



# **Coral IPx Office**

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## **Installation Procedure and Hardware Reference Manual**

(Document Edition 6.2)



*Creating a new world of IPportunities*



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# **Federal Communications Commission**

## **Rules Part 68 Compliance Statement**

This equipment complies with Part 68 of the FCC rules. On this equipment is a label that contains, among other information, the FCC registration number and ringer equivalence number (REN) for this equipment. If requested, this information must be provided to the telephone company.

The REN is used to determine the quantity of devices which may be connected to the telephone line. Excessive REN's on the telephone line may result in the devices not ringing in response to an incoming call. In most, but not all areas, the sum of the REN's should not exceed five (5.0). To be certain of the number of devices that may be connected to the line, as determined by the total REN's contact the telephone company to determine the maximum REN for the calling area.

An FCC compliant telephone cord and modular plug is provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using a compatible modular jack which is Part 68 compliant.

This equipment cannot be used on telephone company-provided coin service. Connection to Party Line Service is subject to state tariffs.

If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. If advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make the necessary modifications in order to maintain uninterrupted service.

If trouble is experienced with this equipment, please contact the supplier at (516)-632-7200 for repair and/or warranty information. If the trouble is causing harm to the telephone network, the telephone company may request you remove the equipment from the network until the problem is resolved.

The following repairs can be done by the customer: No repairs allowed.

This equipment is hearing-aid compatible.

It is recommended that the customer install an AC surge arrestor in the AC outlet to which this device is connected. This is to avoid damaging the equipment caused by local lightning strikes and other electrical surges.

This equipment is capable of providing user's access to interstate providers of operator services through the use of equal access codes. Modifications by aggregators to alter these capabilities may be a violation of the telephone operator consumer services improvement act of 1990 and part 68 of the FCC Rules.

## **Canadian DOT Compliance Statement**

NOTICE: The Industry Canada label identifies certified equipment. This certification means that the equipment meets telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

NOTICE: The Ringer Equivalence Number (REN) assigned to each terminal device 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 5.

## **TUV Safety of Information Technology Equipment Compliance**

Equipment certified according to TUV has been tested and complies with the following:

UL 60950-1 :2007

CAN / CSA-C22.2 No.60950-1-07

TUV Rheinland of North America is a Nationally Recognized Testing Laboratory (NRTL) in the United States and is accredited by the Standards Council of Canada to test and certify products to Canadian National Standards. Clients can demonstrate compliance for both U.S. and Canadian markets through a single mark (TUV) on their product(s) which denotes compliance to U.S. and Canadian National Standards.

## **CB SCHEME Compliance Statement**

Equipment certified according to the CB SCHEME has been tested and complies with the following:

IEC 60950-1 :2005, 2nd Edition

## **CE Compliance Statement (R & TTE)**

Equipment certified according to CE has been tested and complies with the following:

EN 60950-1 :2006, 2nd Edition + A11 :2009

EN 55022 CISPR 22

EN 55024 CISPR 24

## **Australia and New Zealand Compliance Statement**

Equipment certified for Australia and New Zealand has been tested and complies with the following:

AS/NZS 4117

AS/NZS 60950.1

ACA TS002 TS003 TS004

AS/NZS CISPR22

# Federal Communications Commission

## Part 15

### The FCC Wants you to Know

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- a) Reorient or relocate the receiving antenna.
- b) Increase the separation between the equipment and the receiver.
- c) Connect the equipment on an outlet on a circuit different from that to which the receiver is connected.
- d) Consult with the dealer or an experienced radio/TV technician.

To ensure continued compliance with specified radio energy emissions limits of FCC Rules, the following precautions must be observed while installing and operating the equipment:

1. Install the equipment in strict accordance with the manufacturer's instructions.
2. Verify that the power supply and associated A.C. powered equipment are connected to a properly grounded electrical supply, and that power cords, if used, are unmodified.
3. Verify that the system grounding, including Master Ground, D.C. power system, and equipment cabinets, is in accordance with the manufacturer's instructions and connected to an approved earth ground source.
4. Always replace the factory-supplied cover or keep the cabinet doors closed when not servicing the equipment.
5. Make no modification to the equipment that would affect its compliance with the specified limits of FCC Rules.
6. Maintain the equipment in a satisfactory state of repair.
7. Verify that emissions limiting devices, such as ferrite blocks and radio frequency interference modules, are properly installed and functional.
8. If necessary the operator should consult their supplier, or an experienced radio/television engineer for additional suggestions. The following booklet prepared by the Federal Communications Commission (FCC) may be of assistance: "How to Identify and Resolve Radio-TV Interference Problems."

This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.

## FCC Warning

Modifications not expressly approved by the manufacturer could void the user authority to operate the equipment under FCC rules.

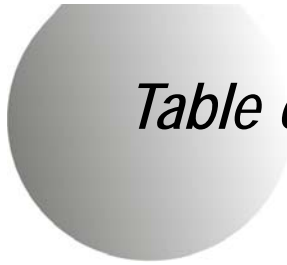


# **Waste of Electrical and Electronic Equipment (WEEE)**

## **Directive 2002/96/EC of the European Parliament**

It is the responsibility of the Distributor to fully comply with Directive 2002/96/EC dated 27 January 2003 of the European Parliament and of the Council on Waste of Electrical and Electronic Equipment (WEEE) and with any applicable law and regulation promulgated in its respective Member State in connection with such Directive. Accordingly, the Distributor is responsible for, and shall bear all costs related to, the collection, treatment, recovery, reporting and environmentally sound disposal of all electronic waste related to the products. For the purpose of this paragraph, the term “Distributor” shall mean the person and/or entity engaged in the importation, distribution, sales, support or any other activity carried out in the applicable jurisdiction in connection with products supplied by Tadiran Telecom Ltd.





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# Chapter 1

## Introduction

**Coral**

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# 1.1 About this Manual

## Document Description

The *Coral IPx Office Installation Guide and Hardware Reference Manual*, is designed for field use by Coral system installation and service personnel. It describes the installation of the Coral IPx Office system.

This manual is divided into two primary parts:

- A systematic installation procedure
- A complete hardware reference

Chapters 2, 3, 4, 5, and 6 include all installation procedures. These chapters listed below, outline the step-by-step process of performing a complete, new Coral IPx Office system installation. Peripheral devices can be installed at any time after system installation. For peripheral device installation, refer to the *Coral Terminal Equipment Installation Manual*.

| Chapter   | Topic                                  | Description   |
|-----------|--|---|
| Chapter 1 | <i>Introduction</i>                    | To learn about this manual  |
| Chapter 2 | <i>Hardware Installation Procedure</i> | Start the installation process with this chapter. Follow its instructions to ensure that the Coral IPx Office system will be properly unpacked, installed and ready for operation.                    |
| Chapter 3 | <i>Initial Power-up Tests</i>          | After completing installation, use this chapter to enable the IPx Office system to process calls.   |
| Chapter 4 | <i>Software Installation Procedure</i> | Use this chapter to upgrade the IPx Office software and save the database.  |
| Chapter 5 | <i>External Connections</i>            | The pinout tables for peripheral card and LAN/WAN connections are found here. The tables are used during the installation procedure performed in Chapter 2. Also, surge arrestors are installed here. |

Chapters 6, 7, 8, 9, 10, and 11 describe the hardware reference. These chapters offer detailed technical information about IPx Office system hardware, including cage specifications, internal power supplies, and interface circuit operation:.

| Chapter    | Topic                       | Description  |
|------------|-----------------------------|--|
| Chapter 6  | <i>System Description</i>   | To learn about the main unit and expansion cages   |
| Chapter 7  | <i>Power Supply</i>         | Whenever reference information about power supplies is required, or whenever adding or re-installing a power supply item                                   |
| Chapter 8  | <i>Common Control Cards</i> | For general information, installation procedures and card handling advice regarding the common control card set  |
| Chapter 9  | <i>Shared Service Cards</i> | For reference material (U-RMI Office, U-MR Office or MRC)  |
| Chapter 10 | <i>Peripheral Cards</i>     | For reference material or if you are installing a peripheral interface card. Also, see the <i>Coral Service and Peripheral Cards Installation Manual</i> . |
| Chapter 11 | <i>System Networking</i>    | For reference material or if you are installing and registering the NTU Office card  |



## Related Documentation

For further information not in the scope of this manual about Coral service cards, peripheral cards, voice terminals, VoIP devices, etc., consult the following documentation:

**Table 1-1 Related Documentation**

| Item  | Subject  | Manual   |
|---|--|--|
| Coral systems   | General description and specifications for marketing | Coral IPx and FlexiCom Product Description   |
| Coral Database  | Programming  | 1) PI - Program Interface and Database Reference Manual<br>2) CVA - CoralVIEW Administrator User Manual<br>3) CVD - CoralVIEW Designer Guide |
|   | Backup   | 1) PI - Program Interface and Database Reference Manual, Chapter 21<br>2) Database Binary Backup PC Utility                                  |
| Coral Software  | Installation and Upgrade                             | FMprog PC-Utility Reference Manual   |
| FlexiCom 200 (CSLX) Expansion Cabinets for IPx Office | Descriptions and Installation Procedure              | Coral FlexiCom 200 (CSLX) Expansion Cabinets Installation Procedure and Hardware Reference Manual  |
| IPx 500X Expansion Cages for IPx Office               | Descriptions and Installation Procedure              | Coral IPx 500 Installation Procedure and Hardware Reference Manual   |
| IPx 800X Expansion Cages for IPx Office               | Descriptions and Installation Procedure              | Coral IPx 800 Installation Procedure and Hardware Reference Manual   |
| Peripheral cards                                      | Descriptions and Installation Procedure              | Coral Service and Peripheral Cards Installation Manual   |
| Shared Service cards                                  |  |  |
| C/MAP and C/PUGW applications                         | Descriptions and Software Upgrade                    | Coral Control Cards (for CDRS 200,200E; IPx 500,800,3000 and FlexiCom 200,300,400,5000) Installation Manual                                  |
| MRC   | Descriptions and Installation Procedure              | Coral Service and Peripheral Cards Installation Manual   |

| Item   | Subject  | Manual   |
|--|--|--|
| Voice Terminal Equipment/<br>Peripheral Device | Description  | Coral IPx and FlexiCom Product Description, Chapter 3  |
|  | Installation, Administration Procedure, Troubleshooting and Hardware Reference | T207M, T208M, T207M/NP and T208M/BL<br>IP station Installation Manual  |
|  |  | T207S, T208S, T207S/NP and T208S/BL<br>IP station Installation Manual  |
|  |  | FlexSet-IP 280S<br>IP station Installation Manual  |
|  |  | FlexSet (120, 120D, 120L, 120S, 121S, 280, 280D, 280D-Z, 280S, 281S, APDL, PEX, APA and CPA)<br>Digital Station Terminal Equipment Installation Manual |
|  |  | DKT, DST, and VDM<br>Digital Station Terminal Equipment Installation Manual  |
|  |  | FlexIP SoftPhone User Guide  |
|  |  | SeaBeam Installation and Administration Manual   |

## ● Special Symbols Used in this Document

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This manual includes information that requires special attention, or is distinguished from the main texts in some significant way. These are indicated by the use of symbols and text formatting. This is illustrated in the following examples:

### **WARNING!**

*There is a risk of danger to **life** or personal injury.*

### **CAUTION!**

*There is a risk of damage to Coral system.*



### **NOTE:**

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Indicates important information demanding special attention.

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### *Tip:*

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*Advice that makes it easier to follow the steps of a procedure.*

---

## **NOTES:**

This manual includes information for the Coral configurations in all geographic market areas. Much of the information is relevant for all hardware configurations and all market areas.

## List of Acronyms

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|                  |   |
|------------------|---|
| 2DT Office.....  | 2 peers universal Digital Trunk (PRI-23, PRI-30, T1, 30T or 30TM) interface card                |
| 30T (/M) Office  | 30 channel, E1/CEPT digital trunk interface card  |
| 4T Office.....   | 4 Analog Loop-Start Trunk Line with power fail circuits card                                    |
| 4T-CID Office .  | Same as 4T-Csl card with 4CID module  |
| 4TBR Office....  | 4 Trunk BRI circuit card  |
| 8T Office.....   | 8 Analog Loop-Start Trunk Line with power fail circuits card                                    |
| 8T-CID Office .  | Same as 4T Office card with 8CID module   |
| 8SFT Office .... | 8 digital Station FlexSet Terminal/Telephones interface card                                    |
| 16SFT Office ..  | 16 digital Station FlexSet Terminal/Telephones interface card                                   |
| 24SFT Office ..  | 24 digital Station FlexSet Terminal/Telephones interface card                                   |
| 4SA Office ..... | 4 Single Line Telephone interface card  |
| 8SA Office ..... | 8 Single Line Telephone interface card  |
| 8SAx Office .... | 8 Single Line Telephone interface expansion card  |
| 16SAx Office ..  | 16 Single Line Telephone interface expansion card   |
| 24SA Office .... | Combination station card including: 8SA and 16SAx on a 8SA Single Line Telephone interface card |
| 16SA Office .... | Combination station card including: 8SA and 8SAx on a 8SA Single Line Telephone interface card  |
| 4SA+8Fx Office   | Combination station card including: 4SA and 8Fx on a 4SA Single Line Telephone interface card   |
| 4SA+16Fx Office  | Combination station card including: 4SA and 16Fx on a 4SA Single Line Telephone interface card  |
| 8SA+8Fx Office   | Combination station card including: 8SA and 8Fx on a 8SA Single Line Telephone interface card   |
| 8SA+16Fx Office  | Combination station card including: 8SA and 16Fx on a 8SA Single Line Telephone interface card  |
| 4S Office .....  | 4 Single Line Telephone interface card  |
| 8S Office .....  | 8 Single Line Telephone interface card  |
| 12Sx Office..... | 12 Single Line Telephone interface expansion card   |
| 20S Office ..... | Combination station card including: 8S and 12Sx on a 8S Single Line Telephone interface card    |
| 4S+8Fx Office    | Combination station card including: 4S and 8Fx on a 4S Single Line Telephone interface card     |
| 4S+16Fx Office   | Combination station card including: 4S and 16Fx on a 4S Single Line Telephone interface card    |
| 8S+8Fx Office    | Combination station card including: 8S and 8Fx on a 8S Single Line Telephone interface card     |
| 8S+16Fx Office   | Combination station card including: 8S and 16Fx on a 8S Single Line Telephone interface card    |

ESIM Office .... Expansion Shelf Interface card in the Main unit

ESIX Office..... Expansion Shelf Interface card in the eXpansion unit

IPC2 Office..... Integrated PC card including SFC, UCMC, and WiCMC voice mail applications

CSLX 200..... Optional Expansion Unit of the IPx Office, uses standard Coral FlexiCom ,300,400,5000,6000 and IPx 800,3000,4000 peripheral cards'

IPx 500X ..... Expansion Unit of the IPx Office, uses small factor XXXipx peripheral cards

IPx 800X ..... Optional Expansion Unit of the IPx Office, uses standard Coral FlexiCom ,300,400,5000,6000 and IPx 800,3000,4000 peripheral cards

IMC8/IMC16... Flash Module for generic software and database backup (PCM-CIA format PC-CARD)

MR Office ..... Music Relay Office Card

PRI-23 Office.. 23 channel, PRI (Primary Rate Interface) digital trunk card

PRI-30 Office.. 30 channel, PRI (Primary Rate Interface) digital trunk card

PS Office AC.. AC Power Supply

PS Office DC.. DC Power Supply

URC ..... Universal Resources Card

RMI Office ..... Remote Maintenance Interface Office Card

U-MR Office ... URC - Music Relay Office Card

U-RMI Office .. URC - Remote Maintenance Interface Office Card

UDT Office ..... Universal Digital Trunk (T1 or PRI-23) interface card

**NOTES:**

## 1.2 About the Coral IPx Office

### System Description

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The Coral IPx Office is a 19"/23", rack-mounted or table-mounted, compact system that provides a converged system with sophisticated call-handling. It includes a range of IP functionalities, a comprehensive list of user features, and a large selection of gateway to legacy systems. The IPx Office supports all the Coral FlexiCom and Coral IPx family features.

The IPx Office is a communications platform that offers Voice over IP with all of the features and capabilities required in today's business environment. The number of wired stations supported by the IPx Office configuration depends on the combination of SLTs (Single Line Telephones) and keyset peripheral cards. See [Chapter 10, Peripheral Cards](#).

The Coral IPx Office can be expanded by adding up to two expansion units to one IPx Office unit. The IPx Office operates from a standard wide input 100-240VAC, 47-63Hz or from a -48VDC source.

#### VoIP

- G.168 line echo-cancellation
- Gain control
- Voice codec: G.711A/u law, G.726, G.723.1, G.729 A/B
- Tone generation and detection: DTMF, Dial, Busy Ring back, call process
- Protocol support: SIP, MGCP, RTP/RTCP

#### Circuitry

The Coral IPx Office includes digital communications switching based on Pulse Code Modulation (PCM) switching technology. The active circuitry of the system is embedded on the MCB Office card and removable cards.

The active circuitry of the IPx Office system serves common control and peripheral functions. The common control circuitry directs call traffic through the system, establishing audio connections between peripheral ports and an outlet to the IP world.

The peripheral circuitry provides the hardware necessary to establish those connections. Instructions from the common control to the peripheral circuitry, and status information from the peripheral circuitry to the common control are passed through the group controller, which provides driver and time slot interchange functions for the PCM highways and the HDLC channels.

The common control is further divided into shared service, the group controller, the main central processor, connection to the IP and the MRC.

The shared service circuitry is integrated into the MR / RMI / U-MR / U-RMI Office peripheral card, which provides the equipment necessary to establish calls between peripheral interfaces.

The peripheral interface circuitry provides standardized electrical connections to external telephone station equipment and network facilities.



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## *Major Features*

The Coral IPx Office main unit houses all hardware components of the Coral IPx Office system, including the power supply unit, control cards, peripheral cards, service cards, and I/O connections. In addition, the main unit:

- Provides all the features, capabilities, interfaces, and terminals of the Coral communication server
- Provides built-in voice/data convergence
- Provides built-in hardware for functions: C/PUGW, C/MAP, CLA (CoraLINK)
- Optimizes space utilization through extensive configuration flexibility
- Fits into standard 19" and 23" racks, including racks designed to earthquake specifications. See [Mounting the IPx Office onto a Rack, page 2-14](#).
- Can be mounted on a table. See [Mounting the IPx Office onto a Table, page 2-13](#).
- Enables AC or DC input power supply in every cage. See [Chapter 7, Power Supply](#).
- Enables connection to the IP world via interface through the NTU Office card
- Enables full communication between digital and IP stations
- Includes simple Input/Output (I/O) cable routing directly from the peripheral cards on the rear panel of the unit
- Includes simple assembly procedures
- Can be mounted on the same rack as customer-supplied cages
- Includes up to two expansion cages per system. See [System Configuration Options, page 6-25](#).
- Includes forced ventilation supported by internal fans within the unit
- Includes full RFI protection
- Supports the insertion of peripheral cards under power conditions

**Table 1-2 IPx Office System Specifications**

| Specification *  | IPx Office Main Unit  | IPx Office EX† Expansion Unit | IPx 500X Cage  | IPx 800X Cage                 | FlexiCom 200 CSLX Cabinet   |
|--|---|-------------------------------|--|-------------------------------|---|
| Control cards  | MCB Office (1)  | —                             | —  | PX card ‡ (1 or 0)            | —   |
| Shared Service Card Slots                                    | 1   | —                             | —  | 0 or 1                        | 1   |
| Peripheral Interface Card Slots                              | 5 (or 4 + ESIM)   | 4 + ESIX                      | 10   | 11                            | 2   |
| CTI functions  | CLA built-in  | —                             | —  | —                             | —   |
| Ports per Slot   | <u>Office half-sized cards:</u><br>4, 23, 30 trunks<br><br><u>Office full-sized cards:</u><br>4, 8, 16, 24 stations, 8 trunks |                               | <u>XXX-ipx Cards:</u><br>4, 8, 23, 24, 30 trunks,<br>8 RBS (FlexAir),<br>8, 16 or 24 stations,<br>240 IP endpoints |                               | <u>Universal Cards:</u><br>4, 8, 23, 24, 30 trunks,<br>8, 16 RBS (FlexAir wireless),<br>8, 16 or 24 stations,<br>240 IP endpoints |
| IP endpoints   | 240   | —                             | Requires PUGWipx card  | Requires PUGW card            |   |
| Maximum Combined Trunk and Station (Wired Ports) per cage ** | 108 (or 78 + ESIM)  | 108                           | 240  | 264                           | 48 stations and 30 trunks or 90 trunks  |
| Maximum Ports In Use Simultaneously                          | Non-blocking system   |                               | 384 ports in two expansion cages   |                               | 128 ports in two expansion cages  |
|  | <i>(See Chapter 1 of the Coral IPx and FlexiCom Product Description)</i>  |                               |  |                               |   |
| Power Input  | -48VDC and 100-240VAC 47-63Hz   |                               |  |                               | 115/230VAC 60/50Hz  |
| Rack Mounted – Size (H×W×D)                                  | 3.5×19.0×17.7 inches (9×48×45 cm)   |                               | 15.2×19.0×8.0 inches (39×48×20.4 cm)   | 16×19×13 Inches (40×48×33 cm) | —   |
| Wall Mounted – Size (H×W×D)                                  | —   | —                             | 15.2×18.5×9.2 inches (39×47×23.3 cm)   | —                             | 16×20×8 inches (41×50×20 cm)  |
| Table Mounted – Size (H×W×D)                                 | 3.5×17.5×17.7 inches (9×44.3×45 cm)   |                               | —  | —                             | —   |
| Weight - fully assembled                                     | 19.4 lbs (8.8 Kg)   |                               | 30 lbs (13.5 Kg)   | 57 lbs (26 Kg)                | 22 lbs (10Kg)   |
| Operating Temperature  | 32-104°F (0-40°C)   |                               |  |                               |   |
| Operating Humidity   | 20-80% Relative, Non-Condensing   |                               |  |                               |   |
| Maximum Power Consumption (Watt) ††                          | 160   | 160                           | 460  | 575                           | 150   |
| Heat Dissipation (BTU/Hr)                                    | 246   | 246                           | 700  | 1070                          | 312   |

\* For a full list of specifications see Chapter 1 of the Coral IPx and FlexiCom Product Description.

† Expansion cabinets; IPx Office EX and FlexiCom 200 CSLX require Coral Software Version 15.5 or higher.

‡ A PX card occupies slot 1 of the first IPx 800X expansion cage.

\*\* The maximum number of ports listed is a nominal estimate that does not include IP endpoints or FlexAir handsets and is also subject to change depending on the combination of cards installed. The available number of ports, IP endpoints and FlexAir handsets in a system is subject to SAU authorization.

†† Maximum power consumption and heat dissipation are worst-case projections based on fully populated cages. The figures do not include power consumption and heat dissipation caused by stationary batteries in a high rate of charge.

## Recommended Tools

---

The following tools are required in order to install and maintain the Coral IPx Office system:

### Required Tools:

- 4 mm (max.) flat blade screwdriver for installation and removal of the door
- 3/16", 1/4", and 5/16" straight-blade screwdrivers
- #1 and #2 Phillips screwdrivers
- Diagonal wire cutters
- Long-nosed pliers
- Electrician's pliers
- Slip-joint pliers
- Adjustable wrench
- Wrench for ground cable hex nuts (3.2 mm x 7 mm)
- Telephone cable cutters
- Standard crimping tool
- Telephone cable insulation strippers
- 16 ft (5m) measuring tape
- Punch tool matching all telephone cable terminal blocks used at the installation site
- Digital Volt/Ohm/Amp meter
- Telephone line test set capable of pulse and DTMF dialling
- Static dissipating wrist strap
- Portable (laptop) personal computer with a PCMCIA slot, capable of emulating an asynchronous ASCII data terminal and approved by the manufacturer to run the binary database save and restore utility, portable asynchronous ASCII data terminal, or permanently installed on-site personal computer or ASCII data terminal.

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*Optional Tools:*

- Modular line polarity tester
- Flashlight
- Tone/continuity/talk battery generator
- Tone detector/amplifier probe
- Telephone line test set with MF tone signalling capability
- Alligator clip leads
- AMP™ Champ™ installation tool
- Soldering iron and high quality, rosin-core solder
- 3/16" and 1/2" cable staple gun
- Analog line transmission analyzer
- Portable DS1/E1 analyzer, Bit Error Rate tester, and channel demultiplexer

# Chapter 2

## Hardware Installation Procedure

Coral

|     |  |      |
|-----|--|------|
| 2.1 | <i>Site Inspection</i> .....                     | 2-1  |
| 2.2 | <i>Equipment Installation</i> .....              | 2-7  |
| 2.3 | <i>Program Interface Device Connection</i> ..... | 2-47 |



# 2.1 Site Inspection

## Installation Environment

The Coral IPx Office system should be installed in restricted access areas (dedicated equipment rooms, equipment closets, etc.) in accordance with articles 110-16, 110-17, and 110-18 of the national electric code, ANSI/NFPA 70.

Access to the system should be limited and controlled to prevent unauthorized access. The system uses hazardous working voltages and extremely high short circuit currents, and the area must be protected against damage by, and injury to, unqualified personnel.

Due to these considerations, an installation area must be chosen in accordance with the following guidelines:

- 1 Verify that the installation area is clean, dry, and protected from weather extremes.
- 2 Verify that the floor of the installation area is covered with linoleum, vinyl, ceramic, wooden flooring, or polished sealed concrete. Carpeting is not acceptable.
- 3 Verify that the ceiling of the installation area is finished or treated to prevent particle discharge.
- 4 Verify that the installation area is well lit, and that the light is uniformly diffused without shadows. Adequate lighting should provide a comfortable reading level and allow for wire insulator color identification without undue eye fatigue.

Lighting should be comparable to an office work environment, with a minimum level of 70 foot-candles at each work surface. As a general rule, in a room with an 8 ft (2.5m) ceiling, one 48 inch fluorescent tube provides sufficient illumination for 20-25 sq. ft. (1.9-2.4 m<sup>2</sup>).

- 5 Verify that ventilation of the installation area is capable of maintaining an ambient temperature of 32°-104°F (0°-40°C), and a relative humidity of 20-80% non-condensing, considering the system nominal heat dissipation 700 BTU/hr. (These figures are for each cage only, and do not take into account heat generated by other equipment.)

- 6 Verify that the installation area is free of caustic or corrosive liquids, substances, or materials. Check local building codes for additional requirements.
- 7 Verify that the installation area is located no closer than 20ft (6.1m) from electric devices that produce large electro-magnetic fields or high levels of radio frequency energy. Possible sources are radio transmitters, electric arc welding machines, copying machines, electric motors, refrigeration units, power transformers, electric load centers, and main circuit breaker panels.
- 8 Verify that the installation area provides reasonable security to the system. Room construction should include solid, reinforced walls and a locking door.

## Space Requirements

---

This section describes the Coral IPx Office space requirements.

- 1 Verify that there is sufficient space for the Coral IPx Office system components.
- 2 The dimensions and weights of the various components are provided in [Figure 2-1](#), [Table 2-1](#) and [Table 2-2](#).
- 3 A minimum clearance, as detailed in [Table 2-3](#), must be provided around the the various system components. For more detailed information, see [Figure 2-3 on page 2-4](#).
- 4 [Figure 2-3](#) displays a schematic diagram of all installation orientation options.
- 5 The cage must be mounted horizontally.
- 6 The mounting of an optional expansion cage should be taken into consideration when mounting the Coral IPx Office equipment.
- 7 For safety reasons, the top cover of the IPx Office unit must not be positioned higher than 64" (162.5 cm) from the floor.
- 8 Sufficient space must be reserved for any additional equipment related to the Coral IPx Office system, such as the Program Interface terminal or personal computer, voice mail system, external public address system, etc.
- 9 Sufficient space must be reserved for a technician's desk or work table.



**Table 2-1 Coral IPx Office Dimensions**

| <i>Item</i>     | <i>Dimension</i> | <i>Inches</i>                   | <i>Centimeters (cm)</i>         |
|-----------------|------------------|---------------------------------|---------------------------------|
| IPx Office Unit | Width            | 17.5<br>(19 bracket to bracket) | 44.3<br>(48 bracket to bracket) |
|                 | Depth            | 17.7                            | 45                              |
|                 | Height - 2U      | 3.5                             | 9                               |

**Table 2-2 Coral IPx Office Weights**

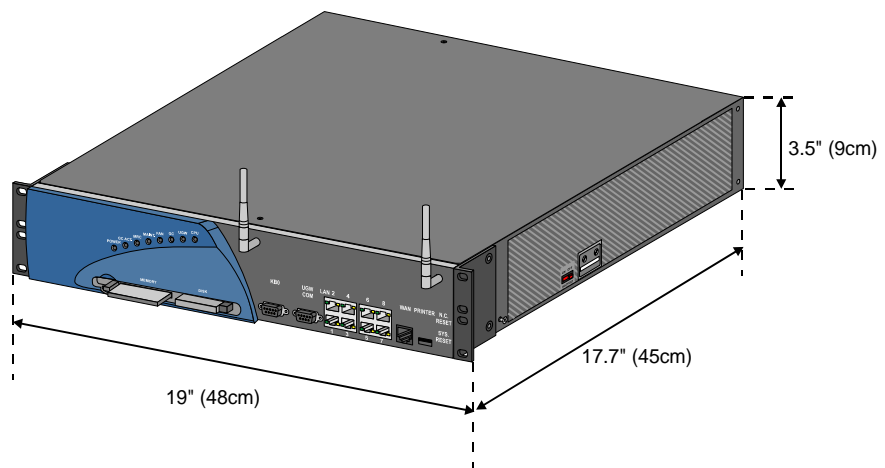
| <i>Item</i>                               | <i>Pounds</i> | <i>Kilograms</i> |
|---|---------------|------------------|
| IPx main Office Unit (Fully loaded)*      | 19.4          | 8.8              |
| IPx Office Expansion Unit (Fully loaded)* | 17.6          | 8.0              |

*\*The weight provided is typical and can significantly differ depending on the type of cards installed.*

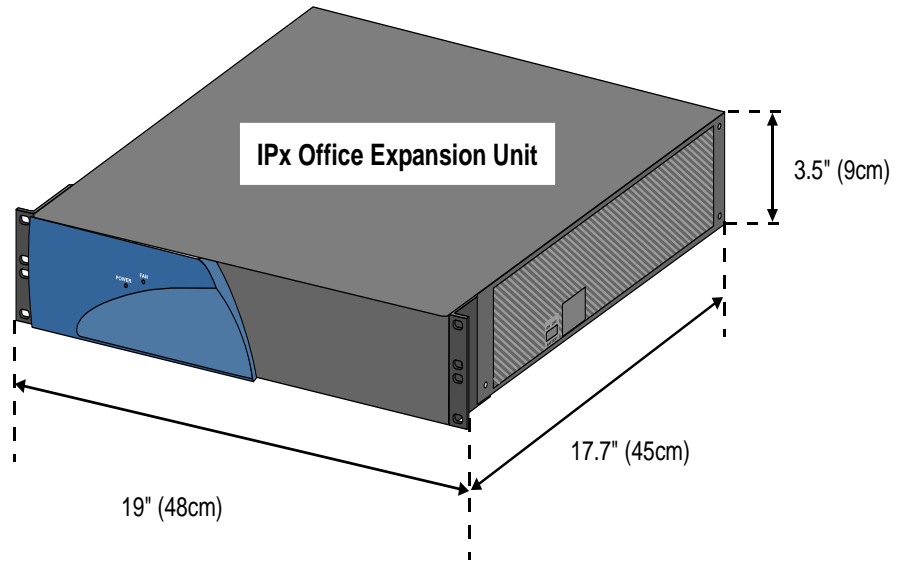
**Table 2-3 Coral IPx Office Space Requirements**

| <i>Item</i>     | <i>Dimension</i>                   | <i>Inches</i> | <i>Centimeters (cm)</i> |
|-----------------|------------------------------------|---------------|-------------------------|
| IPx Office Unit | Front                              | 36            | 100                     |
|                 | Rear                               | 36            | 100                     |
|                 | Sides                              | 3.15          | 8                       |
|                 | Space between front and rear rails | 18.1 - 25.2   | 46 - 64                 |

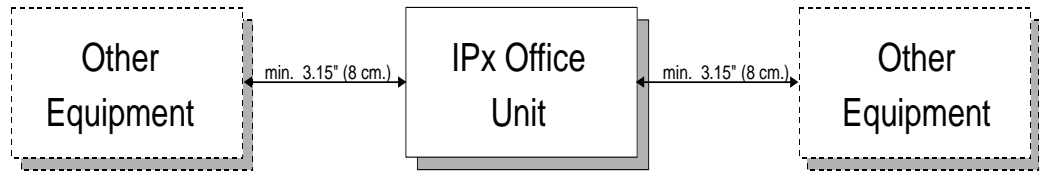
**Figure 2-1 Coral IPx Office Main Unit Sizes**



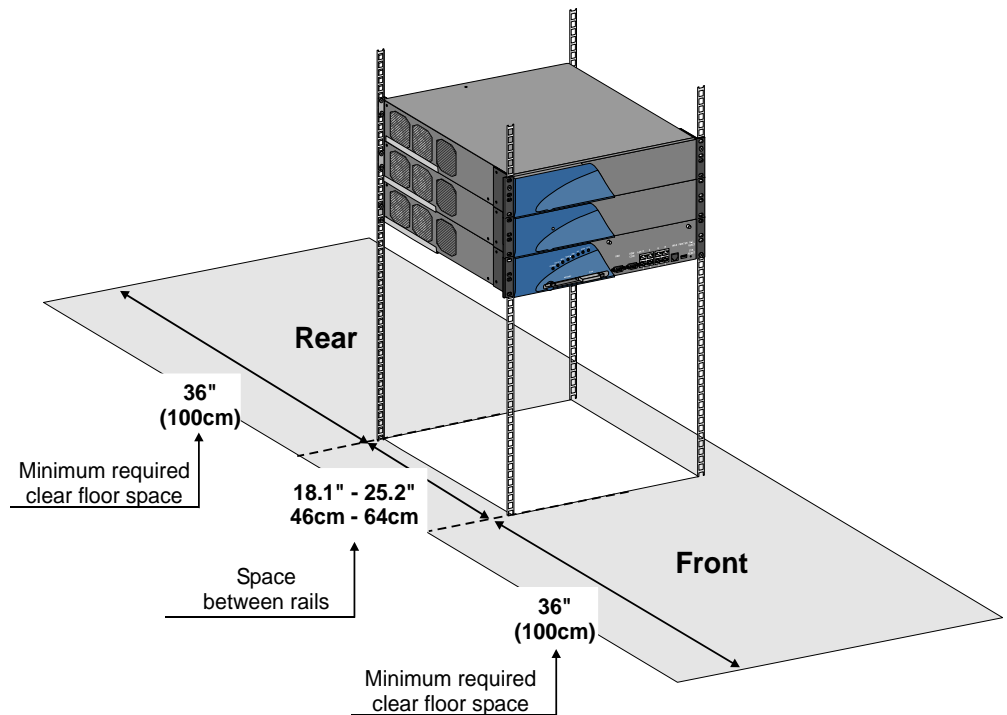
**Figure 2-2 Coral IPx Office Expansion Unit Sizes and Weights**



**Figure 2-3 Coral IPx Office Space Requirements (from Side Panels)**



**Figure 2-4 Coral IPx Office Space Requirements (from Front and Rear Panels)**



## Electrical Requirements

---

### *General Requirements*

The Coral IPx Office operates from a standard wide input of 100 to 240VAC, 47 to 63Hz source or from a -40 to -56VDC source.

- 1 Verify that electrical service is sufficient and located in close proximity to the system. Coral IPx Office system requires at least one dedicated branch circuit with at least two receptacles: one for the cage, and one for ancillary equipment such as data terminals or personal computers, external paging equipment, or test instruments, etc.
- 2 For 115VAC or 230VAC power, a 1.85mm<sup>2</sup> or 14AWG wire must be used in the circuit branch.
- 3 Each branch circuit must be independently protected by a fuse or circuit breaker, and must not be controlled by a switch. C-type fuses must be used where required by local authorities.
- 4 The receptacle for the Coral system branch circuit must be located within 4 feet (1.2m) of the cage for AC operated systems, or within 4 feet (1.2m) of the 48VDC power supply for DC operated systems.
- 5 Auxiliary branch circuit receptacles should be located conveniently for ancillary equipment, and should allow data terminals, personal computers, or test instruments to be operated near the system.
- 6 [Table 2-4](#) lists the voltages and current requirements for each cabinet.

### *DC Electrical Requirements*

DC powered units must comply with the following instructions:

- 1 **Restricted Access Area:** The DC powered equipment should only be installed in a Restricted Access Area.
- 2 **Installation Codes:** The equipment must be installed according to country national electrical codes. For North America, equipment must be installed in accordance with the US National Electrical Code, Articles 110-16, 110-17 and 110-18 and the Canadian Electrical Code, Section 12.
- 3 **Overcurrent Protection:** A readily accessible listed branch circuit overcurrent protective device rated "30A/60VDC minimum slow blow" must be incorporated in the building wiring for every three units.

- 4 **CAUTION:** This equipment is designed to permit connection between the grounded conductor of the DC supply circuit and the grounding conductor at the equipment. See installation instructions below.
- 5 The equipment shall be connected to a properly grounded supply system.
- 6 All equipment in the immediate vicinity shall be grounded the same way, and shall not be grounded elsewhere.
- 7 The DC supply system is to be local, i.e. within the same premises as the equipment.
- 8 A disconnect device is not allowed in the grounded circuit between the DC supply source and the frame/grounded circuit connection.

**Table 2-4 Coral IPx Office Maximum Power Requirements**

| <b>System Configuration*</b>         | <b>115VAC</b> | <b>230VAC</b> | <b>-48DC</b> |
|--------------------------------------|---------------|---------------|--------------|
| Main                                 | 2.2 A         | 1.5 A         | 4 A          |
| Main + IPx Office EX                 | 4.4 A         | 3.0 A         | 8 A          |
| Main + IPx Office EX + IPx Office EX | 6.6 A         | 4.5 A         | 12 A         |
| Main + IPx 500X                      | 8.2 A         | 4.5A          | 14A          |
| Main + IPx 500X + IPx 500X           | 14.2A         | 7.5A          | 24A          |
| Main + IPx 800X                      | 8.2 A         | 4.5A          | 14A          |
| Main + IPx 500X + IPx 800X           | 14.2A         | 7.5A          | 24A          |
| Main + IPx 800X + IPx 800X           | 14.2A         | 7.5A          | 24A          |
| Main + F.C. 200 CSLX                 | 3.5           | 2.2           | —            |
| Main + F.C. 200 CSLX + F.C. 200 CSLX | 4.8           | 2.9           | —            |

\* Maximum power requirement is a maximum case projection based on fully populated systems. The total number may be defined per actual system.

## 2.2 *Equipment Installation*

### ● Introduction

---

The Coral IPx Office cage description is covered in [Chapter 6, General System Description](#). The cage mounting and installation procedure includes the following stages:

- [Unpacking the Shipping Container](#) on page 2-8
- [Preparing the Unit for Installation](#) on page 2-11
- [Installing the Front Section Cards](#) on page 2-12 if necessary
- [Installing the External Components](#) on page 2-12
- One of the following:
  - [Mounting the IPx Office onto a Table](#) on page 2-13
  - [Mounting the IPx Office onto a Rack](#) on page 2-14
- [Ground Wiring](#) on page 2-18
- [Strapping the Configuration Jumpers](#) on page 2-23 if necessary
- [Peripheral Card Installation](#) on page 2-24
- [Interconnecting IPx Office Main and the Expansion Units](#) on page 2-37
- [Installing the DC Power Supply](#) on page 2-41 if necessary
- [Connecting the Power Wires](#) on page 2-42

#### **WARNING!**

*General Hazard. Installation and maintenance activities carried out by unqualified personnel could lead to death, serious injury, or damage to equipment. Only qualified service technicians certified by the manufacturer may install and maintain the Coral IPx Office.*

## Unpacking the Shipping Container

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- 1 Inspect the shipping container for evidence of physical damage or mishandling. Report any damage to the carrier immediately.
- 2 If it is necessary to make a damage claim to the carrier, do not move the container until it has been examined by a representative of the carrier. Otherwise, before opening, move the container as close as possible to the installation area.
- 3 Using a utility knife, carefully cut the tape securing the top flaps of the container and open the flaps.
- 4 Remove any parts in the depressions of the top foam insert.
- 5 Remove the top foam insert and set aside.
- 6 Using an assistant to prevent personal injury, grasp the ends of the cage and lift it out of the container. Place the cage on a stable surface.
- 7 Inspect the cage and covers for shipping damage.
- 8 Check the part list and verify that all the items are present. [Table 2-5](#) lists the components that are supplied with the Coral IPx Office system.
- 9 Remove any other items from the shipping container, and move the container so that it does not interfere with the remaining installation procedures.

**Table 2-5 Part List (Items per IPx Office Main Unit)**

| Item Description   | Quantity    |
|--|-------------|
| Main unit (IPx Office*), including one MCB Office card   | 1           |
| For systems that include expansion cages, one ESIM Office card (ordered at specific customer request) including one of the following expansion cables: <ul style="list-style-type: none"> <li>■ To IPx Office expansion unit: 50 pin female pin-type SCSI connector / female 50 pin ribbon SCSI connector</li> <li>■ To IPx 500X / 800X: 50 pin female pin-type SCSI connector / female 50 pin D-type connector</li> <li>■ To FlexiCom 200 CSLX: 50 pin female pin-type SCSI connector / female 25 pin D-type connector</li> </ul> | 1           |
| PS Office AC or DC power supply unit (AC supplied by default; DC ordered at specific customer request)   | 1           |
| Peripheral interface cards (ordered by the customer)   | As required |
| Installation kit including:  | 1           |
| ■ Front 19" rack-mounting brackets attached to the unit (23" brackets are supplied separately, at specific customer request)   | 2           |
| ■ M4X8 Phillips screws for rack mounting bracket   | 6           |
| ■ Table-mounting rubber supports   | 5           |
| ■ Right rear rack-mounting bracket   | 1           |
| ■ Left rear rack-mounting bracket  | 1           |
| AC Power cord  | 1           |
| DC cable harness (ordered at specific customer request) including:   | 1           |
| ■ Molex™ 39-00-0078 crimp terminal   | 1           |
| ■ Molex™ 39-01-4031 connector (3 circuit minifit pitch 4.2mm)  | 1           |
| ■ Black 16AWG wire approximately 2m long   | 1           |
| ■ Red 16AWG wire approximately 2m long   | 1           |
| Main Resources Card (ordered at specific customer request)   | 1           |
| NTU Office card (ordered at specific customer request)   | 1           |
| U-MR / MR / RMI / U-RMI card<br>(U-MR card is supplied as standard. All other variations of the card (U-RMI, RMI, MR) require special order and checking of availability)  | 1           |
| ICM8/16 flash memory card  | 1           |
| SAU lock device  | 1           |
| Compact flash disk (ordered at specific customer request)  | 1           |
| DBM-X (ordered at specific customer request)   | 1           |
| WiFi card including antennas and cables (ordered at specific customer request)   | 1           |
| Any of the following blank panels (ordered at specific customer request):  |             |
| ■ Full size  | 1           |
| ■ Half size (upper)  | 1           |
| ■ Half size (lower)  | 1           |
| ■ Half size (right)  | 1           |

\* For items included with IPx Office expansion unit, see [Table 2-6](#). For items included with IPx 500X or IPx 800X expansion cages or the FlexiCom 200 CSLX expansion cabinets, see the relevant *Installation Procedure and Hardware Reference Manual*.

**Table 2-6 Part List (Items per IPx Office Expansion Unit)**

| Item Description   | Quantity    |
|--|-------------|
| Expansion unit (IPx Office*)   | 1           |
| One ESIX Office card including a cable with 50 pin female pin-type SCSI connector / female 50 pin ribbon SCSI connector      | 1           |
| PS Office AC or DC power supply unit (AC supplied by default; DC ordered at specific customer request)                       | 1           |
| Peripheral interface cards (ordered by the customer)   | As required |
| Installation kit including:  | 1           |
| ■ Front 19" rack-mounting brackets attached to the unit (23" brackets are supplied separately, at specific customer request) | 2           |
| ■ M4X8 Phillips screws for rack mounting bracket   | 6           |
| ■ Table-mounting rubber supports   | 5           |
| ■ Right rear rack-mounting bracket   | 1           |
| ■ Left rear rack-mounting bracket  | 1           |
| AC Power cord  | 1           |
| DC cable harness (ordered at specific customer request) including:   | 1           |
| ■ Molex™ 39-00-0078 crimp terminal   | 1           |
| ■ Molex™ 39-01-4031 connector (3 circuit minifit pitch 4.2mm)  | 1           |
| ■ Black 16AWG wire approximately 2m long   | 1           |
| ■ Red 16AWG wire approximately 2m long   | 1           |
| Any of the following blank panels (ordered at specific customer request):  |             |
| ■ Full size  | 1           |
| ■ Half size (upper)  | 1           |
| ■ Half size (lower)  | 1           |
| ■ Half size (right)  | 1           |

\* For items included with IPx Office main unit, see [Table 2-5](#). For items included with IPx 500X or IPx 800X expansion cages or the FlexiCom 200 CSLX cabinets, see the relevant *Installation Procedure and Hardware Reference Manual*.



## ● Preparing the Unit for Installation

---

The process of mounting and installing the unit includes the following stages:

- [Checking the Space and Positioning Requirements on page 2-11](#)
- [Checking the Electrical Requirements on page 2-11](#)

---

### *Checking the Space and Positioning Requirements*

Verify that the Coral IPx Office system will be positioned in accordance with local and system space and positioning requirements. The spacing requirements as described in [Space Requirements on page 2-2](#) ensure proper system operation and maintenance.

---

### *Checking the Electrical Requirements*

Verify that the Coral IPx Office system installation meets all electrical requirements. The electrical requirements as described in [Electrical Requirements on page 2-5 on page 2-5](#) ensure safe operation and maintenance.

## Installing the Front Section Cards

---

This section describes how to install the front section cards if they have not already been installed by the manufacturer. Perform the relevant section of any card that has not yet been installed.

- 1 Remove the unit cover. See [Opening the Unit Cover](#), page 6-9.
- 2 Install the Main Resources Card (MRC), if supplied. See [Installing the MRC](#), page 9-8.
- 3 Install the (DBM-X) card, if supplied. See [Installing the DBM Card](#), page 8-49.
- 4 Install the main NTU Office card. See [Installing the NTU Office Card](#), page 11-10.
- 5 Install the optional WiFi NTU Office card and antenna cable, if supplied. See [Assembling the WiFi Card](#), page 11-13.
- 6 Close the unit cover as described in [Closing the Unit Cover](#), page 6-10.

## Installing the External Components

---

This section describes how to install the components that are installed externally if they have not already been installed by the manufacturer. Skip the relevant section of any component that is already installed.

- 1 Install the IMC8 or IMC16 flash card. See [Flash Memory Cards - IMC8 and IMC16](#), page 8-37.
- 2 Install the compact flash disk. See [DISK - Compact Flash Disk](#), page 8-45.
- 3 Install the Software Authorization Unit (SAU). See [Software Authorization Management](#), page 8-24.
- 4 Install the WiFi antennas. See [Assembling the WiFi Antennas](#), page 11-18.

## ● Mounting the IPx Office onto a Table

For units mounted onto a rack, skip to [Mounting the IPx Office onto a Rack, page 2-14](#). To mount the unit onto a table:

- 1 Peel off five rubber bumpers provided and affix them onto the bottom panel of the IPx Office unit as shown in [Figure 2-5](#).



### NOTE:

Attaching the rubber bumpers on to the bottom panel of the IPx Office unit will increase the height of the unit by approximately 0.16" (4mm).

- 2 Turn ON the battery switch. See [Figure 6-7 on page 6-7](#).

Figure 2-5 **Table Mounting Bumpers**

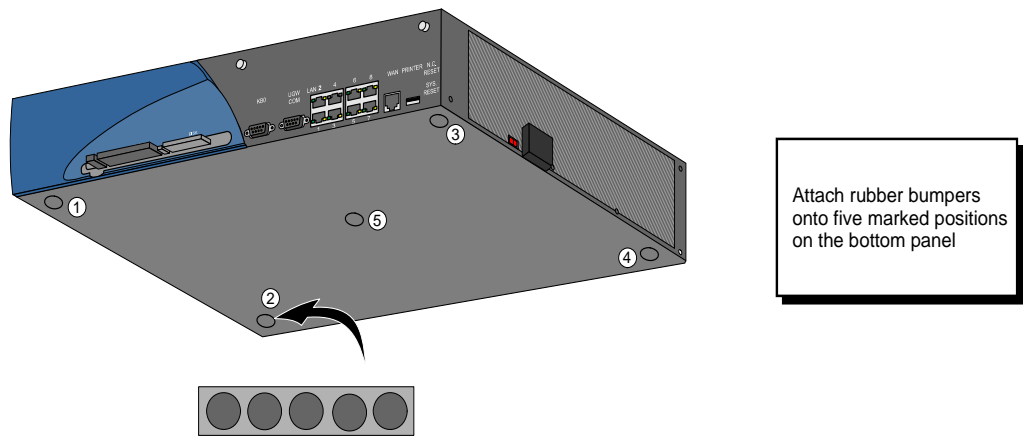
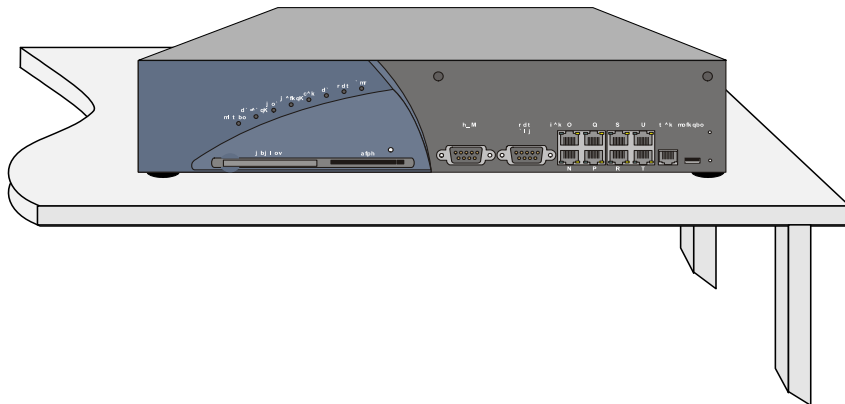


Figure 2-6 **IPx Office Unit Mounted on Table**



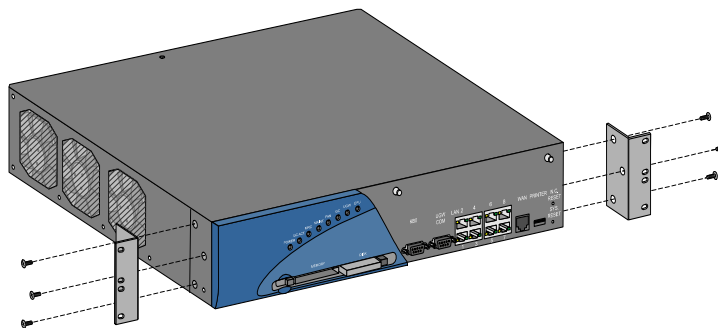
## Mounting the IPx Office onto a Rack

The IPx Office is supplied to the field with the front rack-mounting brackets attached to the unit. These brackets are designed to fit the unit onto a 19" rack. If the unit is to be mounted onto a 23" rack, perform the following procedure. Otherwise, skip to [Preparing the Rack for Unit Mounting, page 2-14](#).

### *Preparing the Unit for Mounting onto a 23" Rack*

- 1 Remove the existing 19" front rack-mounting brackets from the unit.
- 2 Align a 23" front rack-mounting bracket such that the three holes are adjacent with the holes on the unit.
- 3 Insert three of the M4X8 screws provided into the three holes and fasten the right bracket to the unit.
- 4 Repeat [Step 1](#) through [Step 3](#) for the other front rack-mounting bracket.

**Figure 2-7 23" Bracket Installation**



### *Preparing the Rack for Unit Mounting*

The IPx Office unit is supported from the rear by two brackets that are attached to the rack. To install the support brackets (see [Figure 2-8](#)):

- 1 Fasten the left rear rack-mounting bracket to the rack.
- 2 Fasten the right rear rack-mounting bracket to the rack.



#### **NOTE:**

*The fasteners that are secured to the rack are not included.*

### *Mounting the Unit onto the Rack*

- 1 Verify the unit mounting position on the rack. See [Space Requirements, page 2-2](#).

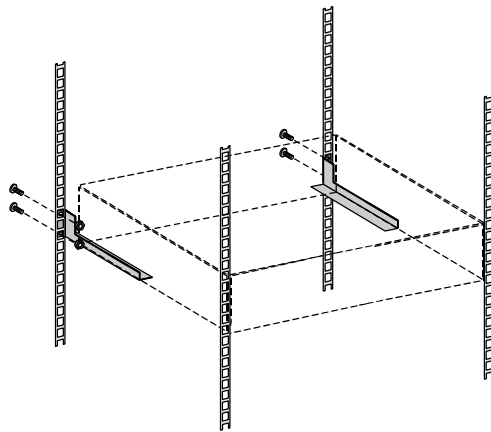
- 2 Grasp each end of the unit and lift it to the mounting position on the rack.

**WARNING!**

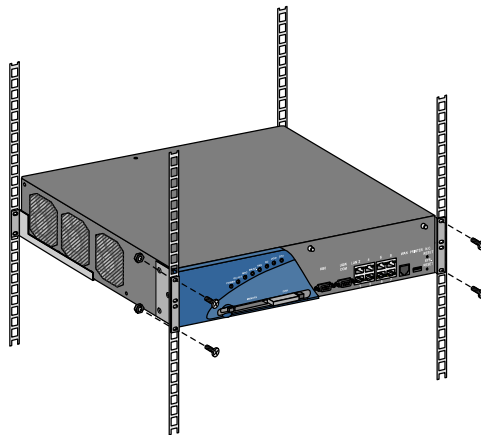
*Ergonomic Hazard. The weight is provided in [Table 2-2 on page 2-3](#). Serious injury could result due to improper handling. Use proper techniques to mount and secure to the rack.*

- 3 Rest the unit on the support brackets installed, while continuing to support the unit from the front and fasten the left and right bracket to the rack.
- 4 Turn ON the battery switch. See [Figure 6-7 on page 6-7](#).

**Figure 2-8 IPx Office Unit Mounted onto Rack**



**1** Fasten support brackets to rear side of rack



**2** Lift unit and fasten to rack

## *Dismounting the IPx Office Unit from the Rack*

- 1 Refer to [Removing the IMC8 Card, page 8-40](#) and carefully follow the procedure as described in that section.

### **CAUTION!**

*The IMC8 card could be damaged if removed when the system is powered. Data will be lost if power is removed from the system while programming the flash memory during backup.*

- 2 Do one of the following:
  - For DC powered systems, shut down the facilities power supply unit that supplies power to the system and disconnect the DC power connector from the PS Office DC power supply unit.
  - For AC powered systems, disconnect the AC power cable.

### **WARNING!**

*Electrical Hazard. This procedure requires handling power wires. Contact with live cables could cause shock, burn, or death. Verify that no power cables are connected to the system before handling and that the power switch is OFF.*

- 3 Disconnect all I/O cables from the rear panel.
- 4 Disconnect the ground wire from the unit ground terminal. **Do not** disconnect the ground connection from the master ground.
- 5 Unfasten the screws that secure the unit to the rack on each side of the unit.

### **WARNING!**

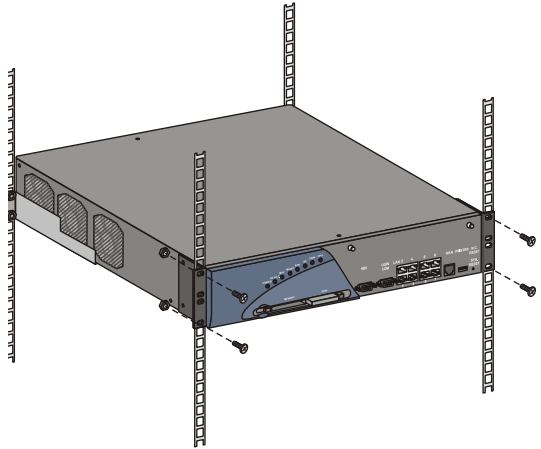
*Ergonomic Hazard. The weight is provided in [Table 2-2 on page 2-3](#). Serious injury could result due to improper handling. Use proper techniques to remove from the rack.*

- 6 Remove the unit from the rack using proper lifting techniques.

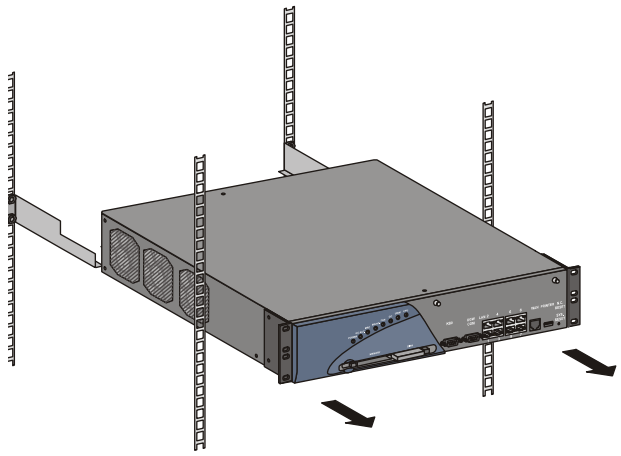
### **CAUTION!**

*Do **not** turn off the battery switch. If the backup power is removed, the database memory will be lost.*

**Figure 2-9 Removing IPx Office Unit from Rack**



**1** Unfasten screws from front bracket



**2** Remove unit from rack

## Ground Wiring

To ensure adequate protection from interference by RF energy, electrical impulse noise, and lightening or power line surge, the building electrical ground point must comply with grounding recommendations of the National Area Code, Article 800, and/or applicable local building and electrical codes.

The object of ground circuit design is to establish a low resistance path to the ground and to conduct a multitude of currents in such a way as to minimize the interaction of any two or more currents. In essence, the ground connection is used as a common conductor for many circuits: some carrying wanted signals, and others carrying unwanted signals. The same ground that carries small networking currents must also carry unwanted radio frequency energy, impulse noise, and lightening surges that might otherwise interfere with system operation.

The ground connection includes an M4 threaded terminal pole welded onto the surface of the rear panel, a serrated washer between each terminal connection, a flat washer, and an M4 nut.

### **WARNING!**

*Electrical Hazard. Incorrect ground wire connections to the system can cause shock, burn, or death.*

*Verify that the ground wires are 10 AWG stranded conductor.*

*Verify that all ground connections are made directly from the cage ground connection to the master ground.*

**Do not** interconnect cage ground terminals between the Coral units.

*Ring terminals retain wires onto the terminal lug when the connection is loosened.*

*Verify that all ground wires include ring terminals at both ends.*

*Connect only a Protective Earth (PE) to the Coral system.*

**Do not** connect a separate Telecommunications Reference Conductor (TRC).

*Resistance from the master ground to the building electrical ground should never exceed 1.0 ohm. The master ground bar should be located in the switching room as close as possible to the Coral system. Any ground connection of equipment related to the switching Coral system should ultimately connect to the master ground.*

The unit ground wire is connected to the unit on the rear panel. See [Connecting the Ground Wire to the Unit, page 2-19](#). For instructions on how to ground the customer-supplied MDF unit, see [Connecting the Ground Wires to the Master Ground, page 2-20](#).



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## Connecting the Ground Wire to the Unit

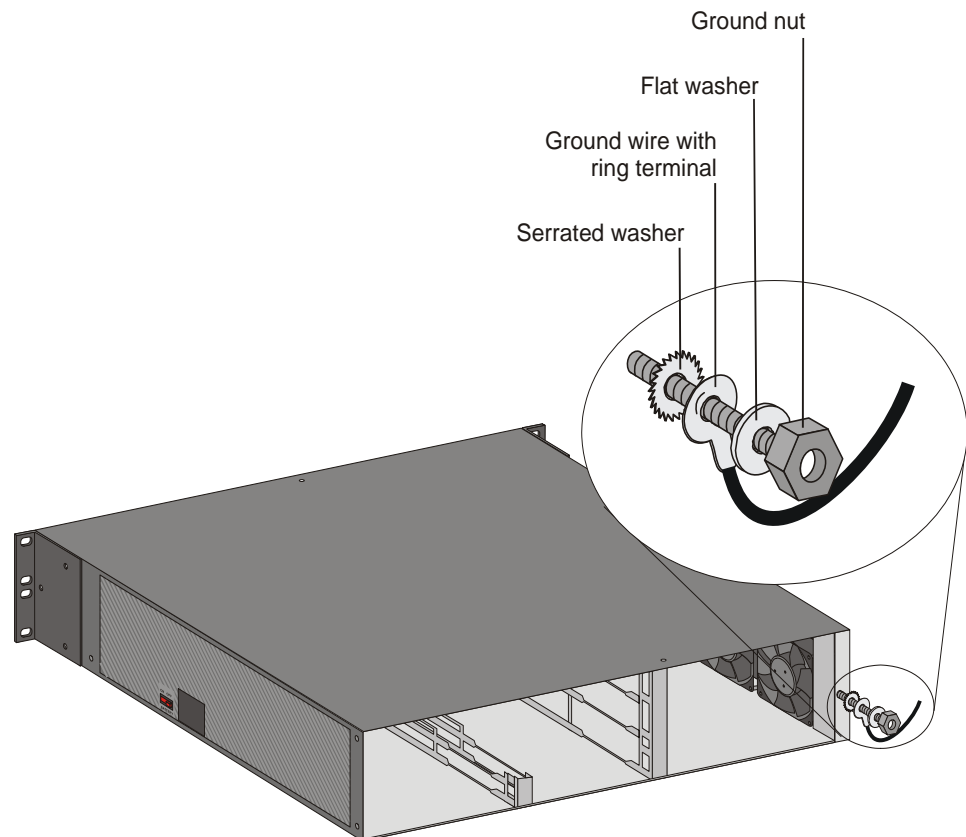
The cage ground connection includes one serrated washer, a flat washer, and one hexagonal nut assembled on the terminal connection. See [Figure 2-10](#).

Connect the ground wire to the cage as follows:

- 1 Remove the hexagonal nut and flat washer from the ground terminal. **Do not** discard.
- 2 Insert the serrated washer onto the ground terminal.
- 3 Insert the ground wire ring terminal over the serrated washer.
- 4 Insert the flat washer onto the ground wire ring terminal.
- 5 Fasten the hexagonal nut.

---

**Figure 2-10 Coral  
IPx Office Cage  
Ground Assembly**



## Connecting the Ground Wires to the Master Ground

A master ground must be included within the system. See [Figure 2-11](#), [Figure 2-12](#) and [Figure 2-13](#). The system ground connection is fabricated as follows:

- 1 The master ground unit must have the following specifications. See

[Figure 2-11](#):

Dimensions:..... Minimum of 5.5" x 1/4" x 1" (140 mm x 6 mm x 25 mm)

Material:..... Brass or Copper

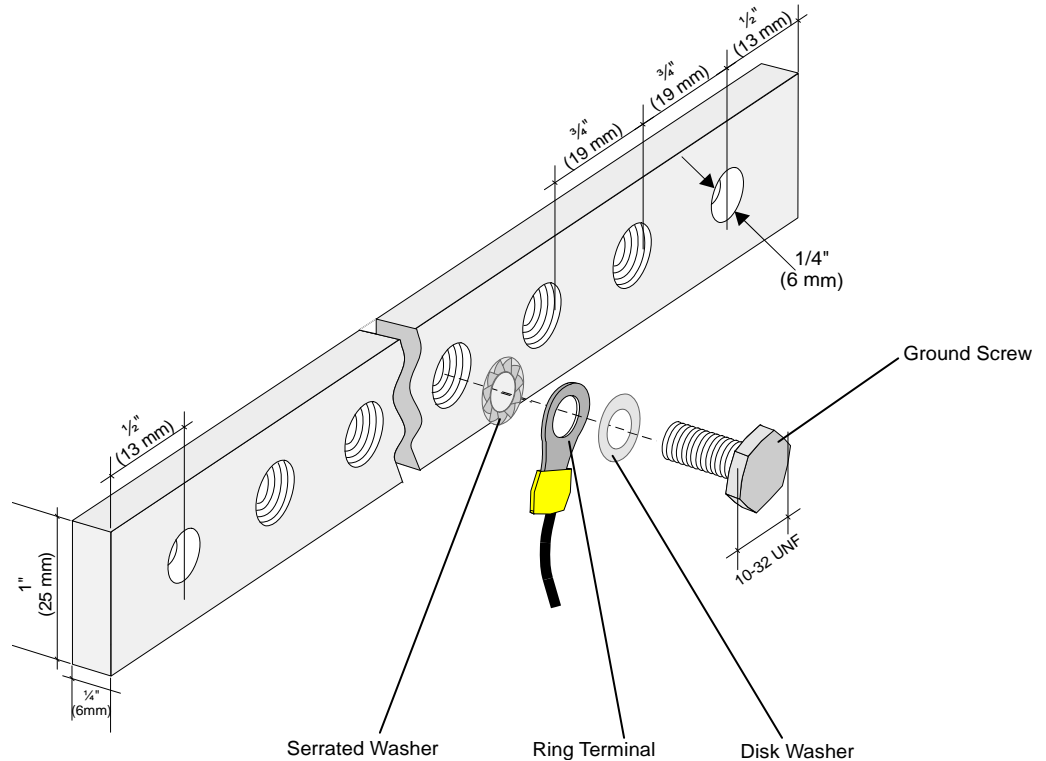
Mounting holes:..... 1/4" (6 mm) diameter, 1/2" (13 mm) distance from edges

Ground screws:..... 10-32 UNF

Washers..... One serrated washer above the ring terminal

Distance between screws:..... 3/4" (19 mm)

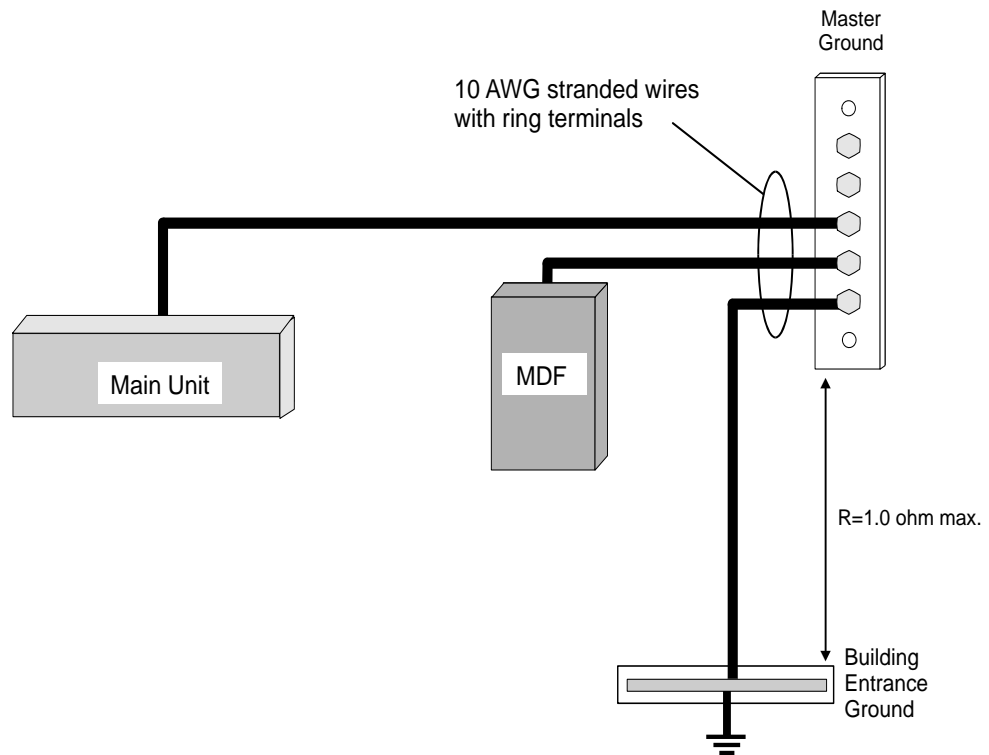
**Figure 2-11 Master Ground Unit**



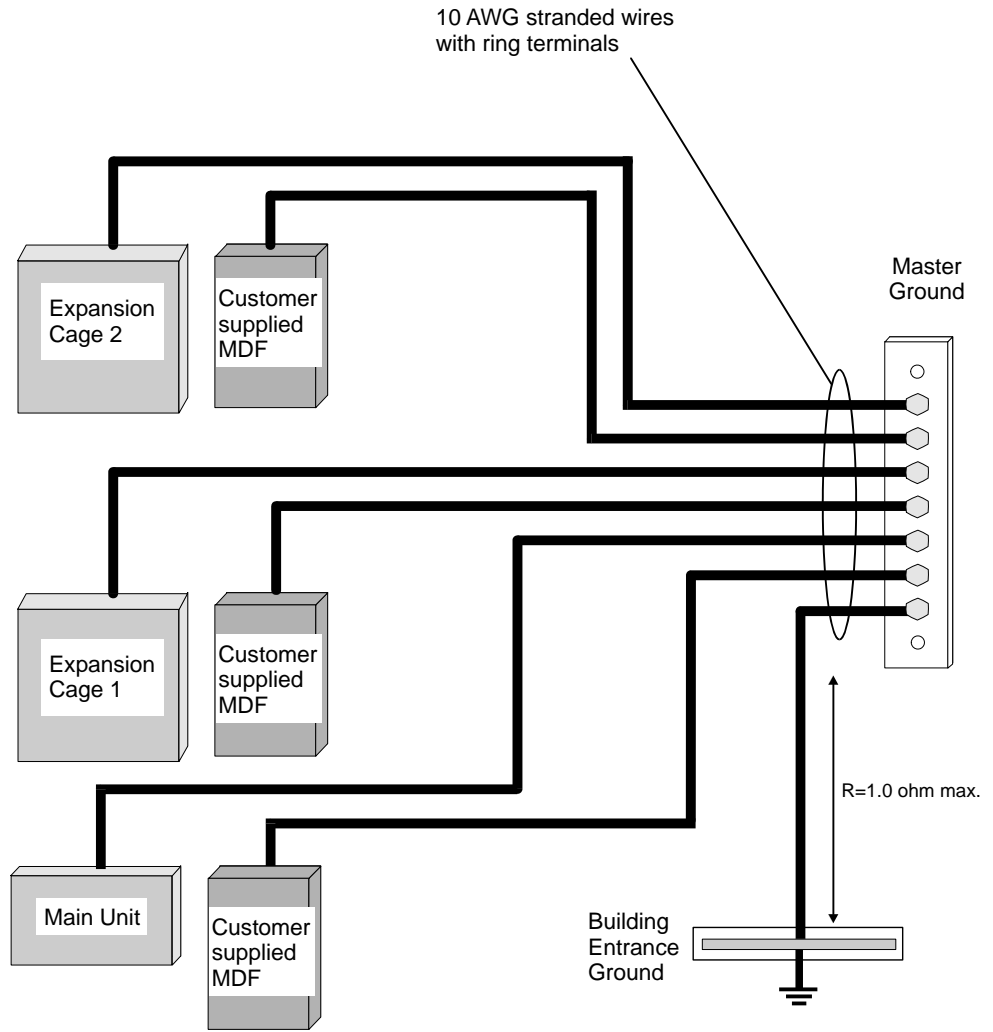
- 2 Verify that the ground wire is 10AWG stranded conductor, is the proper length and includes two ring terminals fitted onto either end of the wire that are suitable for connecting to the master ground and to the MDF.
- 3 Route the ground wire between the unit and the master ground.

- 4 Connect the ground wire to the unit as described on [Connecting the Ground Wire to the Unit](#), page 2-19.  
Connect the unit ground wire to the master ground unit as follows:
  - a Unfasten one of the 10-32 UNF screws connected to the master ground unit and retain the screw and serrated washer. See [Figure 2-11](#).
  - b Insert the 10-32 UNF screw such that the ground wire ring terminal is positioned between the serrated washer and the threaded hole of the master ground unit.
  - c Position the wire ring terminal over the threaded hole of the master ground unit and fasten. Tighten until snug. See [Figure 2-11](#).
- 5 Repeat [Step 1](#) through [Step 4](#) for all cages and MDF units in the system. Verify that the system ground wire connection between the different units and MDF is identical to the schematic diagram displayed in [Figure 2-12](#) or [Figure 2-13](#).
- 6 Connect the MDF to the master ground according to the manufacturer's recommendations.

**Figure 2-12 Main System Ground Connection**



**Figure 2-13 System Ground connection with Main and Two Expansion Units**



## Strapping the Configuration Jumpers

This section describes how to strap the shorting plugs of the various jumpers. In the Coral IPx Office system, some of the peripheral cards include jumpers that configure the shared service functions. For a detailed card description, see [Chapter 9, Shared Service Cards](#) and [Chapter 10, Peripheral Cards](#) or the *Peripheral and Shared Service Cards Installation Manual*. To set the configuration jumpers:

- 1 Connect the ESD wrist strap connector to the cage and put on the strap.

### CAUTION!

*Circuit cards contain static-sensitive circuitry and may be damaged or destroyed by electro-static discharge (ESD). Always wear the static dissipating wrist strap connected to the cage while handling cards. See [Figure 2-14 on page 2-24](#). Hold circuit cards by their edges and avoid touching contact surfaces. Handle with care and do not drop.*



### NOTE:

#### **Synchronization Jumpers**

*Using the same synch. classification for multiple cards or cages can result in system disruption. Verify that the synchronization jumpers are strapped as described in [Chapter 10, Peripheral Cards](#).*

#### **Expansion Cage Identification Jumpers**

*Defining two expansion cages with the same cage number could lead to system disruption. Verify that the cage numbering jumpers are strapped as described in Chapter 6 of the relevant *Installation Procedure and Hardware Reference Manual*.*

- 2 In the IPx Office main unit, configure the peripheral card jumpers. See *Peripheral and Shared Service Cards Installation Manual*.
- 3 For the IPx Office main unit, configure the ESIM card as described in [Figure 10-4 on page 10-23](#).
- 4 For IPx Office expansion units, configure the ESIX card as described in [Figure 10-5 on page 10-24](#).
- 5 For IPx 500X expansion cages, configure the jumpers as described in [Figure 2-18](#) and [Figure 2-19](#).
- 6 For IPx 800X expansion cages, configure the jumpers as described in [Figure 2-20](#) and [Figure 2-21](#).
- 7 For FlexiCom 200 CSLX expansion cabinets, configure the jumpers as described in [Figure 2-22](#) and [Figure 2-24](#).

## Peripheral Card Installation

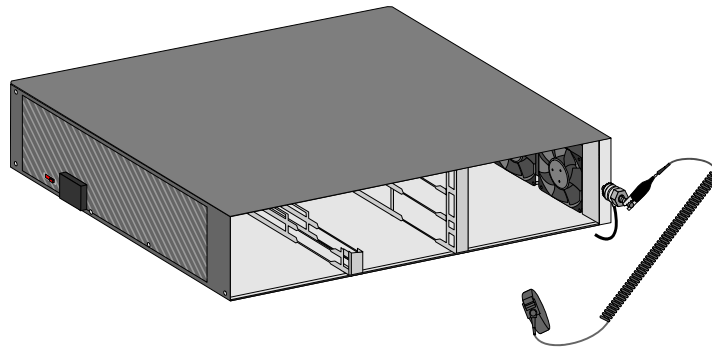
### *General Guidelines*

- 1 Connect a static dissipating wrist strap connector (not provided by the manufacturer) to the cage and put on the strap. See [Figure 2-14](#).

### **CAUTION!**

*Circuit cards contain static-sensitive circuitry and may be damaged or destroyed by Electro-Static Discharge (ESD). Always wear the static dissipating wrist strap connected to the unit. Hold circuit cards by their edges and handle with care.*

**Figure 2-14 ESD Strap Connection to Cage**



- 2 Grasp the card with both hands and fingers on the card edge near the front.
- 3 Verify that the card is oriented correctly (the red diagnostic indicator on the front side is oriented toward right of the card).
- 4 Align the edges of the circuit card with the card edge guides in the unit, and gently slide the card straight into the card slot. A slight resistance is felt as the multi-pin connectors on the circuit card mate with connectors on the backplane. Push against the front panel until it is flush with the unit frame.

### **CAUTION!**

*Do not force the circuit card into the slot. If more than slight resistance is encountered, remove the circuit card and examine the connectors for bent pins or interfering debris. Never place a card in a slot other than the dedicated one. See [Table 2-7](#).*

---

## Inserting a Peripheral Card into the Main Unit

**Table 2-7** lists the peripheral interface card types that may be inserted into each card slot in the Coral IPx Office system.



---

### NOTE:

Peripheral Interface cards listed in **Table 2-7** may require changes to jumpers on the card that determines the electrical characteristic or operation of each interface circuit. Refer to specific card descriptions in the *Coral Service and Peripheral Cards Installation Manual*.

---

Determine the position of peripheral interface cards that will be inserted into card slots 2-3 through slots 10-11 in the IPx Office main and IPx Office expansion units; slots 1 through 10 in the IPx 500X cages or 1 through 12 in the IPx 800X cages; and slots 1 through 3 in the FlexiCom 200 CSLX cabinets. Observe any order previously directed by a system designer or any established convention of the distributor. Card placement diagrams **Figure 2-15** through **Figure 2-24** can be used as a worksheet by the system designer to establish card placement prior to installation. Refer to **Table 2-7** to determine peripheral interface card types.

- See *Suggestions for Peripheral Card Distribution*, page 6-43 for timeslot/PCM distribution among the slots.
- If no other convention exists, see *Peripheral Card Installation*, page 10-1 and *Coral Service and Peripheral Cards Installation Manual*.
- For a description on possible full-sized card combinations, see *Analog/Digital Stations*, page 10-9.

---

## Inserting a Peripheral Card into the Expansion Unit, Cages, or Cabinets

- 1 If IPx Office expansion units are installed, determine the position of peripheral interface cards that will be inserted into card 2-3 through slots 10-11 in the expansion unit. Slot 6-7 is always reserved for the ESIX Office card. Observe any order previously directed by a system designer or any established convention of the distributor. The card placement diagram shown in **Figure 2-16** and **Figure 2-17** may be used as a worksheet by the system designer to establish card placement prior to installation. See **Table 2-7** for peripheral card types.



---

### NOTE:

IPx Office expansion units are supported by Coral software version 15.5 and higher.

---

- 2 If IPx 500X expansion cages are installed, determine the position of peripheral interface cards that will be inserted into card slots 1 through 10 in the expansion cage. Observe any order previously directed by a system designer or any established convention of the distributor. Card placement diagrams shown on [Figure 2-18](#) and [Figure 2-19](#) may be used as a worksheet by the system designer to establish card placement prior to installation. Refer to the *Coral IPx 500 Installation Manual Chapter 2* and the *Coral Service and Peripheral Cards Installation Manual*.

Place digital trunk interface cards in card slots 4 and/or 5. Slots 4 and 5 are wired as the primary and secondary external clock source, respectively. The cards inserted in these slots can be used to synchronize the Coral IPx system clock with a network clock signal derived from a digital trunk circuit.

If no other convention exists, refer to *Section 10, Peripheral Cards Installation* of the *Coral IPx 500 Installation Manual*.

- 3 If IPx 800X expansion cages are installed, determine the position of service and peripheral interface cards that will be inserted into card slots 1 through 12. Observe any order previously directed by a system designer or any established convention of the distributor. Card placement diagrams [Figure 2-20](#) through [Figure 2-21](#) may be used as a worksheet by the system designer to establish card placement prior to installation. Refer to *Coral IPx 800 Installation Manual - Section-2* and *Coral Service and Peripheral Cards Installation Manual*. If no other convention exists, plan the card placement as follows:

- In a system with one expansion cage, insert a shared service card into slot 1 of the expansion cage.
- In a system with two IPx 800X expansion cages, insert a PX card into slot 1 of the first expansion cage, and insert a shared service card into slot 1 of the second expansion cage.
- Insert the digital trunk interface cards into slots 4 and 5 of the designated cage(s). Slots 4 and 5 are wired as the primary and secondary external clock source, respectively. The cards inserted in these slots can be used to synchronize the Coral system clock with a network clock signal via a digital trunk circuit. Refer to [Digital Trunk Synchronization, page 10-15](#) and *Coral Synchronization via Digital Trunks* section in the *Coral Service and Peripheral Cards Installation Manual*, for more information on synchronization.
- Insert peripheral cards into slots 2 through 12 of the expansion cages.



- 4 If FlexiCom 200 CSLX cabinets are installed, determine the position of peripheral interface cards that will be inserted into card slots 1 through 3 in the expansion cages. Observe any order previously directed by a system designer or any established convention of the distributor. Card placement diagrams shown on [Figure 2-22](#) through [Figure 2-24](#) may be used as a worksheet by the system designer to establish card placement prior to installation. Refer to the *Coral FlexiCom 200 Expansion Unit (CSLX) Installation Procedure and Hardware Reference Manual, Chapter 2* and the *Coral Service and Peripheral Cards Installation Manual*.



**NOTE:**

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*FlexiCom 200 CSLX cabinets are supported by Coral software version 15.5 and higher.*

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- 5 Remove the peripheral interface cards from their shipping containers and partially insert them into the card slots as determined above. Allow the cards to protrude from the card cage by approximately 1 inch (2.5 cm).
- 6 Skip to [Interconnecting IPx Office Main and the Expansion Units, page 2-37](#).

## Card Placement Diagrams

**Figure 2-15** through **Figure 2-24** may be used as a worksheet by the system designer to establish card placement prior to installation. Refer to the *Chapter 2* of the specific *Coral Installation Procedure and Hardware Reference Manual* and the *Coral Service and Peripheral Card Installation Manual* for further information.

**Table 2-7 Coral IPx Office Card Types**

| Card Type  | Card Names  | Slot Allocation  |                       |
|--|---|--|-----------------------|
| Peripheral Analog Trunk Interface                                  | 8T Office, 8T-CID Office  | 2-3 or 4-5   |                       |
|  | 4T Office, 4T-CID Office  | 10-11  |                       |
| Peripheral Digital Trunk Interface                                 | 4TBR Office, UDT Office*,<br>2DT Office*,<br>PRI-30 Office*, 30T Office*  | 8-9 or 10-11   |                       |
| Peripheral Wired Station Interface                                 | 8SFT Office,<br>16SFT Office,<br>24SFT Office,<br>4SA Office*,<br>8SA Office*,<br>16SA Office* (8SA + 8SAx),<br>24SA Office* (8SA + 16SAx),<br>4SA8F Office* (4SA + 8Fx),<br>4SA16F Office* (4SA + 16Fx),<br>8SA8F Office* (8SA + 8Fx),<br>8SA16F Office* (8SA + 16Fx), | 4S Office*,<br>8S Office*,<br>20S Office (8S + 12Sx),<br>4S8F* Office (4S + 8Fx),<br>4S16F* Office (4S + 16Fx),<br>8S8F* Office (8S + 8Fx),<br>8S16F* Office (8S + 16Fx) | 2-3 or 4-5            |
| Integrated Coral Message Center/<br>Voice Mail / Unified Messaging | IPC/SFC Office<br>IPC/uCMC Office<br>IPC/WiCMC Office   | 2-3 or 4-5   |                       |
| Resources  | MR* Office<br>RMI* Office   | U-MR* Office @<br>U-RMI* Office  | 6-7 (main unit, only) |
| Expansion  | ESIM* Office  |  | 8-9 (main unit, only) |
| Expansion  | ESIX* Office  |  | 6-7 (Ex. unit, only)  |

\* These cards may require changes to option straps which affect interface characteristics or operation. For reference material see the **Coral Service and Peripheral Cards Installation Manual**.

@ U-MR Office card is supplied as standard. All other variations of the card (U-RMI, RMI, MR) require special order and checking of availability.

### CAUTION!

Never insert "4/8/20S Office" and "4/8/16/24SA Office" cards in the same Coral IPx unit. Never exceed the number of POTs and FlexSets stations listed in [Table 10-5](#) and [Table 10-6](#).

Figure 2-15 **Coral IPx Office Main Unit Card Placement**

Coral IPx Office  
MAIN UNIT

Shelf Number: **1**

|                  |                  |                  |   |                       |
|------------------|------------------|------------------|---|-----------------------|
| ⊕                | Card Type: _____ | •                | ⊕ | PS Office Type: _____ |
| ⊕                | Card Type: _____ | •                | ⊕ |                       |
| Card Type: _____ |                  | Card Type: _____ |   |                       |
| Card Type: _____ |                  | Card Type: _____ |   |                       |

Figure 2-16 **Coral IPx Office 1st Expansion Unit Card Placement**

Coral IPx Office  
1st EXPANSION UNIT

Shelf Number\* **2**

|                        |                  |                  |   |                       |
|------------------------|------------------|------------------|---|-----------------------|
| ⊕                      | Card Type: _____ | •                | ⊕ | PS Office Type: _____ |
| ⊕                      | Card Type: _____ | •                | ⊕ |                       |
| Card Type: <b>ESIX</b> |                  | Card Type: _____ |   |                       |
| Card Type: _____       |                  | Card Type: _____ |   |                       |

Figure 2-17 **Coral IPx Office 2nd Expansion Unit Card Placement**

Coral IPx Office  
2nd EXPANSION UNIT

Shelf Number\* **3**

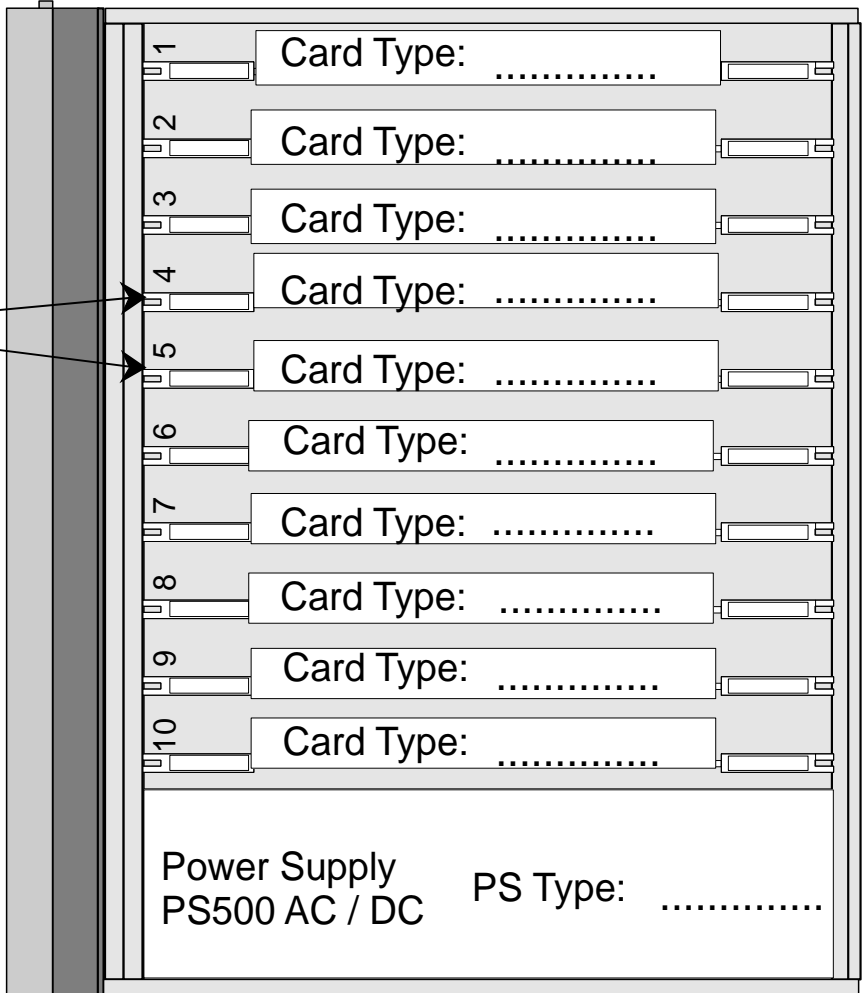
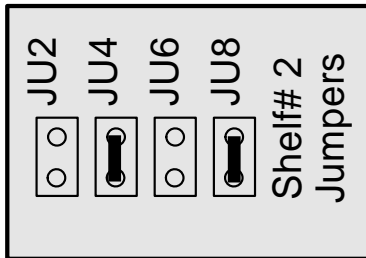
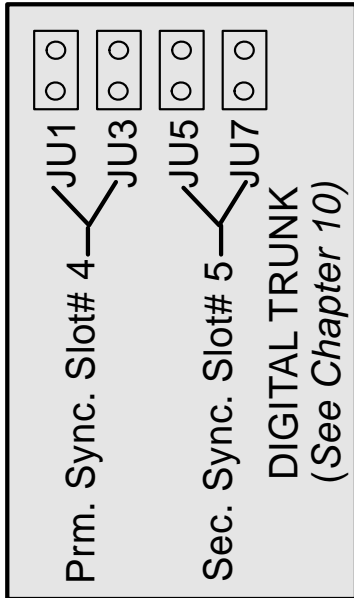
|                        |                  |                  |   |                       |
|------------------------|------------------|------------------|---|-----------------------|
| ⊕                      | Card Type: _____ | •                | ⊕ | PS Office Type: _____ |
| ⊕                      | Card Type: _____ | •                | ⊕ |                       |
| Card Type: <b>ESIX</b> |                  | Card Type: _____ |   |                       |
| Card Type: _____       |                  | Card Type: _____ |   |                       |

Figure 2-18 1st  
Expansion Cage IPx 500X  
Card Placement

Coral IPx 500X  
1st EXP. CAGE

Shelf Number:

2



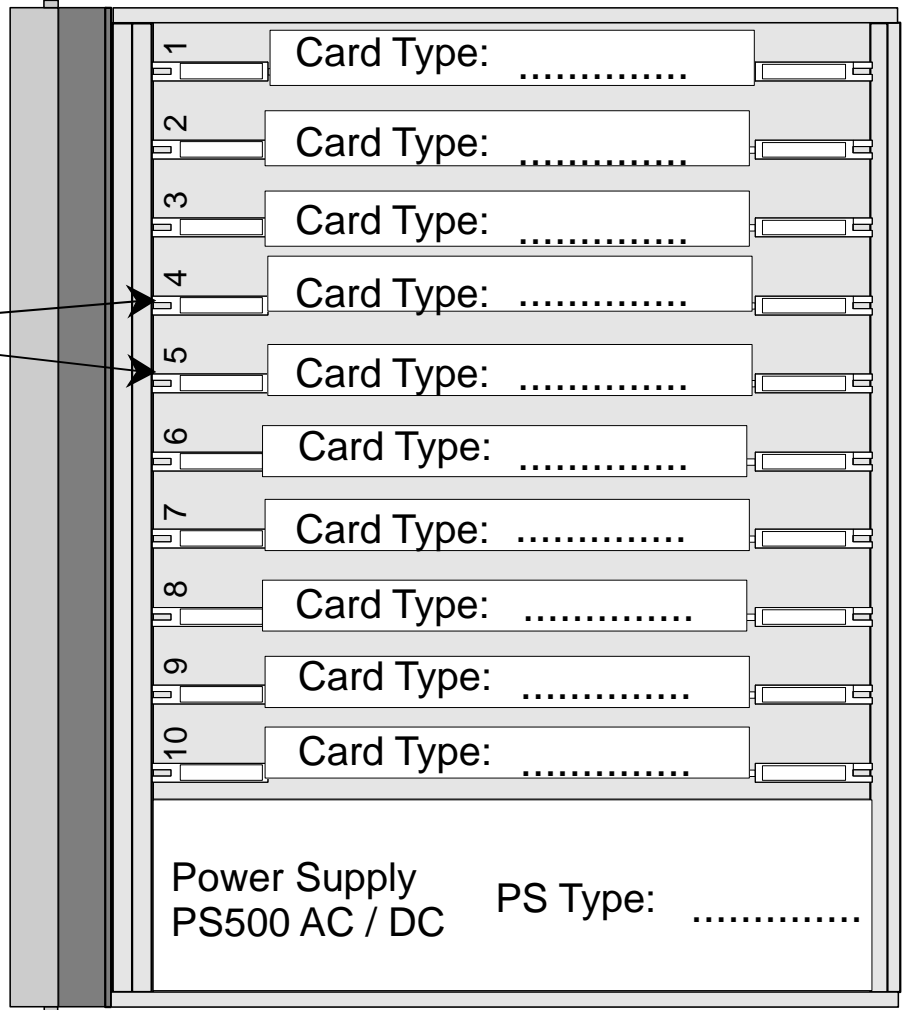
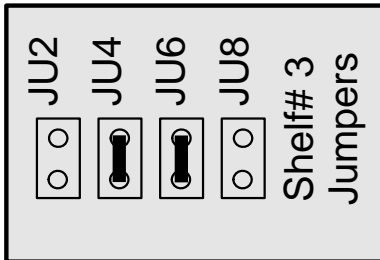
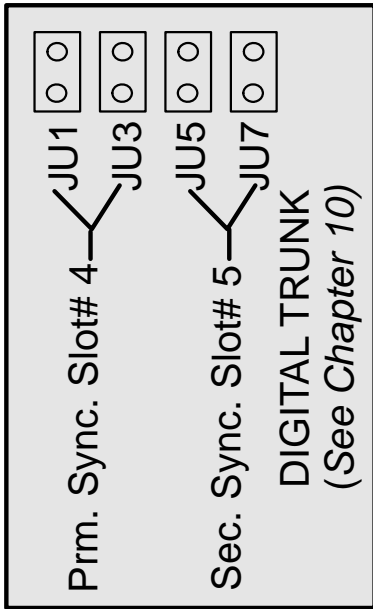
Battery Pack  
BATTipx for PS500 AC Yes/No: .....

Figure 2-19 2nd  
Expansion Cage IPx 500X  
Card Placement

Coral IPx 500X  
2nd EXP. CAGE

Shelf Number:

3

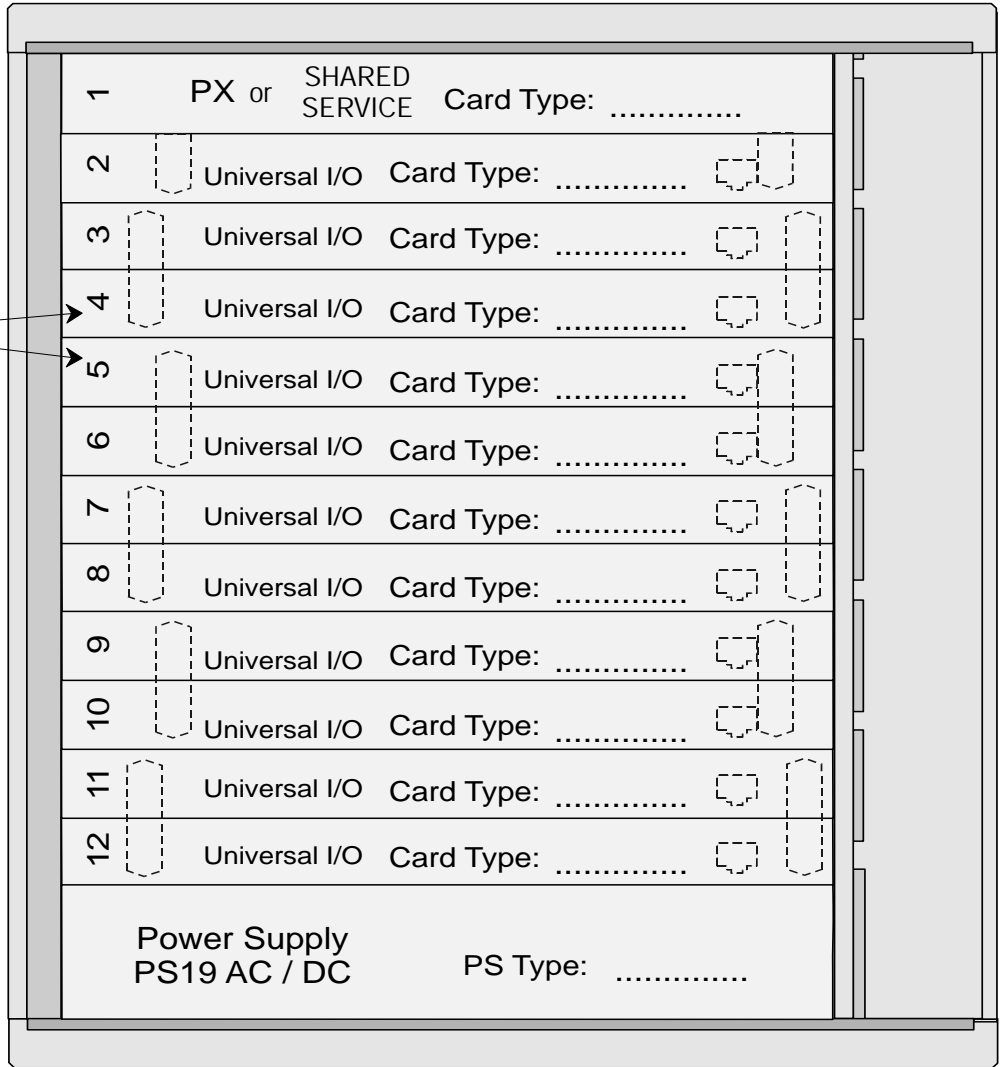
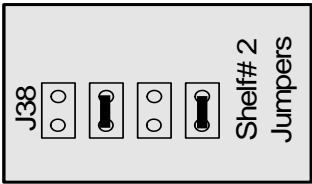
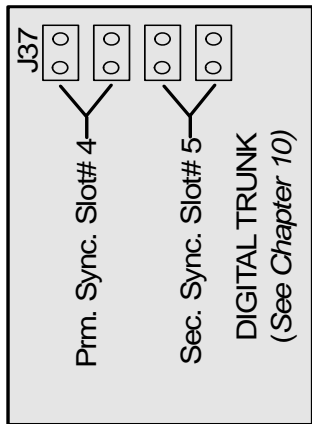


Battery Pack  
BATTipx for PS500 AC Yes/No: .....

Figure 2-20 1st  
Expansion Cage IPx 800X  
Card Placement

Coral IPx 800X  
1st EXPANSION CAGE

Shelf Number: 2



**Note:**

Requires a PX card in slot# 1 if a second expansion cage is installed.

Figure 2-21 2nd  
Expansion Cage IPx 800X  
Card Placement

Coral IPx 800X  
2nd EXPANSION CAGE

Shelf Number: 3

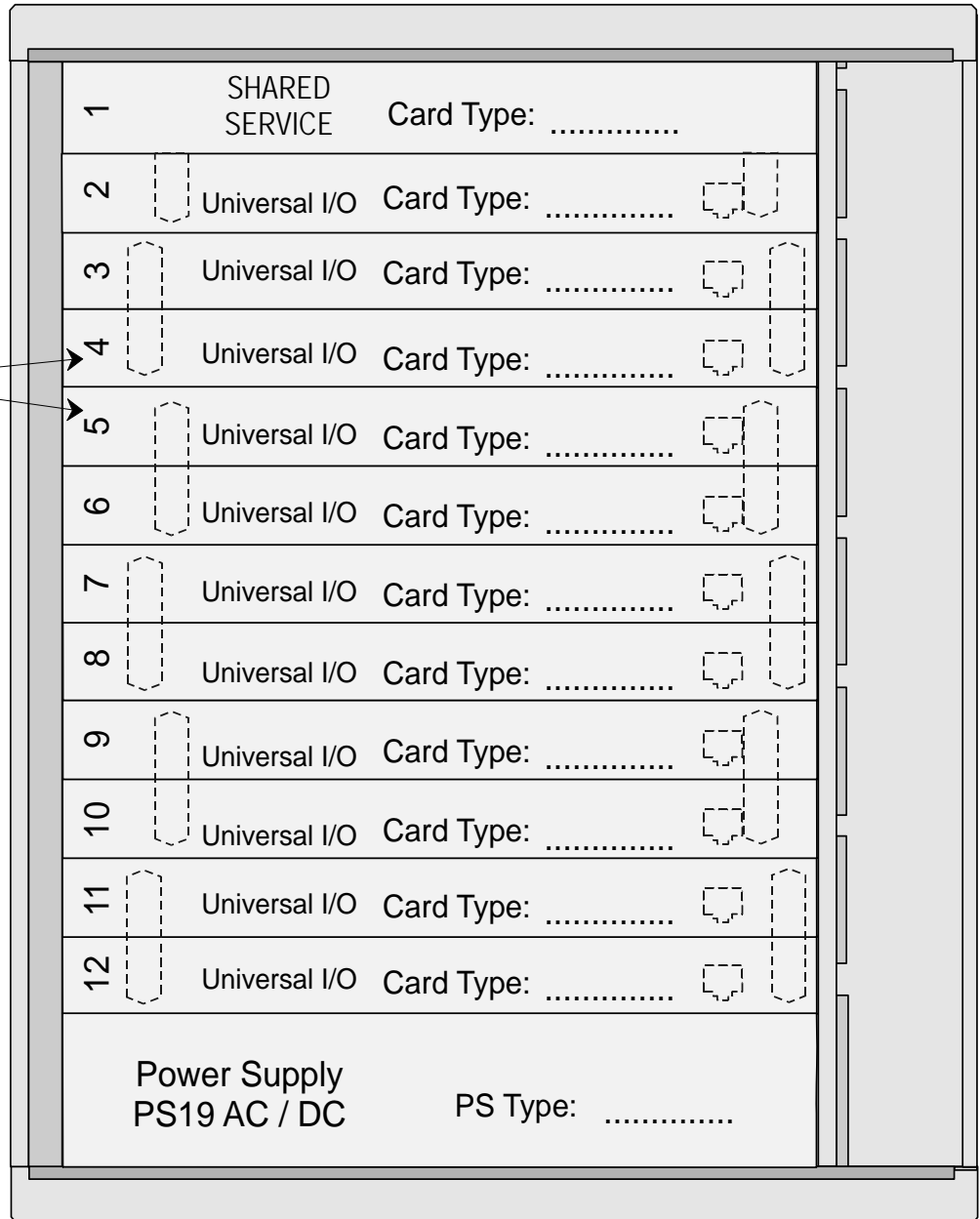
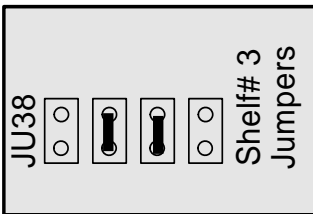
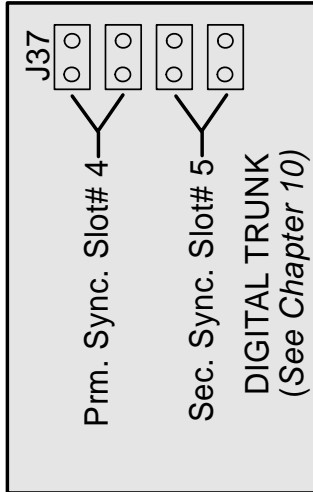


Figure 2-22 System with One FlexiCom 200 (CSLX) Expansion Unit

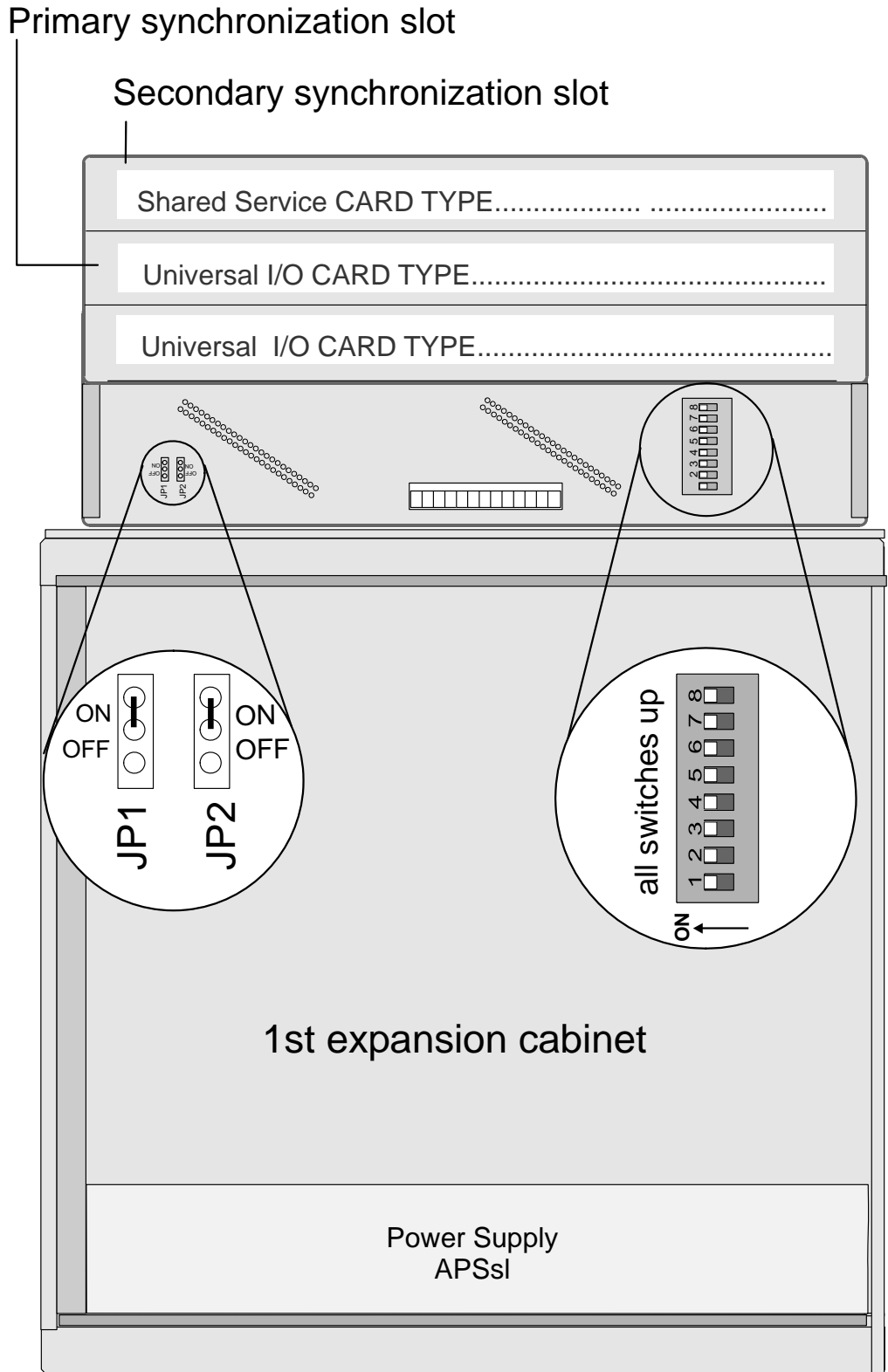




Figure 2-23 1st FlexiCom 200 (CSLX) Cabinet in a System with Two Expansion Cabinets

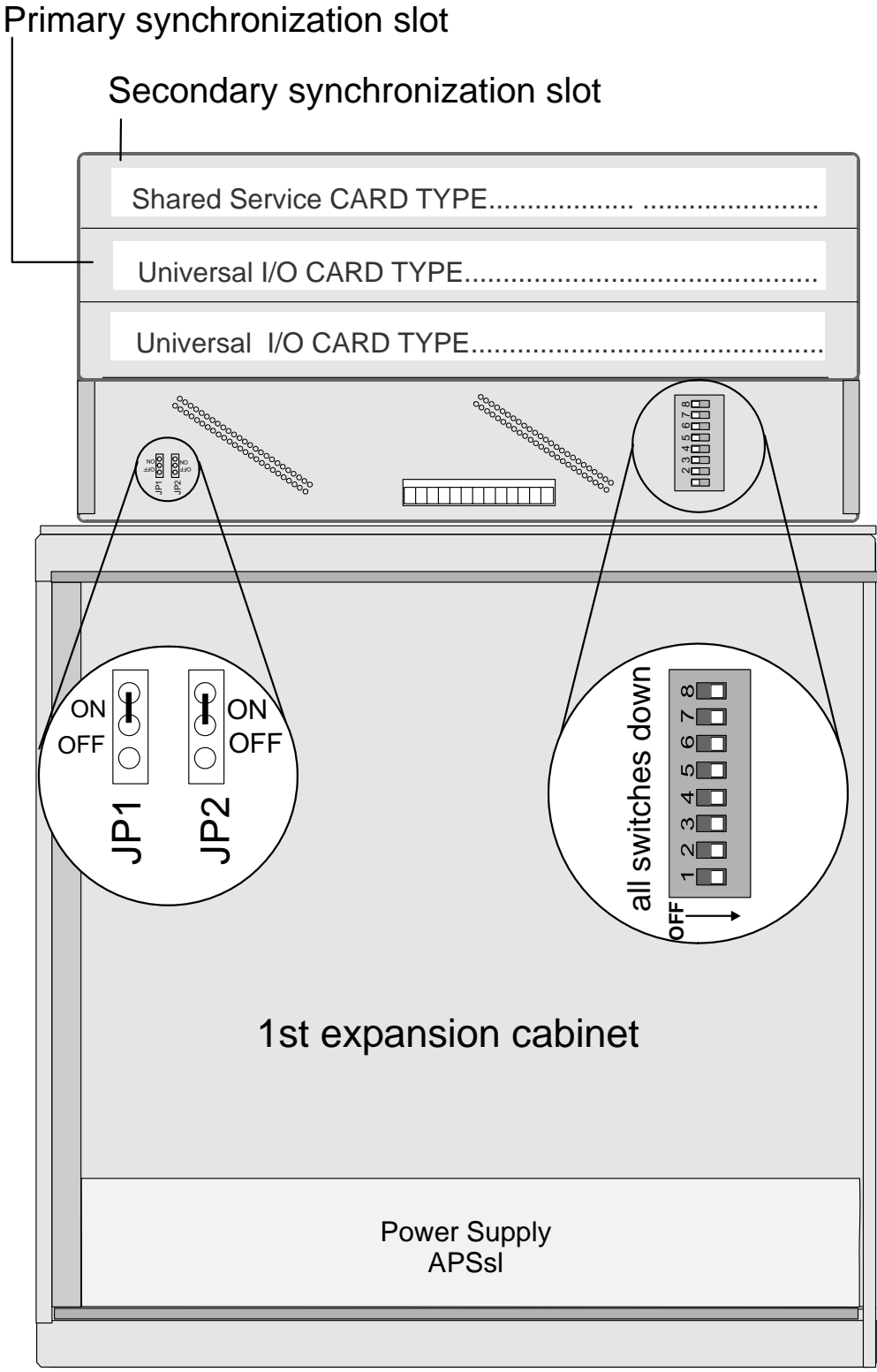
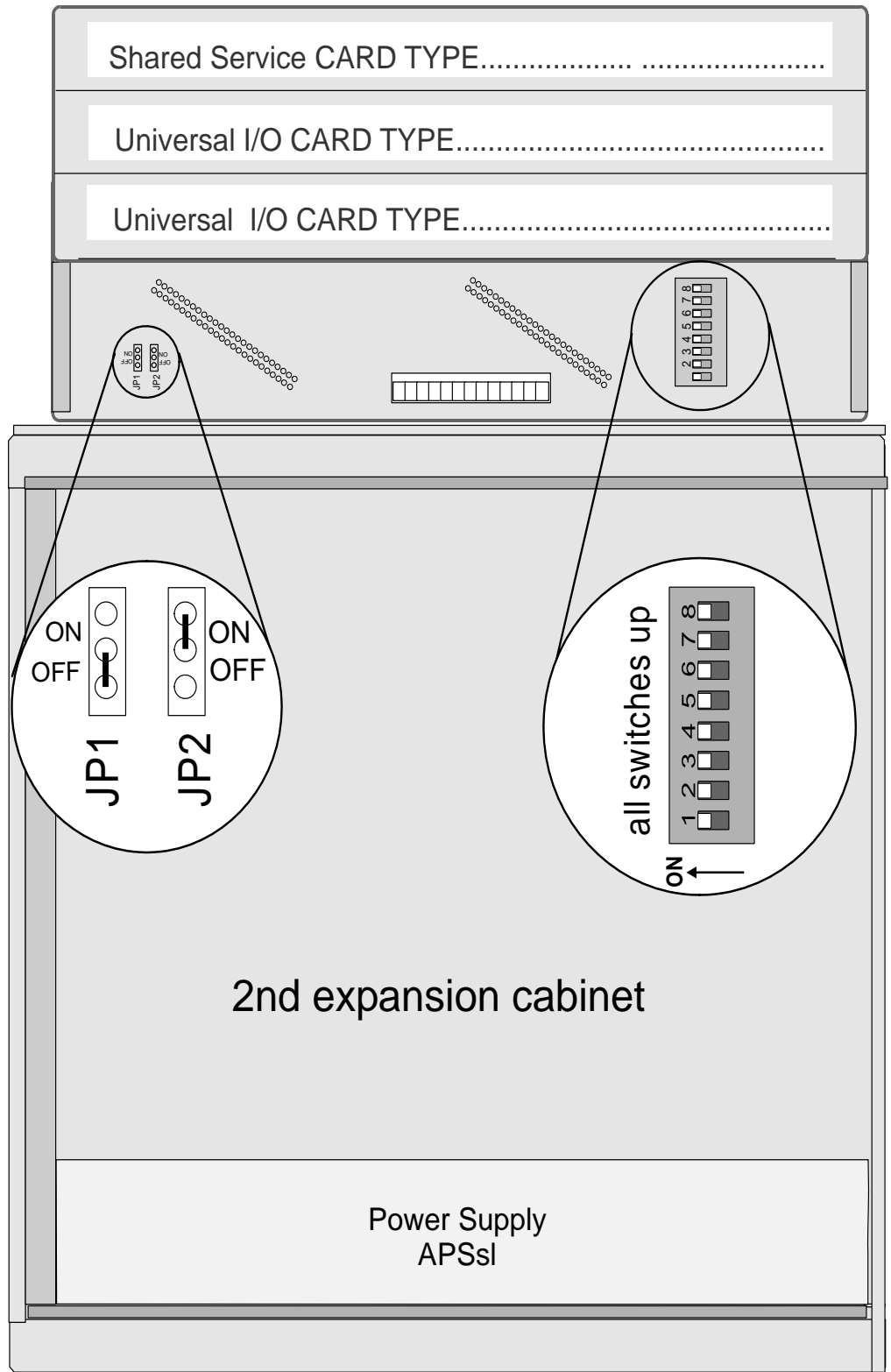


Figure 2-24 2nd FlexiCom 200 (CSLX) Cabinet in a System with Two Expansion Cabinets



## Interconnecting IPx Office Main and the Expansion Units

---

This section describes how to interconnect the units within the Coral IPx Office system. For a full description of the different system configurations, see [IPx Office and IPx Expansion Unit Installation Configurations, page 6-35](#).



### NOTE:

---

*Table 6-5 lists the possible different combinations of expansion cages that can be connected to the IPx Office main unit. Do NOT interconnect any other combination of expansion units to the main unit.*

---

Two types of cables are used to interconnect units within the IPx Office system:

- For connection to the IPx Office expansion unit, an ESIM Office card and an ESIX Office card is supplied with a cable including a female, 50-pin SCSI pin-type connector on one end and a female, 50-pin ribbon-type SCSI connector on the other end. For connection between two expansion units, an additional ESIX card is supplied with a cable including a female, 50-pin SCSI pin-type connector on one end and a female, 50-pin ribbon-type SCSI connector on the other end.
- For connection to the IPx 500X or IPx 800X cage, an ESIM Office card is supplied with a cable including a female, 50-pin, SCSI pin-type connector on one end and a female, 50-pin D-type connector on the other end. This cable is not used when IPx Office expansion units are installed.
- For connection to the FlexiCom 200 CSLX cabinet, an ESIM Office card is supplied with a cable including a female, 50-pin, SCSI pin-type connector on one end and a female, 25-pin, D-type connector on the other end. This cable is not used when IPx Office expansion units are installed.

---

### *Interconnecting the IPx Office Main and IPx Office Expansion Units*



### NOTE:

---

*IPx Office EX Expansion cages require Coral IPx Office Software Version 15.5 or higher.*

---

### *Connecting the Main Unit to the First Expansion Cage*

- 1 Verify that the ESIM Office card is installed in slot 8-9 of the main unit.
- 2 Verify that the ESIX Office card is installed in slot 6-7 of the first expansion unit.

- 3 Plug the pin-type connector of the IPx Office expansion cable into the pin-type receptacle on the front panel of the ESIM Office peripheral card.
- 4 Plug the ribbon-type connector of the IPx Office expansion cable into the ribbon-type receptacle on the front panel of the ESIX card of the first expansion unit.
- 5 Using a straight-blade screwdriver, tighten the screws on both sides of the cable connection to secure it to the card.

### *Connecting the First Expansion Cage to the Second Expansion Cage*

- 1 Verify that the ESIX Office card is installed in slot 6-7 of the second expansion unit.
- 2 Plug the pin-type connector of the IPx Office expansion cable into the pin-type receptacle on the front panel of the ESIX Office card of the first expansion unit.
- 3 Plug the ribbon-type connector of the IPx Office expansion cable into the ribbon-type receptacle on the front panel of the ESIX Office card of the second expansion unit.
- 4 Using a straight-blade screwdriver, tighten the screws on both sides of the cable connection to secure it to secure it to the card.

---

### *Interconnecting the IPx Office Unit and IPx 500X/800X Cages*

Use the cable including a female, 50-pin, SCSI pin-type connector on one end and a female, 50-pin D-type connector on the other end. See [Figure 6-35 on page 6-37](#) and [Figure 6-39 on page 6-40](#).

### *Connecting the Main Unit to the First Expansion Cage*

- 1 Verify that the ESIM Office card is installed in slot 8-9 of the IPx Office unit.
- 2 Plug the male end of the IPx Office expansion cable into the female SCSI connector on the front panel of the ESIM Office card.
- 3 Plug the female, D-type connector of the cable into the connector labeled FROM CONTROL UNIT OR FIRST EXPANSION UNIT on the first expansion cage.
- 4 Using a straight-blade screwdriver, tighten the screws on both sides of the cable connection to secure it to the card.

### *Connecting the First Expansion Cage to the Second Expansion Cage*

- 1 Plug the male end of the H500-1 cable into the female D-type connector labeled TO SECOND EXPANSION UNIT located in the top section of the first expansion cage.
- 2 Plug the female end of the H500-1 cable into the male D-type connector labeled FROM CONTROL UNIT OR FIRST EXPANSION UNIT located in the top section of the second expansion cage.
- 3 Using a straight-blade screwdriver, tighten the screws on both sides of the cable connection to secure it to the card.

---

### *Interconnecting the IPx Office Unit and CSLX Expansion Cages*

See [Figure 6-40 on page 6-41](#) and [Figure 6-41 on page 6-42](#).



#### **NOTE:**

*FlexiCom 200 CSLX Expansion cages require Coral IPx Office Software Version 15.5 or higher.*

---

### *Connecting the Main Unit to the First Expansion Cage*

- 1 Verify that the ESIM Office card is installed in slot 8-9 of the IPx Office unit.
- 2 Plug the male end of the IPx Office expansion cable into the female SCSI connector on the front panel of the ESIM Office card.
- 3 Plug the female, D-type connector of the cable into the connector to the male connector on the first FlexiCom 200 CSLX expansion cage.
- 4 Using a straight-blade screwdriver, tighten the screws on both sides of the cable connection to secure it to the card.

### *Connecting the First Expansion Cage to the Second Expansion Cage*

- 1 Plug the male end of the cable into the female D-type connector located on the first FlexiCom 200 CSLX expansion cage.
- 2 Plug the female end of the cable into the male D-type connector located on the second FlexiCom 200 CSLX expansion cage.
- 3 Using a straight-blade screwdriver, tighten the screws on both sides of the cable connection to secure it to the card.

---

## *Defining Expansion Cage Numbers*

IPx Office cage numbers are defined automatically and require no strapping. For information on IPx 500X, 800X cages, and FlexiCom 200 CSLX cabinets, see [Figure 2-18](#) through [Figure 2-21](#) and refer to Chapter 6 of the relevant Coral Installation Procedure and Hardware Reference Manual.

## Installing the DC Power Supply

This section describes how to install the DC power supply card into its slot. The IPx Office unit is shipped from the manufacturer with the AC power supply installed. If a DC power supply is to be installed, remove the existing AC power supply and insert the DC power supply in its place. See [Figure 2-25](#) and [Figure 2-26](#) for power supply placement in the IPx Office unit.

### CAUTION!

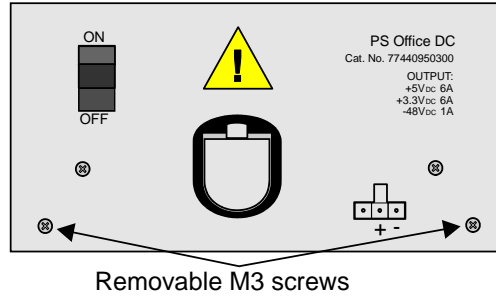
*Circuit cards contain static-sensitive circuitry and may be damaged or destroyed by electro-static discharge (ESD). Always wear a static dissipating wrist strap connected to the unit while handling circuit cards. See [Figure 2-14 on page 2-24](#). Hold circuit cards by their edges and avoid touching contact surfaces. Handle with care and do not drop.*

- 1 Verify that the IPx Office is properly grounded. See [Ground Wiring, page 2-18](#).
- 2 Turn OFF (downwards) the power switch on the PS Office AC power supply card.
- 3 Remove the PS Office AC power supply card from its slot.
- 4 Verify that the power switch on the PS Office DC power supply card is OFF (turned downwards). See [Figure 2-25](#).
- 5 Grasp the power supply horizontally with both hands, fingers near the left and right of the power supply near the front panel.
- 6 Align the two guide ridges located on the bottom panel of the power supply (right and left) in the card edge guides. Slide the power supply gently but firmly, until fully inserted into the unit.
- 7 Fasten the two M3 screws located on the left and right of the power supply front panel, thus securing the card to the cage as well as grounding the unit.

