

# Excalibur™ Card Carrier

## Installation and Operation

07D08C-1/C 3/94

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## Warranty

The period of warranty for the Excalibur Card Carrier starts on the date of sale to the original end user and extends one year. Refer to Milgo Solutions, Inc. Limited Warranty for details.

Milgo Solutions requires a Return Material Authorization (RMA) prior to the return of any equipment under the provisions of the warranty. Please contact your authorized reseller or the nearest Milgo support center for details.

Third Edition, March, 1994

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# About This Manual

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## Manual Description

The Excalibur Card Carrier Installation and Operation manual provides the information you need to properly install and operate this high-density card cage. It covers Excalibur Card Carrier model 07-08C. (If you have an 07-08A model cage, refer to manual number 07D08A-1.) The manual is organized as follows:

- **Chapter 1, "Introduction"** provides you with an overview of card cage features. It includes information on the master control panel, available power supply arrangements, and the two cage backplanes.
- **Chapter 2, "Installation"** contains information on mounting the cage, installing its various components, connecting to external equipment, grounding the cage, and applying power.
- **Chapter 3, "Operation"** explains how to use the master control panel to select individual devices within the cage for monitoring, configuration, or testing.
- **Appendix A** lists the technical specifications.
- **Appendix B** contains important information for U.K. users.



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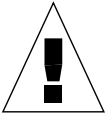
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## Important Safety Instructions

1. Never install telephone wiring during a lightning storm.
2. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
3. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
4. Use caution when installing or modifying telephone lines.
5. Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electrical shock from lightning.
6. Do not use the telephone to report a gas leak in the vicinity of the leak.

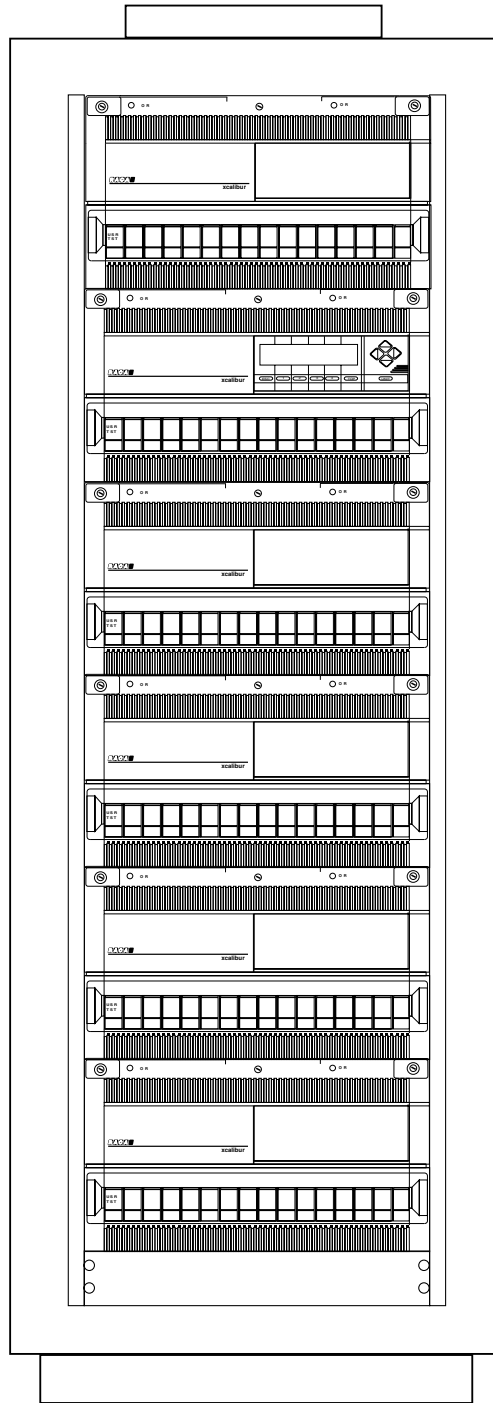


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**Caution:** To ensure compliance with government regulations, do not install or operate this product until you have read the information contained in Appendix B.

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**Excalibur Card Carrier Rack Installation**

# Chapter 1

## Introduction

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### Introducing the Excalibur Card Carrier

The Excalibur Card Carrier is a high-density cage designed to house the Excalibur Network Access Resource (ENAR) family of communication products and systems. Each cage can house up to 16 single-card communication devices and one system control device (required for certain Excalibur systems) in a space just 10 inches high by 17 inches wide. Up to six cages can be installed in a standard 6-foot rack, providing housing for up to 96 communication devices. (The housing capacity is reduced when option cards such as Multiport are installed.)

The Excalibur Card Carrier features a modular design that makes it easy to install and replace components. All communication devices slide easily in and out of the front of the cage. The interface connectors for each device are contained on special transition boards that slide into the back of the cage. There is no need to turn off the power when installing or removing a device. Modular power supplies and fan assemblies can be replaced by simply sliding out a module and sliding in its replacement.

Virtually any combination of analog and digital ENAR communication devices can be intermixed within the same cage. These devices include modems, modecs, digital access products (DAPs), and T-1 CSUs. The Excalibur Card Carrier also houses components of the Excalibur Dial Restoral System (EDRS) and Excalibur Analog Single-Ended T-1 (ASET-1) system.

### Master Control Panel

The Excalibur Card Carrier comes with a master control panel that provides single-point control for all devices installed in the rack. The control panel has 11 pushbuttons and a 7-line by 32-character LCD screen that let you select any device for monitoring, configuration, and testing. The control panel continuously monitors the status of all installed devices. Any active alarms, calls, or tests are displayed with easy-to-read graphics on the LCD screen.

### Power Supply Arrangements

The Excalibur Card Carrier is available with five power supply arrangements:

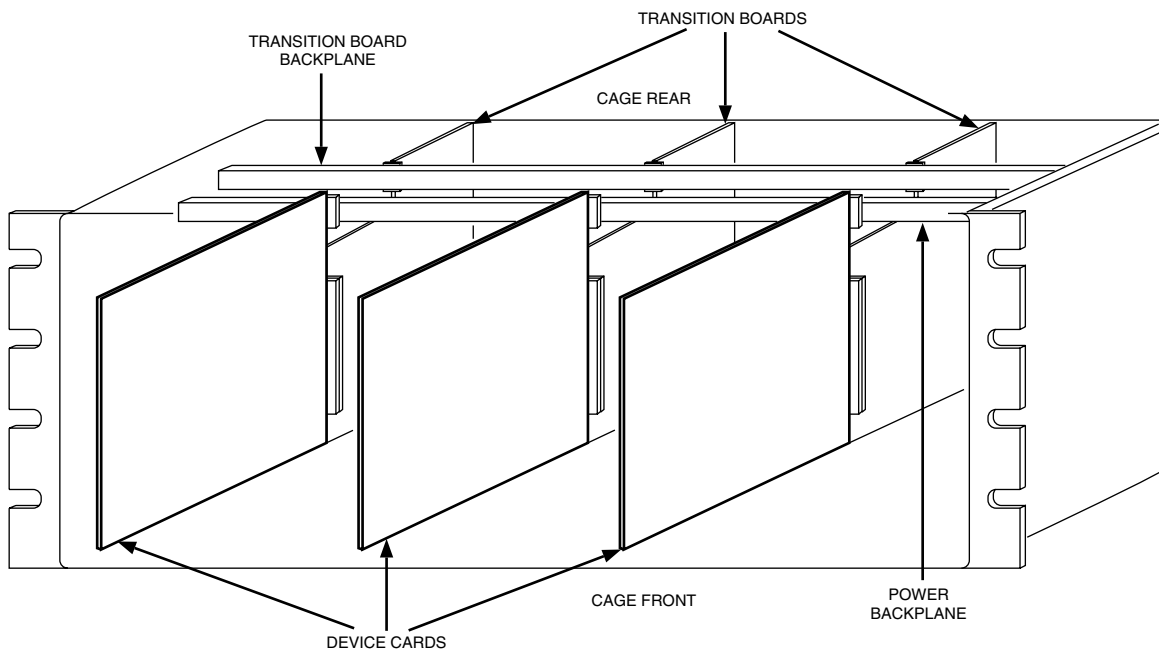
- Single AC supply
- Single DC supply

- Dual AC supplies
- Dual DC supplies
- Single AC supply with single DC supply

The dual power supply arrangements provide automatic backup power. When both supplies are working, they share the load between them. If one fails, the other takes over the entire load automatically. The single AC supply with single DC supply arrangement provides automatic battery backup to AC primary power. In this arrangement, the AC supply supports the entire load when it is working. If it fails, the DC supply takes over the entire load automatically.

## Backplanes

The Excalibur Card Carrier contains two backplanes that extend across the width of the cage: the power backplane and the transition board backplane. These backplanes provide the path through which power and signals travel to the installed cards. Communication device cards plug into the power backplane through the front of the cage, while transition boards plug into the transition board backplane through the back of the cage. (See Figure 1-1.)



**Figure 1-1. Card Carrier Backplanes**

## Power Backplane

The power backplane carries:

- Power to the installed device cards and the transition board backplane
- Cage/slot addressing information between installed devices
- Two high-speed time-division multiplexed (TDM) busses, which transmit DS0 (64 Kbps) channels between installed devices
- The control panel bus, which transmits data and control signals between the master control panel and the installed devices

## Transition Board Backplane

The transition board backplane carries:

- Four bridge busses, which mix and route data and control signals between installed devices; typically used for dial backup applications
- The daisy-chain bus; typically used by device cards to communicate with their associated Multiport cards



# Chapter 2

## Installation

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### Overview

This chapter explains how to install the Excalibur Card Carrier. Installation consists of the following steps:

1. Mounting the cage in an equipment rack
2. Installing the Card Cage I/O card
3. Installing transition boards and corresponding Excalibur communication devices
4. Installing the master control panel
5. Making required Card Cage I/O card and transition board cable connections
6. Grounding the cage and rack
7. Powering up the system



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**Warning:** The procedures described in this chapter must be performed by qualified service personnel only.

