IP Office 6.1

IP Office Installation

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Contents

1. System Overview

1.1 Control Units ... 11
1.2 IP500v2 System Components ... 12
1.3 IP500 Office System Components ... 14
1.4 IP400 Office System Components ... 16
1.5 Control Unit Cards ... 18
1.5.1 IP500 Base Cards ... 18
1.5.2 IP500 Trunk Cards ... 20
1.5.3 IP400 Trunk Cards ... 22
1.5.4 Other Cards ... 24
1.6 External Expansion Modules ... 26
1.6.1 IP500 External Expansion Modules ... 29
1.6.2 IP400 External Expansion Modules ... 30
1.7 Power Supplies and Cables ... 32
1.7.1 Power Supplies ... 32
1.7.2 Power Supply Cords ... 33
1.7.3 Power Supply Backup ... 34
1.7.4 Cabling and Cables ... 35
1.7.5 Grounding ... 37
1.7.6 Lightning Protection/Out-of-Building Connections ... 38
1.8 Wall and Rack Mounting ... 39
1.9 Feature Keys and Licenses ... 41
1.10 IP Office Phones ... 43
1.11 VoIP ... 44
1.11.1 Voice Compression Channels ... 45
1.12 Supported Country Locales ... 46
1.13 IP Office Software Applications ... 48
1.14 Training ... 51
1.15 Web Sites ... 51
1.16 Emergency and Power Failure Ports ... 52
1.17 PARTNER Version ... 52
1.18 NORSTAR Version ... 52

2. Installation Requirements

2.1 Environmental Requirements ... 56
2.2 Space Requirements ... 57
2.2.1 IP500 and IP500v2 Control Units ... 57
2.2.2 IP500 Expansion Modules ... 58
2.2.3 IP400 Control Units and Expansion Modules ... 58
2.2.4 Wall Mounting ... 59
2.2.5 Rack Space Requirements ... 60

3. IP Office Administration Software

3.1 Installing the Admin Applications ... 65
3.2 Installer PC Connection ... 67
3.3 Starting Manager ... 68
3.4 Starting System Status ... 69
3.5 Starting Monitor ... 70

4. IP500v2 Installation

4.1 Tools and Equipment Required ... 73
4.2 Documentation ... 74
4.3 Unpacking ... 75
4.4 SD Card Preparation ... 76
4.4.1 Upgrade the Card Firmware ... 76
4.4.2 Adding a Pre-Built Configuration File ... 76
4.4.3 Creating a Configuration File ... 77
4.4.4 Adding a License File ... 78
4.4.5 Adding Music on Hold Files ... 78
4.4.6 Adding a 9600 Series Screen Saver File ... 78
4.5 IP500 Card Installation ... 79
4.5.1 IP500 Daughter Card Preparation ... 80
4.5.2 IP500 Legacy Card Preparation ... 81
4.5.3 IP500 Card Insertion ... 82
4.6 Wall Mounting ... 83
4.7 Rack Mounting ... 84
4.8 Connecting External Expansion Modules ... 86
4.9 Grounding ... 88
4.10 Network Connection ... 89
4.11 Starting the System ... 90
4.12 Checking the LEDs ... 91
4.13 Connecting Phones ... 92

5. Initial Configuration

5.1 Default Configuration ... 95
5.2 Changing the Default Passwords ... 96
5.3 Changing the IP Address Settings ... 98
5.4 Entering Licenses ... 99
5.5 Disable Unused Trunks ... 100
5.6 Setting the Digital Trunk Clock Source ... 102
5.7 Setting the Trunk Prefixes ... 104

6. Additional Processes

6.1 Switching Off an IP Office System ... 109
6.2 Rebooting an IP Office System ... 111
6.3 Memory Card Removal ... 112
6.4 Changing Components ... 114
6.5 Swapping Extension Users ... 116
6.6 Changing Extension Numbers ... 117
6.7 Upgrading the IP Office Software ... 119
6.7.1 Using the Upgrade Wizard ... 120
6.7.2 Using an SD Card ... 122
6.8 Out of Building Telephone Installations ... 123
6.8.1 DS Phones ... 124
6.8.2 Analog Phone Barrier Box ... 125
6.8.3 Rack Mounting Barrier Boxes ... 126
6.9 Using the External Output Port ... 127
6.9.1 Port Connection ... 127
6.10 So8 BRI Module ... 128
6.10.1 Example 1: ISDN Terminal ... 128
6.10.2 Example 2: Video Conference ... 129
6.11 SNMP ... 131
6.11.1 Installing the IP Office MIB Files ... 132
6.11.2 Enabling SNMP and Polling Support ... 134
6.11.3 Enabling SNMP Trap Sending ... 134
6.12 DTE Port Maintenance ... 135
6.12.1 DTE Port Settings ... 135
6.12.2 Erasing the Configuration ... 135
6.12.3 Defaulting Security Settings ... 138
6.12.4 Erasing the Operational Firmware ... 139
6.13 Reset Button ... 141
6.14 AUX Button ... 141
6.15 Creating a WAN Link ... 142

7. SD Card Management

7.1 Booting from the SD Cards 147
7.2 Creating an IP Office SD Card 149
7.3 Viewing the Card Contents 150
7.4 Backing Up the System SD Card 151
7.4.1 Backing Up the Primary Folder 151
7.4.2 Restore from the Backup Folder 152
7.4.3 Backing Up to the Optional Card 153
7.4.4 Restoring from the Optional Card 154
7.5 Upgrading Card Software 156
7.5.1 Upgrading Remotely Using Manager 157
7.5.2 Upgrading the SD Card Locally 157
7.5.3 Upgrading Using an Optional SD Card 158
7.6 Removing SD Cards 159
7.6.1 Card Shutdown 159
7.6.2 Card Startup 160
7.6.3 System Shutdown 161

8. IP500 Basic Installation

8.1 IP500 Tools Required 166
8.2 IP500 Read the Documentation 167
8.3 IP500 Unpacking 168
8.4 IP500 Card Installation 169
8.4.1 IP500 Daughter Card Preparation 170
8.4.2 IP500 Legacy Card Preparation 171
8.4.3 IP500 Card Insertion 172
8.5 Inserting the Feature Key 173
8.6 Applying Power 174
8.7 Check the CPU LED 176
8.8 Upgrading the Core Software 177
8.9 Receiving the Configuration 178
8.10 Adding Licences 179
8.11 Adding External Expansion Modules 180
8.12 Rack Mounting 182
8.13 Wall Mounting 184
8.14 Grounding 185

9. IP400 Basic Installation

9.1 Unpacking 188
9.2 Control Unit Power Up 189
9.3 Connecting the Manager PC 191
9.4 Receiving a Configuration (Pre 3.2) 192
9.5 Using Monitor 193
9.6 Fitting VCM Cards 194
9.7 Fitting Modem Cards 196
9.8 Fitting Trunk Cards 198
9.9 Rack Mounting 201
9.10 Adding Expansion Modules 203
9.11 Adding a WAN3 Module 205
9.12 Grounding 207

10.System Components

10.1 Control Units 212
10.1.1 IP500v2 213
10.1.2 IP500 215
10.1.3 IP412 218
10.1.4 IP406 V2 220
10.1.5 IP406 V1 222
10.1.6 IP403 224
10.1.7 Small Office Edition (SOE) 226
10.1.8 IP401 Control Unit 228
10.2 IP500 Base Cards 229
10.2.1 Analog Phone 231
10.2.2 Digital Station 233
10.2.3 Legacy Card Carrier 234
10.2.4 VCM 235
10.2.5 4-Port Expansion Card 237
10.2.6 ETR6 Card 238
10.2.7 ATM Combination Card 240
10.2.8 BRI Combination Card 242
10.3 IP500 Trunk Daughter Cards 243
10.3.1 Analog Trunk Card 245
10.3.2 BRI Trunk Cards 246
10.3.3 PRI Trunk Cards 247
10.4 IP500 Expansion Modules 248
10.4.1 Analog Trunk 16 249
10.4.2 BRI SO8 251
10.4.3 Digital Station 253
10.4.4 Phone 255
10.5 Feature Keys 257
10.5.1 IP500v2 System SD Cards 257
10.5.2 IP500 Smart Card 257
10.5.3 IP400 Serial Port Feature Key 258
10.5.4 IP400 Parallel Port feature Key 258
10.5.5 IP400 USB Port feature Key 258
10.6 IP400 Trunk Cards 259
10.6.1 Analog Trunk Card Uni (ATM4U) 261
10.6.2 Analog Trunk Cards (ATM4) 262
10.6.3 BRI Trunk Cards 262
10.6.4 T1 PRI Trunk Cards 263
10.6.5 E1 PRI Trunk Cards 263
10.6.6 E1R2 PRI Trunk Cards 264
10.7 IP400 Internal Cards 265
10.7.1 Modem Cards 265
10.7.2 Embedded Voicemail Memory Cards 265
10.7.3 Voice Compression Modules 266
10.8 IP400 Expansion Modules 267
10.8.1 Analog Trunk 16 269
10.8.2 Digital Station V2 271
10.8.3 Digital Station 273
10.8.4 Phone V2 275
10.8.5 Phone 277
10.8.6 So8 279
10.8.7 WAN3 10/100 281
10.9 Mounting Kits 283
10.9.1 IP500 Wall Mounting Kit 283
10.9.2 IP500 Rack Mounting Kit 283
10.9.3 IP400 Rack Mounting Kit 284
10.9.4 Barrier Box Rack Mounting Kit 284
10.10 Phones 285
10.10.1 1010/1040 286
10.10.2 1120/1140/1220/1230 287
10.10.3 1403 288
10.10.4 1408 289
10.10.5 1416 290
10.10.6 1603 291

10.10.7 1608 ... 293
10.10.8 1616 ... 295
10.10.9 2402 ... 297
10.10.10 2410 ... 298
10.10.11 2420 ... 299
10.10.12 3616 ... 300
10.10.13 3620 ... 301
10.10.14 3626 ... 302
10.10.15 3641 ... 303
10.10.16 3645 ... 304
10.10.17 3701 ... 305
10.10.18 3711 ... 306
10.10.19 3720 ... 307
10.10.20 3725 ... 308
10.10.21 3810 ... 309
10.10.22 3910 ... 310
10.10.23 3920 ... 310
10.10.24 4406 ... 311
10.10.25 4412 ... 312
10.10.26 4424 ... 313
10.10.27 4601 ... 314
10.10.28 4602 ... 315
10.10.29 4610 ... 316
10.10.30 4620 ... 317
10.10.31 4621 ... 318
10.10.32 4625 ... 319
10.10.33 5402 ... 320
10.10.34 5410 ... 321
10.10.35 5420 ... 322
10.10.36 5601 ... 323
10.10.37 5602 ... 325
10.10.38 5610 ... 326
10.10.39 5620 ... 327
10.10.40 5621 ... 328
10.10.41 6408D ... 329
10.10.42 6416D ... 330
10.10.43 6424D ... 331
10.10.44 9620L, 9620C ... 332
10.10.45 9630G ... 334
10.10.46 9640, 9640G ... 336
10.10.47 9650, 9650C ... 338
10.10.48 ETR 6, ETR 6D ... 340
10.10.49 ETR 18, ETR 18D ... 341
10.10.50 ETR 34D ... 342
10.10.51 T3 Classic ... 343
10.10.52 T3 Comfort ... 344
10.10.53 T3 Compact ... 345
10.11 Phone Add-Ons ... 346
10.11.1 4450 ... 347
10.11.2 BM32, DBM32 ... 348
10.11.3 EU24 ... 349
10.11.4 EU24BL ... 350
10.11.5 T3 DSS ... 351
10.11.6 SMB24 ... 352
10.11.7 201B RIM ... 353
10.11.8 XM24 ... 354
10.12 Applications ... 355
10.12.1 IP Office Application Server ... 355
10.12.2 ContactStore ... 356
10.12.3 Customer Call Reporter (CCR) ... 357
10.12.4 Manager ... 358
10.12.5 Monitor ... 359
10.12.6 one-X Portal for IP Office ... 360
10.12.7 Phone Manager ... 361
10.12.8 SoftConsole ... 363
10.12.9 System Status Application (SSA) ... 364
10.12.10 TAPI ... 365
10.12.11 Voicemail Pro ... 366
10.12.12 Operating System Summary ... 368
10.12.13 IP Office Ports ... 370
10.13 Physical Ports ... 373
10.13.1 Cables ... 374
10.13.2 ANALOG Port ... 376
10.13.3 AUDIO Port ... 376
10.13.4 BRI Port (So) ... 377
10.13.5 BRI Port (To) ... 378
10.13.6 DC I/P Port ... 379
10.13.7 DS Ports ... 379
10.13.8 EF Port ... 380
10.13.9 RS232 DTE Port ... 380
10.13.10 ETR Port ... 380
10.13.11 EXPANSION Port ... 381
10.13.12 EXT O/P Port ... 381
10.13.13 LAN Port ... 382
10.13.14 PF Port ... 383
10.13.15 PHONE (POT) Port ... 384
10.13.16 PRI Port ... 385
10.13.17 WAN Port ... 386
10.13.18 V.24 WAN Cable ... 387
10.13.19 V.35 WAN Cable ... 388
10.13.20 X.21 WAN Cable ... 389
10.14 Licences ... 390
10.14.1 System Edition Licenses ... 392
10.14.2 Trunk Licensing ... 393
10.14.3 Telephone/Endpoint Licenses ... 394
10.14.4 User Licenses ... 395
10.14.5 Voicemail Pro Licenses ... 397
10.14.6 Customer Call Reporter Licenses ... 399
10.14.7 Trial Licenses ... 401
10.14.8 Other Licenses ... 402

11. Safety Statements

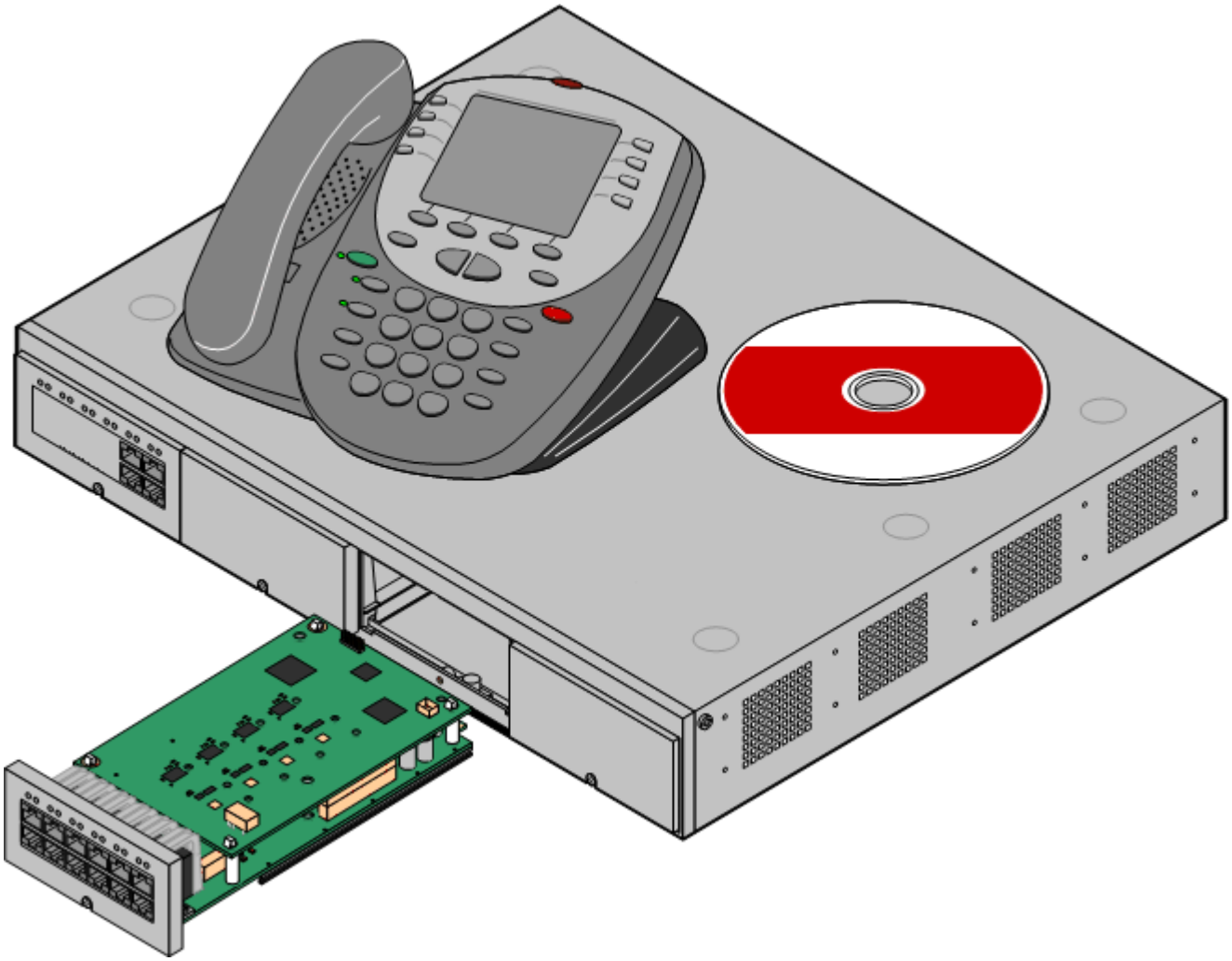
11.1 Lithium Batteries ... 404
11.2 Lightning Protection/Hazard Symbols ... 404
11.3 Trunk Interface Modules ... 405
11.4 Further Information and Product Updates ... 406
11.5 Port Safety Classification ... 406
11.6 EMC Directive ... 407
11.7 Regulatory Instructions for Use ... 408
11.7.1 Australia ... 408
11.7.2 Canada ... 408
11.7.3 China ... 409
11.7.4 European Union ... 410
11.7.5 New Zealand ... 410
11.7.6 FCC Notification ... 411
11.7.7 Compliance with FCC Rules ... 413

Index 415

Chapter 1.
System Overview

1. System Overview

This documentation is intended to assist with the installation of the core components of an Avaya IP Office telephone system. It describes those components and factors that should be considered for an installation.



- The IP Office is a converged voice and data communications system. It should therefore only be installed by persons with telephony and IP data network experience.
- Installers must be trained on IP Office systems. Through its Avaya University 51 (AU), Avaya provides a range of training courses including specific IP Office implementation and installation training. It also provides certification schemes for installers to achieve various levels of IP Office accreditation.
- It is the installer's responsibility to ensure that all installation work is done in accordance with local and national regulations and requirements. It is also their responsibility to accurately establish the customer's requirements before installation and to ensure that the installation meets those requirements.
- You should read and understand this documentation before installation. You should also obtain and read the Avaya Technical Bulletins relevant to recent IP Office software and hardware releases to ensure that you are familiar with any changes to the IP Office equipment and software.

Additional Documentation

The following components of IP Office are outside the range of a basic IP Office installation. They are covered by separate installation and configuration documentation. If those components are to be part of the IP Office system installation, that documentation should be obtained, read and understood prior to the installation.

- Partner Version Installation
- one-X Portal for IP Office Installation
- 4600/5600 Series IP Phone Installation.
- Embedded Voicemail Installation.
- Voicemail Pro Installation.
- Contact Store Installation.
- Compact DECT Installation.
- IP DECT R4 Installation.
- 3600 Series Wireless IP Installation.
- Phone Manager Installation Manual.
- SoftConsole Installation Manual.
- SIP Extension Configuration

- IP Office Technical Bulletins
  Ensure that you have obtained and read the IP Office Technical Bulletin relating to the IP Office software release which you are installing. This bulletin will contain important information that may not have been included in this manual. IP Office Technical Bulletins are available from the Avaya support website *(http://support.avaya.com)*.
- Upgrade Licenses
  Some upgrades may require entry of upgrade licenses.

Equipment Availability

SAP codes and details of specific items within this documentation are for reference only. Items available in any specific locale should be confirmed against the local Avaya IP Office price list for that locale. The local price list may also include additional items relative to the installation requirements of that locale.

This documentation covers the equipment supported by IP Office Release 6. That includes equipment supported but no longer available as new from Avaya.

Repair

IP Office systems do not contain any user serviceable or repairable components. If a faulty unit is suspected the whole unit should be replace.

- IP400 control units should only be opened where indicated for the installation of IP400 cards.
- IP500 control units should not be opened under any circumstances.

RoHS

RoHS is a European Union directive for the Removal of Certain Hazardous Substances from Electrical and Electronic Equipment. Similar legislation has been or is being introduced in a number of other countries. Avaya has decided to make its global product range compliant with the requirements of RoHS.

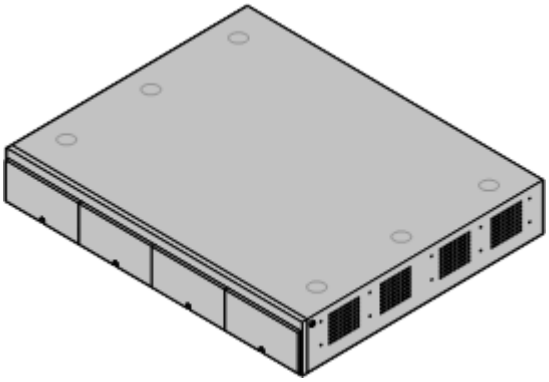
The actions taken vary

- In some cases equipment has been discontinued and is no longer available from Avaya.
- In some cases new manufactured stock has been made RoHS compliant and keeps its existing SAP code.
- In other cases the equipment has been replaced by a new RoHS compliant alternative with new SAP codes.
- The SAP codes within this document are for RoHS compliant equipment unless otherwise stated.

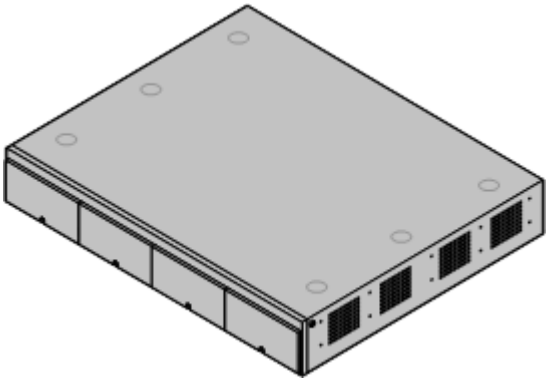
1.1 Control Units

The base of any IP Office system is the system or control unit. It stores the system configuration and controls the system operation. Each control unit can be customized by adding various internal cards 24 such as trunk cards. External expansion modules can be also be connected to add additional extension and trunk ports.

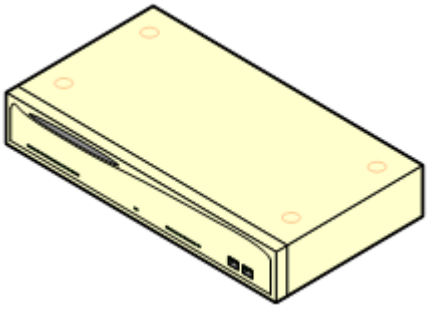
IP Office Release 6 supports the following IP Office control units.



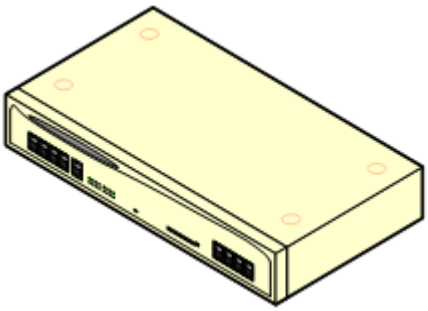
- IP500v2 Control Unit 213
  This control unit has four front slots for IP500 base cards. It has an internal power supply unit and uses a mandatory SD card Feature Key dongle. It includes a 2 port ethernet LAN switch (layer 3 managed) on the rear.



- IP500 Control Unit 215
  This control unit has four front slots for IP500 base cards. It has an internal power supply unit and uses a mandatory smart card Feature Key dongle. It includes a 2 port ethernet LAN switch (layer 3 managed) on the rear.



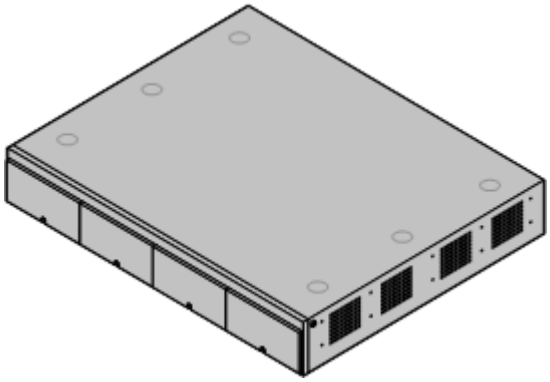
- IP412 Control Unit 220
  This unit supports 2 IP400 trunk cards of any type. Up to 12 external expansion modules can be added plus 2 WAN3 10/100 modules. It includes a 2 port ethernet LAN switch (layer 3 managed).



- IP406 V2 Control Unit 220
  This unit supports up to 6 external expansion modules plus 2 WAN3 10/100 modules. It supports 2 IP400 trunk cards of all types though only one may be a dual PRI trunk card. The unit has 8 Avaya digital DS 379 phone ports and 2 analog 376 phone ports plus an 8 port ethernet LAN switch (layer 2 unmanaged).

1.2 IP500v2 System Components

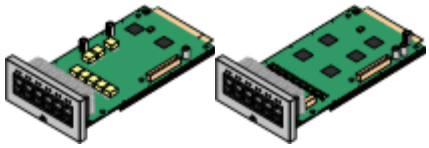
The following are the typical components of an IP Office system based on an IP500v2 control unit.



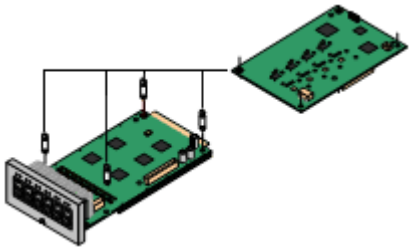
- IP Office IP500v2 System Unit 213
  The control unit holds the main configuration and performs the routing and switching for telephone calls and data traffic. Each control unit includes 4 slots for optional base cards to support trunk and phone extension ports.
  - Avaya SD Card 41
    This uniquely numbered dongle is used to validate license keys entered into the system's configuration to enable features. For IP500v2 control units, a dongle is mandatory for correct system operation even if no licensed features are being used. IP500v2 control units use an Avaya SD card which is slotted into the rear of the control unit. This card also provides embedded voicemail support and storage for system software files.

VK00nDd15SDvXoxkw9cR9x_jOXr_AWz9

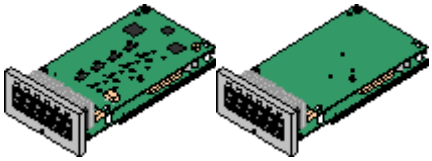
- License Keys 401
  Various IP Office features and applications require a license key to be entered into the system's configuration. Each key is a 32-character text string unique to the feature being activated and the serial number of the Feature Key dongle installed in the system.



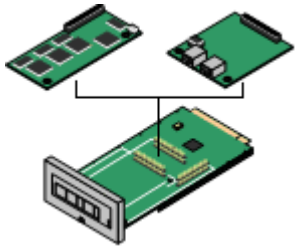
- IP500 Base Cards 18
  The IP500 control unit has slots for up to 4 IP500 base cards. These can be used to add analog extension port, digital extension ports, voice compression channels and some legacy IP400 cards.
  - IP500 Digital Station Base Card 233
  - IP500 Analog Phone Base Card 231
  - IP500 VCM Base Card 235
  - IP500 Legacy Card Carrier 234
  - IP500 4-Port Expansion Base Card 237
  - IP500 ETR6 Base Card 238



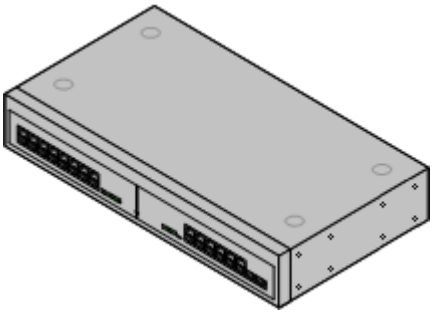
- IP500 Trunk Daughter Cards 20
  Many of the IP500 base cards can be fitted with an IP500 daughter card in order to support various types of trunk connections.
  - IP500 Analog Trunk Card 245
  - IP500 BRI Trunk Card 246
  - IP500 PRI Trunk Card 247



- IP500 Combination Cards 18
  These card are pre-paired base and daughter cards. They provide 6 digital station ports, 2 analog phone ports, 10 VCM channels and either 4 analog trunk ports or 4 BRI channels (2 ports). The trunk daughter card cannot be removed or replaced with another type.



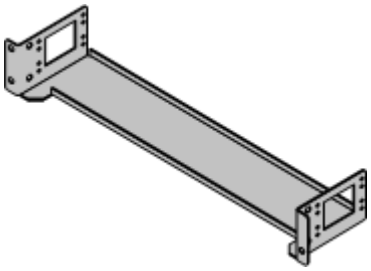
- IP400 Cards 22
  The IP500 Legacy Carrier base card can be used to allow IP400 trunk cards and IP400 VCM cards to be added to the IP500 control unit.



- IP500 External Expansion Modules 26
  Additional analog and digital extension ports can be added using a number of IP500 external expansion modules.
  - If an IP500 4-Port Expansion Base Card is fitted then up to 12 external expansion modules are supported.
  - Support includes IP400 external expansion modules 30 except for WAN3 modules.

- Power Supplies 32
  The IP500 control unit has an internal power supply unit. Each external expansion module is supplied with an external power supply unit. Additional power supply units may also be required for IP phones and some phone add-ons.
- Power Cords 33
  Depending on the locale, different power cords need to be ordered for each control unit, external expansion module and any phones or devices using external power supply units.

- Cables 35
  The IP Office is designed primarily for connection to a structured cabling system using CAT3 UTP cabling. This approach allows telephone and data traffic to share the same wiring infrastructure and simplifies equipment moves.



- Mounting Kits 39
  The control unit can be used free-standing, with external expansion modules stacked above it. With optional rack mounting kits, the control unit and external expansion modules can also be rack mounted. Alternatively with an optional wall mounting kit the IP500 control unit can be wall mounted. However it cannot support any external expansion modules when wall mounted.

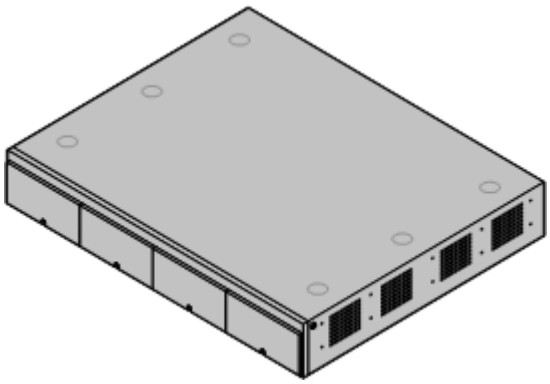
- Surge Protectors and Barrier Boxes 38
  Where the installation includes extensions in other buildings additional protective equipment is required. This equipment may also be required in areas where the lightning risk is high.

- Phones 43
  IP Office systems support a variety of Avaya digital and IP phones plus analog phones.

- Application DVDs
  The IP Office applications can be ordered on a number of DVDs. In addition they can be downloaded from the IP Office section of the Avaya support web site (*http://support.avaya.com*).

1.3 IP500 Office System Components

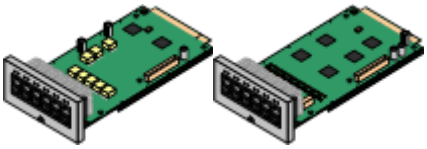
The following are the typical components of an IP Office system based on an IP500 control unit.



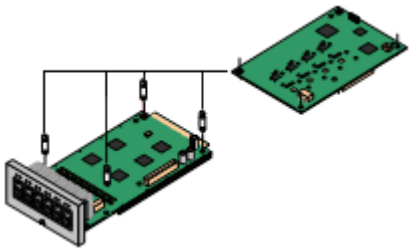
- IP Office IP500 Control Unit 11
  The control unit holds the main configuration and performs the routing and switching for telephone calls and data traffic. Each control unit includes 4 slots for optional base cards to support trunk and phone extension ports.
  - Feature Key Dongle 41
    This uniquely numbered dongle is used to validate license keys entered into the system's configuration to enable features. For IP500 control units, a dongle is mandatory for correct system operation even if no licensed features are being used. IP500 control units use a Smart Card which is slotted into the rear of the control unit.

VK00nDd15SDvXoxkw9cR9x_jOXr_AWz9

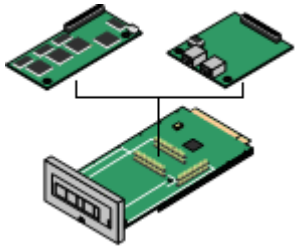
- License Keys 40
  Various IP Office features and applications require a license key to be entered into the system's configuration. Each key is a 32-character text string unique to the feature being activated and the serial number of the Feature Key dongle installed in the system.



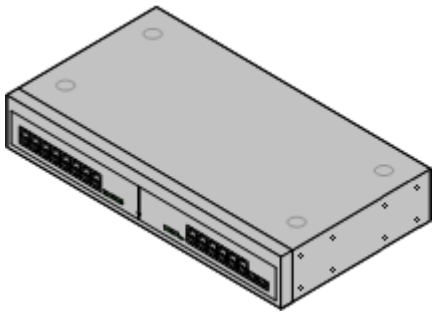
- IP500 Base Cards 18
  The IP500 control unit has slots for up to 4 IP500 base cards. These can be used to add analog extension port, digital extension ports, voice compression channels and some legacy IP400 cards.
  - IP500 Digital Station Base Card 233
  - IP500 Analog Phone Base Card 231
  - IP500 VCM Base Card 235
  - IP500 Legacy Card Carrier 234
  - IP500 4-Port Expansion Base Card 237
  - IP500 ETR6 Base Card 238



- IP500 Trunk Daughter Cards 20
  Many of the IP500 base cards can be fitted with an IP500 daughter card in order to support various types of trunk connections.
  - IP500 Analog Trunk Card 245
  - IP500 BRI Trunk Card 246
  - IP500 PRI Trunk Card 247



- IP400 Cards 22
  The IP500 Legacy Carrier base card can be used to allow IP400 trunk cards and IP400 VCM cards to be added to the IP500 control unit.

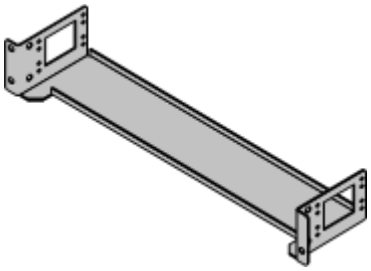


- IP500 External Expansion Modules 26
  Additional analog and digital extension ports can be added using a number of IP500 external expansion modules.
  - If an IP500 4-Port Expansion Base Card is fitted then up to 12 external expansion modules are supported.
  - Support includes IP400 external expansion modules 30 except for WAN3 modules.

- Power Supplies 32
  The IP500 control unit has an internal power supply unit. Each external expansion module is supplied with an external power supply unit. Additional power supply units may also be required for IP phones and some phone add-ons.

- Power Cords 33
  Depending on the locale, different power cords need to be ordered for each control unit, external expansion module and any phones or devices using external power supply units.

- Cables 35
  The IP Office is designed primarily for connection to a structured cabling system using CAT3 UTP cabling. This approach allows telephone and data traffic to share the same wiring infrastructure and simplifies equipment moves.



- Mounting Kits 39
  The control unit can be used free-standing, with external expansion modules stacked above it. With optional rack mounting kits, the control unit and external expansion modules can also be rack mounted. Alternatively with an optional wall mounting kit the IP500 control unit can be wall mounted. However it cannot support any external expansion modules when wall mounted.

- Surge Protectors and Barrier Boxes 38
  Where the installation includes extensions in other buildings additional protective equipment is required. This equipment may also be required in areas where the lightning risk is high.

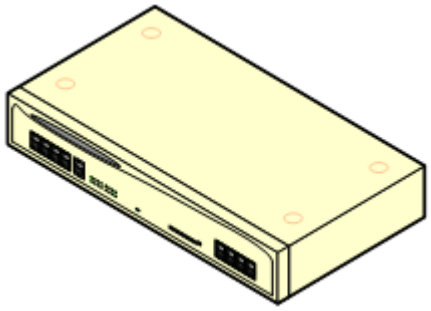
- Phones 43
  IP Office systems support a variety of Avaya digital and IP phones plus analog phones.

- Application DVDs
  The IP Office applications can be ordered on a number of DVDs. In addition they can be downloaded from the IP Office section of the Avaya support web site (*http://support.avaya.com*).

- Embedded Voicemail Memory Card 24
  This optional card can be used to support embedded voicemail.

1.4 IP400 Office System Components

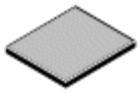
The following are the typical components of an IP Office system based on an IP412 or IP406 V2 control unit.



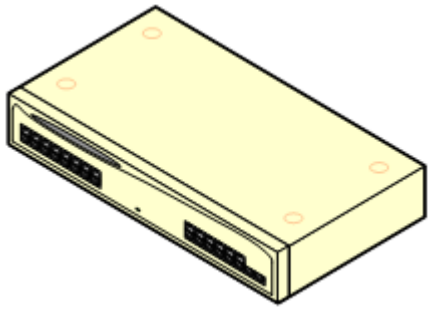
- IP Office IP400 Control Unit
  The control unit holds the main configuration and performs the routing and switching for telephone calls and data traffic. Each control unit includes LAN ports, slots for additional internal cards and in some cases integral digital and analog phone ports. IP Office Release 6 supports the following IP400 control units:
  - IP406 V2 220
    Includes 8 integral digital extension (DS 379) ports, 2 analog phone ports and an 8 port ethernet LAN switch. Can be expanded by the addition of up to 6 external expansion modules 26.
  - IP412 218
    Includes a 2 port ethernet switch. Can be expanded by the addition of up to 12 external expansion modules 26.

- Trunk Cards 22
  Each IP400 control unit supports the addition of two IP400 trunk cards.

- Internal Cards 24
  Additional cards can be added to the IP400 control units for features such as modem ports and voice compression channels (used for VoIP).



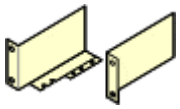
- Embedded Voicemail Memory Card 24
  The IP460 V2 supports IP Office embedded voicemail by the addition of an Embedded Voicemail memory card.



- IP400 External Expansion Modules 26
  Additional extension and trunk ports can be added using a number of external expansion modules. The number supported depends on the control unit type and the module type.

- Power Supplies 32
  Each IP400 Office control unit and external expansion module is supplied with an external power supply unit. Additional power supply units may also be required for IP phones and some phone add-ons.
- Power Cords 33
  Depending on the locale, different power cords need to be ordered for each control unit, external expansion module and any phones or devices using external power supply units.

- Cables 35
  The IP Office is designed primarily for connection to a structured cabling system using CAT3 UTP cabling. This approach allows telephone and data traffic to share the same wiring infrastructure and simplifies equipment moves.



- IP400 Rack Mounting Kit 39
  The IP400 control units and expansion modules are designed to be stacked free-standing. However they can also be rack mounted using an optional rack mounting kit for each unit and module.

- Surge Protectors and Barrier Boxes 38
  Where the installation includes extensions in other buildings additional protective equipment is required. This equipment may also be required in areas where the lightning risk is high.

- Phones 43
  IP Office systems support a variety of Avaya digital and IP phones plus analog phones.

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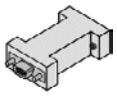
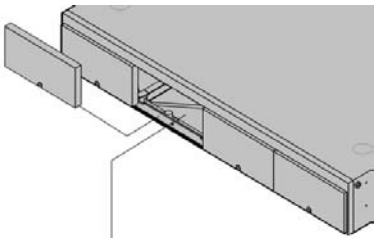


- License Keys 390
  Various IP Office features and applications require a license key to be entered into the system's configuration. Each key is a 32-character text string unique to the feature being activated and the serial number of the Feature Key dongle (see below) installed in the system.
- Feature Key Dongle 41
  A uniquely numbered dongle used to validate license keys entered into the systems configuration to activate features. For IP Office Release 6 only the serial port Feature Key dongle which attaches to the control unit is supported.
- Application DVDs
  The IP Office applications can be ordered on a number of DVDs. In addition they can be downloaded from the IP Office section of the Avaya support web site (http://support.avaya.com).

1.5 Control Unit Cards

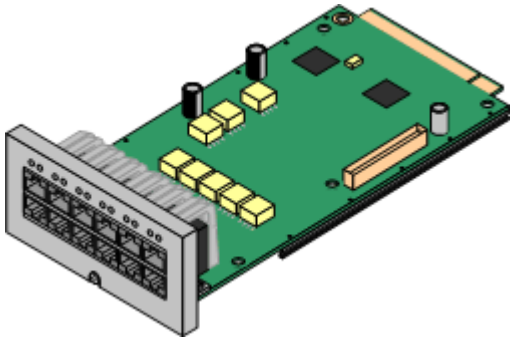
1.5.1 IP500 Base Cards



The IP500 and IP500v2 control units have 4 slots for the insertion of base cards. The slots are numbered 1 to 4 from left to right. Normally they can be used in any order, however if the capacity for a particular type of card is exceeded, the card in the rightmost slot will be disabled.

Each base card includes an integral front panel with ports for cable connections. Typically the first 8 ports on the left are for connection of extension devices. The 4 ports on the left are used for connection of trunks if a trunk daughter card 20 is added to the base card.

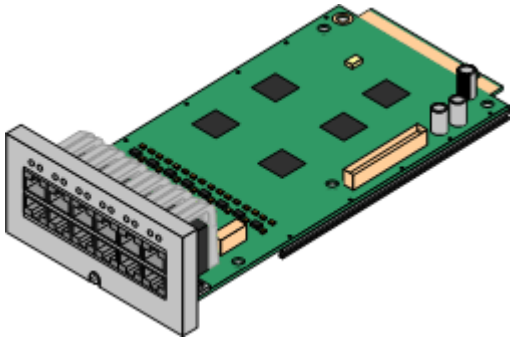
IP500 Digital Station Base Card 233



This card provides 8 DS (digital station) ports for the connection of Avaya digital phones other than IP phones.

- The card can be fitted with an IP500 trunk daughter card which uses the base card ports for trunk connection.
- Maximum: 3 per control unit.
- 4400 Series phones (4406D, 4412D and 4424D) are not supported on this card. They are supported on an external expansion module.

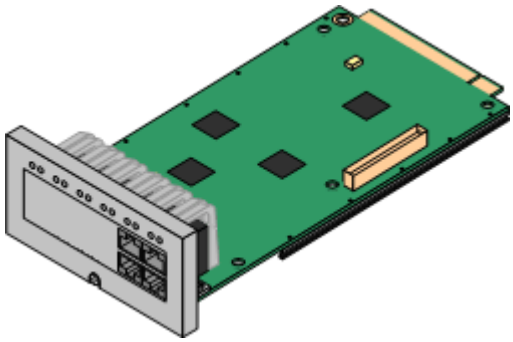
IP500 Analog Phone Base Card 231



The card is available in two variants, supporting either 2 or 8 analog phone ports.

- The card can be fitted with an IP500 trunk daughter card 20 which uses the base card ports for trunk connection.
- Maximum: 4 per control unit.
- The analog phone ports do not include a ringing capacitor. Where this is a requirement, connection should be via a Master socket containing ringing capacitors.
- If fitted with an IP500 Analog Trunk daughter card, during power failure phone port 8 is connected to analog trunk port 12.

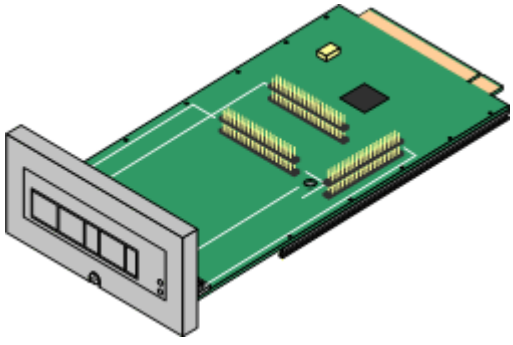
IP500 VCM Base Card 235



This card is available in variants supporting either 32 or 64 voice compression channels 45 for use with VoIP calls.

- The card can be fitted with an IP500 trunk daughter card 20 which uses the base card ports for trunk connection.
- Maximum: 2 per control unit.

IP500 Legacy Card Carrier Base Card 234

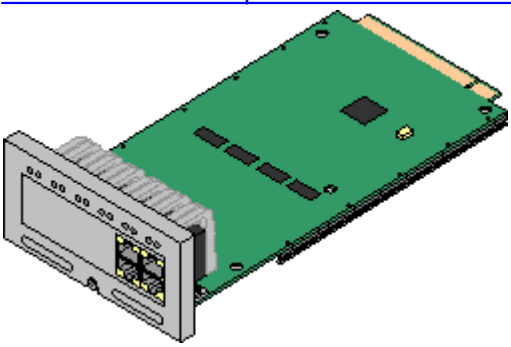


This card allows various IP400 trunk cards 22 and IP400 VCM cards 25 to be used. The front of the card includes panels that can be removed to match the trunk card fitted.

- This card does not accept any IP500 trunk daughter card.
- Maximum: 2 per control unit.
- IP400 Cards Supported: The following cards are supported.

✓ PRI T1	✓ PRI 30 E1R2 RJ45	✓ VCM 4
✓ Dual PRI T1	✓ Dual PRI E1R2 RJ45	✓ VCM 8
✓ PRI 30 E1 (1.4)	✓ BRI-8 (UNI)	✓ VCM 16
✓ Dual PRI E1	✓ ANLG 4 Uni (US only)	✓ VCM 24
		✓ VCM 30

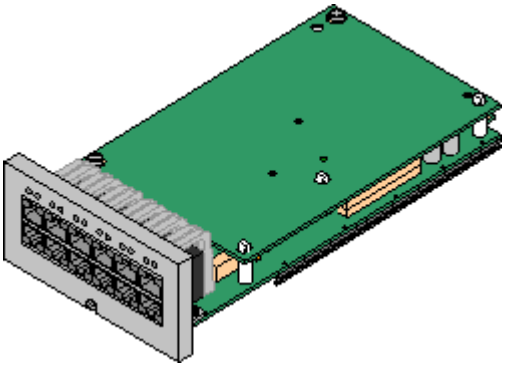
IP500 4-Port Expansion Base Card 237



This card adds an additional 4 expansion ports for external expansion modules. The card is supplied with four 2m yellow interconnect cables.

- This card does not accept any IP500 trunk daughter card.
- Maximum: 1 per control unit (Right-hand slot 4 only).
- Supported Expansion Modules: The following external expansion modules are supported:
  - IP500 Analogue Trunk Module
  - IP500 BRI So Module
  - IP500 Digital Station Module
  - IP500 Phone Module
  - IP400 Digital Station V2 Modules
  - IP400 Phone V2 Modules

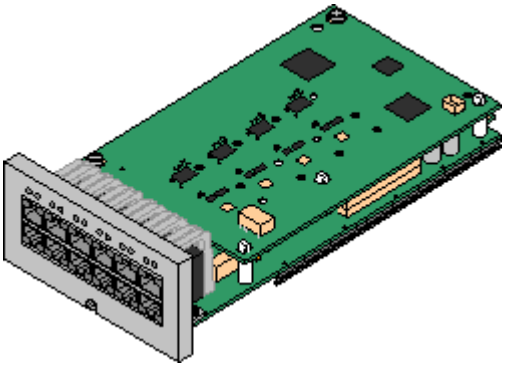
IP500 BRI Combination Card 242



This card provides 6 digital station ports (1-6), 2 analog extension ports (7-8) and 2 BRI trunk ports (9-10, 4 channels). The card also includes 10 VCM channels.

- This card has a pre-installed IP500 BRI trunk daughter card 21.
- Maximum: 2 combination cards of any type per IP500v2 control unit. Not supported by IP500 control units.

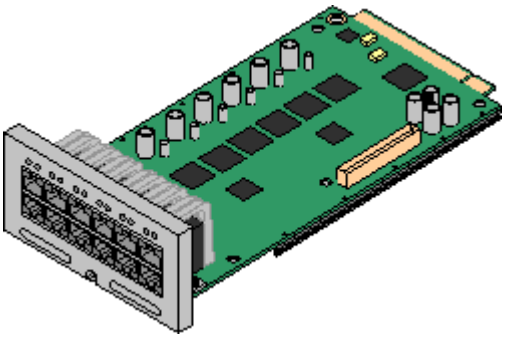
IP500 ATM Combination Card 240



This card provides 6 digital station ports (1-6), 2 analog extension ports (7-8) and 4 analog trunk ports (9-12). The card also includes 10 VCM channels.

- This card has a pre-installed IP500 analog trunk daughter card 21.
- Maximum: 2 combination cards of any type per IP500v2 control unit. Not supported by IP500 control units.
- The analog phone ports do not include a ringing capacitor. Where this is a requirement, connection should be via a Master socket containing ringing capacitors.
- If fitted with an IP500 Analog Trunk daughter card, during power failure phone port 8 is connected to analog trunk port 12.

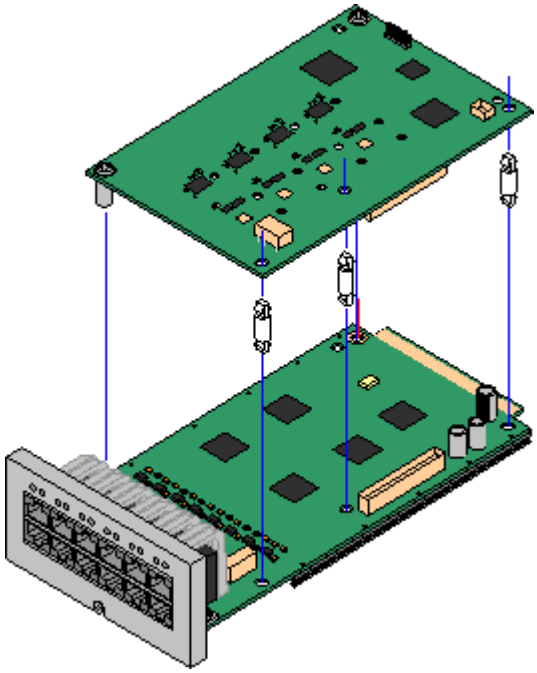
IP500 ETR6 Base Card 238



This card is only supported in an IP500v2 control unit running in Partner Version mode. It provides 6 ETR ports for connection of ETR phones. 2 Analog extension ports are also provided for emergency use only with an analog trunk card.

- The card can be fitted with an IP500 trunk daughter card which uses the base card ports for trunk connection.
- Maximum: 3 per IP500v2 control unit. Not supported by IP500 control units.
- The analog phone ports do not include a ringing capacitor. Where this is a requirement, connection should be via a Master socket containing ringing capacitors.
- If fitted with an IP500 Analog Trunk daughter card, during power failure phone ports 7 and 8 are connected to analog trunk port 12. However during normal operation analog phone ports 7 and 8 are not useable.

1.5.2 IP500 Trunk Cards

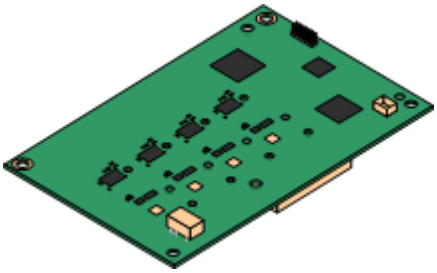


Most IP500 base cards 18 can be fitted with an IP500 trunk daughter cards to support the connection of trunks to the base card.

Each daughter card is supplied with the stand off pillars required for installation and a label to identify the daughter cards presence on the front of the base card after installation.

- IP500 Combination cards are pre-fitted with a trunk daughter card which cannot be removed or changed for another type of trunk daughter card.

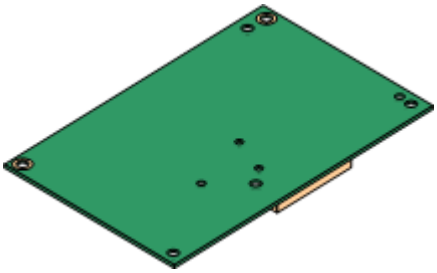
IP500 Analog Trunk Daughter Card 245



This card allows the base card to support 4 analog loop-start trunks.

- The analog phone ports do not include a ringing capacitor. Where this is a requirement, connection should be via a Master socket containing ringing capacitors.
- If fitted with an IP500 Analog Trunk daughter card, during power failure phone port 8 is connected to analog trunk port 12.
- Maximum: 4 per IP500 control unit.

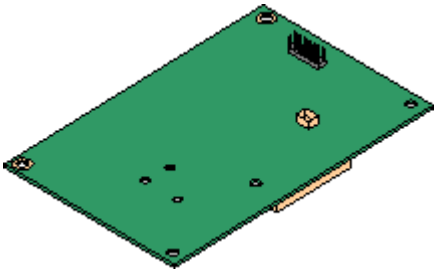
IP500 BRI Trunk Daughter Card 246



This card allows the base card to support up to 4 BRI trunk connections, each trunk providing 2B+D digital channels. The card is available in 2 port (4 channels) and 4 port (8 channels) variants.

- Maximum: 4 per IP500 control unit.
- S-Bus Connection: The card can be switched from To trunk mode to So mode. This mode requires additional terminating resistors and an ISDN crossover cable connection, see BRI Port (So) 377.

IP500 PRI-U Trunk Daughter Card 247



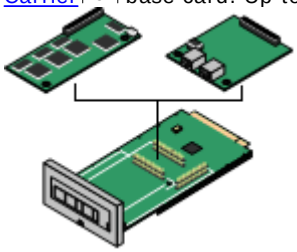
This card allows the base card to support up to 2 PRI trunk connections. The card is available in single and dual port variants. The card can be configured for E1 PRI, T1 robbed bit, T1 PRI or E1R2 PRI trunks.

- Maximum: 4 per IP500 control unit.
- The IP Office system supports 8 unlicensed B-channels on each IP500 PRI-U port fitted. Additional B-channels, up to the capacity of ports installed and PRI mode selected require IP500 Universal PRI (Additional Channels) licenses added to the configuration. These additional channels consume the licenses based on which additional channels are configured as in-service from port 9 of slot 1 upwards. D-channels are not affected by licensing.

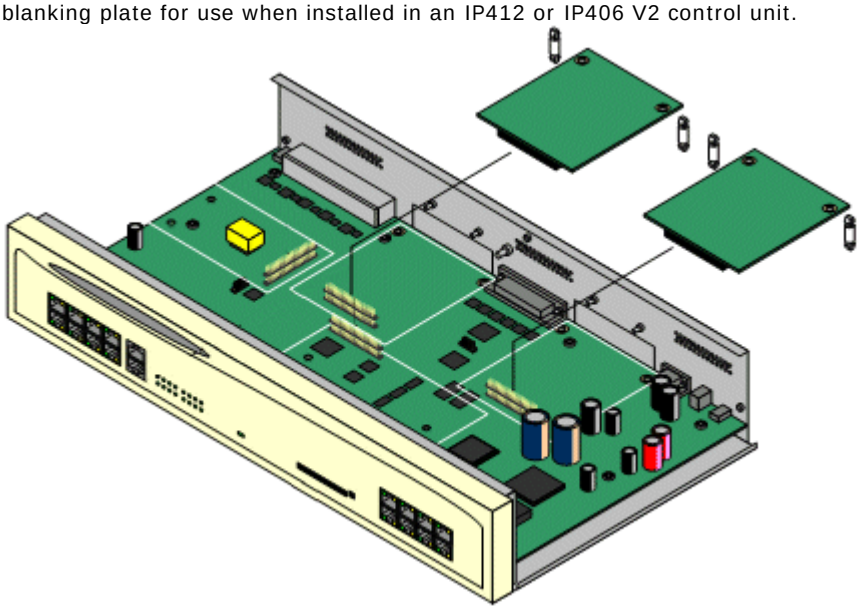
1.5.3 IP400 Trunk Cards

A range of IP400 trunk cards are available for different trunk types. These can be used in IP412 and IP406 V2 control units. Some can also be used in IP500 and IP500v2 control units.

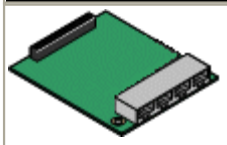
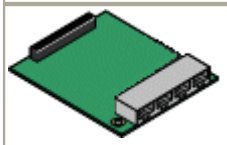
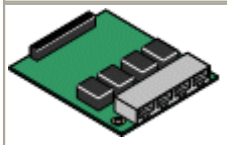
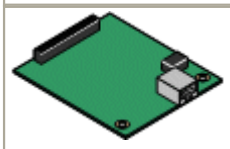
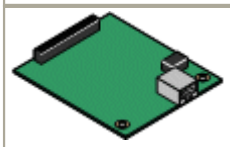
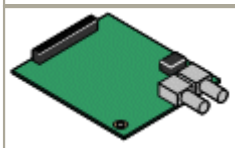
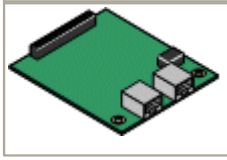
- IP500 and IP500v2 Control Units
  IP400 trunk cards can be used in IP500 and IP500 v2 controls units by being fitted onto an IP500 Legacy Card Carrier 234 base card. Up to 2 cards can be added to the control unit in this way.



- IP400 Control Units
  The IP406 V2 and IP412 can be fitted with up to 2 IP400 trunk cards. Except where otherwise indicated, it is recommended that Slot B is used first. Each IP400 trunk card is supplied with stand off pillars and a replacement blanking plate for use when installed in an IP412 or IP406 V2 control unit.



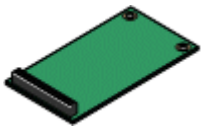
The following IP400 trunk card types are supported by IP Office Release 6:

IP400 Trunk Cards		IP406 V2	IP412	IP500	IP500v2
	Analog Trunk Card (ATM4) 262 Provides 4 RJ45 loop-start analog trunk ports. The card is available in several locale specific variants. This card has been superseded by the ATM4U card below. Additional loop or ground start analog trunks can also be added using Analog Trunk 269 external expansion modules.	✓	✓	✓	✓
	Analog Trunk Card (ATM4U) 261 Provides 4 RJ45 loop-start analog trunk ports as per the ATM4 above but available in a single worldwide variant. Also supports adjustable echo cancellation on IP Office 3.1. Additional loop or ground start analog trunks can also be added using Analog Trunk 269 external expansion modules.	✓	✓	✓	✓
	Quad BRI Trunk Card 262 Provides support for 4 RJ45 BRI (2B+D) trunk ports. These can be configured to ETSI or AusTS013 operation. The ports include 100ohm termination.	✓	✓	✓	✓
	Single PRI T1 Trunk Cards 263 Supports PRI (23B+D) trunks and T1 Robbed-Bit (24B) trunks through a single RJ45 port. The mode of operation is selected in the IP Office configuration.	✓	✓	✓	✓
	Single E1 PRI Trunk Cards 263 Supports PRI (30B+D) trunks through a single RJ45 port. The port can be configured for PRI or QSIG operation.	✓	✓	✓	✓
	Single E1R2 Trunk Cards 264 Supports PRI (30B+D) trunks using E1R2 signaling. Available in coaxial or RJ45 connector variants. Coaxial variants are not supported on an IP500 carrier card.	✓	✓	✓	✓
	Dual PRI Trunk Cards 263 As the single PRI cards above but supporting the connection of two PRI trunks. On the IP406 V2, supported in Slot A only.	✓	✓	✓	✓

1.5.4 Other Cards

Each IP Office control unit can be fitted with a number of internal cards. The cards supported depend on the control unit type.

IP400 Modem Cards

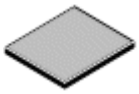


These cards provide modem circuits to answer incoming V.90 analog modem calls.

- For control units fitted with analog trunks, the first analog trunk can be set to answer V.32 analog modem calls without requiring a modem card. Whilst in this mode, the trunk cannot be used for voice calls.

Modem Cards	SAP Code	IP406 V2	IP412	IP500	IP500v2
Internal Modem Card / Modem 12: 265 Provides 12 V.90 modem channels, 4 only in the IP403 control unit.	700343452	✓	✓	–	–
Modem 2 Card: 265 Provides 2 V.90 modem channels.	700185226	✓	✓	–	–

Embedded Voicemail Memory Cards



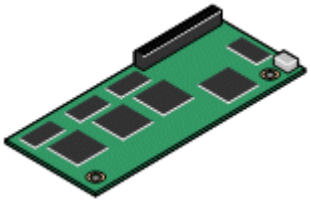
These cards provide message and prompt storage space for embedded voicemail and auto-attendant options. The cards used are specially formatted compact flash cards.

- The IP500v2 control unit uses its SD Feature Key dongle card for embedded voicemail and file storage.

Embedded Voicemail Memory Cards	SAP Code	IP406 V2	IP412	IP500	IP500v2
IP406 V2 Memory Card: 265 Supports a 512MB Compact Flash card. This provides up to 15 hours of uncompressed message storage.	700343460	✓	–	✓	–

- Memory cards in these slots can also be used for storage of files normally obtained via TFTP transfer. For example the music-on-hold .wav file and supported Avaya phone software files. This will however reduce storage space for prompt and message files if embedded voicemail is being used.
- IP Office systems that have downloaded an internal music on hold source can then backup and restore that music on hold to and from the memory card.
- Non-Avaya cards can be used for file storage but will not support Embedded Voicemail.

IP400 Voice Compression Modules



VCM cards are used to provide voice compression channels for calls between IP and non-IP devices, devices being both trunks and extensions. VCM cards with differing numbers of voice compression channels are available.

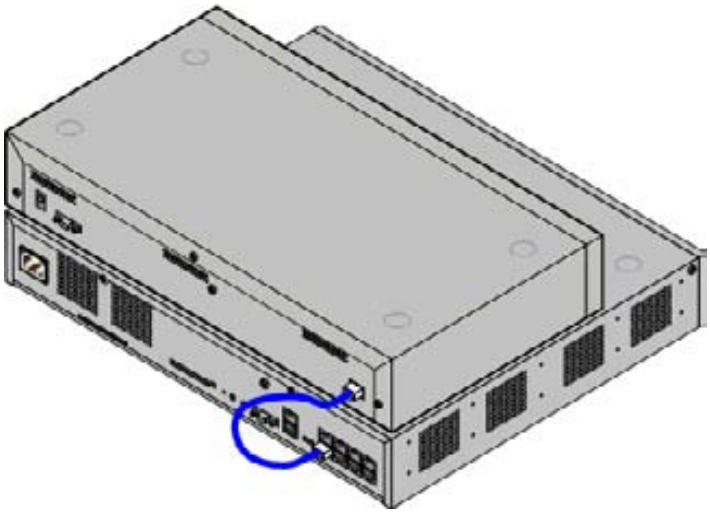
- For IP500 and IP500v2 control units, voice compression channels can be added using combinations of IP400 VCM modules mounted on an IP500 Carrier Card, IP500 VCM cards and IP500 Combination cards.

VCM Cards		SAP Code	IP406 V2	IP412	IP500	IP500v 2
25ms echo cancellation.	IP400 VCM5*	700185119	✓	✓	–	–
	IP400 VCM10*	700185127	✓	✓	–	–
	IP400 VCM20*	700185135	✓	✓	–	–
	IP400 VCM30	700293939	✓	✓	✓	✓
64ms echo cancellation.	IP400 VCM4	700359854	✓	✓	✓	✓
	IP400 VCM8	700359862	✓	✓	✓	✓
	IP400 VCM16	700359870	✓	✓	✓	✓
	IP400 VCM24	700359888	✓	✓	✓	✓
Number of IP400 VCM cards.			1	2	2	2
Maximum number of channels.			30	60	128	148

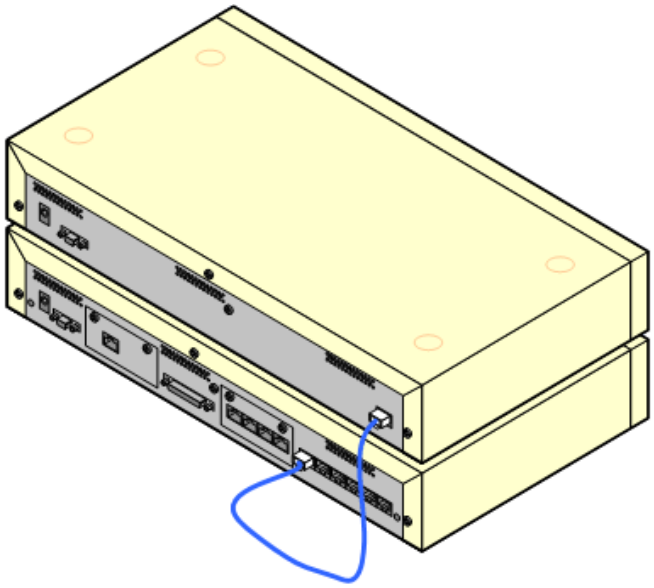
- *These modules are still supported but are no longer available from Avaya.

1.6 External Expansion Modules

These modules can be used to add additional ports to an IP400 and IP500 systems. The number of external expansion modules supported depends on the control unit type. Each module uses an external power supply unit 32 supplied with the module. A locale specific power cord 33 for the PSU must be ordered separately.



IP500 System with External Expansion Module



IP400 System with External Expansion Module

Control Unit	External Expansion Ports	WAN3 10/100 Supported
IP406 V2	6	✓
IP412	12	✓
IP500	8	–
" +4-Port Expansion Card	12	–
IP500v2	8	–
" +4-Port Expansion Card	12	–

- Each external expansion module (except the WAN3 10/100) is supplied with a blue 1 meter (3'3'') expansion interconnect cable. This cable must be used when connecting to expansion ports on the rear of a control unit.
- When connecting to expansion ports on an IP500 4-Port Expansion card, a yellow 2 meter (6'6") expansion interconnect cable can be used in place of the standard blue cable. 4 Yellow cables are supplied with the IP500 4-Port Expansion card.
- The WAN3 10/100 module differs in that it connects via a LAN port on its front to one of the control unit's LAN ports. This type of external expansion module is not supported by IP500 and IP500v2 control units.

IP500 External Expansion Modules

Expansion modules include an external power supply unit (PSU) and a 1m blue interconnect cable. They do not include a locale specific power cord for the external PSU or any phone extension cables.

Variant	Country	SAP Code	IP406 V2	IP412	IP500	IP500 +4-Port Exp	IP500	IP500v2 +4-Port Exp
IPO 500 Analog Trunk 16	US	700449473	✓	✓	✓	✓	✓	✓
IPO 500 BRI So8	All	700449515	✓	✓	✓	✓	✓	✓
Digital Station								
IPO 500 Digital Station 16	All	700449499	✓	✓	✓	✓	✓	✓
IPO 500 Digital Station 30	All	700426216	✓	✓	✓	✓	✓	✓
Analog Phone								
IPO 500 Phone 16	All	700449507	✓	✓	✓	✓	✓	✓
IPO 500 Phone 30	All	700426224	✓	✓	✓	✓	✓	✓

IP400 External Expansion Modules

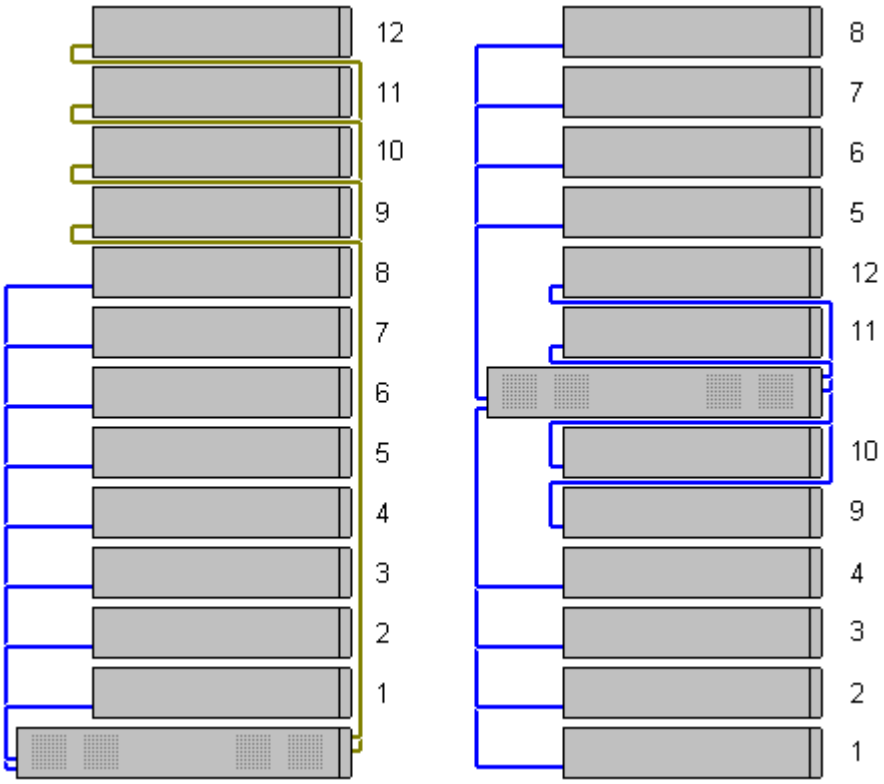
Expansion modules include an external power supply unit (PSU) and a 1m blue interconnect cable. They do not include a locale specific power cord for the external PSU or any phone extension cables.

Variant	Country	SAP Code	IP406 V2	IP412	IP500	IP500 +4-Port Exp	IP500v2	IP500v2 +4-Port Exp
Analog Trunk								
IP400 Analog Trunk 16	North America	700211360	✓	✓	✓	–	✓	–
	Europe	700241680	✓	✓	✓	–	✓	–
	New Zealand	700241698	✓	✓	✓	–	✓	–
Digital Station								
IP400 Digital Station 16 V2	All	700359839	✓	✓	✓	✓	✓	✓
IP400 Digital Station 30 V2	All	700359847	✓	✓	✓	✓	✓	✓
IP400 Digital Station 16	All	700184807	✓	✓	✓	–	✓	–
IP400 Digital Station 30	All	700184880	✓	✓	✓	–	✓	–
Phone								
IP400 Phone 8 V2	All	700359896	✓	✓	✓	✓	✓	✓
IP400 Phone 16 V2	All	700359904	✓	✓	✓	✓	✓	✓
IP400 Phone 30 V2	All	700359912	✓	✓	✓	✓	✓	✓
IP400 Phone 8	All	700184773	✓	✓	✓	–	✓	–
IP400 Phone 16	All	700184781	✓	✓	✓	–	✓	–
IP400 Phone 30	All	700184799	✓	✓	✓	–	✓	–
S0 (BRI)								
IP400 So8	All	700185077	✓	✓	✓	✓	✓	✓
WAN								
IP400 WAN3	All	700185028	✓	✓	–	–	–	–
IP400 WAN3 10/100	All	700262009	✓	✓	–	–	–	–

Connecting External Expansion Modules

The integral expansion ports on a control unit are located on the rear of the unit. For IP500 and IP500v2 control units, an additional 4 expansion ports can be added to the front of the control unit by installing an IP500 4-Port Expansion card.

- Each external expansion module (except the WAN3 10/100) is supplied with a blue 1 meter (3'3'') expansion interconnect cable. This cable must be used when connecting to expansion ports on the rear of a control unit.
- When connecting to expansion ports on an IP500 4-Port Expansion card, a yellow 2 meter (6'6") expansion interconnect cable can be used in place of the standard blue cable. 4 Yellow cables are supplied with the IP500 4-Port Expansion card.
- The WAN3 10/100 module differs in that it connects via a LAN port on its front to one of the control unit's LAN ports. This type of external expansion module is not supported by IP500 and IP500v2 control units.

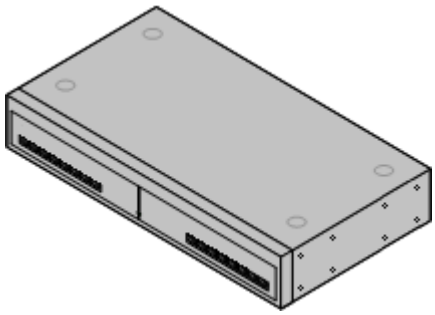


1.6.1 IP500 External Expansion Modules

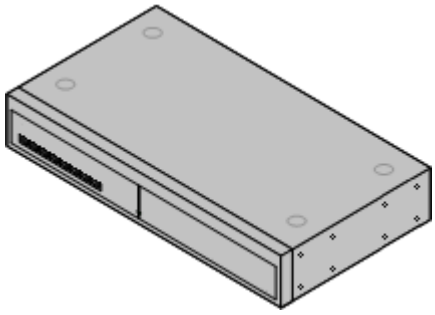
The following IP500 external expansion modules are supported by IP Office Release 6. They are intended for use with an IP500 or IP500v2 control unit but can also be used with IP400 control units.

Each module uses an external power supply unit 32 supplied with the module. A locale specific power cord 33 for the PSU must be ordered separately. If being rack mounted these units use the IP500 rack mounting kit.

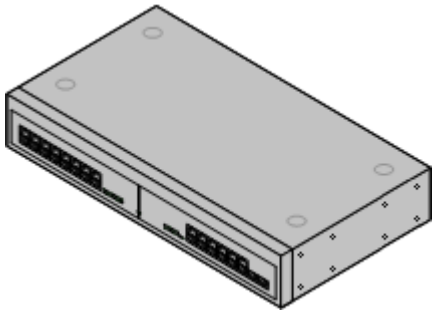
- IP500 Analog Trunk Module 249
  Provides an additional 16 ANALOG 376 ports for connection of analog trunks. Supports both loop-start and ground-start trunks.
  - Currently only available for the US locale.
  - Use with ground start trunks requires that the trunk module and the IP Office control unit are grounded.



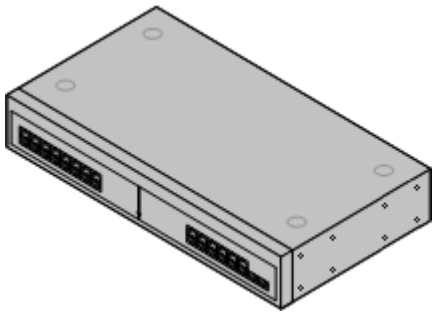
- IP500 BRI So8 Module 251
  Provides 8 ETSI BRI-So ports 377 for the connection of ISDN devices. This unit is not intended to support BRI trunks.



- IP500 Digital Station Module 253
  Provides, depending on variant, an additional 16 or 30 DS 379 ports for supported Avaya digital phones 43.



- IP500 Phone Module 255
  Provides, depending on variant, an additional 16 or 30 PHONE 384 ports for analog phones.

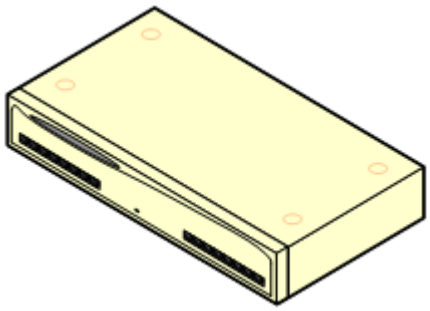


1.6.2 IP400 External Expansion Modules

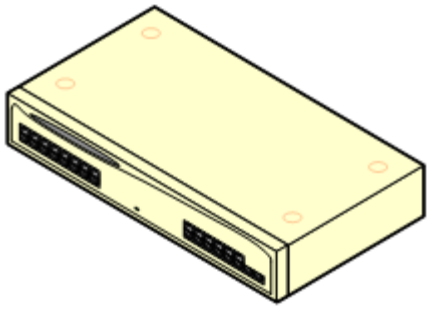
The following IP400 external expansion modules are supported by IP Office Release 6. Except for the WAN3 10/100, these modules can also be used with an IP500 and IP500v2 control units.

Each module uses an external power supply unit 32 supplied with the module. A locale specific power cord 33 for the PSU must be ordered separately. If being rack mounted these units use the IP400 rack mounting kit.

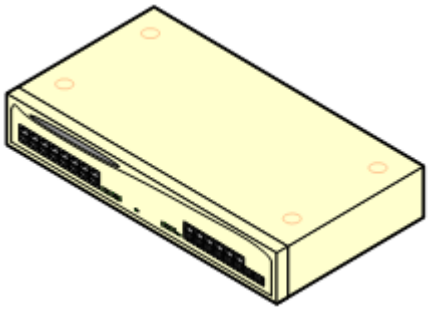
- IP400 Analog Trunk Module (ATM16) 269
  Provides an additional 16 ANALOG 376 ports for connection of analog trunks. Supports both loop-start and ground-start trunks.
  - Available in a number of variants for different locales.
  - Use with ground start trunks requires that the trunk module and the IP Office control unit are grounded.



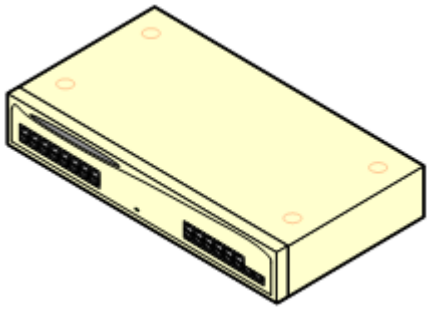
- IP400 Digital Station Module 273
  Provides, depending on the variant, an additional 16 or 30 DS 379 ports for supported Avaya digital phones. This module has been superseded by the Digital Station V2.



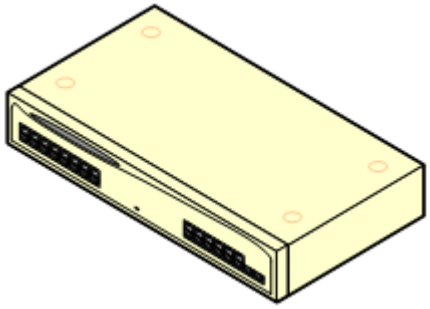
- IP400 Digital Station Module V2 271
  Provides, depending on variant, an additional 16 or 30 DS 379 ports for supported Avaya digital phones 43. Supersedes the previous Digital Station module.



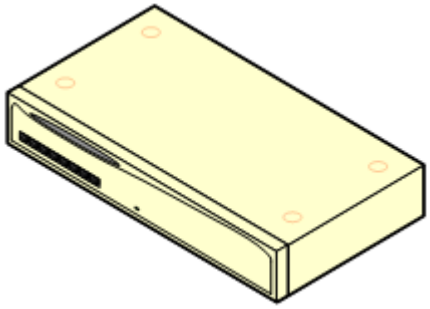
- IP400 Phone Module 277
  Provides, depending on variant, an additional 8, 16 or 30 POT 384 ports for analog phones. This module has been superseded by the Phone Module V2.



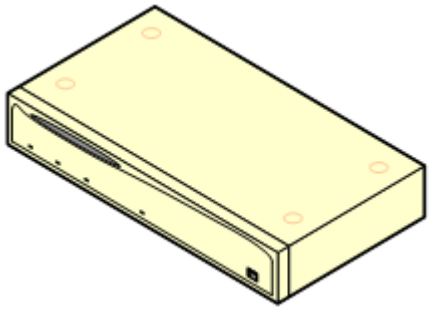
- IP400 Phone Module V2 275
  Provides, depending on variant, an additional 8, 16 or 30 PHONE 384 ports for analog phones. Supersedes the previous Phone module. With IP Office 3.1, the Phone V2 supports a wider range of message waiting indication (MWI) options than Phone V1 modules.
  - With V2 units, the labeling of analog phone ports was changed from POT to PHONE.



- IP400 So8 Module 279
  Provides 8 ETSI BRI-So 377 ports for the connection of ISDN devices. This unit is not intended to support BRI trunks.



- IP400 WAN3 10/100 Module 281
  Provides on its rear an additional three 37-way D-type WAN 387 ports. These can be used for the connection of V.24 387, V.35 388 and X.21 389 WAN services. The module connects to the control unit via a LAN port rather than an expansion port.
  - The WAN3 has been superseded by the WAN3 10/100 and is not supported by IP Office 3.2 and higher.
  - IP Office systems are restricted to a maximum of 2 WAN3 modules regardless of the control unit type.
  - This module is not supported with the IP500 and Ip500 V2.



1.7 Power Supplies and Cables

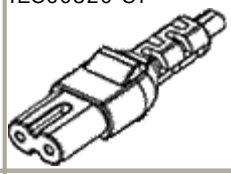
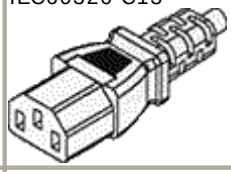
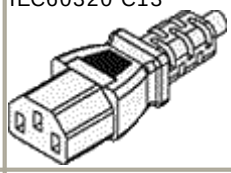
All IP Office control units and external expansion modules either have an internal power supply unit or are supplied with an external power supply unit.

1.7.1 Power Supplies

The IP500 and IP500v2 control units have an internal power supply unit and so only require a suitable locale specific power cord 33 and a power outlet that includes a switch. Note that if the power cord includes an earth lead, the power outlet must be connected to a protective earth.

IP406 V2 control units, IP412 control units and external expansion modules are all supplied with an external power supply unit (PSU). These PSUs include an integral 1.5 meter lead for connection to the control unit or expansion module. A power cord 33 for connection from the PSU to the power outlet is not included as this varies by locale. The appropriate power cord must be ordered separately or sourced locally.

Additional power supply units are required for 4450, EU24, XM24 and T3 DSS add-on modules and may also be required for Avaya IP phones.

Area	Type	Used on:	Connector Type
IP Office Control Units and External Expansion Modules	40W PSU	Analog, Digital Station V1, Phone V1.	IEC60320 C7 
	60W Earthed PSU	IP406 V2, IP412, IP400 Digital Station V2, IP400 Phone V2, IP400 So8, IP400 WAN3 10/100, IP500 Phone 30, IP500 Digital Station 30.	IEC60320 C13 
IP Phones and Phone Add-Ons	1151D1	All phones with XM24 Phone add-ons. All phones with EU24/EU24BL Phone add-ons unless using Class 3 PoE. 4600 and 56000 Series IP Phones when not using a PoE.	IEC60320 C13 
	1151D2		
	1600PWR 5V	Plug-top PSU used with 1600 Series phones on IP Office when not being power using PoE.	Various country variants.

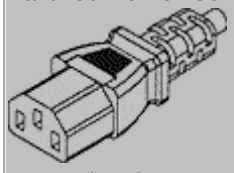
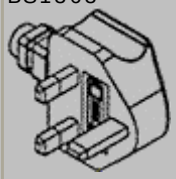
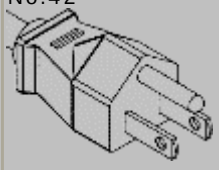
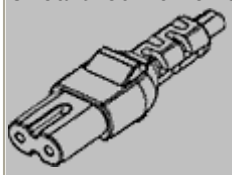
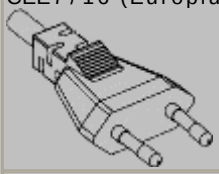
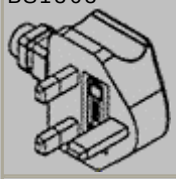
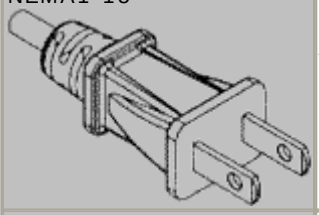
- Some units previously supplied with a 40W unearthed PSU are now approved for and supplied with a 60W earthed PSU. That changes affects the IP412, So8 and WAN3 10/100 units.
- The 1151D2 is the same as the 1151D1 except that it includes a backup battery that is charged during normal operation. This can provide typically 15 minutes backup at maximum load (20 Watts) and up to 8 hours at light load (2 Watts).
- Avaya IP phones can use IEEE 802.3af Power over Ethernet (PoE) power supplies. Refer to the IP Office IP Phone Installation Manual for full details.

1.7.2 Power Supply Cords

Each control unit and expansion module requires a switched power outlet socket rated at 110-240V ac, 50-60Hz. Connection from that power outlet socket requires an appropriate locale specific power cord which is not supplied with the unit and must be ordered separately. Note that if the power cord includes an earth lead, the power outlet must be connected to a protective earth.

Power cords must not be attached to the building surface or run through walls, ceilings, floors and similar openings. Installation measures must be taken to prevent physical damage to the power supply cord, including proper routing of the power supply cord and provision of a socket outlet near the fixed equipment or positioning of the equipment near a socket outlet.

For locales not detailed below an appropriate power cord must be obtained locally.

Power Cord Type	Power Outlet Plug Type	Locales	SAP Codes
Earthed Power Cords (IEC60320 C13)  Control Units • IP500v2. • IP500. • IP406 V2. • IP412.* IP400 External Expansion Modules • Digital Station V2. • Phone V2. • So8.* • WAN3 10/100.* IP500 External Expansion Modules • BRI So8. • Digital Station 16/30. • Phone 16/30.	CEE7/7 (Schuko) 	Europe and South Africa.	700289762
	BS1363 	Czech Republic, Ireland, United Kingdom.	700289747
	NEMA5-15P / CS22.2 No.42 	North, Central and South America.	700289770
Unearthed Power Cord (IEC60320 C7)  IP400 External Expansion Modules • Analog. • Digital Station V1. • Phone V1. IP500 External Expansion Modules • Analog Trunk 16.	CEE7/16 (Europlug) 	Europe and South Africa.	700213382
	BS1363 	Czech Republic, Ireland, United Kingdom.	700213374
	NEMA1-15 	North, Central and South America.	700213390
		Korea.	700254519

*Older units were supplied with a 40W unearthed PSU and required an IEC60320 C7 power cord.

1.7.3 Power Supply Backup

The use of an Uninterrupted Power Supply (UPS) with any telephone system is strongly recommended. Even at sites that rarely lose electrical power, that power may occasionally have to be switched off for maintenance of other equipment. In addition, most UPSs also provide an element of power conditioning, reducing spikes and surges.

The capacity of UPS systems and the total equipment load the UPS is expected to support are usually quoted in VA. Where equipment load is quoted in Watts, multiply by 1.4 to get the VA load.

The calculation of how much UPS capacity is required depends on several choices.

- What equipment to place on the UPS?
  Remember to include server PCs such as the voicemail. It is recommended that the total load on a new UPS is never greater than 75% capacity, thus allowing for future equipment.
- How many minutes of UPS support is required?
  Actual UPS runtime is variable, it depends on what percentage of the UPSs capacity the total equipment load represents. For example, a 1000VA capacity UPS may only support a 1000VA (100%) load for 5 minutes. This relationship is not linear, the same UPS would support a 500VA (50%) load for 16 minutes. Therefore the lower the percentage of capacity used, the increasingly longer the UPS runtime, typically up to 8 hours maximum. Remember also that for most UPS's the ratio of discharge to full recharge time is 1:10.
- How many output sockets does the UPS provide?
  Multiple UPS units may be required to ensure that every item of supported equipment has its own supply socket.

The web site http://www.avayaups.com provides a calculator into which you can enter the equipment you want supported on a UPS. It will then display various UPS options. The site uses VA values for typical IP Office systems. However, if more specific values are required for a particular system, the table below can be used to enter values.

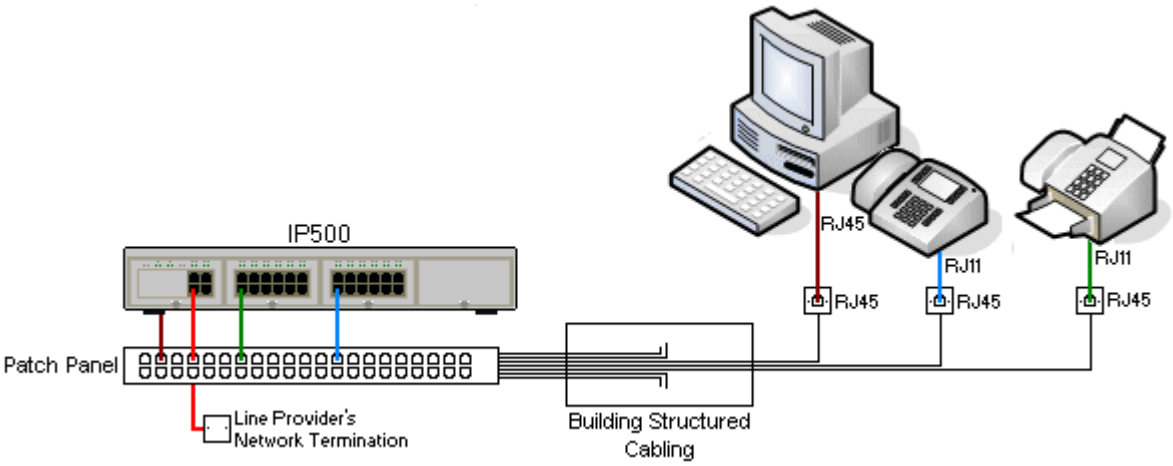
Typical IP Office System	VA		Typical IP Office System	VA
IP500 System	230		IP406 V2 System	168
IP500v2 System	230		IP412 System	312
Individual Equipment	**VA**		**Individual Equipment**	**VA**
IP406 V2 Control Unit	23		Phone 8 Module	17
IP412 Control Unit	25		Phone 16 Module	23
Analog 16 Module	88		Phone 30 Module	42
Digital Station 16 Module	34		Typical Server PC	600
Digital Station 30 Module	42		Typical Desktop PC	400
WAN3 Module	17		Mid Span PSU - 6 ports	150
So8 Module	34		Mid Span PSU - 12/24 ports	300

- The 1151D2 power supply unit for Avaya H.323 IP phones includes a backup battery. This typically provides 15 minutes backup at maximum load (20 Watts) and up to 8 hours at light load (2 Watts).

1.7.4 Cabling and Cables

The IP Office systems are designed primarily for use within an RJ45 structured cabling system using CAT3 unshielded twisted-pair (UTP) cabling and RJ45 sockets.

A structured cabling system is one where cables are run from a central RJ45 patch panel in the communications/data room to individual RJ45 sockets at user locations. All wires in each cable between the patch panel and the desk socket are connected straight through. This arrangement allows devices connected at the patch panel to be swapped to match the type of device that needs to be connected at the user socket. For example, making one user socket a phone port and another user socket a computer LAN port, without requiring any rewiring of the cables between the patch panel and the user location.



- Traditional IDC Punchdown Wiring Installations
  Where necessary, the far end RJ45 plug can be stripped from IP Office cables and wired into traditional wiring systems using punch-block connectors. This type of installation should be performed by an experienced wiring technician.
- Trunk Connections
  The majority of IP Office trunk ports use RJ45 connectors for acceptance of an RJ45-to-RJ45 cable. However, connection at the line provider's end may require use of a different plug type in order to match the line providers equipment.
- RJ11 Phone Connectors
  Many phones use RJ11 sockets and are supplied with RJ11-to-RJ11 cables. RJ11 plugs can be inserted into RJ45 sockets and in many case the connection will work. However this is not recommended or supported as the connection lock is not truly positive and may become disconnected. An RJ45-to-RJ11 cable 379 is available for these connections.

Standard IP Office Cables

The following are Avaya standard cables available for use with IP Office systems. The maximum length is applicable if the standard Avaya cable is replaced with an alternate cable.

Cable	Description	SAP Code	Standard Length	Maximum Length
9-Way DTE Cable 135	Connects to control unit RS232 DTE port. 9-Way D-type plug to 9-way D-type socket.	–	2m/6'6''.	2m/6'6''.
Structured Cabling DS Line Cable 379	Connects from RJ45 sockets to RJ11 socketed DS and analog phones.	700047871	4m/13'2''.	See table below.
BRI/PRI Trunk Cable 378	Connects BRI/PRI trunk ports to the line provider's network termination point. RJ45 to RJ45. Red.	700213440	3m/9'10''.	–
Expansion Interconnect Cable 381	Connects the control unit to expansion modules (except WAN3 modules). RJ45 to RJ45. Blue.	700213457	1m/3'3''.	1m/3'3''.
LAN Cable 382	Connects from IP Office LAN ports to IP devices. RJ45 to RJ45. Grey.	700213481	3m/9'10''.	100m/328'.
LAN Interconnect Cable 382	Connects WAN3 module to the control unit. Replace with a LAN crossover cable for IP412 control units. Green.	700213465	1m/3'3''.	–
LAN Crossover Cable 382	Used for connection of IP devices to LAN ports on the IP412 control unit. Black	700213473	3m/9'10''.	100m/328'.
V.24 WAN Cable 387	37-Way D-type plug to 25-way D-type plug.	700213416	3m/9'10''.	5m/16'5''
V.35 WAN Cable 388	37-Way D-type plug to 34-way MRAC plug.	700213424	3m/9'10''.	5m/16'5''
X.21 WAN Cable 389	37-Way D-type plug to 15-way D-type plug.	700213408	3m/9'10''.	5m/16'5''

The table below details the maximum total cable distances for DS and analog extensions using different cable types.

Telephone	Unshielded Twisted-Pair (UTP) - 50nf/Km			CW1308
	AWG22 (0.65mm)	AWG24 (0.5mm)	AWG26 (0.4mm)	
ETR Phones	305m/1000'.	305m/1000'.	122m/400'.	122m/400'.
2400/5400 Series	1200m/3937'.	1000m/3280'.	670m/2200'.	400m/1310'.
4406D Phone	1000m/3280'.	1000m/3280'.	400m/1310'.	400m/1310'.
4412D Phone	1000m/3280'.	700m/2295'.	400m/1310'.	400m/1310'.
4424D	500m/1640'.	500m/1640'.	400m/1310'.	400m/1310'.
6400 Series	1000m/3280'.	1000m/3280'.	400m/1310'.	400m/1310'.
T3 Series (Upn)	1000m/3280'.	1000m/3280'.	400m/1310'.	–
Analog Phones	1000m/3280'.	1000m/ 3280'.	400m/1640'.	800m/2620'.

1.7.5 Grounding

Use of ground connections reduces the likelihood of problems in most telephony and data systems. This is especially important in buildings where multiple items of equipment are interconnected using long cable runs, for example phone and data networks.

All IP Office control units and external expansion modules must be connected to a functional ground. Where the unit is connected to a power outlet using a power cord with an earth lead, the power outlet must be connected to a protective earth.

In some cases, such as ground start trunks, in addition to being a protective measure this is a functional requirement for the equipment to operate. In other cases it may be a locale regulatory requirement and or a necessary protective step, for example areas of high lightning risk.

- ⚠ WARNING
  During installation do not assume that ground points are correctly connected to ground. Test ground points before relying on them to ground connected equipment.

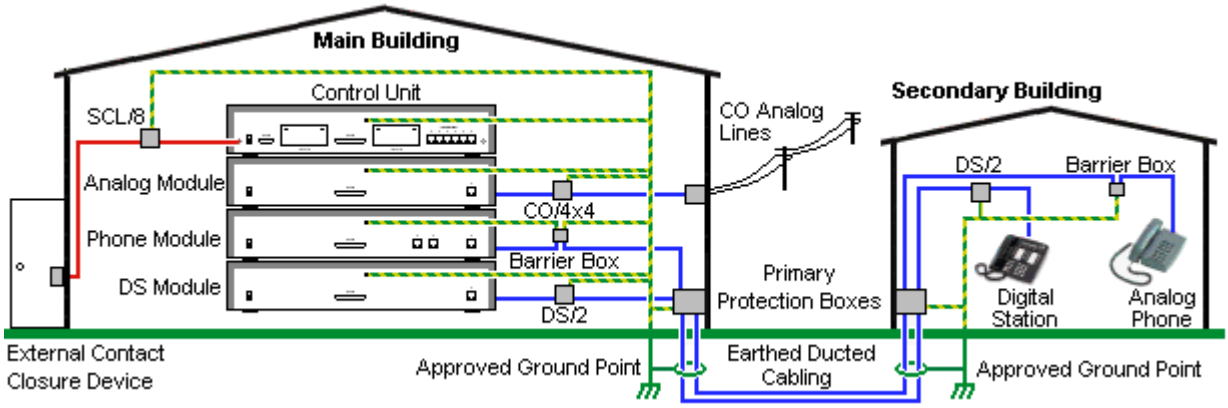
The ground point on IP Office control units and external expansion modules are marked with a or symbol. Ground 20 connections to these points should use a 14 AWG solid wire with either a green sleeve for a functional ground or green and yellow sleeve for a protective ground.

- Additional protective equipment
  In addition to grounding, additional protective equipment will be required in the following situations. Refer to "Out of Building Telephone Installations 38".
  - On any Digital Station or Phones external expansion module connected to an extension located in another building.
  - In the Republic of South Africa, on all Analog Trunk external expansion modules (ATM16) and on any control units containing an analog trunk cards (ATM4/ATM4U).

1.7.6 Lightning Protection/Out-of-Building Connections

The following are the only supported scenarios in which wired extensions and devices outside the main building can be connected to the IP Office system. In these scenarios, additional protection, in the form of protective grounding and surge protectors, must be fitted.

- ⚠ WARNING
  The fitting of additional protection does not remove the risk of damage. It merely reduces the chances of damage.



- Cables of different types, for example trunk lines, phone extensions, ground and power connections, should be kept separate.
- All cabling between buildings should be enclosed in grounded ducting. Ideally this ducting should be buried.
- A Primary Protection Box must be provided at the point where the cables enter the building. This should be three point protection (tip, ring and ground). Typically this would be gas tube protection provided by the local telephone company. The ground wire must be thick enough to handle all the lines being affected by indirect strike at the same time.

Connection Type	Protection Device Type	Requirement
DS Phone Extensions External expansion module DS 379 ports only.	ITWLinx towerMAX DS/2 124 Supports up to 4 connections. (This device was previously referred to as the Avaya 146E).	• Connection from the expansion module to the phone must be via a surge protector at each end and via the primary protection point in each building. • The IP Office expansion module and control unit and IROB devices must be connected to the protective ground point in their building. • The between building connection must be via earthed ducting, preferable underground. The cable must not be exposed externally at any point.
Analog Phone Extensions Phones External expansion module (POT 384 or PHONE 384) ports only.	IP Office Barrier Box 125 Supports a single connection. Maximum of 16 on any expansion module.	
Analog Trunks	ITWLinx towerMAX CO/4x4 124 Supports up to 4 two-wire lines. (This device was previously referred to as the Avaya 146C).	For installations in the Republic of South Africa, the fitting of surge protection on analog trunks is a requirement. For other locations where the risk of lightning strikes is felt to be high, additional protection of incoming analog trunks is recommended.
External Output Switch	ITWLinx towerMAX SCL/8 (This device was previously referred to as the Avaya 146G)	Connections from an IP Office Ext O/P port to an external relay device must be via a surge protector.

The towerMAX range of devices are supplied by ITWLinx (http://www.itwlinx.com).

1.8 Wall and Rack Mounting

All the IP Office control units are designed to be free-standing. On systems with external expansion modules, the control unit and modules are intended to be stacked.

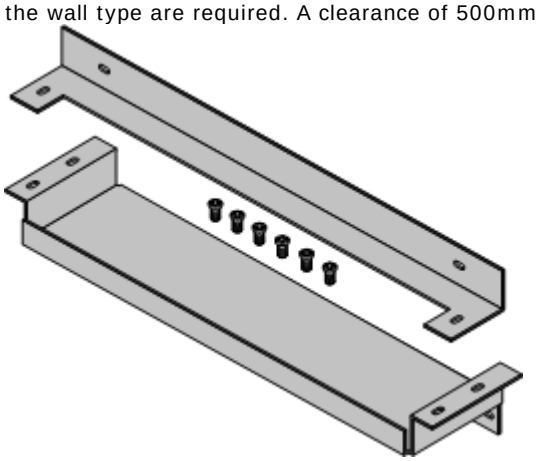
Using additional option mounting kits, some systems can be wall or rack mounted.

Control/Expansion Unit	Wall Mount	Rack Mount
IP500 Control Unit	✓	✓
IP500v2 Control Unit	✓	✓
IP500 External Expansion Modules	–	✓
IP412 Control Unit	–	✓
IP406 V2 Control Unit	–	✓
IP400 External Expansion Modules	–	✓

Wall Mounting

IP500 and IP500v2 control units can be wall mounted if not using any external expansion modules. An IP500 wall mounting kit is required in addition to suitable wall fixings.

- IP500 Wall Mounting Kit *(SAP Code 700430150)*
  This kit must be used when wall mounting an IP500 or IP500v2 control unit. Additional 4.5mm fixings suitable for the wall type are required. A clearance of 500mm around the control unit is required.

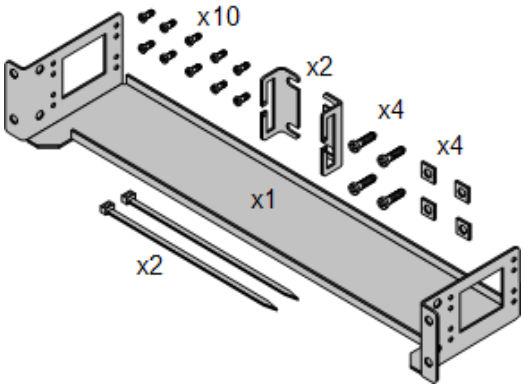


Rack Mounting

All IP Office control units and external expansion modules can be rack mounted into standard 19" rack systems. Each unit requires a 2U slot space within the rack. Rack mounting requires an IP400 or IP500 rack mounting kit for each control unit and external expansion module.

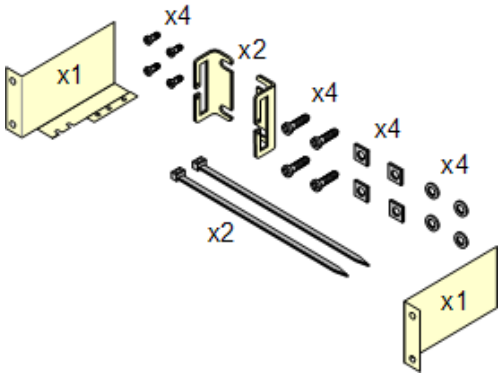
Where IP Office systems are being rack mounted, the effect of conditions within the rack cabinet must be considered. For example the rack temperature may be above the room temperature and airflow within the rack will be restricted. The environmental requirements 56 for the individual IP Office units are still applicable inside the rack cabinet.

IP500 Rack Mounting Kit



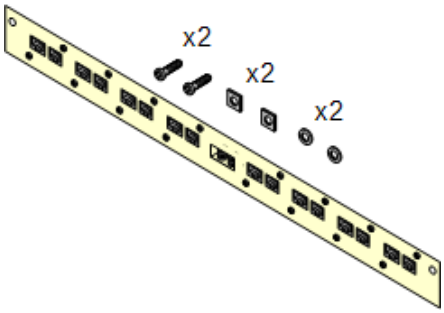
- IP500 Rack Mounting Kit *(SAP 700429202)*
  This kit contains all the components required for the rack mounting of a single IP500v2 control unit, IP500 control unit or IP500 external expansion module. This includes screws for fixing of the brackets to the module, bolts for securing the module in the rack and cable tidy brackets.

IP400 Rack Mounting Kit



- IP400 Rack Mounting Kit *(SAP 700210800)*
  This kit contains all the components required for the rack mounting of a single control unit or expansion module. This includes screws for fixing of the brackets to the module and bolts for securing the module in the rack.

Barrier Box Rack Mounting Kit



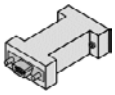
- Barrier Box Rack Mounting Kit *(SAP 700293905)*
  Barrier boxes must be used for out-of-building analog phone extensions 38. This bracket allows up to 8 IP Office barrier boxes to be rack mounted and simplifies the number of connections to the protective ground point in the rack. This kit must be used when more than 3 barrier boxes are in use and supports a maximum of 16 barrier boxes for a single external expansion module.

1.9 Feature Keys and Licenses

The following types of feature key dongle are supported for IP Office Release 6. The serial number is printed on the dongle, prefixed with either *SN* or *FK*.

- IP500v2 Avaya SD Card 257
  Inserts into the System slot on the rear of an IP500v2 control unit. This card is required even if not using any IP Office licenses.

- IP500 Smart Card 257
  Inserts into a dedicated slot on the rear of the IP500 control unit. This card is required even if not using any IP Office licenses.

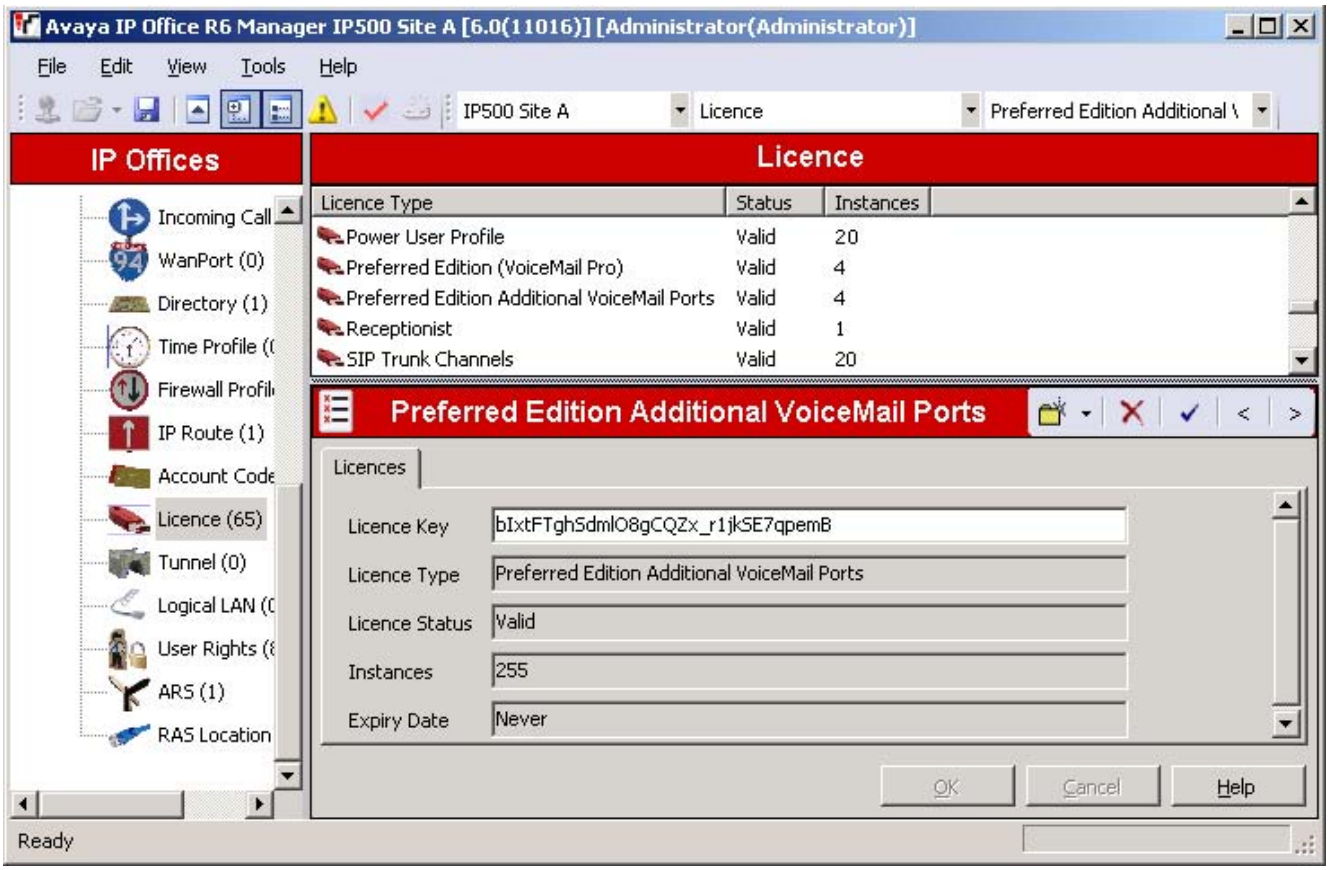


- Serial Port Feature Key 258
  Plugs directly into the DTE serial port on the rear of IP406 V2 and IP412 control units. The feature key is only required is using IP Office licenses.

Various IP Office features and applications require entry of license keys into the system's configuration. The license keys are unique 32-character codes based on the feature being activated and the serial number of the feature key dongle 257 installed with the IP Office system.

The serial number is printed on the feature key dongle and prefixed with SN (FK for IP500v2 SD card dongles). It can also be viewed in the system configuration by selecting System | System | Dongle Serial Number.

- For IP406 V2 and IP412 systems, the feature key dongle takes the form of a device attached to the serial port of the control unit. This key is only required if licensed features are needed.
- For IP500 and IP500v2 systems, the feature key dongle takes the form of a card (smart media or SD card respectively) inserted into the control unit. The card is a mandatory item for these systems even if they use no licensed features.



- Example 1: Enabling Features
  In the example above, the IP Office system has a valid Power User Profile license. In this case the license is for 20 instances. That means that up to 20 IP Office users can have their Profile set to Power User. This allows them to be configured for a range of features not available to other users.
- Example 2: Enabling Applications and Features
  The example above the IP Office also has a Preferred Edition (Voicemail Pro) license. This license enables a range of features including support for the IP Office Voicemail Pro application and 4 ports between the IP Office system and the voicemail server. Additional ports have also been added using a Preferred Edition Additional Voicemail Ports license.

When a license key is entered into the IP Office configuration, the following information is shown.

- Status
  The status, which is Unknown until the configuration file is sent back to the IP Office system.
  - *Unknown*
    This status is shown for licenses that have just been added to the configuration shown in IP Office Manager. Once the configuration has been sent back to the IP Office and then reloaded, the status will change to one of those below.
  - *Valid*
    The features licensed can be configured and used.
  - *Invalid*
    The license was not recognized. It did not match the serial number of the Feature Key.
  - *Dormant*
    The license is valid but is conditional on some other pre-requisite licenses.
  - *Obsolete*
    The license is valid but is one no longer used by the level of software running on the IP Office system.
  - *Expired*
    The license has gone past its expiry date.
- License
  The name of the licensed feature. This may differ from the ordered RFA name.
- Instances
  Depending on the license, this may be the number of ports enabled or number of simultaneous users of the licensed feature. Sometime the number of instances is specified in the license name.
- Expires
  Most purchased licenses have no expiry setting. For some features, trial licenses may be available which will have an expiry date.

1.10 IP Office Phones

IP Office Release 6 supports the following phones and phone add-ons. Availability may be subject to local restrictions.

Digital stations connect to the IP Office via DS 379 ports.

Series	IP Office Supported Digital Station (DS) Phones	Region
1400	1403 288, 1408 289, 1416 290	Global
2400	2402 297, 2410 298, 2420 299.	Global
4400	4406D 311, 4412D+ 312, 4424D+ 313 *(Not supported on the IP500 and IP500v2 control unit DS ports)*	North America
5400	5402 320, 5410 321, 5420 322.	Global
6400	6408D 329, 6416D+M 330, 6424D+M 331.	Global
T3 (Upn)	T3 Compact 345, T3 Classic 343, T3 Comfort 344.	Europe, Middle East and Africa
–	3810 Wireless phone 309.	North America

IP Phones (SIP and H323) connect to the IP Office system via the RJ45 LAN or WAN. These device require an Avaya IP Endpoint license and VCM resources.