### WARNING!

*Electrical Hazard. If the power supply screws are not fastened to the unit, the power supply unit will not be grounded and could be subject to hazardous voltages. Do not proceed further until the screws have been fastened.*

Figure 2-25 PS Office DC Front Panel



## Connecting the Power Wires

The Coral IPx Office can operate as an AC powered system or as a DC powered system. For DC powered systems, skip to [DC Powered Systems, page 2-44](#).

### AC Powered Systems

This section describes how to connect the power wires to the IPx Office unit for AC systems (when the PS Office AC power supply card is installed). See [Figure 2-26](#).

- 1 Route the AC power cord from the AC power receptacle to the AC connection of the PS Office AC unit.



#### NOTE:

**For 115 volt operation**, when the power supply cord is not factory-supplied the cord should be selected as follows:

Use a UL Listed/CSA Labeled Cord Set consisting of a minimum 18 AWG, Type SVT or SJT three-conductor cord, terminating in a molded connector body. The cord should have an IEC CEE-22 female configuration on one end, and a molded-on parallel blade grounding type attachment plug rated 15A, 125V configuration (5-15P), at the other end.

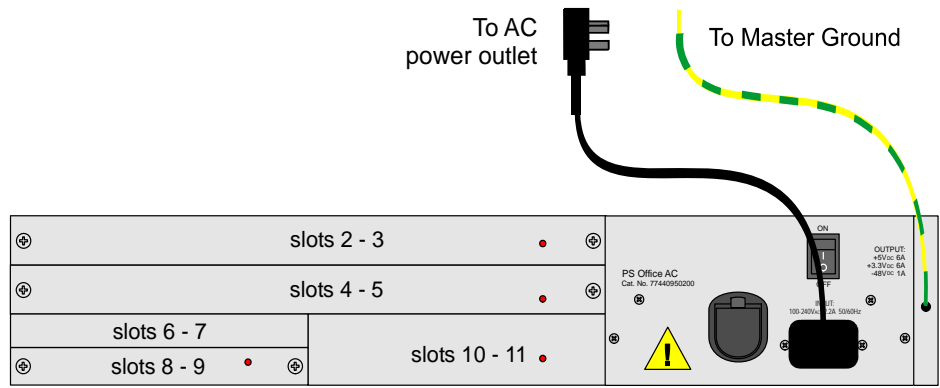
- 2 Do **not** insert the power cord into the AC receptacle at this time.

#### WARNING!

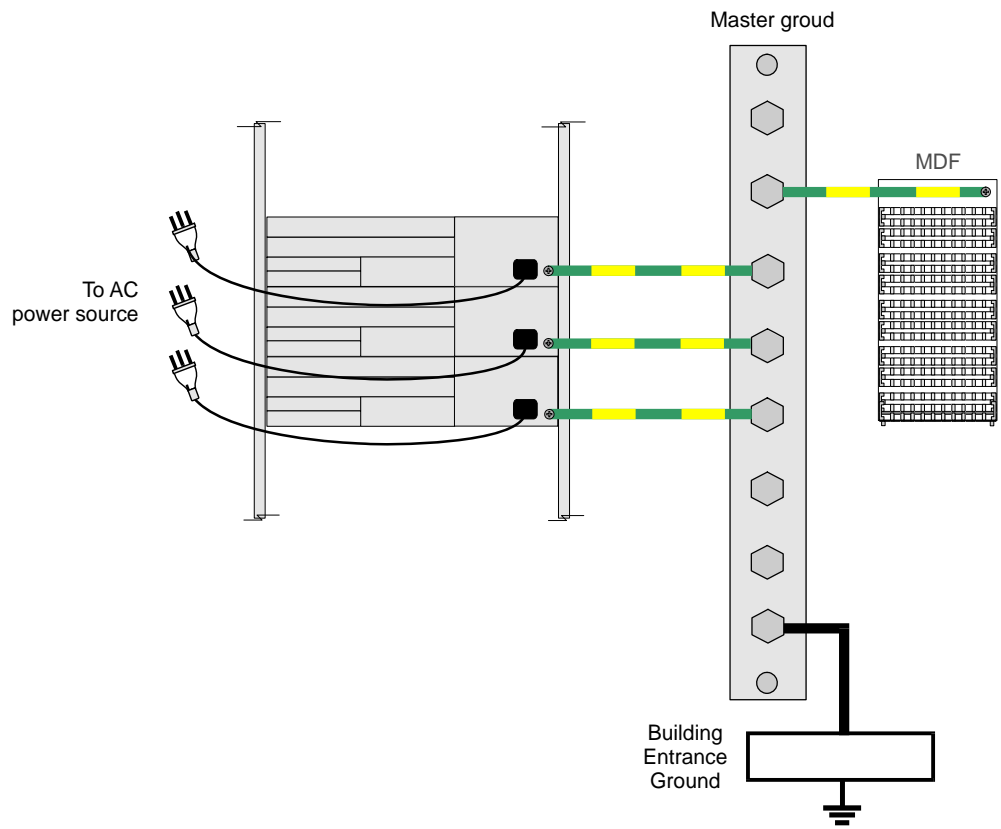
**Electrical Hazard.** Verify that the AC power strip or outlet supplying the unit is easily accessible and can be easily disconnected in the event of emergency. Verify that the power strip or outlet is no higher than 64" (162.5 cm) from the floor.



**Figure 2-26 AC Power Connection for One IPx Office Unit**



**Figure 2-27 AC Power Connection for Three IPx Office Units**



---

## DC Powered Systems

This section describes how to connect the power wires to the Coral IPx Office unit for DC powered systems (that is, when the PS Office DC power supply card is installed in the unit).

[Figure 2-28](#) shows one IPx Office unit installed within the system, and [Figure 2-29](#) shows three units installed within the system.



---

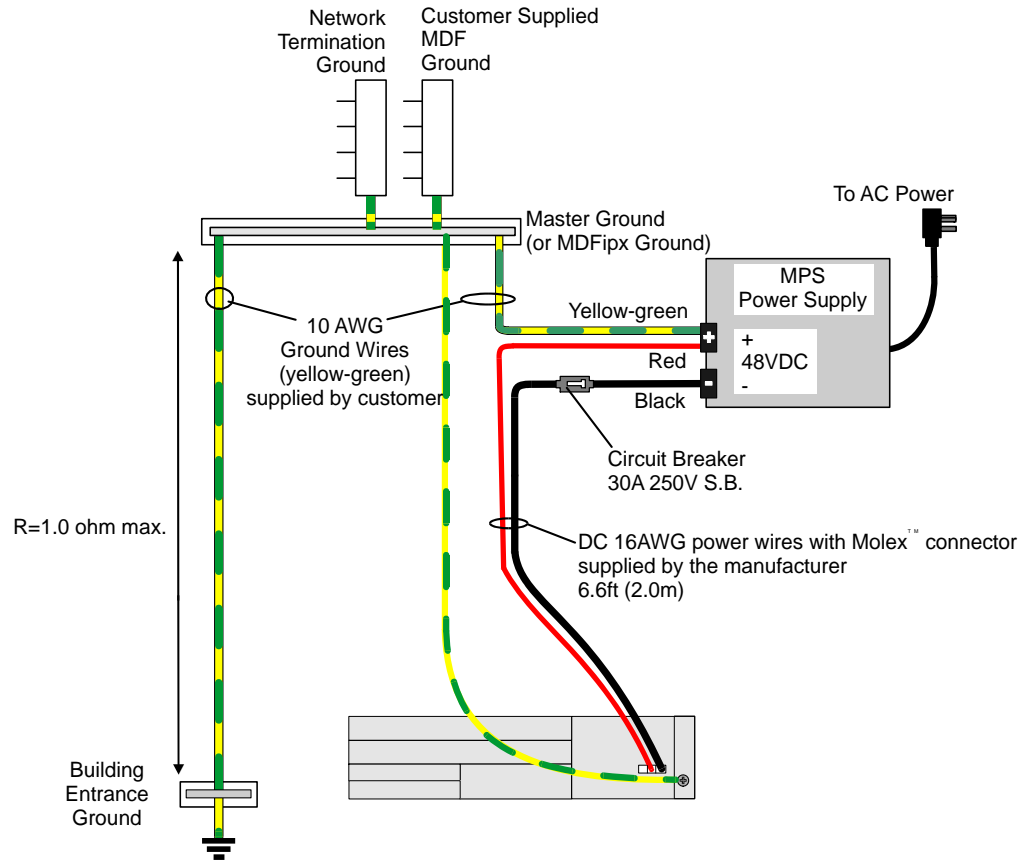
### NOTE:

*The DC power wires provided with the system are 6.6ft (2m) long. Verify that the connection to the facilities power source is made according to local requirements.*

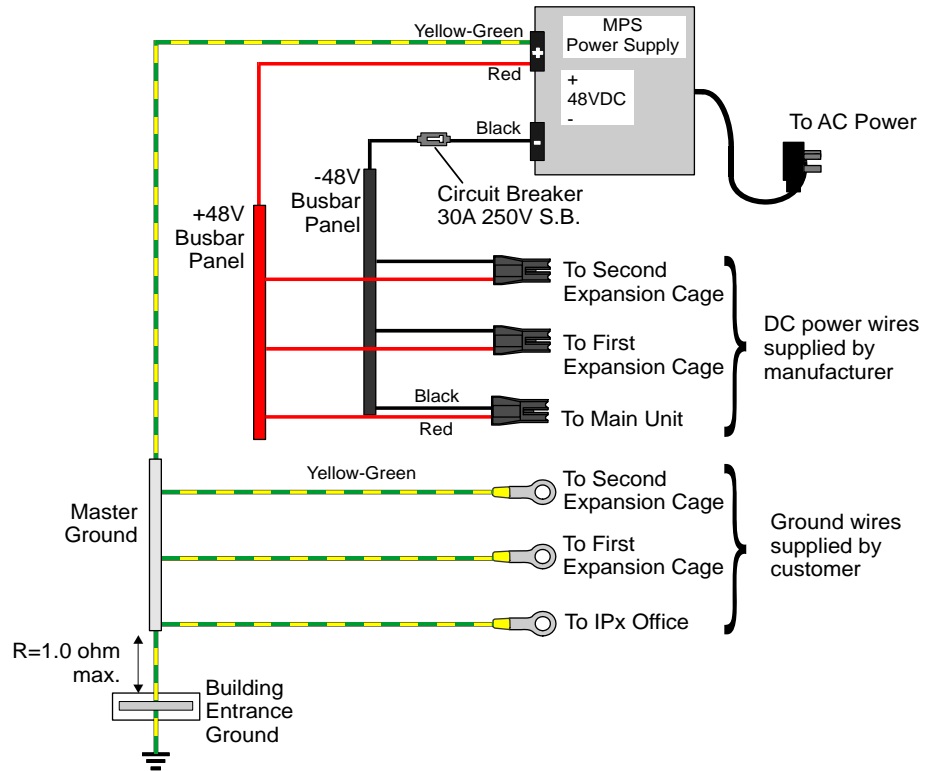
---

- 1 The PS Office DC power supply unit is supplied with a 6.6ft (2m) long pair of 16 AWG wires (one red and one black). If this is not long enough to connect the facilities power source to the cage, fabricate an extension at the customer's site with two wires that are identical to the ones above.
- 2 Route each power wire to the DC connection on the front panel of the PS Office DC. Take care not to let the free end of the cable cause damage by swinging loose or making contact with another electrical connection.
- 3 Do **not** insert the DC power input connector at this time. Leave the DC power input connector unplugged.
- 4 Connect the other ends of the wires to the -48VDC facilities power source and a circuit breaker as shown in [Figure 2-28](#) and [Figure 2-29](#) and according to local regulatory requirements.
  - Negative (black) wire to the circuit breaker or -48V busbar panel
  - Positive (red) wire to the +48VDC terminal or +48V busbar panel

**Figure 2-28 DC Power Wiring for One IPx Office Unit**



**Figure 2-29 DC Power Wiring for Three Units**



**NOTES:**

## 2.3 Program Interface Device Connection

The data terminal or personal computer used as the Program Interface (PI) device must meet the following requirements:

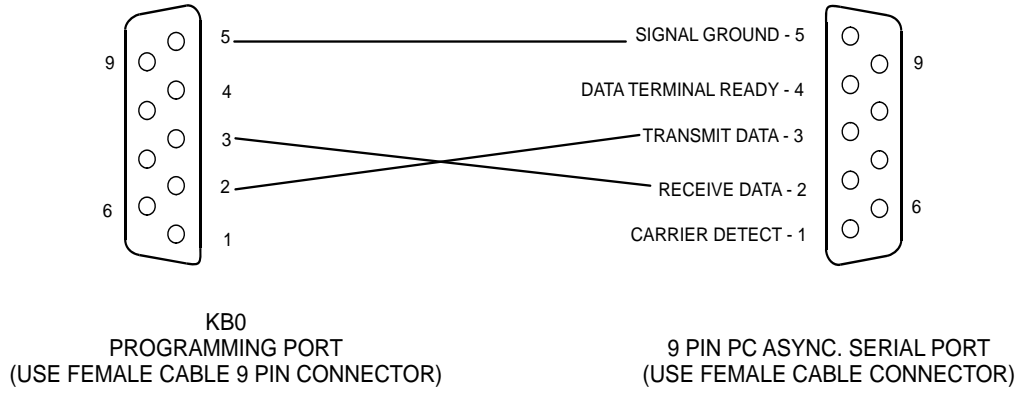
- RS-232E asynchronous serial interface with data rate capabilities of 19200, 9600, 4800, 1200, or 300 bps, or 8 data bits, 1 stop bit, and no parity bit or EVEN, ODD, mark, space, and parity.
  - ASCII character set compatibility
  - Ground connected to the same the same building entrance ground as the Coral system.
- 1 Unpack the PI device and prepare it for operation. Set the interface for a data rate of 9600 bps, 8 data bits, 1 stop bit, and no parity bit. These are the default settings for all serial programming ports of the Coral system.
  - 2 Determine the connector type and pin assignments for the data interface of the PI device. [Figure 2-30](#) shows the connections for using personal computers with a DA-9P connector for the serial interface.
  - 3 Obtain or prepare a serial data cable to connect the PI device to the KB0 serial programming port on the front side of the unit. The KB0 port end of the serial programming cable requires a male DA-9P style connector, wired as shown in [Figure 2-30](#).

### **WARNING!**

*Electrical Hazard. Grounding interconnected equipment to different building entrance grounds could cause shock, burn, or death. Before connecting the PI device and the Coral system, verify that they are both connected to the same building entrance ground.*

- 4 Do one of the following:
  - If the PI device is a personal computer equipped with a DA-9P connector, wire the connectors according to [Figure 2-30](#).
  - If the PI device is permanent, route the serial data cable from the PI device to the front panel of the unit and connect it to the KB0 connector.

**Figure 2-30 9-Pin Program Interface Device Connections to KB0**



## Initial Power-up Tests

Coral

|     |   |      |
|-----|---|------|
| 3.1 | <i>Power Supply Test</i> .....                        | 3-1  |
| 3.2 | <i>Common Control Test</i> .....                      | 3-5  |
| 3.3 | <i>Identifying the Coral Expansion Units</i> .....    | 3-11 |
| 3.4 | <i>Peripheral Interface Card Initialization</i> ..... | 3-13 |
| 3.5 | <i>I/O Cable Installation</i> .....                   | 3-21 |
| 3.6 | <i>Completing the Installation</i> .....              | 3-23 |





## 3.1 Power Supply Test

This chapter provides information about connecting the power supply to the facilities power supply.

### CAUTION!

*Before proceeding, verify that the peripheral cards in the expansion cages of the IPx Office system are only partially inserted into their respective card slots, with the front side protruding approximately 1 inch (2.5 cm) from the front of the card cage.*

The IPx Office can operate as an AC powered system or as a DC powered system.

- For AC powered systems, see [AC Powered Systems, page 3-1](#), below.
- For DC powered systems, skip to [DC Powered Systems, page 3-3](#).

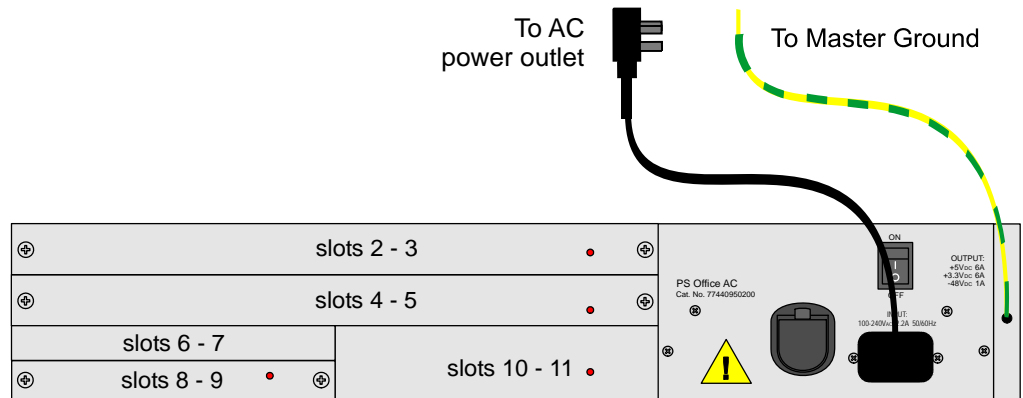
### AC Powered Systems

---

- 1 Verify that the cage ground wire is connected and the ground nut is tightened. See [Ground Wiring, page 2-18](#).
- 2 Verify that the power supply unit has been installed and the two removable screws on the left and right side of the PS Office AC front panel are tightened.
- 3 Verify that the PS Office AC **power** switch is OFF (turned downwards).
- 4 Verify that the female connector of the AC power cord has been inserted into the front panel socket of the PS Office AC power supply. See [Figure 3-1](#).
- 5 Insert the male plug of the AC power cord into the line outlet or primary power receptacle designated for the system.
- 6 Turn ON the PS Office AC ON/OFF switch.
- 7 Verify that the LED indicators on the front panel light as described in [Chapter 2, Hardware Installation Procedure](#).
- 8 Turn OFF the PS Office ON/OFF switch.

- 9 Perform the AC power supply test for expansion cages as described in *Chapter 3 of the Coral IPx 500 Installation Procedure and Hardware Reference Manual* or *Coral IPx 800 Installation Procedure and Hardware Reference Manual*.
- 10 Skip to [Common Control Test, page 3-5](#).

**Figure 3-1 Coral IPx Office Unit AC Power Connections**



## DC Powered Systems

---

- 1 Verify that the cage ground wire is connected and the ground nut is tightened. See [Ground Wiring, page 2-18](#).
- 2 Verify that the PS Office DC unit has been installed and the two removable screws on the left and right side of the PS Office DC front panel are tightened.
- 3 Verify that the PS Office power switch is OFF (turned downwards).
- 4 Turn ON the facilities 48VDC Main Power Supply (MPS) and close any fuse or circuit breaker required to supply 48VDC to the Coral IPx Office unit.
- 5 Measure the DC voltage entering the power input connector. See figures on [DC Power Wiring for One IPx Office Unit, page 2-45](#) and on [DC Power Wiring for Three Units, page 2-45](#).

Connect the positive lead of the DMM to the positive (red) terminal and the negative lead to the negative (black) terminal. The reading must be +48 volts.



### NOTE:

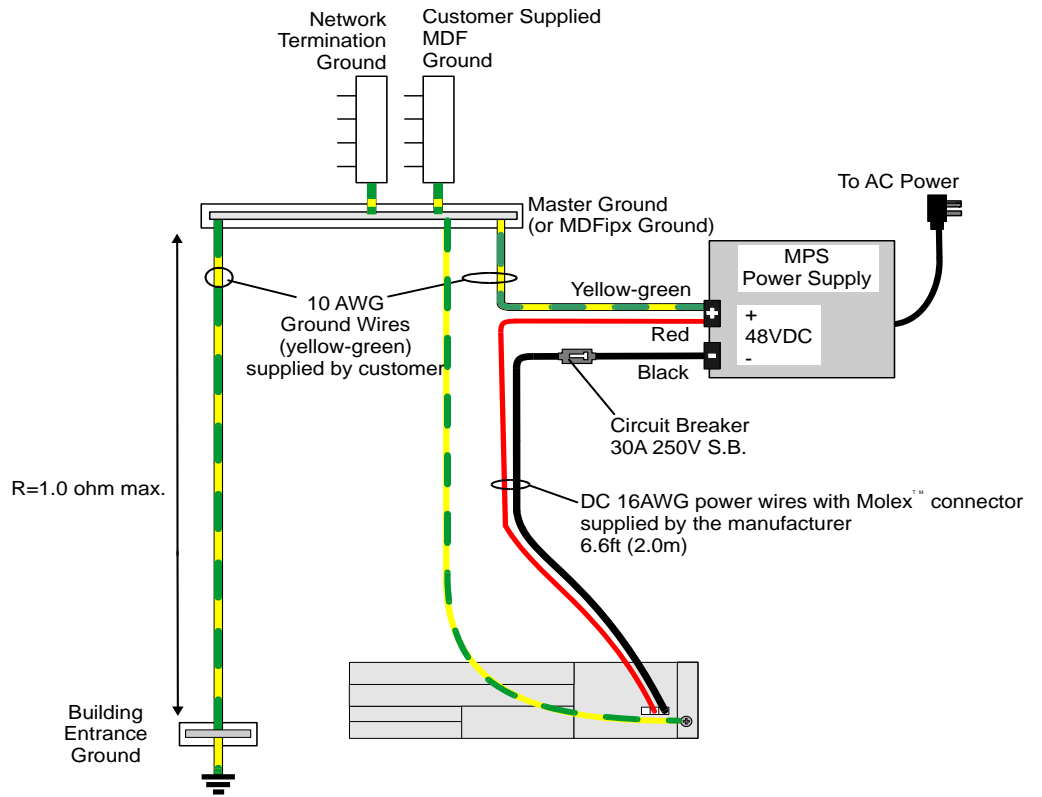
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*If a minus sign (-) appears in the meter display, the polarity of the 48VDC power to the cage is reversed. Verify the meter settings and connections. If the meter is properly set and connected, carefully examine the wiring between the external 48VDC main power supply, determine the location of the polarity reversal, and correct the wiring error before continuing.*

---

- 6 Insert the DC power input connector into the receptacle of the PS Office DC unit.
- 7 Turn ON the PS Office ON/OFF switch.
- 8 Verify that the LED indicators on the front panel appear as described in [Chapter 2, Hardware Installation Procedure](#).
- 9 Turn OFF the PS Office ON/OFF switch.
- 10 Perform the DC power supply test for expansion cages as described in Chapter 3 of the *Coral IPx 500 Installation Procedure and Hardware Reference Manual* or *Coral IPx 800 Installation Procedure and Hardware Reference Manual*.

**Figure 3-2 IPx Office Unit DC Power Connections**



## 3.2 Common Control Test

This section deals with the Common Control Test. This test checks that the system has initialized properly and that the memory lithium battery is functional.

### Activating and Initializing the Control Card

Control card initialization includes two stages:

- Activating the power supply card and checking the LED indicators for functionality
- Checking the PI device for successful initialization.

The MCB Office control card layout is shown in [Figure 8-1](#).

#### *Activating the Control Card*

- 1 In the main cage and in the expansion cages, verify that the PS Office power switch is in the OFF position (turned downwards).
- 2 Verify that all peripheral cards in the IPx Office unit are completely installed.
- 3 Verify that all peripheral cards in the expansion cages protrude from the cage by approximately 1 inch (2.5 cm).
- 4 Verify that the SAU is attached to the connector on the right side of the IPx Office main unit. See [Software Authorization Management, page 8-24](#).
- 5 Verify that the IMC8 flash memory card and the compact flash memory disk have been inserted into their respective drives located on the front panel of the IPx Office unit. See [Flash Memory Cards - IMC8 and IMC16, page 8-37](#).
- 6 Attach the Program Interface (PI) device cable to the KB0 programming port connector on the front panel of the IPx Office unit. Verify that the PI device is configured to match the data rate, word length, parity, and stop bits of KB0. Default settings for KB0 are **9600 bps, 8 data bit, no parity, and 1 stop bit**.
- 7 Turn ON the power switch on the PS Office power supply on the rear panel of the IPx Office unit.

- 8 On the front panel of the IPx Office unit (see [Figure 6-3 on page 6-3](#)), verify that the LED indicators appear as follows:
  - Green **POWER** LED indicator turns ON.
  - Red **GC** LED indicator turns ON until the system initializes and then turns OFF.
  - Red **UGW** LED indicator turns ON until the system initializes and then turns OFF.
  - Red **CPU** LED indicator turns ON until the system initializes and then turns OFF.
  - Green LED **GC ACT.** indicator flashes after the GC initializes.
  - Green LED **MRC** indicator turns ON after the MRC card initializes.



**NOTE:**

For further information on the IPx Office front panel LED indicators, see [LED Card, page 8-35](#).

---

### Checking Control Card Initialization

This section describes how to reset the system during initialization. For information on how to reset the system during normal system operation, see [Regular Reset, page 3-8](#).



**NOTE:**

The messages outlined in this section do not indicate that the C/PUGW circuit has initialized and is active. The status of the C/PUGW circuit must be checked independently. See

- 1 If the following message appears on the PI device and is repeated continuously:

```

For SERVICE/SOFTWARE installation menu HIT <CTRL I> NOW
*****
CHK RAM
END CHK RAM
Custom Init Code...
NO CCS VERSION
  
```

The line that reads **NO CCS VERSION** indicates that no generic feature software was detected in the IMC8 card. To load the generic feature software into the IMC8 card, follow the procedure in [Chapter 4, Software Installation Procedure](#).

- 2 The following messages appear on the PI device during system first time start-up:

**For SERVICE/SOFTWARE installation menu HIT <CTRL I> NOW  
\*\*\*\*\***

**CHK RAM  
END CHK RAM  
Custom Init Code...  
CHECKING PROG-MEM  
PROG-MEM IS O.K  
CHECKING CODING MEMORY  
CODING MEMORY IS O.K.  
END CHECKING CODING MEMORY  
CHECKING MCB Office CONTROLS  
END CHECKING MCB Office CONTROLS  
CHECKING SAU #  
END CHECKING SAU #  
Patch Loaded...!  
CHECKING CODING MEMORY  
CODING MEMORY IS O.K.  
END CHECKING CODING MEMORY  
CHECKING MCB Office CONTROLS  
END CHECKING MCB Office CONTROLS  
CHECKING SAU #  
END CHECKING SAU #  
CHECK CHECKSUM...  
END CHECK CHECKSUM**

And the following second message appears after two or three minutes, following several short messages that appear during system start-up:

Initializing CCS...  
Partial initialization phase starting  
32/16GC BROADCAST RESET...  
System configuration identified.....  
**CCS is on the air.....**  
**(ROOT)**  
**CCS     xx.xx.xx**  
**Copyright (c) 2001-yyyy.....**  
**NAME - (site name)**  
**SAU # -**

- 3 Do one of the following:
  - If the second message appears, the system has initialized properly and is capable of processing calls. The version number of the generic feature software is indicated where the x's appear in the line that reads **CCS xx.xx.xx**.
  - If the version number shown in the PI does not match the version number printed on the IMC8 flash card supplied with the system, perform the procedure described in [Chapter 4, Software Installation Procedure](#) to install a new generic software version on the IMC8/16 card.

---

### *Regular Reset*

This section describes how to reset the system after it has been initialized for the first time. For information on how to reset the system during installation, see [Checking Control Card Initialization, page 3-6](#).

- 1 If the following message appears on the PI device during system start-up:

```
CHECKING CODING MEMORY  
CODING MEMORY IS O.K.  
END CHECKING CODING MEMORY  
CHECKING MEX CONTROLS  
END CHECKING MEX CONTROLS  
Initializing CCS...  
Partial initialization phase starting  
System configuration identified.....  
CCS is on the air.....  
Application Manager initialization completed  
(ROOT)  
CCS 02.13.00  
Copyright (c) 1991-XXXX Tadiran Telecom Ltd. ("Tadiran")  
NAME - site_name  
SAU # - 1  
NIC init completed
```

- The version number of the generic feature software is indicated where the x's appear in the line that reads **CCS xx.xx.xx**.
- If the version number shown in the PI does not match the version number printed on the IMC8 flash card supplied with the system, perform the procedure described in [Chapter 4, Software Installation Procedure](#) to install a new generic software version on the IMC8/16 card.



## Memory Lithium Battery Condition Test

If the start-up tests detect that the voltage level of a lithium backup battery on the MCB Office is insufficient to reliably maintain the memory contents in the event of power failure, the following message will appear:

### **MCB Office - BATTERY LOW**

This message indicates that the MCB Office card battery has an insufficient voltage level. In this event, the Coral system database is in jeopardy of being lost during a power failure. If this message appears, the database should be saved and the battery replaced at the first opportunity.

To ensure that the system database is not lost, save the database to the IMC8 card via the database control branch of the system database (*ROUTE: ROOT, 0, 10, 2, 2, 0*). For details, see [Saving to a Directory, page 4-6](#). If the system loses power or is reset for any reason and the database is lost from memory, the system will copy the database from the IMC8 card into database memory as the system restarts.

Once the system database is safely saved on the IMC8 card, power to the Coral system may be turned off at a time that will cause the least disruption of service to the user. At that time, the battery on the MCB Office may be replaced and the system restarted.



### **NOTE:**

*To replace the lithium battery, carefully raise the battery holder clip and then insert the new battery with the + (positive) symbol appearing on top. Do not apply too much pressure to the battery holder clip as this could cause the clip to snap.*

### **WARNING!**

*Explosion and Environmental Hazards.*

*There is a danger of explosion if the battery is replaced incorrectly.*

*Replace the battery only with the same or equivalent type recommended by the manufacturer.*

*Dispose of used batteries according to requirements specified by the battery manufacturer and/or local regulatory agencies.*

**NOTES:**

## 3.3 Identifying the Coral Expansion Units

### Introduction

This section describes how to identify the expansion units connected to the Coral IPx Office system.

[Table 3-1](#) defines the minimum software version requirements for the IPx Office as a function of the expansion unit connected to the IPx Office main unit.

**Table 3-1 Minimum Software Version per Expansion Unit Type**

| Expansion Unit Type Installed in System | Minimum Coral IPx Office Software Version |
|---|---|
| IPx Office EX                           | 15.5                                      |
| IPx 500X                                | 15  |
| IPx 800X                                | 15  |
| FlexiCom 200 CSLX                       | 15.5                                      |

### Coral IPx Office Software Version 15

When Coral software version 15 is installed, IPx 500X and 800X cages connected to the IPx Office main unit are automatically identified by the system.



**NOTE:**

*IPx Office/EX and FlexiCom 200 CSLX Expansion units require Coral IPx Office Software Version 15.5 or higher.*

### Coral IPx Office Software Version 15.5 or higher

Before the peripheral cards can be installed and the system initialized, it is necessary for the Coral system to identify each unit or cage within the system. Therefore, the following procedure is to be carried out immediately after powering the system and performing all power-up tests.

- 1 Attach the Program Interface (PI) device cable to the KB0 programming port connector on the front panel of the IPx Office unit. The installation of shared service and peripheral interface cards into a Coral system has considerable impact on the system database. Refer to *Chapter 6 of the Program Interface & Database Reference Manual* for more information. Using the PI, verify that each of the following parameters contain the appropriate information.
- 2 Access the Installation branch of the PI (Route: SYSGEN,0) to verify that the expansion units are properly recognized by the IPx Office main processor.

The following appears on the PI terminal:

EXPANSION\_TYPE

(0-None, 1-IPx Office, 2-IPx 500X/800X, 3-FlexiCom 200)

The following is an explanation of the optional entries:

- 0-None..... There is no expansion unit integrated in this system.
- 1-IPx Office..... Identifies the expansion units attached to the system as being IPx Office/EX units.
- 2-IPx 500X/800X..... Identifies the expansion units attached to the system as being any combination of IPx 500X and IPx 800X cages.
- 3-FlexiCom 200 ..... Identifies the expansion units attached to the system as being FlexiCom 200 CSLX cabinets.



#### NOTE:

---

*Upgrading from Version 15 sets the EXPANSION\_TYPE value to NONE! A value of None will prevent the cards in the expansion unit from initializing and the PI will show an error message "CONFIG\_ERR ", in the Card List branch (Route: CLIS).*

---

- 3 After defining the expansion unit in the EXPANSION\_TYPE parameter, the Coral IPx Office system must be re-initialized (soft reboot) in order to initialize the peripheral cards, as described [Activating and Initializing the Control Card, page 3-5](#).
- 4 On the PS Office power supply card, turn the power switch OFF (downwards).
- 5 Turn the PS Office power supply card, turn the power switch on (upwards). The system is initialized.

## 3.4 Peripheral Interface Card Initialization

### Introduction

This section describes how to initialize the peripheral cards. Perform this section only after the Coral IPx Office has been initialized properly and all expansion cages have been defined in the system. See [System Initialization, page 3-17](#). If the peripheral cards are inserted before the IPx Office system has initialized and/or expansion units have been recognized, they will not initialize properly.

The card installation is described in [Peripheral Card Installation, page 2-24](#).

The IPx Office system peripheral cards installation and initialization procedure includes the following steps:

- 1 [Preparing for Initialization on page 3-17](#)
- 2 [IPx Office Main Unit Initialization on page 3-18](#)
- 3 [First Expansion Cage or Cabinet Initialization on page 3-19](#)
- 4 [Second Expansion Cage or Cabinet Initialization on page 3-19](#)

#### *Rules for Inserting a Coral Circuit Card*

- 1 Connect a static dissipating wrist strap connector to the cage and put on the strap. See [Figure 2-14 on page 2-24](#).

#### **CAUTION!**

*Circuit cards contain static-sensitive circuitry and may be damaged or destroyed by electro-static discharge (ESD). Always wear a static dissipating wrist strap connected to the unit while handling circuit cards. Hold circuit cards by their edges and avoid touching contact surfaces. Handle with care and do not drop.*

- 2 To insert a circuit card completely into its slot, gently slide the card straight into the card slot. A slight resistance will be felt as the multi-pin connectors on the circuit card meet mating connectors on the backplane and engage.

- 3 Push against the front panel of the card until it is flush with the front frame of the card cage.

**CAUTION!**

*Do not force the circuit card into the slot. If more than slight resistance is encountered, remove the circuit card and examine the connectors for bent pins or interfering debris. Never place a card in a slot other than the dedicated one. Refer to [Table 2-7 on page 2-28](#) to determine peripheral interface card types.*

- 4 On the front panel of the peripheral card, verify that the red diagnostic LED indicator (near the right side of the card) illuminates. The LED indicator remains ON continuously until the card receives its database from the system. After a few seconds, verify that the LED indicator turns OFF. This indicates that the card has initialized properly.
- 5 If the LED indicator remains illuminated continuously for more than two or three minutes, either there is a conflict between the system database and its authorizations, or the card may be faulty. See [Table 6-1 on page 6-4](#), or refer to the *Coral Service and Peripheral Cards Installation Manual* for further details.
- 6 Attach the Program Interface (PI) device cable to the KB0 programming port connector on the front panel of the IPx Office unit if not already attached. The installation of shared service and peripheral interface cards into a Coral system has considerable impact on the system database. Refer to *Chapter 6* of the *Program Interface & Database Reference Manual* for more information. Using the PI, verify that each of the parameters detailed below contain the appropriate information.

Access the card list branch of the PI (Route: CLIS) to verify that the cards are properly recognized and initialized by the IPx Office MCB Office processor.

The following table appears on the PI terminal:

| <b>shelf/slot</b> | <b>I_TYPE</b> | <b>P_TYPE</b> | <b>CDB</b> | <b>version</b> | <b>subversion</b> | <b>status</b> |
|-------------------|---------------|---------------|------------|----------------|-------------------|---------------|
| 1 / SLOT No.      | CARD_NAME     | CARD_NAME     | XXX        | XXX            | XXX               | ACTIVE        |

The following is an explanation of the CLIS fields:

- Shelf Number ..... The IPx Office main unit is labeled shelf # 1;  
the first expansion unit or cage is labeled shelf #2;  
the second expansion unit or cage is labeled shelf #3.  
Both FlexiCom 200 expansion cabinets are labeled shelf #2.

Slot Number ..... Identifies the slot location of the indicated card for display.  
 2-3 through 10-11 in the IPx Office main and expansion units;  
 1-10 in the IPx 500X expansion cage;  
 1-12 in the IPx 800X expansion cage;  
 1-3 in the first FlexiCom 200 expansion cabinet;  
 5-7 in the second FlexiCom 200 expansion cabinet



**NOTE:**

*There are five physical card slots located in the rear section of the main and expansion IPx Office units. However, the PI recognizes each physical slot as two separate slots (slot 2-3, slot 4-5, slot 6-7, slot 8-9, and slot 10-11).*

I\_TYPE ..... This field should show the required card name.

If the I\_Type lists a different card type this indicates that the card slot has been previously initialized by a different card type. That card must be relocated to a clear card slot (where the I\_Type field shows NO\_CARD) or the current card slot assignment must be cleared throughout the PI.

P\_TYPE..... Shows the card type currently located in the slot.

CDB..... Allows modifying the card database set assigned by the system. When not applicable for the card, --- is displayed in this field.

Version/Subversion ..... Provides information on the card software set loaded. For display purposes only.

Status ..... The information provided in this field helps you to troubleshoot card initialization problems. See [Table 3-2](#).

7 Verify that the cards are identified properly in the Card List branch of the system database (*Route: CLIS*). The different card slot STATUS messages are described below in [Table 3-2](#).

Verify that the embedded C/PUGW circuit is ACTIVE as defined under shelf #5, slot #6 (for IPx Office systems).



**NOTE:**

*Although the C/PUGW circuit is embedded on the MCB Office card in IPx Office systems, it is recognized by the system as a separate card. The C/PUGW circuit must be ACTIVE before this parameter can be configured.*

8 Verify that the STATUS field indicates ACTIVE for each of the cards installed. If another message is displayed, see [Table 3-2](#). For a complete list of card slot status messages, see *Chapter 6 of the Program Interface & Database Reference Manual*.

**Table 3-2 Card Slot Status Messages**

| Message      | Description   | Recommendations  |
|--------------|---|--|
| ACTIVE       | Initialization was successfully completed.  | None   |
| ACTIVE/P     | Card is partially active because there are not enough resources to support the other sub circuits on an 8DRCM/8DRCF card or not all tone generators are being used on the iDSP card.  | Readjust SIZES to support unsupported sub circuits for 8DRCM/8DRCF card.<br>Partial Active for the iDSP card is not critical. Readjust the parameter value only when needed. |
| REPLACED     | P_TYPE and I_TYPE are not compatible.<br>Both p_type and i_type fields should show the required card name.<br>The card slot has previously been initialized by a different card type (see the entry for I_TYPE field, as well). | Install proper card or enter NO_CARD in the I_TYPE option.   |
| WAIT_DB      | Card has not received database, or has not reported initialization.   | Continue waiting   |
| NO_RESOURCES | Insufficient system memory to initialize card.  | Check SIZES  |
| FAULT        | HDLC problem  | Check HDLC wiring  |
| UNAUTHORIZED | The SAU ports are limited and therefore the card is not authorized for use in this system.  | Install an updated version of the SAU with the appropriate amount of ports added. Ask your dealer for an authorized upgrade.   |



## System Initialization

---

### *Preparing for Initialization*

After the software has been installed and initialized:

- 1 In the expansion cages, verify that the power supply switch is in the OFF position (turned downwards).



#### **NOTE:**

*Verify that all power supply units within the expansion units are turned OFF. If the expansion units are turned ON before the main unit, the peripheral cards within the expansion units will not initialize properly.*

---

- 2 Check the position of shared service and peripheral interface cards that will be inserted into the system card cage. Observe any order previously directed or any established convention of the distributor. See [Inserting a Peripheral Card into the Main Unit, page 2-25](#) and refer to the following card placement diagrams:
  - [Figure 2-15 Coral IPx Office Main Unit Card Placement on page 2-29](#)
  - [Figure 2-16 Coral IPx Office 1st Expansion Unit Card Placement on page 2-29](#)
  - [Figure 2-18 1st Expansion Cage IPx 500X Card Placement on page 2-30](#)
  - [Figure 2-19 2nd Expansion Cage IPx 500X Card Placement on page 2-31](#)
  - [Figure 2-20 1st Expansion Cage IPx 800X Card Placement on page 2-32](#)
  - [Figure 2-21 2nd Expansion Cage IPx 800X Card Placement on page 2-33](#)
  - [Figure 2-22 System with One FlexiCom 200 \(CSLX\) Expansion Unit on page 2-34](#)
- 3 Verify that all peripheral cards in the expansion cages protrude from the cage by approximately 1 inch (2.5 cm).
- 4 Attach the Program Interface (PI) device cable to the KB0 programming port connector on the front side of the IPx Office unit.

---

### *IPx Office Main Unit Initialization*

- 1 Verify that the MCB Office control card has been initialized properly as defined by the front panel LED indicators. See [Table 6-1 on page 6-4](#).
- 2 Insert the peripheral cards completely into their card slots. See [Peripheral Card Installation, page 2-24](#). Insert the cards fully, one by one, in sequential order (slot 2-3 through slot 10-11) in adjacent card slots, so that the installation corresponds with the uniform numbering plan. See [Figure 2-15](#) for the location of each peripheral card slot.

---

### *First IPx Office Expansion Unit Initialization*

- 1 Turn ON the power supply unit in the first expansion unit.

**NOTE:**

---

*Turn on the power supply unit within the first expansion unit only after powering the IPx Office unit and verifying that the control card has initialized properly, otherwise the cards in the expansion units may not initialize properly.*

---

- 2 Insert the peripheral cards completely into their card slots. See [Peripheral Card Installation, page 2-24](#). Insert the cards fully, one by one, in sequential order (slot 2-3 through slot 10-11) in adjacent card slots, so that the installation corresponds with the uniform numbering plan. See [Figure 2-16](#) for the location of each peripheral card slot.

---

### *Second IPx Office Expansion Unit Initialization*

- 1 Turn ON the power supply unit in the second expansion unit.
- 2 Insert the peripheral cards completely into their card slots. See [Peripheral Card Installation, page 2-24](#). Insert the cards fully, one by one, in sequential order (slot 2-3 through slot 10-11) in adjacent card slots, so that the installation corresponds with the uniform numbering plan. See [Figure 2-16](#) for the location of each peripheral card slot.

---

### *First Expansion Cage or Cabinet Initialization*

- 1 Turn ON the power supply unit in the first expansion cage.
- 2 On the front panel of the power supply unit, verify that the green **power** indicator is lit, and in IPx cages, the red **alarm** indicator is not lit.



---

**NOTE:**

---

*Turn on the power supply unit within the expansion cage only after powering the IPx Office unit and verifying that the control card has initialized properly, otherwise the cards in the expansion cages may not initialize properly.*

---

- 3 Insert the peripheral cards completely into their card slots. See [Peripheral Card Installation, page 2-24](#).

---

### *Second Expansion Cage or Cabinet Initialization*

- 1 Turn ON the power supply unit in the second expansion cage.
- 2 On the front panel of the power supply unit, verify that the green **power** indicator is ON, and in IPx cages, the red **alarm** indicator is OFF.



---

**NOTE:**

---

*Turn on the power supply unit within the expansion unit only after powering the main unit and the first expansion unit and verifying that the control cards have initialized properly, otherwise the cards in the second expansion cage will not initialize.*

---

- 3 Insert the peripheral cards completely into their card slots. See [Peripheral Card Installation, page 2-24](#).

**NOTES:**

## 3.5 I/O Cable Installation

The I/O cables are connected to the cage after all the corresponding cards are in place.

- 1 Determine the route of Input/Output (I/O) cables from the MDF to the I/O connectors of the relevant peripheral cards. If required, measure the longest distance from an I/O connector on the card cage to the corresponding cable punch block (if such blocks are installed) on the MDF.
- 2 For each peripheral card that includes a Champ™ connector, fabricate cables of the length determined above with a male 25 pair connector on one end, for each I/O connector on the cards.

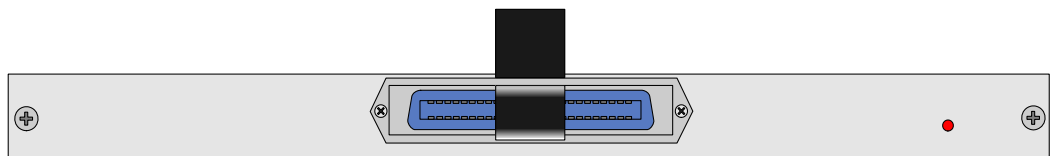


### NOTE:

*Each I/O cable must be fabricated such that it is long enough to reach its designated card connection on the rear panel of the unit. Verify that each cable is attached to the correct connection.*

- 3 For each connector used on the peripheral cards, fabricate cables of the length determined above with a suitable connector on one end.
- 4 Carefully route the connector end of the first cable to the rear panel of the unit. For each installed card, insert the cable connector firmly onto the I/O connector on the peripheral card. See [Figure 3-4](#) for the cage-MDF connection.
- 5 Secure all Champ™ connectors to their corresponding peripheral card hook and loop Velcro™ strap. See [Figure 3-3](#).

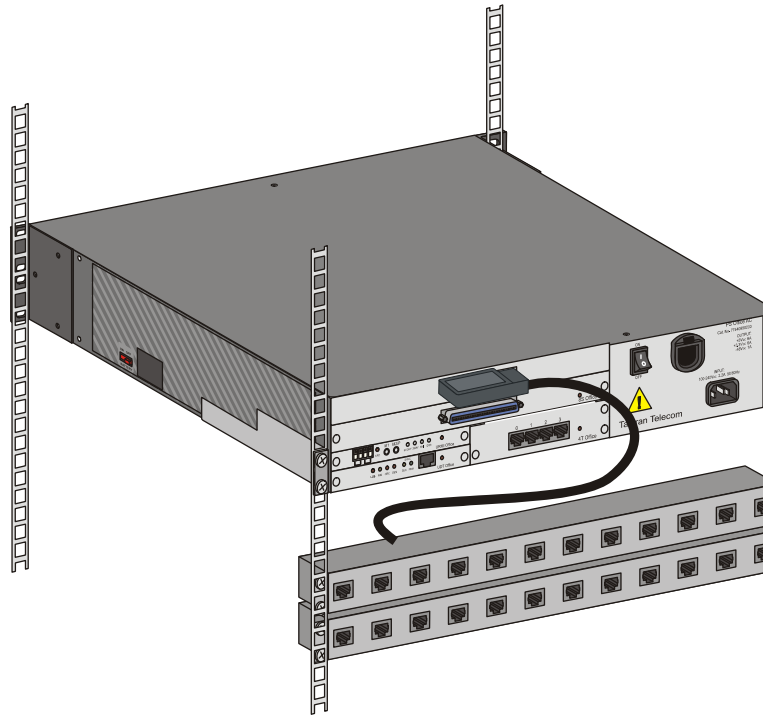
**Figure 3-3 Velcro™ Strap on Champ™ connector**



- 6 Connect the I/O connections to the MDF in accordance with the instructions provided by your MDF manufacturer.

- 7 For information on external connections for peripheral card connection information (pinouts), refer to:
  - [Direct Pinout of the Champ/Card Connection](#), page 5-25
  - OR
  - [Direct Pinout of the Block 66 MDF Connection](#), page 5-29.
- 8 For information on protection devices, refer to [Protection Devices](#), page 5-11 for the surge arrestor mounting procedure.
- 9 For information about peripheral device hardware connections, refer to *Coral Terminal Equipment Installation Manual*.
- 10 For information on how to install the expansion cages, refer to the Chapter 3 of the *Coral IPx 500 Installation Procedure and Hardware Reference Manual* and/or *Coral IPx 800 Installation Procedure and Hardware Reference Manual* or *Coral FlexiCom 200 Installation Procedure and Hardware Reference Manual (CSLX)*.

Figure 3-4 **MDF Connector Configuration**



## 3.6 *Completing the Installation*

- 1 Remove any other items from the shipping containers.
- 2 Remove all empty packages, crates, and debris.
- 3 Verify that you have provided all of the necessary instructions and documentation to the system operator.



### **NOTE:**

---

*Once the system is completely installed and operating, it is no longer necessary to keep the shipping containers.*

---

- 4 Disconnect the KB0 cable from the front panel of the IPx Office unit.

**NOTES:**



# Chapter 4

## Software Installation Procedure

Coral

|     |  |      |
|-----|--|------|
| 4.1 | <i>Generic Feature Software</i> .....                              | 4-1  |
| 4.2 | <i>System Database Control</i> .....                               | 4-5  |
| 4.3 | <i>Application Platform Circuit Configuration and Upgrade</i> .... | 4-13 |



# 4.1 Generic Feature Software Upgrade

## Introduction

The Coral IPx Office is delivered to the site with factory-loaded software on the IMC8 card. The IMC8 card is an 8MB flash memory card. See [IMC8 Flash Memory Card, page 8-27](#) for details. The IMC8 card is installed on the front panel of the IPx Office system.



### NOTE:

*The IMC16 card is a 16MB flash memory card. For specific applications, the IPx Office might require an IMC16 flash memory card. Contact the manufacturer's representative for further information.*

The software initialization procedure is described in [Activating and Initializing the Control Card, page 3-5](#).

The Coral system is delivered to the site with factory-loaded software on IMC card. The IMC card contains three types of data:

- Generic Feature Software Version and Boot Code
- Authorization
- Database Backup

The IMC card can be inserted into a PC slot using any PCMCIA application adapter for loading a new Coral IPx Office software version.

Whenever an updated version of the Coral software is released, the upgrade is delivered to the sites either on a disk, e-mail, or via other electronic media file transfer. The upgrade is contained in a self-extracting compressed file, specific for the site.

The upgraded generic feature software must be extracted by a PC using the FMprog tool, and then written from the PC hard disk into the IMC card. The FMprog is a tool for Coral dealers who install, upgrade and maintain Coral systems using flash memory cards. For FMprog application, see the *FMprog PC-Utility Reference Manual*. This reference manual describes how to install and operate the FMprog-Utility.

## ● Upgrading Using the FMprog-Utility

---



### **NOTE:**

*Use FMprog version 6.xx and above. Otherwise, the Coral will not initialize.*

---

The upgrade of the generic feature software involves the following main steps:

- Installing the FMprog-Utility (version 6.xx or higher)
- Extracting the new Coral generic feature software file into the PC hard disk
- Programming the new generic software upgrade to the IMC8 or IMC16 card

The FMprog-Utility can be used to backup the Coral software into PCMCIA cards. The backup file is in a binary format and includes all the software components of the specific Coral system from which it was copied, including the Coral IPx Office generic software version, the switch authorization, and the database. Copies should be made and maintained at every customer site. Each site has its unique software configuration, including its main software version, switch authorization and database, as well as its specific Software Authorization Unit (SAU) information. Copies of all system files exist and are available for use via the FMprog-Utility, if they are needed.

Use the FMprog-Utility to:

- Manage your new database versions
- Load the Coral generic version, authorization and database information on to flash memory cards
- Extract version, authorization, and database information from source files

### *Removing the IMC8 Card*

- 1 Turn the power supply switch OFF.

### **CAUTION!**

*Before each installation or removal of an IMC8 card from the IPx Office unit, press the RESET button on the front panel of the IPx Office unit.*

- 2 Press the Reset button on the front panel of the IPx unit.
- 3 Press the Release button on the front panel of the IPx Office unit to remove the IMC8 card.

## ● Installing an Upgraded IMC8 Card

---

This section provides instructions on inserting the IMC8 flash memory card after it has been programmed with a new or upgraded software version.

---

### *Creating a Binary Backup of the Database*

Before installing an IMC8 card with a new generic software version, it is strongly recommended that you make a binary backup of the database. The binary backup must be done by a PC using the Binary Backup PC-Utility. The Binary Backup is a tool for Coral technicians who install, upgrade and maintain Coral systems. See the *Database Binary Backup PC Utility Reference Manual* for further details.

---

### *Installing the IMC8 Card*

- 1 Press the release button on the PCMCIA drive of the PC to remove the new IMC8 card.
- 2 Turn the power supply switch off.

#### **CAUTION!**

*Turn the power supply OFF. The IMC8 card could be damaged if inserted or removed when the system is powered.*

- 3 Press the release button on the front panel of the IPx Office unit to remove the old IMC8 card.
- 4 Insert the new IMC8 card containing the upgraded generic software version.
- 5 Turn the power supply switch ON.
- 6 Verify that the following two messages appear on the PI device:

**For SERVICE/SOFTWARE installation menu HIT <CTRL I> NOW**

\*\*\*\*\*

**CHK RAM**

**END CHK RAM**

**Custom Init Code...**

The second message may appear after two or three minutes, following several short messages that appear during system start-up:

```
CCS is on the air.....  
(ROOT)  
CCS    xx.xx.xx  
Copyright (c) 2001-xxxx.....  
NAME - (site name)  
SAU # -
```

After the second message appears, the system has initialized properly and is capable of processing calls. After entering the password, the version level of the generic feature software is indicated where the x's appear in the line that reads **CCS xx.xx.xx**.

- 7 The new IMC8 card does not include a backup of the current database. To make a backup of the database, perform the procedure described in [Saving to a Directory](#), page 4-6.

### CAUTION!

*The Coral system automatically ceases call processing after 14 days for any of the following reasons:*

*The SAU serial number does not match the corresponding CFD SAU serial number.*

*The Coral generic version contained in the CFD is higher than the version that is authorized by the SAU.*

*An SAU is removed from the IPx Office side panel.*

*Relevant system messages appear on the PI automatically warning that the system will not operate without the proper SAU.*

The program contained on the IMC8 card permits the generic software to function even if the serial number of the SAU is incorrect, or the SAU is absent entirely. If, however, the Coral determines that the SAU is missing or not correct, a message appears during the procedure warning that the system will not operate without the proper SAU. This provision allows the generic feature software and/or feature authorizations to be upgraded on an IMC8 card in another remote system, then installed at the proper system by replacing the existing IMC8 card from the other remote system containing the upgrade.

## 4.2 System Database Control

During normal system operation, the configuration database may be saved to a file on the IMC8 card for permanent storage. The system may also be programmed to save the database to IMC8 automatically on a daily basis, at a particular time.

A saved database file may be loaded at any time into the system database memory. This is a way to restore the database into the RAM of a new MCB Office (and DBM-X) control card.

Once the database in the system has been constructed, copy the database onto the IMC8 card. For more detailed information, see *Chapter 21* of the *Program Interface Reference Manual*.

### Accessing the Database Flash Menu

---

- 1 If a session has not already been established, establish a PI programming session by entering a PI password.
- 2 Select the Database Flash Menu (Route: ROOT,0,10,2,2) branch. The Database Flash menu appears, as follows:

#### **FLASH -MENU**

|   |   |                |
|---|---|----------------|
| 0 | - | SAVE           |
| 1 | - | LOAD DBS       |
| 2 | - | SHOW FILE INFO |
| 3 | - | AUTO BACKUP    |
| 4 | - | ERASE          |

## ● Saving to a Directory

---

The Database Save feature allows the system database to be copied to a directory at any time. The procedure is as follows:

- 1 Verify that the system time and date are correct (press Control-T to check). Update through the Time and Date branch (Route: TIME) of the system database if necessary.
- 2 From the Database Flash menu press 0 to save the database to a file on the IMC8 card. The system prompts for the selection of a destination file number, either DB0.DEF or DB1.DEF, with:
  - 3 `DEST FILE (0,1) - [0]`
- 4 The DB0.DEF file may be saved automatically at a preset time each day and so is usually more up-to-date than the DB1.DEF file. See [Automatic Daily Backup, page 4-11](#). The DB1.DEF file is referred to as the technician's copy of the database, and should be saved each time installation or maintenance personnel make changes to the database.
- 5 Press 0 or 1, according to the table below, to begin saving the system database to a file. The default entry is 0 or DB0.DEF.

| Database File Name | PI Entry | File Description                              |
|--------------------|----------|---|
| DB0.DEF            | 0        | Backup automatically at a preset time         |
| DB1.DEF            | 1        | Manual backup, typically used by a technician |

- 6 When the prompt **EXECUTE (Y/N) - [N]** appears, type **Y** to begin the save process, or **N** to cancel and return to the Database IMC8 menu. The PI command prompt (\*:) will return immediately, but the system will process the command as a background (low priority) task.



---

*Saving the database to a file generally takes several seconds. While the database is being saved, it is important to note that changes to the system configuration (such as: changing the system to Night Service, setting a Call Forward or Do Not Disturb instruction at a station, even turning on or off Background Music at a key set) are disabled until the database save process is completed.*

---

If the system is unable to save the database, one of several messages will be generated by the system.



When the flash memory space is insufficient for saving the database (DBS), the following message appears:

**NO SPACE FOR SAVING DATA BASE**

When at least one of the flags cannot be recognized, the following message will appear:

**CORRUPTED**

**DBS**

7 When the backup is valid, the save operation continues with:

**Caution: Previous backup will be lost:**

**Proceed with backup (Y/N) [N]**

Type **Y** to continue the save operation. The following message appears:

**SAVING.....**

If the backup file is saved successfully, the following message appears:

**SAVE OK.....**

If the backup file save operation fails, the following message appears:

**SAVE FAILED!!**

During the save operation, no database updating will occur.

## Loading (Restoring) from a Directory

A system database stored in IMC8 can be loaded into the database memory on the MCB Office card at any time.



### NOTE:

*Loading the database from IMC8 generally takes several minutes. During this process, the Coral system is non-operational.*

Loading a database can be useful for installing the database of an existing system into the database memory of another system that will have a substantially similar configuration. Similarly, a database can be created by programming a system off-line at another location (perhaps at the distributor's facilities). The database can then be loaded at a convenient time at the intended site.

### CAUTION!

*Loading a database from IMC8 into the system database memory overwrites the original database information stored in the database memory with information in the IMC8 database file. Once overwritten, the original database cannot be recovered.*

- 1 From the Database Flash Menu, press **1** to load a database from IMC8 card. The system displays the following message:  
**CAUTION: Database contents will be lost & system will restart!!!**  
**Proceed with restore (Y/N)? [N]**
- 2 If **Y** is selected, the system prompts to select a source file number, either DB0.DEF or DB1.DEF with:  
**FILE (0/1) - [0]**
- 3 Press **0** or **1**, according to the table below, to begin loading the database stored in IMC8 card.

| Database File Name | PI Entry | File Description                            |
|--------------------|----------|---|
| DB0.DEF            | 0        | Daily backup automatically at a preset time |
| DB1.DEF            | 1        | Technician copy for manual backup           |

The following prompt appears:

**EXECUTE (Y/N) - [N]**

- 4 If you type **Y**, the system goes through the following retrieval condition check sequence:
  - a Verify that the internal flags are present in the database to be loaded.
  - b Verify that the database is not corrupted (the system executes the checksum test procedure).

If the procedure checking the database (DBS) retrieval conditions found the above conditions fulfilled, the following message will appear:

```
Restore DBS.....
```

Upon completing the restoration procedure, the system reports:

```
Restore Successful
```

Next, the system will execute the partial initialization.

If the conditions mentioned above were not met, one of the following messages will be displayed:

```
Operation denied DB0.DEF is not O.K.
```

or

```
Operation denied DB1.DEF is not O.K.
```

If only one backup file was present when the technician requested DB1.DEF retrieval, the following message appears:

```
Operation denied, Load DBS available only to DB0.DEF
```

- 5 Press **Y** to begin loading the database, or press **N** to return to the Database menu.

Loading the database from a file generally takes several minutes. When the database has been loaded, the system performs a partial initialization and begins processing calls.

## ● Show File Information

---

This option displays the list of backed up files stored on the IMC8 card. From the Database Flash menu, press **2** to display the list of backed up files. The following prompt appears:

**Execute (Y/N)? - [N]**

Type **Y**. A report appears with the following columns:

|                    |  |
|--------------------|--|
| <b>File Name</b>   | Displays a list of the DB0.DEF and DB1.DEF files<br>If only one file is present, DB0.DEF will appear |
| <b>Version</b>     | File version   |
| <b>Last Date</b>   | Last backup date   |
| <b>Last-Time</b>   | Last backup time   |
| <b>File-Status</b> | <i>OK</i> - the backed up file is valid<br><i>Invalid</i> - the backed up file is invalid            |

## Automatic Daily Backup

---

The system configuration database can be automatically saved to a database file on the IMC8 at a preset time each day. Use AutoBackup to automatically save the database. During automatic daily backup the database is saved to DB0.DEF.

- 1 From the Database Menu, press **3** to set the Auto Backup time. The following prompt appears:

**NUMBER OF DAYS BETWEEN BACKUPS [1..to..255, N]**

Set the number of days between automatic backups. The default is set to 7 days between backups, so that an automatic backup file is created every week. If no automatic backups are needed, enter N for creating manual backups.

Selection of the backup type is required; either a manual backup performed by the technician or an automatic daily backup. The default after First Initialization is automatic daily backup every week.

- 2 Enter **N** to enable the manual backup or number between **1 to 255** to enable a daily backup.

The system prompts for the time of day with:

**SET AUTO BACKUP TIME:**

**TIME:**

- 3 Enter the time of day to automatically save the system database in the 24 hour, military time format. Use 24:00 for midnight and 24:01 to 24:59 for times between midnight and 1:00 a.m. The default time is 01:30, or 1:30 a.m.
- 4 The system will return to the Database Backup menu. Press **0** to return to the Database menu.

## Erasing Flash Memory

This function enables erasing of backed up files stored on the IMC8 card:

### CAUTION!

*Performing the following procedure will erase the Flash DBS backup. Before erasing, verify that the database is no longer needed.*

- 1 From the Database menu, press **4** to erase the flash memory. The following prompt appears:

```
Proceed with Erase (0/1/A/N/)? [N]
```

- 2 Specify one of the options, as follows:

0 - erases DB0.DEF.

1 - erases DB1.DEF.

A - erases both DB0.DEF and DB1.DEF.

N - cancels the operation.

After you specify 0, 1, or A, the following message appears:

**Erasing..**

Upon completion, the following message appears:

**Erase Completed....**

If the erasing operation was not successful the following message appears:

**Erase failed!!**

## 4.3 *Application Platform Circuit Configuration and Upgrade*

### About the Applications Embedded on the Platform Circuit

---

The Application Platform Circuit embedded on the MCB Office card combines the functions of the MAP card and the PUGW card (also known as C/MAP and C/PUGW in relation to IPx Office main unit) used in other Coral systems. In other words, the Application Platform Circuit manages the PUGW circuit in addition to all of the other applications installed on the MAP card.

These applications include:

- [PUGW Circuit \(C/PUGW\)](#), page 8-11
- [MAP Circuit \(C/MAP\)](#), page 8-12
- [Coral Network Communication Manager \(CNCM\)](#), page 8-13
- SeaMail Voicemail application. See the *Coral SeaMail User Guide*
- [CoraLINK Adapter \(CLA\) Application](#), page 8-14
- Application Manager - manages all of the other MAP applications

For further information, see [Application Platform Circuit \(CLA, MAP, and PUGW\)](#), page 8-10.

## Configuring the Applications

---



### NOTE:

---

#### **IP Address of the Application Platform Circuit**

*In other Coral systems, the PUGW, MAP and/or CLA circuits are embedded on separate cards and are, therefore, accessed from a different IP addresses. In the Coral IPx Office, the PUGW, MAP and/or CLA are integrated in the same circuit as the Application Platform and are known as C/PUGW, C/MAP and/or C/CLA. Therefore, all applications embedded on this circuit share the same IP address, see [Configuring Application Parameters from the Coral PI Database](#), page 4-18.*

---

The Platform Circuit applications are configured by accessing the configuration page on the HTTP web portal.

To configure the applications:

- 1 Record the IP address of the C/PUGW as follows: in the Coral Program Interface (PI) database, access the LOCAL\_IP\_ADDRESS parameter under UGWC, 1 (IP, 0,1) in the Signalling section.



### NOTE:

---

*In the Coral IPx Office, C/PUGW, C/MAP, C/CLA and all other Application Platforms are integrated within the same circuit. Therefore, all applications embedded on this circuit share the same IP address defined by this parameter.*

---

- 2 Open the web browser and enter the IP address of the C/PUGW (recorded in [Step 1](#)) in the Address Box.  
The Enter Network Password dialog box is displayed, prompting you to enter your user name and password.
- 3 In the **User Name** field, enter Admin.  
In the **Password** field, enter 123456.  
The Coral Web Designer page is displayed.



---

## *Displaying the Applications Versions*

To display the versions of individual applications within the application circuit, under the Options heading, click INFO; the application information page is displayed, including the software versions of the Application Manager, CNCM, CLA, and Web server. This page is for display, only.

Figure 4-1 **INFO page**

| COMPONENT           | VERSION    |
|---------------------|------------|
| Application Manager | 8.08       |
| CNCM                | 06.03      |
| CLA                 | 07.00.04.E |
| WEBSERVER           | 10.06      |

## Configuring Application IP Parameters from the Web Portal

The IP Definitions Page includes the TCP port of every feature that gets sent to the queue via the C/PUGW port. Because all features except for SMDR are automatically defined as Server, this is the only parameter that is defined by the user. The SMDR can be defined as Client or Server. When the SMDR feature is defined as a Client, enter the server IP address in the corresponding field. See [Table 4-1](#).

### Application Setup for Client Applications

- 1 If the client is positioned on the other side of the firewall, verify that the NAT settings of the TCP port have been configured as shown in [Figure 4-2](#).
- 2 Define the server IP Address in the application side.

### Server Application Setup

- 1 Select a specific terminal from the server terminals group.
- 2 Define IP address and IP port of the application.
- 3 Set an application destination for the selected terminal.

Figure 4-2 IP Definitions Page

| APPLICATION NAME | MODE   | SERVER IP ADDRESS | TCP PORT | SECONDARY SERVER IP ADDRESS | SECONDARY TCP PORT |
|------------------|--------|-------------------|----------|-----------------------------|--------------------|
| WAKEUP           | Server |                   | 11001    |                             |                    |
| CHARGE           | Server |                   | 11002    |                             |                    |
| MCT              | Server |                   | 11003    |                             |                    |
| CVD              | Server |                   | 11004    |                             |                    |
| TRAFFIC          | Server |                   | 11006    |                             |                    |
| SMDR             | Client | 172.28.9.9        | 11001    |                             |                    |
| DL_ALAR          | Server |                   | 11008    |                             |                    |
| HL_STIM          | Server |                   | 11009    |                             |                    |
| HI               | Server |                   | 11010    |                             |                    |
| CFMCom           | Server |                   | 11015    |                             |                    |

Apply

## Configuring the SMDR Report TCP/IP Destinations

SMDR Report destinations are defined as a TCP/IP sockets when the CNCM application is used.

- 1 In the Coral PI database, define the SMDR\_DEST parameter as 99 (Route: SMDR, 0). Coral displays the last IP port not yet used. See *Chapter 14* of the *Coral Program Interface and Database* manual.
- 2 In the Coral PI database, you can define the SMDR\_BACKUP parameter as 0 (Route: SIZ). This releases the SMDR memory allocated by Coral that is not utilized by the CNCM application.
- 3 In the CNCM application, in the IP Definitions page (see [Figure 4-2](#)), define the SMDR mode as Server or Client; [Table 4-1](#) describes the SMDR field entries for both modes.
  - **SMDR Server**, the application can send SMDR reports to one TCP/IP socket destination, only.
  - **SMDR Client**, the application can send SMDR reports to up to two TCP/IP socket destinations. This provides additional redundancy as SMDR output is sent to two different devices simultaneously.
- 4 Configure the parameters as specified in [Table 4-1](#) and click Apply; the SMDR application is configured to send records to one or two different TCP/IP sockets.

**Table 4-1 SMDR Destination Configuration Possibilities**

| Field                       | Enabled in Mode |        | Entry                                 |
|-----------------------------|-----------------|--------|---------------------------------------|
|                             | Client          | Server |                                       |
| Server IP Address           | Yes             | No     | IP address of first SMDR destination  |
| TCP Port                    | Yes             | Yes    | TCP port of first SMDR destination*   |
| Secondary Server IP Address | Yes             | No     | IP address of second SMDR destination |
| Secondary TCP Port          | Yes             | No     | TCP port of second SMDR destination   |

\* This default TCP/IP port is automatically defined as 11007 by the CNCM application but can be modified if necessary.

---

## *Configuring Application Parameters from the Coral PI Database*

This section lists the Coral database parameters that are relevant to applications embedded on this circuit.

Management applications such as CVD, CFM and CLA require standard authorization from the Coral.

### **Parameters Relevant to all Applications**

Refer to *Chapter 29* of the *Program Interface and Database Reference Manual* for instructions on the database programming required.

**Current UGW: Signalling \_\_\_\_\_ (Route: UGWC, 1)**



#### **NOTE:**

---

Although the C/PUGW circuit is embedded on the MCB Office card in IPx Office systems, it is recognized by the system as a separate card. The PUGW circuit must be ACTIVE before this parameter can be configured. For further information, see [Peripheral Interface Card Initialization, page 3-13](#).

---



#### **NOTE:**

---

Updating any parameter in this branch causes the PUGW card to reset:

- All calls using media channels are dropped.
- All IP\_NET calls are dropped.
- One or more of the IP endpoints (IP Keyset, IP SLT, IP LGS or IP Net) may re-initialize on another PUGW card with the same zone.

Additionally, all Coral Teleport (FXS/FXO) calls are dropped if any IP\_SLT/IP\_LGS ports re-initialize on another PUGW.

---

### **ZONE\_LIST(0-7)**

Define the zones for this PUGW card. Between one and eight zones can be defined.

#### **SIGNALLING: LOCAL\_IP\_ADDRESS**

Enter the IP Address used by the Application Platform Circuit. All applications embedded on this Coral IPx Office (known as C/PUGW, C/MAP and/or C/CLA) share the same IP address. Also define the static IP address for the C/PUGW (signalling only).

#### **GLOBAL\_IP\_ADDRESS**

Define the static global IP Socket address for the PUGW card (signalling only).

#### **SUBNET\_MASK**

Define the Subnet Mask address for the PUGW card (signalling only).

#### **DEFAULT\_ROUTER\_ADDRESS**

Enter the Subnet Mask IP Address used by the Application Platform Circuit. Also define the Default Router Address for the C/PUGW (signalling only).

### **Echo Cancellation Period**

Define the echo cancellation period required for this PUGW card.

### **QoS: DiffServ**

Define whether or not the DiffServ Quality of Service (QoS) protocol is used.

### **802.1Q/p**

Define whether or not the 802.1Q/p QoS protocol is used.

### **MEDIA: MAC**

This parameter is irrelevant for the PUGW/MRC (it is used for UGW/MG only).

### **LOCAL\_IP\_ADDRESS**

Defines the static, local IP socket (IP Address and IP Port) for the media module. The local IP address is the address of the PUGW card when accessed from the LAN.

### **GLOBAL\_IP\_ADDRESS**

Defines the static, global IP Socket (IP address and port) of the media. The global IP address is used when accessed from the other side of the NAT (the outside world).

### **SUBNET\_MASK**

Define the Subnet Mask address for the MRC module, if installed.

### **DEFAULT\_ROUTER\_ADDRESS**

Define the Default Router Address for the MRC module, if installed.

**PHYSICAL CAPACITY:** The Physical Capacity displays the actual maximum values for this PUGW card.

### **MEDIA\_CHANNELS**

Displays the MRC module type "**MRC-XX**" (XX=8/16/32/64) and its maximum number of G.729 media channels that can be supported by this MRC module, based on the card hardware (regardless of what is defined in Sizes Tab).

### **RESOURCES\_TYPES**

Displays the type of system resources supported by this MRC.  
(Display Only) **DTMF, MFC, Caller ID, 3 Way**, and/or **CONF**.

### **MAX\_G711\_MEDIA\_CHANNELS**

Displays the maximum number of media channels that are available when using G.711 protocol, when this card is used *only* for media channels. When other media protocols are used, or if MRC resources are used, then this number can't be reached.

### **TOTAL\_END\_POINTS**

Displays the maximum number of IP endpoints, including IP terminals and MRC media channels that can be supported by this PUGW card, based on the card hardware (regardless of what is defined in Sizes). The PUGW or MCB Office card can support 240 IP endpoints. The maximum number of IP terminals that can be supported by the PUGW is equal to 240 minus the number of media channels supported by the PUGW. For example, a PUGW with an MRC-16 card supports at least (240-64=176) IP terminals.

### **END\_POINT\_TYPES**

Displays a list of the IP endpoint types supported by this PUGW card  
(Display Only) **Keyset, SLT, LGS, NET, SIP**, and/or **Media**.

## REQUIRED MEDIA\_CHANNELS

**CAPACITY:** Enter the maximum number of media channels supported by this MRC. Enter 0 if no MRC module is installed. [Table 4-2](#) through [Table 4-4](#) give examples of how the number of IP terminals that can be defined varies with the number of media channels programmed under REQUIRED CAPACITY for an MRC-16 card. For more details, see [MEDIA\\_CHANNELS](#) in Chapter 8 of the *Service and Peripheral Cards Installation Manual*.

## KEYSETS

Enter the maximum number of IP Keysets that this PUGW will support.

## SLT

Define the maximum number of SLT Keysets that this PUGW will support.

## LGS

Define the maximum number of loop/ground start trunks that this PUGW will support.

## NET

Define the maximum number of NET signalling resources that this PUGW will support.

## SIP

Define the maximum number of SIP terminal resources that this PUGW will support.



### NOTE:

---

*The total capacity (maximum 240 ports) includes a combination of Media Channels, Keysets, SLTs, LGS, SIP and NET resources allocated.*

---

## UPDATE?

Updating any of these IP addresses causes the Application Platform Circuit to initialize, thereby interrupting the connection to all applications embedded on the platform, **including the C/PUGW circuit.**

**Table 4-2 Example 1:**  
**MRC-16 - Media Channels**  
**Defined to Full Physical**  
**Capacity**

| <i>Required Capacity Parameter</i> |              |
|------------------------------------|--------------|
| <i>Name</i>                        | <i>Value</i> |
| <b>MEDIA_CHANNELS</b>              | <b>64</b>    |
| KEYSET                             | 60           |
| SLT                                | 10           |
| LGS                                | 10           |
| NET                                | 60           |
| SIP                                | 36           |
| <b>Total IP Terminals</b>          | <b>176</b>   |
| <b>Total Endpoints</b>             | <b>240</b>   |

**Table 4-3 Example 2:**  
**MRC-16 - Media Channels**  
**Defined to Half Physical**  
**Capacity**

| <i>Required Capacity Parameter</i> |              |
|------------------------------------|--------------|
| <i>Name</i>                        | <i>Value</i> |
| <b>MEDIA_CHANNELS</b>              | <b>32</b>    |
| KEYSET                             | 60           |
| SLT                                | 10           |
| LGS                                | 10           |
| NET                                | 60           |
| SIP                                | 68           |
| <b>Total IP Terminals</b>          | <b>208</b>   |
| <b>Total Endpoints</b>             | <b>240</b>   |

**Table 4-4 Example 3:**  
**MRC-16 - No Media**  
**Channels Defined**

| <i>Parameter</i>          |              |
|---------------------------|--------------|
| <i>Name</i>               | <i>Value</i> |
| <b>MEDIA_CHANNELS</b>     | <b>0</b>     |
| KEYSET                    | 92           |
| SLT                       | 10           |
| LGS                       | 10           |
| NET                       | 60           |
| SIP                       | 68           |
| <b>Total IP Terminals</b> | <b>240</b>   |
| <b>Total Endpoints</b>    | <b>240</b>   |

*Routing and Cost Calculation* \_\_\_\_\_ (Route: LCR, 3)

**IP\_ADDRESS**

For each dial service, define the IP Address to which the card is to connect.

**COMPRESSION\_CAPABILITY**

Define the available compression protocols for the dial service.

*IP Net* \_\_\_\_\_ (Route: 9, 4)

**CARD LOCATION: NAME**

Define the name of the card. This name is for reference only and is not displayed anywhere else in the Coral system.

**MAIN CHANNEL: PROTOCOL\_ID**

Displays standard network protocol: ISDN (public) or QSIG (private networks).  
Display only.

**Send Connected Number to Public Network**

Define whether the Coral sends a Connect message which includes the Connected Number to the Public Network.

**QSIG DEFINITIONS: SUPPORT CALL INDEPENDENT SIGNALLING CONNECTION**

Define whether CISC calls are supported, thus enabling use of QSIG network features between nodes.

**TRANSIT COUNTERS IN CISC CALLS**

Define whether to set Transit Counters for the CISC calls. The Transit Counters help avoid a endless loop scenario of forwarded calls.

**NET DIVERSION**

Define whether or not the Coral attempts to re-route calls to forwarded destinations (as opposed to direct switching) in other PBXs by using QSIG protocol.

**TRANSIT\_COUNTER\_CODING**

A Transit PBX sends the call information in code form. Define which QSIG code form is implemented when call information is sent. Ensure that the QSIG code form matches the code form used in the system to which the Coral is connected.

**PROTOCOL PROFILE**

Define the Protocol Profile used for Coral features in this network node. All the network node PBXs should have the same Protocol Profile defined so that they may communicate.



## **Parameters Relevant to CLA (CoraLINK)**

### **Feature Authorization**\_\_\_\_\_ (Route: FEAT,1)

This display-only parameters display the CLA feature that is authorized for use with this Coral system. Refer to *Chapter 3* of the *Program Interface and Database Reference Manual* for instructions on the database programming required.

### **CoraLINK**\_\_\_\_\_ (Route: ROOT,7)

Enables the CLA card operation when set to Yes. For further information, refer to *Chapter 27* in the *Program Interface Reference Manual*.

## **Parameters Relevant to CNCM (Coral software version 15.5 or higher)**

Refer to *Chapter 3* of the *Program Interface and Database Reference Manual* for instructions on the database programming required.

### **Feature Authorization**\_\_\_\_\_ (Route: FEAT,1)

These display-only parameters include the CNCM features authorized for this system.

### **SMDR BACKUP**

Provides the system with a memory buffer for storage of SMDR on-line records whenever the printer or log device are unable to accept records. For information on SMDR database programming, see *Chapter 14* in the *Program Interface Reference Manual*.

### **HOTEL/MOTEL**

Determines whether the following features are accessible when set to Yes:

- Wakeup
- Call Charge.

### **TRAFFIC (CVT)**

Enables installation of the Traffic Application Package: CoralVIEW Traffic (CVT).

### **CALL TRACE**

Malicious Call Trace (MCT) allows the Called Party or an Attendant to compile a list of all incoming calls to the “Called” station. The Attendant can compile a list for more than one station.

### **CVA**

When set to Yes, this parameter enables access to the Coral View Administrator (CVA) Application. The CVA is mostly used by entry-level operators and supervisors.

### ***CVD***

When set to Yes, enables access to the Coral View Designer (CVD) application.

### ***CVD\_PRO***

When set to Yes, enables access to the Coral View Designer Pro. application.

### ***CFM***

Authorizes the system to send diagnostic and alarm messages to the CFM application.

### ***INTERNAL TRAFFIC***

When set to Yes, enables the Coral to produce internal traffic reports.

### ***MAP*** \_\_\_\_\_ *(Root, 3, 10)*

Refer to *Chapter 27 of the Program Interface and Database Reference Manual* for instructions on the database programming required.

### ***MAP card***

Displays the status (Active/Inactive) of the Application Platform Circuit (similar to MAP cards installed in other Coral systems).

### ***CNCM***

Displays the status (Active/Inactive) of the CNCM application embedded on the Application Platform Circuit and offers terminal IP connectivity between external applications and the Coral system.

### ***MAP Card Reset?***

Updates the Application Platform Circuit including all connected applications. In the Coral IPx Office, this includes all terminal equipment connected via the C/PUGW circuit.



#### ***NOTE:***

*If this parameter is set to Yes in a Coral IPx Office system, service to all terminal IP equipment connected via the C/PUGW circuit is disrupted in addition to the applications embedded on the circuit. This is not the case when this parameter is activated in other Coral systems.*

## CNCM Supports IP Coral Destinations

Currently, the Coral can define IP connections for these destinations by entering the “99” string as the destination port number. In this manner, an IP connection can be established for the application (via the CNCM software) when the Application Platform Circuit is in “ACTIVE” status for the Coral system.

PI destination parameters appear in the following branches and are assigned the following default TCP/IP ports as described in [Table 4-5](#).

**Table 4-5 Application Default Port assignment for IP Socket**

| Application Name   | PI Branch Name       | Root       | Parameter Name      | Default TCP Port for IP Socket* |
|--------------------|----------------------|------------|---------------------|---------------------------------|
| Wakeup             | Wakeup Control       | Wakeup, 0  | DEST                | 11001                           |
| Charge             | SMDR Control         | SMDR, 0    | CHARGE_DEST         | 11002                           |
| MCT                | Call Trace Terminal  | Root, 3, 6 | Call Trace Terminal | 11003                           |
| CVD                | NA                   | NA         | NA                  | 11004                           |
| CFM                | NA                   | NA         | NA                  | 11015                           |
| Traffic            | CVT Terminal Dest    | Root, 3, 5 | Traffic_Terminal#   | 11006                           |
| SMDR               | SMDR Control         | SMDR, 0    | SMDR_DEST           | 11007                           |
| DI_ALAR            | Terminal Destination | MSG, 2, 2  | DIAG                | 11008                           |
| HI_STIM            | Terminal Destination | MSG, 2, 2  | STIMU               | 11009                           |
| Program Interface† | Terminal Setup       | Term, 0    | TERM(INAL)          | 11010                           |

\* These IP port numbers can be changed in the application software.

† Coral Database Binary Backup and ASCII are NOT supported via the Application Platform Circuit.

## ● Upgrading the Applications C/MAP, C/PUGW and MRC

The applications software is regularly enhanced to provide new features. You can upgrade the MAP, PUGW and MRC application by downloading its latest version from the manufacturer's website.



### **NOTE:**

*The package installed on the PUGW, PUGWipx, and MAP cards, and the Coral IPx Office and Wave Gateway systems are identical. The application components used by each product are listed in [Table 4-6](#).*

**Table 4-6 C/PUGW Software Components**

| C/PUGW Software Components | Applicable Via |           |              |            |          |              |
|----------------------------|----------------|-----------|--------------|------------|----------|--------------|
|                            | MRC module     | PUGW card | PUGWipx card | IPx Office | MAP card | Wave Gateway |
| CLA                        | —              | —         | —            | ●          | ●        | —            |
| CNCM                       | —              | —         | —            | ●          | ●        | ●            |
| DTMF (DTR) red.            | ●              | —         | —            | —          | —        | —            |
| Media channels             | ●              | —         | —            | —          | —        | —            |
| MFC-2 (MFR) red.           | ●              | —         | —            | —          | —        | —            |
| NIC                        | —              | —         | —            | —          | —        | ●            |
| SeaMail                    | —              | —         | —            | ●          | —        | —            |
| UGW signaling              | —              | ●         | ●            | ●          | —        | —            |
| Web admin.                 | ●              | ●         | ●            | ●          | ●        | ●            |

## Upgrading Applications from the Web Portal

- 1 Download the latest C/PUGW version from the manufacturer's website.
  - a Access the manufacturer's website at <http://www.tadirantele.com>.
  - b Go to **Partners login**, type your username and password.
  - c Click **Enter**. The Main Partners page is displayed.
  - d Go to **Support > Cards** and download the C/PUGW version.
- 2 Upload the file to the TFTP server and verify that the server is working (TFTP Server, located on a server on the same LAN as the IPx Office).
- 3 Do one of the following:
  - For connections made directly to the Coral IPx Office, connect an RJ-45 crossover cable between an IPx Office LAN port and the workstation. See [Figure 4-3](#) and [Figure 4-4](#).
  - For connections to the Coral IPx Office via the LAN, attach an ordinary cable from the workstation to a LAN outlet. See [Figure 4-4](#).

Figure 4-3 **Workstation Connection**

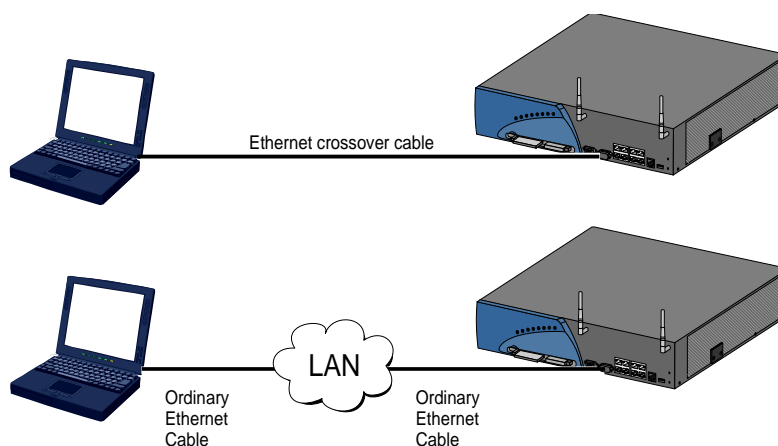
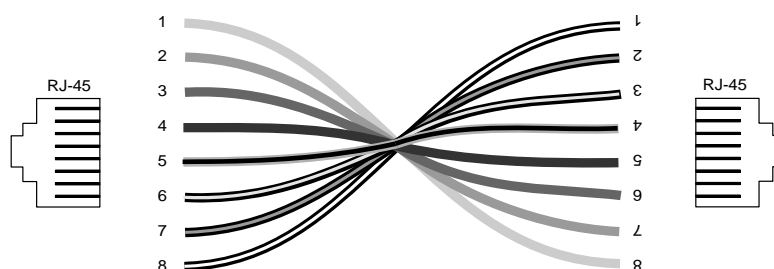


Figure 4-4 **RJ-45 Crossover Cable**



- 4 From the Coral Programming Interface (PI), access the UGW Current Configuration menu (Route: UGWC, 1), and reconfigure the following UGW: Signalling parameters to values that can be reached by the workstation:
  - a Reconfigure the LOCAL\_IP\_ADDRESS.

- b Reconfigure the SUBNET\_MASK.
- c Reconfigure the DEFAULT\_ROUTER\_ADDRESS.
- d Update the UGW: Signalling parameters.

For more information, refer to *Chapter 29* of the *Program Interface and Database Reference Manual*.



**NOTE:**

---

*In the Coral IPx Office, the C/PUGW and the C/MAP Application Platform are integrated onto the same circuit. Therefore, all applications embedded on this circuit share the same IP parameters as defined above.*

---

- 5 If the workstation is configured to an assigned static IP address, record the IP address on a piece of paper.
- 6 Temporarily assign a static IP address to your workstation that is on the same IP subnet as the IP address configured in [Step 4](#); the MAP Upgrade Status window is displayed.



**NOTE:**

---

*The MAP Upgrade Status page is used for the MAP card in other Coral systems as well.*

---

- 7 Enter the name of the software upgrade file into the File Name field.
- 8 Enter the IP address of the TFTP server in the **TFTP server IP Address** field.
- 9 Click **Start Upgrade**; the application is upgraded.
- 10 Refresh the web browser and verify that the upgraded application is displayed in the Upgrade Success field, along with the time and date of the upgrade.
- 11 If applicable, reconfigure the workstation to the IP address recorded in [Step 6](#).

Figure 4-5 MAP Upgrade Status Page

**MAP Current Upgrade Status**

| Upgrade Success  | Success Upgrade Date     |
|------------------|--------------------------|
| application_ququ | Thu Nov 23 16:23:26 2006 |

**MAP Upgrade**

| Upgrade Type  | File Name            | TFTP Server IP Address | Upgrade State |
|---------------|----------------------|------------------------|---------------|
| application ▾ | <input type="text"/> | <input type="text"/>   | free          |

---

## *Upgrading the C/PUGW Circuit from the Coral PI Database*

Refer to *Chapter 29* of the *Program Interface and Database Reference Manual* for instructions on the database programming required.

### *Upgrading the C/PUGW Circuit*

**UGW Software Upgrade:** \_\_\_\_\_ (Route: ADMIN, 7, 0, 0)

#### **FROM/TO SHELF#**

For Coral IPx Office systems, the shelf is defined as #6.

#### **FROM/TO SLOT#**

For Coral IPx Office systems, the slot is defined as #5.

#### **CORAL TIME**

Define the time and date for the software upgrade to be performed. Time must be entered as hours and minutes in a 24 hour format.

#### **YEAR**

Define the year for the software upgrade. The year is entered with four digits or the last two digits of the required year.

#### **MONTH**

Define the month for the software upgrade. The month is entered by the actual number of the month in one or two digits; January = 1, December = 12.

#### **DAY**

Define the day of the month for the software upgrade. The day of the month is entered in one or two digits.

#### **TFTP\_SERVER\_IP\_ADDR**

Enter the IP address for the TFTP server that holds the UGW software version upgrade file. Once an address is entered, the same address is retained and displayed the next time an upgrade is requested.

#### **FILE\_NAME**

Enter the UGW software upgrade file name. Once a name is entered, the same address is retained and displayed the next time an upgrade is requested.

#### **UPDATE (Y/N)?**

Enter Yes to enable the request for the software upgrade for the embedded C/PUGW circuit.



## *Canceling the C/PUGW Circuit Upgrade*

**UGW Software Upgrade: Cancel \_\_\_\_\_** (Route: ADMIN, 7, 1, 0)

**FROM/TO SHELF#**

For Coral IPx Office systems, the shelf is defined as #6.

**FROM/TO SLOT#**

For Coral IPx Office systems, the slot is defined as #5.

**UPDATE (Y/N)?**

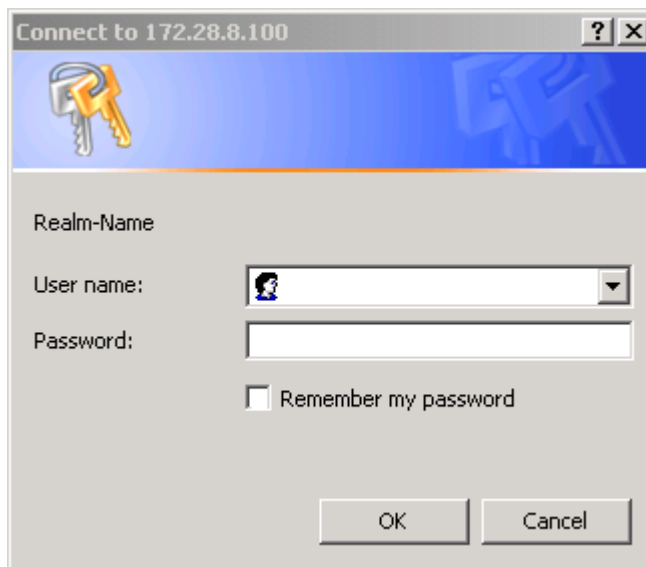
Enter Yes to cancel the request for the software upgrade for the embedded C/PUGW circuit.

## Using the C/PUGW and MRC Local Web Portal

The C/PUGW local web portal enables various parameters to be viewed or configured via the web. To access the C/PUGW local web portal:

1. Enter the IP address of the C/PUGW in the address bar of your Internet browser; the PUGW login window is displayed. See Figure 4-6.

Figure 4-6 PUGW Web Portal Login Window



2. In the **User Name** field, enter your username.  
In the **Password** field, enter your password.  
Click **OK** or press Enter; the C/PUGW Local Web Portal is displayed.

Figure 4-7 PUGW Web Portal Main Screen

| Menu                  | CARD STATUS     |                   |                  |                   |
|-----------------------|-----------------|-------------------|------------------|-------------------|
| <a href="#">Home</a>  | <b>IP Addr</b>  | 172.28.9.17       | <b>Card Type</b> | PUGW_ipx Layout C |
| <a href="#">Media</a> | <b>Net Mask</b> | 255.255.252.0     | <b>Card Vers</b> | 10.18             |
| <a href="#">SIP</a>   | <b>Mac Addr</b> | 00:0A:6B:00:4F:37 | <b>Media</b>     | MRC32 Ver-6.12    |
| <a href="#">Trace</a> |                 |                   |                  |                   |

**Welcome to UGW Portal**  
To the left is the Navigation Bar with links to portal functions.

## Using the C/PUGW Web Portal

The C/PUGW web portal includes the navigation bar and the Card Status table. These items are displayed on all of the Web Portal pages. [Table 4-7](#) describes the navigation bar options. [Table 4-8](#) describes the Card Status table elements.

**Table 4-7 Navigation Bar (Menu) Elements**

| Element | Description  |
|---------|--|
| Home    | Main Portal Web page that is first displayed. It includes the Welcome message indicating that the UGW portal application has been accessed |
| Media   | MRC setup page including DTMF and fax definitions used by stations supported by the MRC (see <a href="#">Figure 4-8</a> )                  |
| SIP     | For manufacturer use, only   |
| Trace   | For manufacturer use, only   |

**Table 4-8 Card Status Table Elements**

| Element      | Description  |
|--------------|--|
| IP address   | IP address of the PUGW card as defined in the PI database in the GLOBAL_IP_ADDRESS parameter under the MEDIA section of the UGW: CURRENT CONFIGURATION branch (IP, 0, 1).  |
| Net mask     | Subnet mask as defined in the PI database in the SUBNET_MASK parameter under the SIGNALLING section of the UGW: CURRENT CONFIGURATION branch (IP, 0, 1).   |
| MAC address  | Unique coded MAC address of PUGW card defined by manufacturer and displayed on PUGW card label.  |
| Card Type    | Hardware version of the PUGW card issued by the manufacturer   |
| Card Version | Upgradeable software version installed on the PUGW card  |
| Media        | MRC card details including: <ul style="list-style-type: none"><li>• MRC card type: MRC-8, MRC-16, MRC-32, MRC-64, or NO_MEDIA</li><li>• PUGW software version</li></ul> <b>Note:</b> A software version is displayed even if an MRC card is not installed. |

## Configuring the (MRC) Media

To configure the (MRC) media settings, click **Media**; the **MRC SETUP** page is displayed. See [Figure 4-8](#). [Table 4-8](#) describes the Media settings.



### NOTE:

The **MRC SETUP** page settings can be modified without an MRC installed. However, changes take effect only if a card is installed **at the same time**. Before modifying any of the options on this page, verify that the **Media** field in the Card Status table does **not** display **NO\_MEDIA**.

Figure 4-8 MRC Setup

## MRC SETUP

Years: Months: Days: Hours: Minutes 00: 00: 05: 09: 40

Debug MRC  Debug MSDrv

---

### DTMF

Relay RFC-2833  Payload Type:

Inband

---

### FAX

T38  Bypass

---

### ECHO CANCELLER

Standard EC   8091  8006  Overwrite

Table 4-9 MRC Setup Elements

| Element        | Description   |
|----------------|---|
| Debug          | For manufacturer use, only  |
| DTMF           | Used to configure the DTMF relay protocols used by the equipment supported by the MRC. The default protocol is Payload Type: 101 as per RFC-2833, and is suitable for most equipment.   |
| FAX            | Used to define the fax transmission protocol, T.38 or Bypass. If Bypass is selected, the G7.11 CODEC is used. In order for either option to function, the Coral database must be configured accordingly. See page 8-122, General Trunk Definitions (Route: TRK, 0) or Chapter 8 of the Program Interface & Database Reference Manual. |
| Echo canceller | For manufacturer use, only  |

# Chapter 5

## External Connections

Coral

|     |  |      |
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| 5.2 | <i>External Equipment</i> .....                | 5-5  |
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# 5.1 Main Distribution Frame (MDF)

## General

This chapter describes the MDF and the pinout connections to the cage and external equipment. For hardware installation instructions, refer to [Chapter 2, Hardware Installation Procedure](#).



### NOTE:

*This chapter describes connections between the Coral IPx Office unit and the customer-supplied MDF. Some of these connections can be made directly from the Coral IPx Office unit and the facilities' infrastructure, without the use of an MDF. It is the customer's responsibility to decide when to do so.*

*For information on connections between the IPx 500X, IPx 800X expansion cage, or the Coral FlexiCom 200 expansion cabinets and the MDF see the relevant Installation Procedure and Hardware Manual.*

The MDF is often located adjacent to other signaling systems, such as:

- Paging and public address systems
- Voice messaging systems
- Alarm and monitoring systems
- Closed circuit television
- Property management systems
- Building and energy management systems

Therefore, care should be taken to plan the MDF layout before fastening components to the rack or table-mounted surface, such as:

- Network (LAN/WAN) Connection
- Trunk circuits
- Wired and wireless station equipment
- Database programming terminals
- Report printers
- Music and/or audio sources

- External public address or paging equipment
- Recording devices

Connections to most telecommunications interfaces of the Coral IPx Office unit are made via:

- Standard 25 pair Input/Output (I/O) Champ (telco) connectors located on the front panel of the full size peripheral cards. See [Table 5-1](#) and [Figure 5-1](#).
- RJ-45 connectors located on the front panel of full and half size peripheral cards. See [Table 5-1](#) and [Figure 5-1](#).

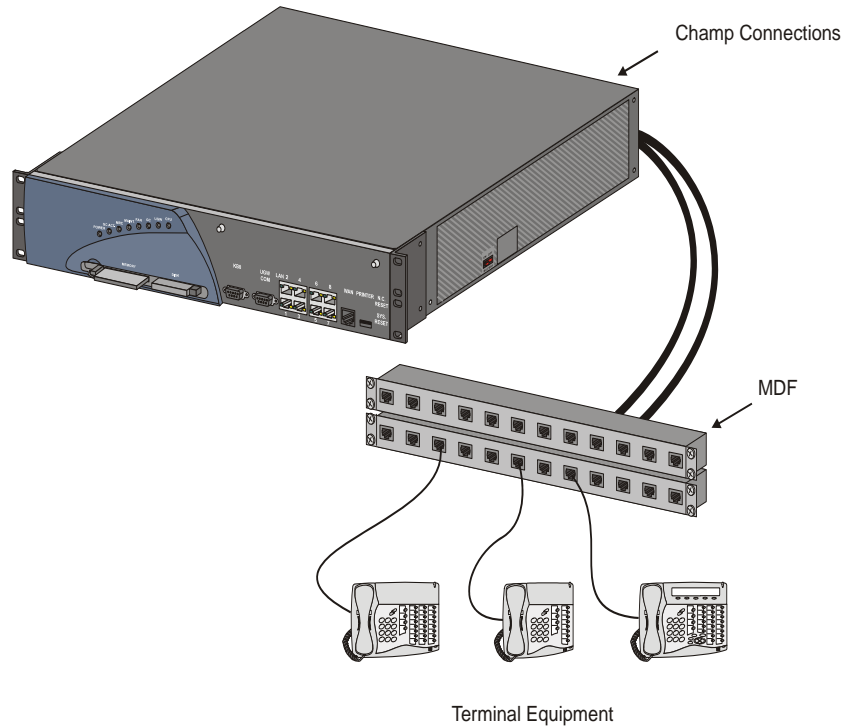
For information on LAN/WAN connections, see [Chapter 11, System Networking](#).



**Tip:**

*It is recommended to terminate all the I/O connectors available in the system on punch blocks at the MDF even if some cables are not initially used. This saves time and effort when the system is expanded.*

**Figure 5-1 Connecting via an MDF**





**Table 5-1 External I/O Connectors for Coral IPx Office Peripheral Cards**

| Card Name                   | Number of Connectors |       |   | Card Slot |
|-----------------------------|----------------------|-------|---|-----------|
|                             | Champ                | RJ-45 | Special   |           |
| 8/16/24SFT Office           | 1                    | -     | -   | 2-3, 4-5  |
| 4/8SA Office                | 1                    | -     | see <a href="#">Figure 10-26</a>  |           |
| 16SA Office (8SA + 8SAx)    | 1                    | -     | -   |           |
| 24SA Office (8SA + 16SAx)   | 1                    | -     | -   |           |
| 4SA+8Fx Office              | 1                    | -     | -   |           |
| 4SA+16Fx Office             | 1                    | -     | -   |           |
| 8SA+8Fx Office              | 1                    | -     | -   |           |
| 8SA+16Fx Office             | 1                    | -     | -   |           |
| 4/8S Office                 | 1                    | -     | -   |           |
| 20S Office (8S + 12Sx)      | 1                    | -     | -   |           |
| 4S+8Fx Office               | 1                    | -     | -   |           |
| 4S+16Fx Office              | 1                    | -     | -   |           |
| 8S+8Fx Office               | 1                    | -     | -   |           |
| 8S+16Fx Office              | 1                    | -     | -   |           |
| 8T Office                   | -                    | 8     | -   |           |
| 8T-CID Office (8T + 8CID)   | -                    | 8     | -   |           |
| IPC (SFC/uCMC/WiCMC) Office | -                    | -     | see <a href="#">Figure 10-35</a>  |           |
| MR Office                   | -                    | -     | 2 stereo 3.5 mm phone plugs and 2 relay wire pairs see <a href="#">Figure 9-9</a> | 6-7 Main  |
| RMI Office                  | -                    | -     |   |           |
| U-MR Office                 | -                    | -     |   |           |
| U-RMI Office                | -                    | -     |   |           |
| ESIM Office                 | -                    | -     | Expansion cable   | 8-9 Main  |
| ESIX Office                 | -                    | -     | Expansion cables  | 6-7 Exp.  |

| Card Name  | Number of Connectors |       |         | Card Slot  |
|--|----------------------|-------|---------|------------|
|  | Champ                | RJ-45 | Special |            |
| 2DT Office<br>(T1, 30T, 30TM, PRI-23, or PRI-30) | -                    | 3     | -       | 8-9, 10-11 |
| 30T Office (30T or 30TM)                         | -                    | 1     | -       |            |
| 4TBR Office                                      | -                    | 4     | -       |            |
| PRI-30 Office                                    | -                    | 1     | -       |            |
| UDT Office (T1 or PRI-23)                        | -                    | 1     | -       |            |
| 4T Office  | -                    | 4     | -       | 10-11      |
| 4T-CID Office (4T + 4CID)                        | -                    | 4     | -       |            |

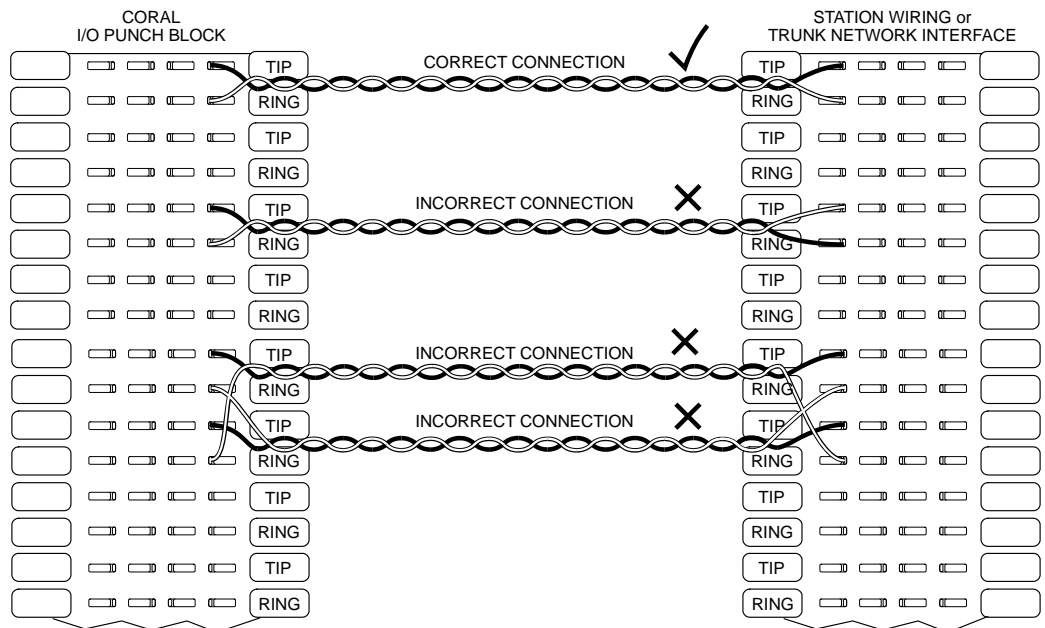
### *The Importance of Proper TIP and Ring Wiring*

Due to the high speed digital signaling over the wire pair, it is important to verify that the wiring is free of potential problems. The wire pair feeding the terminals must be low capacitance, continuously twisted wire.

The wire gage and type should be consistent for the entire loop length. More than one type or gage of wire spliced together in the same loop will reduce the maximum possible loop length of the station or trunk.

Always match the twisted pair of a loop to corresponding tip and ring connections. Do not connect the wires of the same twisted pair to different tip and ring connections. See [Figure 5-2](#).

**Figure 5-2 Twisted Pair TIP and Ring Wiring Detail**



## 5.2 External Equipment

### Station Equipment

---

This section discusses the station equipment used with the Coral IPx Office including both wired, wireless, and VoIP stations.

#### *Wired Stations*

Each station peripheral card provides an I/O Champ™ connector.

Connections to Coral IPx Office system station equipment are established by cross-connecting the station circuit from the appropriate Coral IPx Office I/O cable punch block to the corresponding station wiring punch block.

[Table 5-2](#) lists the various station interface cards available for the Coral IPx Office system, the type of station equipment that the card supports, and the number of wire pairs required by the station interface.

Station wiring between the Coral IPx Office system MDF and the station equipment should contain at least two, and preferably three wire pairs to ensure adequate wiring capacity. At the station location, the station wiring should be terminated with a modular, six position, telephone jack, containing at least four conductors (pins 2, 3, 4, and 5).

[Figure 5-3](#) illustrates typical jack configurations with wire designations for four station types:

- 2-wire single-line telephones SLT and digital station sets (FlexSet, APDL, CPA) need only connect Tip [T] and Ring [R] or <UpA> and <UpB> as shown.
- FlexSet 280/281 series or FlexSet APDL units with PEX or PEX+APA need an extra two wires when power is supplied through the line connector. The polarity of this connection is irrelevant. When using the TPS (single unit Telephone Power Supply), no additional wires are required.

For peripheral device installation, refer to the *Coral Terminal Equipment Installation Manual*.

To prevent a potential shock hazard to station users and damage to the system, make sure that station circuits extended over cables that exit the building are adequately protected from lightning and surge currents. See [Protection Devices, page 5-11](#) for protective device specifications.

## Wireless and VoIP Stations

The following terminals are not connected via the MDF:

FlexAir handset, FlexSet-IP 280S, T207S, T208S, T207S/NP, T208S/BL, T207M, T208M, T207M/NP, T208M/BL, and other 3rd party SIP terminals.

## Related Documentation

For further information about Coral voice terminals not covered by this section, consult the documentation as listed in [Related Documentation, page 1-3](#).

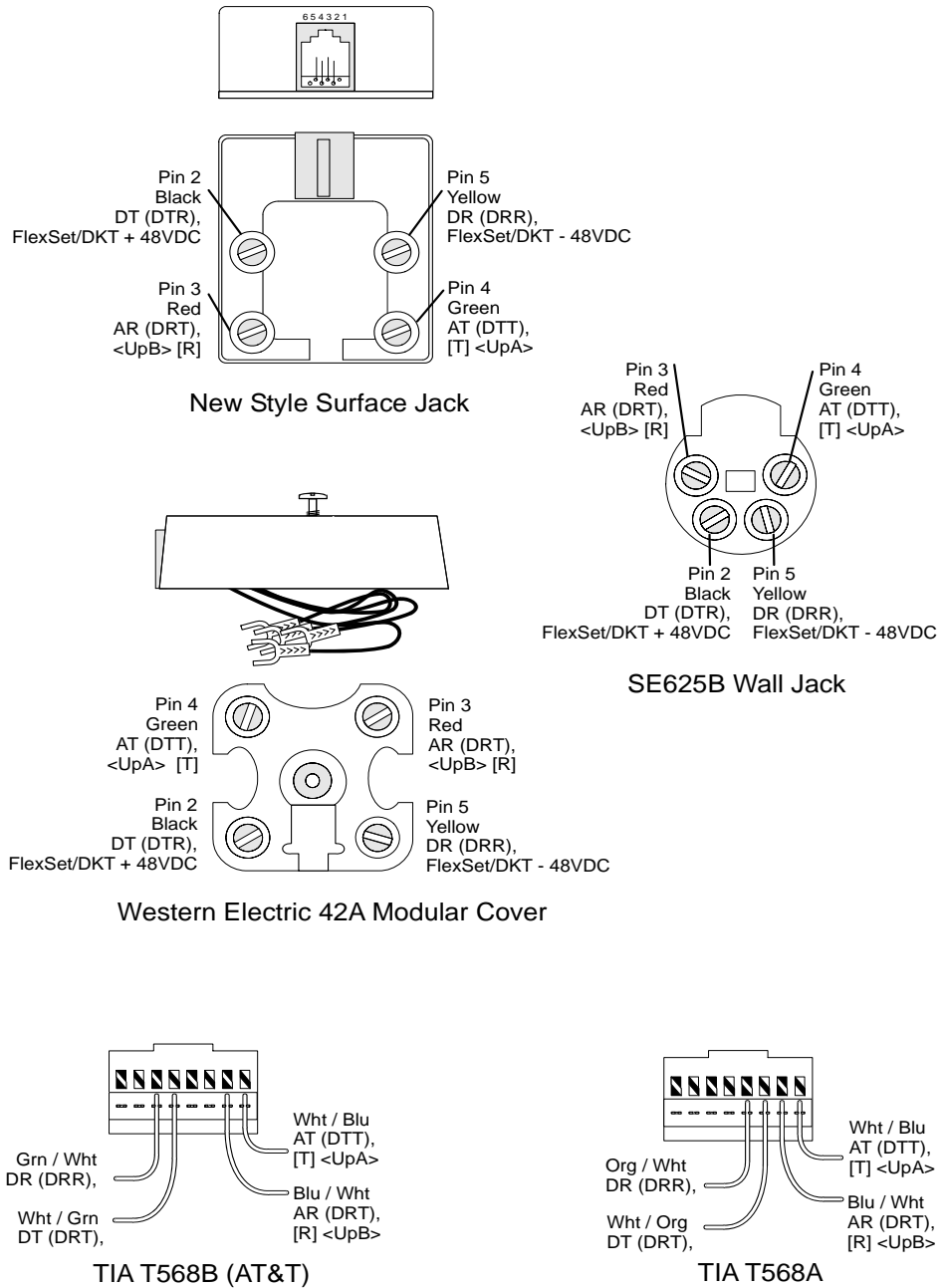
**Table 5-2 Station Interface Wire Pair Requirements**

| Station Interface Card Type  | Supported Station Equipment  | Pairs Required |
|--|--|----------------|
| 4/8/16/24SA Office,<br>4SA+8Fx Office,<br>4SA+16Fx Office,<br>8SA+8Fx Office,<br>8SA+16Fx Office   | Standard Single-Line Telephone (2500 SLT) Sets,<br>SLT Sets with Message Waiting Lamp  | 1              |
| 4/8/20S Office,<br>4S+8Fx Office,<br>4S+16Fx Office,<br>8S+8Fx Office,<br>8S+16Fx Office   | Standard Single-Line Telephone (500/2500 SLT) Sets,<br>SLT Sets with Message Waiting Lamp  | 1              |
| 8/16/24SFT Office,<br>4S+8Fx Office,<br>4S+16Fx Office,<br>8S+8Fx Office,<br>8S+16Fx Office  | FlexSet, APDL, CPA, GKT, APA, PEX,<br>PEX+APA  | 1              |
|  | FlexSet 280/281 series with PEX / APA,<br>FlexAPDL,<br>CPA;<br>For optional external power via line connector pins 2 and 5, see <a href="#">Coral Terminal Equipment Installation Manual</a> . | 2              |
| FlexSet-IP 280S, T207S,<br>T208S, T207S/NP,<br>T208S/BL, T207M, T208M,<br>T207M/NP, T208M/BL,<br>Coral Sentinel,<br>3rd party SIP terminal | LAN connection   | 2              |
|  | with power over LAN type-A   | 4              |

**CAUTION!**

Never insert “4/8/20S Office” and “4/8/16/24SA Office” cards in the same Coral IPx unit.  
 Never exceed the number of POTs and FlexSets stations listed in [Table 10-5](#) and [Table 10-6](#).

**Figure 5-3 Modular Wired Station Jack Wiring Diagram**

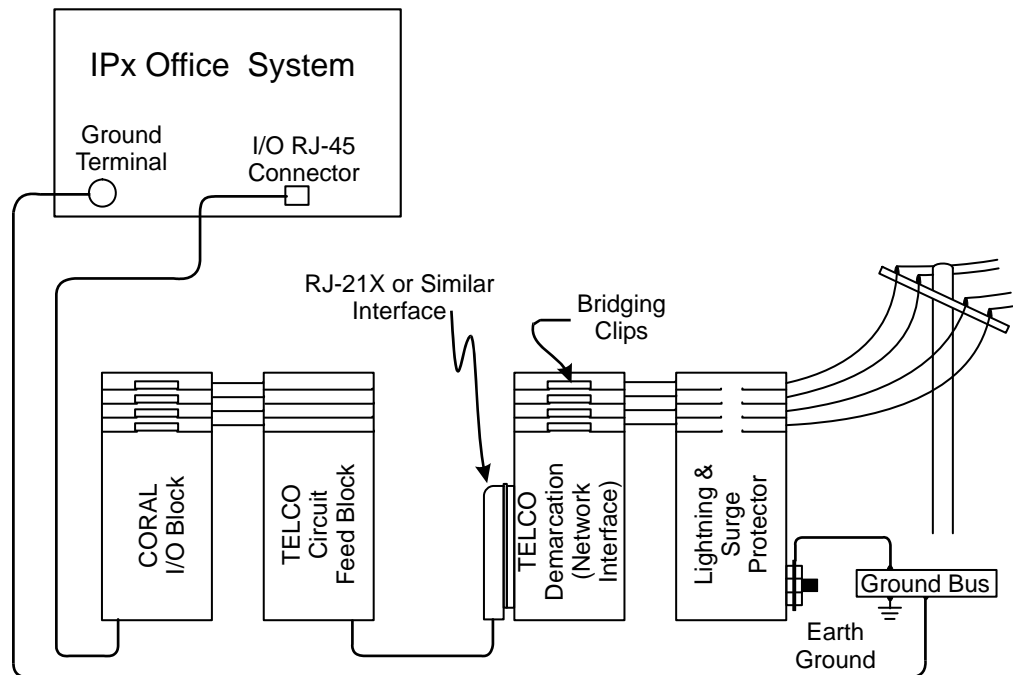


## Trunk Circuits

Generally, trunk circuits are connected to the Coral IPx Office system simply by connecting the trunk interface circuit of a Coral IPx Office trunk card to the point of demarcation where the trunk circuits from the Telephone utility Company (TELCO) appear. For more specific data regarding all trunk types supported by the Coral IPx Office systems, refer to [Peripheral Card Description, page 10-5](#). Refer also to the *Coral Service and Peripheral Cards Installation Manual*.

Protective devices are regularly provided by the TELCO on circuits originating outside the building. Determine whether the TELCO protective devices meet the specifications provided in [Protection Devices, page 5-11](#), and if necessary, install secondary protector devices that meet these specifications. To be effective, the protective devices, whether TELCO or customer provided, must be grounded to the same ground point as the IPx Office system. [Figure 5-4](#) illustrates typical trunk circuit wiring from building entrance to the Coral IPx Office system.

**Figure 5-4 Typical Trunk Circuit Wiring Diagram**



## Auxiliary Connections

Table 5-3 lists the auxiliary connectors (located on the peripheral cards) and their functions.

**Table 5-3 Auxiliary Connectors**

| Card   | Connector          | Type   | Remarks   |
|--|--------------------|--|---|
| U-MR Office<br>MR Office<br>U-RMI Office<br>RMI Office | Relays             | Terminal Block   | See <a href="#">Configuring the Relay Contacts Jumper</a> , page 9-105 for relay definition |
|  | M1 Music           | 3.5 mm Stereo Phone Jack   | See <a href="#">External Connectors</a> , page 9-21 for details                             |
|  | M2/P<br>Music/Page |  |   |
| ESIM Office  | Expansion          | 50-pin, angled, SCSI connector   | Installed in the main unit, used to connect to the expansion unit, only                     |
| ESIX Office  | Expansion          | One 50-pin female pin-type SCSI connector female and<br>One 50-pin ribbon SCSI connector | Installed in the IPx Office expansion unit, only  |

**NOTES:**



## 5.3 Protection Devices

### Introduction to Primary and Secondary Protection Devices

This section describes the primary and secondary protection devices used with the Coral IPx Office system and how they are installed.

#### **WARNING!**

*Any circuit connected to the Coral system that is exposed to lightning or electrical hazards must be protected with approved lightning and surge protection devices to avoid potentially lethal hazards to all users.*

#### **CAUTION!**

*Secondary protection devices should be installed on any circuit requiring primary lightning protection, which connects electrically to an interface of the Coral system.*

Lightning and over-voltage arrestors are used to protect the user and the system from lightning and other electrical hazards that may occur on external circuits connected to the system.

Any cable that passes through open air, under open ground (i.e. across parking lots, fields, road beds, etc.), across a bridge, or along the exterior or under the non-metallic roof of a building, is exposed to lightning and electrical hazards.

Telephone circuit protection devices fall into two distinct design categories:

- Primary (lightning) protection devices that limit voltages on a telephone circuit below levels which do not present a hazard to the user. (Table 5-4 lists minimum specifications).
- Secondary (surge and impulse) protectors that further limit voltages on a telephone circuit to prevent damage to electronic equipment. Table 5-5 lists the specifications.
- Primary protection absorbs the major impact of infrequent, but dangerous, catastrophic surges, while secondary protection suppresses constantly occurring

impulses. These impulses, while not dangerous, can cripple valuable, and in many cases, essential, communication facilities.

- Generally, leased or switched circuit facilities provided by the local telephone utility company are equipped with primary protection devices installed with the circuit. However, privately owned aerial or buried cable feeding from one building to another might not be equipped with protection devices. Always consult with whoever provided the circuits to determine whether protection devices are present, and if so, what type. Never assume that protection devices have been provided by another party, or that existing protection devices are adequate.
- The secondary protection must include a leakage current protector in series with every wire, tip and ring, on every port that is either connected to the public telephone network, or to any cable located outdoors. The requirement is in accordance with UL® Specification 60950, Third Edition or CSA C22.2 No. 60950. The required protectors can be mounted directly on a Block 66 in the MDF.

**Table 5-4 Telephone Circuit Primary Protection Device Specifications**

| Specification   | Measurement   |
|---|---|
| Construction<br>Primary Element<br>Fail-safe Metallic Shunt<br>Vent Safe Spark Gap<br>Heat Coil (recommended) | 3 Electrode Gas Tube<br>1.0Ω to Ground Max.<br>Per UL 497<br>1.0A 100 Sec. Max. |
| Clamp Points (per REA PE-80)<br>DC.<br>2kV/S.<br>100V/μS<br>10kV/μS<br>Vent Safe @ 100V/μS                    | 350VDC Max.<br>400VDC Max.<br>500VDC Max.<br>800VDC Max.<br>1600VDC Max.        |
| DC Impulse Current (8x20μS wave)  | 10KA Nom.   |
| AC Discharge Current (60Hz/1S)  | 10A Nom.  |
| DC Holdover (per IEEE 465.1)  | 160VDC Max.   |

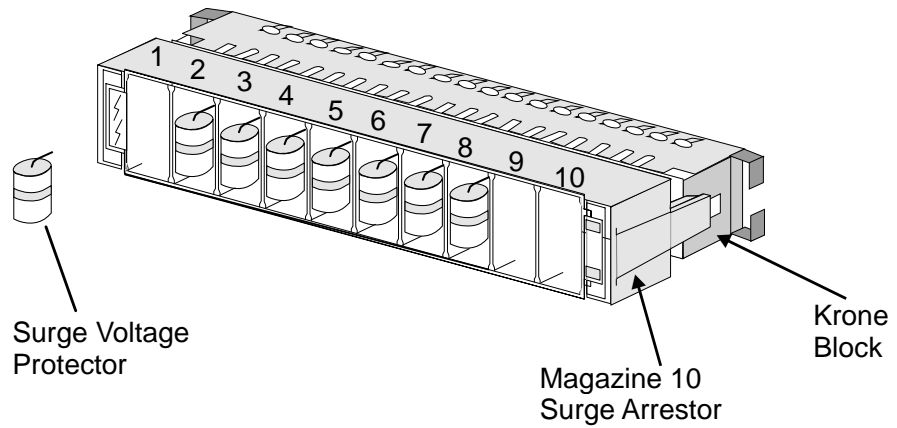
**Table 5-5 Telephone Circuit Secondary Protection Device Specifications**

| Device Type             | Specification   | Measurement  |
|-------------------------|---|--|
| Surge/Impulse Protector | Clamp Points<br>DC.<br>2kV/S<br>100V/μS<br>10kV/μS              | 230VDC Max.<br>230VDC Max.<br>100VDC Max<br>30VDC Max. |
|                         | Response Time   | 5nS Max.   |
|                         | Series Resistance   | 15Ω Max.   |
| Sneak Current Protector | Acceptance  | UL Listed  |
|                         | Voltage Rating  | 600VDC Min.  |
|                         | Current Rating  | 350mA Max.   |
|                         | Fusing Time Characteristics<br>100% of Rating<br>150% of Rating | 4 Hr. Min.<br>10 Sec. Nom., 210 Sec. Max.              |

## ● Surge Arrestor Magazine

To prevent serious damage to the Coral IPx Office system, the analog trunk and station circuits whose cables are laid outside the building, must be protected from the electrical peaks caused by lightning. Magazine 10 surge arrestors must be mounted on the MDF where telephone circuits are cross-connected.

**Figure 5-5 Magazine with 10 Surge Arrestor and Voltage Protector Units**



## 5.4 Power Fail (PF) Transfer Circuits

With the installation of trunk cards to support the PF (Power Fail) transfer option, four trunks per trunk card may be directed to station sets if power to the Coral IPx Office system is interrupted. This arrangement, referred to as power failure transfer, completely bypasses the system, allowing specific stations to originate outgoing calls and/or continue answering incoming calls.

### Physical Connection

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#### Stations

The SLT (single line telephone) set can be used as a power failure station. [Figure 5-6](#) illustrates wiring interconnections between the trunk card, station card, and a single line station set.



#### NOTE:

*Coral FlexSet cannot be used as power failure stations.*

---

#### Trunks

In the Coral IPx Office system, the following analog trunk peripheral cards support power fail transfer:

- The following four-trunk cards each provide four (4) ports with PF transfer connections:  
*4T Office* and *4T-CID Office* (in slots 10-11)
- The following eight-trunk cards each provide four (4) ports with PF transfer connections:  
*8T Office* and *8T-CID Office* (in slots 2-3 and 4-5)  
*NOTE:* Only circuits 2, 3, 4, and 5 support power failure transfer connections.

