

# PDR8000<sup>®</sup> Portable Digital Repeater and Booster Pack Deployment Guide

**JUNE 2024**

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MN010434A01-AA

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# Document History

Version	Description	Date
MN010434A01-AA	Initial converted edition.	June 2024

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# About This Manual

This manual provides deployment guidelines for the Portable Digital Repeater PDR8000® and the Booster Pack.

For details on the APX series Mobile Radios operation, refer to the applicable Manuals available from Motorola Solutions Learning eXperience Portal (LXP) [website](#).

 **IMPORTANT:** Read the RF Safety Booklets provided with the product before proceeding with deployment.

## Notations Used in This Manual

This guide is designed to give you more visual cues.

The following graphic icons are used throughout the user guide.

 **DANGER:** The signal word DANGER with the associated safety icon implies information that, if disregarded, will result in death or serious injury.

 **WARNING:** The signal word WARNING with the associated safety icon implies information that, if disregarded, could result in death or serious injury, or serious product damage.

 **CAUTION:** The signal word CAUTION with the associated safety icon implies information that, if disregarded, may result in minor or moderate injury, or serious product damage.

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 **IMPORTANT:** IMPORTANT statements contain information that is crucial to the discussion at hand, but is not a CAUTION or WARNING. There is no warning level associated with the IMPORTANT statement.

 **NOTE:** NOTE contains information more important than the surrounding text, such as exceptions or preconditions. They also refer the reader elsewhere for additional information, remind the reader how to complete an action (when it is not part of the current procedure, for instance), or tell the reader where something is on the screen. There is no warning level associated with a notice.

 **TIP:** TIP contains information that provides the reader a different or quicker method in accomplishing the same task. At times, they also give the reader the best way to proceed or handle the task.

The following special notations highlight certain information:

**Table 1: Special Notations**

Example	Description
<b>Menu</b> key or <b>PTT</b> button	Bold words indicate a name of a key, button, soft menu item, or programming menu item.
<i>Ordering Guide</i>	Italic word indicates title of a bibliographic resource.
Powering Off	Typewriter words indicate the Human Machine Interface (HMI) strings or messages displayed on your display.
<b>File</b> → <b>Templates (DPD Files)</b> → <b>Load DPD Template</b>	Bold words with the arrow between indicate the navigation structure in the menu items.

# Related Publications

## User Guides

Part Number	Description
MN010354A01	Battery Pack and Charger User Guide
MN010433A01	PDR8000 Portable Digital Repeater Connectivity Deployment Application Note
MN010436A01	PDR8000 Product Planner

## Programming Guides

Part Number	Description
MN010432A01	PDR8000 Portable Digital Repeater Programming Guide

## Data Sheets

Data sheets can be retrieved from the Futurecom [website](#). Go to **Support** → **Documentation and Software** → **PDR8000** → **Datasheets**.

Model	Data sheets
PDR8000®	<ul style="list-style-type: none"><li>• PDR8000 - Suitcase</li><li>• PDR8000 - Rackmount</li></ul>

## Safety Booklets

Part Number	Description
MN010430A01	Product Safety and RF Energy Exposure Booklet for Booster Pack
MN010431A01	Product Safety and RF Energy Exposure Booklet for PDR8000

## Others

Publication	Description
Ordering Guides	<p>Include the following guides:</p> <ul style="list-style-type: none"><li>• PDR8000 Ordering Guide</li><li>• PDR8000 Rackmount Ordering Guide</li></ul> <p>Ordering guides can be retrieved from the Futurecom <a href="#">website</a>. Go to <b>Support</b> → <b>Documentation and Software</b> → <b>PDR8000</b> → <b>Ordering Guide</b>.</p>

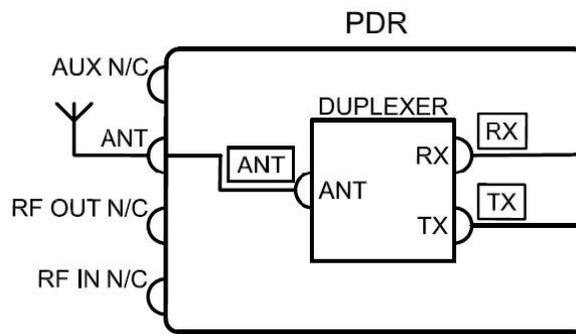
Chapter 1

# Introduction

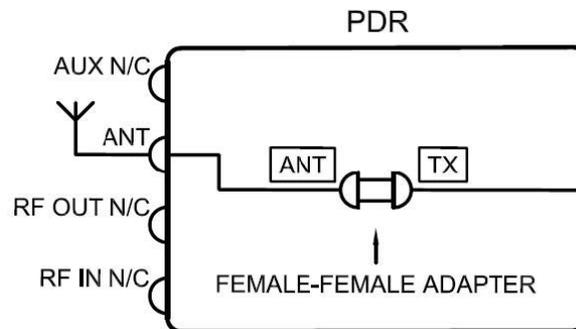
The PDR8000® is a self-contained device that is easily modified to utilize an alternate duplexer, transmit power Booster Pack, or both when required.

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 following figures are screened on the back of the removable top panel inside the PDR8000.

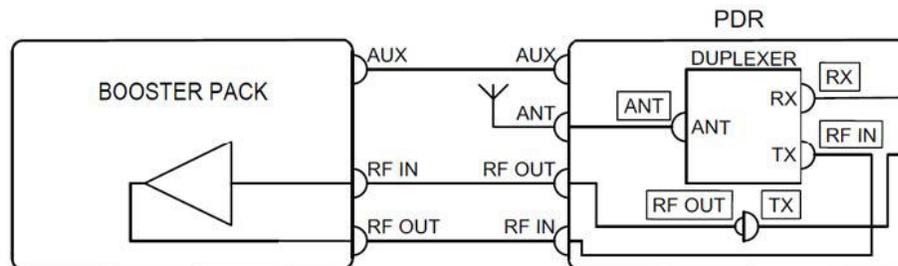
**Figure 1: Internal Duplexer Hardware Configuration**



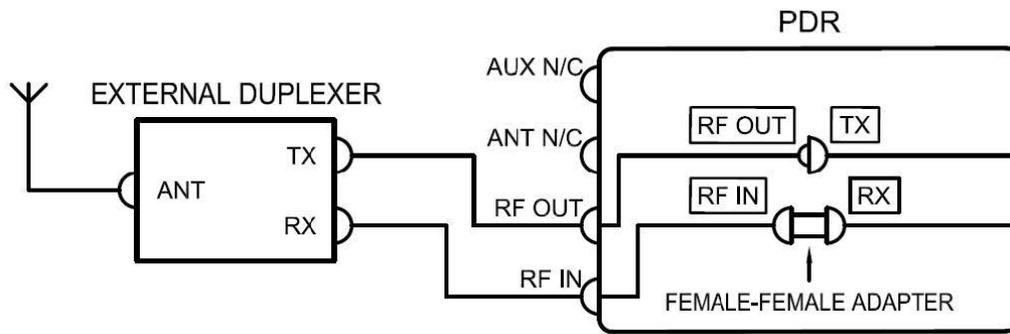
**Figure 2: Simplex Hardware Configuration**