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### Parts List

Each Excalibur Card Carrier comes with a bag containing the parts listed in Table 2-1.

**Table 2-1. Parts List**

Quantity	Description
2	Rack mount brackets
4	Pan-head screws (3/8")
4	Internal tooth lock washers (#10)
8	Pan-head screws (3/4")

**Table 2-1. Parts List (Continued)**

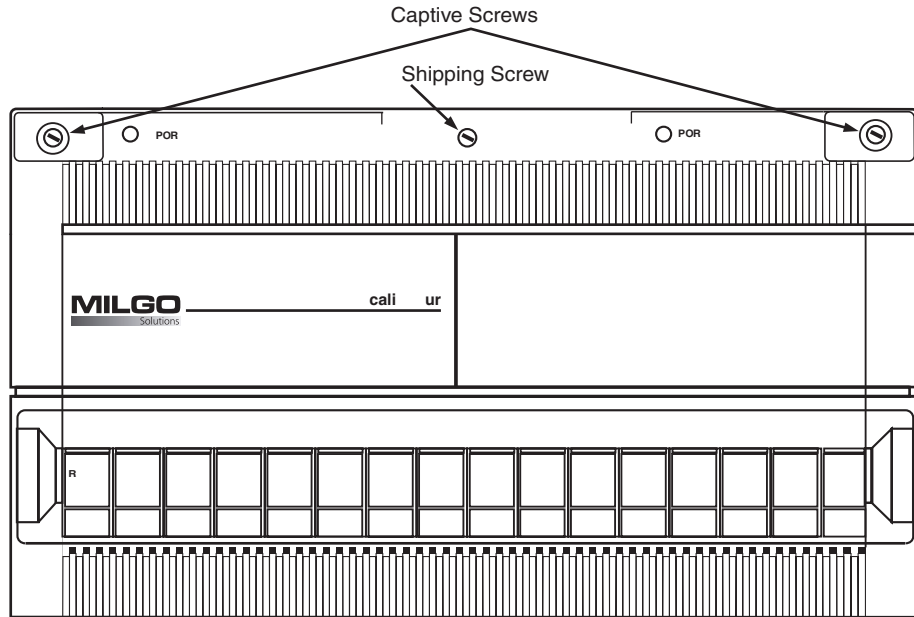
Quantity	Description
10	Flat washers (#10)
10	Split lock washers (#10)
2	Pan-head screws (1/2")
2	Cage nuts
15	Rear panel cover plates
30	Pan-head screws (1/4")
30	Internal tooth lock washers (#6)
2	Power cords (AC or DC)
1	Grounding caution label
1	P.C. card extractor

The Card Cage I/O card and the control panel are shipped in separate packages. One Card Cage I/O card is required for each cage. One control panel is required for each rack of up to six cages.

## Rack Mounting

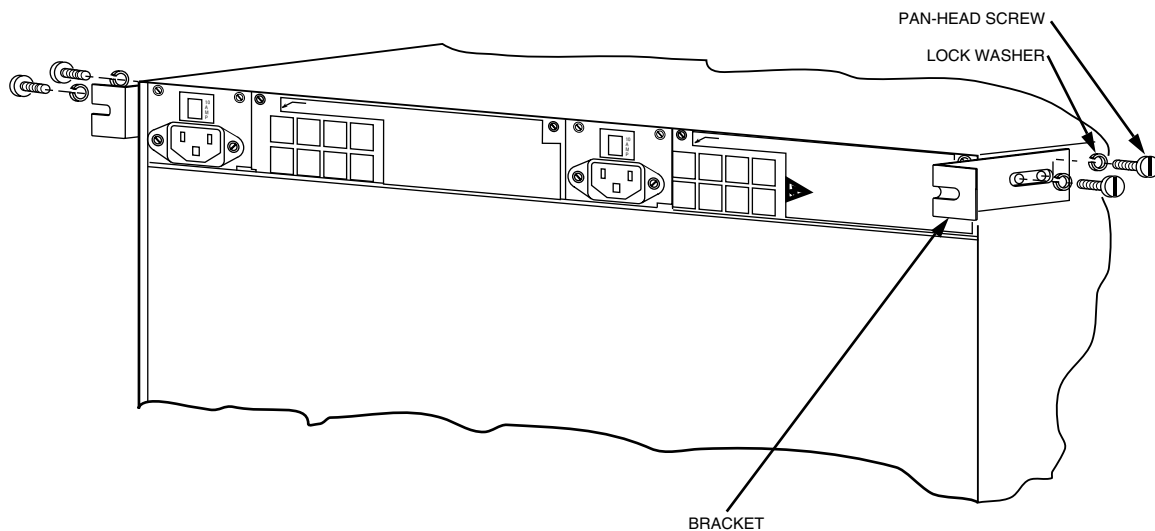
To mount the Excalibur Card Carrier in a standard 19-inch wide equipment rack, follow these steps:

1. Remove and discard the shipping screw (Figure 2-1) from the front door of the cage.
2. Unlatch the front door by loosening each of the captive screws (Figure 2-1). Then pull the door forward.



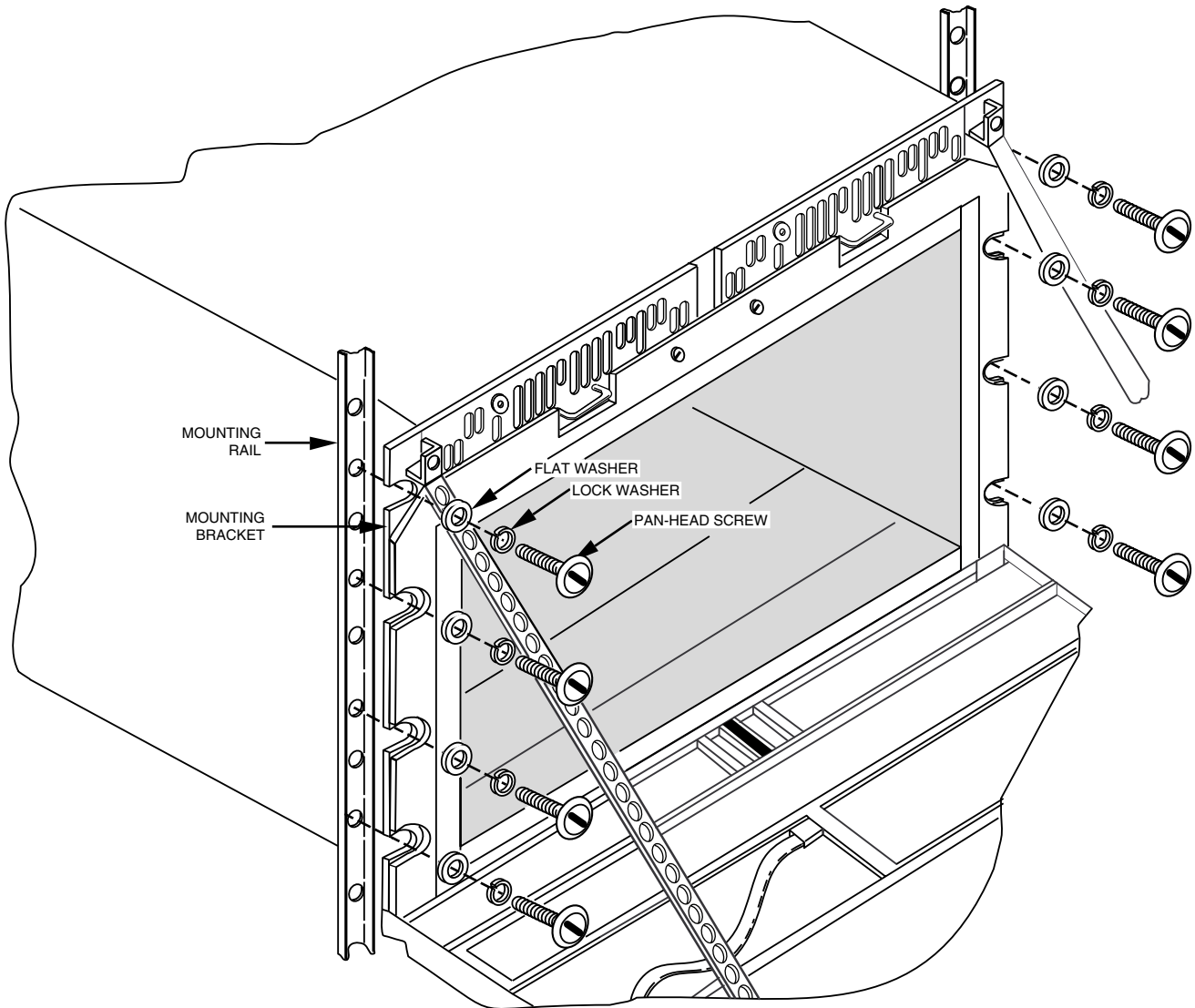
**Figure 2-1. Cage Door Screws**

3. Attach a rack mount bracket to each side of the cage using 3/8" pan-head screws and #10 internal tooth lock washers. (See Figure 2-2.) Do not completely tighten the screws at this time; the brackets must remain adjustable so that when you place the cage in the rack, you can move the brackets forward or back for proper fit.