## ● Database Programming

---

To use the power fail transfer features of the Coral system, the station dial numbers, to which power fail trunks are transferred, must be entered in the system database. Refer to Power Fail Trunk Definition in *Chapter 8* of the *Program Interface and Database Reference Manual* for more information.

*Power Failure Trunk Definition (Route: TRK, 4)*

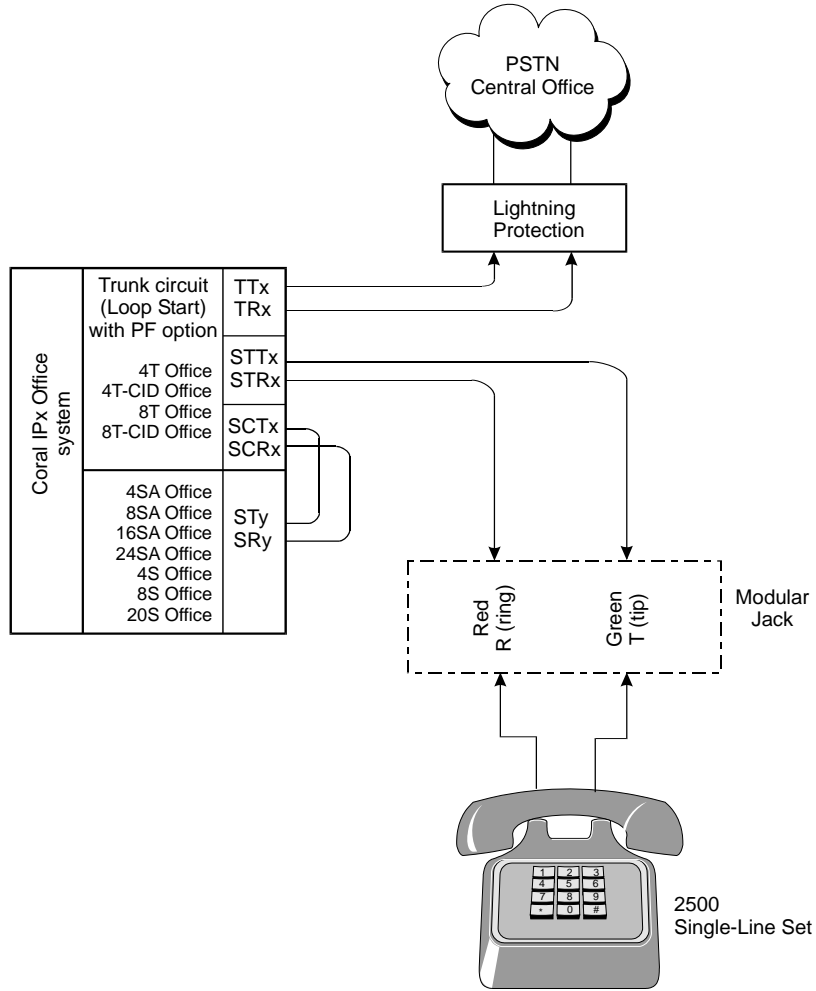
*FROM/TO DIAL#*

Enter the required range of Loop Start analog trunks.

*DEST*

Set this parameter to determine the power fail station system dial number to be connected to the trunk during power failure.

**Figure 5-6 Power Fail Wiring to Single-Line Telephone Set**



**NOTES:**



# 5.5 Data Communication Ports

## RS-232E

The Coral IPx Office switching system is capable of switching digital data information as well as voice signals.

Coral IPx Office system data communication devices are available for packet switched data for low volume applications. The packet data communication devices are provided using the APA (Application Processor Adapter) or APDL (Applications Processor Data Link). The data communication devices provide a serial interface wired as Data Communication Equipment (DCE). That is, transmit data that is sent to the APA/APDL, and receive data that is received from the device.

The APA provides a proprietary data link to an external applications processor. The link uses an asynchronous RS-232E (V.24) serial data interface, operating at a data rate of up to 19.2Kbps. The interface appears at the PC RJ-45 jack connector on the bottom panel of the FlexSet 280S/281S/APDL with APA or PEX+APA.

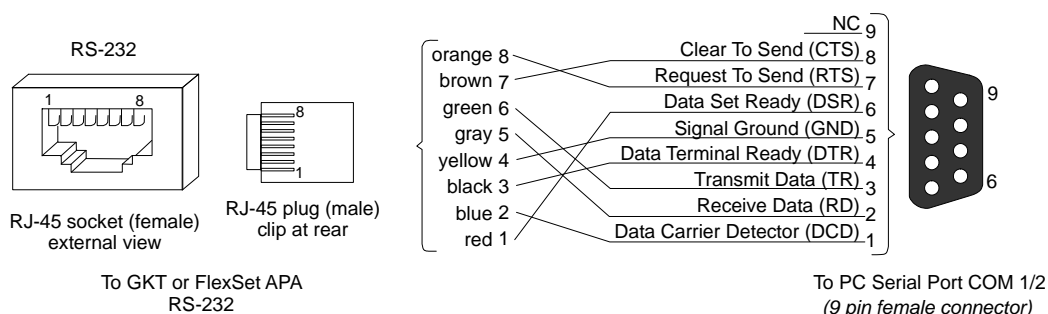
Through the link, a proprietary signaling protocol allows the Coral system master processor to send call status messages to the applications processor, and the applications processor to send call control instructions to the APA/APDL. Application processors available for the Coral system include the Computerized Attendant Position (CAP), the ACD group supervisor and management position, Coral CallMaster (CCM), Coral World Wide Office (WVO), TAPIdriver, GKT PC-Utility, or any other application that complies with proprietary API products.

Use the following RS-232 cables:

- Catalog no. 7244-6914055 for FlexSet 280S/281S/APDL with APA or PEX+APA with APA or FlexSet 80 (GKT).
- [Figure 5-7](#) lists the pin designations for the RS-232 interface of the APA/APDL.

For more information, refer to the *Coral Terminal Equipment - Installation Manual*.

**Figure 5-7 FlexSet 80 / 280S / 281S / APDL / APA or PEX+APA RS-232E (v.24) Pinout**



**NOTES:**

# 5.6 I/O Card Connections

## For Coral Peripheral Interface Cards

### Peripheral Cards Index

The following tables list the pinout connection directly on the Champ/card connection for all currently available peripheral cards for the Coral IPx Office.

To help identify the peripheral cards, they are listed below in alpha-numeric order.

#### CAUTION!

Never insert “4/8/20S Office” and “4/8/16/24SA Office” cards in the same Coral IPx unit. Never exceed the number of POTs and FlexSets stations listed in [Table 10-5](#) and [Table 10-6](#).

Table 5-6 **Card I/O Connector Pinout**

| External I/O Connectors Pinout                                |           |            |  |
|---|-----------|------------|--|
| Card Name   | Connector | Card Slot  | Table/Page   |
| 12Sx Office (20S)   | 1 x Champ | 2-3, 4-5   | <a href="#">Table 5-8 on page 5-26</a> and <a href="#">Table 5-11 on page 5-30</a>   |
| 16SAx Office (24SA)   | 1 x Champ | 2-3, 4-5   | <a href="#">Table 5-8 on page 5-26</a> and <a href="#">Table 5-11 on page 5-30</a>   |
| 16Fx Office<br>(4S+16Fx or 8S+16Fx)<br>(4SA+16Fx or 8SA+16Fx) | 1 x Champ | 2-3, 4-5   | <a href="#">Table 5-10 on page 5-28</a> and <a href="#">Table 5-13 on page 5-32</a>  |
| 16SFT Office  | 1 x Champ | 2-3, 4-5   | <a href="#">Table 5-9 on page 5-27</a> and <a href="#">Table 5-12 on page 5-31</a>   |
| 2DT Office<br>(PRI-23, PRI-30, T1, 30T, 30TM)                 | 2 x RJ-45 | 8-9, 10-11 | <a href="#">Table 5-14 on page 5-34</a> and <a href="#">Figure 5-10 on page 5-35</a> |
| 20S Office (8S+12Sx)  | 1 x Champ | 2-3, 4-5   | <a href="#">Table 5-8 on page 5-26</a> and <a href="#">Table 5-11 on page 5-30</a>   |
| 24SFT Office  | 1 x Champ | 2-3, 4-5   | <a href="#">Table 5-9 on page 5-27</a> and <a href="#">Table 5-12 on page 5-31</a>   |

## External I/O Connectors Pinout

| Card Name  | Connector | Card Slot  | Table/Page  |
|--|-----------|------------|---|
| 30T Office (30T or 30TM)                                 | 1 x RJ-45 | 8-9, 10-11 | Table 5-20 on page 5-41                             |
| 4S Office  | 1 x Champ | 2-3, 4-5   | Table 5-8 on page 5-26 and Table 5-11 on page 5-30  |
| 4S+16Fx Office   | 1 x Champ | 2-3, 4-5   | Table 5-10 on page 5-28 and Table 5-13 on page 5-32 |
| 4S+8Fx Office  | 1 x Champ | 2-3, 4-5   | Table 5-10 on page 5-28 and Table 5-13 on page 5-32 |
| 4SA Office   | 1 x Champ | 2-3, 4-5   | Table 5-8 on page 5-26 and Table 5-11 on page 5-30  |
| 4SA+16Fx Office  | 1 x Champ | 2-3, 4-5   | Table 5-10 on page 5-28 and Table 5-13 on page 5-32 |
| 4SA+8Fx Office   | 1 x Champ | 2-3, 4-5   | Table 5-10 on page 5-28 and Table 5-13 on page 5-32 |
| 4T Office  | 4 x RJ-45 | 10-11      | Table 5-15 on page 5-36                             |
| 4TBR Office  | 4 x RJ-45 | 8-9, 10-11 | Table 5-17 on page 5-38                             |
| 4T-CID Office (4T+4CID)                                  | 4 x RJ-45 | 10-11      | Table 5-15 on page 5-36                             |
| 8Fx Office<br>(4S+8Fx or 8S+8Fx)<br>(4SA+8Fx or 8SA+8Fx) | 1 x Champ | 2-3, 4-5   | Table 5-10 on page 5-28 and Table 5-13 on page 5-32 |
| 8S Office  | 1 x Champ | 2-3, 4-5   | Table 5-8 on page 5-26 and Table 5-11 on page 5-30  |
| 8S+16Fx Office   | 1 x Champ | 2-3, 4-5   | Table 5-10 on page 5-28 and Table 5-13 on page 5-32 |
| 8S+8Fx Office  | 1 x Champ | 2-3, 4-5   | Table 5-10 on page 5-28 and Table 5-13 on page 5-32 |
| 8SA Office   | 1 x Champ | 2-3, 4-5   | Table 5-8 on page 5-26 and Table 5-11 on page 5-30  |
| 8SA+16Fx Office  | 1 x Champ | 2-3, 4-5   | Table 5-10 on page 5-28 and Table 5-13 on page 5-32 |
| 8SA+8Fx Office   | 1 x Champ | 2-3, 4-5   | Table 5-10 on page 5-28 and Table 5-13 on page 5-32 |
| 8SAx Office (16SA)                                       | 1 x Champ | 2-3, 4-5   | Table 5-8 on page 5-26 and Table 5-11 on page 5-30  |
| 8SFT Office  | 1 x Champ | 2-3, 4-5   | Table 5-9 on page 5-27 and Table 5-12 on page 5-31  |
| 8T Office  | 8 x RJ-45 | 2-3, 4-5   | Table 5-16 on page 5-37                             |
| 8T-CID Office (8T+8CID)                                  | 8 x RJ-45 | 2-3, 4-5   | Table 5-16 on page 5-37                             |
| IPC (SFC/uCMC/WiCMC)<br>Office                           |           | 2-3, 4-5   | Figure 10-35 on page 10-58                          |

### External I/O Connectors Pinout

| Card Name  | Connector  | Card Slot             | Table/Page                                    |
|--|--|-----------------------|---|
| KB0 (MCB Office)                                       | 1 x DB-9P  | Main Unit front panel | <a href="#">Table 8-1 on page 8-28</a>        |
| LAN (MCB Office)                                       | 8 x RJ-45  | Main Unit front panel | <a href="#">Table 5-21 on page 5-46</a>       |
| U-MR Office<br>MR Office<br>U-RMI Office<br>RMI Office | 2 stereo 3.5 mm phone plugs and 2 relay wire pairs | 6-7 in Main Unit      | <a href="#">Table 5-3 on page 5-9</a>         |
| PRI-30 Office  | 1 x RJ-45  | 8-9, 10-11            | <a href="#">Table 5-19 on page 5-40</a>       |
| PRINTER  |  | Unit front panel      | <a href="#">Chapter 11, System Networking</a> |
| UDT Office (T1 or PRI-23)                              | 1 x RJ-45  | 8-9, 10-11            | <a href="#">Table 5-18 on page 5-39</a>       |
| WAN (MCB Office)                                       | 1 x RJ-45  | Unit front panel      | <a href="#">Table 5-21 on page 5-46</a>       |

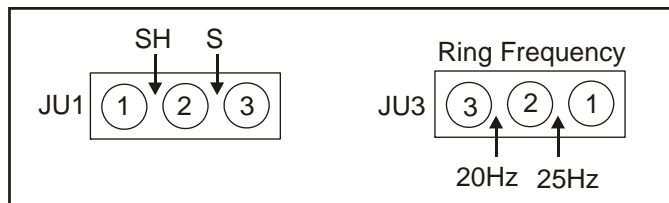
## Champ Connections

The following tables list the pinout, the wire colors, and the signals of the I/O Champ connectors for each station card and each optional connection.

**Table 5-7 Peripheral Card Connection Information**

| Type               | Table   | Information Provided  |
|--------------------|---|---|
| Champ 50 connector | <a href="#">Direct Pinout of the Champ/Card Connection, page 5-25</a>   | These tables display the direct pinout of the (I/O) connector (Champ 50) connected to the card. |
| Block 66 MDF       | <a href="#">Direct Pinout of the Block 66 MDF Connection, page 5-29</a> | These tables display the Block 66 MDF connections.  |

**Figure 5-8 4S Office and 8S Office Jumper Settings**



## Direct Pinout of the Champ/Card Connection

Tables below display the direct pinout of the (I/O) connector (Champ 50) connected to the following peripheral cards.

| Card Name   | Table / Page                            |
|---|---|
| 4SA Office,<br>8SA Office,<br>16SA Office,<br>24SA Office,<br>4S Office,<br>8S Office,<br>20S Office  | <a href="#">Table 5-8 on page 5-26</a>  |
| 8SFT Office,<br>16SFT Office,<br>24SFT Office   | <a href="#">Table 5-9 on page 5-27</a>  |
| 4SA+8Fx Office,<br>4SA+16Fx Office,<br>8SA+8Fx Office,<br>8SA+16Fx Office,<br>4S+8Fx Office,<br>4S+16Fx Office,<br>8S+8Fx Office,<br>8S+16Fx Office | <a href="#">Table 5-10 on page 5-28</a> |

**Table 5-8 Champ 50  
Connector Card Pinout  
(4/8/20S 4/8/16/24SA)**

| Pin      | 4S, 4SA<br>Office | 8S, 8SA<br>Office | 16SA Office<br>(8SA+8SAx) | 20S Office<br>(8S+12Sx) | 24SA Office<br>(8SA+16SAx) |
|----------|-------------------|-------------------|---------------------------|-------------------------|----------------------------|
| 1<br>26  | SR0<br>ST0        | SR0<br>ST0        | SR0<br>ST0                | SR0<br>ST0              | SR0<br>ST0                 |
| 2<br>27  | SR1<br>ST1        | SR1<br>ST1        | SR1<br>ST1                | SR1<br>ST1              | SR1<br>ST1                 |
| 3<br>28  | SR2<br>ST2        | SR2<br>ST2        | SR2<br>ST2                | SR2<br>ST2              | SR2<br>ST2                 |
| 4<br>29  | SR3<br>ST3        | SR3<br>ST3        | SR3<br>ST3                | SR3<br>ST3              | SR3<br>ST3                 |
| 5<br>30  |                   | SR4<br>ST4        | SR4<br>ST4                | SR4<br>ST4              | SR4<br>ST4                 |
| 6<br>31  |                   | SR5<br>ST5        | SR5<br>ST5                | SR5<br>ST5              | SR5<br>ST5                 |
| 7<br>32  |                   | SR6<br>ST6        | SR6<br>ST6                | SR6<br>ST6              | SR6<br>ST6                 |
| 8<br>33  |                   | SR7<br>ST7        | SR7<br>ST7                | SR7<br>ST7              | SR7<br>ST7                 |
| 9<br>34  |                   |                   | SR8<br>ST8                | SR8<br>ST8              | SR8<br>ST8                 |
| 10<br>35 |                   |                   | SR9<br>ST9                | SR9<br>ST9              | SR9<br>ST9                 |
| 11<br>36 |                   |                   | SR10<br>ST10              | SR10<br>ST10            | SR10<br>ST10               |
| 12<br>37 |                   |                   | SR11<br>ST11              | SR11<br>ST11            | SR11<br>ST11               |
| 13<br>38 |                   |                   | SR12<br>ST12              | SR12<br>ST12            | SR12<br>ST12               |
| 14<br>39 |                   |                   | SR13<br>ST13              | SR13<br>ST13            | SR13<br>ST13               |
| 15<br>40 |                   |                   | SR14<br>ST14              | SR14<br>ST14            | SR14<br>ST14               |
| 16<br>41 |                   |                   | SR15<br>ST15              | SR15<br>ST15            | SR15<br>ST15               |
| 17<br>42 |                   |                   |                           | SR16<br>ST16            | SR16<br>ST16               |
| 18<br>43 |                   |                   |                           | SR17<br>ST17            | SR17<br>ST17               |
| 19<br>44 |                   |                   |                           | SR18<br>ST18            | SR18<br>ST18               |
| 20<br>45 |                   |                   |                           | SR19<br>ST19            | SR19<br>ST19               |
| 21<br>46 |                   |                   |                           |                         | SR20<br>ST20               |
| 22<br>47 |                   |                   |                           |                         | SR21<br>ST21               |
| 23<br>48 |                   |                   |                           |                         | SR22<br>ST22               |
| 24<br>49 |                   |                   |                           |                         | SR23<br>ST23               |
| 25<br>50 |                   |                   |                           |                         |                            |



**Table 5-9 Champ 50  
Connector Card Pinout  
(8/16/24SFT)**

| Pin | 8SFT<br>Office | 16SFT<br>Office | 24SFT<br>Office |
|-----|----------------|-----------------|-----------------|
| 1   | A0             | A0              | A0              |
| 26  | B0             | B0              | B0              |
| 2   | A1             | A1              | A1              |
| 27  | B1             | B1              | B1              |
| 3   | A2             | A2              | A2              |
| 28  | B2             | B2              | B2              |
| 4   | A3             | A3              | A3              |
| 29  | B3             | B3              | B3              |
| 5   | A4             | B4              | B4              |
| 30  | B4             | A4              | A4              |
| 6   | A5             | A5              | A5              |
| 31  | B5             | B5              | B5              |
| 7   | A6             | A6              | A6              |
| 32  | B6             | B6              | B6              |
| 8   | A7             | A7              | A7              |
| 33  | B7             | B7              | B7              |
| 9   |                | A8              | A8              |
| 34  |                | B8              | B8              |
| 10  |                | A9              | A9              |
| 35  |                | B9              | B9              |
| 11  |                | A10             | A10             |
| 36  |                | B10             | B10             |
| 12  |                | A11             | A11             |
| 37  |                | B11             | B11             |
| 13  |                | A12             | A12             |
| 38  |                | B12             | B12             |
| 14  |                | A13             | A13             |
| 39  |                | B13             | B13             |
| 15  |                | A14             | A14             |
| 40  |                | B14             | B14             |
| 16  |                | A15             | A15             |
| 41  |                | B15             | B15             |
| 17  |                |                 | A16             |
| 42  |                |                 | B16             |
| 18  |                |                 | A17             |
| 43  |                |                 | B17             |
| 19  |                |                 | A18             |
| 44  |                |                 | B18             |
| 20  |                |                 | A19             |
| 45  |                |                 | B19             |
| 21  |                |                 | A20             |
| 46  |                |                 | B20             |
| 22  |                |                 | A21             |
| 47  |                |                 | B21             |
| 23  |                |                 | A22             |
| 48  |                |                 | B22             |
| 24  |                |                 | A23             |
| 49  |                |                 | B23             |
| 25  |                |                 |                 |
| 50  |                |                 |                 |

**Table 5-10 Champ 50  
Connector Card Pinout  
(4/8SA+8/16Fx),  
(4/8S+8/16Fx)**

| Pin      | 4S+8Fx<br>4SA+8Fx<br>Office | 4S+16Fx<br>4SA+16Fx<br>Office | 8S+8Fx<br>8SA+8Fx<br>Office | 8S+16Fx<br>8SA+16Fx<br>Office |
|----------|-----------------------------|-------------------------------|-----------------------------|-------------------------------|
| 1<br>26  | SR0<br>ST0                  | SR0<br>ST0                    | SR0<br>ST0                  | SR0<br>ST0                    |
| 2<br>27  | SR1<br>ST1                  | SR1<br>ST1                    | SR1<br>ST1                  | SR1<br>ST1                    |
| 3<br>28  | SR2<br>ST2                  | SR2<br>ST2                    | SR2<br>ST2                  | SR2<br>ST2                    |
| 4<br>29  | SR3<br>ST3                  | SR3<br>ST3                    | SR3<br>ST3                  | SR3<br>ST3                    |
| 5<br>30  |                             |                               | SR4<br>ST4                  | SR4<br>ST4                    |
| 6<br>31  |                             |                               | SR5<br>ST5                  | SR5<br>ST5                    |
| 7<br>32  |                             |                               | SR6<br>ST6                  | SR6<br>ST6                    |
| 8<br>33  |                             |                               | SR7<br>ST7                  | SR7<br>ST7                    |
| 9<br>34  | A0<br>B0                    | A0<br>B0                      | A0<br>B0                    | A0<br>B0                      |
| 10<br>35 | A1<br>B1                    | A1<br>B1                      | A1<br>B1                    | A1<br>B1                      |
| 11<br>36 | A2<br>B2                    | A2<br>B2                      | A2<br>B2                    | A2<br>B2                      |
| 12<br>37 | A3<br>B3                    | A3<br>B3                      | A3<br>B3                    | A3<br>B3                      |
| 13<br>38 | B4<br>A4                    | B4<br>A4                      | B4<br>A4                    | B4<br>A4                      |
| 14<br>39 | A5<br>B5                    | A5<br>B5                      | A5<br>B5                    | A5<br>B5                      |
| 15<br>40 | A6<br>B6                    | A6<br>B6                      | A6<br>B6                    | A6<br>B6                      |
| 16<br>41 | A7<br>B7                    | A7<br>B7                      | A7<br>B7                    | A7<br>B7                      |
| 17<br>42 |                             | A8<br>B8                      |                             | A8<br>B8                      |
| 18<br>43 |                             | A9<br>B9                      |                             | A9<br>B9                      |
| 19<br>44 |                             | A10<br>B10                    |                             | A10<br>B10                    |
| 20<br>45 |                             | A11<br>B11                    |                             | A11<br>B11                    |
| 21<br>46 |                             | A12<br>B12                    |                             | A12<br>B12                    |
| 22<br>47 |                             | A13<br>B13                    |                             | A13<br>B13                    |
| 23<br>48 |                             | A14<br>B14                    |                             | A14<br>B14                    |
| 24<br>49 |                             | A15<br>B15                    |                             | A15<br>B15                    |
| 25<br>50 |                             |                               |                             |                               |

## Direct Pinout of the Block 66 MDF Connection

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Tables below display the Block 66 MDF connection for the following peripheral cards.

| Card Name   | Table / Page                            |
|---|---|
| 4SA Office,<br>8SA Office,<br>16SA Office,<br>24SA Office,<br>4S Office,<br>8S Office,<br>20S Office  | <a href="#">Table 5-11 on page 5-30</a> |
| 8SFT Office,<br>16SFT Office,<br>24SFT Office   | <a href="#">Table 5-12 on page 5-31</a> |
| 4SA+8Fx Office,<br>4SA+16Fx Office,<br>8SA+8Fx Office,<br>8SA+16Fx Office,<br>4S+8Fx Office,<br>4S+16Fx Office,<br>8S+8Fx Office,<br>8S+16Fx Office | <a href="#">Table 5-13 on page 5-32</a> |

**Table 5-11 Block 66 MDF Pinout (4/8/16/24SA, 4/8/20S)**

| Pin/Color           | 4S, 4SA Office | 8S, 8SA Office | 16SA Office (8SA+16SAx) | 20S Office (8S+12Sx) | 24SA Office (8SA+16SAx) |
|---------------------|----------------|----------------|-------------------------|----------------------|-------------------------|
| 1/26 White/Blue     | S0             | S0             | S0                      | S0                   | S0                      |
| 2/27 White/Orange   | S1             | S1             | S1                      | S1                   | S1                      |
| 3/28 White/Green    | S2             | S2             | S2                      | S2                   | S2                      |
| 4/29 White/Brown    | S3             | S3             | S3                      | S3                   | S3                      |
| 5/30 White/Slate    |                | S4             | S4                      | S4                   | S4                      |
| 6/31 Red/Blue       |                | S5             | S5                      | S5                   | S5                      |
| 7/32 Red/Orange     |                | S6             | S6                      | S6                   | S6                      |
| 8/33 Red/Green      |                | S7             | S7                      | S7                   | S7                      |
| 9/34 Red/Brown      |                |                | S8                      | S8                   | S8                      |
| 10/35 Red/Slate     |                |                | S9                      | S9                   | S9                      |
| 11/36 Black/Blue    |                |                | S10                     | S10                  | S10                     |
| 12/37 Black/Orange  |                |                | S11                     | S11                  | S11                     |
| 13/38 Black/Green   |                |                | S12                     | S12                  | S12                     |
| 14/39 Black/Brown   |                |                | S13                     | S13                  | S13                     |
| 15/40 Black/Slate   |                |                | S14                     | S14                  | S14                     |
| 16/41 Yellow/Blue   |                |                | S15                     | S15                  | S15                     |
| 17/42 Yellow/Orange |                |                |                         | S16                  | S16                     |
| 18/43 Yellow/Green  |                |                |                         | S17                  | S17                     |
| 19/44 Yellow/Brown  |                |                |                         | S18                  | S18                     |
| 20/45 Yellow/Slate  |                |                |                         | S19                  | S19                     |
| 21/46 Violet/Blue   |                |                |                         |                      | S20                     |
| 22/47 Violet/Orange |                |                |                         |                      | S21                     |
| 23/48 Violet/Green  |                |                |                         |                      | S22                     |
| 24/49 Violet/Brown  |                |                |                         |                      | S23                     |
| 25/50 Violet/Slate  |                |                |                         |                      |                         |

### CAUTION!

Never insert “4/8/20S Office” and “4/8/16/24SA Office” cards in the same Coral IPx unit. Never exceed the number of POTs and FlexSets stations listed in [Table 10-5](#) and [Table 10-6](#).

**Table 5-12 Block 66 MDF Pinout (8/16/24SFT)**

| Pin/Color           | 8SFT Office | 16SFT Office | 24SFT Office |
|---------------------|-------------|--------------|--------------|
| 1/26 White/Blue     | A/B0        | A/B0         | A/B0         |
| 2/27 White/Orange   | A/B1        | A/B1         | A/B1         |
| 3/28 White/Green    | A/B2        | A/B2         | A/B2         |
| 4/29 White/Brown    | A/B3        | A/B3         | A/B3         |
| 5/30 White/Slate    | A/B4        | A/B4         | A/B4         |
| 6/31 Red/Blue       | A/B5        | A/B5         | A/B5         |
| 7/32 Red/Orange     | A/B6        | A/B6         | A/B6         |
| 8/33 Red/Green      | A/B7        | A/B7         | A/B7         |
| 9/34 Red/Brown      |             | A/B8         | A/B8         |
| 10/35 Red/Slate     |             | A/B9         | A/B9         |
| 11/36 Black/Blue    |             | A/B10        | A/B10        |
| 12/37 Black/Orange  |             | A/B11        | A/B11        |
| 13/38 Black/Green   |             | A/B12        | A/B12        |
| 14/39 Black/Brown   |             | A/B13        | A/B13        |
| 15/40 Black/Slate   |             | A/B14        | A/B14        |
| 16/41 Yellow/Blue   |             | A/B15        | A/B15        |
| 17/42 Yellow/Orange |             |              | A/B16        |
| 18/43 Yellow/Green  |             |              | A/B17        |
| 19/44 Yellow/Brown  |             |              | A/B18        |
| 20/45 Yellow/Slate  |             |              | A/B19        |
| 21/46 Violet/Blue   |             |              | A/B20        |
| 22/47 Violet/Orange |             |              | A/B21        |
| 23/48 Violet/Green  |             |              | A/B22        |
| 24/49 Violet/Brown  |             |              | A/B23        |
| 25/50 Violet/Slate  |             |              |              |

Table 5-13 **Block 66 MDF Pinout (4/8SA+8/16Fx), (4/8S+8/16Fx)**

| Pin/Color           | 4S+8Fx<br>4SA+8Fx<br>Office | 4S+16Fx<br>4SA+16Fx<br>Office | 8S+8Fx<br>8SA+8Fx<br>Office | 8S+16Fx<br>8SA+16Fx<br>Office |
|---------------------|-----------------------------|-------------------------------|-----------------------------|-------------------------------|
| 1/26 White/Blue     | S0                          | S0                            | S0                          | S0                            |
| 2/27 White/Orange   | S1                          | S1                            | S1                          | S1                            |
| 3/28 White/Green    | S2                          | S2                            | S2                          | S2                            |
| 4/29 White/Brown    | S3                          | S3                            | S3                          | S3                            |
| 5/30 White/Slate    |                             |                               | S4                          | S4                            |
| 6/31 Red/Blue       |                             |                               | S5                          | S5                            |
| 7/32 Red/Orange     |                             |                               | S6                          | S6                            |
| 8/33 Red/Green      |                             |                               | S7                          | S7                            |
| 9/34 Red/Brown      | A/B0                        | A/B0                          | A/B0                        | A/B0                          |
| 10/35 Red/Slate     | A/B1                        | A/B1                          | A/B1                        | A/B1                          |
| 11/36 Black/Blue    | A/B2                        | A/B2                          | A/B2                        | A/B2                          |
| 12/37 Black/Orange  | A/B3                        | A/B3                          | A/B3                        | A/B3                          |
| 13/38 Black/Green   | A/B4                        | A/B4                          | A/B4                        | A/B4                          |
| 14/39 Black/Brown   | A/B5                        | A/B5                          | A/B5                        | A/B5                          |
| 15/40 Black/Slate   | A/B6                        | A/B6                          | A/B6                        | A/B6                          |
| 16/41 Yellow/Blue   | A/B7                        | A/B7                          | A/B7                        | A/B7                          |
| 17/42 Yellow/Orange |                             | A/B8                          |                             | A/B8                          |
| 18/43 Yellow/Green  |                             | A/B9                          |                             | A/B9                          |
| 19/44 Yellow/Brown  |                             | A/B10                         |                             | A/B10                         |
| 20/45 Yellow/Slate  |                             | A/B11                         |                             | A/B11                         |
| 21/46 Violet/Blue   |                             | A/B12                         |                             | A/B12                         |
| 22/47 Violet/Orange |                             | A/B13                         |                             | A/B13                         |
| 23/48 Violet/Green  |                             | A/B14                         |                             | A/B14                         |
| 24/49 Violet/Brown  |                             | A/B15                         |                             | A/B15                         |
| 25/50 Violet/Slate  |                             |                               |                             |                               |

### CAUTION!

Never insert “4/8/20S Office” and “4/8/16/24SA Office” cards in the same Coral IPx unit. Never exceed the number of POTs and FlexSets stations listed in [Table 10-5](#) and [Table 10-6](#).

## RJ-45 Connections

### *Peripheral Cards Index*

The I/O connections of the following interface cards are performed via cables connected to their RJ-45 connectors.

| Card Name                                    | Page                         |
|--|------------------------------|
| 2DT Office (T1,30T,30TM,PRI-23, or PRI-30)   | <a href="#">on page 5-34</a> |
| 4T Office,<br>4T-CID Office                  | <a href="#">on page 5-36</a> |
| 8T Office,<br>8T-CID Office                  | <a href="#">on page 5-37</a> |
| 4TBR Office                                  | <a href="#">on page 5-38</a> |
| UDT Office (PRI-23),<br>PRI-30 Office        | <a href="#">on page 5-40</a> |
| UDT Office (T1),<br>30T Office (30T or 30TM) | <a href="#">on page 5-41</a> |
| LAN/WAN (IPx Office Front Panel)             | <a href="#">on page 5-46</a> |

## 2DT Office Card

Due to logistical requirements, the card is labelled: "**PRI-2DT Office**", on the front panel and on attached shipping documentation.

The external network connections to the 2DT Office digital circuit are made via the RJ-45 telephony connectors on the front panel. See [Table 5-14](#), [Figure 5-9](#), and [Figure 5-10](#).



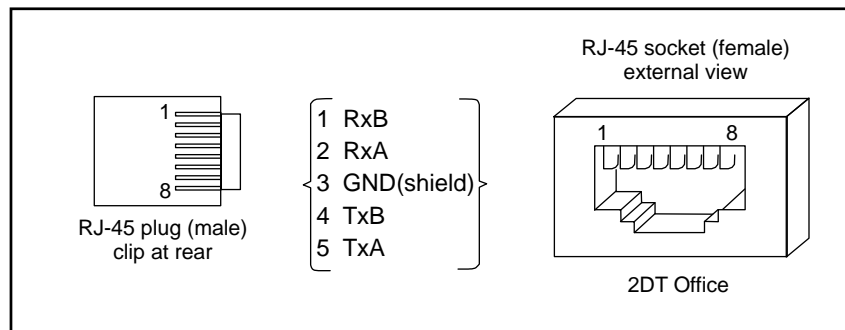
### NOTE:

For further information on how to connect and configure the network interface connection, refer to the *Coral Service and Peripheral Cards Installation Manual*.

Table 5-14 2DT Office Pinout

| RJ-45 Pin # | Nomination | Functions                        |
|-------------|------------|----------------------------------|
| Pin 1       | RxB        | Receive Data (ring) from Network |
| Pin 2       | RxA        | Receive Data (tip) from Network  |
| Pin 3       | Shield     | GND (Cable Shield)               |
| Pin 4       | TxB        | Transmit Data (ring) to Network  |
| Pin 5       | TxA        | Transmit Data (tip) to Network   |

Figure 5-9 2DT Office Pinout

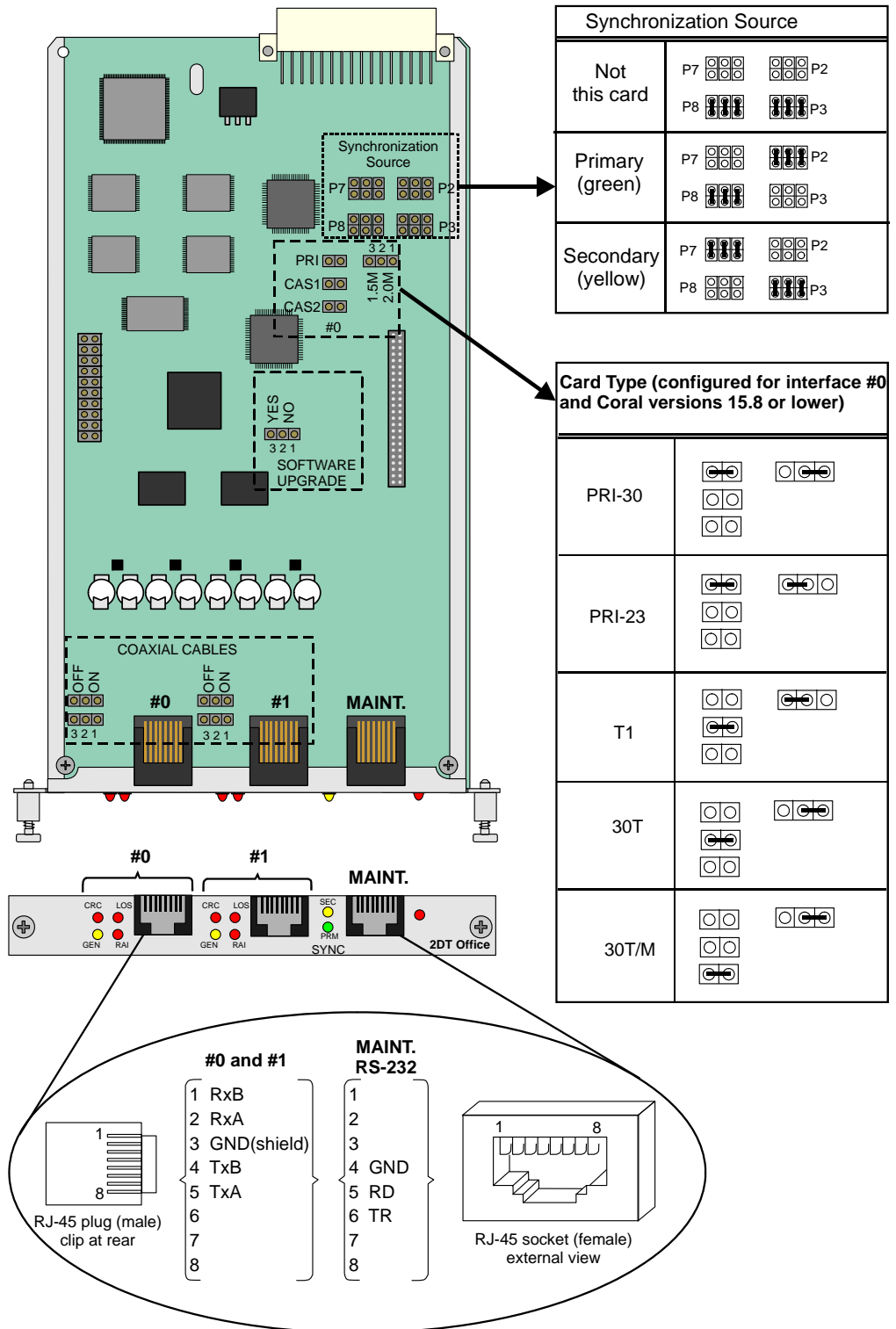


### NOTE:

For synchronization and configuration jumpers, see [Figure 10-15 on page 10-38](#).



Figure 5-10 2DT Office Interface Connections to PSTN/LTU/CSU



**NOTE:**

Due to logistical requirements, the card is labelled: "PRI-2DT Office", on the front panel and on attached shipping documentation.

## 4T Office and 4T-CID Office Cards

The external network connections to the *4T Office* and *4T-CID Office* circuit card are made via four RJ-45 telephony connectors on the front panel. See [Table 5-15](#) and [Figure 5-11](#).

*4T Office* and *4T-CID Office* (installed in slots 10-11) provide four (4) ports with power failure (PF) transfer connections:



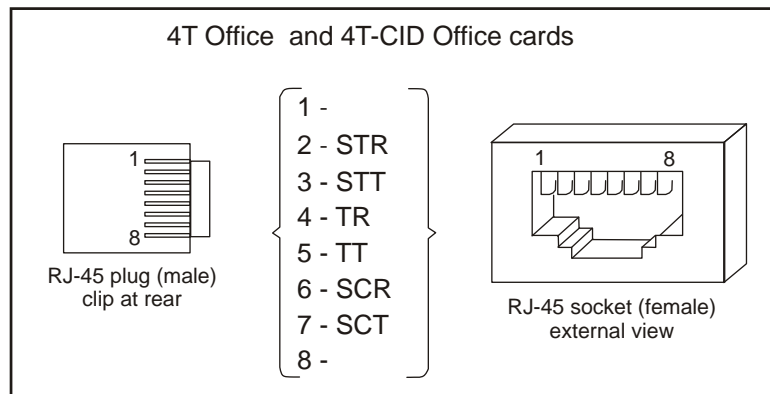
### NOTE:

For further information, on how to make the connection, refer also to the *Coral Service and Peripheral Cards Installation Manual*.

**Table 5-15 4T / 4T-CID Office Pinout**

| RJ-45 Pin # | Pin Assignment | Conductor | Connect To                       |
|-------------|----------------|-----------|----------------------------------|
| Pin 1       | Not Used       |           |                                  |
| Pin 2       | STR            | Ring      | Station Single-Line Set          |
| Pin 3       | STT            | Tip       |                                  |
| Pin 4       | TR             | Ring      | PSTN Central Office Trunk        |
| Pin 5       | TT             | Tip       |                                  |
| Pin 6       | SCR            | Ring      | Station Circuit (4/8/20S Office) |
| Pin 7       | SCT            | Tip       |                                  |
| Pin 8       | Not Used       |           |                                  |

**Figure 5-11 4T / 4T-CID Office Pinout**



STT, STR, SCT and SCR are power failure transfer connections.

See [Figure 5-6 on page 5-17](#) for power failure transfer wiring interconnections diagram and database programming.

## 8T Office and 8T-CID Office Cards

The external network connections to the *8T Office* and *8T-CID Office* circuit card are made via eight RJ-45 telephony connectors on the front panel. See [Table 5-16](#) and [Figure 5-12](#).

*8T Office* and *8T-CID Office* (installed in slots 2-3 and 4-5) provide four (4) ports with power failure (PF) transfer connections on circuits 2, 3, 4, and 5:



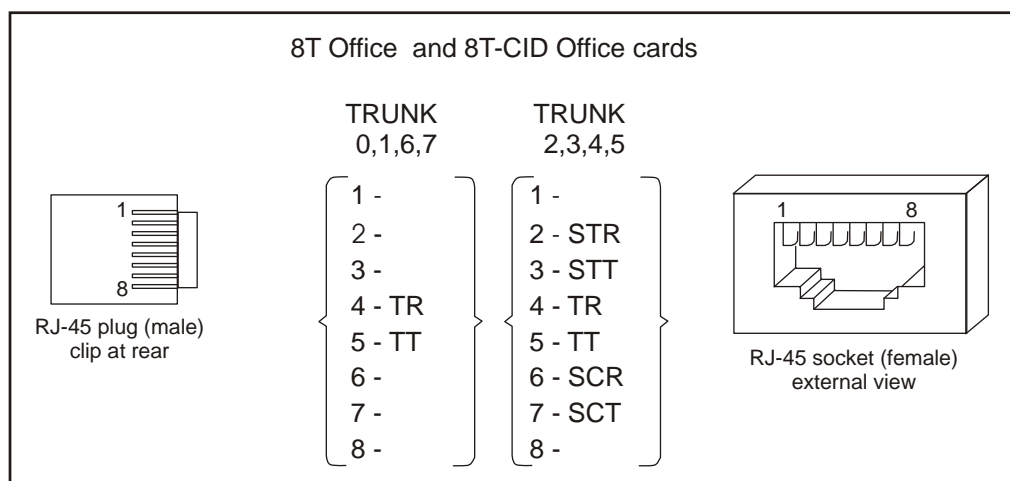
### NOTE:

For further information, on how to make the connection, refer also to the *Coral Service and Peripheral Cards Installation Manual*.

Table 5-16 *8T / 8T-CID Office Pinout*

| RJ-45 Pin # | Pin Assignment |               | Conductor | Connect To                       |
|-------------|----------------|---------------|-----------|----------------------------------|
|             | Trunk 0,1,6,7  | Trunk 2,3,4,5 |           |                                  |
| Pin 1       | Not Used       | Not Used      |           |                                  |
| Pin 2       | Not Used       | STR           | Ring      | Station Single-Line Set          |
| Pin 3       | Not Used       | STT           | Tip       |                                  |
| Pin 4       | TR             | TR            | Ring      | PSTN Central Office Trunk        |
| Pin 5       | TT             | TT            | Tip       |                                  |
| Pin 6       | Not Used       | SCR           | Ring      | Station Circuit (4/8/20S Office) |
| Pin 7       | Not Used       | SCT           | Tip       |                                  |
| Pin 8       | Not Used       | Not Used      |           |                                  |

Figure 5-12 *8T / 8T-CID Office Pinout*



STT, STR, SCT and SCR are power failure transfer connections.

See [Figure 5-6 on page 5-17](#) for power failure transfer wiring interconnections diagram and database programming.

## 4TBR Office Card

The external network connections to the *4TBR Office* digital circuit card are made via four RJ-45 telephony connectors on the front panel. See [Table 5-17](#) and [Figure 5-13](#).



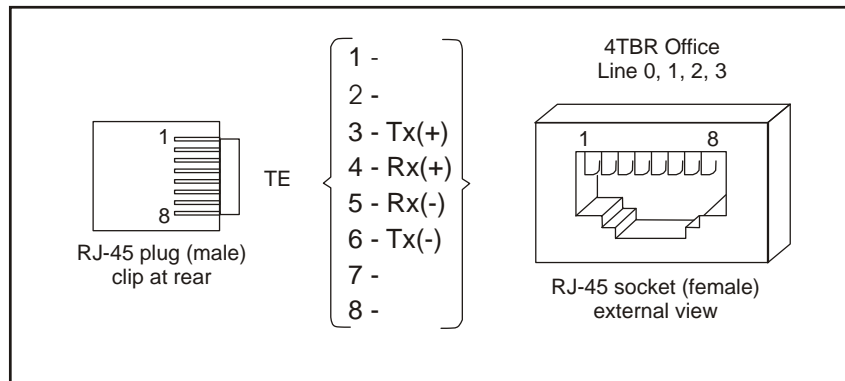
### NOTE:

For further information, on how to make the connection, refer also to the *Coral Service and Peripheral Cards Installation Manual*.

**Table 5-17 4TBR Office Pinout - for all connectors**

| RJ-45 Pin # | Nomination TE | Functions                     |
|-------------|---------------|-------------------------------|
| Pin 1       | Not Used      | Not Used                      |
| Pin 2       | Not Used      | Not Used                      |
| Pin 3       | Tx (+)        | Transmit Data (+) to Network  |
| Pin 4       | Rx (+)        | Receive Data (+) from Network |
| Pin 5       | Rx (-)        | Receive Data (-) from Network |
| Pin 6       | Tx (-)        | Transmit Data (-) to Network  |
| Pin 7       | Not Used      | Not Used                      |
| Pin 8       | Not Used      | Not Used                      |

**Figure 5-13 4TBR Office Pinout**



### NOTE:

For synchronization jumpers, see [Figure 10-17](#) on page 10-40.

## UDT Office (T1 or PRI-23)

The external network connections to the *UDT Office* (T1 or PRI-23, jumper selection) digital circuit are made via the RJ-45 telephony connector on the front panel. See [Table 5-18](#) and [Figure 5-14](#).



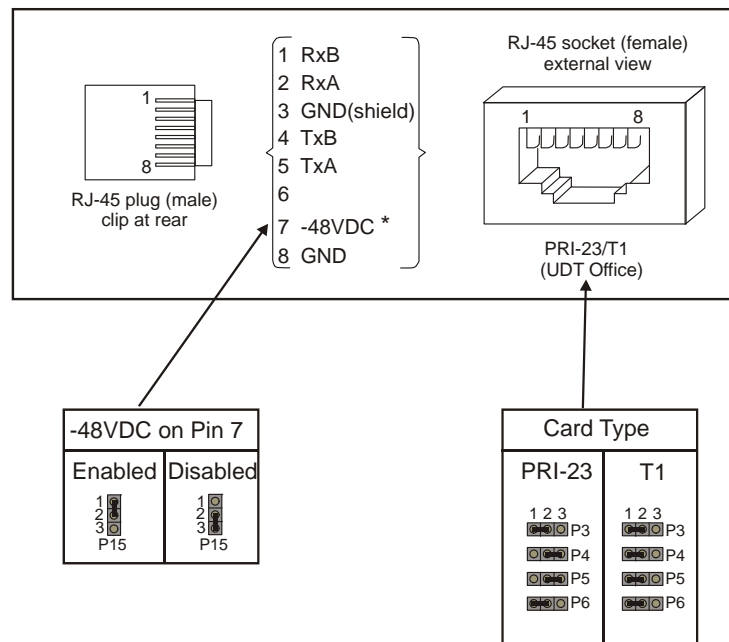
### NOTE:

For further information, on how to make the connection to the PSTN/LTU/CSU, refer also to the *Coral Service and Peripheral Cards Installation Manual*.

Table 5-18 *UDT Office* (T1 or PRI-23) Pinout

| RJ-45 Pin # | Nomination | Functions  |
|-------------|------------|--|
| Pin 1       | RxB        | Receive Data (ring) from Network                                       |
| Pin 2       | RxA        | Receive Data (tip) from Network  |
| Pin 3       | Shield     | Cable Shield, 48VDC Return   |
| Pin 4       | TxB        | Transmit Data (ring) to Network  |
| Pin 5       | TxA        | Transmit Data (tip) to Network   |
| Pin 6       | Not Used   | Not Used   |
| Pin 7       | -48VDC *   | Power for CSU/LTU<br>(Enable/Disable see <a href="#">Figure 5-14</a> ) |
| Pin 8       | GND        | Cable Shield, 48VDC Return   |

Figure 5-14 *UDT Office* (T1 or PRI-23) Pinout



### NOTE:

For synchronization jumpers, see [Figure 10-19](#) on page 10-42.

## PRI-30 Office

The external network connections to the *PRI-30 Office* digital circuit are made via the RJ-45 telephony connector on the front panel. See [Table 5-19](#) and [Figure 5-15](#).



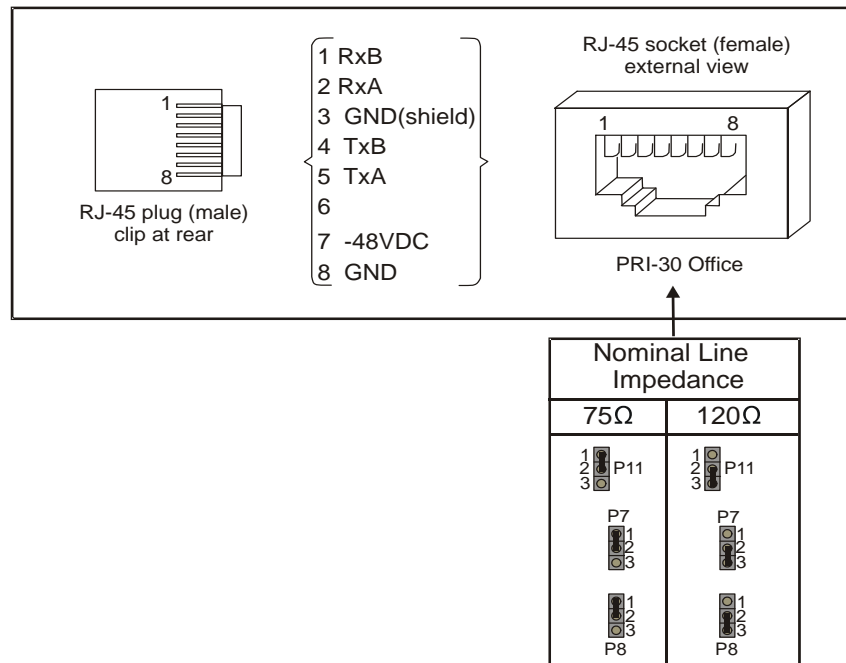
### NOTE:

For further information on how to connect to the PSTN/LTU/CSU, refer to the *Coral Service and Peripheral Cards Installation Manual*.

Table 5-19 *PRI-30 Office* Pinout

| RJ-45 Pin # | Nomination | Functions                        |
|-------------|------------|----------------------------------|
| Pin 1       | RxB        | Receive Data (ring) from Network |
| Pin 2       | RxA        | Receive Data (tip) from Network  |
| Pin 3       | Shield     | Cable Shield, 48VDC Return       |
| Pin 4       | TxB        | Transmit Data (ring) to Network  |
| Pin 5       | TxA        | Transmit Data (tip) to Network   |
| Pin 6       | Not Used   | Not Used                         |
| Pin 7       | -48VDC     | Power for CSU/LTU                |
| Pin 8       | GND        | Cable Shield, 48VDC Return       |

Figure 5-15 *PRI-30 Office* Pinout



### NOTE:

For synchronization jumpers, see [Figure 10-18](#) on page 10-41.

## 30T Office Card (30T or 30TM)

The external network connections to the 30T Office digital circuit are made via the RJ-45 telephony connector on the front panel. See [Table 5-20](#) and [Figure 5-16](#).



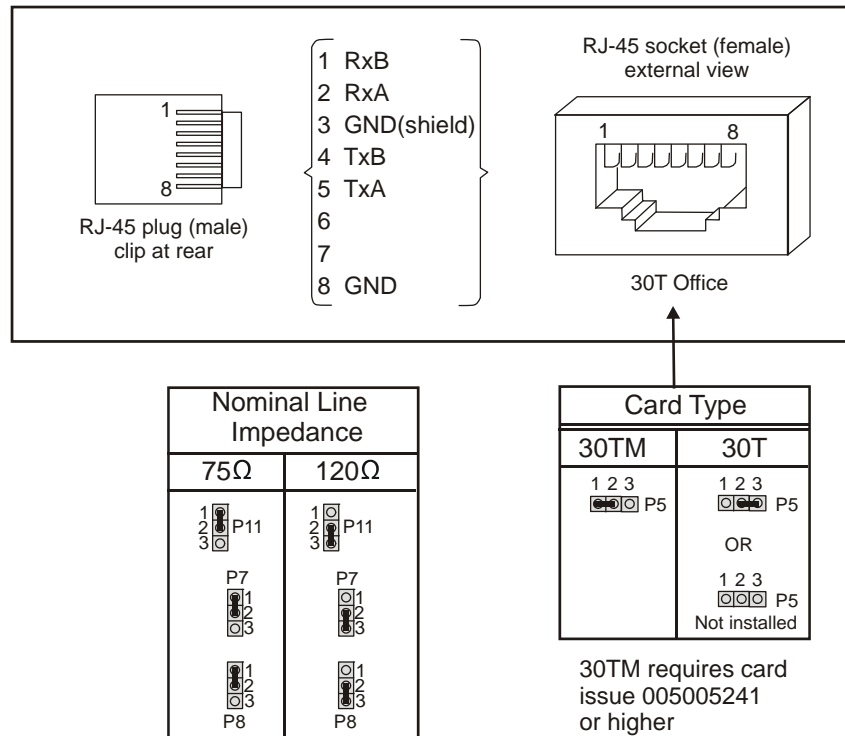
### NOTE:

For further information, on how to make the connection to the PSTN/LTU/CSU, refer also to the Coral Service and Peripheral Cards Installation Manual.

Table 5-20 30T Office Pinout (30T or 30TM)

| RJ-45 Pin # | Nomination   | Functions                 |
|-------------|--------------|---------------------------|
| Pin 1       | RxB          | Receive Data from Network |
| Pin 2       | RxA          | Receive Data from Network |
| Pin 3       | GND (Shield) | Cable Shield              |
| Pin 4       | TxA          | Transmit Data to Network  |
| Pin 5       | TxB          | Transmit Data to Network  |
| Pin 6       | Not Used     | Not Used                  |
| Pin 7       | Not Used     | Not Used                  |
| Pin 8       | GND          | Cable Shield              |

Figure 5-16 30T Office Pinout (30T or 30TM)



### NOTE:

For impedance jumpers, see [Figure 10-16](#) on page 10-39.

**NOTES:**



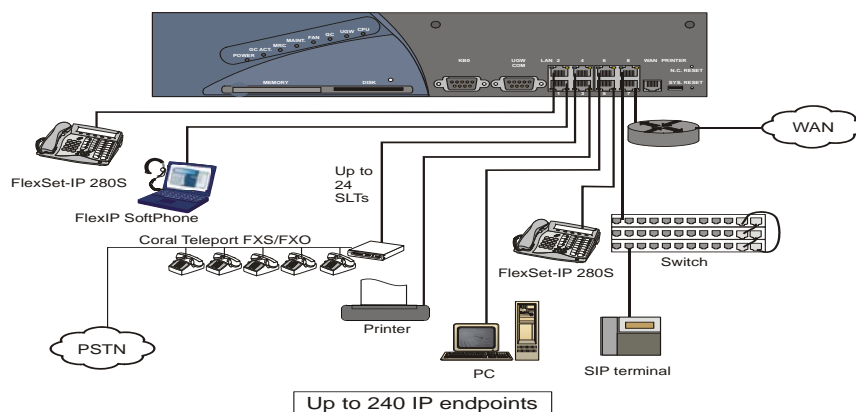
## 5.7 LAN, WAN, and Printer Connections

This section describes how to connect LAN, WAN, and a printer to the Coral Office main unit. The Coral IPx Office main unit includes:

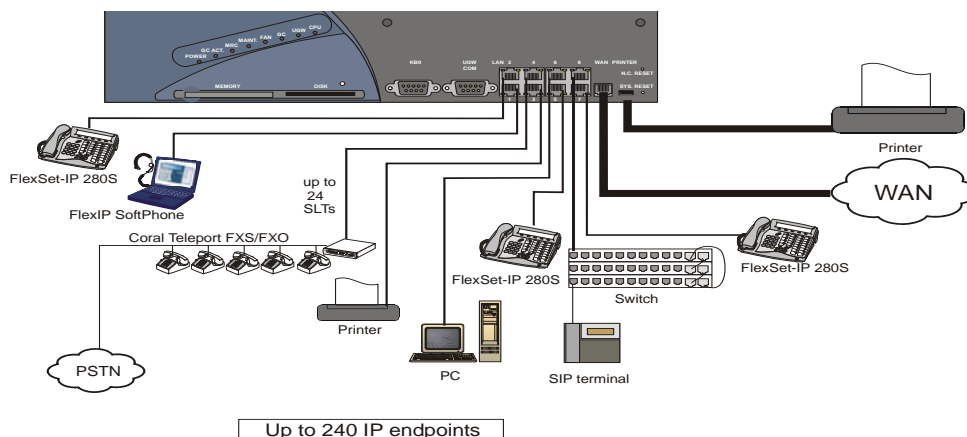
- Eight RJ-45 ports for connection to the LAN
- One RJ-45 port for connection to the WAN (requires an NTU Office card)
- One USB port for connection to a printer (requires an NTU Office card)

Connection to these media vary, depending on whether or not the Coral Office main unit is supplied with an NTU Office card. The NTU Office card acts as a router, enabling direct connection to the WAN. If an NTU Office card is not supplied, connections to the WAN can be facilitated only after an external customer-supplied router has been connected. See [Chapter 11, System Networking](#).

**Figure 5-17 Network Connection when an NTU Office Card is not Supplied**



**Figure 5-18 Network Connection when an NTU Office Card is Supplied**



## Connecting to the LAN

---

The Coral IPx Office connects directly to the LAN whether or not an NTU Office card is supplied with the system. A switching device can be added, allowing additional IP endpoints to be cascaded within the system (up to 240 altogether). See [Figure 5-17](#) and [Figure 5-18](#). See [Chapter 11, System Networking](#), for more information.

---

### *Connecting to the LAN when an NTU Office Card is Supplied*

If an NTU Office card is supplied with the system, the dynamic IP addresses can be provided either by the NTU Office card or by the DHCP server at the customer's site. When the customer's DHCP server is used, disable the NTU Office card DHCP server.

---

### *Connecting to the LAN when an NTU Office Card is not Supplied*

If an NTU Office card is not supplied with the system, the dynamic IP addresses are provided by the customer's DHCP server.

The Coral IPx Office can connect to the WAN whether or not an NTU Office card is supplied with the system. See [Chapter 11, System Networking](#), for more information.

## Connecting to the WAN

---

---

### *Connecting to the WAN when an NTU Office Card is Supplied*

If an NTU Office card is supplied with the system, the Coral IPx Office connects directly to the WAN without an external, customer-supplied router. In this case, the dynamic IP addresses can be provided either by the NTU Office card or by the DHCP server at the customer's site. For ADSL or cable/DSL, an additional modem is required.

When the customer's DHCP server is used, disable the NTU Office card DHCP server.

---

### *Connecting to the WAN when an NTU Office Card is not Supplied*

If an NTU Office card has not been supplied, connecting to the WAN is possible only after a router has been added between one of the LAN ports and the WAN. In this case, the dynamic IP addresses are provided by the customer's DHCP server. For ADSL or cable/DSL, an additional modem is required.

## ● Connecting to a Printer

---

The Coral IPx Office can function as a printer server when an NTU Office card is supplied with the system.

---

### *Connecting to a Printer when an NTU Office Card is Supplied*

If an NTU Office card is supplied, a printer can be connected via the USB port.

---

### *Connecting to a Printer when an NTU Office Card is not Supplied*

If an NTU Office card is not provided, a printer can be connected to any of the LAN RJ-45 ports as any other Ethernet device. However, an external printer server must be supplied and the USB port cannot be used.

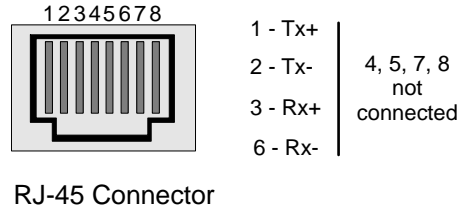
## LAN/WAN Pinout

Table 5-21 and Figure 5-19 show the interface connections of the pins on the LAN/WAN RJ-45 connector to the network and IP endpoints.

Table 5-21 LAN/WAN Pinout

| Pin # | Nomination | Function                      |
|-------|------------|-------------------------------|
| Pin 1 | Tx(+)      | Transmit Data (+) to Network. |
| Pin 2 | Tx(-)      | Transmit Data (-) to Network  |
| Pin 3 | Rx(+)      | Receive Data (+) from Network |
| Pin 4 | not used   | not connected                 |
| Pin 5 | not used   | not connected                 |
| Pin 6 | Rx(-)      | Receive Data (-) from Network |
| Pin 7 | not used   | not connected                 |
| Pin 8 | not used   | not connected                 |

Figure 5-19 LAN/WAN Pinout



For information on LAN/WAN connections, see [Chapter 11, System Networking](#).



### NOTE:

For further information on how to make the connection, refer to the Chapter 3 of the Coral Voice over IP Installation Manual.

# Chapter 6

## System Description

Coral

|     |   |      |
|-----|---|------|
| 6.1 | <i>General System Description</i> .....   | 6-1  |
| 6.2 | <i>System Configuration Options</i> ..... | 6-25 |



## 6.1 General System Description

This chapter describes the IPx Office unit components. Upon completing this section, you will be familiar with unit components. The instructions for installing the unit are found in [Chapter 2, Hardware Installation Procedure](#).

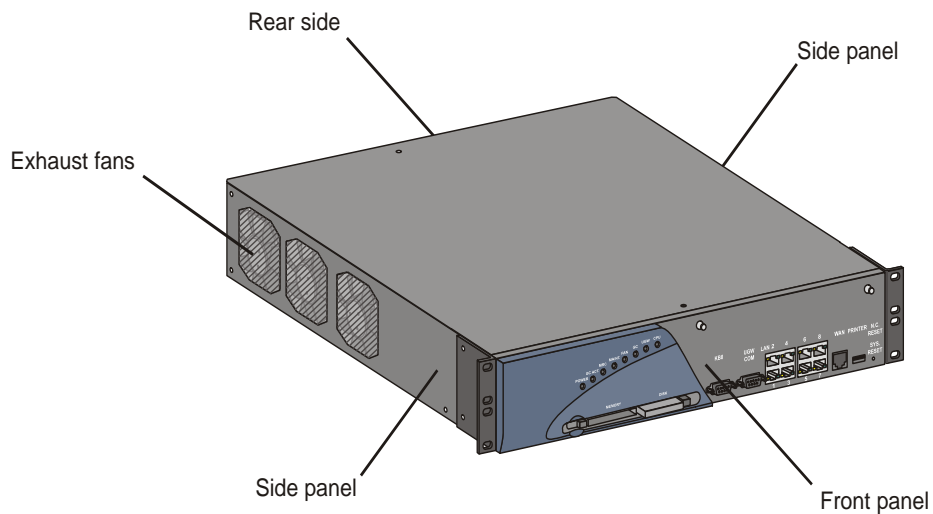
The IPx Office system is housed in a rack-mounted or table-mounted unit and can be expanded by adding additional IPx Office unit EX expansion units, IPx 500 or IPx 800 expansion cages, or FlexiCom 200 expansion cabinets. Each system consists of one main unit that contains the common control cards and peripheral cards, as well as one or two optional expansion cages. The main unit is equipped with peripheral card slots. Expansion cages are equipped with additional peripheral card slots.

### Exterior Housing

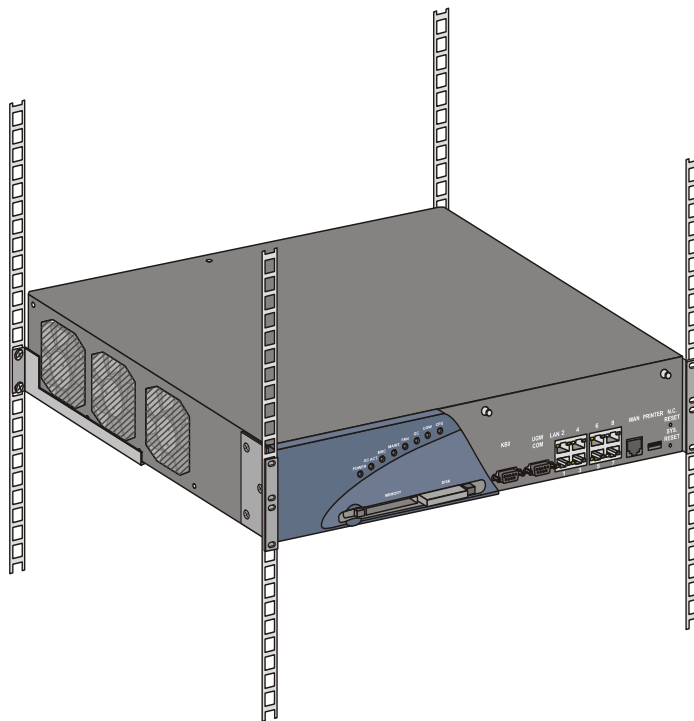
The IPx Office unit is designed to provide a simple, reliable method for installing and removing the printed circuit cards and assemblies that contain the active circuitry of the system. The IPx Office unit is housed in a case that includes networking, and peripheral cards, a slot for the power supply unit, three DC fan units, holes on the side panels for forced ventilation, eight ports for connection to the LAN, one port for connection to the WAN, one printer connection, the UGW port, the KB0 port, system and NTU Office card reset buttons, flash, and compact flash cards, and a cover that can be easily removed. The entire unit is 2U (3.5in or 8.9cm) in height.

The IPx Office is a versatile unit that can be mounted onto either a 19" or a 23" rack or a table located at the customer's site. The unit is supplied with mounting brackets and fasteners, exhaust fans, and a top cover with ventilation holes. The IPx Office is shipped with an installation kit that includes components for mounting the cage onto a table and onto a rack. [Figure 6-1](#) displays the IPx Office unit mounted onto a table. [Figure 6-2](#) displays the rack configuration for the IPx Office unit mounted onto a 19" rack including the front and rear rack-mounting brackets. Instructions for mounting the cage onto the rack can be found on [Mounting the IPx Office onto a Rack, page 2-14](#).

**Figure 6-1 Front View of the Table-Mounted IPx Office Unit**



**Figure 6-2 Front View of the Rack-Mounted IPx Office Unit**





## Front Panel

The front panel of the main unit includes eight diagnostic LED indicators, a slot for a memory card, a compact FLASH disk, a KB0 port, a UGW port, eight LAN ports, one WAN port, one printer server port, two openings for the reset buttons, and two holes for mounting the optional WiFi antennas.

Figure 6-3 displays the front panel of the IPx Office unit. Table 6-1 displays the front panel features, including a short description for each feature.

The front panel of the expansion unit includes the Power and Fan LED indicators, only. These LED indicators are identical to the Power and Fan LED indicators on the front panel of the main unit. There are no other features on the front panel of the expansion unit.

Figure 6-3 **Main Unit Front Panel**

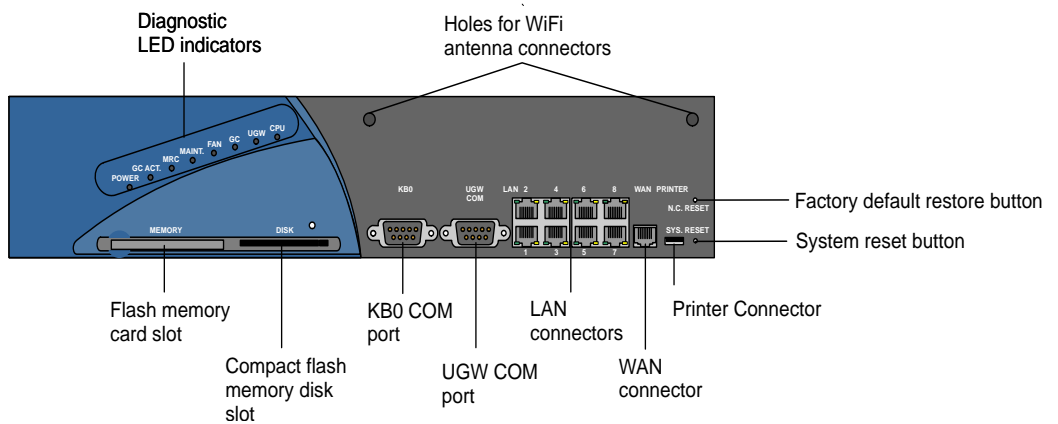
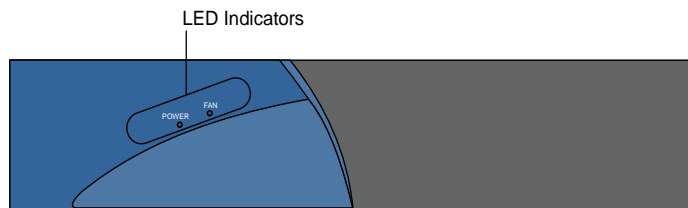


Figure 6-4 **Expansion Unit Front Panel**



**Table 6-1 Front Panel Features**

| MNEMONIC | Feature                                | What is it for?   |
|----------|--|---|
| POWER    | POWER LED<br>(green - continuously on) | System power is on and functional   |
| GC ACT.  | GC ACT. LED<br>(green - flashes)       | Group controller functional   |
| MRC      | MRC LED<br>(green - continuously on)   | MRC functional, see <a href="#">MRC Cards, page 9-1</a>   |
| MAINT.   | MAINT. LED<br>(red - continuously on)  | Software upgrade  |
| FAN      | FAN LED<br>(red - continuously on)     | Any fan is malfunctioning   |
| GC       | GC LED<br>(red- continuously on)       | GC status   |
| UGW      | UGW LED<br>(red -continuously on)      | CUGW status   |
| CPU      | CPU LED<br>(red - continuously on)     | MCP status  |
| MEMORY   | Flash memory card slot                 | Used to save and restore the database as well as to store the Generic feature software/. For further information see <a href="#">Flash Memory Cards - IMC8 and IMC16, page 8-39</a> .   |
| DISK     | Compact flash disk slot                | Used to store optional applications, such as SeaMail. For further information see <a href="#">DISK - Compact Flash Disk, page 8-49</a> .  |
| KB0      | KB0 COM port*                          | Data Terminal Port, DTE Interface, used to connect an RS232-E serial cable, providing access to the PI or CoralVIEW CVA/CVD/CVT.<br><br>Default configuration:<br>9600 bps, No parity, 8 data bits, 1 stop bit, VT-100. See <a href="#">KB0 RS-232E Programming Port, page 8-29</a> . |
| UGW COM  | UGW COM port                           | DA-9S (RS-232) connector D-Type Maintenance port.<br><b>For manufacturer's use, only.</b><br>See <a href="#">UGW RS-232E Programming Port, page 8-30</a> .  |

| MNEMONIC      | Feature                         | What is it for?  |
|---------------|---------------------------------|--|
| LAN 1-8       | LAN Connectors*                 | Used to connect the NTU Office card to the LAN. Any one connector can be used.   |
| WAN           | WAN Connector*                  | Used to connect the NTU Office card to the WAN.  |
| PRINTER       | Printer Connector*              | Used to connect the system to a printer.   |
| N.C.<br>RESET | Factory restore default button* | Restores the factory default settings to the NTU Office card.<br><br><b>Caution!:</b> Resetting the Factory restore default button while the database is being reprogrammed could corrupt the database. If this happens, the database must be restored.  |
| SYS.<br>RESET | System reset button*            | Forces the Coral system to restart.<br>Used to partially initialize the system (cause a <i>warm restart</i> procedure), simulating the procedure that occurs automatically when power is applied to the system.<br>Forcing initialization by pressing RST immediately disconnects all calls in progress but does not default the database. However, resetting the Main Processor while the database is being programmed, may corrupt the database. If this happens, the database must be restored.<br>MCB Office Reset Button<br><br><b>Caution!:</b> Pressing the RST button will cause a partial initialization. All calls in progress will be terminated. |

\* In main unit, only

### Rear Side

The rear side of the unit houses the peripheral cards and the power supply card. See [Figure 6-5](#). When installed, the front panels of the peripheral cards and the power supply card completely overlay the rear section of the unit. Since the front panel of all cards installed from the rear are RFI protected, the unit cover does not need to protect the rear side of the unit. Therefore, the cards can be installed and removed without removing the unit cover.

The rear side includes the slots for inserting the power supply card and the peripheral cards. The peripheral card slots are designated slot 2-3, slot 4-5, slot 6-7, slot 8-9, and slot 10-11. (Each card slot is recognized by the programming interface as two separate slots.)

The rear side is designed to house full-size as well as half-size cards. See [Peripheral Card Description, page 10-5](#). The front panel of the half-size cards come in three different sizes. For that reason, some of the half-size cards must be installed in specific slots. See [Table 2-7 on page 2-28](#) for further detail. Slot 2-3 and slot 4-5 house the full-sized cards. Slot 6-7, slot 8-9, and slot 10-11 house the half-sized cards.

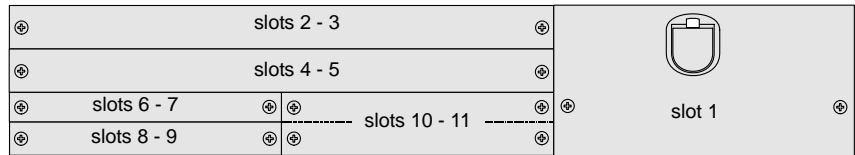
When any of the peripheral slots are not used, the openings must be covered by an appropriate blank panel. See [Blank Panels, page 6-15](#).

**WARNING!**

*Electrical Hazard. Exposure to live circuits could cause shock, burn, and death. Do not operate the IPx Office system without covering empty card slots with a protective panel.*

The rear side also houses the unit ground terminal including, the M4 threaded pole, a serrated washer, a flat washer, and an M4 nut.

Figure 6-5 Rear Side of the IPx Office Unit



*Side Panels*

The side panels of the IPx Office cover include perforations that allow the flow of cool ambient air to the system with the aid of three convection fans. See [Figure 6-6](#) and [Figure 6-7](#). The right side panel also includes the Lithium backup battery switch and the Software Authorization Unit (SAU) connector. See [Software Authorization Management, page 8-24](#).

**CAUTION!**

*Do not touch the battery switch.*  
*If the battery switch is turned off or the battery is removed, the database memory will be lost.*

Figure 6-6 Left Panel of the IPx Office Main Unit

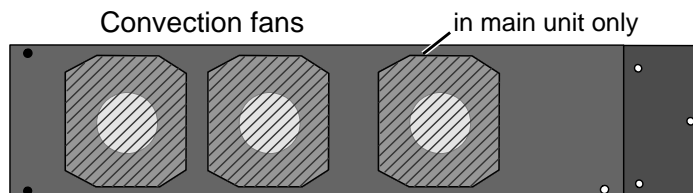
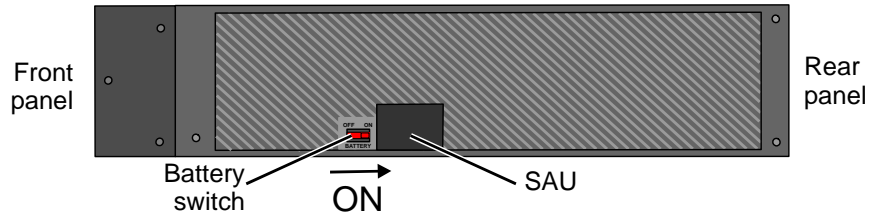


Figure 6-7 **Right Panel of the IPx Office Main Unit**



### *Top Side*

The top side is part of the cover. No space needs to be maintained above the unit cover for maintenance purposes; the IPx Office unit can be positioned directly below other equipment.

### *Bottom Panel*

The bottom panel includes five circular indentations that mark where the five rubber supports are to be affixed when the unit is mounted onto a table. See [Mounting the IPx Office onto a Table, page 2-13](#). No space needs to be maintained beneath the bottom panel; the IPx Office unit can be positioned directly above other equipment.

### *Installation Kit*

The cage is supplied with a kit that includes components for mounting the cage onto a table or a rack. For table-mounted systems, five rubber supports are affixed to the bottom panel of the IPx Office unit. See [Figure 6-1 on page 6-2](#). For more information, see [Mounting the IPx Office onto a Table, page 2-13](#).

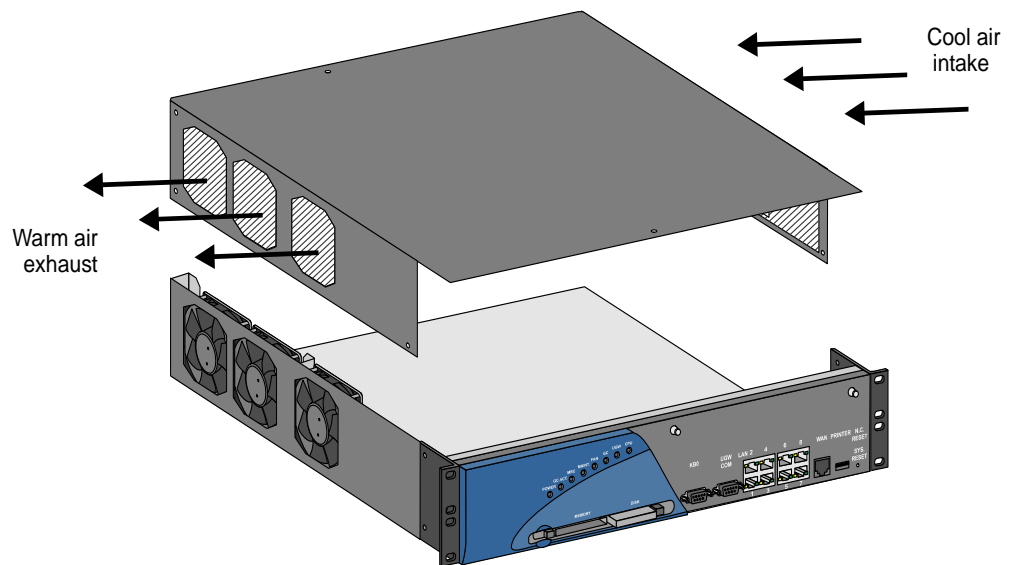
For rack-mounted units, two brackets are attached to the unit cover and the unit itself. The bracket and unit assembly are then attached to the rack. Two additional brackets are mounted onto the rack and provide additional support from below. See [Figure 6-2 on page 6-2](#). For more information, see [Mounting the IPx Office onto a Rack, page 2-14](#).

## Unit Cover

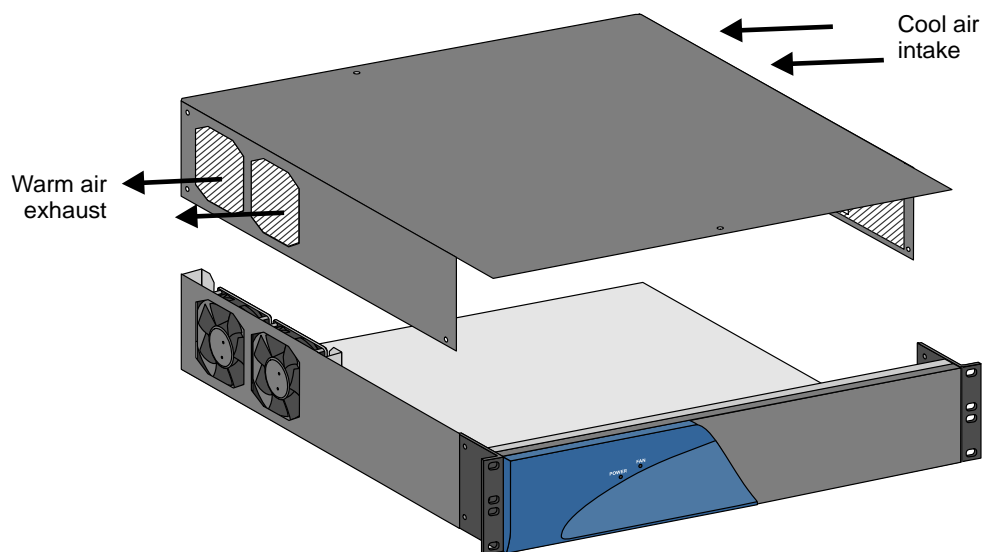
The unit cover protects internal circuitry during normal operation from damage and RFI while still allowing access to the interior for maintenance activities. The cover also enables forced convection cooling of the components. See [Figure 6-8](#). The unit cover includes:

- Ventilation openings on the left and right sides that enable cool air intake from the right panel and warm exhaust air from the left
- Openings for the numerous LEDs and connectors and holes that enable the unit to be attached to the rack

**Figure 6-8 Left View of the IPx Office Main Unit Cover**



**Figure 6-9 Left View of the IPx Office Expansion Unit Cover**



## Opening the Unit Cover

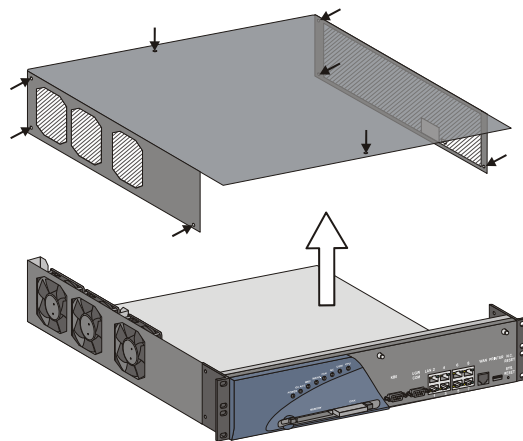
- 1 Verify that the ON/OFF switch on the PS Office unit is turned OFF.
- 2 Remove the AC power cord or DC wires from the PS Office unit.

### **WARNING!**

*Electrical Hazard. Contact with live internal components could cause shock, burn, or death. During system operation, the unit cover must always be closed.*

- 3 Disconnect any cables attached to the front panel.
- 4 Remove the flash card, if installed.
- 5 Remove the compact flash disk, if installed.
- 6 Remove the SAU, if installed.
- 7 Remove the WiFi antennas, if installed.
- 8 Using a Phillips screwdriver, unfasten all of the M3 screws that clamp the cover to the unit.
- 9 Using moderate force, lift the cover from the rear section.
- 10 Remove the cover completely.

Figure 6-10 Removing the Unit Cover

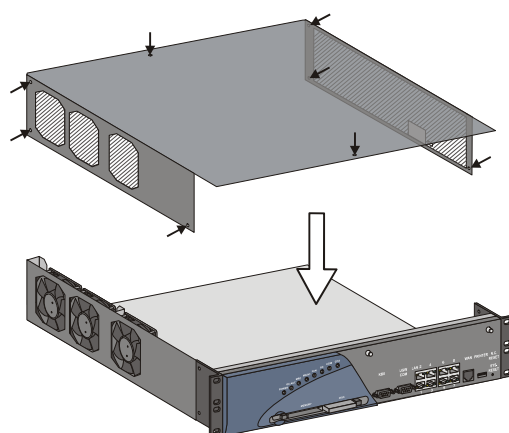


Unfasten all  
8 screws and  
lift cover  
upwards

## *Closing the Unit Cover*

- 1 Verify that all control cards and the NTU Office card are properly installed, that all internal cables are properly connected, and that the NTU Office card ON/OFF switch is turned ON.
- 2 Verify that the internal space within the unit is free of foreign objects.
- 3 Position the internal side of the front panel adjacent to the front side of the IPx Office unit and lift the rear side of the cover upward.
- 4 Close the unit cover.
- 5 Using a Phillips screwdriver, fasten all of the M3 screws.

**Figure 6-11 Closing the Cover**



Place cover  
in position and  
replace all  
8 screws



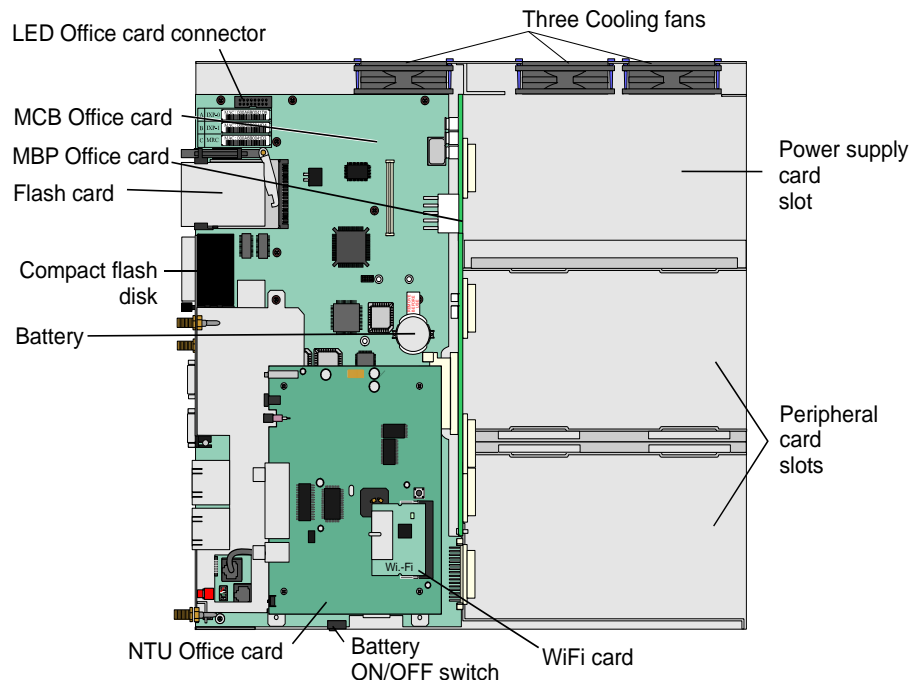
## Unit Interior

The unit interior is different for the main unit and the expansion unit.

### *Main Unit*

The front and rear section of the main unit is displayed in [Figure 6-12](#).

**Figure 6-12 IPx Office  
Main Unit Interior**



The interior of the main unit includes the following:

- Main Control Board (MCB Office)
- LED Office Card connector
- Main BackPlane (MBP)
- Flash (IMC8 or IMC16) Card
- Compact flash disk
- Battery
- NTU Office card
- WiFi card
- Three Cooling fans
- Peripheral card slots
- Power supply card slot

### *MCB Office Card*

The MCB Office card is the main control card of the IPx Office unit. It is attached to on the bottom surface of the IPx Office chassis on the front section and is connected to the MBP Office. The MCB Office integrates MCP, IPI, and GC circuitry and performs HDLC, synchronization. For further information see [MCB Office Card, page 8-5](#).

### *MBP Office Card*

The MBP office card functions as the system backplane, linking all control, peripheral, and resource cards inserted into the slots.

### *IMC8 / IMC16 Flash Card*

The optional IMC8 or IMC16 flash card includes the Coral software. See [Flash Memory Cards - IMC8 and IMC16, page 8-37](#).

### *Compact Flash Disk*

The optional compact flash disk provides backup for applications requiring additional memory. See [DISK - Compact Flash Disk, page 8-45](#).

### *NTU Office Card*

The networking card integrates full networking capabilities within the IPx Office system. For further information, see [Chapter 11, System Networking](#).

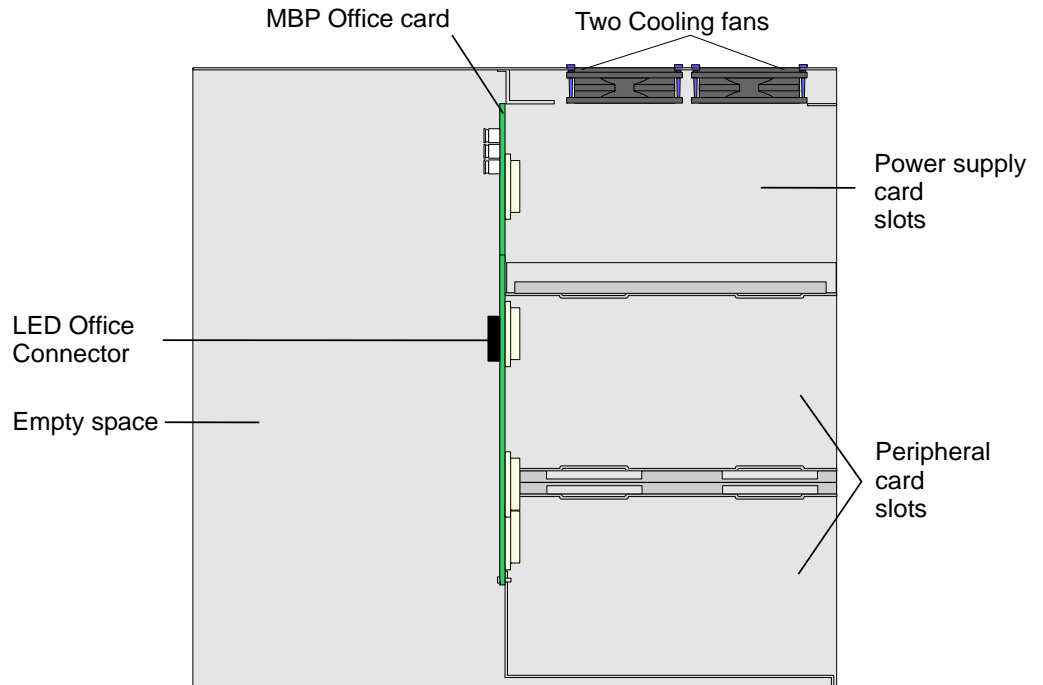
### *WiFi Card*

The WiFi card integrates full WiFi capabilities within the IPx Office system. For further information, see [Chapter 11, System Networking](#).

## Expansion Unit

The front and rear section of the expansion unit is displayed in [Figure 6-13](#). The expansion unit does not include any components in the front section. The LED Office card on the front panel is powered by the EBP (Expansion BackPlane) Office card.

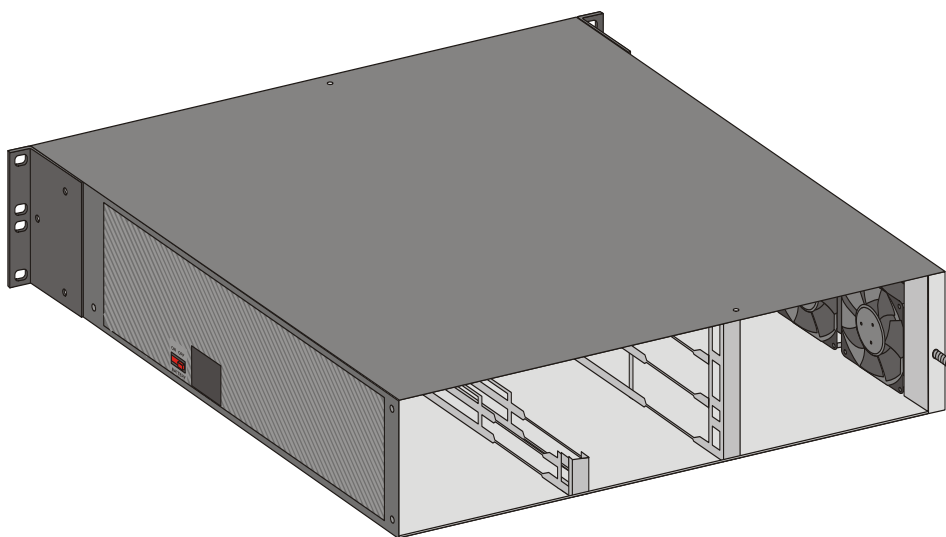
**Figure 6-13 IPx Office Expansion Unit Interior**



## Rear Section

The rear section of the unit interior includes the peripheral card slots and the power supply slot. The slots are aligned horizontally from top to bottom. The top two slots (slot 2-3 and slot 4-5) house full-size cards. A vertical partition is positioned beneath these slots forming an additional three slots (slot 6-7, slot 8-9, and slot 10-11), which are used to house half-sized cards.

**Figure 6-14 IPx Office Rear Section without Cards Installed**



### *Card Slots*

Guides aligned horizontally along the rear section of the IPx Office unit enable the cards to be connected to multi-pin connectors mounted on the MBP Office. The guides and associated connectors comprise a card slot. See [Figure 6-14](#). The connectors provide metallic paths from the cards to the various power and signal buses of the system and for peripheral cards, to the Input/Output (I/O) connectors.

These slots are designated slot 2-3, slot 4-5, slot 6-7, slot 8-9, and slot 10-11, because the Program Interface (PI) recognizes each physical slot as two separate slots for the purpose of system programming.

### *Power Supply Unit*

The IPx Office includes one AC or DC PS Office power supply unit located on the right side of the unit. The power supply unit is attached to the unit with two screws that ensure that the unit is grounded. These power supply units are described in detail in [Chapter 7, Power Supply](#).

---

## *Peripheral Cards*

The IPx Office unit includes five peripheral card slots in the rear section. These card types are described in [Chapter 10, Peripheral Cards](#), and in greater detail in the *Coral Service and Peripheral Card Manual*.

---

## *Configuration Jumpers*

The jumpers of the IPx Office unit that are configured at the customer's site are located in the peripheral cards. For further information, see the *Service and Peripheral Card Installation Manual*.

---

## *I/O Connectors*

Every peripheral card includes an I/O connector to interface with the MDF. The I/O connections for each peripheral card slot are provided directly from the front panel of the card to the MDF. The I/O connectors are either Champ or RJ-45:

- **Champ connectors** include female, 25 pair AMP™ Champ™, or Amphenol® Microribbon® type connectors that appear on the front panel of many peripheral cards (for example, 8SA Office, 16SFT Office, etc.)
- **RJ-45 jacks** are mounted on the front panel of many of the peripheral cards (for example, the 2DT Office, UDT Office, etc.) Mating male RJ-45 connectors should be industry standard.

Refer to the specific card tables in [Chapter 5, External Connections](#) for I/O connector pin assignments.

---

## *Expansion Connector*

The expansion connector is positioned on the ESIM Office card. The IPx Office expansion cable can be connected to an expansion cage only if the ESIM Office card is inserted in slot 8-9. See [IPx Office and IPx Expansion Unit Installation Configurations, page 6-35](#).

---

## *Cage Ground Terminal*

The ground connection is used to connect the cage to the master ground unit. See [Figure 6-14](#) for more details.

---

## *Blank Panels*

Blank panels are used to cover peripheral card slots that are not occupied by a peripheral card. The blank panel covers the slot, blocking the insertion of foreign

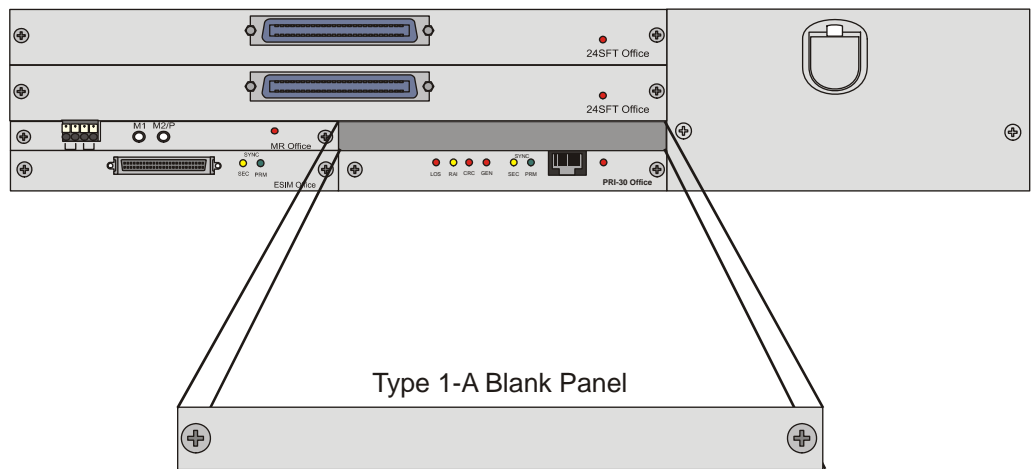
objects into the system, thus preventing inadvertent shock or malfunction. There are four blank panel sizes. See [Table 6-2](#) and [Figure 6-16](#).

**Table 6-2 Blank Panel Description**

| Part Number | Card Type | Card Description                                    |
|-------------|-----------|---|
| 77444000066 | Type II   | Full sized panel used to cover slots 2-3 and 4-5    |
| 77444000067 | Type I-A  | Half-sized panel used to cover slots 6-7 and 10-11* |
| 77444000068 | Type I-B  | Half-sized panel used to cover slot 8-9, 10-11      |
| 77444000069 | Type I-C  | Half-sized panel used to cover slot 10-11           |

\* If either 2DT Office, 4TBR Office, 30T Office, PRI-30 Office, or UDT Office is installed in slot 10-11, blank panel 1-A must cover the opening directly above the installed card. See [Figure 6-15](#).

**Figure 6-15 Type 1-A Blank Panel Used in Slot 10-11**



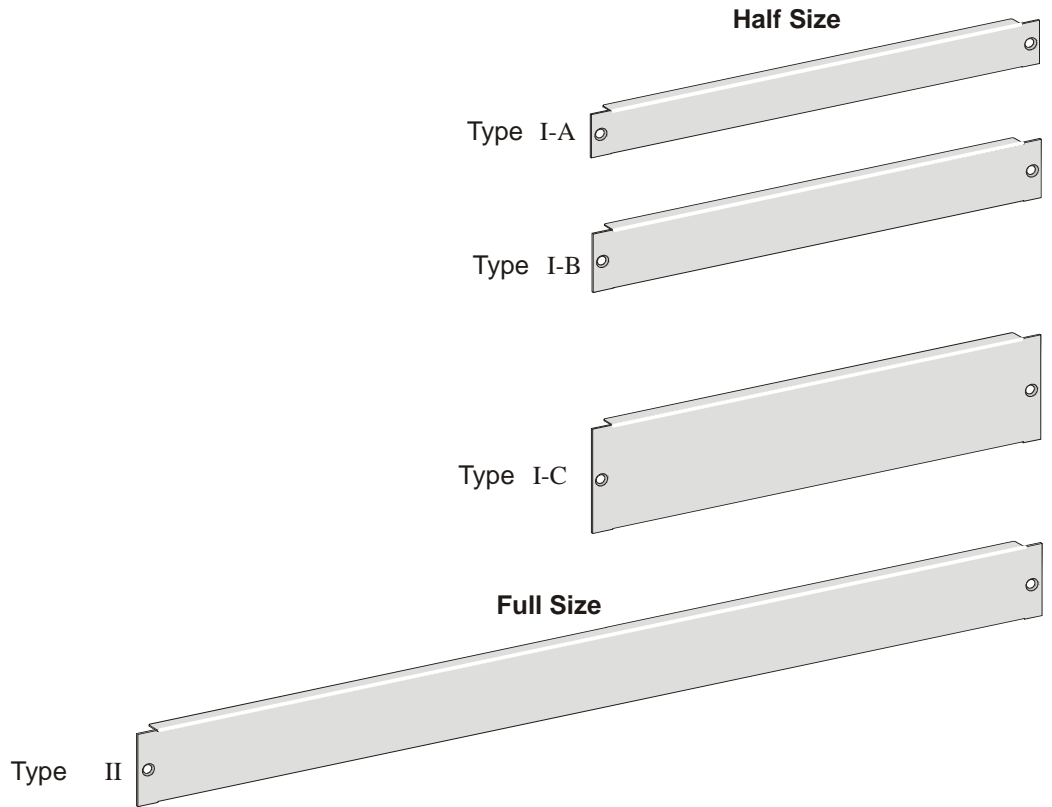
**WARNING!**

*Electrical Hazard. Contact with live internal components could cause shock, burn, or death. During system operation, peripheral card slots that are not occupied must be protected by a blank panel.*

Other disadvantages of not covering an empty slot with a panel, include:

- Rendering the system susceptible to RFI disturbances
- Increasing the risk of damage to the system caused by the influx of electrostatically charged dust and particles
- Poor aesthetic appearance

Figure 6-16 IPx Office  
with Blank Panels



## Heat Removal

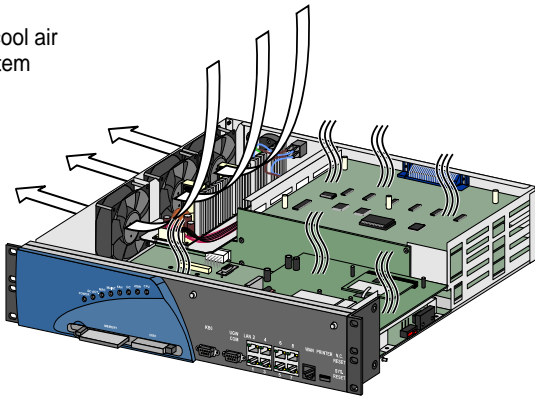
Heat is removed from the IPx Office unit by forced convection. Three DC fans, mounted on the inside of the right panel, draw cool, ambient air from the left side of the unit. The cool air absorbs the heat from the circuitry inside of the unit, and is then expelled through the fans via the right panel. In order for the unit to be cooled effectively, the **cool ambient air must be drawn in from the left panel, only**.

### CAUTION!

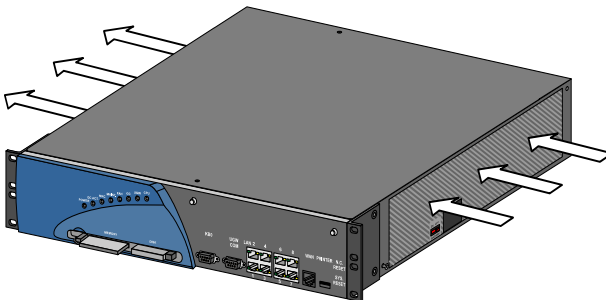
*Operating the IPx Office unit while the cover is not closed will cause the cool air to be drawn into the fans from above, bypassing the internal circuitry of the unit. Heat buildup within the unit could cause damage to the system. Do not operate the unit before closing the cover.*

**Figure 6-17 Heat Flow Schematic in the Main Unit**

Cover open: cool air bypasses system components



Cover closed: cool air is forced over system components





---

## *Cooling Fans*

The unit includes fans mounted inside the left panel of the unit. They draw cool ambient air in from the right panel of the unit that cools the internal components of the IPx Office unit and then expel the warm exhaust air from the left panel of the unit. The fans can be replaced when necessary. The main unit includes three fans; the expansion unit includes two fans.



---

### **NOTE:**

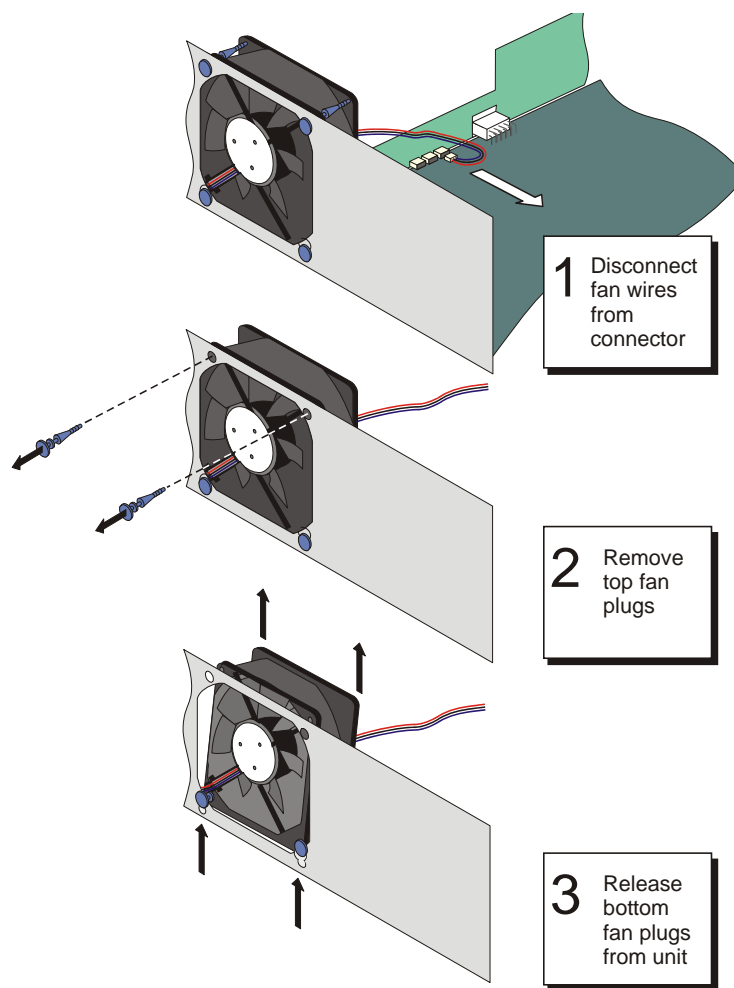
*When one fan needs to be replaced, replace the other fans as well.*

---

## Removing a Fan

- 1 Open the unit cover. See [Figure 6-18](#) and [Opening the Unit Cover, page 6-9](#).
- 2 Remove the fan power wires from its connector on the MBP Office.
- 3 Release the top fan plugs from the fan and the MBP Office, and the bottom fan plugs from the IPx Office unit holes.

Figure 6-18 **Fan Dismounting**



## Installing a New Fan

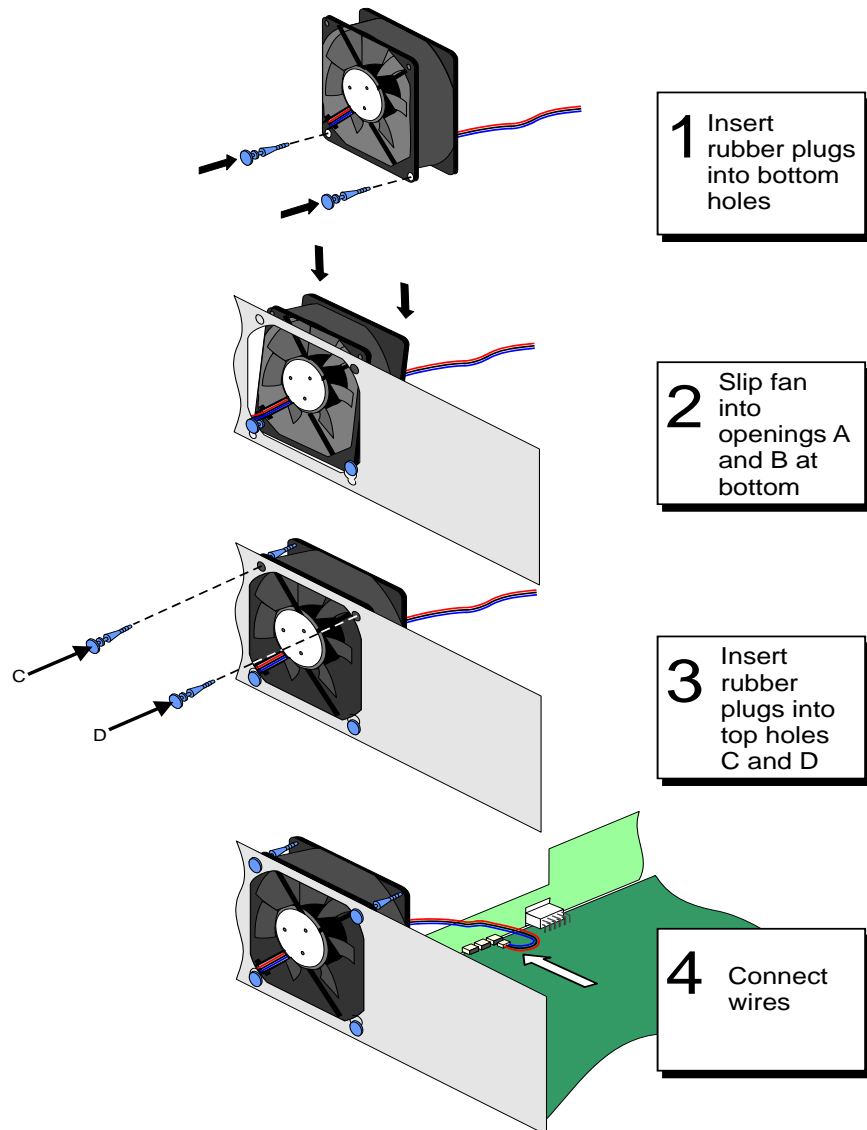
- 1 Insert the rubber plugs into the bottom mounting holes of the fan. See [Figure 6-19](#).
- 2 Slip the fan plug assembly into the mating openings on the unit.
- 3 Insert the top rubber plug through the top holes of the unit into the mounting holes of the fan.
- 4 Connect the fan wires to the receptacle on the MBP Office.



### NOTE:

When one fan needs to be replaced, replace the other fans as well.

Figure 6-19 Fan Installation



## Safety Labels

There are five safety labels located on the IPx Office unit and related equipment: the nameplate label, the SeaMail MAC label, the electrical hazard label, ESD label, and the ground label.

### *Nameplate Label*

The nameplate label provides the product name, the FCC compliance statement and conditions of use, the CE trademark, the safety compliance seal, and the WEEE symbol, indicating the requirement for disposal according to local environmental regulations. See [Figure 6-20](#). This label can vary according to your local regulations. See the compliance statements at the beginning of the manual.

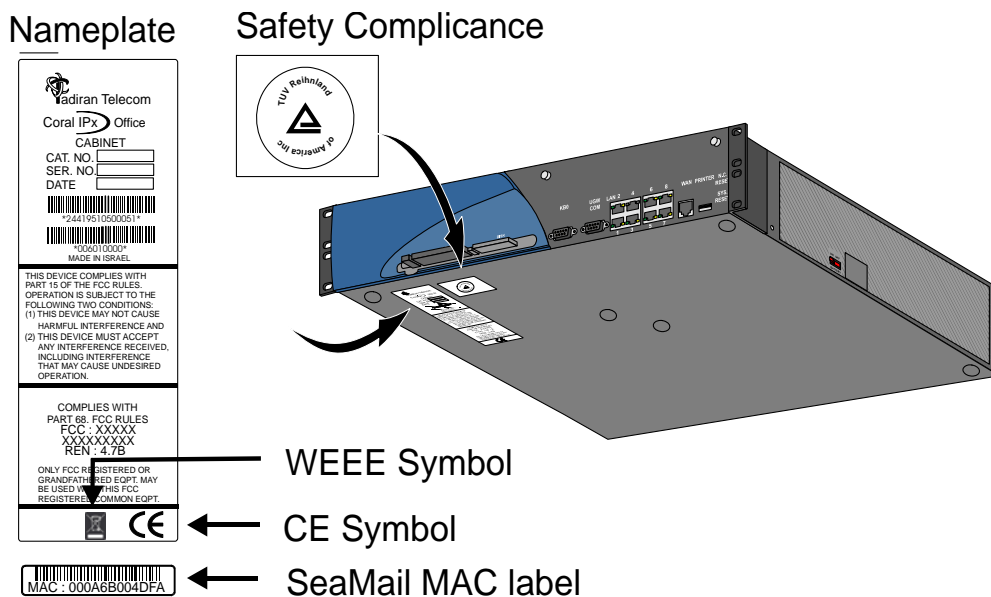
### *Safety Compliance Label*

The safety compliance label includes the seal of the organization that certified that the product has been tested and meets standard safety requirements.

### *SeaMail MAC Address Label*

The MAC address label of the application is affixed below the nameplate label. This SeaMail MAC address is used for application identification purposes and should be safeguarded for possible future use.

Figure 6-20 **Bottom Panel Labels**



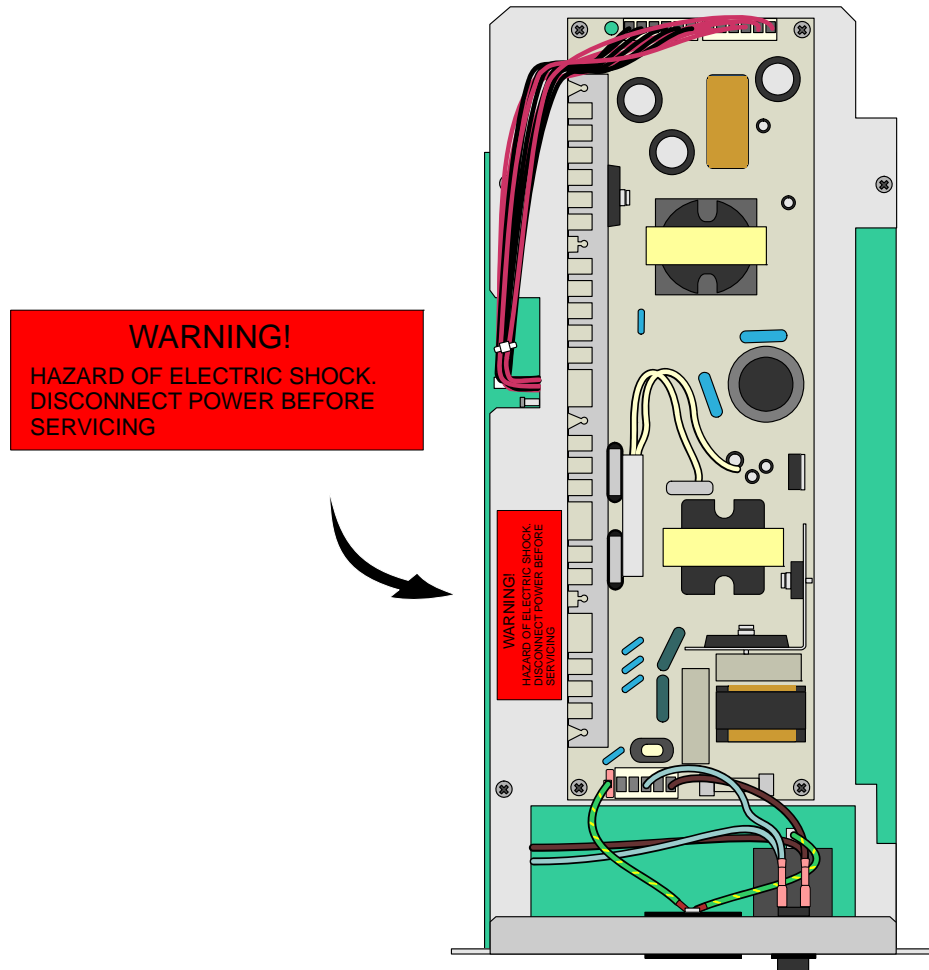
## Electrical Hazard Label

The electrical hazard label is affixed to the internal surface of the power supply unit (AC and DC). It can be viewed only when the power supply is removed from the Coral IPx Office unit. See [Figure 6-21](#).

### **WARNING!**

*Electrical Hazard! High voltages are present that could cause shock, burn, or death. Verify that the power cord or wires have been disconnected AND the ON/OFF switch is turned OFF before removing the power supply unit.*

Figure 6-21 **Electrical Hazard Label**



## ESD Label

An ESD label is located on the unit cover towards the rear panel, above the grounding terminal. See [Figure 6-22](#).



### NOTE:

*The IPx Office unit is not equipped with a Electro-Static Dissipating (ESD) wrist strap. It is the customer's responsibility to provide the ESD wrist strap.*

The ESD wrist strap should be worn while inserting, removing, or handling *any* card in the system. For further information, see [Peripheral Card Installation, page 2-24](#). Each card is shipped inside an anti-static plastic bag. Cards should be kept in this bag whenever handling is not required.

These labels warn the user to connect the static dissipating wrist strap connector to the cage and put on the strap before handling the cards.

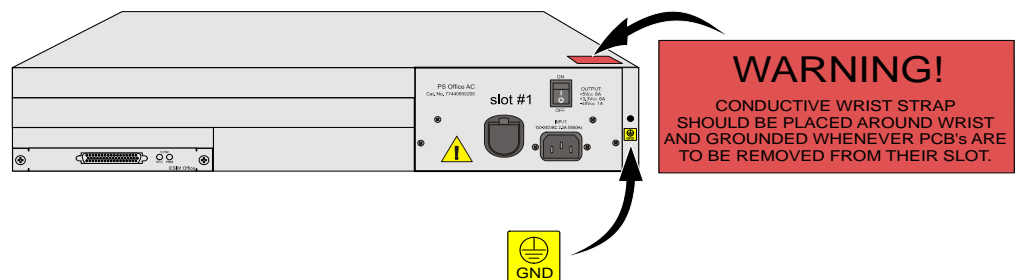
### CAUTION!

*All circuit cards, including Shared Service cards, Common Control cards, and Peripheral cards, contain static-sensitive circuitry and may be damaged or destroyed by Electrostatic Discharge (ESD). Always wear the static dissipating wrist strap connected to the cage while handling circuit cards. See [Figure 6-22](#). Hold circuit cards by their edges and avoid touching contact surfaces. Handle with care and do not drop.*

## Ground Label

The ground label is affixed to the rear side of the unit beneath the ground terminal. This label indicates that only the threaded rod above the label is to be used as a grounding terminal. See [Figure 6-22](#).

Figure 6-22 **ESD and Ground Labels**



## 6.2. System Configuration Options

### IPx Office

#### General Description

This section describes the layout and configuration of the IPx Office system. For a general description of the IPx Office units, see [General System Description, page 6-1](#). For a more detailed description of the FlexiCom 200 CSLX, IPx 500X and IPx 800X expansion cages, see Chapter 6 of the relevant *Installation Procedure and Hardware Reference Manual*.

The IPx Office can operate as a system in any one of the following configurations.

**Table 6-3 IPx Office System Configuration Options**

| System Configuration           |                                | See Figure                               | Min. Coral IPx Software Version |
|--------------------------------|--------------------------------|--|---------------------------------|
| 1 <sup>st</sup> Expansion Cage | 2 <sup>nd</sup> Expansion Cage |  |                                 |
| Main unit only                 | Main unit only                 | <a href="#">Figure 6-23 on page 6-27</a> | 15                              |
| IPx Office/Exp.                | —                              | <a href="#">Figure 6-24 on page 6-28</a> | 15.5                            |
| IPx Office/Exp.                | IPx Office/Exp.                | <a href="#">Figure 6-25 on page 6-27</a> | 15.5                            |
| IPx 500X                       | —                              | <a href="#">Figure 6-26 on page 6-29</a> | 15                              |
| IPx 500X                       | IPx 500X                       | <a href="#">Figure 6-27 on page 6-30</a> | 15                              |
| IPx 500X                       | IPx 800X                       | <a href="#">Figure 6-29 on page 6-32</a> | 15                              |
| IPx 800X                       | —                              | <a href="#">Figure 6-28 on page 6-31</a> | 15                              |
| IPx 800X                       | IPx 800X                       | <a href="#">Figure 6-30 on page 6-33</a> | 15                              |
| FlexiCom 200 CLSX              | —                              | <a href="#">Figure 6-31 on page 6-34</a> | 15.5                            |
| FlexiCom 200 CLSX              | FlexiCom 200 CLSX              | <a href="#">Figure 6-32 on page 6-34</a> | 15.5                            |

The main unit cage includes control cards and peripheral cards.

The expansion cage or cages include peripheral cards.

---

### *Main Unit (IPx Office)*

The IPx Office unit houses the MBP (Main BackPlane) Office, Main Control Board (MCB) Office, the NTU Office card, DataBase Module (DBM-X) card, Software Authorization Unit (SAU), LED Office card, and the Main Resources Card (MRC). In addition, the main unit houses five peripheral card slots and a power supply slot.

---

### *Expansion Unit (IPx Office/EX)*

Requires Software Version 15.5 or higher.

The IPx Office unit houses the EBP (Expansion BackPlane) Office card. The front section of the unit is empty. In addition, the expansion unit houses five peripheral card slots and a power supply slot.

---

### *Expansion Cage (IPx 500X)*

The expansion cage may house 10 universal peripheral special form-factor cards. These card types are described in detail in the *Coral Service and Peripheral Cards Manual*, and [Chapter 10, Peripheral Cards](#). For more detailed information about the expansion cage, refer to Chapter 6 of the *Installation Procedure and Hardware Reference Manual* for the Coral IPx 500 and IPx 800 systems.

---

### *Expansion Cage (IPx 800X)*

One IPx 800X cage may house up to 11 universal peripheral cards. Slot 2 through slot 12 are universal I/O slots, and may house any combination of shared service and peripheral Coral cards. Slot 1 is used to house a shared service card or a PX card. See [PX Card, page 6-50](#).

---

### *Expansion Cage (FlexiCom 200 - CSLX)*

Requires Software Version 15.5 or higher.

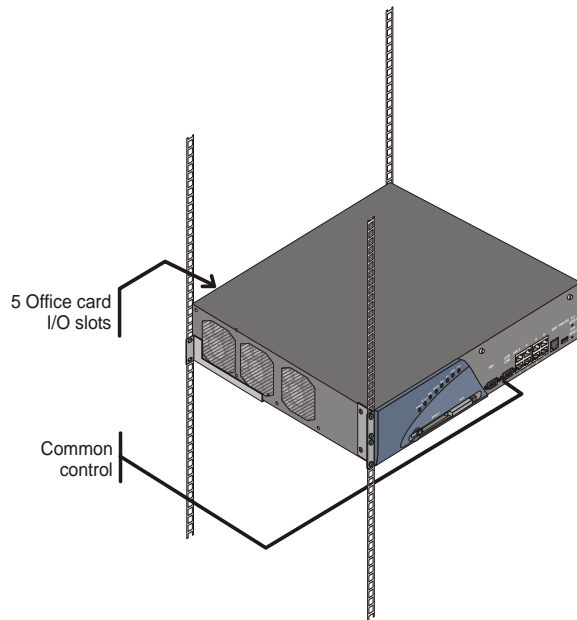
One FlexiCom 200 - CSLX cabinet may house up to six peripheral and shared service cards. Slots 1 and 2, are universal I/O slots. Slot 3 is used to house a shared service card.



