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Futurecom Systems Group, ULC

PDR8000[®] Portable Digital Repeater and Booster Pack Deployment Guide

ATTENTION!

Please read the RF Safety Booklet provided with the product before proceeding with deployment

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Document Revisions

| Revision | Date | Notes & References |
|----------|------------|--|
| D2 | 2017-05-09 | Trial Release |
| R1.0 | 2017-05-25 | Initial Release |
| R2.0 | 2017-10-02 | Contents applicable to R2.0 and R1.0; added newsletter info |
| R2.1 | 2018-02-26 | Correction of DC voltage 13.8V made |
| R3.0 | 2018-07-19 | R3.0 Updates - Keypad/Display, V.24 interface details, cable pinouts |
| R4.0 | 2019-09-23 | PDR8000® R4.0 and Booster Pack updates |
| R4.01 | 2020-07-30 | FRC references change |
| R5.0 | 2021-11-15 | Changes to R5.0 DFSI menu items and other |
| R5.01 | 2022-12-02 | Updated Status LED info |
| R5.02 | 2023-02-14 | Added V.24 Note |
| R5.03 | 2023-07-19 | Updated Keypad/Display "Link" menu |
| R5.04 | 2023-12-18 | Allow configuration of Duplexer Losses |
| R5.05 | 2024-03-19 | Remove indication/note regarding Ethernet port being disabled |



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1. Introduction

The PDR8000 is typically a self-contained device but is easily modified to utilize an alternate duplexer and/or a transmit power Booster Pack when required. Multiple RF hardware configurations are supported, using accessible internal and external connection points to enable the desired configuration. This manual provides installation instructions for each of these configurations. The figures below are also screened on the back of the removable top panel inside the PDR8000.

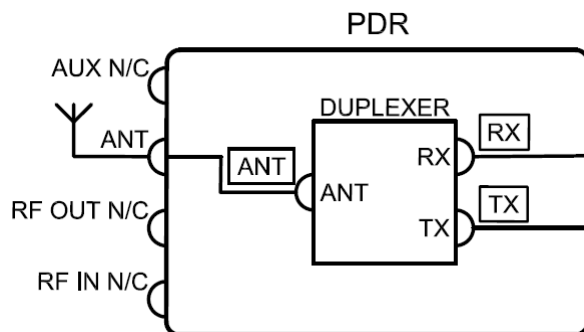


Figure 1 - Internal Duplexer Hardware Configuration

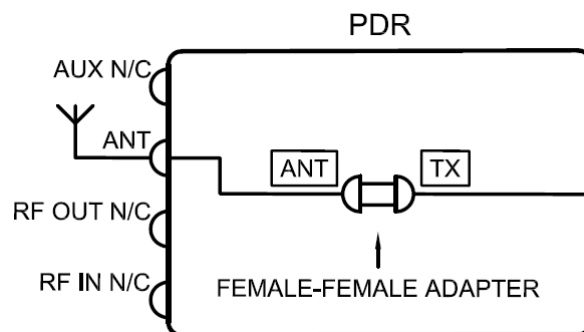


Figure 2 - Simplex Hardware Configuration

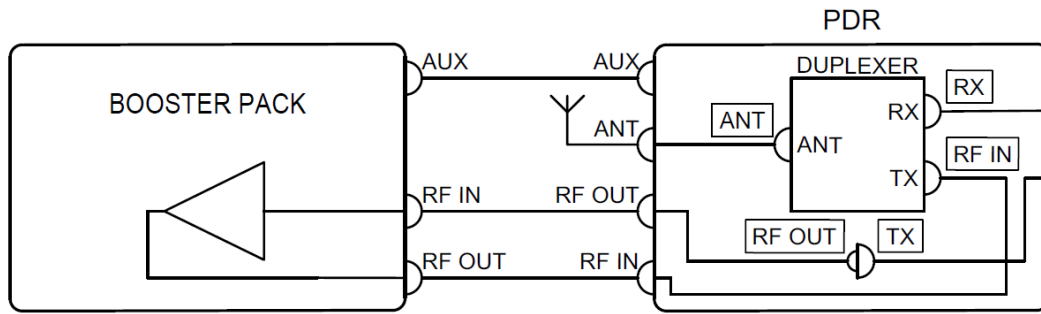


Figure 3 - Internal Duplexer and Booster Pack Hardware Configuration

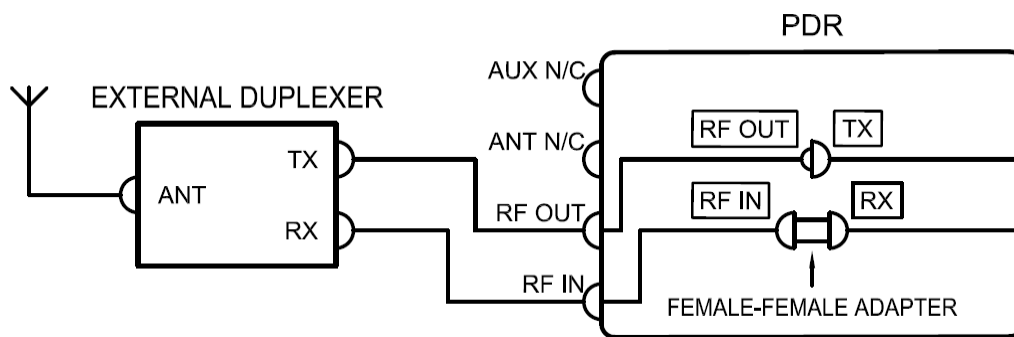


Figure 4 - External Duplexer Hardware Configuration

Note: External Duplexer Cabling supplied by user

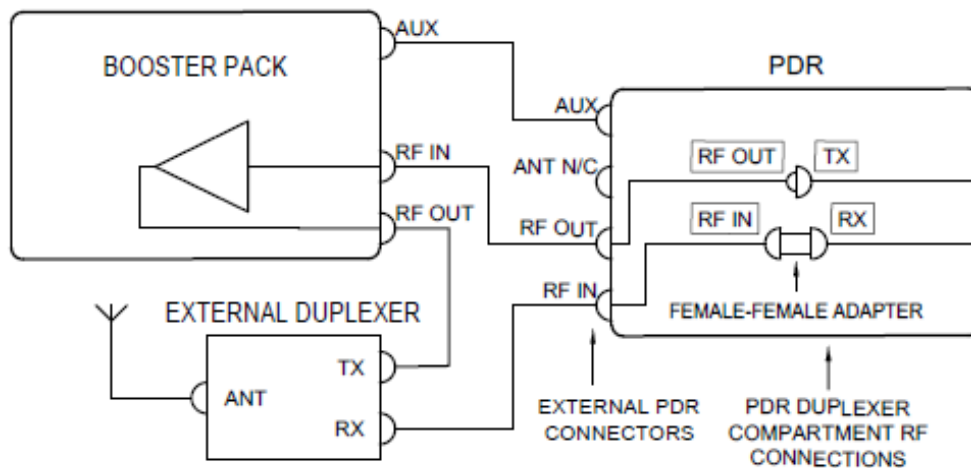


Figure 5 - External Duplexer and Booster Pack Hardware Configuration

Note: External Duplexer Cabling supplied by user

2. PDR8000 Deployment

Step 1- Internal Connections

Determine the required RF hardware configuration and confirm the internal connections correspond to the instructions below. To access the internal connections, unscrew the four corner thumbscrews of the top panel and remove it.



Figure 6 - Removable Top Panel



Figure 7 - Top Panel Removed

If the PDR8000 Duplexer is changed, the 'Duplexer Losses' field values in FRC must be verified to match the 'Duplexer Losses' reading on the Duplexer's Label for Motorola Duplexers (See Figure 8). For Duplexers from different manufacturer, please refer to the manufacturer's specification for Duplexer losses and enter them into the FRC 'Duplexer Losses' fields. To make this easier, it is possible to create different 'Deployment Profiles' for each duplexer (if multiple Duplexers are being used). The user then has to merely select the appropriate Deployment Profile when inserting a different Duplexer. (Refer to PDR8000 Programming Guide 8K088X04).



