6 Hardware Replacement

When a faulty unit has been determined either by indications at the MSC, by routine maintenance checks, or by using the troubleshooting procedure, the unit can be replaced by following the appropriate procedure in this section.

Warning!

If possible avoid “hot repair” of CRI units. Hot repair is the process of replacing a failed unit without powering down the CRI cabinet.

Before replacing any unit, contact the MSC for further assistance. The MSC may have to block one or more units before they can be replaced.

6.1 Prerequisites and Tools

6.1.1 Prerequisites

Before a faulty magazine or unit can be replaced, the replacement magazine or unit must be available and have the same or higher R-state number (R-state letters do not matter). For example, product number ROF 134 8002/1 R3B can be replaced with product number ROF 134 8002/1 R3C, but not with ROF 134 8002/1 R4A.

6.1.2 Tools and Materials

The following tools are recommended for the equipment replacement procedures:

- ESD wrist strap with "banana" connector
- Extractor tool for removing cards (handle and button)
- Cable connector torque wrench set including:
  - Torque wrench (preset to 0.6 Nm and 2.8 Nm)
  - Torx bit TX10 and TX8 for circuit board screws
  - SMA tool for coaxial cables
- Flat blade screwdriver set for power and data cable connectors
- Phillips screwdriver set

- Torx screwdrivers TX20 and TX30
- T1 or E1 test set with cables
- 8-position crimping hand tool
- RJ-45 connectors
- Side-cutting pliers
- Metric socket set with 100 mm and 300 mm extension bars
- Torque wrench with socket adapter
- Small soldering iron
- Multimeter (voltmeter and ohmmeter)
- Electric light
- Cable ties and cable tie gun
- Extra ESD bag

6.2 CRI Hardware Replacement

6.2.1 CID Unit Replacement

CID Unit Removal

1. **Warning!**

   Contact the MSC for authority to proceed before removing the Cabinet Identification (CID) Unit. One or more CRI units may have to be blocked at the MSC before starting this procedure.

   Remove the door from the front of the CRI cabinet.

2. Attach the ESD strap to your wrist and connect the free end of the strap cable to an appropriate ground conductor on the cabinet.

3. Verify that all the status LEDs on the front of the printed circuit boards in the CRI are off indicating that the units are blocked. If the LEDs are not off, contact the MSC for further assistance.

4. Record the settings for the two rotary switches on the CID Unit. See Figure 6-1 on page 6-11 for the location of the CID Unit rotary switches.

   Note: The CID Unit is located on the bottom left side of the CRI rack mount (subrack) and on the top left side of the CRI floor mount (cabinet).

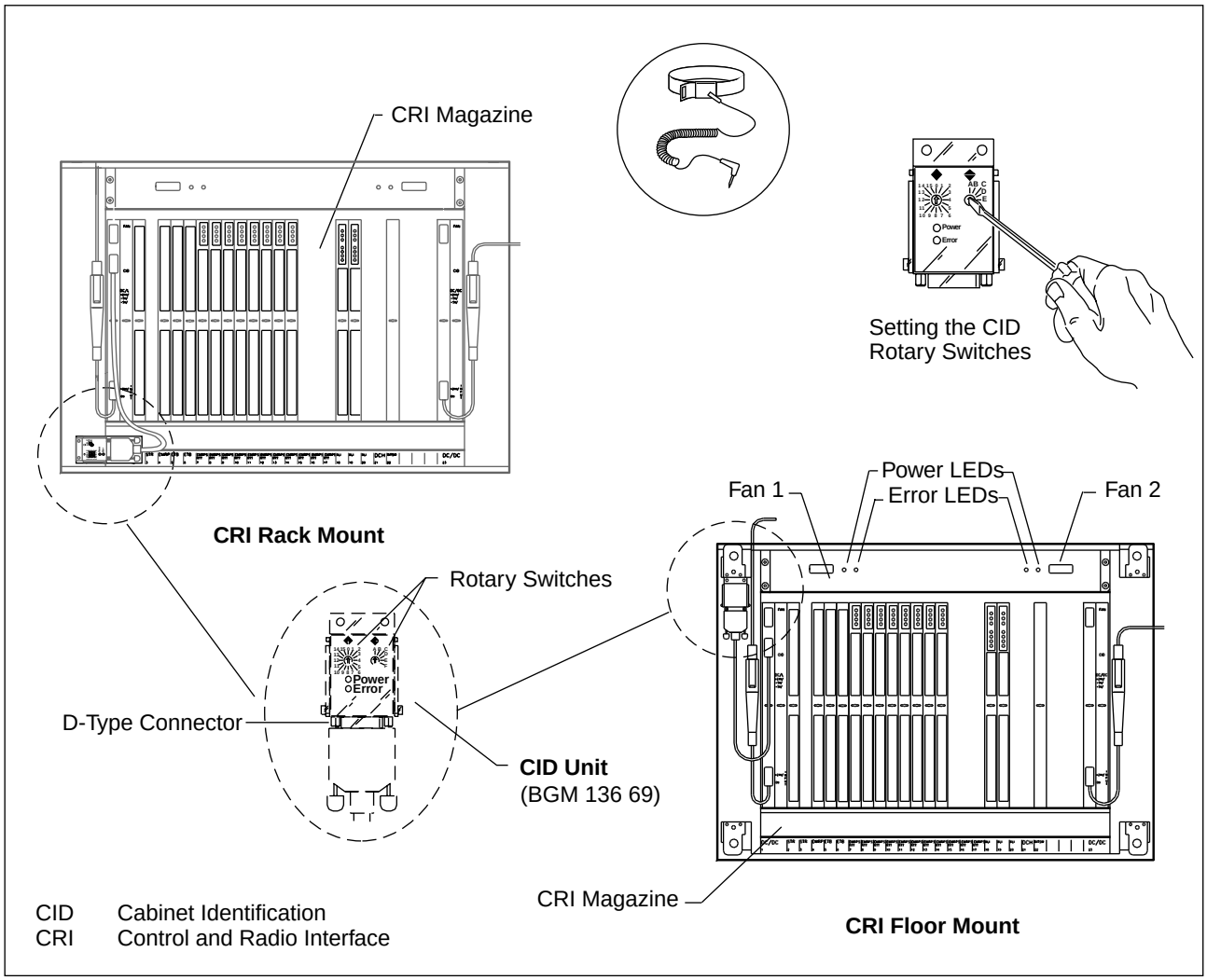


Figure 6-1. CID Unit

5. Disconnect the CID cable from the D-type connector on the CID Unit. See Figure 6-1 on page 6-11 for the location of the D-type connector on the CID Unit.

6. Using a Torx screwdriver, remove the two Torx screws that connect the CID Unit to the CRI subrack or cabinet.

Unit Replacement

7. Install the new CID unit using the two Torx screws in Step 6 on page 6-11 and tighten the screws.

8. Reconnect the CID cable from the DC/DC converter unit to the CID Unit.

9. Using a small, flat-head screwdriver, set the rotary switches to the same settings recorded in Step 4 on page 6-11. See Figure 6-1 on page 6-11.

10. Remove the ESD strap and cable.

11. Notify the MSC operator that the new CID unit is ready for operation and testing.

12. Reinstall the door on the front of the CRI cabinet.

Unit Repair

13. Complete the Repair Traveler Note. Describe in detail the circumstances and symptoms of the fault.

14. Attach the Repair Traveler Note to the unit.

15. Use the packaging material from the replacement fan unit to repackage the suspected faulty CID unit.

16. Return the CID unit to the service center.

17. Update the Site Inventory list in the *Site Installation Documentation* with the replacement CID unit details.

6.2.2 Power Supply Replacement

Power Supply Removal

1. **Warning!**

   Contact the MSC for authority to proceed before removing the power supply unit.

   Disconnect the power cord from the AC outlet.

2. Attach the ESD strap to your wrist and connect the free end of the strap cable to an appropriate ground conductor on the cabinet.

3. If the power supply is mounted in a subrack, loosen the two screws that hold the power supply tray to the power shelf.

4. If the power supply is mounted in a floor mount cabinet, remove the top cover by loosening the two rear bolts and removing the two front bolts that secure it to the power supply shelf.

5. Slide the power supply tray off the power shelf.

6. Disconnect the power cord from the AC connector on the rear panel of the power supply. See the *CRI Top View* illustration in Figure 6-2 on page 6-14.

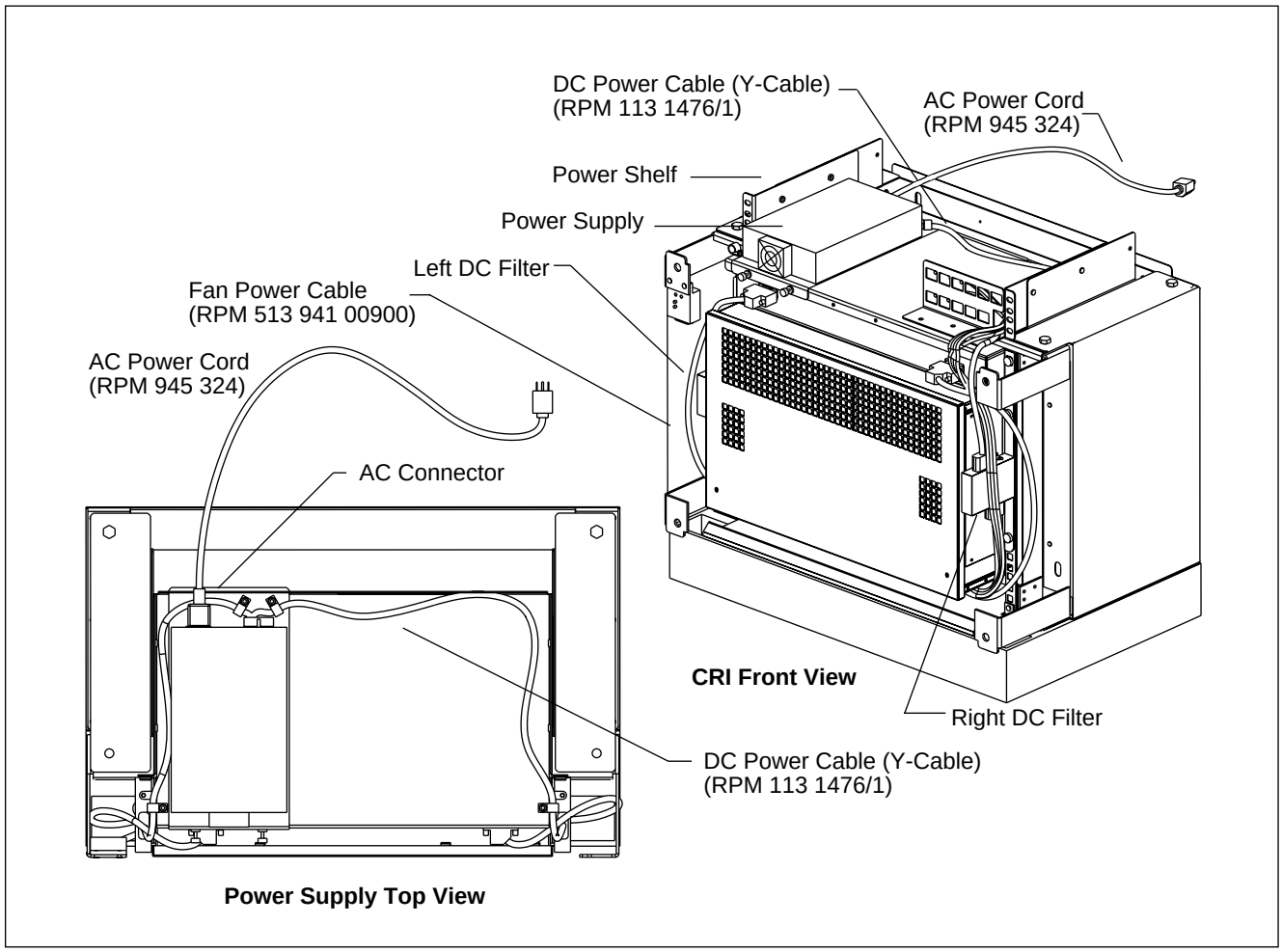


Figure 6-2. CRI Power Supply

7. Disconnect the DC power cable (RPM 113 1476) from the power supply. See the *CRI Top View* illustration in Figure 6-2 on page 6-14.

8. Remove the four screws that hold the power supply to the tray.

9. Remove the power supply unit and put it in an ESD protected antistatic bag.

Power Supply Replacement

10. Remove the replacement power supply unit from its ESD bag.

11. Secure the power supply unit to the power supply tray using the four mounting screws.

12. Reconnect the AC power cord (RPM 945 324) to the AC connector on the rear panel of the power supply. See Figure 6-2 on page 6-14.

13. Reconnect the DC power cable (RPM 113 1476) to the new power supply. See Figure 6-2 on page 6-14.

14. Slide the power supply tray onto the power shelf and secure it with the two mounting screws.

15. If installing the power supply in a floor mount cabinet, install the top cover using the four bolts from Step 4 on page 6-13.

16. Plug the other end of the AC power cord into the AC outlet.

17. Notify the MSC operator that the new power supply unit is ready for operation and testing.

Power Supply Repair

18. Complete the Repair Traveler Note. Describe in detail the circumstances and symptoms of the fault.

19. Attach the Repair Traveler Note to the unit.

20. Use the packaging material from the replacement fan unit to repackage the suspected faulty power supply unit.

21. Return the power supply unit to the service center.

22. Update the Site Inventory list in the *Site Installation Documentation* with the replacement power supply unit details.

6.2.3 Fan Unit Replacement

Fan Unit Removal

1.

Warning!

Contact the MSC for authority to proceed before removing the fan unit.

Attach the ESD strap to your wrist and connect the free end of the strap cable to an appropriate ground conductor on the cabinet.

2.

Caution !

Perform this procedure as quickly as safety requirements will allow, to prevent overheating of the CRI equipment.

When removing the fan unit, refer to Figure 6-3 on page 6-16.

3. Use a small flat-blade screwdriver to remove the fan power cable from Fan 1 and Fan 2 on the front of the fan unit. Make sure each cable has the correct label attached.

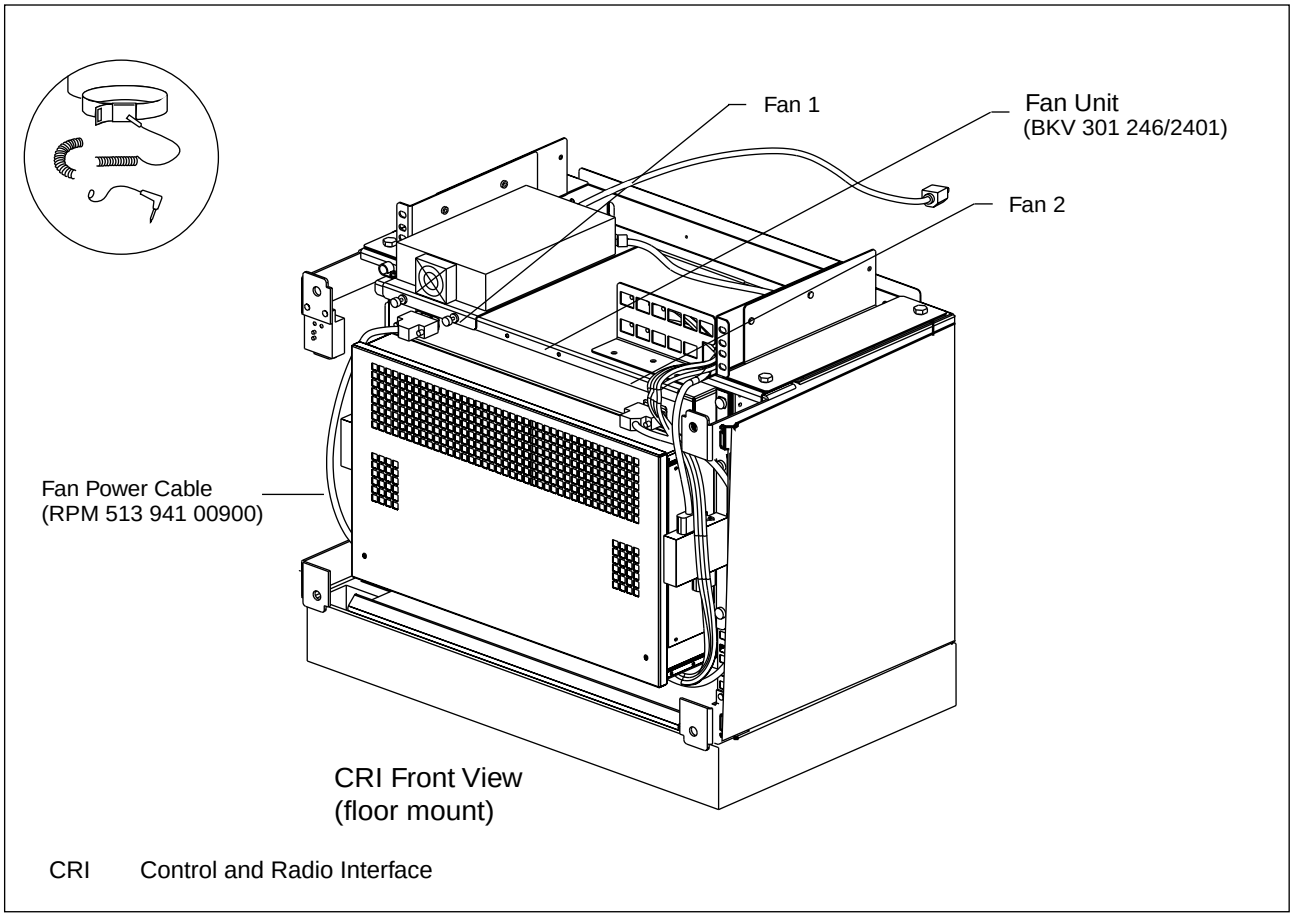


Figure 6-3. CRI Fan Unit

4. Hold the fan unit in position, and use a Torx TX30 screwdriver to loosen and remove the four mounting screws.

5. Remove the fan unit from the equipment rack.

Unit Replacement

6. Remove the replacement fan unit from its packaging.

7. Adjust the position of the fan unit so there is no space between the fan unit and the CRI magazine.

8. Support the CRI fan unit and reinstall the four mounting screws. Use a Torx TX30 screwdriver to tighten the four screws.

9. Connect the two power cables removed in Step 3 on page 6-16. See Figure 6-3 on page 6-16.

10. Verify the fan starts to operate.

11. Remove the ESD strap and cable.

12. Notify the MSC operator that the fan unit is ready for operation and testing.

Unit Repair

13. Complete the Repair Traveler Note. Describe in detail the circumstances and symptoms of the fault.

14. Attach the Repair Traveler Note to the unit.

15. Use the packaging material from the replacement fan unit to repackage the suspected faulty fan unit.

16. Return the fan unit to the service center.

17. Update the Site Inventory list in the *Site Installation Documentation* with the replacement fan unit details.

18. Notify the MSC operator that the new fan unit is ready for operation and testing.

6.2.4 CRI Magazine Replacement

Magazine Removal

1. **Warning!**

   Contact the MSC for authority to proceed before removing the CRI magazine. One or more units may have to be blocked at the MSC before starting this procedure.

   Remove the door from the front of the CRI cabinet.

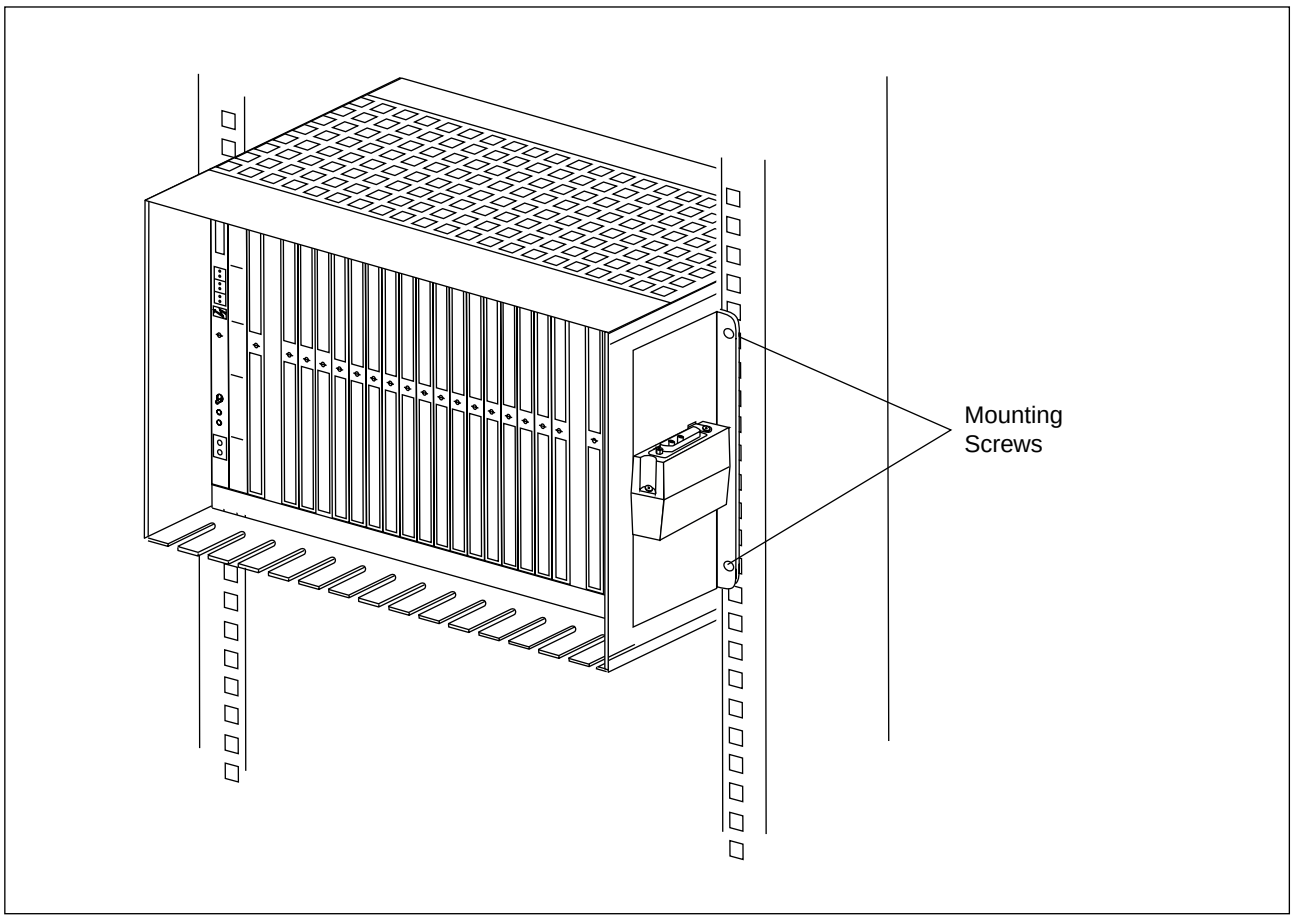


Figure 6-4. Rack-Mount CRI Magazine

2. Attach the ESD strap to your wrist and connect the free end of the strap cable to an appropriate ground conductor on the cabinet.

3. Verify that all the status LEDs on the front of the EMRPS units in the CRI are permanently OFF (that is, not in a flashing state), which indicates the EMRPS units are blocked. If the LEDs are not OFF, contact the MSC for further assistance.

4. Disconnect the AC power cord from the AC outlet.

5. Tag and disconnect the following cables:

   - DC power cable (Y-Cable)
   - CID cable
   - PCM cable
   - Fan unit cable

6. Disconnect the cable connectors, one at a time, from the front of the CRI units (boards). Make sure each cable has the correct label attached when removing each connector.

   Note: The cable retaining screws on the CRI magazine must be loosened before removing the cables, as shown in Figure 6-5 on page 6-20.

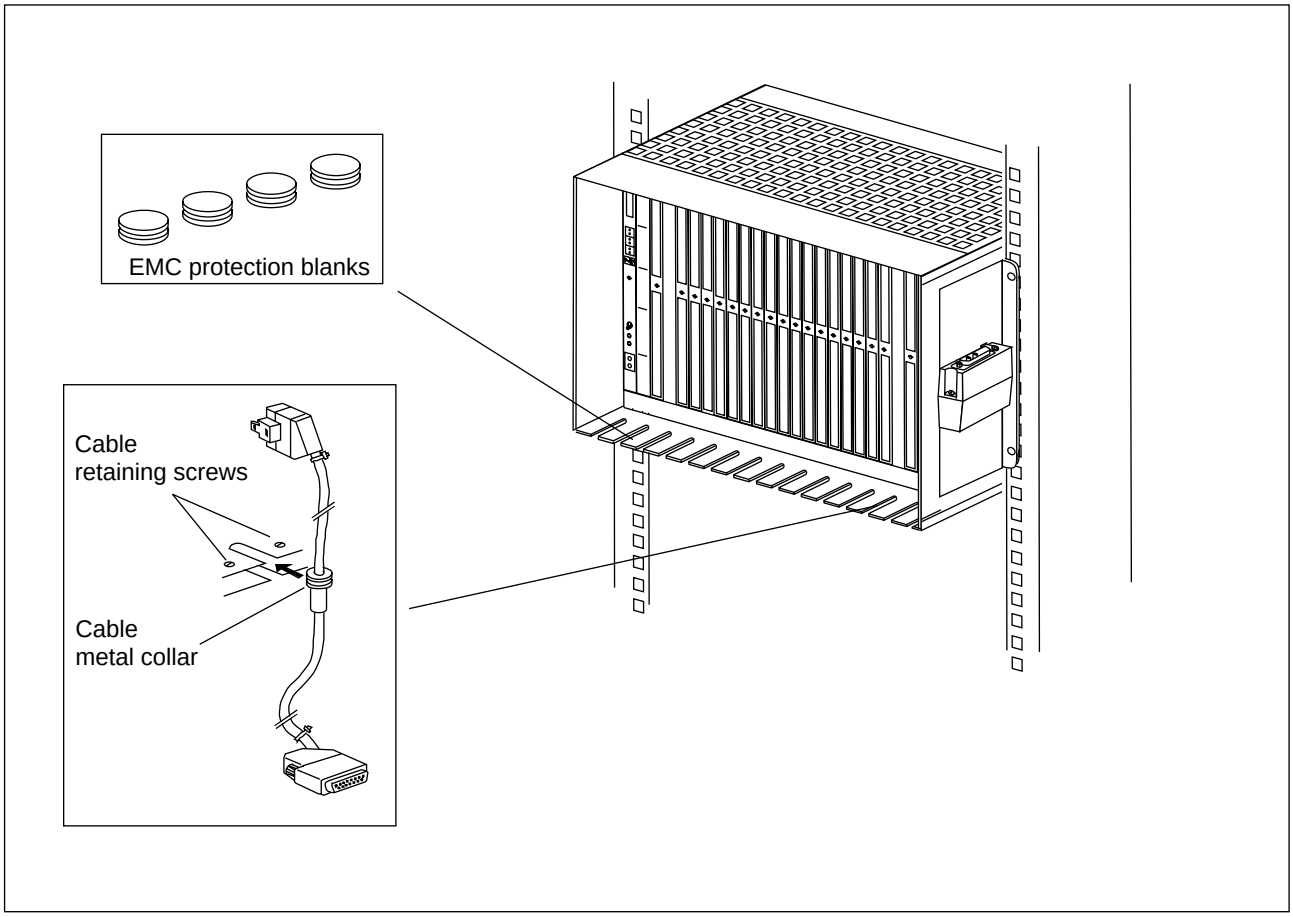


Figure 6-5. CRI Magazine – Cable Removal

7. Keep the separate CRI cables in a safe place. Make sure that each cable has the correct label attached.

8. **Caution !**

   Before proceeding, tag the EMRP unit and each EMRPS unit with the allocated slot position of the units and associated address plugs.

   At the top of the CRI magazine, carefully press each plastic retaining catch upwards and use the extractor tool to remove the individual units from the CRI magazine.

9. Make sure the rear connectors do not have any bent or broken pins.

10. Put each unit in a separate ESD protected antistatic bag.

11. Hold the CRI magazine in position, and use a Torx TX30 screwdriver to loosen and remove the four mounting screws (Figure 6-6 on page 6-21).