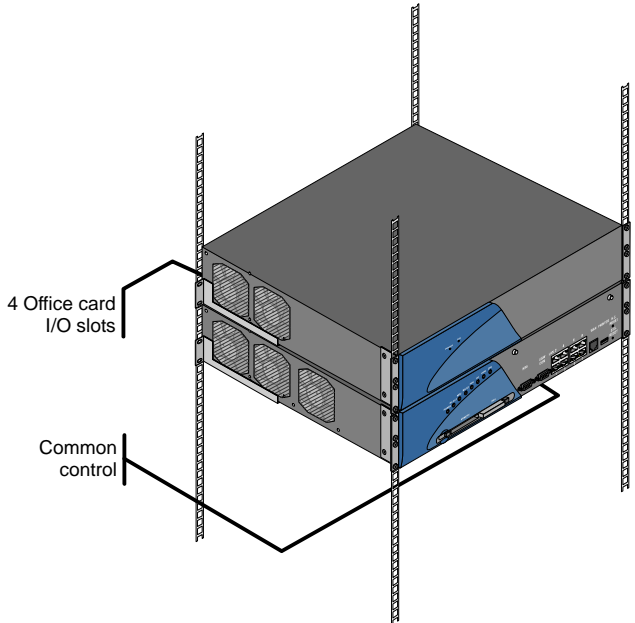
**Table 6-4 Number of Universal I/O Slots per System Configuration**

| System Configuration                 | Main Unit | 1 <sup>st</sup> Expansion Cage | 2 <sup>nd</sup> Expansion Cage | Total System Universal I/O Slots |
|--------------------------------------|-----------|--------------------------------|--------------------------------|----------------------------------|
| Main                                 | 5         | —                              | —                              | 5                                |
| Main + IPx Office EX                 | 4         | 4                              | —                              | 8                                |
| Main + IPx Office EX + IPx Office EX | 4         | 4                              | 4                              | 12                               |
| Main + IPx 500X                      | 4         | 10                             | —                              | 14                               |
| Main + IPx 500X + IPx 500X           | 4         | 10                             | 10                             | 24                               |
| Main + IPx 800X                      | 4         | 11                             | —                              | 15                               |
| Main + IPx 500X + IPx 800X           | 4         | 10 (IPx 500X)                  | 11 (IPx 800X)                  | 25                               |
| Main + IPx 800X + IPx 800X           | 4         | 11                             | 11                             | 26                               |
| Main + F.C. 200 CSLX                 | 4         | 2                              | —                              | 6                                |
| Main + F.C. 200 CSLX + F.C. 200 CSLX | 4         | 2                              | 2                              | 8                                |

**Figure 6-23 System with One Unit (IPx Office)**



**Figure 6-24 System with IPx Office Main Unit and One IPx Office Expansion Unit**



**Figure 6-25 System with IPx Office Main Unit and Two IPx Office Expansion Units**

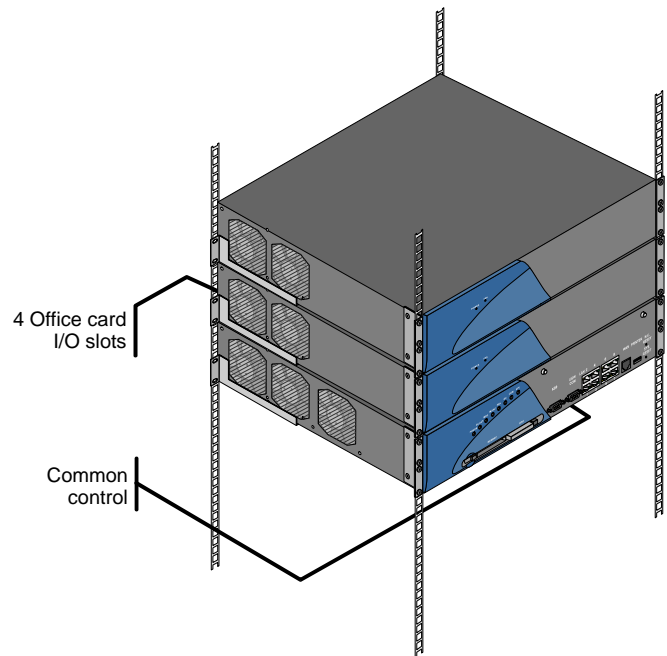


Figure 6-26 System with Two Units (IPx Office and IPx 500X)

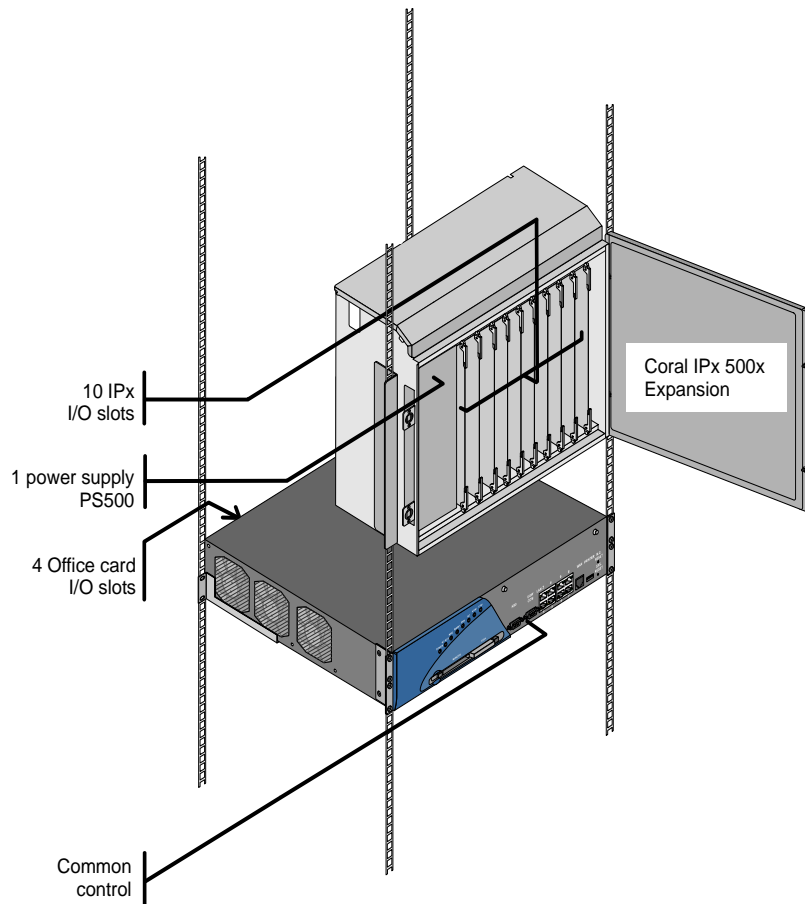


Figure 6-27 System with Three Units (IPx Office and Two IPx 500X Cages)

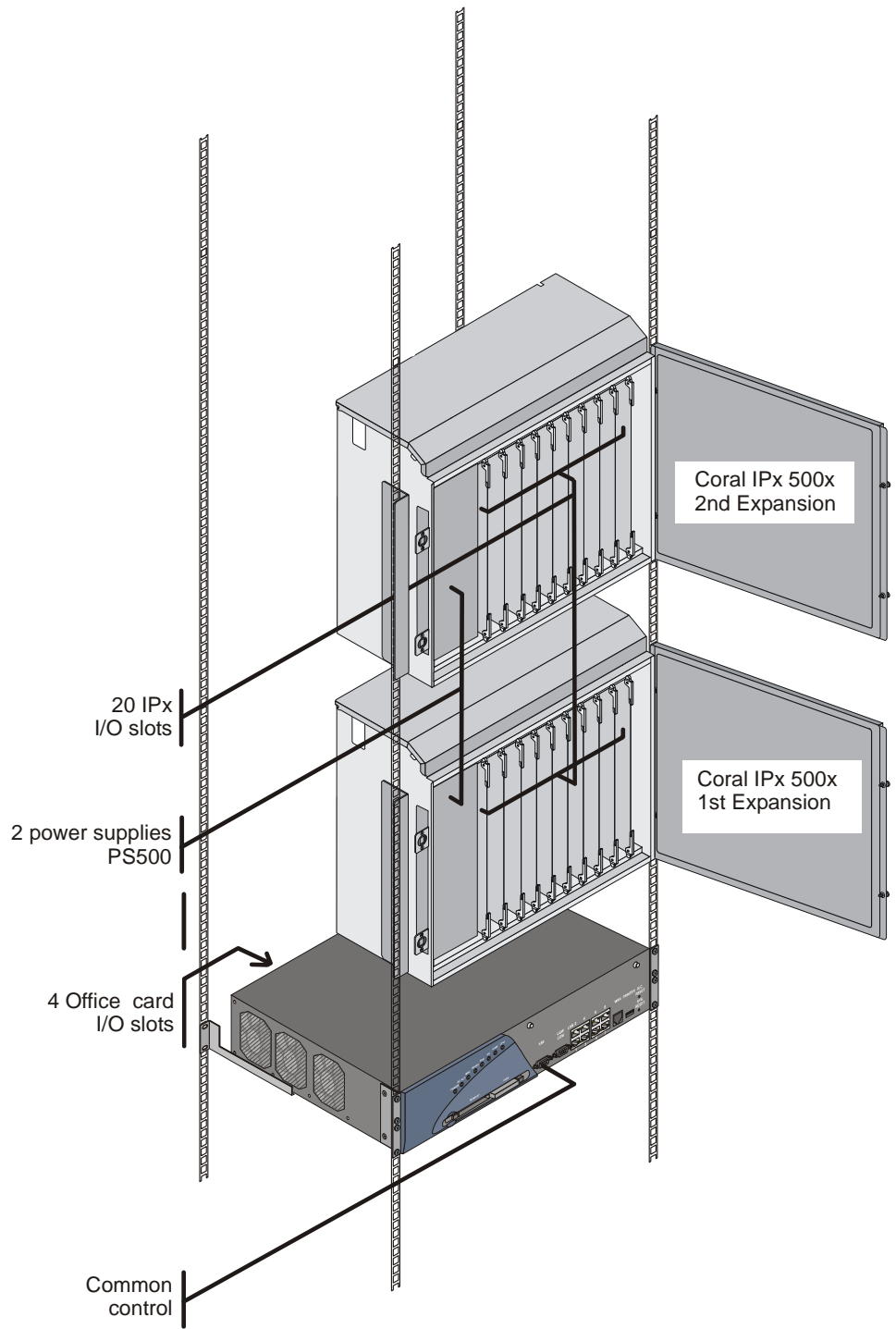


Figure 6-28 System with Two Units IPx Office and IPx 800X)

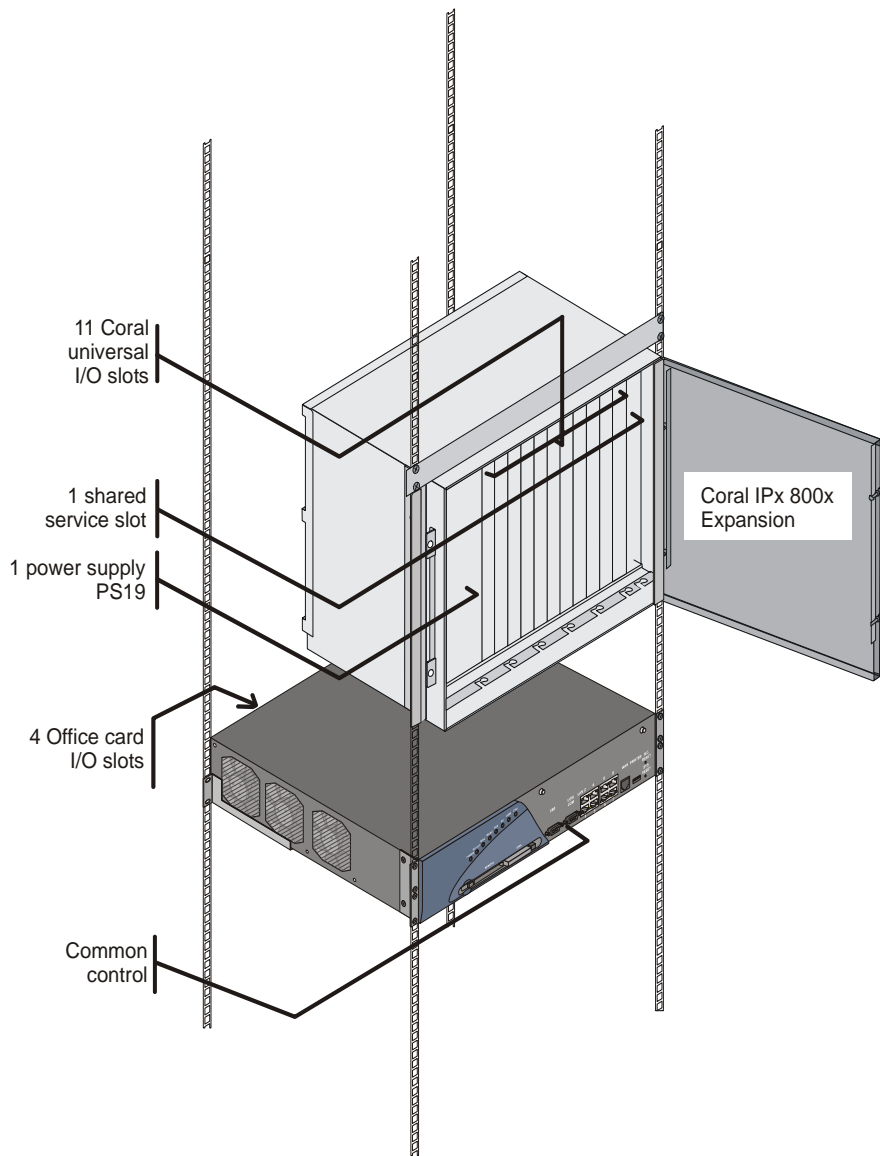
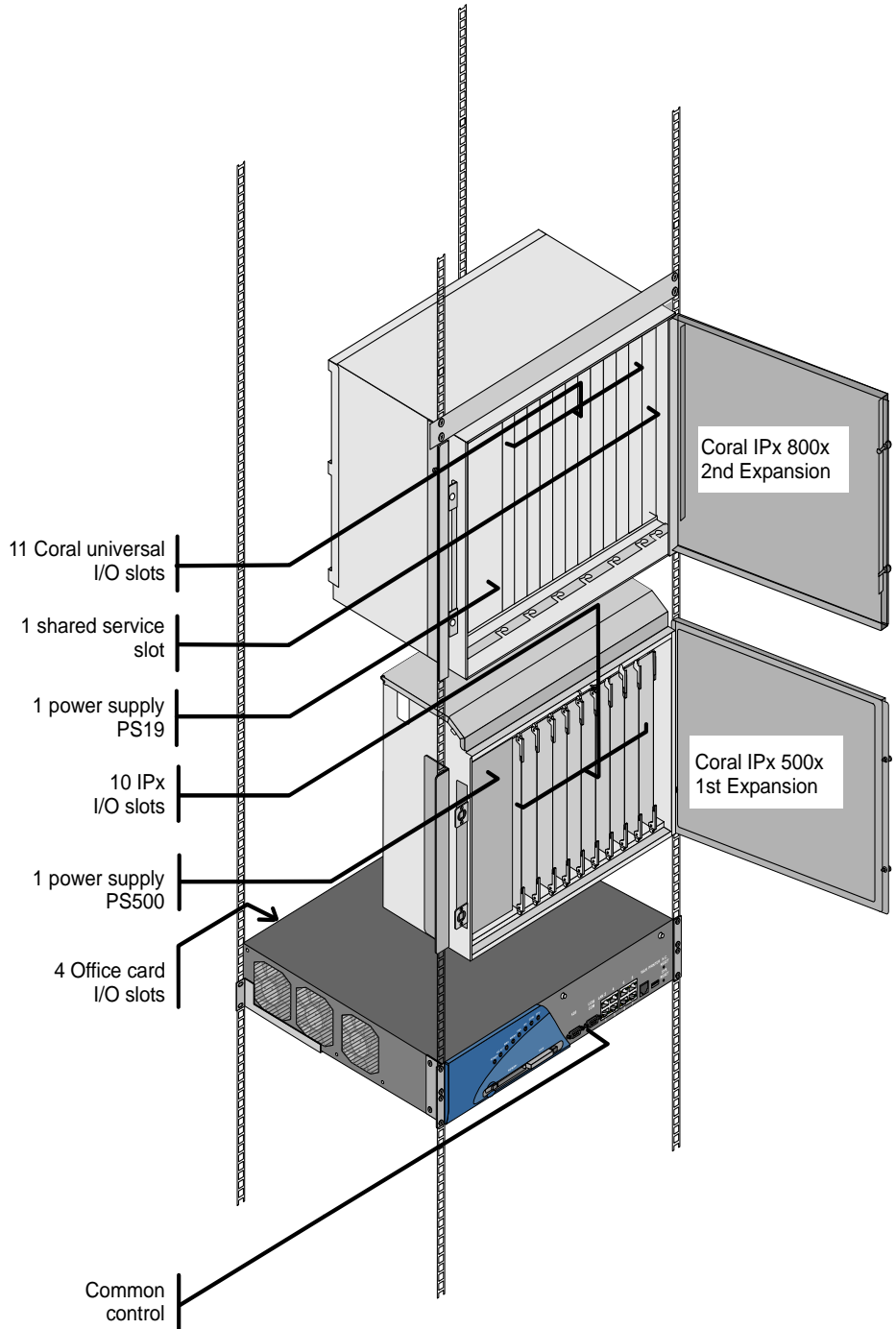
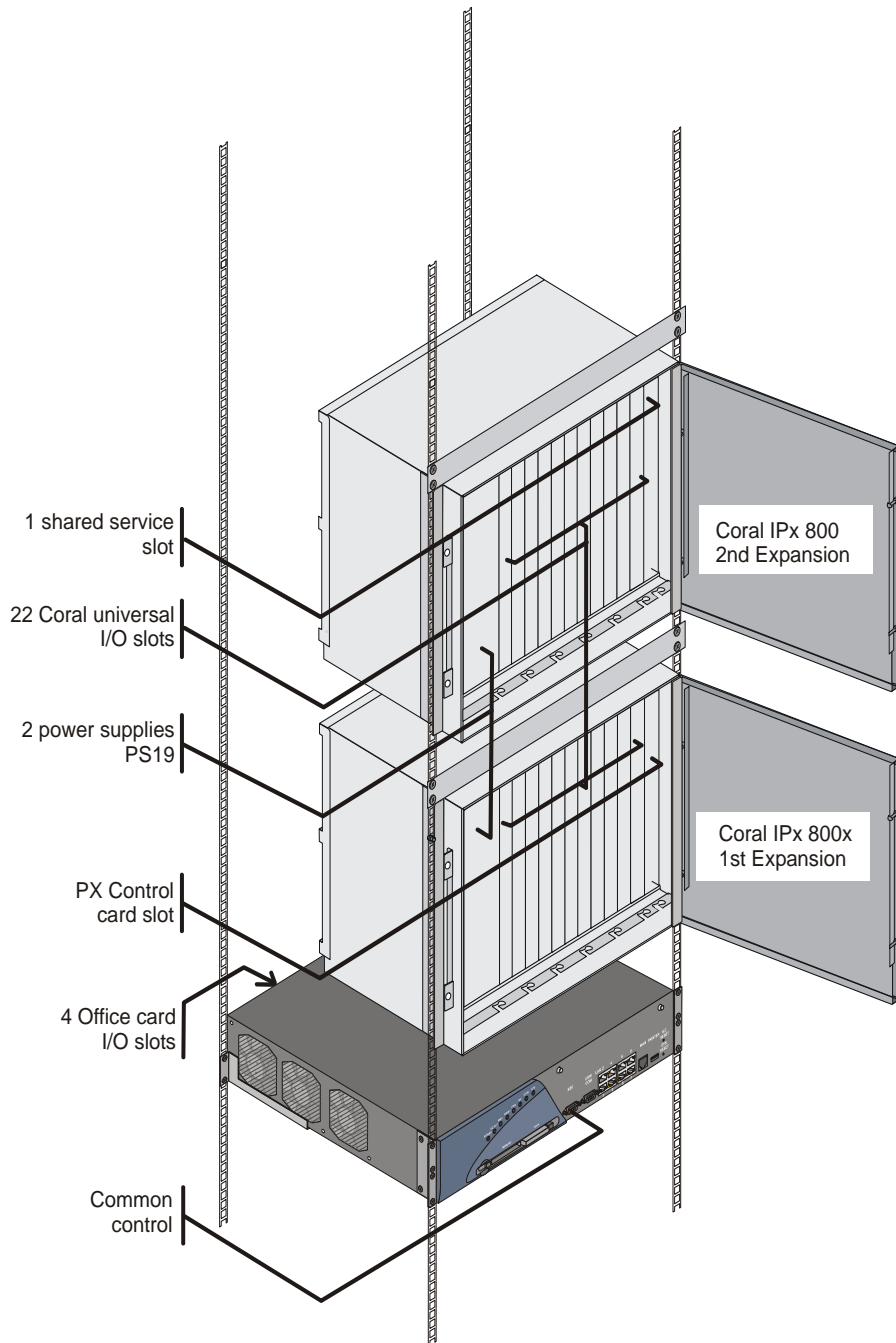


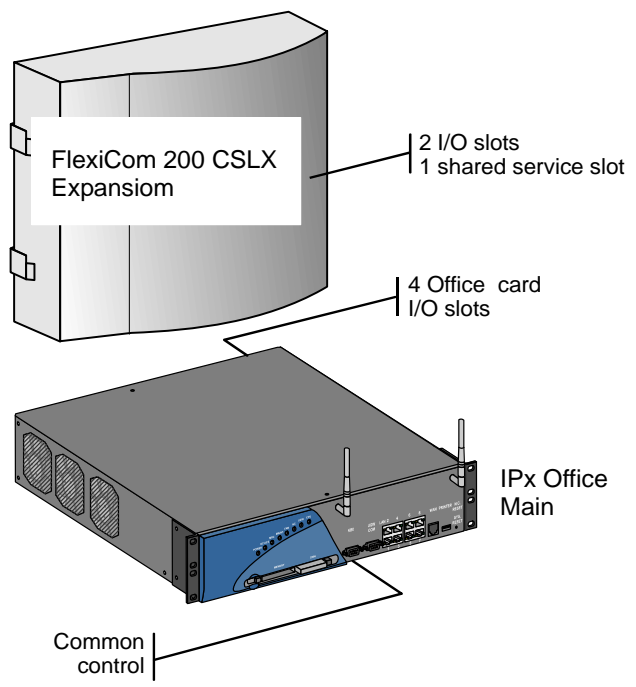
Figure 6-29 System with Three Units (IPx Office, IPx 500X, and IPx 800X)



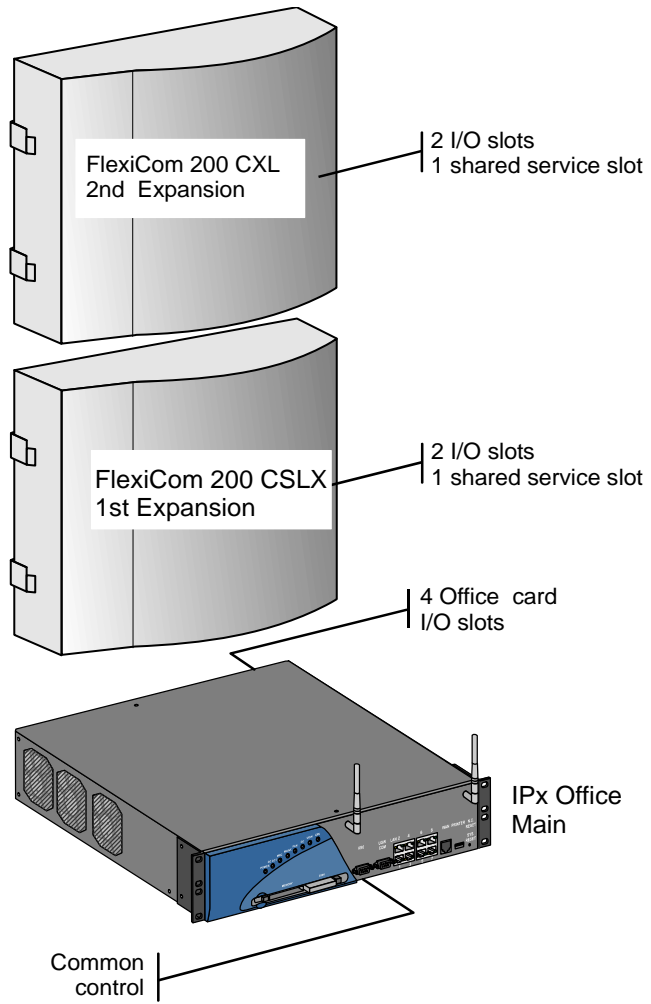
**Figure 6-30 System with Three Units (IPx Office and Two IPx 800X Cages)**



**Figure 6-31 System with Two Units (IPx Office and One FlexiCom 200 Cabinet)**



**Figure 6-32 System with Three Units (IPx Office and Two FlexiCom 200 Cabinets)**





## IPx Office and IPx Expansion Unit Installation Configurations

The IPx Office system can be connected in any one of the following configurations:

**Table 6-5 IPx Office System Expansion Options**

| System Configuration           |                                | See Figure                               | Min. Coral IPx Software Version |
|--------------------------------|--------------------------------|--|---------------------------------|
| 1 <sup>st</sup> Expansion Cage | 2 <sup>nd</sup> Expansion Cage |  |                                 |
| IPx Office/Exp.                | —                              | <a href="#">Figure 6-33 on page 6-37</a> | 15.5                            |
| IPx Office/Exp.                | IPx Office/Exp.                | <a href="#">Figure 6-34 on page 6-37</a> | 15.5                            |
| IPx 500X                       | —                              | <a href="#">Figure 6-35 on page 6-37</a> | 15                              |
| IPx 500X                       | IPx 500X                       | <a href="#">Figure 6-36 on page 6-38</a> | 15                              |
| IPx 500X                       | IPx 800X                       | <a href="#">Figure 6-37 on page 6-38</a> | 15                              |
| IPx 800X                       | —                              | <a href="#">Figure 6-37 on page 6-38</a> | 15                              |
| IPx 800X                       | IPx 800X                       | <a href="#">Figure 6-39 on page 6-40</a> | 15                              |
| FlexiCom 200 CLSX              | —                              | <a href="#">Figure 6-40 on page 6-41</a> | 15.5                            |
| FlexiCom 200 CLSX              | FlexiCom 200 CLSX              | <a href="#">Figure 6-41 on page 6-42</a> | 15.5                            |

The IPx Office main cage and its expansion cages maintain a continuous “conversation”. HDLC and PCM highways, clock and synchronization signals as well as alarms are constantly exchanged between the cages.

All data transfer is carried out via an IPx Office expansion cable. There are two IPx Office expansion cables:

The second IPx Office expansion cable is connected between the IPx Office unit and the first IPx 500X or IPx 800X expansion cage. If an additional expansion cage is connected, an H500-1 cable is connected between the first IPx 500X expansion cage and the second IPx 500X or IPx 800X expansion cage. This IPx Office cable, 47.2" (120 cm) long, is supplied with each ESIM Office card. The cable includes a 50-pin male SCSI pin-type connector that connects to the female connector on the front panel of the ESIM card. The 50-pin, angled, SCSI connector is connected to the first expansion cage.



### **NOTE:**

*IPx Office/EX Expansion units cannot be interconnected in the same system with IPx 500X cages or IPx 800X cages or FlexiCom 200 CSLX cabinets.*

**NOTE:**

---

*FlexiCom 200 CSLX Expansion cabinets cannot be interconnected in the same system with IPx 500X cages or IPx 800X cages or IPx Office/EX units.*

---

**NOTE:**

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*IPx Office/EX and FlexiCom 200 CSLX Expansion cabinets require Coral IPx Office Software Version 15.5 or higher.*

---

Every IPx Office expansion unit houses an ESIX card in slot 6-7. Each ESIX card includes two expansion connectors: one 50-pin, female, pin-type connector and one 50-pin, female, ribbon-type connector.

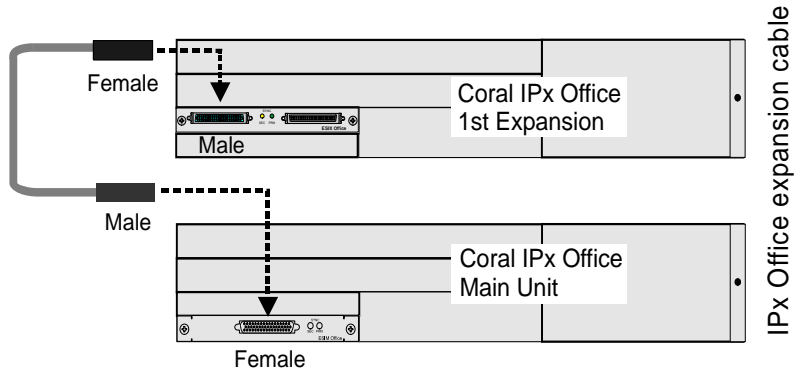
The IPx 500X expansion cage includes two 50-pin connectors: the top connection is female; the bottom connection is male. The top female connection connects the first expansion cage to the second expansion cage. The lower male connection connects either to the female connection on the main cage or to the female connection on the first expansion cage.

The IPx 800X expansion cage includes two 50-pin cable connectors: the lower connection is female; the top connection is male. The lower female connection connects the first expansion cage to the second expansion cage. The top male connection connects either to the female connection on the main cage or to the female connection on the first expansion cage.

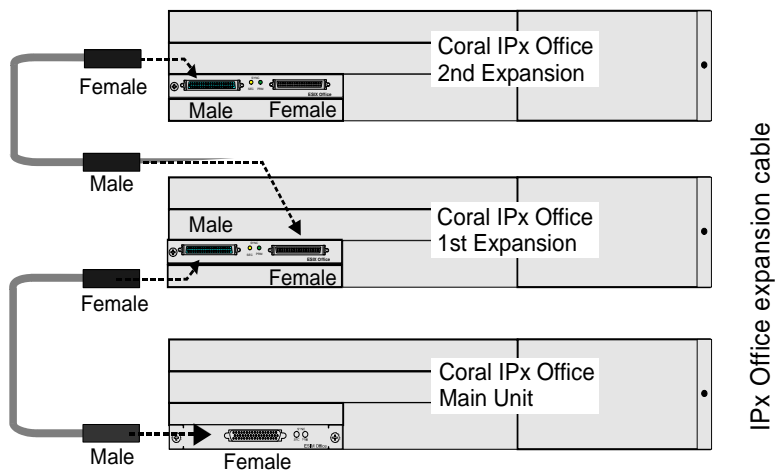
The FlexiCom 200 expansion cabinet includes two 25-pin D-type cable connectors: the connector closest to the front is male; the connector closest to the rear is female. The male connector connects to the main unit or the first expansion cage. The female connector connects to the second expansion cage.

The figures below show how to interconnect the IPx Office main unit with expansion units.

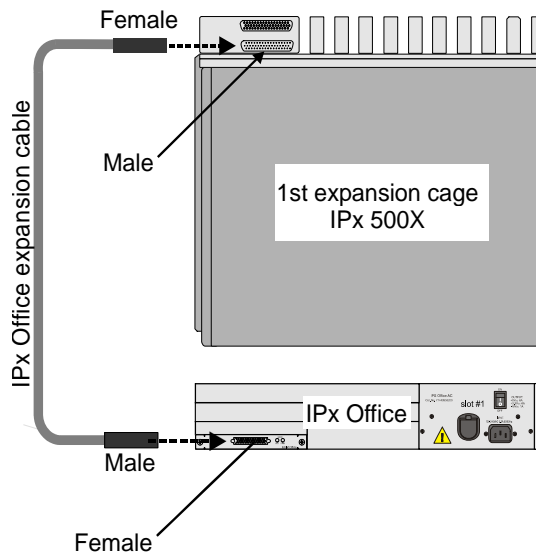
**Figure 6-33 Connection between Two Units**



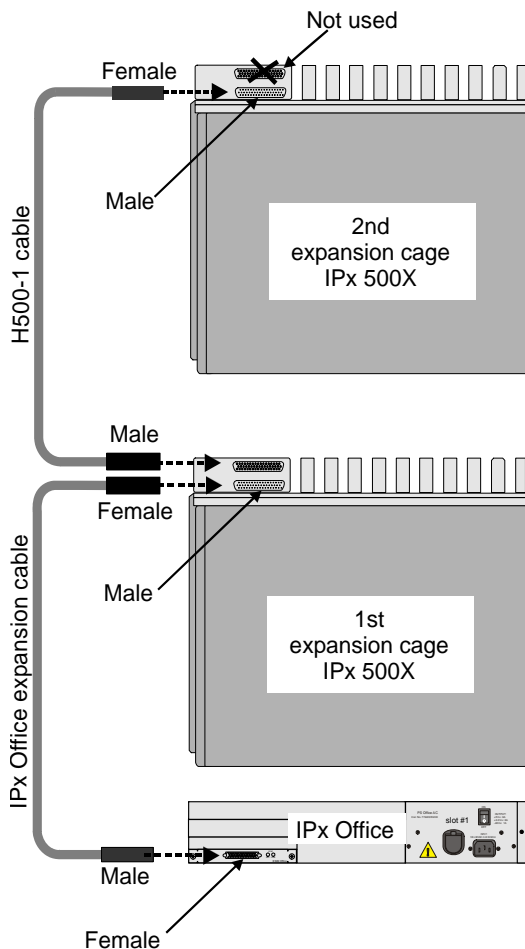
**Figure 6-34 Connection between Three Units**



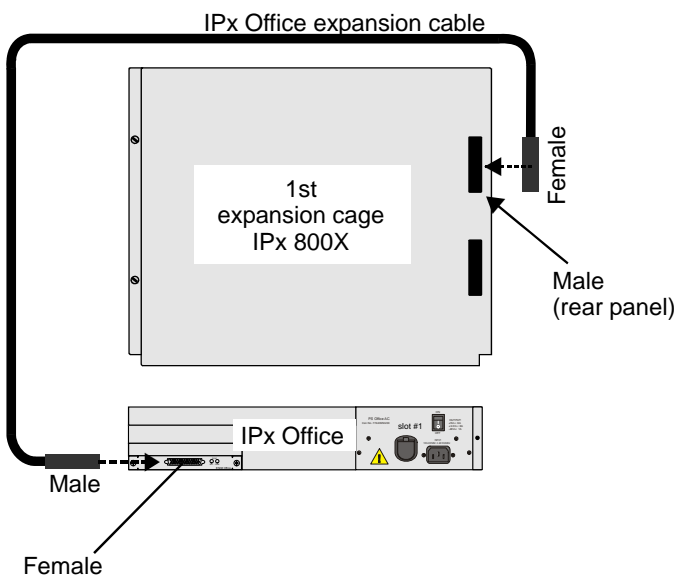
**Figure 6-35 Connection between the IPx Office and 500X**



**Figure 6-36 Connection between the IPx Office unit and two 500X**



**Figure 6-37 Connection between the IPx Office Unit and the 800X Cage**



**Figure 6-38 Connection between the IPx Office Unit, 500X and 800X Cages**

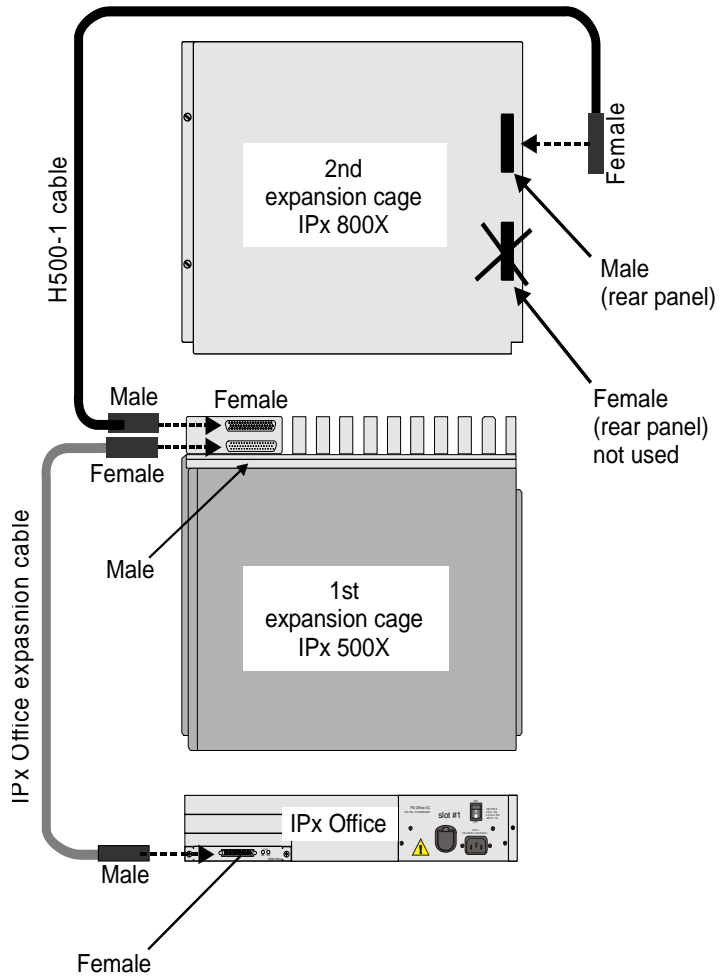
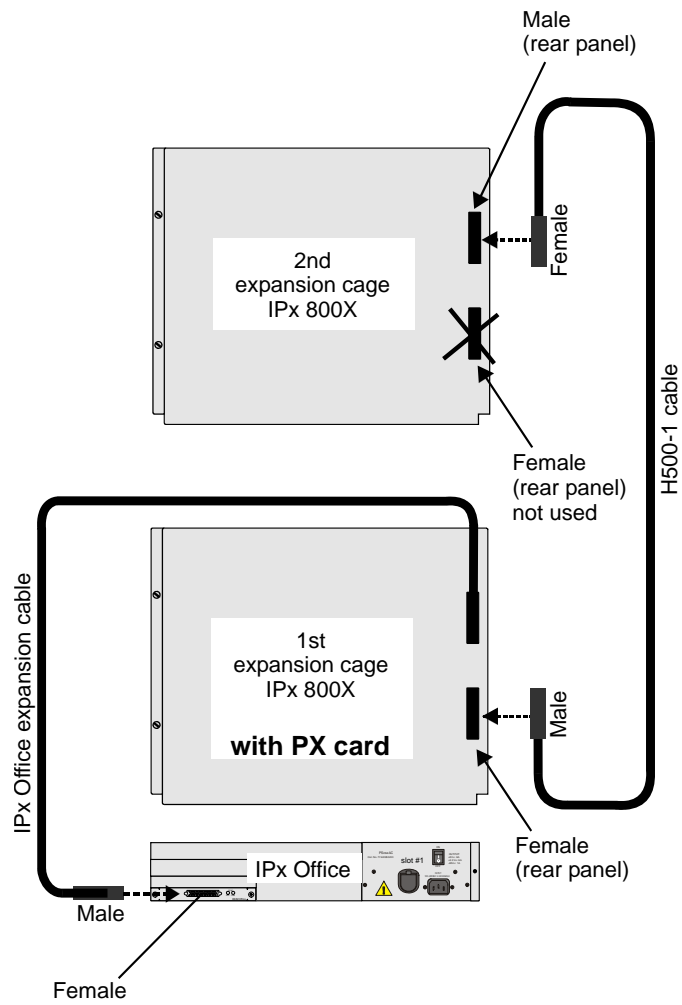
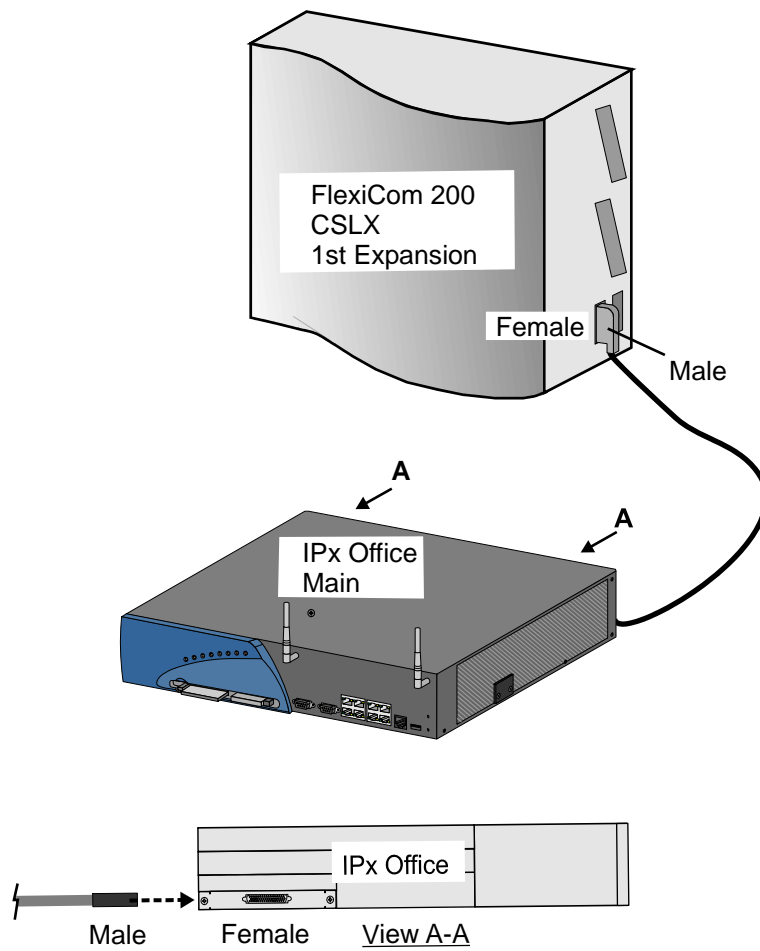


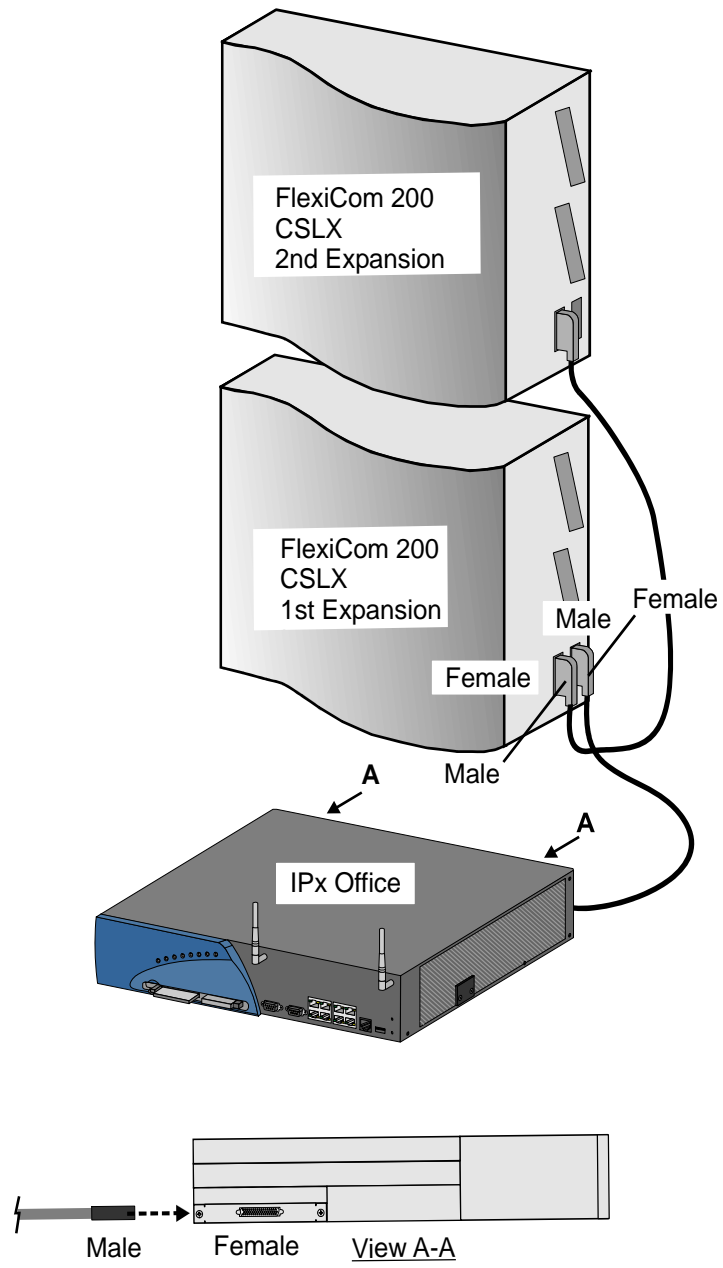
Figure 6-39 Connection between the IPx Office Unit and two 800X Cages



**Figure 6-40 Connection between the IPx Office Unit and One FlexiCom 200 Cabinet**



**Figure 6-41 Connection between the IPx Office Unit and Two FlexiCom 200 Cabinets**





## ● Suggestions for Peripheral Card Distribution

---

### *IPx Office Main Unit*

**The Coral IPx Office main unit is a non-blocking system.** The IPx Office system incorporates 1024X1024 timeslots. The timeslots are distributed as follows: slots 2-3, 4-5, 8-9, and 10-11 share the time slots 0-127 (128 time slots). Slot 6-7 uses time slots 128-255 (128 time slots). See [Table 6-6](#).

**Table 6-6 Timeslot Distribution in Coral IPx Office Main Unit**

| Peripheral Shelf # | Card Slots or Function | Number of Peripheral Card Slots | Number of Timeslots |
|--------------------|------------------------|---------------------------------|---------------------|
| 1                  | 2-3, 4-5, 8-9, 10-11   | 4                               | 128                 |
| 1                  | 6-7                    | 1                               | 128                 |

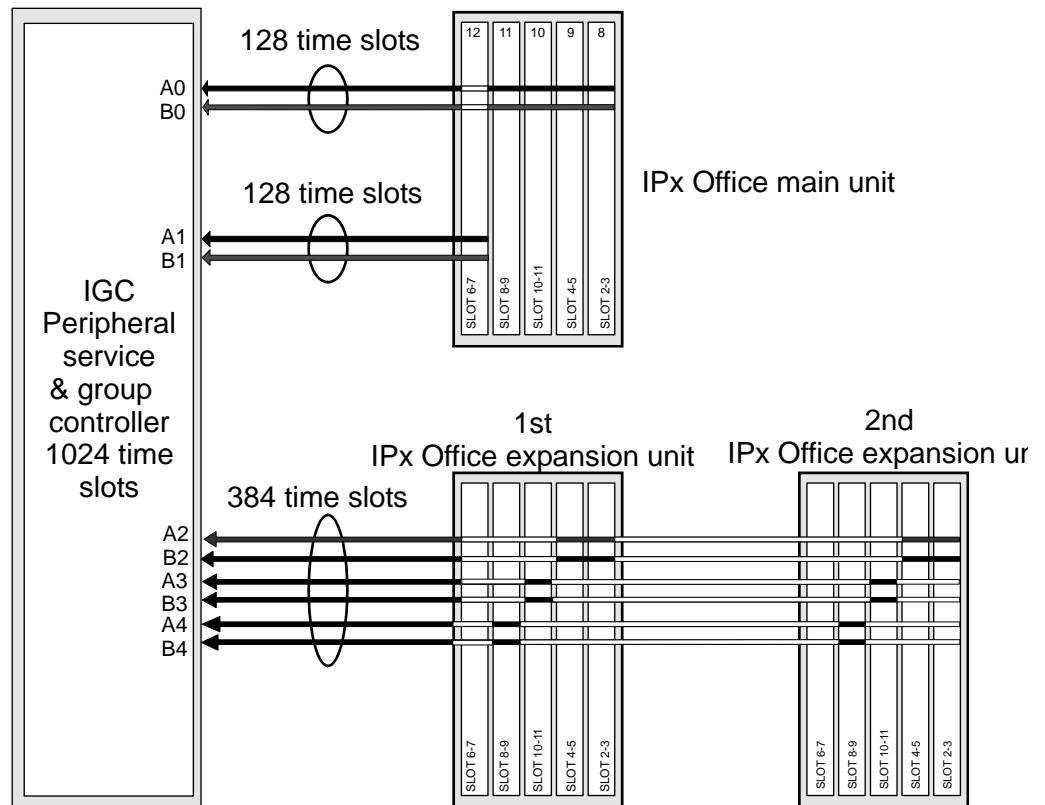
## IPx Office/Ex Expansion Cages

The IPx Office expansion cage shares time slots 256-639 (384 time slots) between a maximum of 4 card slots. Slots 2-3 and 4-5, share 128 time slots. Slots 8-9 share another 128 time slots, and 10-11 share another 128 time slots.

**Table 6-7 Timeslot Distribution in Coral IPx Office Expansion Unit**

| Peripheral Shelf # | Card Slots or Function | Number of Peripheral Card Slots | Number of Timeslots |
|--------------------|------------------------|---------------------------------|---------------------|
| 2 or 3             | 2-3 and 4-5            | 2                               | 128                 |
| 2 or 3             | 8-9                    | 1                               | 128                 |
| 2 or 3             | 10-11                  | 1                               | 128                 |

**Figure 6-42 PCM Timeslot Distribution with IPx Office Expansion Units Installed**



## IPx 500X/800X Expansion Cages

Both IPx 500X and/or IPx 800X cages share time slots 256-639 (384 time slots) between a maximum of 24 card slots. The timeslots are evenly divided to three groups of 128 timeslots and distributed between *slot sets*, as detailed in [Table 6-8](#). Therefore, slots 1-4 share 128 timeslots, slots 5-8 share 128 timeslots, and slots 9-10 in IPx 500X or slots 9-12 in IPx 800X share an additional 128 timeslots. [Figure 6-43](#) illustrates the distribution of PCM highways in Coral IPx Office systems. To ensure efficient use of timeslots of the IPx 500X and IPx 800X expansion cages, *heavy consumer cards* (cards with a large number of ports: 30T, T1, PRI-30, PRI-23, or PUGW with MRC-32 or MRC-64 units) should be distributed evenly among the slot sets, i.e. one heavy consumer card per slot set. The least blocking sets are the ones that have the highest ratio of **Number of Timeslots to Number of Peripheral Card Slots**.

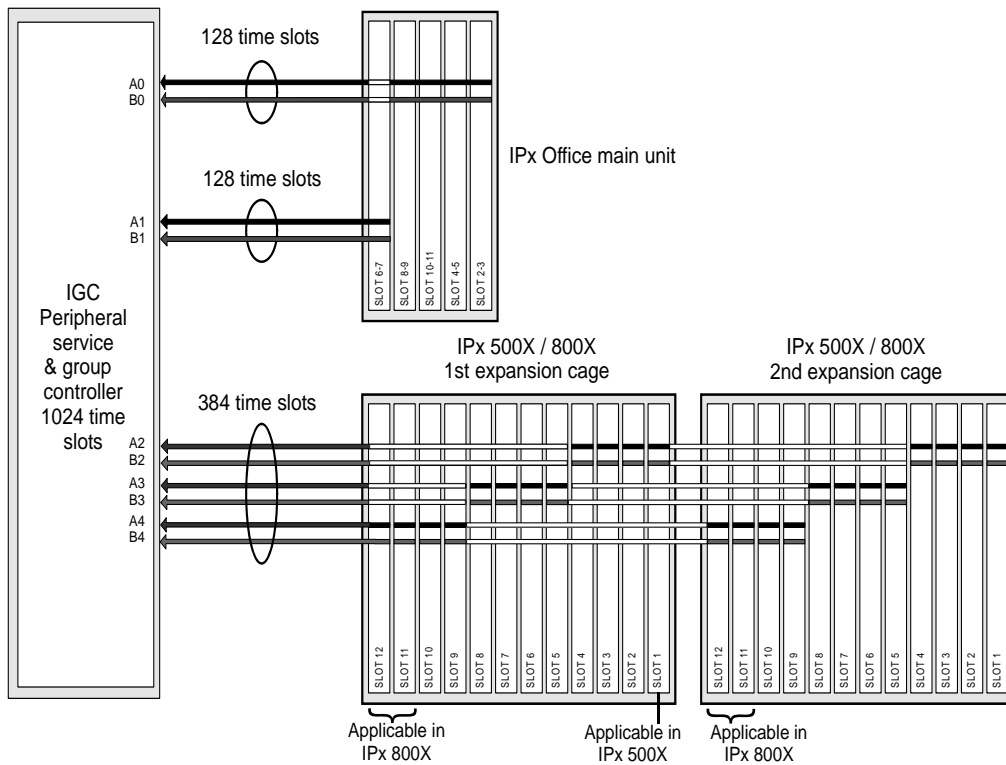
### Example:

*If three PRI-30 cards are installed, it is recommended that one of them be installed in any one of slots 1-4, the second card in any one of slots 5-8, and the last card in any one of slots 9-10 in IPx 500X or slots 9-12 in IPx 800X.*

**Table 6-8 Timeslot Distribution in IPx 500/800 Expansion Cages**

| Expansion Shelf # | Card Slots   | Number of Peripheral Card Slots                  | Number of Timeslots |
|-------------------|--|--|---------------------|
| 2, 3              | 1, 2, 3, 4   | 4 slots  | 128                 |
| 2, 3              | 5, 6, 7, 8   | 4 slots  | 128                 |
| 2, 3              | 9, 10 (for IPx 500X)<br>9, 10, 11, 12 (for IPx 800X) | 2 slots (for IPx 500X)<br>4 slots (for IPx 800X) | 128                 |

**Figure 6-43 PCM Timeslot Distribution with IPx 500X/800X Cages Installed**



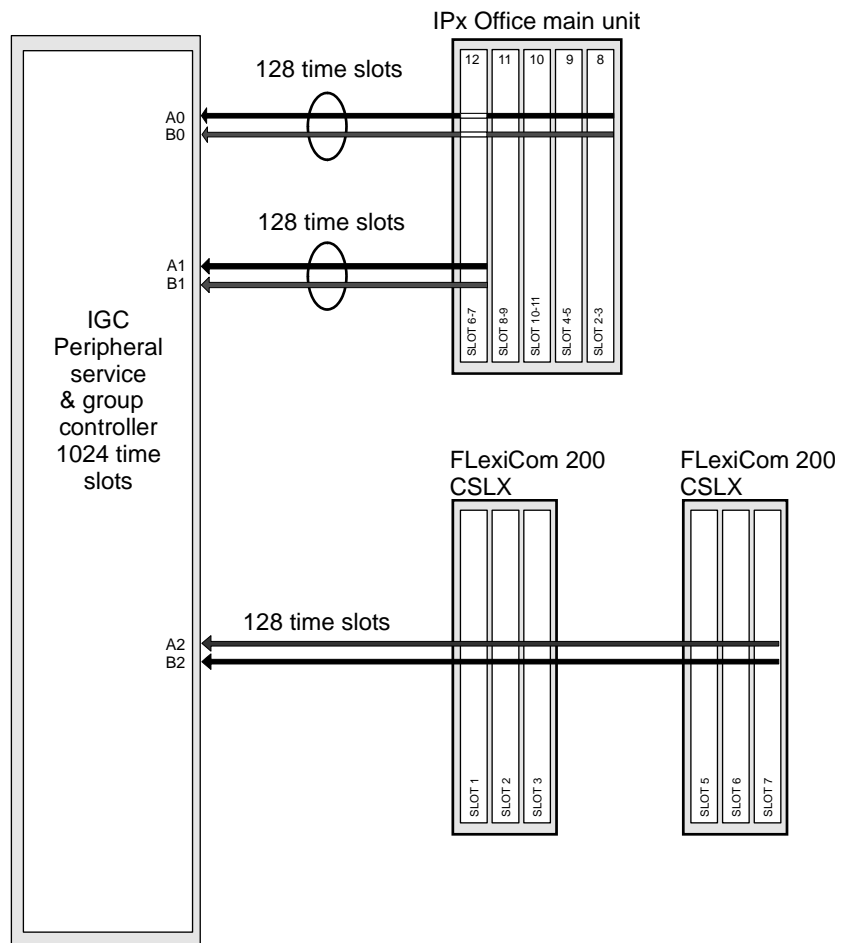
## FlexiCom 200 (CSLX) Expansion Cabinets

Both FlexiCom 200 cabinets share time slots 256-384 (128 time slots) between a maximum of six card slots. The timeslots are detailed in [Table 6-9](#). [Figure 6-44](#) illustrates the distribution of PCM highways in Coral IPx Office systems.

**Table 6-9 Timeslot Distribution in IPx 500/800 Expansion Cages**

| Expansion Shelf # | Card Slots       | Number of Peripheral Card Slots | Number of Timeslots |
|-------------------|------------------|---------------------------------|---------------------|
| 2, 3              | 1, 2, 3, 5, 6, 7 | 6 slots                         | 128                 |

**Figure 6-44 PCM Timeslot Distribution with FlexiCom 200 CSLX Cabinets Installed**



## Optional Coral IPx 500X Expansion Cage

---

### *General*

The Coral IPx 500X expansion cage is a small, rack or wall-mounted extension to the IPx Office, Coral IPx 500M or Coral IPx 800M cage. It supports any of the Coral IPx 500 family peripheral cards. Any combination of up to two IPx 500X and IPx 800X expansion cages can be connected to one IPx Office unit. The key features of the IPx 500X cage capacity and functions are described below.

### *Card Slots*

One IPx 500X cage may house ten peripheral special form-factor “ipx” cards. These card types are described in detail in *Chapter 10* of the *Coral IPx 500 Hardware and Installation Manual*.

### *Port Capacity*

One IPx 500X cage supports up to 240 combined trunk and wired station ports.

### *Power Supply*

The expansion unit is compatible with 48VDC or 115/230VAC power. The expansion cage is either powered by the PS500 AC or PS500 DC power supply unit. There is also an option to install a backup battery for the IPx 500X cage. This battery pack, known as the BATTipx, can be ordered at specific customer request.

### *MDFipx*

An MDF may be supplied with the IPx 500X cage at specific customer request. Whenever an MDFipx unit is included with an IPx 500X cage, it can function as a master ground and be connected directly to the building master ground. For further information, see *Chapter 6* of the *Coral IPx 500 Installation Procedure and Hardware Reference Manual*.

### *Setting the Configuration Jumpers*

For information on setting the configuration jumpers on Coral IPx 500X cages, refer to the *Coral IPx 500 Installation Manual, Section 6.3*.

### *Connecting the IPx 500X Cage to the IPx Office Unit*

All IPx Office and IPx 500 cages are interconnected with an IPx Office expansion cable.

For systems that include one IPx 500X cage and one IPx 800X cage, always connect the IPx 500X cage directly to the IPx Office unit. If an IPx 800X cage is installed between the IPx Office unit and an IPx 500X cage, a PX card will have to be installed in slot 1 of the IPx 800X cage. This slot could otherwise be used for a service card.

---

### *Related Documentation*

- Coral IPx 500 Hardware and Installation Manual
- Coral FlexiCom and IPx Product Description

## Optional Coral IPx 800X Expansion Cage

---

### *General*

The Coral IPx 800X expansion cage is a small, rack-mounted extension to the IPx Office, IPx 800M, or Coral IPx 500M cage. It supports any of the FlexiCom 300,400,5000,6000 and IPx 800,3000,4000 family standard shared service and peripheral cards (iDSP, 8DRCM-2, 24SLS, 24SFT, 2DT, etc.). Any combination of up to two IPx 500X and IPx 800X expansion cages can be connected to one IPx Office unit. The key features of the IPx 800X cage capacity and functions are described below.

### *Card Slots*

One IPx 800X cage can hold up to twelve cards. Slot 2 through slot 12 are universal I/O slots, and may house any combination of shared service and peripheral cards. Slot 1 is used either to house a shared service card if there is only one expansion cage in the system, or a PX card if the IPx 800X cage supports a second expansion cage. These card types are described in detail in the *Coral Service and Peripheral Cards Manual*.

### *Port Capacity*

One IPx 800X cage supports up to 264 combined trunk and wired station ports.

### *Power Supply*

The expansion unit is compatible with 48VDC or 115/230VAC power. The expansion cage is either powered by the PS19 AC, PS19 DC, or PS19 DC-D power supply unit. There is no option to install a backup battery for the IPx 800X cage.

### *PX Card*

The PX (Peripheral eXpansion) buffer card occupies slot 1 of the first IPx 800X expansion cage in an IPx Office+IPx 800X+IPx 800X system configuration.



---

## *When an IPx 800X Expansion Cage is Used in an IPx Office System*

There are situations where it is worthwhile to include an IPx 800X cage in an IPx Office system:

- To allow the use of Coral features not supported by IPx Office unit interface cards (XXX Office), such as iDSP, 8DRCM-2, magneto stations (8SM), Long Loop SLT, VIC, etc.
- To allow the use of IPx 800X cages or standard CORAL cards that are already in stock.
- See [Additional Shared Service Cards in the Expansion Cages, page 9-3](#).

---

## *Setting the Configuration Jumpers*

For information on setting the configuration jumpers on Coral IPx 800X cages, refer to the *Coral IPx 800 Installation Manual, Chapter 6*.

---

## *Connecting the IPx 800X Cage to the IPx Office Unit*

All IPx Office units and IPx 800 cages are interconnected with an IPx Office expansion cable.

For systems that include one IPx 500X cage and one IPx 800X cage, always connect the IPx 500X cage directly to the IPx Office unit. If an IPx 800X cage is installed between the IPx 500M cage and an IPx 500X cage, a PX card will have to be installed in slot 1 of the IPx 800X cage. This slot could otherwise be used for a service card.

---

## *Related Documentation*

- Coral IPx 500 Installation Procedure and Hardware Reference Manual
- Coral IPx 800 Installation Procedure and Hardware Reference Manual
- Coral FlexiCom and IPx Product Description

## Optional Coral FlexiCom 200 CSLX Expansion Cage

---



### NOTE:

*FlexiCom 200 CSLX Expansion cabinets require Coral IPx Office Software Version 15.5 or higher.*

---

### General

The Coral FlexiCom 200 CSLX expansion cage is a small wall-mounted extension to the IPx Office unit or Coral FlexiCom 200 base cabinet. It supports any of the Coral peripheral cards. Up to two FlexiCom 200 CSLX expansion cabinets can be connected to one IPx Office unit. The key features of the FlexiCom 200 CSLX expansion cabinet capacity and functions are described below.

### Card Slots

One FlexiCom 200 CSLX expansion cabinet may house three peripheral special form-factor Coral cards.

These card types are described in detail in *Chapter 10* of the *Coral Service and Peripheral Card Installation Manual*.

### Port Capacity

One FlexiCom 200 CSLX expansion cabinet supports up to 90 combined trunk and wired station ports.

### Power Supply

The expansion cabinet is compatible with 115/230VAC power. The expansion cabinet is powered by the APSsl power supply unit. There is also an option to install a battery backup pack at specific customer request. In addition, certain situations require a RNGslx ringer power supply when certain cards are installed. For further information, see *Chapter 7* of the *Coral FlexiCom 200 Expansion Unit Installation Procedure and Hardware Reference Manual*.

### MDFsl

An MDF may be supplied with the FlexiCom 200 CSLX cabinet at specific customer request. Whenever an MDFsl unit is included with a FlexiCom 200 CSLX cabinet, it can function as a master ground and be connected directly to the building master ground. For further information, see *Chapter 2* of the *Coral FlexiCom 200 Expansion Unit Installation Procedure and Hardware Reference Manual*.

---

## *Setting the Configuration Jumpers*

For information on setting the configuration jumpers on FlexiCom 200 CSLX cabinets, refer to the *Coral FlexiCom 200 Expansion Unit Installation Procedure and Hardware Reference Manual, Section 4.2*.

---

## *Connecting the FlexiCom 200 CSLX Cabinet to the IPx Office Unit*

All IPx Office units and FlexiCom 200 CSLX cabinets are interconnected with a specific IPx Office expansion cable. See [Table 2-5 on page 2-9](#).

---

## *Related Documentation*

- Coral FlexiCom 200 Expansion Unit Installation Procedure and Hardware Reference Manual
- Coral FlexiCom and IPx Product Description

**NOTES:**

# Chapter 7

## Power Supply

Coral

|     |   |      |
|-----|---|------|
| 7.1 | <i>PS Office AC Power Supply Unit</i> ..... | 7-1  |
| 7.2 | <i>PS Office DC Power Supply Unit</i> ..... | 7-13 |



# 7.1 PS Office AC Power Supply Unit

## General Description

The PS Office AC power supply unit provides operating voltages for the Coral IPx Office main unit and expansion unit.

### Power Source

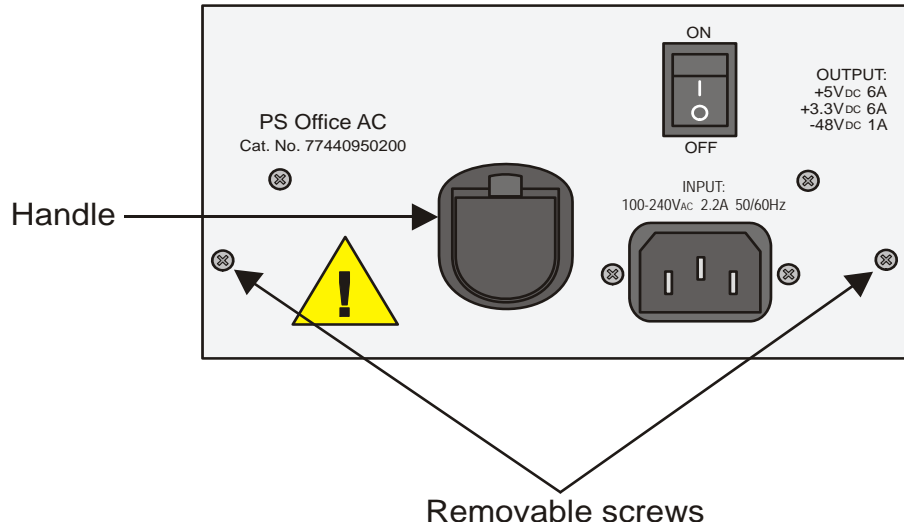
The PS Office AC operates from a nominal input of 100-240VAC/47-63Hz.

### PS Office AC Front Panel

Figure 7-1 displays the front panel of the PS Office AC. The components located on the front panel are described in the following table:

| Feature                         | Description   |
|---------------------------------|---|
| Power Switch                    | Turns the unit ON or OFF.<br><b>WARNING!</b><br>Contact with live wires in the power supply unit could cause shock, burn, or death. <b>Do not</b> remove the unit cover from the IPx Office unit when the power switch is turned ON and power is connected. |
| Handle                          | Used to pull the unit out of the card cage.   |
| Left and Right Removable Screws | Used to secure the power supply to the unit. These screws also ground the unit to the cage and safeguard the unit against malfunction.  |
| 100-240VAC Power Outlet         | Male connector used to connect the female AC power cord from the power mains.   |

Figure 7-1 PS Office AC Front Panel



### PS Office AC Card Layout

The PS Office AC card component side is shown in Figure 7-2. The components are described in the following table:

| Feature                          | Description   |
|----------------------------------|---|
| Power Output LED Indicator       | Indicates whether the -48 VDC power output is operational.  |
| F1 Power Input Fuse              | A 5A/250V, slow blow fuse that protects the input voltage. See <a href="#">Replacing the PS Office AC Fuses, page 7-10</a> .                          |
| FS2 Intermodule Fuse             | A 5A/250V, slow blow fuse that protects the DC voltage after conversion from AC. See <a href="#">The PS Office AC includes two fuses; page 7-10</a> . |
| AC to DC Convertor Circuit Board | Circuit board that houses the module responsible for converting the AC input voltage to -48 VDC.  |
| DC to DC Convertor Circuit Board | Circuit board that houses the module responsible for converting the -48 VDC output to the other voltage levels.                                       |
| Connection to Backplane          | Connects the power supply to the cage backplane.  |



Figure 7-2 PS Office AC Card Layout

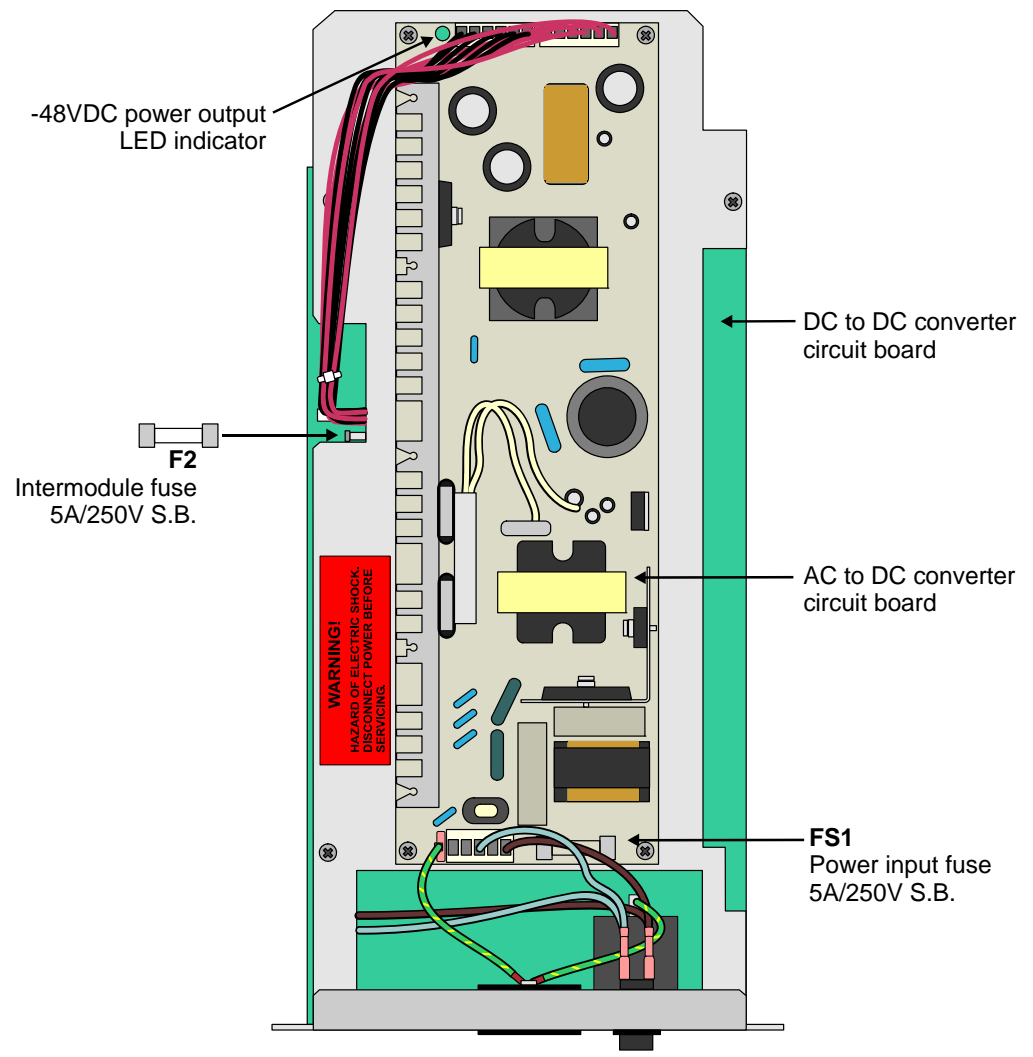
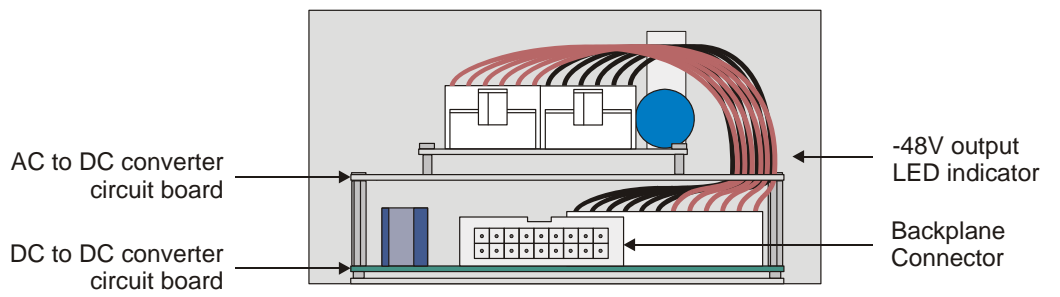


Figure 7-3 PS Office AC Card Rear View



## Circuit Description

The PS Office AC includes an AC to DC converter to produce -48V and a DC to DC converter to produce the +5VDC and +3.3VDC operating voltages for the Coral IPx Office internal circuitry. All outputs are regulated. Two internal fuses protect the PS Office AC circuitry from current overload. [Figure 7-4](#) displays a block diagram of the PS Office AC power supply.

### *DC Output Power*

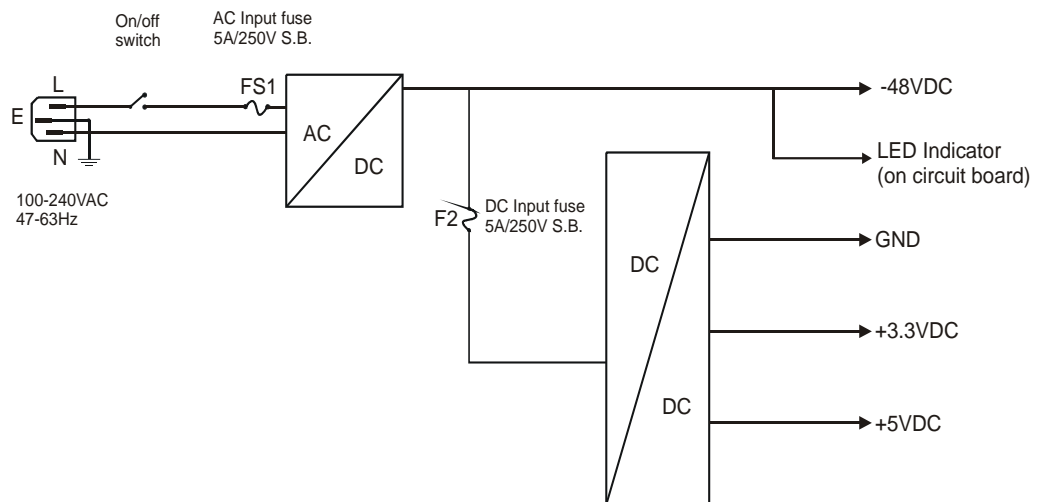
The PS Office AC includes one AC-DC converter and one switch-mode DC-DC converter that converts 100-240VAC/47-63Hz input power to:

- +5VDC
- +3.3VDC
- -48VDC

### *Normal Operation*

The AC input passes through the AC input fuse (FS1) via an RFI filter, into the AC to DC converter circuit. The converter circuit produces an output of -48VDC. The -48VDC is fed, via the intermodule fuse (F2), into the DC/DC converter. This circuit produces +5VDC and +3.3VDC.

**Figure 7-4 PS Office AC Block Diagram**



---

### *Disconnecting the AC Power Cord from the AC Power Mains*

Disconnecting the AC power cord from the AC power mains will cause normal operation to discontinue. However, the best way to disable the output voltages is by turning OFF the power switch.

---

### *Turning the Power Switch OFF*

Turning the power switch OFF allows you to shut down all power to the Coral IPx Office system. It is used for maintenance purposes.

---

### *Monitoring Circuitry*

The PS Office AC also limits the -48VDC output to feed the peripheral card slots.

## Installation and Activation

The power supply unit is inserted into the Coral IPx Office unit in the right side of the IPx Office unit from the rear.

### *Installing the AC Power Supply*

- 1 Verify that the IPx Office unit ground wire is connected and the ground nut is tightened. See [Figure 2-10](#).
- 2 Verify that the power switch is turned OFF.

#### **WARNING!**

*Contact with live wires in the power supply unit could cause shock, burn, or death. **Do not** connect the power cord or turn **ON** the power switch of the power supply before inserting it into the IPx Office system and fastening the screws.*

- 3 Position the two guide ridges (located on the lower panel of the power supply, at the right and left) into the card edge guides. The power supply slot is positioned adjacent to the fans in the rear section of the IPx Office unit.
- 4 Slide the power supply gently but firmly, until fully inserted into the card cage. A slight resistance should be felt as the multi-pin connectors engage at the rear of the power supply and backplane.  
Do not force the power supply into the card cage. Irreparable damage may occur if the multi-pin connectors misalign while attempting to insert the unit into the card cage. If more than slight resistance is encountered, partially slide out the card from the cage and verify the alignment of the guide ridges with the card edge guides. If alignment appears to be correct, remove the card from the slot and inspect the multi-pin connectors for bent pins and debris in the pin holes.
- 5 Secure the power supply unit to the cage with the two removable screws on the left and right sides of the front panel. See [Figure 7-1 on page 7-2](#).

#### **WARNING!**

*The screws on the front panel **must** be tightened properly to prevent dangerous electrical shock.*

## *Activating the AC Power Supply*

- 1 Verify that the cage ground wire is connected and the ground nut is tightened. See [Figure 2-10](#).
- 2 Verify that the two removable screws on the left and right side of the front panel are tightened.
- 3 Verify that the **Power** switch is OFF (turned downwards).

### **WARNING!**

*Contact with live wires in the power supply unit could cause shock, burn, or death. Do not turn ON the power supply before connecting the AC power cord.*

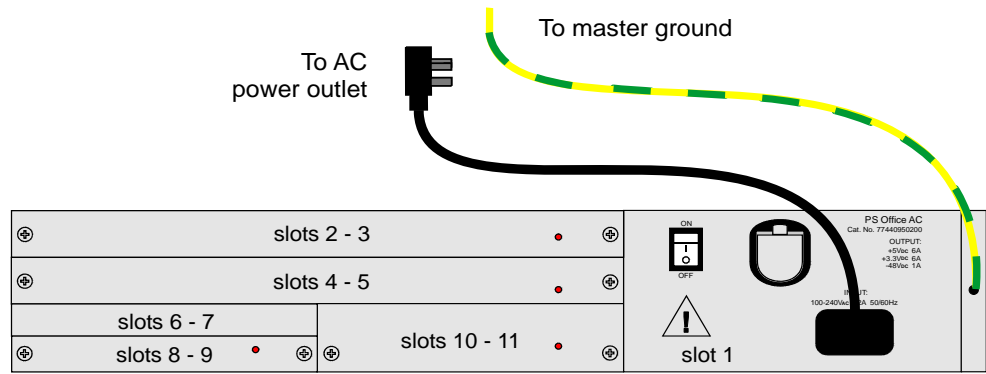
- 4 Route the AC power cable to the customer's AC power outlet, as described in [AC Powered Systems, page 2-42](#).
- 5 Insert the female connector of the AC power cable into the front panel socket of the PS Office AC power supply. See [Figure 2-10](#).
- 6 Insert the male plug of the AC power cord into the line outlet or primary power receptacle designated for the system.
- 7 Verify that the flash card and the compact flash card (if used) are installed. Peripheral cards may be inserted or removed from the system with power applied.

### **CAUTION!**

*Turn on the power supply units in the expansion units only after powering the main unit and verifying that it unit has initialized properly. Otherwise the cards in the peripheral expansion cages might not initialize.*

- 8 Turn the PS Office AC power switch ON and verify that the front panel LED indicators illuminate as described in [Chapter 6, System Description](#).
- 9 Turn the PS Office AC power switch OFF.

Figure 7-5 IPx Office AC Power Connections



### Removing the Power Supply

- 1 Locate a desk or a table top. If the surface can be damaged by sharp objects, place a protective sheet of cardboard or similar material over the top surface.
- 2 Turn the PS Office AC power switch off (downwards).
- 3 Unplug the AC power cord from the front panel. See [Figure 7-5](#).

**CAUTION!**  
 Do not remove the power supply unit from the cage when turned ON. Sudden power surges could damage system components. Before extracting the PS Office AC card, verify that the power switch is turned OFF.

- 4 Unfasten the two removable screws on the front panel of the PS Office AC and safeguard them for future reassembly. See [Figure 7-1](#).
- 5 Carefully remove the PS Office AC from its slot.
- 6 Place the PS Office AC over the anti-static material with the component side facing upwards.

## Troubleshooting

---

The PS Office AC unit does not include an alarm LED indicator. The front panel of the IPx Office unit includes eight (8) diagnostic LED indicators. For information on troubleshooting, see [Figure 6-3 on page 6-3](#).

Power supply failure generally results in the loss of one or more output voltages. However, protection circuitry in the power supply regulator may shut down a regulator due to a current overload caused by an external fault.

All maintenance activities are to be carried out by a qualified service technician.

If the power supply is turned ON and power is not present in the system, check the following:

- AC power cord. See [Figure 7-5](#).
- AC power failure
- Blown main or circuit fuse/breaker in the building electrical panel
- Faulty PS Office AC
- Blown fuse FS1 or F2 on the PS Office AC. Replace fuse as described on [Replacing the PS Office AC Fuses, page 7-10](#).

## Replacing the PS Office AC Fuses

---

The PS Office AC includes two fuses:

- If the FS1 fuse blows, replace it with an identical fuse with the same rating. See [Specifications, page 7-12](#).
- If the F2 fuse blows, replace it with an identical fuse with the same rating. See [Specifications, page 7-12](#).

To replace a fuse within the PS Office AC:

- 1 Turn the PS Office AC power switch OFF (downwards).
- 2 Unplug the AC power cord from the front panel. See [Figure 7-5](#).

### CAUTION!

*Do not remove the power supply unit from the cage when turned ON. Sudden power surges could damage system components. Before extracting the PS Office AC card, verify that the power switch is turned OFF.*

- 3 Remove the power supply unit from its slot and place it over the anti-static material with the component side facing upwards. See [Removing the Power Supply, page 7-8](#).
- 4 Replace only with the same type and rating of fuse. See the PS Office AC card layout in [Figure 7-2 on page 7-3](#).
- 5 Re-install the power supply unit as described on [Installing the AC Power Supply, page 7-6](#).

---

### Diagnosing the IPx Office LED Indicators

Refer to [Front Panel, page 6-3](#), for a complete description of the LED indicators on the front panel of the IPx Office unit.



#### NOTE:

*The PS Office AC does not include an alarm LED indicator.*

---

- 1 Turn the PS Office AC power switch OFF (downwards).
- 2 Remove all peripheral cards from the IPx Office unit or control and peripheral cards from the relevant cage so that they protrude from the cage by approximately 1 inch (2.5 cm).



- 3 Turn ON the PS Office AC. Either the PS Office AC is malfunctioning (replace as described on [Installation and Activation, page 7-6](#)) or the problem is caused by the backplane, control cards, peripheral, or NTU Office cards within the IPx Office unit. (Contact the manufacturer.)
- 4 To determine which peripheral card is causing the problem, insert the cards into their appropriate slots, one at a time, beginning from the right side of the cage. Ensure that the card's rear panel connectors engage properly with the backplane and that they initialize properly.

## ● Specifications

---

### ***PS Office AC Power Supply***

|                                      |   |
|--------------------------------------|---|
| Input: .....                         | 100-240VAC 47-63Hz  |
| Power Rating:.....                   | 115VAC / 60Hz / 6A (Range: 98 to 126VAC)<br>230VAC / 50Hz / 3A (Range: 198 to 253VAC)                 |
| Power Consumption (from mains):..... | Continuous 160W   |
| Outputs: .....                       | +5VDC nom. regulated 6.0A max.<br>+3.3VDC nom. regulated 6.0A max.<br>-48VDC nom. regulated 1.0A max. |
| Fuses:                               |   |
| Input (AC) .....                     | FS1 - 5A/250V S.B. replaceable  |
| Intermodule .....                    | F2 - 5A/250V S.B. replaceable   |
| Output.....                          | None  |
| Controls and Adjustments:.....       | power switch  |
| Weight: .....                        | 1.2 kg  |
| External AC Input Connection:.....   | straight connector  |

## 7.2 PS Office DC Power Supply Unit

### General Description

The PS Office DC card's component side power supply unit provides internal operating voltages for the Coral IPx Office main unit and expansion unit. The PS Office DC operates from a nominal input of -48VDC, typically supplied by an external 48VDC rectifier or stationary battery plant. Actual input may vary from -40VDC to -56VDC, allowing operation:

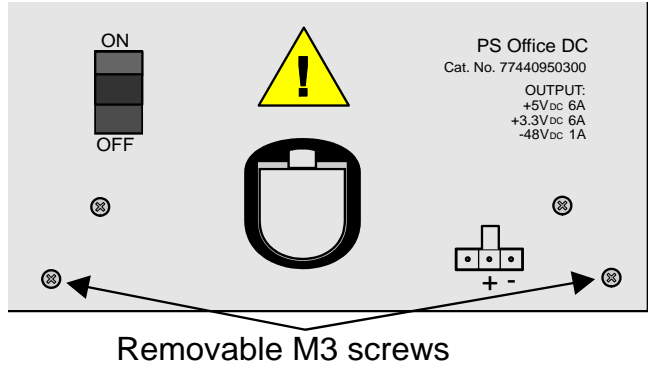
- From a battery power source while the batteries are charged at an equalized charge rate
- Under power failure, until the batteries are completely discharged

#### *PS Office DC Front Panel*

Figure 7-6 displays the front panel of the PS Office DC. The components positioned on the front panel are described in the following table:

| Feature                         | Description   |
|---------------------------------|---|
| Power Switch                    | Turns the unit ON or OFF.<br><b>WARNING!</b><br>Contact with live wires in the power supply unit could cause shock, burn, or death. <b>Do not</b> remove the power supply from the IPx Office system when the power switch is turned ON and power is connected. |
| Handle                          | Used to pull the unit out of the card cage.   |
| Right and Left Removable Screws | Used to secure the unit to the cage. These screws also ground the unit to the cage and safeguard the unit against malfunction.  |

Figure 7-6 PS Office DC Front Panel



### PS Office DC Card Layout

The PS Office DC card’s component side is shown in [Figure 7-7](#). The components on the card are described in the following table.

| Feature                          | Description   |
|----------------------------------|---|
| Power Switch                     | Turns the unit ON or OFF.<br><b>WARNING!</b><br>Contact with live wires in the power supply unit could cause shock, burn, or death. <b>Do not</b> remove the power supply from the IPx Office system when the power switch is turned ON and power is connected. |
| <b>F2</b><br>DC Power Input Fuse | A 6.3A/250V, slow blow fuse that protects the unit’s voltage. See <a href="#">PS Office DC Power Supply, page 7-22</a> .<br>The entire 48VDC input circuitry, including the power supply, is protected by that fuse. See <a href="#">Figure 7-9</a> .           |
| DC Input Power Connector         | Connects the PS Office DC power supply to the -48VDC power source.  |
| Connection to Backplane          | Connects the power supply to the cage backplane.  |

Figure 7-7 PS Office DC Card Layout

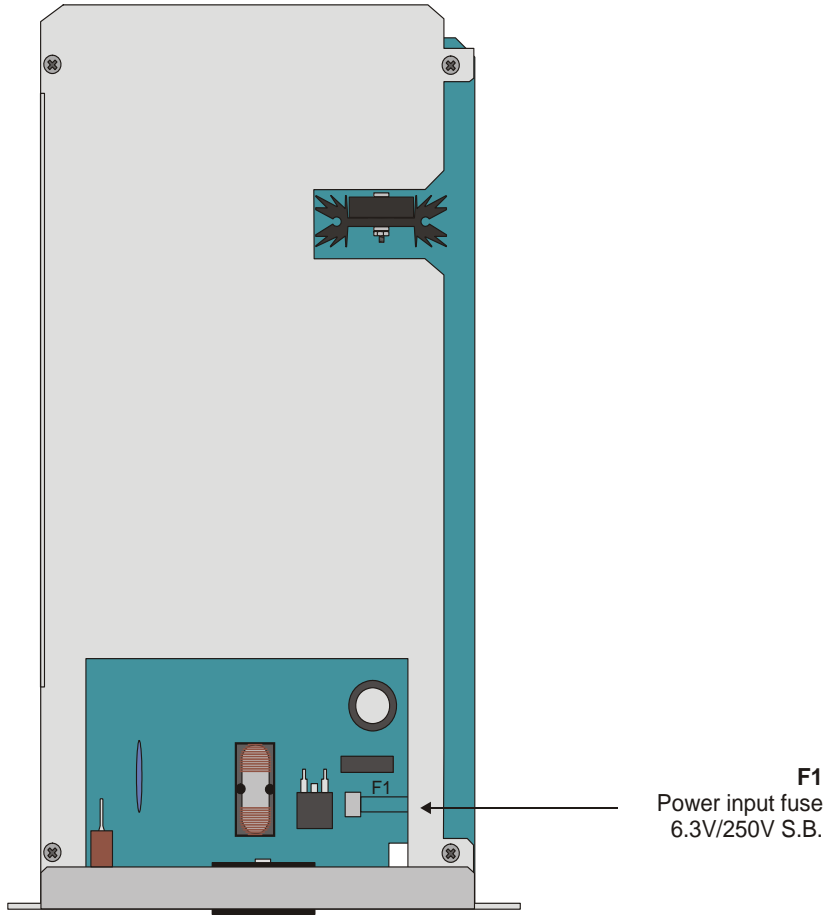
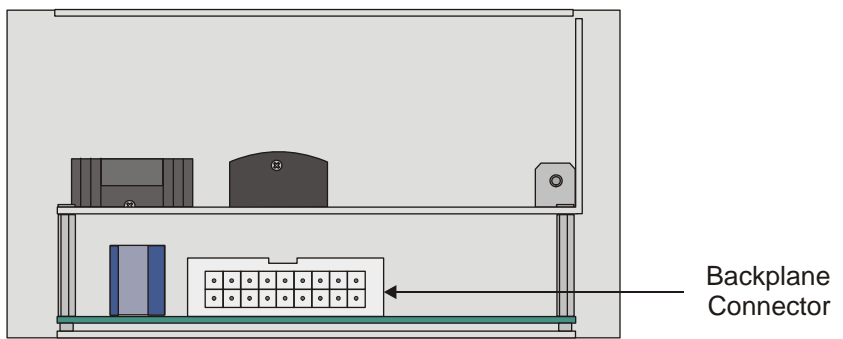


Figure 7-8 DC Power Supply Rear View



## Circuit Description

---

Figure 7-9 presents a block diagram of the PS Office DC power supply.

### *Power Input Section*

The DC input includes a passive filter, inrush current, and a power switch. The DC input is protected against reverse polarity.

### *DC Output Power*

The DC to DC converters convert the  $-48\text{VDC}$  power to the following outputs:

- $+5\text{VDC}$
- $+3.3\text{VDC}$
- $-48\text{VDC}$

### *-48VDC Output Power*

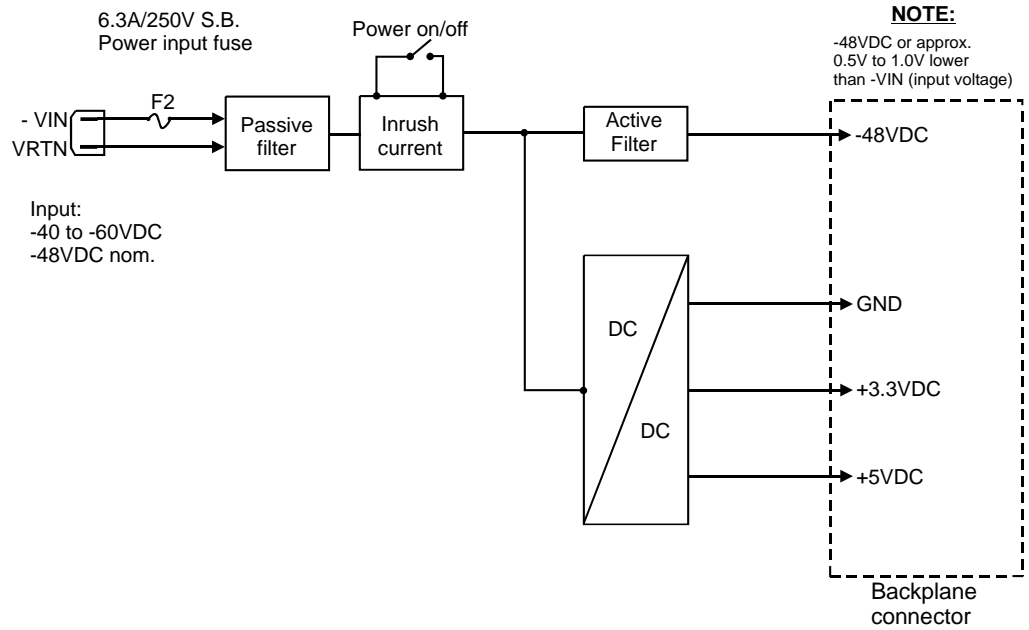
The PS Office DC also filters and limits the  $-48\text{VDC}$  input to feed the peripheral card slots.

### *Ripple and Noise*

Filtering circuitry minimizes ripple and noise on the  $-48\text{VDC}$  feed to the peripheral cards. The filtering circuitry produces an output voltage that is approximately  $0.5\text{V}$  to  $1.0\text{V}$  lower than the input voltage  $-V_{\text{IN}}$  to the PS Office DC.

If the voltage input is less than  $-38\pm 0.5\text{VDC}$  or greater than  $-58\pm 0.5\text{VDC}$ , the power supply shuts down. The power supply will turn on when the voltage is greater than  $-58\pm 0.5\text{VDC}$  or less than  $-45\pm 0.5\text{VDC}$ .

**Figure 7-9 PS Office DC Block Diagram**



## Installation and Activation

The power supply unit is inserted into the IPx Office unit in slot 1. See [Figure 7-10](#).

### *Installing the Power Supply*

- 1 Verify that the cage ground wire is connected and the ground nut is tightened. See [Figure 7-10](#).
- 2 Verify that the power switch is turned OFF.

#### **CAUTION!**

*Do not remove the power supply unit from the cage when turned ON. Sudden power surges could damage system components. Before extracting the PS Office AC card, verify that the power switch is turned OFF.*

- 3 Position the two guide ridges (located on the right panel of the power supply, at the right and left) into the card edge guides. The power supply slot is positioned adjacent to the fans in the rear section of the IPx Office unit.
- 4 Slide the power supply gently but firmly, until fully inserted into the card cage. A slight resistance should be felt as the multi-pin connectors engage at the rear of the power supply and backplane.  
Do not force the power supply into the card cage. Irreparable damage may occur if the multi-pin connectors misalign while attempting to insert the unit into the card cage. If more than slight resistance is encountered, partially slide out the card from the cage and verify the alignment of the guide ridges with the card edge guides. If alignment appears to be correct, remove the card from the slot and inspect the multi-pin connectors for bent pins and debris in the pin holes.
- 5 Secure the power supply unit to the cage with the two removable screws on the right and left of the front panel. See [Figure 7-6](#).

#### **WARNING!**

*The screws on the front panel **must** be tightened properly to prevent dangerous electrical shock.*



## Activating the PS Office DC

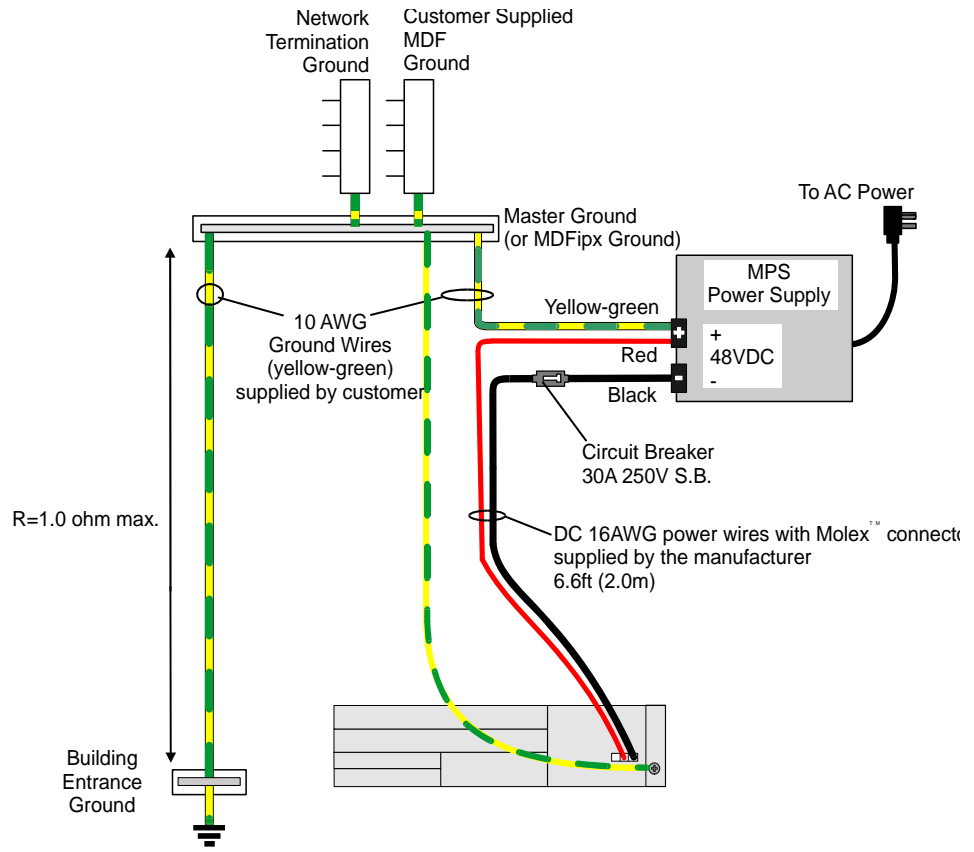
- 1 Verify that the unit ground wire is connected and the ground nut is tightened. See [Figure 7-10](#).
- 2 Verify that the power switch is in the OFF position (turned downwards).
- 3 Verify that the two removable screws on the right and left side of the front panel of the power supply are tightened.
- 4 Connect the DC cable (supplied) to the customer's DC power source, as described in [DC Powered Systems, page 2-44](#).
- 5 Insert the DC power input connector into the receptacle of the PS Office DC unit. See [Figure 7-10](#).
- 6 Verify that the flash card and the compact flash card (if used) are installed.
- 7 In expansion cages make sure that at least one peripheral card is fully installed.

### **CAUTION!**

*Turn on the power supply units in the expansion units only after powering the main unit and verifying that it unit has initialized properly. Otherwise the cards in the peripheral expansion cages might not initialize.*

- 8 Turn the PS Office DC power switch ON and verify that the front panel LED indicators illuminate as described in [Chapter 6, System Description](#).
- 9 Turn the power switch OFF.

Figure 7-10 PS Office DC Connection



### Removing the Power Supply

- 1 Locate a desk or table top. If the surface can be damaged by sharp objects, place a protective sheet of cardboard or similar material over the top surface.
- 2 Turn the PS Office DC power switch OFF (turn the switch downwards).
- 3 Remove the DC power input connector. See [Figure 7-10](#).

### WARNING!

*Do **not** remove the power supply unit from the unit when turned ON. Sudden power surges could damage system components. Before extracting the PS Office AC card, verify that the power switch is turned OFF.*

- 4 Unfasten the two removable screws located at the right and left of the unit's front panel and safeguard them for reassembly.
- 5 Carefully remove the PS Office DC from its slot.
- 6 Place the PS Office DC over the anti-static material with the component side facing upwards.

## Troubleshooting

---

The PS Office DC unit does not include an alarm LED indicator. The front panel of the IPx Office unit includes eight (8) diagnostic LED indicators. For information on troubleshooting, see [Front Panel, page 6-3](#).

Power supply failure generally results in the loss of one or more output voltages. However, protection circuitry in the power supply regulator may shut down a regulator due to a current overload caused by an external fault.

All maintenance activities are to be carried out by a qualified service technician.

If the power supply is turned ON and power is not present in the system, check the following:

- DC power wires. See [Figure 7-10](#).
- DC power failure
- Blown main or circuit fuse/breaker in the building electrical panel
- Faulty PS Office DC
- Blown fuse FS1 or on the PS Office DC. Replace fuse as described on [Replacing the PS Office DC Power Fuse, page 7-21](#).

## Replacing the PS Office DC Power Fuse

---

The PS Office DC employs one fuse (F2) to protect the DC main input. To replace the DC Power Input Fuse:

- 1 Remove the power supply unit from its slot and place it over the anti-static material with the component side facing upwards, as described on [Removing the Power Supply, page 7-20](#).

### **WARNING!**

*Do **not** remove the power supply unit from the cage when turned ON. Sudden power surges could damage system components. Before extracting the PS Office AC card, verify that the power switch is turned OFF.*

- 2 Replace only with the same type and rating of fuse. See the PS Office DC card layout in [Figure 7-7 on page 7-15](#).
- 3 Reinstall the power supply unit as described on [Installation and Activation, page 7-18](#).

## ● Specifications

---

### ***PS Office DC Power Supply***

Power rating: ..... -40VDC to -56VDC, 10A max.

Power Consumption (from mains): ..... Continuous 160W

Outputs: ..... +5VDC nom. regulated 6.0A max.  
+3.3VDC nom. regulated 6.0A max.  
-48VDC nom. regulated 1.0A max.

Fuses:

Intermodule ..... F2 - 6.3A/250V S.B. replaceable

Output ..... None

Controls and Adjustments: ..... Power switch

Weight: ..... 0.8 kg

External DC Input Connection: ..... Molex™ 39-01-4031 connector (3 circuit  
minifit pitch 4.2mm)

## Common Control Cards

Coral

|     |  |      |
|-----|--|------|
| 8.1 | <i>Control Cards</i> .....                       | 8-1  |
| 8.2 | <i>MCB Office Card</i> .....                     | 8-5  |
| 8.3 | <i>LED Card</i> .....                            | 8-35 |
| 8.4 | <i>Flash Memory Cards - IMC8 and IMC16</i> ..... | 8-37 |
| 8.5 | <i>DISK - Compact Flash Disk</i> .....           | 8-45 |
| 8.6 | <i>DBM-4 and DBM-8 Module</i> .....              | 8-47 |
| 8.7 | <i>Hard Disk</i> .....                           | 8-55 |



## 8.1 Control Cards

The common control cards include the MCB Office, the IMC8 flash card, the compact flash disk, the MRC card, the LED Office card, and the DBM-X card. The MCB Office card acts as a mother card to the other cards. All control cards are situated in the main unit, with the exception of the LED Office card, which is both situated in the expansion unit as well as in the main unit.

### MCB office

---

The MCB Office card contains the following embedded circuits:

- **Main Control Processor (MCP)** is the “core” of the IPx Office common control. The MCP includes memory management circuitry, local bus interface and database memory (protected against power loss by a long-life lithium standby battery) and provides a real-time clock and houses the Software Authorization Unit (SAU). The main processor receives status messages from ports in the system and determines the appropriate response based on programming entries contained in the system database. The MCP circuit functions in a similar manner as the MCP-IP2 card. For further information, see [Main Control Processor, page 8-8](#).
- **Management Application Platform (MAP)** manages the applications that run on this card including the **Primary Universal Gateway (PUGW)** circuit, also known as C/PUGW in relation to IPx Office main unit.  
The C/PUGW circuit performs the same function as the PUGW card or PUGWipx card in other Coral systems. The C/PUGW provides the Coral IPx Office system with the ability to connect to the IP World. The C/PUGW circuitry includes the PUGW processor, the connection to the MRC card, the PUGW COM port, the LAN ports, WAN port, and printer port. For further information, see [Application Platform Circuit \(CLA, MAP, and PUGW\), page 8-10](#).
- **Group Controller (GC)** contains the High-Level Data Link Control (HDLC) bus interface circuitry, Pulse Code Modulation (PCM) bus interface circuitry, clock circuitry to synchronize the peripheral section of the system, and digital tone generators (dial, busy, ringing, ringback, DTMF, MFC, and test).

Additionally, the group controller contains circuitry to synchronize the Coral peripheral clock to an external clock derived from a digital trunk interface. The GC circuitry functions in a similar manner to the 32GC cards in other Coral systems. For further information, see [Group Controller Circuit, page 8-16](#).

The MCB Office is permanently installed onto the inner surface of the front section of the IPx Office unit and is not removed in the field. It connects to the system via the backplane connector on the MBP Office (Main BackPlane) card and is powered via the power supply connector.

Because the MCB Office integrates several embedded circuits that were previously part of separate cards in earlier systems, it also includes additional components and baby card connectors, as described in [Card Components, page 8-5](#).

The MCB Office acts as mother card to the following cards:

- **LED Office card.** The LED Office card is described in further detail on [LED Card, page 8-35](#).
- **IMC8 flash memory card.** The IMC8 card is described in further detail in [Flash Memory Cards - IMC8 and IMC16, page 8-37](#).
- **Compact flash memory disk.** The compact flash memory disk is described in further detail in [DISK - Compact Flash Disk, page 8-45](#).
- **MRC (Media Resources Card).** The MRC card is described in further detail in [MRC-8, 16, 32, 64 Modules, page 9-5](#).
- **DBM (DataBase Memory) card.** The DBM card is described in further detail in [DBM-4 and DBM-8 Module, page 8-47](#).
- **Hard Disk.** The hard disk is described in further detail in [Hard Disk, page 8-55](#).
- **SAU (Software Application Unit).** The SAU is described in further detail in [Software Authorization Management, page 8-24](#).
- **The NTU (NeTwork Unit) Office card.** The NTU card is described in further detail in [Chapter 11, System Networking](#).

The MAC address is a unique 6 byte hexadecimal address coded on every IP entity. Each MCB Office card provides three MAC addresses (A, B, and C). The MRC and SeaMail does not have any private coded MAC address, they get it from the MCB Office holding them.

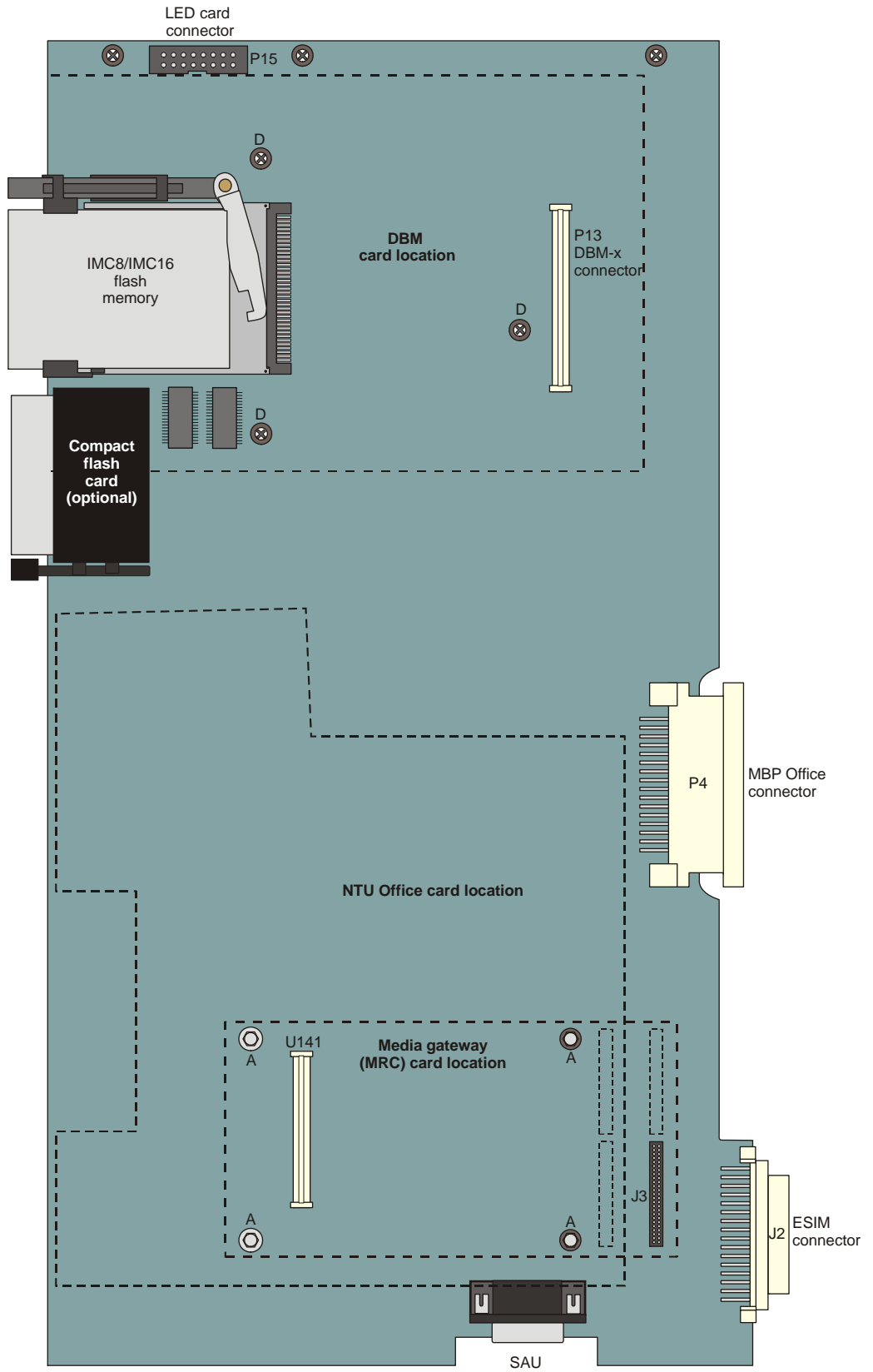
The MAC addresses of the C/PUGW and MRC are automatically supplied by the MCB Office card to the Coral database.

The MAC address labels of the C/PUGW, SeaMail, and MRC are affixed to the MCB Office card, as follows:

- MAC (A) - C/PUGW application
- MAC (B) - SeaMail hard disk (SIP entity) also affixed to the unit bottom panel
- MAC (C) - MRC module



Figure 8-1 MCB Office Card Layout



## ● Card Handling Procedures

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### CAUTION!

*Circuit cards contain static-sensitive circuitry and may be damaged or destroyed by electro-static discharge (ESD). Always wear the static dissipating wrist strap connected to the cage while handling circuit cards. See [Figure 2-14](#). Hold circuit cards by their edges and avoid touching contact surfaces. Handle with care and do not drop.*

### Control Card Installation

Install control cards as described below:

- [Installing the IMC8 Card, page 8-41](#)
- [Installing the DBM Card, page 8-49](#)
- [Installing the MRC, page 9-8](#)

### CAUTION!

**Do not** attach a control card to any connector other than the one designated. Irreparable damage may occur to a control card that is attached to the wrong connector if power is applied.

## 8.2 MCB Office Card

### Main Control Board

#### General Information

This section describes the features and functions of the MCB Office main control card. The MCB Office card is the control processor card for Coral IPx Office systems. The MCB Office includes the following embedded circuits:

- Main Control Processor (MCP)
- Management Application Platform (C/MAP)
- Primary Universal GateWay (C/PUGW)
- Group Controller (GC)

The MCB Office contains multi-pin connectors and support circuitry for the addition of DBM and MRC baby cards and a hard disk.

#### Card Components

The MCB Office includes components of the MCP, MAP, and GC circuits:

- **Main control processor** including a the MCP, CPU processor, the KB0, RS-232 connector, and the SAU. Other components that belong to this circuit include:
  - **LED Office card connector P15.** The LED Office card is described in further detail in [LED Card, page 8-35](#).
  - **IMC8 flash memory card slot.** The IMC8/16 card is described in further detail in [Flash Memory Cards - IMC8 and IMC16, page 8-37](#).
  - **Compact flash memory disk slot.** The compact flash memory card is described in further detail in [DISK - Compact Flash Disk, page 8-45](#).
  - **DBM card components** including connector P13 and threaded holes D. The DBM card is described in further detail in [DBM-4 and DBM-8 Module, page 8-47](#).

The MCP is described in further detail in [Main Control Processor, page 8-8](#).

- **Application Platform circuit** combines the functions of the MAP card and the PUGW card used in other Coral systems. The applications managed by this circuit are described in further detail in [Application Platform Circuit \(CLA, MAP, and PUGW\)](#), page 8-10. Other components that belong to this circuit include:
  - **Networking components** including LAN ports, the WAN port, printer port and connector P16, and connectors J9 and J8. The networking components are described in further detail in [Chapter 11, System Networking](#).
  - **MRC card connectors J3 and J4** and threaded holes A. The MRC card is described in further detail in [MRC-8, 16, 32, 64 Modules](#), page 9-5.
- **Group Controller circuit** including the GC processor and replaceable software chips. The group controller circuit is described in further detail in [Group Controller Circuit](#), page 8-16.
- **SYS. RESET button** used to reset the IPx unit including all telephony and IP applications. The reset button is described in further detail in [Front Panel](#), page 6-3.
- **Backup battery** used to backup the database during power failure. The backup battery is described in further detail in [Lithium Battery Condition Testing](#), page 8-31.

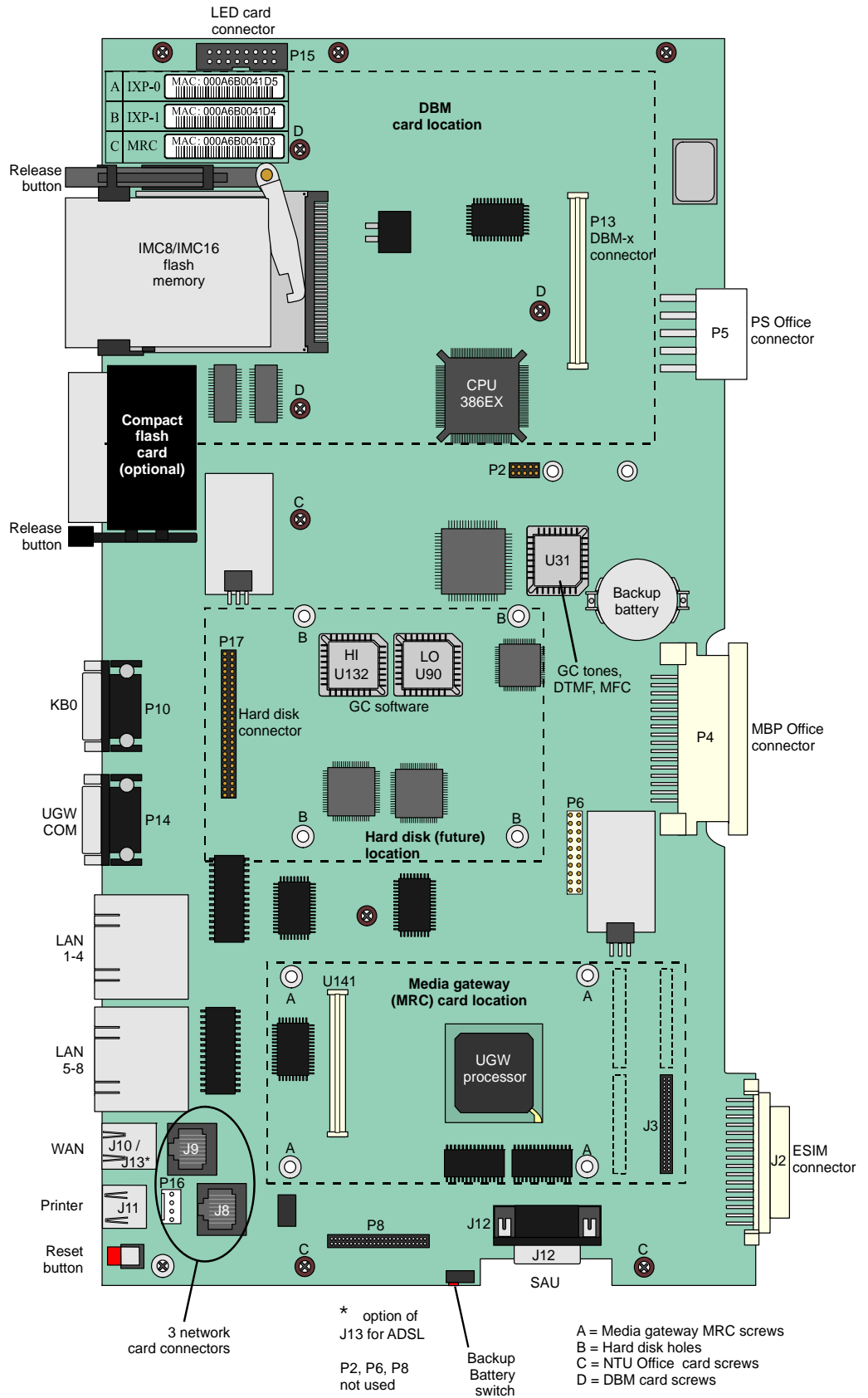
**CAUTION!**

Do **not** touch the battery switch once it has been turned on.

If the battery switch is turned off or the battery is removed, the database memory will be lost

- **Rear connectors** including the J2, ESIM connector, P4, MCB Office connector, and the P5, power supply connector.
- **PS Office card connector** supplies power from the PS Office power supply card to the MCB Office card.
- **MBP Office connector** connects the MCB Office card to the backplane.
- **ESIM connector** provides an interface between the MCB Office and the first expansion cage. The MCB Office card includes a 48-pin, female connector that can facilitate an ESIM card.

Figure 8-2 MCB Office Card Layout



MCB Office Card Main Control Board



## Main Control Processor

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The Main Control Processor (MCP) provides RS-232E KB0 programming and maintenance interface, a SAU connection, and an IMC8 flash card interface. It integrates the main processor, memory management circuitry, local bus interface, real-time clock, generic feature software memory, and database memory. The MCP supervises overall system operation by executing system-wide processes. These processes include port connection management, feature management, generic feature software installation, feature authorization, configuration database management, database backup and restoration, program interface input/output and diagnostic testing.

### *Port Management*

In order to manage port connections and feature operation, the main control processor embedded circuit controls the embedded GC circuit, which communicates through the MBP Office (backplane) card via the HDLC buses. Communication is enabled with the local card processors on every peripheral card both in the main and in the expansion units.

The main processor receives status messages from the embedded GC circuit regarding port activity. The main processor determines the appropriate response based on the programming entries contained in the system database. The main processor then instructs the GC as to what action to take with each port.

### *Memory Management*

All system memory resides on the MCP embedded circuitry. RAM is located directly on the MCB Office card. The MCB Office also acts as a mother card to the DBM-X memory card. The DBM contains 2MB, 4MB, or 8MB of Static Random Access Memory (SRAM) expansion memory.

Flash memory, located on the IMC8 card, stores the generic feature software, which determines the operation of the system. RAM, both on the MCB Office and on the DBM expansion cards, stores the system configuration database, and is used as a run memory for general purposes.

Database memory and real-time clock functions in the Coral system are protected against power loss by a long-life lithium backup battery installed on the MCB Office. A monitoring circuit on the card constantly measures the voltage level of the battery. It signals the main processor when the remaining energy stored in the battery is reduced to the level that it can no longer provide sufficient power to maintain the memory circuitry. If the DBM card is separated from the MCP card, all of the stored information on the card is lost.

The generic feature software and feature authorization information is installed and updated into the IMC8 flash card using the FMprog PC-utility. Similarly, the system database is regularly backed up to, and may be transferred and restored from, an IMC8 flash card housed in the IMC8 flash card drive.

---

## *The Program Interface Facility*

The PI (Program Interface) and CoralVIEW CVA/CVD provides a text-based facility for reviewing and changing the system configuration and database. It enables the performance and monitor of diagnostic routines. The PI can be accessed either via a simple data terminal or by a personal computer.

The PI and CoralVIEW CVA/CVD/CVT can be accessed via an RS-232E data terminal port (KB0) provided on the MCB Office front panel. See [Figure 8-2](#).

## Application Platform Circuit (CLA, MAP, and PUGW)

---

The Application Platform Circuit embedded on the MCB Office card combines the functions of the MAP card and the PUGW card used in other Coral systems. In other words, the Application Platform Circuit manages the PUGW circuit (C/PUGW) in addition to all of the other applications installed on the MAP card (C/MAP).

---

### *IP Address of the Application Platform Circuit*

In other Coral systems, the PUGW, MAP and/or CLA circuits are embedded on separate cards and are, therefore, accessed from a different IP addresses. In the Coral IPx Office, the PUGW, MAP and/or CLA are integrated in the same circuit as the Application Platform and are known as C/PUGW, C/MAP and/or C/CLA. Therefore, all applications embedded on this circuit share the same IP address. For further details, see [Application Platform Circuit Configuration and Upgrade, page 4-13](#).

---

### *Applications Embedded on the Platform Circuit*

The following applications are embedded on the platform circuit:

- [PUGW Circuit \(C/PUGW\), page 8-11](#). The PUGW circuit performs the same function as the PUGW card or the PUGWipx card in other Coral systems. For the purposes of this chapter, the term “C/PUGW” refers to the PUGW circuit embedded on the MCB Office card.
- [MAP Circuit \(C/MAP\), page 8-12](#). The MAP circuit performs the same function as the MAP card in other Coral systems. For the purposes of this chapter, the term “C/MAP” refers to the MAP circuit embedded on the MCB Office card. The C/MAP provides the CNCM and CoraLINK applications.



---

## *PUGW Circuit (C/PUGW)*

The C/PUGW is a Coral integrated gateway for IP phones, SIP trunks and IP keysets. It supports up to 240 Coral IP endpoints, regardless of their physical location, and provides full Coral services to these sets.



---

### **NOTE:**

*Although the C/PUGW is embedded on the MCB Office card in IPx Office systems, it is recognized by the system as a separate PUGW card. The C/PUGW must be ACTIVE before this parameter can be configured. For further information, see [Peripheral Interface Card Initialization](#), page 3-13.*

---

Certain Coral features require the intervention of the Media Resources Card (MRC). The MRC is mounted on the MCB Office in piggyback fashion. It provides media channels used to convert PCM calls to IP Packets and vice versa. Media channels are also needed when one of the calling parties is not an IP host. No media channels are needed for pure IP-to-IP connections (direct-connections). For further information, see [MRC-8, 16, 32, 64 Modules](#), page 9-5.



---

### **NOTE:**

*The C/PUGW is described in further detail in Chapter 10 of the Service and Peripheral Card Installation Manual.*

---

## *Upgrading the C/PUGW*

You can upgrade the C/PUGW application by downloading the latest version from the manufacturer's website.

See [Upgrading the Applications C/MAP, C/PUGW and MRC](#), page 4-26.

