Tadiran Telecom
Business Systems Ltd.

Coral IPx 500

Quick Installation Guide

DRAFT 3

CoraliPx

The flexible way to communicate

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Federal Communications Commission
Rules Part 68 Compliance Statement

This equipment complies with Part 68 of the FCC rules. On the left side of the Coral FlexiCom 200 cabinet; on the left side of the (Coral FlexiCom 300 and 400 systems); the left internal side of the cabinet frame (Coral FlexiCom 5000 and 6000 systems); the rear panel (Coral IPx 500, 800, and 3000 systems); or the right internal side of the cage (Coral IPx 4000) 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.

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 equipent to an outlet on a circuit different from that to which the receiver is connected.

d) Consult the dealer or an experienced radio/TV technician.

FCC Warning

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

FEDERAL COMMUNICATIONS COMMISSION
RADIO FREQUENCY INTERFERENCE STATEMENT

The Coral system generates, uses, and can radiate radio energy; and, if not installed in strict accordance with this installation manual, may cause harmful interference to radio communications.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Subpart B of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when this equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause unacceptable interference to radio and TV reception, in which case the operator at his own expense will be required to take whatever measures may be necessary to correct the interference.

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.

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

The Coral IPx 500 Unit (CSLX) has been tested and complied with the following:

USL Compliance

USL indicates that the Coral FlexiCom 200, 300, 400, 5000, and 6000, and Coral IPx 500, 800, 3000, and 4000 were investigated to the standard for Safety of Information Technology Equipment In Electrical Business Equipment, UL 60950, Third Edition CSA C22.2, No. 60950 with D3 Deviation, with no clause 6 Evaluation. However the ringer circuit and message waiting on Models SL and Coral SLX was determined to comply with Annex M.3, B and M4 of UL 60950, Third Edition CSA C22.2, No. 60950.

CNL Compliance

CNL indicates that the product was investigated to the Canadian Standard for Safety of Information Technology Equipment Including Electrical Business Equipment, UL 60950, Third Edition CSA C22.2, No. 60950.

1 General System Description and Installation

This section describes the Coral IPx 500 cage components. Upon completing this section, you will be familiar with cage components and the general procedure of installing a rack-mounted or wall-mounted cage onto a 19" or a 23" rack. For more detailed information about the main and expansion cages, refer to *page 2-1, Main and Expansion Cage Description*. For specific information on how to configure the Coral IPx 500, refer to *page 3-1, System Configuration*.

1 Cage Description

The Coral IPx system is housed in one or more rack-mounted or wall-mounted cages. Each system consists of one main cage that contains the common control cards and peripheral cards, as well as one or two optional expansion cages. Main cages are equipped with peripheral card slots in addition to the common control cards. Expansion cages are equipped with additional peripheral card slots.

Features

The cage houses all hardware components of the Coral IPx 500 system including the power supply unit, control cards, peripheral cards, and the I/O connections. The cage includes the following features:

- Rack-mounted cages are compatible with 19" and 23" racks (rendered by two mounting brackets)
- Wall-mounted cages can be easily removed from the wall
- Simple assembly procedures
- Up to three cages per Coral IPx 500 system
- Free ventilation without fans
- RFI protection
- Simple input/output (I/O) cable routing from the top panel
- Either 48 VDC or 115/230 VAC electrical power supply units in every cage
- Ability to be mounted on the same rack as customer-supplied cages
- Supports all of the features, interfaces, and terminals of Coral FlexiCom products
- Suitable for mounting in earthquake-protected racks

Cage Components

The Coral IPx 500 cage 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 Coral IPx 500 cage includes slots for control and peripheral cards, a slot for the power supply unit, door locking studs, free space at the top of the cage designed for cool air outflow and cable connection, holes on the side and top panels for hot air outflow, I/O cable routing from the top section of the cage through the rear panel, and a door release mechanism on the right side of the cabinet adjacent to the door hinge.

Front View (Figure 1-1)

The front view of the cage displays the cage door. The cage door includes a ventilation grille near the bottom for incoming cool air and at the top for warm exhaust air. The door also includes locking studs on the left side of the door.

Left and Right Views (Figure 1-1)

The left and right views of the cage display the mounting bracket. The mounting bracket is used to attach the cage to the rack. The cooling holes allow warm air to be removed from the cage. The left panel of the cage includes an opening for routing the Resources and Expansion cables.

Top View (Figure 1-1 and Figure 1-19)

The top view of the cage displays the decorative cover that protects the top section. The top view (as seen from the rear side) displays the openings at the top of the rear panel, through which the I/O cables rare routed to and from the top section of the cage.

View of Top Section (Figure 1-15)

The top section includes the slots for all I/O connections (Champ™, Amphenol®, Microribbon®, and RJ-45), the AC power connection, and the cage ground connection nut. The top section of the cage includes ten routing slots on the rear panel that enable I/O connection cables to be routed to and from the top section. The top section also includes the chassis grounding wire connection.

Internal Views (Figure 1-4, Figure 1-5, Figure 1-6, and Figure 1-7)

The internal view of the assembled cage (*Figure 1-4* and *Figure 1-5*) displays the internal view of the cage when it is operational. The power supply unit is installed in the extreme left slot of the cage. The remaining cards displayed are either peripheral or control cards. The internal view of the empty cage (*Figure 1-6* and *Figure 1-7*) displays the relevant motherboard components including card connections and jumpers.

Rack-Mounted Layout (Figure 1-1)

The Coral IPx 500 is a versatile unit that can be mounted onto either a 19" or a 23" rack located at the customer's site. The Coral IPx 500 includes a kit that is ordered separately by the customer for cages that are to be mounted in a rack. *Figure 1-5* displays the rack configuration for the Coral IPx 500 cage mounted onto a 19" rack.

Wall-Mounted Layout (Figure 1-2 and Figure 1-3)

The Coral IPx wall-mounted cage is a versatile unit that is mounted onto the wall at the customer's site. The Coral IPx 500 includes a kit that is ordered separately by the customer for cages that are to be mounted on a wall. *Figure 1-2* displays the wall-mounted configuration. *Figure 1-3* displays the wall-mounting bracket.

Figure 1-1 ***Front, Left, Right, and Top Views of Rack-Mounted Coral IPx 500 Cage***

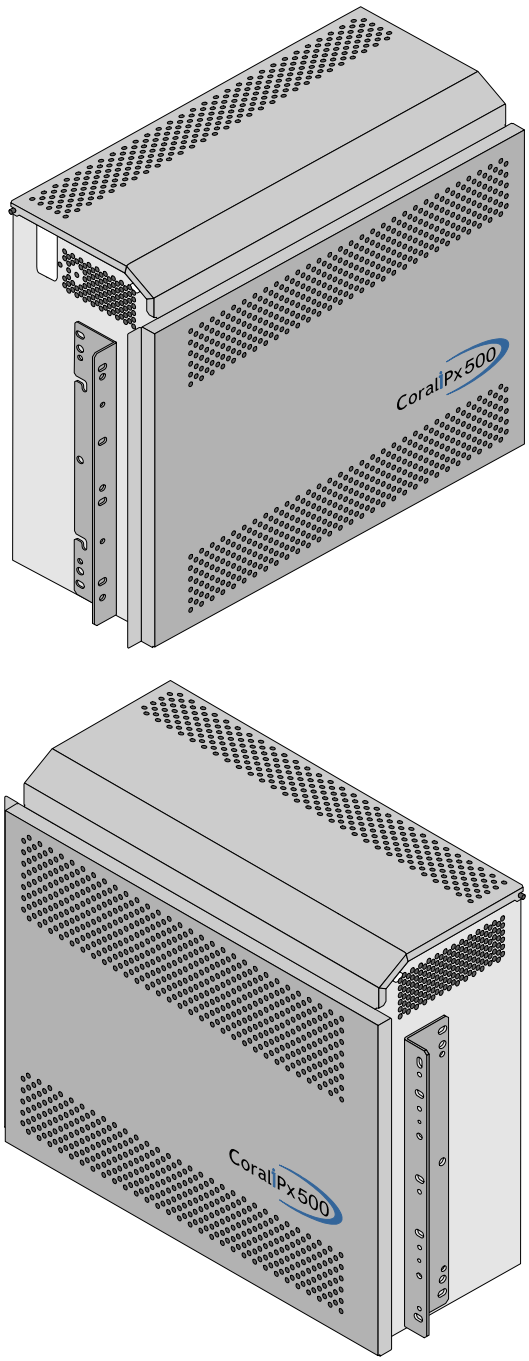


Figure 1-2 ***Front, Left, Right, and Top Views of Wall-Mounted Coral IPx 500 Cage***

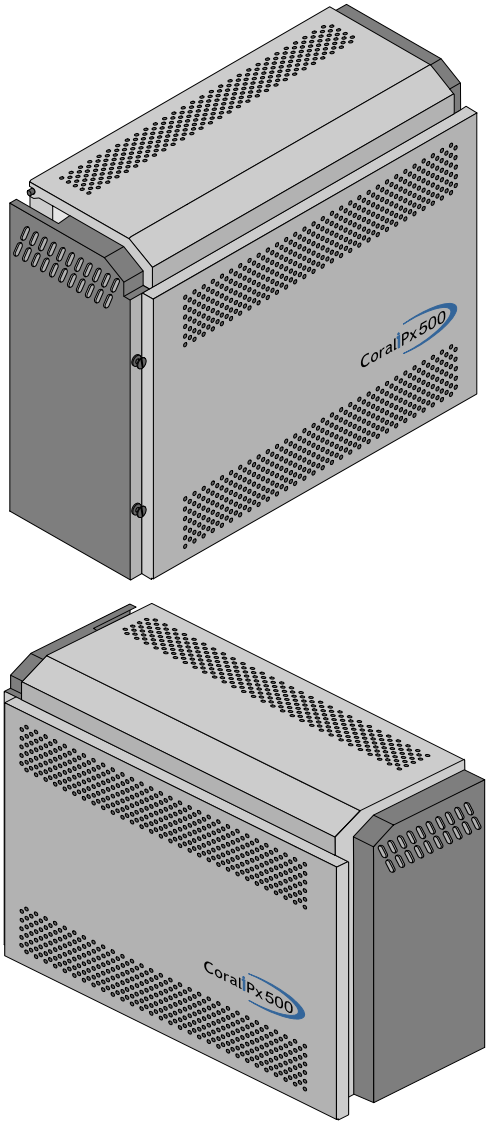


Figure 1-3 ***Bracket for Wall-Mounted Cage***

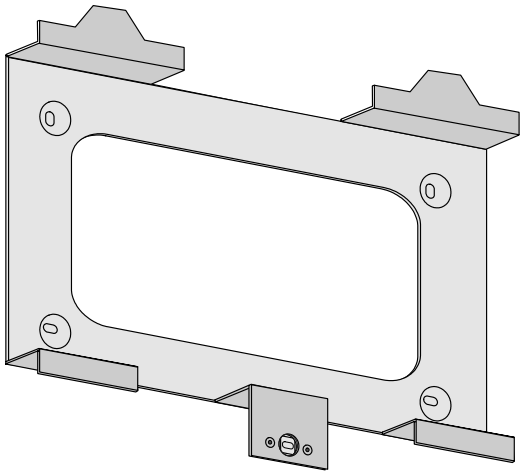


Figure 1-4 ***Internal View of Coral IPx 500M (Main Cage)***

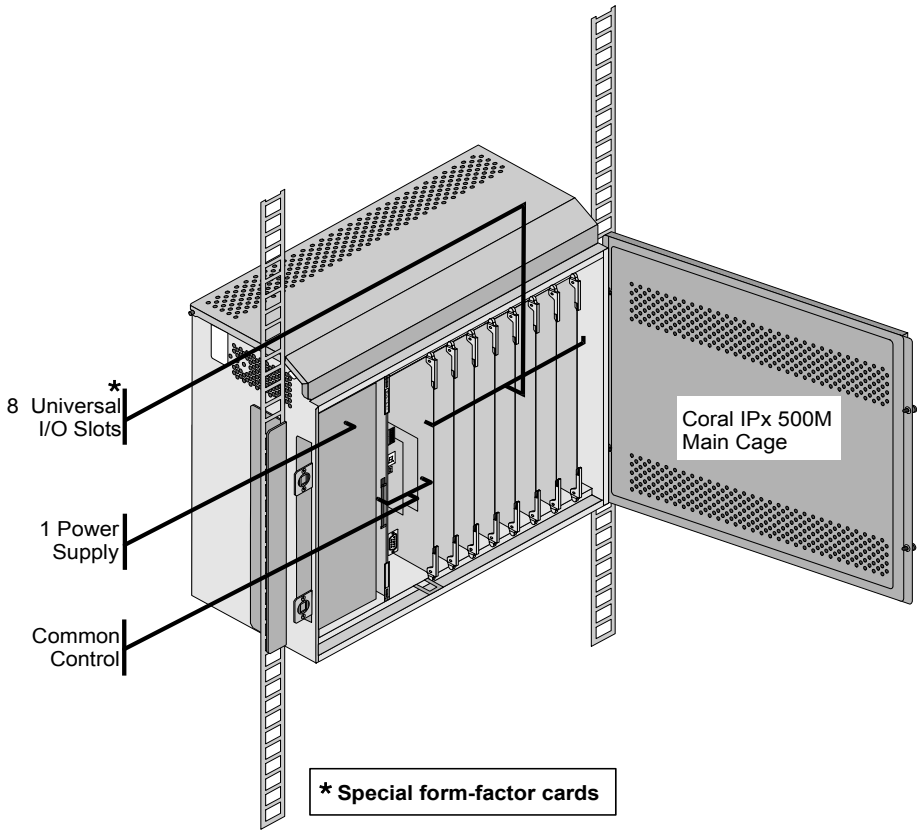


Figure 1-5 ***Internal View of Coral IPx 500X (Expansion Cage)***

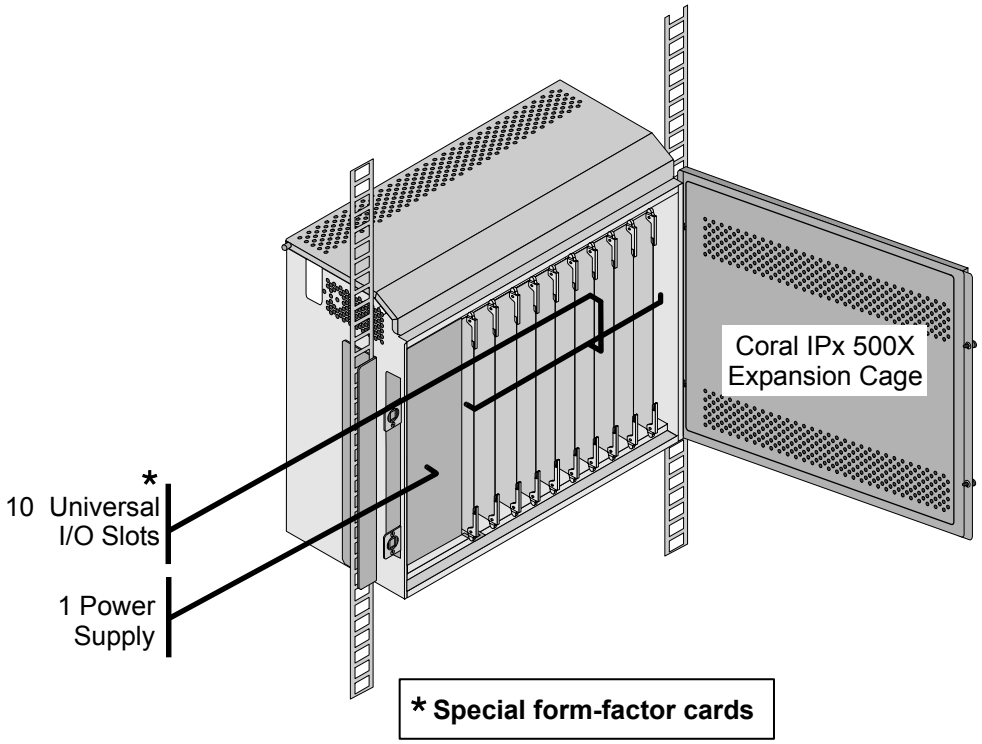


Figure 1-6 ***Internal View of Empty Coral IPx 500M Cage***

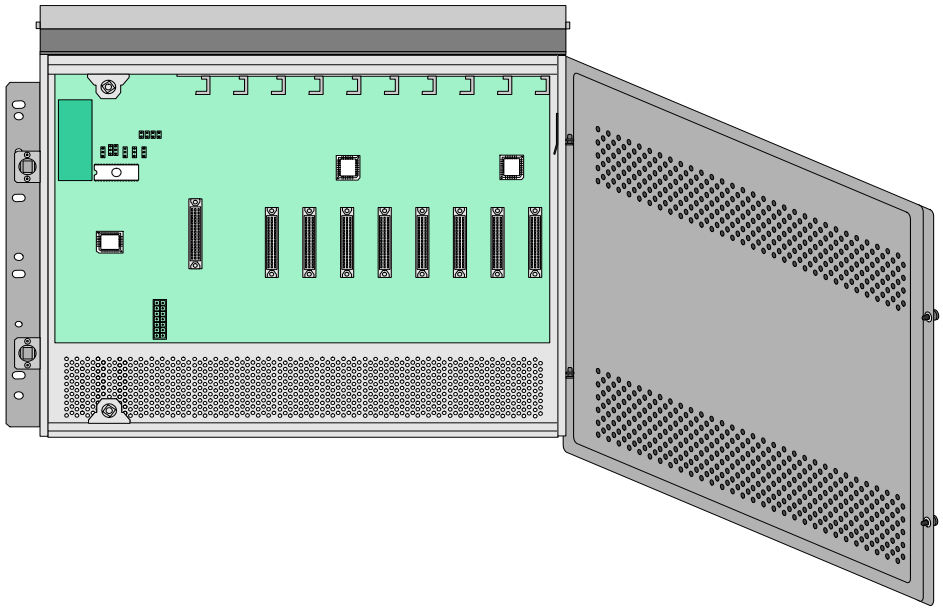
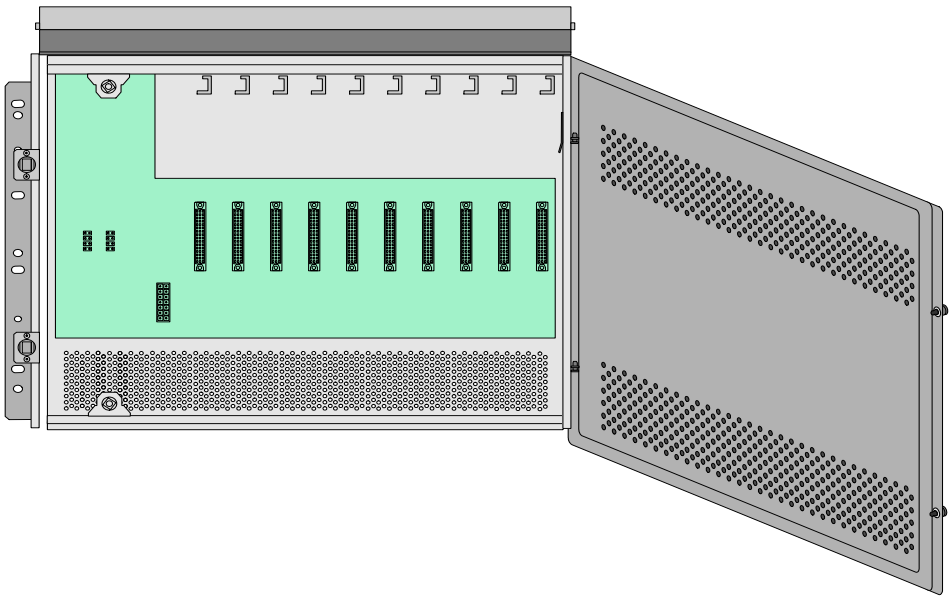


Figure 1-7 ***Internal View of Empty Coral IPx 500X Cage***



Specifications

The main operating specifications are provided in *Table 1-1*.

Table 1-1 ***Coral IPx 500 System Specifications***

Feature	*Quantity*
Nominal DC Input Voltage (for DC Systems)	-48VDC
Nominal AC Input Voltage (for AC Systems)	115/230VAC 60/50Hz
Nominal Current Input (for DC Systems)	7A
Nominal Current Input (for AC Systems)	2.5A
Maximum Ports (with three Coral IPx 500 Cages)	448
Operating Temperature Range	32-104°F (0-40°C)
Operating Humidity Range	20-80% Relative Non Condensing
Maximum Power Consumption	460W
Heat Dissipation (of any cage)	700BTU/Hr

Dimensions and Weights

The Coral IPx cage weights and dimensions are provided in *Table 1-2*, *Table 1-3* and *Table 1-4*.

Table 1-2 ***Coral IPx Rack-Mounted Configuration Dimensions***

Dimension	*Inches*	*Centimeters (cm)*
Width	19	48
Depth	8	20.4
Height - 8.7U	15.2	39

Table 1-3 ***Coral IPx Wall-Mounted Configuration Dimensions***

Dimension	*Inches*	*Centimeters (cm)*
Width	18.5	47
Depth	9.2	23.3
Height - 8.7U	15.2	39

Table 1-4 ***Coral IPx Cage Weights***

Weight	*Pounds*	*Kilograms*
Empty	16.5	7.4
Fully Assembled	30	13.5

Space and Positioning Requirements

The Coral IPx 500 cage must be positioned in accordance with local and system requirements. Space requirements above and below the cage are necessary to facilitate heat dissipation and cable and wire routing. Space requirements in front and behind the system are necessary to allow maintenance activities to be carried out safely and effectively. See *Figure 1-8*.