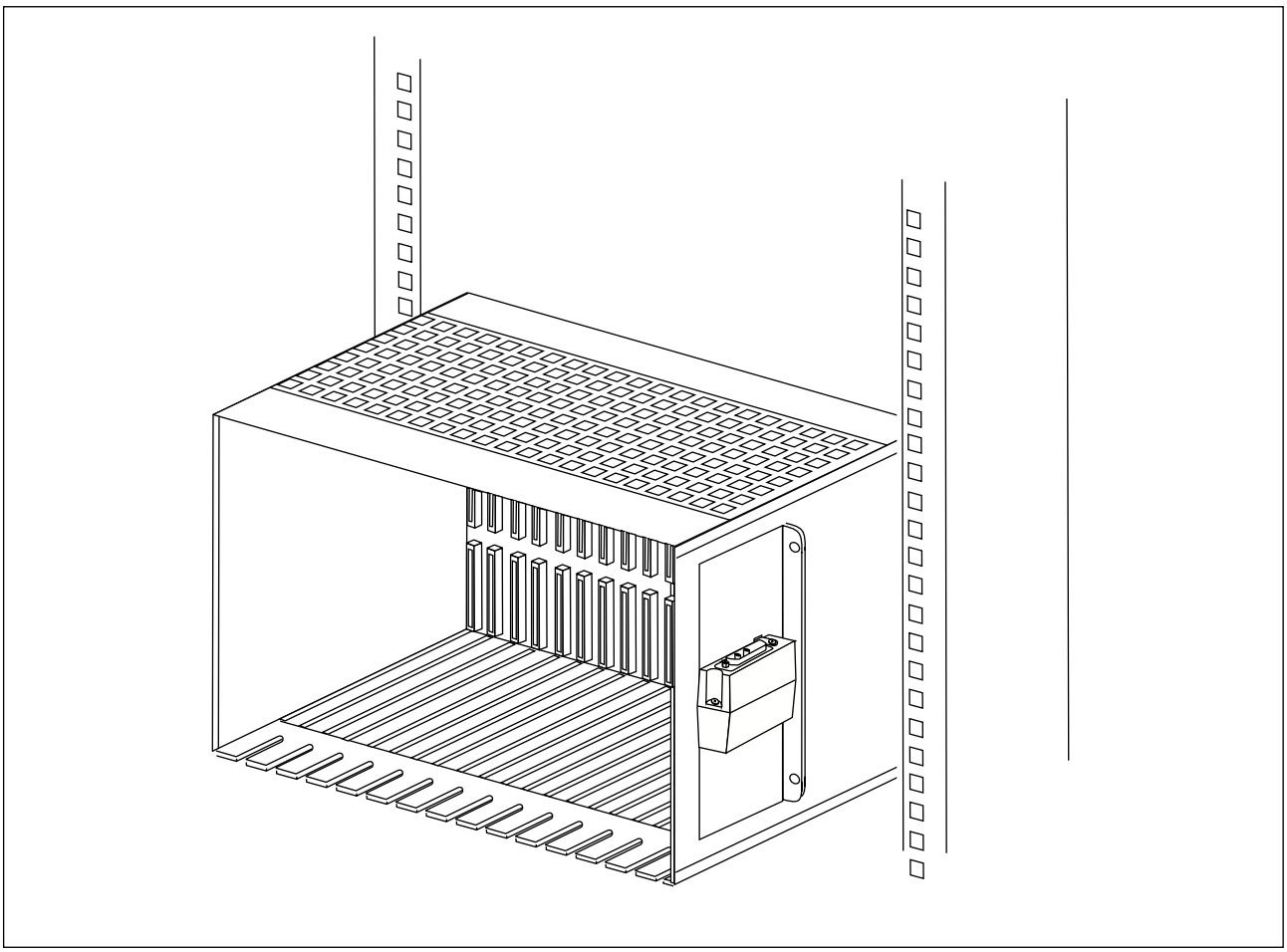


Figure 6-6. CRI Magazine Removal

12. Remove the CRI magazine from the subrack or cabinet.

Magazine Replacement

13. When replacing a CRI magazine, refer to Figure 6-4 on page 6-18 and Figure 6-5 on page 6-20. Remove the replacement CRI magazine from the packaging material.

14. Install the magazine in the CRI subrack.

15. Support the CRI magazine and reinstall the four mounting screws. Use a Torx TX 30 screwdriver to tighten the four screws.

    Note: If necessary, adjust the position of the CRI magazine so there is no space between the CRI magazine and the fan unit.

16. Verify that your ESD wrist strap is connected to an appropriate ground conductor on the cabinet.

17. Remove the CRI units from the ESD protected antistatic bags and install them into the designated slots in the CRI magazine.

    Note: Make sure the units are installed in the same slots.

18. Push the unit to the rear firmly, until it is positioned into the rear connector and the plastic retaining catch (at the upper front) snaps into position.

    Note: If a unit is difficult to fully insert, do not use excessive force, but try instead to undo the screws at the front of the unit. If it still does not go in, inspect the connectors at the back of the unit and the cabinet backplane connectors.

19. Use the torque wrench (preset to 0.6 Nm) with the Torx bit TX10 (TX8) to tighten the mounting screws on the front of each unit.

20. Connect the cable connectors removed in Step 5 on page 6-19 one at a time, to the front of the CRI units. Make sure each cable has the correct label attached when connecting each connector.

21. Use a flat blade screwdriver to tighten the connector securing screws on the front of the CRI units (boards).

22. Insert the cable metal collars in suitable ground slots (Figure 6-5 on page 6-20).

23. Tighten the cable retaining screws on the CRI magazine.

24. Remove the ESD strap and cable.

25. Plug the AC power cord into the AC outlet.

26. Notify the MSC operator that the CRI magazine is ready for operation and testing.

27. On the CRI units, verify the following:

- DC/DC (1) green Power LED is ON
- DC/DC (1) red Error LED is OFF
- DC/DC (2) green Power LED is ON
- DC/DC (2) red Error LED is OFF
- Fan 1 green Power LED is ON
- Fan 1 red Error LED is OFF
- Fan 2 green Power LED is ON
- Fan 2 red Error LED is OFF
- All EMRPS green Power LEDs are ON
- All EMRPS red Error LEDs are OFF
- All EMRPS yellow Status LEDs are ON or flashing
- CID green Power LED is ON
- CID red Error LED is OFF
- All ELI green Power LEDs are ON
- All ELI red Error LEDs are OFF
- All ELI yellow Status LEDs are ON or flashing

28. Reinstall the door on the front of the CRI cabinet.

Magazine Repair

29. Complete the Repair Traveler Note. Describe in detail the circumstances and symptoms of the fault.

30. Attach the Repair Traveler Note to the magazine.

31. Use the packaging material from the replacement CRI magazine to repackage the suspected faulty CRI magazine.

32. Return the CRI magazine to the service center.

33. Update the Site Inventory list in the *Site Installation Documentation* with the replacement CRI magazine details.

6.2.5 DC/DC Converter Unit Replacement

DC/DC Converter Unit Removal

1.

Warning!

Contact the MSC for authority to proceed before removing a DC/DC converter unit. One or more units may have to be blocked at the MSC before starting this procedure.

When removing a DC/DC converter unit, refer to Figure 6-7 on page 6-24.

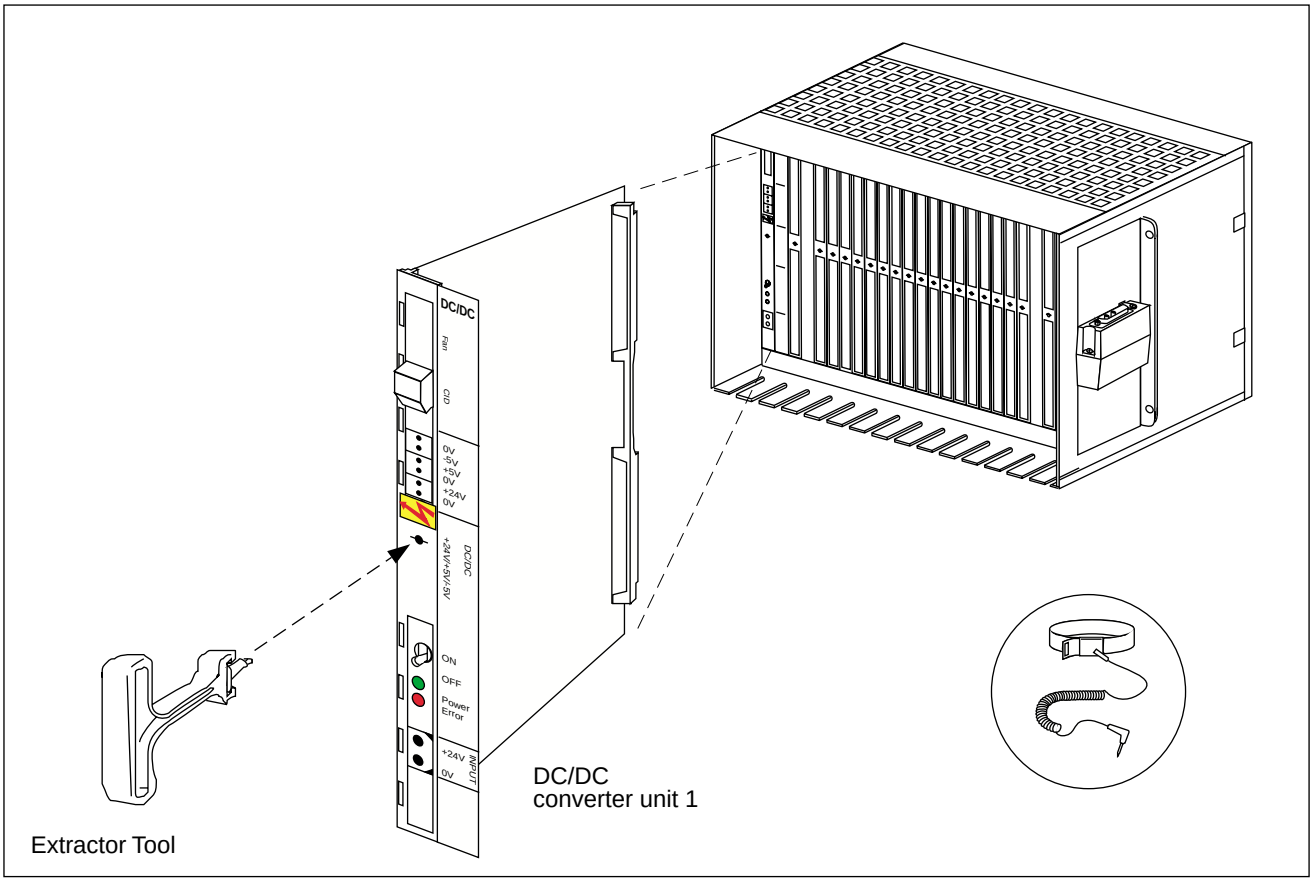


Figure 6-7. CRI DC/DC Converter Unit Removal

2.

Warning!

At least one of the DC/DC converter units must be working or the RBS 884 Pico (1900 MHz) will lose power and the site will be disconnected from the MSC.

Remove the door from the front of the CRI cabinet.

3. On the DC/DC converter unit, verify the Green power LED (below the switch) goes OFF.

4. Verify that all the status LEDs on the front of the EMRPS units in the CRI are steady OFF (that is, not in a flashing state), which indicates the EMRPS units are blocked. If the LEDs are not OFF, contact the MSC for further assistance.

5. Set the switch on the front of the DC/DC converter unit being replaced to OFF.

   Note: When one DC/DC converter unit is removed from the CRI magazine, the second DC/DC converter unit will supply power to the units in the magazine.

6. Attach the ESD strap to your wrist and connect the free end of the strap cable to an appropriate ground conductor on the cabinet.

7. On the front of the DC/DC converter unit, disconnect the following cables:

   - Power supply cable
   - Fan cable
   - CID cable (if applicable)

   Note: Make sure each cable has the correct label attached.

8. At the top of the CRI magazine, carefully press the plastic retaining catch upwards and use the extractor tool to remove the DC/DC converter unit from the CRI magazine.

9. Check the DC/DC converter unit, rear connector, and associated backplane connector do not have any bent or broken connector pins.

10. Put the DC/DC converter unit in an ESD protected antistatic bag.

Unit Replacement

11. Remove the new DC/DC converter unit from the ESD antistatic bag and install the unit into the designated slot in the CRI magazine.

12. Push the unit to the rear firmly, until it is positioned into the rear connector and the plastic retaining catch (at the upper front) snaps into position.

    Note: If a unit is difficult to fully insert, do not use excessive force, but try instead to undo the screws at the front of the unit. If it still does not go in, inspect the connectors at the back of the unit and the cabinet backplane connectors.

13. Use the torque wrench (preset to 0.6 Nm) with the Torx bit TX10 (TX8) to tighten the two mounting screws on the front of the DC/DC converter unit.

14. Connect the following cables connectors:

    - Power supply cable
    - Fan cable
    - CID cable (if applicable)

15. Set the power switch on the front of the new DC/DC converter unit to ON.

16. Verify the proper voltage at the following test points on the front of the new DC/DC converter unit:

    - +5 V test point, (tolerance within +4.95V to +5.25V)
    - –5V test point, (tolerance within –5.10V to –4.90V)
    - +24V test point, (tolerance within +21V to +31V)

17. Remove the ESD strap and cable.

18. Notify the MSC operator that the new DC/DC converter unit is ready for operation and testing.

19. Reinstall the door on the front of the CRI cabinet.

Unit Repair

20. Complete the Repair Traveler Note. Describe in detail the circumstances and symptoms of the fault.

21. Attach the Repair Traveler Note to the unit.

22. Use the packaging material from the replacement unit to repackage the suspected faulty DC/DC converter unit.

23. Return the DC/DC converter unit to the service center.

24. Update the Site Inventory list in the *Site Installation Documentation* with the replacement DC/DC converter unit details.

6.2.6 STR Unit Replacement

STR Unit Removal

1.

Warning!

Contact the MSC for authority to proceed before removing the Signaling Terminal Regional (STR) unit. One or more units may have to be blocked at the MSC before starting this procedure. When the site is operational, the STR unit can be removed only after approval from the MSC operator.

Remove the door from the front of the CRI cabinet.

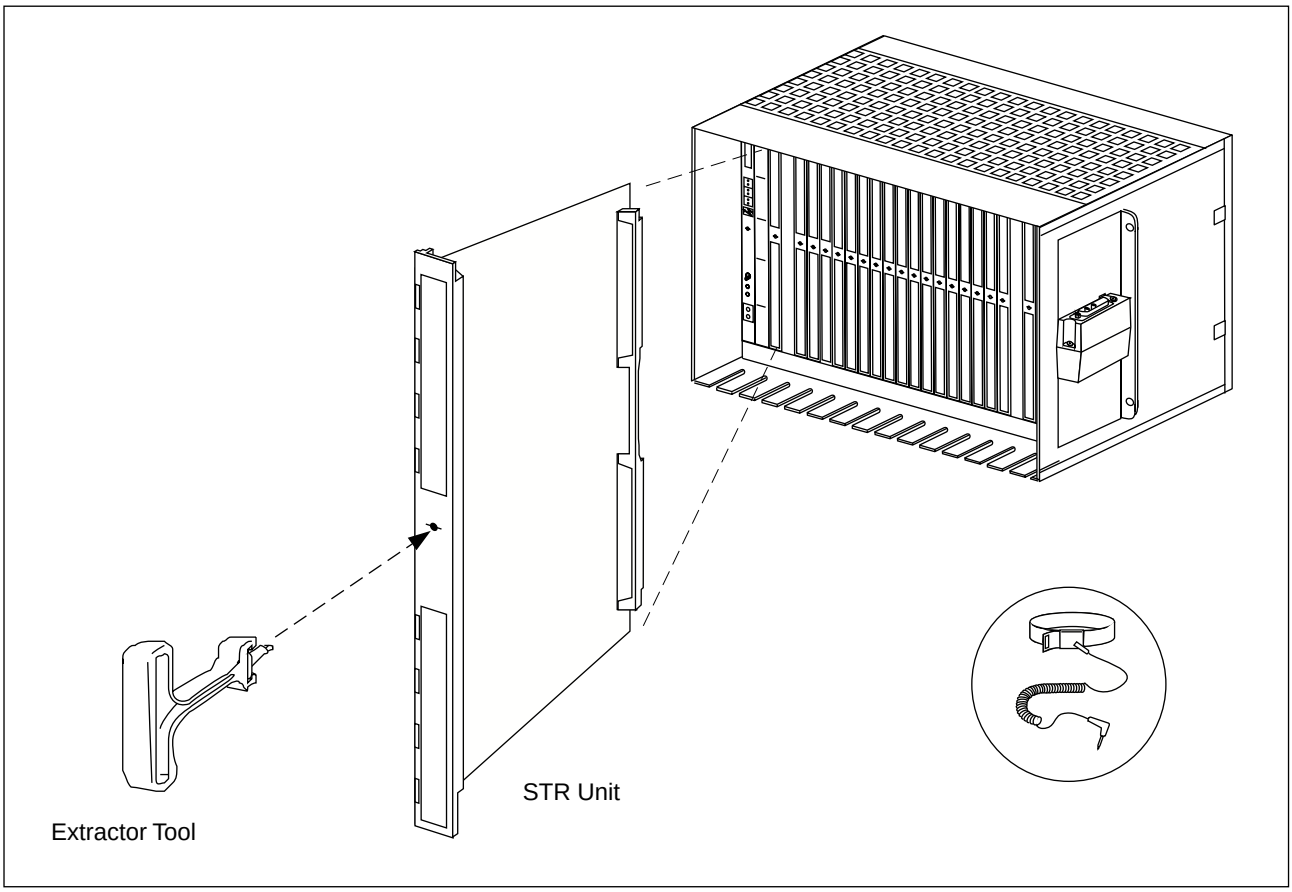


Figure 6-8. STR Unit Removal

2. Attach the ESD strap to your wrist and connect the free end of the strap cable to an appropriate ground conductor on the cabinet.

3. On the front of each DC/DC converter unit, set the power switch to OFF.

4. At the front of the STR unit, disconnect the cables. Make sure each cable has the correct label attached.

5. At the top of the CRI magazine, carefully press the plastic retaining catch upwards and use the extractor tool to remove the STR unit from the CRI magazine (Figure 6-8 on page 6-28).

6. Make sure the STR unit, rear connector, and the associated back plane connector do not have any bent or broken pins.

7. Put the STR unit in an ESD protected antistatic bag.

Unit Replacement

8. Ensure the ESD wrist strap is connected to an appropriate ground conductor on the cabinet.

9. Remove the replacement STR unit from the ESD protected antistatic bag.

10. Install the STR unit in the designated slot in the CRI magazine.

11. Push the unit to the rear firmly, until it is positioned into the rear connector and the plastic retaining catch (at the upper front) snaps into position.

    Note: If a unit is difficult to fully insert, do not use excessive force, but try instead to undo the screws at the front of the unit. If it still does not go in, inspect the connectors at the back of the unit and the cabinet backplane connectors.

12. Use the torque wrench (preset to 0.6 Nm) with the Torx bit TX10 (TX8) to tighten the two mounting screws on the front of the RITSW unit.

13. Connect the cables removed in Step 5 on page 6-31 to the front of the STR unit.

14. Set the power switch on the front of each DC/DC converter unit to ON.

15. Remove the ESD strap and cable.

16. Notify the MSC operator that the new STR unit is ready for operation and testing.

17. Reinstall the door on the front of the CRI cabinet.

Unit Repair

18. Complete the Repair Traveler Note. Describe in detail the circumstances and symptoms of the fault.

19. Attach the Repair Traveler Note to the unit.

20. Use the packaging material from the replacement fan unit to repackage the suspected faulty STR unit.

21. Return the STR unit to the service center.

22. Update the Site Inventory list in the *Site Installation Documentation* with the replacement STR unit details.

6.2.7 EMRP and EMRPS Unit Replacement

Unit Removal

1. **Warning!**

   Contact the MSC for authority to proceed before removing the Extension Module Regional Processor (EMRP) unit or the Extension Module Regional Processor with Device Speech Bus Access (EMRPS) units. One or more units may have to be blocked at the MSC before starting this procedure.

   Remove the door from the front of the CRI cabinet.

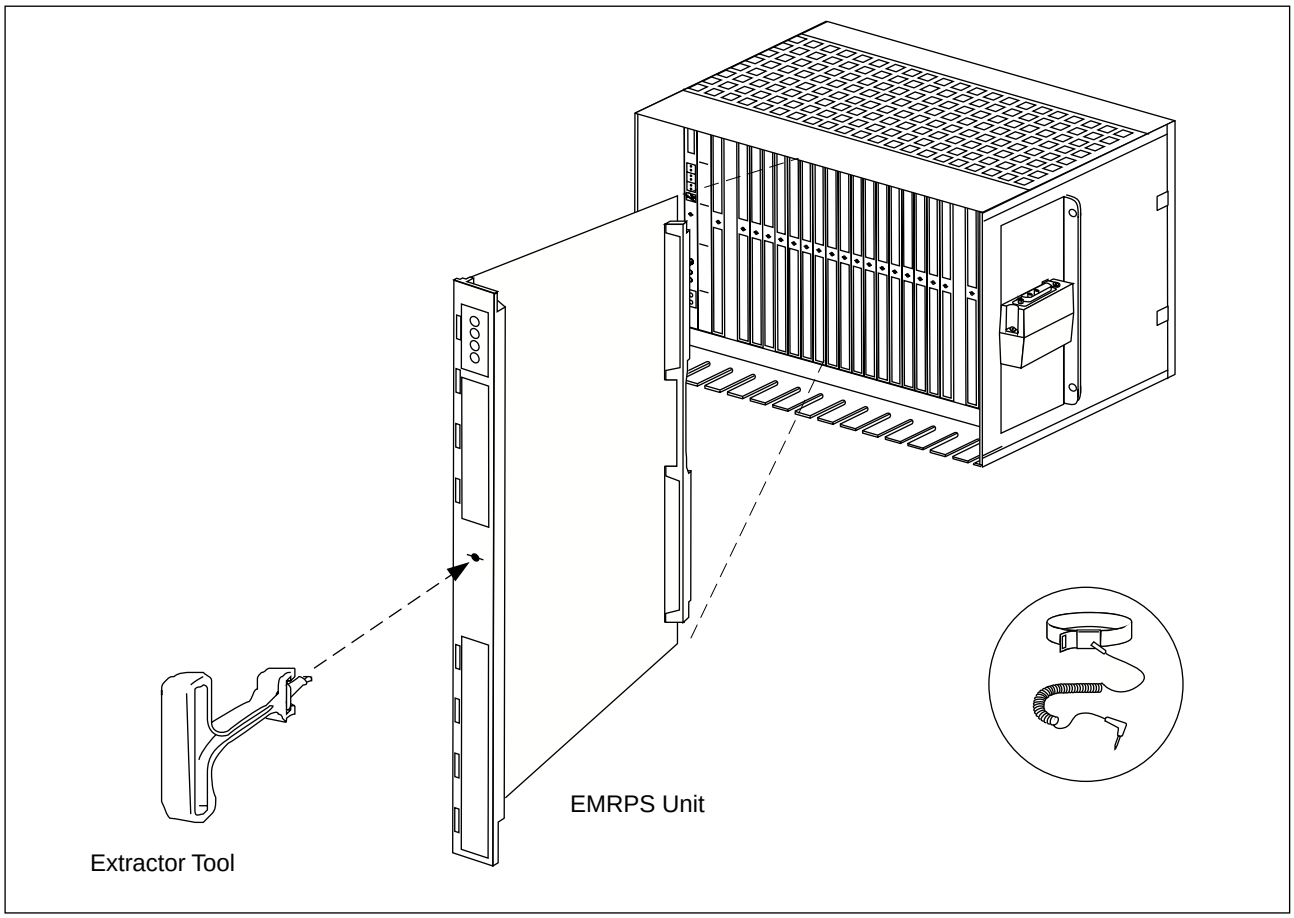


Figure 6-9. EMRPS Unit Removal

2. Attach the ESD strap to your wrist and connect the free end of the strap cable to an appropriate ground conductor on the cabinet.

3. Verify that all the status LEDs on the front of the EMRPS units in the CRI are permanently OFF (that is, not in a flashing state), which indicates the EMRPS units are blocked. If the LEDs are not OFF, contact the MSC for further assistance.

4. Remove the address plug from the A2 connector on the EMRPS unit being replaced or the A1 connector on the EMRP unit being replaced.

5. At the front of the EMRP or EMRPS unit, disconnect the cables. Make sure each cable has the correct label attached.

6. At the top of the CRI magazine, carefully press the plastic retaining catch upwards and use the extractor tool to remove the EMRP or EMRPS unit from the CRI magazine (Figure 6-10 on page 6-34).

7. Make sure the EMRP or EMRPS unit, rear connector, and the associated back plane connector do not have any bent or broken pins.

8. Put the EMRP or EMRPS unit in an ESD protected antistatic bag.

Unit Replacement

9. Remove the new EMRP unit (ROF 131 995/7) or the EMRPS unit (ROF 131 8217/3) from its ESD bag and insert it into the proper slot in the CRI magazine.

10. Insert the address plug into the proper connector (A2 for an EMRPS unit or A1 for an EMRP unit).

11. Insert the replacement EMRP or EMRPS unit into the designated slot in the CRI magazine.

12. Push the unit to the rear firmly, until it is positioned into the rear connector and the plastic retaining catch (at the upper front) snaps into position.

    Note: If a unit is difficult to fully insert, do not use excessive force, but try instead to undo the screws at the front of the unit. If it still does not go in, inspect the connectors at the back of the unit and the cabinet backplane connectors.

13. Use the torque wrench (preset to 0.6 Nm) with the Torx bit TX10 (TX8) to tighten the two mounting screws on the front of the RITSW unit.

14. Connect the cables removed in Step 5 on page 6-31 to the front of the EMRP or EMRPS unit.

15. Remove the ESD strap and cable.

16. Notify the MSC operator that the new EMRPS or EMRP unit is ready for operation and testing.

17. Reinstall the door on the front of the CRI cabinet.

Unit Repair

18. Complete the Repair Traveler Note. Describe in detail the circumstances and symptoms of the fault.

19. Attach the Repair Traveler Note to the unit.

20. Use the packaging material from the replacement fan unit to repackage the suspected faulty CID unit.

21. Return the EMRPS or EMRP unit to the service center.

22. Update the Site Inventory list in the *Site Installation Documentation* with the replacement EMRPS or EMRP unit details.

6.2.8 RITSW Unit Replacement

Unit Removal

1.

Warning!

Contact the MSC for authority to proceed before removing the Radio Interface Time Switch (RITSW) unit. When the site is operational, the RITSW unit can be removed only after approval from the MSC operator. One or more units may have to be blocked at the MSC before starting this procedure.

Remove the door from the front of the CRI cabinet.

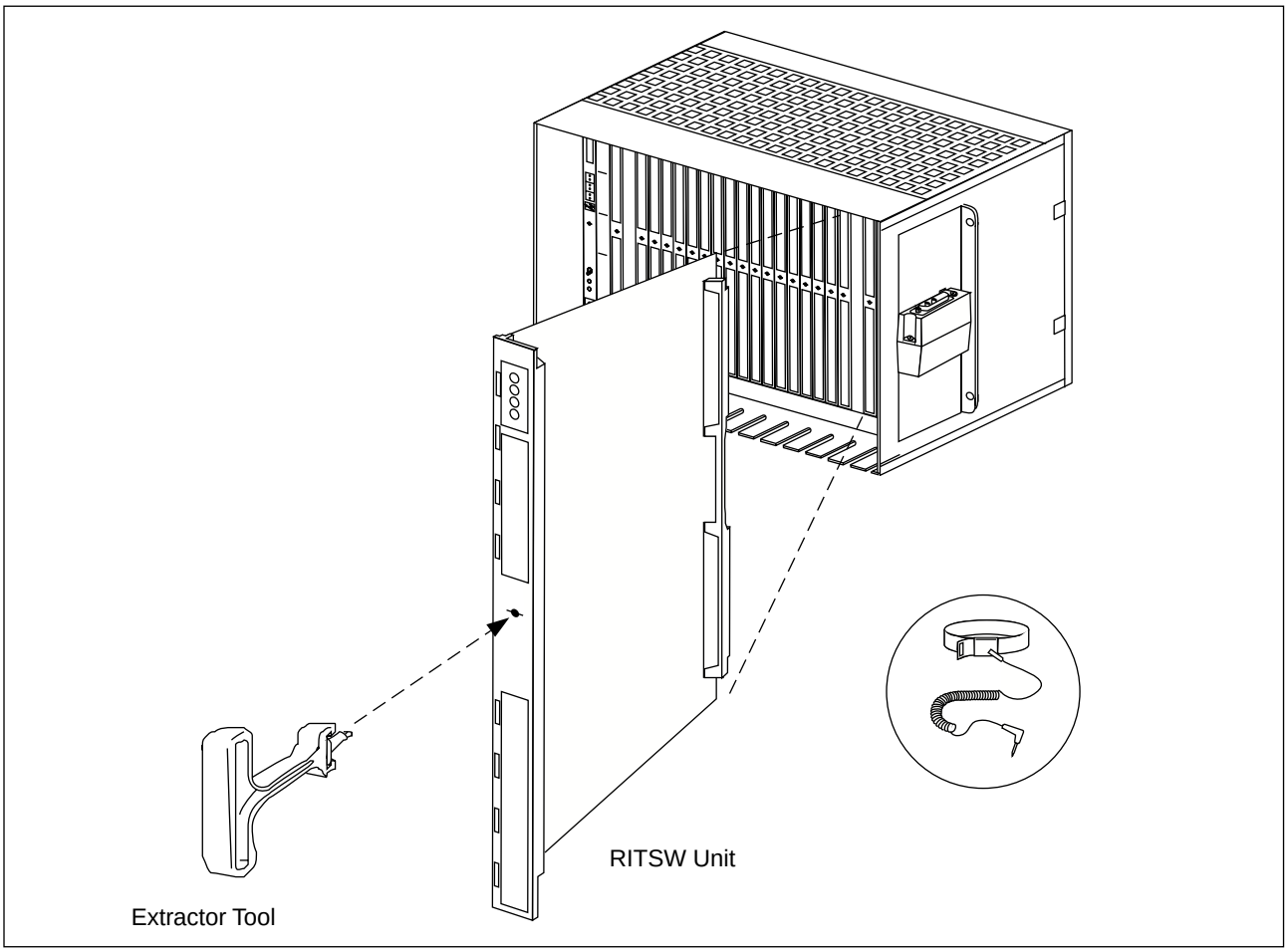


Figure 6-10. RITSW Unit Removal

2. Attach the ESD strap to your wrist and connect the free end of the strap cable to an appropriate ground conductor on the cabinet.