## *VoIP Endpoints*

The C/PUGW provides full support and services offered on the enterprise network for up to 240 Coral IP ports in any physical location, including:

- IP stations, such as FlexSet-IP 280S, FlexIP SoftPhone, SeaBeam softphone stick/software, T207M, T208M, T207M/NP, T208M/BL, T207S, T208S, T207S/NP, T208S/BL, 3rd party SIP phones
- Coral SIP and NET\_IP trunks
- External telephony gateways such as Coral Teleport for analog SLTs and Loop-Start/Ground-Start trunks

---

## MAP Circuit (C/MAP)

The C/MAP functions as CNCM and CoraLINK applications as described below.



### NOTE:

---

The C/MAP is described in further detail in Chapter 6 of the Coral Common Control Cards Installation Manual.

---

## Upgrading the C/MAP

You can upgrade the C/MAP application by downloading the latest C/PUGW version from the manufacturer's website.

See [Upgrading the Applications C/MAP, C/PUGW and MRC, page 4-26](#).

## MAP Applications

The built-in C/MAP includes the following applications:

- Coral Network Communication Manager (CNCM) - directs data between Coral and the IP world, including CFM, Wakeup, Charge, MCT, CVD, PI, DI Alarm, SMDR, Traffic. See [Coral Network Communication Manager \(CNCM\), page 8-13](#)



### NOTE:

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The C/MAP does not support Initialization messages, GP messages and other online Alarm messages, when used to communicate with the PI (Program Interface) over IP.

---

- SeaMail - Voicemail application. See the *Coral SeaMail User Guide*
- TG-CGW - transfers voice and data to and from the Coral system to the Coral Sea Softswitch when the Coral system is converted to work as a Wave Gateway system.
- Coral Link Adapter (CLA) - Acts as an interface between the Coral system and any CTI server application (Composite, FlexCT, etc.). For more information, see [CoraLINK Adapter \(CLA\) Application, page 8-14](#).
- Web Server - interface from which the MAP card is configured
- Application Manager - manages all of the other C/MAP applications

---

## *Coral Network Communication Manager (CNCM)*

Coral Network Communication Manager (CNCM) directs data between Coral and the IP world, including CFM, Wakeup, Charge, MCT, CVD, PI, DI Alarm, SMDR, Traffic.

### *IP Connectivity via the CNCM*

The CNCM offers integrated Coral system IP connectivity to replace the Coral KB0 serial connections RS-232 in other Coral systems. CNCM IP connectivity offers:

- Concurrent Users: For PI and CVD IP connectivity, up to four concurrent users can connect via the same TCP/IP network socket.
- SMDR buffering whereby the SMDR records are saved, even if the connection is lost.
- SMDR redundancy by allowing records to be sent to two different TCP/IP socket destinations.
- Port per Application: The connections must be pre-configured to a specific application, and cannot be changed dynamically (e.g. CVD and PI cannot share the same TCP port definition).

### *TCP IP Sockets*

The CNCM acts as a TCP/IP Server for most of its connected applications. All of the applications are connected with the same IP Address while their ports differ and are assigned by the CNCM.

### *SMDR TCP IP Sockets*

The SMDR application, however, may be defined as a SMDR Client or TCP/IP Server, as required:

- SMDR Server, the application can send SMDR reports to one TCP/IP socket destination, only.
- SMDR Client, the application can send SMDR reports to up to two TCP/IP socket destinations. This provides additional redundancy as SMDR output is sent to two different devices simultaneously.

For further information, see [Application Platform Circuit Configuration and Upgrade, page 4-13](#).

---

## *CoraLINK Adapter (CLA) Application*

The built-in Coral Link Adapter (C/CLA) - Acts as an interface between the Coral system and any CTI server application (Composite, FlexCT, etc.).

In Coral CTI applications, CoraLINK is connected to the Ethernet backbone along with the telephony server, as shown in [Figure 8-3](#).

The CoraLink acts as an interface between the Coral system and any CTI server application for all the services (call, transfer, etc.) and events (monitoring functions) of the network. The CTI application together with the CTI telephony server manipulate numerous different call commands from the agent network and translate them into logical data. The CTI telephony server communicates with the CoraLINK through a single connection. The CoraLINK then translates that data into logical information for the Coral system, which processes the calls.

CoraLINK can support eight concurrent different multiple CTI applications on the network, any or all of which may be simultaneously directing service requests to, and receiving status events at any time.

CoraLINK uses TCP/IP protocol, complies with the ECMA 179, ECMA 180, and ECMA 269 phase 3 standards (CSTA III). CoraLINK also supports the Novell TSAPI protocol, the Intel Dialogic CT-connect, and IBM's Callpath.



### *Tip:*

---

*The built-in CoraLINK (C/CLA) requires **appropriate authorization** and should be accompanied by an appropriate software application. Please contact the manufacturer for the required CTI application and/or price list.*

*In other Coral systems the MAP card is equipped with DIP switches that are used to activate certain functions. In the Coral IPx Office, the built-in CoraLINK (C/CLA) is activated automatically without DIP switches.*

---

For the IPx Office, the MAP IP Address is defined via the CUGW card in the UGW Card Configuration branch. This IP Address is also used as the CLA's IP address. Therefore, when the MAP is in an ACTIVE state, CLA IP Address information cannot be updated (in the CLA branch) and a relevant error message is issued.



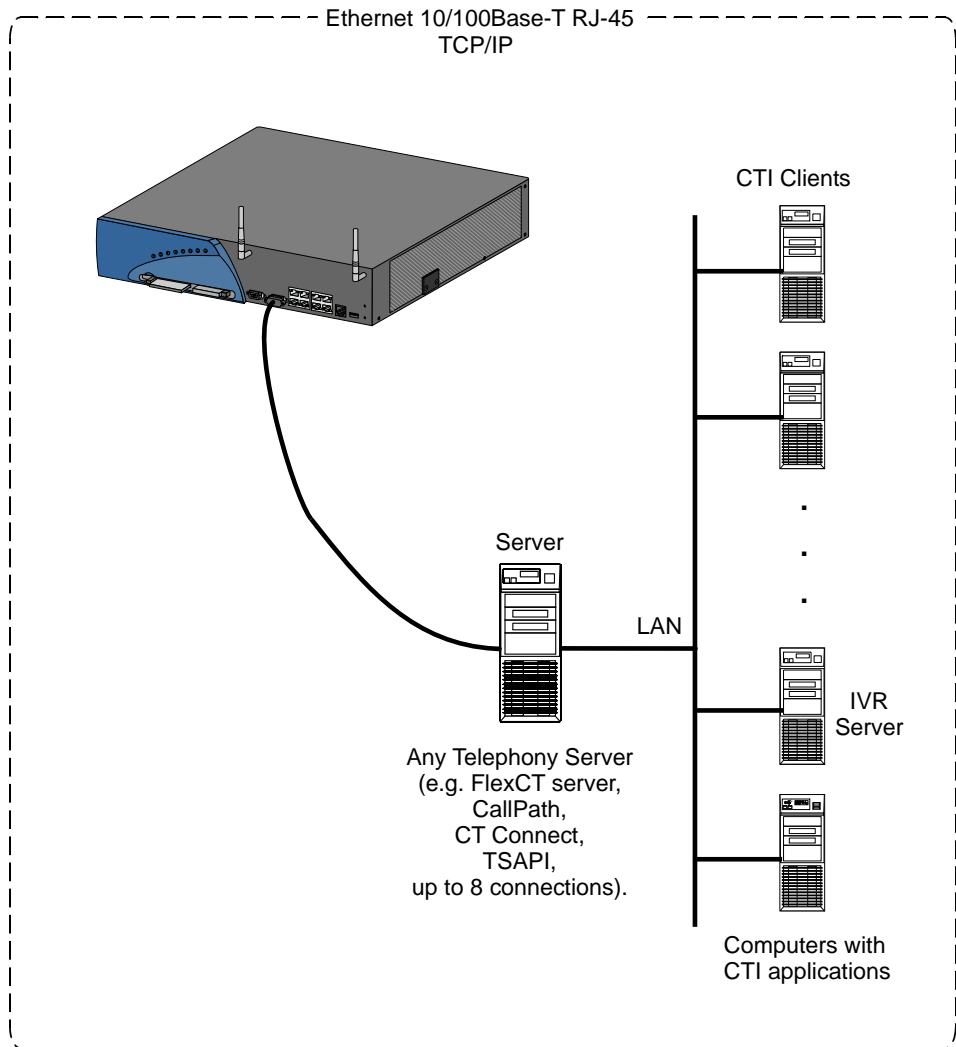
### **NOTE:**

---

*The CLA is described in further detail in Chapter 6 of the Coral Common Control Cards Installation Manual. See also Chapter 2 in the Coral FlexiCom & Coral IPx Product Description, for more details.*

---

**Figure 8-3 CoraLINK  
Application Telephony  
Server**



## Group Controller Circuit

---

The group controller embedded circuit serves as the communication link in the Coral IPx Office system, between the MCB Office and the peripheral cards via the MBP Office backplane.

The group controller circuit contains the High-Level Data Link Control (HDLC) bus interface circuitry, Pulse Code Modulation (PCM) bus interface circuitry, clock circuitry to synchronize the peripheral section of the system, and digital tone generators (dial, busy, ringing, ringback, DTMF, MFC, and test). Additionally, the group controller contains circuitry to synchronize the Coral peripheral clock to an external clock derived from a digital trunk interface. The group controller circuit supports two HDLC highways and sixteen PCM streams (including one stream reserved for the MRC), and up to two expansion cages. It is capable of establishing a maximum of 1024 time slots on its maximum peripheral shelf capacity. This matrix allows for a Constant Frame Delay operation mode.

The time slot distribution is described in [Figure 8-6](#).

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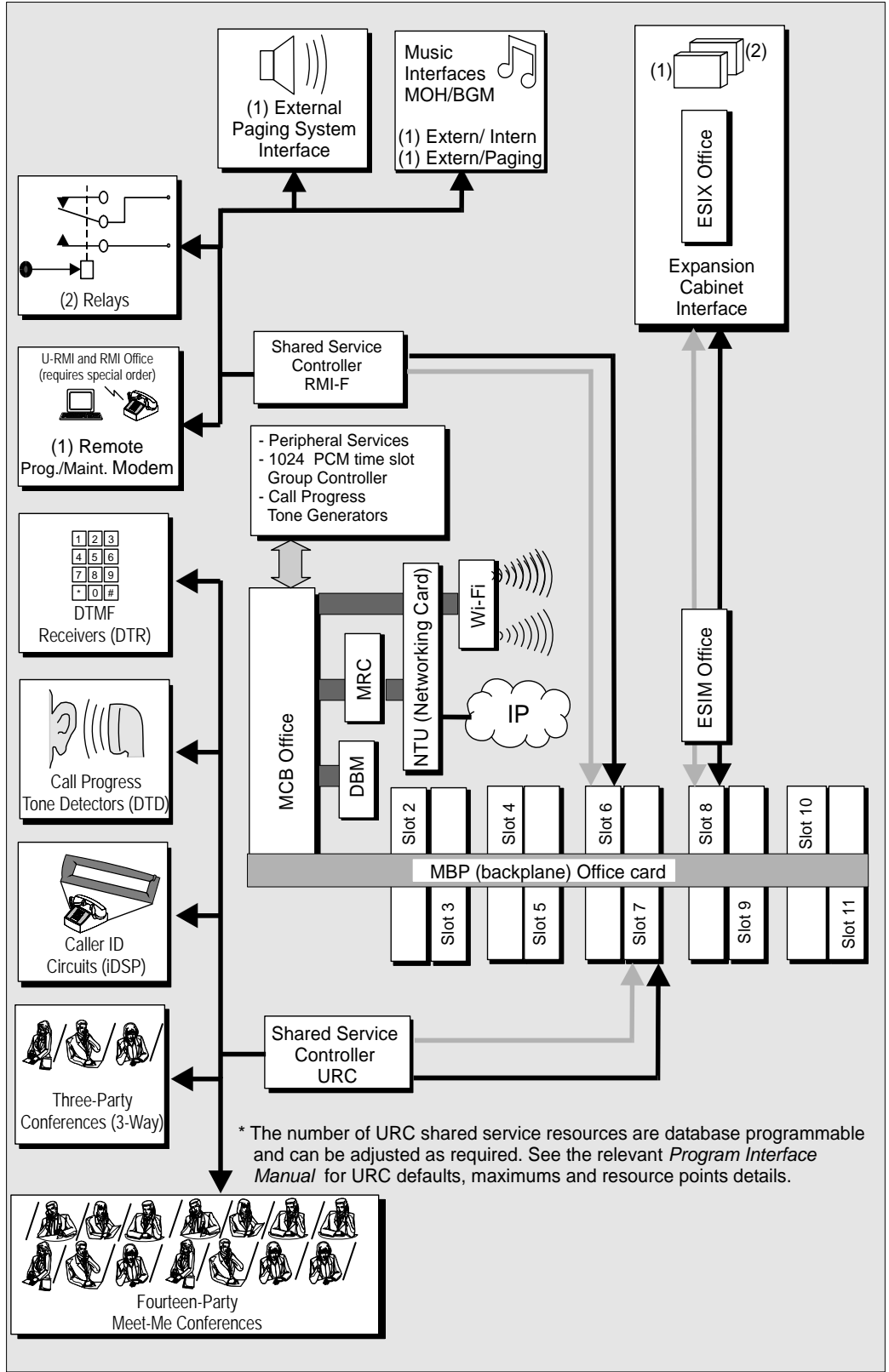
### *Voice Switching and Time Slot Configuration*

The group controller supports up to two HDLC highways, 16 PCM streams, and up to two expansion cages.

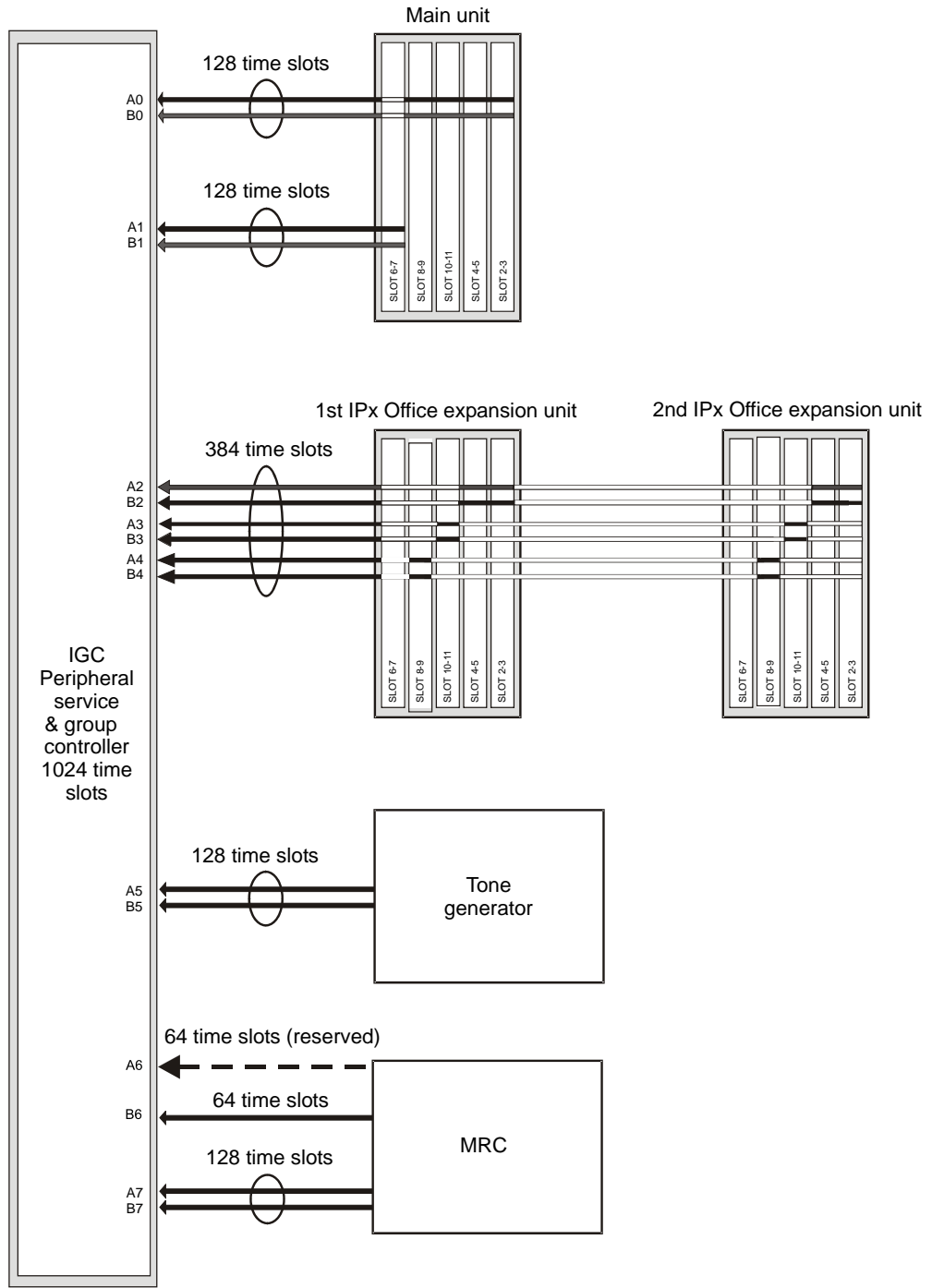
Each PCM stream includes 64 Time Slots. Each shelf unit (one or two expansion units) receives 384 Time Slots, divided into three groups of 128 Time Slots.

The Coral IPx Office supports 1024 PCM time slots. The expansion shelf unit requires only 384 of the entire 1024 time slots. The remaining time slots are used for the main unit, the tone generator, and the MRC. See [Figure 8-6](#).

Figure 8-4 Coral IPx Office Voice Switching



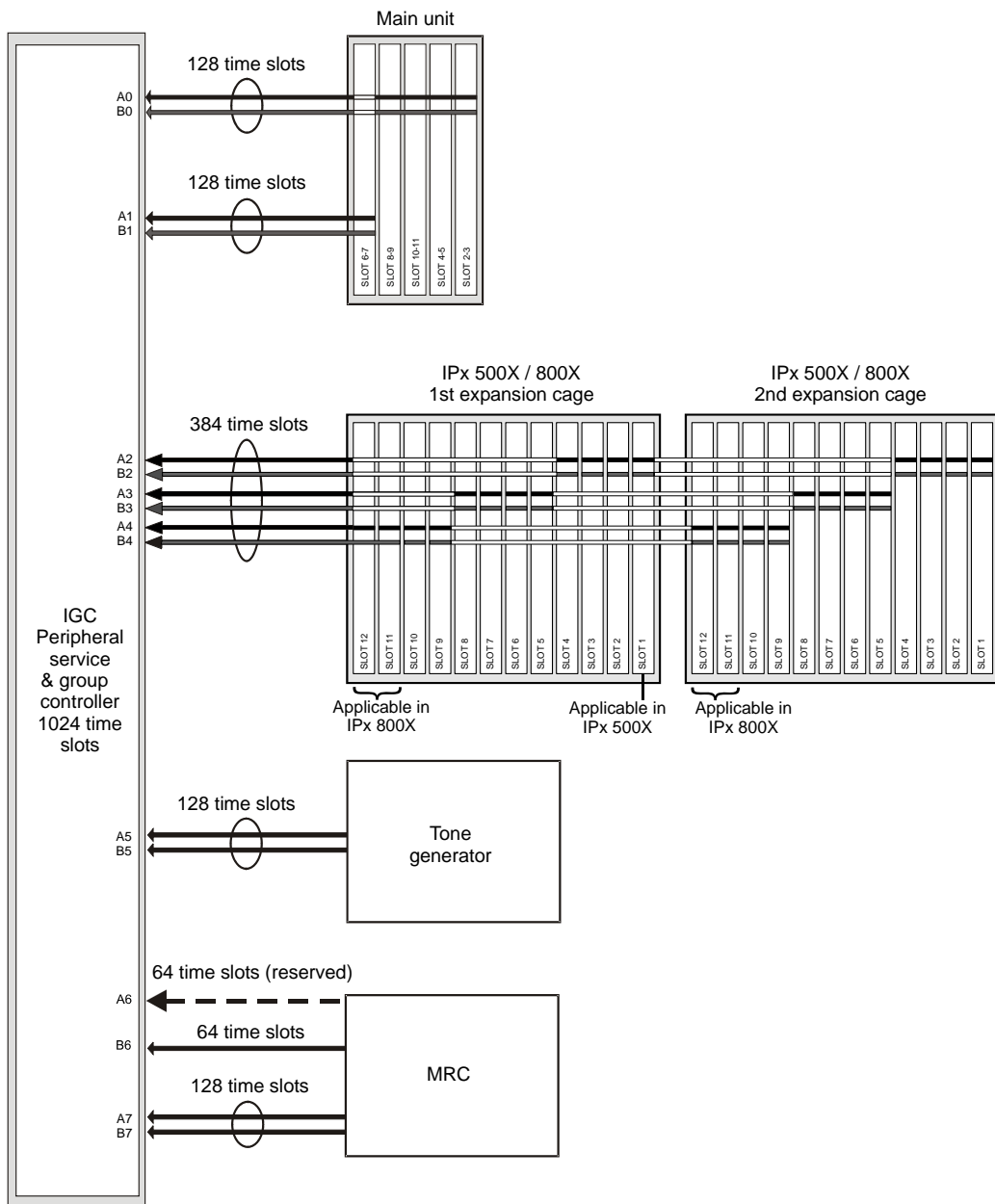
**Figure 8-5 Highways for IPx Office with IPx Expansion Units**





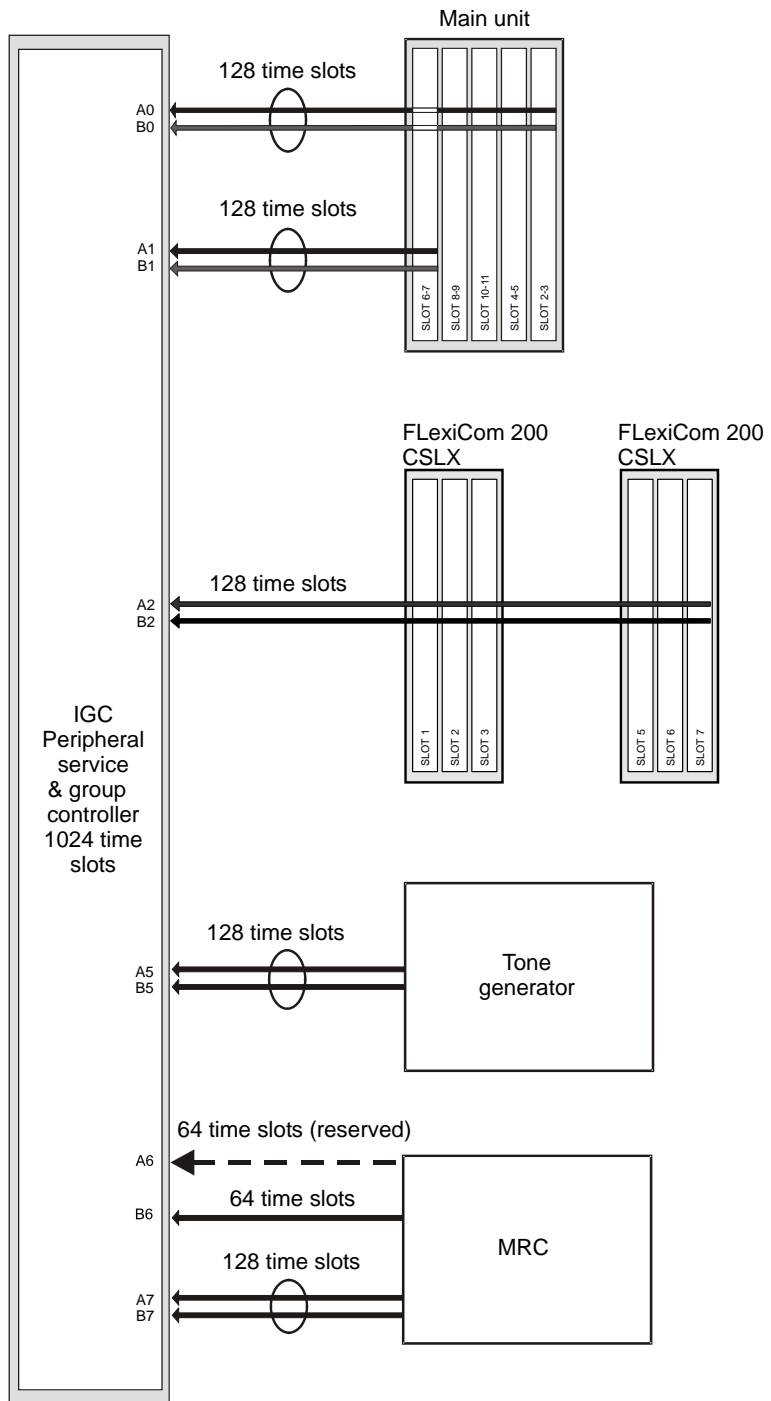
## NOTES:

**Figure 8-6 Highways for IPx Office with IPx 500X/800X Cages**



## NOTES:

Figure 8-7 Highways for IPx Office with FlexiCom 200 CSLX Cabinets



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## *Circuit Description*

### *Clock Selection*

The external clock synchronization selector monitors the two inputs for the presence of an 8.0 kHz clock signal, which may be derived from a digital trunk card. A primary and secondary clock source may be defined in the system database, to synchronize the PCM clock of the group controller to the digital trunk. In the absence of an external clock source, the group controller always reverts to an internal clock. Clock failure is reported in the Program Interface.

### *Digital Tone Generator*

The digital tone generator generates the audio call progress tones used to notify the caller of the status of the call. The stored tone patterns are sent directly to the digital PCM bus when required.

### *PCM Streaming*

Each PCM stream operates at a data rate of 4.096 Mbps. Each PCM stream consists of transmit and receive signals, each of which are divided into 64 time slots. Each time slot is eight bits wide, sampled every 125  $\mu$ s, or 8,000 times per second. This rate matches both A-law and  $\mu$ -law PCM voice transmission rates to facilitate complete digital integration with the local telephone network.

The time switching matrix, acting on command by the system processor, is responsible for forwarding PCM voice samples from an incoming transmit time slot assigned to one port to a complementary outgoing receive time slot for the recipient port.

---

## *Using Time Slots*

A call between two ports requires one transmit and one receive time slot on a single peripheral highway. Therefore, the group controller is capable of establishing calls between any 1024 time slots and any other 1024 time slots. This switching matrix allows for a Constant Frame Delay operation mode.

## Software Authorization Management

The MCB Office card supervises the feature authorization using the SAU (Software Authorization Unit) lock device. The SAU is a small, encapsulated device that is plugged into a connector on the left side of the MCB Office. [Figure 8-8](#) illustrates four views of the SAU.

The SAU enables a set of permissions and feature authorizations associated with its unique identification number. The Coral software detects and verifies the permission settings of the SAU on the control card (MCB Office), enabling the system to function properly.

The SAU provides the system identification number (i.e. a serial number). Each system identification number is unique. In addition, the SAU stores a market identification number, which indicates the general geographical area in which the Coral system is installed. The system identification number is used to identify a particular Coral system installation site.

During software installation, the SAU serial number is compared with the features authorization data, to verify the authorized use of enhanced Coral system features. During regular system operation, the SAU is checked to ensure that it remains attached to the MCB Office card. However, if necessary, the SAU can be removed for short periods (a maximum of two weeks) without interrupting system operation. If the SAU is removed for more than two weeks, the system ceases to process calls.

### CAUTION!

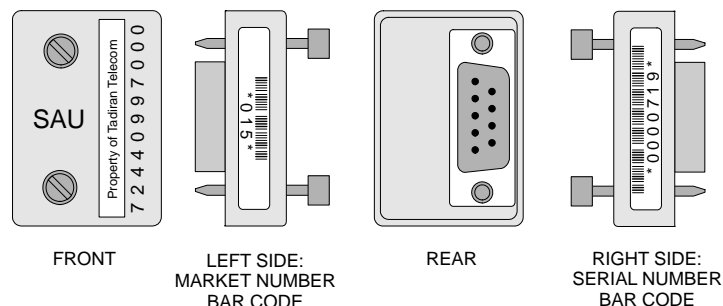
*The Coral system automatically ceases call processing after 14 days for any of the following reasons:*

- The SAU serial number does not match the corresponding IMC8 SAU serial number.
- The Coral generic version contained in the IMC8 is higher than is authorized by the SAU.
- An SAU device is removed from the MCB Office front panel.

*Relevant system messages appear on the PI, warning that the system will not operate without the proper SAU.*

Replacing an MCB Office card necessitates removing the SAU from the old card and installing it onto the replaced MCB Office card.

**Figure 8-8 Software Authorization Unit (SAU) Detail**



When starting up the Coral system, ensure that there are no SAU fault messages during startup or SAU Alarms (PI Branch: Root, 1, 1, 15-Controls) due to any one of the following three reasons:

- A missing SAU device
- Inappropriate SAU software for this type of system
- Mismatched SAU serial numbers on the IMC8/16 and SAU device

---

### *SAU Unique Serial Numbers*

Each SAU is assigned a unique, factory set, system identification serial number, which enables the feature authorizations and Coral generic software version for the Coral system. [Figure 8-8](#) illustrates the four views of the SAU, including sample ID numbers. The left side includes the country code, while the right side includes the unique serial number. The last digit of the serial number is a verification digit. Any leading zeros, as well as the verification digit do not appear in the SAU number reported in the PI root menu.

## ● Front Panel Features

---

The front panel of the MCB Office card contains various elements that are accessed via the front panel. These elements, include LED indicators, buttons, connectors, and disk card slots. Because they are accessed directly from the front panel of the unit, they are described fully in [Front Panel, page 6-3](#).



## IMC8 Flash Memory Card

---

The IMC8 flash card is an integrated memory card with an 8 MB flash memory capacity. It contains the generic software of the Coral and is used to store the system database. See [Flash Memory Cards - IMC8 and IMC16, page 8-37](#) for details.



### NOTE:

*The IMC16 card is a 16MB flash memory card. For specific applications, the IPx Office might require an IMC16 flash memory card. Contact the manufacturer's representative for further information.*

---

The IMC8 flash card is used by the main control during run-time. The memory management on the MCB Office allows part of the code to use portions of the IMC8 flash memory for run-time. Therefore, the IMC8 memory card must not be removed from its drive during system operation. If removed, the system will crash.

### CAUTION!

*Do **not** remove the IMC8 flash memory card from its drive during system operation. Removing the IMC8 flash memory card while the system is operating will cause the system to crash.*

## KB0 RS-232E Programming Port

The serial interface of the KB0 programming port on the MCB Office conforms to the EIA RS-232E specification. It is wired as a Data Terminal Equipment (DTE) device using a popular 9-pin, male, D type connector. The interface allows connection of a common, asynchronous, ASCII data terminal, personal computer or external modem for programming the various features of the Coral IPx Office system and monitoring diagnostic information.

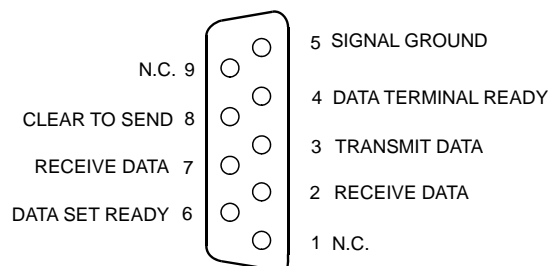
Figure 8-9 illustrates the pin assignments of the DB-9P.

Table 8-1 lists the pin functions. See *Program Interface Device Connection, page 2-47* for detailed connection information and terminal setup.

Table 8-1 **KB0 RS-232E Interface Pin Functions**

| Pin Designation     | Pin # | Function            |
|---------------------|-------|---------------------|
| Receive Data        | 2     | Input to MCP-IPx    |
| Transmit Data       | 3     | Output from MCP-IPx |
| Data Terminal Ready | 4     | Output from MCP-IPx |
| Signal Ground       | 5     | Signal return       |
| Data Set Ready      | 6     | Input to MCP-IPx    |
| Request to Send     | 7     | Output from MCP-IPx |
| Clear to Send       | 8     | Input to MCP-IPx    |

Figure 8-9 **KB0 Pin Assignment**



### *KB0 Setup*

The baud rate is set during first initialization at 9600 bps, No parity, 8 data bits, 1 stop bit, VT-100.

The baud rate can be set from 300 bps to 19,200 bps.

Consult the *Program Interface Reference Manual* (Chapter-17 Terminal Setup - Route: TERM,0) for instructions on the database programming required.

## UGW COM RS-232E Maintenance Port

### For manufacturer's use, only.

The serial interface of the C/PUGW programming port on the MCB Office, accessed from the front panel of the main unit as shown in [Figure 8-15 on page 8-38](#), conforms to the EIA RS-232E specification. It is wired as a Data Terminal Equipment (DTE) device using a popular 9-pin, male, D-type connector. The interface allows connection of a common, asynchronous, ASCII data terminal, personal computer for maintenance and monitoring diagnostic information.

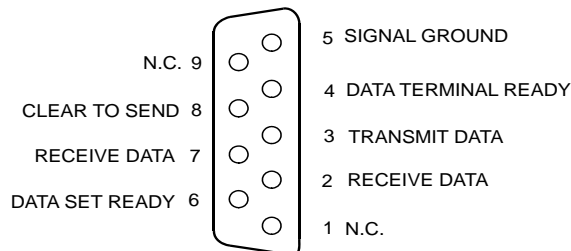
[Figure 8-10](#) illustrates the pin assignments of the DA-9S (RS-232) D-type connector.

[Table 8-2](#) lists the pin functions.

**Table 8-2 UGW COM RS-232E Interface Pin Functions**

| Pin Designation     | Pin # | Function               |
|---------------------|-------|------------------------|
| Receive Data        | 2     | Input to MCB Office    |
| Transmit Data       | 3     | Output from MCB Office |
| Data Terminal Ready | 4     | Output from MCB Office |
| Signal Ground       | 5     | Signal return          |
| Data Set Ready      | 6     | Input to MCB Office    |
| Request to Send     | 7     | Output from MCB Office |
| Clear to Send       | 8     | Input to MCB Office    |

**Figure 8-10 UGW COM Pin Assignment**



### UGW COM Setup

The baud rate is set during first initialization at 115200 bps, No parity, 8 data bits, 1 stop bit, VT-100.

## ● DBM Memory Card

---

The DBM card is an expansion memory card. It adds an additional 4 or 8MB SRAM to the Coral main control. The card is equipped with an extension connector on its top side. However, only one DBM card can be installed in the IPx Office unit. There is no battery installed on the DBM card. In the event of a power failure, the DBM is powered from the lithium battery installed on the MCB Office. For further information, see [DBM-4 and DBM-8 Module, page 8-47](#).

## Lithium Battery Condition Testing

A new lithium battery can maintain power to the MCB Office memory circuitry and real-time clock for approximately 90 days. The battery is *not* recharged by the system power. Thus, if the battery has powered the memory and real-time clock for an extended period and is almost discharged, the contents of the memory must be backed up, and the battery must be replaced.

The battery voltage, tested under load, can be used to determine its state of charge. Voltage measured across an unused battery connected to the memory circuitry should fall between 3.30 and 3.35 volts. If the voltage measured across a battery is less than 2.50 volts, the battery must be replaced.

### *Replacing the Lithium Battery*

In the following procedure, do not apply too much pressure to the battery clasp as this could cause it to break.

- 1 Turn off the battery switch.
- 2 Carefully raise the battery clasp.

#### **CAUTION!**

*Do not use any metal tool to release or insert the battery. Doing so could result in a short circuit and damage the battery.*

- 3 Insert the new battery with the + (positive) symbol appearing on top.

#### **WARNING!**

##### **Explosion and Environmental Hazards.**

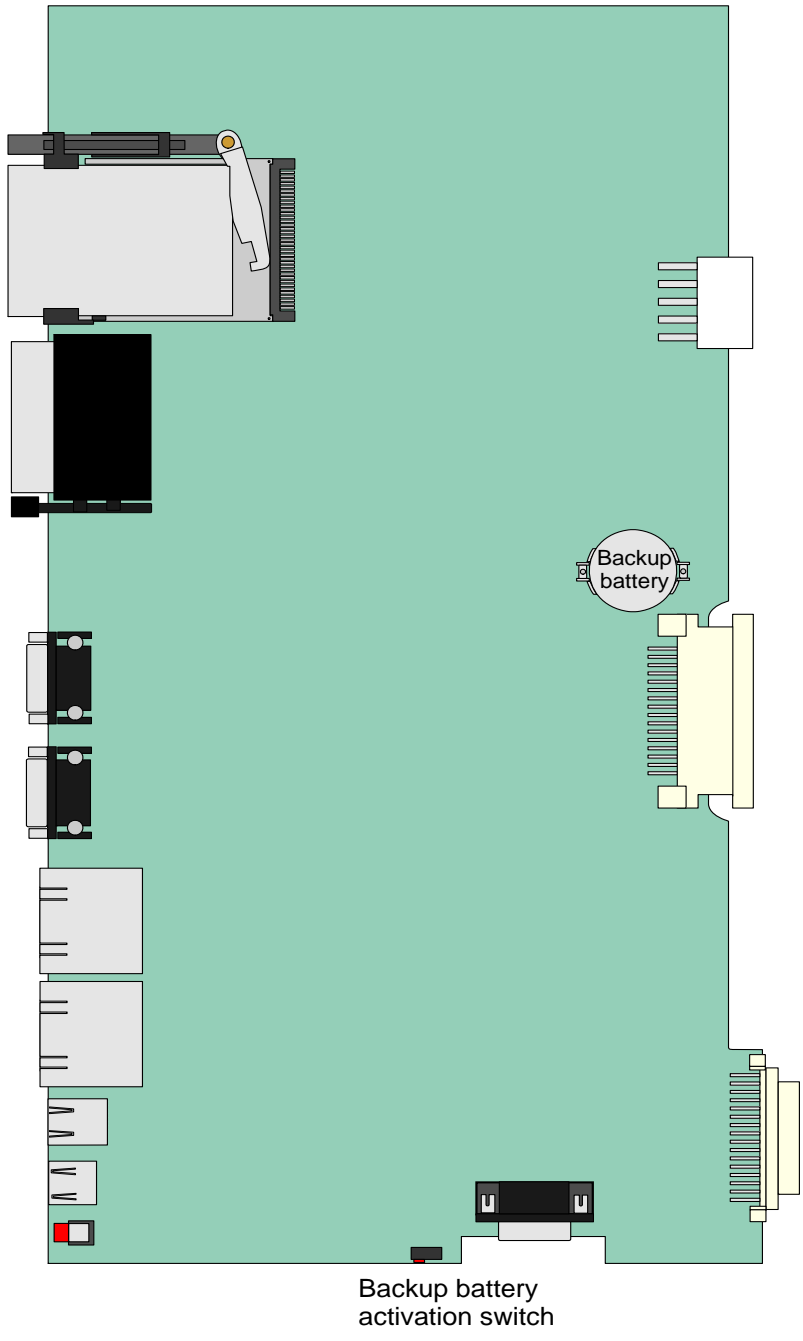
*There is a danger of explosion if the battery is replaced incorrectly.*

*Replace the battery only with the same or equivalent type recommended by the manufacturer.*

*Dispose of used batteries according to requirements specified by the battery manufacturer and/or local regulatory agencies.*

- 4 Turn on the battery switch.

Figure 8-11 MCB Office Card Battery Activation Switch



## Specifications - MCB Office

---

|  |   |
|--|---|
| <b>Microprocessor:</b> .....               | Intel™ 80386EX  |
| <b>CPU Clock Rate:</b> .....               | 32 MHz  |
| <b>Memory Addressing:</b> .....            | 16 MB   |
| <b>Data Bus Structure:</b> .....           | 16 Bit; Shared with DBM-X, IMC8/16                    |
| <b>RAM Storage Capacity:</b> .....         | 2M Bytes with battery backup (90 days typically)      |
| <b>RAM Backup Battery:</b> .....           | LF1/2W, 2430, 2430B                                   |
| Voltage.....                               | 3.0 VDC Nom.  |
| Capacity.....                              | 250 mA/H  |
| Control.....                               | Activation switch                                     |
| Dimensions:                                |   |
| Diameter.....                              | 0.965 in. (24.5 mm)                                   |
| Width.....                                 | 0.118 in. (3 mm)                                      |
| NEDA Equivalent .....                      | 5011L   |
| <b>Baby Cards:</b> .....                   | Up to two (one DBM-X and one MRC)                     |
| <b>KB0:</b> .....                          | RS-232E, DB-9S  |
| Baud rate .....                            | 300 bps to 19,200 bps                                 |
| Parity .....                               | None, Odd, Even                                       |
| Number of bits.....                        | 7, 8  |
| Stop bit .....                             | 1   |
| Default.....                               | 9600 bps, No parity, 8 data bits, 1 stop bit, VT-100  |
| <b>MAP Applications (C/PUGW) COM:</b> .... | RS-232E, DB-9S  |
| Baud rate .....                            | 9600 bps to 115,200 bps                               |
| Parity .....                               | None, Odd, Even                                       |
| Number of bits.....                        | 7, 8  |
| Stop bit .....                             | 1   |
| Default.....                               | 11500 bps, No parity, 8 data bits, 1 stop bit, VT-100 |

**NOTES:**



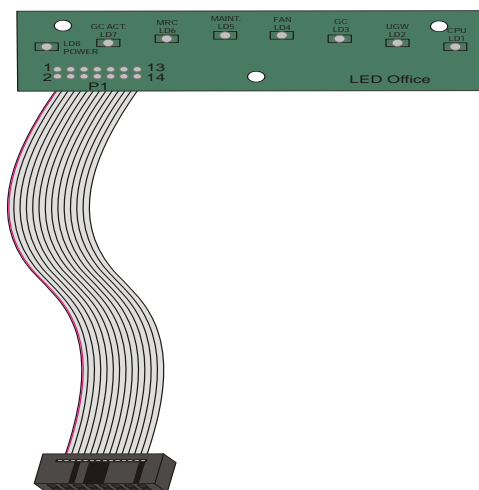
## 8.3 LED Card

### General Information

The LED card includes the eight (8) diagnostic LED indicators that appear on the front panel of the IPx Office system. These LEDs are:

- **POWER** (green) - indicates whether the 5V power output is functional
- **GC ACT.** (green) - indicates 16GC activity status
- **MRC** (green) - indicates whether the MRC card is functioning
- **MAINT.** (red) - indicates whether the MCB circuit is in maintenance mode
- **FAN** (red) - indicates whether the fans are functional
- **GC** (red) - indicates the GC status
- **UGW** (red) - indicates the C/PUGW status
- **CPU** (red) - indicates the MCP circuit status

Figure 8-12 **LED Office Card**



## Replacing the LED Office Card

---

This section describes how to remove the LED Office card from the unit cover and replace it with a new one.

To replace the LED Office card:

- 1 Open the unit cover. See [Opening the Unit Cover, page 6-9](#).
- 2 Unfasten the three M3X6 screws that connect the LED Office card to the unit cover and safeguard for reassembly.
- 3 Do one of the following:
  - Disconnect the LED Office card cable from the MCB Office card. See [Figure 6-12 on page 6-11](#).
  - Disconnect the LED Office card cable from the EBP Office card. See [Figure 6-13 on page 6-13](#).
- 4 Remove the LED Office card.
- 5 Position the new LED Office card such that the holes in the LED Office card are aligned with the threaded holes on the unit cover.
- 6 Fasten the LED Office card to the unit cover with the three M3X6 screws.
- 7 Do one of the following:
  - Connect the LED Office card cable from the MCB Office card.
  - Connect the LED Office card cable from the EBP Office card.
- 8 Close the unit cover. See [Closing the Unit Cover, page 6-10](#).

## 8.4 Flash Memory Cards - IMC8 and IMC16

### Introduction

---

The Coral system is delivered to the site with factory-loaded software on IMC card. The IMC card contains three types of data:

- Generic Feature Software Version and Boot Code
- Authorization
- Database Backup

The IMC card can be inserted into a PC slot using any PCMCIA application adapter for loading a new Coral IPx Office software version.

Whenever an updated version of the Coral software is released, the upgrade is delivered to the sites either on a disk, e-mail, or via other electronic media file transfer. The upgrade is contained in a self-extracting compressed file, specific for the site.

The upgraded generic feature software must be extracted by a PC using the FMprog tool, and then written from the PC hard disk into the IMC card. The FMprog is a tool for Coral dealers who install, upgrade and maintain Coral systems using flash memory cards. For FMprog application, see the *FMprog PC-Utility Reference Manual*. This reference manual describes how to install and operate the FMprog-Utility.

### General Information

---

The IMC card is an integrated memory card with 8MB or 16MB of flash memory and capacity. It contains the Erasable, Programmable, Memory flash, used to store the generic feature software of the control card and the system database.

The flash memory card is a removable component of the common control section installed on the MCB Office card.

- The IMC8 card includes 8MB of flash memory.
- The IMC16 card includes 16MB of flash memory.

**NOTE:**

*The IMC16 card is a 16MB flash memory card. For specific applications, the IPx Office might require an IMC16 flash memory card. Contact the manufacturer's representative for further information.*

The generic feature software determines the feature operation of the Coral system. In addition, the flash card is used to store the database backup as well as the Boot Code. The flash card is used by the main control during run-time. Therefore, the flash card must not be removed from its drive during system operation. If removed, the system will crash.

**CAUTION!**

*The IMC flash card could be damaged if removed when the system is powered. Data will be lost if power is removed from the system while programming the flash memory during backup.*

The flash card provides an extremely reliable and non-volatile storage medium, yet allows field software update capability. Once programmed, the flash memory retains its contents indefinitely without power. However, by using a precisely controlled erase procedure, the entire flash contents can be flash cleared and then reprogrammed to update the operating software of the system.

The IMC is a FlashLite Linear PC Card provides an easy, simple data storage in a standard PCMCIA Type I form factor. The FlashLite PC Card provides a rugged, removable linear flash data storage solution for mobile, embedded systems and Telecom applications. The card can also be inserted into a PC slot using any PCMCIA application adapter for loading a new Coral IPx Office software version.

## IMC Flash Card Slot

The flash card slot, marked MEMORY, is located on the front panel of the Coral IPx Office main unit as shown in Figure 8-15. The labels are affixed to the flash cards by the manufacturer as shown in Figure 8-13 and Figure 8-14.

Figure 8-13 **Flash Memory Card Installed - Top**

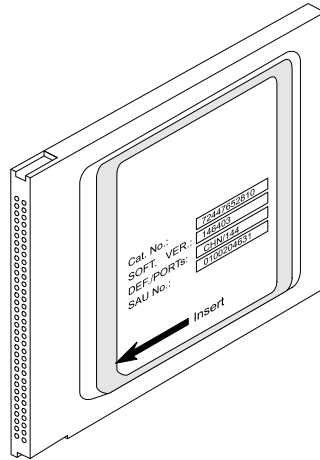


Figure 8-14 **Flash Memory Card Installed - Bottom**

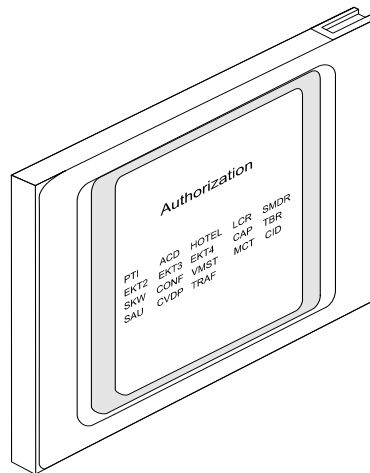
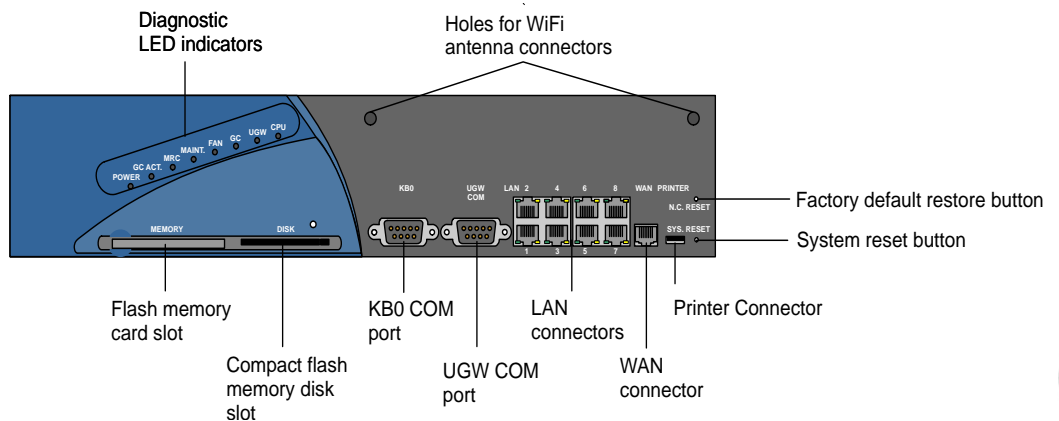


Figure 8-15 **Main Unit Front Panel**



## Removing the IMC8 Card

The flash card contains three types of data:

- Generic Feature Software Version
- Database Backup
- Boot Code

When replacing a flash card with another card that contains upgraded software, the new card might not contain an updated database. If the new card does not contain a database, make a binary backup of the existing database before removing the card. See the *Database Binary Backup PC Utility Reference Manual* for further details.

### CAUTION!

*The flash card could be damaged if removed when the system is powered. Data will be lost if power is removed from the system while programming the flash memory.*

To remove a memory flash card:

- 1 When required, save the Coral database to the flash card and wait while the data is being written to the flash card. See *Saving to a Directory*, page 4-6.
- 2 Verify that the database is not being backed up:  
To verify whether database backup is being executed:
  - Activate the Do-Not-Disturb feature (default access code #145) from any phone with a display panel.
  - Cancel the feature.If the following message appears on the display, database backup is being executed:  
**TEMP. BLOCKED  
B A C K U P.**
- 3 If the database is not being backed up, turn OFF the power supply.
- 4 If expansion units are installed in the system, remove power from all of them.

### CAUTION!

*Before removing a memory card from the Coral system turn the power supply OFF. The flash card could be damaged if removed when the system is powered.*

- 5 If the main power supply is turned OFF, press the flash memory card release button on the front panel of the main cage. This releases the flash card from the drive.

## Installing the IMC8 Card

The flash memory card does not occupy a card slot within the Coral system. It is inserted into the flash drive of the MCB Office card. The flash memory release button releases the flash card. An arrow on the front side of the flash card indicates the insertion direction. The IMC8 flash card slot is shown in [Figure 8-2](#) and [Figure 6-3](#).

To install a flash memory card:

- 1 Remove the old memory card, as described in [Removing the IMC8 Card, page 8-40](#)
- 2 Verify that the power supply in the main cage is turned OFF.
- 3 If expansion cages are installed in the system, turn the power supply of all expansion cages OFF.

### CAUTION!

*Turn the Coral power supply OFF. The flash card could be damaged if inserted when the system is powered.*

- 4 Insert the flash card into the drive on the front panel of the IPx Office main unit.

### CAUTION!

*Push the flash card very gently during the card insertion. The flash card could be damaged if inserted with excessive force.*

- 5 Turn ON the power supply in the main cage.
- 6 Verify that the following two messages appear on the PI device:

For SERVICE/SOFTWARE installation menu

HIT <CTRL I> NOW

\*\*\*\*\*

CHK RAM

END CHK RAM

Custom Init Code...

The second message may appear after two or three minutes, following several short messages that appear during system start-up:

CCS is on the air.....  
(ROOT)  
CCS xx.xx.xx  
Copyright (c) 2001-xxxx.....  
NAME - (site name)  
SAU# -

After the second message appears, the system is initialized properly and capable of processing calls. After entering the password, the version level of the generic feature software is indicated where the x's appear in the line that reads CCS xx.xx.xx.

- 7 If the new flash memory card does not include a backup of the current database, perform the procedure described in [Saving to a Directory, page 4-6](#).
- 8 If expansion cages are installed in the system, turn the power supply of each expansion cage on again to initialize the peripheral cards in each cage.

### CAUTION!

*The Coral system automatically ceases call processing after 14 days for any of the following reasons:*

- The SAU serial number does not match the corresponding flash SAU serial number.
- The Coral generic version contained in the flash card is higher than is authorized by the SAU.
- An SAU is removed from the main control processor card.

*Relevant system messages appear on the PI, warning that the system will not operate without the proper SAU.*

The program contained on the memory card permits the generic software to run even if the serial number of the SAU is incorrect, or the SAU is absent entirely. However, if the Coral determines that the SAU is missing or not correct, a message appears during the procedure warning that the system will not operate without the proper SAU. This provision enables the generic feature software and/or feature authorizations to be upgraded onto a memory card in a remote system that can then replace the existing memory card.



## ● Specifications

---

### **IMC8**

Storage Capacity: ..... 8,388,608 Bytes (8MB)

PCMCIA: ..... Standard Compatible

### **IMC16**

Storage Capacity: ..... 16,777,216 Bytes (16MB)

PCMCIA: ..... Standard Compatible

Required: ..... when system database exceeds 1.5MB

**NOTES:**

## 8.5 DISK - Compact Flash Disk

### Introduction

An ATA-type PCMCIA connector houses the Compact Flash Disk (CFD) memory. The CFD disk has an erasable memory capacity of 64MB or more.

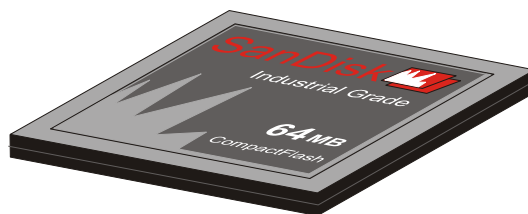
The CFD is used to back up applications, such as SeaMail, for which there is insufficient memory in the Coral. For more information about the SeaMail application, see the *Coral SeaMail User Guide*.

The ATA type PCMCIA slot is housed on the MCB Office card side edge.

### Inserting the CFD

The CFD card is inserted to the slot marked DISK, with the front side facing up as shown in [Figure 8-15 on page 8-39](#).

Figure 8-16 **CFD Card**



### Removing the CFD

Press the card release button on the front panel of the Coral IPx unit.

**NOTES:**

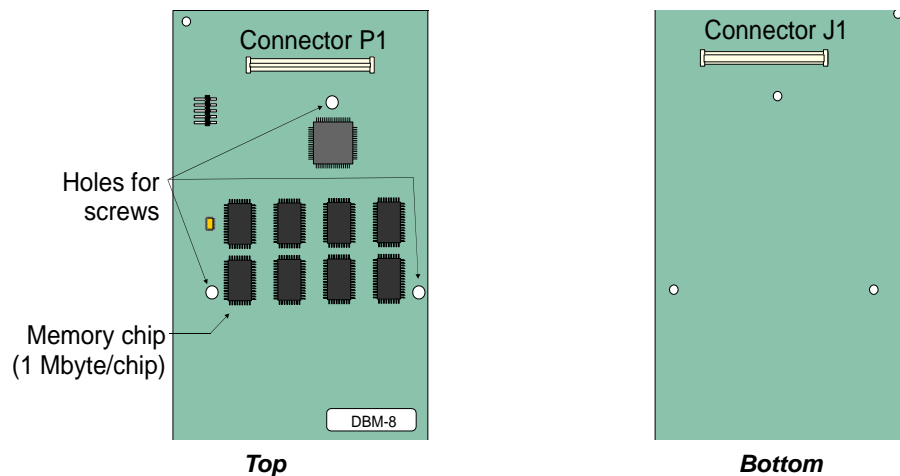
## 8.6 DBM-4 and DBM-8 Module Database Expansion Memory Card

### General Information

The DBM memory expansion card is a component of the Coral IPx Office common control section. The DBM integrates 4MB or 8MB of Static Random Access Memory (SRAM), used to store the configuration database of a IPx Office system. The DBM is an optional card that expands the database memory space. The configuration database determines the individual characteristics of a particular installation site. [Figure 8-17](#) displays the DBM card layout. The label at the bottom of the card that reads “DBM-8”, indicates that the DBM card is supplied with 8MB of memory (1 MByte per chip).

Only **one** DBM card can be installed in the IPx Office unit.

Figure 8-17 DBM Card Layout



SRAM devices require a constant source of power to retain their memory. Power to maintain the memory is ordinarily provided by the IPx Office system in which the DBM is installed. Backup voltage is supplied by the MCB Office lithium battery.

The MCB Office card contains an on-board lithium battery that provides continuous power to the DBM memory circuitry during the absence of system power. A battery monitor circuit signals the main processor when the remaining electrical power stored in the lithium backup battery has exhausted to a level that can no longer support the memory circuitry.

The DBM does not occupy a card slot within the IPx Office system unit. Rather, it is installed as a baby card onto a memory interface connector on the MCB Office main processor card. The J1 connector on the DBM bottom card is installed onto the P13 connector of the MCB Office card. See [Figure 8-18](#).

The DBM card is equipped with an extension connector “P1” on the top side, this connector is not used in IPx Office systems. (In other Coral systems it allows for another DBM or MAP card to be connected on top of it. Refer to chapter 3 of the *Coral Common Control Cards Installation Manual*.)

Most Coral IPx Office systems do not require a DBM at all. Special applications may require a DBM.

### CAUTION!

*Once the system database has been installed, the DBM is powered by a backup battery positioned on the MCB Office main control processor card. Removing the DBM card from the MCB Office card will cause data on the DBM card to be lost. Doing so will cause the Coral IPx Office system to malfunction.*

### When a DBM Card is Required

To use one or more of the following features:

- Coral Directory
- Traffic
- Call Log

Refer to the [Program Interface Reference Manual](#) (Chapter-4 Size Definition, Route: SIZ, CHECK MEMORY?) to display the database memory status.

## Installing the DBM Card

The DBM card is secured to the MCB Office card by threaded standoff spacers. The parts used to attach the spacer to the MCB Office are listed below. The DBM assembly kit includes additional parts. However, you only need to use the parts listed below.

### *Preparing for DBM Installation*

- 1 Locate a desk or table top that will support the weight of the IPx Office and any necessary materials. If the surface can be damaged by sharp objects, place a protective sheet of cardboard or similar material over the top surface.
- 2 Refer to [Removing the IMC8 Card, page 8-40](#) and carefully follow the procedure as described in that section.

#### **CAUTION!**

*The IMC8 card could be damaged if removed when the system is powered. Data will be lost if power is removed from the system while flash memory is being programmed.*

- 3 Remove the compact flash disk. See [Removing the CFD, page 8-45](#).
- 4 Verify that power has been removed from the main unit before proceeding.

#### **WARNING!**

*Electrical Hazard. Contact with live internal components could cause shock, burn, or death. Before opening the unit cover, power must be removed from the system.*

- 5 If necessary, dismount the unit from the rack. See [Dismounting the IPx Office Unit from the Rack, page 2-16](#).
- 6 Attach the ESD wrist strap to your wrist and to a GND connection. See [Card Handling Procedures, page 8-4](#).
- 7 Open the cover of the main unit. See [Opening the Unit Cover, page 6-9](#).
- 8 The unit interior is shown in [Figure 6-12 on page 6-11](#).

## *Installing the DBM Card*

- 1 Verify that all assembly parts required to assemble the DBM card to the MSB Office card are available. See [Table 8-3](#).

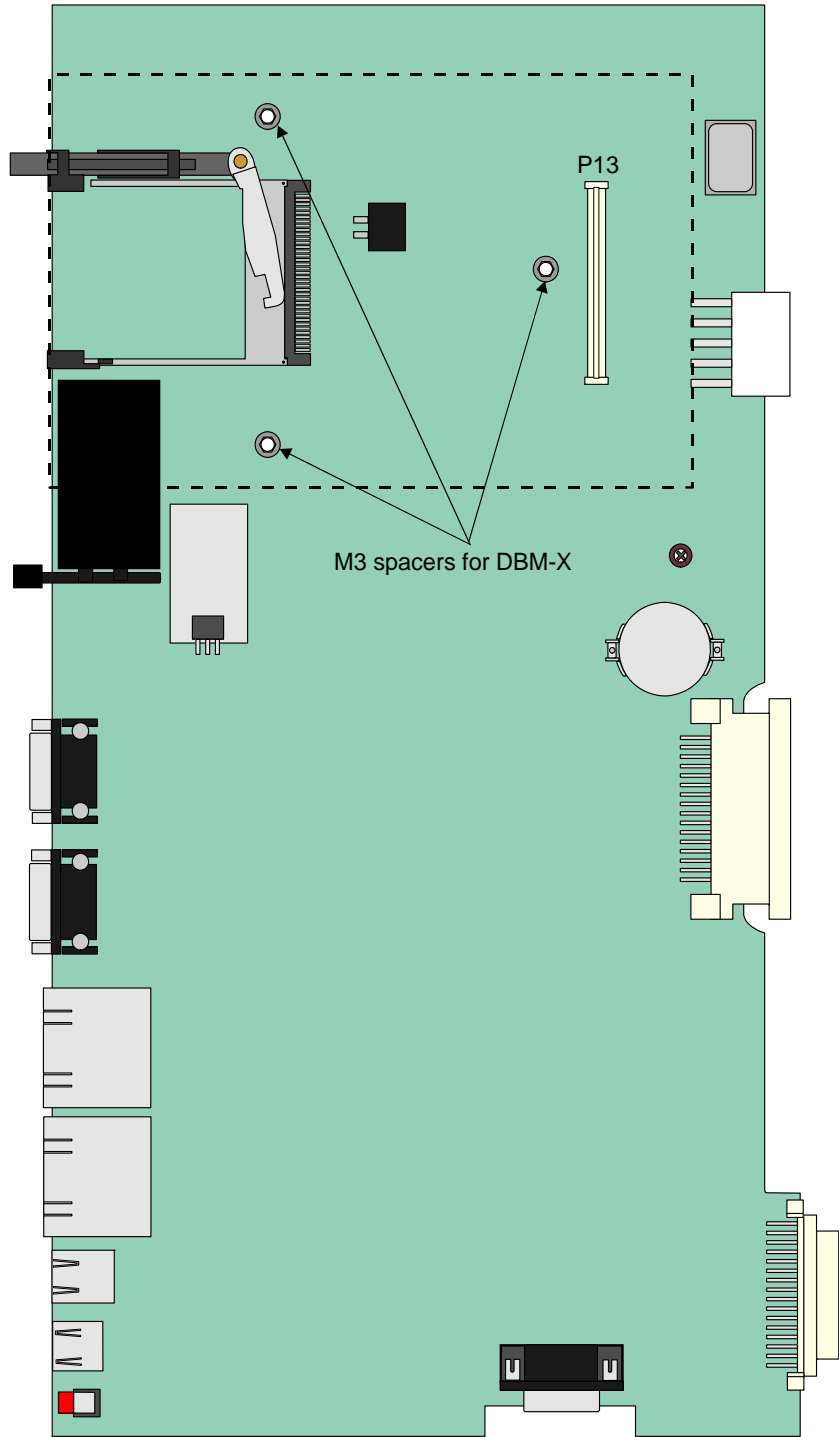
**Table 8-3 DBM Card Assembly Kit**

| Part   | Quantity |
|--|----------|
| Phillips screw M3X6                                      | 6        |
| Washer spring curved A3                                  | 6        |
| Male-female standoff hex M3X8                            | 3        |
| Female-female standoff hex M3X8 (not used in IPx Office) | 3        |

- 2 Perform all of the necessary steps outlined in [Preparing for DBM Installation, page 8-49](#).
- 3 Fasten the three male-female hex M3X6 standoff spacers into the three holes displayed in [Figure 8-18](#).
- 4 Position the DBM card on top of the MCB Office card and align the three fastening holes on top of the standoff spacers.
- 5 Gently, but firmly press the DBM connector into MCB Office connector until the DBM card rests on the standoff spacers. A slight resistance will be felt as the cards engage.
- 6 Position the A3 spring curved washers over the three DBM holes
- 7 Insert the 3 Phillips M3X6 screws into the DBM card holes and fasten them to the M3X8 male-female standoff spacers.



Figure 8-18 DBM  
Assembly onto MCB  
Office



## Removing the DBM Card

---

### CAUTION!

*The DBM is powered by a backup battery positioned on the MCB Office card. Removing the DBM card from the MCB Office card will cause data on the DBM card to be lost. Perform the Database Binary Backup procedure before removing the DBM card from the main control card.*

- 1 Perform the steps specified in [Preparing for DBM Installation, page 8-49](#).
- 2 Remove the M3X6 Phillips screws and washers that secure the DBM card to the standoff spacers of the MCB Office card and safeguard for future re-assembly.
- 3 Place your thumbs on the MCB Office card, on either side of the DBM card near the MCB Office front side. Use your fingers to lift the edge of the DBM card on both sides and gently disengage the multi-pin connector J1 on the DBM from MCB Office connector P13.

## ● Specifications - DBM Card

---

Storage capacity per chip: ..... 1,048,576 Bytes (1MB)

Backup Battery:..... Located on the MCB Office card

Storage Capacity:

DBM-4 ..... 4MB (4,194,304 Bytes)

DBM-8 ..... 8MB (8,388,608 Bytes)

Memory Configuration: ..... 16 bits

**NOTES:**

## 8.7 Hard Disk for Systems that Include SeaMail

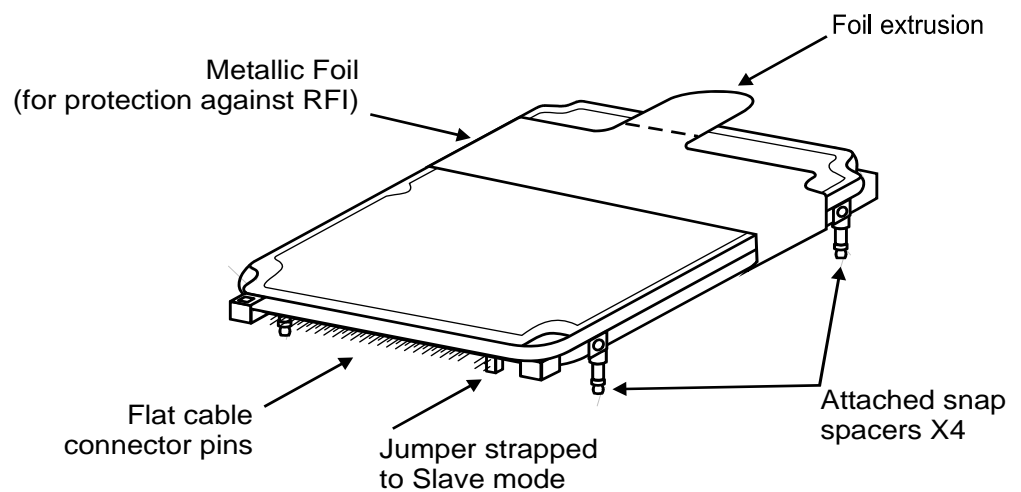
### About the Hard Disk

The hard disk includes the SeaMail voicemail application and is installed in the Coral IPx Office by the manufacturer whenever SeaMail is ordered by the customer. However, it can also be retrofitted at the customer's site if SeaMail is added in the field. For more information about the SeaMail application, see the *Coral SeaMail User Guide*.

The hard disk includes four attached snap spacers, and a jumper plug strapped to Slave mode. See [Figure 8-19](#).

The hard disk is wrapped in a metallic foil for protection against RFI disturbances. Do not remove the metallic foil.

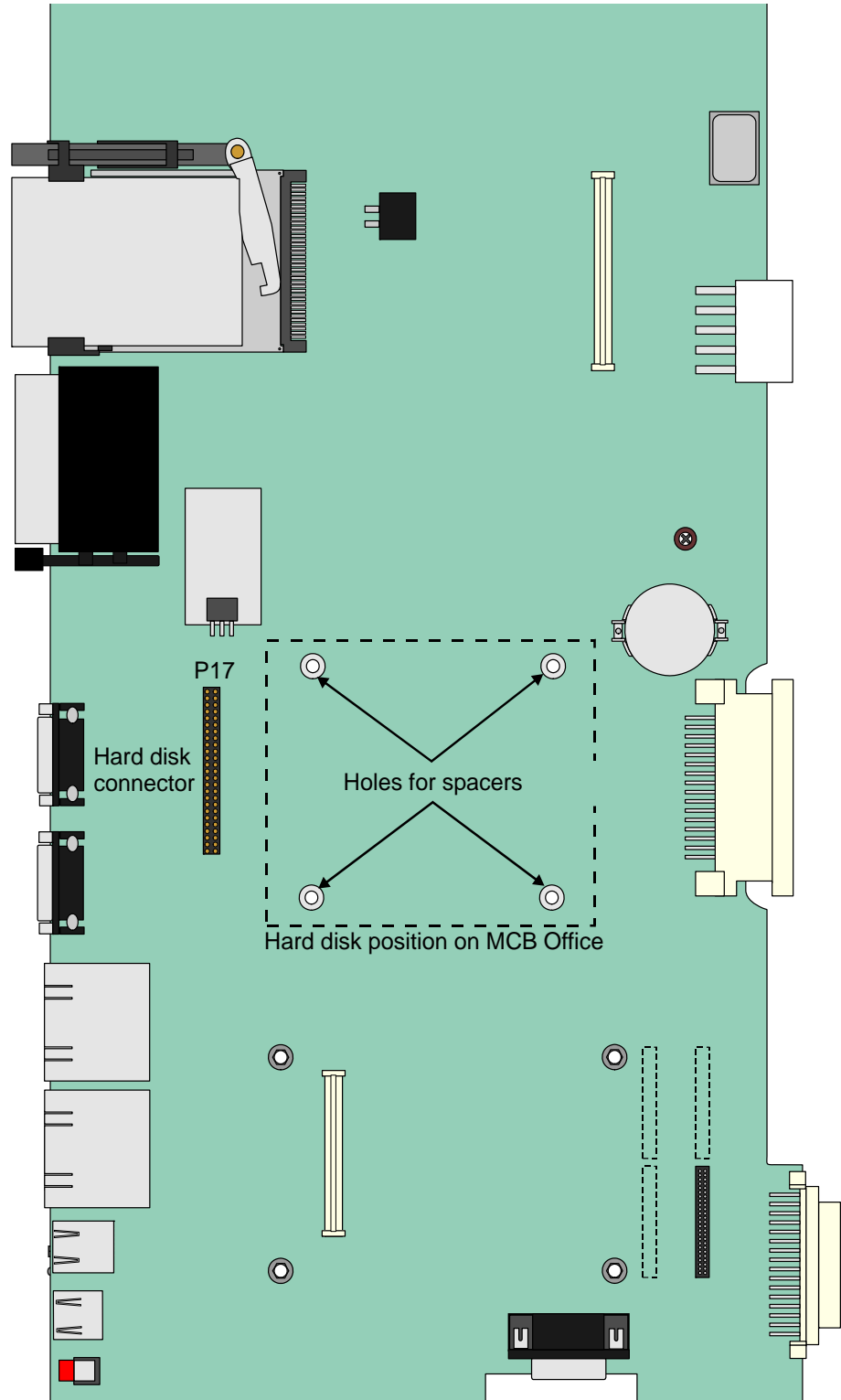
Figure 8-19 **Hard Disk**



## ● Installing and Removing the Hard Disk

The hard disk is installed on the MCB Office card as displayed in [Figure 8-20](#).

**Figure 8-20** *Hard Disk Position on MCB Office*



## Preparing for Hard Disk Installation or Removal

The hard disk is secured to the MCB Office by four snap spacers. The hard disk and the MCB Office are connected by a flat cable. The hard disk components are listed in [Table 8-4](#).

Table 8-4 **Hard Disk Components**

| Part   | Quantity |
|--|----------|
| Hard disk packaged in metallic foil wrapping (for RFI protection) including four (4) attached snap spacers | 1        |
| Flat cable   | 1        |

- 1 Locate a desk or table top that will support the weight of the IPx Office and any necessary materials. If the surface can be damaged by sharp objects, place a protective sheet of cardboard or similar material over the top surface.
- 2 Refer to [Removing the IMC8 Card, page 8-40](#) and carefully follow the procedure as described in that section.

### CAUTION!

*The IMC8 card could be damaged if removed when the system is powered. Data will be lost if power is removed from the system while programming the flash memory during backup.*

- 3 Remove the compact flash disk. See [Removing the CFD, page 8-45](#).
- 4 Verify that power has been removed from the main unit before proceeding.

### WARNING!

*Electrical Hazard. Contact with live internal components could cause shock, burn, or death. Before opening the unit cover, power must be removed from the system.*

- 5 If necessary, dismount the unit from the rack. See [Dismounting the IPx Office Unit from the Rack, page 2-16](#).
- 6 Attach the ESD wrist strap to your wrist and to a GND connection. See [Card Handling Procedures, page 8-4](#).
- 7 Open the cover of the main unit. See [Opening the Unit Cover, page 6-9](#). The unit interior is shown in [Figure 6-12 on page 6-11](#).
- 8 If necessary, remove the NTU Office card. See [Installing and Replacing the NTU Office Card, page 11-9](#).

## Installing the Hard Disk

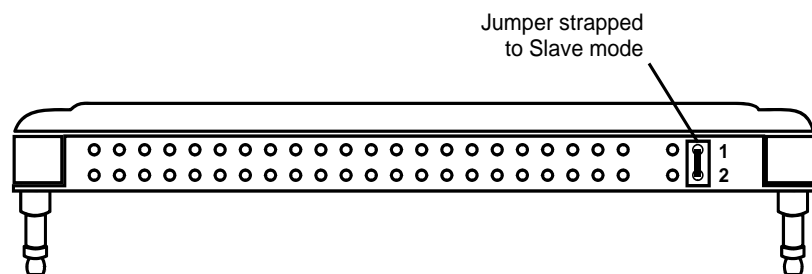
- 1 Perform all of the necessary steps outlined in [Preparing for Hard Disk Installation or Removal](#), page 8-57.
- 2 Cut the metallic foil extrusion that extends beyond the hard disk. Do not remove the metallic foil altogether. See step 1 of [Figure 8-22](#).

### CAUTION!

The metallic foil extrusion is an electrical conductor and can cause damage to equipment if it contacts live electrical components. Remove the foil extrusion that extends beyond the hard disk. Do not remove the foil altogether.

- 3 Verify that the hard disk jumper is strapped to Slave mode. See [Figure 8-21](#).

Figure 8-21 View of Hard Disk from Connector



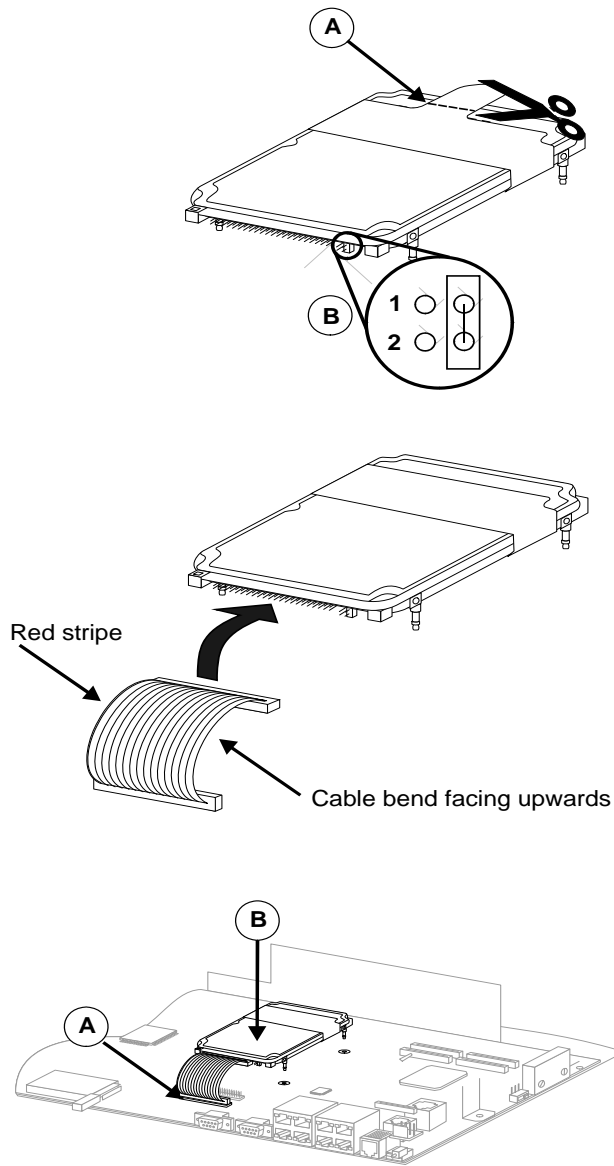
### NOTE:

If the hard disk jumper plug is not strapped over pins 1 and 2, the hard disk will not be configured to Slave mode and will not be recognized by the IPx Office System.

- 4 Connect the flat cable to the male connector on the hard disk. Verify that the red stripe on the cable is oriented towards the left, while the cable bend is facing upwards. See step 2 of [Figure 8-22](#).
- 5 Connect the other end of the flat cable to connector P17 on the MCB Office card. See step 3A of [Figure 8-22](#).
- 6 Attach the hard disk to the MCB Office card as follows:
  - a Position each spacer on the bottom surface of the hard disk adjacent to each mating hole on the MCB Office card.
  - b Press down on the top surface of the hard disk above each spacer until they snap into their mating holes, securing the hard disk to the MCB Office card. See step 3B of [Figure 8-22](#).



Figure 8-22 **Hard Disk Assembly onto MCB Office**



**1** A. Cut foil extrusion.  
B. Verify that jumper is strapped to Slave mode (over pins 1-2).

**2** Connect flat cable to hard disk as displayed.

**3** A. Connect flat cable to connector P17 on MCB Office.  
B. Insert hard disk spacers into mating holes and press down.

---

## *Removing the Hard Disk*

- 1 Perform all of the necessary steps outlined in [Preparing for Hard Disk Installation or Removal](#), page 8-57.
- 2 Gently lift each of the four corners of the hard disk until each spacer separates from the MCB Office card.
- 3 Disconnect the flat cable from connector P17 on the MCB Office card. See [Figure 8-22](#).
- 4 Disconnect the flat cable from the hard disk connector. See [Figure 8-22](#)

## Shared Service Cards

Coral

|      |   |       |
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# 9.1 Shared Service Circuitry Installation

## ● General Description

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The *shared service* circuits provide functions such as media gateway channels, dial and call progress detection, MF tone dialing reception, multi-party conferencing, and more.

Shared service circuits reside on the peripheral bus, but do not provide a physical interface to external devices such as stations and trunks.

## ● Shared Service Cards in the Main Unit

---

The Coral IPx Office main unit is equipped with the following shared service cards:

- One MRC module (optional)
- One of the following four OFFICE cards:
  - U-MR Office, MR Office, U-RMI Office or RMI Office

The main shared service functions of these cards are described in [Table 9-1](#).

## ● Card Handling Procedures

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For card handling procedures and general installation procedure, see [Peripheral Card Installation, page 10-1](#).

## ● MRC Cards

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Shared service circuits in the MRC cards are embedded in DSP units.

The MRC module is a daughter board installed on the MCB Office card in a piggyback fashion, see [MRC-8, 16, 32, 64 Modules, page 9-5](#).

## U-RMI, U-MR, RMI and MR Office Cards

Shared service circuits in the *U-RMI Office*, *U-MR Office*, *RMI Office* and *MR Office* cards are embedded in the MR/RMI-F (U60) unit and the URC (U73) unit.

One of these cards may be installed in peripheral slot 6-7.

see [U-RMI / U-MR / RMI / MR Office Cards](#), page 9-11.



### NOTE:

*U-MR card is supplied as standard. All other variations of the card (U-RMI, RMI, MR) require special order and checking of availability.*

## Shared Service Features in the Main Unit

Table 9-1 *Shared Service Features in the Main Unit*

| Features  | MRC | OFFICE Cards |      |     |     |
|---|-----|--------------|------|-----|-----|
|   |     | U-RMI        | U-MR | RMI | MR  |
| <ul style="list-style-type: none"> <li>■ VoIP media gateway channels</li> </ul>   | Yes | No           | No   | No  | Mo  |
| <ul style="list-style-type: none"> <li>■ One internal or external music interface for music on hold and background music</li> <li>■ One external music interface or one external voice paging interface for public address</li> <li>■ One auxiliary or major/minor alarm relay contacts</li> <li>■ One universal night answer UNA or central bell relay contacts</li> </ul> | No  | Yes          | Yes  | Yes | Yes |
| <ul style="list-style-type: none"> <li>■ A remote maintenance access modem (V.92 ITU-T standard)</li> </ul>   | No  | Yes          | No   | Yes | No  |
| <ul style="list-style-type: none"> <li>■ Tone Detectors (DTD) detects all necessary call progress tones</li> </ul>  | No  | Yes          | Yes  | No  | No  |
| <ul style="list-style-type: none"> <li>■ DTMF Receivers (DTR) for touch-tone digits</li> <li>■ 3-way Conference functions.</li> <li>■ Multi party Conference Bridge (Meet Me)</li> <li>■ Caller ID transmitters (iDSP) for SLT users, adapted to Bellcore standards</li> </ul>  | No  | Yes          | Yes  | No  | No  |
| <ul style="list-style-type: none"> <li>■ Multi-Frequency Code (MF or MFC tone) Receiver and decoder</li> </ul>  | Yes | No           | No   | No  | No  |

Each shared service circuit and function is described in detail in the following sections. Refer to these subsections for more information.

## Additional Shared Service Cards in the Expansion Cages

Additional shared service cards may be installed in the optional Coral IPx 500X and 800X expansion cages.

Additional shared service cards include, but are not limited to the following:

| Card    | Cage                  | Description   |
|---------|-----------------------|---|
| MRC     | IPx 800X<br>w/PUGW    | <p>The MRC-16, 64 (Main Resources Card) functions as a daughterboard to the PUGW/PUGWipx card. It integrates onto one card:</p> <ul style="list-style-type: none"> <li>■ Media channel gateway circuits</li> <li>■ DTMF Receiver (DTR) circuits</li> <li>■ MFC-R2 (MFR) circuits</li> </ul> <p><b>NOTE:</b> For detailed description, refer to Chapter 8 of the <i>Coral Service and Peripheral Cards Installation Manual</i>.<br/>PUGW and PUGWipx support SIP and MGCP end points.</p>  |
|         | IPx 500X<br>w/PUGWipx |   |
| 8DRCM-2 | IPx 800X              | <p>Includes the following functions:</p> <ul style="list-style-type: none"> <li>■ 8 DTD circuit dialTone detector and call progress tone analyzer</li> <li>■ 8 DTR circuit DTMF receiver and decoder card</li> <li>■ 6 x 3-way conference</li> <li>■ 1 x 6-party conference</li> <li>■ 1 internal or external music interface</li> <li>■ 1 external music interface</li> <li>■ 1 external voice paging interface or public address and relay contacts</li> <li>■ 1 auxiliary or major/minor alarm relay contacts</li> <li>■ 1 universal night answer or central bell relay contacts</li> <li>■ 3 RS-232E programming/maintenance interfaces 300 to 115,200 bps</li> </ul> |
| 8DTMF   | IPx 800X              | 8 circuit DTMF Receiver and decoder card.   |
| CNF     | IPx 800X              | Dual 15 party or eight 3-way, digital Conference Bridge card. One card required for each mode (2 x 15-party or 8 x 3-way).  |
| iDSP    | IPx 800X              | FSK tone generator card. Required for displaying Caller ID for SLT users.   |
| 16MFR   | IPx 800X              | 16 MFC tone dialing Receiver circuits.  |
| 8DRCF   | IPx 800X              | <p>Same as 8DRCM-2 but with 1 remote maintenance modem (V.92 ITU-T standard up to 56Kbps).</p> <p><b>NOTE:</b> Discontinued card, no longer produced, requires special order and checking of availability.</p>  |

| Card  | Cage     | Description   |
|-------|----------|---|
| 8DRCM | IPx 800X | Same as 8DRCFM-2 but with 1 remote maintenance modem (Bell 103/212A or ITU V.21/V.22, 300/1200bps).<br><i>NOTE: Discontinued card, no longer produced, requires special order and checking of availability.</i> |

These cards are described in the *Coral Service and Peripheral Cards Installation Manual*.

Shared Service cards may be installed in any available peripheral card slot in the optional expansion unit. In the PI system database, the expansion units are shown as:

- The first IPx Office EX expansion unit includes: shelf #1, slot #2 to slot #11
- The second IPx Office EX expansion unit includes:shelf #2, slot #2 to slot #11
- The first IPx 500X expansion unit includes: shelf #1, slot #1 to slot #10
- The second IPx 500X expansion unit includes: shelf #2, slot #1 to slot #10
- The first IPx 800X expansion unit includes: shelf #1, slot #1 to slot #12
- The second IPx 800X expansion unit includes: shelf #2, slot #1 to slot #12
- The first FlexiCom 200 CSLX expansion cabinet includes: shelf #3, slot #1 to slot #3
- The second FlexiCom 200 CSLX expansion cabinet includes:shelf #3, slot #5 to slot #7

Refer to *Chapter 6* of the *Program Interface (PI) and Database Reference Manual* for additional details.



## 9.2 MRC-8, 16, 32, 64 Modules (Main Resources Card)

### General Information



#### NOTE:

##### **Coral Components Discontinuation Announcement:**

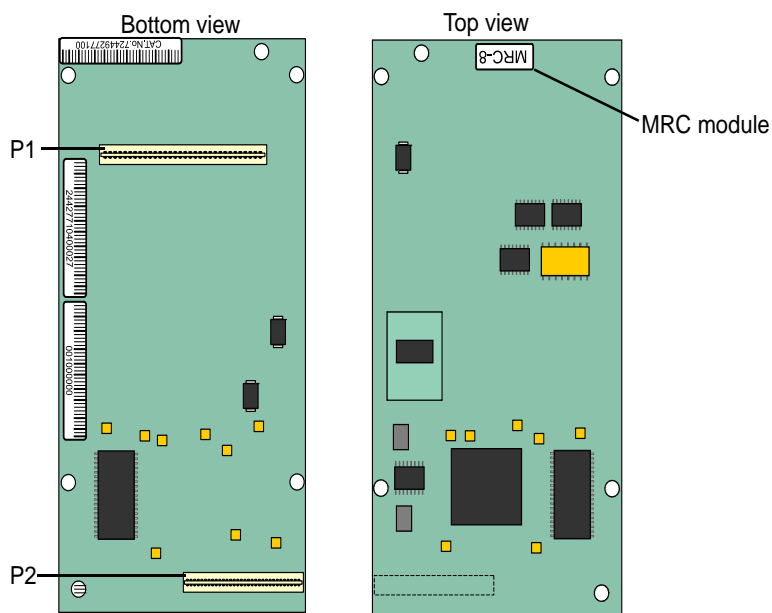
MRC-8 and MRC-32 cards have been discontinued. MRC-16 and MRC-64 cards replace the discontinued cards, which are no longer produced.

The MRC (Main Resources Card) functions as a daughterboard to the MCB Office. It integrates:

- Media channel gateway
- DTMF Receiver (DTR)
- MFC-R2 (MFR)

These resource circuits are embedded onto DSP units. MRC modules include MRC-8, MRC-16, MRC-32, or MRC-64 types. The term “MRC” refers to all modules. [Figure 9-1](#) displays the MRC card layout. The four MRC module types almost identical externally, they are identified by the card label. The MRC is attached to the MCB Office by connectors P1 and P2.

Figure 9-1 MRC Card Layout



The MRC does not have any private coded MAC address, it gets it from the MCB Office holding it. The MAC addresses of the C/PUGW and MRC are automatically supplied by the MCB Office card to the Coral database. Therefore, the MAC address label of the MRC is affixed to the MCB Office.

The MRC status (green) LED indicator is located on the front panel of the Coral IPx Office main unit, the third LED from left. [Table 9-2](#) describes the different states of the status LED indicators.

**Table 9-2 MRC Module Status Indications**

| <b>LED State</b> | <b>Indication</b>   |
|------------------|---|
| Steadily Off     | The MRC module is not installed or has not been initialized |
| Steadily On      | The MRC module is installed and fully operational           |

The VoIP capacity of the Coral IPx Office main unit is 240 IP endpoints, including a combination of IP terminals, IP trunks, and MRC media channels. The MRC supports DTMF Receiver (DTR), MFR-R2 (MFR), and media channels. The number of shared services supported by the card depends on several factors.

### *Maximum Number of Receivers or Media Channels Supported*

The MRC card enables receivers and media channels to be used simultaneously. [Table 9-22](#) lists the different media channel and receiver types supported by MRC models along with the maximum number supported per type. Any value provided in [Table 9-22](#) indicates that the MRC is operating at full capacity and cannot support any other function. When other media protocols or receivers are used, then these values cannot be achieved.

**Table 9-3 Maximum Number of MRC Receivers or Media Channels Supported**

| <b>Category</b> | <b>Type</b>          | <b>MRC-8</b> | <b>MRC-16</b> | <b>MRC-32</b> | <b>MRC-64</b> |
|-----------------|----------------------|--------------|---------------|---------------|---------------|
| Receivers       | DTMF Receivers (DTR) | 32           | 64            | 64            | 128           |
|                 | MFC Receivers (MFR)  | 32           | 64            | 64            | 128           |
| Media Channels  | G.729                | 8            | 16            | 32            | 64            |
|                 | G.723 (NET_IP)       | 8            | 16            | 24            | 64            |
|                 | T.38 (NET_IP)        | 8            | 16            | 32            | 32            |
|                 | G.711                | 32           | 64            | 64            | 128           |

To ensure that the system will be non-blocking, resources for DTR and MFR can be reserved. See *Reserving Resources for DTR and MFC Shared Services* in *Chapter 8 of the Coral Service and Peripheral Cards Installation Manual*.

For example, an MRC-16 card can simultaneously support up to 16 media channels that utilize CODEC G.729. If all of these channels are actually in use at the same time, the card will not be able to support any other media channel or receiver.



**NOTE:**

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*For detailed description, refer to Chapter 8 of the Coral Service and Peripheral Cards Installation Manual.*

---

## ● Card Location

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The MRC is a daughter board installed on the MCB Office card in a piggyback fashion.

---

### *Database Programming*

#### **Card List** (Route: CLIS)

In the PI system database, the MRC shared service circuits are displayed as

**UGW- Location: Shelf #6, Slot #5**



**NOTE:**

---

*This slot does not physically exist, but is embedded onto the MCB Office card. This slot number is recognized as such by the PI, only.*

---

Refer to the *Program Interface and Database Reference Manual - Chapter 6, Card List*, for further details.

## Installing the MRC

The parts used to attach the MRC card to the MCB Office are listed below. See [Table 9-4](#).



### NOTE:

The MRC card is secured to the MCB Office by a threaded spacer that is already installed onto the MCB Office card by the manufacturer.

Table 9-4 MRC Assembly Parts

| Part                         | Quantity |
|------------------------------|----------|
| Phillips screw M3X6          | 4        |
| Lock washer M3               | 4        |
| Male-female spacer hex M3X10 | 4        |

### Preparing for Installation

- 1 Locate a desk or table top. If the surface can be damaged by sharp objects, place a protective sheet of cardboard or similar material over the top surface.
- 2 Place an anti-static sheet over the desk or table top. (The card's plastic shipping bag will suffice.)
- 3 If necessary, remove power from the IPx Office system by turning OFF the power switch on the front panel of the PS Office unit.
- 4 Disconnect the power cord or wires from the PS Office unit.

### WARNING!

*Electrical Hazard. Contact with live internal components could cause shock, burn, or death. Before opening the unit cover, power must be removed from the system.*

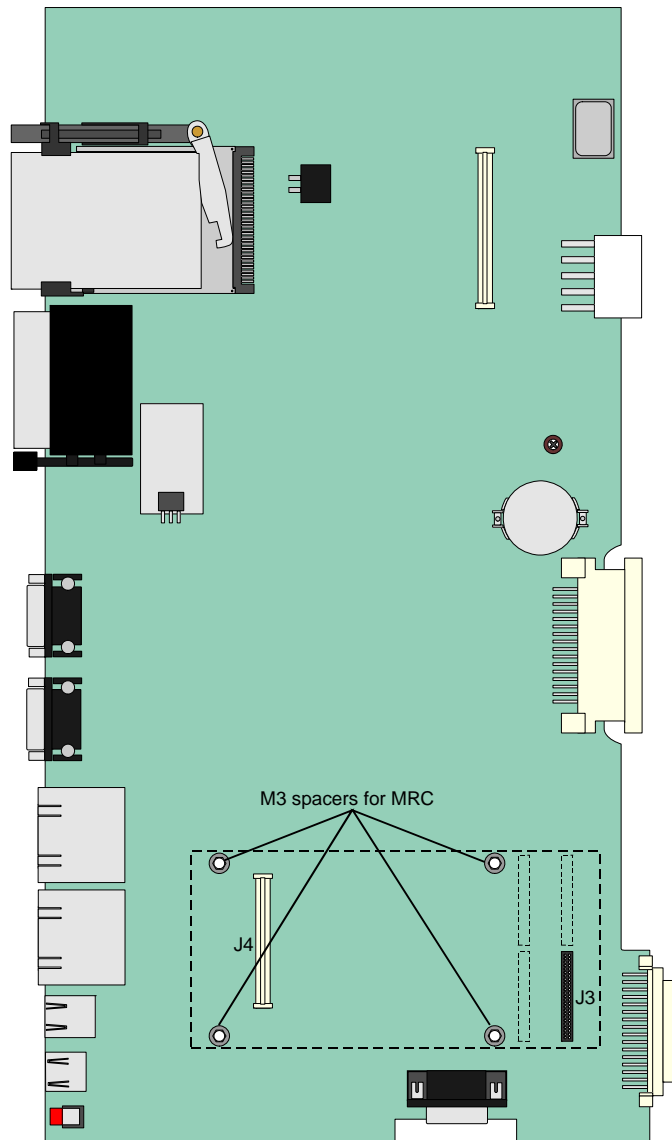
- 5 Open the IPx Office unit. See [Opening the Unit Cover, page 6-9](#).
- 6 The unit interior is shown in [Figure 6-12 on page 6-11](#).

### Installing the MRC Card

- 1 If necessary, remove the NTU Office card. See [Installing and Replacing the NTU Office Card, page 11-9](#).
- 2 Position the MRC card on top of the MCB Office card and align the four fastening holes on top of the spacers affixed to the MCB Office card.

- 3 Gently, but firmly press the MRC connectors into the MCB Office connectors until the MRC card rests on the spacers. A slight resistance will be felt as the connectors mate (connector P1 on the MRC to connector J4 on the MCB Office and connector P2 on the MRC to connector J7 on the MCB Office).
- 4 Insert the M3 lock washers over the four Phillips M3X6 screws and fasten the MRC card to the MCB Office card.

Figure 9-2 **MRC Assembly onto MCB Office**



## Removing the MRC

---

- 1 Repeat [Preparing for Installation, page 9-8](#).
- 2 Remove the M3X6 Phillips screws and washers that secure the MRC card to the standoff spacers of the MCB Office card and safeguard for future re-assembly.
- 3 Place your thumbs on the MCB Office card, on either side of the MRC card near the MCB Office front side. Use your fingers to lift the edge of the MRC card on both sides and gently disengage it from the MCB Office card.

## Configuring the MRC Parameters via the Program Interface

---

For information on the relevant parameters configured for MRC resources, refer to *Chapter 8 of the Coral Service and Peripheral Card Installation Manual*.

## Upgrading the MRC

---

The MRC application is a component of the C/PUGW application that is uploaded to the MRC each time it initializes.

You can upgrade the MRC application by downloading the latest C/PUGW version from the manufacturer's website.

See [Upgrading the Applications C/MAP, C/PUGW and MRC, page 4-26](#).

## 9.3 U-RMI / U-MR / RMI / MR Office Cards

### General Description

Figure 9-4 through Figure 9-7, starting on page 9-15, display the U-RMI Office, U-MR Office, RMI Office and MR Office card circuit layout.

The main shared service functions of these cards are described in Table 9-6.

Figure 9-3 displays the U-RMI Office, U-MR Office, RMI Office and MR Office architecture.



#### NOTE:

U-MR card is supplied as standard. All other variations of the card (U-RMI, RMI, MR) require special order and checking of availability.

### Card Location

The U-MR Office, MR Office, U-RMI Office, and RMI Office cards may be installed only in peripheral slot 6-7.

### Database Programming

#### Card List (Route: CLIS)

Optional card names shown in the **P\_TYPE** field of the Card List branch (Route: CLIS) include MR, RMI-F, and URC2, depending on which components are actually installed. Refer to Table 9-5:

Table 9-5 U-RMI, U-MR, RMI, MR Office Card List (Route: CLIS)

| Card List Location | P_TYPE for Optional Card Configurations |      |         |         |
|--------------------|---|------|---------|---------|
|                    | U-RMI                                   | U-MR | RMI     | MR      |
| Shelf #1, Slot #6  | RMI-F                                   | MR   | RMI-F   | MR      |
| Shelf #1, Slot #7  | URC2                                    | URC2 | NO-CARD | NO-CARD |

Shared service circuits in the U-RMI Office, U-MR Office, RMI Office and MR Office cards are embedded in the MR/RMI-F (U60) unit and the URC (U73) unit. See:

- [MR/RMI-F EPROM \(U60\) on page 9-22.](#)
- [URC PROM \(U73\) on page 9-24](#)

## Features

Table 9-6 U-RMI, U-MR, RMI, MR Office Features

| Features  | U-RMI | U-MR | RMI | MR  |
|---|-------|------|-----|-----|
| <ul style="list-style-type: none"> <li>■ 1 internal or external music interface</li> <li>■ 1 external music interface or</li> <li>1 external voice paging interface or public address and relay contacts</li> <li>■ 1 auxiliary or major/minor alarm relay contacts</li> <li>■ 1 universal night answer UNA or central bell relay contacts</li> <li>■ 2 relay contacts</li> </ul>   | Yes   | Yes  | Yes | Yes |
| <ul style="list-style-type: none"> <li>■ 1 remote maintenance modem (V.92 ITU-T standard up to 56Kbps)</li> </ul>   | Yes   | No   | Yes | No  |
| <ul style="list-style-type: none"> <li>■ 16 DTD circuit dial tone detector and call progress tone analyzer (max: 32*)</li> <li>■ 24 DTR circuit DTMF receiver and decoder card for touch-tone digits (max: 24*)</li> <li>■ Eight 3-way conference (max: 24*)</li> <li>■ Two Meet-me bridge conference for 14 parties (max: 6*)</li> <li>■ 16 Caller ID circuit transmitters adapted to Bellcore standards which includes the time and Caller Name/Num display (max: 32*). Required for the 4/8T-CID Office card</li> </ul> <p><b>NOTE:</b> Separate authorization (SAU) is required to allocate the DTMF, DTR, 3-way and conference circuits supported by the URC.</p> <p><b>NOTE:</b> (max: *) The maximum number for the resources is dependant on the number of URC resource points. Therefore, increasing one of these resources requires decreasing another.</p> | Yes   | Yes  | No  | No  |

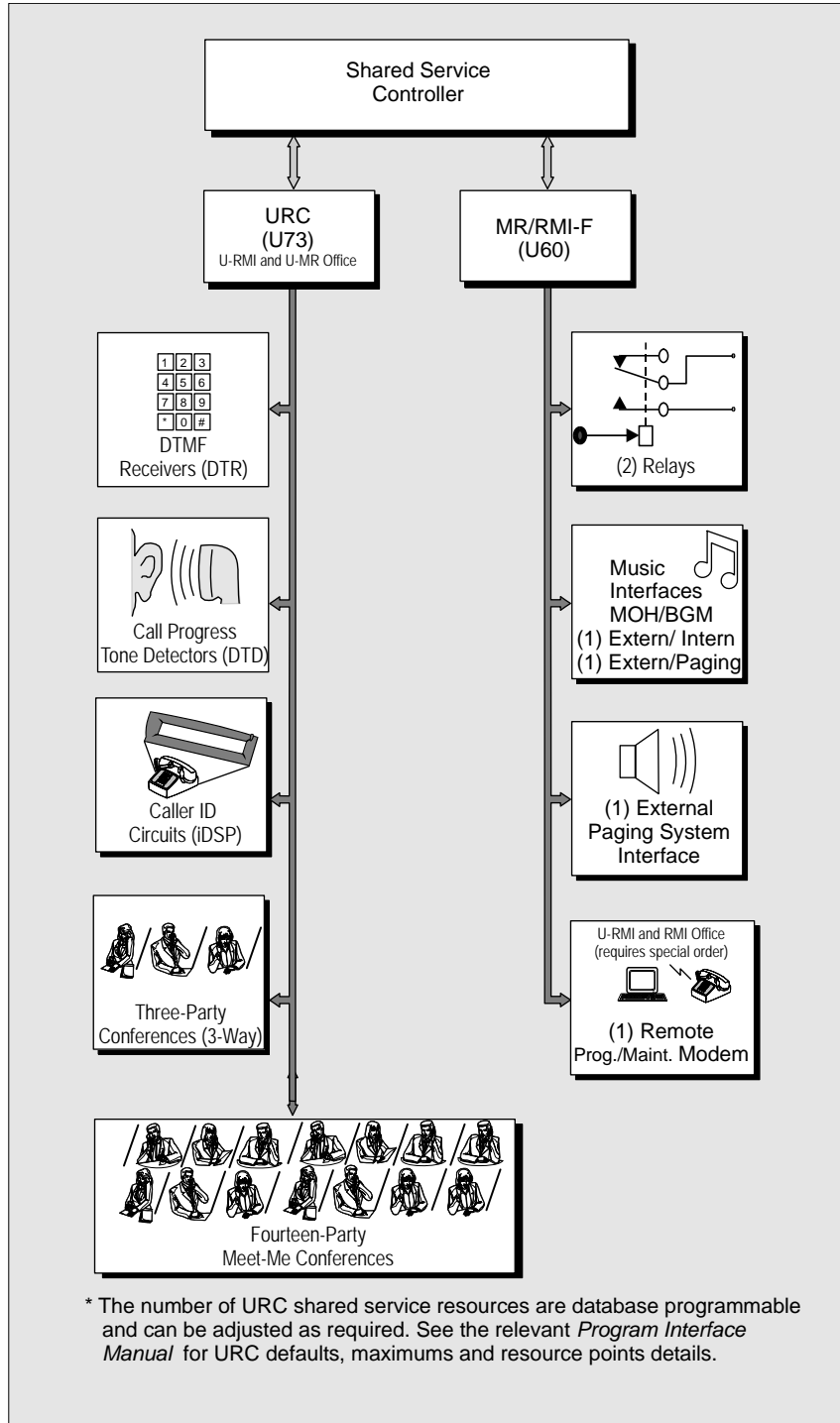


### NOTE:

Separate authorization is required to allocate the DTMF, CLID, 3way and CONF circuits supported by the U-RMI Office and U-MR Office cards. (max: \*) The max. number is dependant on the number of URC resource points. Therefore, increasing one of these resources requires decreasing another.



**Figure 9-3 U-RMI / U-MR / RMI MR Office Architecture**



The U-MR Office, MR Office, U-RMI Office and RMI Office cards include:

- Configuration jumpers, as described [on page 9-19](#)
- External connectors, as described [on page 9-21](#)
- MR/RMI-F software, as described [on page 9-22](#)
- Internal/external music on hold and background music ports, as described [on page 9-73](#)
- A paging output port (or an external music on hold and background music port), as described [on page 9-81](#)
- Universal Night Answer (UNA) Central Bell, as described [on page 9-89](#)
- Dial operated accessory or alarm (RELAY), as described [on page 9-95](#)
- Two relay contacts for two of the following three features:
  - External voice paging (PAGE),
  - Universal Night Answer (UNA) Central Bell
  - Dial operated accessory/alarm (RELAY), as described [on page 9-103](#)

The U-MR Office and U-RMI Office cards include:

- Shared Service components
- URC indicator (front panel red LED), as described [on page 9-20](#)
- URC software, as described [on page 9-24](#)
- Eight (max: 24\*) 3-way conferences/Consultation/Broker service for digital trunks (3-way for stations and analog lines is standard), support for Silent Monitoring and the Coral Message Center's Silent Record feature, as described [on page 9-35](#)
- Two (max: 6\*) meet-me bridge conference for 14 parties, as described [on page 9-39](#)
- 24 (max: 24\*) port DTMF receivers and decoders for touch-tone digits, as described [on page 9-47](#)
- 16 (max: 32\*) port tone detector DTD and call progress tone analyzer for enhanced dialing (busy outside number auto-redial), as described [on page 9-51](#). Use a self-contained table of call progress tone profiles to identify standard dial, busy, and ringback tone signals
- 16 (max: 32\*) Caller ID circuit transmitters adapted to Bellcore standards which includes the time and Caller Name/Num display

The U-RMI Office and RMI Office cards include a built-in remote maintenance access modem (V.92 ITU-T standard; up to 56Kbps), as described [on page 9-63](#).

These cards are no longer produced.

**Figure 9-4 U-RMI Office Card Circuits Layout, Front Panel and Jumpers**

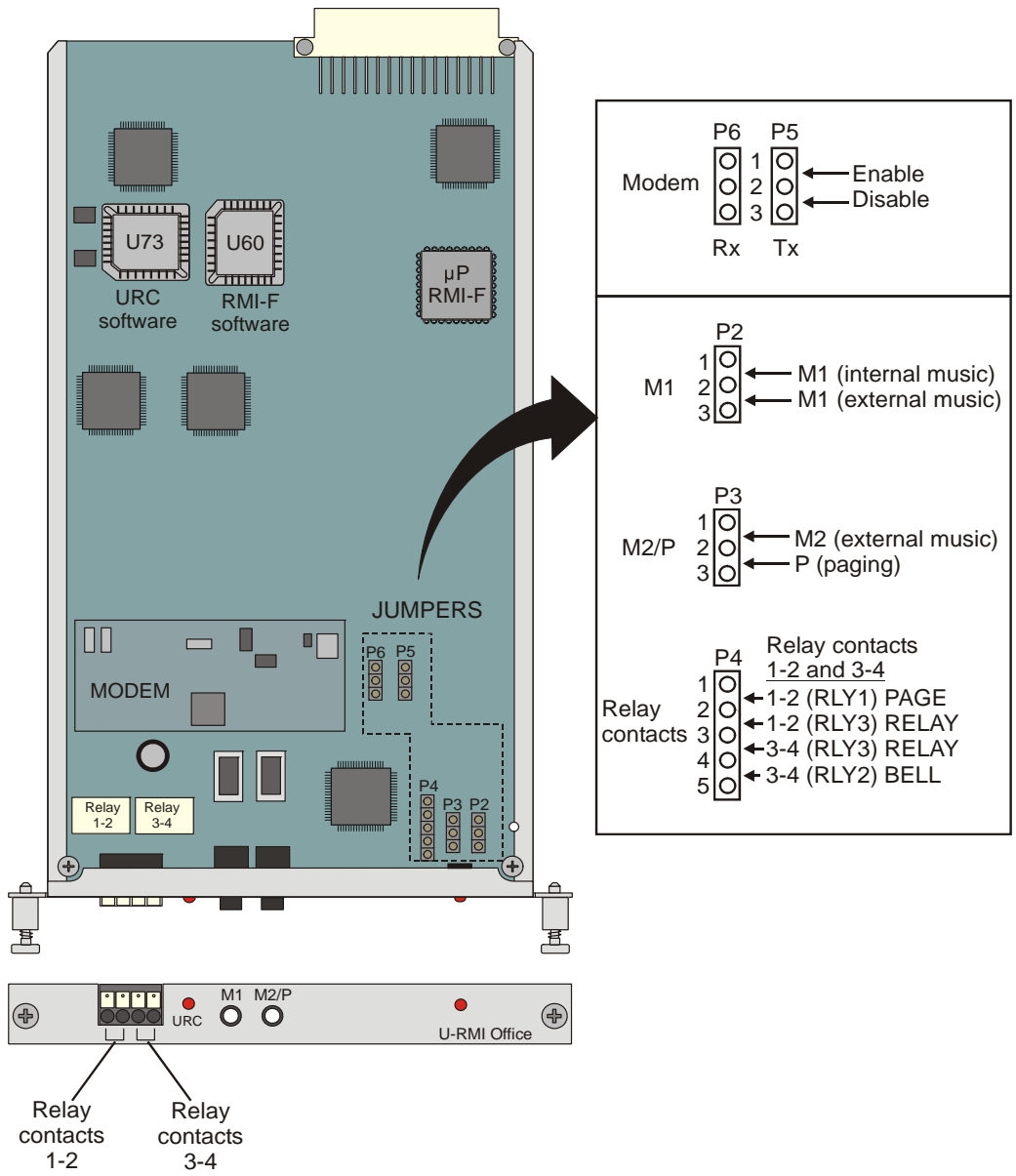
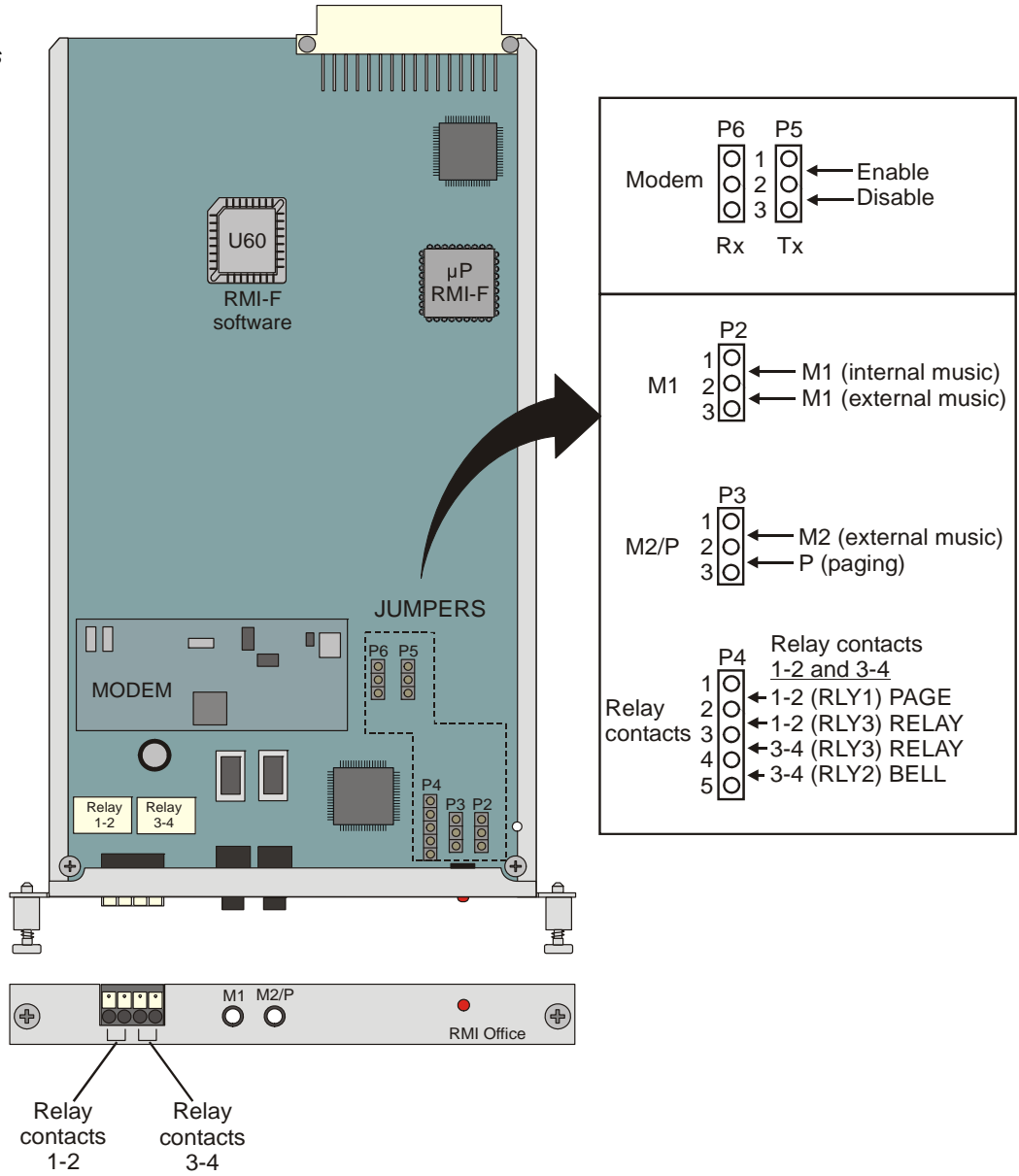


Figure 9-5 RMI Office Card Circuits Layout, Front Panel and Jumpers



**Figure 9-6 U-MR Office Card Circuits Layout, Front Panel and Jumpers**

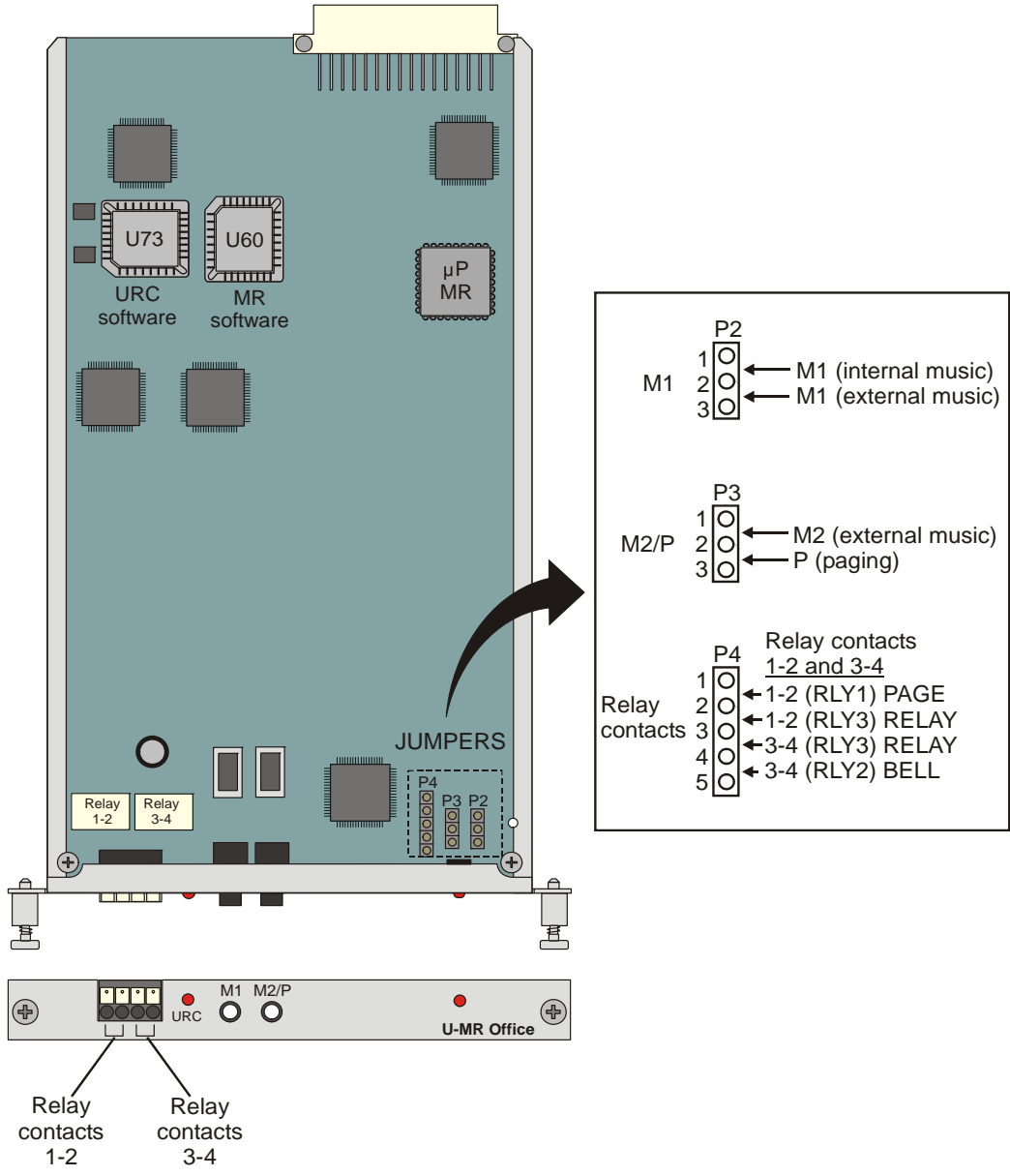
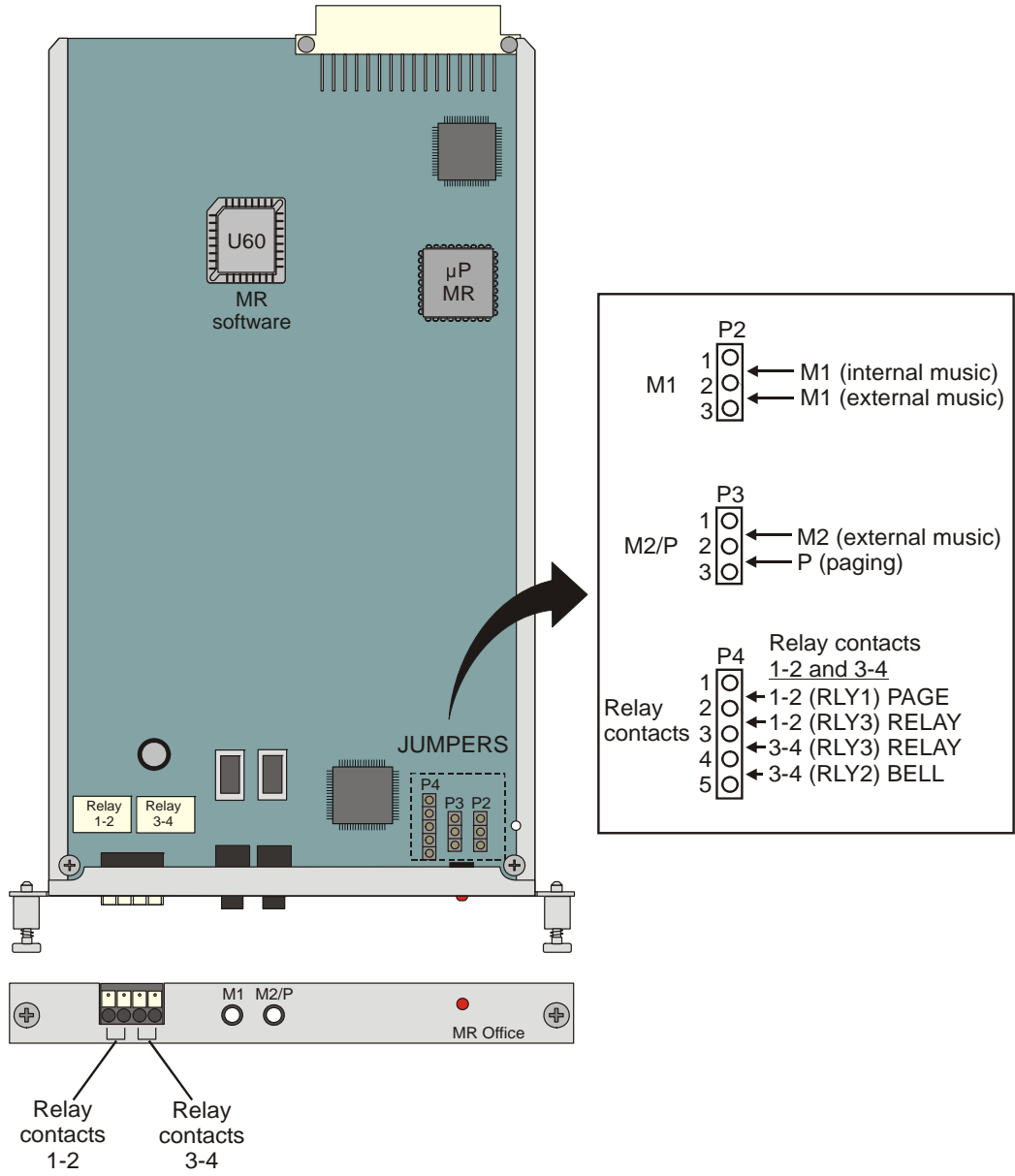


Figure 9-7 MR Office Card Circuits Layout, Front Panel and Jumpers



## Configuration Jumpers

The *U-MR Office*, *MR Office*, *U-RMI Office* and *RMI Office* cards are equipped with jumpers (P2 - P6) that enable or disable various functions. The enabling or disabling is accomplished by jumper straps.



### NOTE:

Before installing the card, the jumpers are set to their correct positions. See [Figure 9-4 on page 9-15](#) through [Figure 9-7 on page 9-18](#).

Table 9-7 **U-MR, MR, U-RMI, RMI Office Configuration Jumpers**

| Jumper | Purpose  |
|--------|--|
| P2     | Enables (when installed) selection of the M1-Music source as internal or external.<br>See <a href="#">Configuring the Music M1 Jumper to External or Internal on page 9-74</a> .   |
| P3     | Enables selection of the M2/P as Music source or Paging output.<br>See <a href="#">Configuring the Music M2/P Jumper to Music on page 9-75</a> .<br>See <a href="#">Configuring the Paging M2/P Jumper to Paging on page 9-83</a> .  |
| P4     | Enables the selection of two out of three relay functions: <ul style="list-style-type: none"> <li>■ External Voice Paging (PAGE/RLY1)</li> <li>■ Universal Night Answer (UNA) and Central Bell (BELL/RLY2)</li> <li>■ Dial Operated Accessory/Alarm (RELAY/RLY3)</li> </ul> These functions are operated through relays. See <a href="#">Configuring the Relay Contacts Jumper on page 9-105</a> . |
| P5, P6 | Applicable on U-RMI Office and RMI Office cards.<br>Enable or disable the modem, by means of connecting or disconnecting the Tx and Rx analog lines. Applying each jumper between terminals 1 and 2 enables the modem. Applying each jumper between terminals 2 and 3 disables the modem.<br>See <a href="#">Modem Jumpers - Enable/Disable on page 9-63</a> .                                     |

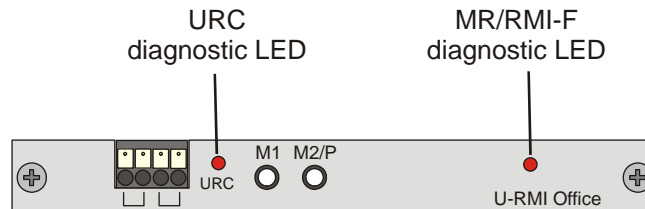
## Indicators

The *U-RMI Office*, *RMI Office*, *U-MR Office* and *MR Office* cards are equipped with two LEDs, located on the card front panel (see [Figure 9-4 on page 9-15](#) through [Figure 9-7 on page 9-18](#)).