**Figure 3: Internal Duplexer and Booster Pack Hardware Configuration**

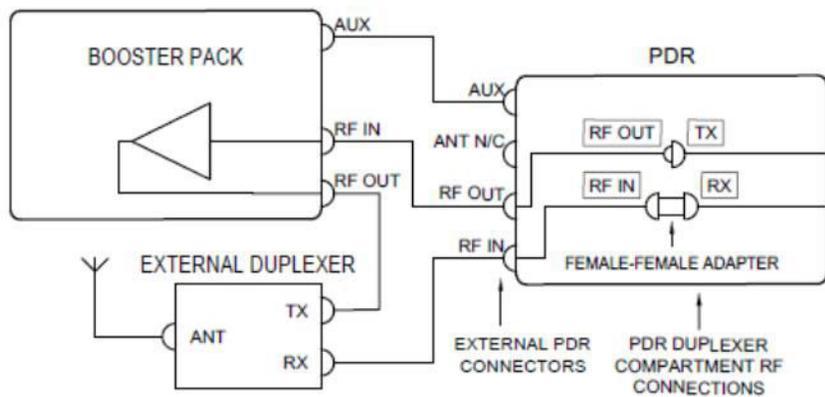


**Figure 4: External Duplexer Hardware Configuration**



 **NOTE:** External Duplexer Cabling is supplied by the user.

**Figure 5: External Duplexer and Booster Pack Hardware Configuration**



 **NOTE:** External Duplexer Cabling is supplied by the user.

## Chapter 2

# PDR8000® Deployment

This section depicts the setup and usage procedures of the PDR8000. These procedures must be performed in the following sequence:

1. [Connecting Internal Connections on page 13](#)
2. [Connecting External Connections on page 15](#)
3. [Connecting V.24 \(Optional\) on page 18](#)
4. [Connecting Ethernet \(Optional\) on page 19](#)
5. [Power Connection on page 19](#)
6. [Power up Confirmation on page 22](#)
7. [Keypad/Display Navigation on page 25](#)
8. [Open/Closed Case Operation on page 29](#)

### 2.1

## Connecting Internal Connections

This section determines the required RF hardware configuration and confirms that the internal connections correspond to the following instructions.

### Procedure:

1. To access the internal connections, unscrew the top panel four corner thumbscrews and remove the top panel.

**Figure 6: Removing PDR8000 Top Panel**



**Figure 7: PDR8000 Internal Connections and AC Fuse**



 **NOTE:** The location of the AC fuse in [Figure 7: PDR8000 Internal Connections and AC Fuse on page 14](#) is depicted by the arrow.

- If the PDR8000 Duplexer is changed, the **Duplexer Losses** field values in the Futurecom Repeater Configurator (FRC) must be verified to match the Duplexer Losses reading on the Duplexer Label for Motorola Solutions Duplexers.

**Figure 8: Duplexer Label (with Indicated Insertion Losses)**



For Duplexers from different manufacturers, refer to the manufacturer's specification for Duplexer losses and enter the values into the FRC **Duplexer Losses** fields. You can create different **Deployment Profiles** for each duplexer (if multiple Duplexers are being used) by selecting the appropriate Deployment Profile when inserting a different Duplexer. See the *PDR8000 Portable Digital Repeater Programming Guide* for more information.

- Connect the cables accordingly.

Configuration	Cable Connections
Internal Duplexer	<ul style="list-style-type: none"> <li>RX labeled cable connects to the RX port on Duplexer.</li> <li>TX labeled cable connects to the TX port on Duplexer.</li> <li>ANTENNA labeled cable connects to the ANTENNA port on Duplexer.</li> </ul>
Simplex	<ul style="list-style-type: none"> <li>TX labeled cable connects to the ANTENNA labeled cable using the supplied Female-Female adapter.</li> </ul>

Configuration	Cable Connections
Internal Duplexer and Booster Pack	<ul style="list-style-type: none"> <li>● RX labeled cable connects to the RX port on Duplexer.</li> <li>● RF IN labeled cable connects to the TX port on Duplexer.</li> <li>● ANTENNA labeled cable connects to the ANTENNA port on Duplexer.</li> <li>● TX labeled cable connects to the RF OUT labeled cable.</li> </ul>
External Duplexer	<ul style="list-style-type: none"> <li>● TX labeled cable connects to the RF OUT labeled cable.</li> <li>● RX labeled cable connects to the RF IN labeled cable using the supplied Female-Female adapter.</li> </ul>
External Duplexer and Booster Pack	<ul style="list-style-type: none"> <li>● TX labeled cable connects to the RF OUT labeled cable.</li> <li>● RX labeled cable connects to the RF IN labeled cable using the supplied Female-Female adapter.</li> </ul>

4. When cable connections are completed, reattach the top panel and tighten the screws.

## 2.2

# Connecting External Connections

Based on your required configuration, proceed with the following procedures for the external connections.

### Procedure:

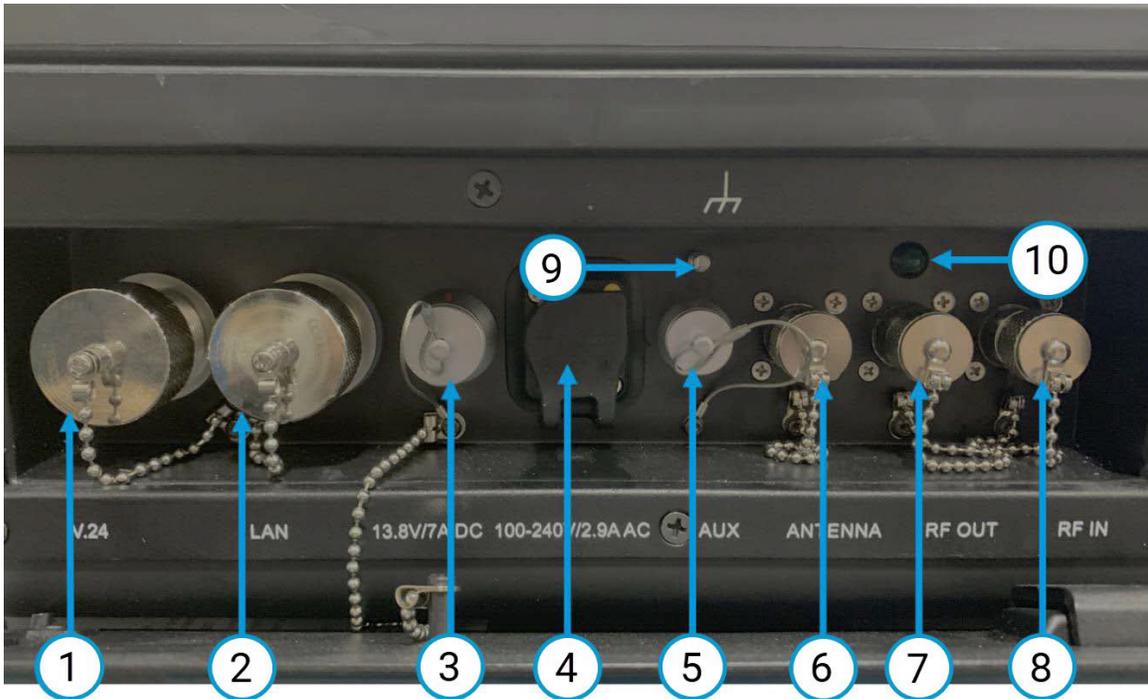
1. To access the external connections, pull the release latch and remove the side panel.

**Figure 9: Side Panel Removal**



2. Familiarize with the external connectors located at the side panel.

**Figure 10: PDR8000 Side Panel External Connectors**



**Table 2: PDR8000 External Connectors and LED Specifications**

Annotation	Label	Type	Manufacturer	Model Reference	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	13.8V/7A DC	DC Power Input	LEMO	EGL.2K.30 2.CLA	Push-Pull Dust Cap
4	100-240V/4 A AC	AC Power Input	NEUTRIK	NAC3MPX	Push-Pull Sealing Cover
5	AUX	Circular Receptacle	LEMO	EGG.1K.30 8.CLL <sup>1</sup>	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	N/A	N/A	N/A
10	Green LED Indicator		N/A	N/A	N/A

<sup>1</sup> Connector model was EGG.1K.306.CLL on releases before PDR8000 Release 4.