Figure 1-8 ***Space Required in Front and Behind of Rack-Mounted System***

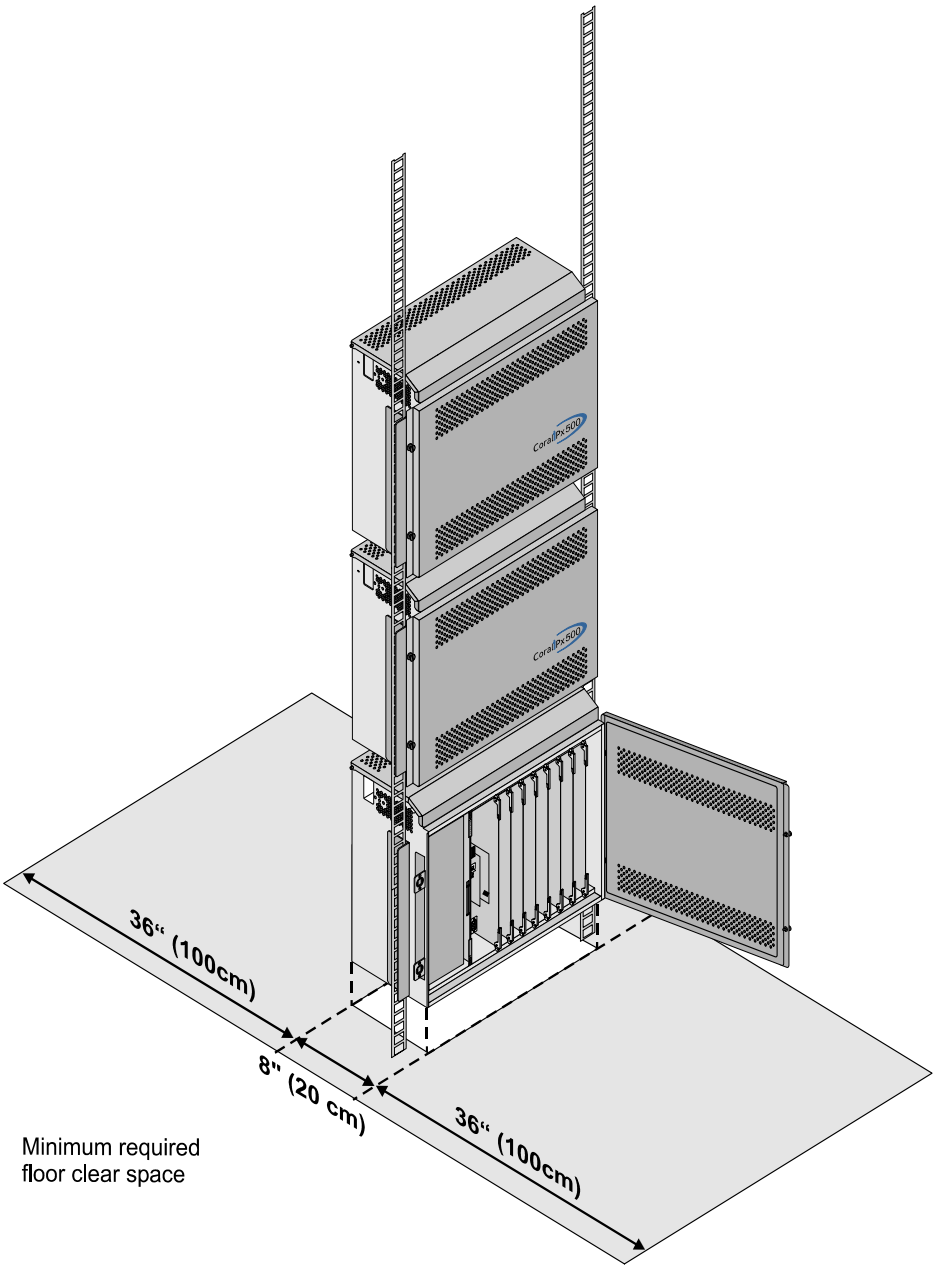
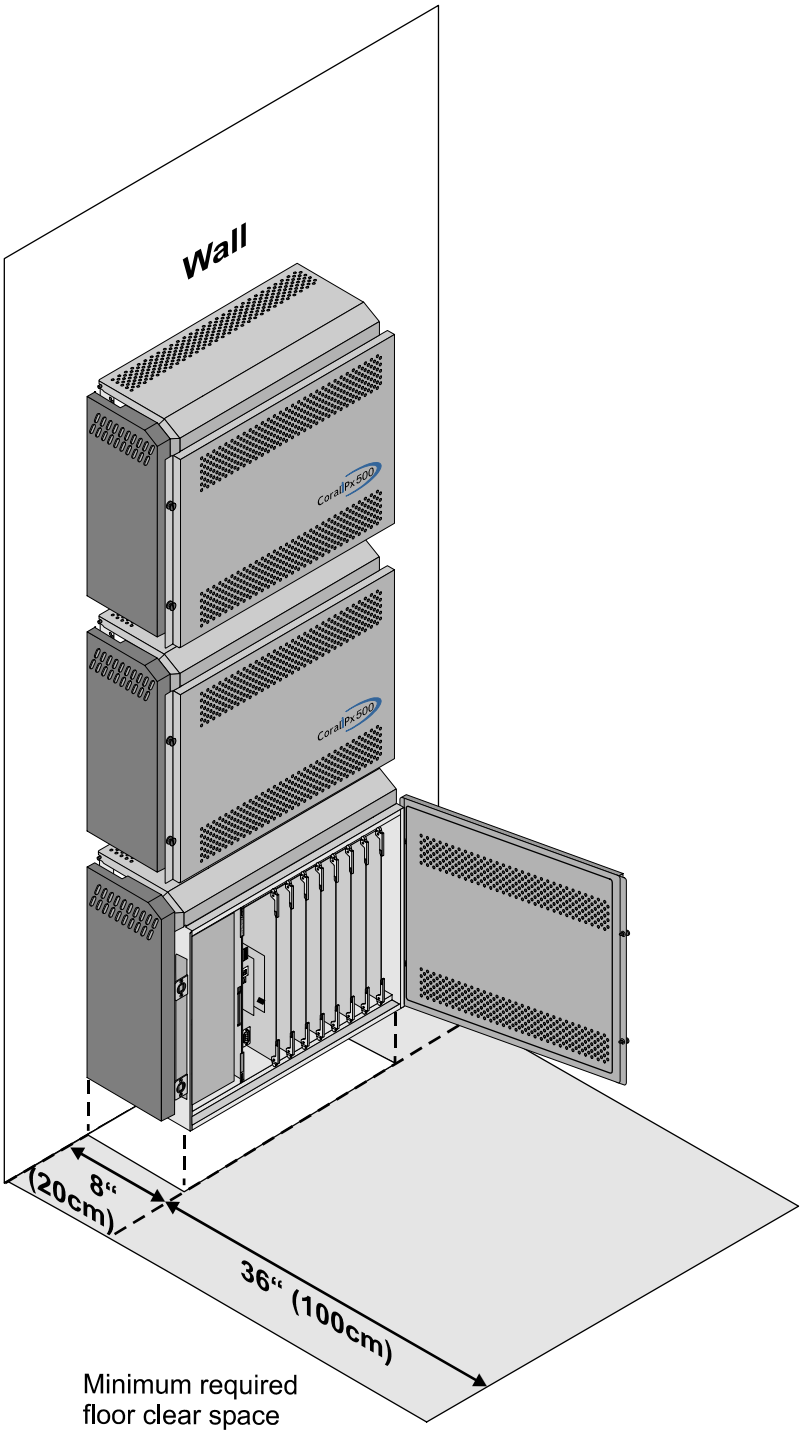


Figure 1-9 ***Space Required in Front of Wall-Mounted System***



Above the Cage

The Coral IPX 500 cage requires a minimum space of 2U (3.5" or 89mm) above the top decorative panel, in order to allow room for maintenance purposes (that is, opening the top cover, and routing the cables via the rear slots). This cover must be installed at all times during operation. The open slots on the rear panel allow the cables to be routed to the top section of the cage. The top cover ensures that the champ cables do not slip out of the cage. See *Figure 1-10*.

Below the Cage

If the customer's equipment is positioned below the IPx 500 cage, a minimum space of 1U (1.75" or 45mm) must be maintained to allow cool ambient air to reach the perforations at the bottom panel. See *Figure 1-10*.

WARNING!

Fire Hazard! Exceeding the maximum allowed temperature could result in fire. The Manufacturer's maximum recommended ambient operating temperature (TMRA) is 104° F (40° C). Ensure that the ambient air temperature around the cage does not exceed the maximum temperature.

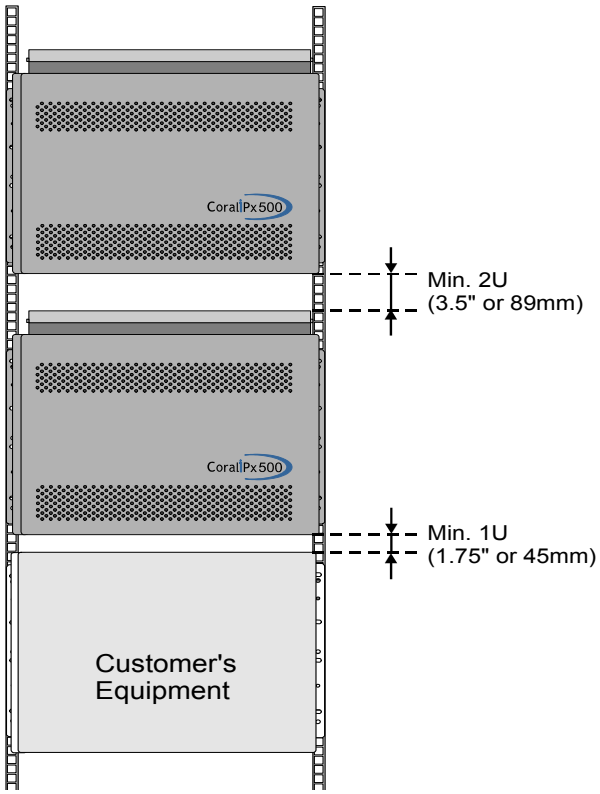
WARNING!

Fire Hazard! Exceeding the maximum allowed temperature could result in fire.Ensure that a free space of at least 1U (1.75" or 45mm) below the bottom panel of the cage be maintained to allow the inflow of cool ambient air to the cage.

WARNING!

Fire Hazard! Exceeding the maximum allowed temperature could result in fire. If the customer's equipment is installed below the Coral IPx 500, ensure that the temperature in the space between the Coral IPx 500 and the customer's equipment does not exceed 122° F (50° C).

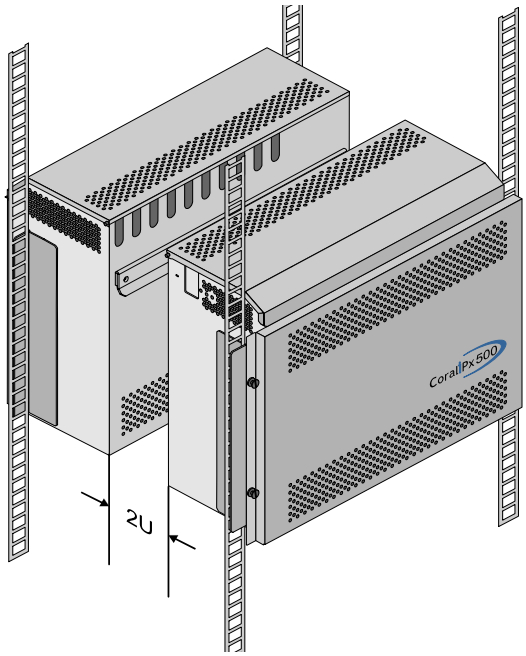
Figure 1-10 **Space Required Above and Below Rack-Mounted Cages**



Behind the Cage

If two Coral IPx 500 cages are mounted at the same level, with the rear panels facing each other, a minimum space of 2U (3.5" or 90mm) must be maintained to allow cable routing behind both cages. See *Figure 1-11*.

Figure 1-11 **Coral IPx 500 Rack Mounted Cage Back-to-Back Configuration**



2 Cage Components

Cage Door

A locking door on the front of the cage provides physical protection to internal circuitry during normal operation while still allowing access to the interior for maintenance activities. In addition, the cage is protected from RFI (radio frequency interference) when the door is closed. The cage door includes ventilation grilles near the bottom and the top that allow cool air to enter the cage. Also included are locking studs on the left side of the door that prevent the door from opening during normal operation. The locking stud is moved from the unlocked position to the locked position by inserting a screwdriver blade into the stud slot and turning clockwise. The inside of the door includes a grounding wire connection designed to ground the door. Door hinge mounts are mounted onto the hinges on the right side of the cage. Also included are the door locking studs that secure the door to the cage when closed. The door release mechanism on the right side of the cage prevents the door from being removed from the cage accidentally from the two door hinges. The grounding wire at the top right side of the cage is attached to the door, and grounds the entire door/cage assembly.

Opening the Door

1. Unfasten the two locking studs on the left side of the door with a straight blade screwdriver (half a turn counter clockwise).
2. Pull the door open using moderate force. The door opens to 110°.

WARNING!

Electrical Hazard! When subject to electrical power, the internal components of the cage include electrical currents that could cause shock, burn, or death. During normal system operation, the cage door must remain closed at all times. Exercise extreme caution while handling the internal components of the cage.

Closing the Door

1. Verify that all cards and power supply unit are properly installed and that all cables are properly connected.
2. Verify that the top section of the cage is free of objects with the exception of cables routed from the front of the cage.
3. Close the top decorative cover. See *page 1-23, Assembling the Protective Cover*.
4. Close the door firmly.
5. Fasten the locking studs with a straight blade screwdriver (half a turn clockwise).

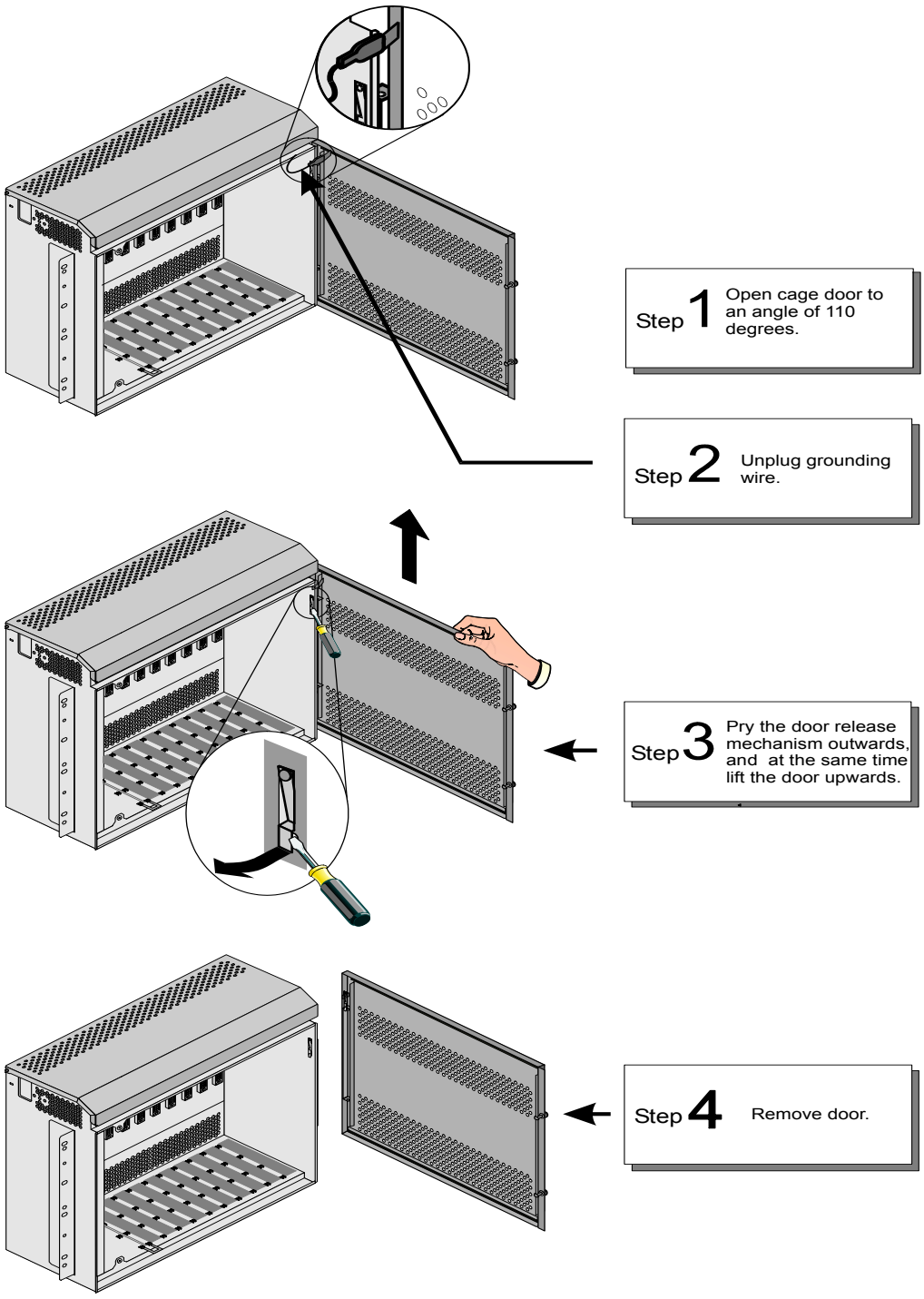
Removing the Door

1. Open the door to an angle of at least 90°.

2. Disconnect the grounding wire from the door by pulling the plug at the end of the grounding wire from the connection on the door.

3. Insert a straight blade screwdriver between the door release mechanism and the right panel of the cage, and twist. At the same time, lift and remove the door.

Figure 1-12 ***Removing the Door***

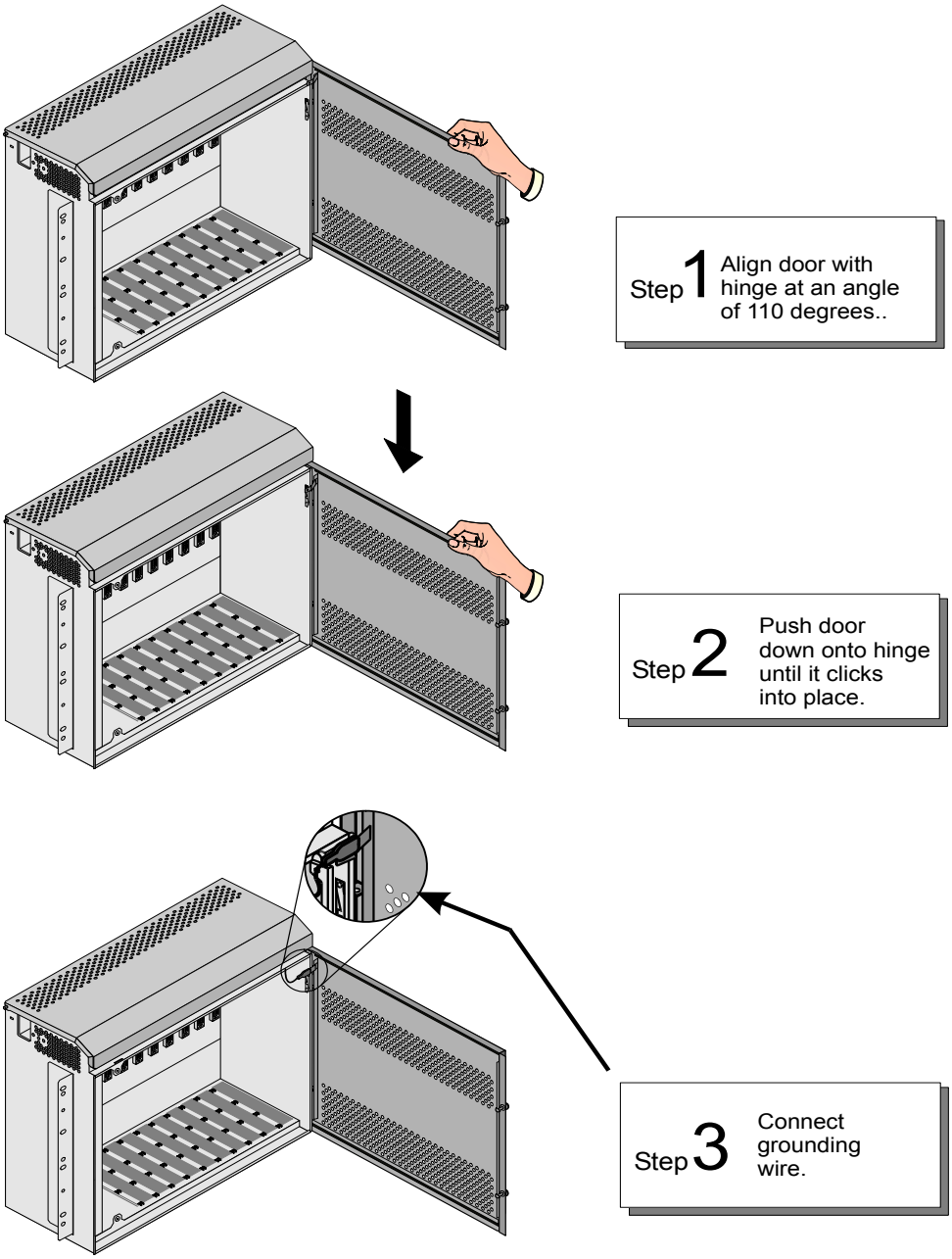


Assembling the Door

To assemble the door:

1. Align the door hinge mount above the cage hinges, such that the door and the cage form an angle that is greater than 90°.
2. Lower the door onto the hinges and push down until the door clicks into place.
3. Connect the ground wire from the top right of the cage to the door by connecting the plug of the grounding wire to the door grounding connection.

