Installing Conduit for the RBS

The RBS main unit can accommodate up to eight separate 3/4-inch (19 mm) conduits to carry power, fiber optic cables, T1/E1 cable, alarms cables, and GPS cable. The remote units can accommodate up to two conduits.

Use a raceway (or gutter box) between conduits, especially if the site makes use of multiple remote units. The raceway makes the finished installation easier, provides a sheltered place to store the cables before they are connected, and provides space to store excess cable.

The remote unit mounting bracket is designed to let you connect conduit directly to it. On the main unit, conduit is connected to the main unit chassis (see "Installing the RBS Main Unit" on page 4-1).

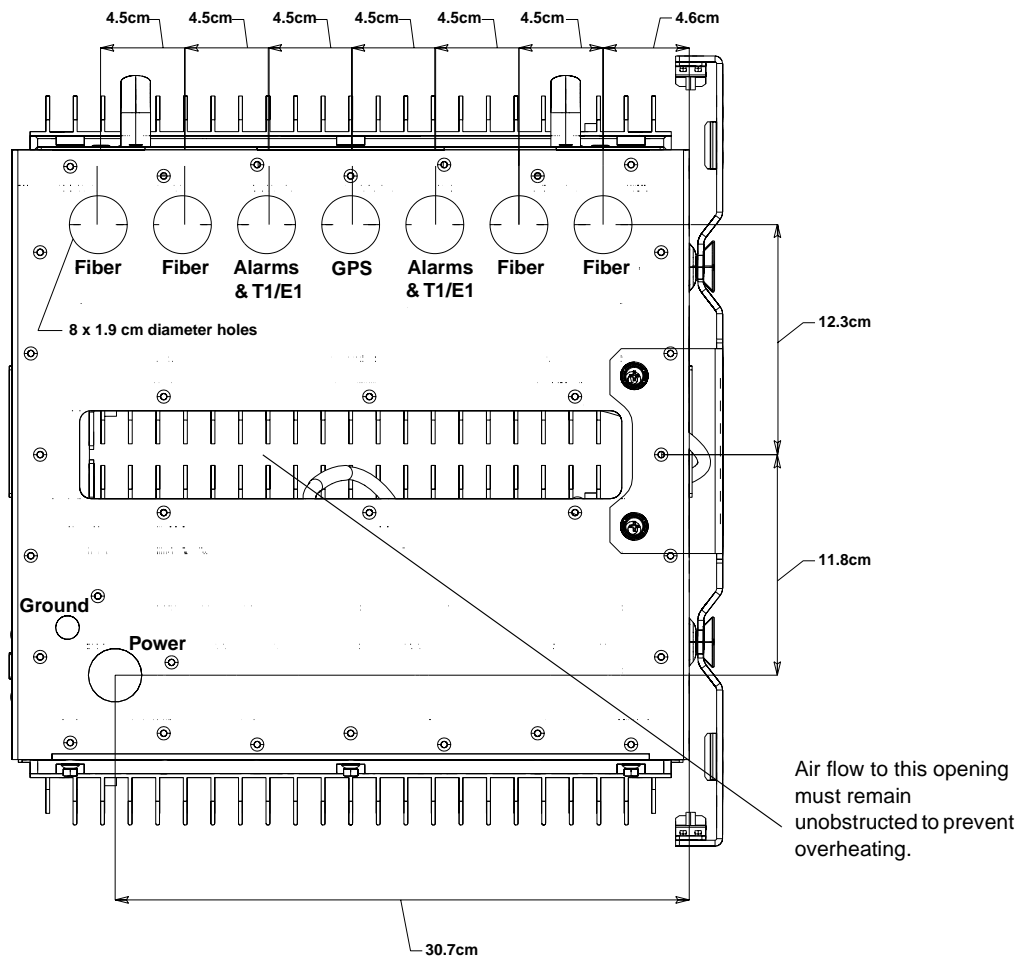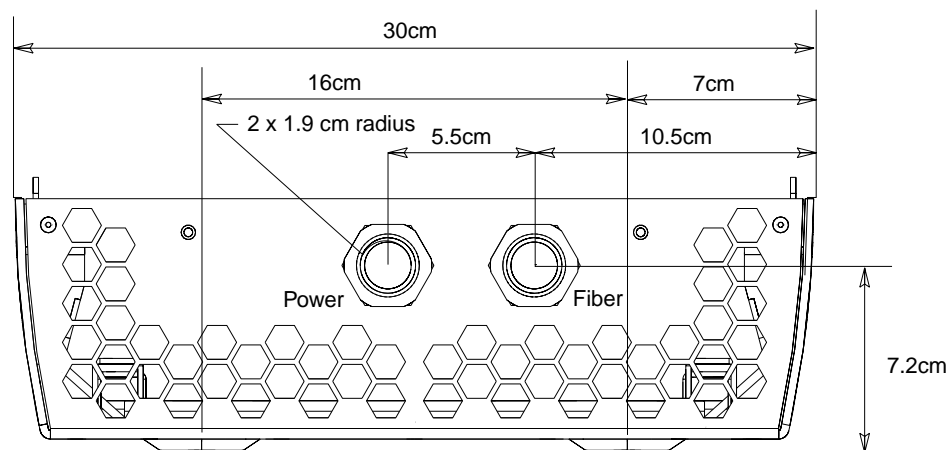|	
CAUTION	**Using the wrong size conduit can cause misalignment of the modules in the mounting brackets.**
CAUTION	**Do not obstruct the flow of air to the rectangular opening on the bottom of the main unit support chassis. This air flow is critical to prevent overheating.**

Figure 2–8 Main Unit Chassis Conduit Connections

Figure 2–9 Remote Unit Mounting Bracket Conduit Connections

Steps   ***To install conduit for a monopole***

1. Run conduit (3/4 inch (19 mm)) for the fiber optic cables from the main and remote unit mounting brackets to the appropriate access panels on the monopole. For the correct connection locations on the main unit chassis, see Figure 2–8 on page 2-10 and for the remote unit mounting bracket, see Figure 2–9 on page 2-10.

2. Run conduit (3/4 inch (19 mm)) for power from the UPS or electrical breakers to the main unit mounting bracket.

3. Run conduit (3/4 inch (19 mm)) for power from the UPS or electrical breakers to the appropriate access panel on the monopole, and from the remote unit mounting brackets to the appropriate access panel on the monopole.

4. Install electrical junction boxes in the power conduits immediately below the main and each remote unit mounting bracket.

5. Run conduit (3/4 inch (19 mm)) for the backhaul from the landline telephone service demarcation point to the main unit mounting bracket.

6. Install 1 inch (25.4 mm) conduit to serve as a GPS receiver bracket.

    For information on positioning the GPS receiver bracket see "Positioning the GPS Bracket" on page 2-8.

7. Install a 3/4" to 1" conduit adapter and run conduit (3/4 inch (19 mm)) from the GPS receiver bracket to the appropriate access panel on the monopole, and from the main unit mounting bracket conduit template to the appropriate access panel on the monopole.

8. Run any required conduit for alarms to the main unit mounting bracket.

9. Waterproof all conduit connections.

Note   When you install conduit, ensure that there is adequate provision for cable strain relief.

Steps   ***To install conduit for a wall mounting***

1. Install the raceway.

2. Run conduit (3/4 inch (19 mm)) for the fiber optic cables from the main and remote unit mounting brackets to the raceway. For the correct connection locations on the main unit chassis, see Figure 2–8 on page 2-10 and for the remote unit mounting bracket, see Figure 2–9 on page 2-10.

3. Run conduit (3/4 inch (19 mm)) for the power from the UPS or electrical breakers to the main unit mounting bracket.

4. Run conduit (3/4 inch (19 mm)) for the power from the UPS or electrical breakers to the raceway, and from the remote unit mounting brackets to the raceway.

5. Install electrical junction boxes in the power conduits immediately below the main unit and each remote unit mounting bracket.

6. Run conduit (3/4 inch (19 mm)) for the backhaul from the landline telephone service demarcation point to the raceway, and from the main unit mounting bracket to the raceway.

7. Install 1-inch (25.4 mm) conduit to serve as a GPS receiver bracket.

   For information on positioning the GPS receiver bracket, see "Positioning the GPS Bracket" on page 2-8.

8. Run conduit (3/4 inch (19 mm)) from the GPS receiver bracket to the raceway, and from the main unit mounting bracket to the raceway. For the correct conduit connection location on the main unit mounting bracket, see Figure 2–8 on page 2-10.

9. Run any required conduit for alarms to the main mounting bracket.

10. Waterproof all conduit connections.

Note   When you install the conduit, ensure that there is adequate provision for cable strain relief.

Pulling the Power Cables

Separate power cables must be supplied from the UPS to the main unit and to each remote unit (each remote unit requires a separate power cable). Label the cables at the UPS or breaker to indicate the unit to which each cable is connected. Always abide by local electrical codes when installing power cables.

For the RBS power requirements, see Table 1–3 on page 1-8.
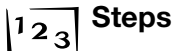
Steps   ***To pull the power cables***

1. From the junction box at each of the remote unit mounting brackets, feed the power cable (AWG 14 (1.63 mm diameter) or larger) into the power conduit, and pull it through the raceway or pole to the UPS.

   If the remote unit is pole mounted, use a pulling eye kit to pull the power cable.

2. From the junction box at the main unit mounting bracket, feed the power cable into the power conduit and pull it to the UPS.

3. Tie the ends of the power cables near the UPS or electrical breakers and at the junction boxes.

WARNING   **DO NOT TERMINATE the power cables at the UPS at this time; this could pose a electrical shock hazard. Connect the power cables during the installation phase.**

Installing the RF Antennas and Cables

Install the RF antennas according to the manufacturer's specifications. For the RBS antenna requirements and configurations, see Table 1–1 on page 1-6 and Table 1–9 on page 1-14.

After the RF antennas are installed, you must perform the return-loss measurement test described below to ensure that each RF antenna, and each cable running to the RBS, meets the specified transmission requirements. Do this test immediately after the RF antennas and RF jumpers have been installed, while the installers are still on-site, so they can make any necessary repairs.

Verifying the RF Connections

To perform the return loss measurement test, use the following equipment:

■ Anritsu Wiltron SiteMaster S330, S332, or equivalent, calibrated open/short/load

■ Adapters and test cables as needed

Steps

To verify the RF connection

1. Check the installation of RF jumpers and antennas to ensure that the clamps, mounting hardware, and grounding clamps are in place. Ensure that all of the DIN (male) connectors are torqued to the recommended 221–260 inch-pounds (2500–2900 N-cm).

2. Attach all of the cables and adapters necessary for the test to the SiteMaster.

3. Turn on the SiteMaster and calibrate it following the SiteMaster documentation.

4. For calibration and testing, use a frequency range of 1850–1990 MHz for the Compact 1900 MHz.

5. If multiple antennas are used, start with the Alpha sector (i.e., the first antenna in the chain). Hook the SiteMaster to the antenna Tx connector or Tx/Rx if a duplexed antenna is used. Ensure that all jumpers are in place and that continuity exists to the antenna.

6. Perform a return-loss sweep following the SiteMaster documentation. Move a marker to the highest point of the sweep. Ensure that the return loss reads 15 dB or higher (17–21 dB is typical).

7. Record the site, sector, and antenna port of the sweep.

8. Repeat steps 4 through 6 for each of the antennas in the sector, followed by all of the sectors in the site.

9. If any sweep fails, take corrective action (see the antenna documentation) and resweep the entire site. All readings must be within specifications before the site can go on air.

10. If you will not be installing the remote units immediately, ensure that all cable ends are properly weatherproofed.

Installing the Backhaul (T1/E1) Cable

The backhaul (T1/E1) provides the connection from the BSC through the landline telephone service to the RBS. Install this cable as follows:

Steps

To install the backhaul (T1/E1) cable

1. Run the appropriate cable in conduit from the landline telephone service demarcation point to the main unit mounting bracket. For information on the cable and conduit, see Table 1–10 on page 1-15.

2. Temporarily tie the cable to the main unit mounting bracket.

Installing the Fiber Optic Cables

Each remote unit is connected to the main unit via a fiber optic cable containing two fiber optic subcables. For information on connecting the fiber optic cables, see "Connecting the Fiber Optic Cables" on page 4-14. If preterminated length cables are used, the pulling eye kit is required to pull the fiber optic cable from each remote unit.

If a remote unit is mounted so that the cabling path is not accessible, use a pulling eye kit to pull the cable from the remote unit. Be sure to use proper cable pulling techniques, as specified by the cable manufacturer, In addition, for preterminated cables see Figure 2–10. Label the cables at the main unit to indicate the remote unit and RF module to which each cable is or will be connected.

