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Introduction

IP Office Installation
This manual covers the installation of your Avaya IP403/406V2/412 Office equipped with software release Level 3.0+ only. It is intended for use by installers and maintainers who have successfully completed the appropriate IP Office training courses.

- Ensure that you have read and understood this manual before beginning installation.


*Not supported on software release 3.0+. 
Scope of Manual
This manual, for Avaya IP Office systems, covers the following subjects and should be read in the sequence shown below:

- **Avaya IP Office Platforms**
  This section provides details of the various Avaya IP Office platforms available. Illustrations of the front and rear of each unit show what ports/sockets/etc are provided. Typical configuration examples are also provided in this section. A further section details the country variants of modules/trunks/integral modules/etc.

- **Preparing for and Installing a new system**
  These sections provide all the information required and the actions to be performed to physically install an IP Office, i.e. what tools are required, the environmental/power requirements, wall mounting, rack mounting, etc. The software installation is covered in the following section.

- **Basic System Programming**
  System programming is necessary for configuration and maintenance of the Avaya IP Office. This manual only covers the installation of the IP Office suite of programs (see System Programming - Introduction). For full details refer to the Installation Wizard Help files and/or to the Manuals contained on the documentation CD (supplied with every unit).

- **Terminal/Telephone Installation**
  This manual details the information required to install telephone but does not detail the usage and functionality of IP Office terminals/telephones. These details are to be found in the appropriate User Guides. For maximum cable run lengths for connection between IP Office units and terminals refer to Terminal/Telephone Cable Lengths. The terminals/telephones that are supported by the IP Office are (these are also used across a number of Avaya platforms):
    - Avaya 2400 Series: 2402, 2410 and 2420.
    - Avaya 3600 Series: 3616 and 3626.
    - Avaya 4400 Series: 4406D, 4412D, 4424D and 4450DSS.*
    - Avaya 4600 Series: 4601, 4602, 4610, 4602SW, 4606, 4612, 4620 and 4624.
    - Avaya 5400 Series: 5402, 5410 and 5420.
    - Avaya 5600 Series: 5601, 5602, 5610 and 5620.
    - Avaya 6400 Series: 6408D+, 6416D+M, 6424D+M and XM24 (DSS)

*Caution: See Line Cord for Structured Cabling for wiring details on a 4450DSS module.

- **Safety and Homologation Statements**
  This provides all the necessary Safety, Homologation Statements and Regulatory Instructions for Use required. This section also detail where further information, including other Manuals and support telephone numbers, can be obtained.

- **Technical Data**
  This manual contains information on the Port Pinouts/Safety classifications, cables, and basic technical specifications only (see Technical Specifications). Descriptions of the functionality, features and performance of the IP Office are covered by the Product Description.
IP403 Office Platform

IP403 Office

The IP403 Office base unit, running software level 3.0+, supports up to eight digital and two analog telephones. This can be expanded, by use of 3 additional extension modules, to a max. of 100 extensions.

The IP403 Office base unit is equipped with DS ports that support Avaya 24xx, 44xx, 54xx and/or 64xx telephones. These ports can be set for either mu-Law or A-Law PCM encoding. At default DS ports are set to mu-Law. However, these can be switched in software (refer to the Administration Manager Manual for details).

Connection to trunks is via any of the following integral interface modules:-

- Single PRI E1 (30 trunks) or Single PRI T1 (23B+1D or 24B trunks - USA only)
- Quad BRI (8 trunks) or Analog 4 (loop start trunks).

An eight port auto-negotiating 10/100 Base-TX LAN hub provides access to networks and/or up to eight IP telephones. (Where IP telephones are to be used, the hub should be connected to a suitable LAN switch with QoS capabilities.)

Expansion Modules

Optional Expansion Modules allow the IP403 Office to be expanded to 100 extensions. These modules (with the exception of the WAN3) are connected via the Expansion Port sockets that are located on the back of each unit. Up to 3, in any combination, of the following Expansion Modules can be supported by the IP403 Office base unit.

- **IP400 Digital Station 16/30**
  Two variants of 16 or 30 extensions for digital telephones. Hence, if all 3 extension modules are IP400 Digital Station 30's, then the maximum of 100 extensions will consist of 90 digital extensions, plus the base unit's 2 analog extensions and 8 digital extensions.

- **IP400 Phone 8/16/30**
  Three variants (8, 16 or 30 extensions) for analog telephones. Hence, if all 3 extension modules are IP400 Phone 30's, then the maximum of 100 extensions will consist of 90 analog extensions, plus the base unit's 2 analog extensions and 8 digital extensions.

- **IP400 So8**
  An S-bus module that provides 8 Basic Rate ISDN interfaces.

- **IP400 WAN3**
  Provides support for a further 3 digital leased line (WAN) connections. These expansion modules are connected to the IP403 Office unit via one of the LAN Ports located on the front of each unit.

- **IP400 Analog Trunk 16**
  Provides support for up to 16 Loop Start or Ground Start analog trunks. Two power fail sockets are also provided.

Integral Modules (Optional)

In addition the IP403 Office can be fitted with either or both of the following optional Integral Modules:

- **Voice Compression Module (VCM)**
  Supports VoIP applications including trunking and support for IP telephones. The IP403 accepts any one of the 5, 10 or 20 channel variants.

- **Modem Modules**
  - Dual Modem Module:
    Allows termination of 2 simultaneous analog modem calls up to and including 56kbps (V90).
  - Internal Modem Module:
    Allows termination of 4 simultaneous analog modem calls up to and including 56kbps (V90).
• **DS Ports**
  DS ports support Avaya 24xx, 44xx, 54xx and 64xx series telephones. These ports support either A-Law or mu-Law PCM encoding (default is country dependant and can be switched in software - refer to the Administration Manager Manual for details). Using standard structured wiring, these RJ45 ports can be extended to the required telephone location. When telephones are equipped with line cords that terminate in RJ11 plugs then, although their wiring is compatible, it is advisable to use pin-to-pin RJ11/RJ45 adapters.

• **Plain Ordinary Telephone (POTS) Ports**
  These two ports are used for connection to standard analog telephones, fax machines and modems. They must not be connect to trunks. Using standard structured wiring, these RJ45 ports can be extended to the required telephone location. Converters can be used to provide BT New Plan sockets (431A/631A) if required. When devices are equipped with line cords that terminate in RJ11 plugs, then pin-to-pin RJ11/RJ45 adapters should be used.

• **LAN Ports**
  The eight auto-negotiating 10/100 BaseT LAN hub ports are used for PC and server connectivity. They can also be used to connect to the optional IP400 WAN3 Expansion Module and IP telephones. LAN ports allow information relating to incoming and outgoing telephone calls to be forwarded to PC based applications. They also provide access to the router functionality/configuration of the IP403 Office platform for both data and Voice over IP (VoIP) calls. (Where IP telephony is required, a suitable switch LAN switch with QoS capabilities.) This eight port auto-negotiating 10/100 BaseT LAN hub has a single MAC address (printed on the base of the unit). Where more than eight LAN connections are required, the eighth LAN port can be used for cascading to other hubs. The Uplink push button to the right of this port is used to set the mode. When the Uplink switch is in the out position the port can be connected to another hub without the need for a crossover cable, i.e. the port is an MDI type port. When the Uplink switch is in the in position the port can be connected directly to a PC.

• **Cables**
  IP403 Office DS PRI 24 T1 are supplied with one red CAT5E cable. IP403 Office DS Analog 4 are supplied with four red CAT5E cables. For Port Pinouts and Cables, refer to Port Pinouts and Cables respectively.
IP403 Office - Rear View

- **External O/P Socket**
  Two relay ports that allow externally powered circuits to be controlled via a single 3.5mm stereo jack socket.

- **DC Power I/P Socket**
  Socket for the external 24V DC unregulated power supply (supplied with equipment).

- **DTE Port**
  A 25-way D-type socket. Used for connection to PCs, servers and EFTPOS devices or terminals.

- **Slot A/Slot B: BRI/PRI/ALOG Ports**
  The trunk interface modules are fitted into either Slots A or B and can consist of any combination of:
  - Quad Analog - 4 trunks. See Functional Ground
  - PRI E1/PRI E1-R2: 30 trunks.
  - PRI T1: 24B trunks or 23B+1D trunks.
    PRI T1 trunks support both ISDN and Analog emulation. The default setting is 23B+1D and is switchable in the installation software to provide 24B trunks.
  - Quad BRI: 8 trunks.

- **WAN Port**
  This port supports a single synchronous data connection, which can be X.21, V.35 or V.24. 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 unit to the existing Network Terminating Unit (NTU) via the appropriate X.21, V.35 or V.24 cable. This interface is identical to those on the WAN3 Expansion Module.

- **USB Interface:** Not used.

- **Expansion Ports 1-3:** Used to provide access to the optional **Expansion Modules** which allow the IP403 Office to be expanded to 100 extensions.

- **Audio I/P Socket:** A single 3.5mm stereo or mono jack socket that enables input from an external 'Music-on-Hold' source.
IP403 Typical Configuration

Scenario
A customer with sophisticated telephony requirements, needing 30 exchange lines and 80 Display Stations.

This configuration provides support for 98 Avaya 5400 Series digital stations (18 spare for growth) and a single Primary Rate ISDN connection. If growth beyond 18 users or additional line capacity were anticipated, the IP406 V2 Office would be considered more appropriate.

Typically, a business of this size would have a data network built using LAN switches such as the Avaya Cajun range. The IP403 Office would be connected to the data network through its integral 8 port Hub, providing all users access to the Internet and IP Office productivity applications.

Kit List
- IP403 Office DS PRI 30 E1
- 3 x IP400 Digital Station Module 30
- 80 x Avaya 5400 Series telephones.
IP406 Office V2 Platform

IP406 V2 Office
The IP406 V2 Office base unit, running software level 3.0+, supports up to 190 extensions by using the ten built in ports and up to 6 Expansion Modules. The IP406 V2 Office base unit is equipped with DS ports that support Avaya 24xx, 44xx, 54xx and 64xx telephones. These ports can be set for either mu-Law or A-Law PCM encoding. At default DS ports are set to mu-Law. However, these can be switched in software (refer to the Administration Manager Manual for details).

Connection to trunks is via up to two of the following integral interface modules:-

- Single or dual* PRI E1/PRI E1-R2 (30 or 60 trunks).
- Single or dual* PRI T1 (23B+1D or 24B trunks - USA only).
- (*dual PRI modules are only fitted to Slot A).
- Quad BRI (8 trunks).
- Analog 4 (loop start).

Eight LAN 10/100Mbps full duplex Layer 2 Ethernet switches and are used for PC and server connectivity. They can also be used to connect to IP telephones (Avaya 46xx/56xx IP series). Power over Ethernet is not provided by IP Office. The MAC address table can support up to 4000 devices.

Expansion Modules
Optional Expansion Modules allow the IP406 V2 Office to be expanded to 190 extensions. These modules (except the WAN3 module – see below) are connected via the Expansion Port sockets that are located on the back of each unit.

Up to six, in any combination, of the following Expansion Modules can be supported by the IP406 V2 Office base unit.

- **IP400 Digital Station 16/30:**
  Two variants of 16 or 30 extensions for digital stations. Hence, six IP400 Digital Terminal/Station 30s will allow for a further 180 extensions which, with the 10 built in ports, makes a maximum of 190 extensions.

- **IP400 Phone 8/16/30:**
  Three variants (8, 16 or 30 extensions) for analog telephones.
  Hence, six IP400 Phone 30s will allow for a further 180 digital extensions which, with the 2 built in ports, makes a maximum of 182 extensions.

- **IP400 So8:**
  An S-bus module that provides 8 Basic rate ISDN interfaces.

- **IP400 WAN3:**
  Provides support for a further 3 digital leased line (WAN) connections. These expansion modules are connected to the IP406 V2 Office unit via one of the LAN Ports located on the front of each unit.

- **IP400 Analog Trunk 16:**
  Provides support for up to 16 Loop Start or Ground Start analog trunks. Two power fail sockets are also provided.

Integral Modules (Optional)
In addition the IP406 V2 Office can be fitted with either or both of the following optional Integral Modules:

- **Voice Compression Module (VCM)**
  Supports VoIP applications including trunking and support for IP telephones. Available in 5, 10 and 20 channel variants.

- **Modem Modules**
  - **Dual Modem Module:**
    Allows termination of two simultaneous analog modem calls up to and including 56kbps (V90).
  - **Internal Modem Module:**
    Allows termination of up to 12 simultaneous analog modem calls up to and including 56kbps (V90).
**IP406 V2 Office - Front View**

- **DS Ports:**
  DS ports support Avaya 24xx, 44xx, 54xx and 64xx telephones. These ports support either A-Law or mu-Law PCM encoding (default is country dependant and can be switched in software). Using standard structured wiring, these RJ45 ports can be extended to the required telephone location. When telephones are equipped with line cords that terminate in RJ11 plugs then, although their wiring is compatible, it is advisable to use pin-to-pin RJ11/RJ45 adapters.

- **Phone Ports:**
  These ports are used for connection to standard analog telephones, fax machines, modems and only support 2-wire connection. Using standard structured wiring, these RJ45 ports can be extended to the required telephone location. When telephones are equipped with line cords that terminate in RJ11 plugs then, although their wiring is compatible, it is advisable to use pin-to-pin RJ11/RJ45 adapters.

- **LAN Ports:**
  These are LAN 10/100Mbps full duplex Layer 2 Ethernet ports and are used for PC and server connectivity. They have auto-sensing capability (MDI/MDIX) and hence avoid the need for LAN crossover cables when connecting to a network. They can also be used to connect to IP telephones (Avaya 4600 IP series). LAN ports allow information relating to incoming and outgoing telephone calls to be forwarded to PC based applications. They also provide access to the router functionality/configuration of the Avaya IP406 V2 Office V2 for both data and Voice over IP (VoIP) calls.

- **Cables**
  IP406 V2 Office PRI 30 E1 & PRI 24 T1 are supplied with one red CAT5E cable. IP406 V2 Office Analog 4 is supplied with four red CAT5E cables. IP406 V2 Office BRI 16 is supplied with eight red CAT5E cables.
• **External O/P Socket:**
  Two relay ports that allow externally powered circuits to be controlled via a single 3.5mm stereo jack socket.

• **DC Power I/P Socket:**
  Socket for the external 24V DC regulated power supply (supplied with kit).

• **DTE Port:**
  A 9-way D-type socket. Used for maintenance, serial dongle, connection to PCs, servers and EFTPOS terminals.

• **BRI/PRI/ALOG Ports:**
  The trunk interface modules are fitted into either Slots A or B and can consist of any combination of:
  - **Quad Analog:** 4 trunks
  - **PRI E1/PRI E1-R2:** 30 trunks
  - **PRI J1:** 24 trunks
  - **PRI T1:** 24B trunks or 23B+1D trunks.
    PRI T1 trunks support both ISDN and Analog emulation. The default setting is 23B+1D and is switchable in the installation software to provide 24B trunks.
  - **Quad BRI:** 8 trunks.

• **WAN Port:**
  This port supports a single synchronous data connection, which can be X.21, V.35 or V.24. 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 unit to the existing Network Terminating Unit (NTU) via the appropriate X.21, V.35 or V.24 cable. These interfaces are identical to those on the IP400 WAN3.

• **Expansion Ports 1-6:**
  Used to provide access to the optional Expansion Modules (see Expansion Modules - Introduction) which allow the IP406 V2 Office to be expanded by a further 180 extensions to make a maximum of 190 extensions.

• **Audio I/P Socket:**
  A single 3.5mm stereo or mono jack socket that enables input from an external 'Music-on-Hold' source.
Typical Configurations

Scenario 1
A business requiring 60 analog Telephones and 16 Basic Rate ISDN lines (16 channels).

The IP406 V2 Office with two IP400 Office Phone 30 modules and two BRI 8 cards provides the required line and extension capacity. Through the use of Phone Manager Lite the functionality provided by the Analog Telephones is greatly enhanced. The expansion capability for an additional 4 Modules allows the system to be expanded to a full 190 extensions. Additional lines can be added by replacing one of the BRI interfaces for a Primary rate.