3. Connect the cables accordingly.

Configuration	Cable Connections
Internal Duplexer	<ul style="list-style-type: none"> <li>● The ANTENNA cable connects to the ANTENNA connector.</li> <li>● AUX, RF OUT, and RF IN are not connected.</li> </ul>
Simplex	<ul style="list-style-type: none"> <li>● The ANTENNA cable connects to the ANTENNA connector.</li> <li>● AUX, RF OUT, and RF IN are not connected.</li> </ul>
Internal Duplexer and Booster Pack	<ul style="list-style-type: none"> <li>● AUX cable connects from the AUX connector of the PDR8000 to the AUX connector of the Booster Pack.</li> <li>● The ANTENNA cable connects to the ANTENNA connector.</li> <li>● RF cable connects from the RF OUT connector of PDR8000 to the RF IN connector of Booster Pack.</li> <li>● RF cable connects from the RF IN connector of PDR8000 to the RF OUT connector of Booster Pack.</li> </ul>
External Duplexer	<ul style="list-style-type: none"> <li>● The duplexer cable (supplied by the end user) connects from the RF OUT connector of PDR8000 to the TX port of External Duplexer.</li> <li>● The duplexer cable (supplied by the end user) connects from the RF IN connector of PDR8000 to the RX port of External Duplexer.</li> <li>● AUX and ANTENNA are not connected.</li> </ul>
External Duplexer and Booster Pack	<ul style="list-style-type: none"> <li>● AUX cable connects from the AUX connector of the PDR8000 to the AUX connector of the Booster Pack.</li> <li>● RF cable connects from the RF OUT connector of PDR8000 to the RF IN connector of Booster Pack.</li> <li>● The duplexer cable (supplied by the end user) connects from the RF IN connector of PDR8000 to the RX port of External Duplexer.</li> <li>● Duplexer cable (supplied by end user) connects from the TX port of External Duplexer to the RF OUT end connector of Booster Pack.</li> <li>● The ANTENNA cable connects to the ANTENNA port of the External Duplexer.</li> <li>● The ANTENNA connector of PDR8000 is not connected.</li> </ul>

**Postrequisites:** When the PDR8000 is no longer required, remove the cable connections and replace the side panel. To replace the side panel, hook the left side of the panel in place and push the right side of the panel in place. A click sound is heard when the side panel locks in place.

**Figure 11: PDR8000 Side Panel Cover**



### 2.3

## Connecting V.24 (Optional)

Perform the following procedures when V.24 connection is required.



**NOTE:**

- PDR8000 supports a 9600 baud synchronous link.
- The V.24 end connector on the PDR8000 is weatherproof. To ensure the connection remains weatherproof, use an IP65 compliant end connector, such as CONEC 17-103274, with the V.24 cable.
- PDR8000 has been tested with DIU3000 and serial modems, such as Raymar-Telenetics V.3600 SA Modem and Paradyne 325.

**Procedure:**

1. To access the V.24 end connector, unscrew the V.24 connector dust cap (see [Figure 10: PDR8000 Side Panel External Connectors on page 16](#)).
2. Connect the V.24 cable (supplied by the end user, see [V.24 Cable on page 41](#)) from the V.24 end connector of the PDR8000 to one of the following V.24 system devices:
  - DIU (supplied by end user)
  - Modem (supplied by end user)
  - Conventional Channel Gateway (supplied by end user. Also available as model number SQM01SUM0205 from Motorola Solutions)
  - Another PDR8000

## 2.4

# Connecting Ethernet (Optional)

Perform the following procedures when an Ethernet connection is required.

 **NOTE:** The LAN end connector on the PDR8000 is weatherproof. To ensure the connection remains weatherproof, use an IP65 compliant end connector with the Ethernet cable.

### Procedure:

1. To access the Ethernet end connector, unscrew the LAN connector dust cap (see [Figure 10: PDR8000 Side Panel External Connectors on page 16](#)).
2. Connect the Ethernet cable (supplied by the end user) from the LAN end connector of the PDR8000 to the Ethernet system device:
  - Ethernet Switch or Modems (supplied by the end user)
  - Gateway (supplied by the end user)

## 2.5

# Power Connection

The following procedures connect DC power, AC power, or both to your PDR8000.

 **IMPORTANT:**

- Read the RF Safety Booklets provided with the product before proceeding.
- Only proceed with this step once all the other connections are complete.

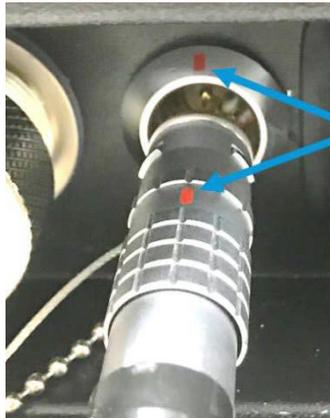
### 2.5.1

# Connecting DC Power

### Procedure:

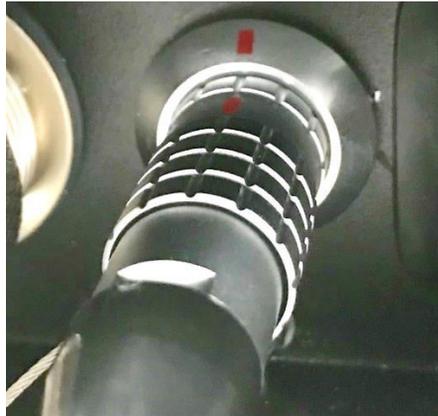
1. The DC Power Input connector is located at the side panel. To access the side panel external connectors, remove the side panel cover.  
 **NOTE:** For more information, see [Connecting External Connections on page 15](#).
2. Pull to remove the dust cap.
3. Align the red dots on the external connector and the cable.

**Figure 12: DC Connector Alignment**



4. Push DC power cable into place.

**Figure 13: DC Connector Plugged In**



5. Connect the other end of the DC power cable to the DC power supply.

**Result:** DC power is connected.

**Postrequisites:** To remove the DC cable, pull back the cable connector sleeve and pull out the cable using the connector body.

**Figure 14: Unplugging DC Power**



## 2.5.2

# Connecting AC Power

### Procedure:

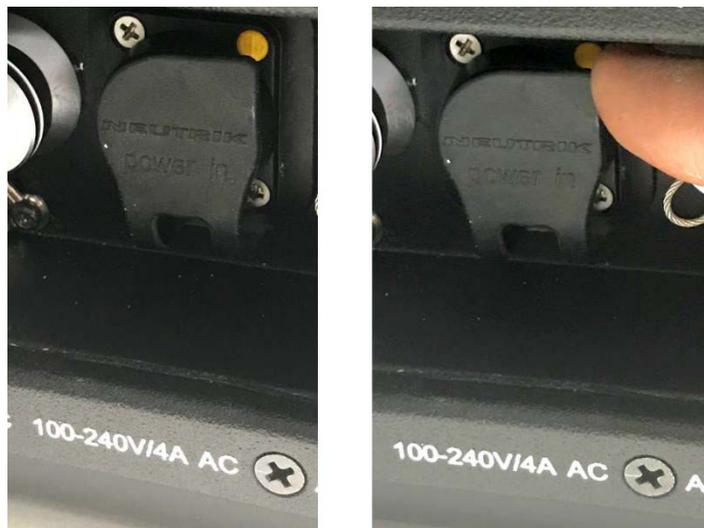
1. The AC Power Input connector is located at the side panel. To access the side panel external connectors, remove the side panel cover.



**NOTE:** For more information, see [Connecting External Connections on page 15](#).

2. Pull to remove the sealing cover.

**Figure 15: Removing AC Sealing Cover**



3. Insert the AC cable connector with the release latch at the 11 o'clock position and twist clockwise until you hear a click.