CAUTION   **Do not bend the fiber optic subcables to less than 1 inch (25 mm) in radius. Do not bend the fiber optic outer cables to less than 4 inches (102 mm) in radius.**
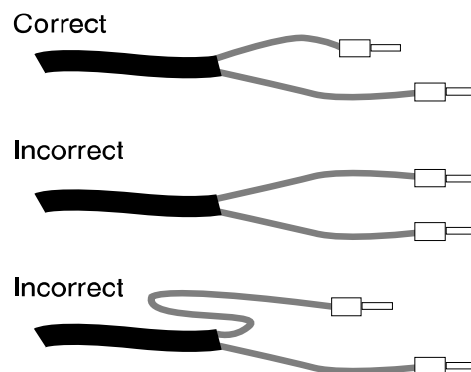

Figure 2–10 Pulling preterminated fiber optic cables

Steps

To install the fiber optic cables

1. Locate the fiber optic conduit entrances on each of the remote unit mounting brackets. For the location of the fiber optic conduit entrances on the mounting brackets, see Figure 2–9 on page 2-10.

2. For each of the remote unit mounting brackets, pull the fiber optic cable through the conduits (and raceway, if used) to the main unit mounting bracket. Allow 1–2

inches (2.5–5 cm) of the outer protective jacket of the fiber optic cable into the mounting brackets at each end. Allow 1-1/2 feet (0.50 m) excess subcable at each end for later termination. There is no room in the main unit or in the remote units for excess cable.

3. Temporarily tie the outer protective jacket of the fiber optic cable to the remote unit mounting bracket.

4. Temporarily tie the outer protective jacket of the fiber optic cable to the main unit mounting bracket conduit template.

5. For a tower or monopole site, provide additional strain relief where the cables enter at the top of the pole.

6. At the main unit mounting bracket, mark each fiber optic cable with the RBS remote unit mounting bracket and RF module it belongs to.

CAUTION   **The fiber optic cables can be damaged if strain relief is not provided where the cables enter at the top of a pole or tower.**

Installing the GPS Cable

For information on positioning the GPS receiver bracket, see "Positioning the GPS Bracket" on page 2-8. For information on installing the GPS conduit, see "Installing Conduit for the RBS" on page 2-9.

To install the GPS cable

1. Pull the unterminated end of the GPS interconnect cable from the GPS mounting bracket, through the conduit, to the main unit mounting bracket.

Note   If the provided GPS cable is not long enough, you can replace or extend it with 24 AWG solid conductor with drain wire category 5-type twisted pair cable.

2. Make sure to provide enough slack in the cable to ease the connection/disconnection from the GPS.

3. Tie the GPS interconnect cable to the main unit mounting bracket.

Connecting the Protective Earth Ground

1. Run grounding wire from the Earth ground to both the main and remote units. (Use #2 or #4 AWG (7.42 mm or 5.90 mm diameter) wire.)

2. Temporarily tie the grounding wire to the main and remote unit mounting brackets.

3. Test each of the ground wires for impedance. See Table 1–1 on page 1-7 for specifications.

3

Installing the RBS Remote Units

This chapter provides procedures for installing the RBS remote units, including the core modules (with the attached LNA filters), RF modules, sunshield, and cabling.

Procedure Preview: How to install the RBS remote units

Step	Action	Described on
1	Mount the core module with the attached LNA filters in the remote unit mounting bracket.	page 3-2
2	Attach the RF modules to the remote unit core module.	page 3-4
3	Connect the LNA cables from the LNA filters to the RF modules.	page 3-5
4	Connect the ground cable to the remote unit core module.	page 3-7
5	Connect the power to the remote unit core module.	page 3-8
6	Connect the RF jumpers to the LNA filters.	page 3-8
7	Install and secure the sunshield.	page 3-9

Mounting the Remote Unit Core Modules

The remote unit core module supplies power to, and a connection point for, the RF modules. The core module also provides connections for the fiber optic cables. Figure 3–1 shows how the core module installs in the mounting bracket.
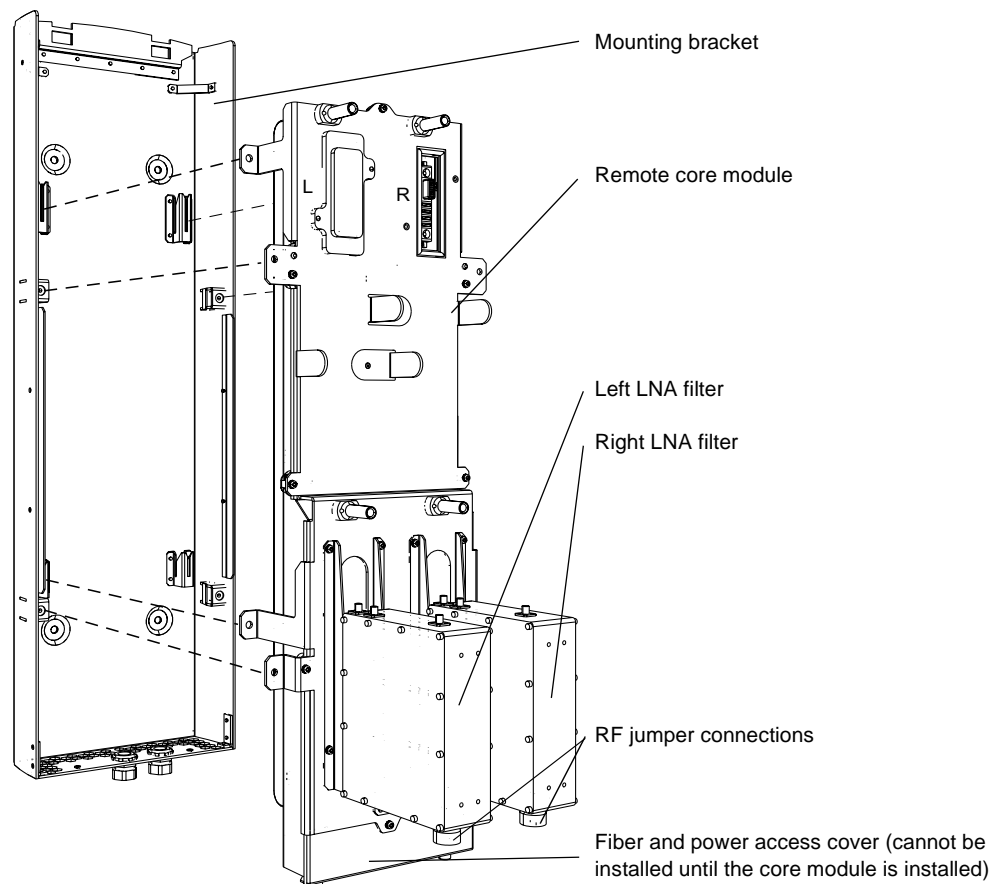

Figure 3–1 Mounting the Remote Core Module

|123| **Steps**   *To mount the core modules*

1. With the RF jumper connectors facing down, lift the core module into place in front of the remote unit mounting bracket.

2. Line up the guides on the core module with the guides on the remote unit mounting bracket.

CAUTION   **To prevent damage to cables, ensure that the AC power and fiber optic cables are out of the way.**

3. Slide the core module down until it is firmly seated into the mounting bracket.

4. Using the supplied bolts, attach the core module to the mounting bracket. Use a torque wrench set to the recommended 35 ± 3.5 in.-lbs. (395 ± 40 N-cm).

CAUTION   **Never use power tools to tighten the retaining bolts.**

Installing the RF Modules

If the RF modules are not installed you will need to install them. Figure 3–2 shows the first RF module being installed. The second RF module is installed in the same manner as the first. For ease of cabling and consistency, install the right RF module first.

⚠ **CAUTION**   **All connections must remain dry during installation.**

CAUTION   **To avoid overheating, do not attempt to straighten the fin portion of the RF module.**

✎ **Note**   If you want to install the RF Modules before mounting the core module (because of an inconvenient final location for the remote, for instance), the weight of the assembly will exceed the maximum for a single-person lift. You can use more than one person to lift the remote or use slings through the handles on the RF modules and lift with a crane or other lifting device.
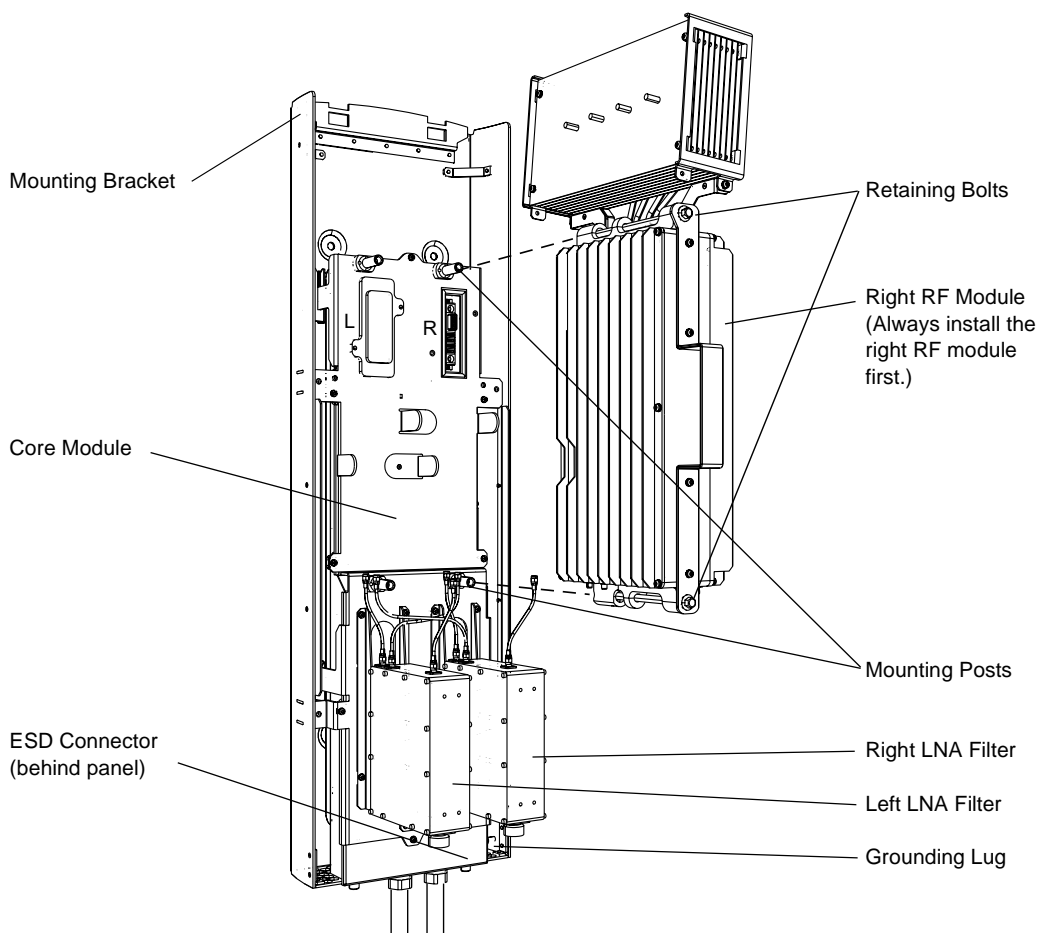

Figure 3–2 Installing the RF Modules

Steps   ***To install the RF modules***

1. Make sure that the RF module and LNA filter Material Control Number (MCN) dash number (-1, -2, -3) match.

2. Remove the RF and core module connector caps and tape.

Note   Save the core module connector cap. Use it to cover the port when the RF module is removed.

CAUTION   **You must wear ESD wrist straps when working near the Core-to-RF module connectors or you could seriously damage the RBS. You can connect the strap to the ESD connector on the core module. For the location of the ESD connector, see Figure 3–2 on page 3-3.**

3. Fit the RF module onto the mounting posts on the core module as shown in Figure 3–2 on page 3-3.

4. Push the RF module securely into place.

5. Tighten the retaining bolts (never use power tools to tighten) to secure the RF module to the core module. The retaining bolts should be tightened to 80 ± 8 in-lbs (900 ± 90 N-cm).