Series	IP Office Supported IP Phones	Region
1000	1010 286, 1040 286	Global
1100	1120 287, 1140 287	
1200	1220 287, 1230 287	
1600	1603IP/SW 291, 1608 293, 1608-i 293, 1616 295, 1616-i 295	
3600	3616 300, 3620 301, 3626 302, 3641 303, 3645 304	
4600	4601 314, 4602 315, 4602SW 315, 4610 316, 4610SW 316, 4620 317, 4620SW 317, 4621SW 318, 4625 319.	
5600	5601 323, 5602 325, 5602SW 325, 5610 326, 5620 327, 5621 328.	
9600	9620L 332, 9620C 332, 9630G 334, 9640 336, 9640G 336, 9650 338, 9650C 338	
ETR	ETR 6, ETR 6D 340, ETR 18, ETR 18D 341, ETR 34D 342 *(Refresh and Euro models of all)*	North America
Softphone	Avaya IP Office SIP SoftPhone application	Global
T3 (IP)	T3 IP Compact 345, T3 IP Classic 343, T3 IP Comfort 344.	Europe, Middle East and Africa

- Non-Avaya IP phones (SIP and H323) are supported by the addition of 3rd Party IP Endpoint licenses. Functionality beyond making and answering calls is not guaranteed by Avaya.

Analog phones and devices connect to PHONE 384 ports with the IP Office system. However due to the variety of analog phones and device available no guarantee of operation is given. It is the responsibility of the IP Office installer and maintainer to test and verify the operation of proposed analog equipment.

Series	IP Office Recommended Analog Phones	Region
6200 Series	6211, 6219, 6221.	North America
Interquartz Gemini	9330-AV, 9335-AV, 9281-AV.	Europe, Middle East, Africa, Asia-Pacific

Series	IP Office Supported DECT Phones	Region
IP DECT	3701 305, 3711 306 - Connection via IP DECT base stations.	Global
DECT R4	3720 307, 3725 308 - Connection via Unified DECT base stations.	Global
PARTNER DECT	3910 310, 3920 310 - Connect to ETR ports on IP500v2 control unit.	North America

1.11 VoIP

IP Office is a converged telephony system, that is it combines aspects of traditional PABX telephone systems and IP data and telephony systems. This works at various levels.

- Individual phone users can control the operation of their phone through applications running on their PC.
- Data traffic can be routed from the LAN interface to a telephony trunk interface, for example a dial-up ISP connection.
- Voice traffic can be routed across internal and external data links. This option is referred to as voice over IP (VoIP).

The VoIP mode of operation can include IP trunks between customer systems and or H.323 IP telephones for users. In either case the following factors must be considered:

- The IP Office control unit must be fitted with voice compression channels 45. These channels are used whenever an IP device (trunk or extension) needs to communicate with a non-IP device (trunk or extension) or a device that uses a different codec.
- A network assessment is a mandatory requirement for all systems using VoIP. For support issues with VoIP, Avaya may request access to the network assessment results and may refuse support if those are not available or satisfactory.

A network assessment would include a determination of the following:

- A network audit to review existing equipment and evaluate its capabilities, including its ability to meet both current and planned voice and data needs.
- A determination of network objectives, including the dominant traffic type, choice of technologies, and setting voice quality objectives.
- The assessment should leave you confident that the implemented network will have the capacity for the foreseen data and voice traffic, and can support H.323, DHCP, TFTP and jitter buffers in H.323 applications.
- An outline of the expected network assessment targets is:

Test	Minimum Assessment Target
Latency	Less than 150ms.
Packet Loss	Less than 3%.
Duration	Monitor statistics once every minute for a full week.

1.11.1 Voice Compression Channels

Calls to and from IP devices can require conversion to the audio codec format being used by the IP device. For IP Office systems this conversion is done by voice compression channels. These support the common IP audio codecs G711, G723 and G729a.

For IP400 control units channels can be added by fitting IP400 Voice Compression Modules (VCMs) 266. For the IP500 control units, channels can be added using IP500 VCM cards 235, IP500 Combination Cards 240 and or IP400 Voice Compression Modules 266.

The voice compression channels are used as follows:

Call Type	Voice Compression Channel Usage
IP Device to Non-IP Device	These calls require a voice compression channel for the duration of the call. If no channel is available, busy indication is returned to the caller.
IP Device to IP Device	Call progress tones (for example dial tone, secondary dial tone, etc) do not require voice compression channels with the following exceptions: • Short code confirmation, ARS camp on and account code entry tones require a voice compression channel. • Devices using G723 require a voice compression channel for all tones except call waiting. When a call is connected: • If the IP devices use the same audio codec no voice compression channel is used. • If the devices use differing audio codecs, a voice compression channel is required for each.
Non-IP Device to Non-IP Device	No voice compression channels are required.
Music on Hold	This is provided from the IP Office's TDM bus and therefore requires a voice compression channel when played to an IP device.
Conference Resources and IP Devices	Conferencing resources are managed by the conference chip which is on the IP Office's TDM bus. Therefore, a voice compression channel is required for each IP device involved in a conference. This includes services that use conference resources such as call listen, intrusion, call recording and silent monitoring.
Page Calls to IP Device	IP Office 4.0 and higher only uses G729a for page calls, therefore only requiring one channel but also only supporting pages to G729a capable devices.
Voicemail Services and IP Devices	Calls to the IP Office voicemail servers are treated as data calls from the TDM bus. Therefore calls from an IP device to voicemail require a voice compression channel.
Fax Calls	These are voice calls but with a slightly wider frequency range than spoken voice calls. IP Office only supports fax across IP between IP Office systems with the Fax Transport option selected. It does not currently support T38.
T38 Fax Calls	IP Office 5.0+ supports T38 fax on SIP trunks and SIP extensions. Each T38 fax call uses a VCM channel. Within a Small Community Network, a T38 fax call can be converted to a call across an H323 SCN lines using the IP Office Fax Transport Support protocol. This conversion uses 2 VCM channels. In order use T38 Fax connection, the Equipment Classification of an analog extension connected to a fax machine can be set *Fax Machine*. Additionally, a new short code feature Dial Fax is available.

Note: T3 IP devices must be configured to 20ms packet size for the above conditions to apply. If left configured for 10ms packet size, a voice compression channel is needed for all tones and for non-direct media calls.

Measuring Channel Usage

The IP Office System Status Application can be used to display voice compression channel usage. Within the Resources section it displays the number of channel in use. It also displays how often there have been insufficient channels available and the last time such an event occurred.

The IP500 VCM cards, the level of channel usage is also indicated by the LEDs (1 to 8) on the front of the IP500 VCM card 235.

1.12 Supported Country Locales

When a new or defaulted system's configuration is first opened in Manager, the value set in the Locale field (System | System | Locale) should always be checked and changed if necessary. The system's Locale sets factors such as the default ringing patterns and caller display settings. The locale also controls the language that a voicemail server will use for prompts.

This following table indicates locale settings supported for different functions. Note that this does not necessarily indicate support, availability or approval for IP Office within that country.

This following table indicates locale settings used within 4.0 and higher for different functions. Note that reference to a locale does not necessarily indicate support, availability or approval for IP Office within that country.

Locale	Language	Telephony	Phone Display	Applications					Voicemail	
				Manager	Customer Call Reporter	Phone Manager	Soft Console	one-X Portal	Embedded Voicemail	Voicemail Pro
Argentina	Latin Spanish	✓	✓	✓	✓	✓	✓	✓	✓	✓
Australia	UK English	✓	✓	✓	✓	✓	✓	✓	✓	✓
Belgium	Dutch	✓	✓	✓	✓	✓	✓	✓	✓	✓
Belgium	French	✓	✓	✓	✓	✓	✓	✓	✓	✓
Brazil	Brazilian	✓	✓	✓	✓	✓	✓	✓	✓	✓
Canada	Canadian French	✓	✓	-	-	-	-	-	✓	✓
Chile	Latin Spanish	✓	✓	✓	✓	✓	✓	✓	✓	✓
China	Mandarin	✓	-	-		✓	✓	-	✓	✓
Colombia	Latin Spanish	✓	✓	✓	✓	✓	✓	✓	✓	✓
Denmark	Danish	✓	✓	-	-	✓	✓	-	✓	✓
Finland	Suomi	✓	✓	-		✓	✓	-	✓	✓
France	French	✓	✓	✓	✓	✓	✓	✓	✓	✓
Germany	German	✓	✓	✓	✓	✓	✓	✓	✓	✓
Greece	Greek	✓	-	-	-	-	-	-	-	✓
Hong Kong	Cantonese	✓	-	-	-	-	-	-	-	✓
Hungary	Hungarian	-	-	-	-	-	-	-	-	✓
Iceland	Icelandic	✓	-	-	-	-	-	-	-	-
India	UK English	✓	-	✓	✓	✓	✓	✓	✓	✓
Italy	Italian	✓	✓	✓	✓	✓	✓	✓	✓	✓
Korea	Korean	✓	-	-	-	✓	✓	-	✓	✓
Mexico	Latin Spanish	✓	✓	✓	✓	✓	✓	✓	✓	✓
Netherlands	Dutch	✓	✓	✓	✓	✓	✓	✓	✓	✓
New Zealand	UK English	✓	✓	✓	✓	✓	✓	✓	✓	✓
Norway	Norwegian	✓	✓	-		✓	✓	✓	✓	✓
Peru	Latin Spanish	✓	✓	✓	✓	✓	✓	✓	✓	✓
Poland	Polish	✓	-	-	-	-	-	-	-	✓
Portugal	Portuguese	✓	✓	-		✓	-	-	✓	✓
Russia	Russian	✓	-	-	✓	✓	✓	✓	✓	✓
Saudi Arabia	UK English	✓	-	✓	✓	✓	✓	✓	✓	✓
Singapore	UK English	✓	✓	✓	✓	✓	✓	✓	✓	✓
South Africa	UK English	✓	✓	✓	✓	✓	✓	✓	✓	✓
Spain	Spanish	✓	✓	✓	-	✓	✓	✓	✓	✓
Sweden	Svenska	✓	✓	-	-	✓	✓	-	✓	✓
Switzerland	French	✓	✓	-	✓	-	-	✓	✓	✓
Taiwan	Putonghua	✓	-	-	-	✓	✓	-	-	✓
Turkey	US English	✓	✓	✓	✓	✓	✓	✓	✓	✓
UK	UK English	✓	✓	✓	✓	✓	✓	✓	✓	✓
USA	US English	✓	✓	✓	✓	✓	✓	✓	✓	✓
Venezuela	Latin Spanish	✓	✓	✓	✓	✓	✓	✓	✓	✓

- Locale:
  The country represented by the locale.
- Language:
  The voicemail prompt language used for that locale.
- Manager:
  Indicates that the IP Office Manager application can run in the specific locale language. Manager uses the best match it has (French, German, Brazilian, Dutch, Italian, Mexican Spanish or US English) for the regional location settings setting of the PC on which it is running, otherwise it defaults to UK English. If required the language used within the Manager screens can be overridden.
- Telephony:
  The IP Office provides default telephony settings matching the normal expected defaults for the locale.
- Phone Display:
  Indicates that display messages from the IP Office to Avaya phones can be sent using the appropriate language for that locale. Note that the user locale can be used to override the system locale for these messages. Note also that some phones support their own language selection options for menus displayed by the phone's own software.
- Voicemail:
  These columns indicate for which locales the different Avaya IP Office voicemail servers can provide the appropriate language prompts. In all cases, the system locale can be overridden by setting a different user locale.
  - EVM:
    Indicates that the locale is recognized by Embedded Voicemail and appropriate language prompts are then used. If an unsupported locale is used, Embedded Voicemail will attempt the best match using the first two characters of the locale.
  - VM Pro:
    Indicates that the locale is recognized by Voicemail Pro and appropriate language prompts are then used. For an unsupported locale if used, or one for which the necessary prompts are not available, Voicemail Pro will attempt the best match using a sequence of alternate locales. For example French Canadian falls back to French, then US English and finally UK English. Note that the languages available are selectable during Voicemail Pro installation.

1.13 IP Office Software Applications

The IP Office applications are available on a number of DVDs. These can be ordered at a nominal cost to cover order processing and delivery. Separate installation packages for IP Office applications can also be downloaded from the Avaya support website at http://support.avaya.com.

Title	Discs	Description	SAP Code
IP Office Release 6 Admin and User DVD	1	This DVD contains installation packages for all the main IP Office administration and user applications. It also contains documentation for IP Office.	700500949
Voicemail Pro ScanSoft TTS DVD	2	Contains text to speech engines for use with Voicemail Pro's TTS functions. Supports the same languages as Voicemail Pro pre-recorded prompts except Hungarian.	–

- It is acceptable to make copies of the Avaya IP Office DVDs listed above. However the content must remain intact, unaltered and without change or addition. Avaya does not accept any liability and responsibility for damage or problems arising from the use of such copies.

Programming Applications

The following applications are used to program and maintain an IP Office system. Typically they run on a PC connected to the IP Office system via its LAN interface. These applications are all provided on the IP Office Administrator Applications DVD and don't require any licenses.

Due to the nature of the applications, if installed on a PC at the customer site, this should be a secure PC or the PC of a trusted user. If a voicemail server PC is also being installed with the IP Office system, the same PC can be used for the programming and maintenance applications.

For maintainers, these applications can also be run remotely if a route for data connections to the customer's IP Office exists from the maintainer's location.

- IP Office Manager 358
  This tool is used to access all parts of the IP Office configuration. Different levels of access can be defined to control which parts of the configuration the Manager user can view and alter. Manager is also used to upgrade the software files used by an IP Office system.
- System Status Application 364
  This application can be used to inspect the current status of IP Office lines and extensions and to view records of recent alarms and events. It runs as a Java application.
- SNMP MIBs 131
  Not an application as such. Using IP Office SNMP MIB files the status of the IP Office system to be monitored by 3rd-party SNMP applications such as Castlerock and HP OpenView. When configured for SNMP operation, the IP Office can also send alerts for potential problems. IP Office systems also support the sending of the same alerts to SMTP email or Syslog addresses.
- Monitor (SysMon) 359
  Monitor is a tool that can show a trace of all activity on the IP Office system in detail. As a consequence, interpretation of Monitor traces requires a high-level of data and telephony protocol knowledge. Despite that however, all IP Office installers and maintainers need to understand how to run Monitor when necessary as Avaya may request copies of Monitor traces to resolve support issues.

User Applications

The IP Office supports a number of applications that operate in parallel with users telephones. These applications are installed from the IP Office Applications DVD. Some of them require licenses to be entered into the IP Office system's configuration to enable features or to set the number of simultaneous users.

- one-X Portal for IP Office 360
  This application is installed on a server PC connected to the IP Office. Users can access the one-X portal from their own PC using a web browser. The application allows the user to control their phones, access voicemail messages, call logs and phone directories.
- Phone Manager 361
  Phone Manager allows a user to control and monitor their phone through their PC. For Avaya phones that support handsfree operation, Phone Manager can be used to make and answer calls. During use, Phone Manager records details of calls made, answered and missed. It can also be configured to show the status of other users on the system. Phone Manager also allows the user to access and change many of the setting stored in the IP Office configuration that relate to their own phone operation, for example their forwarding destination numbers. Phone Manager software can operate in several modes:
  - Phone Manager Lite 361
    The default mode of Phone Manager. Requires no license, this application can be installed for any IP Office user.
  - Phone Manager Pro 361
    Users configured for Phone Manager Pro are able to access a range of additional features. Phone Manager Pro requires entry of licenses into the IP Office system. The licenses also control the number of simultaneous Phone Manager Pro users. The user's Phone Manager software then automatically changes from Lite mode to Professional Edition mode.
  - Phone Manager Pro PC Softphone 361
    This is a PC softphone mode of Phone Manager operation. The user acts as a VoIP extension, making calls through the speaker and microphone of their PC. This mode requires further licenses in addition to the Phone Manager Pro licenses.
- TAPILink Lite 365
  The Microsoft Telephony Application Program Interface (TAPI) allows TAPI compliant applications to interact with IP Office phones by installing an IP Office TAPI driver. TAPILink Lite does not require any licenses entered into the IP Office system's configuration. It allows TAPI compliant applications such as Outlook to make and answer calls. The speech part of the calls is still via the user's physical phone.
- SoftConsole 363
  This is a licensed application. It is intended for telephone system operators or receptionists. It displays details of calls and allows them to quickly see the status of the callers required destination and transfer the call. The SoftConsole user is able to access a range of details about the status of users and groups on the IP Office system. Up to 4 simultaneous SoftConsole users can be licensed.

Voicemail Applications

The IP Office supports a range of applications for the recording and playing of voicemail messages.

- Embedded Voicemail 265
  This application is supported on all IP Office Release 6 systems. Embedded Voicemail supports basic voicemail mailbox operation, simple auto-attendants and hunt group announcements. For IP406 V2 and IP412 control units it requires the addition of an Avaya memory card to store the voicemail messages and prompts. For IP500 and IP500v2 controls units embedded voicemail is provided by the Avaya SD card fitted by default.
- Voicemail Pro 366
  This voicemail application runs on a server PC connected to the IP Office. It requires various licenses entered into the IP Office configuration to control the features it offers and the number of simultaneous connections. The operation of Voicemail Pro can be customized to provide special services.
- ContactStore for IP Office 356
  Voicemail Pro can be used for manual and automatic call recording. Those recording are placed into mailboxes. Contact Store allows those recordings to be redirected into a database on the ContactStore PC. This allows recordings to be archived and searched separately from mailbox messages. This application requires entry of a license into the IP Office configuration.

Call Logging Applications

A wide range of 3rd -party applications exist to provide call logging and accounting for telephone systems. To support these the IP Office provides an SMDR output.

- SMDR Output
  For IP Office 4.2 and higher, the IP Office control unit can directly output SMDR records to a specified IP address.

Call Center Application

- Customer Call Reporter 357
  This application is installed on a server PC connected to the IP Office. Users access the application from their PC using a web browser. The application obtains data about the calls handled by CCR agents and groups from the IP Office system and stores that data in an MS-SQL database. It can support up to 150 agents and 75 supervisors.

CTI Applications

- TAPILink Pro
  Using the same software as TAPILink Lite, TAPILink Pro provides all of the features and functionality of TAPILink Lite, but additionally provides third party CTI operation. This means that a single server can control and monitor any number of telephone devices. This requires entry of a CTI Link Pro license. TAPILink Pro also provides the ability to monitor and control groups. This allows an application to be notified when a call enters a queue, and can also redirect it to another location.

- TAPI WAV driver
  Provides software-based support for voice processing. Purchasing the CTI Link Pro RFA license key also enables 4 ports of voice processing; additional ports can be purchased in 4 port increments. The TAPI-WAV driver is for use with TAPI 2.1 only; for TAPI 3.0, IP Office supports the Media Service Provider (MSP) interface, defined by Microsoft in TAPI 3.0.

- DevLink Pro
  Provides a real-time event stream in addition to the SMDR interface provided in IP Office SMDR (see below). The real-time event stream takes the form of a call record, which is issued whenever the state of any endpoint of a call changes (typically there are two endpoints on a call, but for some circumstances, such as conference calls, intruded calls there may be more).

1.14 Training

Avaya University provides a wide range of training courses for IP Office and its associated applications. This includes courses necessary for IP Office resellers to become Avaya Authorized Channel Partners and for individuals to achieve IP Office certification.

Details of courses can be found on the Avaya University web site (http://www.avaya-learning.com). The site can be used to check course availability and to book course. It also includes on-line courses and on-line course assessments. The site requires users to setup a user name and password in order to track their personal training record.

1.15 Web Sites

Information to support the IP Office can be found on a number of web sites.

- Avaya *(http://www.avaya.com)*
  The official web site for Avaya. The front page also provides access to individual Avaya web sites for different countries.
- Avaya Enterprise Portal *(http://partner.avaya.com)*
  This is the official web site for all Avaya Business Partners. The site requires registration for a user name and password. Once accessed, the site portal can be individually customized for what products and information types you wish to see and to be notified about by email.
- Avaya Support *(http://support.avaya.com)*
  Contains documentation and other support materials for Avaya products including IP Office. Copies of the IP Office CD images are available from this site and updated core software .bin files.
- Avaya IP Office Knowledge Base *(http://marketingtools.avaya.com/knowledgebase)*
  Access to an on-line regularly updated version of the IP Office Knowledge Base.
- Avaya University *(http://www.avaya-learning.com)*
  This site provides access to the full range of Avaya training courses. That includes both on-line courses, course assessments and access to details of classroom based courses. The site requires users to register in order to provide the user with access to details of their training record.
- Avaya Community *(http://www.aucommunity.com)*
  This is the official discussion forum for Avaya product users. However it does not include any separate area for discussion of IP Office issues.
- Other Non-Avaya Web Sites
  A number of third-party web forums exist that discuss IP Office. These can act as useful source of information about how the IP Office is used. Some of these forums require you to be a member and to register. These are not official Avaya forums and their content is not monitored or sanctioned by Avaya.
  - Tek-Tips *(http://www.tek-tips.com)*
  - IP Office Info *(http://www.ipofficeinfo.com)*
  - Yahoo Groups *(http://groups.yahoo.com/group/ipoffice)*
  - PBX Tech *(http://www.pbxtech.info/forumdisplay.php?f=8)*

1.16 Emergency and Power Failure Ports

IP Office systems can provide 2 types of analog extension power failure ports. These are:

Type	Description	Provided By:
Switching Power Failure Ports	During normal IP Office operation these ports can be used for normal analog phone connection. During power failure the port is directly connected to an analog trunk port.	• IP500 Analog Phone 8 Card When an IP500 Analog Phone 8 base card is fitted with an IP500 Analog Trunk daughter card, during power failure extension port 8 is connected to analog trunk port 12. • IP500 ATM Combination Card On this card, during power failure, extension port 8 is connected to analog trunk port 12.
Emergency Only Power Failure Ports	During normal IP Office operation these ports cannot be used. During power failure the port is directly connected to an analog trunk port.	• IP500 Analog Trunk Daughter Card Regardless of the IP500 card hosting it, during power failure pins 4 and 5 of port 12 are connected to pins 7 and 8. • IP400 ATM16 External Expansion Module This external expansion module has two ports, PF1 and PF2, on its rear. During power fail conditions, PF1 is internally connected to ANALOG port 1 on the module, PF2 is internally connected to ANALOG port 2 on the same module. • IP500 ETR6 Card On this card, during normal operation extension ports 7 and 8 are not useable. However, if the card is fitted with an IP500 Analog Trunk daughter card, during power failure extension ports 7 and 8 are connected to analog trunk port 12.

In all cases these only work with loop-start analog trunks. Any phones connected to these ports should be clearly labeled as power fail extensions in accordance with the appropriate national and local regulatory requirements.

1.17 PARTNER Version

The installation of IP500v2 systems running in PARTNER Version mode is covered by a separate installation manual. Those systems only support the following equipment.

IP500 Base Cards	IP500 Daughter Cards	Expansion Modules	Phones
Maximum 4	Maximum 4	Maximum 1	Maximum 48
• Digital Station 8 (Max 3) • Phone 2 • Phone 8 • ETR6 (Max 3) • Combination Card ATM4	• ATM4 Uni • PRI 1 Uni (Max 1)	• Digital Station 16 • Phone 16	• 1408 • 1416 • ETR 6D • ETR 18D • ETR 34D • 3910 • 3920 • Analog phones.

1.18 NORSTAR Version

The installation of IP500v2 systems running in NORSTAR Version mode is covered by a separate installation manual. Those systems only support the following equipment.

IP500 Base Cards	IP500 Daughter Cards	Expansion Modules	Phones
Maximum 4	Maximum 4	Maximum 1	Maximum 48
• Digital Station 8 (Max 3) • Phone 2 • Phone 8 • Combination Card ATM4	• ATM4 Uni	• Digital Station 16 • Phone 16	• 1408 • 1416 • Analog phones.

Chapter 2.
Installation Requirements

2. Installation Requirements

2.1 Environmental Requirements

The planned location must meet the following requirements. If being installed into a rack system, these are requirements for within the rack:

1. ☐ Temperature: 0°C to 40°C / 32°F to 104°F.
2. ☐ Humidity: 10% to 95% non-condensing.
3. ☐ Check there are no flammable materials in the area.
4. ☐ Check there is no possibility of flooding.
5. ☐ Check that no other machinery or equipment needs to be moved first.
6. ☐ Check that it is not an excessively dusty atmosphere.
7. ☐ Check that the area is unlikely to suffer rapid changes in temperature and humidity.
8. ☐ Check for the proximity of strong magnetic fields, sources of radio frequency and other electrical interference.
9. ☐ Check there are no corrosive chemicals or gasses.
10. ☐ Check there is no excessive vibration or potential of excessive vibration, especially of any mounting surface.
11. ☐ Check that where telephones are installed in another building, that the appropriate protectors and protective grounds are fitted (see Out of Building Telephone Installation 38).
12. ☐ Check there is suitable lighting for installation, system programming and future maintenance.
13. ☐ Check that there is sufficient working space for installation and future maintenance.
14. ☐ Ensure that likely activities near the system will not cause any problems, e.g. access to and maintenance of any other equipment in the area.
15. ☐ Where ventilation holes are present on any of the IP Office units, those holes should not be covered or blocked.
16. ☐ The surface must be flat horizontal for free-standing or rack mounted installations.

Wall Mounting

In additional to the requirements above, the following are applicable to IP Office units that support wall mounting.

1. Units must only be mounted onto permanent wall surfaces.
2. The surface must be vertical and flat.
3. Orientation of the unit must be as shown in the section on IP500 Wall Mounting 184.
4. The appropriate Avaya wall mounting kits must be used.

IMPORTANT SAFETY INSTRUCTIONS

When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

1. Do not use this product near water, for example, near a bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement or near a swimming pool.
2. Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
3. Do not use the telephone to report a gas leak in the vicinity of the leak.
4. Use only the power cord and batteries indicated in this manual.

2.2 Space Requirements

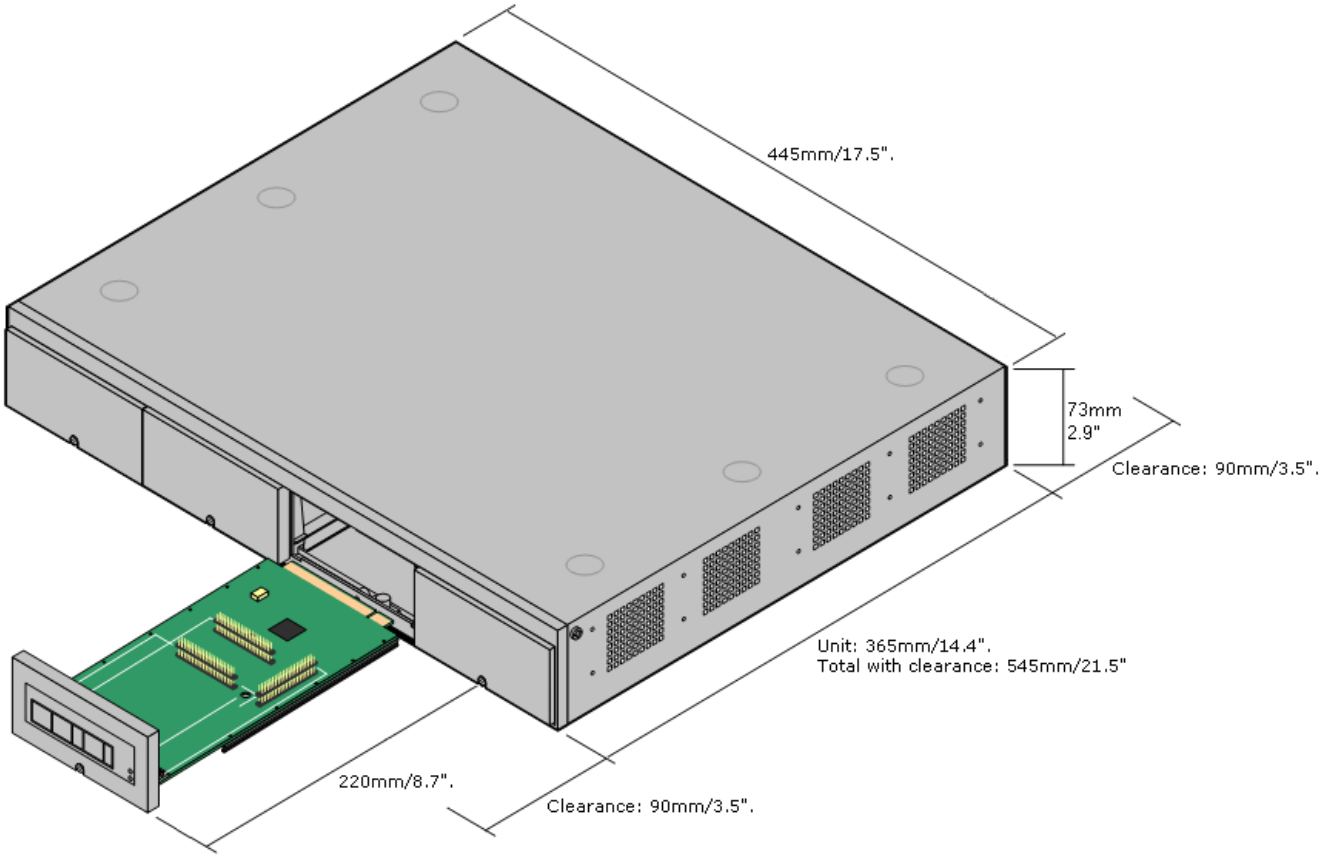
IP Office control units and modules are designed to be installed either in a free-standing stack or into a 19" rack system. Rack installation requires a rack mounting kit 39 for each control unit and expansion module.

If being used without any external expansion modules, the IP500 and IP500v2 control units can be wall mounted using a wall mounting kit.

- Cable Clearance
  Clearance must be provided at the front and rear of all modules for cable access and feature key dongle connection.
  - On IP400 systems, allow a minimum clearance of 75mm (3 inches).
  - On IP500 and IP500v2 systems allow a minimum clearance of 90mm (3.5 inches).
- Additional Clearance
  Care should be taken to ensure that the positioning of the modules does not interrupt air flow and other factors that may affect environmental requirements 56. This is especially important on IP500 and IP500v2 control units which have ventilation slots at the side.
- Cable Access
  Power cords must not be attached to the building surface or run through walls, ceilings, floors and similar openings. Installation measures must be taken to prevent physical damage to the power supply cord, including proper routing of the power supply cord and provision of a socket outlet near the fixed equipment or positioning of the equipment near a socket outlet.

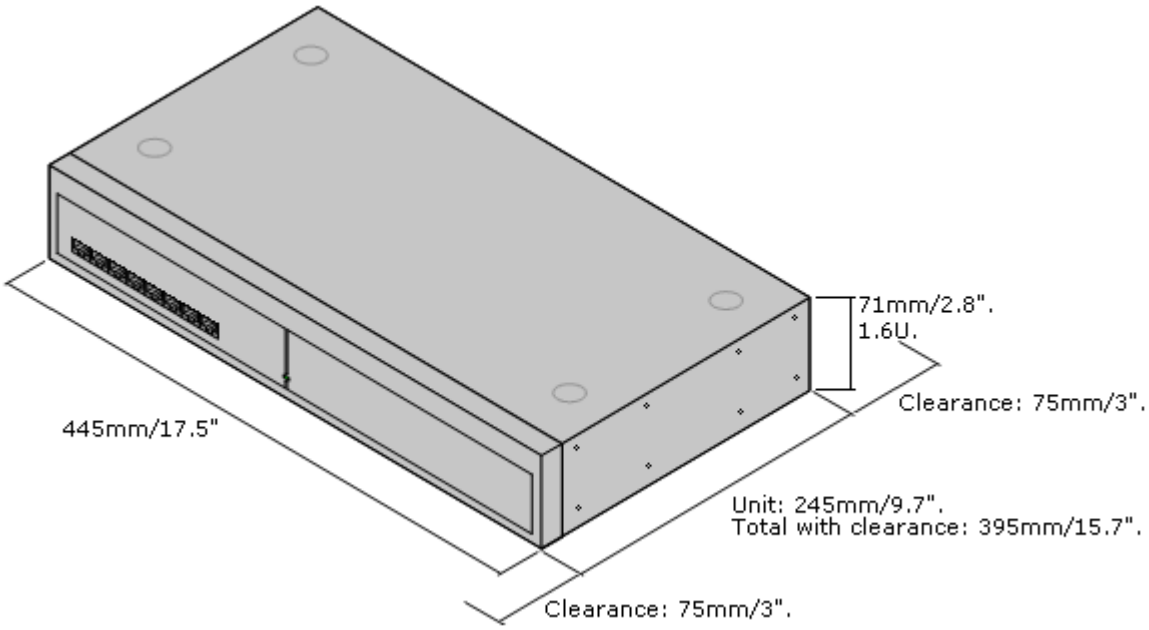
2.2.1 IP500 and IP500v2 Control Units

When wall mounted, a clearance of 500mm is required on all sides. The ventilation slots on the rear and sides should not be covered or blocked.



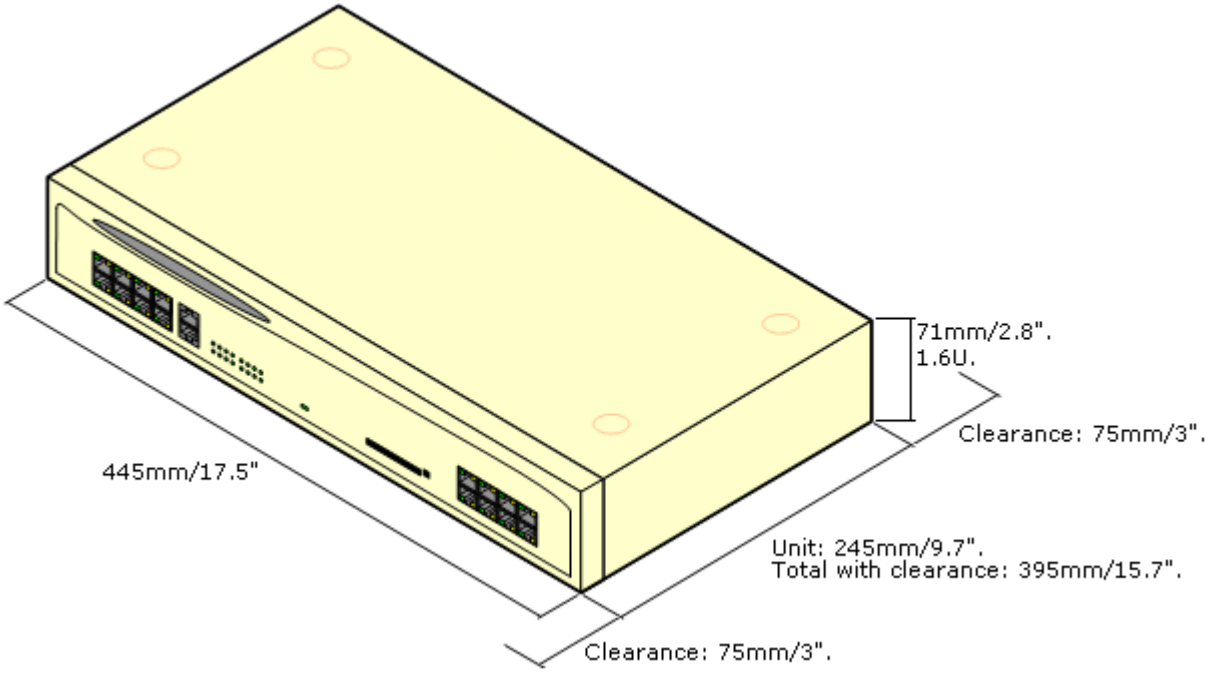
2.2.2 IP500 Expansion Modules

The dimensions below are applicable to all IP500 external expansion modules.



2.2.3 IP400 Control Units and Expansion Modules

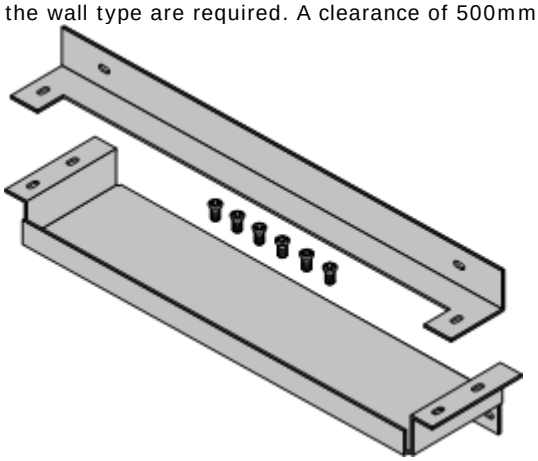
The dimensions below are applicable to all IP400 control units and IP400 external expansion modules.

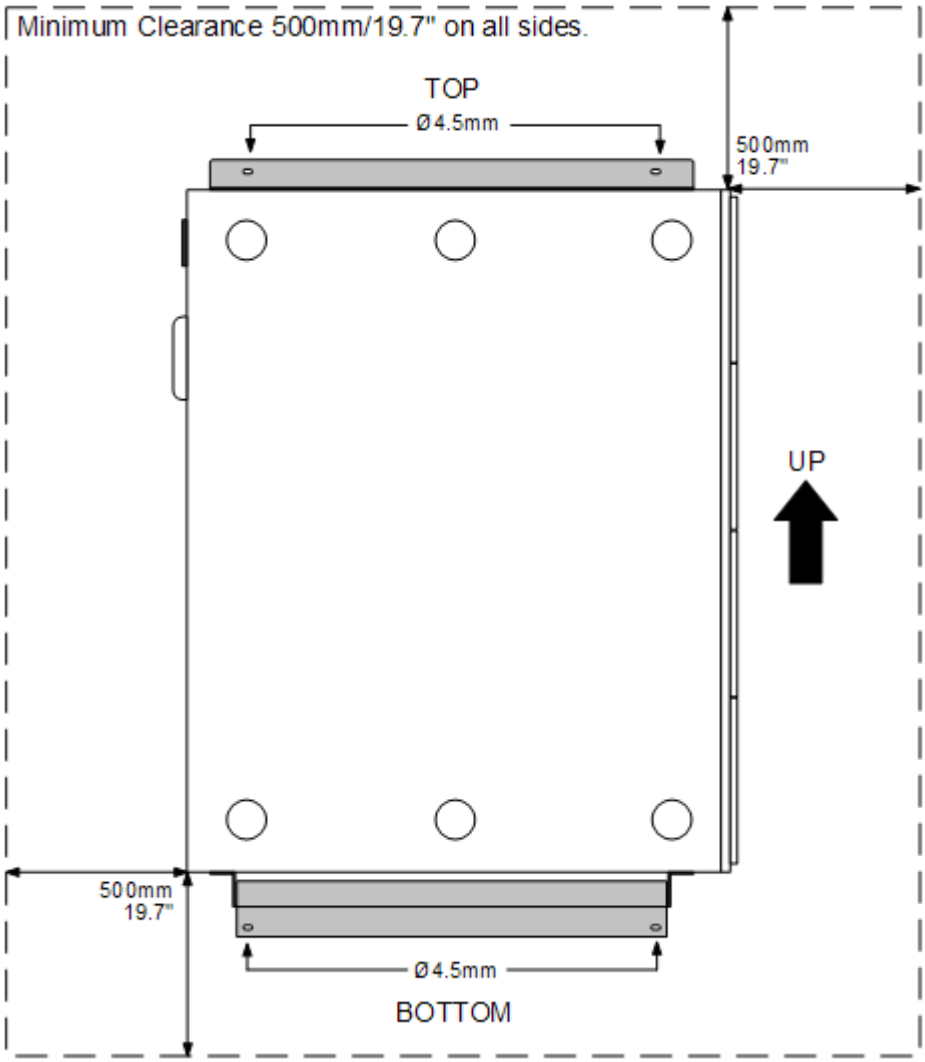


2.2.4 Wall Mounting

IP500 and IP500v2 control units can be wall mounted if not using any external expansion modules. An IP500 wall mounting kit is required in addition to suitable wall fixings.

- IP500 Wall Mounting Kit *(SAP Code 700430150)*
  This kit must be used when wall mounting an IP500 or IP500v2 control unit. Additional 4.5mm fixings suitable for the wall type are required. A clearance of 500mm around the control unit is required.



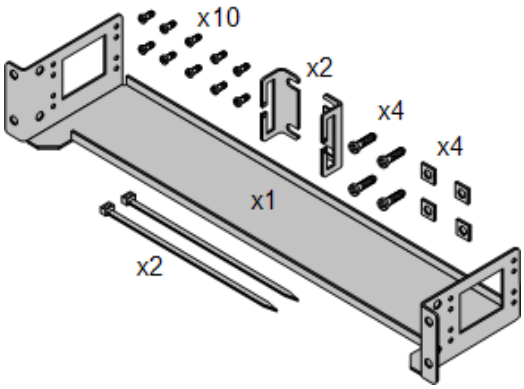


2.2.5 Rack Space Requirements

All IP Office control units and external expansion modules can be rack mounted into standard 19" rack systems. Each unit requires a 2U slot space within the rack. Rack mounting requires an IP400 or IP500 rack mounting kit for each control unit and external expansion module.

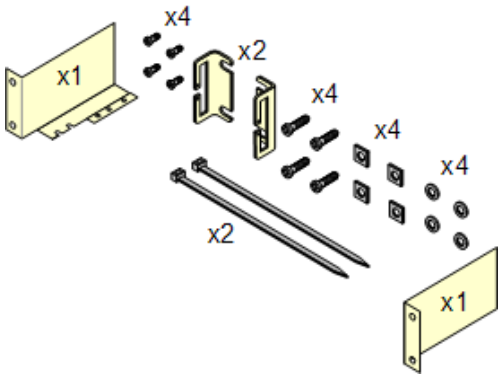
Where IP Office systems are being rack mounted, the effect of conditions within the rack cabinet must be considered. For example the rack temperature may be above the room temperature and airflow within the rack will be restricted. The environmental requirements 56 for the individual IP Office units are still applicable inside the rack cabinet.

IP500 Rack Mounting Kit



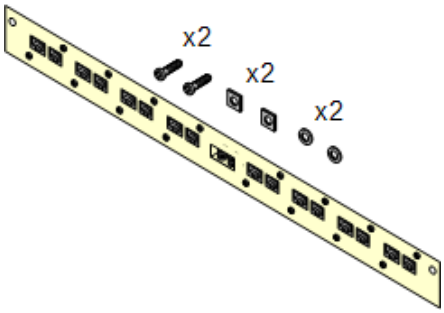
- IP500 Rack Mounting Kit *(SAP 700429202)*
  This kit contains all the components required for the rack mounting of a single IP500v2 control unit, IP500 control unit or IP500 external expansion module. This includes screws for fixing of the brackets to the module, bolts for securing the module in the rack and cable tidy brackets.

IP400 Rack Mounting Kit



- IP400 Rack Mounting Kit *(SAP 700210800)*
  This kit contains all the components required for the rack mounting of a single control unit or expansion module. This includes screws for fixing of the brackets to the module and bolts for securing the module in the rack.

Barrier Box Rack Mounting Kit

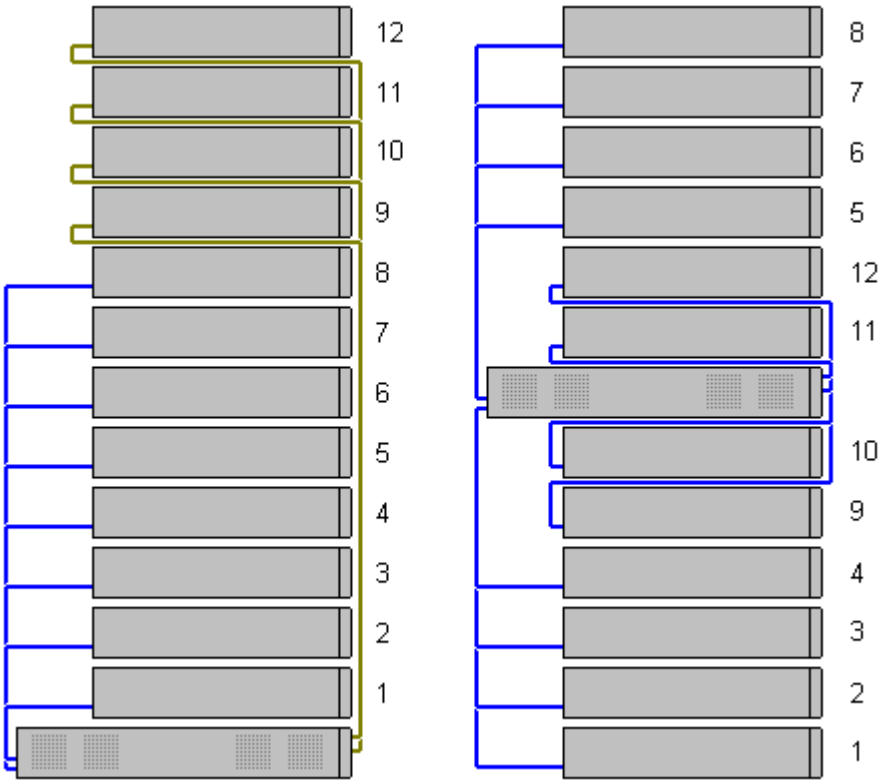


- Barrier Box Rack Mounting Kit *(SAP 700293905)*
  Barrier boxes must be used for out-of-building analog phone extensions 38. This bracket allows up to 8 IP Office barrier boxes to be rack mounted and simplifies the number of connections to the protective ground point in the rack. This kit must be used when more than 3 barrier boxes are in use and supports a maximum of 16 barrier boxes for a single external expansion module.

Rack Module Positioning

The integral expansion ports on a control unit are located on the rear of the unit. For IP500 and IP500v2 control units, an additional 4 expansion ports can be added to the front of the control unit by installing an IP500 4-Port Expansion card.

- Each external expansion module (except the WAN3 10/100) is supplied with a blue 1 meter (3'3'') expansion interconnect cable. This cable must be used when connecting to expansion ports on the rear of a control unit.
- When connecting to expansion ports on an IP500 4-Port Expansion card, a yellow 2 meter (6'6") expansion interconnect cable can be used in place of the standard blue cable. 4 Yellow cables are supplied with the IP500 4-Port Expansion card.
- The WAN3 10/100 module differs in that it connects via a LAN port on its front to one of the control unit's LAN ports. This type of external expansion module is not supported by IP500 and IP500v2 control units.



Chapter 3.

IP Office Administration Software

3. IP Office Administration Software

In order to install an IP Office system you must be familiar with using the following IP Office applications. They must be available on your installation PC.

Application		Description
	Manager	IP Office Manager is used to access all parts of the IP Office configuration. Different levels of access can be defined to control which parts of the configuration Manager user can view and alter. Manager is also used to upgrade the software files used by an IP Office system.
	System Status	The IP Office System Status application (SSA) is a reporting tool that provides a wide range of information about the current status of an IP Office system. Its can report the available resources and components within the system and details of calls in progress. Details of the number of alarms are recorded and the time date of the most recent alarms. When required for diagnostics escalation, SSA is able to take a snap shot image of the IP Office system's status including a copy of its current configuration. Use of SSA requires an IP Office service user name and password that has been configured for System Status access in the IP Office's security settings.
	Monitor	IP Office Monitor (also know as System Monitor) is a tool that can show all activity on the IP Office system in great detail. As a consequence, interpretation of Monitor traces requires a high-level of data and telephony protocol knowledge. However, all IP Office installers and maintainers must understand how to run Monitor when necessary as Avaya may request copies of Monitor traces to resolve support issues.

3.1 Installing the Admin Applications

The IP Office Administration suite consists of a number of applications for IP Office installers and maintainers.

- ☐ System Monitor - *Install* ✓
- ☐ Manager - *Install* ✓
- ☐ System Status Application - *Install* ✓
- ☐ Previous System Monitor - *Optional*
  This version of System Monitor is only required if you need to monitor the functioning of IP Offices running pre-IP Office 4.0 software.

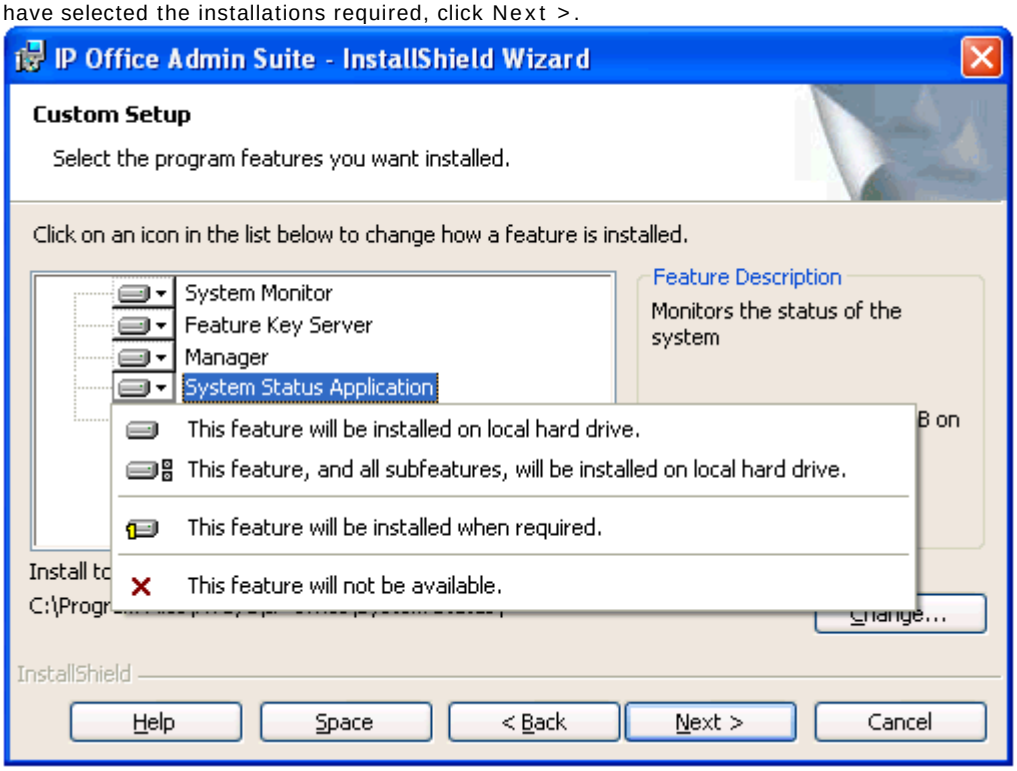
Requirements

- ☐ IPO 6.1 User/Admin DVD (700500949)
  Alternatively the IP Office Administrator Applications suite can be downloaded from Avaya's support website *(http://support.avaya.com)*.
- ☐ Windows PC Requirements
  This should meet the requirements of the administrator applications being installed. The specification below are the minimum requirements for IP Office Manager. If other applications are to be installed on the PC then their individual requirements should also be meet.

Requirement	Minimum	Recommended
Processor	600MHz Pentium or AMD Opteron, AMD Athlon64, AMD Athlon XP.	800MHz Pentium or AMD Opteron, AMD Athlon64, AMD Athlon XP.
RAM	128MB	256MB
HD Space	1GB - 800MB for .NET2, 200MB for Manager.	1.4GB - 800MB for .NET2, 600MB for the full IP Office Admin suite.
Display	800 x 600 - 256 Colors	1024 x 768 - 16-bit High Color
Operating System	Supported on Windows XP Pro, Windows Vista, Windows 7, Windows 2003 and Windows 2008. • 32-bit and 64-bit versions are supported. • Vista support is only on Business, Enterprise and Ultimate versions. • Windows 7 support is only on Professional, Enterprise and Ultimate versions.	

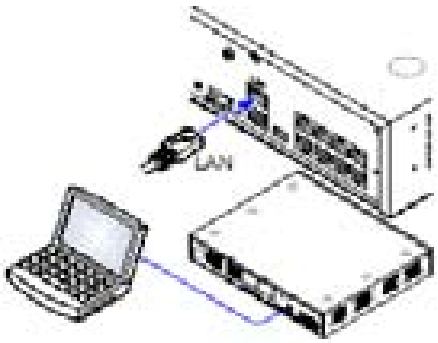
Installing the IP Office Admin Applications

1. Using the Add or Remove Programs option in the Windows Control Panel, check that the PC does not already have a version of the IP Office Admin suite installed.
   - If 'yes' and the suite is a pre-IP Office 3.2 version, remove the existing IP Office Admin suite via Add/Remove Programs.
   - If the existing suite is IP Office 3.2 or higher, it is possible to upgrade without removing the previous installation. However, if the system already has a USB Feature Key, the key should be removed prior to upgrading and then reinserted and the PC restarted.
2. Insert the IP Office Administrator Applications DVD. Select the option for the IP Office Administration Suit. A folder window will display the installation files for the administration suite.
3. Double-click on setup.exe.
4. Select the language you want to use for the installation process. This does not affect the language used by Manager when running. Click Next >.
5. Select who should be able to run the Admin Suite applications. Click Next >.
6. If required select the destination to which the applications should be installed. We recommend that you accept the default destination. Click Next >.
7. The next screen is used to select which applications in the suite should be installed. Clicking on each will display a description of the application. Click on the ▼ next to each application to change the installation selection. When you have selected the installations required, click Next >.



8. Ensure that at minimum System Monitor and Manager are selected. Click Next >.
9. Click Install.
10. Installation of Windows .Net2 components may be required. If dialogs for this appear, follow the prompts to install .Net.
11. If requested, reboot the PC.

3.2 Installer PC Connection



During installation it is recommended that the IP Office control unit is started without it being connected to any network. That ensure that the IP Office defaults to a known set of IP address settings.

This section covers connecting your installation PC directly to the IP Office control unit.

Requirements

- ☐ IP Office Administration PC
  A Windows PC with the IP Office Administrator Application suite installed 65.
- ☐ LAN Cable
  - ☐ IP Office IP406 V2, IP500 and IP500v2 control units can use a standard RJ45-RJ45 LAN cable.
  - ☐ IP412 Control Unit require used of an RJ45-RJ45 cross-over LAN cable.

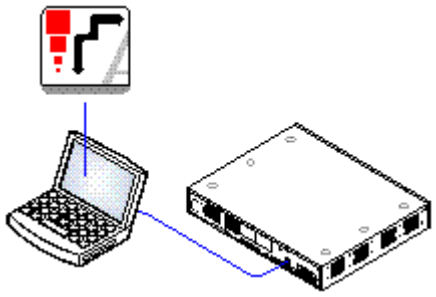
Direct Connection to a Defaulted IP Office Control Unit

1. The default address for an IP Office control unit LAN port is 192.168.42.1/255.255.255.0. To directly connect a PC, change the TCP/IP properties for the PCs LAN port to the following:

Fixed IP address	192.168.42.203
Subnet mask	255.255.255.0
Default gateway	192.168.42.1.

   - While setting the PC to be a DHCP client could be used, this is not recommended for performing more advanced functions such as firmware upgrades.
2. Connect the LAN cable from the PCs LAN port the LAN or LAN1 port on the IP Office control unit.
3. Check that the orange LED lamp on the IP Office LAN port is on. The green LED may also be flickering as it indicates traffic across the LAN connection.
4. To test the connection before running Manager or System Status Application:
   - Select Start | Run and enter *cmd*.
   - In the command window that appears enter ping 192.168.42.1. The results should show a number of ping replies from the IP Office. This confirms basic communication between the Manager PC and the IP Office.
   - If there are no ping replies enter ipconfig. The results should list the IP address settings of the Manager PC as required above. If they do enter exit and check the cable connection.
5. You can now start Manager 68, System Status 69 or System Monitor 70.

3.3 Starting Manager

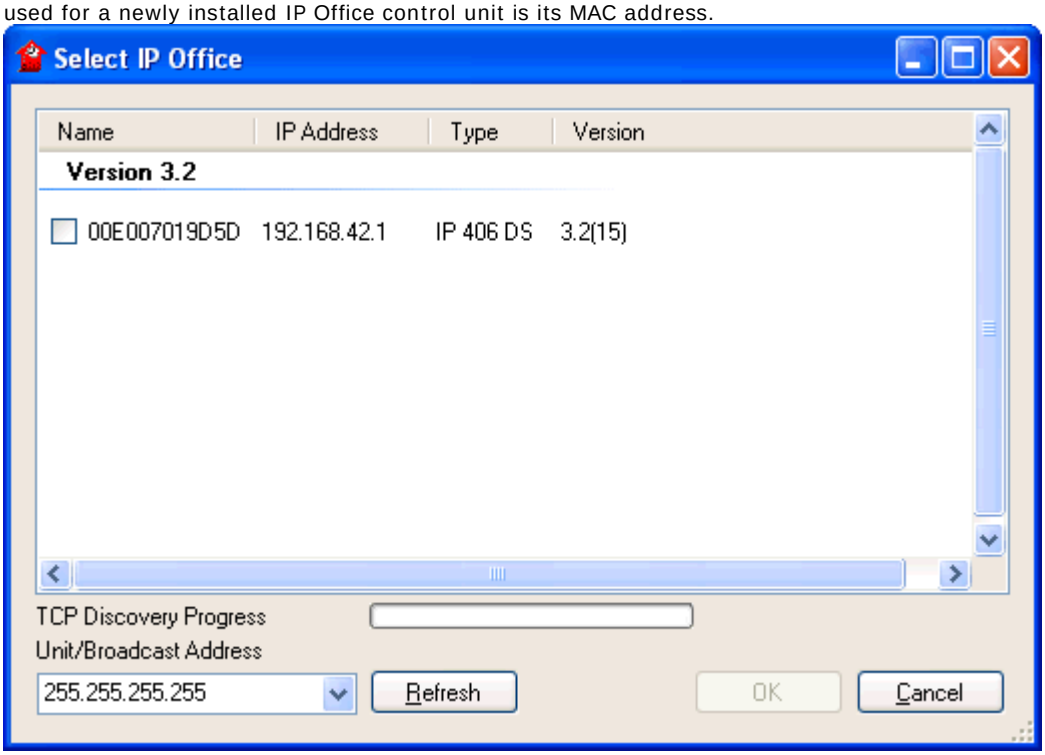


IP Office Manager is used to access all parts of the IP Office configuration. Different levels of access can be defined to control which parts of the configuration Manager user can view and alter. Manager is also used to upgrade the software files used by an IP Office system.

Requirements

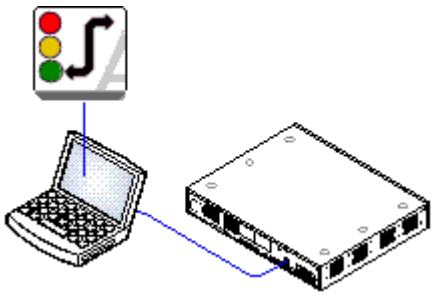
- ☐ IP Office Administration PC
  A Windows PC with the IP Office Administrator Application suite installed 65.
- ☐ LAN Cable
  - ☐ IP Office IP406 V2, IP500 and IP500v2 control units can use a standard RJ45-RJ45 LAN cable.
  - ☐ IP412 Control Unit require used of an RJ45-RJ45 cross-over LAN cable.

1. Select Start | Programs | IP Office | Manager.
2. If the PC has firewall software installed, you may be prompted as to whether you want to allow this program to access the network. Select Yes or OK.
3. Select File | Open Configuration from the menu bar.
4. The Select IP Office window appears. After a few seconds it should list the IP Office control unit. The default name used for a newly installed IP Office control unit is its MAC address.



   - If the system required was not found, the address used for the search can be changed. Enter or select the required address in the Unit/Broadcast Address field and then click Refresh to perform a new search.
5. Click the check the box next to the system and then click OK.
6. The name and password request is displayed. The name and password must match one of those setup through the security settings. The default name and password for full configuration settings access is *Administrator* and *Administrator*.

3.4 Starting System Status



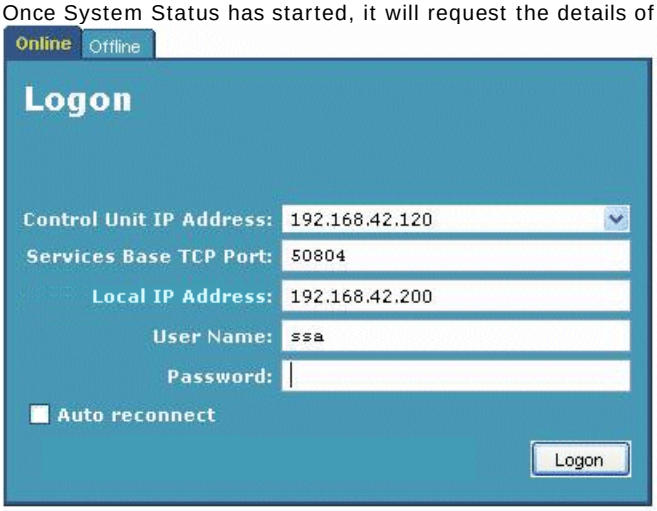
The IP Office System Status application (SSA) is a reporting tool that provides a wide range of information about the current status of an IP Office system. Its can report the available resources and components within the system and details of calls in progress. Details of the number of alarms are recorded and the time date of the most recent alarms.

When required for diagnostics escalation, SSA is able to take a snap shot image of the IP Office system's status including a copy of its current configuration. Use of SSA requires an IP Office service user name and password that has been configured for System Status access in the IP Office's security settings.

Requirements

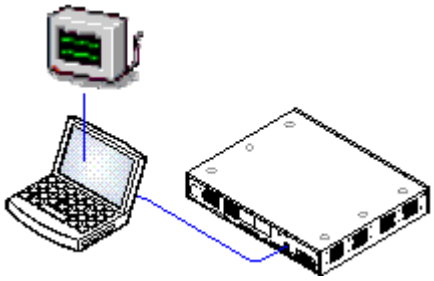
- ☐ IP Office Administration PC
  A Windows PC with the IP Office Administrator Application suite installed 65.
- ☐ LAN Cable
  - ☐ IP Office IP406 V2, IP500 and IP500v2 control units can use a standard RJ45-RJ45 LAN cable.
  - ☐ IP412 Control Unit require used of an RJ45-RJ45 cross-over LAN cable.

1. There are several methods that can be used to start the IP Office System Status application.
   - On a PC where System Status has been installed, select Start | Programs | IP Office | System Status.
   - If Manager is also installed and is running, select File | Advanced | System Status.
   - For IP500v2 controls units, start a web browse and enter the IP address of the control unit. Select the link for the System Status Application.
2. Once System Status has started, it will request the details of the IP Office system to which you want it to connect.



   - Control Unit IP Address
     Enter the IP address of the IP Office control units LAN interface or use the drop down to select a previously used address.
   - Services Base TCP Port
     This should match the Services Base TCP Port setting of the IP Office system, set in that systems security settings. The default is 50804.
   - Local IP Address
     If the PC has more than one IP address assigned to its network card or multiple network cards, the address to use can be selected if necessary. This allows SSA to be run on a PC that is already running an SSI connection to the IP Office for the IP Office Customer Call Reporter application.
   - User Name/Password
     Enter a user name and password that has been provided for SSA usage. This must be the name of an IP Office service user name that has been configured for system status access in the IP Office's security settings. See Assigning Security Settings.
   - Auto Reconnect
     If selected, SSA will attempt to reconnect using the same settings if connection to the IP Office is lost.
3. Enter the required details for the IP Office and click Logon.

3.5 Starting Monitor

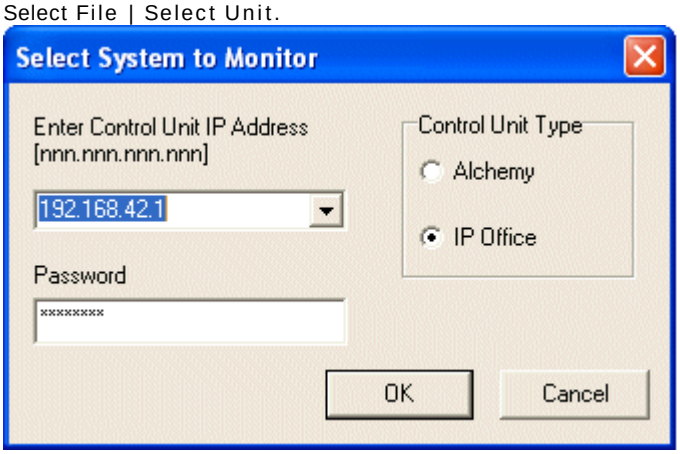


IP Office Monitor (also know as System Monitor) is a tool that can show all activity on the IP Office system in great detail. As a consequence, interpretation of Monitor traces requires a high-level of data and telephony protocol knowledge. However, all IP Office installers and maintainers must understand how to run Monitor when necessary as Avaya may request copies of Monitor traces to resolve support issues.

Requirements

- ☐ IP Office Administration PC
  A Windows PC with the IP Office Administrator Application suite installed 65.
- ☐ LAN Cable
  - ☐ IP Office IP406 V2, IP500 and IP500v2 control units can use a standard RJ45-RJ45 LAN cable.
  - ☐ IP412 Control Unit require used of an RJ45-RJ45 cross-over LAN cable.

1. Select Start | Programs | IP Office | Monitor.
2. If System Monitor has been run before it will attempt to connect with the system which it monitored previously. If otherwise or you want to monitor a different system use the steps below.
3. Select File | Select Unit.



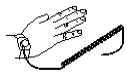
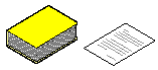
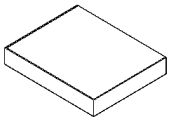
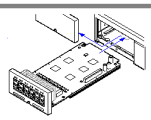
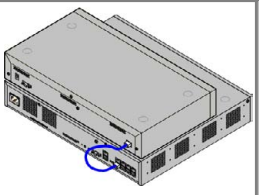
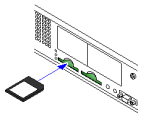
4. Enter the IP Office IP address and password of the IP Office Control Unit you want to monitor.
   - Using IP Office Manager it is possible to set a specific System Monitor Password for System Monitor access to an IP Office system. If the IP Office doesn't have a System Monitor Password set, System Monitor uses the IP Office's System Password. The System Monitor Password and System Password are both set within the IP Office system security settings.
   - For an IP Office system, ensure that the Control Unit Type is set to IP Office.
5. Click OK.

Chapter 4.
IP500v2 Installation

4. IP500v2 Installation

This installation process is a simple outline as installation requirements and processes will vary.

- In this process, all the IP Office hardware components are installed and connected without being switched on until the end of the process. The control unit will then upgrade all the connected components, including phones, to the appropriate level of firmware.
- Also when switched on, the system is not connected to the customers data network. This ensures that the control unit will default to known default IP address settings (unless you have pre-loaded the System SD card with a configuration file with different settings).

Process		Description
	Tools and Parts Required 73	Check that you have the tools and additional parts required.
	Documentation 74	Ensure that you have obtained and read all the relevant documentation.
	Unpacking 75	Check that all the required equipment has been delivered and that there is no damage.
	SD Card Preparation 76	Upgrade and pre-load the System SD card with a configuration and other files in order to speed up installation
	Install the Base Cards 79	Attach any trunk daughter cards and IP400 legacy cards to the IP500 base cards. Insert the cards into the control unit.
	Wall Mount 83	If wall mounting, attach the brackets and fit the control unit to the wall.
	Rack Mounting 84	If rack mounting, attach the brackets and fit the control unit into the rack.
	Connect External Expansion Modules 86	Connect the external expansions modules to the control unit.
	Grounding 88	Attach required ground cables to the control unit and external expansion modules.
	LAN Network Connections 89	Attach the IP Office control unit and a PC with IP Office Manager to the LAN network.
	Starting the System 90	Insert the System SD card and power up the system.
	Connecting Phones 92	Connect the Avaya digital phones.

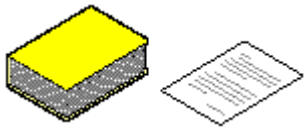
4.1 Tools and Equipment Required

The following is a general summary of the tools required. Additional tools and equipment will be required for wall and or rack mounting and to fashion ground cable connections suitable to local requirements.

- Tools Required
  - ☐ 5mm Flat-blade screwdriver.
  - ☐ Crosshead screwdriver.
  - ☐ Anti-static wrist strap and ground point.
  - ☐ RJ45-RJ45 Ethernet LAN Cable.
  - ☐ M4 Cross-Head Screwdriver.
  - ☐ Tools suitable for crimping a cable spade.
  - ☐ If wall mounting, drills and tools for wall mounting fixtures.

- Additional Parts Required
  In addition to orderable IP Office equipment, the following items will be required.
  - ☐ 14AWG Solid copper wire for ground connection of control units and expansion modules.
  - ☐ Cable sleeve matching local regulator requirements for ground wires. Typically green for a functional ground and green/yellow for a protective ground.
  - ☐ If wall mounting, additional 4.5mm diameter fixtures and fittings suitable for the wall type.
  - ☐ Cable ties and labels for tidying and identifying cables.
- PC Requirements
  1. ☐ Windows PC with IP Office Admin suite installed 65 and RJ45 Ethernet LAN port.
  2. ☐ SD Card reader.

4.2 Documentation



Ensure that you have read this manual in full before starting installation. Also include the installation documentation for any other equipment and applications being installed as part of the IP Office system.

- ⚠ IP Office Technical Bulletins
  Ensure that you have obtained and read the IP Office Technical Bulletin relating to the IP Office software release which you are installing. This bulletin will contain important information that may not have been included in this manual. IP Office Technical Bulletins are available from the Avaya support website *(http://support.avaya.com)*.
- ⚠ Upgrade Licenses
  Some upgrades may require entry of upgrade licenses.

Other IP Office Installation Manuals

The following components of IP Office are outside the range of a basic IP Office installation. They are covered by separate installation and configuration documentation. If those components are to be part of the IP Office system installation, that documentation should be obtained, read and understood prior to the installation.

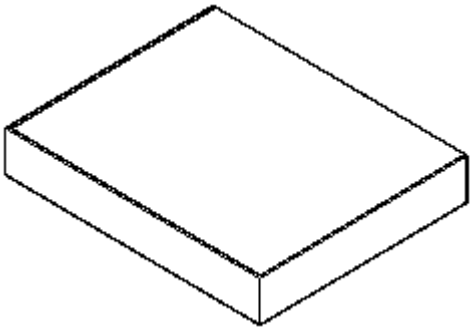
- Partner Version Installation
- one-X Portal for IP Office Installation
- 4600/5600 Series IP Phone Installation.
- Embedded Voicemail Installation.
- Voicemail Pro Installation.
- Contact Store Installation.
- Compact DECT Installation.
- IP DECT R4 Installation.
- 3600 Series Wireless IP Installation.
- Phone Manager Installation Manual.
- SoftConsole Installation Manual.
- SIP Extension Configuration

Information Web Sites

IP Office documentation is available from the following web sites.

- Avaya Support *(http://support.avaya.com)*
  Contains documentation and other support materials for Avaya products including IP Office. Copies of the IP Office CD images are available from this site and updated core software .bin files.
- Avaya IP Office Knowledge Base *(http://marketingtools.avaya.com/knowledgebase)*
  Access to an on-line regularly updated version of the IP Office Knowledge Base.

4.3 Unpacking



Use the following procedure when unpacking any equipment supplied by Avaya or an Avaya reseller or distributor.

Information Required

- ☐ Equipment Checklist.
  An installation checklist of the parts and equipment ordered for the installation.

Procedure

1. ☐ Check for Package Damage
   Before unpacking any equipment, check for any signs of damage that may have occurred during transit. If any damage exists bring it to the attention of the carrier.
2. ☐ Check the Correct Parts Have Been Delivered
   Check all cartons against the packing slip and ensure that you have the correct items. Report any errors or omissions to the equipment supplier.
3. ☐ Retain All Packaging and Documentation
   While unpacking the equipment, retain all the packaging material. Fault returns are accepted only if repackaged in the original packaging. If performing a staged installation, the original packaging will also assist when repacking equipment to be moved to the final install site.
4. ☐ Ensure that Anti-Static Protection Measures are Observed
   Ensure that anti-static protection measures are observed at all times when handling equipment with exposed electrical circuit boards.
5. ☐ Check All Parts
   Visually inspect each item and check that all the necessary documentation and accessory items have been included. Report any errors or omissions to the dealer who supplied the equipment.
6. ☐ Check All Documentation
   Ensure that you read and retain any documentation included with the equipment.

4.4 SD Card Preparation

IP500v2 control units are supplied with no installed firmware or configuration. When first powered up, the control unit will load and install the necessary firmware from the System SD card installed in it. It will then create a default configuration matching the cards installed in the control unit and external expansion modules attached to it.

You can perform a number of additional actions prior to installing the System SD card in order to pre configure the IP Office system.

- Upgrade the Card Firmware 76
- Add a Configuration File 76
- Add a License File 78
- Add Music on Hold Files 78
- Add a 9600 Screen Saver Image File 78

Additional actions that can be performed on SD cards are detailed in the SD Card Management 144 section.

4.4.1 Upgrade the Card Firmware

This process will create the folder structure on the SD card and copy the necessary firmware files from those installed with IP Office Manager onto the SD card. This includes the binary files for the IP500v2 system, any external expansion modules and phones. It also includes the prompt files for embedded voicemail operation.

This process can be used to upgrade an existing SD card to match the file set installed with Manager. For the card to be used in an IP500v2 system's System SD slot the card must be Avaya SD Feature Key card. The card must be correctly formatted (see Format IP Office SD card 149).

If the card contains any dynamic system files, for example SMDR records, they are temporarily backed up by Manager and then restored after the card is recreated.

This process takes approximately 15 minutes.

1. Once started do not interrupt this process, for example by removing the SD card. This process takes approximately 15 minutes.
2. Insert the SD card into a card reader on the Manager PC.
3. Using IP Office Manager, select File | Advanced | Recreate IP Office SD Card.
4. Select IP Office A-Law, IP Office U-Law or IP Office Partner Version. This selection will affect how the IP Office systems operates when defaulted with this card present in its System SD card slot. .
5. Browse to the card location and click OK.
6. Manager will start creating folders on the SD card and copying the required files into those folders. This process will take approximately 15 minutes. Do not remove the SD card during the process. Wait until the Manager status bar at the bottom shows a *"Ready"* message.

4.4.2 Adding a Pre-Built Configuration File

IP Office Manager can be used to create an IP Office configuration file 77. For IP500v2control units, such a pre-created IP Office configuration file can be placed on the System SD card. That file will then be used when the IP Office system is started.

1. Using IP Office, create an offline configuration that matches the customer requirements and the equipment that will be installed in the IP Office.
2. Rename the configuration file *config.cfg*.
3. Using a card reader, copy the file into the */system/primary* folder on the System SD memory card.

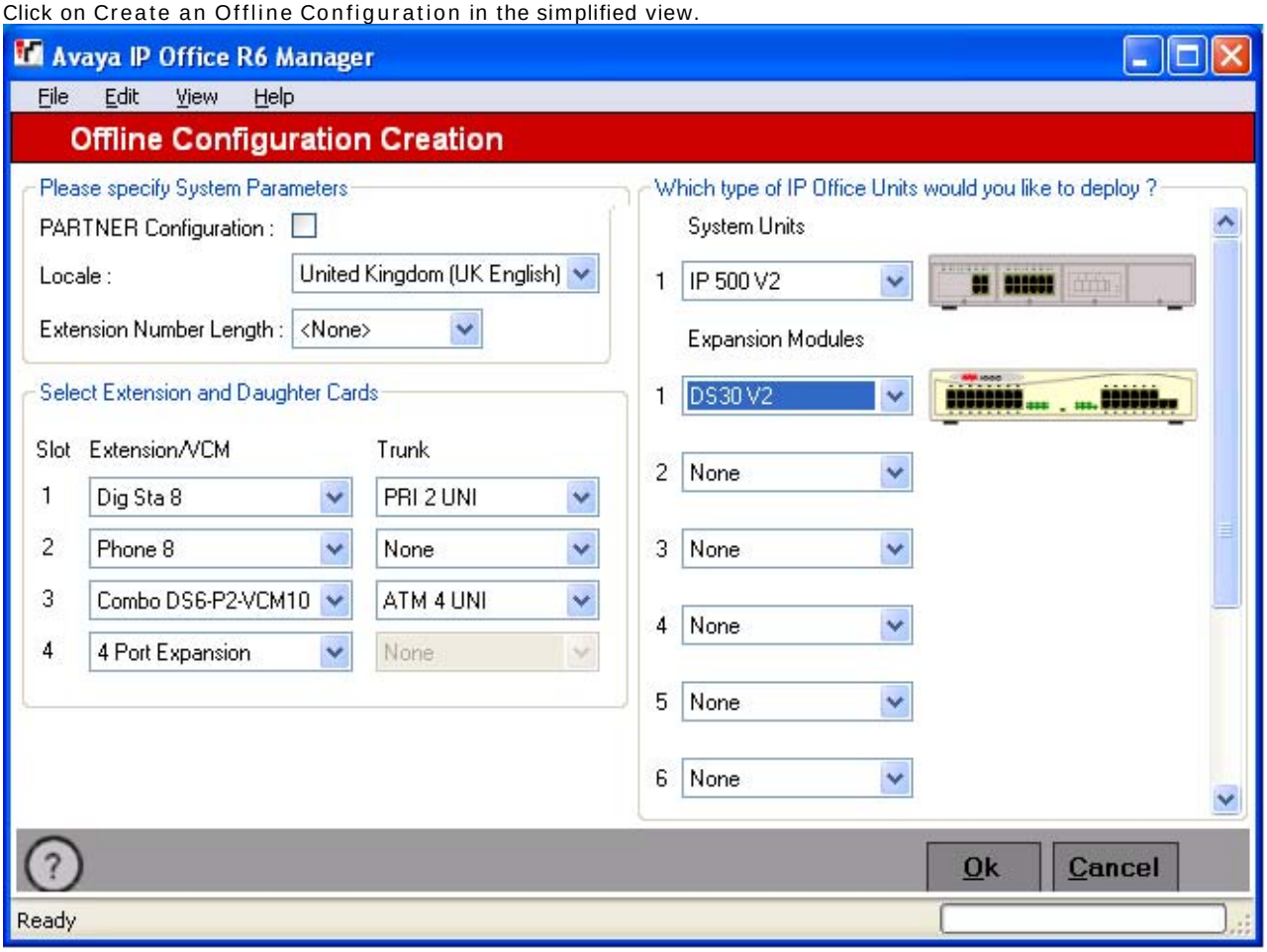
4.4.3 Creating a Configuration File

IP Office Manager can be used to create a new configuration without connecting to an IP Office system. During the process, you can specify the locale of the system, what type of trunk cards it uses and what type of control unit and expansion modules to include.

This allows the creation of a configuration prior to installation of system. For IP500v2 control units, the configuration file can be placed onto the System SD card 76 before it is installed into the system. For other IP Office control units, the configuration can be uploaded using Manager after initial installation of the system.

- The configuration created must match the physical equipment in the IP Office system onto which the configuration will be loaded. Doing otherwise may cause the IP Office system to reset and experience other problems.
- The configuration creation tool includes all control units, external expansion modules and trunk cards supported by IP Office Release 6. It is you responsibility to confirm what IP Office equipment is supported in your locale.

1. Start IP Office Manager with no configuration loaded into Manager
2. Click on Create an Offline Configuration in the simplified view.



3. Select the type of configuration that you want to create. If you select PARTNER Configuration, the equipment and settings will be restricted to those supported by IP Office running in Partner Version mode.
4. When completed click OK.
5. Manager will create an load the configuration. If PARTNER Configuration was selected, Manager will switch to Partner Version Administration mode, otherwise it will use IP Office configuration mode.
6. Edit the configuration to match the customer requirements. This can include importing information from preprepared CSV files.
7. When completed, select File | Save Configuration As.

4.4.4 Adding a License File

For IP500v2 control uits, if a licence file called keys.txt is found in the SD card folder which the IP Office uses when it boots, the IP Office will merge the licenses in that file with its configuration.

The files should be a plain text file (UTF8) containing either:

- A license name and license key separated by a comma on each line.

```
Teleworker, uAuToY@9VvVV@VOzIgeegwLXL2sAs1Z5
Mobile Worker, NvWO_iVY5KJpZMNeY89IB1sIj0_QUCDm
Power User, 9IJQW3yuPsbxjGS2XcMa16_J9H8cSeZ9
System Advanced, JAWZaw@YtK37vcnXkqM4mDYDIdSMd9_1
```

- A license key on each line.

```
uAuToY@9VvVV@VOzIgeegwLXL2sAs1Z5
NvWO_iVY5KJpZMNeY89IB1sIj0_QUCDm
9IJQW3yuPsbxjGS2XcMa16_J9H8cSeZ9
JAWZaw@YtK37vcnXkqM4mDYDIdSMd9_1
```

1. Using a card reader, copy the file into the */system/primary* folder on the System SD memory card.

4.4.5 Adding Music on Hold Files

By default the IP Office will use internal music on hold by uploading a music file. For IP500v2 systems you can load a file onto the System SD card prior to installing it in the IP Office.

The file must be of the following format and must be called *holdmusic.wav*.

Property	Value
File Type	WAV
Bit Rate	128kbps
Audio sample size	16 bit
Channels	1 (mono)
Audio Sample Rate	8 kHz
Audio Format	PCM
Length	Up to 90 seconds.

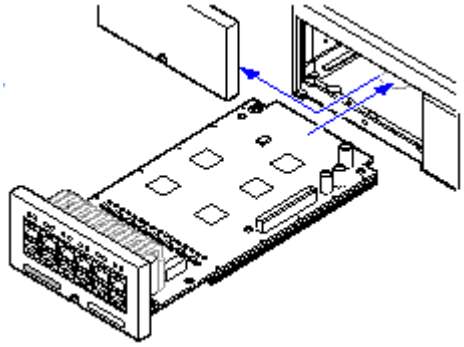
1. Rename the music file *holdmusic.wav*.
2. Using a card reader, copy the file into the */system/primary* folder on the System SD memory card.
3. If the IP Office is or will be configured for additional hold music files (up to 3 additional files), copy those files to the same location. The name of the additional files must match those specified in the IP Office system's configuration.

4.4.6 Adding a 9600 Series Screen Saver File

When idle, 9600 Series phones can timeout to displaying a screen saver image. A file, *96xxiposs.jpg*, is present on the cards by default.

You can replace this file with your own branded file. The file should be smaller than the screen size on 9600 Series phones in order to then be moved around the screen.

4.5 IP500 Card Installation



The IP500 base cards and trunk daughter cards should be fitted before power is applied to the control unit. Ensure that cards are inserted in the order that matches the planned or pre-built configuration.

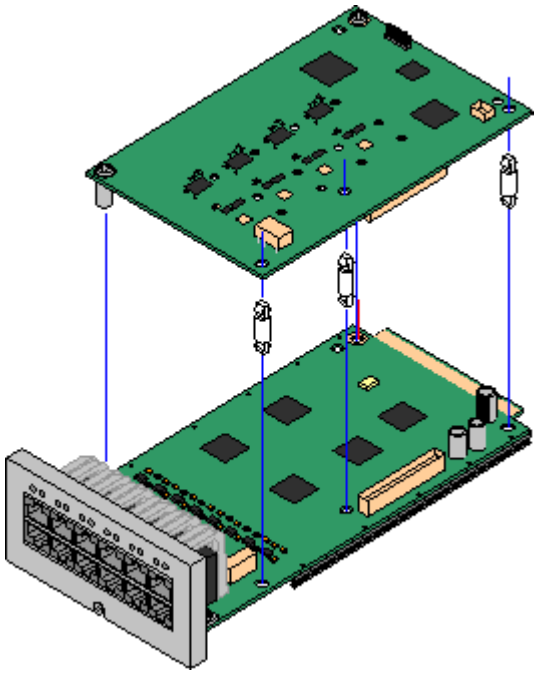
1. Fitting IP500 Trunk Daughter Cards to the Base Cards. 80
2. Fitting IP400 Legacy Cards to a Legacy Card Carrier. 81
3. Installing IP500 Cards into the Control Unit. 82

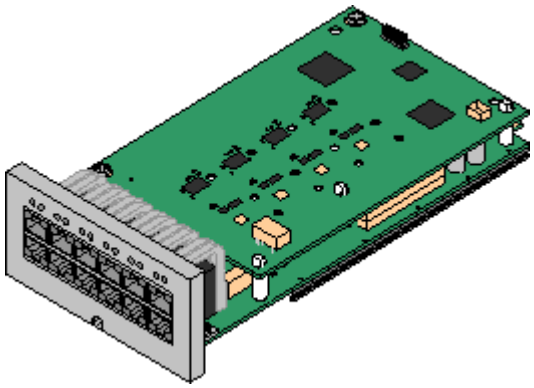
- ⚠ Warnings
  - Correct anti-static protection steps should be taken before handling circuit boards.
  - Cards must never be added or removed from the control unit while it has power connected.

- General Notes
  - Cards can be fitted in any order into any available slots. The only exception is the IP500 4-Port Expansion card which can only be installed in right hand slot 4.
  - It is recommended that cards are fitted from left to right.
  - There are restrictions to the number of supported cards of some types. When such a limit is exceed, the right-most card of that type will not function.
  - Ensure that you use the labels supplied to identify the card fitted into the control unit.

4.5.1 IP500 Daughter Card Preparation

IP500 trunk daughter cards can be fitted to any IP500 base card except the IP500 Legacy Card Carrier. For IP500 Combination cards, the trunk daughter card is pre-installed and cannot be changed.





⚠ Warnings

1. Correct anti-static protection steps should be taken while handling circuit boards.

Parts and Equipment Required

1. ☐ IP500 Base Card (except the IP500 Legacy Card Carrier).
2. ☐ IP500 Trunk Daughter Card
3. ☐ 3 Stand Off Pillars
   These are supplied with the trunk daughter card.

Tools Required.

1. ☐ 5mm Flat-blade screwdriver.
2. ☐ Anti-static wrist strap and ground point.

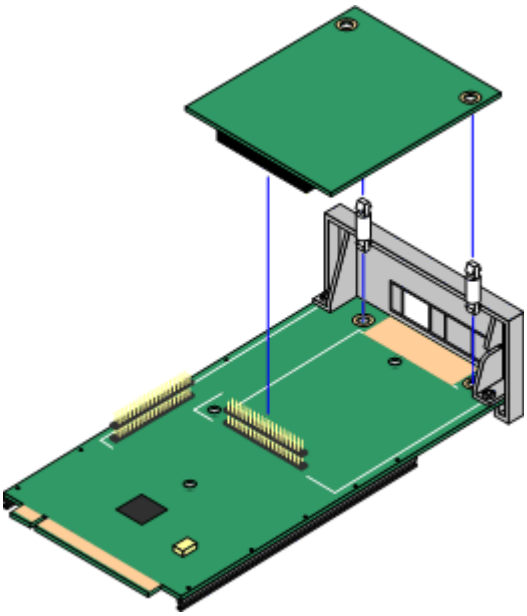
Procedure: Installing an IP500 Trunk Daughter Card

1. Check that correct cards have been supplied.
2. Ensure that you are wearing an anti-static wrist strap connected to a suitable ground point.
3. On the base card identify the position of 3 holes for the plastic pillars for the IP500 card. These are along the same edge as the card connector.
4. Fit the stand off pillars to the IP500 base card.
5. If there is a clip-on metal shield over the connector block on the base card, remove it.
6. Using minimal force and checking that the pins are correctly located, push the IP500 trunk card onto its connector block and the stand off pillars.
7. Check that the card connector has snapped into position.
8. Using the washers and screws provided, secure the metal stand off pillars to the base card.
9. A set of labels are supplied with the trunk daughter card. Fit the appropriate label to the front of the base card.

4.5.2 IP500 Legacy Card Preparation

An IP500 Legacy Carrier card can be used to fit IP400 trunk or VCM cards into an IP500 or IP500v2 control unit. Up to 2 IP500 legacy carrier cards can be inserted.

- ✓ PRI T1
- ✓ Dual PRI T1
- ✓ PRI 30 E1 (1.4)
- ✓ Dual PRI E1
- ✓ PRI 30 E1R2 RJ45
- ✓ Dual PRI E1R2 RJ45
- ✓ BRI-8 (UNI)
- ✓ ANLG 4 Uni (US only)
- ✓ VCM 4
- ✓ VCM 8
- ✓ VCM 16
- ✓ VCM 24
- ✓ VCM 30



⚠ Warnings

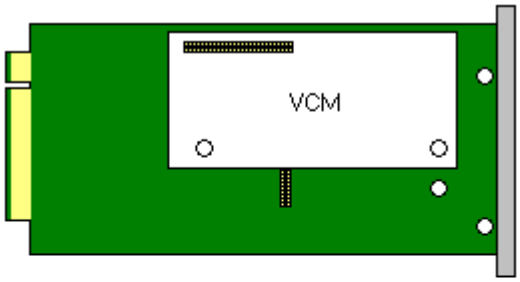
1. Correct anti-static protection steps should be taken while handling circuit boards.

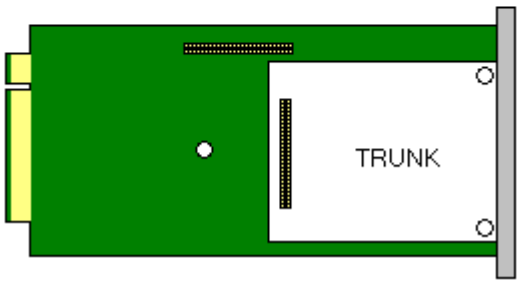
Parts and Equipment Required

1. ☐ IP500 Carrier Card
2. ☐ IP400 Card
   The table opposite lists supported cards. Any card not listed is not supported. Cards are supplied with 2 plastic stand off pillars. Trunk cards are also supplied with a replacement blanking plate which is not required.

Tools Required

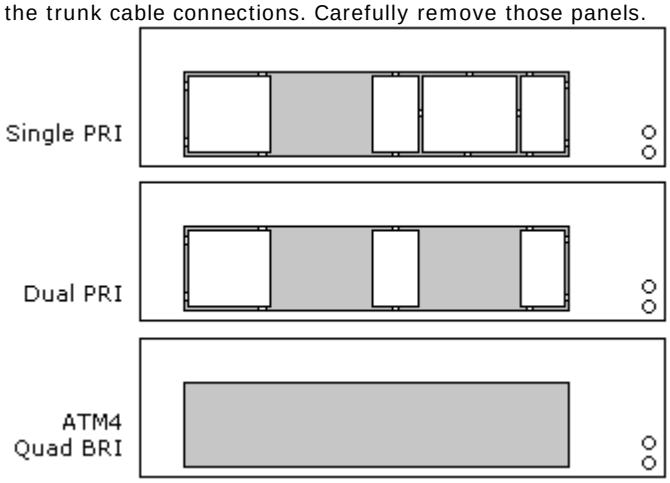
1. ☐ 5mm Flat-blade screwdriver.
2. ☐ Anti-static wrist strap and ground point.





Procedure: Installing a Carrier Card

1. Check that correct cards have been supplied.
2. Ensure that you are wearing an anti-static wrist strap connected to a suitable ground point.
3. On the carrier card identify the position of the jumper block and stand off pillar holes for the IP400 card. The peg holes are labeled as VCM or TRUNK.
4. If fitting an IP400 trunk card, identify which of the plastic snap-off panels on the front of the carrier card need to be removed to allow the trunk cable connections. Carefully remove those panels.



5. Fit the stand off pillars to the IP500 carrier card.
6. Using minimal force and checking that the pins are correctly located, push the IP400 card onto its jumper and the stand off pillars.

4.5.3 IP500 Card Insertion

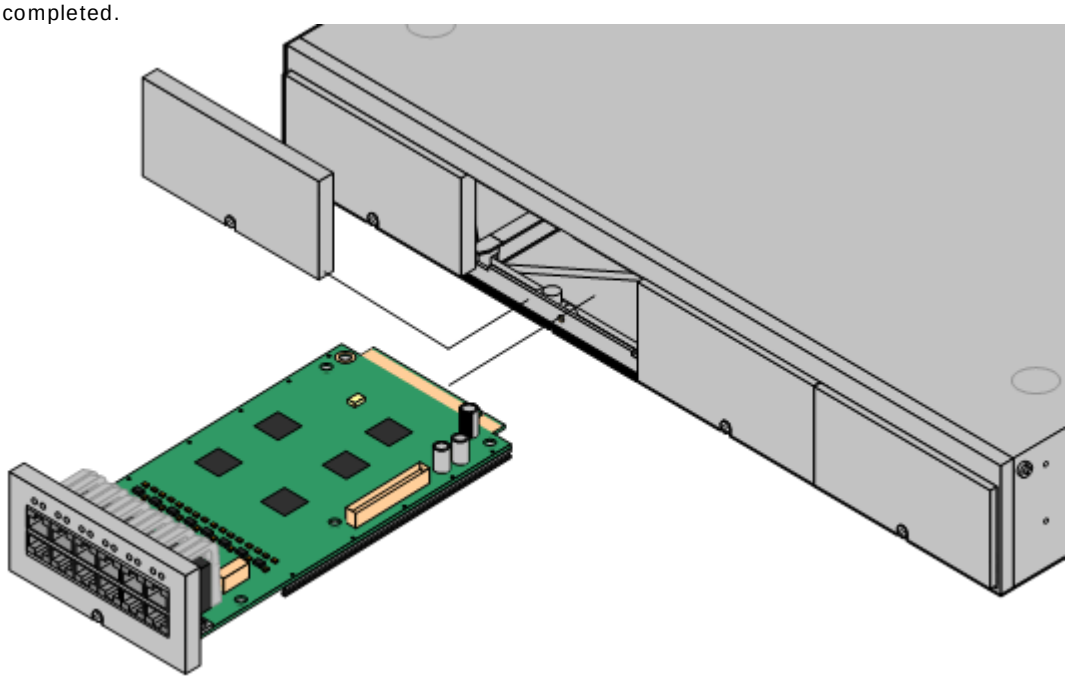
Having prepared each IP500 base card by adding any trunk daughter card 80 or IP400 legacy card 81, the base card can be inserted into the control unit.

- ⚠ Warnings
  - Correct anti-static protection steps should be taken while handling circuit boards.
  - Cards must never be added or removed from the control unit while it has power connected.

- Tools Required
  - ☐ 5mm Flat-blade screwdriver.
  - ☐ Anti-static wrist strap and ground point.

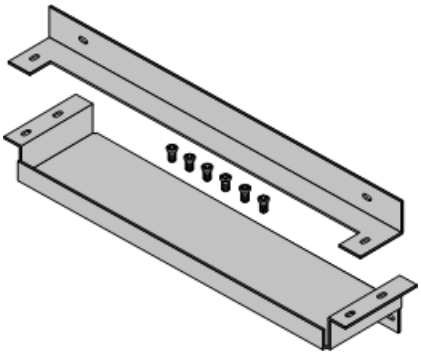
Installing an IP500 Card

1. Check that there is no power to the control unit.
2. Using a flat-bladed screwdriver, remove the cover from the slot on the front of the control unit that will be used for each card being installed. This cover is no longer required but should be retained until installation has been completed.



3. Allowing the card to rest against the bottom of the slot, begin sliding it into the control unit. When half inserted, check that the card rails have engaged with the slot edges by trying to gently rotate it. If the card rotates remove it and begin inserting it again.
4. The card should slide in freely until almost fully inserted. At this point apply pressure at the base of the front of the card to complete insertion.
5. Using a flat-bladed screwdriver secure the card.

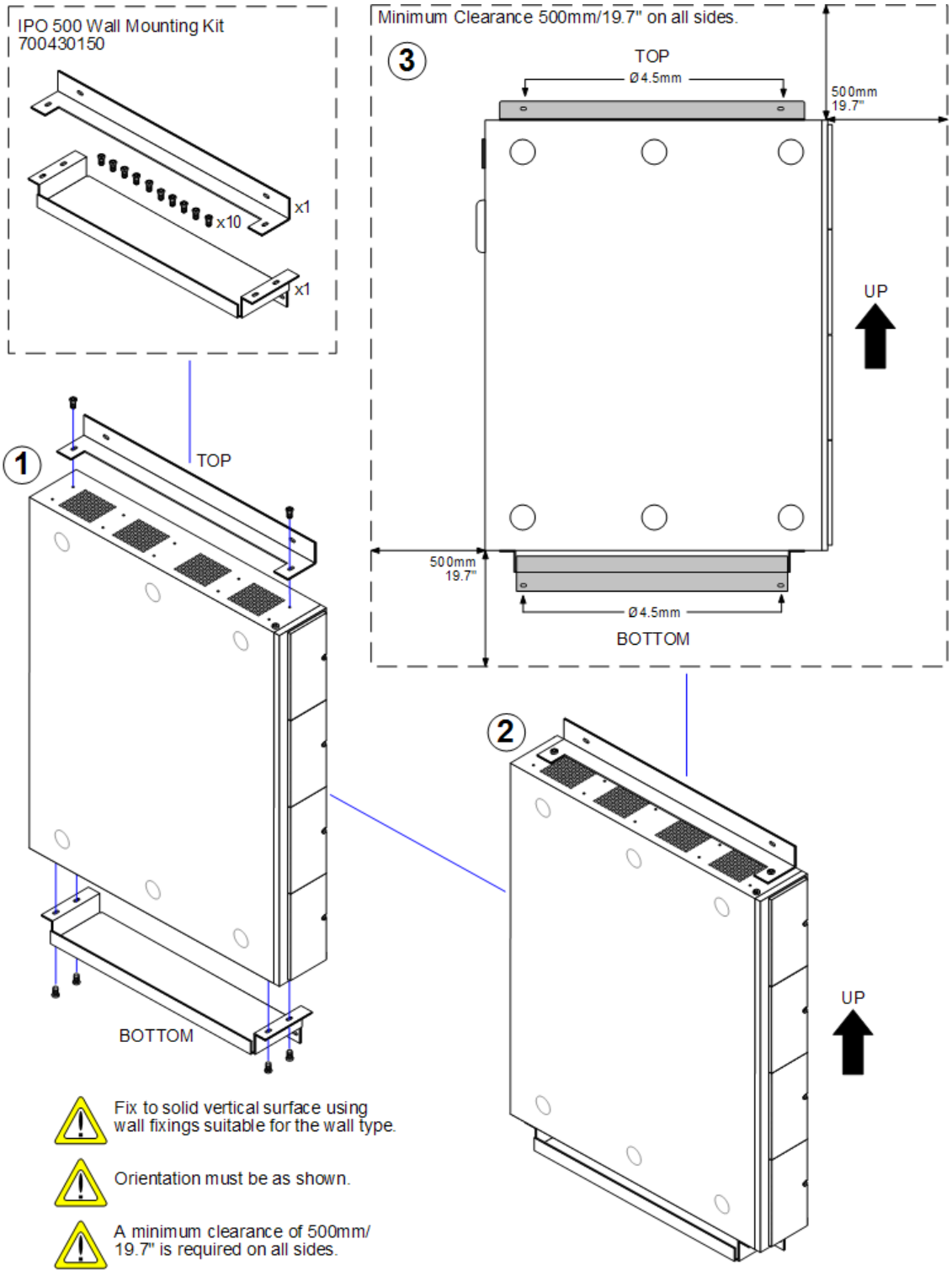
4.6 Wall Mounting



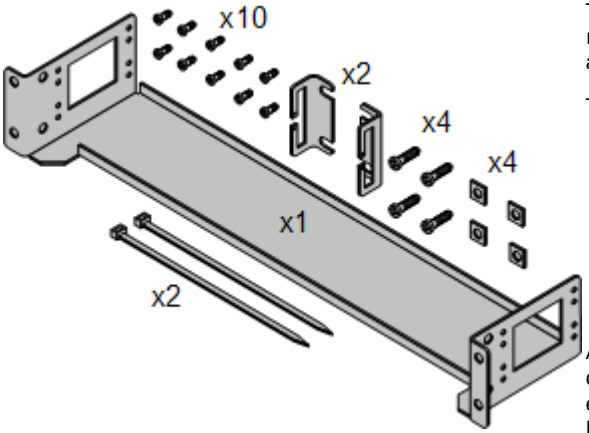
IP500 and IP500v2 control units can be wall mounted. This requires an IP500 Wall Mounting Kit (SAP 700430150) plus additional 4.5mm fixtures and fittings suitable for the wall type. The wall mounting kit includes two brackets, one top and one bottom.

In addition to the existing environmental requirements 56 for an IP Office system, the following additional requirements apply when wall mounting a unit:

- The wall surface must be vertical, flat and vibration free.
- The brackets must be used as shown, with the deeper tray-like bracket used at the bottom of the wall mounted control unit.
- Only the screws (M3 x 6mm) provided with the mounting kit should used to attach the brackets to the control unit.



4.7 Rack Mounting



The IP500 control unit and IP500 external expansion units can be rack mounted if required into 19-inch rack systems. This requires an IP500 Rack Mounting Kit (SAP 700429202) for each unit.

The kit includes:

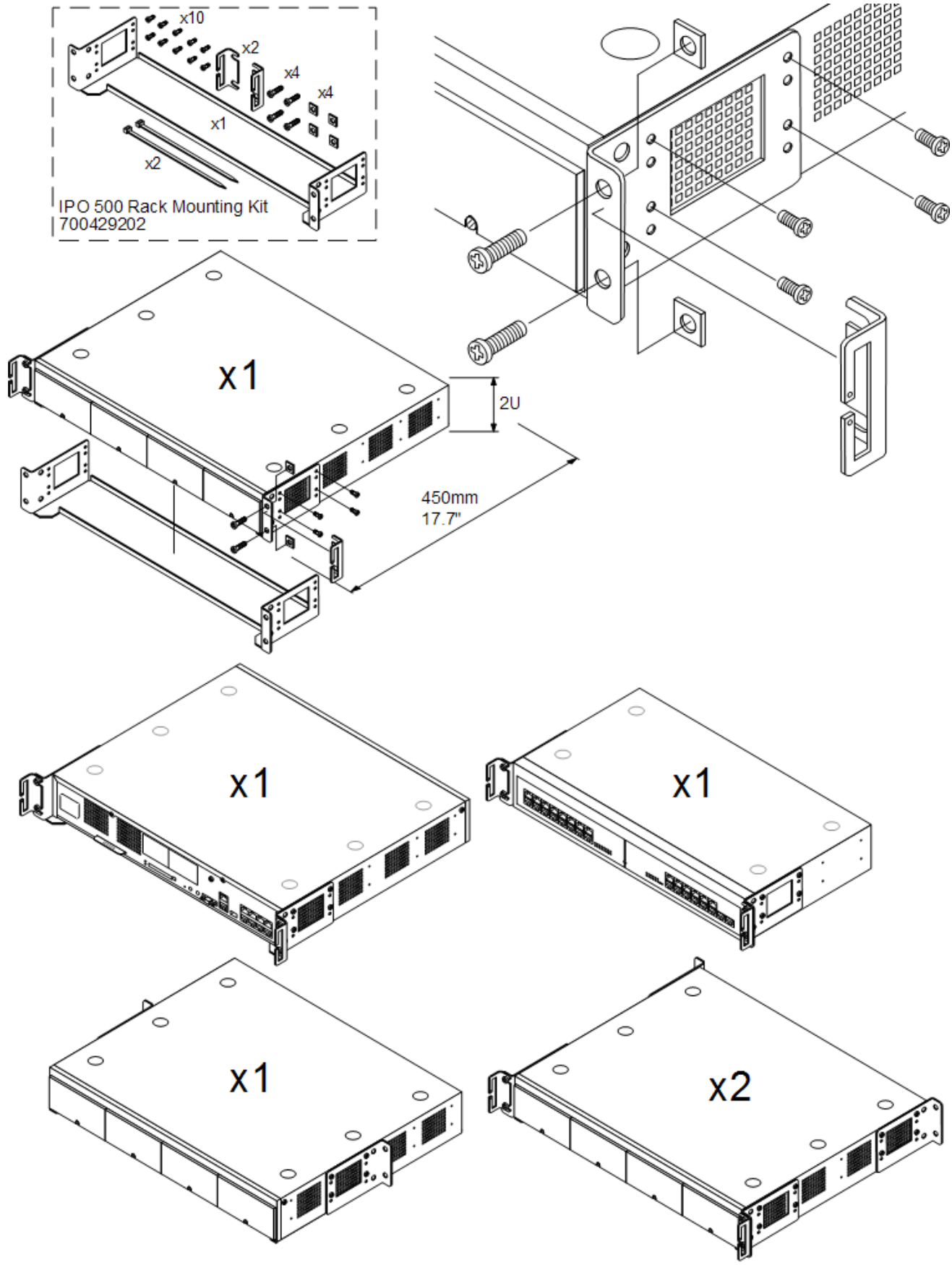
- A rack mounting bracket and screws for attachment of the bracket to the unit
- Nuts and bolts for rack attachment.
- Brackets and cable ties for cable tidying.

As indicated in the diagram following, the rack mounting bracket can be used in several positions on the unit. IP400 external expansion units used in an IP500 system can also be rack mounted but use a separate IP400 Rack Mounting Kit.

Environmental Requirements

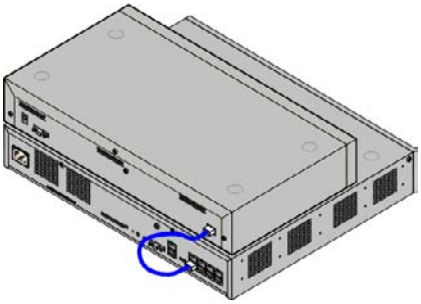
In addition to the existing environmental requirements 56 for an IP Office system, the following additional factors must be considered when rack mounting a unit:

1. Rack Positioning - Ensure compliance with the rack manufacturers safety instructions. For example check that the rack legs have been lowered and fixing brackets have been used to stop toppling.
2. Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.
   - ☐ Operating Temperature: 0°C (32°F) to 40°C (104°F).
   - ☐ Operating Humidity: 10% to 95% non-condensing.
3. Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised. Proper ventilation must be maintained. The side ventilation slots on the IP500 control unit should not be covered or blocked.
4. Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
5. Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
6. Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).
7. ⚠ Only the screws (M3 x 6mm) provided with the mounting kit should used to attach the brackets to the control unit.



- ⚠ Only the screws (M3 x 6mm) provided with the mounting kit should used to attach the brackets to the control unit.

4.8 Connecting External Expansion Modules



Any external expansion modules should be connected to the control unit before power is applied to the control unit. Ensure that modules are attached in the order that matches the planned or pre-built configuration.

External expansion modules connect to the IP Office control unit using an expansion interconnect cable. Each module is supplied with an expansion connect cable and a power supply unit 32. An appropriate locale specific power cord 33 for the power supply unit must be ordered separately.

- Each external expansion module (except the WAN3 10/100) is supplied with a blue 1 meter (3'3'') expansion interconnect cable. This cable must be used when connecting to expansion ports on the rear of a control unit.
- When connecting to expansion ports on an IP500 4-Port Expansion card, a yellow 2 meter (6'6") expansion interconnect cable can be used in place of the standard blue cable. 4 Yellow cables are supplied with the IP500 4-Port Expansion card.
- The WAN3 10/100 module differs in that it connects via a LAN port on its front to one of the control unit's LAN ports. This type of external expansion module is not supported by IP500 and IP500v2 control units.

Installation Requirements

- ☐ Installation space either on or under the existing IP Office control unit.
- ☐ Switched power outlet socket.
- ☐ Available EXPANSION port on the control unit.
- ☐ Grounding Requirements
  - ☐ Functional Grounding
    Connection of a functional ground 207 is:
    - ☐ Recommend for all modules.
    - ☐ Connection of a functional ground is mandatory for Analog Trunk modules.
  - ☐ Protective Grounding
    Connections of a protective ground via surge protection equipment 38 is:
    - ☐ Mandatory for Analog trunk modules in the Republic of South Africa.
    - ☐ Mandatory for Digital Station and Phone modules connected to out of building extensions.
    - ☐ Mandatory for Digital Station V2 and Phone V2 modules.

Tools Required

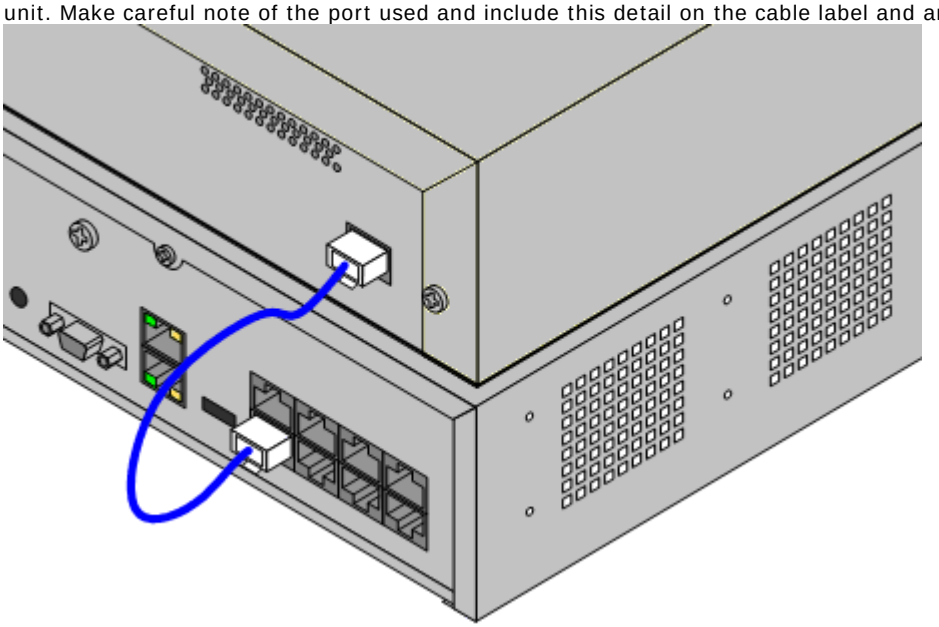
- ☐ Manager PC.
- ☐ Tools for rack mounting 201 (optional).

Parts and Equipment Required

- ☐ External Expansion Module.
  Each module is supplied with a suitable external power supply unit and a 1m blue interconnect cable. 2m Yellow interconnect cables are supplied with the IP500 4-Port Expansion card and should only be used with that card.
- ☐ Power cord for the power supply unit 33.
- ☐ Rack mounting kit 39 (optional).
- ☐ Cable labeling tags.

Procedure

1. External expansion modules should not be attached to a control unit that has power.
2. If the IP Office system is being installed in a rack, attach the rack mounting kit 84 to the expansion module.
3. Attach the external expansion module's power supply but do not switch power on.
4. Connect the expansion interconnect cable from the module's EXPANSION port to the EXPANSION port on the control unit. Make careful note of the port used and include this detail on the cable label and any other system records.