Figure 1-13 ***Assembling the Door***



Cage Interior

The cage houses the power supply unit and all peripheral and control cards. On the left side of the cage, the PS500 power supply unit is installed. The remaining cards displayed are either peripheral or control cards.

Main Cage

The main cage is designated as the common control cage, and is used to house the common control cards. *Figure 1-4* displays the motherboard of the main cage. The Coral IPx 500M houses eight peripheral slots as well. The Coral IPx 500 system includes one IPx 500M main cage for all configurations. The *Installation Manual for Coral IPx 500* will soon be released. These control card types are described in detail in *Chapter 8 - Common Control Card Descriptions*.

Expansion Cage

The expansion cage is used to house ten peripheral cards. These card types are described in detail in the *Coral Service and Peripheral Card Manual*. The Coral IPx 500 system can include:

- One Main IPx 500M cage
- One Main IPx 500M cage and one IPx 500X expansion cage
- One Main IPx 500M cage and two IPx 500X expansion cages

Card Slots

Guides at the top and bottom of the card cage align the cards and assemblies during their insertion with multi-pin connectors mounted on the card cage motherboard. The guides and associated connectors comprise a ***card slot***.

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.

Power Supply Unit

The Coral IPx cage includes one PS500 AC or DC power supply unit located on the left side of the cage. The power supply unit is attached to the cage with two screws that ensure that the unit is grounded. The *Installation Manual for Coral IPx 500* will soon be released. These power supply units are described in detail in *Chapter 7 - Power Supply Descriptions*.

Control Card

The control card is housed in the left side of the main cage next to the power supply. The *Installation Manual for Coral IPx 500* will soon be released. This card is described in detail in *Chapter 8 - Common Control Card Descriptions*. Coral IPx 500 includes the MCP-IPsl5 system central processing card.

Peripheral Cards

Coral IPx 500 includes:

- Eight peripheral cards in the main cage
- Ten peripheral cards in the either IPx 500X expansion cage

Configuration Jumpers

Main Cage

The configuration jumpers in the main cage define:

- Whether or not primary or secondary synchronization cards are installed in the main cage
- Whether the system runs internal or external music
- The modem receive and transmit setting (On or Off)
- The "handshaking" Clear to Send (CTS) setting (On or Off)

The configuration jumpers of the main cage are located near the left side of the motherboard.

Expansion Cage

The configuration jumpers in the expansion cage define:

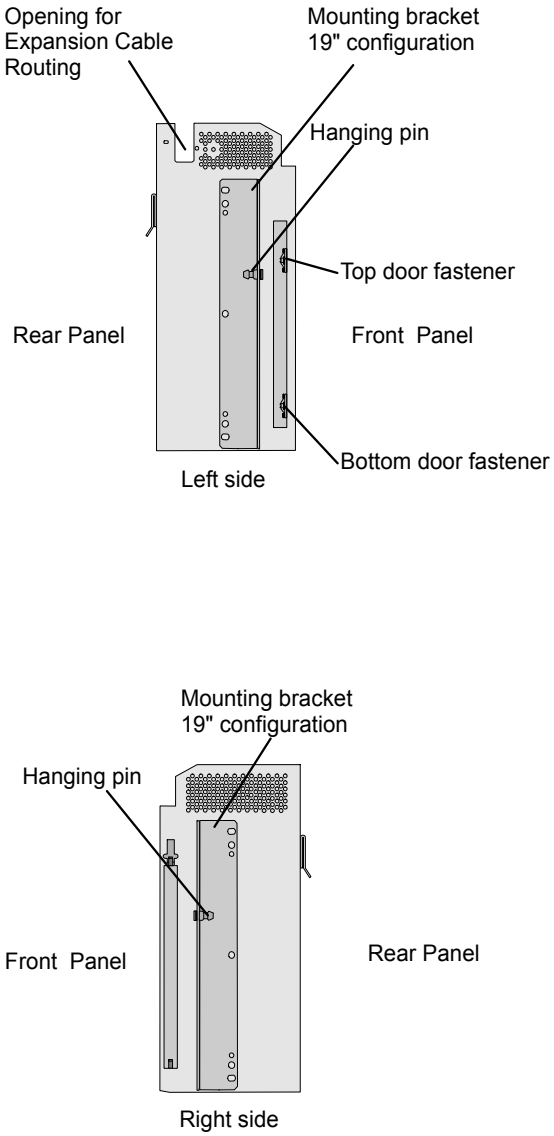
- Whether or not primary or secondary synchronization cards are installed in the expansion cage
- The expansion cage shelf number (1 or 2)

The configuration jumpers of the expansion cage are located near the left side of the motherboard.

Right and Left Panels

The left panel of the cage (*Figure 1-14*) includes a slot for expansion and resource cable routing. The right and left panels also include the bracket used to attach the cage to the rack. In addition, the top section of the right and left panels include perforations designed to expel warm exhaust air from the top section of the cage. The left panel includes a slot for routing cables.

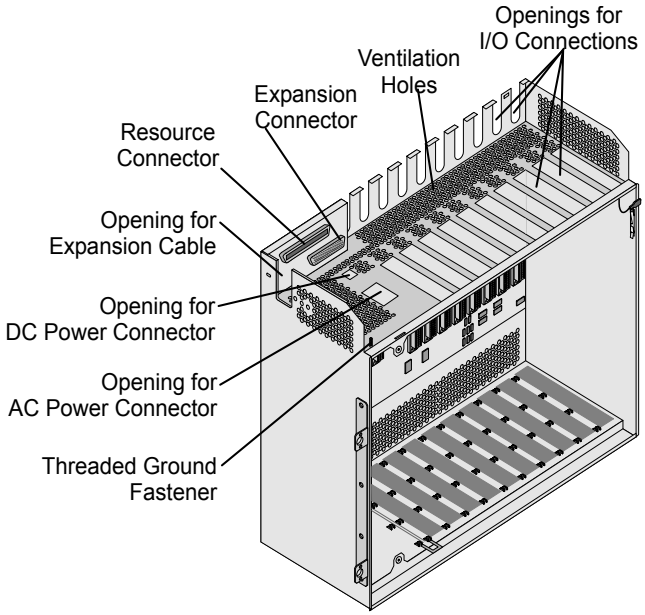
Figure 1-14 ***Mounting Bracket Assembly to Cage for 19" Configuration***



Top Section

The top section (*Figure 1-15* and *Figure 1-18*) includes the openings for the I/O cable connections (Champ™ and RJ-45), slots for the AC power receptacle and DC power Molex™ receptacle, and the cage ground fastener. The top shelf includes the Resources connector (in the main cage, only) and the Expansion connector. All other connections (power and I/O) are made on the top panel of the cards through the slots in the top section.

Figure 1-15 ***Top Section of Empty Coral IPx 500 Cage***



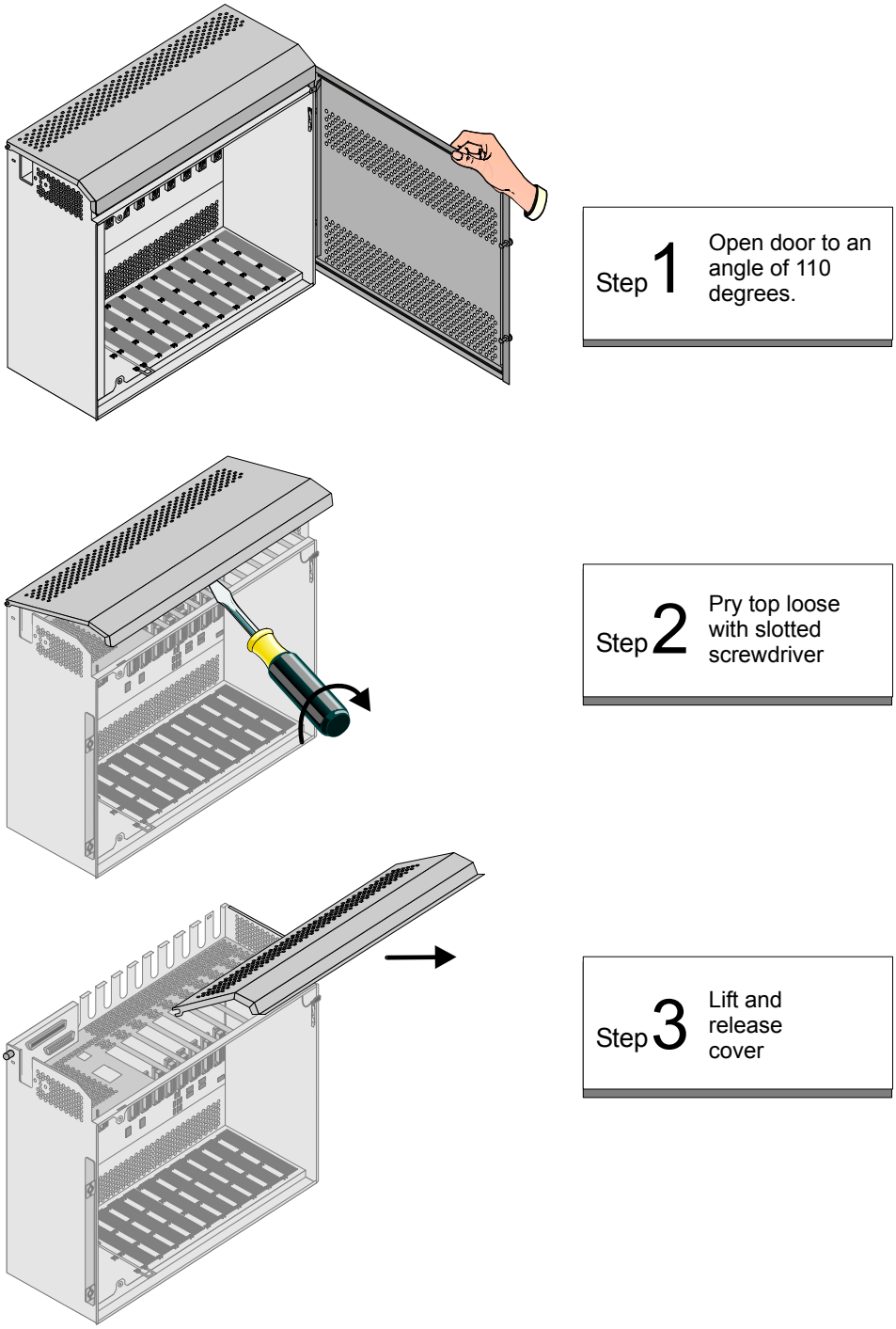
Decorative Protective Cover

The decorative protective cover is installed above the top panel. A space of 2U must be maintained above the decorative panel and the equipment above it for maintenance purposes. See *page 1-11, Space and Positioning Requirements*.

Removing the Top Cover

1. Open the door. See *page 1-15, Opening the Door*.
2. Insert a slotted screwdriver between the top panel of the cage and twist until the cover is released from the cage.
3. Lift and remove the cover from the cage. See *Figure 1-17*.

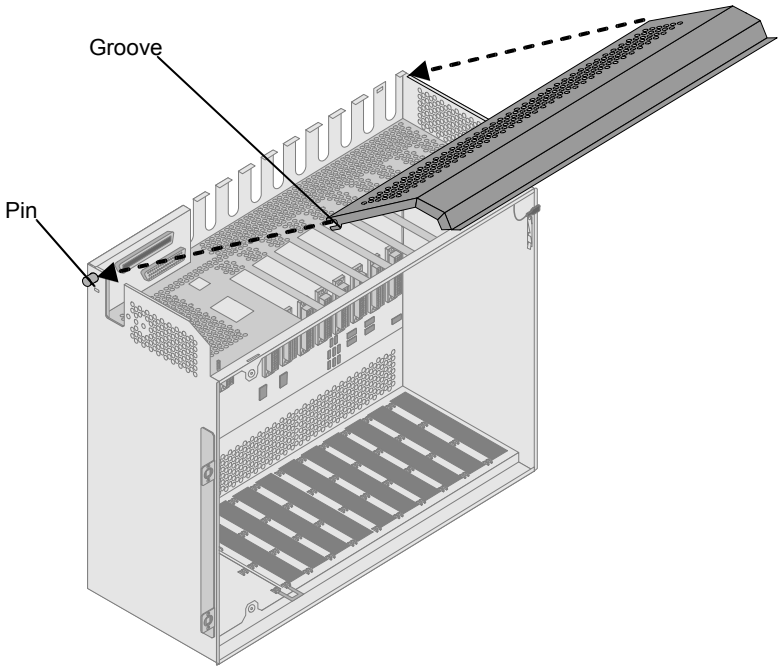
Figure 1-16 ***Removing the TopCover***



Assembling the Protective Cover

1. Open the door. See *page 1-15, Opening the Door*.
2. Insert the groove at the end of the top panel over the mating pin at the rear side of the cage. See *Figure 1-17*.
3. Push down on the cover until it snaps into place on the cage.

Figure 1-17 ***Assembling and Removing the Protective Cover***



Top Section

I/O (Champ) Connections

I/O connections to the peripheral cards are made via eight or ten female, 25 pair AMP™ Champ™, or Amphenol® Microribbon® type connectors. Each connector provides the I/O connections for one peripheral card. I/O connectors are mounted at the top of each peripheral card. Interface cables exit from the rear panel of the cage. I/O connections are only provided for peripheral cards installed in I/O card slots.

Mating male plugs should be industry standard, Amphenol®, AMP™ Champ™, or similar.

I/O (RJ-45) Connections

The I/O connections of the following interface cards are established via RJ-45 connectors mounted on their top panel:

- MCP-IPx
- PRI-23ipx
- PRI-30ipx
- T1ipx

- 30Tipx
- UGWipx
- 8SKKipx

I/O connections to those peripheral cards are made via RJ-45 type connectors. I/O RJ-45 connectors are mounted at the top of each peripheral card. Interface RJ-45 cables exit from the rear panel of the cage. I/O RJ-45 connections are only provided for peripheral cards installed in I/O card slots 1, 2 and 3.

Mating male RJ-45 plugs should be industry standard.

Expansion Connection (See *Figure 1-15*)

Each cage includes one or two connectors that join that cage to another cage or cages. For more detailed information, refer to *page 3-13, Connections to Other Cages*.

Resource Connection (See *Figure 1-15*)

The Resource connector from the main cage is responsible for the KB interface, music, and relay circuits. *Table 2-3 on page 2-5* provides the pinout interface of the Resource connector.

AC Power Connection Opening (See *Figure 1-18*)

The AC power cord is attached to the AC power receptacle on the top panel of the PS500 AC unit. The AC power connection slot in the top section of the cage is directly above the AC power receptacle in the PS500. If the system runs on PS500 DC unit, this slot is not used.

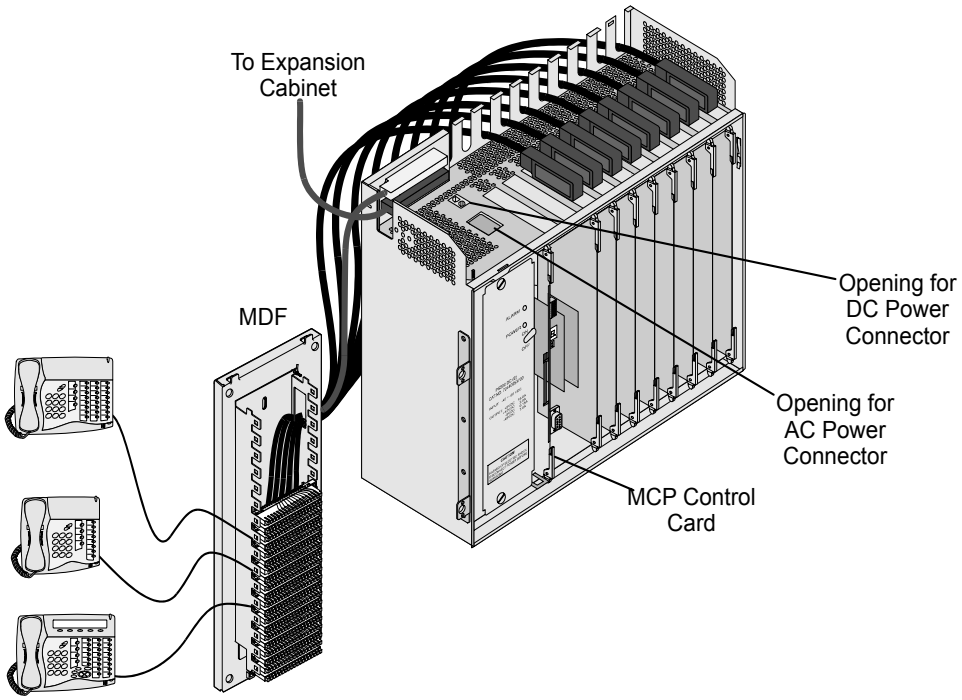
DC Power Connection Opening (See *Figure 1-18*)

The DC power Molex connector is attached to the DC power receptacle on the top of all PS500 units. In PS500 DC units, it is used to supply DC power from the external power supply to the cages. See *page 1-40, Grounding* for more details. In PS500 AC units, this slot can also be used to connect to a battery. Contact the Manufacturer for details. See *page 1-45, Power Connections for AC Systems* for more details. The DC power connection slot in the top section of the cage is directly above the DC molex receptacle in every PS500.

Cage Chassis Ground Connection (*Figure 1-15*)

The ground connection is used to connect the cage to the master ground unit for cages supplied with both AC and DC electrical power. The connection includes an M4 threaded rod that is part of the surface of the top section, a serrated washer, two flat washers, a spring washer, and an M4 nut. See *page 1-40, Grounding* for more details.

Figure 1-18 ***Top section of Coral IPx 500 Cage with Cards Installed***



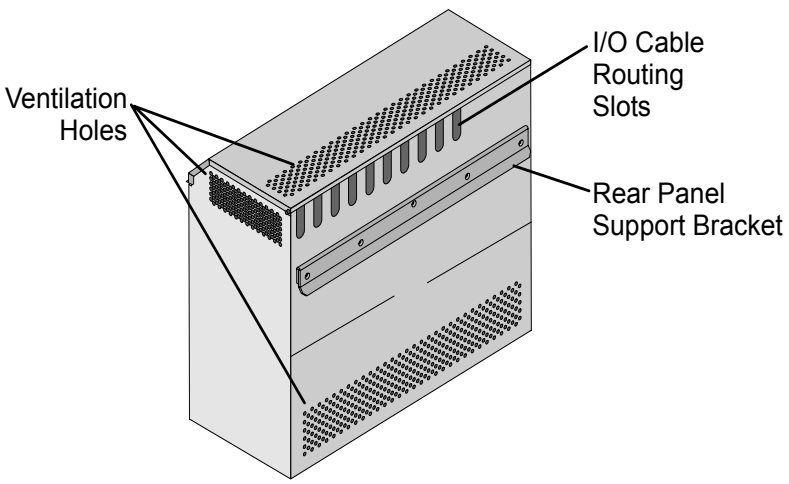
Rear Panel

The rear panel includes:

- Ventilation holes on the lower section, to allow the inflow of cool air
- Cable routing slots at the top section, to allow the card I/O cables to be routed to the MDF
- A wall mounting support bracket that runs across the length of the rear panel.

For more information on space requirements in back-to-back installations, see *page 1-11, Space and Positioning Requirements*.

Figure 1-19 ***Coral IPx 500 Rear Panel***



Bottom Panel

The bottom panel includes ventilation holes that allow cool air flow into the cage. If these holes are blocked, cool air cannot enter the cage. Heat build-up could cause a fire. Do not block the bottom panel of the cage. When the customer's equipment is installed directly below the Coral IPx 500, a heat buffer space of 1U (1.75") must be maintained. See *page 1-11, Space and Positioning Requirements* for specific conditions that require this space.

Input/Output Connections

I/O connections to the system are established with RJ-45 connectors and female 25 pair connectors via openings in the top section of the cage.

Card Connections

Every peripheral card slot includes an opening on the top of the cage to allow the I/O connectors to interface with the MDF. These connectors are routed from the free space between the top panel and the decorative cover, through the cable routing slots at the top of the rear panel.

The I/O connector routed through the opening above each card slot on the top section can either be an RJ-45 connector (such as the ones used for digital cards 30T, T1, PRI, BRI, UGW, etc.) or a Champ™ connector (such as 8SLSipx, 8T-Cipx, etc.). Mating male plugs should be industry standard (Amphenol®, AMP™, or equivalent).

Card Slot to I/O Champ Connection Relationship

The I/O connections for each peripheral card slot are provided directly from the top of the card to the MDF.

The *Installation Manual for Coral IPx 500* will soon be released. Refer to the specific card tables in *Chapter 5 - External Connections* of the *Coral IPx 500 Installation Manual* for I/O connector pin assignments. There are no I/O connector pin assignments for either the power supplies or the common control cards.

Place TBR, PRI, T1, 30T, or 30T/x digital trunk interface cards in slot #4 (the primary synchronization slot) or slot #5 (the secondary synchronization slot). These slots have been pre-wired to function as the primary and secondary external clock sources. The *Coral Service and Peripheral Cards Manual* will soon be released. Refer to *Chapter 3*.

