

**DRAFT 5**



# **Coral IPx Office**

---

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



*The flexible way to communicate*



The information contained in this document is proprietary and is subject to all relevant copyright, patent and other laws protecting intellectual property, as well as any specific agreement protecting TADIRAN TELECOM LTD.'s (herein referred to as the "Manufacturer") rights in the aforesaid information. Neither this document nor the information contained herein may be published, reproduced or disclosed to third parties, in whole or in part, without the express, prior, written permission of the Manufacturer. In addition, any use of this document or the information contained herein for any purposes other than those for which it was disclosed is strictly forbidden.

The Manufacturer reserves the right, without prior notice or liability, to make changes in equipment design or specifications.

Information supplied by the Manufacturer is believed to be accurate and reliable. However, no responsibility is assumed by the Manufacturer for the use thereof nor for the rights of third parties which may be effected in any way by the use thereof.

Any representation(s) in this document concerning performance of the Manufacturer's product(s) are for informational purposes only and are not warranties of future performance, either express or implied. The Manufacturer's standard limited warranty, stated in its sales contract or order confirmation form, is the only warranty offered by the Manufacturer in relation thereto.

This document may contain flaws, omissions or typesetting errors; no warranty is granted nor liability assumed in relation thereto unless specifically undertaken in the Manufacturer's sales contract or order confirmation. Information contained herein is periodically updated and changes will be incorporated into subsequent editions. If you have encountered an error, please notify the Manufacturer. All specifications are subject to change without prior notice.

© Copyright by TADIRAN TELECOM LTD., 2003-2006.  
All rights reserved worldwide.

The Coral is Protected by U.S. Patents 6,594,255; 6,598,098; 6,608,895; 6,615,404

All trademarks contained herein are the property of their respective holders.



# **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.

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

This equipment has been tested and complied with the following:

### **USL Compliance**

USL indicates Listing to U.S. Standard for Information Technology Equipment Including Electrical Business Equipment, UL60950, Third Edition.

### **CNL Compliance**

CNL indicates Certification to Canadian Standard for Information Technology Equipment Including Electrical Business Equipment, CSA C22.2 No.60950-00.

## **CE Compliance Statement**

The Coral system complies with the requirements of the following standards:

EN60950-1	EN55022
ACA-TS001	EN55024
AS/NZS 3260	AS/NZS 3548 CISPR22
AS/NZS 60950	

The Coral system may include a CLASS I laser product.

All laser transmitters integrated within the Coral systems are approved CLASS I laser units. Coral systems that include such laser transmitters comply with EN60825-1.

# 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.

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.



# Table of Contents

---

## Chapter 1: Introduction

1.1 About this Manual.....	1-1
<i>Document Description</i> .....	1-1
<i>Related Documentation</i> .....	1-3
<i>Special Symbols Used in this Document</i> .....	1-4
<i>List of Abbreviations</i> .....	1-5
1.2 About the Coral IPx Office .....	1-7
<i>System Description</i> .....	1-7
Capacity.....	1-7
VoIP .....	1-7
Circuitry.....	1-8
Major Features.....	1-9
<i>Recommended Tools</i> .....	1-11

## Chapter 2: Hardware Installation Procedure

2.1 Site Inspection .....	2-1
<i>Installation Environment</i> .....	2-1
<i>Space Requirements</i> .....	2-2
<i>Electrical Requirements</i> .....	2-5
General Requirements.....	2-5
DC Electrical Requirements.....	2-5
2.2 Equipment Installation .....	2-7
<i>Introduction</i> .....	2-7
<i>Unpacking the Shipping Container</i> .....	2-8
<i>Preparing the Unit for Installation</i> .....	2-10
Checking the Space and Positioning Requirements.....	2-10
Checking the Electrical Requirements.....	2-10
Power Test.....	2-10
<i>Installing the Control and NTU Office cards</i> .....	2-11
Opening the Unit Cover .....	2-11
Installing the Main Resources Card.....	2-11
Installing the DBM-X Card .....	2-11
Installing the NTU Office Card .....	2-11
Installing the Internal LAN Cable .....	2-11
Installing the WiFi Card and Antenna .....	2-11
Removing the Battery Insulator .....	2-11
Closing the Unit Cover.....	2-11
<i>Installing the External Components</i> .....	2-12
Installing the IMC-8 or IMC-16 Flash Card .....	2-12
Installing the Compact Flash Disk .....	2-12
Installing the Software Authorization Unit.....	2-12
Assembling the WiFi Antennas.....	2-12

<i>Mounting Table Units</i> .....	2-13
<i>Mounting Rack Units</i> .....	2-14
Preparing the Unit for Mounting onto the Rack.....	2-14
Preparing the Rack for Unit Mounting.....	2-14
Mounting the Unit onto the Rack .....	2-14
Dismounting the IPx Office Unit from the Rack .....	2-16
<i>Ground Wiring</i> .....	2-18
Connecting the Ground Wire to the Unit.....	2-19
Grounding the MDF Unit.....	2-20
<i>Strapping the Configuration Jumpers</i> .....	2-23
<i>Peripheral Card Installation</i> .....	2-24
Inserting a Coral Peripheral Card .....	2-24
<i>Interconnecting the IPx Office and the Expansion Cages</i> .....	2-33
Interconnecting the IPx Office Unit and the Expansion Cage.....	2-33
Interconnecting the 1st Expansion cage and 2nd Expansion Cage .....	2-33
Defining Expansion Cage Numbers.....	2-33
<i>Installing the DC Power Supply</i> .....	2-34
<i>Connecting the Power Wires</i> .....	2-35
AC Powered Systems.....	2-35
DC Powered Systems.....	2-36
2.3 Program Interface Device Connection.....	2-39

## **Chapter 3: Initial Power-up Tests**

3.1 Power Supply Test.....	3-1
<i>AC Powered Systems</i> .....	3-1
<i>DC Powered Systems</i> .....	3-3
3.2 Common Control Test.....	3-5
<i>Control Card Initialization</i> .....	3-5
<i>Memory Lithium Battery Condition Test</i> .....	3-8
3.3 Peripheral Interface Card Initialization.....	3-9
<i>Introduction</i> .....	3-9
Rules for Inserting a Coral Circuit Card .....	3-10
<i>System Initialization</i> .....	3-13
Preparing for Initialization .....	3-13
IPx Office Unit Initialization .....	3-13
First Expansion Cage Initialization.....	3-14
Second Expansion Cage Initialization .....	3-14
3.4 I/O Cable Installation .....	3-15
3.5 Installation Wrap-up.....	3-17

## **Chapter 4: Software Installation Procedure**

4.1 Generic Feature Software .....	4-1
------------------------------------	-----

<i>Introduction</i> .....	4-1
<i>Upgrading Using the FMprog-Utility</i> .....	4-2
<i>Installing an Upgraded IMC8 / IMC16 Card</i> .....	4-3
<i>Creating a Binary Backup of the Database</i> .....	4-3
<i>Installing the IMC8 / IMC16 Card</i> .....	4-3
<i>Upgrading the UGW Software</i> .....	4-4
<b>4.2 System Database Control</b> .....	4-5
<i>Accessing the Database Flash Menu</i> .....	4-5
<i>Saving to IMC8 or IMC16</i> .....	4-6
<i>Loading (Restoring) from IMC8 or IMC16</i> .....	4-8
<i>Show File Information</i> .....	4-10
<i>Automatic Daily Backup</i> .....	4-11
<i>Erasing Flash Memory</i> .....	4-12
<i>Backing up the Hard Disk onto the Compact Flash Card</i> .....	4-13
<i>Loading (Restoring) from the Compact Flash Card</i> .....	4-13

## Chapter 5: External Connections

<b>5.1 Main Distribution Frame (MDF)</b> .....	5-1
<b>5.2 External Equipment</b> .....	5-5
<i>Station Equipment</i> .....	5-5
Wired Stations .....	5-5
Wireless and VoIP Stations .....	5-8
Related Documentation .....	5-8
<i>Trunk Circuits</i> .....	5-9
<i>Auxiliary Connections</i> .....	5-10
<b>5.3 Protection Devices</b> .....	5-11
<i>Introduction to Primary and Secondary Protection Devices</i> .....	5-11
<i>Surge Arrestor Magazine</i> .....	5-14
<b>5.4 Power Fail (PF) Transfer Circuits</b> .....	5-15
<i>Physical Connection</i> .....	5-15
Stations .....	5-15
Trunks .....	5-15
<i>Database Programming</i> .....	5-16
Power Failure Trunk Definition (Route: TRK, 4) .....	5-16
<b>5.5 Data Communication Ports</b> .....	5-17
<b>5.6 I/O Card Connections</b> .....	5-19
<i>Peripheral Cards Index</i> .....	5-19
<i>Champ Connections</i> .....	5-22
Direct Pinout of the Champ/Card Connection .....	5-23
Direct Pinout of the MDF Connection .....	5-25
<i>RJ-45 Connections</i> .....	5-27
Peripheral Cards Index .....	5-27
4T Office and 4T-CID Office Cards .....	5-28
8T Office and 8T-CID Office Cards .....	5-29
4TBR Office Card .....	5-30

UDT Office (T1 or PRI-23) .....	5-31
PRI-30 Office .....	5-32
30T Office Card .....	5-33
<b>5.7 LAN, WAN, and Printer Connections.....</b>	<b>5-35</b>
<i>Connecting to the LAN.....</i>	<i>5-36</i>
Connecting to the LAN when an NTU Office Card is Supplied.....	5-36
Connecting to the LAN when an NTU Office Card is not Supplied.....	5-36
<i>Connecting to the WAN .....</i>	<i>5-36</i>
Connecting to the WAN when an NTU Office Card is Supplied .....	5-36
Connecting to the WAN when an NTU Office Card is not Supplied .....	5-36
<i>Connecting to a Printer .....</i>	<i>5-37</i>
Connecting to a Printer when an NTU Office Card is Supplied .....	5-37
Connecting to a Printer when an NTU Office Card is not Supplied .....	5-37
<i>LAN/WAN Pinout .....</i>	<i>5-38</i>

## Chapter 6: Cage Description

<b>6.1 General System Description.....</b>	<b>6-1</b>
<i>Unit Exterior .....</i>	<i>6-1</i>
Front Panel .....	6-3
Rear Side.....	6-5
Side Panels.....	6-6
Top Side .....	6-6
Bottom Panel .....	6-6
Installation Kit .....	6-6
<i>Unit Cover.....</i>	<i>6-7</i>
Opening the Unit Cover .....	6-8
Closing the Unit Cover.....	6-10
<i>Unit Interior - Front Section.....</i>	<i>6-12</i>
MCB Office Card.....	6-13
DBM-X Card .....	6-13
Hard Disk .....	6-13
MRC Card.....	6-13
IMC8 / IMC16 Flash Card .....	6-13
Compact Flash Disk.....	6-13
Networking Card .....	6-13
WiFi Card.....	6-13
<i>Unit Interior - Rear Section .....</i>	<i>6-14</i>
Card Slots .....	6-14
Power Supply Unit .....	6-14
Peripheral Cards.....	6-15
Configuration Jumpers.....	6-15
I/O Connectors.....	6-15
Expansion Connector .....	6-15
Cage Ground Terminal .....	6-15
Blank Panels .....	6-16
<i>Heat Removal .....</i>	<i>6-18</i>
Cooling Fans.....	6-19
<i>Safety Labels .....</i>	<i>6-21</i>
Nameplate Label.....	6-21
UL Label .....	6-21

ESD Label.....	6-22
<b>6.2 System Configuration Options.....</b>	<b>6-23</b>
<i>General Description</i> .....	6-23
Main Unit (IPx Office).....	6-24
Expansion Cage (IPx 500X) .....	6-24
Expansion Cage (IPx 800X) .....	6-24
<i>Interconnecting the IPx Office Unit and the Expansion Cage</i> .....	6-30
<i>Suggestions for Peripheral Card Distribution</i> .....	6-34
Main Unit.....	6-34
Expansion Cages.....	6-34
<i>Optional Coral IPx 500X Expansion Cage</i> .....	6-36
General.....	6-36
Card Slots .....	6-36
Port Capacity .....	6-36
Power Supply.....	6-36
MDFipx .....	6-36
Setting the Configuration Jumpers .....	6-36
Connecting the IPx 500X Cage to the IPx Office Unit .....	6-37
Related Documentation .....	6-37
<i>Optional Coral IPx 800X Expansion Cage</i> .....	6-38
General.....	6-38
Card Slots .....	6-38
Port Capacity .....	6-38
Power Supply.....	6-38
PX Card .....	6-38
When an IPx 800X Expansion Cage is Used in an IPx Office System .....	6-39
Setting the Configuration Jumpers .....	6-39
Connecting the IPx 800X Cage to the IPx Office Unit .....	6-39
Related Documentation .....	6-39

## Chapter 7: Power Supply

<b>7.1 PS Office AC Power Supply Unit.....</b>	<b>7-1</b>
<i>General Description</i> .....	7-1
Power Source .....	7-1
PS Office AC Front Panel.....	7-1
PS Office AC Card Layout.....	7-2
<i>Circuit Description</i> .....	7-4
DC Output Power.....	7-4
Normal Operation .....	7-4
Disconnecting the AC Power Cord from the AC Power Mains .....	7-5
Turning the Power Switch OFF.....	7-5
Monitoring Circuitry.....	7-5
<i>Installation and Operation</i> .....	7-6
Installing the Power Supply .....	7-6
Operating the PS Office AC.....	7-7
Removing the Power Supply .....	7-9
<i>Troubleshooting</i> .....	7-9
<i>Replacing the PS Office AC Fuses</i> .....	7-10
Diagnosing the IPx Office LED Indicators.....	7-10

<i>Specifications</i> .....	7-12
7.2 PS Office DC Power Supply Unit.....	7-13
<i>General Description</i> .....	7-13
PS Office DC Front Panel.....	7-13
PS Office DC Card Layout.....	7-15
<i>Circuit Description</i> .....	7-17
Power Input Section.....	7-17
DC Output Power.....	7-17
-48VDC Output Power .....	7-17
<i>Installation and Operation</i> .....	7-19
Installing the Power Supply .....	7-19
Operating the PS Office DC.....	7-20
Removing the Power Supply .....	7-21
<i>Troubleshooting</i> .....	7-22
<i>Replacing the PS Office DC Power Fuse</i> .....	7-22
<i>Specifications</i> .....	7-23

## Chapter 8: Common Control Cards

8.1 Control Cards .....	8-1
<i>General Description</i> .....	8-1
<i>Card Handling Procedures</i> .....	8-4
Control Card Installation .....	8-4
8.2 MCB Office Card .....	8-5
<i>General Information</i> .....	8-5
<i>Card Components</i> .....	8-5
<i>Main Control Processor</i> .....	8-8
Port Management .....	8-8
Memory Management.....	8-8
The Program Interface Facility.....	8-9
<i>Internet Protocol Gateway</i> .....	8-9
<i>Group Controller Circuit</i> .....	8-10
Voice Switching and Time Slot Configuration.....	8-10
Circuit Description.....	8-13
Using Time Slots.....	8-13
<i>Software Authorization Management</i> .....	8-14
SAU Unique Serial Numbers .....	8-15
<i>Front Panel Features</i> .....	8-16
<i>IMC8/16 Memory Card</i> .....	8-17
<i>KB0 RS-232E Programming Port</i> .....	8-18
KB0 Setup.....	8-18
<i>UGW RS-232E Programming Port</i> .....	8-19
UGW Setup.....	8-19
<i>Installing the DBM-X Memory Card</i> .....	8-20
<i>Lithium Battery Condition Testing</i> .....	8-21
<i>Specifications - MCB Office</i> .....	8-23
8.3 LED Card.....	8-25

<i>General Information</i> .....	8-25
<i>Disconnecting the LED Office Card from the MCB Office Card</i> .....	8-26
<i>Replacing the LED Office Card</i> .....	8-26
8.4 MRC Card.....	8-27
<i>General Information</i> .....	8-27
Functional Description .....	8-27
Layout.....	8-28
<i>Installing the MRC</i> .....	8-29
Preparing for Installation.....	8-29
Installing the MRC Card.....	8-29
<i>Removing the MRC</i> .....	8-31
8.5 IMC8 and IMC16 Flash Cards .....	8-33
<i>General Information</i> .....	8-33
<i>Installing the IMC8/16</i> .....	8-34
<i>Removing the IMC8/16</i> .....	8-35
<i>Specifications</i> .....	8-36
8.6 Compact Flash Disk .....	8-39
<i>Introduction</i> .....	8-39
<i>Inserting the CFD</i> .....	8-39
8.7 DBM-X Card .....	8-41
<i>General Information</i> .....	8-41
When is a DBM-X card required? .....	8-42
<i>Installing the DBM-X</i> .....	8-43
Preparing for Installation.....	8-43
Installing the DBM-X Card .....	8-43
<i>Removing the DBM-X</i> .....	8-45
<i>Specifications - DBM-X</i> .....	8-46

## Chapter 9: Shared Service Cards

9.1 Shared Service Circuitry .....	9-1
<i>General Description</i> .....	9-1
<i>Shared Service Cards in the Main Unit</i> .....	9-1
<i>Card Handling Procedures</i> .....	9-1
<i>MRC Cards</i> .....	9-1
<i>U-RMI, U-MR, RMI and MR Office Cards</i> .....	9-2
<i>Shared Service Features in the Main Unit</i> .....	9-2
<i>Additional Shared Service Cards in the Expansion Cages</i> .....	9-3
9.2 MRC-8, 16, 32, 64 Modules.....	9-5
<i>General Description</i> .....	9-5
Card Location .....	9-5
Database Programming.....	9-5
<i>Layout and Installation</i> .....	9-6
9.3 U-RMI / U-MR / RMI / MR Office Cards.....	9-7
<i>General Description</i> .....	9-7
Card Location .....	9-7

Database Programming.....	9-7
<i>Features</i> .....	9-8
<i>Configuration Jumpers</i> .....	9-15
<i>Indicators</i> .....	9-16
<i>External Connectors</i> .....	9-17
<i>MR/RMI-F EPROM (U60)</i> .....	9-18
MR/RMI-F <i>Features</i> .....	9-18
MR and RMI-F <i>Database Programming</i> .....	9-19
<i>URC PROM (U73)</i> .....	9-21
<i>Features</i> .....	9-22
URC2 <i>Database Programming (U-RMI Office and U-MR Office cards)</i> .....	9-23
9.4 <i>Three-Way Conference (3-Way)</i> .....	9-35
<i>General Description</i> .....	9-35
<i>Database Programming</i> .....	9-35
<i>Additional 3-Way Circuits</i> .....	9-37
<i>Specifications - 3-Way Conference</i> .....	9-37
9.5 <i>Multi-Party Conference (CONF)</i> .....	9-39
<i>General Description</i> .....	9-39
<i>Feature Descriptions</i> .....	9-40
URC <i>Chained Meet Me Groups</i> .....	9-40
URC <i>Meet Me Conference Modes</i> .....	9-40
<i>Database Programming</i> .....	9-41
<i>Additional Multi-Party Conference Circuits</i> .....	9-44
<i>Specifications - Multi-Party Conference</i> .....	9-44
9.6 <i>DTMF Receiver (DTR)</i> .....	9-45
<i>General Description</i> .....	9-45
<i>How many DTMF receiver circuits (DTRs) are required?</i> .....	9-46
<i>Additional DTR Circuits</i> .....	9-46
<i>Database Programming</i> .....	9-47
<i>Specifications - DTR</i> .....	9-48
9.7 <i>Dial Tone Detector (DTD)</i> .....	9-49
<i>General Description</i> .....	9-49
<i>Database Programming</i> .....	9-50
<i>Additional DTD Circuits</i> .....	9-51
<i>Specifications - DTD</i> .....	9-51
9.8 <i>Caller ID for SLT (iDSP)</i> .....	9-53
<i>General Description</i> .....	9-53
<i>Database Programming</i> .....	9-54
<i>Additional CID Circuits</i> .....	9-55
<i>Specifications - CID</i> .....	9-55
9.9 <i>MFC Receiver (MFR)</i> .....	9-57
<i>General Description</i> .....	9-57
<i>Available MFR Circuits</i> .....	9-57
<i>Specifications</i> .....	9-57
9.10 <i>VoIP Media Gateway (MG)</i> .....	9-59



<i>General Description</i> .....	9-59
<i>Additional Media Channel Circuits</i> .....	9-59
9.11 Remote Maintenance (Modem) .....	9-61
<i>General Description</i> .....	9-61
<i>Modem Jumpers - Enable/Disable</i> .....	9-61
<i>Database Programming</i> .....	9-63
<i>Additional Modem in the Optional IPx 800X Cage</i> .....	9-65
<i>Specifications - Modem</i> .....	9-65
9.12 Data Serial Ports (RS-232E) .....	9-67
<i>General Description</i> .....	9-67
<i>RS-232E ports in the Optional IPx 800X Cage</i> .....	9-68
<i>Specifications - RS-232E</i> .....	9-68
9.13 Music .....	9-69
<i>Introduction</i> .....	9-69
<i>Circuit Description</i> .....	9-69
M1 Internal/External music .....	9-69
M2/P Paging/External music .....	9-69
<i>Configuring the Music M1 Jumper to External or Internal</i> .....	9-70
<i>Configuring the Music M2/P Jumper to Music</i> .....	9-71
<i>Database Programming</i> .....	9-72
<i>External Connections</i> .....	9-74
<i>Additional Music Interfaces in the Optional IPx 800X Cage</i> .....	9-75
<i>Specifications - Music</i> .....	9-75
9.14 Voice Paging (Public Address) and Relay-1 .....	9-77
<i>Introduction</i> .....	9-77
<i>Circuit Description</i> .....	9-77
M2/P Paging/External music .....	9-77
Relay Contacts 1-2 Paging/Relay .....	9-78
<i>Configuring the Paging M2/P Jumper to Paging</i> .....	9-79
<i>Configuring the Relay Contacts 1-2 Jumper to Paging</i> .....	9-80
<i>Database Programming</i> .....	9-81
<i>External Connections</i> .....	9-82
<i>Relay Electrical Limitations</i> .....	9-83
<i>Additional Paging Interface in the optional IPx 800X Cage</i> .....	9-83
<i>Specifications - Paging</i> .....	9-84
9.15 UNA/Bell and Relay-2 .....	9-85
<i>Introduction</i> .....	9-85
<i>Circuit Description</i> .....	9-85
<i>Configuring the Relay Contacts 3-4 Jumper to Bell</i> .....	9-86
<i>Database Programming</i> .....	9-87
<i>External Connections</i> .....	9-88
<i>Relay Electrical Limitations</i> .....	9-89
<i>Additional UNA and Relay Contacts in the Optional IPx 800X Cage</i> .....	9-89
<i>Specifications - BELL/UNA</i> .....	9-90
9.16 Accessory or Alarm Relay-3 .....	9-91
<i>Introduction</i> .....	9-91
Dial Operated Accessory .....	9-91
Major/Minor Alarm Relay .....	9-91

<i>Circuit Description</i> .....	9-92
<i>Configuring the Relay Contacts 1-2 Jumper to RLY3</i> .....	9-93
<i>Configuring the Relay Contacts 3-4 Jumper to RLY3</i> .....	9-94
<i>Database Programming</i> .....	9-95
Dial Operated Accessory .....	9-95
Major/Minor Alarm Relay .....	9-96
<i>External Connections</i> .....	9-97
Dial Operated Accessory .....	9-97
Major/Minor Alarm Relays .....	9-97
<i>Relay Electrical Limitations</i> .....	9-98
<i>Additional RLY3 Contacts in the Optional IPx 800X Cage</i> .....	9-98
<i>Specifications - RELAY</i> .....	9-98
9.17 Relay Contacts .....	9-99
<i>General Information</i> .....	9-99
<i>Configuring the Relay Contacts Jumper</i> .....	9-101
<i>Specifications - Relays</i> .....	9-102

## Chapter 10: Peripheral Cards

10.1 Peripheral Card Installation .....	10-1
<i>General Information</i> .....	10-1
<i>Card Handling Procedures</i> .....	10-1
<i>General Installation Procedure</i> .....	10-2
<i>Diagnostic LED Indication</i> .....	10-2
LED Constantly Lit.....	10-3
LED Flashing .....	10-3
10.2 Peripheral Card Description .....	10-5
<i>General Description</i> .....	10-5
XXX Office Cards.....	10-5
Peripheral Card types .....	10-5
10.3 Digital Trunk Synchronization .....	10-9
<i>Slave Clock Mode Operation</i> .....	10-9
How The System Derives The External Clock Signal.....	10-9
<i>Synchronization Slots in the Main and Expansion Cages</i> .....	10-10
Synchronization Slot Selection .....	10-10
Conditions for Slave Clock Mode Operation.....	10-10
System Switch from Slave Clock Mode to Master Clock Mode .....	10-10
<i>Choosing the Best Synchronization Source</i> .....	10-12
Optional Synchronization Cards .....	10-12
Order of Preference .....	10-13
<i>Synchronization Instructions</i> .....	10-14
10.4 Service and Peripheral Cards.....	10-19

## Chapter 11: System Networking

11.1 NTU Office Card Description .....	11-3
--	------

<i>Introduction</i> .....	11-3
<i>System Operation without an NTU Office Card</i> .....	11-3
Media Stream from the Digital World to the LAN and WAN .....	11-3
Media Stream from the LAN and WAN to the Digital World .....	11-4
<i>System Operation with an NTU Office Card</i> .....	11-5
Media Stream from the LAN and WAN to the Digital World .....	11-5
<i>NTU Office Card Components</i> .....	11-7
11.2 NTU Office Card Installation .....	11-9
<i>Introduction</i> .....	11-9
<i>Installing the NTU Office Card</i> .....	11-10
<i>Replacing the NTU Office Card</i> .....	11-12
<i>Installing the WiFi Card</i> .....	11-13
<i>Assembling the WiFi Antennas</i> .....	11-15
<i>Configuring the Networking Software</i> .....	11-16
<i>Specifications</i> .....	11-17
11.3 Connecting to the Network without an NTU Office Card .....	11-21



# List of Tables

---

Table 1-1: Related Documentation .....	1-3
Table 1-2: IPx Office System Specifications .....	1-10
Table 2-1: Coral IPx Office Dimensions .....	2-3
Table 2-2: Coral IPx Office Weights .....	2-3
Table 2-3: Coral IPx Office Space Requirements .....	2-3
Table 2-4: Coral IPx Office Maximum Power Requirements .....	2-6
Table 2-5: Part List (Items per IPx Office Unit) .....	2-9
Table 2-6: Coral IPx Office Card Types .....	2-27
Table 3-1: Card Slot Status Messages .....	3-12
Table 5-1: External I/O Connectors for Coral IPx Office Peripheral Cards .....	5-3
Table 5-2: Station Interface Wire Pair Requirements .....	5-6
Table 5-3: Auxiliary Connectors .....	5-10
Table 5-4: Telephone Circuit Primary Protection Device Specifications .....	5-12
Table 5-5: Telephone Circuit Secondary Protection Device Specifications .....	5-13
Table 5-6: Card I/O Connector Pinout .....	5-19
Table 5-7: Peripheral Card Connection Information .....	5-22
Table 5-8: Champ 50 Connector Card Pinout (4/8/20S, 8/16/24SFT) .....	5-23
Table 5-9: Champ 50 Connector Card Pinout (4S8F, 4S16F, 8S8F, 8S16F) .....	5-24
Table 5-10: Block 66 MDF Pinout (4/8/20S, 8/16/24SFT) .....	5-25
Table 5-11: Block 66 MDF Pinout (4S8F, 4S16F, 8S8F, 8S16F) .....	5-26
Table 5-12: 4T / 4T-CID Office Pinout .....	5-28
Table 5-13: 8T / 8T-CID Office Pinout .....	5-29
Table 5-14: 4TBR Office Pinout .....	5-30
Table 5-15: UDT Office (PRI-23/T1) Pinout .....	5-31
Table 5-16: PRI-30 Office Pinout .....	5-32
Table 5-17: 30T Office Pinout .....	5-33
Table 5-18: LAN/WAN Pinout .....	5-38
Table 6-1: Front Panel Features .....	6-3
Table 6-2: Blank Panel Description .....	6-16
Table 6-3: IPx Office System Configuration Options .....	6-23
Table 6-4: Number of Universal I/O Slots per System Configuration .....	6-24
Table 6-5: IPx Office System Expansion Options .....	6-30
Table 6-6: Timeslot Distribution in Coral IPx Office Main Unit .....	6-34
Table 6-7: Timeslot Distribution in IPx Office Expansion Cages .....	6-35
Table 8-1: KB0 RS-232E Interface Pin Functions .....	8-18
Table 8-2: UGW RS-232E Interface Pin Functions .....	8-19
Table 8-3: Assembly Parts Used in MRC Assembly Kit .....	8-29
Table 8-4: Assembly Parts Used in DBM-X Assembly Kit .....	8-43
Table 9-1: Shared Service Features in the Main Unit .....	9-2
Table 9-2: MRC Features .....	9-5
Table 9-3: U-RMI / U-MR / RMI / MR Office Card List (Route: CLIS) .....	9-7
Table 9-4: U-RMI / U-MR Office / RMI / MR Office Features .....	9-8
Table 9-5: U-RMI Office, U-MR Office, RMI Office and MR Office Configuration Jumpers .....	9-15
Table 9-6: Card LED Indications .....	9-16
Table 9-7: External Connections .....	9-17
Table 9-8: MR and RMI-F Features .....	9-19
Table 9-9: MR and RMI-F PI (Route: PLIS) .....	9-20
Table 9-10: URC2 Features and SAU Requirements .....	9-22
Table 9-11: PI defaults per URC2 Resource .....	9-23
Table 9-12: URC2 Features .....	9-25
Table 9-13: URC DTR/DTMF PI Configuration .....	9-26

Table 9-14: URC DTB PI Route .....	9-28
Table 9-15: URC Spare ports (not used) .....	9-28
Table 9-16: URC Three-Way Conference (C3WAY) PI Configuration .....	9-29
Table 9-17: URC iDSP CID (Caller ID) Transmitters PI Configuration .....	9-30
Table 9-18: URC Dial Tone Detector (DTD) PI Configuration .....	9-32
Table 9-19: MRC Media Channels .....	9-59
Table 9-20: Music-1 Internal/External Selection P2 Jumper Setting .....	9-70
Table 9-21: Music-2 M2/P Music/Paging Selection P3 Jumper Setting .....	9-71
Table 9-22: Paging M2/P Music/Paging Selection P3 Jumper Setting .....	9-79
Table 9-23: Relay Contacts 1-2 PAGE/RELAY Selection P4 Jumper Setting .....	9-80
Table 9-24: Relay Contacts 3-4 BELL/RELAY Selection P4 Jumper Setting .....	9-86
Table 9-25: Relay Contacts 1-2 RLY3/PAGE Selection P4 Jumper Setting .....	9-93
Table 9-26: Relay Contacts 3-4 RLY3/BELL Selection P4 Jumper Setting .....	9-94
Table 9-27: Relay Selection .....	9-101
Table 10-1: Card Diagnostic LED Indications .....	10-3
Table 10-2: Coral IPx Office Peripheral CARD TYPE .....	10-7
Table 10-3: Coral IPx Office Peripheral CARD SLOT Location .....	10-8
Table 10-4: Coral IPx Office Unit Service and Peripheral Card Types .....	10-19
Table 10-5: Coral IPx Office Piggyback modules for Peripheral Cards .....	10-23
Table 10-6: U-RMI Office, U-MR Office, RMI Office and MR Office features .....	10-24
Table 11-1: Assembly Parts Used in NTU Office card Assembly Kit .....	11-9

# List of Figures

---

Figure 2-1: Coral IPx Office Sizes and Weights .....	2-4
Figure 2-2: Coral IPx Office Space Requirements .....	2-4
Figure 2-3: Table Mounting Bumpers .....	2-13
Figure 2-4: IPx Office Unit Mounted on Table .....	2-13
Figure 2-5: IPx Office Unit Mounted onto Rack .....	2-15
Figure 2-6: Removing IPx Office Unit from Rack .....	2-17
Figure 2-7: Coral IPx Office Cage Ground Assembly .....	2-19
Figure 2-8: Master Ground Unit .....	2-20
Figure 2-9: System Ground Connection .....	2-21
Figure 2-10: System Ground with Three Units .....	2-22
Figure 2-11: ESD Strap Connection to Cage .....	2-24
Figure 2-12: Coral IPx Office Card Placement .....	2-28
Figure 2-13: 1st Expansion Cage 500X Card Placement .....	2-29
Figure 2-14: 2nd Expansion Cage 500X Card Placement .....	2-30
Figure 2-15: 1st Expansion Cage 800X Card Placement .....	2-31
Figure 2-16: 2nd Expansion Cage 800X Card Placement .....	2-32
Figure 2-17: PS Office DC Front Panel .....	2-34
Figure 2-18: AC Power Connection for One IPx Office Unit .....	2-35
Figure 2-19: DC Power Wiring for One IPx Office Unit .....	2-37
Figure 2-20: DC Power Wiring for Three Units .....	2-37
Figure 2-21: 9-Pin Program Interface Device Connections to KB0 .....	2-40
Figure 3-1: Coral IPx Office Unit AC Power Connections .....	3-2
Figure 3-2: IPx Office Unit DC Power Connections .....	3-3
Figure 3-3: MDF Connector Configuration .....	3-16
Figure 5-1: Connecting via an MDF .....	5-4
Figure 5-2: Modular Wired Station Jack Wiring Diagram .....	5-7
Figure 5-3: Typical Trunk Circuit Wiring Diagram .....	5-9
Figure 5-4: Magazine with 10 Surge Arrestor and Voltage Protector Units .....	5-14
Figure 5-5: Power Fail Wiring to Single-Line Telephone Set .....	5-16
Figure 5-6: FlexSet 80 / 280S / 281S / APDL / APA or PEX+APA RS-232E (v.24) Pinout .....	5-18
Figure 5-7: 4S Office and 8S Office Jumper Settings .....	5-22
Figure 5-8: 4T / 4T-CID Office Pinout .....	5-28
Figure 5-9: 8T / 8T-CID Office Pinout .....	5-29
Figure 5-10: 4TBR Office Pinout .....	5-30
Figure 5-11: UDT Office (PRI-23/T1) Pinout .....	5-31
Figure 5-12: PRI-30 Office Pinout .....	5-32
Figure 5-13: 30T Office Pinout .....	5-33
Figure 5-14: Network Connection when an NTU Office Card is not Supplied .....	5-35
Figure 5-15: Network Connection when an NTU Office Card is Supplied .....	5-35
Figure 5-16: LAN/WAN Pinout .....	5-38
Figure 6-1: Front View of the Table-Mounted IPx Office Unit .....	6-2
Figure 6-2: Front View of the Rack-Mounted IPx Office Unit .....	6-2
Figure 6-3: Front Panel .....	6-3
Figure 6-4: Rear Side of the IPx Office Unit .....	6-5
Figure 6-5: Left View of the IPx Office Unit Cover .....	6-7
Figure 6-6: Right View of the IPx Office Unit Cover .....	6-7
Figure 6-7: Removing the Unit Cover .....	6-9
Figure 6-8: Closing the Cover .....	6-11
Figure 6-9: IPx Office Unit Interior .....	6-12
Figure 6-10: IPx Office Rear Section without Cards Installed .....	6-14
Figure 6-11: IPx Office with Blank Panels .....	6-17

Figure 6-12: Heat Flow Schematic .....	6-18
Figure 6-13: Fan Dismounting .....	6-19
Figure 6-14: Fan Installation .....	6-20
Figure 6-15: Bottom Panel Labels .....	6-21
Figure 6-16: ESD and Ground Labels .....	6-22
Figure 6-17: System with One Unit (IPx Office).....	6-25
Figure 6-18: System with Two Units (IPx Office and IPx 500X) .....	6-25
Figure 6-19: System with Three Units (IPx Office and Two IPx 500X Cages) .....	6-26
Figure 6-20: System with Two Units (IPx Office and IPx 800X) .....	6-27
Figure 6-21: System with Three Units (IPx Office, IPx 500X, and IPx 800X) .....	6-28
Figure 6-22: System with Three Units (IPx Office and Two IPx 800X Cages) .....	6-29
Figure 6-23: Connection between the IPx Office and 500X .....	6-31
Figure 6-24: Connection between the IPx Office unit and two 500X .....	6-31
Figure 6-25: Connection between the IPx Office Unit and the 800X Cage .....	6-32
Figure 6-26: Connection between the IPx Office Unit, 500X and 800X Cages .....	6-32
Figure 6-27: Connection between the IPx Office Unit and two 800X Cages .....	6-33
Figure 6-28: IPx Office System PCM Timeslot Distribution .....	6-35
Figure 7-1: PS Office AC Front Panel .....	7-2
Figure 7-2: PS Office AC Card Layout .....	7-3
Figure 7-3: PS Office AC Card Rear View.....	7-3
Figure 7-4: PS Office AC Block Diagram.....	7-4
Figure 7-5: IPx Office AC Power Connections .....	7-8
Figure 7-6: PS Office DC Front Panel .....	7-14
Figure 7-7: PS Office DC Card Layout .....	7-16
Figure 7-8: DC Power Supply Rear View .....	7-16
Figure 7-9: PS Office DC Block Diagram .....	7-18
Figure 7-10: IPx Office PS Office DC Connection .....	7-20
Figure 8-1: MCB Office Card Layout .....	8-3
Figure 8-2: MCB Office Card Layout .....	8-7
Figure 8-3: Coral IPx Office Voice Switching.....	8-11
Figure 8-4: Coral system PCM Highway Distribution for Group Control.....	8-12
Figure 8-5: Software Authorization Unit (SAU) Detail.....	8-15
Figure 8-6: KB0 Pin Assignment .....	8-18
Figure 8-7: UGW Pin Assignment .....	8-19
Figure 8-8: MCB Office Card Battery Insulator Release.....	8-22
Figure 8-9: LED Office Card .....	8-25
Figure 8-10: Description of MRC .....	8-27
Figure 8-11: MRC Card Layout - Bottom View .....	8-28
Figure 8-12: MRC Assembly onto MCB Office .....	8-30
Figure 8-13: IMC8 Flash Memory Card - Left side .....	8-33
Figure 8-14: DBM-X Card Layout .....	8-41
Figure 8-15: DBM-X Assembly onto MCB Office.....	8-44
Figure 9-1: MRC Card Layout .....	9-6
Figure 9-2: U-RMI / U-MR / RMI MR Office Architecture.....	9-9
Figure 9-3: U-RMI Office Card Circuits Layout, Front Panel and Jumpers .....	9-11
Figure 9-4: RMI Office Card Circuits Layout, Front Panel and Jumpers .....	9-12
Figure 9-5: U-MR Office Card Circuits Layout, Front Panel and Jumpers .....	9-13
Figure 9-6: MR Office Card Circuits Layout, Front Panel and Jumpers .....	9-14
Figure 9-7: Card LED Indications .....	9-16
Figure 9-8: External Connections (Front View) .....	9-17
Figure 9-9: Music and Paging Plugs Connection .....	9-17
Figure 9-10: MR/RMI-F Features .....	9-18
Figure 9-11: Modem - Jumper Configuration.....	9-62
Figure 9-12: Music-1 Simplified Diagram .....	9-70



Figure 9-13: Music-1 Internal/External Selection P2 Jumper Setting .....	9-70
Figure 9-14: Music-2 Simplified Diagram .....	9-71
Figure 9-15: Music-2 M2/P Music/Paging Selection P3 Jumper Setting .....	9-71
Figure 9-16: Music - Wiring to External Music Source .....	9-74
Figure 9-17: Paging & Relay Contacts 1-2 Simplified Diagram .....	9-78
Figure 9-18: Paging Simplified Diagram .....	9-79
Figure 9-19: Paging M2/P Music/Paging Selection P3 Jumper Setting.....	9-79
Figure 9-20: Paging Relay Simplified Diagram.....	9-80
Figure 9-21: Relay Contacts 1-2 PAGE/RELAY Selection P4 Jumper Setting .....	9-80
Figure 9-22: Page - Wiring To Paging Amplifier .....	9-82
Figure 9-23: Page - Wiring To Amplified Speakers .....	9-82
Figure 9-24: UNA & Relay Contacts 3-4 Simplified Diagram .....	9-85
Figure 9-25: Bell Relay Simplified Diagram.....	9-86
Figure 9-26: Relay Contacts 3-4 BELL/RELAY Selection P4 Jumper Setting.....	9-86
Figure 9-27: UNA Bell - Wiring to Tone Generator.....	9-88
Figure 9-28: UNA Bell - Wiring to Mechanical Bell.....	9-88
Figure 9-29: RLY3 Simplified Diagram .....	9-92
Figure 9-30: RLY3 Contacts 1-2 Simplified Diagram.....	9-93
Figure 9-31: Relay Contacts 1-2 RLY3/PAGE Selection P4 Jumper Setting .....	9-93
Figure 9-32: RLY3 Contacts 3-4 Simplified Diagram.....	9-94
Figure 9-33: Relay Contacts 3-4 RLY3/BELL Selection P4 Jumper Setting .....	9-94
Figure 9-34: Dial Operated Relay (RLY3) Connections .....	9-97
Figure 9-35: Alarm Relay (RLY3) Connections .....	9-97
Figure 9-36: DC Arc Suppression for U-RMI / U-MR / RMI / MR Office Card Relays .....	9-100
Figure 9-37: Simplified Relay Diagram.....	9-101
Figure 10-1: Coral IPx Office Peripheral Card Slot Location .....	10-6
Figure 10-2: Coral IPx Office Peripheral Card Types .....	10-6
Figure 10-3: Digital Trunk Cards Jumper Settings for Synchronization.....	10-16
Figure 10-4: ESIM Office Card Jumper Settings for Synchronization .....	10-17
Figure 10-5: 30T Office Card.....	10-25
Figure 10-6: 4TBR Office Card.....	10-26
Figure 10-7: PRI-30 Office Card.....	10-27
Figure 10-8: UDT Office Card.....	10-28
Figure 10-9: 4T Office Card.....	10-29
Figure 10-10: 4T-CID Office Card .....	10-30
Figure 10-11: 8SFT Office Card .....	10-31
Figure 10-12: 16SFT Office Card .....	10-32
Figure 10-13: 24SFT Office Card .....	10-33
Figure 10-14: 4S Office Card.....	10-34
Figure 10-15: 8S Office Card.....	10-35
Figure 10-16: 12Sx Office Card - Top Side .....	10-36
Figure 10-17: 12Sx Office Card - Rear Side.....	10-37
Figure 10-18: 20S Office Card.....	10-38
Figure 10-19: 4S8F, 4S16F , 8S8F and 8S16F Office Card.....	10-39
Figure 10-20: 8T Office Card.....	10-40
Figure 10-21: 8T-CID Office Card .....	10-41
Figure 10-22: IPC Office Card .....	10-42
Figure 10-23: 4CID Office Card.....	10-43
Figure 10-24: 8CID Card .....	10-44
Figure 10-25: 8Fx Office and 16Fx Office Card.....	10-45
Figure 11-1: System Operation without an NTU Office Card .....	11-4
Figure 11-2: System Operation with an NTU Office Card .....	11-6
Figure 11-3: NTU Office Card.....	11-7
Figure 11-4: NTU Office Card Fasteners.....	11-11

Figure 11-5: NTU Office Card Assembly .....	11-11
Figure 11-6: WiFi Card Assembly.....	11-14
Figure 11-7: WiFi Antenna Assembly .....	11-15
Figure 11-8: Networking Connection without an NTU Office Card .....	11-21

# Chapter 1

## Introduction

Coral

1.1 About this Manual.....	1-1
1.2 About the Coral IPx Office.....	1-7



# 1.1 About this Manual

## 1 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*.

Where is it?	What is it about?	When to use it?
Chapter 2	Hardware Installation Procedure	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	Initial Power Up	After completing installation, use this chapter to enable the IPx Office system to process calls.
Chapter 4	Software Installation Procedure	Use this chapter to upgrade the IPx Office software and save the database.
Chapter 5	External Connections	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:

<b>Where is it?</b>	<b>What is it about?</b>	<b>When to use it?</b>
Chapter 6	Cabinet Description	To learn about the main unit and expansion cages
Chapter 7	Power Supply Description	Whenever reference information about power supplies is required, or whenever adding or re-installing a power supply item
Chapter 8	Control Cards	For general information, installation procedures and card handling advice regarding the common control card set
Chapter 9	Shared Service	For reference material (U-RMI Office, U-MR Office or MRC)
Chapter 10	Peripheral Interface Cards	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	NTU Office Card and WiFi Card	For reference material or if you are installing and registering the NTU Office card

## 2 Related Documentation

For further information not in the scope of this manual about Coral service cards Coral 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 Product Description
All FlexSet types	Description	Coral Product Description
Coral Database	Programming	1) PI - Program Interface and Database Reference Manual 2) CVA -CoralVIEW Administrator User Manual 3) CVD -CoralVIEW Designer Guide
	Backup	1) PI - Program Interface and Database Reference Manual, Chapter 21 2) Database Binary Backup PC Utility
Coral Software	Installation and Upgrade	FMprog PC-Utility Reference Manual
IPx 500X Expansion Cages for IPx Office	Descriptions and Installation Procedure	Coral IPx 500 Installation Manual
IPx 800X Expansion Cages for IPx Office	Descriptions and Installation Procedure	Coral IPx 800 Installation Manual
Peripheral cards	Descriptions and Installation Procedure	Coral Service and Peripheral Cards Installation Manual
Peripheral device	Installation and Troubleshooting	Coral Terminal Equipment Installation Manual
Shared Service cards	Descriptions and Installation Procedure	Coral Service and Peripheral Cards Installation Manual

### 3 Special Symbols Used in this Document

---

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:**

---

Indicates important information demanding special attention.

---



#### **Tip:**

---

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

---

### **NOTES:**

A page that is intentionally left blank, and may be used for reader information.

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.



## 4 List of Abbreviations

---

ESIM Office	....Expansion Shelf Interface card in the Main unit
30T 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
4S Office	.....4 Single Line Telephone interface card
8S Office	.....8 Single Line Telephone interface card
12S Office	.....12 Single Line Telephone interface card
20S Office	.....Combination station card including: 8S and 12S on a 8S Single Line Telephone interface card
4S8F Office	.....Combination station card including: 4S and 8S on a 4S Single Line Telephone interface card
4S16S Office	..Combination station card including: 4S and 16S on a 4S Single Line Telephone interface card
8S16F Office	...Combination station card including: 8S and 16S on a 8S Single Line Telephone interface card
IPC Office	.....Integrated PC card including SFC, UCMC, and WiCMC voice mail applications
PS Office AC	..AC Power Supply
PS Office DC	..DC Power Supply
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 (PCMCIA format PC-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
UDT Office	.....Universal Digital Trunk (T1ipx or PRI-23ipx) interface card
MR Office/RMI Office/U-MR Office/U-RMI Office	

## ***NOTES:***

# 1.2 About the Coral IPx Office

## 1 System Description

### Capacity

The Coral IPx Office is the first Coral product to integrate traditional telephony and VOIP networking abilities in the same basic system. The Coral IPx Office is a small, table or rack-mounted PABX, designed to fit in the low to medium range of the private PBX telephone market. 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 units. See the Product Description.

The Coral IPx Office can be expanded using an additional expansion unit. Up to two expansion units (combination of IPx 500X and IPx 800X) can be connected to one IPx Office unit. The IPx 800X expansion cage uses standard Coral FlexiCom 300,400,5000,6000 and Coral IPx 800,3000,4000 peripheral cards. The IPx 500X expansion cage uses the special form factor XXXipx cards. 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, VAD/CNG
- Tone generation and detection: DTMF, Dial, Busy Ring back, call process
- Protocol support: SIP, MGCP, RTP/RTCP



#### **NOTE:**

*Only the SIP will be implemented at this stage. The other protocols will be implemented in future versions.*

## Circuitry

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

The active circuitry of the IPx Office system is divided into two major functions: common control and peripheral. 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.

---

## Major Features

The 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 unit:

- Provides all the features, capabilities, interfaces, and terminals of the Coral communication server
- Provides built-in voice/data convergence
- Provides built-in functions. See *The Coral Service and Peripheral Cards Installation Manual*.
- Optimizes space utilization through extensive configuration flexibility
- Fits into 19" and 23" racks, including racks designed to earthquake specifications
- Can be mounted on a table. See [Mounting Table Units, page 2-13](#)
- Enables installation into standard racks. See [Mounting Rack Units, page 2-14](#).
- 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 6-23](#).
- 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**

<b>Specification *</b>	<b>Coral IPx Office Main Cage</b>	<b>Coral IPx 500X Expansion Cage</b>	<b>Coral IPx 800X Expansion Cage</b>
Control Card Slots	1	—	—
PX Card Slots †	—	—	1 or 0
MRC and Shared Service Card Slots	MR / RMI / U-MR / U-RMI Office	—	0 or 1
Peripheral Interface Card Slots	5 (4 if expansion cages are installed)	10	11
Ports per Slot (See <i>Coral Service and Peripheral Cards Installation Manual</i> )	See the Coral Product Description		
Maximum Combined Trunk and wired Station Ports	See the Coral Product Description		
Maximum Ports In Use Simultaneously	See <a href="#">Suggestions for Peripheral Card Distribution, page 6-34</a>		
Size	See <a href="#">Coral IPx Office Dimensions, page 2-3</a>		
Weight	See <a href="#">Coral IPx Office Weights, page 2-3</a>		
Space Requirements	See <a href="#">Coral IPx Office Space Requirements, page 2-3</a>		
Power Input	See <a href="#">Coral IPx Office Maximum Power Requirements, page 2-6</a>		
Operating Temperature	32-104°F (0-40°C)		
Operating Humidity	20-80% Relative, Non-Condensing		
Maximum Power Consumption‡	160 Watt	460 Watt	575 Watt
Heat Dissipation	246 BTU/Hr	700 BTU/Hr	1070 BTU/Hr

\* For a full list of specifications, refer to the *Coral Product Description*.

† A PX card occupies slot 1 of the first IPx 800X expansion cage in an IPx Office+800X+800X system configuration.

‡ 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.

## 2 Recommended Tools

The following tools are needed 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.

*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	Site Inspection.....	2-1
2.2	Equipment Installation.....	2-7
2.3	Program Interface Device Connection.....	2-39



## 2.1 *Site Inspection*

### 1 Installation Environment

The Coral IPx Office system should be installed in restricted access areas (dedicated equipment rooms, equipment closets, or the like) 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 tampering. 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 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 20 ft (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.

## 2 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 components. For more detailed information, see [Figure 2-2](#) and [Figure 2-2 on page 2-4](#).
4. [Figure 2-2](#) displays a schematic diagram of all installation orientation options.
5. The cage must be mounted horizontally.
6. It is recommended to mount the first expansion cage above the main cage. However, any position around the main cage is acceptable.
7. It is recommended to mount the second expansion cage above the first expansion cage. However, any position around the first expansion cage is acceptable.
8. The mounting of an optional expansion cage should be taken into consideration when mounting the Coral IPx Office equipment.

9. For safety reasons, the top cover of the IPx Office cage should not be positioned higher than 64" (162 cm) from the floor.
10. 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.
11. 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 (19 bracket to bracket)	43.2 (48 bracket to bracket)
	Depth	17.7	45
	Height - 2U	3.5	9

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

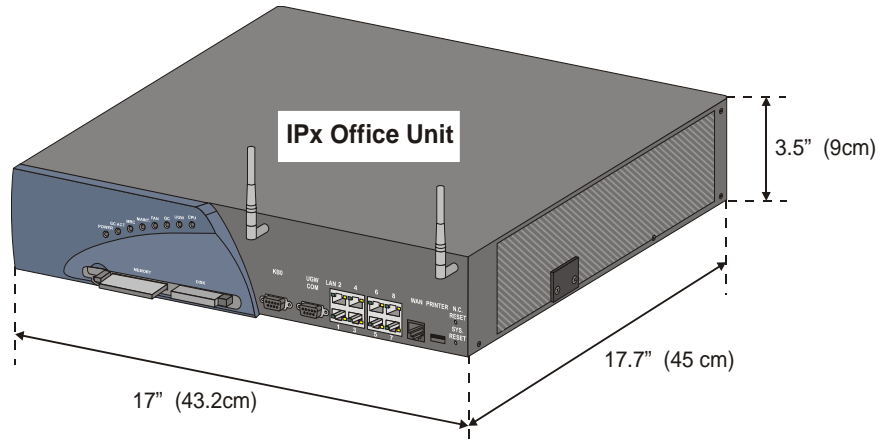
<i>Item</i>	<i>Pounds</i>	<i>Kilograms</i>
IPx Office Unit (Fully loaded)*	19.4	8.8

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

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

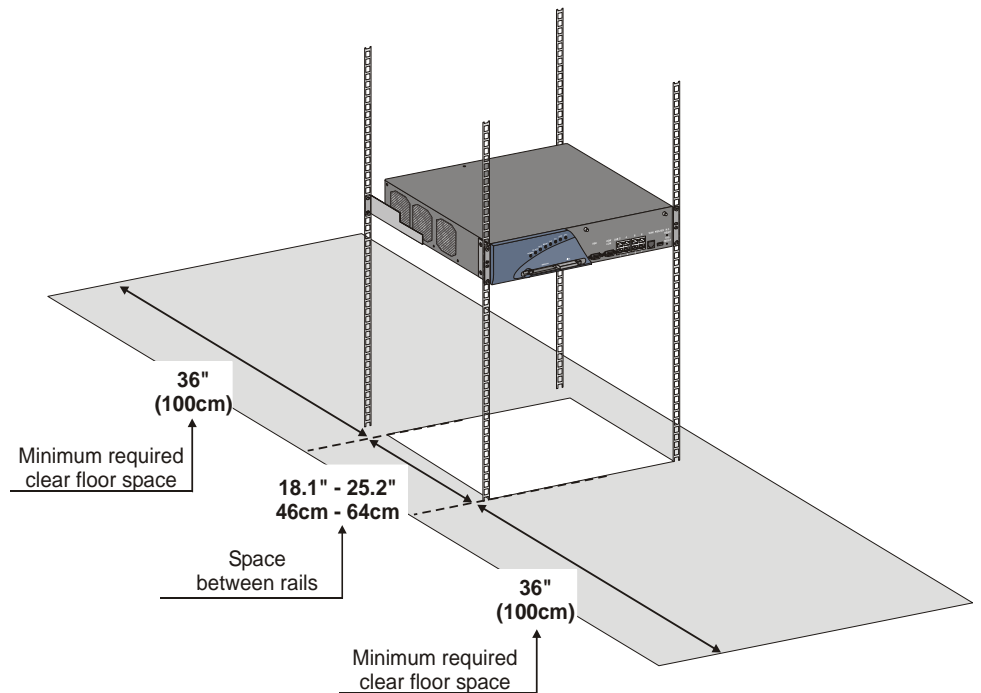
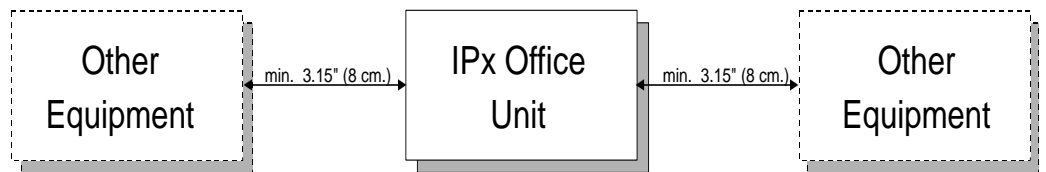
<i>Item</i>	<i>Dimension</i>	<i>Inches</i>	<i>Centimeters (cm)</i>
IPx Office Unit	Front	36	100
	Rear	36	100
	Sides	3.15	8
	Space between rails	18.1 - 25.2	46 - 64

**Figure 2-1 Coral IPx Office Sizes and Weights**



Weight (fully loaded)  
19.4lb  
8.8Kg

**Figure 2-2 Coral IPx Office Space Requirements**



## 3 Electrical Requirements

---

### *General Requirements*

The Coral IPx Office operates from a standard wide input 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 should 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>
IPx Office	2.2 A	1.5 A	4 A
IPx Office+500X	8.2 A	4.5A	14A
IPx Office+500X+500X	14.2A	7.5A	24A
IPx Office+800X	8.2 A	4.5A	14A
IPx Office+500X+800X	14.2A	7.5A	24A
IPx Office+800X+800X	14.2A	7.5A	24A

\* 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

### 1 Introduction

The Coral IPx Office cage description are covered in *Chapter 6, General System Description*. The cage mounting and installation procedure includes the following stages:

- *Unpacking the Shipping Container*
- *Preparing the Unit for Installation*
- *Installing the Control and NTU Office cards* , if necessary
- *Installing the External Components*
- One of the following:
  - *Mounting Table Units*
  - *Mounting Rack Units*
- *Ground Wiring*
- *Strapping the Configuration Jumpers*
- *Peripheral Card Installation*
- *Interconnecting the IPx Office and the Expansion Cages*
- *Installing the DC Power Supply* , if necessary
- *Connecting the Power Wires*

#### **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.*

## 2 Unpacking the Shipping Container

---

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  
Unit)**

<b>Item Description</b>	<b>Quantity</b>
Main unit (IPx Office*), including one MCB Office card	1
For systems that include expansion cages (IPx 500X or IPx 800X), one ESIM Office card (ordered at specific customer request) for connection to the first expansion cage including a IPx Office expansion cable with a female D-type 50-pin connector and a male 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 rack-mounting brackets	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
MR Office / RMI Office / U-MR Office / U-RMI card (ordered at specific customer request)	1
ICM8/16 flash memory card	1
SAU lock device	1
Hard disk (ordered at specific customer request)	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 expansion cages, see the *Coral IPx 500 Installation Procedure and Hardware Reference Manual* or the *Coral IPx 800 Installation Procedure and Hardware Reference Manual*.

## 3 Preparing the Unit for Installation

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

- [Checking the Space and Positioning Requirements](#)
- [Checking the Electrical Requirements](#)
- [Opening the Unit Cover](#)

---

### *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 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](#) ensure safe operation and maintenance.

---

### *Power Test*

Check the functionality of the power supply to the IPx Office system as follows:

1. Place an anti-static sheet over a desk or a table top that can support 19.4lb (8.8kg) (a plastic shipping bag will do).
2. Connect a ground wire between the IPx Office unit and the master ground as described in [Connecting the Ground Wire to the Unit, page 2-19](#).
3. Connect the power cable(s) as described in [Connecting the Power Wires, page 2-35](#).
4. If necessary, install the DC power supply. See [Installing the DC Power Supply, page 2-34](#).
5. Turn ON the PS Office ON/OFF switch.
6. Verify that the LED indicators on the front panel light as described in [Chapter 2, Hardware Installation Procedure](#).
7. Turn OFF the PS Office ON/OFF switch.
8. Disconnect the power cable(s).
9. Disconnect the ground wire.

## 4 Installing the Control and NTU Office cards

---

The control and NTU Office cards are installed in the front section of the system.

---

### *Opening the Unit Cover*

Remove the unit cover. See [Opening the Unit Cover, page 6-8](#).

---

### *Installing the Main Resources Card*

Install the Main Resources Card (MRC), if supplied. See [Installing the MRC, page 8-29](#).

---

### *Installing the DBM-X Card*

Install the (DBM-X) card, if supplied. See [Installing the DBM-X, page 8-43](#).

---

### *Installing the NTU Office Card*

Install the main NTU Office card, if supplied. See [Installing the NTU Office Card, page 11-10](#).

---

### *Installing the Internal LAN Cable*

Install the internal LAN cable, if an NTU Office card is *not* supplied. See [Connecting to the Network without an NTU Office Card, page 11-21](#).

---

### *Installing the WiFi Card and Antenna*

Install the optional WiFi NTU Office card and antenna, if supplied. See [Installing the WiFi Card, page 11-13](#).

---

### *Removing the Battery Insulator*

Carefully remove the battery insulator from underneath the lithium battery on the MCB Office card. See [Figure 8-8 on page 8-22](#).

---

### *Closing the Unit Cover*

Close the unit cover. See [Closing the Unit Cover, page 6-10](#).

## 5 Installing the External Components

---

### *Installing the IMC-8 or IMC-16 Flash Card*

Install the IMC-8 or IMC-16 flash card. See [IMC8 and IMC16 Flash Cards, page 8-33](#).

### *Installing the Compact Flash Disk*

Install the compact flash disk. See [Compact Flash Disk, page 8-39](#).

### *Installing the Software Authorization Unit*

Install the Software Authorization Unit (SAU). See [Installing the Software Authorization Unit, page 2-12](#).

### *Assembling the WiFi Antennas*

Install the WiFi antennas. See [Assembling the WiFi Antennas, page 11-15](#).

## 6 Mounting Table Units

For rack-mounted units, skip to [Mounting Rack Units, page 2-14](#). To mount the unit onto a table, peel off five rubber bumpers provided and affix them onto the bottom panel of the IPx Office unit as shown in [Figure 2-3](#).



### 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).

Figure 2-3 **Table Mounting Bumpers**

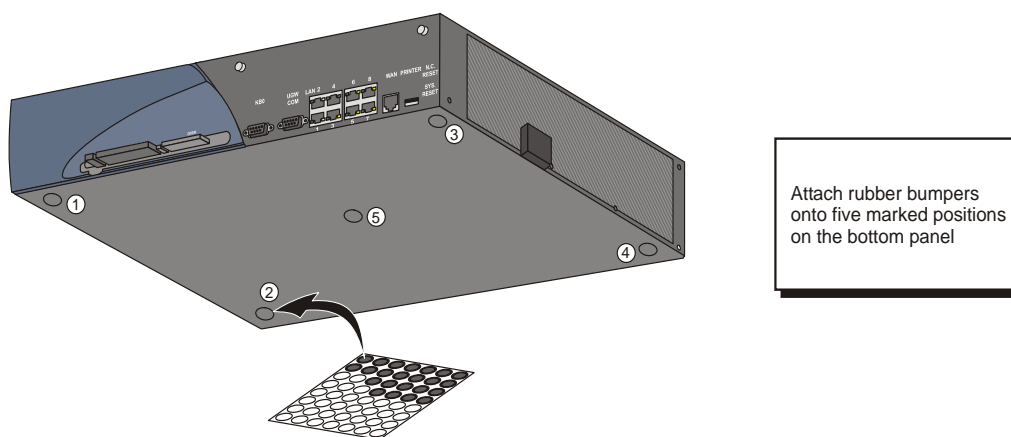
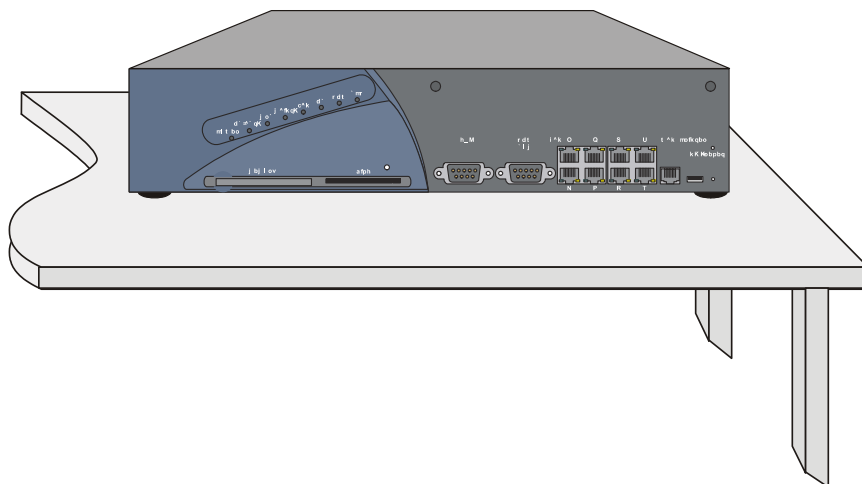


Figure 2-4 **IPx Office Unit Mounted on Table**



## 7 Mounting Rack Units

---

### *Preparing the Unit for Mounting onto the Rack*

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

### *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 2-5](#)):

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.

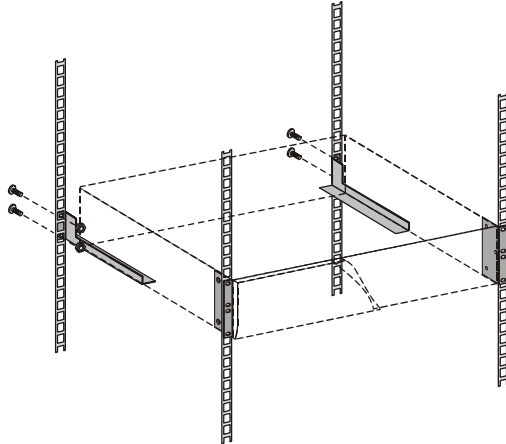
#### **WARNING!**

*Weight 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.*

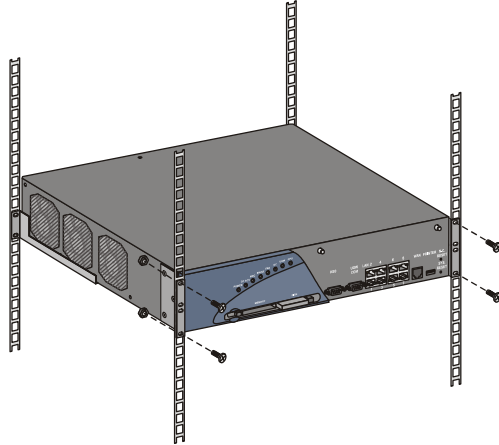
3. Rest the unit on the support brackets installed, while continuing to support the unit from the front and fasten the left and right bracket to the rack.



Figure 2-5 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. Turn OFF the ON/OFF switch on the PS Office unit.
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.*

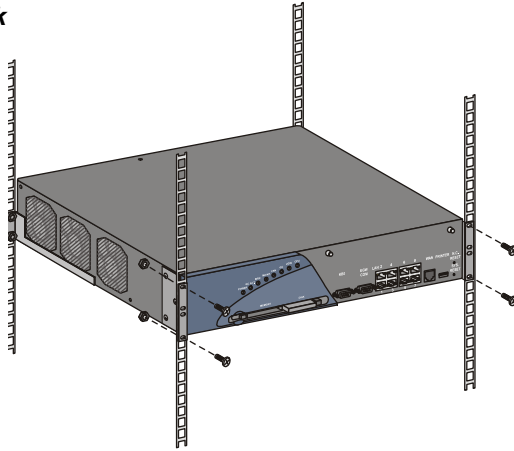
3. Disconnect all I/O cables from the rear panel.
4. Disconnect the ground wire from the unit ground terminal. **Do not** disconnect the ground connection from the master ground.
5. Unfasten the four screws that secure the unit to the rack on each side of the unit.