4.9 Grounding

Use of ground connections reduces the likelihood of problems in most telephony and data systems. This is especially important in buildings where multiple items of equipment are interconnected using long cable runs, for example phone and data networks.

All IP Office control units and external expansion modules must be connected to a functional ground. Where the unit is connected to a power outlet using a power cord with an earth lead, the power outlet must be connected to a protective earth.

In some cases, such as ground start trunks, in addition to being a protective measure this is a functional requirement for the equipment to operate. In other cases it may be a locale regulatory requirement and or a necessary protective step, for example areas of high lightning risk.

- ⚠ WARNING
  During installation do not assume that ground points are correctly connected to ground. Test ground points before relying on them to ground connected equipment.
- Additional protective equipment
  In addition to grounding, additional protective equipment will be required in the following situations.
  - On any Digital Station or Phones external expansion module connected to an extension located in another building. Refer to "Out of Building Telephone Installations 38".
  - In the Republic of South Africa, on all Analog Trunk external expansion modules (ATM16) and on any control units containing an analog trunk cards (ATM4/ATM4U).

Tools Required

- ☐ M4 Cross-Head Screwdriver.
- ☐ Tools suitable for crimping a cable spade.

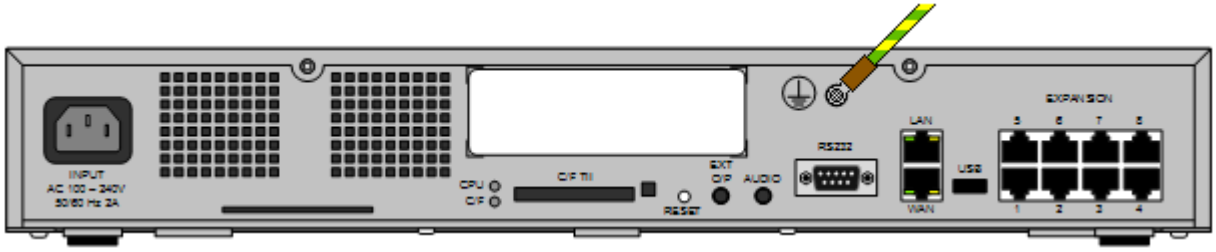
Parts and Equipment Required

- ☐ 14AWG Solid copper wire for ground connection.
- ☐ Cable sleeve matching local regulator requirements. Typically green for a functional ground and green/yellow for a protective ground.

The ground point on IP Office control units and expansion modules are marked with a ⏚ or ⏚ symbol. Ground 20 connections to these points should use a 14 AWG solid wire with either a green sleeve for a functional ground or green and yellow sleeve for a protective ground.

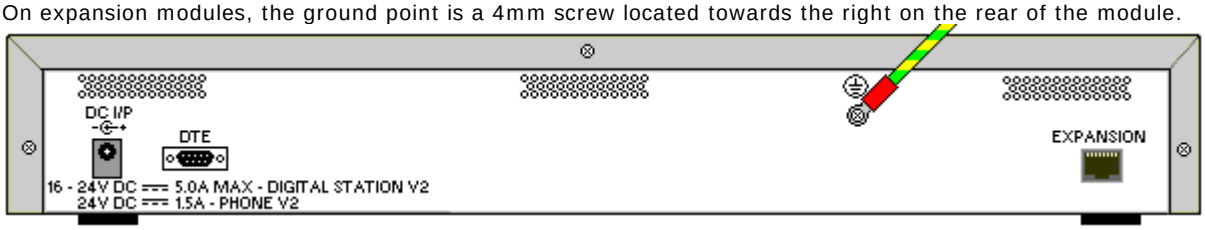
IP500/IP500v2 Control Unit

On IP500 control units the ground point is located above the RS232 DTE port.



External Expansion Modules

On expansion modules, the ground point is a 4mm screw located towards the right on the rear of the module.



- On some older modules, the dedicated ground point screw is not present. In those cases, the top-center cover fixing screw (3mm) can be used as an alternative ground connection point. A toothed washer should be added to ensure good contact.

4.10 Network Connection

The section below details how a new IP Office system determines what IP address it should use and whether it is a DHCP client or server when it is powered on for the first time.

- ! If a IP Office has already been powered on before without being connected to the LAN network, it will have defaulted to being a DHCP server. If that is not the intended DHCP role for the IP Office, connecting it to the customer network will cause conflicts with any existing DHCP server and any client devices using DHCP. You should connect a PC with IP Office Manager directly to the IP Office. Start the IP Office and then use Manager to reconfigure the network settings.

Scenario	Actions
If the customer network has its own DHCP server...	1. With the IP Office system still switched off, connect a LAN cable from the customer network to the LAN port on the back of the IP Office control unit. 2. Connect the PC with IP Office Manager to the customer network as a DHCP client.
If the IP Office will be the DHCP Server...	
If the customer network is not available during installation...	1. Connect the Manager PC as a DHCP client directly to the LAN port on the back of the IP Office control unit. 2. Once the IP Office has started, Manager should be used to configure the IP address and DHCP settings required for when the IP Office is connected to the customer network.
If the customer network uses fix IP address, ie. no DHCP.	

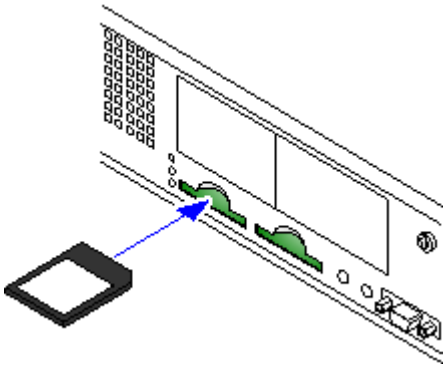
IP Address and DHCP Mode Resolution

When a defaulted or new IP Office control unit is switched on, it requests IP address information from a DHCP Server on the network. This operation will occur whether the LAN cable is plugged in or not. The process below is done separately for both the LAN port (LAN1 in the configuration) and the WAN port (LAN2 in the configuration) on the back of the IP Office control unit.

- The IP Office makes a DHCP request for what IP address information it should use.
- If a DHCP server responds within approximately 10 seconds, the control unit defaults to being a DHCP client and uses the IP address information supplied by the DHCP server.
- If no DHCP Server responds, the control unit defaults to being the DHCP server for the LAN using the following settings:
  - For its LAN1 it allocates the IP address 192.168.42.1 and IP Mask 255.255.255.0. It supports 200 DHCP clients using the addresses range 192.168.42.2 and 192.168.42.201, the IP Mask 255.255.255.0 and default gateway address 192.168.42.1 (the Control Unit's LAN1 address).
  - For its LAN2 if supported, it allocates the IP address 192.168.43.1 and IP Mask 255.255.255.0.
  - Note that the IP Office does not check that these addresses are valid and or available on the network.

- ! Once an IP500v2 control unit has obtained IP address and DHCP mode settings, it will retain those settings even if rebooted without a configuration file present on the System SD card. To fully remove the existing IP address and DHCP mode setting the IP Office must be defaulted using IP Office Manager.

4.11 Starting the System



1. With the IP500v2 control unit shut down or unpowered, insert the Avaya System SD card into the System SD slot on the rear of the control unit.
   - Ensure that you have the correct card. There are three versions, A-Law, Mu-Law and Partner Version.
   - Ensure that the card has the level of software required. If necessary the card can be upgraded to match a version of IP Office Manager 76.
2. Apply power to the external expansion modules. The power outlet used must include a switch and in cases where the power cord includes an earth lead, that outlet must have a protective earth connection.
3. Apply power to the IP500v2 control unit. The power outlet used must include a switch and the power outlet must have a protective earth connection.
4. The control unit will begin loading firmware from the System SD card with which it will upgrade itself and the components installed in the control unit.
5. This process takes approximately a minute. The end of this process will be indicated by LED1 on each base card flashing every 5 seconds. LED9 on each base card fitted with a trunk daughter card will also flash every 5 seconds.
6. The control unit will then begin upgrading the external expansion modules. This will be indicated by the red center LED on each module flashing red. The process is completed when the LED changes to steady green.
7. If a configuration file is already present on the System SD 76 card it is loaded by the IP Office. If not, the IP Office creates a default configuration based on the components of the system and copies that configuration onto the System SD card.
8. It should be possible now to use IP Office Manager to access the configuration of the IP Office.

The LEDs on the rear of the control unit go through the following sequence during a normal start up. Note that the times are approximately only:

LED	4s	4s	12s	5s	2s	5s	5s	10s	10s	Finished
CPU	Orange	Green	Green	Green Red	Green	Green	Green	Green	Green	Green
System SD	Orange	Off	Green	Green	Green	Off	Green	Green	Green Flash	Green
Optional SD If present.	Orange	Off	Green	Green	Green	Off	Off	Green	Green	Green

On the front of the control unit, LED1 on any IP500 base cards fitted is used as follows. LED9 is also used for any trunk daughter cards fitted.

LED	30s	30s	Finished
LED1/LED9	Red	Red Fast Flash	Red Flash every 5 seconds

4.12 Checking the LEDs

Control Unit LEDs

LED	Description
Optional SD System SD	• Off = Card shutdown 159. • Green on = Card present. • Green flashing = Card in use. • Orange steady = Reset imminent. • Red flashing = Card initializing or shutting down. • Red fast flashing = card full • Red steady = Card failure/wrong type.
CPU	• Alternate red/green = Starting up. • Green on = Okay. • Red on = No software. • Flashing Red = Error/Shutdown.

Base Card LEDs

Base Card	LEDs 1 to 8 Usage

All Cards	• LED1 is used for base card status:
	  • Red On = Error
	  • Red Slow Flash = Initializing.
	  • Red Flash every 5 seconds = Card okay.
	  • Red Fast Flash = System shutdown.

IP500 Analog Phone	No status LEDs are used for analog phone extensions.
IP500 Digital Station	• Green On - Phone detected.
IP500 VCM	• LEDs 1 to 8 are unlabelled. They are used to indicate voice compression channel usage. Each LED lit represents 12.5% of the available voice compression channel capacity in use (total card capacity rather than licensed capacity).
IP500 4-Port Expansion	LEDs 1 to 8 are used for the expansion ports on the rear of the control unit. LEDs 9 to 12 are used for the card's own expansion ports.

Green	On	Expansion module present.
Red	Flashing	Initializing.
Red	On	Error.
Orange	Regular Flash	Base card okay.

IP500 Combination	LEDs 1 to 6 • Green On - Phone detected.

Trunk Daughter Card LEDs

Trunk Daughter Card	LEDs 9 to 12 Usage

All cards	• LED 9 is used for daughter card status.
	  • Red On = Error
	  • Red Slow Flash = Initializing.
	  • Red Flash every 5 seconds = Card okay.
	  • Red Fast Flash = System shutdown.

Analog Trunk	• Green on: Card fitted. • Green flashing: Trunk in use.
BRI Trunk	• Off: No trunk present. • Green on: Trunk present. • Green flashing: Trunk in use.
PRI Trunk	• Off: No trunk present. • Green on: Trunk present. • Green flashing: Trunk in use. • Red/Green Fast Flash (port 9) or Green Fast Flash (port 10): Alarm indication signal (AIS) from the trunk remote end. • Red with Green Blink (port 9) or Green Blink (port 10): Port in loopback mode (set through IP Office System Monitor).

External Expansion Module LEDs

- Green on = Module okay.
- Red flashing = Module starting up.
- Red on = Error.

4.13 Connecting Phones

Connect any analog phones to the Phone 384 ports. Ensure that those connected to power failure ports 52 are clearly labeled as such.

Connect any Avaya digital phones to the appropriate DS 379 ports. When the IP500v2 control unit is started, after loading its own firmware and the firmware for its external expansion modules, it will upload the appropriate firmware to the digital phones.

Avaya H323 phones do not need to be connected at this stage. They will go through a firmware upgrade process when connected to an IP500v2 system that is already running. Refer to the IP Office H323 IP Phone Installation Manual.

Chapter 5.
Initial Configuration

5. Initial Configuration

This section covers basic configuration changes required for all IP Office systems.

- The Default Configuration 95
- Change the Default Passwords 96
- Change the System Name and IP Address / DHCP Settings 98
- Entering Licenses 99
- Trunk Configuration
  - Remove Unused Trunks 100
    Disabling the use of trunks and trunk channels that are not available.
  - Select the Clock Source for Digital Lines 102
    Altering which digital trunk is used to provide the IP Office with its clock signal for call synchronization.
  - Enter Trunk Prefixes 104
    On systems where a prefix is being used for external dialing, ensure that the same prefix is added to incoming numbers in order to allow return calls.

5.1 Default Configuration

Unless, for the IP500v2 control unit, you loaded a configuration file onto the System SD card, the IP Office will have assumed a default configuration.

The following are the basic default configuration settings for an IP Office system.

Network Settings	LAN1	LAN2/WAN
IP address	192.168.42.1.	192.168.43.1
IP Mask	255.255.255.0	255.255.255.0
DHCP Mode	Server	Server
No of DHCP IP Addresses	200.	200.

- Extensions and Users
  A user is automatically created for each physical extension port detected in the system. Users are assigned extension numbers starting from 201. User names take the form Extn201, Extn202, ...
- Hunt Group
  A single hunt group 200 called Main is created and the first 10 users are placed into that hunt group as members.
- Incoming Call Routes
  Two default incoming call routes are created. Voice calls are routed to the hunt group Main. Data calls are routed to the RAS user DialIn.
- Default Short Codes
  IP400 control units are manufactured as either A-Law or U-Law variants. For IP500 and IP500v2 control units, A-Law or U-Law variant operation is determined by the Feature Key installed in the control unit. Depending on the variant, different short codes and trunk settings are added to the default configuration.
- A-Law or Mu-Law
  PCM (Pulse Code Modulation) is a method for encoding voice as data. In telephony, two methods PCM encoding are widely used, A-law and Mu-law (also called U-law). Typically Mu-law is used in North America and a few other locations while A-law by the rest of the world. As well as setting the correct PCM encoding for the region, the A-Law or Mu-Law setting of an IP Office system when it is first started affects a wide range of regional defaults relating to line settings and other values.
  - For IP400 IP Office systems, each control units was manufactured as either an A-Law variant or a Mu-Law variant.
  - For IP500 and IP500v2 systems, the encoding default is set by the type of Feature Key installed when the system is first started.

Default DHCP/IP Address Settings

When a defaulted or new IP Office control unit is switched on, it requests IP address information from a DHCP Server on the network. This operation will occur whether the LAN cable is plugged in or not. The process below is done separately for both the LAN port (LAN1 in the configuration) and the WAN port (LAN2 in the configuration) on the back of the IP Office control unit.

- The IP Office makes a DHCP request for what IP address information it should use.
- If a DHCP server responds within approximately 10 seconds, the control unit defaults to being a DHCP client and uses the IP address information supplied by the DHCP server.
- If no DHCP Server responds, the control unit defaults to being the DHCP server for the LAN using the following settings:
  - For its LAN1 it allocates the IP address 192.168.42.1 and IP Mask 255.255.255.0. It supports 200 DHCP clients using the addresses range 192.168.42.2 and 192.168.42.201, the IP Mask 255.255.255.0 and default gateway address 192.168.42.1 (the Control Unit's LAN1 address).
  - For its LAN2 if supported, it allocates the IP address 192.168.43.1 and IP Mask 255.255.255.0.
  - Note that the IP Office does not check that these addresses are valid and or available on the network.

- ! Once an IP500v2 control unit has obtained IP address and DHCP mode settings, it will retain those settings even if rebooted without a configuration file present on the System SD card. To fully remove the existing IP address and DHCP mode setting the IP Office must be defaulted using IP Office Manager.

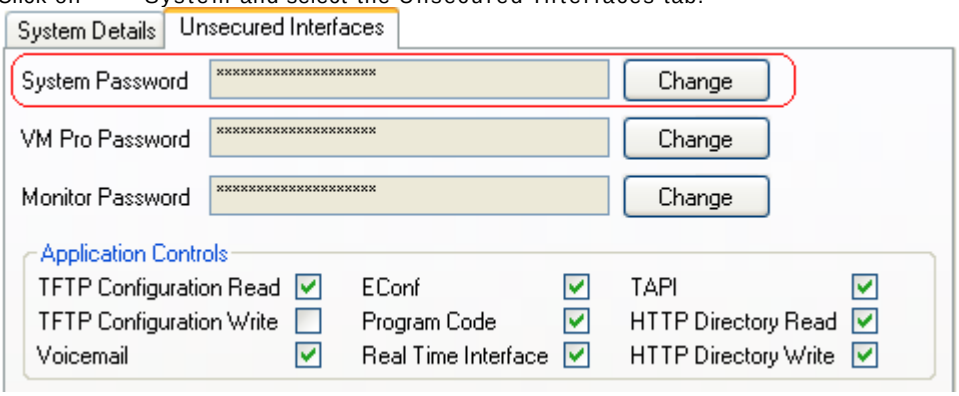
5.2 Changing the Default Passwords

Do not change any other settings than those described below until you have read and understood the IP Office Security Mode section of the IP Office Manager manual.

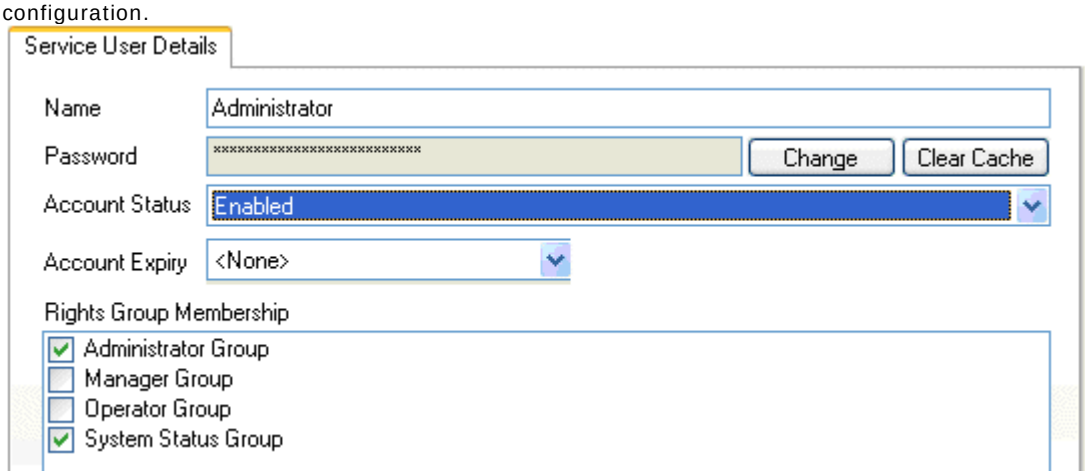
An IP Office system's security settings can be set back to default 138 if necessary.

Changing the Security Settings

1. Start Manager 68 and connect to the IP Office system.
2. Select File | Advanced | Security Settings.
3. Enter a user name and password of an account that has security configuration access to the IP Office system. The defaults (which should be changed as part of this process) are *security* and *securitypwd*.
4. Click on System and select the Unsecured Interfaces tab.

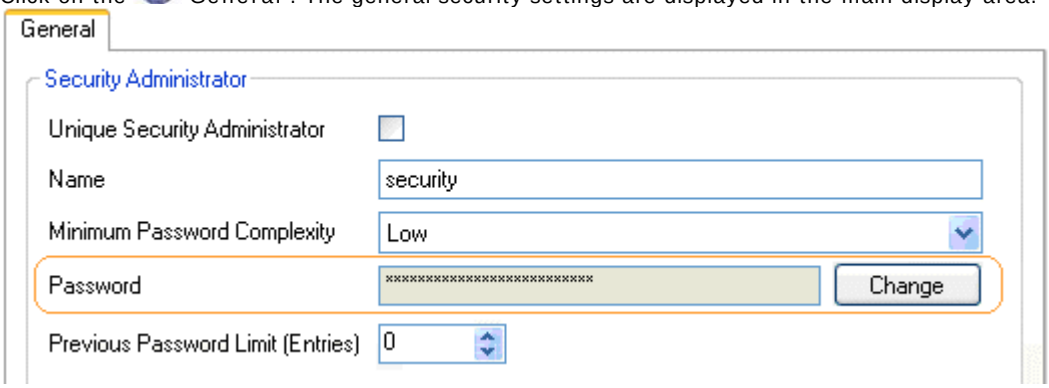


   - The System Password is used by Manager for remote software upgraded of the IP Office system. The default password is *password*. Click on the Change button and enter a new password. Click OK.
   - Click OK.
5. Click on Service Users. The list will show the service user accounts that exist to access the IP Office configuration.



6. The default service users Administrator, Manager and Operator each use the same value (*Administrator*, *Manager* and *Operator*) as their password. For each of these service users:
   - Click on the service user name. In the Service User Details tab, click on Change and enter a new password. Click OK.
   - Click OK.

7. Click on the General . The general security settings are displayed in the main display area.



- Click on Change and enter a new password for the security administrator.

8. Click on File | Configuration to exit security configuration mode and return to the IP Office configuration.

Changing the Remote User Password

The IP Office configuration contains a user whose password is used as the default for remote dial in access to the IP Office network. The password of this user should be changed.

1. Start Manager 68 and connect to the IP Office system.
2. Click on Users and in the list of users click on Remote Manager.
3. On the User tab, enter a new password for the user and click OK.
4. Click on and save the updated configuration back to the IP Office system.

5.3 Changing the IP Address Settings

By default the IP Office system name is set to match its MAC address. This can be changed to something more distinctive.

When a new or defaulted IP Office is switched on, the control unit will make a DHCP requests for IP address settings on each of its LAN interfaces (LAN1 and LAN2).

- If the IP Office receives a response from a DHCP server, it will configure itself as a DHCP client using the address details provided by the DHCP server.
- If the IP Office does not receive a response from a DHCP server, it will configure itself as a DHCP server and use the following default address details:

Network Settings	LAN1	LAN2/WAN
IP address	192.168.42.1.	192.168.43.1
IP Mask	255.255.255.0	255.255.255.0
DHCP Mode	Server	Server
No of DHCP IP Addresses	200.	200.

If the IP address and DHCP mode settings are not suitable for the customers network then they should changed. Note that changing the IP Office's IP address settings requires it to restart.

1. Start Manager 68 and connect to the IP Office system.
2. Click on System.
3. On the System tab, in the Name field enter a distinctive name for the IP Office system. Click OK.
4. Click on the LAN1 tab.
5. On the LAN Settings sub-tab, change the IP Address, IP Mask and DHCP Mode settings to match the customer requirements. These settings are used for the LAN port on the back of the IP Office control unit. Click OK.
6. Repeat the process for the LAN2 tab. Those settings are used for the WAN port on the back of the IP Office control unit.
7. Click on and save the updated configuration back to the IP Office system.

5.4 Entering Licenses

For IP500v2 control units, license files can be pre-loaded 78 onto the System SD card. Those licenses will then be merged with the configuration when the control unit is powered up. Otherwise for all control units, licenses can be entered into the configuration using IP Office Manager.

Adding a Serial Port Feature Key to an IP412 or IP406 V2

For IP500 and IP500v2 a Feature Key is mandatory and is fitted at all times. However, for IP412 and IP406 V2 control units a Feature Key is optional and only needs to be attached when the configuration contains licenses.

1. Connect the serial port feature key to the 9-pin DTE port of the IP Office control unit.
2. Start Manager 68 and connect to the IP Office system.
3. Select System.
4. The License Server IP Address field is used to set the location of the feature key. For a serial port license key, set the address to 0.0.0.0.
5. Click OK.
6. Click on to send the configuration back to the IP Office. Select to allow the IP Office system to reboot immediately.

Entering Licenses

1. Start Manager 68 and connect to the IP Office system.
2. Select System.
3. The field Dongle Serial Number shows the serial number of the Feature Key Dongle is already detected. Check that this number matches the one against which the licenses have been issued.
4. Click OK.
5. Select License.
6. To add a license, click and select License. Enter the new license and click OK. We recommend that add licenses by cut and pasting them from a supplied file listing each 32-character license keys. That avoids potential issues with mistyping.
7. The Status of the new license should show *Unknown* and name the license as expected. If the name is *Invalid*, the most likely cause is incorrect entry of the license key characters.
8. Click on to send the configuration back to the IP Office. The menu that appears will indicate whether a reboot is required.
9. Use Manager to receive the configuration again and check that the status of the license. It should now be *Valid*.

5.5 Disable Unused Trunks

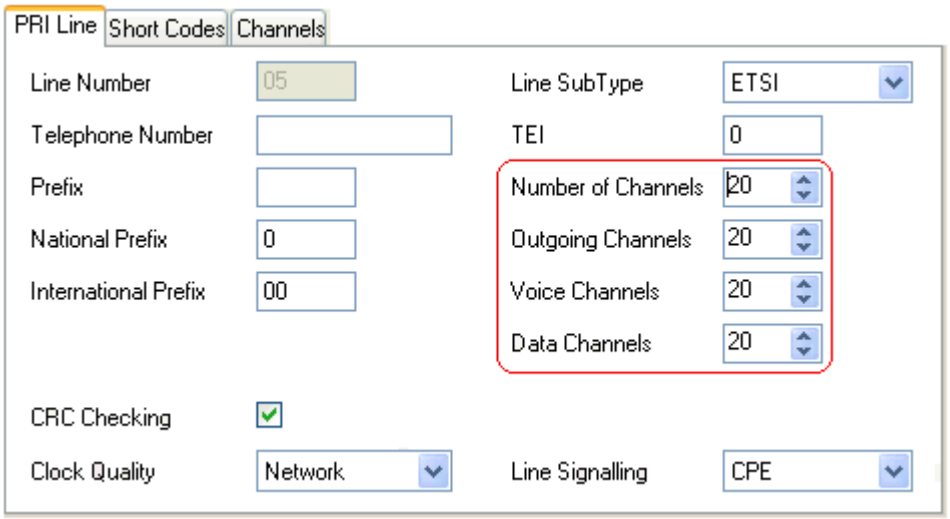
Each IP Office trunk card provides a fixed number of trunk ports with digital trunk ports supporting a fixed number of digital channels. By default the IP Office configuration will have settings for all the possible trunks and channels.

In cases where the number of trunks or trunk channels in use is lower than the number supported by the trunk card, the unused trunks and channel must be disabled.

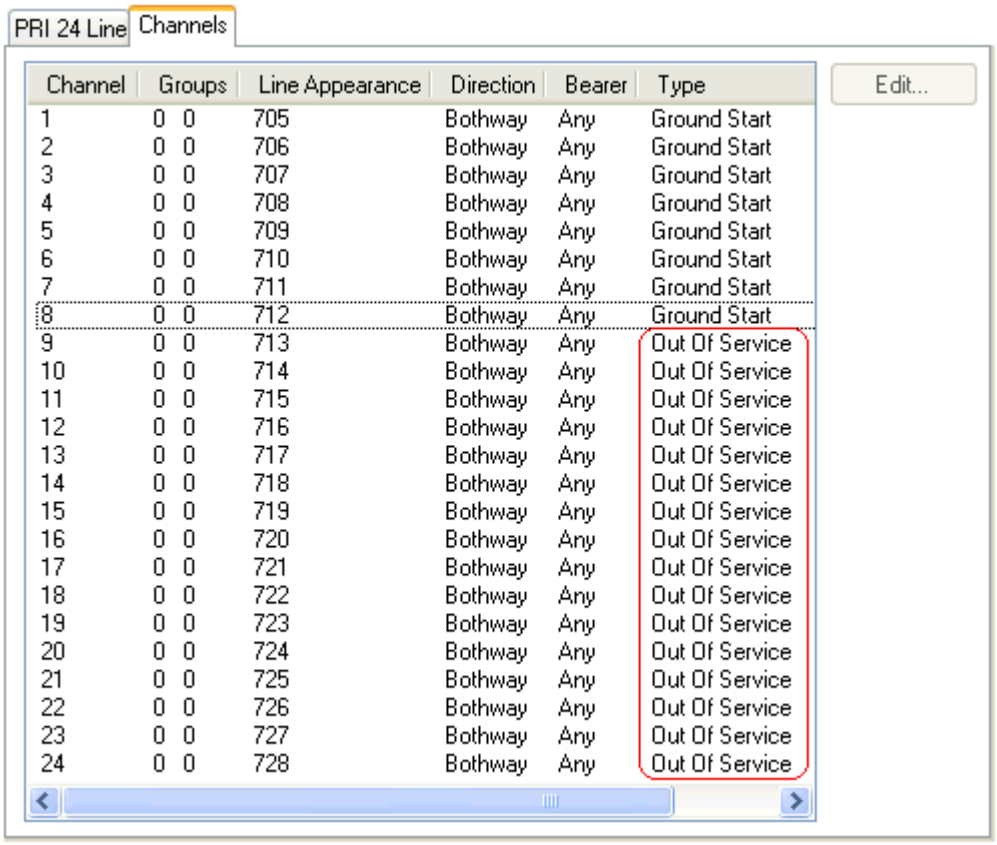
- ⚠ Failure to do this will cause problems with outgoing calls. For example, on a system with an ATM4 trunk card fitted but only two analog trunks actually connected, failure to disable the other two trunks within the IP Office configuration will cause 50% of outgoing call attempts to fail.

1. Within the IP Office configuration, select Line.
2. For each line, set those lines or channels that are not connected or being used as out of service. The location of the relevant setting varies for each trunk type.
   - Analog Trunks
     Set the Trunk Type to *Out of Service*.

   - BRI, E1 PRI, S0 and QSIG Trunks
     Set the channels quantities to match the actual subscribed channels.



- T1, T1 PRI and E1R2 Trunks
  Select the Channels tab. Select those channels that are not used and click Edit.



Channel	Groups	Line Appearance	Direction	Bearer	Type
1	0 0	705	Bothway	Any	Ground Start
2	0 0	706	Bothway	Any	Ground Start
3	0 0	707	Bothway	Any	Ground Start
4	0 0	708	Bothway	Any	Ground Start
5	0 0	709	Bothway	Any	Ground Start
6	0 0	710	Bothway	Any	Ground Start
7	0 0	711	Bothway	Any	Ground Start
8	0 0	712	Bothway	Any	Ground Start
9	0 0	713	Bothway	Any	Out Of Service
10	0 0	714	Bothway	Any	Out Of Service
11	0 0	715	Bothway	Any	Out Of Service
12	0 0	716	Bothway	Any	Out Of Service
13	0 0	717	Bothway	Any	Out Of Service
14	0 0	718	Bothway	Any	Out Of Service
15	0 0	719	Bothway	Any	Out Of Service
16	0 0	720	Bothway	Any	Out Of Service
17	0 0	721	Bothway	Any	Out Of Service
18	0 0	722	Bothway	Any	Out Of Service
19	0 0	723	Bothway	Any	Out Of Service
20	0 0	724	Bothway	Any	Out Of Service
21	0 0	725	Bothway	Any	Out Of Service
22	0 0	726	Bothway	Any	Out Of Service
23	0 0	727	Bothway	Any	Out Of Service
24	0 0	728	Bothway	Any	Out Of Service

  - For T1 set the Type to *Out of Service*.
  - For T1 PRI set the Admin field to *Out of Service*.
  - For E1R2 trunks set the Line Signalling Type to *Out of Service*.

5.6 Setting the Digital Trunk Clock Source

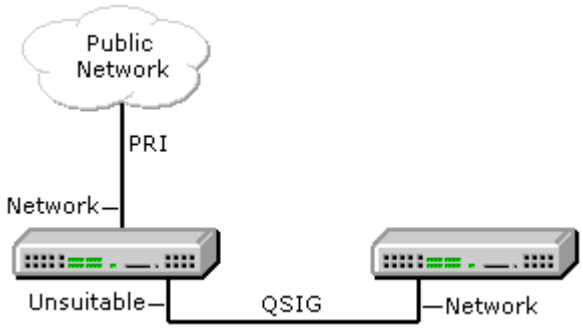
Digital trunks require the telephone system at each end of the trunk to share a clock signal to ensure synchronization of call signalling. The IP Office can obtain and use the clock signal from any of its digital trunks. Typically the clock signal provided by a digital trunk from the central office exchange is used as this will be the most accurate and reliable clock source.

To do this, the Clock Quality setting on each line in the IP Office configuration is set to one of the following:

- *Network*
  If available, the clock signal from this trunk should be used as the IP Office's clock source for call synchronization. If several trunk sources are set as Network, the IP Office will default to using one as detailed below.
- *Fallback*
  If available, the clock signal from this trunk can be used as the clock source if none of the trunks set as *Network* are providing a clock source.
- *Unsuitable*
  The clock source from this trunk will never be used as the IP Office's clock source.

If no clock source is available the IP Office can use its own internal clock if necessary.

In the example below the first IP Office is set to use the public network trunk as its clock source and ignoring the possible clock source from the QSIG trunk. The other IP Office system is using the clock signal received from the first IP Office on its QSIG trunk as its clock source. Thus both IP Offices are using the same clock source and that clock source is the public network exchange.



Multiple Source Priority

When multiple trunks with the same setting are providing clock signals, the trunk used is determined in the following order of priority.

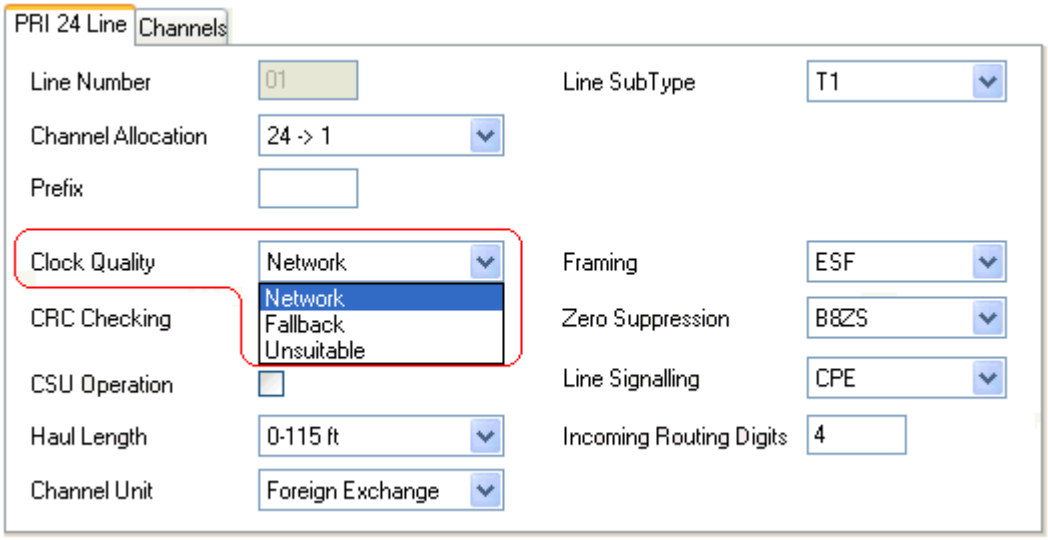
- IP500 and IP500v2 Control Units: Trunks are used in the order of slots 1 to 4 and then by port on each slot.
- IP421 and IP406 V2 Control Units: Trunks are used in the order Slot B ports 1 to 4, then Slot A ports 1 to 4.

Viewing the Current Clock Source

The current clock source being used by an IP Office system is shown on the Resources page within the IP Office System Status Application.

Setting a Trunk Clock Quality Setting

1. Within the IP Office configuration, select Line.
2. For each digital line, select the line and on the Line tab select whether that trunk should provide the clock source for the network or whether the trunk is unsuitable. For E1R2 trunks the Clock Quality setting is on the Advanced tab.



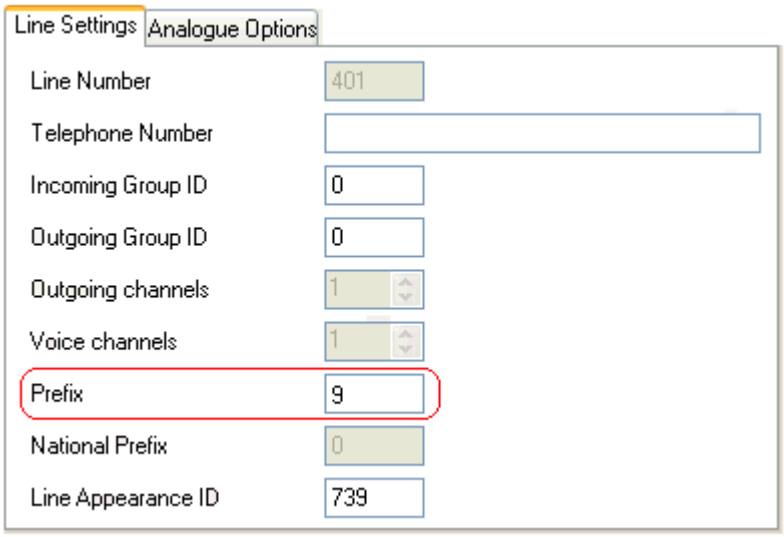
3. Ensure that only one trunk is set to *Network*. This should preferably be a direct digital trunk to the central office exchange.
4. One other trunk can be set a *Fallback* should the selected Network trunk connection be lost. If possible this should be a trunk from a different provider since that reduces the chances of both sources failing at the same time.
5. Ensure that all other digital trunks are set as *Unsuitable*.

5.7 Setting the Trunk Prefixes

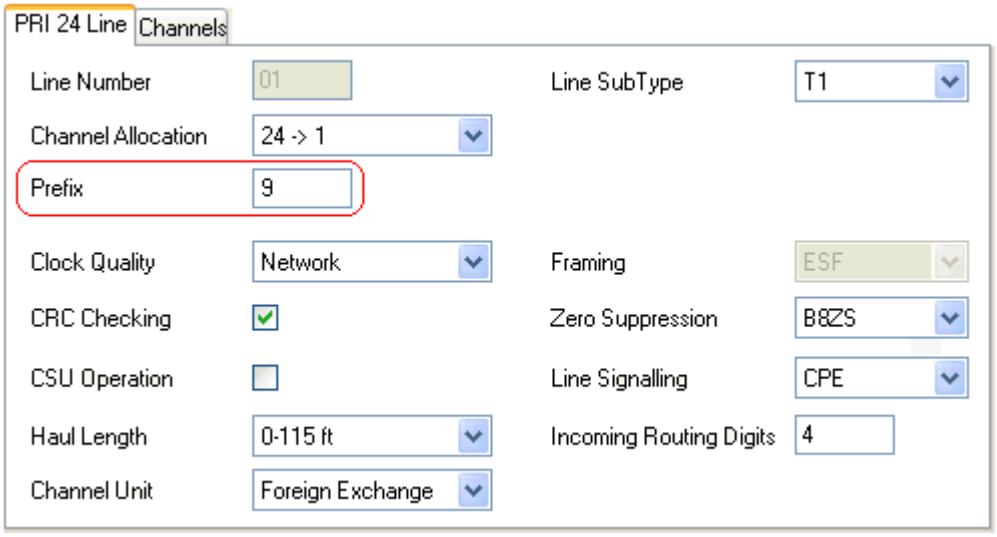
Where a prefix has been implemented for outgoing calls, that same prefix needs to be added to trunk settings. The prefix is then used as follows:

- On incoming calls the prefix is added to any incoming ICLID received with the call. That allows the ICLID to be used by IP Office phones and applications to make return calls.
- On outgoing calls, the short codes used to route the call to a trunk must remove the dialing prefix.

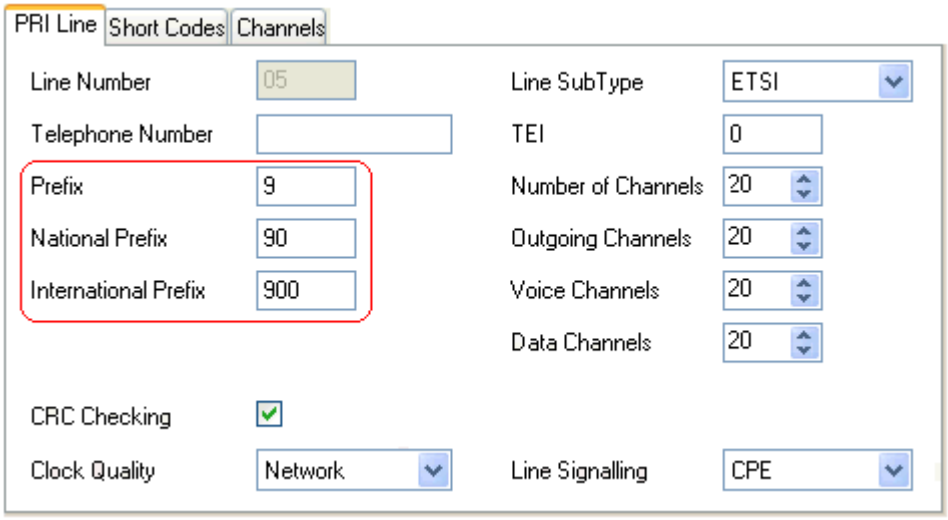
1. Within the IP Office configuration, select Line.
2. For each line enter the prefix. The location of the relevant setting varies for each trunk type.
   - Analog Trunks



   - T1 and T1 PRI Trunks



- BRI, E1 PRI, S0 and QSIG Trunks



SIP Trunk Prefixes

For IP Office Release 6, the prefix fields Prefix, National Prefix, Country Code and International Prefix are available with the SIP Line settings. These fields are used in the following order:

1. If an incoming number (called or calling) starts with the + symbol, the + is replaced with the International Prefix .
2. If the Country Code has been set and an incoming number begins with that Country Code or with the International Prefix and Country Code, they are replace with the National Prefix.
3. If the Country Code has been set and the incoming number does not start with the National Prefix or International Prefix, the International Prefix is added.
4. If the incoming number does not begin with either the National Prefix or International Prefix, then the Prefix is added.

For example, if the SIP Line is configured with prefixes as follows:

- Line Prefix: 9
- National Prefix: 90
- International Prefix: 900
- Country Code: 44

Number Received	Processing	Resulting Number
+441707362200	Following rule 1 above, the + is replace with the International Prefix (900), resulting in 900441707362200. The number now matches the International Prefix (900) and Country Code (44).Following rule 2 above they are replace with the National Prefix (90).	901707362200
00441707362200	Following rule 2 above the International Prefix (900) and the Country Code (44) are replaced with the National Prefix (90).	90107362200
441707362200	Following rule 2 above, the Country Code (44) is replace with the National Prefix (90).	901707362200
6494770557	Following rule 3 above the the International Prefix (900) is added.	9006494770557

Chapter 6.
Additional Processes

6. Additional Processes

This section covers the following additional installation processes:

- Switching Off an IP Office System 109
- Rebooting an IP Office System 111
- Memory Card Removal 112
- Changing Components 114
- Swapping Extension Users 116
- Changing Extension Numbers 117
- Upgrading the IP Office Software 119
- Out of Building Extensions 38
- Using the External Output Port 127
- So8 BRI Modules 128
- SNMP 131
- DTE Port Maintenance 135
- Reset Button Usage 141
- AUX Button Usage 141
- Creating a WAN Link 142

6.1 Switching Off an IP Office System

IP Office systems running IP Office Release 6 can be shut down in order to perform maintenance. The shut down can be either indefinite or for a set period of time after which the IP Office will automatically reboot.

During the shut down process, the current configuration in the control unit's RAM memory is copied to the control units non-volatile memory. For IP500v2 systems that location is the System SD card.

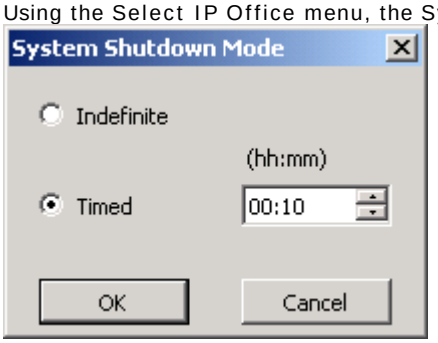
For control units with memory cards the memory cards can be shutdown and restarted 159 separately from the system.

! WARNINGS

- A shutdown must always be used to switch off the system. Simply removing the power cord or switching off the power input may cause errors.
- This is not a polite shutdown, any users calls and services in operation will be stopped. Once shutdown, the system cannot be used to make or receive any calls until restarted.
- The shutdown process takes up to a minute to complete. When shutdown, the CPU LED and the IP500 base card LEDs 1 and 9 (if trunk daughter card fitted) will flash red rapidly. The memory card LEDs are extinguished. Do not remove power from the system or remove any of the memory cards until the system is in the this state.
- To restart a system when shutdown indefinitely, or to restart a system before the timed restart, switch power to the system off and on again.

System Shutdown Using IP Office Manager

1. Using IP Office Manager, select File | Advanced | System Shutdown.
2. Using the Select IP Office menu, the System Shutdown Mode menu is displayed.



3. Select the type of shutdown required. If Indefinite is used, the system can only be restarted by having its power switched off and then on again. If a Timed shutdown is selected, the IP Office will reboot after the set time has elapsed.

System Shutdown Using the System Status Application

1. Start System Status 69 and access the IP Office's status output.
2. In the navigation panel select System.
3. At the bottom of the screen select Shutdown System.
4. Select the time duration for the shutdown or indefinite.

System Shutdown Using a System Phone

This process can be used by a user configured as a System Phone user and using a 1400, 1600, 2400, 4600, 5400, 5600 or 9600 Series phone (excluding XX01, XX02 and XX03 models). The user's Login Code is used to restrict access to system administration functions on the phone.

Unlike Manager, a system phone user cannot select an indefinite shutdown. The can set a timed shut down of between 5 minutes and 24 hours.

1. Select Features | Phone User | System Admin.
2. Enter your IP Office user login code.
3. From the menu select System Shutdown.
4. Select a time period for the shutdown. It must be in between 5 minutes and 24 hours.
5. Press Done and then Confirm to begin the shutdown.

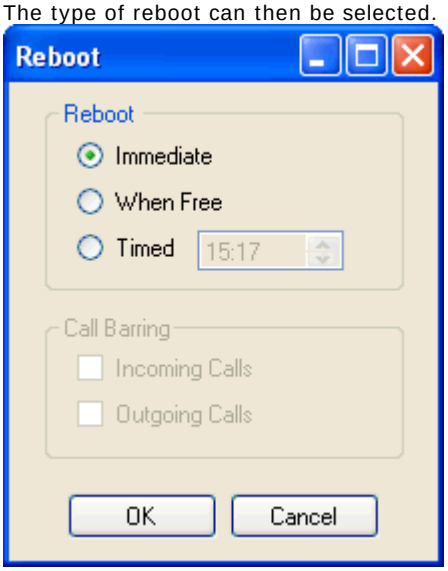
System Shutdown Using the IP500v2 AUX Button

When the AUX button is pressed for more than 5 seconds, the IP500v2 control unit will shutdown with the restart timer set to 10 minutes.

6.2 Rebooting an IP Office System

You can use IP Office Manager to reboot an IP Office system.

1. Using IP Office Manager, select File | Advanced | Reboot.
2. Use the Select IP Office menu to locate and select the IP Office system. Enter a valid user name and password.
3. The type of reboot can then be selected.



- Reboot
  Select when the reboot should occur.
  - Immediate
    Send the configuration and then reboot the IP Office.
  - When Free
    Send the configuration and reboot the IP Office when there are no calls in progress. This mode can be combined with the Call Barring options.
  - Timed
    The same as When Free but waits for a specific time after which it then wait for there to be no calls in progress. The time is specified by the Reboot Time. This mode can be combined with the Call Barring options.
- Reboot Time
  This setting is used when the reboot mode Timed is selected. It sets the time for the IP Office reboot. If the time is after midnight, the IP Office's normal daily backup is canceled.
- Call Barring
  These settings can be used when the reboot mode When Free is selected. They bar the sending or receiving of any new calls.

4. Click OK.

6.3 Memory Card Removal

Card Removal	Memory cards should always be shutdown 159 before being removed when the system is running. Though the card slot LEDs indicate when data is being written to an card, lack of flashing LED is not a sufficient safeguard. Shutting down the card will disable embedded voicemail if being used. If the System SD card is removed, features licensed by the card's Feature Key serial number will continue operating for up to 2 hours.

Before a memory card is removed from an IP Office system that is running, the card must be shutdown. Removing a memory card while the system is running may cause file corruption.

Card services can be restarted by either reinserting the card or using a Start Up command.

Card Shutdown Using IP Office Manager

1. Using IP Office Manager, select File | Advanced | Memory Card Commands | Shutdown.
2. Using the Select IP Office menu, select the IP Office system containing the memory card.
3. Click OK.
   - At the back of the control unit, confirm that the appropriate memory card LED is off.
   - The card can now be removed in order to perform the necessary maintenance actions.

Card Shutdown Using the System Status Application Application

1. Start System Status 69 and access the IP Office's status output.
2. In the navigation panel select System.
3. Select Memory Cards.
4. Select either System Card or Optional Card.
5. At the bottom of the screen select Shutdown.
   - At the back of the control unit, confirm that the appropriate memory card LED is off.
   - The card can now be removed in order to perform the necessary maintenance actions.

Card Shutdown Using a System Phone

This process can be used by a user configured as a System Phone user and using a 1400, 1600, 2400, 4600, 5400, 5600 or 9600 Series phone (excluding XX01, XX02 and XX03 models). The user's Login Code is used to restrict access to system administration functions on the phone.

1. Select Features | Phone User | System Admin.
2. Enter your IP Office user login code.
3. From the menu select Memory Card.
4. Select System for the System SD card or Option for the Optional SD card.
5. Select Shutdown.
   - At the back of the control unit, confirm that the appropriate memory card LED is off.
   - The card can now be removed in order to perform the necessary maintenance actions.

Card Reinsertion

Reinserting a memory card into a system that is already switched on will automatically restart card operation. However, if the card has been shutdown but not removed, it can be restarted using Manager without requiring a reboot.

Card Startup Using IP Office Manager

1. Using IP Office Manager, select File | Advanced | Memory Card Commands | Startup.
2. Using the Select IP Office menu, select the IP Office system containing the memory card.
3. Click OK.

Card Startup Using the System Status Application

3. Start System Status 69 and access the IP Office's status output.
4. In the navigation panel select System.
3. Select Memory Cards.
4. Select either System Card or Optional Card.
5. At the bottom of the screen select Start Up.

Card Shutdown Using a System Phone

This process can be used by a user configured as a System Phone user and using a 1400, 1600, 2400, 4600, 5400, 5600 or 9600 Series phone (excluding XX01, XX02 and XX03 models). The user's Login Code is used to restrict access to system administration functions on the phone.

4. Select Features | Phone User | System Admin.
5. Enter your IP Office user login code.
6. From the menu select Memory Card.
4. Select System for the System SD card or Option for the Optional SD card.
5. Select Startup.

6.4 Changing Components

Except for memory cards (see Memory Card Removal 112), cards and external expansions modules must only be removed and added to an IP Office system when that system is switched off 109.

In the sections below, the term component can refer to a card fitted into the IP Office or an external expansion module.

Note that for extension ports, by default both an extension entry and a user entry will exist in the IP Office configuration. Extension entries can be deleted without deleting the corresponding user entry. This allows retention of the user settings and association of the user with a different extension by changing that extensions Base Extension number to match the user's Extension ID.

Like for Like Replacement

If replacing with a componenet of the same type no configuration changes are necessary.

1. Switch off the IP Office system 109.
2. Remove the card or external expansion module. Note the card slot or expansion port used as the replacement must be installed in the same position.
3. Install the replacement using the appropriate process for the type of component (Fitting IP500 cards 79, Adding External Expansion Modules 86).
4. Restart the IP Office system.

Higher Capacity Replacement

If replacing with a component of the same type but higher capacity, when restarted the IP Office will automatically create configuration entries for the new trunks or extensions/users.

1. Switch off the IP Office system 109.
2. Remove the card or external expansion module. Note the card slot or expansion port used as the replacement must be installed in the same position.
3. Install the replacement using the appropriate process for the type of component (Fitting IP500 cards 79, Adding External Expansion Modules 86).
4. Restart the IP Office system.
5. Use Manager to configure the new trunks or extensions/users.

Lower Capacity Replacement

If replacing with a component of the same type but lower capacity, after restarting the IP Office the configuration will need to be edited to remove redundant entries.

1. Switch off the IP Office system 109.
2. Remove the card or external expansion module. Note the card slot or expansion port used as the replacement must be installed in the same position.
3. Install the replacement using the appropriate process for the type of component (Fitting IP500 cards 79, Adding External Expansion Modules 86).
4. Restart the IP Office system.
5. Use Manager to delete the trunks or extensions/users in the configuration that are no longer supported by the component installed.

Adding a New Component

If adding a new component to an available slot or port, when restarted the IP Office will automatically create configuration entries for the new trunks or extensions/users.

1. Switch off the IP Office system 109.
2. Install the replacement using the appropriate process for the type of component (Fitting IP500 cards 79, Adding External Expansion Modules 86).
3. Restart the IP Office system.
4. Use Manager to configure the new trunks or extensions/users.

Permanent Removal

If permanently removing the component, the configuration will need to be edited to remove redundant trunk or extension/user entries.

1. Switch off the IP Office system 109.
2. Remove the card or external expansion module.
3. Restart the IP Office system.
4. Use Manager to delete the trunks or extensions/users in the configuration that relate to the component removed.
5. In the Control Unit section of the configuration, delete the entry for the component that is no longer present in the system.

Replacement of a Different Type

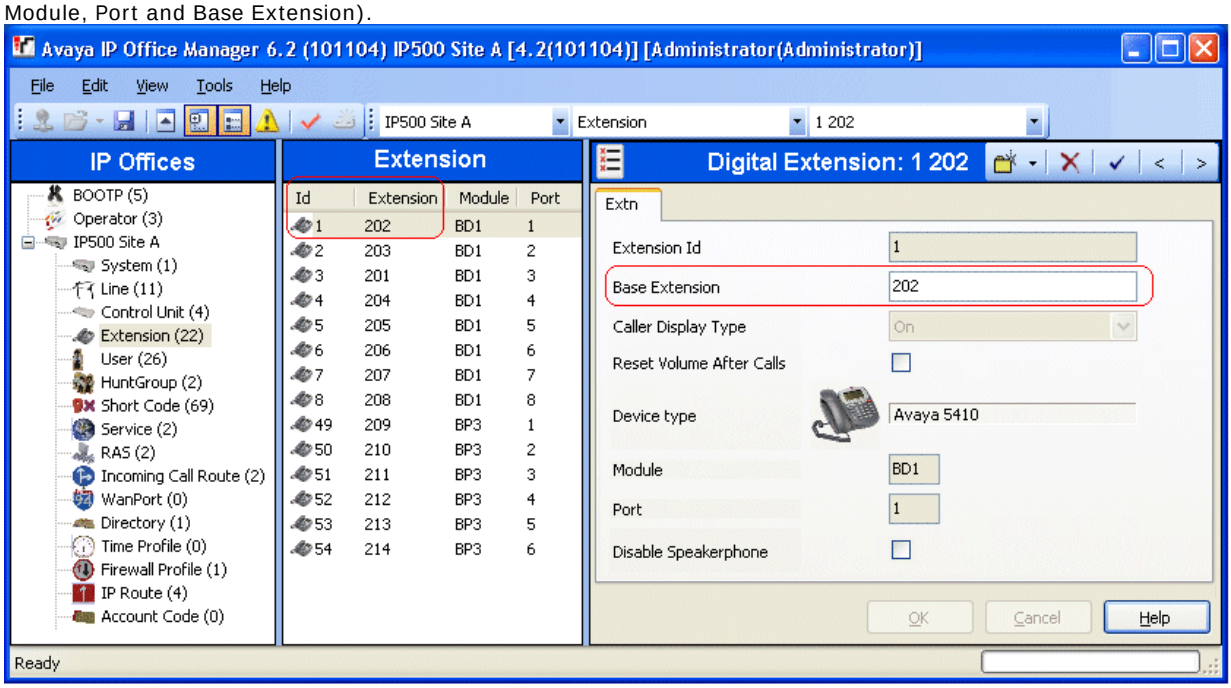
If replacing a component with one of a different type, the process should be divided into two stages. First remove the existing component using the Permanent Removal process above and adjust the configuration and reboot. Then install the new component using the Adding a New Component process above.

6.5 Swapping Extension Users

Whilst the example below shows 2 users swapping extensions the method can be used to swap multiple users within the configuration and effecting the swaps after a single merge of the configuration changes.

For this example User A (202) and User B (203) want to swap extensions.

1. Load the IP Office configuration and select Extension.
2. Locate the extension with the Base Extension set to *202*, ie. matching User A's extension number.
   - If the group pane is visible (View | Group Pane) in IP Office Manager, it shows the extension details (ID, Module, Port and Base Extension).



3. Select that extension and change its Base Extension setting to *203*, ie. to now match User B's extension number. If IP Office Manager is set to validate edits, it will warn that this change conflicts with the existing Base Extension setting of another extension. Ignore the warning at this stage. Click OK.
4. Locate the other extension with the Base Extension set to *203*, ie. matching User B's extension number.
5. Select that extension and change its Base Extension setting to *202*, ie. to now match User A's extension number. If the error pane is visible (View | Error Pane), the warnings about extension conflicts should now disappear. Click OK.
6. Save the configuration back to the IP Office system.
7. At each of the extensions dial the log out short code set on the IP Office system. By default this is **36*.
   - If any of the users is set to Forced Login, they will have to complete the login process at their new extension using their Login Code.

6.6 Changing Extension Numbers

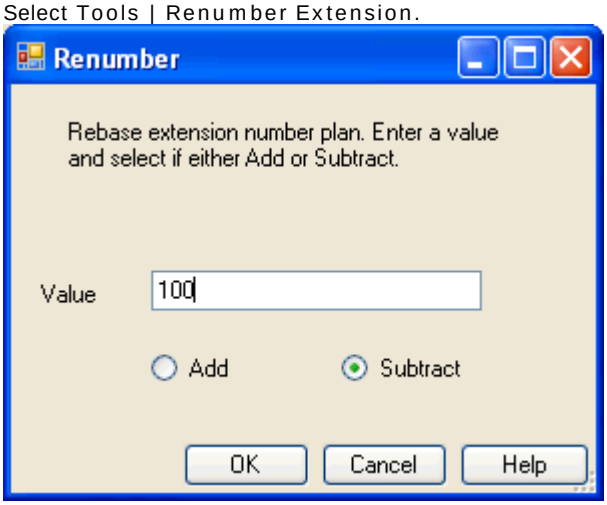
A new or defaulted IP Office system numbers each extension in sequence, going by module and port order, starting from 201. An extension entry is created in the configuration and also an associated user entry. A similar process occurs when a new extension expansion module is detected.

- Extension versus User
  It is important with IP Office to understand that "extension number" is a user setting that belongs to and moves with the user. For example, users can login at any phone, that phone then temporarily assumes the user's extension number and settings until they log off. The Base Extension value set against extensions in the IP Office configuration indicates the default associated user of the extension, it is not the extension number of that port.

Renumbering All Extensions and Users

The following process allows all user extension numbers to be shift up or down by a set amount. Any settings linked to those numbers are adjusted including extension Base Extension settings. It does not affect hunt group extension numbers.

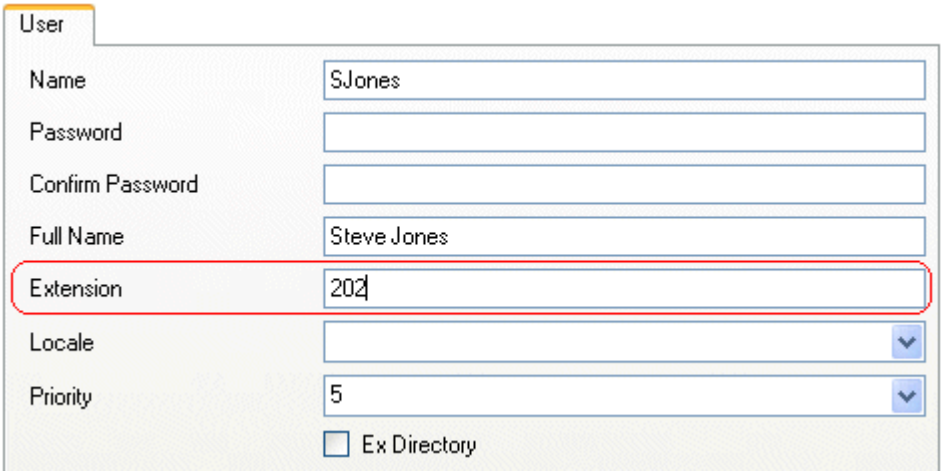
1. WARNING
   This action alters extension settings and so requires a system reboot when the configuration is sent to the IP Office.
2. Select Tools | Renumber Extension.



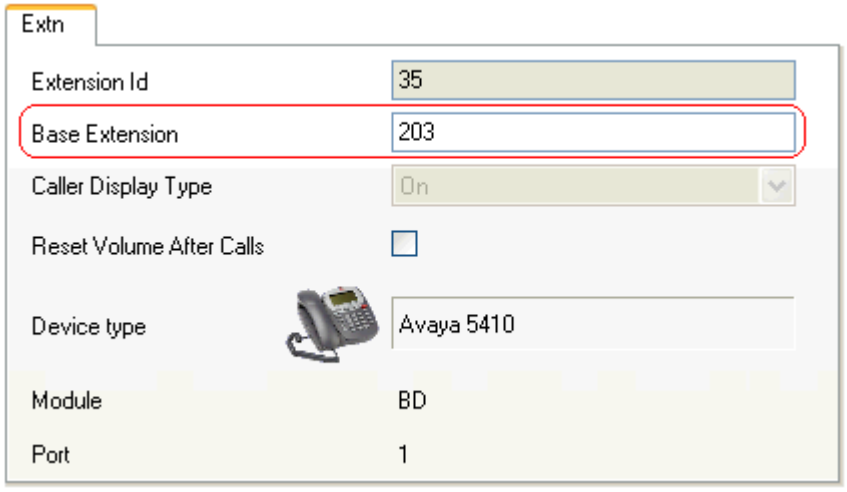
3. Enter the amount by which you want to shift the current extension numbering of extensions and users.
4. Click OK.
5. If the configuration changes are complete, send the configuration back to the IP Office and select appropriate settings for the reboot.

Changing an Individual User's Extension Number

1. Select User. Locate and select the relevant user.
   a. On the User tab, change the Extension number to the required new number.



   b. Click on another field. If an error warning appears it will most likely be due to a conflict with an existing use of that extension number.
      - If this an error, click Cancel to return the user to their original extension number.
      - If this is intended as the other entry will be corrected click OK and then edit the other entry.
      - When OK is clicked, Manager will automatically propagate the number change to any hunt groups, incoming call routes, user buttons, bridged appearance buttons and call coverage appearance buttons associated with the user's original extension number.
2. If the user has an extension with which they are associated by being the extension's Base Extension setting, that setting is not automatically updated. If the user should still be associated with that extension by default, the extension must be updated manually to match the user's new extension number.
   a. Select Extension.
   b. Change the Base Extension number to match the user extension who should now be associated with that extension port by default.



   c. Click OK. Manager will probably give a validation error message due to a user being associated with two extensions. This can be ignored until all the user moves have been completed.
3. If changing several users repeat the processes as required.
4. Click to revalidate the configuration and check that no conflicts between users and associated extensions.
5. If the configuration changes are complete, send the configuration back to the IP Office and select appropriate settings for the reboot.

6.7 Upgrading the IP Office Software

The installed IP Office Manager includes IP Office software files for control units, external expansion modules and phones appropriate to the IP Office software level. The IP Office system can be upgraded in two ways:

- Using the IP Office Manager Upgrade Wizard
  The upgrade wizard is part of IP Office Manager and can be used to upgrade all types of IP Office system.
- Upgrading the System SD Card
  For IP500v2 control units, the software on the System SD card can be upgraded by a range of methods, i.e. directly upgrading the SD card or using the upgrade wizard. When the system is rebooted it will use the new software.

⚠ WARNINGS

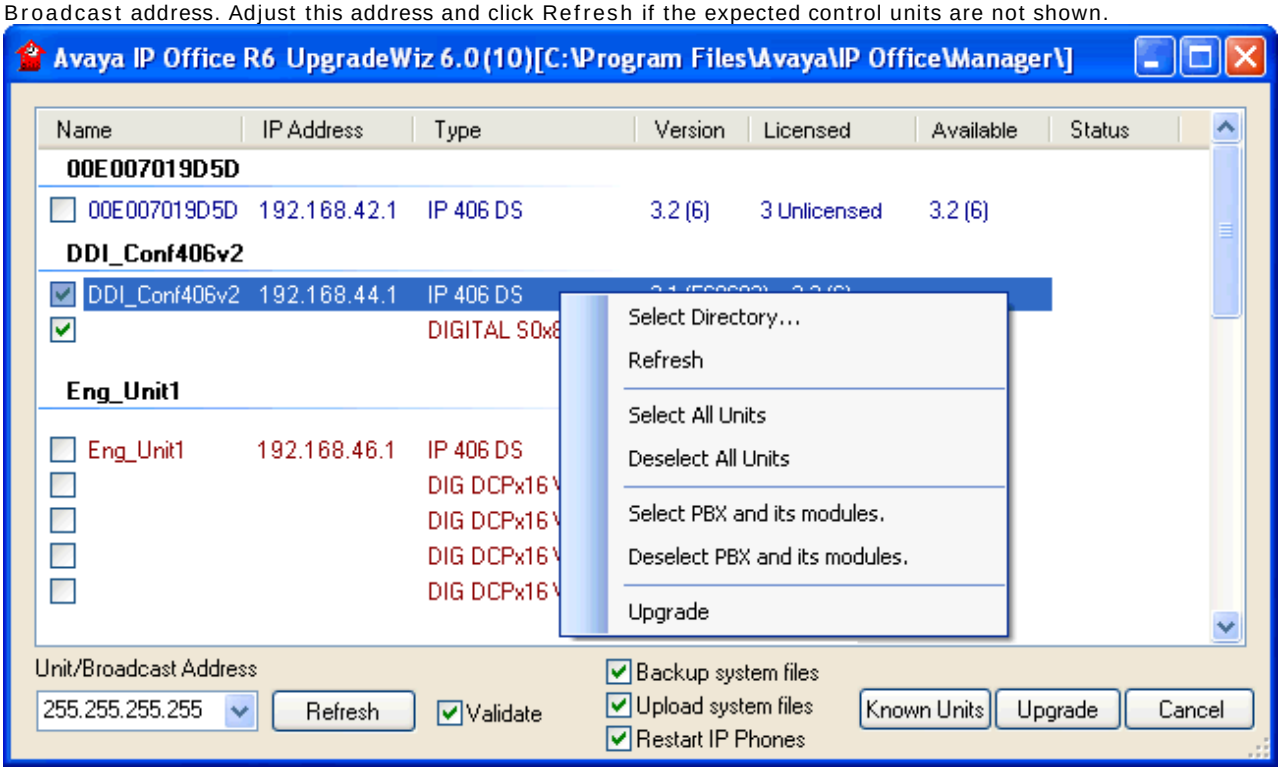
- Check IP Office Technical Bulletins
  Check the latest IP Office Technical Bulletin for the IP Office software release before proceeding any further. It may contain information relating to changes that occurred after this document was completed. Bulletins are available from http://support.avaya.com.
- WAN3 10/100 Modules
  Upgrade each WAN3 10/100 module separately and only after having upgraded the control unit and any other expansion modules.
- Upgrading pre-Level 2.1 Systems
  For IP Office Systems with software Level 2.0 or earlier, the upgrade procedure must be done from a PC with a fixed IP address on the same subnet and LAN segment as the IP Office.
- Upgrade Path/Multi-Stage Upgrades
  Due to the need to adjust internal memory allocation and configuration storage, for some upgrades the control unit may need to perform multi-stage upgrade process. The table below indicates the require upgrade paths.

Platform	Current Release	Upgrade Step 1	Upgrade Step 2
IP406v2	4.0 / 4.1 / 4.2 / 5.0	5.0.999 Loader	Load 6.1
	6.0	Load 6.1	–
IP412	4.0 / 4.1 / 4.2 / 5.0	Load 6.1	–
IP500	4.0 / 4.1 / 4.2 / 5.0	Load 6.1	–
IP500v2	6.0	Load 6.1	–
All modules	4.0 / 4.1 / 4.2 / 5.0	Load 6.1	–

- Multiple Managers
  If more than one copy of Manager is running it is possible for the IP Office to request BIN files from a different Manager from the one that started the upgrade process. Ensure that only one copy of Manager is running when upgrading an IP Office system.
- Other IP Office Applications
  Upgrading the core software of the IP Office control unit may require upgrades to associated software. Typically IP Office is compatible with the previous release of most IP Office applications, however for each IP Office core software release there may be exceptions. These exceptions will be detailed in the Technical Bulletin for the IP Office core software release.

6.7.1 Using the Upgrade Wizard

1. Ensure that you have a backup copy of the IP Office's configuration before performing this action. If a copy of the configuration cannot be downloaded using Manager, check the Manager application directory for previously downloaded configurations.
   a. Use Manager to download an up to date copy of the configuration. If that is not possible, check in the Manager application folder for a previous copy of the configuration.
   b. Using IP Office Manager, select File | Open Configuration.
   c. Using the Select IP Office Menu, locate and select the IP Office system. Click OK.
   d. Enter the name and password for a service user account on that IP Office. Click OK. Manager will receive and display the configuration from the IP Office.
      - If not already done, this action creates a BOOTP entry in Manager for the IP Office system.
      - This action also confirms communication between the Manager PC and the IP Office prior to any following process.
   e. Select File | Save Configuration As... and save a copy of the configuration file onto the PC.
2. Select File | Advanced | Upgrade. The UpgradeWiz is started and scans for IP Office modules using the Unit / Broadcast address. Adjust this address and click Refresh if the expected control units are not shown.



2. The information displayed depends on the type of control unit.
   - For IP500v2 control units
     The current version of each IP Office .bin file held in the control units memory is shown. That is regardless of whether that .bin file is currently being used by any module in the system.
   - For other control units
     For the control unit and each external expansion module present in the system, the current version of software installed is displayed.
3. In the Available column Manager indicates the versions of software it has available. Where Manager detects that it has a higher version available, the tick box next to that row is automatically selected.
   - If any of the modules have pre-version 2.1 software installed, an upgrade with Validate unticked is required. If this is the case, only continue with the upgrade process using a PC with a fixed IP address on the same LAN domain and physical LAN segment as the IP Office control unit and only upgrade the pre-2.1 system.
   - If a multi-stage upgrade is necessary, use the following additional steps to select the appropriate interim software:
     - Right-click on the upgrade wizard and click Select Directory. Locate and select the directory containing the bin file for the intermediate software level.
     - The upgrade wizard should now list just the control unit as having upgrade software available.
4. For those modules which you want to upgrade, tick the check box.

- For systems including WAN3 modules, untick the WAN3 modules. Each WAN3 module should be upgraded separately once the control unit and modules in the same system have been upgraded.

5. For IP500v2 control units, the following additional options are available:

   - Backup System Files
     If selected, before upgrading to the new software, the current files in the System SD cards /primary folder will be copied to its /backup folder.

   - Upload System Files
     If selected, the full set of software files that Manager has is copied to the /primary folder on the System SD card. In addition to control unit and module software this will include phone software files. Following the reboot, the phone will upgrade using those files if necessary.

   - Restart IP Phones
     If selected, following the upgrade and reboot, all Avaya IP phones are also restarted. This will cause them to recheck whether the firmware they currently have loaded matches that on their configured file server. Use this option if the IP Office system is the file server and the upgrade included new IP phone firmware.

6. Select Upgrade. The system password for each system will be requested. Enter it and click OK. The next steps depend on the upgrade options selected. Do not cancel or close the upgrade wizard while these processes are running.

   - Validated Upgrade
     If using the Validated option, a number of actions take place as follows;

     a. The upgrade wizard checks the amount of free RAM memory available in the control unit to temporarily store the new BIN files. If insufficient memory is available, you will be prompted whether to continue with an off-line upgrade or cancel upgrading.

        - If offline is selected, the IP Office is rebooted into offline mode. It may be necessary to use the Refresh option within the Upgrade Wizard to reconnect following the reboot. Validate upgrade can then be attempted to again check the amount of available RAM memory for transfer of BIN files. If the memory is still insufficient, the option is offered to either do an unvalidated upgrade or cancel.

     b. The bin files required are transferred to the system and stored in temporary memory.

     c. For IP500v2 control units, the backup system files and upload system files actions are performed.

     d. Once all file transfers are completed, the upgrade wizard will prompt whether it okay to proceed with the upgrade process. Select Yes to continue.

     e. Each module being upgraded will delete its existing core software, restart and load the new software file that was transferred. This process may take several minutes for each unit.

   - Unvalidated Upgrade
     This method of upgrading should be avoided unless absolutely necessary. It is only required for IP Office systems with pre-2.1 software and should only be done from a Manager PC with a fixed IP address running on the same LAN segment and subnet as the IP Office system. During the upgrade the units and modules erases their current software and then request the new software file from Manager.

7. Following the upgrade check that the upgrade wizard now shows that the selected units and modules have upgraded. It may be necessary to select Refresh to update the information in the upgrade wizard display.

8. Repeat the process as required. For example if doing a multi-stage control unit upgrade or if there are WAN3 modules in the system that are being upgraded separately.

6.7.2 Using an SD Card

In addition to using the traditional IP Office Upgrade Wizard 120, IP500v2 control units can be upgraded by loading the required set of firmware files onto the System SD card and rebooting the system.

- ⚠ IP Office Technical Bulletins
  Ensure that you have obtained and read the IP Office Technical Bulletin relating to the IP Office software release which you are installing. This bulletin will contain important information that may not have been included in this manual. IP Office Technical Bulletins are available from the Avaya support website (*http://support.avaya.com*).
- ⚠ Upgrade Licenses
  Some upgrades may require entry of upgrade licenses.
- ⚠ WARNING
  These processes will cause the IP Office system to be restarted, disconnecting any current calls and services in progress.

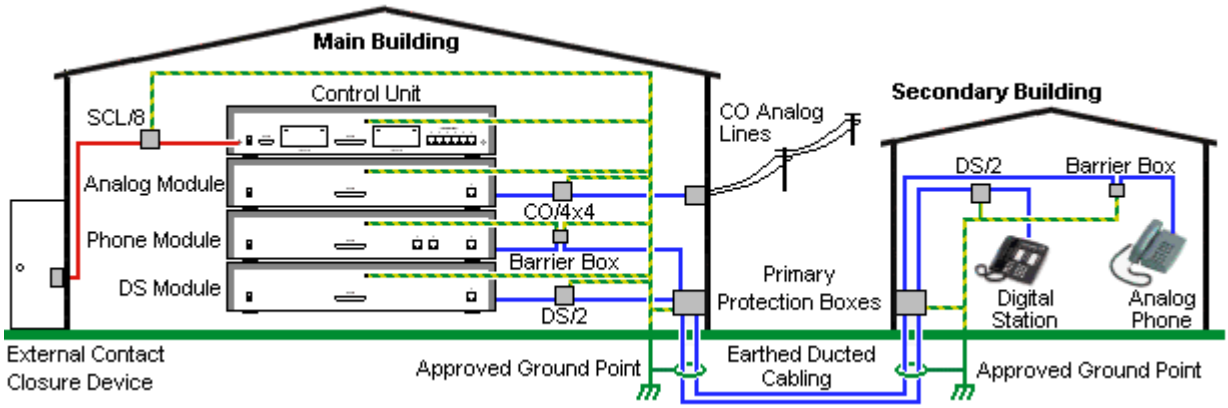
There are a number of ways in which this can be done.

Method	Description	Location	Software Files	Embedded Voicemail Prompts
Using Manager 157	Using IP Office Manager, the contents of the card are compared to the files that Manager has available and are upgraded if necessary.	Local or Remote	✓	✓
System SD Card Upgrade 157	In this method, the System SD card is shut down and removed from the control unit. The card's contents are upgraded using IP Office Manager.	Local	✓	✓
Upgrade from Optional SD Card 158	This method uses an SD card loaded with the required version of IP Office software. The card is inserted into the control unit and then Manager, System Status or a system phone is used to transfer the software to the System SD card.	Local	✓	–

6.8 Out of Building Telephone Installations

The following are the only supported scenarios in which wired extensions and devices outside the main building can be connected to the IP Office system. In these scenarios, additional protection, in the form of protective grounding and surge protectors, must be fitted.

- ⚠ WARNING
  The fitting of additional protection does not remove the risk of damage. It merely reduces the chances of damage.



- Cables of different types, for example trunk lines, phone extensions, ground and power connections, should be kept separate.
- All cabling between buildings should be enclosed in grounded ducting. Ideally this ducting should be buried.
- A Primary Protection Box must be provided at the point where the cables enter the building. This should be three point protection (tip, ring and ground). Typically this would be gas tube protection provided by the local telephone company. The ground wire must be thick enough to handle all the lines being affected by indirect strike at the same time.

Connection Type	Protection Device Type	Requirement
DS Phone Extensions External expansion module DS 379 ports only.	ITWLinx towerMAX DS/2 124 Supports up to 4 connections. (This device was previously referred to as the Avaya 146E).	• Connection from the expansion module to the phone must be via a surge protector at each end and via the primary protection point in each building. • The IP Office expansion module and control unit and IROB devices must be connected to the protective ground point in their building. • The between building connection must be via earthed ducting, preferable underground. The cable must not be exposed externally at any point.
Analog Phone Extensions Phones External expansion module (POT 384 or PHONE 384) ports only.	IP Office Barrier Box 125 Supports a single connection. Maximum of 16 on any expansion module.	
Analog Trunks	ITWLinx towerMAX CO/4x4 124 Supports up to 4 two-wire lines. (This device was previously referred to as the Avaya 146C).	For installations in the Republic of South Africa, the fitting of surge protection on analog trunks is a requirement. For other locations where the risk of lightning strikes is felt to be high, additional protection of incoming analog trunks is recommended.
External Output Switch	ITWLinx towerMAX SCL/8 (This device was previously referred to as the Avaya 146G)	Connections from an IP Office Ext O/P port to an external relay device must be via a surge protector.

The towerMAX range of devices are supplied by ITWLinx (http://www.itwlinx.com).

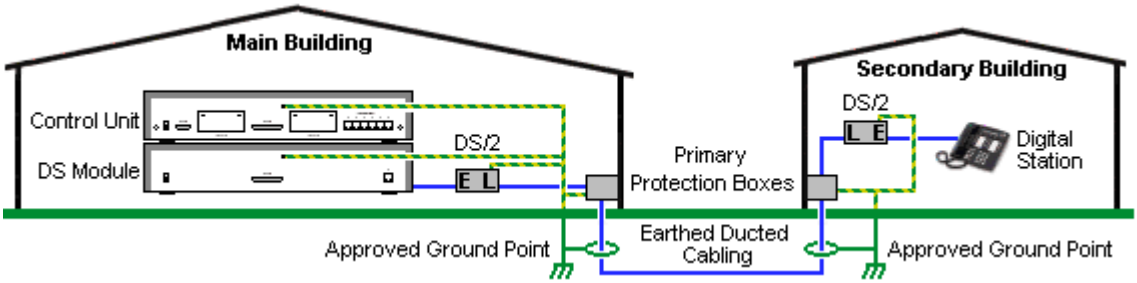
6.8.1 DS Phones

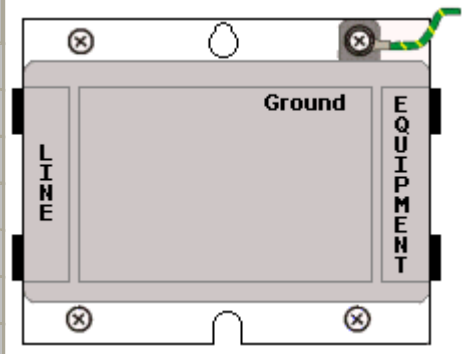
When digital phone extensions are required in another building, additional In-Range Out-Of-Building (IROB) protective equipment must be used. For phones connected to IP Office DS 379 ports, the supported device supplied by ITWLinx is a towerMAX DS/2 module. This IROB device was previous badged by Avaya as the 146E IROB.

- ⚠ CAUTION
  DS ports on the front of the IP406 V2 control units must not be used for extensions that are external to the main building.

The protection device should be installed as per the instructions supplied with the device. The ground points on the IP Office control unit and the DS modules must be connected to a protective ground using 18AWG wire with a green and yellow sleeve.

Typically the IROBs 2 RJ45 EQUIPMENT ports are straight through connected to the 2 RJ45 LINE ports. This allows existing RJ45 structured cabling, using pins 4 and 5, to be used without rewiring for up to two DS connection. However each of these ports can be used to connect a second extension using pins 3 and 6.

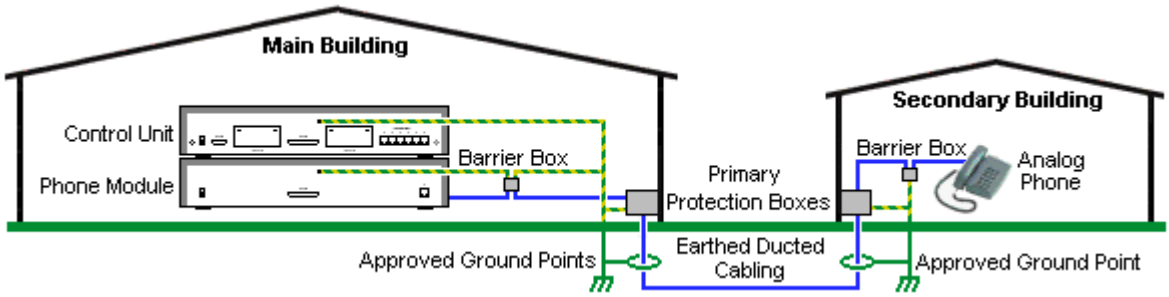


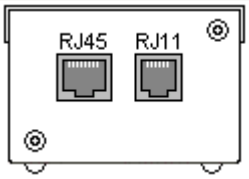
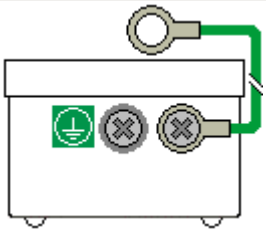
LINE		Signal		EQUIPMENT	
RJ45 8 1	1	Not used.		1	RJ45 8 1
	2	Not used.		2	
	3	Ring II (Optional)		3	
	4	Ring I		4	
	5	Tip I		5	
	6	Tip II (Optional)		6	
	7	Not used.		7	
	8	Not used.		8	

6.8.2 Analog Phone Barrier Box

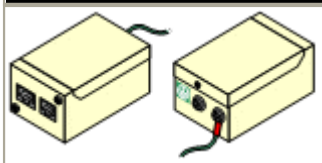
Where analog phone extensions are required in another building, additional protective equipment must be used, in the form of IP Office Phone Barrier Boxes and protective earth connections.

- ⚠ CAUTION
  PHONE (POT) ports on the front of control units must not be used for extensions that are external to the main building.
- The correct IP Office specific barrier boxes must be used. These modules have been designed specifically for the signalling voltages used by the IP Office system:
  - Only the IP Office Phone Barrier Box should be used with Phone V1 modules.
  - Only the IP Office Phone Barrier Box V2 should be used with Phone V2 modules.
  - No other type of analog phone barrier box should be used.
- Where more than 3 barrier boxes are required in a building, they must be rack mounted using a Barrier Box rack mounting kit 126.
- A maximum of 16 barrier boxes can be used with any Phone module.
- The Phone Barrier Box does not connect the ringing capacitor in Phone V1 modules.



Main Building	Barrier Box	Secondary Building
• RJ11 Connect to PHONE (POT) port on the Phone module using cable supplied with the barrier box. • RJ45 Connect to the secondary building barrier box via primary protection in both buildings.		• RJ11 Connect to analog phone. Cable not supplied. • RJ45 From main building via primary protection in both buildings.
• Center Screw Connect to main building protective ground (or ground terminal of Barrier Box Rack Mounting Kit). Use 18AWG (minimum) wire with a green and yellow sleeve. • Right-Hand Screw Connect to ground point on Phone module using ground cable supplied with barrier box.		• Center Screw Connect to main building protective ground. Use 18AWG (minimum) wire with a green and yellow sleeve. • Right-Hand Screw Not used.

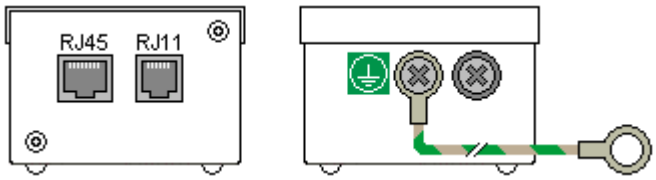
1. The following wires must be kept apart, that is not routed in the same bundle:
   - Earth leads from the barrier box to the Phone modules.
   - Internal wires, for example extension leads going directly to the Phone modules.
   - Wires from external telephone going directly to the barrier boxes.

IP Office Barrier Boxes		SAP Code
	IP400 Phone Barrier Box (81V) Use with Phone V1 module. Includes an RJ45 to RJ11 cable and a functional earth lead.	700293897
	IP400 Phone Barrier Box V2 (101V) Use with Phone V2 module. Includes an RJ45 to RJ11 cable and a functional earth lead.	700385495
	Barrier Box Rack Mounting Kit	700293905

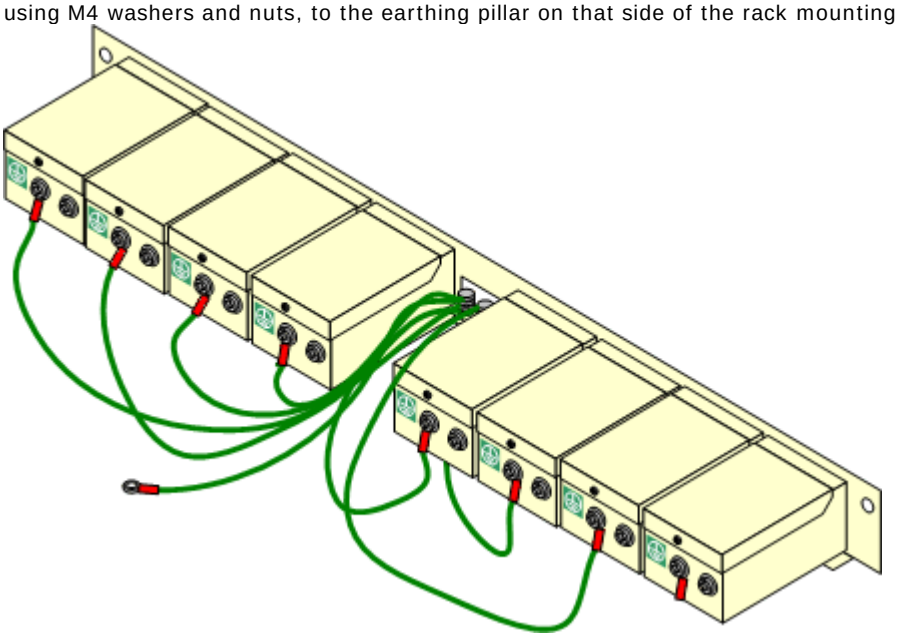
6.8.3 Rack Mounting Barrier Boxes

Where more than 3 Phone Barrier Boxes are used they must be rack mounted. The Barrier Box Rack Mounting Kit (SAP Code 700293905) supports up to 8 Phone Barrier Boxes.

1. Unscrew the two screws arranged diagonally at the front of each barrier box and use these same screws to reattach the barrier box to the rack mounting strip.
2. Each barrier box is supplied with a solid green ground wire connected to its functional ground screw. Remove and discard this wire. Connect a green/yellow ground wire to the protective earth screw in the center of the Point on the back of the Barrier Box.



3. The rack mounting strip has threaded M4 earthing pillars. Connect the other end of the barrier box ground wire, using M4 washers and nuts, to the earthing pillar on that side of the rack mounting strip.



4. Using 14AWG wire with green and yellow sleeve, connect one of the earthing pillars to the buildings protective earth.
5. Using 14AWG wire with green and yellow sleeve, connect the other earthing pillar to the Phone module.
6. Ensure that the following wires are not routed together in the same bundle:
   - Earth lead from the barrier box to the Phone module.
   - Internal wires, e.g. wires going directly to the Phone module.
   - Wires from external telephone going directly to the barrier boxes.

6.9 Using the External Output Port

All the IP Office control units are equipped with a EXT O/P port. The port is marked as EXT O/P and is located on the back of the control unit adjacent to the power supply input socket.

The port can be used to control up to two external devices such as door entry relay switches. The usual application for these switches is to activate relays on door entry systems. However, as long as the criteria for maximum current, voltage and if necessary protection are met, the switches can be used for other applications.

The switches can be switched closed, open or pulsed (closed for 5 seconds and then open). This can be done in a number of ways:

- Using IP Office short codes.
- Through the Door tab in Phone Manager Pro.
- Through the Door Release option in IP Office SoftConsole.
- Via the Open Door action in Voicemail Pro.

Default Short Codes

The following are the default short codes in the IP Office configuration for external output switch operation. They use the short code features Relay On (closed), Relay Off (open) and Relay Pulse.

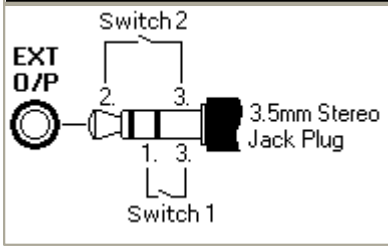
State	Switch 1	Switch 2
Closed	*39	*42
Open	*40	*43
Pulse	*41	*44

6.9.1 Port Connection

These ports are found on the rear of all IP Office control units. They are used for connection to external switching relays. The port uses a standard 3.5mm stereo jack plug for connection.

The IP Office is able to open (high resistance), close (low resistance) or pulse (close for 5 seconds and then open) two switches within the port. Either switch can be operated separately. These switches are intended for activation of external relays in systems such as door opening systems.

- CAUTION: In installations where this port is connected to a device external to the building, connection must be via a towerMAX SCL/8 Surge Protector and a protective ground connection must be provided on the IP Office control unit.

EXT O/P	Pin	Description
	1	Switch 1.
	2	Switch 2.
	3	0 Volts (Ground/Chassis)

- Switching Capacity: 0.7A.
- Maximum Voltage: 55V d.c.
- On state resistance: 0.7 ohms.
- Short circuit current: 1A.
- Reverse circuit current capacity: 1.4A.
- Ensure that pins 1 and 2 are always at a positive voltage with respect to pin 3.

3.5mm stereo audio jack plugs are frequently sold as pre-wired sealed modules. It may be necessary to use a multi-meter to determine the wiring connections from an available plug. Typically 3 (common to both relays) is the cable screen.

6.10 So8 BRI Module

6.10.1 Example 1: ISDN Terminal

In this example, calls on DID 123456 are routed to the first port of the So8 expansion module. That port has been configured as Line Group ID 701.

1. Configure an Incoming Call Routing
   The destination is a short code that directs the call to the line group ID that contains the So lines. The Bearer Capability has been set to *Any*, to allow data and voice via this route.
   - Line Group ID: 0
   - Incoming Number: 123456
   - Destination: 123456
   - Bearer Capability: Any
2. Create a System Short Code:
   This is the destination used in the Incoming Call Route.
   - Short Code: 123456
   - Telephone Number: 123456
   - Line Group ID: 701
   - Feature: Dial
3. Send the configuration to the Control Unit.

Any call coming into the main system on DID 123456 will now be passed directly to the first port.

If you wish to assign DIDs from your main pool to individual ports and avoid network charges when dialing between them, try variations on the following:

1. You have DID ranges, for example: 7325551000 to 7325551099. You wish to assign 7325551000-19 to port 1 and 7325551020-20 to port 2 etc.
2. Configure Incoming Call Route:
   The # is used here instead of "n" to avoid problems with "Main". The minus sign means the number is processed from the left and so will wait for the whole number.
   - Line Group ID: 701
   - Incoming Number: -100x
   - Destination: #
3. Repeat for Line Group ID 702 etc.
4. Create Short codes, for example:
   - Short Code: 100x
   - Telephone Number: .
   - Line Group ID: 701
   - Feature: Dial

S0 calls dialed without the area code are handled locally without network charges. Calls with area calls will go via the network.

6.10.2 Example 2: Video Conference

In this example, calls are routed to a Polycom Viewstation module connected to a S0 port of the IP Office system.

The following settings were used on 4 incoming data channels of a PRI line:

- Line Number: 5
- Channel Allocation: 23 -> 1
- Switch Type: 5ESS
- Line Sub Type: PRI
- Provider: AT&T
- Channels: 1-4
- Incoming Line Group: 95
- Outgoing Line Group: 95
- Direction: Bothway
- Bearer: Data
- Service: Accunet (this is a important)
- Admin: In Service

To route an incoming video call on the PRI lines configured above to an SO8 module requires the following:

1. Create a dial short code that has the SO port as its destination Line Group. For this example the following was used:
   - Short Code: 1500
   - Number: .
   - Feature: Dial
   - Line Group: 601 (the SO8 port number)
2. Create an Incoming Call Routing that routes the appropriate calls to that short code. For this example the following was used:
   - Line Group: 95 (identifies calls using the PRI lines configured above)
   - Destination: 1500 (the short code created above)
   - Bearer: Any

To allow the video device on the S0 port to make outgoing calls to the PRI lines also requires a short code.

1. For this example the following was used:

- Code: 91N;
- Number: N
- Feature: Dial
- Line Group: 95

Polycom Video Module Settings
The Polycom modules used in the previous example were the Viewstation 128, Viewstation 256 and Viewstation MP.

The Polycom module must have software that supports 'Standard ETSI ISDN' (European ISDN) and have its ISDN Switch Protocol setting set to 'Standard ETSI Euro-ISDN'

The following were the settings used during testing:

Characteristics	Admin/Software and Hardware/Software
• Polycom View Station 512 MP. • NTSC UIS Interface. • View Station PVS 1419.	• Software: 7.0.1. • Network Interface: S/T Interface. • ISDN Version: IEUS v18:a00320
Admin/General Setup	**Admin/Video Network/ISDN Video Network**
• Country: USA • Language: English (USA) • Auto Answer: Yes • AllowDial: Yes • Allow User Setup: Yes • Maximum Time on Call: 480.	• Country Code: 1 • Area Code: 732 • Number A: blank • Number B: blank • ISDN Switch Protocol: Standard ETSI Euro-ISDN.
User Setup	**Admin/Video Network/IMUX**
• Auto Answer: Yes • PIP: Auto • Far Control of Near Camera: Yes • MP Mode: Auto	• Numbers: blank • SPID: blank • Audio Quality: 168KB/s • Advanced Dialing: Dial Channels in Parallel
System Information	**Admin/Software and Hardware/Hardware**
• Release: 7.0.1 • Model: VS: 512	• Camera: NTSC • Video Comm Interface: ISDN_Quad_BRI • Network Interface Type: S/T Interface
Admin/Video Network	**Admin/Video Network/Call Preference**
• MultiPoint Setup: Auto	• ISDN Video Calls (H:320): Yes

6.11 SNMP

SNMP (Simple Network Management Protocol) is a standard network protocol that allows the monitoring and management of data devices across a network. An SNMP agent can be built into network devices such as routers and hubs. An SNMP manager application, for example CastleRock or HP OpenView, can then communicate with those devices.

IP Office 2.0 and above supports SNMP communication. This communication can be:

- Polling:
  Some SNMP applications (called "managers") send out polling messages to the network. They then record the responds of any SNMP enabled devices (called "agents"). This allows the application to create a network map and to raise an alarm when devices previously present do not respond.
  - Most SNMP manager applications can also do simple IP address polling to locate non-SNMP enabled devices. However this method of polling does not identify the device type or other information.
  - SNMP polling including details about the responding device. For example an IP Office control unit's response includes the control unit type, level of software, routing table information, up time, etc.
- Traps:
  When certain events occur, a devices SNMP agent can send details of the event to the SNMP manager. This is called an SNMP 'trap'. These appear in the event log of the SNMP manager. Most SNMP managers can be configured to give additional alerts in response to particular traps.
- Management:
  Some SNMP agents support device management and configuration changes through the SNMP manager interface. This is not supported by IP Office.

IP Office SNMP operation has been tested against Castle Rock SNMPc-EE 5.1.6c and HP OpenView Network Node Manager 6.41.

What Information is Available Via SNMP

As described above, SNMP information can either be polled by the SNMP application or received as the result of the IP Office sending SNMP trap information.

While the *.mib* files should not be edited, they can be read using a text editor and contain descriptions of all the various information objects that can be polled or sent and the information tha each object will include. For a list of the *.mib* files, see Installing the IP Office MIB Files 132. The *NOTIFICATION-TYPE* objects are those used for SNMP traps 134, the other types of objects are those that can be polled 134.

6.11.1 Installing the IP Office MIB Files

To allow full communication between an SNMP agent and an SNMP manager, the SNMP manager must load MIB files (Management Information Base) specific to the SNMP agent device and the features it supports. These MIB files contain details of the information the agent can provide and the traps that it can send. Full details of the structure of the IP Office MIB files, MIB groups within those files and event traps can be found in the "IP Office Installation Manual".

The MIB files for IP Office operation are included on the IP Office DVD in the folder *\AdminCD\snmp_mibs*. The actual files required and the method of loading depend on the SNMP manager application being used. The details below cover the two SNMP manager applications tested.

HP Open View Network Node Manager

1. Copy the following MIB files to the applications MIBs folder.

	MIB File	Source
a.	rfc2737-entity-mib.mib	snmp_mibs\standard folder on OpenView Install CD.
b.	avayagen-mib.mib	\AdminCD\snmp_mibs\IPOffice folder on IP Office Admin DVD.
c.	ipo-prod-mib.mib	\AdminCD\snmp_mibs\IPOffice folder on IP Office Admin DVD.
d.	ipo-mib.mib	\AdminCD\snmp_mibs\IPOffice folder on IP Office Admin DVD.
e.	inet-address-mib.mib	\AdminCD\snmp_mibs\Standard folder on IP Office Admin DVD.
f.	rfc2213-integrated-services-mib.mib	\AdminCD\snmp_mibs\standard folder on OpenView Install CD.
g.	diffserv-dscp-tc.mib	\AdminCD\snmp_mibs\Standard folder on IP Office Admin DVD.
h.	diffserv-mib-hpov.mib	\AdminCD\snmp_mibs\Standard folder on IP Office Admin DVD.
i.	ipo-phones-mib.mib	\AdminCD\snmp_mibs\IPOffice folder on IP Office Admin DVD.

2. Start the OpenView Network Node Manager console.
3. Select Options and then Load/Unload MIBs: SNMP.
4. Select Load and select all the MIB files listed above.
5. Select Compile.

CastleRock SNMPc 5.1.6c and earlier

1. Copy the following MIB files to the applications MIBs folder, normally C:\Program Files\SNMPc Network Manager\mibfiles.

	MIB file	Source
a.	ENTITY-MIB	\AdminCD\snmp_mibs\Standard on IP Office Admin DVD.
b.	AVAYAGEN-MIB.mib	\AdminCD\snmp_mibs\IPOffice on IP Office Admin DVD.
c.	IPO-PROD-MIB.mib	\AdminCD\snmp_mibs\IPOffice on IP Office Admin DVD.
d.	IPO-MIB.mib	\AdminCD\snmp_mibs\IPOffice on IP Office Admin DVD.
e.	INET-ADDRESS-MIB.mib	\AdminCD\snmp_mibs\Standard on IP Office Admin DVD.
f.	INTEGRATED-SERVICES-MIB	\AdminCD\snmp_mibs\Standard on IP Office Admin DVD.
g.	DIFFSERV-DSCP-TC.mib	\AdminCD\snmp_mibs\Standard on IP Office Admin DVD.
h.	DIFFSERV-MIB.mib	\AdminCD\snmp_mibs\Standard on IP Office Admin DVD.
i.	IPO-PHONES-MIB.mib	\AdminCD\snmp_mibs\IPOffice on IP Office Admin DVD.

2. In SMNPc select Config | MIB Database.
3. Select Add and select the MIB files listed above in the order listed.

CastleRock SNMPc V5.0.1

The MIB installation instructions provided above are correct for CastleRock SNMPc V5.0.8 and later. For V5.0.1 of CastleRock SNMPc the following must be carried out:

1. Copy all of the IP Office MIBs and standard MIBs from the IP Office Administrator Applications DVD to the SNMPc mibfiles directory.
2. In the SNMPc mibfiles directory open the files STANDARD.mib and SNMPv2-SMI.mib in Notepad.
3. In the SNMPv2-SMI.mib file find the definition of zeroDotZero and copy this to the clipboard.
4. In the STANDARD.MIB file find the SNMPv2-SMI section and paste in the definition of zeroDotZero from the clipboard before the end of this section (just before the END statement).
5. Save the modified STANDARD.MIB file.
6. Add the MIB file SNMP-FRAMEWORK-MIB.mib to the MIB database using the instructions provided in the IP Office installation guide.
7. Add all the MIB files listed in the instructions provided in the IP Office installation guide in the order given.
8. Compile the MIBs ready for use.

The reason for this is: The IPO-PHONES-MIB.mib relies upon the DIFFSERV-MIB.mib for the definition of the textual convention of IndexInteger. The DIFFSERV-MIB needs the definition of the textual convention zeroDotZero which is normally defined in SNMPv2-SMI.mib. However including SNMPv2-SMI.mib in the MIB file compilation list results in errors due to conflicts with what appear to be internal definitions within SNMPc and the SNMPv2-SMI section in its STANDARD. mib file. Therefore to resolve the issue the required definition of zeroDotZero must be placed in the SNMPv2-SMI section in SNMPc's STANDARD.mib file.

6.11.2 Enabling SNMP and Polling Support

In order for the IP Office control unit to be discovered and polled by an SNMP manager, its SNMP agent must be enabled and placed in the same read community as the SNMP manager.

1. In Manager, receive the control unit's configuration.
2. Double-click System from the Configuration Tree panel and select the SNMP tab.
3. Tick SNMP Enabled.
4. In SNMP Port, enter the UDP port number used by the IP Office SNMP agent to listen for and respond to SNMP traffic. The normal default is 161.
5. In Community (Read-only), enter the community to which the device belongs for read access. This community name must match that used by the SNMP manager application when sending requests to the device. The community public is frequently used to establish communication and then changed (at both the SNMP agent and manager ends) for security.
6. Click OK.
7. Send the configuration back to the IP Office and select reboot.
8. Following the IP Office reboot, the SNMP manager should be able to discover the control unit.
9. The control unit's response will include details of the control unit type and the current level of core software.

6.11.3 Enabling SNMP Trap Sending

In Manager, receive the control unit's configuration.

1. Double-click System from the Configuration Tree panel and select the SNMP tab.
2. Ensure that SNMP Enabled is ticked.
3. Using either Trap Destination 1 or Trap Destination 2, enter the following information:
   - Enter the IP Address of the PC running the SNMP manager application.
   - Enter the Port on which the traps messages should be sent. This is the UDP port on which the IP Office sends SNMP trap messages. The default is 162.
   - Set the Community that will be used by the agent and the SNMP manager. The community public is frequently used to establish communication and then changed (at both the SNMP agent and manager ends) for security.
4. Select the Events which should be sent:
   - Generic:
     Events such as soft reboot (warm start), hard reboot (cold start), links up/down (transition in the status of a PPP or frame relay interface) or SNMP community mismatch.
   - Entity:
     Failures, errors and changes of state in IP Office modules and trunk interfaces. Note: Does not include WAN3, Modem2 and ATM4.
   - Licence:
     Changes of state in the communication with the Feature Key Server.
   - Phone Change:
     Changes to the type of DS or IP phone connected to a port.
   - Click on OK.
5. Send the configuration back to the IP Office and select reboot.

6.12 DTE Port Maintenance

The DTE port on the back of IP Office control units is not normally used when configuring an IP Office system. However, in extreme cases, the DTE port can be used to default the system's configuration or to erase it core software if necessary.

- ⚠ WARNING
  Due to the nature of the actions in this section, they should only be performed if absolutely necessary to return a system back to working order. In all cases, you must make every effort to ensure that you have a backup copy of the system configuration.
- The DTE ports on IP Office expansion modules are not used for any maintenance or diagnostics.

6.12.1 DTE Port Settings

These ports are found on the rear of all IP Office control units and external expansion modules. The DTE ports on external expansion modules are not used.

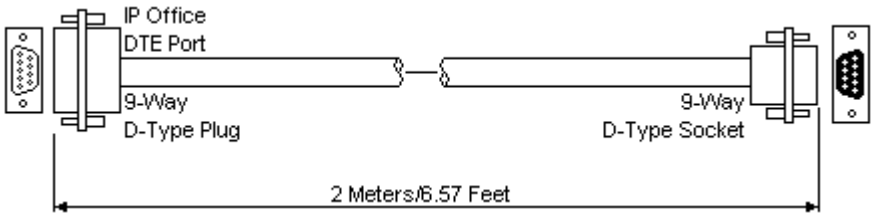
The RS232 DTE ports on the control units can be used for system maintenance and connection of serial terminal adaptors. On IP400 control units the port can also be used for connection of the IP Office serial port licence key dongle.

An asynchronous terminal program such as HyperTerminal is also required. Configure this for operation via a PC serial port, as follows:

Bits per second	38,400	Parity	None	Flow Control	None
Data bits	8	Stop Bits	1	Settings | Emulation	TTY

DTE Cables

These cables are used for system maintenance and diagnostics under Avaya guidance. They can also be used for connection of RS232 serial terminal adaptor equipment to the IP Office control unit. The cable required depends on the IP Office control unit. This cable is a "Straight through DB9 female to DB9 male serial cable".



IP Office 9-Way RS232 DTE Port	Signal	PC/Terminal Adaptor
3	⬅ Receive data	3
2	➡ Transmit Data	2
7	⬅ RTS (Request To Send)	7
8	➡ CTS (Clear To Send)	8
6	➡ DSR (Data Set Ready)	6
5	● Ground	5
1	➡ DCD (Data Carrier Detect)	1
4	⬅ DTR (Data Terminal Ready)	4
9	➡ RI (Ring Indicator)	9

6.12.2 Erasing the Configuration

The following processes erases the configuration held in the IP Office control unit's memory. That include both the current configuration being used in RAM memory and the backup configuration stored in non-volatile memory. Following this the IP Office will restart with a default configuration 95.

This process should be performed from a PC with a fixed IP address, directly connected to the IP Office control unit and with the IP Office system disconnected from any network. Following this process, the control unit's IP address will default to 192.168.42.1.

- ⚠ Do not perform any of these processes unless absolutely necessary. The IP Office's configuration settings can be default through Manager using the File | Advanced | Erase Configuration command.

Erasing the Configuration via Debug

This process erases the IP Office's configuration settings but does not alter its security settings. It is easier to use than the boot loader method.

1. Ensure that you have a backup copy of the IP Office's configuration before performing this action. If a copy of the configuration cannot be downloaded using Manager, check the Manager application directory for previously downloaded configurations.
    a. Use Manager to download an up to date copy of the configuration. If that is not possible, check in the Manager application folder for a previous copy of the configuration.
    b. Using IP Office Manager, select File | Open Configuration.
    c. Using the Select IP Office Menu, locate and select the IP Office system. Click OK.
    d. Enter the name and password for a service user account on that IP Office. Click OK. Manager will receive and display the configuration from the IP Office.
        - If not already done, this action creates a BOOTP entry in Manager for the IP Office system.
        - This action also confirms communication between the Manager PC and the IP Office prior to any following process.
    e. Select File | Save Configuration As... and save a copy of the configuration file onto the PC.
2. Attach the serial cable between the PC and the DTE port on the IP Office control unit.
    a. Start the terminal program on your PC. Ensure that it has been setup as listed in DTE Port Settings 135. Within a HyperTerminal session, the current settings are summarized across the base of the screen.
    b. Enter AT (note upper case). The control unit should respond *OK*.
    c. Enter AT-DEBUG. The control unit should response with the time and date and then *Hello>* to show it is ready to accept commands.
3. To erase the current configuration in RAM memory enter eraseconfig. The *Hello>* command prompt reappears when the action is completed.
4. To erase the backup configuration stored in non-volatile Flash memory enter erasenvconfig. The *Hello>* command prompt reappears when the action is completed.
5. To reboot the IP Office enter reboot. The IP Office will reboot and restart with a defaulted configuration.
6. Close the terminal program session.
7. Manager can now be used to alter and then upload an old configuration file or receive and edit the control unit's now defaulted configuration.

Erasing the Configuration and Security Settings via the Boot Loader

This process defaults the IP Office security settings and its configurations settings.

2. Ensure that you have a backup copy of the IP Office's configuration before performing this action. If a copy of the configuration cannot be downloaded using Manager, check the Manager application directory for previously downloaded configurations.
    f. Use Manager to download an up to date copy of the configuration. If that is not possible, check in the Manager application folder for a previous copy of the configuration.
    g. Using IP Office Manager, select File | Open Configuration.
    h. Using the Select IP Office Menu, locate and select the IP Office system. Click OK.
    i. Enter the name and password for a service user account on that IP Office. Click OK. Manager will receive and display the configuration from the IP Office.
        - If not already done, this action creates a BOOTP entry in Manager for the IP Office system.
        - This action also confirms communication between the Manager PC and the IP Office prior to any following process.
    j. Select File | Save Configuration As... and save a copy of the configuration file onto the PC.
2. Attach the serial cable between the PC and the DTE port on the IP Office control unit.
    a. Start the terminal program on your PC. Ensure that it has been setup as listed in DTE Port Settings 135. Within a HyperTerminal session, the current settings are summarized across the base of the screen.
    b. Arrange the program windows so that the Terminal program and Manager TFTP Log are visible at the same time.
    c. Switch off power to the IP Office control unit.
    d. Power on the control unit and press the escape key every second until you get a Loader message. Below is an example.

        ```
        P12 Loader 2.4
        CPU Revision 0x0900
        ```

    e. Enter AT (note upper case). The control unit should respond *OK*.
    f. If an OK response is not received, check the settings of your terminal program and repeat the process above.
3. Proceed with the erasure process.
    - To erase the alarm log enter *AT-X1*.
    - To erase the current configuration, enter *AT-X2*. A typical response if *Sector 2 Erase (NV Config)* followed by *OK*. Enter *AT-X3*. A typical response is *Sector Erases (Config)* followed by a series of *OK* responses.
4. Switch power to the control unit off and then back on. Within the terminal program you should see various messages as the control unit performs various start up tasks.
5. Close the terminal program session.
6. Manager can now be used to alter and then upload an old configuration file or receive and edit the control unit's now defaulted configuration.

6.12.3 Defaulting Security Settings

Procedure: Defaulting Security Settings

This process defaults the IP Office's security settings but does not alter its configuration settings.