3. On the front of each DC/DC converter unit, set the power switch to OFF.

4. At the top of the CRI magazine, carefully press the plastic retaining catch upwards and use the extractor tool to remove the RITSW unit from the CRI magazine (Figure 6-10 on page 6-34).

5. Make sure the RITSW unit, rear connector, and the associated back plane connector do not have any bent or broken pins.

6. Put the RITSW unit in an ESD protected antistatic bag.

Replacement

7. Ensure the ESD wrist strap is connected to an appropriate ground conductor on the cabinet.

8. Remove the replacement RITSW unit from the ESD protected antistatic bag.

9. Set the switches to the same settings as on the replaced unit.

10. Install the unit into the designated slot in the CRI magazine.

11. Push the unit to the rear firmly, until it is positioned into the rear connector and the plastic retaining catch (at the upper front) snaps into position.

    Note: If a unit is difficult to fully insert, do not use excessive force, but try instead to undo the screws at the front of the unit. If it still does not go in, inspect the connectors at the back of the unit and the cabinet backplane connectors.

12. Use the torque wrench (preset to 0.6 Nm) with the Torx bit TX10 (TX8) to tighten the two mounting screws on the front of the RITSW unit.

13. Set the power switch on the front of each DC/DC converter unit to ON.

14. Remove the ESD strap and cable.

15. Notify the MSC operator that the new RITSW unit is ready for operation and testing.

16. Reinstall the door on the front of the CRI cabinet.

Unit Repair

17. Complete the Repair Traveler Note. Describe in detail the circumstances and symptoms of the fault.

18. Attach the Repair Traveler Note to the unit.

19. Use the packaging material from the replacement fan unit to repackage the suspected faulty RITSW unit.

20. Return the RITSW unit to the service center.

21. Update the Site Inventory list in the *Site Installation Documentation* with the replacement RITSW unit details.

6.2.9 ETB Unit Replacement

Unit Removal

1.

Warning!

Contact the MSC for authority to proceed before removing the Exchange Terminal Board (ETB). The ETB unit may have to be blocked at the MSC before starting this procedure. Removal of this unit can terminate normal operation of the Radio Base Station.

Remove the door from the front of the CRI cabinet.

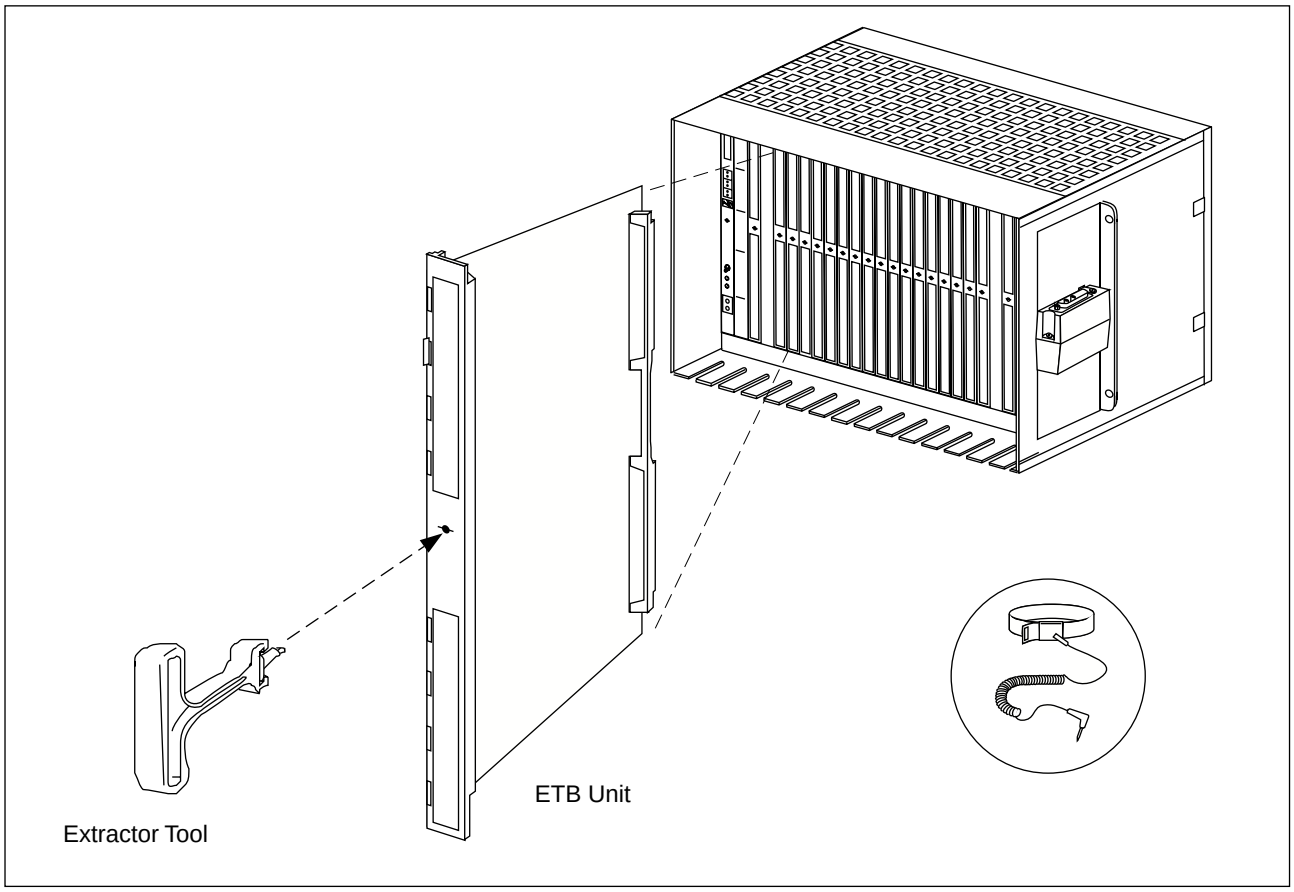


Figure 6-11. ETB Unit Removal

2. Remove the door from the front of the CRI cabinet.

3. Attach the ESD strap to your wrist and connect the free end of the strap cable to an appropriate ground conductor on the cabinet.

4. On the front of each DC/DC converter unit, set the power switch to OFF.

5. At the front of the ETB unit, disconnect the cables. Make sure each cable has the correct label attached.

6. At the top of the CRI magazine, carefully press the plastic retaining catch upwards and use the extractor tool to remove the ETB unit from the CRI magazine (Figure 6-11 on page 6-36).

7. Make sure the ETB unit, rear connector, and the associated back plane connector do not have any bent or broken pins.

8. Put the ETB unit in an ESD protected antistatic bag.

Unit Replacement

9. Ensure the ESD wrist strap is connected to an appropriate ground conductor on the cabinet.

10. Remove the replacement ETB unit from the ESD protected antistatic bag.

11. Set the switches to the same settings as on the replaced unit.

12. Install the unit into the designated slot in the CRI magazine.

13. Connect the cables removed in Step 5 on page 6-37 to the front of the ETB unit.

14. Push the unit to the rear firmly, until it is positioned into the rear connector and the plastic retaining catch (at the upper front) snaps into position.

    Note: If a unit is difficult to fully insert, do not use excessive force, but try instead to undo the screws at the front of the unit. If it still does not go in, inspect the connectors at the back of the unit and the cabinet backplane connectors.

15. Use the torque wrench (preset to 0.6 Nm) with the Torx bit TX10 (TX8) to tighten the two mounting screws on the front of the ETB unit.

16. Connect the cables to the front connectors on the ETB unit.
17. Set the power switch on the front of each DC/DC converter unit to ON.
18. Remove the ESD strap and cable.
19. Notify the MSC operator that the new ETB unit is ready for operation and testing.
20. Reinstall the door on the front of the CRI cabinet.

Unit Repair

21. Complete the Repair Traveler Note. Describe in detail the circumstances and symptoms of the fault.
22. Attach the Repair Traveler Note to the unit.
23. Use the packaging material from the replacement fan unit to repackage the suspected faulty ETB unit.
24. Return the ETB unit to the service center.
25. Update the Site Inventory list in the *Site Installation Documentation* with the replacement ETB unit details.

6.2.10 ELI Unit Replacement

Unit Removal

1. **Warning!**

   Contact the MSC for authority to proceed before removing the Enhanced Link Interface (ELI) unit. The dual Radio Transceiver (TRX) units in the Radio Head, which are connected to the ELI unit, must be blocked. Removal of the ELI unit will terminate operation of all hardware connected to the TRX units.

   Attach the ESD strap to your wrist and connect the free end of the strap cable to an appropriate ground conductor on the cabinet.

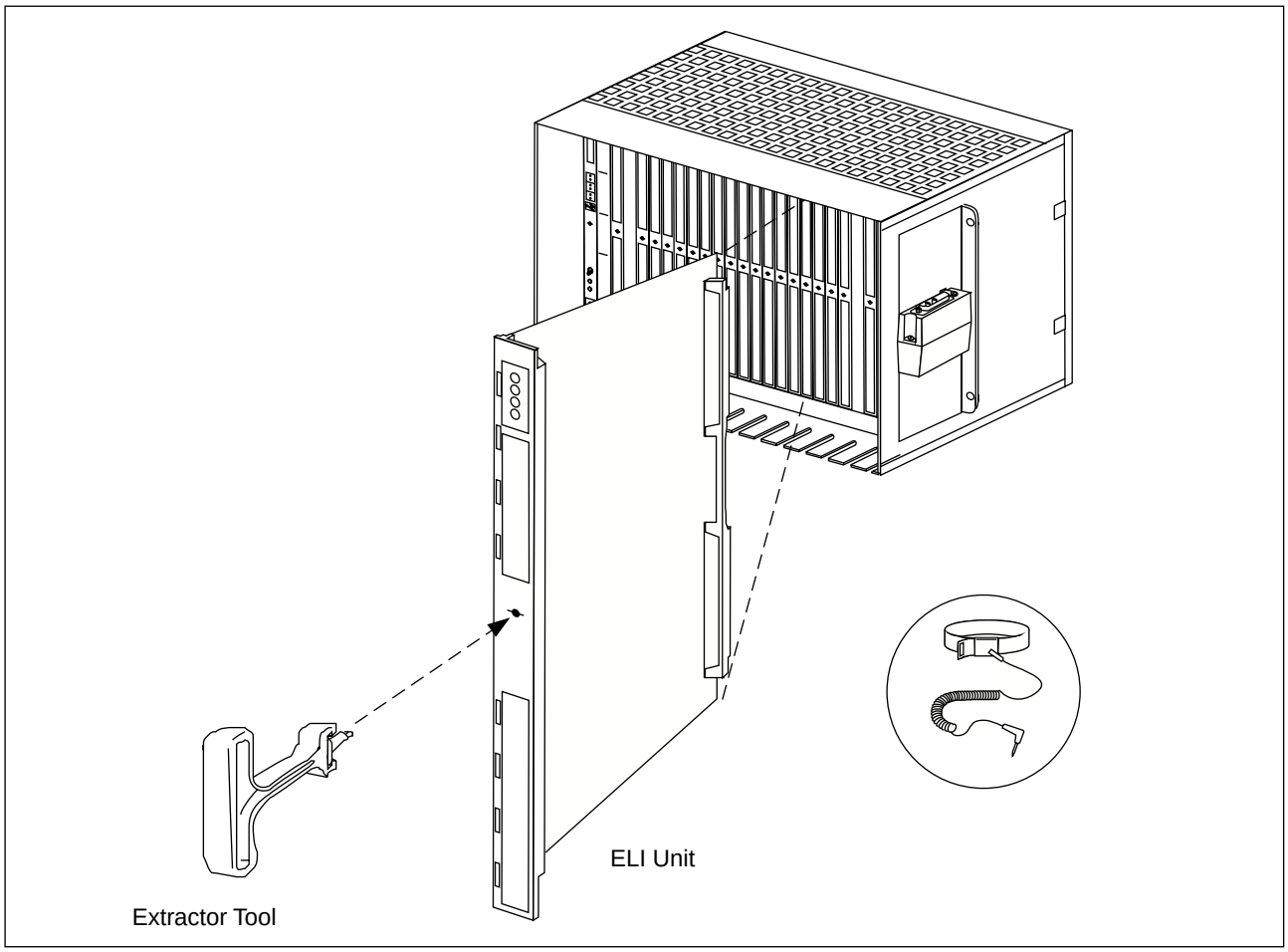


Figure 6-12. ELI Unit Removal

2. At the front of the ELI unit, disconnect the following cables. Make sure each cable has the correct label attached.
   - ETB-ELI Sync Cable
   - Patch Panel Cable (if applicable)
   - T1/E1 PCM Cable (if applicable)
3. Check the backplane connector for bent or broken pins.
4. Remove the door from the front of the CRI cabinet.
5. Attach the ESD strap to your wrist and connect the free end of the strap cable to an appropriate ground conductor on the cabinet.
6. On the front of each DC/DC converter unit, set the power switch to OFF.

7. At the top of the CRI magazine, carefully press the plastic retaining catch upwards and use the extractor tool to remove the ELI unit from the CRI magazine (Figure 6-12 on page 6-39).

8. Make sure the ELI unit, rear connector, and the associated back plane connector do not have any bent or broken pins.

9. Put the ELI unit in an ESD protected antistatic bag.

ELI Unit Replacement

10. Ensure the ESD wrist strap is connected to an appropriate ground conductor on the cabinet.

11. Remove the replacement ELI unit from the ESD protected antistatic bag.

12. Set the switches to the same settings as on the replaced unit.

13. Install the unit into the designated slot in the CRI magazine.

14. Push the unit to the rear firmly, until it is positioned into the rear connector and the plastic retaining catch (at the upper front) snaps into position.

    Note: If a unit is difficult to fully insert, do not use excessive force, but try instead to undo the screws at the front of the unit. If it still does not go in, inspect the connectors at the back of the unit and the cabinet backplane connectors.

15. Use the torque wrench (preset to 0.6 Nm) with the Torx bit TX10 (TX8) to tighten the two mounting screws on the front of the ELI unit.

16. Connect the cables removed in Step 1 on page 6-38.

17. Set the power switch on the front of each DC/DC converter unit to ON.

18. Remove the ESD strap and cable.

19. Notify the MSC operator that the new ELI unit is ready for operation and testing, and the blocked TRX units should be placed back into service.

20. Reinstall the door on the front of the CRI cabinet.

Unit Repair

21. Complete the Repair Traveler Note. Describe in detail the circumstances and symptoms of the fault.
22. Attach the Repair Traveler Note to the unit.
23. Use the packaging material from the replacement fan unit to repackage the suspected faulty ELI unit.
24. Return the ELI unit to the service center.
25. Update the Site Inventory list in the *Site Installation Documentation* with the replacement ELI unit details.

6.3 Radio Head Replacement

Warning!

Do not tamper with the Warranty Seal on the Radio Head. Tampering with this seal voids your warranty. The Radio Head does not contain field-serviceable units. Service is performed only by your local Ericsson company repair center.

6.3.1 Radio Head Replacement

Radio Head Removal

1. **DANGER!**

   Make sure that the TRX units are blocked before removing the Radio Head. Removal of a deblocked TRX unit can cause damage to equipment.

Warning!

Contact the MSC for authority to proceed before removing a Radio Head. Verify that the TRXs are blocked.

Unplug the AC power cord from the outlet.

2. Remove the four tamper-resistant screws on the Radio Head cover using the Torx driver tool provided in the Radio Head Hardware Kit (NTM 201 1581). See Figure 6-13 on page 6-42 for the location of the screws.

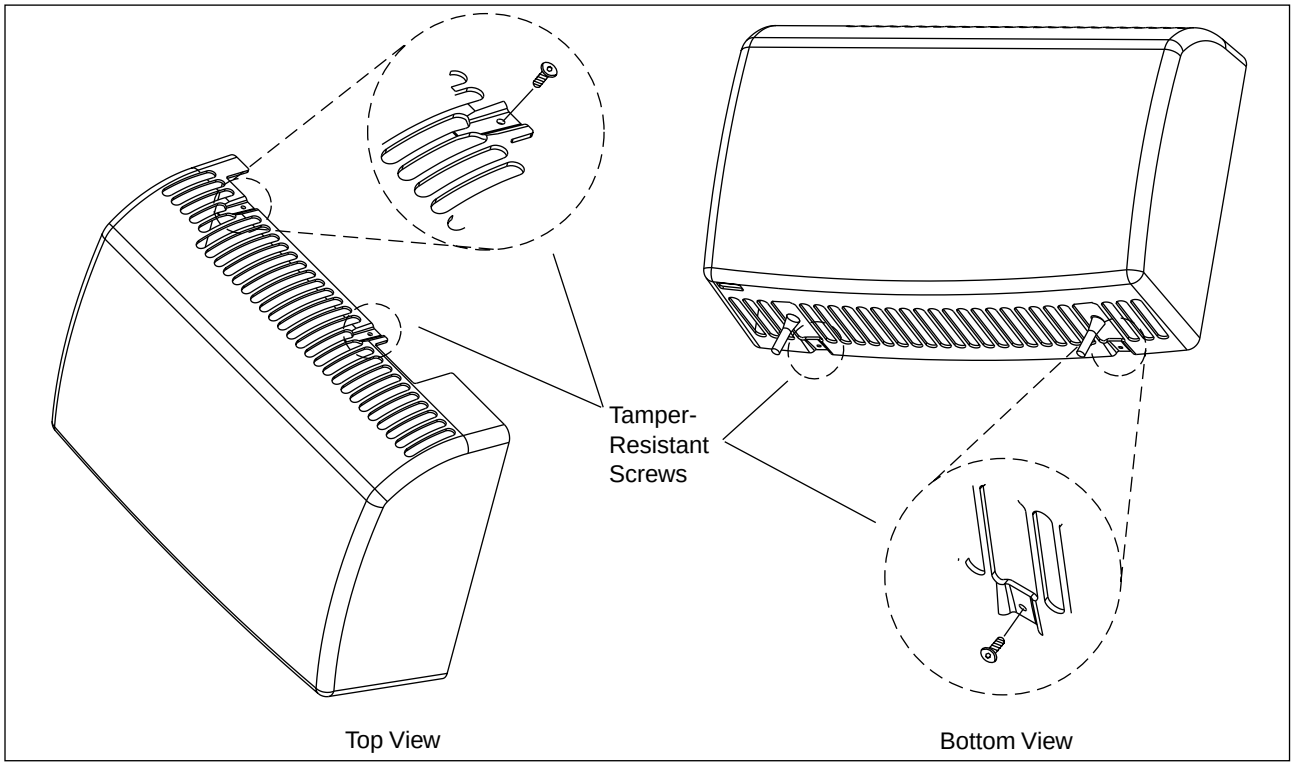


Figure 6-13. Radio Head Front Cover

3. Remove the Radio Head cover.

   Note: Use the Radio Head customer interface or the maintenance log to note the Cabinet Identifier (CABID) number on the Radio Head being replaced. This CABID number must be set on the replacement Radio Head in Step 18 on page 6-49.

4. Unplug the AC power cord from the AC receptacle on the back of the Radio Head. See Figure 6-14 on page 6-43 for the location of the AC receptacle.

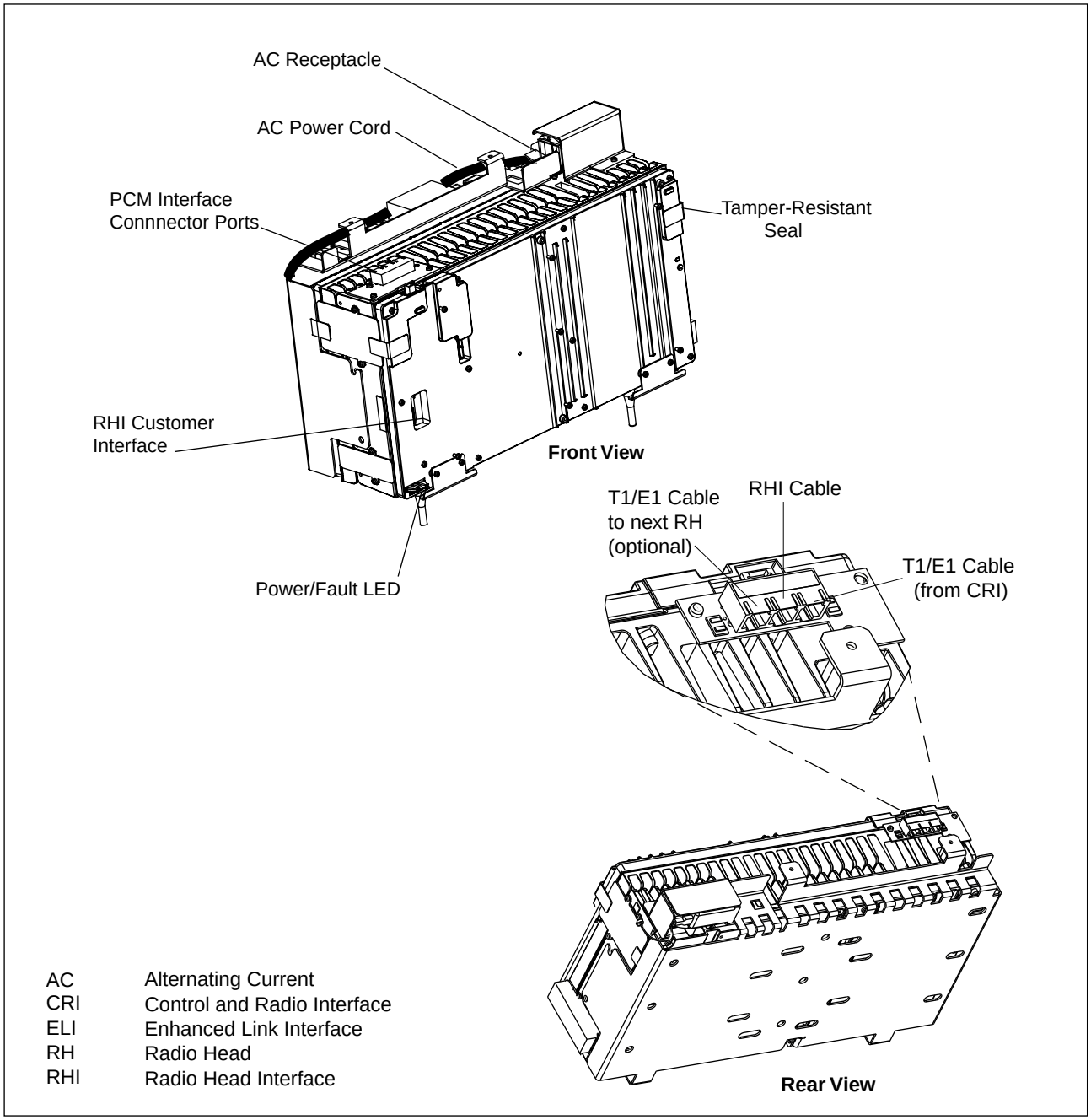


Figure 6-14. Radio Head Connectors

5. If a patch antenna is installed, refer to Figure 6-15 on page 6-44 and disconnect the two patch antenna cables from the external duplexers.

Note: Use care when handling the connectors.

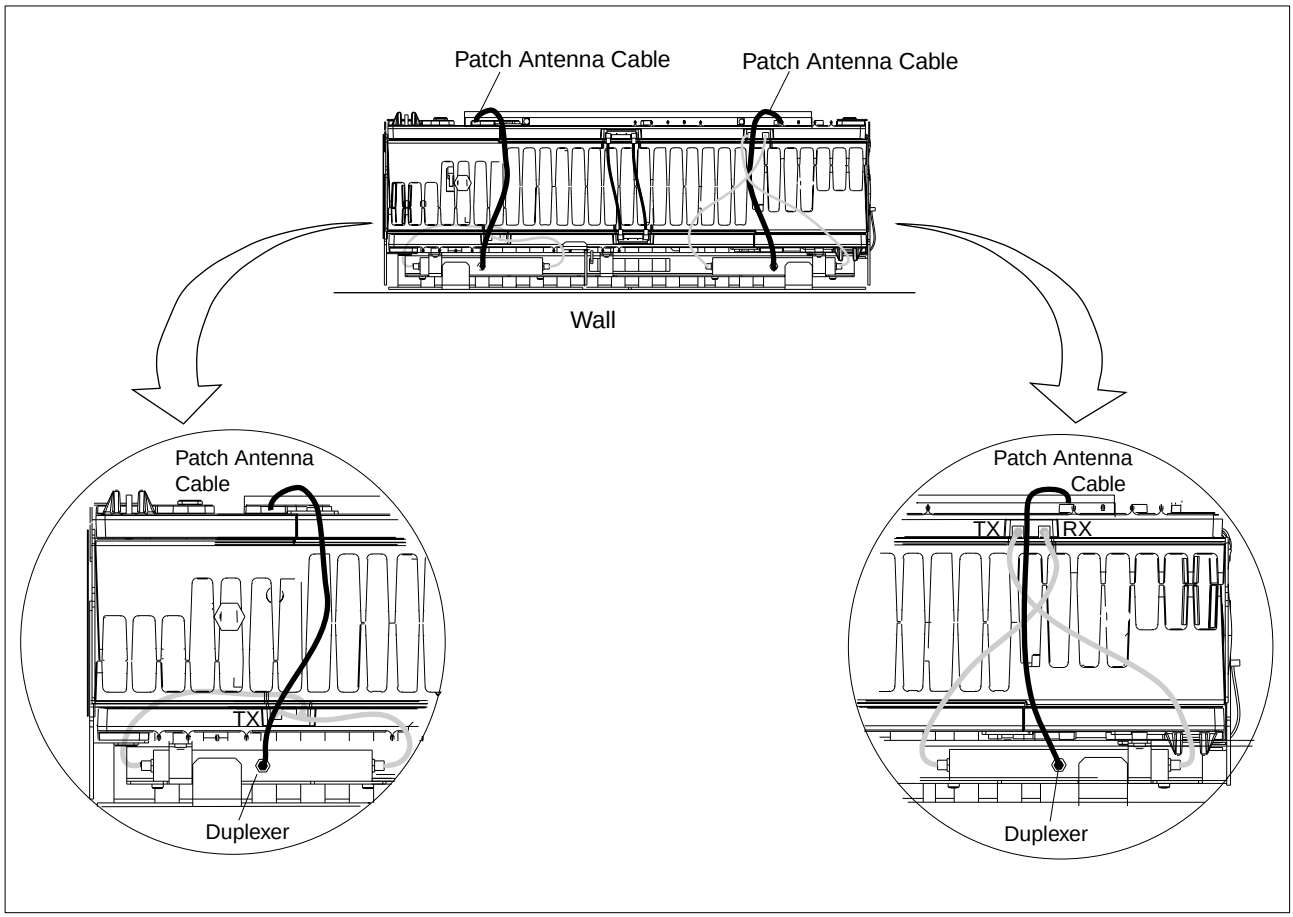


Figure 6-15. Radio Head Patch Antenna Cables and External Duplexers

6. Attach the patch antenna cables to the external duplexers on the replacement Radio Head (Figure 6-15 on page 6-44).

7. Remove the six screws that secure the patch antenna assembly to the Radio Head. See Figure 6-16 on page 6-45.

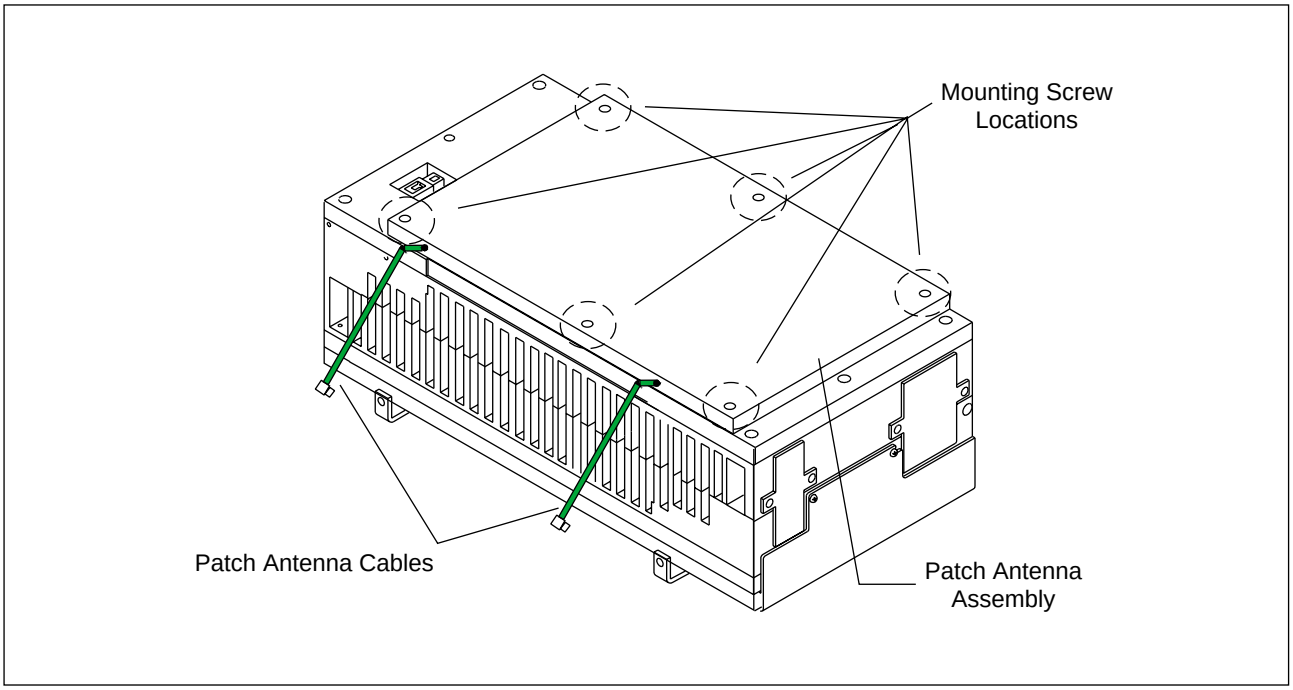


Figure 6-16. Radio Head Patch Antenna Assembly

8. Remove the patch antenna assembly from the Radio Head.

   Note: Save all patch antenna parts for use on the new Radio Head.