6. Connect the LNA cables, see "Connecting the LNA Cables" on page 3-5.

7. If required, repeat steps 1–6 for the second RF module.

WARNING   **Power to the unit must be off while installing or removing the RF units.**

Connecting the LNA Cables

After you install the RF modules, you can connect the RF modules to the LNA filters using the short LNA cables. Figure 3–3 shows the RF module LNA cable connections for a one- and two-RF module installation.
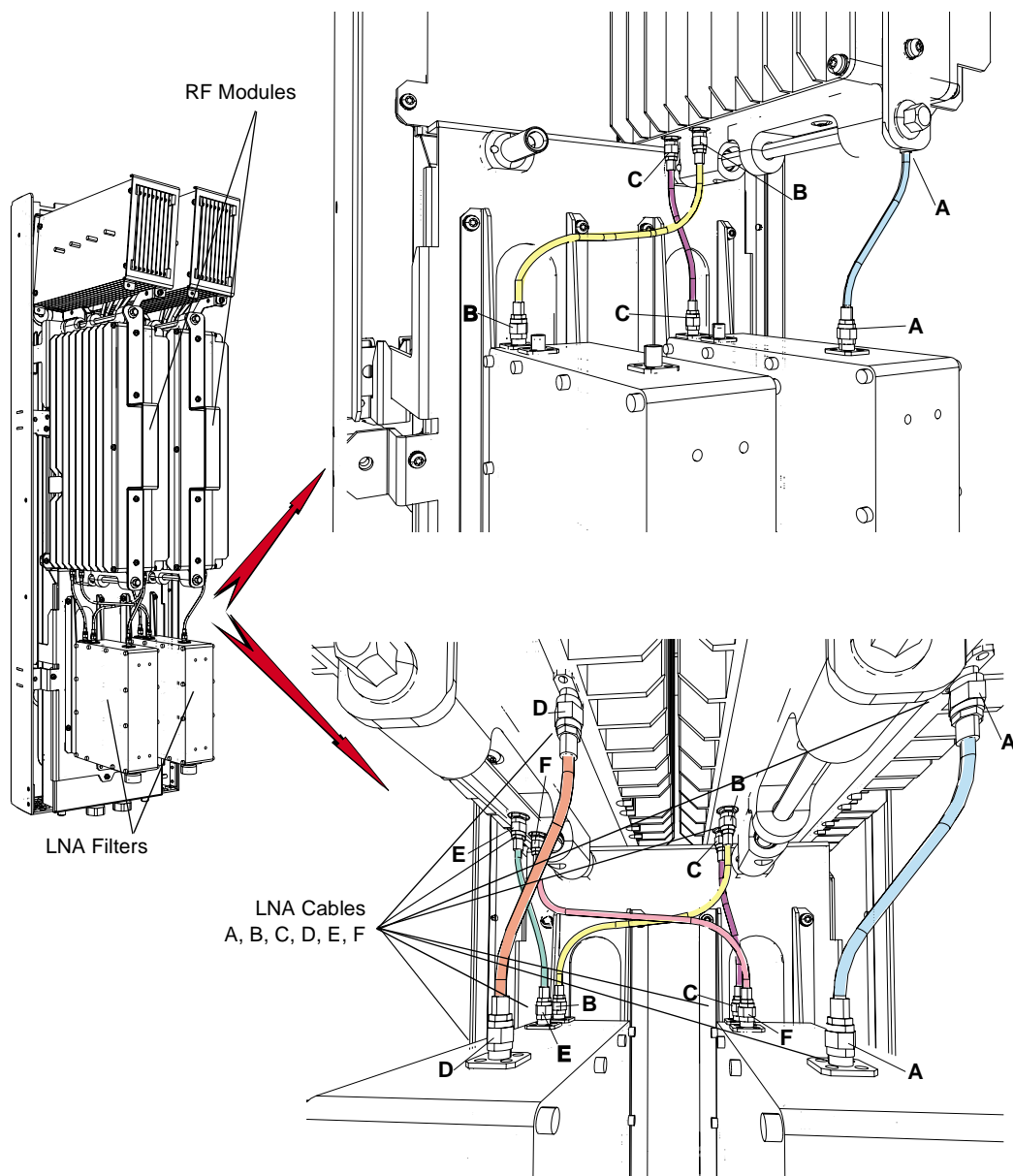

Figure 3–3 LNA Cable Connections

	Steps	***To connect the LNA cables***

1. For a two RF module installation, connect the LNA cables from the LNA filters to the RF modules as shown in Figure 3–3 on page 3-5.

2. For a single RF module installation, connect the LNA cables from the LNA filters to the RF module, as shown in Figure 3–3 on page 3-5, and cap connections D, E, and F.

CAUTION   **To avoid damaging the LNA cables, do not bend them to less than 1 inch (25.4 mm) in radius.**

3. Tighten the LNA cable ends carefully. Use a torque wrench set to the recommended 8 to 9 inch-pounds (90.4 to 101.7 N-cm).

CAUTION   **Do not use pliers to tighten the LNA cable ends; pliers can damage the SMA connector body.**

ATTENTION   **Over- or under-tightening the LNA cable connections can cause off-specification performance.**

Connecting the Ground Cable to the Core Module

The RBS external protective Earth ground must be tested after installation. The impedance to Earth ground must be less than 5 Ω (see "RBS Specifications" on page 1-6). We recommend testing ground integrity twice a year.
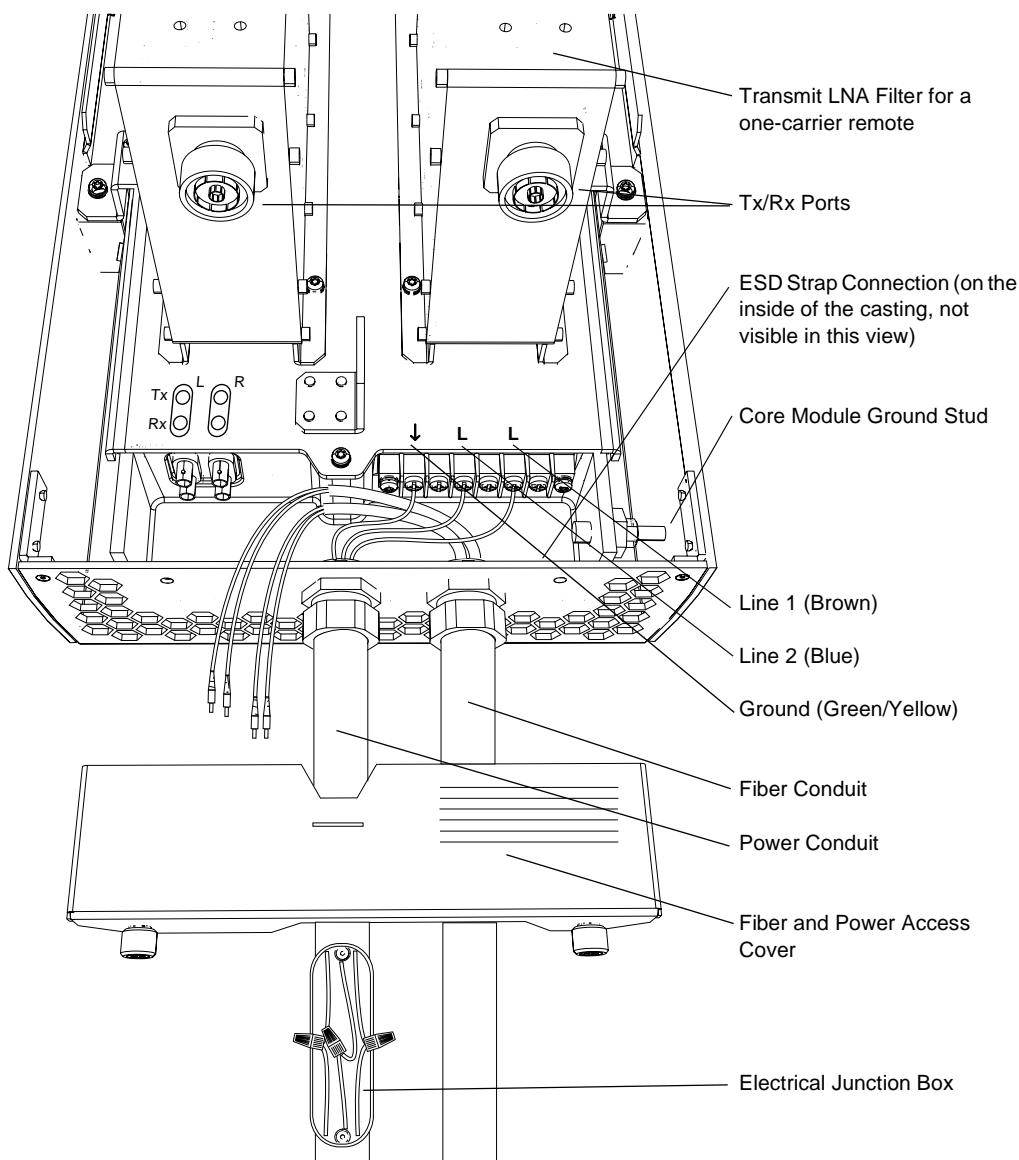

Transmit LNA Filter for a one-carrier remote

Tx/Rx Ports

ESD Strap Connection (on the inside of the casting, not visible in this view)

Core Module Ground Stud

Line 1 (Brown)

Line 2 (Blue)

Ground (Green/Yellow)

Fiber Conduit

Power Conduit

Fiber and Power Access Cover

Electrical Junction Box

Figure 3–4 Connecting the Ground Cable and RF Jumpers

Steps

To connect the ground cable to the core modules

❑ Connect the ground jumper to the core module ground stud shown in Figure 3–4 (35–40 in-lbs (400–450 N-cm) maximum torque recommended).

Connecting Power to the Remote Units

The remote unit core module comes with "pigtails" connected to the power connectors. The pigtails must be pulled through the power conduit to the electrical junction box where they will be connected to the power cable from the UPS or electrical breaker. For the correct power designations see, Figure 3–4 on page 3-7.

WARNING

To avoid electrical shock, make sure the power is OFF before connecting the power cables.

Steps   *To connect the power cable to the remote units*

1. If the fiber and power access cover has previously been installed, remove it by turning the two screws.

2. Pull the power cables' pigtails from the core module through the power conduit to the electrical junction box.

3. Strain-relieve the power cable from the UPS or breaker within the junction box.

4. Carefully remove the weatherproofing from the power cables.

5. Using the set-screw wire connectors from the Compact RBS Hardware Installation Kit, connect the pigtails to the power cable.

6. Close the electrical junction box and ensure that all wires are adequately protected from the weather.

7. Install the Fiber and Power Access Cover.

Connecting the RF Jumpers

The RF jumpers from the antennas connect to the LNA filters. RF jumpers longer than 10 feet (3 m) require an installed external ground kit; cables longer than 50 feet (15 m) require that an installed in-line surge suppressor.

Steps   *To connect the RF jumpers*

1. Connect the RF jumper from the Tx/Rx antenna to the LNA filters (see Figure 3–4 on page 3-7).

2. Tighten all of the RF jumper connections to the recommended 221–260 in-lbs (2500–2900 N-cm).

3. Weatherproof the RF jumper connections.

Note   Over- or under-tightening the RF connectors can cause off-specification transmission.

Note   The RBS antenna connections are female 7/16 DIN connectors and require 7/16 DIN male RF jumpers.

Installing the Sunshield

You install the sunshields on the remote units only after you test and connect the fiber optic cables between the main and remote units. For information on testing and connecting the fiber optic cables, see "Testing the Fiber Optic Cables" on page 4-14 and "Connecting the Fiber Optic Cables" on page 4-14. Figure 3–5 shows the sun shield installation.

A magnet on each remote unit sunshield engages an alarm switch in the RBS. When the sunshields are installed properly, these switches are closed, and the sunshield alarm at the BSM is cleared. When you have completed commissioning the RBS, a BSM operator can confirm that the alarm is cleared after the sunshields are installed. Another alarm will be generated if someone tampers with any of the sunshields.

✎ **Note**   Before you can test the sunshield alarm, it must be configured at the BSM.
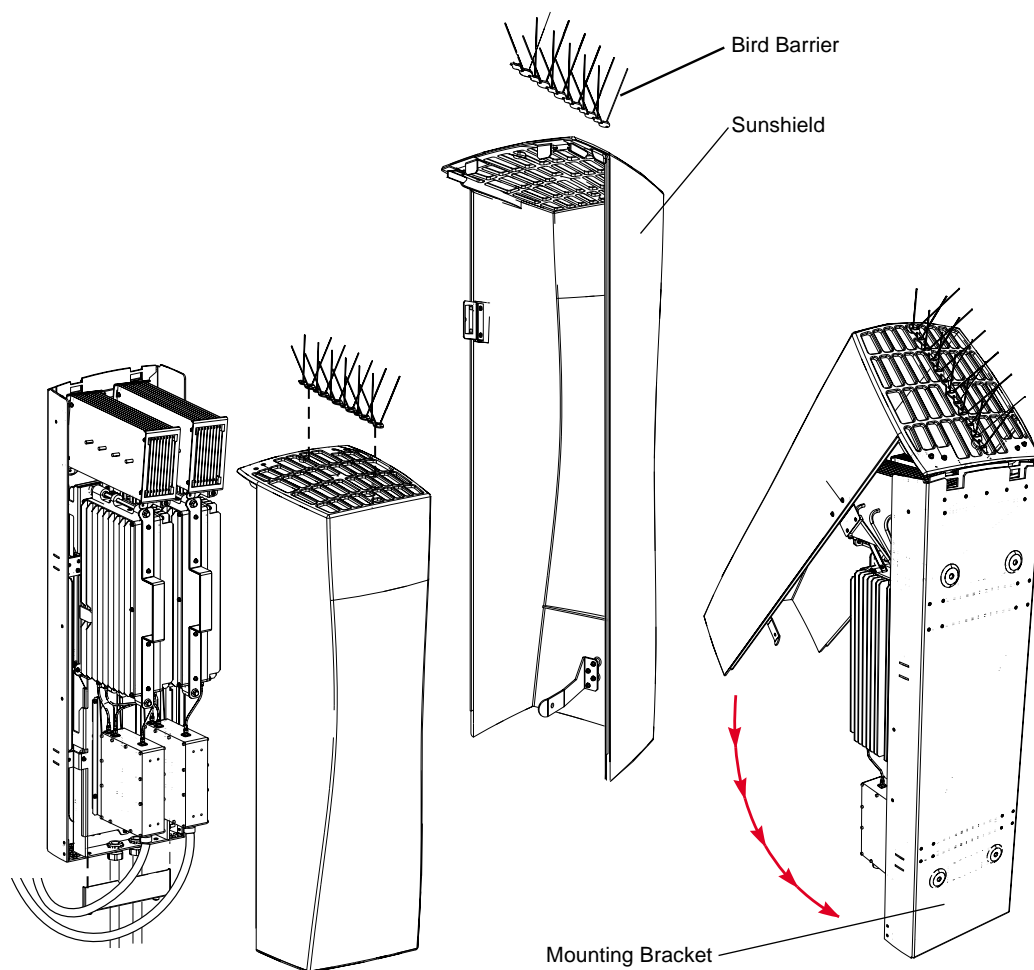
Figure 3–5 Installing the Sunshield

123 Steps

To install the sunshields

1. If the remote unit is installed outdoors, attach the bird barrier to the top of the sunshield.

   a. Align the three screw holes in the bird barrier with the screw holes in the top of the sunshield.

   b. Drive the self-threading screws (from the Compact RBS Hardware Installation Kit) through the bird barrier into the holes in the sunshield. Do not overtighten the screws.