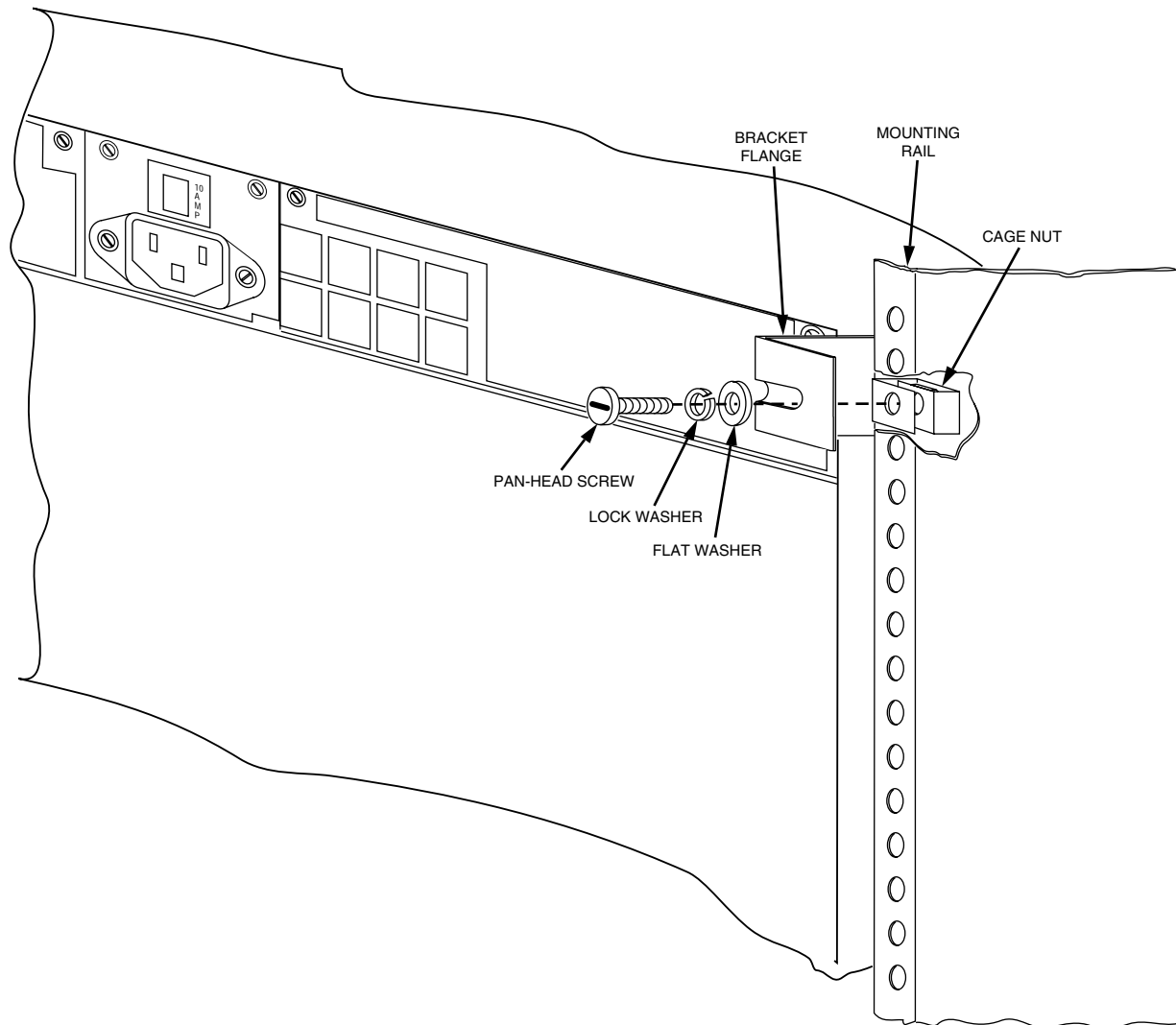
**Figure 2-2. Attaching Rack Mount Brackets to Cage**

4. Lift the cage into the rack, and align the openings on the cage's front mounting brackets with the holes in the rack's front mounting rails. (See Figure 2-3.)
5. Attach the cage to the front rails using 3/4" pan-head screws, #10 split lock washers, and flat washers, as shown in Figure 2-3.



**Figure 2-3. Attaching Cage to Front Rails**

- At the rear of the cage, extend each rack mount bracket so that its flange fits snugly around the back of the rack's middle mounting rails. (See Figure 2-4.) Fasten each bracket to the rail using a 1/2" pan-head screw, #10 split lock washer, flat washer, and cage nut. Then tighten the screws that secure the rear brackets to the cage. (See Figure 2-2.)



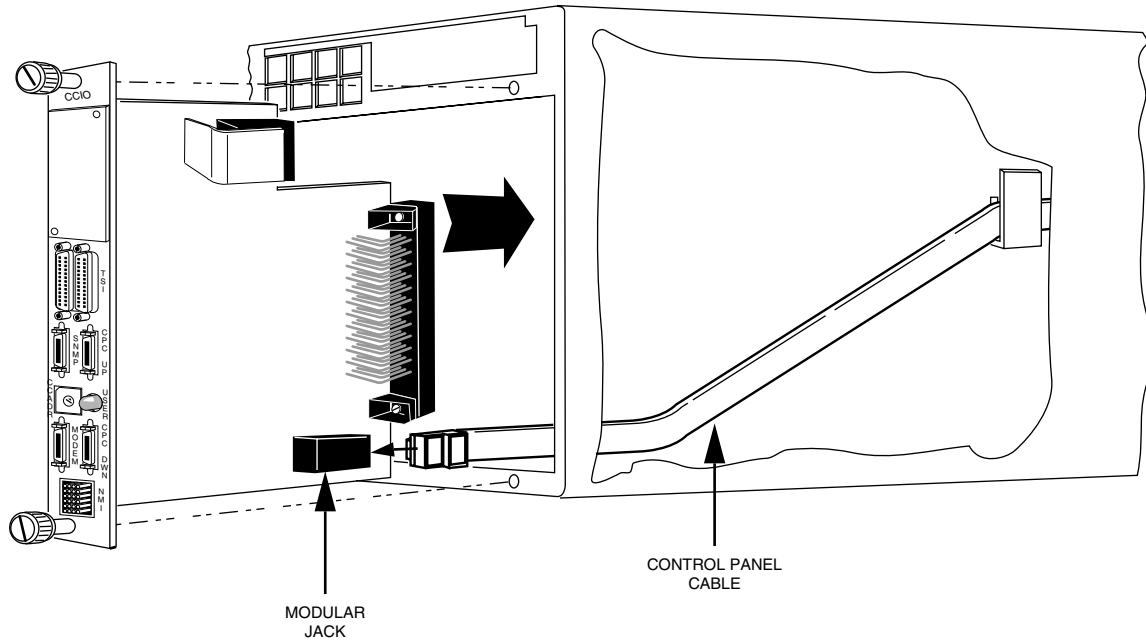
**Figure 2-4. Attaching Cage to Middle Rails**

## Installing CCIO Cards

One Card Cage I/O (CCIO) card must be installed in each Excalibur Card Carrier. Several types of CCIO cards are available. The type you need depends on the products you are installing in the cage. For detailed information about CCIO card functions and connections, refer to the individual product manuals.

The CCIO card must be installed in the rightmost slot in back of the cage (labeled 0). To install the card, follow these steps:

1. Position the card at slot 0, and connect the control panel cable (located inside the cage) to the card's modular jack. See Figure 2-5.
2. Slide the card completely into the slot.
3. Secure the card by tightening the top and bottom retaining screws.



**Figure 2-5. Installing CCIO Card**

## Installing Transition Boards

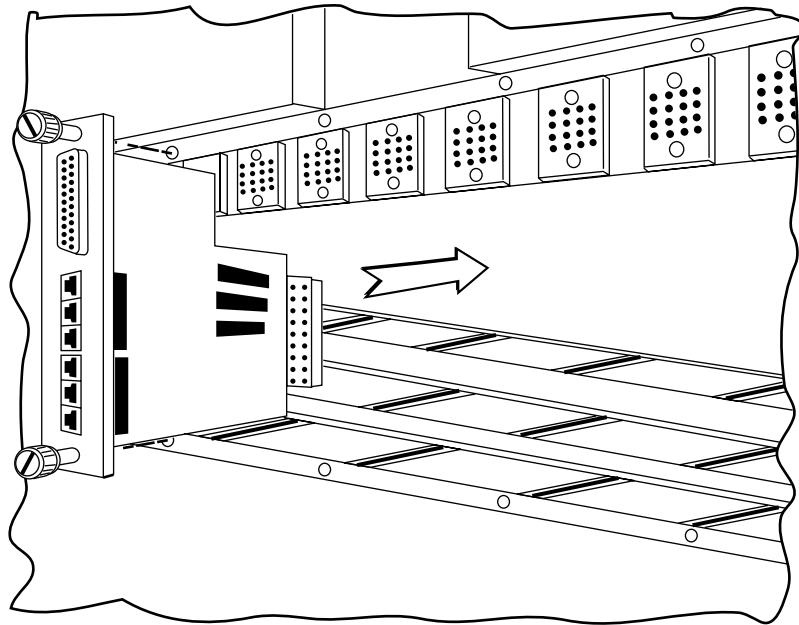
Most Excalibur communication devices come with a transition board. A transition board is a vertically oriented printed circuit assembly that contains the interface connectors for a device. The back of the Excalibur Card Carrier provides 16 slots, labeled 1-16, for housing the transition boards. To install a transition board, slide it into the desired slot. (See Figure 2-6.) Secure the board by tightening the top and bottom retaining screws.