9. Using a Torx driver tool provided in the Radio Head Hardware Kit (NTM 201 1581), remove the two lower tamper-resistant screws on each side of the Radio Head that secure it to the mounting bracket. See Figure 6-17 on page 6-46 for the location of the lower tamper-resistant screws.

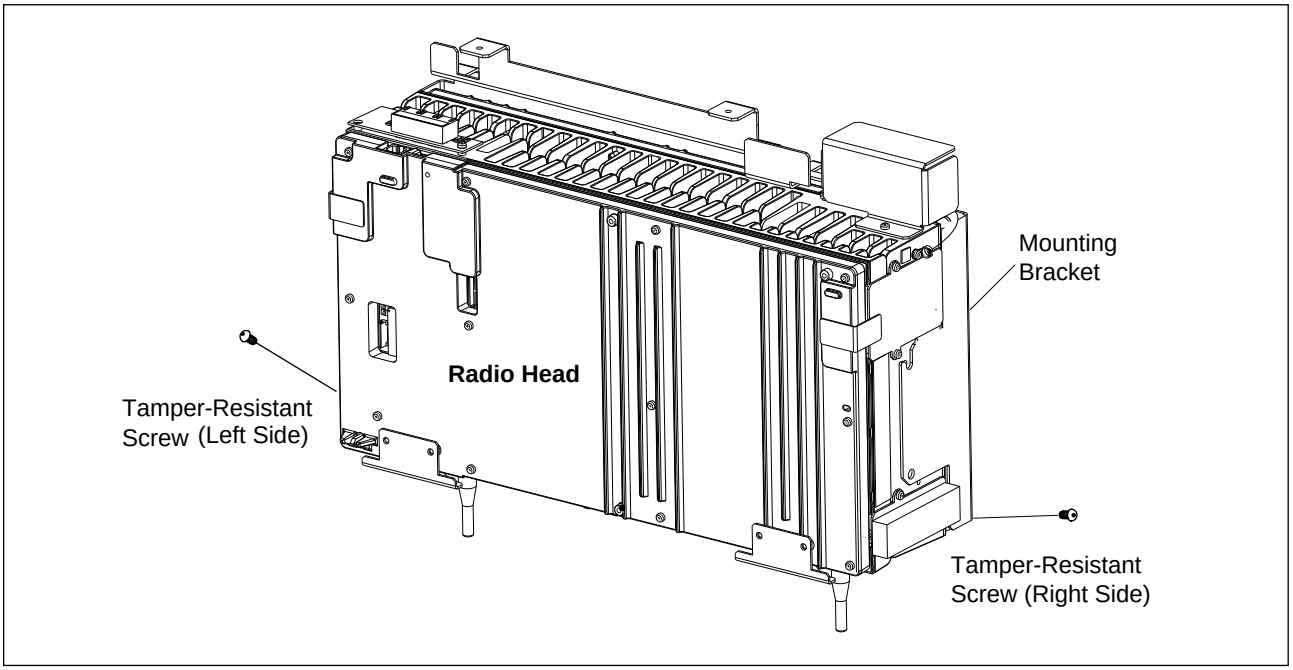


Figure 6-17. Radio Head with Mounting Bracket and Mounting Screws

10. Loosen the upper tamper-resistant screws on each side of the Radio Head that secure it to the mounting bracket. See Figure 6-18 on page 6-47 for the location of the upper tamper-resistant screws.

11. Lift the Radio Head up and away from the mounting bracket.

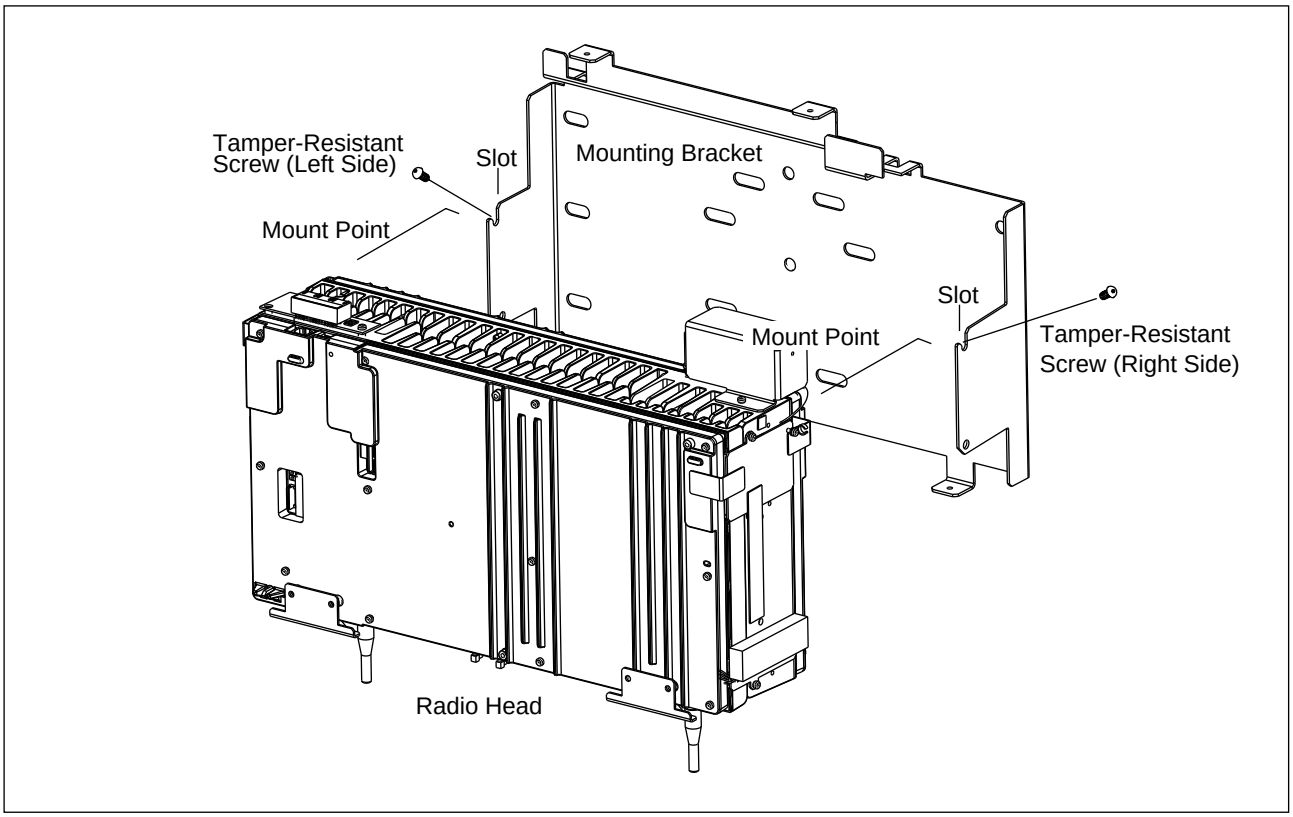


Figure 6-18. Removing Radio Head from Mounting Bracket

Radio Head Replacement

Caution !

Mount the Radio Head on the wall prior to installing the patch antenna assembly to guard against possible damage to the patch antenna assembly.

12. If using a patch antenna, verify that the monopole antennas and the monopole antenna brackets have been removed from the Radio Head and that the patch antenna cables from the old Radio Head have been connected to the external duplexers on the new Radio Head (Step 6 on page 6-44). See Figure 6-15 on page 6-44 for the location of the external duplexers..

    Note: Use care when handling the connectors.

13. Install, but do not tighten, one tamper-resistant screw in top hole on each side of the Radio Head. Leave a sufficient gap between the screw and the Radio Head to allow the screw to slip into the notch on the mounting bracket. See Figure 6-19 on page 6-48 for the location of the top holes on the Radio Head.

    Note: Hardware Kit (NTM 201 1581) contains screws and Torx driver tool for installing the Radio Head.

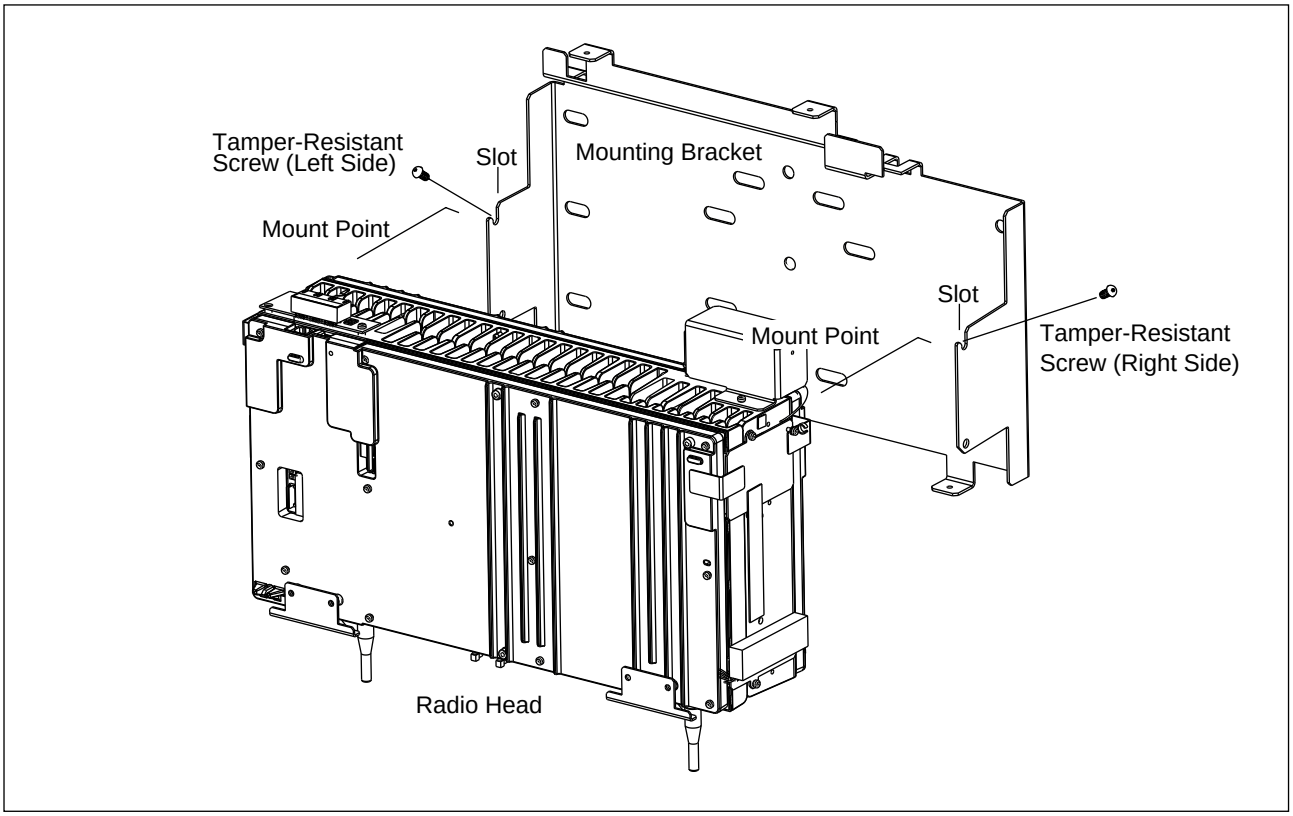


Figure 6-19. Attaching Radio Head to Mounting Bracket

14. Hang the Radio Head on the mounting bracket by placing the Radio Head between the two mount points and by sliding the tamper-resistant screws into the slots on the mounting bracket. See Figure 6-18 on page 6-47.

15. Install a second tamper-resistant screw into each side of the Radio Head just below the screws installed in Step 20 on page 6-50.

16. Tighten the four tamper-resistant screws to secure the Radio Head to the mounting bracket using the Torx driver tool provided in the Radio Head Hardware Kit (NTM 201 1581).

17. If using a patch antenna, mount the patch antenna and reinstall the six screws removed in Step 7 on page 6-44. See Figure 6-16 on page 6-45 for an illustration of an installed patch antenna assembly.

18. Use the Radio Head customer interface to set the Cabinet Identifier (CABID) number on the new Radio Head. Use the same CABID as the identifier recorded on the old Radio Head in Step 3 on page 6-42. See Figure 6-20 on page 6-49 for the location of the Radio Head customer interface.

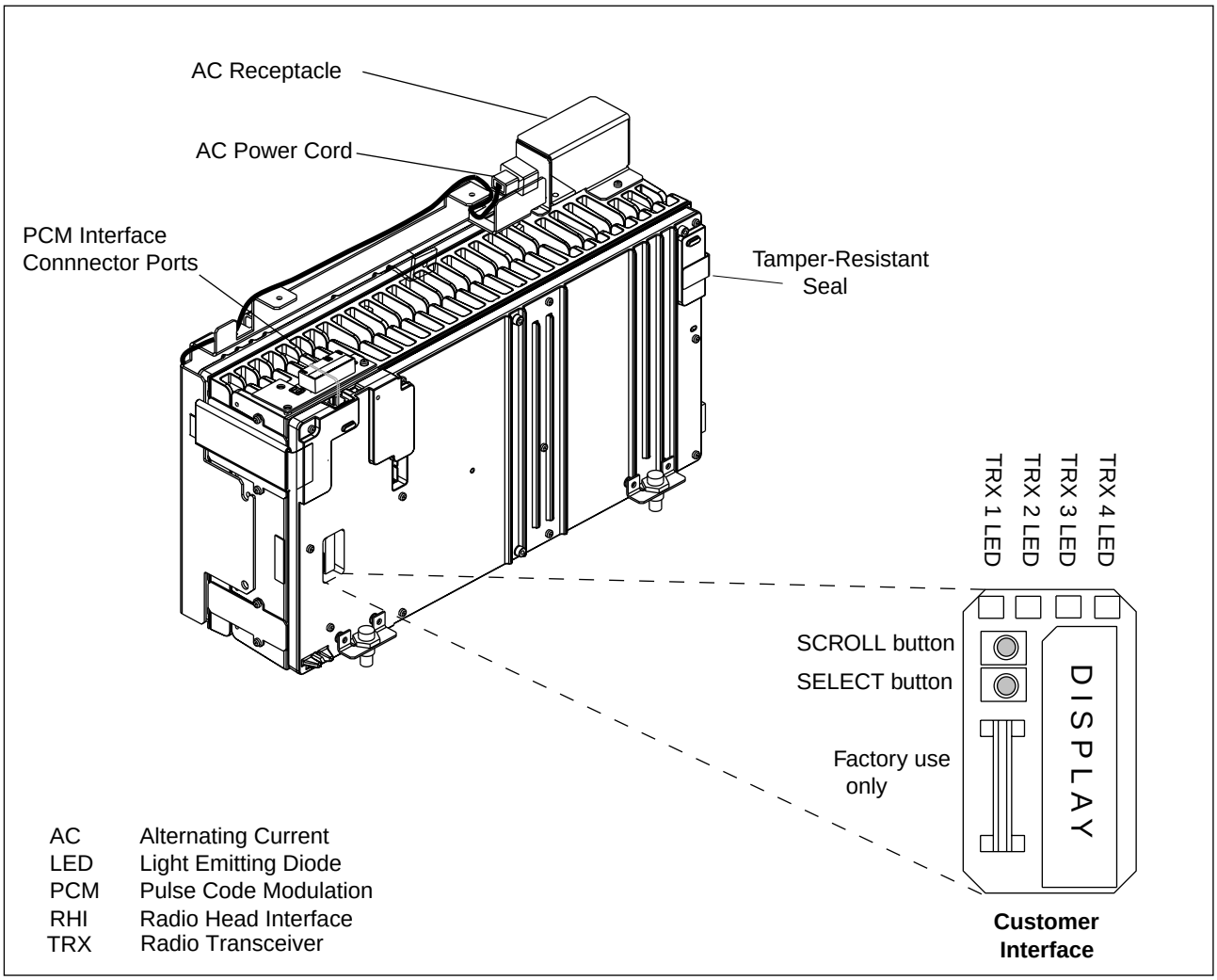


Figure 6-20. Radio Head Customer Interface and LEDs

19.

Warning!

Do not drape excess cables on top of the heat sink fins. Use the cable tray on top of the mounting bracket.

Reconnect the AC power cord to the AC receptacle on the Radio Head. See Figure 6-20 on page 6-49 for the location of the AC power cord and AC receptacle.

20. Install one tamper-resistant screw into each side of the new Radio Head (KRC 121 104/1 or /2). See Figure 6-18 on page 6-47.

    Note: Leave a gap between the screw and the Radio Head that is sufficient to allow the screws to slip into the slots on the mounting bracket.

Radio Head Start-Up

21. Reconnect the PCM cable to the RJ-45 connector on the Radio Head. See Figure 6-14 on page 6-43.

22. Plug the other end of the power cord into the AC outlet.

23. Check the Power/Fault LED on the lower left corner of the Radio Head. See Figure 6-20 on page 6-49 for the location of the Power/Fault LED.

    Note: When power is applied to the Radio Head, a self-test is performed. The Power/Fault LED flashes red at a rate of 3 Hz during the self test.

24. Notify the MSC operator that the replacement Radio Head is ready for operation and testing.

25. Wait 30 minutes to allow the PLL software in the Radio Heads to lock.

    Note: Note: Under normal circumstances the PLL will lock in less than 30 minutes. In some cases (with wander frequencies of 0.03 Hz or less) the PLL will lock in less than 30 minutes but the display will take more than 30 minutes to indicate lock. In extremely rare cases (with wander of 0.001 Hz at 138 UI) the PLL may take more than 30 minutes to lock.

26. Check the Radio Head customer interface display for alarms. If no alarms are present, `OK` appears on the display. Refer to *Part 7, Troubleshooting* for further information on troubleshooting Radio Head connection problems.

27. If using CSUs, consult the CSU customer documentation to troubleshoot connection problems.

28. Check the TRX LEDs. Refer to Figure 6-21 on page 6-51 for the location of the TRX LEDs. The TRX LEDs should be steady yellow indicating that the TRXs are deblocked and not carrying traffic. Refer to *Part 7, Troubleshooting* for further information on troubleshooting TRX problems.

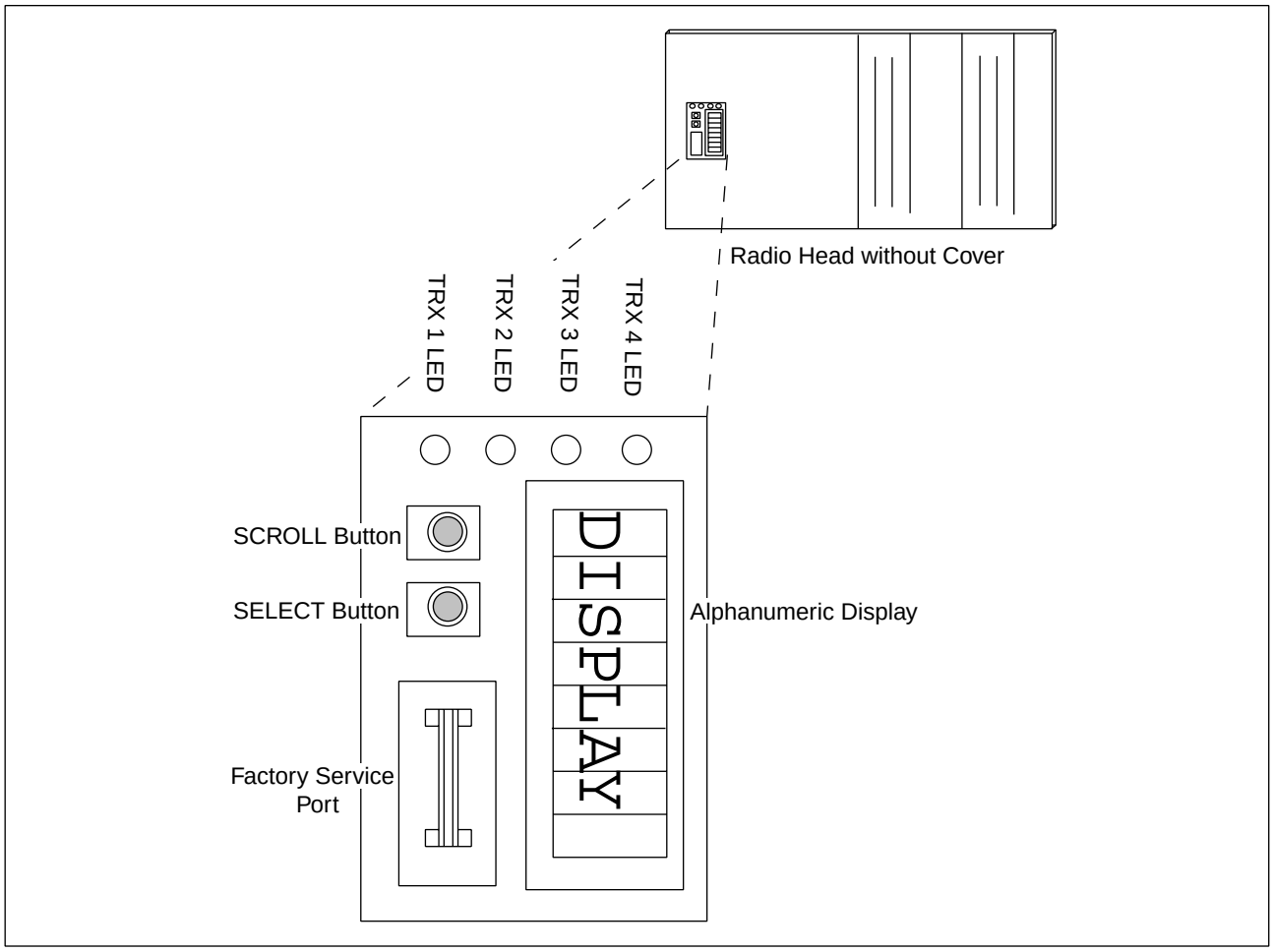


Figure 6-21. Radio Head Customer Interface

29. Install the Radio Head cover on the Radio Head using the four tamper-resistant screws from Step 2 on page 6-42. See Figure 6-13 on page 6-42.

30. Remove the ESD strap and cable.

31. Notify the MSC operator that the new Radio Head is ready for operation.

    Note: The MSC operator must load software in the Radio Head and deblock the TRXs.

Unit Repair

32. Complete the Repair Traveler Note. Describe in detail the circumstances and symptoms of the fault.

33. Attach the Repair Traveler Note to the Radio Head.

34. Use the packaging material from the replacement Radio Head to repackage the suspected faulty Radio Head.

35. Return the Radio Head to the service center.

36. Update the Site Inventory list in the *Site Installation Documentation* with the replacement Radio Head details.

Part 7

Troubleshooting

1 Introduction

This document provides troubleshooting instructions to enable field service personnel to perform on-site troubleshooting and repair of the RBS 884 Pico (1900 MHz) system. The troubleshooting procedures are intended to be followed if a fault is detected during the power-up procedure, or at the request of the Mobile Switching Center (MSC) as a result of an RBS site equipment error indication at the MSC.

2 Troubleshooting

The operational status of the RBS 884 Pico (1900 MHz) equipment is shown by the following:

- Light Emitting Diode (LED) indicators on the front panels of hardware units in the Control and Radio Interface (CRI)
- LEDs on the Cabinet Identification (CID) Unit and Fan Unit viewable from the front of the CRI
- Power LED viewable through the front cover of the Radio Head
- TRX LEDs located under the Radio Head cover
- Radio Head customer interface located under the Radio Head cover

In general, green LEDs indicate the presence of power, red LEDs indicate errors or alarm conditions, and yellow LEDs show operational status.

The procedures in this section are used to identify faulty units by visual inspection of the LEDs, by use of the customer interface, and by alarm reporting. If a procedure does not result in the detection of a faulty unit, contact the MSC to determine if the cell site problem is still indicated at the MSC.

Once the faulty unit is identified, use the appropriate procedures for removing and replacing the equipment in *Part 5, Operations and Maintenance* of this manual.

3 Prerequisites and Tools

3.1 Prerequisites

The following prerequisites are required for diagnostics:

- Compliance with safety precautions described in *Part 5, Operations and Maintenance* of this manual.
- Compliance with product and Electrostatic Discharge (ESD) precautions described in *Part 5, Operations and Maintenance* of this manual.
- Knowledge of installation practices and procedures described in *Part 3, RBS 884 Pico (1900 MHz) CRI Installation* and *Part 4, RBS 884 Pico (1900 MHz) Radio Head Installation* of this manual.
- Knowledge of configuration and test procedures described in *Part 4, Integration and Test* of this manual.

3.2 Tools

The tools required for the Troubleshooting Procedures are listed in Table 7-1 on page 7-4 and the following list.

Table 7-1. Required Tools for the Replacement Procedures

Product Number	Description
LYB 250 01/14	ESD wrist strap with crocodile clip
LTD 117 02	Extractor tool for removing hardware units (boards)
LTT 601 82	Torque wrench set including: • Torque wrench for 0.6 Nm; for Subminiature Connector Type A (SMA) tool and Torx bit 0.8 • Torx bit 0.8; for circuit board screws • SMA tool, for coaxial cables

The following tools are recommended for the equipment replacement procedures:

- T1 or E1 test set with cables to connect to the ELI, the Radio Head, and both ends of the PCM cable
- 8-position crimping hand tool
- Screwdrivers

  - Torx no. 8, 10, 20, and 30
  - Phillips no. 1, 2, and 3
  - small flat blade
  - medium flat blade
  - large flat blade
  - stubby flat blade

- Side cutting pliers
- Metric socket set with 100 mm and 300 mm extension bars
- Torque wrench with socket adapter
- Cable tie gun
- Small soldering iron
- Multimeter
- Extra ESD bag

4 Fault Isolation and Repair

Faults are isolated and repaired using the LEDs on the CRI and Radio Heads, by alarms reported to the MSC, and by alarms displayed on the Radio Head customer interface.

The tables provided in this document provide a description of faults and errors and the recommended solutions. *Possible Solutions* provided in the tables are listed in order from most likely to least likely and, therefore, should be followed from top to bottom. If all procedures have been followed and the fault continues to exist, the affected equipment should be returned to the Ericsson designated repair center. Refer to *Part 6, Operations and Maintenance* of this manual for the hardware replacement procedures. Prior to replacing a hardware unit, contact the MSC for further assistance. Some hardware units should be blocked at the MSC prior to removal.