Rack Mounting Kit for Rack

Rack Mounting Brackets

The cage can be supplied with either a kit for mounting the cage onto the wall or onto a rack. The rack mounting brackets for the rack can be fitted to interface with both 19" and 23" racks. See *Figure 1-14*. If the cage is to be mounted on a 23" rack, the bracket must be reassembled accordingly, as described on *page 1-28, System Installation*.

M3 Phillips Screw

The rack mounting kit includes six M3 screws that are used to fasten the cage to the rack.

Wall Mounting Kit

Left and Right Decorative Panels

The left and right plastic covers are assembled onto the cage and fastened with four 0.118" (3mm) rivets each. The left panel includes space on the top rear side for routing the expansion cable and the resources cable. The left panel also includes space for assembling the cable support bracket.

Cable Support Bracket

The cable support bracket is fastened to the top left panel of the cage. It guides the expansion cable and the resources cable to the rear side of the cage and protects the left decorative panel from force exerted by the cables.

Bottom Panel Support Bracket

The Bottom Panel support bracket supports the cage from rear section of the bottom panel. It is fastened to the bottom panel of the cage and includes a locking stud that allows the cage to be secured to the wall-mounting bracket.

3 System Installation

The Coral IPx 500 system installation includes the following stages:

- System unpacking. See *page 1-29, Unpacking the Shipping Container*.
- Preparations for mounting the cage onto the wall or rack. See *page 1-34, Attaching the Wall-Mounted Bracket onto the Wall* or *page 1-35, Mounting the Cage onto the Wall-Mounting Bracket*.
- Mounting the cage. See *page 1-31, Wall-Mounted Configurations*.
- System grounding. See *page 1-40, Grounding*.
- System power wiring. See *page 1-40, Grounding* or *page 1-45, Power Connections for AC Systems*.

The Coral IPx 500 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.

WARNING!

General Hazard. Installation and maintenance activities carried out by unqualified personel 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 500.

WARNING!

There is the danger of explosion if a lithium battery in any card is replaced incorrectly. If for any reason, during the installation or maintenance of the Coral IPx 500, you need to replace a lithium battery, replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Unpacking the Shipping Container

1. Inspect the shipping carton for evidence of physical damage or mishandling. Report any damage to the carrier immediately.

WARNING!

Ergonomic Hazard. The cage weights are provided in Table 1-2 on page 1-10. Serious back injury could result due to improper handling. Use proper lifting techniques to lift the shipping carton.

2. If it is necessary to make a damage claim to the carrier, do not move the shipping carton until it has been examined by a representative of the carrier. Otherwise, move the shipping carton as near as possible to the installation area before opening.
3. Using a utility knife, carefully cut the tape securing the top flaps of the shipping carton and open the flaps.
4. Remove any circuit card boxes in the depressions of the top foam insert.
5. Remove the top foam insert and set it aside.
6. Using an assistant to avoid personal injury, grasp each end of the cage and lift out of the shipping carton. Place the cage on a stable surface.
7. Inspect the cage door for hidden shipping damage.
8. Verify that all kit components are present before beginning. See *Table 1-7* or *Table 1-8*.

Table 1-5 ***System Part List (Items per Cage)***

Item Description	*Quantity*
Rack Installation Kit	1
Wall Installation Kit	1
Main Cage (including MCP-ipx card)	1
Main Cage (including MCPIP-sl5 Control Card)	1
Expansion Cage (including H-500/1 Expansion Cable w/D-Type 50-Pin Connector)	1 (per exp cage)

Table 1-6 ***Power Supply Units (Ordered Separately by the Customer)***

Item Description	*Quantity*
PS500 AC Power Supply (including AC power cord)	1
PS500 DC Power Supply (including DC power wires)	1

Table 1-7 ***Wall Mounting Kit***

Item Description	*Catalog Number*	*Quantity*
Wall Mounted Bracket	72444301300	1
Bottom Panel Support Bracket	72444301380	1
Cable Support Bracket	72444301390	1
Left Decorative Cover	72444301400	1
Right Decorative Cover	72444301410	1
Nylon Snap Rivet 3 mm	72445401000	12
Phillips Screw M3X8	72445223038	4
Slotted Tapped Screw 4.2X3.2	72445224023	4
Flat Washer M4X6	72445322012	4
Helical Spring Washer	72445323080	4
Flanged Wall Plug (Anchor)	72445500902	4
Installation Template	72447480310	1

Table 1-8 ***Rack Mount Kit***

Item Description	*Catalog Number*	*Quantity*
Right Mounting Bracket	72444301130	1
Left Mounting Bracket	72444301140	1
Phillips Screw M3 (for securing bracket to cage)	72445223059	6

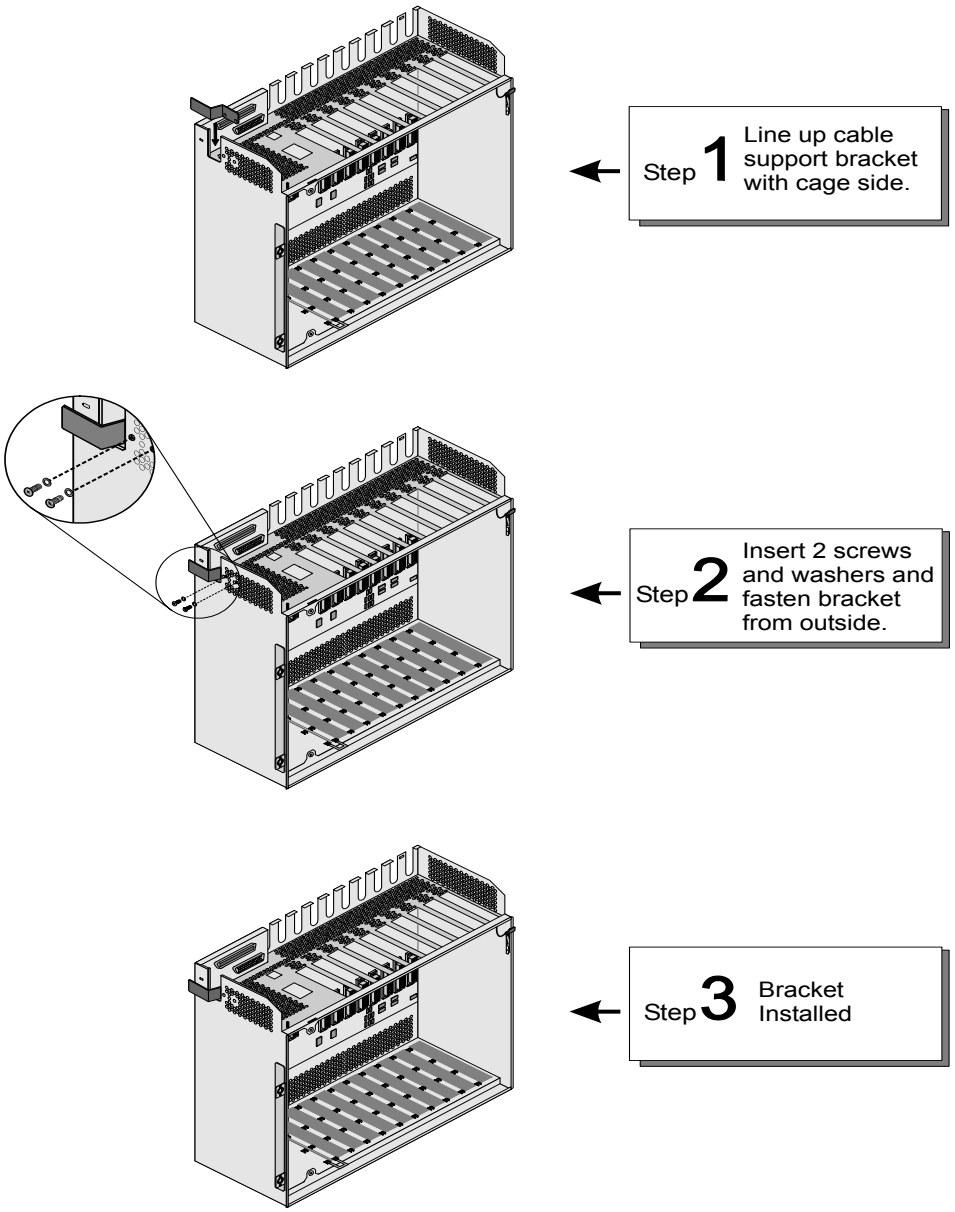
Wall-Mounted Configurations

The cage can be mounted either onto a rack or onto a wall. A special kit is supplied for each mounting configuration. For wall-mounted configurations, the wall-mounting kit is used.

Installing the Cable Support Bracket

1. Open the cage door. See *page 1-15, Opening the Door*.
2. Remove the top cover of the cage. See *page 1-22, Removing the Top Cover*.
3. Insert the cable support bracket into the inner top section as shown in *Figure 1-20*.
4. Fasten the bracket to the cage with two of the M3 screws and washers provided.

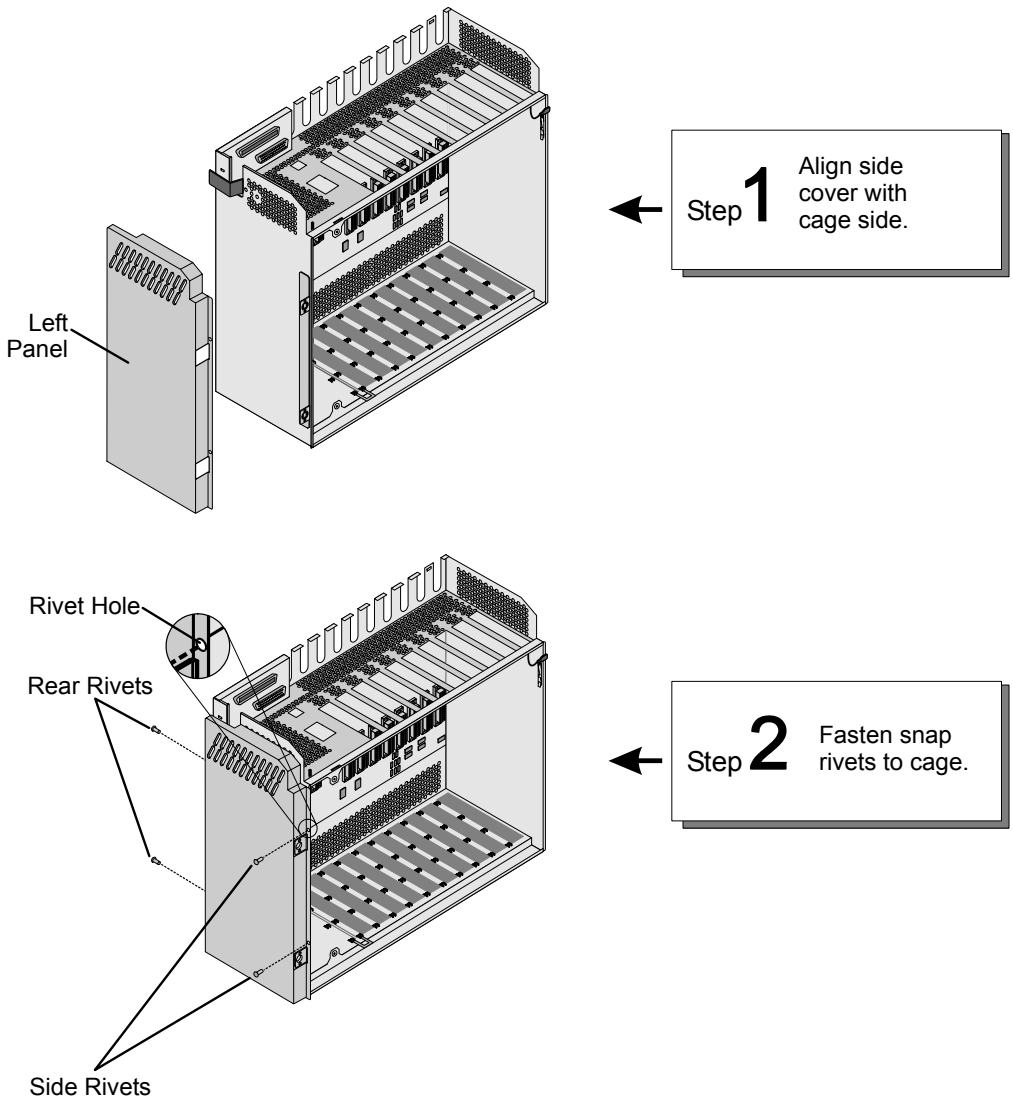
Figure 1-20 ***Installing the Cable Support Bracket***



Assembling the Left Side Panel

1. Assemble the left panel (Catalog No. 72444301400) to the cage.
2. Fasten the left bracket to the cage with four of the plastic snap rivets (Catalog No. 72445401000) provided as shown in *Figure 1-21*.

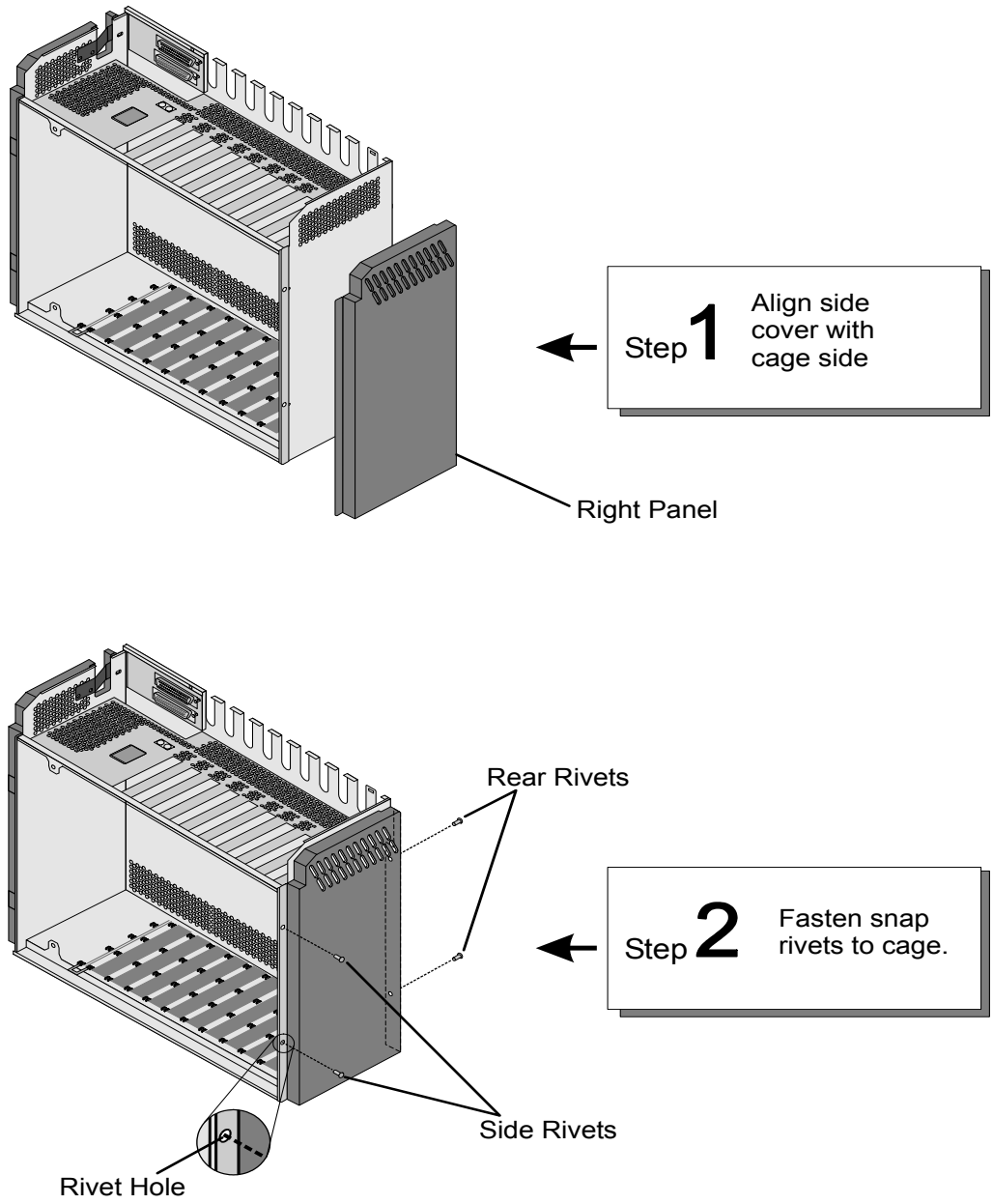
Figure 1-21 ***Left Side Panel Assembly***



Assembling the Right Side Panel

1. Assemble the right panel (Catalog No. 72444301410) to the cage.
2. Fasten the right bracket to the cage with four of the plastic snap rivets (Catalog No. 72445401000) provided as shown in *Figure 1-22*.

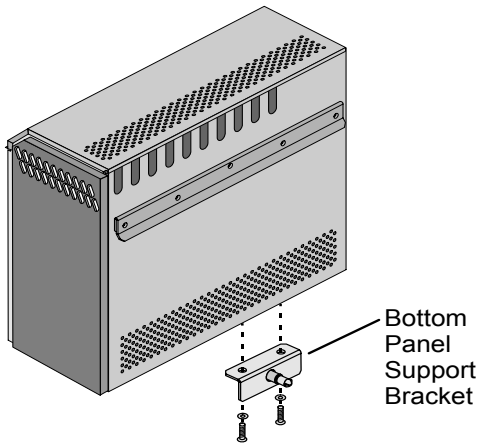
Figure 1-22 ***Right Side Panel Assembly***



Mounting the Bottom Panel Support Bracket

Fasten the bottom panel support bracket (Catalog No. 72444301380) to the bottom of the cage with two of the M3 screws (Catalog No. 72445322012) and flat washers (Catalog No. 72445223038) provided.

Figure 1-23 ***Mounting the Bottom Panel Support Bracket***



Attaching the Wall-Mounted Bracket onto the Wall

1. Verify the cage mounting position on the wall. In addition to customer requirements, heat dissipation factors must be taken into account. See *page 1-11, Space and Positioning Requirements*.
2. Using the installation template (Catalog No. 72447480310), drill four holes into the wall spaced according to the holes in the cage wall-mounting bracket. If necessary, use a spirit level to ensure that the holes are drilled such that the cage is level.
3. Insert four anchors provided (Catalog No. 72445500902) into the drilled holes.
4. Position the cage holes at the rear panel over the anchors and fasten the bracket to the wall with the four M4.2 screws (Catalog No. 72445224023) and helical spring washers, (Catalog No. 72445323080) provided.

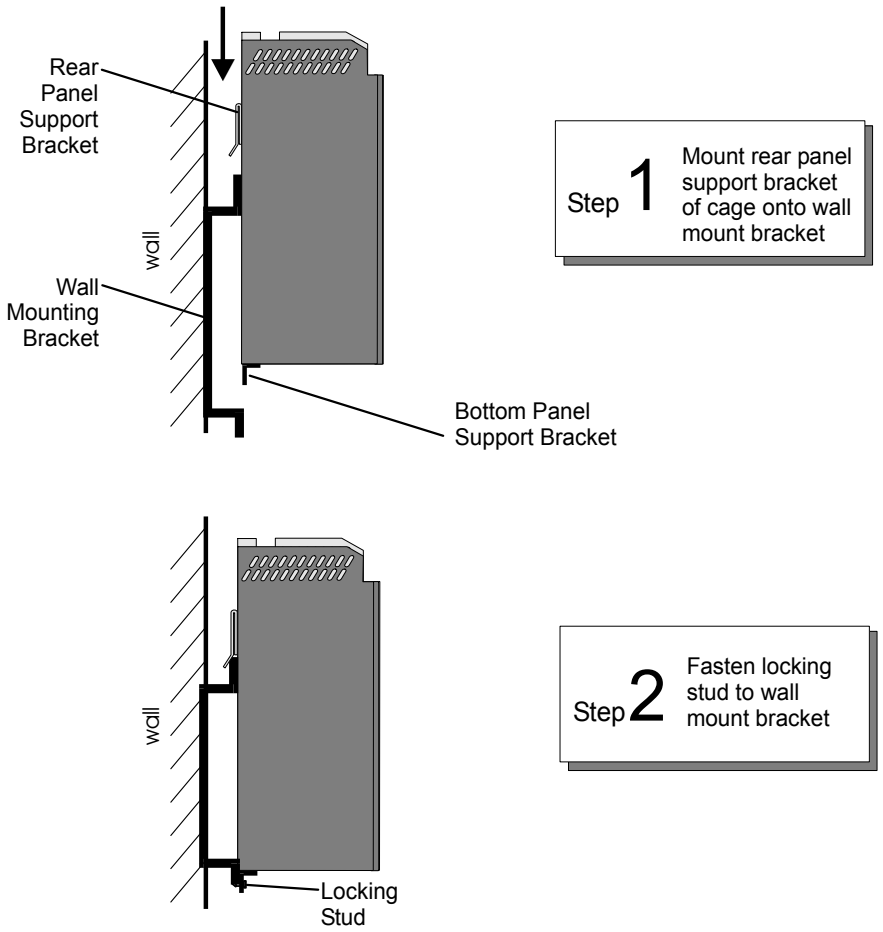
Mounting the Cage onto the Wall-Mounting Bracket

1. Attach the bottom panel support bracket (Catalog No. 72444301380) to the bottom of the cage with two of the M3 screws (Catalog No. 72445322012) and flat washers (Catalog No. 72445223038) provided.