1. Attach the serial cable between the PC and the DTE port on the IP Office control unit.
2. Start the terminal program on your PC. Ensure that it has been setup as listed in DTE Port Settings 135. Within a HyperTerminal session, the current settings are summarized across the base of the screen.
3. Enter AT (note upper case). The control unit should respond *OK*.
4. Enter AT-SECURITYRESETALL.
5. You will be prompted to confirm the control unit's MAC address before continuing. Enter the address.
6. The control unit will respond *OK* when the action has been completed.
7. Close the terminal program session.
8. Manager can now be used to receive and edit the control unit's now defaulted security settings.

Defaulting the Configuration and Security Settings via the Boot Loader

This process defaults the IP Office security settings and its configurations settings.

1. Ensure that you have a backup copy of the IP Office's configuration before performing this action. If a copy of the configuration cannot be downloaded using Manager, check the Manager application directory for previously downloaded configurations.
   a. Use Manager to download an up to date copy of the configuration. If that is not possible, check in the Manager application folder for a previous copy of the configuration.
   b. Using IP Office Manager, select File | Open Configuration.
   c. Using the Select IP Office Menu, locate and select the IP Office system. Click OK.
   d. Enter the name and password for a service user account on that IP Office. Click OK. Manager will receive and display the configuration from the IP Office.
      - If not already done, this action creates a BOOTP entry in Manager for the IP Office system.
      - This action also confirms communication between the Manager PC and the IP Office prior to any following process.
   e. Select File | Save Configuration As... and save a copy of the configuration file onto the PC.
2. Attach the serial cable between the PC and the DTE port on the IP Office control unit.
   a. Start the terminal program on your PC. Ensure that it has been setup as listed in DTE Port Settings 135. Within a HyperTerminal session, the current settings are summarized across the base of the screen.
   b. Arrange the program windows so that the Terminal program and Manager TFTP Log are visible at the same time.
   c. Switch off power to the IP Office control unit.
   d. Power on the control unit and press the escape key every second until you get a Loader message. Below is an example.

      ```
      P12 Loader 2.4
      CPU Revision 0x0900
      ```

   e. Enter AT (note upper case). The control unit should respond *OK*.
   f. If an OK response is not received, check the settings of your terminal program and repeat the process above.
3. To erase the current configuration in RAM memory enter AT-X3. A typical response is *Sector Erases (Config)* followed by a series of *OK* responses.
4. To erase the backup configuration stored in non-volatile memory enter AT-X2. A typical response if *Sector 2 Erase (NV Config)* followed by *OK*. IP Office 403 only: If running an IP Office 403 control unit, also enter AT-X4.
5. Switch power to the control unit off and then back on. Within the terminal program you should see various messages as the control unit performs various start up tasks.
6. Close the terminal program session.
7. Manager can now be used to alter and then upload an old configuration file or receive and edit the control unit's now defaulted configuration.

6.12.4 Erasing the Operational Firmware

When the firmware loaded by the control unit is erased, the control unit will begin making BOOTP requests for a replacement firmware file. Manager can act as a BOOTP server and respond to the control units request with the appropriate file from those installed with Manager.

Unlike other control units, when the firmware loaded by an IP500v2 control unit is erased, the IP500v2 control unit will first look for replacement firmware on its SD cards before falling back to using a BOOTP request to Manager.

The processes below should be performed from a PC with a fixed IP address, directly connected to the IP Office control unit and with the IP Office system disconnected from any network. During the process, the control unit's IP address may default to a value in the 192.168.42.1 to 192.168.42.10 range. If this occurs it may be necessary to amend the BOOTP entry in Manager to match the address the system is using. The

- ⚠ Do not perform any of the following processes unless absolutely necessary. The IP Office software can normally be upgraded using Manager 119.
- ⚠ This process erases the operational software. Before attempting this process you must know the MAC and IP addresses of the system, plus have a backup copy of its configuration and the correct .bin file for the control unit type and level of software.
- ⚠ The presence of any firewall blocking TFTP and or BOOTP will cause this process to fail.

Erasing the Core Software via Debug

1. Run Manager.
   - In the BOOTP entries, check that there is an entry that matches the MAC Address, IP Address and .bin file used by the system. An entry is normally automatically created when a configuration has been loaded from that IP Office. .
     - If an entry is not present, create a new entry manually. The first two details can be found in the Control Unit settings in the configuration file. Then close and restart Manager.
   - Under File | Preferences ensure that Manager is set to 255.255.255.255. Also check that Enable BootP Server is checked.
   - Select View | TFTPLog.
   - Check that the required .bin file is present in Manager's working directory.
2. Attach the serial cable between the PC and the DTE port on the IP Office control unit.
   a. Start the terminal program on your PC. Ensure that it has been setup as listed in DTE Port Settings 135. Within a HyperTerminal session, the current settings are summarized across the base of the screen.
   b. Enter AT (note upper case). The control unit should respond *OK*.
   c. Enter AT-DEBUG. The control unit should response with the time and date and then *Hello>* to show it is ready to accept commands.
3. To erase the current configuration in RAM memory enter upgrade.
4. The IP Office will erase its current software and then send out a BootP request on the network for new software. Manager will respond and start transferring the software using TFTP.

2. Run Manager.
   - In the BOOTP entries, check that there is an entry that matches the MAC Address, IP Address and .bin file used by the system. An entry is normally automatically created when a configuration has been loaded from that IP Office. .
     - If an entry is not present, create a new entry manually. The first two details can be found in the Control Unit settings in the configuration file. Then close and restart Manager.
   - Under File | Preferences ensure that Manager is set to 255.255.255.255. Also check that Enable BootP Server is checked.
   - Select View | TFTPLog.
   - Check that the required .bin file is present in Manager's working directory.
2. Attach the serial cable between the PC and the DTE port on the IP Office control unit.
   a. Start the terminal program on your PC. Ensure that it has been setup as listed in DTE Port Settings 135. Within a HyperTerminal session, the current settings are summarized across the base of the screen.
   b. Arrange the program windows so that the Terminal program and Manager TFTP Log are visible at the same time.
   c. Switch off power to the IP Office control unit.
   d. Power on the control unit and press the escape key every second until you get a Loader message. Below is an example.

      ```
      P12 Loader 2.4
      CPU Revision 0x0900
      ```

   e. Enter AT (note upper case). The control unit should respond *OK*.
   f. If an OK response is not received, check the settings of your terminal program and repeat the process above.
3. Enter AT-X. The control unit should respond Multi-Sector Erase.
4. The control unit will now request the .bin file it requires. For IP500v2 control units this will be from files on the System SD card. For other control units it will be from Manager and appears in the TFTP Log.
5. If the file transfers does not appear to be taking place, check that the IP address shown in the TFTP Log matches the BOOTP entry. Adjust the BOOTP entry if necessary.
6. When completed the system will reboot.

6.13 Reset Button

The IP500 and IP500v2 control units have a Reset button. Pressing the button while the control unit is starting up will pause the start up until the button is released. The effect of pressing the button during normal operation will depend on how long the button is pressed and is indicated by the CPU LED.

Press Duration (seconds)	CPU LED	Action	Summary
0 to 5.	Off	None	None.
5 to 10.	Orange	Reboot When Free	Reboot when free with new incoming/outgoing call barring. A reboot using the reset button is recorded in the Audit Trail.
10 to 30.	Flashing orange	Erase Configuration/ Immediate Reboot	Erase the configuration, alarm log and audit trail. Immediate reboot without waiting for active calls to end. See Erasing the configuration 135 for full details.
30 to 40.	Red	Erase All.	Erase configuration, alarm log and core software. See Erasing the Operational Software 139 for full details.
Over 40.	Flashing green	None	None.

6.14 AUX Button

IP500v2 control units have an AUX button. This button can be used as follows.

If pressed during a restart of the control unit, the control unit skip booting 147 from the */primary* folder on the System SD card.
If pressed for more than 5 seconds when a system is running, the control unit will shutdown 109 for 10 minutes.

6.15 Creating a WAN Link

The following is a simplified process for creating a data link from Site A to Site B via the WAN ports.

At Site A on IP address 192.168.43.1.

1. Create a Normal Service
   The Service name can be any text and is used to identify this particular service. The account Name and password entered for the service are presented to the remote end, therefore must match the user name and password configured at Site B. The Encrypted Password option can only be used if the remote end also supports CHAP.
2. Create a User
   Under the Dial In tab, tick Dial In On. This User account is used to authenticate the connection from the Site B. Note that if the Service and User have the same name these two configuration forms are automatically linked and become an Intranet Service. The User password is displayed at the bottom of the Service tab as the Incoming Password.
3. Setup RAS
   If CHAP is to be used on this link then the Encrypted Password option must be checked in the Service and in the RAS service. The name of the RAS service must match the name of the Service at Site B. Note that if the RAS settings are given the same name as the Service and User they are automatically linked and become a WAN Service. Ensure that the Encrypted Password option is not checked when using a WAN Service.
4. Edit the WANPort
   Note: Do not create a new WANPort, this is automatically detected. If a WANPort is not displayed, connect the WAN cable, reboot the Control Unit and receive the configuration. The WANPort configuration form should now be added.
5. Create an IP Route
   In the IP Address field enter the network address of the remote end, not the IP address of the Control Unit. Under Destination select the Service created above.

At Site B on IP address 192.168.45.1

1. Repeat the above process but altering the details to create a route from Site B to Site A.

Chapter 7.
SD Card Management

7. SD Card Management

The IP500v2 control unit has two SD card slots, labeled System SD and Optional SD respectively. These are used as follows:

- System SD Card
  An Avaya System SD card must be present in this slot at all times. This card holds copies of the IP Office firmware and configuration and is used as the IP500v2 control units non-volatile memory.
  - Each Avaya System SD card has a unique Feature Key serial number which is used for generating and validating licenses entered into the IP Office configuration.
  - The card stores the prompts for embedded voicemail operation and acts as the message store for embedded voicemail messages.
  - Prior to any planned shutdown or restart of the IP Office system, the current configuration running in the IP Office system's RAM memory is copied to the /primary folder on the System SD card and to the systems non-volatile memory.
  - Following a restart, the software in the /primary folder is loaded by the IP500v2 control unit. If the required software is not present or valid a sequence of fallback options is used, see Booting from the SD Cards 147 for full details.
  - Following a restart, if present, the configuration file in the /primary folder is loaded by the IP500v2 control unit. If no file is present the system will check for a file in its internal non-volatile memory. If no copy is found it will generate a default configuration file. See Booting from the SD Cards 147 for full details.
  - Once each day (approximately between 00:00 and 00:30) the IP Office will copy the current configuration running in its RAM memory to the /primary folder on the card.
  - Configuration changes made using IP Office Manager are first written to the copy of the configuration file on the card and then merged with the configuration running in the IP Office system's RAM memory.
  - The write lock setting on cards in the System SD card slot is ignored.
- Optional SD Card
  A card does not have to be present in this slot for normal IP Office operation. The slot can be used for various maintenance actions.
  - A card with an updated IP Office software or configuration can be inserted and those files then transferred to the System SD card in order to upgrade the IP Office system.
  - The full contents of the System SD card can be copied to the Optional SD card while the IP Office system is running.
  - The write lock setting on cards in the Optional SD card slot is honored.

Card Removal	Memory cards should always be shutdown 159 before being removed when the system is running. Though the card slot LEDs indicate when data is being written to an card, lack of flashing LED is not a sufficient safeguard. Shutting down the card will disable embedded voicemail if being used. If the System SD card is removed, features licensed by the card's Feature Key serial number will continue operating for up to 2 hours.

Card Maintenance Actions

Using IP Office Manager, IP Office System Status Application or a phone configured as a System Phone, a number of actions can be performed on the SD cards.

Action	Description	Manager	System Status	System Phone	Minutes
Shutdown / Restart 159	Memory cards should always be shutdown 159 before being removed when the system is running. Though the card slot LEDs indicate when data is being written to an card, lack of flashing LED is not a sufficient safeguard. Shutting down the card will disable embedded voicemail if being used. If the System SD card is removed, features licensed by the card's Feature Key serial number will continue operating for up to 2 hours.	✓	✓	✓	–
Backup 151	Copy the files in the /primary folder on the System SD card to the /backup folder on the card.	✓	✓	✓	6
Restore 152	Copy the files in the /backup folder on the System SD card to the /primary folder on the card and restart the IP Office system.	✓	✓	✓	6
Copy 153	Copy all the files on the System SD card to the Optional SD card.	✓	✓	✓	90
Upgrade Binaries 156	Copy software files in the /primary folder on the Optional SD card to the /primary folder on the System SD card and then restart the IP Office system.	✓	–	–	5
Upgrade Configuration 156	Copy the configuration file in the /primary folder on the Optional SD card to the /primary folder on the System SD card and then restart the IP Office system.	✓	–	–	5 seconds
Upload System Files 156	Upload a set of IP Office software and embedded voicemail prompts to the System SD card.	✓	–	–	40
View Files 150	View the folders and files on the control unit memory cards.	✓	–	–	–
	The actions below can be performed on cards in a SD card reader on a PC running IP Office Manager.				
Format 149	Reformat a card for IP Office usage without removing the Feature Key serial number. • ⚠ This process will erase all existing files on the card.	✓	✓	–	1
Recreate 149	Create the folder structure on a memory card and copy a set of IP Office software files into those folders.	✓	–	–	15

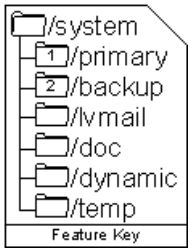
Card Specification

Non-Avaya cards can be used in the Optional SD slot as long as they match or exceed the standard below:

- SDHC 4GB minimum Class 2+. Single partition FAT32 format.

SD Card Folders

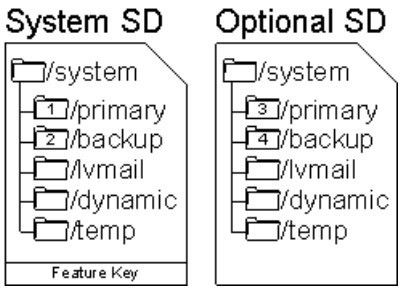
The System SD card contains the following folders:



- /primary
  Contains the firmware files for the IP Office control unit, external expansion modules and supported phones. The folder can also contain music on hold files and license key files. This is the main set of files used by the IP Office system when booting up. Also contains the stored copy of the IP Office configuration.
- /backup
  Contains a copy of the primary folder at some previous point. A backup copy of the primary contents to this folder can be invoked manually (using Manager or SSA) or as part of the IP Office software upgrade using Manager.
- /lvmail
  Contains the system prompts used by embedded voicemail. Note that the mailbox messages and greetings are stored in a sub-folder of the /dynamic folder.
  - The sub-folder /AAG is used to store embedded voicemail auto-attendant greetings.
- /doc
  Contains initial installation documentation for IP Office and Avaya IP Office Essential Edition Partner Version.
- /dynamic
  Contains files used by the IP Office and retained through a reboot of the IP Office system.
  - The sub-folder /lvmail is used to store individual user and group mailbox messages, name recordings and announcements. The storage capacity for embedded voicemail is limited to 15 hours regardless of the capacity of the card.
- /temp
  Contains temporary files used by the IP Office and not retained through a reboot of the IP Office system.

The Optional SD card can contain a similar set of folders. These are used as an additional backup or they can be used as the source for upgrading the contents of the System SD card.

7.1 Booting from the SD Cards



When being powered up, the IP500v2 control unit looks for a valid ip500v2.bin binary file to load. It does this using the possible source below in the order shown, skipping to the next source if the file is not present or is not valid.

1. System SD card */primary* folder.
2. The control unit's own internal non-volatile memory. Once a system has been installed, it uses its non-volatile memory to keep copies of the configuration and system binary files it is using. These can be used to restore operation during a system reboot. Note that though a system can boot from non-volatile memory, a System SD card must still be present for correct system operation.
3. System SD card */backup* folder.
4. Optional SD card */primary* folder.
5. Optional SD card */backup* folder.
6. If no file is found, the control unit will fallback to making BOOTP requests to the network. IP Office Manager can respond the BOOTP request. See Erasing the Operational Firmware 139.

Once a valid ip500v2.bin file is found, the IP Office control unit will load that firmware. The source from which the control unit binary file was loaded is then used to load further files.

Configuration File Loading

Having installed the necessary system firmware files as above, the IP500v2 control unit requires a configuration file:

- If the IP500v2 booted using binary files from an SD card location, it looks for a valid configuration file in the same location.
  - If a configuration file is present and valid, it is loaded.
  - If a configuration file is present but is not valid, load the configuration copy in its non-volatile memory if present, else it assumes a default configuration.
  - If a configuration file is not present, use the non-volatile memory copy as above unless the reboot is as a result of a default system command.
- If the IP500v2 booted using binary files from its non-volatile memory, it will also load the configuration copy from that location.
  - It will indicate a boot alarm (see below).
  - It will attempt to restore the firmware file in the System SD card's /primary folder using the copy in its non-volatile memory.
  - The normal boot up process of upgrading expansion module firmware does not occur. If the File | Advanced | Upgrade command is used, only external expansion modules actually present in the system are listed for upgrade.

Post Boot Operation

During normal operation, configuration and binary files sent to the System SD card /primary folder using IP Office Manager are also written to the non-volatile memory.

If the system has booted from its non-volatile memory due to an SD card problem, it is still possible to upgrade the ip500v2.bin file using the IP Office upgrade wizard.

Boot Alarms

The following apply if the IP500v2 boots using software other than that in its System SD /primary folder:

- An alarm will be shown in the System Status Application. It will also generate an alarm if the card in any slot is not compatible. These alarms are also output as SNMP, Syslog or email alarms.
- The IP Office Manager Select IP Office menu will display an ⚠ icon indicating that the IP Office system is running using software other than from the System SD card's primary folder.
- The configuration can be read but will be read only. Attempting to send a configuration to the system will cause the error message *Failed to save configuration data. (Internal error)*.

Bypassing the System SD Card Primary Folder

The control unit can be forced to bypass the System SD card's */primary* folder and non-volatile memory when starting. This is done by pressing the Aux button while applying power to the control unit.

This action may be necessary if, following an upgrade of the IP Office system, it is determined that a roll back to the previously backed up firmware and configuration is required. Using the Aux button should restore system operation using the */backup* folder files while the installer then restores the contents of the */primary* folder to a previous release.

7.2 Creating an IP Office SD Card

The processes below can be applied to Avaya IP Office SD cards. They can also be applied to non-Avaya SD cards for use in a system's Optional SD card slot.

The card must be the following format. For the System SD slot, only Avaya SD cards with a Feature Key should be used.

- SDHC 4GB minimum Class 2+. Single partition FAT32 format.
- ⚠ WARNING
  Avaya supplied SD cards should not be formatted using any other method than the format commands within IP Office Manager and IP Office System Status Application. Formatting the cards using any other method will remove the feature key used for IP Office licensing from the card.

Creating a Card on a Local PC

These processes can be run on an SD card inserted in a card reader on the IP Office Manager PC. That card can then be used in the System SD card slot of a new system or in the Optional SD card slot of an existing system to upgrade that system 122.

Formatting an SD Card

Avaya SD cards should only be formatted using the format options provided within IP Office applications. .

- ⚠ WARNING: All File Will Be Erased
  Note that this action will erase any existing files and folders on the card. Once a card has been formatted, the folders and files required for IP Office operation can be loaded onto the card from the Manager PC using the Recreate IP Office SD Card command.

1. Insert the SD card into a reader slot on the Manager computer.
2. Using IP Office Manager, select File | Advanced | Format IP Office SD Card.
3. Select IP Office A-Law, IP Office U-Law or IP Office Partner Version. This selection just sets the card label shown when viewing the card details. It does not affect the actual formatting. Select the label that matches the files set you will be placing on the card.
4. Browse to the card location and click OK.
5. The status bar at the bottom of Manager will display the progress of the formatting process.
6. When the formatting is complete, you can use the Recreate IP Office SD Card command to load the IP Office folders and files onto the card from the Manager PC.

Recreating an IP Office SD Card

This process will create the folder structure on the SD card and copy the necessary firmware files from those installed with IP Office Manager onto the SD card. This includes the binary files for the IP500v2 system, any external expansion modules and phones. It also includes the prompt files for embedded voicemail operation.

This process can be used to upgrade an existing SD card to match the file set installed with Manager. For the card to be used in an IP500v2 system's System SD slot the card must be Avaya SD Feature Key card. The card must be correctly formatted (see Format IP Office SD card 149).

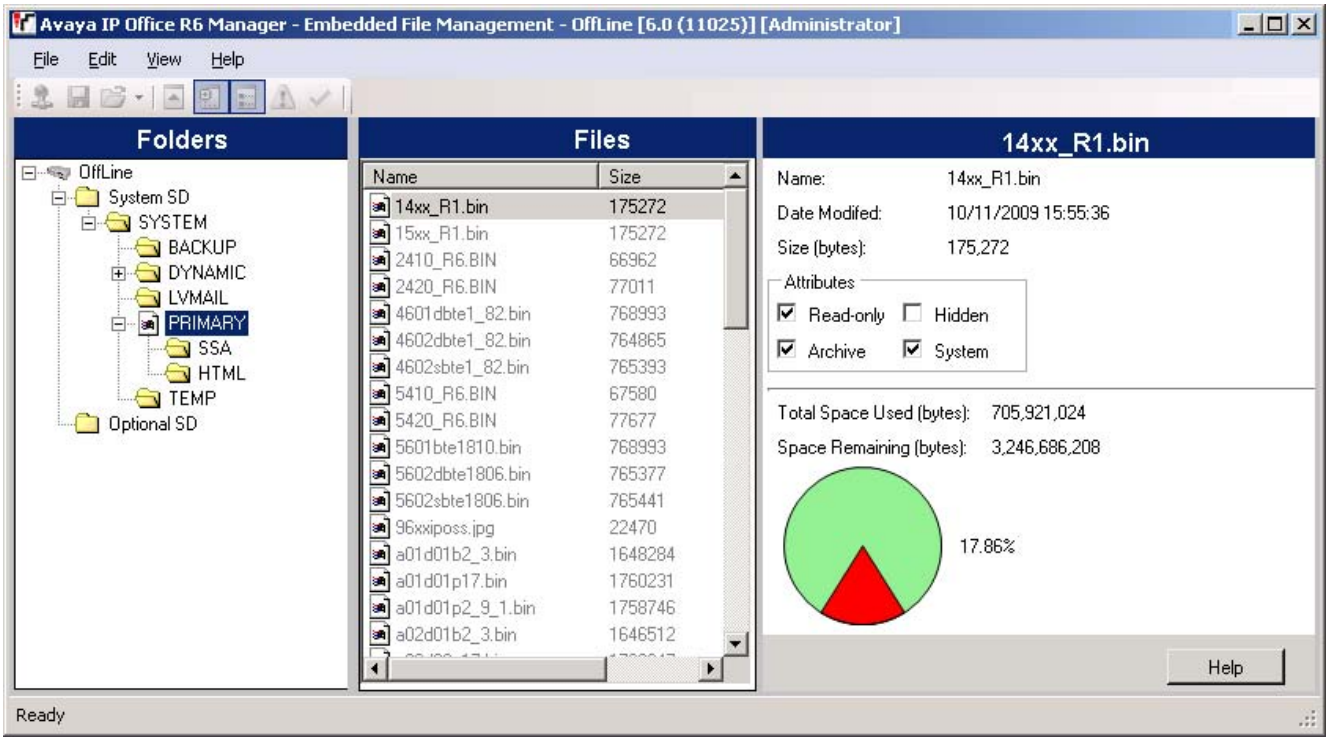
If the card contains any dynamic system files, for example SMDR records, they are temporarily backed up by Manager and then restored after the card is recreated.

This process takes approximately 15 minutes.

1. Once started do not interrupt this process, for example by removing the SD card. This process takes approximately 15 minutes.
2. Insert the SD card into a card reader on the Manager PC.
3. Using IP Office Manager, select File | Advanced | Recreate IP Office SD Card.
4. Select IP Office A-Law, IP Office U-Law or IP Office Partner Version. This selection will affect how the IP Office systems operates when defaulted with this card present in its System SD card slot. .
5. Browse to the card location and click OK.
6. Manager will start creating folders on the SD card and copying the required files into those folders. This process will take approximately 15 minutes. Do not remove the SD card during the process. Wait until the Manager status bar at the bottom shows a *"Ready"* message.

7.3 Viewing the Card Contents

Using IP Office Manager you can view the folders and files on the System SD card and the Optional SD card. You can then use various commands to upload and download files to and from the cards.



1. Using IP Office Manager, select File | Embedded File Management.
2. Using the Select IP Office menu, select the IP Office system.
3. The file contents of the memory cards are displayed.

7.4 Backing Up the System SD Card

There are two levels of backup that can be performed.

- Backup the System SD Card Primary Folder 151
  The contents of the primary folder on the card can be copied to the backup folder. They files can then be restored if necessary. Both actions can be performed remotely.
- Backup the Whole System SD Card 153
  The contents of the whole System SD card can be copied to the Optional SD card. While this can be done remotely, the contents can only be copied back manually using a card reader.

The backup, restore and copy operations will not be performed if the destination card has insufficient space for the files being copied.

7.4.1 Backing Up the Primary Folder

This process copies the contents of the /primary folder on the System SD card over the /backup folder. Any files with matching file names will be replaced.

This takes approximately 6 minutes.

Using IP Office Manager

1. Using IP Office Manager, select File | Embedded File Management.
2. Using the Select IP Office menu, select the IP Office system.
3. The file contents of the memory cards are displayed.
4. Select File | Backup System Files.
   - The contents of the /primary folder on the System SD card will be copied to the /backup folder. This process takes approximately 6 minutes.

Using the System Status Application

1. Start System Status 69 and access the IP Office's status output.
2. In the navigation panel select System.
3. At the bottom of the screen select Backup System Files.
   - The contents of the /primary folder on the System SD card will be copied to the /backup folder. This process takes approximately 6 minutes.

Using a System Phone

This process can be used by a user configured as a System Phone user and using a 1400, 1600, 2400, 4600, 5400, 5600 or 9600 Series phone (excluding XX01, XX02 and XX03 models). The user's Login Code is used to restrict access to system administration functions on the phone.

1. Select Features | Phone User | System Admin.
2. Enter your IP Office user login code.
3. From the menu select Memory Card.
4. Select System Backup.
   - The contents of the /primary folder on the System SD card will be copied to the /backup folder. This process takes approximately 6 minutes.

7.4.2 Restore from the Backup Folder

The contents of the /backup folder on the System SD card can be copied to the /primary folder. Any files with matching file names will be replaced. The IP Office is then restarted using the files now in the /primary folder.

- ⚠ WARNING
  These processes will cause the IP Office system to be restarted, disconnecting any current calls and services in progress.

Using IP Office Manager

1. Using IP Office Manager, select File | Embedded File Management.
2. Using the Select IP Office menu, select the IP Office system.
3. The file contents of the memory cards are displayed.
4. Select File | Backup System Files.
   - The contents of the /backup folder on the System SD card will be copied to the /primary folder. The process takes approximately 6 minutes.
   - When the process has been completed, the IP Office system will be restarted.

Using the System Status Application

1. Start System Status 69 and access the IP Office's status output.
2. In the navigation panel select System.
3. At the bottom of the screen select Restore System Files.
   - The contents of the /backup folder on the System SD card will be copied to the /primary folder. The process takes approximately 6 minutes.
   - When the process has been completed, the IP Office system will be restarted.

Using a System Phone

This process can be used by a user configured as a System Phone user and using a 1400, 1600, 2400, 4600, 5400, 5600 or 9600 Series phone (excluding XX01, XX02 and XX03 models). The user's Login Code is used to restrict access to system administration functions on the phone.

1. Select Features | Phone User | System Admin.
2. Enter your IP Office user login code.
3. From the menu select Memory Card.
4. Select System Restore.
   - The contents of the /backup folder on the System SD card will be copied to the /primary folder. The process takes approximately 6 minutes.
   - When the process has been completed, the IP Office system will be restarted.

7.4.3 Backing Up to the Optional Card

This process copies all files on the System SD card to the Optional SD card. It includes the /primary and /backup folders and the embedded voicemail files including message files. Any matching files and folders on the Optional SD card are overwritten.

The process is a simple copy. Any files already copied that change while the process are not recopied. Any new files added (for example voicemail messages) while the process is running may not be copied.

This process takes at least 90 minutes and may take much longer depending on the amount of data to be copied, for example it will be longer if embedded voicemail is being used by the IP Office system to take messages.

Using IP Office Manager

1. Using IP Office Manager, select File | Embedded File Management.
2. Using the Select IP Office menu, select the IP Office system.
3. The file contents of the memory cards are displayed.
4. Select File | Copy System Card.
   - The contents of the System SD card will be copied to the Optional SD card. This process at least 90 minutes and can take much longer.

Using the System Status Application

1. Start System Status 69 and access the IP Office's status output.
2. In the navigation panel select System.
3. Select Memory Cards.
4. Select System Card.
5. At the bottom of the screen select Copy System Card.
   - The contents of the System SD card will be copied to the Optional SD card. This process at least 90 minutes and can take much longer.

Using a System Phone

This process can be used by a user configured as a System Phone user and using a 1400, 1600, 2400, 4600, 5400, 5600 or 9600 Series phone (excluding XX01, XX02 and XX03 models). The user's Login Code is used to restrict access to system administration functions on the phone.

1. Select Features | Phone User | System Admin.
2. Enter your IP Office user login code.
3. From the menu select Memory Card.
4. Select Copy.
   - The contents of the System SD card will be copied to the Optional SD card. This process at least 90 minutes and can take much longer.

7.4.4 Restoring from the Optional Card

The files in the /primary folder on the Optional SD card can be copied to the /primary folder on the System SD card. Any files with matching file names will be replaced. The IP Office is then restarted using the files now in the System SD card's /primary folder.

The restore process is separated into two parts, either copying configuration files from the Optional SD card or copying software files from the Optional SD card. This allows software files to be copied from an Optional SD card without affecting the existing configuration of that system.

- WARNING
  These processes will cause the IP Office system to be restarted, disconnecting any current calls and services in progress.

7.4.4.1 Restoring a Configuration from an Optional Card

The following processes copy the configuration file (*config.cfg*) and licenses file (*keys.txt*). The processes take a few seconds.

- WARNING
  These processes will cause the IP Office system to be restarted, disconnecting any current calls and services in progress.

Copying a Configuration from the Optional SD Card File Using IP Office Manager

1. Using IP Office Manager, select File | Embedded File Management.
2. Using the Select IP Office menu, select the IP Office system.
3. The file contents of the memory cards are displayed.
4. Select File | Upgrade Configuration.
   - The configuration file (*config.cfg*) and licenses file (*keys.txt*) in the */primary* folder on the Optional SD card are copied to the */primary* folder on the System SD card. This process takes approximately a few seconds.
   - When the process has been completed, the IP Office system will be restarted.

Copying a Configuration File from the Optional SD Card Using a System Phone

This process can be used by a user configured as a System Phone user and using a 1400, 1600, 2400, 4600, 5400, 5600 or 9600 Series phone (excluding XX01, XX02 and XX03 models). The user's Login Code is used to restrict access to system administration functions on the phone.

1. Select Features | Phone User | System Admin.
2. Enter your IP Office user login code.
3. From the menu select Memory Card.
4. Select Upgrade Config....
   - The configuration file (*config.cfg*) and licenses file (*keys.txt*) in the */primary* folder on the Optional SD card are copied to the */primary* folder on the System SD card. This process takes approximately a few seconds.
   - When the process has been completed, the IP Office system will be restarted.

7.4.4.2 Restoring Software from an Optional SD Card

These processes copy all files in the folder except the configuration file (*config.cfg*) and licenses file (*keys.txt*). The processes take approximately 5 minutes. These process do not restore embedded voicemail prompts (see Upgrading Card Software 156).

- ⚠ IP Office Technical Bulletins
  Ensure that you have obtained and read the IP Office Technical Bulletin relating to the IP Office software release which you are installing. This bulletin will contain important information that may not have been included in this manual. IP Office Technical Bulletins are available from the Avaya support website (*http://support.avaya.com*).
- ⚠ Upgrade Licenses
  Some upgrades may require entry of upgrade licenses.
- ⚠ WARNING
  These processes will cause the IP Office system to be restarted, disconnecting any current calls and services in progress.

Copying Software Files from the Optional SD Card Using IP Office Manager

1. Using IP Office Manager, select File | Embedded File Management.
2. Using the Select IP Office menu, select the IP Office system.
3. The file contents of the memory cards are displayed.
4. Select File | Upgrade Binaries.
   - The software files (all files in the folder except the configuration file (*config.cfg*) and licenses file (*keys.txt*)) in the */primary* folder on the Optional SD card are copied to the */primary* folder on the System SD card. This process takes approximately 5 minutes.
   - When the process has been completed, the IP Office system will be restarted.

Copying Software Files from the Optional SD Card Using a System Phone

This process can be used by a user configured as a System Phone user and using a 1400, 1600, 2400, 4600, 5400, 5600 or 9600 Series phone (excluding XX01, XX02 and XX03 models). The user's Login Code is used to restrict access to system administration functions on the phone.

1. Select Features | Phone User | System Admin.
2. Enter your IP Office user login code.
3. From the menu select Memory Card.
4. Select Upgrade Binaries....
   - The software files (all files in the folder except the configuration file (*config.cfg*) and licenses file (*keys.txt*)) in the */primary* folder on the Optional SD card are copied to the */primary* folder on the System SD card. This process takes approximately 5 minutes.
   - When the process has been completed, the IP Office system will be restarted.

7.5 Upgrading Card Software

In addition to using the traditional IP Office Upgrade Wizard 120, IP500v2 control units can be upgraded by loading the required set of firmware files onto the System SD card and rebooting the system.

- ⚠ IP Office Technical Bulletins
  Ensure that you have obtained and read the IP Office Technical Bulletin relating to the IP Office software release which you are installing. This bulletin will contain important information that may not have been included in this manual. IP Office Technical Bulletins are available from the Avaya support website (*http://support.avaya.com*).
- ⚠ Upgrade Licenses
  Some upgrades may require entry of upgrade licenses.
- ⚠ WARNING
  These processes will cause the IP Office system to be restarted, disconnecting any current calls and services in progress.

There are a number of ways in which this can be done.

Method	Description	Location	Software Files	Embedded Voicemail Prompts
Using Manager 157	Using IP Office Manager, the contents of the card are compared to the files that Manager has available and are upgraded if necessary.	Local or Remote	✓	✓
System SD Card Upgrade 157	In this method, the System SD card is shut down and removed from the control unit. The card's contents are upgraded using IP Office Manager.	Local	✓	✓
Upgrade from Optional SD Card 158	This method uses an SD card loaded with the required version of IP Office software. The card is inserted into the control unit and then Manager, System Status or a system phone is used to transfer the software to the System SD card.	Local	✓	–

7.5.1 Upgrading Remotely Using Manager

This process will copy all system files not present or of a different version compared to those already present on the System SD card. That includes IP Office software files and embedded voicemail prompt files.

1. Using IP Office Manager, select File | Embedded File Management.
2. Using the Select IP Office menu, select the IP Office system.
3. The file contents of the memory cards are displayed.
4. Select File | Backup System Files. The contents of the /primary folder on the System SD card will be copied to the /backup folder. This process takes approximately 6 minutes.
5. Select File | Upload System Files. The system files that Manager has will be uploaded to the /primary folder on the System SD card. This includes IP Office software files and embedded voicemail prompt files. Depending on the files that need to be updated, this process can take up to 40 minutes.

7.5.2 Upgrading the SD Card Locally

The following process can be used if you have physical access to the IP500v2 control unit. This method be used with a timed reboot, allowing the card upgrade to be done during normal operation hours followed by a reboot outside of normal operation hours.

If the card is being used for embedded voicemail, that service is not available while the card is shutdown. Licensed features however will continue running for up to 2 hours while the card is shutdown.

1. Shutdown the System SD memory card 159 and remove it from the control unit.
2. Follow the process for recreating the SD card 149. This process will overwrite the software files on the card with the files available to IP Office Manager. It will not affect any other files, for example the configuration file. This process takes approximately 15 minutes.
3. When the recreate process has completed, reinsert the card into the control unit's System SD card slot.
4. Using IP Office Manager select File | Advanced | Reboot.
5. In the Select IP Office menu, select the IP500v2 system and click OK.
6. Select the type of reboot that you want performed and click OK.
7. When the system is rebooted, as it restarts it will load the software files in the primary folder of the System SD card.

7.5.3 Upgrading Using an Optional SD Card

This method allows an Optional SD card to be used as the source from which the System SD card is upgraded. It only upgrades the software files, it does not update embedded voicemail prompts.

1. Once started do not interrupt this process, for example by removing the SD card. This process takes approximately 15 minutes.
2. Insert the SD card into a card reader on the Manager PC.
3. Using IP Office Manager, select File | Advanced | Recreate IP Office SD Card.
4. Select IP Office A-Law, IP Office U-Law or IP Office Partner Version. This selection will affect how the IP Office systems operates when defaulted with this card present in its System SD card slot. .
5. Browse to the card location and click OK.
6. Manager will start creating folders on the SD card and copying the required files into those folders. This process will take approximately 15 minutes. Do not remove the SD card during the process. Wait until the Manager status bar at the bottom shows a *"Ready"* message.
7. Insert the card into the control unit's Optional SD card slot.
8. Use one of the processes below to copy the software from the Optional SD card to the System SD card. Each of those processes will cause the IP Office system to be restarted.

Copying Software Files from the Optional SD Card Using IP Office Manager

1. Using IP Office Manager, select File | Embedded File Management.
2. Using the Select IP Office menu, select the IP Office system.
3. The file contents of the memory cards are displayed.
4. Select File | Upgrade Binaries.
   - The software files (all files in the folder except the configuration file (*config.cfg*) and licenses file (*keys.txt*)) in the */primary* folder on the Optional SD card are copied to the */primary* folder on the System SD card. This process takes approximately 5 minutes.
   - When the process has been completed, the IP Office system will be restarted.

Copying Software Files from the Optional SD Card Using a System Phone

This process can be used by a user configured as a System Phone user and using a 1400, 1600, 2400, 4600, 5400, 5600 or 9600 Series phone (excluding XX01, XX02 and XX03 models). The user's Login Code is used to restrict access to system administration functions on the phone.

1. Select Features | Phone User | System Admin.
2. Enter your IP Office user login code.
3. From the menu select Memory Card.
4. Select Upgrade Binaries....
   - The software files (all files in the folder except the configuration file (*config.cfg*) and licenses file (*keys.txt*)) in the */primary* folder on the Optional SD card are copied to the */primary* folder on the System SD card. This process takes approximately 5 minutes.
   - When the process has been completed, the IP Office system will be restarted.

7.6 Removing SD Cards

Card Removal	Memory cards should always be shutdown 159 before being removed when the system is running. Though the card slot LEDs indicate when data is being written to an card, lack of flashing LED is not a sufficient safeguard. Shutting down the card will disable embedded voicemail if being used. If the System SD card is removed, features licensed by the card's Feature Key serial number will continue operating for up to 2 hours.

The following processes can be used with SD cards installed in IP500v2 control units and also with Compact Flash memory cards installed in IP406 V2 control units.

7.6.1 Card Shutdown

Card Removal	Memory cards should always be shutdown 159 before being removed when the system is running. Though the card slot LEDs indicate when data is being written to an card, lack of flashing LED is not a sufficient safeguard. Shutting down the card will disable embedded voicemail if being used. If the System SD card is removed, features licensed by the card's Feature Key serial number will continue operating for up to 2 hours.

Before a memory card is removed from an IP Office system that is running, the card must be shutdown. Removing a memory card while the system is running may cause file corruption.

Card services can be restarted by either reinserting the card or using a Start Up command.

Card Shutdown Using IP Office Manager

1. Using IP Office Manager, select File | Advanced | Memory Card Commands | Shutdown.
2. Using the Select IP Office menu, select the IP Office system containing the memory card.
3. Click OK.
   - At the back of the control unit, confirm that the appropriate memory card LED is off.
   - The card can now be removed in order to perform the necessary maintenance actions.

Card Shutdown Using the System Status Application Application

1. Start System Status 69 and access the IP Office's status output.
2. In the navigation panel select System.
3. Select Memory Cards.
4. Select either System Card or Optional Card.
5. At the bottom of the screen select Shutdown.
   - At the back of the control unit, confirm that the appropriate memory card LED is off.
   - The card can now be removed in order to perform the necessary maintenance actions.

Card Shutdown Using a System Phone

This process can be used by a user configured as a System Phone user and using a 1400, 1600, 2400, 4600, 5400, 5600 or 9600 Series phone (excluding XX01, XX02 and XX03 models). The user's Login Code is used to restrict access to system administration functions on the phone.

1. Select Features | Phone User | System Admin.
2. Enter your IP Office user login code.
3. From the menu select Memory Card.
4. Select System for the System SD card or Option for the Optional SD card.
5. Select Shutdown.
   - At the back of the control unit, confirm that the appropriate memory card LED is off.
   - The card can now be removed in order to perform the necessary maintenance actions.

7.6.2 Card Startup

Reinserting a memory card into a system that is already switched on will automatically restart card operation. However, if the card has been shutdown but not removed, it can be restarted using Manager without requiring a reboot.

Card Startup Using IP Office Manager

1. Using IP Office Manager, select File | Advanced | Memory Card Commands | Startup.
2. Using the Select IP Office menu, select the IP Office system containing the memory card.
3. Click OK.

Card Startup Using the System Status Application

1. Start System Status 69 and access the IP Office's status output.
2. In the navigation panel select System.
3. Select Memory Cards.
4. Select either System Card or Optional Card.
5. At the bottom of the screen select Start Up.

Card Shutdown Using a System Phone

This process can be used by a user configured as a System Phone user and using a 1400, 1600, 2400, 4600, 5400, 5600 or 9600 Series phone (excluding XX01, XX02 and XX03 models). The user's Login Code is used to restrict access to system administration functions on the phone.

1. Select Features | Phone User | System Admin.
2. Enter your IP Office user login code.
3. From the menu select Memory Card.
4. Select System for the System SD card or Option for the Optional SD card.
5. Select Startup.

7.6.3 System Shutdown

IP Office systems running IP Office Release 6 can be shut down in order to perform maintenance. The shut down can be either indefinite or for a set period of time after which the IP Office will automatically reboot.

During the shut down process, the current configuration in the control unit's RAM memory is copied to the control units non-volatile memory. For IP500v2 systems that location is the System SD card.

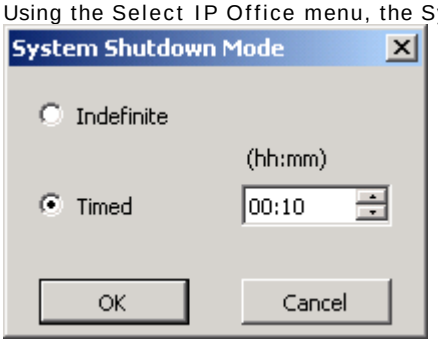
For control units with memory cards the memory cards can be shutdown and restarted 159 separately from the system.

! WARNINGS

- A shutdown must always be used to switch off the system. Simply removing the power cord or switching off the power input may cause errors.
- This is not a polite shutdown, any users calls and services in operation will be stopped. Once shutdown, the system cannot be used to make or receive any calls until restarted.
- The shutdown process takes up to a minute to complete. When shutdown, the CPU LED and the IP500 base card LEDs 1 and 9 (if trunk daughter card fitted) will flash red rapidly. The memory card LEDs are extinguished. Do not remove power from the system or remove any of the memory cards until the system is in the this state.
- To restart a system when shutdown indefinitely, or to restart a system before the timed restart, switch power to the system off and on again.

System Shutdown Using IP Office Manager

1. Using IP Office Manager, select File | Advanced | System Shutdown.
2. Using the Select IP Office menu, the System Shutdown Mode menu is displayed.



3. Select the type of shutdown required. If Indefinite is used, the system can only be restarted by having its power switched off and then on again. If a Timed shutdown is selected, the IP Office will reboot after the set time has elapsed.

System Shutdown Using the System Status Application

1. Start System Status 69 and access the IP Office's status output.
2. In the navigation panel select System.
3. At the bottom of the screen select Shutdown System.
4. Select the time duration for the shutdown or indefinite.

System Shutdown Using a System Phone

This process can be used by a user configured as a System Phone user and using a 1400, 1600, 2400, 4600, 5400, 5600 or 9600 Series phone (excluding XX01, XX02 and XX03 models). The user's Login Code is used to restrict access to system administration functions on the phone.

Unlike Manager, a system phone user cannot select an indefinite shutdown. The can set a timed shut down of between 5 minutes and 24 hours.

1. Select Features | Phone User | System Admin.
2. Enter your IP Office user login code.
3. From the menu select System Shutdown.
4. Select a time period for the shutdown. It must be in between 5 minutes and 24 hours.
5. Press Done and then Confirm to begin the shutdown.

System Shutdown Using the IP500v2 AUX Button

When the AUX button is pressed for more than 5 seconds, the IP500v2 control unit will shutdown with the restart timer set to 10 minutes.

Chapter 8.
IP500 Basic Installation

8. IP500 Basic Installation

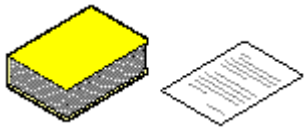
8.1 IP500 Tools Required

The following is a general summary of the tools required. Additional tools and equipment will be required for wall and or rack mounting and to fashion ground cable connections suitable to local requirements.

- Tools Required
  - ☐ 5mm Flat-blade screwdriver.
  - ☐ Crosshead screwdriver.
  - ☐ Anti-static wrist strap and ground point.
  - ☐ RJ45-RJ45 Ethernet LAN Cable.
  - ☐ M4 Cross-Head Screwdriver.
  - ☐ Tools suitable for crimping a cable spade.
  - ☐ If wall mounting, drills and tools for wall mounting fixtures.

- Additional Parts Required
  In addition to orderable IP Office equipment, the following items will be required.
  - ☐ 14AWG Solid copper wire for ground connection of control units and expansion modules.
  - ☐ Cable sleeve matching local regulator requirements for ground wires. Typically green for a functional ground and green/yellow for a protective ground.
  - ☐ If wall mounting, additional 4.5mm diameter fixtures and fittings suitable for the wall type.
  - ☐ Cable ties and labels for tidying and identifying cables.

8.2 IP500 Read the Documentation



Ensure that you have read this manual in full before starting installation. Also include the installation documentation for any other equipment and applications being installed as part of the IP Office system.

- ⚠ IP Office Technical Bulletins
  Ensure that you have obtained and read the IP Office Technical Bulletin relating to the IP Office software release which you are installing. This bulletin will contain important information that may not have been included in this manual. IP Office Technical Bulletins are available from the Avaya support website *(http://support.avaya.com)*.
- ⚠ Upgrade Licenses
  Some upgrades may require entry of upgrade licenses.

Other IP Office Installation Manuals

The following components of IP Office are outside the range of a basic IP Office installation. They are covered by separate installation and configuration documentation. If those components are to be part of the IP Office system installation, that documentation should be obtained, read and understood prior to the installation.

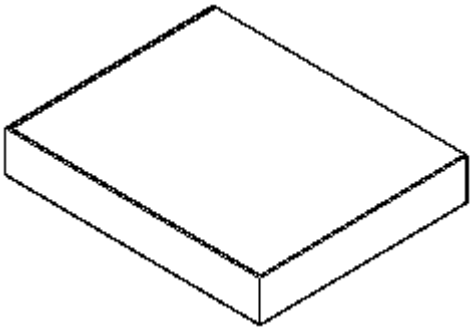
- Partner Version Installation
- one-X Portal for IP Office Installation
- 4600/5600 Series IP Phone Installation.
- Embedded Voicemail Installation.
- Voicemail Pro Installation.
- Contact Store Installation.
- Compact DECT Installation.
- IP DECT R4 Installation.
- 3600 Series Wireless IP Installation.
- Phone Manager Installation Manual.
- SoftConsole Installation Manual.
- SIP Extension Configuration

Information Web Sites

IP Office documentation is available from the following web sites.

- Avaya Support *(http://support.avaya.com)*
  Contains documentation and other support materials for Avaya products including IP Office. Copies of the IP Office CD images are available from this site and updated core software .bin files.
- Avaya IP Office Knowledge Base *(http://marketingtools.avaya.com/knowledgebase)*
  Access to an on-line regularly updated version of the IP Office Knowledge Base.

8.3 IP500 Unpacking



Use the following procedure when unpacking any equipment supplied by Avaya or an Avaya reseller or distributor.

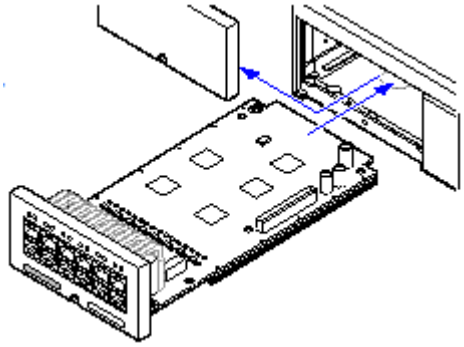
Information Required

- ☐ Equipment Checklist.
  An installation checklist of the parts and equipment ordered for the installation.

Procedure

1. ☐ Check for Package Damage
   Before unpacking any equipment, check for any signs of damage that may have occurred during transit. If any damage exists bring it to the attention of the carrier.
2. ☐ Check the Correct Parts Have Been Delivered
   Check all cartons against the packing slip and ensure that you have the correct items. Report any errors or omissions to the equipment supplier.
3. ☐ Retain All Packaging and Documentation
   While unpacking the equipment, retain all the packaging material. Fault returns are accepted only if repackaged in the original packaging. If performing a staged installation, the original packaging will also assist when repacking equipment to be moved to the final install site.
4. ☐ Ensure that Anti-Static Protection Measures are Observed
   Ensure that anti-static protection measures are observed at all times when handling equipment with exposed electrical circuit boards.
5. ☐ Check All Parts
   Visually inspect each item and check that all the necessary documentation and accessory items have been included. Report any errors or omissions to the dealer who supplied the equipment.
6. ☐ Check All Documentation
   Ensure that you read and retain any documentation included with the equipment.

8.4 IP500 Card Installation



The IP500 base cards and trunk daughter cards should be fitted before power is applied to the control unit.

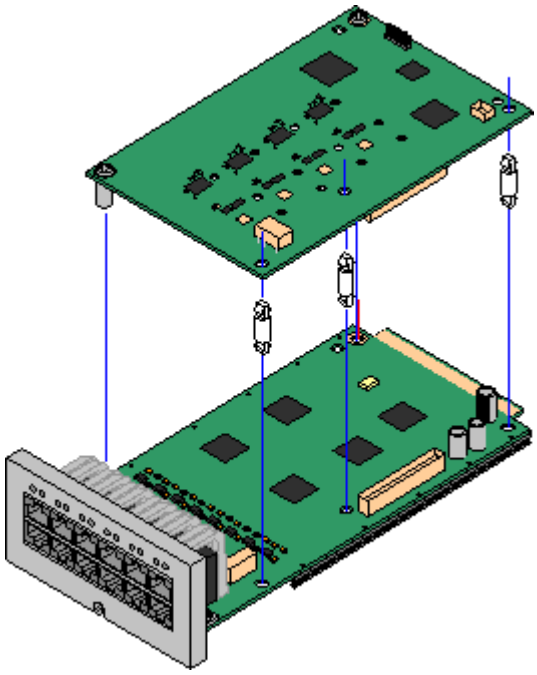
1. Fitting IP500 Trunk Daughter Cards to the Base Cards. 170
2. Fitting IP400 Legacy Cards to a Legacy Card Carrier. 171
3. Installing IP500 Cards into the Control Unit. 172

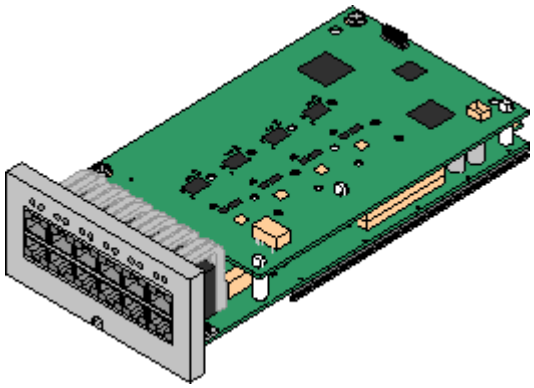
- ⚠ Warnings
  - Correct anti-static protection steps should be taken before handling circuit boards.
  - Cards must never be added or removed from the control unit while it has power connected.

- General Notes
  - Cards can be fitted in any order into any available slots. The only exception is the IP500 4-Port Expansion card which can only be installed in right hand slot 4.
  - It is recommended that cards are fitted from left to right.
  - There are restrictions to the number of supported cards of some types. When such a limit is exceed, the right-most card of that type will not function.
  - Ensure that you use the labels supplied to identify the card fitted into the control unit.

8.4.1 IP500 Daughter Card Preparation

IP500 trunk daughter cards can be fitted to any IP500 base card except the IP500 Legacy Card Carrier. For IP500 Combination cards, the trunk daughter card is pre-installed and cannot be changed.





⚠ Warnings

1. Correct anti-static protection steps should be taken while handling circuit boards.

Parts and Equipment Required

1. ☐ IP500 Base Card (except the IP500 Legacy Card Carrier).
2. ☐ IP500 Trunk Daughter Card
3. ☐ 3 Stand Off Pillars
   These are supplied with the trunk daughter card.

Tools Required.

1. ☐ 5mm Flat-blade screwdriver.
2. ☐ Anti-static wrist strap and ground point.

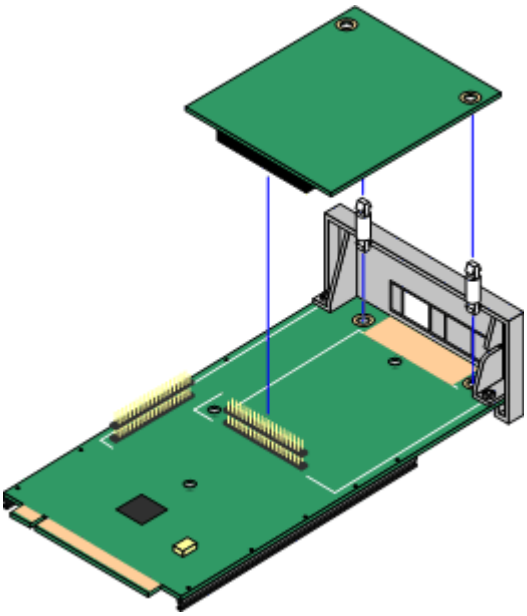
Procedure: Installing an IP500 Trunk Daughter Card

1. Check that correct cards have been supplied.
2. Ensure that you are wearing an anti-static wrist strap connected to a suitable ground point.
3. On the base card identify the position of 3 holes for the plastic pillars for the IP500 card. These are along the same edge as the card connector.
4. Fit the stand off pillars to the IP500 base card.
5. If there is a clip-on metal shield over the connector block on the base card, remove it.
6. Using minimal force and checking that the pins are correctly located, push the IP500 trunk card onto its connector block and the stand off pillars.
7. Check that the card connector has snapped into position.
8. Using the washers and screws provided, secure the metal stand off pillars to the base card.
9. A set of labels are supplied with the trunk daughter card. Fit the appropriate label to the front of the base card.

8.4.2 IP500 Legacy Card Preparation

An IP500 Legacy Carrier card can be used to fit IP400 trunk or VCM cards into an IP500 or IP500v2 control unit. Up to 2 IP500 legacy carrier cards can be inserted.

- ✓ PRI T1
- ✓ Dual PRI T1
- ✓ PRI 30 E1 (1.4)
- ✓ Dual PRI E1
- ✓ PRI 30 E1R2 RJ45
- ✓ Dual PRI E1R2 RJ45
- ✓ BRI-8 (UNI)
- ✓ ANLG 4 Uni (US only)
- ✓ VCM 4
- ✓ VCM 8
- ✓ VCM 16
- ✓ VCM 24
- ✓ VCM 30



⚠ Warnings

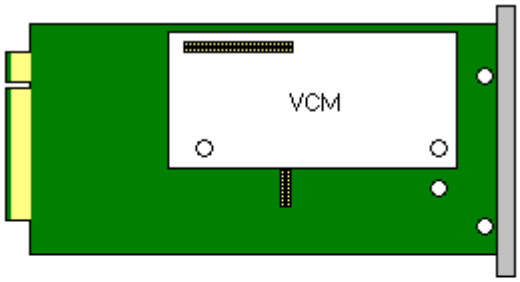
1. Correct anti-static protection steps should be taken while handling circuit boards.

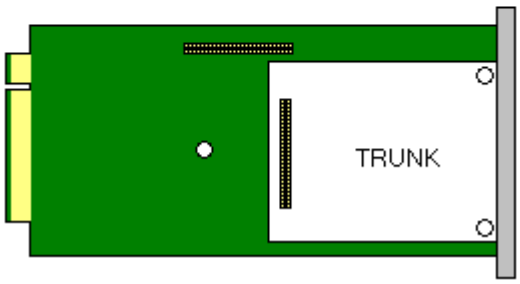
Parts and Equipment Required

1. ☐ IP500 Carrier Card
2. ☐ IP400 Card
   The table opposite lists supported cards. Any card not listed is not supported. Cards are supplied with 2 plastic stand off pillars. Trunk cards are also supplied with a replacement blanking plate which is not required.

Tools Required

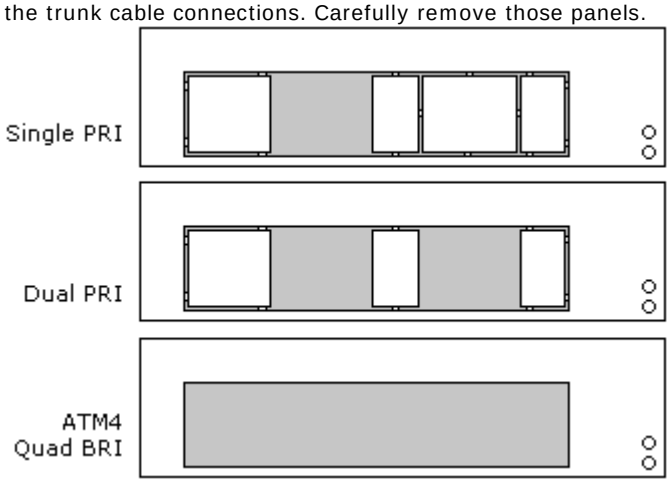
1. ☐ 5mm Flat-blade screwdriver.
2. ☐ Anti-static wrist strap and ground point.





Procedure: Installing a Carrier Card

1. Check that correct cards have been supplied.
2. Ensure that you are wearing an anti-static wrist strap connected to a suitable ground point.
3. On the carrier card identify the position of the jumper block and stand off pillar holes for the IP400 card. The peg holes are labeled as VCM or TRUNK.
4. If fitting an IP400 trunk card, identify which of the plastic snap-off panels on the front of the carrier card need to be removed to allow the trunk cable connections. Carefully remove those panels.



5. Fit the stand off pillars to the IP500 carrier card.
6. Using minimal force and checking that the pins are correctly located, push the IP400 card onto its jumper and the stand off pillars.

8.4.3 IP500 Card Insertion

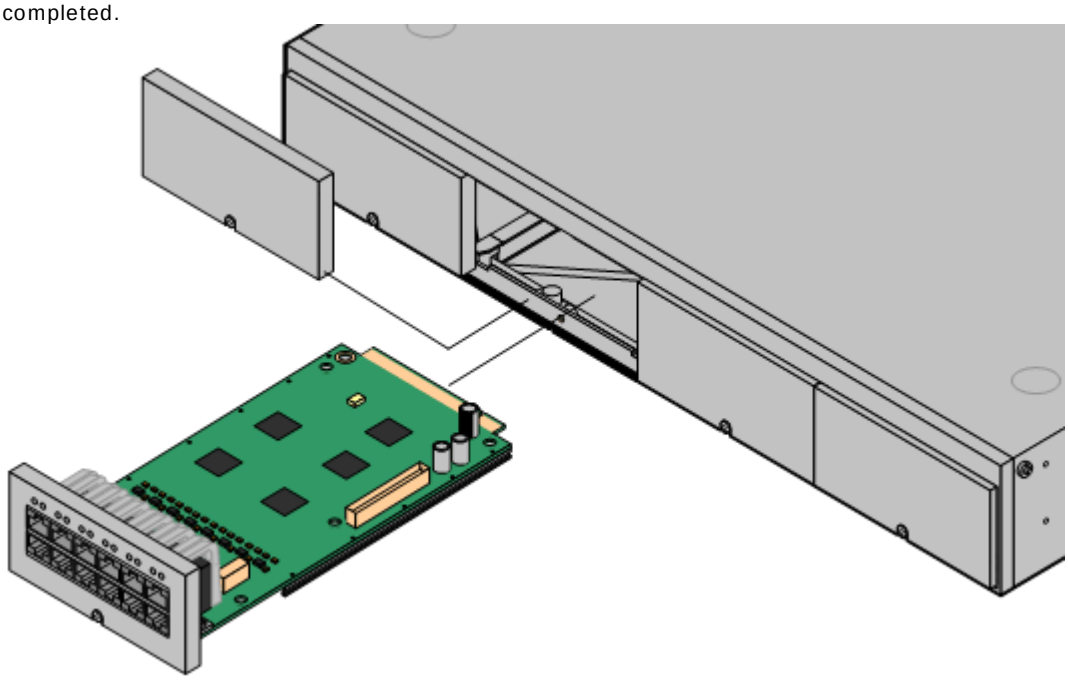
Having prepared each IP500 base card by adding any trunk daughter card 170 or IP400 legacy card 171, the base card can be inserted into the control unit.

- ⚠ Warnings
  - Correct anti-static protection steps should be taken while handling circuit boards.
  - Cards must never be added or removed from the control unit while it has power connected.

- Tools Required
  - ☐ 5mm Flat-blade screwdriver.
  - ☐ Anti-static wrist strap and ground point.

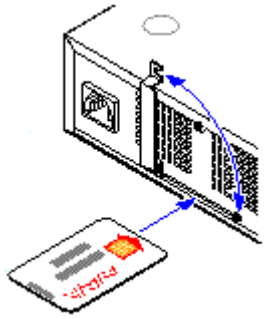
Installing an IP500 Card

1. Check that there is no power to the control unit.
2. Using a flat-bladed screwdriver, remove the cover from the slot on the front of the control unit that will be used for each card being installed. This cover is no longer required but should be retained until installation has been completed.



3. Allowing the card to rest against the bottom of the slot, begin sliding it into the control unit. When half inserted, check that the card rails have engaged with the slot edges by trying to gently rotate it. If the card rotates remove it and begin inserting it again.
4. The card should slide in freely until almost fully inserted. At this point apply pressure at the base of the front of the card to complete insertion.
5. Using a flat-bladed screwdriver secure the card.
6. Reapply power to the control unit. Initially each card should show a red LED (two if a daughter card is fitted) as the control unit restarts. After approximately 30 seconds these should change to flashing red as the card is started. These should then change to flashing every 5 seconds if the cards have started correctly.
7. Run the IP Office System Status Application and verify that the cards have all been recognized.
8. IP Office Manager can now be used to configure the extensions and trunk lines. For any IP500 VCM base cards, VCM Channel licenses must be added to the configuration to enable channels above the base 4.

8.5 Inserting the Feature Key



The IP500 uses a smart card feature key dongle. In addition to feature licensing the IP500 control unit uses this feature key dongle to determine various systems defaults such as A-Law or Mu-Law operation, default short codes and trunk settings.

Warnings

1. The feature key is required for all IP500 control units and must be present when the system is started and during operation. This applies even if the IP500 is not using any licensed features.
2. The feature key slot cover must remain present to protect the card and the card reader from damage.
3. Correct anti-static protection steps should be taken before handling circuit boards.
4. During this process power to the IP Office control unit must be switched off and disconnected.

Parts Required

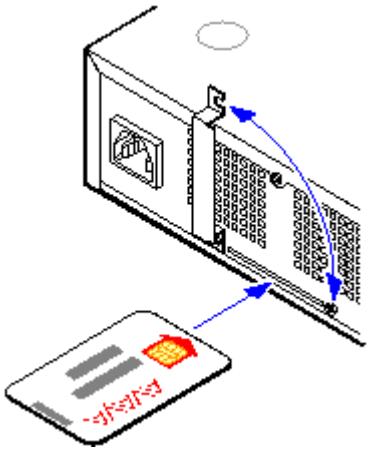
- IP500 Feature Key
  The correct key will depend on the locale. The listing below is typical and may not apply in all cases. Ensure that the serial number of the key, shown on the card, is recorded.
  - ☐ Mu-Law: Used in North America and Korea.
  - ☐ A-Law: Used in all other locales.

Tools Required:

- ☐ 5mm Flat-blade screwdriver.

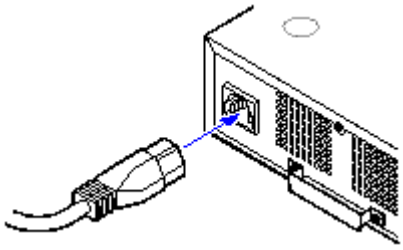
Procedure

1. Locate the feature key slot on the rear of the IP500 control unit. The slot is adjacent to the power input socket and is protected by a metal cover.
2. Undo the screws on the cover until it can be rotated clear of the feature key card slot.



3. Insert the feature key. The card should be face up and inserted in the direction of the arrow on the card.
4. Rotate the slot cover back into position and tighten the screws.

8.6 Applying Power



This procedure starts a new IP Office control unit not connected to any LAN. In this scenario the IP Office control unit will assume its default configuration settings.

Objective - To power up the IP Office control unit to a known state with a known set of defaults.

Warnings

1. When powering up the control unit for the first time do not connect the LAN or WAN ports of the control unit to any network.
2. The power cord must be connected directly from the control unit to the switched power outlet socket. The cord must not be fixed in anyway or routed through any permanent structure.

Parts and Equipment Required

- ☐ Switched power outlet socket.
- ☐ IP Office Control Unit.
- ☐ Locale Specific Power Cord.

Procedure

1. Connect the power cord from the power supply outlet to the power input socket on the rear of the control unit.
   - Power cords must not be attached to the building surface or run through walls, ceilings, floors and similar openings. Installation measures must be taken to prevent physical damage to the power supply cord, including proper routing of the power supply cord and provision of a socket outlet near the fixed equipment or positioning of the equipment near a socket outlet.
2. Switch on power to the control unit.
3. New IP Office 500 control units are supplied with a base software level of 4.0.0. The CPU LED on these units will flash red until the unit is upgraded to the required level of released IP Office core software.
4. The CPU LED on units that have already been upgraded from 4.0.0 will go through a green red cycle several times and then stay green on. During this time other LEDs may flash as the unit goes through its power on self test cycle.

The following are the basic default configuration settings for an IP Office system.

Network Settings	LAN1	LAN2/WAN
IP address	192.168.42.1.	192.168.43.1
IP Mask	255.255.255.0	255.255.255.0
DHCP Mode	Server	Server
No of DHCP IP Addresses	200.	200.

- Extensions and Users
  A user is automatically created for each physical extension port detected in the system. Users are assigned extension numbers starting from 201. User names take the form Extn201, Extn202, ...
- Hunt Group
  A single hunt group 200 called Main is created and the first 10 users are placed into that hunt group as members.
- Incoming Call Routes
  Two default incoming call routes are created. Voice calls are routed to the hunt group Main. Data calls are routed to the RAS user DialIn.
- Default Short Codes
  IP400 control units are manufactured as either A-Law or U-Law variants. For IP500 and IP500v2 control units, A-Law or U-Law variant operation is determined by the Feature Key installed in the control unit. Depending on the variant, different short codes and trunk settings are added to the default configuration.
- A-Law or Mu-Law
  PCM (Pulse Code Modulation) is a method for encoding voice as data. In telephony, two methods PCM encoding are widely used, A-law and Mu-law (also called U-law). Typically Mu-law is used in North America and a few other locations while A-law by the rest of the world. As well as setting the correct PCM encoding for the region, the A-Law or Mu-Law setting of an IP Office system when it is first started affects a wide range of regional defaults relating to line settings and other values.
  - For IP400 IP Office systems, each control units was manufactured as either an A-Law variant or a Mu-Law variant.
  - For IP500 and IP500v2 systems, the encoding default is set by the type of Feature Key installed when the system is first started.

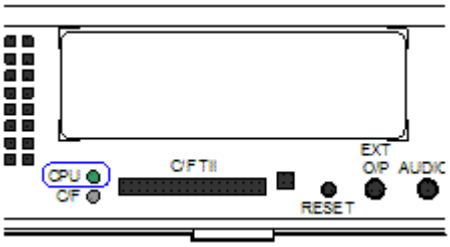
Default DHCP/IP Address Settings

When a defaulted or new IP Office control unit is switched on, it requests IP address information from a DHCP Server on the network. This operation will occur whether the LAN cable is plugged in or not. The process below is done separately for both the LAN port (LAN1 in the configuration) and the WAN port (LAN2 in the configuration) on the back of the IP Office control unit.

- The IP Office makes a DHCP request for what IP address information it should use.
- If a DHCP server responds within approximately 10 seconds, the control unit defaults to being a DHCP client and uses the IP address information supplied by the DHCP server.
- If no DHCP Server responds, the control unit defaults to being the DHCP server for the LAN using the following settings:
  - For its LAN1 it allocates the IP address 192.168.42.1 and IP Mask 255.255.255.0. It supports 200 DHCP clients using the addresses range 192.168.42.2 and 192.168.42.201, the IP Mask 255.255.255.0 and default gateway address 192.168.42.1 (the Control Unit's LAN1 address).
  - For its LAN2 if supported, it allocates the IP address 192.168.43.1 and IP Mask 255.255.255.0.
  - Note that the IP Office does not check that these addresses are valid and or available on the network.

- ! Once an IP500v2 control unit has obtained IP address and DHCP mode settings, it will retain those settings even if rebooted without a configuration file present on the System SD card. To fully remove the existing IP address and DHCP mode setting the IP Office must be defaulted using IP Office Manager.

8.7 Check the CPU LED



During normal operation, the CPU LED on the rear of the IP500 control unit should be green.

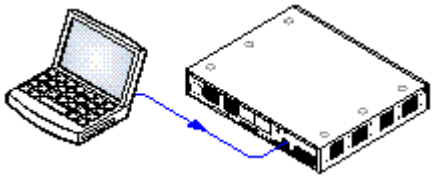
- Note
  New IP Office 500 control units are supplied with a base software level of 4.0.0. The CPU LED on these units will flash red until the unit is upgraded to the required level of released IP Office core software.

Normal Power On Sequence

When power to the control unit is switched on, the normal sequence for the CPU LED is as follows.

1. Steady Red for 3 seconds
2. Off for 10 seconds
3. Flashing alternate red/green for 4 seconds.
4. The LED should be steady green following successful start up. Note that the IP500 cards on the front of the control unit may still be going through their own start up process.
   - Flashing RED
     A flashing red CPU LED at this stage indicates an error. The most likely cause is a missing Feature Key card.

8.8 Upgrading the Core Software



New IP500 control units are supplied with a basic level of software (4.0.0). That software is sufficient to allow LAN network connect to the control unit in order to then upgrade it to the level of IP Office software required.

Objective - Upgrade the control unit to IP Office 4.0 software.

Information Required

- ☐ System Password - For a new or defaulted system this is password.

Tools Required

- ☐ Manager PC - The Upgrade Wizard tool is part of the Manager application.

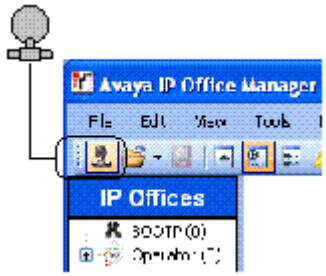
WARNINGS

- Check IP Office Technical Bulletins
  Check the latest IP Office Technical Bulletin for the IP Office software release before proceeding any further. It may contain information relating to changes that occurred after this document was completed. Bulletins are available from http://support.avaya.com.
- Multiple Managers
  If more than one copy of Manager is running it is possible for the IP Office to request BIN files from a different Manager from the one that started the upgrade process. Ensure that only one copy of Manager is running when upgrading an IP Office system.

Procedure: Upgrade Procedure

1. Using IP Office Manager, click and receive the configuration from the IP Office. If not already done this action creates a BOOTP entry in Manager for the IP Office system. This action also confirms communication between the Manager PC and the IP Office.
2. Select File | Save Configuration As... and save a copy of the configuration file onto the PC. This action should be completed before upgrading any IP Office system.
3. Select File | Advanced | Upgrade.
4. The UpgradeWiz is started and scans for IP Office unit using the Unit/Broadcast address. Adjust this address and click Refresh if the expected modules are not shown.
5. For each the unit found, the UpgradeWiz displays the module type, its current version of software installed in the unit and the software version of the .bin file that Manager has available.
6. For those units and modules where manager detects that it has a higher version available, the tick box next to the unit or module is automatically selected.
7. For those modules which you want to upgrade, tick the check box. For modules where a later version of software is available the check box may have already been automatically ticked.
8. Select Upgrade.
9. The system password will be requested. Enter it and click OK.
10. The bin files required are transferred to the system and stored in temporary memory.
11. Once all the files have been transferred, the upgrade wizard will prompt whether it okay to proceed with the upgrade process. Select Yes to continue.
12. Each module being upgraded will delete its existing core software, restart and load the new software file that was transferred. This process may take several minutes for each unit. Do not cancel or close the upgrade wizard while this process is running.
13. Following the upgrade check that the upgrade wizard now shows that the selected units and modules have upgraded. It may be necessary to select Refresh to update the information in the upgrade wizard display.

8.9 Receiving the Configuration



The process here applies to systems running IP Office 3.2 and higher.

Objective - Receive a configuration from an IP Office running IP Office 3.2 or higher software.

Information Required

- ☐ Service User Name and Password
  The defaults for full configuration access are Administrator and Administrator. However these should have been changed as part of the installation process, see Configuring Security Settings.

Procedure: Receiving the Configuration

1. Select Start | Programs | IP Office | Manager.
2. Click in the main toolbar or select File | Open Configuration from the menu bar.
3. The Select IP Office window appears. After a few seconds it should list the control unit that is being setup. The default name used is the control units MAC address.
   - If the system required was not found, the address used for the search can be changed. Enter or select the required address in the Unit/Broadcast Address field and then click Refresh to perform a new search.
4. Click the check the box next to the system and then click OK.
5. The name and password request is displayed. The name and password must match one of those setup through the security settings. The default name and password for full configuration settings access is Administrator and Administrator.
6. Successful receiving of the configuration is shown by the full configuration tree being shown in the left-hand panel. With no configuration loaded the navigation pane shows just BOOTP and Operator entries.

IP Office Default Settings

The following are the basic default configuration settings for an IP Office system.

System	Name	MAC address of the control unit.	
	System Password	password	
	License Server IP Address	255.255.255.255	
LAN1		LAN1	LAN2/WAN
	IP address	192.168.42.1.	192.168.43.1
	IP Mask	255.255.255.0	255.255.255.0
	DHCP Mode	Server	Server
	No of DHCP IP Addresses	200.	200.

- Extensions and Users
  A user is automatically created for each physical extension port detected in the system. Users are assigned extension numbers starting from 201. User names take the form Extn201, Extn202, ...
- Hunt Group
  A single hunt group 200 called Main is created and the first 10 users are placed into that hunt group as members.
- Incoming Call Routes
  Two default incoming call routes are created. Voice calls are routed to the hunt group Main. Data calls are routed to the RAS user DialIn.

8.10 Adding Licences

32-Character license keys strings are used to activate various IP Office features. These keys are uniquely based on the feature being activated and the serial number of the Feature Key dongle installed with the IP Office system.

Licenses can be added individually to the IP Office's configuration. However the licence key file provided by Avaya from their license ordering web site generates a License.csv file containing all the ordered licenses. That file can be imported into the configuration.

Parts and Equipment Required

- ☐ License Keys Documentation
  Ensure that the Feature Key dongle serial number used to generate the license keys matches that of the Feature Key dongle installed and that all the licenses required have been included.

Importing a License.csv File

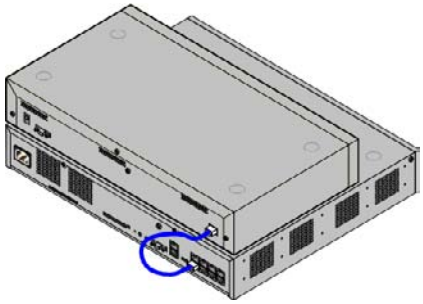
1. Copy the License.csv file to the Manager PC.
2. Start Manager and receive the IP Office system's configuration.
3. Select File | Import/Export | Import... .
4. Click the button next to Look In and browse to and select the folder containing the license file.
5. The file should be listed as Available along with an indication of the number of licenses it contains. Select the check box next to the file name and then clock OK.
6. Click on to send the configuration back to the IP Office.
7. Use Manager to receive the configuration again and check that the status of the licenses. They should now be Valid.

Manually Adding Licenses

Use this process to individually copy and paste license keys into the configuration. Cutting and pasting removes any errors that may be caused by the incorrect typing of any license key.

1. Start Manager and receive the IP Office system's configuration.
2. Select License.
3. To add a license, click and select License. Enter the new license and click OK.
4. The Status of the new license should show *Unknown* and name the license as expected. If its Status is *Unknown* and name *Invalid*, the most likely cause is incorrect entry of the license key characters.
5. Repeat the process for any other licences
6. Click on to send the configuration back to the IP Office.
7. Use Manager to receive the configuration again and check that the status of the licenses. They should now be *Valid* .

8.11 Adding External Expansion Modules



External expansion modules connect to the IP Office control unit using an expansion interconnect cable.

Objective - Connect the external expansion modules and then restart the control unit so that the new modules are recognized.

Each module is supplied with an expansion connect cable and a power supply unit 32.

An appropriate locale specific power cord 33 for the power supply unit, and cables 35 for the ports on the front of the module must be ordered separately.

- Each external expansion module (except the WAN3 10/100) is supplied with a blue 1 meter (3'3'') expansion interconnect cable. This cable must be used when connecting to expansion ports on the rear of a control unit.
- When connecting to expansion ports on an IP500 4-Port Expansion card, a yellow 2 meter (6'6") expansion interconnect cable can be used in place of the standard blue cable. 4 Yellow cables are supplied with the IP500 4-Port Expansion card.
- The WAN3 10/100 module differs in that it connects via a LAN port on its front to one of the control unit's LAN ports. This type of external expansion module is not supported by IP500 and IP500v2 control units.

Installation Requirements

- ☐ Installation space either on or under the existing IP Office control unit.
- ☐ Switched power outlet socket.
- ☐ Available EXPANSION port on the control unit.
- ☐ Grounding Requirements
  - ☐ Functional Grounding
    Connection of a functional ground 207 is:
    - ☐ Recommend for all modules.
    - ☐ Connection of a functional ground is mandatory for Analog Trunk module.
  - ☐ Protective Grounding
    Connections of a protective ground via surge protection equipment 38 is:
    - ☐ Mandatory for Analog trunk modules in the Republic of South Africa.
    - ☐ Mandatory for Digital Station and Phone modules connected to out of building extensions.
    - ☐ Mandatory for Digital Station V2 and Phone V2 modules.

Tools Required

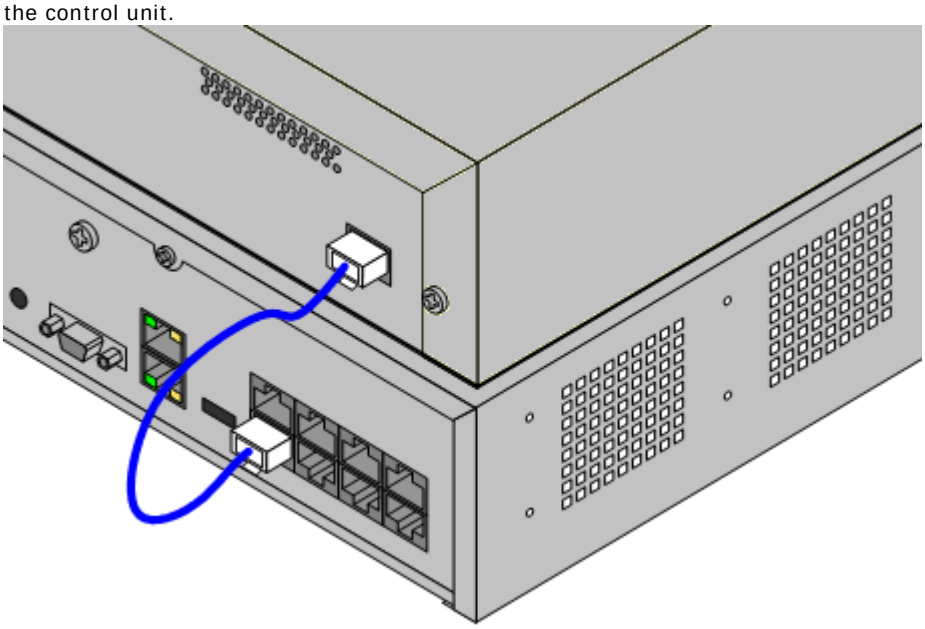
- ☐ Manager PC.
- ☐ Tools for rack mounting 201 (optional).

Parts and Equipment Required

- ☐ External Expansion Module.
  Each module is supplied with a suitable external power supply unit and a 1m blue interconnect cable. 2m Yellow interconnect cables are supplied with the IP500 4-Port Expansion card and should only be used with that card.
- ☐ Power cord for the power supply unit 33.
- ☐ Rack mounting kit 39 (optional).
- ☐ Cable labeling tags.

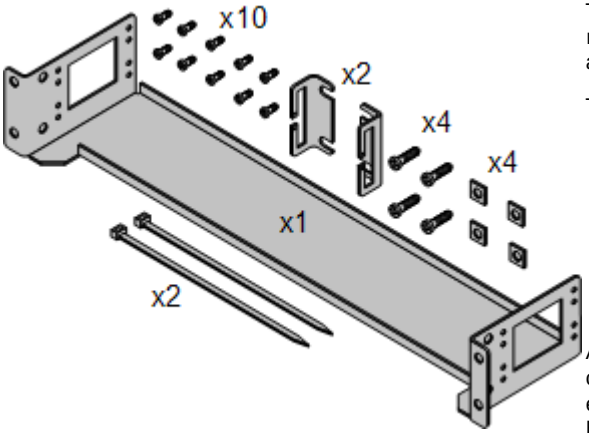
Procedure

1. Switch off power to the IP Office control unit.
2. Attach the external expansion module's power supply.
3. Connect the expansion interconnect cable from the module's EXPANSION port to the first free EXPANSION port on the control unit.



4. Make careful note of the port used and include this detail on the cable label and any other system records.
5. Switch on power to the module. Wait for the center LED on the front of the module to change from red to green.
6. Switch on power to the control unit.
7. Once the control unit has rebooted, using Manager receive the system configuration.
8. Click on Unit in the left-hand panel.
9. Check that the list of units shown in the right-hand panel is correct.
10. The external expansion modules should be upgraded to the same level of software as the control unit. Do this by repeating the IP Office upgrade process (see K. Upgrading the Core Software 177).

8.12 Rack Mounting



The IP500 control unit and IP500 external expansion units can be rack mounted if required into 19-inch rack systems. This requires an IP500 Rack Mounting Kit (SAP 700429202) for each unit.

The kit includes:

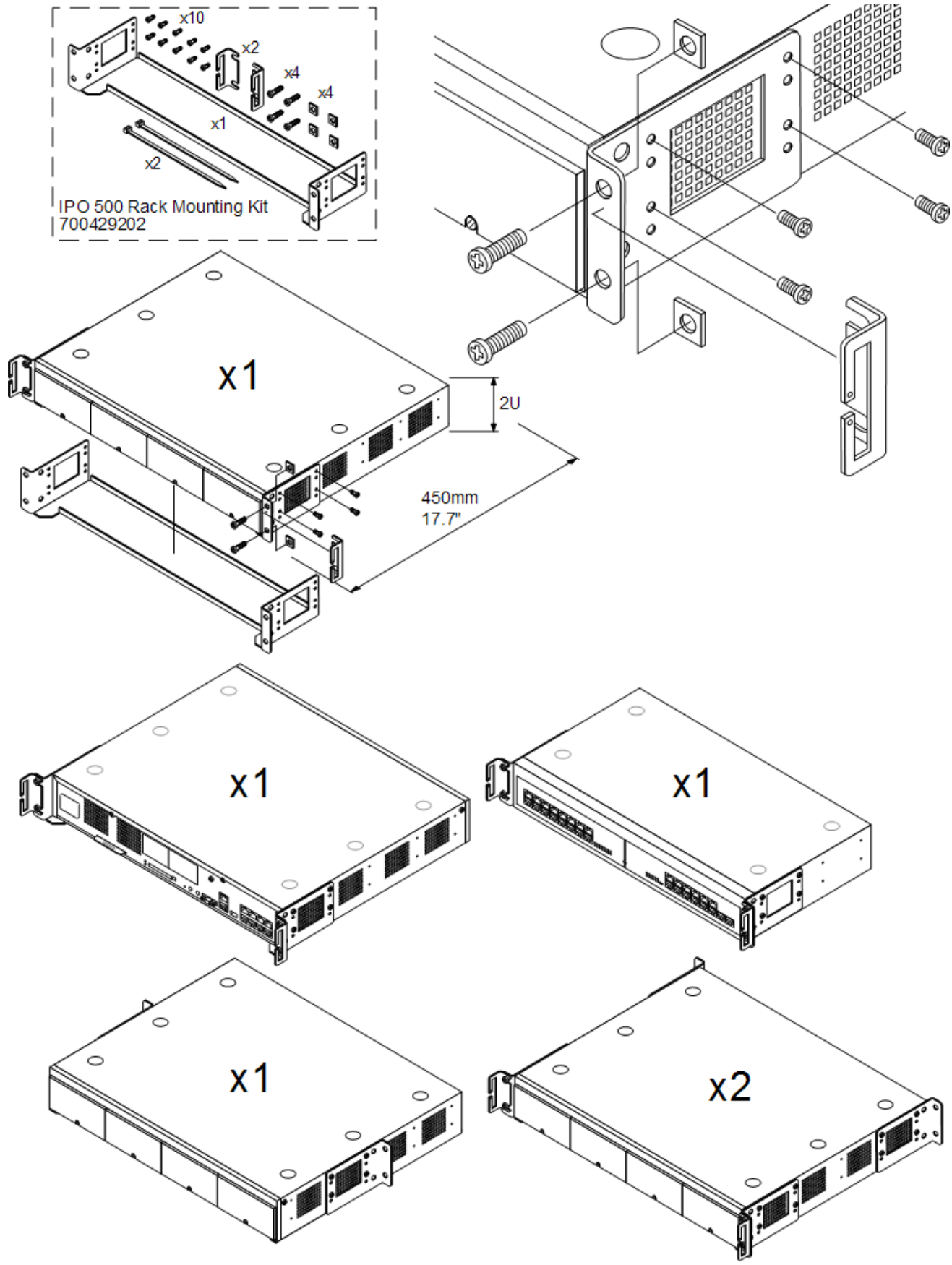
- A rack mounting bracket and screws for attachment of the bracket to the unit
- Nuts and bolts for rack attachment.
- Brackets and cable ties for cable tidying.

As indicated in the diagram following, the rack mounting bracket can be used in several positions on the unit. IP400 external expansion units used in an IP500 system can also be rack mounted but use a separate IP400 Rack Mounting Kit.

Environmental Requirements

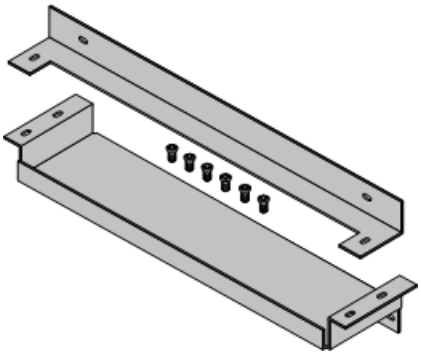
In addition to the existing environmental requirements 56 for an IP Office system, the following additional factors must be considered when rack mounting a unit:

1. Rack Positioning - Ensure compliance with the rack manufacturers safety instructions. For example check that the rack legs have been lowered and fixing brackets have been used to stop toppling.
2. Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.
   - ☐ Operating Temperature: 0°C (32°F) to 40°C (104°F).
   - ☐ Operating Humidity: 10% to 95% non-condensing.
3. Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised. Proper ventilation must be maintained. The side ventilation slots on the IP500 control unit should not be covered or blocked.
4. Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
5. Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
6. Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).
7. ⚠ Only the screws (M3 x 6mm) provided with the mounting kit should used to attach the brackets to the control unit.



- ⚠ Only the screws (M3 x 6mm) provided with the mounting kit should used to attach the brackets to the control unit.

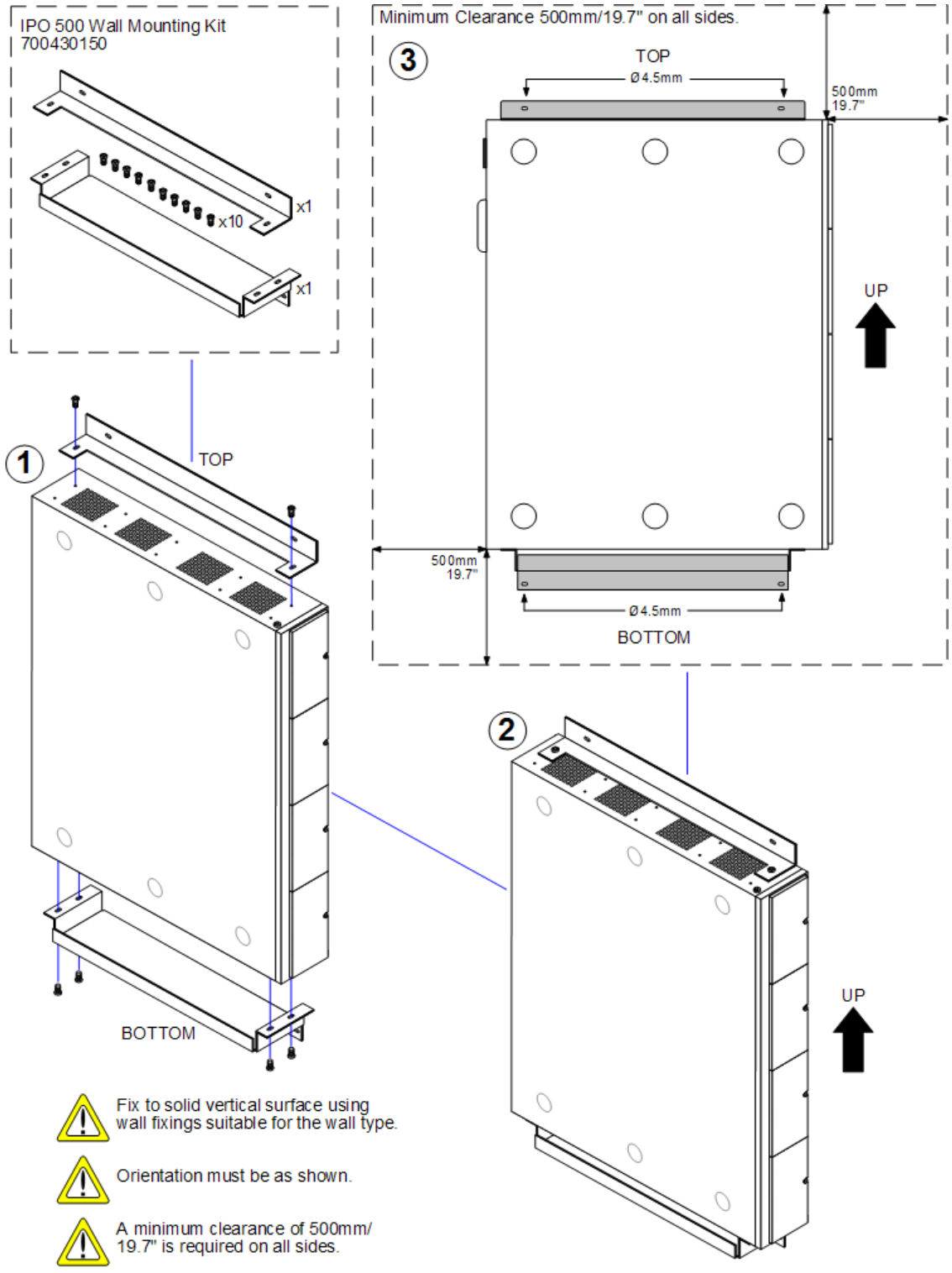
8.13 Wall Mounting



IP500 and IP500v2 control units can be wall mounted. This requires an IP500 Wall Mounting Kit (SAP 700430150) plus additional 4.5mm fixtures and fittings suitable for the wall type. The wall mounting kit includes two brackets, one top and one bottom.

In addition to the existing environmental requirements 56 for an IP Office system, the following additional requirements apply when wall mounting a unit:

- The wall surface must be vertical, flat and vibration free.
- The brackets must be used as shown, with the deeper tray-like bracket used at the bottom of the wall mounted control unit.
- Only the screws (M3 x 6mm) provided with the mounting kit should used to attach the brackets to the control unit.



8.14 Grounding

Use of ground connections reduces the likelihood of problems in most telephony and data systems. This is especially important in buildings where multiple items of equipment are interconnected using long cable runs, for example phone and data networks.

All IP Office control units and external expansion modules must be connected to a functional ground. Where the unit is connected to a power outlet using a power cord with an earth lead, the power outlet must be connected to a protective earth.

In some cases, such as ground start trunks, in addition to being a protective measure this is a functional requirement for the equipment to operate. In other cases it may be a locale regulatory requirement and or a necessary protective step, for example areas of high lightning risk.

- ⚠ WARNING
  During installation do not assume that ground points are correctly connected to ground. Test ground points before relying on them to ground connected equipment.
- Additional protective equipment
  In addition to grounding, additional protective equipment will be required in the following situations.
  - On any Digital Station or Phones external expansion module connected to an extension located in another building. Refer to "Out of Building Telephone Installations 38".
  - In the Republic of South Africa, on all Analog Trunk external expansion modules (ATM16) and on any control units containing an analog trunk cards (ATM4/ATM4U).

Tools Required

- ☐ M4 Cross-Head Screwdriver.
- ☐ Tools suitable for crimping a cable spade.

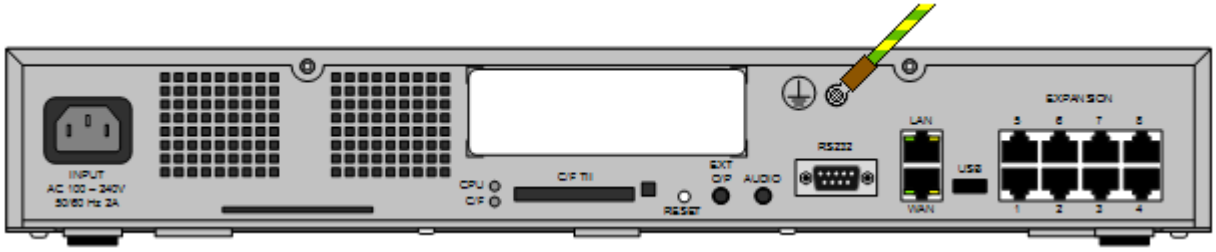
Parts and Equipment Required

- ☐ 14AWG Solid copper wire for ground connection.
- ☐ Cable sleeve matching local regulator requirements. Typically green for a functional ground and green/yellow for a protective ground.

The ground point on IP Office control units and expansion modules are marked with a ⏚ or ⏚ symbol. Ground 207 connections to these points should use a 14 AWG solid wire with either a green sleeve for a functional ground or green and yellow sleeve for a protective ground.

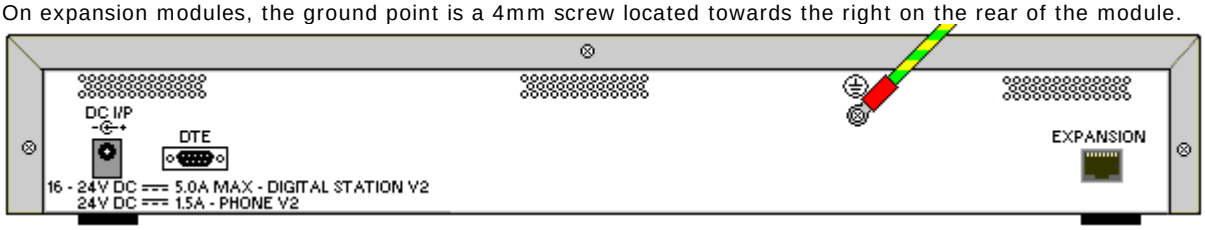
IP500/IP500v2 Control Unit

On IP500 control units the ground point is located above the RS232 DTE port.



External Expansion Modules

On expansion modules, the ground point is a 4mm screw located towards the right on the rear of the module.

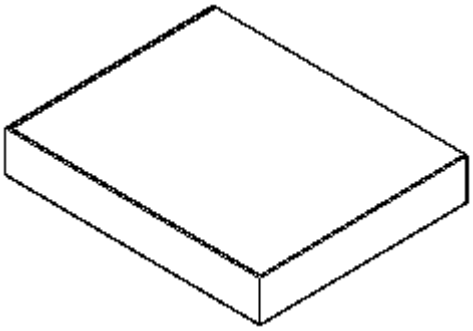


- On some older modules, the dedicated ground point screw is not present. In those cases, the top-center cover fixing screw (3mm) can be used as an alternative ground connection point. A toothed washer should be added to ensure good contact.

Chapter 9.
IP400 Basic Installation

9. IP400 Basic Installation

9.1 Unpacking



Use the following procedure when unpacking any equipment supplied by Avaya or an Avaya reseller or distributor.

Information Required

- ☐ Equipment Checklist.
  An installation checklist of the parts and equipment ordered for the installation.

Procedure

1. ☐ Check for Package Damage
   Before unpacking any equipment, check for any signs of damage that may have occurred during transit. If any damage exists bring it to the attention of the carrier.
2. ☐ Check the Correct Parts Have Been Delivered
   Check all cartons against the packing slip and ensure that you have the correct items. Report any errors or omissions to the equipment supplier.
3. ☐ Retain All Packaging and Documentation
   While unpacking the equipment, retain all the packaging material. Fault returns are accepted only if repackaged in the original packaging. If performing a staged installation, the original packaging will also assist when repacking equipment to be moved to the final install site.
4. ☐ Ensure that Anti-Static Protection Measures are Observed
   Ensure that anti-static protection measures are observed at all times when handling equipment with exposed electrical circuit boards.
5. ☐ Check All Parts
   Visually inspect each item and check that all the necessary documentation and accessory items have been included. Report any errors or omissions to the dealer who supplied the equipment.
6. ☐ Check All Documentation
   Ensure that you read and retain any documentation included with the equipment.

9.2 Control Unit Power Up

This procedure starts a new IP Office control unit not connected to any LAN. In this scenario the IP Office control unit will assume its default configuration settings.

Objective - To power up the IP Office control unit to a known state with a known set of defaults.

Parts and Equipment Required

- ☐ Switched power outlet socket.
- ☐ IP Office Control Unit.
- ☐ Locale Specific Power Cord.

Procedure

1. Remove the control unit from its box and check its condition. Check that an external power supply unit has been included with the control unit.
2. Connect the external power supply unit to the control unit.
3. Connect the power cord from the power supply outlet to the external power supply unit.
    - Power cords must not be attached to the building surface or run through walls, ceilings, floors and similar openings. Installation measures must be taken to prevent physical damage to the power supply cord, including proper routing of the power supply cord and provision of a socket outlet near the fixed equipment or positioning of the equipment near a socket outlet.
4. Switch on power to the control unit.
5. Observe the center LED on the front of the control unit. Initially this LED will be red. After approximately 10 seconds it should change to green. During this time other LEDs may flash as the unit goes through its power on self test cycle.

The following are the basic default configuration settings for an IP Office system.

Network Settings	LAN1	LAN2/WAN
IP address	192.168.42.1.	192.168.43.1
IP Mask	255.255.255.0	255.255.255.0
DHCP Mode	Server	Server
No of DHCP IP Addresses	200.	200.

- Extensions and Users
  A user is automatically created for each physical extension port detected in the system. Users are assigned extension numbers starting from 201. User names take the form Extn201, Extn202, ...
- Hunt Group
  A single hunt group 200 called Main is created and the first 10 users are placed into that hunt group as members.
- Incoming Call Routes
  Two default incoming call routes are created. Voice calls are routed to the hunt group Main. Data calls are routed to the RAS user DialIn.
- Default Short Codes
  IP400 control units are manufactured as either A-Law or U-Law variants. For IP500 and IP500v2 control units, A-Law or U-Law variant operation is determined by the Feature Key installed in the control unit. Depending on the variant, different short codes and trunk settings are added to the default configuration.
- A-Law or Mu-Law
  PCM (Pulse Code Modulation) is a method for encoding voice as data. In telephony, two methods PCM encoding are widely used, A-law and Mu-law (also called U-law). Typically Mu-law is used in North America and a few other locations while A-law by the rest of the world. As well as setting the correct PCM encoding for the region, the A-Law or Mu-Law setting of an IP Office system when it is first started affects a wide range of regional defaults relating to line settings and other values.
    - For IP400 IP Office systems, each control units was manufactured as either an A-Law variant or a Mu-Law variant.
    - For IP500 and IP500v2 systems, the encoding default is set by the type of Feature Key installed when the system is first started.

Default DHCP / IP Address Settings

When a defaulted or new IP Office control unit is switched on, it requests IP address information from a DHCP Server on the network. This operation will occur whether the LAN cable is plugged in or not. The process below is done separately for both the LAN port (LAN1 in the configuration) and the WAN port (LAN2 in the configuration) on the back of the IP Office control unit.

- The IP Office makes a DHCP request for what IP address information it should use.
- If a DHCP server responds within approximately 10 seconds, the control unit defaults to being a DHCP client and uses the IP address information supplied by the DHCP server.
- If no DHCP Server responds, the control unit defaults to being the DHCP server for the LAN using the following settings:
  - For its LAN1 it allocates the IP address 192.168.42.1 and IP Mask 255.255.255.0. It supports 200 DHCP clients using the addresses range 192.168.42.2 and 192.168.42.201, the IP Mask 255.255.255.0 and default gateway address 192.168.42.1 (the Control Unit's LAN1 address).
  - For its LAN2 if supported, it allocates the IP address 192.168.43.1 and IP Mask 255.255.255.0.
  - Note that the IP Office does not check that these addresses are valid and or available on the network.

- ! Once an IP500v2 control unit has obtained IP address and DHCP mode settings, it will retain those settings even if rebooted without a configuration file present on the System SD card. To fully remove the existing IP address and DHCP mode setting the IP Office must be defaulted using IP Office Manager.

9.3 Connecting the Manager PC

At this stage we will directly connect the Manager PC to the new IP Office control unit. For this the PC will need to be set to a fixed IP address in the same subnet range as the IP Office control unit's default address (192.168.42.1/255.255.255.255).

Objective - Physically connecting the Manager PC and the IP Office without needing to adjust or configure any intervening equipment.

Parts and Equipment Required

- ☐ Manager PC.
- ☐ LAN Cable.
  - ☐ IP Office IP406 V2 and IP500 control units:
    A standard RJ45-RJ45 LAN cable can be used.
  - ☐ IP412 Control Unit:
    A RJ45-RJ45 cross-over LAN cable is required.

Procedure: Direct Connection to a Defaulted IP Office Control Unit

1. Check that the TCP/IP properties for the Manager PC's Local Area Network connection are set as follow:
   - Fixed IP address: 192.168.42.203
   - Subnet mask: 255.255.255.0
   - Default gateway: 192.168.42.1.
2. Connect the LAN cable from the PC's LAN port the LAN 1 port on the IP Office control unit.
3. Check that the orange LED lamp on the IP Office LAN port is on. The green LED may also be flickering as it indicates traffic across the LAN connection.
4. Select Start | Run and enter *cmd*.
5. In the command window that appears enter ping 192.168.42.1. The results should show a number of ping replies from the IP Office. This confirms basic communication between the Manager PC and the IP Office.
6. If there are no ping replies enter *ipconfig*. The results should list the IP address settings of the Manager PC as required above and with no mention of DHCP being used. Enter exit.
7. Check the cable connection.

9.4 Receiving a Configuration (Pre 3.2)

The following is the normal procedure for receiving a copy of the IP Office configuration from a new or defaulted control unit running pre-3.2 IP Office core software.

Objective - This process tests the communication between the Manager application and the IP Office control unit.

Information Required

1. ☐ System Password - For a new or defaulted system this is password.

Procedure: Receiving the Configuration from a Pre-3.2 IP Office Control Unit

1. Select Start | Programs | IP Office | Manager.
2. Click in the main toolbar or select File | Open Configuration from the menu bar.
3. The Select IP Office window appears. After a few seconds it should list the control unit that is being setup. The default name used is the control units MAC address.
   - If the system required was not found, the address used for the search can be changed. Enter or select the required address in the Unit/Broadcast Address field and then click Refresh to perform a new search.
4. Click the check the box next to the system and then click OK.
5. The name and password request is displayed. The name must match a Manager operator and the password must match the IP Office control unit's system password. For a defaulted IP Office with pre-3.2 IP Office software enter *Administrator* and *password*.
6. The name and password used above are applicable to new control units which are supplied with a basic IP Office 2.1 level of software. Once upgraded to IP Office 3.2 the name and password required change.
7. Successful receiving of the configuration is shown by the full configuration tree being shown in the left-hand panel. With no configuration loaded the configuration tree shows just BOOTP and Operator.

9.5 Using Monitor

Monitor is a tool intended primarily for Avaya technicians and engineers. However it is also able to report the presence of hardware devices that are not reported by the IP Office Manager application and is therefore an important tool during the installation process. This process shows how System Monitor can be used to obtain information about the components installed with the IP Office control unit.

Objective

To introduce System Monitor so that it can be used during later stages of installation to confirm the correct installation of some components into the control unit.

Warnings

- Running Monitor can create a high network load on the IP Office system. Therefore it should only be used when necessary and should be closed when not needed.

Information Required

- ☐ System IP Address - For a new or defaulted system this will still be 192.168.42.1.
- ☐ System Password - For a new or defaulted system this is password.

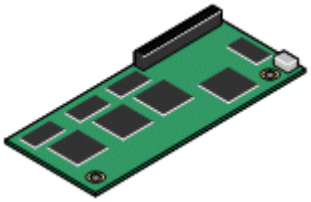
Procedure: Running Monitor

1. Select Start | Programs | IP Office | Monitor.
2. If Monitor has been run before it will attempt to connect will the system which is monitored previously. If you want to monitor a different system use the steps below.
3. Select File and then Select Unit.
4. Enter the IP Address and Password (see below) of the IP Office control unit you want to monitor.
   - For a new or defaulted control unit the IP address is 192.168.42.1 and the password is password.
   - Following installation, the IP Office control unit can be configured with a specific Monitor Password for Monitor access to an IP Office system. If the IP Office does not have a Monitor Password set, Monitor uses the IP Office's System Password.
5. For an IP Office system, ensure that IP Office is selected.
6. Click OK.
7. The first few lines give information about various aspects of the IP Office system. For example:

```
0ms PRN: Monitor Started IP=192.168.42.203 IP406 DS 3.2(8) IPOffice_1
1ms PRN: LAW=U PRI=0, BRI=0, ALOG=0, ADSL=0, VCOMP=16, MDM=0, WAN=0 MODU=0 LANM-0, CkSRC=0 VMAIL=1(VER=2 TYP
```

   - LAW = A or MU law system.
   - PRI = PRI channels
   - BRI = BRI channels.
   - ALOG = Analog Trunks
   - VCOMP = VCM channels.
   - MDM = Modem channels.
   - WAN = WAN Ports configured.
   - MODU = Number of external expansion modules.
   - LANM = Number of WAN3 Modules attached.
   - CkSRC = Current Clock Source (ISDN port number - 0 = Internal Clock Source)
   - VMAIL = 1 if connected, 0 if not connected.
   - VER = Version of the voicemail server if obtainable.
   - TYP = Type of Voicemail Server:
     0= None, 1 = PC (Voicemail Lite or Pro), 2 = Line, 3 = Embedded, 4 = Group, 5 = Audix.
   - CALLS = Number of current calls
   - TOT = Total number of calls made to date since last IP Office reboot.
8. Close Monitor until it is need again. When restarted, Monitor will attempt to reconnect using the last settings entered. Proceed to Fitting VCM Cards 194.

9.6 Fitting VCM Cards



VCM cards are used to provide voice compression channels for calls between IP and non-IP devices, devices being both trunks and extensions. VCM cards with differing numbers of voice compression channels are available.

Objective - To fit the card and confirm its presence after restarting the IP Office.

Warnings

- Correct anti-static protection steps should be taken before handling circuit boards.
- During this process power to the IP Office control unit must be switched off and disconnected.

Parts and Equipment Required

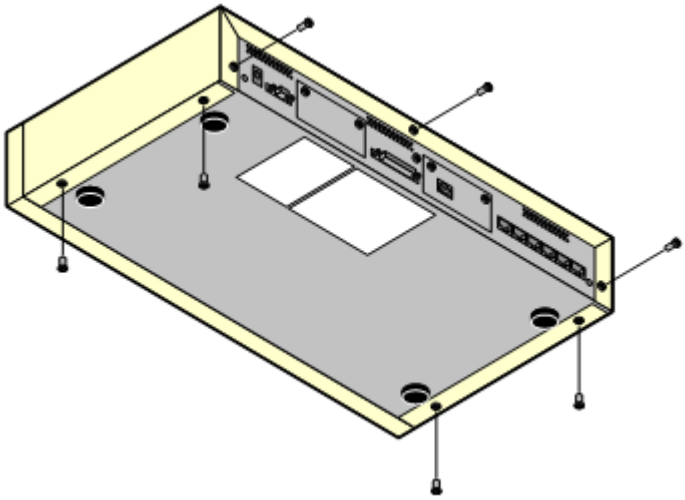
- ☐ VCM Card
  Check that the correct card has been supplied. The number and maximum capacity supported varies between different IP Office control units. All cards are supplied with 2 plastic snap-in stand off pillars.