Figure 8 - Duplexer label (with indicated Insertion Losses)

Internal Duplexer Cable Connections

- RX labelled cable is connected to RX port on Duplexer
- TX labelled cable is connected to TX port on Duplexer
- ANTENNA labelled cable is connected to ANTENNA port on Duplexer

Simplex Cable Connections

- TX labelled cable is connected to ANTENNA labelled cable using the supplied Female-Female adapter

Internal Duplexer and Booster Pack Cable Connections

- RX labelled cable is connected to RX port on Duplexer
- RF IN labelled cable is connected to TX port on Duplexer
- ANTENNA labelled cable is connected to ANTENNA port on Duplexer
- TX labelled cable is connected to RF OUT labelled cable

External Duplexer Cable Connections

- TX labelled cable is connected to RF OUT labelled cable
- RX labelled cable is connected to RF IN labelled cable using the supplied Female-Female adapter

External Duplexer and Booster Pack Cable Connections

- TX labelled cable is connected to RF OUT labelled cable
- RX labelled cable is connected to RF IN labelled cable using the supplied Female-Female adapter

Once connections are complete, replace the top cover and screw back in place.

Step 2- External Connections

Based on the required RF hardware configuration, proceed with the external connections as per the instructions below. To access the external connections, pull the release latch and remove the side panel. When replacing the side panel, hook left side of panel in place first and then push the right side of panel in place. A click will be heard when it locks in place.



Figure 9 - PDR8000 Side Panel Cover



Figure 10 - Pull Release Latch

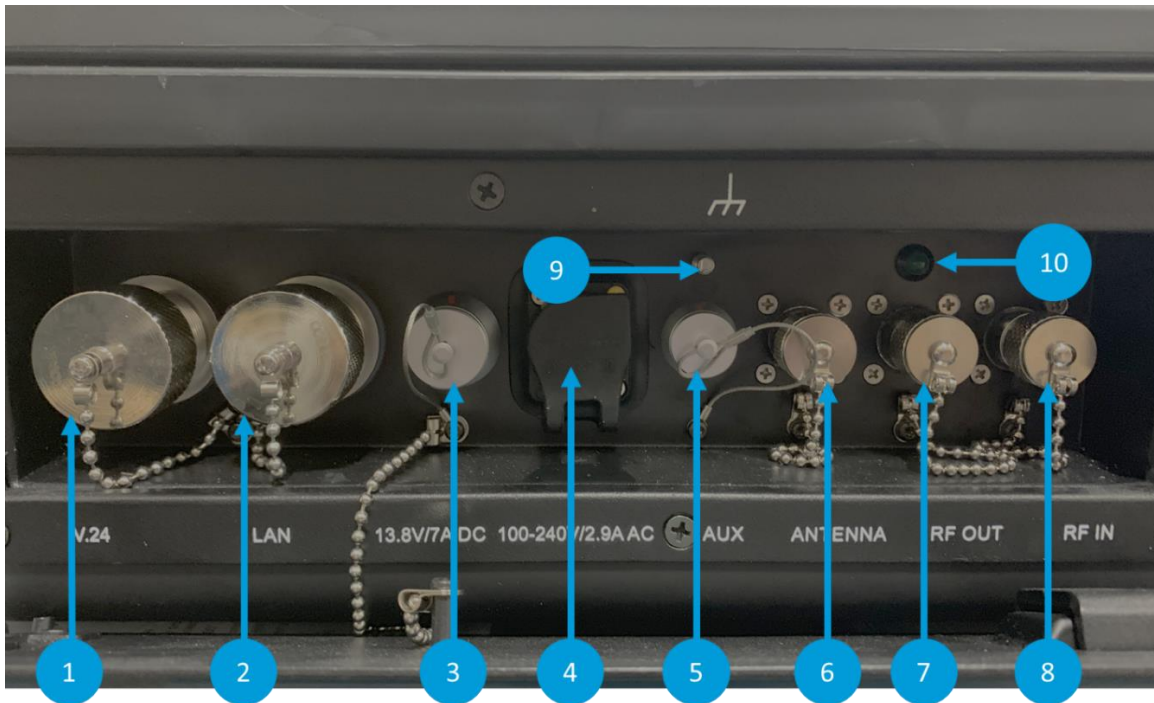


Figure 11 - PDR8000 Side Panel


| ID | Label | Type | Manufacturer | Model Ref* | Open/Close Mechanism |
|----|---|---------------------|--------------|---------------------------------|-------------------------|
| 1 | V.24 | RJ-45 | CONEC | 17-111574 | Screw/Unscrew Dust Cap |
| 2 | LAN | RJ-45 | CONEC | 17-111574 | Screw/Unscrew Dust Cap |
| 3 | 13V/7A DC | DC Power Input | LEMO | EGL.2K.302. CLA | Push Pull Dust Cap |
| 4 | 100-240V/4A AC | AC Power Input | NEUTRIK | NAC3MPX | Push Pull Sealing Cover |
| 5 | AUX | Circular Receptacle | LEMO | EGG.1K.308 .CLL ¹ | Push Pull Dust Cap |
| 6 | ANTENNA | N Female | N/A | N/A | Screw/Unscrew Dust Cap |
| 7 | RF OUT | N Female | N/A | N/A | Screw/Unscrew Dust Cap |
| 8 | RF IN | N Female | N/A | N/A | Screw/Unscrew Dust Cap |
| 9 |  | Ground Lug | NA | N/A | N/A |
| 10 | Green LED Indicator | | N/A | N/A | N/A |

Figure 12 - PDR8000 External Connectors' and LED Specifications

¹ Connector was EGG.1K.306.CLL on releases prior to PDR8000 Release 4

Internal Duplexer

- ANTENNA cable is connected ANTENNA connector
- AUX, RF OUT, and RF IN are not connected

Simplex

- ANTENNA cable is connected ANTENNA connector
- AUX, RF OUT, and RF IN are not connected

Internal Duplexer and Booster Pack

- AUX cable is connected from AUX connector of PDR8000 to AUX connector of Booster Pack
- ANTENNA cable is connected to ANTENNA connector
- RF cable is connected from RF OUT connector of PDR8000 to RF IN connector of Booster Pack
- RF cable is connected from RF IN connector of PDR8000 to RF OUT connector of Booster Pack

External Duplexer

- Duplexer cable (supplied by end user) is connected from RF OUT connector of PDR8000 to TX port of External Duplexer
- Duplexer cable (supplied by end user) is connected from RF IN connector of PDR8000 to RX port of External Duplexer
- AUX and ANTENNA are not connected

External Duplexer and Booster Pack

- AUX cable is connected from AUX connector of PDR8000 to AUX connector of Booster Pack
- RF cable is connected from RF OUT connector of PDR8000 to RF IN connector of Booster Pack
- Duplexer cable (supplied by end user) is connected from RF IN connector of PDR8000 to RX port of External Duplexer
- Duplexer cable (supplied by end user) is connected from TX port of External Duplexer to RF OUT end connector of Booster Pack.
- The ANTENNA cable is connected to the ANTENNA port of the External Duplexer
- The ANTENNA connector of PDR8000 is not connected

Step 3A - V.24 Connection (optional)

To access the V.24 end connector, unscrew the dust cover (refer to Figure 11). The V.24 cable (supplied by end user see **Appendix A - V.24 Cable**) is connected from the V.24 end connector of the PDR8000 to the V.24 system device: DIU (supplied by end user), Modem (supplied by end user), Conventional Channel Gateway (supplied by end user- available as model number SQM01SUM0205 from Motorola Solutions) or another PDR8000.

NOTES:

- PDR8000 supports a 9600 baud synchronous link.
- The V.24 end connector on the PDR8000 is weatherproof. To ensure connection remains weatherproof, an IP 65 compliant end connector (i.e., CONEC 17-103274) should be used with the V.24 cable.
- PDR8000 has been tested with DIU3000 and serial modems namely Raymar-Telenetics V.3600 SA Modem and Paradyne 325.