2. Mount the cage support bracket on the rear of the cage onto the wall mounted bracket, such that the cage support bracket is adjacent to the wall mounted bracket.

3. Fasten the locking stud on the cage bottom panel support bracket to the wall mounting bracket with a straight blade screwdriver (half a turn clockwise).

Figure 1-24 ***Mounting the Cage onto the Wall-Mounted Bracket***



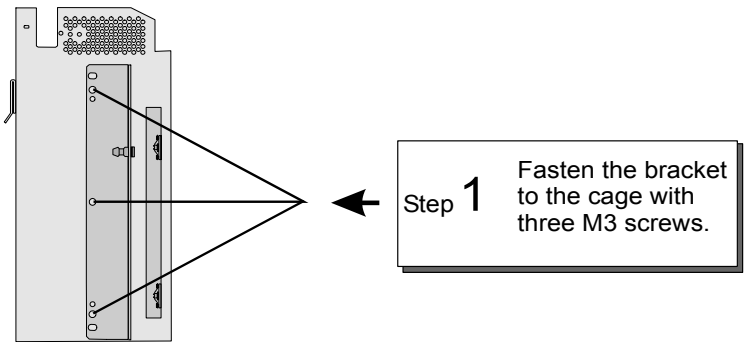
Rack-Mounted Configurations

The cage can be mounted either onto a rack or onto a wall. A special kit is supplied for each mounting configuration. For rack-mounted configurations, the rack-mounting kit is used.

Preparing the Cage for 19" Rack-Mounted Configuration

1. Fasten the left bracket to the cage with the three M3 screws (Catalog No. 72445223059) provided as shown in *Figure 1-25*.
2. Repeat *Step 1* for the right bracket.

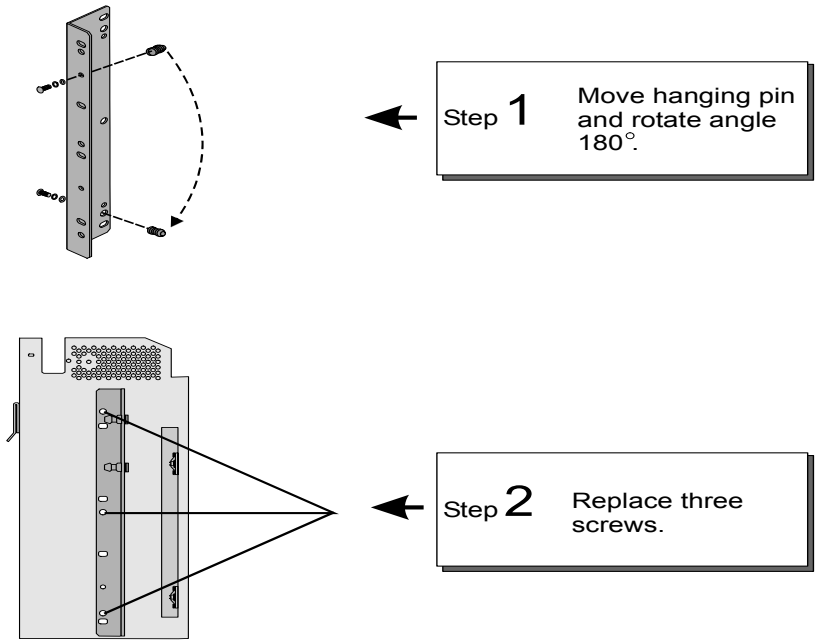
Figure 1-25 ***Preparing the Mounting Bracket of the Cage for 19" Rack Assembly***



Preparing the Cage for 23" Rack-Mounted Configuration

1. Reposition the hanging pin assembly on the bracket as depicted in step 2 of *Figure 1-26* and align the bracket with the cage such that the narrow edge of the bracket is adjacent to the cage.
2. Fasten the bracket to the cage with the three screws.
3. Repeat *Step 1* through *Step 2* for the left bracket.

Figure 1-26 ***Preparing the Mounting Bracket of the Cage for 23" Rack Assembly***



Mounting the Cage onto the Rack:

WARNING!

Mechanical Hazard! Insecure mechanical loads could result in injury or death. If the cage is mounted onto a rack, it is the customer's responsibility to ensure that the cage is tightly secured to the frame and that the cage cannot be inadvertently released from the rack.

1. Verify the cage mounting position on the rack. In addition to customer requirements, requirements for heat dissipation need to be taken into account. See *page 1-11, Space and Positioning Requirements*.
2. Assemble the mounting bracket according to rack size. See *page 1-36, Preparing the Cage for 19" Rack-Mounted Configuration* OR *page 1-36, Preparing the Cage for 23" Rack-Mounted Configuration*.
3. For 19" rack configurations, remove the front door and set it aside to obtain access to the bracket fasteners. See *page 1-16, Removing the Door*.
4. Lift the cage to the mounting position on the rack.

WARNING!

Ergonomic Hazard. The cage weight is provided in Table 1-2 on page 1-10. Serious back injury could result due to improper handling. Use proper lifting techniques to mount the cage onto the rack.

5. Insert the hanging pins (*Figure 1-27* and *Figure 1-28 on page 1-38*) into the two square holes on the rack. This ensures that the cage remains in position while it is fastened to the rack. ***Do not*** let go of the cage after you have inserted the hanging pins. The hanging pins are not designed to support the weight of the cage and are to be used only for assistance.

WARNING!

*Ergonomic Hazard. The hanging pins are not designed to support the weight of the cage. **Do not** rest the weight of the cage on the hanging pins. Continue to support the cage until it has been securely fastened to the rack.*

6. Fasten the cage to the rack by inserting the three fasteners into the holes of the mounting bracket.

NOTE:

The fasteners that secure the cage to the rack are not included in the rack-mounting kit.

7. Assemble the front door, if removed in *Step 3*. See *page 1-17, Assembling the Door*.

8. Assemble the power supply unit and cards that are packed in the top foam of the shipping carton.

Figure 1-27 ***Left Side View of Coral IPx Cage Mounted onto 19" Rack***

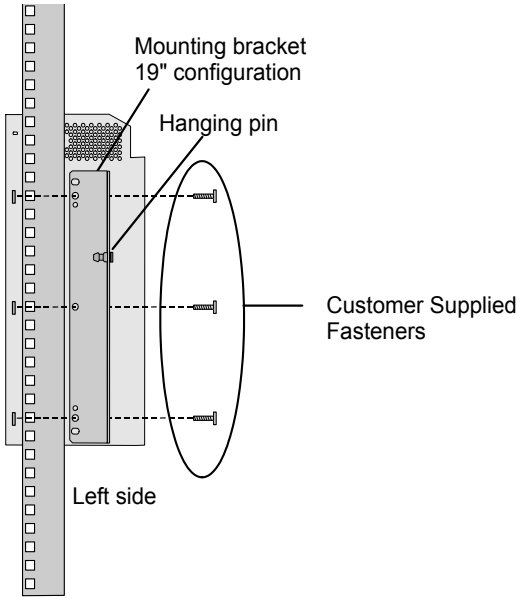
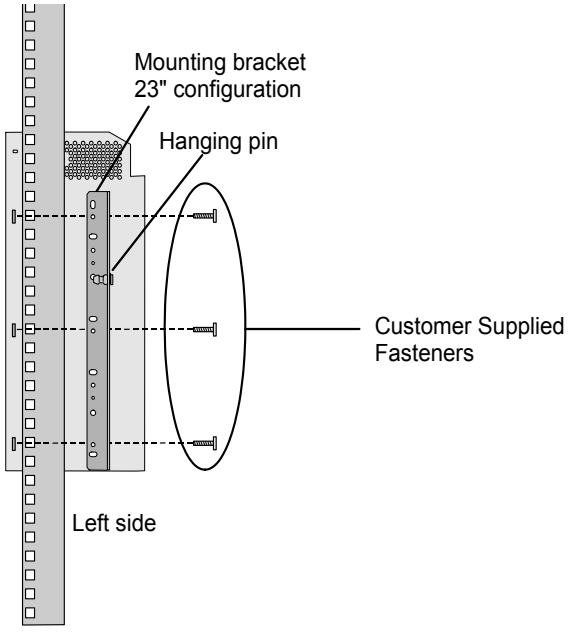


Figure 1-28 ***Left Side View of Coral IPx Cage Mounted onto 23" Rack***



Electrical Requirements

1. Verify that electrical service is sufficient and located in close proximity to the system. Coral IPx 500 system requires at least one dedicated branch circuit with at least two receptacles; one for the cabinet, and one for ancillary equipment or test instruments.
2. For 115 VAC or 230 VAC power, a 1.5 mm^2 or 16 AWG 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. For 115 VAC or 230 VAC power Miniature Circuit Breakers (MCB) with at least 6A C, 10 kA breaking capacity must be used in the circuit branch.

The receptacle for the Coral IPx 500 system branch circuit must be located within 4 ft (1.2m) of the cabinet. Ancillary branch circuit receptacles should be located conveniently for ancillary equipment and to allow data terminals, personal computers, or test instruments to be operated near the system.

WARNING!

Electrical Fire Hazard! Exceeding the maximum allowed currents could result in circuit overload and fire. The Coral IPx 500 system includes up to three cages (one IPx 500M with one or two IPx 500X expansion cages). If the system is powered by a DC facilities power source, ensure that no more than these three cages are connected to the same facilities circuit breaker. Likewise, ensure that a dedicated circuit breaker with a rating of 30A/250V slow blow protects the system.

WARNING!

Electrical Fire Hazard! Exceeding the maximum allowed currents could result in circuit overload and fire. The Coral IPx 500 system includes up to three cages (one IPx 500M with one or two IPx 500X expansion cages). If the system is powered by an AC facilities power source, ensure that no more than the three cages be connected to the same power strip. Likewise, ensure that a dedicated Miniature Circuit Breaker (MCB) with a rating of 6A C, 10 kA breaking capacity protects the system.

Grounding

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 earth, 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.

Grounding the Cage

The cage ground wire is connected to the cage in the top section. A ring terminal is connected with a serrated washer and a nut. The other end of the wire is connected to the master ground. The master ground is connected to the building ground. In a multi-cage configuration, each cage is connected directly to the master ground.

1. Verify that a master ground unit for ground connections (*Figure 1-29*) is used. The recommended master ground unit must have the following specifications:
Dimensions:.....Minimum of 5.5" x ¼" x 1" (140 mm x 6 mm x 25 mm)
Material:.....Brass or Copper
Mounting holes:.....¼" (6 mm) diameter, ½" (12 mm) distance from edges
Ground screws:.....10-32 UNF
Washers.....One serrated washer above the ring terminal
Distance between screws:.....¾" (18 mm)

WARNING!

Electrical Hazard! Connect only a Protective Earth (PE) to the Coral IPx 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. Any ground connection of equipment related to the switching Coral system should ultimately connect to the master ground.

WARNING!

Electrical Hazard. Incorrect 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 Coral IPx cages.*
- *Ring terminals retain wires onto the terminal lug when the connection is loosened. Verify that all ground wires include ring terminals at both ends.*

2. Verify that the ground wire is the proper length including the two ring terminals fitted onto the two ends of the wire.
3. Unfasten one of the 10-32 UNF screws connected to the master ground unit and retain the screw and serrated washer (*Figure 1-29*).
4. 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.
5. Position the wire ring terminal over the threaded hole of the master ground unit, and fasten. Tighten until snug (*Figure 1-29*).
6. Unfasten the cage terminal nut (inside the top section of the cage) and retain it with the serrated washer.

NOTE:

The cage nut can be fastened or unfastened only with a closed 7 mm hexagonal socket wrench with a 1/4" drive and an adaptor. An open wrench cannot be maneuvered in the restricted space around the nut.

7. Insert the serrated washer over the threaded rod of the ground terminal, then one flat washer, the ground wire ring terminal, the second flat disk, the spring washer, and refasten the nut with the closed 7 mm hexagonal socket wrench with a 1/4" drive and an adaptor. Tighten until snug.
8. Verify that the ground connection between the cage and the master ground unit is identical to *Figure 1-31* or *Figure 1-33*.

Figure 1-29 ***Master Ground Unit***

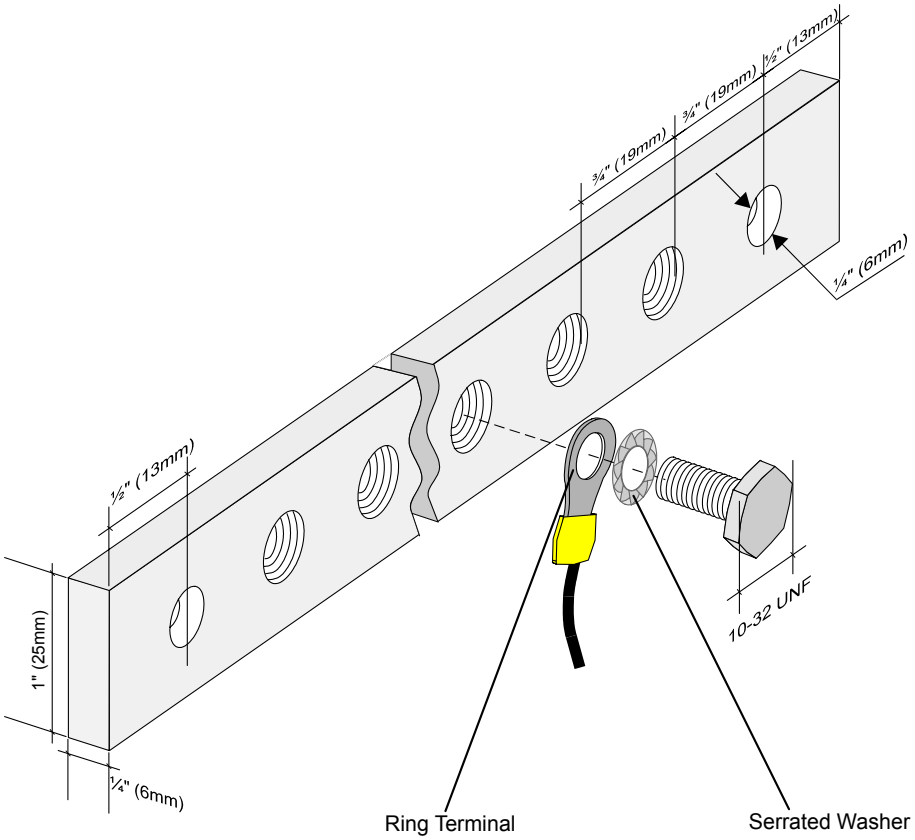
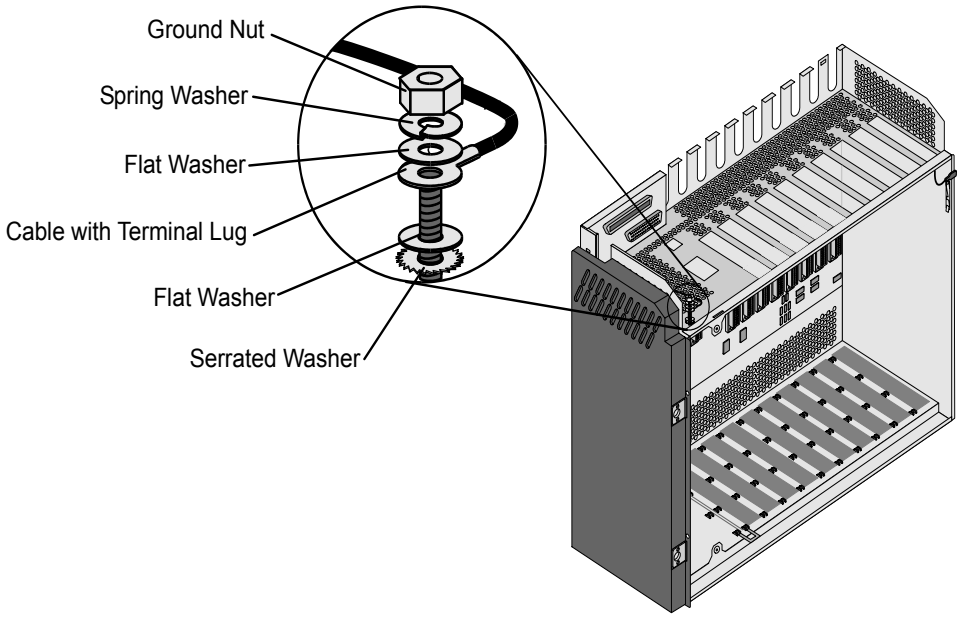


Figure 1-30 ***Coral IPx 500 Cage Ground Assembly***



Power Connections for DC Systems

This section describes how to connect the power wires to the Coral IPx cage for DC powered systems (that is, when the PS500 DC power supply card is installed in the cage). For instructions on how to connect power wires to AC powered systems, see *page 1-45, Power Connections for AC Systems*.

The DC power connection is made via a Molex receptacle on the top panel of the PS500 DC. The top section of the cage includes a opening above the Molex receptacle such that the cable with a Molex connector can be connected directly to the PS500 unit. Each cage is connected directly to the customer's DC power source and is protected by a 16A / 250V slow blow fuse that is located on the PS500 unit.

WARNING!

*Electrical Fire Hazard. **Do not** interconnect several Coral IPx 500 cages together. Doing so could result in currents that exceed the allowable limit and cause a fire. Connect each cage directly to the facilities distribution panel. Likewise, verify that no more than up to three cages of the Coral IPx 500 system are connected to the same circuit breaker (rating:30 A, 250 V, slow blow).*

Connecting the Cage to the Facilities Power Source

NOTE:

The DC power cable provided with the system is 4.5 feet (1.5 meters) long. Verify that the connection to the facilities power source is made according to local requirements.

1. Do one of the following:
   - If the Coral IPx 500 system is located close enough to be connected to the customer's power supply with the supplied wires, skip to *Step 2*.
   - If the Coral IPx 500 system is not located close enough to the customer's power supply, fabricate a DC power connection from the DC facilities power source up to a point that is close enough to connect the cage to the fabricated connection with the supplied 4.5 ft (1.5m) long wire pair. Fabricate the connection according to local requirements.
2. Connect the DC Molex wire pair into the receptacle of the PS500 unit via the opening in the top section.