Kit List
- IP406 V2 Office with two BRI 8 cards.
- 2 x IP400 Office Phone Module 30.

Scenario 2
A business requiring 180 analog Telephones and 60 lines.

The configuration illustrates a fully configured IP406 Office providing 180 extensions and 60 trunks. Factory shipped with a single PRI the system is fitted with an extra trunk card in its spare slot to provide the additional 30 lines.

Kit List
- IP406 V2 Office PRI 30 E1 fitted with an additional IP400 IP PRI E1 trunk card.
- 6 x IP400 Office Phone Module 30.
IP412 Office

The IP412 Office base unit, running software level 3.0+, supports up to 360 extensions by using up to 12 Expansion modules. Connection to trunks is via a combination of any of the following integral interface modules:-

- Single or Dual\* PRI E1/PRI-E1-R2 (30 or 60 trunks respectively).
- Single or Dual\* PRI T1 (24 or 48 trunks respectively - USA only).
- Quad BRI (8 trunks).
- Analog 4 (4 loop start trunks).

(*dual PRIs can be fitted to either Slots A or B).

Dual independent auto-negotiating 10/100 Base-TX Ethernet ports provide segmented access (allows a firewall break to be used) to the LAN.

(Where IP telephones are to be used a suitable LAN switch with QoS capabilities, must be used.)

Expansion Modules

Optional Expansion Modules allow the IP412 Office to be expanded to a maximum of 360 digital or analog extensions. The Expansion Modules (with the exception of the WAN3 – see below) are connected via the Expansion Port sockets that are located on the back of each unit.

Up to twelve, in any combination, of the following Expansion Modules can be supported by the IP412 Office base unit provided that the maximum number of extensions does not exceed 360.

- **IP400 Digital Station 16/30**
  Two variants of 16 or 30 extensions for digital telephones. Hence, twelve IP400 Digital Terminal/Station modules can be fitted to allow a maximum of 360 digital extensions.

- **IP400 Phone 8/16/30**
  Three variants (for 8, 16 or 30 extensions) for analog telephones. Hence, twelve IP400 Phone modules can be fitted to allow a maximum of 360 analog extensions.

- **IP400 So8**
  An S-bus module that provides 8 Basic rate ISDN interfaces.

- **IP400 WAN3**
  Provides support for a further 3 digital leased line (WAN) connections. These expansion modules are connected to the IP403 Office unit via one of the LAN Ports located on the front of each unit.

- **IP400 Analog Trunk 16**
  Provides support for up to 16 Loop Start or Ground Start analog trunks. Two power fail sockets are also provided.

Integral Modules (Optional)

In addition the IP412 Office can be fitted with either or both of the following optional Integral Modules:

- **Voice Compression Module (VCM)**
  Provides VoIP applications (including trunking) and support for IP telephones. Available in 5, 10, 20 and 30 channel variants. The IP412 Office supports two VCMs of any type.

- **Modem Modules**
  - Dual Modem Module:
    Allows termination of two simultaneous analog modem calls up to and including 56kbps (V90).
  - Internal Modem Module:
    Allows termination of up to 12 simultaneous analog modem calls up to and including 56kbps (V90).
### IP412 Office - Front View

**Expansion Ports 1 - 12**
**WAN Port**
**LAN Ports 1 - 2**

**Green Status LEDs**
LED 8 = WAN status

**Unit Status LED**
Red = = Alive but not initiated
Green = Running OK

**Trunk Ports 1 - 8**
**Green Status LEDs**

#### LAN Ports
The segmented dual independent auto-negotiating 10/100 BaseT Ethernet ports are used for PC and server connectivity. They can also be used to connect to the optional IP400 WAN3 Expansion Module and IP telephones. See IP400 WAN3. Information relating to incoming and outgoing telephone calls can be forwarded to PC based applications via these ports. These segmented Ethernet ports support separate IP and MAC addresses and hence a Firewall break may be implemented. They also provide access to the router functionality/configuration of the IP412 Office platform for both data and Voice over IP (VoIP) calls.

#### Cables
IP412 Office DS PRI 24 T1 are supplied with one red CAT5E cable.
IP412 Office - Rear View

- **External O/P Socket**
  Two relay ports that allow externally powered circuits to be controlled via a single 3.5mm stereo jack socket.

- **DC Power I/P Socket**
  Socket for the external 24V DC unregulated power supply (supplied with kit).

- **DTE Port**
  A 9-way D-type socket. Used for connection to PCs, servers and EFTPOS terminals.

- **BRI/PRI/ALOG Ports**
  The trunk interface modules are fitted into either Slots A or B and can consist of any combination of:
  - Quad Analog: 4 trunks.
  - Quad BRI: 8 trunks.
  - Single PRI E1/E1-R2: 30 trunks.

  PRI T1 trunks support both ISDN and Analog emulation. The default setting is 23B+1D (46B+2D) and is switchable in the installation software to become a 24B (48B) trunk.

- **WAN Port**
  This port supports a single synchronous data connection, which can be X.21, V.35 or V.24. 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 unit to the supplied Network Terminating Unit (NTU) via the appropriate X.21/V.35 /V.24 cable. This interface is identical to those on the WAN3 Expansion Module.

- **Expansion Ports 1-12**
  Used to provide access to either optional Expansion Modules which allow the IP412 Office to be expanded to 256 extensions or additional WAN interfaces.

- **Audio I/P Socket**
  A single 3.5mm stereo or mono jack socket that enables input from an external 'Music-on-Hold' source.
Typical Configurations

IP412 Scenario 1
A business requiring 210 Display Telephones and 96 Digital lines with 20 Analog lines for fall back purposes in the event of the T1 service failing.

The configuration illustrates a fully configured IP412 Office providing 210 extensions and 96 digital trunks (4 x T1) and two IP400 Office Analog Trunk 16 modules offering capacity of up to 32 analog trunk lines. Factory shipped with a single Dual PRI T1 interface, the system is fitted with an extra trunk card in its spare slot to provide the additional 48 lines. If the system requires expansion, a further five expansion modules can be added.

Kit List
- IP412 Office PRI 48 T1.
- 7 X IP400 Office Digital Station 30 Module.
- 2 x IP400 Office Analog Trunk 16.
- 210 x Avaya 54102 Digital Terminals.
IP412 Scenario 2

A Business requiring 90 IP hardphones, 90 IP softphones and 60 lines.

This configuration illustrates an IP412 Office PRI 60 E1 fitted with two optional IP400 Office Voice Compression Module 20s. These two internally fitted cards allow up 40 simultaneous calls to external parties, as they are only used when an IP extension is calling a non-IP telephone or line. If less ‘Gateway’ed calls are required, one of the 20 channel cards could be substituted for a smaller variant.

The IP Office softphone is ‘Phone Manager PC Softphone’ which requires two types of Licence Keys which allow Phone Manager Lite, supplied as standard, to run as IP Extensions.

Kit List

- IP412 Office PRI 60 E1 fitted with two optional IP400 Voice Compression Module 20s.
- 90 x 5610 IP Hardphones.
- IP400 Phone Manager Pro RFA unlimited.
- IP400 Phone Manager PC Softphone RFA 50.
- IP400iPhone Manager PC Softphone RFA 40 (50+40 = 90)).
Expansion Modules

Introduction
Dependent upon configuration requirements, combinations of the following Expansion Modules are used with IP Office platforms. With the exception of the WAN3 module, all of these Expansion Modules are connected to the Expansion Ports of an IP Office platform using Expansion Interconnect Cables.

- IP400 Digital Stations 16/30
- IP400 Phone 8/16/30
- IP400 So8
- IP400 WAN3
- IP400 Analog Trunk 16
IP400 Digital Stations 16/30
Front View (30 Port version)

- **DS ports** support Avaya 24xx, 54xx, 64xx and/or 44xx series telephones (see page 5). These ports support either A-Law or mu-Law PCM encoding (default is country dependent and can be switched in software - refer to the Administration Manager Manual for details). Using standard structured wiring, these RJ45 ports can be extended to the required telephone location. When telephones are equipped with line cords that terminate in RJ11 plugs then, although their wiring is compatible, it is advisable to use pin-to-pin RJ11/RJ45 adapters.

Rear View

- **Expansion Port**
  Used to connect a Phone Expansion Module to the Expansion Ports of an IP Office platform.

- **DC Power I/P Socket**
  Socket for the external 24V DC unregulated power supply (supplied with kit).

- **DTE Port**
  A 25-way D-type socket. Used for connection to PC (diagnostics only).

All IP400 Office Digital Station variants are supplied with one blue Expansion Interconnect cable. See Expansion Interconnect Cable and Port Pinouts.
Notes

1. The IP400 Phone 8 variant is only equipped with the bottom left row of ports.
2. The IP400 Phone 16 variant is only equipped with the bottom row of ports.

- **Plain Ordinary Telephone (POT) Ports**
  These ports are used for connection to standard analog telephones, fax machines and modems. Using standard structured wiring, these RJ45 ports can be extended to the required telephone location. Converters can be used to provide BT New Plan sockets (431A/631A) if required. When devices are equipped with line cords that terminate in RJ11 plugs, then RJ11/RJ45 adapters should be used. All analog telephones must conform to the port specification (see Interfaces).

- **Expansion Port**
  Used to connect a Phone Expansion Module to the Expansion Ports of an IP Office platform.

- **DC Power I/P Socket**
  Socket for the external 24V DC unregulated power supply (supplied with kit).

- **DTE Port**
  A 25-way D-type socket. Used for connection to PC (diagnostics only).

All IP400 Office Phone variants are supplied with one blue Expansion Interconnect cable. See Expansion Interconnect Cable and Port Pinouts.
IP400 So8
The So8 Module is only applicable to countries that support the ETSI signaling protocol.

Front View

- **Green Ind**
  - Connection OK

Yellow LED
- **Activity Indicator**

Phone Ports 1 - 0

- **BRI Ports**
  - These are 64k ISDN BRI S-Bus ports and are used for connection to ISDN Telephones, Group 4 faxes, Video conferencing units, etc.

- **WARNING:**
  - BRI phone ports must not be connected to the external ISDN Connections.

Rear View

- **Expansion Port**
  - Used to connect a So8 Module to the Expansion Ports of an IP Office platform.

- **DC Power I/P Socket**
  - Socket for the external 24V DC unregulated power supply (supplied with kit).

- **DTE Port**
  - A 25-way D-type socket. Used for connection to PC (as a diagnostic aid).

IP400 So8 is supplied with one blue Expansion Interconnect cable. See Expansion Interconnect Cable and Port Pinouts.
IP400 WAN3

Front View

- **LAN Port**
The LAN Port is the expansion port and permits connection to an IP403, IP406 or IP412 Office platform LAN Port. A LAN Interconnect cable is required for connection to an IP403 or IP406. An IP412 requires a LAN Crossover cable.

Rear View

- **WAN Ports**
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 unit to the existing Network Terminating Unit (NTU) via the appropriate X.21, V.35 or V.24 cable. These WAN ports are identical to those on the IP403/406/412 control units.

- **DC Power I/P Socket**
Socket for the external 24V DC unregulated power supply (supplied with kit).

- **DTE Port**
A 25-way D-type socket. Used for connection to PC (as a diagnostic aid).

IP400 WAN3 is supplied with one green LAN Interconnect cable. See LAN Interconnect Cable and Port Pinouts.
Analog Trunk Ports 1 - 8

- **Analog Trunk Ports**
  These ports are used for connection to standard analog trunks (loop start or ground start). Using standard structured wiring, these RJ45 ports can be extended to the required trunk sockets. Trunk ports 1 and 2 are, in the event of power failure, automatically switched to PF1 and PF2 respectively on the rear of the unit.

Rear View

- **Expansion Port**
  Used to connect the Analog Trunk Expansion Module an Expansion Ports of an IP400 Office platform.

- **DC Power I/P Socket**
  Socket for the external 24V DC unregulated power supply (supplied with kit).

- **Power Fail Trunks**
  These two ports **must be** set and connected to Loop Start trunks only. POTs plugged into these two sockets are mapped to trunk ports 1 & 2 such that, in the event of a mains power failure, PF1 and PF2 can operate as 'hot lines' to the emergency services (eg. 911, etc).

- **Protective Grounding Point**
  Within the USA a protective grounding **must be permanently** fitted. Connection of this protective grounding requires the use of suitable tools and **must be** connected at both ends before connection is made to the telecommunications network.

IP400 Analog Trunk 16 is supplied with one blue Expansion Interconnect cable. See Expansion Interconnect Cable and Port Pinouts.
Country Variants

Overview of Country Variants
The following are lists of the country variants for each IP400 Office platform, trunk module kits, Integral module kits and expansion modules. The PCS level for each module can be found on a label that is stuck to the base of each module.

Throughout this section the following abbreviations are used:

- All = Everywhere.
- CALA = Caribbean/Latin America.
- CH = China.
- EU = Europe.
- NA = North America (USA and/or Canada).
- NZ = New Zealand.
- ROW = Rest of world (all countries excluding USA, Canada).

For countries outside North America/ CALA, use ROW variant unless stated otherwise.
## IP400 Office Systems

### IP403 Office

<table>
<thead>
<tr>
<th>Variant</th>
<th>A-Law/Mu-Law</th>
<th>Country</th>
<th>SAP Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP403 Office DS (No Trunks) Base</td>
<td>A</td>
<td>ROW/CALA</td>
<td>700234453</td>
</tr>
<tr>
<td>IP403 Office DS (No Trunks) Base</td>
<td>Mu</td>
<td>NA</td>
<td>700350390</td>
</tr>
<tr>
<td>IP403 Office DS PRI 24 T1 Base</td>
<td>Mu</td>
<td>NA</td>
<td>700184666</td>
</tr>
<tr>
<td>IP403 Office DS Analog 4 Base</td>
<td>Mu</td>
<td>NA</td>
<td>700184674</td>
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### IP406 V2 Office

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<th>Variant</th>
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<th>Country</th>
<th>SAP Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP406 V2 Office DS (No Trunks) Base</td>
<td>A</td>
<td>ROW/CALA</td>
<td>700343536</td>
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<td>IP406 V2 Office DS (No Trunks) Base</td>
<td>A</td>
<td>NA</td>
<td>700359946</td>
</tr>
<tr>
<td>IP406 V2 Office DS BRI 8 Base</td>
<td>A</td>
<td>NA</td>
<td>700343478</td>
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<td>IP406 V2 Office DS PRI 30 E1 Base</td>
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<td>IP406 V2 Office DS PRI 24 T1 Base</td>
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<td>IP406 V2 Office DS Analog 4 Base</td>
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### IP412 Office

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<th>SAP Code</th>
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</thead>
<tbody>
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<td>ROW/CALA</td>
<td>700234479</td>
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<tr>
<td>IP412 Office PRI 30 E1 Base</td>
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<td>ROW but not CH, CALA</td>
<td>700184724</td>
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<td>IP412 Office PRI 60 E1 Base</td>
<td>A</td>
<td>ROW but not CH, CALA</td>
<td>700184732</td>
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<td>IP412 Office (No Trunks) Base</td>
<td>Mu</td>
<td>NA</td>
<td>700350408</td>
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<tr>
<td>IP412 Office PRI 24 T1 Base</td>
<td>Mu</td>
<td>NA</td>
<td>700184740</td>
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<td>IP412 Office PRI 48 T1 Base</td>
<td>Mu</td>
<td>NA</td>
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</table>

### IP Office Administration CD Set

This CD set is no longer supplied in the base unit box and must be ordered separately.