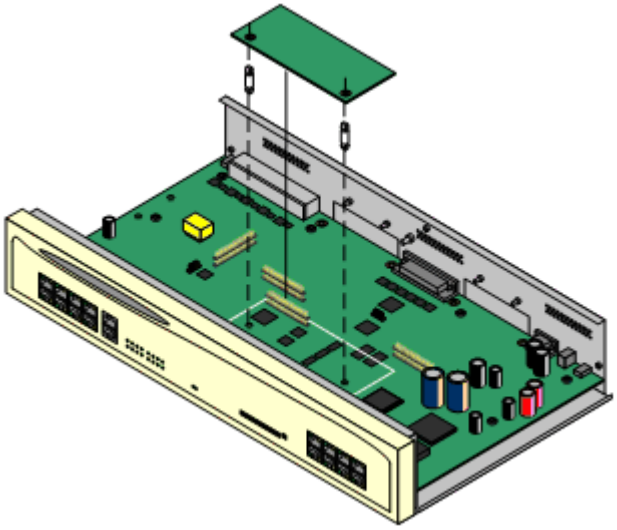
VCM Cards		SAP Code	IP406 V2	IP412
Voice Compression Modules (25ms echo cancellation)	VCM5	700185119	✓	✓
	VCM10	700185127	✓	✓
	VCM20	700185135	✓	✓
	VCM30	700293939	✓	✓
Voice Compression Modules (64ms echo cancellation)	VCM4	700359854	✓	✓
	VCM8	700359862	✓	✓
	VCM16	700359870	✓	✓
	VCM24	700359888	✓	✓
Number of VCM cards.			1	2
Maximum number of channels.			30	60

Tools Required.

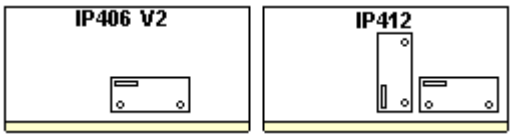
- ☐ Cross-head screwdriver.
- ☐ Anti-static wrist strap and ground point.
- ☐ IP Office Monitor application.

Procedure: Installing VCM Cards



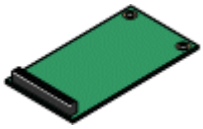


1. Check that correct card has been supplied.
2. Ensure that you are wearing an anti-static wrist strap connected to a suitable ground point.
3. Remove the 7 screws fixing the IP Office control unit cover and slide the cover off the control unit.
4. Locate the position for the card and its jumper block.
5. Using the card as a template locate the two holes in the control unit circuit board. Insert the stand off pillars into these holes. For the IP412 either slot can be used in any order.



6. Using minimal force and checking that the pins are correctly located, push the card onto the jumper block and stand off pillars.
7. If other cards are being fitted, proceed to 08. Fitting Modem Cards 196.
8. Slide the control unit cover back on and replace the cover screws.
9. Reapply power to the control unit and check that it restarts correctly.
10. Using the IP Office Monitor application, confirm that the correct number of voice compression channels are reported. They are shown by the value VCOMP= at the start of the Monitor trace.

9.7 Fitting Modem Cards



Objective - To fit and verify the presence of a modem card.

Warnings

- Correct anti-static protection steps should be taken before handling circuit boards.
- During this process power to the IP Office control unit must be switched off and disconnected.

Parts and Equipment Required

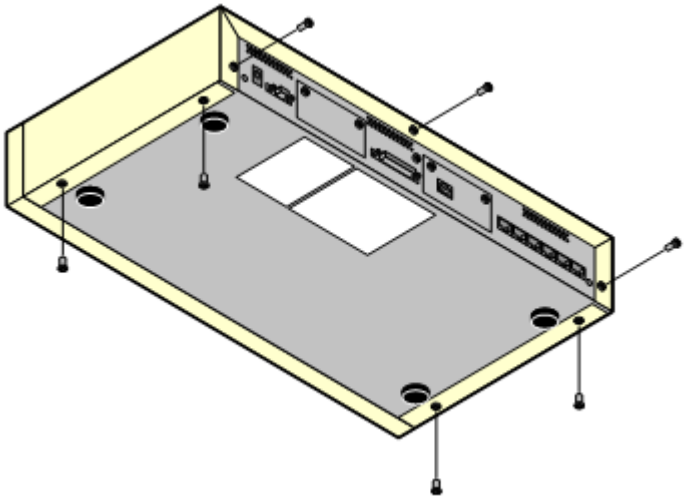
- ☐ Modem Card
  Check that the correct card has been supplied. The number and maximum capacity supported varies between different IP Office control units. All cards are supplied with 2 plastic snap-in stand off pillars.

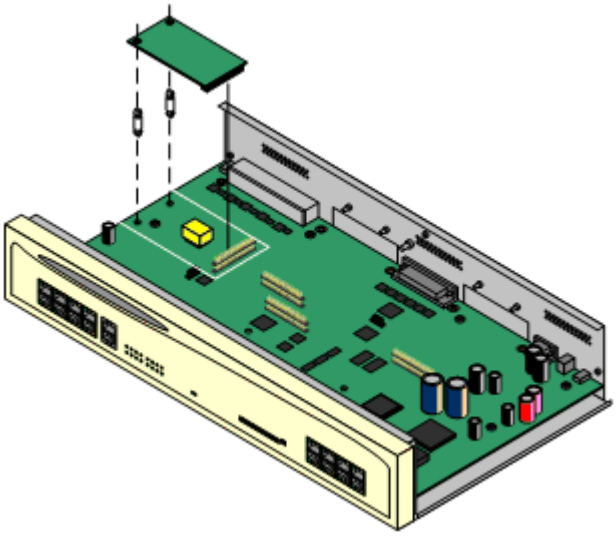
Modem Cards	SAP Code	IP406 V2	IP412
Internal Modem Card / Modem 12 265 Provides 12 V.90 modem channels.	700343452	✓	✓
Modem 2 Card 265 Provides 2 V.90 modem channels.	700185226	✓	✓

Tools Required

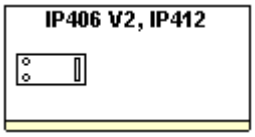
- ☐ Cross-head screwdriver.
- ☐ Anti-static wrist strap and ground point.
- ☐ IP Office Monitor application.

Procedure: Installing Modem Cards





1. Check that correct card has been supplied.
2. Ensure that you are wearing a anti-static wrist strap connected to a suitable ground point.
3. Remove the 7 screws fixing the IP Office control unit cover and slide the cover off the unit.
4. Locate the position for the card and its jumper block.
5. Using the card as a template locate the two holes in the control unit circuit board. Insert the stand off pillars into these holes.



6. Using minimal force and checking that the pins are correctly located, push the card onto the jumper block and stand off pillars.
7. If other cards are being fitted, proceed to Fitting Trunk Cards 198.
8. Slide the control unit cover back on and replace the cover screws.
9. Reapply power to the control unit and check that it restarts correctly.
10. Using the IP Office Monitor application, confirm that the correct number of modem channels are now reported. They are shown by the value MDM= when Monitor first connects to the control unit.

9.8 Fitting Trunk Cards

All trunk cards are supplied with 2 plastic snap-in stand off pillars and a blanking plate appropriate to the cards ports. E1R2 coaxial trunk cards include additional grounding strap, screws and bolts.

Warnings

- Correct anti-static protection steps should be taken before handling circuit boards.
- During this process power to the IP Office control unit must be switched off and disconnected.

Parts and Equipment Required

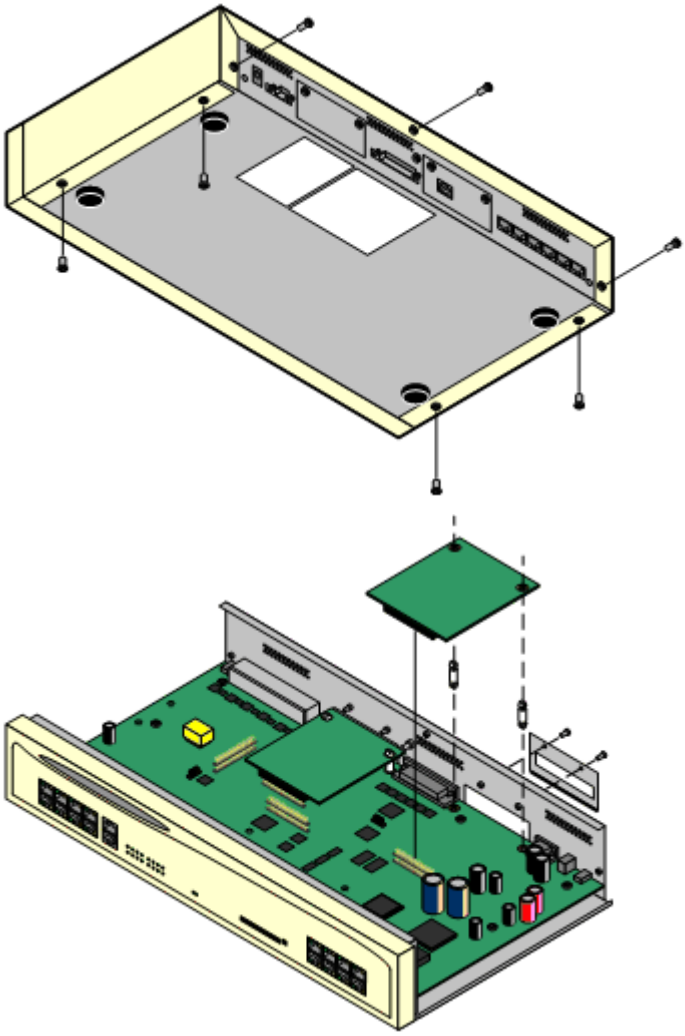
- ☐ Trunk Card or Cards
  Check that the correct card has been supplied. The number and maximum capacity supported varies between different IP Office control units. All cards are supplied with 2 plastic snap-in stand off pillars.

IP400 Trunk Cards	IP406 V2	IP412
Analog Trunk Card (ATM4) 262	✓	✓
Analog Trunk Card (ATM4U) 261	✓	✓
Quad BRI Trunk Card 262	✓	✓
Single PRI T1 Trunk Cards 263	✓	✓
Single E1 PRI Trunk Cards 263	✓	✓
Single E1R2 Trunk Cards 264	✓	✓
Dual PRI Trunk Cards 263	✓	✓

Tools Required

- ☐ Cross-head screwdriver.
- ☐ Anti-static wrist strap and ground point.
- ☐ IP Office Monitor application.

Procedure: Fitting Trunk Cards



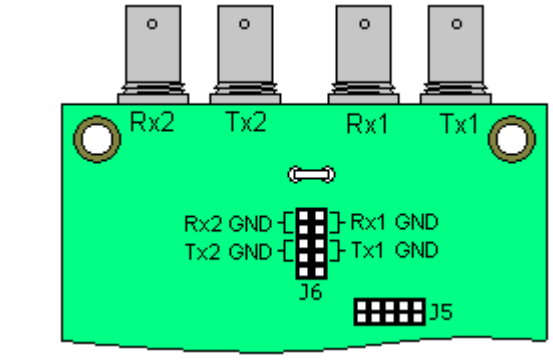
1. Check that correct card has been supplied. Dual PRI cards are only supported in Slot A of the IP406 V2 control unit or both slots on an IP412 control unit.
2. Ensure that you are wearing a ground wrist strap connected to a suitable ground point.
3. Remove the 7 screws fixing the IP Office control unit cover and slide the cover off the unit.
4. Remove the 2 screws fixing the slot blanking plate.
5. Attach the replacement blanking plate.
6. Using the card as a template locate the two holes in the control unit circuit board. Insert the stand off pillars into these holes.
   - Except where otherwise indicated, it is recommended that Slot B is used first.
   - The IP406 V2 only supports dual PRI cards in Slot A.
7. Using minimal force and checking that the pins are correctly located, push the card onto the jumper block and stand off pillars.
   - Coaxial E1R2 Trunk Cards Only:
     For these trunk cards care must be taken to ground the connectors. See the following section for details. This must be completed before proceeding any further.
8. Reapply power to the control unit and check that it restarts correctly.
9. Using IP Office Manager, receive the IP Office configuration and check that the lines are now shown.
10. If Modem and VCM cards were also fitted whilst the control unit was open, use Monitor to check that the VCOMP and MDM values match the cards fitted.
11. Proceed to Adding Expansion Modules 203.

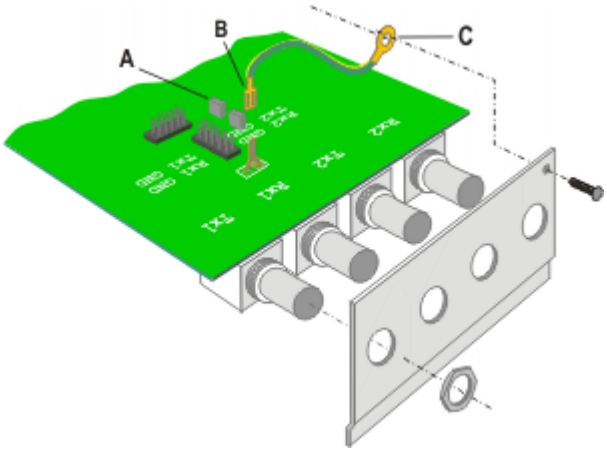
Grounding E1R2 Coaxial Connections

E1R2 coaxial trunk cards must be grounded correctly and require the IP Office control unit to be connected to a protective ground.

Normally the ends of one connection is grounded. For example, if the exchange Tx1 is grounded, the IP Office Rx1 should also be grounded. However this must be confirmed with the line provider to establish which ends they want grounded.

Procedure





1. Use the two jumpers supplied with the card, match the ground selection of the line provider. For example, if the line provider wants the IP Office Rx1 grounded, place a jumper across the two Rx1 pins of jumper block J6.
2. Connect the ground strap spade end (B) to the spade connection on the board.
3. Connect the other end of the ground strap (C) to the blanking plate using the long securing screw supplied with the card.
4. Ensure that the coaxial connector ports are locked to the blanking plate using the nuts provided.
5. Continue with trunk card installation as in Stage 9a.

9.9 Rack Mounting

All IP Office control units and expansion modules can be rack mounted. To do this requires a separate rack mounting kit for each unit and module.

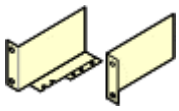
Installation Requirements

In addition to the existing environmental requirements 56 for an IP Office system, the following additional factors must be considered when rack mounting a unit:

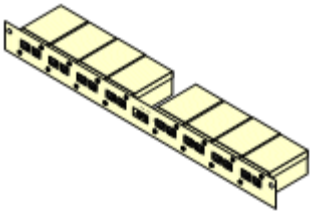
- Rack Positioning
  Ensure compliance with the rack manufacturers safety instructions. For example check that the rack legs have been lowered and fixing brackets have been used to stop toppling.
- Elevated Operating Ambient
  If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.
- Reduced Air Flow
  Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised. Proper ventilation must be maintained. The side ventilation slots on the IP500 control unit should not be covered or blocked.
- Mechanical Loading
  Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- Circuit Overloading
  Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- Reliable Earthing
  Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

Parts and Equipment Required

- Rack Mounting Kit *(SAP 700210800)*
  This kit contains all the components required for the rack mounting of a single control unit or expansion module. This includes screws for fixing of the brackets to the module and bolts for securing the module in the rack.

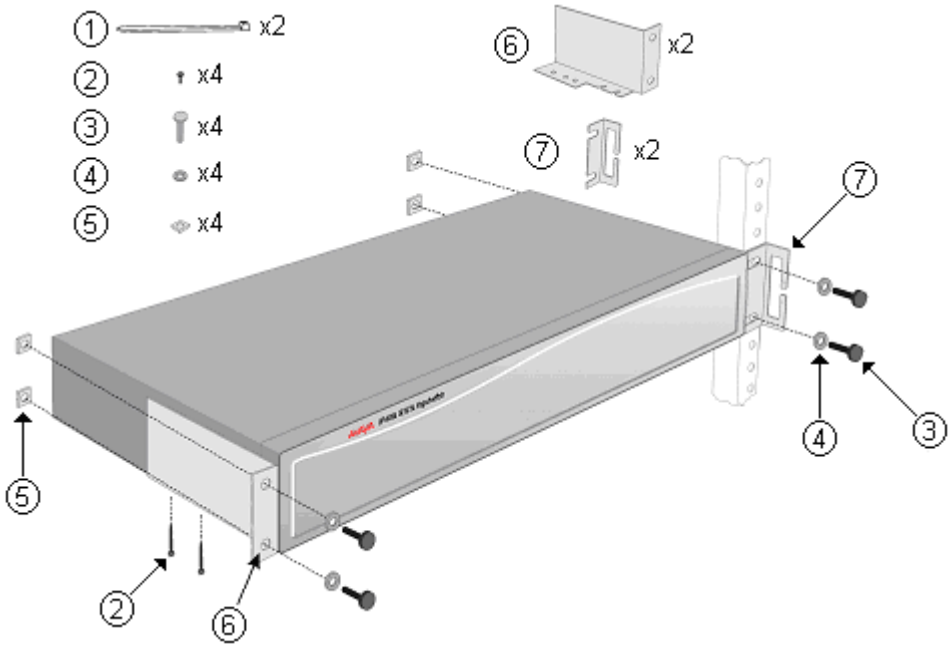


- Barrier Box Rack Mounting Kit *(SAP 700293905)*
  Barrier boxes must be used for out-of-building analog phone extensions 38. This bracket allows up to 8 IP Office barrier boxes to be rack mounted and simplifies the number of connections to the protective ground point in the rack.
  - Must be used when more than 3 Barrier Boxes are in use.
  - A maximum of 16 Barrier Boxes are supported on any module.



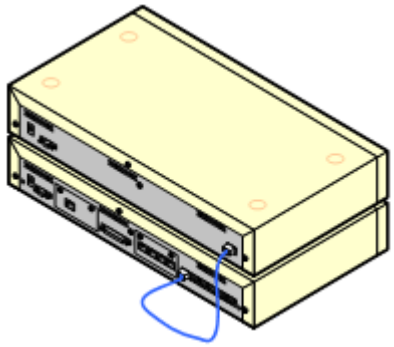
Procedure: Rack Mounting

1. Using the small screws (2), fix the main brackets (6) to the module.



2. Using the nut (5), bolt (3) and washer (4) provided, loosely fit the module into the rack system in its intended position.
3. If required, add the cable guide brackets (7) before finally tightening the nuts and bolts.
4. If required, connect the module ground points to the rack ground point. This should be done using 14AWG solid wire with either a green sleeve (functional ground) or green and yellow sleeve (protective ground).
5. Continue installation and setup as normal.

9.10 Adding Expansion Modules



External expansion modules, except the WAN3, connect to the IP Office control unit using a blue 1 meter (3'3'') expansion interconnect cable.

- Note
  Expansion modules are only detected by the IP Office control unit, if the Expansion modules are powered up and running before the control unit is started. The control unit power on process includes a delay to ensure that if all modules in a system are started at the same time, the expansion modules should complete their power up before the control unit.

Each module is supplied with an expansion connect cable and a power supply unit 32. An appropriate locale specific power cord 33 for the power supply unit, and cables 35 for the ports on the front of the module must be ordered separately.

Warnings

- No cable other than an Expansion Interconnect cable should be used. Use of any alternate cable will lead to system failure.

Installation Requirements

- ☐ Installation space either on or under the existing IP Office control unit.
- ☐ Switched power outlet socket.
- ☐ Free EXPANSION port on the rear of the control unit.
- ☐ Grounding Requirements
  - ☐ Functional Grounding
    Connection of a functional ground 207 is:
    - ☐ Recommend for all modules.
    - ☐ Connection of a functional ground is mandatory for Analog Trunk module.
  - ☐ Protective Grounding
    Connections of a protective ground via surge protection equipment 38 is:
    - ☐ Mandatory for Analog trunk modules in the Republic of South Africa.
    - ☐ Mandatory for Digital Station and Phone modules connected to out of building extensions.
    - ☐ Mandatory for Digital Station V2 and Phone V2 modules.

Tools Required

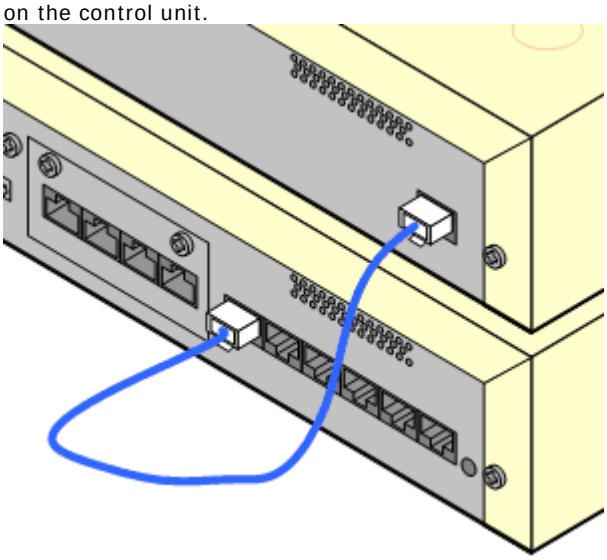
- ☐ Manager PC.
- ☐ Tools for rack mounting 201 (optional).

Parts and Equipment Required

- ☐ External Expansion Module.
  Each module is supplied with a suitable external power supply unit and a RJ45-RJ45 expansion interconnect cable.
- ☐ Power cord for the power supply unit 33.
- ☐ Rack mounting kit 39 (optional).
- ☐ Cable labeling tags.

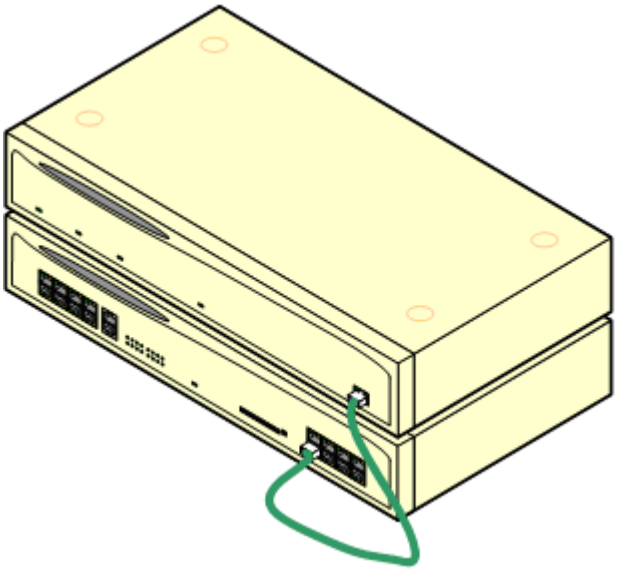
Procedure

1. Switch off power to the IP Office control unit.
2. Attach the external expansion module's power supply.
3. Connect the blue expansion interconnect cable from the module's EXPANSION port to the first free EXPANSION port on the control unit.



4. Make careful note of the port used and include this detail on the cable label and any other system records.
5. Switch on power to the module. Wait for the center LED on the front of the module to change from red to green.
6. Switch on power to the control unit.
7. Once the control unit has rebooted, using Manager receive the system configuration.
8. Click on Unit in the left-hand panel.
9. Check that the list of units shown in the right-hand panel is correct.
10. Proceed to Adding a WAN3 Module 205.

9.11 Adding a WAN3 Module



WAN3 expansion modules connect to the IP Office control unit using a LAN cable. It is preferred that the cable is connected directly to the IP Office control unit rather than via any other equipment. A green 1 meter (3'3'') LAN interconnect cable is supplied with the module for this purpose though a replacement cross-over cable is required if connecting to an IP412 control unit.

The WAN3 module requires its own IP address on the same subnet as the IP Office control unit. A WAN3 module obtains that address using DHCP so a DHCP server is required for installation.

This module is supplied with a LAN interconnect cable and a power supply unit 32. An appropriate locale specific power cord 33 for the power supply unit, and cables 386 for the WAN ports on the rear of the module must be ordered separately.

Installation Requirements

- ☐ Installation space either on or under the existing IP Office control unit.
- ☐ Switched power outlet socket.
- ☐ System password.
- ☐ Free LAN port on the front of the control unit.
- ☐ Grounding Requirements
  - ☐ Functional Ground - Connection of a functional ground 207 is recommend for all modules.

Tools Required

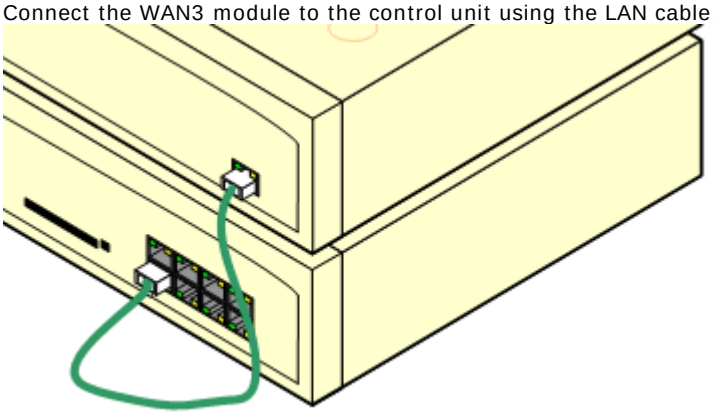
- ☐ Manager PC.
- ☐ DHCP server (preferably the IP Office itself).
- ☐ Tools for rack mounting (optional).

Parts and Equipment Required

- ☐ WAN3 10/100 Module
  Each module is supplied with a suitable external power supply unit and a RJ45-RJ45 LAN interconnect cable.
- ☐ For the IP412 control unit an RJ45-RJ45 LAN crossover cable is required.
- ☐ WAN Cables
  A V.24, V.35 or X.21 WAN cable is required for connection to each WAN port. The cable used determines the signalling provided by that port.
- ☐ Power cord for the power supply unit 33.
- ☐ Rack mounting kit (optional) 39.
- ☐ Cable labeling tags.

Procedure: Adding a WAN3 Module

1. Switch off power to the IP Office control unit.
2. Connect the WAN3 module to the control unit using the LAN cable.



3. Switch on power to the WAN3 10/100 module.
4. Switch on power to the IP Office Control Unit.
5. Using IP Office Manager receive the configuration from the IP Office system.
6. Select Control Unit. If the WAN3 10/100 module is not listed, right-click and select New. A Select WAN unit window appears which will allows the network to be scanned for the WAN3 unit.
7. When the unit is located, select it and then OK.
8. Send the configuration back to the IP Office system.

9.12 Grounding

Use of ground connections reduces the likelihood of problems in most telephony and data systems. This is especially important in buildings where multiple items of equipment are interconnected using long cable runs, for example phone and data networks.

All IP Office control units and external expansion modules must be connected to a functional ground. In some cases, such as ground start trunks, in addition to being a protective measure this is a functional requirement for the equipment to operate. In other cases it may be a locale regulatory requirement and or a necessary protective step, for example areas of high lightning risk.

- ⚠ WARNING
  During installation do not assume that ground points are correctly connected to ground. Test ground points before relying on them to ground connected equipment.

The ground point on IP Office control units and external expansion modules are marked with a ⏚ or ⏚ symbol. Ground 207 connections to these points should use a 14 AWG solid wire with either a green sleeve for a functional ground or green and yellow sleeve for a protective ground.

- Additional protective equipment
  In addition to grounding, additional protective equipment will be required in the following situations. Refer to "Out of Building Telephone Installations 38".
  - On any Digital Station or Phones external expansion module connected to an extension located in another building.
  - In the Republic of South Africa, on all Analog Trunk external expansion modules (ATM16) and on any control units containing an analog trunk cards (ATM4/ATM4U).

Tools Required

- ☐ M4 Cross-Head Screwdriver.
- ☐ Tools suitable for crimping a cable spade.

Parts and Equipment Required

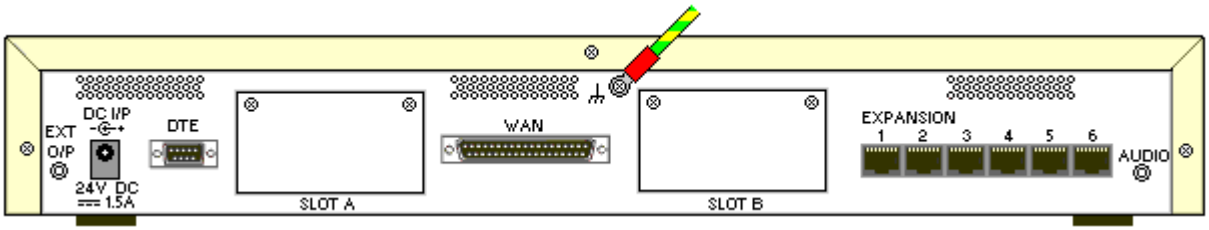
- ☐ 14AWG Solid copper wire for ground connection.
- ☐ Cable sleeve matching local regulator requirements. Typically green for a functional ground and green/yellow for a protective ground.

Procedure

The ground point on IP Office control units and expansion modules are marked with a ⏚ or ⏚ symbol. Ground 207 connections to these points should use a 14 AWG solid wire with either a green sleeve for a functional ground or green and yellow sleeve for a protective ground.

IP400 Control Units

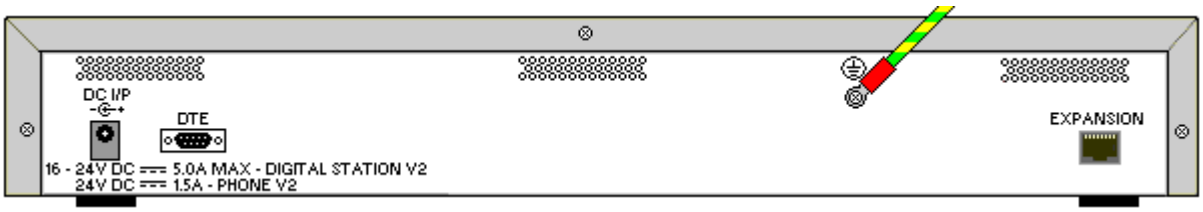
On IP406 V2 and IP412 control units, the ground point is a 4mm screw located adjacent to trunk card Slot B.



- On some older units, the dedicated ground point screw is not present. In those cases, the left-hand 3mm fixing screw on the Slot B blanking plate can be used as an alternate ground connection point. A toothed washer should be added to ensure good contact.

Expansion Modules

On expansion modules, the ground point is a 4mm screw located towards the right on the rear of the module.



- On some older modules, the dedicated ground point screw is not present. In those cases, the top-center cover fixing screw (3mm) can be used as an alternative ground connection point. A toothed washer should be added to ensure good contact.

Chapter 10.
System Components

10. System Components

This section covers the individual components that comprise an IP Office installation.

10.1 Control Units

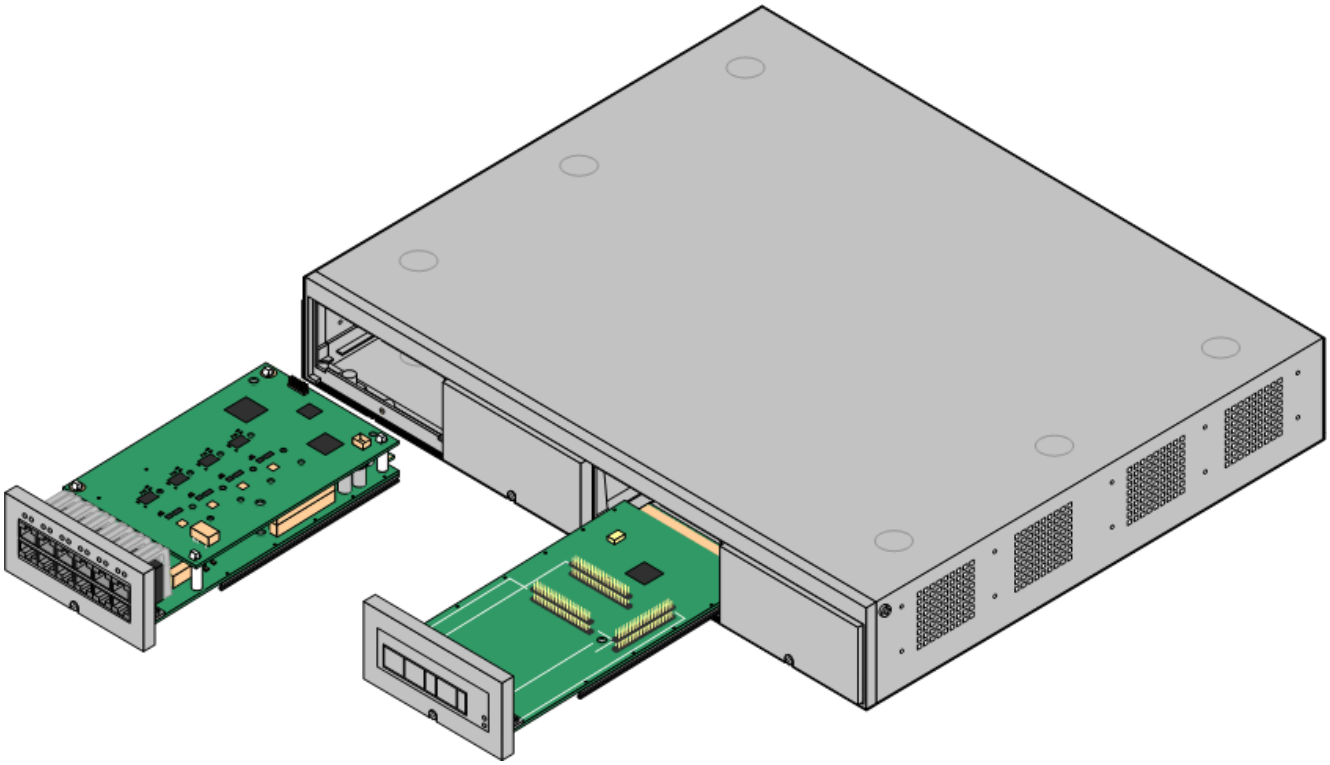
The following table summarizes the capacities of the IP Office control units supported by IP Office Release 6 software.

Feature	IP400		IP500		IP500v2		
	IP406 V2	IP412	IP500	+4-Port Exp Card	IP500v2	+4-Port Exp Card	Partner Version
Control Unit Digital Station Ports	8	0	Up to 24	Up to 24	Up to 30	Up to 24	Up to 30
Control Unit Analog Phone Ports	2	0	Up to 32	Up to 24	Up to 32	Up to 24	Up to 26
Control Unit ETR Phone Ports	-	-	-	-	-	-	18
Embedded Voicemail Card Slot	✓	-	✓	✓	✓	✓	✓
Integral WAN Port	✓	✓	-	-	-	-	-
External Expansion Ports	6	12	8	12	8	12	1
Audio In (MOH) Port	✓	✓	✓	✓	✓	✓	✓
External O/P Switch Port	✓	✓	✓	✓	✓	✓	✓
Conference Parties	64	128	128	128	128	128	128
Voicemail Pro/TAPI WAV Channels	20	30	40	40	40	40	-
Maximum Extension Capacity	190	360	384	384	384	384	48
Digital Phones only.	188	360	264	384	270	384	46
Analog Phones only.	182	360	272	384	272	384	42
ETR Phones only.	-	-	-	-	-	-	18
IP Phones only.	190	360	384	384	384	384	-
IP400 Trunk Cards Supported	2	2	2	2	2	2	-
Analog trunk cards	✓	✓	✓	✓	✓	✓	-
Quad BRI trunk cards	✓	✓	✓	✓	✓	✓	-
Single PRI trunk cards	✓	✓	✓	✓	✓	✓	-
Dual PRI trunks cards	✓ (Slot A)	✓	✓	✓	✓	✓	-
IP500 Trunk Daughter Cards	0	0	4	3	4	3	
IP500 Analog trunks	-	-	✓ 16	✓ 12	✓ 16	✓ 12	✓ 12
IP500 BRI trunk channels	-	-	✓ 32	✓ 24	✓ 32	✓ 24	-
IP500 PRI trunk channels	-	-	✓ 240	✓ 180	✓ 240	✓ 180	✓ 24
VCM Cards							
IP400 VCM Cards	1	2	2	2	2	2	-
IP500 VCM Cards	-	-	2	2	2	2	2[1]
Maximum voice compression channels	30	60	128	128	148	138	
Dimensions							
Height x Width x Depth	71x445x245mm 2.8"x17.5"x9.7"		73x445x365mm 2.9"x17.5"x14.4"		73x445x365mm 2.9"x17.5"x14.4"		

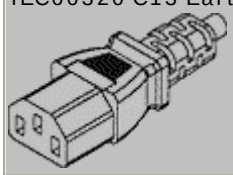
1. IP500v2 in Partner Version mode only supports VCM channels provided by fitting IP500 Combination cards.

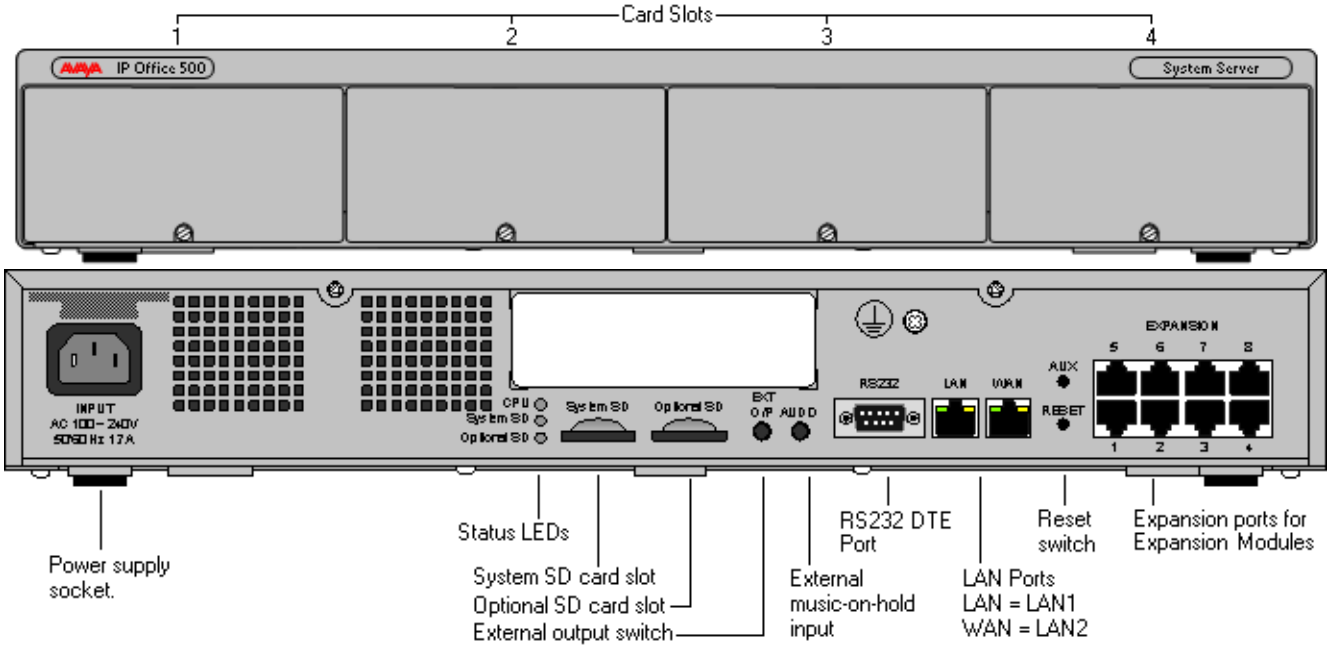
10.1.1 IP500v2

The slots are numbered 1 to 4 from left to right. They can be used in any order. However if the capacity for a particular type of card is exceeded, the card in the rightmost slot will be disabled. The unit must not be used with uncovered slots.



Feature	Capacity
Maximum Extensions	Up to 384 extensions. 48 in Partner Version 52 mode.
Conference Parties	128 as standard but maximum 64 in any individual conference. Silence suppression is applied to conferences with more than 10 parties.
Trunks Cards	4. Any combination of IP500 trunk daughter cards and up to 2 IP400 trunk cards.
VCM Card Slots	4. Up to a maximum of 128 channels using 2 IP500 VCM cards and or 2 IP400 VCM cards.
Voicemail Channels	Maximum 40 usable for Voicemail Pro/TAPI WAV connection sessions subject to available licenses.
Locales	Supported in all IP Office locales.
Software Level	• IP Office core software level 6.0 minimum. Bin file = ip500v2.bin.
Power Supply	Internal power supply unit.
Mounting	Free-standing, rack mounted (requires IP500 Rack Mounting Kit) or wall mounted (requires IP500 Wall Mounting Kit).
Dimensions	Width: 445mm/17.5". Depth: 365mm/14.4". Height: 73mm/2.9"/2U. Clearance: 90mm minimum all sides, 220m at front. 500mm all side when wall mounted.
Memory	Maximum configuration file size: 2048KB.

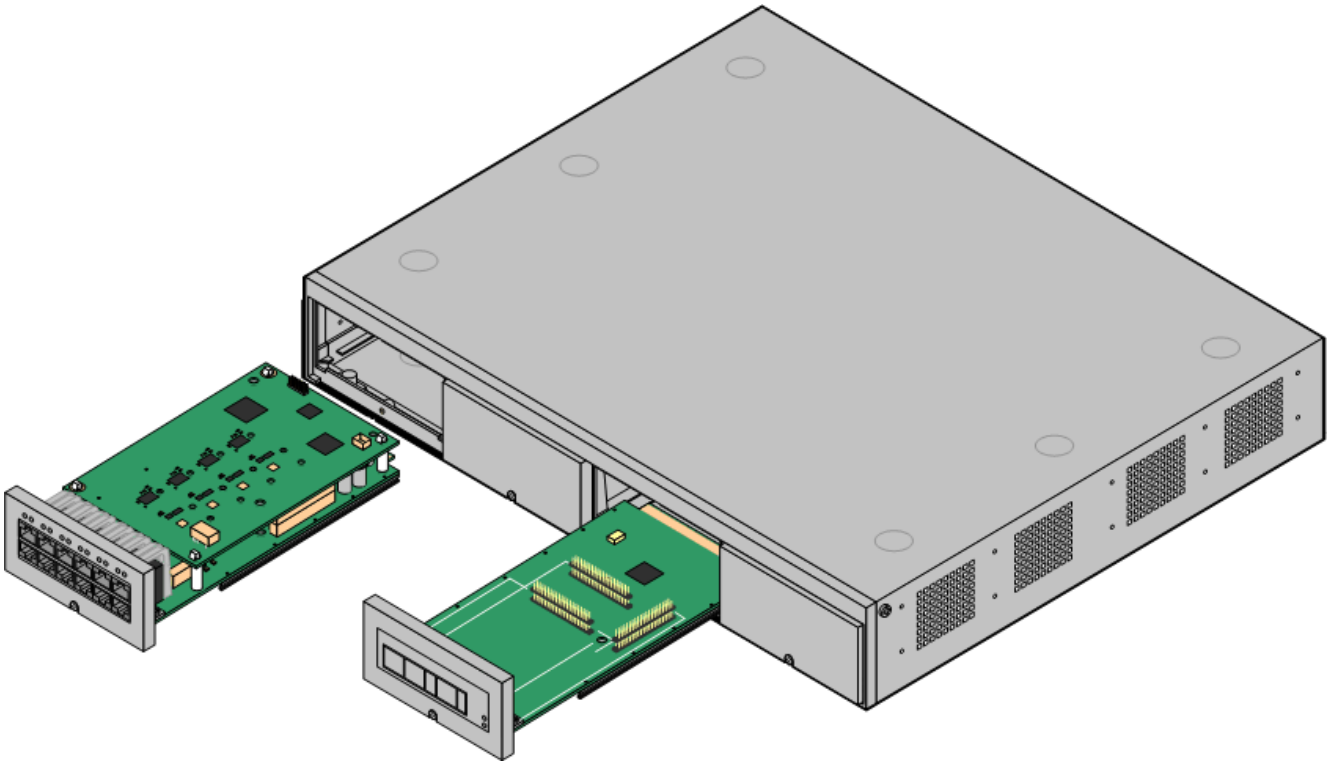
Name	Description	Country	SAP Code
IPO 500 V2 Base Unit	IP Office 500 V2 Base Unit		700476005
Avaya SD Memory Card	IPO System SD Card A-Law		700479702
	IPO System SD Card Mu-Law		700479710
	IPO System SD Card Partner		700479728
IEC60320 C13 Earthed Power Cord 	CEE7/7	Europe	700289762
	BS1363	United Kingdom	700289747
	NEMA5-15P	America	700289770
IP500 Rack Mounting Kit	IP500 Rack Mounting Kit		700429202
IP500 Wall Mounting Kit	IP500 Wall Mounting Kit		700430150
IP500 Blanking Plate Kit	IP500 Blanking Plate Kit		700429194



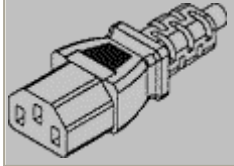
Ports	Description
AUDIO 376	3.5mm Stereo jack socket. Used for external music on hold source input.
AUX 147	If pressed during a restart of the control unit, the control unit skip booting 147 from the */primary* folder on the System SD card. If pressed for more than 5 seconds when a system is running, the control unit will shutdown 109 for 10 minutes.
CPU	Indicates the status of the control unit. • Alternate red/green = Starting up. • Green on = Okay. • Red on = No software. • Flashing Red = Error/Shutdown.
EXPANSION 381	RJ45 socket. Used for direct connection to external expansion modules using the Expansion Interconnect cable supplied with the expansion module.
EXT O/P 127	3.5mm Stereo jack socket. Used for switching external relay systems such as door entry controls. The port contains two independent switches controlled by the IP Office.
INPUT 33	AC power input port.
LAN 382	RJ45 socket. With the WAN port forms a managed layer 3 Ethernet switch. The ports are full-duplex 10/100Mbps auto-sensing, MDI crossover ports.
Optional SD 144	Used for the Optional SD card. The LED is used in the same way as for the System SD *(see below)*.
RESET 141	This switch is used to restart the IP Office, optionally erasing the configuration and or the core software in the process. See Reset Button 141.
RS232 135	9-Way D-Type socket. Used for system maintenance.
System SD 144	Used for the System SD card,. The LED is used as follows. • Off = Card shutdown 159. • Green on = Card present. • Green flashing = Card in use. • Orange steady = Reset imminent. • Red flashing = Card initializing or shutting down. • Red fast flashing = card full • Red steady = Card failure/wrong type.
WAN 382	RJ45 socket. With the LAN port forms a managed layer 3 Ethernet switch. The ports are full-duplex 10/100Mbps auto-sensing, MDI crossover ports.
⏚	Used for connection of a function or protective ground 207. Use of a ground for all systems is recommended and for some locales may be a regulatory requirement.

10.1.2 IP500

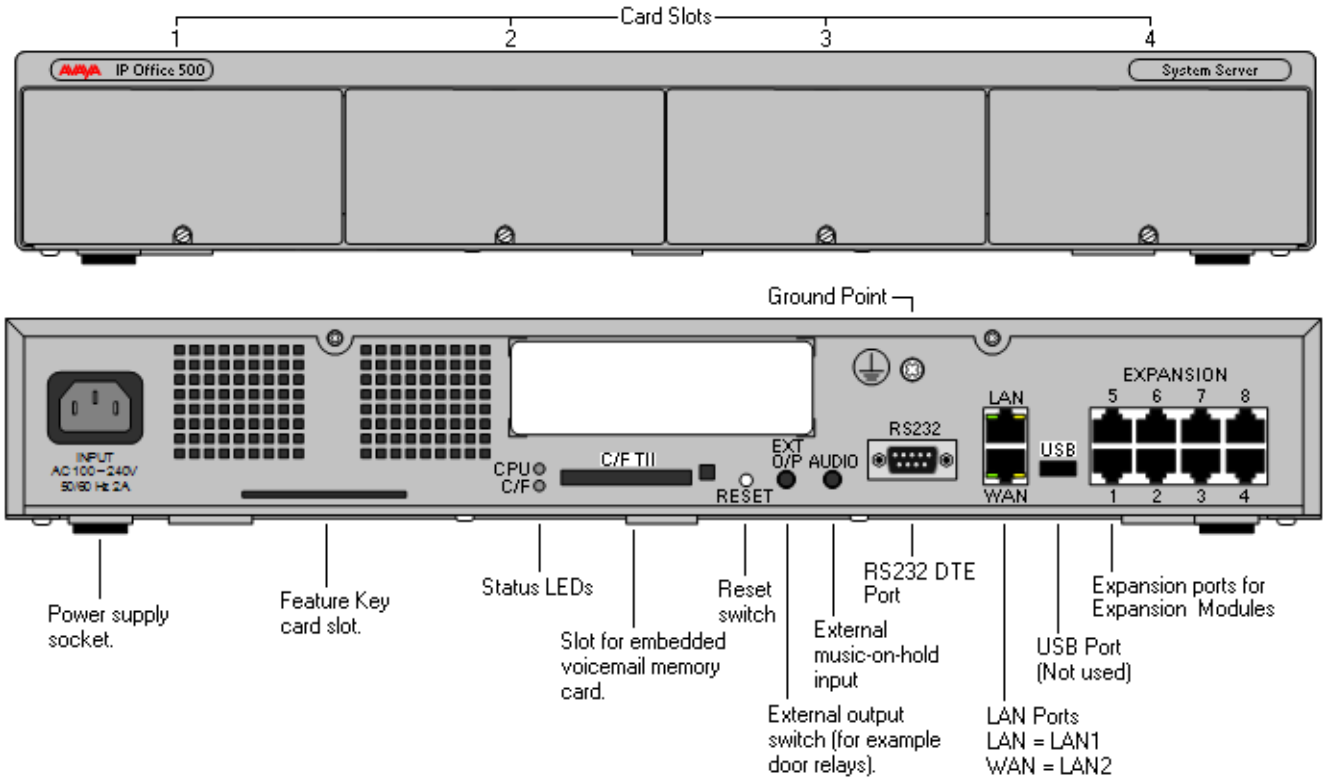
The slots are numbered 1 to 4 from left to right. They can be used in any order. However if the capacity for a particular type of card is exceeded, the card in the rightmost slot will be disabled. The unit must not be used with uncovered slots.



Feature	Capacity
Maximum Extensions	Up to 384 extensions.
Conference Parties	128 as standard but maximum 64 in any individual conference. Silence suppression is applied to conferences with more than 10 parties.
Trunks Cards	4. Any combination of IP500 trunk daughter cards and up to 2 IP400 trunk cards.
VCM Card Slots	4. Up to a maximum of 128 channels using 2 IP500 VCM cards and or 2 IP400 VCM cards.
Voicemail Channels	Maximum 40 usable for Voicemail Pro/TAPI WAV connection sessions subject to available licenses (maximum 30 pre-IP Office 5.0).
Locales	Supported in all IP Office locales.
Software Level	• IP Office core software level 4.0 minimum. • Bin file = ip500.bin.
Power Supply	Internal power supply unit.
Mounting	Free-standing, rack mounted (requires IP500 Rack Mounting Kit) or wall mounted (requires IP500 Wall Mounting Kit).
Dimensions	Width: 445mm/17.5". Depth: 365mm/14.4". Height: 73mm/2.9"/2U. Clearance: 90mm minimum all sides, 220m at front. 500mm all side when wall mounted.
Memory	Maximum configuration file size: 1024KB.

Name	Description	Country	SAP Code
IPO 500 Base Unit	IP Office 500 Base Unit		700417207
Smart Card Feature Key	Smart Card Feature Key (MU-Law)		700417470
	Smart Card feature Key (A-Law)		700417488
IEC60320 C13 Earthed Power Cord 	CEE7/7	Europe	700289762
	BS1363	United Kingdom	700289747
	NEMA5-15P	America	700289770
IP500 Rack Mounting Kit	IP500 Rack Mounting Kit		700429202
IP500 Wall Mounting Kit	IP500 Wall Mounting Kit		700430150

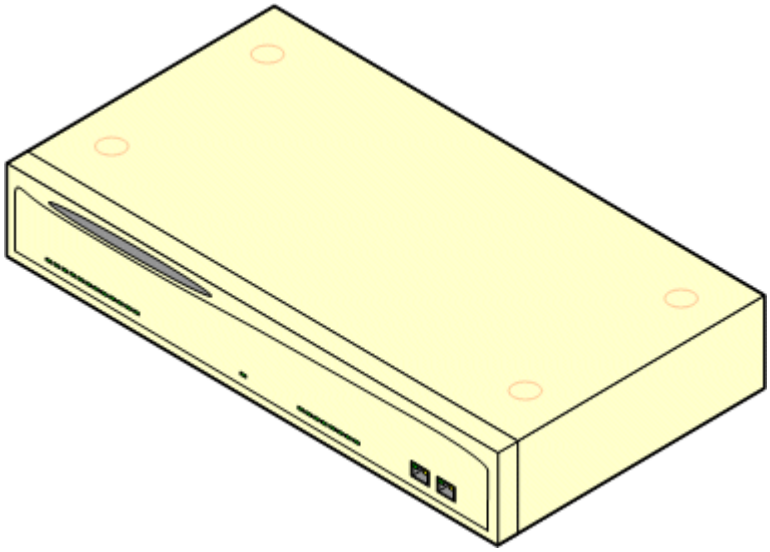
IP500 Blanking Plate Kit	IP500 Blanking Plate Kit	700429194



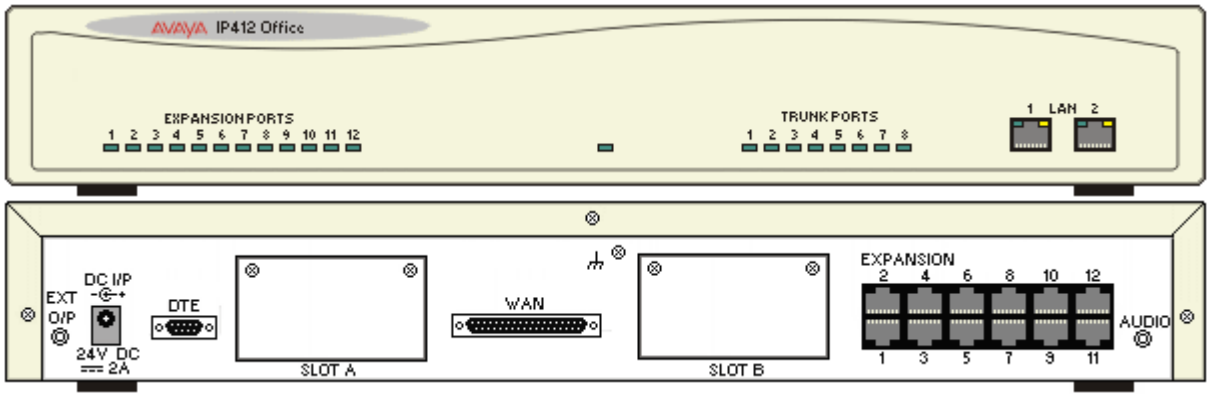
Ports	Description
AUDIO 376	3.5mm Stereo jack socket. Used for external music on hold source input.
CPU	• Alternate red/green = Starting up. • Green on = Okay. • Red on = No software. • Flashing Red = Error/Shutdown.
C/F	• Off = Card shutdown 159. • Green on = Card present. • Green flashing = Card in use. • Orange steady = Reset imminent. • Red flashing = Card initializing or shutting down. • Red fast flashing = card full • Red steady = Card failure/wrong type.
C/F TII	Used to house the optional embedded voicemail card.
EXPANSION 381	RJ45 socket. Used for direct connection to external expansion modules using the Expansion Interconnect cable supplied with the expansion module.
EXT O/P 127	3.5mm Stereo jack socket. Used for switching external relay systems such as door entry controls. The port contains two independent switches controlled by the IP Office.
INPUT	AC power input port.
LAN 382	RJ45 socket. With the WAN port forms a managed layer 3 Ethernet switch. The ports are full-duplex 10/100Mbps auto-sensing, MDI crossover ports.
RESET 141	This switch is used to restart the IP Office, optionally erasing the configuration and or the core software in the process. See Reset Button 141.
RS232 135	9-Way D-Type socket. Used for system maintenance.
USB	Not used.
WAN 382	RJ45 socket. With the LAN port forms a managed layer 3 Ethernet switch. The ports are full-duplex 10/100Mbps auto-sensing, MDI crossover ports.
⏚	Used for connection of a function or protective ground 207. Use of a ground for all systems is recommended and for some locales may be a regulatory requirement.

10.1.3 IP412

The IP412 control unit supports up to 12 Expansion modules. Its LAN ports act as a managed layer 3 Ethernet switch with optional internal firewall for traffic between the two ports.

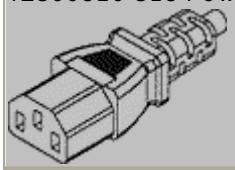


Feature	Capacity
Maximum Extensions	360 of various types in combination. Analog only: 360. DS only: 360. IP only: 360.
Conference Parties	128 (2 banks of 64. Conferences cannot combine resources from both banks. When a conference is started, the bank with the most free resource is used).
Trunks Cards	2 Trunk card slots. All types supported.
VCM Card Slots	2 up to maximum voice compression channels capacity of 60 channels.
Voicemail Channels	30 usable for Voicemail Pro/TAPI WAV connection sessions (subject to available licenses).
Locales	Supported in all IP Office locales.
Software Level	• IP Office core software level 1.3 minimum. • Bin file = ip412.bin.
Power Supply	The unit is supplied with an earthed 3-Pin, 60W external power supply unit. The PSU has an integral power cord for connection to the unit's DC I/P socket. A locale specific IEC60320 C13 power cord 32 for the external PSU is required but is not supplied with the unit. • Older units were supplied with a 2-Pin, 40W external power supply unit which used a locale specific locale specific IEC60320 C7 power cord 32 not supplied with the unit.
Mounting	The unit is designed as a free-standing module that can be stacked on or under other IP Office modules. The unit can be rack mounted in a 19" rack system using the optional IP400 Rack Mounting Kit 201.
Dimensions	Width: 445mm/17.5". Depth: 245mm/9.7". Height: 71mm/2.8"/2U.
Weight	Unboxed: 3.0Kg/6.7lbs. Boxed: 4.3Kg/9.6lbs.
Memory	Maximum configuration file size: 1024KB.



Ports	Description
AUDIO 376	3.5mm Stereo jack socket. Used for external music on hold source input.
DC I/P 379	DC power input port. Used for connection of the power lead from an Avaya earthed 60W external power supply unit supplied with the control unit.
DTE 135	9-Way D-Type socket. Used for system maintenance. Suitable for direct connection of IP Office Serial Port Feature Key dongle.
EXPANSION 381	RJ45 socket. Used for direct connection to external expansion modules using the Expansion Interconnect cable supplied with the expansion module.
EXT O/P 127	3.5mm Stereo jack socket. Used for switching external relay systems such as door entry controls. The port contains two independent switches controlled by the IP Office.
LAN 382	RJ45 socket. These ports form a managed layer 3 Ethernet switch. The ports are half-duplex 10/100Mbps auto-sensing, MDI crossover ports.
SLOT A SLOT B	Used for trunk cards of all types except WAN port trunk card. Normally Slot B should be used first. Trunks cards are supplied with replacement external blanking plates suitable for the trunk card port connections.
WAN 386	37-Way D-Type socket. Used for the connection of V.24, V.35 or X.21 WAN service.
⏚	Used for connection of a function or protective ground 207. Use of a ground for all systems is recommended and for some locales may be a regulatory requirement. On older modules where this screw is not present, the left-hand fixing screw of Slot B can be used.

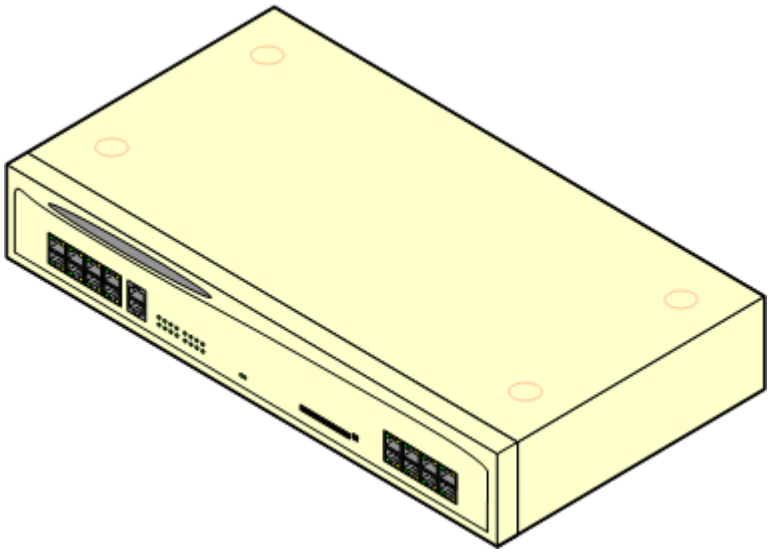
All control units are available in either North America or Rest of World variants. The choice controls various default settings of the unit. For E911 support a North American variant control unit must be used. The companding can be changed once a unit is installed. Control units are supplied with an external power supply unit but not a locale specific power cord.

Item	Variant	Country	SAP Code
IP412 Office	A-Law	Rest of World	700234479
	U-Law	North America	700350408
IEC60320 C13 Power Cord 	CEE7/7	Europe	700289762
	BS1363	United Kingdom	700289747
	NEMA5-15P	America	700289770
IP400 Rack Mounting Kit		All	700210800

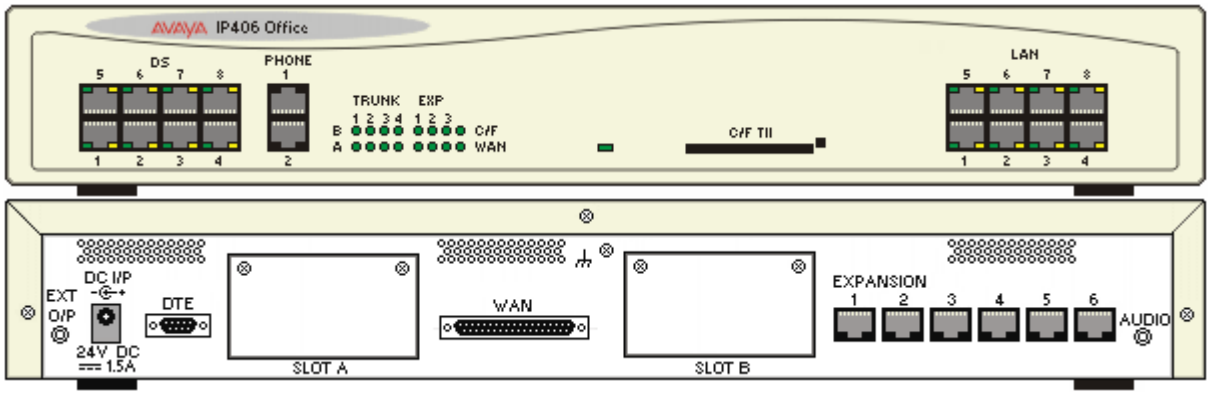
10.1.4 IP406 V2

The IP406 V2 includes 8 digital station (DS) and 2 analog phone (PHONE) ports. It includes an eight port Ethernet LAN switch (unmanaged Layer 2) and Compact Flash card slot for an optional embedded voicemail memory card. It supports up to 6 external expansion modules plus IP extensions controlled through its LAN interface.

The IP406 V2 also includes automatic gain control (AGC) on its conference chip and performs IPSec tunneling through hardware rather than software.

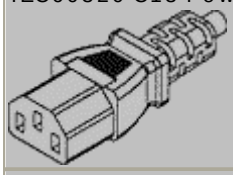


Feature	Capacity
Maximum Extensions	190 of various types in combination. Analog only: 182. DS only: 188. IP only: 190.
Conference Parties	64. Conference chip includes automatic gain control (AGC).
Trunks Cards	2 Trunk card slots. All types supported. Dual PRI trunk cards in Slot A only.
VCM Card Slots	1 up to maximum voice compression channels capacity of 30 channels.
Voicemail Channels	Maximum 20 usable for Voicemail Pro/TAPI WAV connection sessions (subject to available licenses).
Locales	Supported in all IP Office locales.
Software Level	• IP Office core software level 2.1(27) minimum. • Bin file = ip406u.bin.
Power Supply	The unit is supplied with an earthed 3-Pin, 60W external power supply unit. The PSU has an integral power cord for connection to the unit's DC I/P socket. A locale specific IEC60320 C13 power cord 32 for the external PSU is required but is not supplied with the unit.
Mounting	The unit is designed as a free-standing module that can be stacked on or under other IP Office modules. The unit can be rack mounted in a 19" rack system using the optional IP400 Rack Mounting Kit 201.
Dimensions	Width: 445mm/17.5". Depth: 245mm/9.7". Height: 71mm/2.8"/2U.
Weight	Unboxed: 3.0Kg/6.7lbs. Boxed: 4.3Kg/9.6lbs.
Memory	Maximum configuration file size: 256KB.



Ports	Description
AUDIO 376	3.5mm Stereo jack socket. Used for external music on hold source input.
C/F TII 386	Type 2 Compact Flash socket. Used for optional embedded voicemail card.
DC I/P 379	DC power input port. Used for connection of the power lead from an Avaya un-earthed 45W external power supply unit supplied with the control unit.
DS 379	RJ45 socket. Digital Station port. Used for connection of IP Office supported DS phones 43. Not suitable for out-of-building connections.
DTE 135	9-Way D-Type socket. Used for system maintenance. Suitable for direct connection of IP Office Serial Port Feature Key dongle.
EXPANSION 381	RJ45 socket. Used for direct connection to external expansion modules using the Expansion Interconnect cable supplied with the expansion module.
EXT O/P 127	3.5mm Stereo jack socket. Used for switching external relay systems such as door entry controls. The port contains two independent switches controlled by the IP Office.
LAN 382	These ports form an unmanaged layer 2 Ethernet switch. The ports are full-duplex 10/100Mbps auto-sensing, auto-MDI/MDIX.
PHONE 384	Used for connection of analog phones. Not suitable for out-of-building connections. Four-wire analog phones should be connected via a master socket containing ringing capacitors.
SLOT A SLOT B	Used for trunk cards of all types except WAN port trunk card. Normally Slot B should be used first. Dual PRI trunk cards supported in Slot A only. Trunks cards are supplied with replacement external blanking plates suitable for the trunk card port connections.
WAN 386	37-Way D-Type socket. Used for the connection of V.24, V.35 or X.21 WAN service.
	Used for connection of a function or protective ground 207. Use of a ground for all systems is recommended and for some locales may be a regulatory requirement.

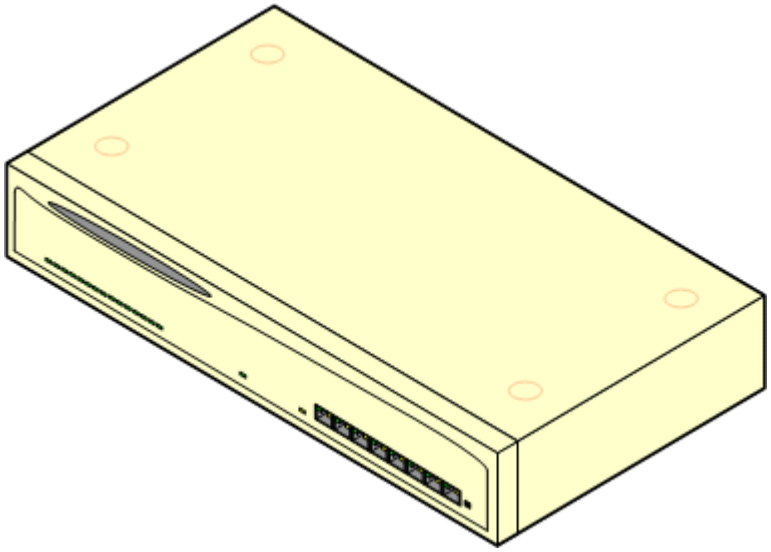
All control units are available in either North America or Rest of World variants. The choice controls various default settings of the unit. For E911 support a North American variant control unit must be used. The companding can be changed once a unit is installed. Control units are supplied with an external power supply unit but not a locale specific power cord.

Item	Variant	Country	SAP Code
IP406 V2 Office DS.	A-Law	Rest of World	700343536
	U-Law	North America	700359946
IEC60320 C13 Power Cord 	CEE7/7	Europe	700289762
	BS1363	United Kingdom	700289747
	NEMA5-15P	America	700289770
IP400 Rack Mounting Kit		All	700210800

10.1.5 IP406 V1

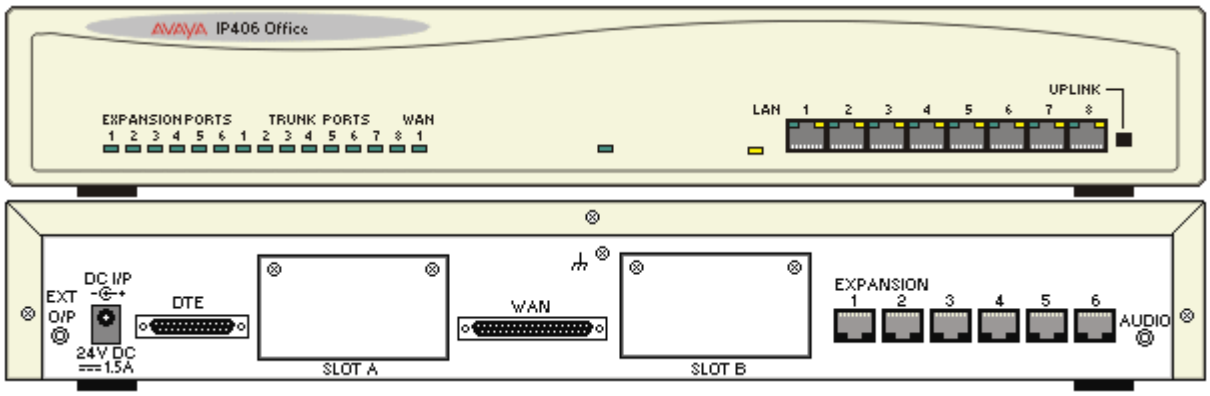
This section is included for maintainer information only. This unit is not supported on IP Office 4.0 and higher.

IP406 Office control unit supports up to 180 extensions by using up to 6 Expansion modules. It includes an eight port 10/100Mbps Ethernet LAN hub. The IP406 V1 has been superseded by the IP406 V2 control unit.



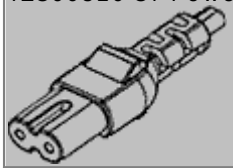
Feature	Capacity
Maximum Extensions	180 of various types in combination. Analog only: 180. DS only: 180. IP only: 180.
Conference Parties	64.
Trunks Cards	2 Trunk card slots. All types supported except Dual PRI trunk cards.
VCM Card Slots	1 up to maximum voice compression channels capacity of 20 channels.
Data Channels	24 of which 20 usable for Voicemail Pro/TAPI WAV connection sessions (subject to available Voicemail Pro Port and TAPI WAV licenses).
Locales	Supported in all IP Office locales.
Software Level	• IP Office core software level 2.1(27) minimum to 3.2 maximum. • Bin file = ip406.bin.
Power Supply	The unit is supplied with a 2-Pin, 40W external power supply unit. The PSU has an integral power cord for connection to the unit's DC I/P socket. A locale specific IEC60320 C7 power cord for the external PSU is required but is not supplied with the unit.
Mounting	The unit is designed as a free-standing module that can be stacked on or under other IP Office modules. The unit can be rack mounted in a 19" rack system using the optional Rack Mounting Kit.
Dimensions	Width: 445mm/17.5". Depth: 245mm/9.7". Height: 71mm/2.8".
Weight	Unboxed: 3.0Kg/6.6lbs. Boxed: 4.3Kg/9.6lbs.
Maximum Configuration Size	192KB.

IP406 V1 Connections



Ports	Description
AUDIO	3.5mm Stereo jack socket. Used for external music on hold source input.
DC I/P	DC power input port. Used for connection of the power lead from an Avaya earthed 60W external power supply unit supplied with the control unit.
DTE	9-Way D-Type socket. Used for system maintenance. Suitable for direct connection of IP Office Serial Port Feature Key dongle.
EXPANSION	RJ45 Socket. Used for direct connection to external expansion modules using the Expansion Interconnect cable supplied with the expansion module.
EXT O/P	3.5mm Stereo jack socket. Used for switching external relay systems such as door entry controls. The port contains two independent switches controlled by the IP Office.
LAN	These ports form an Ethernet hub. The ports are half-duplex 10/100Mbps auto-sensing. Port 8 can be switched from MDIX standard LAN to MDI crossover operation using the UPLINK button on the control unit (In = MDIX, Out = MDI).
SLOT A SLOT B	Used for trunk cards of all types except Dual PRI trunk cards. Normally Slot B should be used first. Trunks cards are supplied with replacement external blanking plates suitable for the trunk card port connections.
WAN	37-Way D-Type socket. Used for the connection of V.24, V.35 or X.21 WAN service.
⏚	Used for connection of a function or protective ground. Use of a ground for all systems is recommended and for some locales may be a regulatory requirement. On older modules where this screw is not present, the left-hand fixing screw of Slot B can be used.

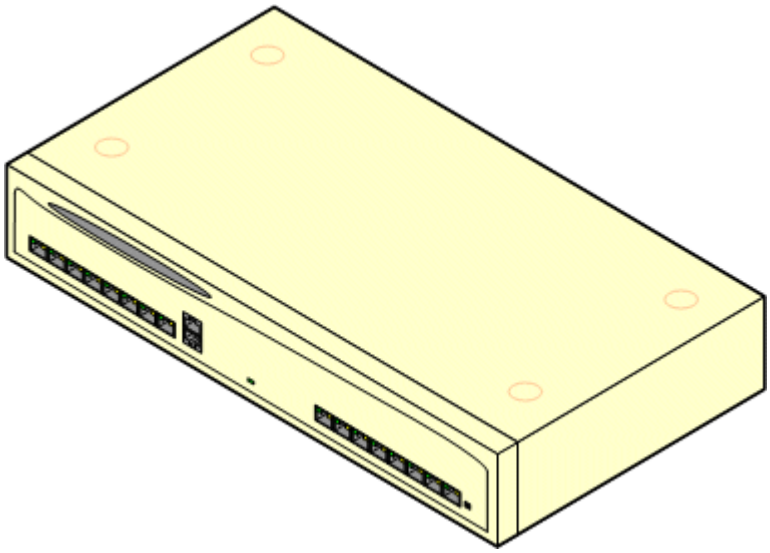
All control units are available in either North America or Rest of World variants. The choice controls various default settings of the unit. For E911 support a North American variant control unit must be used. The companding can be changed once a unit is installed.

Item	Variant	Country	SAP Code
IP406 V1 Office	A-Law	Rest of World	700234461
	U-Law	North America	700210776
IEC60320 C7 Power Cord 	CEE7/16	Europe	700213382
	BS1363	United Kingdom	700213374
	NEMA1-15	America	700213390
	Korea	Korea	700254519
Rack Mounting Kit		All	700210800

10.1.6 IP403

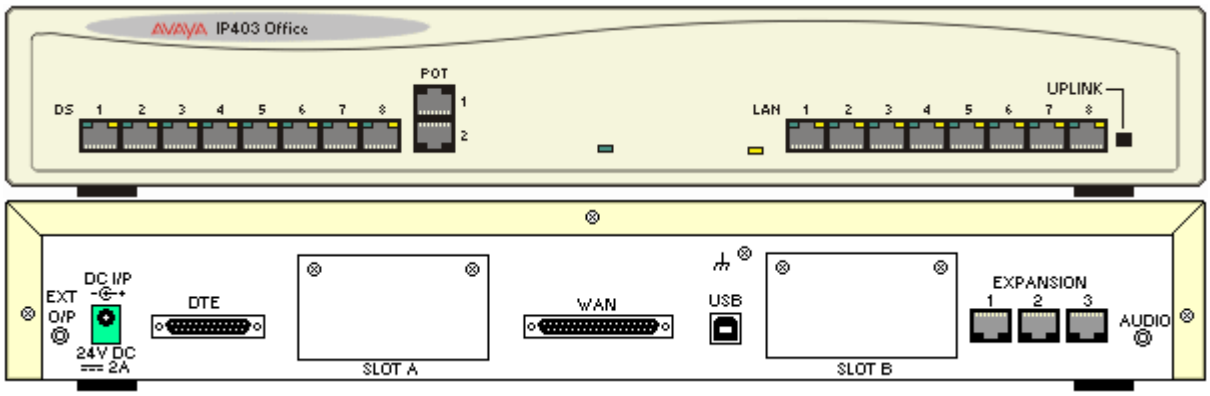
This section is included for maintainer information only. This unit is not supported on IP Office 4.0 and higher.

The front panel of the IP403 control unit includes eight digital extension (DS) ports, two analog phone (POT) ports and an eight port 10/100Mbps Ethernet LAN hub. The IP403 has been superseded by the IP406 V2 control unit. IP403 control units with integral DT rather than DS ports are also supported up to 3.2, however use of devices on those ports is not supported.



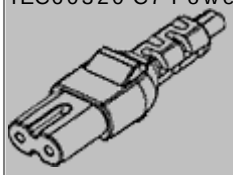
Feature	Capacity
Maximum Extensions	100 of various types in combination. Analog only: 92. DS only: 98. IP only: 100.
Conference Parties	64.
Trunks Cards	2 Trunk card slots. All types supported except Dual PRI trunk cards.
VCM Card Slots	1 up to maximum voice compression channels capacity of 20 channels.
Data Channels	20 of which 10 usable for Voicemail Pro/TAPI WAV connection sessions (subject to available Voicemail Pro Port and TAPI WAV licenses).
Locales	Supported in all IP Office locales.
Software Level	• IP Office core software level 1.0 to 3.2 maximum. • DT Port Support: IP Office 3.0 and higher software does not support the use of DT ports. IP403 DT modules are supported on IP Office 3.0 but use of the integral DT ports is not supported. • Bin file = ip403.bin.
Power Supply	The unit is supplied with a 2-Pin, 40W external power supply unit. The PSU has an integral power cord for connection to the unit's DC I/P socket. A locale specific IEC60320 C7 power cord for the external PSU is required but is not supplied with the unit.
Mounting	The unit is designed as a free-standing module that can be stacked on or under other IP Office modules. The unit can be rack mounted in a 19" rack system using the optional Rack Mounting Kit.
Dimensions	Width: 445mm/17.5". Depth: 245mm/9.7". Height: 71mm/2.8".
Weight	Unboxed: 2.5Kg/5.8lbs. Boxed: 3.85Kg/8.6lbs.
Maximum Configuration Size	192KB.

IP403 Connections



Ports	Description
AUDIO	3.5mm Stereo jack socket. Used for external music on hold source input.
DC I/P	DC power input port. Used for connection of the power lead from an Avaya earthed 60W external power supply unit supplied with the control unit.
DS	RJ45 Socket. Digital Station port. Used for connection of IP Office supported DS phones. Not suitable for out-of-building connections.
DTE	9-Way D-Type socket. Used for system maintenance. Suitable for direct connection of IP Office Serial Port Feature Key dongle.
EXPANSION	RJ45 Socket. Used for direct connection to external expansion modules using the Expansion Interconnect cable supplied with the expansion module.
EXT O/P	3.5mm Stereo jack socket. Used for switching external relay systems such as door entry controls. The port contains two independent switches controlled by the IP Office.
LAN	These ports form an Ethernet hub. The ports are half-duplex 10/100Mbps auto-sensing. Port 8 can be switched from MDIX standard LAN to MDI crossover operation using the UPLINK button on the control unit (In = MDIX, Out = MDI).
POT	Used for connection of analog phones. Not suitable for out-of-building connections.
SLOT A SLOT B	Used for trunk cards of all types except Dual PRI trunk cards. Normally Slot B should be used first. Trunks cards are supplied with replacement external blanking plates suitable for the trunk card port connections.
USB	Not used.
WAN	37-Way D-Type socket. Used for the connection of V.24, V.35 or X.21 WAN service.
⏚	Used for connection of a function or protective ground. Use of a ground for all systems is recommended and for some locales may be a regulatory requirement. On older modules where this screw is not present, the left-hand fixing screw of Slot B can be used.

All control units are available in either North America or Rest of World variants. The choice controls various default settings of the unit. For E911 support a North American variant control unit must be used. The companding can be changed once a unit is installed.

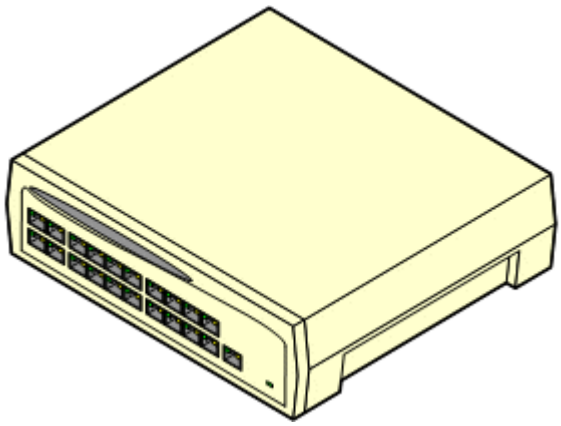
Item	Variant	Country	SAP Code
IP403 Office DS	A-Law	Rest of World	700234453
	U-Law	North America	700350390
IEC60320 C7 Power Cord 	CEE7/16	Europe	700213382
	BS1363	United Kingdom	700213374
	NEMA1-15	America	700213390
	Korea	Korea	700254519
Rack Mounting Kit		All	700210800

Control units are supplied with an external power supply unit but not a locale specific power cord.

10.1.7 Small Office Edition (SOE)

This section is included for maintainer information only. This unit is not supported on IP Office Release 5 and higher.

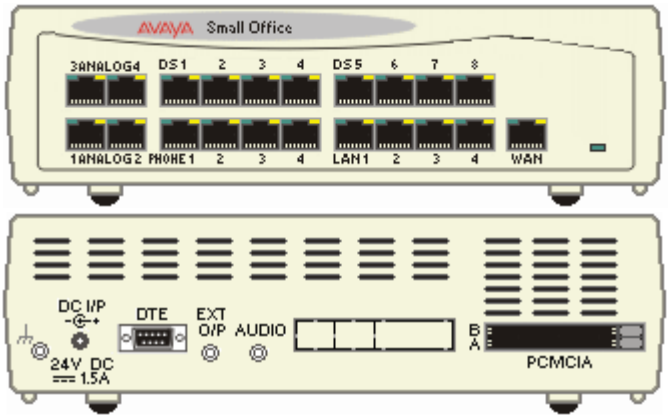
The IP Office Small Office Edition control unit shares many of the features of the other IP Office control units, however it does not support any expansion modules. Small Office Edition control units include various numbers of integral DS, PHONE (POT) and Analog ports.



Small Office Edition Model	Analog Trunks	Analog Extensions	Digital Stations	Voice Compression Channels
2T+4A (3 VoIP)	2	4	0	3
4T+8A (3 VoIP)	4	8	0	3
4T+4A+8DS (3 VoIP)	4	4	8	3
4T+4A+8DS (16 VoIP)	4	4	8	16

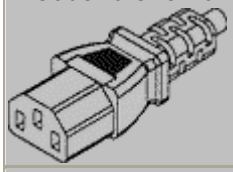
Previous models that included integral DT ports are not supported on IP Office 3.0 or higher.

Feature	Capacity
Maximum Extensions	28 of various types in combination. Analog only: 4. DS only: 8. IP only: 16.
Conference Parties	21 with a maximum of 8 parties in any particular conference.
Trunks Cards	1 Trunk card slot for ATM4, Quad BRI, Single T1 PRI or single WAN port trunk cards. Sections of the rear panel are removable to provide cable connection to the installed trunk card. For the WAN port card a complete replacement back panel is provided.
VCM Card Slots	None. Either 3 or 16 voice compression channels are pre-built into the module.
Voicemail Channels	Maximum 10 usable for Voicemail Pro/TAPI WAV connection sessions (subject to licenses).
Locales	Supported in all IP Office locales.
Software Level	• IP Office core software level 2.0 minimum. • Bin file = ip401ng.bin.
Power Supply	The unit is supplied with a 3-Pin 45W external power supply unit. The PSU has an integral power cord for connection to the module's DC I/P socket. A locale specific IEC60320 C13 power cord 32 for the external PSU is required but is not supplied with the unit.
Mounting	The unit is designed as a free-standing module that can also be wall mounted via fixing brackets in the base.
Dimensions	Width: 255mm/10.0". Depth: 241mm/9.5". Height: 76mm/3.0".
Weight	Unboxed: 1.2Kg/2.64lbs. Boxed: 2.17Kg/4.77lbs.
Memory	Maximum configuration file size: 192KB.



Ports	Description
AUDIO 376	3.5mm Stereo jack socket. Used for external music on hold source input.
ANALOG 376	Used for connection of external analog trunks. Loop-start only.
DC I/P 379	DC power input port. Used for connection of the power lead from an Avaya earthed 60W external power supply unit supplied with the control unit.
DS 379	Digital Station port. Used for connection of IP Office supported DS phones 43. Not suitable for out-of-building extensions.
DTE 135	9-Way D-Type socket. Used for system maintenance. Suitable for direct connection of IP Office Serial Port Feature Key dongle.
EXT O/P 127	3.5mm Stereo jack socket. Used for switching external relay systems such as door entry controls. The port contains two independent switches controlled by the IP Office.
LAN 382	RJ45 socket. These ports form an unmanaged layer 2 Ethernet switch. The ports are full-duplex 10/100Mbps auto-sensing, auto-MDI/MDIX ports.
PCMCIA	Dual PCMCIA card slot. Used for optional Embedded Voicemail card 265 and wireless access point card. Cards are not hot-swappable and order of slot usage is not significant.
PHONE 384	RJ45 socket. Used for connection of analog phones. Intended for two-wire analog phones. For connection to 4-wire analog phones connection should be via a master socket with ringing capacitors. During power failure, PHONE port 1 is directly connected to ANALOG trunk port 2. Not suitable for out-of-building connections. • On some older Small Office Edition control units, these ports are labeled as POT rather than PHONE.
WAN 386	RJ45 socket. 10/100Mbps Ethernet LAN port. Acts as LAN2 within the configuration.
⏚	3.5mm Jack socket. Function ground point. Used for connection of a function or protective ground 207. Use of a ground for all systems is recommended and for some locales may be a regulatory requirement.

All control units are available in either North America or Rest of World variants. The choice controls various default settings of the unit. For E911 support a North American variant control unit must be used. The companding can be changed once a unit is installed.

Item	Variant	Country	SAP Code
Small Office Edition 4T+4A+8DS (3 VoIP)	A-Law	Rest of World	700280209
	U-Law	North America	700350424
Small Office Edition 4T+4A+8DS (16 VoIP)	A-Law	Rest of World	700280217
	U-Law	North America	700350432
IEC60320 C13 Power Cord 	CEE7/7	Europe	700289762
	BS1363	United Kingdom	700289747
	NEMA5-15P	America	700289770
Rack Mounting Kit		All	700210800

Control units are supplied with an external power supply unit but not a locale specific power cord.

10.1.8 IP401 Control Unit

This type of IP Office control unit is supported up to IP Office 2.0 software.

- IP401 Compact Office 2 supports:
  - Two digital and two analog telephones
  - A BRI ISDN port (2 trunks)
  - An four port auto-negotiating 10/100 BaseT LAN hub
- IP401 Compact Office 4 supports:
  - Four digital and four analog telephones
  - Two BRI ISDN ports (4 trunks)
  - An eight port auto-negotiating 10/100 BaseT LAN hub.

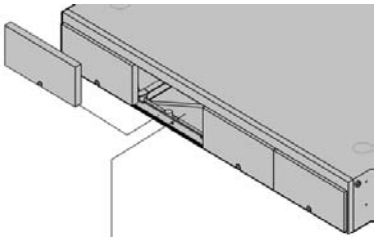
The auto-negotiating 10/100 BaseT LAN hub provides access to networks and/or up to eight IP telephones. The DT ports support Avaya 20 series telephones. DT ports are set to A-Law PCM encoding at default but can be programmed to µ-Law PCM encoding.

An IP401 Compact Office 2 can be expanded to an IP401 Compact Office 4.

In addition the IP401 Compact Office can be fitted with any of the following optional Integral Modules:

- WAN Port
  This port supports a single synchronous data connection, which can be X.21, V.35 or V.24.
- Voice Compression Module (VCM)
  Supports VoIP applications (over two channels) using Avaya 4600 IP telephone connected via LAN ports.
- VME card
  Provides memory capacity for embedded voice mail feature.

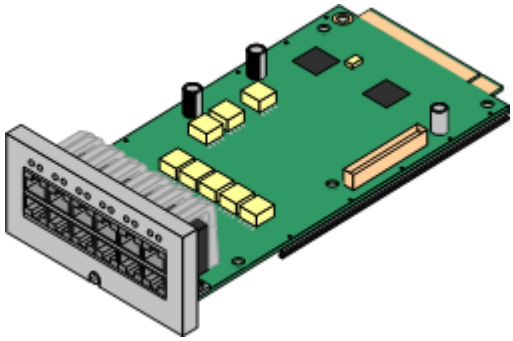
10.2 IP500 Base Cards



The IP500 and IP500v2 control units have 4 slots for the insertion of base cards. The slots are numbered 1 to 4 from left to right. Normally they can be used in any order, however if the capacity for a particular type of card is exceeded, the card in the rightmost slot will be disabled.

Each base card includes an integral front panel with ports for cable connections. Typically the first 8 ports on the left are for connection of extension devices. The 4 ports on the left are used for connection of trunks if a trunk daughter card 20 is added to the base card.

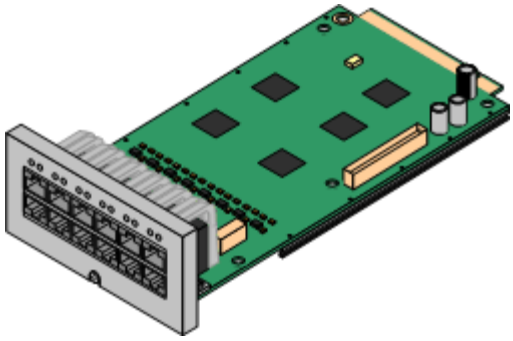
IP500 Digital Station Base Card 233



This card provides 8 DS (digital station) ports for the connection of Avaya digital phones other than IP phones.

- The card can be fitted with an IP500 trunk daughter card which uses the base card ports for trunk connection.
- Maximum: 3 per control unit.
- 4400 Series phones (4406D, 4412D and 4424D) are not supported on this card. They are supported on an external expansion module.

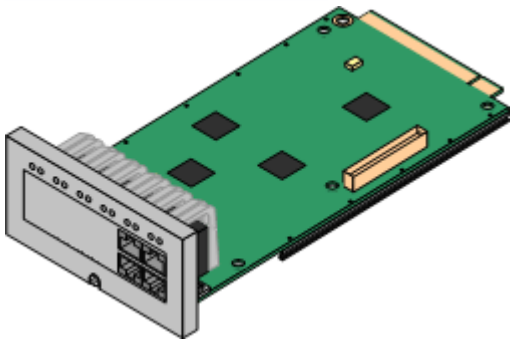
IP500 Analog Phone Base Card 231



The card is available in two variants, supporting either 2 or 8 analog phone ports.

- The card can be fitted with an IP500 trunk daughter card 20 which uses the base card ports for trunk connection.
- Maximum: 4 per control unit.
- The analog phone ports do not include a ringing capacitor. Where this is a requirement, connection should be via a Master socket containing ringing capacitors.
- If fitted with an IP500 Analog Trunk daughter card, during power failure phone port 8 is connected to analog trunk port 12.

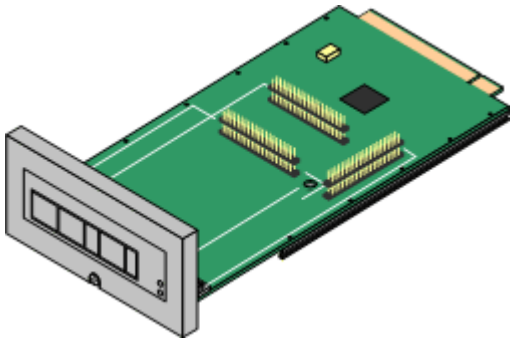
IP500 VCM Base Card 235



This card is available in variants supporting either 32 or 64 voice compression channels 45 for use with VoIP calls.

- The card can be fitted with an IP500 trunk daughter card 20 which uses the base card ports for trunk connection.
- Maximum: 2 per control unit.

IP500 Legacy Card Carrier Base Card 234

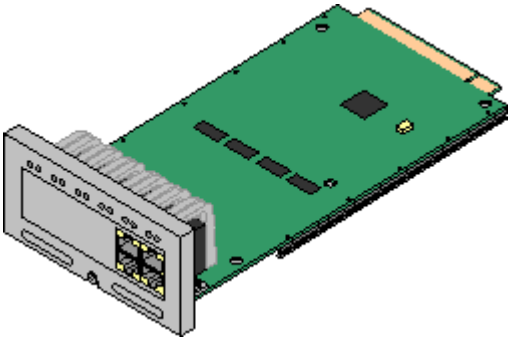


This card allows various IP400 trunk cards 22 and IP400 VCM cards 25 to be used. The front of the card includes panels that can be removed to match the trunk card fitted.

- This card does not accept any IP500 trunk daughter card.
- Maximum: 2 per control unit.
- IP400 Cards Supported: The following cards are supported.

✓ PRI T1	✓ PRI 30 E1R2 RJ45	✓ VCM 4
✓ Dual PRI T1	✓ Dual PRI E1R2 RJ45	✓ VCM 8
✓ PRI 30 E1 (1.4)	✓ BRI-8 (UNI)	✓ VCM 16
✓ Dual PRI E1	✓ ANLG 4 Uni (US only)	✓ VCM 24
		✓ VCM 30

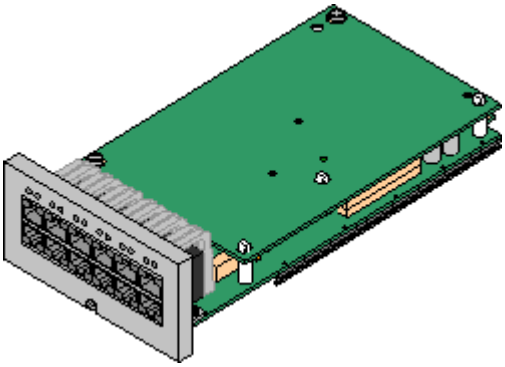
IP500 4-Port Expansion Base Card 237



This card adds an additional 4 expansion ports for external expansion modules. The card is supplied with four 2m yellow interconnect cables.

- This card does not accept any IP500 trunk daughter card.
- Maximum: 1 per control unit (Right-hand slot 4 only).
- Supported Expansion Modules: The following external expansion modules are supported:
  - IP500 Analogue Trunk Module
  - IP500 BRI So Module
  - IP500 Digital Station Module
  - IP500 Phone Module
  - IP400 Digital Station V2 Modules
  - IP400 Phone V2 Modules

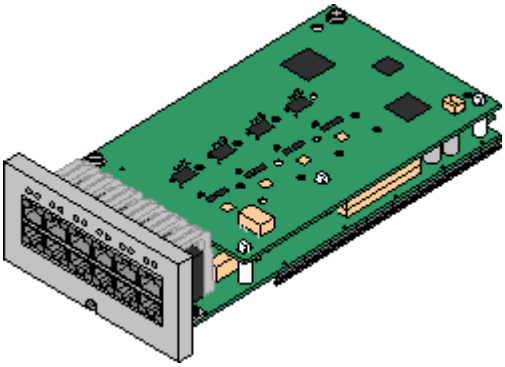
IP500 BRI Combination Card 242



This card provides 6 digital station ports (1-6), 2 analog extension ports (7-8) and 2 BRI trunk ports (9-10, 4 channels). The card also includes 10 VCM channels.

- This card has a pre-installed IP500 BRI trunk daughter card 21.
- Maximum: 2 combination cards of any type per IP500v2 control unit. Not supported by IP500 control units.

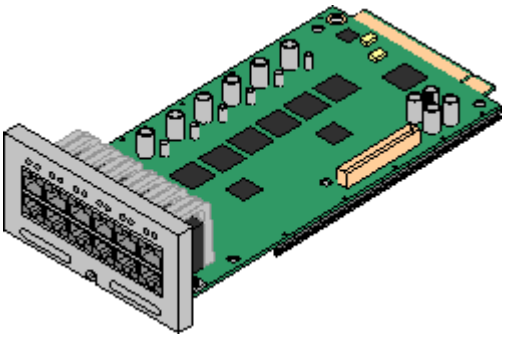
IP500 ATM Combination Card 240



This card provides 6 digital station ports (1-6), 2 analog extension ports (7-8) and 4 analog trunk ports (9-12). The card also includes 10 VCM channels.

- This card has a pre-installed IP500 analog trunk daughter card 21.
- Maximum: 2 combination cards of any type per IP500v2 control unit. Not supported by IP500 control units.
- The analog phone ports do not include a ringing capacitor. Where this is a requirement, connection should be via a Master socket containing ringing capacitors.
- If fitted with an IP500 Analog Trunk daughter card, during power failure phone port 8 is connected to analog trunk port 12.

IP500 ETR6 Base Card 238

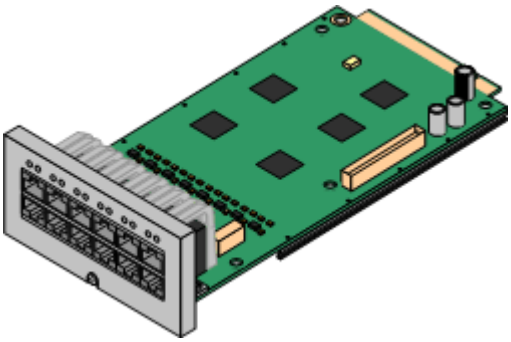


This card is only supported in an IP500v2 control unit running in Partner Version mode. It provides 6 ETR ports for connection of ETR phones. 2 Analog extension ports are also provided for emergency use only with an analog trunk card.

- The card can be fitted with an IP500 trunk daughter card which uses the base card ports for trunk connection.
- Maximum: 3 per IP500v2 control unit. Not supported by IP500 control units.
- The analog phone ports do not include a ringing capacitor. Where this is a requirement, connection should be via a Master socket containing ringing capacitors.
- If fitted with an IP500 Analog Trunk daughter card, during power failure phone ports 7 and 8 are connected to analog trunk port 12. However during normal operation analog phone ports 7 and 8 are not useable.

10.2.1 Analog Phone

This card is used to add analog phone extension ports to an IP500 and IP500v2 control unit. It is available in two variants, providing either 2 or 8 analog extension ports.



- Supports
  Provides either 8 or 2 analog 376 phone ports depending on card variant.
- Maximum per IP500 Control Unit: 4.
- IP500 Daughter Card Support: ✓ 1.

Port Type	Ports	Features	Port LEDs

Analog Extension	1 to 8	• Supports ICLID modes DTMFA, DTMFC, DTMFD, FSK and UK20.
		• REN 2 (1 for external bell device).
		• Off-Hook current: 25mA
		• Ring Voltage: 40V.
		• Intended for connection to two-wire analog phones, the ports do not include a ringing capacitor. For connection to 4-wire analog phones, connection should be via a master socket with ringing capacitors.
		• If fitted with an analog trunk card, for the Phone 8, during power failure extension port 8 is connected to the analog trunk port 12.
			No status LEDs are used for analog phone extensions.
			• LED1 is used for base card status:
			  • Red On = Error
			  • Red Slow Flash = Initializing.
			  • Red Flash every 5 seconds = Card okay.
			  • Red Fast Flash = System shutdown.

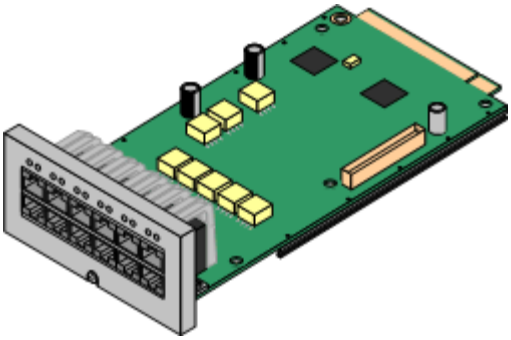
Optional Trunk Card Ports	9 to 12	The card can be fitted with one of the following trunk daughter cards. The trunk daughter card then uses ports 9 to 12 on the base card for its trunk connections.
		• IP500 Analog Trunk Card. 245
		• IP500 BRI Trunk Card. 246
		• IP500 PRI Trunk Card. 247
			LED use depends daughter card type fitted.
			• LED 9 is used for daughter card status.
			  • Red On = Error
			  • Red Slow Flash = Initializing.
			  • Red Flash every 5 seconds = Card okay.
			  • Red Fast Flash = System shutdown.
			Analog Trunk Daughter Card
			• Green on: Card fitted.
			• Green flashing: Trunk in use.
			BRI Trunk Daughter Card
			• Off: No trunk present.
			• Green on: Trunk present.
			• Green flashing: Trunk in use.
			PRI Trunk Daughter Card
			• Off: No trunk present.
			• Green on: Trunk present.
			• Green flashing: Trunk in use.
			• Red/Green Fast Flash (port 9) or Green Fast Flash (port 10): Alarm indication signal (AIS) from the trunk remote end.

			• Red with Green Blink (port 9) or Green Blink (port 10): Port in loopback mode (set through IP Office System Monitor).

Name	Description	SAP Code
IPO 500 Extn Card Phone 2	IP Office 500 Extension Card Phone 2	700431778
IPO 500 Extn Card Phone 8	IP Office 500 Extension Card Phone 8	700417231

10.2.2 Digital Station

This card is used to add digital station (DS) extension ports to an IP500 and IP500v2 control unit. It provides 8 RJ45 DS extension ports for use with Avaya digital phones not including IP phones. A further 4 RJ45 ports are provided for trunk connections when an IP500 trunk card is fitted to this card.



- Supports
  Provides 8 DS 379 ports for digital stations 43 supported (except 4406D, 4412D and 4424D).
- Maximum per IP500 Control Unit: 3.
- IP500 Daughter Card Support: ✓ 1.

Port Type	Ports	Features	Port LEDs

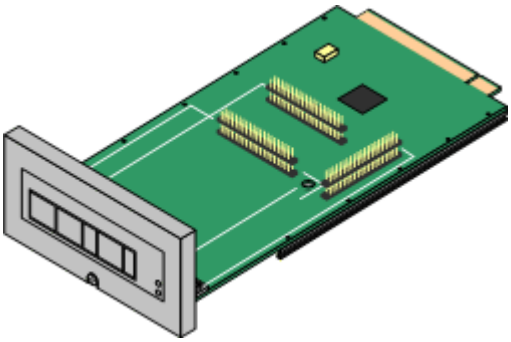
Digit Station	1 to 8	Provides DS 379 ports for digital stations 43 (except 4406D, 4412D and 4424D).	• Green On - Phone detected.
			• LED1 is used for base card status:
			  • Red On = Error
			  • Red Slow Flash = Initializing.
			  • Red Flash every 5 seconds = Card okay.
			  • Red Fast Flash = System shutdown.

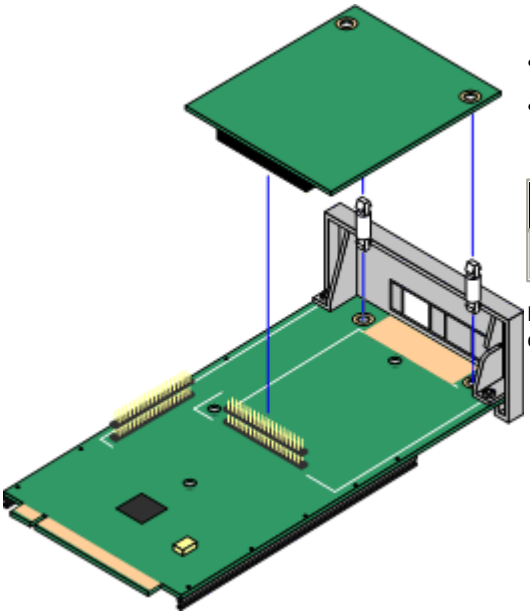
Optional Trunk Card Ports	9 to 12	The card can be fitted with one of the following trunk daughter cards. The trunk daughter card then uses ports 9 to 12 on the base card for its trunk connections.
		• IP500 Analog Trunk Card. 245
		• IP500 BRI Trunk Card. 246
		• IP500 PRI Trunk Card. 247
			LED use depends daughter card type fitted.
			• LED 9 is used for daughter card status.
			  • Red On = Error
			  • Red Slow Flash = Initializing.
			  • Red Flash every 5 seconds = Card okay.
			  • Red Fast Flash = System shutdown.
			Analog Trunk Daughter Card
			• Green on: Card fitted.
			• Green flashing: Trunk in use.
			BRI Trunk Daughter Card
			• Off: No trunk present.
			• Green on: Trunk present.
			• Green flashing: Trunk in use.
			PRI Trunk Daughter Card
			• Off: No trunk present.
			• Green on: Trunk present.
			• Green flashing: Trunk in use.
			  • Red/Green Fast Flash (port 9) or Green Fast Flash (port 10): Alarm indication signal (AIS) from the trunk remote end.
			  • Red with Green Blink (port 9) or Green Blink (port 10): Port in loopback mode (set through IP Office System Monitor).

Name	Description	SAP Code
IPO 500 Extn Card Dgtl Sta 8	IP Office 500 Extension Card Digital Station 8	700417330

10.2.3 Legacy Card Carrier

The IP500 Legacy Card Carrier base card can be used to fit IP Office IP400 cards into the IP500 control unit. This can include IP400 trunk and IP400 VCM cards. Up to 2 Legacy Card Carrier cards are supported in an IP500 control unit.





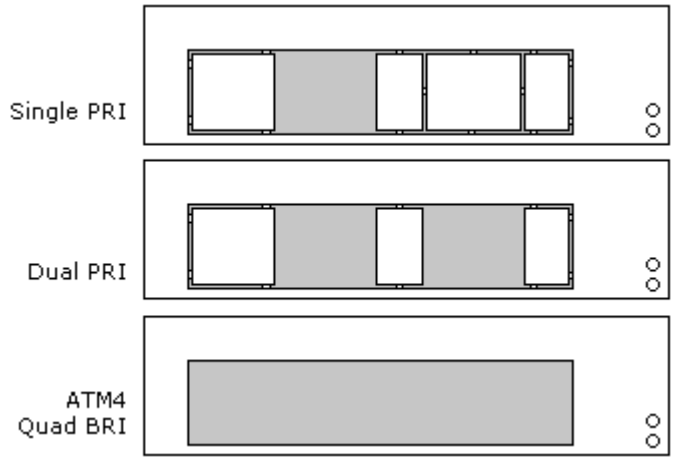
- Supports
  The following IP400 cards are supported. Cards not listed are not supported.

  - ✓ PRI T1
  - ✓ Dual PRI T1
  - ✓ PRI 30 E1 (1.4)
  - ✓ Dual PRI E1
  - ✓ PRI 30 E1R2 RJ45
  - ✓ Dual PRI E1R2 RJ45
  - ✓ BRI-8 (UNI)
  - ✓ ANLG 4 Uni (US only)
  - ✓ VCM 4
  - ✓ VCM 8
  - ✓ VCM 16
  - ✓ VCM 24
  - ✓ VCM 30

  - IP400 VCM cards fitted to IP500/IP500v2 systems do not override IP500 license requirements for voice networking trunks.
  - IP400 PRI trunk cards fitted to IP500/IP500v2 systems do not require trunk licenses.
- Maximum per IP500 Control Unit: 2.
- IP500 Daughter Card Support: ✗.

Name	Description	SAP Code
IPO 500 Carrier Card	IP Office 500 Carrier Card	700417215

Panels on the front of the carrier card can be snapped off to match the port connects when fitting an IP500 trunk card.

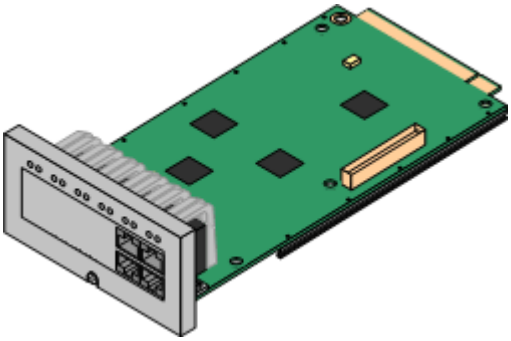


10.2.4 VCM

This type of card is used to add voice compression channels 45 to an IP500 amd IP500v2control unit. Those channels are used for VoIP calls including IP extensions and or IP trunks.

The IP500 VCM card is available in two variants; 32 channels and 64 channels. Both cards have 4 RJ45 ports for that are used for connections when an IP500 daughter card 243 is fitted.

The IP500 control unit supports up to 128 voice compression channels, using IP500 VCM cards and or IP400 VCM cards 266 on an IP500 carrier card 234. The IP500v2 control unit supports up to 148 voice compression channels, using the same cards plus VCM ports on IP500 Combination Cards.



- Supports
  Codecs G.711, G729a and G.723 with 64ms echo cancellation. The maximum number of simultaneous channels useable on an IP500 VCM base card is affected by the codec being used. The following table assumes that all calls using the VCM use the same codec.

Codec	IP500 VCM32	IP500 VCM64
G.711	32	64
G.729a	30	60
G.723	22	44

- Maximum per IP500 Control Unit: 2.
- IP500 Daughter Card Support: ✓ 1.

- LEDs 1 to 8 are unlabelled. They are used to indicate voice compression channel usage. Each LED lit represents 12.5% of the available voice compression channel capacity in use (total card capacity rather than licensed capacity).
- LED1 is used for base card status:
  - Red On = Error
  - Red Slow Flash = Initializing.
  - Red Flash every 5 seconds = Card okay.
  - Red Fast Flash = System shutdown.

Port Type	Ports	Features	Port LEDs

Not present	1 to 8	Not present.	• LED1 is used for base card status:
			  • Red On = Error
			  • Red Slow Flash = Initializing.
			  • Red Flash every 5 seconds = Card okay.
			  • Red Fast Flash = System shutdown.

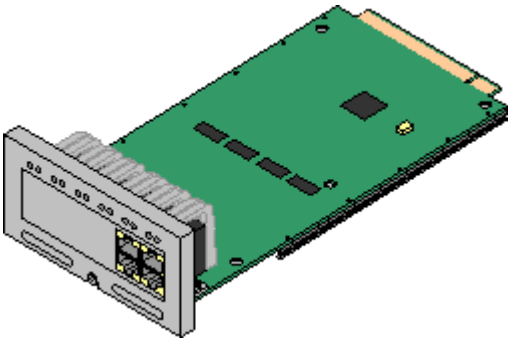
Optional Trunk Card Ports	9 to 12	The card can be fitted with one of the following trunk daughter cards. The trunk daughter card then uses ports 9 to 12 on the base card for its trunk connections.
		• IP500 Analog Trunk Card. 245
		• IP500 BRI Trunk Card. 246
		• IP500 PRI Trunk Card. 247
			LED use depends daughter card type fitted.
			• LED 9 is used for daughter card status.
			  • Red On = Error
			  • Red Slow Flash = Initializing.
			  • Red Flash every 5 seconds = Card okay.
			  • Red Fast Flash = System shutdown.
			Analog Trunk Daughter Card
			• Green on: Card fitted.
			• Green flashing: Trunk in use.
			BRI Trunk Daughter Card
			• Off: No trunk present.
			• Green on: Trunk present.
			• Green flashing: Trunk in use.
			PRI Trunk Daughter Card
			• Off: No trunk present.
			• Green on: Trunk present.
			• Green flashing: Trunk in use.
			  • Red/Green Fast Flash (port 9) or Green Fast Flash (port 10): Alarm indication signal (AIS) from the trunk remote end.