2. Hang the sunshield so that its top back tabs fit into the keyholes on the mounting bracket.

3. Pivot the sunshield down into the groove on the sides of the mounting bracket.

4. To prevent tampering or wind damage, place a padlock, or bolt with washers and nut, in the locking bracket at the bottom and lock the unit shut.

CAUTION   **If you do not correctly align the keyholes on the mounting bracket with the hooks on the sunshield, the sunshield can crack.**

CAUTION   **Take care not to damage the cooling fin array at the top of the remote unit when installing the sunshield.**

CAUTION   **If you do not secure the sunshield with a padlock or a bolt with washers and nut, the sunshield may come loose in strong winds and cause damage.**

CAUTION   **Always use the Ericsson sunshield, with the original factory paint. Painting the sunshield can adversely effect the operating temperature of the RBS. If the unit absolutely must be painted (e.g., for zoning reasons), Ericsson will work with you to find a solution. If you paint the sunshield of the unit without the approval of Ericsson, you will void Ericsson's warranty on that unit.**

4
Installing the RBS Main Unit

This chapter provides procedures for the installation of the RBS main unit, including the main unit chassis, daughter cards, sunshield, and cabling. After you complete the steps in this chapter, the RBS will be ready for commissioning.

Procedure Preview: How to install the RBS main unit

Step	Action	Described on
1	Mount the main unit chassis.	page 4-2
2	Install the daughter cards.	page 4-5
3	Connect the RBS site alarms.	page 4-6
4	Connect the grounding cable to the main unit chassis.	page 4-9
5	Connect power to the main unit.	page 4-9
6	Connect the backhaul (T1/E1).	page 4-11
7	Install the GPS receiver.	page 4-12
8	Connect the GPS cables.	page 4-12
9	Test the fiber optic cables.	page 4-14
10	Connect the fiber optic cables to the main and remote units.	page 4-14
11	Connect the main and remote units to the power.	page 4-17
12	Apply power to the RBS.	page 4-18
13	Verify the LED alarms.	page 4-19
14	Install the sunshield.	page 4-19

Mounting the Main Unit Chassis

The main unit chassis provides the connection point for cabling to the main and remote units. Figure 4–1 shows the main unit chassis and mounting bracket.
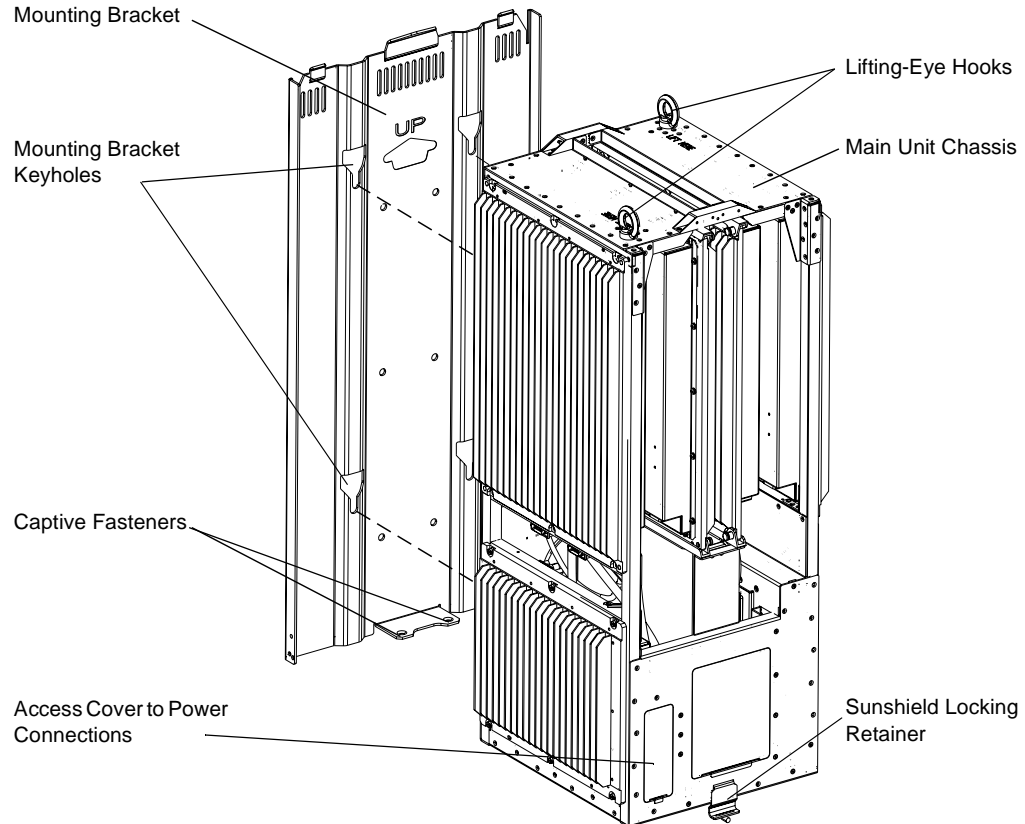

Mounting Bracket

Lifting-Eye Hooks

Mounting Bracket Keyholes

Main Unit Chassis

Captive Fasteners

Access Cover to Power Connections

Sunshield Locking Retainer

Figure 4–1 Mounting the Main Unit Chassis

Steps

To mount the main unit chassis

1. Position the main unit chassis in front of the mounting bracket. You can use the lifting eye hooks at the top of the chassis to lift it into place.

CAUTION

A main unit chassis configured with more than two CDMA modules is heavy and requires more than a single person to lift it. For the configured weights of RBS units, see Table 1–4 on page 1-9.

2. Carefully route the power, GPS, backhaul, alarms, and fiber optic cables through the conduit openings.

Note

Ensure that the conduit lock nuts are removed and available. If the main unit chassis is installed without removing the conduit lock nuts, you will have to remove the main unit again to remove them.

3. Set the shoulder screws of the chassis into the keyholes on the mounting bracket.

4. To secure the chassis, tighten the captive fasteners on the bottom of the main mounting bracket; the recommended torque is 55 +/- 2.0 in-lbs (621 +/- 23 N-cm).

CAUTION   **If you do not tighten the bolts at the bottom of the main unit chassis after mounting, the chassis could come loose if subjected to vibration or an earthquake.**

5. Install and tighten the conduit lock nuts.

CAUTION   **Use extreme care when tightening the conduit lock nuts so as not to damage the cables.**

Understanding the Daughter Cards

You install daughter cards on the main unit signal surge modules to provide functionality for primary and secondary backhaul, GPS, and alarms. Table 4–1 illustrates the daughter cards and connections.

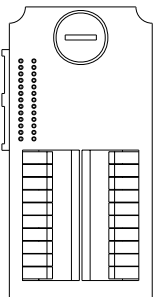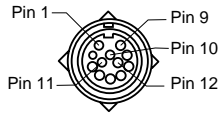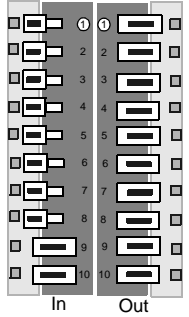*Table 4–1 Daughter Cards*
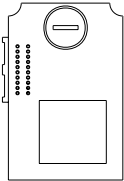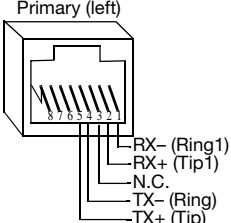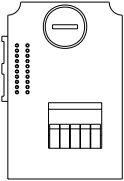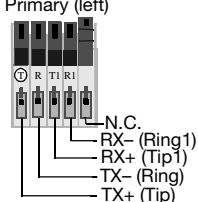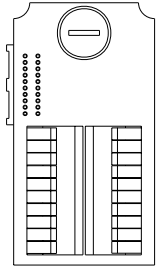
| Primary and Secondary Backhaul Cards
Uses either a standard RJ-45 connector or a 5-position, cam-type (Riacon). The Riacon backhaul card is not normally provided in the United States; contact Ericsson if you want to use this card. | **Balanced T1/E1 RJ-45**

T1/E1 Riacon | Primary (left)
RX– (Ring1)
RX+ (Tip1)
N.C.
TX– (Ring)
TX+ (Tip)

Primary (left)
N.C.
RX– (Ring1)
RX+ (Tip1)
TX– (Ring)
TX+ (Tip) |

Table 4–1 Daughter Cards (continued)

Alarms Card Uses a 10-position, cam-type (Riacon) interface.	 AUX1 INPUT+ ① ① AUX1 OUTPUT Normally Open AUX1 INPUT- 2 2 AUX1 OUTPUT Common AUX2 INPUT+ 3 3 AUX1 OUTPUT Normally Closed AUX2 INPUT- 4 4 AUX2 OUTPUT Normally Open AUX3 INPUT+ 5 5 AUX2 OUTPUT Common AUX3 INPUT- 6 6 AUX2 OUTPUT Normally Closed AUX4 INPUT+ 7 7 (No Connection) AUX4 INPUT- 8 8 (No Connection) AUX5 INPUT+ 9 9 AUX6 INPUT+ AUX5 INPUT- 10 10 AUX6 INPUT- IN OUT

GPS Card
Uses a 10-position, cam-type (Riacon) interface.

Pinout at GPS

GPS		Cable	Daughter Card	
Pin	**Signal**		**Signal**	**Pin**
3	RX+	Orange	TX+	1
2	RX–	Violet	TX–	2
5	TX+	Yellow	RX+	3
4	TX–	Gray	RX–	4
11	1PPS+	Green	1PPS+	5
12	1PPS–	Blue	1PPS–	6
1	PWR	Red	PWR	7
9	GRD	Black	GND	8
			Optional Shield GND	
			Optional Shield GND	
Connect the GPS Rx to the daughter card Tx				
Connect the GPS Tx to the daughter card Rx				

In   Out
Pinout is identical for in and out

Installing the Daughter Cards

You install the daughter cards on the main unit signal surge modules. Figure 4–2 shows the location of the signal surge modules and the installation locations for the daughter cards. Some configurations will use only one signal surge module.

CDMA Module C
Secondary T1/E1 C
"Port B Secondary T1/E1"

Primary T1/E1 C
"Port B Primary T1/E1"

Serial Port C
"Port B Com1"

Alarms C
"Port B Alarms"

Ethernet C
"Port B Ethernet"

Intrusion (Sun Shield) Alarm

SMA "PP2S"

GPS

CDMA Module D
Ethernet D
"Port A Ethernet"

Serial Port D
"Port A Com1"

Alarms D
"Port A Alarms"

Secondary T1/E1 D
"Port A Secondary T1/E1"

Primary T1/E1 D
"Port A Primary T1/E1"

Main Unit Chassis

Sunshield

I/O Access Cover

Signal Surge Modules

CDMA Module A
Primary T1/E1 A
"Port A Primary T1/E1"

Secondary T1/E1 A
"Port A Secondary T1/T1"

Alarms A
"Port A Alarms"

Serial Port A
"Port A Com1"

Ethernet A
"Port A Ethernet"

GPS

SMA "PP2S"

Intrusion (Sunshield) Alarm

CDMA Module B
Ethernet B
"Port B Ethernet"

Alarms B
"Port B Alarms"

Serial Port B
"Port B Com1"

Primary T1/E1 B
"Port B Primary T1/E1"

Secondary T1/E1 B
"Port B Secondary T1/E1"

Note:
Each signal surge module provides connections for up to two CDMA modules.