### **WARNING!**

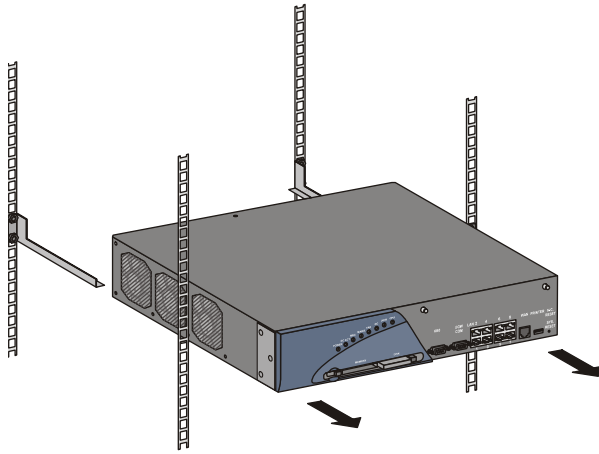
*Ergonomic Hazard. The cage weights are provided in [Table 2-2 on page 2-3](#). Serious back injury could result as a result of improper handling. Use proper lifting techniques to remove the unit from the rack.*

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

Figure 2-6 **Removing IPx Office Unit from Rack**



**1** Unfasten screws from front bracket



**2** Remove unit from rack

## 8 Ground Wiring

Proper system grounding is critical to reliable system operation. System grounding is only as effective as the ground point itself. To ensure adequate protection from interference by radio frequency 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 that is fixed onto the surface of the rear panel (by the manufacturer), 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 in 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 [Grounding the MDF Unit, page 2-20](#).

---

### *Connecting the Ground Wire to the Unit*

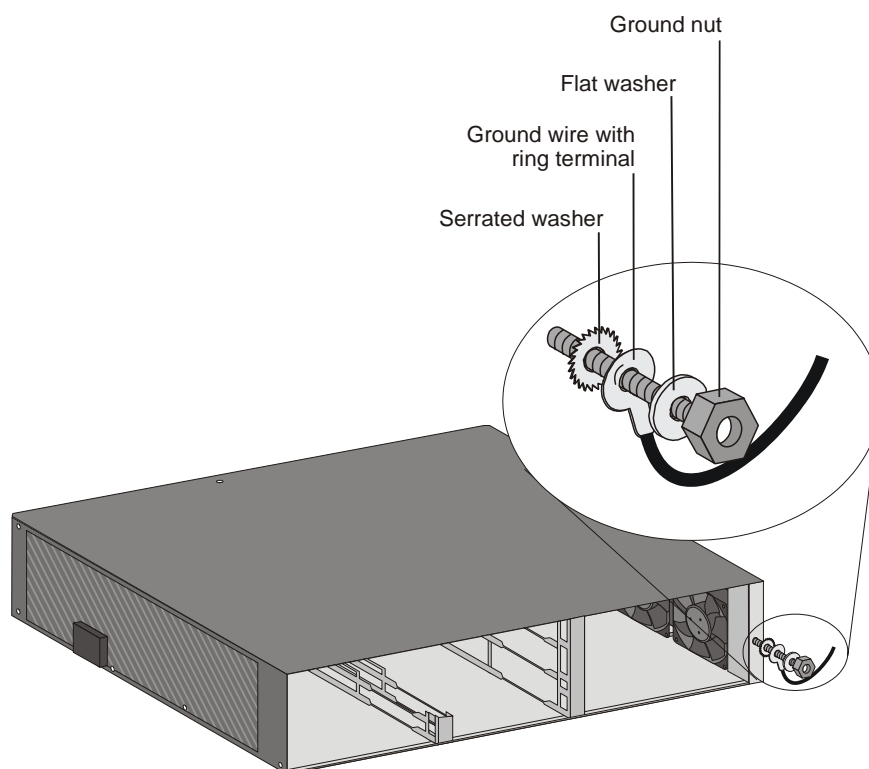
The cage ground connection includes one serrated washer, a flat washer, and one hexagonal nut assembled on the terminal connection. See [Figure 2-7](#).

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 2-7 Coral  
IPx Office Cage  
Ground Assembly**

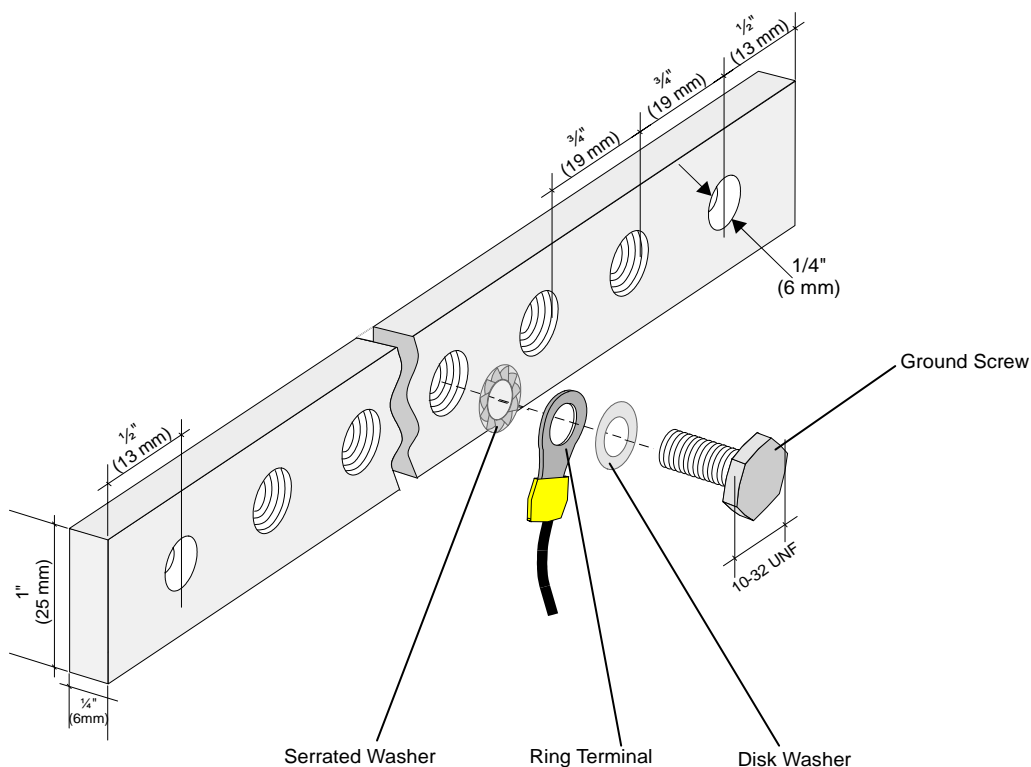


## Grounding the MDF Unit

A master ground must be included within the system. See [Figure 2-8](#), [Figure 2-9](#) and [Figure 2-10](#). The system ground connection is fabricated as follows:

1. The master ground unit must have the following specifications. See [Figure 2-8](#):  
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 2-8 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.
5. 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 2-8*.
  - 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 2-8*.
6. Repeat *Step 1* through *Step 5* 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 2-9* or *Figure 2-10*.
  7. Connect the MDF to the master ground according to the manufacturer's recommendations.

**Figure 2-9 System Ground Connection**

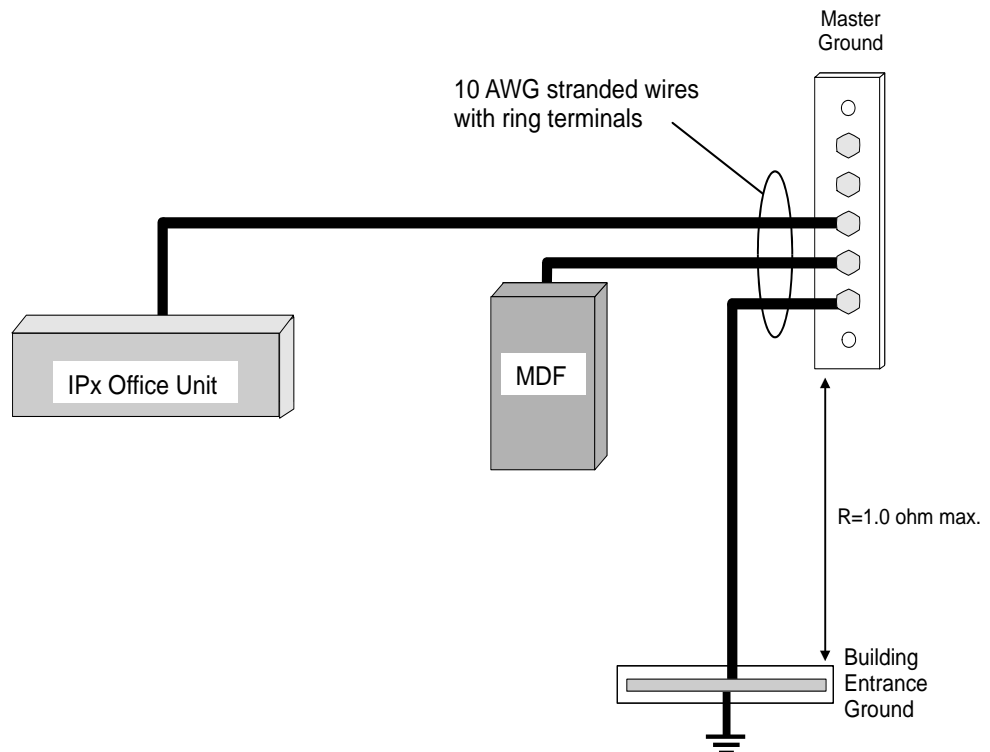
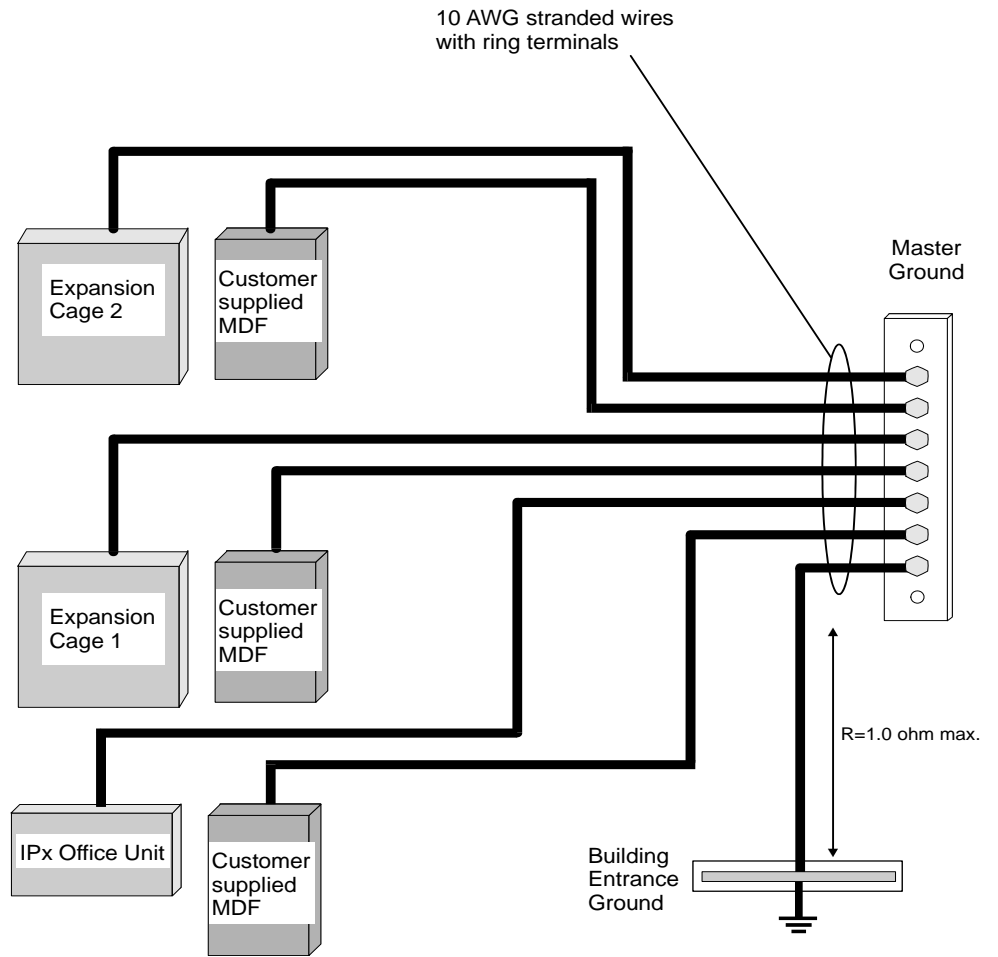


Figure 2-10 System Ground with Three Units





## 9 Strapping the Configuration Jumpers

This section describes how to remove and insert 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 specific card description, see [Chapter 9, Shared Service Cards](#) and [Chapter 10, Peripheral Cards](#). For a specific description of these cards, see the *Peripheral and Shared Service Cards Installation Manual*. This must be done before inserting the peripheral cards.

To set the configuration jumpers:

1. Connect the static dissipating 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 circuit cards. See [Figure 2-11 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**

*Defining different cards or cages by the same synchronization classification could lead to system disruption. Verify that the synchronization jumpers are strapped as described in [Chapter 10, Peripheral Cards](#).*

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

*Defining two expansion cages by the same cage number could lead to system disruption. Verify that the cage numbering jumpers are strapped as described in Chapter 6 of the Coral IPx 500 Installation and Hardware Reference Manual and/or the Coral IPx 800 Installation and Hardware Reference Manual.*

2. In the IPx Office unit, configure the peripheral card jumpers as described in *Peripheral and Shared Service Cards Installation Manual*.
3. For IPx 500X expansion cages, configure the jumpers as described in [Figure 2-13](#) and [Figure 2-14](#).
4. For IPx 800X expansion cages, configure the jumpers as described in [Figure 2-15](#) and [Figure 2-16](#).

## 10 Peripheral Card Installation

---

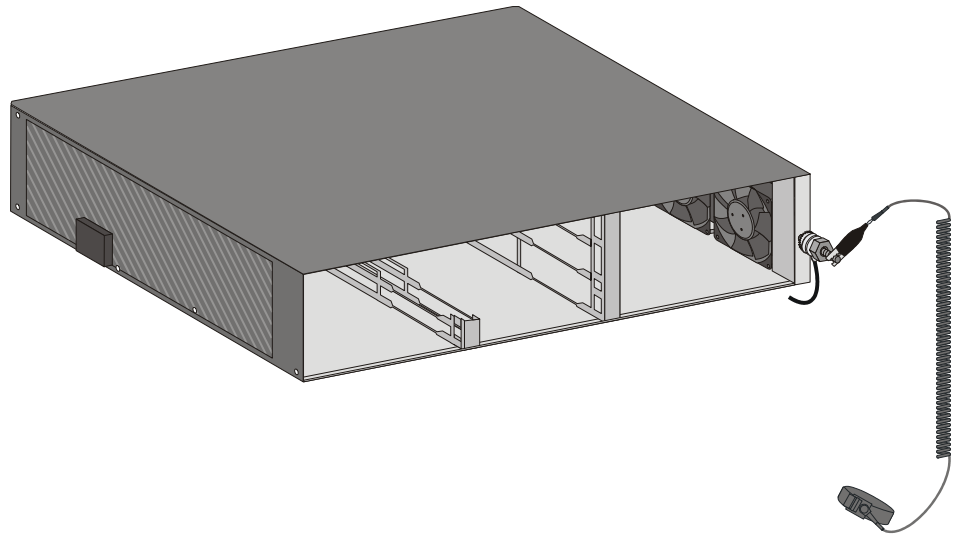
### CAUTION!

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 2-11](#). Hold circuit cards by their edges and avoid touching contact surfaces. Handle with care and do not drop.

### *Inserting a Coral Peripheral Card*

1. Connect a static dissipating wrist strap connector (not provided by the manufacturer) to the cage and put on the strap.

*Figure 2-11 ESD Strap Connection to Cage*



2. To insert a circuit card into a card slot, grasp the card with both hands and fingers on the edge of the card near the front side.
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 card cage, and 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. Push against the front panel until the front panel of the card 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 2-6](#) to determine peripheral interface card types.*

[Table 2-6](#) lists the peripheral interface card types that may be inserted into each card slot in the Coral IPx Office system.



Peripheral Interface cards listed in [Table 2-6](#) 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* for details.

5. Determine the position of peripheral interface cards that will be inserted into card slots 2-3 through slots 10-11 in the IPx Office unit and slots 1 through 10 in the IPx 500X cages or 1 through 12 in the IPx 800X cages. Observe any order previously directed by a system designer or any established convention of the distributor. Card placement diagrams [Figure 2-12](#) through [Figure 2-16](#) can be used as a worksheet by the system designer to establish card placement prior to installation. Refer to [Table 2-6](#) to determine peripheral interface card types.
  - See [Suggestions for Peripheral Card Distribution, page 6-34](#) 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*.
6. 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 2-13](#) through [Figure 2-15](#) 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*.

7. 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 2-15](#) through [Figure 2-16](#) 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 800 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 secondary and primary 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 10-9](#) 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.
8. 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).
9. Skip to [Interconnecting the IPx Office and the Expansion Cages, page 2-33](#).

Table 2-6 **Coral**  
**IPx Office Card Types**

<b>Card Type</b>	<b>Card Names</b>	<b>Slot Allocation</b>
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*, PRI-30 Office*, 30T Office*	8-9 or 10-11
Peripheral Wired Station Interface	8SFT Office, 16SFT Office, 24SFT Office, 4S Office*, 8S Office*, 20S Office (8S + 12Sx), 4S8F* Office (4S + 8Fx), 4S16F* Office (4S + 16Fx), 8S8F* Office (8S + 8Fx), 8S16F* Office (8S + 16Fx),	2-3 or 4-5
Integrated Coral Message Center/ Voice Mail / Unified Messaging	IPC/SFC Office IPC/uCMC Office IPC/WiCMC Office	2-3 or 4-5
Resources	MR* Office RMI* Office U-MR* Office U-RMI* Office*	6-7
Expansion	ESIM* Office	8-9

\* *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**.*

Figure 2-12 Coral IPx Office Card Placement

Coral IPx Office  
MAIN UNIT

Shelf Number: 1

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

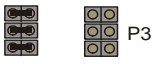

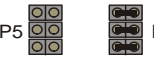
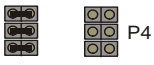


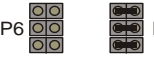
ESIM card Jumper configuration				
Synchronization Source	Primary and Secondary in any exp. cage	Secondary (yellow) in any exp. cage	Primary (green) in any exp. cage	Not the expansion cage in any exp. cage
	P5			
P6				

Figure 2-13 1st  
Expansion Cage 500X  
Card Placement

Coral IPx 500X  
1st EXP. CAGE

Shelf Number: 2

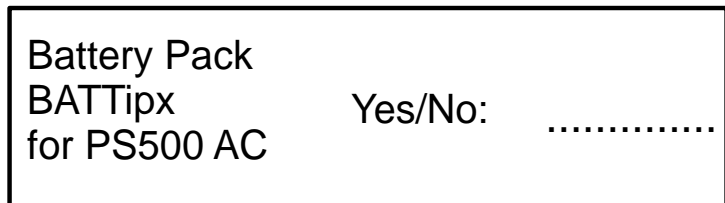
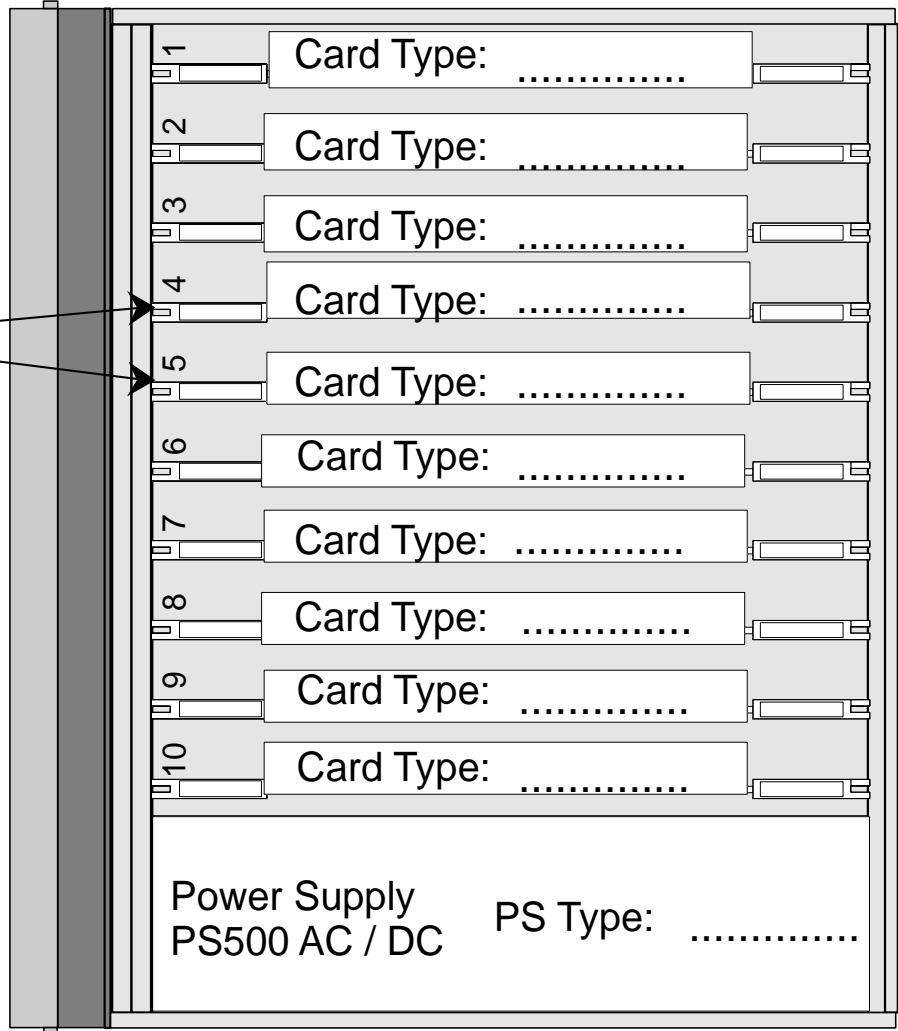
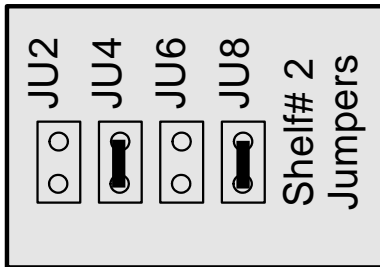
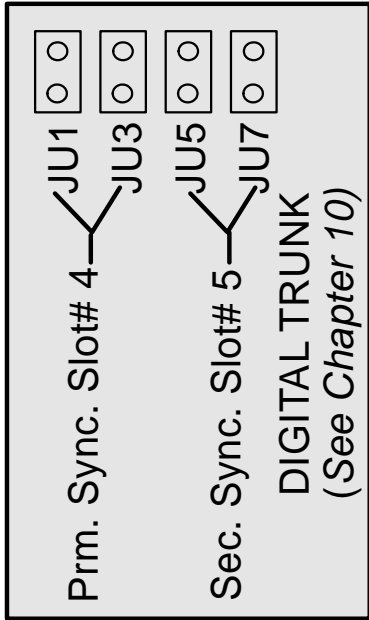


Figure 2-14 2nd  
Expansion Cage 500X  
Card Placement

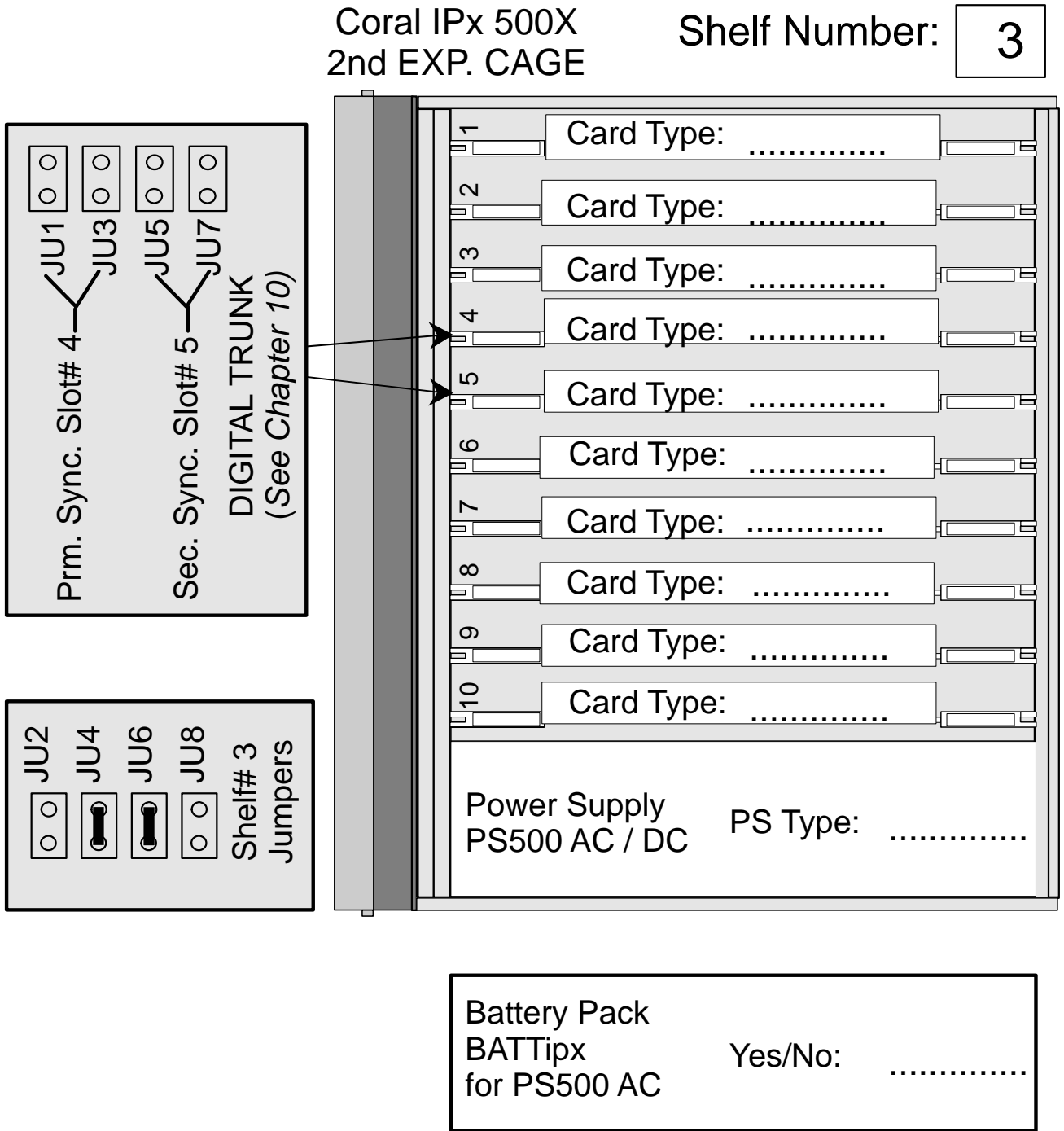
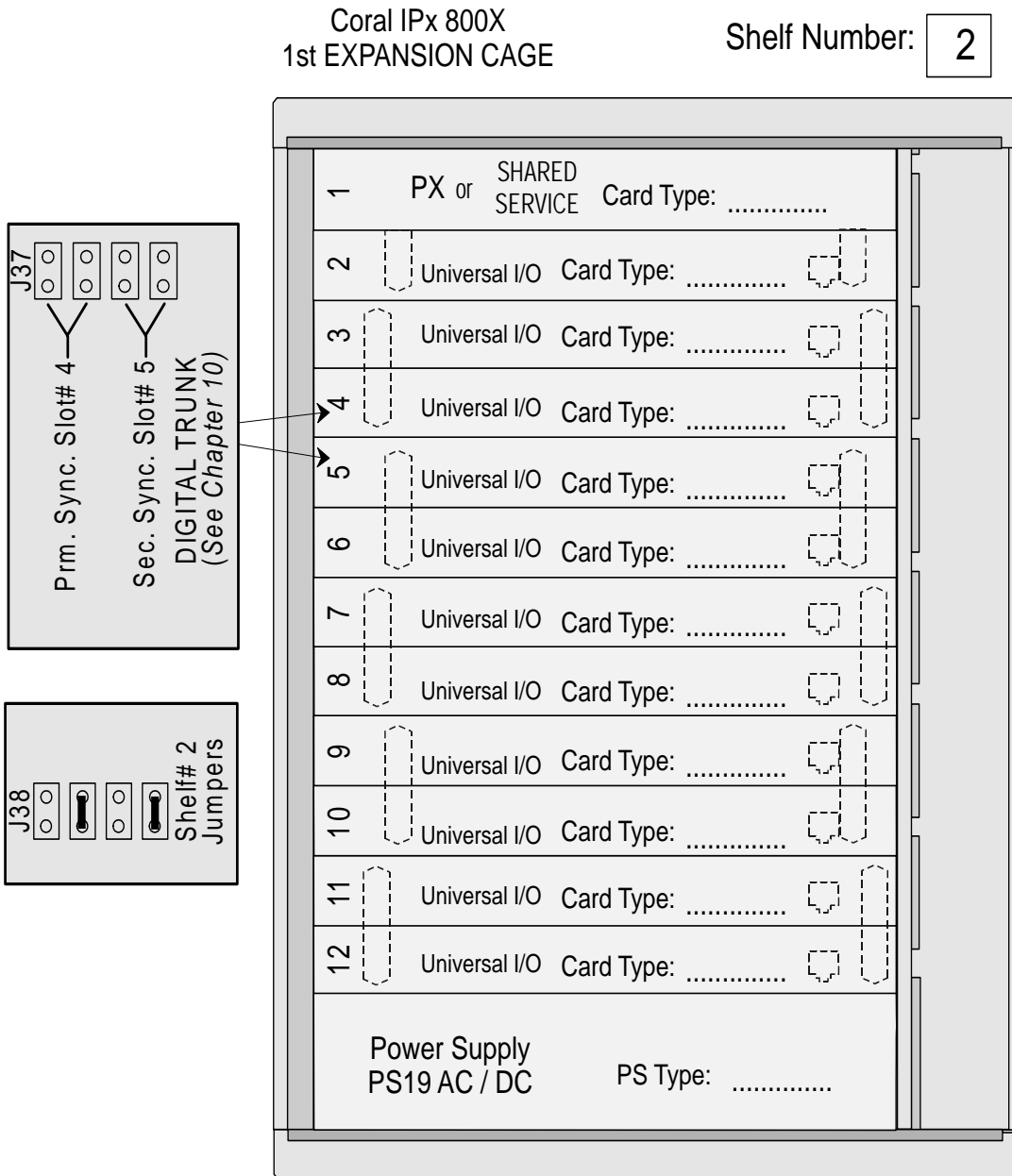




Figure 2-15 1st  
Expansion Cage 800X  
Card Placement



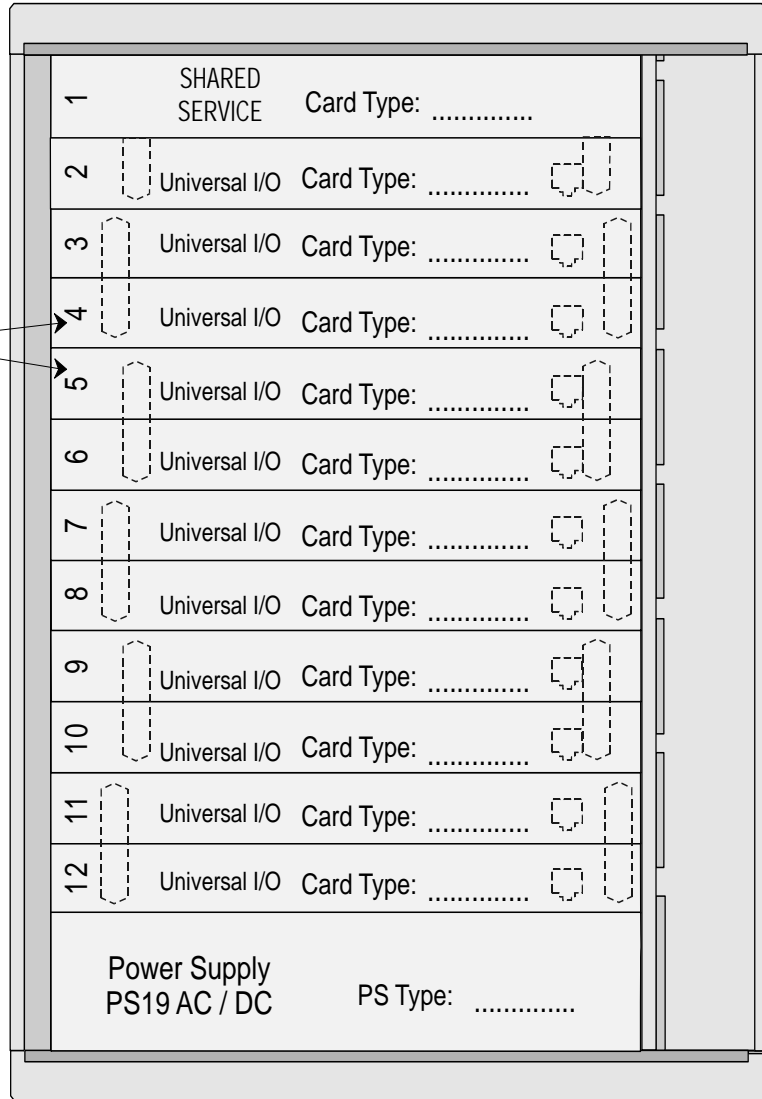
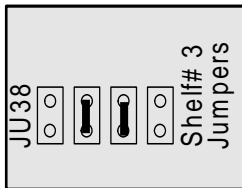
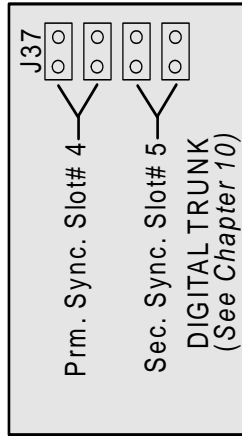
**Note:**

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

Figure 2-16 2nd  
Expansion Cage 800X  
Card Placement

Coral IPx 800X  
2nd EXPANSION CAGE

Shelf Number: **3**



## 11 Interconnecting the IPx Office and the Expansion Cages

---

This section describes how to interconnect the units within the Coral IPx Office system. For a full description of the different system configurations, see [Interconnecting the IPx Office Unit and the Expansion Cage, page 6-30](#).

A IPx Office expansion cable is supplied with the ESIM card and is used to connect the backplane of the cage to the IPx Office unit. The IPx Office expansion cable has one female D-Type 50-pin connector at one end and a SCSI female connector at the other end. When the IPx Office system includes expansion cages, the ESIM Office card is installed into the IPx Office unit in slot 8-9 and the IPx Office expansion cable is attached to the SCSI female connector on the front panel of the ESIM Office card.

---

### *Interconnecting the IPx Office Unit and the Expansion Cage*

1. Verify that the ESIM Office peripheral 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 peripheral card.
3. Plug the female, D-type connector of the cable into the connector labeled FROM CONTROL UNIT OR FIRST EXPANSION UNIT on the the first expansion cage.
4. Tighten the screws on both sides of the cable to secure it.

---

### *Interconnecting the 1st Expansion cage and 2nd 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. Tighten the screws on both sides of the cable to secure it.

---

### *Defining Expansion Cage Numbers*

Skip to [Strapping the Configuration Jumpers, page 2-23](#).

## 12 Installing the DC Power Supply

This section describes how to insert 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 2-17](#) and [Figure 2-18](#) 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 2-11 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. Verify that the power switch is turned OFF (downwards). See [Figure 2-17](#).
3. Grasp the power supply horizontally with both hands, fingers near the left and right of the power supply near the front panel.
4. 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.
5. Fasten the two M3 screws located on the top and bottom of the power supply front panel, thus securing the card to the cage as well as grounding the unit

### WARNING!

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

Figure 2-17 PS Office DC Front Panel



Removable screws

## 13 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 2-36](#).

### 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 2-18](#).

1. Route the AC power cord from the AC power receptacle to the DC 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:

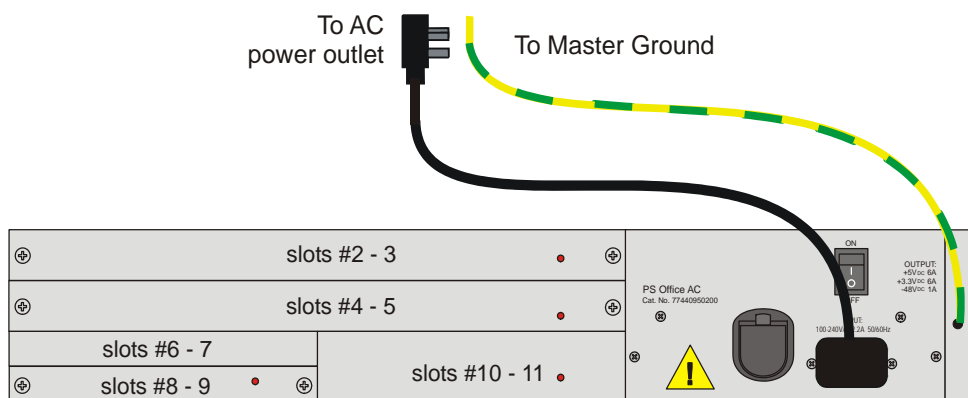
Use a UL Listed/CSA Labeled Cord Set consisting of a minimum 18 AWG, Type SVT or SJT three-conductor cord, terminating in a molded connector body. The cord should have an IEC CEE-22 female configuration on one end, and a molded-on parallel blade grounding type attachment plug rated 15A, 125V configuration (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 63" (160 cm) from the floor.

Figure 2-18 AC Power Connection for One IPx Office Unit



---

## 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 2-19](#) shows one IPx Office unit installed in the system, and [Figure 2-20](#) shows three units installed within the system.



---

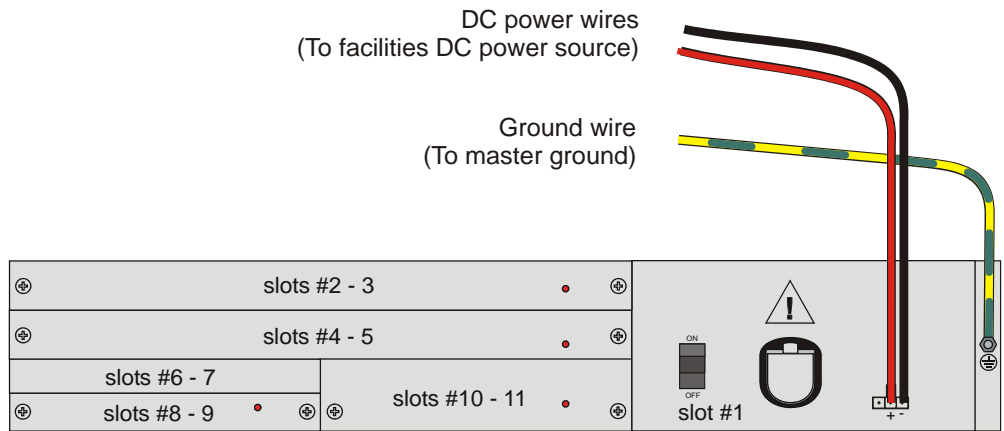
### NOTE:

*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.*

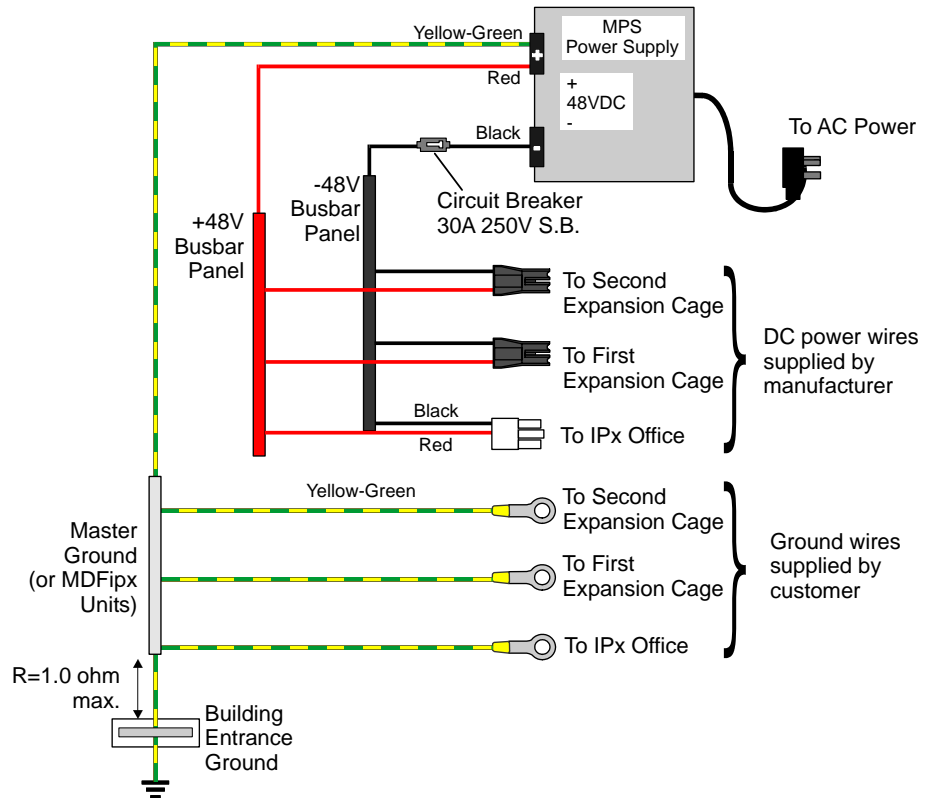
---

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 2-19](#) and [Figure 2-20](#) 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
5. Skip to [Chapter 3, Initial Power-up Tests](#).

**Figure 2-19 DC Power Wiring for One IPx Office Unit**



**Figure 2-20 DC Power Wiring for Three Units**







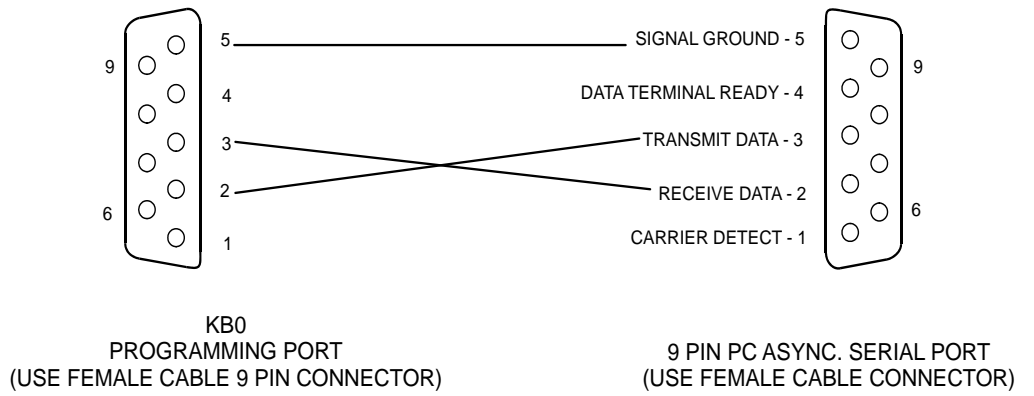
## 2.3 Program Interface Device Connection



*The data terminal or personal computer that will be used as the Program Interface (PI) device must be equipped with an RS-232E asynchronous serial data interface that can be configured for a data rate of 19200, 9600, 4800, 1200, or 300 bps, 8 data bits, 1 stop bit, and no parity bit or EVEN, ODD, mark, space, and parity. The PI device must use the ASCII character set. The ground connection to the PI device must be the same ground connection supplied to 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 2-21](#) 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 2-21](#).
4. If the PI device is a personal computer equipped with a DA-9P connector, wire the connectors according to [Figure 2-21](#).
5. For installations with a permanent PI device, route the serial data cable from the PI device to the front panel of the unit and connect it to the KB0 connector.

**Figure 2-21 9-Pin Program Interface Device Connections to KB0**



# Chapter 3

## Initial Power-up Tests

Coral

3.1 Power Supply Test.....	3-1
3.2 Common Control Test.....	3-5
3.3 Peripheral Interface Card Initialization.....	3-9
3.4 I/O Cable Installation.....	3-15
3.5 Installation Wrap-up.....	3-17



# 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.

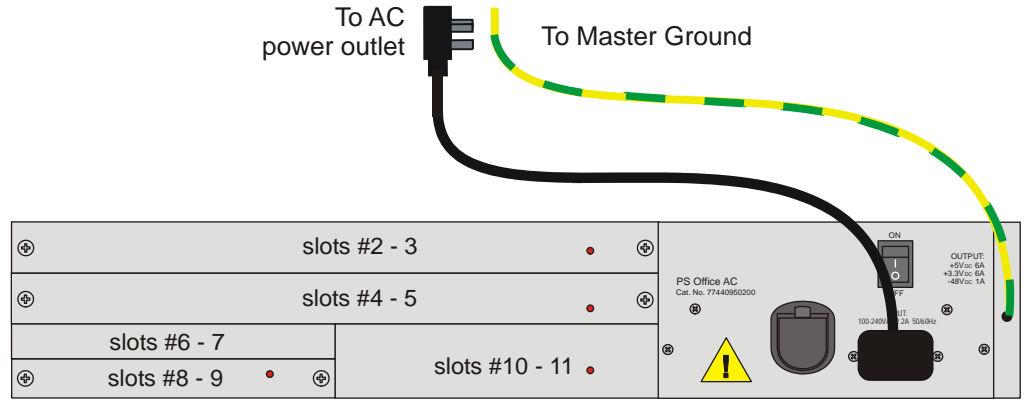
The IPx Office can operate as an AC powered system or as a DC powered system.

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

## 1 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 turned OFF (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. 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*.
7. Skip to [Common Control Test, page 3-5](#).

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



## 2 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 DC **power** switch is turned OFF (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 2-37](#) and on [DC Power Wiring for Three Units, page 2-37](#).

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.

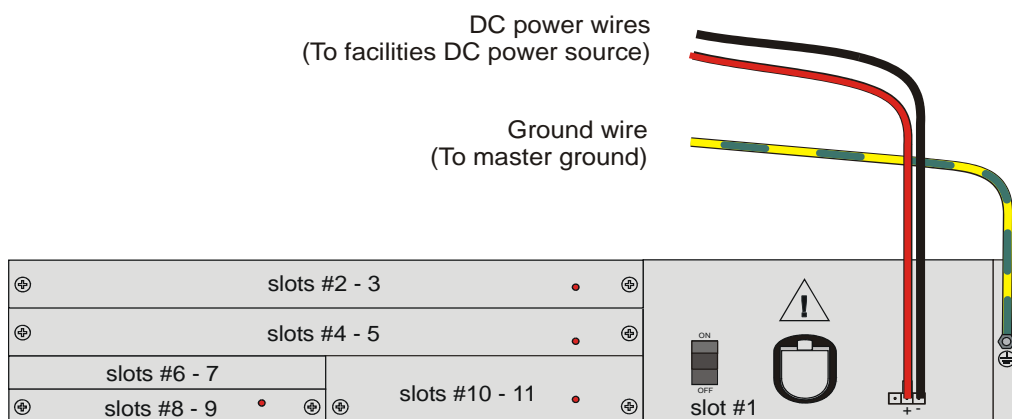


### NOTE:

*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. 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



## ***NOTES:***



## 3.2 Common Control Test

This section deals with the Common Control Test.

### 1 Control Card Initialization

---

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

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 unit. See Chapter 8.
5. Verify that the IMC8/IMC16 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 [IMC8 and IMC16 Flash Cards, page 8-33](#).
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**, respectively.
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 indicators illuminate as follows:
  - The green **POWER** indicator turns ON.
  - Red **GC** indicator turns ON until the system initializes and then turns OFF.
  - Red **UGW** indicator turns ON until the system initializes and then turns OFF.

- Red **CPU** indicator turns ON until the system initializes and then turns OFF.
  - The green **GC ACT.** indicator flashes after the GC initializes.
  - The green **MRC** indicator turns ON after the MRC card initializes.
9. 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/IMC16 card. To load the generic feature software into the IMC8 or IMC16 card, follow the procedure in [Chapter 4, Software Installation Procedure](#).

10. If the following message appears on the PI device during system 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 # -*

11. Do 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 IMC8/16 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.
12. Disconnect the KB0 cable from the front panel of the IPx Office unit.

## 2 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 messages 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/IMC16 card via the database controls branch of the system database (*ROUTE: ROOT, 0, 10, 2, 2, 0*). For details, see [System Database Control, page 4-5](#). 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.*

## 3.3 *Peripheral Interface Card Initialization*

### 1 Introduction

---

This section describes how to initialize the peripheral cards. Perform this section only after the MCB Office control card in the IPx Office has been initialized properly. If the peripheral cards are inserted before the IPx Office system has initialized, they will not initialize properly, either.

The card installation is described on [Rules for Inserting a Coral Circuit Card, page 3-10](#).

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

1. [Preparing for Initialization](#)
2. [IPx Office Unit Initialization](#)
3. [First Expansion Cage Initialization](#)
4. [Second Expansion Cage Initialization](#)

---

## 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 2-11 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 2-6 on page 2-27](#) to determine peripheral interface card types.*

4. On the front panel of the peripheral card, verify that the red diagnostic LED(s) (near the right side of the card) illuminates. The LED remains illuminated continuously until the card receives its database from the system. After a few seconds, verify that the LED extinguishes. An extinguished diagnostic LED indicates that the card has initialized properly.

If the LED 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 6-3](#), or refer to the *Coral Service and Peripheral Cards Installation Manual* for further details.

5. 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.
6. 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:

<i>shelf/slot</i>	<i>I_TYPE</i>	<i>P_TYPE</i>	<i>CDB</i>	<i>version</i>	<i>subversion</i>	<i>status</i>
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 unit is designated shelf # 1; the first expansion cage is labeled shelf #2; the second expansion cage is labeled shelf #3.

Slot Number..... Identifies the slot location of the indicated card for display. In the IPx Office unit, the range of slot numbers is 2-11; in the expansion cage, the range of slot numbers is 1-10.



There are five physical card slots located in the rear section of the IPx Office unit. However, the PI recognizes each physical slots 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 3-1](#).

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 3-1](#).
8. Verify that the STATUS field indicates ACTIVE for each of the cards installed. If another message is displayed, see [Table 3-1](#). For a complete list of card slot status messages, see *Chapter 6* of the the *Program Interface & Database Reference Manual*.

**Table 3-1 Card Slot Status Messages**

<b>Message</b>	<b>Description</b>	<b>Recommendations</b>
<b>ACTIVE</b>	Initialization was successfully completed.	None
<b>ACTIVE/P</b>	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. Partial Active for the iDSP card is not critical. Readjust the parameter value only when needed.
<b>REPLACED</b>	P_TYPE and I_TYPE are not compatible. Both i_type and p_type fields should show the required card name. 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.
<b>WAIT_DB</b>	Card has not received database, or has not reported initialization.	Continue waiting
<b>NO_RESOURCES</b>	Insufficient system memory to initialize card.	Check SIZES
<b>FAULT</b>	HDLC problem	Check HDLC wiring
<b>UNAUTHORIZED</b>	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.



## 2 System Initialization

### *Preparing for Initialization*

After the software has been installed and initialized:

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



*Before proceeding, verify that all power supply units within the expansion cages are turned OFF. If the expansion cages are turned ON before the IPx Office unit, the peripheral cards within the expansion cages 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 Coral Peripheral Card, page 2-24](#) and use the following card placement diagrams:
  - [Coral IPx Office Card Placement, page 2-28](#)
  - [1st Expansion Cage 500X Card Placement, page 2-29](#)
  - [2nd Expansion Cage 500X Card Placement, page 2-30](#)
  - [1st Expansion Cage 800X Card Placement, page 2-31](#)
  - [2nd Expansion Cage 800X Card Placement, page 2-32](#)
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 KB0 programming port connector on the front side of the IPx Office unit.

### *IPx Office Unit Initialization*

1. Verify that the MCB Office control card has been initialized properly.
2. Insert the peripheral cards completely into their card slots. See [Rules for Inserting a Coral Circuit Card, page 3-10](#). 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 2-12](#) for the location of each peripheral card slot.

---

## First Expansion Cage Initialization

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



### 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.

---

2. Insert the peripheral cards completely into their card slots. See [Rules for Inserting a Coral Circuit Card, page 3-10](#).  
Insert the cards fully, one by one, from right to left (slot #1-10) in adjacent card slots, so that the installation corresponds with the uniform numbering plan.
3. On the front panel of the power supply unit, verify that the green **power** indicator is lit, while the red **alarm** indicator is not lit.

---

## Second Expansion Cage Initialization

1. Turn ON the power supply unit in the second expansion cage.



### NOTE:

---

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

---

2. Insert the peripheral cards completely into their card slots. See [Rules for Inserting a Coral Circuit Card, page 3-10](#).  
Insert the cards fully, one by one, from right to left (slot# 1-10) in adjacent card slots, so that the installation corresponds with the uniform numbering plan.
3. On the front panel of the power supply unit, verify that the green **power** indicator is lit, while the red **alarm** indicator is not lit.

## 3.4 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.



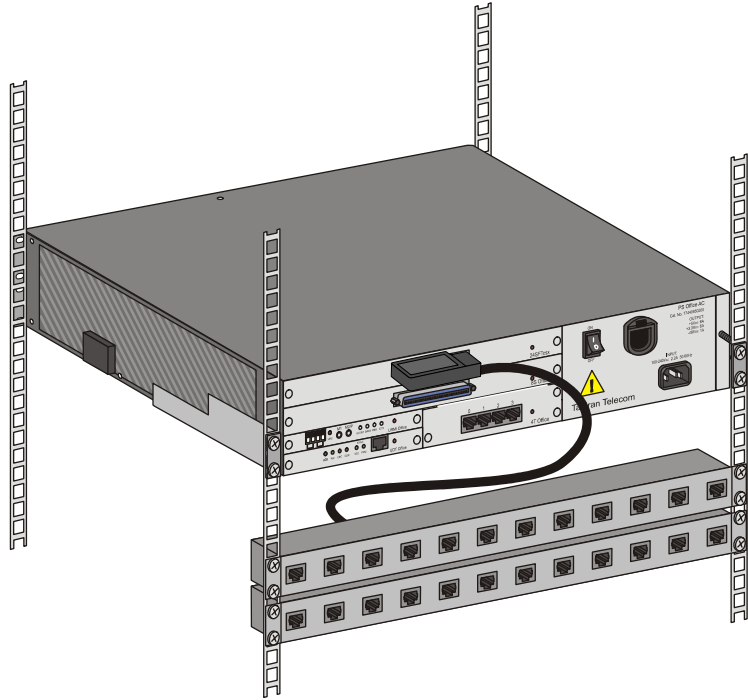
### NOTE:

*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 IPx Office I/O connector on the peripheral card. See [Figure 3-3](#) for the cage-MDF connection.
5. Connect the the I/O connections to the MDF in accordance with the instructions provided by your MDF manufacturer.
6. For information on external connections for peripheral card connection information (pinouts), refer to:
  - [Direct Pinout of the Champ/Card Connection, page 5-23](#)
  - or
  - [Direct Pinout of the MDF Connection, page 5-25.](#)
7. For information on protection devices, refer to [Protection Devices, page 5-11](#) for the surge arrestor mounting procedure.

8. For information about peripheral device hardware connections, refer to *Coral Terminal Equipment Installation Manual*.
9. 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*.

Figure 3-3 **MDF**  
**Connector Configuration**



## 3.5 Installation Wrap-up

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.*

---

## ***NOTES:***

# Chapter 4

## Software Installation Procedure

Coral

4.1 Generic Feature Software .....	4-1
4.2 System Database Control.....	4-5





# 4.1 *Generic Feature Software Upgrade*

## 1 Introduction

The Coral IPx Office is delivered to the site with factory-loaded software on the IMC8 or IMC16 card. The IMC8 card is an 8MB flash memory card. The IMC16 card is a 16MB flash memory card. See [IMC8 and IMC16 Flash Cards, page 8-33](#) for details. The IMC8 card is installed on the front panel of the IPx Office system.

The software initialization procedure is described in [Common Control Test, page 3-5](#).

The IMC8 and IMC16 cards contain three types of data:

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

The IMC8 or IMC16 card can be inserted into a PC slot using any PCMCIA application adapter for loading a new Coral software version.

Whenever an updated version of the IPx Office software is released, the upgrade is delivered to the sites either on 3.5" diskettes, via e-mail, or via other electronic media file transfer applications. The upgrade is contained in a self-extracting compressed file that is 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 onto the IMC8 and IMC16 cards. The FMprog is a tool for Coral dealers who install, upgrade and maintain Coral systems using flash memory cards. See the [FMprog PC-Utility Reference Manual](#). This reference manual describes how to install and operate the FMprog-Utility.

## 2 Upgrading Using the FMprog-Utility



### NOTE:

*Use FMprog version 5.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 5.xx and later)
- 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 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 / IMC16 Card*

### 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.*

To remove the IMC8/IMC16 card from the IPx Office unit:

1. Press the Reset button on the front panel of the IPx Office unit.
1. Press the Release button on the front panel of the IPx Office unit to remove the IMC8/IMC16 card.

### 3 Installing an Upgraded IMC8 / IMC16 Card

This section provides instructions on inserting the IMC8 / IMC16 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 or IMC16 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 / IMC16 Card*

#### **CAUTION!**

*Before each installation or removal of an IMC8/IMC16 card from the IPx Office unit, press the RESET button on the front panel of the IPx Office unit.*

1. Press the Release button on the PCMCIA drive of the PC to remove the new IMC8/IMC16 card.
2. Press the Reset button on the on the front panel of the IPx Office unit.
3. Press the Release button on the front panel of the IPx Office unit to remove the old IMC8/IMC16 card.
4. Insert the new IMC8/IMC16 card containing the upgraded generic software version.
5. Press the **Reset** button on the front panel of the IPx Office unit.
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 IMC8 or IMC16, 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 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 distant system, then installed at the proper system by replacing the existing IMC8 card from the other distant system containing the upgrade.

## 4 Upgrading the UGW Software

The Universal GateWay (UGW) software is embedded on the MCB Office card. To upgrade the UGW software, see TBD????

## 4.2 System Database Control

During normal system operation, the configuration database may be saved to a file on the IMC8 / IMC16 card for permanent storage. The system may also be programmed to save the database to IMC8 / IMC16 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 / IMC16 card. For more detailed information, see *Chapter 21* of the *Program Interface Reference Manual*.

### 1 Accessing the Database Flash Menu

1. If a session has not already been established, establish a PI programming session by entering a PI password.
1. 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

## 2 Saving to IMC8 or IMC16

The Database Save feature allows the system database to be copied to IMC8 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:

**DEST FILE (0,1) - [0]**

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.

3. 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.

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

4. 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.



### **NOTE:**

*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 will appear:

**NO SPACE FOR SAVING DATA BASE**

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

**CORRUPTED  
DBS**

5. 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.

### 3 Loading (Restoring) from IMC8 or IMC16

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 destroys the original database information stored in the database memory and overwrites it 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.

The system will display 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.

<b>Database File Name</b>	<b>PI Entry</b>	<b>File Description</b>
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 conditions 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 finishing the restoring 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.

## 4 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 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 <i>Invalid</i> - the backed up file is invalid

## 5 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.

6. 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:**

7. 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.
8. The system will return to the Database Backup menu. Press **0** to return to the Database menu.