<table>
<thead>
<tr>
<th>Variant</th>
<th>Country</th>
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<tbody>
<tr>
<td>IP Office Use/Admin CD Set</td>
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<td>700345879</td>
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## Integral Module Kits

### Voice Compression Modules (VCM)

<table>
<thead>
<tr>
<th>Variants</th>
<th>Country</th>
<th>SAP Code</th>
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</thead>
<tbody>
<tr>
<td>IP400 VCM 5 expansion kit</td>
<td>ALL</td>
<td>700185119</td>
</tr>
<tr>
<td>IP400 VCM 10 expansion kit</td>
<td>ALL</td>
<td>700185127</td>
</tr>
<tr>
<td>IP400 VCM 20 expansion kit</td>
<td>ALL</td>
<td>700185135</td>
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<tr>
<td>IP400 VCM 30 expansion kit</td>
<td>ALL</td>
<td>700293939</td>
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### Dual Modem Module

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<th>Variants</th>
<th>Country</th>
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<tbody>
<tr>
<td>IP400 Modem 2 expansion kit (V.90)</td>
<td>ALL</td>
<td>700185226</td>
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<tr>
<td>IPO MC Int. MDM expansion kit</td>
<td>ALL</td>
<td>700343452</td>
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</table>
Trunk Module Kits

BRI Trunk Interface Module

<table>
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<th>Variant</th>
<th>Country</th>
<th>SAP Code</th>
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<tbody>
<tr>
<td>IP400 BRI expansion kit</td>
<td>ROW</td>
<td>700185168</td>
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<tr>
<td>IP400 BRI 8 (UNI) expansion kit</td>
<td>ROW but not CH</td>
<td>700262017</td>
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</table>

Analog Trunk Interface Module

<table>
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<tr>
<th>Variant</th>
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<th>SAP Code</th>
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<tbody>
<tr>
<td>IP400 ANALOG 4 (LS) expansion kit</td>
<td>NA/CALA</td>
<td>700185192</td>
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<tr>
<td>IP400 ANALOG 4 EU (LS) expansion kit</td>
<td>EU</td>
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<tr>
<td>IP400 ANALOG 4 NZ (LS) expansion kit</td>
<td>NZ</td>
<td>700241706</td>
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</table>

Note: V32 soft modem is available via Analog 4 cards.

PRI Module

<table>
<thead>
<tr>
<th>Variant</th>
<th>Country</th>
<th>SAP Code</th>
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<tbody>
<tr>
<td>IP400 PRI 30 E1 Expansion Kit (Single)</td>
<td>ROW but not CH, CALA</td>
<td>700185176</td>
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<tr>
<td>IP400 PRI 30 E1R2 RJ45 Expansion Kit (Single)</td>
<td>CALA/KR/CH</td>
<td>700241631</td>
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<tr>
<td>IP400 PRI 30 E1R2 COAX Expansion Kit (Single)</td>
<td>CALA</td>
<td>700241656</td>
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<td>IP400 PRI 24 T1 Expansion Kit (Single)</td>
<td>NA</td>
<td>700185200</td>
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<tr>
<td>IP400 PRI 24 J1 Expansion Kit (Single)</td>
<td>JP</td>
<td>700262033</td>
</tr>
</tbody>
</table>

Notes:
1. For countries outside North America/CALA, use the ROW variant unless stated otherwise.
2. PRI T1 trunks support both ISDN and Analog emulation. The default setting is 23B+1D and is switchable in the installation software to become a 24B trunk.

IP406 V2 Office Flash Memory

<table>
<thead>
<tr>
<th>Variant</th>
<th>Country</th>
<th>SAP Code</th>
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<tbody>
<tr>
<td>IP Office Media Card - Embedded Messaging Expansion</td>
<td>ALL</td>
<td>70034345</td>
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</table>
Power Supplies & Power Cords
Common Lump-in-Line Power Supply units are supplied with each IP Office/Expansion Module. However, the power cords are country specific and must be ordered separately. These power cords only applicable to IP Office base units/Expansions modules and must not be used on the IP Office Small Edition, see the separate Installation Manual for details.

### Power Supplies (Spare)

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<tr>
<th>Variant</th>
<th>Country</th>
<th>SAP Code</th>
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<tr>
<td>IP400 Power Supply 40W</td>
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<td>IP400 Power Supply 60W (IP406 V2)</td>
<td>ALL</td>
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<td>IP400 Power Supply 80W</td>
<td>CH</td>
<td>700260029</td>
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### Power Cords

<table>
<thead>
<tr>
<th>Country</th>
<th>IP403, IP412</th>
<th>IP406 V2</th>
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<tbody>
<tr>
<td>Australia, Argentina, New Zealand, Russia</td>
<td>None*</td>
<td>None*</td>
</tr>
<tr>
<td>Austria, Belgium, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Luxemburg, Netherlands, Norway, Poland, Portugal, South Africa, Spain, Sweden, Switzerland</td>
<td>700213382</td>
<td>700289762</td>
</tr>
<tr>
<td>Czech Republic, Ireland, United Kingdom</td>
<td>700213374</td>
<td>700289747</td>
</tr>
<tr>
<td>Canada, USA, Bolivia, Brazil, Chile, Colombia, Costa Rica, El Salvador, Jamaica, Mexico, Panama, Venezuela, Bahamas, Bermuda, Puerto Rico, Trinidad &amp; Tobago, Guatemala, Peru</td>
<td>700213390</td>
<td>700289770</td>
</tr>
<tr>
<td>Korea</td>
<td>700254519</td>
<td>700289762</td>
</tr>
<tr>
<td>China</td>
<td>700261977</td>
<td>700314172</td>
</tr>
</tbody>
</table>

*None: In these countries the power cord must be obtained locally. Please refer to your local agent for details.
## IP Office Rack Mounting Kits

<table>
<thead>
<tr>
<th>Variant</th>
<th>Country</th>
<th>SAP Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rack Mounting kit for 19 inch racks</td>
<td>ALL</td>
<td>700210800</td>
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</table>

## Expansion Module Variants

### IP400 Phone

<table>
<thead>
<tr>
<th>Variant</th>
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</tr>
</thead>
<tbody>
<tr>
<td>IP400 Phone 8</td>
<td>ALL</td>
<td>700184773</td>
</tr>
<tr>
<td>IP400 Phone 16</td>
<td>ALL</td>
<td>700184781</td>
</tr>
<tr>
<td>IP400 Phone 30</td>
<td>ALL</td>
<td>700184799</td>
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### IP400 Digital Stations

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<tr>
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<tbody>
<tr>
<td>IP400 Digital Station 16</td>
<td>ALL</td>
<td>700184807</td>
</tr>
<tr>
<td>IP400 Digital Station 30</td>
<td>ALL</td>
<td>700184880</td>
</tr>
<tr>
<td>IP400 Digital Station 30 45/80W USA/CALA/CH</td>
<td>NZ</td>
<td>700260003</td>
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### IP400 Analog 16 Trunks

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<tr>
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<tr>
<td>IP400 Analog Trunk 16</td>
<td>NA/CALA</td>
<td>700211360</td>
</tr>
<tr>
<td>IP400 Analog Trunk 16 EU</td>
<td>EU</td>
<td>700241680</td>
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<tr>
<td>IP400 Analog Trunk 16 NZ</td>
<td>NZ</td>
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### IP400 So8

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</thead>
<tbody>
<tr>
<td>IP400 So8</td>
<td>ALL</td>
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### IP400 WAN3

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<tr>
<th>Variant</th>
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<tbody>
<tr>
<td>IP400 WAN3</td>
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<td>700185028</td>
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<tr>
<td>IP400 WAN3 10/100</td>
<td>ALL</td>
<td>700262009</td>
</tr>
</tbody>
</table>

- **Note:** For countries outside the Americas/CALA, use ROW variant unless stated otherwise.
Preparing for Installation

This section reviews the requirements for installing an IP Office system. You must meet these requirements for the system to operate safely and in the intended manner.

This section covers:

- Tools & Parts Required.
- Space requirements
- Environmental requirements
- Power Supply requirements

Tools & Parts Required

- **General**
  - Pozidrive No. 1 screwdriver for removal of unit covers.
  - Cutter/knife for cable ties.
  - Cable ties - 3mm x 50mm.
  - Pozidrive No. 4 screwdriver for Analog Trunk 16 expansion module grounding post.
  - **Note:**
    - In addition, ensure that you have sufficient cables that are **not supplied** with the modules, e.g. power supply cables.

- **Programming**
  - These are the tools required for programming of a newly installed IP Office system.
  - PC running Windows 2000/XP or NT with the following specification:
    - Intel Pentium II 333Mhz or faster, 100MB HD space, CD-ROM drive, COM port, terminal emulation (e.g. HyperTerminal) and a super VGA Monitor (set to 1024x768).
    - PC with a LAN card with either a fixed IP address (allocated by your system administrator) or be using DHCP to obtain an IP address.
  - IP Cat.5E patch cable (red - supplied with control unit).
  - IP Office Administration CD.
  - IP Office Manager Application Manual.
  - IP Office Feature Key (where software that requires a Licence Key is to be installed).
Space requirements
The following are applicable for all IP403, IP406 V2, IP412 and Expansion Modules. Check that the planned location meets the following requirements.

- **Height**: 71mm (2.8 inches) high.
  Hence the total height of a system is the number of modules multiplied by 71mm (2.8 inches).
- **Width**: 445mm (17.5 inches) wide.
- **Depth**: 245mm (9.7 inches) deep.

- Modules and units can be mounted in 19" racks (see Rack Mounting Assembly Instructions).
- When modules are free standing (ideally mounted one upon another), allow a minimum clearance of 50mm (20 inches) either side for cable trunking.
- Check there is suitable lighting for installation, system programming and future maintenance.
- Check that there is sufficient working space for installation and future maintenance.
- 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.
Environmental requirements
The planned location must meet the following requirements:

- Check that the area is a well ventilated area, having a temperature range of 0°C to +40°C and a humidity range of 10% to 95% non-condensing.
- Check there are no flammable materials in the area.
- Check there is no possibility of flooding.
- Check that no other machinery or equipment needs to be moved first.
- Check that it is not an excessively dusty atmosphere.
- Check that the area is unlikely to suffer rapid changes in temperature and humidity.
- Check for the proximity of strong magnetic fields, sources of radio frequency and other electrical interference.
- Check there are no corrosive chemicals or gasses.
- Check there is no excessive vibration or potential of excessive vibration, especially of the cabinet mounting surface.
- Check that, for the USA only, where telephones are installed in another building, that the appropriate IROB protectors are fitted (see Out of Building Telephone Installation).

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. Do not dispose of batteries in a fire. They may explode. Check with local codes for possible special disposal instructions.

SAVE THESE INSTRUCTIONS.
Power Supply requirements
IP Office Base Units and Expansion Modules should only be connected to a clean power supply or a UPS.

Check the following:

- **IP Office Base Unit and Expansion Modules**
  IP Office modules require a separate **switched** mains supply. Power on the Expansion Modules **first**. If the main IP Office Module does not detect an item at power on, it will never use it. If power is switched on from a central point for all modules, then, as the main unit is the slowest to start, this will be taken care of automatically.
  
  - Standard Lump-in-Line Power Supply units are supplied with each IP Office/Expansion Module. However, for IP400 Digital Station 30 Expansion Modules, that use more than ten 4424 terminals, the 80W Lump-in-Line Power Supply **must** be used. This must be ordered separately (see Power Supplies).
  
  - Power leads are country specific and **must** be ordered separately (see Power Supplies).
    
    - **CAUTION:**
      The Lump-in-Line PSU's supplied with each IP Office module must only be connected to a 50/60Hz, 100-240V power source.

- **UPS Equipment**
  The use of UPS's to support the IP Office system during mains power failure is highly recommended. Such equipment also provides mains conditioning. Contact Avaya for details of preferred and tested suppliers and models.
Grounding

Provision is made for both protective ground (earthing) and functional ground (earthing). In addition, where the installation of telephone and/or other standard (tip/ring) devices in another building is required, In-Range-Out-Of-Building (IROB) protectors must be fitted (see Out of Building Telephone Installations).

Protective Ground

A protective ground must be permanently fitted to IP400 Analog Trunk 16 modules (see IP400 Analog Trunk 16). Connection of this protective ground requires the use of suitable tools and must be connected at both ends before connection is made to the telecommunications network.

To connect the protective ground:

1. Attached one end of a #14 AWG (minimum) solid insulated cable (sleeve must be green/yellow) to the Protective Ground Point as shown below. Ensure that the Ground Post securing screw is fully tightened.

2. Connect, using a fastening that satisfies local regulations, the other end of the wire to the approved protective ground.

Functional Ground

To ensure proper operation of the IP Office equipment, functional grounding is required:

- Caution
  This functional ground is not a protective ground – see Protective Ground.

On some models of the units/expansion modules, there may not be a specific M4 functional ground point. In which case use either the Trunk module kit fixing screw or the top cover center fixing screw as shown below:

To connect the functional ground:

1. Attached one end of a #14 AWG (minimum) solid insulated cable (sleeve must not be green/yellow) to the grounding screw and fully tightened.

2. Connect, using a fastening that satisfies local regulations, the other end of the wire to the approved ground, such as building steel or an earthed metal cold water pipe.
Out of Building Telephone Installations

Installation of telephone and/or other standard (tip/ring) devices that are external to the building housing the Avaya IP Office or in another building require In-Range-Out-Of-Building (IROB) protectors to protect the control unit and device from electrical surges. These must be fitted as follows:

- **System telephone**: Two IROB protectors
- **Standard telephone**: Two IROB protectors plus one carbon block protector.

The following diagram provides an overview of the protection requirements for installation of telephones that are external to the building housing the Avaya IP Office. Details of these requirements are given in the following paragraphs:

A Primary Protection Box **must be** provided at the point where the cable enters 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.

- **CAUTION** - All cabling between buildings **must not be** exposed. E.g. cabling between buildings **must be** carried in suitably earthed ducting; ideally underground.

There are two versions of IROBs and one version of the Barrier Box are available as follows:

- **146C** - Trunks - SAP code 407228923
- **146E** - TDL - SAP code 407568161
- **IP400 Phone Barrier Box** - SAP code 700293897

Installation of a Contact Closure Adjunct controlled device outside the building requires a 146G Surge Protector – SCL/8 to protect the control unit from electrical surges.
IROB Installation
Install the 146C and 146E IROBs as per the instructions supplied with the IROBs. Typically this would be:

**Protective Earth Point.**
Use a Green/Yellow earth lead (18AWG minimum) and connect to building's approved ground point

Inter-Building Cabling via building’s Primary Protection Box

Digital Station/Terminal Ports

Barrier Box Installation
Avaya IP400 Phone Barrier Boxes must only be used in conjunction with UL Listed Avaya IP400 Phone 8/16/30 modules.

Where more than three Avaya IP400 Phone Barrier boxes are to be used, they **must be** rack mounted (see Rack Mounting Barrier Boxes). For non-rack mounting of the Avaya IP400 Phone Barrier Box, proceed as follows:

**Notes**
1. The following wires **must be** kept apart, e.g. not routed in the same bundle:
   - Earth lead from the barrier box to the IP400 Phone 8/16/30.
   - Internal wires, e.g. wires going directly to the IP400 Phone 8/16/30.
   - Wires from external telephone going directly to the barrier boxes.
2. The Avaya IP400 Phone Barrier Box will not connect the ringing capacitor in the UK, hence a Master socket is required.

**CAUTIONS**
1. The analog ports on the front of the IP403 must not be used for lines that are going to be terminated at points that are external to the building. If these are required, use lines from the Phone 8/16/39 Expansion Module.
2. It is recommended not to use the DS ports on the front of the IP403 for extension lines that are going to be terminated at points that are external to the building. If these are required, use lines from the DS 16/30 Expansion Module.
3. The Avaya IP400 Phone Barrier Box must not be connected to the analog trunk lines.
Rack Mounting Barrier Boxes

Where more than three Avaya IP400 Phone Barrier Boxes are to be used they must be rack mounted. Rack mounting kits are available (SAP Code 700293905) for mounting eight Avaya IP400 Phone Barrier Boxes. A maximum of 16 Avaya IP400 Phone Barrier Boxes (using two Rack kits) can be connected to one IP400 Phone 30 module. To rack mount up to eight Avaya IP400 Phone Barrier Boxes into a rack, perform the following:

1. Mount the Barrier boxes in the rack as shown below:

2. For each Barrier Box, discard the solid green earth wire and connect the green/yellow earth wire to the Protective Earth Point on the back of the Barrier Box.