Note: "**A**" corresponds to CDMA module A, "**B**" corresponds to CDMA module B, etc.
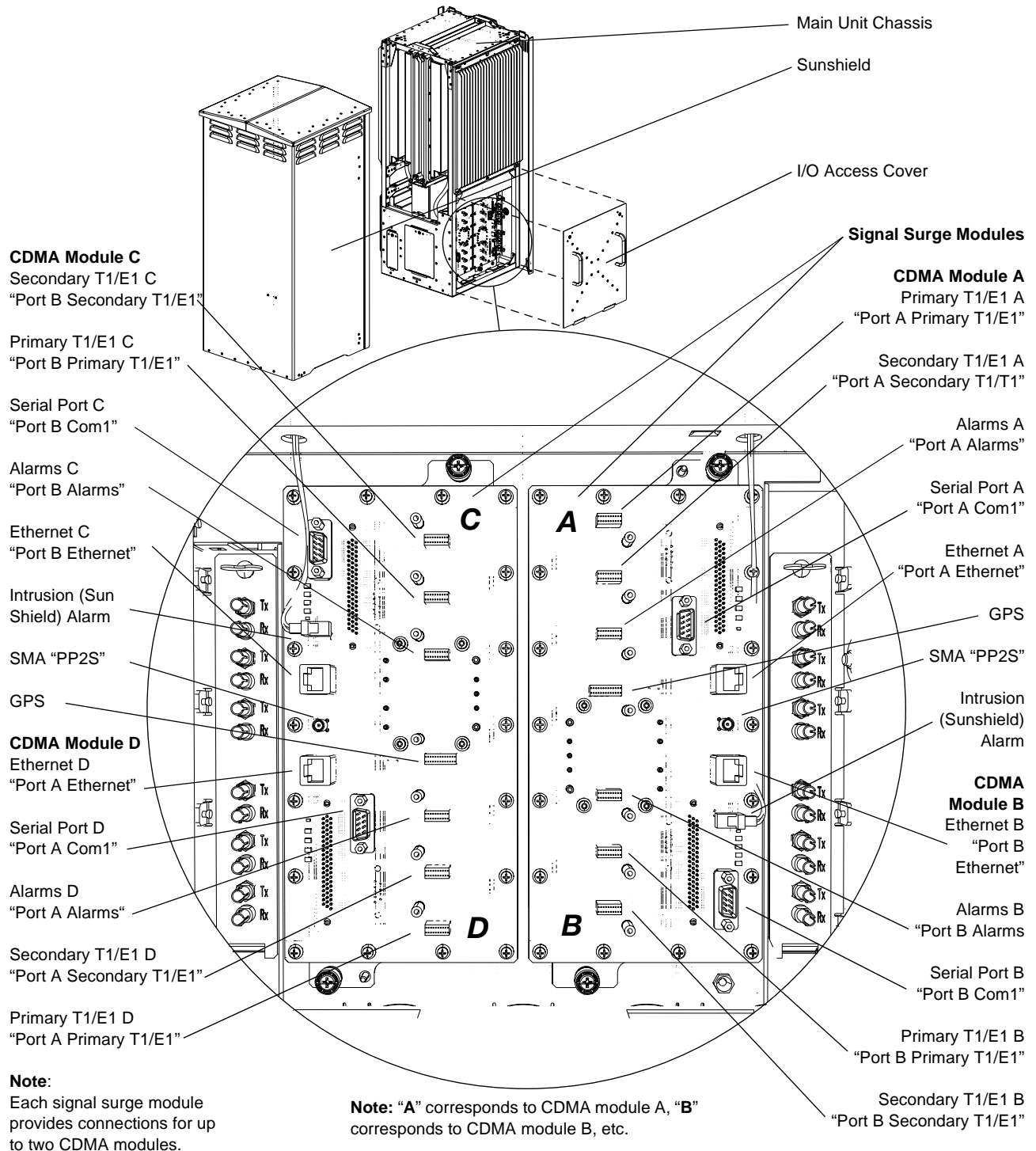
Figure 4–2 Signal Surge Modules

| 1 2 3 | **Steps** | ***To install daughter cards on the main unit signal surge modules*** |

1. To remove the I/O access cover from the main chassis, turn each of the two screws (one at each top corner of the access cover) until the catch releases. For the location of the access cover, see Figure 4–2. Use the handles on the access cover to lift it away from the chassis.

2. Remove the desired daughter card from the daughter card assembly. Use snips and pliers to remove any excess material from the card.

3. For each signal surge module, install each of the following cards: 2 T1/E1 Primary cards, 2 T1/E1 Secondary cards (if you will be daisy chaining the backhaul), 1 GPS card, and 2 Alarms cards.

4. Connect the daughter cards at the locations shown in Figure 4–2.

5. Seat the daughter card on the signal surge module and tighten its screws to the recommended 5 in-lbs (56 N-cm) of torque.

CAUTION   **To prevent the daughter cards from falling off the signal surge module, make sure you tighten the screws on each daughter card.**

Connecting the RBS Site Alarms

After you install the alarms daughter cards (one per CDMA module), you can connect the input and output devices to them. Keep a record of the normal state (i.e., normally open or normally closed) for each input sensor and output relay connected to each alarms card. Appendix A has a checklist you can use to record this. The BSM operator needs this information to configure the alarms. Each alarms card has six input sensors and two output relays.

ATTENTION   **The BSM operator must configure the relationship of the input sensors to output relays for each CDMA module.**

After configuration, the state of the input sensors is monitored by the RBS and BSM once every second. Changes in state are reported as faults.

Note   **Each CDMA module and each RF chain will throw a fault when the associated sunshield is opened. Thus, for a 4x3 RBS system, opening the main sunshield will throw four faults (one for each CDMA module, and opening a remote sunshield will throw a fault through each of two different CDMA modules (one for each RF Chain.)**

You can view faults and the current state of each sensor input and output relay at both the RBS and the BSM. Figure 4–3 on page 4-7 shows an example of alarm input sensors and output relays for a single alarms card. The figure also shows the specifications for the connections.

In Figure 4–3, the alarms are configured to work as follows:

- If the FAA Light fails, its input (which is normally open) closes, the output relay becomes energized, and the Warning Light goes on. In addition, a fault is generated and sent to the BSM.

- If the UPS fails, its input (which is normally closed) opens, the output relay becomes de-energized, and the Warning Siren is sounded. In addition, a fault is generated and sent to the BSM.

CAUTION **To prevent ground loops, equipment connected to input sensors must be isolated from its chassis ground (reference).**

RBS

Alarms Card

Input

Output
Energize Relay
Alert BSM

Indicate to the BSM operator each input device's normal state — normally open or normally closed.

Indicate to the BSM operator each output device's normal state — normally open or normally closed.

FAA Light
(example shown open)

UPS
(example shown closed)

AUX1 INPUT+
AUX1 INPUT-
AUX2 INPUT+
AUX2 INPUT-
AUX3 INPUT+
AUX3 INPUT-
AUX4 INPUT+
AUX4 INPUT-
AUX5 INPUT+
AUX5 INPUT-

AUX1 OUTPUT Normally Open
AUX1 OUTPUT Common
AUX1 OUTPUT Normally Closed
AUX2 OUTPUT Normally Open
AUX2 OUTPUT Common
AUX2 OUTPUT Normally Closed
(No Connection)
(No Connection)
AUX6 INPUT+
AUX6 INPUT-

Warning Light

Warning Siren

IN   OUT

- +5 VDC open circuit voltage
- 5 mA max current
- 100 ohms max series resistance (to sense closure)

- 100mA @ 48VDC
- 50mA @ 21 VAC RMS, non-inductive
- 10 ohms max impedance for contact closure
- 35V breakdown between contacts and ground

Note: To prevent ground loops, equipment connected to input sensors *must* be isolated from the chassis ground (reference).
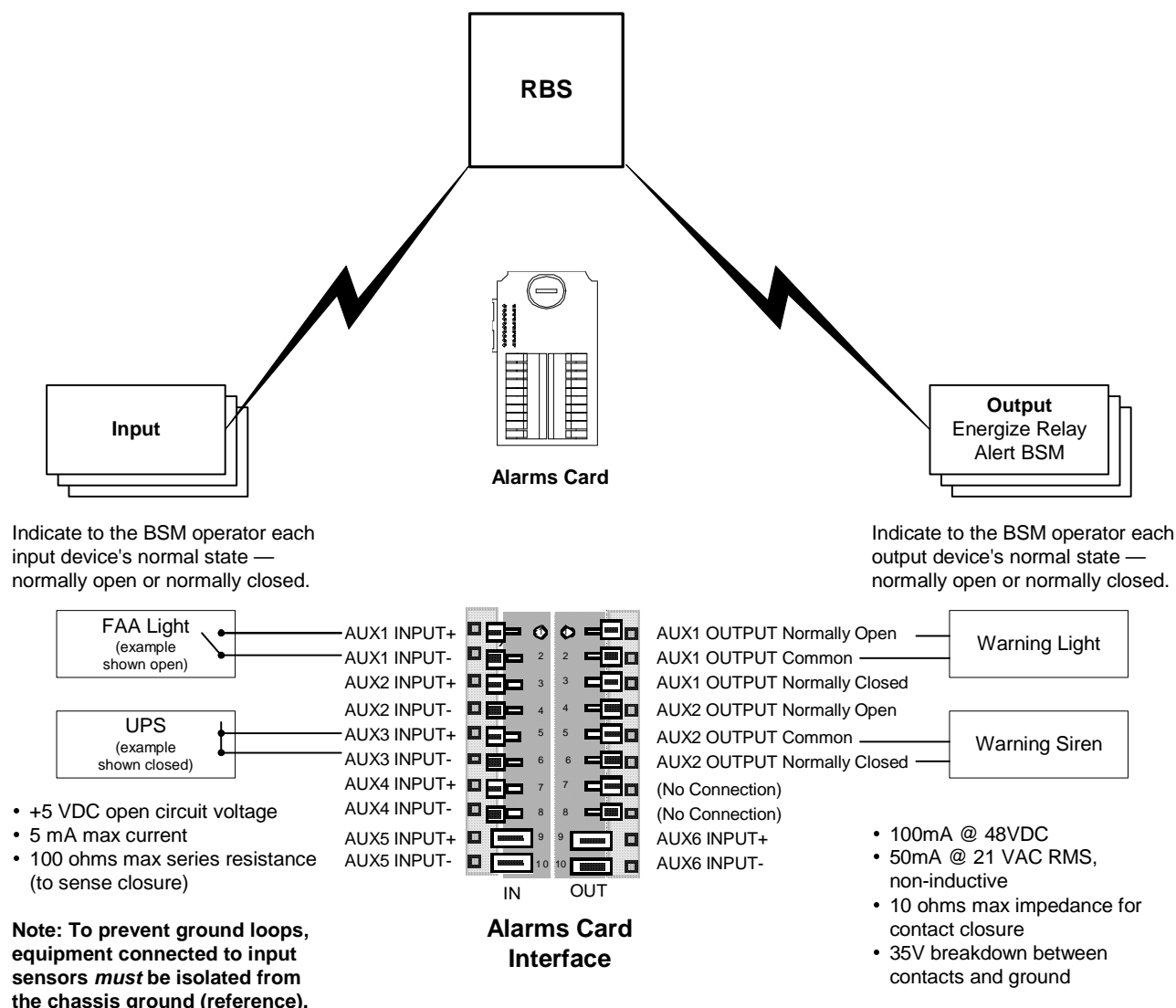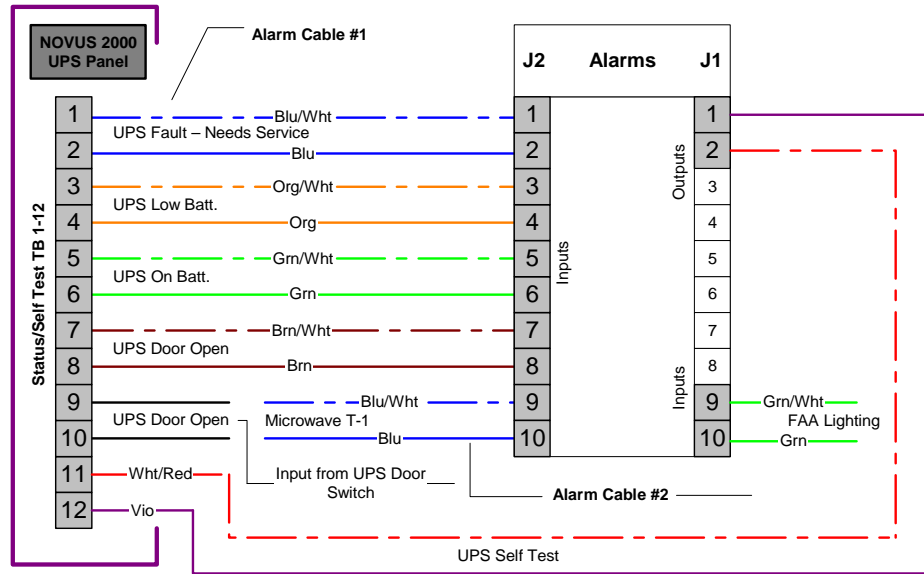
**Alarms Card
Interface**

Figure 4–3 Example Alarm Input Sensors and Output Relays Configuration

Note For the RBS alarms to operate correctly, the BSM must be configured with your recorded information.

Figure 4–4 Alarms Wiring Diagram

Steps

To connect the site alarms

1. For each alarms card (one per CDMA module), connect the leads from each input device to an input sensor on the alarms card.