**Table 9-8 Card LED Indications**

| Indicator                           | LED State    | Indication  |
|-------------------------------------|--------------|---|
| URC Diagnostic LED (middle)         | Steadily Off | No problem - card operating normally in slot 7  |
|                                     | Steadily On  | Card has not received a card database from system or the system resources are not sufficient. To increase resource allotment, go to the Sizes branch of the PI, see Database Programming on <a href="#">page 9-25</a> . |
| MR/RMI-F Diagnostic LED (right end) | Steadily Off | No problem - card operating normally in slot 6  |
|                                     | Steadily On  | Card has not received a card database from system   |
|                                     | Flashing     | Diagnostic test failed by circuitry on card   |

**Figure 9-8 Card LED Indications**





## External Connectors

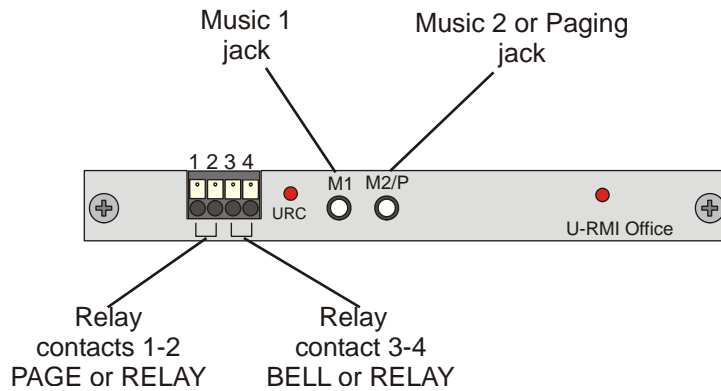
The card front panel connectors, [Figure 9-9](#), provides music connection, paging connection, and relay circuits.

The music and paging connectors are stereo 3.5 mm phone plugs, see [Figure 9-10](#).

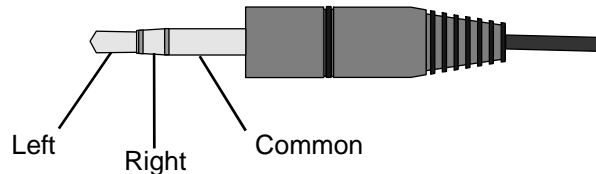
**Table 9-9 External Connections**

| Connector          | Function | Description   |
|--------------------|----------|---|
| Relay contacts 1-2 | RLY1     | Voice paging activation (jumper P4, pins 1-2 selected)                |
|                    | RLY3     | System Alarm or Dial-Operated contacts (jumper P4, pins 2-3 selected) |
| Relay contacts 3-4 | RLY3     | System Alarm or Dial-Operated contacts (jumper P4, pins 3-4 selected) |
|                    | RLY2     | UNA/Bell contacts (jumper P4, pins 4-5 selected)                      |
| M1 jack            | Music-1  | External music input (jumper P2 pins 2-3 selected)                    |
| M2/P jack          | Music-2  | External music input (jumper P3 pins 1-2 selected)                    |
|                    | Page     | Voice paging output (jumper P3 pins 2-3 selected)                     |

**Figure 9-9 External Connections (Front View)**



**Figure 9-10 Music and Paging Plugs Connection**



## MR/RMI-F EPROM (U60)

Figure 9-4 on page 9-15 through Figure 9-7 on page 9-18 illustrate the MR/RMI-F EPROM (U60) location on the U-RMI Office, U-MR Office, RMI Office and MR Office cards.

The MR/RMI-F is displayed in PI CLIS in Shelf 1, Slot 6 of the IPx Office as **MR** or **RMI-F**.

### *MR/RMI-F Features*

The RMI-F software includes the following shared service functions:

**Table 9-10 MR and RMI-F Features**

| Function  | “RMI-F”<br>RMI Office,<br>U-RMI Office | “MR”<br>MR Office,<br>U-MR Office |
|---|--|-----------------------------------|
| <ul style="list-style-type: none"> <li>■ A remote maintenance access modem (V.92 ITU-T standard). Described on page 9-63.</li> </ul>  | Yes                                    | No                                |
| <ul style="list-style-type: none"> <li>■ Auxiliary functions:</li> <li>■ One external music interface for music on hold and background music. Described on page 9-73.</li> <li>■ One internal or external music interface (jumper selection), for music on hold and background music. Described on page 9-73.</li> <li>■ One external voice paging interface for public address. Described on page 9-81.</li> <li>■ Two relay contacts. Described on page 9-103.</li> </ul> | Yes                                    | Yes                               |

### *MR and RMI-F Database Programming*

The MR and RMI-F provides the features listed in Table 9-11.

The MR and RMI-F in a Coral system has considerable impact on the system database. Use the PI to verify that each of the parameters detailed in this chapter is defined correctly. Refer to *Program Interface (PI) and Database Reference Manual, Chapter 6, System Port List* for more details.

#### *Sizes Def (Route: SIZ)*

- 8DRCF/8DRCM/RMI/ASU parameter shows the current capacity for U-RMI Office, U-MR Office, RMI Office, MR Office, 8DRCM-2, 8DRCF, 8DRCM, RMI and ASU cards.

### Card List (Route: CLIS)

Card type must show MR or RMI-F in the P\_TYPE field of **Shelf #1, Slot #6**. See [Table 9-5 on page 9-11](#).

The card status can be one of the following:

- ACTIVE
- INACTIVE

The Port List supplies detailed information on which port is active or inactive.

### Port List (Route: PLIS)

Use this option to assign a short/full name to MR and RMI-F ports, see [Table 9-12](#).

**Table 9-11 MR and RMI-F Features**

| Circuit      | Purpose  | Circuit No. | Default Name | Default Dial No. |
|--------------|--|-------------|--------------|------------------|
| NA           | NA   | 0-22        | —            | —                |
| PAGE (RLY1)  | External Voice Page (Public Address)                               | 23          | PAGE0        | 7074             |
| UNA (RLY2)   | Universal Night Answer/BELL  | 24          | BELL0        | 7050             |
| RELAY (RLY3) | Auxiliary or Major/Minor Alarm Relay                               | 25          | BLANK        | 7086             |
| MODEM *      | MODEM Connection   | 26          | MODM0        | 7070             |
| Music 1      | 1st Music Background and Music On Hold Internal or External Source | N/A         | N/A          | N/A              |
| Music 2      | 2nd Music Background and Music On Hold External Source             | N/A         | N/A          | N/A              |

**Table 9-12 MR and RMI-F PI (Route: PLIS)**

| Shelf/Slot/Ckt |   |      | Type    | Dial No. | Name<br>Short : Full |       |
|----------------|---|------|---------|----------|----------------------|-------|
| 1              | 6 | 0-22 | None    | —        | —                    | —     |
| 1              | 6 | 23   | PAGE    | 7074     | PAGE0                | BLANK |
| 1              | 6 | 24   | UNA     | 7050     | BELL0                | BLANK |
| 1              | 6 | 25   | RELAY   | 7086     | BLANK                | BLANK |
| 1              | 6 | 26   | MODEM * | 7070     | MODM0                | BLANK |

\* Modem is provided with U-RMI Office and RMI Office cards, which are no longer produced. These cards include a built-in remote maintenance access modem (V.92 ITU-T standard; up to 56Kbps), as described [on page 9-63](#).

## URC PROM (U73)

Figure 9-4 on page 9-15 and Figure 9-6 on page 9-17 display the URC PROM (U73) location on the U-RMI Office and U-MR Office cards. The URC (Universal Resource Card) unit software is provided with U-RMI Office and U-MR Office cards. The URC is displayed in PI CLIS in Shelf 1, Slot 7 of the IPx Office as URC2.



### NOTE:

Authorization is required to allocate the DTMF, CLID, 3way, and CONF circuits supported by U-RMI Office and U-MR Office cards. See [Table 9-13](#).

The URC software includes the following shared service functions:

Table 9-13 URC2 Features and SAU Requirements

| Notation    | Function   | SAU Required |
|-------------|--|--------------|
| <b>D</b>    | Tone Detectors (DTD) detect all necessary call progress tones. 16 (max: 32*) port dial tone detector and call progress tone analyzer for enhanced dialing (such as busy outside number auto-redial). Use a self-contained table of call progress tone profiles to identify standard dial, busy, and ringback tone signals. See <a href="#">Dial Tone Detector (DTD)</a> , page 9-51. | No           |
| <b>R</b>    | DTMF Receivers (DTR). 24 (max: 24*) DTR circuit DTMF signaling receiver and decoder for touch-tone digits and cellular features. See <a href="#">DTMF Receiver (DTR)</a> , page 9-47.  | Yes          |
| <b>C</b>    | 3-way Conference functions. Eight (max: 24*) 3-way conferences/Consultation/Broker service bridge units for digital and IP channels, FlexSet-IP, and Wireless sets (3-way for stations and analog lines is standard), support for Silent Monitoring and the Coral Message Center's Silent Record feature. See <a href="#">Three-Way Conference (3-Way)</a> , page 9-35.              | Yes          |
|             | 14 party Conference Bridge (Meet Me). Enables a conference of a maximum of 84 participants. Two (max: 6*) meet-me bridge conference for 14 parties. See <a href="#">Multi-Party Conference (CONF)</a> , page 9-39.   | Yes          |
| <b>iDSP</b> | Caller ID transmitters: 16 (max: 32*) Caller ID circuit transmitters adapted to Bellcore standards which includes the time and Caller Name/Num display   | Yes          |



### NOTE:

The maximum number for the embedded resources is dependant on the number of URC resource points: increasing a resource necessitates decreasing another.

## URC2 Database Programming (U-RMI Office and U-MR Office cards)

The URC provides the features listed in [Table 9-13](#). The URC in a Coral system has considerable impact on the system database. Use the PI to verify that each of the parameters detailed in this chapter is defined correctly. Refer to Program Interface (PI) and Database Reference Manual for more details.

### Maximum URC Resources

Each system resource circuit uses Coral time slots (resource points). The Coral enables a maximum of 120 resource points per URC2. [Table 9-14](#) lists the resource points needed per circuit and enables the technician to plan accordingly when configuring the URC configurations.

A maximum of 120 resource points is allowed per URC2 card. Therefore, the Full Assembly is never used. Allocate your resources such that you use a maximum of 120 resource points. For example, increasing the number of 3-way circuits, forces you to decrease one or more of the other resources.

**Table 9-14 PI defaults per URC2 Resource**

| Resource Type       | Max Circuits per URC2 (Full Assembly) | Resource Points Needed per Circuit (CKT) | Default Configuration |                        | See Table                               |
|---------------------|---------------------------------------|--|-----------------------|------------------------|---|
|                     |                                       |  | Max CKTs              | Resource Points Needed |   |
| DTMF Receiver (DTR) | 24                                    | 1  | 24                    | 1x24                   | <a href="#">Table 9-16 on page 9-27</a> |
| CONF (Meet Me)      | 6                                     | 16                                       | 2                     | 16x2                   | <a href="#">Table 9-18 on page 9-30</a> |
| 3-WAY               | 24                                    | 4  | 8                     | 4x8                    | <a href="#">Table 9-19 on page 9-30</a> |
| Caller ID (CID)     | 32                                    | 1  | 16                    | 1x16                   | <a href="#">Table 9-20 on page 9-31</a> |
| DTD                 | 32                                    | 1  | 16                    | 1x16                   | <a href="#">Table 9-21 on page 9-33</a> |
| TOTAL               |                                       |  | 66                    | 120                    |   |

### Feature Authorization (Route: FEAT,1)

- URC DTMF
- URC CLID
- URC 3WAY
- URC CONF

Separate Software Authorization is required to allocate the URC resources. Refer to *Program Interface (PI) and Database Reference Manual, Chapter 3, Feature Authorization*.

### *URC Configuration - NUMBER OF RESOURCES (Route: CDB,11)*

- DTMF
- Meet Me
- 3WAY
- CID
- DTD

### *URC Card DB - GAIN (Route: CDB,11,2)*

The Gains may be adjusted in this branch and not in the Feature Control branch as with other cards.

- DTMF GAIN
- DTD GAIN

### *URC Card DB - Meet Me Conference (Route: CDB,11,2)*

- CONF MEMBERS
- CONF SWITCH DELAY

### *Sizes Def (Route: SIZ)*

- CONF\_CKTS parameter. Between 1 to 6 ports required for the URC.

### *Sizes TAB (Route: SYSGEN,2)*

- RESOURCES parameter. Between 64 to 112 ports required for the URC.

### *Card List (Route: CLIS)*

Card type must show URC2 in the P\_TYPE field of **Shelf #1, Slot #7**.

The card status can be one of the following:

- ACTIVE
- INACTIVE

The Port List supplies detailed information on which port is active or inactive, see [Table 9-15 on page 9-27](#).

### *Port List (Route: PLIS)*

Use this option to assign a short/full name to URC Meet-Me Multiparty Conference ports, see [Table 9-14 on page 9-30](#).

**Table 9-15 URC2 Features**

| Circuit Type | Purpose   | Circuit No. (Ckt)      | Default Name | Default Dial No. | See Table               |
|--------------|---|------------------------|--------------|------------------|-------------------------|
| DTR          | DTMF signaling receivers                                      | 0-23 URC2<br>0-47 URC4 | —            | —                | Table 9-16 on page 9-27 |
| CONF         | Meet me bridges conference call for 14 parties                | 48-53                  | BLANK        | 7098-7099        | Table 9-17 on page 9-29 |
| Spare        | Not used in this version                                      | 54-55                  | —            | —                | Table 9-18 on page 9-30 |
| C3WAY        | Circuits of 3-way conference calls                            | 56-79                  | —            | —                | Table 9-19 on page 9-30 |
| iDSP         | FSK transmitters for displaying CID (Caller ID) for SLT users | 80-111                 | —            | —                | Table 9-20 on page 9-31 |
| DTD          | Dial and progress tone detectors                              | 112-143                | —            | —                | Table 9-21 on page 9-33 |

**Table 9-16 URC  
DTR/DTMF PI  
Configuration**

| URC Configuration<br>PI Route: DTB,11 |                                       | PI Route: PLIS |   |    |           |          |                      |   |
|---------------------------------------|---------------------------------------|----------------|---|----|-----------|----------|----------------------|---|
| DTMF<br>URC2 0-24<br>URC4 0-48        | Total<br>Resource<br>Points<br>Needed | Shelf/Slot/Ckt |   |    | Type      | Dial No. | Name<br>Short : Full |   |
| 1                                     | 1                                     | 1              | 7 | 0  | DTR /DTMF | —        | —                    | — |
| 2                                     | 2                                     | 1              | 7 | 1  | DTR /DTMF | —        | —                    | — |
| 3                                     | 3                                     | 1              | 7 | 2  | DTR /DTMF | —        | —                    | — |
| 4                                     | 4                                     | 1              | 7 | 3  | DTR /DTMF | —        | —                    | — |
| 5                                     | 5                                     | 1              | 7 | 4  | DTR /DTMF | —        | —                    | — |
| 6                                     | 6                                     | 1              | 7 | 5  | DTR /DTMF | —        | —                    | — |
| 7                                     | 7                                     | 1              | 7 | 6  | DTR /DTMF | —        | —                    | — |
| 8                                     | 8                                     | 1              | 7 | 7  | DTR /DTMF | —        | —                    | — |
| 9                                     | 9                                     | 1              | 7 | 8  | DTR /DTMF | —        | —                    | — |
| 10                                    | 10                                    | 1              | 7 | 9  | DTR /DTMF | —        | —                    | — |
| 11                                    | 11                                    | 1              | 7 | 10 | DTR /DTMF | —        | —                    | — |
| 12                                    | 12                                    | 1              | 7 | 11 | DTR /DTMF | —        | —                    | — |

| URC Configuration<br>PI Route: DTB,11 |                                       | PI Route: PLIS |   |    |           |          |                      |   |
|---------------------------------------|---------------------------------------|----------------|---|----|-----------|----------|----------------------|---|
| DTMF<br>URC2 0-24<br>URC4 0-48        | Total<br>Resource<br>Points<br>Needed | Shelf/Slot/Ckt |   |    | Type      | Dial No. | Name<br>Short : Full |   |
| 13                                    | 13                                    | 1              | 7 | 12 | DTR /DTMF | —        | —                    | — |
| 14                                    | 14                                    | 1              | 7 | 13 | DTR /DTMF | —        | —                    | — |
| 15                                    | 15                                    | 1              | 7 | 14 | DTR /DTMF | —        | —                    | — |
| 16                                    | 16                                    | 1              | 7 | 15 | DTR /DTMF | —        | —                    | — |
| 17                                    | 17                                    | 1              | 7 | 16 | DTR /DTMF | —        | —                    | — |
| 18                                    | 18                                    | 1              | 7 | 17 | DTR /DTMF | —        | —                    | — |
| 19                                    | 19                                    | 1              | 7 | 18 | DTR /DTMF | —        | —                    | — |
| 20                                    | 20                                    | 1              | 7 | 19 | DTR /DTMF | —        | —                    | — |
| 21                                    | 21                                    | 1              | 7 | 20 | DTR /DTMF | —        | —                    | — |
| 22                                    | 22                                    | 1              | 7 | 21 | DTR /DTMF | —        | —                    | — |
| 23                                    | 23                                    | 1              | 7 | 22 | DTR /DTMF | —        | —                    | — |
| 24*                                   | 24                                    | 1              | 7 | 23 | DTR /DTMF | —        | —                    | — |
| 25                                    | 25                                    | 1              | 7 | 24 | DTR /DTMF | —        | —                    | — |
| 26                                    | 26                                    | 1              | 7 | 25 | DTR /DTMF | —        | —                    | — |
| 27                                    | 27                                    | 1              | 7 | 26 | DTR /DTMF | —        | —                    | — |
| 28                                    | 28                                    | 1              | 7 | 27 | DTR /DTMF | —        | —                    | — |
| 29                                    | 29                                    | 1              | 7 | 28 | DTR /DTMF | —        | —                    | — |
| 30                                    | 30                                    | 1              | 7 | 29 | DTR /DTMF | —        | —                    | — |
| 31                                    | 31                                    | 1              | 7 | 30 | DTR /DTMF | —        | —                    | — |
| 32                                    | 32                                    | 1              | 7 | 31 | DTR /DTMF | —        | —                    | — |
| 33                                    | 33                                    | 1              | 7 | 32 | DTR /DTMF | —        | —                    | — |
| 34                                    | 34                                    | 1              | 7 | 33 | DTR /DTMF | —        | —                    | — |
| 35                                    | 35                                    | 1              | 7 | 34 | DTR /DTMF | —        | —                    | — |
| 36                                    | 36                                    | 1              | 7 | 35 | DTR /DTMF | —        | —                    | — |
| 37                                    | 37                                    | 1              | 7 | 36 | DTR /DTMF | —        | —                    | — |
| 38                                    | 38                                    | 1              | 7 | 37 | DTR /DTMF | —        | —                    | — |
| 39                                    | 39                                    | 1              | 7 | 38 | DTR /DTMF | —        | —                    | — |
| 40                                    | 40                                    | 1              | 7 | 39 | DTR /DTMF | —        | —                    | — |
| 41                                    | 41                                    | 1              | 7 | 40 | DTR /DTMF | —        | —                    | — |



| URC Configuration<br>PI Route: DTB,11 |                                       | PI Route: PLIS |   |    |           |          |                      |   |
|---------------------------------------|---------------------------------------|----------------|---|----|-----------|----------|----------------------|---|
| DTMF<br>URC2 0-24<br>URC4 0-48        | Total<br>Resource<br>Points<br>Needed | Shelf/Slot/Ckt |   |    | Type      | Dial No. | Name<br>Short : Full |   |
| 42                                    | 42                                    | 1              | 7 | 41 | DTR /DTMF | —        | —                    | — |
| 43                                    | 43                                    | 1              | 7 | 42 | DTR /DTMF | —        | —                    | — |
| 44                                    | 44                                    | 1              | 7 | 43 | DTR /DTMF | —        | —                    | — |
| 45                                    | 45                                    | 1              | 7 | 44 | DTR /DTMF | —        | —                    | — |
| 46                                    | 46                                    | 1              | 7 | 45 | DTR /DTMF | —        | —                    | — |
| 47                                    | 47                                    | 1              | 7 | 46 | DTR /DTMF | —        | —                    | — |
| 48                                    | 48                                    | 1              | 7 | 47 | DTR /DTMF | —        | —                    | — |

\* The ports listed above the double line indicate the default range. See [Table 9-14 on page 9-25](#).

**Table 9-17 URC DTB PI Route**

| URC Configuration<br>PI Route: DTB,11 |                                       | PI Route: PLIS |   |    |      |          |                      |       |
|---------------------------------------|---------------------------------------|----------------|---|----|------|----------|----------------------|-------|
| Meet-Me<br>(0-6)                      | Total<br>Resource<br>Points<br>Needed | Shelf/Slot/Ckt |   |    | Type | Dial No. | Name<br>Short : Full |       |
| 1                                     | 16                                    | 1              | 7 | 48 | CONF | 7098     | BLANK                | BLANK |
| 2*                                    | 32                                    | 1              | 7 | 49 | CONF | 7099     | BLANK                | BLANK |
| 3                                     | 48                                    | 1              | 7 | 50 | CONF |          | BLANK                | BLANK |
| 4                                     | 64                                    | 1              | 7 | 51 | CONF |          | BLANK                | BLANK |
| 5                                     | 80                                    | 1              | 7 | 52 | CONF |          | BLANK                | BLANK |
| 6                                     | 96                                    | 1              | 7 | 53 | CONF |          | BLANK                | BLANK |

\* The ports listed above the double line indicate the default range. See [Table 9-14 on page 9-25](#).

**Table 9-18 URC Spare ports (not used)**

| URC Configuration<br>PI Route: DTB,11 |                              | PI Route: PLIS |   |    |      |          |                      |   |
|---------------------------------------|------------------------------|----------------|---|----|------|----------|----------------------|---|
| Spare (2)                             | Total Resource Points Needed | Shelf/Slot/Ckt |   |    | Type | Dial No. | Name<br>Short : Full |   |
| 1                                     | 0                            | 1              | 7 | 54 |      | —        | —                    | — |
| 2                                     | 0                            | 1              | 7 | 55 |      | —        | —                    | — |

**Table 9-19 URC Three-Way Conference (C3WAY) PI Configuration**

| URC Configuration<br>PI Route: DTB,11 |                              | PI Route: PLIS |   |    |       |          |                      |   |
|---------------------------------------|------------------------------|----------------|---|----|-------|----------|----------------------|---|
| C3WAY (0-24)                          | Total Resource Points Needed | Shelf/Slot/Ckt |   |    | Type  | Dial No. | Name<br>Short : Full |   |
| 1                                     | 4                            | 1              | 7 | 56 | C3WAY | —        | —                    | — |
| 2                                     | 8                            | 1              | 7 | 57 | C3WAY | —        | —                    | — |
| 3                                     | 12                           | 1              | 7 | 58 | C3WAY | —        | —                    | — |
| 4                                     | 16                           | 1              | 7 | 59 | C3WAY | —        | —                    | — |
| 5                                     | 20                           | 1              | 7 | 60 | C3WAY | —        | —                    | — |
| 6                                     | 24                           | 1              | 7 | 61 | C3WAY | —        | —                    | — |
| 7                                     | 28                           | 1              | 7 | 62 | C3WAY | —        | —                    | — |
| 8*                                    | 32                           | 1              | 7 | 63 | C3WAY | —        | —                    | — |
| 9                                     | 36                           | 1              | 7 | 64 | C3WAY | —        | —                    | — |
| 10                                    | 40                           | 1              | 7 | 65 | C3WAY | —        | —                    | — |
| 11                                    | 44                           | 1              | 7 | 66 | C3WAY | —        | —                    | — |
| 12                                    | 48                           | 1              | 7 | 67 | C3WAY | —        | —                    | — |
| 13                                    | 52                           | 1              | 7 | 68 | C3WAY | —        | —                    | — |
| 14                                    | 56                           | 1              | 7 | 69 | C3WAY | —        | —                    | — |
| 15                                    | 60                           | 1              | 7 | 70 | C3WAY | —        | —                    | — |
| 16                                    | 64                           | 1              | 7 | 71 | C3WAY | —        | —                    | — |
| 17                                    | 68                           | 1              | 7 | 72 | C3WAY | —        | —                    | — |
| 18                                    | 72                           | 1              | 7 | 73 | C3WAY | —        | —                    | — |

| URC Configuration<br>PI Route: DTB,11 |                                       | PI Route: PLIS |   |    |       |          |                      |   |
|---------------------------------------|---------------------------------------|----------------|---|----|-------|----------|----------------------|---|
| C3WAY<br>(0-24)                       | Total<br>Resource<br>Points<br>Needed | Shelf/Slot/Ckt |   |    | Type  | Dial No. | Name<br>Short : Full |   |
| 19                                    | 76                                    | 1              | 7 | 74 | C3WAY | —        | —                    | — |
| 20                                    | 80                                    | 1              | 7 | 75 | C3WAY | —        | —                    | — |
| 21                                    | 84                                    | 1              | 7 | 76 | C3WAY | —        | —                    | — |
| 22                                    | 88                                    | 1              | 7 | 77 | C3WAY | —        | —                    | — |
| 23                                    | 92                                    | 1              | 7 | 78 | C3WAY | —        | —                    | — |
| 24                                    | 96                                    | 1              | 7 | 79 | C3WAY | —        | —                    | — |

\* The ports listed above the double line indicate the default range. See [Table 9-14 on page 9-25](#).

**Table 9-20 URC iDSP CID  
(Caller ID) Transmitters  
PI Configuration**

| URC Configuration<br>PI Route: DTB,11 |                                       | PI Route: PLIS |   |    |      |          |                      |   |
|---------------------------------------|---------------------------------------|----------------|---|----|------|----------|----------------------|---|
| CID<br>(0-32)                         | Total<br>Resource<br>Points<br>Needed | Shelf/Slot/Ckt |   |    | Type | Dial No. | Name<br>Short : Full |   |
| 1                                     | 1                                     | 1              | 7 | 80 | iDSP | —        | —                    | — |
| 2                                     | 2                                     | 1              | 7 | 81 | iDSP | —        | —                    | — |
| 3                                     | 3                                     | 1              | 7 | 82 | iDSP | —        | —                    | — |
| 4                                     | 4                                     | 1              | 7 | 83 | iDSP | —        | —                    | — |
| 5                                     | 5                                     | 1              | 7 | 84 | iDSP | —        | —                    | — |
| 6                                     | 6                                     | 1              | 7 | 85 | iDSP | —        | —                    | — |
| 7                                     | 7                                     | 1              | 7 | 86 | iDSP | —        | —                    | — |
| 8                                     | 8                                     | 1              | 7 | 87 | iDSP | —        | —                    | — |
| 9                                     | 9                                     | 1              | 7 | 88 | iDSP | —        | —                    | — |
| 10                                    | 10                                    | 1              | 7 | 89 | iDSP | —        | —                    | — |
| 11                                    | 11                                    | 1              | 7 | 90 | iDSP | —        | —                    | — |
| 12                                    | 12                                    | 1              | 7 | 91 | iDSP | —        | —                    | — |
| 13                                    | 13                                    | 1              | 7 | 92 | iDSP | —        | —                    | — |
| 14                                    | 14                                    | 1              | 7 | 93 | iDSP | —        | —                    | — |

| URC Configuration<br>PI Route: DTB,11 |                                       | PI Route: PLIS |   |     |      |          |                      |   |
|---------------------------------------|---------------------------------------|----------------|---|-----|------|----------|----------------------|---|
| CID<br>(0-32)                         | Total<br>Resource<br>Points<br>Needed | Shelf/Slot/Ckt |   |     | Type | Dial No. | Name<br>Short : Full |   |
|                                       |                                       |                |   |     |      |          |                      |   |
| 15                                    | 15                                    | 1              | 7 | 94  | iDSP | —        | —                    | — |
| 16*                                   | 16                                    | 1              | 7 | 95  | iDSP | —        | —                    | — |
| 17                                    | 17                                    | 1              | 7 | 96  | iDSP | —        | —                    | — |
| 18                                    | 18                                    | 1              | 7 | 97  | iDSP | —        | —                    | — |
| 19                                    | 19                                    | 1              | 7 | 98  | iDSP | —        | —                    | — |
| 20                                    | 20                                    | 1              | 7 | 99  | iDSP | —        | —                    | — |
| 21                                    | 21                                    | 1              | 7 | 100 | iDSP | —        | —                    | — |
| 22                                    | 22                                    | 1              | 7 | 101 | iDSP | —        | —                    | — |
| 23                                    | 23                                    | 1              | 7 | 102 | iDSP | —        | —                    | — |
| 24                                    | 24                                    | 1              | 7 | 103 | iDSP | —        | —                    | — |
| 25                                    | 25                                    | 1              | 7 | 104 | iDSP | —        | —                    | — |
| 26                                    | 26                                    | 1              | 7 | 105 | iDSP | —        | —                    | — |
| 27                                    | 27                                    | 1              | 7 | 106 | iDSP | —        | —                    | — |
| 28                                    | 28                                    | 1              | 7 | 107 | iDSP | —        | —                    | — |
| 29                                    | 29                                    | 1              | 7 | 108 | iDSP | —        | —                    | — |
| 30                                    | 30                                    | 1              | 7 | 109 | iDSP | —        | —                    | — |
| 31                                    | 31                                    | 1              | 7 | 110 | iDSP | —        | —                    | — |
| 32                                    | 32                                    | 1              | 7 | 111 | iDSP | —        | —                    | — |

\* The ports listed above the double line indicate the default range. See [Table 9-14 on page 9-25](#).

**Table 9-21 URC Dial Tone  
Detector (DTD) PI  
Configuration**

| URC Configuration<br>PI Route: DTB,11 |                                       | PI Route: PLIS |   |     |      |          |                      |   |
|---------------------------------------|---------------------------------------|----------------|---|-----|------|----------|----------------------|---|
| DTD<br>(0-32)                         | Total<br>Resource<br>Points<br>Needed | Shelf/Slot/Ckt |   |     | Type | Dial No. | Name<br>Short : Full |   |
| 1                                     | 1                                     | 1              | 7 | 112 | DTD  | —        | —                    | — |
| 2                                     | 2                                     | 1              | 7 | 113 | DTD  | —        | —                    | — |
| 3                                     | 3                                     | 1              | 7 | 114 | DTD  | —        | —                    | — |
| 4                                     | 4                                     | 1              | 7 | 115 | DTD  | —        | —                    | — |
| 5                                     | 5                                     | 1              | 7 | 116 | DTD  | —        | —                    | — |
| 6                                     | 6                                     | 1              | 7 | 117 | DTD  | —        | —                    | — |
| 7                                     | 7                                     | 1              | 7 | 118 | DTD  | —        | —                    | — |
| 8                                     | 8                                     | 1              | 7 | 119 | DTD  | —        | —                    | — |
| 9                                     | 9                                     | 1              | 7 | 120 | DTD  | —        | —                    | — |
| 10                                    | 10                                    | 1              | 7 | 121 | DTD  | —        | —                    | — |
| 11                                    | 11                                    | 1              | 7 | 122 | DTD  | —        | —                    | — |
| 12                                    | 12                                    | 1              | 7 | 123 | DTD  | —        | —                    | — |
| 13                                    | 13                                    | 1              | 7 | 124 | DTD  | —        | —                    | — |
| 14                                    | 14                                    | 1              | 7 | 125 | DTD  | —        | —                    | — |
| 15                                    | 15                                    | 1              | 7 | 126 | DTD  | —        | —                    | — |
| 16*                                   | 16                                    | 1              | 7 | 127 | DTD  | —        | —                    | — |
| 17                                    | 17                                    | 1              | 7 | 128 | DTD  | —        | —                    | — |
| 18                                    | 18                                    | 1              | 7 | 129 | DTD  | —        | —                    | — |
| 19                                    | 19                                    | 1              | 7 | 130 | DTD  | —        | —                    | — |
| 20                                    | 20                                    | 1              | 7 | 131 | DTD  | —        | —                    | — |
| 21                                    | 21                                    | 1              | 7 | 132 | DTD  | —        | —                    | — |
| 22                                    | 22                                    | 1              | 7 | 133 | DTD  | —        | —                    | — |
| 23                                    | 23                                    | 1              | 7 | 134 | DTD  | —        | —                    | — |
| 24                                    | 24                                    | 1              | 7 | 135 | DTD  | —        | —                    | — |
| 25                                    | 25                                    | 1              | 7 | 136 | DTD  | —        | —                    | — |
| 26                                    | 26                                    | 1              | 7 | 137 | DTD  | —        | —                    | — |
| 27                                    | 27                                    | 1              | 7 | 138 | DTD  | —        | —                    | — |

| URC Configuration<br>PI Route: DTB,11 |                                       | PI Route: PLIS |   |     |      |          |                      |   |
|---------------------------------------|---------------------------------------|----------------|---|-----|------|----------|----------------------|---|
| DTD<br>(0-32)                         | Total<br>Resource<br>Points<br>Needed | Shelf/Slot/Ckt |   |     | Type | Dial No. | Name<br>Short : Full |   |
| 28                                    | 28                                    | 1              | 7 | 139 | DTD  | —        | —                    | — |
| 29                                    | 29                                    | 1              | 7 | 140 | DTD  | —        | —                    | — |
| 30                                    | 30                                    | 1              | 7 | 141 | DTD  | —        | —                    | — |
| 31                                    | 31                                    | 1              | 7 | 142 | DTD  | —        | —                    | — |
| 32                                    | 32                                    | 1              | 7 | 143 | DTD  | —        | —                    | — |

\* The ports listed above the double line indicate the default range. See [Table 9-14 on page 9-25](#).

## 9.4 Three-Way Conference (3-Way) Conference Circuitry

### General Description

---

The *U-RMI Office* and *U-MR Office* cards provide eight (max: 24\*) independent 3-way (conferences/Consultation/Broker service) conversation circuits. They can be used for:

- Digital voice ports, such as SKK, IPG, UGW, PRI-23, PRI-30, 4TBR, 8TBR, 8TBRP, T1 or 30T/x; to participate in a **3-way conference call** (3-way for SLT stations and analog lines is standard)
- The **Silent Monitor** feature
- The **Coral Message Center's Silent Record** feature



#### **NOTE:**

---

*Separate authorization is required to allocate the 3way circuits supported by the U-RMI Office and U-MR Office cards.*

*(max: \*) The max. number is dependant on the number of URC resource points.*

---

The 3-way conference circuitry is completely digital. During the conferencing session, each participant hears the voices of other participants.

## Database Programming

The 3-WAY circuit requires some database settings. Consult the *Program Interface (PI) and Database Reference Manual* for instructions on the database programming required for C3WAY.

The following parameters must be set for **3-way** conference and **Silent Monitoring**.

### *Sizes TAB (Route: SYSGEN)*

RESOURCES

### *Class of Service (Route: COS,0)*

BROKER/CONSULT/3-WAY/ALL  
SILENT\_MONITOR

### *Numbering Plan (Route: NPL,0)*

SILENT\_MONITOR - field 9, index 171

### *URC Feature Authorization (Route: FEAT,1)*

URC 3WAY

### *URC Configuration (Route: CDB,11,1)*

3WAY - Defines the maximum number of 3-way Conference bridge resources to be enabled by the system URC cards. Each 3-way conference circuit requires 4 card resource points (therefore, eight 3-way circuits require 32 resource points).

When the 3-way conference exists and is initialized, the PI displays the following:

### *Card List (Route: CLIS)*

Card type (see [Table 9-5 on page 9-11](#)) must show:

RMI-F or MR in the P\_TYPE field of **Shelf #1, Slot #6**.

URC2 in the P\_TYPE field of **Shelf #1, Slot #7**.

### *Port List (Route: PLIS,0)*

Port type must show:

C3WAY in the TYPE field of **Shelf #1, Slot #7, Ckt #56-79(max.)**.

See [Table 9-19 URC Three-Way Conference \(C3WAY\) PI Configuration, page 9-30](#).

Refer to *Program Interface (PI) and Database Reference Manual, Chapter 6, System Port List* for more details.



## Additional 3-Way Circuits

Additional digital Conference Bridge cards may be installed in the optional Coral IPx 800X expansion cage. The additional cards include:

| Card    | Cage     | Description  |
|---------|----------|--|
| CNF     | IPx 800X | Includes one of the following functions: <ul style="list-style-type: none"><li>■ Eight 3-way conference (<b>8 x 3-way</b>), or</li><li>■ Dual 15-party conference (2 x 15-party)</li></ul> One card is required for each mode, and is database selectable (2 x 15-party or 8 x 3-way). |
| 8DRCM-2 | IPx 800X | Includes, but is not limited to, the following conference functions: <ul style="list-style-type: none"><li>■ Six 3-way conference (<b>6 x 3-way</b>), and</li><li>■ One x 6-party conference (1 x 6-party)</li></ul>   |

These cards are described in the “*Coral Service and Peripheral Cards Installation Manual*”.

## ● Specifications - 3-Way Conference

---

### Number of Circuits:

|                         |                                      |
|-------------------------|--------------------------------------|
| U-RMI Office card ..... | 24 max. 8 default                    |
| U-MR Office card .....  | 24 max. 8 default                    |
| RMI Office card .....   | 0                                    |
| MR Office card.....     | 0                                    |
| 8DRCO /4 card.....      | 6 (requires IPx 800X expansion cage) |
| CNF card .....          | 8 (requires IPx 800X expansion cage) |

## 9.5 Multi-Party Conference (CONF) Meet Me Conference Circuitry

### General Description

---

The U-RMI Office and U-MR Office cards provide two (max: 6\*) meet-me bridge conference circuits for 14 parties.



#### **NOTE:**

*Separate authorization is required to allocate the CONF circuits supported by the U-RMI Office and U-MR Office cards.  
(max: \*) The max. number is dependent on the number of URC resource points.*

---

The Meet Me bridge manages conferences talk for up to 14/84 participants. Any combination of trunks or stations can participate. The circuitry is completely digital. During the conferencing session, each participant hears the voices of other participants as their amplitude voices are added.

The Meet Me bridge allows the establishment of a conference call at an appointed hour by dialing a special conference destination number.

The multi-party conference feature allows a conference of up 14/84 simultaneous conversations in a conference mode.

The conference bridge is a Meet Me feature. Station users can dial the programmable access code and/or transfer or be transferred to the conference call.

Access to the conference bridge may be defined through the Tenant feature.

## Feature Descriptions

---

The Meet Me Bridge Conference Circuit (CONF) in the Coral IPx Office system enables:

- Group Call
- Multiparty conference

---

### *URC Chained Meet Me Groups*

The URC has 6 circuits that may be allocated as Conference ports. Each of these ports can enable one conference of 14 participants. Alternatively, these conference ports can be chained together internally by the URC, without using extra time slots, so that a conference with a maximum of 84 participants can be created. The “chain” definition is created via the PDB branch, see [Special Port Facilities \(Route: PDB,3\), page 9-43](#).



#### **NOTE:**

---

*84 participants requires URC Software Versions 2.xx or higher.  
The conference number is displayed on the user's keyset. However, different members in the same chained conference may see different conference numbers on their display.*

---

---

### *URC Meet Me Conference Modes*

The Meet-Me conference can be defined to operate in one of two different modes:

- **Summation:**  
Enables all conference participants to be heard simultaneously during the conference.
- **Strongest Win:**  
Enables only the loudest speaker to be heard during the conference.

The technician is able to define a maximum number of participants when using the Summation mode. When this maximum is exceeded, the system automatically switches the conference to the Strongest Win mode (see PI Branch: CDB,11,2; [CONF MEMBERS, page 9-43](#) and [CONF SWITCH DELAY, page 9-43](#) on [URC Card DB - Meet Me Conference \(Route: CDB,11,2\), page 9-43](#)).

## Database Programming

---

The Meet Me Bridge Conference Circuit (CONF) requires the appropriate definitions in the database. Consult the *Program Interface (PI) and Database Reference Manual* for instructions on the database programming required for CONF.

The following parameters must be set, to enable **Multi-party** conferencing and **Group Calls**.

### *Special Port Facilities (Route: PDB,3)*

Use this field for the following:

- To assign this port to a specific tenant group.
- To determine whether the conference participants will be notified when a member joins or leaves the conversation.

Refer to [Chapter 23 - Conference](#) in the [Program Interface and Database Reference Manual](#) for details.

### *Class of Service (Route: COS,0)*

CONF

CONF\_RELEASE

CONF\_LOCK

### *Feature Timers (Route: FE.T)*

This branch may be used to determine time intervals for multi-party conference call features. The related parameters are:

CONF\_SUPV\_RECALL

GRP\_CALL\_RING

Refer to [Chapter 6 - System Features](#) in the [Program Interface and Database Reference Manual](#) for details.

### *Group Calls (Route: CALL)*

This branch may be used to assign various multi-party conference call features.

Refer to [Chapter 10 - Groups](#), in the [Program Interface and Database Reference Manual](#) for details.

### *Feature Timers (Route: FE.T)*

GRP\_CALL\_RING

### *Gains Table (Route: ROOT,0,1,3)*

Entry #12 of the gains table can be used to set gain parameters to the conference. For more information see Chapter 19 in the Program Interface (PI) and Database Reference manual.

### *Feature Authorization (Route: FEAT,1)*

- URC CONF
- CONF

Separate Software Authorization is required to allocate the URC resources. Refer to *Program Interface (PI) and Database Reference Manual, Chapter 3, Feature Authorization* for more details.

### *Sizes (Route: SIZ)*

- CONF\_CKTS parameter - enter 1 to 6 ports as required.

### *URC Configuration (Route: CDB,11,1)*

- 3WAY - defines the maximum number of 3-way Conference bridge resources to be enabled by the system URC cards. Each 3-way conference circuit requires 4 card resource points (therefore, eight 3-way circuits require 32 resource points).

### *Card List (Route: CLIS)*

Card type (see [Table 9-5 on page 9-11](#)) must show:

RMI-F or MR in the P\_TYPE field of **Shelf #1, Slot #6**.

URC2 in the P\_TYPE field of **Shelf #1, Slot #7**.

### *Port List (Route: PLIS,0)*

Port type must show:

CONF in the TYPE field of **Shelf #1, Slot #7, Ckt #48-53(max.)**.

Use the NAME fields to assign a short/full name to the authorized CONF ports.

If you choose **0 - Physical Location**, type (Shelf #1, Slot #7, Ckt #48-53).

If you choose **1 - Dial Number**, select field [All].

Refer to *Program Interface (PI) and Database Reference Manual, Chapter 6, System Port List* for more details.

### *Numbering Plan (Route: NPL,0)*

CONFERENCE RELEASE - field 9, index 173.

CONFERENCE LOCK - field 9, index 190.

CONFERENCE DIAL NUMBERS - field 30 (Shelf #1, Slot #7, Ckt #48-53).

### *URC Configuration (Route: CDB,11,1)*

Meet Me - defines the maximum number of Multi-Party (Meet-Me) conference bridge resources to be enabled by the system URC cards. Each Meet Me conference circuit requires 16 card resource points.

### *URC Card DB - Meet Me Conference (Route: CDB,11,2)*

CONF MEMBERS

CONF SWITCH DELAY

### *Special Port Facilities (Route: PDB,3)*

LINKED TO CONF DIAL# -

Refer to [Chapter 23 - Conference](#) in the [Program Interface and Database Reference Manual](#) for details.

## Additional Multi-Party Conference Circuits

Additional digital Conference Bridge cards may be installed in the optional Coral IPx 800X expansion cage. The additional cards include:

| Card    | Cage     | Description   |
|---------|----------|---|
| CNF     | IPx 800X | Includes one of the following functions: <ul style="list-style-type: none"><li>■ Dual 15-party conference (<b>2 x 15-party</b>)</li><li>■ Eight 3-way conference (8 x 3-way), or</li></ul> One card is required for each mode, database selectable (2 x 15-party or 8 x 3-way). |
| 8DRCM-2 | IPx 800X | Includes the following conference functions, among others: <ul style="list-style-type: none"><li>■ One x 6-party conference (<b>1 x 6-party</b>)</li><li>■ Six 3-way conference (6 x 3-way)</li></ul>   |

These cards are described in the “*Coral Service and Peripheral Cards Installation Manual*”.



## ● Specifications - Multi-Party Conference

---

### Number of Circuits:

|                         |   |
|-------------------------|---|
| U-RMI Office card ..... | 6 max. 2 default                          |
| U-MR Office card .....  | 6 max. 2 default                          |
| RMI Office card .....   | 0   |
| MR Office card.....     | 0   |
| 8DRCM-2 card.....       | 1 x 6-party (requires IPx 800X exp. cage) |
| CNF card .....          | 2 x15-party (requires IPx 800X exp. cage) |

### Number of Participants:

|                                   |         |
|-----------------------------------|---------|
| Per (U-RMI or U-MR) circuit ..... | 14 max. |
| Per (U-RMI or U-MR) card .....    | 84 max. |

**NOTES:**

## 9.6 DTMF Receiver (DTR)

### General Description

---

The U-RMI Office and U-MR Office cards provide 24 (max: 24\*) port DTMF receivers and decoders for touch-tone digits.



#### **NOTE:**

*Separate authorization is required to allocate the DTMF circuits supported by the U-RMI Office and U-MR Office cards.  
(max: \*) The max. number is dependent on the number of URC resource points.*

---

The U-RMI Office and U-MR Office cards include the DTR circuits. The DTR provides up to 24 circuits, which receive and decode Dual Tone Multi-Frequency (DTMF) dialing tones. The DTR is required to support telephone station apparatus or trunks that send DTMF tones to the Coral IPx Office system to activate system features or select other ports.

DTMF signalling is commonly used by industry standard, single line telephone (SLT) sets, as well as E&M tie trunks and Direct Inward Dialing (DID) central office trunks. Loop-start and ground-start central office trunks, which are defined in the system database as IRSS (Freedom) or DISA, require a DTR to be installed in the system.

The DTR uses industry standard DTMF receiver circuitry to decode DTMF dialing tones. The audio side of each DTMF receiver circuit is directly coupled through a CODEC to the Pulse Code Modulation (PCM) switching matrix of the Coral IPx Office system. Decoded digital data is passed through the peripheral bus to the system processor.

## How many DTMF receiver circuits (DTRs) are required?

To provide adequate DTMF dialing Quality Of Service in the system the number of DTMF receivers should match the anticipated traffic volume. The following table provides the number of DTR ports required for several different DTMF dialing port sizes.

| Number of DTMF Dialing Ports | Number of DTR Receiver Circuits |
|------------------------------|---------------------------------|
| 100                          | 8                               |
| 500                          | 16                              |
| 1000                         | 24                              |



### NOTE:

*This table assumes standard office traffic (medium traffic volume of 0.3Eg per port). Higher traffic volumes should increase DTMF service accordingly. Additional DTMF service should be used when features as FlexiCall, IRSS, Freedom and DISA are used.*

## Additional DTR Circuits

Additional DTR resource cards may be installed in the optional cages. The additional cards include:

| Card           | Cage            | Description   |
|----------------|-----------------|---|
| 8DTMF          | IPx 800X        | 8 circuit DTMF Receiver and decoder card  |
| 8DRCM-2        | IPx 800X        | Includes 8 DTR circuit DTMF receiver and decoder functions, among other functions   |
| MRC on PUGW    | IPx 800X        | The MRC functions as a daughterboard to the PUGW, PUGWipx or MCB_Office card. It integrates media channel gateway, DTMF receiver (DTR), and MFC-R2 receiver (MFR) circuits. MRC modules include MRC-16 or MRC-64 types. It provides up to 64 or 128 circuit DTMF Receiver respectively, see <a href="#">MRC-8, 16, 32, 64 Modules, page 9-5</a> . |
| MRC on PUGWipx | IPx 500X        |   |
| MRC            | IPx Office Main |   |

These cards are described in *Chapter 8 of the Coral Service and Peripheral Cards Installation Manual*.

## Database Programming

---

The DTR requires the appropriate definitions in the database. Consult the *Program Interface (PI) and Database Reference Manual* for instructions on the database programming required for the DTR. The following parameters must be set, to enable the DTR:

*Sizes TAB (Route: SYSGEN)*

RESOURCES

*URC Feature Authorization (Route: FEAT,1)*

URC DTMF

Separate Software Authorization is required to allocate the URC resources. Refer to *Program Interface (PI) and Database Reference Manual, Chapter 3, Feature Authorization* for more details.

*URC Configuration (Route: CDB,11,1)*

DTMF

Defines the maximum number of DTMF Receiver (DTR) resources to be enabled by the system URC cards. Each DTMF receiver requires one card resource point.

*URC Card Database (Route: CDB,11,2)*

DTMF GAIN

The gain may be adjusted in this branch and not in the Feature Control branch as with other cards.

*Card List (Route: CLIS)*

Card type (see [Table 9-5 on page 9-11](#)) must show:

RMI-F or MR in the P\_TYPE field of **Shelf #1, Slot #6**.

URC2 in the P\_TYPE field of **Shelf #1, Slot #7**.

*Port List (Route: PLIS,0)*

Port type must show:

DTR in the TYPE field of **Shelf #1, Slot #7,**

**Ckt #0-23(max. for URC2) or 0-47(max. for URC4)**

See [Table 9-16 URC DTR/DTMF PI Configuration, page 9-27](#).

## Specifications - DTR

---

### Number of Circuits:

|                            |  |
|----------------------------|--|
| U-RMI Office card .....    | 24 max. 24 default   |
| U-MR Office card .....     | 24 max. 24 default   |
| RMI Office card .....      | 0  |
| MR Office card.....        | 0  |
| 8DTMF card.....            | 8 (requires IPx 800X expansion cage)   |
| 8DRCM-2 card.....          | 8 (requires IPx 800X expansion cage)   |
| MRC card .....             | (see <i>MRC-8, 16, 32, 64 Modules, page 9-5,</i><br><i>refer to Chapter 8 of the Coral Service and</i><br><i>Peripheral Cards Installation Manual)</i> |
| Detection Level: .....     | -28 to 0 dBm   |
| Detection Threshold: ..... | -32 dBm Min.   |
| Signal Duration: .....     | 50 ms Min.   |
| Interdigit Time:.....      | 50 ms Min.   |
| Frequency Tolerance: ..... | Less than $\pm 1.5\%$  |
| Frequency Reject:.....     | More than $\pm 3.5\%$  |



### Tip:

---

*Sizing the number of DTR receivers must take into account the use of DISA, FlexiCall and (IRSS) Freedom features as well as the number of DTMF phones.*

---

## 9.7 Dial Tone Detector (DTD)

### General Description

The *U-RMI Office* and *U-MR Office* cards provide 16 (max: 32\*) port DTD (Dial Tone Detector) circuits for enhanced dialing, such as busy outside number auto-redial.



#### **NOTE:**

(max: \*) The max. number is dependent on the number of URC resource points.

The DTD circuits are used to detect and identify standard call progress tones such as dial tone, busy tone, reorder (fast busy) tone and ringback tone. The DTD is required to support system features such as Automatic Called Number Redial (ACNR, also called Scanner).

The DTD may also be utilized to force a station user to wait for a dial tone before dialing to the central office. This increases the effectiveness of the toll restriction by prohibiting users from dialing an unrestricted code before the central office is ready, and then making a toll call when the dial tone is heard.

Each tone detection circuit of the DTD consists of a sophisticated audio noise level detector. This circuit monitors audio signals and determines a constant or ambient level, and then determines the presence of noise above ambient.

During operation, the system passes digitized voice signals from a port to be monitored, through the Pulse Code Modulation (PCM) switching matrix to one of the noise level detection circuits of the DTD. The presence of a call progress tone is typically characterized by a sustained, non-fluctuating noise level.

The DTD then multiplies the periods that the tone is present and the periods of silence. The durations of tone and silence are assembled to form a cadence (or rhythm pattern) that is compared with an internal list of call progress tones and their associated cadence. By matching the cadence of the monitored tone with the one contained in the list, the DTD identifies the tone and reports the tone type via the peripheral bus to the system processor.

## Database Programming

---

The DTD requires the appropriate definitions in the database. Consult the *Program Interface (PI) and Database Reference Manual* for instructions on the database programming required.

The following parameters must be set, to enable **DTD**.

*Sizes TAB (Route: SYSGEN)*

RESOURCES

*URC Configuration (Route: CDB,11,1)*

DTD

Defines the maximum number of Dial Tone Detector (DTD) resources to be enabled by the system URC cards. Each DTD circuit requires 1 card resource point.

*URC Card Database (Route: CDB,11,2)*

DTD GAIN

The gain may be adjusted in this branch and not in the Feature Control branch as with other cards.

When the DTD exists and is initialized, the PI shows:

*Card List (Route: CLIS)*

Card type (see [Table 9-5 on page 9-11](#)) must show:

RMI-F or MR in the P\_TYPE field of **Shelf #1, Slot #6**.

URC2 in the P\_TYPE field of **Shelf #1, Slot #7**.

*Port List (Route: PLIS,0)*

Port type must show:

DTD in the TYPE field of **Shelf #0, Slot #7, Ckt #112-143(max.)**

See [Table 9-21 URC Dial Tone Detector \(DTD\) PI Configuration, page 9-33](#).

Refer to *Program Interface (PI) and Database Reference Manual, Chapter 6, System Port List* for more details.



## Additional DTD Circuits

---

Additional DTD resources cards may be installed in the optional Coral IPx 800X expansion cage. The additional cards include:

| Card    | Cage     | Description  |
|---------|----------|--|
| 8DRCM-2 | IPx 800X | Includes 8 DTD circuit dialtone detector and call progress tone analyzer functions, among other functions. |

These cards are described in the *Coral Service and Peripheral Cards Installation Manual*.

## ● Specifications - DTD

---

### Number of Circuits:

|                         |                                      |
|-------------------------|--------------------------------------|
| U-RMI Office card ..... | 32 max. 16 default                   |
| U-MR Office card .....  | 32 max. 16 default                   |
| RMI Office card .....   | 0                                    |
| MR Office card.....     | 0                                    |
| 8DRCM-2 card.....       | 8 (requires IPx 800X expansion cage) |
| Detection Level: .....  | -28 to 0 dBm                         |
| Rejection Level: .....  | -32 dBm Minimum                      |

## 9.8 Caller ID for SLT (iDSP)

### General Description

---

The *U-RMI Office* and *U-MR Office* cards provide 16 (max: 32\*) iDSP ports.



#### **NOTE:**

*Separate authorization is required to allocate the iDSP circuits supported by the U-RMI Office and U-MR Office cards.  
(max: \*) The max. number is dependent on the number of URC resource points.*

---

The iDSP is required for displaying CID (Caller ID) for SLT users. The iDSP application converts ASCII text information, received from the Coral main processor, into FSK tone:

- BellCore GR-30, or
- ETSI 300-659-1 para. 6.1.1

The FSK tones are supplied for direct injection onto the Coral PCM highways. The iDSP application provides up to 32 individual FSK tones simultaneously, each on a different PCM channel and call.

The CID display feature for SLT requires Authorization for SLT-CID, and an FSK compatible display unit installed on the SLT port.

The following information modulated in FSK is sent to an SLT interface by the iDSP application, between the 1st and 2nd ring:

- Date
- Time
- Number (the last 10 digits)
- Name (the first 15 characters); enabled through programming in the configuration database

The CID display unit detects this information and transforms it back into ASCII codes. Up to 32 SLT sets can receive CID information simultaneously from a single URC iDSP application. Multi-appearance and waiting call's information is not supported.

## Database Programming

---

The CID requires the appropriate definitions in the database. Consult the *Program Interface (PI) and Database Reference Manual* for instructions on the database programming required.

The following parameters must be set, to enable **CID**.

### *URC Feature Authorization (Route: FEAT,1)*

URC CLID

SLT-CID

### *URC Configuration (Route: CDB,11)*

CID

Defines the maximum number of Caller ID (CID) transmitter resources to be enabled by the system URC cards. Each CID transmitter circuit requires 1 card resource point.

When the CID exists and is initialized, the PI shows:

### *Card List (Route: CLIS)*

Card type (see [Table 9-5 on page 9-11](#)) must show:

RMI-F or MR in the P\_TYPE field of **Shelf #1, Slot #6**.

URC2 in the P\_TYPE field of **Shelf #1, Slot #7**.

### *Port List (Route: PLIS,0)*

Port type must show:

CID in the TYPE field of **Shelf #1, Slot #7, Ckt #80-111(max.)**

See [Table 9-20 URC iDSP CID \(Caller ID\) Transmitters PI Configuration, page 9-31](#).

Refer to *Program Interface (PI) and Database Reference Manual, Chapter 6, System Port List* for more details.

### *iDSP Card Database (Route: CDB, 9)*

CLID TYPE.

## Additional CID Circuits

---

Additional CID resources cards may be installed in the optional Coral IPx 800X expansion cage. The additional cards include:

| Card | Cage     | Description  |
|------|----------|--|
| iDSP | IPx 800X | 64 circuit FSK (Frequency Shift Keying) tone generator card. |

These cards are described in the *Coral Service and Peripheral Cards Installation Manual*.

## ● Specifications - CID

---

### Number of Circuits:

|                         |                                       |
|-------------------------|---------------------------------------|
| U-RMI Office card ..... | 32 max. 16 default                    |
| U-MR Office card .....  | 32 max. 16 default                    |
| RMI Office card .....   | 0                                     |
| MR Office card.....     | 0                                     |
| iDSP card.....          | 64 (requires IPx 800X expansion cage) |

# 9.9 MFC Receiver (MFR)

## Multi-Frequency Code Receiver Circuit

### General Description

The *U-RMI Office*, *U-MR Office*, *RMI Office* and *MR Office* cards do not provide circuits for MFC (Multi-Frequency Code) Receiver.

It is required to support telephone equipment or trunks which send MFC-R2 inter-office tone dial signalling to the Coral system for the purpose of activating system features or selecting other ports.

### Available MFR Circuits

MFR resource cards may be installed in the following cages. The additional cards include:

| Card           | Cage            | Description   |
|----------------|-----------------|---|
| 16MFR          | IPx 800X        | 16 circuit Multi-Frequency Code (MF or MFC tone) Receiver and decoder card.   |
| MRC on PUGW    | IPx 800X        | The MRC functions as a daughterboard to the PUGW, PUGWipx or MCB_Office card. It integrates media channel gateway, DTMF receiver (DTR), and MFC-R2 receiver (MFR) circuits.   |
| MRC on PUGWipx | IPx 500X        |   |
| MRC            | IPx Office Main | MRC modules include MRC-16 or MRC-64 types. It provides up to 64 or 128 circuit (respectively) Multi-Frequency Code (MF or MFC tone), Receiver and decoder (MFR), see <a href="#">MRC-8, 16, 32, 64 Modules, page 9-5</a> |

These cards are described in *Chapter 8 of the Coral Service and Peripheral Cards Installation Manual*.

## ● Specifications

---

### Number of Circuits:

|                         |   |
|-------------------------|---|
| U-RMI Office card ..... | 0   |
| U-MR Office card .....  | 0   |
| RMI Office card .....   | 0   |
| MR Office card.....     | 0   |
| 16MFR card.....         | 16 (requires IPx 800X expansion cage)   |
| MRC card .....          | (see <a href="#">MRC-8, 16, 32, 64 Modules, page 9-5</a> ,<br>refer to <i>Chapter 8 of the Coral Service and<br/>Peripheral Cards Installation Manual</i> ) |



# 9.10 VoIP Media Channel Gateway

## General Description

The MRC module supplies media channels necessary to convert PCM calls (digital media streams) to IP packets and vice versa, thereby converting standard Coral “talk” into Internet Protocol “talk”. Media channels are also used when one of the calling parties is not an IP host. Media channels are not required for pure peer-to-peer (pure IP-to-IP) connections. Each *MCB Office* can support one MRC daughterboard.

### *Maximum Number of Receivers or Media Channels Supported*

The MRC card enables receivers and media channels to be used simultaneously. [Table 9-22](#) lists the different media channel and receiver types supported by MRC models along with the maximum number supported per type. Any value provided in [Table 9-22](#) indicates that the MRC is operating at full capacity and cannot support any other function. When other media protocols or receivers are used, then these values cannot be achieved.

To ensure that the system will be non-blocking, resources for DTR and MFR can be reserved. See *Reserving Resources for DTR and MFC Shared Services* in [Chapter 8 of the Coral Service and Peripheral Cards Installation Manual](#).

For example, an MRC-16 card can simultaneously support up to 16 media channels that utilize CODEC G.729. If all of these channels are actually in use at the same time, the card will not be able to support any other media channel or receiver.

**Table 9-22 Maximum Number of MRC Receivers or Media Channels Supported**

| Category       | Type                 | MRC-8 | MRC-16 | MRC-32 | MRC-64 |
|----------------|----------------------|-------|--------|--------|--------|
| Receivers      | DTMF Receivers (DTR) | 32    | 64     | 64     | 128    |
|                | MFC Receivers (MFR)  | 32    | 64     | 64     | 128    |
| Media Channels | G.729                | 8     | 16     | 32     | 64     |
|                | G.723 (NET_IP)       | 8     | 16     | 24     | 64     |
|                | T.38 (NET_IP)        | 8     | 16     | 32     | 32     |
|                | G.711                | 32    | 64     | 64     | 128    |

## Additional Media Channel Circuits

Additional media gateway cards may be installed in the optional Coral IPx 500X and 800X expansion cages. The additional cards include:

| Card          | Cage     | Description  |
|---------------|----------|--|
| PUGW w/MRC    | IPx 800X | The MRC-16 or 64 functions as a daughterboard to the PUGW/PUGWipx card. It integrates onto one card: <ul style="list-style-type: none"><li>■ Media channel gateway circuits</li><li>■ DTMF Receiver (DTR) circuits</li><li>■ MFC-R2 (MFR) circuits</li></ul> |
| PUGWipx w/MRC | IPx 500X |  |

For more information see [MRC-8, 16, 32, 64 Modules, page 9-5](#).

These cards are also described in *Chapter 8* of the *Coral Service and Peripheral Cards Installation Manual*.

# 9.11 Remote Maintenance (Modem)



## NOTE:

### **Coral Components Discontinuation Announcement:**

*U-MR Office and MR Office cards replace the discontinued U-RMI Office and RMI Office cards, which are no longer produced.*

*As of 30-Nov-2011 U-MR Office card is supplied as standard.*

*Modem is not available on U-MR Office and MR Office cards.*

## General Description

The *U-RMI Office* and *RMI Office* cards provide an auto-answer data modem. A full duplex, asynchronous, ASCII modem, used for remote programming of the system database, diagnostics and system maintenance, and/or for displaying various reports.

The modem operates at up to 56Kbps, using the ITU-T V.92 standard.

The modem answers an incoming call in Originate mode (no answer tone). To establish a connection, the originating modem must initiate the call in answer mode (by sending answer tone). This feature may be used as an added security measure to protect the system database from intrusions.

## Modem Jumpers - Enable/Disable

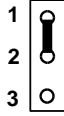
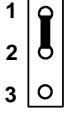
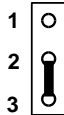

The *U-RMI Office* and *RMI Office* cards are equipped with jumper straps P5 and P6 (see [Figure 9-4 on page 9-15](#)) that enable and disable the modem. These jumpers, when removed, disable the on-board modem, without affecting the other programming interfaces. Thus, a local programming terminal or an external modem incorporating more sophisticated security features may be operated while the modem is disabled.

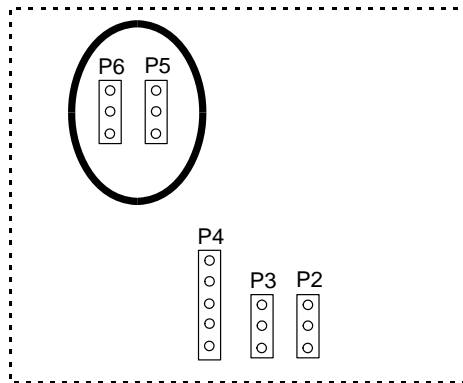
The modem requires no external connections to function. The data side of the modem circuitry directly accesses the peripheral data bus to communicate with the system processor. The audio side of the modem circuitry directly accesses the switching matrix, is assigned a dial number in the system database and may answer incoming calls in virtually the same manner as any other port in the system.

The modem can be configured to transmit or receive data. This is useful when maintenance from a remote workstation is necessary. During normal system operation,

it is advisable to set the modem transmit and receive function to “Off” for more secure system operation. [Table 9-23](#) displays the jumper settings for the modem.

**Table 9-23 Modem - Jumper Configuration (U-RMI and RMI Office)**

| Function       | P6  | Function       | P5  |
|----------------|---|----------------|---|
| Rx Modem - On  |  | Tx Modem - On  |  |
| Rx Modem - Off |  | Tx Modem - Off |  |



**CAUTION!**

The modem may only be used to communicate with the system processor for programming and maintenance purposes, or for retrieving station message detail recording (SMDR) data or wake-up reports. It may not be used as a switched data port.

**CAUTION!**

Setting the Transmit or Receive function of the modem to “On” during normal system operation exposes the Coral IPx Office system to penetration by unauthorized parties.

## Database Programming



### NOTE:

This function requires installation of additional jumpers (P5 and P6, pins 1 and 2 must be connected) on the U-RMI Office and RMI Office cards. Described on page 9-63.

The Modem requires the appropriate definitions in the database. Consult the *Program Interface (PI) and Database Reference Manual* for instructions on the database programming required for the modem.

When the modem exists and is initialized, the PI shows:

- 1 Card List** (Route: CLIS)  
Card type must show RMI-F in the P\_TYPE field of **Shelf #1, Slot #6**.
- 2 Port List** (Route: PLIS)  
Port type must show MODEM in the TYPE field of **Shelf #1, Slot #6, Ckt #26**.  
Use this field to assign a short/full name to this port.  
If you choose **0 - Physical Location**, type (Shelf #1, Slot #6, Ckt #26).  
If you choose **1 - Dial Number**, choose field [5] MODEM.  
Refer to *Chapter 6 - System Port List*, in the *Program Interface (PI) and Database Reference Manual*, for more details.
- 3 General Numbering Plan** (Route: NPL,0) [13] (Ckt #26)  
Use the 13-MODEM field of the Update Menu, to designate dial numbers to the modem ports in the system. Refer to *Chapter 5 - Numbering Plan*, in the *Program Interface (PI) and Database Reference Manual*, for more details.
- 4 Special Port Facilities** (Route: PDB,6)  
Use this field to assign this port to a specific tenant group.  
Refer to *Chapter 23 - RMI Modem*, in the *Program Interface (PI) and Database Reference Manual*, for more details.
- 5 Class Of Service** (Route: COS,0) [MODEM]
- 6** Use the MODEM parameter to determine whether a specific station user is allowed to dial to the MODEM. Refer to *Chapter 7 - Station and Trunk COS*, in the *Program Interface (PI) and Database Reference Manual*, for more details.

**7 Terminal Setup** (Route: TERM,0)

Use this field to set up the communication parameters for the data applications. Refer to *Chapter 17* in the *Program Interface (PI) and Database Reference Manual* for more details.

**8 Gains Table** (Route: ROOT,0,1,3)

Entry #10 of the gains table can be used to set gain parameters to the modem. These parameters set the transmission value levels of the modem while in CONNECT state with any possible port in the system. For more information see *Chapter 19* in the *Program Interface (PI) and Database Reference And Database Manual*.

## Additional Modem in the Optional IPx 800X Cage

Additional modem ports may be installed in the optional Coral IPx 800X expansion cage. The additional cards include:

| Card  | Description   |
|-------|---|
| 8DRCF | Same as 8DRCM-2 but with 1 remote maintenance modem (V.92 ITU-T standard up to 56Kbps).<br><i>NOTE: Discontinued card, no longer produced, requires special order and checking of availability.</i>             |
| 8DRCM | Same as 8DRCFM-2 but with 1 remote maintenance modem (Bell 103/212A or ITU V.21/V.22, 300/1200bps).<br><i>NOTE: Discontinued card, no longer produced, requires special order and checking of availability.</i> |

These cards are described in the *Coral Service and Peripheral Cards Installation Manual*.

Shared service cards may be installed in any available peripheral card slot in the optional Coral IPx 800X expansion unit.

## Specifications - Modem

---

### Number of Circuits:

|                         |                                      |
|-------------------------|--------------------------------------|
| U-RMI Office card ..... | 1                                    |
| RMI Office card .....   | 1                                    |
| U-MR Office card .....  | 0                                    |
| MR Office card.....     | 0                                    |
| 8DRCF card.....         | 1 (requires IPx 800X expansion cage) |

### Modem Operating Modes: (V.92 ITU-T) up to 56Kbps

|                           |                                    |
|---------------------------|------------------------------------|
| Client-to-Server .....    | DataComm: supports V.92 or K56flex |
| Modem Compatibility ..... | ITU V.92, K56flex                  |



#### **NOTE:**

---

*Data communications via the modem use the 7 bit, American Standard Code for Information Interchange (ASCII) character set, although each port may be programmed to send and receive a “dummy” 8th character bit. Data is exchanged in asynchronous character transmission mode.*

---



#### **NOTE:**

---

*U-MR card is supplied as standard. All other variations of the card (U-RMI, RMI, MR) require special order and checking of availability.*

---



# 9.12 Data Serial Ports (RS-232E)

## KB0, KB1, KB2, KB3

### General Description

---

The *U-RMI Office*, *U-MR Office*, *RMI Office* and *MR Office* cards do not provide Serial ports.

The Coral IPx provides one EIA RS-232E Asynchronous, ASCII serial data interface (KB0) via the *MCB Office*, for the following functions:

- System database programming
- Diagnostics and system maintenance

See [KB0 RS-232E Programming Port](#), page 8-28

## RS-232E ports in the Optional IPx 800X Cage

RS-232E Serial ports may be installed in the optional Coral IPx 800X expansion cage. The additional cards include:

| Card    | Cage     | Description  |
|---------|----------|--|
| 8DRCM-2 | IPx 800X | Includes three RS-232E programming/maintenance interfaces (300 to 115,200 bps), among other functions. |

This card is described in the *Coral Service and Peripheral Cards Installation Manual*. 8DRCM-2 cards may be installed in any available peripheral card slot in the optional Coral IPx 800X expansion unit.

The 8DRCM-2 card provides three EIA RS-232E Asynchronous, ASCII serial data interfaces (KB1, KB2 and KB3), for the following functions:

- System database programming
- Diagnostics and system maintenance
- Displaying reports such as station message detail recording (SMDR)
- Displaying wake-up reports
- Displaying call charge
- Printing the Malicious Call Trace reports

### CAUTION!

*The KB1, KB2 and KB3 data ports may only be used to communicate with the system processor for programming and maintenance purposes, or for retrieving station message detail recording (SMDR) data or wake-up reports. It may not be used as switched data ports.*

## ● Specifications - RS-232E

---

### Number of Circuits:

|                         |                                      |
|-------------------------|--------------------------------------|
| U-RMI Office card ..... | 0                                    |
| U-MR Office card .....  | 0                                    |
| RMI Office card .....   | 0                                    |
| MR Office card.....     | 0                                    |
| 8DRCM-2 card.....       | 3 (requires IPx 800X expansion cage) |

**NOTES:**

# 9.13 Music

## Background and Music-On-Hold (M1/M2)

### Introduction

---

The *U-RMI Office*, *U-MR Office*, *RMI Office* and *MR Office* cards provide the following common system functions:

- Two music inputs, one of which can be internal.
- Music-on-hold interface (two ports).
- Key telephone background music interface (two different sources)

### Circuit Description

---

[Figure 9-11](#) and [Figure 9-13](#) are simplified circuit diagrams of the two Music Interfaces. The external music (M1,M2) interfaces are electrically identical. Audio signals to the system are passed through the audio coupling transformer to the interface. A direct current (DC) blocking capacitor protects the secondary winding of the audio coupling transformer from conducting DC energy. As a music input the circuit operates as an input only, and so it can be used to play but not record music.

#### M1 Internal/External Music

Internal music (M1) is available in all cards. The selection between the internal or external source is accomplished by P2 jumper located on the *U-RMI Office*, *U-MR Office*, *RMI Office* and *MR Office* cards. See [Figure 9-12](#). [Table 9-24](#) defines the position of P2 for the music selection.

#### M2/P Paging/External Music

External music (M2/P) connector can be used as voice paging output. The selection between the external music source or voice paging output is accomplished by P3 jumper located on the *U-RMI Office*, *U-MR Office*, *RMI Office* and *MR Office* cards. See [Figure 9-14](#). [Table 9-25](#) defines the position of P3 for the music selection.

## Configuring the Music M1 Jumper to External or Internal

The system music source M1 may be either from an internal or an external source. Figure 9-12 displays the jumper settings for the source type.

Table 9-24 Music-1 Internal/External Selection P2 Jumper Setting

| P2 | 1-2      | 2-3      |
|----|----------|----------|
| M1 | Internal | External |

Figure 9-11 Music-1 Simplified Diagram

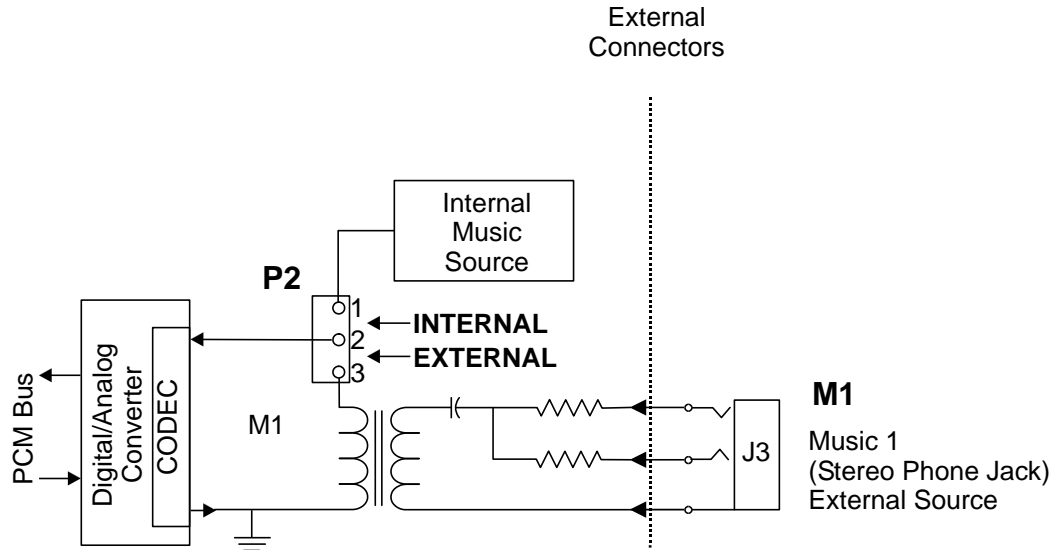
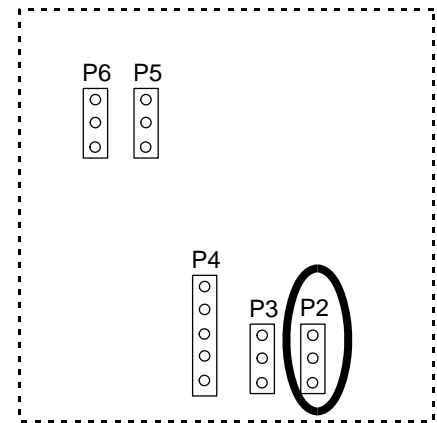


Figure 9-12 Music-1 Internal/External Selection P2 Jumper Setting

| Function       | P2 |
|----------------|----|
| Internal Music |    |
| External Music |    |



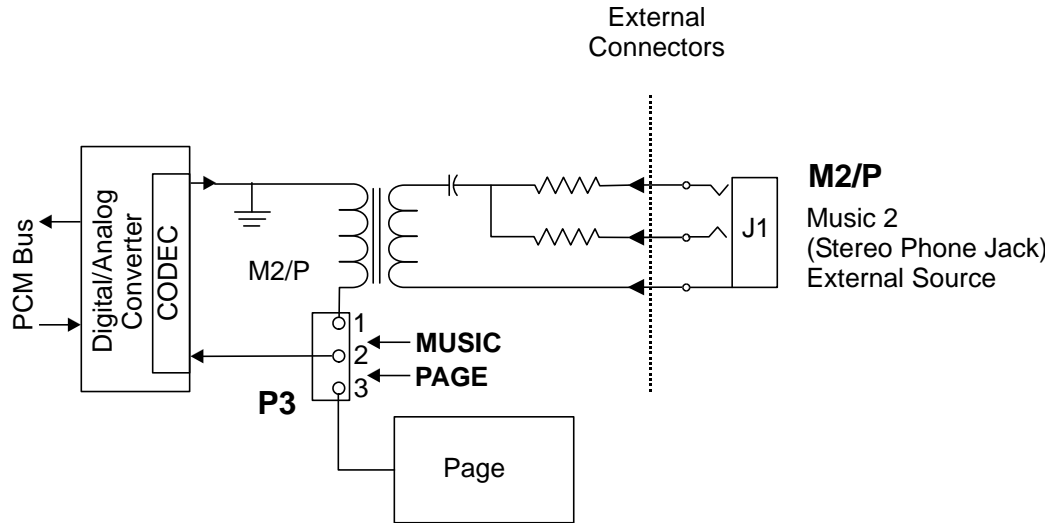
## Configuring the Music M2/P Jumper to Music

The system music source M2/P may be either external music source or a voice page output. [Figure 9-13](#) displays the jumper settings for the music source.

**Table 9-25 Music-2 M2/P Music/Paging Selection P3 Jumper Setting**

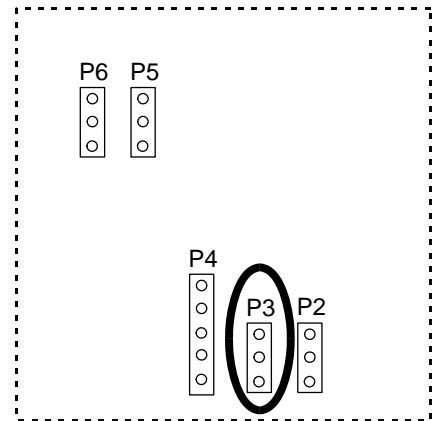
| P3   | 1-2                  | 2-3           |
|------|----------------------|---------------|
| M2/P | External Music Input | Paging Output |

**Figure 9-13 Music-2 Simplified Diagram**



**Figure 9-14 Music-2 M2/P Music/Paging Selection P3 Jumper Setting**

| M2/P Function        | P3                |
|----------------------|-------------------|
| Paging Output        | 1 ○<br>2 ●<br>3 ○ |
| External Music Input | 1 ●<br>2 ○<br>3 ○ |



## Database Programming

---

Each *U-RMI Office*, *U-MR Office*, *RMI Office* or *MR Office* card provides two music sources; M1 (External/Internal selectable) and M2 (External).

The Music feature requires the appropriate definitions in the database. Consult the *Program Interface (PI) and Database Reference Manual* for instructions on the database programming required for Music.

The following parameters must be set, to enable the Music feature.

- 1 Card List** (Route: CLIS)  
Card type must show RMI-F or MR in the P\_TYPE field of **Shelf #1, Slot #6**.
- 2 Music Sources** (Route: SYSGEN,4)  
Use this field to determine the number and the location of music sources in the system. Refer to *Chapter 4 - Music Sources*, in the *Program Interface and Database Reference Manual*, for more details.
- 3 Page-Q** (Route: ROOT,0,7)  
Use this field to determine which music source will be used when a call is placed on a specific queue. Refer to *Chapter 23 - Page\_Q Music*, in the *Program Interface (PI) and Database Reference Manual*, for more details.
- 4 SLT\_Def** (Route: SLT)  
Use the **MUSIC\_ON\_HOLD/TRANSFER** field to determine which music source will be used when a call is placed on hold by the relevant port.
- 5 E&M\_Def** (Route: TRK,1)  
Use the **MUSIC\_ON\_HOLD/TRANSFER** field to determine which music source will be used when a call is placed on hold by the relevant port.
- 6 KEYSSET\_Def** (Route: KEY)  
Use the **MUSIC** field to activate or cancel background music for a specific keyset.
- Use the **MUSIC\_NUM** field to determine which music source will be sounded.  
Use the **MUSIC\_ON\_HOLD/TRANSFER** field to determine which music source will be used when a call is placed on hold by the relevant port.
- 8 Hunt Group** (Route: HUNT)  
Use the **MUSIC\_SOURCE** field to determine which music source will be sounded for callers that queue on the group.  
Use the **RETAIN\_HUNT\_MUSIC\_SOURCE** field as described in *Chapter 9*, in the *Program Interface (PI) and Database Reference Manual*.



9 **Gains Table** (Route: ROOT,0,1,3)

Entry #11 of the gains table can be used to set gain parameters to the music sources. These parameters set the transmission value levels of the music while in CONNECT state with any possible port in the system. For more information see *Chapter 19* in the *Program Interface (PI) and Database Reference manual*.

10 **WAIT\_QUE** (Route: ROOT, 7, 3)

The following three fields **MUSIC/TONE**, **MUSIC\_SOURCE#** and **RETAIN\_WAIT\_Q\_SOURCE** are used to activate WAIT\_Q features. For more information see *Chapter 27 - CoraLINK* in the *Program Interface (PI) and Database Reference manual*.

## External Connections

Figure 9-15 illustrates the connection of customer-supplied music sources. The first music source is passed to any port in a hold state and may also be selected as background music over the speaker of idle key telephone sets. The second music source may be defined in the system database as a second music source for multiple background music sources.

The music source should have a line-level (-10dBm or 50 to 100mV), 600 $\Omega$ , balanced output, with an adjustable output level. In some cases, an 8 $\Omega$  speaker level output from a portable radio or tape player may be used with satisfactory results, if the volume is set relatively low and background noise is not objectionable.

The music connectors are stereo 3.5 mm phone plugs, see Figure 9-10 on page 9-21.

Figure 9-15 Music - Wiring to External Music Source

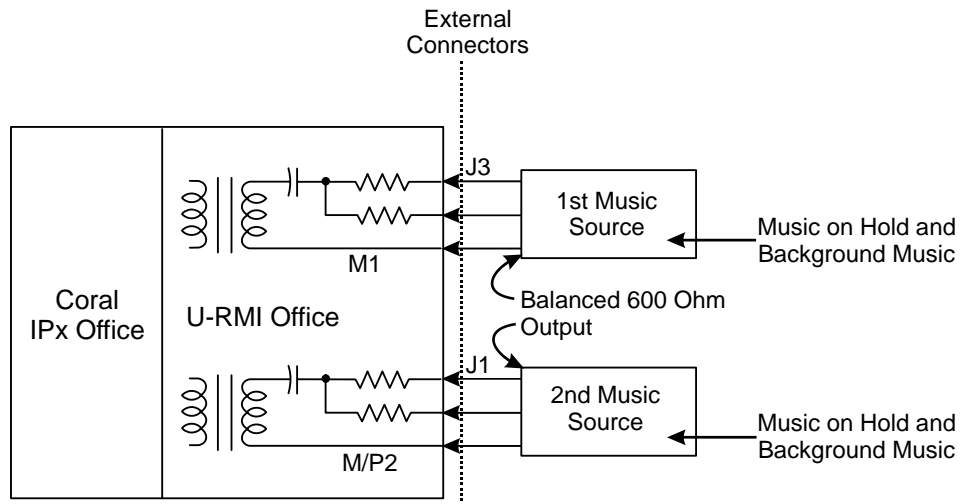


Table 9-9 on page 9-21 lists the function of each interface connector, as they appear on the card front panel, Figure 9-9 on page 9-21 illustrates that connector.

## Additional Music Interfaces in the Optional IPx 800X Cage

Additional Music ports may be installed in the optional Coral IPx 800X expansion cage. The additional cards include:

| Card    | Cage     | Description   |
|---------|----------|---|
| 8DRCM-2 | IPx 800X | Includes the following functions, among others: <ul style="list-style-type: none"><li>■ 1 internal or external music interface</li><li>■ 1 external music interface</li></ul> |

These cards are described in the *Coral Service and Peripheral Cards Installation Manual*.

## ● Specifications - Music

---

### Number of Circuits:

|                         |                                      |
|-------------------------|--------------------------------------|
| U-RMI Office card ..... | 2 (1 when paging is used)            |
| U-MR Office card .....  | 2 (1 when paging is used)            |
| RMI Office card .....   | 2 (1 when paging is used)            |
| MR Office card.....     | 2 (1 when paging is used)            |
| 8DRCM-2 card.....       | 2 (requires IPx 800X expansion cage) |

### M1/M2 (Music-On-Hold and Background Music):

|                   |  |
|-------------------|--|
| Uses .....        | Music-On-Hold (MOH),<br>Background Music       |
| Termination ..... | Capacitor-coupled transformer,<br>non-grounded |
| Impedance .....   | 600Ω Nominal                                   |
| Input Level ..... | -15 dBm Nominal                                |

### MUSIC Connectors:

|                      |                          |
|----------------------|--------------------------|
| Connector Type ..... | Stereo 3.5 mm phone plug |
|----------------------|--------------------------|

# 9.14 Voice Paging and Relay-1 Public Address

## Introduction

The *U-RMI Office*, *U-MR Office*, *RMI Office* and *MR Office* cards provide one external paging interface (public address, one port). Station users can access an external voice paging system connected to the Coral IPx by dialing access code.

## Circuit Description

[Figure 9-16](#) is a simplified circuit diagram of the Paging Interfaces and the relay contacts.

Each *U-RMI Office*, *U-MR Office*, *RMI Office* or *MR Office* card provides one paging output: the external voice paging port operates by using both the relay circuit (RLY1) and the PAGE circuit. The PAGE circuit is used for public address.

The External Paging (PAGE) Interface is electrically identical to the Music interfaces. Audio signals from the system are passed through the audio coupling transformer to the interface. A direct current (DC) blocking capacitor protects the secondary winding of the audio coupling transformer from conducting DC energy. As a music input the circuit operates as an input only, and so it can be used to play but not record music.

The relay provides form A (single pole, single throw and normally open) contacts for activating external circuitry and devices. Contacts RLY1 are designated to operate in conjunction with audio interface PAGE for external paging applications. Care must be taken not to exceed the contact ratings listed in the specifications.

### M2/P Paging/External Music

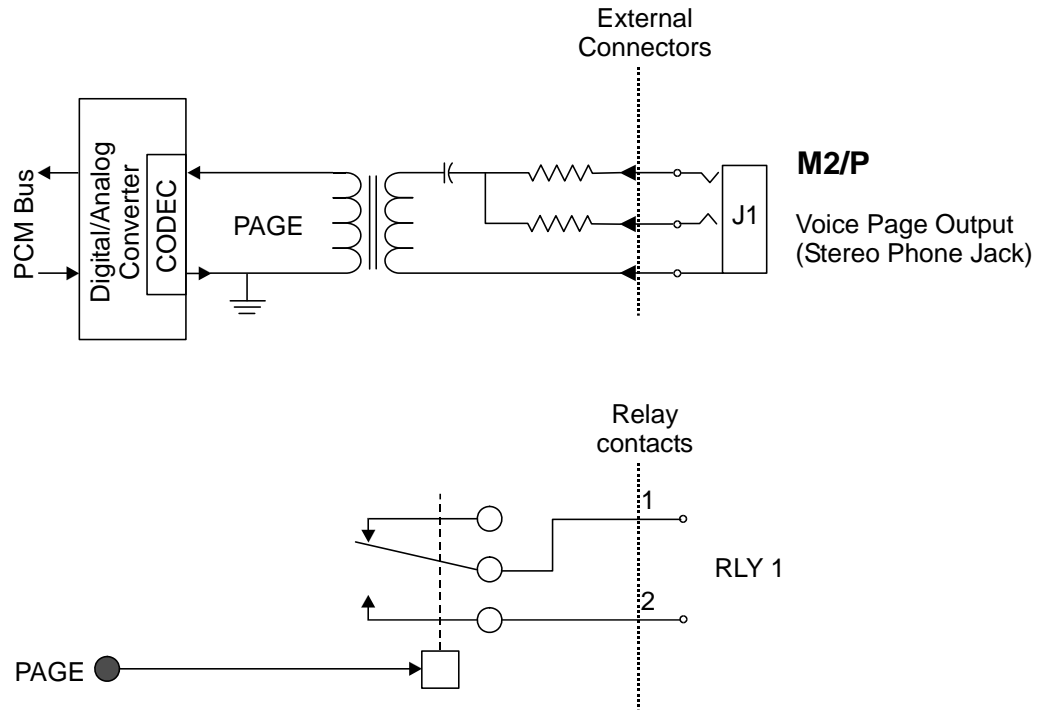
Page (M2/P) connector can be used as a music source. The selection between the music source or voice paging output is accomplished by jumper P3 located on the *U-RMI Office*, *U-MR Office*, *RMI Office* and *MR Office* cards. See [Figure 9-17](#). [Table 9-26](#) defines the position of P3 for the music selection.

### Relay Contacts 1-2 Paging/Relay

Relay Contacts 1-2 can be dial-activated or used as a system alarm. The selection between the paging or system alarm/dial-operated is accomplished by jumper P4

located on the U-RMI Office, U-MR Office, RMI Office and MR Office cards. See [Figure 9-19](#). [Table 9-27](#) defines the position of P4 for the paging selection.

**Figure 9-16 Paging & Relay Contacts 1-2 Simplified Diagram**



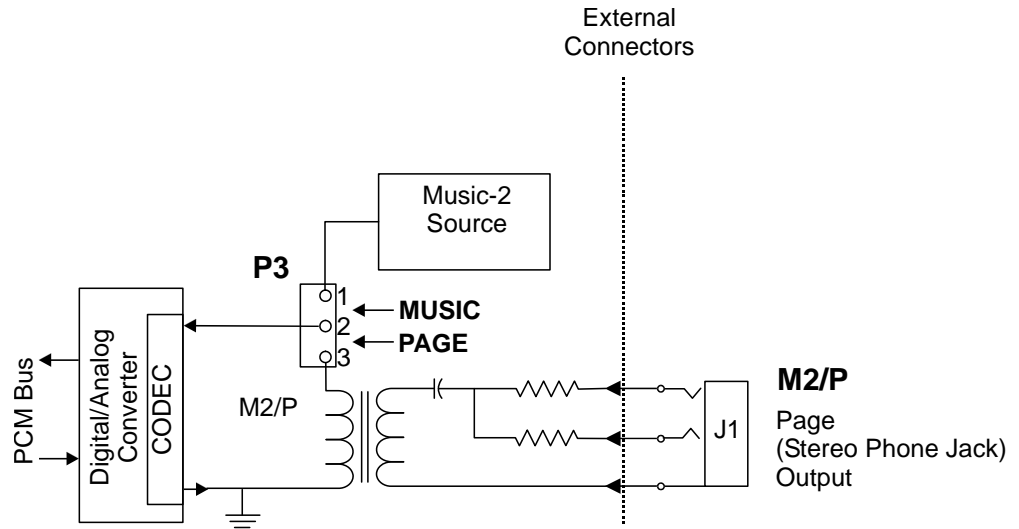
## Configuring the Paging M2/P Jumper to Paging

The system paging output M2/P may be either music source or a voice page output. [Figure 9-18](#) displays the jumper settings for the music source.

**Table 9-26 Paging M2/P Music/Paging Selection P3 Jumper Setting**

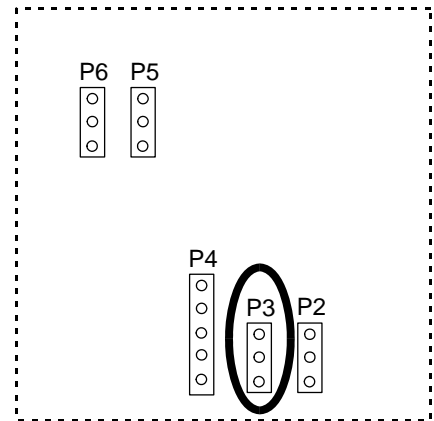
| P3   | 2-3           | 1-2                  |
|------|---------------|----------------------|
| M2/P | Paging Output | External Music Input |

**Figure 9-17 Paging Simplified Diagram**



**Figure 9-18 Paging M2/P Music/Paging Selection P3 Jumper Setting**

| M2/P Function        | P3 |
|----------------------|----|
| Paging Output        |    |
| External Music Input |    |



## Configuring the Relay Contacts 1-2 Jumper to Paging

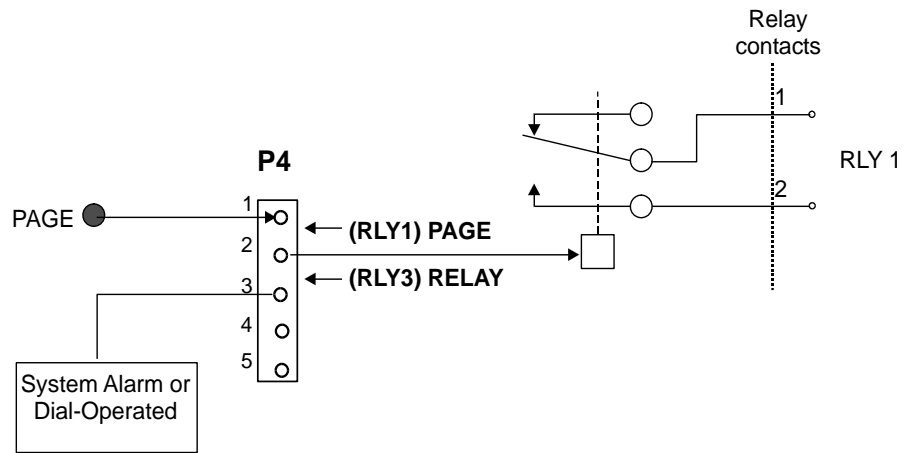
The relay contacts 1-2 may be either RLY1 (PAGE) or RLY3 (System Alarm or Dial-Operated) contacts.

Figure 9-20 displays the jumper settings for the page feature.

**Table 9-27 Relay Contacts 1-2 PAGE/RELAY Selection P4 Jumper Setting**

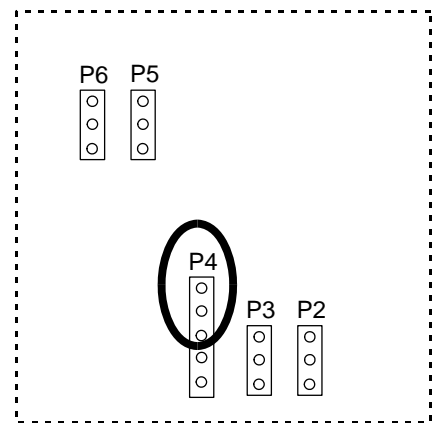
| P4                 | 1-2         | 2-3          |
|--------------------|-------------|--------------|
| Relay Contacts 1-2 | PAGE (RLY1) | RELAY (RLY3) |

**Figure 9-19 Paging Relay Simplified Diagram**



**Figure 9-20 Relay Contacts 1-2 PAGE/RELAY Selection P4 Jumper Setting**

| Relay Contacts 1-2 Function | P4 |
|-----------------------------|----|
| (RLY1) PAGE                 |    |
| (RLY3) RELAY                |    |





## Database Programming

---

Each *U-RMI Office*, *U-MR Office*, *RMI Office* or *MR Office* card provides one paging output: the external voice paging port operates by using both the relay circuit (RLY1) and the PAGE circuit.

The paging feature requires the appropriate definitions in the database. Consult the *Program Interface (PI) and Database and Database Reference Manual* for instructions on the database programming required for Paging.

The following parameters must be set, to enable the paging feature.

- 1 Card List** (Route: CLIS)  
Card type must show RMI-F or MR in the P\_TYPE field of **Shelf #1, Slot #6**.
- 2 General Numbering Plan** (Route: NPL,0) [**12**] (**Ckt #23**)  
Use the **12-Page** field of the PI in the Update Menu to designate dial numbers to the Public Address Page in the system. Refer to *Chapter 5 - Numbering Plan*, in the *Program Interface (PI) and Database Reference Manual*, for more details.
- 3 Port List** (Route: PLIS)  
Port type must show PAGE in the TYPE field of **Shelf #1, Slot #6, Ckt #23**.  
Use this field to assign a short/full name to this port.  
If you choose **0 - Physical Location**, type (Shelf # 1, Slot # 6, Ckt # 23).  
If you choose **1 - Dial Number**, choose field [6] PAGE.  
Refer to *Chapter 6 - System Port List*, in the *Program Interface and Database Reference Manual*, for more details.
- 4 Special Port Facilities** (Route: PDB,5)  
Use this field to assign this port to a specific tenant group.  
Refer to *Chapter 23 - Public Address/Page*, in the *Program Interface and Database Reference Manual*, for more details.
- 5 Class Of Service** (Route: COS,0) [**PAGE**]  
Use the PAGE parameter to determine whether a specific station user is allowed to dial and access the External Voice Paging system. Refer to *Chapter 7 - Station and Trunk COS*, in the *Program Interface and Database Reference Manual*, for more details.

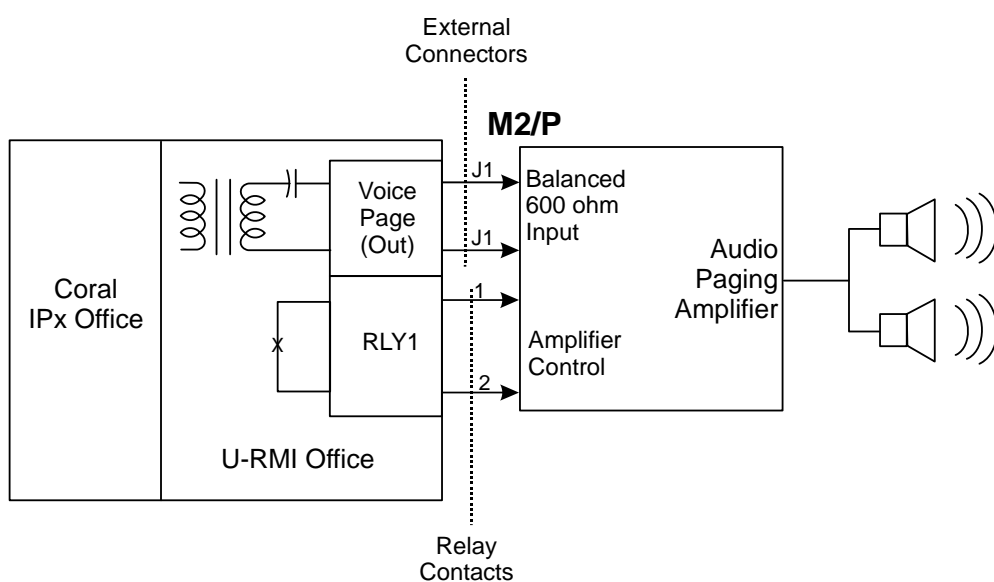
## External Connections

Each *U-RMI Office*, *U-MR Office*, *RMI Office* or *MR Office* card provides a voice page interface for external paging and public address. The interface supplies a line-level (-10dBm or 50 to 100mV), 600Ω, balanced audio output, and a Single Pole, Single Throw, Normally Open or SPST - NO (form A) relay RLY1 contact. [Figure 9-21](#) and [Figure 9-22](#) illustrate connections to two typical examples of voice paging systems.

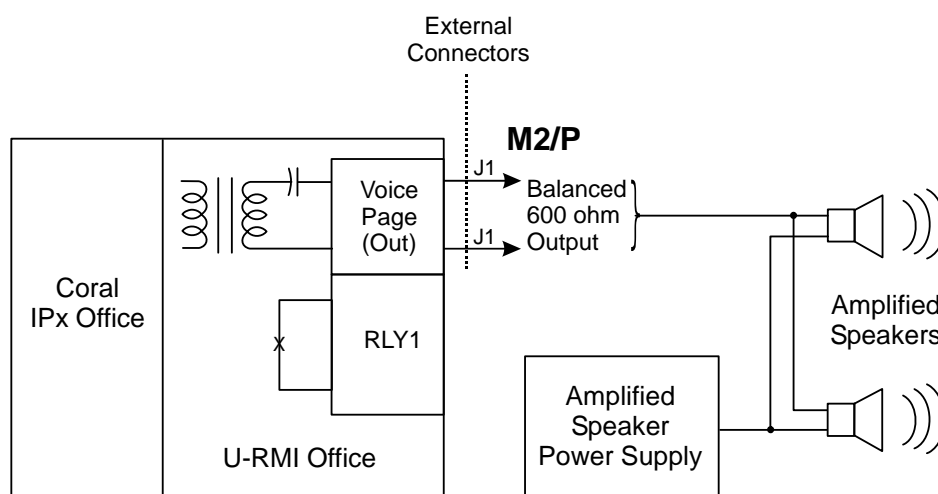
The audio output of the voice page interface may drive amplified speakers directly. The number of speakers which may be driven varies from manufacturer to manufacturer. See speaker manufacturer documentation for specific details.

The paging connector is a stereo 3.5 mm phone plug, see [Figure 9-10 on page 9-21](#).

**Figure 9-21 Page - Wiring To Paging Amplifier**



**Figure 9-22 Page - Wiring To Amplified Speakers**



The relay contact closes continuously during access to the voice page interface. Although not always required, the relay contact is often utilized for “Mac Precedence” or “Mute Control” to mute background music during voice pages. The control of high voltage, high current, or inductive loads should be avoided.

[Table 9-9 on page 9-21](#) lists the function of each interface connector, as they appear on the card front panel, [Figure 9-9 on page 9-21](#) illustrates that connector.

## ● Relay Electrical Limitations

---

The RLY1 relay contacts have specific electrical limitations which are described in detail in [Relay Contacts on page 9-103](#). These limitations must not be exceeded. In addition, the type of load the relay contact operates can have a great significance.

## ● Additional Paging Interface in the optional IPx 800X Cage

---

Additional Paging ports may be installed in the optional Coral IPx 800X expansion cage. The additional cards include:

| Card    | Cage    | Description   |
|---------|---------|---|
| 8DRCM-2 | IPx 800 | Includes the following functions, among others: <ul style="list-style-type: none"><li>■ 1 external voice paging interface (or public address)</li><li>■ 1 paging relay contacts</li></ul> |

These cards are described in the *Coral Service and Peripheral Cards Installation Manual*.

## ● Specifications - Paging

---

### Number of Circuits:

|                         |                                      |
|-------------------------|--------------------------------------|
| U-RMI Office card ..... | 1 (0 when Music-2 is used)           |
| U-MR Office card .....  | 1 (0 when Music-2 is used)           |
| RMI Office card .....   | 1 (0 when Music-2 is used)           |
| MR Office card.....     | 1 (0 when Music-2 is used)           |
| 8DRCM-2 card.....       | 1 (requires IPx 800X expansion cage) |

### PAGE (External Paging):

|                          |  |
|--------------------------|--|
| Output Termination ..... | Capacitor-coupled transformer,<br>non-grounded |
| Output Level.....        | -15 dBm Nominal                                |
| External Device .....    | 10,000Ω Minimum                                |

### PAGE Connector:

|                      |                          |
|----------------------|--------------------------|
| Connector Type ..... | Stereo 3.5 mm phone plug |
|----------------------|--------------------------|

### Relay Contacts 1-2 (RLY1):

|                    |                                 |
|--------------------|---------------------------------|
| Contact Type ..... | Isolated (Dry) Form A (SPST-NO) |
| Voltage Limit..... | 50VDC Maximum                   |
| Current Limit..... | 0.5A Maximum non-inductive      |
| Power Limit.....   | 30VA Maximum                    |

# 9.15 UNA/Bell and Relay-2 (Universal Night Answering/Central Bell)

## Introduction

The *U-RMI Office*, *U-MR Office*, *RMI Office* and *MR Office* cards provide relay contacts for central ringing bell interface.

An incoming call may be automatically directed to a central bell. When the bell rings, anyone within that group may dial the feature code to pick up that call.

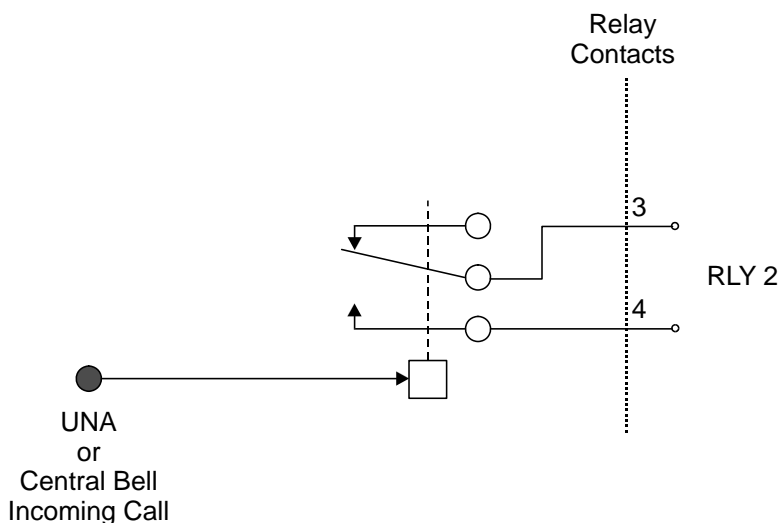
Calls may be answered after the attendant leaves or when a central bell is ringing. Normally this feature is activated for incoming calls during the night answering period. There are two ways to do this: group pickup and directed pickup.

## Circuit Description

Figure 9-23 is a simplified circuit diagram of the UNA and RLY2 relay contacts.

The relay provides form A (single pole, single throw and normally open) contacts for activating external circuitry and devices. Operation of the relay is determined by the system database. Contacts RLY2 are designated to operate in conjunction with UNA for central ringing applications.

Figure 9-23 **UNA & Relay Contacts 3-4 Simplified Diagram**



## Configuring the Relay Contacts 3-4 Jumper to Bell

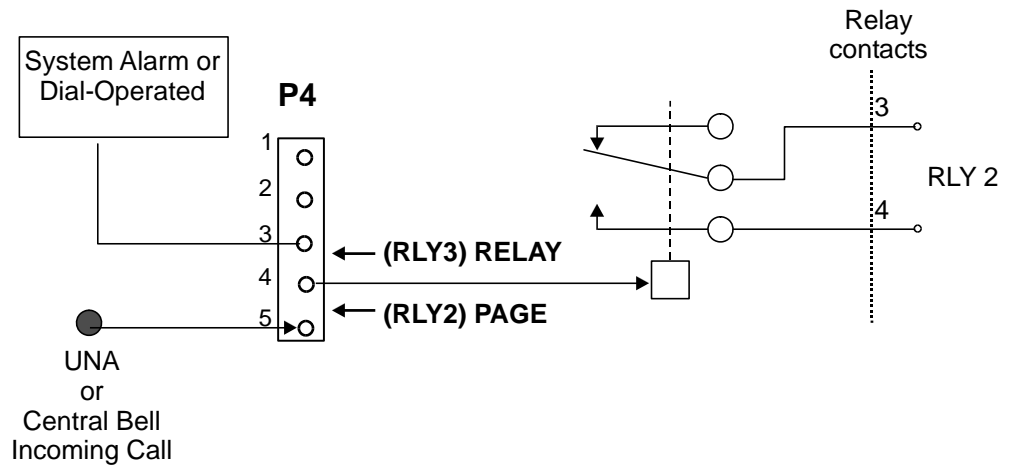
The relay contacts 3-4 may be either RLY2 (BELL) or RLY3 (System Alarm or Dial-Operated) contacts.

Figure 9-20 displays the jumper settings for the page feature.

**Table 9-28 Relay Contacts 3-4 BELL/RELAY Selection P4 Jumper Setting**

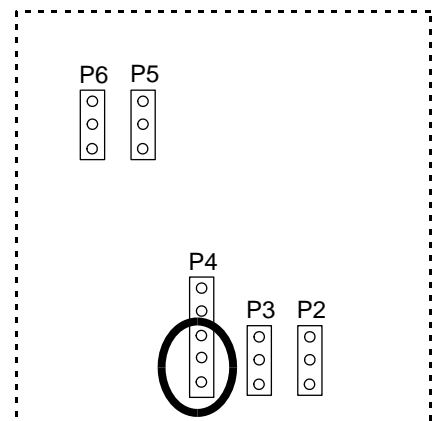
| P4                 | 4-5         | 3-4          |
|--------------------|-------------|--------------|
| Relay Contacts 3-4 | BELL (RLY2) | RELAY (RLY3) |

**Figure 9-24 Bell Relay Simplified Diagram**



**Figure 9-25 Relay Contacts 3-4 BELL/RELAY Selection P4 Jumper Setting**

| Relay Contacts 3-4 Function | P4 |
|-----------------------------|----|
| (RLY2) BELL                 |    |
| (RLY3) RELAY                |    |



## Database Programming

---

The Central Bell (UNA) requires the appropriate definitions in the database. Consult the *Program Interface (PI) and Database Reference Manual* for instructions on the database programming required for the feature.

The following parameters must be set, to enable the paging feature.

- 1 Card List** (Route: CLIS)  
Card type must show RMI-F or MR in the P\_TYPE field of **Shelf #1, Slot #6**.
- 2 General Numbering Plan** (Route: NPL,0) [11] (Ckt #24)  
Use the field **11-Bell** of the Update menu to designate dial numbers to the UNA bell ports in the system.  
Refer to *Chapter 5 - Numbering Plan*, in the *Program Interface (PI) and Database Reference Manual*, for more details.
- 3 Port List** (Route: PLIS)  
Port type must show UNA in the TYPE field of **Shelf #1, Slot #6, Ckt #24**.  
Use this field to assign a short/full name to this port.  
If you choose **0 - Physical Location**, type (Shelf # 1, Slot # 6, Ckt # 24).  
If you choose **1- Dial Number**, choose field [7] BELL.  
Refer to *Chapter 6 - System Port List*, in the *Program Interface (PI) and Database Reference Manual*, for more details.
- 4 Special Port Facilities** (Route: PDB,7)  
Use this field to assign this port to a specific tenant group.  
Refer to *Chapter 23 - Bell/UNA*, in the *Program Interface (PI) and Database Reference Manual*, for more details.
- 5 Class Of Service** (Route: COS,0) [UNA]  
Use the UNA parameter to determine whether a specific station user is allowed to dial the Bell port.  
Refer to *Chapter 7 - Station and Trunk COS*, in the *Program Interface (PI) and Database Reference Manual*, for more details.
- 6 Sizes Def** (Route: SIZ) [BELL/UNA]  
Use the BELL/UNA parameter to determine the number of Bell/Universal Night Answering (UNA) groups.

## External Connections

Incoming trunk calls may be directed to activate a relay contact at certain times of the day (typically after normal business hours). The relay contact sounds a tone over a paging or public address system, or operate a mechanical bell. Upon hearing the tone or bell, the trunk is then answered by dialing a specific feature code at any station allowed to answer calls.

Figure 9-26 and Figure 9-27 illustrate connections to a contact operated tone signal and to a mechanical bell. Note that due to electrical limitations, the contact may not be used to switch loads requiring high voltage or high current. See [Relay Contacts on page 9-103](#), for complete specifications. To operate a highly inductive load such as a mechanical bell, the relay should operate an external, AC powered or non-inductive relay with an appropriately rated contact, which in turn operates the mechanical bell.

Figure 9-26 **UNA Bell - Wiring to Tone Generator**

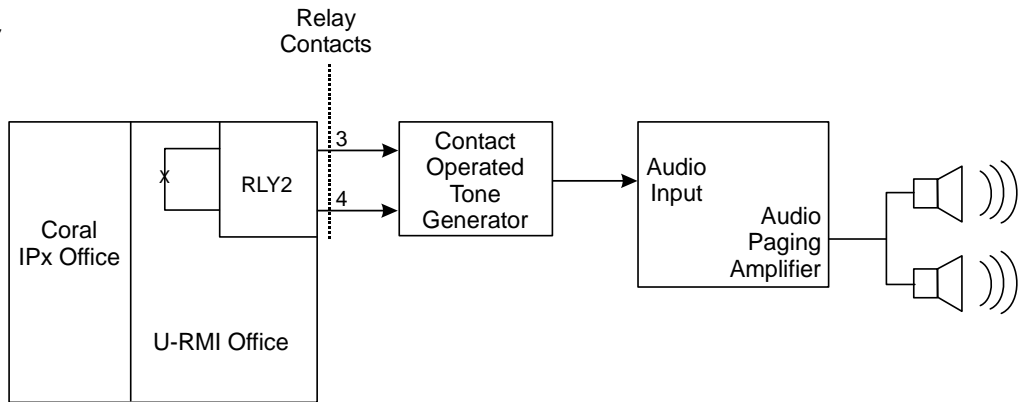


Figure 9-27 **UNA Bell - Wiring to Mechanical Bell**

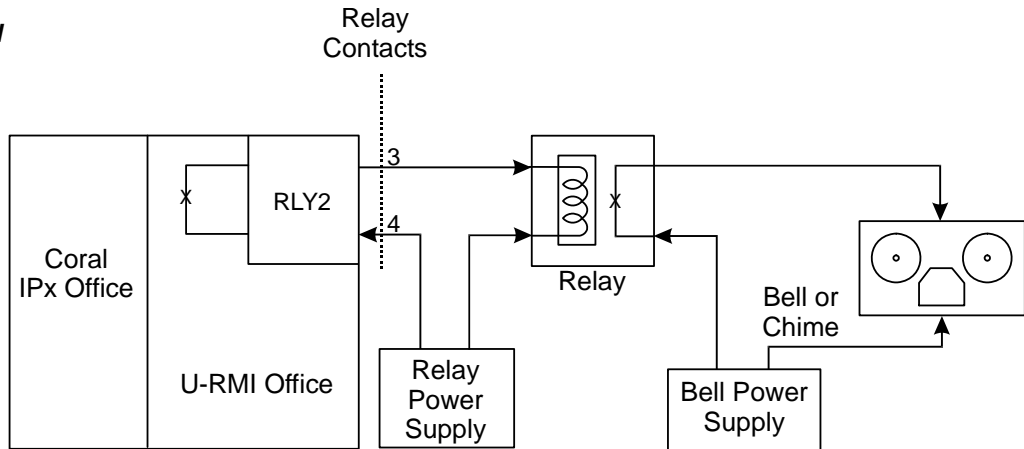


Table 9-9 on page 9-21 lists the function of each interface connector, as they appear on the card front panel, Figure 9-9 on page 9-21 illustrates that connector.



## ● Relay Electrical Limitations

---

The relay contacts have specific electrical limitations. For further detail, see [Relay Contacts on page 9-103](#). These limitations must not be exceeded. In addition, the type of load the relay contact operates can have a great significance. Do not exceed the contact ratings listed in the specifications.

## ● Additional UNA and Relay Contacts in the Optional IPx 800X Cage

---

Additional relay contacts for central ringing bell interface may be installed in the optional Coral IPx 800X expansion cage. The additional cards include:

| Card    | Cage     | Description   |
|---------|----------|---|
| 8DRCM-2 | IPx 800X | Includes the following functions, among others: <ul style="list-style-type: none"><li>■ 1 universal night answer or central bell</li><li>■ 1 bell relay contact</li></ul> |

These cards are described in the *Coral Service and Peripheral Cards Installation Manual*.

## ● Specifications - BELL/UNA

---

### Number of Circuits:

|                         |  |
|-------------------------|--|
| U-RMI Office card ..... | 1 (0 when Accessory/Alarm Relay is used) |
| U-MR Office card .....  | 1 (0 when Accessory/Alarm Relay is used) |
| RMI Office card .....   | 1 (0 when Accessory/Alarm Relay is used) |
| MR Office card.....     | 1 (0 when Accessory/Alarm Relay is used) |
| 8DRCM-2 card.....       | 1 (requires IPx 800X expansion cage)     |

### Relay Contacts 3-4 (RLY2):

|                    |                                 |
|--------------------|---------------------------------|
| Contact Type ..... | Isolated (Dry) Form A (SPST-NO) |
| Voltage Limit..... | 50VDC Maximum                   |
| Current Limit..... | 0.5A Maximum non-inductive      |
| Power Limit.....   | 30VA Maximum                    |

# 9.16 Accessory or Alarm Relay-3

## Major/Minor Alarm

### Introduction

---

The *U-RMI Office*, *U-MR Office*, *RMI Office* and *MR Office* cards provide one relay contact for major/minor alarm or accessory interface.

Each *U-RMI Office*, *U-MR Office*, *RMI Office* or *MR Office* card provides a multipurpose relay contact that can function as an On/Off control of external equipment such as a door latch or light control. It can also be programmed to operate during an alarm condition of the system, signaling a malfunction.

#### Dial Operated Accessory

The Coral IPx system can operate the relay contacts assigned by a specific dialed number. Users can use this feature to switch external devices on and off.

A station user can switch the relay On or Off in order to activate certain external devices, such as external alarm or electric locks.

#### Major/Minor Alarm Relay

The Coral IPx system reports failures, as they occur, on the PI screen. A list of alarms can be retrieved by the Coral technician when needed.

A major or a minor system alarm can be programmed to appear on designated display telephones and/or operate a relay and hence an external alert device.

### Circuit Description

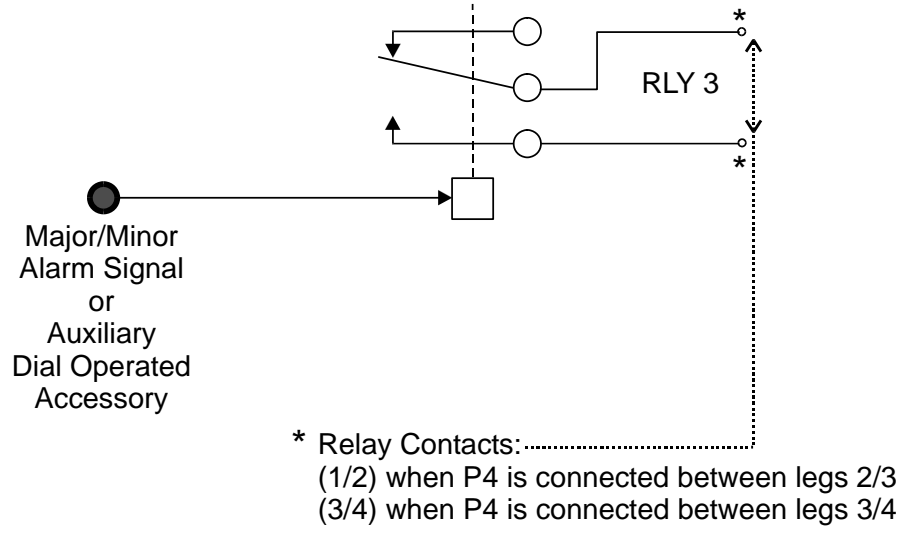
---

[Figure 9-28](#) is a simplified circuit diagram of the relay contacts.

The relay provide form A (single pole, single throw and normally open) contacts for activating external circuitry and devices. Operation of the relays is configured at the PI system database.

Contacts RLY3 are designated for use as either a major or minor system alarm, signal, or an auxiliary dial-operated relay contact. Do not exceed the contact ratings listed in the specifications.

Figure 9-28 RLY3  
Simplified Diagram



## Configuring the Relay Contacts 1-2 Jumper to RLY3

The relay contacts 1-2 may be either RLY1 (PAGE) or RLY3 (System Alarm or Dial-Operated) contacts.

Figure 9-30 displays the jumper settings for the page feature.

| P4                 | 2-3          | 1-2         |
|--------------------|--------------|-------------|
| Relay Contacts 1-2 | RELAY (RLY3) | PAGE (RLY1) |

Figure 9-29 RLY3 Contacts 1-2 Simplified Diagram

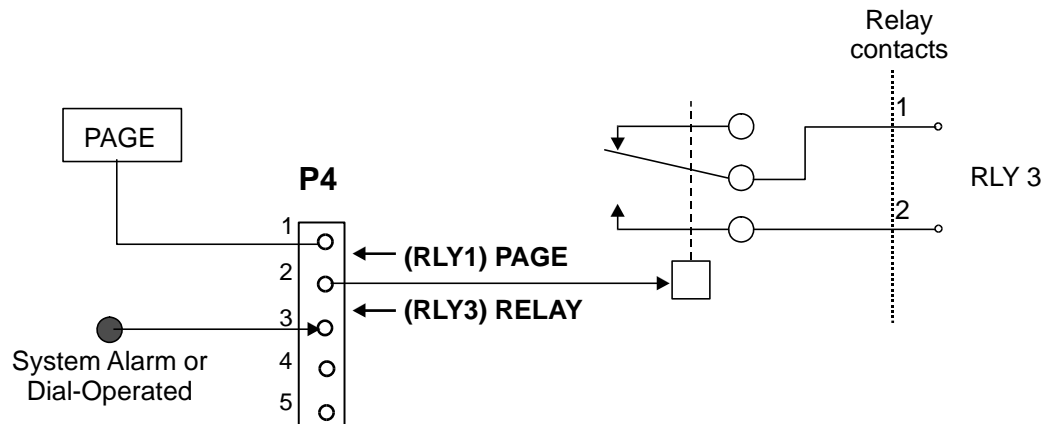
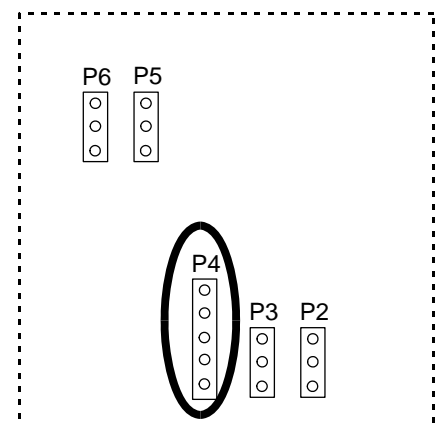


Figure 9-30 Relay Contacts 1-2 RLY3/PAGE Selection P4 Jumper Setting

| Relay Contacts 1-2 Function | P4                              |
|-----------------------------|---------------------------------|
| (RLY3) RELAY                | 1 ○<br>2 ●<br>3 ○<br>4 ●<br>5 ● |
| (RLY1) PAGE                 | 1 ●<br>2 ○<br>3 ○<br>4 ●<br>5 ● |



## Configuring the Relay Contacts 3-4 Jumper to RLY3

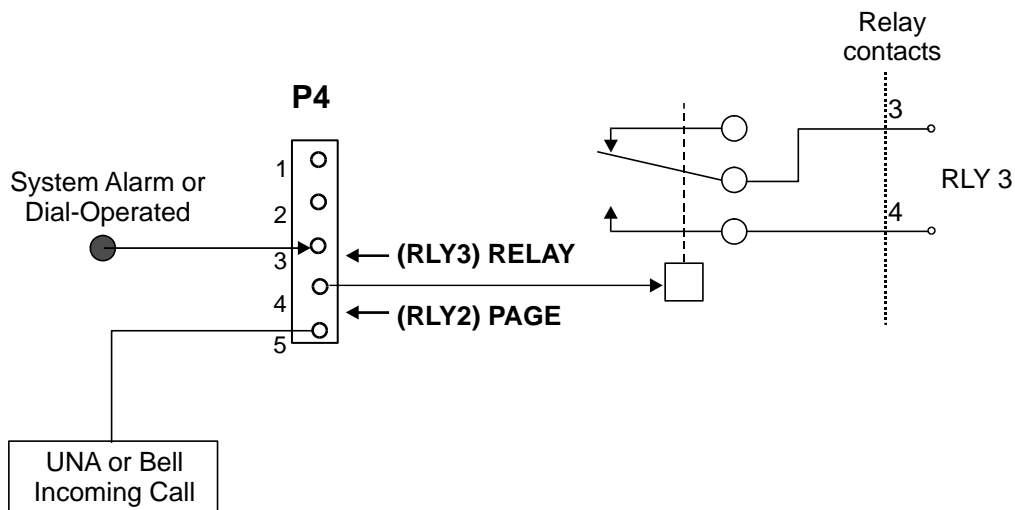
The relay contacts 3-4 may be either RLY2 (BELL) or RLY3 (System Alarm or Dial-Operated) contacts.