**Figure 16: Connecting AC Power Cable**



4. Connect the other end of the AC power cable to the AC power supply.

**Result:** AC power is connected.

**Postrequisites:** To remove the AC cable, pull the release latch back, twist the cable connector counterclockwise, and then pull the cable out.

### 2.5.3

## Power Scheme

Both AC (100 V–240 V) and DC (13.8 V) can be connected simultaneously.

The PDR8000 dynamically chooses the supply with the highest voltage. If one supply fails, the other will take over with an instant transfer of power.

 **NOTE:** The AC power does not recharge the DC battery pack.

### 2.6

## Power up Confirmation

Once the PDR8000 successfully powers up, the fan and the POWER LED in the bottom-right corner of the LED panel turn on.

### PDR8000 LED Panel

Figure 17: PDR8000 LED Panel

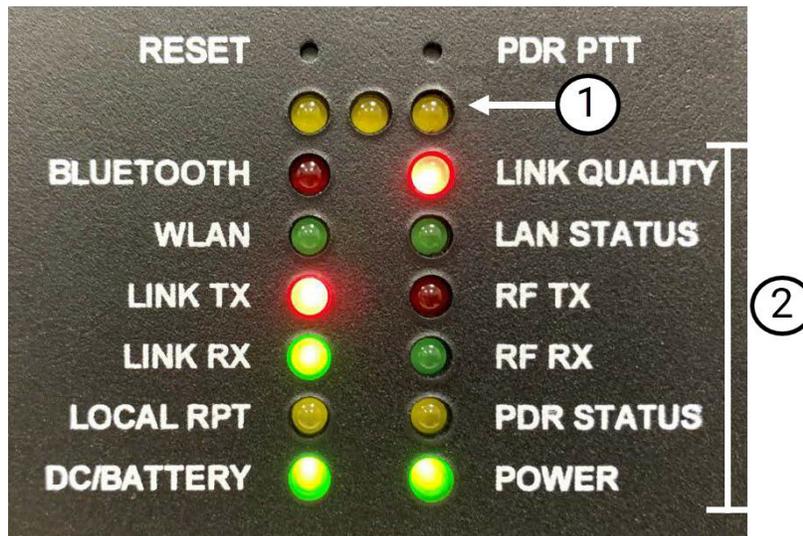


Table 3: PDR8000 LED Panel Description

Annotation	Description
1	General Status LEDs
2	Dedicated Status LEDs

### General Status LEDs

The three General Status LEDs are used to communicate various high-level status:

- PDR8000 Operational Mode
- PDR8000 Warning Status
- PDR8000 Error Status

See [Table 4: General Status LEDs Definitions on page 23](#) for the General Status LED state definitions.

**Table 4: General Status LEDs Definitions**

LED State <sup>2</sup>			Status Description
LED 1	LED 2	LED 3	
<b>PDR Operational Modes</b>			
OFF	OFF	OFF	In Normal mode – No errors or warnings
ON			In Fallback In-Cabinet Repeat (FBICR) Mode
	ON		In Service Mode
<b>PDR Error Status</b>			
	Fast Blinking		Internal Software Image Error
<b>PDR Warning Status</b>			
Fast Blinking			Real-Time Clock Battery Alarm
	Slow Blinking		Low Transmit Power Alarm
		Slow Blinking	Temperature Alarm

### Dedicated Status LEDs

The Dedicated Status LEDs are labeled to indicate the represented PDR8000 functions. The specific state of the status is dependent on the configuration and the notification mechanism used (ON/OFF/Blinking).

See [Table 5: Dedicated Status LEDs Definitions on page 23](#) for the state definitions for Dedicated Status LEDs.

**Table 5: Dedicated Status LEDs Definitions**

Label	LED State	Status Description
LINK QUALITY	OFF	No Link (wireline interface is off as programmed)
	Fast Blinking	Link Failure (when a wireline link is expected)
	Slow Blinking	Poor Quality Network
	Short Pulse	Marginal Quality Network
	ON	Good Quality Network
LAN STATUS	OFF	Ethernet Cable Disconnected
	ON	Ethernet Cable Connected
LINK TX	OFF	Link Tx Interface Off
	Short Pulse	Link Tx Interface On
	ON	Link Tx Interface Activity
	Fast Blinking	Link Tx Interface Failure (see Tech Log)
LINK RX	OFF	Link Rx Interface Off
	Short Pulse	Link Rx Interface Working
	ON	Link Rx Interface Activity

<sup>2</sup> A blank state within the table indicates that the LED status can be anything and need not taken into consideration.

Label	LED State	Status Description
LOCAL RPT	Fast Blinking	Link Rx Interface Failure (see Tech Log)
	OFF	Local Repeat Disabled
DC BATTERY	ON	Local Repeat Enabled
	OFF	DC source below threshold
	Fast Blinking	DC source above threshold
	ON	DC power acceptable
RF TX	Slow Blinking	Warning, DC source approaching lower threshold
	OFF	Transmitter Inactive
	ON	Transmitter Active
RF RX	OFF	Receiver Inactive
	ON	Receiver Active
PDR STATUS	Fast Blinking	Error (Check Tech Log)
	Slow Blinking	Warning (Check Tech Log)
	Short Pulse	PDR Functional
POWER	OFF	PDR Power Off
	ON	PDR Power On

## Side LED States

See [Table 6: PDR8000 Side LED Definitions on page 24](#) for the status definitions for the side LED.

**Table 6: PDR8000 Side LED Definitions**

LED State	Status Description
ON	PDR8000 is operating normally.
Slow Blinking	PDR8000 is operating, but under an abnormal or warning condition, such as 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.)
Fast Blinking	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 the LED has been disabled through configuration.

If the PDR8000 does not power up, the fan and the LED panel do not turn on. Disconnect the power source and replace the appropriate fuse.

### DC Power

The DC fuses are located inside the PDR8000. Contact your administrator for services.

### AC Power

The AC Fuse is located inside the Duplexer compartment.

To replace the fuse, unscrew the four screws on the top panel and remove the top panel. The fuse is in the bottom-right corner. Unscrew counterclockwise to remove the fuse cover and replace the fuse.

For more information, see [Figure 6: Removing PDR8000 Top Panel on page 13](#) and [Figure 7: PDR8000 Internal Connections and AC Fuse on page 14](#).

Replacement fuse: Manufacturer: Bel, Part Number: 5ST5-R, 5 Amps.