3. Connect the earth leads as follows:

   - Secure, using the M4 screws, washers and nuts, a Green/Yellow earth lead (#14AWG minimum) from here to a suitable Earth Protection point. This must always be the top connection.

   - Secure, using the M4 screws, washers and nuts, the supplied Green/Yellow earth leads from the back of each Barrier Box (up to 4 per side).

Notes

1. The following wires must be kept apart, e.g. not routed in the same bundle:
   - Earth lead from the barrier box to the IP400 Phone 8/16/32.
   - Internal wires, e.g. wires going directly to the IP400 Phone 8/16/32.
   - Wires from external telephone going directly to the barrier box(es).

2. The Avaya IP400 Phone Barrier Box will not connect the ringing capacitor in the UK, hence a Master socket is required.

CAUTION:

- The analog ports on the front of the IP403 must not be used for lines external to the building.
Installing a New System

Unpacking

Before proceeding with installation, ensure that you have read the notes covered in Preparing for Installation.

Unpacking and checking:

1. Before unpacking check for any signs of damage that has occurred during transit. If any damage exists bring it to the attention of the carrier.

2. Check all cartons against the packing slip and ensure that you have the correct item as per the country variants (see Overview of Country Variants). Report any errors or omissions to the equipment supplier.

3. While unpacking the equipment, retain all the packaging material. Fault returns are accepted only if repackaged in the original packaging.

4. 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.

5. Ensure you read and understand any documentation included with any item.

- **Note:**
  The IP Office User/Admin CD Set is no longer supplied in the base unit box and must be ordered separately.
Initial Assembly

Prior to initial assembly and mounting (rack or free standing) of your system, you must perform the following:

- For Analog Trunk 16 expansion modules, ensure that the protective ground is fitted (see IP400 Analog Trunk 16 and Protective Ground).
- Ensure that the required Trunk Interface Modules have been installed. See:
  - IP403 Office - Rear View, P406 Office V2 - Rear View and IP412 Office - Rear View for which trunk types can be fitted to which platforms
  - Trunk Module Kits for the correct country variant type.
- Grounding if functional grounding is required
  - Trunk Interface Modules (BRI/PRI/ANALOG4) for installation instructions.
- Any optional Integral Voice Compression and/or Dual Modem Modules have been fitted (see Installation of Voice Compression Modules (VCM) and Dual Modem Module).
- Where rack mounting is required, that the mounting brackets have been fitted (see Rack Mounting Assembly Instructions).
- Where structured cabling is to be used it has been installed, conforms to all local regulations and is clearly labeled.

Perform the following:

1. Mount the IP Office modules in their final location (free standing units are ideally stacked one upon another).
2. Run the individual Lump-in-Line PSU cables back to the switchable mains supply but do not switch-on or connect the PSUs to the IP Office modules.
3. With the exception of a WAN3 module, connect the IP Office Control Unit to the Expansion Modules using blue Expansion Interconnect Cables (see Expansion Interconnect Cable). These cables run from one of the Expansion Ports on the rear of a base module to the Expansion Port on the rear of the Expansion Modules. For WAN3 Modules, use a LAN Interconnect Cable running between the LAN Port on the front of the WAN3 module to one of the LAN Ports on the front of either an IP403 or IP406 unit or, via a hub, to LAN1 Port on the front of the IP412 unit.
4. Connect the Trunk Ports on the control unit, using PRI/BRI CAT5E cables, to your provider’s trunk sockets (see PRI/BRI ISDN Cable).
5. Connect the DS/POT Ports on the front of the units, to the structured cable sockets (see Line Cord for Structured Cabling).
6. Install all telephones in their appropriate locations (see Wall Mounting IP Office Phones).
7. Connect your PC LAN Port to one of the LAN Ports on the front of an IP Office base module using a LAN Cable.
8. Connect the individual Lump-in-Line PSU to each IP Office module and switch on.
   - IMPORTANT
     Power on the Expansion Modules first. If the main IP Office Module does not detect an item at power on, it will not use it. If power is switched on from a central point for all modules, then, as the main unit is the slowest to start, this will be taken care of automatically.
9. Refer to System Programming - Introduction and, from the IP Office Administrator CD, proceed with Installing the IP Office Software Suite.
Installation of Trunk Interface Modules

1. **CAUTION** - While installing, ensure that you wear a ground wrist strap that is connected to a suitable grounding point.

2. Remove the three fixing screws on the rear of cover.

3. Turn the unit over and remove the four fixing screws from the base.

4. Slide the cover from the unit.

5. Remove the two blanking plate securing screws and remove blanking plate.

6. Insert the trunk module and secure with the two screws.

7. Mount the trunk module in position as shown below and secure with the two snap-in spacers (except for PRI E1/R2).

8. For CALA only: On the PRI E1/R2 coaxial module, use the shorting blocks (A) to connect Rx1 to GND, Tx1 to GND and/or Rx2 to GND, Tx2 to GND as required. Connect the earthing strap spade end (B) to the spade connection on the board and the other end (C) to the chassis with the long securing screw (both of which are supplied with the kit).

9. Where required, fit the functional ground (see Functional Ground).

10. Replace cover and secure with the seven fixing screws.
**Installation of Voice Compression Modules (VCM)**

The IP403 and IP406 V2 can support one VCM5, 10 or 20 but not the VCM30. The IP412 can support two VCMs of any type. VCMs are fitted to as follows:

1. **CAUTION** - While installing, ensure that you wear a ground wrist strap that is connected to a suitable grounding point.
2. Remove the three fixing screws on the rear of cover.
3. Turn the unit over and remove the four fixing screws from the base.
4. Slide the cover from the unit.
5. Mount the VCM in position as shown below and secure with the two snap-in spacers. The IP412 can support a second VCM; the first module can be mounted in either position.
6. Replace cover and secure with the seven fixing screws.
Installation of Modem Modules

Either an optional Dual Modem Module or an Internal Modem Module is fitted to an IP Office base unit as follows:

1. **CAUTION** - While installing, ensure that you wear a ground wrist strap that is connected to a suitable grounding point.
2. Remove the three fixing screws on the rear of cover.
3. Turn the unit over and remove the four fixing screws from the base.
4. Slide the cover from the unit.
5. Mount the module in position as shown below and secure with the two snap-in spacers.
6. Replace the cover and secure with the seven fixing screws.
Rack Mounting Assembly Instructions

IP403, IP406 V2, IP412 and Expansion Modules can be mounted in any standard 19" rack as follows:

CAUTIONS

- **Elevated Operating Ambient Temperature**
  If installed in a closed or multi-unit rack assemble, the operating ambient temperature of the rack environment may be greater that the room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (Tmra).

- **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.

- **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 circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

- **Reliable Grounding**
  Reliable grounding 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).
Basic System Programming

System Programming - Introduction

This sections covers only the most basic aspects of system programming required to install an IP Office system. When first powered up, all IP Office systems will operate as a simple PBX. However, full system programming is highly dependent on customer requirements. Hence, some basic Initial Programming must be performed before detailed configuration programming is possible. The Administration CD (supplied with each system) contains the suite of programs required to install and maintain the IP Office system. Once loaded, inter-active Help files provide all the instructions and details required to operate and administer the program suite.

Notes:

1. When applying power to the IP Office system, the Expansion Modules must be switched on first. If the main IP Office Module does not detect an item at power on it will never use it. If power is switched on from a central point for all modules, then, as the main unit is the slowest to start, this will be taken care of automatically.

2. When powered up correctly, all modules will display a steady green light in the center of each module. When connection is established with ports, the port socket on the appropriate module will show a green LED, e.g. the hub port connected to your PC for programming. IP Office systems are ready for use within 1 minute of power on.
Programming Tools
The IP Office supports programming through any one of it’s 10/100 Base-T hub port connections. The tools required for programming of a newly installed IP Office system are:

- PC running Windows NT, 2000, XP or ME (see Tools & Parts Required).
- PC with a LAN (NIC) card with either a fixed IP address (allocated by your system administrator) or by using DHCP to obtain an IP address.
- IP Office Cat. 5E patch cable (red – supplied with system see PRI/BRI ISDN Cable).
- IP Office Administration CD (supplied with system).
- IP Office Manager Application Manual (supplied on CD with system).
- IP Office Feature Key (where software that requires a Licence Key is to be installed).

**Note:**
Once installed, the software level of all software fitted to the IP Office system can be identified. With Manager running, use File/Advanced/Upgrade to display menu. Refer to the Manager Application Manual for details of system configuration, software upgrade, etc.

PC to IP Office LAN Port Connection
An IP Office system, when first powered up, will scan the LAN for a DHCP server that will allocate it with an IP address. If the IP Office system does not find a DHCP server then it will automatically become a DHCP server itself with an IP address of 192.168.42.1. The IP Office system will allocate an IP address to the PC if required. Initially, the IP Office system assumes that all addresses are on the local LAN and that the PC software supplied uses broadcast to establish communication with the IP Office system.

The IP Office hub port can be connected in two ways; either directly to a PC or as part of a LAN. Both methods use an IP Office Cat. 5E patch cable (see PRI/BRI ISDN Cable) connected between one of the LAN hub ports on the front of the IP Office base unit and the PC.

- **Direct Connection**
  This method is used for local system programming directly from a PC.

- **LAN Network Connection**
  This is the option to use for remote programming access. It will require liaison with the LAN network manager to obtain the IP address details and to ensure that the IP traffic routing is allowed. When connected to an IP LAN network, you must consult with the Network Manager to obtain the required IP settings. For IP operation the IP Office requires a static IP address including a subnet mask and default gateway value.
Initial Programming

Installing the IP Office Admin Suite

All the software that is to used to configure and manage the IP Office system can be installed on your PC from the supplied Administrator CD. With the initial assembly completed (see Initial System Assembly) and your PC connected to the IP Office system, insert and run the Administrator (CD 1 of 3) to install Software Level 3.0+ on your PC.

- **Note:** The IP Office User/Admin CD Set is no longer supplied in the base unit box and must be ordered separately (see IP400 Office Systems).

1. Insert the IP Office Administration CD (1 of 3) into your PC. The CD autoruns. You are initially presented with the option to select which language you wish to use. Select the language from the pull down list and click **OK**.

2. If not already installed on your PC, you are then given the option to install the Microsoft Net 1.1 Framework* application. This should be installed if you wish to use the IP Office Installation Wizard application. If you are going to install this application, then click **OK**, agree to the License and on completion click **OK**. The Welcome screen is then displayed. Click **Next** to continue.

   - **Caution:** If the Net 1.0 Framework application is already installed, then remove and install the Net 1.1 Framework application.

3. At the Welcome screen, click **Next** to display the Destination folder location option. Either accept the default location (click on **Next**) of where the Administration Suite is to be installed or, if you have a specific reason for doing so, change the location by clicking on **Browse** and entering a new location.

4. Select which components you wish to install by selecting the appropriate boxes (Manager and Voice Mail are default minimums) and click **Next**.

5. Name the program folder or accept the default (**IP Office**), click **Next** and wait for the Administration Suite installation to be completed.

6. Installation runs and on completion select **Restart now** and click **Finish** twice.

7. The IP Office Administration suite of applications is now installed on your PC and you are now ready to configure your Avaya IP Office.

8. You have two choices:
   - Using the IP Office Installation Wizard
   - Using the IP Office Manager Application
Using the IP Office Installation Wizard:
This application is recommended for first time installers. From the Program file on your PC, select IP Office and Wizard. The application is intuitive and will guide you through the configuration process. Follow the instructions on each menu and use the Help files for detailed instructions.

Using the IP Office Manager Application:
This application is recommended for experienced installers. From the Program file on your PC, select IP Office and Manager.

1. You will be requested to enter both the Operator Name and Password. This password gains access to the Configuration Tree facilities allocated to the named operator. At default, five options are available. For full access, select Administrator.

2. The Configuration Tree blank screen is displayed. To display the facilities available for this named operator’s Configuration Tree, from File select Open and, when requested, enter the password for the IP Office unit. The default for the IP Office unit is password.

3. You must change the Operator Name, it’s Passwords and the Password for the IP Office unit as soon as possible. A combination of at least 8 alpha and numeric characters is recommended for passwords, avoiding the use of common words.

4. From the Configuration Tree, select File and Change Password. The operator Name is displayed, together with both the Password and Confirm Password as a series of xxxxx’s. Enter the new Password and Confirm Password. Click OK and Save As.

5. From the Configuration Tree for the Administrator, double click on the System icon to display the System Configuration menu for the IP Office unit. The following items must be set/changed:
   - Name
     A name to identify this system. Used to identify the configuration by its location or customer's company name.
   - Locale
     This option sets country variations, e.g. US = enu, UK = eng, Netherlands = nld, Germany = deu. Locale defines the country dependent default ring sequences, display types/language, etc. This option is automatically set dependent on the Regional Settings of the PC on which the Manager is running. For instance, if this setting defaults to eng rather than enu this is because the Regional Settings of the PC are set to English (United Kingdom) therefore change the Regional Settings to English (United States).
   - Password
     This is the password (default password) for controlling access to the IP Office unit and is required to upgrade, reboot and send or receive configurations from the unit. Change this password as soon as possible.

6. Basic programming is completed and you can now configure the system to the customer’s requirements. Full details on configuration and administration are contained in the inter-active Help files and/or the Manager Application Manual. Press F1 to access the Help files.
   - Note: To activate Voicemail Lite, from the Program file, select IP Office and Voicemail and click on Run.
Software Upgrades

Software Upgrades

The software level of the IP Office and the core software within the IP Office must always be the same. Install a new version of the IP Office manager includes core software files appropriate for upgrading the hardware.

- **Caution: Upgrading IP Office 403 Systems**
  
  Please note the following exceptional upgrade scenarios applicable to IP403 control unit.
  
  - **Upgrading to levels between 2.0 and 2.1(27) inclusive.**
    
    In this scenario, the IP403 must first be upgraded to level 1.99. Once upgrade to 1.99, the unit can be further upgraded to levels from 2.0. Refer to Two-Stage IP403 Upgrades.
  
  - **Upgrading to 2.1(28) or higher.**
    
    In this scenario, the IP403 must first be upgraded to level 2.99. Once upgraded to 2.99, the unit can be further upgraded to level from 2.1(28) or higher. Refer to Two-Stage IP403 Upgrades.

As the IP Office Manager upgrade procedure requires the existing Manager application to be removed, it is strongly advised that any software upgrade actions are performed during a system quiet time.

Validated Upgrades

IP Office 2.1 software supports validated upgrades. This allows remote upgrades to be attempted. However validated upgrades are only supported for units with core software level 2.1 or higher already installed.

For hardware with Level 2.0 or earlier software installed, validated upgrades are not supported. Therefore, when upgrading a system to Level 2.1, the upgrade must be done from a PC running IP Office Manager that:

- Has a fixed IP address.
- Is connected on the same LAN segment as the IP Office control units.

Removing Existing IP Office Suite

1. Right click on **Start** and select **Explore | Program Files | Avaya | IP Office Manager**. Save all xxx.cfg files (where xxx is the name of the configuration) to a separate safe location. Make a note of the location of where the IP Office suite is located and the name of the Program folder (these will be needed latter for Upgrading the IP Office Software).

2. From **Start** select **Settings | Control Panel | Add/Remove Programs**. Highlight **IP Office Admin Suite** and click **Change/Remove**. The install Wizard will run.

3. Select **Modify** and click **Next**. Make a note of the ticked components used in the current installation (these will be used latter). Click **Back**.

4. Select **Remove** and click **Next**. Confirm that you wish to remove all components.

5. If Read Only files are detected, click OK. If Locked Files are detected, click Ignore. **Note:** Your configuration and license files will be untouched and available for the upgraded software.