Figure 9-32 displays the jumper settings for the page feature.

**Table 9-30 Relay Contacts 3-4 RLY3/BELL Selection P4 Jumper Setting**

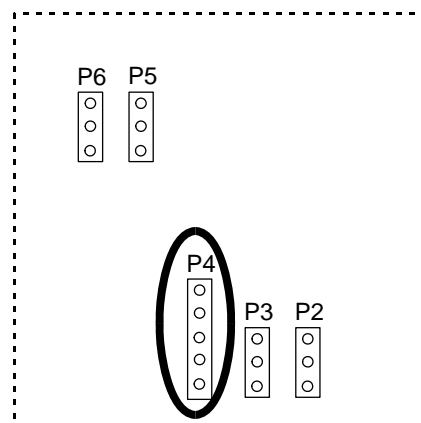
| P4                 | 3-4          | 4-5         |
|--------------------|--------------|-------------|
| Relay Contacts 3-4 | RELAY (RLY3) | BELL (RLY2) |

**Figure 9-31 RLY3 Contacts 3-4 Simplified Diagram**



**Figure 9-32 Relay Contacts 3-4 RLY3/BELL Selection P4 Jumper Setting**

| Relay Contacts 3-4 Function | P4 |
|-----------------------------|----|
| (RLY3) RELAY                |    |
| (RLY2) BELL                 |    |



## Database Programming

---

The major and minor alarm or accessory interface feature requires the appropriate definitions in the database. Consult the *Program Interface (PI) and Database Reference Manual* for instructions on the database programming required.

---

### *Dial Operated Accessory*

The following parameters must be set, to enable the Dial Operated Accessory feature.

- 1 Card List** (Route: CLIS)  
Card type must show RMI-F or MR in the P\_TYPE field of **Shelf #1, Slot #6**.
- 2 General Numbering Plan** (Route: NPL,0) [21] (Ckt #25)  
Use the **21-RELAY** field of the Update menu to designate dial numbers to the dial select/alarm relay ports in the system. Refer to *Chapter 5 - Numbering Plan*, in the *Program Interface and Database Reference Manual*, for more details.
- 3 Port List** (Route: PLIS)  
Port type must show RELAY in the TYPE field of **Shelf #1, Slot #6, Ckt #25**.  
Use this field to assign a short/full name to this port.  
If you choose **0 - Physical Location**, type (Shelf # 1, Slot # 6, Ckt # 25).  
If you choose **1 - Dial Number**, choose field [8] RELAY.  
Refer to *Chapter 6 - System Port List*, in the *Program Interface and Database Reference Manual*, for more details.
- 4 Class Of Service** (Route: COS,0) [RELAY]  
Use the RELAY parameter to determine whether a specific station user is allowed to switch the Relay ON and OFF. Refer to *Chapter 7 - Station and Trunk COS*, in the *Program Interface and Database Reference Manual*, for more details.

---

### *Major/Minor Alarm Relay*

#### *System Features - Diagnostics (Route: SFE, 9)*

##### **MINOR\_RLY**

Use this parameter to define the relay dial number as the minor alarm situation destination.

##### **MAJOR\_RLY**

Use this parameter to define the relay dial number as the major alarm situation destination.

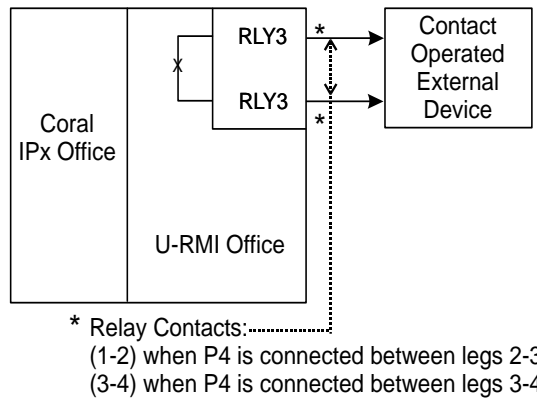
## External Connections

Table 9-9 on page 9-21 lists the function of each interface connector, as they appear on the card front panel, Figure 9-9 on page 9-21 illustrates that connector.

### Dial Operated Accessory

To operate external equipment, the relay is assigned a dial access code. Successive accesses alternately toggle the relay on and off. Figure 9-33 illustrates a sample application.

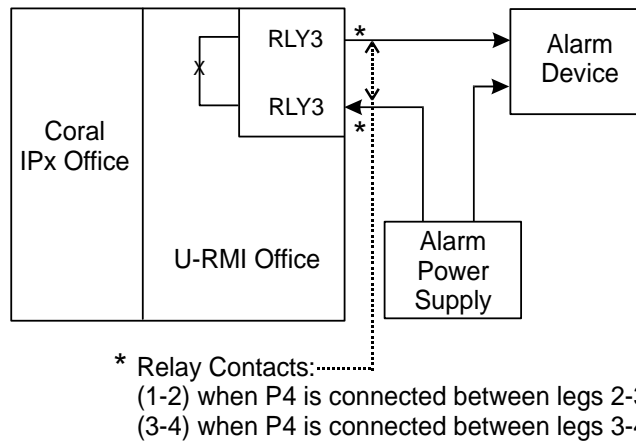
Figure 9-33 Dial Operated Relay (RLY3) Connections



### Major/Minor Alarm Relays

When programmed as a minor or major alarm indication, the relay operates if the system fails to pass a diagnostic test. This test falls under the corresponding alarm category. The relay is released when the relay dial access code is dialed or when a subsequent execution of the diagnostic test that is issued the alarm is successfully passed. Figure 9-34 illustrates a sample application.

Figure 9-34 Alarm Relay (RLY3) Connections





## ● Relay Electrical Limitations

---

The relay contacts have specific electrical limitations. See [Relay Contacts on page 9-103](#). Do not exceed these limitations. In addition, the type of load the relay contact operates can have a great significance.

## ● Additional RLY3 Contacts in the Optional IPx 800X Cage

---

Additional relay contacts for major and minor alarm or accessory interface may be installed in the optional Coral IPx 800X expansion cage. The additional cards include:

| Card    | Cage     | Description  |
|---------|----------|--|
| 8DRCM-2 | IPx 800X | Includes one auxiliary or major/minor alarm relay contacts, among other functions. |

These cards are described in the *Coral Service and Peripheral Cards Installation Manual*.

## ● Specifications - RELAY

---

### Number of Circuits:

|                         |                                       |
|-------------------------|---------------------------------------|
| U-RMI Office card ..... | 1 (0 when Page and Bell/UNA are used) |
| U-MR Office card .....  | 1 (0 when Page and Bell/UNA are used) |
| RMI Office card .....   | 1 (0 when Page and Bell/UNA are used) |
| MR Office card.....     | 1 (0 when Page and Bell/UNA are used) |
| 8DRCM-2 card.....       | 1 (requires IPx 800X expansion cage)  |

### Relay Contacts 1-2 and 3-4 (RLY3):

|                    |                                 |
|--------------------|---------------------------------|
| Contact Type ..... | Isolated (Dry) Form A (SPST-NO) |
| Voltage Limit..... | 50VDC Maximum                   |
| Current Limit..... | 0.5A Maximum non-inductive      |
| Power Limit.....   | 30VA Maximum                    |

# 9.17 Relay Contacts

## RLY1, RLY2, RLY3

### General Information

The *U-RMI Office*, *U-MR Office*, *RMI Office* and *MR Office* cards incorporate two relay contacts (1-2 and 3-4) for two of the following three features:

- External voice paging (PAGE). Described [on page 9-81](#).
- Universal Night Answer (UNA) Central Bell. Described [on page 9-89](#).
- Dial operated accessory/alarm (RELAY). Described [on page 9-95](#).

The applications described in the sections above describe several examples of the control of external devices through relay contacts on the *U-RMI Office*, *U-MR Office*, *RMI Office* or *MR Office* cards. A limited description of most of the external devices is listed herein. In each application, however, several important factors should be considered.

The relays provide form A (single pole, single throw, normally open, or SPST-NO) contacts for activating external circuitry and devices. Operation of the relays is determined by the system database.

- Contacts RLY1 are designated to operate in conjunction with audio interface M2/P for external paging applications.
- Contacts RLY2 are designated as a UNA Bell destination.
- Contacts RLY3 are also designated for use as either a major or minor system alarm signal, or an auxiliary dial-operated relay contact.

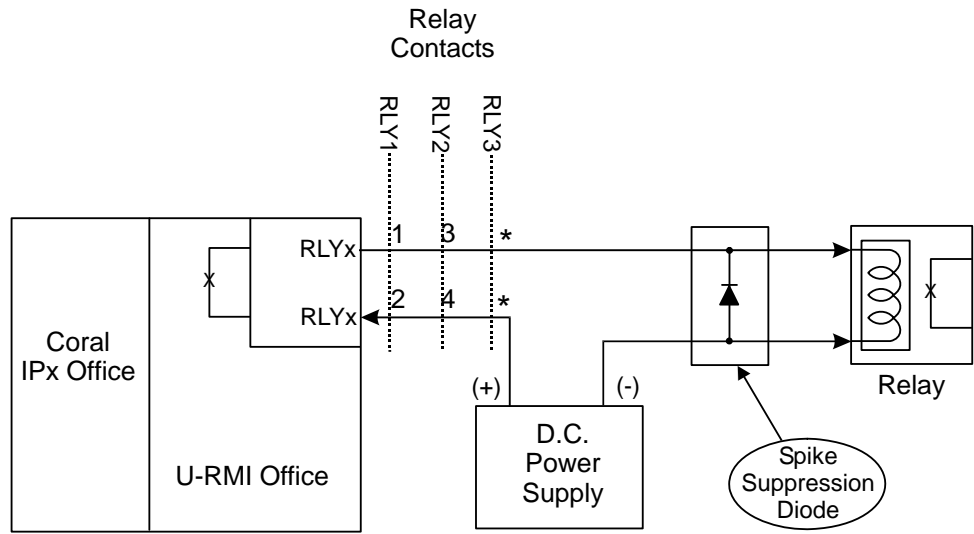
The relay contacts provided on the *U-RMI Office*, *U-MR Office*, *RMI Office* and *MR Office* cards have specific electrical limitations. See [Specifications - Relays](#) below. Do not exceed these limitations. In addition, the type of load the relay contact operates can have a great impact.

Ideally, the contact should operate a low voltage, low current, non-inductive load such as a light bulb or solid state device. When the voltage or current increases, or when an inductive load such as a relay coil or solenoid is connected, the likelihood of arcing across the contact increases. Contact arcing occurs while the contact is opening and burns away the precious metal surface, increasing the chance of the contact being “welded” closed or failing completely. Arcing also generates high frequency energy that may be coupled to any one of the data buses of the Coral IPx Office, causing unreliable or unpredictable system behavior.

If the contact is to operate a relay or solenoid, use an alternating current (AC) operated device and an AC power source, if at all possible. AC operated inductive loads produce much lower arc levels than direct current (DC) operated loads.

If the contact must operate a DC powered inductive load, the contact must be adequately protected by arc suppression devices. Figure 9-35 illustrates the use of a common rectifier diode as a simple arc suppression device. The diode is normally reverse biased (not conducting) with the cathode (top side in the drawing) connected to the positive side of the power source.

Figure 9-35 **DC Arc Suppression for U-RMI / U-MR / RMI / MR Office Card Relays**



\* RLY3 contacts:  
 (1-2) when P4 is connected between legs 2-3  
 (3-4) when P4 is connected between legs 3-4

When the inductive load is powered, a magnetic field is created around the coil windings. When power is removed, the magnetic field quickly deteriorates, producing a reverse polarity voltage (counter EMF) across the windings. This reverse polarity voltage is typically many times the voltage which originally powered the coil, providing enough potential to arc across the open relay contacts.

By placing the diode in the circuit, the reverse polarity current is conducted by the diode, shunting the energy around the contacts. A rectifier rated at 1.0 ampere forward current (1.0A  $I_F$ ) and a peak inverse (reverse) voltage of at least 250 volts (250V, PIV, PRV, or  $V_{RM}$ ) should be sufficient in most cases.

## Configuring the Relay Contacts Jumper

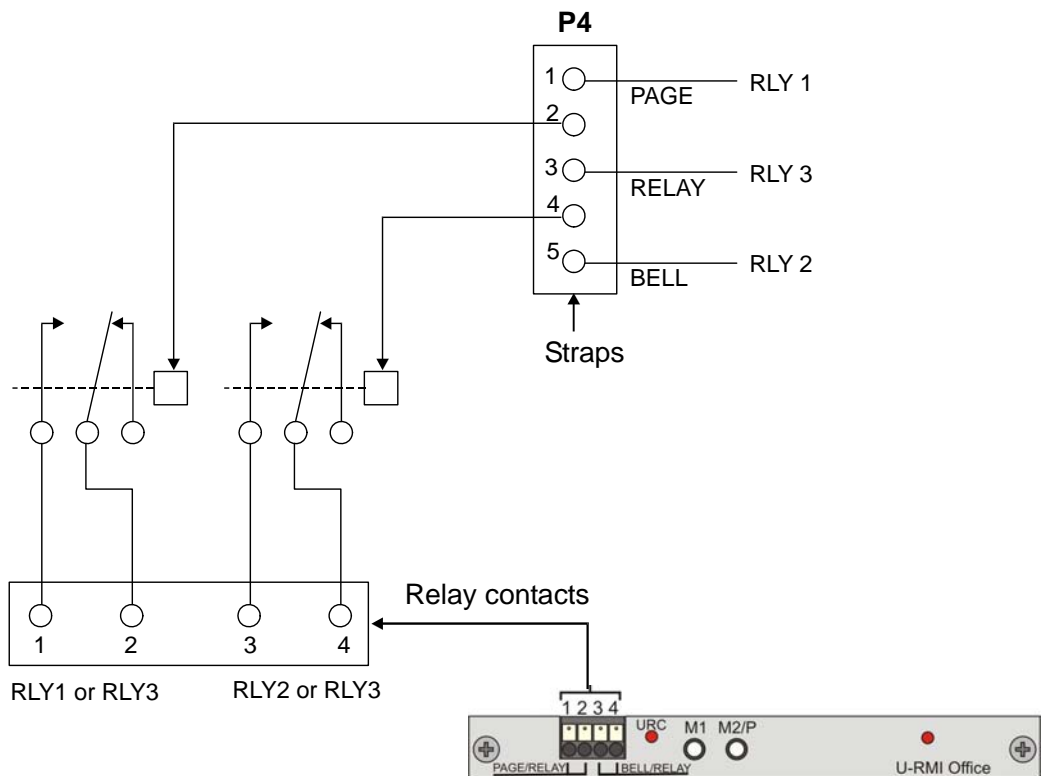
Figure 9-36 is a simplified circuit diagram of the two relay contacts.

The relays provide form A (single pole, single throw and normally open) contacts for activating external circuitry and devices. Operation of the relays is determined by the system database.

Only two of the three relay functions (RLY1, RLY2, RLY3) can be selected. The selection is accomplished by P4 straps located on the U-RMI Office, RMI Office, U-MR Office and MR Office cards (see Figure 9-36). Table 9-31 defines the position of the P4 straps for the relays selection.

| Required Relays | P4 Strap Setting |
|-----------------|------------------|
| RLY1 & RLY2     | 4-5 & 1-2        |
| RLY1 & RLY3     | 4-5 & 2-3        |
| RLY2 & RLY3     | 1-2 & 3-4        |

Figure 9-36 Simplified Relay Diagram



## ● Specifications - Relays

---

### Number of Circuits:

|                         |                                      |
|-------------------------|--------------------------------------|
| U-RMI Office card ..... | 2                                    |
| U-MR Office card .....  | 2                                    |
| RMI Office card .....   | 2                                    |
| MR Office card.....     | 2                                    |
| 8DRCM-2 card.....       | 3 (requires IPx 800X expansion cage) |

### Relay Contacts (1-2 and 3-4):

|                    |                                 |
|--------------------|---------------------------------|
| Contact Type ..... | Isolated (Dry) Form A (SPST-NO) |
| Voltage Limit..... | 50VDC Maximum                   |
| Current Limit..... | 0.5A Maximum non-inductive      |
| Power Limit.....   | 30VA Maximum                    |

## Peripheral Cards

Coral

|      |  |       |
|------|--|-------|
| 10.1 | <i>Peripheral Card Installation</i> .....  | 10-1  |
| 10.2 | <i>Peripheral Card Description</i> .....   | 10-5  |
| 10.3 | <i>Digital Trunk Synchronization</i> ..... | 10-15 |
| 10.4 | <i>Service and Peripheral Cards</i> .....  | 10-31 |





# 10.1 Peripheral Card Installation

## General Information



### Tip:

Each peripheral card is described in detail in the ***Coral Service and Peripheral Cards Installation Manual***.

The Coral IPx Office system divides peripheral interface functions among several different station and trunk card types. Each card contains 4, 8, 16, 20, or 24 circuits.

Some analog trunk peripheral cards support power fail transfer, as described on [Power Fail \(PF\) Transfer Circuits, page 5-15](#).

Coral IPx Office systems convention suggests that peripheral interface cards are installed in specific card slots, as described in [Table 10-9](#).

## Card Handling Procedures

Each of the Coral IPx Office cards contains circuitry sensitive to electrostatic discharge (ESD). Failure to observe safe handling procedures for static-sensitive circuitry may result in permanent damage to a card.

An anti-static wrist strap, connected to the ground terminal pole and tightened with the wing nut should be worn while inserting, removing, or handling any card in the system. Each card is shipped inside an anti-static plastic bag. Cards should be kept in this bag whenever handling is not required.

### CAUTION!

Before removing a peripheral card, disconnect the I/O connectors.



### NOTE:

After a peripheral card is removed, wait for at least two seconds before re-inserting the card. If not, the card will not function properly.

## General Installation Procedure

---

Peripheral card installation and initialization are done through automatic identification by the hardware application called "Plug and Play" (plug in and start working). All the technician has to do is to install the card into the required slot and connect its respective I/O cable. The MCB Office card will identify the peripheral card, define it for the system and display all details on the PI screen. The PI Card List branch (Route: CLIS), Snap Mode, shows details of every new peripheral card that is installed or removed. There is a short delay between installation/removal of the card and PI screen display.

All peripheral cards may be inserted into a card slot only if the card slot has not been previously initialized by another card type. Before installing the card into a card slot that has been initialized by another card type, the previous card name must be cleared first.

To clear an initialized card slot:

- 1 Select the Card List branch (Route: CLIS) in the system database.
- 2 If the I\_TYPE for the card slot shows a card type other than the card currently installed, enter NO\_CARD to clear the slot. Refer to *Program Interface and Database Reference Manual - Chapter 6*, for further details.

## Diagnostic LED Indication

Each plug-in Office service and peripheral card is equipped with one or two red diagnostic indication LEDs on the front side, near the right side of the card<sup>1</sup>. These LEDs can assume one of three states of illumination: OFF, ON, or FLASHING. The illumination state of the LED indicates the card's operating condition. Table 10-1 lists the indication provided by each of the three LED states.

During normal operation, the card diagnostic LED should be extinguished. However, the LED routinely illuminates steadily whenever power is first applied to the system, the entire system is initializing, or the card is first inserted into a card slot. The LED remains illuminated steadily until the card receives a card database from the system.

### *LED Constantly Lit*

If the LED stays lit for more than two or three minutes, a problem may exist within the card. The most likely problem is a conflict with the system database, although it also may be an actual malfunction of the card circuitry.

**Table 10-1 Card Diagnostic LED Indications**

| <i>LED State</i>  | <i>Indication</i>                                  |
|-------------------|--|
| Extinguished OFF  | No problem with the card, it is functional.        |
| Steadily lit - ON | Card has not received a card database from system. |
| Flashing          | Diagnostic test failed by circuitry on card.       |

The system database will prevent a card from initializing:

- When the card is inserted into a card slot that has been initialized with another card type.  
Check the Card List branch (Route: CLIS) in the database, to determine whether the card slot has been previously initialized with a different card type. If the STATUS field shows CARD REPLACED, and the I\_TYPE for the card slot shows a different card type, enter NO\_CARD to clear the slot.
- There are insufficient system resources allocated in the System Sizes Definition to support the new card. The STATUS field in the Card List branch (Route: CLIS) shows NO RESOURCES. Check the Sizes branch (Route: SIZ) in the database to determine the maximum number of ports of the type provided by the problematic card, and then determine how many of these ports are already installed. If the additional ports provided by the new card exceed the maximum number allocated in Sizes, the card cannot initialize.

1. In the U-RMI Office and U-MR Office card a second LED is located in the middle of the card.  
In the 4S+8/16Fx Office, 4SA+/816Fx Office, 8S+8/16Fx Office and 8SA+8/16Fx Office cards a second LED is located in the right side of the card.

This situation can be rectified only through restructuring the memory allocation of the system. Initializing the database and reprogramming the system restructures the memory allocation.

### LED Flashing

The Coral IPx Office system continuously runs diagnostic routines to monitor the performance and integrity of its database and circuitry. When the circuitry on a particular card fails to perform as expected the system instructs the card to flash its diagnostic LED. If, on a subsequent execution of the same routine that reported a failure, the circuitry passes the test, the card is instructed to extinguish the LED.

Occasionally, circuitry may fail a diagnostic test, even though it is not truly defective. If a card diagnostic LED is observed flashing but no problem is apparent, wait 60 minutes and check the card again. If the LED is no longer flashing, the test failure was probably insignificant. If the flashing continues however, the card is likely to be malfunctioning, even if no problem can be identified.

# 10.2 Peripheral Card Description

## XXX Office Cards

### General Description

---



#### Tip:

Each peripheral card is described in detail in the **Coral Service and Peripheral Cards Installation Manual**.

Peripheral interface cards are described in the *Coral Service and Peripheral Cards Installation Manual*. [Table 10-9](#) lists the Peripheral Interface card types that can be inserted into each card slot in the Coral\_IPx Office unit.

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#### XXX Office Cards

Peripheral cards with the suffix “Office” are special form-factor cards for use in the Coral IPx Office system. These cards come in four sizes as shown in [Table 10-9](#).

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#### Peripheral Card Types

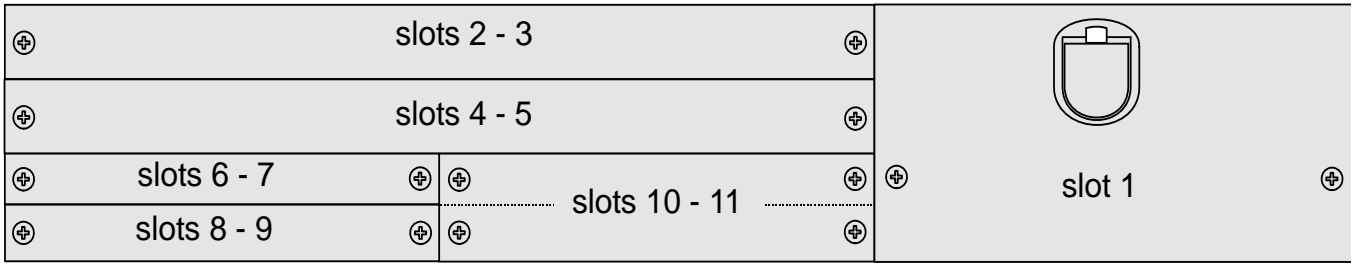
Peripheral card slots in the Coral IPx Office unit are not universal. Slot 1 is reserved for the power supply

- Slots 2-3 and 4-5 house full size cards (Type II).
- Slots 6-7, 8-9, and 10-11 house half-size cards (Type I).
  - Cards type I-A may be installed in slots 6-7.
  - Cards type I-B may be installed in slots 8-9, 10-11 (ESIM Office in slot 8-9 only).
  - Cards type I-C may be installed in slots 10-11.

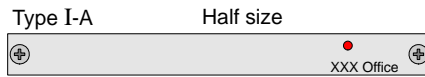
See [Figure 10-1](#) and [Table 10-2 Coral IPx Office Peripheral CARD TYPE](#).

See [Figure 10-2](#) and [Table 10-3 Coral IPx Office Peripheral CARD SLOT Location](#).

**Figure 10-1 Coral IPx Office Peripheral Card Slot Location**



**Figure 10-2 Coral IPx Office Peripheral Card Types**



**Table 10-2 Coral IPx Office Peripheral CARD TYPE**

| Card Type | Card Name  | Card Slot             |                               |
|-----------|--|-----------------------|-------------------------------|
| II        | 8/16/24SFT Office  | 2-3, 4-5              |                               |
|           | 4SA Office   |                       | 4S Office                     |
|           | 8SA Office   |                       | 8S Office                     |
|           | 16SA* Office (8SA+8SAx)  |                       | 20S* Office (8S+12Sx)         |
|           | 24SA* Office (8SA+16SAx)   |                       | 4S+8Fx Office *               |
|           | 4SA+8Fx Office   |                       | 4S+16Fx Office *              |
|           | 4SA+16Fx Office  |                       | 8S+8Fx Office *               |
|           | 8SA+8Fx Office   |                       | 8S+16Fx Office *              |
|           | 8SA+16Fx Office  |                       |                               |
|           | 8T Office  |                       |                               |
|           | 8T-CID* Office (8T+8CID)   |                       |                               |
|           | IPC/SFC Office   |                       |                               |
|           | IPC/uCMC Office  |                       |                               |
|           | IPC/WiCMC Office   |                       |                               |
| I-A       | MR Office  | 6-7<br>Main Unit      |                               |
|           | RMI Office   |                       | U-MR Office †<br>U-RMI Office |
|           | ESIX Office  | 6-7<br>Expansion Unit |                               |
| I-B       | ESIM Office  | 8-9<br>Main Unit      |                               |
|           | 2DT Office (T1, 30T, 30TM, PRI30 or PRI23),<br>30T Office (30T or 30TM jumper selection),<br>4TBR Office,<br>PRI-30 Office<br>UDT Office (T1 or PRI-23 jumper selection) | 8-9, 10-11‡           |                               |
| I-C       | 4T Office<br>4T-CID* Office (4T + 4CID)  | 10-11                 |                               |

- \* These cards are a combination of two cards.
- † U-MR card is supplied as standard. All other variations of the card (U-RMI, RMI, MR) require special order and checking of availability.
- ‡ If either 2DT Office, 4TBR Office, 30T Office, PRI-30 Office, or UDT Office is installed in slot 10-11, blank panel 1-A must cover the opening directly above the installed card.

**Table 10-3 Coral IPx  
Office Peripheral CARD  
SLOT Location**

| Card Slot             | Card Name   | Card Type |
|-----------------------|---|-----------|
| 2-3, 4-5              | 8/16/24SFT Office<br>4SA Office                      4S Office<br>8SA Office                      8S Office<br>16SA* Office (8SA+8SAx)      20S* Office (8S+12Sx)<br>24SA* Office (8SA+16SAx)      4S+8Fx Office *<br>4SA+8Fx Office                      4S+16Fx Office *<br>4SA+16Fx Office                      8S+8Fx Office *<br>8SA+8Fx Office                      8S+16Fx Office *<br>8SA+16Fx Office<br>8T Office<br>8T-CID* Office (8T+8CID)<br>IPC/SFC Office<br>IPC/uCMC Office<br>IPC/WiCMC Office | II        |
| 6-7<br>Main Unit      | MR Office                              U-MR Office †<br>RMI Office                              U-RMI Office  | I-A       |
| 6-7<br>Expansion Unit | ESIX Office   |           |
| 8-9                   | 2DT Office (T1, 30T, 30TM, PRI-30 or PRI-23),<br>30T Office (30T or 30TM jumper selection),<br>4TBR Office,<br>PRI-30 Office<br>UDT Office (T1 or PRI-23 jumper selection)  | I-B       |
| 8-9<br>Main Unit      | ESIM Office   |           |
| 10-11                 | 2DT Office (T1, 30T, 30TM, PRI-30 or PRI-23),<br>30T Office (30T or 30TM jumper selection),<br>4TBR Office,<br>PRI-30 Office<br>UDT Office (T1 or PRI-23 jumper selection)  | I-B       |
|                       | 4T Office<br>4T-CID* Office (4T + 4CID)   | I-C       |

\* These cards are a combination of two cards

† U-MR card is supplied as standard. All other variations of the card (U-RMI, RMI, MR) require special order and checking of availability.



## Analog/Digital Stations

The Coral IPx Office main and expansion units can accommodate two large-sized station cards to provide a variety of station capacities. The following large-sized station cards can be installed in the system:

- 8SFT Office, 16SFT Office, and 24SFT Office digital station cards
- 4SA Office and 8SA Office analog station cards. These cards can also support 8Fx Office or 16Fx Office daughterboards. The 8SA Office card can also support a 8SAx Office or 16SAx Office daughterboard to provide for a total of 16 or 24 analog stations.

[Table 10-4](#) displays the maximum analog stations capacities (POTs) in each unit. [Table 10-5](#) displays some of the different possible combinations of digital stations and analog stations (POTs) in each unit.

There are no limitations for the Coral IPx Office main unit when the loop resistances (including the telephone set) is up to 600Ω.

There are no limitations for the Coral IPx Office EX expansion unit.

- 4S Office and 8S Office analog station cards. These cards can also support 8Fx Office or 16Fx Office daughterboards. The 8S Office card can also support a 12Sx Office daughterboard to provide for a total of 20 analog stations.

[Table 10-4](#) displays the maximum analog station ports capacities (POTs) in each unit. [Table 10-6](#) displays some of the different possible combinations of digital station ports and analog stations (POTs) in each unit.

**Table 10-4 Max.# of Analog Stations per IPx Office Unit Versus Loop Resistances**

| Coral IPx Office Unit | 4/8/16/24SA Office Cards |            | 4/8/20S Office Cards |
|-----------------------|--------------------------|------------|----------------------|
|                       | 600Ω Max.                | 1800Ω Max. | 1200Ω Max.           |
| Main Unit             | 48 *                     | 32         | 28                   |
| Expansion Unit        | 48                       | 48         | 40                   |

\* Main unit with 0.3 Erlang Max.

### CAUTION!

Never insert “4/8S Office” and “4/8SA Office” cards in the same Coral IPx unit.

[Table 10-5](#) and [Table 10-6](#) display the maximum number of Analog and Digital station configurations of POTs and FlexSets stations. Never exceed these numbers for any card combination. The analog and digital stations supported is the end result of the different card combinations.

Table 10-5A 4/8SA Office Card Configurations in the Main Unit, 600Ω Max.

| Analog Stations (POTs) | Digital Station Ports (FlexSets) |           |           |           |          |          |       |
|------------------------|----------------------------------|-----------|-----------|-----------|----------|----------|-------|
|                        | 0                                | 8         | 16        | 24        | 32       | 40       | 48    |
| 0                      |                                  | 8SFT      | 16SFT     | 24SFT     | 24SFT    | 24SFT    | 24SFT |
|                        |                                  |           |           |           | 8SFT     | 16SFT    | 24SFT |
| 4                      | 4SA                              | 4SA+8Fx   | 4SA+16Fx  | 4SA       | 4SA+8Fx  | 4SA+16Fx |       |
|                        |                                  |           |           | 24SFT     | 24SFT    | 24SFT    |       |
| 8                      | 8SA                              | 8SA+8Fx   | 8SA+16Fx  | 8SA       | 8SA+8Fx  | 8SA+16Fx |       |
|                        |                                  |           |           | 24SFT     | 24SFT    | 24SFT    |       |
| 12                     | 4SA                              | 4SA+8Fx   | 4SA+16Fx  | 4SA+8Fx   | 8SA+16Fx |          |       |
|                        | 8SA                              | 8SA       | 8SA       | 8SA+16Fx  | 4SA+16Fx |          |       |
| 16                     | 8SA+8SAx                         | 8SA+8Fx   | 8SA+16Fx  | 8SA+8Fx   | 8SA+16Fx |          |       |
|                        |                                  | 8SA       | 8SA       | 8SA+16Fx  | 8SA+16Fx |          |       |
| 20                     | 8SA+8SAx                         | 8SA+8SAx  | 8SA+8SAx  |           |          |          |       |
|                        | 4SA                              | 4SA+8Fx   | 4SA+16Fx  |           |          |          |       |
| 24                     | 8SA+16SAx                        | 8SA+16SAx | 8SA+16SAx | 8SA+16SAx |          |          |       |
|                        |                                  | 8SFT      | 16SFT     | 24SFT     |          |          |       |
| 28                     | 8SA+16SAx                        | 8SA+16SAx | 8SA+16SAx |           |          |          |       |
|                        | 4SA                              | 4SA+8Fx   | 4SA+16Fx  |           |          |          |       |
| 32                     | 8SA+8SAx                         | 8SA+16SAx | 8SA+16SAx |           |          |          |       |
|                        | 8SA+8SAx                         | 8SA+8Fx   | 8SA+16Fx  |           |          |          |       |
| 40                     | 8SA+16SAx                        |           |           |           |          |          |       |
|                        | 8SA+8SAx                         |           |           |           |          |          |       |
| 48                     | 8SA+16SAx                        |           |           |           |          |          |       |
|                        | 8SA+16SAx                        |           |           |           |          |          |       |

**Table 10-5B 4/8SA Office Card Configurations in the Main Unit, 1800Ω Max.**

| Analog Stations (POTs) | Digital Station Ports (FlexSets) |           |           |          |          |          |       |
|------------------------|----------------------------------|-----------|-----------|----------|----------|----------|-------|
|                        | 0                                | 8         | 16        | 24       | 32       | 40       | 48    |
| 0                      |                                  | 8SFT      | 16SFT     | 24SFT    | 24SFT    | 24SFT    | 24SFT |
|                        |                                  |           |           |          | 8SFT     | 16SFT    | 24SFT |
| 4                      | 4SA                              | 4SA+8Fx   | 4SA+16Fx  | 4SA      | 4SA+8Fx  | 4SA+16Fx |       |
|                        |                                  |           |           | 24SFT    | 24SFT    | 24SFT    |       |
| 8                      | 8SA                              | 8SA+8Fx   | 8SA+16Fx  | 8SA      | 8SA+8Fx  | 8SA+16Fx |       |
|                        |                                  |           |           | 24SFT    | 24SFT    | 24SFT    |       |
| 12                     | 4SA                              | 4SA+8Fx   | 4SA+16Fx  | 4SA+8Fx  | 8SA+16Fx |          |       |
|                        | 8SA                              | 8SA       | 8SA       | 8SA+16Fx | 4SA+16Fx |          |       |
| 16                     | 8SA+8SAx                         | 8SA+8Fx   | 8SA+16Fx  | 8SA+8Fx  | 8SA+16Fx |          |       |
|                        |                                  | 8SA       | 8SA       | 8SA+16Fx | 8SA+16Fx |          |       |
| 20                     | 8SA+8SAx                         | 8SA+8SAx  | 8SA+8SAx  |          |          |          |       |
|                        | 4SA                              | 4SA+8Fx   | 4SA+16Fx  |          |          |          |       |
| 24                     | 8SA+16SAx                        | 8SA+16SAx | 8SA+16SAx |          |          |          |       |
|                        |                                  | 8SFT      | 16SFT     |          |          |          |       |
| 28                     | 8SA+16SAx                        | 8SA+16SAx |           |          |          |          |       |
|                        | 4SA                              | 4SA+8Fx   |           |          |          |          |       |
| 32                     | 8SA+8SAx                         |           |           |          |          |          |       |
|                        | 8SA+8SAx                         |           |           |          |          |          |       |
| 40                     |                                  |           |           |          |          |          |       |
| 48                     |                                  |           |           |          |          |          |       |

**Table 10-5C 4/8SA Office Card Configurations in an Expansion Unit, 1800Ω Max.**

| Analog Stations (POTs) | Digital Station Ports (FlexSets) |           |           |           |          |          |       |
|------------------------|----------------------------------|-----------|-----------|-----------|----------|----------|-------|
|                        | 0                                | 8         | 16        | 24        | 32       | 40       | 48    |
| 0                      |                                  | 8SFT      | 16SFT     | 24SFT     | 24SFT    | 24SFT    | 24SFT |
|                        |                                  |           |           |           | 8SFT     | 16SFT    | 24SFT |
| 4                      | 4SA                              | 4SA+8Fx   | 4SA+16Fx  | 4SA       | 4SA+8Fx  | 4SA+16Fx |       |
|                        |                                  |           |           | 24SFT     | 24SFT    | 24SFT    |       |
| 8                      | 8SA                              | 8SA+8Fx   | 8SA+16Fx  | 8SA       | 8SA+8Fx  | 8SA+16Fx |       |
|                        |                                  |           |           | 24SFT     | 24SFT    | 24SFT    |       |
| 12                     | 4SA                              | 4SA+8Fx   | 4SA+16Fx  | 4SA+8Fx   | 8SA+16Fx |          |       |
|                        | 8SA                              | 8SA       | 8SA       | 8SA+16Fx  | 4SA+16Fx |          |       |
| 16                     | 8SA+8SAx                         | 8SA+8Fx   | 8SA+16Fx  | 8SA+8Fx   | 8SA+16Fx |          |       |
|                        |                                  | 8SA       | 8SA       | 8SA+16Fx  | 8SA+16Fx |          |       |
| 20                     | 8SA+8SAx                         | 8SA+8SAx  | 8SA+8SAx  |           |          |          |       |
|                        | 4SA                              | 4SA+8Fx   | 4SA+16Fx  |           |          |          |       |
| 24                     | 8SA+16SAx                        | 8SA+16SAx | 8SA+16SAx | 8SA+16SAx |          |          |       |
|                        |                                  | 8SFT      | 16SFT     | 24SFT     |          |          |       |
| 28                     | 8SA+16SAx                        | 8SA+16SAx | 8SA+16SAx |           |          |          |       |
|                        | 4SA                              | 4SA+8Fx   | 4SA+16Fx  |           |          |          |       |
| 32                     | 8SA+8SAx                         | 8SA+16SAx | 8SA+16SAx |           |          |          |       |
|                        | 8SA+8SAx                         | 8SA+8Fx   | 8SA+16Fx  |           |          |          |       |
| 40                     | 8SA+16SAx                        |           |           |           |          |          |       |
|                        | 8SA+8SAx                         |           |           |           |          |          |       |
| 48                     | 8SA+16SAx                        |           |           |           |          |          |       |
|                        | 8SA+16SAx                        |           |           |           |          |          |       |

Table 10-6 4/8S Office  
Card Configurations, 1200 ohm Max.

| Analog Stations (POTs) | Digital Station Ports (FlexSets) |         |         |         |         |         |       |
|------------------------|----------------------------------|---------|---------|---------|---------|---------|-------|
|                        | 0                                | 8       | 16      | 24      | 32      | 40      | 48    |
| 0                      |                                  | 8SFT    | 16SFT   | 24SFT   | 24SFT   | 24SFT   | 24SFT |
|                        |                                  |         |         |         | 8SFT    | 16SFT   | 24SFT |
| 4                      | 4S                               | 4S+8Fx  | 4S+16Fx | 4S      | 4S+8Fx  | 4S+16Fx |       |
|                        |                                  |         |         | 24SFT   | 24SFT   | 24SFT   |       |
| 8                      | 8S                               | 8S+8Fx  | 8S+16Fx | 8S      | 8S+8Fx  | 8S+16Fx |       |
|                        |                                  |         |         | 24SFT   | 24SFT   | 24SFT   |       |
| 12                     | 4S                               | 4S+8Fx  | 4S+16Fx | 4S+8Fx  | 4S+16Fx |         |       |
|                        | 8S                               | 8S      | 8S      | 8S+16Fx | 8S+16Fx |         |       |
| 16                     | 8S                               | 8S+8Fx  | 8S+16Fx | 8S+16Fx | 8S+16Fx |         |       |
|                        | 8S                               | 8S      | 8S      | 8S+8Fx  | 8S+16Fx |         |       |
| 20                     | 8S+12Sx                          | 8S+12Sx | 8S+12Sx | 8S+12Sx |         |         |       |
|                        |                                  | 8SFT    | 16SFT   | 24SFT   |         |         |       |
| 24                     | 8S+12Sx                          | 8S+12Sx | 8S+12Sx |         |         |         |       |
|                        | 4S                               | 4S+8Fx  | 4S+16Fx |         |         |         |       |
| 28                     | 8S+12Sx                          | 8S+12Sx | 8S+12Sx |         |         |         |       |
|                        | 8S                               | 8S+8Fx  | 8S+16Fx |         |         |         |       |
| 40                     | 8S+12Sx                          |         |         |         |         |         |       |
|                        | 8S+12Sx                          |         |         |         |         |         |       |

Legend (Range of possible configurations):

| Range | Main Unit | Expansion Unit |
|-------|-----------|----------------|
| Green | Yes       | Yes            |
| Red   | No        | Yes            |

**CAUTION!**

Never insert “4/8S Office” and “4/8SA Office” cards in the same Coral IPx unit.  
Never exceed the number of POTs and FlexSets stations listed in Table 10-5 and Table 10-6.

**Range of possible configurations** (Table 10-5 and Table 10-6) of digital and analog stations within system specifications, including a combination example for each possible configuration. Other combinations are available, provided that the number of POTs and FlexSets stations does not exceed the number of capacity of wired stations listed. Never exceed these numbers.

In addition to the card combinations displayed in Table 10-5 and Table 10-6, other combinations are available, provided that the number of analog (POTs) and digital (FlexSets) stations does not exceed the number of capacity of wired stations listed in Table 10-4.

Example-1:

24 FlexSets and 4 POTs can be combined as follows:

- 24SFT and 4SA (preferred combination)
- 8SFT and 4SA+16Fx
- 16SFT and 4SA+8Fx

Example-2:

16 FlexSets and 8 POTs can be combined as follows:

- 8SA+16Fx and optional 8T/IPC (preferred combination)
- 4SA+16Fx and 4SA

Example-3:

32 FlexSets and 8 POTs can be combined as follows:

- 8SA+8Fx and 24SFT (preferred combination)
- 4SA+16Fx and 4SA+16Fx
- 8SA+16Fx and 16SFT

---

## *Analog Trunks*

Analog trunks are available on a large size 8 circuit card or a small size 4 circuit card. Caller ID detection modules can be mounted as daughter boards on these cards.

- 4T Office, 4CID Office
- 8T Office, 8CID

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## *Digital Trunks*

The following digital trunks are available in small size card format:

- UDT Office (T1/PRI-23) - Single trunk (23 channels) per card, up to 2 cards per system.
- 2DT Office (T1/30T/30TM/PRI-30/PRI-23 - Up to two interfaces (23/30 channels) per card, up to 2 cards per system
- PRI-30 Office - Single trunk (30 channels) per card, up to 2 cards per system.
- 30T Office (30T or 30TM jumper selection) - Single trunk (30 E1 channels) per card, up to 2 cards per system.
- 4TBR Office - 4 trunks (8 BRI channels) per card, up to 2 cards per system.

**NOTES:**



## 10.3 Digital Trunk Synchronization

### Slave Clock Mode Operation

---

The Coral IPx Office system is capable of operating in either master clock mode or slave clock mode. The selection between modes is made via the PI software.

#### *How the System Derives the External Clock Signal*

The Coral IPx Office uses digital trunk interface cards to synchronize its internal clock with the PSTN clock or with another switching system clock. When operating in slave-clock mode, the data stream transferred on the digital trunk is fed into the MCB Office (Main Control Board), incorporating the external clock rate into the Coral IPx Office internal clock.

To allow the clock signal to be fed into the Coral IPx Office internal clock, the ESIM and the digital trunk interface cards are properly strapped to accept those signals.

Two synchronization sources can be defined for a system. One serves as the primary source and the other serves as a secondary synchronization signal source.

The following digital trunk cards can retrieve synchronization signals in the Coral IPx Office main unit: 2DT Office, UDT Office (PRI-23 or T1), 30T Office (30T or 30TM), PRI-30 Office, and 4TBR Office.

The following digital trunk cards can retrieve synchronization signals in the Coral IPx 500X expansion cages: 2DTipx, UDTipx (PRI-23 or T1), 30Tipx, PRI-23ipx, PRI-30ipx, 4TBRipx and 8TBRipx.

More Coral FlexiCom 300,400,5000,6000 and IPx 800,3000,4000 digital trunk cards (2DT, UDT, 30T, T1, PRI-23, PRI-30, 4TBR, 8TBR) are available for synchronization purposes through the Coral IPx 800X expansion cages.

## Synchronization Slots in the Main and Expansion Cages

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Two slots, located in the Coral IPx Office main unit, are set to accept the digital trunk cards: slot # 8-9 and slot # 10-11. Each card can be installed into either slot. See [Figure 10-3](#) below.

---

### *Synchronization Slot Selection*

Any combination of primary and secondary synchronization sources, either in the main unit or in the expansion cage is valid.

The hardware selection between the Coral IPx Office unit and the expansion cages synchronization slots is determined by:

- In the IPx Office main unit, jumper settings on the ESIM Office card and on the digital trunk cards.
- In the IPx Office expansion unit, jumper settings on the ESIX Office card and on the digital trunk cards.
- In the IPx 500 and IPx 800 expansion cages, jumper settings on the backplane card.
- In the FlexiCom 200 CSLX expansion cabinets, jumper settings on the backplane card.

In addition, a software selection must take place. The system must be notified, via the PI facility, of the synchronization card shelf/slot location. See [Choosing the Best Synchronization Source](#), page 10-18.

---

### *Conditions for Slave Clock Mode Operation*

The following conditions are necessary for the Coral IPx Office to retrieve external clock signals:

- The jumpers must be strapped accordingly on the digital trunk cards and on the ESIM Office card.
- The digital trunk synchronization cards must be installed in the synchronization slots of the expansion cages (IPx 500X and IPx 800X or FlexiCom 200 CSLX).
- The PI parameters must be properly set.

---

### *System Switch from Slave Clock Mode to Master Clock Mode*

When a digital trunk card is initialized in the appropriate slot, the jumpers properly set, and the shelf/slot combination has been entered as a primary external clock source, the system determines if the digital trunk card in the indicated position is properly

synchronized with the network. If the system is functioning properly, it locks onto the primary external clock source.

If the primary digital trunk card issues a LOS or Red alarm, and a secondary external clock source is defined, the system determines whether the secondary digital trunk card is functioning properly. If it is, the system then locks onto the secondary external clock source.

If no secondary clock source is defined, or the secondary clock is also in LOS or Red alarm, the Coral IPx Office system uses its internal clock source, and the system free runs.

## Choosing the Best Synchronization Source

---

### *Optional Synchronization Cards*

In the Coral IPx Office main unit and IPx expansion unit:

- PRI-30 Office, 2DT Office (PRI-23/30), UDT Office (PRI-23)
- T1 - 2DT Office (T1), UDT Office (T1)
- E1 - 2DT Office (30T/30TM), 30T Office (30T/30TM)
- BRI - 4TBR Office

In the Coral IPx 500X expansion cage:

- PRI-23ipx, PRI-30ipx, 2DTipx (PRI-23/30), UDTipx(PRI-23)
- T1 - T1ipx, 2DTipx (T1), UDTipx (T1)
- E1 - 30Tipx, 2DTipx (30T/30TM)
- BRI - 4TBRipx, 8TBRipx

In the Coral IPx 800X expansion cage:

- PRI-23, PRI-30, 2DT(PRI-23/30), UDT(PRI-23)
- T1 - T1, 2DT(T1), UDT(T1)
- E1 - 30T/x, 2DT(30T/30TM)
- BRI - 4TBR, 8TBR



#### **NOTE:**

*If an IPx 500X Expansion cage is installed and 2DTipx, UDTipx, 30Tipx, PRI-23ipx, PRI-30ipx, 4TBRipx and 8TBRipx digital trunk interface cards are available, refer to the Coral IPx 500 Installation Guide.*

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#### **NOTE:**

*If an IPx 800X Expansion cage is installed and 2DT, UDT, 30T, T1, PRI-23, PRI-30, 4TBR and 8TBR digital trunk interface cards are available, refer to the Coral IPx 800 Installation Guide.*

---

#### **CAUTION!**

*4TBRP, 8TBRP, 4TBRPipx, and 8TBRPipx cards (with Power supply) cannot be used in the synchronization slots.*



## NOTE:

### *BRI Lines for Synchronization*

1) *BRI lines used for synchronization must be defined in the PI (Route: DTDB, 4) SYNC - YES. See **PI Manual Chapter 26 - ISDN** for more information.*

2) *It is not recommended to use BRI lines defined as PERMANENTLY\_ACTIVE\_CHANNEL - NO as synchronization sources.*

---

### *Order of Preference*

The possible digital trunk synchronization sources are listed in order of preference:

- 1 PRI or T1/E1 card (all types) connected to PSTN type stratum #3 - TANDEM switch (North America only).
- 2 PRI or T1/E1 card (all types) connected to PSTN type stratum # 4 (End office).
- 3 PRI or T1/E1 card (all types) connected to a private network. There are three possibilities listed in order of preference.
  - a The network is synchronized on PSTN stratum #4 (or less).
  - b The private network contains a stable internal clock.
  - c The private network is synchronized to the Coral - **do not use for synchronization.**

### **CAUTION!**

*When the Coral operates in Master Clock mode and the private network is synchronized by the Coral, it is prohibited to insert Digital Trunk cards in the synchronization slots.*

- 4 4TBR and 8TBR card (all types) connected to the PSTN.
- 5 4TBR and 8TBR card (all types) connected to a private network. The three possibilities are the same as listed in order of preference in possibilities 3.a - 3.c above.

## Synchronization Instructions

- 1 See the selection of the digital trunk cards available at the Coral site, given on [Choosing the Best Synchronization Source](#), page 10-18, to determine which cards will be used as the primary and secondary synchronization sources.
- 2 Determine into which slots the card chosen in [Step 1](#) should be inserted. See [Figure 10-3](#).
- 3 Verify that the digital trunk cards are properly strapped. See [Figure 10-3](#).
- 4 When expansion cages are installed, verify that the ESIM Office and ESIX Office cards are properly strapped. See [Figure 10-4](#).

### CAUTION!

*If an IPx 500X cage is installed and if straps must be changed, verify that the power is OFF before removing the power supply. See the Coral IPx 500 Installation Guide.*

- 5 Verify that the backplane of the expansion cages are properly strapped. See:
  - *Chapter 6 of the Coral IPx 500 Installation Procedure and Hardware Reference Manual, and/or*
  - *Coral IPx 800 Installation Procedure and Hardware Reference Manual, or*
  - *Chapter 2 of the FlexiCom 200 Expansion Unit Installation Procedure and Hardware Reference Manual.*
- 6 Use the PI facility to inform the system of the synchronization slot selection. Access the Synchronization branch (*Route: DTDB, 3*) to set the following parameters:

#### **ADDR - PRM, SEC**

Enter the appropriate (shelf, slot) combination of your choice:

- IPx Office main unit:  
PRM (shelf#1, slot#8/10), SEC (shelf#1, slot#8/10)
- IPx Office expansion unit:  
PRM (shelf#2/3, slot 8/10) SEC (shelf#2/3, slot#8/10)
- IPx 500X/800X first expansion cage:  
PRM (shelf#2, slot#4), SEC (shelf#2, slot#5)
- IPx 500X/800X second expansion cage:  
PRM (shelf#3, slot#4), SEC (shelf#3, slot#5)

- FlexiCom 200 CSLX-1 (first expansion unit, only)  
PRM (shelf#2, slot2), SEC (shelf#2, slot#3)

For more information, refer to *Chapter 8* of the *Program Interface reference Manual*.

- 7 If BRI lines are used for synchronization, access the ISDN branch (*Route: DTDB, 4*) to set the following parameters:

**SYNC**

Set this parameter to YES.

PERMANENTLY active Channel

Set this parameter to YES.

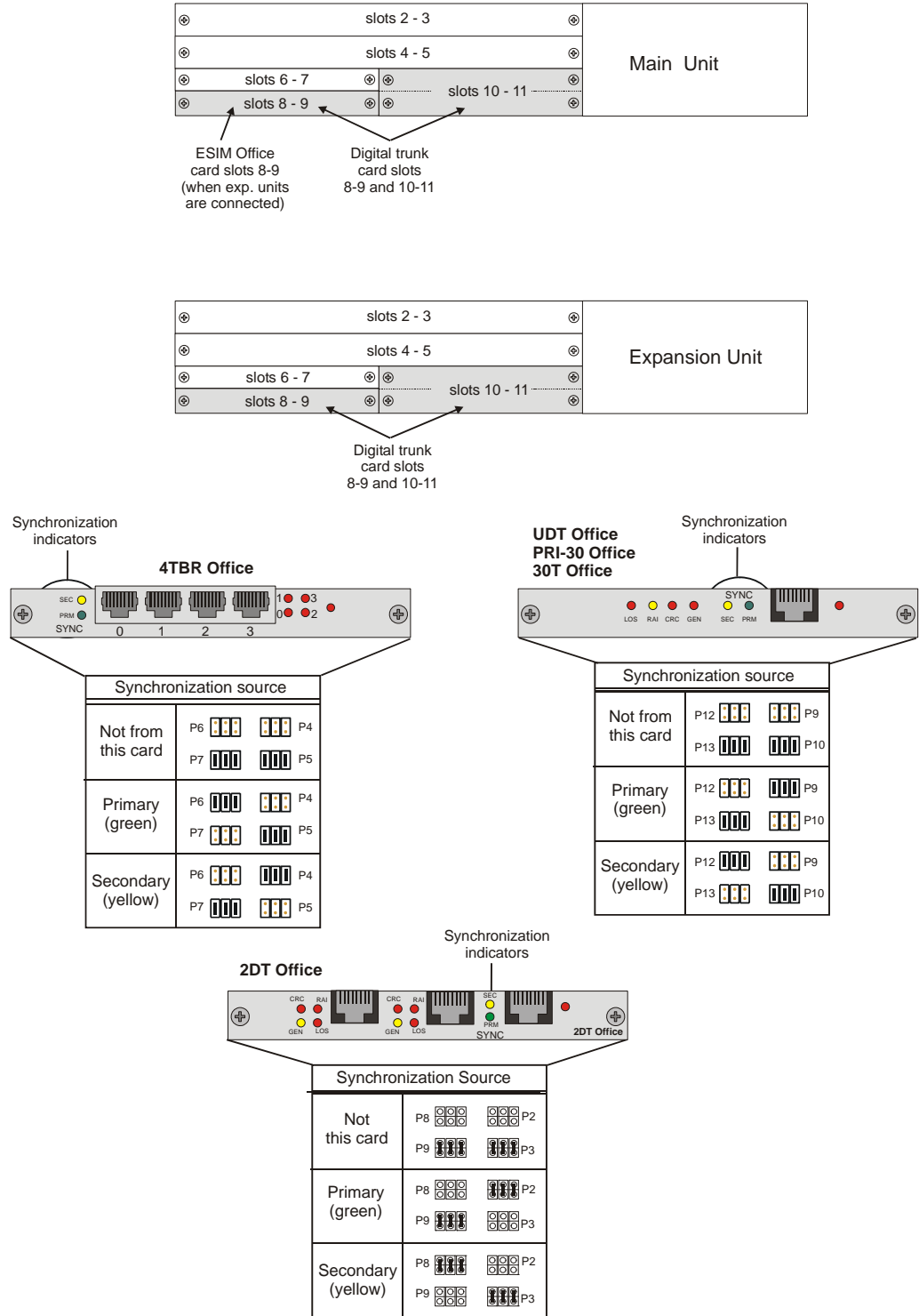
For more information, refer to *Chapter 26* of the *Program Interface reference Manual*.

- 8 Verify that the system is synchronized upon your settings:  
Access the PI Synchronization branch (*Route DTDB, 3*), check the following parameter:

**CURR\_CLK**

Verify that the value 1 is displayed, indicating that the system is synchronized by the primary synchronization source.

**Figure 10-3 Digital Trunk Cards Jumper Settings for Synchronization**

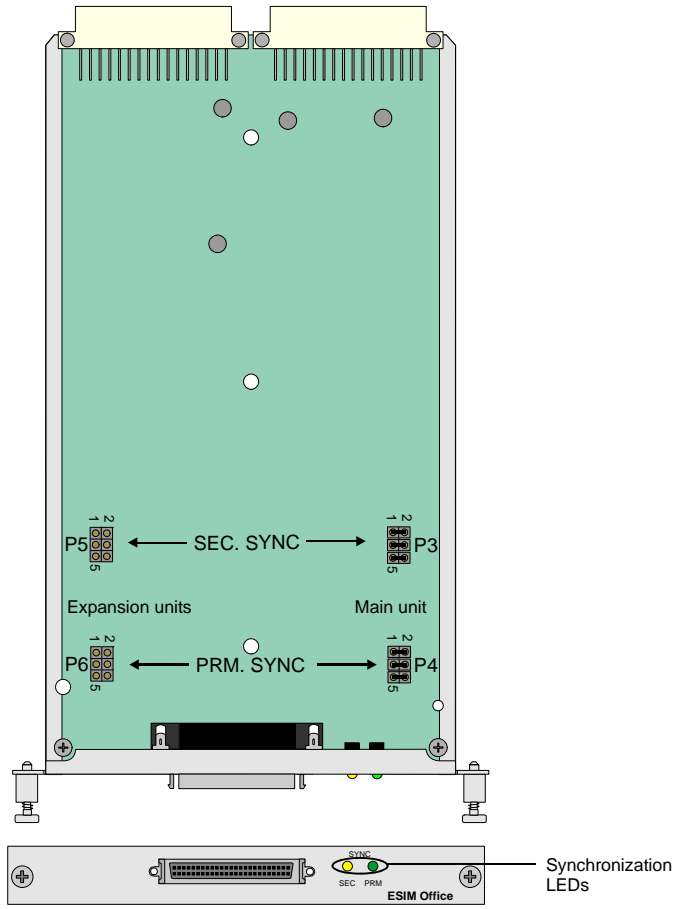


**NOTE:**

Due to logistical requirements, the "2DT Office" card is labelled: "PRI-2DT Office", on the front panel and on attached shipping documentation.



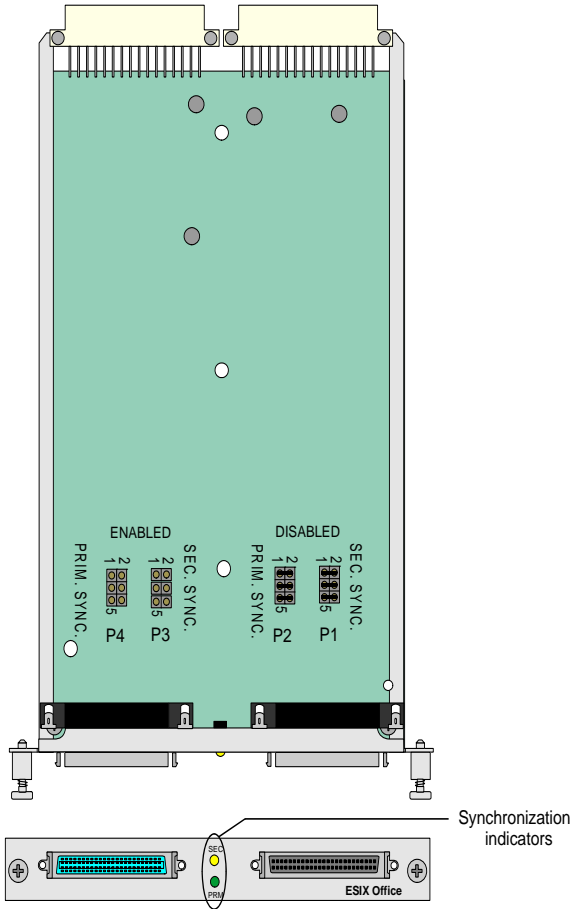
Figure 10-4 ESIM Office Card Jumper Settings for Synchronization



**NOTE:** The following configurations are applicable for all expansion units connected to the main unit, including IPx Office EX, IPx 500X, IPx 800X, and CSLX 200.

| Sync. Card | Unit     | Jumper                                    | LED  |
|------------|----------|---|--|
| Primary    | Main     | P5: [1, 2, 3, 4, 5]   P3: [1, 2, 3, 4, 5] | SEC: <span style="color: yellow;">●</span> PRM: <span style="color: green;">●</span> |
| Secondary  | Main     | P6: [1, 2, 3, 4, 5]   P4: [1, 2, 3, 4, 5] | SEC: <span style="color: yellow;">●</span> PRM: <span style="color: green;">●</span> |
| Primary    | Any Exp. | P5: [1, 2, 3, 4, 5]   P3: [1, 2, 3, 4, 5] | SEC: <span style="color: yellow;">●</span> PRM: <span style="color: green;">⦿</span> |
| Secondary  | Main     | P6: [1, 2, 3, 4, 5]   P4: [1, 2, 3, 4, 5] | SEC: <span style="color: yellow;">●</span> PRM: <span style="color: green;">●</span> |
| Primary    | Main     | P5: [1, 2, 3, 4, 5]   P3: [1, 2, 3, 4, 5] | SEC: <span style="color: yellow;">⦿</span> PRM: <span style="color: green;">●</span> |
| Secondary  | Any Exp. | P6: [1, 2, 3, 4, 5]   P4: [1, 2, 3, 4, 5] | SEC: <span style="color: yellow;">●</span> PRM: <span style="color: green;">●</span> |
| Primary    | Any Exp. | P5: [1, 2, 3, 4, 5]   P3: [1, 2, 3, 4, 5] | SEC: <span style="color: yellow;">⦿</span> PRM: <span style="color: green;">⦿</span> |
| Secondary  | Any Exp. | P6: [1, 2, 3, 4, 5]   P4: [1, 2, 3, 4, 5] | SEC: <span style="color: yellow;">⦿</span> PRM: <span style="color: green;">⦿</span> |

Figure 10-5 ESIX Office Card Jumper Settings for Synchronization



NOTE: For jumper configurations, refer to the drawings on the following pages.

## Synchronization Configurations

This section describes the different synchronization configurations available with the Coral IPx Office. The Coral IPx Office system can house any combination of primary and secondary synchronization units and cages. Both the ESIM and ESIX Office card include a green LED indicator labelled PRM and a yellow LED indicator labelled SEC. [Table 10-7](#) describes the meaning of each LED indicator status. [Table 10-9](#) lists the different synchronization configurations.

**Table 10-7 ESIM and ESIX Office card LED Indicator Status**

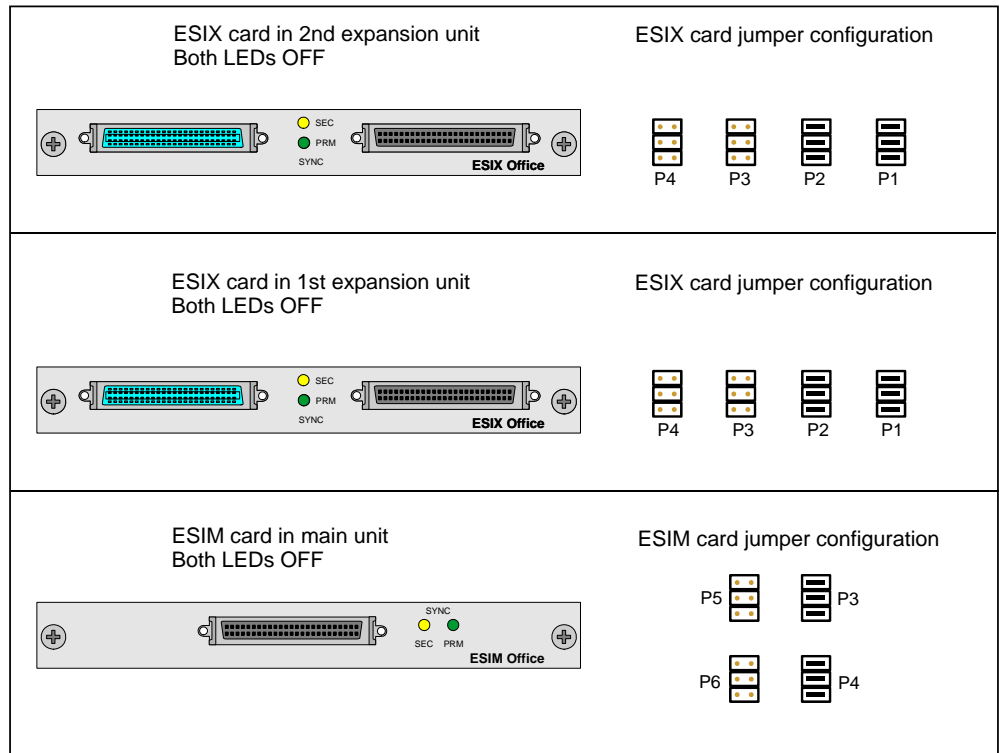
| LED                     | Status  |   |
|-------------------------|---|---|
|                         | OFF   | ON  |
| ESIM Card<br>Green PRM  | Primary synchronization card is housed in main unit                         | Primary synchronization card is housed in any expansion unit or cage    |
| ESIM Card<br>Yellow SEC | Secondary synchronization card is housed in main unit                       | Secondary synchronization card is housed in any expansion unit or cage  |
| ESIX Card<br>Green PRM  | Primary synchronization card is not housed in this expansion unit or cage   | Primary synchronization card is housed in this expansion unit or cage   |
| ESIX Card<br>Yellow SEC | Secondary synchronization card is not housed in this expansion unit or cage | Secondary synchronization card is housed in this expansion unit or cage |

### System Synchronization configurations

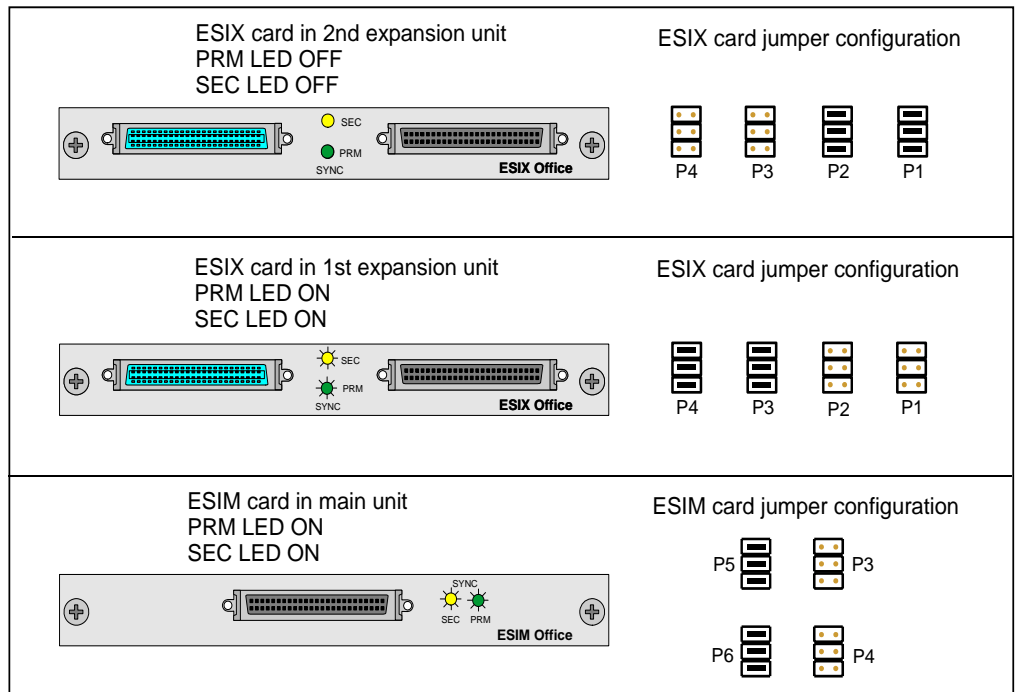
**Table 10-8 System Synchronization Configurations**

| Synchronization Source |          |          | on Page                                    |
|------------------------|----------|----------|--|
| Main                   | 1st Exp. | 2nd Exp. |  |
| PRM+SEC                |          |          | <a href="#">Figure 10-6 on page 10-25</a>  |
|                        | PRM+SEC  |          | <a href="#">Figure 10-7 on page 10-26</a>  |
|                        |          | PRM+SEC  | <a href="#">Figure 10-8 on page 10-26</a>  |
| PRM                    | SEC      |          | <a href="#">Figure 10-9 on page 10-27</a>  |
| SEC                    | PRM      |          | <a href="#">Figure 10-10 on page 10-27</a> |
| PRM                    |          | SEC      | <a href="#">Figure 10-11 on page 10-28</a> |
| SEC                    |          | PRM      | <a href="#">Figure 10-12 on page 10-28</a> |
|                        | PRM      | SEC      | <a href="#">Figure 10-13 on page 10-29</a> |
|                        | SEC      | PRM      | <a href="#">Figure 10-14 on page 10-29</a> |

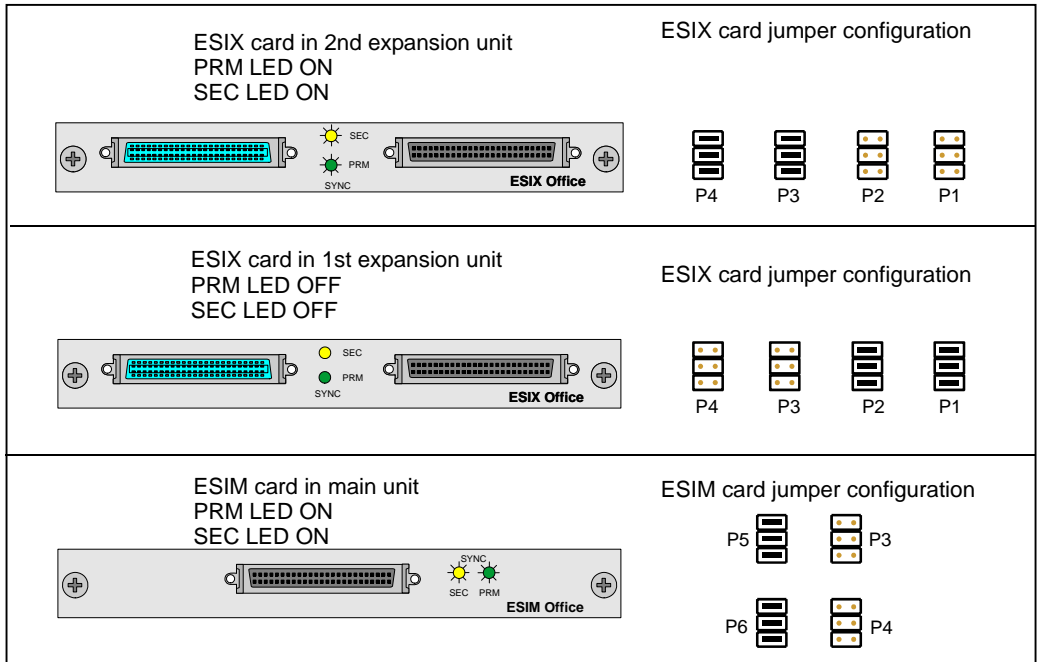
**Figure 10-6 Primary and Secondary in Main**



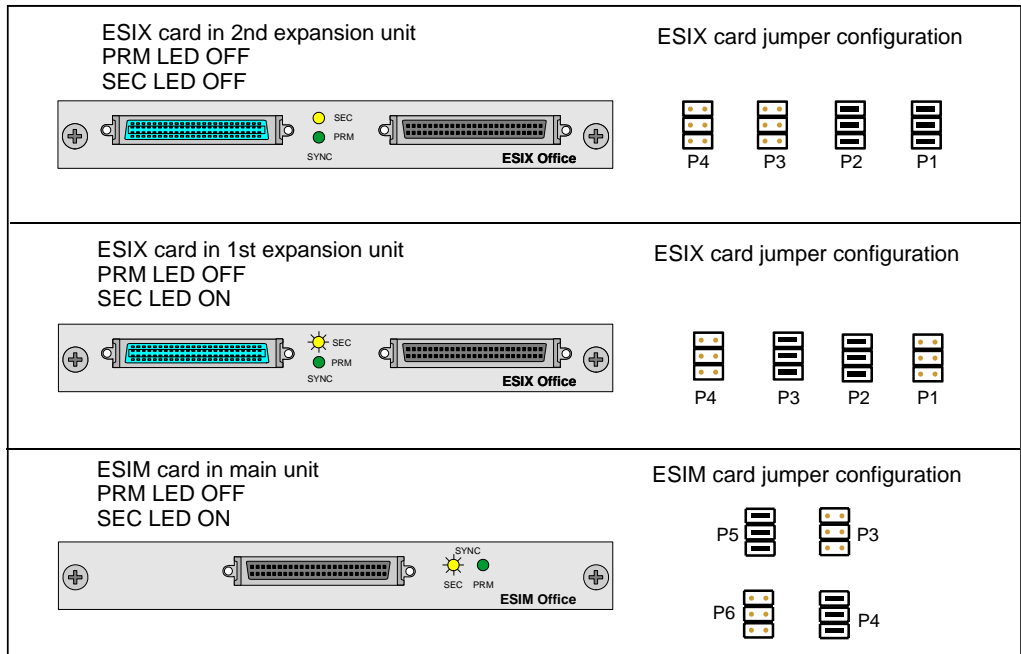
**Figure 10-7 Primary and Secondary in First Expansion**



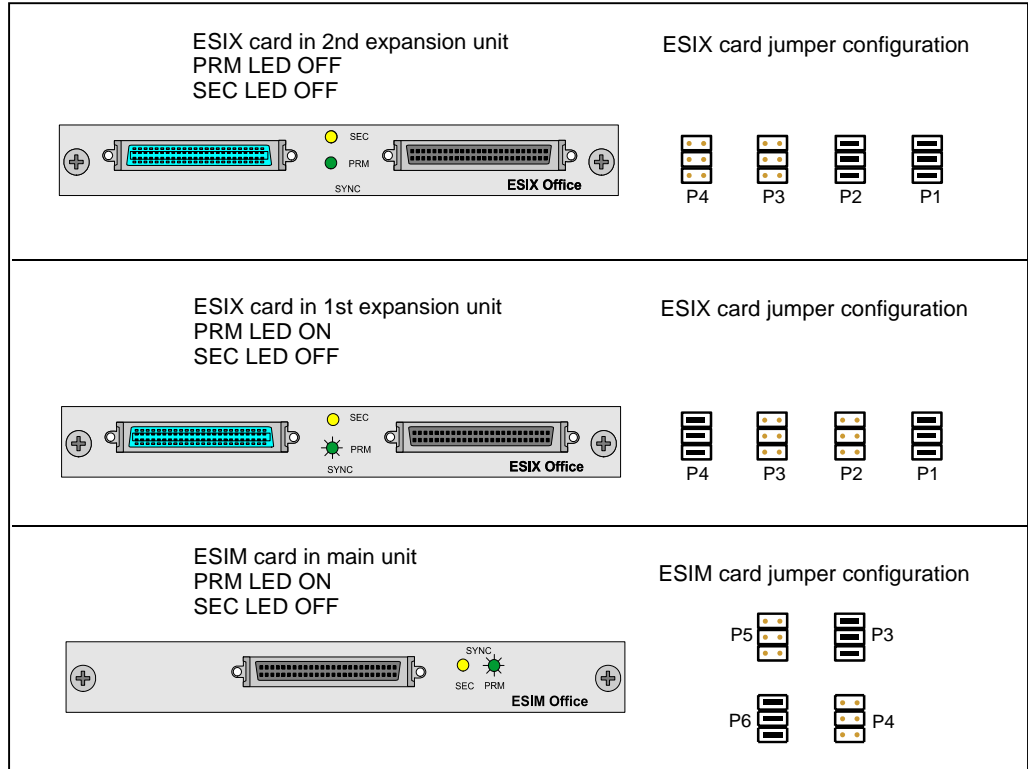
**Figure 10-8 Primary and Secondary in Second Expansion**



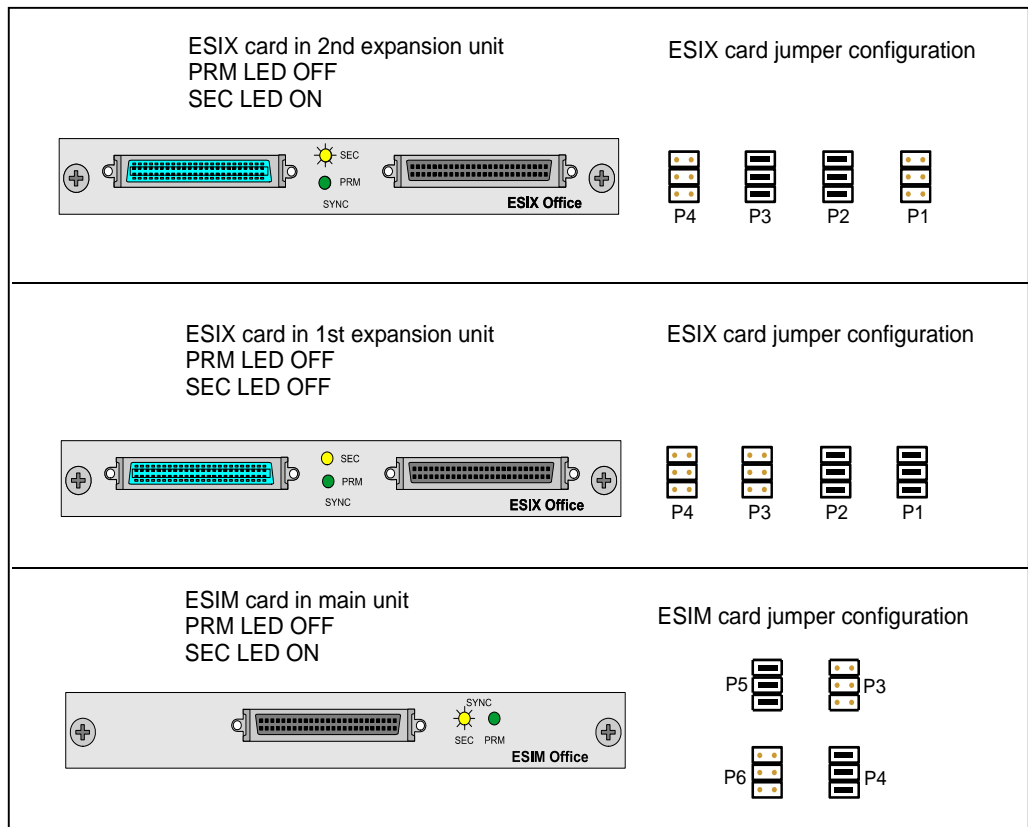
**Figure 10-9 Primary in Main and Secondary in First Expansion**



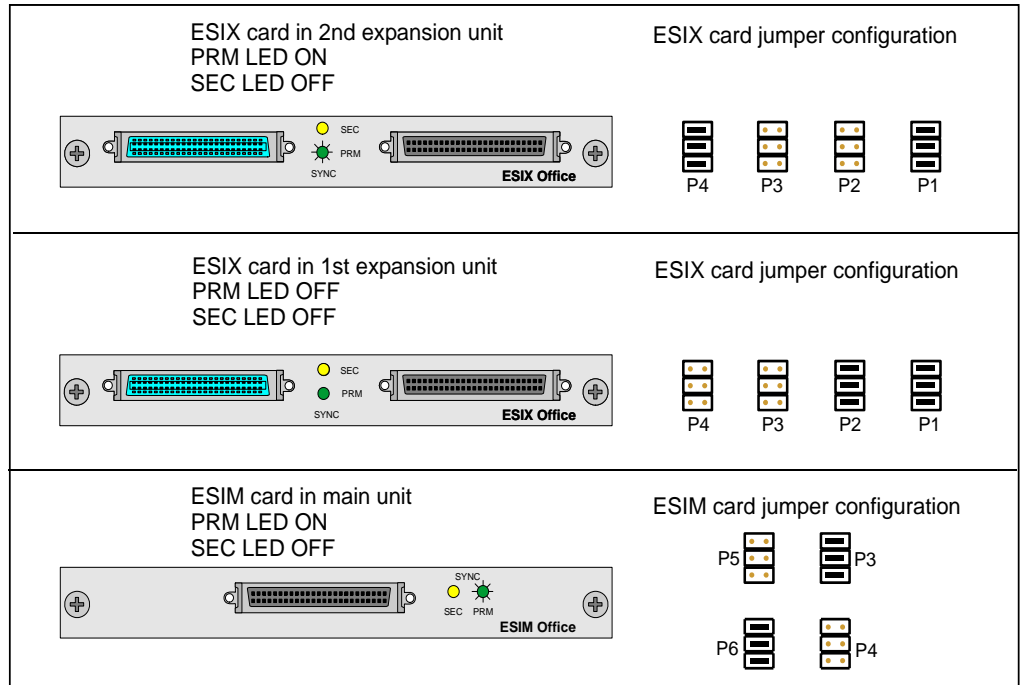
**Figure 10-10 Primary in First Expansion and Secondary in Main**



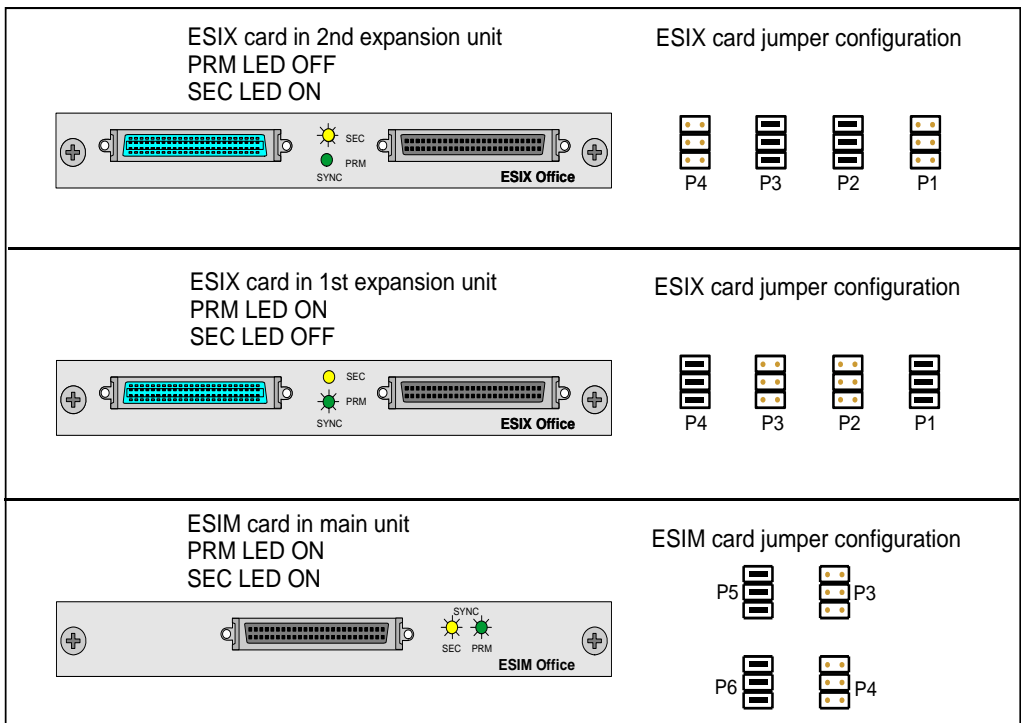
**Figure 10-11 Primary in Main and Secondary in Second Expansion**



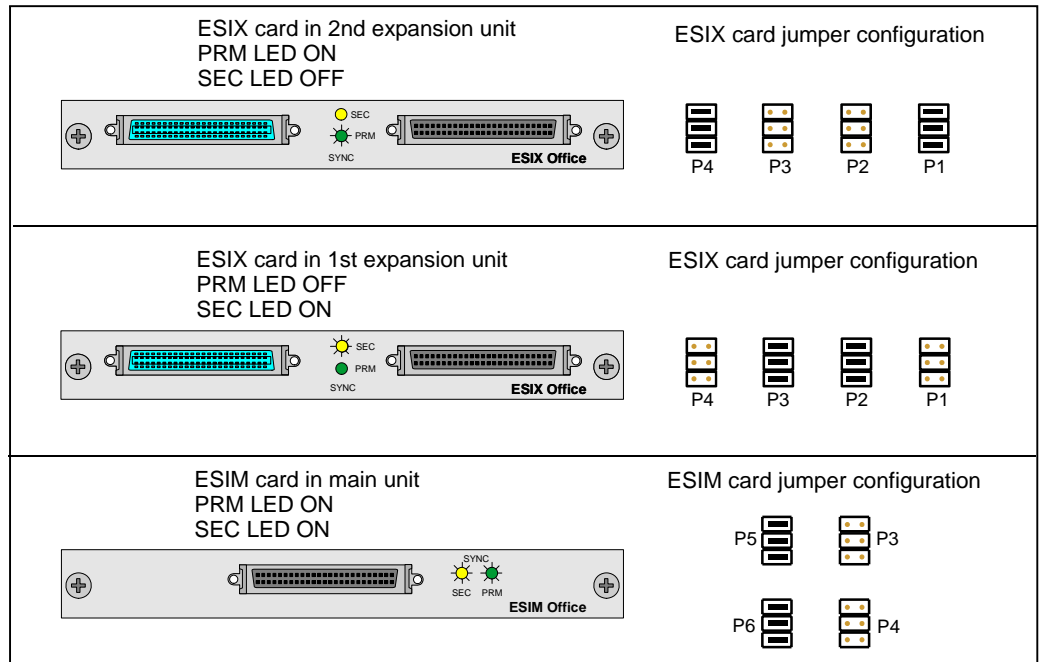
**Figure 10-12 Primary in Second and Secondary in Main**



**Figure 10-13 Primary in First and Secondary in Second**



**Figure 10-14 Primary in Second and Secondary in First**





## 10.4 Service and Peripheral Cards

This section includes a list of all peripheral cards currently used in the Coral IPx Office system.

The *Coral Service and Peripheral Cards Installation Manual* provides a full description of all service and peripheral cards used in the Coral IPx Office system.

**Table 10-9 Coral IPx Office Unit Service and Peripheral Card Types**

| Coral IPx Office - Service and Peripheral Card Types |           |            |                            |   |
|--|-----------|------------|----------------------------|---|
| Card Name  | Card Type | Card Slot  | PI Slot P_TYPE             | Description   |
| 2DT Office   | I-B       | 8-9, 10-11 | Any of the following:      | See <a href="#">Figure 10-15</a> .<br><b>NOTE:</b> Due to logistical requirements, the card is labelled: " <b>PRI-2DT Office</b> ", on the front panel and on attached shipping documentation.<br>Each card provides up to two of the following network interfaces:                                       |
|  |           |            | Even: T1<br>Odd: -----     | T1 - 24 channel, T1 digital trunk interfaces.   |
|  |           |            | Even: PRI 23<br>Odd: ----- | PRI-23 - 23 channel, PRI (Primary Rate Interface) digital trunks. ISDN compatible digital interface, North America ANSI standard (23B+D) at 1.544Mbps DS1 rate.   |
|  |           |            | Even: 30T<br>Odd: -----    | 30T/TM - 30 channel, E1 digital trunk interface card. Provides a 4-wire, digital multiplexed, CEPT compatible trunk interface at 2.048Mbps rate.  |
| 30T Office   | I-B       | 8-9, 10-11 | Even: 30T<br>Odd: -----    | See <a href="#">Figure 10-16</a> .<br>30T or 30T/M application card, jumper selection.<br>30 channel, E1 digital trunk interface card. Provides a 4-wire, digital multiplexed, CEPT compatible trunk interface at 2.048Mbps rate.<br><b>NOTE:</b> 30T Office is not for use in the North American market. |
|  |           |            |                            |   |

These cards are a combination of two cards

| Coral IPx Office - Service and Peripheral Card Types |           |            |                   |                 |   |
|--|-----------|------------|-------------------|-----------------|---|
| Card Name  | Card Type | Card Slot  | PI Slot<br>P_TYPE |                 | Description   |
| 4T Office  | I-C       | 10-11      | Even:<br>Odd:     | 4T-C<br>-----   | See <a href="#">Figure 10-20</a> .<br>4 port Loop-Start trunk interface card.<br>Includes 4 ports with power failure (PF) transfer.<br>Provides a multi-pin connector to attach an optional 4CID Office card in piggyback fashion.  |
| 4T-CID Office*                                       | I-C       | 10-11      | Even:<br>Odd:     | 4T-CID<br>----- | See <a href="#">Figure 10-21</a> .<br>Combination trunk card, 4T Office and 4CID Office cards on 4T Office board in piggyback fashion.<br>4 ports total.<br>The 4CID Office card is used for detecting Caller ID information.   |
| 4TBR Office  | I-B       | 8-9, 10-11 | Even:<br>Odd:     | 4TBR<br>-----   | See <a href="#">Figure 10-17</a> .<br>4 port BRI (Basic Rate Interface), digital trunk card. ISDN compatible. Each circuit provides a 144 Kbps 2B+D signal, consisting of two 64 Kbps B (voice) channels and a 16kbps D (data/control) channel.   |
| 4S Office  | II        | 2-3, 4-5   | Even:<br>Odd:     | 4SLS<br>-----   | See <a href="#">Figure 10-25</a> .<br>4 port, 2-wire SLT (500/2500 type device, Single-Line Telephone) interface card.<br>Provides a multi-pin connector to attach an optional 8Fx Office or 16Fx Office card in piggyback fashion.   |
| 4SA Office   | II        | 2-3, 4-5   | Even:<br>Odd:     | 4SLS<br>-----   | See <a href="#">Figure 10-26</a> .<br>4 port, 2-wire SLT (500/2500 type device, Single-Line Telephone) interface card.<br>Provides a multi-pin connector to attach an optional 8Fx Office or 16Fx Office card in piggyback fashion.<br><br><b>NOTE:</b> 4SA Office cards support Pulse/Rotary dialing (500-type) from firmware version 6 or higher. |
| 4S+8Fx Office*                                       | II        | 2-3, 4-5   | Even:<br>Odd:     | 4SLS<br>8SFT    | See <a href="#">Figure 10-31</a> .<br>Combination station card, 4S Office and 8Fx Office cards on 4S Office board. 12 ports total.  |
| 4SA+8Fx Office*                                      | II        | 2-3, 4-5   | Even:<br>Odd:     | 4SLS<br>8SFT    | See <a href="#">Figure 10-32</a> .<br>Combination station card, 4SA Office and 8Fx Office cards on 4S Office board. 12 ports total.   |
| 4S+16Fx Office*                                      | II        | 2-3, 4-5   | Even:<br>Odd:     | 4SLS<br>16SFT   | See <a href="#">Figure 10-31</a> .<br>Combination station card, 4S Office and 16Fx Office cards on 4S Office board. 20 ports total.   |
| 4SA+16Fx Office*                                     | II        | 2-3, 4-5   | Even:<br>Odd:     | 4SLS<br>16SFT   | See <a href="#">Figure 10-31</a> .<br>Combination station card, 4SA Office and 16Fx Office cards on 4S Office board. 20 ports total.  |

These cards are a combination of two cards

| Coral IPx Office - Service and Peripheral Card Types |           |           |                   |                |   |
|--|-----------|-----------|-------------------|----------------|---|
| Card Name  | Card Type | Card Slot | PI Slot<br>P_TYPE |                | Description   |
| 8S Office  | II        | 2-3, 4-5  | Even:<br>Odd:     | 8SLS<br>-----  | See <a href="#">Figure 10-27</a> .<br>8 port, 2-wire SLT (500/2500 type device, Single-Line Telephone) interface card.<br>Provides a multi-pin connector to attach an optional 12Sx Office, 8Fx Office or 16Fx Office card in piggyback fashion.  |
| 8SA Office   | II        | 2-3, 4-5  | Even:<br>Odd:     | 8SLS<br>-----  | See <a href="#">Figure 10-28</a> .<br>8 port, 2-wire SLT (500/2500 type device, Single-Line Telephone) interface card.<br>Provides a multi-pin connector to attach an optional 8SAx, 16SAx Office, 8Fx Office or 16Fx Office card in piggyback fashion.<br><br><b>NOTE:</b> 8SA Office cards support Pulse/Rotary dialing (500-type) from firmware version 6 or higher. |
| 8S+8Fx Office*                                       | II        | 2-3, 4-5  | Even:<br>Odd:     | 8SLS<br>8SFT   | See <a href="#">Figure 10-31</a> .<br>Combination station card, 8S Office and 8Fx Office cards on 8S Office board. 16 ports total.  |
| 8SA+8Fx Office*                                      | II        | 2-3, 4-5  | Even:<br>Odd:     | 8SLS<br>8SFT   | See <a href="#">Figure 10-32</a> .<br>Combination station card, 8SA Office and 8Fx Office cards on 8S Office board. 16 ports total.   |
| 8S+16Fx Office*                                      | II        | 2-3, 4-5  | Even:<br>Odd:     | 8SLS<br>16SFT  | See <a href="#">Figure 10-31</a> .<br>Combination station card, 8S Office and 16Fx Office cards on 8S Office board. 24 ports total.   |
| 20S Office*  | II        | 2-3, 4-5  | Even:<br>Odd:     | 20SLS<br>----- | See <a href="#">Figure 10-29</a> .<br>Combination station card, 8S Office and 12Sx Office cards on 8S Office board. 20 ports total.<br><br><b>NOTE:</b> Only one 20S Office card is allowed in a Coral IP Office main unit.   |
| 8SFT Office  | II        | 2-3, 4-5  | Even:<br>Odd:     | 8SFT<br>-----  | See <a href="#">Figure 10-22</a> .<br>8 port, 2-wire SFT (Station FlexSet Terminal) interface card.<br>Each of the circuits support Coral FlexSet, GKT, CPA, DKT, DST and APDL.   |
| 16SFT Office   | II        | 2-3, 4-5  | Even:<br>Odd:     | 16SFT<br>----- | See <a href="#">Figure 10-23</a> .<br>16 port, 2-wire SFT (Station FlexSet Terminal) interface card.<br>Each of the circuits support Coral FlexSet, GKT, CPA, DKT, DST and APDL.  |
| 24SFT Office   | II        | 2-3, 4-5  | Even:<br>Odd:     | 24SFT<br>----- | See <a href="#">Figure 10-24</a> .<br>24 port, 2-wire SFT (Station FlexSet Terminal) interface card.<br>Each of the circuits support Coral FlexSet, GKT, CPA, DKT, DST and APDL.  |

These cards are a combination of two cards

| Coral IPx Office - Service and Peripheral Card Types |           |                  |                   |                 |   |
|--|-----------|------------------|-------------------|-----------------|---|
| Card Name  | Card Type | Card Slot        | PI Slot<br>P_TYPE |                 | Description   |
| 8T Office  | II        | 2-3, 4-5         | Even:<br>Odd:     | 8T-C<br>-----   | See <a href="#">Figure 10-33</a> .<br>8 port Loop-Start trunk interface card.<br>Includes 4 ports with power failure (PF) transfer.<br>Provides a multi-pin connector to attach an optional 8CID card in piggyback fashion.   |
| 8T-CID Office*                                       | II        | 2-3, 4-5         | Even:<br>Odd:     | 4T-CID<br>----- | See <a href="#">Figure 10-34</a> .<br>Combination trunk card, 8T Office and 8CID cards on 8T Office board in piggyback fashion.<br>8 ports total.<br>The 8CID card is used for detecting Caller ID information.   |
| ESIM Office  | I-B       | 8-9<br>Main Unit | Even:<br>Odd:     | -----<br>-----  | See <a href="#">Figure 10-4</a> .<br>When the Coral IPx Office system includes expansion cages, the ESIM Office card is installed into the Coral IPx Office main unit and the Coral IPx Office expansion cable is attached to the connector on the front panel of the ESIM Office card.                       |
| ESIX Office  | I-A       | 6-7<br>Exp. Unit | Even:<br>Odd:     | -----<br>-----  | The ESIX Office card is installed into the Coral IPx Office/X expansion unit (slot 6-7) and the Coral IPx Office expansion cable is attached to the connectors on the front panel of the ESIM and ESIX Office cards.  |
| IPC Office/<br>SFC                                   | II        | 2-3, 4-5         | Even:<br>Odd:     | 24SDT<br>-----  | See <a href="#">Figure 10-35</a> .<br>Voice mail  |
| IPC Office/<br>uCMC                                  | II        | 2-3, 4-5         | Even:<br>Odd:     | 24SDT<br>-----  | See <a href="#">Figure 10-35</a> .<br>Voice mail  |
| IPC Office/<br>WiCMC                                 | II        | 2-3, 4-5         | Even:<br>Odd:     | 24SDT<br>-----  | See <a href="#">Figure 10-35</a> .<br>Voice mail  |
| MR Office  | I-A       | 6-7<br>Main Unit | Even:<br>Odd:     | MR<br>-----     | See <a href="#">Table 10-11</a> .   |
| PRI-30 Office  | I-B       | 8-9, 10-11       | Even:<br>Odd:     | PRI30<br>-----  | See <a href="#">Figure 10-18</a> .<br>30 channel, PRI (Primary Rate Interface) digital trunk card. ISDN compatible digital interface, European ETSI standard (30B+D) at 2.048Mbps E1 rate.<br><b>NOTE:</b> PRI-30 Office are not for use in the North American market.  |
| RMI Office   | I-A       | 6-7<br>Main Unit | Even:<br>Odd:     | RMI-F<br>-----  | See <a href="#">Table 10-11</a> .   |
| UDT Office   | I-B       | 8-9, 10-11       | Even:<br>Odd:     | T1<br>-----     | See <a href="#">Figure 10-19</a> .<br>T1 or PRI-23 application card, jumper selection.<br>T1: 24 channel, T1 digital trunk interface card.<br>PRI: 23 channel, PRI (Primary Rate Interface) digital trunk card. ISDN compatible digital interface, North America ANSI standard (23B+D) at 1.544Mbps DS1 rate. |
|  |           |                  | Even:<br>Odd:     | PRI 23<br>----- |   |

These cards are a combination of two cards

**Coral IPx Office - Service and Peripheral Card Types**

| <b>Card Name</b> | <b>Card Type</b> | <b>Card Slot</b> | <b>PI Slot<br/>P_TYPE</b> |               | <b>Description</b>                |
|------------------|------------------|------------------|---------------------------|---------------|-----------------------------------|
| U-MR Office      | I-A              | 6-7<br>Main Unit | Even:<br>Odd:             | MR<br>URC2    | See <a href="#">Table 10-11</a> . |
| U-RMI Office     | I-A              | 6-7<br>Main Unit | Even:<br>Odd:             | RMI-F<br>URC2 | See <a href="#">Table 10-11</a> . |

These cards are a combination of two cards

**Table 10-10 Coral IPx Office Piggyback modules for Peripheral Cards**

| Coral IPx Office Piggyback modules for Peripheral Cards |   |
|---|---|
| Item  | Description   |
| 4CID Office   | <p>The 4CID Office is installed on the 4T Office card in Coral IPx Office systems. See <a href="#">Figure 10-36</a>.</p> <p>The 4CID Office card is used for detecting CID (Caller ID) information, modulated in FSK (Frequency Shift Keying), sent from the PSTN over Loop-Start trunks.</p> <p>The 4CID Office card includes 4 circuit FSK tone receiver and decoder. The card converts FSK tone:</p> <ul style="list-style-type: none"> <li>■ BellCore GR-30, or</li> <li>■ ETSI 300-659-1 para. 6.1.1</li> </ul> <p>into ASCII text information. The ASCII information is sent to the Coral IPx Office main processor for CID displaying on FlexSet, SLT (see 4/8/20S Office and URC above) and for SMDR, CLA, APA, etc.</p> <p>The CID feature for analog Loop-Start trunk requires Authorization for Caller ID. Each trunk can be individually enabled through programming in the configuration database.</p> |
| 8CID  | <p>Same as 4CID Office but includes 8 circuit FSK tone receiver and decoder. The 8CID is installed on the 8T Office card in Coral Office systems. See <a href="#">Figure 10-37</a>.</p>   |
| 12Sx Office   | <p>12Sx Office card plugged on the:</p> <ul style="list-style-type: none"> <li>■ 8S Office card, for 20S Office (20 SLT ports total).</li> </ul> <p>The 12Sx Office expansion piggyback (optional card) adds 12 SLT ports to the 8S Office card. See <a href="#">Figure 10-42</a> and <a href="#">Figure 10-43</a>.</p>   |
| 8Fx Office  | <p>8Fx Office card plugged on the:</p> <ul style="list-style-type: none"> <li>■ 4S Office card for 4S+8Fx Office (12 ports total, 4 SLT and 8 SFT)</li> <li>■ 8S Office card for 8S+8Fx (16 ports total, 8 SLT and 8 SFT)</li> </ul> <p>The 8Fx Office expansion piggyback (optional card) adds 8 SFT ports to the 4S Office and 8S Office cards. See <a href="#">Figure 10-38</a>, <a href="#">Figure 10-40</a> and <a href="#">Figure 10-41</a> for installation instructions.</p>  |
| 16Fx Office   | <p>16Fx Office card plugged on the:</p> <ul style="list-style-type: none"> <li>■ 4S Office card for 4S+16Fx Office (20 ports total, 4 SLT and 16 SFT)</li> <li>■ 8S Office card for 8S+16Fx Office (24 ports total, 8 SLT and 16 SFT)</li> </ul> <p>The 16Fx Office expansion piggyback (optional card) adds 16 SFT ports to the 4S Office and 8S Office cards. See <a href="#">Figure 10-39</a>, <a href="#">Figure 10-40</a> and <a href="#">Figure 10-41</a> for installation instructions.</p>  |



**Tip:**

For 8/16Fx installation instructions, refer to [Figure 10-41](#).

Table 10-11 U-RMI Office, U-MR Office, RMI Office and MR Office features

| Features  | U-RMI | U-MR | RMI | MR |
|---|-------|------|-----|----|
| <ul style="list-style-type: none"> <li>■ 1 internal or external music interface</li> <li>■ 1 external music interface</li> <li>or</li> <li>1 external voice paging interface or public address and relay contacts</li> <li>■ 1 auxiliary or major/minor alarm relay contacts</li> <li>■ 1 universal night answer UNA or central bell relay contacts</li> <li>■ 2 relay contacts</li> </ul>  | ●     | ●    | ●   | ●  |
| <ul style="list-style-type: none"> <li>■ 1 remote maintenance modem (V.92 ITU-T standard up to 56Kbps)</li> </ul>   | ●     | —    | ●   | —  |
| <ul style="list-style-type: none"> <li>■ 16 DTD circuit dial tone detector and call progress tone analyzer (max: 32*)</li> <li>■ 24 DTR circuit DTMF receiver and decoder card for touch-tone digits (max: 24*)</li> <li>■ Eight 3-way conference (max: 24*)</li> <li>■ Two Meet-me bridge conference for 14 parties (max: 6*)</li> <li>■ 16 Caller ID circuit transmitters adapted to Bellcore standards which includes the time and Caller Name/Num display (max: 32*). Required for the 4/8T-CID Office card</li> </ul> <p><b>NOTE:</b> Separate authorization (SAU) is required to allocate the DTMF, DTR, 3-way and conference circuits supported by the URC.</p> <p><b>NOTE:</b> (max: *) The maximum number for the resources is dependent on the number of URC timeslots. Therefore, increasing one of these resources requires decreasing another.</p> | ●     | ●    | —   | —  |

See [Chapter 9, Shared Service Circuitry](#) for more information about service cards.

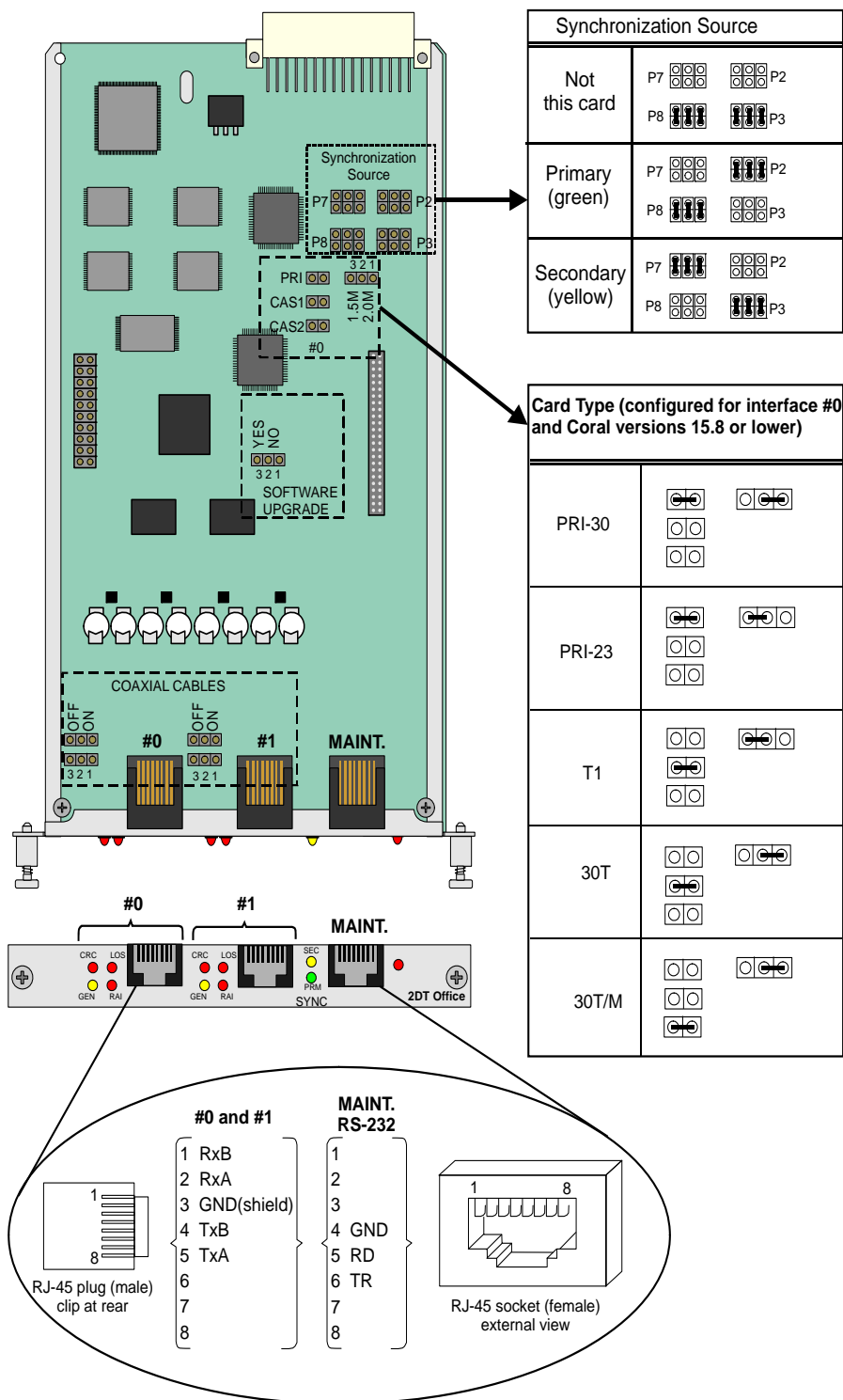
- U-RMI Office card see [Figure 9-4](#).
- RMI Office card see [Figure 9-5](#).
- U-MR Office card see [Figure 9-6](#).
- MR Office card, see [Figure 9-7](#).



**NOTE:**

U-MR card is supplied as standard. All other variations of the card (U-RMI, RMI, MR) require special order and checking of availability.

Figure 10-15 2DT Office Card (30T, 30TM, T1, PRI-30 or PRI-23)



**NOTE:** Due to logistical requirements, the card is labelled: "PRI-2DT Office", on the front panel and on attached shipping documentation.

**NOTE:** All Jumper Straps are irrelevant (except Software Upgrade jumper) for Card firmware 60 with Coral version 16 or higher. See "Coral Service and Peripheral Cards Installation Manual".



Figure 10-16 30T Office Card (30T or 30TM)

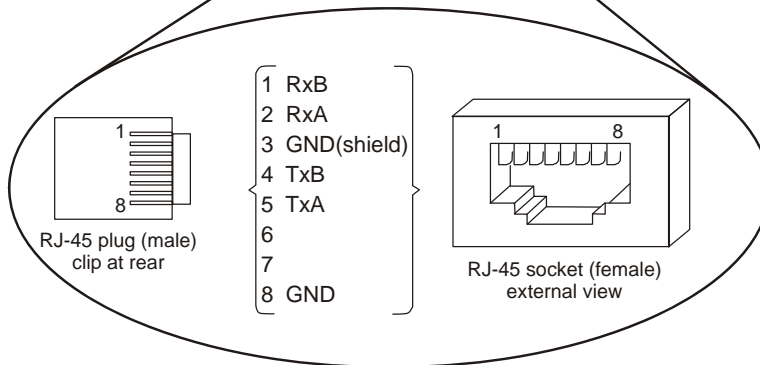
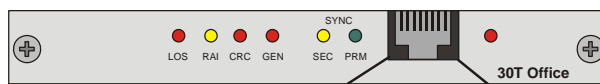
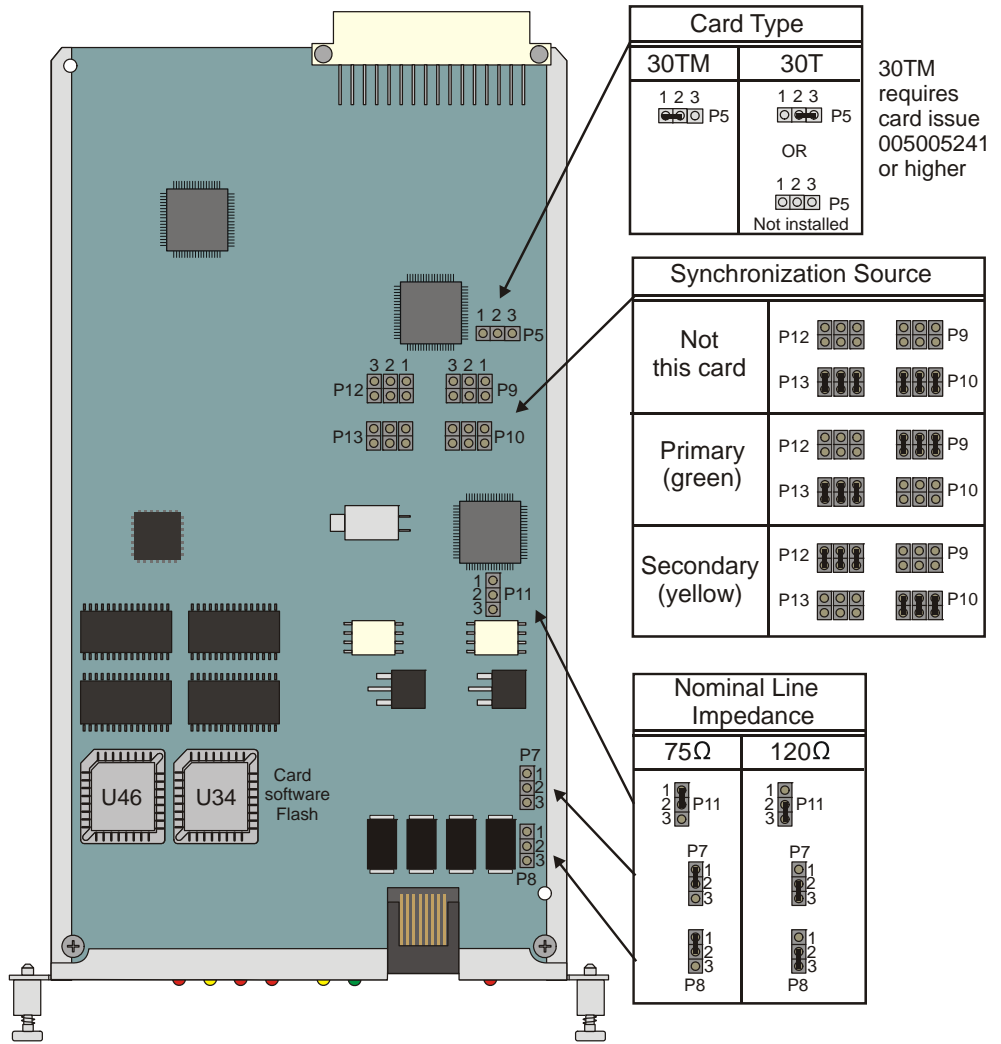


Figure 10-17 4TBR Office Card

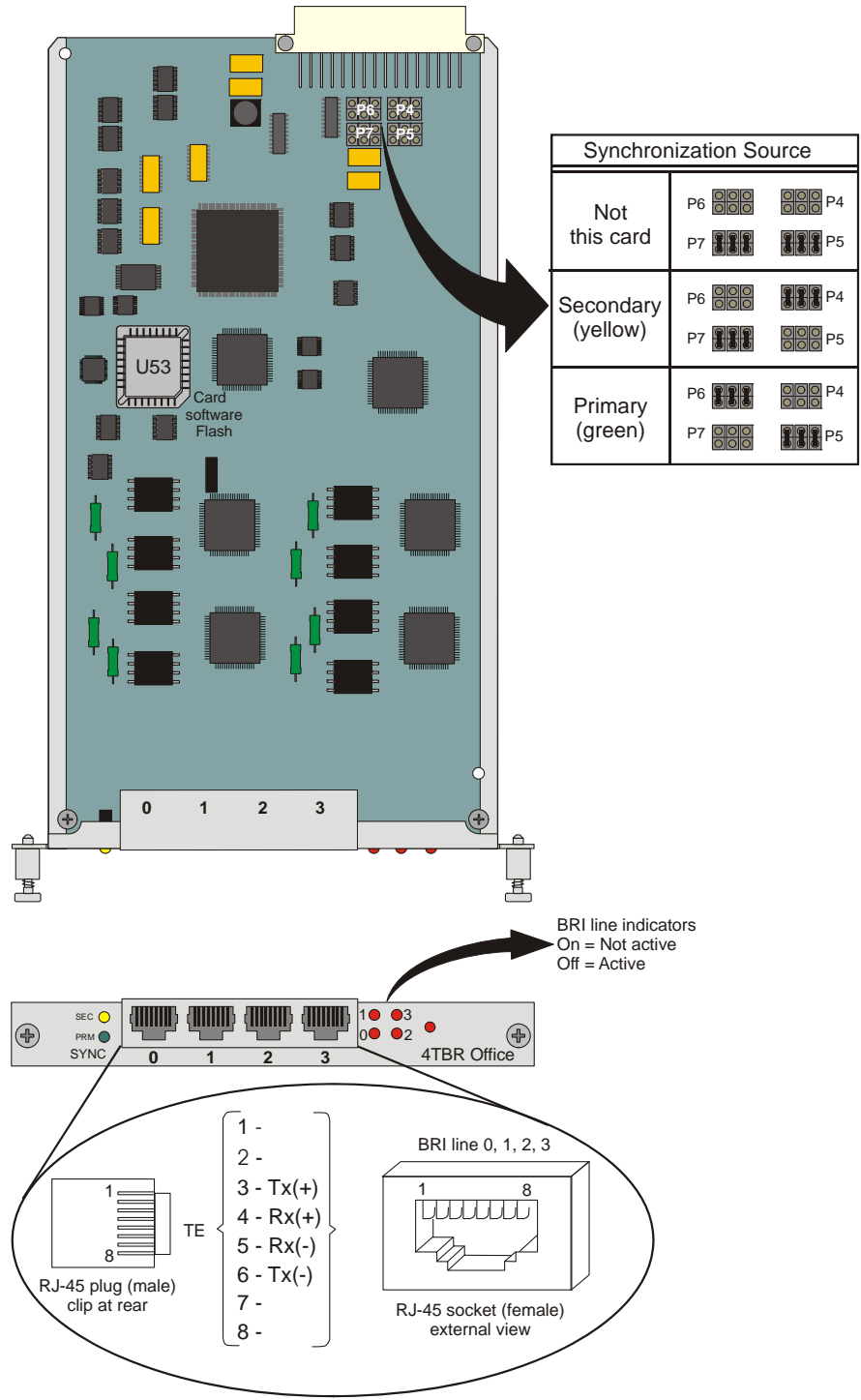


Figure 10-18 PRI-30 Office Card

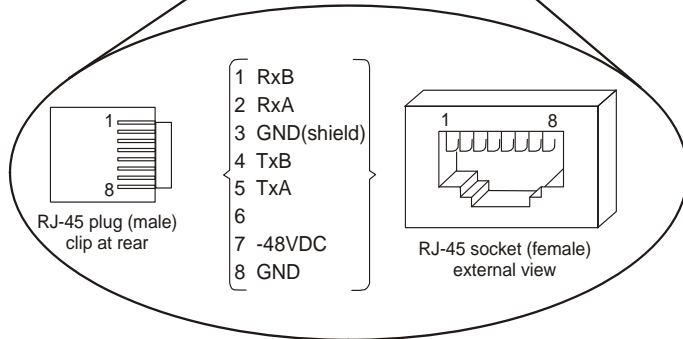
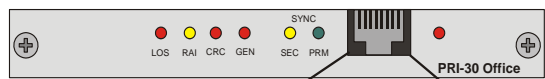
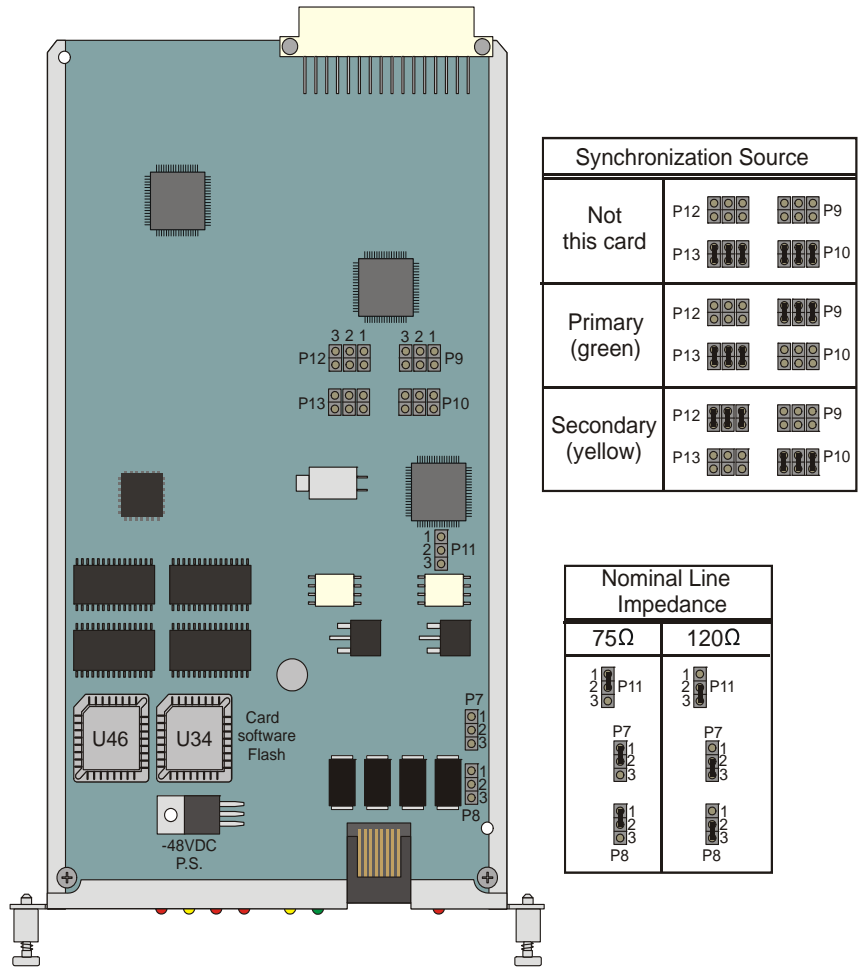


Figure 10-19 UDT Office Card (T1 or PRI-23)

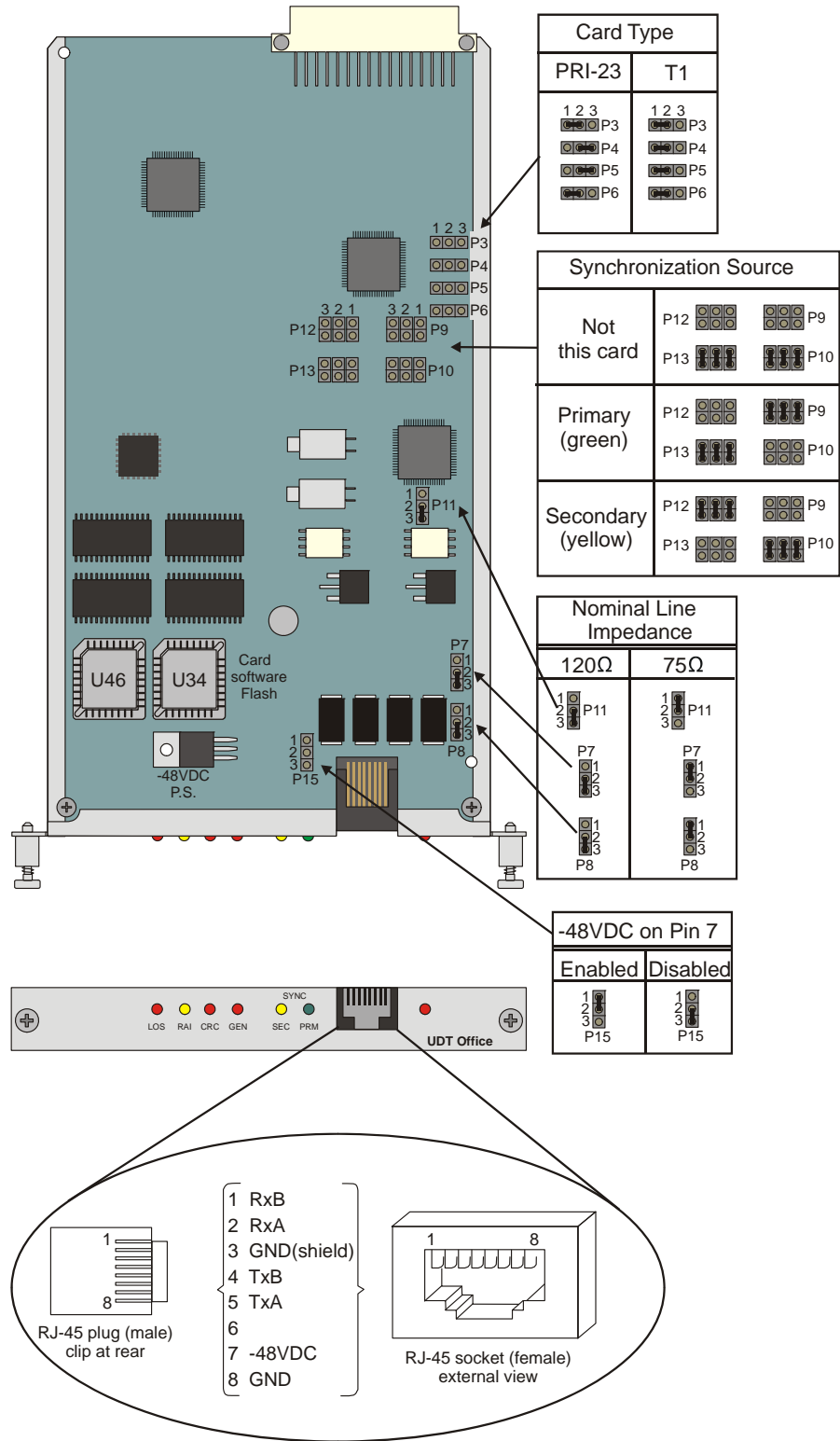


Figure 10-20 4T Office Card

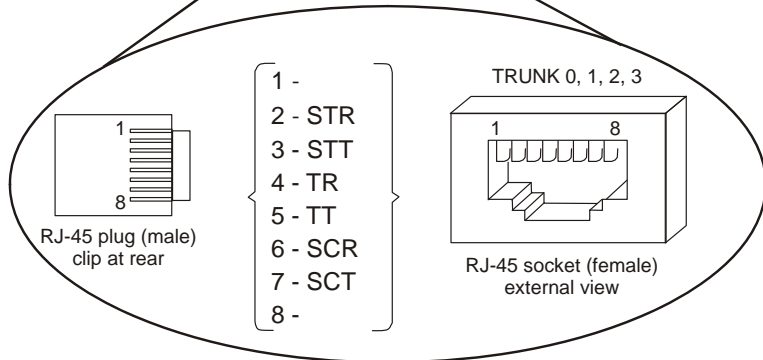
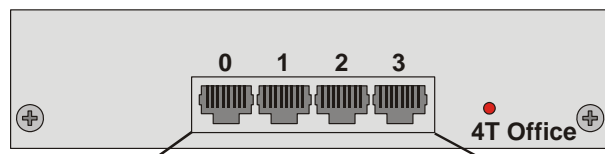
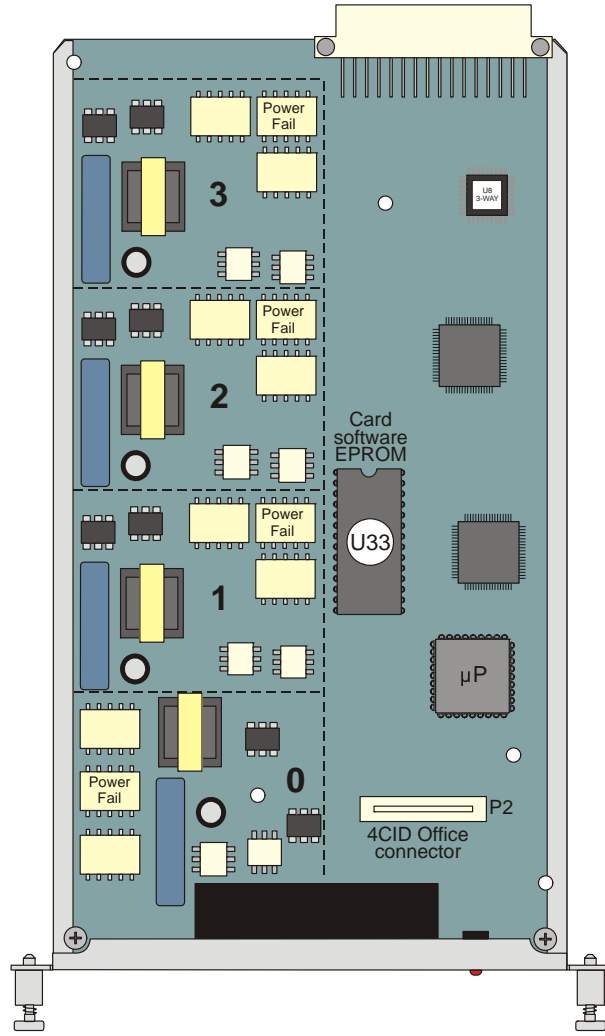


Figure 5-6 illustrates wiring interconnections between the trunk card, station card, and a single line station set.