## 2.7

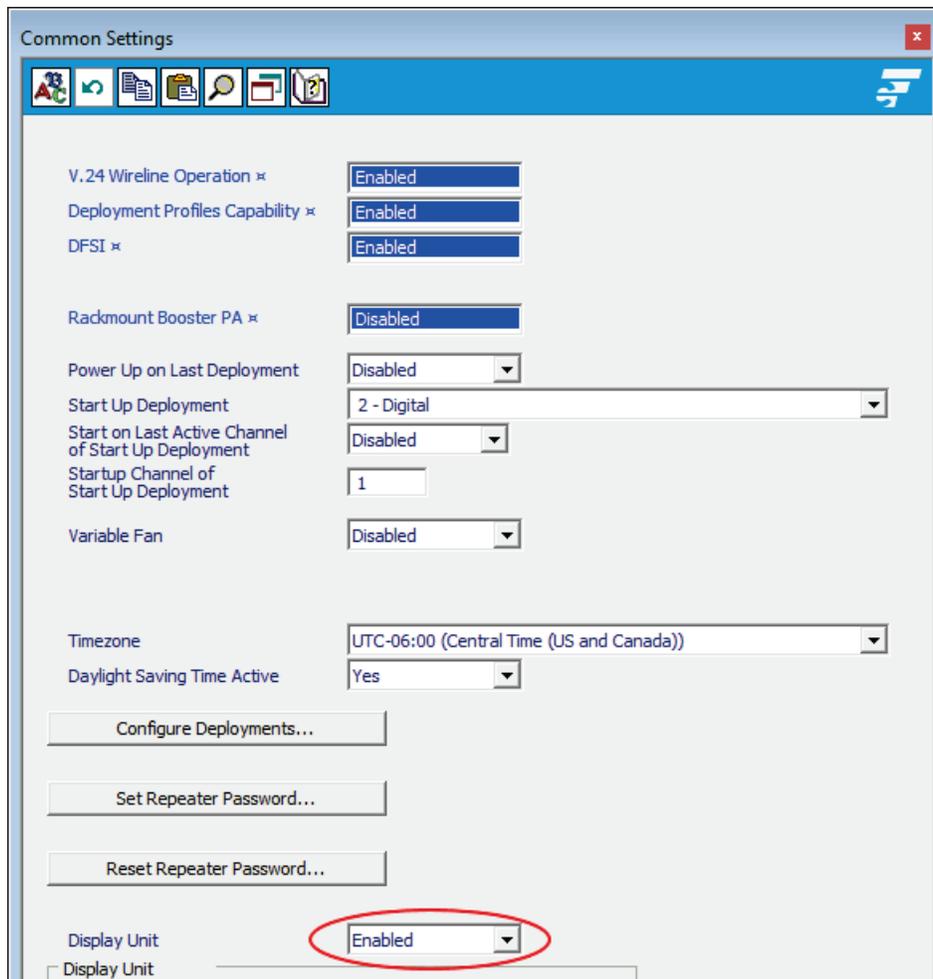
# Keypad/Display Navigation

The 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.

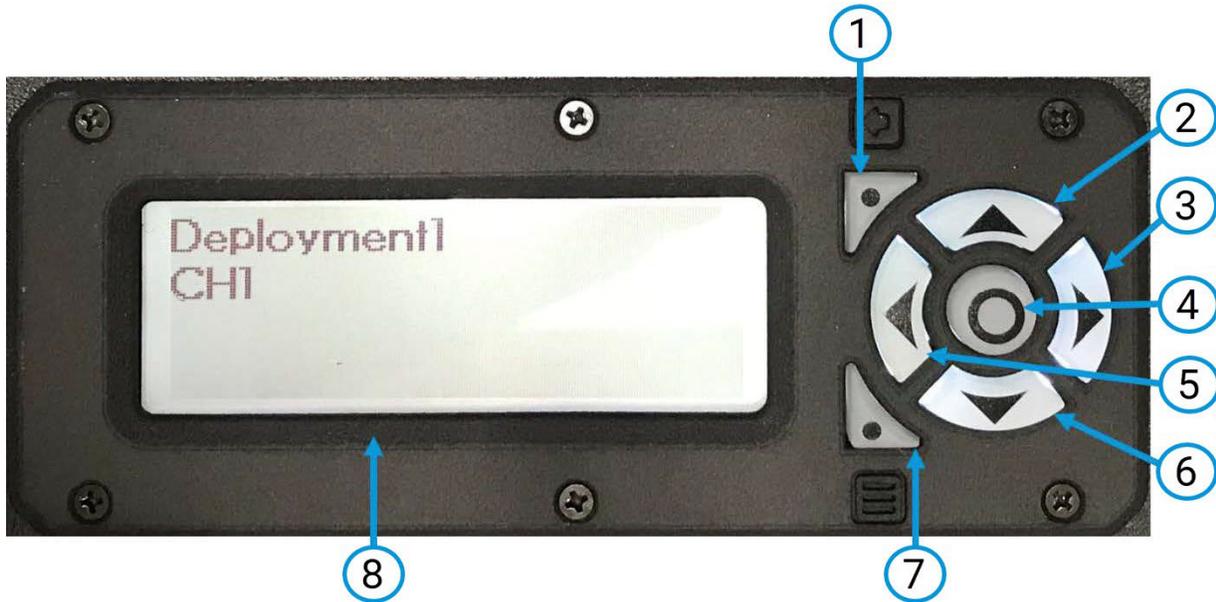
The Display Menu is configured by the PDR8000 configuration utility program known as the Futurecom Repeater Configurator (FRC). Any PDR8000 unit will have the menu specifically configured for the unit.

To allow display functionality from the FRC navigation tree, select **Common Settings** → **Display Unit** → **Enabled**.

**Figure 18: Display Unit Setting in FRC**



**Figure 19: PDR8000 Keypad/Display**



**Table 7: PDR8000 Keypad/Display Description**

Annotation	Button	Functions
1	Back	Navigate backwards to the previous menu level.
2	Up	Navigate upwards in a list of menu items.
3	Right	<ol style="list-style-type: none"> <li>1. Increment values such as CONTRAST, BRIGHTNESS, TIME ZONE, HOURS, MINUTES, SECONDS.</li> <li>2. Toggle (ENABLED/DISABLED) values for the KEYPAD TONE or DST.</li> <li>3. When the main screen is displayed as shown in <a href="#">Figure 19: PDR8000 Keypad/Display on page 26</a>, pressing and holding the Right button for 7 seconds sets the BRIGHTNESS to 100% and CONTRAST to 43%.</li> </ol>
4	Select	Select a menu item or value.
5	Left	<ol style="list-style-type: none"> <li>1. Decrement values such as CONTRAST, BRIGHTNESS, TIME ZONE, HOURS, MINUTES, SECONDS.</li> <li>2. Toggle (ENABLED/DISABLED) values for KEYPAD TONE or DST.</li> </ol>
6	Down	Navigate downwards in a list of menu items.
7	Menu	Toggles Menu On/Off (Menu may auto toggle off after a period of time). The user would be prompted for a password if the menu access is password protected and in a locked state.

Annotation	Button	Functions
8	Display	Display screen of the PDR8000.  <b>NOTE:</b> The response rate of display may be a bit slow at extremely low temperatures.

 **NOTE:** The menu navigation in [Table 7: PDR8000 Keypad/Display Description on page 26](#) is based on a generic configuration of a PDR8000 unit.

The PDR8000 can be configured to protect the access to display/keypad control operation with a password. If the display/keypad is in a 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 pressing **MENU** and selecting **SETTINGS** → **LOCK KEYPAD**.

Warning messages are displayed on line 3 of the display, and Error messages on line 4. See the *PDR8000 Portable Digital Repeater Programming Guide* for information pertaining to these messages.

**Table 8: PDR8000 Menu Items**

Main Menu	Sub-Menu	Action/Description
>CHANNELS	>List of Channels	View/Select Active Channel.
>DEPLOYMENTS	<List of Deployment Profiles	View/Select Active Deployment Profile.
>SETTINGS	>CONTRAST	View/Set Display Contrast Level.
	>BRIGHTNESS	View/Set Display 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.  <b>NOTE:</b> 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) ▶▶ (Marginal) ▶▶▶ (Good)