2. Connect the leads from each output device to the Normally Open/Normally Closed (depending on the normal state of the device) and Common output relays on the Alarms card.

3. For each input sensor and output relay, use the "Pre-Commissioning Checklist" on page A-3 to record the following:

   ❑ Input Sensor # - Record the value (Input AUX1 to AUX6) to identify the selected input sensor. See Figure 4–4.

   ❑ Output Relay # - Record the value (Output AUX1 to AUX2) to identify the selected output relay. See Figure 4–4.

   ❑ Device Identifier - Record a name or description for the input sensor or output relay.

   ❑ Normal State (open/closed) - Record the non-alarm state of the input sensor or output relay.

   ❑ Usage (enabled/disabled) - Specify whether the Input Sensor # or Output Relay # is enabled or disabled.

Connecting the Ground Cable to the Main Unit Chassis

The RBS external protective Earth ground must be tested after installation. The impedance to Earth ground must be less than 5 Ω (see "RBS Specifications" on page 1-6). Tests should be performed twice a year to ensure continued ground integrity.

Main Unit Chassis Grounding Stud
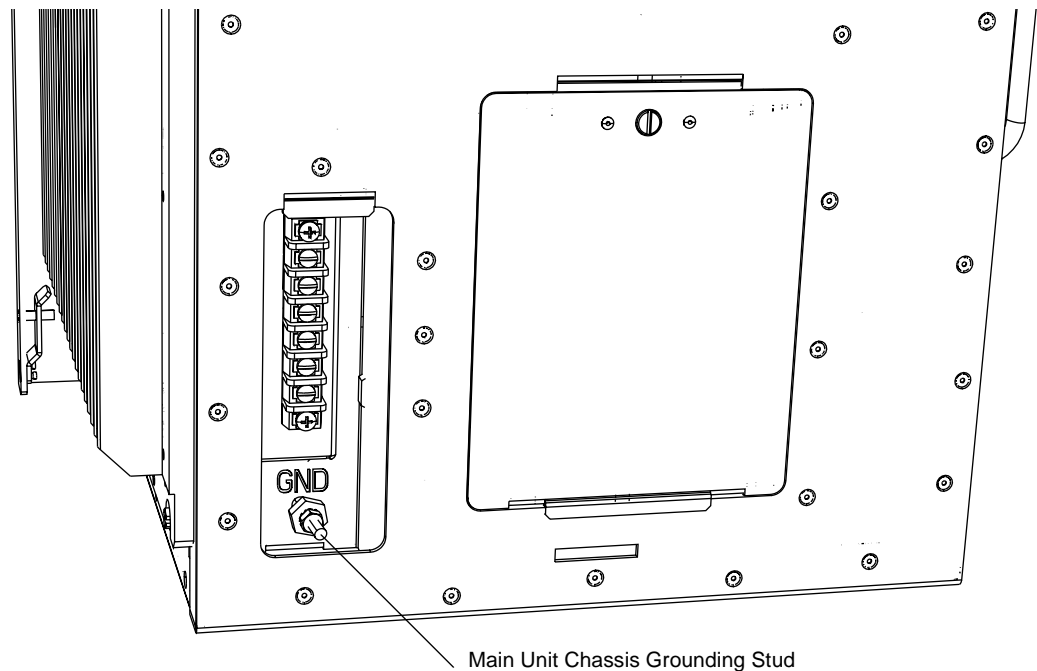
Figure 4–5 Connecting the Ground Cable to the Main Unit

Steps

To connect the ground cable to the main unit chassis

❑   Connect the ground jumper to the main unit chassis grounding stud shown in Figure 4–5 (35–40 inch-pounds (400–450 N-cm) maximum torque recommended). For the location of the hole for the grounding wire in the bottom of the main unit chassis, see Figure 2–8 on page 2-10.

Connecting Power to the Main Unit

The main unit chassis comes with "pigtails" connected to the power connectors. For the location of the power connections, see Figure 4–6 on page 4-10. The pigtails must be pulled through the power conduit to the electrical junction box where they will be connected to the power cable from the UPS or breaker switch.

WARNING

To avoid electrical shock, make sure the power is OFF before connecting the power cables.

⌐1 2 3⌐ Steps   ***To connect the power cable to the main unit***

1. Pull the main unit line 1 (brown), line 2 (blue), and ground (green/yellow) power cables' pigtails from the main unit chassis through the power conduit to the electrical junction box.

2. Strain-relieve the power cable from the UPS or electrical breaker within the junction box, and carefully remove the weatherproofing from the power cable.

3. Using the set-screw wire connectors from the Compact RBS Hardware Installation Kit, connect the pigtails to the UPS power cables.
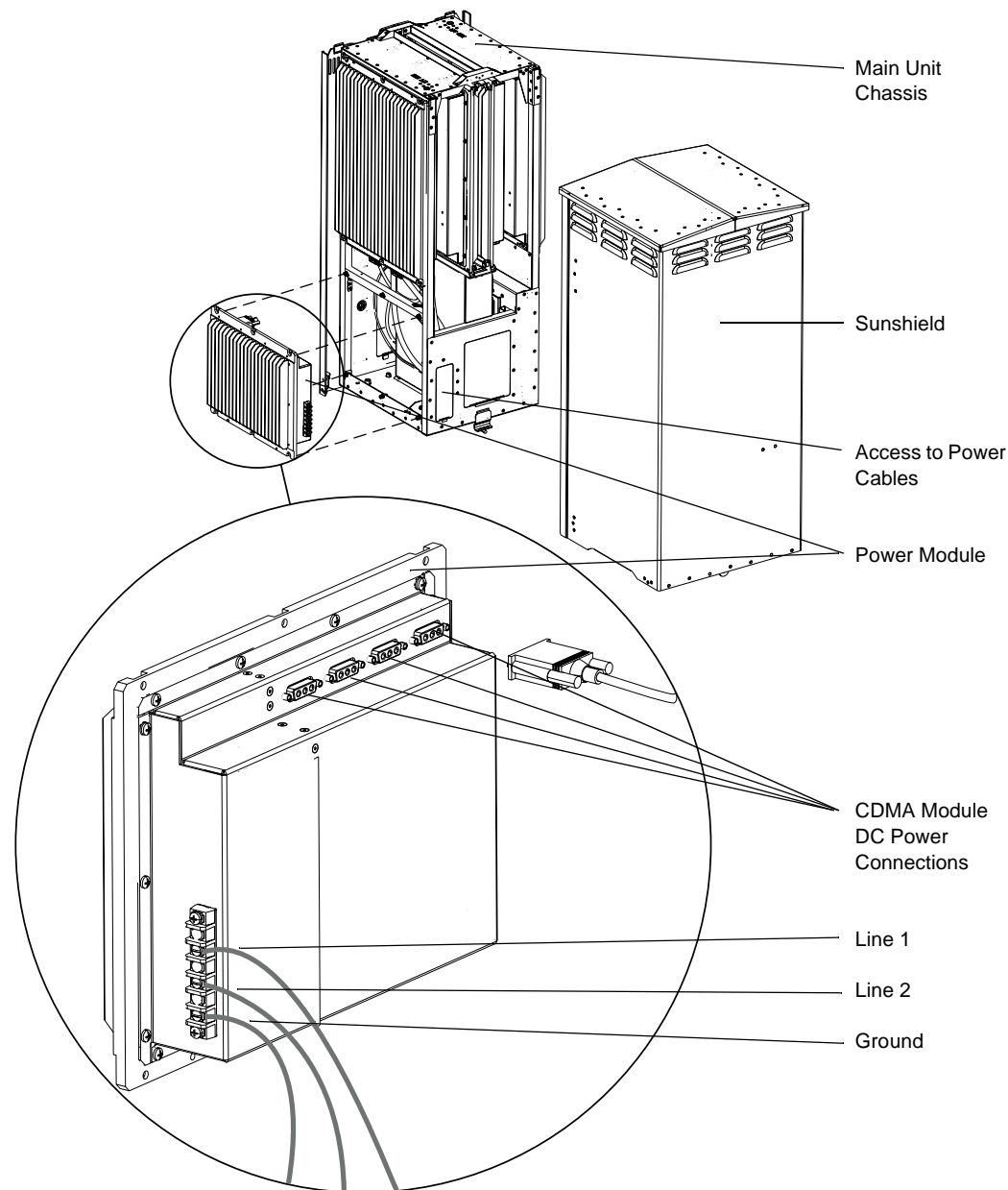

Figure 4–6 Main Unit Power Connections

Connecting the Backhaul (T1/E1)

The backhaul (T1/E1) provides the connection from the BSC through the switched telephone network to the RBS. To provide greater economy, the RBS 1107 can be configured to use a fractional T1/E1, allowing each backhaul to support two of the four (possible) CDMA modules.

Steps

To connect the primary backhaul cables

1. Terminate the T1/E1 cables run from the landline telephone service demarcation point to the main unit mounting bracket. For the pinouts for Riacon and RJ-45 connectors on the backhaul daughter cards, see Table 4–1 on page 4-3.

2. To prevent the T1/E1 cables from falling back down the conduit, attach a cable tie to the T1/E1 cables at a point just above where they enter the main unit chassis. The "tail" of the cable tie will keep the cable from falling.

3. To connect each T1/E1 cable to the appropriate primary T1/E1 connector on the signal surge module, see Figure 4–7.

Note

The signal surge section marked "A" in Figure 4–2 on page 4-5 corresponds to CDMA module A, that marked "B" corresponds to CDMA module B, etc.

Primary backhaul daughter card
for CDMA module A
"T1/E1 Balanced"

T1/E1 backhaul from the telco box

Secondary backhaul daughter
card for CDMA module A
"T1/E1 Balanced"

Backhaul daisy chain cable

Primary backhaul daughter card
for CDMA module B
"T1/E1 Balanced"

Secondary backhaul daughter
card for CDMA module B
"T1/E1 Balanced" (not used)
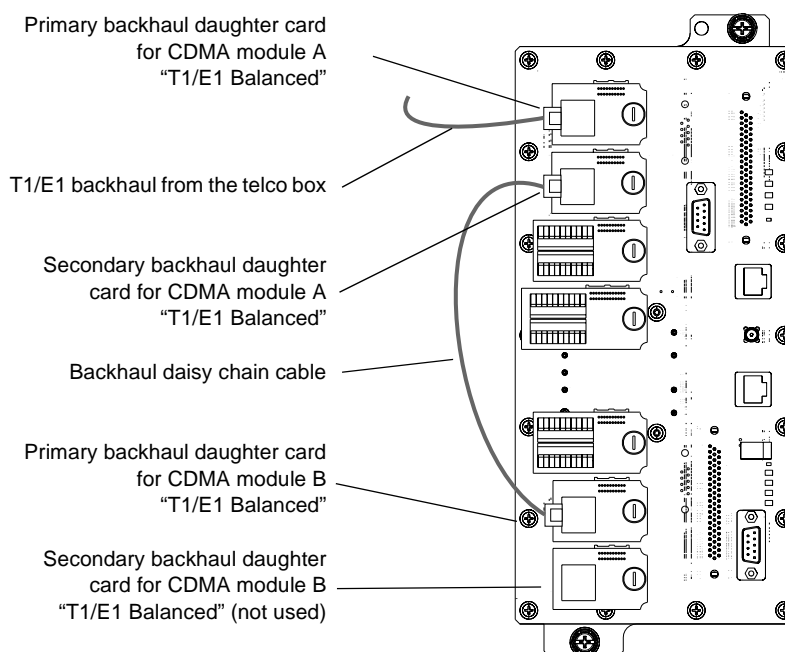
Figure 4–7 Signal Surge Module with Backhaul Daisy Chaining

Steps

To daisy chain a backhaul

■ Using an RJ-45-terminated, Category 5 twisted-pair cable, connect the secondary backhaul (one of the ones you connected in the previous step) to the primary backhaul of the second CDMA module. For the location of the T1/E1 connectors on the signal surge modules, see Figure 4–7. For the location of the signal surge modules see Figure 4–2 on page 4-5

Working with the GPS

For information about the GPS, see "GPS Receiver" on page 1-4. For information about positioning the GPS receiver bracket, see "Positioning the GPS Bracket" on page 2-8.

Installing the GPS Receiver

Install the GPS receiver in the GPS receiver bracket as discussed in "Installing Conduit for the RBS" on page 2-9.

Steps   ***To install the GPS receiver***

1. Connect the mated 8-pin circular connector on the GPS receiver to the 8-pin connector on the GPS interconnect cable and weatherproof the connection.

2. Mount the GPS receiver in the GPS receiver bracket.

3. Tighten the hex screw on the receiver to the GPS bracket (do not overtighten).

Connecting the GPS

The GPS receiver and cables should already be installed as described above. For the locations of the GPS connectors, see "Installing the Daughter Cards" on page 4-5. Figure 4–8 shows the wiring connections to the GPS connector.