			• Red with Green Blink (port 9) or Green Blink (port 10): Port in loopback mode (set through IP Office System Monitor).

Name	Description	SAP Code
IPO 500 MC VCM 32	IP Office 500 Media Card Voice Coding Module 32	700417389
IPO 500 MC VCM 64	IP Office 500 Media Card Voice Coding Module 64	700417397

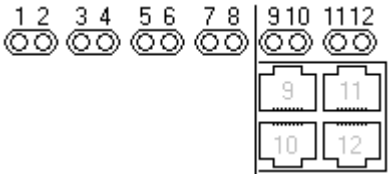
10.2.5 4-Port Expansion Card

This card is used to add 4 additional expansion ports to the IP500 and IP500v2 control unit. This card is only supported in slot 4.



- Supports
  Provides 4 additional expansion ports 381 for connection of external expansion modules.
- Supported Expansion Modules: The following external expansion modules are supported:
  - IP500 Analogue Trunk Module
  - IP500 BRI So Module
  - IP500 Digital Station Module
  - IP500 Phone Module
  - IP400 Digital Station V2 Modules
  - IP400 Phone V2 Modules
- Maximum per IP500 Control Unit: 1 - Right hand slot 4 only.
- IP500 Daughter Card Support: ✗.

- Each external expansion module (except the WAN3 10/100) is supplied with a blue 1 meter (3'3'') expansion interconnect cable. This cable must be used when connecting to expansion ports on the rear of a control unit.
- When connecting to expansion ports on an IP500 4-Port Expansion card, a yellow 2 meter (6'6") expansion interconnect cable can be used in place of the standard blue cable. 4 Yellow cables are supplied with the IP500 4-Port Expansion card.
- The WAN3 10/100 module differs in that it connects via a LAN port on its front to one of the control unit's LAN ports. This type of external expansion module is not supported by IP500 and IP500v2 control units.



LEDs 1 to 8 are used for the expansion ports on the rear of the control unit.
LEDs 9 to 12 are used for the card's own expansion ports.

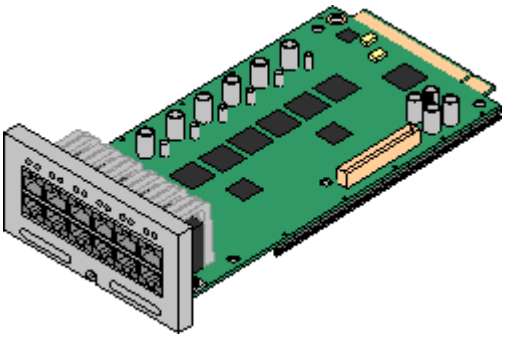
Green	On	Expansion module present.
Red	Flashing	Initializing.
Red	On	Error.
Orange	Regular Flash	Base card okay.

Name	Description	SAP Code
IPO IP500 EXP CARD 4 PORT	Includes 4 yellow 2 metre interconnect cables.	700472889
IPO EXP CABLE RJ45/RJ45 2M YELLOW	Only for use with the 4-Port Expansion card.	700472871

10.2.6 ETR6 Card

This card is used to add 6 ETR phone extension ports to an IP500v2 control unit. This card is only supported by IP500v2 systems running in Partner Version 52 mode.

It also includes 2 analog extension ports which are for emergency use only when the card is fitted with an analog trunk daughter card. A further 4 RJ45 ports (9 to 12) are provided for trunk connections when an IP500 trunk daughter card is fitted to this card.



- Supports
  ETR and analog phones.
- Maximum per IP500 Control Unit: 3.
- IP500 Daughter Card Support: ✓ 1.
  The IP500 BRI trunk daughter card is not supported.

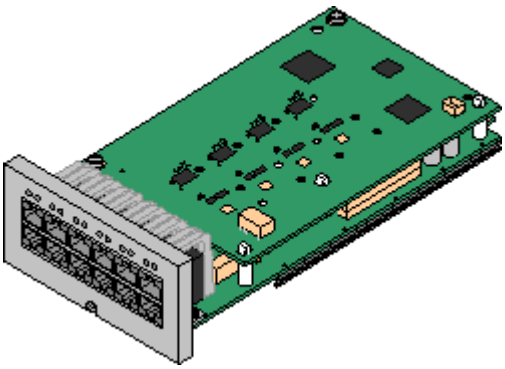
Port Type	Ports	Features	Port LEDs
ETR Extensions	1 to 6	Each ETR phone can be used for an ETR or analog phone. Support for ETR 34D phone is limited to a maximum of 2 per ETR6 card and 4 in total. • REN 1. • DTMF dialing only. • Message waiting indication 51V stepped. • ICLID mode Bellcore 202.	No status LED are used for ETR ports. • LED1 is used for base card status: • Red On = Error • Red Slow Flash = Initializing. • Red Flash every 5 seconds = Card okay. • Red Fast Flash = System shutdown.
EF	7 to 8	• If fitted with an IP500 Trunk Daughter card, during power failure both these ports are connected to analog trunk port 12. • Supports ICLID modes DTMFA, DTMFC, DTMFD, FSK and UK20. • REN 2 (1 for external bell device). • Off-Hook current: 25mA • Ring Voltage: 40V. • Intended for connection to two-wire analog phones, the ports do not include a ringing capacitor. For connection to 4-wire analog phones, connection should be via a master socket with ringing capacitors.	No status LEDs are used for analog phone extensions.
Optional Trunk Ports	9 to 12	Depends on the type of trunk daughter card fitted. The ETR6 can be fitted with either a Analog Trunk 245 card or PRI Trunk 247 card.	LED use depends daughter card type fitted. • LED 9 is used for daughter card status. • Red On = Error • Red Slow Flash = Initializing. • Red Flash every 5 seconds = Card okay.

			Analog Trunk Daughter Card • Green on: Card fitted. • Green flashing: Trunk in use. PRI Trunk Daughter Card • Off: No trunk present. • Green on: Trunk present. • Green flashing: Trunk in use.	• Red Fast Flash = System shutdown. • Red/Green Fast Flash (port 9) or Green Fast Flash (port 10): Alarm indication signal (AIS) from the trunk remote end. • Red with Green Blink (port 9) or Green Blink (port 10): Port in loopback mode (set through IP Office System Monitor).

Name	Description	SAP Code
IPO IP500v2 EXTN CARD ETR6	IPO IP500v2 EXTN CARD ETR6	700476039

10.2.7 ATM Combination Card

This card is used to add a combination of ports to an IP500v2 control unit. Not supported by IP500 control units.



- Supports
  - 6 Digital Station ports.
  - 2 Analog Extension ports.
  - 4 Analog Trunk ports.
  - 10 VCM channels.
- Maximum per IP500v2 Control Unit: 2 combination cards of any type per IP500v2 control unit. Not supported by IP500 control units.
- IP500 Daughter Card Support: ✓ 1. The trunk daughter card is pre-installed and cannot be replaced with another card type.

Port Type	Ports	Features	Port LEDs

Digit Station	1 to 6	Provides DS 379 ports for digital stations 43 (except 4406D, 4412D and 4424D).	• Green On - Phone detected.
			• LED1 is used for base card status:
			  • Red On = Error
			  • Red Slow Flash = Initializing.
			  • Red Flash every 5 seconds = Card okay.
			  • Red Fast Flash = System shutdown.

Analog Extension	7 to 8	• Supports ICLID modes DTMFA, DTMFC, DTMFD, FSK and UK20. • REN 2 (1 for external bell device). • Off-Hook current: 25mA • Ring Voltage: 40V. • Intended for connection to two-wire analog phones, the ports do not include a ringing capacitor. For connection to 4-wire analog phones, connection should be via a master socket with ringing capacitors. • During power failure extension port 8 is connected to the analog trunk port 12.	No status LEDs are used for analog phone extensions.

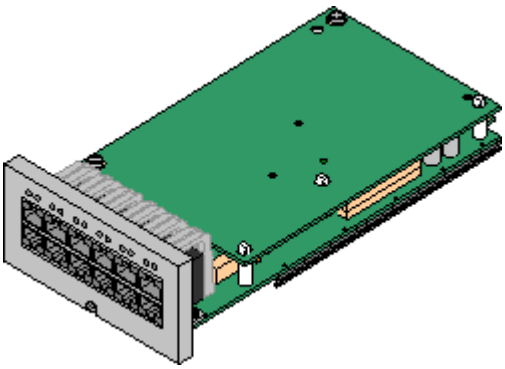
Analog Trunk	9 to 12	• DTMF, ICLID, Busy tone detection.
		• Over-voltage and lightning protection.
		• DTMF and LD dialing.
		• Adjustable echo cancellation (default 16ms). Selectable to Off, 8, 16, 32, 64 and 128 milliseconds.
			• Green on: Card fitted.
			• Green flashing: Trunk in use.
			• LED 9 is used for daughter card status.
			  • Red On = Error
			  • Red Slow Flash = Initializing.
			  • Red Flash every 5 seconds = Card okay.
			  • Red Fast Flash = System shutdown.

Name	Description	SAP Code

IPO IP500v2 COMBINATION CARD ATM	IPO IP500v2 COMBINATION CARD ATM	700476013

10.2.8 BRI Combination Card

This card is used to add a combination of ports to an IP500v2 control unit. Not supported by IP500 control units.



- Supports
  - 6 Digital Station ports.
  - 2 Analog Extension ports.
  - 2 BRI Trunk ports (4 BRI channels).
  - 10 VCM channels.
- Maximum per IP500 Control Unit: 2 combination cards of any type per IP500v2 control unit. Not supported by IP500 control units.
- IP500 Daughter Card Support: ✓ 1. The trunk daughter card is pre-installed and cannot be replaced with another card type.

Port Type	Ports	Features	Port LEDs

Digit Station	1 to 6	Provides DS 379 ports for digital stations 43 (except 4406D, 4412D and 4424D).	• Green On - Phone detected.
			• LED1 is used for base card status:
			  • Red On = Error
			  • Red Slow Flash = Initializing.
			  • Red Flash every 5 seconds = Card okay.
			  • Red Fast Flash = System shutdown.

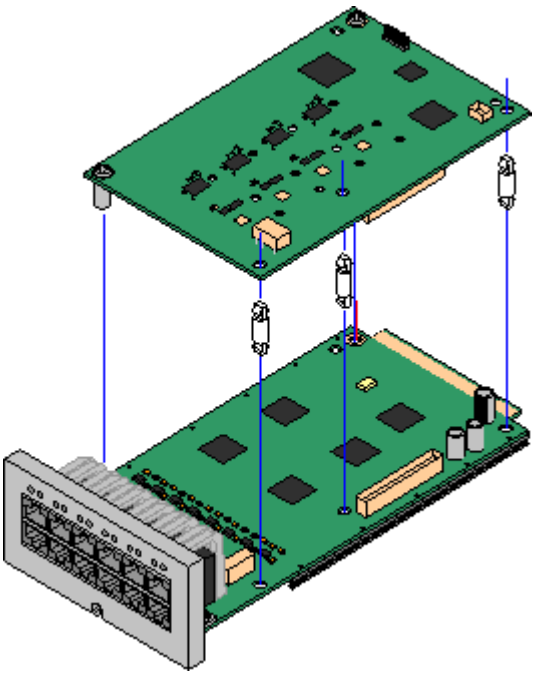
Analog Extension	7 to 8	• Supports ICLID modes DTMFA, DTMFC, DTMFD, FSK and UK20. • REN 2 (1 for external bell device). • Off-Hook current: 25mA • Ring Voltage: 40V. • Intended for connection to two-wire analog phones, the ports do not include a ringing capacitor. For connection to 4-wire analog phones, connection should be via a master socket with ringing capacitors.	No status LEDs are used for analog phone extensions.

BRI Trunk	9 to 10	• Each trunk port supports 2B+D channels.
		• ETSI or AusTS013 basic rate protocol set through the IP Office configuration .
			• Off: No trunk present.
			• Green on: Trunk present.
			• Green flashing: Trunk in use.
			• LED 9 is used for daughter card status.
			  • Red On = Error
			  • Red Slow Flash = Initializing.
			  • Red Flash every 5 seconds = Card okay.
			  • Red Fast Flash = System shutdown.

Not Used	11 to 12	–	–

Name	Description	SAP Code
IPO IP500v2 COMBINATION CARD BRI	IPO IP500v2 COMBINATION CARD BRI	700476021

10.3 IP500 Trunk Daughter Cards

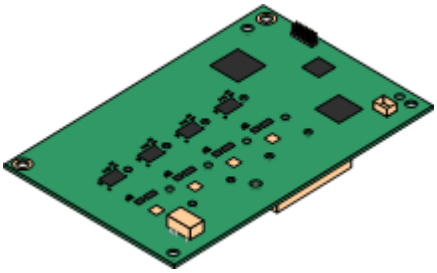


Most IP500 base cards 18 can be fitted with an IP500 trunk daughter cards to support the connection of trunks to the base card.

Each daughter card is supplied with the stand off pillars required for installation and a label to identify the daughter cards presence on the front of the base card after installation.

- IP500 Combination cards are pre-fitted with a trunk daughter card which cannot be removed or changed for another type of trunk daughter card.

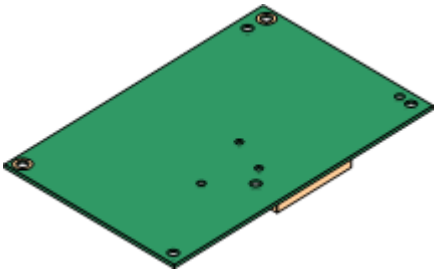
IP500 Analog Trunk Daughter Card 245



This card allows the base card to support 4 analog loop-start trunks.

- The analog phone ports do not include a ringing capacitor. Where this is a requirement, connection should be via a Master socket containing ringing capacitors.
- If fitted with an IP500 Analog Trunk daughter card, during power failure phone port 8 is connected to analog trunk port 12.
- Maximum: 4 per IP500 control unit.

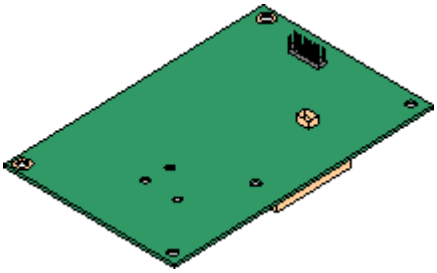
IP500 BRI Trunk Daughter Card 246



This card allows the base card to support up to 4 BRI trunk connections, each trunk providing 2B+D digital channels. The card is available in 2 port (4 channels) and 4 port (8 channels) variants.

- Maximum: 4 per IP500 control unit.
- S-Bus Connection: The card can be switched from To trunk mode to So mode. This mode requires additional terminating resistors and an ISDN crossover cable connection, see BRI Port (So) 377.

IP500 PRI-U Trunk Daughter Card 247

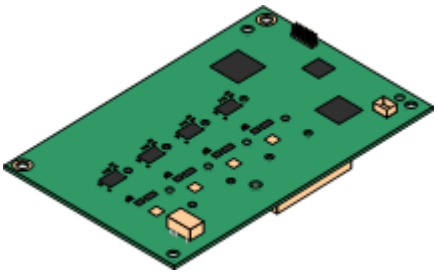


This card allows the base card to support up to 2 PRI trunk connections. The card is available in single and dual port variants. The card can be configured for E1 PRI, T1 robbed bit, T1 PRI or E1R2 PRI trunks.

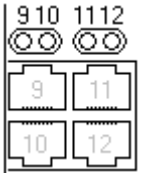
- Maximum: 4 per IP500 control unit.
- The IP Office system supports 8 unlicensed B-channels on each IP500 PRI-U port fitted. Additional B-channels, up to the capacity of ports installed and PRI mode selected require IP500 Universal PRI (Additional Channels) licenses added to the configuration. These additional channels consume the licenses based on which additional channels are configured as in-service from port 9 of slot 1 upwards. D-channels are not affected by licensing.

10.3.1 Analog Trunk Card

This card can be added to an IP500 base card to provide that card with support for 4 loop-start analog trunks. This card can be fitted to any IP500 base card except the IP500 Legacy Carrier card and IP500 4-Port Expansion card.



- Ports/Channels
  4 Loop-start analog trunk ports. Connections via the host IP500 base card.
  - DTMF, ICLID, Busy tone detection.
  - Over-voltage and lightning protection (may still require additional protection equipment see Lightning Protection/Out-of-Building Connections 38.
  - DTMF and LD dialing.
  - Adjustable echo cancellation (default 16ms). Selectable to Off, 8, 16, 32, 64 and 128 milliseconds.
  - Power Failure Port
    Regardless of the IP500 card hosting it, during power failure pins 4 and 5 of port 12 are connected to pins 7 and 8. In addition, when fitted to an IP500 Analog Phone 8 base card, during power failure extension port 8 is connected to the analog trunk port 12.
- License: No license required.
- Maximum per IP500 Control Unit: 4.
- IP Office Software Level: 4.0+.



Daughter Card Ports (9-12)
The LEDs for ports 9 to 12 of the IP500 base card are used as follows:

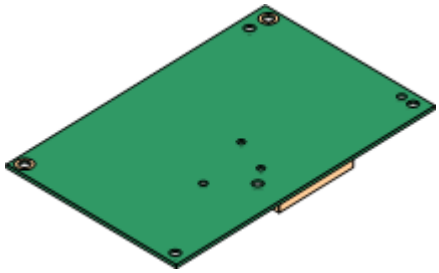
- Green on: Card fitted.
- Green flashing: Trunk in use.
- LED 9 is used for daughter card status.
  - Red On = Error
  - Red Slow Flash = Initializing.
  - Red Flash every 5 seconds = Card okay.
  - Red Fast Flash = System shutdown.

Name	Description	SAP Code
IPO 500 Trnk Anlg 4 Uni	IP Office 500 Trunk Card Analog 4 Universal	700417405

10.3.2 BRI Trunk Cards

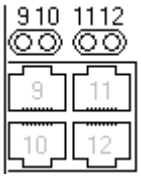
This card can be added to an IP500 base card to provide that card with support for BRI-To 378 trunks. The card is available in 8 channel (4 physical trunks) or 4 channel (2 physical trunks) variants.

This card can be fitted to any IP500 base card except the IP500 Legacy Carrier card and IP500 4-Port Expansion card.



- Ports/Channels
  2 or 4 BRI trunk ports. Connections via ports 9 to 12 of the host IP500 base card.
  - Each trunk port supports 2B+D channels.
  - ETSI or AusTS013 basic rate protocol set through the IP Office configuration.
- License: No license required.
- Maximum per IP500 Control Unit: 4.
- IP Office Software Level: 4.0+.
- S-Bus Connection: On IP Office 4.2+ systems, the card can be switched from To 378 trunk mode to So 377 mode. This mode requires additional terminating resistors and an ISDN crossover cable connection, see BRI Port (So) 377.
- This card is approved for use in the following countries:

Brazil.	New Zealand.
China.	Russia.
India.	South Africa.
Argentina.	United Arab Emirates (UAE).
Australia.	European Union (EU).



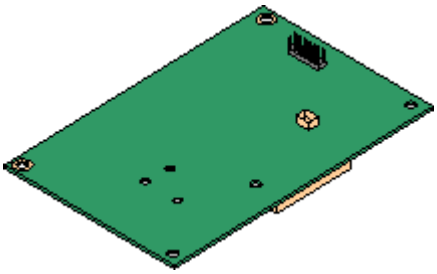
Daughter Card Ports (9-12)
The LEDs for ports 9 to 12 of the IP500 base card are used as follows:

- Off: No trunk present.
- Green on: Trunk present.
- Green flashing: Trunk in use.
- LED 9 is used for daughter card status.
  - Red On = Error
  - Red Slow Flash = Initializing.
  - Red Flash every 5 seconds = Card okay.
  - Red Fast Flash = System shutdown.

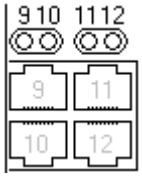
Name	Description	SAP Code
IPO 500 Trnk BRI 4 Uni	IP Office 500 Trunk Card Basic Rate 4 Universal	700417413
IPO 500 Trnk BRI 8 Uni	IP Office 500 Trunk Card Basic Rate 8 Universal	700417421
IP0 IP500 BRI S0 CONVTR CBL	IP500 BRI So Converter Cable	700458649

10.3.3 PRI Trunk Cards

This card can be added to an IP500 base card to provide that card with support for PRI trunks. The card is available in single port or dual port variants.



- Ports/Channels
  1 or 2 PRI trunk ports 385. Each port supports the following PRI line types. On dual port cards both ports will be the same line type. The line type selection can be changed using IP Office Manager.
  - E1 PRI (30B+D channels per port).
  - E1R2 PRI (30B channels per port).
  - T1 robbed bit (24B channels per port) or T1 PRI (23B+D channels per port).
  - The required mode can be selected within IP Office Manager by right-clicking on the line icon and selecting Change Universal PRI Card Line Type and then selecting the required line type.
  - Physical trunk connection is via ports 9 and 10 of the host IP500 base card.
  - Port 11 and 12 can be used as test points for connection of test and monitoring equipment for the adjacent port.
- Licenses
  The IP Office system supports 8 unlicensed B-channels on each IP500 PRI-U port fitted. Additional B-channels, up to the capacity of ports installed and PRI mode selected require IP500 Universal PRI (Additional Channels) licenses added to the configuration. These additional channels consume the licenses based on which additional channels are configured as in-service from port 9 of slot 1 upwards. D-channels are not affected by licensing.
- Maximum per IP500 Control Unit: 4.
- Software Level: 4.1+.



Daughter Card Ports (9-12)
The LEDs for ports 9 to 12 of the IP500 base card are used as follows:

- Off: No trunk present.
- Green on: Trunk present.
- Green flashing: Trunk in use.
- Red/Green Fast Flash (port 9) or Green Fast Flash (port 10): Alarm indication signal (AIS) from the trunk remote end.
- Red with Green Blink (port 9) or Green Blink (port 10): Port in loopback mode (set through IP Office System Monitor).
- LED 9 is used for daughter card status.
  - Red On = Error
  - Red Slow Flash = Initializing.
  - Red Flash every 5 seconds = Card okay.
  - Red Fast Flash = System shutdown.

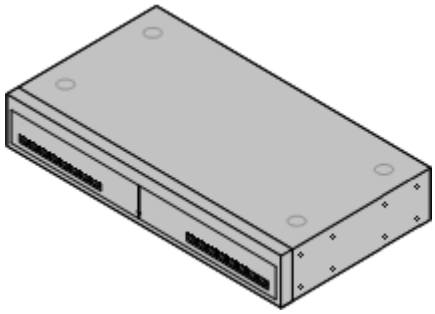
Name	Description	SAP Code
IPO 500 TRNK PRI 1 UNI	IP Office 500 Trunk Card Primary Rate 1 Universal	700417439
IPO 500 TRNK PRI 2 UNI	IP Office 500 Trunk Card Primary Rate 2 Universal	700417462

10.4 IP500 Expansion Modules

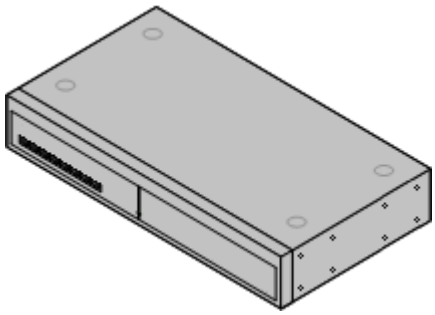
The following IP500 external expansion modules are supported by IP Office Release 6. They are intended for use with an IP500 or IP500v2 control unit but can also be used with IP400 control units.

Each module uses an external power supply unit 32 supplied with the module. A locale specific power cord 33 for the PSU must be ordered separately. If being rack mounted these units use the IP500 rack mounting kit.

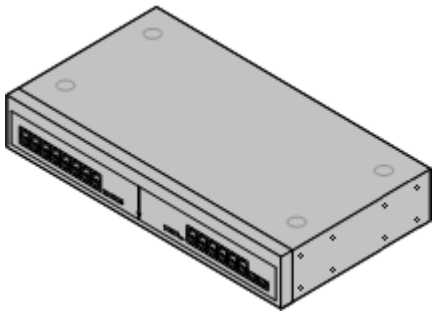
- IP500 Analog Trunk Module 249
  Provides an additional 16 ANALOG 376 ports for connection of analog trunks. Supports both loop-start and ground-start trunks.
  - Currently only available for the US locale.
  - Use with ground start trunks requires that the trunk module and the IP Office control unit are grounded.



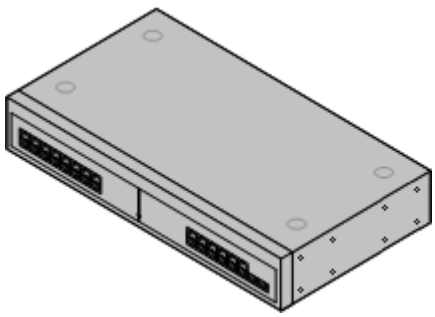
- IP500 BRI So8 Module 251
  Provides 8 ETSI BRI-So ports 377 for the connection of ISDN devices. This unit is not intended to support BRI trunks.



- IP500 Digital Station Module 253
  Provides, depending on variant, an additional 16 or 30 DS 379 ports for supported Avaya digital phones 43.



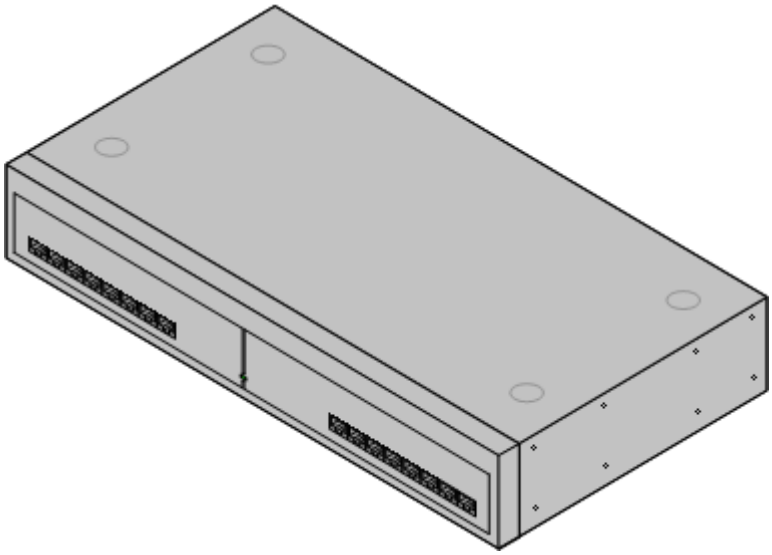
- IP500 Phone Module 255
  Provides, depending on variant, an additional 16 or 30 PHONE 384 ports for analog phones.



10.4.1 Analog Trunk 16

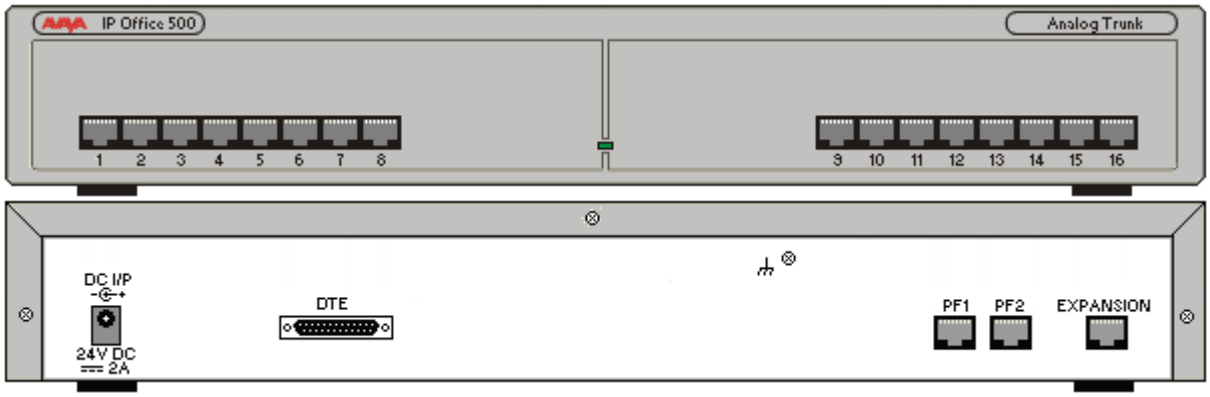
The IP500 Analog Trunk module can be used to add 16 additional analog trunks to an IP Office system. The module supports both loop-start and, with suitable grounding, ground-start trunks. This module is currently only supported in the US locale.

- IMPORTANT
  In all IP Office installations, any module being used for analog trunk connections must be connected to a functional earth 207.
- ⚠ WARNING
  Within areas of high lightning risk, any module using analog trunk connections must be connected to a protective ground 207 and to surge protection equipment 38 (an Avaya 146G Surge Protector).



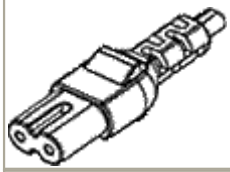
Feature	Details
Supported on	All IP Office control units except Small Office Edition.
Locales	Specific variants are provided for different IP Office locales, see below.
Software Level	IP Office core software level 1.0 minimum. Bin file = naatm16.bin.
Included	Power supply unit (see below) and Expansion Interconnect cable.
Power Supply	The module is supplied with a 2-pin, 40W external power supply unit. The PSU has an integral power cord for connection to the module's DC I/P socket. A locale specific IEC60320 C7 power cord 32 for the external PSU is required but is not supplied with the module.
Mounting	The module is designed as a free-standing module that can be stacked on or under other IP Office modules. The module can be rack mounted in a 19" rack system using the optional IP500 Rack Mounting Kit.
Dimensions	Width: 445mm/17.5". Depth: 245mm/9.7". Height: 71mm/2.8"/2U.
Weight	Unboxed: 2.9Kg/6.6lbs. Boxed: 4.2Kg/9.4lbs.

IPO 500 Analog Trunk Module Connections



Ports	Description
ANALOG 376	RJ45 socket. Used for connection to analog trunks. Ports can be configured as either loop-start or ground-start trunks through the IP Office configuration. In the event of power failure, Analog ports 1 and 2 are directly connected to analog extension ports PF1 and PF2 respectively. If used the connected phones must be clearly labeled as power failure devices. This is only supported for loop-start analog trunks.
DC I/P 379	DC power input port. Used for connection of the power lead from an Avaya 40W external power supply unit supplied with the expansion module. A locale specific IEC60320 C7 power cord 32 for the external PSU is required but is not supplied with the module.
DTE 135	25-Way D-Type socket. For Avaya use only.
EXPANSION 381	RJ45 Socket. Used for direct connection to an Expansion port on an IP Office control unit using the Expansion Interconnect cable supplied with the module.
PF 383	RJ45 socket. Power failure analog extension ports. See Analog section above.
⏚	Ground point. Used for connection of a protective or functional ground 207 if required. On older modules where this screw is not present, the top-center cover screw should be used instead. • IMPORTANT In all IP Office installations, any module being used for analog trunk connections must be connected to a functional earth 207. • ⚠ WARNING Within areas of high lightning risk, any module using analog trunk connections must be connected to a protective ground 207 and to surge protection equipment 38.

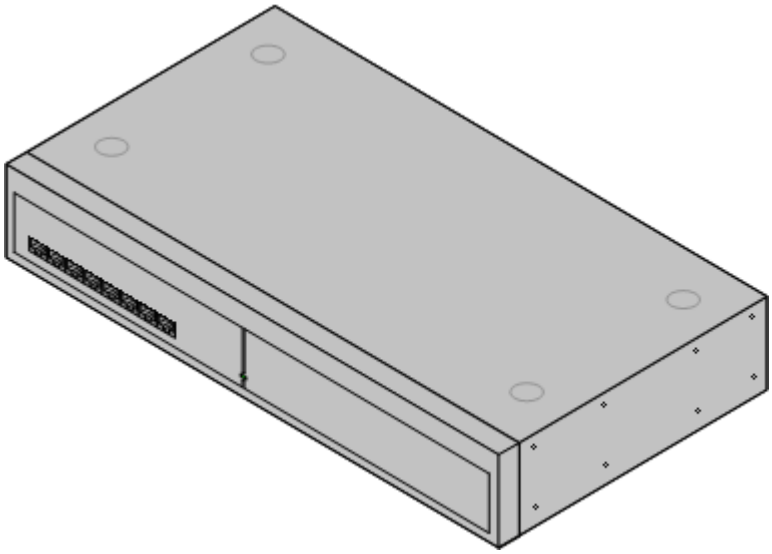
All expansion modules are supplied with a base software level and should be upgraded to match the core software of the control unit in the IP Office system.

Item	Variant	Country	SAP Code
IPO 500 Analog Trunk 16	America	America	700449473
IEC60320 C7 Power Cord 	NEMA1-15	America	700213390
IP500 Rack Mounting Kit		All	700429202

Expansion modules include an external power supply unit (PSU) and an appropriate interconnect cable. They do not include a locale specific power cord for the external PSU or any phone extension cables.

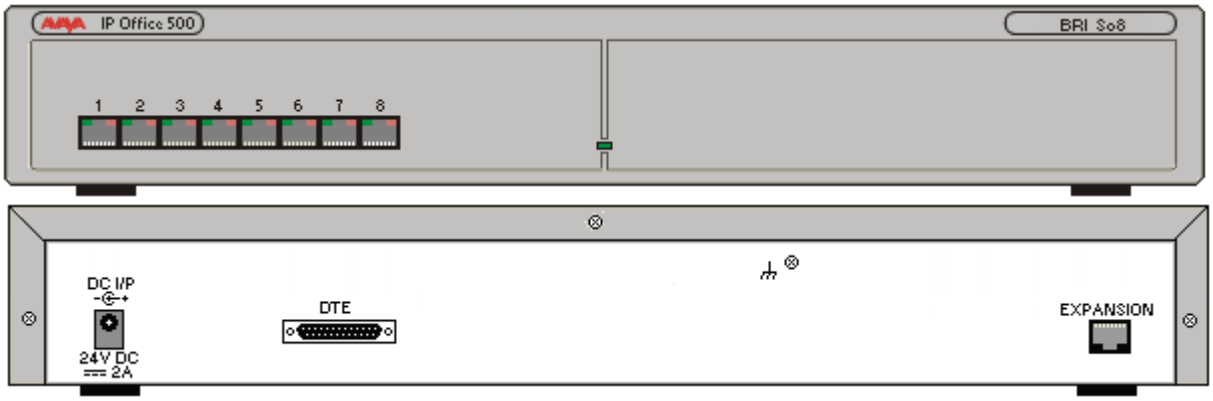
10.4.2 BRI SO8

The So8 module can be used to add ETSI BRI S0-interface ports to the IP Office system. These ports can then be used for the connection of ISDN devices.



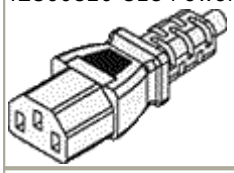
Feature	Details
Supported on	All IP Office control units except Small Office Edition.
Locales	Supported in all IP Office locales.
Software Level	IP Office core software level 1.0 minimum. Bin file = nas0-16.bin.
Included	Power supply unit (see below) and Expansion Interconnect cable.
Power Supply	The unit is supplied with an earthed 3-Pin, 60W external power supply unit. The PSU has an integral power cord for connection to the unit's DC I/P socket. A locale specific IEC60320 C13 power cord 32 for the external PSU is required but is not supplied with the unit.
Mounting	The module is designed as a free-standing module that can be stacked on or under other IP Office modules. The module can be rack mounted in a 19" rack system using the optional IP500 Rack Mounting Kit.
Dimensions	Width: 445mm/17.5". Depth: 245mm/9.7". Height: 71mm/2.8"/2U.
Weight	Unboxed: 2.8Kg/6.3lbs. Boxed: 4.1Kg/9.2lbs.

IPO 500 So8 Module Connections



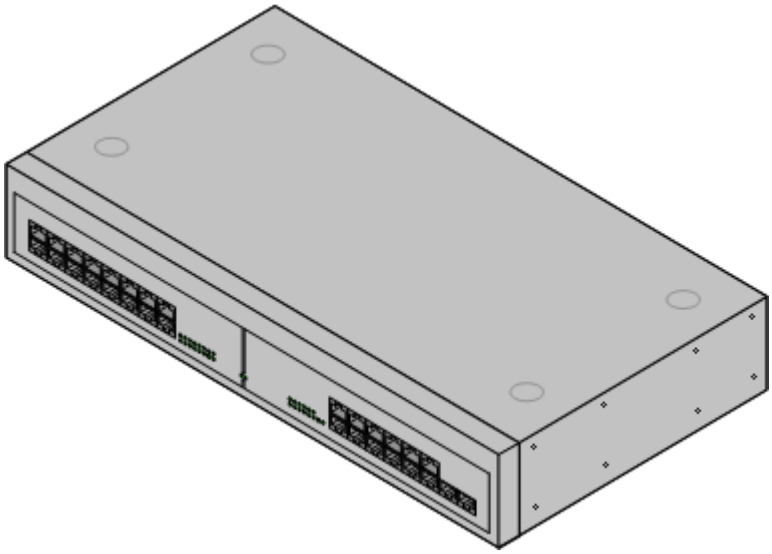
Ports	Description
BRI 377	RJ45 socket. Used for connection of ISDN terminal devices. Note: These ports appear a lines within the IP Office configuration. However they cannot be used for connection to external BRI lines.
DC I/P 379	DC power input port. Used for connection of the power lead from an Avaya 60W external power supply unit supplied with the expansion module. A locale specific IEC60320 C13 power cord 32 for the external PSU is required but is not supplied with the module.
DTE 135	25-Way D-Type socket. For Avaya use only.
EXPANSION 381	RJ45 Socket. Used for direct connection to an Expansion port on an IP Office control unit using the Expansion Interconnect cable supplied with the module.
⏚	Function ground point. Used for connection of a protective or functional ground 207 if required. On older modules where this screw is not present, the top-center cover screw should be used instead.

All expansion modules are supplied with a base software level and should be upgraded to match the core software of the control unit in the IP Office system. Expansion modules include an external power supply unit (PSU) and an appropriate interconnect cable. They do not include a locale specific power cord for the external PSU or any phone extension cables.

Item	Variant	Country	SAP Code
IPO 500 BRI So8		All	700449515
IEC60320 C13 Power Cord 	CEE7/7	Europe	700289762
	BS1363	United Kingdom	700289747
	NEMA5-15P	America	700289770
IP500 Rack Mounting Kit		All	700429202

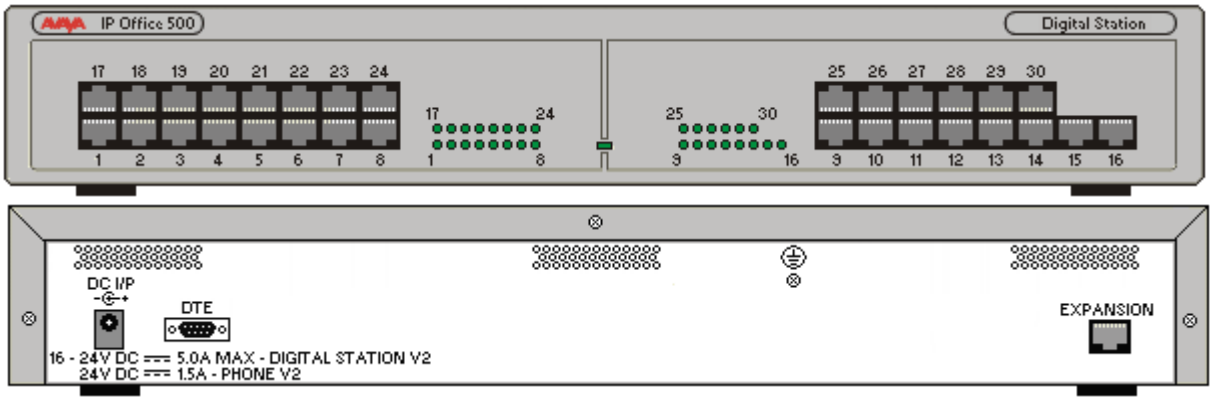
10.4.3 Digital Station

IPO 500 Digital Station modules can be used to add additional DS ports to an IP Office system. The module is available in 16 and 30 port variants, referred to as the IP500 Digital Station 16 and IP500 Digital Station 30 respectively.



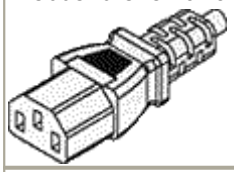
Feature	Details
Supported on	All IP Office control units except Small Office Edition.
Locales	Supported in all IP Office locales.
Software Level	IP Office core software level 2.1(31) minimum. Bin file = nadcpV2.bin.
Included	Power supply unit (see below) and Expansion Interconnect cable.
Power Supply	The module is supplied with a Earthed 3-Pin, 60W external power supply module. The PSU has an integral power cord for connection to the module's DC I/P socket. A locale specific IEC60320 C13 power cord 32 for the external PSU is required but is not supplied with the module.
Mounting	The module is designed as a free-standing module that can be stacked on or under other IP Office modules. The module can be rack mounted in a 19" rack system using the optional IP500 Rack Mounting Kit.
Dimensions	Width: 445mm/17.5". Depth: 245mm/9.7". Height: 71mm/2.8".
Weight	Unboxed: 3.5Kg/7.8lbs. Boxed: 4.8Kg/10.8lbs. (Based on DS30 V2)

IPO 500 Digital Station Connections



Ports	Description
DC I/P 379	DC power input port. Used for connection of the power lead from an Avaya earthed 60W external power supply unit supplied with the expansion module. A locale specific IEC60320 C13 power cord 32 for the external PSU is required but is not supplied with the module.
DS 379	RJ45 socket. Digital Station port. Used for connection of IP Office supported DS phones 43. If connected to an out-of-building extension 38, the connection must be made via additional IROB barrier devices in addition to the buildings primary protection. The module must also be connected to a protective ground.
DTE 135	9-Way D-Type socket. For Avaya use only.
EXPANSION 381	RJ45 Socket. Used for direct connection to an Expansion port on an IP Office control unit using the Expansion Interconnect cable supplied with the module.
⏚	Protective Ground point. Use of a protective ground is required for all installations, see Grounding (Earthing) 207. Where the module is connected to analog extensions in another building, an IP Office Phone Barrier Box V2 (101V) is required at both ends, see Lightning Protection/Out-of-Building Connections 38.

All expansion modules are supplied with a base software level and should be upgraded to match the core software of the control unit in the IP Office system.

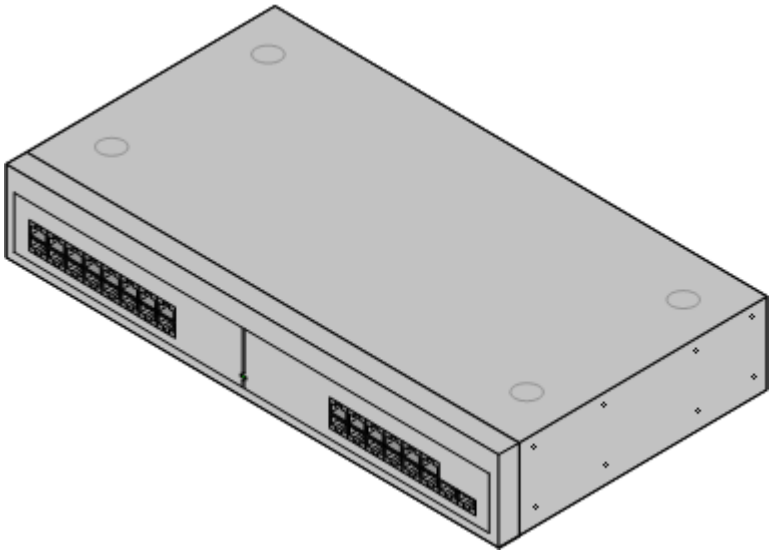
Item	Variant	Country	SAP Code
IPO 500 Digital Station	16 Ports	All	700449499
	30 Ports		700426216
IEC60320 C13 Power Cord 	CEE7/7	Europe	700289762
	BS1363	United Kingdom	700289747
	NEMA5-15P	America	700289770
IP500 Rack Mounting Kit		All	700429202

Expansion modules include an external power supply unit (PSU) and an appropriate interconnect cable. They do not include a locale specific power cord for the external PSU or any phone extension cables.

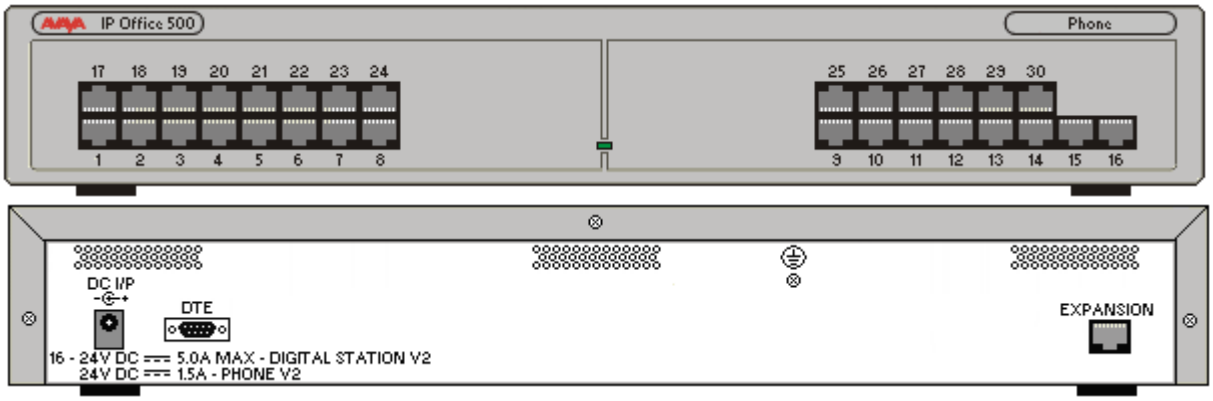
10.4.4 Phone

IP500 Phone modules can be used to add additional PHONE ports to an IP Office system.

The module is available in 16 and 30 port variants, referred to as the IP500 Phone 16 and IP500 Phone 30 respectively.

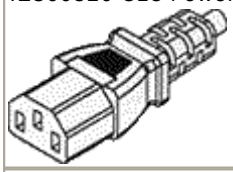


Feature	Details
Supported on	All IP Office control units except Small Office Edition.
Locales	Supported in all IP Office locales.
Software Level	IP Office core software level 2.1(36) minimum. Bin file = dvpots.bin.
Included	Power supply unit (see below) and Expansion Interconnect cable.
Power Supply	The module is supplied with a Earthed 3-Pin, 60W external power supply unit. The PSU has an integral power cord for connection to the module's DC I/P socket. A locale specific IEC60320 C13 power cord 32 for the external PSU is required but is not supplied with the module.
Mounting	The module is designed as a free-standing module that can be stacked on or under other IP Office modules. The module can be rack mounted in a 19" rack system using the optional IP500 Rack Mounting Kit.
Dimensions	Width: 445mm/17.5". Depth: 245mm/9.7". Height: 71mm/2.8".
Weight	Unboxed: 3.1Kg/6.94lbs. Boxed: 4.4Kg/9.7lbs. (Based on Phone 30 V2)



Ports	Description
DC I/P 379	DC power input port. Used for connection of the power lead from an Avaya earthed 60W external power supply unit supplied with the expansion module. A locale specific IEC60320 C13 power cord 32 for the external PSU is required but is not supplied with the module.
DTE 135	9-Way D-Type socket. For Avaya use only.
EXPANSION 381	RJ45 Socket. Used for direct connection to an Expansion port on an IP Office control unit using the Expansion Interconnect cable supplied with the module.
PHONE 384	RJ45 socket. Used for connection of analog phones. Intended for two-wire analog phones. For connection to 4-wire analog phones connection should be via a master socket with ringing capacitors. If connected to an out-of-building extension 38, the connection must be made via additional IP Office Barrier Boxes 125 in addition to the buildings primary protection. The module must also be connected to a protective ground.
⏚	Protective Ground point. Use of a protective ground is required for all installations, see Grounding (Earthing) 207. Where the module is connected to analog extensions in another building, an IP Office Phone Barrier Box V2 (101V) is required at both ends, see Lightning Protection/Out-of-Building Connections 38.

All expansion modules are supplied with a base software level and should be upgraded to match the core software of the control unit in the IP Office system.

Item	Variant	Country	SAP Code
IPO 500 Phone	16 Ports	All	700449507
	30 Ports	All	700426224
IEC60320 C13 Power Cord 	CEE7/7	Europe	700289762
	BS1363	United Kingdom	700289747
	NEMA5-15P	America	700289770
IP500 Rack Mounting Kit		All	700429202

Expansion modules include an external power supply unit (PSU) and an appropriate interconnect cable. They do not include a locale specific power cord for the external PSU or any phone extension cables.

10.5 Feature Keys

The serial number of the feature key fitted to the IP Office control unit is used as the basis for all licenses issued for that IP Office system and is used to regularly re-validate the licenses. If the feature key is removed, over the next few hours licensed features will stop operating.

10.5.1 IP500v2 System SD Cards

This type of feature key is used with IP500v2 control units and is a mandatory item. The control unit must be fitted with one of these feature keys even if no licenses are being used.

The serial number for licenses issued for use with this type of feature key is printed on the card label and prefixed by FK.

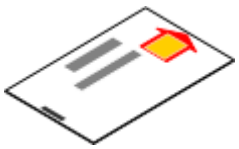
This type of feature key is also a memory card used for other system functions and to provide embedded voicemail if required.

- By default the card can be used for 2 ports of embedded voicemail. Additional ports up to a maximum of 6 can be enabled by the addition of licenses 392. The voicemail mailbox message and prompt capacity is limited to 15 hours regardless of the card capacity.
- ⚠ WARNING
  These cards should only be formatted using IP Office Manager or IP Office System Status Application. The cards should only be removed from a system after either a card shut down 159 or a system shut down 161.

Feature Key Dongle	SAP Code
IPO IP500 V2 SYS SD CARD A-LAW	700479702
IPO IP500 V2 SYS SD CARD MU-LAW	700479710
IPO IP500 V2 SYS SD CARD PARTNER	700479728
IPO IP500 V2 SYS SD CARD NORSTAR	700500948

- A-Law or Mu-Law
  PCM (Pulse Code Modulation) is a method for encoding voice as data. In telephony, two methods PCM encoding are widely used, A-law and Mu-law (also called U-law). Typically Mu-law is used in North America and a few other locations while A-law by the rest of the world. As well as setting the correct PCM encoding for the region, the A-Law or Mu-Law setting of an IP Office system when it is first started affects a wide range of regional defaults relating to line settings and other values.
  - For IP400 IP Office systems, each control units was manufactured as either an A-Law variant or a Mu-Law variant.
  - For IP500 and IP500v2 systems, the encoding default is set by the type of Feature Key installed when the system is first started.
- PARTNER
  This type of feature key is used for IP500v2 control units running in PARTNER Version 52 mode. The installation and operation of such a system is covered by separate installation documentation.
- NORSTAR
  This type of feature key is used for IP500v2 control units running in Norstar Version 52 mode. The installation and operation of such a system is covered by separate installation documentation.

10.5.2 IP500 Smart Card



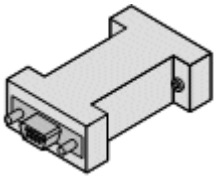
This type of feature key is used with IP500 control units and is a mandatory item. The control unit must be fitted with one of these feature keys even if no licenses are being used.

The serial number for licenses issued for use with this type of feature key is printed on the card and prefixed by SN.

Feature Key Dongle	SAP Code
Smart Card Feature Key (Mu-Law)	700417470
Smart Card Feature Key (A-Law)	700417488

- A-Law or Mu-Law
  PCM (Pulse Code Modulation) is a method for encoding voice as data. In telephony, two methods PCM encoding are widely used, A-law and Mu-law (also called U-law). Typically Mu-law is used in North America and a few other locations while A-law by the rest of the world. As well as setting the correct PCM encoding for the region, the A-Law or Mu-Law setting of an IP Office system when it is first started affects a wide range of regional defaults relating to line settings and other values.
  - For IP400 IP Office systems, each control units was manufactured as either an A-Law variant or a Mu-Law variant.
  - For IP500 and IP500v2 systems, the encoding default is set by the type of Feature Key installed when the system is first started.

10.5.3 IP400 Serial Port Feature Key



This type of Feature Key connects to the serial port on the back of the IP Office control unit. It is supported on all IP400 control units with a 9-pin DTE port. For IP Office Release 6 that covers IP406 V2 and IP412 controls units.

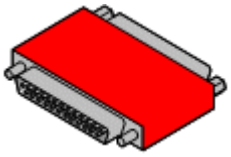
The serial number for licenses issued for use with this type of feature key is printed on the feature key and prefixed by SN.

This type of Feature Key is not supported with IP500 and IP500v2 systems.

This type of Feature Key is only required if the IP Office systems requires licenses.

Feature Key Dongle	SAP Code
Serial Port Feature Key	700293095

10.5.4 IP400 Parallel Port feature Key

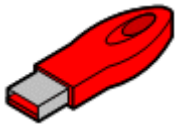


This type of feature key attaches to the parallel port of a PC running IP Office Feature Key Server software. This type of feature key is not supported for IP Office systems running IP Office Release 6.0.

The serial number for licenses issued for use with this type of feature key is printed on the feature key and prefixed by SN.

Feature Key Dongle	SAP Code
Parallel Port Feature Key	700185234

10.5.5 IP400 USB Port feature Key



This type of feature key attaches to a USB port on a PC running IP Office Feature Key Server software. This type of feature key is not supported for IP Office systems running IP Office Release 6.0.

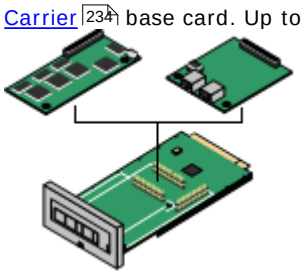
The serial number for licenses issued for use with this type of feature key is printed on the feature key and prefixed by SN.

Feature Key Dongle	SAP Code
USB Port Feature Key	700261506

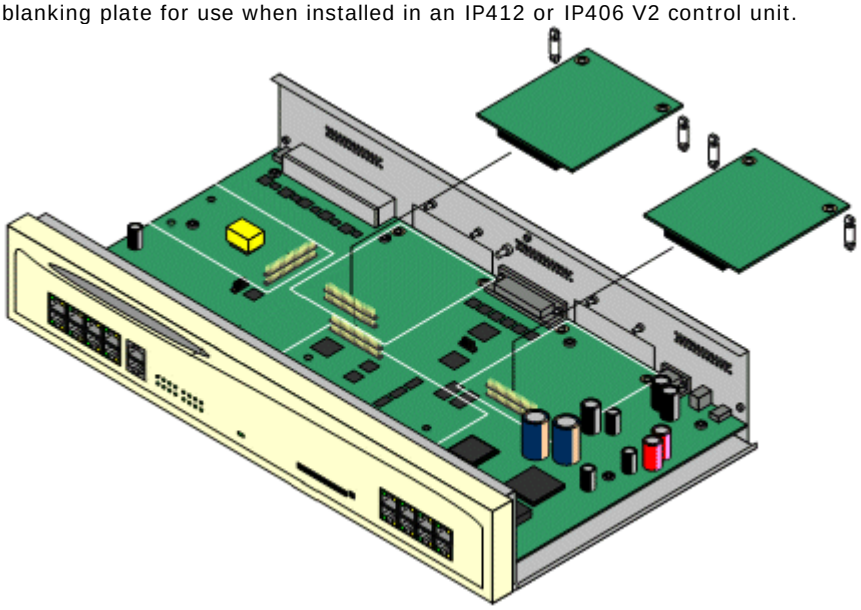
10.6 IP400 Trunk Cards

A range of IP400 trunk cards are available for different trunk types. These can be used in IP412 and IP406 V2 control units. Some can also be used in IP500 and IP500v2 control units.

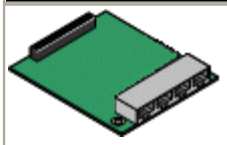
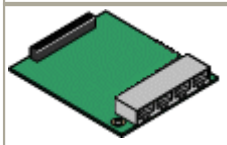
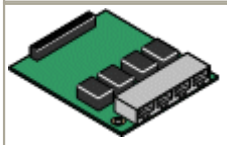
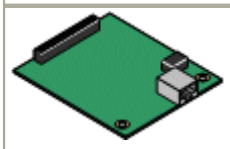
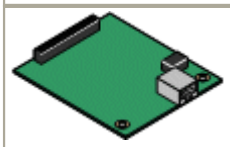
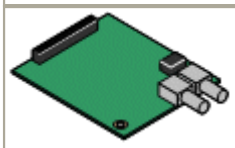
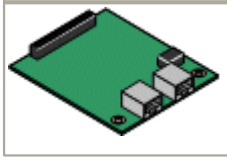
- IP500 and IP500v2 Control Units
  IP400 trunk cards can be used in IP500 and IP500 v2 controls units by being fitted onto an IP500 Legacy Card Carrier 234 base card. Up to 2 cards can be added to the control unit in this way.



- IP400 Control Units
  The IP406 V2 and IP412 can be fitted with up to 2 IP400 trunk cards. Except where otherwise indicated, it is recommended that Slot B is used first. Each IP400 trunk card is supplied with stand off pillars and a replacement blanking plate for use when installed in an IP412 or IP406 V2 control unit.



The following IP400 trunk card types are supported by IP Office Release 6:

IP400 Trunk Cards		IP406 V2	IP412	IP500	IP500v2
	Analog Trunk Card (ATM4) 262 Provides 4 RJ45 loop-start analog trunk ports. The card is available in several locale specific variants. This card has been superseded by the ATM4U card below. Additional loop or ground start analog trunks can also be added using Analog Trunk 269 external expansion modules.	✓	✓	✓	✓
	Analog Trunk Card (ATM4U) 261 Provides 4 RJ45 loop-start analog trunk ports as per the ATM4 above but available in a single worldwide variant. Also supports adjustable echo cancellation on IP Office 3.1. Additional loop or ground start analog trunks can also be added using Analog Trunk 269 external expansion modules.	✓	✓	✓	✓
	Quad BRI Trunk Card 262 Provides support for 4 RJ45 BRI (2B+D) trunk ports. These can be configured to ETSI or AusTS013 operation. The ports include 100ohm termination.	✓	✓	✓	✓
	Single PRI T1 Trunk Cards 263 Supports PRI (23B+D) trunks and T1 Robbed-Bit (24B) trunks through a single RJ45 port. The mode of operation is selected in the IP Office configuration.	✓	✓	✓	✓
	Single E1 PRI Trunk Cards 263 Supports PRI (30B+D) trunks through a single RJ45 port. The port can be configured for PRI or QSIG operation.	✓	✓	✓	✓
	Single E1R2 Trunk Cards 264 Supports PRI (30B+D) trunks using E1R2 signaling. Available in coaxial or RJ45 connector variants. Coaxial variants are not supported on an IP500 carrier card.	✓	✓	✓	✓
	Dual PRI Trunk Cards 263 As the single PRI cards above but supporting the connection of two PRI trunks. On the IP406 V2, supported in Slot A only.	✓	✓	✓	✓

10.6.1 Analog Trunk Card Uni (ATM4U)

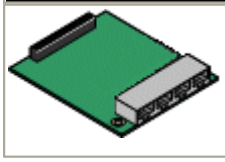
This card supersedes the previous Analog Trunk cards and is referred to as the "ATM4U". It can be identified by a label on the base of the card.

The card is supported on IP Office software 2.1(36) and higher. Unlike the previous ATM4 card, the same ATM4U card variant can be used in all locales.

For systems running IP Office software 3.1 or higher, the echo cancellation used on each trunk can be switched off or on (16ms).

The card provides 4 RJ45 sockets for analog trunk connections 376. The card only supports loop-start trunks. For ground-start trunks an Analog Trunk expansion module 269 should be used.

- Power Failure Operation
  There are no power failure extension connections provided for the analog trunk card. If this is a requirement, the ATM16 expansion module should be used.
- ⚠ WARNING
  In all IP Office installations, any module or control unit using analog trunk connections must be connected to a functional earth 207.
- ⚠ WARNING
  Within the Republic of South Africa and in areas of high lightning risk, any module or control unit using analog trunk connections must be connected to a protective ground 207 and to surge protection equipment 38.

ATM4U Trunk Card		Country	SAP Code	IP406 V2	IP412	IP500	IP500v2
	ATM4 Uni (Loop-Start)	All	700359938	✓	✓	✓	✓

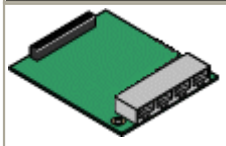
- The card includes two plastic stand off pillars for installation and a replacement blanking plate for the rear of IP400 control units.
- For the IP500 and IP500v2 control units, an IP500 Carrier Card is required, up to a maximum of 2 IP500 Carrier Cards.

10.6.2 Analog Trunk Cards (ATM4)

The Analog Trunk card is also referred to as the "ATM4". It provides 4 RJ45 sockets for analog trunk connections 376. The card only supports loop-start trunks.

The card is available in a number of locale specific variants as detailed below.

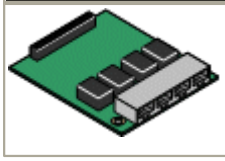
- Power Failure Operation
  There are no power failure extension connections provided for the analog trunk card.
- ⚠ WARNING
  In all IP Office installations, any module or control unit using analog trunk connections must be connected to a functional earth 207.
- ⚠ WARNING
  Within the Republic of South Africa and in areas of high lightning risk, any module or control unit using analog trunk connections must be connected to a protective ground 207 and to surge protection equipment 38.

ATM4 Trunk Cards		Country	SAP Code	IP406 V2	IP412	IP500	IP500v2
	IP400 Analog 4 (Loop-Start)	North and South America	700185192	✓	✓	–	–
	IP400 Analog 4 EU (Loop-Start)	Europe	700241672	✓	✓	–	–
	IP400 Analog 4 NZ (Loop-Start)	New Zealand	700241706	✓	✓	–	–

- These cards include two plastic stand off pillars for installation and a replacement blanking plate for the rear of IP400 control units.

10.6.3 BRI Trunk Cards

The BRI trunk card is also referred to as the "Quad BRI". It provides 4 RJ45 sockets for ETSI BRI trunk connections, with each trunk supporting 2B+D channels.

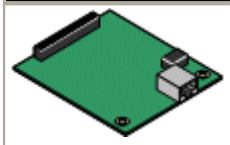
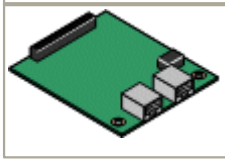
Variant		Country	SAP Code	IP406 V2	IP412	IP500	IP500v2
	IP400 BRI	All	700185168	✓	✓	✓	✓
	IP400 BRI 8 (UNI)	All except China	700262017	✓	✓	✓	✓

- The trunk card ports include 100 ohm termination.
- These cards include two plastic stand off pillars for installation and a replacement blanking plate for the rear of IP400 control units.
- For the IP500 and IP500v2 control units, an IP500 Carrier Card is required, up to a maximum of 2 IP500 Carrier Cards.

10.6.4 T1 PRI Trunk Cards

These trunk cards support 23B+D primary rate (US PRI) trunks and 24B T1 robbed-bit trunks. The mode of operation is selected within the IP Office configuration.

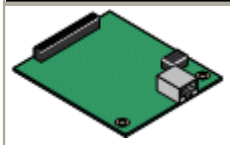
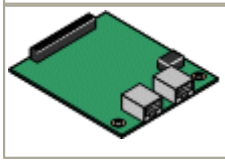
The T1 PRI card includes an integral CSU/DSU that can be activated through the IP Office Monitor application.

PRI Trunk Cards		Country	SAP Code	IP406 V2	IP412	IP500	IP500v2
	IP400 PRI 24 T1	North America	700185200	✓	✓	✓	✓
	IP400 PRI 48 T1	North America	700185218	✓	✓	✓	✓

- These cards include two plastic stand off pillars for installation and a replacement blanking plate for the rear of IP400 control units.
- For dual port cards the IP406 V2 only supports a single dual card in Slot A.
- For the IP500 and IP500v2 control units, an IP500 Carrier Card is required, up to a maximum of 2 IP500 Carrier Cards.

10.6.5 E1 PRI Trunk Cards

These cards support primary rate trunks providing 30B+D channels.

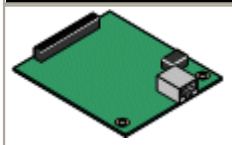
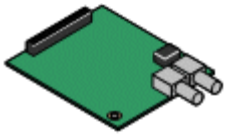
E1 PRI trunk Cards		Country	SAP Code	IP406 V2	IP412	IP500	IP500v2
	IP400 PRI 30 E1 (1.4)	All except China and CALA.	700272461	✓	✓	✓	✓
	IP400 PRI 60 E1	All except China and CALA.	700185184	✓	✓	✓	✓

- These cards include two plastic stand off pillars for installation and a replacement blanking plate for the rear of IP400 control units.
- For dual port cards the IP406 V2 only supports a single dual card in Slot A.
- For the IP500 and IP500v2 control units, an IP500 Carrier Card is required, up to a maximum of 2 IP500 Carrier Cards.

10.6.6 E1R2 PRI Trunk Cards

These cards support E1 trunks with R2 signalling. Each trunk provides up to 30B+D channels.

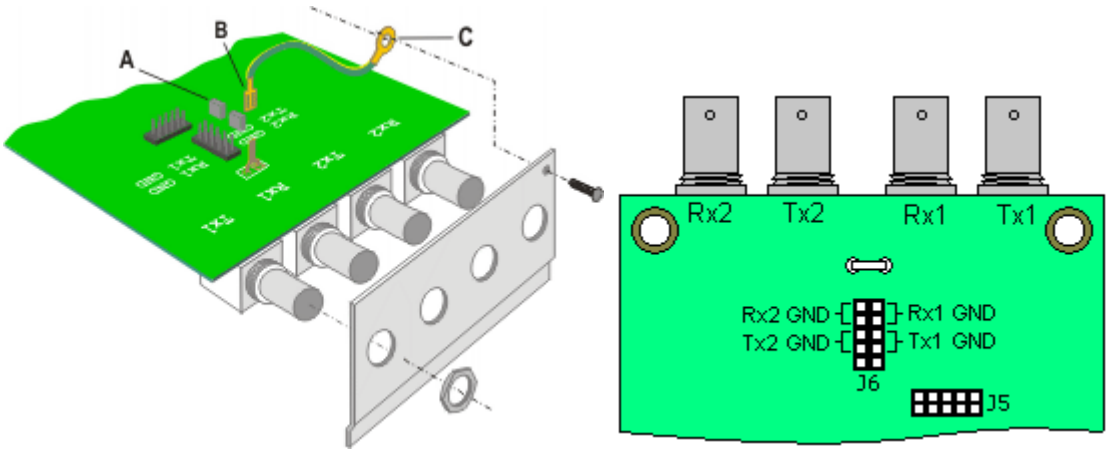
E1R2 PRI trunk cards are available with either RJ45 or coaxial cable connectors.

E1R2PRI trunk Cards		Country	SAP Code	IP406 V2	IP412	IP500	IP500v2
	IP400 PRI 30 E1R2 RJ45	CALA, Korea, China	700241631	✓	✓	✓	✓
	IP400 PRI 60 E1R2 RJ45		700241649	✓	✓	✓	✓
	IP400 PRI 30 E1R2 COAX	CALA	700241656	✓	✓	–	–
	IP400 PRI 60 E1R2 COAX		700241664	✓	✓	–	–

- These cards include two plastic stand off pillars for installation and a replacement blanking plate for the rear of IP400 control units.
- For E1R2 coaxial card, a ground-jumper cable and coaxial connector locking rings are included.
- For dual port cards the IP406 V2 only supports a single dual card in Slot A.

- For the IP500 and IP500v2 control units, an IP500 Carrier Card is required, up to a maximum of 2 IP500 Carrier Cards.

E1R2 coax trunk cards must be grounded correctly and require the IP Office control unit to be connected to a protective ground. Normally the ends of one connection is grounded. For example, if the exchange Tx1 is grounded, the IP Office Rx1 should also be grounded. However this must be confirmed with the line provider to establish which ends they want grounded.

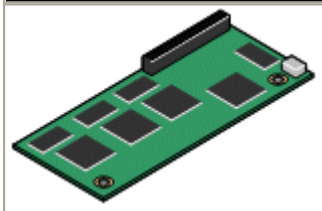


1. Connect the ground strap spade end (B) supplied with the card to the spade connection on the card and the other end (C) to the chassis with the long securing screw also supplied with the card.
2. Use the two jumpers supplied with the card, match the ground selection of the line provider. For example, if the line provider has grounded their Tx1, place a jumper across the two Rx1 pins of jumper block J6.

10.7 IP400 Internal Cards

10.7.1 Modem Cards

A modem card allows the IP Office to answer incoming modem calls up to V.90. There are two variants of modem card available:

Variants		Country	IP406 V2	IP412	IP500	IP500v2	SAP Code
	Modem 2 Card Provides 2 modem channels. Supported from IP Office 1.0 onwards.	All	✓	✓	–	–	700185226
	Internal Modem Card Provides 12 modem channels except on the IP403 where it only provides 4. Supported from IP Office 2.1(27) onwards.	All	✓	✓	–	–	700343452

- The cards are supplied with 2 plastic stand off pillars for installation.
- The first analog trunk on control units fitted with an ATM4 or ATM4U trunk card, can be set to answer V.32 analog modem calls. Whilst in this mode, the trunk cannot be used for voice calls.

10.7.2 Embedded Voicemail Memory Cards

This card is supported on IP406 V2 control units. It is a specially formatted Compact Flash cards that provides embedded voicemail operation and can also be configured for basic auto-attendant support. Use of these cards for voicemail does not require a license.

- ⚠ These cards are not hot swappable. Removal of the cards while the IP Office control unit is powered may cause lose or corruption of messages and prompts. IP Office Manager can be used to shutdown a memory card 112 before its removal.

Variant		Country	IP406 V2	IP412	IP500	IP500v2	SAP Code
	IP406 V2 Uses a 512MB Compact Flash card. This card provides up to 15 hours storage for uncompressed prompts, greetings and messages. Operation of this card does not require voice compression channels.	All	✓	–	✓	–	700343460

- From IP Office 3.0 onwards, the prompt files for the following languages are pre-installed on the Avaya memory cards.
  - Danish
  - German
  - English-UK
  - English-US
  - Spanish
  - Spanish-Mexico
  - Spanish-Argentina
  - Finnish
  - French
  - French-Canadian
  - Italian
  - Korean
  - Dutch
  - Norwegian
  - Portuguese
  - Portuguese-Brazilian
  - Russian
  - Swedish
  - Chinese - Mandarin
  - Chinese- Cantonese *(IP Office 4.2 +)*
- For full details of embedded voicemail setup and configuration, refer to the Embedded Voicemail Installation manual.
- The memory card can also be used for storage of files normally obtained via TFTP transfer. For example the music-on-hold wav file and supported 4600 Series/5600 Series software files. This will however reduce storage space for prompt and message files if embedded voicemail is being used. Non-Avaya memory cards can be used for this function.

10.7.3 Voice Compression Modules

IP400 VCMs are optional cards that can be installed inside the IP Office control unit. Each VCM provides a number of voice compression channels 45, indicated by a number suffix. For example, a VCM 8 has 8 voice compression channels.

- For the IP500 control unit, to use an IP400 Voice Compression Card an IP500 Carrier Card 234 is also required for each IP400 VCM. For IP500 control units, voice compression channels can also be added using up to 2 IP500 VCM base cards with VCM licenses 235.

VCM Cards		SAP Code	IP406 V2	IP412	IP500	IP500v2
25ms echo cancellation.	IP400 VCM5*	700185119	✓	✓	–	–
	IP400 VCM10*	700185127	✓	✓	–	–
	IP400 VCM20*	700185135	✓	✓	–	–
	IP400 VCM30	700293939	✓	✓	✓	✓
64ms echo cancellation.	IP400 VCM4	700359854	✓	✓	✓	✓
	IP400 VCM8	700359862	✓	✓	✓	✓
	IP400 VCM16	700359870	✓	✓	✓	✓
	IP400 VCM24	700359888	✓	✓	✓	✓
Number of IP400 VCM cards.			1	2	2	2
Maximum number of channels.			30	60	128	148

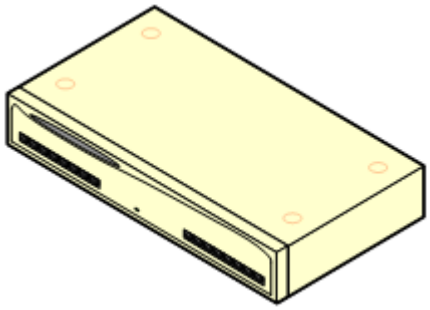
1. These modules are still supported on some systems but are no longer available from Avaya.

10.8 IP400 Expansion Modules

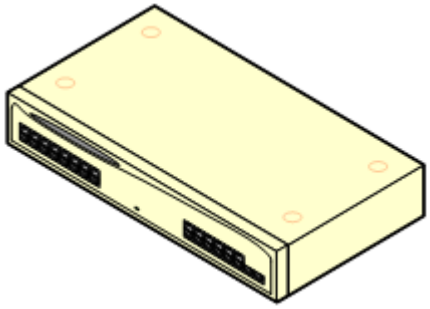
The following IP400 external expansion modules are supported by IP Office Release 6. Except for the WAN3 10/100, these modules can also be used with an IP500 and IP500v2 control units.

Each module uses an external power supply unit 32 supplied with the module. A locale specific power cord 33 for the PSU must be ordered separately. If being rack mounted these units use the IP400 rack mounting kit.

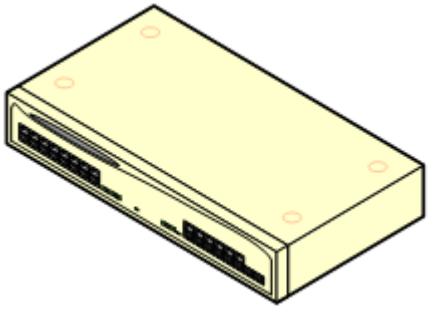
- IP400 Analog Trunk Module (ATM16) 269
  Provides an additional 16 ANALOG 376 ports for connection of analog trunks. Supports both loop-start and ground-start trunks.
  - Available in a number of variants for different locales.
  - Use with ground start trunks requires that the trunk module and the IP Office control unit are grounded.



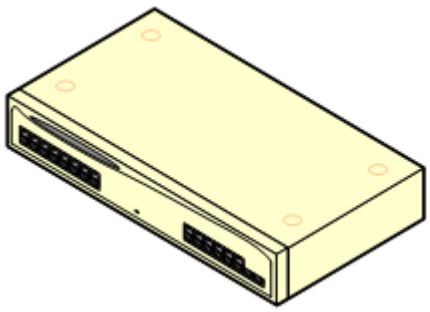
- IP400 Digital Station Module 273
  Provides, depending on the variant, an additional 16 or 30 DS 379 ports for supported Avaya digital phones. This module has been superseded by the Digital Station V2.



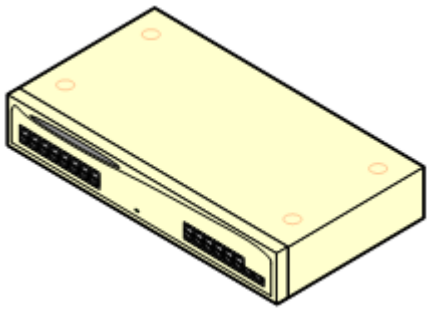
- IP400 Digital Station Module V2 271
  Provides, depending on variant, an additional 16 or 30 DS 379 ports for supported Avaya digital phones 43. Supersedes the previous Digital Station module.



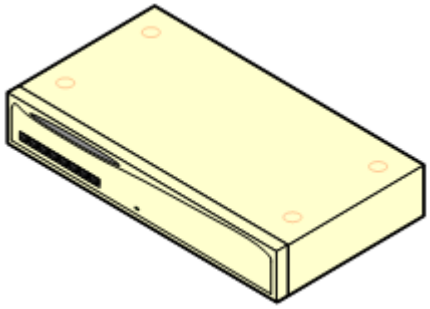
- IP400 Phone Module 277
  Provides, depending on variant, an additional 8, 16 or 30 POT 384 ports for analog phones. This module has been superseded by the Phone Module V2.



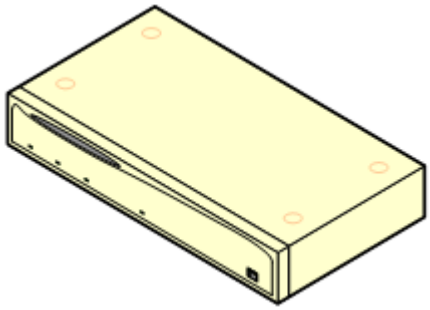
- IP400 Phone Module V2 275
  Provides, depending on variant, an additional 8, 16 or 30 PHONE 384 ports for analog phones. Supersedes the previous Phone module. With IP Office 3.1, the Phone V2 supports a wider range of message waiting indication (MWI) options than Phone V1 modules.
  - With V2 units, the labeling of analog phone ports was changed from POT to PHONE.



- IP400 So8 Module 279
  Provides 8 ETSI BRI-So 377 ports for the connection of ISDN devices. This unit is not intended to support BRI trunks.



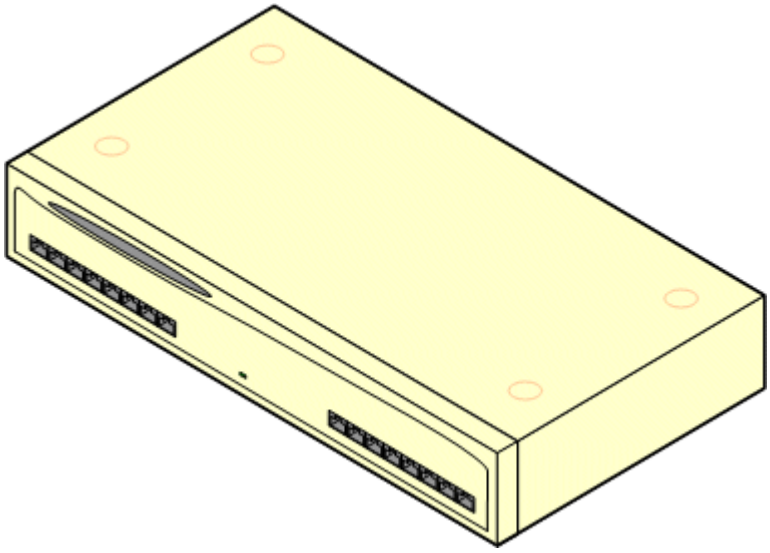
- IP400 WAN3 10/100 Module 281
  Provides on its rear an additional three 37-way D-type WAN 387 ports. These can be used for the connection of V.24 387, V.35 388 and X.21 389 WAN services. The module connects to the control unit via a LAN port rather than an expansion port.
  - The WAN3 has been superseded by the WAN3 10/100 and is not supported by IP Office 3.2 and higher.
  - IP Office systems are restricted to a maximum of 2 WAN3 modules regardless of the control unit type.
  - This module is not supported with the IP500 and Ip500 V2.



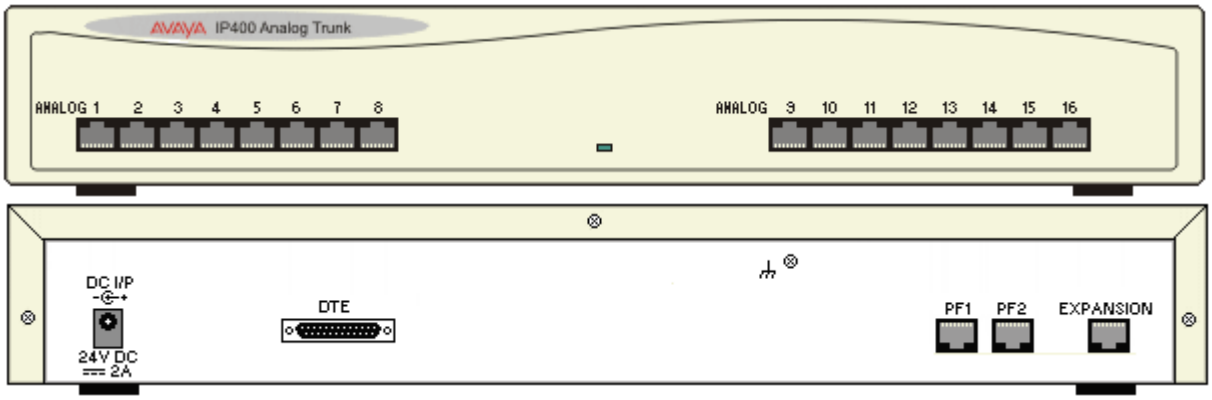
10.8.1 Analog Trunk 16

The IP400 Analog Trunk module (also known as the ATM16) is used to add 16 additional analog trunks to an IP Office system. The module supports both loop-start and, with suitable grounding, ground-start trunks.

- IMPORTANT
  In all IP Office installations, any module being used for analog trunk connections must be connected to a functional earth 207.
- ⚠ WARNING
  Within the Republic of South Africa and in areas of high lightning risk, any module using analog trunk connections must be connected to a protective ground 207 and to surge protection equipment 38.

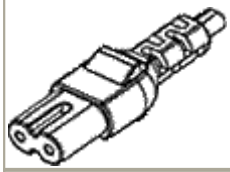


Feature	Details
Supported on	All IP Office control units except Small Office Edition.
Locales	Specific variants are provided for different IP Office locales, see below.
Software Level	IP Office core software level 1.0 minimum. Bin file = naatm16.bin.
Included	Power supply unit (see below) and Expansion Interconnect cable.
Power Supply	The module is supplied with a 2-pin, 40W external power supply unit. The PSU has an integral power cord for connection to the module's DC I/P socket. A locale specific IEC60320 C7 power cord 32 for the external PSU is required but is not supplied with the module.
Mounting	The module is designed as a free-standing module that can be stacked on or under other IP Office modules. The module can be rack mounted in a 19" rack system using the optional IP400 Rack Mounting Kit.
Dimensions	Width: 445mm/17.5". Depth: 245mm/9.7". Height: 71mm/2.8"/2U.
Weight	Unboxed: 2.9Kg/6.6lbs. Boxed: 4.2Kg/9.4lbs.



Ports	Description
ANALOG 376	RJ45 socket. Used for connection to analog trunks. Ports can be configured as either loop-start or ground-start trunks through the IP Office configuration. In the event of power failure, Analog ports 1 and 2 are directly connected to analog extension ports PF1 and PF2 respectively. If used the connected phones must be clearly labeled as power failure devices. This is only supported for loop-start analog trunks.
DC I/P 379	DC power input port. Used for connection of the power lead from an Avaya 40W external power supply unit supplied with the expansion module. A locale specific IEC60320 C7 power cord 32 for the external PSU is required but is not supplied with the module.
DTE 135	25-Way D-Type socket. For Avaya use only.
EXPANSION 381	RJ45 Socket. Used for direct connection to an Expansion port on an IP Office control unit using the Expansion Interconnect cable supplied with the module.
PF 383	RJ45 socket. Power failure analog extension ports. See Analog section above.
	Ground point. Used for connection of a protective or functional ground 207 if required. On older modules where this screw is not present, the top-center cover screw should be used instead. • IMPORTANT In all IP Office installations, any module being used for analog trunk connections must be connected to a functional earth 207. • ⚠ WARNING Within the Republic of South Africa and in areas of high lightning risk, any module using analog trunk connections must be connected to a protective ground 207 and to surge protection equipment 38.

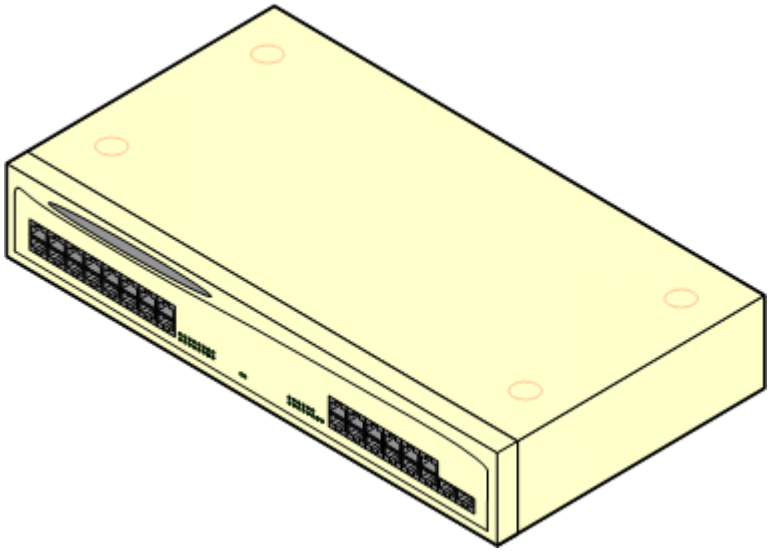
All expansion modules are supplied with a base software level and should be upgraded to match the core software of the control unit in the IP Office system.

Item	Variant	Country	SAP Code
IP400 Analog Trunk 16	America	America	700211360
	Europe	Europe	700241680
	New Zealand	New Zealand	700241698
IEC60320 C7 Power Cord 	CEE7/16	Europe	700213382
	BS1363	United Kingdom	700213374
	NEMA1-15	America	700213390
	Korea	Korea	700254519
IP400 Rack Mounting Kit		All	700210800

Expansion modules include an external power supply unit (PSU) and an appropriate interconnect cable. They do not include a locale specific power cord for the external PSU or any phone extension cables.

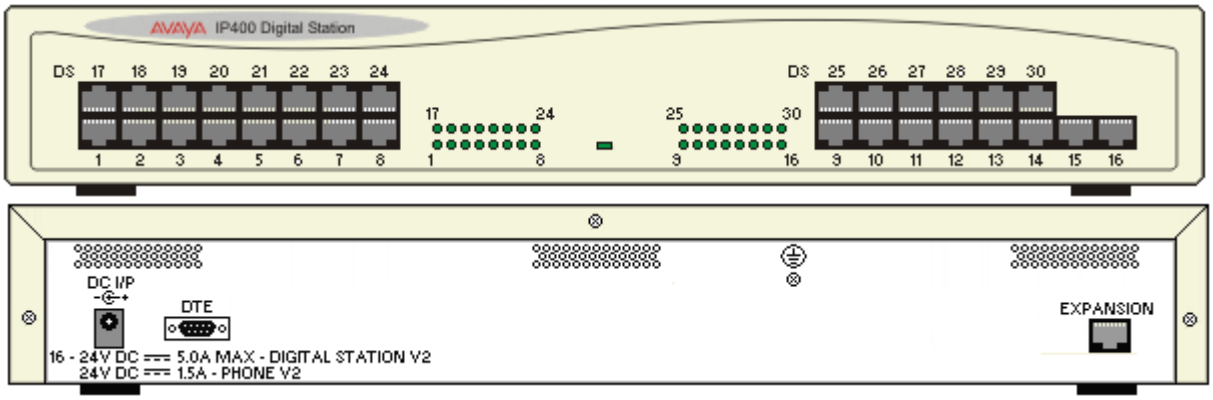
10.8.2 Digital Station V2

The IP400 Digital Station V2 (also known as DS V2) is used to add additional DS ports to an IP Office system. The DS V2 is available in 16 and 30 port variants, referred to as DS16 V2 and DS30 V2 respectively.



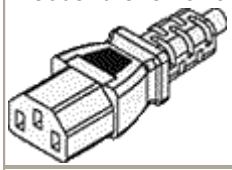
The DS V2 supersedes the original IP400 Digital Station, now referred to as a DS V1. The module version is indicated by labels both the base and the rear of the module.

Feature	Details
Supported on	All IP Office control units except Small Office Edition.
Locales	Supported in all IP Office locales.
Software Level	IP Office core software level 2.1(31) minimum. Bin file = nadcpV2.bin.
Included	Power supply unit (see below) and Expansion Interconnect cable.
Power Supply	The module is supplied with a Earthed 3-Pin, 60W external power supply module. The PSU has an integral power cord for connection to the module's DC I/P socket. A locale specific IEC60320 C13 power cord 32 for the external PSU is required but is not supplied with the module.
Mounting	The module is designed as a free-standing module that can be stacked on or under other IP Office modules. The module can be rack mounted in a 19" rack system using the optional IP400 Rack Mounting Kit.
Dimensions	Width: 445mm/17.5". Depth: 245mm/9.7". Height: 71mm/2.8"/2U.
Weight	Unboxed: 3.5Kg/7.8lbs. Boxed: 4.8Kg/10.8lbs. (Based on DS30 V2)



Ports	Description
DC I/P 379	DC power input port. Used for connection of the power lead from an Avaya earthed 60W external power supply unit supplied with the expansion module. A locale specific IEC60320 C13 power cord 32 for the external PSU is required but is not supplied with the module.
DS 379	RJ45 socket. Digital Station port. Used for connection of IP Office supported DS phones 43. If connected to an out-of-building extension 38, the connection must be made via additional IROB barrier devices in addition to the buildings primary protection. The module must also be connected to a protective ground.
DTE 135	9-Way D-Type socket. For Avaya use only.
EXPANSION 381	RJ45 Socket. Used for direct connection to an Expansion port on an IP Office control unit using the Expansion Interconnect cable supplied with the module.
⏚	Protective Ground point. Use of a protective ground is required for all installations, see Grounding (Earthing) 207. Where the module is connected to analog extensions in another building, an IP Office Phone Barrier Box V2 (101V) is required at both ends, see Lightning Protection/Out-of-Building Connections 38.

All expansion modules are supplied with a base software level and should be upgraded to match the core software of the control unit in the IP Office system.

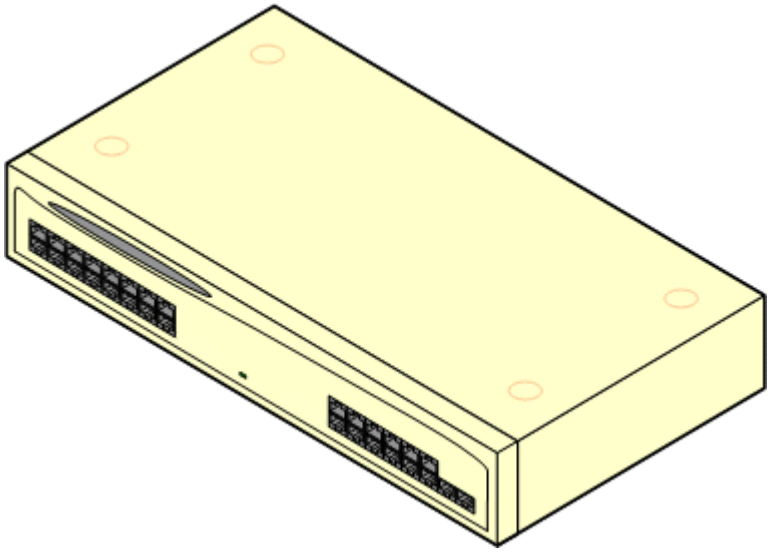
Item	Variant	Country	SAP Code
IP400 Digital Station V2	16 Ports	All	700359839
	30 Ports		700359847
IEC60320 C13 Power Cord 	CEE7/7	Europe	700289762
	BS1363	United Kingdom	700289747
	NEMA5-15P	America	700289770
IP400 Rack Mounting Kit		All	700210800

Expansion modules include an external power supply unit (PSU) and an appropriate interconnect cable. They do not include a locale specific power cord for the external PSU or any phone extension cables.

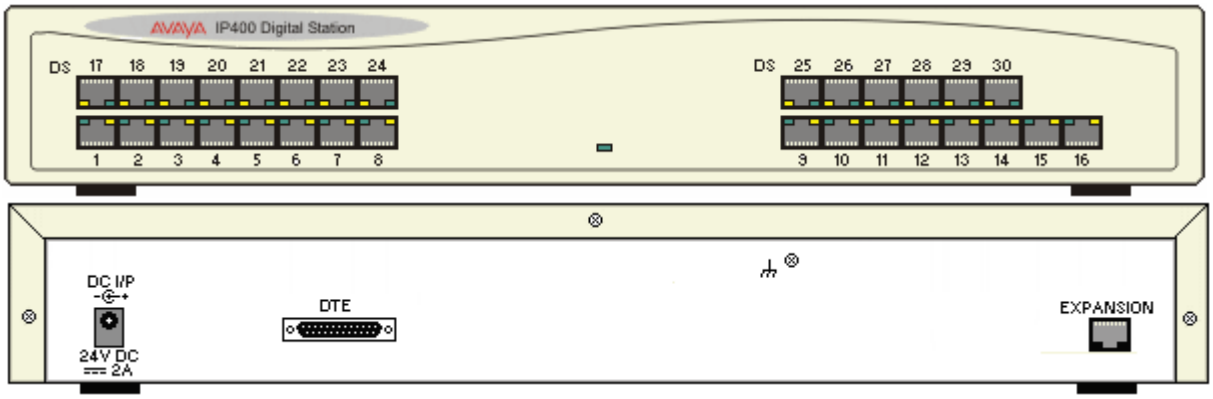
10.8.3 Digital Station

The IP400 Digital Station module (also known as DS module) is used to add additional DS ports to an IP Office system.

The DS module is available in 16 and 30 port variants, referred to as DS16 and DS30 modules respectively. The IP400 Digital Station Module has been superseded by the IP400 Digital Station Module V2 271.

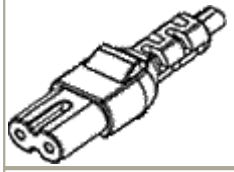


Feature	Details
Supported on	All IP Office control units except Small Office Edition.
Locales	Supported in all IP Office locales.
Software Level	IP Office core software level 1.0 minimum. Bin file = nadcp-16.bin.
Included	Power supply unit (see below) and Expansion Interconnect cable.
Power Supply	The module is supplied with a 2-pin, 40W external power supply unit. The PSU has an integral power cord for connection to the module's DC I/P socket. A locale specific IEC60320 C7 power cord 32 for the external PSU is required but is not supplied with the module.
Mounting	The module is designed as a free-standing module that can be stacked on or under other IP Office modules. The module can be rack mounted in a 19" rack system using the optional IP400 Rack Mounting Kit.
Dimensions	Width: 445mm/17.5". Depth: 245mm/9.7". Height: 71mm/2.8"/2U.
Weight	Unboxed: 3.5Kg/7.8lbs. Boxed: 4.8Kg/10.8lbs. (Based on DS30).



Ports	Description
DC I/P 379	DC power input port. Used for connection of the power lead from an Avaya 40W external power supply unit supplied with the expansion module. A locale specific IEC60320 C7 power cord 32 for the external PSU is required but is not supplied with the module.
DS 379	Digital Station port. Used for connection of IP Office supported DS phones 43. If connected to an out-of-building extension 38, the connection must be made via additional IROB barrier devices in addition to the buildings primary protection. The module must also be connected to a protective ground.
DTE 135	25-Way D-Type socket. For Avaya use only.
EXPANSION 381	RJ45 Socket. Used for direct connection to an Expansion port on an IP Office control unit using the Expansion Interconnect cable supplied with the module.
⏚	Ground point. Used for connection of a protective or functional ground 207 if required. On older modules where this screw is not present, the top-center cover screw should be used instead. Must be connected if any out-of-building extensions 38 are connected to this module.

All expansion modules are supplied with a base software level and should be upgraded to match the core software of the control unit in the IP Office system.

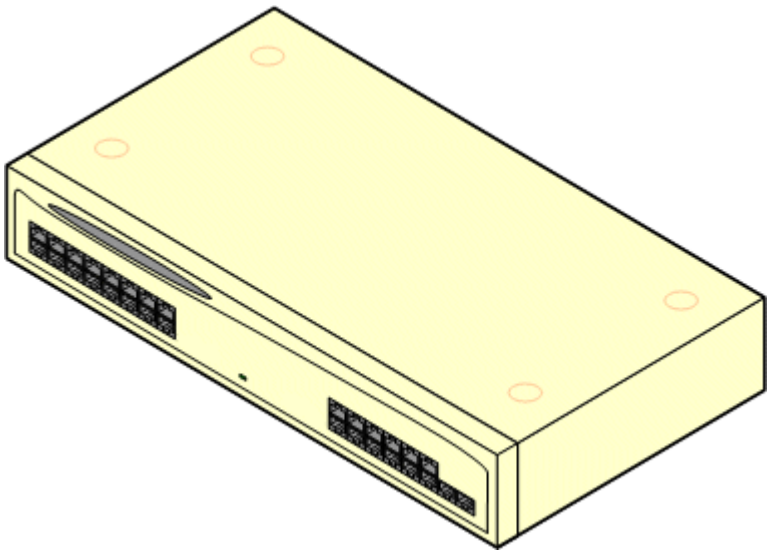
Item	Variant	Country	SAP Code
IP400 Digital Station	16 Ports	All	700184807
	30 Ports		700184880
IEC60320 C7 Power Cord 	CEE7/16	Europe	700213382
	BS1363	United Kingdom	700213374
	NEMA1-15	America	700213390
	Korea	Korea	700254519
IP400 Rack Mounting Kit		All	700210800

Expansion modules include an external power supply unit (PSU) and an appropriate interconnect cable. They do not include a locale specific power cord for the external PSU or any phone extension cables.

10.8.4 Phone V2

The IP400 Phone V2 module (also known as the Phone V2 module) is used to add additional PHONE ports to an IP Office system. PHONE ports are used for analog phones.

The Phone V2 module is available in 8, 16 and 30 port variants, referred to as the Phone 8, Phone 16 and Phone 30 respectively.

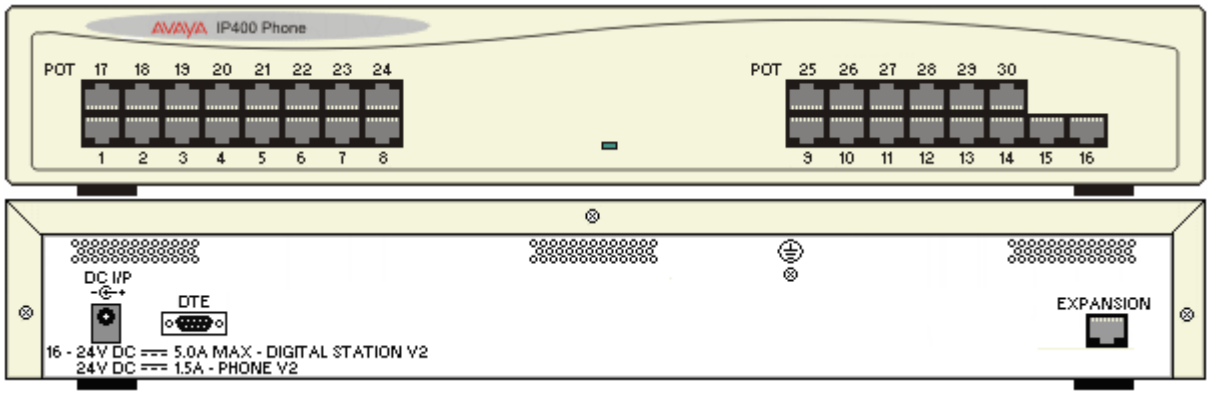


The Phone V2 module supersedes the original IP400 Phone module, now referred to as the Phone V1. The module version is indicated by labels on both the base and the rear of the module. Key changes are:

- The Phone V2 uses an earthed 3-pin 60W external power supply unit.
- With IP Office 3.1, the message waiting indication (MWI) on each port can be configured for None, On, 51V Stepped, 81V, Line Reversal A or Line Reversal B. On uses the default determined by the system locale. Ports on a Phone V2 module can additionally be configured for 101V operation.
- These ports do not include a ringing capacitor. Therefore for connection to 4-wire analog phones where this is a requirement (typically the United Kingdom and New Zealand), connection should be via a Master socket containing ringing capacitors.
- The DTE serial port on the rear of the module has been changed to a 9-pin D-type socket.

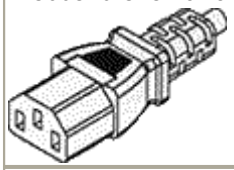
Feature	Details
Supported on	All IP Office control units except Small Office Edition.
Locales	Supported in all IP Office locales.
Software Level	IP Office core software level 2.1(36) minimum. Bin file = dvpots.bin.
Included	Power supply unit (see below) and Expansion Interconnect cable.
Power Supply	The module is supplied with a Earthed 3-Pin, 60W external power supply unit. The PSU has an integral power cord for connection to the module's DC I/P socket. A locale specific IEC60320 C13 power cord 32 for the external PSU is required but is not supplied with the module.
Mounting	The module is designed as a free-standing module that can be stacked on or under other IP Office modules. The module can be rack mounted in a 19" rack system using the optional IP400 Rack Mounting Kit.
Dimensions	Width: 445mm/17.5". Depth: 245mm/9.7". Height: 71mm/2.8"/2U.
Weight	Unboxed: 3.1Kg/6.94lbs. Boxed: 4.4Kg/9.7lbs. (Based on Phone 30 V2)

Phone Module V2 Connections



Ports	Description
DC I/P 379	DC power input port. Used for connection of the power lead from an Avaya earthed 60W external power supply unit supplied with the expansion module. A locale specific IEC60320 C13 power cord 32 for the external PSU is required but is not supplied with the module.
DTE 135	9-Way D-Type socket. For Avaya use only.
EXPANSION 381	RJ45 Socket. Used for direct connection to an Expansion port on an IP Office control unit using the Expansion Interconnect cable supplied with the module.
PHONE 384	RJ45 socket. Used for connection of analog phones. Intended for two-wire analog phones. For connection to 4-wire analog phones connection should be via a master socket with ringing capacitors. If connected to an out-of-building extension 38, the connection must be made via additional IP Office Barrier Boxes 125 in addition to the buildings primary protection. The module must also be connected to a protective ground.
⏚	Protective Ground point. Use of a protective ground is required for all installations, see Grounding (Earthing) 207. Where the module is connected to analog extensions in another building, an IP Office Phone Barrier Box V2 (101V) is required at both ends, see Lightning Protection/Out-of-Building Connections 38.

All expansion modules are supplied with a base software level and should be upgraded to match the core software of the control unit in the IP Office system.

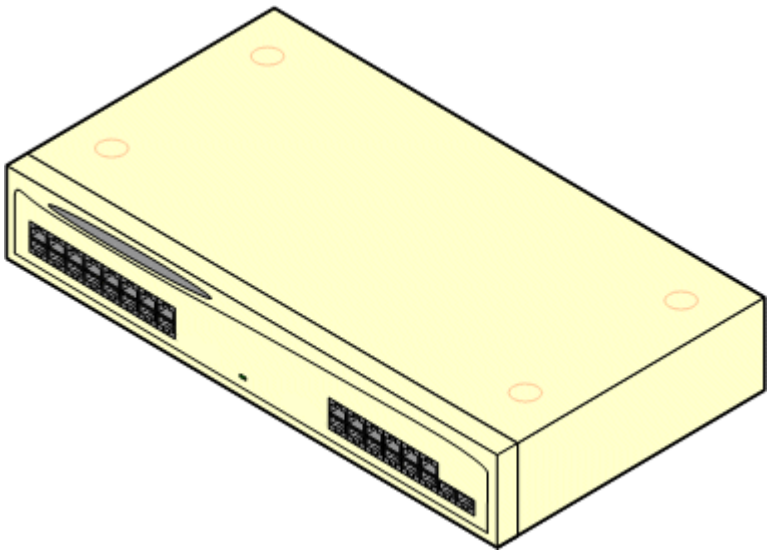
Item	Variant	Country	SAP Code
IP400 Phone V2	8 Ports	All	700359896
	16 Ports		700359904
	30 Ports		700359912
IEC60320 C13 Power Cord 	CEE7/7	Europe	700289762
	BS1363	United Kingdom	700289747
	NEMA5-15P	America	700289770
IP400 Rack Mounting Kit		All	700210800

Expansion modules include an external power supply unit (PSU) and an appropriate interconnect cable. They do not include a locale specific power cord for the external PSU or any phone extension cables.

10.8.5 Phone

The IP400 Phone module (also known as the Phone V1 module) is used to add additional POT ports to an IP Office system. POT ports are used for analog phones.

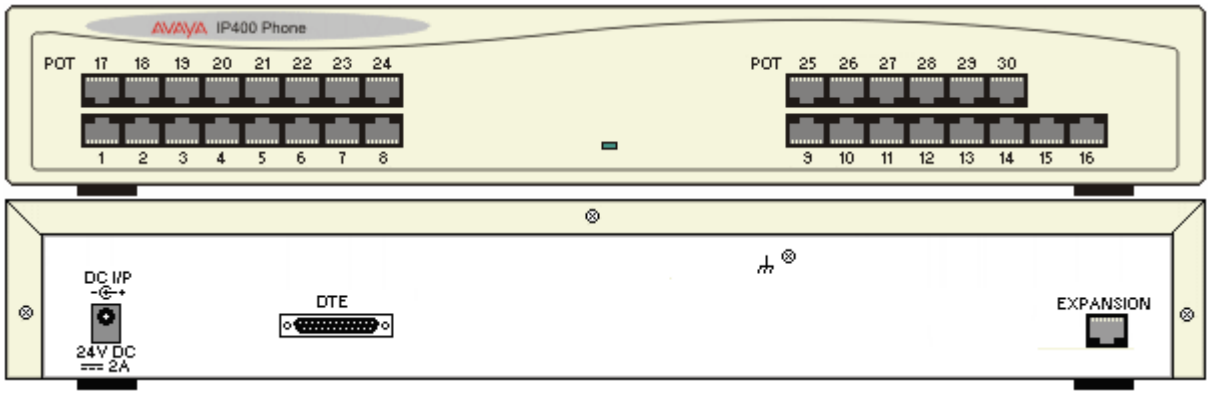
The Phone module is available in 8, 16 and 30 port variants, referred to as the Phone 8, Phone 16 and Phone 30 respectively. The IP400 Phone Module has been superseded by the Phone Module V2 275.



- With IP Office 3.1 and higher, the message waiting indication (MWI) on each POT port can be configured for None, On, 51V Stepped, 81V, Line Reversal A or Line Reversal B. On uses the default determined by the system locale. POT ports on a Phone V2 module can additionally be configured for 101V operation.

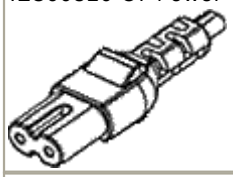
Feature	Details
Supported on	All IP Office control units except Small Office Edition.
Locales	Supported in all IP Office locales.
Software Level	IP Office core software level 1.0 minimum. Bin file = napots16.bin (earlier units, not supported on IP500) or avpots16.bin (later units).
Included	Power supply unit (see below) and Expansion Interconnect cable.
Power Supply	The module is supplied with a 2-pin, 40W external power supply unit. The PSU has an integral power cord for connection to the module's DC I/P socket. A locale specific IEC60320 C7 power cord 32 for the external PSU is required but is not supplied with the module.
Mounting	The module is designed as a free-standing module that can be stacked on or under other IP Office modules. The module can be rack mounted in a 19" rack system using the optional IP400 Rack Mounting Kit.
Dimensions	Width: 445mm/17.5". Depth: 245mm/9.7". Height: 71mm/2.8"/2U.
Weight	Unboxed: 3.1Kg/6.94lbs. Boxed: 4.4Kg/9.7lbs. (Based on Phone 30 V2).

Phone V1 Module Connections



Ports	Description
DC I/P 379	DC power input port. Used for connection of the power lead from an Avaya 40W external power supply unit supplied with the expansion module. A locale specific IEC60320 C7 power cord 32 for the external PSU is required but is not supplied with the module.
DTE 135	25-Way D-Type socket. For Avaya use only.
EXPANSION 381	RJ45 Socket. Used for direct connection to an Expansion port on an IP Office control unit using the Expansion Interconnect cable supplied with the module.
POT 384	RJ45 socket. Used for connection of analog phones. If connected to an out-of-building extension 38, the connection must be made via additional IP Office Barrier Box devices in addition to the buildings primary protection. The module must also be connected to a protective ground.
	Function ground point. Used for connection of a protective or functional ground 207 if required. On older modules where this screw is not present, the top-center cover screw should be used instead. Must be connected if any out-of-building extensions 38 are connected to this module.

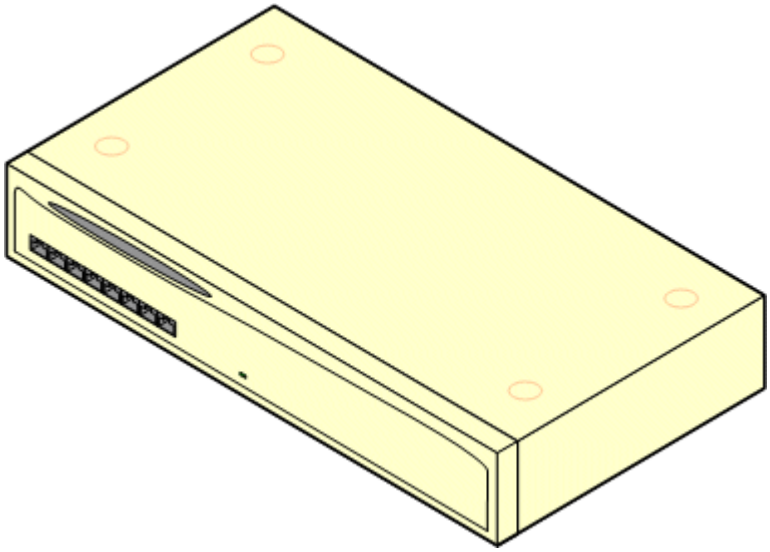
All expansion modules are supplied with a base software level and should be upgraded to match the core software of the control unit in the IP Office system.