6. You are provided with the option to reboot your PC. Select **Reboot** and click **Finish**. The Wizard will run (removing the existing IP Office Suite). On completion click **Finish**.
7. When your PC has rebooted, proceed from either Upgrading The IP Office Software or IP403 Upgrade to Level 2.1 as required

**Upgrading the IP Office Software**

Before upgrading the IP Office software, ensure that you have removed the existing IP Office suite. See Removing Existing IP Office Suite. Installing IP Office software also include the appropriate .bin software files for the hardware units within the IP Office system.

**WARNINGS:**

- **Do not** use the following procedure for upgrading an IP403 with Level 1.4 or earlier software. This upgrade is upgrade procedure is a multistage operation and is detailed in Two-Stage IP403 Upgrades.
- 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 and on the same LAN segment as the IP Office. It **must not** be attempted via RAS or routed network links (see Validated Upgrades).

1. Insert the Administration CD containing the software Level upgrade to be installed. The CD Autoruns. You are initially presented with the option to select which language you wish to use. Select the language from the pull down list and click **OK**.
2. If not already installed on your PC, you are then given the option to install the Microsoft Net 1.1 Framework* application. This should be installed if you wish to use the IP Office Installation Wizard application. If you are going to install this application, then click **OK**, agree to the License and on completion click **OK**. The Welcome screen is then displayed. Click **Next** to continue.
   - **Caution:** If the Net 1.0 Framework application is already installed, then remove and install the Net 1.1 Framework application.
3. At the Welcome screen, click **Next** to display the Destination folder location option. Either accept the default location (click on **Next**) of where the Administration Suite is to be installed or, if you have a specific reason for doing so, change the location by clicking on **Browse** and entering a new location.
4. Select all the appropriate components (recorded at step 1 in Removing the existing IP Office Admin Suite) and click **Next**.
5. Select the Program folder (recorded at step 1 in Removing Existing IP Office Suite) and click **Next**.
6. Installation runs and on completion select **Restart** now and click **Finish** twice.
7. When your PC has rebooted, select from **Program | IP Office | Manager**.
8. You will be requested to enter both the Operator Name and Password. This will be the default name and password, e.g. **Administrator** and **Administrator**. You must change the Operator Name, it's Password and the Password for the IP Office unit as soon as possible.
9. With **Manager** opened, use the **Open** icon to access and open the required configuration from the IP Office system (this creates a BOOTP entry in the Manager for the system and ensure that you have a copy of the configuration and the correct system password). With the required configuration opened, from **File** select **Advanced | Upgrade**.
10. The IP Office UpgradeWiz is started and will scan for IP Office units. For the units found it will show the unit type, its currently installed software **Version** and what version of software is **Available** from the IP Office Manager installed on your PC. Units for which a later version of software is available will be already ticked.
11. If any of the units have pre-version 2.1 software shown, untick Validate. The validated upgrade option is only supported for units which have 2.1 or higher software installed.
12. The current **Version** and the **Available** version are displayed. Tick the required box under **Name** and click on **Upgrade**.
13. Enter the password of the existing configuration (not the default). Click **OK** and the IP Office will reboot. Click **OK** to finish and close the **Upgrade** menu.

The upgrade software will now be running with the existing previous configuration and licenses intact. If the configuration file is not correct, then re-install the original .cfg file(s) saved during step 1 in Removing Existing IP Office Suite) and re-install in **Explore | Program Files | Avaya | IP Office Manager**.
Two-Stage IP403 Upgrades

Due to the need to adjust internal memory allocation, at certain critical points IP403 Control Units have to perform a two stage upgrade process.

Upgrading to levels between 2.0 and 2.1(27) inclusive.
In this scenario, the IP403 must first be upgraded to level 1.99. Once upgrade to 1.99, the unit can be further upgraded to levels from 2.0. This is a one-time process that does not need to be repeated.

Upgrading to 2.1(28) or higher.
In this scenario, the IP403 must first be upgraded to level 2.99. Once upgraded to 2.99, the unit can be further upgraded to level from 2.1(28) or higher. This is a one-time process that does not need to be repeated.

IP403 Two-Stage Upgrade Process

1. Run the existing Manager that matches the system's current software level and receive a copy of the configuration from the system.
2. Remove the existing IP Office suite, see Removing Existing IP Office Suite.
3. Insert the Administration CD containing the new software Level upgrade to be installed and install the new software suite. Perform Installing the IP Office Software Suite.
5. The upgrade wizard will list the units found, their current software level and software levels for those units Manager has available.
6. Right-click on the upgrade wizard and click Select Directory.
   - If upgrading to between 2.0 and 2.1(27) inclusive, select the IP403V1_99 folder within the Manager program directory.
   - If upgrading to level 2.1(28) or higher, select IP403V2_99 the folder within the Manager program directory.
7. The upgrade wizard should now list just the IP403 control unit as having upgrade software available.
8. If upgrading from pre- 2.1 software, untick Validate and see the note below.
   - The validated upgrade option is only supported for units which already have 2.1 or higher software installed. If doing an unvalidated upgrade, you must be using a PC with a fixed IP address and on the same LAN segment as the IP Office control unit.
9. Tick the checkbox next to the IP403 unit name and then click Upgrade.
10. Enter the system password when requested.
11. Following the upgrade, stop and restart the upgrade wizard. The upgrade wizard will again show the software levels available in the Manager program folder and allow all the units in the system to be upgraded.
Telephone Installation

Checking Telephones
It is preferable to leave connection of telephones until after installation of other IP Office equipment and full system programming has been completed (including the set-up of directory numbers and names). Note that by IP Office telephones we mean devices manufactured and supplied as part of the IP Office product range and not third party telephone devices.

While installing and checking each telephone, it may also be required to do some basic telephone programming such as setting-up call forwarding, call pickup, group numbers, etc.

The detailed instructions for setting-up these feature are contained in the Manager Application Manual and within the Configuration Tree Help files. With the configuration tree for Administrator open, press F1 to access the Help files.

The following instructions are the minimum required for testing and wall mounting of IP Office telephones. Detailed instructions for testing, wall mounting and using IP Office telephones are contained in the appropriate Installation and User Guides contained on the CD supplied with each system.

Key & Lamp Operation Operation
All the DS port telephones are, at default, set to operate in Key and Lamp mode, e.g. they have at least two Call Appearance keys. If the telephones are required to operate in PBX mode, e.g. no Call Appearance keys, then these must be deleted by the Installer. From Manager | User | Digital Telephony remove all instances of Appearance from the Action column.

The detailed instructions for setting-up these feature are contained in the Manager Application Manual and within the Configuration Tree Help files. With the configuration tree for Administrator open, press F1 to access the Help files.

Connecting & Testing Avaya Telephones
Use the following process to connect and check IP Office telephones.

To check a IP Office telephone:

1. Unpack the telephone and check that all parts are present including labels and user guides.
2. Insert the handset cord into the base. Route the cord thorough the cable channels to come out at the side of the telephone.
3. Insert the line cord into the wall socket.
4. Insert the line cord into the telephone’s base and route the cord thorough the cable channels to come out at the side/rear of the telephone.
5. Lift the handset, check that you hear dial tone and make a test call to another extension.
6. On a display telephone, ensure that the display shows the number called and that the display is in the correct language.

Note:
On 44/4600 series telephones, the line cord is fitted with an RJ11 plug. In which case, when connecting directly to an IP Office module, an RJ11/RJ45 adapter should be used. Similarly, the structured wiring should terminate in RJ11 sockets.
Connecting & Checking Two-Wire Telephones
All two-wire devices (POTS) should be tested according to the manufacturer's instructions before connection to the IP Office system. Connect the two-wire device and make a test call.

Power Fail Telephones and Sockets
All power fail sockets (on IP400 Analog Trunk 16 modules only – see IP400 Analog Trunk 16) must be tested.

To test a power fail socket:
1. Locate the socket and check that it is clearly labeled as a power fail socket.
2. Connect a telephone to the socket.
3. With power to the IP Office system switched on, make a test call.
4. Switch the power to the IP Office system off and again make a test call.
5. Switch the power to the IP Office system back on again.
6. Repeat the test for any other power fail sockets.

Note
Where E911 statutory requirements for discrete location identification of a power fail phone are required on the transmitted CLI, ensure that the relevant installation programming is completed.

Wall Mounting IP Office Telephones
IP Office telephones can be wall mounted. For specific instructions on each telephone type, refer to the instructions leaflet contained, with the telephone, in the delivery box. For safety instructions and details, refer to the specific instructions for each telephone type.
System Handover

Checklist

**Equipment**:  
- Have all extensions been tested?  
- Have all exchange lines been tested?  
- Have all private wires been tested?  
- Is system programming in line with the customer specification? E.g. all specified applications, CTI settings, etc.  
- Has the customer been made aware of the drop back (power fail) locations? Are these been clearly marked and have they been tested?  
- Has the mains supply (and any UPS if fitted) been tested?  
- Where VoIP is to be deployed have the appropriate network design criteria and QoS mechanisms been applied as per the Avaya planning guidelines.

**Wiring**:  
- Have the trunk modules and Analog Trunk 16, where equipped, been fitted with the appropriate functional/protective grounds (see Grounding).  
- Is the distribution wiring (structured cabling) satisfactory to the required national standards?  
- Are all wires and cables clearly labeled.  
- Is the site clean and tidy with all rubbish removed?

**Information**:  
- Have the telephone user guides been issued to the user.  
- Has the customer been made aware of the telephone number for maintenance/fault reports.

**Feature Key**:  
- Where a Feature Key has been used (for software requiring a license), record it's physical location (location of the PC is it plugged into) and leave a record of such on site with the system.
Safety and Homologation Statements

Safety and Homologation Statements

- **CE Mark**
  The “CE” mark affixed to this equipment means that the unit complies with the 1999/5/EC (R&TTE), 89/336/EEC (EMC) and 72/23EEC (LVD) Directives.

- **Declaration of Conformity**
  The Declaration of Conformity (DoC) for the IP400 Office products is contained within the CD accompanying the products.

- **This warning symbol is found on the base of IP403, IP406 V2, IP412 units and on the base of the IP400 Digital Station 80W Lump-in-Line PSU. Refer to Trunk Interface Modules for information concerning which Trunk Interface module variants are fitted in which country.**

**WARNING**

The Avaya IP400 Office units 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.

**Lithium Batteries**

A lithium battery is fitted to the real time clock on the IP403, IP406V2 and IP412 mother boards.

**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.

**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).

**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.
## Trunk Interface Modules

### USA/Canada

To ensure the validation of the approvals in US and Canada, only the following interface cards must be installed in the following IP400 Office products:

<table>
<thead>
<tr>
<th>Product</th>
<th>Quad BRI</th>
<th>PRI-E1</th>
<th>PRI-T1</th>
<th>Analog Trunk 4 (LS)</th>
<th>Dual PRI-E1</th>
<th>Dual PRI-T1</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP403 Office DS</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>IP406 V2 Office</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>IP412 Office*</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

See Trunk Module Kits for country specific variant SAP codes.

### Rest of World (ROW)

To ensure the validation of the approvals in ROW (i.e. EU, Hungary, Australia and New Zealand), only the following interface cards must be installed as detailed in the following IP400 Office products:

<table>
<thead>
<tr>
<th>Product</th>
<th>Quad BRI</th>
<th>PRI-E1</th>
<th>PRI-T1</th>
<th>Analog Trunk 4 (LS)</th>
<th>Dual PRI-E1</th>
<th>Dual PRI-T1</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP403 Office DS</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>IP406 V2 Office</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>IP412 Office</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

* CALA /Korea only.
Further Information and Product Updates
Further information, including Product and Reference Manual updates, can be obtained from Avaya's 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-free 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
Electromagnetic Interference Information

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."


- WARNING
  IP403, IP406 V2, IP412 and all Expansion Modules are Class A products. In a domestic environment, IP403, IP406 V2, IP412 and all Expansion Modules may cause radio interference in which case the user may be requested to take adequate measures.
Regulatory Instructions for Use

IP Office Operation in Australia

Connection
Connection of IP400 Office products must be via a Line Isolation Unit 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.
Industry Canada Notification (DoC)
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."

IP Office Operation in EU
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.

IP Office Operation in 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.
FCC Notification
This equipment is registered with the ACTA (Administrative Council for Terminal Attachments) in accordance with FCC Part 68 of its rules. In compliance with those rules, you are advised of the following:

- **Means of Connection**
  Connection of this equipment to the telephone network shall be through a standard network interface jack. Connection to 1.544-MBps digital facilities must be through a USOC RJ48C. Connection to the Analog Trunk facilities must be through a USOC RJ45S.

- **Notification to the Telephone Companies**
  Before connecting this equipment, you or your equipment supplier must notify your local telephone company's business office of the telephone number or numbers you will be using with this equipment.

- **The facility interface codes (FIC)** for 1.544-MBps digital connection (i.e. IP400 Office PRI-T1) are 04DU9.BN, 04DU9.DN, 04DU9.IKN, 04DU9.ISN.

- **The facility interface code (FIC)** for analog trunk connection (i.e IP400 Office Quad Analog Trunk-LS) are OL13A, OL13B, OL13C, 02AC2, 02LA2, 02LB2, 02LC2, 02LR2, 02LS2.

- **The facility interface code (FIC)** for analog trunk connection (i.e. IP400 Office ATM16-LS/GS) are OL13A, OL13B, OL13C, 02AC2, 02GS2, 02LA2, 02LB2, 02LC2, 02LR2, 02LF2.

- **The Service Order Code (SOC)** for 1.544-MBps digital connection (i.e. IP400 Office PRI-T1) is 6.0Y.

- **The Service Order Code (SOC)** for analog trunk connection (i.e. IP400 Office Quad Analog Trunk-LS) is 9.0Y.

- **Disconnection**
  You must also notify your local telephone company if and when this equipment is permanently disconnected from the line or lines.

- **Hearing Aid Compatibility**
  The custom telephone sets for this system are compatible with inductively coupled hearing aids as prescribed by the FCC.

Ringer Equivalence Number (REN). The REN is used to determine the number of devices that may be connected to the telephone line. Excessive RENs on the line may result in the devices not ringing in response to an incoming call. In most, but not all, areas, the sum of the RENs should not exceed five. To be certain of the number of devices that may be connected to the line, as determined by the total RENs, contact the local telephone company to determine the maximum REN for the calling area.
Technical Data

Port Pinouts

This section provides the technical specifications for the IP Office ports with the exception of the USB port and cable. All diagrams are viewed from the front. The USB port and cable (up to 5 meters) are standard. Refer to Cables for cable details.

- **Note:** Throughout the following, Tx = from IP Office and Rx = to IP Office.

### Analog Trunk Ports (RJ45)

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3</td>
<td>Do not use.</td>
</tr>
<tr>
<td>4</td>
<td>Ring.</td>
</tr>
<tr>
<td>5</td>
<td>Tip.</td>
</tr>
<tr>
<td>6-8</td>
<td>Do not use.</td>
</tr>
</tbody>
</table>

#### Power Fail and POT Ports (RJ45)

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 &amp; 3</td>
<td>Do not use.</td>
</tr>
<tr>
<td>2</td>
<td>Connected to Pin 6*.</td>
</tr>
<tr>
<td>4</td>
<td>Ring.</td>
</tr>
<tr>
<td>5</td>
<td>Tip.</td>
</tr>
<tr>
<td>6</td>
<td>Connected to Pin 2*.</td>
</tr>
<tr>
<td>7-8</td>
<td>Do not use.</td>
</tr>
</tbody>
</table>

- * Pins 2 and 6 are shorted together and, via a ‘ringer’ capacitor, connected to in 5.
- For IP406 V2 only, pins 2 and 6 are not shorted; only pins 4 and 5 (ring/tip) are used. This acknowledges that the majority of new telephones are designed for 2-wire operation. On the IP406 V2, where support for previous generations of telephones is required, then external line adaptors should be used.