4.1 Conventions Used in the Troubleshooting Procedures

The following troubleshooting conventions are used in the tables provided in this document:

- Verify the power supply is functioning. Check the CRI power supply and the test points on the DC/DC converter unit for correct voltages.
- Verify the cables are securely connected. Check all cables on the CRI equipment and the Enhanced Link Interface (ELI) unit and, if present, on the CRI patch panel to ensure secure connections.
- Interpret the LEDs. Use LEDs on the CRI equipment and Radio Head unit to isolate a fault.
- Interpret the Radio Head customer interface. Use the alarm messages displayed on the Radio Head customer interface to isolate a fault.
- Reset the Radio Head customer interface by disconnecting and reconnecting power.
- Replace the Radio Head. Remove and replace the Radio Head if a fault is isolated to the Radio Head that cannot be resolved. The Radio Head unit does not contain user-serviceable circuit boards (units).

4.2 General Troubleshooting Procedures

RBS 884 Pico (1900 MHz) System faults can be identified at the MSC or the Radio Head. Possible indications at the MSC may include the following:

- Radio Transceiver (TRX) devices are blocked.
- Fault codes are present in the malfunction log.

Indications at the Radio Head and the CRI include LEDs and Red Alarm and Yellow Alarm messages. The alarm messages are described in Table 7-8 on page 7-22.

When a fault occurs in the system, the problem can usually be isolated to the following components:

- Radio Head
- ELI Unit
- T1/E1 PCM Cable and Connectors

4.2.1 Leased Lines

The use of network leased lines requires the addition of customer-supplied Channel Service Units (CSU) to provide the required interface between the RBS 884 Pico (1900 MHz) and the carrier network. The interface created by the CSU provides T1/E1 test capabilities. Refer to the CSU customer documentation for troubleshooting leased line connection problems.

4.2.2 Proprietary or Non-Leased Lines

Table 7-2 on page 7-7 contains general troubleshooting procedures to isolate the fault.Section 4.3 on page 7-8 and Section 4.4 on page 7-18 contain specific troubleshooting procedures for faults identified by the LEDs and the Radio Head customer interface.

Table 7-2. General Troubleshooting Procedures for Non-Leased Lines

Action	Procedure
Check the PCM status LEDs at the ELI and the Radio Head customer interface.	• Look for a red PCM LED on the ELI unit to detect an error. • Look for a PCM interface alarm at the Radio Head interface to detect an error.
Check the ELI.	• Disconnect the T1/E1 PCM cable from the ELI and connect the T1/E1 test set to the ELI and check for a red error LED. If present, the ELI is faulty and must be replaced. • If the red error LED in not present, the ELI is functioning properly and the problem is located in the Radio Head, the PCM cable, or the PCM cable connectors.
Check the Radio Head.	• Check power/fault LED, and if LED is red remove the Radio Head cover. • Disconnect the PCM cable from the Radio Head and connect the T1/E1 test set to the Radio Head. • If no PCM alarms appear on the RH interface, the RH is functioning properly. The problem is isolated to either the PCM cable (for example, a broken cable or a cable that is routed through EMI problem areas), or the PCM connectors. If the alarm messages remain, refer to Table 7-7 on page 7-20 and Table 7-8 on page 7-22.
Check the T1/E1 PCM cable and connectors.	• Perform a continuity check of the PCM cable (including connectors) from the Radio Head RJ-45s to the ELI quarter plugs. • If an open circuit is found, perform a continuity check from the patch panel connector to the ELI quarter plugs. • If an open circuit is found between the patch panel and the ELI, the patch panel cable is faulty. Replace the patch panel cable. • If an open circuit does not exist, remove the connector from the Radio Head end of the cable and perform a continuity check on the cable. • If an open circuit is found, the PCM cable is faulty. Replace the PCM cable. • If an open circuit does exist, the Radio Head PCM connector is faulty. Attach the new connector and reconnect the PCM cable to the Radio Head and the patch panel.

Table 7-2. General Troubleshooting Procedures for Non-Leased Lines (Continued)

Action	Procedure
Check for excessive EMI in the PCM cable.	• Loop the PCM cable at the Radio Head back to the CRI. • Connect the T1/E1 test set and perform a Bit Error Rate (BER) test, or measure the errored seconds. • If bit errors or errored seconds are measured, reroute the T1/E1 PCM cable. • If the problem persists, contact the next level of technical support.
Note: The BER test may not provide valid results if the length of the PCM cable being tested, when looped back, exceeds the maximum cable length supported by the T1/E1 test set.	

4.3 CRI LEDs

After the CRI power supply and the test points on the DC/DC converter unit are checked and the CRI cable connections are secured, proceed to individual LEDs on the CRI equipment to isolate a fault.

4.3.1 CID Unit LEDs

The CID Unit has a green LED for Power and a red LED for Error. See Figure 7-1 on page 7-9 for an illustration of the CID Unit LEDs.

Note: The CID Unit is identical for both the CRI floor mount and the rack mount except for location. The CID Unit is located on the top left side of the CRI floor mount cabinet and on the bottom left side of the CRI rack mount.

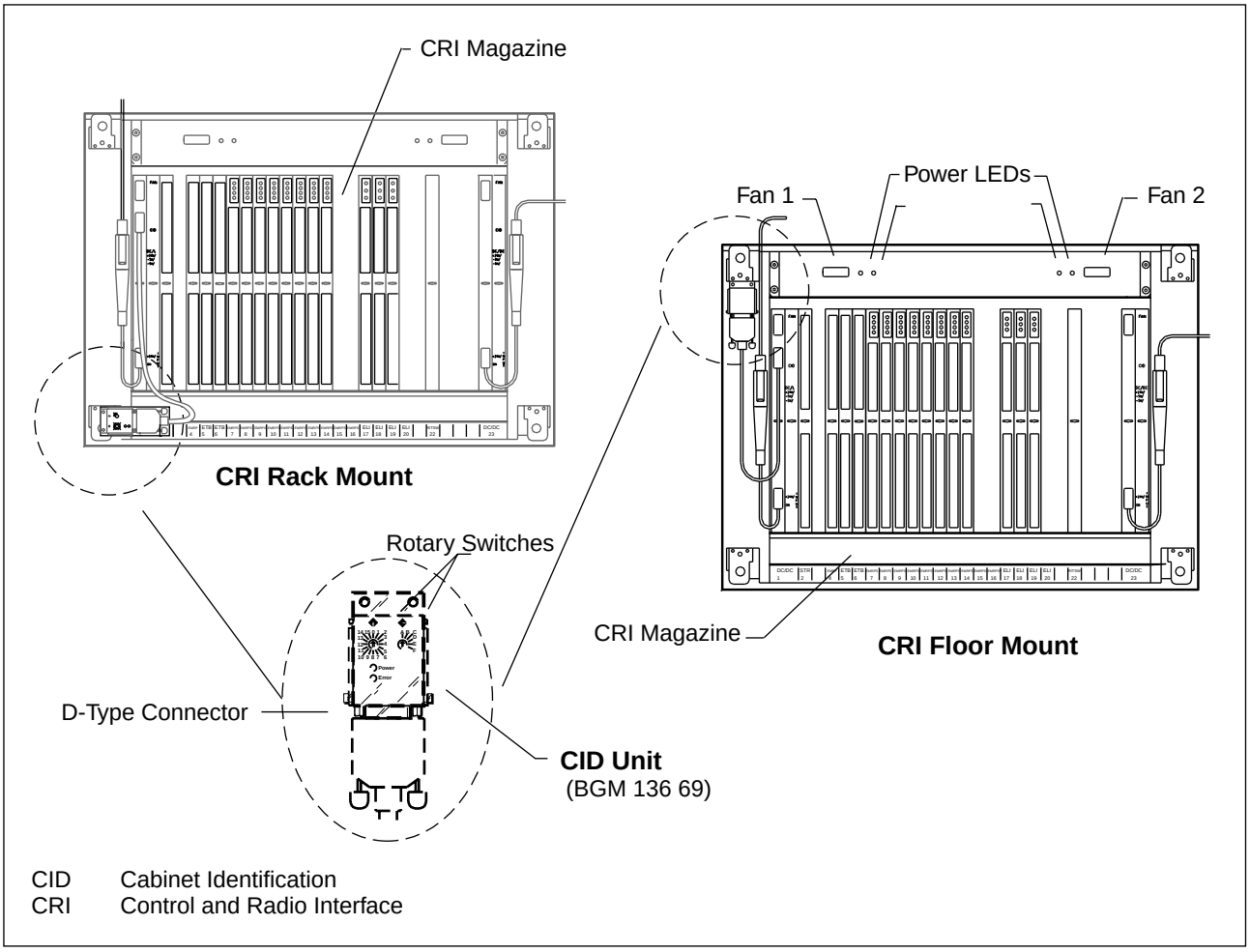


Figure 7-1. CRI Rack Mount and Floor Mount CID Unit

The Power LED is illuminated when power is applied to the CRI subrack or cabinet. The Error LED is illuminated when there is a power fault or a unit fault with a circuit board in the subrack.

Figure 7-2 on page 7-10 and Figure 7-3 on page 7-11 contain the troubleshooting flowchart and the CRI power cable diagram that can be used to isolate power and CID problems.

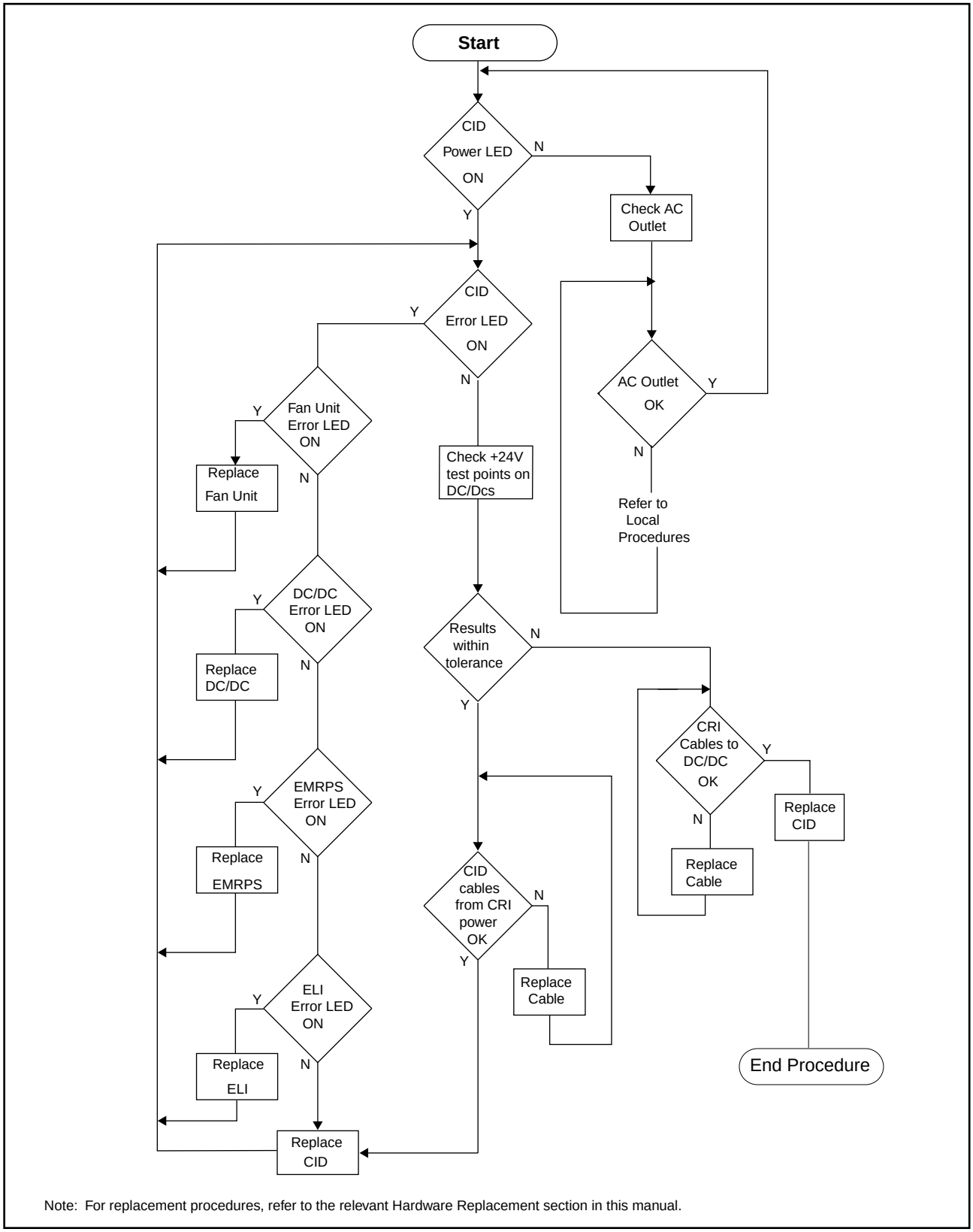


Figure 7-2. Troubleshooting Flowchart for Cabinet Identification Unit and Power Problems

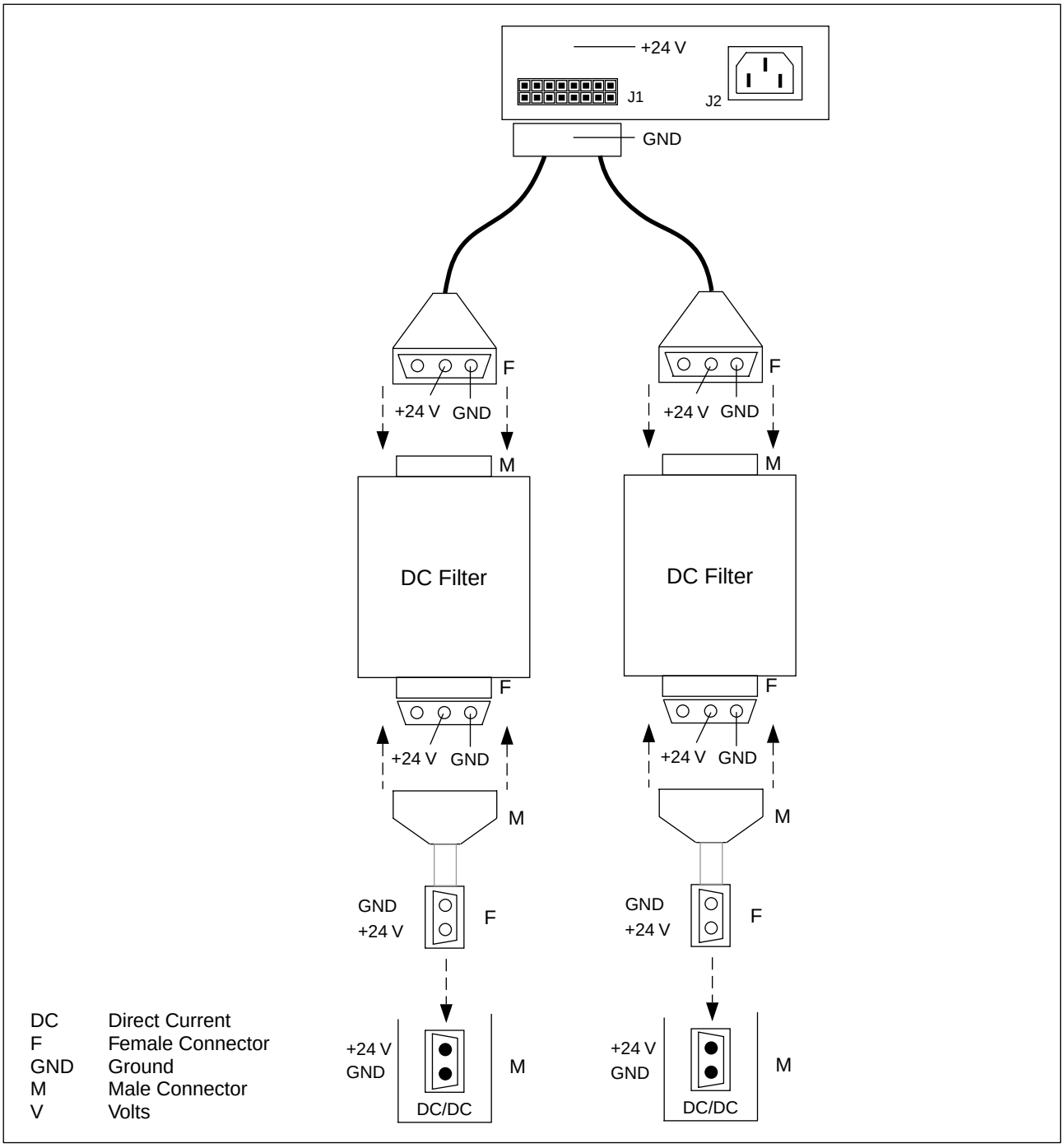


Figure 7-3. CRI Power Cable Diagram

4.3.2 Fan Unit LEDs

The Fan Unit, which is mounted above the CRI subrack, contains two fans that are powered separately by each of the DC/DC converters. Each fan has a

Power (green) LED and an Error (red) LED, which indicate the status of the fans. Each fan can provide sufficient cooling of the CRI subrack if the other fan fails.

Note: At least one fan must be operating to prevent overheating. If a Fan Unit must be replaced, this procedure must be performed as quickly as possible after first contacting the MSC.

See Figure 7-1 on page 7-9 for the location of the Fan Unit LEDs. See Table 7-3 on page 7-12 for LED descriptions and recommended solutions.

Table 7-3. Fan Unit LEDs

LED Indication	Description	Possible Solution
Power:		
Green, steady ON	The fan is receiving power.	No action is required.
Green, OFF	The fan is not receiving power.	• Verify the fan cable is installed correctly. • Replace the fan cable if required. • If the fan cable is secure and operational and the Power LED is still OFF, verify the power supply. • If the power supply is functioning properly, replace the fan unit. See table footnote.
Error:		
Red OFF	No error is indicated.	No action is required.
Red, steady ON	An error is indicated.	• If both the Power and the Error LEDs are ON, verify the fan cable is installed correctly. • Replace the fan cable if required. • If the fan cable is secure and operational and the Power LED is still OFF, verify the power supply. • If the power supply is functioning properly, replace the fan unit. See table footnote.
Note: Call the MSC before removing the fan unit. Fan unit removal and replacement should be done as quickly as possible to avoid overheating the CRI equipment.		

4.3.3 DC/DC Converter Unit LEDs

The CRI magazine contains two DC/DC units that work in parallel redundancy to provide power to the other units in the CRI. The DC/DC unit is illustrated in Figure 7-4 on page 7-13. See Table 7-4 on page 7-13 for the LED indications and recommended solutions.

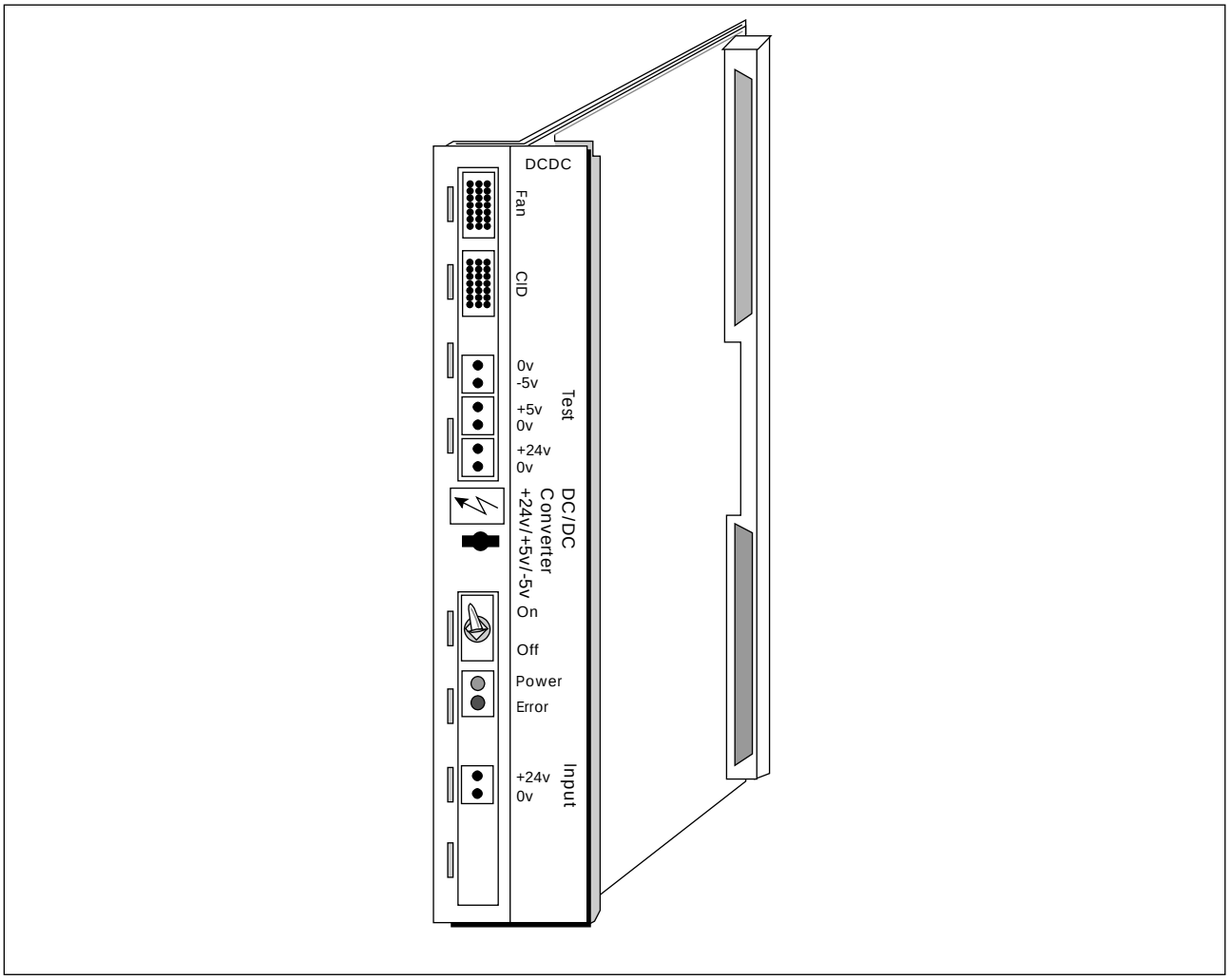


Figure 7-4. DC/DC Converter Unit LEDs

Table 7-4. DC/DC Converter Unit LEDs

LED Indication	Description	Possible Solution
Power:		
Green, steady ON	The DC/DC unit is receiving power.	No action is required.
Green, OFF	The DC/DC unit is not receiving power.	• Verify the power switch is set to ON. • Verify the DC/DC cable is secure and operational. • Verify the CID power LED is ON. • Use the flowchart to troubleshoot a CID power fault.

Table 7-4. DC/DC Converter Unit LEDs (Continued)

LED Indication	Description	Possible Solution
Error:		
Red OFF	No error is indicated.	No action is required.
Red, steady ON	An error is indicated.	• Check the voltage at the +24V test point. • If the voltage is not within the tolerance of +21V to +31V, check the power supply. • If the +24V is within tolerance, check the -5V test point. • If the -5V test point is within the tolerance of -5.10V to -4.90V, check the +5V test point. • If the -5V test point is out of tolerance, replace the DC/DC unit. • If the +5V test point is within the tolerance of +4.95V to +5.25V, verify that the DC/DC unit is securely installed. • If the +5V test point is out of tolerance, replace the DC/DC unit.

4.3.4 EMRPS Unit LEDs

The Extension Module Regional Processor with Device Speech Bus Access (EMRPS) unit is an Extension Module Regional Processor (EMRP) with an extended processor power and speech bus interface. The EMRPS unit is illustrated in Figure 7-5 on page 7-15. See Table 7-5 on page 7-15 for LED indications and recommended solutions.

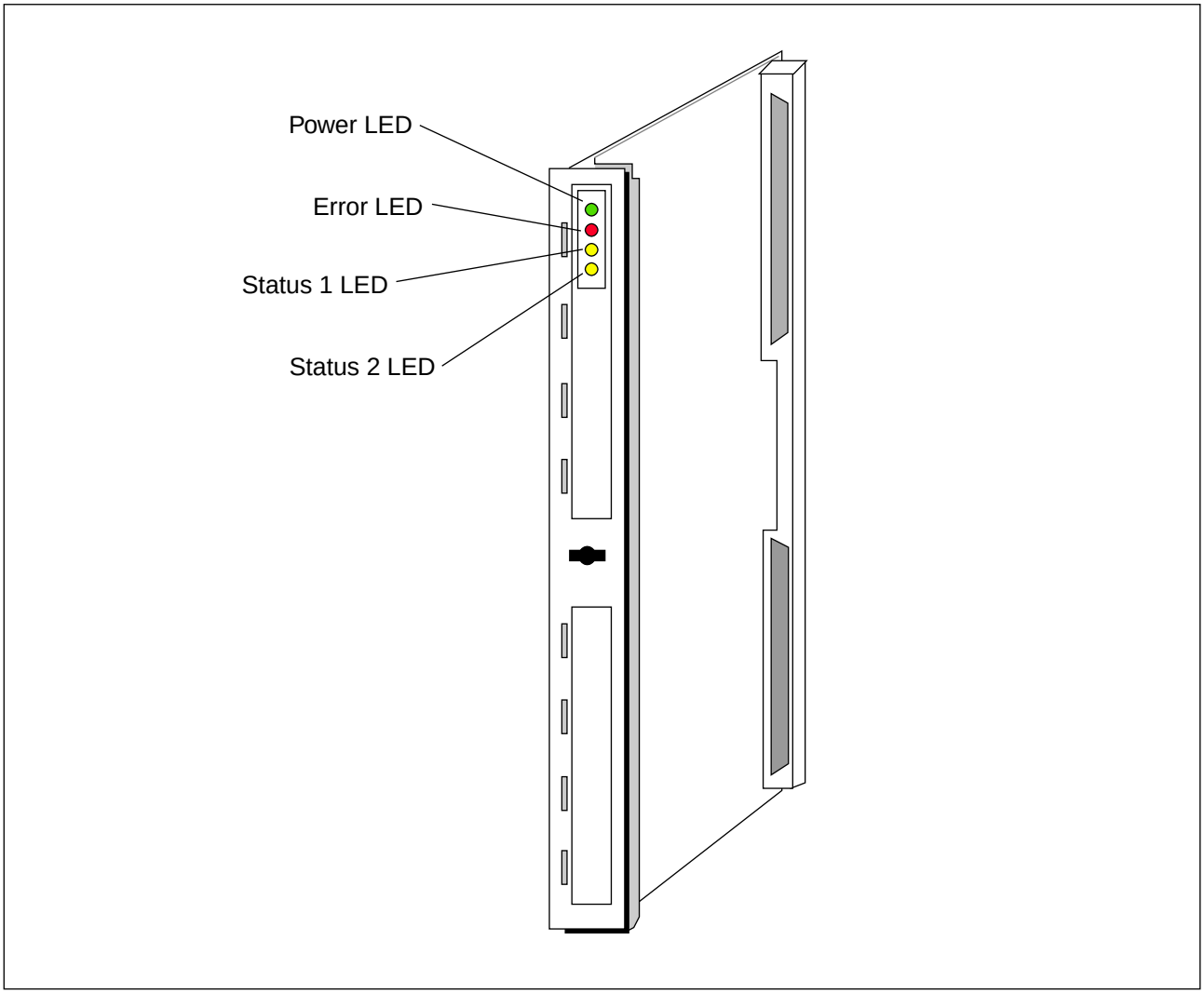


Figure 7-5. EMRPS Unit LEDs

Table 7-5. EMRPS Unit LEDs

LED Indication	Description	Possible Solution
Power:		
Green, steady ON	The EMRPS unit is receiving power.	No action is required.
Green, OFF	The EMRPS unit is not receiving power.	Check the connector on the backplane.
Error:		
Red OFF	No error is indicated.	No action is required.
Red, steady ON	An error is indicated.	Replace the EMRPS unit.

Table 7-5. EMRPS Unit LEDs (Continued)

LED Indication	Description	Possible Solution
Status 1:		
LED OFF	The EMRPS is in a reset state.	No action is required.
Yellow, steady ON	The EMRPS is in an idle state.	No action is required.
Yellow, flashing	The EMRPS is in use.	No action is required.
Status 2:		
LED OFF	All devices are blocked.	No action is required.
Yellow, flashing	The Channel Function Unit is idle or busy.	No action is required.

4.3.5 ELI Unit LEDs

The ELI unit provides the T1/E1 PCM link between the CRI and the Radio Head for proprietary or non-leased lines. All LEDs are on briefly during the power-on sequence. The ELI unit is illustrated in Figure 7-6 on page 7-17. See Table 7-6 on page 7-17 for LEDs and recommended solutions.