Item	Variant	Country	SAP Code
IP400 Phone V1	8 Ports	All	700184773
	16 Ports		700184781
	30 Ports		700184799
IEC60320 C7 Power Cord 	CEE7/16	Europe	700213382
	BS1363	United Kingdom	700213374
	NEMA1-15	America	700213390
	Korea	Korea	700254519
IP400 Rack Mounting Kit		All	700210800

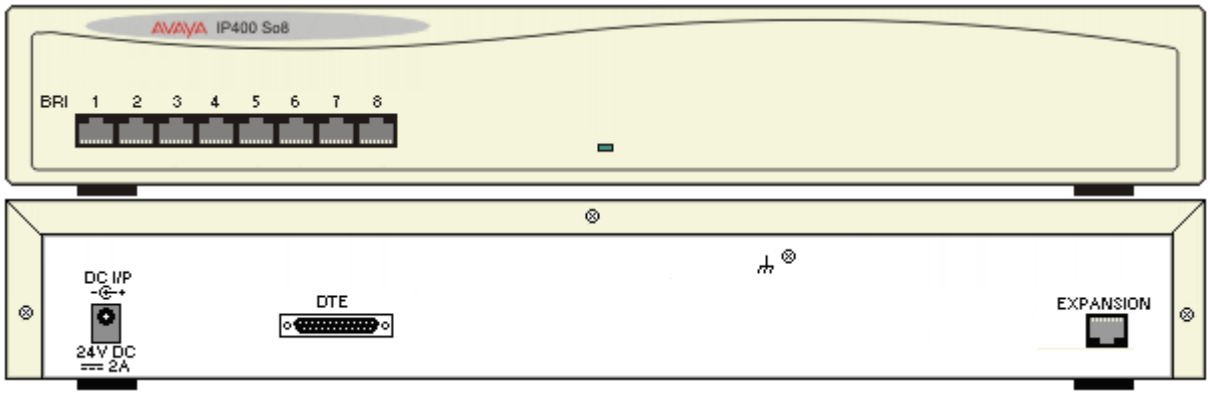
Expansion modules include an external power supply unit (PSU) and an appropriate interconnect cable. They do not include a locale specific power cord for the external PSU or any phone extension cables.

10.8.6 So8

The So8 module is used to add ETSI BRI S0-interface ports to the IP Office system. These ports can then be used for the connection of ISDN devices.

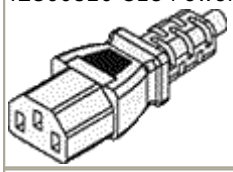


Feature	Details
Supported on	All IP Office control units except Small Office Edition.
Locales	Supported in all IP Office locales.
Software Level	IP Office core software level 1.0 minimum. Bin file = nas0-16.bin.
Included	Power supply unit (see below) and Expansion Interconnect cable.
Power Supply	The unit is supplied with an earthed 3-Pin, 60W external power supply unit. The PSU has an integral power cord for connection to the unit's DC I/P socket. A locale specific IEC60320 C13 power cord 32 for the external PSU is required but is not supplied with the unit. • Older units were supplied with a 2-Pin, 40W external power supply unit which used a locale specific locale specific IEC60320 C7 power cord 32.
Mounting	The module is designed as a free-standing module that can be stacked on or under other IP Office modules. The module can be rack mounted in a 19" rack system using the optional IP400 Rack Mounting Kit.
Dimensions	Width: 445mm/17.5". Depth: 245mm/9.7". Height: 71mm/2.8"/2U.
Weight	Unboxed: 2.8Kg/6.3lbs. Boxed: 4.1Kg/9.2lbs.



Ports	Description
BRI 377	RJ45 socket. Used for connection of ISDN terminal devices. Note: These ports appear a lines within the IP Office configuration. However they cannot be used for connection to external BRI lines.
DC I/P 379	DC power input port. Used for connection of the power lead from an Avaya 60W external power supply unit supplied with the expansion module. A locale specific IEC60320 C13 power cord 32 for the external PSU is required but is not supplied with the module.
DTE 135	25-Way D-Type socket. For Avaya use only.
EXPANSION 381	RJ45 Socket. Used for direct connection to an Expansion port on an IP Office control unit using the Expansion Interconnect cable supplied with the module.
⏚	Function ground point. Used for connection of a protective or functional ground 207 if required. On older modules where this screw is not present, the top-center cover screw should be used instead.

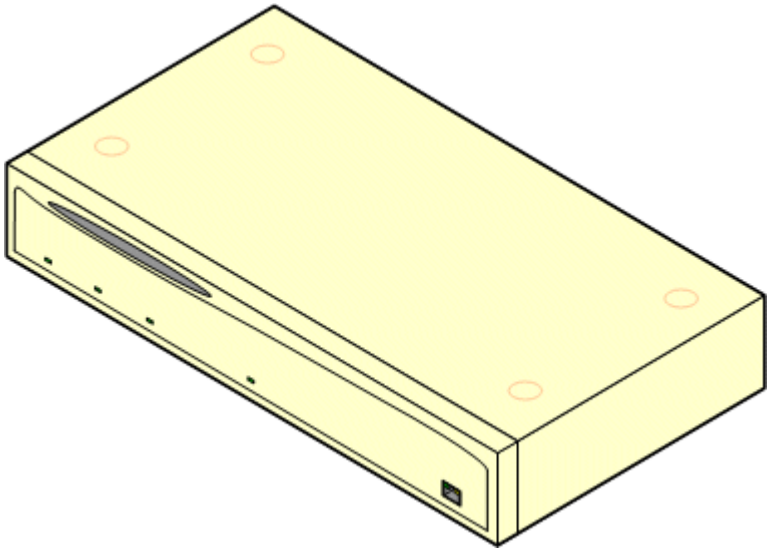
All expansion modules are supplied with a base software level and should be upgraded to match the core software of the control unit in the IP Office system. Expansion modules include an external power supply unit (PSU) and an appropriate interconnect cable. They do not include a locale specific power cord for the external PSU or any phone extension cables.

Item	Variant	Country	SAP Code
IP400 So8		All	700185077
IEC60320 C13 Power Cord 	CEE7/7	Europe	700289762
	BS1363	United Kingdom	700289747
	NEMA5-15P	America	700289770
IP400 Rack Mounting Kit		All	700210800

10.8.7 WAN3 10/100

The IP400 WAN3 10/100 module can be used to add an additional 3 WAN ports to an IP Office system. These ports are used for V.24, V.35 and X.21 WAN services.

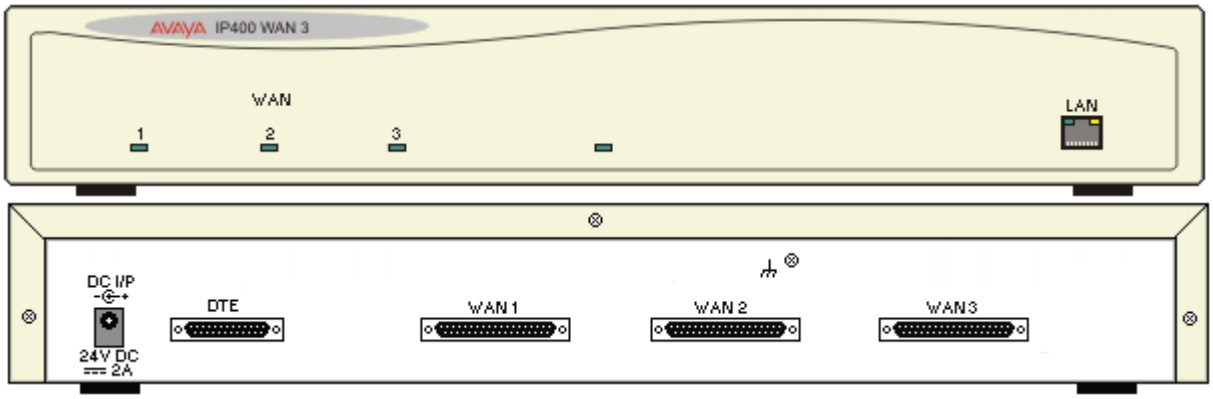
Unlike other external expansion modules the WAN3 10/100 module connects to the IP Office control unit via LAN ports. It has its own IP address, which is obtained by DHCP.



The WAN3 exists in two variants. The original WAN3 only supported a 10Mbps LAN connection and is not supported on IP Office 3.2 and higher. The WAN3 has been superseded by the WAN3 10/100 which supports a 10Mbps/100Mbps LAN connection.

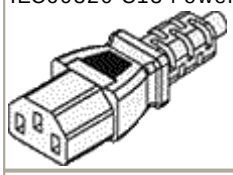
Feature	Details
Supported on	All IP400 control units except IP500 and IP500v2.
Locales	Supported in all IP Office locales.
Software Level	WAN3 10/100: IP Office core software level 1.4 minimum. Bin file = ipwan3.bin.
Included	Power supply unit (see below) and LAN Interconnect cable.
Power Supply	The unit is supplied with an earthed 3-Pin, 60W external power supply unit. The PSU has an integral power cord for connection to the unit's DC I/P socket. A locale specific IEC60320 C13 power cord 32 for the external PSU is required but is not supplied with the unit. • Older units were supplied with a 2-Pin, 40W external power supply unit which used a locale specific locale specific IEC60320 C7 power cord 32.
Mounting	The module is designed as a free-standing module that can be stacked on or under other IP Office modules. The module can be rack mounted in a 19" rack system using the optional IP400 Rack Mounting Kit.
Dimensions	Width: 445mm/17.5". Depth: 245mm/9.7". Height: 71mm/2.8"/2U.
Weight	Unboxed: 2.8Kg/6.3lbs. Boxed: 4.1Kg/9.2lbs.

WAN3 Module Connections



Ports	Description
DC I/P 379	DC power input port. Used for connection of the power lead from an Avaya 40W external power supply unit supplied with the expansion module. A locale specific IEC60320 C7 power cord 32 for the external PSU is required but is not supplied with the module.
DTE 135	25-Way D-Type socket. For Avaya use only.
EXPANSION 381	RJ45 Socket. Used for direct connection to an Expansion port on an IP Office control unit using the Expansion Interconnect cable supplied with the module.
LAN 382	RJ45 socket. Used for direct connection to a LAN port on the IP Office control unit. A LAN Interconnect cable is supplied with the module for that purpose. When connecting to an IP412 control unit a LAN crossover cable should be used.
WAN 386	These ports support a single synchronous data connection, which can be X.21, V.35 or V.24/V.28. The selection of the required interface is automatically determined from the pin-out of the cable plugged into the WAN port. This cable must be connected before power is applied for auto detection to work. Connection to a Digital Leased Circuit is made by connecting the WAN port on the rear of the module to the existing Network Terminating Module (NTU) via the appropriate X.21, V.35 or V.24 cable. These WAN ports are identical to those on the IP406 V2 and IP412 control units. • These WAN ports must be clocked externally, the IP Office does not provide a clock signal. The clock signal is usually provided by the service provider but under some circumstances (for example laser, microwave or baseband modems) extra provision must be made by the installer.
⏚	Function ground point. Used for connection of a protective or functional ground 207 if required. On older modules where this screw is not present, the top-center cover screw should be used instead.

All expansion modules are supplied with a base software level and should be upgraded to match the core software of the control unit in the IP Office system. Expansion modules include an external power supply unit (PSU) and an appropriate interconnect cable. They do not include a locale specific power cord for the external PSU or any phone extension cables.

Item	Variant	Country	SAP Code
IP400 WAN3		All	700185028
IP400 WAN3 10/100			700262009
IEC60320 C13 Power Cord 	CEE7/16	Europe	700289762
	BS1363	United Kingdom	700289747
	NEMA5-15P	America	700289770
IP400 Rack Mounting Kit		All	700210800

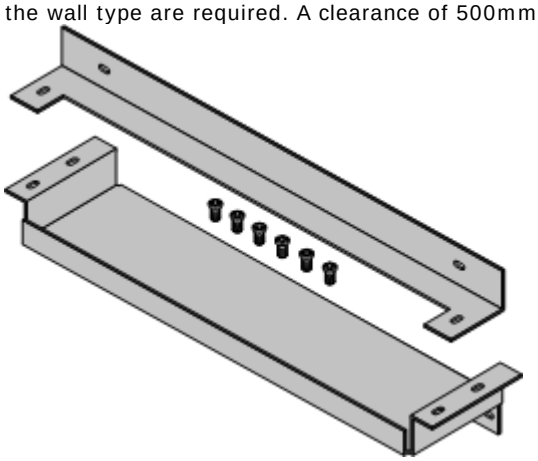
10.9 Mounting Kits

The following mounting kits are available for use with IP Office systems.

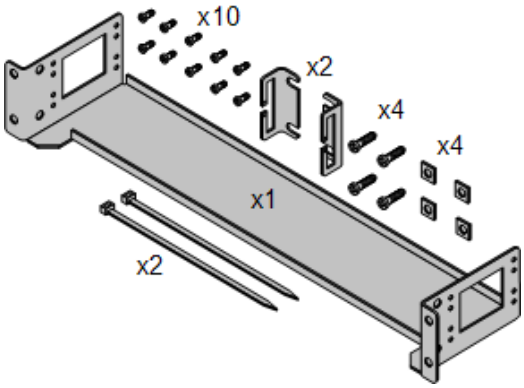
10.9.1 IP500 Wall Mounting Kit

IP500 and IP500v2 control units can be wall mounted if not using any external expansion modules. An IP500 wall mounting kit is required in addition to suitable wall fixings.

- IP500 Wall Mounting Kit *(SAP Code 700430150)*
  This kit must be used when wall mounting an IP500 or IP500v2 control unit. Additional 4.5mm fixings suitable for the wall type are required. A clearance of 500mm around the control unit is required.

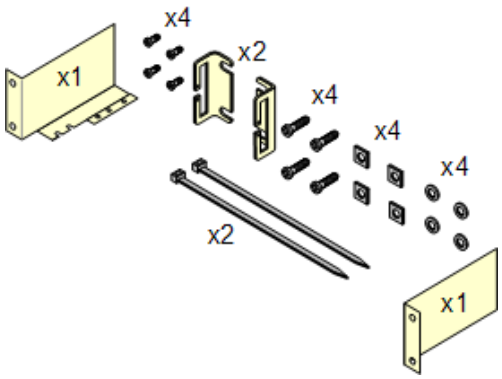


10.9.2 IP500 Rack Mounting Kit



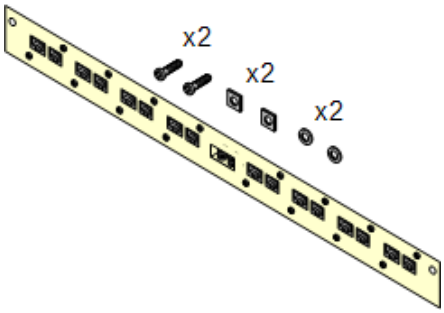
- IP500 Rack Mounting Kit *(SAP 700429202)*
  This kit contains all the components required for the rack mounting of a single IP500v2 control unit, IP500 control unit or IP500 external expansion module. This includes screws for fixing of the brackets to the module, bolts for securing the module in the rack and cable tidy brackets.

10.9.3 IP400 Rack Mounting Kit



- IP400 Rack Mounting Kit *(SAP 700210800)*
  This kit contains all the components required for the rack mounting of a single control unit or expansion module. This includes screws for fixing of the brackets to the module and bolts for securing the module in the rack.

10.9.4 Barrier Box Rack Mounting Kit



- Barrier Box Rack Mounting Kit *(SAP 700293905)*
  Barrier boxes must be used for out-of-building analog phone extensions 38. This bracket allows up to 8 IP Office barrier boxes to be rack mounted and simplifies the number of connections to the protective ground point in the rack. This kit must be used when more than 3 barrier boxes are in use and supports a maximum of 16 barrier boxes for a single external expansion module.

10.10 Phones

IP Office Release 6 supports the following phones and phone add-ons. Availability may be subject to local restrictions.

Digital stations connect to the IP Office via DS 379 ports.

Series	IP Office Supported Digital Station (DS) Phones	Region
1400	1403 288, 1408 289, 1416 290	Global
2400	2402 297, 2410 298, 2420 299.	Global
4400	4406D 311, 4412D+ 312, 4424D+ 313 *(Not supported on the IP500 and IP500v2 control unit DS ports)*	North America
5400	5402 320, 5410 321, 5420 322.	Global
6400	6408D 329, 6416D+M 330, 6424D+M 331.	Global
T3 (Upn)	T3 Compact 345, T3 Classic 343, T3 Comfort 344.	Europe, Middle East and Africa
–	3810 Wireless phone 309.	North America

IP Phones (SIP and H323) connect to the IP Office system via the RJ45 LAN or WAN. These device require an Avaya IP Endpoint license and VCM resources.

Series	IP Office Supported IP Phones	Region
1000	1010 286, 1040 286	Global
1100	1120 287, 1140 287	
1200	1220 287, 1230 287	
1600	1603IP/SW 291, 1608 293, 1608-i 293, 1616 295, 1616-i 295	
3600	3616 300, 3620 301, 3626 302, 3641 303, 3645 304	
4600	4601 314, 4602 315, 4602SW 315, 4610 316, 4610SW 316, 4620 317, 4620SW 317, 4621SW 318, 4625 319.	
5600	5601 323, 5602 325, 5602SW 325, 5610 326, 5620 327, 5621 328.	
9600	9620L 332, 9620C 332, 9630G 334, 9640 336, 9640G 336, 9650 338, 9650C 338	
ETR	ETR 6, ETR 6D 340, ETR 18, ETR 18D 341, ETR 34D 342 *(Refresh and Euro models of all)*	North America
Softphone	Avaya IP Office SIP SoftPhone application	Global
T3 (IP)	T3 IP Compact 345, T3 IP Classic 343, T3 IP Comfort 344.	Europe, Middle East and Africa

- Non-Avaya IP phones (SIP and H323) are supported by the addition of 3rd Party IP Endpoint licenses. Functionality beyond making and answering calls is not guaranteed by Avaya.

Analog phones and devices connect to PHONE 384 ports with the IP Office system. However due to the variety of analog phones and device available no guarantee of operation is given. It is the responsibility of the IP Office installer and maintainer to test and verify the operation of proposed analog equipment.

Series	IP Office Recommended Analog Phones	Region
6200 Series	6211, 6219, 6221.	North America
Interquartz Gemini	9330-AV, 9335-AV, 9281-AV.	Europe, Middle East, Africa, Asia-Pacific

Series	IP Office Supported DECT Phones	Region
IP DECT	3701 305, 3711 306 - Connection via IP DECT base stations.	Global
DECT R4	3720 307, 3725 308 - Connection via Unified DECT base stations.	Global
PARTNER DECT	3910 310, 3920 310 - Connect to ETR ports on IP500v2 control unit.	North America

10.10.1 1010/1040

The 1000 Series phones are high-quality SIP video phone devices. The 1010 and 1040 phones are supported. Each consists of a main module to which a range of video camera and microphone/speaker devices can be attached. The main module provides outputs for display of video on HD video compatible devices

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.

1010 Main module with camera, mircrophone and remote control

10.10.2 1120/1140/1220/1230

These Avaya Nortel SIP telephones are supported by IP Office Release 6.1.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.

1120 Telephone

1140 Telephone

1120 Telephone

1140 Telephone

10.10.3 1403

This phone is supported with IP Office Release 6.0 and higher.

1603	Feature	1403
	Connects via	DS port.
	IP Office Release	6.0
	Programmable Buttons	✓ 3
	Headset Socket	✗
	Handsfree Speaker / Microphone	✓ / ✓
	Message Waiting Lamp	✓
	Display	2 x 16 backlit.
	Supported Add-Ons	None
	Upgradeable Firmware	✓

Fixed Telephony Function Keys				
✓ SPEAKER	✗ HEADSET	✓ MUTE	✓ VOLUME UP	✗ CONTACTS
✗ MESSAGE	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN	✗ CALL LOG
✓ DROP	✓ REDIAL	✓ CONFERENCE	✓ MENU	

Variant		SAP Code
1403 Telephone	Black	700469927

10.10.4 1408

This phone is supported with IP Office Release 6 and higher.

1408	Feature	1408
	Connects via	DS port.
	IP Office Release	6.0+
	Programmable Buttons	✓ 8
	Headset Socket	✓
	Handsfree Speaker / Microphone	✓/✓
	Message Waiting Lamp	✓
	Display	3 x 24 backlit.
	Supported Add-Ons	None.
	Upgradeable Firmware	✓

Fixed Function Keys				
✓ SPEAKER	✓ HEADSET	✓ MUTE	✓ VOLUME UP	✓ CONTACTS
✓ MESSAGE	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN	✓ CALL LOG
✓ DROP	✓ REDIAL	✓ CONFERENCE	✓ MENU	

Variant		SAP Code
1408 Telephone	Black	700469851

10.10.5 1416

This phone is supported with IP Office Release 6 and higher.

1416	Feature	1416
	Connects via	DS port.
	IP Office Release	6.0+
	Programmable Buttons	✓ 16
	Headset Socket	✓
	Handsfree Speaker / Microphone	✓/✓
	Message Waiting Lamp	✓
	Display	4 x 24 Backlit.
	Supported Add-Ons	DBM32 348 x 3.
	Upgradeable Firmware	✓

Fixed Function Keys				
✓ SPEAKER	✓ HEADSET	✓ MUTE	✓ VOLUME UP	✓ CONTACTS
✓ MESSAGE	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN	✓ CALL LOG
✓ DROP	✓ REDIAL	✓ CONFERENCE	✓ MENU	

Variant		SAP Code
1416 Telephone	Black	700469869
DBM32 Button Module	Black	700469968

10.10.6 1603

This phone is supported with IP Office 4.2 and higher. Support for the 1603SW model was added in IP Office 5.0. Support for the I variants was added in IP Office Release 6.0 and in 5.0 maintenance releases.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.

1603	Feature	1603-I	1603SW-I
	Connects via	IP network.	
	IP Office Release	4.2 Q4 2008 +	5.0+
	Programmable Buttons	✓ 3	
	Headset Socket	✗	
	Handsfree Speaker / Microphone	✓/✓	
	Message Waiting Lamp	✓	
	PoE Class / Typical Idle Power Consumption	Class 2 (4.3W)	Class 2 (4.3W)
	Display	2 x 16 backlit.	
	Supported Add-Ons	None	
	Upgradeable Firmware	✓	✓
	PC Pass-Through Port / with Voice Priority	✗/✗	✓/✓

Fixed Telephony Function Keys				
✓ SPEAKER	✗ HEADSET	✓ MUTE	✓ VOLUME UP	✗ CONTACTS
✗ MESSAGE	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN	✗ CALL LOG
✓ DROP	✓ REDIAL	✓ CONFERENCE	✓ MENU	

Material Description	Code
Phones *(Ethernet cord sold separately. Local power sold separately. PoE adapter sold separately.)*	
1603IP Phone	700415540
1603SW Phone	700458508
1603-I Telephone	700476849
1603SW-I Telephone	700458524
Replacement Wedge Stand	700415615
Accessories	
CAT5 Ethernet Cable (14 ft)	700383326
CAT5 Ethernet Cable (1 ft)	700436710
Power Adapters	
1603 PoE adapter	700415607
Power Adapter for 1600 IP Phones 5V US	700451230
Power Adapter for 1600 IP Phones 5V UK	700451248
Power Adapter for 1600 IP Phones 5V EU	700451255
Power Adapter for 1600 IP Phones 5V ARGENTINA	700451263

Material Description	Code
Power Adapter for 1600 IP Phones 5V KOREA	700451271
Power Adapter for 1600 IP Phones 5V CHINA	700451289
Power Adapter for 1600 IP Phones 5V AUSTRALIA	700451297
Labels	
1603 Paper DESI Labels - Pack of 50 Labels (8.5" x 11")	700415706
1603 Paper DESI Labels - Pack of 50 Labels (A4)	700434210

10.10.7 1608

This phone is supported with IP Office 4.2 and higher. Support for the I variant was added in IP Office Release 6.0 and in 5.0 maintenance releases.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.

1608	Feature	1608
	Connects via	IP network.
	IP Office Release	4.2 Q4 2008 +
	Programmable Buttons	✓ 8
	Headset Socket	✓
	Handsfree Speaker / Microphone	✓/✓
	Message Waiting Lamp	✓
	PoE Class / Typical Idle Power Consumption	Class 2 (4.7W)
	Display	3 x 24 backlit.
	Supported Add-Ons	None.
	Upgradeable Firmware	✓
	PC Pass-Through Port / with Voice Priority	✓/✓

Fixed Function Keys				
✓ SPEAKER	✓ HEADSET	✓ MUTE	✓ VOLUME UP	✓ CONTACTS
✓ MESSAGE	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN	✓ CALL LOG
✓ DROP	✓ REDIAL	✓ CONFERENCE	✓ MENU	

Material Description	Code
Phones *(Ethernet cord sold separately. Local power sold separately. PoE adapter sold separately.)*	
1608 IP Phone	700415557
1608-I IP Phone	700458532
Replacement Stand	700415714
Wall Mounting Kit	700415623
Accessories	
CAT5 Ethernet Cable (14 ft)	700383326
CAT5 Ethernet Cable (1 ft)	700436710
1608 Wall Mount Kit (Includes 1 ft Ethernet cable and screws)	700415623
Power Adapters	
Power Adapter for 1600 IP Phones 5V US	700451230
Power Adapter for 1600 IP Phones 5V UK	700451248
Power Adapter for 1600 IP Phones 5V EU	700451255
Power Adapter for 1600 IP Phones 5V ARGENTINA	700451263
Power Adapter for 1600 IP Phones 5V KOREA	700451271
Power Adapter for 1600 IP Phones 5V CHINA	700451289
Power Adapter for 1600 IP Phones 5V AUSTRALIA	700451297
Labels	

Material Description	Code
1608 Paper DESI Labels - Pack of 50 Labels (8.5" x 11")	700415649
1608 Paper DESI Labels - Pack of 50 Labels (A4)	700434228
Headsets	
HIS Headset Cable for 9600 & 1608/1616 IP Phones	700409881
SupraElite Monaural (One Ear) Voice Tube (HIS cable required)	700343718
SupraElite Monaural (One Ear) Noise Cancelling (HIS cable required)	700343726
SupraElite Monaural (Two Ear) Voice Tube (HIS cable required)	700343734
SupraElite Monaural (Two Ear) Noise Cancelling (HIS cable required)	700343742
AWH-55+ Wireless Headset	700428204
AWH-65+ Wireless Headset - UK	700428212
AWH-65+ Wireless Headset - EURO	700428220
AWH75N Executive Wireless Headset NAR	700446313
AWH75N Executive Wireless Headset EU	700446321
AWH75N Executive Wireless Headset UK	700446339
ABT-35+S Headset & Base - NA	700428170
ABT-35+S Headset & Base - EURO	700428196

10.10.8 1616

This phone is supported with IP Office 4.2 and higher. Support for the I variant was added in IP Office Release 6.0 and in 5.0 maintenance releases.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.

1616	Feature	1616
	Connects via	IP network.
	IP Office Release	4.2 Q4 2008+
	Programmable Buttons	✓ 16
	Headset Socket	✓
	Handsfree Speaker / Microphone	✓/✓
	Message Waiting Lamp	✓
	PoE Class / Typical Idle Power Consumption	Class 2
	Display	4 x 24 Backlit.
	Supported Add-Ons	BM32 348 x 3.
	Upgradeable Firmware	✓
	PC Pass-Through Port / with Voice Priority	✓/✓

Fixed Function Keys				
✓ SPEAKER	✓ HEADSET	✓ MUTE	✓ VOLUME UP	✓ CONTACTS
✓ MESSAGE	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN	✓ CALL LOG
✓ DROP	✓ REDIAL	✓ CONFERENCE	✓ MENU	

Material Description	Code
Phones *(Ethernet cord sold separately. Local power sold separately. PoE adapter sold separately.)*	
1616 IP Phone	700450190
1616-I IP Phone	700458540
BM32 Button Module for 1616 (includes cable and bridge)	700415573
Replacement Stand	700415722
Accessories	
CAT5 Ethernet Cable (14 ft)	700383326
CAT5 Ethernet Cable (1 ft)	700436710
1616 Wall Mount Kit (Includes 1 ft Ethernet cable and screws)	700415631
Power Adapters	
Power Adapter for 1600 IP Phones 5V US	700451230
Power Adapter for 1600 IP Phones 5V UK	700451248
Power Adapter for 1600 IP Phones 5V EU	700451255
Power Adapter for 1600 IP Phones 5V ARGENTINA	700451263
Power Adapter for 1600 IP Phones 5V KOREA	700451271
Power Adapter for 1600 IP Phones 5V CHINA	700451289
Power Adapter for 1600 IP Phones 5V AUSTRALIA	700451297
Labels	

Material Description	Code
1616/BM32 Paper DESI Labels - Pack of 50 Labels (8.5" x 11")	700415656
1616/BM32 Paper DESI Labels - Pack of 50 Labels (A4)	700434236
Headsets	
HIS Headset Cable for 9600 & 1608/1616 IP Phones	700409881
SupraElite Monaural (One Ear) Voice Tube (HIS cable required)	700343718
SupraElite Monaural (One Ear) Noise Cancelling (HIS cable required)	700343726
SupraElite Monaural (Two Ear) Voice Tube (HIS cable required)	700343734
SupraElite Monaural (Two Ear) Noise Cancelling (HIS cable required)	700343742
AWH-55+ Wireless Headset	700428204
AWH-65+ Wireless Headset - UK	700428212
AWH-65+ Wireless Headset - EURO	700428220
AWH75N Executive Wireless Headset NAR	700446313
AWH75N Executive Wireless Headset EU	700446321
AWH75N Executive Wireless Headset UK	700446339
ABT-35+S Headset & Base - NA	700428170
ABT-35+S Headset & Base - EURO	700428196

10.10.9 2402

In addition to the two physical programmable buttons, the FEATURE key plus 0-9, * and # can be used to access an addition 12 programmable slots.

On IP Office, the 2402D display is not used.

2402D	Feature	Detail
	Connects via	DS port.
	IP Office Release	3.0+
	Programmable Buttons	✓ 2
	Headset Socket	✗
	Handsfree Speaker/Microphone	✓/✗
	Message Waiting Lamp	✓
	Display	Not used.
	Supported Add-Ons	None.
	Upgradable Firmware	✓

Standard DCP Phone Keys			
✗ SPEAKER	✗ HEADSET	✓ MUTE	✓ VOLUME UP
✓ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✓ DROP	✓ REDIAL	✓ CONFERENCE	

Variant		SAP Code
2402D	Multi-Grey	700381973
Replacement Handset	Dark Grey	700203797
Amplified Handset	Dark Grey	700229735
Noisy Location Handset	Dark Grey	700229743
Push to Talk Handset	Dark Grey	700229727

10.10.10 2410

2410D	Feature	2410
	Connects via	DS port.
	IP Office Release	3.0+
	Programmable Buttons	✓ 12. (6 buttons x 2 pages).
	Headset Socket	✓
	Handsfree Speaker/ Microphone	✓/✓
	Message Waiting Lamp	✓
	Display	29 characters x 5 lines. (168 x 80 pixels).
	Supported Add-Ons	None.
	Upgradable Firmware	✓

Standard DCP Phone Keys			
✓ SPEAKER	✓ HEADSET	✓ MUTE	✓ VOLUME UP
✓ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✓ DROP	✓ REDIAL	✓ CONFERENCE	

Variant		SAP Code
2410	Multi-Grey	700381999
Replacement Handset	Dark Grey	700203797
Amplified Handset	Dark Grey	700229735
Noisy Location Handset	Dark Grey	700229743
Push to Talk Handset	Dark Grey	700229727

10.10.11 2420

2420D	Feature	Details
	Connects via	DS port.
	IP Office Release	1.4+
	Programmable Buttons	✓ 24 (8 buttons x 3 pages)
	Headset Socket	✓
	Handsfree Speaker/ Microphone	✓/✓
	Message Waiting Lamp	✓
	Display	29 characters x 7 lines.
	Supported Add-Ons	EU24*, 201B.
	Upgradable Firmware	✓

Standard DCP Phone Keys			
✓ SPEAKER	✓ HEADSET	✓ MUTE	✓ VOLUME UP
✓ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✓ DROP	✓ REDIAL	✓ CONFERENCE	

2420	Multi-Grey	700381585
Replacement Handset	Dark Grey	700203797
Amplified Handset	Dark Grey	700229735
Noisy Location Handset	Dark Grey	700229743
Push to Talk Handset	Dark Grey	700229727
201B Recorder Interface Module		700381635
20B Stand		700381650
EU24*	Multi-Grey	700381817
1151D1 Power Supply	With CAT5 cable.	700434897
1151D2 Power Supply with battery backup.	With CAT5 cable.	700434905
1151D1/1151D2 Power Cord	USA	405362641
	Europe	407786623
	Australia/New Zealand	407786631
	India	407790991
	United Kingdom	407786599
	Argentina	408161453

*When used with an EU24 unit, a 1151 type power supply unit must be used to power the phone.

10.10.12 3616

This is an 802.11b WiFi phone. It connects to the IP Office via a wireless access point and Avaya Voice Priority Processor (AVPP).

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.

3616	Feature	Detail
	Connects via	IP network.
	IP Office Release	2.0+
	Programmable Buttons	✓ 6.
	Headset Socket	✓
	Message Waiting Lamp	✗
	Upgradable Firmware	✗

Variant	SAP Code
3616 Wireless Phone	700413040
Additional battery pack for 3616	700277387
Desktop charger for 3616.	700412901
Clip for 3616	700413057
3616/3626 Configuration Cradle	700375934

10.10.13 3620

This is an 802.11b WiFi phone. It connects to the IP Office via a wireless access point and Avaya Voice Priority Processor (AVPP).

The 3620 is similar to the 3616 but has been designed for use in healthcare environments. It is waterproof and has a back lit display.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.

3616	Feature	Detail
	Connects via	IP network.
	IP Office Release	3.2+
	Programmable Buttons	✓ 6.
	Headset Socket	✓
	Message Waiting Lamp	✗
	Upgradable Firmware	✗

Variant	SAP Code
3620 Wireless Phone	700413065
Additional battery pack.	700277387
Desktop charger.	700412901
Clip	700413057
Configuration Cradle	700375934

10.10.14 3626

This phones is similar to the 3616 in functionality. However the 3626 has a ruggedized construction. This is an 802.11b WiFi phone. It connects to the IP Office via a wireless access point and Avaya Voice Priority Processor (AVPP).

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.

3626	Feature	Detail
	Connects via	IP network.
	IP Office Release	2.0+
	Programmable Buttons	✓ 6.
	Headset Socket	✓
	Message Waiting Lamp	✗
	Upgradable Firmware	✗

Variant		SAP Code
3626 Wireless Phone		700413024
Additional battery pack for 3626		700277395
Desktop charger for 3626		700412919
3626 Gang changer		700412927
Clip for 3626		700413131
3626 Vinyl case with keypad cover		700412984
3626 Carry case	Yellow	700289309
3626 Carry case with keypad cover	Black	700289317
	Yellow	700289325
3616/3626 Configuration Cradle		700375934

10.10.15 3641

The Avaya 3641 IP Wireless Telephone is a WiFi telephone that runs using H.323.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.

The 3641 supports the following features:

- Lightweight innovative design .
- Simple to use.
- 802.11a, 802.11b and 802.11g standard-compatible.
- Transmission type Direct Sequence Spread Spectrum (DSSS).
- FCC certification Part 15.247.
- Management of telephones via DHCP and TFTP.
- Voice encoding G711.
- Wired Equivalent Privacy (WEP) - 40bit and 128 bit. WPA-PSK, WPA2-PSK.
- 5x16 character alphanumeric, plus status indicators.
- 4 hours talk time and 80 hours standby. Extendable with optional battery packs to 8 hours talk time and 160 hours standby.

10.10.16 3645

The Avaya 3645 IP Wireless Telephone is a WiFi telephone that runs using H.323.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.

The 3645 supports the following features:

- Lightweight innovative design .
- Simple to use.
- 802.11a, 802.11b and 802.11g standard-compatible.
- Transmission type Direct Sequence Spread Spectrum (DSSS).
- FCC certification Part 15.247.
- Management of telephones via DHCP and TFTP.
- Voice encoding G711.
- Wired Equivalent Privacy (WEP) - 40bit and 128 bit. WPA-PSK, WPA2-PSK.
- 5x16 character alphanumeric, plus status indicators.
- 4 hours talk time and 80 hours standby. Extendable with optional battery packs to 8 hours talk time and 160 hours standby.
- Can be enabled for Push-to-talk (walkie-talkie) feature for broadcast between employees.

10.10.17 3701

The 3701 is an Avaya DECT handset supported on IP Office when using Avaya IP DECT base stations.

3701	Feature	Detail
	Connects via	IP network
	IP Office Release	3.1+
	Programmable Buttons	✗
	Headset Socket	✗
	Handsfree Speaker / Microphone	✓/✗
	Message Waiting Lamp	✓
	Upgradable Firmware	✓

Variant		SAP Code
3701		700346802
Belt Clip		700346885
Phone Charger		700346828
Power Adaptor for Charger	European	700346836
	UK	700346844
	Australia	700378318
8-Phone Gang Charger		700346851
Power Adaptor for Rack Mount Charger	Global	700346869

10.10.18 3711

The 3711 is an Avaya DECT handset supported on IP Office when using Avaya IP DECT base stations.

3711	Feature	Detail
	Connects via	IP network
	IP Office Release	3.1+
	Programmable Buttons	✗
	Headset Socket	✓
	Handsfree Speaker/Microphone	✓/✓
	Message Waiting Lamp	✓
	Upgradable Firmware	✓

Variant		SAP Code
3711		700346810
Belt Clip		700346885
Phone Charger		700346828
Power Adaptor for Charger	European	700346836
	UK	700346844
	Australia	700378318
8-Phone Gang Charger		700346851
Power Adapator for Rack Mount Charger	Global	700346869

10.10.19 3720

This DECT handset is supported with Avaya DECT R4 on IP Office Release 5 and higher.

10.10.20 3725

This DECT handset is supported with Avaya DECT R4 on IP Office Release 5 and higher.

10.10.21 3810

The phone uses a wireless 900MHz digital protocol to connect to its base station. The base station connects to an IP Office DS port. The base station also requires a power outlet socket. Additional power outlet sockets are required for the phone charger.

Depending on coverage overlap, between three and five 3810s can be connected to the same IP Office.

This phone is supported in North America only.

3810	Feature	Detail
	Connects via	DS port.
	IP Office Release	2.1+
	Programmable Buttons	✓ 4.
	Headset Socket	✓
	Handsfree Speaker / Microphone	✓/✓
	Message Waiting Lamp	✓
	Upgradable Firmware	✗

Item	SAP Code
3810 Set - Includes phone, base station, charger, belt clip and power supply units for charger and base station.	700305105

10.10.22 3910

This single station DECT phone is supported on an IP500v2 control unit running in Partner Version 52 mode. The base station uses an ETR port for connection to the IP Office. This phone is no longer available from Avaya and has been superseded by the 3920 310.

10.10.23 3920

This single station DECT phone is supported on an IP500v2 control unit running in Partner Version 52 mode. The base station uses an ETR port for connection to the IP Office.

10.10.24 4406

This phone is supported in North America only (U-Law only). Not supported on the IP500 Digital Station card.

4406D+	Feature	Detail
	Connects via	DS port.
	IP Office Release	1.0+
	Programmable Buttons	✓ 6
	Headset Socket	✓
	Handsfree Speaker / Microphone	✓ / ✓
	Message Waiting Lamp	✓
	Display	16 characters x 2 lines.
	Supported Add-Ons	None.
	Upgradable Firmware	✗

Standard DCP Phone Keys			
✓ SPEAKER	✗ HEADSET	✓ MUTE	✓ VOLUME UP
✗ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✗ DROP	✓ REDIAL	✓ CONFERENCE	

Item	SAP Code
4406D+ (Black)	108199027
4406D+ (White)	108199019
Small 4400 Series Stand (Black)	108541194
Stand 4400 Series Stand (White)	108541202

10.10.25 4412

This phone is supported in North America only (U-Law only). Not supported on the IP500 Digital Station card.

Note: A maximum of twenty-seven 4412D telephones are supported on the IP500 DS30 expansion modules and on IP400 DS30 (version 2) expansion module at PCS level 5. Earlier IP400 DS30 expansion modules will only support sixteen of these telephones.

4412D+	Feature	Detail
	Connects via	DS port.
	IP Office Release	1.0+
	Programmable Buttons	✓ 24 (12 /12).
	Headset Socket	✓
	Handsfree Speaker/ Microphone	✓/✓
	Message Waiting Lamp	✓
	Display	24 characters x 2 lines.
	Supported Add-Ons	4450 x 2.
	Upgradable Firmware	✗

Standard DCP Phone Keys			
✓ SPEAKER	✗ HEADSET	✓ MUTE	✓ VOLUME UP
✗ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✗ DROP	✓ REDIAL	✓ CONFERENCE	

Item		SAP Code
4412D+	Black	108199050
	White	108199043
Large 4400 Series Stand for 4412D+/4424D+	Black	108541269
	White	108541277

10.10.26 4424

This phone is supported in North America only (U-Law only). Not supported on the IP500 Digital Station card.

Note: A maximum of twenty-seven 4424D telephones are supported on the IP500 DS30 expansion modules and on IP400 DS30 (version 2) expansion module at PCS level 5. Earlier IP400 DS30 expansion modules will only support sixteen of these telephones.

4424D+	Feature	Detail
	Connects via	DS ports.
	IP Office Release	1.0+
	Programmable Buttons	✓ 24.
	Headset Socket	✓
	Handsfree Speaker / Microphone	✓ / ✓
	Message Waiting Lamp	✓
	Display	24 characters x 2 lines.
	Supported Add-Ons	4450 x 2.
	Upgradeable Firmware	✗

Standard DCP Phone Keys			
✓ SPEAKER	✗ HEADSET	✓ MUTE	✓ VOLUME UP
✗ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✗ DROP	✓ REDIAL	✓ CONFERENCE	

Item		SAP Code
4424D+	Black	108199084
	White	108199076
Large 4400 Series Stand for 4412D+/4424D+	Black	108541269
	White	108541277
4450 DSS Add-On	Black	108199696
	White	108199407
Small 4400 Series Stand for 4450.	Black	108541194
	White	108541202
Power Supply for 4450		108596412

10.10.27 4601

This phone requires a separate power supply, using either a Avaya 1151D1 or 1151D2 power supply unit and power cord or an 802.3af Power over Ethernet (PoE) source. For RoHS compliance the 4601 has been replaced by the 4601+, however the two phones are functionally the same.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.

4601+	Feature	Detail
	Connects via	IP Network.
	IP Office Release	3.0+
	Programmable Buttons	✓ 2
	Headset Socket	✗
	Handsfree Speaker / Microphone	✗/✗
	Message Waiting Lamp	✓
	PoE Class / Typical Idle Power Consumption	3.5W (Class 2)
	Display	None.
	Supported Add-Ons	None.
	Upgradeable Firmware	✓
	PC Pass-Through Port / with Voice Priority	✗/✗

Standard DCP Phone Keys			
✗ SPEAKER	✗ HEADSET	✓ MUTE	✓ VOLUME UP
✓ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✓ DROP	✓ REDIAL	✓ CONFERENCE	

Variant		SAP Code
4601+	Multi-Grey	700381890
1151D1 Power Supply	With CAT5 cable.	700434897
1151D2 Power Supply with battery backup.	With CAT5 cable.	700434905
1151D1/1151D2 Power Cord	USA	405362641
	Europe	407786623
	Australia and New Zealand	407786631
	India	407790991
	United Kingdom	407786599
	Argentina	408161453
Replacement Handset	Dark Grey	700203797
Amplified Handset	Dark Grey	700229735
Noisy Location Handset	Dark Grey	700229743
Push to Talk Handset	Dark Grey	700229727

10.10.28 4602

These phones are similar in physical appearance and functions. However the 4602SW+ includes a PC data pass-through port which gives priority to phone traffic. The 4602IP is no longer available from Avaya.

The 4602SW+ is the RoHS compliant replacement for the 4602SW which is no longer available.

This phone requires a separate power supply, using either a Avaya 1151D1 or 1151D2 power supply unit and power cord or a 802.3af Power over Ethernet (PoE) source.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.

4602/4602SW	Feature	4602IP	4602SW+
	Connects via	IP network.	
	IP Office Release	1.3+	
	Programmable Buttons	✓ 2	
	Headset Socket	✗	
	Handsfree Speaker/Microphone	✓/✗	
	Message Waiting Lamp	✓	
	PoE Class/Typical Idle Power Consumption	3.5W (Class 2)	
	Display	24 characters x 2 lines.	
	Supported Add-Ons	None.	
	Upgradable Firmware	✓	
	PC Pass-Through Port/with Voice Priority	✗/✗	✓/✓

Standard DCP Phone Keys			
✗ SPEAKER	✗ HEADSET	✓ MUTE	✓ VOLUME UP
✓ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✓ DROP	✓ REDIAL	✓ CONFERENCE	

Variant		SAP Code
4602IP	Multi-Grey	700221260
4602SW+	Multi-Grey	700381916
1151D1 Power Supply	With CAT5 cable.	700434897
1151D2 Power Supply with battery backup.	With CAT5 cable.	700434905
1151D1/1151D2 Power Cord	USA	405362641
	Europe	407786623
	Australia and New Zealand	407786631
	India	407790991
	United Kingdom	407786599
	Argentina	408161453
Replacement Handset	Dark Grey	700203797
Amplified Handset	Dark Grey	700229735
Noisy Location Handset	Dark Grey	700229743
Push to Talk Handset	Dark Grey	700229727

10.10.29 4610

This phone requires a separate power supply, using either a Avaya 1151D1 or 1151D2 power supply unit and power cord or a 802.3af Power over Ethernet (PoE) source.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.

4610SW	Feature	Detail
	Connects via	IP network.
	IP Office Release	3.0+
	Programmable Buttons	✓ 24 (6 buttons x 4pages).
	Headset Socket	✓
	Handsfree Speaker/Microphone	✓/✓.
	Message Waiting Lamp	✓
	PoE Class/Typical Idle Power Consumption	4.0W (Class 2)
	Display	29 characters x 5 lines (168 x 80 pixels)
	Supported Add-Ons	None.
	Upgradable Firmware	✓
	PC Pass-Through Port/with Voice Priority	✓/✓

Standard DCP Phone Keys			
✓ SPEAKER	✓ HEADSET	✓ MUTE	✓ VOLUME UP
✗ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✓ DROP	✓ REDIAL	✓ CONFERENCE	

Variant		SAP Code
4610SW	Multi-Grey	700381957
1151D1 Power Supply	With CAT5 cable.	700434897
1151D2 Power Supply with battery backup.	With CAT5 cable.	700434905
1151D1/1151D2 Power Cord.	USA	405362641
	Europe	407786623
	Australia and New Zealand	407786631
	India	407790991
	United Kingdom	407786599
	Argentina	408161453
Replacement Handset	Dark Grey	700203797
Amplified Handset	Dark Grey	700229735
Noisy Location Handset	Dark Grey	700229743
Push to Talk Handset	Dark Grey	700229727

10.10.30 4620

These phones are similar in physical appearance and functions. However the 4620SW's PC data pass-through port gives priority to phone traffic.

This phone requires a separate power supply, using either a Avaya 1151D1 or 1151D2 power supply unit and power cord or a 802.3af Power over Ethernet (PoE) source.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.

4620IP/4620SW	Feature	4620IP	4620SW
	Connects via	IP network.	
	IP Office Release	2.0+	
	Programmable Buttons	✓ 24 (12 buttons x 2 pages).	
	Headset Socket	✓	
	Handsfree Speaker/Microphone	✓/✓	
	Message Waiting Lamp	✓	
	PoE Class/Typical Idle Power Consumption	4W (Class 3)	5.9W (Class 3)
	Display	29 characters x 7 lines (168 x 132 pixels)	
	Supported Add-Ons	EU24*, EU24BL*.	
	Upgradeable Firmware	✓	
	PC Pass-Through Port/with Voice Priority	✓/✗	✓/✓

Standard DCP Phone Keys			
✓ SPEAKER	✓ HEADSET	✓ MUTE	✓ VOLUME UP
✗ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✓ DROP	✓ REDIAL	✓ CONFERENCE	

Variant		SAP Code
4620IP	Multi-Grey	700212186
4620SW	Multi-Grey	700259674
Replacement Handset	Dark Grey	700203797
Amplified Handset	Dark Grey	700229735
Noisy Location Handset	Dark Grey	700229743
Push to Talk Handset	Dark Grey	700229727
EU24	Multi-Grey	700381817
EU24BL	Multi-Grey	700381544
1151D1 Power Supply	With CAT5 cable.	700434897
1151D2 Power Supply with battery backup.	With CAT5 cable.	700434905
1151D1/1151D2 Power Cord	USA	405362641
	Europe	407786623
	Australia/New Zealand	407786631
	India	407790991
	United Kingdom	407786599
	Argentina	408161453

*When used with an EU24 or EU24BL unit, a 1151 type power supply unit must be used to power the phone.

10.10.31 4621

The 4621 is similar in physical appearance and function to the 4620SW. However the 4621SW includes a backlight function for the screen.

This phone requires a separate power supply, using either a Avaya 1151D1 or 1151D2 power supply unit and power cord or a 802.3af Power over Ethernet (PoE) source.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.

4621SW	Feature	4621SW
	Connects via	IP network.
	IP Office Release	3.0(577)+
	Programmable Buttons	✓ 24 (12 buttons x 2 pages).
	Headset Socket	✓
	Handsfree Speaker/Microphone	✓/✓
	Message Waiting Lamp	✓
	PoE Class/Typical Idle Power Consumption	5.75W (Class 2)
	Display	29 characters x 7 lines (168 x 132 pixels)
	Supported Add-Ons	EU24*, EU24BL*.
	Upgradeable Firmware	✓
	PC Pass-Through Port/with Voice Priority	✓/✓

Standard DCP Phone Keys			
✓ SPEAKER	✓ HEADSET	✓ MUTE	✓ VOLUME UP
✗ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✓ DROP	✓ REDIAL	✓ CONFERENCE	

Variant		SAP Code
4621SW	Multi-Grey	700345192
Replacement Handset	Dark Grey	700203797
Amplified Handset	Dark Grey	700229735
Noisy Location Handset	Dark Grey	700229743
Push to Talk Handset	Dark Grey	700229727
EU24*	Multi-Grey	700381817
EU24BL*	Multi-Grey	700381544
1151D1 Power Supply	With CAT5 cable.	700434897
1151D2 Power Supply with battery backup.	With CAT5 cable.	700434905
1151D1/1151D2 Power Cord	USA	405362641
	Europe	407786623
	Australia/New Zealand	407786631
	India	407790991
	United Kingdom	407786599
	Argentina	408161453

*When used with an EU24 or EU24BL unit, a 1151 type power supply unit must be used to power the phone.

10.10.32 4625

The 4625 is similar in physical appearance and function to the 4621SW. However the 4625SW includes a color display.

This phone requires a separate power supply, using either a Avaya 1151D1 or 1151D2 power supply unit and power cord or a 802.3af Power over Ethernet (PoE) source.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.

4625SW	Feature	4625SW
	Connects via	IP network.
	IP Office Release	3.2+
	Programmable Buttons	✓ 24 (12 buttons x 2 pages).
	Headset Socket	✓
	Handsfree Speaker / Microphone	✓/✓
	Message Waiting Lamp	✓
	PoE Class / Typical Idle Power Consumption	6.45W (Class 3)
	Display	29 characters x 7 lines (168 x 132 pixels)
	Supported Add-Ons	EU24*, EU24BL*.
	Upgradeable Firmware	✓
	PC Pass-Through Port / with Voice Priority	✓/✓

Standard DCP Phone Keys			
✓ SPEAKER	✓ HEADSET	✓ MUTE	✓ VOLUME UP
✗ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✓ DROP	✓ REDIAL	✓ CONFERENCE	

Variant		SAP Code
4625SW	Multi-Grey	700381551
Replacement Handset	Dark Grey	700203797
Amplified Handset	Dark Grey	700229735
Noisy Location Handset	Dark Grey	700229743
Push to Talk Handset	Dark Grey	700229727
EU24*	Multi-Grey	700381817
EU24BL*	Multi-Grey	700381544
1151D1 Power Supply	With CAT5 cable.	700434897
1151D2 Power Supply with battery backup.	With CAT5 cable.	700434905
1151D1/1151D2 Power Cord	USA	405362641
	Europe	407786623
	Australia/New Zealand	407786631
	India	407790991
	United Kingdom	407786599
	Argentina	408161453

*When used with an EU24 or EU24BL unit, a 1151 type power supply unit must be used to power the phone.

10.10.33 5402

This phone is similar in physical appearance and functions to the 2402D. However the 5402 phone is only supported on IP Office.

In addition to the two physical programmable buttons, the FEATURE key plus 0-9, * and # can be used to access an addition 12 programmable slots.

5402	Feature	Detail
	Connects via	DS port.
	IP Office Release	3.0+.
	Programmable Buttons	✓ 2 .
	Headset Socket	✗
	Handsfree Speaker/Microphone	✓/✗
	Message Waiting Lamp	✓
	Display	24 characters x 2 lines.
	Supported Add-Ons	None.
	Upgradable Firmware	✓

Standard DCP Phone Keys			
✗ SPEAKER	✗ HEADSET	✓ MUTE	✓ VOLUME UP
✓ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✓ DROP	✓ REDIAL	✓ CONFERENCE	

Variant		SAP Code
5402	Multi-Grey	700345309
Replacement Handset	Dark Grey	700203797
Amplified Handset	Dark Grey	700229735
Noisy Location Handset	Dark Grey	700229743
Push to Talk Handset	Dark Grey	700229727

10.10.34 5410

This phone is similar in physical appearance and functions to the 2410. However the 5410 phone is only supported on IP Office.

5410	Feature	Detail
	Connects via	DS port.
	IP Office Release	3.0+
	Programmable Buttons	✓ 12 (6 buttons x 2 pages).
	Headset Socket	✓
	Handsfree Speaker / Microphone	✓/✓
	Message Waiting Lamp	✓
	Display	29 characters x 5 lines. (168 x 80 pixels).
	Supported Add-Ons	None.
	Upgradable Firmware	✓

Standard DCP Phone Keys			
✓ SPEAKER	✓ HEADSET	✓ MUTE	✓ VOLUME UP
✓ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✓ DROP	✓ REDIAL	✓ CONFERENCE	

Variant		SAP Code
5410	Multi-Grey	700345291
5410 (RoHS compliant)	Multi-Grey	700382005
Replacement Handset	Dark Grey	700203797
Amplified Handset	Dark Grey	700229735
Noisy Location Handset	Dark Grey	700229743
Push to Talk Handset	Dark Grey	700229727

10.10.35 5420

This phone is similar in physical appearance and functions to the 2420. However the 5420 is only supported on IP Office.

5420D	Feature	Detail
	Connects via	DS port.
	IP Office Release	3.0+
	Programmable Buttons	✓ 24 (8 buttons x 3 pages)
	Headset Socket	✓
	Handsfree Speaker/Microphone	✓/✓
	Message Waiting Lamp	✓
	Display	29 characters x 7 lines.
	Supported Add-Ons	EU24*, 201B.
	Upgradable Firmware	✓

Standard DCP Phone Keys			
✓ SPEAKER	✓ HEADSET	✓ MUTE	✓ VOLUME UP
✓ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✓ DROP	✓ REDIAL	✓ CONFERENCE	

Variant		SAP Code
5420D	Multi-Grey	700339823
5420D (RoHS compliant)	Multi-Grey	700381627
Replacement Handset	Dark Grey	700203797
Amplified Handset	Dark Grey	700229735
Noisy Location Handset	Dark Grey	700229743
Push to Talk Handset	Dark Grey	700229727
201B Recorder Interface Module		700381635
20B Stand		700381650
EU24*	Multi-Grey	700381817
1151D1 Power Supply	With CAT5 cable.	700434897
1151D2 Power Supply with battery backup.	With CAT5 cable.	700434905
1151D1/1151D2 Power Cord	USA	405362641
	Europe	407786623
	Australia/New Zealand	407786631
	India	407790991
	United Kingdom	407786599
	Argentina	408161453

*When used with an EU24 unit, a 1151 type power supply unit must be used to power the phone.

10.10.36 5601

This phone is similar in physical appearance and functions to the 4601. However the 5601 phone is only supported on IP Office. The 5601+ is the RoHS compliant version that has replaced the previous 5601 IP model but is otherwise the same.

This phone requires a separate power supply, using either a Avaya 1151D1 or 1151D2 power supply unit and power cord or a 802.3af Power over Ethernet (PoE) source.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.

5601	Feature	Detail
	Connects via	IP Network.
	IP Office Release	3.0+
	Programmable Buttons	✓ 2
	Headset Socket	✗
	Handsfree Speaker / Microphone	✗/✗
	Message Waiting Lamp	✓
	PoE Class / Typical Idle Power Consumption	3.5W (Class 2)
	Display	None.
	Supported Add-Ons	None.
	Upgradeable Firmware	✓
	PC Pass-Through Port / with Voice Priority	✗/✗

Standard DCP Phone Keys			
✗ SPEAKER	✗ HEADSET	✓ MUTE	✓ VOLUME UP
✓ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✓ DROP	✓ REDIAL	✓ CONFERENCE	

Variant		SAP Code
5601IP	Multi-Grey	700345366
5601+ (RoHS compliant)	Multi-Grey	700381908
Replacement Handset	Dark Grey	700203797
Amplified Handset	Dark Grey	700229735
Noisy Location Handset	Dark Grey	700229743
Push to Talk Handset	Dark Grey	700229727
1151D1 Power Supply	With CAT5 cable.	700434897
1151D2 Power Supply with battery backup.	With CAT5 cable.	700434905
1151D1/1151D2 Power Cord	USA	405362641
	Europe	407786623
	Australia/New Zealand	407786631
	India	407790991
	United Kingdom	407786599
	Argentina	408161453

10.10.37 5602

The 5602IP and 5602SW phones are similar in physical appearance and functions. However the 5602SW includes a PC data pass-through port which gives priority to phone traffic. The 5602IP is no longer available from Avaya. The 5602SW+ is the RoHS compliant version that has replaced the previous 5602SW model but is otherwise the same.

This phone requires a separate power supply, using either a Avaya 1151D1 or 1151D2 power supply unit and power cord or a 802.3af Power over Ethernet (PoE) source.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.

5602IP/5602SW	Feature	5602IP	5602SW
	Connects via	IP network.	
	IP Office Release	3.0+	
	Programmable Buttons	✓ 2	
	Headset Socket	✗	
	Handsfree Speaker/Microphone	✓/✗	
	Message Waiting Lamp	✓	
	PoE Class/Typical Idle Power Consumption	4.1W (Class 2)	
	Display	24 characters x 2 lines.	
	Supported Add-Ons	None.	
	Upgradable Firmware	✓	
	PC Pass-Through Port/with Voice Priority	✗/✗	✓/✓

Standard DCP Phone Keys			
✗ SPEAKER	✗ HEADSET	✓ MUTE	✓ VOLUME UP
✓ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✓ DROP	✓ REDIAL	✓ CONFERENCE	

Variant		SAP Code
5602IP	Multi-Grey	700345341
5602SW	Multi-Grey	700381825
5602SW+ (RoHS compliant)	Multi-Grey	700381932
Replacement Handset	Dark Grey	700203797
Amplified Handset	Dark Grey	700229735
Noisy Location Handset	Dark Grey	700229743
Push to Talk Handset	Dark Grey	700229727
EU24	Multi-Grey	700381817
EU24BL	Multi-Grey	700381544
1151D1 Power Supply	With CAT5 cable.	700434897
1151D2 Power Supply with battery backup.	With CAT5 cable.	700434905
1151D1/1151D2 Power Cord	USA	405362641
	Europe	407786623
	Australia/New Zealand	407786631
	India	407790991
	United Kingdom	407786599
	Argentina	408161453

10.10.38 5610

This phone requires a separate power supply, using either a Avaya 1151D1 or 1151D2 power supply unit and power cord or a 802.3af Power over Ethernet (PoE) source.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.

5610	Feature	Detail
	Connects via	IP network.
	IP Office Release	3.0+
	Programmable Buttons	✓ 24 (6 buttons x 4 pages).
	Headset Socket	✓
	Handsfree Speaker/Microphone	✓/✓.
	Message Waiting Lamp	✓
	PoE Class/Typical Idle Power Consumption	5W (Class 2)
	Display	29 characters x 5 lines (168 x 80 pixels)
	Supported Add-Ons	None.
	Upgradable Firmware	✓
	PC Pass-Through Port/with Voice Priority	✓/✓

Standard DCP Phone Keys			
✓ SPEAKER	✓ HEADSET	✓ MUTE	✓ VOLUME UP
✗ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✓ DROP	✓ REDIAL	✓ CONFERENCE	

Variant		SAP Code
5610SW	Multi-Grey	700345333
5610SW (RoHS compliant)	Multi-Grey	700381965
Replacement Handset	Dark Grey	700203797
Amplified Handset	Dark Grey	700229735
Noisy Location Handset	Dark Grey	700229743
Push to Talk Handset	Dark Grey	700229727
EU24	Multi-Grey	700381817
EU24BL	Multi-Grey	700381544
1151D1 Power Supply	With CAT5 cable.	700434897
1151D2 Power Supply with battery backup.	With CAT5 cable.	700434905
1151D1/1151D2 Power Cord	USA	405362641
	Europe	407786623
	Australia/New Zealand	407786631
	India	407790991
	United Kingdom	407786599
	Argentina	408161453

10.10.39 5620

This phone is similar in physical appearance and functions to the 4620SW. It is no longer available from Avaya, having been replaced by the 5621.

This phone requires a separate power supply, using either a Avaya 1151D1 or 1151D2 power supply unit and power cord or a 802.3af Power over Ethernet (PoE) source.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.

5620	Feature	5620IP
	Connects via	IP network.
	IP Office Release	3.0+
	Programmable Buttons	✓ 24 (12 buttons x 2 pages).
	Headset Socket	✓
	Handsfree Speaker/Microphone	✓/✓
	Message Waiting Lamp	✓
	PoE Class/Typical Idle Power Consumption	5.9W (Class 3)
	Display	29 characters x 7 lines (168 x 132 pixels)
	Supported Add-Ons	EU24*, EU24BL*.
	Upgradeable Firmware	✓
	PC Pass-Through Port/with Voice Priority	✓/✓

Standard DCP Phone Keys			
✓ SPEAKER	✓ HEADSET	✓ MUTE	✓ VOLUME UP
✗ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✓ DROP	✓ REDIAL	✓ CONFERENCE	

Variant		SAP Code
5620IP	Multi-Grey	700339815
Replacement Handset	Dark Grey	700203797
Amplified Handset	Dark Grey	700229735
Noisy Location Handset	Dark Grey	700229743
Push to Talk Handset	Dark Grey	700229727
EU24*	Multi-Grey	700381817
EU24BL*	Multi-Grey	700381544
1151D1 Power Supply	With CAT5 cable.	700434897
1151D2 Power Supply with battery backup.	With CAT5 cable.	700434905
1151D1/1151D2 Power Cord	USA	405362641
	Europe	407786623
	Australia/New Zealand	407786631
	India	407790991
	United Kingdom	407786599
	Argentina	408161453

*When used with an EU24 or EU24BL unit, a 1151 type power supply unit must be used to power the phone.

10.10.40 5621

This phone is similar in physical appearance and functions to the 4621SW.

This phone requires a separate power supply, using either a Avaya 1151D1 or 1151D2 power supply unit and power cord or a 802.3af Power over Ethernet (PoE) source.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.

5621	Feature	5620IP
	Connects via	IP network.
	IP Office Release	3.2+
	Programmable Buttons	✓ 24 (12 buttons x 2 pages).
	Headset Socket	✓
	Handsfree Speaker/Microphone	✓/✓
	Message Waiting Lamp	✓
	PoE Class/Typical Idle Power Consumption	5.9W (Class 3)
	Display	29 characters x 7 lines (168 x 132 pixels)
	Supported Add-Ons	EU24*, EU24BL*.
	Upgradeable Firmware	✓
	PC Pass-Through Port/with Voice Priority	✓/✓

Standard DCP Phone Keys			
✓ SPEAKER	✓ HEADSET	✓ MUTE	✓ VOLUME UP
✗ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✓ DROP	✓ REDIAL	✓ CONFERENCE	

Variant		SAP Code
5621SW	Multi-Grey	700345982
5621SW (RoHS compliant)	Multi-Grey	700385982
Replacement Handset	Dark Grey	700203797
Amplified Handset	Dark Grey	700229735
Noisy Location Handset	Dark Grey	700229743
Push to Talk Handset	Dark Grey	700229727
EU24*	Multi-Grey	700381817
EU24BL*	Multi-Grey	700381544
1151D1 Power Supply	With CAT5 cable.	700434897
1151D2 Power Supply with battery backup.	With CAT5 cable.	700434905
1151D1/1151D2 Power Cord	USA	405362641
	Europe	407786623
	Australia/New Zealand	407786631
	India	407790991
	United Kingdom	407786599
	Argentina	408161453

*When used with an EU24 or EU24BL unit, a 1151 type power supply unit must be used to power the phone.

10.10.41 6408D

These phones no longer available from Avaya.

6408D	Feature	Detail
	Connects via	DS port.
	IP Office Release	1.0+.
	Programmable Buttons	✓ 8 .
	Headset Socket	✗
	Handsfree Speaker / Microphone	✓ / ✓
	Message Waiting Lamp	✓
	Display	24 characters x 2 lines.
	Supported Add-Ons	None.
	Upgradable Firmware	✗

Standard DCP Phone Keys			
✓ SPEAKER	✗ HEADSET	✓ MUTE	✓ VOLUME UP
✗ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✗ DROP	✓ REDIAL	✓ CONFERENCE	

Item	SAP Code
6408D+ (Grey)	70020100
6408D+ (White)	70020092
6408 Stand (Grey)	108933169
6408 Stand (White)	108933177

10.10.42 6416D

These phones no longer available from Avaya. An additional 24 programmable buttons can be added using an XM24 and power supply unit.

6416D	Feature	Detail
	Connects via	DS port.
	IP Office Release	1.0+.
	Programmable Buttons	✓ 16 .
	Headset Socket	✓
	Handsfree Speaker/Microphone	✓/✓
	Message Waiting Lamp	✓
	Display	24 characters x 2 lines.
	Supported Add-Ons	XM24
	Upgradable Firmware	✗

Standard DCP Phone Keys			
✓ SPEAKER	✓ HEADSET	✓ MUTE	✓ VOLUME UP
✗ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✓ DROP	✓ REDIAL	✓ CONFERENCE	

Variant		SAP Code
6416D+M	Grey	108807611
	White	108807603
6416/6424D+M Stand	Grey	848219127
	White	848219119
XM24	Grey	700406523
	White	700406515
XM24 Stand	Grey	108272378
	White	108272386
1151D1 Power Supply	With CAT5 cable.	700434897
1151D2 Power Supply with battery backup.	With CAT5 cable.	700434905
1151D1/1151D2 Power Cord	USA	405362641
	Europe	407786623
	Australia and New Zealand	407786631
	India	407790991
	United Kingdom	407786599
	Argentina	408161453

10.10.43 6424D

An additional 24 programmable buttons can be added using an XM24 and power supply unit.

6424D	Feature	Detail
	Connects via	DS port.
	IP Office Release	1.0+.
	Programmable Buttons	✓ 24 .
	Headset Socket	✓
	Handsfree Speaker / Microphone	✓ / ✓
	Message Waiting Lamp	✓
	Display	24 characters x 2 lines.
	Supported Add-Ons	XM24
	Upgradeable Firmware	✗

Standard DCP Phone Keys			
✓ SPEAKER	✓ HEADSET	✓ MUTE	✓ VOLUME UP
✗ MESSAGES	✓ HOLD	✓ TRANSFER	✓ VOLUME DOWN
✓ DROP	✓ REDIAL	✓ CONFERENCE	

Variant		SAP Code
6424D+M	Grey	108807595
	White	108807587
6416/6424D+M Stand	Grey	848219127
	White	848219119
XM24	Grey	700406523
	White	700406515
XM24 Stand	Grey	108272378
	White	108272386
1151D1 Power Supply	With CAT5 cable.	700345447
1151D2 Power Supply with battery backup.	With CAT5 cable.	700345454
1151D1/1151D2 Power Cord.	USA	405362641
	Europe	407786623
	Australia and New Zealand	407786631
	India	407790991
	United Kingdom	407786599
	Argentina	408161453

10.10.44 9620L, 9620C

These phones are supported on IP500 and IP500v2 systems running IP Office Release 6 and higher. The phones are supplied with a two-position stand.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.
- The voice activated dialing and USB features are not supported.
- For IP Office Release 6.1, these phones are supported running SIP software. When that is the case, the IP Office or IP Office Manager should not be used as the file server for the phone. Avaya SIP phones require an Avaya IP Endpoints license.
- The Class requirement of PoE powered phones may be increased if the phone is used with additional equipment such as a button module.

9620	Feature	9620L	9620C
	Connects via	IP network.	IP network.
	IP Office Release	6.0+	6.0+
	Programmable Buttons	✓ Soft buttons.	✓ Soft buttons.
	Headset Socket	✓	✓
	Handsfree Speaker / Microphone	✓/✓	✓/✓
	Message Waiting Lamp	✓	✓
	PoE Class / Typical Idle Power Consumption	Class 1	Class 1
	Display	1/4 VGA Greyscale	1/4 VGA Color
	Supported Add-Ons	–	–
	Upgradeable Firmware	✓	✓
	PC Pass-Through Port / with Voice Priority	✓/✓	✓/✓

Fixed Function Keys				
✓ SPEAKER	✓ HEADSET	✓ MUTE	✓ VOLUME UP	✓ CONTACTS
✓ MESSAGE	✗ HOLD	✗ TRANSFER	✓ VOLUME DOWN	✓ CALL LOG
✗ DROP	✗ REDIAL	✗ CONFERENCE	✓ MENU	✗ FORWARD

Functions for fixed functions keys not present are accessible through display menu soft key functions.

Variant		SAP Code
9620L Telephone	Charcoal Grey	700461197
9620C Telephone	Charcoal Grey	700461205
9620L without faceplate	–	700461239
9620C without faceplate	–	700461247
Replacement Stand	Silver	700416555
Wedge Stand	Charcoal Grey	700383870
Wall Mounting Plate	Charcoal Grey	700383375
Gigabit Adapter	–	700383771
Bluetooth Adapter	–	700383789

Replacement Handset		700416548
Amplified Speech Handset		700446370
Replacement Handset Cord (9 feet)		700383318
Replacement Handset Cord (25 feet)		700383821
Replacement Line Cord		700383326

10.10.45 9630G

These phones are supported on IP500 and IP500v2 systems running IP Office Release 6 and higher. The phones are supplied with a two-position stand.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.
- The voice activated dialing and USB features are not supported.
- For IP Office Release 6.1, these phones are supported running SIP software. When that is the case, the IP Office or IP Office Manager should not be used as the file server for the phone. Avaya SIP phones require an Avaya IP Endpoints license.
- The Class requirement of PoE powered phones may be increased if the phone is used with additional equipment such as a button module.

9630	Feature	9630
	Connects via	IP network.
	IP Office Release	6.0+
	Programmable Buttons	✓
	Headset Socket	✓
	Handsfree Speaker / Microphone	✓ / ✓
	Message Waiting Lamp	✓
	PoE Class / Typical Idle Power Consumption	Class 2
	Display	1/3 VGA Greyscale
	Supported Add-Ons	SMB24 352 x 3.
	Upgradeable Firmware	✓
	PC Pass-Through Port / with Voice Priority	✓ / ✓

Fixed Function Keys				
✓ SPEAKER	✓ HEADSET	✓ MUTE	✓ VOLUME UP	✓ CONTACTS
✓ MESSAGE	✗ HOLD	✗ TRANSFER	✓ VOLUME DOWN	✓ CALL LOG
✗ DROP	✗ REDIAL	✗ CONFERENCE	✓ MENU	✓ FORWARD

Functions for fixed functions keys not present are accessible through display menu soft key functions.

Variant		SAP Code
9630G Telephone	Charcoal Grey	700405673
9630G without faceplate	–	700408602
SMB24 Button Module	Charcoal Grey	700462518
SMB24 without faceplate	–	700462526
SMB24 Replacement Stand	Silver	700416571
Replacement Stand	Silver	700416563
Wedge Stand	Charcoal Grey	700383888
Wall Mounting Plate	Charcoal Grey	700383383
Gigabit Adapter	–	700383771
Bluetooth Adapter	–	700383789
Replacement Handset		700416548
Amplified Speech Handset		700446370
Replacement Handset Cord (9 feet)		700383318

Replacement Handset Cord (25 feet)		700383821
Replacement Line Cord		700383326

10.10.46 9640, 9640G

These phones are supported on IP500 and IP500v2 systems running IP Office Release 6 and higher. The phones are supplied with a two-position stand.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.
- The voice activated dialing and USB features are not supported.
- For IP Office Release 6.1, these phones are supported running SIP software. When that is the case, the IP Office or IP Office Manager should not be used as the file server for the phone. Avaya SIP phones require an Avaya IP Endpoints license.
- The Class requirement of PoE powered phones may be increased if the phone is used with additional equipment such as a button module.

9640	Feature	9640
	Connects via	IP network.
	IP Office Release	6.0+
	Programmable Buttons	✓
	Headset Socket	✓
	Handsfree Speaker / Microphone	✓/✓
	Message Waiting Lamp	✓
	PoE Class / Typical Idle Power Consumption	Class 2
	Display	1/3 VGA Greyscale
	Supported Add-Ons	SMB24 352 x 3.
	Upgradeable Firmware	✓
	PC Pass-Through Port / with Voice Priority	✓/✓

Fixed Function Keys				
✓ SPEAKER	✓ HEADSET	✓ MUTE	✓ VOLUME UP	✓ CONTACTS
✓ MESSAGE	✗ HOLD	✗ TRANSFER	✓ VOLUME DOWN	✓ CALL LOG
✗ DROP	✗ REDIAL	✗ CONFERENCE	✓ MENU	✓ FORWARD

Functions for fixed functions keys not present are accessible through display menu soft key functions.

Variant		SAP Code
9640 Telephone	Charcoal Grey	700383920
9640G Telephone	Charcoal Grey	700419195
9640 without faceplate	–	700408610
9640G without faceplate	–	700429095
SMB24 Button Module	Charcoal Grey	700462518
SMB24 without faceplate	–	700462526
SMB24 Replacement Stand	Silver	700416571
Replacement Stand	Silver	700416563
Wedge Stand	Charcoal Grey	700383888
Wall Mounting Plate	Charcoal Grey	700383383
Gigabit Adapter	–	700383771

Bluetooth Adapter	–	700383789
Replacement Handset		700416548
Amplified Speech Handset		700446370
Replacement Handset Cord (9 feet)		700383318
Replacement Handset Cord (25 feet)		700383821
Replacement Line Cord		700383326

10.10.47 9650, 9650C

These phones are supported on IP500 and IP500v2 systems running IP Office Release 6 and higher. The phones are supplied with a two-position stand.

- The availability of VCM (Voice Compression Module) 45 channels is necessary to support IP telephony. For IP Office 6.0+, these phones require an Avaya IP Endpoints 394 license.
- The voice activated dialing and USB features are not supported.
- For IP Office Release 6.1, these phones are supported running SIP software. When that is the case, the IP Office or IP Office Manager should not be used as the file server for the phone. Avaya SIP phones require an Avaya IP Endpoints license.
- The Class requirement of PoE powered phones may be increased if the phone is used with additional equipment such as a button module.

9650	Feature	9650	9650C
	Connects via	IP network.	IP network.
	IP Office Release	6.0+	6.0+
	Programmable Buttons	✓	✓
	Headset Socket	✓	✓
	Handsfree Speaker/ Microphone	✓/✓	✓/✓
	Message Waiting Lamp	✓	✓
	PoE Class/Typical Idle Power Consumption	Class 2	Class 2
	Display	1/3 VGA Greyscale	1/3 VGA Color
	Supported Add-Ons	SMB24 352 x 3.	SMB24 352 x 3.
	Upgradeable Firmware	✓	✓
	PC Pass-Through Port/ with Voice Priority	✓/✓	

Fixed Function Keys				
✓ SPEAKER	✓ HEADSET	✓ MUTE	✓ VOLUME UP	✓ CONTACTS
✓ MESSAGE	✗ HOLD	✗ TRANSFER	✓ VOLUME DOWN	✓ CALL LOG
✗ DROP	✗ REDIAL	✗ CONFERENCE	✓ MENU	✗ FORWARD

Functions for fixed functions keys not present are accessible through display menu soft key functions.

Variant		SAP Code
9650 Telephone	Charcoal Grey	700383938
9650C Telepehone	Charcoal Grey	700461213
9650 without faceplate	–	700408628
9650C without faceplate	–	700462526
SMB24 Button Module	Charcoal Grey	700462518
SMB24 without faceplate	–	700462526
SMB24 Replacement Stand	Silver	700416571
Replacement Stand	Silver	700416563
Wedge Stand	Charcoal Grey	700383888
Wall Mounting Plate	Charcoal Grey	700383383
Gigabit Adapter	–	700383771
Bluetooth Adapter	–	700383789
Replacement Handset		700416548
Amplified Speech Handset		700446370
Replacement Handset Cord (9 feet)		700383318

Replacement Handset Cord (25 feet)		700383821
Replacement Line Cord		700383326

10.10.48 ETR 6, ETR 6D

This phone is supported with IP Office Release 6 and higher. It is only supported on an ETR6 card 238 in IP500v2 systems running Partner Version 52 mode. Refer to the separate IP Office Partner Version documentation for full details.

All 'Refresh' and 'Euro Style' variants of the phone are supported. An additional analog device using the same extension number can be connected via the ETR phone's AUX socket.

10.10.49 ETR 18, ETR 18D

This phone is supported with IP Office Release 6 and higher. It is only supported on an ETR6 card 238 in IP500v2 systems running Partner Version 52 mode. Refer to the separate IP Office Partner Version documentation for full details.

All 'Refresh' and 'Euro Style' variants of the phone are supported. An additional analog device using the same extension number can be connected via the ETR phone's AUX socket.

10.10.50 ETR 34D

This phone is supported with IP Office Release 6 and higher. It is only supported on an ETR6 card 238 in IP500v2 systems running Partner Version 52 mode. Refer to the separate IP Office Partner Version documentation for full details.

All 'Refresh' and 'Euro Style' variants of the phone are supported. An additional analog device using the same extension number can be connected via the ETR phone's AUX socket.

A maximum of 4 ETR 34D phones are supported on a system with a maximum of 2 on any individual ETR6 base card.

10.10.51 T3 Classic

This phone is supported in Europe only (U-Law only). The T3 Classic has 2 Link ports for optional add-on T3 Headset and or T3 DSS units (up to 2 further T3 DSS units can be chained from the first T3 DSS).

The IP Office supports T3 UPN and IP phones. It does not support T3 IPN phones. Previous restrictions against using T3 phones on systems with other types of digital stations no longer apply.

T3 Classic	Feature	Detail
	Connects via	DS port.
	IP Office Release	3.1+. [Not Small Office Edition]
	Programmable Buttons	✓ 4.
	Headset Socket*	✓
	Handsfree Speaker/Microphone	✓/✓
	Message Waiting Lamp	✓
	Upgradeable Firmware	✗

*Using optional T3 Headset Link unit.

Variant	Colour	SAP Code
T3 UPN Classic	Black	700380272
	White	700380306
T3 IP Classic	Black	700414733
	White	700414725
T3 DSS Unit	Black	700380322
	White	700380330
T3 DSS Expansion Unit	Black	700380348
	White	700380355
T3 IP Power Supply Unit		700414766
AEI/Headset Link for T3 IP		700414774
Power Supply for T3 IP DSS		700414790
Headset Link for T3 UPN		700380363

10.10.52 T3 Comfort

This phone is supported in Europe only (U-Law only). The T3 Classic has 2 Link ports for optional add-on T3 Headset and or T3 DSS units (up to 2 further T3 DSS units can be chained from the first T3 DSS).

The IP Office supports T3 UPN and IP phones. It does not support T3 IPN phones. Previous restrictions against using T3 phones on systems with other types of digital stations no longer apply.

T3 Comfort	Feature	T3 Comfort
	Connects via	DS ports.
	IP Office Release	3.1+ [Not Small Office Edition]
	Programmable Buttons	✓ 10.
	Headset Socket*	✓
	Handsfree Speaker/Microphone	✓/✓
	Message Waiting Lamp	✓
	Upgradeable Firmware	✗

*Using optional T3 Headset Link unit.

Variant	Colour	SAP Code
T3 UPN Comfort	Black	700380280
	White	700380314
T3 IP Comfort	Black	700414758
	White	700414741
T3 DSS Unit	Black	700380322
	White	700380330
T3 DSS Expansion Unit	Black	700380348
	White	700380355
T3 IP Power Supply Unit		700414766
AEI/Headset Link for T3 IP		700414774
Power Supply for T3 IP DSS		700414790
Headset Link for T3 UPN		700380363

10.10.53 T3 Compact

This phone is supported in Europe only (U-Law only). The T3 Classic has 1 Link port for optional add-on T3 Headset or T3 DSS units (up to 2 further T3 DSS units can be chained from the first T3 DSS).

The IP Office supports T3 UPN and IP phones. It does not support T3 IPN phones. Previous restrictions against using T3 phones on systems with other types of digital stations no longer apply.

T3 Compact	Feature	T3 Compact
	Connects via	DS ports.
	IP Office Release	3.1+ [Not Small Office Edition]
	Programmable Buttons	✓ 10.
	Headset Socket	✓
	Handsfree Speaker/Microphone	✓/✓
	Message Waiting Lamp	✓
	Upgradeable Firmware	✗

*Using optional T3 Headset Link unit.

Variant	Colour	SAP Code
T3 UPN Compact	Black	700380264
	White	700380298
T3 IP Compact	Black	700414717
	White	700414709
T3 DSS Unit	Black	700380322
	White	700380330
T3 DSS Expansion Unit	Black	700380348
	White	700380355
T3 IP Power Supply Unit		700414766
AEI/Headset Link for T3 IP		700414774
Power Supply for T3 IP DSS		700414790
Headset Link for T3 UPN		700380363

10.11 Phone Add-Ons

Some IP Office phones support button modules which provided the phone with additional programmable buttons. The number of button modules supported per phone and per system are as follow:

- BM32: *(1616)*
  Up to 32 DBM32s supported (32 buttons each, up to 1024 buttons).
- DSS4450: *(4412D+, 4424D+)*
  Up to 8 DSS4450 modules per system (maximum of 2 per DS expansion module, including the IP406v2) (50 buttons each, max 400 buttons).
- DBM32: *(1416)*
  Up to 32 DBM32s supported (32 buttons each, up to 1024 buttons).
- EU24/EU24BL: *(4620, 4621, 5420, 5620, 5621/4620, 4621, 5620, 5621)*
  Up to 8 EU24s per system (24 buttons each, max 196 buttons).
- SBM12/SBM24: *(9630G, 9640, 9640G, 9650, 9650C)*
  Up to 42 SBM12 and SBM24 modules per system (24 buttons each, up to 1008 buttons). Note that SBM12 and SMB24 modules cannot be mixed on the same phone.
- T3 Series: *(All T3 phones)*
  Up to 30 T3 DSS modules supported. (36 buttons each, up to 1080 buttons). T3 DSS buttons are not included in the overall system limit for additional button module buttons.
- XM24: *(6416+, 6424+)*
  Up to 10 XM24 units per system (maximum of 2 per DS expansion module, including the IP406v2) with a maximum of 1 per 6416+/6424+ phone (24 buttons each giving a maximum of 240 XM24 buttons).

Note that for IP phones, the addition of a button module may change the PoE Class rating of the phone and may require the use of a separate power supply.

Excluding T3 DSS modules only, where different types of button module are being used on the same system, in addition to the individual limits above, the maximum combined number of buttons per system is 1024, regardless of whether the buttons are programmed or not.

10.11.1 4450

The DSS4450 works in association with the 4412D and 4424D telephones, each of which can support up to two DSS4450 adjuncts.

Each DSS4450 provides an additional 60 programmable keys with single red lamps except for the bottom two rows which have green lamps. The DSS4450 requires an auxiliary Avaya power supply unit and must be used with the cables supplied.

IP Office supports a maximum 2 x 4450 units on each Digital Station expansion module, including the IP406 V2 control unit. A maximum of 8 x 4450 units total are supported on the whole IP Office system. For additional limitations see Phone Add-Ons 346.

This phone is not supported on the IP500 DS8 Extension Card. For the IP500 it will work on external Digital Station Expansion Modules.

4450	Feature	Detail
	Connects via	DSS port on phone.
	Supported by	4412D+, 4424D+
	Maximum per phone	2.
	Maximum per DS module/ control unit	2.
	Maximum per IP Office system	8.
	Additional requirements	4450 power supply unit on phone.
	IP Office Release	1.0+
	Programmable Buttons	✓ 60 (50x /10x).

Item	SAP Code
4450 (Black)	108199696
4450 (White)	108199407
Small 4400 Series Stand (Black)	108541194
Small 4400 Series Stand (White)	108541202
Power Supply for 4450	108596412

10.11.2 BM32, DBM32

The BM32 add on provides an additional 32 twin-LED programmable buttons for 1616 phones. The DBM32 is a similar unit used for 1416 phones. The units do not require their own power supply connection as they draw power from the phone to which they are connected.

- Up to 3 units can be connected in a chain from a single 1416 or 1616.
- For 1616 phones, to support a BM32 the phone must be powered by an individual 1600 Series Power Adapter.
- Up to a maximum of 16 BM32 units are supported on the whole IP Office system. For IP Office 5.0+ this limit has been increased to 32 BM32 units on the system. For additional limitations see Phone Add-Ons 346.

Item	SAP Code
BM32 BUTTON MODULE	700415573
DBM32 BUTTON MODULE	700469968
Accessories	
1600 SERIES BM32 CABLE - REPLACEMENT	700415581
1600 SERIES BM32 BOND BRIDGE - REPLACEMENT	700415599
1616/BM32 PLASTIC LABEL COVERS (20) – REPLACEMENT	700415672
1600 SERIES BM32 FLIP STAND - REPLACEMENT	700432800
Paper Labels	
1616/BM32 PAPER DESI LABELS - PACKAGE OF 50 LABELS (8.5" x 11")	700415656
1616/BM32 PAPER DESI LABELS - PACKAGE OF 50 LABELS (A4)	700434236

- ⚠ Note for Australian installations only:
  Installations of the 1416 terminal with an 1151 PSU and DBM32 must be restricted to the same building as the host Gateway. That is, the 1416 – if installed with an 1151 PSU and DBM32 – cannot be connected in a campus environment where the 1416 terminal is installed in a building separate from the building housing the Gateway. This application cannot be used with exposed (out-of-building) wiring.
  - For installations in which the 1416 is used without the 1151 PSU and DBM32, campus connections are acceptable: the 1416 can be located in a separate building in these cases.
  - This restriction applies to Australian installations only.

10.11.3 EU24

Provides an additional 24 programmable buttons. For additional limitations see Phone Add-Ons 346.

- ⚠ Only the cable supplied with the EU24/EU24BL should for connection to the EU24/EU24BL. This cable should only be connected to the port marked EU24 on suitable phones. Doing otherwise will cause damage to the EU24/EU24BL and the equipment to which it is attached.

EU24	Feature	Detail
	Connects via	EU24 port on phone.
	Supported by	2420, 4620, 4621, 4625, 5420, 5620, 5621.
	Maximum per phone	1.
	Maximum per IP Office	8.
	Additional Requirements	A 1151 Type power supply unit must be used to power the phone.
	IP Office Release	3.0+
	Programmable Buttons	✓ 24.

Item		SAP Code
EU24 1XU-A Expansion Module	Multi-Grey	700381817
1151D1 Power Supply	With CAT5 cable.	700434897
1151D2 Power Supply with battery backup.	With CAT5 cable.	700434905
1151D1/1151D2 Power Cord	USA	405362641
	Europe	407786623
	Australia/New Zealand	407786631
	India	407790991
	United Kingdom	407786599
	Argentina	408161453

10.11.4 EU24BL

Provides an additional 24 programmable buttons. The EU24BL is physically similar to the EU24 but includes a backlight function that matches 4621 phone. For additional limitations see Phone Add-Ons 346.

- ⚠ Only the cable supplied with the EU24/EU24BL should for connection to the EU24/EU24BL. This cable should only be connected to the port marked EU24 on suitable phones. Doing otherwise will cause damage to the EU24/EU24BL and the equipment to which it is attached.

EU24BL	Feature	Detail
	Connects via	EU24 port on phone.
	Supported by	4620, 4621, 4625, 5620, 5621.
	Maximum per phone	1.
	Maximum per IP Office	8.
	Additional requirements	A 1151 Type power supply unit must be used to power the phone.
	IP Office release	3.1+.
	Programmable Buttons	✓ 24.

Item		SAP Code
EU24BL 2XU-A Backlighted Expansion Module	Multi-Grey	700381544
1151D1 Power Supply	With CAT5 cable.	700434897
1151D2 Power Supply with battery backup.	With CAT5 cable.	700434905
1151D1/1151D2 Power Cord	USA	405362641
	Europe	407786623
	Australia/New Zealand	407786631
	India	407790991
	United Kingdom	407786599
	Argentina	408161453

10.11.5 T3 DSS

The T3 DSS provides an additional 36 programmable keys for phones in the supported T3 series. The T3 DSS is moulded and designed to be attached to the associated phone. Signalling is achieved by cable connection to the Link port on the T3 phone. A further two T3 DSS units can be chained from the first T3 DSS. For additional limitations see Phone Add-Ons 346
.

Feature	Detail
Connects via	Link port on phone.
Supported by	T3 Compact, T3 Classic, T3 Comfort
Maximum per phone	3.
Maximum per DS module	-.
Additional requirements	None.
IP Office release	3.1+.
Programmable Buttons	✓ 36.

Item	Colour	SAP Code
T3 DSS Unit	Black	700380322
	White	700380330
T3 DSS Expansion Unit	Black	700380348
	White	700380355

10.11.6 SMB24

This button module is supported with most 9600 Series phones except for 9620 and 9621 phones. Up to 3 SMB24 modules can be attached to any one phone. For additional limitations see Phone Add-Ons 346.

Note that SMB12 and SMB24 may not be mixed on the same phone.

- The Class requirement of PoE powered phones may be increased if the phone is used with additional equipment such as a button module.

Variant		SAP Code
SMB24 Button Module	Charcoal Grey	700462518
SMB24 without faceplate	–	700462526
SMB24 Replacement Stand	Silver	700416571

10.11.7 201B RIM

The 201B Recorder Interface Module (RIM) is supported for use with 2420 and 5420 phones. It provides the phone with a 3.5mm mini-RCA jack socket for connection of recording devices. It also provides two headset sockets which can be used in place of the phones existing headset socket (the phone and the RIM sockets can not be used at the same time).

- The 201B is the RoHS compliant replacement for the 201A. The 20B stand is the RoHS complaint replacement for the 20A stand.

To install the 201B, the phones existing stand must be removed and be replace by a 20B stand (also called the 20B Module Adapter Base). This is an expanded stand that includes two slots, into one of which the 201B can be inserted. However only one 201B is supported per phone.

Use of the 20B and therefore the 201B requires the phone to be powered by a 1151D1 or 1151D2 power supply unit. Full installation instructions are included with the 20B Stand.

Item		SAP Code
201B Recorder Interface Module		700381635
20B Stand		700381650
EU24	Multi-Grey	700381817
1151D1 Power Supply	With CAT5 cable.	700434897
1151D2 Power Supply with battery backup.	With CAT5 cable.	700434905
1151D1/1151D2 Power Cord	USA	405362641
	Europe	407786623
	Australia/New Zealand	407786631
	India	407790991
	United Kingdom	407786599
	Argentina	408161453

10.11.8 XM24

Connects to the XM24 port on the base of 6416 and 6424 phones. Requires the phone to have a separate power supply using an Avaya 1151D1 or 1151D2 power supply unit and a power outlet socket are required. For additional limitations see Phone Add-Ons 346.

XM24	Feature	XM24
	Connects via	XM24 port on phone.
	Supported by	6416+, 6424+
	Maximum per phone	1.
	Maximum per DS module/control unit	2.
	Maximum per IP Office system	10
	Additional requirements	1151D1 or 1151D2 PSU for phone.
	IP Office Release	1.0+.
	Programmable Buttons	✓ 24.

Item		SAP Code
XM24	Grey	700406523
	White	700406515
XM24 Stand	Grey	108272378
	White	108272386
1151D1 Power Supply.	With CAT5 cable.	700434897
1151D2 Power Supply with battery backup.	With CAT5 cable.	700434905
1151D1/1151D2 Power Cord	USA	405362641
	Europe	407786623
	Australia and New Zealand	407786631
	India	407790991
	United Kingdom	407786599
	Argentina	408161453

10.12 Applications

This section outlines the requirements for various IP Office applications. These are just outlines, for full details refer to the specific installation manuals for those applications and to the IP Office Technical Bulletins.

10.12.1 IP Office Application Server

The IP Office Application Server is a single server installation package for the IP Office applications listed below. The DVD installs the CentOS Linux operating system, the IP Office applications and a set of web pages for server management. Note that except in the case of an IP Office Application Server upgrade, the installation overwrites any existing operating system and data on the server PC.

- one-X Portal for IP Office
  User and configuration access is via web browser in the same way as for a Windows sever installation of one-X Portal for IP Office.
- Voicemail Pro
  Configuration access is done using a Windows installation of the Voicemail Pro client software. An installation package for the Voicemail Pro client is included on the IP Office Application Server server.

For Voicemail Pro server running on the IP Office Application Server, the following Voicemail Pro features are not supported:

- VB Scripting.
- TTS Text to Speech.
- MAPI Email.
- UMS Exchange Integration.
- UMS Web Voicemail
  However access via IMAP and one-X Portal are available as alternatives.
- 3rd Party Database Integration.
- VPNM.

When logged into the voicemail server using the Voicemail Pro client, those features not supported are grayed out or hidden. If those features are present in an imported call flow, they will not function and calls attempting to use those features will be disconnected.

For Small Community Network scenarios where multiple voicemail servers are present, for example distributed and backup server, a mix of Linux based and Windows based servers are allowed.

Details	
DVD	IP Office Application Server DVD (700500949) Two DVD set, 2nd DVD contain open source used by the IP Office Application Server.
License	✓ - Depends on the IP Office applications selected during installation The IP Office Application Server server itself does not require any license.

PC Requirements

The compatibility of any particular server PC cannot be guaranteed. A list of know suitable servers is available at https://hardware.redhat.com/.

PC Requirements	Minimum	Recommended
RAM	2GB	4GB
Hard Disk Free Space	30GB	30GB
Processor:		
- Pentium	Core 2 duo	Quad Core 2.4GHz
- AMD		Athlon 64 4000
Additional Apps:		
- Web Browser	• Internet Explorer 7+. • Firefox 3+ • Opera 2+ • Safari 3.2+	

Ports

Component	Ports
IP Office Application Server • HTTP/HTTP Access • SFTP Access	 7070 22

- Access to additional ports is as per the IP Office applications selected during installation.

10.12.2 ContactStore

The Voicemail Pro can be used for manual and automatic call recording. Normally those recordings are placed into the mailbox specified for the user or hunt group whose call is being recorded and are then treated as normal messages. Contact Store allows those recordings to be redirected into a database on the ContactStore PC. This allows recordings to be archived and searched separately from user messages. User access to Contact Store is via web browser. This application requires entry of a license into the IP Office configuration.

- For IP Office Release 6, the supported version of ContactStore for IP Office is 7.8.

Details	
DVD	IPO 6.1 User/Admin DVD (700500949)
License	✓ VMPro Recordings Administrators (IP400 ContactStore for IPO RFA - 187166). See Voicemail Pro Licenses 397.

PC Requirements

Minimum Server PC Requirements	
RAM	512MB
Hard Disk Free Space	10GB*
Processor:	
- Pentium	P4 2.4GHz
- Celeron	Not tested.
- AMD	Athlon XP 3000+, Athlon64
Additional Apps:	
- Web Browser	• Internet Explorer 7. • Internet Explorer 8.

Operating System Support	
Server OS:	
2003 Server	✓
2008 Server	✓
Client OS:	
XP Professional	✗
Vista	✓
Windows 7	✗

- If run on the same PC as the Voicemail Pro, apart from meeting the requirements of Voicemail Pro:
  - ContactStore must use a separate disk partition from Voicemail Pro.
  - Minimum hard disk free space increases to 20GB* and Pentium processor to P4 2.8GHz minimum.
    - *1: For all voicemail servers, also allow 1MB per minute for messages and greeting storage.
    - *2: Also allow 7.2MB per hour for recordings in the Contact Store disk partition.
- Recordings and data are stored in PostgresSQL database. This is created during installation of the Contact Store software.
- ContactStore is not supported on 32-bit operating systems.

Ports

Component	Location - %ProgramFiles%\Avaya\IP Office\	Ports
Contact Store	Witness\tomcat5024\bin\tomcat5.exe	TCP 8888. UDP 50791. UDP 50795.

10.12.3 Customer Call Reporter (CCR)

- Customer Call Reporter 357
  This application is installed on a server PC connected to the IP Office. Users access the application from their PC using a web browser. The application obtains data about the calls handled by CCR agents and groups from the IP Office system and stores that data in an MS-SQL database. It can support up to 150 agents and 75 supervisors.

Details	
DVD	IPO 6.1 User/Admin DVD (700500949)
License	✓ See Customer Call Reporter Licenses 399.
Languages	Dutch, English (UK), English (US), French, Italian, Brazilian Portuguese, Russian and Spanish.

PC Requirements

Minimum Server PC Requirements	
RAM	2GB
Hard Disk Free Space	30GB
Processor:	
- Pentium	Intel Pentium D945 Dual Core
- Celeron	Not tested.
- AMD	AMD Athlon 64 4000+.
User PC Requirements	
Web Browser	• Google Chrome • Internet Explorer 7. • Internet Explorer 8. • Mozilla Firefox 3.0. • Safari 3.2.

Operating System Support	
Server OS:	
2003 Server	✓
2008 Server	✓
Client OS:	
XP Professional	✗
Vista	✗
Windows 7	✗

10.12.4 Manager

This tool is used to access all parts of the IP Office configuration. Different levels of access can be defined to control which parts of the configuration the Manager user can view and alter. Manager is also used to upgrade the software files used by an IP Office system. When running is also acts as a TFTP server from which some Avaya phones can request new software.

Note that IP Office Manager's software level is always two higher than the IP Office core software with which it is release. For example IP Office 6.0 core software is release with IP Office Manager 8.0.

IP Office Manager is backwards compatible and can be used to manage IP Office systems running software from IP Office 2.1 upwards.

Details	
DVD	IPO 6.1 User/Admin DVD (700500949)
Languages	English, Brazilian, Dutch, French, German, Italian, Spanish (Mexican).
License	✗ No license required.

PC Requirements

Minimum PC Requirements	
RAM	256MB
Hard Disk Free Space	1GB*
Processor:	
- Pentium	PIII 800MHz
- Celeron	Celeron 3 800Mhz
- AMD	Athlon Opteron, Athlon64/XP
Additional Apps:	
- .NET2	Installed with Manager if not already present.

Operating System Support	
Server OS:	
2003 Server	✓
2008 Server	✓
Client OS:	
XP Professional	✓
Vista	✓
Windows 7	✓

*Includes disk space required for .NET2 component.

Ports

Component	Location - %ProgramFiles%\Avaya\IP Office\	Ports
IP Office Manager	Manager\manager.exe	TCP Port 50802. TCP Port 50804. TCP Port 50812. UDP Port 50798.

10.12.5 Monitor

Monitor (also know as System Monitor) is a tool that can show all activity on the IP Office system in great detail. As a consequence, interpretation of Monitor traces requires a high-level of data and telephony protocol knowledge. However, all IP Office installers and maintainers must understand how to run Monitor when necessary as Avaya may request copies of Monitor traces to resolve support issues.

For IP Office 4.0 and higher, the System Status Application has been added to provide more easily interpreted information than is provided by Monitor.

- Two versions of Monitor are included in the IP Office Admin applications suite, one for IP Office 4.0 systems and one for pre-4.0 IP Office systems. Care should be taken to ensure that the correct version is used when monitoring an IP Office system.

Details	
DVD	IPO 6.1 User/Admin DVD (700500949)
Languages	English only.
License	✗ No license required.

PC Requirements

Minimum PC Requirements	
RAM	128MB
Hard Disk Free Space	10GB
Processor:	
- Pentium	PIII 800MHz
- Celeron	Celeron 3 800Mhz
- AMD	Athlon B 650MHz

Operating System Support	
Server OS:	
2003 Server	✓
2008 Server	✓
Client OS:	
XP Professional	✓
Vista	✓
Windows 7	✓

Ports

Component	Location - %ProgramFiles%\Avaya\IP Office\	Ports
System Monitor	Monitor\sysmonitor.exe	UDP 50794.

10.12.6 one-X Portal for IP Office

This application is installed on a server PC connected to the IP Office. Users can access the one-X portal from their own PC using a web browser. The application allows the user to control their phones, access voicemail messages, call logs and phone directories.

Details	
DVD	IPO 6.1 User/Admin DVD (700500949)
License	✓ See User Licenses 395.
Languages	Dutch, English (UK), English (US), French, Italian, Brazilian Portuguese, Russian and Latin Spanish.

The details below are for a Windows based server installation of one-X Portal for IP Office. one-X Portal for IP Office can also be installed as part of a Linux based server installation using the IP Office Application Server DVD 355.

PC Requirements

Minimum Server PC Requirements	
RAM	2GB
Hard Disk Free Space	10GB
Processor:	
- Pentium	Intel Pentium D945 Dual Core
- Celeron	Not tested.
- AMD	AMD Athlon 64 4000+.
User PC Requirements	
Web Browser	• Google Chrome • Internet Explorer 7. • Internet Explorer 8. • Mozilla Firefox 3.0. • Safari 3.2.

Operating System Support	
Server OS:	
2003 Server	✓
2008 Server	✓
Client OS:	
XP Professional	✗
Vista	✗
Windows 7	✗

10.12.7 Phone Manager

Phone Manager is an application that allows the user to control and monitor their own phone through their PC. For Avaya phones that support handsfree operation, Phone Manager can be used to make and answer calls. During usage, the Phone Manager records details of calls made, answered and missed. It can also be configured to show the status of other users on the system. Phone Manager also allows the user to access and change many of the setting stored in the IP Office configuration that relate to their own phone operation, for example their forwarding destination numbers.

Though installed as a single set of software, that same software can operate in several modes:

- Phone Manager Lite
  The default mode of Phone Manager. Requires no license, this application can be installed for any IP Office user.
- Phone Manager Pro
  Users configured for Professional Edition mode are able to access a range of additional features. Phone manager Pro requires entry of licenses into the IP Office system. The licenses also control the number of simultaneous Phone Manager Pro users. The user's Phone Manager software then automatically changes from Lite mode to Professional Edition mode.
- Phone Manager Pro PC Softphone *(formerly called Phone Manager iPro)*
  This is a PC softphone mode of Phone Manager operation. The user acts as a VoIP extension, making calls through the speaker and microphone of their PC. This mode requires further licenses in addition to the Phone Manager Pro licenses.

Details	
DVD	IPO 6.1 User/Admin DVD (700500949)
Languages	Brazilian, Chinese (Simplified), Danish, Dutch, English, French, Finnish, German, Italian, Korean, Latin Spanish, Norwegian, Portuguese, Russian, Spanish, Swedish.
License	✓ Licensed application. See Phone Manager Licenses 402.

PC Requirements

Minimum PC Requirements	
RAM	64MB
Hard Disk Free Space	160MB for Lite/1GB for Pro.
Processor:	
- Pentium	PIII 800MHz
- Celeron	Celeron 3 800Mhz
- AMD	Athlon B 650MHz

Operating System Support	
Server OS:	
2003 Server	✗
2008 Server	✗
Client OS:	
XP Professional *(32-bit)*	✓
Vista *(32-bit)*	✓
Windows 7	✗

- Phone Manager Pro PC Softphone also requires the user PC to have a speaker and microphone installed and the user associated with an IP extension on the IP Office.

Ports

Component	Location - %ProgramFiles%\Avaya\IP Office\	Ports
Phone Manager	Phone Manager\PhoneManager.exe	UDP 50796. UDP 50799.
Phone Manager VOIP Server	Phone Manager\iClaritySvr.exe	UDP 1719. UDP 1720.

Licenses

License shows the name as it appears in the IP Office configuration. RFA Name is the name used for the orderable item.

License	Description	RFA Name		SAP
Phone Manager Pro (per seat)	Enables Phone Manager Pro for 1, 5, 10, 20, 50, 100 or unlimited users. The user's Phone Manager mode is set through the IP Office configuration (User | Telephony | Phone Manager Type).	IP400 Phone Manager Pro	1	177468
			5	177469
			10	177470
			20	177471
			50	177472
Phone Manager Pro IP Audio Enabled (per user)	Enables Phone Manager Pro IP softphone operation for a user. Note: Also requires the user to have a Phone Manager Pro license.	IP400 IPPRO	1	171992
			5	174463
			10	174464
			20	174465
			50	174466

- In addition to entering Phone Manager licenses, each user is individually configured for the expected Phone Manager type.
- During operation, the number of Phone Manager license keys available and the number unused can be checked. Run Phone Manager and select Help | About. Holding down the Ctrl and Shift keys, click on the software version number.

10.12.8 SoftConsole

This is a licensed application. It is intended for telephone system operators or receptionists. Its displays details of calls directed to the user and allows them to quickly see the status of the callers required destination and transfer the call. The SoftConsole user is able to access a range of details about the status of users and groups on the IP Office system.

- The IP Office SoftConsole works in conjunction with a physical IP Office extension phone to provide the speech path for calls. It is not supported for use with an IP softphone.
- Up to 4 simultaneous SoftConsole users can be licensed.

Details	
DVD	IPO 6.1 User/Admin DVD (700500949)
Languages	Brazilian, Chinese (Simplified), Danish, Dutch, English, French, Finnish, German, Italian, Korean, Latin Spanish, Norwegian, Portuguese, Russian, Spanish, Swedish.
License	✓ Licensed application. See below.

PC Requirements

Minimum PC Requirements	
RAM	128MB
Hard Disk Free Space	1GB
Processor:	
- Pentium	PIII 800MHz
- Celeron	Celeron 3 800Mhz
- AMD	Athlon B 650MHz

Operating System Support	
Server OS:	
2003 Server	✗
2008 Server	✗
Client OS:	
XP Professional	✓
Vista	✓
Windows 7	✓

Ports

Component	Location - %ProgramFiles%\Avaya\IP Office\	Ports
SoftConsole	SoftConsole\SoftConsole.exe	UDP 50799. UDP 50796.

Licenses

License	Description	RFA Name	SAP
Receptionist	Adds one additional SoftConsole user. A maximum of four SoftConsole user can be licensed.	IPO LIC RECEPTIONIST RFA	171987

10.12.9 System Status Application (SSA)

This tool provides a wide range of information about the current status of an IP Office 4.0 or higher system. Its includes available resources and components within the system. This includes details of current call in progress. Details of the number of alarms are recorded and the time date of the most recent alarms.

When required for diagnostics escalation SSA is able to take a snap shot image of the IP Office system's status including a copy of its current configuration. Use of SSA requires an IP Office service user name and password that has been configured for System Status access in the IP Office's security settings.

- For IP500v2 systems, SSA is pre-installed on the system's Avaya SD memory card and can be run by browsing to the IP Office system's IP address.

Details	
DVD	IPO 6.1 User/Admin DVD (700500949)
License	✗ No license required.

PC Requirements

Minimum PC Requirements	
RAM	256MB
Hard Disk Free Space	1.4GB
Processor:	
- Pentium	PIII 800MHz
- Celeron	Celeron 3 800Mhz
- AMD	Athlon B 650MHz
Additional Apps:	
- Sun Java Virtual Machine	Installed with SSA if not already present.

Operating System Support	
Server OS:	
2003 Server	✓
2008 Server	✓
Client OS:	
XP Professional	✓
Vista	✓
Windows 7	✓

10.12.10 TAPI

IP Office TAPI is a client PC application that allows TAPI compliant applications to interact with the IP Office. The IP Office TAPI software can be used in one of two modes, depended on whether it is licensed or not. The same software is installed in either case with the licenses, if any, being entered in the IP Office system configuration.

- 1st Party TAPI
  In this unlicensed mode the TAPI software supports control of an individual user's associated extension, allowing a TAPI compliant application to answer (requires a phone that supports handsfree answer) and make calls.
- 3rd Party TAPI
  In this licensed mode, TAPI software can be used to control call function on multiple user extension. This mode is used with CTI Developer applications.

Details	
DVD	IPO 6.1 User/Admin DVD (700500949)
License	✗ Optional. Licenses are required for 3rd party TAPI mode operation. See CTI Licenses 402.

PC Requirements: 1st Party TAPI

Minimum PC Requirements	
RAM	64MB
Hard Disk Free Space	50MB
Processor:	
- Pentium	PIII 800MHz
- Celeron	Celeron 3 800Mhz
- AMD	Athlon B 65-0MHz

Operating System Support	
Server OS:	
2003 Server	✗
2008 Server	✗
Client OS:	
XP Professional	✓
Vista	✓
Windows 7	✓

PC Requirements: 3rd Party TAPI

Minimum PC Requirements	
RAM	64MB
Hard Disk Free Space	50MB
Processor:	
- Pentium	PIII 800MHz
- Celeron	Celeron 3 800Mhz
- AMD	Athlon B 65-0MHz

Operating System Support	
Server OS:	
2003 Server	✓
2008 Server	✓
Client OS:	
XP Professional	✓
Vista	✓
Windows 7	✓

Ports

Component	Location - %ProgramFiles%\Avaya\IP Office\	Ports
TAPI2	TAPI\tspi2w.tsp	UDP 50797.

10.12.11 Voicemail Pro

This application requires various licenses entered into the IP Office configuration to control the features it offers and the number of simultaneous connections, up to 30 on the IP412 and IP500 control units. The operation of Voicemail Pro can be customized to provide special services.

The Voicemail Pro software can be installed as separate Voicemail Pro client and server parts. This allows the remote administration of the Voicemail Pro server from a PC with just the Voicemail Pro client installed. A copy of the client is automatically installed locally with the Voicemail Pro server.

Source	
DVD	IPO 6.1 User/Admin DVD (700500949)
Languages	Chinese (Mandarin and Cantonese), Danish, German, Greek, English (UK), English (US), Spanish, Latin Spanish, Finnish, French, French Canadian, Hungarian, Italian, Korean, Dutch, Norwegian, Polish, Portuguese, Brazilian, Swedish.
License	✓ See Voicemail Pro Licenses 397.