## 6 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]
```

9. 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 of the erasing the following message appears:

```
Erase Completed ....
```

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

```
Erase failed !!
```

## 7 Backing up the Hard Disk onto the Compact Flash Card

---

In the future, IPx Office systems will include an optional hard disk that is installed onto the MCB Office card. The hard disk will be backed up with the compact flash card.

## 8 Loading (Restoring) from the Compact Flash Card

---

TBD



## External Connections

Coral

<i>5.1 Main Distribution Frame (MDF)</i> .....	<i>5-1</i>
<i>5.2 External Equipment</i> .....	<i>5-5</i>
<i>5.3 Protection Devices</i> .....	<i>5-11</i>
<i>5.4 Power Fail (PF) Transfer Circuits</i> .....	<i>5-15</i>
<i>5.5 Data Communication Ports</i> .....	<i>5-17</i>
<i>5.6 I/O Card Connections</i> .....	<i>5-19</i>
<i>5.7 LAN, WAN, and Printer Connections</i> .....	<i>5-35</i>





# 5.1 Main Distribution Frame (MDF)

This chapter describes the MDF and the pinout connections to the cage and external equipment. For hardware installation instructions, refer to [Hardware Installation Procedure, page 2-1](#).



---

*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 expansion cage and the MDF see the Coral IPX 500 Installation Procedure and Hardware Manual.*

*For information on the Coral IPx 800X expansion cage and the MDF, see the Coral IPx 800 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:**

---

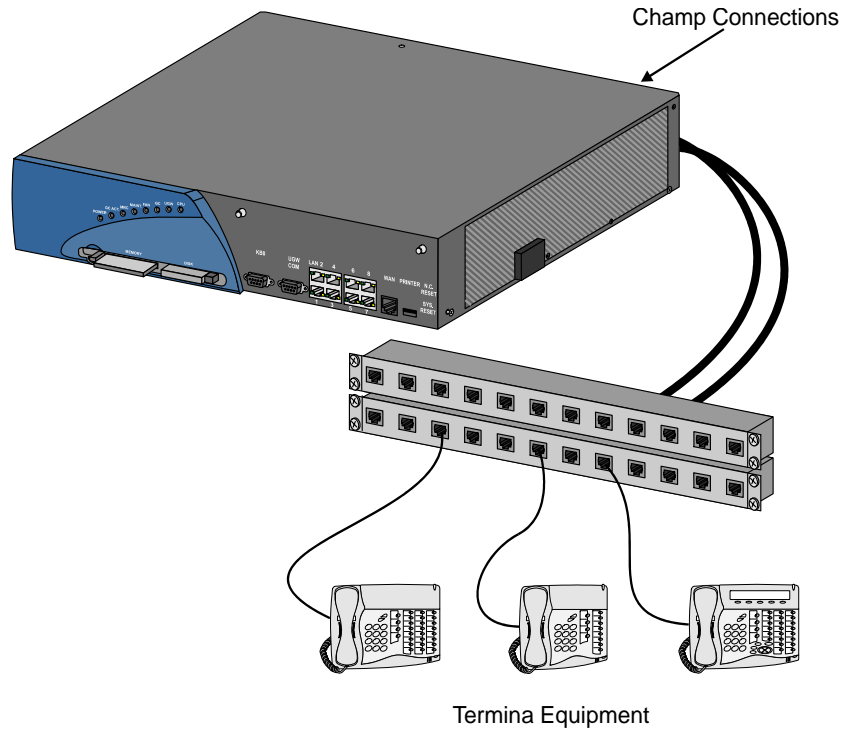
*It is recommended to terminate all the I/O connectors available in the system on punch blocks at the MDF even if some cables are not initially used. This saves time and effort when the system expands.*

---

**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
4/8S Office	1	-	-	
20S Office (8S + 12Sx)	1	-	-	
4S8F Office (4S + 8Fx)	1	-	-	
4S16F Office (4S + 16Fx)	1	-	-	
8S8F Office (8S + 8Fx)	1	-	-	
8S16F Office (8S + 16Fx)	1	-	-	
8T Office	-	8	-	
8T-CID Office (8T + 8CID)	-	8	-	
IPC (SFC/uCMC/WiCMC) office	-	-	see <a href="#">Figure 10-22</a>	
MR Office	-	-	2 stereo 3.5 mm phone plugs and 2 relay wire pairs see <a href="#">Figure 9-8</a>	6-7
RMI Office	-	-		
U-MR Office	-	-		
U-RMI Office	-	-		
ESIM Office	-	-	Expansion cable	8-9
30T Office	-	1	-	8-9, 10-11
4TBR Office	-	4	-	
PRI-30 Office	-	1	-	
UDT Office	-	1	-	
4T Office	-	4	-	10-11
4T-CID Office (4T + 4CID)	-	4	-	

Figure 5-1 Connecting via an MDF



## 5.2 External Equipment

### 1 Station Equipment

#### *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 5-2* 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 series or FlexSet APDL units with PEX or PEX+APA need an extra 2 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*.

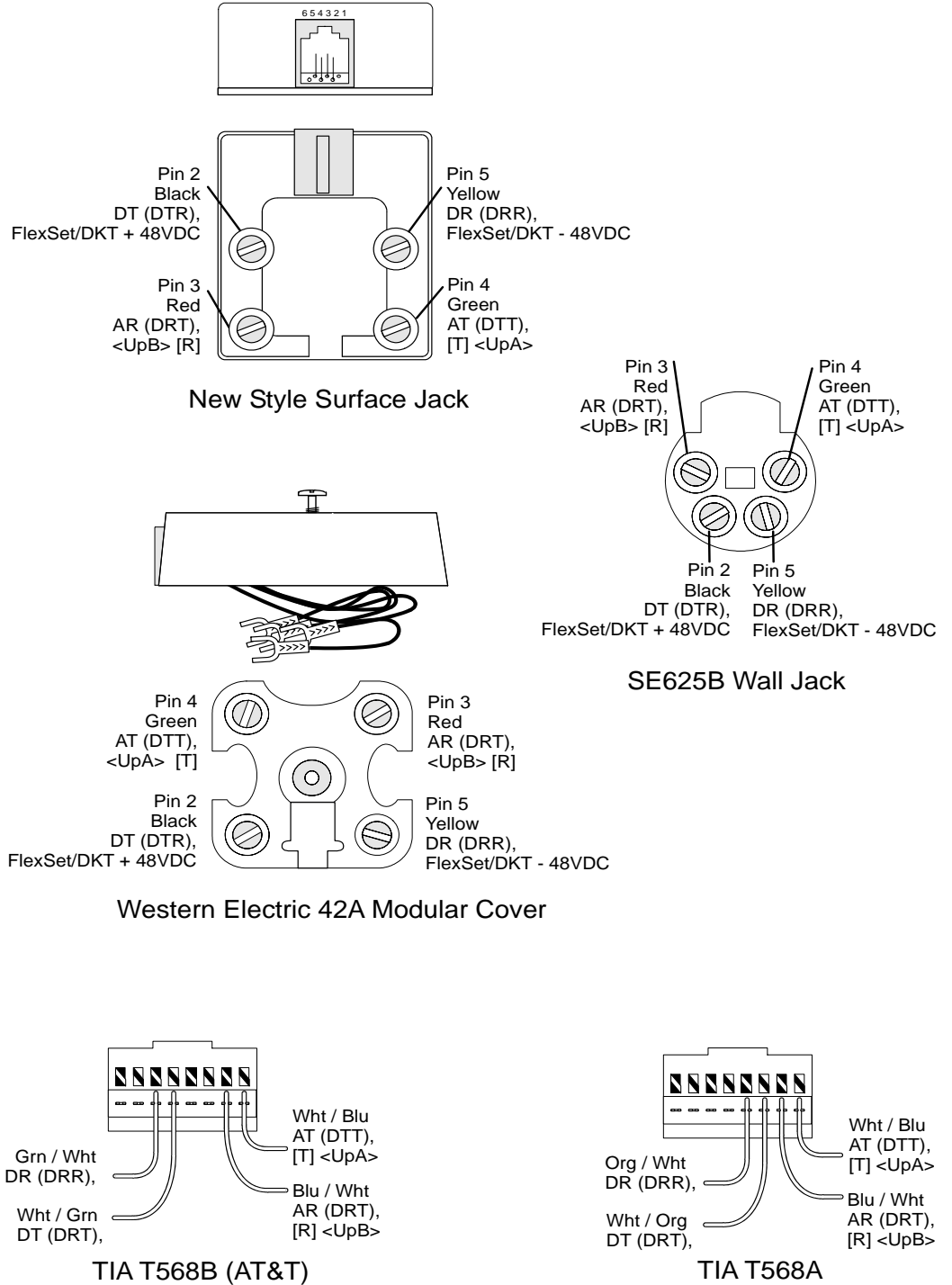
To prevent a potential shock hazard to station users and damage to the system, make sure that station circuits extended over cables that exit the building are adequately

protected from lightning and surge currents. See [Protection Devices, page 511](#) for protective device specifications.

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

<b>Station Interface Card Type</b>	<b>Supported Station Equipment</b>	<b>Pairs Required</b>
4/8/20S Office, 4S8F Office, 4S16F Office, 8S8F Office, 8S16F Office	Standard Single-Line Telephone (SLT) Sets, SLT Sets with Message Waiting Lamp	1
8/16/24SFT Office, 4S8F Office, 4S16F Office, 8S8F Office, 8S16F Office	FlexSet, APDL, CPA, GKT, APA, PEX, PEX+APA	1
	FlexSet 280 series with PEX, FlexSet 280S/APDL with PEX or PEX+APA, CPA;  for optional external power via line connector pins 2 and 5 (see <a href="#">Coral Terminal Equipment Installation Manual</a> ).	2
SIP phone, FlexSet-IP 280S, Coral Sentinel	LAN connection	2
	with power over LAN type-A	4

**Figure 5-2 Modular  
Wired Station Jack  
Wiring Diagram**



---

## *Wireless and VoIP Stations*

The FlexAir handset, the SIP phone and the FlexSet-IP 280S model are not connected via the MDF.

---

## *Related Documentation*

For further information about Coral voice terminals not covered by this section, consult the following documentation.

<b>Station Type</b>	<b>Manual</b>
IP device FlexSet-IP 280S, Coral Teleport FlexIP SoftPhone	Coral VoIP Installation Manual
Peripheral device FlexSet 120/280/121/281/APDL series	Coral Terminal Equipment Installation Manual

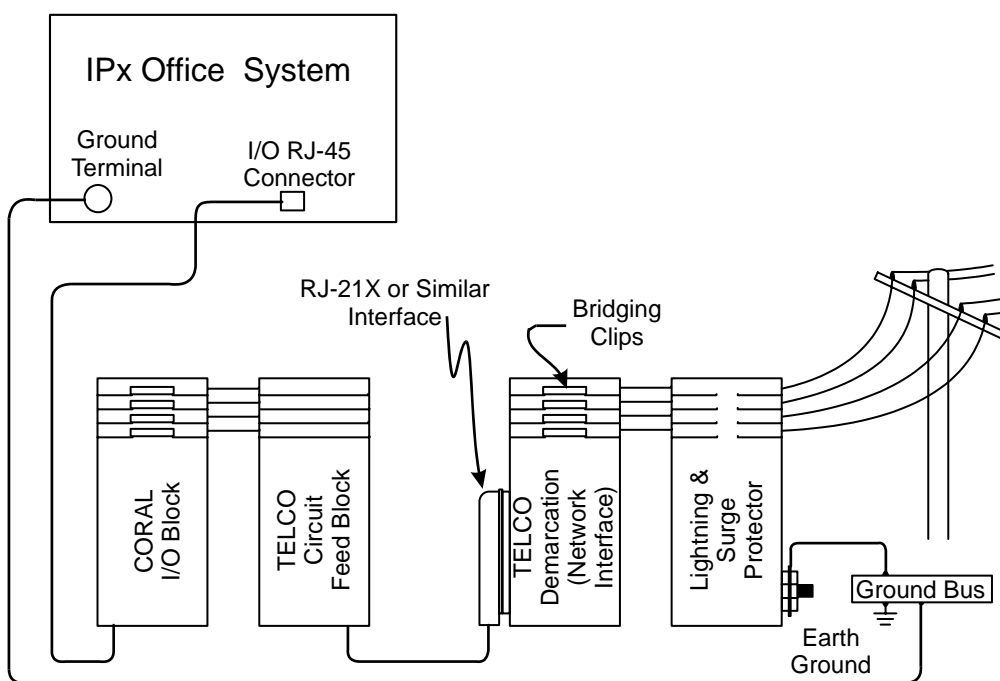


## 2 Trunk Circuits

Generally, trunk circuits are connected to the Coral IPx Office system simply by cross-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 105*. 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 if the TELCO protective devices meet the specifications provided in *Protection Devices, page 511*, 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 5-3* illustrates typical trunk circuit wiring from building entrance to the Coral IPx Office system.

Figure 5-3 **Typical Trunk Circuit Wiring Diagram**



# 1 Auxiliary Connections

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

**Table 5-3 Auxiliary Connectors**

<i>Card</i>	<i>Connector</i>	<i>Type</i>	<i>Remarks</i>
U-RMI Office U-MR Office RMI Office MR Office	Relays	Terminal Block	See <a href="#">Configuring the Relay Contacts Jumper, page 9101</a> for relays definition
	M1 Music	3.5 mm Stereo Phone Jack	See <a href="#">External Connectors, page 917</a> for details
	M2/P Music/Page		
ESIM Office	Expansion	The 50-pin, angled, SCSI connector	Used with Coral IPx 500X/800X Expansion Unit only

## 5.3 Protection Devices

### 1 Introduction to Primary and Secondary Protection Devices

#### **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 may 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 66 block in the MDF.

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

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

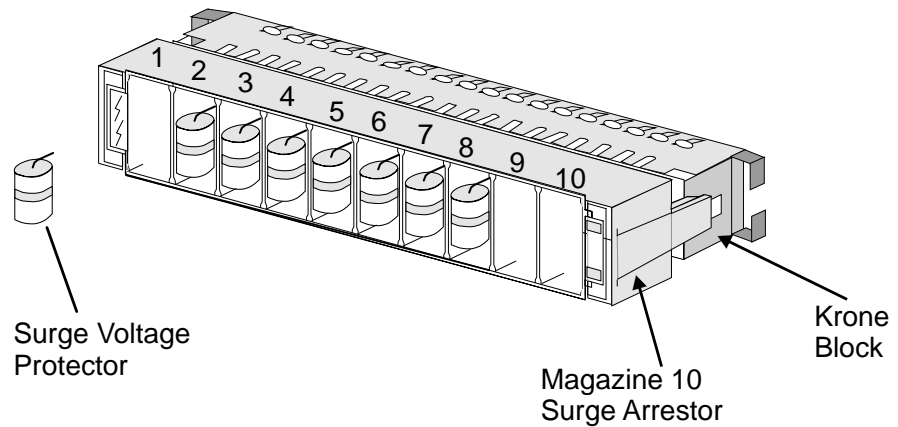
**Table 5-5 Telephone  
Circuit Secondary  
Protection Device  
Specifications**

<b>Device Type</b>	<b>Specification</b>	<b>Measurement</b>
Surge/Impulse Protector	Clamp Points DC. 2kV/S 100V/μS 10kV/μS	230VDC Max. 230VDC Max. 100VDC Max 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 100% of Rating 150% of Rating	4 Hr. Min. 10 Sec. Nom., 210 Sec. Max.

## 2 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 5-4 Magazine with 10 Surge Arrestor and Voltage Protector Units



The mounting procedure is as follows:

1. Identify the MDF disconnecting strips used for telephone connections.
2. Place a magazine 10 surge arrester (catalog no. 7244-3190009) on each MDF strip used for telephone.
3. Identify the MDF cross connection points that are used for each telephone. The connecting cables will be visible.
4. Insert a surge voltage protector (catalog no. 7244-2350001) in the magazine 10 surge arrester where a telephone is connected.

## 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.

### 1 Physical Connection

#### *Stations*

The SLT (single line telephone) set can be used as a power failure station. [Figure 5-5](#) 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.

## 2 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 Reference Manual* for more information.

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

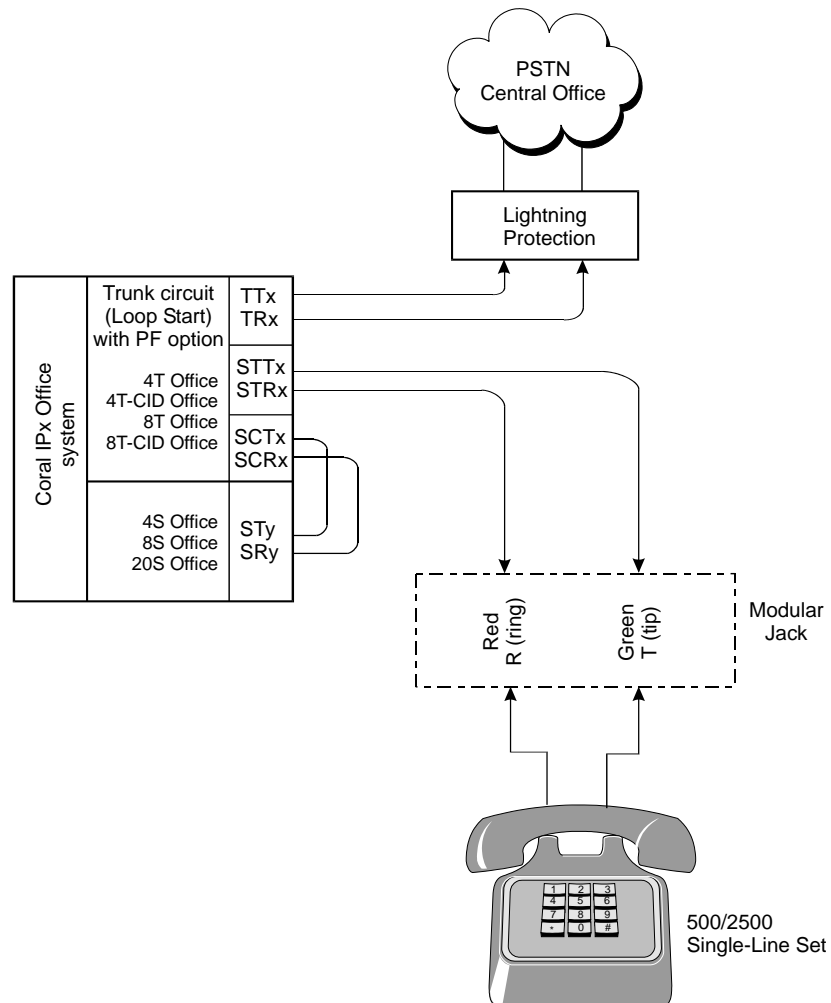
#### *FROM/TO DIAL#*

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





## 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 is data that is sent to the APA/APDL, and receive data is 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 an RJ-45 jack connector on the rear panel of the and 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 (WWO), TAPIdriver, GKT PC-Utility, or any other application that complies with proprietary API products.

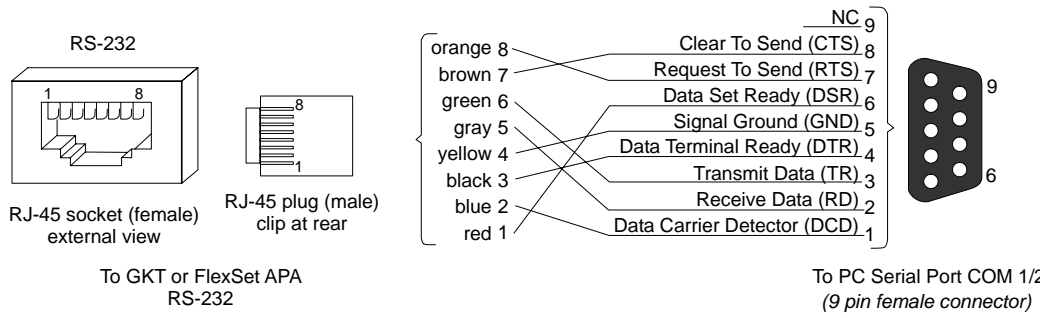
Use the following RS-232 cables:

- Catalog no. 7244-6914055 for FlexSet 280S/281S/APDL with APA or PEX+APA with APA or FlexSet 80 (GKT).

*Figure 5-6* 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 5-6 FlexSet 80 / 280S / 281S / APDL / APA or PEX+APA RS-232E (v.24) Pinout**



# 5.6 I/O Card Connections

## For Coral Peripheral Interface Cards

### 1 Peripheral Cards Index

The following tables display 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.

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

<b>External I/O Connectors Pinout</b>			
<b>Card Name</b>	<b>Connector</b>	<b>Card Slot</b>	<b>Table/Page</b>
12S Office (20S)	1 x Champ	2-3, 4-5	<a href="#">Table 5-8 on page 5-23</a> and <a href="#">Table 5-10 on page 5-25</a>
16Fx Office (4S16F or 8S16F)	1 x Champ	2-3, 4-5	<a href="#">Table 5-9 on page 5-24</a> and <a href="#">Table 5-11 on page 5-26</a>
16SFT Office	1 x Champ	2-3, 4-5	<a href="#">Table 5-8 on page 5-23</a> and <a href="#">Table 5-10 on page 5-25</a>
20S Office (8S + 12Sx)	1 x Champ	2-3, 4-5	<a href="#">Table 5-8 on page 5-23</a> and <a href="#">Table 5-10 on page 5-25</a>
24SFT Office	1 x Champ	2-3, 4-5	<a href="#">Table 5-8 on page 5-23</a> and <a href="#">Table 5-10 on page 5-25</a>
30T Office	1 x RJ-45	8-9, 10-11	<a href="#">Table 5-17 on page 5-33</a>
4S Office	1 x Champ	2-3, 4-5	<a href="#">Table 5-8 on page 5-23</a> and <a href="#">Table 5-10 on page 5-25</a>
4S16F Office (4S+16Fx)	1 x Champ	2-3, 4-5	<a href="#">Table 5-9 on page 5-24</a> and <a href="#">Table 5-11 on page 5-26</a>
4S8F Office (4S + 8Fx)	1 x Champ	2-3, 4-5	<a href="#">Table 5-9 on page 5-24</a> and <a href="#">Table 5-11 on page 5-26</a>
4T Office	4 x RJ-45	10-11	<a href="#">Table 5-12 on page 5-28</a>
4TBR Office	4 x RJ-45	8-9, 10-11	<a href="#">Table 5-14 on page 5-30</a>

### External I/O Connectors Pinout

Card Name	Connector	Card Slot	Table/Page
4T-CID Office (4T+4CID)	4 x RJ-45	10-11	<a href="#">Table 5-12 on page 5-28</a>
8Fx Office (4S8F or 8S8F)	1 x Champ	2-3, 4-5	<a href="#">Table 5-9 on page 5-24</a> and <a href="#">Table 5-11 on page 5-26</a>
8S Office	1 x Champ	2-3, 4-5	<a href="#">Table 5-8 on page 5-23</a> and <a href="#">Table 5-10 on page 5-25</a>
8S16F Office (8S+16Fx)	1 x Champ	2-3, 4-5	<a href="#">Table 5-9 on page 5-24</a> and <a href="#">Table 5-11 on page 5-26</a>
8S8F Office (8S + 8Fx)	1 x Champ	2-3, 4-5	<a href="#">Table 5-9 on page 5-24</a> and <a href="#">Table 5-11 on page 5-26</a>
8SFT Office	1 x Champ	2-3, 4-5	<a href="#">Table 5-8 on page 5-23</a> and <a href="#">Table 5-10 on page 5-25</a>
8T Office	8 x RJ-45	2-3, 4-5	<a href="#">Table 5-13 on page 5-29</a>
8T-CID Office (8T+8CID)	8 x RJ-45	2-3, 4-5	<a href="#">Table 5-13 on page 5-29</a>
IPC (SFC/uCMC/WiCMC) Office		2-3, 4-5	<a href="#">Figure 10-22 on page 10-42</a>
KB0 (MCB Office)	1 x DB-9P	Unit front panel	<a href="#">Table 8-1 on page 8-18</a>
LAN (MCB Office)	8 x RJ-45	Unit front panel	<a href="#">Table 5-18 on page 5-38</a>
MR Office RMI Office U-MR Office U-RMI Office	2 stereo 3.5 mm phone plugs and 2 relay wire pairs	6-7	<a href="#">Table 5-3 on page 5-10</a>
PRI-23 (UDT Office)	1 x RJ-45	8-9, 10-11	<a href="#">Table 5-15 on page 5-31</a>
PRI-30 Office	1 x RJ-45	8-9, 10-11	<a href="#">Table 5-16 on page 5-32</a>
PRINTER		Unit front panel	<a href="#">Chapter 11, System Networking</a>
T1(UDT Office)	1 x RJ-45	8-9, 10-11	<a href="#">Table 5-15 on page 5-31</a>
UDT Office (PRI-23/T1)	1 x RJ-45	8-9, 10-11	<a href="#">Table 5-15 on page 5-31</a>

**External I/O Connectors Pinout**

<b>Card Name</b>	<b>Connector</b>	<b>Card Slot</b>	<b>Table/Page</b>
UGW COMMON	1 x DB-9P	Unit front panel	<i>Chapter 11, System Networking</i>
WAN (MCB Office)	1 x RJ-45	Unit front panel	<i>Table 5-18 on page 5-38</i>

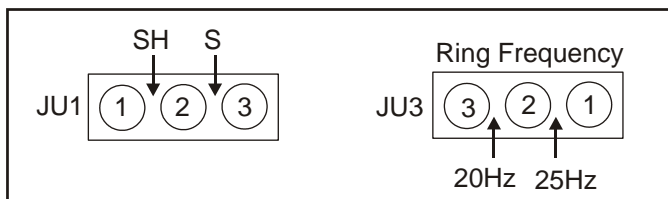
## 2 Champ Connections

The following tables display 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	Tables Starting	Information Provided
Champ 50 connector	<i>Direct Pinout of the Champ/Card Connection, page 523</i>	These tables display the direct pinout of the (I/O) connector (Champ 50) connected to the card.
Block 66 MDF	<i>Direct Pinout of the MDF Connection, page 525</i>	These tables display the Block 66 MDF connections.

**Figure 5-7 4S Office and 8S Office Jumper Settings**



## Direct Pinout of the Champ/Card Connection

*Table 5-8* displays the pinout connection directly on the Champ/card connection for the 4S Office, 8S Office, 20S Office, 8SFT Office, 16SFT Office, and 24SFT Office peripheral cards.

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

Pin	4S Office	8S Office	20S Office (8S+12Sx)	8SFT Office	16SFT Office	24SFT Office
1 26	SR0 ST0	SR0 ST0	SR0 ST0	A0 B0	A0 B0	A0 B0
2 27	SR1 ST1	SR1 ST1	SR1 ST1	A1 B1	A1 B1	A1 B1
3 28	SR2 ST2	SR2 ST2	SR2 ST2	A2 B2	A2 B2	A2 B2
4 29	SR3 ST3	SR3 ST3	SR3 ST3	A3 B3	A3 B3	A3 B3
5 30		SR4 ST4	SR4 ST4	A4 B4	B4 A4	B4 A4
6 31		SR5 ST5	SR5 ST5	A5 B5	A5 B5	A5 B5
7 32		SR6 ST6	SR6 ST6	A6 B6	A6 B6	A6 B6
8 33		SR7 ST7	SR7 ST7	A7 B7	A7 B7	A7 B7
9 34			SR8 ST8		A8 B8	A8 B8
10 35			SR9 ST9		A9 B9	A9 B9
11 36			SR10 ST10		A10 B10	A10 B10
12 37			SR11 ST11		A11 B11	A11 B11
13 38			SR12 ST12		A12 B12	A12 B12
14 39			SR13 ST13		A13 B13	A13 B13
15 40			SR14 ST14		A14 B14	A14 B14
16 41			SR15 ST15		A15 B15	A15 B15
17 42			SR16 ST16			A16 B16
18 43			SR17 ST17			A17 B17
19 44			SR18 ST18			A18 B18
20 45			SR19 ST19			A19 B19
21 46						A20 B20
22 47						A21 B21
23 48						A22 B22
24 49						A23 B23
25 50						

Table 5-9 displays the pinout connection directly on the Champ/card connection for the 4S8F Office, 4S16F Office, 8S8F Office and 8S16F Office peripheral cards.

**Table 5-9 Champ 50 Connector Card Pinout (4S8F, 4S16F, 8S8F, 8S16F)**

Pin	4S8F Office (4S + 8Fx)	4S16F Office (4S + 16Fx)	8S8F Office (8S + 8Fx)	8S16F Office (8S + 16Fx)
1 26	SR0 ST0	SR0 ST0	SR0 ST0	SR0 ST0
2 27	SR1 ST1	SR1 ST1	SR1 ST1	SR1 ST1
3 28	SR2 ST2	SR2 ST2	SR2 ST2	SR2 ST2
4 29	SR3 ST3	SR3 ST3	SR3 ST3	SR3 ST3
5 30			SR4 ST4	SR4 ST4
6 31			SR5 ST5	SR5 ST5
7 32			SR6 ST6	SR6 ST6
8 33			SR7 ST7	SR7 ST7
9 34	A0 B0	A0 B0	A0 B0	A0 B0
10 35	A1 B1	A1 B1	A1 B1	A1 B1
11 36	A2 B2	A2 B2	A2 B2	A2 B2
12 37	A3 B3	A3 B3	A3 B3	A3 B3
13 38	B4 A4	B4 A4	B4 A4	B4 A4
14 39	A5 B5	A5 B5	A5 B5	A5 B5
15 40	A6 B6	A6 B6	A6 B6	A6 B6
16 41	A7 B7	A7 B7	A7 B7	A7 B7
17 42		A8 B8		A8 B8
18 43		A9 B9		A9 B9
19 44		A10 B10		A10 B10
20 45		A11 B11		A11 B11
21 46		A12 B12		A12 B12
22 47		A13 B13		A13 B13
23 48		A14 B14		A14 B14
24 49		A15 B15		A15 B15
25 50				



## Direct Pinout of the MDF Connection

Table 5-10 displays the pinout connection on the block 66 MDF connection for the 4S Office, 8S Office, 20S Office, 8SFT Office, 16SFT Office, and 24SFT Office peripheral cards.

Table 5-10 **Block 66  
MDF Pinout (4/8/20S,  
8/16/24SFT)**

<b>Pin/Color</b>	<b>4S Office</b>	<b>8S Office</b>	<b>20S Office (8S+12Sx)</b>	<b>8SFT Office</b>	<b>16SFT Office</b>	<b>24SFT Office</b>
1/26 White/Blue	S0	S0	S0	A/B0	A/B0	A/B0
2/27 White/Orange	S1	S1	S1	A/B1	A/B1	A/B1
3/28 White/Green	S2	S2	S2	A/B2	A/B2	A/B2
4/29 White/Brown	S3	S3	S3	A/B3	A/B3	A/B3
5/30 White/Slate		S4	S4	A/B4	A/B4	A/B4
6/31 Red/Blue		S5	S5	A/B5	A/B5	A/B5
7/32 Red/Orange		S6	S6	A/B6	A/B6	A/B6
8/33 Red/Green		S7	S7	A/B7	A/B7	A/B7
9/34 Red/Brown			S8		A/B8	A/B8
10/35 Red/Slate			S9		A/B9	A/B9
11/36 Black/Blue			S10		A/B10	A/B10
12/37 Black/Orange			S11		A/B11	A/B11
13/38 Black/Green			S12		A/B12	A/B12
14/39 Black/Brown			S13		A/B13	A/B13
15/40 Black/Slate			S14		A/B14	A/B14
16/41 Yellow/Blue			S15		A/B15	A/B15
17/42 Yellow/Orange			S16			A/B16
18/43 Yellow/Green			S17			A/B17
19/44 Yellow/Brown			S18			A/B18
20/45 Yellow/Slate			S19			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 5-11 displays the pinout connection on the block 66 MDF connection for the 4S8F Office, 4S16F Office, 8S8F Office and 8S16F Office peripheral cards.

**Table 5-11 Block 66 MDF Pinout (4S8F, 4S16F, 8S8F, 8S16F)**

<b>Pin/Color</b>	<b>4S8F Office (4S + 8Fx)</b>	<b>4S16F Office (4S + 16Fx)</b>	<b>8S8F Office (8S + 8Fx)</b>	<b>8S16F Office (8S + 16Fx)</b>
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				

### 3 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.

<b>Card Name</b>	<b>Page</b>
4T Office, 4T-CID Office	<i>on page 5-28</i>
8T Office, 8T-CID Office	<i>on page 5-29</i>
4TBR Office	<i>on page 5-30</i>
UDT Office (PRI-23), PRI-30 Office	<i>on page 5-32</i>
UDT Office (T1), 30T Office	<i>on page 5-33</i>
LAN/WAN (IPx Office Front Panel)	<i>on page 5-38</i>

## 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 5-12](#) and [Figure 5-8](#).

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



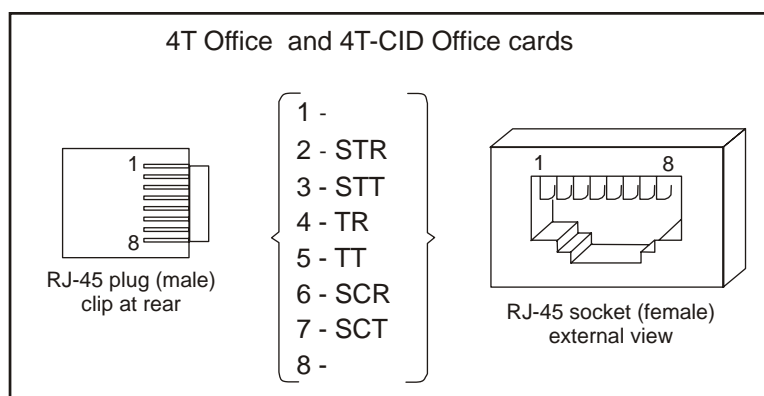
### NOTE:

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

Table 5-12 **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 5-8 **4T / 4T-CID Office Pinout**



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

See [Figure 5-5 on page 5-16](#) 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 5-13](#) and [Figure 5-9](#).

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:



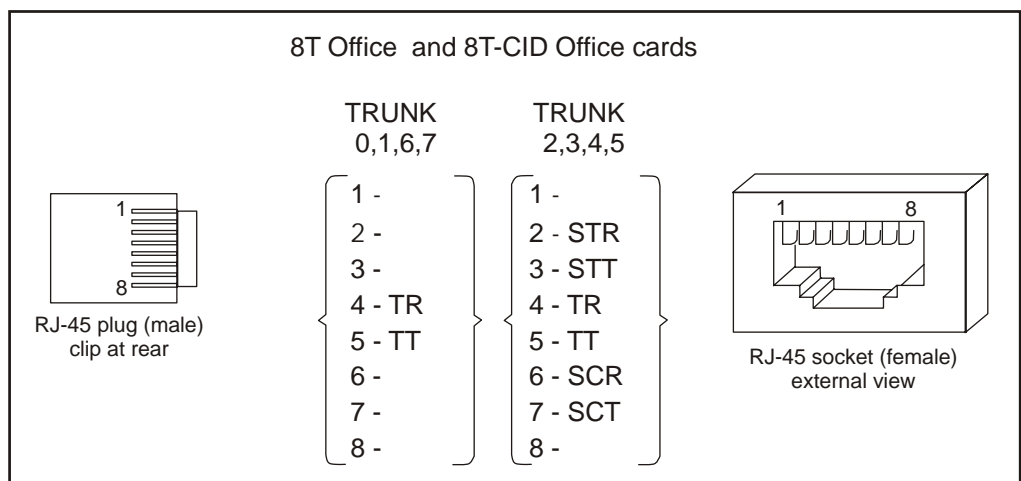
### NOTE:

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

Table 5-13 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 5-9 8T / 8T-CID Office Pinout



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

See [Figure 5-5 on page 5-16](#) 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 the RJ-45 telephony connector on the front panel. See [Table 5-14](#) and [Figure 5-10](#).



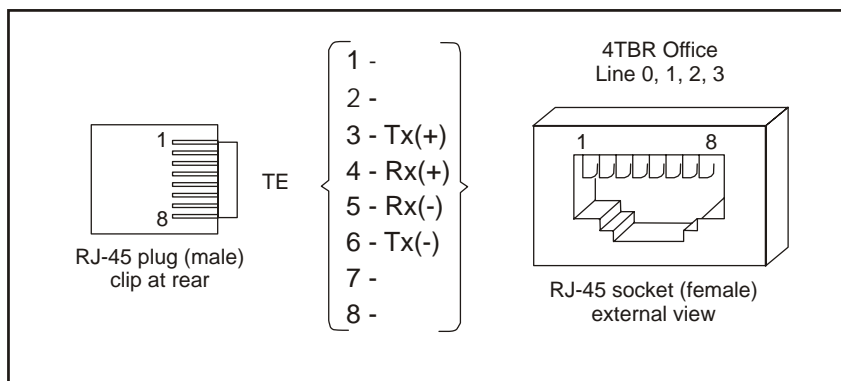
### NOTE:

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

Table 5-14 4TBR Office Pinout

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

Figure 5-10 4TBR Office Pinout



### NOTE:

For synchronization jumpers, see [Figure 10-6](#) on [page 10-26](#).

## 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 5-16](#) and [Figure 5-11](#).



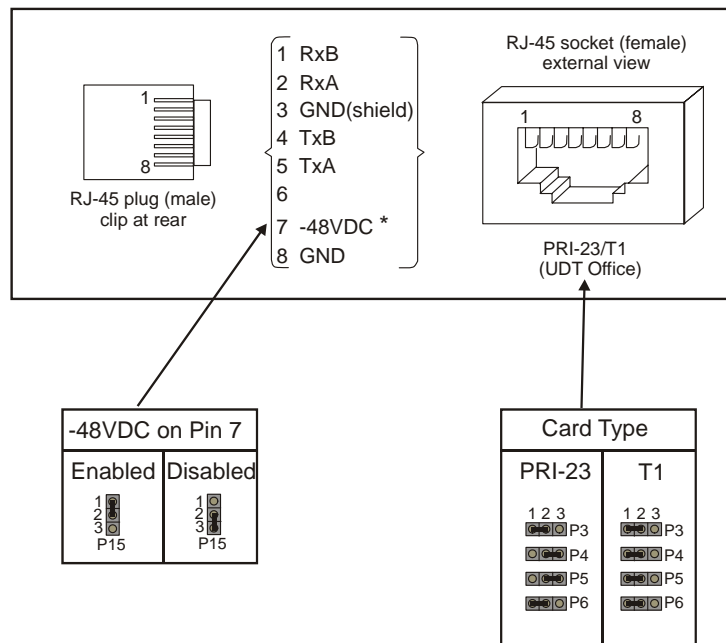
### NOTE:

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 5-15 **UDT Office (PRI-23/T1) 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 (Enable/Disable see <a href="#">Figure 5-11</a> )
Pin 8	GND	Cable Shield, 48VDC Return

Figure 5-11 **UDT Office (PRI-23/T1) Pinout**



### NOTE:

For synchronization jumpers, see [Figure 10-8](#) on [page 10-28](#).

## 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 5-16](#) and [Figure 5-12](#).



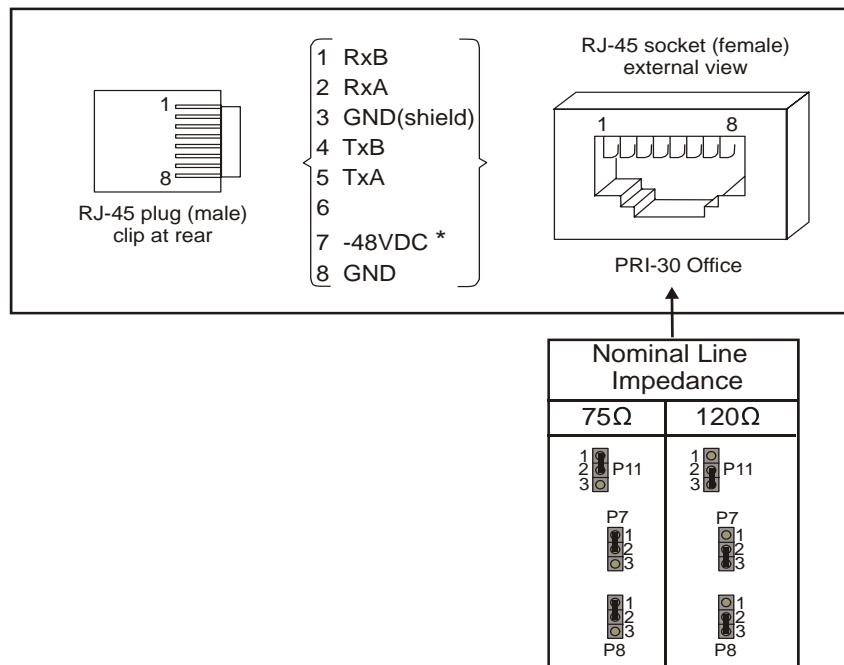
### NOTE:

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

Table 5-16 *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 5-12 *PRI-30 Office Pinout*



### NOTE:

For synchronization jumpers, see [Figure 10-7](#) on [page 10-27](#).



## 30T Office Card

The external network connections to the 30T Office digital circuit are made via the RJ-45 telephony connector on the front panel. See [Table 5-17](#) and [Figure 5-13](#).



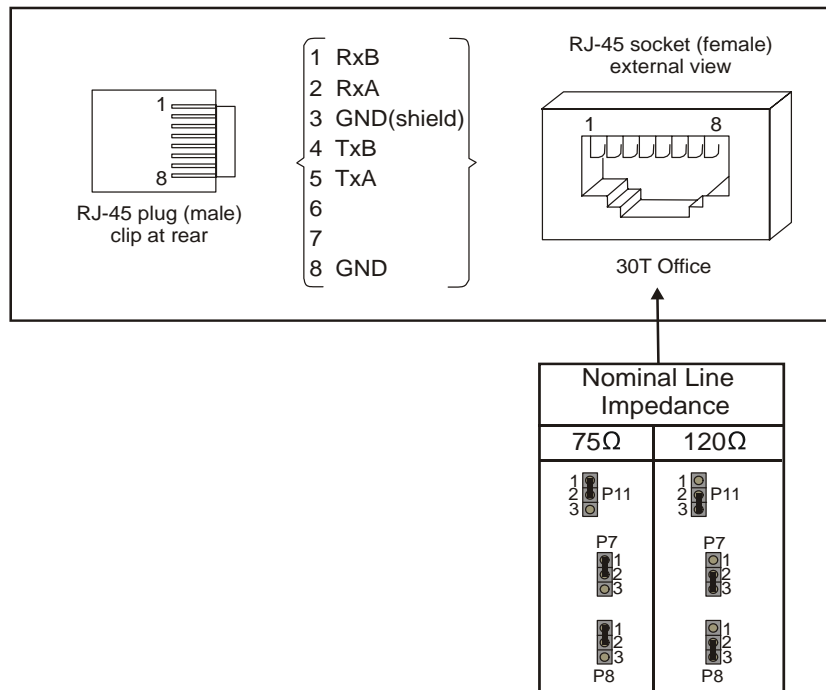
### NOTE:

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 5-17 30T Office Pinout

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 5-13 30T Office Pinout



### NOTE:

For impedance jumpers, see [Figure 10-5](#) on [page 10-25](#).



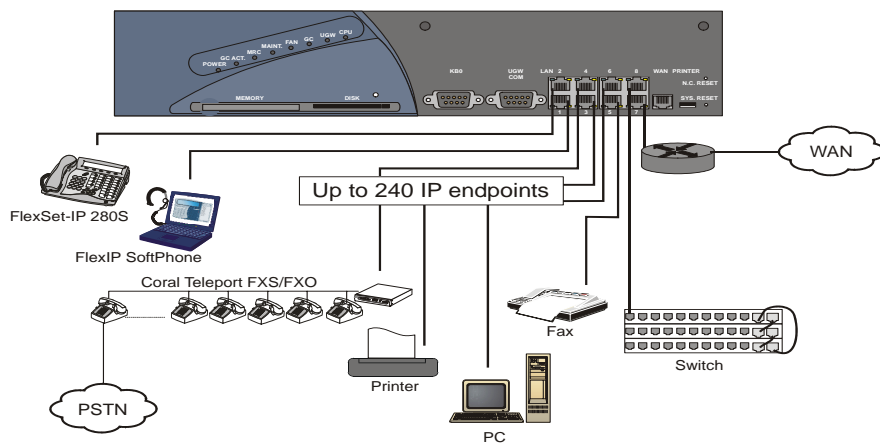
## 5.7 LAN, WAN, and Printer Connections

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

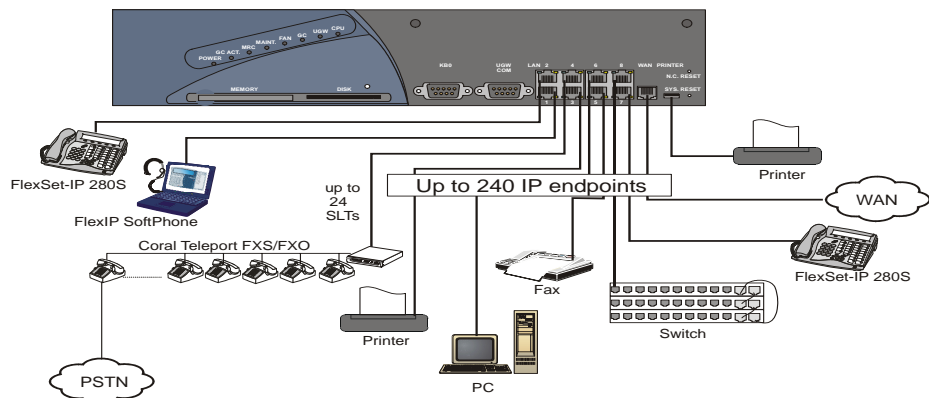
- Eight RJ-45 ports for connection to the LAN
- One RJ-45 port for connection to the WAN, and
- One USB port for connection to a printer.

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

**Figure 5-14 Network Connection when an NTU Office Card is not Supplied**



**Figure 5-15 Network Connection when an NTU Office Card is Supplied**



## 1 Connecting to the LAN

---

The Coral IPx Office connects directly to the LAN whether or not a NTU Office card is supplied with the system. See [Chapter 11, System Networking](#), for more information.

A switching device can be added, allowing additional IP endpoints to be cascaded within the system (up to 240 altogether). See [Figure 5-14](#) and [Figure 5-15](#).

---

### *Connecting to the LAN when an NTU Office Card is Supplied*

When 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.

---

### *Connecting to the LAN when an NTU Office Card is not Supplied*

When an NTU Office card is not supplied with the system, the dynamic IP addresses are provided by the customer's DHCP server. In addition, the LAN can be accessed from the WAN port when configured to do so. See [Chapter 11, Connecting to the Network without an NTU Office Card](#), for further information.

## 2 Connecting to the WAN

---

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 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 a 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.

---

### *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. The WAN port

itself can function as an additional, ninth LAN port. (However, the WAN port does not include any LED indicators).

### 3 Connecting to a Printer

---

The Coral IPx Office can connect to a printer whether or not 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. 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.

---

#### *Connecting to a Printer when an NTU Office Card is not Supplied*

If no NTU Office card is provided, a printer can be connected to any of the LAN RJ-45 ports as any other ethernet device. In this case, the dynamic IP addresses are provided by the customer's DHCP server. See [Chapter 11, System Networking](#), for more information.

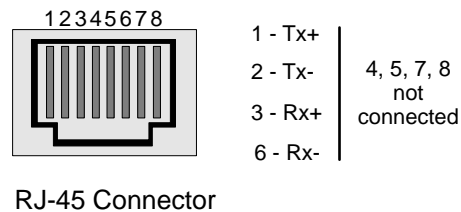
## 4 LAN/WAN Pinout

*Table 5-18* and *Figure 5-16* show the interface connections of the pins on the LAN/WAN RJ-45 connector to the network and IP endpoints.

**Table 5-18 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 5-16 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 *Coral Voice over IP Installation Manual*.

# Chapter 6

## Cage Description

Coral

6.1	General System Description.....	6-1
6.2	System Configuration Options.....	6-23





# 6.1 General System Description

This section describes the IPx Office unit components. Upon completing this section, you will be familiar with unit components. The actual instructions for installing the unit are found in [Chapter 2, Hardware Installation Procedure](#).

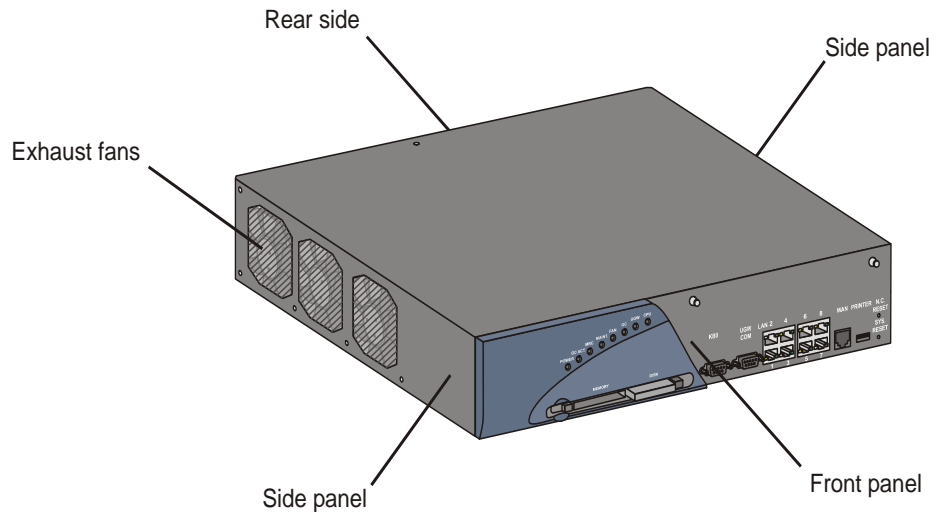
The IPx Office system is housed in a rack-mounted or table-mounted unit and can be expanded by adding additional IPx 500 or IPx 800 expansion cages. Each system consists of one main unit that contains the common control cards and peripheral cards, as well as one or two optional expansion cages. The main unit is equipped with peripheral card slots. Expansion cages are equipped with additional peripheral card slots.

## 1 Unit Exterior

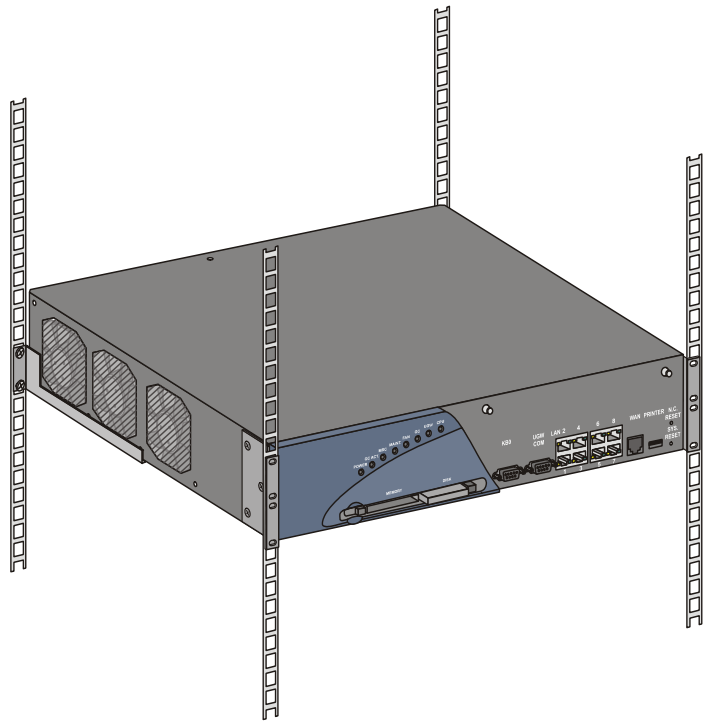
The IPx Office unit is designed to provide a simple, reliable method for installing and removing the printed circuit cards and assemblies that contain the active circuitry of the system. The IPx Office unit is housed in a case that includes networking, and peripheral cards, a slot for the power supply 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 decorative 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 includes an installation kit that includes components for mounting the cage onto a table and onto a rack. [Figure 6-1](#) displays the IPx Office cage mounted onto a table. [Figure 6-2](#) displays the rack configuration for the IPx Office cage 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 Rack Units, 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**

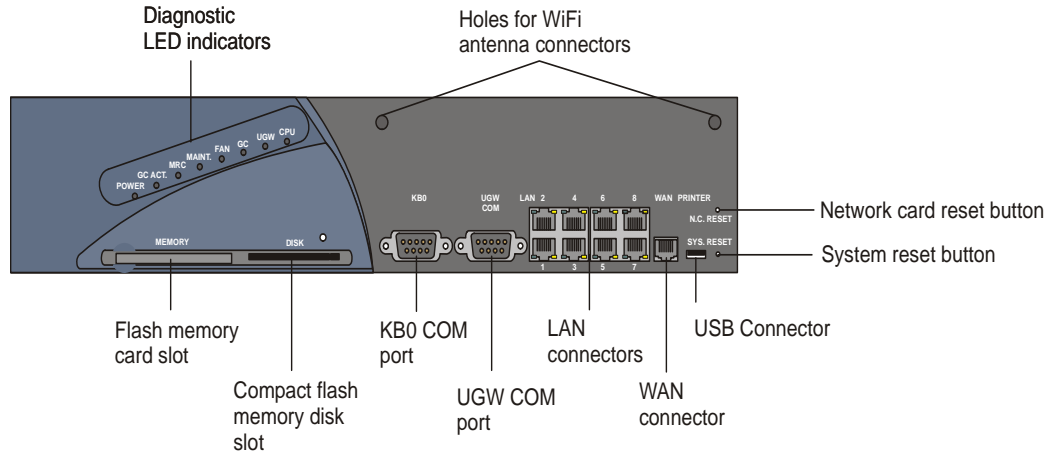


## Front Panel

The front panel includes eight diagnostic LED indicators, a slot for a memory card, a compact FLASH disk, a KBO 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

**Figure 6-3 Front Panel**



**Table 6-1 Front Panel Features**

Feature	What is it for?
POWER LED (green - continuously on)	System power is on and functional
GC ACT. LED (green - flashes)	Group controller functional
MRC LED (green - continuously on)	MRC functional
MAINT. LED (red - continuously on)	Software upgrade
FAN LED (red - continuously on)	Any fan is malfunctioning
GC LED (red- continuously on)	Group control is malfunctioning
UGW LED (red -continuously on)	UGW is malfunctioning
CPU LED (red - continuously on)	CPU is malfunctioning
IMC8/16 release button	Used to release the IMC8/16 card.
IMC8/16 flash memory card	Used to save and restore the database as well as to store the Generic feature software.