If you install less than 16 transition boards in the cage, you must install rear panel cover plates over the empty slots. Secure each cover plate with two pan-head screws and lock washers.

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**Note:** Always install and secure the transition boards before installing devices in the front of the card carrier.

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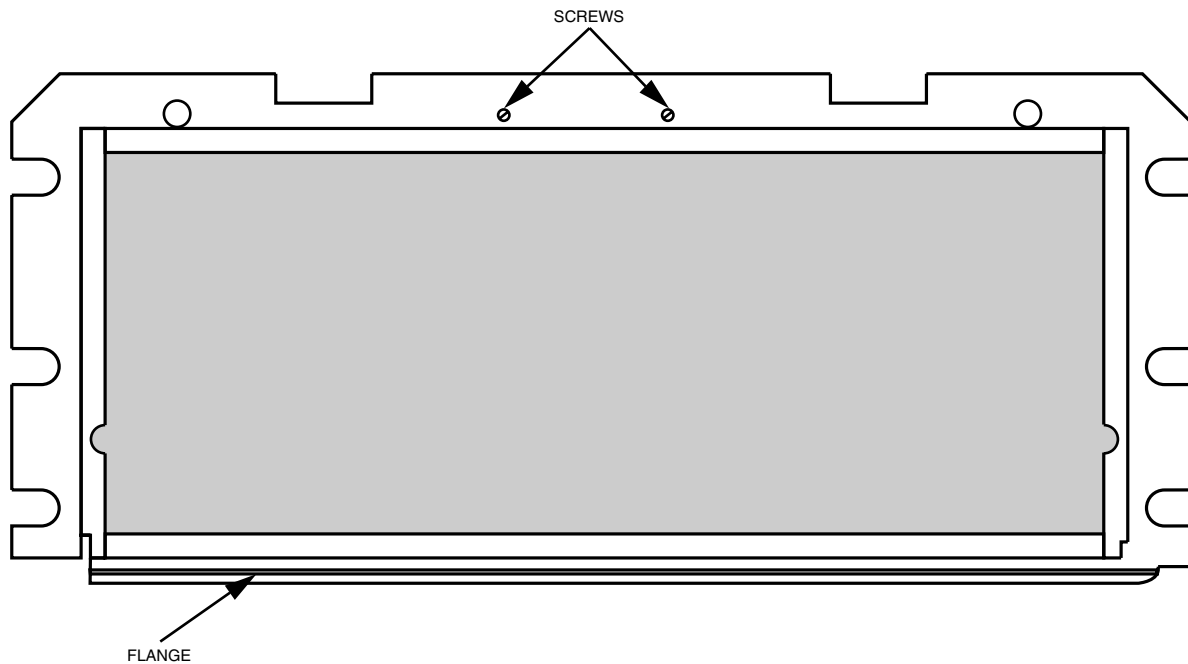


**Figure 2-6. Installing Transition Boards**

## Installing Excalibur Devices

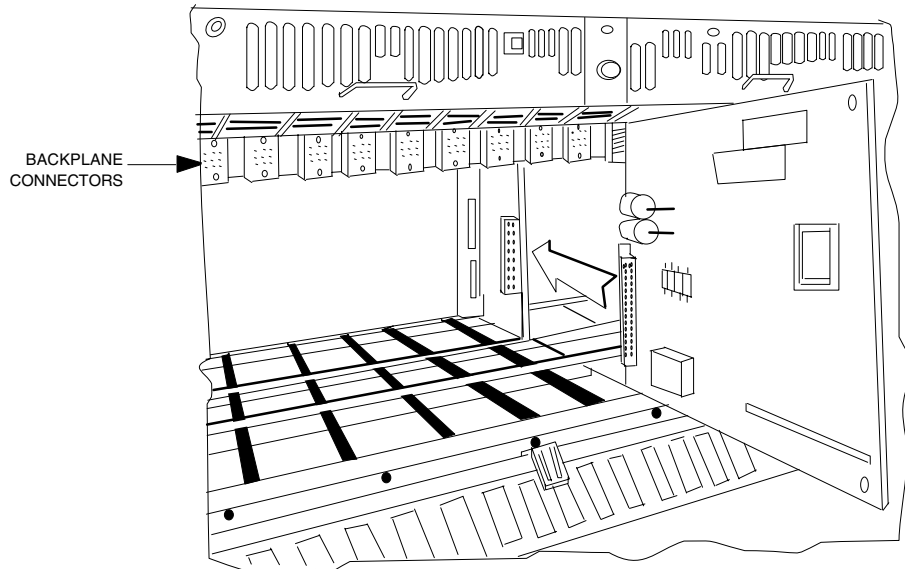
The front of the Excalibur Card Carrier provides 17 slots for housing Excalibur device cards. The slots labeled 1-16 are used for Excalibur communications devices, such as modems, modems, DAPs, DBRs, and T-1 CSUs. The leftmost slot, labeled 0, is reserved for the Excalibur Dial Restoral System (EDRS) Chassis Controller card or the Excalibur Analog Single-Ended T-1 (ASET-1) System Controller card.

Before you can install cards, you must first remove the protective screen from the front of the cage. To do so, remove the two screws from the top of the screen (see Figure 2-7) and lift it from the cage.



**Figure 2-7. Protective Screen**

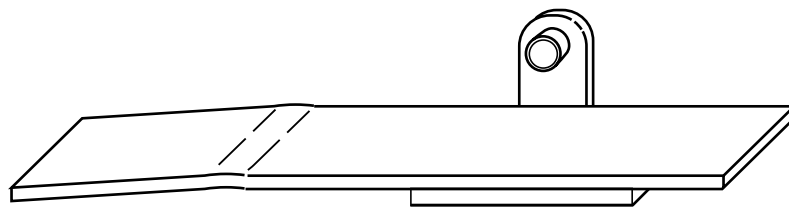
To install a card, slide it into the desired slot using the top and bottom tracks. (See Figure 2-8.) Make sure the edge connector on the card is firmly seated in the cage backplane connector. When installing a Multiport Card, you must use the slot directly to the right of its associated Aggregate Card. If power is on, always install the Multiport Card before installing its associated Aggregate Card.



**Figure 2-8. Installing Excalibur Communication Devices**

When you have finished installing the cards, replace the protective screen. To do so, place it against the front of the cage so that the right-angle flange (see Figure 2-7) is behind the four rivets protruding from the bottom front of the cage. Then replace the two screws you removed earlier. When the screen is installed, close the cage door by moving it into the upright position and tightening the two captive screws.

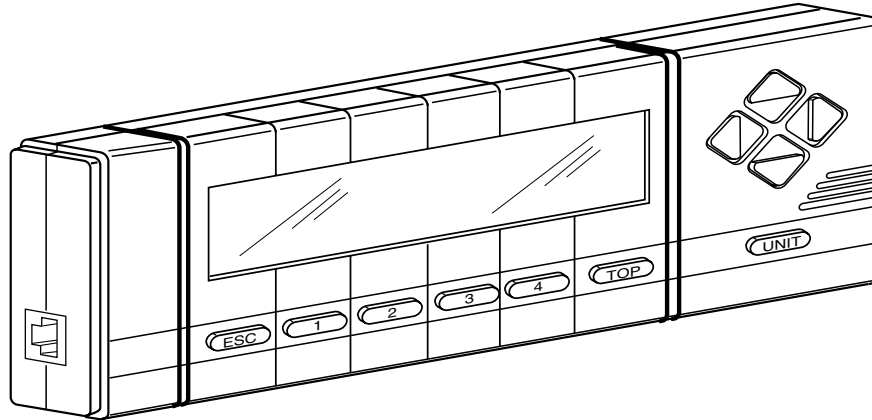
If you ever need to remove a card, use the provided p.c. card extractor tool. (See Figure 2-9.) To remove a card, insert the tool into the card's top or bottom corner hole and pull outward. For convenient storage, the p.c. card extractor has a fastening strip that you can secure to the matching strip on the inside of the cage door (located on the upper left ledge).



**Figure 2-9. P.C. Card Extractor**

## Installing Master Control Panel

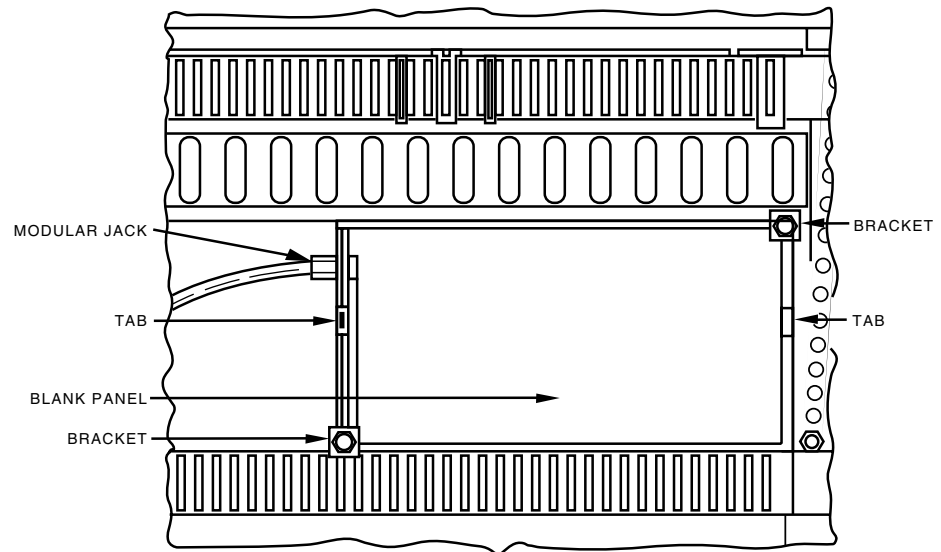
The master control panel (Figure 2-10) lets you control any Excalibur device in up to six interconnected card cages. You can mount the control panel in the front door of any of the interconnected cages, though we recommend that you choose the cage that is at eye level. (If you wish, you can mount a separate control panel in each cage door.)