Figure 1-31 ***DC Power Wiring for One Coral IPx 500 Cage***

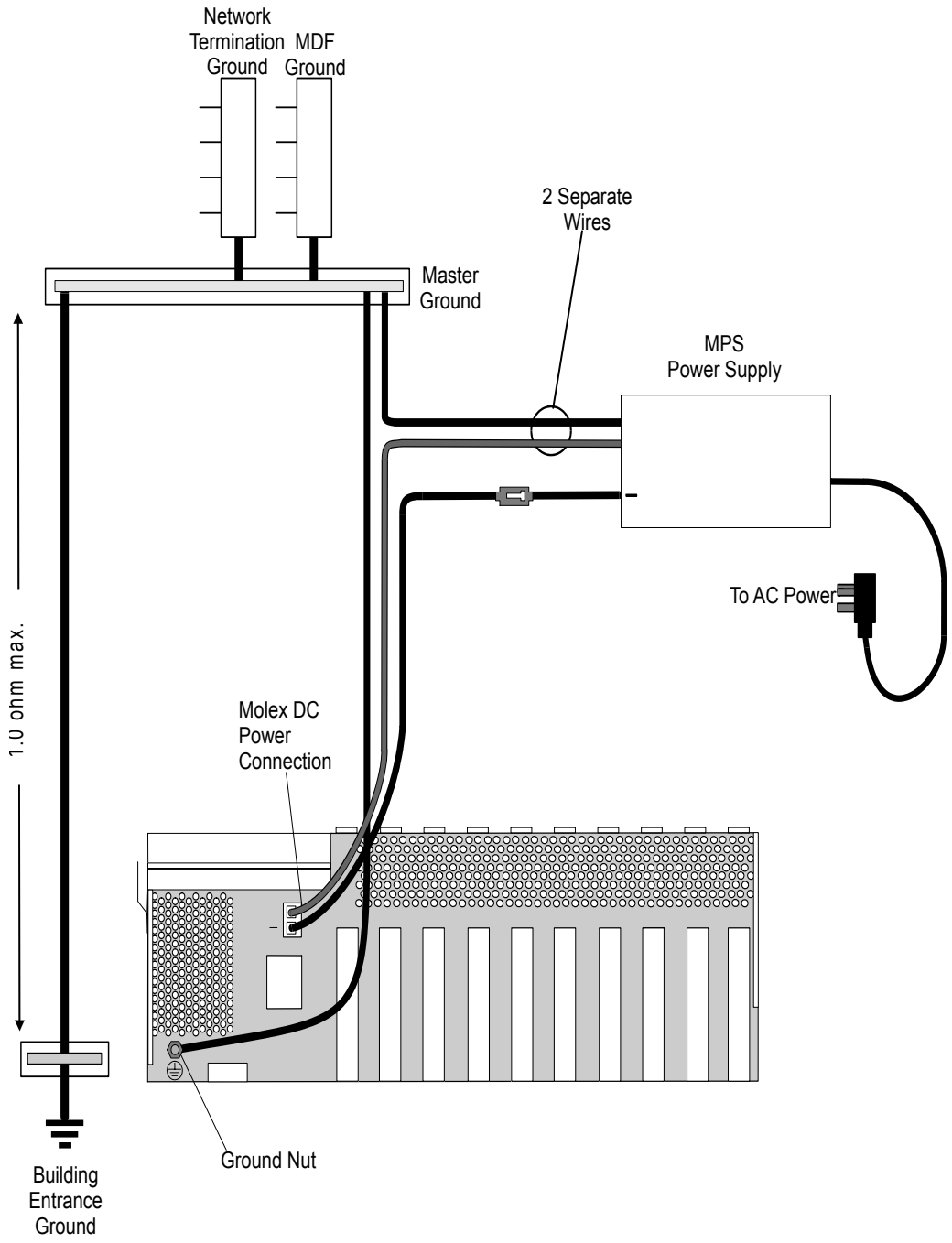
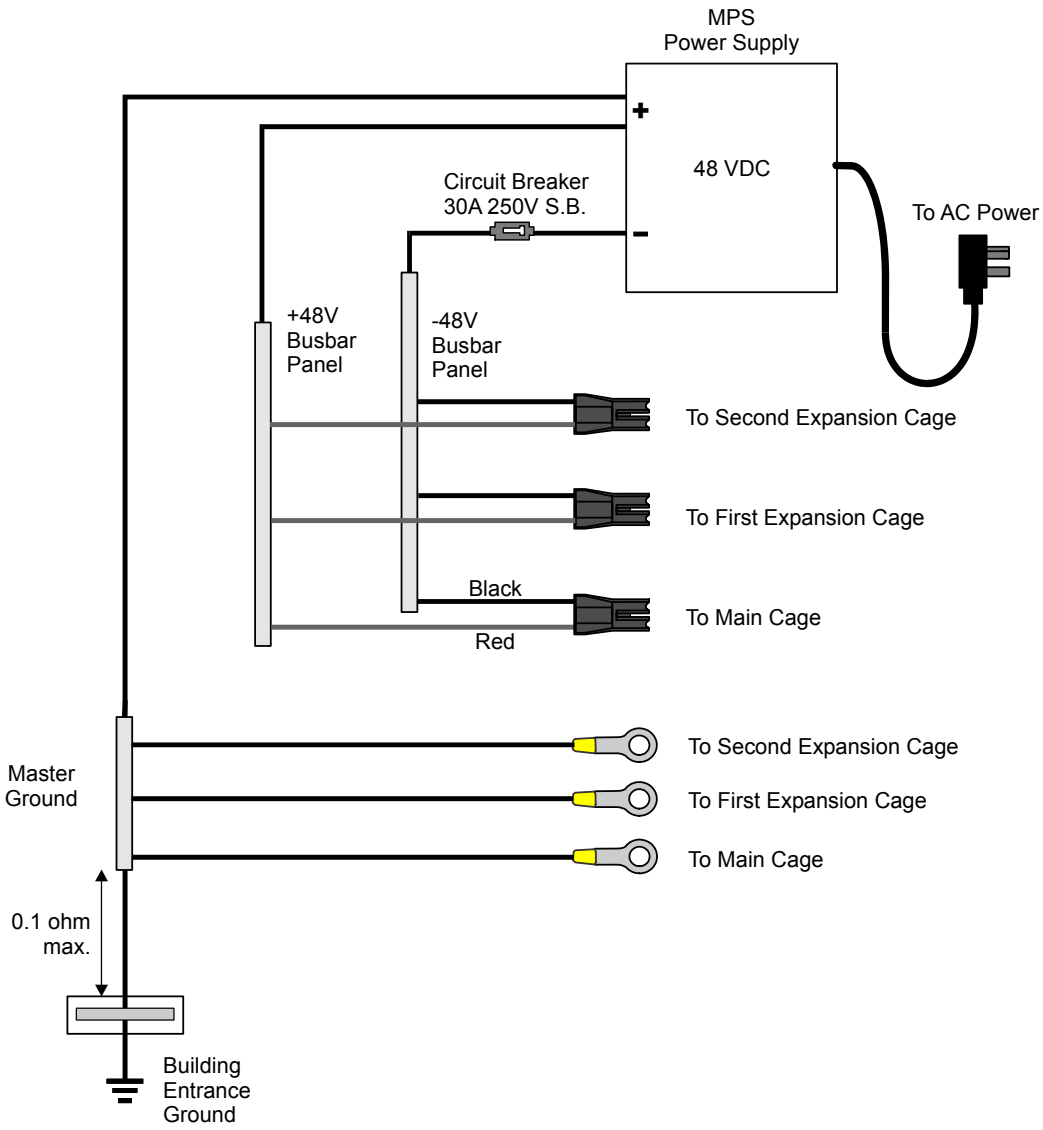


Figure 1-32 ***DC Power Wiring for Three Coral IPx 500 Cages***



Power Connections for AC Systems

This section describes how to connect the power wires to the Coral IPx cage for AC powered systems. For instructions on how to connect power wires to DC powered systems, see *page 1-43, Power Connections for DC Systems*. If you intend to connect a battery pack to the DC Molex receptacle, contact the manufacturer for details.

The AC power connection is made via an AC power receptacle on the top panel of the PS500 AC unit. An opening in the top section of the cage allows an AC cable to be connected directly to the PS500 AC unit. The Coral IPx 500 AC powered cages can all be connected to the same power strip. Each AC facilities power outlet must be

protected by a dedicated circuit breaker. ***Do not*** connect ancillary equipment to the same facilities power outlet as the Coral IPx system.

WARNING!

Electrical Fire Hazard. Verify that no more than up to three cages of the Coral IPx 500 system are connected to the same circuit breaker (rating: 6A C, 10 kA breaking capacity). Doing so could result in currents that exceed the allowable limit and cause a fire. Connect ancillary equipment to a different power outlet that is protected by a different circuit breaker.

Connecting the AC Cage Connection to the Power Connection

1. Connect an AC power cord through the opening in the top section of the unit to the AC power receptacle.
2. Connect the other end of the cord either to the facilities power socket or to the power strip.

WARNING!

Electrical Hazard. Verify that the AC power strip or outlet supplying the cage is easily accessible and can be easily disconnected in the event of emergency. Verify that that the power strip or outlet is no higher than 63" (160 cm) from the floor.

Figure 1-33 ***Coral IPx 500 AC Powered Cage***

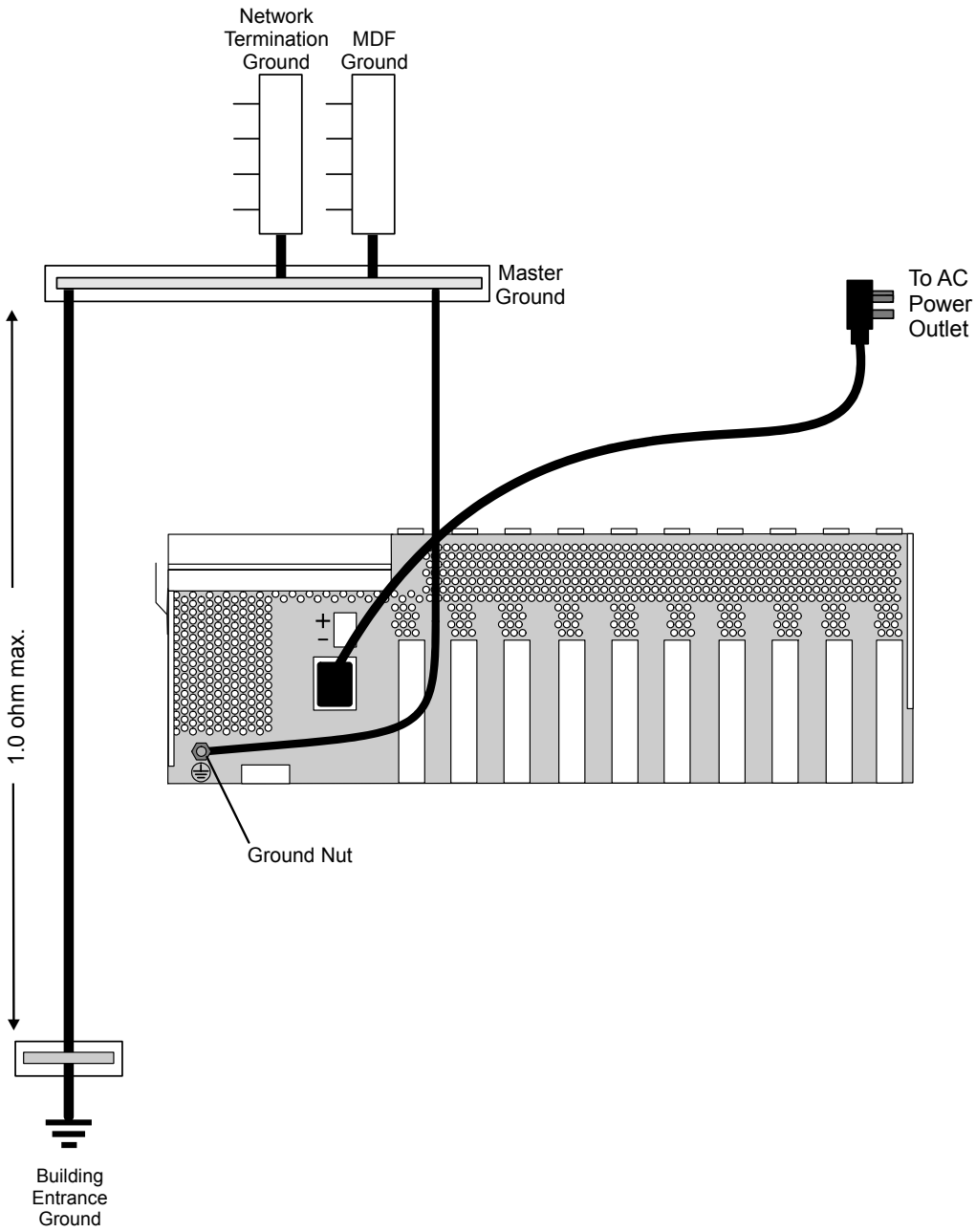
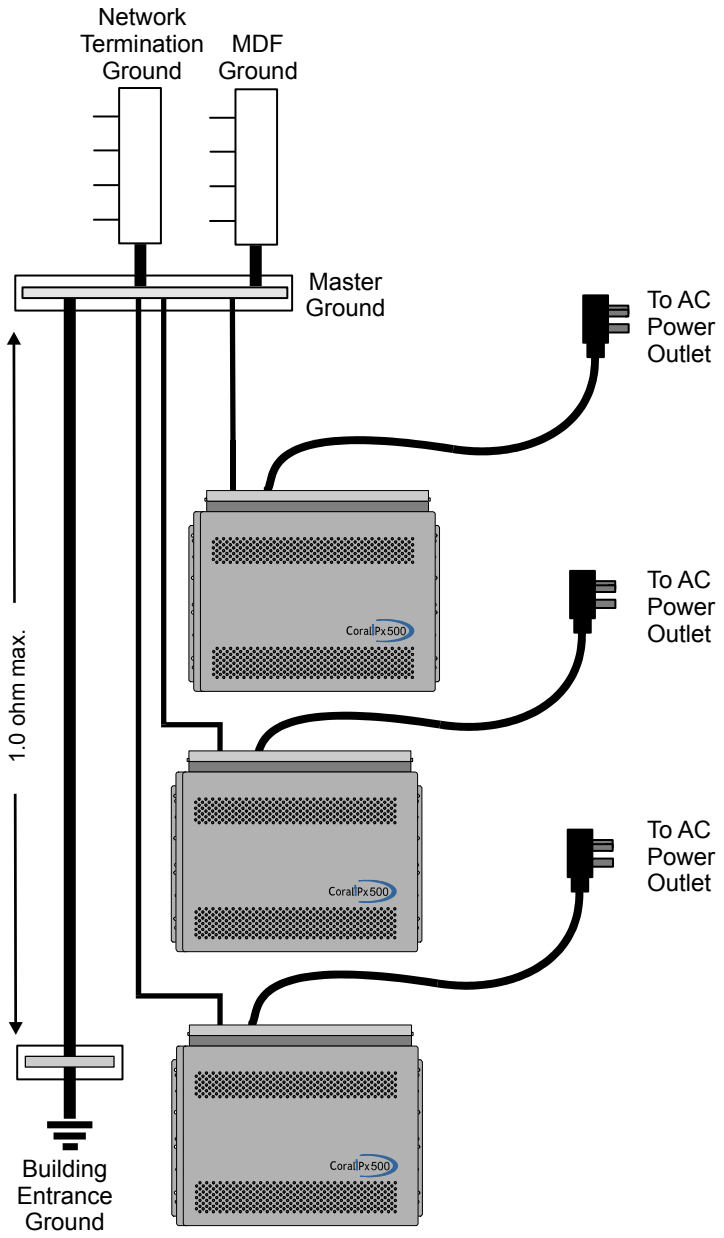


Figure 1-34 ***Coral IPx 500 AC Powered Cages***



4 Cage Disassembly

1. Do one of the following:
   - If the cage is supplied with DC electrical power, turn OFF the power switch and shut down the external power supply unit that supplies power to the cage.
   - If the cage is supplied with AC electrical power, 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 main power switch supplying the system is switched OFF.

2. Disconnect the ground wire from the cage.
3. Disconnect all I/O cables from the top section.

Rack-Mounted Cage

1. For 19" cages, remove the front door to obtain access to the cage bracket. See *page 1-16, Removing the Door*.
2. Unfasten the three screws that secure the cage to the rack on each side of the cage.

WARNING!

Ergonomic Hazard! The cage weights are provided in Table 1-2 on page 1-10. Serious back injury could result due to improper handling. Use proper lifting techniques to mount the cage onto the rack.

3. Remove the cage from the rack using proper lifting techniques.

Wall-Mounted Cage

1. Release the locking stud on the cage support bracket to the wall mount bracket with a straight blade screwdriver (half a turn counter-clockwise).

WARNING!

Ergonomic Hazard! The cage weights are provided in Table 1-2 on page on page 1-10. Serious back injury could result due to improper handling. Use proper lifting techniques to mount the cage onto the rack.

2. Remove the cage from the rack using proper lifting techniques.

2 Main and Expansion Cage Description
Coral IPx 500

This section describes the main features of the Coral IPx 500 main and expansion cages. For a general description of the Coral IPx 500 system, see *page 1-2, General System Description and Installation*. For information on how to configure the system, see *page 3-1, System Configuration*.

1 Main Cage (IPx 500M)

The IPx 500M main cage is the "nerve center" of the Coral IPx 500 system. It includes the MCP-IPx main control card (in addition to the other peripheral cards), the Resources connector, and the system configuration jumpers.

The main cage includes nine card slots: eight peripheral slots and one card slot for the main processor card. The slot at the extreme left of the cage is reserved for the power supply unit.

The top shelf of the cage includes the Expansion connector, which is connected to an expansion cage, and the Resources connector, which is connected via the MDF to external systems.

The basic 0x0 IPx 500M system is supplied with an MCP-IPx control card. The power supply, software, trunk, and station cards must be ordered separately.

Circuit Card Slot Designation

The card section of the main cage includes nine card slots and one power supply unit slot. See *Figure 2-1*. The first eight slots (numbered 1 through 8 from right to left) are universal I/O slots and are reserved for the peripheral cards. Slots 4 and 5 are configured by the manufacturer to house primary and secondary clock synchronization trunk cards.

The ninth slot is reserved for the MCP- IPx control card. A daughter board can be attached (DBX or CLA) to the MCP-IPx card. The MCP-IPx controller card is responsible for controlling the system. The *Installation Manual for Coral IPx 500* will soon be released. For further information, see *Chapter 8, Common Control Cards Description* of the *Coral IPx 500 Installation Manual*.

The slot at the extreme left side is reserved for the power supply unit. *Figure 2-1* and *Table 2-1* describe the cards that are inserted into the card slots for Coral IPx 500M for one main cage.

Figure 2-1 ***Coral IPx 500M Main Cage***

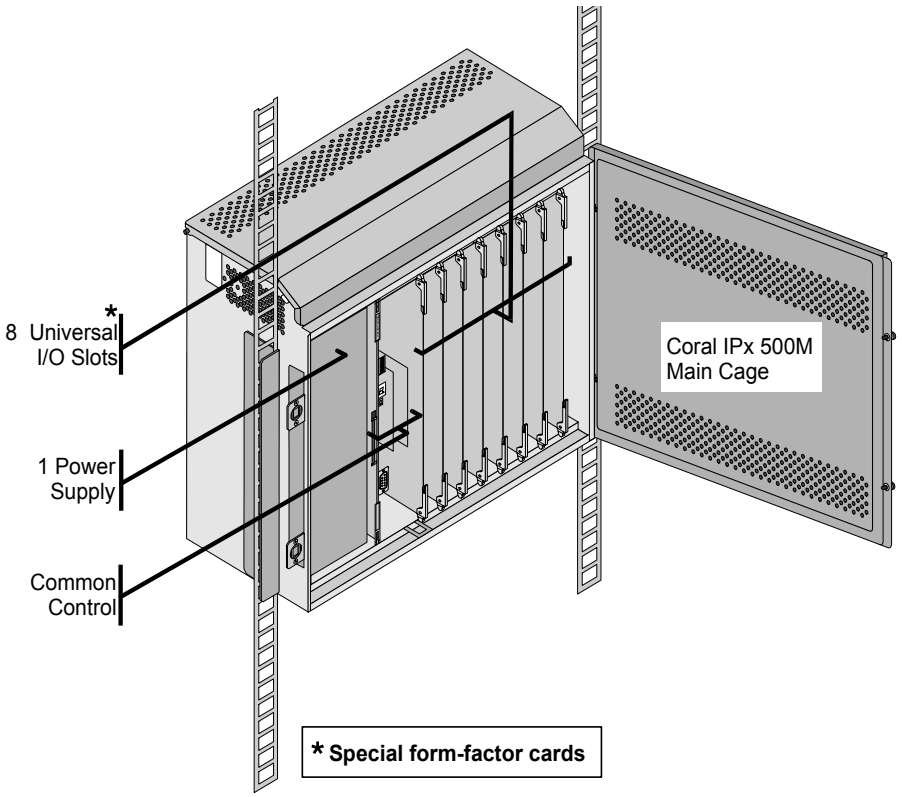


Table 2-1 ***Coral IPx 800M Card Slot Configuration for Main Cage***

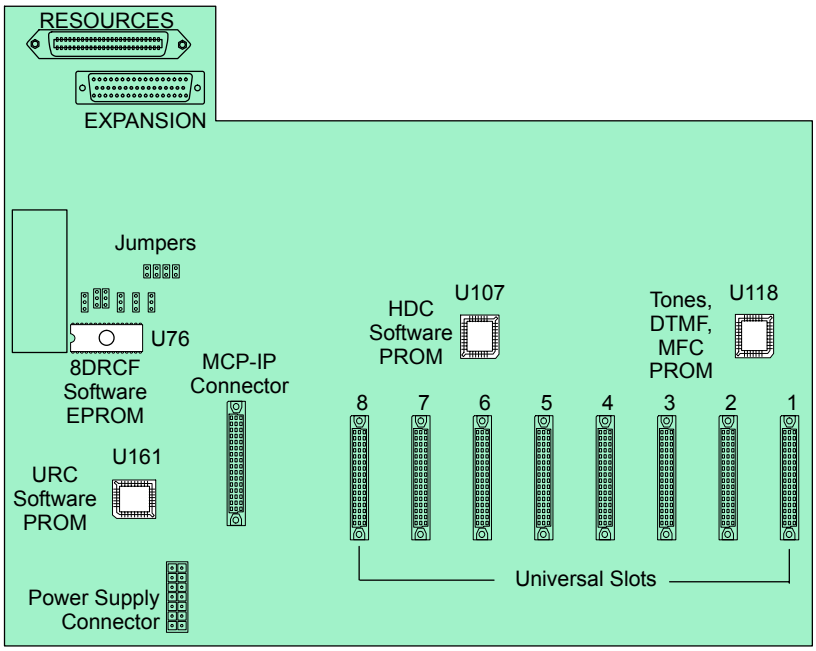
Slot	*Contains*	*Opening on Top Section for I/O Connections*
Slot 1-8	Any Peripheral Card	Yes
MCP	Main Processor Card MCP-IPsl5 (with optional DBX or CLA daughter board)	Yes
Power Supply Slot	PS500 DC or AC unit	No

Motherboard Description

The only feature that distinguishes the main cage from the expansion cage is the motherboard. The motherboard of the main cage includes the eight peripheral card connections and one control card connection, the Resources connection, the Expansion connection, service card components, and the configuration jumpers.

The motherboard is displayed in *Figure 2-2*.

Figure 2-2 ***Coral IPx 500M Motherboard***



System Configuration Jumpers

The configuration jumpers of the main cage:

- Configure the main cage to house the primary and/or secondary synchronization card.
- Designate whether the system uses internal or external music
- Activate and deactivate the Receive and Transmit function of the modem
- Designate the "handshaking" protocol of the serial RS-232 interface.

Table 2-2 displays each jumper setting and its description. For more information on the jumpers, see *page 3-6, Setting the Jumpers on the Main Cage*.

Table 2-2 **Configuration Jumpers for Coral IPx 500M**

Jumper	Setting	Description
JU 5, 6	On (Connected)	Secondary synchronization card in slot 5
JU 5, 6	Off (Disconnected)	Secondary synchronization card not in slot 5
JU 7, 8	On (Connected)	Primary synchronization card in slot 4
JU 7, 8	Off (Disconnected)	Primary synchronization card not in slot 4
JU9	Pins 1-2 Connected	Internal Music Source #1
JU9	Pins 2-3 Connected	External Music Source #1
JU10	Pins 1-2 Connected	Modem can receive data
JU10	Pins 2-3 Connected	Modem cannot receive data
JU11	Pins 1-2 Connected	Modem can transmit data
JU11	Pins 2-3 Connected	Modem cannot transmit data
JU12	Pins 1-2 Connected	UART1 CTS - On
JU12	Pins 2-3 Connected	UART1 CTS - Off
JU13	Pins 1-2 Connected	UART2 CTS - On
JU13	Pins 2-3 Connected	UART2 CTS - Off
JU14	Pins 1-2 Connected	UART3 CTS - On
JU14	Pins 2-3 Connected	UART3 CTS - Off

I/O Connections

The openings in the top section of the cage are for routing universal champ I/O connections and RJ-45 connections. The actual I/O connections are located on the top panel of the peripheral card itself. The opening on the top section of the cage allows the cable to be routed via the top section of the cage.