Compact flash release button	Used to release the compact flash card.

Feature	What is it for?
Compact flash card	TBD
KB0 COM port	<p>Data Terminal Port, DTE Interface, used to connect an RS232-E serial cable, providing access to the PI or CoralVIEW CVA/CVD/CVT.</p> <p>Default configuration: 9600 bps, No parity, 8 data bits, 1 stop bit, VT-100. See <a href="#">KB0 RS-232E Programming Port, page 8-18</a>.</p>
UGW COM port	<p>Data Terminal Port, DTE Interface, used to connect an RS232-E serial cable, providing access to the LAN</p> <p>Default configuration: 9600 bps, No parity, 8 data bits, 1 stop bit, VT-100. See <a href="#">UGW RS-232E Programming Port, page 8-19</a>.</p>
LAN Connectors	Used to connect the NTU Office card to the LAN. Any one connector can be used.
WAN Connector	Used to connect the NTU Office card to the WAN.
Printer Connector	Used to connect the system to a printer.
NTU Office card reset push button	Resets the NTU Office card and restores factory default settings.
Reset push button	<p>Forces the Coral system to restart.</p> <p>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.</p> <p>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.</p> <p>MCB Office Reset Button</p> <p><b>CAUTION</b></p> <p><i>Pressing the RST button will cause a partial initialization. All calls in progress will be terminated.</i></p>

## Rear Side

The rear side of the unit houses the peripheral cards and the power supply card. See [Figure 6-4](#). 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 2-6 on page 2-27](#) 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.

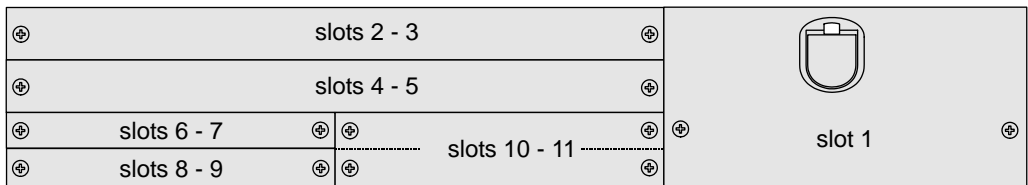
When any of the peripheral slots are not used, the openings must be covered by an appropriate blank panel. See [Blank Panels, page 6-16](#).

### 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 includes the unit ground terminal including, the M4 threaded pole, a serrated washer a flat washer and an M4 nut.

Figure 6-4 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 6-5](#) and [Figure 6-6](#). The right side panel also includes the Software Authorization Unit (SAU) connector. See [Software Authorization Management, page 8-14](#).

---

## *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 Table Units, 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 Table Units, page 2-13](#).

For rack-mounted units, two bracket 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 Rack Units, page 2-14](#).

## 2 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 6-6](#). 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 6-5 **Left View of the IPx Office Unit Cover**

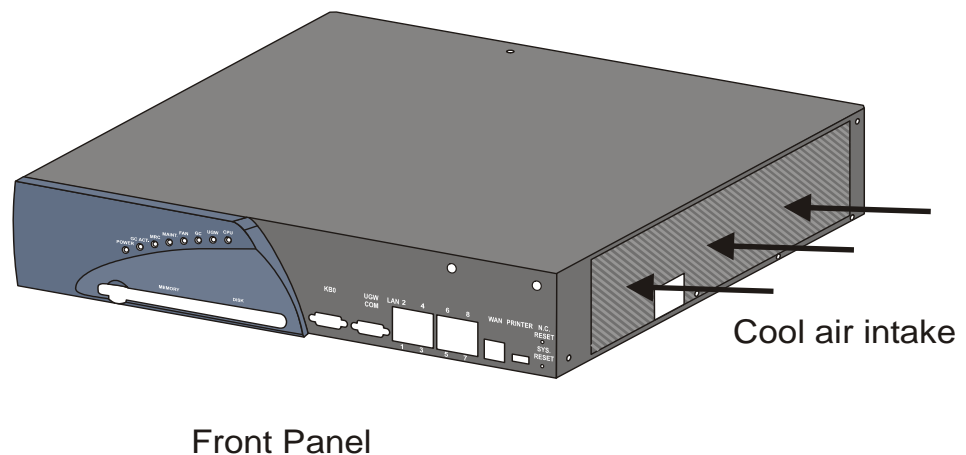
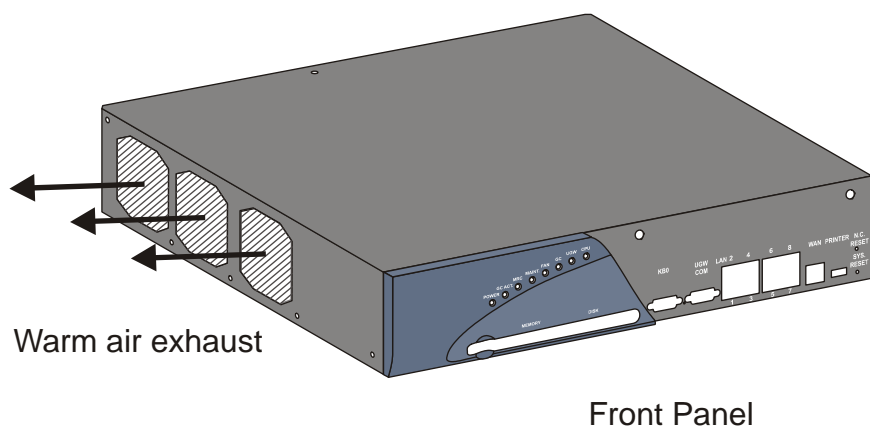


Figure 6-6 **Right View of the IPx Office Unit Cover**



---

## 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. Unscrew the WiFi antennas, if installed.
8. Using a Phillips screwdriver, unfasten the fifteen M3 screws that clamp the cover to the unit. See Step 1 of [Figure 6-7](#).
9. Using moderate force, lift the cover from the rear section and disconnect the LED Office card cable from the unit. See Step 2 of [Figure 6-7](#).

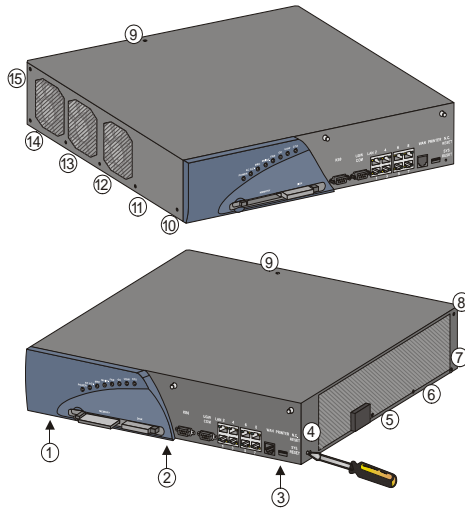
### **CAUTION!**

*Do not remove the cover until the LED Office card cable has been disconnected from the unit, otherwise it will be damaged.*

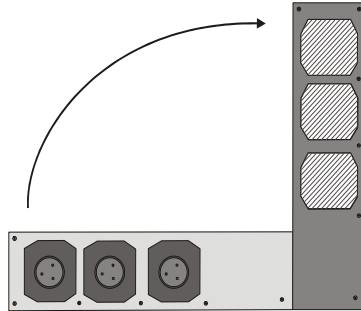
10. Remove the cover completely.



Figure 6-7 Removing the Unit Cover

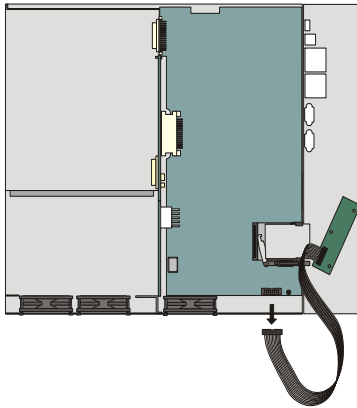


1 Remove all 15 screws.



2 Lift cover upward

**Caution!** Do not remove cover before disconnecting the LED Office panel cable.



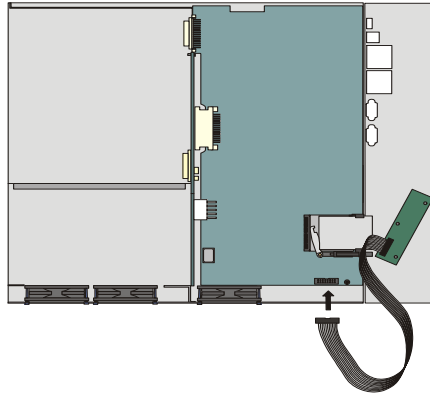
3 Disconnect cable

---

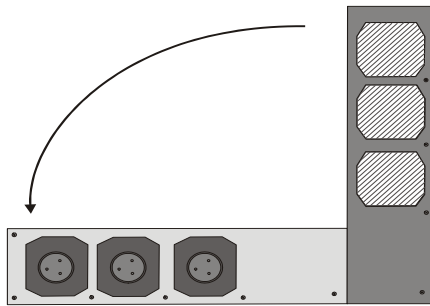
### *Closing the Unit Cover*

1. Verify that the MCB Office battery protective strip has been removed, all control and NTU Office cards 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. From the rear panel of the unit, attach the LED panel cable to the IPx Office unit.
5. Close the unit cover.
6. Fasten the fifteen M3 screws with a Phillips screwdriver.

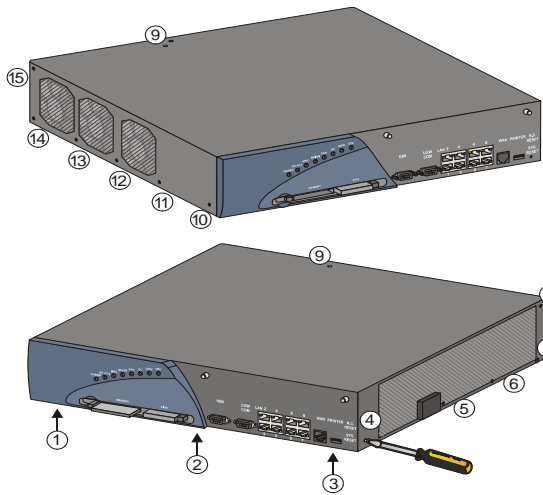
Figure 6-8 Closing the Cover



**1** Connect cable



**2** Lower cover downward

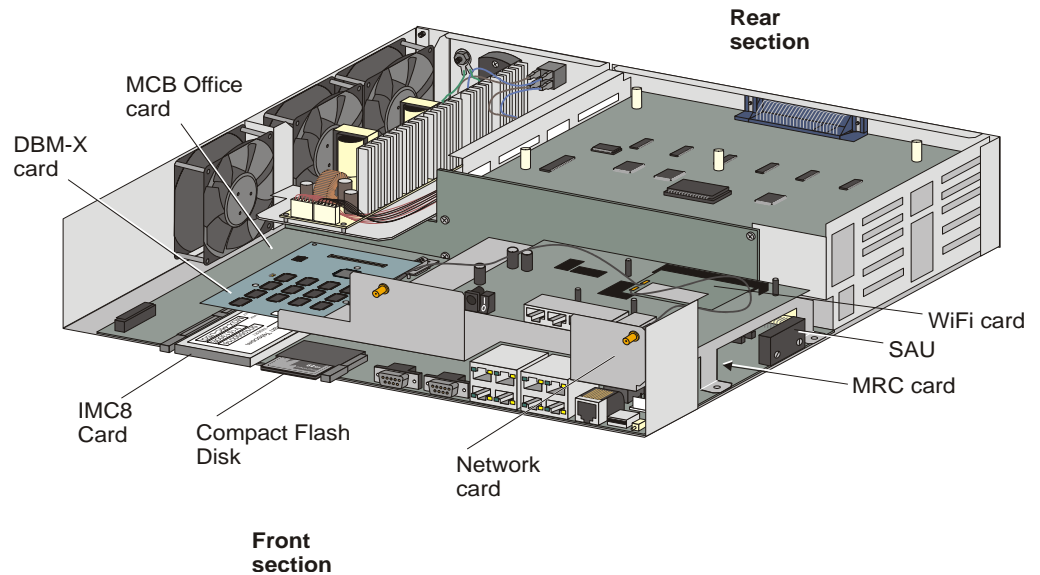


**1** Fasten all 15 screws.

### 3 Unit Interior - Front Section

The Main BackPlane (MBP) divides the interior of the IPx Office unit into two sections: the front section and the rear section. See [Figure 6-9](#).

Figure 6-9 IPx Office Unit Interior



The front section includes the control cards and the networking cards. The control cards include the:

- Main Control Board (MCB Office)
- Optional expansion DataBase Module (DBM-X) card
- Optional hard disk provided with some system versions
- Software Application Unit (SAU)
- Main Resources Card (MRC Office)
- Flash (IMC8 or IMC16) Card
- Compact flash disk

The networking cards include the:

- NTU Office card
- WiFi card.

In addition, the front section of the unit includes the LED Office card, which displays the diagnostic functions.

---

### *MCB Office Card*

The MCB Office card is the main control card of the IPx Office unit. It is attached to the IPx Office case at the floor of 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](#).

---

### *DBM-X Card*

The DBM-X card provides 2MB, 4MB, or 8MB of SRAM (Static Random Access Memory). The optional DBM-X card expands the SRAM of the IPx Office system. For more information, see [DBM-X Card, page 8-41](#).

---

### *Hard Disk*

The optional hard disk provides an additional 20GB - 80GB of memory. The hard disk is supplied only with some system versions.

---

### *MRC Card*

The optional MRC (Main Resources Card) converts PCM signals to IP packets and vice versa. See [MRC Card, page 8-27](#).

---

### *IMC8 / IMC16 Flash Card*

The optional IMC8 or IMC16 flash card includes the Coral software. See [IMC8 and IMC16 Flash Cards, page 8-33](#).

---

### *Compact Flash Disk*

The optional flash disk provides TBD. See [Compact Flash Disk, page 8-39](#).

---

### *Networking Card*

The networking card integrates full networking capabilities within the IPx Office. For further information, see [Chapter 11, System Networking](#).

---

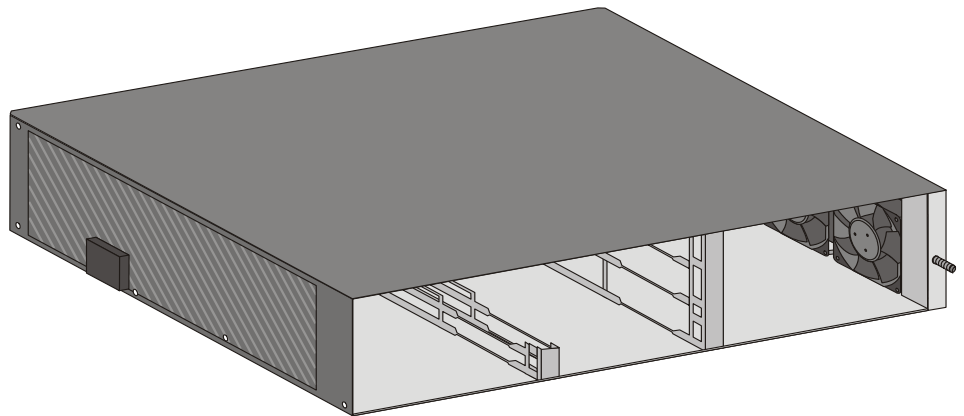
### *WiFi Card*

The WiFi card integrates full WiFi capabilities within the IPx Office. For further information, see [Chapter 11, System Networking](#).

## 4 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) that are used to house half-sized cards.

Figure 6-10 **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 6-10](#). 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 left side of the cage. 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, 8SLS Office, 16SFT Office, etc.)
- **RJ-45 jacks** are mounted on the front panel of many of the peripheral cards (for example, the UDT Office, T1 Office, PRI-30 Office cards, 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 [Interconnecting the IPx Office Unit and the Expansion Cage, page 6-30](#).

---

## *Cage Ground Terminal*

The ground connection is used to connect the cage to the master ground unit. See [Figure 6-10](#) 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 and prevents 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 6-11](#).

**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 2-3 and 4-5
77444000069	Type I-C	Half-sized panel used to cover slot 2-3 and 4-5

### **WARNING!**

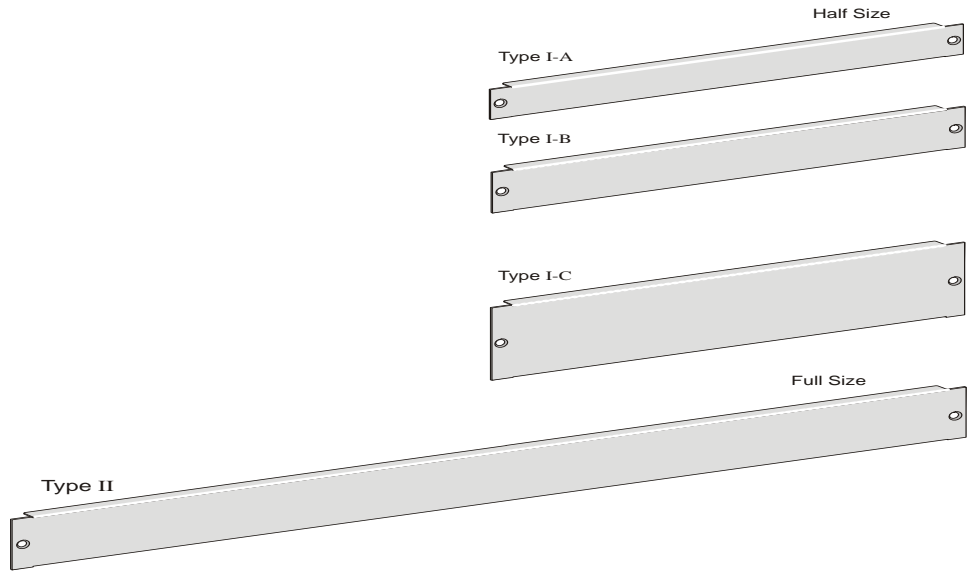
*Electrical Hazard. Contact with live internal components could cause shock, burn, or death. During system operation, peripheral card slots that are not occupied must be protected by a blank panel.*

Other problems likely to be caused by 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 6-11 IPx Office  
with Blank Panels



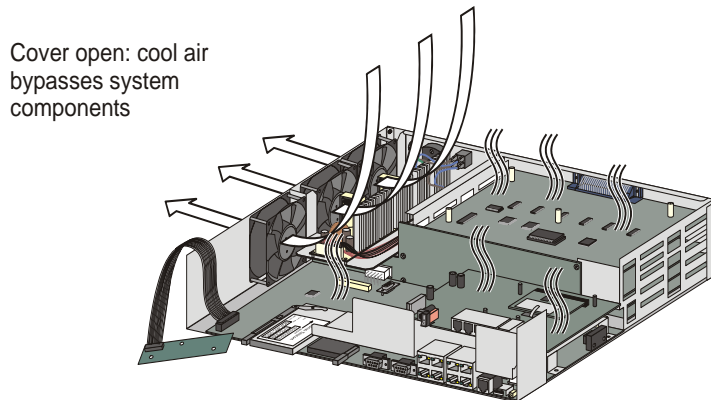
## 5 Heat Removal

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 6-12 **Heat Flow Schematic**



Cover closed: cool air is forced over system components



## Cooling Fans

The unit includes three 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.

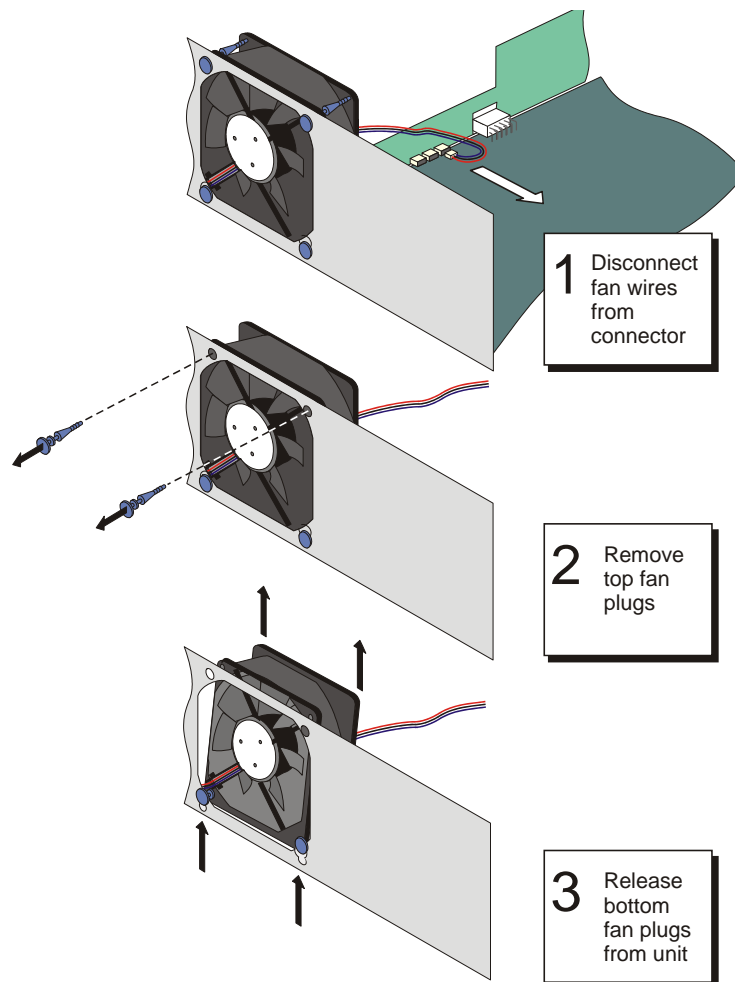


*When one fan needs to be replaced, replace the other fans as well.*

### Removing a Fan

1. Open the IPx Office unit cover. See [Figure 6-13](#) and [Opening the Unit Cover, page 6-8](#).
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 6-13 **Fan Dismounting**



### Installing a New Fan

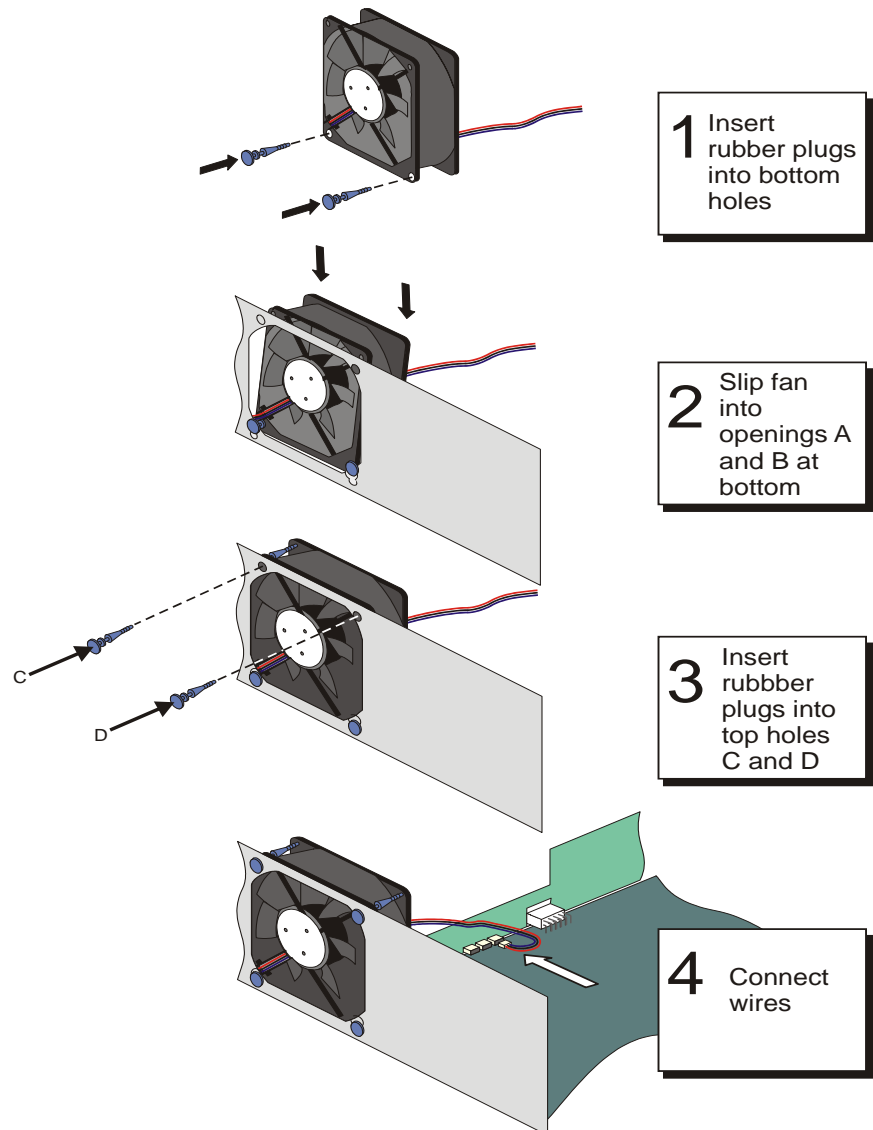
1. Insert the rubber plugs into the bottom mounting holes of the fan. See [Figure 6-14](#).
2. Slip the fan plug assembly into the mating openings on the unit.
3. Insert the top rubber plug through the top holes of the unit into the mounting holes of the fan.
4. Connect the fan wires to the receptacle on the MBP Office.



#### NOTE:

*When one fan needs to be replaced, replace the other fans as well.*

Figure 6-14 Fan Installation



## 6 Safety Labels

There are four safety labels located on the IPx Office unit: the nameplate label, the UL label, the ESD label, and the ground label.

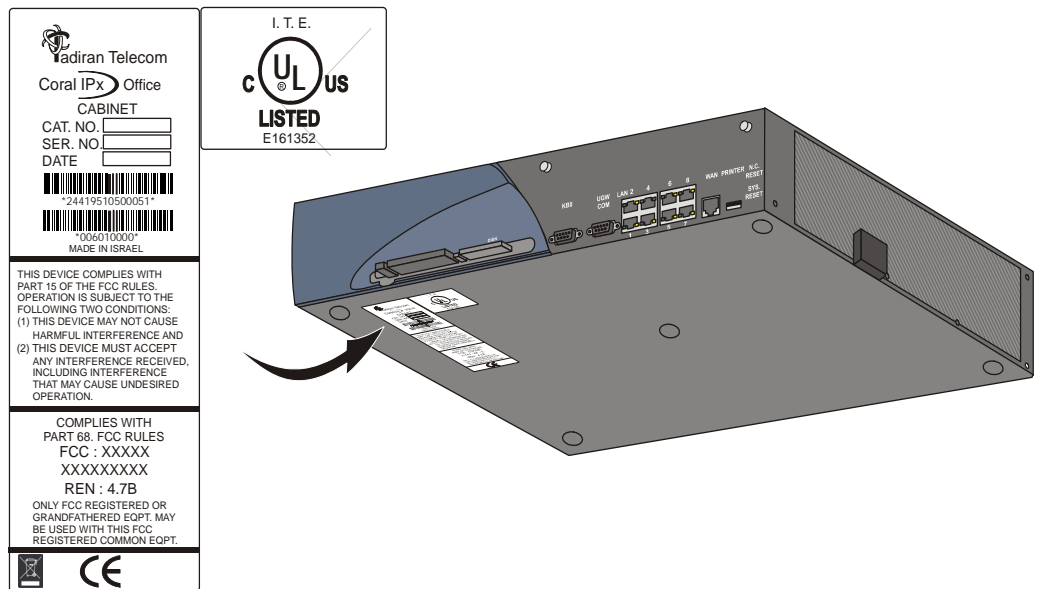
### Nameplate Label

The nameplate label provides the product name, the FCC compliance statement and conditions of use, the CE trademark, and the wheely bin icon, indicating the need for disposal according to local environmental regulations. See [Figure 6-15](#). This label can vary according to your local regulations. See the compliance statements at the beginning of the manual.

### UL Label

The UL label provides the UL registration number (TBD????). See [Figure 6-15](#).

Figure 6-15 **Bottom Panel Labels**



## ESD Label

An ESD label is located on the unit cover towards the rear panel, above the grounding terminal. See Figure 6-16.



### 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 [Inserting a Coral Circuit Card, page 2-53](#). 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.

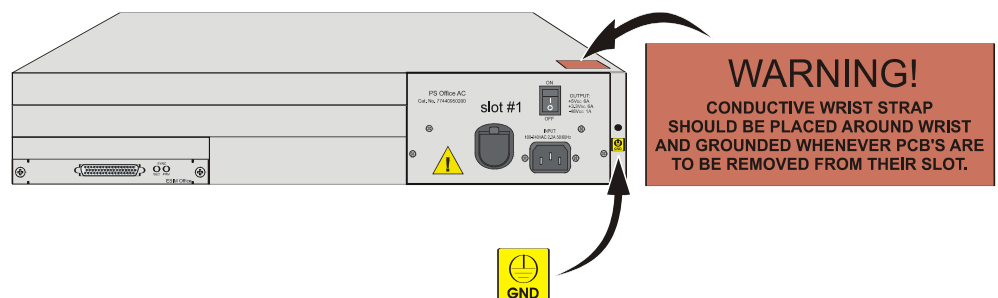
### CAUTION!

*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 6-16](#). 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 6-16](#).

Figure 6-16 **ESD and Ground Labels**



## 6.2. System Configuration Options

### IPx Office

This chapter describes the layout and configuration of the IPx Office system. For a general description of the IPx Office unit, see [General System Description, page 6-1](#). For a more detailed description of the IPx 500 expansion cage, see Chapter 6 of the *Coral IPx 500 Installation Procedure and Hardware Reference Manual*. For a more detailed description of the IPx 800 expansion cage, see Chapter 6 of the *Coral IPx 800 Installation Procedure and Hardware Reference Manual*.

#### 1 General Description

The IPx Office can operate as a system in any one of the following configurations:

Table 6-3 IPx Office System Configuration Options

Main Cage	System Configuration*		See Figure
	1 <sup>st</sup> Expansion Cage	2 <sup>nd</sup> Expansion Cage	
IPx Office	—	—	<a href="#">Figure 6-17 on page 6-25</a>
IPx Office	500X	—	<a href="#">Figure 6-18 on page 6-25</a>
IPx Office	500X	500X	<a href="#">Figure 6-19 on page 6-26</a>
IPx Office	800X	—	<a href="#">Figure 6-20 on page 6-27</a>
IPx Office	500X	800X	<a href="#">Figure 6-21 on page 6-28</a>
IPx Office	800X	800X	<a href="#">Figure 6-22 on page 6-29</a>

\* The main 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 Main Control Board (MCB Office), the NTU Office card, DataBase Module (DBM-X) card, hard disk (when ordered by the customer), Software Application Unit (SAU), LED Office card, and the Main Resources Card (MRC). In addition the IPx Office unit includes five peripheral card slots and a slot for the power supply.

### 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. Refer to [PX Card, page 6-38](#).

Table 6-4 **Number of Universal I/O Slots per System Configuration**

<b>System Configuration</b>	<b>Main Unit</b>	<b>1<sup>st</sup> Expansion Cage</b>	<b>2<sup>nd</sup> Expansion Cage</b>	<b>Total System Universal I/O Slots</b>
IPx Office	4	—	—	4
IPx Office+500X	4	10	—	14
IPx Office+500X+500X	4	10	10	24
IPx Office+800X	4	11	—	15
IPx Office+500X+800X	4	10 (IPx 500)	11 (IPx 800)	25
IPx Office+800X+800X	4	11	11	26



Figure 6-17 System with One Unit (IPx Office)

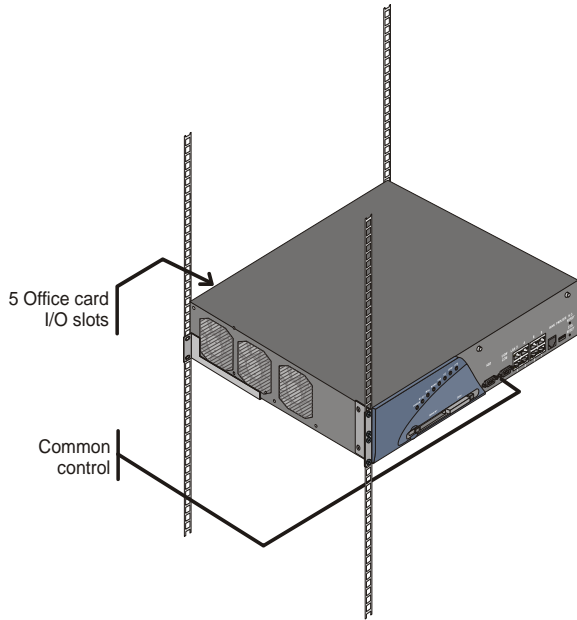


Figure 6-18 System with Two Units (IPx Office and IPx 500X)

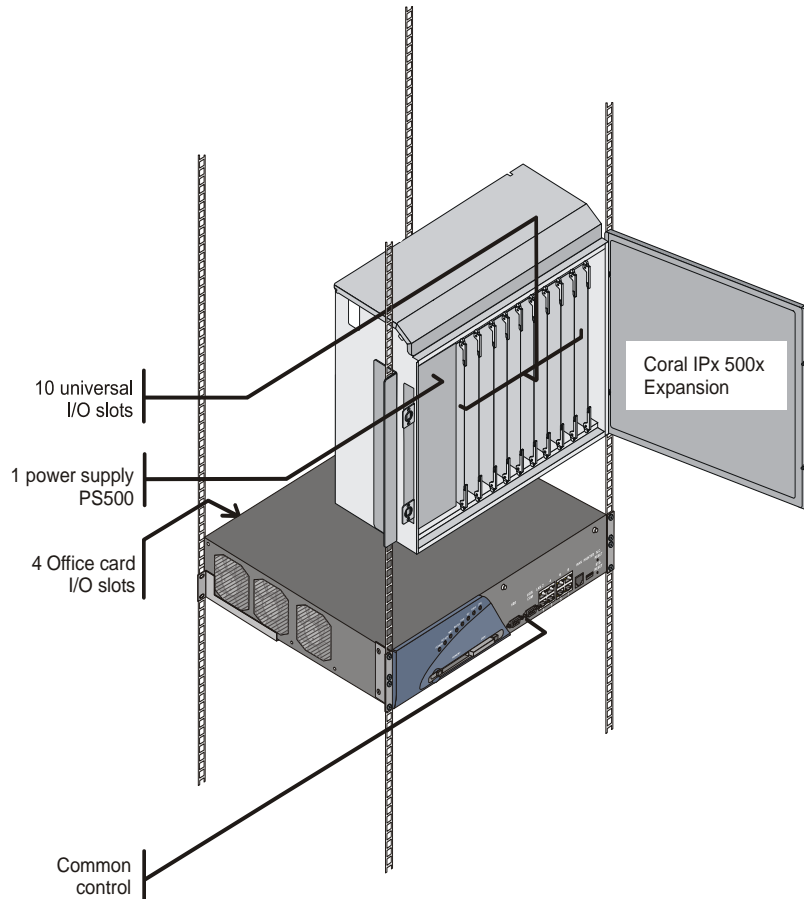


Figure 6-19 System with Three Units (IPx Office and Two IPx 500X Cages)

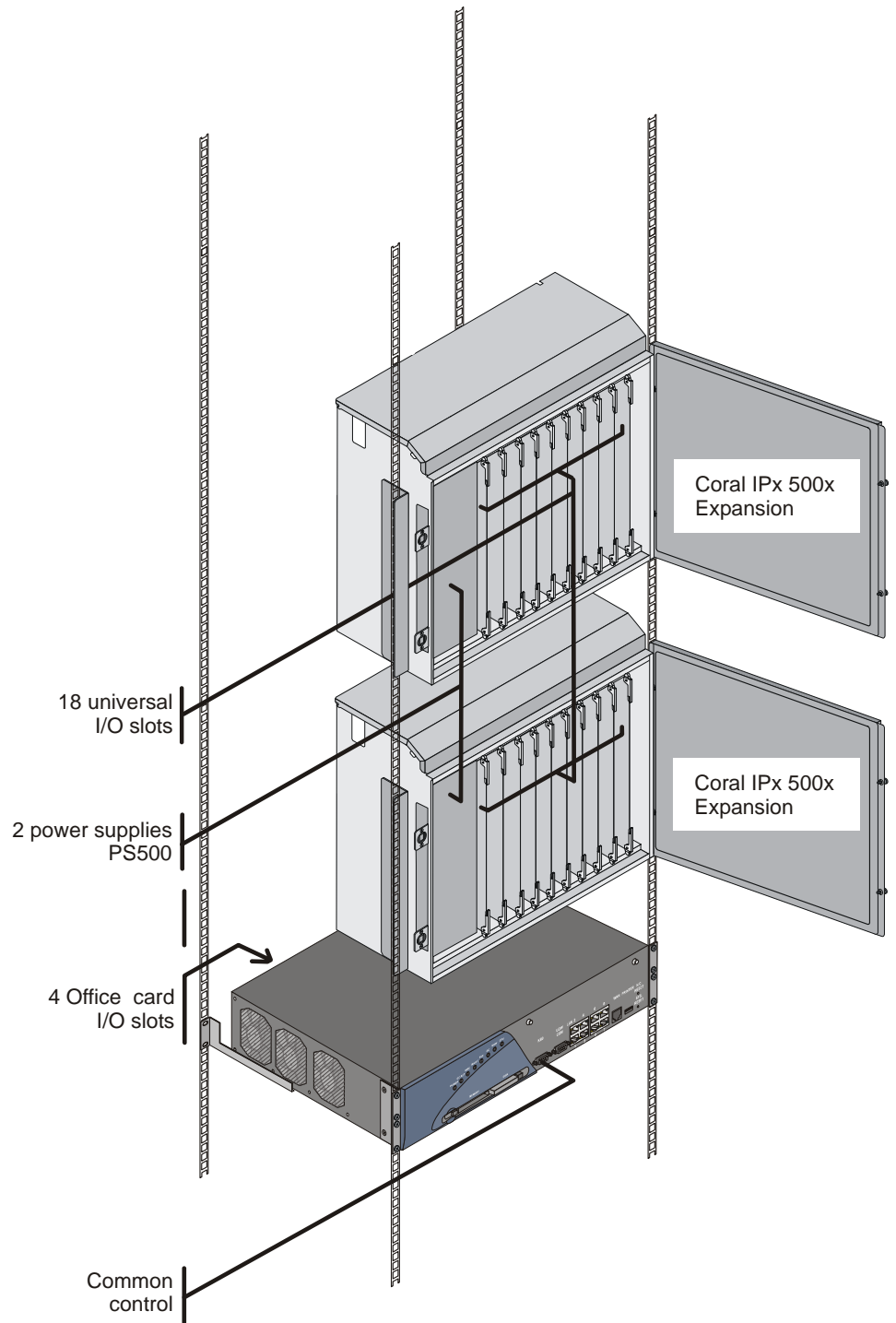


Figure 6-20 System with Two Units (IPx Office and IPx 800X)

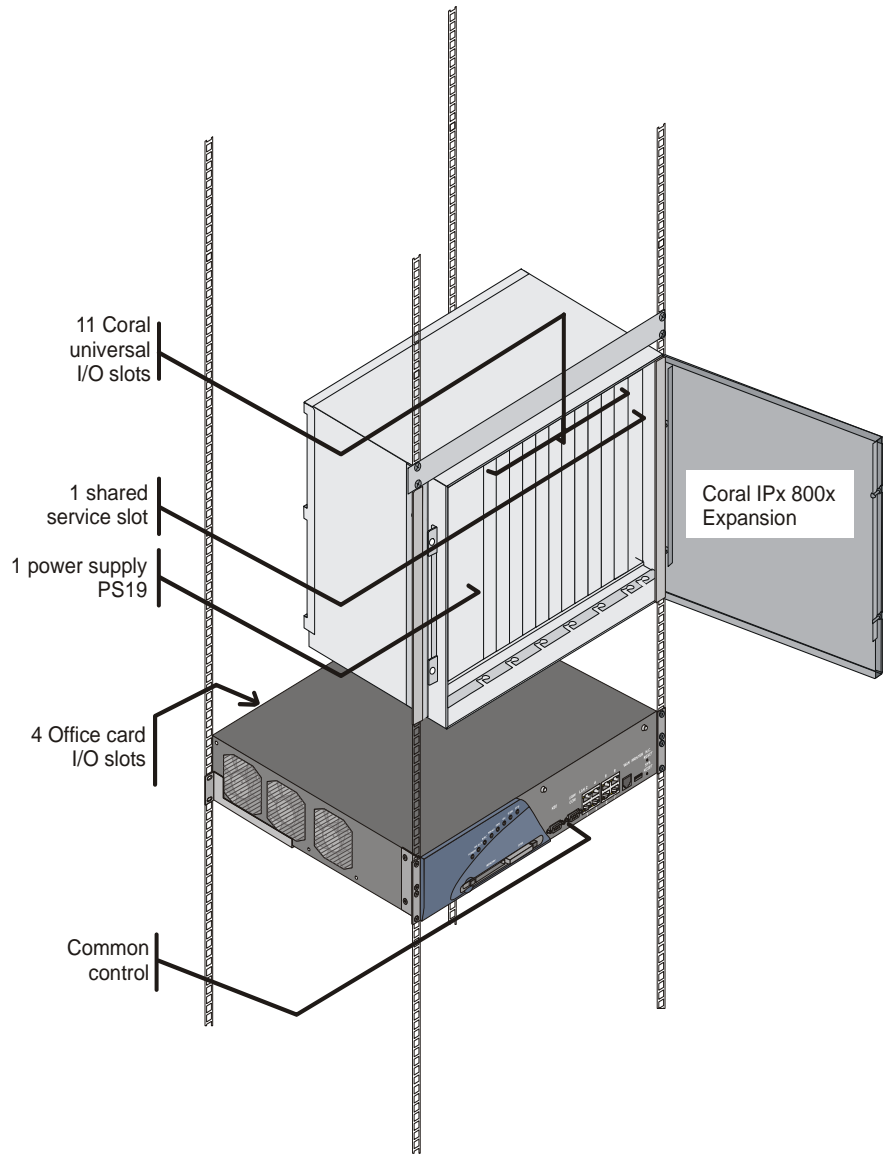


Figure 6-21 System with Three Units (IPx Office, IPx 500X, and IPx 800X)

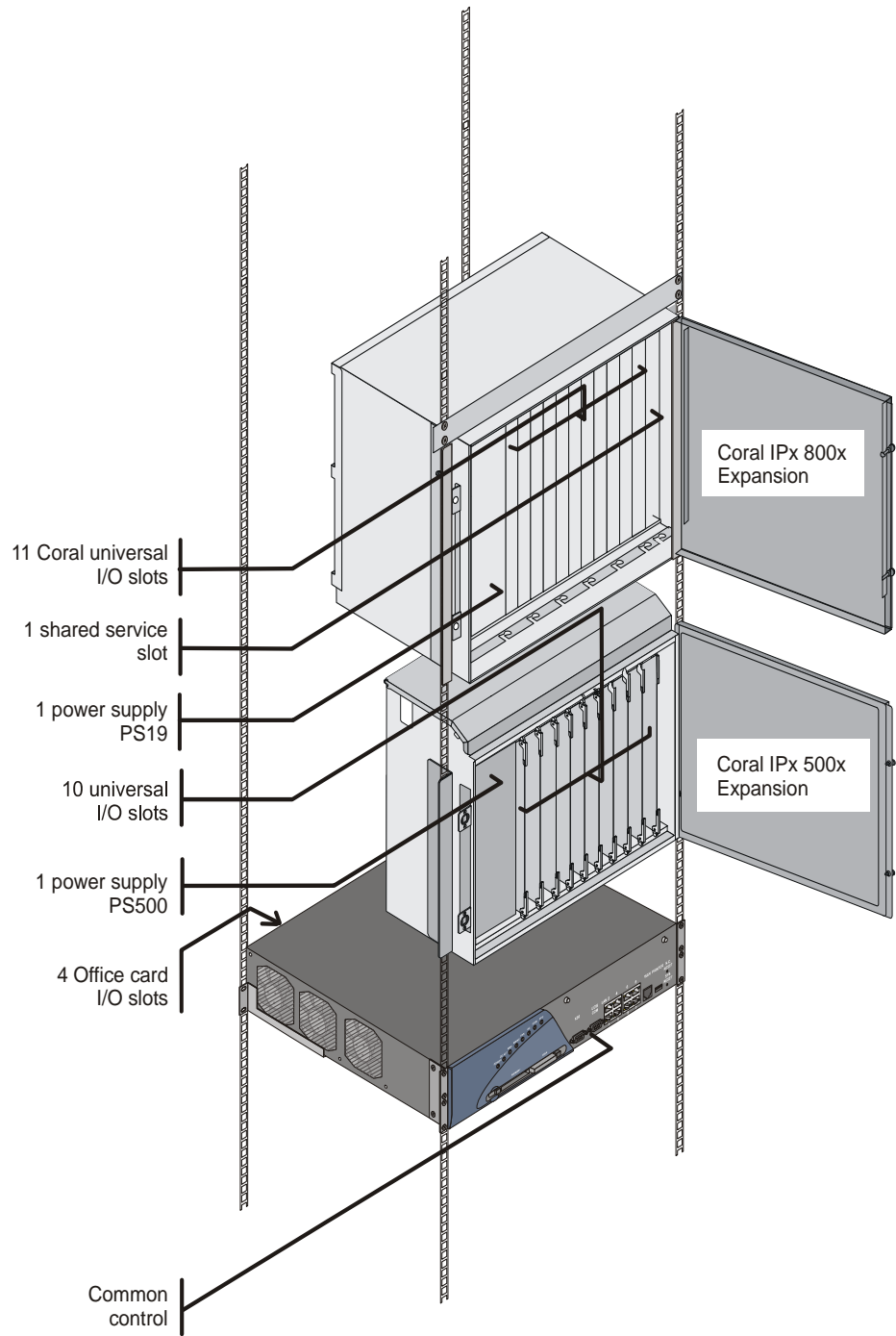
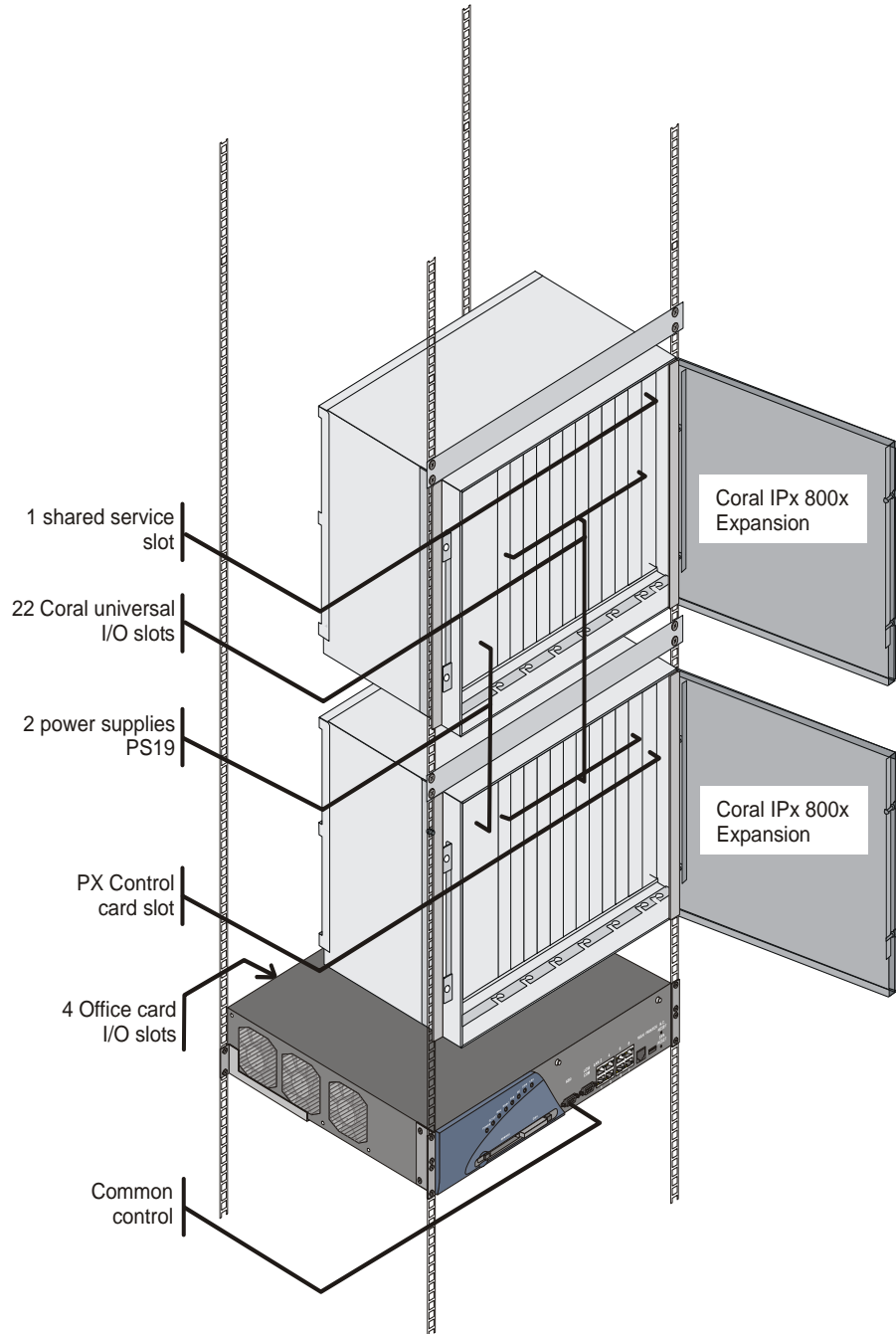


Figure 6-22 System with Three Units (IPx Office and Two IPx 800X Cages)



## 2 Interconnecting the IPx Office Unit and the Expansion Cage

The IPx Office unit can be expanded in any one of the following configurations:

**Table 6-5 IPx Office System Expansion Options**

System Configuration			See Figure
Main Cage	1 <sup>st</sup> Expansion Cage	2 <sup>nd</sup> Expansion Cage	
IPx Office	500X	—	<a href="#">Figure 6-23 on page 6-31</a>
IPx Office	500X	500X	<a href="#">Figure 6-24 on page 6-31</a>
IPx Office	500X	800X	<a href="#">Figure 6-25 on page 6-32</a>
IPx Office	800X	—	<a href="#">Figure 6-25 on page 6-32</a>
IPx Office	800X	800X	<a href="#">Figure 6-27 on page 6-33</a>

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 the IPx Office expansion cable.

The IPx Office expansion cable is connected from the IPx Office unit to the first expansion cage. If an additional expansion cage is connected, an H500-1 cable is connected from the first expansion cage to the second expansion cage.

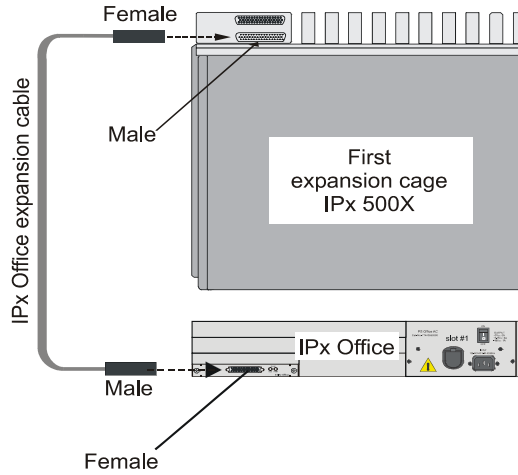
One IPx Office cable, 47.2" (120 cm) long, is supplied with each ESIM Office card. The cable includes a 50-pin male SCSI straight connector that connects to the female connector on the front panel of the ESIM card. The 50-pin, angled, SCSI connector is connected to the first expansion cage.

The IPx 500X expansion cage includes two 50-pin connections: 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.

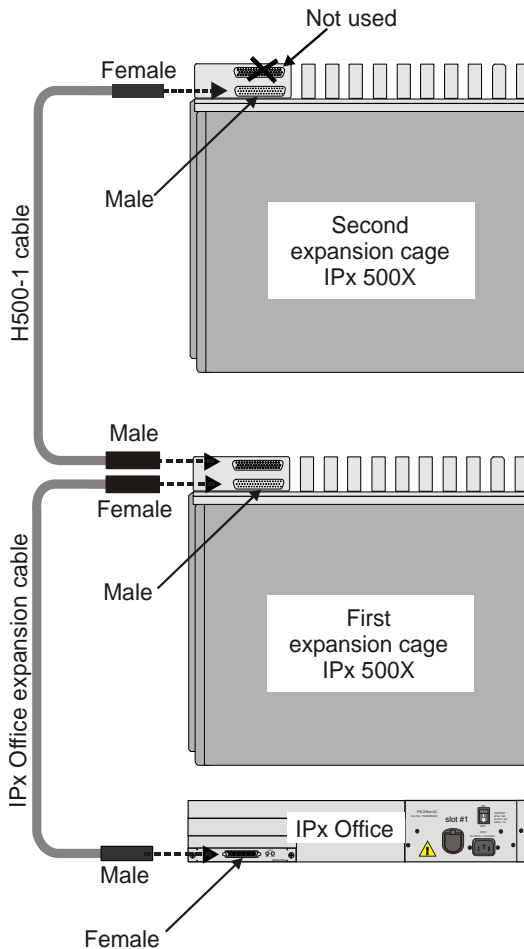
The IPx 800X expansion cage includes two 50-pin cable connections: the lower connection is female; the top connection is male. The lower female connection connects the first expansion cage to the second expansion cage. The top male connection connects either to the female connection on the main cage or to the female connection on the first expansion cage.

The figures below show how to interconnect the IPx Office unit with IPx 500X and/or 800X cages.

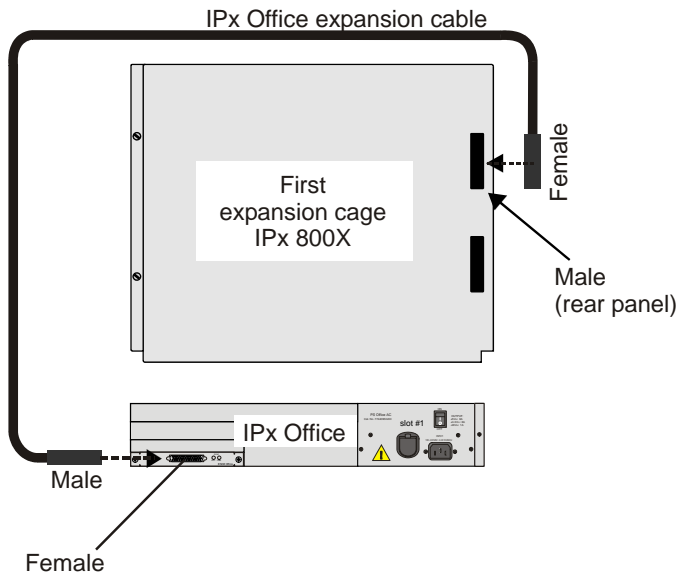
**Figure 6-23 Connection between the IPx Office and 500X**



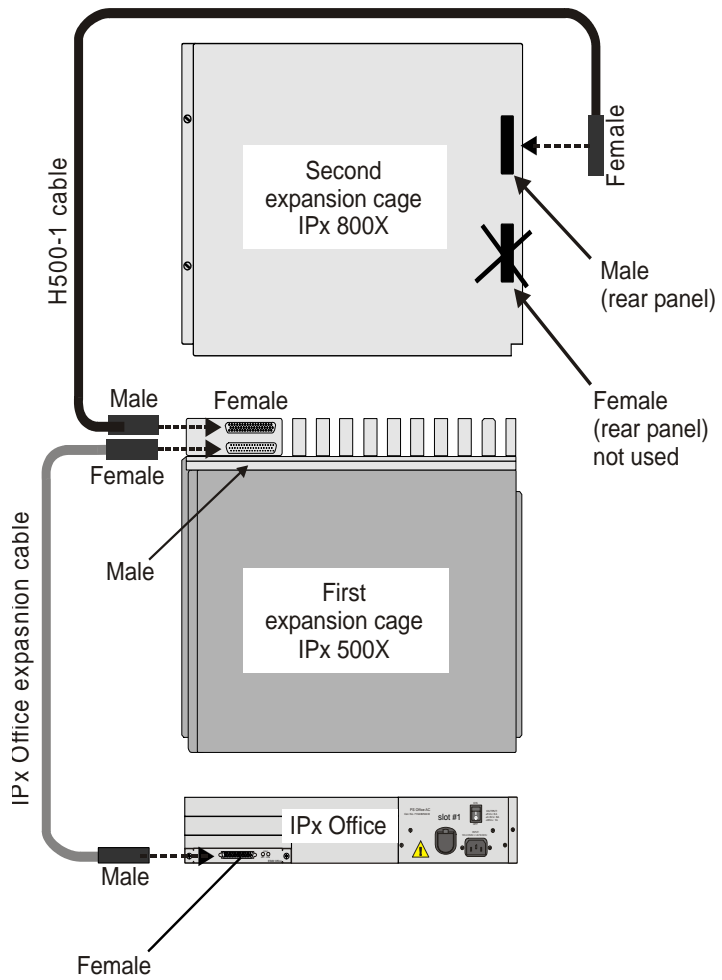
**Figure 6-24 Connection between the IPx Office unit and two 500X**



**Figure 6-25 Connection between the IPx Office Unit and the 800X Cage**

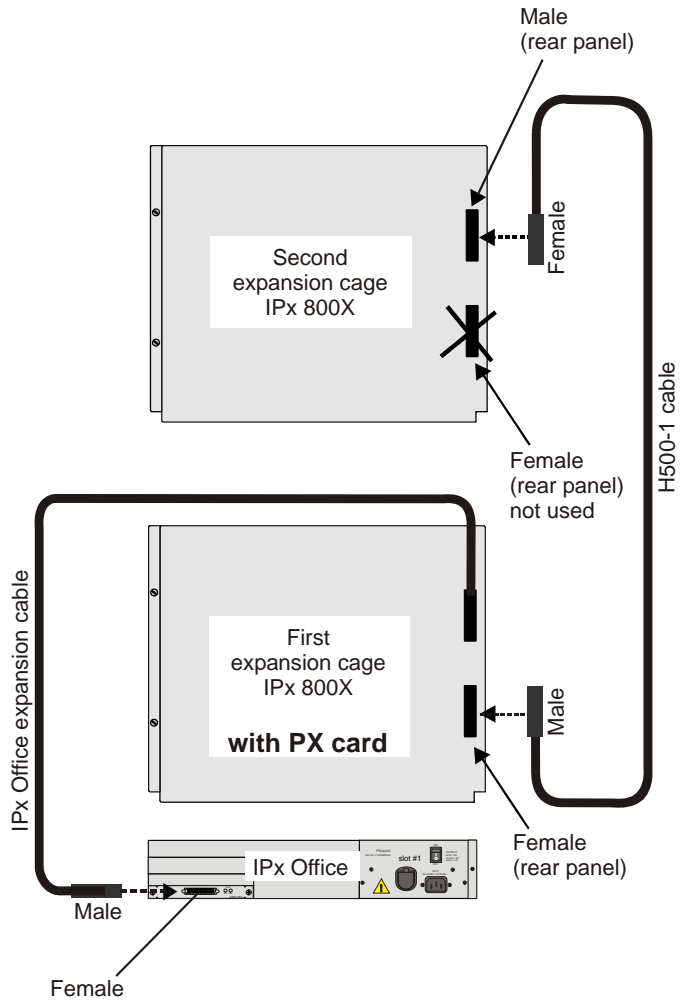


**Figure 6-26 Connection between the IPx Office Unit, 500X and 800X Cages**





**Figure 6-27 Connection between the IPx Office Unit and two 800X Cages**



### 3 Suggestions for Peripheral Card Distribution

#### *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**

<b>Peripheral Shelf #</b>	<b>Card Slots or Function</b>	<b>Number of Peripheral Card Slots</b>	<b>Number of Timeslots</b>
1	2-3, 4-5, 8-9, 10-11	4	128
1	6-7	1	128

#### *Expansion Cages*

Both expansion cages (IPx 500X and/or IPx 800X) 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 6-7](#). 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 6-28](#) 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, it is recommended to distribute *heavy consumer* cards (cards with a large number of ports: 30T, T1, PRI-30, PRI-23, or UGWipx with MG-30 or MG-60 units) evenly among the slot sets, i.e. one heavy consumer card per slot set. The least blocking sets are the slot sets that have the highest ratio of **Number of Timeslots to Number of Peripheral Card Slots** in [Table 6-7](#).

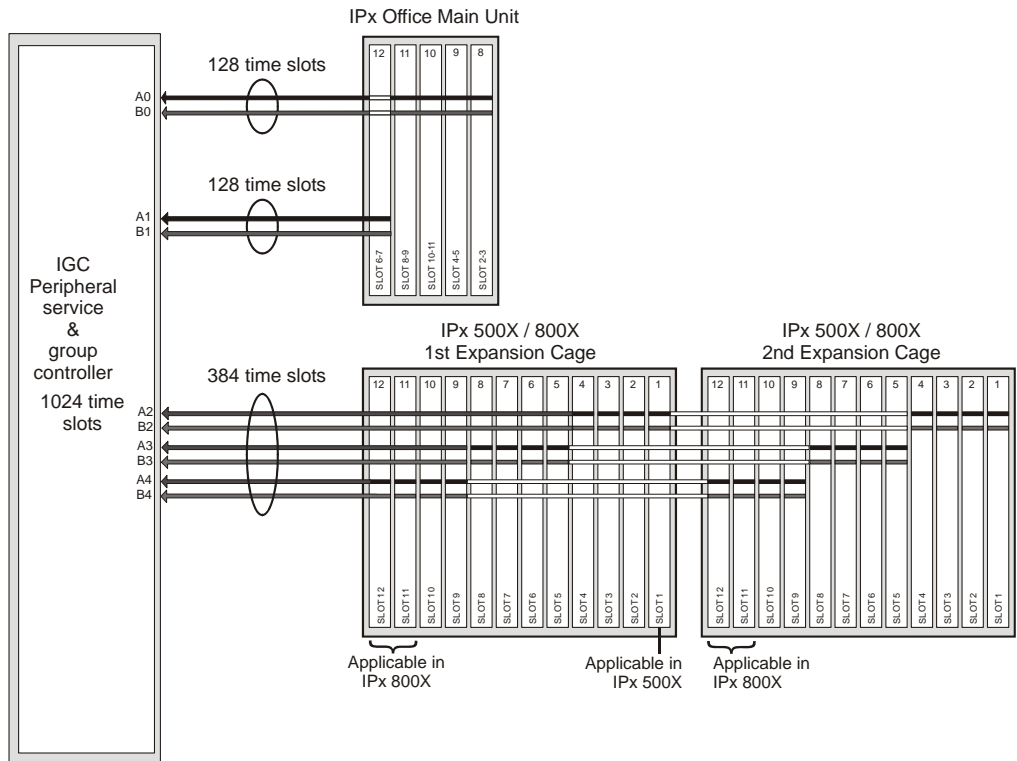
#### **Example:**

*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 6-7 Timeslot Distribution in IPx Office 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) 9, 10, 11, 12 (for IPx 800X)	2 slots (for IPx 500X) 4 slots (for IPx 800X)	128

**Figure 6-28 IPx Office System PCM Timeslot Distribution**



## 4 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 FlexiCom 200 and IPx 500 family small factor and 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 160 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 a 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

## 5 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, 8DRCF, 24SLS, 24SFT, 30T, 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 500 system:

- To allow the use of Coral features not supported by IPx Office unit interface cards (XXX Office), such as iDSP, IPG, 8DRCF, 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

***NOTES:***



# Chapter 7

## Power Supply

Coral

7.1 PS Office AC Power Supply Unit.....	7-1
7.2 PS Office DC Power Supply Unit.....	7-13



# 7.1 PS Office AC Power Supply Unit

## 1 General Description

The PS Office AC power supply unit provides operating voltages for the Coral IPx Office system.

### *Power Source*

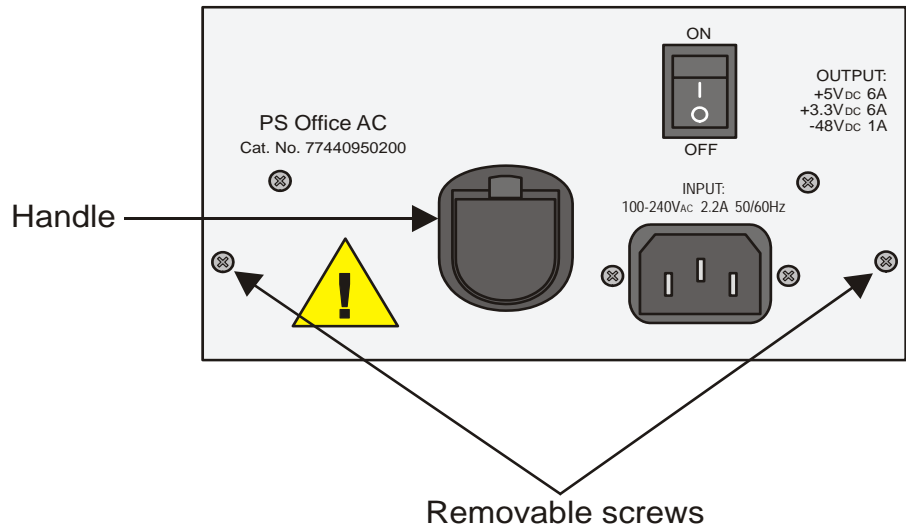
The PS Office AC operates from a nominal input of 100-240VAC/47-63Hz.

### *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:

<b>Feature</b>	<b>Description</b>
Power Switch	Turns the unit ON or OFF. <b>WARNING!</b> <i>Contact with live wires in the power supply unit could cause shock, burn, or death. Do not remove the power supply from the IPx Office system when the Power switch is turned ON and power is connected.</i>
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 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](#). Five components are described in the following table:

Feature	Description
Power Output LED Indicator	Indicates whether the -48VDC 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 Converter Circuit Board	Circuit board that houses the module responsible for converting the AC input voltage to -48 VDC.
DC to DC Converter 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

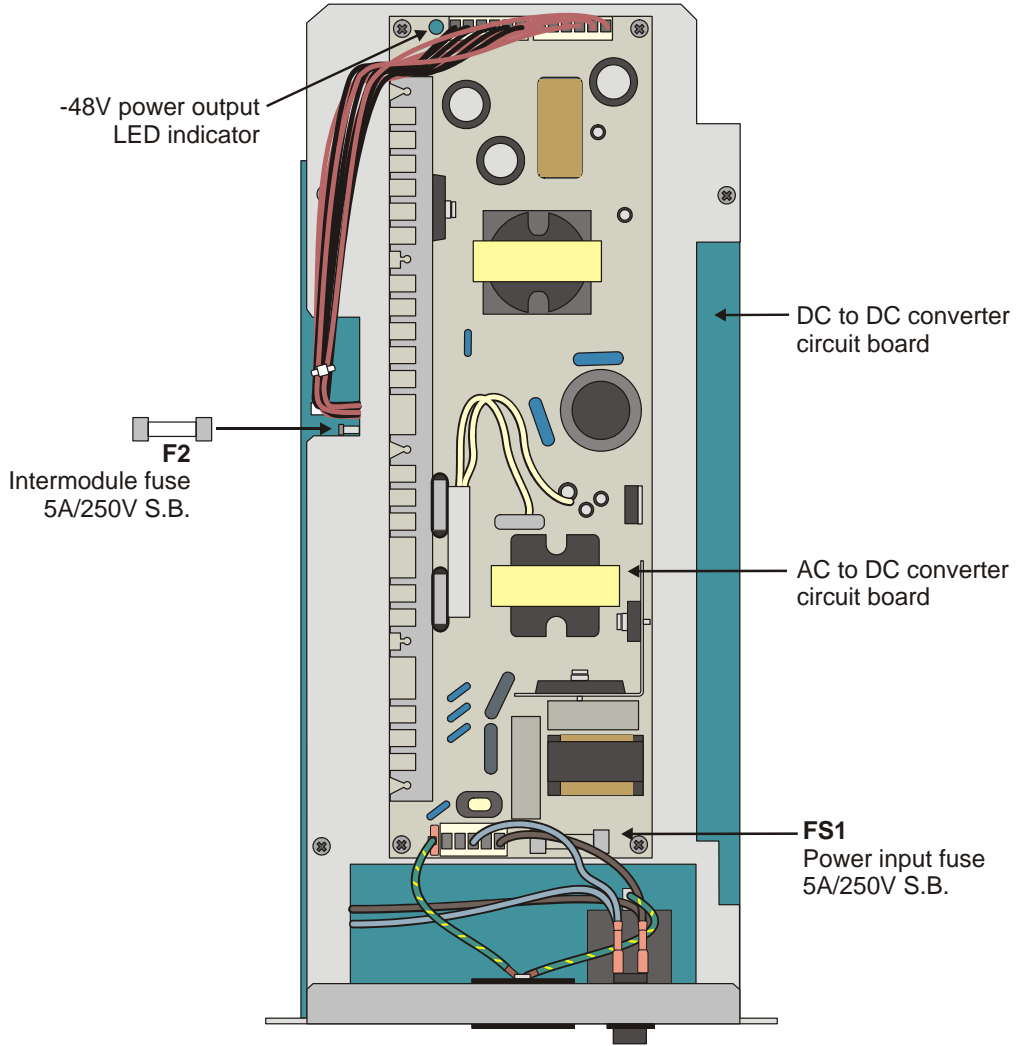
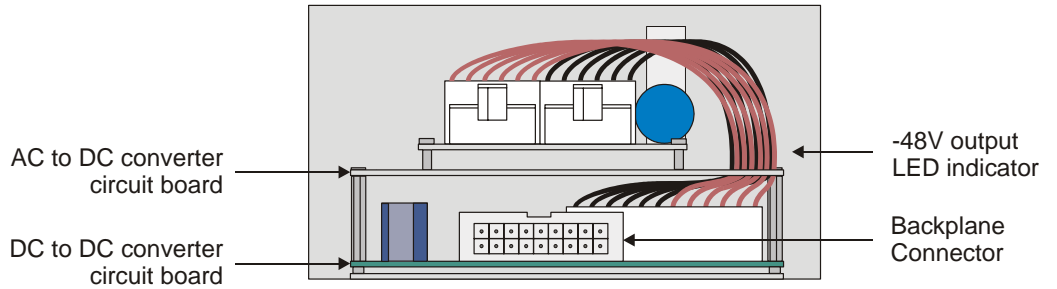


Figure 7-3 PS Office AC Card Rear View



## 2 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*

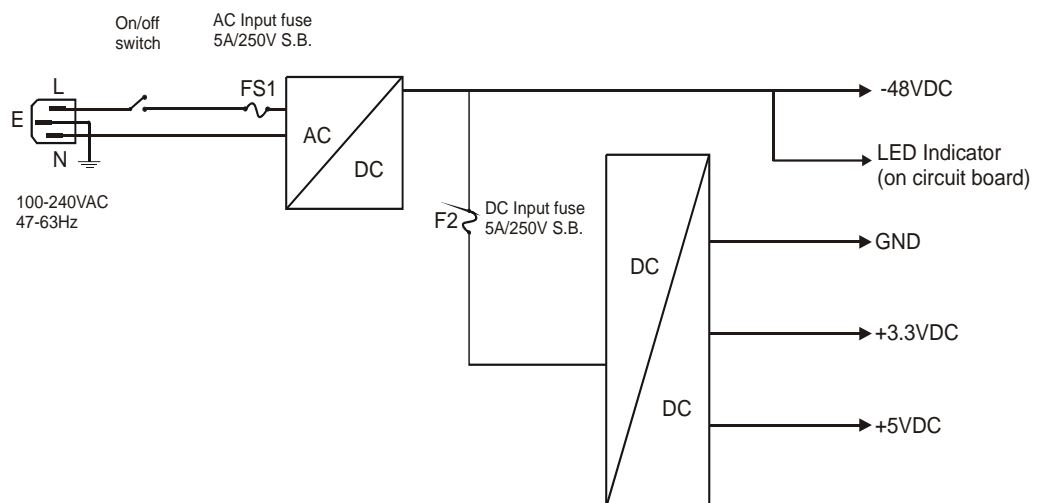
The PS Office AC includes one AC-DC converter and one switch-mode DC-DC converter that converts 100-240VAC/47-63Hz input power to:

- +5VDC
- +3.3VVDC
- -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.

### 3 Installation and Operation

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 Power Supply*

1. Verify that the IPx Office unit ground wire is connected and the ground nut is tightened. See [Figure 2-7](#).
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.

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.



---

## Operating the PS Office AC

Follow these steps:

1. Verify that the cage ground wire is connected and the ground nut is tightened. See [Figure 2-7](#).
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 turned OFF (downwards).

### WARNING!

Contact with live wires in the power supply unit could cause shock, burn, or death. **Do not** remove the power supply from the IPx Office system when the power switch is turned ON and power is connected.

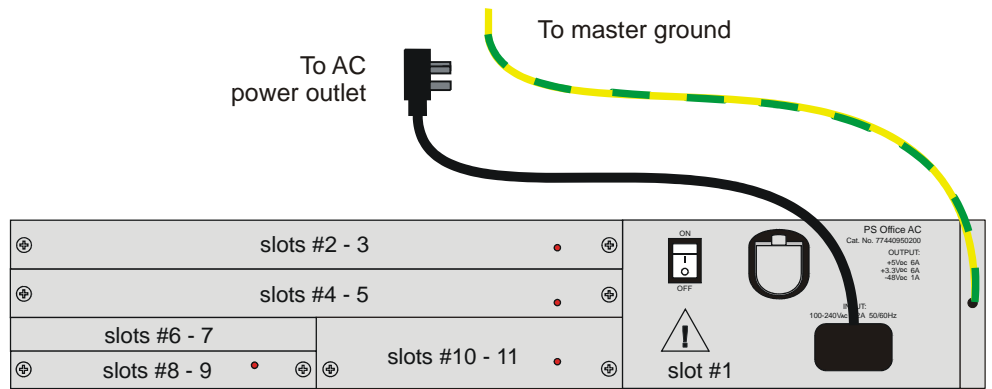
4. Route the AC power cable to the customer's AC power outlet, as described in [AC Powered Systems, page 2-35](#).
5. Insert the female connector of the AC power cable into the front panel socket of the PS Office AC power supply. See [Figure 2-7](#).
6. Insert the male plug of the AC power cord into the line outlet or primary power receptacle designated for the system.
7. Verify that the IMC8 and the flash cards are fully installed. Peripheral cards may be inserted or removed from the system with power applied.

### CAUTION!

Turn on the power supply units in the expansion cages only after powering the IPx Office unit and verifying that it has initialized properly and the Power indicator on the front panel of the IPx Office unit does not illuminate. Otherwise the cards in the peripheral expansion cages might not initialize.

8. Turn the PS Office AC power switch ON and verify that the green Power LED indicator on the front panel of the IPx Office is lit.
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](#).

### **WARNING!**

Contact with live wires in the power supply unit could cause shock, burn, or death. **Do not** remove the power supply from the IPx Office system when the power switch is turned ON and power is connected.

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.

## 4 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 [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](#).

## 5 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](#).

### **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.*

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 7-9](#).
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 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 IPx Office system does not include an alarm LED indicator.*

1. Turn the PS Office AC power switch OFF (turn the switch 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 Operation, 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.

## 6 Specifications

### **PS Office AC Power Supply**

Coral system: ..... IPx Office

Input: ..... 100-240VAC 47-63Hz

Power Rating: ..... 115VAC / 60Hz / 6A (Range: 98 to 126VAC)  
230VAC / 50Hz / 3A (Range: 198 to 253VAC)

Power Consumption (from mains): ..... Continuous 130W

Outputs: ..... +5VDC nom. regulated 6.0A max.  
+3.3VDC nom. regulated 6.0A max.  
+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

### 1 General Description

The PS Office DC card's component side power supply unit provides internal operating voltages for the Coral IPx Office system. 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:

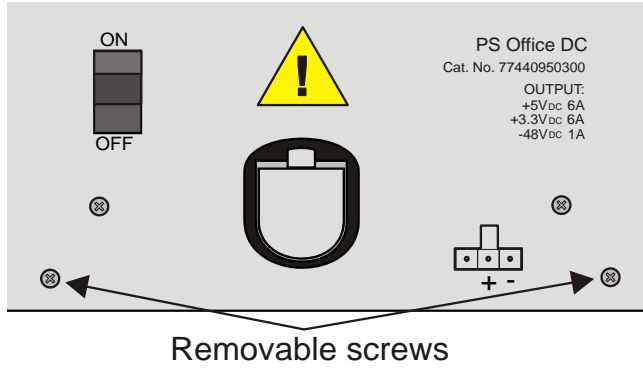
- From a battery power source while the batteries are charged at an equalized charge rate
- Under power failure, until the batteries are completely discharged

#### *PS Office DC Front Panel*

*Figure 7-6* displays the front panel of the PS Office DC. The components located on the front panel are described in the following table:

<b>Feature</b>	<b>Description</b>
Power Switch	Turns the unit ON or OFF. <b>WARNING!</b> <i>Contact with live wires in the power supply unit could cause shock, burn, or death. Do not remove the power supply from the IPx Office system when the power switch is turned ON and power is connected.</i>
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](#). Three components are described in the following table:

<b>Feature</b>	<b>Description</b>
Power Switch	Turns the unit ON or OFF. <b>WARNING!</b> <i>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.</i>
<b>F2</b> 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 7-23</a> . 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

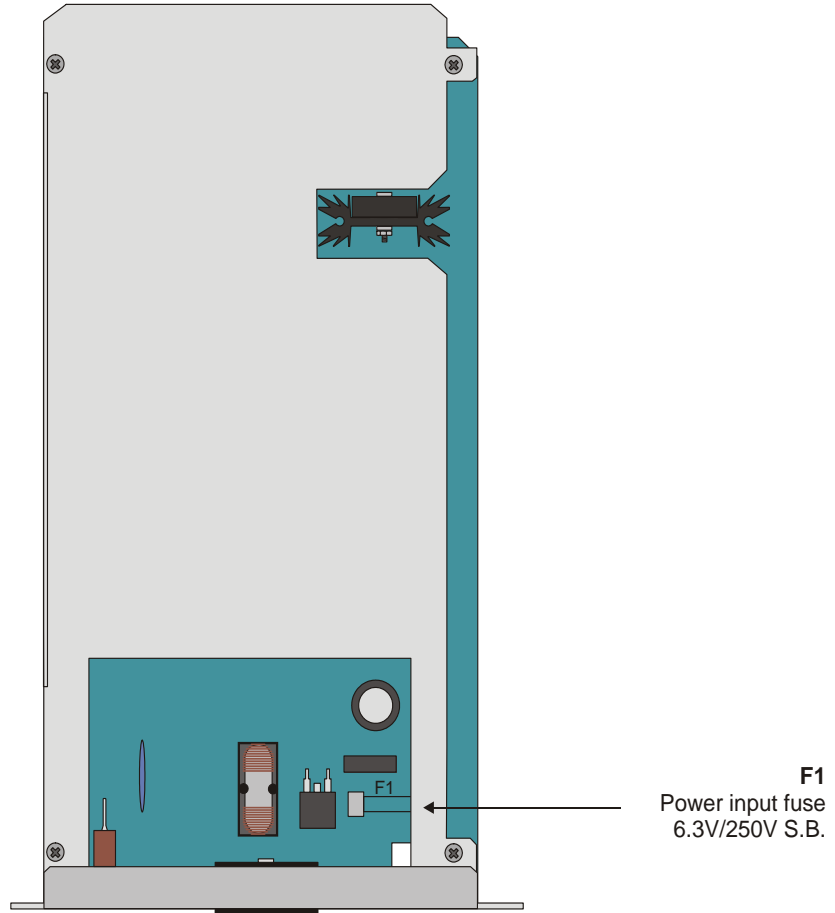
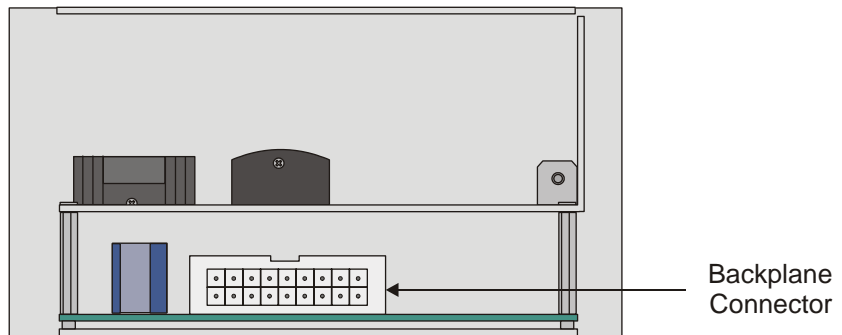


Figure 7-8 DC Power Supply Rear View



## 2 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*

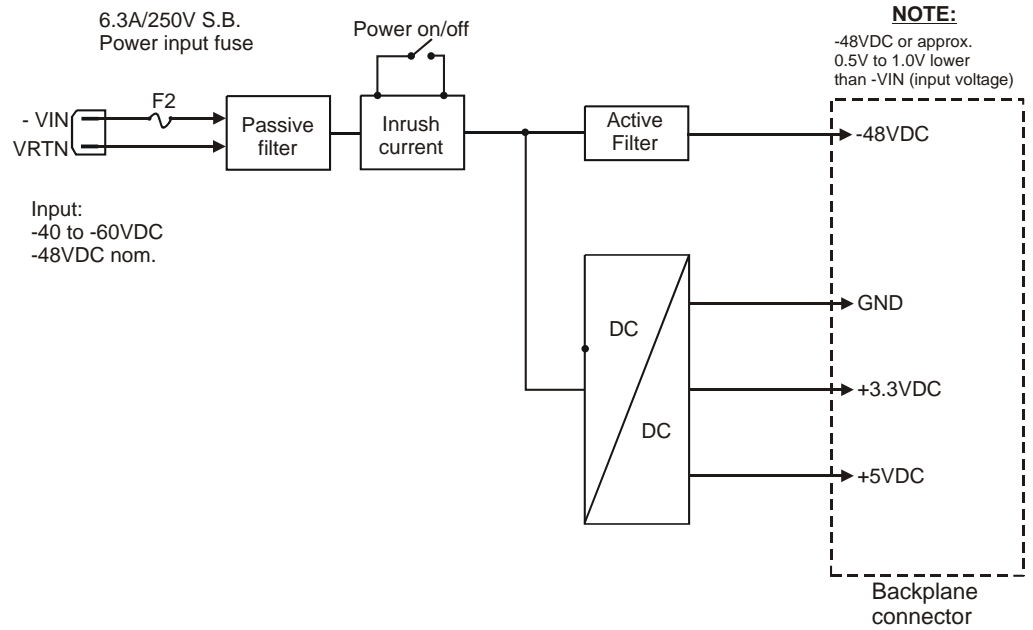
The PS Office DC also filters and limits the  $-48\text{VDC}$  input to feed the peripheral card slots.

### *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  $-V_{IN}$  to the PS Office DC.

If the voltage input is less than  $-38\pm 0.5\text{VDC}$  or greater than  $-58\pm 0.5\text{VDC}$ , then the power supply shuts down. The power supply will turn on when the voltage is less than  $-58\pm 0.5\text{VDC}$  or greater than  $-45\pm 0.5\text{VDC}$ .

Figure 7-9 PS Office DC Block Diagram



### 3 Installation and Operation

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.

#### **WARNING!**

*Contact with live wires in the power supply unit could cause shock, burn, or death. Do not remove the power supply from the IPx Office system when the power switch is turned ON and power is connected..*

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.*