Step 3B - Ethernet Connection (optional)

To access the Ethernet end connector labelled LAN, unscrew the dust cover (refer to Figure 11). The Ethernet cable (supplied by end user) is connected from the LAN end connector of the PDR8000 to the Ethernet system device: Ethernet Switch or Modems (supplied by end user), Gateway (supplied by end user).

NOTES:

The LAN end connector on the PDR8000 is weatherproof. To ensure connection remains weatherproof, an IP 65 compliant end connector should be used with the Ethernet cable.

Step 4- Power

ATTENTION!

Please read the RF Safety Booklet Before proceeding with this step.

Only proceed with this step once all the other connections are complete.

DC Power:

- To access the end connector, remove side panel cover as shown in Figure 10.
- Line up the red dots on the end connector and the cable and push DC power cable into place as shown in Figure 13 and Figure 14.
- Connect the other end of the DC power cable to the DC power supply.
- To remove the DC cable, pull back on the cable connector sleeve and then pull out by connector body as shown in Figure 15.

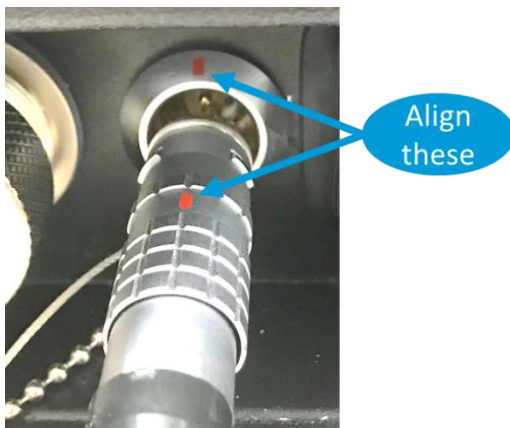


Figure 13 - DC connector alignment



Figure 14 - DC Connector plugged in



Figure 15 - Pull to unplug DC Power

AC Power:

- To access the end connector, pull off the dust cover as shown in Figure 16.
- Insert the cable connector with the yellow release latch at the 11:00 position and twist clockwise until it locks into place at the 12:00 position. A click will be heard. See Figure 17.
- Connect the other end of the AC power cable to the AC power supply.
- To remove the cable, pull the yellow release latch back, twist cable connector counter-clockwise and then pull the cable out.

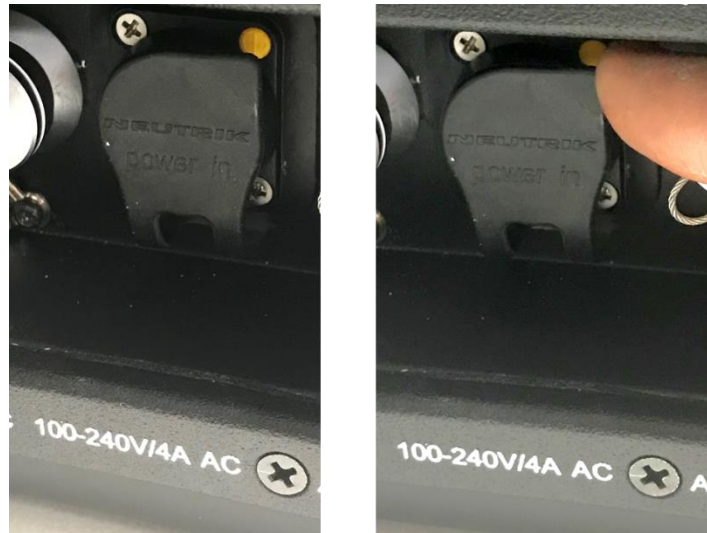


Figure 16 - Pull AC Power Dust Cover

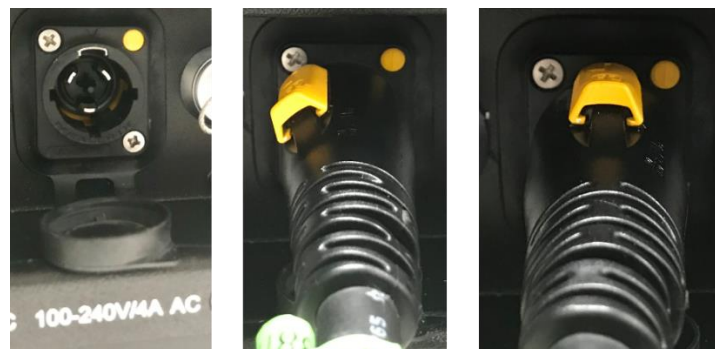


Figure 17 - AC Power Connection to PDR8000

Powering Scheme- both AC (100-240V) and DC (13.8V) can be connected simultaneously. The PDR8000 will dynamically choose the supply with the highest voltage and if one supply fails, the other will take over with an instant transfer of power.

NOTE: The AC power will not charge the DC battery pack.

Step 5- Power Up Confirmation

If the PDR8000 successfully powers up, the fan will start running and the POWER LED in the bottom right corner of the LED panel will turn on.

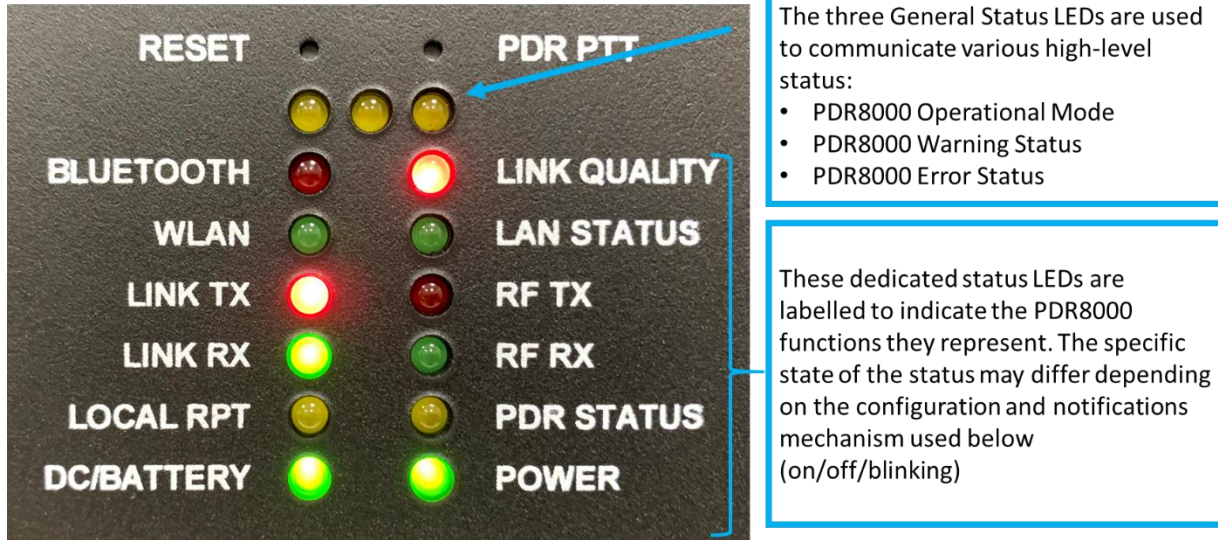


Figure 18 - PDR8000 LED Panel

The following table contains the General Status LED state definitions.

| LED 1 | LED 2 | LED 3 | Status Description |
|------------------------------|------------|------------|--|
| PDR Operational Modes | | | |
| OFF | OFF | OFF | In Normal mode - No errors or warnings |
| ON | | | In Fallback In-Cabinet Repeat (FBICR) Mode |
| | ON | | In Service Mode |
| PDR Error Status | | | |
| | FLASH FAST | | Internal Software Image Error |
| PDR Warning Status | | | |
| FLASH FAST | | | Real Time Clock Battery Alarm |
| | FLASH SLOW | | Low Transmit Power Alarm |
| | | FLASH SLOW | Temperature Alarm |