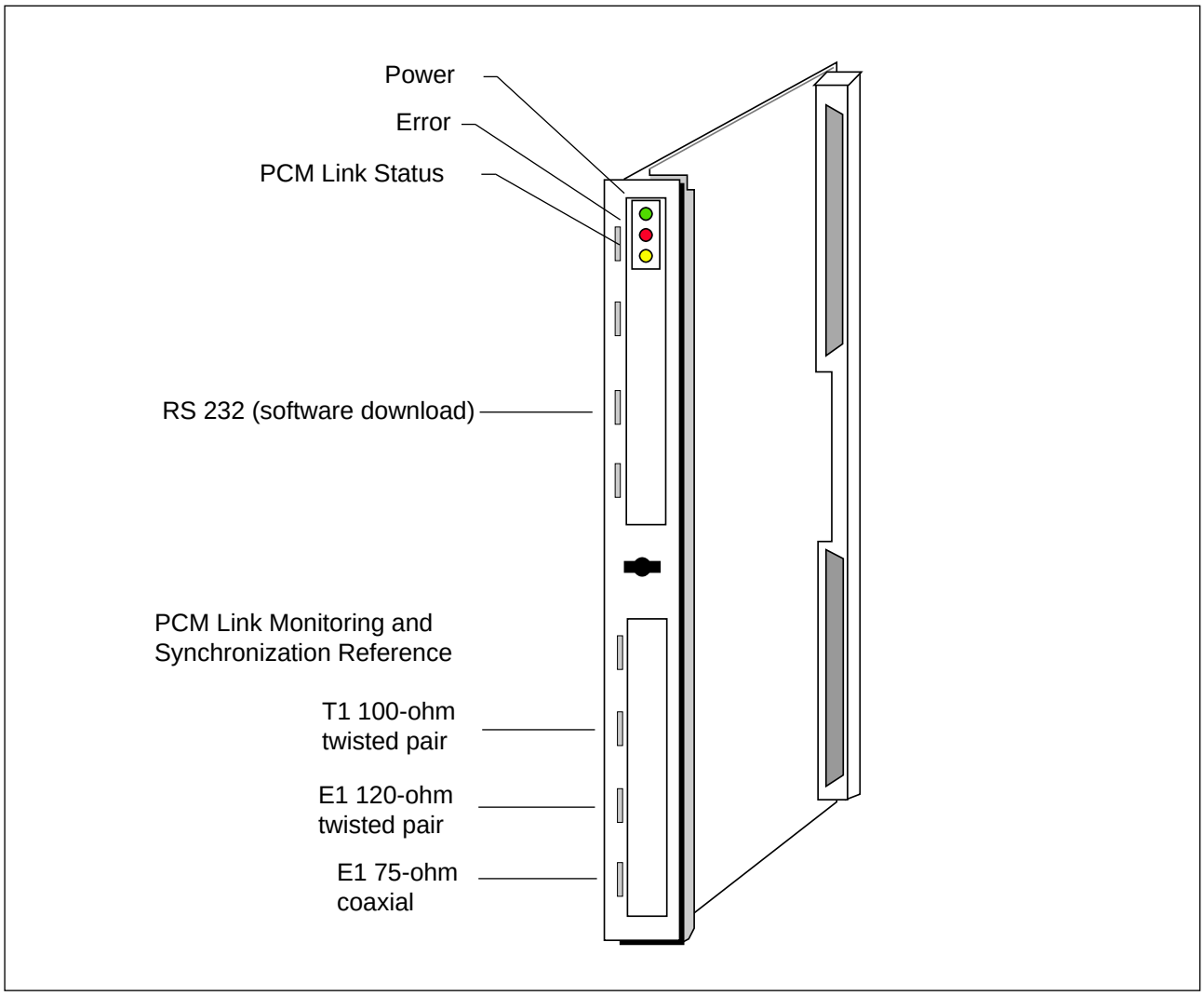


Figure 7-6. ELI Unit LEDs

Table 7-6. ELI Unit LEDs

LED Indications	Description	Possible Solution
Power:		
Green, ON	The ELI unit is receiving power.	No action is required.
Green, OFF	The ELI unit is not receiving power.	Check the connector on the backplane.
Error:		
Red OFF	No error is indicated.	No action is required.
Red, 3 Hz flashing	A self test is in progress.	No action is required.

Table 7-6. ELI Unit LEDs (Continued)

LED Indications	Description	Possible Solution
Red, 1 Hz flashing	A clock or Phase Locked Loop (PLL) fault is indicated.	• If multiple ELI units show this fault, repower the RITSW; otherwise, replace the RITSW unit. • If the RITSW unit is functioning properly, remove and reinsert the ELI unit; otherwise, replace the ELI unit.
Red, steady ON	An error is indicated during self test.	• Remove and reinsert the ELI unit. • If the fault still exists, replace the ELI unit.
Status:		
Red OFF	No error is indicated.	No action is required.
Red, steady ON	A loss of received signal is indicated.	Check the T1/E1 PCM cable. See Table 7-2 on page 7-7.
Red, 1 Hz flashing	A loss of frame synchronization is indicated.	Check the T1/E1 PCM cable. See Table 7-2 on page 7-7.
Yellow, steady ON	A Yellow Alarm is received.	Check the T1/E1 PCM cable. See Table 7-2 on page 7-7.

4.4 Radio Head LEDs and Interface

The RBS 884 Pico (1900 MHz) can consist of up to 10 distributed Radio Heads. The Radio Heads can be connected with a non-leased line or they can be connected with a leased line to provide greater separation distance. The Radio Heads communicate to the CRI over a T1/E1 PCM connection provided by the Radio Head Interface (RHI) units. The Power/Fault LED has a plastic rod that extends through the front cover so the LED is visible when the cover is in place.

Note: The Radio Head cover must be removed to view the TRXs LEDs and the Radio Head customer interface.

The Radio Head LEDs and customer interface are shown in Figure 7-7 on page 7-19.

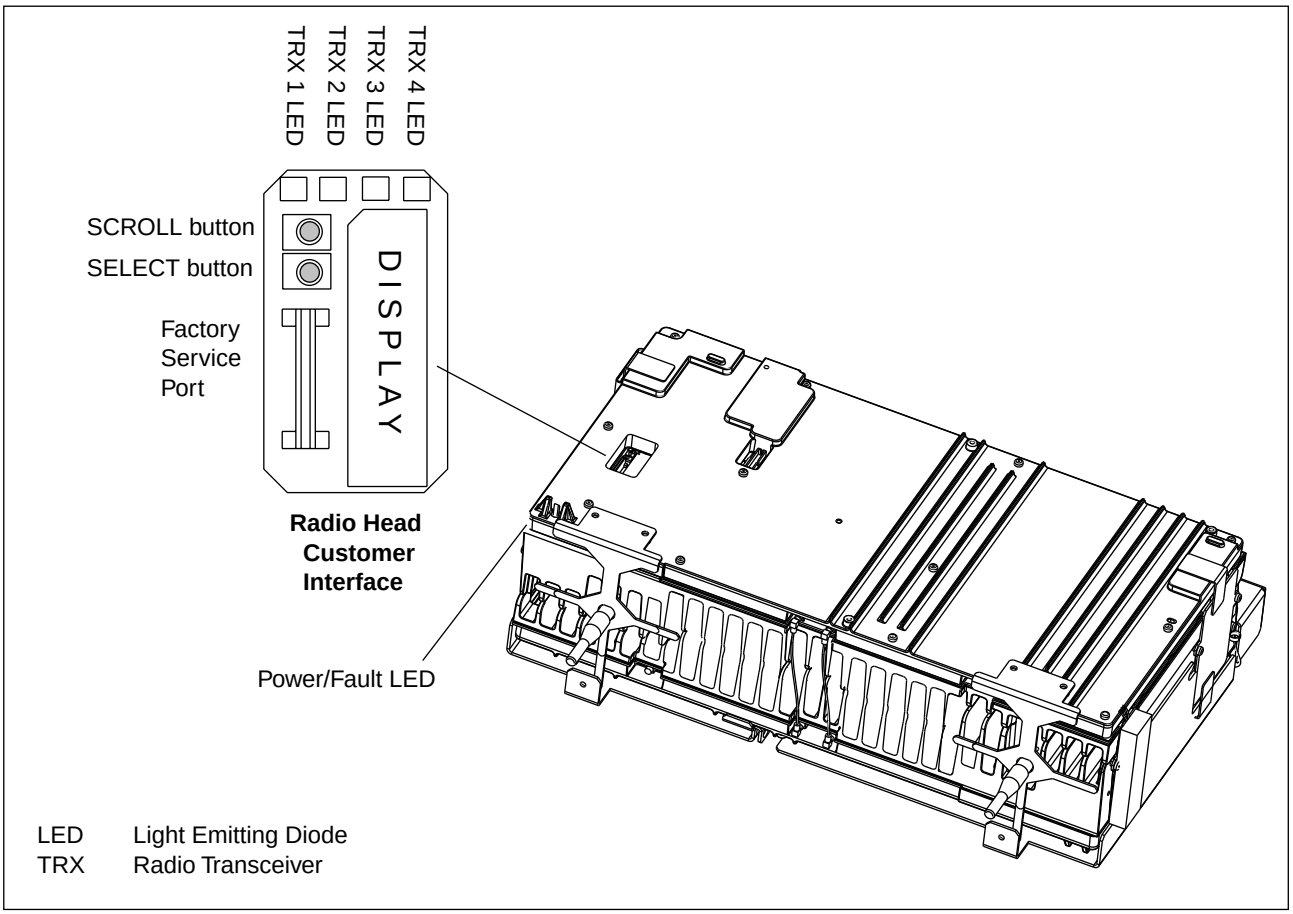


Figure 7-7. Radio Head LEDs and Customer Interface

4.4.1 Radio Head LEDs

Warning!

The use of network leased lines requires the addition of customer-supplied Channel Service Units (CSU) to provide the required interface between the RBS 884 Pico (1900 MHz) and the carrier network. The interface created by the CSU provides T1/E1 test capabilities. Refer to the CSU customer documentation as the initial source for troubleshooting leased line connection problems.

See Table 7-7 on page 7-20 for the LEDs and recommended fault solutions.

Table 7-7. Radio Head LEDs Non-Leased Line Troubleshooting Information

LED Lamp	Description	Possible Solution
RH Power/Fault:		
Green, steady ON	The Radio Head is receiving power. No fault is indicated.	No action is required.
Red, steady ON	An RHI or TRX fault is indicated.	Replace the Radio Head.
Green, OFF	The Radio Head is not receiving power.	• Check the power cord connection at the Radio Head. • Verify that the AC outlet has power.
Red, 1 Hz flashing	The TRX has lost the TLINK clock or there is a primary PCM link fault.	• Check the CRI-RH (primary) PCM cable and the connected ELI unit. • If the CRI-RH (primary) PCM cable is secure and the ELI is functioning, remove the Radio Head cover and press the SCROLL button on the Radio Head customer interface to display the alarm messages. • If no alarms are present, replace the Radio Head
Red, 3 Hz flashing	A self test is in progress.	No action is required.
TRX 1, 2, 3, 4:		
LED OFF	The TRX is blocked.	• Determine if the TRX is blocked manually or is blocked as a result of a fault. • See the malfunction log at the MSC for further instruction.
Yellow, steady ON	The TRX is deblocked and is not carrying traffic.	No action is required.
Yellow, 15 Hz flashing	The TRX is carrying traffic.	No action is required.
Red, 1Hz flashing	The TRX has lost the TLINK clock or there is a primary PCM link fault.	• Check the CRI-RH PCM cable and the connected ELI unit. • If the CRI-RH (primary) PCM cable is secure and the ELI is functioning, remove the Radio Head cover and press the SCROLL button on the customer interface to display the alarm messages. • If no alarms are present, replace the Radio Head.
Red, steady ON	A TRX fault is indicated.	Replace the Radio Head.

See Table 7-8 on page 7-22 for the Radio Head alarms and recommended fault solutions.

Note: The term Primary Interface refers to the upstream transmission interface and the term Secondary Interface refers to the downstream interface.

4.4.2 Radio Head Customer Interface

Warning!

The use of network leased lines requires the addition of customer-supplied Channel Service Units (CSU) to provide the required interface between the RBS 884 Pico (1900 MHz) and the carrier network. The interface created by the CSU provides T1/E1 test capabilities. Refer to the CSU customer documentation as the initial source for troubleshooting leased line connection problems.

The RBS 884 Pico (1900 MHz) Radio Head customer interface consists of an eight-character alphanumeric display and two push buttons, SCROLL and SELECT.

The Radio Head customer interface can be used to view the following alarms or faults:

- T1/E1 primary interface alarms
- T1/E1 secondary interface alarms
- Phase Lock Loop (PLL) alarms
- TRX 1, 2, 3, and 4 faults

Table 7-8. Radio Head Customer Interface

Alarm Display	Description	Actions
T1 Primary Interface Alarms		
`Pri LOS`	Loss of Signal (LOS)	• Check the CRI–RH (primary) PCM cable connection at the ELI unit, the CSUs (if present), and at the Radio Head. • Check for green power LED on the ELI unit. • Remove the Radio Head cover and press the SCROLL button on the user interface to display the alarm messages. • If the alarm occurs on a cascaded Radio Head, verify that the CASCADE parameter on the upstream Radio Head is ENDN. • If a leased line is used, contact your local network service company. • Return the Radio Head to your local RBS Repair Center.
`Pri OOF`	Out of Frame (OOF)	• Check for green power LED on the ELI unit. • Remove the Radio Head cover and press the top SCROLL button on the user interface to display the alarm messages. • If a leased line is used, contact your local network service company. • Return the Radio Head to your Local RBS Repair Center.
`Pri AIS`	Alarm Indication Signal (AIS or Blue alarm)	• Check for green power LED on the ELI unit. • Remove the Radio Head cover and press the SCROLL button on the user interface to display the alarm messages. • If a leased line is used, contact your local network service company. • Return the Radio Head to your local RBS Repair Center.
`Pri RAI`	Remote Alarm Indication (RAI or Yellow alarm)	• Check for green power LED on the ELI unit. • Remove the Radio Head cover and press the SCROLL button on the user interface to display the alarm messages. • If a leased line is used, contact your local network service company. • Return the Radio Head to your local RBS Repair Center.
`Pri LdLP` (leased line alarm only)	Payload Loop Back detected	Contact your local network service company.

Table 7-8. Radio Head Customer Interface (Continued)

Alarm Display	Description	Actions
`Pri LnLP` (leased line alarm only)	Line Loop Back detected	Contact your local network service company.
T1 Secondary Interface Alarms		
`Sec LOS`	Loss of Signal (LOS)	• Check the T1/E1 PCM cable connection at the downstream Radio Heads. • Check for green power LED on the ELI unit. • Remove the Radio Head cover and press the top SCROLL button on the user interface to display the alarm messages. • Return the Radio Head to your Local RBS Repair Center.
`Sec OOF`	Out of Frame (OOF)	• Check the T1/E1 PCM cable connection at the downstream Radio Heads. • Check for green power LED on the ELI unit. • Remove the Radio Head cover and press the top SCROLL button on the user interface to display the alarm messages. • If the alarm occurs on the last cascaded Radio Head, verify that the CASCADE parameter is ENDN. • Return the Radio Head to your local RBS Repair Center.
`Sec AIS`	Alarm Indication Signal (AIS or Blue alarm)	• Check the T1/E1 PCM cable connection at the downstream Radio Heads. • Check for green power LED on the ELI unit. • Remove the Radio Head cover and press the top SCROLL button on the user interface to display the alarm messages. • Return the Radio Head to your local RBS Repair Center.
`Sec RAI`	Remote Alarm Indication (RAI or Yellow alarm)	• Check the T1/E1 PCM cable connection at the downstream Radio Heads. • Check for green power LED on the ELI unit. • Remove the Radio Head cover and press the top SCROLL button on the user interface to display the alarm messages. • Return the Radio Head to your local RBS Repair Center.
`Sec LdLP` (leased line alarm only)	Payload Loop Back detected	Contact your local network service company.

Table 7-8. Radio Head Customer Interface (Continued)

Alarm Display	Description	Actions
`Sec LnLP` (leased line alarm only)	Line Loop Back detected	Contact your local network service company.
E1 Primary Interface Alarms		
`Pri LOS`	Loss of Signal (LOS)	• Check the CRI-RH (primary) PCM cable connection at the ELI unit, the CSUs (if present), and at the Radio Head. • Check for green power LED on the ELI unit. • Remove the Radio Head cover and press the top SCROLL button on the user interface to display the alarm messages. • If the alarm occurs on a cascaded Radio Head, verify that the CASCADE parameter on the upstream Radio Head is ENDN. • If a leased line is used, contact your local network service company. • Return the Radio Head to your Local RBS Repair Center.
`Pri OOF`	Out of Frame (OOF)	• Check for green power LED on the ELI unit. • Remove the Radio Head cover and press the top SCROLL button on the user interface to display the alarm messages. • If a leased line is used, contact your local network service company. • Return the Radio Head to your Local RBS Repair Center.
`Pri AIS`	Alarm Indication Signal (AIS or Blue alarm)	• Check for green power LED on the ELI unit. • Remove the Radio Head cover and press the top SCROLL button on the user interface to display the alarm messages. • If a leased line is used, contact your local network service company. • Return the Radio Head to your Local RBS Repair Center.
`Pri REBE`	Remote End Block Alarm (REBE)	• Check for green power LED on the ELI unit. • Remove the Radio Head cover and press the top SCROLL button on the user interface to display the alarm messages. • If a leased line is used, contact your local network service company. • Return the Radio Head to your Local RBS Repair Center.

Table 7-8. Radio Head Customer Interface (Continued)

Alarm Display	Description	Actions
Pri FAS	FAS Distant Alarm	Contact your local RBS Repair Center.
E1 Secondary Interface Alarms		
Sec LOS	Loss of Signal (LOS)	• Check the PCM cable connection at the downstream Radio Heads. • Check for green power LED on the ELI unit. • Remove the Radio Head cover and press the top SCROLL button on the user interface to display the alarm messages. • Return the Radio Head to your Local RBS Repair Center.
Sec OOF	Out of Frame (OOF)	• Check the PCM cable connection at the downstream Radio Heads. • Check for green power LED on the ELI unit. • Remove the Radio Head cover and press the top SCROLL button on the user interface to display the alarm messages. • Return the Radio Head to your Local RBS Repair Center.
Sec AIS	Alarm Indication Signal (AIS or Blue alarm)	• Check the PCM cable connection at the downstream Radio Heads. • Check for green power LED on the ELI unit. • Remove the Radio Head cover and press the top SCROLL button on the user interface to display the alarm messages. • Return the Radio Head to your Local RBS Repair Center.
Sec REBE	Remote End Block Alarm (REBE)	• Check the PCM cable connection at the downstream Radio Heads. • Check for green power LED on the ELI unit. • Remove the Radio Head cover and press the top SCROLL button on the user interface to display the alarm messages. • Return the Radio Head to your Local RBS Repair Center.
Sec FAS	FAS Distant Alarm	Contact your local RBS Repair Center.
Phase Lock Loop (PLL) Alarms		
p11 UnLK	Unlocked	• This alarm occurs after a reset or power interruption. • This alarm Indicates that the PLL is in the locking process.

Table 7-8. Radio Head Customer Interface (Continued)

Alarm Display	Description	Actions
p11 NoLK	Never Locked	• Verify the existence of the PCM connection. • Replace Radio Head.
pll LOST	Lost Lock	• Check PCM connection quality. • Verify that PCM cable is not located near flourescent light fixtures, transformers, or electric motors. • Verify that PCM cable is not bundled with electric cables. • Replace Radio Head.
p11 AGED	PLL loss of range	Replace Radio Head.
TRX Alarms		
TRX1 FLT	TRX #1 Fault	• Determine if the TRX is blocked manually or is blocked as a result of a fault. • See the malfunction log at MSC for further instructions. • Return the Radio Head to your Local RBS Repair Center.
TRX2 FLT	TRX #2 Fault	• Determine if the TRX is blocked manually or is blocked as a result of a fault. • See the malfunction log at MSC for further instructions. • Return the Radio Head to your Local RBS Repair Center.
TRX3 FLT	TRX #3 Fault	• Determine if the TRX is blocked manually or is blocked as a result of a fault. • See the malfunction log at MSC for further instructions. • Return the Radio Head to your Local RBS Repair Center.
TRX4 FLT	TRX #4 Fault	• Determine if the TRX is blocked manually or is blocked as a result of a fault. • See the malfunction log at MSC for further instructions. • Return the Radio Head to your Local RBS Repair Center.
TRX1LINK	TRX #1 TLINK Fault	• Check PCM connections. • Replace the Radio Head.
TRX2LINK	TRX #2 TLINK Fault	• Check PCM connections. • Replace the Radio Head.

Table 7-8. Radio Head Customer Interface (Continued)

Alarm Display	Description	Actions
TRX3LINK	TRX #3 TLINK Fault	• Check PCM connections. • Replace the Radio Head.
TRX4LINK	TRX #4 TLINK Fault	• Check PCM connections. • Replace the Radio Head.

Part 8

Glossary of Terms

AIS Alarm	Alarm Indication Signal (AIS). Also called “Blue Alarm.” A signal that replaces the normal traffic signal when a maintenance alarm signal has been activated. An AIS is transmitted downstream indicating that an upstream failure has been detected.
ANSI-136	ANSI-136 is the TDMA protocol requirement that specifies the addition of a DQPSK digital control channel to the existing FSK control channel. It also specifies an improved digital speech coder, new cellular features, and protocol additions that allow greater mobility management and better cellular service. The ANSI-136 protocol is used in both the 800 MHz cellular band and the 1900 MHz PCS band.
B8ZS	Binary 8 Zero Substitution. A technique used to accommodate the “ones” density requirement for digital T-carrier facilities in a public network, while allowing 64 Kbps clear data for each channel.
Baud	Serial communications bit rate.
Channel	The smallest subdivision of a circuit that provides a single type of communication service.
CFU	Channel Function Unit. A generic term referring to the following function blocks: MCC, MVC, MDCC, MDVC, MLOC, and MVER.
CHM	Channel Modules (CHMs) are the actual transceiver devices, Analog and Digital Voice Channels, Analog and Digital Control Channels, Signal Strength Receiver and Verification Receiver.
CLC	The Control Link (CLC) provides a path from the MSC to the RBS for controlling and signaling information to and from the RBS. Control information is used for communication with the channel modules, for such things as changing

	channel numbers and collecting RF states. All of the devices in an EMG are supported by the same CLC.
CLINK	The general communication interface within the base station. A 2.048 Mbps signal carrying 32 independent 64 Kbps channels numbered 0-31.
Colocate	To place two or more units close together so as to share common facilities.
Data Transcript	Commands that define the integration of the RBS with the MSC. The commands are entered into the MSC.
dB	Decibel. The standard unit of measure expressing transmission gain or loss and relative power ratios.
dBm	Power of an analog signal into a 600 ohm load referenced to 1 milliwatt.
DIPST	The Digital Path Supervision and Test function block contains functions for Digital Path (DIP) administration, digital path maintenance, hardware administration, and clock reference administration.
Direct Current	Current flowing in one direction.
DS0	Digital Service, Level 0. A 64,000 bps speed for digitizing one voice conversation using Pulse Code Modulation (PCM).
DS1	Digital Service Level 1. A 1.544 Mbps data link comprised of 24 DS0 channels.
E1	A European format that carries data at the rate of 2.048 Mbps (DS–1 level) and designed to carry 32 64 Kbps digital channels.
ET	The Exchange Terminal function block handles maintenance of trunk traffic, maintenance of ETC hardware, and maintenance of digital lines.
Ground	A conducting connection by which an electric circuit or equipment is connected to earth or to some other conducting body of relatively large extent.

Hot repair	The process of adding or removing a device without powering down the device.
IS–54	IS-54 is the U. S. standard for dual mode (analog and digital) cellular phone service. In its analog form, it conforms to the Advanced Mobile Phone System (AMPS) standard.
Magazine	Hardware unit, mounted in a frame, containing printed board assemblies.
MBCECA	The Mobile Telephony Base Station Channel Equipment Capability Administration function block handles commands for controlling the base station channel equipment that allows changing and printing of capability parameters.
MBCEQ	The Mobile Telephony Base Station Channel Equipment function block is the coordinator of the channel equipment and holds the reference to the connected channel function blocks in the subsystem MTS and the connections between MBCEQ-MBRFTL and MBCEQ-MBCTC individuals. The output power, the attenuation, the channel number, and the capability data for all individuals are also stored in the function block.
MBCOC	The Mobile Telephony Base Station Carrier Output Control function block administers the output power, attenuation, and channel number of the transceiver devices. The function block also handles the functions for the transmitter control on the transceiver devices.
MBCOCA	The Mobile Telephony Base Station Carrier Output Control Administration function block handles commands for controlling the base station channel equipment that allow setting and printing the channel number and output power.
MBEQA	The Mobile Telephony Base Station Channel Equipment Administration function block administers connection and disconnection of channel functions to and from channel equipment.
MBHWA	The Mobile Telephony Base Station Hardware Administration function block administers the connection between MBCEQ and MBRFTL.

MBLC/TC1	The Mobile Telephony Base Station Link Check function block sends and receives a 2–kHz tone over a speech circuit as a continuity check of the speech path during the call setup procedure.
MBLOADF	The Mobile Telephony Base Station Device Program Function Change Loading function block handles function change loading.
MBLOADM	The Mobile Telephony Base Station Device Program Maintenance Loading function block is a command function for the administration of maintenance loading.
MBLOADS	The Mobile Telephony Base Station Device Program Data Store Loading function block handles the loading of program files into the data store in the central processor and the administration of these files.
MBLT	Mobile Bothway Line Trunks provides continuity between the MSC and the transceivers. This includes both voice channel transceivers and the Control Link.
MBLT function block	The Mobile Telephony Base Station Line Terminal function block handles the hardware interface for the line terminals to the base station.
MBMFL	The Mobile Telephony Base Station Hardware Malfunction function block records a detected fault in a base station device hardware in the base station device hardware malfunction log.
MBSTA	The Mobile Telephony Base Station Self Test Administration function block administers self-test of the base station devices.
MBTLA	The Mobile Telephony Base Station Transcoder and Line Terminal Administration function block contains command functions for administrating the connection or disconnection of transcoders and line terminals to and from channel equipment.
MBTRAC/MBTRC	The Mobile Telephony Transcoder, Device owning block handles the administration and maintenance of transcoder devices. The block also performs route administration and

	traffic handling. MBTRAC/MBTRC activities with the switching network terminal owning block MBTRACS/MBTRCS to supervise the Transcoder Rate Adaptor Board (TRAB2/TRAB3) hardware. One transcoder rate adaptor board corresponds to four coded transcoder devices and twelve uncoded transcoder devices.
MBTRACS/MBTRCS	The Mobile Telephony Transcoder, Switching Network Terminal (SNT) owning function block handles the administration and maintenance of the devices for the transcoder function within the switching network terminal and the EM/CM concepts. The actual device handling is managed by the device owning function block MBTRACS/MBTRC. A signal network terminal can handle 32 devices in eight groups. Each group consists of one coded device and three uncoded devices.
MBTRAN	The Mobile Telephony Base Station Translation function block handles the administration of the base station function codes (MB-codes), input and output handling of Channel Equipment and Channel Equipment Type (CETY), and the exchange data access control.
MBTRX	The Mobile Telephony Base Station Transceiver function block administers the transceiver devices. The transceiver devices are responsible for handling the channel functions, such as the Mobile Digital Voice Channel (MDVC), the Mobile Analog Voice Channel (MVC), the Mobile Digital Control Channel (MDCC), the Mobile Analog Control Channel (MCC), the Mobile Telephone Locating (MLOC) module, and the Mobile Location Verification (MVER) module. The primary task of the channel function is to convert the format of signals from the MTS subsystem to a format compatible with the air interface specification. The voice channel functions are also used for measurements to supervise voice quality, base station and mobile station output power, and handoff requests. MBTRX also includes the traffic handling in the EMRP and the device processor.