Connections to Other Cages

When more than one cage is present in the system, the main cage includes one port 50-pin female connection for this purpose and it is used to connect to the first expansion cage. The connection is made with an H-500/1 cable with a D-type 50-pin

connector that is 55" (140 cm) long, supplied with the expansion cage. For further information, see *page 2-4, I/O Connections*.

Resources Connector

The Resources connector provides three RS-232 interfaces, music, paging connection, and relay circuits. *Table 2-3* provides the pinout connection for the resource connection.

Table 2-3 ***Resources Pinout Connection to the MDF***

Pin	Description
25 50	RXD1 TXD1
24 49	CTS1 RTS1
23 48	DSR1 DTR1
22 47	RXD2 TXD2
21 46	CTS2 RTS2
20 45	DSR2 DTR2
19 44	Music 1A Music 1B
18 43	Music 2A Music 2B
17 42	RXD3 TXD3
16 41	CTS3 RTS3
15 40	DSR3 DTR3
14 39	RLY1A RLY1B
13 38	RLY2A RLY2B
12 37	RLY3A RLY3B
11 36	PAGE 1A PAGE 1B

Pin	*Description*
10 35	SGRND Not Used
9 34	N.C.
8 33	N.C.
7 32	N.C.
6 31	N.C.
5 30	N.C.
4 29	N.C.
3 28	N.C.
2 27	N.C.
1 26	N.C.

2 Expansion Cages (IPx 500X)

The expansion cage expands the Coral IPx 500 system capacity by adding ports to the system. The expansion cage includes I/O card slots for peripheral cards and a slot for the power supply unit.

The basic 0x0 IPx 500X system is supplied with an H-500/1 cable. It is the customer's responsibility to order the power supply, trunk, and station cards.

Circuit Card Designation

Up to two expansion cages may be installed in any IPx 500 system configuration. See *Figure 2-3*. The expansion cage contains ten card slots that are numbered 1 through 10 from right to left. Slot 1 through slot 10 are universal I/O slots, and may house any combination of shared service and peripheral cards. Slots 4 and 5 may be configured to house primary or secondary clock synchronization trunk cards. See *page 3-11, Designating Synchronization Slots*. The extreme left slot is reserved for the power supply unit.

Table 2-4 and *Figure 2-3* identify the cards that are inserted into the card slots for the Coral IPx 500X cage.

Figure 2-3 ***Coral IPx 500X Expansion Cage***

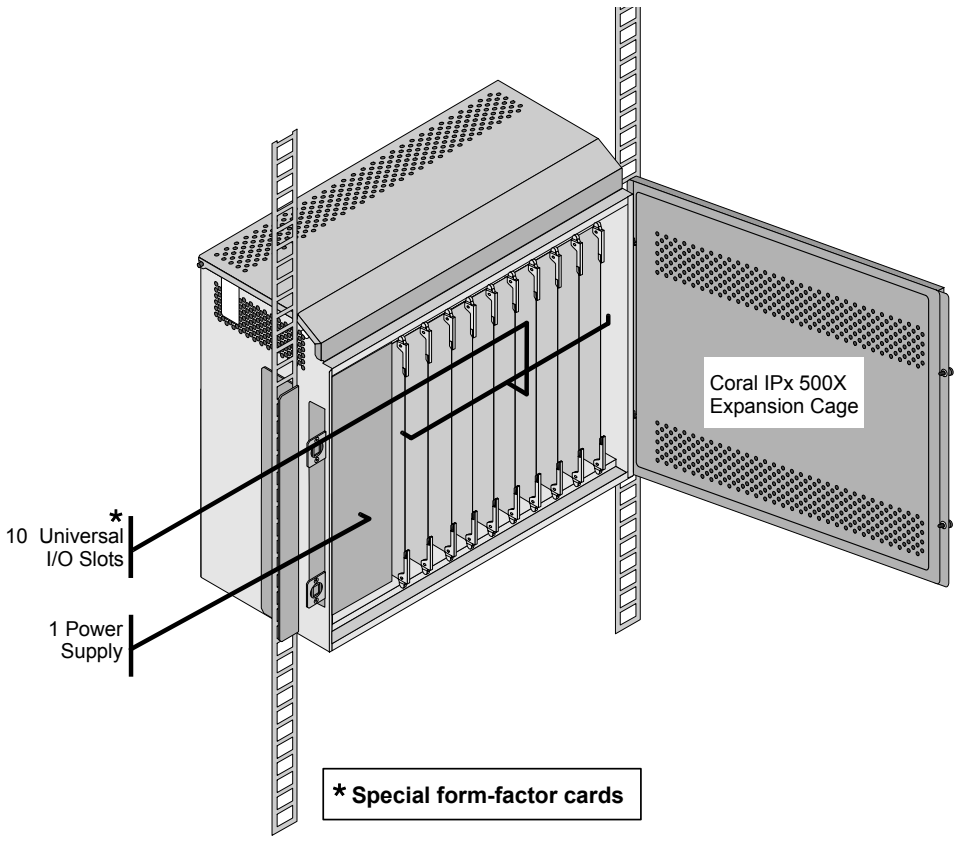


Table 2-4 **Coral IPx 500X Card Slot Configuration for Expansion Cage**

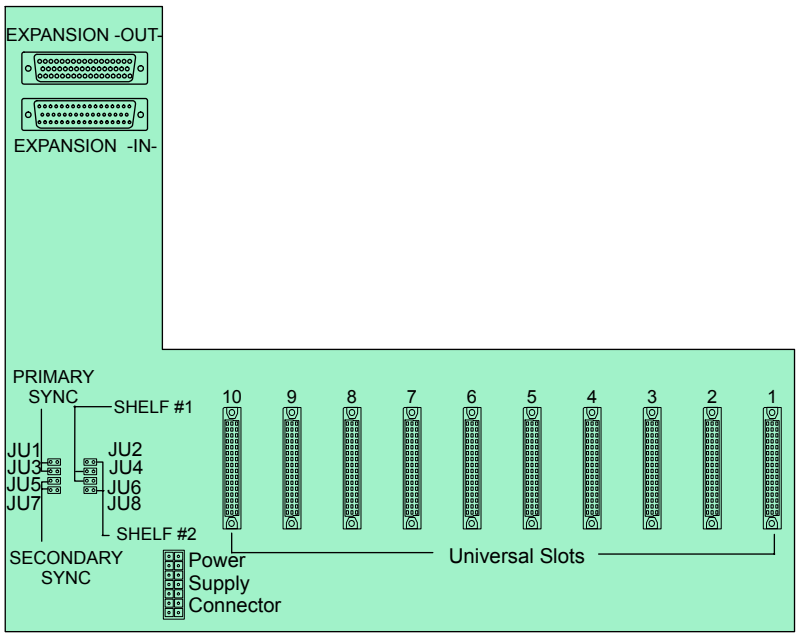
Slot	Contains	Opening on Top Section for I/O Connections
Slot 1-10	Any peripheral card	Yes
Power Supply Slot	PS500 DC or AC unit	No

Motherboard Description

The only feature that distinguishes the expansion cage from the main cage is the motherboard. The motherboard of the expansion cage includes the ten peripheral card connections, two expansion connections, service card components, the power supply connector, and the configuration jumpers.

The motherboard is displayed in *Figure 2-4*.

Figure 2-4 **Coral IPx 500X Motherboard**



Configuration Jumpers

The configuration jumpers for the expansion cage have two functions:

- Synchronization slot designation. These jumpers designate the expansion cage as the shelf that houses the primary and/or secondary synchronization slot.
- Shelf number identification. These jumpers identify the expansion cage as shelf 1 or shelf 2.

I/O Connections

The openings in the top section of the cage are for routing universal champ I/O connections and RJ-45 connections. The actual I/O connections are located on the top panel of the peripheral or service card itself. The opening on the top section of the cage allows the cable to be routed via the top section of the cage.

Connections to Other Cages

The expansion cage includes two port 50-pin female connections for connecting to other cages. The connection is made with an H-500/1 expansion cable with a D-type 50-pin connector that is 55" (140 cm) long, supplied with the expansion cage.

System Configuration Jumpers

The configuration jumpers of the expansion cage:

- Define the cage that houses the primary and/or secondary synchronization card.
- Designates the cage number within the system (shelf 1 or shelf 2)

Table 2-2 displays the settings of each jumper its definition.

Table 2-5 ***Jumper Configuration for Coral IPx 500X***

Jumper	*Setting*	*Definition*
JU 1, 3	On (Connected)	Primary synchronization card in slot 4
JU 1, 3	Off (Disconnected)	Primary synchronization card not in slot 4
JU 5, 7	On (Connected)	Secondary synchronization card in slot 5
JU 5, 7	Off (Disconnected)	Secondary synchronization card not in slot 5
JU 2, 8	On (Connected)	Expansion cage designated "Shelf 2"
JU 2, 8	Off (Disconnected)	Expansion cage not designated "Shelf 2"
JU 4, 6	On (Connected)	Expansion cage designated "Shelf 1"
JU 4, 6	Off (Disconnected)	Expansion cage not designated "Shelf 1"

3 System Configuration
Coral IPx 500

This chapter describes the layout and configuration of the Coral IPx 500 system. For a general description of the Coral IPx 500 cage, see *page 1-2, General System Description and Installation*. For a more detailed description of the main and expansion cages, see *Chapter 2*.

1 General Description

The Coral IPx 500 can operate as a system in any one of the following configurations:

- One main cage (one IPx 500M unit). See *Figure 3-1*.
- One main cage and one expansion cage (one IPx 500M unit and one IPx 500X unit). See *Figure 3-2*.
- One main cage and two main expansion cages (one IPx 500M unit and two IPx 500X units). See *Figure 3-3*.

The main cage includes control cards and peripheral cards. The expansion cage or cages include peripheral cards.

Features

- E1, T1, PRI, and LAN via RJ-45 I/O interface connections on the top panel of the cards
- Simple input/output (I/O) cable routing from the rear panel
- 48 VDC or 115/230 VAC electrical power supply units in every cage
- Supports all of the features, interfaces, and terminals of Coral FlexiCom products
- Includes nine card slots in each main cage and 10 card slots in each expansion cage. *Table 3-1* displays the number of slots per system configuration.
- The motherboard of the main cage integrates the circuitry of the service cards, eliminating the need for installing service cards within the system.

Table 3-1 **Number of Universal I/O Slots per System Configuration**

System Configuration	Main Cage	1st Expansion Cage	2nd Expansion Cage	Total System Universal I/O Slots
1 Main Cage	8	—	—	8
1 Main Cage and 1 IPx 500 Expansion Cage	8	10	—	18
1 Main Cage and 2 IPx 500 Expansion Cages	8	10	10	28

Main Cage (IPx 500M)

The main cage is designated as the common control cage, and is used to house the common control cards. The *Installation Manual for Coral IPx 500* will soon be released. For further information, see *Chapter 8 - Common Control Card Descriptions* in the *Coral IPx 500 Installation Manual*. In addition, the cage houses eight universal peripheral slots as well. Each of the Coral IPx 500 configurations includes one IPx 500M cage. *Figure 3-4* displays the layout of the motherboard for the Coral IPx 500M main cage.

Expansion Cage (IPx 500X)

The expansion cage may house a combination of shared service and peripheral cards. The *Installation Manual for Coral IPx 500* will soon be released. These card types are described in detail in the *Coral Service and Peripheral Cards Manual, Chapter 9 - Shared Service Card Descriptions*, and *Chapter 10 - Peripheral Card Descriptions*. *Figure 3-10* displays the layout of the motherboard for the Coral IPx 500X main cage.

Power Supply

Each IPx 500 cage requires an AC or DC PS500 power supply unit. This unit is ordered seperately from the manufacturer. The *Installation Manual for Coral IPx 500* will soon be released. For more information on these units, see *Chapter 7, Power Supply Descriptions* in the *Coral IPx 500 Installation Manual.*

Figure 3-1 ***Coral IPx 500 System with One Main Cage***

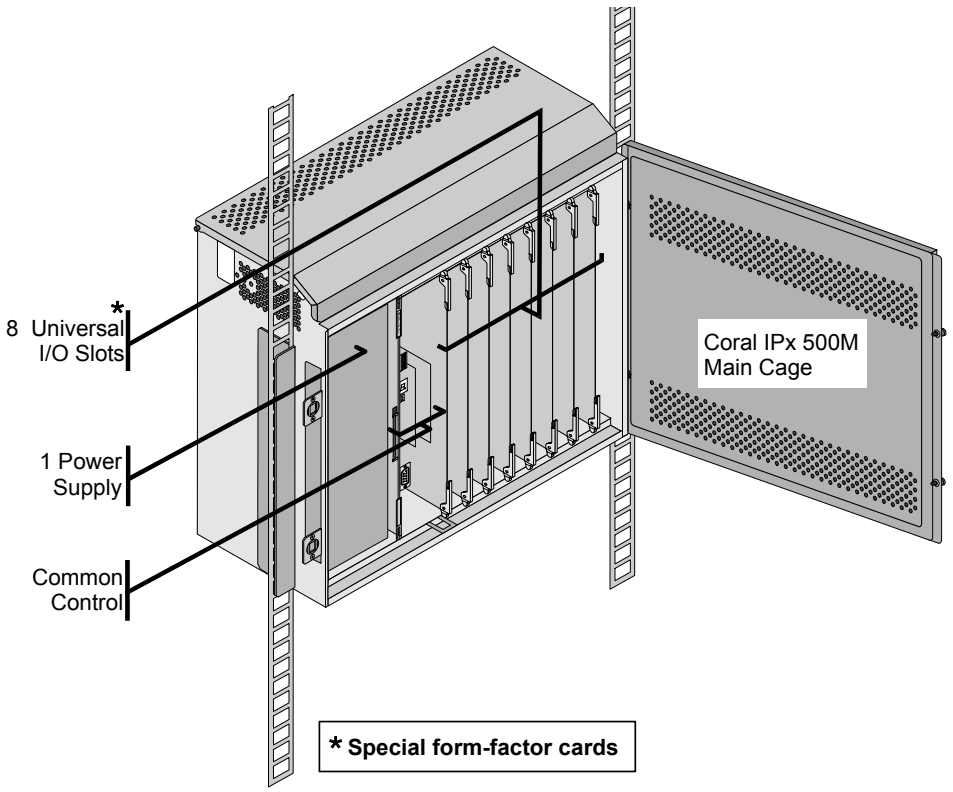


Figure 3-2 ***Coral IPx 500 System with One Main Cage and One IPx 500 Expansion Cage***

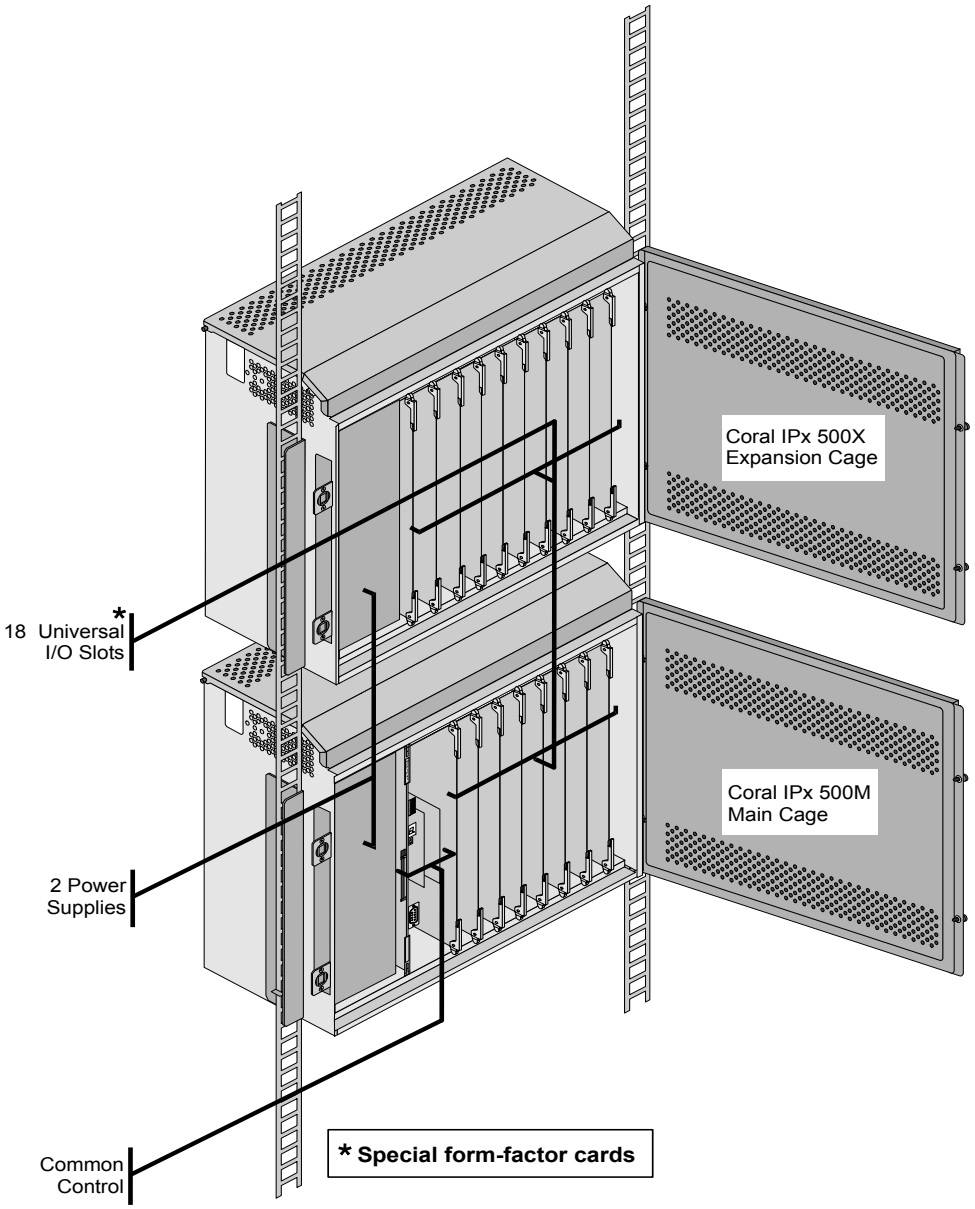
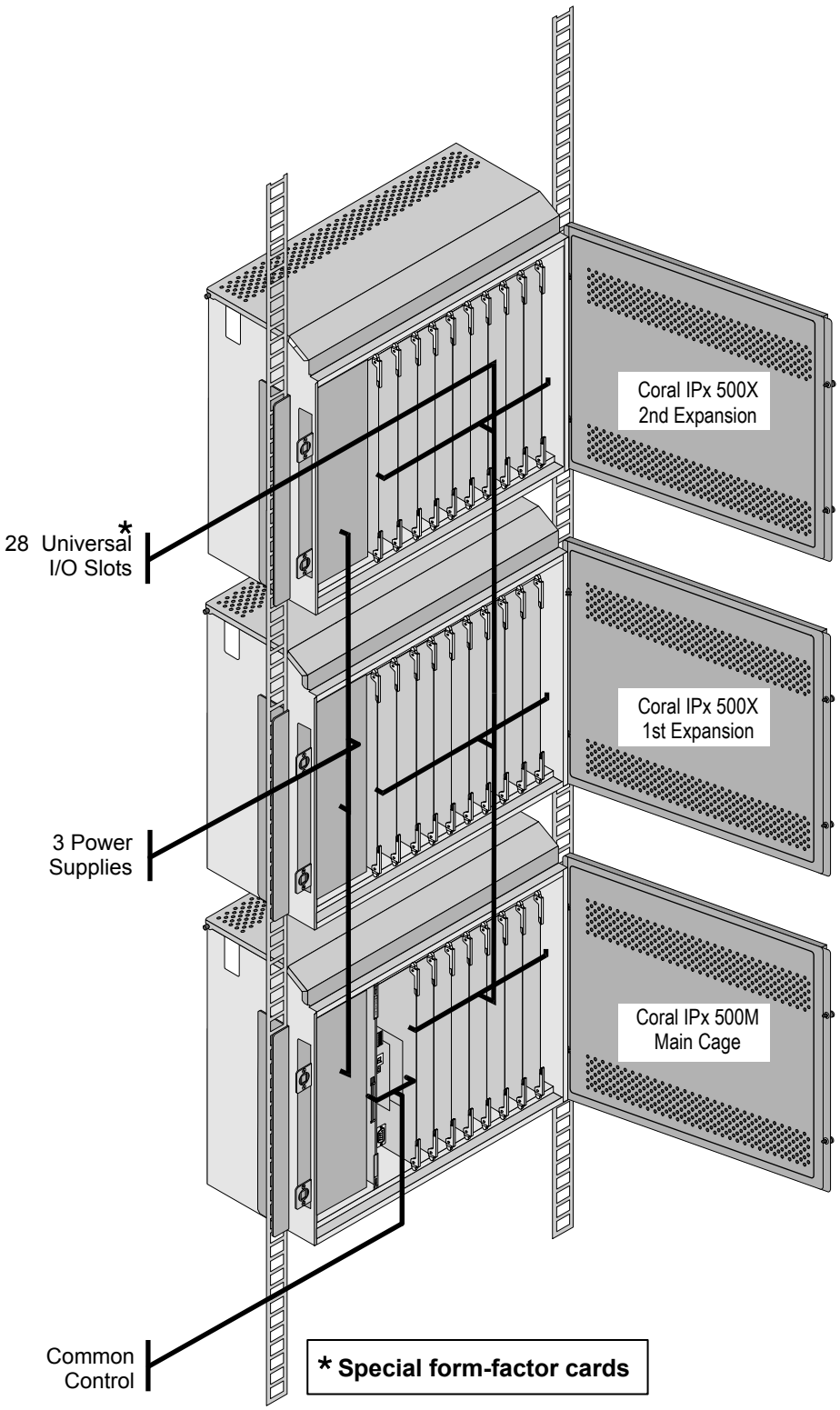