Main Menu	Sub-Menu	Action/Description	
>LINK	>NONE	Indicates that no wireline link is configured in the active Deployment Profile.	
	>V.24 ON/OFF	Indicates that the V.24 link is configured in the active Deployment Profile, and whether the link is established.	
	>DFSI ON/OFF	Indicates that the DFSI link is configured in the active Deployment Profile, and whether the link is established.	
	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 Control Port number.	
	>SVP: <x>	DFSI Station Voice Conveyance Port number.	
	If link is established		
	>HIP: <x.x.x.x>	DFSI Host IP Address.	
	>HCP: <x>	DFSI Host Control Port number.	
	>HVP: <x>	DFSI Host Voice Conveyance Port number.	
	>HB: <x>	Heartbeat in Seconds between DFSI host and station.	
	>ABOUT	> PDR 8000	Product Name
		> SN: <xxxxxxxx>	Product serial number
		> HW PN: 7V083X01	Hardware part number
		> HW REV: <xx.xx>	Hardware revision
> HW REL: <dd/mm/yy>		Hardware release date	
> APP PN: 4C088X01		Repeater firmware part number	
> APP VER: <xx.xx>		Repeater version	
> APP REL: <dd/mm/yy>		Repeater release date	
> APP BUILD: <xxx>		Repeater build number	
> B PN: 4C088X02		Repeater boot firmware part number	
> B VER: <xx.xx>		Repeater boot firmware version	
> B REL: <dd/mm/yy>		Repeater boot firmware release date	
> B BUILD: <xxx>		Repeater boot firmware build number	
> BBD PN:4C083X04		Baseband DSP part number	
> BBD VER: <xx.xx>		Baseband DSP version	
> BBD REL: <dd/mm/yy>		Baseband DSP release date	
> TRD PN: 4C083X03		Transceiver DSP part number	

Main Menu	Sub-Menu	Action/Description
	> TRD VER: <xx . xx>	Transceiver DSP version
	> TRD REL: <dd/mm/yy>	Transceiver DSP release date
	> IF HW PN: 7L088X01	Interface hardware part number
	> IF HW REV: <xxx . xx>	Interface hardware revision number
	> IF HW REL: <dd/mm/yy>	Interface hardware release date
	> IF APP PN: 4C088X07	Interface firmware part number
	> IF APP VER: <xx . xx>	Interface firmware version
	> IF APP R: <dd/mm/yy>	Interface firmware release date
	> IF APP BUILD: <xxx>	Interface firmware build number
	> IF B PN: 4C088X08	Interface boot part number
	> IF B VER: xx.xx	Interface firmware version
	> IF B R: <dd/mm/yy>	Interface firmware release date
	> IF B BUILD: <xxx>	Interface firmware build number
	> Copyright (C) <yyyy>	Copyright information
	> FUTURECOM	
	> SYSTEMS	
	> GROUP, ULC	

## 2.8

# 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.

**Figure 20: Closed Case Operation**



When operating open-case, the PDR8000 is to be placed flat on its large surface. Open case operation provides the best cooling capability.

 **NOTE:** The PDR8000 is not water resistant when operating open-case.

**Figure 21: Open Case Operation**



## Chapter 3

# Booster Pack Deployment

 **IMPORTANT:** The Booster Pack is an optional requirement.

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 with same dimensions and colors as the PDR8000 to provide additional transmit power. The PDR8000 and Booster Pack are connected using RF cables and a control cable.

**Figure 22: Booster Pack**



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

The RF output using a Booster pack is 50 W (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. With the duplexer connected, the power at the PDR antenna port is the power at the PDR8000 RF Out port plus duplexer losses. For example: if the Booster Pack output power is 45 dBm and the duplexer loss is  $-1.5$  dB, the output power at the PDR8000 antenna port is 43.5 dBm.

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 RF cables must be wired properly as shown in the following possible configurations.

**IMPORTANT:** 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 the compatible PDR8000s and Booster Packs configurations. Ensure that the PDR8000 is paired with the matching Booster Pack.

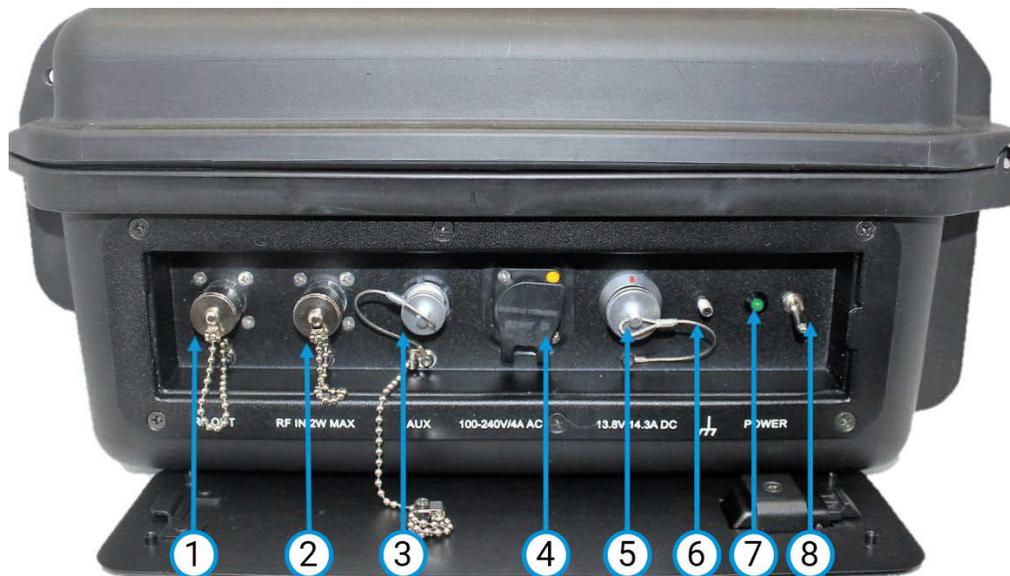
**Table 9: Compatible PDR8000s and Booster Packs Configurations**

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 <sup>3</sup> (DDN2735)	700 (764–776 MHz)
T93VSS9PW1AN (TT3153)	VTF0001A <sup>3</sup> (DDN2735)	800 (851–869 MHz)

3.1

## Booster Pack External Connections

**Figure 23: Booster Pack External Connections**



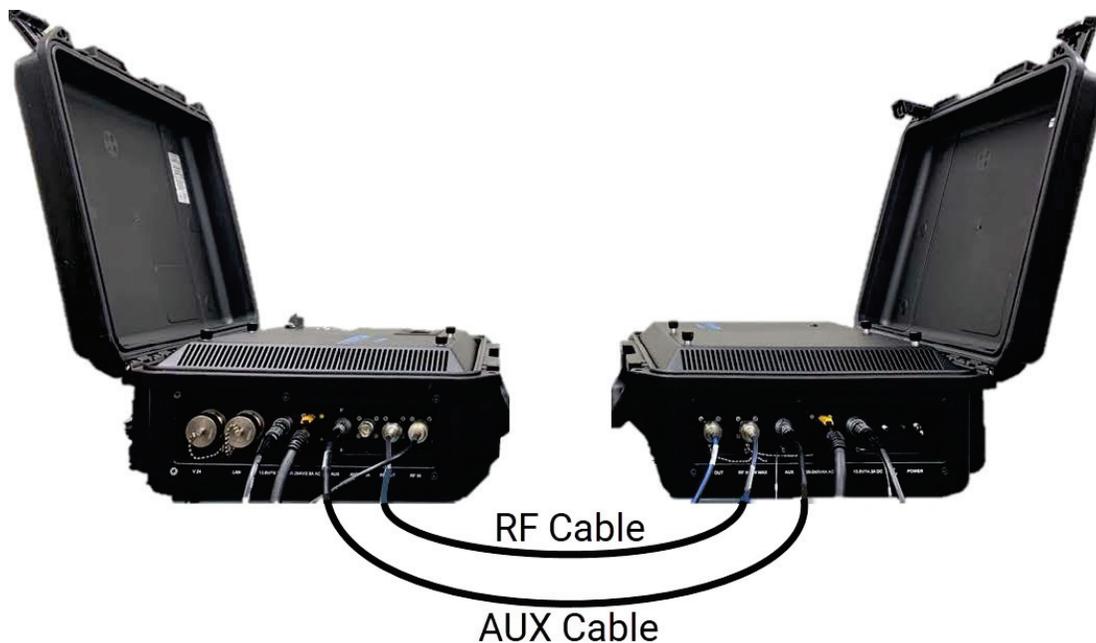
**Table 10: Booster Pack External Connectors and LED Specifications**

Anno-tations	Label	Type	Manufactur-er	Model Ref-erence	Open/Close Mechanism
1	RF OUT	N Female	N/A	N/A	Screw/Unscrew Dust Cap

<sup>3</sup> The 700 MHz and 800 MHz bands are covered by a single Booster Pack Model.