**Figure 2-10. Master Control Panel**

To mount the control panel in the cage door, follow these steps:

1. Open the front door of the cage.
2. Remove the two brackets that secure the blank front panel to the inside of the cage door. (See Figure 2-11.)



**Figure 2-11. Removing Blank Front Panel**

3. Disconnect the modular jack from the blank front panel.
4. Push back the tabs and remove the blank front panel.
5. Place the control panel into the opening vacated by the blank front panel. Carefully support the control panel until it is securely seated in the opening.
6. Reinstall the brackets and modular jack that you removed in Steps 2 and 3.
7. Close the cage door.

## CCIO Card Connections

The cable connections required for the CCIO card differ depending on the type of card installed. For instructions on the connections and cables required for your particular card, refer to the manual(s) for the products installed in the cage.

## Transition Board Connections

The transition boards, installed at the rear of the cage, contain the interface connectors for each Excalibur communication device. For instructions on these connections and required cables, refer to the manual for the particular device.

## Important Safety Precautions for Service Personnel

The following sections contain important safety precautions to follow before powering up the system.

### Grounding the System

To meet safety agency standards, you must make the following ground connections at each rack:

1. Connect each cage's ground wire to a safety earth ground on the rack frame. The ground wire is secured to the left rail on the back of the cage, as shown in Figure 2-12. The safety earth ground on the rack frame must be free of paint.

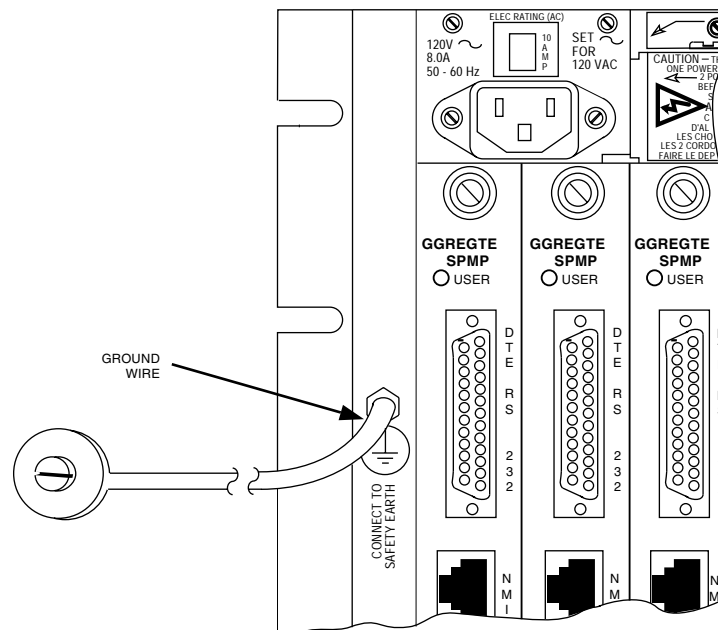


Figure 2-12. Cage Ground Wire

2. Connect a wire from the rack frame to the building's main safety earth ground. Use 12 gauge or larger wire, up to 15 feet in length (preferably green with a yellow stripe). This wire must be identical in insulation material and thickness to that of the grounded and ungrounded branch-circuit supply conductors, and must be installed as part of the branch circuit that supplies the rack. Do not connect this wire to the same screw on the rack frame used for grounding the cages.

When the ground connections are complete, affix the provided ground caution label to the rack frame. Place it in a readily visible location near the ground connections.

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**Notes:** The grounding wire must be grounded to earth at the service equipment or, if supplied by a separately derived system, at the supply transformer or motor generator set.

The attachment plug receptacles in the vicinity of the system must all be of a grounding type, and the grounding conductors serving these receptacles must be connected to earth ground at the service equipment.

If the rack has a non-locking type power plug, you must replace it with a UL/CSA-approved locking type plug (twist-lock) of the same electrical rating.

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## Power Supply Cautions

To avoid electrical shock and energy hazard, follow these guidelines:

- The Excalibur Card Carrier uses switching mode power supplies that produce more than 300 volts. Use extreme caution when removing, replacing, and servicing power supplies.
- The power supplies have large capacitors that hold a high voltage charge. Before removing a supply, turn off the power and wait 2 minutes.
- When the cage is powered by two AC power supplies or two DC power supplies, the system remains powered up when one supply is disconnected. Test the high voltage areas before servicing.
- The safety of this product is dependent on the 48 volt input source being isolated from all hazardous voltages. The 48 volt input source is used to power the 48 volt DC power supply.
- Use extreme caution when checking for voltages on the power backplane. You may contact hazardous voltages when removing the fan assembly if the AC or DC power cord is connected.

### ATTENTION

Pour éviter les chocs électriques et les risques de transfert d'énergie, suivez les directives suivantes:

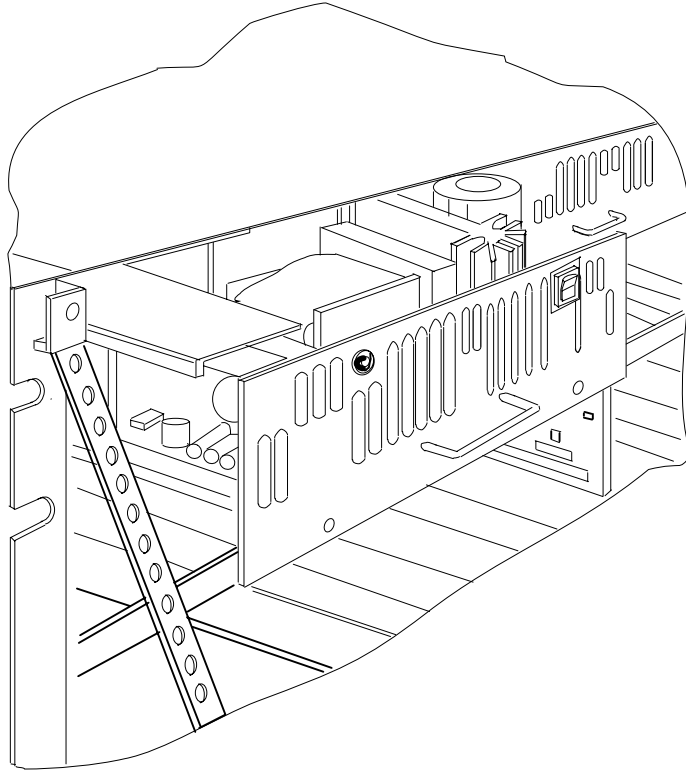
- L'Excalibur comporte des alimentations à découpage fournissant plus de 300 V. Soyez très prudent lors de l'installation, du remplacement et de l'entretien de ces alimentations.
- Les alimentations sont raccordées à de puissants condensateurs haute tension. Avant d'enlever une alimentation, coupez le courant et attendez deux minutes.

- Si le panier est relié à deux alimentations c.a. ou deux alimentations c.c., le système reste sous tension lorsqu'on débranche une des alimentations. Vérifiez les zones à haute tension avant la maintenance.
- Pour ne pas compromettre la sûreté de ce produit, il faut isoler l'entrée à 48V de toute tension dangereuse. L'entrée à 48V sert au bloc d'alimentation 48V c.c.
- La plus grande prudence s'impose lorsqu'on vérifie la tension sur le bus d'alimentation. On risque de toucher des pièces sous tension dangereuse lorsqu'on enlève le bloc ventilateur si le cordon d'alimentation c.a ou c.c. est encore branché.

## Changing Power Supply Input Voltage

Each AC power supply comes preset to operate with an input voltage of 89 to 132 VAC or 178 to 264 VAC, depending on the country the cage is intended for. If you must change the power supply's input voltage setting, follow these steps:

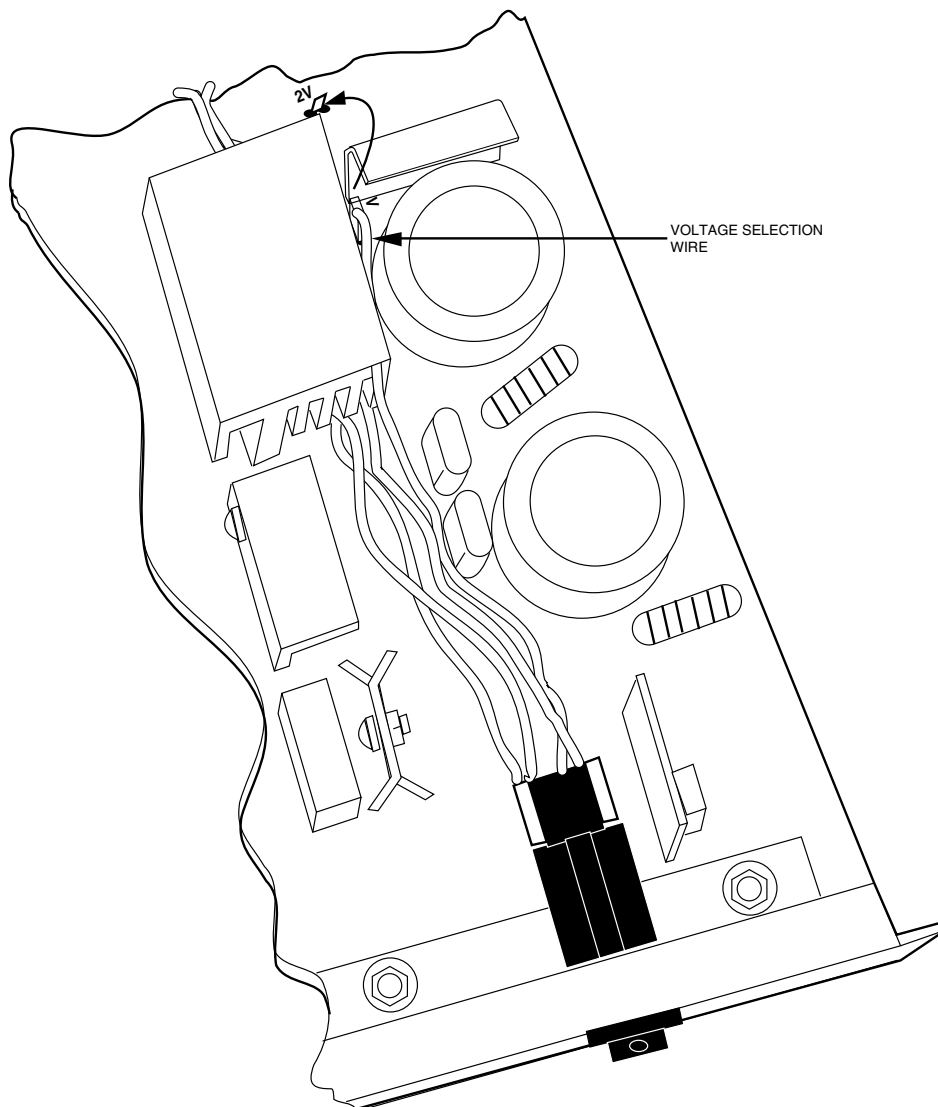
1. Open the front door of the cage. Each power supply is mounted in a shelf located above the Excalibur device cards.
2. Remove the protective screen from the front of the cage. (See "Installing Excalibur Devices" earlier in this chapter for instructions.)
3. Remove the pan-head screw and lock washer that secure the power supply to the cage. Then slide the power supply out of the shelf, as shown in Figure 2-13.



**Figure 2-13. Removing the Power Supply**

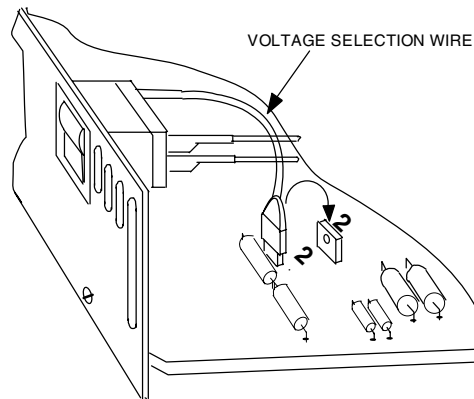
If your card carrier has power supply Part No. 41C5012, follow Step 4. If your card carrier has power supply Part No. 41C5004, follow Step 5.

4. Move the power supply's voltage selection wire to the post labeled **115** or **230**, depending on the desired input voltage. (See Figure 2-14.) To remove the wire from the **115** post, you will need to use 1¾" or longer needlenose pliers. Position the pliers at a 90° angle to the p.c. card and grasp the voltage selection wire as close to the post as possible. Then pull the wire straight up.



**Figure 2-14. Setting Voltage Selection Wire - Power Supply 41C5012**

5. Move the power supply's voltage selection wire to the post labeled **120** or **240**, depending on the desired input voltage. (See Figure 2-15.)



**Figure 2-15. Setting Voltage Selection Wire - Power Supply 41C5004**

6. Slide the power supply back into the shelf and secure it with the pan-head screw and lock washer you removed in Step 3.
7. Replace the protective screen as described in "Installing Excalibur Devices." Then close the front door of the cage.
8. At the rear of the cage, remove the **Factory Set for XXX VAC** label from the AC input connector panel. Then affix the correct voltage label (available from Racal-Datacom) over the incorrect voltage silkscreen on the panel. For example, if you changed the input voltage setting to 240 VAC, affix a **Factory Set for 240 VAC** label over the silkscreen that reads **120V 8.0A**.



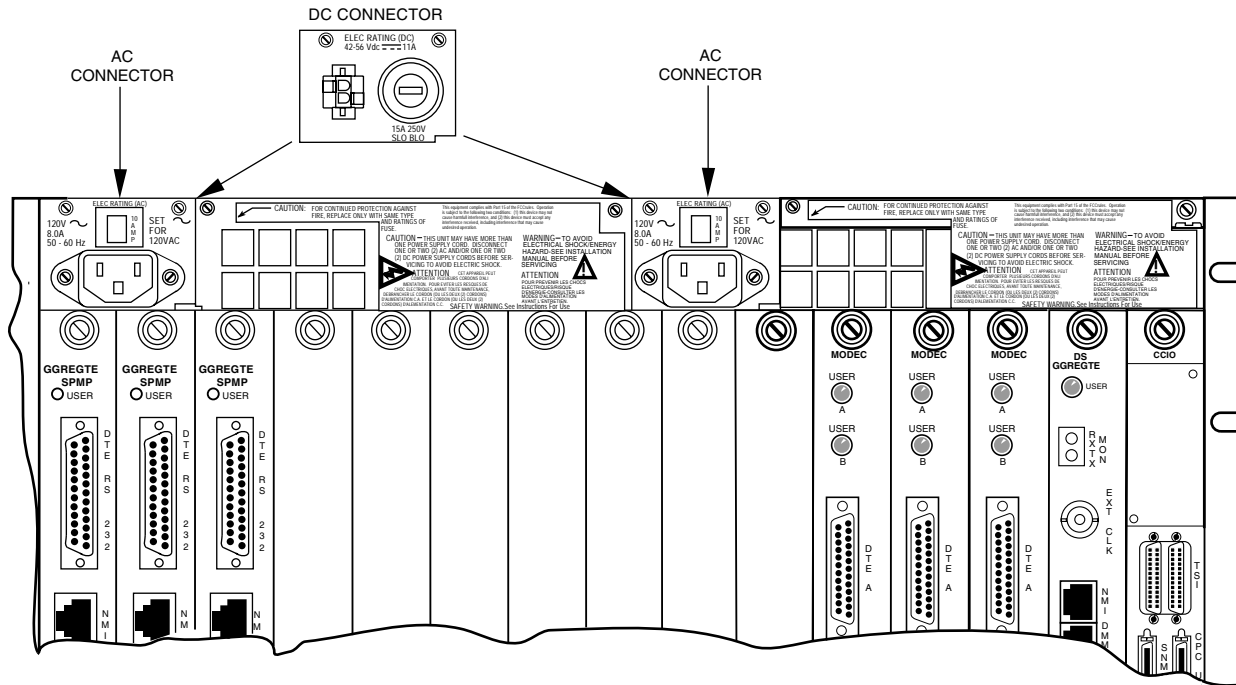
---

**Warning:** When operating with input voltages higher than 115 VAC, you must replace the plug with one suitable for use at the operating voltage. A Table of Attachment Plugs for Voltages Higher than 120 volts has been included in Appendix A.

---

## Powering Up the System

The top panel on the back of each cage contains the power connectors. (See Figure 2-16.) The number (one or two) and type (AC or DC) of connectors depends on your power supply arrangement.



**Figure 2-16. Power Connector Locations**

Connect the appropriate power cords (AC or DC) from the power connectors to the power sources (AC outlet or DC battery). If you are using a + or - 48 VDC power system, connect the white end of the DC power cord to the negative (-) battery terminal and the black end to the positive (+) terminal.

**Note:** The DC power supply is shipped with a fuse in the -48 VDC input line. If you are using a negative ground system (+48 VDC), the power supply must be reconfigured. Contact your Customer Support Center for assistance.

You can then power up the cage by pushing the switch on the front of each power supply to the On position. Each power supply has a green LED indicator on the front of the cage that lights when it is operating properly.

# Chapter 3 Operation

## Overview

This chapter explains how to operate the Excalibur Card Carrier master control panel. The control panel lets you select and operate any Excalibur device in up to six interconnected cages. Once you have selected an individual device, you can then operate it in the same manner as the standalone version. Consult the appropriate product manual for these instructions.

## Control Panel Components

The control panel, shown in Figure 3-1, consists of a 7-line by 32-character LCD screen, four arrow keys, a **UNIT** select key, and six device keys. The **UNIT** key and arrow keys allow you to select individual devices. The device keys and the ← and → arrow keys allow you to control the individual device once it is selected.

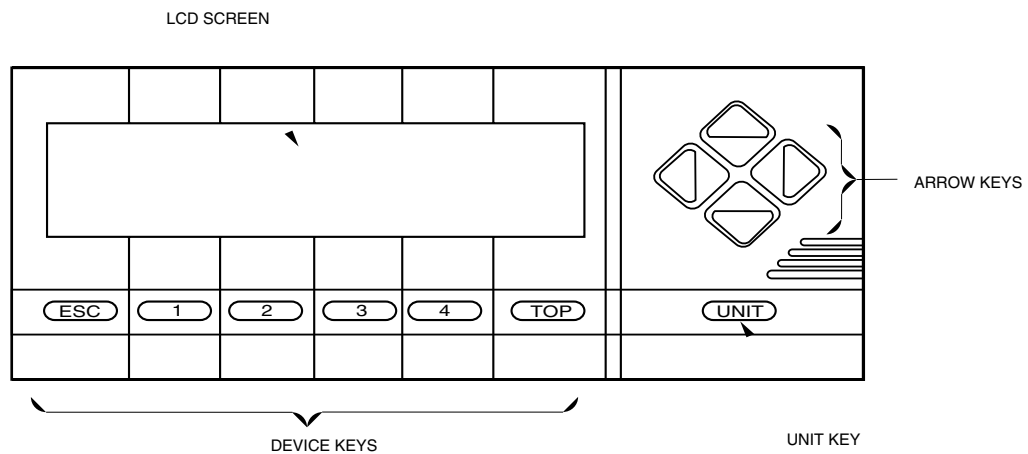


Figure 3-1. Control Panel Components

## Status Display

When you power up the system, the control panel performs a power-up self-test. If the test is successful, the LCD screen then displays the Excalibur symbol (a sword). To view the Status Display, press any key.