### DS Ports (RJ45)

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3</td>
<td>Do not use.</td>
</tr>
<tr>
<td>4</td>
<td>Sig 1.</td>
</tr>
<tr>
<td>5</td>
<td>Sig 2.</td>
</tr>
<tr>
<td>6-8</td>
<td>Do not use.</td>
</tr>
</tbody>
</table>
### ISDN Port – BRI (RJ45)

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Description</th>
<th>Signal Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Transmit Data (Tx-A)</td>
<td>&gt;</td>
</tr>
<tr>
<td>4</td>
<td>Receive Data (Rx-A)</td>
<td>&lt;</td>
</tr>
<tr>
<td>5</td>
<td>Receive Data (Rx-B)</td>
<td>&lt;</td>
</tr>
<tr>
<td>6</td>
<td>Transmit Data (Tx-B)</td>
<td>&gt;</td>
</tr>
</tbody>
</table>

### ISDN Port – PRI (RJ45)

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Description</th>
<th>Signal Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Receive Data (Rx-A)</td>
<td>&lt;</td>
</tr>
<tr>
<td>2</td>
<td>Receive Data (Rx-B)</td>
<td>&gt;</td>
</tr>
<tr>
<td>4</td>
<td>Transmit Data (Tx-A)</td>
<td>&gt;</td>
</tr>
<tr>
<td>5</td>
<td>Transmit Data (Tx-B)</td>
<td>&lt;</td>
</tr>
</tbody>
</table>

### LAN Port – 10/100 BaseT

For IP Office 403/406 the information below refers to LAN ports 1 – 7. Port 8 is switchable (exchanges Tx and Rx signals).

For IP412 and WAN3, both ports have the Rx and Tx connections exchanged.

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Description</th>
<th>Signal Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Receive Data (Rx-A)</td>
<td>&lt;</td>
</tr>
<tr>
<td>2</td>
<td>Receive Data (Rx-B)</td>
<td>&gt;</td>
</tr>
<tr>
<td>3</td>
<td>Transmit Data (Tx-A)</td>
<td>&gt;</td>
</tr>
<tr>
<td>6</td>
<td>Transmit Data (Tx-B)</td>
<td>&lt;</td>
</tr>
</tbody>
</table>
### DTE Port (25 Way or 9 Way D-Type socket)

<table>
<thead>
<tr>
<th>Pin No (25 Way)</th>
<th>Pin No (9 Way)</th>
<th>Description</th>
<th>Signal Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td>Receive Data (Rx)</td>
<td>&lt;</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>Transmit Data (Tx)</td>
<td>&gt;</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>Request to Send (RTS)</td>
<td>&lt;</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>Clear to Send (CTS)</td>
<td>&gt;</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>Data Set Ready (DSR)</td>
<td>&gt;</td>
</tr>
<tr>
<td>7</td>
<td>5</td>
<td>Signal Ground</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>Data Carrier Detect (DCD)</td>
<td>&gt;</td>
</tr>
<tr>
<td>20</td>
<td>4</td>
<td>Data Terminal Ready (DTR)</td>
<td>&lt;</td>
</tr>
<tr>
<td>22</td>
<td>9</td>
<td>Ring Indicator (RI)</td>
<td>&gt;</td>
</tr>
</tbody>
</table>

### Audio Port (3.5mm Stereo Jack Socket)

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Description</th>
<th>Signal Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common</td>
<td>Common</td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td>Audio in – Left Channel</td>
<td>&lt;</td>
</tr>
<tr>
<td>Right</td>
<td>Audio in – Right Channel</td>
<td>&lt;</td>
</tr>
</tbody>
</table>

### Expansion Port (RJ45 Socket)

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Description</th>
<th>Signal Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Receive Data (Rx-B)</td>
<td>&lt;</td>
</tr>
<tr>
<td>2</td>
<td>Receive Data (Rx-A)</td>
<td>&lt;</td>
</tr>
<tr>
<td>3</td>
<td>Sync-B</td>
<td>&gt;</td>
</tr>
<tr>
<td>4</td>
<td>Clock (Clk-B)</td>
<td>&gt;</td>
</tr>
<tr>
<td>5</td>
<td>Clock (Clk-A)</td>
<td>&gt;</td>
</tr>
<tr>
<td>6</td>
<td>Sync-A</td>
<td>&gt;</td>
</tr>
<tr>
<td>7</td>
<td>Transmit Data (Tx-B)</td>
<td>&gt;</td>
</tr>
<tr>
<td>8</td>
<td>Transmit Data (Tx-A)</td>
<td>&gt;</td>
</tr>
<tr>
<td>Shield</td>
<td>Connected to chassis.</td>
<td>Ground.</td>
</tr>
</tbody>
</table>
External Control Port (3.5mm Stereo Jack Socket)

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Circuit 1.</td>
</tr>
<tr>
<td>2</td>
<td>Circuit 2.</td>
</tr>
<tr>
<td>3</td>
<td>0 Volts (Ground/Chassis)</td>
</tr>
<tr>
<td>4</td>
<td>Not connected.</td>
</tr>
<tr>
<td>5</td>
<td>Not connected.</td>
</tr>
</tbody>
</table>

Control Circuit Information

Control Circuit 1 Pin 2 and Pin 3, ensure that Pin 2 is at a positive voltage with respect to Pin 3.

Control Circuit 2 Pin 1 and Pin 3, ensure that Pin 1 is at a positive voltage with respect to Pin 3.

Each circuit can be switched independently.

Switch Setting Information

**ON**  Low resistance between Pins.

**OFF**  High resistance between Pins.
## WAN Port (37 Way D-Type Socket)

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Description</th>
<th>Signal Dir.</th>
<th>Pin No.</th>
<th>Description</th>
<th>Signal Dir.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>V11 Rx-B</td>
<td>&lt;</td>
<td>20</td>
<td>V11 Rx-A</td>
<td>&lt;</td>
</tr>
<tr>
<td>2</td>
<td>V11 Ind-A</td>
<td>&lt;</td>
<td>21</td>
<td>V11 Ind-B</td>
<td>&lt;</td>
</tr>
<tr>
<td>3</td>
<td>V11 Clk-A</td>
<td>&lt;</td>
<td>22</td>
<td>V11 Clk-B</td>
<td>&lt;</td>
</tr>
<tr>
<td>4</td>
<td>V11 Tx-A</td>
<td>&gt;</td>
<td>23</td>
<td>V11 Tx-B</td>
<td>&gt;</td>
</tr>
<tr>
<td>5</td>
<td>V11 Ctl-B</td>
<td>&gt;</td>
<td>24</td>
<td>V11 Ctl-A</td>
<td>&gt;</td>
</tr>
<tr>
<td>6</td>
<td>V11 Gnd</td>
<td></td>
<td>25*</td>
<td>WAN ID 0</td>
<td>&lt;</td>
</tr>
<tr>
<td>7*</td>
<td>WAN ID 1</td>
<td>&lt;</td>
<td>26</td>
<td>V24 Tx</td>
<td>&gt;</td>
</tr>
<tr>
<td>8</td>
<td>V24 DTR</td>
<td>&gt;</td>
<td>27</td>
<td>V24 RTS</td>
<td>&gt;</td>
</tr>
<tr>
<td>9</td>
<td>V24 Rx</td>
<td>&lt;</td>
<td>28</td>
<td>V24 RxClk</td>
<td>&lt;</td>
</tr>
<tr>
<td>10</td>
<td>V24 TxClk</td>
<td>&lt;</td>
<td>29</td>
<td>V24 RI</td>
<td>&lt;</td>
</tr>
<tr>
<td>11</td>
<td>V24 DCD</td>
<td>&lt;</td>
<td>30</td>
<td>V24 DSR</td>
<td>&lt;</td>
</tr>
<tr>
<td>12</td>
<td>V24 CTS</td>
<td>&lt;</td>
<td>31</td>
<td>N/C</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>N/C</td>
<td></td>
<td>32</td>
<td>V35 Tx-A</td>
<td>&gt;</td>
</tr>
<tr>
<td>14</td>
<td>V35 Tx-B</td>
<td>&gt;</td>
<td>33</td>
<td>V35 SCTE-A</td>
<td>&gt;</td>
</tr>
<tr>
<td>15</td>
<td>V35 SCTE-B</td>
<td>&gt;</td>
<td>34</td>
<td>V35 Gnd</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>V35 Rx-B</td>
<td>&gt;</td>
<td>35</td>
<td>V35 Rx-A</td>
<td>&gt;</td>
</tr>
<tr>
<td>17</td>
<td>V35 TxClk-B</td>
<td>&lt;</td>
<td>36</td>
<td>V35 TxClk-A</td>
<td>&lt;</td>
</tr>
<tr>
<td>18</td>
<td>V35 RxClk-B</td>
<td>&lt;</td>
<td>37</td>
<td>V35 RxClk-A</td>
<td>&lt;</td>
</tr>
<tr>
<td>19</td>
<td>CHASSIS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes:

1. For the USA, only FCC Part 68 registered data circuit terminal equipment should be connected to the WAN Ports.
2. *For X21, V24/28 and V35 variants, pins 7 and 25 are connected as follows:
   - X21: Pin 7 is connected to pin 6.
   - V24/28: Pin 25 is connected to pin 6.
   - V35: Pins 7 and 25 are connected to pin 6.
This section provides information about the cables that are used with IP Office. Refer to page 3 for port pin out details. All of the following cables are for internal use only. All structured cabling/site wiring must conform to all local regulations.

Cautions:

1. All ISDN and WAN cables should not be longer than 5 meters in length.
2. For Analog Trunk cables, to reduce the risk of fire, use only No. 26 AWG or larger telecommunications line cord.

DTE Cable

SAP Code.: - 700213432 (25 Way)

A. 25 Way (or 9 Way on IP412) D-Type Plug with UNC 4-40 locking screws.
B. 9 Way D-Type Socket with UNC 4-40 locking screws.
C. 2 core screened cable - each core is 7/0.203mm (24 AWG) tinned copper stranded wire, nominal capacitance of 95pF/m, resistance of 92 /km, screened with tinned copper braid, maximum working voltage of 440V rms and a Maximum current per core of 1A rms
D. 2 meters/6.57ft.

**Pin Connections**

<table>
<thead>
<tr>
<th>End A (25 Way)</th>
<th>End A (9 Way)</th>
<th>Name</th>
<th>End B</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td>Receive data</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>Transmit Data</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>RTS (Request To Send)</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>CTS (Clear To Send)</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>DSR (Data Set Ready)</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>5</td>
<td>Ground</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>DCD (Data Carrier Detect)</td>
<td>1</td>
</tr>
<tr>
<td>20</td>
<td>4</td>
<td>DTR (Data Terminal Ready)</td>
<td>4</td>
</tr>
<tr>
<td>22</td>
<td>9</td>
<td>RI (Ring Indicator)</td>
<td>9</td>
</tr>
</tbody>
</table>
Line Cord for Structured Cabling
SAP Code:- 700047871

A. RJ11 Plug.
B. RJ45 Plug.
C. Cable.
D. 4 meters/13.2ft.

Pin Connections

<table>
<thead>
<tr>
<th>RJ11 Pin Number</th>
<th>RJ45 Pin Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

- **Caution:**
  Other connections may be present in cables and or structured cabling. For 4450DS modules, this cable can be used to connect the module's PSU Line socket and the structured cabling. The PSU's Tel socket **must only be connected** to the Line socket of the associated 4424D telephone using the D4BU cable supplied with the PSU.
PRI/BRI ISDN Cable
SAP Code:- 700213440

Supply: As standard with IP Office systems.

A. RJ45 Plug.
B. RJ45 Plug.
C. Cat 5 UTP cable - RED.
D. 3 meters/9.84ft.

Pin Connections

<table>
<thead>
<tr>
<th>End A</th>
<th>BRI</th>
<th>PRI</th>
<th>Color</th>
<th>Cable Notes</th>
<th>End B</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>*Rx-A</td>
<td>*Tx-A</td>
<td>Blue/White</td>
<td>Twisted pair</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>*Rx-B</td>
<td>*Tx-B</td>
<td>White/Blue</td>
<td>Twisted pair</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>*Tx-A</td>
<td>---</td>
<td>White/Green</td>
<td>Twisted pair</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>*Tx-B</td>
<td>---</td>
<td>Green/White</td>
<td>Twisted pair</td>
<td>6</td>
</tr>
<tr>
<td>1</td>
<td>---</td>
<td>*Rx-A</td>
<td>White/Orange</td>
<td>Twisted pair</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>---</td>
<td>*Rx-B</td>
<td>Orange/White</td>
<td>Twisted pair</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>---</td>
<td>---</td>
<td>White/Brown</td>
<td>Twisted pair</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>---</td>
<td>---</td>
<td>Brown/White</td>
<td>Twisted pair</td>
<td>8</td>
</tr>
</tbody>
</table>

* With reference to the TE.

- Pins 7 and 8 are through connected for ease of construction. They are not actually used.
LAN Interconnect Cable
SAP Code: 700213465

Supply: The cable is supplied with the WAN3 Expansion Module.

A. RJ45 Plug.
B. RJ45 Plug.
C. Cat 5 UTP cable - GREEN.
D. 1 meter/3.28ft.

<table>
<thead>
<tr>
<th>End A</th>
<th>Color</th>
<th>Cable Notes</th>
<th>End B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>White/Orange</td>
<td>Twisted Pair</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Orange/White</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>White/Green</td>
<td>Twisted Pair</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>Green/White</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Blue/White</td>
<td>Twisted Pair</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>White/Blue</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>White/Brown</td>
<td>Twisted Pair</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>Brown/White</td>
<td></td>
<td>8</td>
</tr>
</tbody>
</table>

- This cable is used:
  - When connecting IP Office hub ports 1 - 7 directly to a PC.
  - When connecting a WAN3 to an IP403/406 hub port which is located in the same cabinet as the IP Office.
  - Pins 4,5,7 and 8 are through connected for ease of construction. They are not actually used.
LAN Cable
SAP Code:- 700213481

A. RJ45 Plug.
B. RJ45 Plug.
C. Cat 5 UTP cable - GREY.
D. 3 meters/9.84ft.

Pin Connections

<table>
<thead>
<tr>
<th>End A</th>
<th>Color</th>
<th>Cable Notes</th>
<th>End B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>White/Orange</td>
<td>Twisted Pair</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Orange/White</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>White/Green</td>
<td>Twisted Pair</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>Green/White</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>Blue/White</td>
<td>Twisted Pair</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>White/Blue</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>White/Brown</td>
<td>Twisted Pair</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>Brown/White</td>
<td></td>
<td>8</td>
</tr>
</tbody>
</table>

- This cable is used:
  - When connecting IP Office hub ports 1 - 7 directly to a PC.
  - When connecting a WAN3 port to an IP403/406 hub port which is not located in the same cabinet as the IP Office.
  - Pins 4, 5, 7 and 8 are through connected for ease of construction. They are not actually used.
LAN Crossover Cable
SAP Code:- 700213473

A. RJ45 Plug.
B. RJ45 Plug.
C. Cat 5 UTP cross-over cable - BLACK.
D. 3 meters/9.84ft.

Pin Connections

<table>
<thead>
<tr>
<th>End A</th>
<th>Color</th>
<th>Cable Notes</th>
<th>End B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>White/Orange</td>
<td>Twisted Pair</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Orange/White</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>White/Green</td>
<td>Twisted Pair</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Green/White</td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

- This cable is used when connecting Hub Ports 1-7 directly to another Hub and for connecting a WAN3 to an IP412.
Expansion Interconnect Cable

SAP Code:- 700213457

Supply: One per Expansion Module.