## Operating the PS Office DC

Follow these steps:

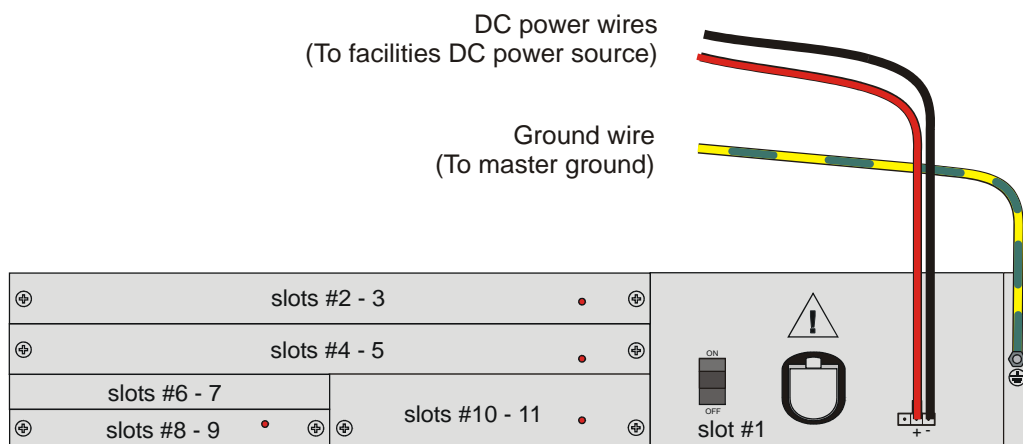
1. Verify that the unit ground wire is connected and the ground nut is tightened. See [Figure 7-10](#).
2. Verify that the power switch is in the OFF position (turned downwards).
3. Verify that the two removable screws on the right and left side of the front panel of the power supply are tightened.
4. Connect the DC cable (supplied) to the customer's DC power source, as described in [DC Powered Systems, page 2-36](#).
5. Insert the DC power input connector into the receptacle of the PS Office DC unit. See [Figure 7-10](#).
6. Verify that the IMC8 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 cages only after powering the main cage and verifying that the main cage has initialized properly and the alarm indicator does not illuminate. Otherwise the cards in the peripheral expansion cages might not initialize.

8. Turn the PS Office DC power switch ON. Verify that the green **power** indicator on the front panel of the IPx Office unit is lit.
9. Turn the power switch OFF.

Figure 7-10 IPx Office  
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.
1. Turn the PS Office DC power switch OFF (turn the switch downwards).
2. Remove the DC power input connector. See [Figure 7-10](#).

### **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.*

3. Unfasten the two captive screws located at the top and bottom of the unit's front panel and set aside.
4. Carefully remove the PS Office DC from its slot.
5. Place the PS Office DC over the anti-static material with the component side facing upwards.

## 4 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 7-22](#).

## 5 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 7-21](#).

### 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.

6. Replace only with the same type and rating of fuse. See the PS Office DC card layout in [Figure 7-7 on page 7-16](#).
7. Reinstall the power supply unit as described on [Installation and Operation, page 7-19](#).



## 6 Specifications

### ***PS Office DC Power Supply***

Coral systems:..... IPx Office

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)

## ***NOTES:***

# Chapter 8

## Common Control Cards

Coral

8.1 Control Cards .....	8-1
8.2 MCB Office Card.....	8-5
8.3 LED Card.....	8-25
8.4 MRC Card.....	8-27
8.5 IMC8 and IMC16 Flash Cards.....	8-33
8.6 Compact Flash Disk .....	8-39
8.7 DBM-X Card .....	8-41



# 8.1 Control Cards

## 1 General Description

The common control cards include the MCB Office, the IMC8 or IMC16 flash card, the compact flash card, the hard 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.

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). It also provides a real-time clock and hosts 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 to the MCP-IP2 card. For further information, see [Main Control Processor, page 8-8](#).
- The **Universal Gateway (UGW)** provides the Coral IPx Office system with the ability to connect to the IP World. The UGW circuit was previously part of the Universal GateWay (UGW) card in previous systems. The UGW circuitry includes the UGW processor, the connection to the MRC card, the UGW COM port, the LAN ports, WAN port, and printer port. For further information, see [Internet Protocol Gateway, page 8-9](#).
- The **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 4GC and 30GC cards in other Coral systems. For further information, see [Group Controller Circuit, page 8-10](#).

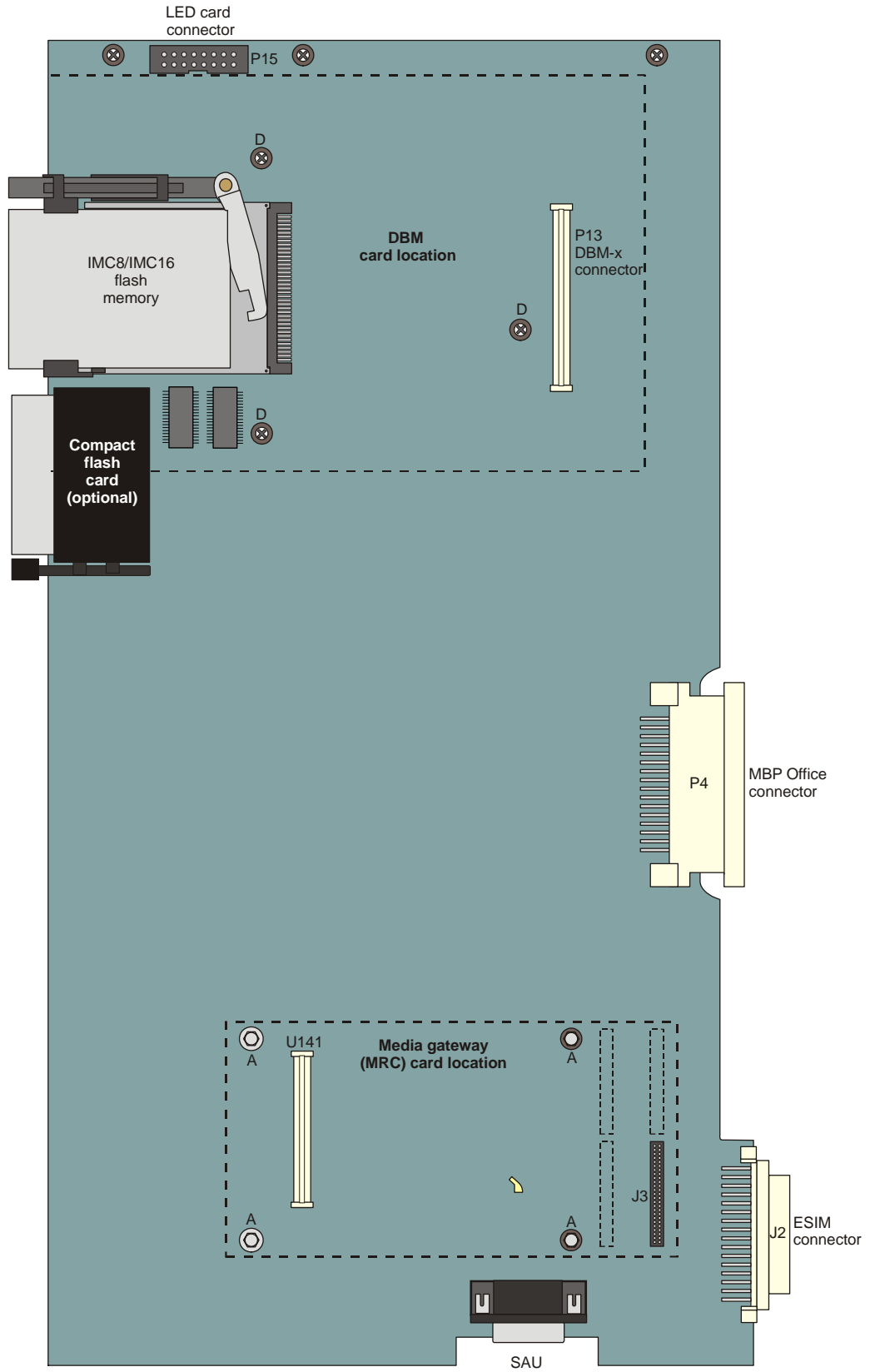
The MCB Office is permanently installed onto the inner surface of the front section of the IPx Office unit and is not removed in the field. It interfaces with the system via the backplane connector on the MBP Office (Main BackPlane) card and is powered via the power supply connector.

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 8-25](#).
- **IMC8/16 flash memory card.** The IMC8 card is described in further detail in [IMC8 and IMC16 Flash Cards, page 8-33](#).
- **Compact flash memory card.** The compact flash memory card is described in further detail in [Compact Flash Disk, page 8-39](#).
- **MRC card.** The MRC card is described in further detail on [MRC Card, page 8-27](#).
- **DBM-X card.** The DBM-x card is described in further detail on [DBM-X Card, page 8-41](#).
- **SAU (Software Application Unit).** The SAU is described in further detail on [Software Authorization Management, page 8-14](#).

Figure 8-1 **MCB Office Card Layout**



## 2 Card Handling Procedures

---

### 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 2-11](#). 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 MRC, page 8-29](#)
- [Installing the IMC8/16, page 8-34](#)
- [Installing the DBM-X, page 8-43](#)

### 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

#### 1 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)**, which is a separate card in other Coral products MCP card.
- **Universal GateWay (UGW)** embedded circuitry, which is part of a separate card in other Coral products known as the UGW (Universal GateWay) card.
- **Group Controller (GC)** embedded circuitry, which is part of a separate card in other Coral products (4GC or 30GC, for example).

The MCB Office contains multi-pin connectors and support circuitry for the addition of DBM-X and MRC baby cards and a hard disk that will be available for future system versions.

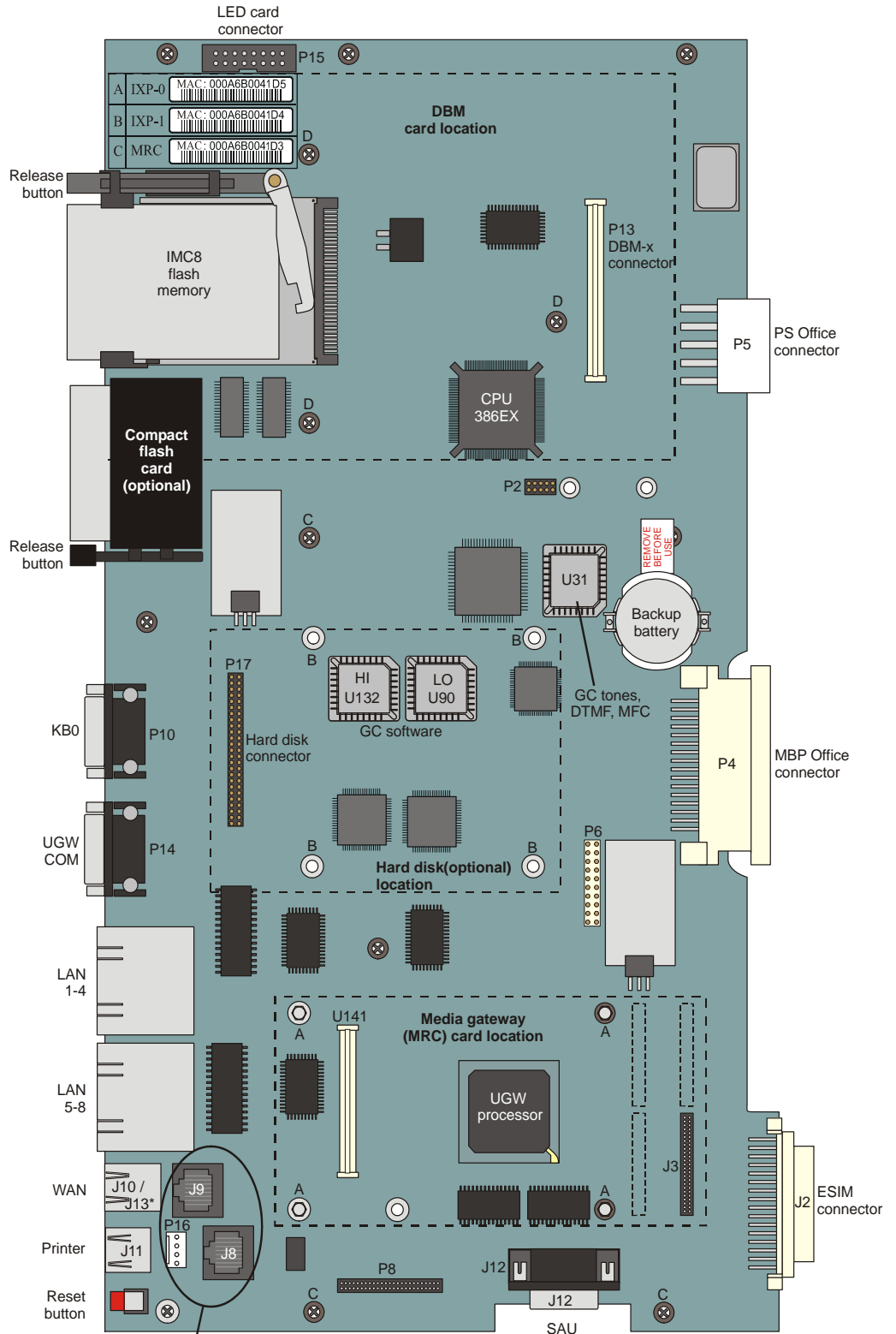
#### 3 Card Components

The MCB Office includes components that are part of the MCP, the UGW, or GC:

- **Main control processor** including a the MCP, CPU processor, the KB0, RS-232 connector, and the SAU. The MCP is described in further detail on [Main Control Processor, page 8-8](#).
  - **LED Office card connector P15**. The LED Office card is described in further detail on LED Card, page 8-23.
  - **IMC8/16 flash memory card slot**. The IMC8 card is described in further detail in IMC8 and IMC16 Flash Cards, page 8-31.
  - **Compact flash memory card slot**. The compact flash memory card is described in further detail in Compact Flash Disk, page 8-37.
  - **DBM-X card components** including connector P13 and threaded holes D. The DBM-X card is described in further detail on DBM-X Card, page 8-39.

- **Hard disk components** including connector P17 and threaded holes B. The hard disk will be provided in future versions of this product.
- **Universal GateWay** including the UGW processor and the RS-232 connector. The UGW is described in further detail in [Internet Protocol Gateway, page 8-9](#). 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 on Chapter 11, Networking.
  - **MRC card connectors J3 and J4** and threaded holes A. The MRC card is described in further detail on MRC Card, page 8-25.
- **Group Controller circuit** including the GC processor and replaceable software chips. The group controller circuit is described in further detail on [Group Controller Circuit, page 8-10](#).
- **Rest Button** used to reset the IPx Office unit including all telephony and IP applications. The reset button is described in further detail on [Front Panel, page 6-3](#).
- **Backup Battery** used to backup the database during power failure. The backup battery is described in further detail on [Lithium Battery Condition Testing, page 8-21](#).
- **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 50-pin, female connector that can facilitate an ESIM card.

Figure 8-2 MCB Office Card Layout



3 network card connectors

\* option of J13 for ADSL  
 P2, P6, P8 not used

A = Media gateway MRC screws  
 B = Hard disk catches  
 C = DrayTek LAN card screws  
 D = DBM card screws

## 4 Main Control Processor

The Main Control Processor (MCP) provides RS-232E KB0 programming and maintenance interface, RS-232 UGW programming and maintenance interface, a SAU connection, and an IMC8/16 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 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 card processors regarding port activity. It determines the appropriate response based on the programming entries contained in the system database. The main processor then instructs the appropriate card processor 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 and the MRC resources card. The DBM-X contains 2MB, 4MB, or 8 MB of Static Random Access Memory (SRAM) expansion memory.

Flash memory, located on the IMC8/16 card, stores the generic feature software, which determines the operation of the system. RAM, both on the MCB Office and on the DBM-X 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.

The generic feature software and feature authorization information is installed and updated into the IMC8/16 using FMprog PC-utility. Similarly, the system database is regularly backed up to, and may be transferred and restored from, an IMC8/16 card housed in the IMC8/16 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](#).

## 5 Internet Protocol Gateway

---

The internet protocol gateway embedded circuit provides the Coral IPx Office system with the ability to connect to the IP World. All Coral IP stations (FlexSet-IP 280S, FlexIP SoftPhone, SIP) and external telephony gateways (Coral Teleport for analog SLTs and Loop-Start/Ground-Start trunks) receive their Coral signalling from the internet protocol gateway circuit.

The internet protocol gateway is the main Coral gateway to services offered on the enterprise network. Voice calls maintained therein, although controlled by the Coral, are carried out entirely on the network when both ports involved are IP ports, thereby allowing heavy traffic configurations.

The internet protocol gateway circuit is a Coral integrated gateway for IP phones, trunks and keysets (SLTs and trunks require a Coral Teleport). It provides the capacity to drive up to 240 Coral IP ports, regardless of their physical location, and provides full Coral services to these sets.

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-connects). See [MRC Card, page 8-27](#) for further information.

## 1 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 1000 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 8-4*.

---

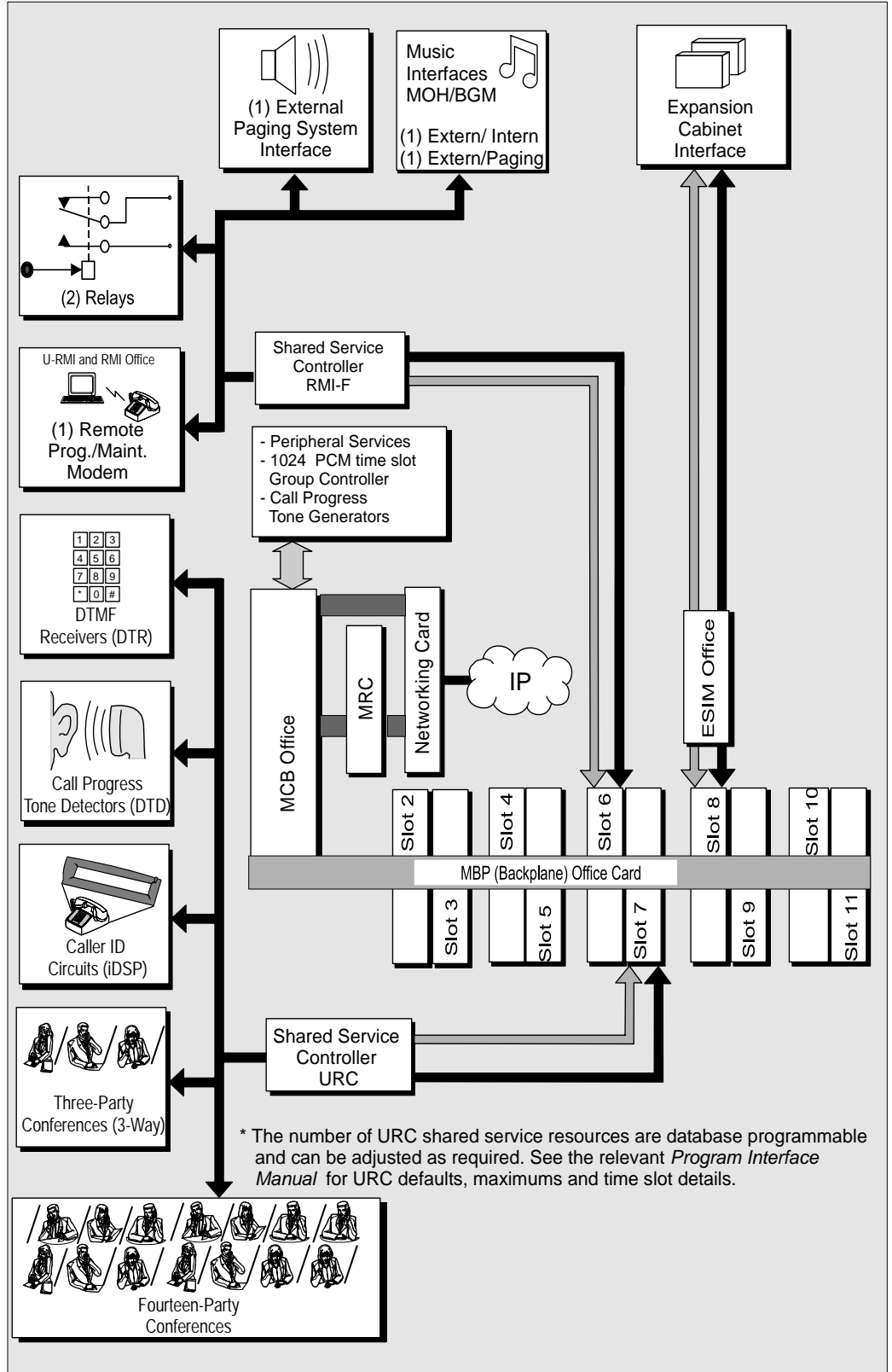
### *Voice Switching and Time Slot Configuration*

The group controller supports up to two HDLC highways, 16 PCM streams, and up to two expansion cages.

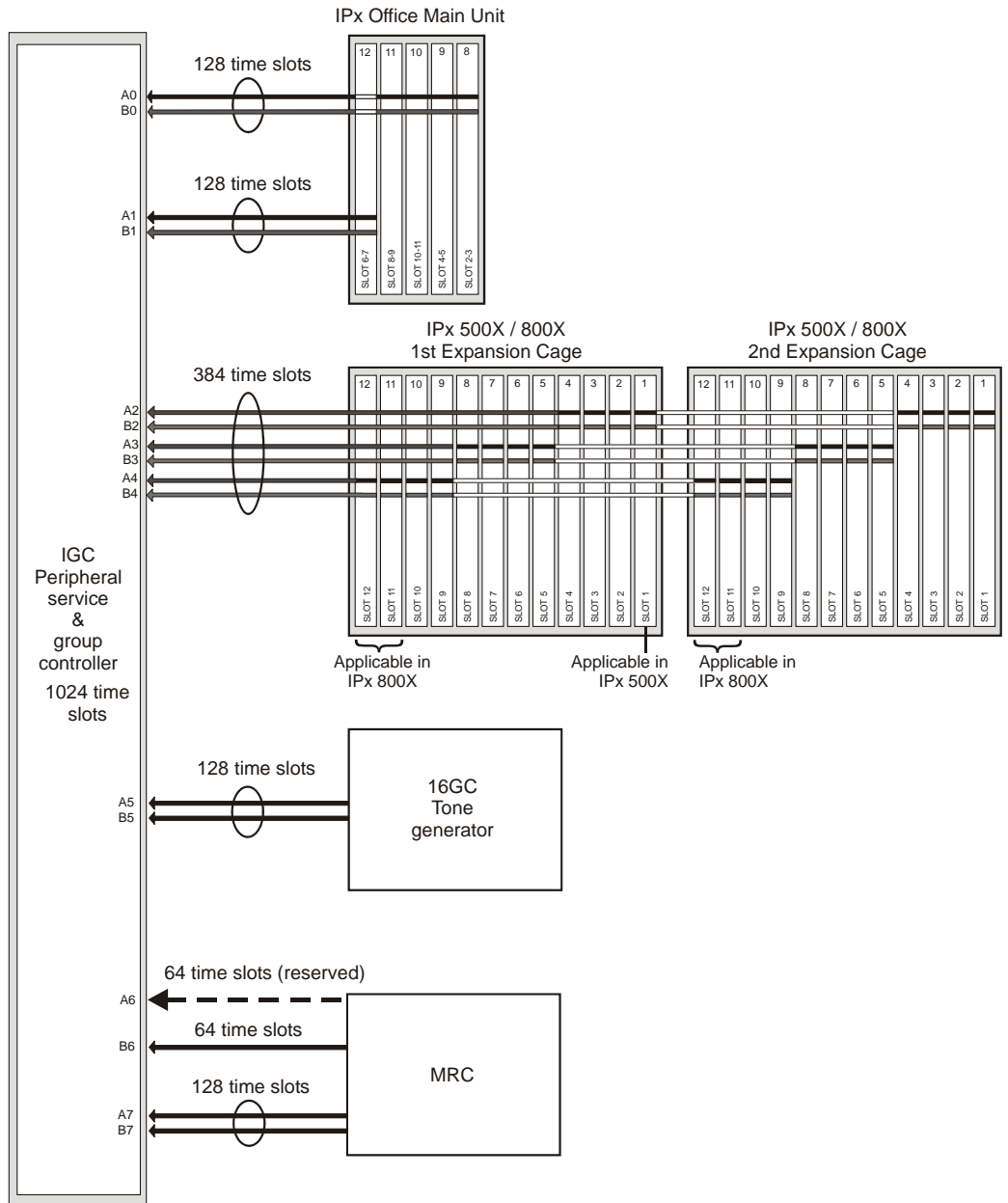
Each PCM stream includes 64 Time Slots. Each shelf unit (one or two expansion cages) receives 384 Time Slots, divided into three groups of 128 Time Slots.

The Coral IPx Office supports 1024 PCM time slots. The 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 8-4*.

Figure 8-3 Coral IPx Office Voice Switching



**Figure 8-4 Coral system PCM Highway Distribution for Group Control**





---

## *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 output directly to the digital PCM bus when required.

### *PCM Streaming*

Each PCM stream operates at a data rate of 4.096 bps. Each PCM stream consists of transmit and receive signals, each of which are divided into 128 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/ $\mu$  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 1000 time slots and any other 1000 time slots. This switching matrix allows for a Constant Frame Delay operation mode.

## 2 Software Authorization Management

The MCB Office 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 8-5* 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!

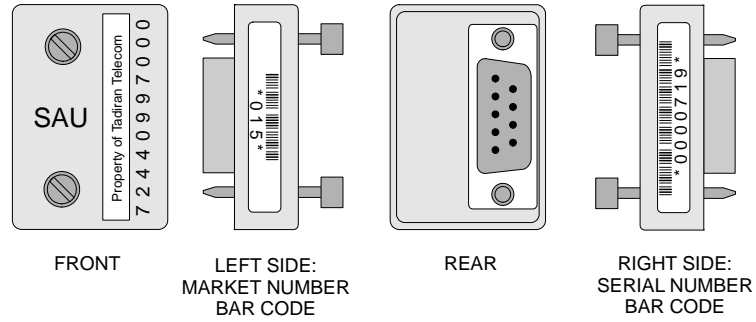
*The Coral system automatically ceases call processing after 14 days for any of the following reasons:*

- *The SAU serial number does not match the corresponding IMC8/16 SAU serial number.*
- *The Coral generic version contained in the IMC8/16 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 8-5 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 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 8-5](#) 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.

### 3 Front Panel Features

---

The front panel of the MCB Office card contains various elements that are accessed via the front panel. These elements, including 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](#).

## 4 IMC8/16 Memory Card

The IMC8/16 is an integrated memory card with a 8 or 16 MB flash memory capacity. It contains the generic software of the Coral and is used to store the system database. See [IMC8 and IMC16 Flash Cards, page 8-33](#) for details.

The IMC8/16 is used by the main control during run-time. The memory management on the MCP-IPx allows part of the code to use portions of the IMC8/16 memory for run-time. Therefore, the IMC8/16 card must not be removed from its drive during system operation. If removed, the system will crash.

### **CAUTION!**

*Do not Remove the IMC8/16 card form its drive during system operation. Removing the IMC8 while the system is ON AIR will cause the system to shut down.*

## 5 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.

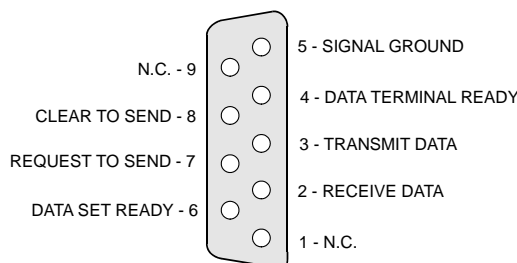
*Figure 8-6* illustrates the pin assignments of the DB-9P.

*Table 8-1* lists the pin functions. See *Program Interface Device Connection, page 2-39* for detailed connection information and terminal setup.

**Table 8-1 KB0 RS-232E Interface Pin Functions**

<i>Pin Designation</i>	<i>Pin #</i>	<i>Function</i>
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 8-6 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.

## 6 UGW RS-232E Programming Port

The serial interface of the UGW 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 to the LAN.

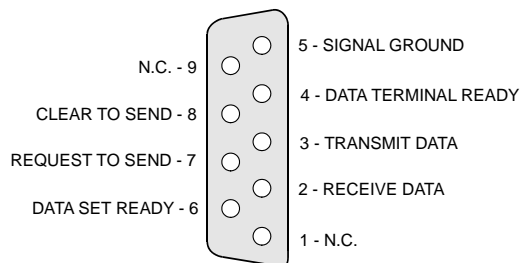
*Figure 8-6* illustrates the pin assignments of the DB-9S.

*Table 8-1* lists the pin functions. See *Program Interface Device Connection, page 2-39* for detailed connection information and terminal setup.

**Table 8-2 UGW 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 8-7 UGW Pin Assignment**



### UGW Setup

The baud rate is set during first initialization at 115200 bps, No parity, 8 data bits, 1 stop bit, VT-100.

The baud rate is set to 115200 bps.

Consult the *Program Interface Reference Manual* (Chapter-17 Terminal Setup - Route: TERM,0) for instructions on the database programming required.

## 7 Installing the DBM-X Memory Card

---

The DBM-X card is an expansion memory card. It adds an additional 2, 6, or 8 MB SRAM to the Coral main control. The card is equipped with an extension connector on its top side. However, only one DBM-X connector can be installed in the IPx Office unit. There is no battery installed on the DBM-X card. In the event of a power failure, the DBM-X is powered from the lithium battery installed on the MCB Office. For further information, see [DBM-X Card, page 8-41](#).



## 8 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 depleted, 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.

For first time use, release the protective battery insulator. See [Figure 8-8](#).

### *Replacing the Lithium Battery*

In the following procedure, do not apply too much pressure to the battery clasp as this could cause it to snap.

1. 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.*

2. Insert the new battery with the + (positive) symbol appearing on top.

### **WARNING!**

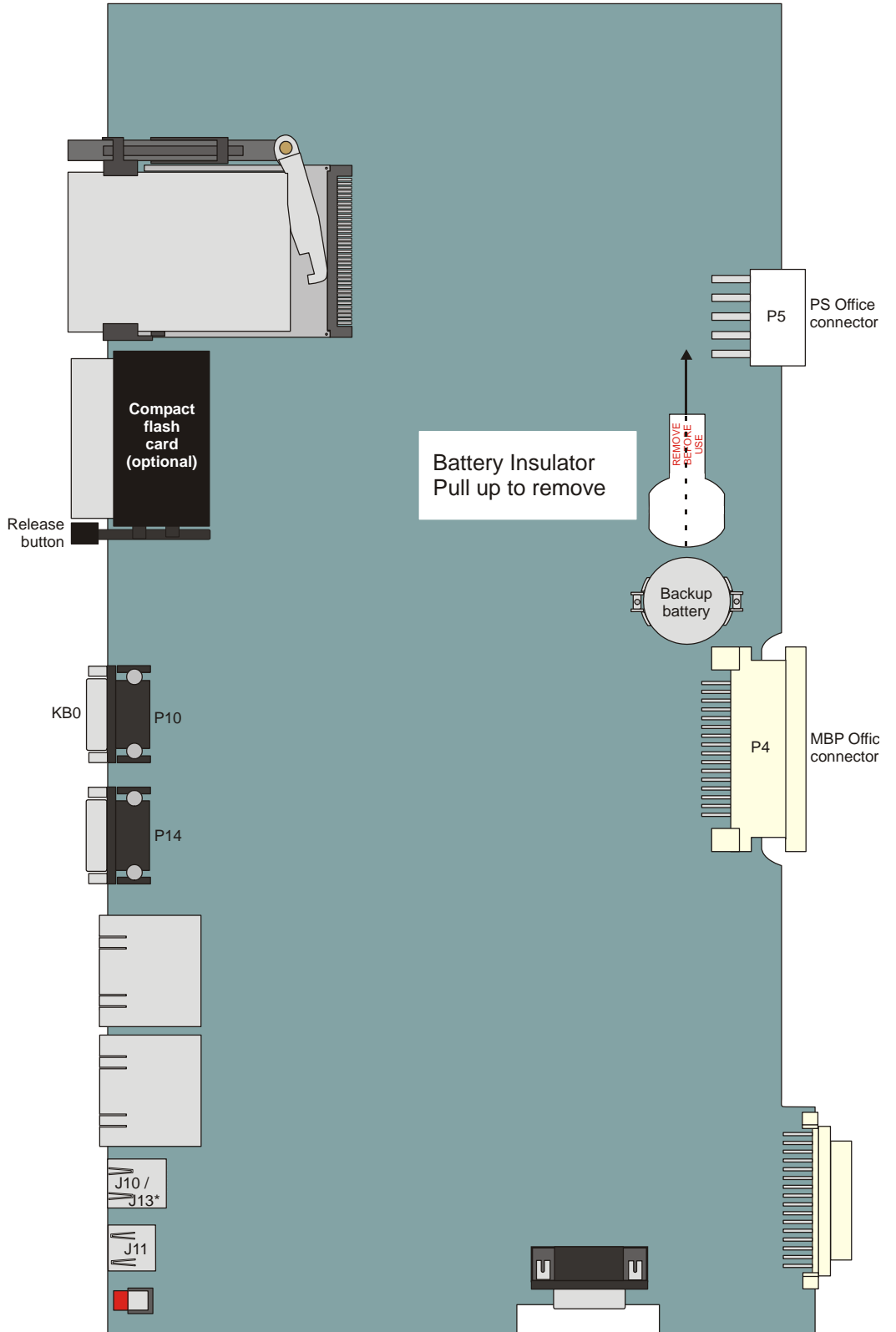
#### **Explosion and Environmental Hazards.**

*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.*

**Figure 8-8 MCB Office Card Battery Insulator Release**



## 9 Specifications - MCB Office

**Microprocessor:** ..... Intel™ 80386EX  
**CPU Clock Rate:**..... 32 MHz  
**Memory Addressing:** ..... 16 MB  
**Data Bus Structure:** ..... 16 Bit; Shared with DBM-X, IMC8/16  
**RAM Storage Capacity:**..... 2M Bytes with battery backup (90 days typically)  
**Memory Device:**..... 512kb 4bit SRAM

**RAM Backup Battery:**..... LF1/2W, 2430, 2430B  
Voltage..... 3.0 VDC Nom.  
Capacity..... 250 mA/H  
Dimensions:  
Diameter ..... 0.965 in. (24.5 mm)  
Width ..... 0.118 in. (3 mm)  
NEDA Equivalent..... 5011L

**Baby Cards:**..... Up to two (one DBM-X and one MRC)

**KB0:** ..... 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

**UGW COM:**..... 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 ..... 11500 bps, No parity, 8 data bits, 1 stop bit, VT-100



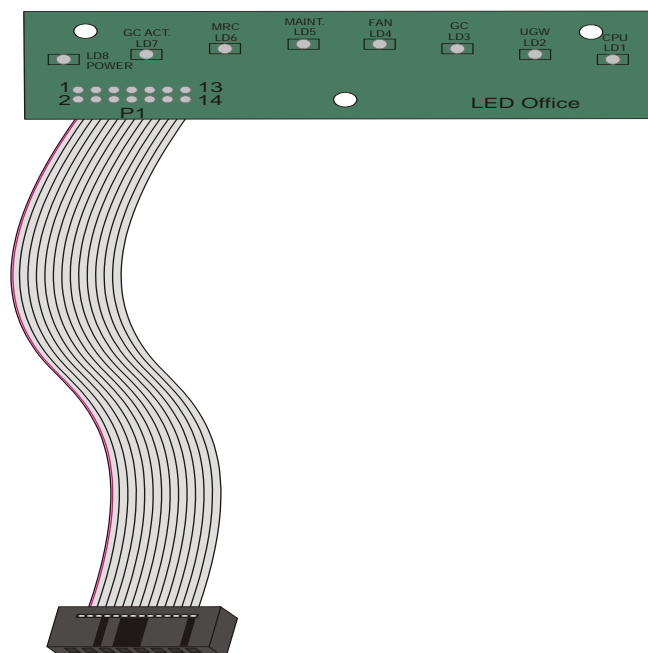
## 8.3 LED Card

### 1 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 UGW or MCB circuit is in maintenance mode
- **Fan** (red) - indicates whether the fans are functional
- **GC** (red) - indicates the GC status
- **UGW** (red) - indicates whether the UGW is in maintenance mode
- **CPU** (red) - indicates the MCP circuit status

Figure 8-9 LED Office Card



## 2 Disconnecting the LED Office Card from the MCB Office Card

The LED Office card is attached to the MCB Office main control card and to the Coral IPx Office cover. If the cover is removed without disconnecting the flat cable from the MCB Office card first, the cable will tear and the LED Office card will not function.

### CAUTION!

Verify that the cable is detached prior to removing the unit cover. See [Opening the Unit Cover, page 6-8](#).

## 3 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 6-8](#).
2. Position the unit cover upright, such that the front panel is resting on a flat surface.
3. Unfasten the three M3X6 screws that connect the LED Office card to the unit cover and safeguard for re-assembly.
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. Close the unit cover. See [Closing the Unit Cover, page 6-10](#).

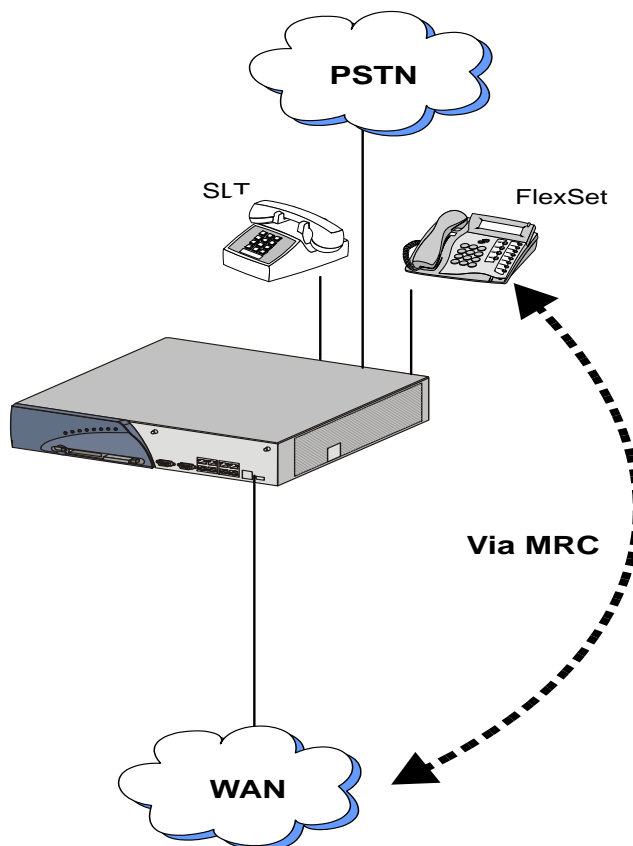
# 8.4 MRC Card

## 1 General Information

### *Functional Description*

The MRC module 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-connects). See [Figure 8-10](#) for an illustration of IP-to-IP connections versus non IP-to-IP connections in the Coral.

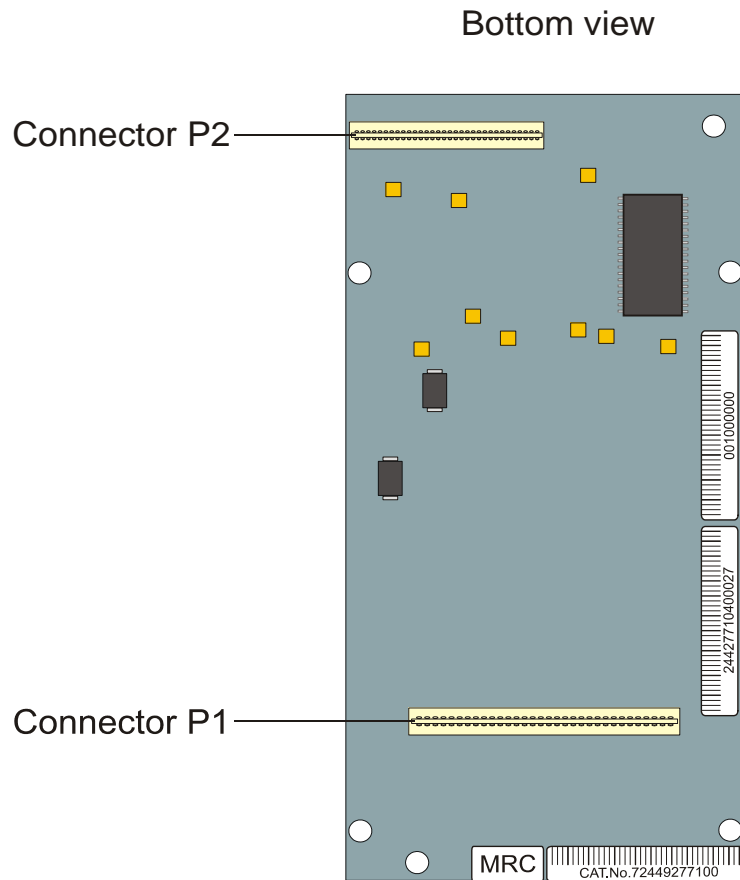
Figure 8-10 **Description of MRC**



## Layout

The MRC card includes two connectors, P1 and P2, that connect to connectors J4 and J7, respectively. The card is initialized via the MCB Office, there is no MAC number label on the card, and the MAC number has no significance for PI programming.

Figure 8-11 **MRC Card Layout - Bottom View**





## 2 Installing the MRC

The MRC card is secured to the MCB Office by a threaded spacer. The parts used to attach the spacer to the MCB Office are listed below.



### NOTE:

The MRC assembly kit includes additional parts. However, you only need to use the parts listed below.

Table 8-3 Assembly Parts Used in MRC Assembly Kit

Part	Quantity
Phillips screw M3X6	4
Lock washer M3	4
Male-female spacer hex M3X10	4

### Preparing for Installation

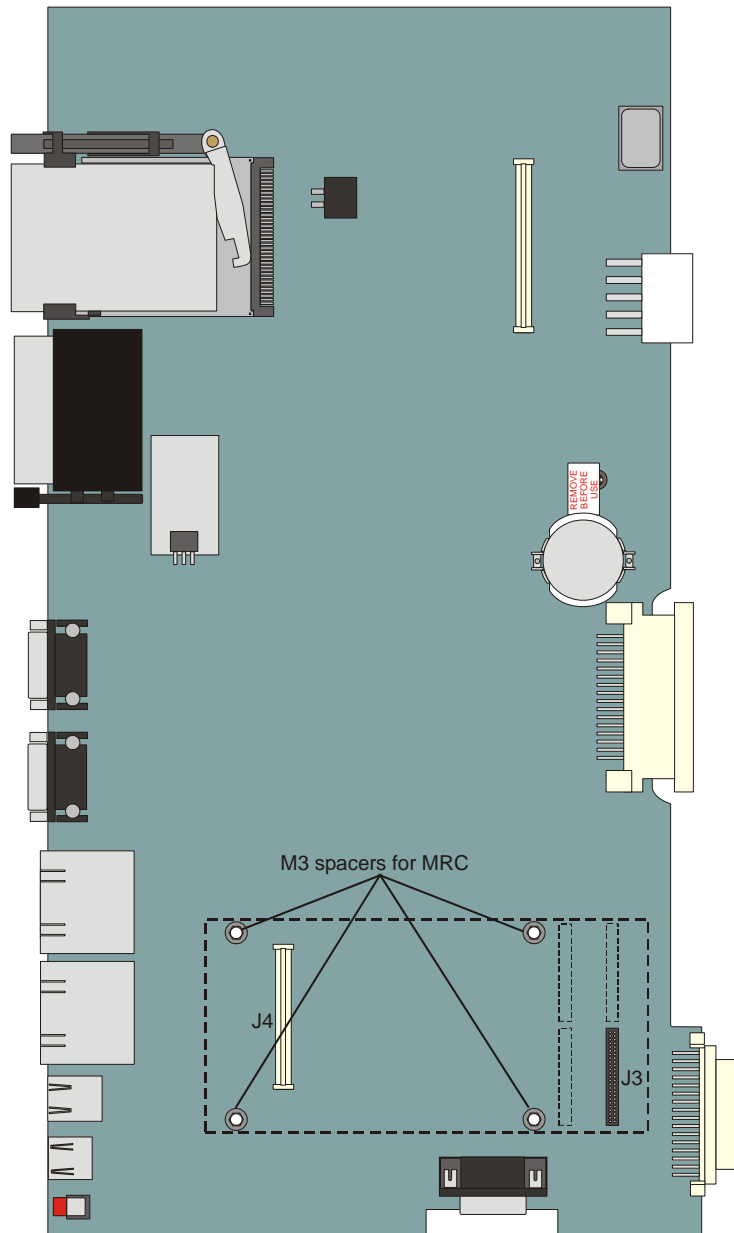
1. Locate a desk or table top that will support 20 lb (9.1 kg). If the surface can be damaged by sharp objects, place a protective sheet of cardboard or similar material over the top surface.
2. Place an anti-static sheet over the desk or table top. (The card's plastic shipping bag will suffice.)
3. 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.
5. If necessary, disconnect the ground wire from the IPx Office unit.
6. If necessary, dismount the IPx Office unit from the rack. See [Dismounting the IPx Office Unit from the Rack, page 2-16](#).

### Installing the MRC Card

1. Open the IPx Office unit. See [Opening the Unit Cover, page 6-8](#).
2. Fasten the four hex M3X10 standoff spacers into the three holes displayed in [Figure 8-15](#).
3. Position the MRC card on top of the MCB Office card and align the four fastening holes on top of the standoff spacers.

4. Gently, but firmly press the MRC connector into MCB Office connector until the MRC card rests on the standoff spacers. A slight resistance will be felt as the cards engage.
5. Insert the M3 spring lock washers over the four Phillips M3X6 screws and fasten the MRC card to the MCB Office card.

Figure 8-12 **MRC Assembly onto MCB Office**



### 3 Removing the MRC

---

1. Repeat *Preparing for Installation, page 8-43*.
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 the multi-pin connector P1 on the MRC from MCB Office connector J4 and multi-pin connector P2 on the MRC from MCB Office connector J7.

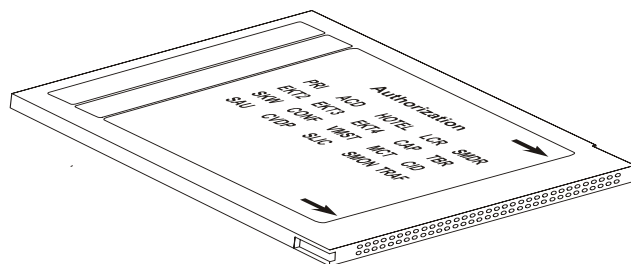
## ***NOTES:***

## 8.5 IMC8 and IMC16 Flash Cards

### 1 General Information

The IMC8/16 Flash Memory card is a removable component of the Coral IPx Office common control section. It is installed on the MCB Office. The IMC8 card incorporates 8 MB of Erasable, Programmable, Read-Only Memory (flash EPROM). The IMC16 card incorporates 16 MB of Erasable, Programmable, Read-Only Memory (flash EPROM). The IMC8/16 card is used to store the generic feature software version of the Coral IPx Office system. The generic feature software determines the feature operation of the Coral IPx Office system. In addition, the IMC8/16 is used to store the database backup as well as the boot code. *Figure 8-13* illustrates the IMC8/16 flash memory card.

Figure 8-13 IMC8 Flash Memory Card - Left side



IMC8/16 provides an extremely reliable and non-volatile storage medium, yet allows field software update capability. Once programmed, the flash EPROM memory retains its contents indefinitely without power. However, by using a precisely controlled erase procedure, the entire EPROM contents can be flash cleared and then reprogrammed to update the operating software of the system.

IMC8/16 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 software version.

## 2 Installing the IMC8/16

The IMC8/16 does not occupy a card slot within the Coral IPx Office system. It is installed on the PCM-CIA connector on the MCB Office. The IMC8/16 release button enables the removal of the IMC8/16 card. An arrow on the foil attached to the front side of the IMC8/16 card indicates the insertion direction. The IMC8/16 card position on the MCB Office card is shown in [Figure 8-13](#).

### CAUTION!

*In order to avoid damage to the IMC8/16 card, press very gently during the card insertion.*

### CAUTION!

*Before each installation or removal of an IMC8/16 card, press the RESET button.*



### NOTE:

*Insert the IMC8/16 card with its label side facing left, as shown in [Figure 8-13](#).*

The IMC8/16 card contains three types of data:

- Generic Feature Software Version
- Database Backup
- Boot Code

When replacing an IMC8/16 card with another card that contains upgraded software, the new card will not contain a database. It is therefore important to make a binary backup of the database before removing the card. See the *Database Binary Backup PC Utility Reference Manual* for further details.

Make sure that the IMC8/16 card being installed is not write-protected.

After a new card is installed, verify that the PI starts up properly, and then save the database in accordance with the procedure provided in [System Database Control, page 4-5](#).

### 3 Removing the IMC8/16

---

The IMC8/16 release button enables the removal of the IMC8/16 card.

#### **CAUTION!**

*Before each removal of an IMC8/16 card, press the RESET button.*

When replacing an IMC8/16 card with another card that contains upgraded software, the new card will not contain a database. It is therefore important to make a binary backup of the database before removing the card. See the *Database Binary Backup PC Utility Reference Manual* for further details.

## 4 Specifications

---

Storage Capacity:..... 8,388,608 Bytes (8MB)

Memory Configuration: ..... 16 bits

PCMCIA:..... Standard Compatible



***NOTES:***



## 8.6 Compact Flash Disk

### 1 Introduction

---

An ATA-type PCMCIA connector houses the Compact Flash Disk (CFD) memory. The CFD contains the TBD??? software and TBD??? files.

The CFD disk has an erasable memory capacity of 64MB or more. The appropriate memory capacity is dependent on ?????? the Coral system configuration.

The ATA type PCMCIA slot is housed on the MCB Office card side edge.

### 2 Inserting the CFD

---

The CFD card is inserted with the front side facing up.



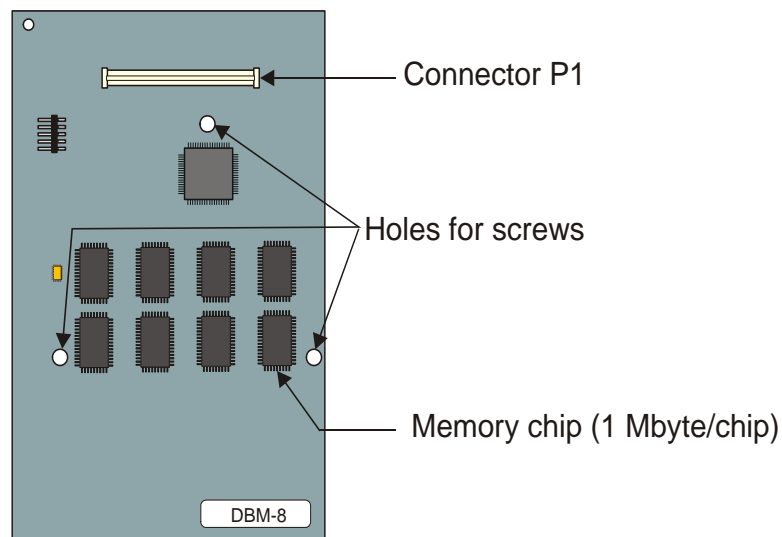
## 8.7 DBM-X Card

### 1 General Information

The DBM-X memory expansion card is a component of the Coral IPx Office common control section. The DBM-X incorporates 2, 4, or 8 MB 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 8-14* displays the DBM-8 card layout. DBM-8 indicates that the DBM card is supplied with 8 MBytes of memory (1 MByte per chip).