	GPS	
3 (RX+) —— Org	1 TX+	1
2 (RX-) —— Vio	2 TX-	2
5 (TX+) —— Yel	3 RX+	3
4 (TX-) —— Gry	4 RX-	4
11 (1pps+) —— Grn	5 1pps+	5
12 (1pps-) —— Blu	6 1pps-	6
1 (PWR) —— Red	7 Pwr	7
9 (GND) —— BLK	8 Gnd	8
Optional Shield Ground	9	9
Optional Shield Ground	10	10

From the GPS Receiver Connection
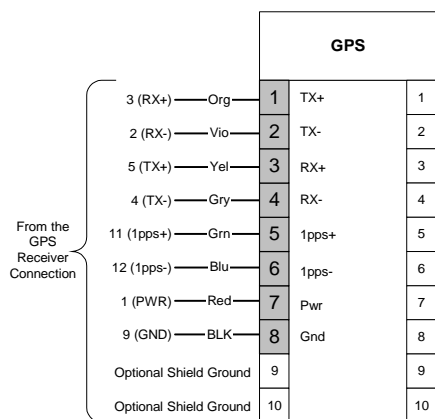
Figure 4–8 GPS Wiring Diagram

Steps   ***To connect the GPS cables***

1. Terminate the GPS cable from the GPS receiver.

2. To prevent the GPS cable from falling back into the junction box, attach a cable tie to it just above the conduit opening in the main unit. The "tail" of the cable tie will prevent the cable from slipping back into the junction box.

3. Connect the GPS cables to the GPS daughter card on the signal surge module as shown in Figure 4–8. For the location of the GPS daughter card see Figure 4–2.

ATTENTION   **If the connections to pins 5 & 6 on the GPS daughter card (1PPS+ and 1PPS-) are switched, no fault will be generated, but no calls will be processed.**

Daisy Chaining the GPS

A single GPS receiver can be daisy-chained to support up to four CDMA modules in a single RBS or up to two separate RBSs each with a single CDMA module.
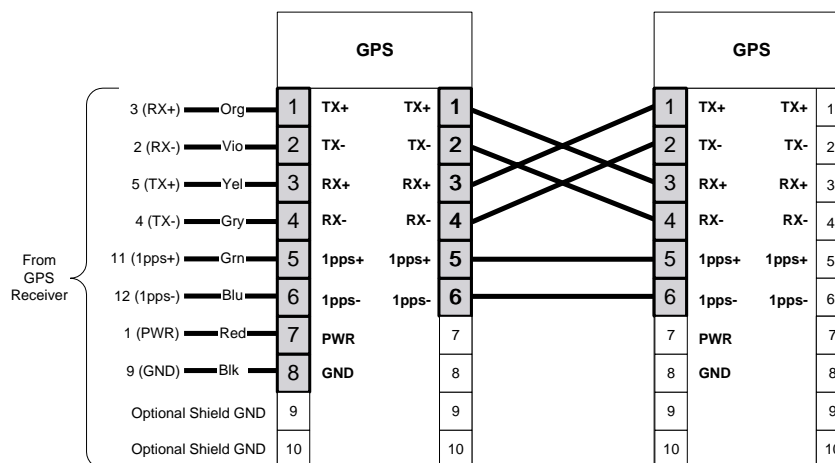

Figure 4–9 GPS Daisy Chaining Diagram

Steps

To daisy chain the GPS

1. To daisy chain the GPS between two main units, install conduit between the two units and install GPS cable. To daisy-chain between two signal surge modules, go directly to step 3.

2. Follow the procedure "To connect the GPS cables" on page 4-12.

3. Connect the GPS cable between the two GPS daughter cards as shown in Figure 4–9. For the location of the GPS daughter cards see Figure 4–2 on page 4-5.

4. If you are daisy-chaining between two main units, ensure that you have a GPS loopback connector on the back of the upstream main unit's signal surge module, covering the lower signal input connection (see Figure 5–7 on page 5-13). If you are daisy-chaining three CDMA modules in the same main unit, ensure that you have a GPS loopback connector on the back of the main unit's second signal surge module, covering the upper signal input connection (see Figure 5–7 on page 5-13).

CAUTION   **If the connections to the 1PPS+ and 1PPS– pins on the GPS daughter cards are switched in a daisy-chained configuration, some or all CDMA modules will not process calls. For more information, see "Troubleshooting a Daisy-Chained GPS Signal" on page 7-19.**
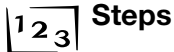
Testing the Fiber Optic Cables

Before you connect the terminated fiber optic subcables to the main and remote units, you must test them to verify their attenuation. The fiber optic cables are tested with a light source and a power meter, both of which must have ST connectors. For the materials needed for testing, see Table 1–8 on page 1-13.

Note

Before connecting any cable to the test equipment, clean the ferrules using connector cleaner. Refer to the light source and power meter manuals for details.

Steps

To test the fiber optic subcables

1. If the fiber optic subcables are terminated, remove the weatherproofing and dustcaps. Otherwise, a the fiber termination kit for ST connectors to terminate the subcables now.

2. Clean the fiber optic cable ends (the glass portion) using connector cleaner.

3. Warm up the test equipment.

4. Connect the reference cable to the light source and the power meter.

5. For the light source and power meter setting, choose 1310 nm.

6. Calibrate the power meter using the zero set button.

7. Disconnect the reference cable from the power meter.

8. Connect one end of the cable to be measured to the light source using the ST to ST adapter (the adapter normally comes with the test kit).

9. Connect the other end of the cable to be measured to the power meter. The measured attenuation is the sum of the cable-run insertion loss and the connection insertion loss. (that is, cable attenuation = 0.75 dB + 0.03 dB per 100 feet of cable).

Connecting the Fiber Optic Cables

Each RF unit in each remote unit will be connected to the corresponding CDMA module via fiber optic cables. Each fiber optic cable contains two subcables. The fiber optic cables must be connected to both the main and remote units immediately after testing. For information on installing the fiber optic cables, see "Installing the Fiber Optic Cables" on page 2-14. For information on testing the fiber optic cables, see "Testing the Fiber Optic Cables" on page 4-14.

CDMA Module D

Gamma

Beta

Alpha

CDMA Module C

Gamma

Beta

Alpha

Main Unit Chassis

I/O Access Cover

Fiber interconnect modules

CDMA Module B

Gamma

Beta

Alpha

CDMA Module A

Gamma

Beta

Alpha
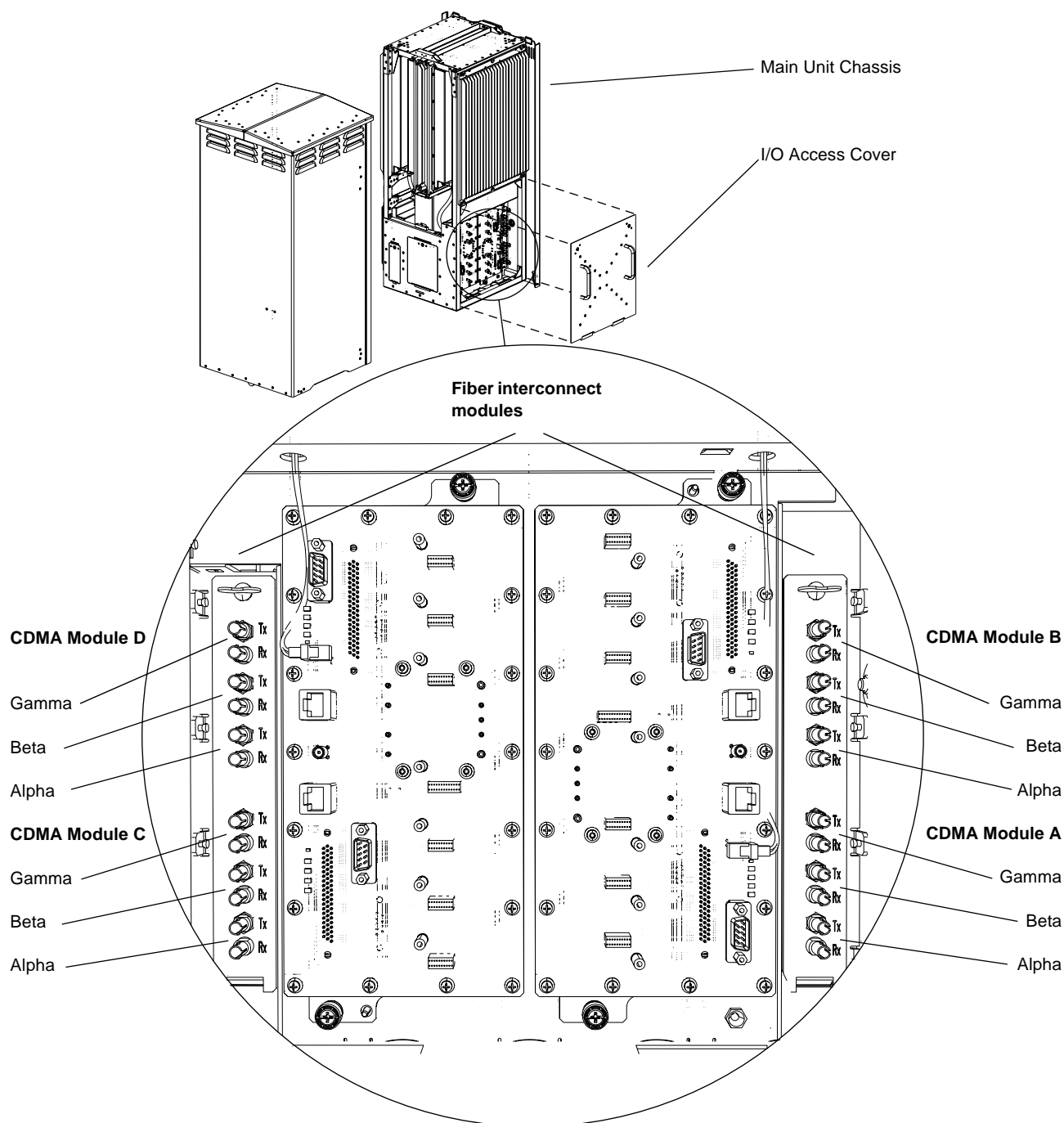
Figure 4–10 Main Unit Fiber Optic Cable Connections

ATTENTION   **The fiber optic cable connections are inverted from the connections to the signal surge module. That is, CDMA Module A connects to the lower section of the right fiber interconnect module, CDMA Module B connects to the upper section of the right fiber interconnect module, and so on.**

Note   You must test the fiber optic cables before connecting them to the main and remote units.

CAUTION **Connect the Tx on the main unit to the Rx on a remote core module. Connect the Rx on the main unit to the Tx on that remote core module. For the location of the Tx and Rx connectors on the main unit, see Figure 4–10 on page 4-15, for the location of the Tx and Rx connectors on the remote core module, see Figure 4–11 on page 4-16.**
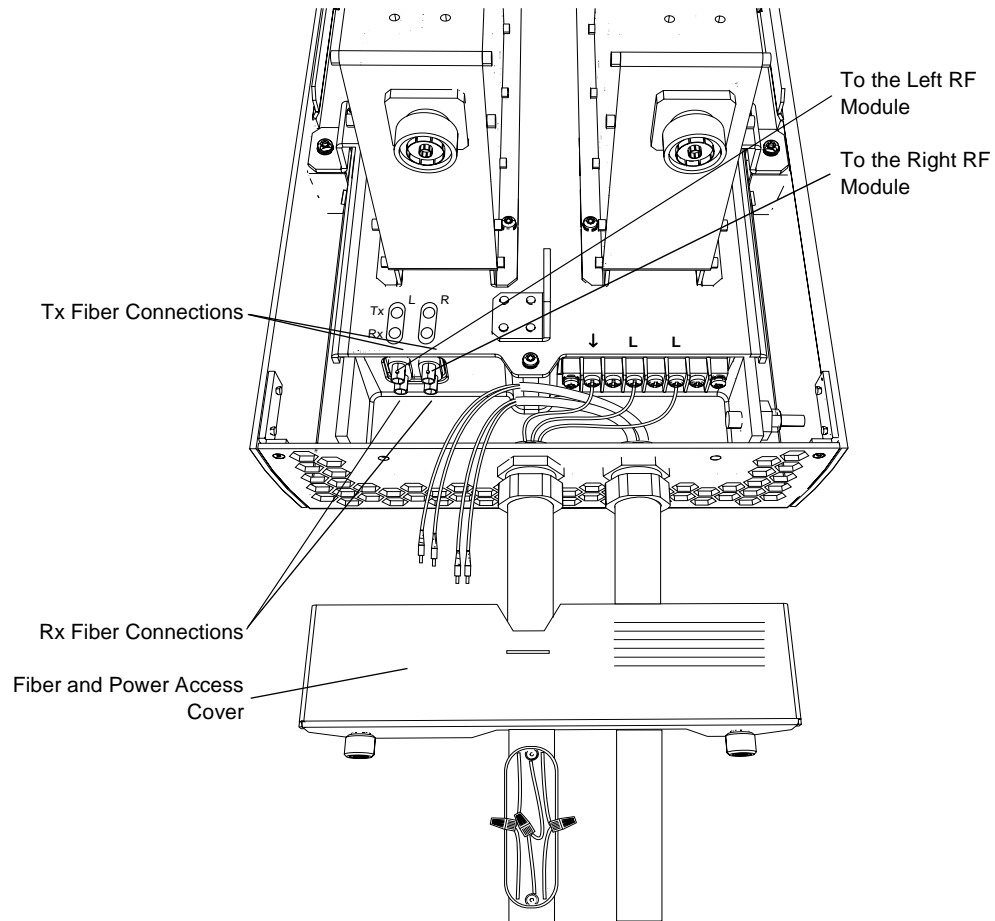

Figure 4–11 Remote Unit Fiber Optic Cable Connections

Steps   *To connect the fiber optic cables*

1.   Remove the Fiber and Power Access Cover by turning the two screws.

2.   Using a cable tie, permanently strain-relieve the outer jacket of the fiber optic cable to the post in the center of the bottom compartment of the remote unit. To prevent the fiber optic cable from falling back into the junction box at the main unit, attach a cable tie to it just above the conduit opening in the main unit. It is not necessary to tie the cable to anything, the "tail" of the cable tie will prevent the cable from slipping back into the junction box.