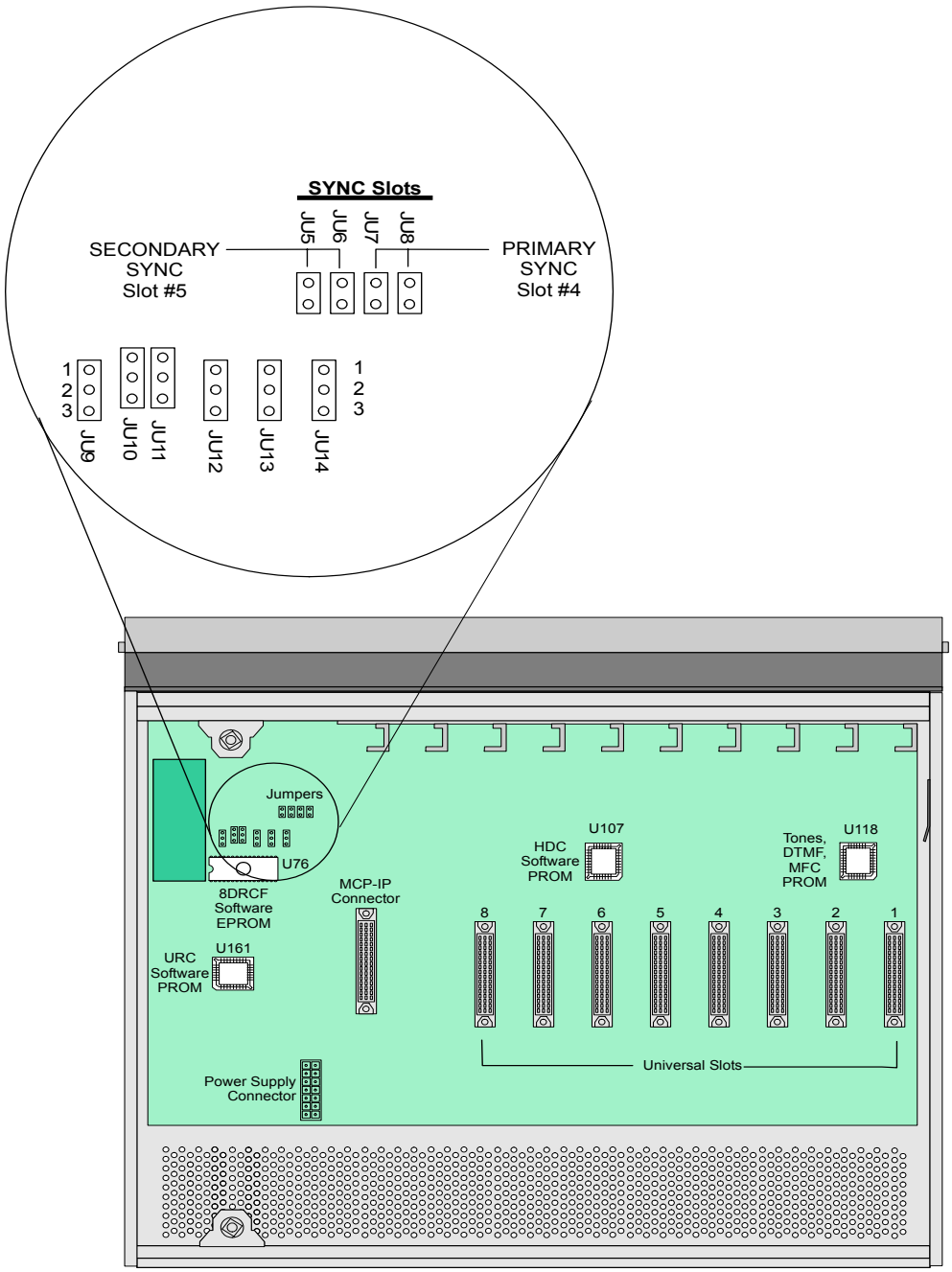
Figure 3-3 ***Coral IPx 500 System with One Main Cage and Two IPx 500 Expansion Cages***



2 Setting the Jumpers on the Main Cage

The jumpers on the main cage are displayed in *Figure 3-4*. The jumpers in the main cage are used to configure the cage to house the primary and/or secondary synchronization slots, configure the modem to transmit and/or receive data, set the music to either an internal or external source, and configure the handshaking options.

Figure 3-4 ***Coral IPx 500M Configuration Jumpers***



Configuring Synchronization Slots

Two synchronization sources may be defined for the Coral IPx 500 system. One serves as the primary source, and the other serves as a secondary synchronization signal source. A total of six slots are factory set to accept digital trunk cards to operate in slave clock mode. Two slots are located in the Coral IPx 500 main cage and the additional four slots are pre-wired in each of the IPx 500 expansion cages. Card slot # 4 in all cages is wired to operate as the primary external clock synchronization source (marked SYNC-PRIME). Card slot # 5 in all cages is wired as the secondary external clock synchronization source (marked SYNC-SECOND). The expansion cage can house the primary and / or secondary synchronization card in slot 4 and 5, respectively. *Figure 3-5* displays the jumper configuration for clock synchronization. The *Installation Manual for Coral IPx 500* will soon be released. For further information, see *section 10.02, Coral Synchronization* in the *Installation Manual for Coral IPx 500.*

NOTE:

The primary and secondary card slots may be housed in the same cage.

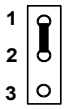
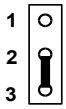
Figure 3-5 ***Jumper Configuration for Synchronization Slots in the Main Cage***

Function	J5	J6	J7	J8
Primary and Secondary Synchronization Cards Installed				
No Synchronization Cards Installed				
Primary Synchronization Card Installed				
Secondary Synchronization Card Installed				

Configuring the Music to External or Internal

The system music source may be either from an internal or an external source. *Figure 3-6* displays the jumper settings for the source type.

Figure 3-6 ***Jumper Configuration for Music Settings***

Function	J9
Internal Music	
External Music	

Configuring the Modem to Transmit or Receive

The Coral IPx 500 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 3-7* displays the jumper settings for the modem.

CAUTION!

Setting the Transmit or Receive function of the modem to "On" during normal system operation exposes the Coral IPx 500 system to penetration by unauthorized parties.

Figure 3-7 ***Jumper Configuration for Modem Reception***

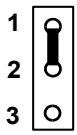
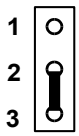
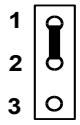
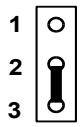
Function	J10
RX Modem - On	
RX Modem - Off	

Figure 3-8 ***Jumper Configuration for Modem Transmission***

Function	J11
TX Modem - On	
TX Modem - Off	

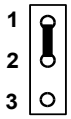
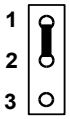
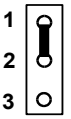
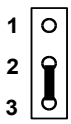
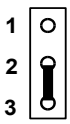
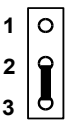
Configuring the "Handshaking" Option

Handshaking is the process whereby two communicating devices acknowledge and recognize each other and open channels for communication.

The Coral IPx 500 system can be managed by three remote workstations. Each remote workstation can be adjusted to a high or low level of handshaking protocol. *Figure 3-9* displays the jumper settings and describes the jumper configuration for each remote station: UART1, UART2, and UART3. An On setting indicates a high level of handshaking protocol; an Off setting indicates a low level of handshaking.

The remote workstations communicate with the Coral IPx 500 system via the Resources connection and the MDF. For information on the connection from the MDF, see *Table 2-3 on page2-5*.

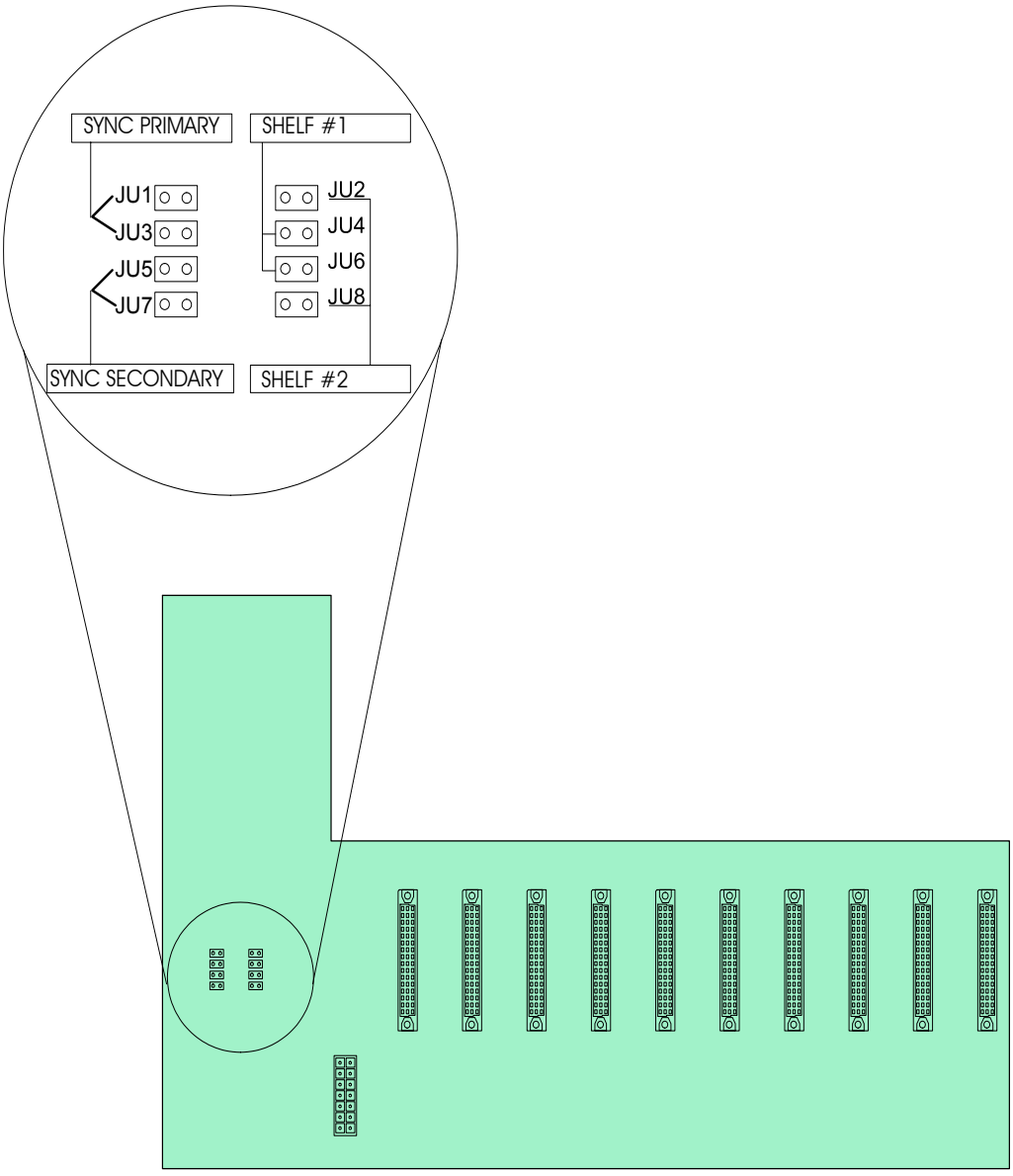
Figure 3-9 ***Jumper Configuration for RS-232 Maintenance Port Handshaking Option***

Function	J12	J13	J14
CTS - On			
CTS - Off			

3 Setting the Jumpers - Expansion Cage

The jumpers on the expansion cage are displayed in *Figure 3-4*. The jumpers in the expansion cage are used to configure the cage to house the primary and/or secondary synchronization slots, and to designate the cage as shelf 1 or shelf 2.

Figure 3-10 ***Coral IPx 500X Configuration Jumpers***



Designating the Shelf Number

CAUTION!

*Do **not** connect configuration jumpers of different shelves to identical settings. Doing so will result in short circuit and system malfunction.*

NOTE:

The term "shelf" is used in this section in order to retain consistency with Program Interface terminology. The terms "shelf" and "cage" are identical.

Each peripheral card must be recognized by the main shelf. Therefore, Coral IPx 500 must be able to distinguish between the first and second expansion shelves. The main shelf is designated 0 by the manufacturer. The first expansion shelf is designated 1. The second expansion shelf is designated 2. Jumpers are used to configure the shelf number. *Figure 3-11* displays the jumper configuration for each cage designation.

Figure 3-11 ***Jumper Configuration for Shelf Designation***

Function	J2	J4	J6	J8
Shelf # 1				
Shelf # 2				

Designating Synchronization Slots

Two synchronization sources may be defined for the Coral IPx 500 system. One serves as the primary source, and the other serves as a secondary synchronization signal source. A total of six slots are factory set to accept digital trunk cards to operate in slave clock mode. Two slots are located in the Coral IPx 500 main cage and the additional two slots are pre-wired in each of the IPx 500 expansion cages. Card slot # 4 in all cages is wired to operate as the primary external clock synchronization source (marked SYNC-PRIME). Card slot # 5 in all cages is wired as the secondary external clock synchronization source (marked SYNC-SECOND). The cage is shipped from the manufacturer with the primary and secondary synchronization cards assembled in slots 4 and 5 of the main cage. The expansion cage can house the primary and/or

secondary synchronization card in slot 4 and 5, respectively. *Figure 3-12* displays the jumper configuration for clock synchronization. The *Installation Manual for Coral IPx 500* will soon be released. For further information, see *section 10.02, Coral Synchronization* in the *Installation Manual for Coral IPx 500.*

NOTE:

The primary and secondary card slots may be housed in the same cage.

Figure 3-12 ***Jumper Configuration for Primary and Secondary Synchronization Slots in the Expansion Cage***

Function	J1	J3	J5	J7
Primary and Secondary Synchronization Cards Installed				
No Synchronization Cards Installed				
Primary Synchronization Card Installed				
Secondary Synchronization Card Installed				

4 Connections to Other Cages

The cages include cable connections that allow the expansion cages to be added. The main cage includes one 50-pin female connection that connects to the first expansion cage with an H500 male/female cable that is 55" (140 cm) long. When there is only one cage in the system, this connection is not used. The second expansion cage includes two 50-pin connections: the top connection is female; the bottom connection is male. The top female connection connects to the first expansion cage. The lower connection connects either to the female connection on the main cage or to the female connection on the second expansion cage. *Figure 3-13* and *Figure 3-14*, show how to interconnect the cages when there is more than one cage in the system.

Figure 3-13 ***Connection between Main Cage and one Expansion Cage***

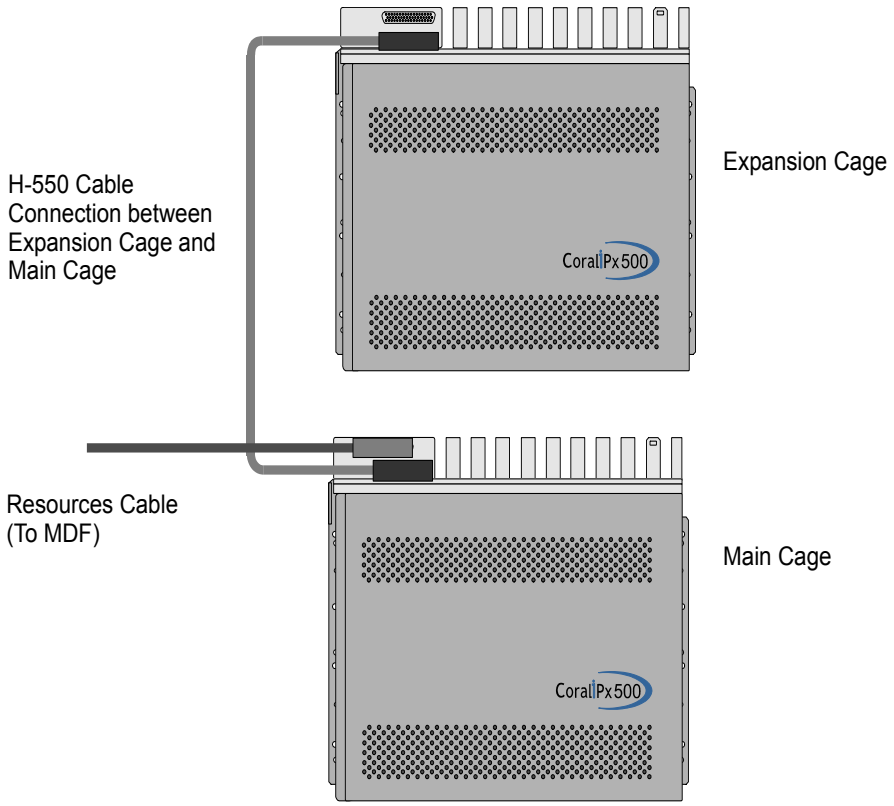
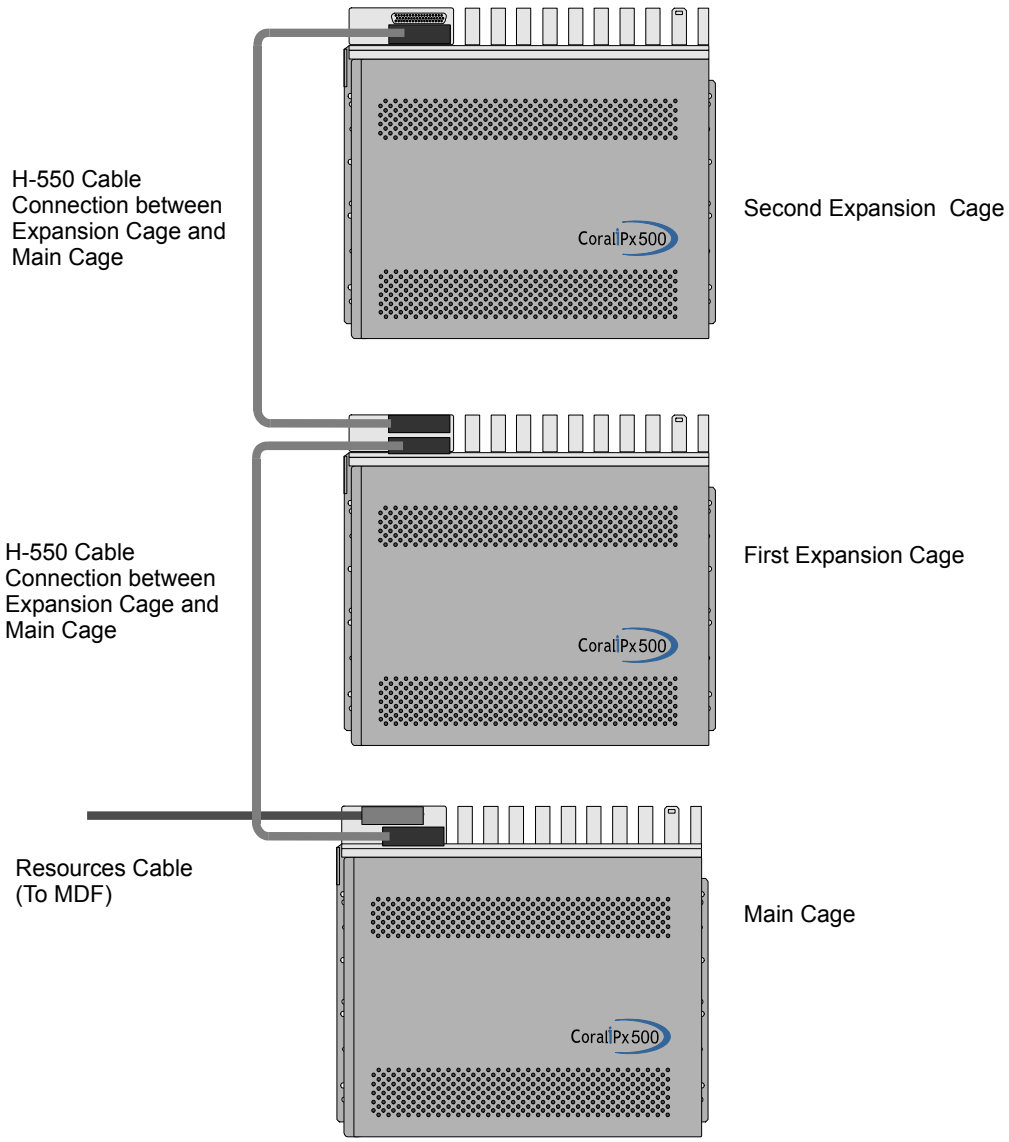


Figure 3-14 ***Connections between Main Cage and Two Expansion Cages***



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