*Figure 8-14 DBM-X Card Layout*



SRAM devices require a constant source of power to retain their contents. Power to maintain the memory is ordinarily provided by the IPx Office system in which the DBM-X is installed. Backup voltage is supplied by the MCB Office motherboard lithium battery.

The DBM-X 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 P1 connector on the DBM-X card is installed onto the P13 connector of the MCB Office card. See *Figure 8-15*. The DBM-X connectors **are not**

compatible with the DBM-X connectors. Only one DBM-X card can be installed in the IPx Office unit.

---

### *When is a DBM-X card required?*

A DBM-X card is required when:

- The Coral Directory, Traffic, and Call Log features are used.
- The CoraLINK Adapter circuitry is relevant to your system version.

Consult the *Program Interface Reference Manual* (Chapter-4 Size Definition, Route: SIZ, CHECK MEMORY?) to display the database memory status.

## 2 Installing the DBM-X

The DBM-X is secured to the MCB Office by a threaded spacer. The parts used to attach the spacer to the MCB Office are listed below.



### NOTE:

The DBM-X assembly kit includes additional parts. However, you only need to use the parts listed below.

Table 8-4 Assembly Parts Used in DBM-X Assembly Kit

Part	Quantity
Phillips screw M3X6	6
Washer spring curved M3	3
Male-female standoff hex M3X6	3

### Preparing for Installation

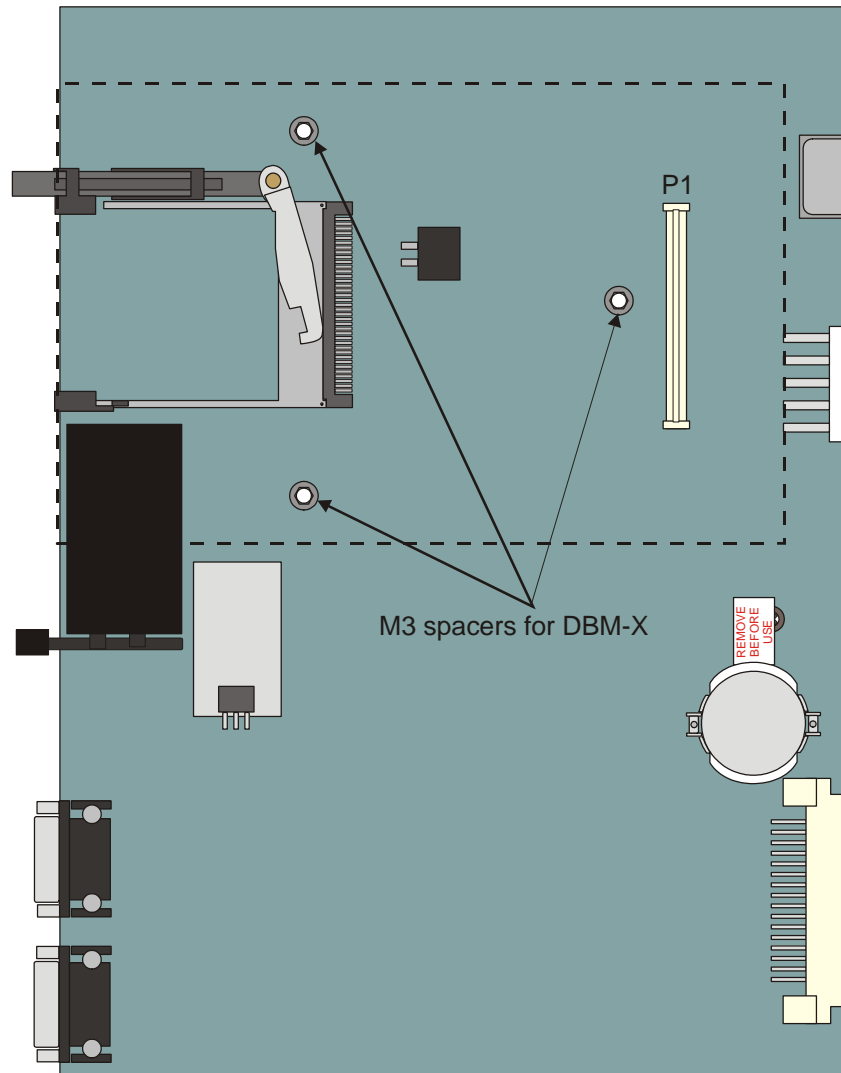
1. Locate a desk or table top that will support 20 lb (9.1 kg). If the surface can be damaged by sharp objects, place a protective sheet of cardboard or similar material over the top surface.
2. Place an anti-static sheet over the desk or table top. (The card's plastic shipping bag will suffice.)
3. 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.
5. If necessary, disconnect the ground wire from the IPx Office unit.
6. If necessary, dismount the IPx Office unit from the rack. See [Dismounting the IPx Office Unit from the Rack, page 2-16](#).

### Installing the DBM-X Card

1. Open the IPx Office unit. See [Opening the Unit Cover, page 6-8](#).
2. Fasten the three hex M3X6 standoff spacers into the three holes displayed in [Figure 8-15](#).
3. Position the DBM-X card on top of the MCB Office card and align the three fastening holes on top of the standoff spacers.

4. Gently, but firmly press the DBM-X connector into MCB Office connector until the DBM-X card rests on the standoff spacers. A slight resistance will be felt as the cards engage.
5. Insert the M3 spring curved washers over the three Phillips M3X6 screws and fasten the DBM-X card to the MCB Office card.

Figure 8-15 **DBM-X  
Assembly onto MCB  
Office**





### 3 Removing the DBM-X

---

1. Repeat *Step 1* through *Step 1* on *Preparing for Installation, page 8-43*.
2. Remove the M3X6 Phillips screws and washers that secure the DBM-X 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-X card near the MCB Office front side. Use your fingers to lift the edge of the DBM-X card on both sides and gently disengage the multi-pin connector P1 on the DBM-X from MCB Office connector P13.

### 3 Specifications - DBM-X

---

**Storage capacity per microprocessor:** 1,048,576 Bytes (1.0MB)

**Memory configuration:**..... 524,288 16 bits

**Memory device:**..... 128kb 8 bit SRAM

**Operating voltage:** ..... 3.3VDC Nom.

## Shared Service Cards

Coral

9.1 Shared Service Circuitry.....	9-1
9.2 MRC-8, 16, 32, 64 Modules.....	9-5
9.3 U-RMI / U-MR / RMI / MR Office Cards.....	9-7
9.4 Three-Way Conference (3-Way).....	9-35
9.5 Multi-Party Conference (CONF).....	9-39
9.6 DTMF Receiver (DTR).....	9-45
9.7 Dial Tone Detector (DTD).....	9-49
9.8 Caller ID for SLT (iDSP).....	9-53
9.9 MFC Receiver (MFR).....	9-57
9.10 VoIP Media Gateway (MG).....	9-59
9.11 Remote Maintenance (Modem).....	9-61
9.12 Data Serial Ports (RS-232E).....	9-67
9.13 Music.....	9-69
9.14 Voice Paging (Public Address) and Relay-1.....	9-77
9.15 UNA/Bell and Relay-2.....	9-85
9.16 Accessory or Alarm Relay-3.....	9-91
9.17 Relay Contacts.....	9-99



# 9.1 Shared Service Circuitry Installation

## 1 General Description

The *shared service* circuits provide functions such as media gateway (MG) 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.

## 2 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-RMI Office, U-MR Office, RMI Office or MR Office

The main shared service functions of these cards are described in [Table 9-1](#).

## 3 Card Handling Procedures

For card handling procedures and general installation procedure, see [Peripheral Card Installation, page 10-1](#).

## 4 MRC Cards

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 [Section 9, MRC-8, 16, 32, 64 Modules on page 9-5](#).

## 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 [Section 9, U-RMI / U-MR / RMI / MR Office Cards on page 9-7](#).

## 6 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

Each shared service circuit and function is described in detail in the following sections. Refer to these subsections for more information.

## 7 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:

<b>Card</b>	<b>Cage</b>	<b>Description</b>
MRC	IPx 800X w/PUGW	MRC-8, 16, 32 or 64 provides 8, 16, 32 or 64 media gateway channels.
	IPx 500X w/PUGWipx	<i>NOTE: PUGW and PUGWipx support SIP and MGCP end points.</i>
MG	IPx 800X w/UGW-E	MG-24, 48, 72, 96 or 120 provides 24, 48, 72, 96 or 120 media gateway channels.
	IPx 500X w/UGW-Eipx	<i>NOTE: UGW-E and PUGW-Eipx support MGCP end points.</i>
4VSN	IPx 800X	<i>[discontinued]</i> 4 ports used to deliver prerecorded announcement messages.
8DRCF	IPx 800X	Includes the following functions: <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> <li>■ 1 remote maintenance modem, (V.92 ITU-T standard up to 56Kbps)</li> </ul>
8DRCM	IPx 800X	<i>[discontinued]</i> Same as 8DRCF but with Bell 103/212A or ITU V.21/V.22, 300/1200bps remote maintenance modem.
8DTD	IPx 800X	<i>[discontinued]</i> 8 circuit DialTone Detector and call progress tone analyzer.

<b>Card</b>	<b>Cage</b>	<b>Description</b>
8DTR	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.
RMI	IPx 800X	[ <i>discontinued</i> ] Includes the following functions: <ul style="list-style-type: none"> <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-232C programming/maintenance interfaces 300 to 9,600 bps</li> <li>■ 1 Bell 103/212A or ITU V.21/V.22, 300/1200bps remote maintenance modem.</li> </ul>

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 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

Refer to *Chapter 6* of the *Program Interface (PI) and Database Reference Manual* for additional details.



## 9.2 MRC-8, 16, 32, 64 Modules (Media Resource Card)

### 1 General Description

*Figure 9-1* illustrates the MRC card circuit layout. Shared service circuits in the MRC cards are embedded in DSP units.

The main shared service functions and the maximum number of resources that can be supported by the various cards are described in *Table 9-2*.

Table 9-2 MRC Features

Features	MRC-8	MRC-16	MRC-32	MRC-64
G.711	32	64	64	128
G.729	8	16	32	64
G.723	8	16	32	64

#### Card Location

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:

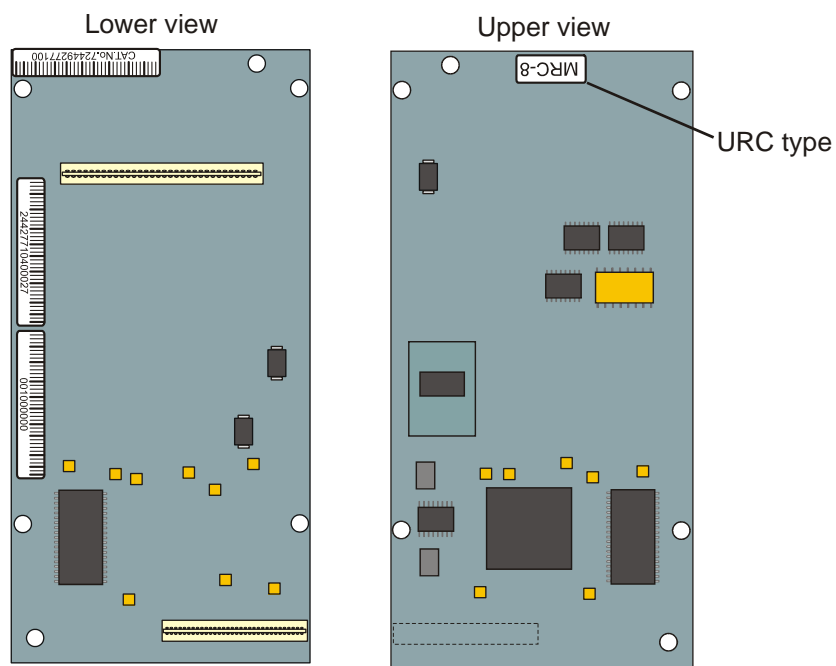
*This slot does not physically exist, but is embedded onto the MCB Office card. This slot number is recognized as such by the PI, only.*

Refer to the *Program Interface and Database Reference Manual - Chapter 6, Card List*, for further details.

## 2 Layout and Installation

The MRC card includes two connectors that connect to connectors J4 and J7 on the MCB Office. For more information about various aspects of the card, refer to [Section 8, MRC Card on page 8-27](#).

Figure 9-1 **MRC Card Layout**



# 9.3 U-RMI / U-MR / RMI / MR Office Cards

## 1 General Description

[Figure 9-3](#) through [Figure 9-6](#), starting [on page 9-11](#), 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 9-4](#).

[Figure 9-2](#) displays the U-RMI Office, U-MR Office, RMI Office and MR Office architecture.

### Card Location

The U-RMI Office, U-MR Office, RMI Office, and MR 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 9-3](#):

Table 9-3 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 9-18.](#)
- [URC PROM \(U73\) on page 9-21](#)

## 2 Features

Table 9-4 U-RMI /  
U-MR Office / RMI /  
MR Office Features

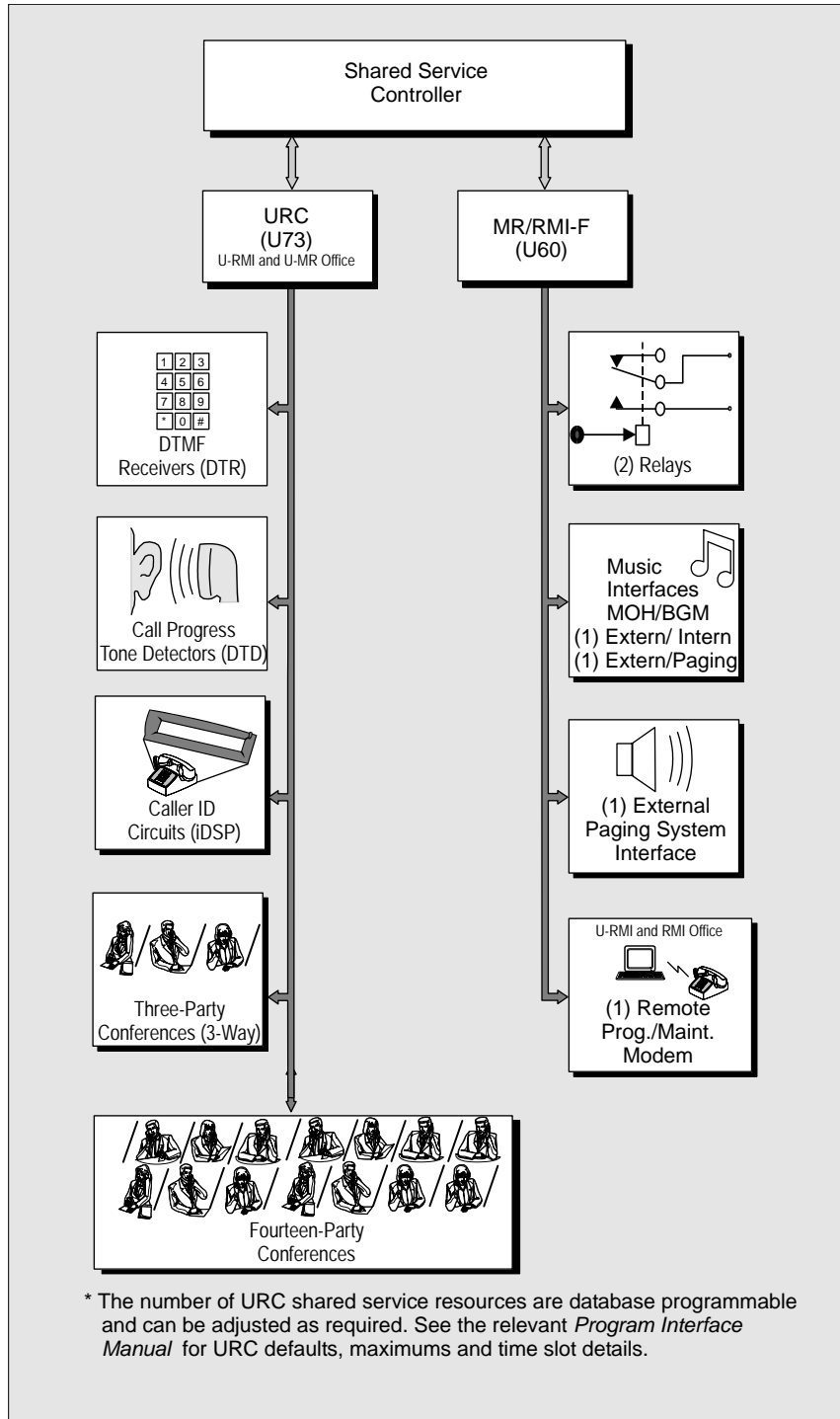
Features	U-RMI	U-MR	RMI	MR
<ul style="list-style-type: none"> <li>■ 1 internal or external music interface</li> <li>■ 1 external music interface or 1 external voice paging interface or public address and relay contacts</li> <li>■ 1 auxiliary or major/minor alarm relay contacts</li> <li>■ 1 universal 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 (<i>max: 32*</i>)</li> <li>■ 24 DTR circuit DTMF receiver and decoder card for touch-tone digits (<i>max: 24*</i>)</li> <li>■ Eight 3-way conference (<i>max: 24*</i>)</li> <li>■ Two Meet-me bridge conference for 14 parties (<i>max: 6*</i>)</li> <li>■ 16 Caller ID circuit transmitters adapted to Bellcore standards which includes the time and Caller Name/Num display (<i>max: 32*</i>). 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> (<i>max: *</i>) The maximum number for the resources is dependant on the number of URC timeslots. 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 time slots. Therefore, increasing one of these resources requires decreasing another.

Figure 9-2 U-RMI / U-MR / RMI MR Office Architecture



The U-RMI Office, U-MR Office, RMI Office and MR Office cards include:

- Configuration jumpers, as described [on page 9-15](#)
- External connectors, as described [on page 9-17](#)
- MR/RMI-F software, as described [on page 9-18](#)
- Internal/external music on hold and background music ports, as described [on page 9-69](#)
- A paging output port (or an external music on hold and background music port), as described [on page 9-77](#)
- Universal Night Answer (UNA) Central Bell), as described [on page 9-85](#)
- Dial operated accessory or alarm (RELAY), as described [on page 9-91](#)
- 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 9-99](#)

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 9-61](#)

The U-RMI Office and U-MR Office cards include:

- Shared Service components
- URC indicator (front panel red LED), as described [on page 9-16](#)
- URC software, as described [on page 9-21](#)
- 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 9-45](#)
- 16 (max: 32\*) port tone detector DTD and call progress tone analyzer for enhanced dialing (busy outside number auto-redial), as described [on page 9-49](#). 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, as described on page 9-53

Figure 9-3 U-RMI Office Card Circuits Layout, Front Panel and Jumpers

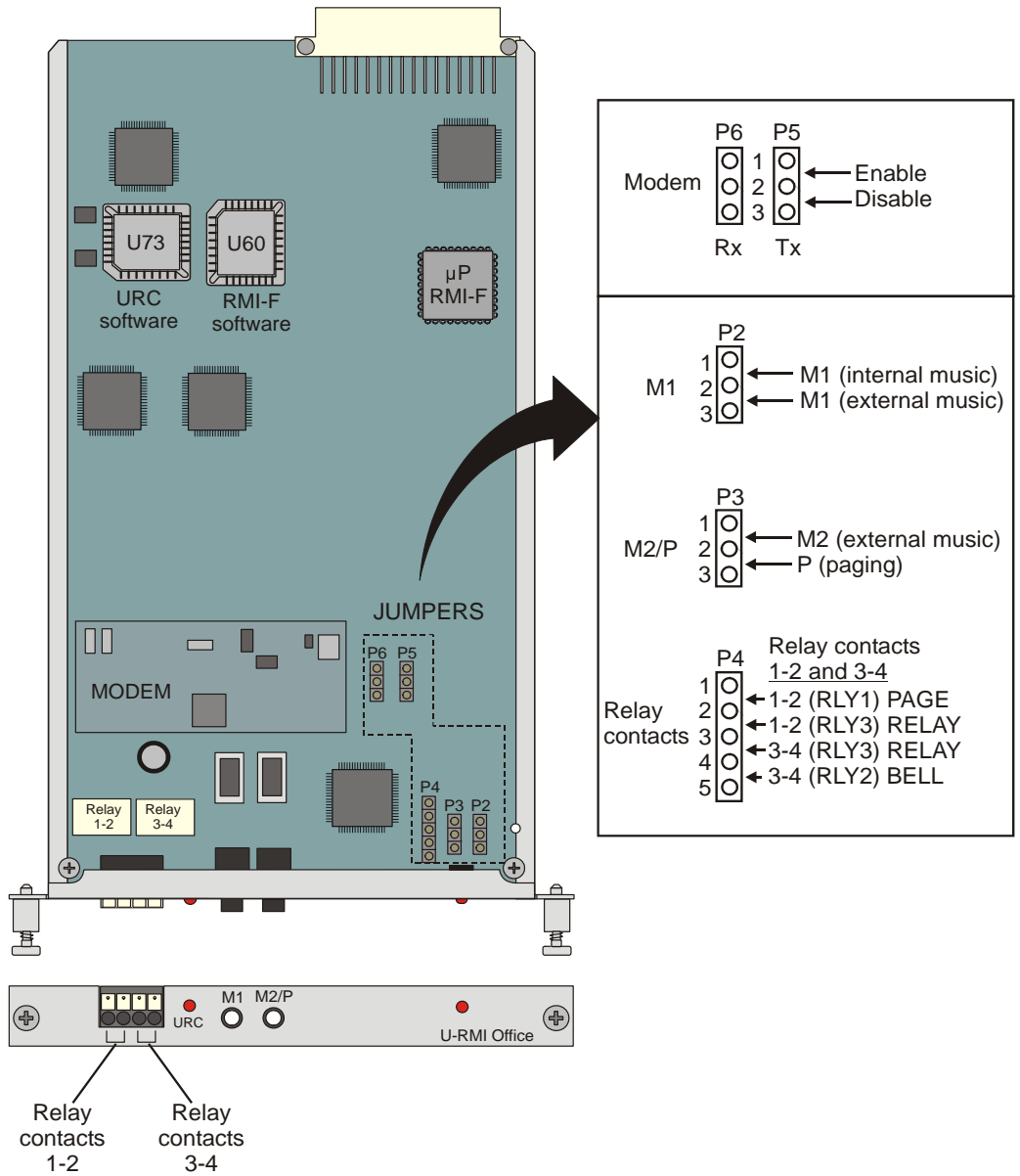


Figure 9-4 RMI Office Card Circuits Layout, Front Panel and Jumpers

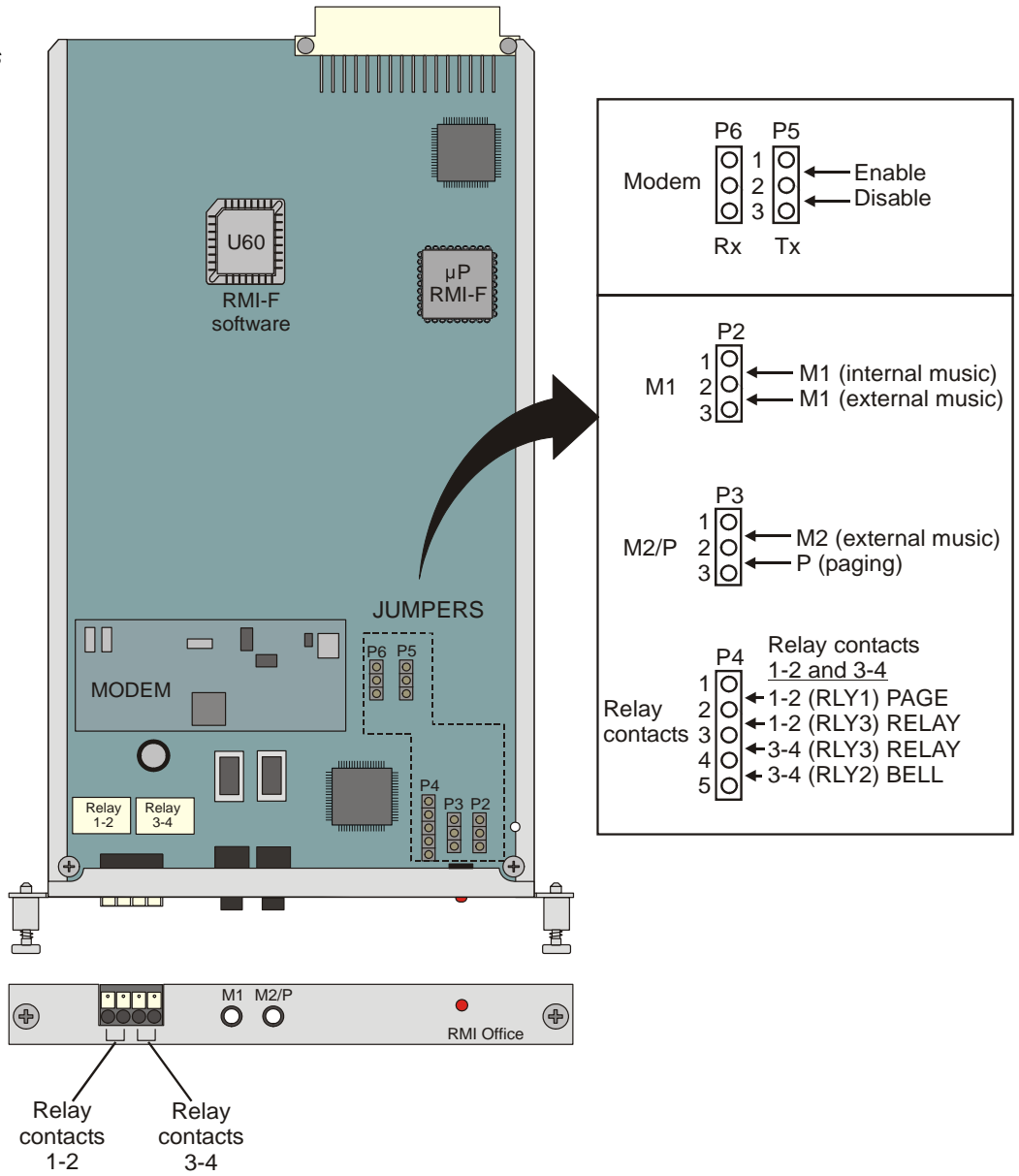




Figure 9-5 U-MR Office Card Circuits Layout, Front Panel and Jumpers

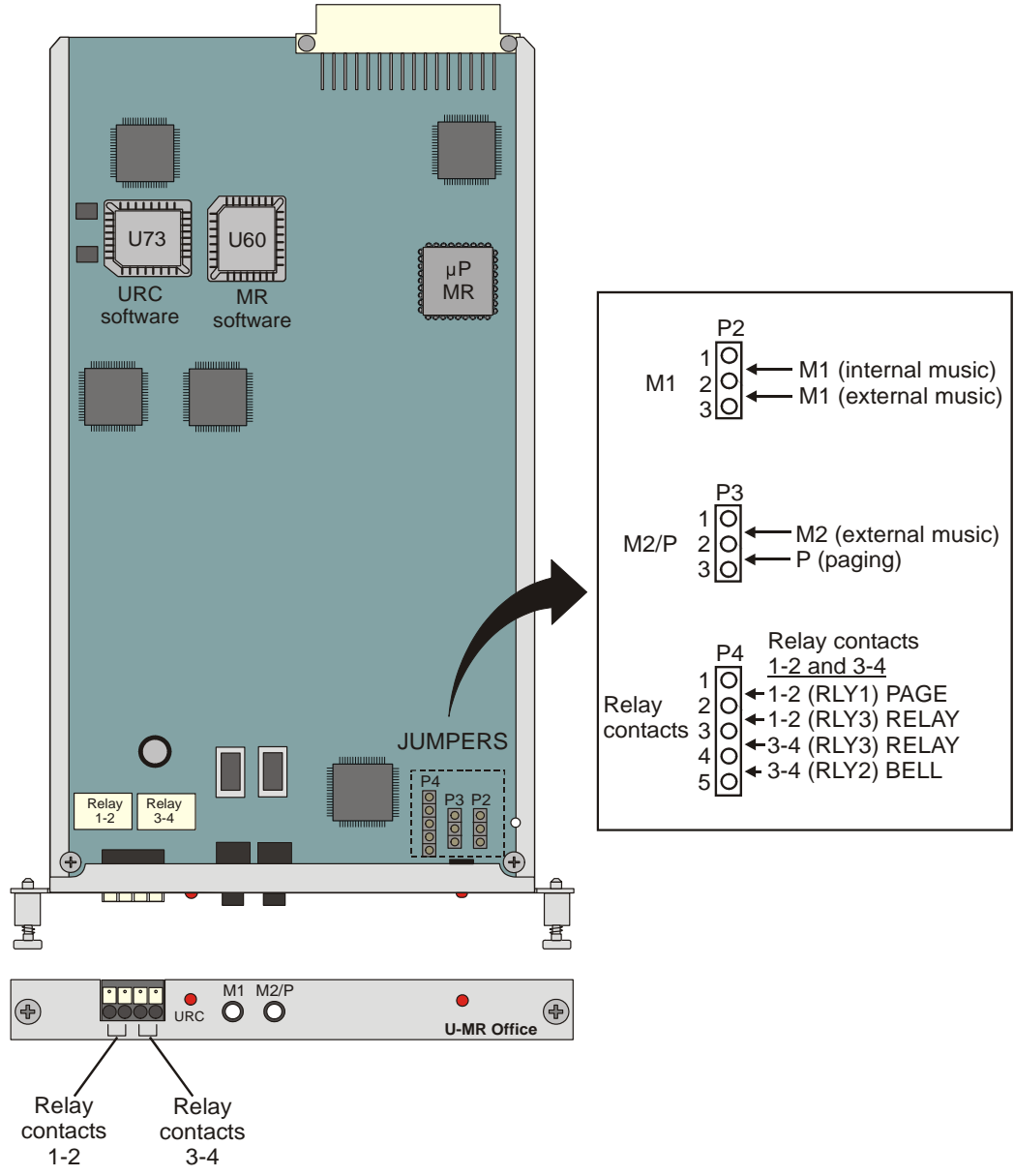
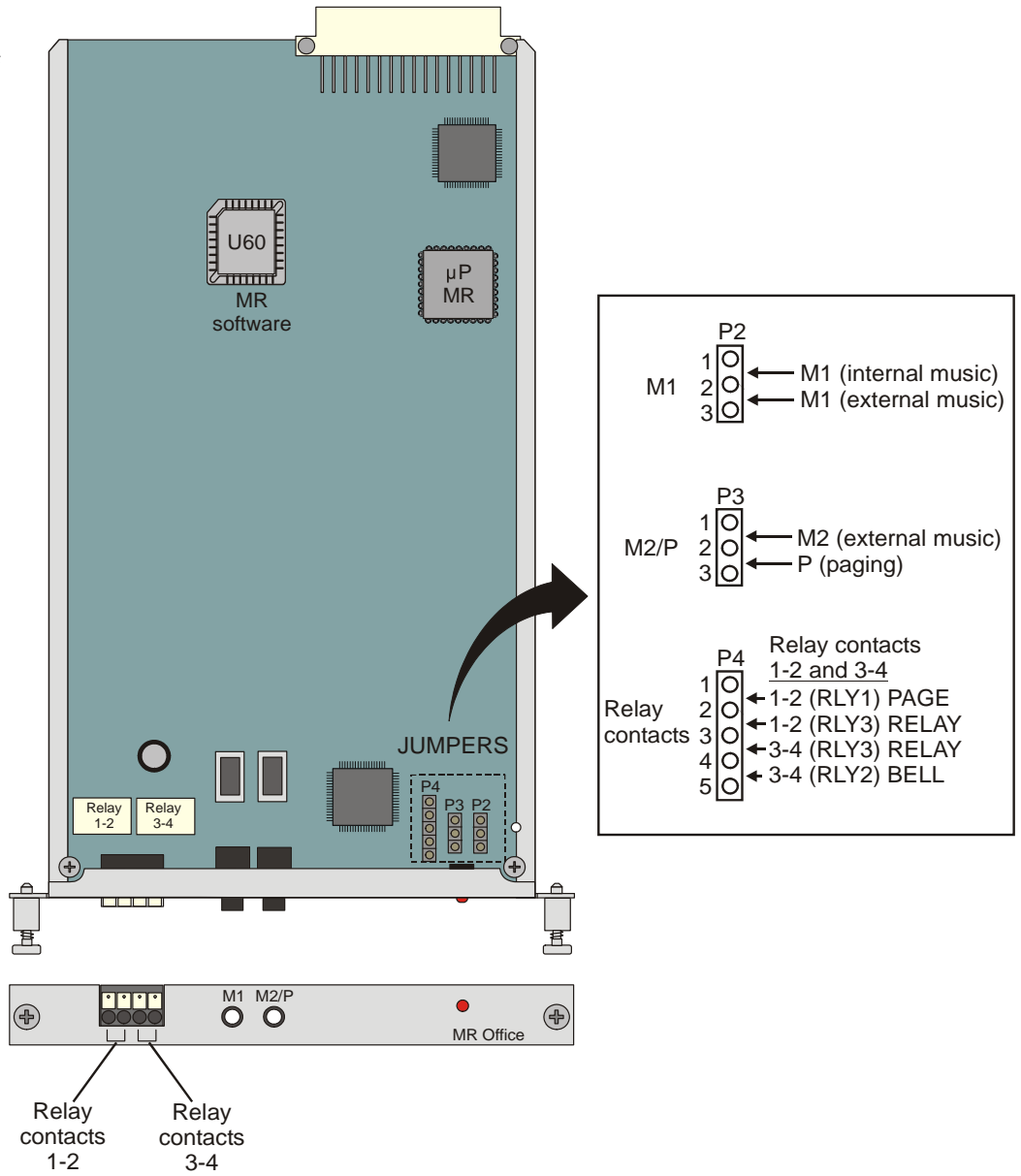


Figure 9-6 MR Office Card Circuits Layout, Front Panel and Jumpers



### 3 Configuration Jumpers

The *U-RMI Office*, *RMI Office*, *U-MR Office* and *MR 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 9-3 on page 9-11](#) through [Figure 9-6 on page 9-14](#).

Table 9-5 **U-RMI Office, U-MR Office, RMI Office and MR Office Configuration Jumpers**

Jumper	Purpose
P2	Enables (when installed) selection of the M1-Music source as internal or external. See <a href="#">Configuring the Music M1 Jumper to External or Internal on page 9-70</a> .
P3	Enables selection of the M2/P as Music source or Paging output. See <a href="#">Configuring the Music M2/P Jumper to Music on page 9-71</a> . See <a href="#">Configuring the Paging M2/P Jumper to Paging on page 9-79</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 9-101</a> .
P5, P6	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. See <a href="#">Modem Jumpers - Enable/Disable on page 9-61</a> .

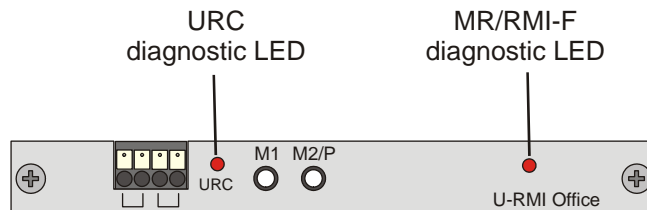
## 4 Indicators

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 9-3 on page 9-11](#) through [Figure 9-6 on page 9-14](#)).

**Table 9-6 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 <a href="#">on page 9-23</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 9-7 Card LED Indications**



## 5 External Connectors

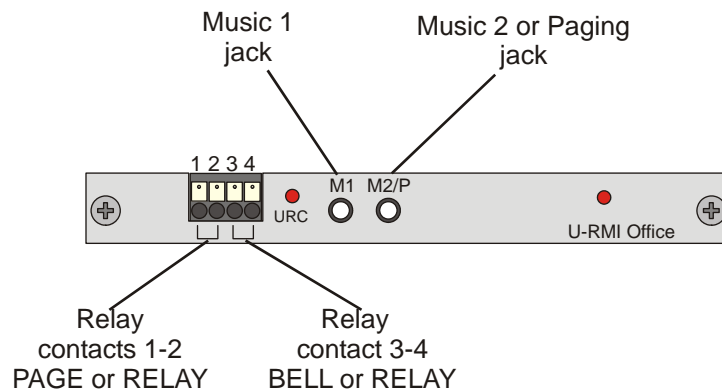
The card front panel connectors, [Figure 9-8](#), provides music connection, paging connection, and relay circuits.

The music and paging connectors are stereo 3.5 mm phone plugs, see [Figure 9-9](#).

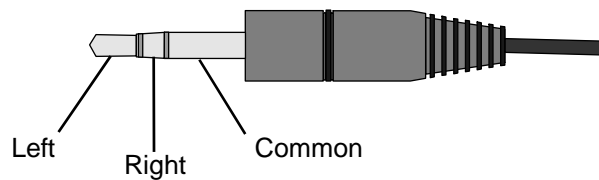
**Table 9-7 External Connections**

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 9-8 External Connections (Front View)**



**Figure 9-9 Music and Paging Plugs Connection**



## 6 MR/RMI-F EPROM (U60)

*Figure 9-3 on page 9-11* through *Figure 9-6 on page 9-14* 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:

Figure 9-10 **MR/RMI-F Features**

<b>Function</b>	<b>“RMI-F” RMI Office, U-RMI Office</b>	<b>“MR” MR Office, U-MR Office</b>
<ul style="list-style-type: none"> <li>■ A remote maintenance access modem (V.92 ITU-T standard). Described <a href="#">on page 9-61</a>.</li> </ul>	Yes	No
Auxiliary functions: <ul style="list-style-type: none"> <li>■ One external music interface for music on hold and background music. Described <a href="#">on page 9-69</a>.</li> <li>■ One internal or external music interface (jumper selection), for music on hold and background music. Described <a href="#">on page 9-69</a>.</li> <li>■ One external voice paging interface for public address. Described <a href="#">on page 9-77</a>.</li> <li>■ Two relay contacts. Described <a href="#">on page 9-99</a>.</li> </ul>	Yes	Yes

## *MR and RMI-F Database Programming*

The MR and RMI-F provides the features listed in [Table 9-8](#).

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, 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 9-3 on page 9-7](#).

The card status can be one of the following:

- ACTIVE
- INACTIVE

The Port List supplies detailed information on which port is active or inactive.

### *Port List (Route: PLIS)*

Use this option to assign a short/full name to MR and RMI-F ports, see [Table 9-9](#).

**Table 9-8 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	BELLO	7050
RELAY (RLY3)	Auxiliary or Major/Minor Alarm Relay	25	BLANK	7086
MODEM *	MODEM Connection	26	MODM0	7070

Circuit	Purpose	Circuit No.	Default Name	Default Dial No.
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

\* Provided with U-RMI and RMI Office cards.

**Table 9-9 MR and RMI-F PI (Route: PLIS)**

Shelf/Slot/Ckt			Type	Dial No.	Name Short : Full	
1	6	0-22	None	—	—	—
1	6	23	PAGE	7074	PAGE0	BLANK
1	6	24	UNA	7050	BELLO	BLANK
1	6	25	RELAY	7086	BLANK	BLANK
1	6	26	MODEM *	7070	MODM0	BLANK

\* Provided with U-RMI and RMI Office cards.



## 7 URC PROM (U73)

[Figure 9-3 on page 9-11](#) and [Figure 9-5 on page 9-13](#) illustrate 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 .



### *Tip:*

---

*Separate authorization is required to allocate the DTMF, CLID, 3way and CONF circuits supported by the U-RMI Office and U-MR Office cards. See [Table 9-10 on page 9-22](#).*

---

## Features

The URC software includes the following shared service functions:

Table 9-10 **URC2**  
**Features and SAU**  
**Requirements**

<b>Notation</b>	<b>Function</b>	<b>SAU Required</b>
<b>D</b>	Tone Detectors (DTD) detects 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 9-49.	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 9-45.	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:

(max: \*) The maximum number for the embedded resources is dependant on the number of URC time slots. Therefore, increasing one of these resources requires decreasing another.

## *URC2 Database Programming (U-RMI Office and U-MR Office cards)*

The URC provides the features listed in [Table 9-10](#). 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 times slots. The Coral enables a maximum of 120 time slots per URC2. [Table 9-11](#) lists the time slots needed per circuit and enables the technician to plan accordingly when configuring the URC configurations.

A maximum of 120 Time Slots is allowed per URC2 card. Therefore, the Full Assembly is never used. Allocate your resources such that you use a maximum of 120 Time Slots. For example, increasing the number of 3-way circuits, forces you to decrease one or more of the other resources.

**Table 9-11 PI defaults per URC2 Resource**

Resource Type	Max Circuits per URC2 (Full Assembly)	Time Slots Needed per Circuit (CKT)	Default Configuration		See Table
			Max CKTs	Time Slots Needed	
DTMF Receiver (DTR)	24	1	24	1x24	<a href="#">Table 9-13 on page 26</a>
CONF (Meet Me)	6	16	2	16x2	<a href="#">Table 9-15 on page 28</a>
3-WAY	24	4	8	4x8	<a href="#">Table 9-16 on page 29</a>
Caller ID (CID)	32	1	16	1x16	<a href="#">Table 9-17 on page 30</a>
DTD	32	1	16	1x16	<a href="#">Table 9-18 on page 32</a>
<b>TOTAL</b>	<b>118</b>		<b>66</b>	<b>120</b>	

### *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 9-12 on page 9-25](#).

### Port List (Route: PLIS)

Use this option to assign a short/full name to URC Meet-Me Multiparty Conference ports, see [Table 9-11 on page 9-28](#).

Table 9-12 **URC2**  
**Features**

Circuit Type	Purpose	Circuit No. (Ckt)	Default Name	Default Dial No.	See Table
DTR	DTMF signaling receivers	0-23 URC2 0-47 URC4	—	—	<a href="#">Table 9-13 on page 26</a>
CONF	Meet me bridges conference call for 14 parties	48-53	BLANK	7098-7099	<a href="#">Table 9-14 on page 28</a>
Spare	Not used in this version	54-55	—	—	<a href="#">Table 9-15 on page 28</a>
C3WAY	Circuits of 3-way conference calls	56-79	—	—	<a href="#">Table 9-16 on page 29</a>
iDSP	FSK transmitters for displaying CID (Caller ID) for SLT users	80-111	—	—	<a href="#">Table 9-17 on page 30</a>
DTD	Dial and progress tone detectors	112-143	—	—	<a href="#">Table 9-18 on page 32</a>

Table 9-13 URC  
DTR/DTMF PI  
Configuration

URC Configuration PI Route: DTB,11		PI Route: PLIS						
DTMF URC2 0-24 URC4 0-48	Total Time Slots Needed	Shelf/Slot/Ckt			Type	Dial No.	Name 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	—	—	—
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	—	—	—

URC Configuration PI Route: DTB,11		PI Route: PLIS						
DTMF URC2 0-24 URC4 0-48	Total Time Slots Needed	Shelf/Slot/Ckt			Type	Dial No.	Name Short : Full	
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	—	—	—
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 9-11 on page 9-23](#).

URC Meet-Me Multiparty Conference PI Configuration

**Table 9-14 URC DTB PI Route**

URC Configuration PI Route: DTB,11		PI Route: PLIS							
Meet-Me (0-6)	Total Time Slots Needed	Shelf/Slot/Ckt			Type	Dial No.	Name 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 9-11 on page 9-23](#).

**Table 9-15 URC Spare ports (not used)**

URC Configuration PI Route: DTB,11		PI Route: PLIS							
Spare (2)	Total Time Slots Needed	Shelf/Slot/Ckt			Type	Dial No.	Name Short : Full		
1	0	1	7	54		—	—	—	
2	0	1	7	55		—	—	—	



**Table 9-16 URC  
Three-Way Conference  
(C3WAY) PI  
Configuration**

URC Configuration PI Route: DTB,11		PI Route: PLIS						
C3WAY (0-24)	Total Time Slots Needed	Shelf/Slot/Ckt			Type	Dial No.	Name 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	—	—	—
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 9-11 on page 9-23](#).

**Table 9-17 URC iDSP  
CID (Caller ID)  
Transmitters PI  
Configuration**

URC Configuration PI Route: DTB,11		PI Route: PLIS						
CID (0-32)	Total Time Slots Needed	Shelf/Slot/Ckt			Type	Dial No.	Name 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	—	—	—
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	—	—	—

URC Configuration PI Route: DTB,11		PI Route: PLIS						
CID (0-32)	Total Time Slots Needed	Shelf/Slot/Ckt			Type	Dial No.	Name Short : Full	
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 9-11 on page 9-23](#).

Table 9-18 **URC Dial  
Tone Detector (DTD) PI  
Configuration**

URC Configuration PI Route: DTB,11		PI Route: PLIS						
DTD (0-32)	Total Time Slots Needed	Shelf/Slot/Ckt			Type	Dial No.	Name 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	—	—	—

URC Configuration PI Route: DTB,11		PI Route: PLIS						
DTD (0-32)	Total Time Slots Needed	Shelf/Slot/Ckt			Type	Dial No.	Name Short : Full	
27	27	1	7	138	DTD	—	—	—
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 9-11 on page 9-23](#).



# 9.4 Three-Way Conference (3-Way) Conference Circuitry

## 1 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



*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 time slots.*

The 3-way conference circuitry is completely digital. During the conferencing session, each participant hears the voices of other participants.

## 2 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 time slots (therefore, eight 3-way circuits require 32 TS).

When the 3-way conference exists and is initialized, the PI shows:

*Card List (Route: CLIS)*

Card type (see [Table 9-3 on page 9-7](#)) 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 9-16 URC Three-Way Conference \(C3WAY\) PI Configuration, page 9-29](#).

Refer to *Program Interface (PI) and Database Reference Manual, Chapter 6, System Port List* for more details.



### 3 Additional 3-Way Circuits

Additional digital Conference Bridge cards may be installed in the optional Coral IPx 800X expansion cage. The additional cards include:

<b>Card</b>	<b>Cage</b>	<b>Description</b>
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).
8DRCF	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*”.

### 4 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
8DRCF card .....	6 (requires IPx 800X expansion cage)
CNF card.....	8 (requires IPx 800X expansion cage)

## ***NOTES:***

# 9.5 Multi-Party Conference (CONF)

## Meet Me Conference Circuitry

### 1 General Description

The U-RMI Office and U-MR Office cards provide two (max: 6\*) meet-me bridge conference 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 dependant on the number of URC time slots.*

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.

## 2 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](#)).

### 3 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 time slots (therefore, eight 3-way circuits require 32 TS).

### *Card List (Route: CLIS)*

Card type (see [Table 9-3 on page 9-7](#)) 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.)**.

See [URC Meet-Me Multiparty Conference PI Configuration, page 9-27](#).

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 time slots.

*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.

## 4 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:

<b>Card</b>	<b>Cage</b>	<b>Description</b>
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).
8DRCF	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), and</li> </ul>

These cards are described in the “*Coral Service and Peripheral Cards Installation Manual*”.

## 5 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
- 8DRCF card ..... 1 x 6-party (requires IPx 800X exp. cage)
- CNF card..... 2 x 15-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.



## 9.6 DTMF Receiver (DTR)

### 1 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 dependant on the number of URC time slots.*

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 signaling 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.

## 2 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 amount of DTR ports required for several different DTMF dialing port sizes.

<b>Number of DTMF Dialing Ports</b>	<b>Number of DTR Receiver Circuits</b>
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.*

## 3 Additional DTR Circuits

Additional DTR resources cards may be installed in the optional Coral IPx 800X expansion cage. The additional cards include:

<b>Card</b>	<b>Cage</b>	<b>Description</b>
8DTR	IPx 800X	8 circuit DTMF Receiver and decoder card
8DRCF	IPx 800X	Includes 8 DTR circuit DTMF receiver and decoder functions, among other functions

These cards are described in the *Coral Service and Peripheral Cards Installation Manual*.