Figure 19 - General LED Status Definitions

Dedicated Status LEDs

The following table contains the state definitions for Dedicated Status LEDs.

| Label | State | Status Description |
|---------------------|-------------|---|
| LINK QUALITY | OFF | No Link (wireline interface is off as programmed) |
| LINK QUALITY | FLASH FAST | Link Failure (when wireline link is expected) |
| LINK QUALITY | FLASH SLOW | Poor Quality Network |
| LINK QUALITY | SHORT PULSE | Marginal Quality Network |
| LINK QUALITY | ON | Good Quality Network |
| | | |
| LAN STATUS | OFF | Ethernet Cable Disconnected |
| LAN STATUS | ON | Ethernet Cable Connected |
| | | |
| LINK TX | OFF | Link Tx Interface Off |
| LINK TX | SHORT PULSE | Link Tx Interface On |
| LINK TX | ON | Link Tx Interface Activity |
| LINK TX | FLASH FAST | Link Tx Interface Failure (see Tech Log) |
| LINK RX | OFF | Link Rx Interface Off |
| LINK RX | SHORT PULSE | Link Rx Interface Working |
| LINK RX | ON | Link Rx Interface Activity |
| LINK RX | FLASH FAST | Link Rx Interface Failure (see Tech Log) |
| | | |
| LOCAL RPT | OFF | Local Repeat disabled |
| LOCAL RPT | ON | Local Repeat enabled |
| | | |
| DC BATTERY | OFF | DC source below threshold |
| DC BATTERY | FLASH FAST | DC source above threshold |
| DC BATTERY | ON | DC power acceptable |
| DC BATTERY | FLASH SLOW | Warning, DC source approaching lower threshold |
| | | |
| RF TX | OFF | Transmitter Inactive |
| RF TX | ON | Transmitter Active |
| RF RX | OFF | Receiver Inactive |
| RF RX | ON | Receiver Active |
| | | |
| PDR STATUS | FLASH FAST | Error (Check Tech Log) |
| PDR STATUS | FLASH SLOW | Warning (Check Tech Log) |
| PDR STATUS | SHORT PULSE | PDR Functional |
| | | |
| POWER | OFF | PDR Power Off |
| POWER | ON | PDR Power On |

Figure 20 - PDR8000 Dedicated Status LEDs Definition

Side LED States

The following table contains the status definitions for the side LED.

| State | Status Description |
|-------------------|---|
| ON | PDR8000 is operating normally. |
| FLASH SLOW | PDR8000 is operating, but under an abnormal or warning condition. This includes operating in Fallback In-Cabinet Repeat when the wireline link has ceased communication. (See front panel LEDs, front panel display, or technicians log to gain further insight.) |
| FLASH FAST | PDR8000 is not functioning. A major error has occurred. (See front panel LEDs, front panel display, or technicians log to gain further insight.) |
| OFF | PDR8000 is powered down or LED has been disabled via configuration. |

Figure 21 - PDR8000 Side LED Definition

If the PDR8000 does not successfully power up, the fan will not start running and there will be no lights displayed on the LED light panel. Disconnect the power source and replace the appropriate fuse.

DC Power- the DC fuses are located inside the PDR8000. Contact Futurecom for service: 1-800-701-9180 or support@futurecom.com

AC Power- the AC Fuse is located inside the Duplexer compartment. Unscrew the four screws and remove the top panel as shown in Figure 6 and Figure 7. The fuse is in the bottom right corner. Unscrew the fuse cover counterclockwise to remove it and replace the fuse (Manufacturer: Bel, Part Number: 5ST5-R, 5Amps).

Step 6 - Keypad/Display

PDR8000 is equipped with an LCD display, providing a means to access and control several aspects of the unit. Access to various functions is available utilizing an on-screen menu, and a set of navigation buttons.

In FRC, Common Settings → Display Unit must be set to "Enabled" to allow display functionality.

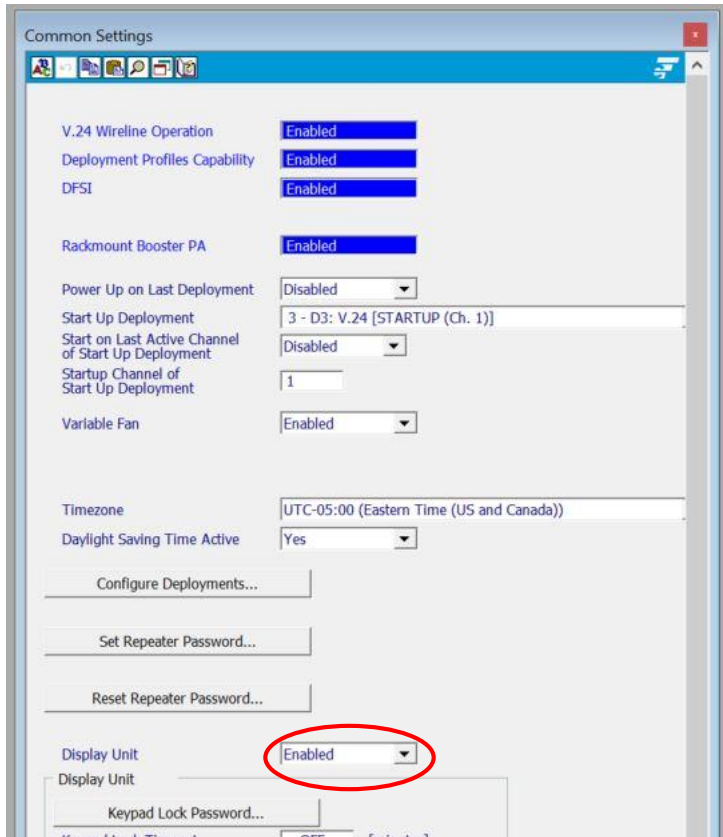


Figure 22 - Display Unit Setting

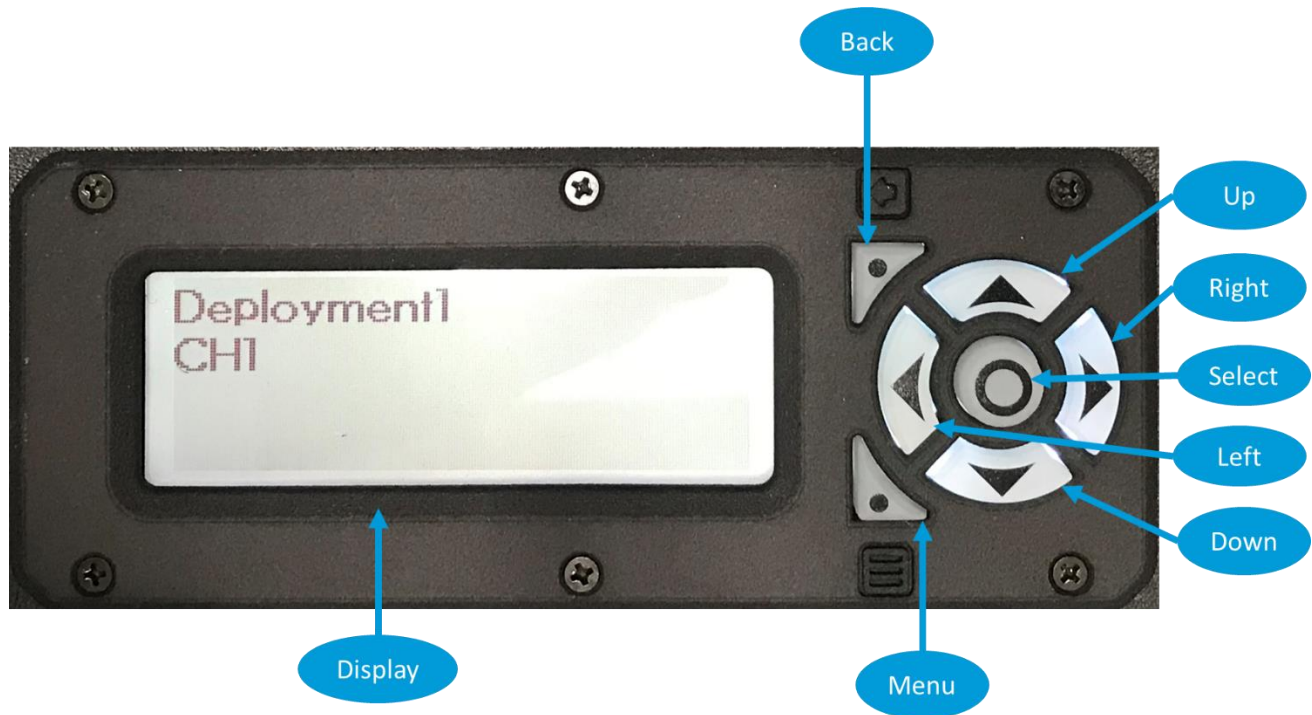


Figure 23 - PDR8000 Keypad/Display

The Display Menu may be configured by the PDR8000 configuration utility program known as the Futurecom Repeater Configurator (FRC). Therefore, any PDR8000 will have the menu specifically configured for the unit.