**Note:** If a control panel key is pressed or stuck down during the power-up self-test, the screen will show the Keyboard Diagnostics Display instead of the Excalibur symbol. The second line of this display indicates which key is pressed. To exit this display, you must first release the key and then press the ↑ and ↓ keys simultaneously. Then press the **UNIT** key to view the Status Display.

Figure 3-2 shows a typical Status Display. The window labeled **Cage** shows the addresses of all interconnected cages while the window labeled **Slot** shows the slot numbers/letters of all devices installed in the selected cage. Empty cages and slots are indicated by blank spaces. Reverse video boxes highlight the currently selected cage and slot. In the example shown in Figure 3-2, the selected device occupies Slots 4 and 5 in Cage 2.

**Note:** Slots A through G on the screen correlate to slots 10 through 16 as labeled on the front of the card carrier. Slot H on the screen correlates to slot 0 (the leftmost slot).

The Alias (assigned name) of the currently selected device is displayed between the top and bottom windows. In the example, Atlanta #1 is the Alias. The bottom window is the front panel display of the currently selected device. A reverse video T appears to the left of the bottom window when the device's **Test** indicator is lit. A reverse video U appears to the right of the bottom window when the device's **User** indicator is lit.

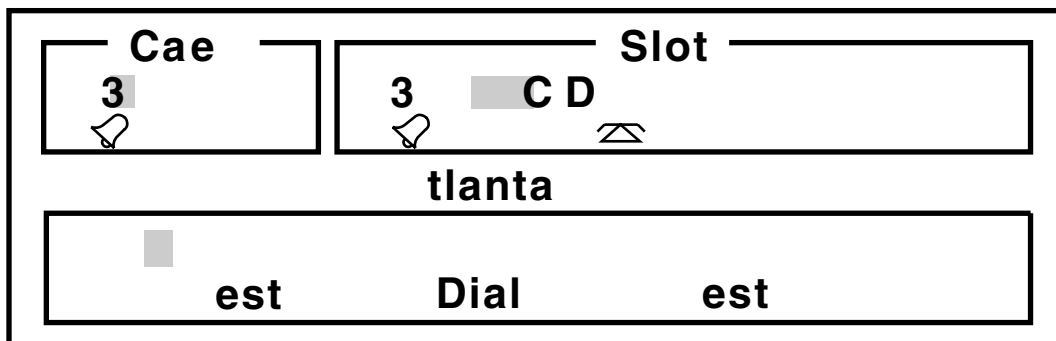




Figure 3-2. Status Display

## Icons

The Status Display uses icons (graphic symbols) to indicate significant conditions (alarms, tests, and calls) occurring in the installed devices. An icon appearing under a cage address indicates the most significant condition occurring in any of the devices installed in that cage. An icon appearing under a slot address indicates the most significant condition occurring in the particular slot of the currently selected cage.

The Status Display uses the following icons, listed from the most significant condition to the least:

1. AT - an alarm is pending and a test is in progress.
2.  - an alarm is pending.
3. T - a test is in progress.
4.  - a call is pending.

## Adjusting Screen Contrast

When the Status Display is shown, you can adjust the contrast of the screen by pressing the  $\uparrow$  and  $\downarrow$  keys. The  $\uparrow$  key makes the screen darker; the  $\downarrow$  key makes it lighter.

## Selecting a Device

The control panel lets you select a device by specifying either its cage/slot address or its Alias. To select a device, follow these steps:

1. Press the **UNIT** key to enter Device Selection mode. A reverse video box appears in the Cage, Slot, or Alias window (depending on its location the last time you exited from this mode).

To select a device using its cage/slot address, follow Steps 2 and 3. To select a device using its Alias, skip to Step 4.

2. If the reverse video box is in the Slot or Alias window, press the  $\rightarrow$  key until it is in the Cage window. A second reverse video box highlights the currently selected cage address. Press the  $\uparrow$  and  $\downarrow$  keys to move this box to the desired address. The  $\uparrow$  key moves the box from left to right. The  $\downarrow$  key moves it from right to left.
3. Press the  $\rightarrow$  key. The word **Slot** and the currently selected slot number/letter are now highlighted by reverse video boxes. Press the  $\uparrow$  and  $\downarrow$  keys to move the box to the desired slot. When a device occupies multiple slots, the box covers all numbers or letters representing those slots. The front panel display of the selected device is shown in the bottom window. Now skip to Step 5.
4. If the reverse video box is in the Cage or Slot window, press the  $\rightarrow$  key until it resides in the Alias window. Then press the  $\uparrow$  and  $\downarrow$  keys to scroll through the alphabetically stored Aliases of all devices. Each time an Alias appears, its corresponding cage and slot addresses are highlighted by reverse video boxes. The front panel display of the selected device is shown in the bottom window.
5. Press the **UNIT** key to exit Device Selection mode. The reverse video box disappears from the screen. You can now control the selected device using the device keys and the  $\leftarrow$  and  $\rightarrow$  arrow keys. Refer to the particular product's instruction manual for specific operating instructions.

## Device Polling

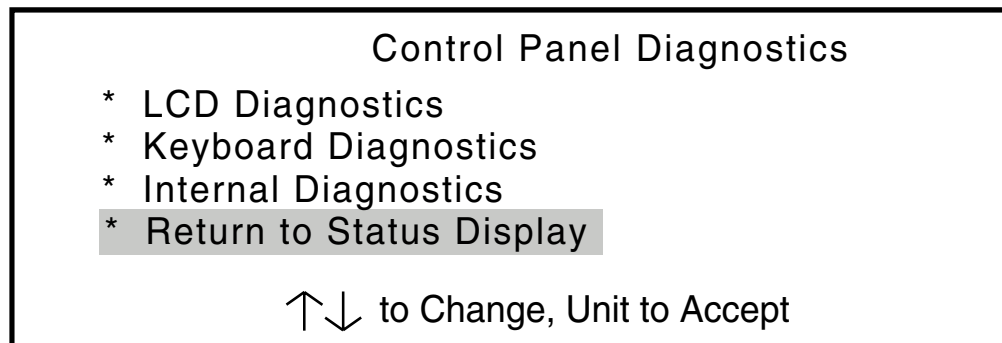
The control panel continuously polls all Excalibur devices in the rack. If it does not receive a response within 100 ms, the control panel assumes that the slot is empty and moves to the next slot. When the control panel detects that a previously filled slot is now empty, it deletes that address from the Slot window (if that cage is currently selected). If all slots in the cage become empty, the cage address is removed from the Cage window.

A cursor line travels above the numbers in the Cage and Slot windows, indicating which device is currently being polled. There is approximately a 20-second delay from the time a device is polled to the time an updated icon appears on the LCD screen. (This delay will be longer if keys are pressed during the interval.)

## Control Panel Diagnostics

The control panel lets you perform several diagnostic tests to verify its proper operation. To do so, follow these steps:

1. Press the **UNIT** key twice in quick succession (within a 1/2 second apart). The screen then displays the Control Panel Diagnostics menu. (See Figure 3-3.)



**Figure 3-3. Control Panel Diagnostics Menu**

2. To verify the control panel's internal circuitry, press the ↑ key once and then press the **UNIT** key. The control panel then runs an internal diagnostic test. When the test is completed, the screen indicates whether it passed or failed. Press any key to return to the Control Panel Diagnostics menu.

3. To verify the operation of the control panel keyboard, press the ↑ key twice and then press the **UNIT** key. The screen then prompts you to press each key to verify its operation. When you press a key, its name appears on the second line of the screen to indicate it is operating properly. To return to the Control Panel Diagnostics menu, press the ↑ and ↓ keys simultaneously.
4. To verify the operation of the LCD screen, press the ↑ key three times and then press the **UNIT** key. The screen then goes blank for 3 seconds (so you can check for character spaces that are always on), dark for 3 seconds (so you can check for character spaces always off), and then displays all possible characters. To return to the Control Panel Diagnostics menu, press any key.
5. To return to the Status Display, press the **UNIT** key.

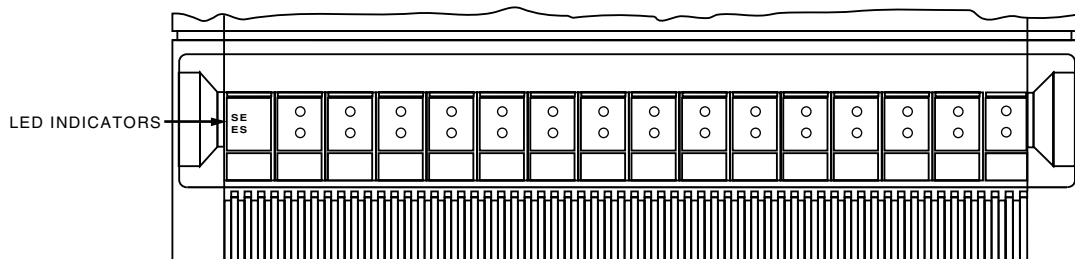
## LED Indicators

Most Excalibur devices have a pair of LED indicators that you can monitor through the front of the cage. (See Figure 3-4.) The conditions that cause the red **USER** indicator to light are user-programmable. The yellow **TEST** indicator lights when a test or a loop is in progress. The smoked plastic windows in front of the indicators provide a convenient place for circuit identification labels.