## 4 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 time slot.

### *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 9-3 on page 9-7](#)) 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 9-13 URC DTR/DTMF PI Configuration, page 9-26](#).

## 5 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
8DTR card.....	8 (requires IPx 800X expansion cage)
8DRCF card .....	8 (requires IPx 800X expansion cage)

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)

### 1 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.



(max: \*) The max. number is dependant on the number of URC time slots.

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.

## 2 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 time slot.

*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 9-3 on page 9-7](#)) 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 9-18 URC Dial Tone Detector \(DTD\) PI Configuration, page 9-32](#).

Refer to *Program Interface (PI) and Database Reference Manual, Chapter 6, System Port List* for more details.

### 3 Additional DTD Circuits

Additional DTD resources cards may be installed in the optional Coral IPx 800X expansion cage. The additional cards include:

<b>Card</b>	<b>Cage</b>	<b>Description</b>
8DTD	IPx 800X	[discontinued] 8 circuit DialTone Detector and call progress tone analyzer.
8DRCF	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*.

### 4 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
- 8DRCF card .....8 (requires IPx 800X expansion cage)

Detection Level: .....-28 to 0 dBm

Rejection Level:.....-32 dBm Minimum

## ***NOTES:***



# 9.8 Caller ID for SLT (iDSP)

## 1 General Description

The *U-RMI Office* and *U-MR Office* cards provide 16 (max: 32\*) iDSP ports.



*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 dependant on the number of URC time slots.*

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.

## 2 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 time slot.

When the CID exists and is initialized, the PI shows:

### *Card List (Route: CLIS)*

Card type (see [Table 9-3 on page 9-7](#)) 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 9-17 URC iDSP CID \(Caller ID\) Transmitters PI Configuration, page 9-30](#).

Refer to *Program Interface (PI) and Database Reference Manual, Chapter 6, System Port List* for more details.

### 3 Additional CID Circuits

---

Additional CID resources cards may be installed in the optional Coral IPx 800X expansion cage. The additional cards include:

<b>Card</b>	<b>Cage</b>	<b>Description</b>
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*.

### 4 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)

## ***NOTES:***

# 9.9 MFC Receiver (MFR)

## Multi-Frequency Code Receiver Circuit

### 1 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 signaling to the Coral system for the purpose of activating system features or selecting other ports.

### 2 Available MFR Circuits

MFR resources cards may be installed in the optional Coral IPx 800X expansion cage. The cards include:

Card	Cage	Description
16MFR	IPx 800X	16 circuit Multi-Frequency Code (MF or MFC tone) Receiver and decoder card.

These cards are described in the *Coral Service and Peripheral Cards Installation Manual*.

### 3 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)

***NOTES:***

# 9.10 VoIP Media Gateway (MG)

## 1 General Description

Media channels are provided by an MRC module, which is a daughterboard attached to the *MCB Office* card in piggyback fashion. The *MRC* modules provide the following media channels.

Table 9-19 **MRC Media Channels**

Features	MRC-8	MRC-16	MRC-32	MRC-64
G.711	32	64	128	128
G.729	8	16	32	64
G.723	8	16	32	64

Media channels are used to convert PCM calls to IP Packets and vice versa. Media channels are also required when one of the calling parties is not an IP host. No media channels are required for pure IP-to-IP connections (direct-connects).

## 2 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	MRC-8, 16, 32 or 64 provides 8, 16, 32 or 64 media gateway channels.
PUGWipx w/MRC	IPx 500X	
UGW-E w/MG †	IPx 800X	MG-24, 48, 72, 96 or 120 provides 24, 48, 72, 96 or 120 media gateway channels.
UGW-Eipx w/MG	IPx 500X	

\* PUGW and PUGWipx support SIP and MGCP end points.

† UGW-E and PUGW-Eipx support MGCP end points.

These cards are described in the *Coral VoIP (Voice Over IP) Installation Manual*.

## ***NOTES:***



# 9.11 Remote Maintenance (Modem)

## 1 General Description

The *U-RMI Office* and *RMI Office* cards provide an auto-answer data modem. A full duplex, asynchronous, ASCII modem, for remote programming 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.

## 2 Modem Jumpers - Enable/Disable

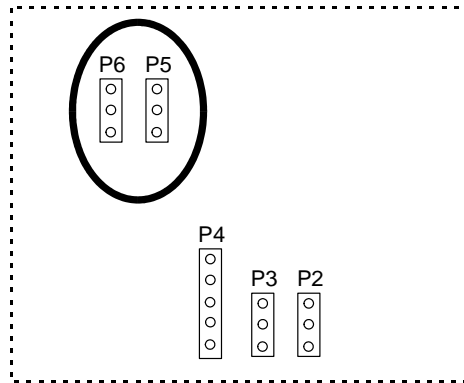
The *U-RMI Office* and *RMI Office* cards are equipped with jumper straps P5 and P6 (see [Figure 9-3 on page 9-11](#)) that enable and disable the modem. These jumpers, when removed, disable the on-board modem, without affecting the other programming interfaces. Thus, a local programming terminal or 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. [Figure 9-11](#) displays the jumper settings for the modem.

Figure 9-11 **Modem - Jumper Configuration**

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.

## 3 Database Programming

---



### NOTE:

This function requires installation of an additional jumpers (P5 and P6, pins 1 and 2 must be connected) on the U-RMI Office and RMI Office cards. Described on page 9-61.

---

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**.

1. **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.

2. **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.

2. **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.

3. **Class Of Service** (Route: COS,0) [MODEM]

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.

**4. 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.

**5. 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*.

## 4 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:

<b>Card</b>	<b>Description</b>
8DRCF	Includes the ITU-T V.92 (up to 56Kbps) remote maintenance modem, among other functions.

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.

## 5 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.*

## ***NOTES:***

# 9.12 Data Serial Ports (RS-232E)

*KB0, KB1, KB2, KB3*

## 1 General Description

---

The *U-RMI Office*, *U-MR Office*, *RMI Office* and *MR Office* cards do not provide Serial ports.

The Coral IPx Office provides one EIA RS-232E Asynchronous, ASCII serial data interfaces (KB0) via the *MCB Office*, for the following functions:

- System database programming
- Diagnostics and system maintenance

See [KB0 RS-232E Programming Port, page 8-18](#)

## 2 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:

<i>Card</i>	<i>Cage</i>	<i>Description</i>
8DRCF	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*. 8DRCF cards may be installed in any available peripheral card slot in the optional Coral IPx 800X expansion unit.

The 8DRCF 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.*

## 3 Specifications - RS-232E

Number of Circuits:

U-RMI Office card.....	0
U-MR Office card .....	0
RMI Office card .....	0
MR Office card .....	0
8DRCF card .....	3 (requires IPx 800X expansion cage)



# 9.13 Music

## Background and Music-On-Hold (M1/M2)

### 1 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)

### 2 Circuit Description

---

[Figure 9-12](#) and [Figure 9-14](#) 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 9-13](#). [Table 9-20](#) 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 9-15](#). [Table 9-21](#) defines the position of P3 for the music selection.

### 3 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 9-13 displays the jumper settings for the source type.

Table 9-20 **Music-1 Internal/External Selection P2 Jumper Setting**

P2	1-2	2-3
M1	Internal	External

Figure 9-12 **Music-1 Simplified Diagram**

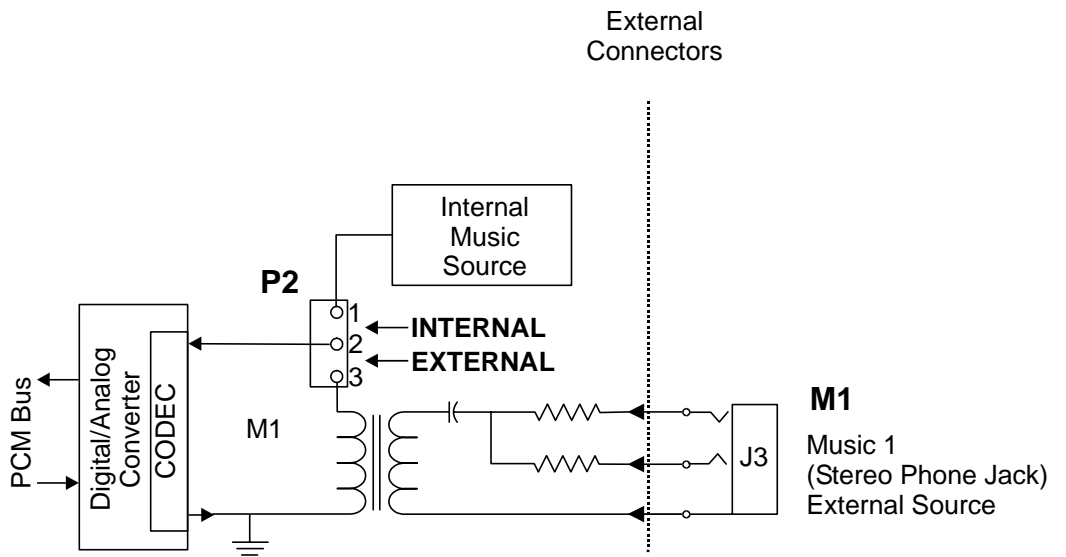
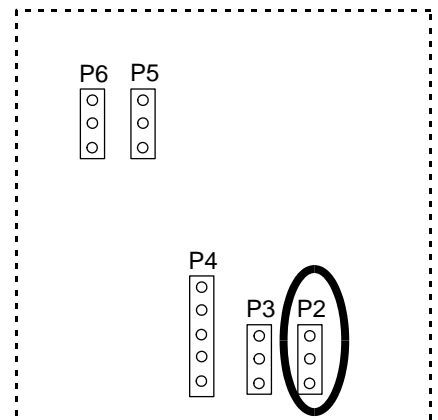


Figure 9-13 **Music-1 Internal/External Selection P2 Jumper Setting**

Function	P2
Internal Music	
External Music	



## 4 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 9-14](#) displays the jumper settings for the music source.

Table 9-21 **Music-2 M2/P Music/Paging Selection P3 Jumper Setting**

P3	1-2	2-3
M2/P	External Music Input	Paging Output

Figure 9-14 **Music-2 Simplified Diagram**

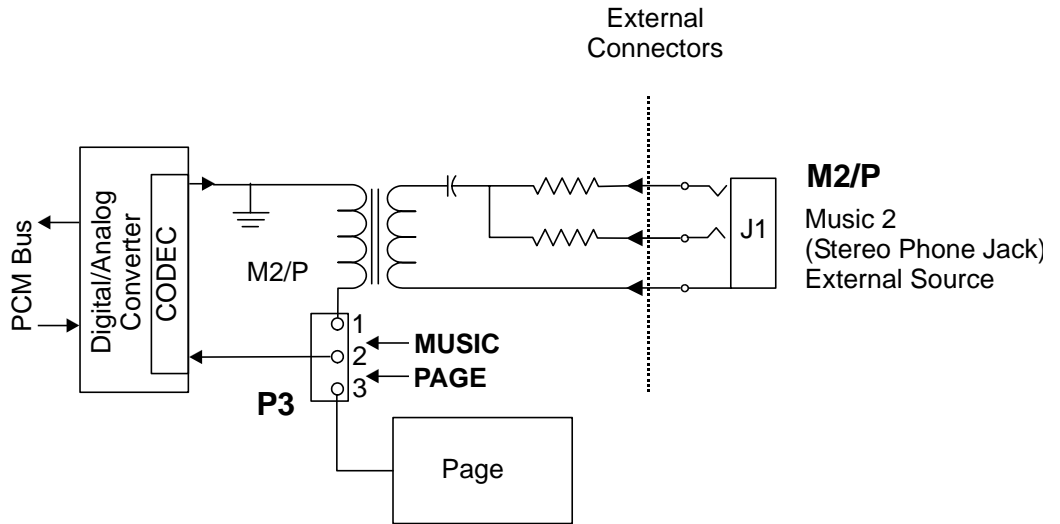
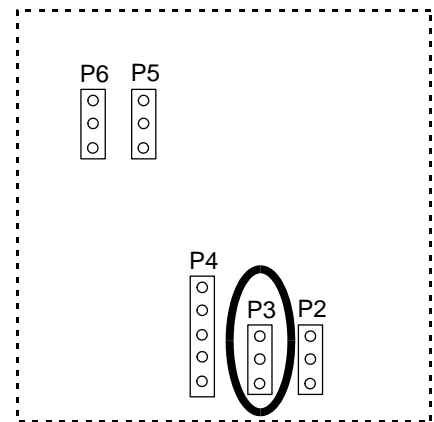


Figure 9-15 **Music-2 M2/P Music/Paging Selection P3 Jumper Setting**

M2/P Function	P3
Paging Output	
External Music Input	



## 5 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**.

### 1. 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.

### 2. 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.

### 3. 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.

### 4. 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.

### 5. 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 sound.

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. Hunt Group (Route: HUNT)

Use the **MUSIC\_SOURCE** field to determine which music source will sound 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*.

**7. 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*.

**8. 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*.

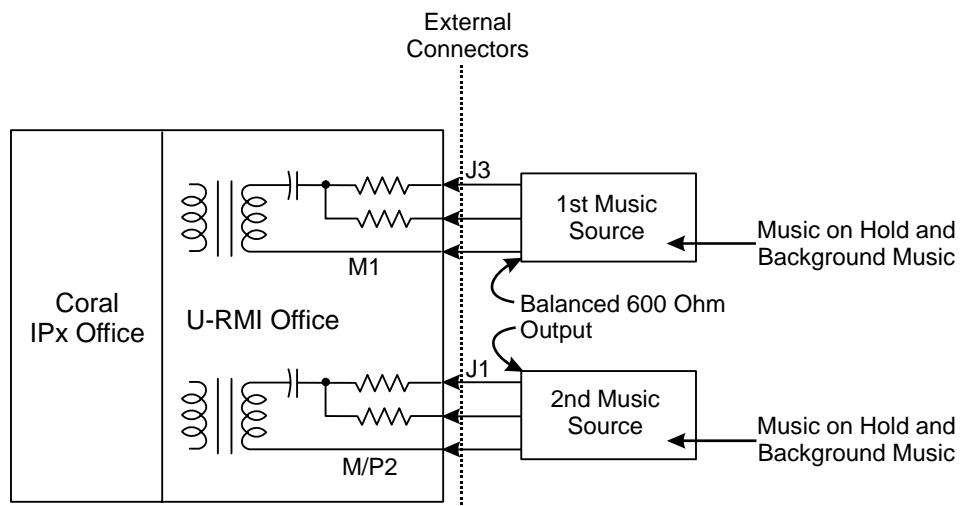
## 6 External Connections

[Figure 9-16](#) 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), 600Ω, balanced output, with an adjustable output level. In some cases, an 8Ω 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 9-9 on page 9-17](#).

**Figure 9-16 Music - Wiring to External Music Source**



[Table 9-7 on page 9-17](#) lists the function of each interface connector, as they appear on the card front panel, [Figure 9-8 on page 9-17](#) illustrates that connector.

## 7 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:

<b>Card</b>	<b>Cage</b>	<b>Description</b>
8DRCF	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*.

## 8 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)
8DRCF card.....	2 (requires IPx 800X expansion cage)

M1/M2 (Music-On-Hold and Background Music):

Uses.....	Music-On-Hold (MOH), Background Music
Termination.....	Capacitor-coupled transformer, non-grounded
Impedance.....	600Ω Nominal
Input Level.....	-15 dBm Nominal

MUSIC Connectors:

Connector Type.....	Stereo 3.5 mm phone plug
---------------------	--------------------------

## ***NOTES:***



# 9.14 Voice Paging (Public Address) and Relay-1

## Public Address

### 1 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 Office by dialing access code.

### 2 Circuit Description

[Figure 9-17](#) 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.

---

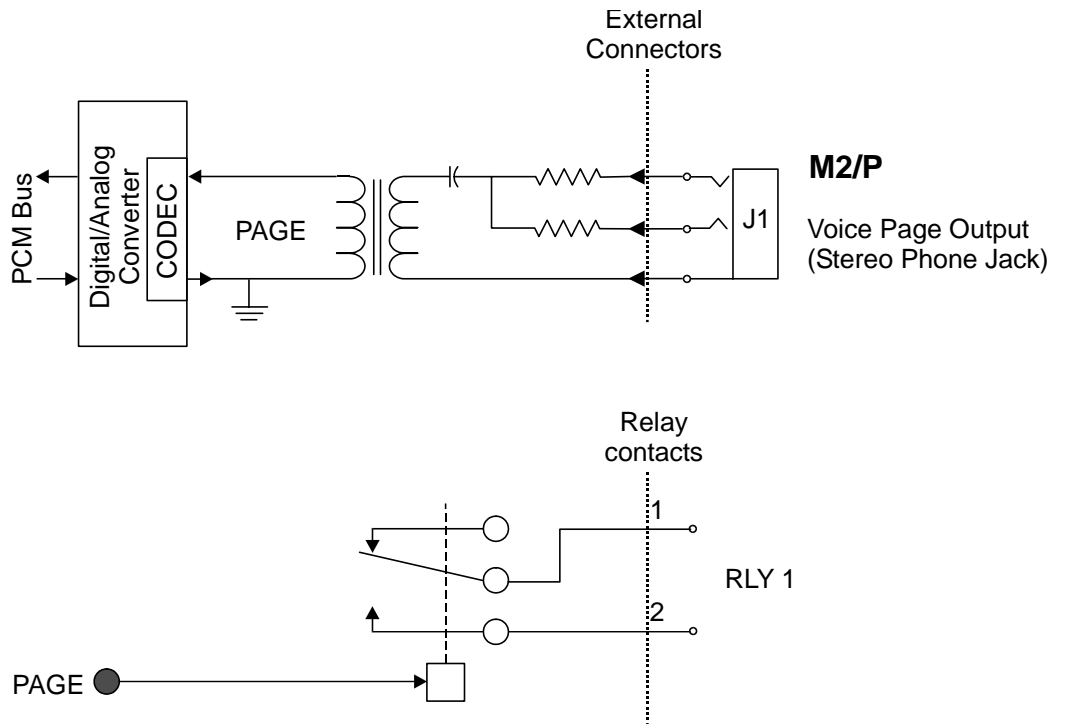
#### *M2/P Paging/External music*

Page (M2/P) connector can be used as a music source. The selection between the music source or voice paging output is accomplished by P3 jumper located on the *U-RMI Office*, *U-MR Office*, *RMI Office* and *MR Office* cards. See [Figure 9-18](#). [Table 9-22](#) defines the position of P3 for the music selection.

## Relay Contacts 1-2 Paging/Relay

Relay Contacts 1-2 can be used as a system alarm or dial-operated. The selection between the paging or system alarm/dial-operated is accomplished by P4 jumper located on the U-RMI Office, U-MR Office, RMI Office and MR Office cards. See [Figure 9-20](#). [Table 9-23](#) defines the position of P4 for the paging selection.

Figure 9-17 **Paging & Relay Contacts 1-2 Simplified Diagram**



### 3 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 9-19](#) displays the jumper settings for the music source.

Table 9-22 **Paging M2/P Music/Paging Selection P3 Jumper Setting**

P3	2-3	1-2
M2/P	Paging Output	External Music Input

Figure 9-18 **Paging Simplified Diagram**

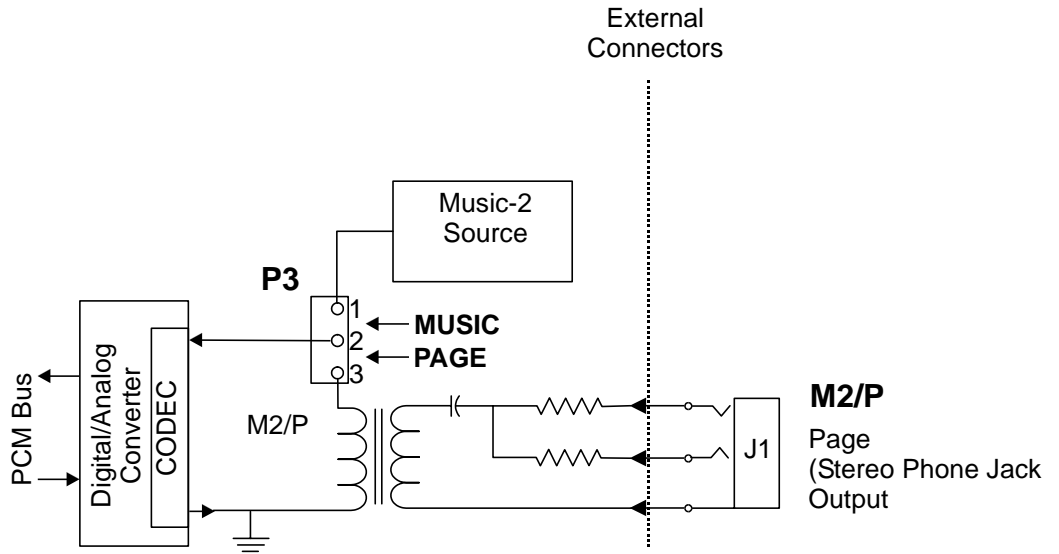
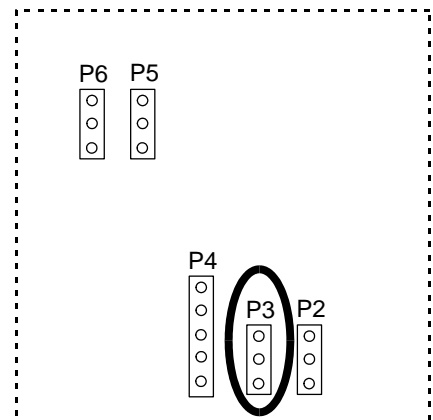


Figure 9-19 **Paging M2/P Music/Paging Selection P3 Jumper Setting**

M2/P Function	P3
Paging Output	
External Music Input	



## 4 Configuring the Relay Contacts 1-2 Jumper to Paging

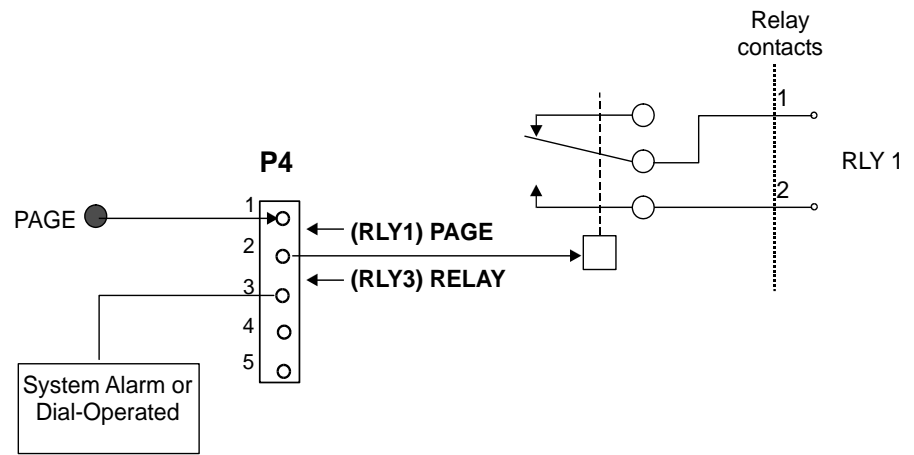
The relay contacts 1-2 may be either RLY1 (PAGE) or RLY3 (System Alarm or Dial-Operated) contacts.

Figure 9-21 displays the jumper settings for the page feature.

**Table 9-23 Relay Contacts 1-2 PAGE/RELAY Selection P4 Jumper Setting**

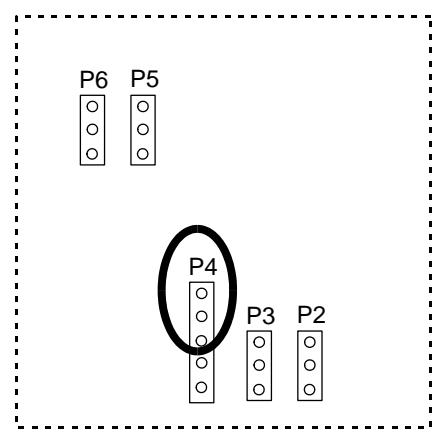
P4	1-2	2-3
Relay Contacts 1-2	PAGE (RLY1)	RELAY (RLY3)

**Figure 9-20 Paging Relay Simplified Diagram**



**Figure 9-21 Relay Contacts 1-2 PAGE/RELAY Selection P4 Jumper Setting**

Relay Contacts 1-2 Function	P4
(RLY1) PAGE	
(RLY3) RELAY	



## 5 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**.

### 1. 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.

### 2. 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.

### 3. 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.

### 4. 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.

## 6 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 9-22](#) and [Figure 9-23](#) 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 9-9 on page 9-17](#).

Figure 9-22 Page - Wiring To Paging Amplifier

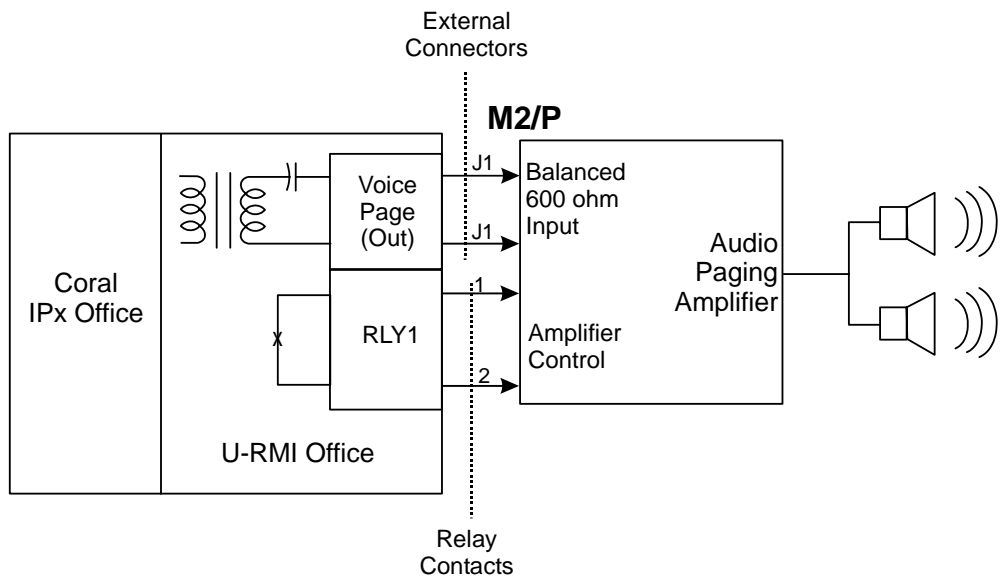
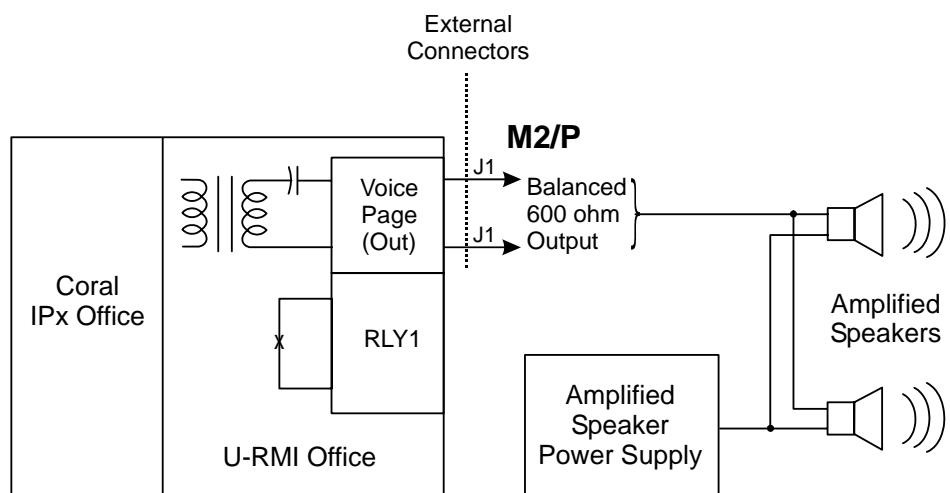


Figure 9-23 Page - Wiring To Amplified Speakers



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 9-7 on page 9-17](#) lists the function of each interface connector, as they appear on the card front panel, [Figure 9-8 on page 9-17](#) illustrates that connector.

## 7 Relay Electrical Limitations

The RLY1 relay contacts have specific electrical limitations which are described in detail in [Relay Contacts on page 9-99](#). These limitations must not be exceeded. In addition, the type of load the relay contact operates can have a great significance.

## 8 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:

<b>Card</b>	<b>Cage</b>	<b>Description</b>
8DRCF	IPx 800X	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*.

## 9 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)
8DRCF card .....	1 (requires IPx 800X expansion cage)

### PAGE (External Paging):

Output Termination .....	Capacitor-coupled transformer, 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)

## 1 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.

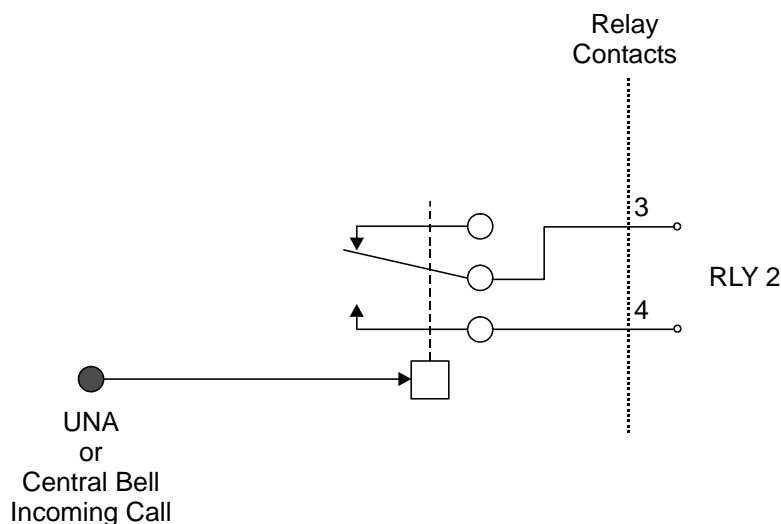
Calls may be answered after the attendant leaves or when a central bell is ringing. Normally this feature is activated for incoming calls during the night answering period. There are two ways to do this: group pickup and directed pickup.

## 2 Circuit Description

*Figure 9-24* 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 9-24 UNA & Relay Contacts 3-4 Simplified Diagram



### 3 Configuring the Relay Contacts 3-4 Jumper to Bell

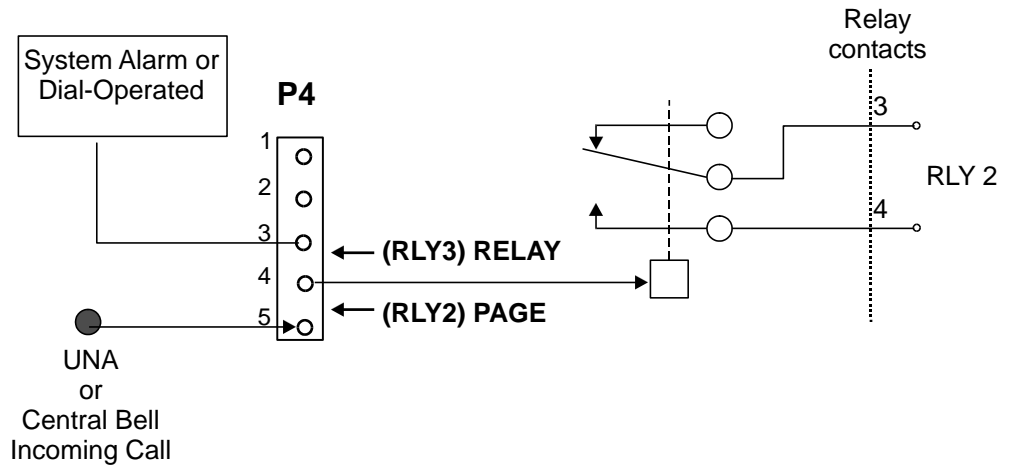
The relay contacts 3-4 may be either RLY2 (BELL) or RLY3 (System Alarm or Dial-Operated) contacts.

*Figure 9-21* displays the jumper settings for the page feature.

**Table 9-24 Relay Contacts 3-4 BELL/RELAY Selection P4 Jumper Setting**

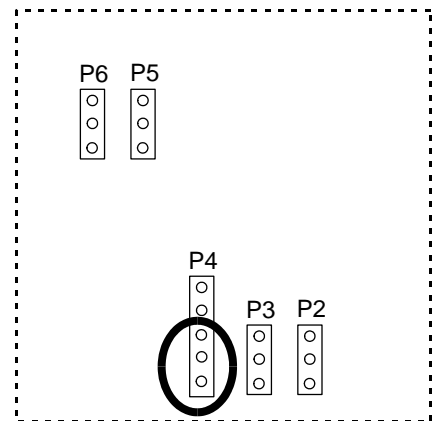
P4	4-5	3-4
Relay Contacts 3-4	BELL (RLY2)	RELAY (RLY3)

**Figure 9-25 Bell Relay Simplified Diagram**



**Figure 9-26 Relay Contacts 3-4 BELL/RELAY Selection P4 Jumper Setting**

Relay Contacts 3-4 Function	P4
(RLY2) BELL	
(RLY3) RELAY	



## 4 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**.

**5. 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.

**6. 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.

**7. 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.

**8. 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.

**9. Sizes Def** (Route: SIZ) [BELL/UNA]

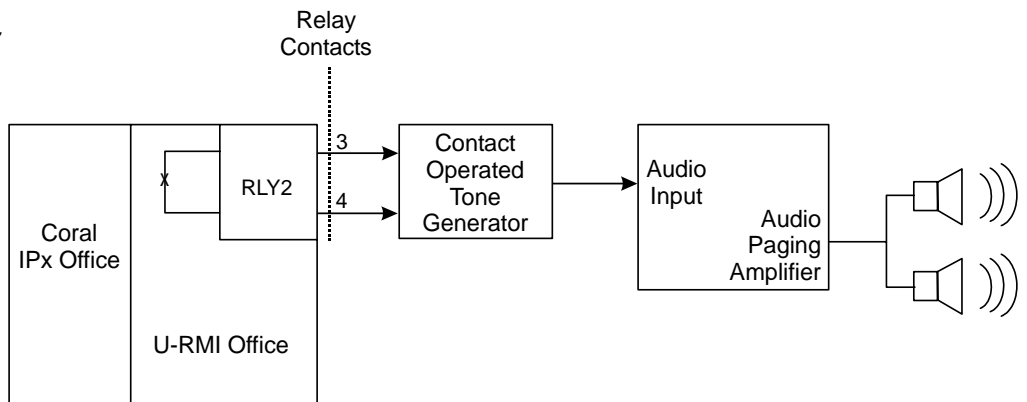
Use the BELL/UNA parameter to determine the number of Bell/Universal Night Answering (UNA) groups.

## 5 External Connections

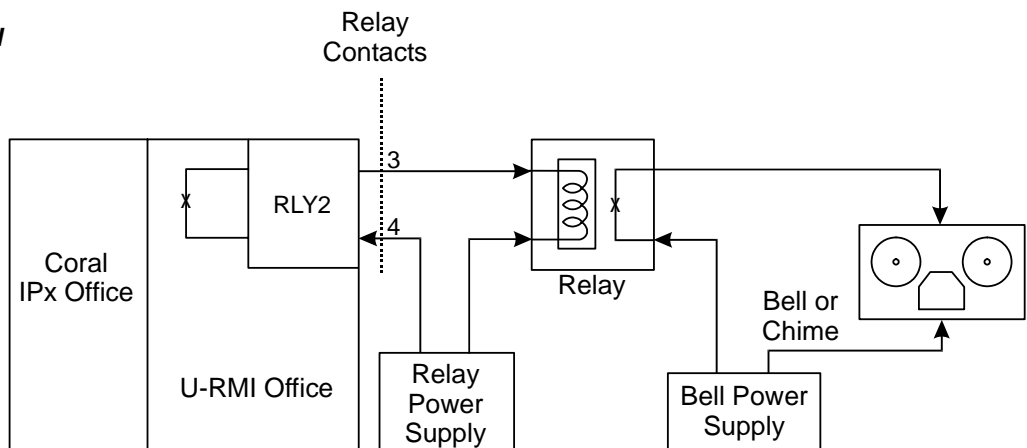
Incoming trunk calls may be directed to activate a relay contact at certain times of the day (typically after normal business hours). The relay contact sounds a tone over a paging or public address system, or operate a mechanical bell. Upon hearing the tone or bell, the trunk is then answered by dialing a specific feature code at any station allowed to answer calls.

[Figure 9-27](#) and [Figure 9-28](#) 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 9-99](#), 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 9-27 UNA Bell - Wiring to Tone Generator**



**Figure 9-28 UNA Bell - Wiring to Mechanical Bell**



[Table 9-7 on page 9-17](#) lists the function of each interface connector, as they appear on the card front panel, [Figure 9-8 on page 9-17](#) illustrates that connector.

## 6 Relay Electrical Limitations

The relay contacts have specific electrical limitations. For further detail, see [Relay Contacts on page 9-99](#). 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.

## 7 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:

<b>Card</b>	<b>Cage</b>	<b>Description</b>
8DRCF	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 contacts</li></ul>

These cards are described in the *Coral Service and Peripheral Cards Installation Manual*.

## 8 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)
8DRCF 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

### 1 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 Office 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 Office 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.

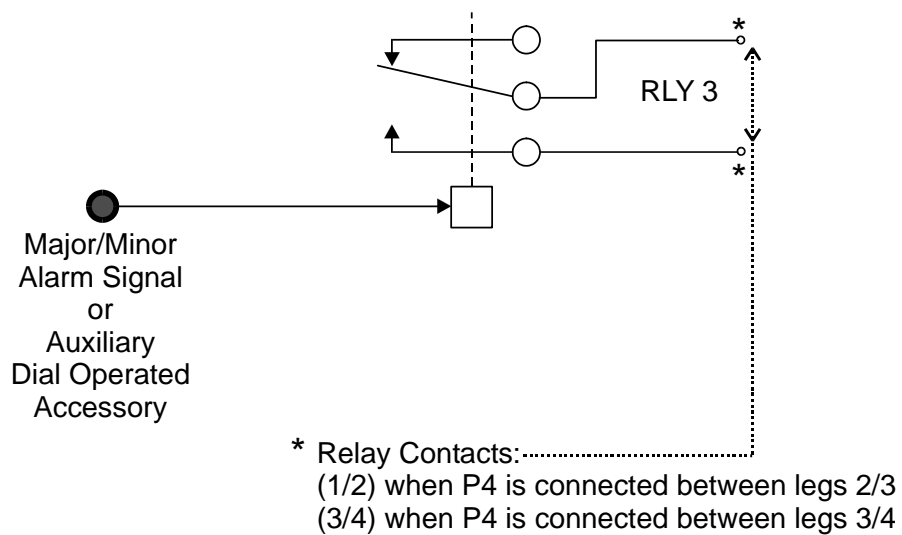
## 2 Circuit Description

*Figure 9-29* 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 9-29 RLY3  
Simplified Diagram*





### 3 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 9-31 displays the jumper settings for the page feature.

Table 9-25 Relay Contacts 1-2 RLY3/PAGE Selection P4 Jumper Setting

P4	2-3	1-2
Relay Contacts 1-2	RELAY (RLY3)	PAGE (RLY1)

Figure 9-30 RLY3 Contacts 1-2 Simplified Diagram

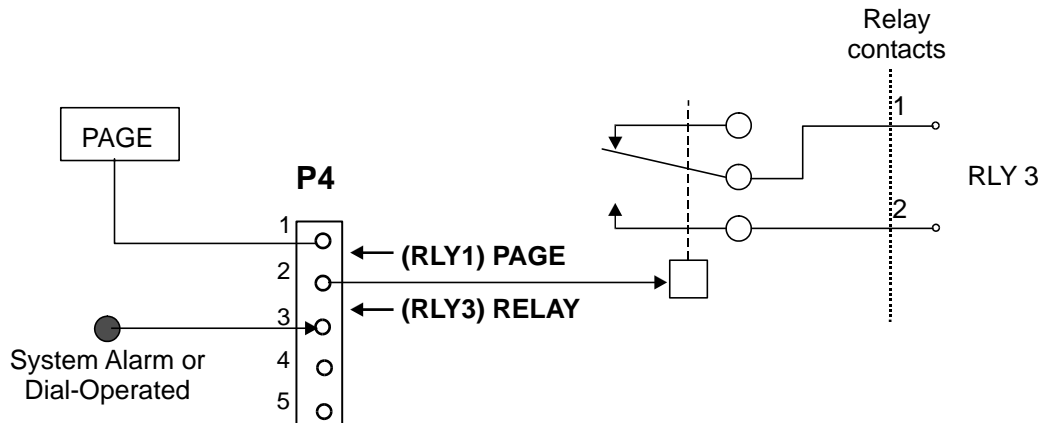
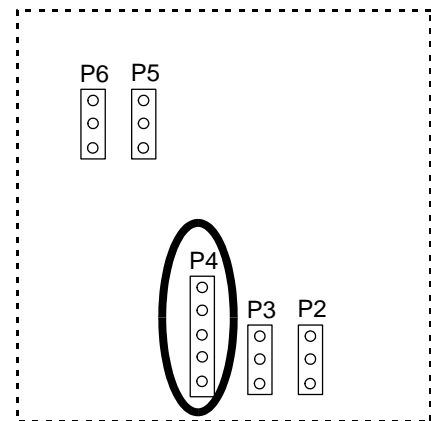


Figure 9-31 Relay Contacts 1-2 RLY3/PAGE Selection P4 Jumper Setting

Relay Contacts 1-2 Function	P4
(RLY3) RELAY	
(RLY1) PAGE	



## 4 Configuring the Relay Contacts 3-4 Jumper to RLY3

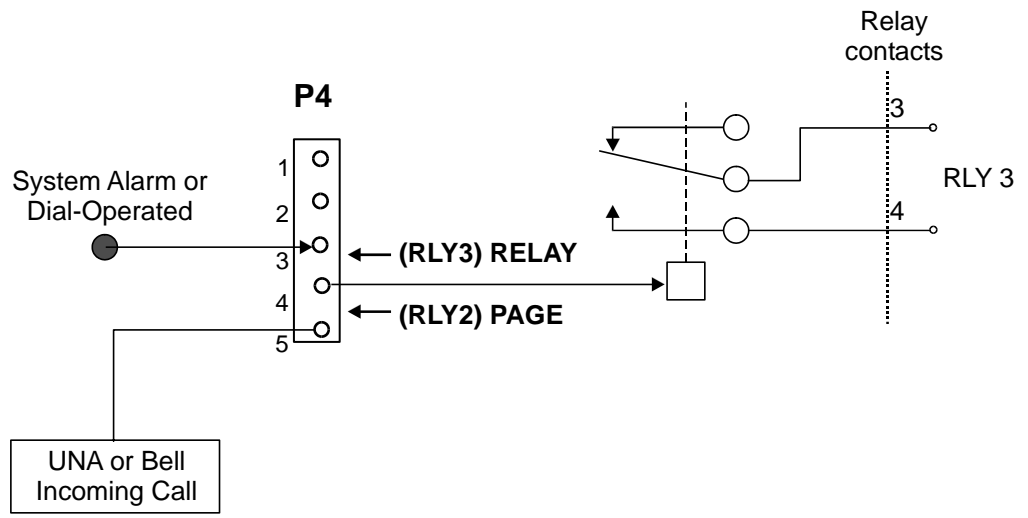
The relay contacts 3-4 may be either RLY2 (BELL) or RLY3 (System Alarm or Dial-Operated) contacts.

Figure 9-33 displays the jumper settings for the page feature.

**Table 9-26 Relay Contacts 3-4 RLY3/BELL Selection P4 Jumper Setting**

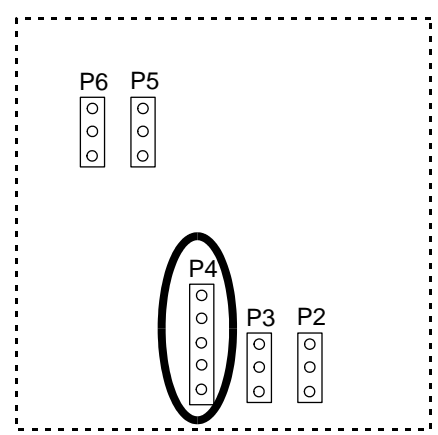
P4	3-4	4-5
Relay Contacts 3-4	RELAY (RLY3)	BELL (RLY2)

**Figure 9-32 RLY3 Contacts 3-4 Simplified Diagram**



**Figure 9-33 Relay Contacts 3-4 RLY3/BELL Selection P4 Jumper Setting**

Relay Contacts 3-4 Function	P4
(RLY3) RELAY	1 2 3 4 5
(RLY2) BELL	1 2 3 4 5



## 5 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**.

**1. 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.

**2. 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.

**3. 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*

### **1. 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.

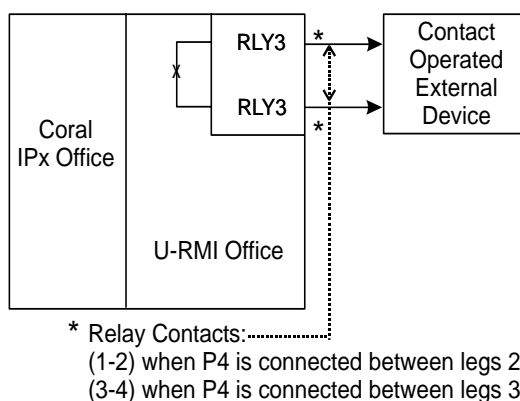
## 6 External Connections

[Table 9-7 on page 9-17](#) lists the function of each interface connector, as they appear on the card front panel, [Figure 9-8 on page 9-17](#) 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 9-34](#) illustrates a sample application.

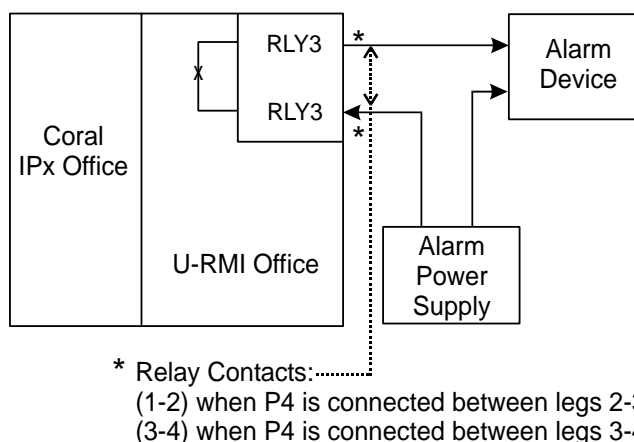
**Figure 9-34 Dial Operated Relay (RLY3) Connections**



### *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 9-35](#) illustrates a sample application.

**Figure 9-35 Alarm Relay (RLY3) Connections**



## 7 Relay Electrical Limitations

The relay contacts have specific electrical limitations. See [Relay Contacts on page 9-99](#). Do not exceed these limitations. In addition, the type of load the relay contact operates can have a great significance.

## 8 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:

<b>Card</b>	<b>Cage</b>	<b>Description</b>
8DRCF	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*.

## 9 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)
- 8DRCF 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*

### 1 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 9-77](#).
- Universal Night Answer (UNA) Central Bell. Described [on page 9-85](#).
- Dial operated accessory/alarm (RELAY). Described [on page 9-91](#).

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 significance.

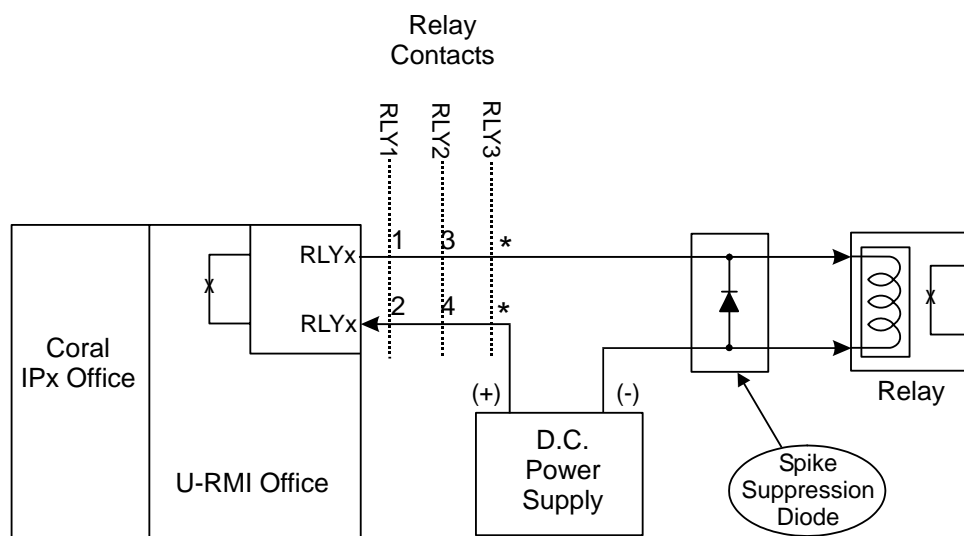
Ideally, the contact should operate a low voltage, low current, non-inductive load such as a light bulb or solid state device. When the voltage or current increases, or when an inductive load such as a relay coil or solenoid is connected, the likelihood of arcing across the contact increases. Contact 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. Arching also generates high frequency energy that may be coupled to any one of the data busses 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 9-36* 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 9-36 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.



## 2 Configuring the Relay Contacts Jumper

*Figure 9-37* is a simplified circuit diagram of the two relay contacts.

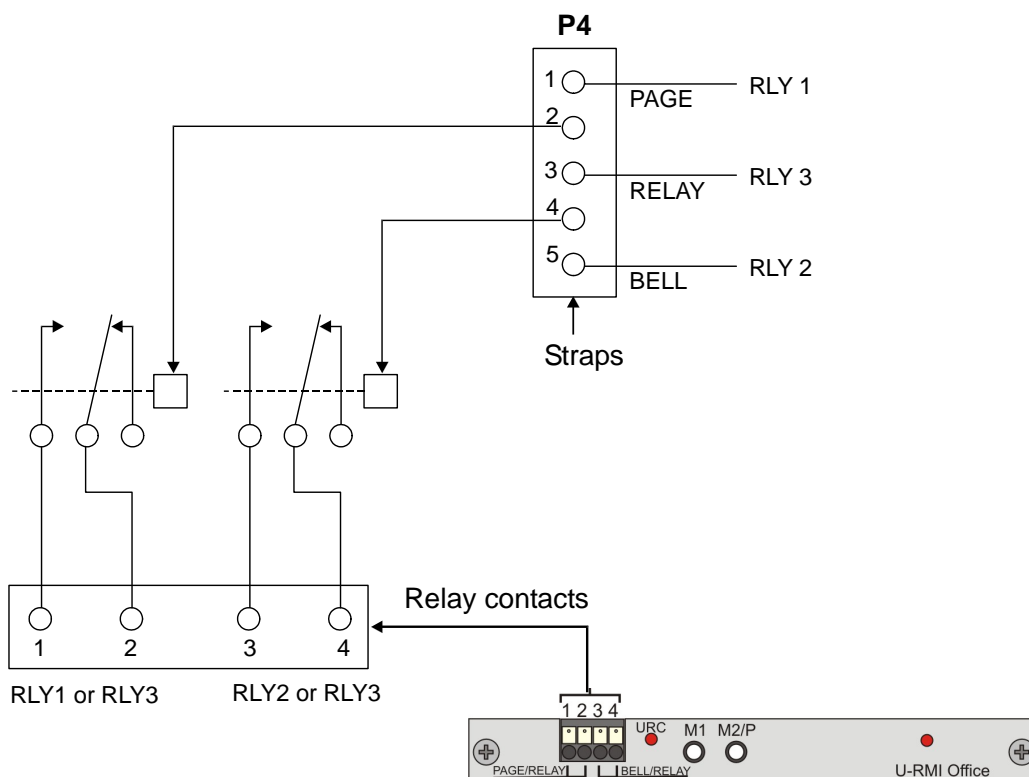
The relays provide form A (single pole, single throw and normally open) contacts for activating external circuitry and devices. Operation of the relays is determined by the system database.

Only two of the three relays 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 9-37*). *Table 9-27* defines the position of the P4 straps for the relays selection.

**Table 9-27 Relay Selection**

<i>Required Relays</i>	<i>P4 Strap Setting</i>
RLY1 & RLY2	4-5 & 1-2
RLY1 & RLY3	4-5 & 2-3
RLY2 & RLY3	1-2 & 3-4

**Figure 9-37 Simplified Relay Diagram**



### 3 Specifications - Relays

---

Number of Circuits:

U-RMI Office card.....	2
U-MR Office card .....	2
RMI Office card .....	2
MR Office card .....	2
8DRCF 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

# Chapter 10

## Peripheral Cards

Coral

<i>10.1 Peripheral Card Installation .....</i>	<i>10-1</i>
<i>10.2 Peripheral Card Description .....</i>	<i>10-5</i>
<i>10.3 Digital Trunk Synchronization .....</i>	<i>10-9</i>
<i>10.4 Service and Peripheral Cards.....</i>	<i>10-19</i>



# 10.1 Peripheral Card Installation

## 1 General Information

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 10-4 on page 10-19](#).

Each Peripheral card is described in detail in the *Coral Service and Peripheral Cards Installation Manual*.

## 2 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.*



*After a peripheral card is removed, wait for at least 2 seconds before re-inserting the card. If not, the card will not function properly.*

### 3 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.

### 4 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.

- 
1. In the U-RMI Office and U-MR Office card a second LED is located in the middle of the card.  
In the 4S8F Office, 4S16F Office, 8S8F Office and 8S16F Office cards a second LED is located in the right side of the card.

## 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**

<b>LED State</b>	<b>Indication</b>
Extinguished Off	No problem with the card, it is operating OK.
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.  
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*

### 1 General Description

Peripheral interface cards are described in the *Coral Service and Peripheral Cards Installation Manual*. [Table 10-4 on page 10-19](#) lists the Peripheral Interface card types that can be inserted into each card slot in the Coral\_IPx Office unit.

---

#### *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 10-4](#).

---

#### *Peripheral Card types*

Peripheral card slots in the Coral IPx Office unit are not universal.

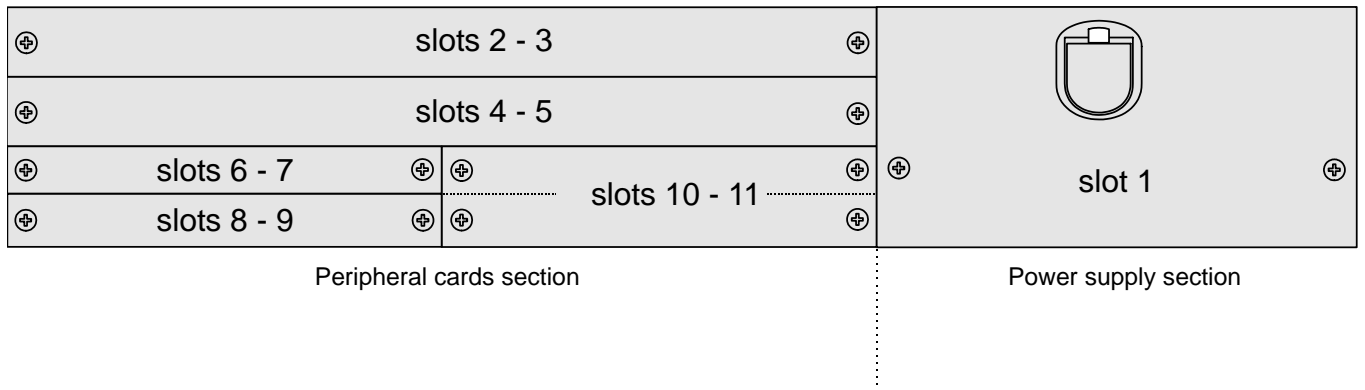
Slot 1 is reserved for the power supply

- 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

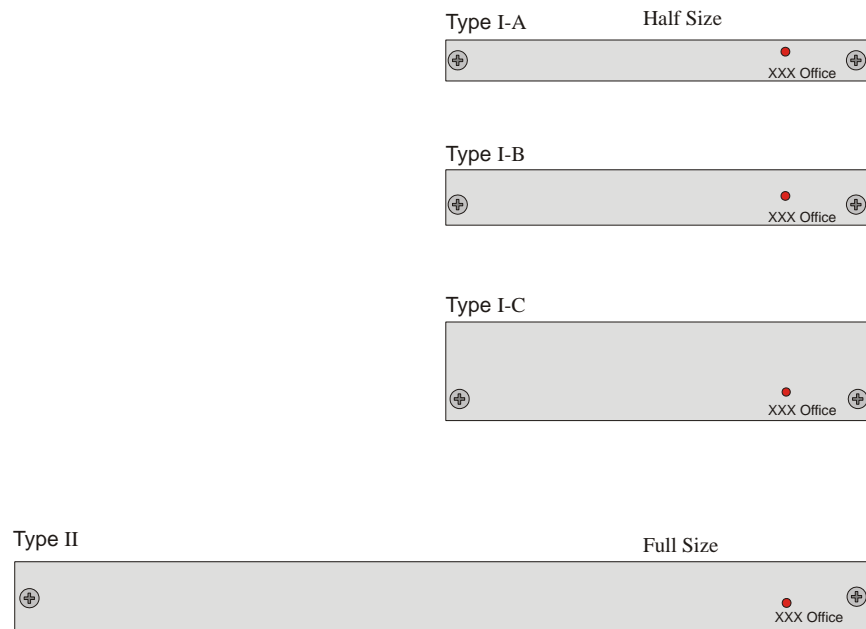
See [Figure 10-1](#) and [Table 10-2 Coral IPx Office Peripheral CARD TYPE](#).

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**

<b>Card Type</b>	<b>Card Name</b>	<b>Card Slot</b>