The PDR8000 can be configured to protect the access to display/keypad control operation with a password. If the display/keypad is in locked state, then the user must enter the correct password to access the menu options using the keypad. The display/keypad switches to the locked state either by a timeout value or by selecting the LOCK KEYPAD command under SETTINGS menu.

The repeater may provide Warning messages on line 3 of the display, and Error messages on line 4. Information pertaining to these messages is provided in the PDR8000 Programming Guide.

The following menu navigation is based on a generic configuration of a PDR8000 unit.

| Buttons | Effect |
|---|---|
| Menu | Toggles Menu On/Off (Menu may auto toggle off after a period of time). User would be prompted for password if the menu access is password protected and in locked state. |
| Back | Goes back to previous menu level |
| Up | Navigate up in a list of menu items |
| Down | Navigate down in a list of menu items |
| Right* | <ul style="list-style-type: none"> a) Increment values such as CONTRAST, BRIGHTNESS, TIME ZONE, HOURS MINUTES, SECONDS b) Toggle (ENABLED/DISABLED) values for KEYPAD TONE or DST c) * When the main screen is displayed as shown in Figure 22, pressing and holding the Right button for 7 seconds sets the BRIGHTNESS to 100% and CONTRAST to 43%. |
| Left | <ul style="list-style-type: none"> a) Decrement values such as CONTRAST, BRIGHTNESS, TIME ZONE, HOURS MINUTES, SECONDS b) Toggle (ENABLED/DISABLED) values for KEYPAD TONE or DST |
| Select | Select a menu item or value |
| NOTE: Response rate of display may be a bit slow at extremely low temperatures. | |

| Main Menu | Sub-Menu | Action/Info |
|------------------------------|--|---|
| >CHANNELS | >List of Channels | View/Select Active Channel |
| >DEPLOYMENTS | >List of Deployment Profiles | View/Select Active Deployment Profiles |
| >SETTINGS | >CONTRAST | View/Set Display's Contrast Level |
| | >BRIGHTNESS | View/Set Display's Brightness Level |
| | >TIME/DATE | View/Set the following ◀Time Zone UTC+/- H:MM ▶ ◀DST ENABLED/DISABLED ▶ ◀YEAR YYYY ▶ ◀MONTH MM ▶ ◀DAY DD ▶ ◀HOUR HH ▶ ◀MINUTE mm ▶ ◀SECOND SS ▶ |
| | >KEYPAD TONE | Toggle keypad tone ENABLED/DISABLED |
| | >LOCK KEYPAD | Lock keypad access |
| >DIAGNOSTICS | >RSSI xxx | View Received Signal Strength (RSSI) value Note: RSSI Threshold levels correspond to the level at the PDR8000 antenna port. PDR8000 attempts to compensate for duplexer losses but is limited by the maximum receiver sensitivity. |
| | >LINK ▶▶▶ | Shows link quality of the V.24 or Ethernet Network: ▶ (poor) or ▶▶ (marginal) or ▶▶▶ (good) |
| >LINK | >NONE | Indicates no wireline link is configured in the active Deployment Profile |
| | >V.24 ON/OFF | Indicates V.24 link is configured in the active Deployment Profile, and whether the link is established |
| | >DFSI ON/OFF | Indicates DFSI link is configured in the active Deployment Profile, and whether the link is established |
| | (below, if link = DFSI) | |
| | >SIP: x.x.x.x | Station IP Address of the DFSI station |
| | >SUB: x.x.x.x | Subnet of the DFSI station |
| | >SCP: X | DFSI Station's Control Port number |
| >SVP: X | DFSI Station's Voice Conveyance Port number | |
| (below, if link established) | | |
| >HIP: x.x.x.x | DFSI Host's IP Address | |
| >HCP: X | DFSI Host's Control Port number | |
| >HVP: X | DFSI Host's Voice Conveyance Port number | |
| >HB: X | Heartbeat in Seconds between DFSI host and station | |

| | | |
|-------------------------|--|---|
| <p>>ABOUT</p> | <ul style="list-style-type: none"> > PDR 8000 > SN: xxxxxxxx > HW PN: 7V083X01 > HW REV: xx.xx > HW REL: dd/mm/yy > APP PN: 4C088X01 > APP VER: xx.xx > APP REL: dd/mm/yy > APP BUILD: xxx > B PN: 4C088X02 > B VER: xx.xx > B REL: DD/MM/YY > B BUILD: xxx > BBD PN:4C083X04 > BBD VER: xx.xx > BBD REL: dd/mm/yy > TRD PN: 4C083X03 > TRD VER: xx.xx > TRD REL: dd/mm/yy > IF HW PN: 7L088X01 > IF HW REV:xxx.xx > IF HW REL: dd/mm/yy > IF APP PN: 4C088X07 > IF APP VER: xx.xx > IF APP R: dd/mm/yy > IF APP BUILD: xxx > IF B PN: 4C088X08 > IF B VER: xx.xx > IF B R: dd/mm/yy > IF B BUILD: xxx > Copyright (C) 2024 > FUTURECOM > SYSTEMS > GROUP, ULC | <ul style="list-style-type: none"> Product Name Product serial number Hardware part number Hardware revision Hardware release date Repeater firmware part number Repeater version Repeater release date Repeater build number Repeater boot firmware part number Repeater boot firmware version Repeater boot firmware release date Repeater boot firmware build number Baseband DSP part number Baseband DSP version Baseband DSP release date Transceiver DSP part number Transceiver DSP version Transceiver DSP release date Interface hardware part number Interface hardware revision number Interface hardware release date Interface firmware part number Interface firmware version Interface firmware release date Interface firmware build number Interface boot part number Interface firmware version Interface firmware release date Interface firmware build number Copyright information |
|-------------------------|--|---|

Step 7 - Open/Closed Case Operation

PDR8000 has been designed to support both open-case and closed-case operation. When operating closed-case, the PDR8000 should be standing on its hinged side, allowing the case to provide better cooling efficiency. When operating open-case (providing the best cooling capability), the PDR8000 is to be placed flat on its large surface. Note that the PDR8000 is not water resistant when operating open-case.



Figure 24 - Open case operation



Figure 25 - Closed case operation

3. Booster Pack Deployment (Optional)

The PDR8000 Tx Output Power is programmed for each individual channel in the Deployment “Channel Setup”. The PDR8000 can be configured to transmit max 20W (43 dBm) output power at its Antenna Port.

If higher output power is needed, an external Booster Pack can be utilized. The Booster Pack configuration utilizes the standard PDR8000 hardware/software and adds an additional suitcase (same dimensions/colors as the PDR8000) which provides additional transmit power. The PDR8000 and Booster Pack are connected via RF cables and a control cable.

The RF output using a Booster pack is 50W (47 dBm) when no Duplexer is connected to the PDR8000.