Note   **It is important that you strain relieve the fiber optic cable only from its outer jacket (not from the individual sub-cables) as it is fragile and may be damaged by the attachment of a cable tie to a sub-cable.**

3.   Remove only the ST connector caps on the main and remote units that you will be using.

4. Connect each ST connector on the fiber optic subcable to its corresponding remote core and main unit ST connectors. If only one RF module is installed, it should be installed on the right as you face the unit.

ATTENTION   **Do not bend the subcables to less than 1 inch (25.4 mm) or the outer cables to less than 4 inches (102 mm) in radius (that is, 15 times the diameter of the cable). There is no room in the main or remote units for excess cable.**

5. Replace the Fiber and Power Access Cover.

Connecting the Main and Remote Units to the Power

You must connect power to the RBS in such a way that you can power down the main unit and each remote unit separately. Label the cables at the UPS or breaker to indicate the unit to which each cable is connected. The main and remote units connect to the UPS or breaker using a standard 3-wire output connector.

Steps   *To connect the main and remote units to the power*

1. Remove the weatherproofing from the power cables leading from each of the RBS units.

2. If you are connecting to a UPS, follow the UPS manufacturer's instructions to connect the power cable from each of the RBS units to the UPS circuit breaker.

3. If you are connecting directly to the circuit breaker, follow the local electrical codes to connect to the breaker.

Note   You can run the power cables in the same conduit as the optical fiber.

Applying Power to the RBS

As you apply power to the RBS, the corresponding LEDs on the main unit signal surge modules should light. Figure 4–12 shows one of the four sets of LEDs on the main unit signal surge module. Figure 4–2 on page 4-5 shows the location of the signal surge modules in the main unit.
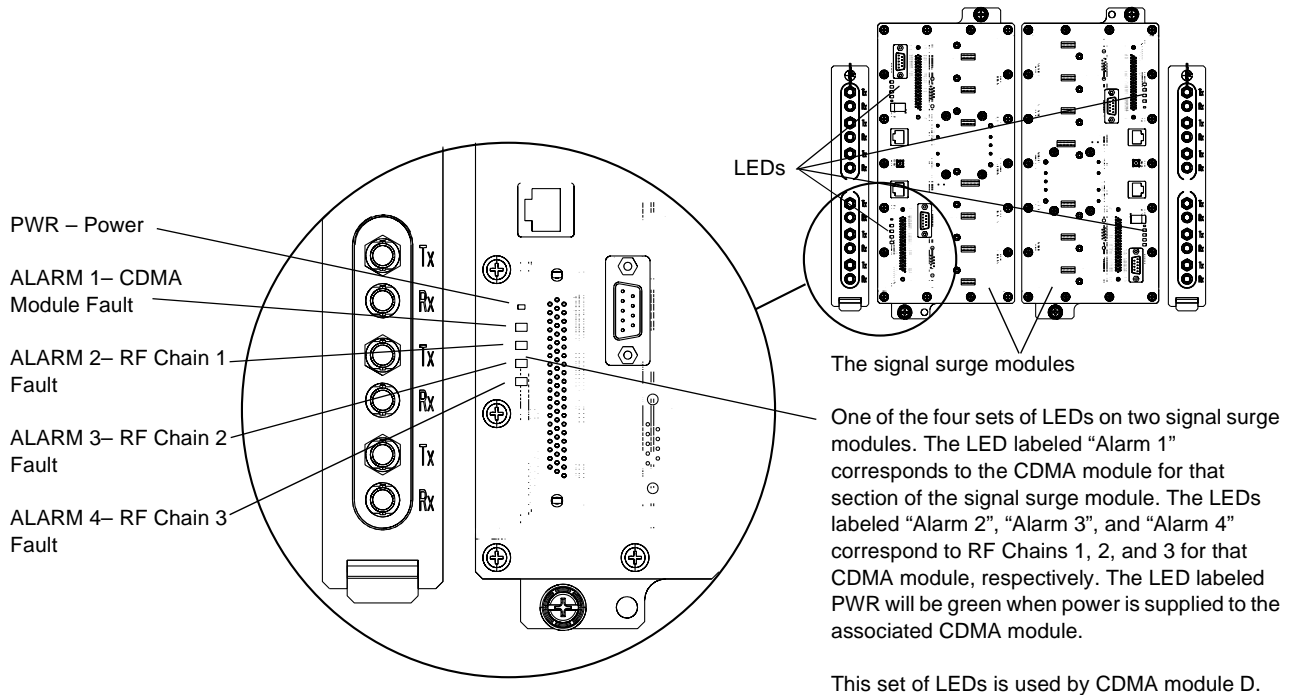

LEDs

PWR – Power

ALARM 1– CDMA Module Fault

ALARM 2– RF Chain 1 Fault

ALARM 3– RF Chain 2 Fault

ALARM 4– RF Chain 3 Fault

The signal surge modules

One of the four sets of LEDs on two signal surge modules. The LED labeled "Alarm 1" corresponds to the CDMA module for that section of the signal surge module. The LEDs labeled "Alarm 2", "Alarm 3", and "Alarm 4" correspond to RF Chains 1, 2, and 3 for that CDMA module, respectively. The LED labeled PWR will be green when power is supplied to the associated CDMA module.

This set of LEDs is used by CDMA module D.

Figure 4–12 Alarm LEDs

Steps

To apply power to the RBS

1. Verify that all AC power terminations have been performed.

2. Follow the UPS manufacturer's instructions to apply AC power to the UPS.

3. Follow the UPS manufacturer's instructions to apply DC power to the UPS.

4. Apply power to the main unit breaker.

    The LEDs corresponding to the connected CDMA modules attached to the main unit signal surge module (see Figure 4–12) should light up as you apply power.

5. Starting with Remote 1, apply power to the remote unit breakers one at a time.

    The LED or LEDs corresponding to each RF chain on the main unit signal surge module (see Figure 4–12) should light up as you apply power, to indicate it is working. Each LED should go out after a few minutes. If the LEDs on the signal surge module do not light, see the following section.

Verifying the Alarm LEDs

When you apply power to main and remote units, the LEDs corresponding to the configured alarms on the main unit signal surge modules (see Figure 4–12 on page 4-18) should light up as you apply power, to indicate their respective RF chains are working properly. They should each go out after a few minutes. If the LEDs on the signal surge module do not light, use the following procedure.

[1 2 3] **Steps**   ***To verify the alarm LEDs***

1. Make sure that the power source to the unit is connected correctly.

2. Test the power leads with a multimeter.

3. If you cannot determine the problem, go to Chapter 7, Troubleshooting.

Installing the Main Unit Sunshield

A switch on the main and on each remote sunshield engages an alarm in the RBS. When the sunshields are installed properly, these switches are closed, and the sunshield alarms at the BSM are cleared. When you have completed commissioning the RBS, a BSM operator can confirm that the alarms are cleared after the sunshields are installed. Another alarm will be generated if someone tampers with any of the sunshields.

Note   Before you can test the sunshield alarms, they must be configured at the BSM.
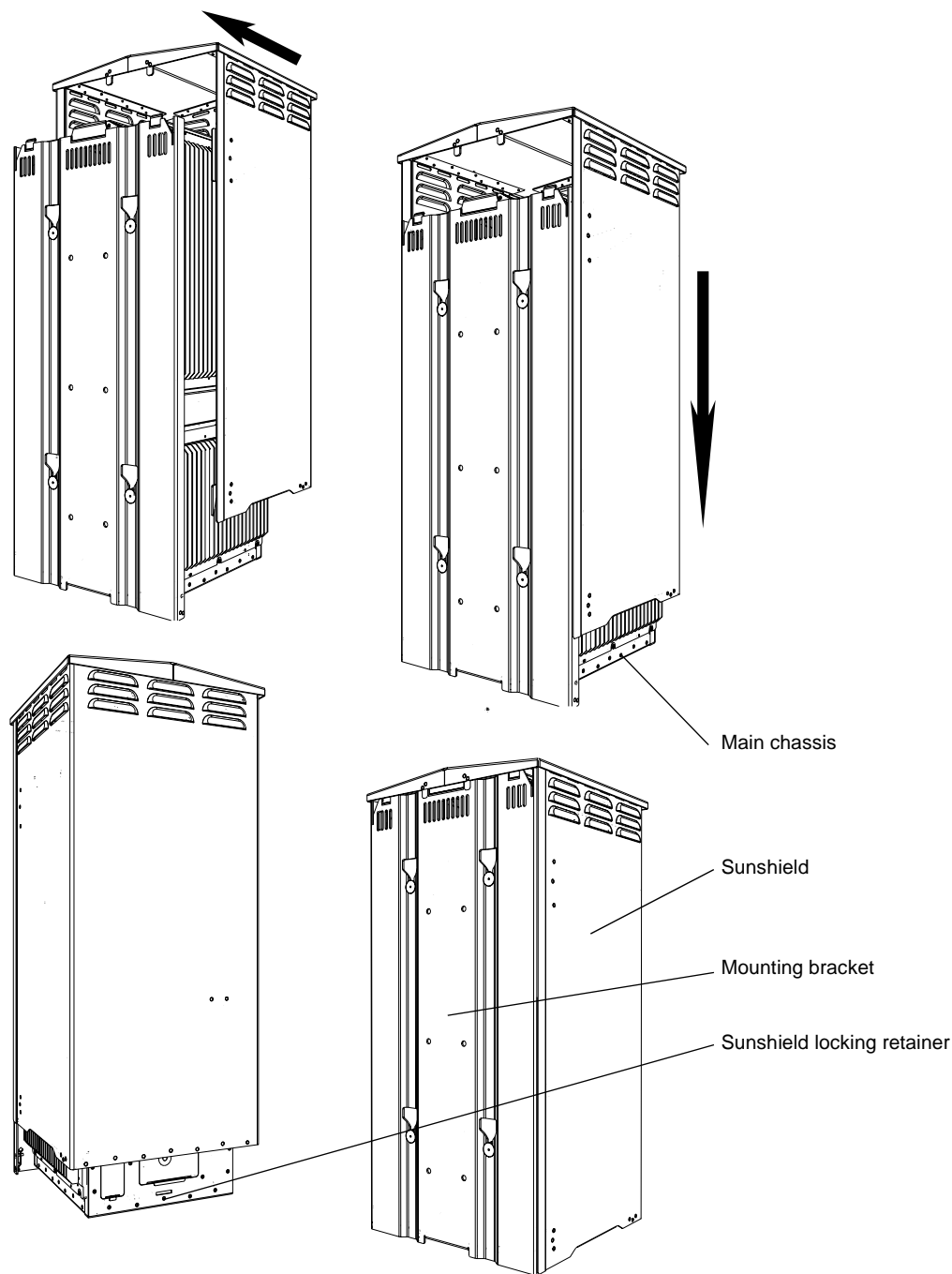
Figure 4–13 Sunshield Installation

| 1 2 3 | **Steps** | **To install the sunshield** |

1. Remove the lifting eye hooks from the main unit chassis.

2. Install the locking retainer from the RBS 1107 Main Hardware Installation Kit on the main unit chassis.

3. Slide the sunshield over the main chassis, inserting the side edges of the mounting bracket into the guides on the sides of the sunshield. See Figure 4–13 on page 4-20.

4. Slide the sunshield down until it is firmly seated.

Note

When properly installed, the tabs on the top of the mounting bracket and at the back and top of the sunshield should be inside the sunshield/mounting bracket enclosure. If the mounting bracket is flush against a wall, the wall will act as a guide to facilitate proper seating. If the mounting bracket is not flush, you can feel along the top back edge of the sunshield to ensure that the tabs are inserted properly.

5. To prevent tampering or wind damage, place a padlock or bolt with washers and nut in the locking bracket at the bottom and secure the sunshield.

CAUTION   **Always use the Ericsson sunshield, with the original factory paint. Painting the sunshield can adversely effect the operating temperature of the unit. If the unit absolutely must be painted (e.g., for zoning reasons), Ericsson will work with you to find a solution. If you paint the sunshield of the unit without the approval of Ericsson, you will void Ericsson's warranty on that unit.**