A. Shielded RJ45 Plug.
B. Shielded RJ45 Plug.
C. STP (Shielded Twisted Pair) cable - BLUE.
D. 1 meter/3.28ft.

Pin Connections

<table>
<thead>
<tr>
<th>End A</th>
<th>Name</th>
<th>Color</th>
<th>Cable Notes</th>
<th>End B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rx-A</td>
<td>White/Orange</td>
<td>Twisted Pair</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Rx-B</td>
<td>Orange/White</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Sync-A</td>
<td>White/Green</td>
<td>Twisted Pair</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>Sync-B</td>
<td>Green/White</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>Clock-A</td>
<td>Blue/White</td>
<td>Twisted Pair</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Clock-B</td>
<td>White/Blue</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>Tx-A</td>
<td>White/Brown</td>
<td>Twisted Pair</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>Tx-B</td>
<td>Brown/White</td>
<td></td>
<td>8</td>
</tr>
</tbody>
</table>

- The RJ45 Plug Shell at each end of the cable is connected to the STP Cable Drain Wire.
**V.24/V.28 WAN Cable**
SAP Code:- 700213416

A. 37 Way D-Type Plug with UNC 4-40 locking screws.
B. 25 Way D-Type Plug with UNC 4-40 locking screws.
C. Label
D. 12 core screened cable - each core is 7/0.203mm (24 AWG) tinned copper stranded wire, nominal capacitance of 95pF/m, resistance of 92 /km, screened with tinned copper braid, maximum working voltage of 440V rms and a Maximum current per core of 1A rms
E. 3 meters/9.84ft.

**Pin Connections**

<table>
<thead>
<tr>
<th>End A</th>
<th>Name</th>
<th>End B</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Ground</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>DTR (Data Terminal Ready)</td>
<td>20</td>
</tr>
<tr>
<td>9</td>
<td>Receive Data</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>Transmit Clock</td>
<td>15</td>
</tr>
<tr>
<td>11</td>
<td>DCD (Data Carrier Detect)</td>
<td>8</td>
</tr>
<tr>
<td>12</td>
<td>CTS (Clear To Send)</td>
<td>5</td>
</tr>
<tr>
<td>26</td>
<td>Transmit Data</td>
<td>2</td>
</tr>
<tr>
<td>27</td>
<td>RTS (Request To Send)</td>
<td>4</td>
</tr>
<tr>
<td>28</td>
<td>Receive Clock</td>
<td>17</td>
</tr>
<tr>
<td>29</td>
<td>RI (Ring Indicator)</td>
<td>22</td>
</tr>
<tr>
<td>30</td>
<td>DSR (Data Set Ready)</td>
<td>6</td>
</tr>
</tbody>
</table>

- Connect pin 25 to pin 6 at End A **only**.
- Pin 19 at end A is connected to the Screened Cable Drain Wire.
- The maximum core to core capacitance must not exceed 800pF.
- This cable is used to connect a WAN port to a Digital leased Line.
X.21 WAN Cable
SAP Code: - 700213408

A. 37 Way D-Type Plug with UNC 4-40 locking screws.
B. 15 Way D-Type Plug with M3 locking screws.
C. Label
D. 6 twisted pair screened cable - each core is 7/0.203mm (24 AWG) tinned copper stranded wire, nominal capacitance of 98pF/m, impedance of 77 at 1MHz, screened with aluminized tape and a tinned copper wire drain.
E. 3 meters/9.84ft.

Pin Connections

<table>
<thead>
<tr>
<th>End A</th>
<th>Name</th>
<th>Cable Notes</th>
<th>End B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Receive (Rx-B)</td>
<td>Twisted Pair</td>
<td>11</td>
</tr>
<tr>
<td>20</td>
<td>Receive (Rx-A)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Transmit (Tx-A)</td>
<td>Twisted Pair</td>
<td>2</td>
</tr>
<tr>
<td>23</td>
<td>Transmit (Tx-B)</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Control (Ctl-A)</td>
<td>Twisted Pair</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>Control (Ctl-B)</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Indicate (Ind-A)</td>
<td>Twisted Pair</td>
<td>5</td>
</tr>
<tr>
<td>21</td>
<td>Indicate (Ind-B)</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>SE-Timing (S-A)</td>
<td>Twisted Pair</td>
<td>6</td>
</tr>
<tr>
<td>22</td>
<td>SE-Timing (S-B)</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Ground</td>
<td>----</td>
<td>8</td>
</tr>
</tbody>
</table>

- Connect pin 7 to pin 6 at End A only.
- Pin 19 at end A is connected to the Screened Cable Drain Wire.
- This cable is used to connect a WAN port to a Digital leased Line.
V.35 WAN Cable
SAP Code:- 700213424

A. 37 Way D-Type Plug with UNC 4-40 locking screws.
B. 34 Way MRAC Plug.
C. Label
D. 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.
E. 3 meters/9.84ft.

Pin Connections

<table>
<thead>
<tr>
<th>End A</th>
<th>Name</th>
<th>Cable Notes</th>
<th>End B</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>DTR (Data Terminal Ready)</td>
<td>-----</td>
<td>H</td>
</tr>
<tr>
<td>11</td>
<td>DCD (Data Carrier Detect)</td>
<td>-----</td>
<td>F</td>
</tr>
<tr>
<td>12</td>
<td>CTS (Clear To Send)</td>
<td>-----</td>
<td>D</td>
</tr>
<tr>
<td>27</td>
<td>RTS (Request To Send)</td>
<td>-----</td>
<td>C</td>
</tr>
<tr>
<td>29</td>
<td>RI (Ring Indicator)</td>
<td>-----</td>
<td>J</td>
</tr>
<tr>
<td>30</td>
<td>DSR (Data Set Ready)</td>
<td>-----</td>
<td>E</td>
</tr>
<tr>
<td>32</td>
<td>Transmit Data - A</td>
<td>Twisted Pair</td>
<td>P</td>
</tr>
<tr>
<td>14</td>
<td>Transmit Data - B</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Receive Data - A</td>
<td>Twisted Pair</td>
<td>R</td>
</tr>
<tr>
<td>16</td>
<td>Receive Data - B</td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>Transmit Clock - A</td>
<td>Twisted Pair</td>
<td>Y</td>
</tr>
<tr>
<td>17</td>
<td>Transmit Clock - B</td>
<td>AA</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Receive Clock - A</td>
<td>Twisted Pair</td>
<td>V</td>
</tr>
<tr>
<td>18</td>
<td>Receive Clock - B</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>External Clock - A</td>
<td>Twisted Pair</td>
<td>U</td>
</tr>
<tr>
<td>15</td>
<td>External Clock - B</td>
<td>W</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Ground</td>
<td>-----</td>
<td>B</td>
</tr>
</tbody>
</table>

- Connect pins 7 and 25 to pin 6 at End A only.
- Pin 19 at end A is connected to the Screened Cable Drain Wire.
- The maximum core to core capacitance must not exceed 800pF.
- This cable is used to connect a WAN port to a Digital leased Line.
IP Office 3.0 40DHB0002UKCL Issue 12d (1st March 2005)

**Telephone Converter Cables**
The following diagrams show the pin-outs of various Structured Cabling Telephone Converters. The first two telephone converters shown provide the required conversion allowing correct operation of the attached telephone.

Each telephone port on the Phone modules acts as a Master socket, thus only Slave Telephone Converters are required.

---

**RJ45 - Compatible Converter**

![Diagram of RJ45 - Compatible Converter](image)

### RJ11/45 Adapter

![Diagram of RJ11/45 Adapter](image)

<table>
<thead>
<tr>
<th>RJ11 Pin Number</th>
<th>RJ45 Pin Number</th>
<th>BT Newplan Socket Pin Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Other connections are not relevant. BT Newplan socket connections may be reversed as polarity is not important.
Port Safety Classification

The Avaya IP Office systems have the following ports:

- Expansion ports
- 10/100 BaseT LAN ports
- Telephone ports which are either DT (A-Law encoding) or DS (Mu-Law encoding). Note that use of DT ports is no longer supported in IP Office 3.0 or higher.
- ISDN ports
- Analog ports
- Power Fail ports
- WAN ports
- DTE ports
- Audio I/P port
- DC Power Input port
- External Control port

These Ports are classified as follows:

<table>
<thead>
<tr>
<th>Port Name</th>
<th>Port Description</th>
<th>Port Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRI port</td>
<td>PRI ISDN connection (NET)</td>
<td>TNV (Operating within the limits of SELV)</td>
</tr>
<tr>
<td>BRI ports</td>
<td>BRI ISDN connection (NET)</td>
<td>TNV (Operating within the limits of SELV)</td>
</tr>
<tr>
<td>Analog ports</td>
<td>Two wire analog trunk</td>
<td>TNV3</td>
</tr>
<tr>
<td>Power fail ports</td>
<td>Two wire analog trunk</td>
<td>TNV3</td>
</tr>
<tr>
<td>DTE port</td>
<td>Async Data connection.</td>
<td>SELV</td>
</tr>
<tr>
<td>Analog Telephone Ports</td>
<td>Telephone Extension ports</td>
<td>TNV2</td>
</tr>
<tr>
<td>Digital Telephone Ports</td>
<td>Telephone Extension ports</td>
<td>SELV</td>
</tr>
<tr>
<td>WAN port</td>
<td>WAN connection (NET).</td>
<td>SELV</td>
</tr>
<tr>
<td>LAN ports</td>
<td>10/100 BaseT attachment to LAN.</td>
<td>SELV</td>
</tr>
<tr>
<td>Expansion ports</td>
<td>Expansion Module connector.</td>
<td>SELV</td>
</tr>
<tr>
<td>Audio port</td>
<td>Connector for Music on Hold.</td>
<td>SELV</td>
</tr>
<tr>
<td>External Control port</td>
<td>Connector for Controlling Ancillary SELV circuits.</td>
<td>SELV</td>
</tr>
<tr>
<td>DC Input port</td>
<td>Connector for DC input power.</td>
<td>SELV</td>
</tr>
</tbody>
</table>

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.
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.
Technical Specifications

General

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Unboxed</th>
<th>Boxed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Width</td>
<td>Height</td>
</tr>
<tr>
<td>IP400 Units and Expansion Modules</td>
<td>445mm (17.5&quot;)</td>
<td>71mm (2.8&quot;)</td>
</tr>
</tbody>
</table>

Environmental: 0 to +40C. 95% relative humidity, non-condensing.

<table>
<thead>
<tr>
<th>Weight (unboxed)</th>
<th>Weight (boxed)</th>
<th>Power Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kg</td>
<td>lbs</td>
<td>Kg</td>
</tr>
<tr>
<td>IP403</td>
<td>2.6</td>
<td>5.8</td>
</tr>
<tr>
<td>IP406 V2</td>
<td>3.0</td>
<td>6.6</td>
</tr>
<tr>
<td>IP412</td>
<td>3.0</td>
<td>6.7</td>
</tr>
<tr>
<td>Alog16</td>
<td>2.9</td>
<td>6.5</td>
</tr>
<tr>
<td>DS16</td>
<td>3.0</td>
<td>6.7</td>
</tr>
<tr>
<td>DS30</td>
<td>3.5</td>
<td>7.8</td>
</tr>
<tr>
<td>WAN3</td>
<td>2.8</td>
<td>6.3</td>
</tr>
<tr>
<td>So8</td>
<td>2.8</td>
<td>6.3</td>
</tr>
<tr>
<td>Phone8</td>
<td>2.8</td>
<td>6.3</td>
</tr>
<tr>
<td>Phone16</td>
<td>2.9</td>
<td>6.5</td>
</tr>
<tr>
<td>Phone30</td>
<td>3.1</td>
<td>6.94</td>
</tr>
</tbody>
</table>

Module Power Supply Input:
- 2.5mm DC inlet socket. 24Vdc Power input. Rating 24Vd.c., 2A max.

Lump-in-Line PSU:
- Power Requirements: I/P 100-240Vac, 50/60Hz, 81-115VA, Input current 2A max
- Standard PSUs: O/P 24Vdc, 1.875A, output power 45W max.
- DS30 80W PSU: O/P 16Vdc, 5A, output power 80W max.
- Lump-in-line PSUs are CE/UL/Dentori Safety Approved.
Terminal/Telephone Cable Lengths
The following table details the maximum cable lengths supported for the telephone range using AWG22, 24 and 26 cabling:

<table>
<thead>
<tr>
<th>Telephone</th>
<th>AWG22</th>
<th>AWG24 (~ 0.5mm Ø)</th>
<th>AWG26</th>
</tr>
</thead>
<tbody>
<tr>
<td>2400/5400 Series</td>
<td>1.67km - 5500 feet</td>
<td>1.1km - 3500 feet</td>
<td>0.67km - 2200 feet</td>
</tr>
<tr>
<td>4406D</td>
<td>1km - 3280 feet</td>
<td>1km - 3280 feet</td>
<td>0.4km - 1310 feet</td>
</tr>
<tr>
<td>4412D</td>
<td>1km - 3280 feet</td>
<td>0.7km - 2295 feet</td>
<td>0.4km - 1310 feet</td>
</tr>
<tr>
<td>4424D</td>
<td>0.5km - 1640 feet</td>
<td>0.5km - 1640 feet</td>
<td>0.4km - 1310 feet</td>
</tr>
<tr>
<td>6400 Series</td>
<td>1km - 3280 feet</td>
<td>1km - 3280 feet</td>
<td>0.4km - 1310 feet</td>
</tr>
<tr>
<td>POT's</td>
<td>1km - 3280 feet</td>
<td>1km - 3280 feet</td>
<td>0.5km - 1640 feet</td>
</tr>
</tbody>
</table>

Interfaces

<table>
<thead>
<tr>
<th>Interface</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTE</td>
<td>25 way D-Type female connector, V.24/V.28. (9 way D-type on IP412s)</td>
</tr>
<tr>
<td>ISDN</td>
<td><strong>ROW Interfaces:</strong></td>
</tr>
<tr>
<td></td>
<td>BRI: RJ45 sockets. ETSI S/T Interface to CTR3 for Pan European Connection.</td>
</tr>
<tr>
<td></td>
<td>PRI E1: RJ45 socket. ETSI T Interface to CTR4 for Pan European Connection.</td>
</tr>
<tr>
<td></td>
<td>PRI E1-R2: RJ45 socket. ETSI T Interface to CTR4 for Pan European Connection.</td>
</tr>
<tr>
<td></td>
<td>PRI E1-R2: 75 BNC Coax.. ETSI T Interface.</td>
</tr>
<tr>
<td>USA Interfaces:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PRI T1 Service: Ground Start (GS) – Default, E&amp;M, 56k data for 5ESS, 56/64/64 restricted for 4ESS</td>
</tr>
<tr>
<td></td>
<td>PRI ISDN Switch support: 4ESS, 5ESS, DMS-100, DMS-250 (includes conformance to ANSI T1.607 &amp; Bellcore Special Report SR4287, 1992</td>
</tr>
<tr>
<td></td>
<td>PRI ISDN Services: AT&amp;T Megacom 800, AT&amp;T WATS (4ESS), AT&amp;T SDS Accunet 56kB/s &amp; 64kB/s (4ESS), AT&amp;T Multiquest (4ESS).</td>
</tr>
<tr>
<td>Analog ports</td>
<td>RJ45 sockets: Loop start/Ground start (region dependant)</td>
</tr>
<tr>
<td>Power Fail ports</td>
<td>RJ45 sockets: telephone ports act as master sockets</td>
</tr>
<tr>
<td>ISDN Data Rates</td>
<td></td>
</tr>
<tr>
<td>BRI:</td>
<td>B-channel 64kbps or 56kbps, D-channel 16kbps.</td>
</tr>
<tr>
<td>PRI:</td>
<td>B-channel 64kbps or 56kbps, D-channel 64kbps.</td>
</tr>
<tr>
<td>Telephone</td>
<td>RJ45 sockets. EU - Telephone ports act as master sockets. CLI Schemes: DTMFA, DTMFC, DTMFD, FSK and UK20. REN = 2 Off Hook current = 25mA. Ring Voltage = 40V (nominal) RMS. External Bell (via analog port); REN = 1</td>
</tr>
<tr>
<td>LAN</td>
<td>RJ45 sockets. Auto-negotiating 10/100BaseT Ethernet (10Mbps). Port 8 is MDI/MDIX switchable via the adjacent Uplink pushbutton switch. See IP403 Office - Front View, IP406 Office V2 - Front View and IP412 Office - Front View</td>
</tr>
<tr>
<td>WAN</td>
<td>37 way D-Type female sockets. X.21 interface to 2048k bps, V.35 interface to 2048k bps and V.24 Interface to 19k2 bps.</td>
</tr>
<tr>
<td>Audio</td>
<td>3.5mm Stereo Jack socket. Input impedance - 10k /channel. Maximum a.c. signal – 200mV rms.</td>
</tr>
<tr>
<td>External Control</td>
<td>3.5mm Stereo Jack socket. Switching Capacity - 0.7A. Maximum Voltage - 55V d.c. On state resistance - 0.7. Short circuit current - 1A. Reverse circuit current capacity - 1.4A.</td>
</tr>
</tbody>
</table>
## Protocols