When the Booster Pack is connected, the Tx duplexer losses are not accounted for in FRC , as the Booster Pack transmits a constant power level. Therefore, with the duplexer connected, the power at the PDR's antenna port is the power at the PDR8000's RF Out port plus duplexer losses. For example: if the Booster Pack's output power is 45dBm and the duplexer loss is - 1.5dB, the output power at the PDR8000's antenna port is 43.5dBm.

Depending on the PDR8000 configuration (simplex, internal duplexer or external duplexer), the Booster Pack connection steps vary accordingly. The following sections describe the entire steps needed to connect PDR8000 and Booster Pack for each of the configurations.

Before attaching a Booster Pack to the PDR8000, the PDR8000's RF cables must be wired properly as shown in the following possible configurations.

ATTENTION:

PDR8000 and Booster Pack are sold in different band configurations. The PDR8000 must be connected to a matching band Booster Pack for them to operate properly. The following table shows compatible PDR8000s and Booster Packs. **Ensure that the PDR8000 is paired with the matching Booster Pack.**

| PDR8000 Model Number | Booster Pack Model Number | Band (Frequency Range) |
|------------------------------|---------------------------|------------------------|
| T93KSS9AW1AN (TT3148) | VTD0001A (DDN2732) | VHF (136 – 174 MHz) |
| T93PSS9PW1AN (TT3149) | VTE0003A (DDN2733) | UHF (380 – 430 MHz) |
| T93RSS9PW1AN (TT3150) | VTE0005A (DDN2734) | UHF (450 – 470 MHz) |
| T93USS9PW1AN (TT3152) | VTF0001A* (DDN2735) | 700 (764 – 776 MHz) |
| T93VSS9PW1AN (TT3153) | VTF0001A* (DDN2735) | 800 (851 – 869 MHz) |

*The 700 and 800 MHz bands are covered by a single Booster Pack Model



Figure 26 - Booster Pack

Booster Pack External Connections

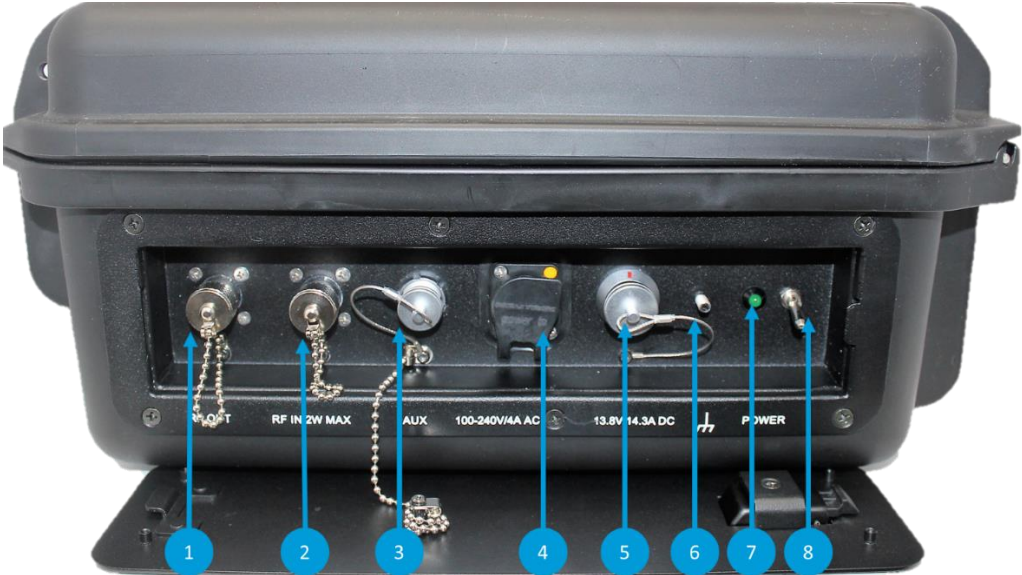


Figure 27 - Booster Pack External Connections

| ID | Label | Type | Manufacturer | Model Ref* | Open/Close Mechanism |
|----|----------------|---------------------|--------------|--------------------|-------------------------|
| 1 | RF OUT | N Female | N/A | N/A | Screw/Unscrew Dust Cap |
| 2 | RF IN | N Female | N/A | N/A | Screw/Unscrew Dust Cap |
| 3 | AUX | Circular Receptacle | LEMO | EGG.1K.30 8.CLL | Push Pull Dust Cap |
| 4 | 100-240V/4A AC | AC Power Input | NEUTRIK | NAC3MPX | Push Pull Sealing Cover |




| | | | | | |
|---|---|---------------------|------|--------------------|---|
| 5 | 13V/14.3A DC | DC Power Input | LEMO | EGL.2K.30 2.CLA | Push Pull Dust Cap |
| 6 |  | Ground Lug | NA | N/A | N/A |
| 7 |  POWER | Green LED Indicator | N/A | N/A | N/A |
| 8 |  | Toggle Switch | NKK | M2012LL3 W01 | Pull out / Toggle switch for power LED to operate in stealth mode |

Figure 28 - Booster Pack External Connectors' and LED Specifications

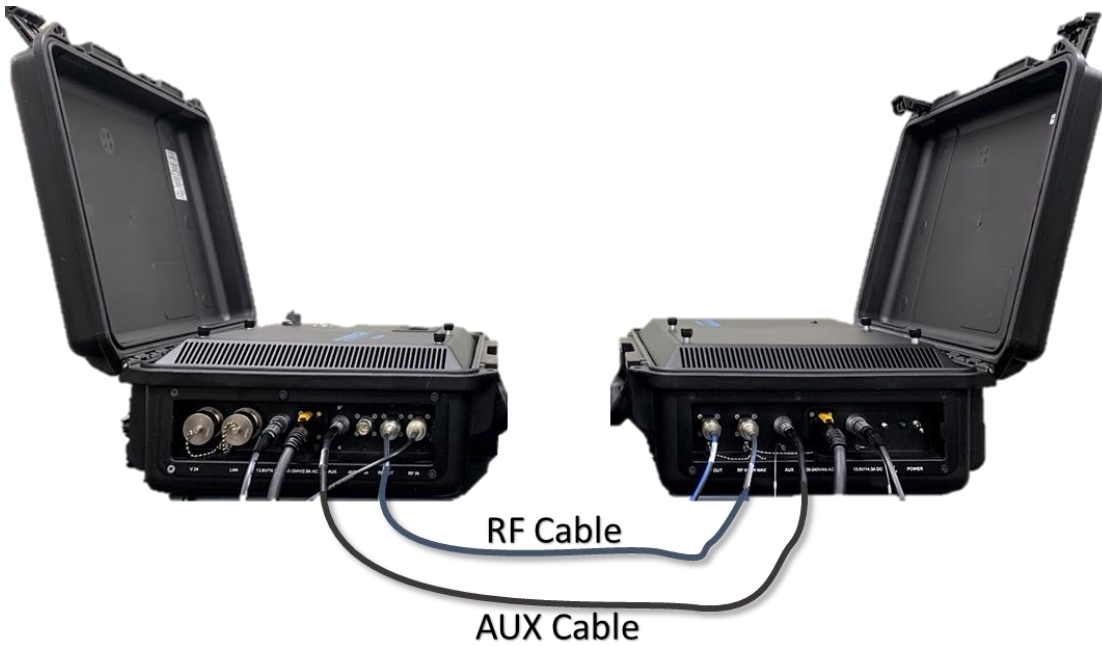


Figure 29 - Booster Pack Connected to PDR8000

Configuration 1 - Simplex with Booster Pack Configuration

Step 1 – Preparing PDR8000 for Booster Pack

Use this configuration when PDR8000 does not have a duplexer and is intended to be used in a Simplex operation with a single antenna. The following steps shall be followed in sequence and is depicted in Figure 30.