The details below are for a Windows based server installation of Voicemail Pro. Voicemail Pro can also be installed as part of a Linux based server installation using the IP Office Application Server DVD 355.

The Voicemail Pro server part of the software consists of several components in addition to the core server software, these are:

- Campaigns
  The Voicemail Pro can be configured to run a campaign. This consists of a series of questions for which the Voicemail Pro records the callers answer or key presses. The resulting recordings can then be played back by users. The web aspect of campaigns allows user to perform this playback and processing of campaign recordings via their web browser. This requires an IIS web server to be run on the same PC as the Voicemail Pro software.
- Text to Speech (TTS)
  Through adding additional licenses, the Voicemail Pro is able to use the TTS functions of Windows to speak text and numbers to callers in addition to recording prompts. This is intended mainly for scenarios where the Voicemail Pro is obtaining text and number values from a customer database.
- Unified Messaging Service (UMS)
  Voicemail Pro supports a feature called voicemail email to send messages or message alerts to a user's email mailbox. This however is a one-way process with no link back to the user's voicemail mailbox on whether the email has been read or deleted. UMS allows this to become a two-way process, where users can play voicemail messages through their email mailbox or voicemail mailbox.

Basic Voicemail Pro

Minimum PC Requirements	
RAM	256MB
Hard Disk Free Space	2GB*
Processor:	
- Pentium	P4 1.4GHz
- Celeron	Any 1.7GHz
- AMD	Any 1.4GHz.

*Also allow 1MB per minute for message and prompt storage.

Operating System Support	
Server OS:	
2003 Server	✓
2008 Server	✓
Client OS:	
XP Professional	✓
Vista	✓
Windows 7	✓

Voicemail Pro plus UMS Web Voicemail and/or Campaigns

Minimum PC Requirements	
RAM	512MB
Hard Disk Free Space	2GB*
Processor:	
- Pentium	P4 2.8GHz
- Celeron	Not tested.
- AMD	Athlon XP 3000+, Athlon 64

*Also allow 1MB per minute for message and prompt storage.

Operating System Support	
Server OS:	
2003 Server	✓
2008 Server	✓
Client OS:	
XP Professional	✗
Vista	✗
Windows 7	✗

- Both Web Campaigns and UMS Web Voicemail require the IIS web server on the voicemail server PC to be enabled.

- UMS Web Voicemail will install PHP if not detected as already installed.

Voicemail Pro plus IVR and or TTS

Minimum PC Requirements: Basic Voicemail Pro	
RAM	512MB
Hard Disk Free Space	20GB*
Processor:	
- Pentium	P4 2.8GHz
- Celeron	Not tested.
- AMD	Athlon XP 3000+, Athlon 64

Operating System Support	
Server OS:	
2003 Server	✓
2008 Server	✓
Client OS:	
XP Professional	✓
Vista	✗
Windows 7	✗

Also allow 1MB per minute for message and prompt storage.

*Generic TTS only. The current ScanSoft TTS provided with Voicemail Pro is not supported on Vista.

- If the database being queried is located on the VM Pro server the query speed of the database will be affected by the amount of memory available. Please take into account the memory requirements of the database being queried.

Ports

The Voicemail Pro service uses the following ports.

Port Number	Type	Description
25	TCP	Used to listen for SMTP connections.
37	UDP	Used to receive time requests (RFC 868).
143	TCP	Used to service IMAP4 requests.
50791	UDP	Used to receive requests from IP Office PBX.
	TCP	Used to receive requests fromone-X Portal for IP Office.
50791	TCP	Used to receive connections from Voicemail Pro client.

Note that additional ports may be used for connection to services such as 3rd party database or Microsoft Exchange.

10.12.12 Operating System Summary

This sections summarizes the support for IP Office applications by IP Office Release 6. Some specific features of applications may have additional requirements. Those requirements will be details in the appropriate application installation manual.

Windows Operating System Support

The following table gives a summary of the operating systems on which the IP Office applications that are part of the IP Office Release 6 have been tested and are supported. While the applications may function of other operating systems, they have not been tested by Avaya and are not supported.

IP Office Application	Windows Clients						Windows Servers		
	XP Pro		Vista		Windows 7		2003	2008	
	32	64	32	64	32	64	32	32	64
Voicemail Pro server	✓	–	✓	–	✓	✓	✓	✓	✓
... plus UMS	–	–	–	–	–	–	✓	✓	✓
... plus campaigns	–	–	–	–	–	–	✓	✓	✓
Voicemail Pro client	✓	✓	✓	✓	✓	✓	✓	✓	✓
ContactStore	–	–	✓	–	–	–	✓	✓	–
one-X Portal for IP Office	–	–	–	–	–	–	✓	✓	✓
Customer Call Reporter	–	–	–	–	–	–	✓	✓	✓
SoftConsole	✓	–	✓	✓	✓	✓	–	–	–
IP Office Manager	✓	✓	✓	✓	✓	✓	✓	✓	✓
System Monitor	✓	✓	✓	✓	✓	✓	✓	✓	✓
System Status Application	✓	✓	✓	✓	✓	✓	✓	✓	✓
TAPI - 1st Party	✓	✓	✓	✓	✓	✓	✓	✓	✓
TAPI - 3rd Party	✓	✓	✓	✓	✓	✓	✓	✓	✓
Phone Manager Lite/Pro	✓	–	✓	–	✓	✓	–	–	–
Phone Manager PC SoftPhone	✓	–	✓	–	✓	✓	–	–	–

- Vista support is only on Business, Enterprise and Ultimate versions.
- Windows 7 support is only on Professional, Enterprise and Ultimate versions.

Virtual Server Support

For IP Office Release 6, all applications supported on Windows server operating systems are supported while running on the following virtual servers:

- VMWare.
- Microsoft Virtual Server.
- Microsoft Server Hyper-V.

Browser Application Support

The following applications are accessed using web browsers. The table below details the browsers tested by Avaya.

Application	Windows				Mac
	Internet Explorer	Firefox	Opera	Safari	Safari
IP Office Application Server	✓ 7+	✓ 3+	✓ 2+	✓ 3.2+	✓ 3.2+
Voicemail Pro UMS	✓ 7+	✓ 3+	✓ 2+	✓ 3.2+	✓ 3.2+
one-X Portal for IP Office	✓ 7+	✓ 3+	✓ 2+	✓ 3.2+	✓ 3.2+
Customer Call Reporter	✓ 7+	✓ 3+	✓ 2+	✓ 3.2+	✓ 3.2+
ContactStore 7.8	✓ 7+	–	–	–	–

Microsoft Outlook Support

Where IP Office applications interact with Microsoft Outlook, for IP Office Release 6.1, the versions of Outlook supported are Outlook 2003, Outlook 2007 and Outlook 2010.

10.12.13 IP Office Ports

Most PC firewalls will request the user to allow various exceptions when a newly installed application is first run. However this may not always be the case, especially if the firewall is located elsewhere than the user's PC.

Adding Firewall Exceptions

The file avayafw.bat can be used to open up the necessary firewall exceptions for IP Office applications. The file can be downloaded from http://marketingtools.avaya.com/knowledgebase/tools/firewall.

It only works for:

- The default Windows XP/Windows 2003 firewall.
- The application must be installed for the exception to be created.
- The application must be installed in the default location.

Whilst avayafw.bat only works subject to the conditions above, for other firewalls study of this file will indicate the necessary application files and ports for which exceptions need to be created.

Ports Used

The list below details many of the IP ports used by IP Office control units and IP Office applications. Many of these are standard ports for different IP traffic protocols.

◀ Indicates a listening port on the IP Office control unit. ▶ indicates a port to which the IP Office sends, for example to a PC running an IP Office application.

* Indicates that the port and or protocol can be changed.

Port		Protocol		Function
25*	▶	SMTP	TCP	Email system alarms from the IP Office to SMTP server. For IP Office 4.2 also used for Voicemail Email on Embedded Voicemail.
37	▶	Time	UDP	Time requests from the IP Office to a Time Server (RFC868).
53	◀	DNS	UDP	Domain Name Service responses.
67	◀	BOOTP/DHCP	UDP	DHCP server operation.
68	▶	BOOTP/DHCP	UDP	DHCP client operation.
69	◀	TFTP	UDP	File requests to the IP Office.
69	▶	TFTP	UDP	File requests by the IP Office.
80	◀	HTTP	TCP	HTTP File requests.
161*	◀	SNMP	UDP	From SNMP applications.
162*	▶	SNMP Trap	UDP	To addresses set in the IP Office configuration.
500	◀	IKE	UDP	Key exchange for IPSec protocol.
389*	▶	LDAP	TCP	Lightweight Directory Access Protocol.
520	▶	RIP	UDP	To and from the IP Office to other RIP devices. For RIP1 and RIP2 (RIP1 compatible) the destination address is a subnet broadcast, eg. 192.168.42.255. For RIP2 Multicast the destination address is 224.0.0.9.
520	◀	RIP	UDP	
1701	◀	L2TP	UDP	Layer 2 tunneling protocol.
1718	◀	H.323	UDP	H.323 Discovery
1719	◀	H.323 RAS	UDP	H.323 Status. VoIP device registering with the IP Office.
1720	▶	H.323/H.245	UDP	H.323 Signalling. Data to a registered VoIP device.
2127	▶	(UDP)	UDP	PC Wallboard to CCC Wallboard Server.
3478	▶	SIP	UDP	Port used for STUN requests from the IP Office to the SIP provider.
5005	◀	RTCPMon	UDP	RTCP Monitoring information from Avaya H323 phones.
5060	◀▶	SIP	UDP/ TCP*	SIP Line Signalling
8080	▶	HTTP	TCP	Browser access to the Delta Server application.
8089	▶	Enconf	UDP	From the IP Office to the Conferencing Center Server Service. User access to the Conferencing Center is direct via HTTP sessions.
8888	▶	HTTP	TCP	Browser access to the IP Office ContactStore (VRL) application.
49152 to 53247 *	◀▶	RTP/RTCP	UDP	Dynamically allocated ports used during VoIP calls for RTP and RTCP traffic. The port range can be adjusted through the System | Gatekeeper tab.

Port		Protocol		Function
50791	▶	IPO Voicemail	UDP	To voicemail server address.
50793	◀	IPO Solo Voicemail	UDP	From IP Office TAPI PC with Wave drive user support.
50794	◀	IPO Monitor	UDP	From the IP Office Monitor application.
50795	◀	IPO Voice Networking	UDP	Small Community Network signalling (AVRIP) and BLF updates. Each system does a broadcast every 30 seconds. BLF updates are sent required up a maximum of every 0.5 seconds.
50796	◀	IPO PCPartner	UDP	From an IP Office application (for example Phone Manager or SoftConsole). Used to initiate a session between the IP Office and the application.
50797	◀	IPO TAPI	UDP	From an IP Office TAPI user PC.
50798	▶	(UDP)	UDP	*BT Fusion variant. No longer used.*
50799	▶	IPO BLF	UDP	Broadcast to the IP Office LAN and the first 10 IP addresses registered from other subnets.
50800	▶	IPO License Dongle	UDP	To the License Server IP Address set in the IP Office configuration.
50801	◀	EConf	UDP	Conferencing Center Service to IP Office.
50802	◀	Discovery	TCP	IP Office discovery from Manager.
50804 *	◀	Service Access Protocol	TCP	IP Office configuration settings access.
50805 *	◀		TCP	" TLS Secure.
50808 *	◀		TCP	IP Office system status access.
50812 *	◀		TCP	IP Office security settings access.
50813 *	◀		TCP	" TLS Secure.

- CDR/SMDR from the IP Office is sent to the port number and IP address defined during configuration and using either TCP or UDP as selected.

Ports

IP Office Monitor can be used to display IP packet details including the source and destination Port numbers. As well as displaying the port numbers (in decimal), IP Office Monitor also displays the names of more commonly used ports including IP Office specific ports.

For example "src = 23" is interpreted as "src = 23 (Telnet)".

The list below details the ports currently decoded by IP Office Monitor. For a full list of assigned non-IP Office ports see http://www.iana.org/assignments/port-numbers.

- 20 File Transfer [Default Data]
- 21 File Transfer [Control]
- 23 Telnet
- 25 Simple Mail Transfer
- 37 Time
- 43 Who Is
- 53 Domain Name Server
- 67 Bootstrap Protocol Server
- 68 Bootstrap Protocol Client
- 69 Trivial File Transfer
- 70 Gopher
- 79 Finger
- 80 World Wide Web-HTTP
- 115 Simple File Transfer Protocol
- 123 Network Time Protocol
- 137 NETBIOS Name Service
- 138 NETBIOS Datagram Service
- 139 NETBIOS Session Service
- 156 SQL Service
- 161 SNMP
- 162 SNMPTRAP
- 179 Border Gateway Protocol
- 1719 H.323Ras
- 1720 H.323/H.245
- 50791 IPO Voicemail
- 50792 IPO Network DTE
- 50793 IPO Solo Voicemail (i.e. Wave driver for TAPI)
- 50794 IPO Monitor
- 50795 IPO Voice Networking
- 50796 IPO PCPartner
- 50797 IPO TAPI
- 50798 IPO Who-Is response
- 50799 IPO BLF
- 50800 IPO License Dongle
- 50801 EConf

Protocols

IP Office Monitor, as well as displaying the Protocol number (in decimal) of packets, also displays the names of the more common Protocols. For example "pcol = 1" is decoded as "pcol = 1 (ICMP)".

Protocol numbers currently decoded by IP Office Monitor are:

- 1 - Internet Control Message [ICMP]
- 2 - Internet Group Management [IGMP]
- 6 - Transmission Control [TCP]
- 8 - Exterior Gateway Protocol [EGP]
- 9 - Interior Gateway Protocol [IGP]
- 17 - User Datagram [UDP]
- 41 - Ipv6 [IPV6]
- 46 - Reservation Protocol [RSVP]
- 47 - General Routing Encapsulation [GRE]
- 58 - ICMP for IPv6 [IPv6-ICMP]
- 111 - IPX in IP[IPX-In-IP]
- 115 - Layer Two Tunneling Protocol [L2TP]
- 121 - Simple Message Protocol [SMP]

10.13 Physical Ports

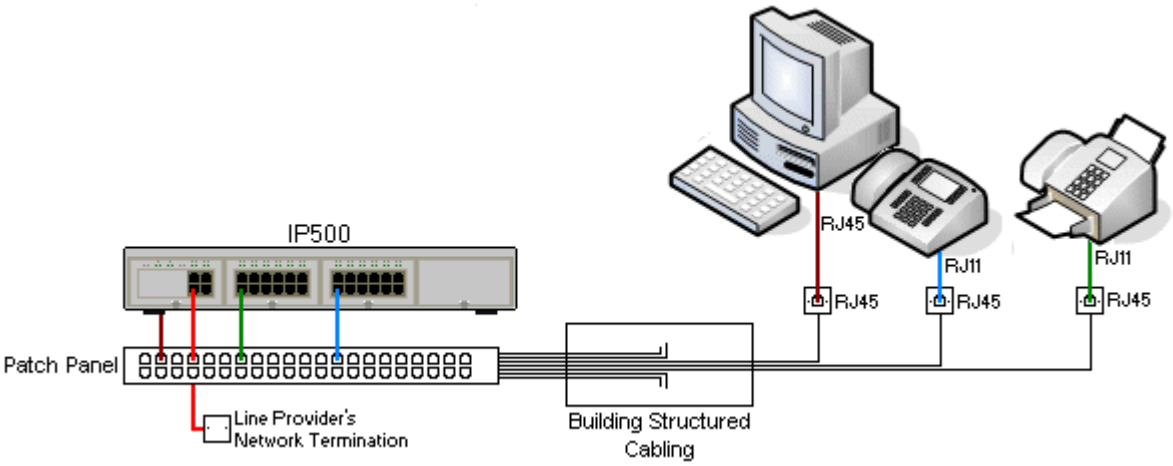
The following port types are found on IP Office systems:

Port	Description
ANALOG 376	Used for the connection of external analog trunks.
AUDIO 376	Used for input of an external music on hold source.
BRI 378	Used for connection of BRI trunks (Quad BRI trunk card) and ISDN terminals devices (So8 module).
DC I/P 379	Power input from external power supply unit.
DS 379	Connection of Avaya digital station phones supported by IP Office 43.
RS232/DTE 135	Used for control unit maintenance under Avaya guidance. On expansion modules not used.
EF 380	Emergency power failure ports found on the ETR6 base card.
ETR 380	Only supported on IP500v2 control unit running in Partner Version mode.
EXPANSION 381	Used for interconnection of external expansions modules and control units.
EXT O/P 127	Used to control external relay systems. The port provides two switchable (on, off and pulse) controls.
	Used for connection of functional or protective ground if required.
LAN 382	10/100Mbps Ethernet LAN ports.
PF 383	Analog power fails ports.
PHONE 384 (POT) 384	Analog phone extension ports. On older units these ports are labeled as POT ports.
PRI 385	PRI trunk ports.
USB	Not used.
WAN 386	WAN interface ports. V.24, V.35 and X.21 through cable selection.

10.13.1 Cables

The IP Office systems are designed primarily for use within an RJ45 structured cabling system using CAT3 unshielded twisted-pair (UTP) cabling and RJ45 sockets.

A structured cabling system is one where cables are run from a central RJ45 patch panel in the communications/data room to individual RJ45 sockets at user locations. All wires in each cable between the patch panel and the desk socket are connected straight through. This arrangement allows devices connected at the patch panel to be swapped to match the type of device that needs to be connected at the user socket. For example, making one user socket a phone port and another user socket a computer LAN port, without requiring any rewiring of the cables between the patch panel and the user location.



- Traditional IDC Punchdown Wiring Installations
  Where necessary, the far end RJ45 plug can be stripped from IP Office cables and wired into traditional wiring systems using punch-block connectors. This type of installation should be performed by an experienced wiring technician.
- Trunk Connections
  The majority of IP Office trunk ports use RJ45 connectors for acceptance of an RJ45-to-RJ45 cable. However, connection at the line provider's end may require use of a different plug type in order to match the line providers equipment.
- RJ11 Phone Connectors
  Many phones use RJ11 sockets and are supplied with RJ11-to-RJ11 cables. RJ11 plugs can be inserted into RJ45 sockets and in many case the connection will work. However this is not recommended or supported as the connection lock is not truly positive and may become disconnected. An RJ45-to-RJ11 cable 379 is available for these connections.

Standard IP Office Cables

The following are Avaya standard cables available for use with IP Office systems. The maximum length is applicable if the standard Avaya cable is replaced with an alternate cable.

Cable	Description	SAP Code	Standard Length	Maximum Length
9-Way DTE Cable 135	Connects to control unit RS232 DTE port. 9-Way D-type plug to 9-way D-type socket.	–	2m/6'6''.	2m/6'6''.
Structured Cabling DS Line Cable 379	Connects from RJ45 sockets to RJ11 socketed DS and analog phones.	700047871	4m/13'2''.	See table below.
BRI/PRI Trunk Cable 378	Connects BRI/PRI trunk ports to the line provider's network termination point. RJ45 to RJ45. Red.	700213440	3m/9'10''.	–
Expansion Interconnect Cable 381	Connects the control unit to expansion modules (except WAN3 modules). RJ45 to RJ45. Blue.	700213457	1m/3'3''.	1m/3'3''.
LAN Cable 382	Connects from IP Office LAN ports to IP devices. RJ45 to RJ45. Grey.	700213481	3m/9'10''.	100m/328'.
LAN Interconnect Cable 382	Connects WAN3 module to the control unit. Replace with a LAN crossover cable for IP412 control units. Green.	700213465	1m/3'3''.	–
LAN Crossover Cable 382	Used for connection of IP devices to LAN ports on the IP412 control unit. Black	700213473	3m/9'10''.	100m/328'.
V.24 WAN Cable 387	37-Way D-type plug to 25-way D-type plug.	700213416	3m/9'10''.	5m/16'5''
V.35 WAN Cable 388	37-Way D-type plug to 34-way MRAC plug.	700213424	3m/9'10''.	5m/16'5''
X.21 WAN Cable 389	37-Way D-type plug to 15-way D-type plug.	700213408	3m/9'10''.	5m/16'5''

The table below details the maximum total cable distances for DS and analog extensions using different cable types.

Telephone	Unshielded Twisted-Pair (UTP) - 50nf/Km			CW1308
	AWG22 (0.65mm)	AWG24 (0.5mm)	AWG26 (0.4mm)	
ETR Phones	305m/1000'.	305m/1000'.	122m/400'.	122m/400'.
2400/5400 Series	1200m/3937'.	1000m/3280'.	670m/2200'.	400m/1310'.
4406D Phone	1000m/3280'.	1000m/3280'.	400m/1310'.	400m/1310'.
4412D Phone	1000m/3280'.	700m/2295'.	400m/1310'.	400m/1310'.
4424D	500m/1640'.	500m/1640'.	400m/1310'.	400m/1310'.
6400 Series	1000m/3280'.	1000m/3280'.	400m/1310'.	400m/1310'.
T3 Series (Upn)	1000m/3280'.	1000m/3280'.	400m/1310'.	–
Analog Phones	1000m/3280'.	1000m/ 3280'.	400m/1640'.	800m/2620'.

10.13.2 ANALOG Port

These ports are analog trunk ports. The IP400 ATM4 analog trunk cards and IP500 analog trunk cards only support loop-start trunks. The ATM16 Analog Trunk module supports both loop-start and ground-start trunks, switchable within the IP Office configuration.

ANALOG	Pin	Description
	1	Not used.
	2	Not used.
	3	Not used.
	4	Ring.
	5	Tip.
	6	Not used.
	7	Not used.
	8	Not used.

- Off-Hook Current: 25mA.
- IMPORTANT
  In all IP Office installations, any module being used for analog trunk connections must be connected to a functional earth 207.
- WARNING
  Within the Republic of South Africa and in areas of high lightning risk, any module using analog trunk connections must be connected to a protective ground 207 and to surge protection equipment 38.

10.13.3 AUDIO Port

This port is found on the rear of all IP Office control units. It is used for the input of an external music-on-hold sound source. Note that if the IP Office has loaded an internal music-on-hold sound file, any input from this socket is ignored.

The port is a 3.5mm stereo jack socket suitable for use with the most standard audio leads and connection to the 'headphone' output socket of most audio systems.

The use of a 'headphone' socket allows simple volume adjustment. Connection via a 'Line Out' socket may require additional equipment in order to adjust the volume level.

Pin No.	Description
Common	Common
Left	Audio In - Left Channel.
Right	Audio In - Right - Channel.

- Input impedance: 10k /channel. Maximum a.c. signal – 200mV rms.

10.13.4 BRI Port (So)

The BRI ports found on the front of the So8 module are BRI So interface ports for connect to ISDN terminal devices.

For IP Office 4.2+, IP500 BRI trunk daughter cards can be switched from To to So mode. IP400 BRI trunk cards can only be used as To connections 378.

IP Office			Wire	ISDN Terminal	
RJ45	Pin	BRI		PIN	RJ45
	1	–	White/Orange	1	
	2	–	Orange/White	2	
	3	⬅Rx-A	White/Green	3	
	4	➡Tx-B	Blue/White	4	
	5	➡Tx-A	White/Blue	5	
	6	⬅Rx-B	Green/White	6	
	7	–	White/Brown	7	
	8	–	Brown/White	8	

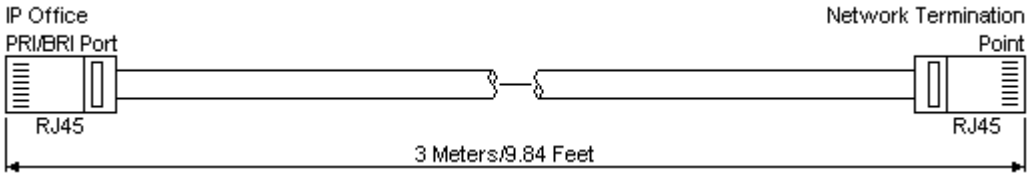
- Terminating Resistors
  100ohm Terminating resistors are required across the transmit and receive wire pairs at each end of the S-bus.
  - The IP Office So8 module BRI ports include integral 100ohm terminating resistors.
  - For IP Office 4.2+, individual ports of an IP500 BRI daughter card can be switched to So mode. This is done by setting the Line Sub-Type to *S-Bus* in the IP Office configuration. In this case terminating resistors must be added at the IP Office end in addition to those at the other end of the S-bus connection.
    - Addition of the necessary termination at the IP Office end can be done using an IP500 BRI So Converter Cable (700458649). This short (25cm/10") cable includes both the necessary terminating resistors and the cable cross-over.
  - Many ISDN terminal devices includes terminating resistors. If this is not the case, 100ohm (+/-5%) resistors must be connected across the receive wire pair and the transmit wire pair in the junction box immediately before the last ISDN terminal on the S-bus.

10.13.5 BRI Port (To)

These ports are BRI To interface ports for connection to external BRI trunk services. Note that BRI ports found on the IP400 So8 module are BRI-S interface ports for connect to ISDN terminal devices, see BRI Port (So) 377.

PRI/BRI Trunk Cable

This cable is used to connect from IP Office BRI/PRI trunk ports to the line providers network termination equipment. If that equipment does not use RJ45 sockets, the cable may need to be stripped and rewired or an alternate cable used. The appropriate signal pin-outs and wire colours are detailed below.



IP Office				Wire	Network Termination	
BRI	RJ45	BRI	PRI		PIN	RJ45
RJ45 8 1	1	–	⬅Rx-A	White/Orange	1	RJ45 8 1
	2	–	⬅Rx-B	Orange/White	2	
	3	➡Tx-A	–	White/Green	3	
	4	⬅Rx-A	➡Tx-A	Blue/White	4	
	5	⬅Rx-B	➡Tx-B	White/Blue	5	
	6	➡Tx-B	–	Green/White	6	
	7	–	–	White/Brown	7	
	8	–	–	Brown/White	8	

- Supply: BRI/PRI trunks cards are not supplied with these cables.
- Cable Color: Red.
- SAP Code: 700213440.
- Standard Length: 3m/9'10".
- Maximum Length: 5m/16'5''.
- Though not used pins 7 and 8 are through connected for ease of construction.

10.13.6 DC I/P Port

Found on all IP Office control units and expansion modules. Used for connection from the external power supply unit 32 supplied with the control unit or module.

- No other type of power supply unit should be used with the module or module unless specifically indicated by Avaya.
- Power cords must not be attached to the building surface or run through walls, ceilings, floors and similar openings.

10.13.7 DS Ports

These ports are used for connection from an RJ45 structured cabling system to digital station phones supported by the IP Office.

Though the RJ11 to RJ11 cables supplied with most DS phones can be plugged directly into RJ45 ports including those on IP Office modules, this is not recommend as the connection lock is not positive and may become disconnected.

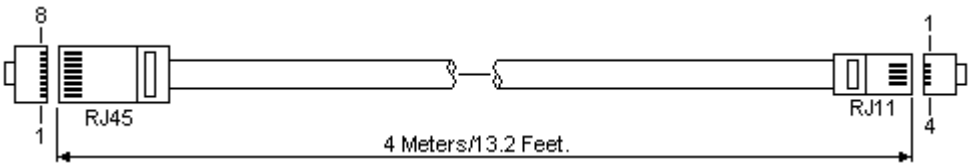
DS ports on Digital Station V1/V2 expansion modules can be connected to out-of-building extensions 38. If this is the case, connection must be made via suitable protective devices at each end and via each building primary protection. In addition the Digital Station module must be connected to a protective ground.

DS ports on IP Office control units must not be connected to out-of-building extensions.

Structured Cabling Line Cord

This is an RJ45 to RJ11 cable suitable for connection from a structured cabling system RJ45 port to a DS phone. It can also be used for two-wire analog phone extensions.

This cable is not suitable for connection from an Avaya 1151D1/B2 power supply unit to a DS phone with a 4450, EU24 or XM24 add-on module. In those cases the cables supplied with the power supply unit and the add-on module should be used.



IP Office			Phone	
DS Port	Pin	Description	Pin	Port
RJ45 (8 1)	1	Not used.	–	RJ11 (6 1)
	2	Not used.	1	
	3	Not used.	2	
	4	Signal 1.	3	
	5	Signal 2.	4	
	6	Not used.	5	
	7	Not used.	6	
	8	Not used.	–	

- SAP Code: 700047871.

10.13.8 EF Port

These ports are found on the ETR6 base card. They are analog trunk ports that are only useable when the card is fitted with an IP500 ATM4 trunk daughter card. When in power fail, the EF ports are connected to trunk port 12.

10.13.9 RS232 DTE Port

These ports are found on the rear of all IP Office control units and external expansion modules. The DTE ports on external expansion modules are not used.

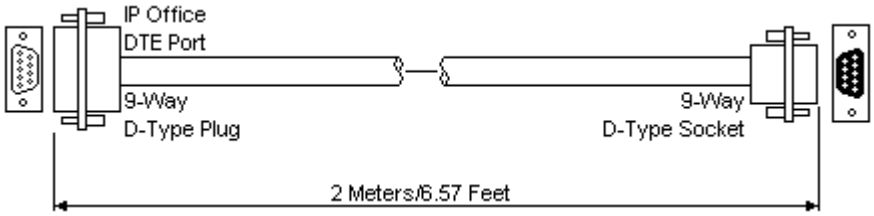
The RS232 DTE ports on the control units can be used for system maintenance and connection of serial terminal adaptors. On IP400 control units the port can also be used for connection of the IP Office serial port licence key dongle.

An asynchronous terminal program such as HyperTerminal is also required. Configure this for operation via a PC serial port, as follows:

Bits per second	38,400	Parity	None	Flow Control	None
Data bits	8	Stop Bits	1	Settings | Emulation	TTY

DTE Cables

These cables are used for system maintenance and diagnostics under Avaya guidance. They can also be used for connection of RS232 serial terminal adaptor equipment to the IP Office control unit. The cable required depends on the IP Office control unit. This cable is a "Straight through DB9 female to DB9 male serial cable".



IP Office 9-Way RS232 DTE Port	Signal	PC/Terminal Adaptor
3	⬅Receive data	3
2	➡Transmit Data	2
7	⬅RTS (Request To Send)	7
8	➡CTS (Clear To Send)	8
6	➡DSR (Data Set Ready)	6
5	⬬ Ground	5
1	➡DCD (Data Carrier Detect)	1
4	⬅DTR (Data Terminal Ready)	4
9	➡RI (Ring Indicator)	9

10.13.10 ETR Port

ETR (Enhanced Tip and Ring) ports are provided by the ETR6 base card. They can be used for the connection of DTMF analog phone devices and Avaya ETR phones.

10.13.11 EXPANSION Port

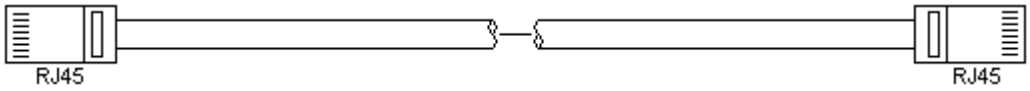
This type of port is found on the rear of IP Office control units and external expansion modules. It is used for connecting the external expansion modules to there parent IP Office control unit.

The connection between these ports should only be done using an Avaya Expansion Interconnect Cable. No other cable type should be used.

- Each external expansion module (except the WAN3 10/100) is supplied with a blue 1 meter (3'3'') expansion interconnect cable. This cable must be used when connecting to expansion ports on the rear of a control unit.
- When connecting to expansion ports on an IP500 4-Port Expansion card, a yellow 2 meter (6'6") expansion interconnect cable can be used in place of the standard blue cable. 4 Yellow cables are supplied with the IP500 4-Port Expansion card.
- The WAN3 10/100 module differs in that it connects via a LAN port on its front to one of the control unit's LAN ports. This type of external expansion module is not supported by IP500 and IP500v2 control units.

Expansion Interconnect Cable

The Expansion Interconnect cable is used to link expansion ports between the IP Office control unit and external expansion module (except WAN3 modules).



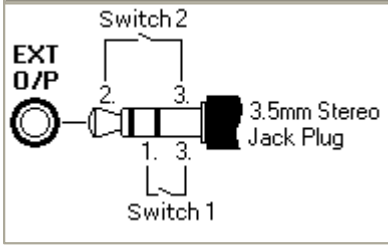
- Supply: One cable is normally supplied with each external expansion module.
- SAP Code: 1m (3'3") Blue cable - 700213457, 2m (6'6") Yellow cable - 700472871.

10.13.12 EXT O/P Port

These ports are found on the rear of all IP Office control units. They are used for connection to external switching relays. The port uses a standard 3.5mm stereo jack plug for connection.

The IP Office is able to open (high resistance), close (low resistance) or pulse (close for 5 seconds and then open) two switches within the port. Either switch can be operated separately. These switches are intended for activation of external relays in systems such as door opening systems.

- CAUTION: In installations where this port is connected to a device external to the building, connection must be via a towerMAX SCL/8 Surge Protector and a protective ground connection must be provided on the IP Office control unit.

EXT O/P	Pin	Description
	1	Switch 1.
	2	Switch 2.
	3	0 Volts (Ground/Chassis)

- Switching Capacity: 0.7A.
- Maximum Voltage: 55V d.c.
- On state resistance: 0.7 ohms.
- Short circuit current: 1A.
- Reverse circuit current capacity: 1.4A.
- Ensure that pins 1 and 2 are always at a positive voltage with respect to pin 3.

3.5mm stereo audio jack plugs are frequently sold as pre-wired sealed modules. It may be necessary to use a multi-meter to determine the wiring connections from an available plug. Typically 3 (common to both relays) is the cable screen.

10.13.13 LAN Port

These ports are found on IP Office control units and the WAN3 10/100 expansion module. They are used for connection to IP LANs and IP devices. On the WAN3 10/100 module the port is used for direct connection to a control unit.

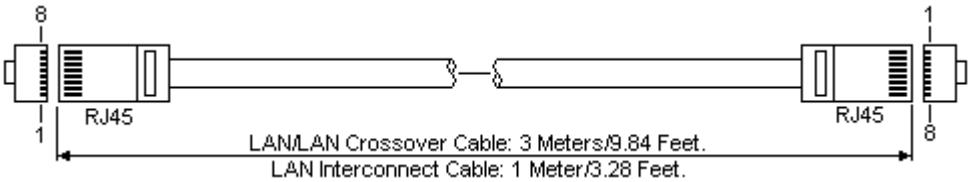
All IP Office LAN ports are 10/100Mbps auto-sensing. Operation varies as follows:

- IP Office 500 / IP500v2
  This unit has 2 RJ45 Ethernet ports, marked as LAN and WAN. These form a full-duplex managed layer-3 switch. Within the IP Office configuration, the physical LAN port is LAN1, the physical WAN port is LAN2.
- IP460 V2
  This unit has 8 RJ45 Ethernet ports marked as LAN 1 to 8. These form a full-duplex unmanaged layer-2 LAN switch. Ports are auto-MDI/MDIX. Within the IP Office configuration the physical LAN ports are LAN1.
- IP412
  This unit has 2 RJ45 Ethernet ports marked as LAN 1 to 2. These form a half-duplex managed layer-3 switch. Both ports are fixed MDI crossover ports. Within the IP Office configuration, physical port 1 is LAN1, physical port 2 is LAN2.

The LAN port LEDs are used as follows:

- Green: On = connected, Flashing = Activity.
- Yellow: On = 100Mbps, Off = 10Mbps.

LAN Cables
These are CAT5 UTP cables for connection of various IP devices within the IP Office system.



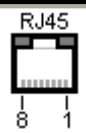
IP Office							
LAN	Pin	MDIX (Normal)	MDI (Crossover)	Wire	Standard / Interconnect	Crossover	
RJ45 8 1	1	⬅Rx-A.	➡Tx-A.	White/Orange	1	3	RJ45 8 1
	2	⬅Rx-B.	➡Tx-B.	Orange/White	2	6	
	3	➡Tx-A.	⬅Rx-A.	White/Green	3	1	
	4	Not used.	Not used.	Blue/White	4	4	
	5	Not used.	Not used.	White/Blue	5	5	
	6	➡Tx-B.	⬅Rx-B.	Green/White	6	2	
	7	Not used.	Not used.	White/Brown	7	7	
	8	Not used.	Not used.	Brown/White	8	8	

- SAP Code:
  - LAN Cable - GREY: 700213481.
    Standard straight LAN cable.
  - LAN Interconnect Cable - Green: 700213465.
    Supplied with WAN3 modules for the direct connection of the WAN3 module to an IP Office control unit LAN port. For an IP412 control unit, this cable should be replaced with a LAN crossover cable.
  - LAN Crossover Cable - Black: 700213473.
    LAN crossover cable.

10.13.14 PF Port

These ports are found on the rear of the IP400 Analog Trunk expansion module. They are analog extension ports that can be used in conjunction with analog loop-start trunks during power failure to the IP Office system.

Any phones connected to these ports should be clearly labeled as power fail extensions in accordance with the appropriate national and local regulatory requirements.

PF	Pin	Description
	1	Not used.
	2	Pin 2 is internally connected to pin 5 via a ringer capacitor.
	3	Not used.
	4	Ring.
	5	Tip.
	6	Pin 6 is internally connected to pin 5 via a ringer capacitor.
	7	Not used.
	8	Not used.

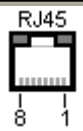
- Minimum Wire Size: AWG 26.
- Maximum Cable Length:
  - AWG26: 500m / 1640'.
  - AWG24, AWG22: 1000m / 3280'.

10.13.15 PHONE (POT) Port

These ports are analog extension ports. On older IP Office units these ports were labeled as POT ports rather than PHONE ports.

PHONE ports on Phone V1/V2 expansion modules can be connected to out-of-building extensions 38. If this is the case, connection must be made via suitable protective devices (IP Office Barrier Box) at each end and via each building primary protection. In addition the Phone module must be connected to a protective ground.

PHONE ports on IP Office control units must not be connected to out-of-building extensions.

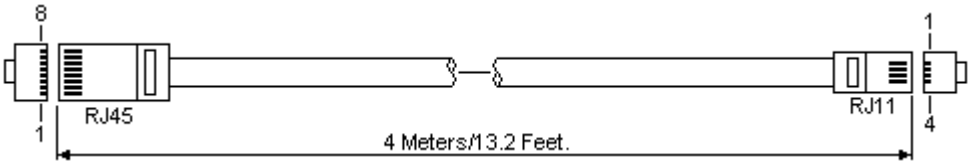
PHONE	Pin	Description
	1	Not used.
	2	Not used.
	3	Not used.
	4	Ring.
	5	Tip.
	6	Not used.
	7	Not used.
	8	Not used.

- REN: 2
- Off-Hook Current: 25mA.
- Ring Voltage: 40V rms.
- Minimum Wire Size: AWG 26.
- Maximum Cable Length:
  - AWG26: 0.5km / 1640 feet.
  - AWG24, AWG22: 1km / 3280 feet.

Except on some older equipment, these ports do not include a ringing capacitor. Therefore for connection to 4-wire analog phones where this is a requirement (typically the United Kingdom and New Zealand), connection should be via a Master socket containing ringing capacitors. On some older IP403 control units and IP400 Phone V1 modules, pins 2 and 6 are internally connected via ringing capacitors.

Structured Cabling Line Cord

This is an RJ45 to RJ11 cable suitable for connection from a structured cabling system RJ45 port to a DS phone. It can also be used for two-wire analog phone extensions.



IP Office			Phone	
DS Port	Pin	Description	Pin	Port
	1	Not used.	–	
	2	Not used.	1	
	3	Not used.	2	
	4	Signal 1.	3	
	5	Signal 2.	4	
	6	Not used.	5	
	7	Not used.	6	
	8	Not used.	–	

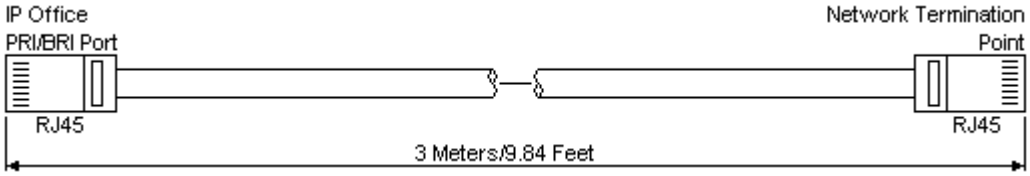
- SAP Code: 700047871.

10.13.16 PRI Port

These ports are used for connection to PRI trunk services including E1, T1 and E1-R2.

PRI/BRI Trunk Cable

This cable is used to connect from IP Office BRI/PRI trunk ports to the line providers network termination equipment. If that equipment does not use RJ45 sockets, the cable may need to be stripped and rewired or an alternate cable used. The appropriate signal pin-outs and wire colours are detailed below.



IP Office				Wire	Network Termination	
BRI	RJ45	BRI	PRI		PIN	RJ45
RJ45 8 1	1	–	⬅Rx-A	White/Orange	1	RJ45 8 1
	2	–	⬅Rx-B	Orange/White	2	
	3	➡Tx-A	–	White/Green	3	
	4	⬅Rx-A	➡Tx-A	Blue/White	4	
	5	⬅Rx-B	➡Tx-B	White/Blue	5	
	6	➡Tx-B	–	Green/White	6	
	7	–	–	White/Brown	7	
	8	–	–	Brown/White	8	

- Supply: BRI/PRI trunks cards are not supplied with these cables.
- Cable Color: Red.
- SAP Code: 700213440.
- Standard Length: 3m/9'10".

10.13.17 WAN Port

This type of port 37-way D-type port is found on the rear of IP406 V2 and IP412 control units, and on the rear of the WAN3 10/100 external expansion modules.

Each WAN port supports a single synchronous data connection, which can be X.21, V.35 or V.24/V.28. Selection of the required interface is determined by the cable plugged into the WAN port when power is applied.

- WAN ports must be clocked externally, the IP Office does not provide a clock signal. The clock signal is usually provided by the service provider but under some circumstances (for example laser, microwave or baseband modems) extra provision must be made by the installer.

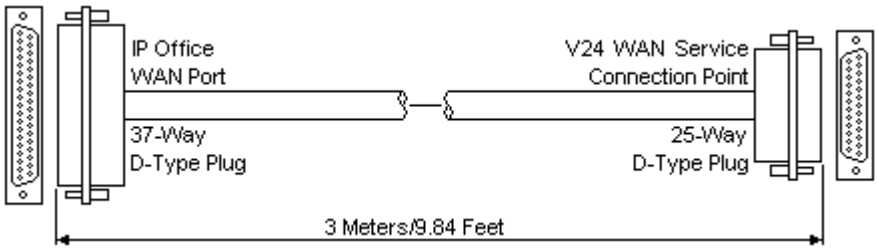
Pin	Protocol	Description		Pin	Protocol	Description
1	X.21	⬅Rx-B: Receive Data B.		20	X.21	⬅Rx-A: Receive Data A.
2	X.21	⬅Ind-A: Indicate A.		21	X.21	⬅Ind-B: Indicate B.
3	X.21	⬅Clk-A: Clock A.		22	X.21	⬅Clk-B: Clock B.
4	X.21	➡Tx-A: Transmit Data A.		23	X.21	➡Tx-B: Transmit Data B.
5	X.21	➡Ctl-B: Control B.		24	X.21	➡Ctl-A: Control A.
6	X.21	⬢Ground		25	V.35	⬅WAN ID 0: Connect to Pin 6.
7	X.21	⬅WAN ID 1: Connect to Pin 6.		26	V.24	➡Tx: Transmit Data.
8	V.24/V.35	➡DTR: Data Terminal Ready.		27	V.24/V.35	➡RTS: Request to Send.
9	V.24	⬅Rx: Receive Data.		28	V.24	⬅RxClk: Receive Clock.
10	V.24	⬅TxClk: Transmit Clock.		29	V.24/V.35	⬅RI: Ring Indicator.
11	V.24/V.35	⬅DCD: Data Carrier Detect.		30	V.24/V.35	⬅DSR: Data Set Ready.
12	V.24/V.35	⬅CTS: Clear to Send.		31	–	Not used.
13	–	Not used.		32	V.35	➡Tx-A: Transmit Data A.
14	V.35	➡Tx-B: Transmit Data B.		33	V.35	➡SCTE-A: External Clock A.
15	V.35	➡SCTE-B: External Clock B.		34	V.35	⬢V35 Gnd
16	V.35	➡Rx-B: Receive Data B.		35	V.35	➡Rx-A: Receive Data A.
17	V.35	⬅TxClk-B: Transmit Clock B.		36	V.35	⬅TxClk-A: Transmit Clock A.
18	V.35	⬅RxClk-B: Receive Clock B.		37	V.35	⬅RxClk-A: Receive Clock A.
19	V.24	⬢CHASSIS		–	–	–

1. For the USA, only FCC Part 68 registered data circuit terminal equipment should be connected to the WAN Ports.

2. In all cases Pin 19 should be connected to the cable screen.

10.13.18 V.24 WAN Cable

This cable is used for connection an IP Office 37-way D-type WAN port to the V.24 WAN service providers equipment.



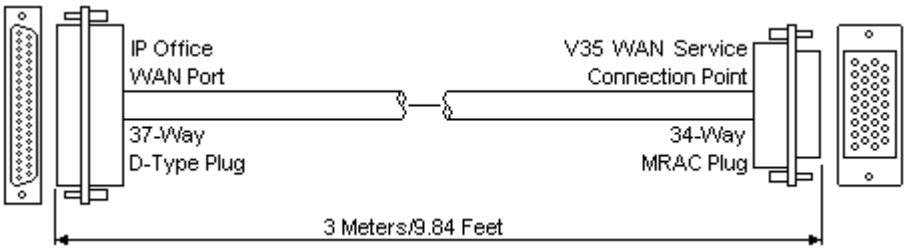
IP Office WAN Port	Signal	V.24 WAN Service
6	⬬ Ground	7
8	➡ DTR: Data Terminal Ready.	20
9	⬅ Rx: Receive Data	3
10	⬅ Tx: Transmit Clock	15
11	⬅ DCD: Data Carrier Detect.	8
12	⬅ CTS: Clear To Send.	5
26	➡ Tx: Transmit Data.	2
27	➡ RTS: Request To Send.	4
28	⬅ Rx-Clk: Receive Clock.	17
29	⬅ RI: Ring Indicator.	22
30	⬅ DSR: Data Set Ready.	6

- At the IP Office end pin 25 is connected to pin 6.
- At the IP Office end pin 19 is connected to the Screened Cable Drain Wire.

- Supply: This cable is not supplied with the control unit or WAN3 module. It must be ordered separately.
- SAP Code: 700213416
- Cable: 12-core screened cable. Each core is 7/0.203mm (24 AWG) tinned copper stranded wire, nominal capacitance of 95pF/m, resistance of 92 ohms/km, screened with tinned copper braid, maximum working voltage of 440V rms and a maximum current per core of 1A rms. The maximum core to core capacitance must not exceed 800pF.
- Maximum Length: 5m/16'5''. This is the maximum length that should be used if the above cable is replaced with an alternate cable.

10.13.19 V.35 WAN Cable

This cable is used for connection an IP Office 37-way D-type WAN port to the V.35 WAN service providers equipment.



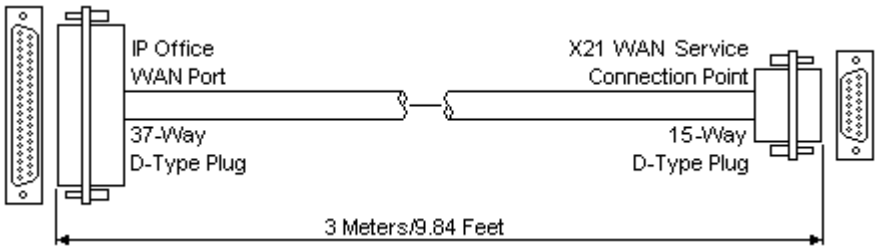
IP Office WAN Port	Signal	Wire	V.35 WAN Service
8	➡DTR: Data Terminal Ready.	-----	H
11	⬅DCD: Data Carrier Detect.	-----	F
12	⬅CTS: Clear To Send.	-----	D
27	➡RTS: Request To Send.	-----	C
29	⬅RI: Ring Indicator.	-----	J
30	⬅DSR: Data Set Ready.	-----	E
32	➡Tx-A: Transmit Data A.	Twisted Pair	P
14	➡Tx-B: Transmit Data B.		S
35	⬅Rx-A: Receive Data A.	Twisted Pair	R
16	⬅Rx-B: Receive Data B.		T
36	➡TxClk-A: Transmit Clock A.	Twisted Pair	Y
17	➡TxClk-B: Transmit Clock B.		AA
37	⬅RxClk-A: Receive Clock A.	Twisted Pair	V
18	⬅RxClk-B: Receive Clock B.		X
33	➡SCTE-A: External Clock A.	Twisted Pair	U
15	➡SCTE-B: External Clock B.		W
34	⬛ Ground	–	B

- At the IP Office end pins 7 and 25 are connected to pin 6.
- At the IP Office end pin 19 is connected to the Screened Cable Drain Wire.

- Supply: This cable is not supplied with the control unit or WAN3 module. It must be ordered separately.
- SAP Code: 700213424.
- Cable: 10 twisted pair screened cable - each core is 7/0.203mm (24 AWG) tinned copper stranded wire, nominal capacitance of 98pF/m, impedance of 80 10% at 1MHz, screened with aluminized tape and a tinned copper wire drain. The maximum core to core capacitance must not exceed 800pF.
- Maximum Length: 5m/16'5''. This is the maximum length that should be used if the above cable is replaced with an alternate cable.

10.13.20 X.21 WAN Cable

This cable is used for connection from an IP Office 37-way D-type WAN port to the X.21 service providers equipment.



IP Office WAN Port	Signal	Wires	X.21 WAN Service
1	⬅ Rx-B: Receive B.	Twisted Pair	11
20	⬅ Rx-A: Receive A.		4
4	➡ Tx-A: Transmit A.	Twisted Pair	2
23	➡ Tx-B: transmit B.		9
24	➡ Ctl-A: Control A.	Twisted Pair	3
5	➡ Ctl-B: Control B.		10
2	⬅ Ind-A: Indicate A.	Twisted Pair	5
21	⬅ Ind-B: Indicate B.		12
3	⬅ Clk-A: Clock A.	Twisted Pair	6
22	⬅ Clk-B: Clock B.		13
6	⬢ Ground	------	8

- At the IP Office end pin 7 is connected to pin 6.
- At the IP Office end pin 19 is connected to the Screened Cable Drain Wire.

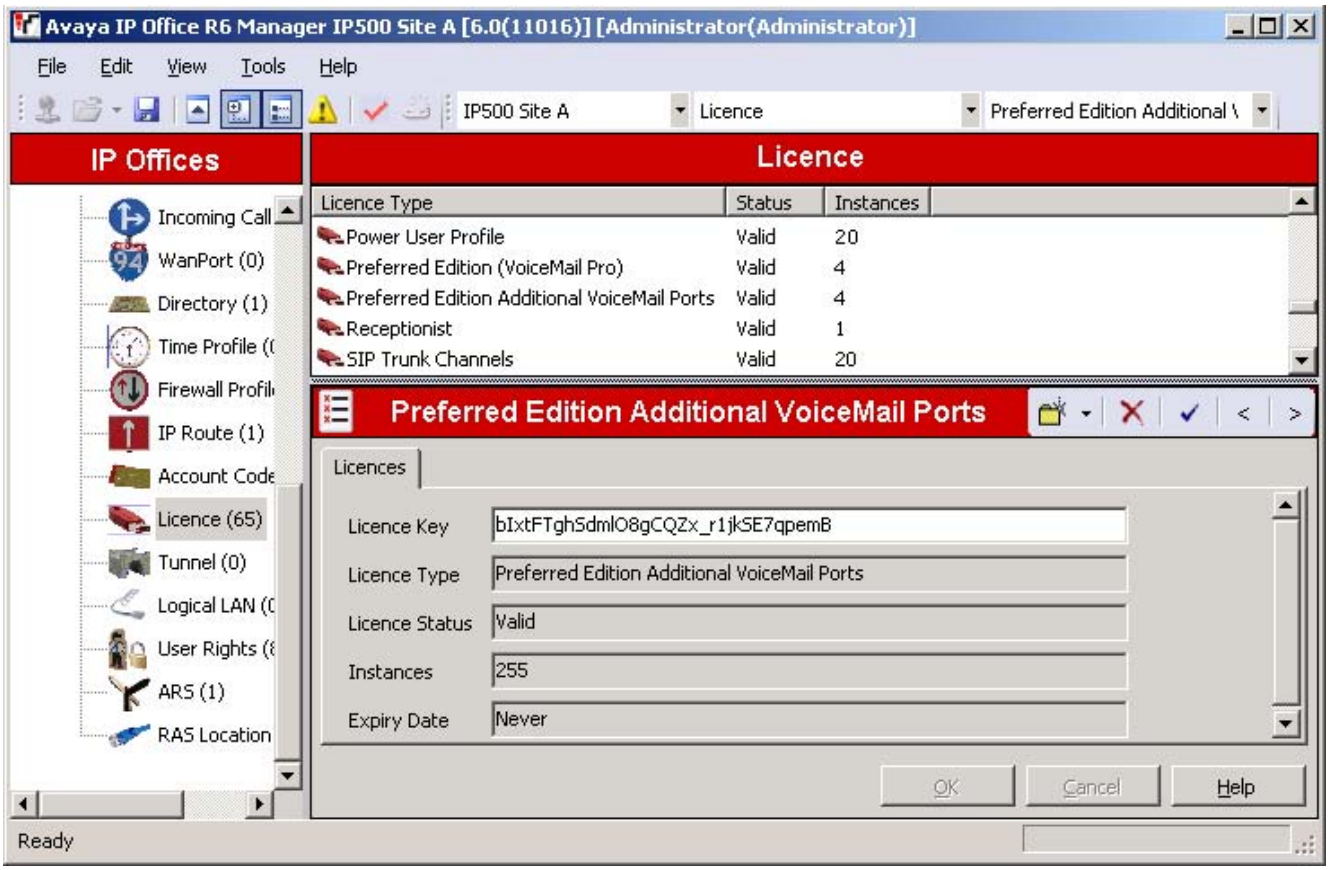
- Supply: This cable is not supplied with the control unit or WAN3 module. It must be ordered separately.
- SAP Code: 700213408.
- Cable: 6 twisted pair screened cable - each core is 7/0.203mm (24 AWG) tinned copper stranded wire, nominal capacitance of 98pF/m, impedance of 77ohms at 1MHz, screened with aluminized tape and a tinned copper wire drain.
- Maximum Length: 5m/16'5''. This is the maximum length that should be used if the above cable is replaced with an alternate cable.

10.14 Licences

Various IP Office features and applications require entry of license keys into the system's configuration. The license keys are unique 32-character codes based on the feature being activated and the serial number of the feature key dongle 257 installed with the IP Office system.

The serial number is printed on the feature key dongle and prefixed with SN (FK for IP500v2 SD card dongles). It can also be viewed in the system configuration by selecting System | System | Dongle Serial Number.

- For IP406 V2 and IP412 systems, the feature key dongle takes the form of a device attached to the serial port of the control unit. This key is only required if licensed features are needed.
- For IP500 and IP500v2 systems, the feature key dongle takes the form of a card (smart media or SD card respectively) inserted into the control unit. The card is a mandatory item for these systems even if they use no licensed features.



- Example 1: Enabling Features
  In the example above, the IP Office system has a valid Power User Profile license. In this case the license is for 20 instances. That means that up to 20 IP Office users can have their Profile set to Power User. This allows them to be configured for a range of features not available to other users.
- Example 2: Enabling Applications and Features
  The example above the IP Office also has a Preferred Edition (Voicemail Pro) license. This license enables a range of features including support for the IP Office Voicemail Pro application and 4 ports between the IP Office system and the voicemail server. Additional ports have also been added using a Preferred Edition Additional Voicemail Ports license.

When a license key is entered into the IP Office configuration, the following information is shown.

- Status
  The status, which is Unknown until the configuration file is sent back to the IP Office system.
  - *Unknown*
    This status is shown for licenses that have just been added to the configuration shown in IP Office Manager. Once the configuration has been sent back to the IP Office and then reloaded, the status will change to one of those below.
  - *Valid*
    The features licensed can be configured and used.
  - *Invalid*
    The license was not recognized. It did not match the serial number of the Feature Key.
  - *Dormant*
    The license is valid but is conditional on some other pre-requisite licenses.
  - *Obsolete*
    The license is valid but is one no longer used by the level of software running on the IP Office system.
  - *Expired*
    The license has gone past its expiry date.
- License
  The name of the licensed feature. This may differ from the ordered RFA name.
- Instances
  Depending on the license, this may be the number of ports enabled or number of simultaneous users of the licensed feature. Sometime the number of instances is specified in the license name.
- Expires
  Most purchased licenses have no expiry setting. For some features, trial licenses may be available which will have an expiry date.

10.14.1 System Edition Licenses

These license are used to set what range of features the IP Office system supports.

- Essential Edition
  Any IP Office running IP Office Release 5 or higher software is licensed by default for Essential Edition mode (no license for this is shown in the configuration). The following additional licenses can be added to enable additional services and features.
  - Essential Edition Additional Voicemail Ports : *IPO LIC R6 ESSNTL EDDITION ADD 2 - 229423.*
    For IP500v2 only. By default the mandatory System SD card is also used to provide 2 ports of embedded voicemail. This license can be used to add additional ports up to the maximum of 6.
- Preferred Edition (Voicemail Pro) : *IP400 LIC PREFRD (VMPRO) - 171991.*
  This license enables support for Voicemail Pro as the IP Office's voicemail server with 4 voicemail ports. The Preferred Edition license allows the voicemail server to provide the services listed below. Additional license can be added for additional voicemail features, these are detailed separately. This license was previously called Voicemail Pro (4 ports).
  - Mailboxes for all users and hunt groups.
  - Announcements for users and hunt groups.
  - Customizable call flows.
    - Call recording to mailboxes.
  - Campaigns.
  - TTS email reading for users licensed to Mobile Worker or Power User profiles.
  - Use of Conference Meet Me functions on IP500 and IP500v2 systems.
- Advanced Edition
  This license enables the additional features listed below. A Preferred Edition license is a pre-requisite for this license.
  - *IPO LIC R6 ADV EDITION RFA LIC:DS - 229424.*
  - *IPO LIC R6 ADV EDITION TRIAL RFA LIC:DS - 229425.*
  - Support for Customer Call Reporter including 1 supervisor.
  - Voicemail Pro database interaction (IVR).
  - Voicemail Pro call flow generic TTS (8 ports).[1]
  - Voicemail Pro Visual Basic Scripting.
  - Voicemail Pro call recording to ContactStore.[2]

1. Provides up to 8 ports of TTS for use with Speak Text actions within Voicemail Pro call flows. Not used for user TTS email reading.
2. Note: In a Small Community Network using centralized voicemail, this license only enables ContactStore support for the central IP Office. Remote IP Offices in the network require their own Advanced Edition license or a VMPro Recordings Administrator license.

Upgrade Licenses

Existing IP Office systems being upgraded to IP Office Release 6.0 or higher may require a software upgrade license.

- New IP500v2 Systems
  For the first 90 days, a new IP500v2 control unit will run any IP Office Release 6.0 or higher without requiring an upgrade license. The highest level run is written into the system's memory (not the SD card) and that becomes a permanent entitlement for the control unit. However, after 90 days the IP500v2 will require an upgrade license if subsequently upgraded to a software release higher than any that it has ran in the initial 90 day period.
- Software Upgrade
  Existing IP Office systems being upgraded to IP Office Release 6.0 or higher require an upgrade license. This applies to all IP Office system modes, for example IP Office standard mode, <%PARTNER%> and <%NORSTAR%>.
- Warning
  Systems upgraded without the appropriate license will display *"No license available"* and will not allow any telephony functions.

There are two types of upgrade licenses as follows:

- Small System Upgrade Licenses: *IPO LIC UPG R6.1 SML - 262695*
  This license can be used to upgrade systems with up to 32 users and no external expansion modules.
- Large System Upgrade Licenses: *IPO LIC UPG R6.1 - 262694.*
  This license can be used to upgrade system with more than 32 users or external expansion modules.

10.14.2 Trunk Licensing

- IP500 Universal PRI (Additional channels)
  These licenses are used to enable additional B-channels above the basic 8 on an IP500 PRI-U card. The IP500 PRI-U card supports E1, T1 and E1-R2 PRI modes. The IP Office system supports 8 unlicensed B-channels on each IP500 PRI-U port fitted. Additional B-channels, up to the capacity of ports installed and PRI mode selected require licenses. These additional channels consume the licenses based on which additional channels are configured as in-service from port 9 of slot 1 upwards. D-channels are not affected by licensing.
    - *IP500 T1 CHANNELS ADD 2CH - 215180.*
    - *IP500 T1 CHANNELS ADD 8CH - 215181.*
    - *IP500 T1 CHANNELS ADD 32CH - 215182.*
    - *IP500 E1 CHANNELS ADD 2CH - 215183.*
    - *IP500 E1 CHANNELS ADD 8CH - 215184.*
    - *IP500 E1 CHANNELS ADD 22CH - 215185.*
    - *IP500 E1R2 CHANNELS ADD 2CH - 215186.*
    - *IP500 E1R2 CHANNELS ADD 8CH - 215187.*
    - *IP500 E1R2 CHANNELS ADD 22CH - 215188.*
- SIP Trunk Channels
  These licenses are used to configure the maximum number of simultaneous SIP trunk calls supported.
    - *IPO LIC SIP TRNK RFA 1 - 202967.*
    - *IPO LIC SIP TRNK RFA 5 - 202968.*
    - *IPO LIC SIP TRNK RFA 10 - 202969.*
    - *IPO LIC SIP TRNK RFA 20 - 202970.*
- IP500 Voice Networking
  These licenses are used with the IP500 and IP500v2 systems to enable support for SCN, QSIG and H323 IP trunks.
    - *IP500 VOICE NTWKG ADD LIC RFA - 205650.*
  - For IP Office Release 5, the additional ports license can be used without requiring a base license first.

10.14.3 Telephone/Endpoint Licenses

The use of H323 and SIP phones with IP Office Release 6+ is controlled by the following licenses. Different licenses are used for Avaya IP phones, non-Avaya phones (including non-Avaya softphones) and Avaya softphones.

For details of the Phone Manager Pro PC SoftPhone refer to the Other Licenses section 402.

- Avaya IP Endpoints License
  On IP500 and IP500v2 systems, these licenses are used to license additional Avaya IP phones. This includes all 1600, 4600, 5600, 9600, IP DECT, DECT R4, T3 IP, Spectralink and VPN phones supported by IP Office Release 6.
    - *IPO LIC R6 AV IP ENDPOINT 1 - 229444.*
    - *IPO LIC R6 AV IP ENDPOINT 5 - 229445.*
    - *IPO LIC R6 AV IP ENDPOINT 20 - 229447.*
    - *IPO LIC R6 AV IP ENDPOINT 5 TRIAL - 229449.*

- The system will automatically license 12 Avaya IP phones for each IP500 VCM 32 or VCM 64 card installed in the system without requiring additional licenses to be added to the configuration.
- Additional Avaya IP phones are licensed either by the addition of Avaya IP Endpoints licenses above or the conversion of legacy IP500 VCM Channels licenses to Channel Migration licenses (see below).
    - By default licenses are consumed by each Avaya IP phone that registers with the IP Office in the order that they register. The license is released if the phone unregisters. However, it is possible to reserve a license for particular phones in order to ensure that those phones always obtain a license first if available. This is done through the Reserve Avaya IP Endpoint Licence setting of each IP extension.
    - Warning
      Avaya IP phones without a license will still be able to register but will be limited to making emergency calls only (Dial Emergency short code calls). The associated user will be treated as if logged off and the phone will display *"No license available"* and *"Emergency Calls Only".* If a license becomes available, it will be assigned to any unlicensed DECT handsets first and then to any other unlicensed Avaya IP phone in the order that the phones registered.
    - For existing IP500 systems being upgraded to IP Office Release 6, the existing VCM channels and IP500 VCM Channels license are treated as follows:
        - For each IP400 VCM card installed in the system, each VCM channel supported by the card allows support for 3 Avaya IP phones.
        - For each IP500 VCM32 and IP500 VCM64 card installed in the system, the 4 unlicensed VCM channels previously provided by each card are converted to allow unlicensed support of 12 Avaya IP phones.
        - For each legacy IP500 VCM Channels license, the license are converted Channel Migration licenses supporting 3 Avaya IP phones. See the Channel Migration license below.
        - The IP500 VCM 32 and IP500 VCM 64 cards will provide their full capacity of VCM channels, ie. providing up to 32 or 64 channels depending on the card type and the codecs being used.
- 3rd Party IP Endpoints License
  These licenses are used for support of non-Avaya IP phones including SIP extensions. The available license are used in order of phone registration. If no licenses are available the phone will not be able to register. Available licenses can reserved for a particular phone using the Reserve 3rd Party IP Endpoint License setting in the each IP extension. This license was previously called the IP End-points license.
    - *IP400 IP ENDPOINTS RFA 1 LIC - 174956.*
    - *IP400 IP ENDPOINTS RFA 5 LIC - 174957.*
    - *IP400 IP ENDPOINTS RFA 20 LIC - 174959.*

Legacy Endpoint Licenses

- Channel Migration
  These licenses were previously called IP500 VCM Channels. In pre-IP Office Release 6 systems, these license were used to enable additional VCM channels on IP500 VCM32 and IP500 VCM 64 cards. For IP Office Release 6 these license are no longer required. Any present in the configuration of systems upgraded to IP Office Release 6 are renamed Channel Migration. Each Channel Migration license instance enables support for 3 Avaya IP phones.
    - *IPO LIC IP500 VCM LIC 4 CH LIC - 202961.*
    - *IPO LIC IP500 VCM LIC 8 CH LIC - 202962.*
    - *IPO LIC IP500 VCM LIC 16 CH LIC - 202963.*
    - *IPO LIC IP500 VCM LIC 28 CH LIC - 202964.*
    - *IPO LIC IP500 VCM LIC 60 CH LIC - 202965.*

10.14.4 User Licenses

The features available to a basic IP Office Worker can be enhanced by the addition of 'User Profile' licenses. Once these licenses are present in the system configuration, the profiles can be applied to selected users through the User | User | Profile setting in the IP Office configuration.

	Basic User	Office Worker	Teleworker	Mobile Worker	Power User
one-X Portal for IP Office	Yes[1]	Yes	Yes	–	Yes
" Telecommuter options	Yes[1]	–	Yes	–	Yes
UMS Web Services	Yes[1]	Yes	Yes	–	Yes
Mobility Features	Yes[1]	–	–	Yes	Yes
TTS for Email Reading	–	–	–	Yes	Yes
IP Office SIP SoftPhone	–	–	Yes	–	Yes

1. These features are supported for users on systems with the appropriate pre-IP Office Release 6 legacy licenses.

- Teleworker Profile License
  These licenses set the number of users who can have their profile set as *Teleworker*. For user with this optional, additional settings are enabled in the IP Office configuration for the following services: one-X Portal for IP Office with Telecommuter option UMS Web Services and IP Office SIP SoftPhone.
  - *IPO LIC R6 TELEWORKER 1 - 229430.*
  - *IPO LIC R6 TELEWORKER 5 - 229431.*
  - *IPO LIC R6 TELEWORKER 20 - 229432.*
  - *IPO LIC R6 TELEWORKER 5 TRIAL - 229433.*
- Mobile Worker Profile License
  Thee licenses set the number of users who can have their profile set as Mobile Worker. For user with this optional, additional settings are enabled in the IP Office configuration for the following services: Mobility Features and TTS for Email Reading.
  - *IPO LIC R6 MOBILE WORKER 1 - 229434.*
  - *IPO LIC R6 MOBILE WORKER 5 - 229435.*
  - *IPO LIC R6 MOBILE WORKER 20 - 229436.*
  - *IPO LIC R6 MOBILE WORKER 5 TRIAL - 229437.*
- Office Worker Profile License
  These licenses set the number of users who can have their profile set as Office Worker. For user with this optional, additional settings are enabled in the IP Office configuration for the following services: one-X Portal for IP Office (no telecommuter features) and UMS Web Services. If no *Office Worker Profile* licenses are present, existing legacy *Phone Manager Pro (per seat)* licenses can be used to enable users for the Office Worker profile.
  - *IPO LIC R6 OFF WORKER RFA 1 - 229438.*
  - *IPO LIC R6 OFF WORKER RFA 5 - 229439.*
  - *IPO LIC R6 OFF WORKER RFA 20 - 229440.*
  - *IPO LIC R6 OFF WORKER 5 TRIAL - 229441.*
- Power User Profile License
  These licenses set the number of users who can have their profile set as Power User. For user with this optional, the same additional services as for Teleworker and Mobile Worker are enabled for the user in the IP Office configuration plus the following service: SoftPhone.
  - *IPO LIC R6 PWR USER 1 - 229426.*
  - *IPO LIC R6 PWR USER 5 - 229427.*
  - *IPO LIC R6 PWR USER 20 - 229428.*
  - *IPO LIC R6 PWR USER 5 TRIAL - 229429.*
- Receptionist: *IPO LIC RECEPTIONIST RFA - 171987.*
  This license is used to enable support for the IP Office SoftConsole application. This license can only be used by users set to Receptionist in the IP Office configuration. A maximum of 4 receptionist are supported. This license was previously called SoftConsole.
  - For IP Office Release 6.0 and 6.1, an instance of this license is consumed by each user configured as a Receptionist. If the user hot desks to another IP Office system in an SCN, their license entitlement is retained, ie. the remote system does not require a Receptionist license.

Legacy User Licenses

The following licenses are no longer available from Avaya but are still supported for systems upgraded to IP Office Release 6.

- Mobility Features
  These legacy licenses were used to enable mobility features, for example mobile twinning or mobile call control, for users set to the *Basic User* profile.
  - *IPO LIC MOBILE WORKER RFA 1 - 195569.*
  - *IPO LIC MOBILE WORKER RFA 5 - 195570.*
  - *IPO LIC MOBILE WORKER RFA 20 - 195572.*
- one-X Portal for IP Office
  These legacy licenses were used to enable one-X Portal for IP Office support for users set to the *Basic User* profile. The licenses were purchased as part of the IP Office Release 5 Power User license packages.
  - UMS Web Services
    These licenses are used to enable UMS voicemail services support for users set to the *Basic User* profile. Other users are enabled for UMS through their licensed user profile. These licenses are also used to license hunt groups for UMS voicemail services.
  - *IPO LIC VMPRO UMS 1 USER - 217880.*
  - *IPO LIC VMPRO UMS 5 USER - 217881.*
  - *IPO LIC VMPRO UMS 20 USER - 217883.*

10.14.5 Voicemail Pro Licenses

For IP Office Release 6, support for Voicemail Pro is enable by the addition of a Preferred Edition license.

- Preferred Edition (Voicemail Pro) : *IP400 LIC PREFRD (VMPRO) - 171991.*
  This license enables support for Voicemail Pro as the IP Office's voicemail server with 4 voicemail ports. The Preferred Edition license allows the voicemail server to provide the services listed below. Additional license can be added for additional voicemail features, these are detailed separately. This license was previously called Voicemail Pro (4 ports).
  - Mailboxes for all users and hunt groups.
  - Announcements for users and hunt groups.
  - Customizable call flows.
    - Call recording to mailboxes.
  - Campaigns.
  - TTS email reading for users licensed to Mobile Worker or Power User profiles.
  - Use of Conference Meet Me functions on IP500 and IP500v2 systems.
- Advanced Edition
  This license enables the additional features listed below. A Preferred Edition license is a pre-requisite for this license.
  - *IPO LIC R6 ADV EDITION RFA LIC:DS - 229424.*
  - *IPO LIC R6 ADV EDITION TRIAL RFA LIC:DS - 229425.*
  - Support for Customer Call Reporter including 1 supervisor.
  - Voicemail Pro database interaction (IVR).
  - Voicemail Pro call flow generic TTS (8 ports).[1]
  - Voicemail Pro Visual Basic Scripting.
  - Voicemail Pro call recording to ContactStore.[2]

1. Provides up to 8 ports of TTS for use with Speak Text actions within Voicemail Pro call flows. Not used for user TTS email reading.
2. Note: In a Small Community Network using centralized voicemail, this license only enables ContactStore support for the central IP Office. Remote IP Offices in the network require their own Advanced Edition license or a VMPro Recordings Administrator license.

- Preferred Edition Additional Voicemail Ports
  The required license for Voicemail Pro server support (Preferred Edition (Voicemail Pro)) also enables 4 voicemail ports. These licenses can be used to add additional voicemail ports up to the maximum capacity of the IP Office system (IP406 V2 = 20, IP412 = 30, IP500 = 40, IP500v2 =40). This license was previously called Additional Voicemail Pro (ports).
  - *IPO LIC VM PRO RFA 2 LIC - 174459.*
  - *IPO LIC VM PRO RFA 4 LIC - 174460.*
  - *IPO LIC VM PRO RFA 8 LIC - 174461.*
  - *IPO LIC VM PRO RFA 16 LIC - 174462.*
- VMPro Recordings Administrators : *IPO LIC CONTACTSTORE RFA LIC - 187166.*
  To support ContactStore in a Small Community Network, IP Offices other than the central IP Office require either their own Advanced Edition license or this license.
- VMPro Networked Messaging : *IPO LIC NTWKD MSGING RFA LIC - 182297.*
  Enables VPNM (Voicemail Pro Networked Messaging) functionality within Voicemail Pro. This allows message exchange with remote Voicemail Pro systems and Avaya Interchange systems.
- VMPro TTS (Generic) : *IP400 3rd PARTY TTS LIC RFA - 182303.*
  This legacy license enables use of text to speech facilities using third party TTS software with Voicemail Pro. One license per simultaneous instance of TTS usage. For IP Office Release 6 this license is no longer used for user email reading. The IP Office Advance Edition license also enables 8 ports of generic TTS.
- VMPro TTS (ScanSoft) : *IPO LIC AVAYA TTS RFA 1 - 182299.*
  This legacy licence enables use of text to speech facilities using Avaya supplied TTS software with Voicemail Pro. One license per simultaneous instance of TTS usage. For IP Office Release 6 this license is no longer used for user email reading.
  - UMS Web Services
    These licenses are used to enable UMS voicemail services support for users set to the *Basic User* profile. Other users are enabled for UMS through their licensed user profile. These licenses are also used to license hunt groups for UMS voicemail services.
  - *IPO LIC VMPRO UMS 1 USER - 217880.*
  - *IPO LIC VMPRO UMS 5 USER - 217881.*
  - *IPO LIC VMPRO UMS 20 USER - 217883.*

Legacy Voicemail Licenses

The following legacy licenses are still supported by IP Office Release 6.

- UMS Web Services
  These licenses are used to enable UMS voicemail services support for users set to the *Basic User* profile. Other users are enabled for UMS through their licensed user profile. These licenses are also used to license hunt groups for UMS voicemail services.
- *IPO LIC VMPRO UMS 1 USER - 217880.*
- *IPO LIC VMPRO UMS 5 USER - 217881.*
- *IPO LIC VMPRO UMS 20 USER - 217883.*

- VMPro Database Interface : *IP400 3RD PARTY IVR LIC RFA - 182298.*
  This legacy license enables 3rd party database support within Voicemail Pro call flows. For IP Office Release 6 this is also enabled by the Advanced Edition license.
- VMPro VB Script : *IP400 VB SCRIPTING LIC RFA - 182300.*
  This legacy license enables Visual Basic Script support with Voicemail Pro. For IP Office Release 6 this is also enabled by the Advanced Edition license.

10.14.6 Customer Call Reporter Licenses

For IP Office Release 6, support for the Customer Call Reporter application is enabled by the presence of Preferred Edition and Advanced Edition licenses in the IP Office configuration. For system being upgraded to IP Office Release 6, Customer Call Reporter can alternately be enabled by a legacy CCR Sup license or a CCC Supervisor and CCR CCC Upg license.

- Preferred Edition (Voicemail Pro) : *IP400 LIC PREFRD (VMPRO) - 171991.*
  This license enables support for Voicemail Pro as the IP Office's voicemail server with 4 voicemail ports. The Preferred Edition license allows the voicemail server to provide the services listed below. Additional license can be added for additional voicemail features, these are detailed separately. This license was previously called Voicemail Pro (4 ports).
  - Mailboxes for all users and hunt groups.
  - Announcements for users and hunt groups.
  - Customizable call flows.
    - Call recording to mailboxes.
  - Campaigns.
  - TTS email reading for users licensed to Mobile Worker or Power User profiles.
  - Use of Conference Meet Me functions on IP500 and IP500v2 systems.
- Advanced Edition
  This license enables the additional features listed below. A Preferred Edition license is a pre-requisite for this license.
  - *IPO LIC R6 ADV EDITION RFA LIC:DS - 229424.*
  - *IPO LIC R6 ADV EDITION TRIAL RFA LIC:DS - 229425.*
  - Support for Customer Call Reporter including 1 supervisor.
  - Voicemail Pro database interaction (IVR).
  - Voicemail Pro call flow generic TTS (8 ports).[1]
  - Voicemail Pro Visual Basic Scripting.
  - Voicemail Pro call recording to ContactStore.[2]

1. Provides up to 8 ports of TTS for use with Speak Text actions within Voicemail Pro call flows. Not used for user TTS email reading.
2. Note: In a Small Community Network using centralized voicemail, this license only enables ContactStore support for the central IP Office. Remote IP Offices in the network require their own Advanced Edition license or a VMPro Recordings Administrator license.

- Customer Service Agent
  These licenses enable the configuration of users as CCR agents. Multiple license can be added for up to the maximum of 150 agents. A license is consumed for each CCR agent logged in. If no more license are available, further agents cannot log in. This license was previous called CCR Agent.
  - *IPO LIC CUSTMR SVC AGT RFA 1 - 217650.*
  - *IPO LIC CUSTMR SVC AGT RFA 5 - 217651.*
  - *IPO LIC CUSTMR SVC AGT RFA 20 - 217653.*
- Customer Service Supervisor
  This license is used to enable support for CCR supervisor and wallboard accounts. Each license instance enables both 1 supervisor account and 1 wallboard account. Multiple license can be added for up to 30 supervisors/ wallboards.
  - *IPO LIC R6 CUSTMR SVC SPV 1 - 229442.*
  - *IPO LIC R6 CUSTMR SVC SPV 1 TRIAL - 229443.*

Legacy CCR Licenses

- CCR Sup
  These legacy licenses were used to enable support for the Customer Call Reporter application and CCR supervisors.
  - *IPO CUSTMR CALL REPORTER 1 SPV LIC RFA - 217655.*
  - *IPO CUSTMR CALL REPORTER 10 SPV LIC RFA - 217656.*
  - *IPO CUSTMR CALL REPORTER 20 SPV LIC RFA - 217657.*
- CCR CCC Upg
  This license allows legacy CCC application licenses to be used for Customer Call Reporter.
  - *IPO LIC CUSTMR CALL REPORTER UPG LIC RFA - 217658.*
- CCC Server - Enables 1 supervisor, 1 wallboard and 5 agents.
- CCC Supervisors - Enables the equivalent number of supervisors and wallboards.
- CCC Agents - Enables the equivalent number of agents.

10.14.7 Trial Licenses

The following trial licenses can be requested. Each is valid for 60 days from the date of issue and can only be issued once for a particular IP Office Feature Key serial number. Apart from that restriction the trial license works the same as a full license.

- Preferred Edition: *IPO LIC PREFERRD (VM PRO) TRIAL RFA LIC:DS (189782).*
- Advanced Edition: *IPO LIC R6 ADV EDITION TRIAL - 229425.*
- Power User (5 Users): *IPO LIC R6 PWR USER 5 TRIAL - 229429.*
- Teleworker (5 Users): *IPO LIC R6 TELEWORKER 5 TRIAL - 229433.*
- Mobile Worker (5 Users): *IPO LIC R6 MOBILE WORKER 5 TRIAL - 229437.*
- Office Worker Profile (5 Users): *IPO LIC R6 OFFICE WORKER 5 TRIAL - 229441.*
- Customer Service Agent: *IPO LIC CUSTMR SVC AGT RFA TRIAL 5 - 227053.*
- Customer Service Supervisor: *IPO LIC R6 CUSTMR SVC SPV 1 TRIAL - 229443.*
- Avaya IP Endpoints (5 Extensions): *IPO LIC R6 AVAYA IP ENDPOINT 5 TRIAL - 229449.*
- Receptionist (Users): *IPO LIC RECEPTIONIST RFA 1 TRIAL LIC:CU - 189783.*
- VMPro Networked Messaging: *IPO LIC NTWKD MSGING TRIAL RFA LIC:DS - 189776.*
- VMPro TTS (ScanSoft): *IPO LIC AVAYA TTS TRIAL RFA 1 LIC:CU - 189778.*
- VM Pro TTS (Generic): *IPO LIC 3RD PRTY TTS TRIAL RFA LIC:CU -189781.*
- Audix Voicemail: *IPO LIC ACM CENTRAL VM TRIAL LIC:DS - 189786.*
- IPSec Tunneling: *IPO LIC IPSec VPN RFA TRIAL LIC:DS - 189806.*
- SIP Trunk Channels: *IPO LIC SIP TRUNKING TRIAL RFA 5 - 205820.*
- IP500 Voice Networking: *IPO LIC IP500 VCE NTWK ADD 4 TRIAL - 205823.*
- CTI Link Pro : *IPO LIC CTI RFA TRIAL - 263128.*

10.14.8 Other Licenses

- Audix Voicemail : *IPO LIC ACM CENTRAL VM - 177467.*
  Enables IP Office to use a remote Intuity Audix or Modular Messaging system for voicemail rather than requiring a local voicemail server.
- IPSec Tunneling : *IPO LIC IPSEC VPN RFA - 182301.*
  Enables the IP Office to initiate and terminate IPSec and L2TP tunnels.

Phone Manager Licenses

These licenses are used for the IP Office Phone Manager application. In addition to entering Phone Manager licenses, each user is individually configured for the expected Phone Manager type.

- Phone Manager Pro (per seat): *IPO LIC PMGR PRO RFA 1 - 177468.*
  Allows users to be configured as Phone Manager Pro users. The user's Phone Manager mode is set through the IP Office configuration (User | Telephony | Phone Manager Type).
- Phone Manager Pro IP Audio Enabled (per user): *IPO LIC PMGR SFTPHN RFA 1 - 171992.*
  Enables Phone Manager Pro IP softphone operation for a user. Note: Also requires the user to have a Phone Manager Pro license.

CTI Licenses

- CTI Link Pro : *IPO LIC CTI RFA - 171988*
  Enables CTI Link Pro functionality (TAPI Link Pro and DEVLink Pro).
- Wave User : *IPO LIC TAPI WAV RFA 4 - 177466*
  Allows streaming of WAV files, using TAPILink Pro, for 3rd party voice applications. This is a per user license. Note that TAPI WAV calls use system data channels taken from the same pools as used for voicemail ports. The maximum number of simultaneous TAPI WAV user calls and voicemail users is determined by the IP Office control unit type; IP406 V2 = 20, IP412 = 30, IP500 = 40, IP500v2 =40.

Chapter 11.
Safety Statements

11. Safety Statements

The Avaya IP400 Office and IP500 Office modules are intended to be installed by 'Service Personnel' and it is the responsibility of the Service Personnel to ensure that all subsidiary interconnected equipment is wired correctly and also meet the safety requirements of IEC60950 or UL60950 where applicable.

- CE
  The CE mark affixed to this equipment means that the module complies with the 1999/5/EC (R&TTE), 89/336/EEC (EMC) and 72/23EEC (LVD) Directives.
- The Declarations of Conformity (DoC) for the IP400 and IP500 products are available on the IP Office Application DVD.
- ⚠ This warning symbol is found on the base of IP406 V2, IP412 and IP500 modules.
- Refer to Trunk Interface Modules 405 for information concerning which Trunk Interface module variants are fitted in which country.

In Finland, Norway and Sweden a protective earthing conductor must be attached to the protective earth point on the rear of the IPO500 and IPO500v2 Servers. See Grounding 88 for more information. In addition the Server must be located in a restricted access location where equipotential bonding has been applied, for example, in a telecommunication centre.

11.1 Lithium Batteries

A lithium battery is fitted to the real time clock on IP Office IP400 control unit motherboards and the IP500 control unit motherboard. .

⚠ WARNING
The Lithium battery must only be replaced by Avaya personnel or authorized representatives. There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

11.2 Lightning Protection/Hazard Symbols

Lightning protectors
The buildings lightning protectors must be verified as follow:

1. Check the lightning protectors, at the trunk cable entry point to the building housing the Avaya IP Office, paying special attention to the lightning protection grounding. Report any problems, in writing, to the telephone company.
2. Equipment that is designed to be connected using internal wiring is typically not lightning protected. Hence, Avaya IP Office extension cabling must not leave the building. For installations where telephones and/or other standard (tip/ring) devices are installed in another building then lightning protection is required (see Out of Building Telephone Installations 38).

Hazard Symbol
The shock hazard symbol is intended to alert personnel to electrical hazard or equipment damage. The following precautions must also be observed when installing telephone equipment:

1. Never install telephone wiring during a lightning storm.
2. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
3. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
4. Always use caution when working with telephone lines.

11.3 Trunk Interface Modules

To ensure the validation of the approvals, only the following types of trunk interface cards must be fitted in the following IP Office control units.

USA/Canada							
Product	Quad BRI	PRI E1		PRI T1		ATM4	WAN
		Single	Dual	Single	Dual		
IP500v2	✗	✗	✗	✓	✓	✓	✗
IP500	✗	✗	✗	✓	✓	✓	✗
IP406 V2	✗	✗	✗	✓	✓	✓	✗
IP412	✗	✗	✗	✓	✓	✓	✗

Rest of World							
Product	Quad BRI	PRI E1/E1R2		PRI T1		ATM4	WAN
		Single	Dual	Single	Dual		
IP500v2	✓	✓	✓	✗	✗	✓	✗
IP500	✓	✓	✓	✗	✗	✓	✗
IP406 V2	✓	✓	✓	✗	✗	✓	✗
IP412	✓	✓	✓	✗	✗	✓	✗

Notes

- E1R2 trunks are only supported in CALA and Korea.

11.4 Further Information and Product Updates

Further information, including Product and Reference Manual updates, can be obtained from Avaya Dealers and Distributors or from Avaya's web site: http://www.avaya.com.

This guide is also available from the Avaya's support web site: http://support.avaya.com.

Support Telephone Numbers
For initial help and support, contact your distributor/supplier. The following contact points are for Avaya authorized partners.

- In the USA only
  Avaya provides a toll-tree Customer Helpline 24 hours a day:
  - Name: Avaya Technical Support Organization (TSO)
  - Customer Helpline: 1 800 628-2888
  - Address: 8744 Lucent Blvd., Highlands Ranch, Colorado, 80129 USA
  - URL: http://support.avaya.com
    If you need assistance when installing, programming, or using your system, call the Helpline or your Avaya representative. Consultation charges may apply.

- Outside the USA
  If you need assistance when installing, programming, or using your system, contact your Avaya representative.
  - URL: http://support.avaya.com

11.5 Port Safety Classification

The Avaya IP Office systems have the following ports which are classified as follows:

Port Name	Port Description	Port Classification
PRI port	PRI ISDN connection (NET)	TNV (Operating within the limits of SELV)
BRI ports	BRI ISDN connection (NET)	TNV (Operating within the limits of SELV)
Analog ports	Two wire analog trunk	TNV3
Power fail ports	Two wire analog trunk	TNV3
DTE port	Async Data connection.	SELV
Analog Telephone Ports	Telephone Extension ports	TNV2
Digital Telephone Ports	Telephone Extension ports	SELV
WAN port	WAN connection (NET).	SELV
LAN ports	10/100 BaseT attachment to LAN.	SELV
Expansion ports	Expansion Module connector.	SELV
Audio port	Connector for Music on Hold.	SELV
External Control port	Connector for Controlling Ancillary circuits.	SELV
DC Input port	Connector for DC input power.	SELV

Interconnection circuits shall be selected to provide continued conformance with the requirements of EN 609050:1992/ A3:1995 clause 2.3 for SELV circuits and with the requirements of clause 6 for TNV circuits, after connections between equipment.

11.6 EMC Directive

889/336/ EEC (EMC Directive) CISPR 22:1993 including A1 + A2, AS/NZ 3548:1995 (ROW)

- ⚠ WARNING
  This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Federal Communications Commission (FCC)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his or her own expense.

Canadian Department of Communications (DOC)

''NOTICE: This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation, IC, before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment."

EMC Caution for China

警示

注意：此为A级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。仅适用于商业或工业环境。

11.7 Regulatory Instructions for Use

11.7.1 Australia

Connection
Connection of IP400 Office products must be via a Line Isolation Module with a telecommunications compliance label.

BRI Interface
During the configuration, ensure "000" emergency number is not barred, by performing the following:

- Short Code: 000
- Telephone No: 000;
- Function: DialEmergency

Connections to TS013, the following Bearer Capabilities shall not be used:

- 7kHz Audio, Video, Restricted Digital Information.

If unknown type of number is used in calling party number, the network will use the default CLI.

The system must be configured for Point to Multi point connection to comply with Austel requirements for connecting to TS013 circuits.

As the IP Office does not support emergency dialing after loss of power, the following warning notice should be recognized:

- WARNING
  This equipment will be inoperable when mains power fails.

PRI Interface
During the configuration, ensure "000" emergency number is not barred, by performing the following:

- Short Code: 000
- Telephone No: 000;
- Function: DialEmergency

- WARNING
  This equipment will be inoperable during mains power failure.

11.7.2 Canada

This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation, IC, before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met.

It does not imply that Industry Canada approved the equipment.

''NOTICE: The Ringer Equivalence Number (REN) for this terminal equipment is 1. The REN assigned to each terminal equipment provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed five.''

11.7.3 China

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所有在中华人民共和国境内进口或销售的电子信息产品必须附上本文件

Include this document with all Electronic Information Products imported or sold in the People's Republic of China

部件名称 (Part Name)	有毒有害物质或元素 (Hazardous Substance)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr^{6+})	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
金属部件 (Metal Parts)	×	○	○	○	○	○
电路模块 (Circuit Modules)	×	○	○	○	○	○
电缆及电缆组件 (Cables & Cable Assemblies)	×	○	○	○	○	○
塑料和聚合物部件 (Plastic and Polymeric parts)	○	○	○	○	○	○
电路开关/断路器 (Circuit Switch/Breakers)	○	○	○	○	○	○
电源组件 (Power Assemblies)	×	○	○	○	○	○
显示器 (LCD, Monitor)	○	○	○	○	○	○
玻璃 (Glass)	○	○	○	○	○	○

○： 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T 11363 2006 标准规定的限量要求以下。
Indicates that the concentration of the hazardous substance in all homogeneous materials in the parts is below the relevant threshold of the SJ/T 11363 2006 standard.

×： 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11363 2006 标准规定的限量要求。
Indicates that the concentration of the hazardous substance of at least one of all homogeneous materials in the parts is above the relevant threshold of the SJ/T 11363 2006 standard.

本表显示，所附的亚美亚电子信息产品中，从生产日期起，可能包含这些物质。注意：所附产品可能包含或不含以上所列的某些组件。
This table shows where these substances may be found in Avaya's electronic information products, as of the date of manufacture of the enclosed product. Note that some of the component types listed above may or may not be a part of the enclosed product.

除非有另外特别的标注,此标志将作为所附产品及零部件的环保使用期标志. 某些产品会有一个不同的环保使用期(例如,电话机)并贴在其产品上.此环保使用期限只适用于产品在产品手册中所规定的条件下使用

The Environmentally Friendly Use Period (EFUP) for all enclosed products and their parts are per the symbol shown here, unless otherwise marked. Certain products have a different EFUP (for example, telephones) and so are marked to reflect such. The Environmentally Friendly Use Period is valid only when the product is operated under the conditions defined in the product manual.

11.7.4 European Union

1. 999 and 112 calls must not be barred. Doing so will invalidate the approval.
2. All connections at the MDF shall be identifiable by suitable labeling.
3. The CE mark displayed on IP Office equipment indicates the systems compliance with the EMC, LVD, and R&TTE Directives and common technical regulations for Primary Rate and Basic Rate ISDN.
4. All ports for the connection of other non-telecommunications apparatus have a Safety Extra Low Voltage (SELV) safety status.

11.7.5 New Zealand

The grant of a Telepermit for any item of terminal equipment indicates only that Telecom has accepted that the item complies with minimum conditions for connection to its network. It indicates no endorsement of the product by Telecom, nor does it provide any sort of warranty. Above all, it provides no assurance that any item will work correctly in all respects with another item of Telepermitted equipment of a different make or model, nor does it imply that any product is compatible with all of Telecom's network services.

11.7.6 FCC Notification

This equipment complies with Part 68 of the FCC rules and the requirements adopted by the Administrative Council on Terminal Attachments (ACTA). On the rear of this equipment is a label that contains, among other information, a product identifier in the format US:AAAEQ##TXXX. If requested, this number must be provided to the telephone company.

The REN is used to determine the quantity of devices that may be connected to the telephone line. Excessive RENs on the telephone line may result in devices not ringing in response to an incoming call. In most, but not all areas, the sum of RENs should not exceed 5.0. To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. For products approved after July 23, 2001, the REN for this product is part of the product identifier that has the format US:AAAEQ##TXXX. The digits represented by ## are the REN without a decimal point (for example, 03 is a REN of 0.3). For earlier products, the REN is separately shown on the label.

Means of Connection

Connection of this equipment to the telephone network is shown in the following table.

Port	FIC	SOC	USOC Jack	REN
IPO500 PRI 1U, IPO500 PRI2U, IP400 PRI-T1	04DU9.BN, 04DU9.DN, 04DU9.IKN, 04DU9.ISN	6.0Y	RJ48C	NA
IPO500 ATM4U IP400 ATM4U	OL13A, OL13B, OL13C, 02AC2, 02LA2, 02LB2, 02LC2, 02LR2, 02LS2	9.0Y	RJ45S	0.1B
IPO500 ATM16	OL13A, OL13B, OL13C, 02AC2, 02GS2, 02LA2, 02LB2, 02LC2, 02LR2, 02LF2 02GS2, 02LS2	9.0Y	RJ45S	0.1B

If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If trouble is experienced with this equipment, for repair or warranty information, please contact the Technical Service Center at 1-800-242- 2121 or contact your local Avaya representative. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA.

Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

Equipment With Direct Inward Dialing ("DID"):

Allowing this equipment to be operated in such a manner as to not provide proper answer supervision is a violation of Part 68 of the FCC's rules.

Proper Answer Supervision is when:

A. This equipment returns answer supervision to the public switched telephone network (PSTN) when DID calls are:
   - answered by the called station,
   - answered by the attendant,
   - routed to a recorded announcement that can be administered by the customer premises equipment (CPE) user.
   - Routed to a dial prompt

B. This equipment returns answer supervision signals on all (DID) calls forwarded back to the PSTN. Permissible exceptions are:
   - A call is unanswered.
   - A busy tone is received.

- A reorder tone is received.

Avaya attests that this registered equipment is capable of providing users access to interstate providers of operator services through the use of access codes. Modification of this equipment by call aggregators to block access dialing codes is a violation of the Telephone Operator Consumers Act of 1990.

Automatic Dialers:

When programming emergency numbers and (or) making test calls to emergency numbers:

1. Remain on the line and briefly explain to the dispatcher the reason for the call.
2. Perform such activities in the off-peak hours, such as early morning or late evenings.

Toll Restriction and Least Cost Routing Equipment:

The software contained in this equipment to allow user access to the network must be upgraded to recognize newly established network area codes and exchange codes as they are placed into service.

Failure to upgrade the premises systems or peripheral equipment to recognize the new codes as they are established will restrict the customer and the customer's employees from gaining access to the network and to these codes.

FCC Part 68 Supplier's Declarations of Conformity

Avaya Inc. in the United States of America hereby certifies that the equipment described in this document and bearing a TIA TSB-168 label identification number complies with the FCC's Rules and Regulations 47 CFR Part 68, and the Administrative Council on Terminal Attachments (ACTA) adopted technical criteria.

Avaya further asserts that Avaya handset-equipped terminal equipment described in this document complies with Paragraph 68.316 of the FCC Rules and Regulations defining Hearing Aid Compatibility and is deemed compatible with hearing aids.

11.7.7 Compliance with FCC Rules

Transmit and Receive Gain Settings for PRI/T1 and Analog Ports

The Gain settings are password controlled for use by qualified installation personnel only and must not be made available to the end user. The default gain settings of 0dB ensures compliance with FCC part 68 section 68.308(b)(5) and TIA/EIA-IS-968 Section 4.5.2.5. "Through transmission amplification from ports for the connection of separately registered equipment or from other network connection ports". Gain setting adjustment by unqualified personnel may result in violation of the FCC rules. Qualified personnel may adjust gain settings above these levels only where:

1. Measurement is made to ensure that the power levels sent to line at each network interface connected does not exceed the maximum levels specified in FCC part 68 section 68.308(b) and TIA/EIA-IS-968 Section 4.5 for that specific interface type.
2. Where gain adjustment away from the default values are made, precautions should be taken to ensure that the connection of terminal equipment is controlled by qualified installation personnel.
3. To conform with the Receive Objective Loudness Rating at distances greater than 2.7km from the central office, on analog trunks a receive gain of 1.5dB must be set.

Index

A

Add-Ons
- 201B Recorder 353
- 4450 Features 347
- EU24 Features 349
- EU24BL Features 350
- Programmable Buttons 347, 349, 350, 351, 354
- T3 DSS Features 351
- XM24 Features 354

Analog
- Phone Barrier Boxes 125
- Phone Region Availability 43, 285
- Port 373, 376
- Trunk Card 22, 259

Application
- Call Center 48, 357
- Call Logging 48
- CD/DVD 48
- ContactStore 356
- CTI 48
- Maintenance 48
- Manager 358
- Monitor 359
- Phone Manager 361
- SoftConsole 363
- System Status Application 364
- TAPI 365
- User 48
- Voicemail 48
- VoiceMail Pro 366

Assessments
- Network 44
- VoIP 44

Audio
- Codec Conversion 45
- Port 373

Audio Port 376

Availability of Equipment 9

B

Backup
- SD Card 151

Barrier Boxes
- Analog Phone 125
- Rack Mounting 126

Base Card
- Analog Phone 18, 229
- Digital Station 18, 229
- Legacy Card Carrier 18, 229
- VCM 18, 229

Batteries
- Lithium 404

BRI
- (So) Port 377
- (Trunk) Port 378
- Port 373

C

Cable
- Access Requirements 57
- Clearance Requirements 57

Cables
- Maximum Cable Distances 35, 374
- Standard IP Office 35, 374

Cabling
- Lightening Protection 38, 123

Call Logging Application 48

Call Status
- Application 48

Cards
- Analog Trunk 261, 262
- ATM4 262
- ATM4U 261
- BRI Trunk 262
- E1 PRI 263
- E1R2 PRI 264
- Embedded Voicemail Memory 24, 265
- IP400 Voice Compression Modules 24
- IP500 Analog Phone Base 231
- IP500 Digital Station Base 233
- IP500 Legacy Card Carrier 234
- IP500 VCM 235
- Modem 24, 265
- Small Office Edition Wireless 24
- T1 PRI 263
- VCM 266
- Voice Compression 266

Castle Rock 131

Channels
- Compression 45

Clock 102

Compact Business Center
- Application 48, 357

Compact Contact Center
- Application 48, 357

Compression Channels 45

Conference Center
- Application 48

Configuration
- Create New 77
- Erase 135

Connections
- Grounding 37
- Out of Building 38, 123

ContactStore
- Application 48
- Components 356
- License Requirements 356
- PC Requirements 356

Control Unit
- IP406 v2 11, 220
- IP412 11, 218
- IP500 215
- IP500 System Unit 11
- Rack Mounting 39
- Small Office Edition 226
- SOE 11
- Summary 212
- Wall Mounting 39

Copy
- SD Card 153

Country
- Languages 46
- Supported Locales 46

Create Configuration 77

D

Daughter Cards
- Analog Trunk 20, 243, 245
- BRI Trunk 20, 243, 246
- PRI Trunk 247
- PRI-U Trunk 20, 243

Daughter Cards
Trunk 20, 243
DC I/P
Port 373
DCI I/P Port 379
DECT
Handset 305, 306
Phone 43, 285
Region Availability 43, 285
DevLink Application 48
DS
IROB 124
Phone 43, 124, 285
Port 373, 379
Region Availablility 43, 285
DTE Port 135
Cable requirement 135, 380
RS232 135, 380
Settings 135, 380
Dual PRI
Trunk Card 22, 259

E

Embedded Voicemail
Application 48
Memory Card 24
EMC Cautions
Canadian Department of Communications 407
EMC Caution for China 407
Federal Communications Commission 407
Envirmental Requirements 56
Equipment Availability 9
Expansion
Port 373
Expansion Modules
IP400 Analog Trunk 26
IP400 Analog Trunk 16 269
IP400 Digital Station 26, 273
IP400 Digital Station V2 271
IP400 Phone 26, 277
IP400 Phone V2 275
IP400 So8 26, 279
IP400 WAN3 26
IP400 WAN3 10/100 281
IP500 Analog Trunk 16 249
IP500 BRI So8 251
IP500 Digital Station 26, 253
IP500 Phone 26, 255
IPO 500 Analog Trunk 26
IPO 500 BRI So8 26
Expansion Port 381
EXT O/P
Port 373
EXT O/P Port 127, 381
Extension Numbers
Changing 117
Renumbering 117
Swapping 116
External Expansion Modules 26

F

Faulty Units 9
FCC Rules 413
Feature Key Server
Application 48
Feature Keys
Parallel 41
Serial 41
Smart Card 41
USB 41
Features
2402D Phone 297
2410D Phone 298
2420 Phone 299
3616 Phone 300
3620 Phone 301
3626 Phone 302
3641 Phone 303, 305
3645 Phone 304
3711 Phone 306
3810 Phone 309
4406D+ Phone 311
4412D+ Phone 312
4424D+ Phone 313
4601 Phone 314
4602IP Phone 315
4602SW Phone 315
4610SW Phone 316
4620IP Phone 317
4620SW Phone 317
4621SW Phone 318
4625SW Phone 319
5202D Phone 320
5220D Phone 322
5410 Phone 321
5601 Phone 323
5602IP Phone 325
5602SW Phone 325
5610SW Phone 326
5620 Phone 327
5621 Phone 328
6408D Phone 329
6416D Phone 330
6424D Phone 331
T3 Classic 343
T3 Comfort 344
T3 Compact 345
Firewall Exceptiong 370

G

General Information
Training Courses 51
Web Sites 51
Grounding Control Units 37

H

H323
Phones 43, 285
Region Availability 43, 285
Hazard Symbols 404
Hazardous Substances 9
Homologation Statement 404
HP OpenView 131

I

IP 400 Installation
Connect Manager PC 191
Expansion Modules 203
Grounding 207
Modem Cards 196
Power up Control Unit 189
Rack Mounting 201
Receive Configuration (Pre 3.2) 192
Trunk Cards 198
Unpacking 188

IP 400 Installation
VCM Cards 194
WAN 3 205
IP Office Operation in
Australia 408
Canada 408
China 409
European Union 410
New Zealand 410
USA 411
IP400
Trunk cards 22, 259
Voice Compression Modules card 24
IP400 Installation
Using Monitor 193
IP406 v2 16
Control Unit 220
IP412 16
Control Unit 218
IP500
Analog Phone Base Card 18, 229
Analog Trunk Daughter Card 20, 243
BRI Trunk Daughter Card 20, 243
Control Unit 215
Digital Station Base Card 18, 229
Legacy Card Carrier Base Card 18, 229
PRI-U Trunk Daughter Card 20, 243
Reset Button 141
system 14
Trunk Daughter Card 20, 243
VCM Base Card 18, 229
IP500 Installation
Admin Applications 65
Card 79, 169
Check Card LED 91
Check CPU LED 176
Connect Manager 67
Documentation 74, 167
Expansion Modules 180
Feature Key 173
Grounding 88, 185
Licences 179
Power 174
Rack Mounting 84, 182
Receive Config 178
Start Manager 68
Tools 73, 166
Unpacking 75, 168, 188
Upgrade Software 177
Using Monitor 193
Wall Mounting 83, 184

L

LAN
Port 373
LAN Port 382
Licences
ContactStore 356
Manager 358
Monitor 359
Phone Manager 361
SoftConsole 363
Syatem Status Application 364
TAPI 365
VoiceMail Pro 366
Licenses
PC-Base 41
PC-Less 41
Lightening Portection 404
Lightening Protection 38, 123
Lithium Batteries 404

M

Maintenance
Applications 48
Manager
Application 48
Clock Quality 102
Components 358
Extension Numbers 117
License Requirements 358
PC Requirements 358
Prefix Dialing 104
Trunks 100
Upgrade Software 119
Memory card
Removal 112, 144, 159
Modem Card 24
Module
Polycom Video 129
Modules
Trunk Interface 405
Monitor
Application 48
Components 359
License Requirements 359
PC Requirements 359
Protocols 370
MS-CRM
Application 48

N

Network Assessments 44
New Configuration 77

O

Operating Systems 368
Out of Building
Connections 38, 123

P

Package Damage
Check 188
Parallel Feature Key 41
PC
Minimum Specifications 368
PC-Base Licensing 41
PC-Less Licensing 41
PF
Port 373
PF Port 383
Phone (POT)
Port 373
Phone (POT) Port 384
Phone 2000 Series
2402D 297
2410D 298
2420 299
Phone 3000 Series
3616 300
3620 301
3626 302
3641 303
3645 304
3701 305
3711 306

Phone 3000 Series
3810 309
DECT Handset 305, 306
WiFi 300, 301, 302, 303, 304
Wireless 309
Phone 4000 Series
4406D+ 311
4412D+ 312
4424D+ 313
4601 314
4602IP 315
4602SW 315
4610SW 316
4620 317
4620SW 317
4621SW 318
4625SW 319
Phone 5000 Series
5402D 320
5410 321
5420D 322
5601 323
5602IP 325
5602SW 325
5610SW 326
5620 327
5621 328
Phone 6000 Series
6408D 329
6416D 330
6424D 331
Phone Manager
Application 48
Components 361
License Requirements 361
PC Requirements 361
Phone T3 Series
Classic 343
Comfort 344
Compact 345
Polycom Video Module 129
Port
Analog 373, 376
Assigned 370
Audio 373, 376
BRI 373
BRI (So) 377
BRI (Trunk) 378
DC I/P 373
DCI I/P 379
Door 127
DS 373, 379
Expansion 373, 381
EXT O/P 127, 373, 381
IP Office 370
LAN 373, 382
PF 373, 383
Phone (POT) 373, 384
PRI 373, 385
RS232/DTE 373
RS323 DTE 135, 380
Safety Classification 406
USB 373
Used 370
WAN 373, 386
WAN V.24 387
WAN V.35 388
WAN X.21 389
Power Supplies
1151C1 32
1151C2 32
Cords 33
Type 40w PSU 32
Type 45W Earthed PSU 32
Type 60W Earthed PSU 32
Uninterrupted Power Supply 34
PRI
Port 373
PRI Port 385
Programmable Buttons 347, 349, 350, 351, 354
Protocols 370

Q

Quad BRI
Trunk Card 22, 259

R

Rack Mounting Control Units 39
Recorder Interface 353
Region Availability
Analog Phone 43, 285
DECT Phone 43, 285
DS Phone 43, 285
H323 Phone 43, 285
Remove
SD Card 112, 144, 159
Renumber Extensions 117
Requirements
Cable Access 57
Cable Clearance 57
Enviromental 56
Space 57
Wall Mounting 56
Restore
SD Card 152
RoHS 9
RS232/DTE
Port 373

S

Safety Statement 404
SAP Codes
201B Recorder 353
2402D Phone 297
2410D Phone 298
2420D Phone 299
3616 Phone 300
3620 Phone 301
3626 Phone 302
3641 Phone 305
3711 Phone 306
3810 Phone 309
4406D+ Phone 311
4412D+ Phone 312
4424D+ Phone 313
4450 Programmable Buttons 347
4601 Phone 314
4602IP Phone 315
4602SW Phone 315
4610SW Phone 316
4620IP Phone 317
4620SW Phone 317
4621SW Phone 318
4625SW Phone 319

SAP Codes
5402D Phone 320
5410 Phone 321
5420D Phone 322
5601 Phone 323
5602IP Phone 325
5602SW Phone 325
5610SW Phone 326
5620 Phone 327
5621 Phone 328
6408D Phone 329
6416D Phone 330
6424D Phone 331
EU24 Programmable Buttons 349
EU24BL Programmable Buttons 350
T3 Classic 343
T3 Comfort 344
T3 Compact 345
T3 DSS Programmable Buttons 351
XM24 Programmable Buttons 354
SD Card
Backup 151
Copy 153
Removal 112, 144, 159
Restore 152
Security Settings
Default 138
Serial Feature Key 41
Server
Minimum Specifications 368
Single E1 PRI
Trunk Card 22, 259
Single E1R2
Trunk Card 22, 259
Single PRI T1
Trunk Card 22, 259
Small Office Edition
Control Unit 226
Wireless Card 24
Smart card Feature Key 41
SNMP 131
Enabling 134
Installation 132
Port 134
respond 134
Trap Sending 134
SNMP MIBs
Application 48
So8
Example ISDN Terminal 128
Example Video Conference 129
SOE Installation
Connect Manager PC 191
Receive Configuration (Pre 3.2) 192
Unpacking 188
Using Monitor 193
SoftConsole
Application 48
Components 363
License Requirements 363
PC Requirements 363
Software
Erase Core Software 139
Space Requirements 57
Statement
Homologation 404
Safety 404
Supported
Language 46
Locales 46
System Status
Application 48
System Status Application
Components 364
License Requirements 364
PC Requirements 364

T

TAPI
Components 365
License Requirements 365
PC Requirements 365
WAV Driver Application 48
TAPILink Lite
Application 48
TAPIlink Pro Application 48
Training Courses 51
Trunk Interface Modules 405

U

Unpacking 188
USB
Feature Key 41
Port 373

V

Voice Compression Channels 45
Voicemail Lite
Application 48
VoiceMail Pro
Application 48
Components 366
License Requirements 366
PC Requirements 366
VoIP Assessments 44

W

Wall Mounting Control Units 39
Wall Mounting Requirements 56
WAN
Link 142
Port 22, 259, 373, 386
V.24 Port 387
V.35 Port 388
X.21 Port 389
Waterproof Phone 301
Web Sites 51
WiFi Phone 300, 301, 302, 303, 304
Wireless Phone 309

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