MBTXA	The Mobile Telephony Base Station Transmitter Control Administration function block administers the functionality for switching the transmitter of a transceiver device ON or OFF.
Modem	Equipment that converts digital signals to analog signals and vice-versa.
Pulse Code Modulation	A form of modulation in which the modulation signal is sampled and the sample quantized and coded, so that each element of information consists of different kinds or numbers of pulses and spaces.
Radio Frequency	Those frequencies of the electromagnetic spectrum (between audio and light range) normally associated with radio wave propagation.
RICS	The Radio Interface Clock Synchronization function block controls the clock synchronization for an Extension Module Radio Selector (EMRS).
RIDIPST	The Radio Interface Digital Path Supervision and Test function block contains functions for connection or disconnection, setting or changing initial data, blocking or deblocking, fault supervision, and quality supervision of digital paths.
RILT	The Remote Interface Line Terminal function block contains functions for administrating and maintaining the Exchange Terminal Board (ETB), Radio Transceiver Terminal (RTT32) device, and EMRPS boards. These boards are known in the RILT as devices. Primary functions for T1–based systems are supervision of boards, administration of time slots for semipermanent paths and tests, blocking or deblocking (taken in or out of service) of the boards, and miscellaneous services for other blocks.
RILT1	The Remote Interface Line Terminal function block contains functions for administrating and maintaining the Exchange Terminal Board (ETB), Radio Transceiver Terminal (RTT32) device, and EMRPS boards. These boards are known in the RILT1 as devices. Primary functions for E1-based systems are supervision of boards,

	administration of time slots for semipermanent paths and tests, blocking or deblocking (taken in or out of service) of the boards, and miscellaneous services for other blocks.
RILTC	The Remote Interface Line Terminal Command function block contains functions for reception and analysis of commands for connection or disconnection of the equipment type of a RILT device in a transmission radio interface extension module, testing of a RILT device, printing of the device status and time slot status, and alarm printout of hardware fault in a RILT device.
RIMC	The Radio Interface Maintenance Command function block contains functions for maintenance of the radio selector, maintenance of clock synchronization, and alarm handling functions.
RISM	The Radio Interface Switch Maintenance function block contains functions for maintenance of the Extension Module Radio Selector, (EMRS). The EMRS consists of two primary parts, a time switch and a clock synchronization function.
RISPC	The Radio Interface Semi Permanent Path Command function block contains functions for the administration of semipermanent paths and printout of semipermanent path data. Information about blocked and deblocked devices are received and processed. Paths are marked for forced release and disconnected in RITS at the loss of external synchronization reference or at the manual blocking of the EMRS.
RITS	The Radio Interface Time Switch function blocks encompasses the time switch function in a transmission radio interface.
RJ45	An 8-pin connector used for data transmission over standard telephone wire.
RS-232	Also known as RS-232–C. A set of standards specifying electrical and mechanical characteristics for interfaces between computers, terminals, and modems.

RS-485	Describes electrical characteristics of a balanced interface used as a bus for master/slave operation for up to 32 users.
Signaling Routes (SI/SO)	Signaling Routes, Signaling In (SI) and Signaling Out (SO), are specified once per EMG and support controlling and signaling administration.
T1	A digital transmission link with a capacity of 1.544 Mbps. A T1 can normally handle 24 voice conversations, with each one digitized at 64 Kbps.
TDMA	Time Division Multiple Access. A technology used to separate multiple conversation transmissions over a finite frequency allocation of through-the-air bandwidth. TDMA is used to allocate a discrete amount of frequency bandwidth to each user in order to permit many simultaneous conversations.
Unit	A term used to refer to the printed circuit board assembly, the front panel, and the rear connectors.
VER	The Verification Channel used to check for the presence of a Mobile Station.
Voice Channel Device Routes (CI/CO)	Voice Channel Device Routes, Channel in (CI) and Channel Out (CO), are specified one per sector within an EMG and support all the channel devices in the sector.
Voice Line routes (LI/LO)	Voice Line routes, Line In (LI) and Line Out (LO), are specified once per sector within an EMG and support all the MBLTs in the sector.
V.22	An ITU-T standard for 1,200 bps duplex modems for use on a switched telephone network.
V.24	An ITU-T standard for interchange circuits between Data Terminal Equipment (DTE) and Data Communications Equipment (DCE) equipment. This standard is similar, but not identical, to the RS-232-C.

Yellow Alarm	A T1 alarm signal sent back toward the source of a failed transmit circuit in a DS-1 two–way transmission path.

Part 9

Acronyms and Abbreviations

AC	Alternating Current
AC/DC	Alternating Current to Direct Current
ACC	Analog Control Channel
ACELP	Algebraic Code Excited Linear Prediction
AFS	Air Frame Synchronization
AIS	Alarm Indication Signal
amp	Ampere
AMPS	Advanced Mobile Phone System
ANI	Automatic Number Identification
ANP	Antenna Near Part
ANSI	American National Standards Institute
APZ	Control System (Data Processing Control part of AXE)
ASD	Accelerated Spectral Density
AXE	Ericsson Stored Program Control Telephone Exchange
B8ZS	Bipolar with 8 Zero Substitution
bps	Bits per second
CAB	Cascade Adapter Board
CCITT	Consultative Committee for International Telegraph and Telephone
CDD	Cell Design Data
CDPD	Cellular Digital Packet Data
CEQ	Channel Equipment

CETY	Channel Equipment Type
CHM	Channel Modules
CI/CO	Channel In/Channel Out
CFR	Carrier Frequency Reference
CFU	Channel Function Unit
CIC	Circuit Identification Code
CID	Cabinet Identification
CLC	Control Link
COP	Control Part
CMS	Cellular Mobile System
CP	Central Processor
CRI	Control and Radio Interface
CSA	Canadian Standards Association
CSU	Channel Service Unit
CTL	Control
D-AMPS	Digital Advanced Mobile Phone System
dB	Decibel
dBi	Decibel reference to isotropic antenna
dBm	Decibels below 1 MW
dc	Direct Current
DC	Direct Current
DC/DC	Direct Current to Direct Current
DCCH	Digital Control Channel
DCE	Data Communications Equipment
DEVCB	Device Control Bus

DEVSB	Device Speech Bus
DIP	Digital Path
DIPST	Digital Path Supervision and Test Function Block
DS0	Digital Signal Level
DSP	Digital Signal Processor
DT	Data Transcript
DTE	Data Terminal Equipment
DTRX	Dual Transceiver
DVC	Digital Voice Channel
DVER	Digital Verification Channel
EIA	Electronic Industries Association
ELI	Enhanced Link Interface
EM	Extension Module
EMC	Electromagnetic Compatibility
EMG	Extension Module Group
EMI	Electromagnetic Interference
EMRP	Extension Module Regional Processor
EMRPB	Extension Module Regional Processor Bus
EMRPS	Extension Module Regional Processor with Device Speech Bus Access
EMRS	Extension Module Radio Selector
EMS	Extension Module Switch
EN	European Committee for Electrotechnical Standardisation
ESD	Electrostatic Discharge
ESF	Extended Superframe

ET	Exchange Terminal Function Block
ETB	Exchange Terminal Board
ETC	Exchange Terminal Circuit
F	Female Connector
FAS-CRC	Frame Alignment Signal-Cyclic Redundancy Check
FCC	Federal Communications Commission
GNP	Global Number Plan
GS	Group Switch
GSS	Group Switch Subsystem
HDB3	High Density Bipolar Level 3
HLR	Home Location Register
HW	Hardware
Hz	Hertz
IC	Integrated Circuit
IEC	International Electrotechnical Commission
IF	Intermediate Frequency
IO	Input/Output
IOG	Input/Output Group
JP	Job Procedure
Kbps	Kilobits per second
kg	Kilogram
kHz	Kilohertz
kV	Kilovolts
lb	Pound
LAN	Location Analysis Number

LAPD	Link Access Protocol D
LBO	Line Build Out
LED	Light Emitting Diode
LI/LO	Line In/Line Out
LO	Local Oscillator
LT	Line Terminal
m	Meter
MBLF	Mobile Telephony Bothway Line Trunk
Mbps	Megabits per second
MBS	Mobile Base Station Subsystem
MCC	Mobile Analog Control Channel
MDCC	Mobile Digital Control Channel
MDVC	Mobile Digital Voice Channel
MHz	Megahertz
MLOC	Mobile Telephone Locating Device
mm	Millimeter
MOP	Modem Part
MS	Mobile Station
MSC	Mobile Switching Center
MTS	Mobile Telephony Subsystem
MTV	Mobile Telephone Visiting Subscriber
MVC	Mobile Analog Voice Channel
MVER	Mobile Verification Module
mW	Milliwatt
Nm	Newton meter (unit for torque)

NRTL	Nationally Recognized Testing Laboratory
O&M	Operations and Maintenance
PAN	Procedure Analysis Table
PCB	Printed Circuit Board
PCM	Pulse Code Modulation
PCS	Personal Communication Service
PIC	Equal Access Primary Interexchange Carrier
PLL	Phase Locked Loop
ppm	Parts per million
PSTN	Public Switched Telephone Network
PSU	Power Supply Unit
RBS	Radio Base Station
RF	Radio Frequency
RHI	Radio Head Interface
RICS	Radio Interface Clock Synchronization Function Block
RIDIPST	Radio Interface Digital Path Supervision and Test Function Block
RILT	Radio Interface Line Terminal Function Block
RILTC	Radio Interface Line Terminal Command Function Block
RIMC	Radio Interface Maintenance Command Function Block
RISM	Radio Interface Switch Maintenance Function Block
RISPC	Radio Interface Semipermanent Path Command Function Block
RISPI	Radio Interface Semipermanent Path, Initiate

RITS	Radio Interface Time Switch Function Block
RITSW	Radio Interface Time Switch
RP	Regional Processor
RPM	Regional Processor Magazine
RSSI	Received Signal Strength Indicator
RTT	Radio Transceiver Terminal
RX	Receive
RXLI	Remote XLINK Interface
SAE	Size Alteration Event
SID	System Identification
SI/SO	Signaling In/Signaling Out
SMA	Subminiature Connector Type A
SNT	Switching Network Terminal
SPG	Support Processor Group
SR	Signal Strength Receiver
SS7	CCITT Signaling System No. 7
STC	Signaling Terminal, Central
STR	Signaling Terminal Regional
STS	Statistics and Traffic Subsystems
SUP	Support Part
TCASE	Test case in the Command with the Parameter
TDMA	Time-Division Multiple Access
TIA	Telecommunication Industries Association
TIA/EIA	Telecommunications Industry Association and Electronics Industry Association

TIM	Timing Module
TLINK	Transistor-Transistor Logic Link
TRAB	Transcoder Rate Adaptation Board
TRX	Radio Transceiver
TSW	Extension Module Time Switch Board
TW	Typewriter Terminal
TX	Transmit
TX/RX	Transmit/Receive
UL	Underwriters Laboratories
UTP	Unshielded Twisted Pair
V	Volt
Vac	Volt alternating current
Vdc	Volt direct current
VER	Location Verification Module
VSA	Virtual Subscription Area
W	Watt
XLI	XLINK Interface
XLINK	Extended Link

Appendix A

RF Guidelines

1 Introduction

The RBS 884 Pico (1900 MHz) system provides coverage for the 1900 MHz Personal Communications Service (PCS) cellular band using Telecommunications Industry Association/Electronics Industry Association (TIA/EIA)-136 Time Division Multiple Access (TDMA) technology.

2 General Description

The RBS 884 Pico (1900 MHz) consists of remote Radio Heads connected to a Control and Radio Interface (CRI) cabinet through digital transmission links. The RBS 884 Pico (1900 MHz) can be used for spot coverage in a larger Ericsson 1900 MHz TDMA system, or it can be used to implement indoor wireless systems.

2.1 Configuration

Figure A-1 on page A-4 provides a diagram of a sample RBS 884 Pico (1900 MHz) configuration.

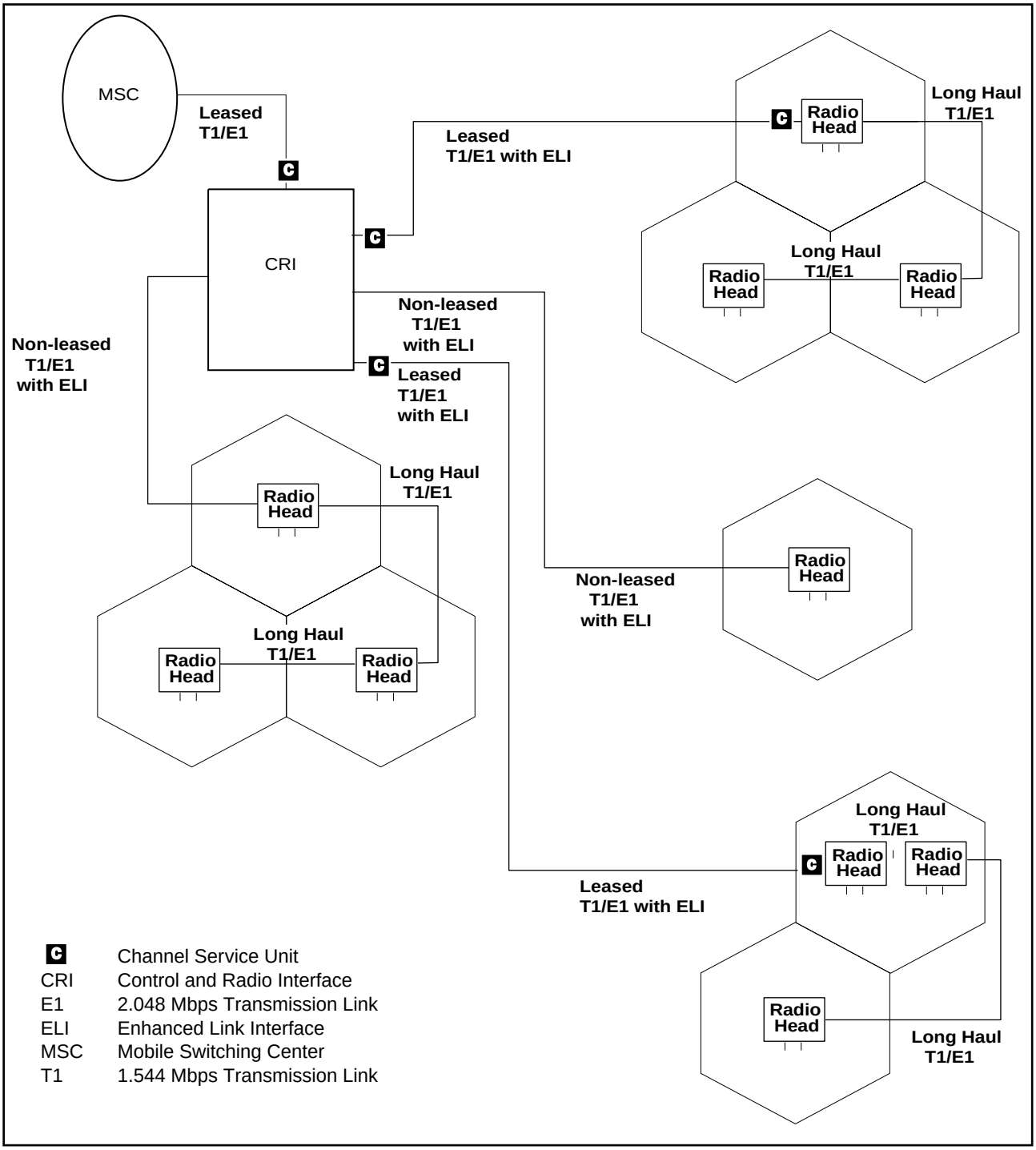


Figure A-1. RBS 884 Pico (1900 MHz) Configuration

2.2 RF Units

The RBS 884 Pico (1900 MHz) RF combining and splitting tasks are fixed in hardware and are performed entirely in the Radio Head. The tasks are fixed in hardware because the product has a fixed antenna configuration and a small number of carriers within each Radio Head.

The RBS 884 Pico (1900 MHz) does not have a separate Antenna Near Part (ANP). Some of the ANP functions, such as duplexing and filtering, are integrated in the DTRX.

The following ANP functions have been omitted from the Pico 1900:

Radio signal looping

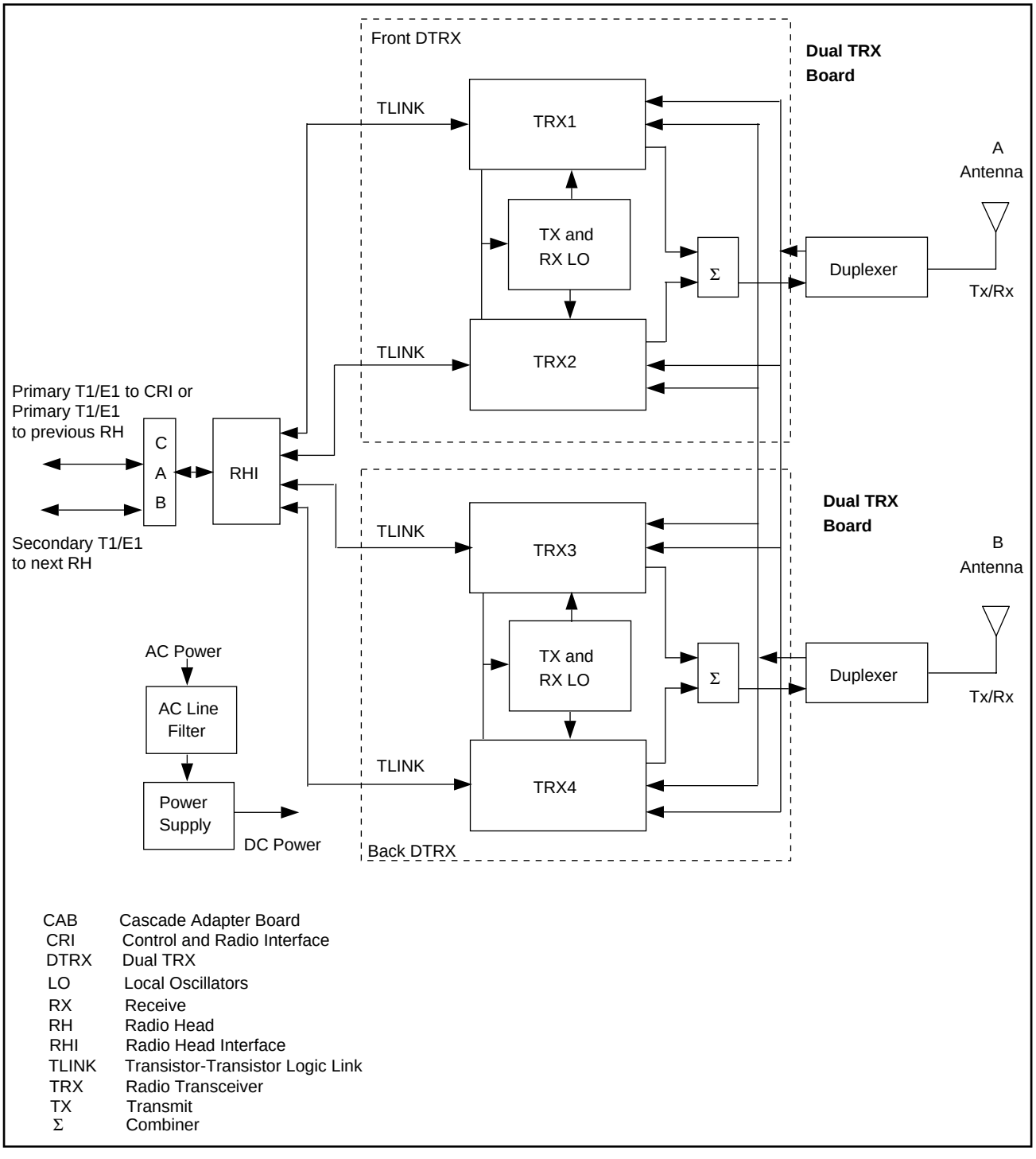
RF power measurement output

RSSI measuring (for testing purposes)

External alarm collecting

External equipment control

3 Transmission Path



CAB	Cascade Adapter Board
CRI	Control and Radio Interface
DTRX	Dual TRX
LO	Local Oscillators
RX	Receive
RH	Radio Head
RHI	Radio Head Interface
TLINK	Transistor-Transistor Logic Link
TRX	Radio Transceiver
TX	Transmit
Σ	Combiner

Figure A-2. Radio Head Transmission Path

4 Link Budget

4.1 RF Link Budget Calculation

The basic link budget equation is:

$$TxPwr + G_{BS} - L_{path} - L_{fade} - L_{shad} + G_{MS} - Link = RxPwr + Perf$$

where:

$TxPwr$ — Transmit power at Base Station (BS) antenna port

$RxPwr$ — Received power at BS antenna port for a given BER

L_{path} — Path loss between TX and RX

L_{fade} — Loss due to fading (allocated as margin)

L_{shad} — Loss due to body shadowing (allocated as margin)

$Perf$ — Performance margin

$Link$ — Link margin

G_{BS} — Gain of BS antenna

G_{MS} — Gain of Mobile Station (MS) antenna

The performance margin is used when the RX sensitivity in the link budget is specified at a higher BER than desired. In order to ensure a better error rate, the sensitivity is increased by the value of the performance margin.

The link margin is a buffer for inaccuracies in the assumptions and predictions made in the link budget and path loss prediction. It can be thought of as an error margin.

The path loss is defined as a function of variable distance with all other quantities being constant. It is important to evaluating the link in both the downlink and uplink directions. The final path loss used to determine the cell size is the smaller of the maximum path loss for the downlink and the maximum path loss for the uplink. Table A-1 on page A-8 defines the values for the terms of the link budget equation.

Table A-1. Link Budget Equation Terms

Term	Downlink	Uplink
$TxPwr$	20 dBm	27.8 dBm
$RxPwr$	-110 dBm (3% BER)	-110 dBm (3% BER)
L_{fade}	Function of distance	Function of distance
L_{fade}	10 dB	10 dB
L_{shad}	3 dB	3 dB
$Perf$	3.5 dB	3.5 dB
$Link$	5 dB	5 dB
G_{BS}	0 dBi	0 dBi
G_{MS}	0 dBi	0 dBi

4.2 Path Loss Formulas

Class IV mobile (27.8 dBm maximum output power and -110 dBm static sensitivity) is used in the link budget calculation. The BS sensitivity is assumed to be -110 dBm with monopole antennas. The performance margin of 3.5 dB is used to improve the overall BER to approximately 1%.

The link budget defines the maximum path loss for both the forward and reverse links and can be expressed as the following equation:

$$L_{path}(d) = TxPwr + G_{BS+} + G_{MS} - RxPwr - L_{fade} - L_{shad} - Perf - Link$$

The maximum tolerable path loss values are shown in Table A-2 on page A-8.

Table A-2. RBS 884 Pico (1900 MHz) Path Loss Calculation Results

Downlink	108.5 dB
Uplink	116.3 dB

Note: The RBS 884 Pico (1900 MHz) is downlink limited due to the low output power (100 mW or 20 dBm) from the Radio Head. The link is balanced when the Mobile Station output power is 20 dBm (17% of the maximum power).

5 Operations and Maintenance

5.1 Performance and Power Parameters

Caution !

Assign frequencies from the same band to all transceivers in a single Radio Head. This assignment prevents the generation of third order intermodulation products in the receive band. For example, with the US band plan, do not mix frequencies from bands A and F or bands D and C.

The following subsections describe parameters related to RBS 884 Pico (1900 MHz) performance and power. Recommended parameter settings for ATT, MAXPOWER, RXATT, RXGAIN, TXATT, and TXGAIN are also provided.

5.1.1 POWER

The POWER parameter is one of the parameters used to set the absolute output power of a transceiver remotely from the MSC. The RBS 884 Pico (1900 MHz) does not have a Radio Frequency Test Loop (RFTL) and does not use the POWER parameter.

5.1.2 ATT

The ATT parameter allows the maximum output power of a transceiver module to be decreased remotely using a command from the MSC. Before the attenuation of a channel device can be changed, the device must be blocked, followed by the associated Channel Equipment (CEQ) for the following channel function units:

- Mobile Digital Control Channel (MDCC)
- Mobile Digital Voice Channel (MDVC)

Once the ATT value is assigned, the associated CEQ must be deblocked followed by the device.

5.1.3 CALV

The CALV parameter compensates for losses in the RBS 884 Measuring Coupler Unit. The RBS 884 Pico (1900 MHz) does not have a Measuring Coupler Unit and does not use the CALV parameter.

5.1.4 FIT

The FIT parameter is used with the POWER or ATT parameters to specify how closely the absolute power is set to the desired value. The default value is EF.

The FIT parameter is assigned one of the following values:

- EF: Exact Fit
- NA: Nearest Above
- NB: Nearest Below

5.1.5 MAXPOWER

The MAXPOWER parameter determines the nominal output power of a transceiver. The value is specified in tenths of a dB in the range 0 – 50 dBm. The RBS 884 Pico (1900 MHz) MAXPOWER parameter is set to 200 (20 dBm).

5.1.6 RXATT

The RXATT parameter determines the attenuation in the receiver branch of the Antenna Near Part (ANP). The RBS 884 Pico (1900 MHz) RXATT parameter is set to 0 dB (0 AXE unit).

5.1.7 RXGAIN

The RXGAIN parameter defines the attenuation in the receiving branch of the ANP due to cables, combiners, feeders, and other ANP devices. The RBS 884 Pico (1900 MHz) RXGAIN parameter is set to 0 dB (0 AXE unit).

5.1.8 TXATT

The TXATT parameter defines the attenuation in the transmit branch of the ANP. The RBS 884 Pico (1900 MHz) TXATT parameter is set to 0 dB (0 AXE unit).

5.1.9 TXGAIN

The TXGAIN parameter defines the gain in the transmit branch of the Antenna Near Part (ANP). The RBS 884 Pico (1900 MHz) TXGAIN parameter is set to 0 dB (0 AXE unit).

5.2 RBS 884 Pico (1900 MHz)-MSC Parameter Settings

The recommended RBS-MSC parameter settings for the RBS 884 Pico (1900 MHz) are specified in Table A-3 on page A-11.

Table A-3. RBS-MSC Channel Module Parameters

Parameter	Used For	Parameter Value
ATT	Power Attenuation	0 – 200 (0 dB – 20 dB) The ATT range is adjusted in increments of 2 (or .2 dB)
FIT	Fitting Method for Assignment of Power or Attenuation of transceiver	EF (Exact Fit) NA (Nearest Above) NB (Nearest Below)
MAXPOWER	Output Power Assignment	200 (20 dBm)
RXATT	Definition of Attenuation in the Receive Branch	0 (0 dB)
TXATT	Definition of Attenuation in the Transmit Branch	0 (0 dB)

Appendix B

RBS 884 Pico (1900 MHz) Spare Parts Catalog

1 General Information

The product number as identified in this document should be used to reference any RBS 884 Pico (1900 MHz) part. A product is defined as containing more than one component and can consist of a number of individual products.

A product can have a mechanical, electrical, and software function. For example, a product can consist of a cabinet or subrack containing a system case or magazine that holds Printed Circuit Board (PCB) products that in turn contain software products.

1.1 How to Use This Catalog

Follow these steps to determine which parts should be returned to the Local Ericsson Company:

1. Determine the product or component to be returned.
2. Record the product number using the tables in this document.
3. Note the repair code (see Section 1.2 on page B-3).
4. Determine the appropriate action (see Section 1.2 on page B-3).

Note: If stock is stored locally, the parts should be sent to that location instead of to the Local Ericsson Company.

1.2 Code Descriptions

Products are classified according to the following universal Ericsson repair codes:

- R (spare part-not repairable); this product is orderable as a spare part and is stored locally. This part is not repairable by the Repair Center.
- U (repairable); this product is repairable by the Repair Center.
- A (available on request); this product is not stored locally, but can be ordered.

Note: The RBS 884 repair codes were changed with this release to be consistent with the universal Ericsson repair codes.

1.3 Ordering, Repairing, and Providing Feedback

Follow standard procedures for ordering, repairing, and providing feedback. The Local Ericsson Company supplies these procedures.

2 Product Location and Referencing

2.1 Control and Radio Interface (CRI) Hardware

2.1.1 CRI Hardware Parts

This section illustrates the following orderable CRI hardware parts:

- Fan Unit
- Power Unit Assembly
- Patch Panel
- Various CRI cables

The CRI hardware parts are illustrated in Figure B-1 on page B-5. The corresponding product numbers and repair codes are referenced in Table B-1 on page B-5.