Figure 10-21 4T-CID Office Card

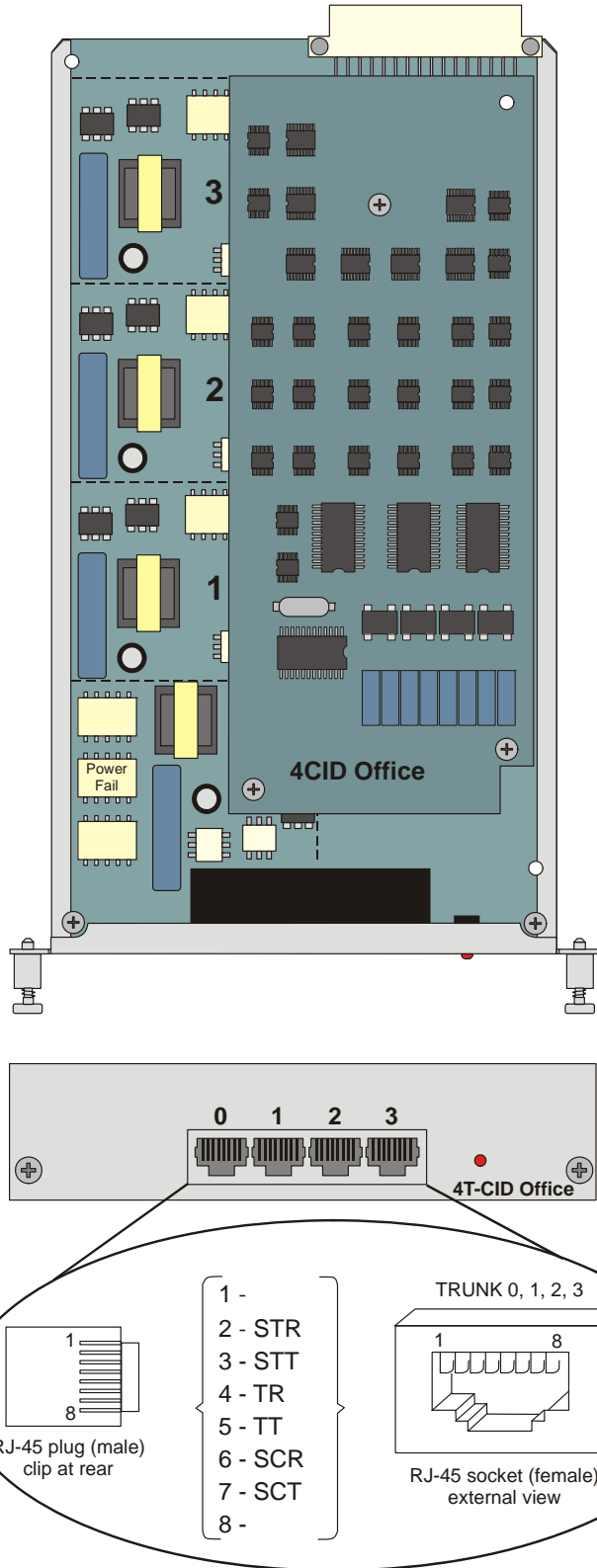
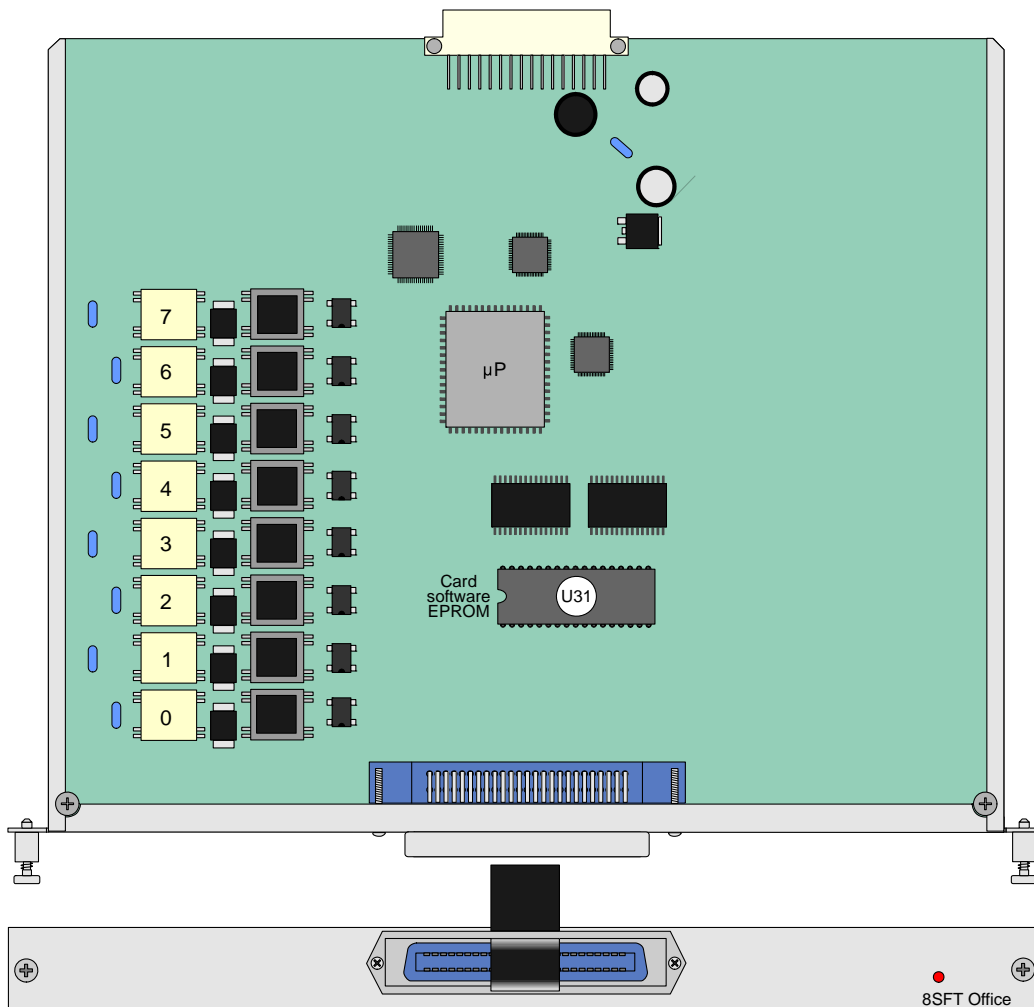


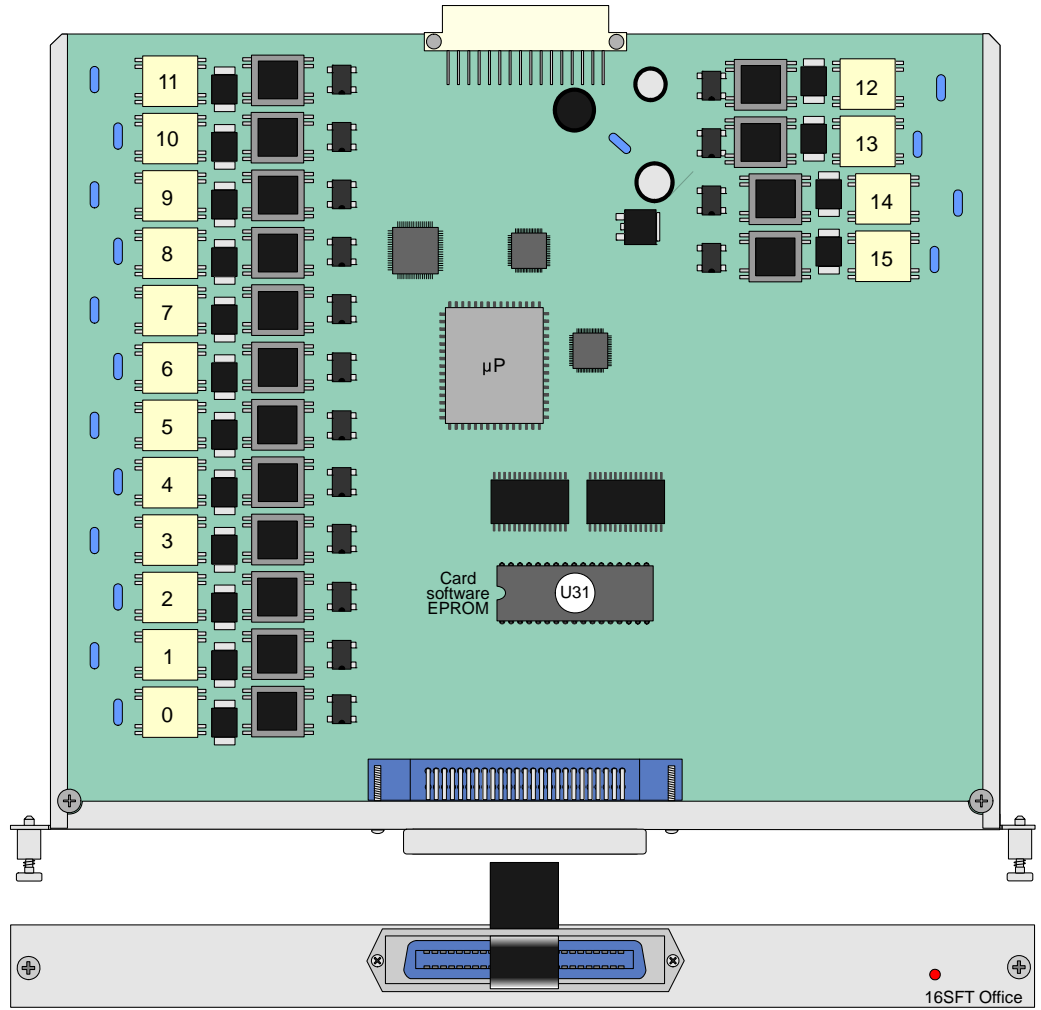
Figure 5-6 illustrates wiring interconnections between the trunk card, station card, and a single line station set.

Figure 10-22 8SFT Office Card



| Pins | FlexSet |
|------|---------|
| 1/26 | A/B0    |
| 2/27 | A/B1    |
| 3/28 | A/B2    |
| 4/29 | A/B3    |
| 5/30 | A/B4    |
| 6/31 | A/B5    |
| 7/32 | A/B6    |
| 8/33 | A/B7    |

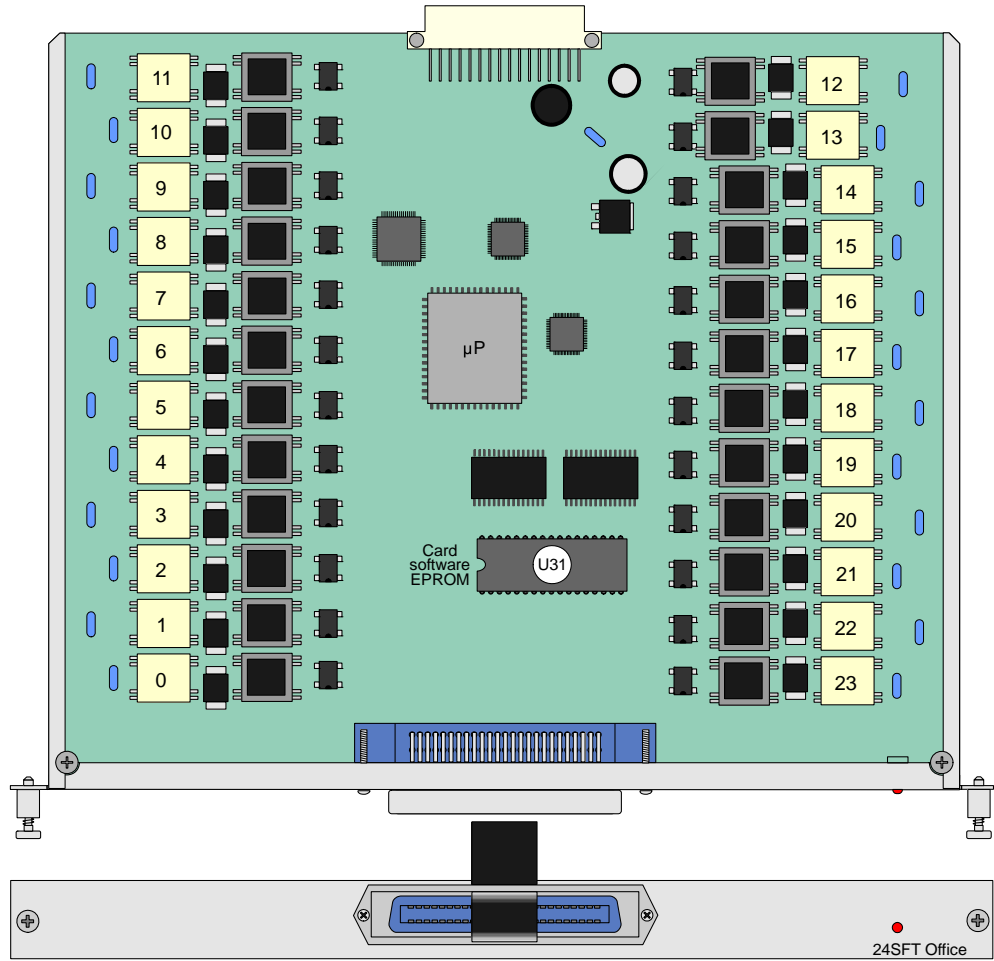
Figure 10-23 16SFT Office Card



| Pins  | FlexSet |
|-------|---------|
| 1/26  | A/B0    |
| 2/27  | A/B1    |
| 3/28  | A/B2    |
| 4/29  | A/B3    |
| 5/30  | A/B4    |
| 6/31  | A/B5    |
| 7/32  | A/B6    |
| 8/33  | A/B7    |
| 9/34  | A/B8    |
| 10/35 | A/B9    |
| 11/36 | A/B10   |
| 12/37 | A/B11   |
| 13/38 | A/B12   |
| 14/39 | A/B13   |
| 15/40 | A/B14   |
| 16/41 | A/B15   |

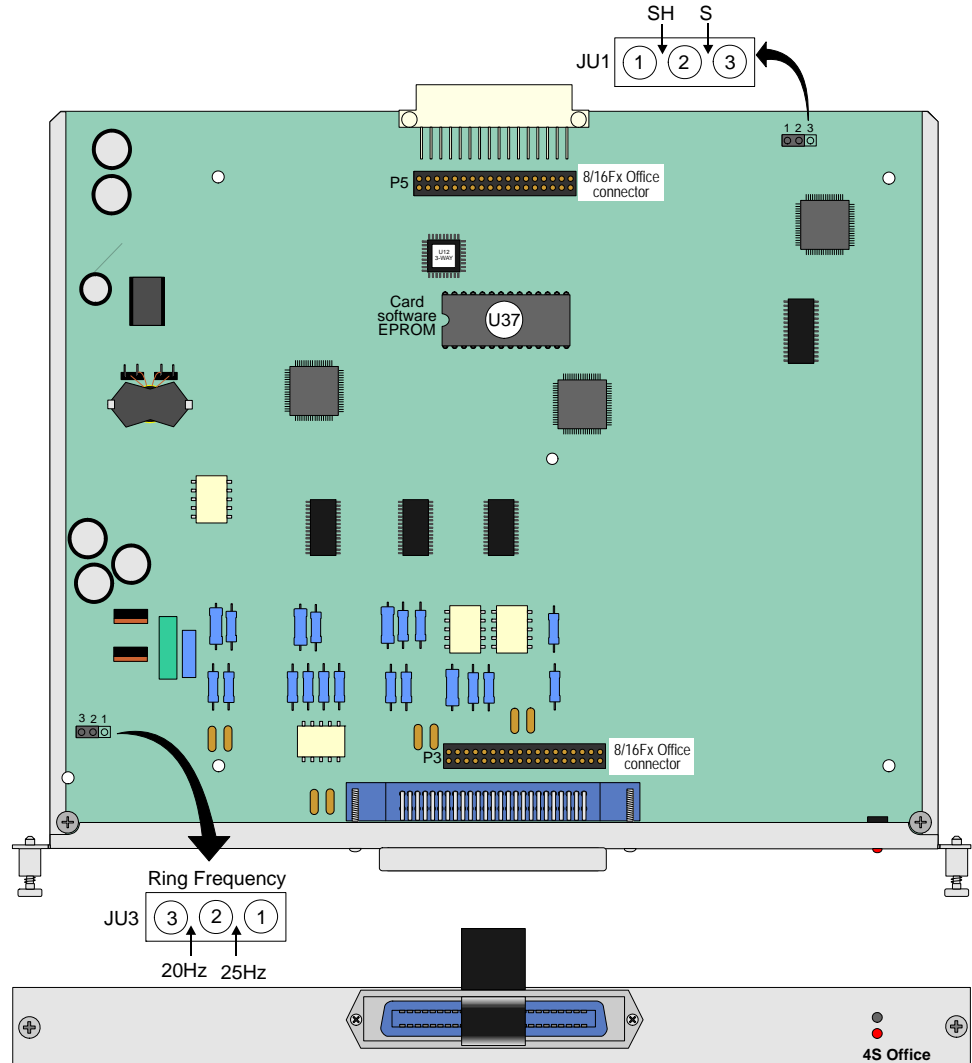


Figure 10-24 24SFT Office Card



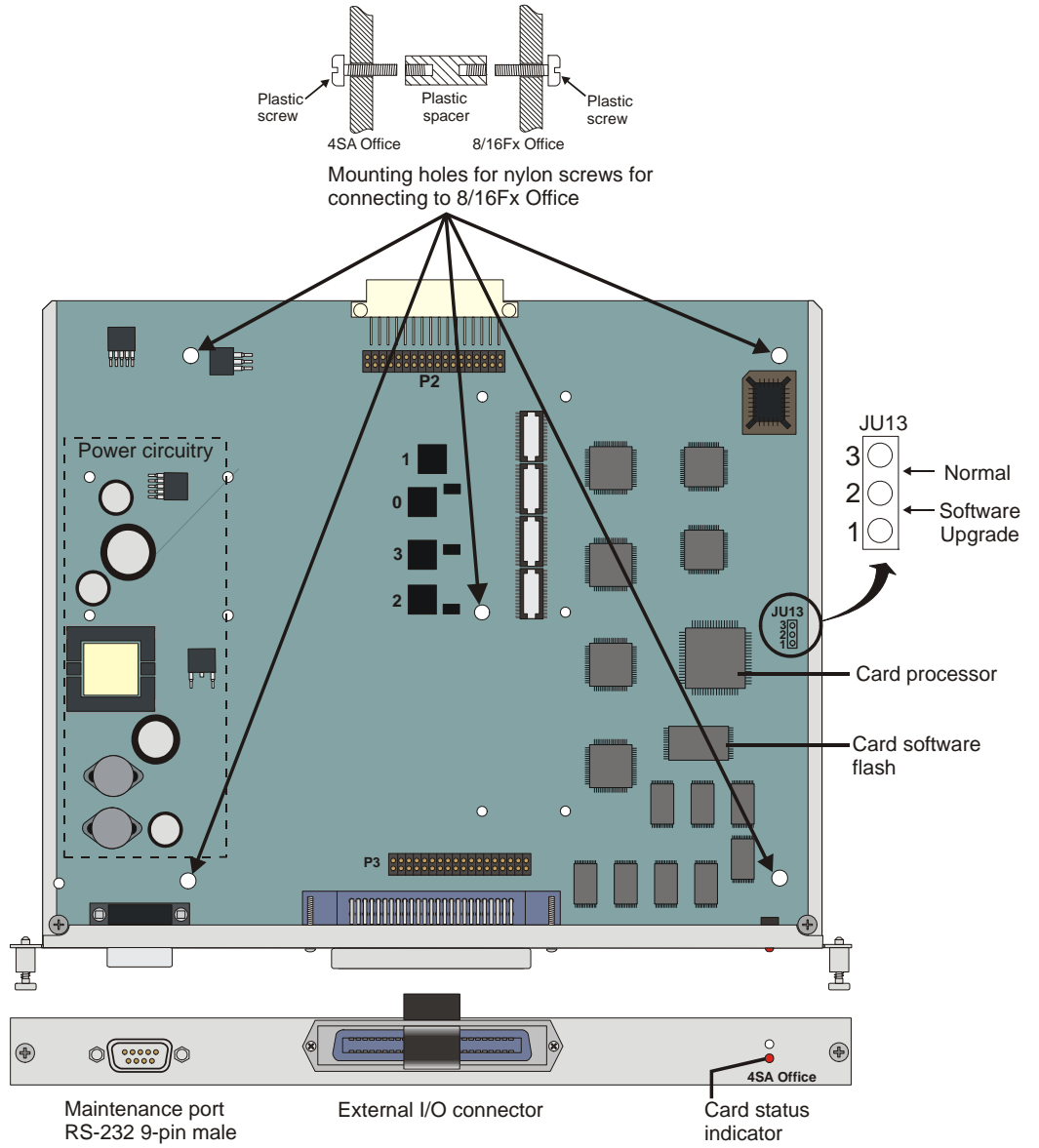
| Pins  | FlexSet |
|-------|---------|
| 1/26  | A/B0    |
| 2/27  | A/B1    |
| 3/28  | A/B2    |
| 4/29  | A/B3    |
| 5/30  | A/B4    |
| 6/31  | A/B5    |
| 7/32  | A/B6    |
| 8/33  | A/B7    |
| 9/34  | A/B8    |
| 10/35 | A/B9    |
| 11/36 | A/B10   |
| 12/37 | A/B11   |
| 13/38 | A/B12   |
| 14/39 | A/B13   |
| 15/40 | A/B14   |
| 16/41 | A/B15   |
| 17/42 | A/B16   |
| 18/43 | A/B17   |
| 19/44 | A/B18   |
| 20/45 | A/B19   |
| 21/46 | A/B20   |
| 22/47 | A/B21   |
| 23/48 | A/B22   |
| 24/49 | A/B23   |

Figure 10-25 4S Office Card



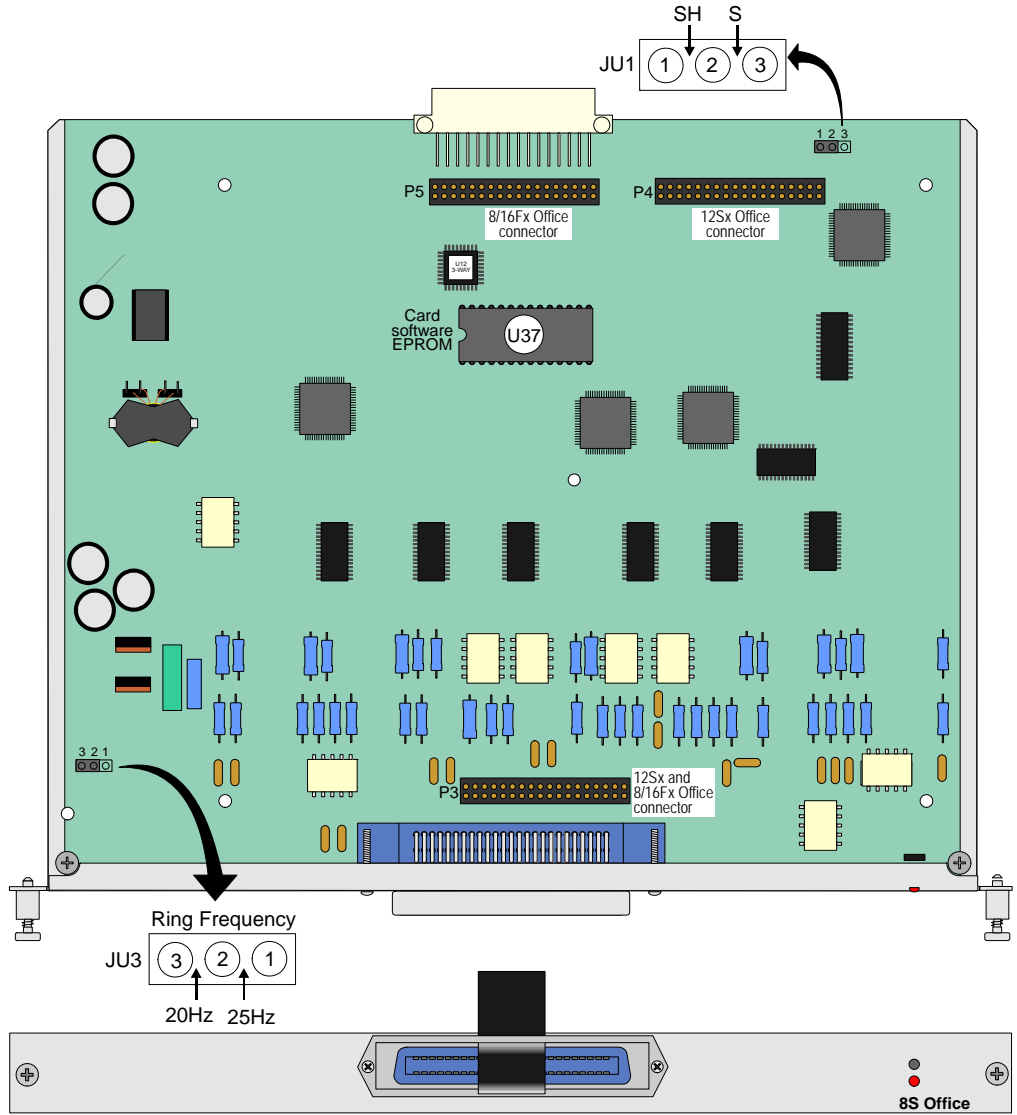
| Pins | SLT Station |
|------|-------------|
| 1/26 | S0          |
| 2/27 | S1          |
| 3/28 | S2          |
| 4/29 | S3          |

Figure 10-26 4SA Office Card



| Pins | SLT Station |
|------|-------------|
| 1/26 | S0          |
| 2/27 | S1          |
| 3/28 | S2          |
| 4/29 | S3          |

Figure 10-27 8S Office Card



| Pins | SLT Station |
|------|-------------|
| 1/26 | S0          |
| 2/27 | S1          |
| 3/28 | S2          |
| 4/29 | S3          |
| 5/30 | S4          |
| 6/31 | S5          |
| 7/32 | S6          |
| 8/33 | S7          |

Figure 10-28 8SA Office Card

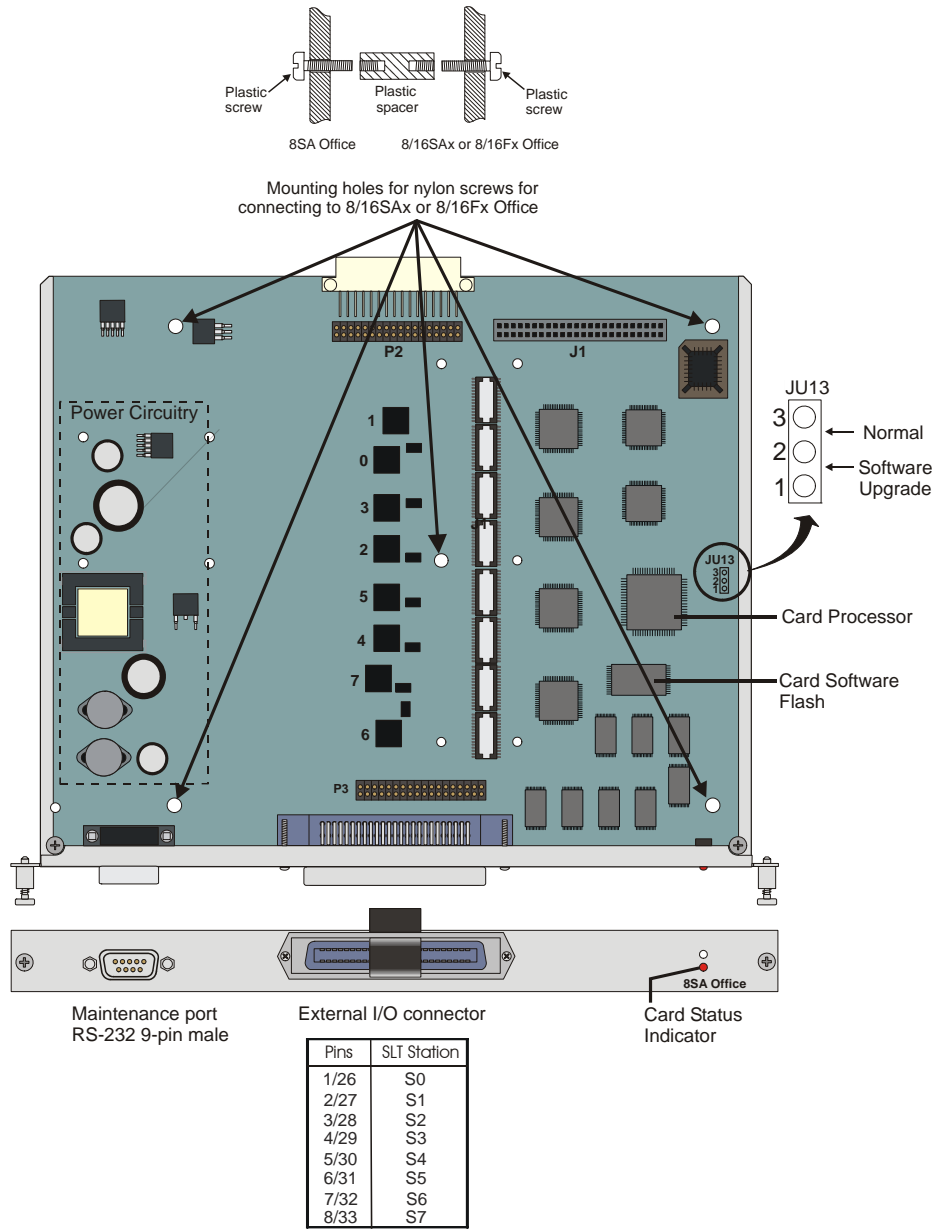
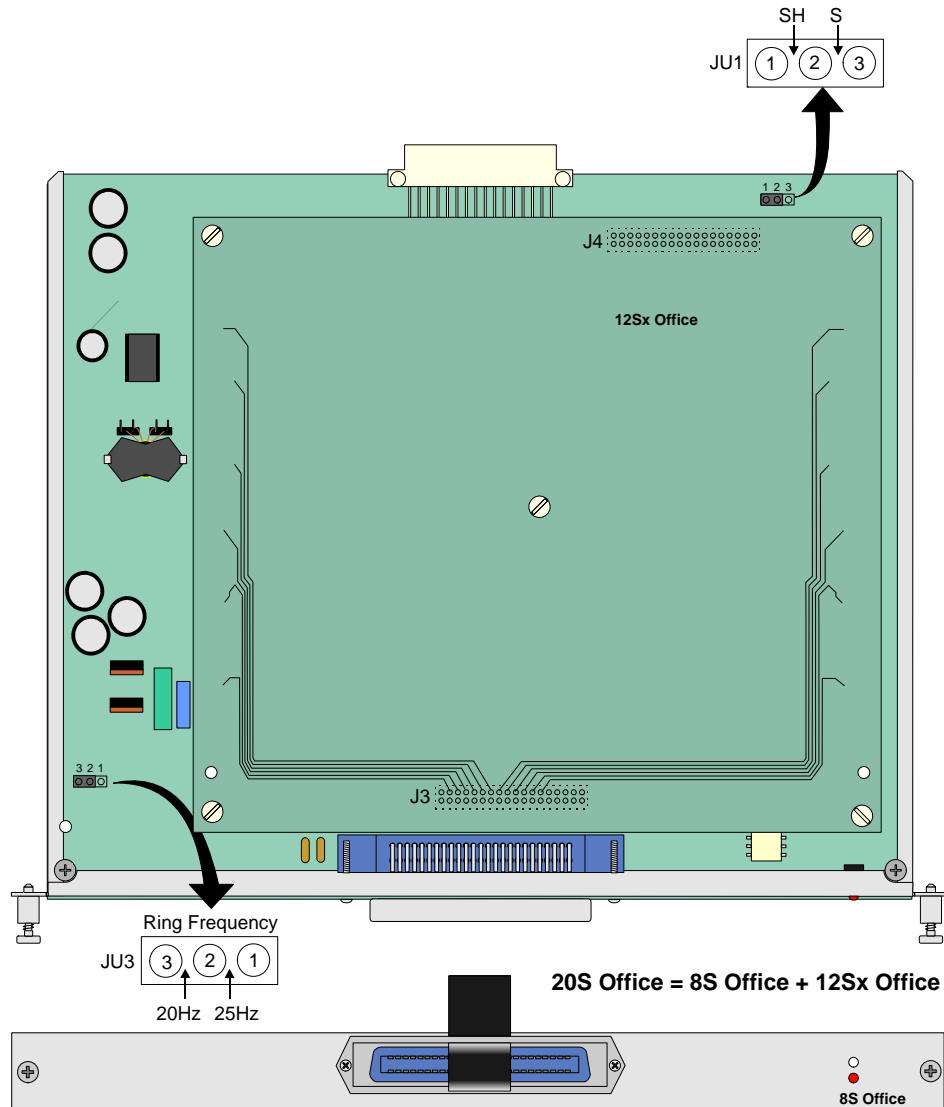
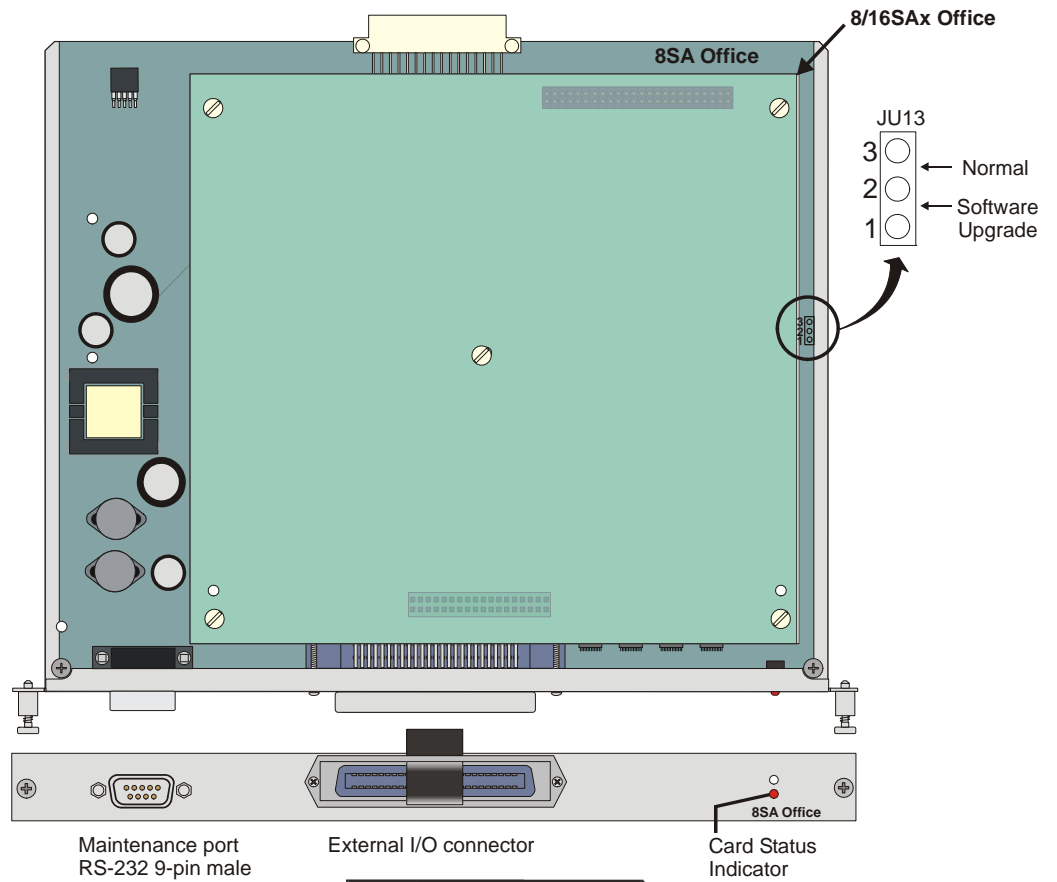


Figure 10-29 20S Office Card



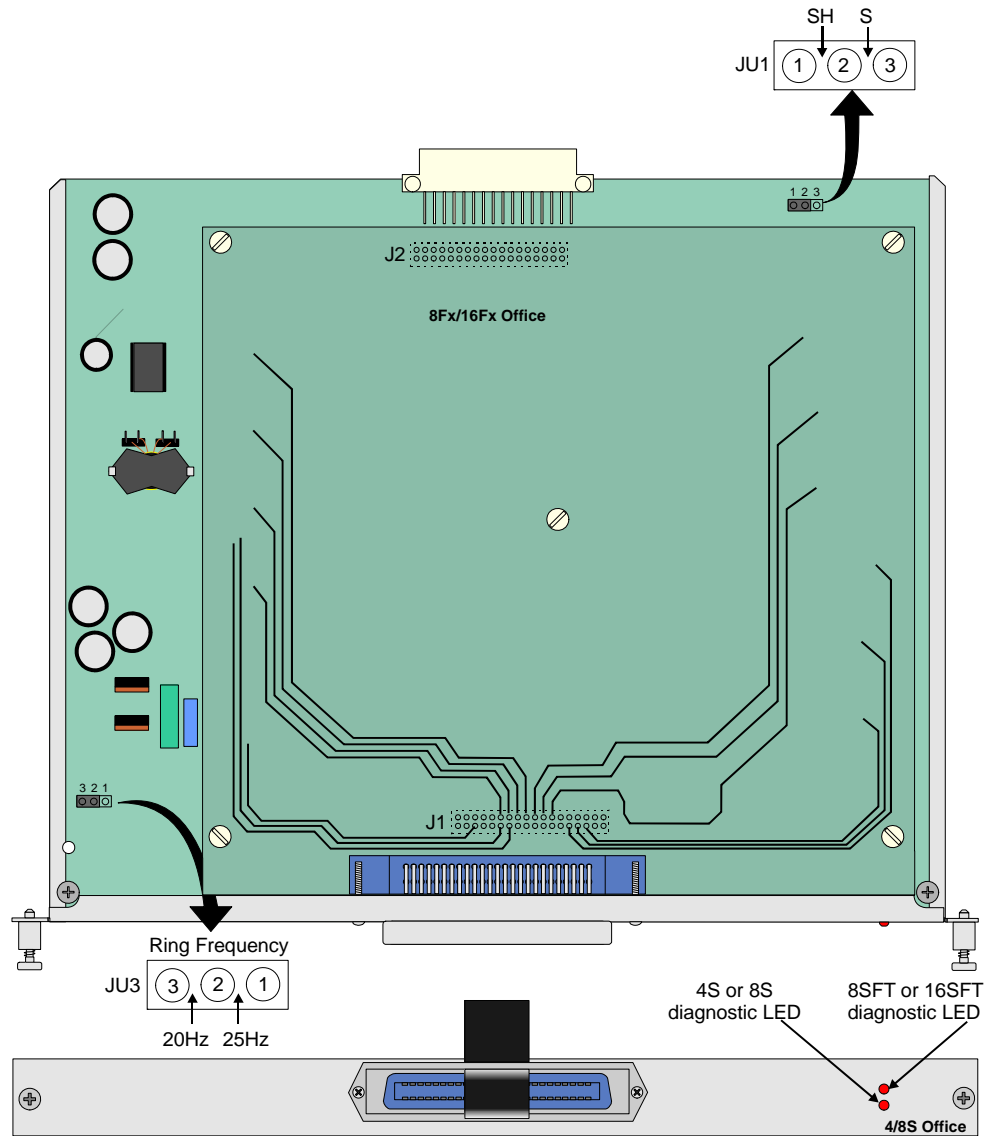
| Pins  | SLT Station |
|-------|-------------|
| 1/26  | S0          |
| 2/27  | S1          |
| 3/28  | S2          |
| 4/29  | S3          |
| 5/30  | S4          |
| 6/31  | S5          |
| 7/32  | S6          |
| 8/33  | S7          |
| 9/34  | S8          |
| 10/35 | S9          |
| 11/36 | S10         |
| 12/37 | S11         |
| 13/38 | S12         |
| 14/39 | S13         |
| 15/40 | S14         |
| 16/41 | S15         |
| 17/42 | S16         |
| 18/43 | S17         |
| 19/44 | S18         |
| 20/45 | S19         |

Figure 10-30 8SA+8SAx  
and 8SA+16SAx



| Pins  | 16SA<br>SLT Station | 24SA<br>SLT Station |
|-------|---------------------|---------------------|
| 1/26  | S0                  | S0                  |
| 2/27  | S1                  | S1                  |
| 3/28  | S2                  | S2                  |
| 4/29  | S3                  | S3                  |
| 5/30  | S4                  | S4                  |
| 6/31  | S5                  | S5                  |
| 7/32  | S6                  | S6                  |
| 8/33  | S7                  | S7                  |
| 9/34  | S8                  | S8                  |
| 10/35 | S9                  | S9                  |
| 11/36 | S10                 | S10                 |
| 12/37 | S11                 | S11                 |
| 13/38 | S12                 | S12                 |
| 14/39 | S13                 | S13                 |
| 15/40 | S14                 | S14                 |
| 16/41 | S15                 | S15                 |
| 17/42 |                     | S16                 |
| 18/43 |                     | S17                 |
| 19/44 |                     | S18                 |
| 20/45 |                     | S19                 |
| 21/46 |                     | S20                 |
| 22/47 |                     | S21                 |
| 23/48 |                     | S22                 |
| 24/49 |                     | S23                 |

Figure 10-31 4S+8F<sub>x</sub>,  
4S+16F<sub>x</sub>, 8S+8F<sub>x</sub> and  
8S+16F<sub>x</sub> Office Card



| 4S Office |             |
|-----------|-------------|
| Pins      | SLT Station |
| 1/26      | S0          |
| 2/27      | S1          |
| 3/28      | S2          |
| 4/29      | S3          |

| 8S Office |             |
|-----------|-------------|
| Pins      | SLT Station |
| 1/26      | S0          |
| 2/27      | S1          |
| 3/28      | S2          |
| 4/29      | S3          |
| 5/30      | S4          |
| 6/31      | S5          |
| 7/32      | S6          |
| 8/33      | S7          |

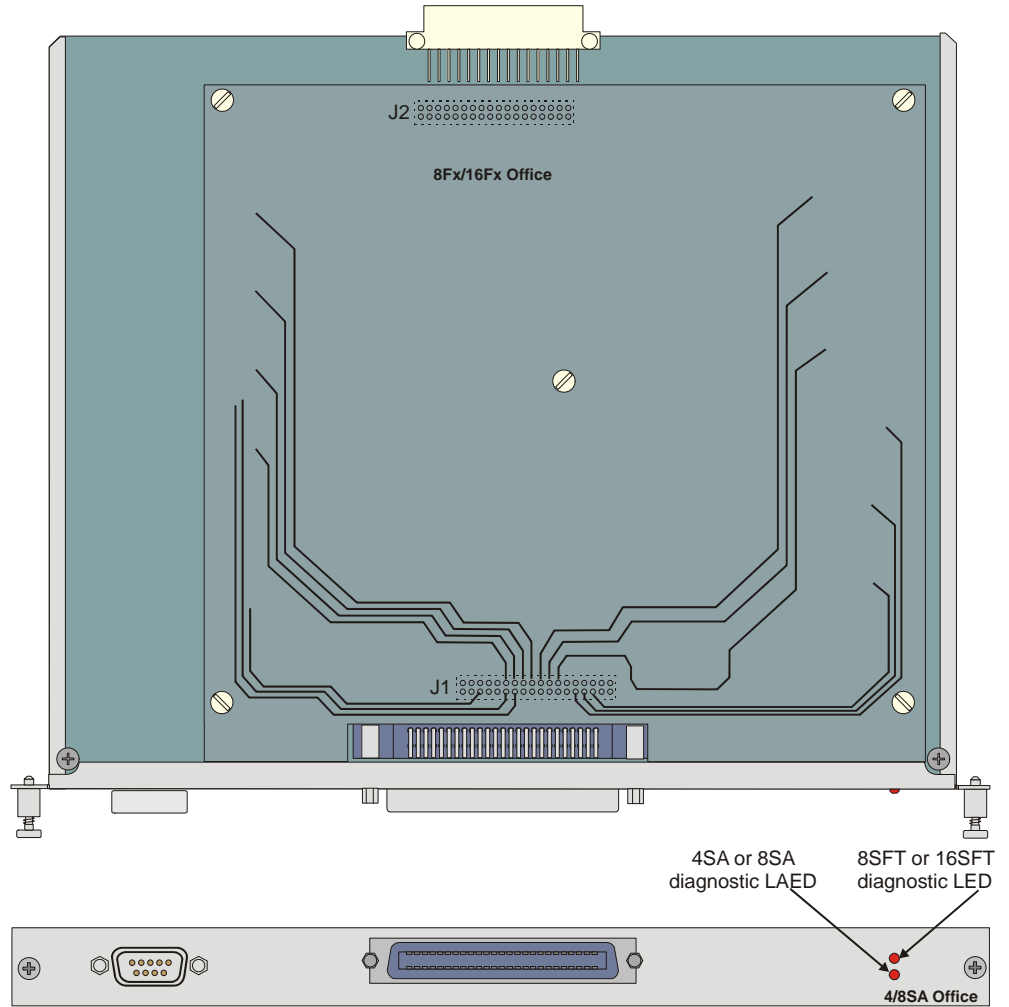
| 8F <sub>x</sub> Office |         |
|------------------------|---------|
| Pins                   | FlexSet |
| 9/34                   | A/B0    |
| 10/35                  | A/B1    |
| 11/36                  | A/B2    |
| 12/37                  | A/B3    |
| 13/38                  | A/B4    |
| 14/39                  | A/B5    |
| 15/40                  | A/B6    |
| 16/41                  | A/B7    |

| 16F <sub>x</sub> Office |         |
|-------------------------|---------|
| Pins                    | FlexSet |
| 9/34                    | A/B0    |
| 10/35                   | A/B1    |
| 11/36                   | A/B2    |
| 12/37                   | A/B3    |
| 13/38                   | A/B4    |
| 14/39                   | A/B5    |
| 15/40                   | A/B6    |
| 16/41                   | A/B7    |
| 17/42                   | A/B8    |
| 18/43                   | A/B9    |
| 19/44                   | A/B10   |
| 20/45                   | A/B11   |
| 21/46                   | A/B12   |
| 22/47                   | A/B13   |
| 23/48                   | A/B14   |
| 24/49                   | A/B15   |

**4S8F Office = 4S Office + 8F<sub>x</sub> Office**  
**4S16F Office = 4S Office + 16F<sub>x</sub> Office**  
**8S8F Office = 8S Office + 8F<sub>x</sub> Office**  
**8S16F Office = 8S Office + 16F<sub>x</sub> Office**



Figure 10-32 4SA+8Fx, 4SA+16Fx, 8SA+8Fx and 8SA+16Fx Office Card



| 4SA Office |             |
|------------|-------------|
| Pins       | SLT Station |
| 1/26       | S0          |
| 2/27       | S1          |
| 3/28       | S2          |
| 4/29       | S3          |

| 8SA Office |             |
|------------|-------------|
| Pins       | SLT Station |
| 1/26       | S0          |
| 2/27       | S1          |
| 3/28       | S2          |
| 4/29       | S3          |
| 5/30       | S4          |
| 6/31       | S5          |
| 7/32       | S6          |
| 8/33       | S7          |

| 8Fx Office |         |
|------------|---------|
| Pins       | FlexSet |
| 9/34       | A/B0    |
| 10/35      | A/B1    |
| 11/36      | A/B2    |
| 12/37      | A/B3    |
| 13/38      | A/B4    |
| 14/39      | A/B5    |
| 15/40      | A/B6    |
| 16/41      | A/B7    |

| 16Fx Office |         |
|-------------|---------|
| Pins        | FlexSet |
| 9/34        | A/B0    |
| 10/35       | A/B1    |
| 11/36       | A/B2    |
| 12/37       | A/B3    |
| 13/38       | A/B4    |
| 14/39       | A/B5    |
| 15/40       | A/B6    |
| 16/41       | A/B7    |
| 17/42       | A/B8    |
| 18/43       | A/B9    |
| 19/44       | A/B10   |
| 20/45       | A/B11   |
| 21/46       | A/B12   |
| 22/47       | A/B13   |
| 23/48       | A/B14   |
| 24/49       | A/B15   |

**4SA8F Office = 4SA Office + 8Fx Office**  
**4SA16F Office = 4SA Office + 16Fx Office**  
**8SA8F Office = 8SA Office + 8Fx Office**  
**8SA16F Office = 8SA Office + 16Fx Office**

Figure 10-33 8T Office Card

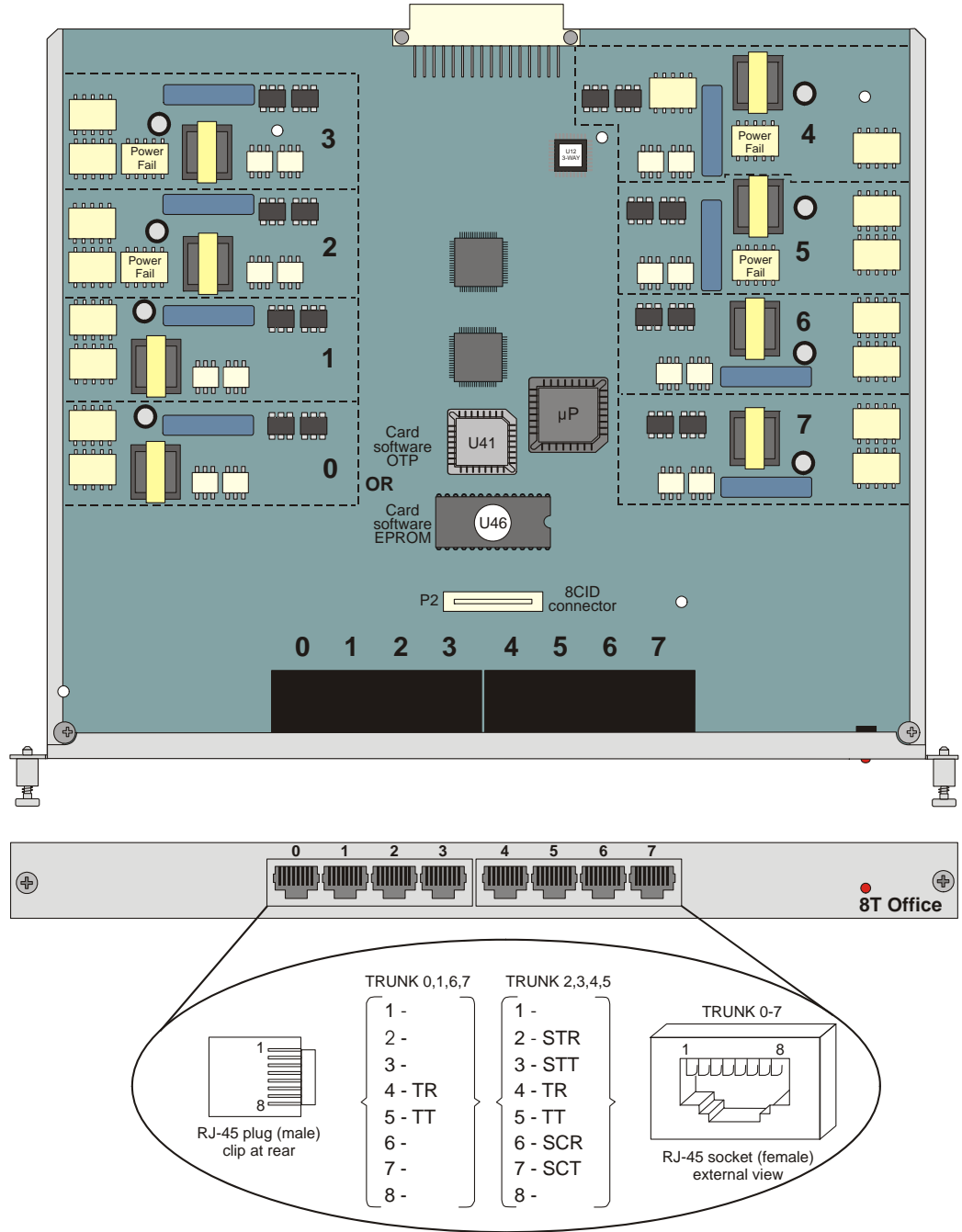


Figure 5-6 illustrates wiring interconnections between the trunk card, station card, and a single line station set.

Figure 10-34 8T-CID Office Card

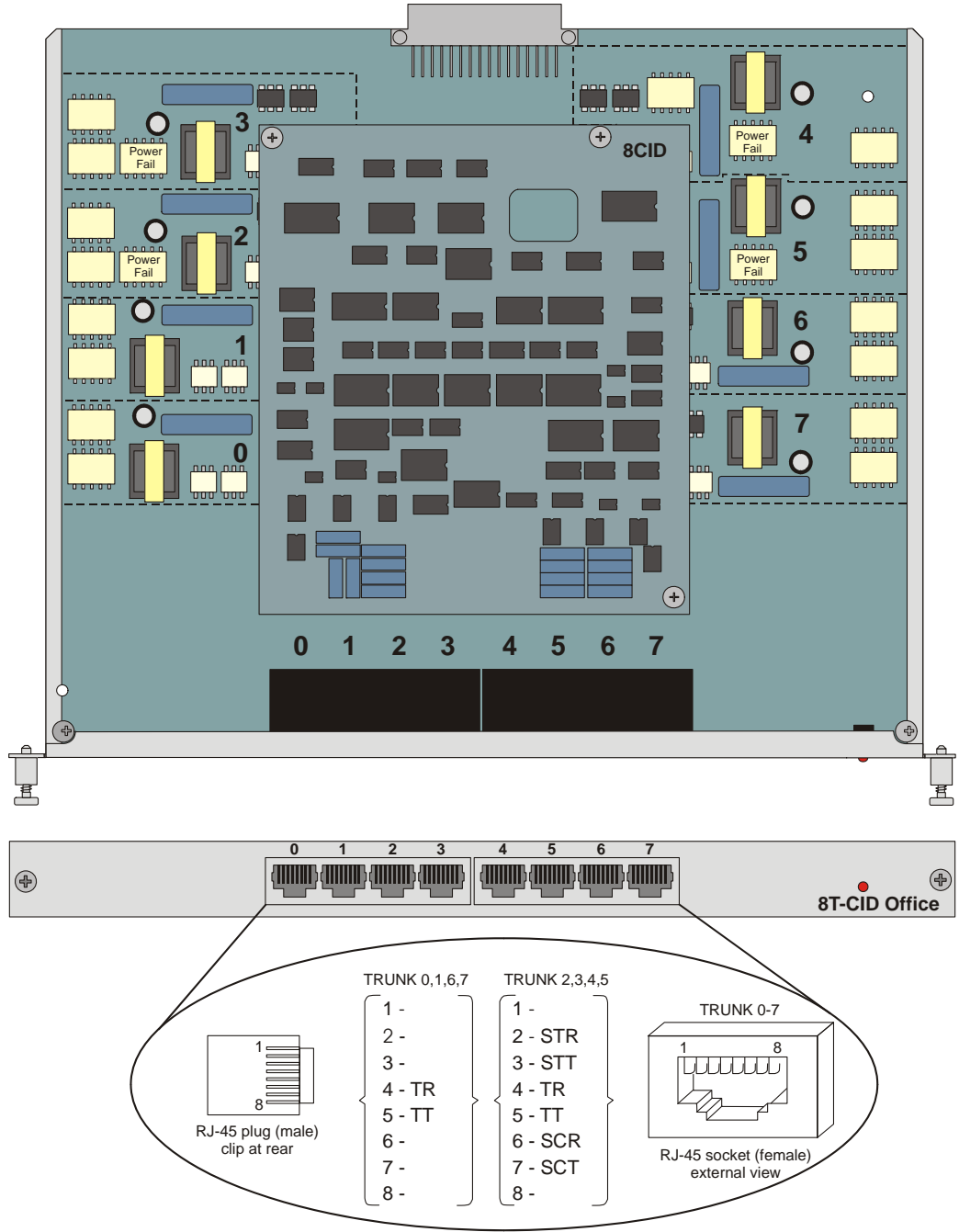


Figure 5-6 illustrates wiring interconnections between the trunk card, station card, and a single line station set.

Figure 10-35 IPC Office Card (SFC, uCMC, WiCMC)

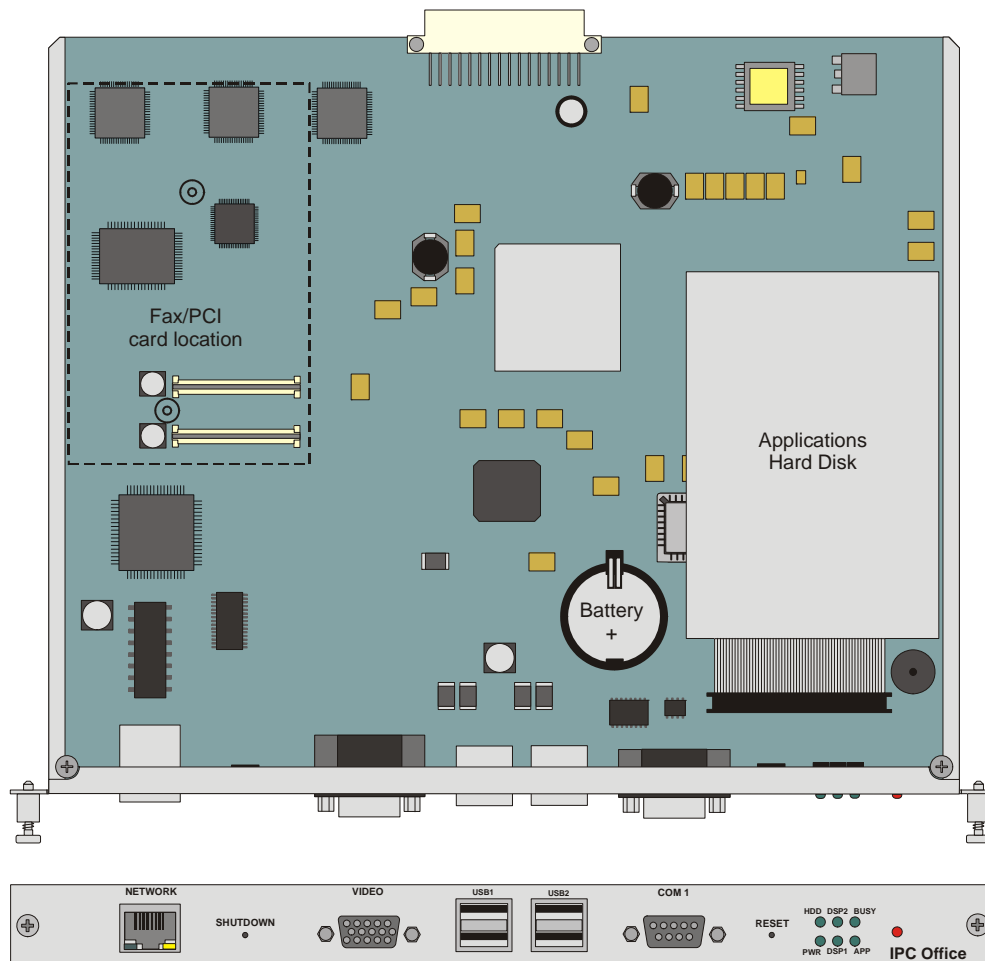
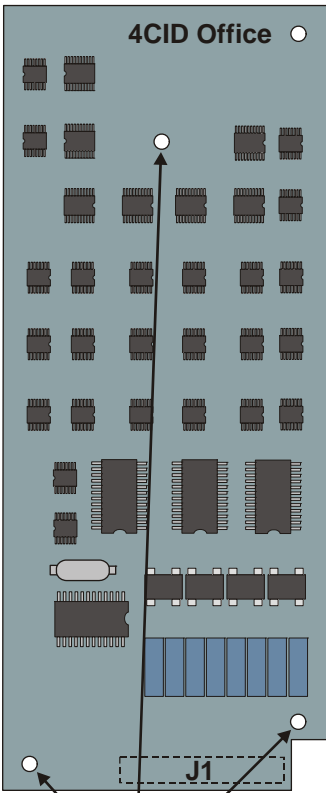


Figure 10-36 4CID Office Card



Mounting holes for metal screws and spacers for connecting to 4T Office

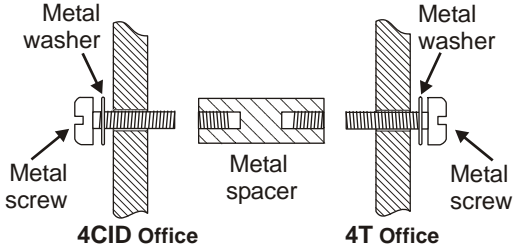
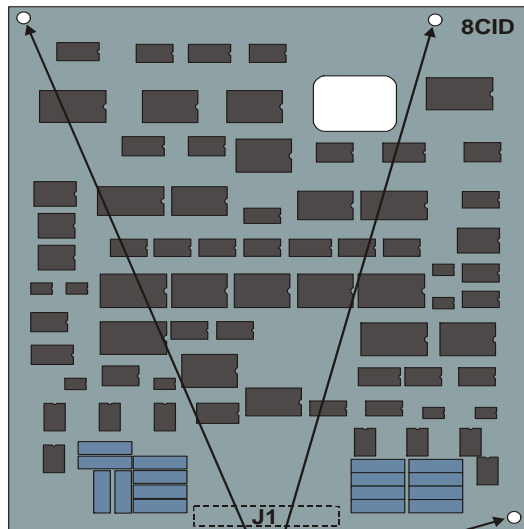


Figure 10-37 8CID Card



Mounting holes for metal screws and spacers for connecting to 8T Office

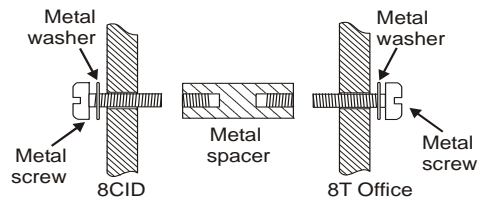
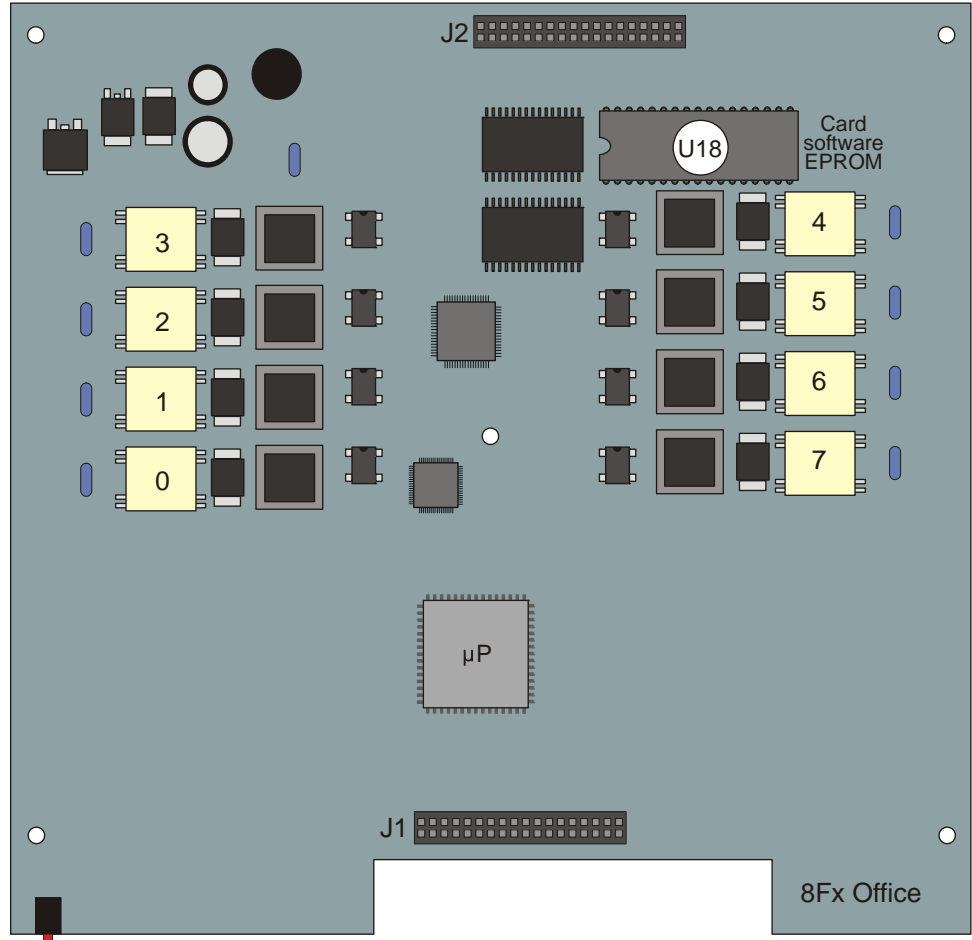


Figure 10-38 8Fx Office Card - Component side



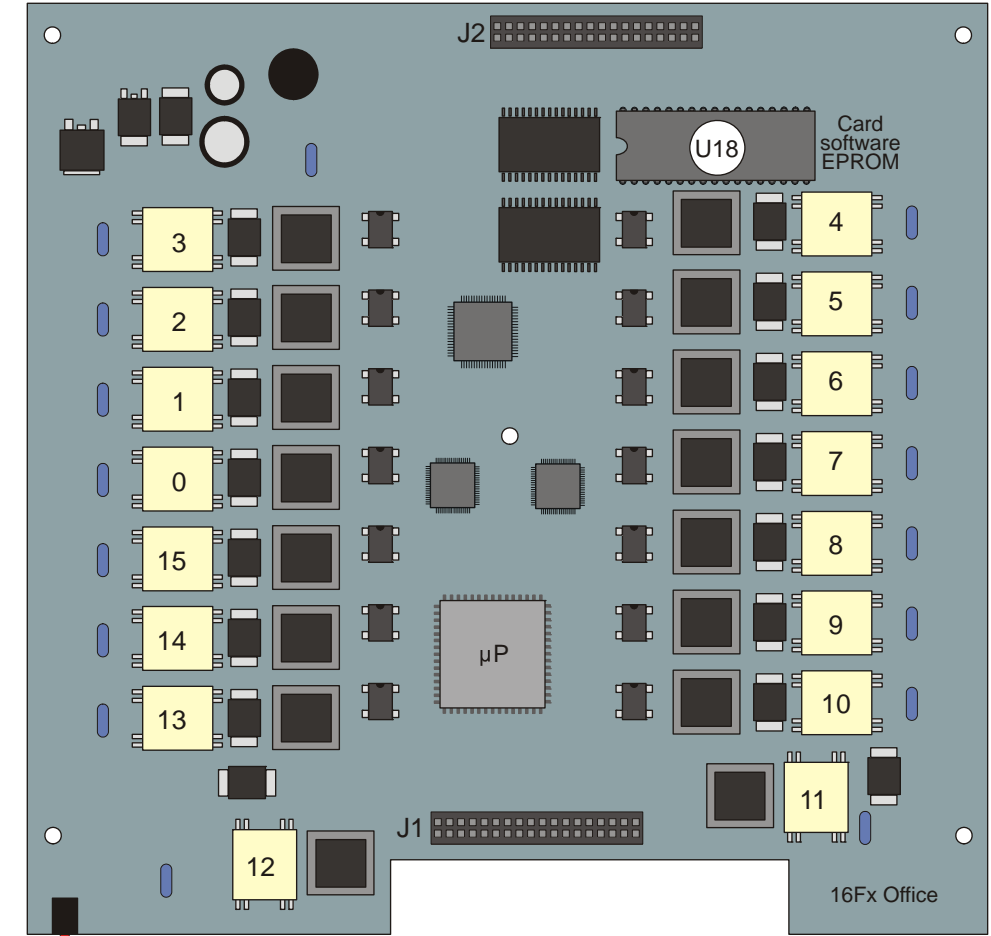
System Diagnostic LED



**Tip:**

For installation instructions refer to [Figure 10-41](#).

Figure 10-39 16Fx Office Card - Component side



System Diagnostic LED

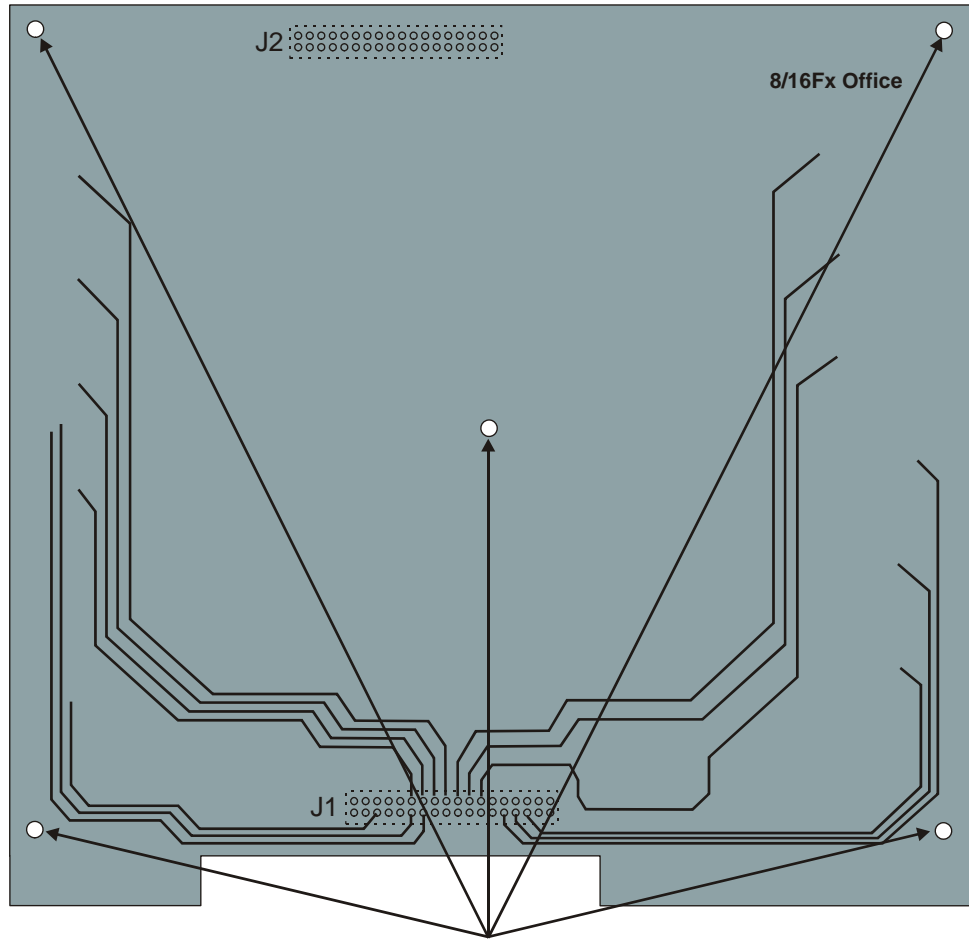


*Tip:*

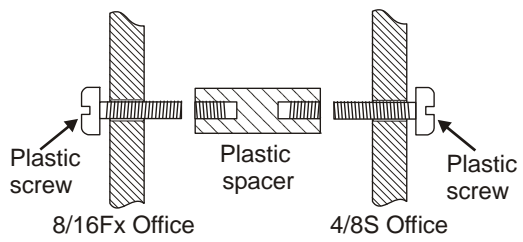
For installation instructions refer to [Figure 10-41](#).



Figure 10-40 8/16Fx Office Card



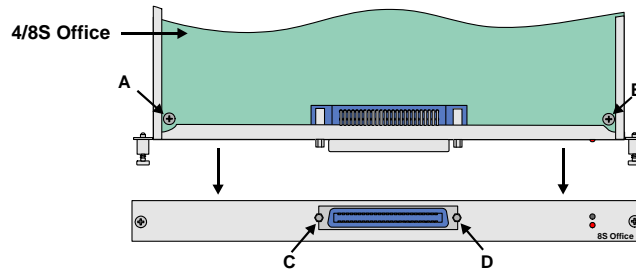
Mounting holes for plastic screws and spacers for connecting to 4/8S Office



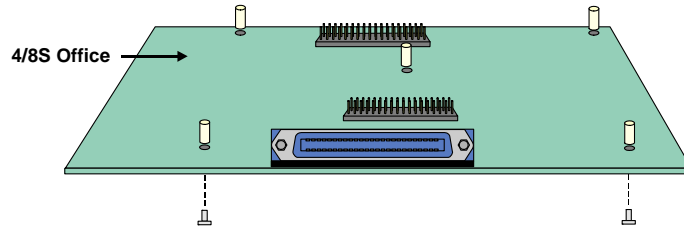
**Tip:**

For installation instructions refer to [Figure 10-41](#).

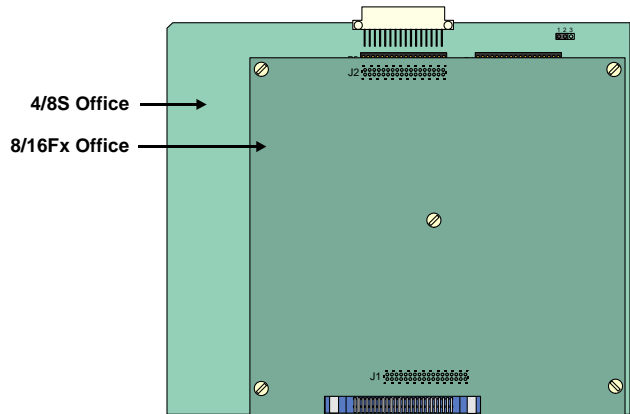
Figure 10-41 8/16Fx Office Card - Installation



**1** Unfasten screws A & B, and nuts C & D and remove front panel.



**2** Insert plastic screws from below. Fasten plastic spacers from above.

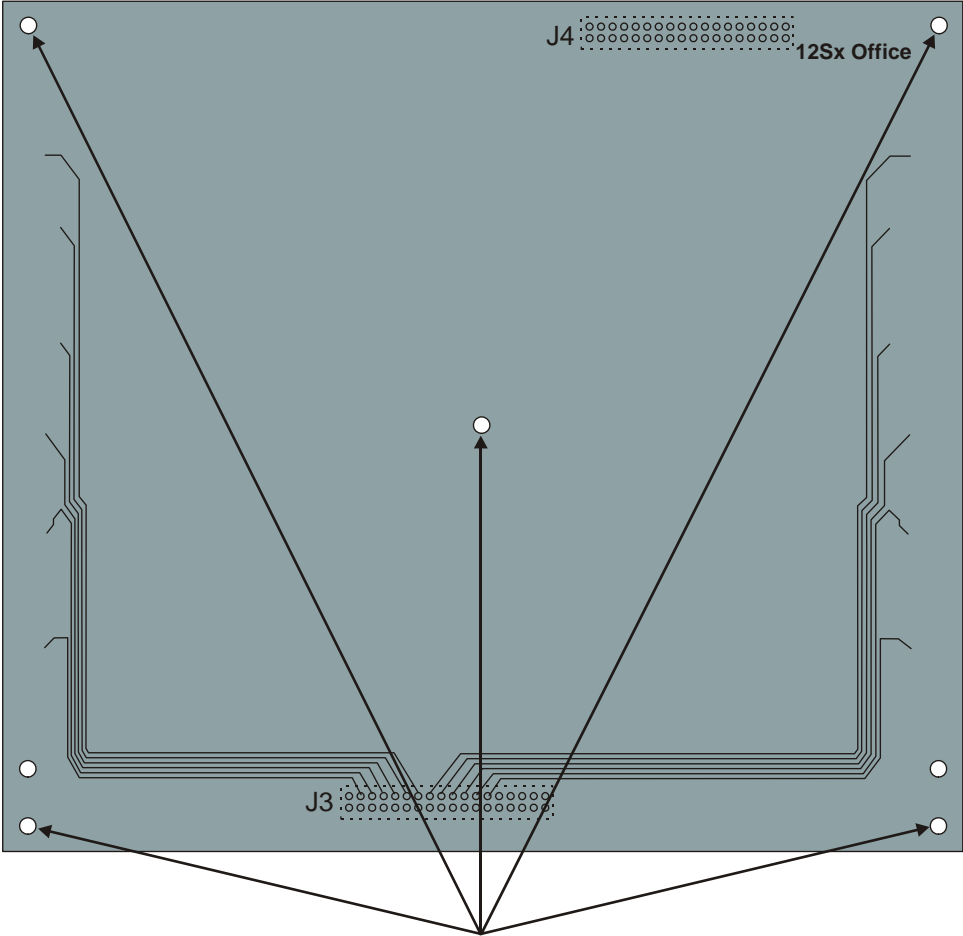


**3** Assemble baby card 8/16Fx Office onto 4/8S Office card and fasten 5 plastic screws.



**4** Reassemble front panel and fasten screws A & B and nuts C & D.

Figure 10-42 12Sx Office Card - Top Side



Mounting holes for plastic screws and spacers for connecting to 8S Office

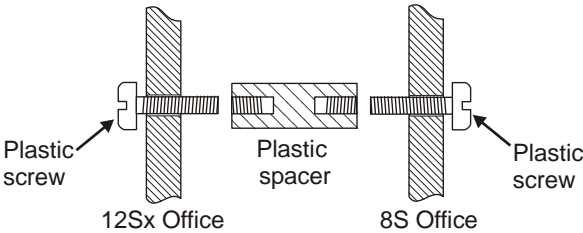
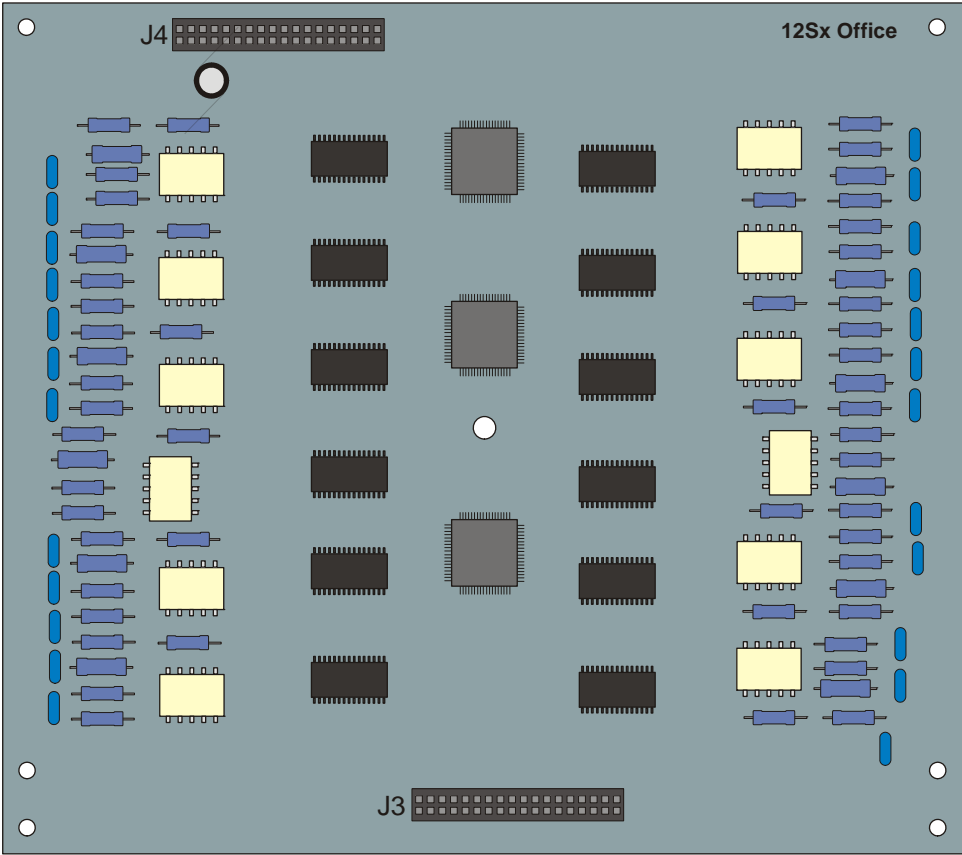


Figure 10-43 12Sx Office Card - Rear Side



## System Networking

Coral

|      |   |       |
|------|---|-------|
| 11.1 | <i>NTU Office Card Description</i> .....                  | 11-3  |
| 11.2 | <i>Installing and Replacing the NTU Office Card</i> ..... | 11-9  |
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# 11.1 NTU Office Card Description

## Introduction

---

This section describes the networking functions of the Coral IPx Office system. For a description on how to install the NTU Office card, see [Installing and Replacing the NTU Office Card](#), page 11-9.

Coral IPx Office offers a complete integration of traditional telephony and VoIP networking abilities. Connection to the WAN is facilitated without installing an additional UGW card or router. The Coral IPx Office includes UGW circuitry embedded on the MCB Office control card as well as the NTU Office (NeTwork Unit) card, which is installed within the system at specific customer request. The NTU card functions as a router, enabling direct connection to the WAN. A WiFi card can be installed upon the NTU Office card supplied at specific customer request. In addition, it also enables direct connection to a printer via a USB port.

## System Operation without an NTU Office Card

---

The Coral IPx Office system enables seamless connection to the digital and IP world with or without an NTU Office card. Without an NTU Office card, the Coral IPx Office can connect to the WAN only after an external, customer-supplied router has been connected. See [Figure 11-1](#).

---

### *Media Stream from the Digital World to the LAN and WAN*

PCM streams are directed from the Coral to the MRC, which converts the PCM streams into RTP packets. See [MRC Cards](#), page 9-1 for more information. The RTP packets are directed through the UGW internal switch. The switch directs the packets to LAN ports 1-8. The DHCP server provides the dynamic IP address to the devices, enabling connection to the endpoints on the LAN. An external, customer-supplied router directs the packets to their destination over the WAN.

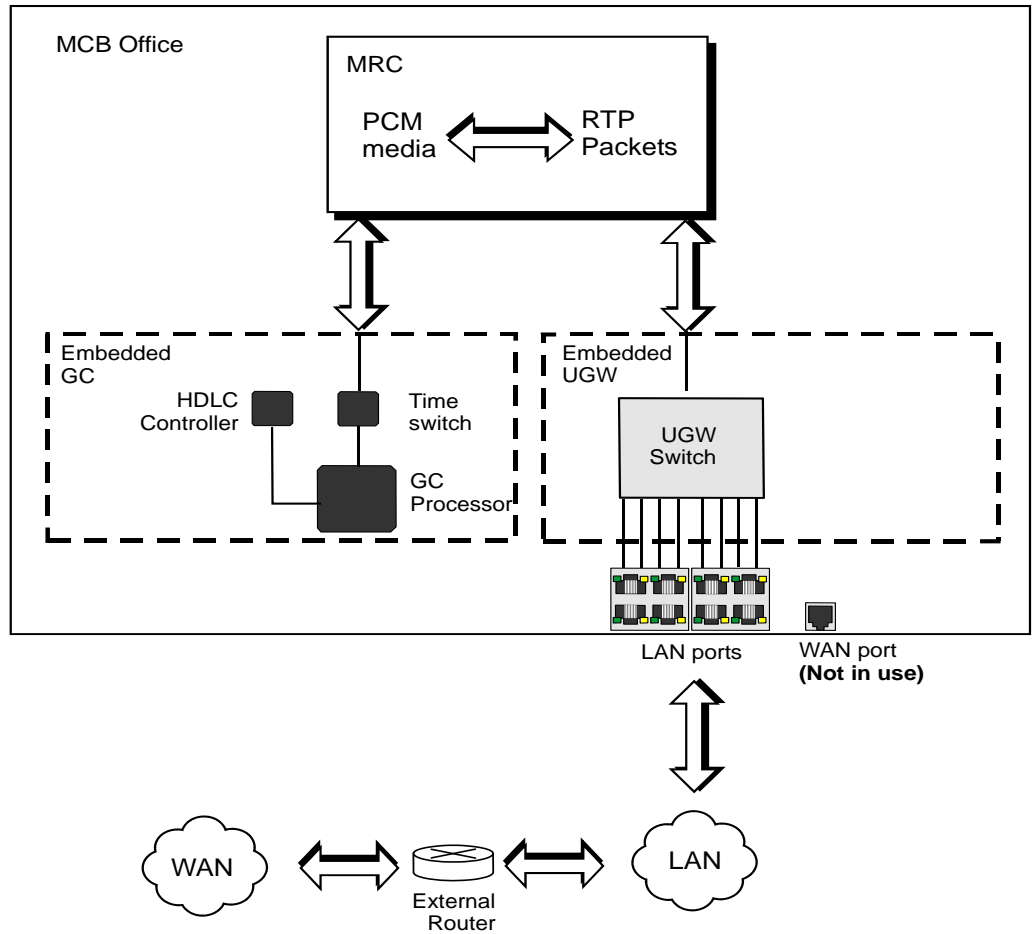
---

### *Media Stream from the LAN and WAN to the Digital World*

Packets are directed from the WAN through a customer-supplied router into one of the LAN ports. The packets are directed from the LAN into one of the LAN ports.

LAN and WAN packets are directed from ports 1-8 (and potentially from the WAN port as well) through the UGW internal switch. The packets are then directed into the MRC, which converts the RTP packets into PCM streams and directs them to the Coral.

**Figure 11-1 System Operation without an NTU Office Card**





## System Operation with an NTU Office Card

---

The Coral IPx Office system enables seamless integration between the digital and IP world with or without an NTU Office card. With an NTU Office card, the Coral IPx Office can connect to the WAN directly from the WAN port without any additional external router. See [Figure 11-2](#).

---

### *Media Stream from the Digital World to the LAN and WAN*

PCM streams are directed from the Coral to the MRC, which converts the PCM streams into RTP packets. See [MRC Cards, page 9-1](#), for more information.

RTP packets designated for the LAN are directed through the UGW internal switch. The UGW switch directs the media stream to LAN ports 1-8. Either the NTU Office card or the DHCP server provides the dynamic IP addresses to the devices, enabling connection to the endpoints on the LAN.

RTP packets designated for the WAN are directed to the NTU Office card, which then directs them through the external WAN port on the front panel to their destination on the WAN.

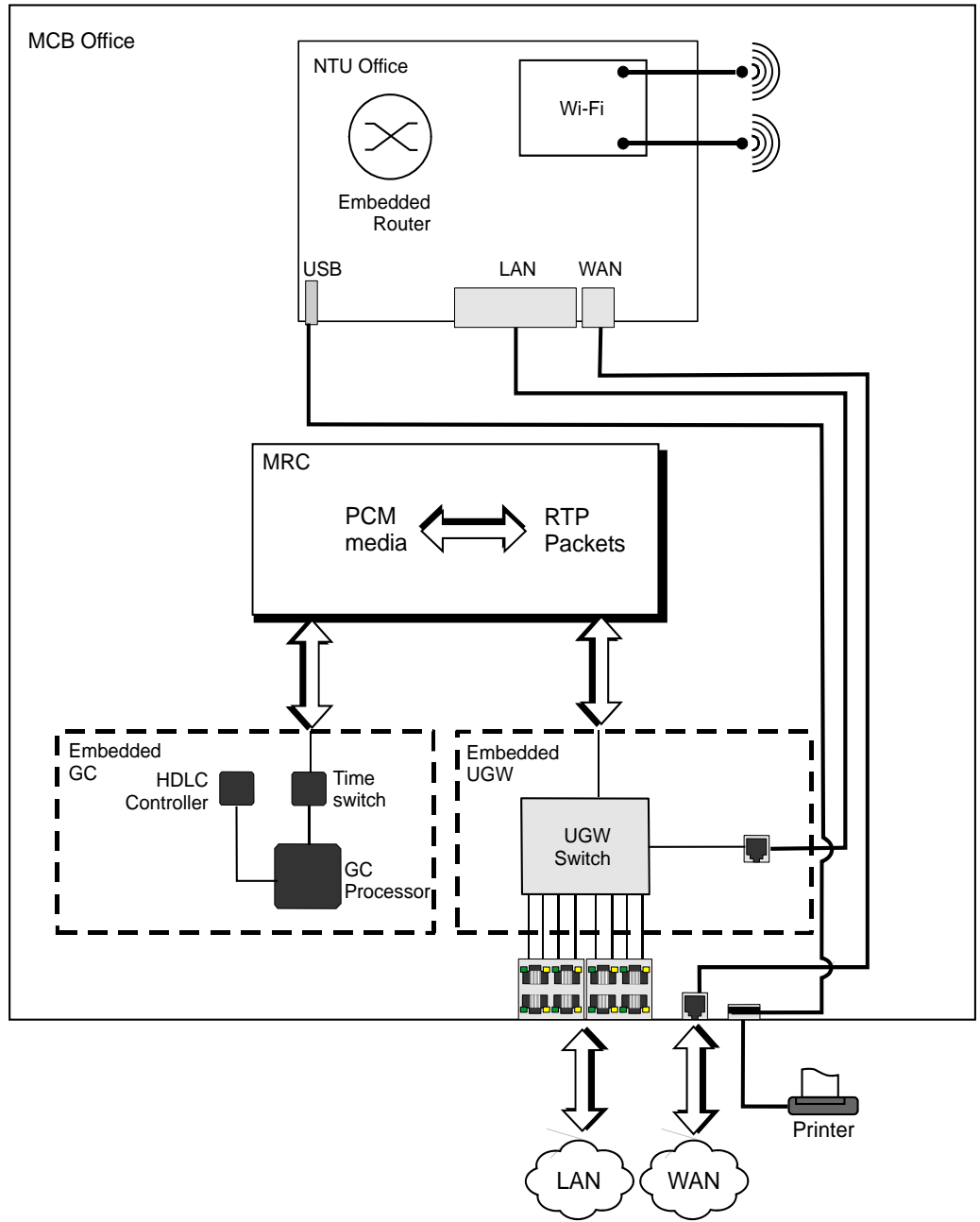
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### *Media Stream from the LAN and WAN to the Digital World*

WAN Packets are directed from the WAN port directly to the NTU Office card. The NTU Office card redirects the RTP packets to the MRC card, where they are translated into PCM streams. Finally, the PCM streams are directed to the digital network.

LAN packets are directed from LAN ports 1-8 through the internal UGW switch, which is embedded on the MCB Office card. The packets are then directed into the MRC, which converts the RTP packets into PCM streams. Finally, the PCM streams are directed to the digital network.

Figure 11-2 System Operation with an NTU Office Card

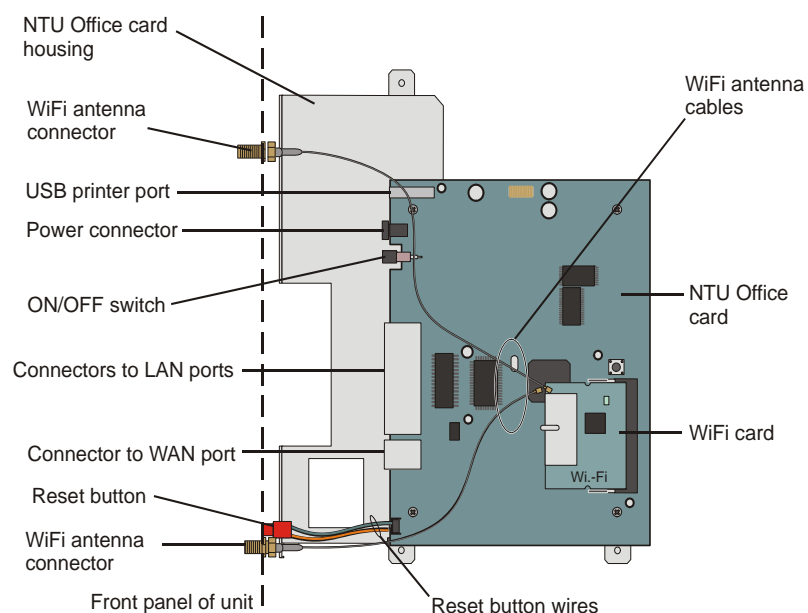


## NTU Office Card Components

The NTU Office card is mounted onto the MCB Office card and includes the following components (see [Figure 11-3](#)):

- **NTU Office card housing.** This is the metallic frame that supports the NTU Office card. The NTU Office card is permanently assembled onto the housing and is not removed in the field.
- **NTU Office card.** This card functions as the system router and includes all of the components as detailed below.
- **WiFi Card.** The WiFi card is provided at specific customer request and is mounted onto the NTU Office card.
- **WiFi Antenna Connectors.** The WiFi antenna wires are routed directly from the WiFi card to the WiFi antenna connectors that protrude from the front panel of the system. The antennas are attached onto these connectors.
- **Power Connector.** Includes the connector of the power harness connector.
- **ON/OFF Switch.** This switch activates the NTU Office card.
- **Connectors to LAN Port.** Includes four connectors, one of which is connected to the MCB Office card, enabling direct connection to the front panel LAN ports.
- **Connector to WAN Port.** Includes one port that is connected to the MCB Office card, enabling direct connection to the front panel WAN port.
- **Reset Button.** Used to reset the NTU Office card from the front panel.

Figure 11-3 **NTU Office Card**



**NOTES:**

# 11.2 Installing and Replacing the NTU Office Card

## ● Introduction

The NTU Office card installation process includes hardware and software installation. The hardware installation process is described in this manual. The software installation process is described by the Vigor 2900 software vendor at <http://www.draytek.com>.



### NOTE:

*As an OEM product, NTU Office card documentation is outside the scope of this manual. The Draytek website contains information and instructions regarding the latest version of this card.*

Table 11-1 displays the items that are supplied with the NTU Office card.

The NTU Office card assembly kit includes additional parts. However, you only need to use the parts listed in Table 11-1.

**Table 11-1 Assembly Parts Used in NTU Office card Assembly Kit**

| Part          | Quantity |
|---------------|----------|
| USB cable     | 1        |
| LAN cable     | 1        |
| WAN cable     | 1        |
| Power harness | 1        |

## ● Installing the NTU Office Card

---

This section describes how to install the NTU Office card assembly (including the card housing). See [Figure 11-5](#).

- 1 If necessary, unplug the power cord that supplies the Coral IPx Office system.

### **WARNING!**

*Electrical Hazard. Contact with live wires could cause shock, burn, and death. Remove power from the Coral IPx Office cover before opening the cover.*

- 2 If necessary, remove the unit cover. See [Opening the Unit Cover, page 6-9](#).
- 3 Verify that the MRC card (if supplied) is installed.
- 4 Unfasten the three M3 screws and remove the washers that are already on the MCB Office card. Safeguard them for re-assembly. See [Figure 11-4](#).
- 5 Mount the NTU Office card onto the MCB Office.
- 6 Fasten the NTU Office card to the MCB Office with the three screws and washers removed in [Step 4](#).
- 7 Connect all cables connected to the NTU Office card, including the LAN and WAN cables, the USB cable, the reset button harness, and the power harness.
- 8 Turn ON the NTU Office card ON/OFF switch.

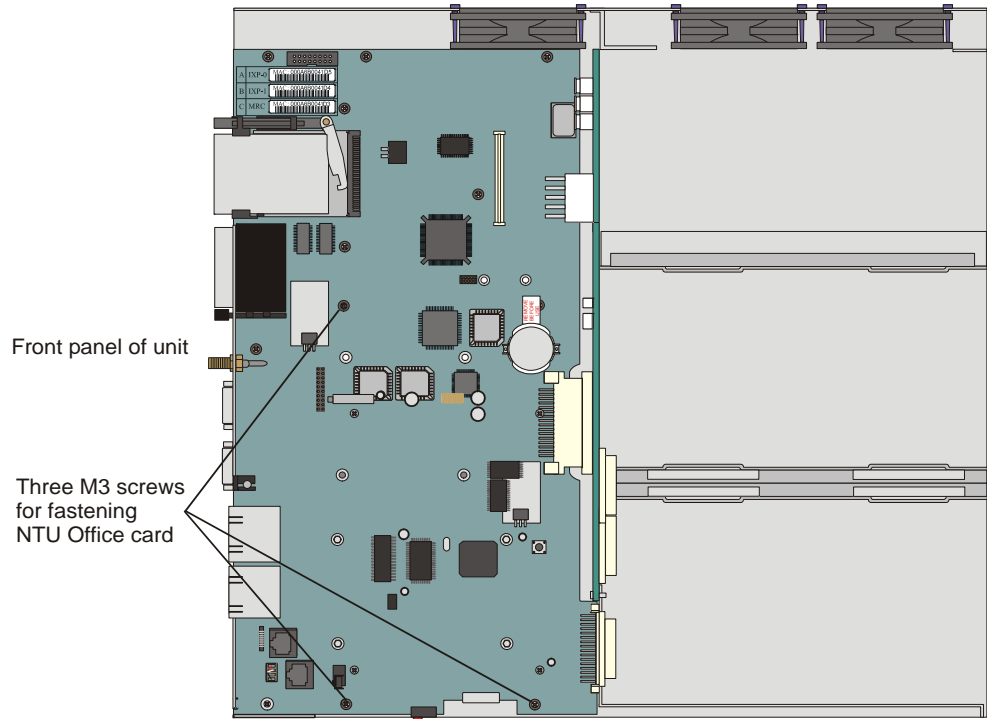


### **NOTE:**

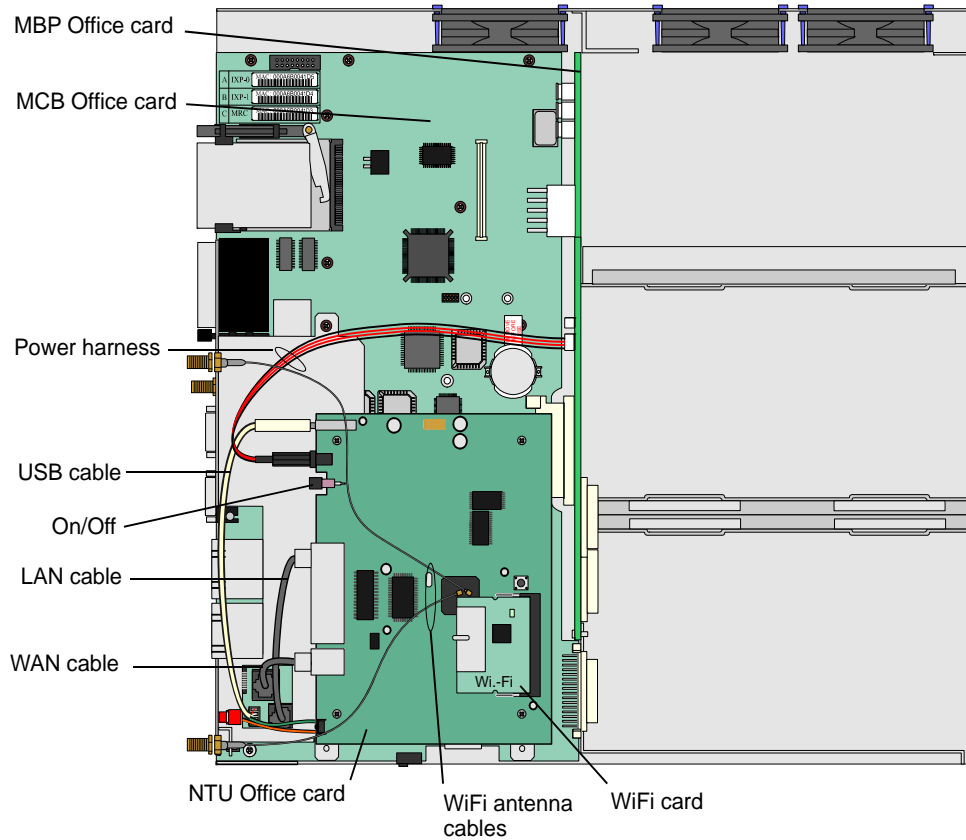
*For a description of external LAN/WAN printer connections, see [LAN, WAN, and Printer Connections, page 5-43](#).*

---

**Figure 11-4 NTU Office Card Fasteners**



**Figure 11-5 NTU Office Card Assembly**



## Replacing the NTU Office Card

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This section describes how to replace the NTU Office card (without replacing the card housing).

- 1 Unplug the power cord that supplies the Coral IPx Office system.

### **WARNING!**

*Electrical Hazard. Contact with live wires could cause shock, burn, and death. Remove power from the Coral IPx Office cover before opening the cover.*

- 2 Remove the unit cover. See [Opening the Unit Cover, page 6-9](#).
- 3 Disconnect all cables connected to the NTU Office card, including the two line harnesses, the USB harness, the power harness, the reset switch harness, and the WiFi cables, if installed.
- 4 Unfasten the three M3 screws and washers and safeguard them for future reassembly.
- 5 Replace the NTU Office card.
- 6 Fasten the three M3 screws and washers.
- 7 Reconnect all cables to the NTU Office card, including the two RJ-45 cables, the USB cable, the power harness, and the reset button harness,
- 8 If a WiFi card is installed, skip to [Assembling the WiFi Card, page 11-13](#).
- 9 Close the unit cover. See [Closing the Unit Cover, page 6-10](#).
- 10 Reconnect the power cable.



## 11.3 Assembling and Removing the WiFi Card

This section describes how to assemble the WiFi card onto the NTU Office card. This section describes the assembly and removal of the same WiFi and NTU Office card combination.



### NOTE:

*More than one WiFi card type is provided by the manufacturer. Before assembling a new WiFi card, verify with the manufacturer's representative that it is compatible with your NTU Office card.*

### Assembling the WiFi Card

#### *Installing the WiFi Card Cables*

- 1 Remove the two protective plugs that cover the holes for the antennas on the front panel of the system.
- 2 Unplug the power cord that supplies the Coral IPx Office system.

### WARNING!

*Electrical Hazard. Contact with live wires could cause shock, burn, and death. Turn OFF the ON/OFF switch and disconnect the power cord before opening the cover.*

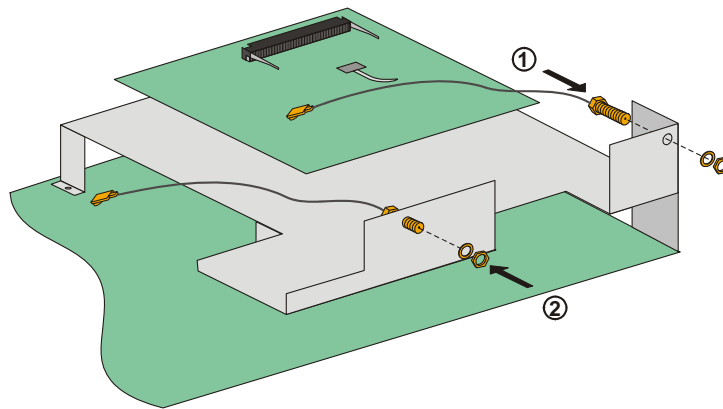
- 3 Remove the unit cover. See [Opening the Unit Cover, page 6-9](#).
- 4 Insert the antenna cables through the front panel of the Coral IPx Office unit.
- 5 Fasten the WiFi cable threaded connectors to the NTU card housing.
- 6 Connect the other side of the WiFi cables to the WiFi card as follows (see [Figure 11-6](#)):
  - a Align the WiFi cable connector with its mating connector on the WiFi card.

## CAUTION!

The WiFi cable connectors are very delicate and can be easily damaged if excessive force is applied. Handle with care.

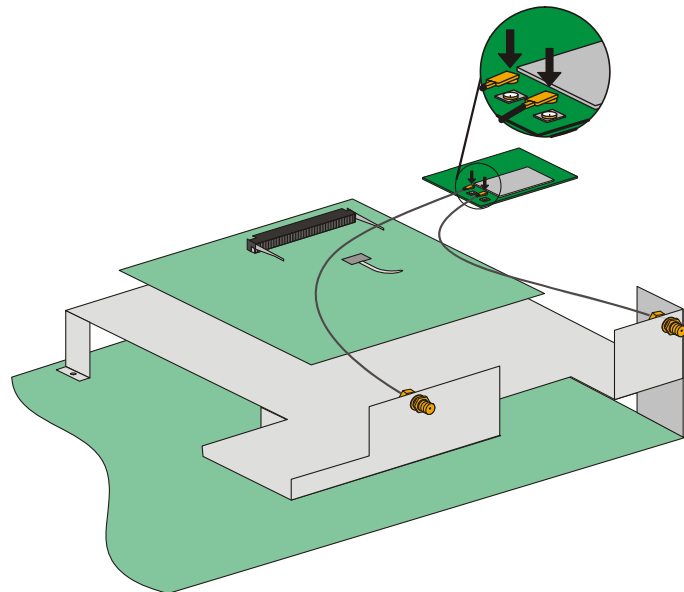
- b Carefully, press down on the WiFi connector until it is firmly attached to the WiFi card.
- c Repeat [Step a](#) and [Step b](#) for the second WiFi cable.

Figure 11-6 WiFi Antenna Cable Installation



**1** Insert threaded connector into holes in card frame

**2** Fasten washers and nuts

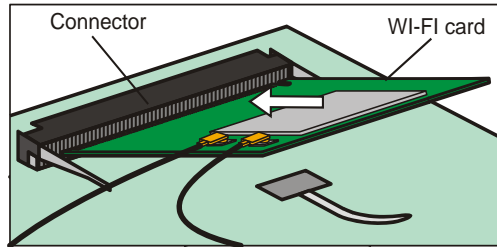


**3** Press clamp connectors gently into place

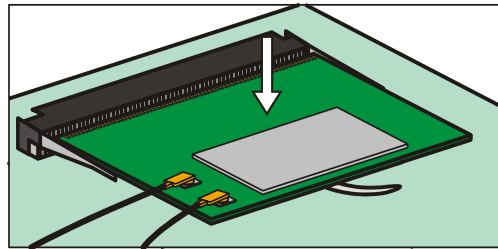
## WiFi Card Assembly

- 1 Open the WiFi card flap and align the WiFi card connector with its corresponding connector on the NTU Office card such that there is an angle between the two cards.
- 2 Push the top section of the card downwards until the card snaps into place.
- 3 Close the WiFi card flap.

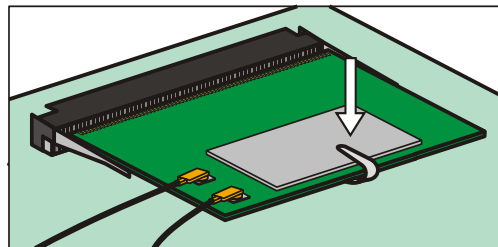
Figure 11-7 **WiFi Card Assembly**



**1** Insert WiFi card at an angle



**2** Press card down until it snaps into place



**3** Close WiFi card flap

## ● Removing the WiFi Card

---

- 1 Remove the WiFi antennas.
- 2 Unplug the power cord that supplies the Coral IPx Office system.

### **WARNING!**

*Electrical Hazard. Contact with live wires could cause shock, burn, and death. Turn OFF the ON/OFF switch and disconnect the power cord before opening the cover.*

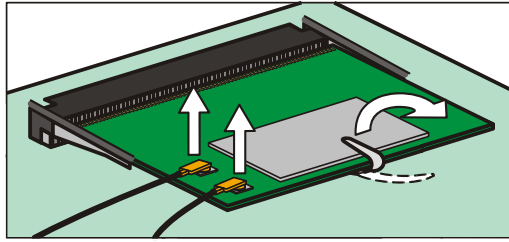
- 3 Remove the unit cover. See [Opening the Unit Cover, page 6-9](#).

### **CAUTION!**

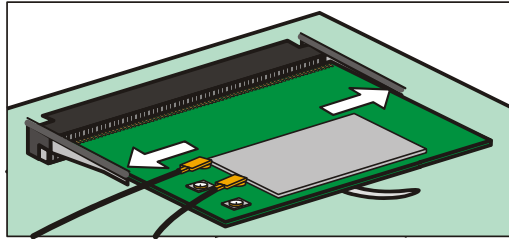
*The WiFi cable connectors are very delicate and can be easily damaged if excessive force is applied. Handle with care.*

- 4 Carefully disconnect the WiFi cables from the WiFi card.
- 5 Open the WiFi card flap.
- 6 Push the two WiFi card release levers outward; the WiFi card is ejected upwards. See [Figure 11-8](#).
- 7 Remove the WiFi card.

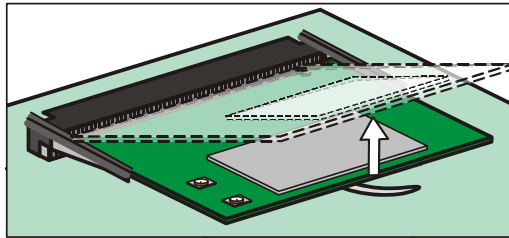
Figure 11-8 **WiFi Card Removal**



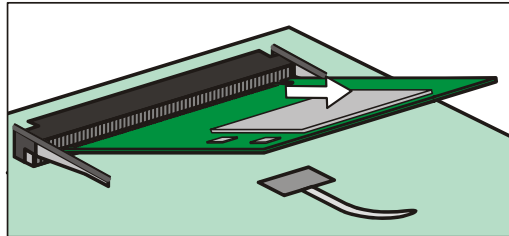
**1** Open flap and disconnect cables from WiFi card



**2** Grip sides of card holder and gently pull outwards



Card springs upwards

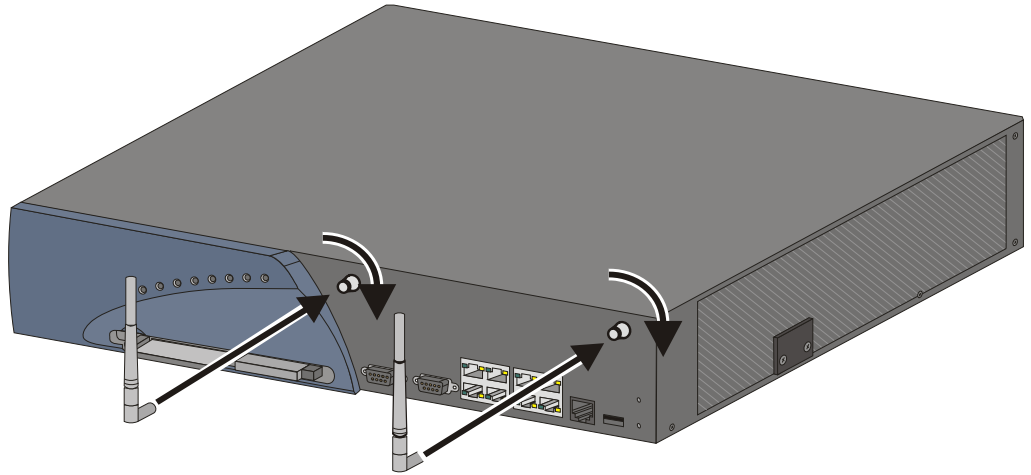


**3** Pull to remove card

## Assembling the WiFi Antennas

- 1 Close the Coral IPx Office unit cover. [Closing the Unit Cover](#), page 6-10.
- 2 Assemble the WiFi antennas as shown in [Figure 11-9](#).

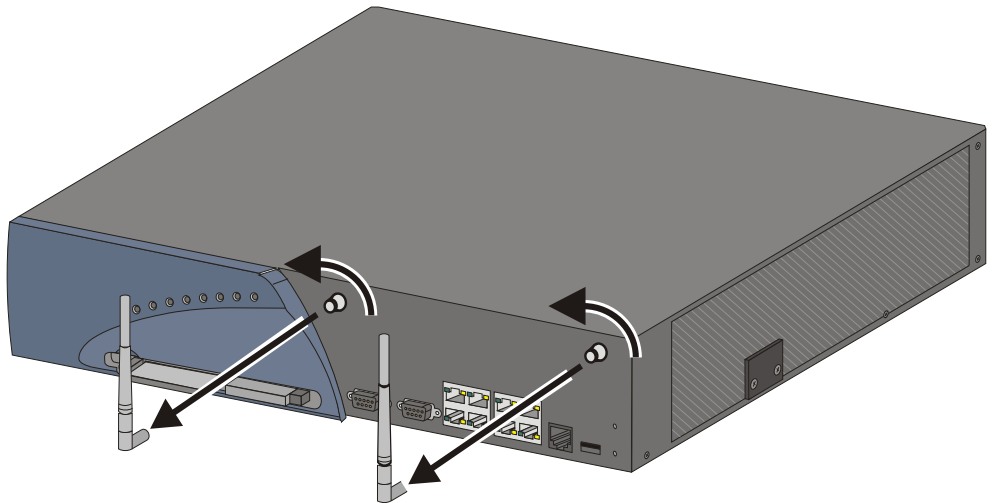
Figure 11-9 **WiFi Antenna Assembly**



## Removing the WiFi Antennas

Remove the antennas as shown in [Figure 11-10](#).

Figure 11-10 **WiFi Antenna Removal**



## ● Configuring the Networking Software

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Configure the networking software as described in the documentation provided by the NTU Office card software vendor at <http://www.draytek.com>. The NTU Office card is named Vigor 2900 by the vendor.



### **NOTE:**

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*As an OEM product, NTU Office card documentation is outside the scope of this manual. The Draytek website contains information and instructions regarding the latest version of this card.*

---

**NOTES:**



# 11.4 Specifications

## ● NTU Office Card

---

### Hardware Interface

|                    |   |
|--------------------|---|
| LAN.....           | port 10/100 Base-TX Switch                        |
| WAN.....           | 1-port 10/100 Base-TX port with a RJ-45 connector |
| Printer.....       | 1-port USB for connecting to USB printer          |
| WAN Protocol ..... | PPPoE / DHCP / PPTP / Static IP/C2TP              |

### NAT

- Multi-NAT
- DMZ
- Port Redirection
- Open Ports Pass-thru (VPN, VoIP, NetMeeting, MSN Messenger, ICQ, Quake...etc.)

### Firewall

- IM blocking
- Multi-NAT, DMZ host, port-redirect / open port
- Stateful Packet Inspection
- DoS / DDoS protection
- User-configurable packet filtering

### VPN

|                          |   |
|--------------------------|---|
| Up to 32 Tunnels         |   |
| Protocol .....           | PPTP / L2TP / IPSec / L2TP over IPSec   |
| Encryption .....         | AES (128 bits)<br>MPPE (40,128 bits)<br>Hardware-based DES/3DES (56/168 bits) |
| Authentication .....     | MD5, SHA-1  |
| IKE Authentication ..... | Pre-shared Key  |
| Connection .....         | Teleworker-to-LAN<br>LAN-to-LAN<br>DHCP over IPSec<br>IPSec Pass-through      |

## Network Features

- DHCP server / relay / client
- DNS cache and proxy
- Dynamic DNS SNTP client
- Call scheduling
- RADIUS client
- UPnP
- Routing protocol..... Static routing / RIP V2

## QoS

- Class-based bandwidth guarantee by user-defined traffic categories
- Rule-based classification (IP / Port / DiffServ Code Point)
- 4-level priority for each direction (Inbound / Outbound)
- Bandwidth borrowed
- Automatic WAN speed detection

## URL Filtering

- URL Blocking with Exception Handling
- Java/ActiveX/Cookies/Zip/EXE Blocking
- Executable/Compressed/multimedia file Blocking
- URL Blocking by User-defined keywords
- Time Schedule support

## Management

### Web-base user Interface (HTTP / HTTPS)

- Command Line Interface (Telnet)
- Administration access control list
- Configuration backup / restore
- Built-in diagnostic function
- Firmware upgrade via TFTP
- Remote firmware upgrade via FTP
- Quick start wizard
- Logging via syslog
- SNMP management MIB-II

Max. Power ..... 10 Watt

Dimensions (L x W x H) cm..... 22.0 x 16.0 x 3.67 cm.

Power..... 15VDC / 1.2A

## WiFi Card (WLAN Access Point)

---

|                          |   |
|--------------------------|---|
| Protocol .....           | IEEE802.11b/g compliant   |
| Wireless client list     |   |
| Security .....           | 64/128 bit WEP<br>WPA / WPA2 (IEEE802.11i)<br>VPN over WLAN<br>Hidden SSID<br>MAC address access control  |
| Regulatory Approval..... | EN / 55022 / 301489-17 / 300328-2   |
| Frequency Band .....     | 2.4 GHz   |
| Transmission Rate .....  | Up to 54 MHz  |
| Channels Support .....   | US / Canada: 11 channels (1~11)<br>Japan: 14 channels (1~13) or 1(14th)<br>France: 4 channels (10~13)<br>Major European country: 13 channels (1~13) |

**NOTES:**





International Headquarters  
Tadiran Telecom (TTL) L.P.  
18 Hasivim Street P.O.Box 7607  
Petach Tikva 49170 Israel  
Tel. +972-3-9262000, Fax. +972-3-9262310

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USA Headquarters  
Tadiran Telecom, Inc.  
265 Executive Dr., Suite 250  
Plainview, NY 11803  
Tel. +1-516-632-7200, Fax. +1-516-632-7210

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<http://www.tadirantele.com>

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Installation Procedure and Hardware Reference Manual  
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