---

**Note:** Refer to the individual product manuals for specific information about the LEDs on each device.

---



**Figure 3-4. Excalibur Device LED Indicators**

On the back of the cage, each transition board has a red indicator labeled **USER**. This indicator lights whenever the board's corresponding device is selected through the control panel.



# Appendix A

## Technical Specifications

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<b>Cage Dimensions</b>	Height	10.5 inches (26.67 cm)
	Width	17.5 inches (44.45 cm)
	Depth	19.5 inches (49.53 cm)
	Weight (fully loaded, with single power supply)	70 lbs. (31.5 kg)
	Weight (fully loaded, with dual power supplies)	73 lbs. (32.85 kg)
<b>Master Control Panel Dimensions</b>	Height	3.25 inches (8.26 cm)
	Width	10.25 inches (26.04 cm)
	Depth	1.0 inch (2.54 cm)
	Weight	1.0 lb. (.45 kg)
<b>Environmental</b>	Operating Temperature	32 to 122° F (0 to 50° C)
	Relative Humidity	Less than 95%, noncondensing
<i>Note: Certain ENAR components have an operating temperature of 0 to 45° C. Temperatures greater than 104° F (40° C) at 85% relative humidity can cause a change in the contrast of the Master Control Panel LCD screen.</i>		
<b>Power Requirements</b>	AC Power Supply	89-132 VAC, 47-65 Hz or 178-264 VAC, 47-65 Hz
	DC Power Supply	42-56 VDC
Power Supplies 41C5012 and 41C5013	Power Consumption (fully loaded cage)	440 watts, max.
	Heat Dissipation	1502 BTU/hr.
Power Supplies 41C5004 and 41C5005	Power Consumption (fully loaded cage)	289 watts, max. per power supply
	Heat Dissipation	987 BTU/hr.
<b>Approvals</b>	UL recognized; CSA approved	

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<p>2 Pole Plu i Proeie round Cona 250 ols 10 ps pproed or se in enar</p>		<p>2 Pole Plu i Proeie round Cona 250 ols 10 ps pproed S or se in Swierland</p>	
<p>2 Pole Plu i Proeie round Cona 250 ols 13 ps pproed or se in nied indo</p>		<p>2 Pole Plu i 2 Proeie round Sses 250 ols 101 ps pproed C C or se in urope ep Swierland and enar</p>	

# Appendix B

## Regulatory Information

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### FCC Part 15: Radio/Television Interference

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications to this equipment not expressly approved by Milgo Solutions can void the user's authority to operate this equipment.

### Special Notice

The instructions in this manual involving actions with the device and requiring a tool\* for access, must be performed only by qualified service personnel.

- \* A tool is defined as any implement used to facilitate a mechanical operation, such as operating a fastener or similar fixing device.

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Chaque fois que le manuel d'instructions recommande d'utiliser un outil\* pour effectuer une opération à l'intérieur du dispositif, cette opération doit absolument être confiée à un personnel de service qualifié.

- \* Un outil est défini tout dispositif utilisé pour faciliter une opération mécanique, p.ex., le fonctionnement d'un organe de fixation ou autre dispositif semblable.

### Notice to Canadian Users

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the Radio Interference Regulations of Industry Canada.

---

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Class A prescrites dans le règlement sur le brouillage Radioélectrique édicté par le Industrie Canada.



# Appendix C

## Special Notice for U.K. Users

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### Statutory Information

Initial adjustments on installation and any subsequent changes to hardware switch settings for optional services must be carried out by an authorized Racal representative, prior to which the apparatus should be disconnected from its system environment including the digital and analog interfaces before disassembly.

This apparatus is approved for connection to telecommunication systems specified in the instructions for use, subject to the conditions set out in them.

It does not employ or otherwise interact with the connected network at frequencies below 200 Hz or above 3400 Hz and will not cause false triggering of any PTT apparatus employing signalling frequencies in the 2280 Hz band.

DC interaction with the network is not possible with this modem.

The approval provided by the Director General, Telecommunications is for connection to Private Speechband Circuits operated by British Telecommunications Limited, Kingston Communications Limited, or Mercury Communications Limited.

All apparatus connected to this Central Site housing and thereby connected directly or indirectly to Private Speechband Circuits must be approved apparatus as defined in Section 22 of British Telecommunications Act of 1984.

A label on the apparatus worded "**SAFETY WARNING. See Instructions for Use**" refers to all digital ports on the apparatus. These ports do not provide isolation sufficient to satisfy the requirements of BS 6301 or have previously been evaluated against British Telecommunications plc (Post Office) Technical Guides 2 or 26 and given permission to attach. Other usage will invalidate any approval given to the apparatus.

Interconnection directly, or by means of other apparatus, of ports marked "**SAFETY WARNING. See Instructions for Use**" with ports marked or not so marked may produce hazardous conditions on the telecommunication network, and therefore advice should be obtained from a competent engineer before such a connection is made.

## Power Supplies

The power supplies provided comply with the requirements of BS6301:1989. Power supplies 41C5012 and 41C5013 are each designed to supply +5 volts DC at 32.0 amps, +12 volts DC at 3.5 amps, -12 volts DC at 3.5 amps, and +24 volts DC at 1.7 amps. Power supplies 41C5004 and 41C5005 are each designed to supply +5 volts DC at 16.0 amps, +12 volts DC at 3.0 amps, -12 volts DC at 3.0 amps, and +24 volts DC at 1.7 amps.

There is no user protection in the apparatus against supplies having voltages in excess of these. Users of the apparatus should ensure that any power supplies comply with the relevant legal safety requirements when properly assembled, installed, and maintained, and when being used with proper care having regard to the purpose for which the equipment is intended.

Other usage will invalidate any approval given to this apparatus if as a result it ceases to comply with BS6301:1989. The information provided in accordance with BS6484:1984 Clause 3.3 is valid for all operating states of the apparatus in the enclosure in which the power supplies are mounted.

## Safety Instructions

The wires in the mains lead are colored in accordance with the following code, for connection to the 240 volt mains supply:

- Green and yellow - Earth
- Blue - Neutral
- Brown - Live

If for any reason the molded-on mains plug has to be replaced by a new mains plug, the terminals shall be connected as follows:

- The green and yellow wire must be connected to the terminal in the plug which is marked by the letter E or the safety earth symbol, or is colored green and yellow.
- The blue wire must be connected to the terminal which is marked with a letter N or is colored black.
- The brown wire must be connected to the terminal which is marked with the letter L or colored red.



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**Warning:** This equipment must be connected to a safety earth ground.

When servicing, hazardous telecomms voltage may be present even if mains power is removed.

---

## Voltage Selection

On U.K. models of the Excalibur Card Carrier, the AC power supplies are set at the factory to operate with an input voltage of 178 to 264 VAC. If you want to operate with an input voltage of 89 to 132 VAC, you must move the power supply's internal voltage selection wire from the **240** position to the **120** position. (Refer to "Power Supply Input Voltage Selection" in Chapter 2 for instructions.) Then replace the label marked "**Set for 240 VAC**" with the one marked "**Set for 120 VAC**."

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**Note:** This procedure is to be performed only by an authorized Racal representative.

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## We want your feedback.

To better serve our customers, Milgo Solutions welcomes your comments concerning this manual. Please take the time to fill out the following questionnaire, remove it from your manual, and drop it in the mail or FAX it to us at (954) 846-3244. We also welcome your comments via e-mail at address *techdoc@milgo.com*.

Name of Manual/Document No./Date:

Excalibur Card Carrier Installation and Operation 07D08C-1/C 3/94

Was the information in this manual presented in a logical order?

\_\_\_\_\_ Excellent      \_\_\_\_\_ Good      \_\_\_\_\_ Fair      \_\_\_\_\_ Poor

How easy was it to locate specific information?

\_\_\_\_\_ Very easy      \_\_\_\_\_ Moderately easy      \_\_\_\_\_ Difficult

Rate the technical level of information presented in this manual:

\_\_\_\_\_ Too technical      \_\_\_\_\_ Suitable technical level      \_\_\_\_\_ Not technical enough

Are technical terms clearly defined?

\_\_\_\_\_ Excellent      \_\_\_\_\_ Good      \_\_\_\_\_ Fair      \_\_\_\_\_ Poor

Rate the quality of the illustrations:

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Are the manual's instructions clearly written?

\_\_\_\_\_ Excellent      \_\_\_\_\_ Good      \_\_\_\_\_ Fair      \_\_\_\_\_ Poor

Rate the quantity of the illustrations in this manual:

\_\_\_\_\_ Too many      \_\_\_\_\_ Suitable amount      \_\_\_\_\_ Not enough

Does this manual contain all the information you require? (Y/N)

If not, what would you suggest we add to make the manual more useful?

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Did you find any errors in this manual? (Y/N)

If yes, please note the error and page number in the space provided below:

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NAME \_\_\_\_\_ TITLE \_\_\_\_\_

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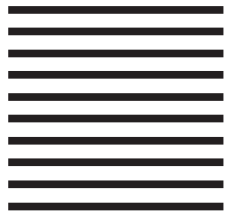
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