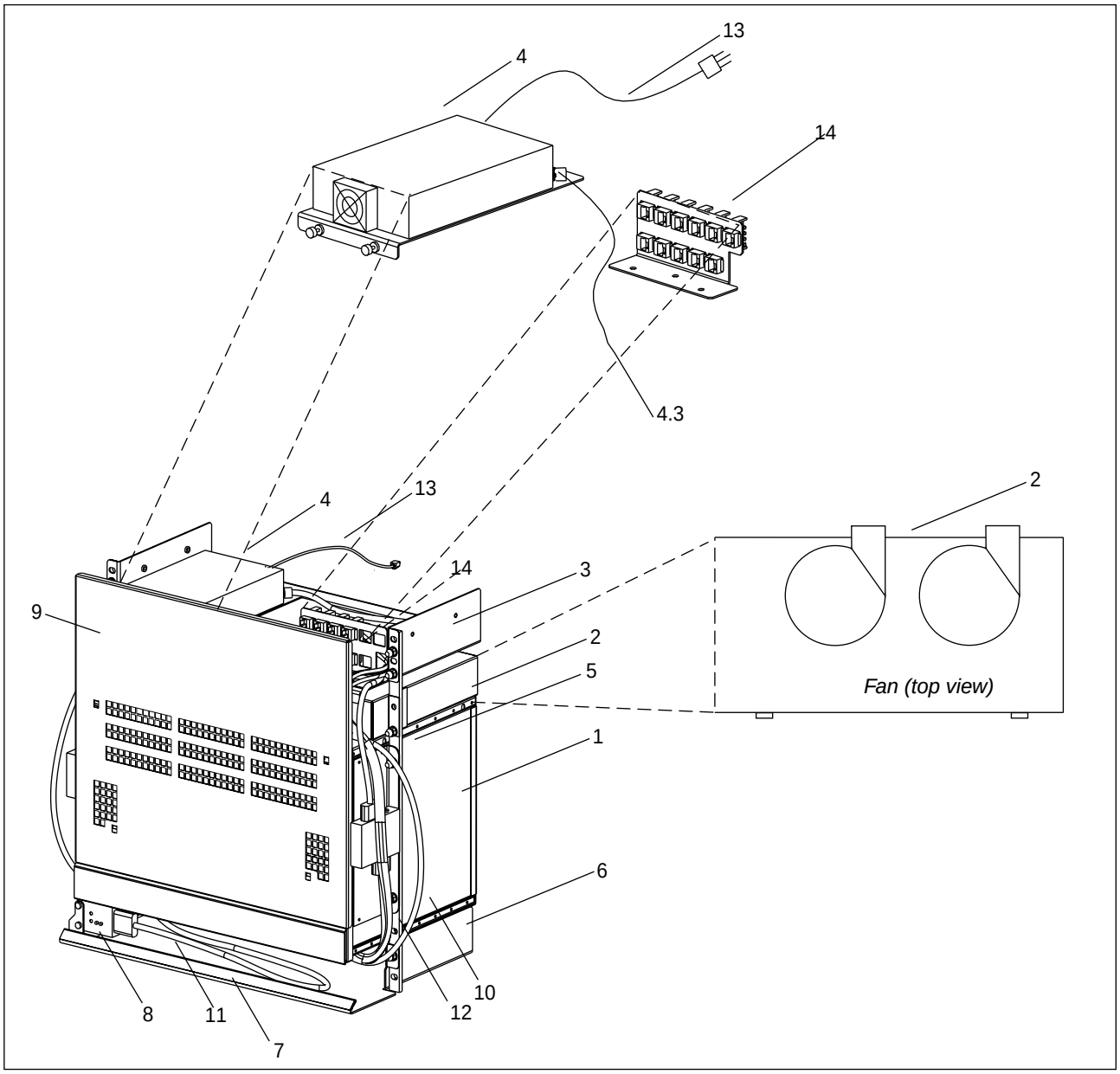


Figure B-1. CRI Hardware Parts

Table B-1. CRI Hardware Parts Referencing

Ref	Product Number	Description	Repair Code	Explanation
1		Cabinet Assembly		
2	BKV 301 246/2401	Fan Unit	R	Spare Part (not repairable)
4	BMK 901 46	Power Unit Assembly (includes 4.1, 4.2, and 4.3)	U	Repairable

Table B-1. CRI Hardware Parts Referencing (Continued)

Ref	Product Number	Description	Repair Code	Explanation
4.3	RPM 513 175/00900	DC/DC Power Cable	R	Spare Part (not repairable)
5	SXK 107 5126/1	Rack Mount Bar Assembly (x2)	A	Available on request
6	SXA 120 6891/1	Air Intake Duct	A	Available on request
7	SXA 105 9349/18	Label Strip	A	Available on request
8	BGM 136 69	Cabinet Identification (CID) Unit	R	Spare Part (not repairable)
9	SXA 120 6899/1	Rack Cover-Hood	A	Available on request
10	RPM 513 941/00900	Fan Power Cable (2x)	R	Spare Part (not repairable)
11	RPM 513 173/00800	Cable, CID-CRI	R	Spare Part (not repairable)
	RPM 113 7673	ETB-ELI Sync Cable (not shown)	R	Spare Part (not repairable)
12	RPM 513 177/00280	Cable, Power Filter-DC/DC (2x)	R	Spare Part (not repairable)
13	RPM 113 1476/1	Cable, Power-DC	R	Spare Part (not repairable)
14	SXA 120 6945/1	Patch Panel	A	Available on request

2.1.2 CRI Floor Mount Kit

The CRI Floor Mount Product is illustrated in Figure B-2 on page B-7. The corresponding product numbers and codes are referenced in Table B-2 on page B-8.

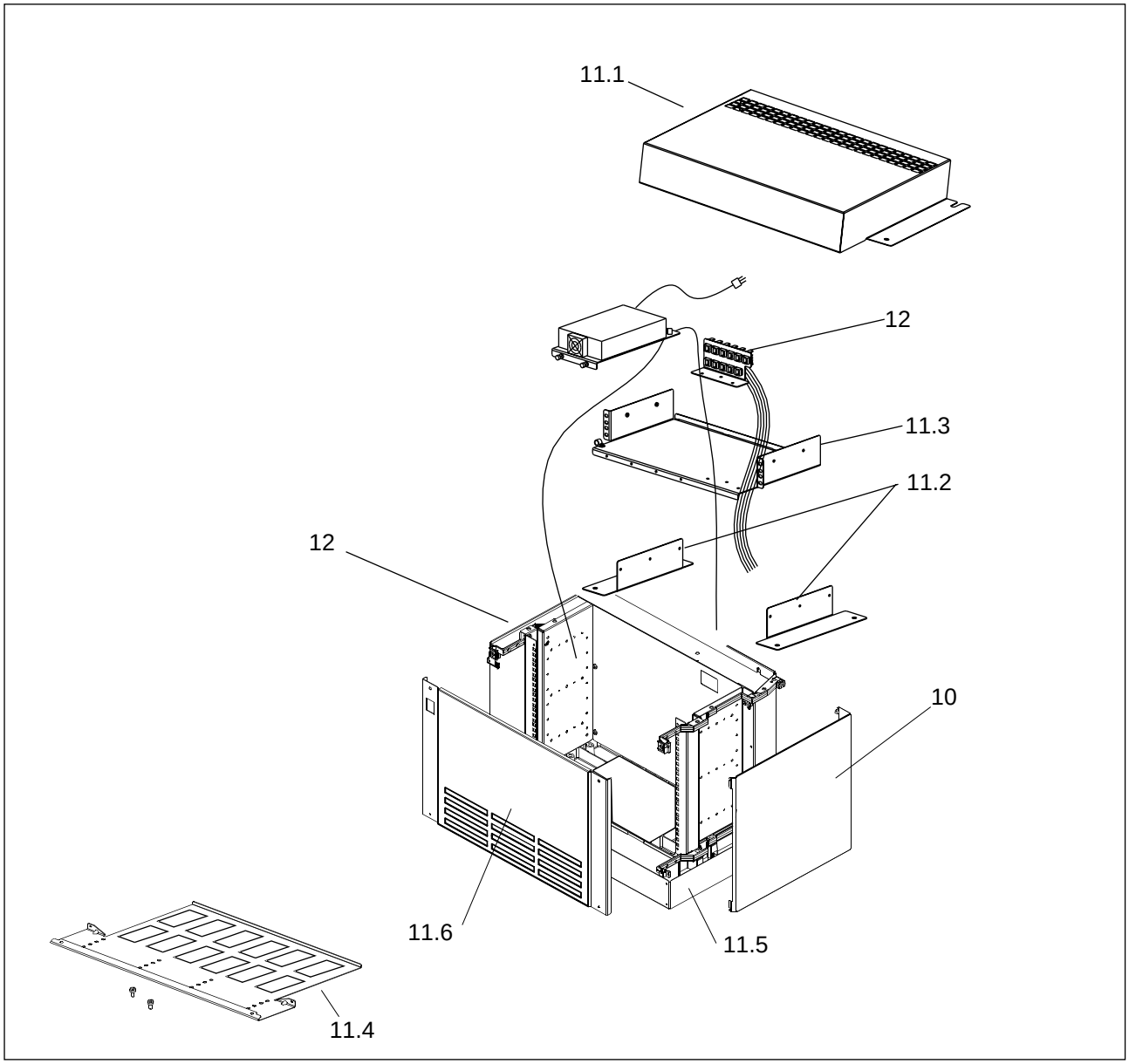


Figure B-2. CRI Floor Mount Parts

Table B-2. CRI Floor Mount Parts Referencing

Ref	Product Number	Description	Repair Code	Explanation
	NTM 201 1122	Floor Mount Kit (consists of items 10-12)		
10	11BYB 502/1	Side Cover Kit	A	Available on request
11.1	SXA 120 6893/1	Top Cover Kit	A	Available on request
11.2	SXA 120 6892/1	Bracket	R	Spare Part (not repairable)
11.3	SXK 107 3756/1	Shelf, Power	R	Spare Part (not repairable)
11.4	SXA 123 2029/1	Shelf, Cable	A	Available on request
11.5	10/BYB 502/1	Mounting Base	A	Available on request
11.6	SXK 107 3761/2	Door, Front	A	Available on request
12	1/BYB 502 340/100	Cabinet Assembly	A	Available on request
	NTM 201 1123	Hardware Kit	R	Spare Part (not repairable)

2.1.3 CRI Units

This section illustrates the following CRI units:

- DC/DC Converter
- STR
- ETB
- EMRP
- EMRPS
- ELI
- RITSW

The CRI boards are illustrated in Figure B-3 on page B-9. The corresponding product numbers and codes are referenced in Table B-3 on page B-9.

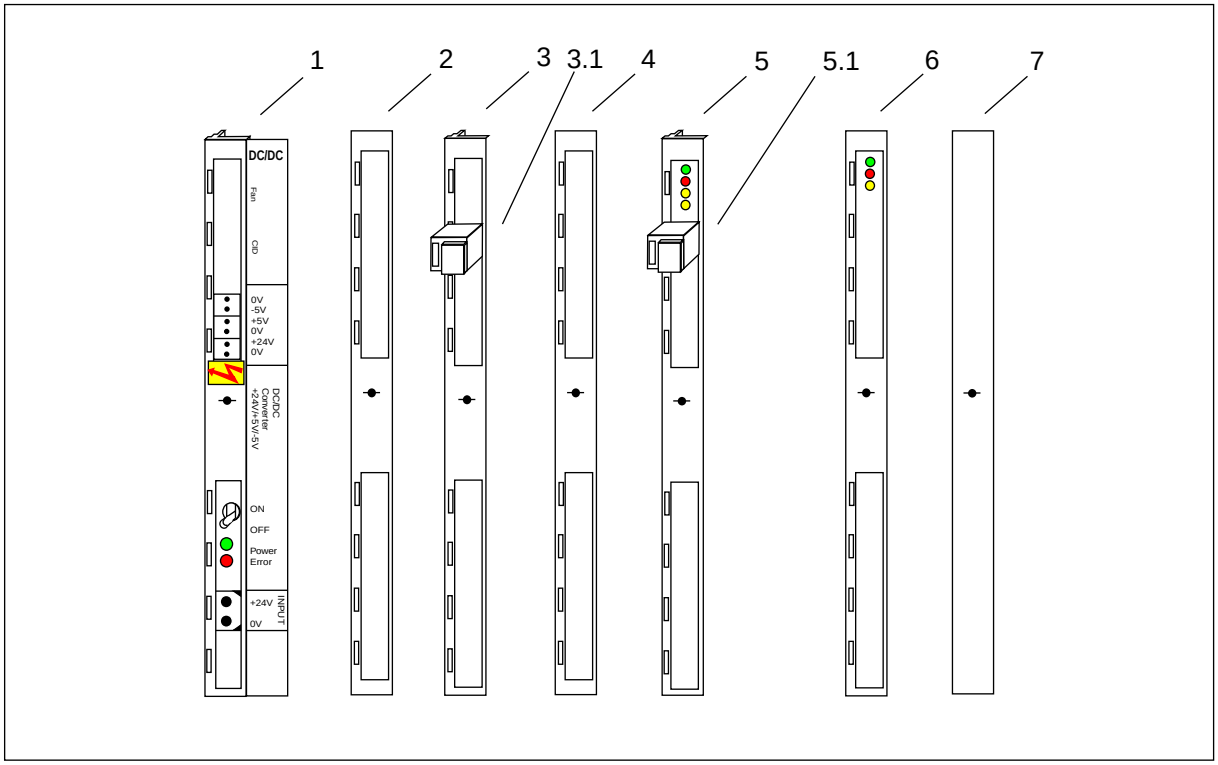


Figure B-3. RBS 884 Pico (1900 MHz) CRI Boards

Table B-3. CRI Component Referencing

Ref	Product Number	Description	Repair Code	Explanation
1	ROF 134 8002/1	DC/DC Converter Unit (x2)	U	Repairable
2	ROF 131 4445/2	STR Unit	U	Repairable
3	ROF 131 995/7	EMRP Unit	U	Repairable
4	ROF 137 7892/1	ETB24 (T1) Unit	U	Repairable
4	ROF 137 7846/1	ETB32 (E1) Unit	U	Repairable
5.1	RNV 991 223/004	Terminating Plug	R	Spare Part (not repairable)
	NTM 202 186	EMRPS Kit • EMRPS Unit • Address Plugs • Connection Cable		Refer to individual parts of EMRPS Kit.
5	ROF 131 8217/3	EMRPS Unit	U	Repairable
3.1	RNV 991 03/2 through /12	EMRP Address Plug	R	Spare Part (not repairable)
	RPM 513 163/00300	EMRP Connection Cable (not shown)	R	Spare Part (not repairable)

Table B-3. CRI Component Referencing (Continued)

Ref	Product Number	Description	Repair Code	Explanation
6	NTM 202 184	ELI Expansion Kit	U	ELI Unit is repairable (ROF 137 2776/1).
7	ROF 137 7968/1	RITSW Unit	U	Repairable

2.2 Radio Head Hardware

This section provides components and ordering information for the following kits:

- Radio Head Kit
- Patch Antenna Kit

2.2.1 Radio Head Kit

This section provides the RBS 884 Pico Radio Head assembly and part numbers. See Figure B-4 on page B-11 for an illustration of the Radio Head Kit. Table B-4 on page B-11 lists the Radio Head parts.

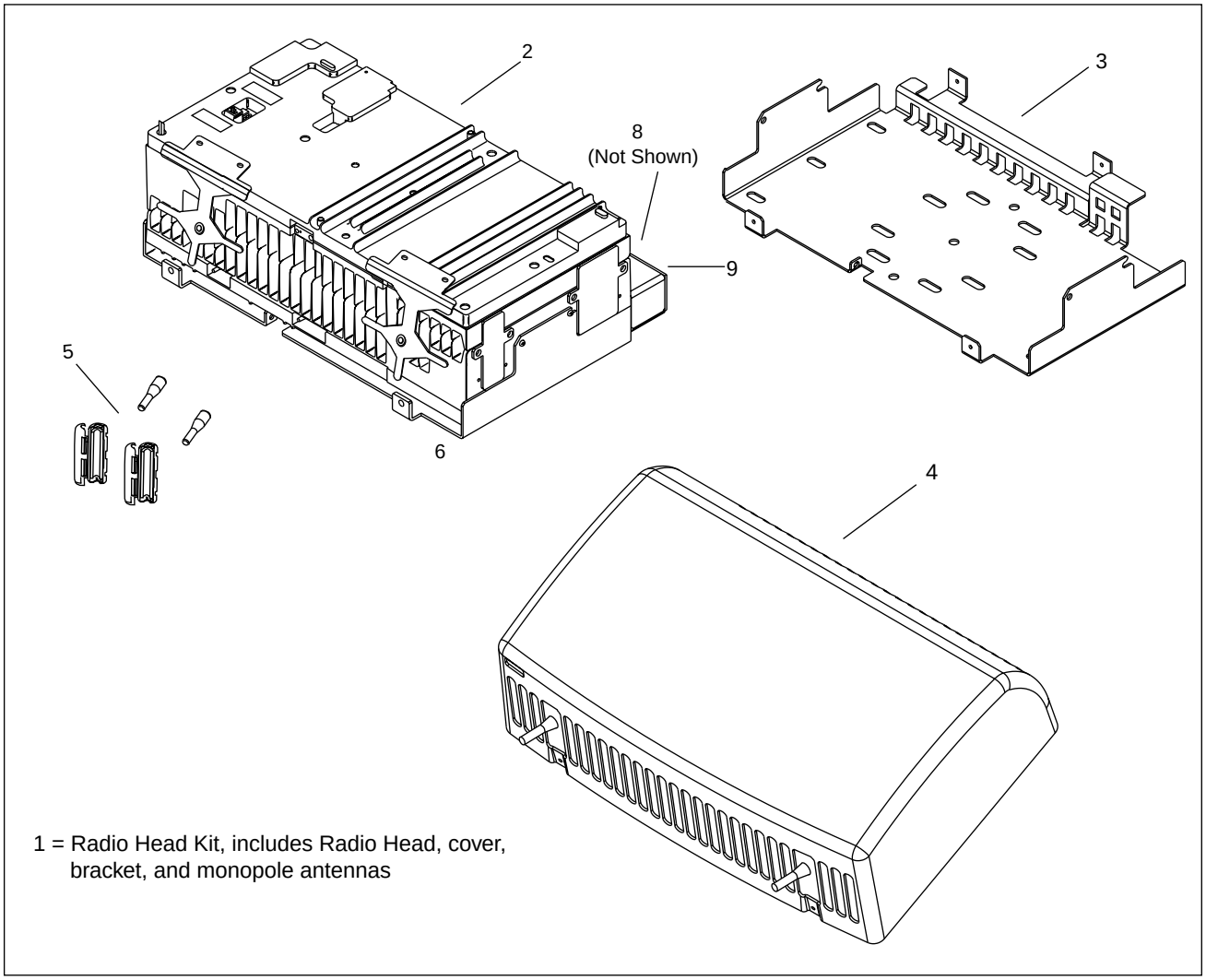


Figure B-4. RBS 884 Pico (1900 MHz) Radio Head Kit

Table B-4. RBS 884 Pico (1900 MHz) Radio Head Parts Reference

Ref	Product Number	Description	Repair Code	Explanation
2	KRC 121 107/1	Radio Head Kit with two DTRXs operable at 110 V or 220 V	U	Repairable
3	SXA 134 0397/1	Mounting Bracket	R	Spare Part (not repairable)
4	SXK 107 9948	Cover Assembly	R	Spare Part (not repairable)

Table B-4. RBS 884 Pico (1900 MHz) Radio Head Parts Reference (Continued)

Ref	Product Number	Description	Repair Code	Explanation
	NTM 201 1581/1	Hardware Kit (not shown)	R	Spare Part (not repairable)
5	NTM 201 2887/1	Pico 1900 Small Parts Kit • Monopole Antenna • Ferrites (E1 and T1)	R	Spare Part (not repairable)

2.2.2 Radio Head Patch Antenna Kit

The Radio Head Patch Antenna Kit is illustrated in Figure B-5 on page B-12. The corresponding product number is referenced in Table B-5 on page B-12.

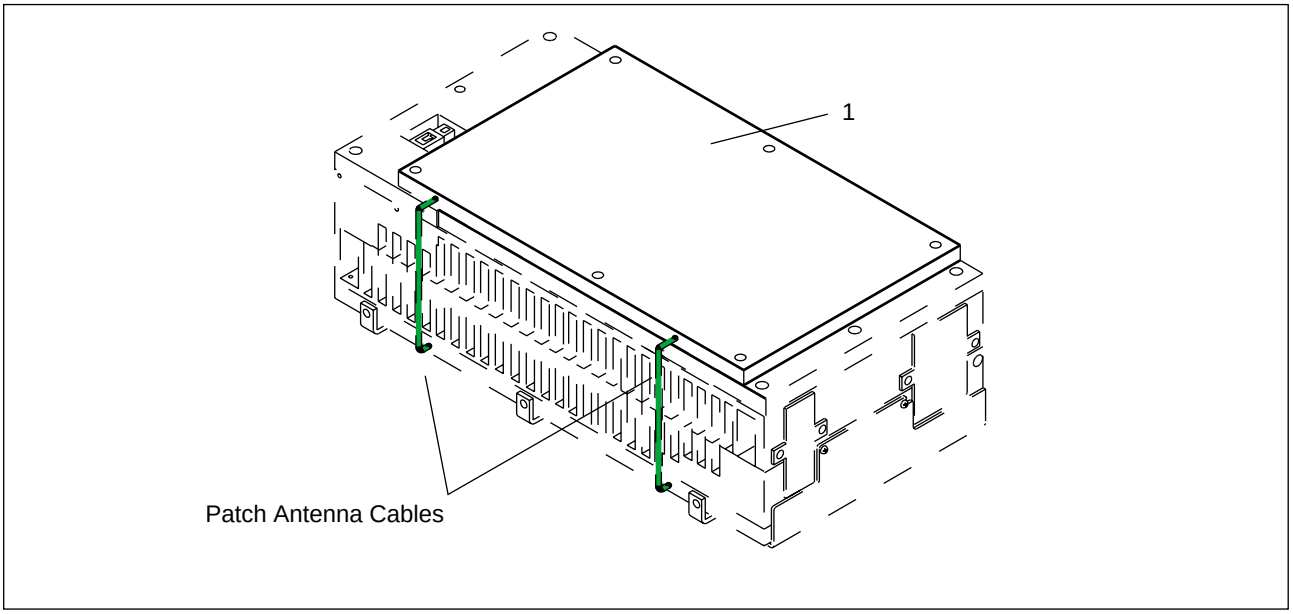


Figure B-5. Radio Head Patch Antenna Kit

Table B-5. Radio Head Patch Antenna Kit Reference

Ref	Product Number	Description	Repair Code	Explanation
1	NTM/KRE 101 1608	Patch Antenna Kit • Mounting Hardware • Patch Antenna Cables	U	Repairable

2.3 Cables and Adapters

This section lists the following cable kits and adapters:

- ETB-ELI Sync Cable
- DC/DC Cable
- Fan Power Cable
- DC/DC Cable
- Power Filter-DC/DC Cable
- CID Unit Cable
- CRI Power Cable
- CAB-RHI Cable (Radio Head)
- PCM Cable Kits (E1 and T1)
- Impedance Matching Network (75-ohm to 120-ohm) for E1 75-ohm coaxial cable

The CRI cables and adapter are illustrated in Figure B-6 on page B-13 and in Figure B-1 on page B-5. The corresponding product numbers and codes are referenced in Table B-6 on page B-14.

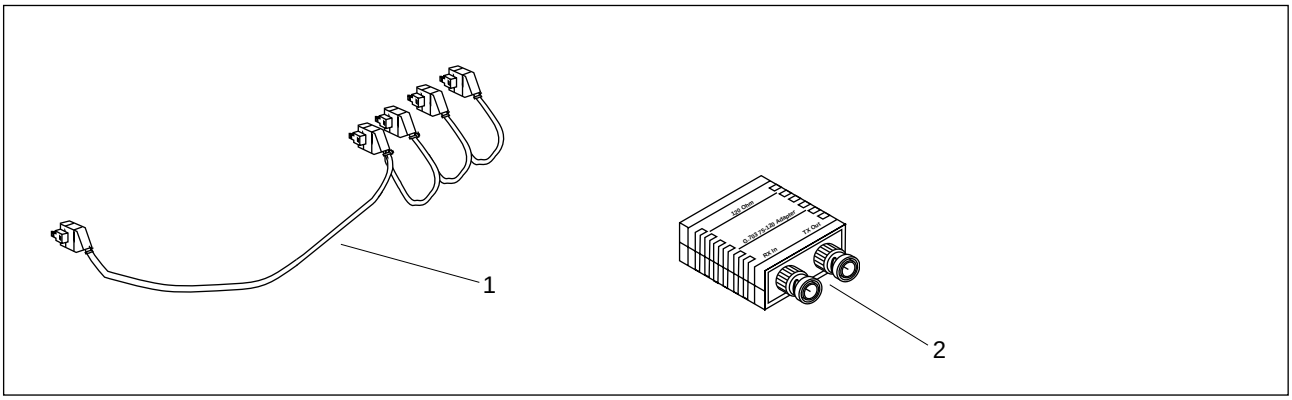


Figure B-6. ETB-ELI Sync Cable and Impedance Matching Network

Table B-6. CRI Cables and Adapter

Ref	Product Number	Description	Repair Code	Explanation
1	RPM 113 7673	ETB-ELI Sync Cable	A	Available on request
2	ZHE 601 04/1	Impedance Matching Network (75-ohm to 120-ohm)	R	Spare Part (not repairable)
	RPM 513 175/00900	DC/DC Power Cable (Refer to Figure B-1 on page B-5)	A	Available on request
	RPM 513 941/00900	Fan Power Cable (2x) (Refer to Figure B-1 on page B-5)	A	Available on request
	RPM 513 173/00800	Cable, CID-CRI (Refer to Figure B-1 on page B-5)	A	Available on request
	RPM 513 177/00280	Cable, Power Filter-DC/DC (2x) (Refer to Figure B-1 on page B-5)	A	Available on request
13	RPM 113 1476/1	Cable, Power-DC	A	Available on request
	RPM 945 324	Mains Cable (AC line 110V)	A	Available on request
		Mains Cable (AC Line 220V)		Available on request
	RPM 513 191/00190	CAB-RHI Cable (connects from the Connector Adapter Board on the top of the Radio Head to the Radio Head Interface board)	A	Available on request
	RPV 403 06/1	RJ-45 Connector (x3)	R	Spare Part (not repairable)

Appendix C

Test Record Form for RBS 884 Pico

1 Introduction

This part contains an example of the RBS 884 Pico Test Record form.

2 Test Record Forms

Figure C-1 on page C-4 and Figure C-2 on page C-5 contain an example of the RBS 884 Pico (850 MHz) and the RBS 884 Pico (1900 MHz) Test Record form.

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RBS 884 Pico Test Record

Site: .....

EMG: .....

Radio Head No: ..... Radio Head No: ..... Radio Head No: .....

Checking of Programs in Device Data Store

Device software versions for all devices on site correspond to ..... ALMs ..... ☐OK
information received from the Project Manager of the MSC
(MBDPP:EMG=*emg*;)

	Radio Head No. ____	Radio Head No. ____	Radio Head No. ____
TRXs	☐ OK	☐ OK	☐ OK
MBTRACSs	☐ OK	☐ OK	☐ OK

Remarks: .....
.....
.....
.....

Self-testing of TRX and MBTRAC Devices

All devices on site passed self-test with RESULT = 0..... ALMs ..... ☐ OK
(MBSDI:DEV=*device-#*;)

	Radio Head No. ____	Radio Head No. ____	Radio Head No. ____
TRXs	☐ OK	☐ OK	☐ OK
MBTRACSs	☐ OK	☐ OK	☐ OK

Remarks: .....
.....
.....
.....
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Figure C-1. RBS 884 Pico Test Record – Page 1

RBS 884 Pico Test Record

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Deblocking of Devices - RBS into Operation

	Radio Head No.___	Radio Head No.___	Radio Head No.___
All MBTRAC devices successfully deblocked	☐ OK	☐ OK	☐ OK
All TRX devices on site successfully deblocked (BLODE:DEV=#&&-#;)	☐ OK	☐ OK	☐ OK
No fault codes associated with devices in malfunction log (MBMLP:DEV=#&&-#;)	☐ OK	☐ OK	☐ OK

Site left in state determined by the Project Manager or MSC

Radio Head No: ___	☐ Left in blocked state	☐ In operational traffic
Radio Head No: ___	☐ Left in blocked state	☐ In operational traffic
Radio Head No: ___	☐ Left in blocked state	☐ In operational traffic

Remarks: .....
.....
.....
.....

Test Record approved date: _____

Test Record approved by: _____

_____
Supplier representatives signature

_____
Customer representatives signature

_____
Print supplier representatives name

_____
Print customer representatives name

_____
Company

_____
Company

Figure C-2. RBS 884 Pico Test Record – Page 2

Appendix D

User Feedback

1 Introduction

This appendix provides information on ordering and trouble reporting for the *RBS 884 Pico (1900 MHz) User Guide*.

2 Ordering of Customer Manuals

Contact your Ericsson account manager for information about ordering the *RBS 884 Pico (1900 MHz) User Guide*.

3 Problem Solving

If you have any problems with a radio base station in the RBS 884 series that cannot be solved by reading the manuals, please contact your nearest Ericsson Technical Assistance Center (TAC).

4 Trouble Reporting

Please report any errors found in this manual to:

Ericsson Inc.

Base Station and Systems Development

Attention: RBS Customer Documentation

7001 Development Dr.

Research Triangle Park, NC 27709

or e-mail:

RTP.Customer.Doc@ericsson.com

Appendix E

Conversion Table

1 Introduction

This appendix provides a conversion reference between selected International System of Units (SI) and non SI units.

2 Conversion Table

Table E-1. Conversion Table between SI Units and Non SI Units

When you know:	Multiply by:	To find:
centimeters	0.4	inches
meters	3.3	feet
kilograms	2.2	pounds
Nm	0.738	ft lbf (foot pound-force)
kilometers	0.6	miles
inches	.0254	meters
feet	.305	meters
yards	0.915	meters
foot pound force	0.356	Nm
miles	1.6	kilometers