Annotations	Label	Type	Manufacturer	Model Reference	Open/Close Mechanism
2	RF IN	N Female	N/A	N/A	Screw/Unscrew Dust Cap
3	AUX	Circular Receptacle	LEMO	EGG.1K.308 .CLL	Push-Pull Dust Cap
4	100-240V/4 A AC	AC Power Input	NEUTRIK	NAC3MPX	Push-Pull Sealing Cover
5	13.8V/14.3A DC	DC Power Input	LEMO	EGL.2K.302. CLA	Push-Pull Dust Cap
6		Ground Lug	N/A	N/A	N/A
7	Power	Green LED Indicator	N/A	N/A	N/A
8	–	Toggle Switch	NKK	M2012LL3W 01	Pull out and toggle the switch for power LED to operate in stealth mode.

Figure 24: Booster Pack Connected to PDR8000



### 3.2

## Configuration A: Simplex with Booster Pack

Use this configuration when PDR8000 does not have a duplexer and is intended to be used in simplex operation with a single antenna.

Perform the following procedures in sequence:

1. [Preparing PDR8000 for Booster Pack on page 34](#)
2. [Connecting the AUX Cable on page 34](#)

3. [Connecting the External RF Cables and Antenna on page 35](#)
4. [Connecting the Power Cables on page 35](#)

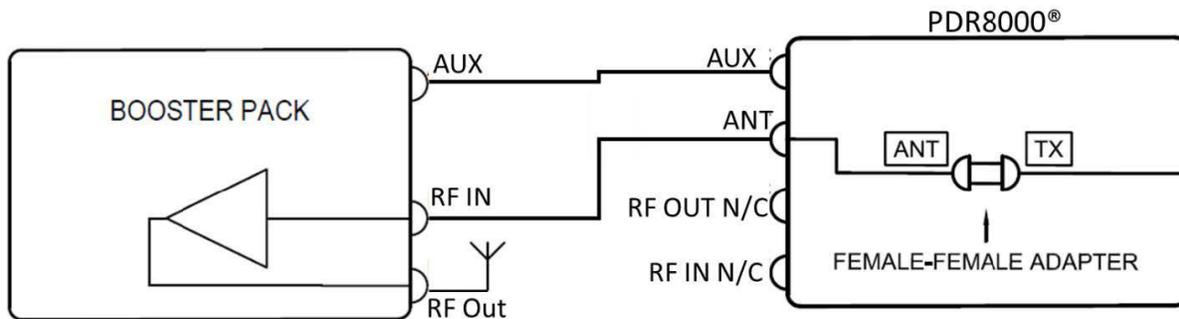
### 3.2.1

## Preparing PDR8000 for Booster Pack

To prepare the PDR8000 for the Booster Pack, perform the following procedures in sequence.

The procedure is also depicted in [Figure 25: PDR8000 Simplex with Booster Pack Configuration on page 34](#).

**Figure 25: PDR8000 Simplex with Booster Pack Configuration**



#### Procedure:

1. On PDR8000, open the top panel cover. See [Figure 6: Removing PDR8000 Top Panel on page 13](#) and [Figure 7: PDR8000 Internal Connections and AC Fuse on page 14](#).
2. Using a female-female adapter, connect the RF cable labeled as TX to the RF cable labeled as ANT.
3. Close the top panel cover.

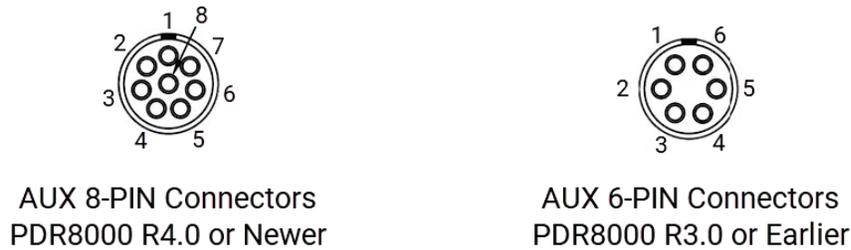
### 3.2.2

## Connecting the AUX Cable

The AUX cable is used for the PDR8000 to detect and communicate with the Booster Pack.

Depending on the revision of the PDR8000, the AUX connector on the side panel may have either a 6-PIN or 8-PIN connector as shown in [Figure 26: 8-PIN or 6-PIN PDR8000 AUX Connector on page 35](#).

**Figure 26: 8-PIN or 6-PIN PDR8000 AUX Connector**



**Procedure:**

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

3.2.3

## Connecting the External RF Cables and Antenna

The simplex with Booster Pack configuration requires one external RF cable and an antenna. Connect the cable and the antenna as follows (see [Figure 25: PDR8000 Simplex with Booster Pack Configuration on page 34](#) for wiring diagram).

**Procedure:**

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

3.2.4

## Connecting the Power Cables

Once the AUX, RF cables, and antenna are connected, connect the AC or DC power cables to the PDR8000 and Booster Pack.



**CAUTION:** Ensure that the power cables to the units are connected securely before plugging the cables to a wall outlet or DC power supply.

**Procedure:**

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

### 3.3

## Configuration B: PDR8000 Internal Duplexer with Booster Pack

Use this configuration when PDR8000 has an internal duplexer and is intended to be used in full duplex operation with a single antenna.<sup>4</sup>

Perform the following procedures in sequence:

1. [Preparing PDR8000 for Booster Pack on page 36](#)
2. [Connecting the AUX Cable on page 37](#)
3. [Connecting the External RF Cables and Antenna on page 37](#)
4. [Connecting the Power Cables on page 37](#)

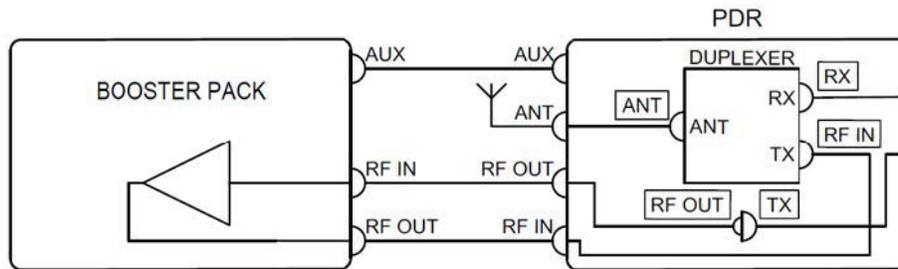
#### 3.3.1

### Preparing PDR8000 for Booster Pack

To prepare the PDR8000 for the Booster Pack, perform the following procedures in sequence.

The procedure is also depicted in [Figure 27: Internal Duplexer and Booster Pack Hardware Configuration on page 36](#).

**Figure 27: Internal Duplexer and Booster Pack Hardware Configuration**



#### Procedure:

1. On PDR8000, open the top panel cover. See [Figure 6: Removing PDR8000 Top Panel on page 13](#) and [Figure 7: PDR8000 Internal Connections and AC Fuse on page 14](#).
2. Connect the RF cable labeled as RX to the RX connector of the duplexer.
3. Connect the RF cable labeled as RF IN to the TX connector of the duplexer.
4. Connect the RF cable labeled as TX to the cable labeled as RF OUT.
5. Connect the RF cable labeled as ANT to the ANT connector of the duplexer.
6. Close the top panel cover.