1. On PDR8000, open the top panel cover as shown in Figure 6 and Figure 7
2. Connect RF cable labelled TX to RF Cable Labelled ANT using a female-female adapter as shown in Figure 30
3. Close the top panel cover

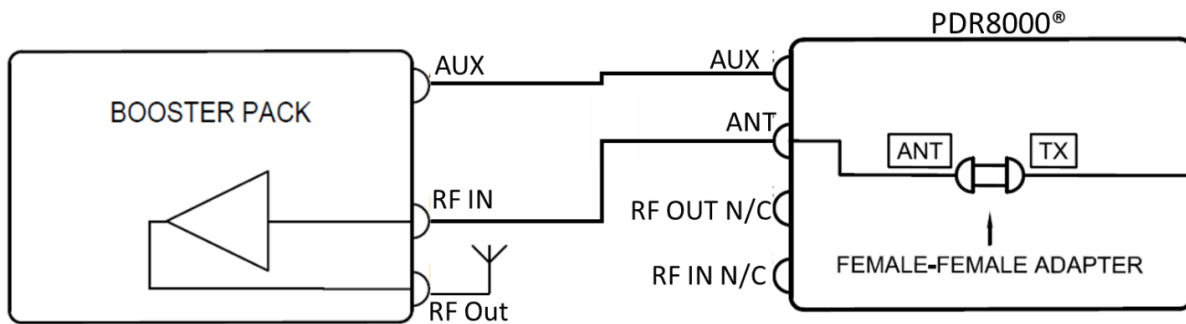


Figure 30 - PDR8000 Simplex with Booster Pack Configuration

Step 2 – Connect the AUX Cable

The AUX cable is used for PDR8000 to detect and communicate with the Booster Pack. Depending on the revision of PDR8000, the AUX connector on the side panel may have either a 6-PIN or 8-PIN connector as shown in Figure 31.

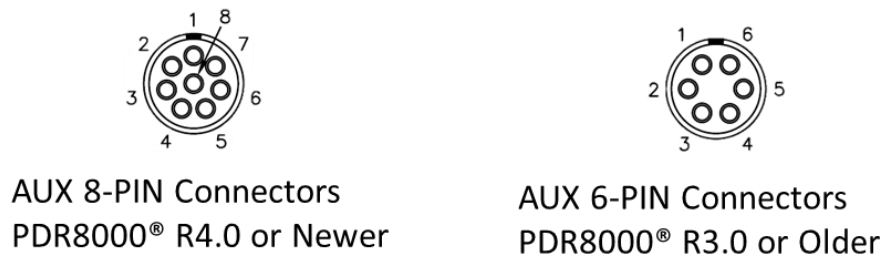


Figure 31 - 8-PIN or 6-PIN PDR8000 AUX Connector

1. Connect the AUX cable to PDR8000 using the appropriate connector option (either 6-PIN or 8-PIN)
2. Connect the other end of the AUX cable to Booster Pack AUX connector (8-PIN)

Step 3 – Connect the External RF Cables and Antenna

The simplex configuration requires one external RF cable and an antenna. This cable and the antenna shall be connected as follows (refer to Figure 30 for wiring diagram)

1. Connect an RF cable to ANT port on the side panel of PDR8000 and the other end of it to RF IN connector on the Booster Pack's side panel
2. Connect the antenna to the RF OUT connector on the Booster Pack's side panel

Step 4 – Connect the Power Cables

Once the AUX, RF cables and antenna are connected, the power cables (AC or DC) shall be connected to PDR8000 and Booster Pack. Ensure that the power cables to the units are connected securely before plugging the cables to wall outlet or DC power supply.

1. Connect the DC or AC power cable to PDR8000
2. Power up the PDR8000
3. Connect the DC or AC power cable to Booster Pack
4. Power up the Booster Pack after the PDR8000 has been powered up

Configuration 2 – PDR8000 Internal Duplexer with Booster Pack Configuration

Step 1 – Preparing PDR8000 for Booster Pack

Use this configuration when PDR8000 has an internal duplexer ^{Note 1} and is intended to be used in a full duplex operation with a single antenna. The following steps shall be followed in sequence and is depicted in Figure 32.

1. On PDR8000, open the top panel cover as shown in Figure 6 and Figure 7
2. Connect RF cable labelled RX to the RX connector of the duplexer
3. Connect the RF cable labelled RF IN to the TX connector of the duplexer
4. Connect RF cable labelled TX to the cable labelled RF OUT
5. Connect the RF cable labelled ANT to the ANT connector of the duplexer
6. Close the top panel cover

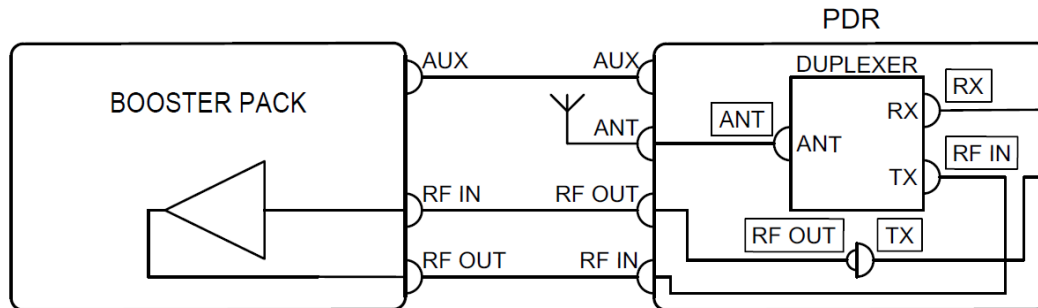


Figure 32 - Internal Duplexer and Booster Pack Hardware Configuration

Note 1: If the PDR8000 Duplexer is changed, the 'Duplexer Losses' field values in FRC must be verified to match the 'Duplexer Losses' reading on the Duplexer's Label (for Motorola Duplexers). For Duplexers from different manufacturer, please refer to the manufacturer's specification for Duplexer losses and enter them into the FRC 'Duplexer Losses' fields. To make this easier, it is possible to create different 'Deployment Profiles' for each duplexer (if multiple Duplexers are being used). The user then has to merely select the appropriate Deployment Profile when inserting a different Duplexer. (Refer to PDR8000 Programming Guide 8K088X04).

Step 2 – Connect the AUX Cable

The AUX cable is used for PDR8000 to detect and communicate with the Booster Pack. Depending on the revision of PDR8000, the AUX connector on the side panel may have either a 6-PIN or 8-PIN connector as shown in Figure 33.



Figure 33 - 8-PIN or 6-PIN PDR8000 AUX Connector

1. Connect the AUX cable to PDR8000 using the appropriate connector option (either 6-PIN or 8-PIN)
2. Connect the other end of the AUX cable to Booster Pack AUX connector (8-PIN)

Step 3 – Connect the External RF Cables and Antenna

This configuration requires two external RF cables and an antenna. These cables and antenna shall be connected as follows (refer to Figure 32 for wiring diagram)

1. Connect an RF cable to RF OUT port on the side panel of PDR8000 and the other end of it to RF IN connector on the Booster Pack's side panel
2. Connect an RF cable to RF IN port on the side panel of PDR8000 and the other end of it to RF OUT connector on the Booster Pack's side panel
3. Connect the antenna to the ANT connector on the PDR8000's side panel

Step 4 – Connect the Power Cables

Once the AUX, RF cables and antenna are connected, the power cables (AC or DC) shall be connected to PDR8000 and Booster Pack. Ensure that the power cables to the units are connected securely before plugging the cables to wall outlet or DC power supply.

1. Connect the DC or AC power cable to PDR8000
2. Power up the PDR8000
3. Connect the DC or AC power cable to Booster Pack
4. Power up the Booster Pack after the PDR8000 has been powered up

Configuration 3 – PDR8000 External Duplexer with Booster Pack Configuration

Step 1 – Preparing PDR8000 for Booster Pack

Use this configuration when PDR8000 has an external duplexer ^{Note 1} and is intended to be used in a full duplex operation with a single antenna. The following steps shall be followed in sequence and is depicted in Figure 34.