II	8/16/24SFT Office 4S Office 8S Office 20S* Office (8S + 12Sx) 4S8F* Office (4S + 8Fx) 4S16F* Office (4S + 16Fx) 8S8F* Office (8S + 8Fx) 8S16F* Office (8S + 16Fx) 8T Office 8T-CID* Office (8T + 8CID) IPC/SFC Office IPC/uCMC Office IPC/WiCMC Office	2-3, 4-5
I-A	MR Office RMI Office U-MR Office U-RMI Office	6-7
I-B	ESIM Office	8-9
	30T Office 4TBR Office PRI-30 Office UDT Office	8-9, 10-11
I-C	4T Office 4T-CID* Office (4T + 4CID)	10-11

\* These cards are combination of two cards

**Table 10-3 Coral IPx  
Office Peripheral CARD  
SLOT Location**

<b>Card Slot</b>	<b>Card Name</b>	<b>Card Type</b>
2-3, 4-5	8/16/24SFT Office 4S Office 8S Office 20S* Office (8S + 12Sx) 4S8F* Office (4S + 8Fx) 4S16F* Office (4S + 16Fx) 8S8F* Office (8S + 8Fx) 8S16F* Office (8S + 16Fx) 8T Office 8T-CID* Office (8T + 8CID) IPC/SFC office IPC/uCMC Office IPC/WiCMC Office	II
6-7	MR Office RMI Office U-MR office U-RMI office	I-A
8-9	30T Office 4TBR Office PRI-30 Office UDT office	I-B
	ESIM office	
10-11	30T Office 4TBR Office PRI-30 Office UDT office	I-B
	4T Office 4T-CID* Office (4T + 4CID)	

\* These cards are combination of two cards

## 10.3 *Digital Trunk Synchronization*

### 1 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: UDT Office (PRI-23 or T1), 30T Office, PRI-30 Office, and 4TBR Office.

The following digital trunk cards can retrieve synchronization signals in the Coral IPx 500X expansion cages: 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 (UDT, 30T, T1, PRI-23, PRI-30, 4TBR, 8TBR) are available for synchronization purposes through the Coral IPx 800X expansion cages.

## 2 Synchronization Slots in the Main and Expansion Cages

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 Coral IPx Office main unit, jumper settings on the *ESIM Office* and on the digital trunk cards.
- In the expansion cages, 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 cards shelf/slot location. See [Choosing the Best Synchronization Source, page 10-12](#).

---

### *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).
- 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.

### 3 Choosing the Best Synchronization Source

---

#### *Optional Synchronization Cards*

##### ***In the Coral IPx Office main unit:***

- PRI - PRI-30 Office, UDT Office (PRI-23)
- T1 - UDT Office (T1)
- E1 - 30T Office
- BRI - 4TBR Office

##### ***In the Coral IPx 500X expansion cage:***

- PRI-23ipx, PRI-30ipx, UDTipx(PRI-23)
- T1 - T1ipx, UDTipx(T1)
- E1 - 30Tipx
- BRI - 4TBRipx, 8TBRipx

##### ***In the Coral IPx 800X expansion cage:***

- PRI-23, PTRI-30, UDT(PRI-23)
- T1 - T1, UDT(T1)
- E1 - 30T/x
- BRI - 4TBR, 8TBR



#### **NOTE:**

*If an IPx 500X Expansion cage is installed and UDTipx (PRI-23 or T1), 30Tipx, PRI-23ipx, PRI-30ipx, 4TBRipx and 8TBRipx digital trunk interface cards are available, refer to the Coral IPx 500 Installation Guide.*

---



#### **NOTE:**

*If an IPx 800X Expansion cage is installed and UDT (PRI-23 or T1), 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.*
- 

**NOTE:**

---

*It is not recommended to use a PRI card with IPAT IC (hardware issue 4) chip as a synchronization source.*

---

---

### *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.***

## 4 Synchronization Instructions

1. See the selection of the digital trunk cards available at the Coral site, given on [Choosing the Best Synchronization Source, page 10-12](#) above, 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 on page 10-16](#).
3. Verify that the digital trunk cards are properly strapped. See [Figure 10-3 on page 10-16](#).
4. When expansion cages are installed, verify that the *ESIM Office* card is properly strapped. See [Figure 10-4 on page 10-17](#).

### CAUTION!

If an IPx 500X Expansion cage is installed and if straps must be changed, verify that the cage power is OFF before removing the PS500 power supply unit. Refer to 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 or Coral IPx 800 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 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)

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**

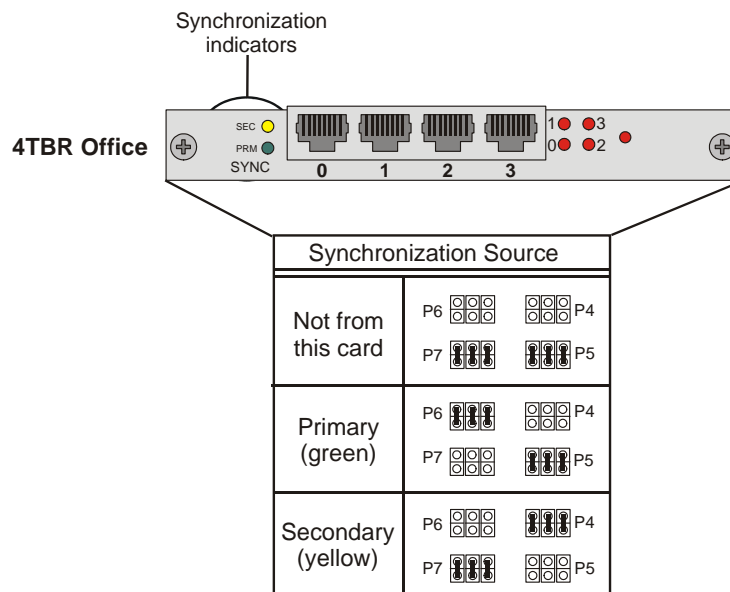
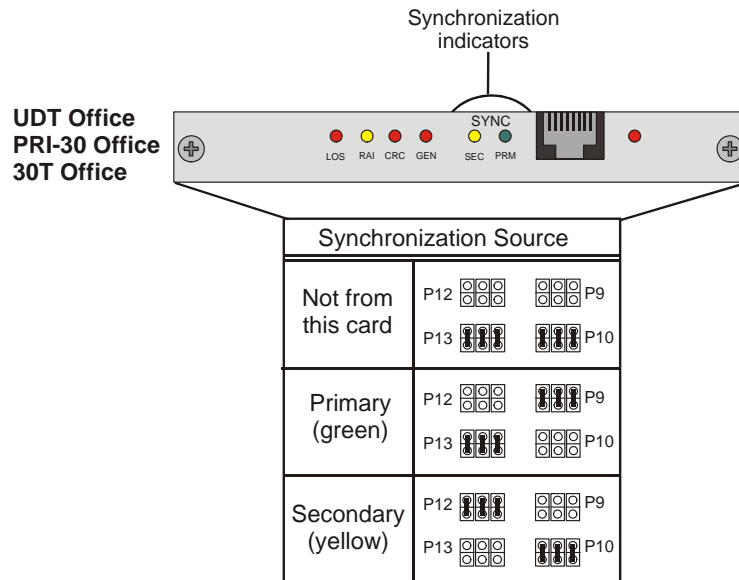
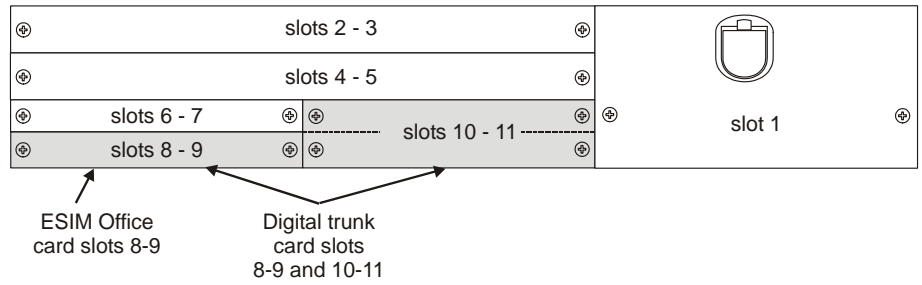
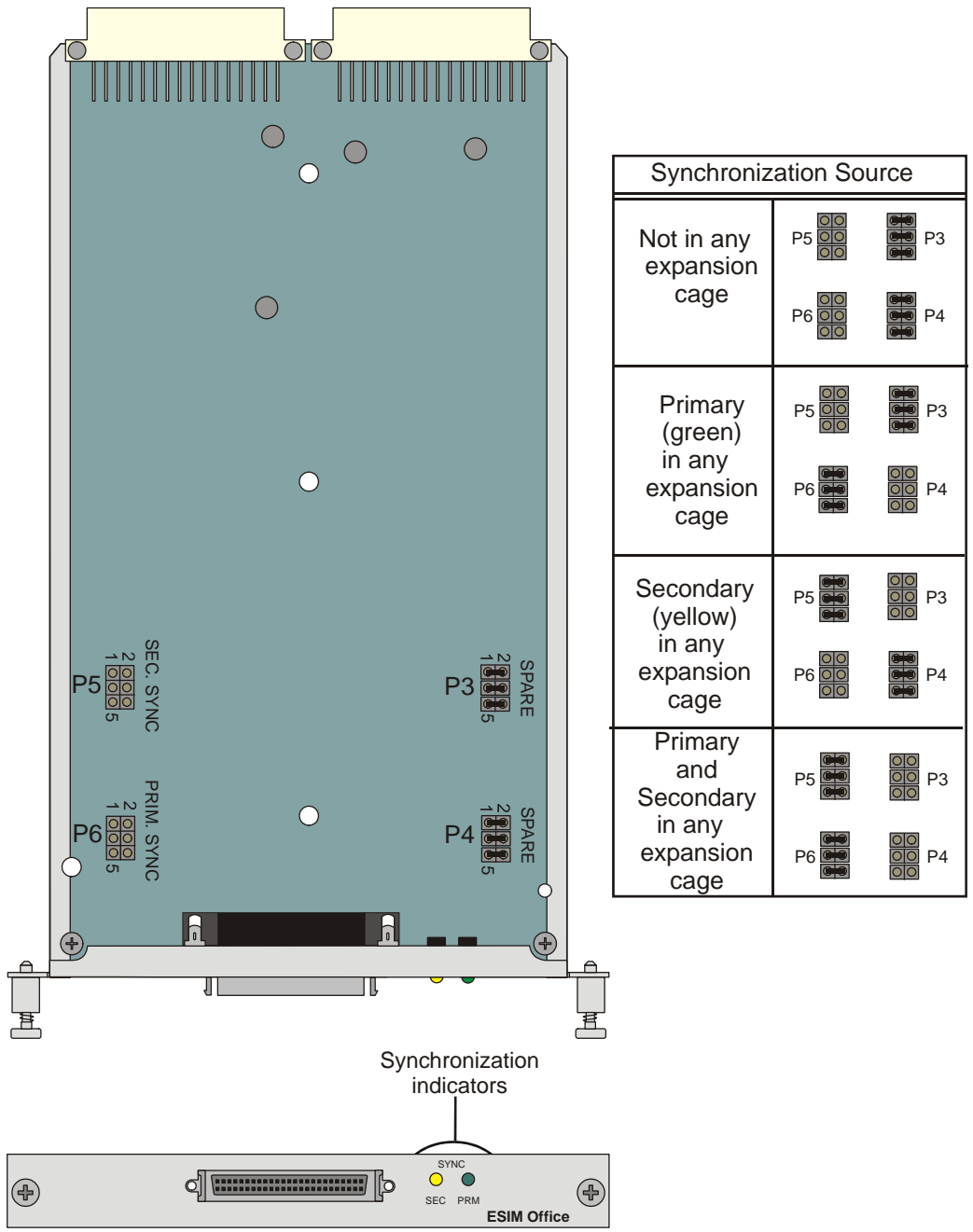


Figure 10-4 ESIM Office Card Jumper Settings for Synchronization



## ***NOTES:***

## 10.4 Service and Peripheral Cards

This section includes a list of all peripheral cards currently used in the Coral IPx Office system. In the future, the *Coral Service and Peripheral Cards Installation Manual* will be available and will provide an updated description of all service and peripheral cards used in the Coral IPx Office system.

Table 10-4 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
30T Office	I-B	8-9, 10-11	Even: 30T Odd: -----	See <a href="#">Figure 10-5 on page 10-25</a> . 30 channel, E1 digital trunk interface card. Provides a 4-wire, digital multiplexed, CEPT compatible trunk interface at 2.048Mbps rate. <b>NOTE:</b> 30T Office is not for use in the North American market.
4T Office	I-C	10-11	Even: 4T-C Odd: -----	See <a href="#">Figure 10-9 on page 10-29</a> . 4 port Loop-Start trunk interface card. Includes 4 ports with power failure (PF) transfer. Provides a multi-pin connector to attach an optional 4CID Office card in piggyback fashion.
4T-CID Office	I-C	10-11	Even: 4T-CID Odd: -----	See <a href="#">Figure 10-10 on page 10-30</a> . Combination trunk card, 4T Office and 4CID Office cards on 4T Office board in piggyback fashion. 4 ports total. The 4CID Office card is used for detecting Caller ID information.
4TBR Office	I-B	8-9, 10-11	Even: 4TBR Odd: -----	See <a href="#">Figure 10-6 on page 10-26</a> . 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.

Coral IPx Office - Service and Peripheral Card Types					
Card Name	Card Type	Card Slot	PI Slot P_TYPE		Description
4S Office	II	2-3, 4-5	Even: 4SLS Odd: -----		See <a href="#">Figure 10-14 on page 10-34</a> . 4 port, 2-wire SLT (2500 type device, Single-Line Telephone) interface card. Provides a multi-pin connector to attach an optional 8Fx Office or 16Fx Office card in piggyback fashion.
4S8F Office *	II	2-3, 4-5	Even: 4SLS Odd: 8SFT		See <a href="#">Figure 10-19 on page 10-39</a> . Combination station card, 4S Office and 8Fx Office cards on 4S Office board. 12 ports total.
4S16F Office *	II	2-3, 4-5	Even: 4SLS Odd: 16SFT		See <a href="#">Figure 10-19 on page 10-39</a> . Combination station card, 4S Office and 16Fx Office cards on 4S Office board. 20 ports total.
8S Office	II	2-3, 4-5	Even: 8SLS Odd: -----		See <a href="#">Figure 10-15 on page 10-35</a> . 8 port, 2-wire SLT (2500 type device, Single-Line Telephone) interface card. Provides a multi-pin connector to attach an optional 12Sx Office, 8Fx Office or 16Fx Office card in piggyback fashion.
8S8F Office *	II	2-3, 4-5	Even: 8SLS Odd: 8SFT		See <a href="#">Figure 10-19 on page 10-39</a> . Combination station card, 8S Office and 8Fx Office cards on 8S Office board. 16 ports total.
8S16F Office *	II	2-3, 4-5	Even: 8SLS Odd: 16SFT		See <a href="#">Figure 10-19 on page 10-39</a> . Combination station card, 8S Office and 16Fx Office cards on 8S Office board. 24 ports total.
20S Office *	II	2-3, 4-5	Even: 20SLS Odd: -----		See <a href="#">Figure 10-18 on page 10-38</a> . Combination station card, 8S Office and 12Sx Office cards on 8S Office board. 20 ports total.  <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: 8SFT Odd: -----		See <a href="#">Figure 10-11 on page 10-31</a> . 8 port, 2-wire SFT (Station FlexSet Terminal) interface card. Each of the circuits support Coral FlexSet, GKT, CPA, DKT, DST and APDL.
16SFT Office	II	2-3, 4-5	Even: 16SFT Odd: -----		See <a href="#">Figure 10-12 on page 10-32</a> . 16 port, 2-wire SFT (Station FlexSet Terminal) interface card. Each of the circuits support Coral FlexSet, GKT, CPA, DKT, DST and APDL.



### Coral IPx Office - Service and Peripheral Card Types

Card Name	Card Type	Card Slot	PI Slot P_TYPE		Description
24SFT Office	II	2-3, 4-5	Even: Odd:	24SFT -----	See <a href="#">Figure 10-13 on page 10-33</a> . 24 port, 2-wire SFT (Station FlexSet Terminal) interface card. Each of the circuits support Coral FlexSet, GKT, CPA, DKT, DST and APDL.
8T Office	II	2-3, 4-5	Even: Odd:	8T-C -----	See <a href="#">Figure 10-20 on page 10-40</a> . 8 port Loop-Start trunk interface card. Includes 4 ports with power failure (PF) transfer. Provides a multi-pin connector to attach an optional 8CID card in piggyback fashion.
8T-CID Office *	II	2-3, 4-5	Even: Odd:	4T-CID -----	See <a href="#">Figure 10-21 on page 10-41</a> . Combination trunk card, 8T Office and 8CID cards on 8T Office board in piggyback fashion. 8 ports total. The 8CID card is used for detecting Caller ID information.
ESIM Office	I-B	8-9	Even: Odd:	----- -----	See <a href="#">Figure 10-4 on page 10-17</a> . When the Coral IPx Office system includes Coral IPx 500X/800X expansion cages, the ESIM Office card is installed into the Coral IPx Office unit and the Coral IPx Office expansion cable is attached to the connector on the front panel of the ESIM Office card.
IPC Office/ SFC	II	2-3, 4-5	Even: Odd:	??? -----	See <a href="#">Figure 10-22 on page 10-42</a> . Voice mail. TBD ???
IPC Office/ uCMC	II	2-3, 4-5	Even: Odd:	uCMC -----	See <a href="#">Figure 10-22 on page 10-42</a> . Voice mail. TBD
IPC Office/ WiCMC	II	2-3, 4-5	Even: Odd:	??? -----	See <a href="#">Figure 10-22 on page 10-42</a> . Voice mail. TBD ???
MR Office	I-A	6-7	Even: Odd:	MR -----	See <a href="#">Table 10-6 on page 10-24</a>
PRI-30 Office	I-B	8-9, 10-11	Even: Odd:	PRI30 -----	See <a href="#">Figure 10-7 on page 10-27</a> . 30 channel, PRI (Primary Rate Interface) digital trunk card. ISDN compatible digital interface, European ETSI standard (30B+D) at 2.048Mbps E1 rate. <b>NOTE:</b> PRI-30 Office are not for use in the North American market.
RMI Office	I-A	6-7	Even: Odd:	RMI-F -----	See <a href="#">Table 10-6 on page 10-24</a>

<b>Coral IPx Office - Service and Peripheral Card Types</b>					
<b>Card Name</b>	<b>Card Type</b>	<b>Card Slot</b>	<b>PI Slot P_TYPE</b>		<b>Description</b>
UDT Office	I-B	8-9, 10-11	Even: T1	Odd: -----	See <a href="#">Figure 10-8 on page 10-28</a> . T1 or PRI-23 application card, jumper selection. <ul style="list-style-type: none"> <li>■ T1: 24 channel, T1 digital trunk interface card.</li> <li>■ 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.</li> </ul>
			Even: PRI 23	Odd: -----	
U-MR Office	I-A	6-7	Even: MR	Odd: URC2	See <a href="#">Table 10-6 on page 10-24</a>
U-RMI Office	I-A	6-7	Even: RMI-F	Odd: URC2	See <a href="#">Table 10-6 on page 10-24</a>

\* These cards are combination of two cards

Table 10-5 Coral IPx Office Piggyback modules for Peripheral Cards

<b>Coral IPx Office Piggyback modules for Peripheral Cards</b>	
<i>Item</i>	<i>Description</i>
4CID Office	<p>The 4CID Office is installed on the 4T Office card in Coral IPx Office systems. See <a href="#">Figure 10-23 on page 10-43</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 IPx Office systems. See <a href="#">Figure 10-24 on page 10-44</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 10-16 on page 10-36</a> and <a href="#">Figure 10-17 on page 10-37</a>.</p>
8Fx Office	<p>8Fx Office card plugged on the:</p> <ul style="list-style-type: none"> <li>■ 4S Office card for 4S8F Office (12 ports total, 4 SLT and 8 SFT)</li> <li>■ 8S Office card for 8S8F Office (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 10-25 on page 10-45</a>.</p>
16Fx Office	<p>16Fx Office card plugged on the:</p> <ul style="list-style-type: none"> <li>■ 4S Office card for 4S16F Office (20 ports total, 4 SLT and 16 SFT)</li> <li>■ 8S Office card for 8S16F 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 10-25 on page 10-45</a>.</p>

**Table 10-6 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 or 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 (<i>max: 32*</i>)</li> <li>■ 24 DTR circuit DTMF receiver and decoder card for touch-tone digits (<i>max: 24*</i>)</li> <li>■ Eight 3-way conference (<i>max: 24*</i>)</li> <li>■ Two Meet-me bridge conference for 14 parties (<i>max: 6*</i>)</li> <li>■ 16 Caller ID circuit transmitters adapted to Bellcore standards which includes the time and Caller Name/Num display (<i>max: 32*</i>). 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> (<i>max: *</i>) The maximum number for the resources is dependant 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.

For *U-RMI Office* card see [Figure 9-3, on page 9-11](#).

For *RMI Office* card see [Figure 9-4, on page 9-12](#).

For *U-MR Office* card see [Figure 9-5, on page 9-13](#).

For *MR Office* card, see [Figure 9-6, on page 9-14](#).

Figure 10-5 30T Office Card

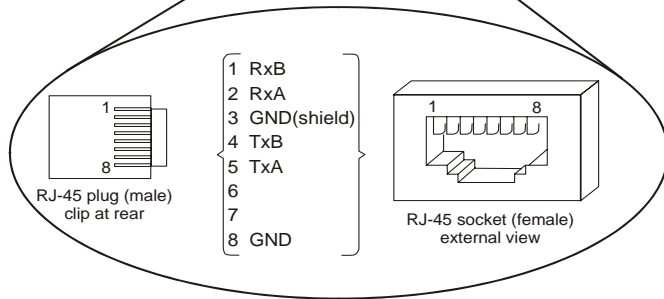
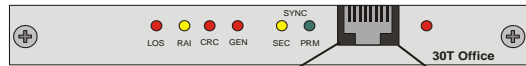
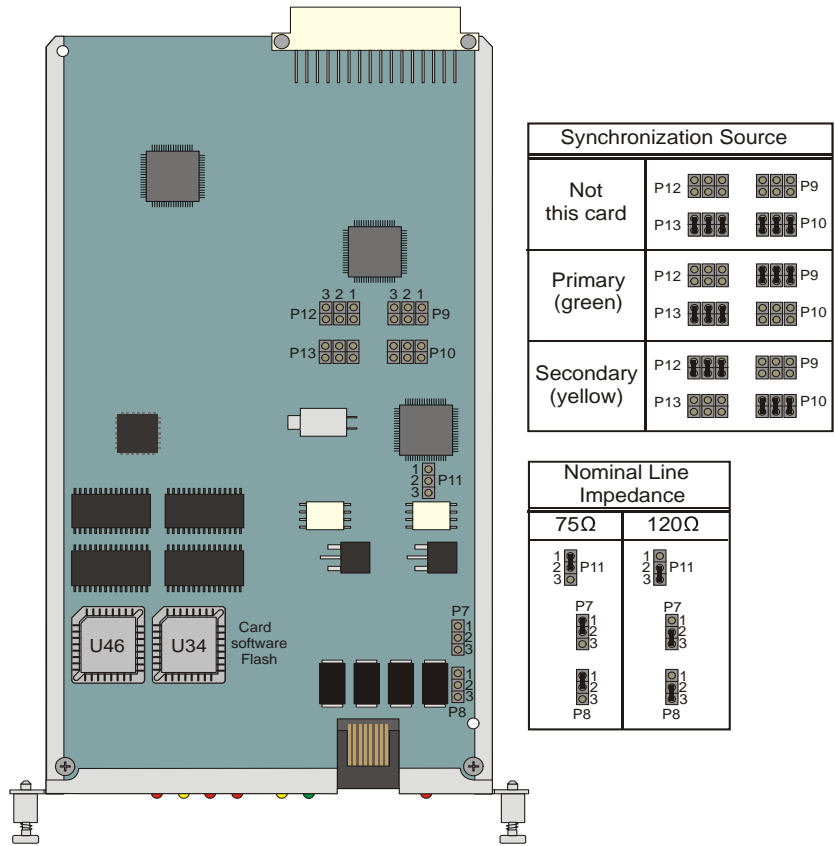


Figure 10-6 4TBR Office Card

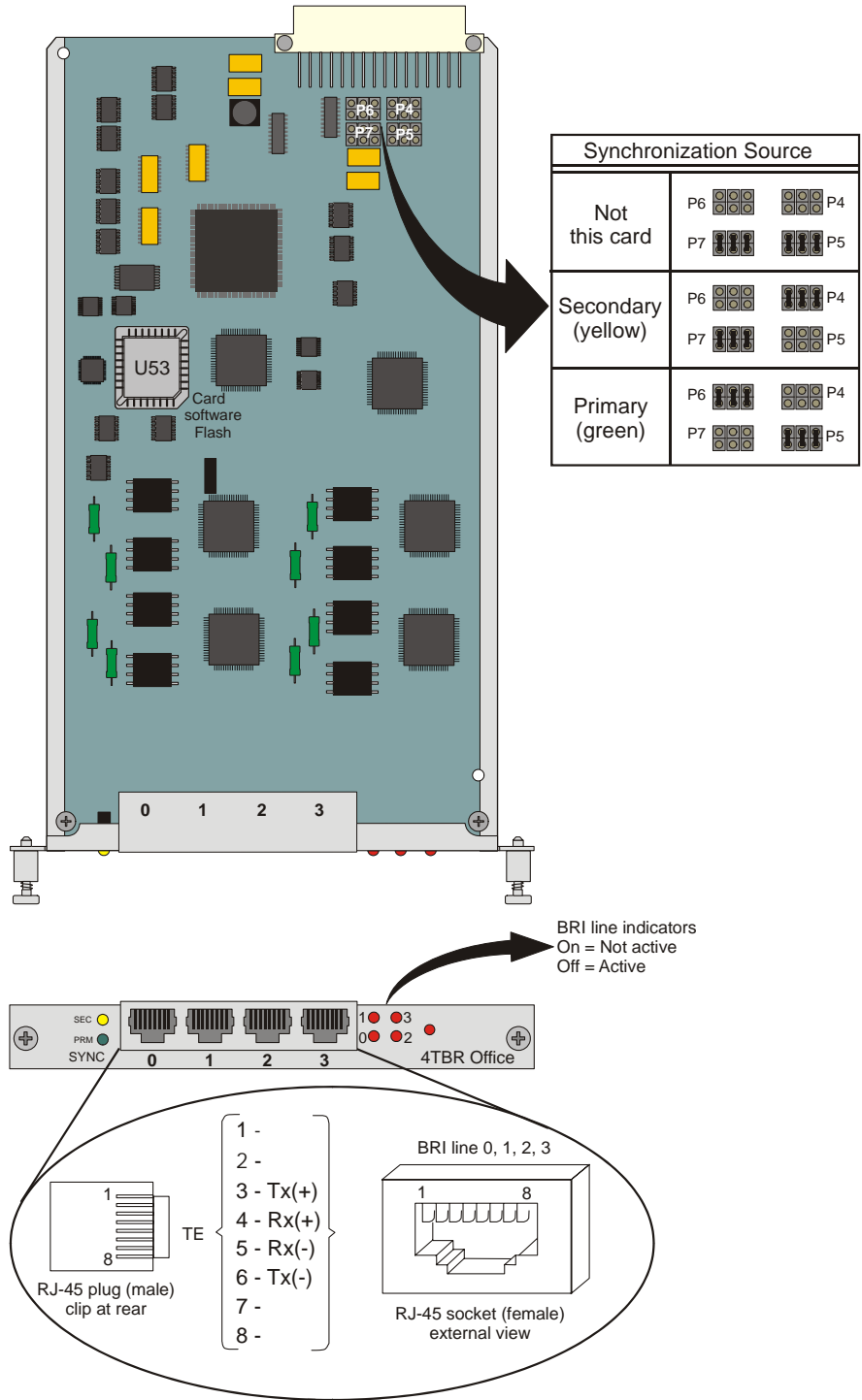
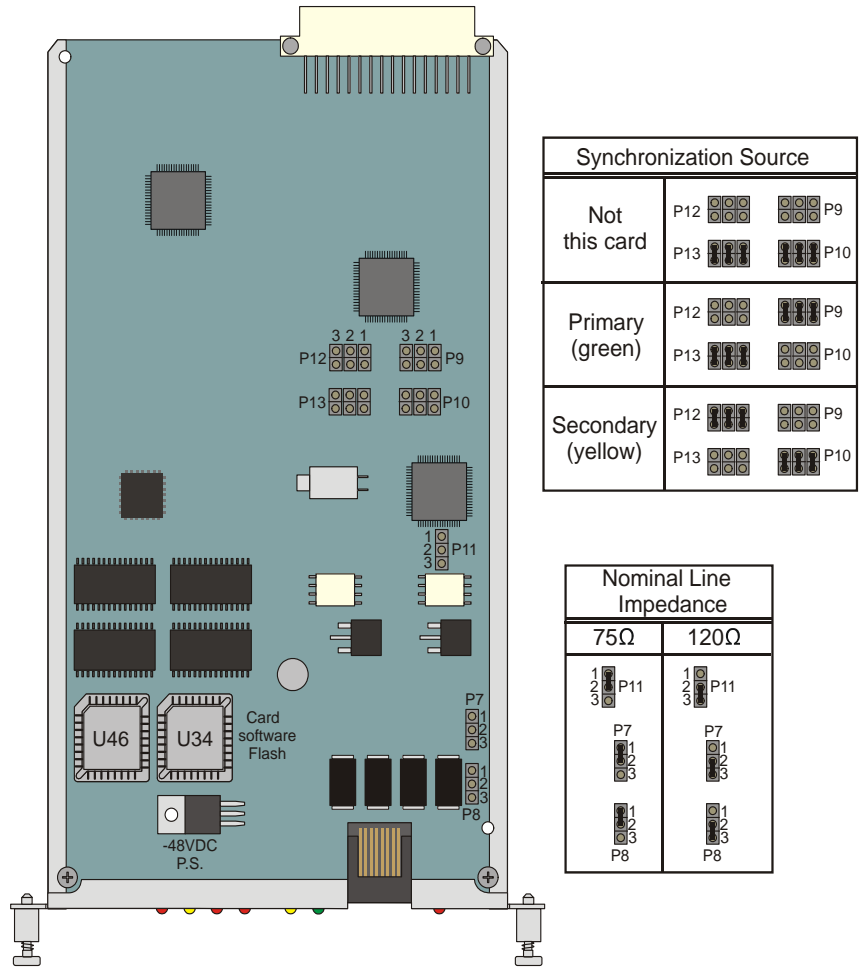


Figure 10-7 **PRI-30 Office Card**



Synchronization Source	
Not this card	P12  P9 P13  P10
Primary (green)	P12  P9 P13  P10
Secondary (yellow)	P12  P9 P13  P10

Nominal Line Impedance	
75Ω	120Ω
P11 P7 P8	P11 P7 P8

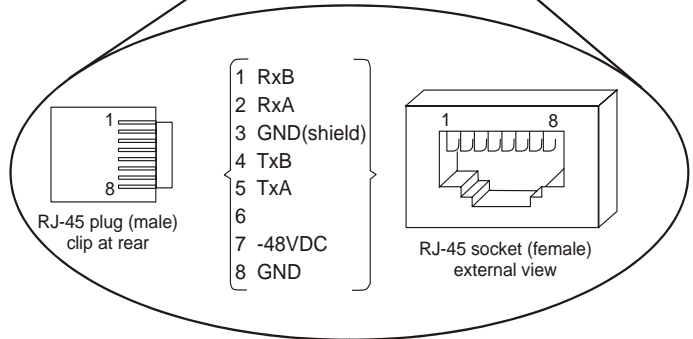
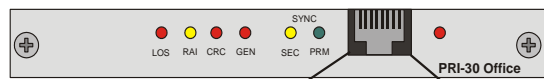


Figure 10-8 UDT Office Card

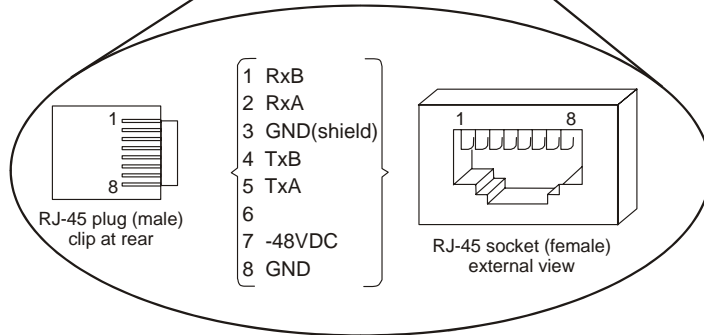
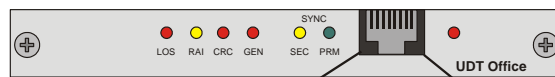
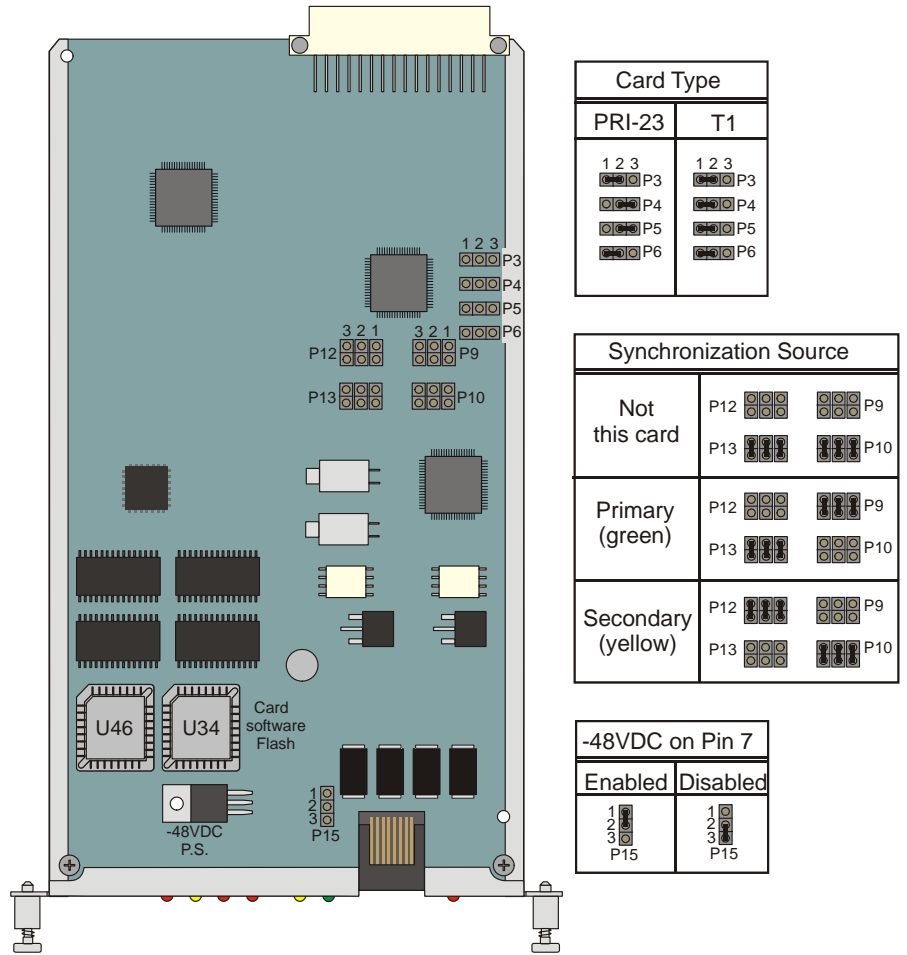




Figure 10-9 4T Office Card

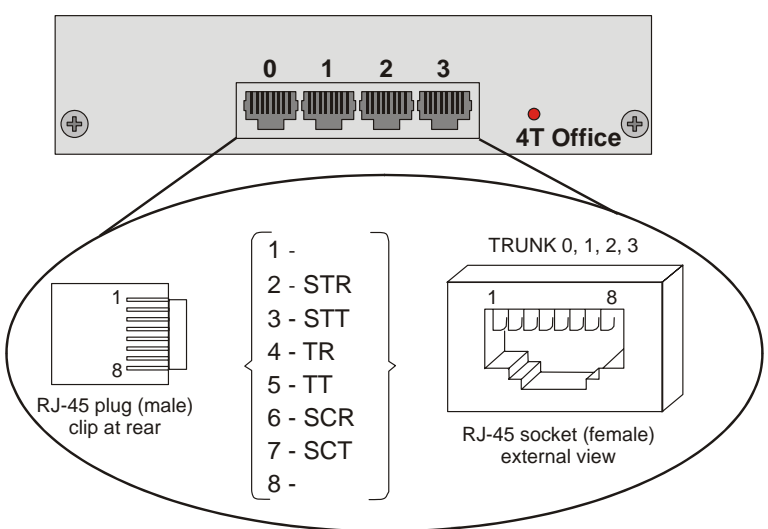
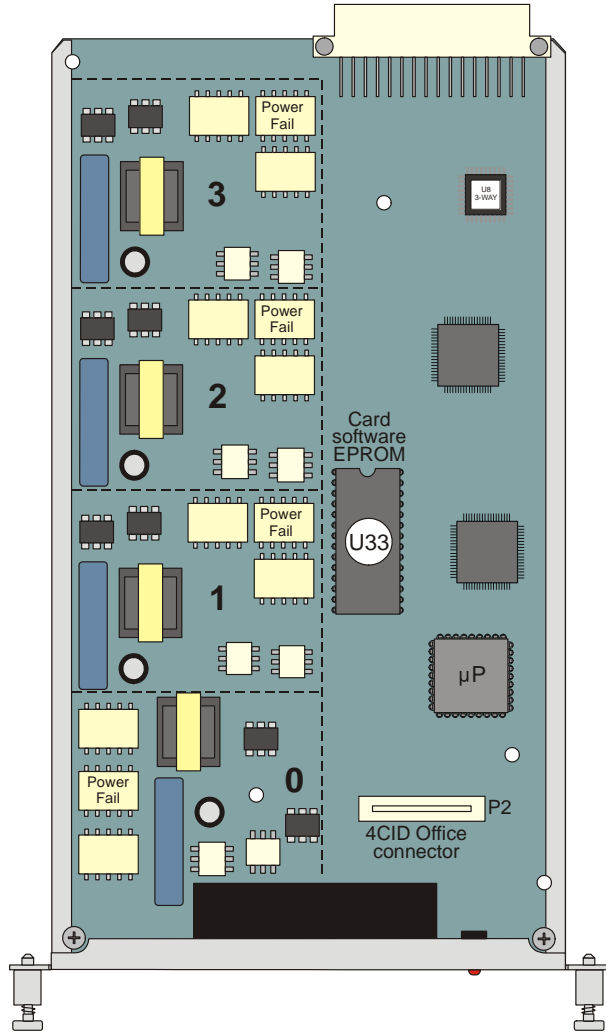


Figure 5-5 on page 5-16 illustrates wiring interconnections between the trunk card, station card, and a single line station set.

Figure 10-10 4T-CID Office Card

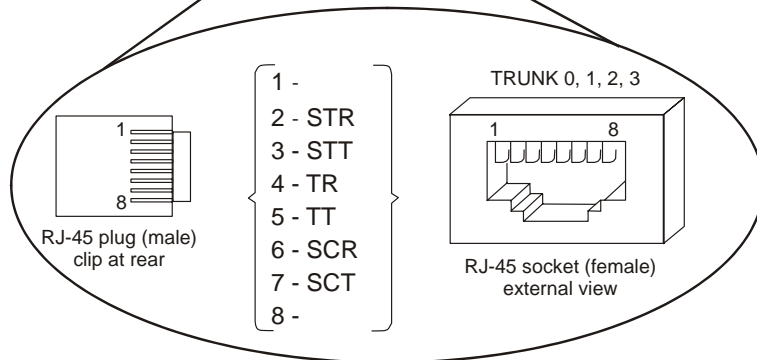
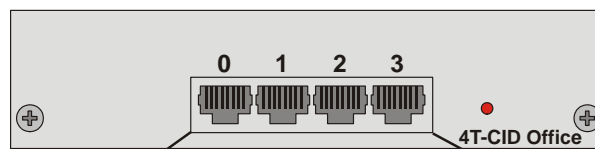
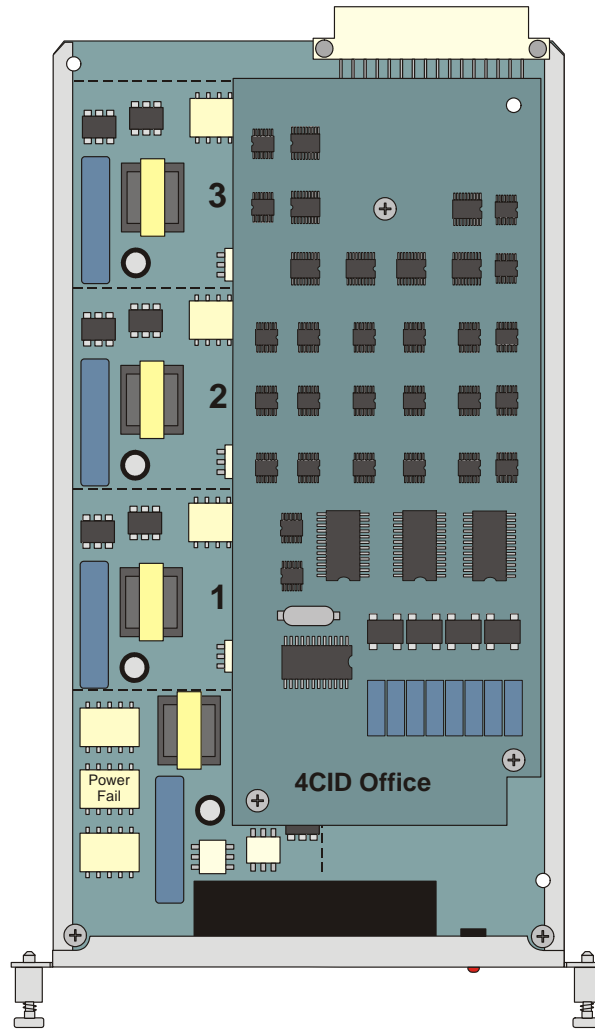
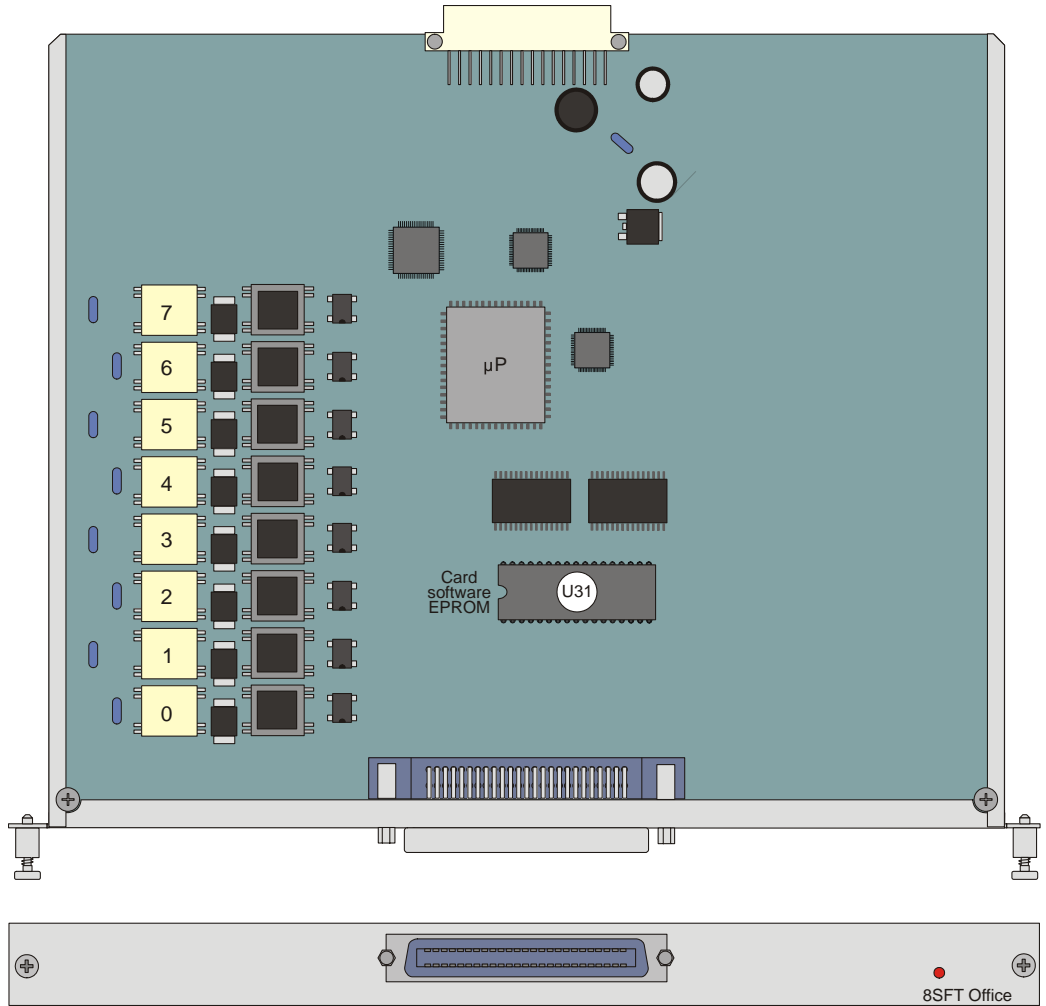


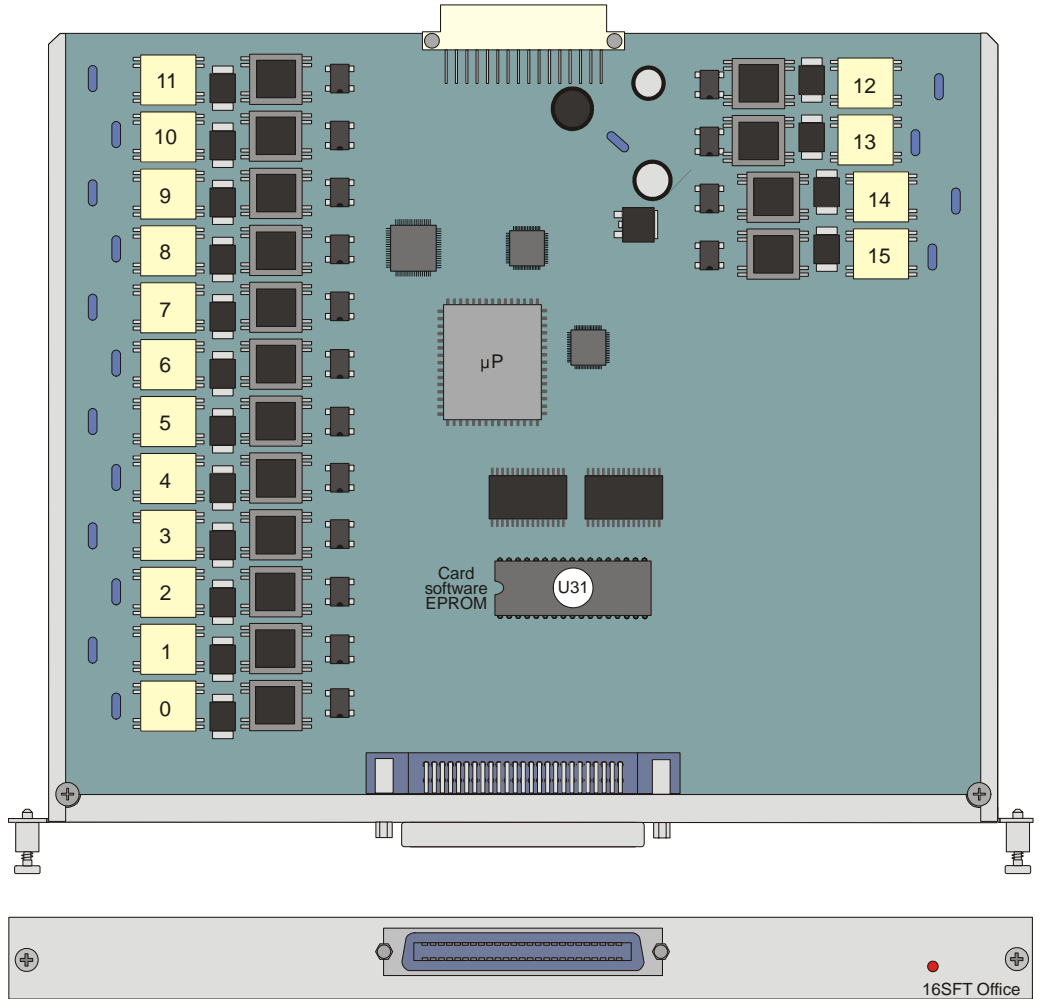
Figure 5-5 on page 5-16 illustrates wiring interconnections between the trunk card, station card, and a single line station set.

Figure 10-11 8SFT Office Card



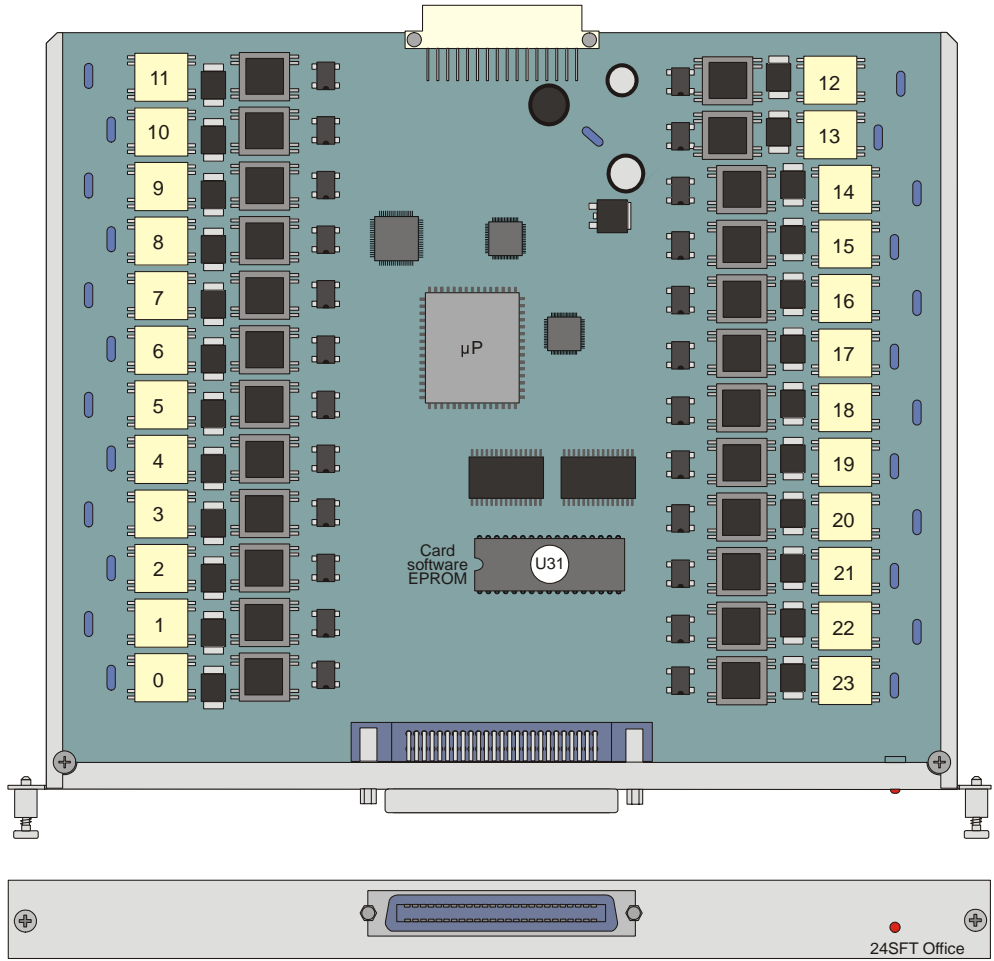
Pins	FlexSet
1/26	A/B0
2/27	A/B1
3/28	A/B2
4/29	A/B3
5/30	A/B4
6/31	A/B5
7/32	A/B6
8/33	A/B7

Figure 10-12 16SFT Office Card



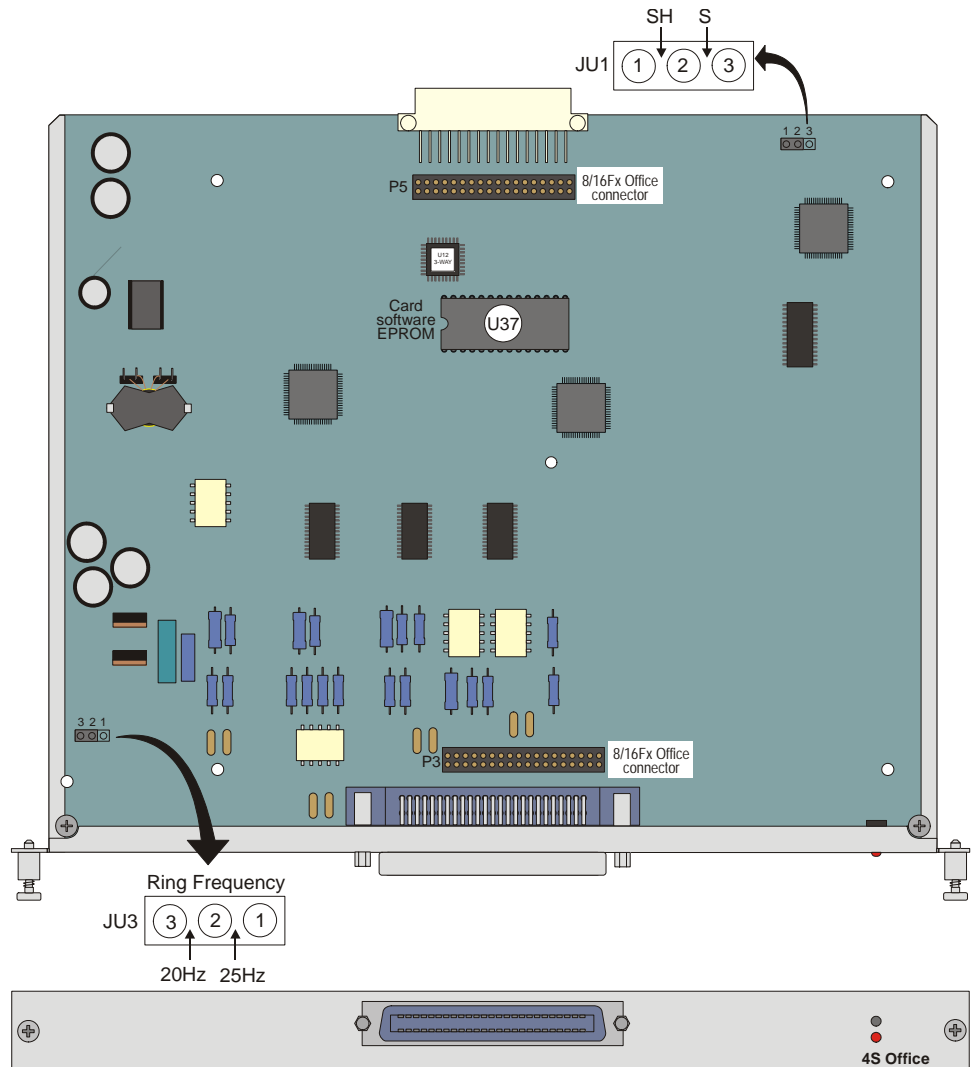
Pins	FlexSet
1/26	A/B0
2/27	A/B1
3/28	A/B2
4/29	A/B3
5/30	A/B4
6/31	A/B5
7/32	A/B6
8/33	A/B7
9/34	A/B8
10/35	A/B9
11/36	A/B10
12/37	A/B11
13/38	A/B12
14/39	A/B13
15/40	A/B14
16/41	A/B15

Figure 10-13 24SFT Office Card



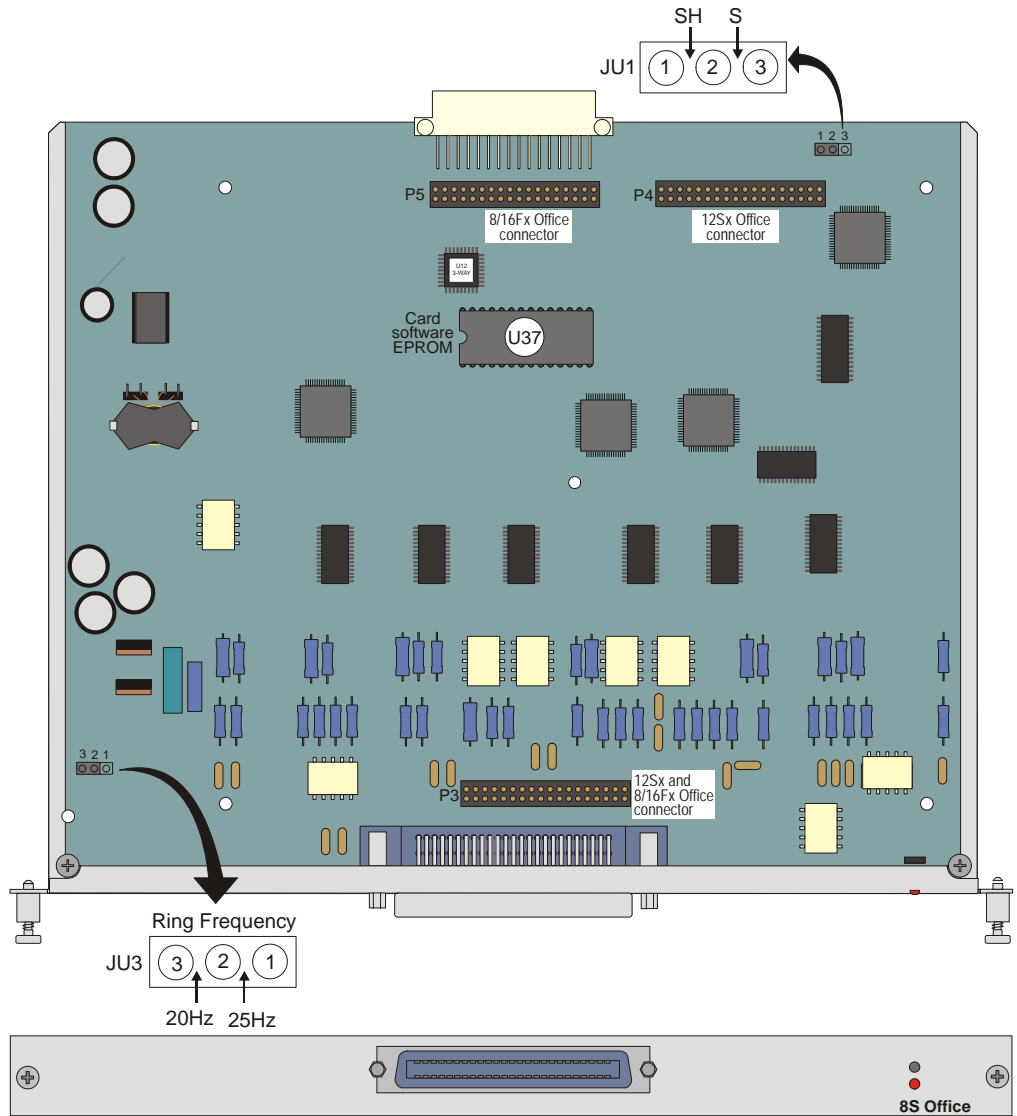
Pins	FlexSet
1/26	A/B0
2/27	A/B1
3/28	A/B2
4/29	A/B3
5/30	A/B4
6/31	A/B5
7/32	A/B6
8/33	A/B7
9/34	A/B8
10/35	A/B9
11/36	A/B10
12/37	A/B11
13/38	A/B12
14/39	A/B13
15/40	A/B14
16/41	A/B15
17/42	A/B16
18/43	A/B17
19/44	A/B18
20/45	A/B19
21/46	A/B20
22/47	A/B21
23/48	A/B22
24/49	A/B23

Figure 10-14 4S Office Card



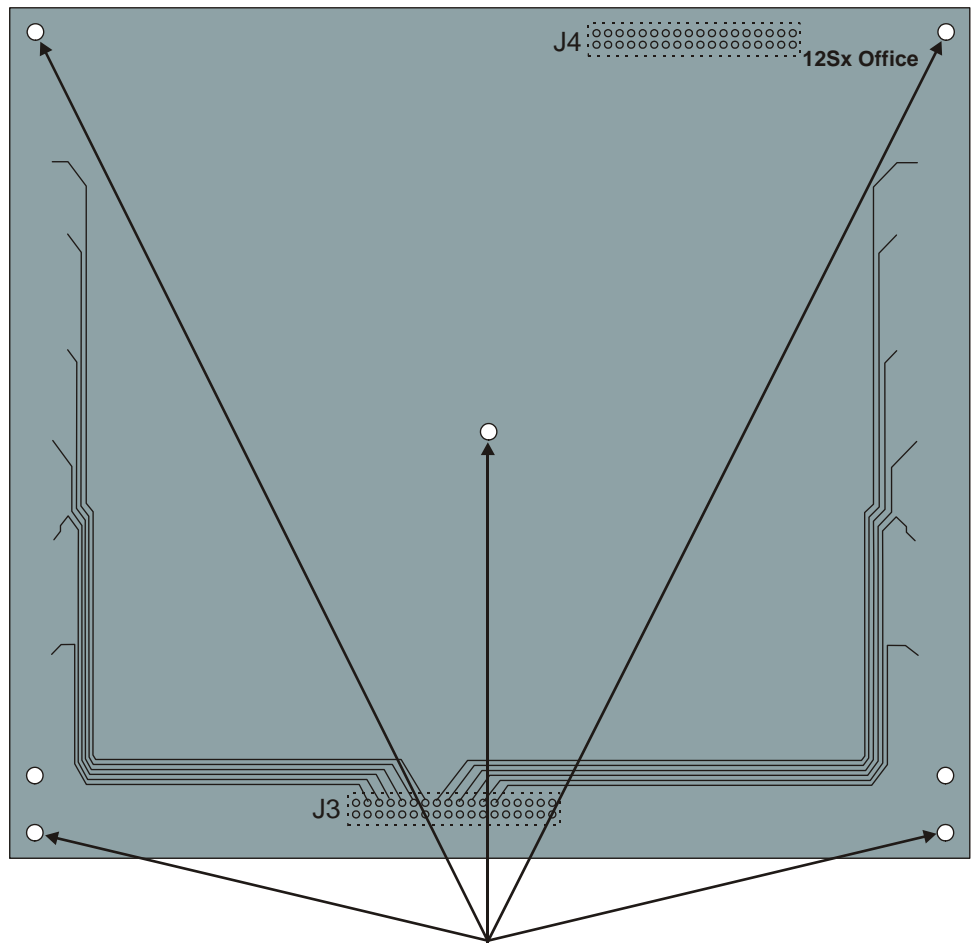
Pins	SLT Station
1/26	S0
2/27	S1
3/28	S2
4/29	S3

Figure 10-15 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 10-16 12Sx Office Card - Top Side



Mounting holes for plastic screws and spacers for connecting to 8S Office

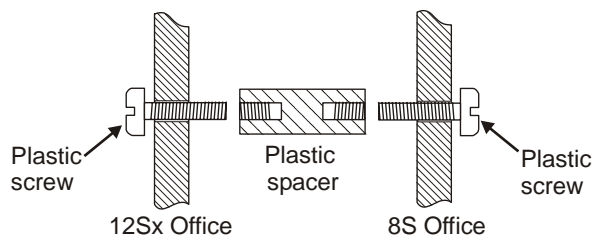




Figure 10-17 12Sx Office Card - Rear Side

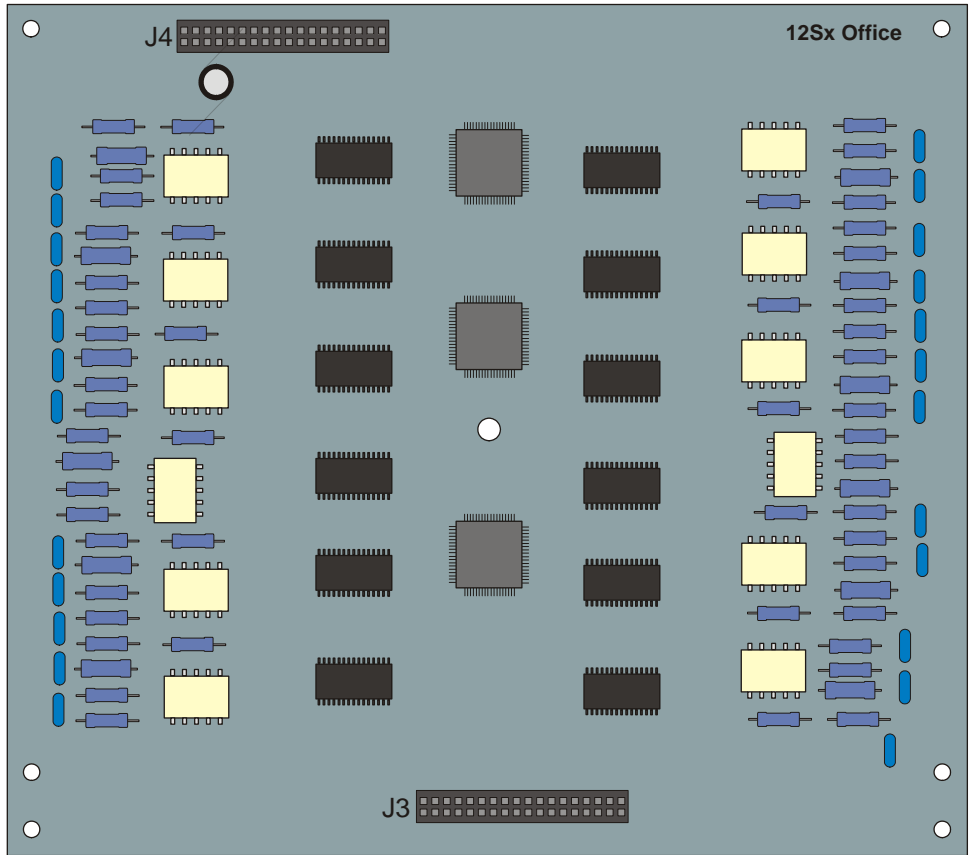
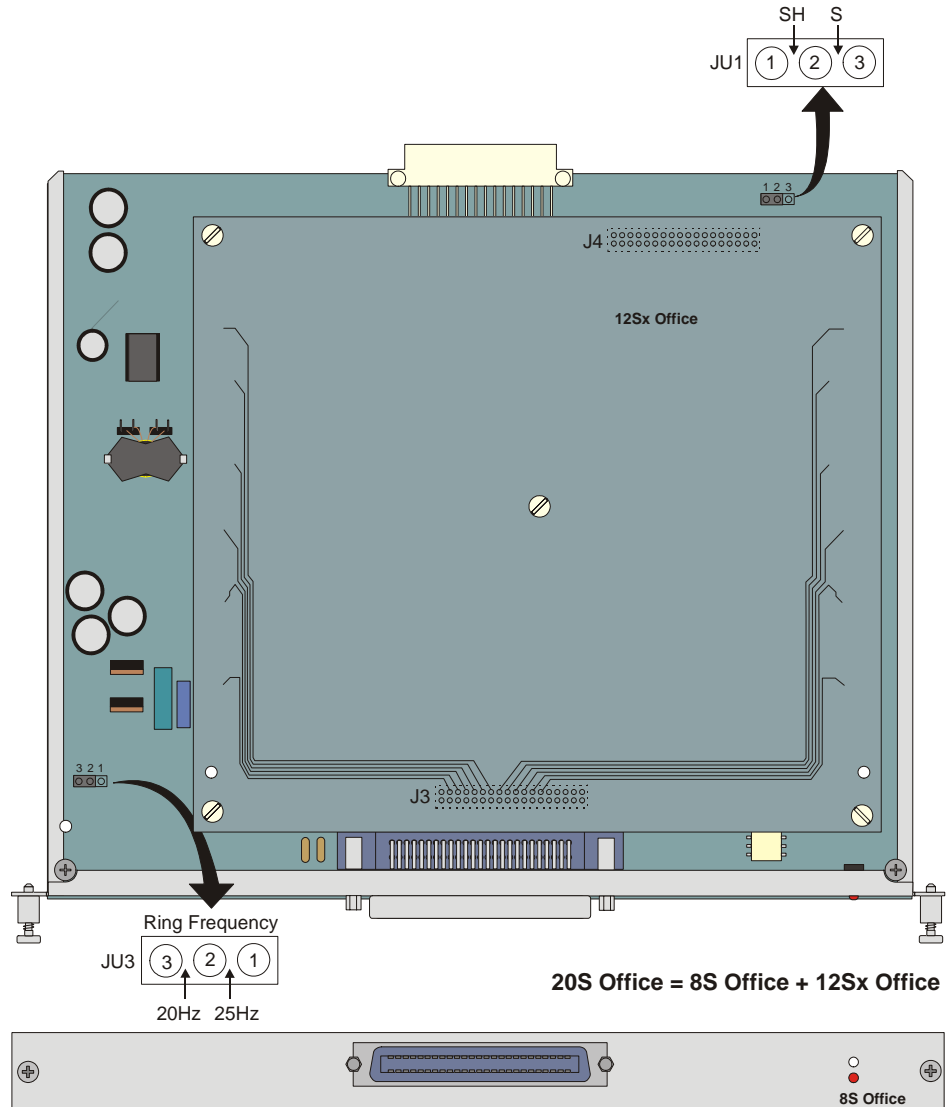
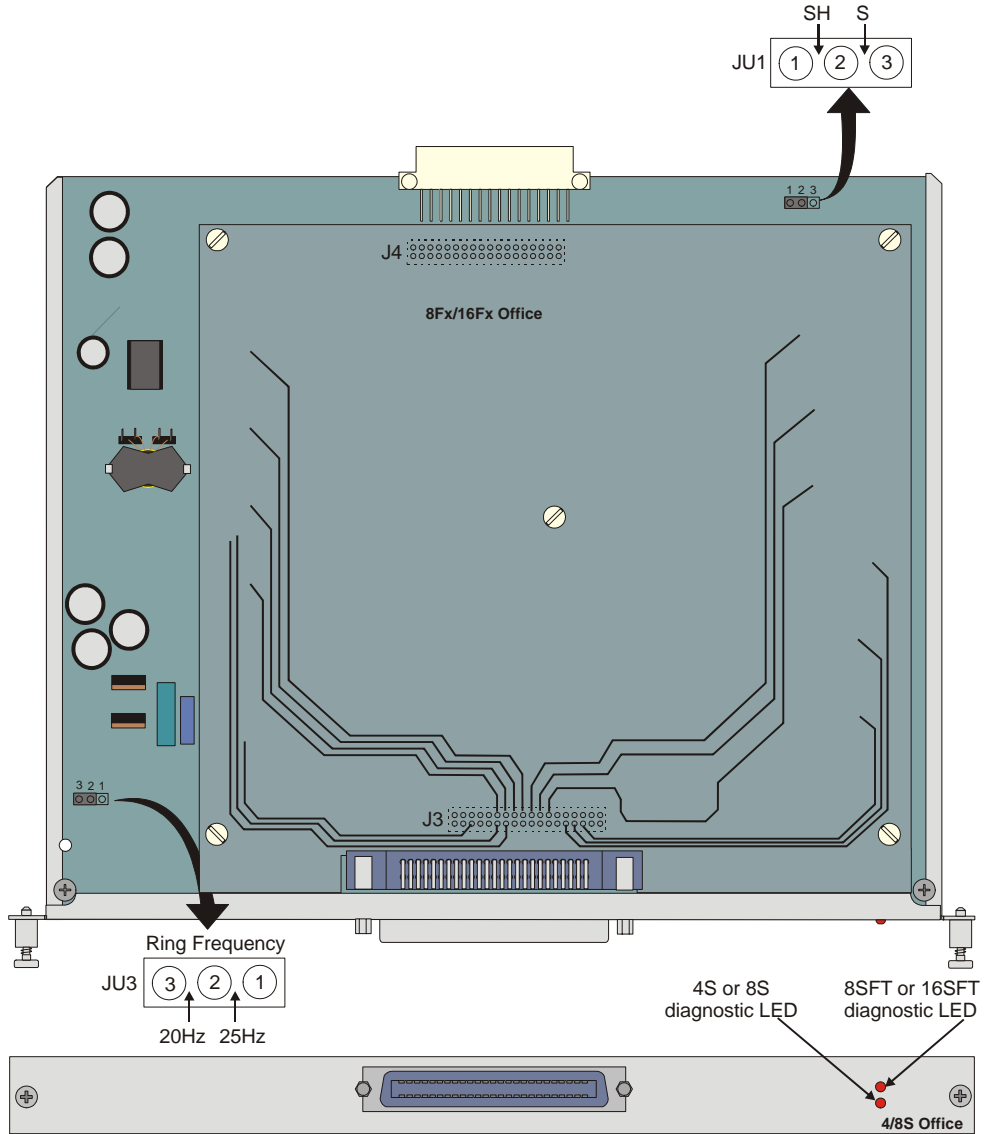


Figure 10-18 20S Office Card



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 10-19 4S8F,  
4S16F, 8S8F and 8S16F  
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

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

4S8F Office = 4S Office + 8Fx Office  
 4S16F Office = 4S Office + 16Fx Office  
 8S8F Office = 8S Office + 8Fx Office  
 8S16F Office = 8S Office + 16Fx Office

Figure 10-20 8T Office Card

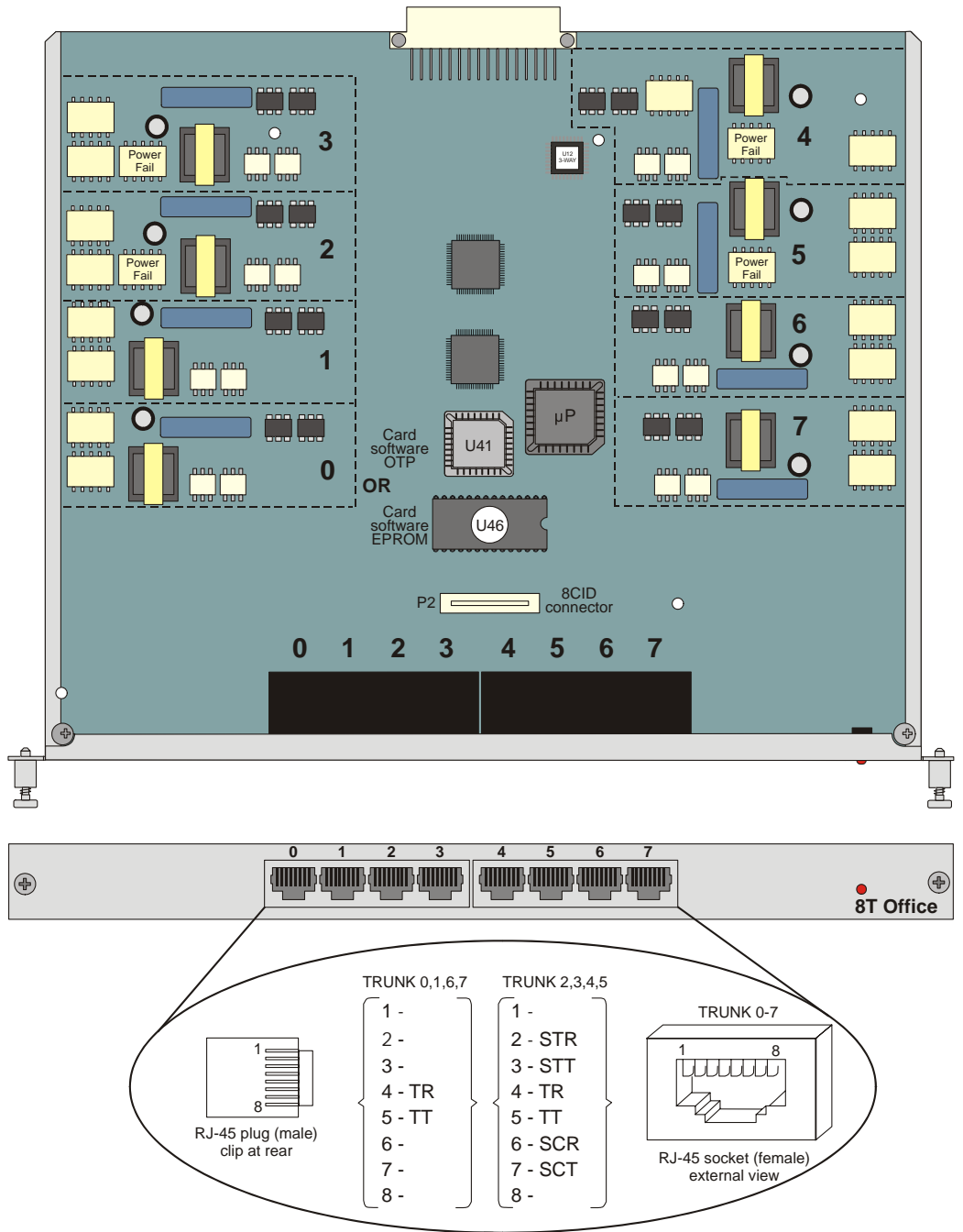


Figure 5-5 on page 5-16 illustrates wiring interconnections between the trunk card, station card, and a single line station set.

Figure 10-21 8T-CID Office Card

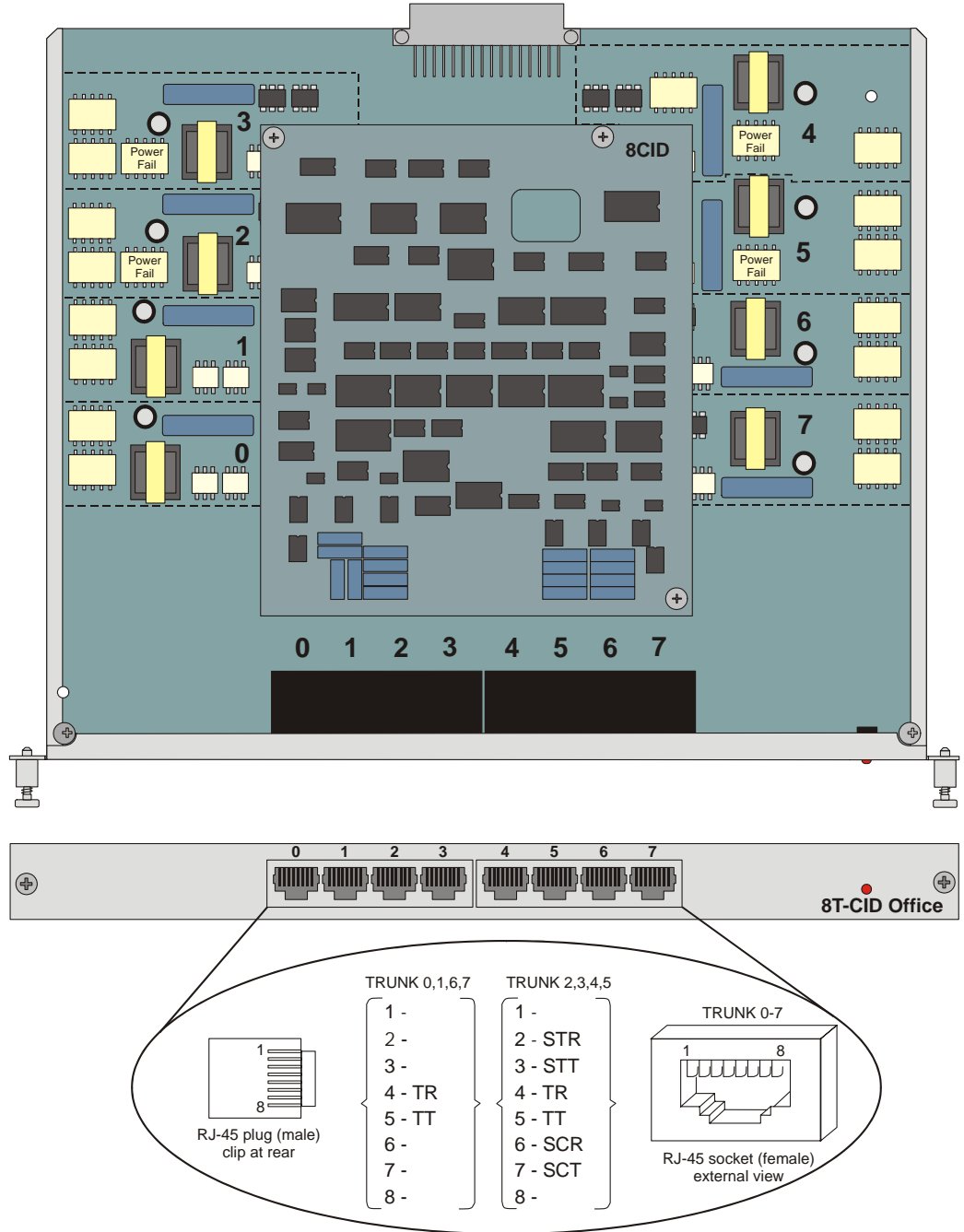


Figure 5-5 on page 5-16 illustrates wiring interconnections between the trunk card, station card, and a single line station set.

Figure 10-22 IPC Office Card

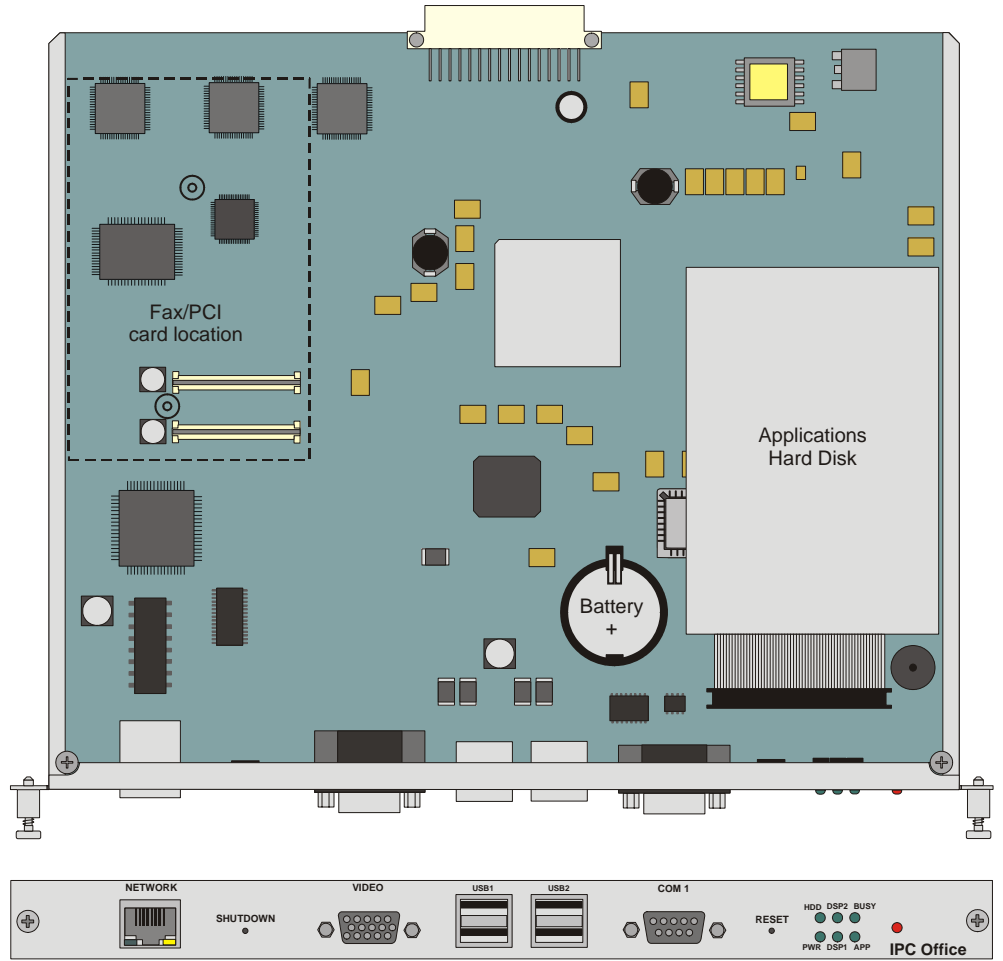
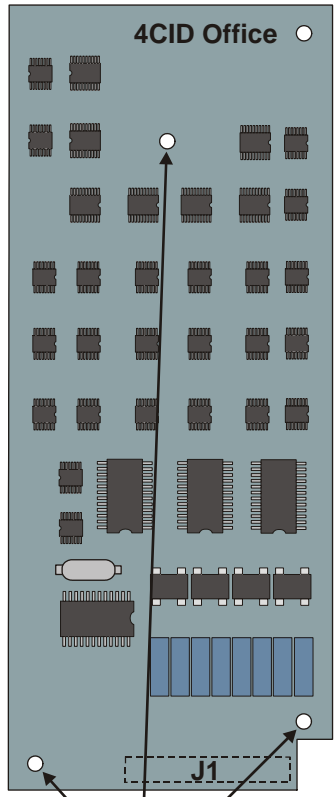


Figure 10-23 4CID Office Card



Mounting holes for metal screws and spacers for connecting to 4T Office

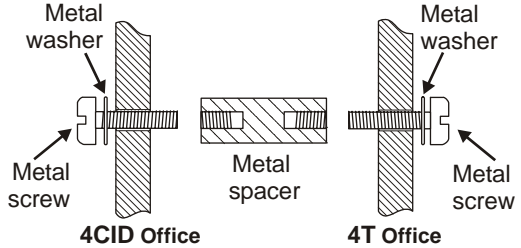
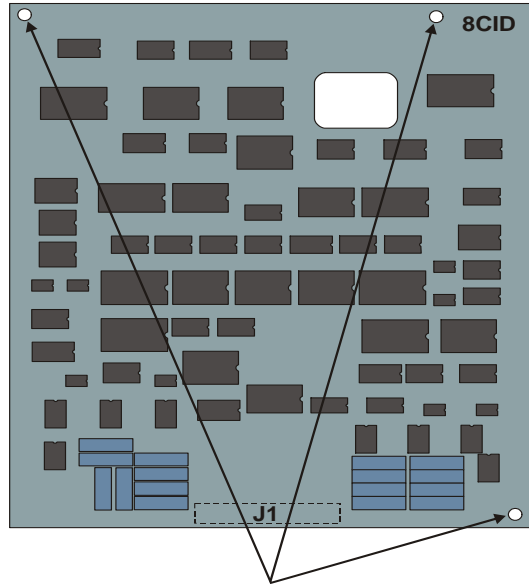


Figure 10-24 8CID Card



Mounting holes for metal screws and spacers for connecting to 8T Office

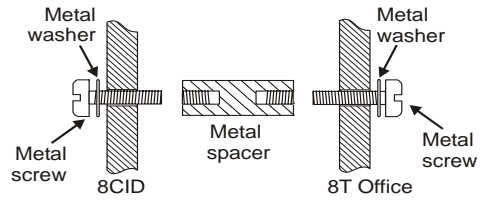
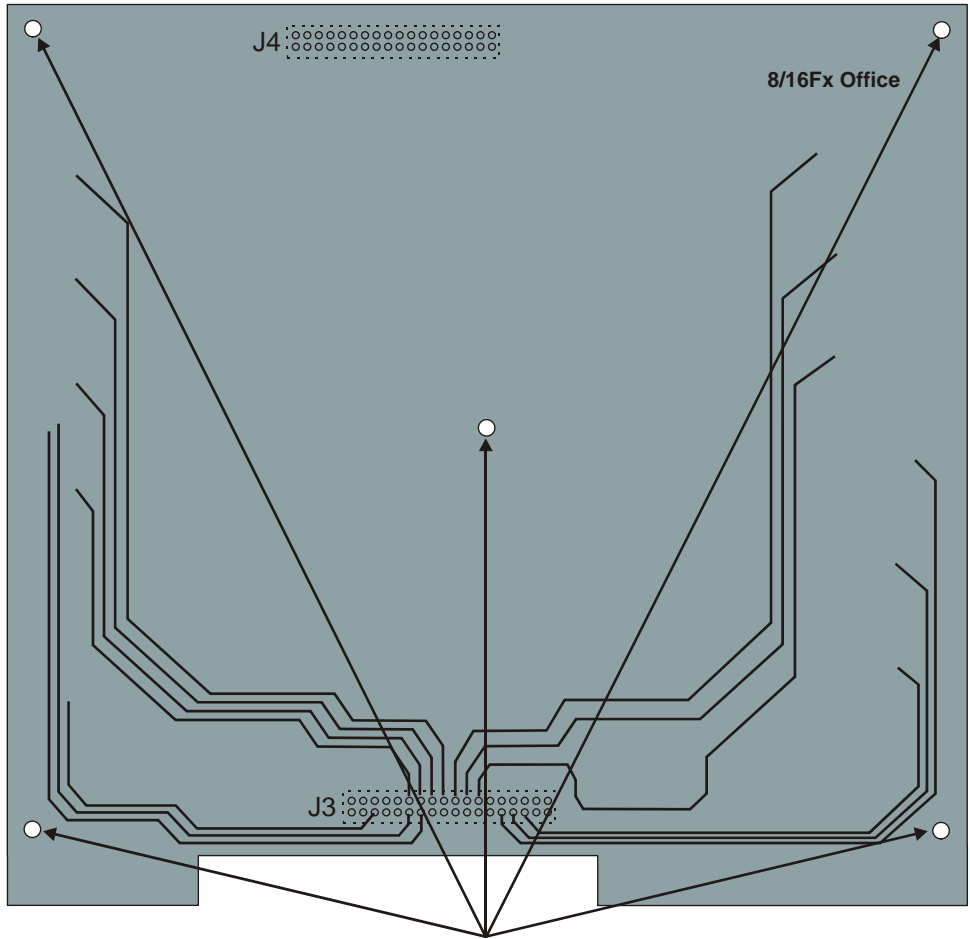
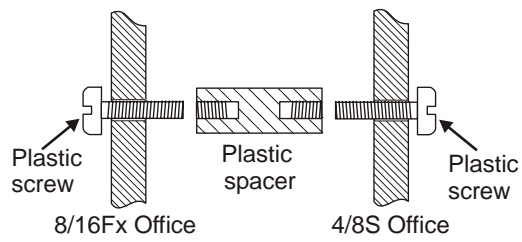




Figure 10-25 8Fx Office and 16Fx Office Card



Mounting holes for plastic screws and spacers for connecting to 4/8S Office



## ***NOTES:***

# Chapter 11

## System Networking

Coral

11.1	<i>NTU Office Card Description</i> .....	11-3
11.2	<i>NTU Office Card Installation</i> .....	11-9
11.3	<i>Connecting to the Network without an NTU Office Card</i> .....	11-21



# 11.1 NTU Office Card Description

## 1 Introduction

This section describes the networking functions of the Coral IPx Office system. For a description on how to install the networking card and components, see [NTU Office Card Installation, 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 that 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 card supplied at specific customer request. In addition, it also enables direct connection to a printer via a USB port.

## 2 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 Card, page 8-27](#) for more information. The RTP packets are directed through the UGW internal switch. The switches direct 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 a customer-supplied router from the WAN into one of the LAN ports. The packets are directed from the LAN into one of the LAN ports.

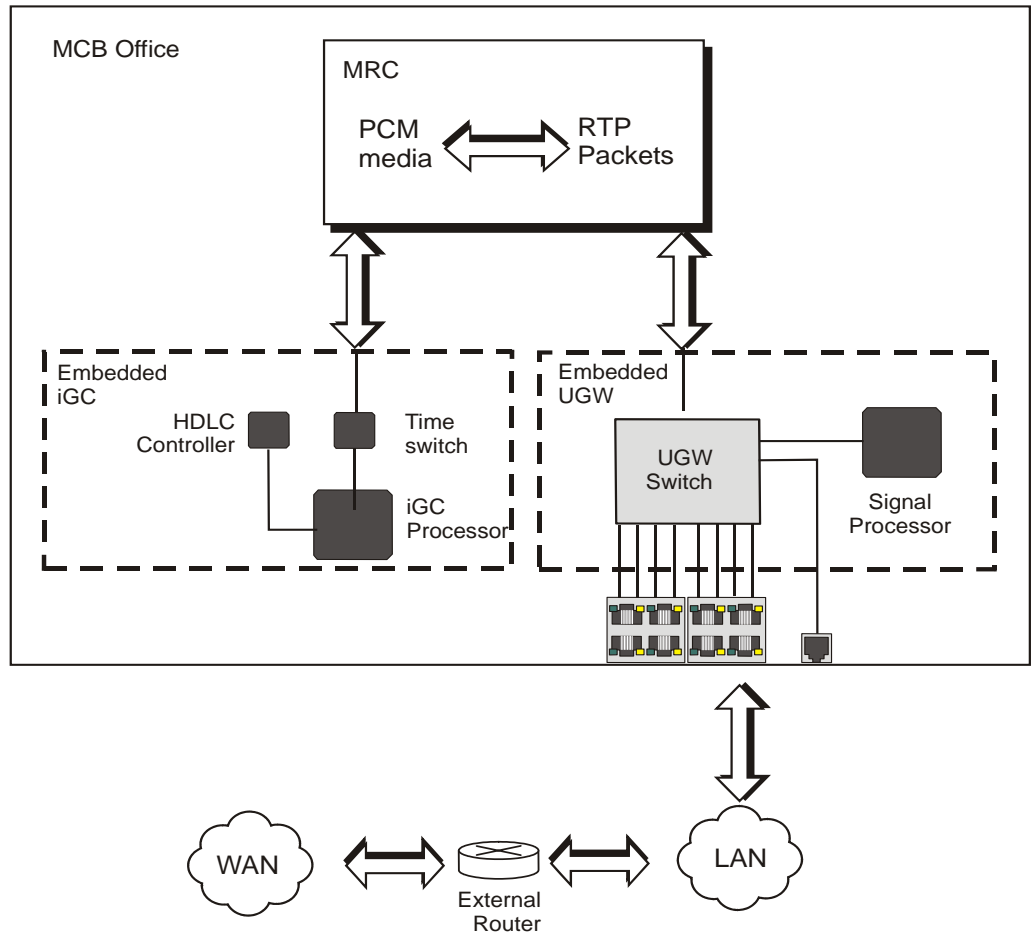


### NOTE:

If a network card is not installed in the system, the WAN port can function as an additional LAN port when a cable is connected between two RJ-45 connectors on the surface of the MCB Office card. For more information, see [Connecting to the Network without an NTU Office Card, page 11-21](#).

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



### 3 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 Card, page 8-27](#), 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. The dynamic IP addresses are either provided by the NTU Office card or the DHCP server, 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.

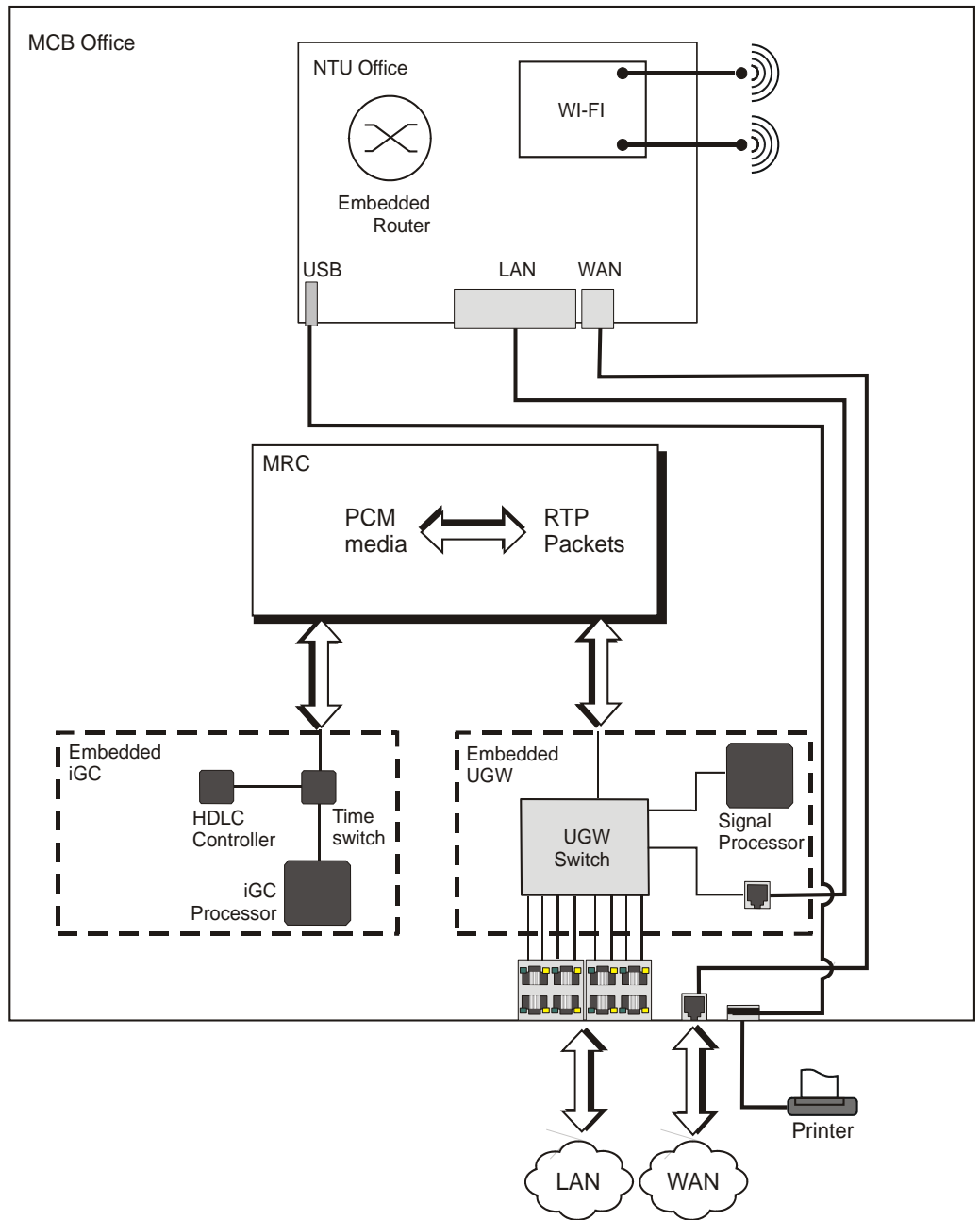
---

#### *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 the 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**



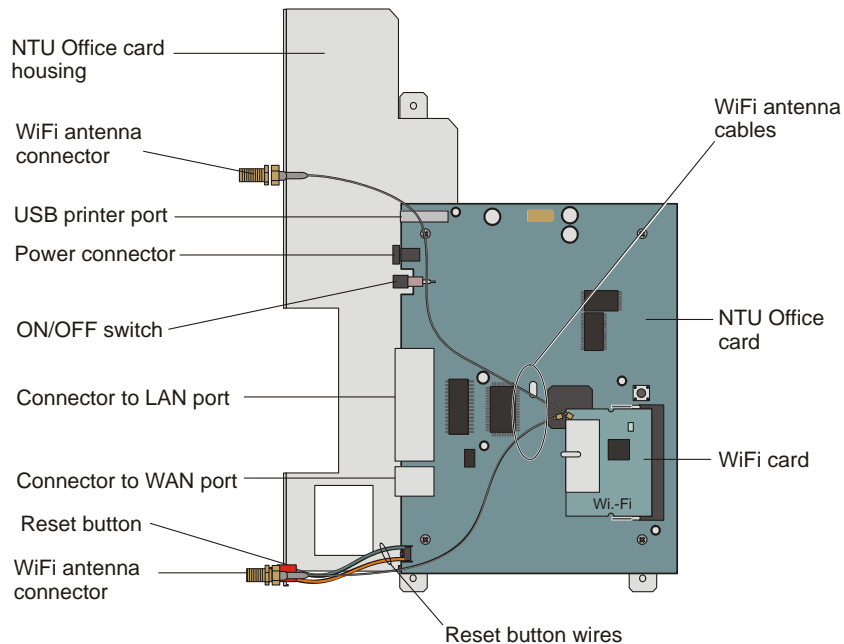


## 4 NTU Office Card Components

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 holds 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 wire harness connector.
- **ON/OFF switch**
- **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.

Figure 11-3 NTU Office Card



## ***NOTES:***

# 11.2 NTU Office Card Installation

## 1 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 [www.draytek.com](http://www.draytek.com).

*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 below.*

**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
Reset switch harness	1

## 2 Installing the NTU Office Card

This section describes how to install the NTU Office card assembly (including the card chassis). 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. **Do not** open the Coral IPx Office cover before removing power from the system.*

2. If necessary, remove the unit cover. See [Opening the Unit Cover, page 6-8](#).
3. Verify that the hard disk (if supplied) and the MRC card are installed.
4. Unfasten the three 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 line harness, 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 5-35](#).*

Figure 11-4 NTU Office Card Fasteners

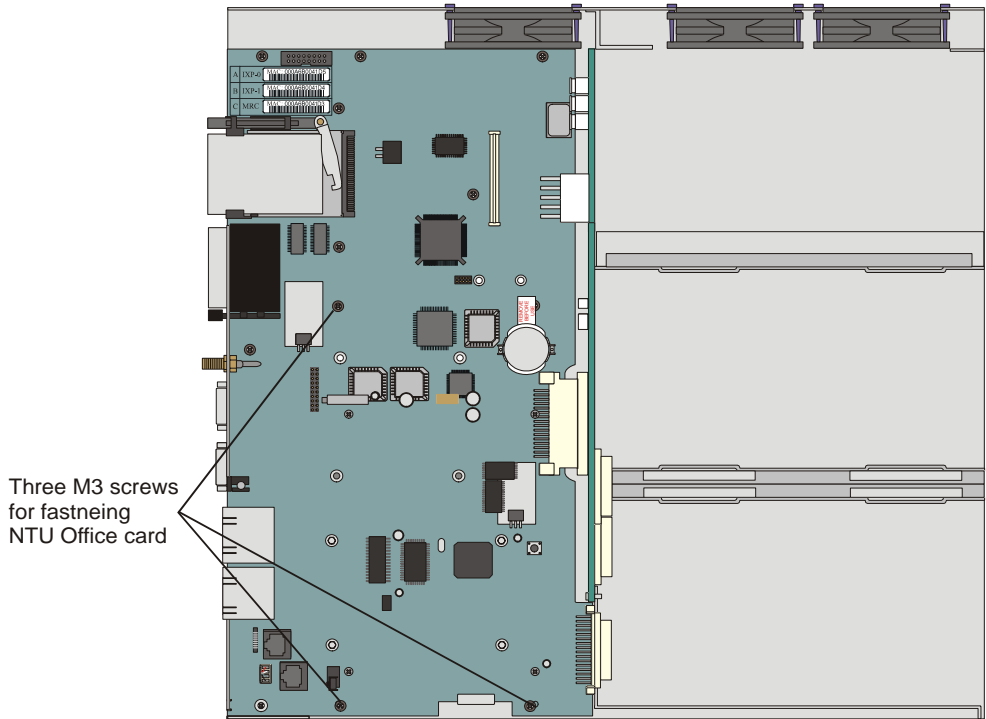
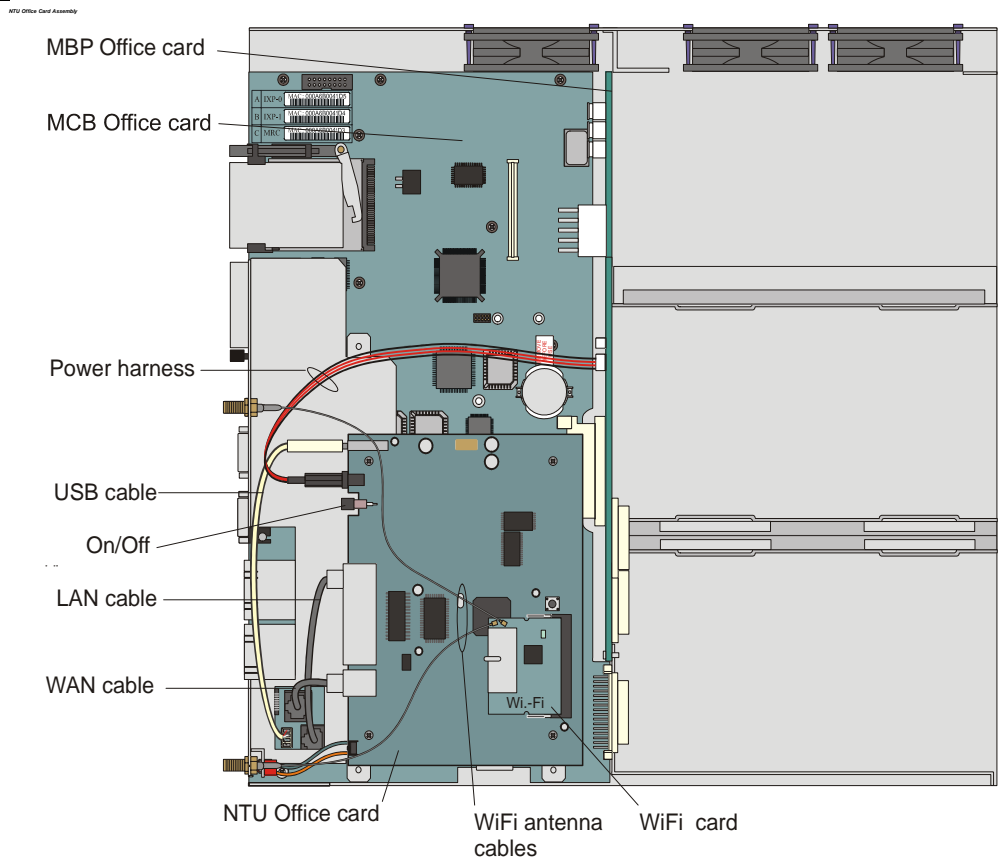


Figure 11-5 NTU Office Card Assembly



### 3 Replacing the NTU Office Card

This section describes how to replace the NTU Office card (without replacing the card chassis).

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. **Do not** open the Coral IPx Office cover before removing power from the system.*

2. Remove the unit cover. See [Opening the Unit Cover, page 6-8](#).
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 [Installing the WiFi Card, page 11-13](#).
9. Close the unit cover. See [Closing the Unit Cover, page 6-10](#).
10. Reconnect the power cable.

## 4 Installing the WiFi Card

---

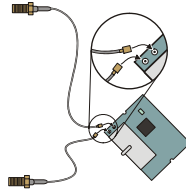
1. Remove the two protective plugs that cover the holes for the antennas on the front panel of the system.
2. Unplug the power cord that supplies the Coral IPx Office system.

### **WARNING!**

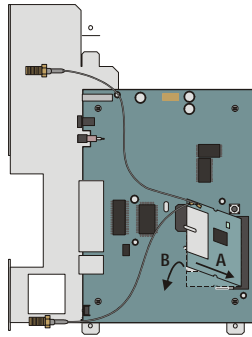
*Electrical Hazard. Contact with live wires could cause shock, burn, and death. **Do not** open the Coral IPx Office cover before removing power from the system.*

3. Remove the unit cover. See [Opening the Unit Cover, page 6-8](#).
4. Insert the antenna cables through the front panel of the Coral IPx Office unit.
5. Install the WiFi card as shown in [Figure 11-6](#).
6. Connect the cables to the WiFi card as shown in [Figure 11-6](#).

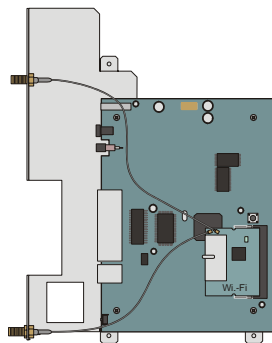
Figure 11-6 WiFi Card Assembly



**1** Attach the antenna wires to the WiFi card.



**2** Attach the WiFi card to the network card.



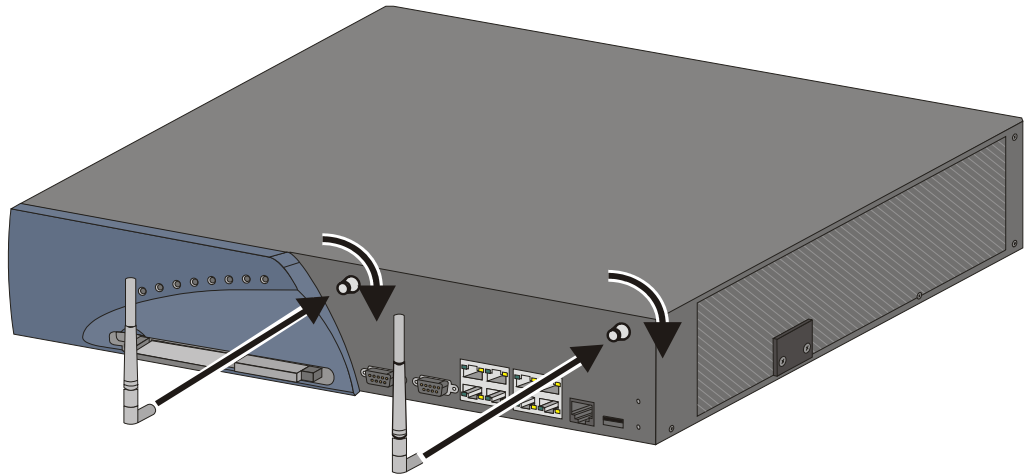
**3** Attach the antenna wires to the network card.



## 5 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 11-6.*

Figure 11-7 **WiFi Antenna Assembly**



## 6 Configuring the Networking Software

---

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 called the Vigor 2900 by the vendor.

## 7 Specifications

---

### **NTU Office Card**

#### Hardware Interface

LAN .....	port 10/100 Base-TX Switch with port-based VLAN
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

#### 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 )  
..... MPPE (40,128 bits)  
..... Hardware-based DES / 3DES (56 / 168 bits )  
Authentication..... MD5, SHA-1  
IKE Authentication ..... Pre-shared Key  
Connection ..... Teleworker-to-LAN  
..... LAN-to-LAN  
..... DHCP over IPSec  
..... 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
- Build-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 .....L22.0 \* W16.0 \* H3.67 (cm)

Power .....15VDC. 1.2A

## **WiFi Card (WLAN Access Point)**

Protocol.....IEEE802.11b/g compliant

Wireless client list

Security .....64/128 bit WEP

..... WPA / WPA2 (IEEE802.11i)

..... VPN over WLAN

..... Hidden SSID

..... 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)

..... Japan: 14 channels (1'13) or 1(14th)

..... Major European country: 13 channels  
(1~13)

..... France: 4 channels (10~13)



## 11.3 Connecting to the Network without an NTU Office Card

The Coral IPx Office system can connect directly to the LAN without a network card. To connect to the WAN requires the addition of an external, customer-supplied router. To enable the Coral IPx Office to connect to the LAN:

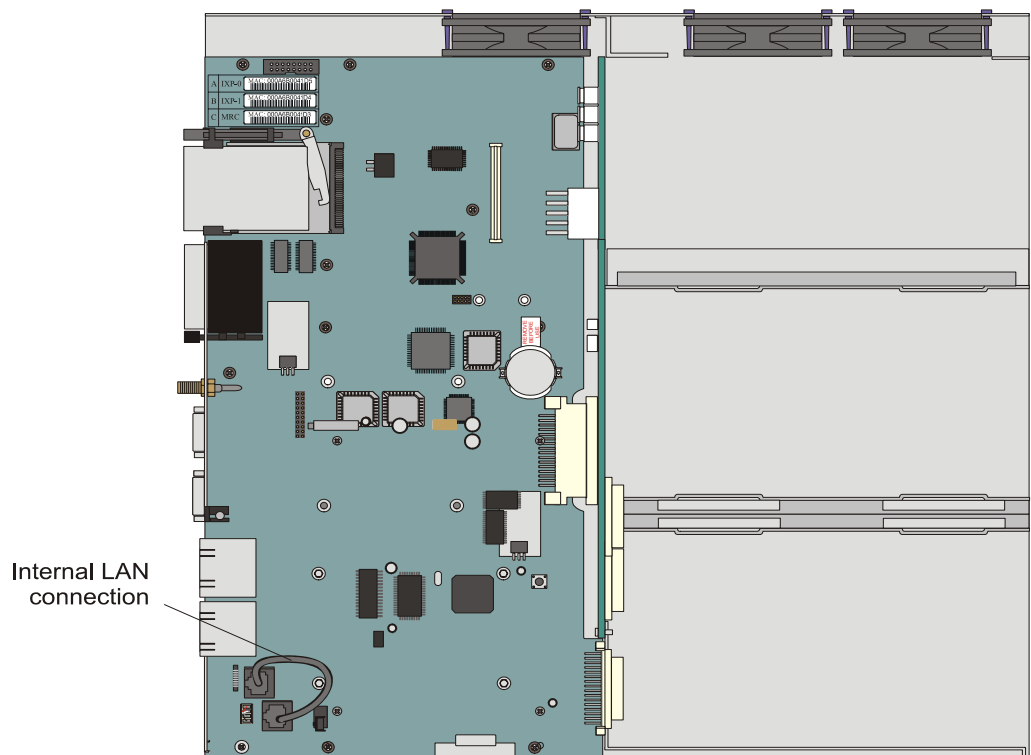
1. If necessary, unplug the power cord that supplies the Coral IPx Office system.

### WARNING!

*Electrical Hazard. Contact with live wires could cause shock, burn, and death. Do not open the Coral IPx Office cover before removing power from the system.*

2. If necessary, remove the unit cover. See [Opening the Unit Cover, page 6-8](#).
3. Connect the WAN cable supplied by the manufacturer between the two internal LAN RJ-45 connectors on the MCB Office card. See [Figure 11-8](#).

Figure 11-8 **Networking Connection without an NTU Office Card**











International Headquarters  
Tadiran Telecom Ltd.  
18 Hasivim Street P.O.Box 7607  
Petach Tikva 49170 Israel  
Tel. +972-3-9262000, Fax. +972-3-9262310

---

USA Headquarters  
Tadiran Telecom, Inc.  
4 Tri Harbor Court  
Port Washington, NY 11050  
Tel. +1-516-632-7200, Fax. +1-516-632-7210

---

Visit us at our website <http://www.tadirantele.com>  
Email: [coral@tadirantele.com](mailto:coral@tadirantele.com)

**Coral™ IPx Office**  
**Installation Procedure and Hardware Reference Manual**  
**1st Edition 2006**