<sup>4</sup> If the PDR8000 Duplexer is changed, the **Duplexer Losses** field values in Futurecom Repeater Configurator (FRC) must be verified to match the 'Duplexer Losses' reading on the Duplexer Label (for Motorola Solutions Duplexers). For Duplexers from different manufacturers, refer to the manufacturer's specification for Duplexer losses and enter the values into the FRC **Duplexer Losses** fields. You can create different **Deployment Profiles** for each duplexer (if multiple Duplexers are being used by selecting the appropriate Deployment Profile when inserting a different Duplexer. For more information, see the *PDR8000 Portable Digital Repeater Programming Guide*.

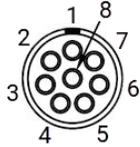
### 3.3.2

## Connecting the AUX Cable

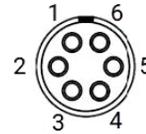
The AUX cable is used for the PDR8000 to detect and communicate with the Booster Pack.

Depending on the revision of the PDR8000, the AUX connector on the side panel may have either a 6-PIN or 8-PIN connector as shown in [Figure 28: 8-PIN or 6-PIN PDR8000 AUX Connector on page 37](#).

**Figure 28: 8-PIN or 6-PIN PDR8000 AUX Connector**



AUX 8-PIN Connectors  
PDR8000 R4.0 or Newer



AUX 6-PIN Connectors  
PDR8000 R3.0 or Earlier

#### Procedure:

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

### 3.3.3

## Connecting the External RF Cables and Antenna

The PDR8000 internal duplexer with Booster Pack configuration requires two external RF cables and an antenna. Connect the cables and the antenna as follows (see [Figure 27: Internal Duplexer and Booster Pack Hardware Configuration on page 36](#) for wiring diagram).

#### Procedure:

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

### 3.3.4

## Connecting the Power Cables

Once the AUX, RF cables, and antenna are connected, connect the AC or DC power cables to the PDR8000 and Booster Pack.



**CAUTION:** Ensure that the power cables to the units are connected securely before plugging the cables to a wall outlet or DC power supply.

#### Procedure:

1. Connect the DC or AC power cable to the PDR8000.
2. Turn on the PDR8000.
3. Connect the DC or AC power cable to the Booster Pack.

4. Turn on the Booster Pack after the PDR8000 has been powered up.

### 3.4

## Configuration C: PDR8000 External Duplexer with Booster Pack

Use this configuration when PDR8000 has an external duplexer and is intended to be used in full duplex operation with a single antenna.<sup>5</sup>

Perform the following procedures in sequence:

1. [Preparing PDR8000 for Booster Pack on page 38](#)
2. [Connecting the AUX Cable on page 39](#)
3. [Connecting the External RF Cables and Antenna on page 39](#)
4. [Connecting the Power Cables on page 40](#)

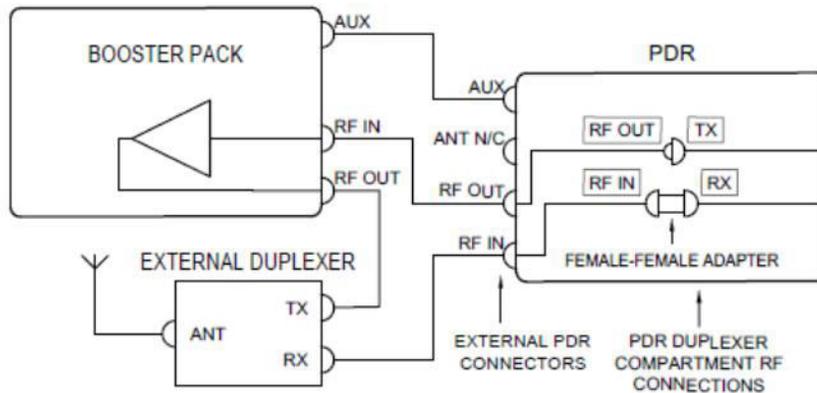
#### 3.4.1

### Preparing PDR8000 for Booster Pack

To prepare the PDR8000 for the Booster Pack, perform the following procedures in sequence.

The procedure is also depicted in [Figure 29: External Duplexer and Booster Pack Hardware Configuration on page 38](#).

**Figure 29: External Duplexer and Booster Pack Hardware Configuration**



#### Procedure:

1. On PDR8000, open the top panel cover. See [Figure 6: Removing PDR8000 Top Panel on page 13](#) and [Figure 7: PDR8000 Internal Connections and AC Fuse on page 14](#).
2. Connect the RF cable labeled as TX to the cable labeled as RF OUT.
3. Using a female-female adapter, connect the RF cable labeled as RX to the cable labeled as RF IN.

<sup>5</sup> If the PDR8000 Duplexer is changed, the **Duplexer Losses** field values in Futurecom Repeater Configurator (FRC) must be verified to match the 'Duplexer Losses' reading on the Duplexer Label (for Motorola Solutions Duplexers). For Duplexers from different manufacturers, refer to the manufacturer's specification for Duplexer losses and enter the values into the FRC **Duplexer Losses** fields. You can create different **Deployment Profiles** for each duplexer (if multiple Duplexers are being used by selecting the appropriate Deployment Profile when inserting a different Duplexer. For more information, see the *PDR8000 Portable Digital Repeater Programming Guide*.

4. Close the top panel cover.

### 3.4.2

## Connecting the AUX Cable

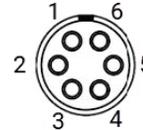
The AUX cable is used for the PDR8000 to detect and communicate with the Booster Pack.

Depending on the revision of the PDR8000, the AUX connector on the side panel may have either a 6-PIN or 8-PIN connector as shown in [Figure 30: 8-PIN or 6-PIN PDR8000 AUX Connector on page 39](#).

**Figure 30: 8-PIN or 6-PIN PDR8000 AUX Connector**



AUX 8-PIN Connectors  
PDR8000 R4.0 or Newer



AUX 6-PIN Connectors  
PDR8000 R3.0 or Earlier

#### Procedure:

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

### 3.4.3

## Connecting the External RF Cables and Antenna

The PDR8000 external duplexer with Booster Pack configuration requires two external RF cables and an antenna. Connect the cables and the antenna as follows (see [Figure 29: External Duplexer and Booster Pack Hardware Configuration on page 38](#) for wiring diagram).

#### Procedure:

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

### 3.4.4

## Connecting the Power Cables

Once the AUX, RF cables, and antenna are connected, connect the AC or DC power cables to the PDR8000 and Booster Pack.



**CAUTION:** Ensure that the power cables to the units are connected securely before plugging the cables to a wall outlet or DC power supply.

#### **Procedure:**

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

## Appendix A

# V.24 Cable

The V.24 cable can be created at a custom length for each customer configuration. The cable 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 listed in [Figure 31: PDR8000 V.24 PinOut Specification to Connect DIU or CCGW on page 41](#).

**Figure 31: PDR8000 V.24 PinOut Specification to Connect DIU or CCGW**

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

2) Another PDR/Repeater as per the cross over connection shown in the pin-outs listed in [Figure 32: V.24 Connection Between Two PDR8000s on page 41](#).

**Figure 32: V.24 Connection Between Two PDR8000s**

Signal Name	Pin Num	Type		Signal Name	Pin Num	Type
RCLK	1	Input	↔	RCLK	1	Input
Rx Line Det	2	Input	↔	Rx Line Det	2	Input
TCLK	3	Input/Output	↔	TCLK	3	Input/Output
GND	4	GND	—	GND	4	GND
Data Rx	5	Input	↔	Data Rx	5	Input
Data Tx	6	Output	↔	Data Tx	6	Output
CTS	7	Input	↔	CTS	7	Input
RTS	8	Output	↔	RTS	8	Output

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, remove the removable cap and connect the black wire to ground and the red wire to +13.8 V.

**Figure 33: 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
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 (for example, CCGW, DIU, comparator).