1. On PDR8000, open the top panel cover as shown in Figure 6 and Figure 7
2. Connect RF cable labelled TX to the cable labelled RF OUT
3. Connect RF cable labelled RX to the cable labelled RF IN using a female-female adapter
4. Close the top panel cover

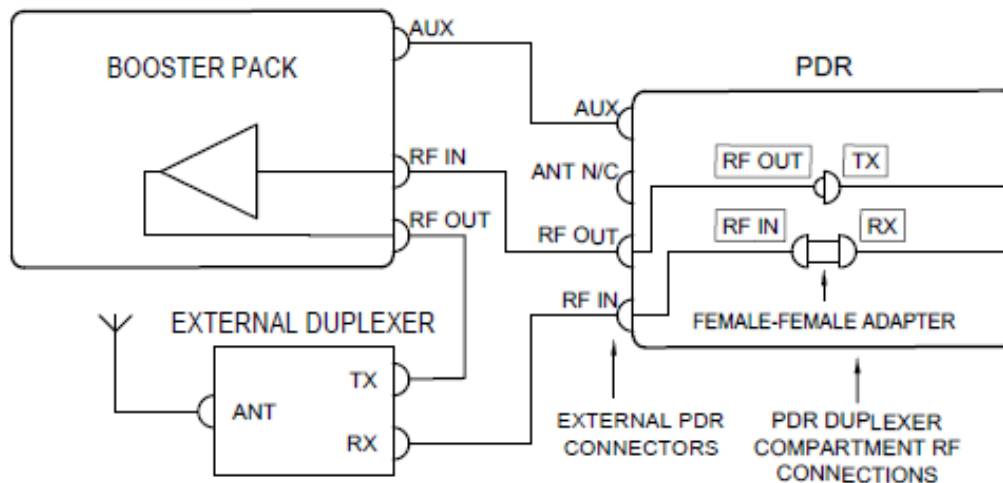
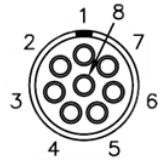


Figure 34 - External Duplexer and Booster Pack Hardware Configuration

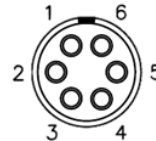
Note 1: If the PDR8000 Duplexer is changed, the 'Duplexer Losses' field values in FRC must be verified to match the 'Duplexer Losses' reading on the Duplexer's Label (for Motorola Duplexers). For Duplexers from different manufacturer, please refer to the manufacturer's specification for Duplexer losses and enter them into the FRC 'Duplexer Losses' fields. To make this easier, it is possible to create different 'Deployment Profiles' for each duplexer (if multiple Duplexers are being used). The user then has to merely select the appropriate Deployment Profile when inserting a different Duplexer. (Refer to PDR8000 Programming Guide 8K088X04).

Step 2 – Connect the AUX Cable

The AUX cable is used for PDR8000 to detect and communicate with the Booster Pack. Depending on the revision of PDR8000, the AUX connector on the side panel may have either a 6-PIN or 8-PIN connector as shown in Figure 35.



AUX 8-PIN Connectors
PDR8000® R4.0 or Newer



AUX 6-PIN Connectors
PDR8000® R3.0 or Older

Figure 35 - 8-PIN or 6-PIN PDR8000 AUX Connector

1. Connect the AUX cable to PDR8000 using the appropriate connector option (either 6-PIN or 8-PIN)
2. Connect the other end of the AUX cable to Booster Pack AUX connector (8-PIN)

Step 3 – Connect the External RF Cables and Antenna

This configuration requires two external RF cables and an antenna. These cables and antenna shall be connected as follows (refer to Figure 34 for wiring diagram)

1. Connect an RF cable to RF OUT port on the side panel of PDR8000 and the other end of it to RF IN connector on the Booster Pack's side panel
2. Connect an RF cable to RF IN port on the side panel of PDR8000 and the other end of it to RX connector on the external duplexer
3. Connect an RF cable to the RF OUT of the Booster Pack's side panel and the other end of it to the TX connector on the external duplexer
4. Connect the antenna to the ANT connector on the external duplexer

Step 4 – Connect the Power Cables

Once the AUX, RF cables and antenna are connected, the power cables (AC or DC) shall be connected to PDR8000 and Booster Pack. Ensure that the power cables to the units are connected securely before plugging the cables to wall outlet or DC power supply.

1. Connect the DC or AC power cable to PDR8000
2. Power up the PDR8000
3. Connect the DC or AC power cable to Booster Pack
4. Power up the Booster Pack after the PDR8000 has been powered up

Appendix A - V.24 Cable

The V.24 cable may be created at a custom length for each customer configuration. It consists of an RJ-45 connector used with CAT5e (minimum) cable that provides the interface to the following categories of devices.

- 1) A Digital Interface Unit (DIU), Conventional Channel Gateway (CCGW) or Voting Comparator as per the port pin-outs below.

| Signal Name | Pin Num | Type |
|-------------|---------|--------------|
| RCLK | 1 | Input |
| RX Line Det | 2 | Input |
| TCLK | 3 | Input/Output |
| GND | 4 | GND |
| Data RX | 5 | Input |
| Data TX | 6 | Output |
| CTS | 7 | Input |
| RTS | 8 | Output |

Figure 36 - PDR8000 V.24 PinOut specification to connect DIU or CCGW

- 2) Another PDR/Repeater as per the cross over connection shown in the pin-outs below.

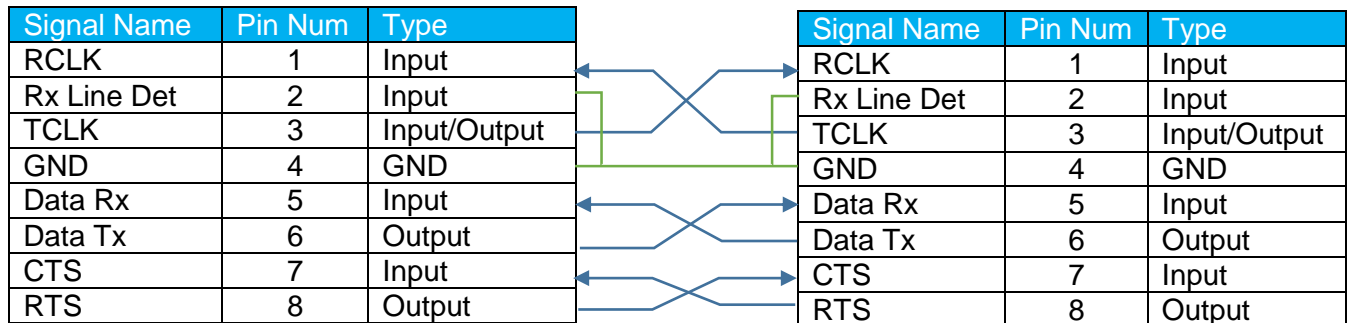


Figure 37 - V.24 Connection between two PDR8000s

To ensure the connection remains weatherproof, it is recommended to use RJ-45 connector CONEC 17-103274.

Appendix B - DC Cable

The DC cable shipped with the PDR8000 has a connector on one end and flying leads on the other. To complete the cable, connect the black wire to ground and the red wire to +13.8V.



Figure 38 - DC Power Cable

Appendix C – LIST OF ACRONYMS

| ACRONYMS | DESCRIPTION |
|-------------------|---|
| AUX | Auxiliary |
| CTS | Clear to Send |
| DC | Direct Current |
| DFSI | Digital Fixed Station Interface |
| DST | Daylight Saving Time |
| GND | Ground |
| kHz | Kilohertz A unit of frequency measurement |
| MHz | Megahertz A unit of frequency measurement |
| PC | Personal Computer or Laptop |
| PDR / PDR8000® | Portable Digital Repeater. An awesome product made proudly by Futurecom. |
| RCLK | Receive Clock |
| RF | Radio Frequency |
| RSSI | Received Signal Strength Indicator |
| RTS | Request to Send |
| Rx / RX | Receiver |
| TCLK | Transmit Clock |
| Tx / TX | Transmitter |
| USB | Universal Serial Bus Used for connecting the PDR to the programming PC. |
| V.24 | A digital link described as a physical V.24 link with HDLC (High-level Data Link Control). Used to connect PDR8000 to other infrastructure elements (e.g., CCGW, DIU, comparator) |