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-Law</td>
<td>PCM encoding (mainly used outside North America).</td>
</tr>
<tr>
<td>U-Law</td>
<td>PCM encoding (mainly used in North America and Japan).</td>
</tr>
<tr>
<td>V.120</td>
<td>A standard Rate Adaption mechanism.</td>
</tr>
<tr>
<td>V.110</td>
<td>A standard Rate Adaption mechanism.</td>
</tr>
<tr>
<td>PPP</td>
<td>RFC 1661: Point to Point Protocol.</td>
</tr>
<tr>
<td>MP</td>
<td>RFC 1990: Multi-Link (Point to Point) Protocol.</td>
</tr>
<tr>
<td>MPPC</td>
<td>RFC 2118: Microsoft Point to Point Compression (Protocol).</td>
</tr>
<tr>
<td>IPCP</td>
<td>RFC 1332: Internet protocol Control Protocol.</td>
</tr>
<tr>
<td>NAT</td>
<td>RFC 1631: Network Address Translation.</td>
</tr>
<tr>
<td></td>
<td>RFC1212 (STD16): Concise MIB Definitions.</td>
</tr>
<tr>
<td></td>
<td>RFC1215: A Convention for Defining Traps for use with the SNMP.</td>
</tr>
<tr>
<td>RIPv1</td>
<td>RFC1058: Routing Information Protocol.</td>
</tr>
<tr>
<td></td>
<td>RFC2402: IP Authentication Header.</td>
</tr>
<tr>
<td></td>
<td>RFC2403: The Use of HMAC-MD5-96 within ESP and AH.</td>
</tr>
<tr>
<td></td>
<td>RFC2404: The Use of HMAC-SHA-1-96 within ESP and AH.</td>
</tr>
<tr>
<td></td>
<td>RFC2405: The ESP DES-CBC Cipher Algorithm With Explicit IV.</td>
</tr>
<tr>
<td></td>
<td>RFC2407: The Internet IP Security Domain of Interpretation for ISAKMP.</td>
</tr>
<tr>
<td></td>
<td>RFC2409: The Internet Key Exchange (IKE).</td>
</tr>
<tr>
<td></td>
<td>RFC2410: The NULL Encryption Algorithm and Its Use With IPsec.</td>
</tr>
<tr>
<td>L2TP</td>
<td>RFC2661: Layer Two Tunneling Protocol &quot;L2TP&quot;.</td>
</tr>
<tr>
<td></td>
<td>RFC3193: Securing L2TP using IPsec.</td>
</tr>
<tr>
<td>ENTITY MIB</td>
<td>RFC2737: Entity MIB (Version 2).</td>
</tr>
</tbody>
</table>

### Internal Data Channels

<table>
<thead>
<tr>
<th>Base Unit</th>
<th>Max. No. of Internal Data Channels</th>
<th>Max. No. of Internal Data Channels for Voicemail</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP403</td>
<td>18</td>
<td>10</td>
</tr>
<tr>
<td>IP406 V1</td>
<td>24</td>
<td>20</td>
</tr>
<tr>
<td>IP412</td>
<td>100</td>
<td>30</td>
</tr>
</tbody>
</table>
SNMP

SNMP Functionality
The IP Office SNMP Agent implements SNMPv1 on a read-only basis for security reasons.

More
- SNMP Agent Configuration
- MIBs Supported
- Trap Generation
- MIB Loading
- HP OpenView Network Node Manager 6.41 and earlier
- CastleRock SNMPc 5.1.6c and earlier

SNMP Agent Configuration
The following operational items may be configured for the IP Office SNMP Agent using the IP Office Manager:

SNMP Server:
- Enable/disable
  - Enabled: the device to respond to SNMP requests and send traps for any associated events that occur if so configured.
  - Disabled: the SNMP agent on the device does not respond to SNMP requests or send traps.
- UDP Port (default 161)
  - Changes the default port value of the SNMP Agent.
- Read-only community
  - Community string of up to 32 alphanumeric characters for read-only access.
- Two trap destinations:
  - IP Address
  - UDP Port (default 162)
  - Community string of up to 32 alphanumeric characters.
- Event mask specifying the events the trap destination is interested in receiving
  - generic (coldStart, warmStart, linkDown, linkUp, authenticationFailure)
  - licence – License Key Server access fault notifications
  - phone change – connected phone change notification
MIBs Supported
The following MIBs are supported by the IP Office SNMP Agent:

- **IETF RFC1213 mib-2 (RFC1213-MIB):**
  - Provides statistics for LAN, WLAN and WAN interfaces.
  - Groups supported: system, interfaces, at, ip, icmp, tcp, udp and snmp.

- **IETF RFC1215:**
  - Provides definitions of generic SNMP traps.
  - Traps supported: warmStart, coldStart, linkDown, LinkUp and authenticationFailure.

- **IETF RFC2737 ENTITY-MIB:**
  - Provides architectural representation.
  - Groups supported: entityPhysical and entityGeneral.

- **Avaya IPO-PROD-MIB:**
  - Provides device/entity identification OIDs.

- **Avaya IPO-MIB:**
  - Provides root OIDs for functional MIBs.
  - Provides system wide notifications for events relating to functional entities.
    - ipoGenLKSCommsFailureEvent.
    - ipoGenLKSCommsOperationalEvent for License Key Server communication events.

- **Avaya IPO-PHONES-MIB:**
  - Provides extension/user/phone-port map.
    - Phone-port mapping via cross-reference to entPhysicalEntry for port with entPhysicalIndex value.
  - Provides notifications of phone change event.
    - IpoPhonesChangeEvent.
### Trap Generation

#### RFC1215 Generic SNMP Traps:

<table>
<thead>
<tr>
<th>Trap type</th>
<th>Generated</th>
</tr>
</thead>
<tbody>
<tr>
<td>warmStart</td>
<td>Upon soft reboot.</td>
</tr>
<tr>
<td>coldStart</td>
<td>Upon unexpected reboot such as a power outage.</td>
</tr>
<tr>
<td>linkDown</td>
<td>Upon transition of an interface (PPP or Frame-Relay) from the up operational state into the down operational state.</td>
</tr>
<tr>
<td>linkUp</td>
<td>Upon transition of an interface (PPP or Frame-Relay) from the down operational state into the up operational state.</td>
</tr>
<tr>
<td>authenticationFailure</td>
<td>Upon attempted SNMP request with mismatched community for the type of operation.</td>
</tr>
</tbody>
</table>

#### IPO-MIB:

<table>
<thead>
<tr>
<th>Trap type</th>
<th>Generated</th>
</tr>
</thead>
<tbody>
<tr>
<td>ipoGenEntityFailureEvent</td>
<td>Whenever a physical entity on the IP Office fails in its operation</td>
</tr>
<tr>
<td>ipoGenEntityOperationalEvent</td>
<td>Whenever a physical entity on the IP Office becomes operational again after having failed. operation.</td>
</tr>
<tr>
<td>ipoGenEntityErrorEvent</td>
<td>Whenever a transitory error is detected for a physical entity on the IP Office.</td>
</tr>
<tr>
<td>ipoGenEntityChangeEvent</td>
<td>Whenever a non-error change event is detected for a physical entity on the IP Office.</td>
</tr>
<tr>
<td>ipoGenLKSCommsFailureEvent</td>
<td>Upon loss of communication with a configured License Key Server.</td>
</tr>
<tr>
<td>ipoGenLKSCommsOperationalEvent</td>
<td>Upon re-gaining communication with a configured License Key Server.</td>
</tr>
<tr>
<td>ipoGenLKSCommsErrorEvent</td>
<td>Trap currently not used.</td>
</tr>
<tr>
<td>ipoGenLKSCommsChangeEvent</td>
<td>Trap currently not used.</td>
</tr>
<tr>
<td>ipoGenVMSCOMmsFailureEvent</td>
<td>Loss of communication to the voicemail system.</td>
</tr>
<tr>
<td>ipoGenVMSCOMmsOperationalEvent</td>
<td>Link to the voicemail system established or reestablished.</td>
</tr>
<tr>
<td>ipoGenVMSCOMmsErrorEvent</td>
<td>Trap currently not used.</td>
</tr>
<tr>
<td>ipoGenVMSCOMmsChangeEvent</td>
<td>Trap currently not used.</td>
</tr>
<tr>
<td>ipoGenDSCOMmsFailureEvent</td>
<td>Loss of communication to the delta server.</td>
</tr>
<tr>
<td>ipoGenDSCOMmsOperationalEvent</td>
<td>Link to the delta server established or reestablished.</td>
</tr>
<tr>
<td>ipoGenDSCOMmsErrorEvent</td>
<td>Trap currently not used.</td>
</tr>
<tr>
<td>ipoGenDSCOMmsChangeEvent</td>
<td>Trap currently not used.</td>
</tr>
</tbody>
</table>
The traps above are generated for the physical entities as follows:

- **Expansion Modules**

<table>
<thead>
<tr>
<th>Trap Type</th>
<th>Phone</th>
<th>Digital Station</th>
<th>Analog Trunk</th>
<th>S08</th>
<th>WAN3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ipoGenEntityFailureEvent</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>ipoGenEntityOperationalEvent</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>ipoGenEntityErrorEvent</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>ipoGenEntityChangeEvent</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Where:

- `ipoGenEntityFailureEvent` and `ipoGenEntityOperationalEvent` traps are issued in relation to connecting cable disconnection and reconnection or power changes.
- `ipoGenEntityErrorEvent` trap is issued for transitory communication errors across the cabling to an expansion module.
- `ipoGenEntityChangeEvent` trap is issued for mismatch(es) in expansion modules discovered at controller start up and those present in the system configuration.

- **Trunk Interfaces**

<table>
<thead>
<tr>
<th>Trap Type</th>
<th>Quad Analog Trunks</th>
<th>Quad BRI Trunks</th>
<th>PRI E1 Trunks</th>
<th>PRI J1 Trunks</th>
<th>PRI R2 Trunks</th>
<th>PRI T1 Trunks</th>
</tr>
</thead>
<tbody>
<tr>
<td>ipoGenEntityFailureEvent</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>ipoGenEntityOperationalEvent</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Where `ipoGenEntityFailureEvent` and `ipoGenEntityOperationalEvent` traps are issued in relation to link status changes.

- **Integral Modules**

<table>
<thead>
<tr>
<th>Trap Type</th>
<th>Modem</th>
<th>Voice Compressor</th>
</tr>
</thead>
<tbody>
<tr>
<td>ipoGenEntityFailureEvent</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>ipoGenEntityOperationalEvent</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Where `ipoGenEntityFailureEvent` and `ipoGenEntityOperationalEvent` traps are issued for voice compressor modules in relation to data access problems that result in code reload.

- **Other Plug-In Modules**

- The `ipoGenEntityChangeEvent` trap is issued for changes in PC-Card slot population on the IP Office Small Office Edition.

---

**IPO-PHONES-MIB:**

<table>
<thead>
<tr>
<th>Trap type</th>
<th>Generated</th>
</tr>
</thead>
<tbody>
<tr>
<td>ipoPhonesChangeEvent</td>
<td>Upon change of a DS or IP extension phone type after normal start-up. No traps are issued for POT extensions as the presence or absence of such phones cannot be established hence the ipoPhonesType for such extensions is always potPhone.</td>
</tr>
</tbody>
</table>
MIB Loading
In order to SNMP manage an IP Office system, that is browse its MIBs and fully interpret the traps it sends out, the MIBs supported by IP Office must be loaded and compiled for use with your Network Management System. The supported standard and proprietary MIBs together with the MIB files relied upon for definitions are provided on the IP Office Admin CD off the directory snmp_mibs. Detailed below are details of how to install the appropriate MIBs with a number of Network Management Systems.

HP OpenView Network Node Manager 6.41 and earlier:
MIBs are installed in Network Node Manager by selecting Options and Load/Unload MIBs: SNMP from the menu and then using the Load… option and browsing for MIB files to load and compile. The following MIBs must be installed in the order listed to fully SNMP manage an IP Office system:

<table>
<thead>
<tr>
<th>MIB file</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFC2737-ENTITY-MIB</td>
<td>snmp_mibs\standard on OpenView install CD</td>
</tr>
<tr>
<td>AVAYAGEN-MIB.mib</td>
<td>snmp_mibs\IPOffice on IP Office Admin CD</td>
</tr>
<tr>
<td>IPO-PROD-MIB.mib</td>
<td>snmp_mibs\IPOffice on IP Office Admin CD</td>
</tr>
<tr>
<td>IPO-MIB.mib</td>
<td>snmp_mibs\IPOffice on IP Office Admin CD</td>
</tr>
<tr>
<td>INET-ADDRESS-MIB.mib</td>
<td>snmp_mibs\Standard on IP Office Admin CD</td>
</tr>
<tr>
<td>RFC2213-INTEGRATED-SERVICES-MIB</td>
<td>snmp_mibs\standard on OpenView install CD</td>
</tr>
<tr>
<td>DIFFSERV-DSCP-TC.mib</td>
<td>snmp_mibs\Standard on IP Office Admin CD</td>
</tr>
<tr>
<td>DIFFSERV-MIB-HPOV.mib</td>
<td>snmp_mibs\Standard on IP Office Admin CD</td>
</tr>
<tr>
<td>IPO-PHONES-MIB.mib</td>
<td>snmp_mibs\IPOffice on IP Office Admin CD</td>
</tr>
</tbody>
</table>
CastleRock SNMPc 5.1.6c and earlier:
For MIBs to be used with SNMPc they must first be copied into its mibfiles directory, which is normally C:\Program Files\SNMPc Network Manager\mibfiles. MIBs are installed by selecting Config and MIB Database from the SNMPc menu and then using the Add option and selecting the MIB file from the list presented to load and compile it. The following MIBs must be installed in the order listed to fully SNMP manage an IP Office system:

<table>
<thead>
<tr>
<th>MIB file</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTITY-MIB</td>
<td>snmp_mibs\Standard on IP Office Admin CD.</td>
</tr>
<tr>
<td>AVAYAGEN-MIB.mib</td>
<td>snmp_mibs\IPOffice on IP Office Admin CD.</td>
</tr>
<tr>
<td>IPO-PROD-MIB.mib</td>
<td>snmp_mibs\IPOffice on IP Office Admin CD.</td>
</tr>
<tr>
<td>IPO-MIB.mib</td>
<td>snmp_mibs\IPOffice on IP Office Admin CD.</td>
</tr>
<tr>
<td>INET-ADDRESS-MIB.mib</td>
<td>snmp_mibs\Standard on IP Office Admin CD.</td>
</tr>
<tr>
<td>INTEGRATED-SERVICES-MIB</td>
<td>snmp_mibs\Standard on IP Office Admin CD.</td>
</tr>
<tr>
<td>DIFFSERV-DSCP-TC.mib</td>
<td>snmp_mibs\Standard on IP Office Admin CD.</td>
</tr>
<tr>
<td>DIFFSERV-MIB.mib</td>
<td>snmp_mibs\Standard on IP Office Admin CD.</td>
</tr>
<tr>
<td>IPO-PHONES-MIB.mib</td>
<td>snmp_mibs\IPOffice on IP Office Admin CD.</td>
</tr>
</tbody>
</table>

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 admin CD 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.
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