Futurecom Systems Group, ULC

PDR8000® Portable Digital Repeater Programming Guide

NOTES

Contents

Manual Revisions

Revision	Date	Notes & References
R1.0	2017-05-24	Initial Version
R2.0	2017-10-02	Release R2.0 updates, newsletter signup info
R3.0	2018-07-27	Release R3.0 updates
R3.02	2018-08-23	Release R3.02 updates
R3.03	2018-12-03	Release R3.03 updates, added Tweaker screen shots
R4.00	2019-10-31	Release R4.0 updates, added Booster Pack
R4.01	2020-04-27	Release 4.01 updates
R4.02	2020-07-24	Changed Tweaker references to Futurecom Repeater Configurator (FRC), documentation updates
R4.03	2020-10-27	Added note about Rackmount to Booster Pack section
R5.00	2021-11-08	Updates for DFSI and Rackmount PDR8000.
R5.01	2022-08-25	Add Windows 11 as a supported OS
R5.02	2022-12-02	Updated screenshots
R5.03	2023-03-17	Updated several default settings
R5.04	2023-07-12	Minor updates to some field labels & explanations
R5.05	2023-11-28	Allow configuration of Duplexer Losses

The list of Firmware given below is the minimum requirement for PDR8000 operation described in this document:

Repeater Module Firmware: 4C088X01 R5.05

Repeater Module Boot Firmware: 4C088X02 R5.04

Transceiver DSP: 4C083X03 R1.18

Baseband DSP: 4C083X04 R1.54

IF Module Firmware: 4C088X07 R5.05

IF Module Boot Firmware: 4C088X08 R5.05

Futurecom Repeater Configurator (FRC): 6V088X01 R1.40 or later

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The Futurecom Repeater Configurator provided by Futurecom Systems Group ULC includes the following Publicly Available Software.

Publicly Available Software List

Name: MFC Grid Control

Version: 2.24

Modified: Yes

Software Site: http://www.codeproject.com/KB/miscctrl/gridctrl.aspx

Source Code: No Source Code Distribution Obligations. The Source Code may be obtained from the original Software Site.

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This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

Changes or modifications not expressly approved by Futurecom Systems Group, ULC. could void the User's authority to operate the equipment.

Important Safety Information

The DVRS Repeater is intended for use in occupational / controlled conditions, where users have full knowledge of the operator exposure and can exercise control over the operator exposure to meet FCC/ISED limits. This radio is NOT authorized for the general population, consumer, or any other use.

Notice to Users (FCC/ISED)

To satisfy FCC/ISED RF exposure requirements for mobile transmitting devices, refer to the RF Safety Booklet [1] for TX – RX duty cycle and a separation distance between the antenna of this device and persons during operation. To ensure compliance, operations at closer than this distance is not allowed.

Futurecom requires the P25 DVRS operator to ensure FCC/ISED Requirements for Radio Frequency Exposure are met. The minimum distance between all possible personnel and the body of the DVRS equipped vehicle is specified in the RF Safety Booklet [2]. Failure to observe the Maximum Permissible Exposure (MPE) distance exclusion area around the antenna may expose persons within this area to RF energy above the FCC exposure limit for bystanders (general population).

It is the responsibility of the repeater operator to ensure that MPR limits are always observed during repeater transmissions. The repeater operator must always ensure that no person comes within MPE distance from the antenna.

Déclaration de Conformité

Cet équipement a été testé et déclaré conforme aux limites pour appareils numériques de classe A, selon la partie 15 des règlements de la FCC. Ces limites sont destinées à assurer une protection raisonnable contre les interférences nuisibles dans une installation commerciale. L'équipement génère, utilise et peut émettre de l'énergie de fréquence radio et peut causer des interférences nuisibles aux communications radio s'il n'est pas installé ou utilisé conformément au mode d'emploi. Toutefois, rien ne garantit l'absence d'interférences dans une installation particulière.

Les changements et les modifications qui n'ont pas été approuvés expressément par Futurecom Systems Group ULC pourraient faire perdre à l'utilisateur son droit à utiliser cet équipement.

Informations de Sécurité Importantes

Le répéteur DVRS est conçu pour être utilisé dans des conditions professionnelles / contrôlées, dans lesquelles les utilisateurs connaissent à fond leur exposition et peuvent exercer le contrôle nécessaire sur celle-ci pour se conformer aux limites de la FCC / ISED. Cette radio N'EST PAS autorisée pour être utilisée par le grand public, les consommateurs ou autres.

Avis Aux Utilisateurs (FCC / ISED)

Pour satisfaire les exigences de la FCC / ISED en matière d'exposition à l'énergie RF pour les transmetteurs mobiles, prière de consulter la Brochure Sécurité RF[1] pour obtenir le facteur d'utilisation transmission / réception et la distance de séparation entre l'antenne de cet appareil et les personnes pendant l'utilisation. Pour assurer la conformité, le fonctionnement à une distance moins élevée n'est pas autorisé.

Futurecom demande à l'opérateur du répéteur P25 DVRS de satisfaire aux exigences de la FCC / ISED en matière d'exposition à l'énergie RF. La distance minimale entre toutes les personnes possibles et une antenne omnidirectionnelle doit respecter les indications de la Brochure Sécurité RF. Tout manquement à respecter la zone d'exclusion autour de l'antenne définie par la distance correspondant à la limite d'exposition maximale peut exposer les personnes qui se trouvent dans ce rayon à une énergie RF supérieure à la limite d'exposition de la FCC pour les spectateurs (population générale).

C'est à l'opérateur du répéteur qu'il incombe de s'assurer que les limites d'exposition maximales sont respectées en tout temps pendant les transmissions du répéteur. L'opérateur du répéteur doit s'assurer en tout temps que personne ne s'approche de l'antenne à une distance inférieure à celle correspondant à la limite d'exposition minimale.

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[1] Prière de consulter la Brochure Sécurité RF (Canada) ou la brochure Sécurité RF (États-Unis) pour les distances de séparation

PDR8000 Programming Basics

Operating Systems	Microsoft Windows 10 or Windows 11
Processor	1GHz (or higher) grade processor
Peripherals	USB Port

Installing and Uninstalling the Futurecom Repeater Configurator (FRC)

If Futurecom Repeater Configurator (FRC) or Tweaker is previously installed on the PC, uninstall it before you install the new Futurecom Repeater Configurator (FRC).

To uninstall a program:

Start Icon → Settings → Apps → Apps & Features → (Select program you want to uninstall) → Uninstall.

To install the Futurecom Repeater Configurator (FRC), download the application from the Futurecom website into the desired location on your PC.

For optimum view of the Futurecom Repeater Configurator (FRC) menu windows on the PC, following are the recommended settings for Microsoft Windows.

- Windows display resolution set to 1920 x 1080 and text size no greater than 125%.
- It is recommended to use 'Tahoma' Regular Font as shown below.
- Adjust the font size for your display and preference
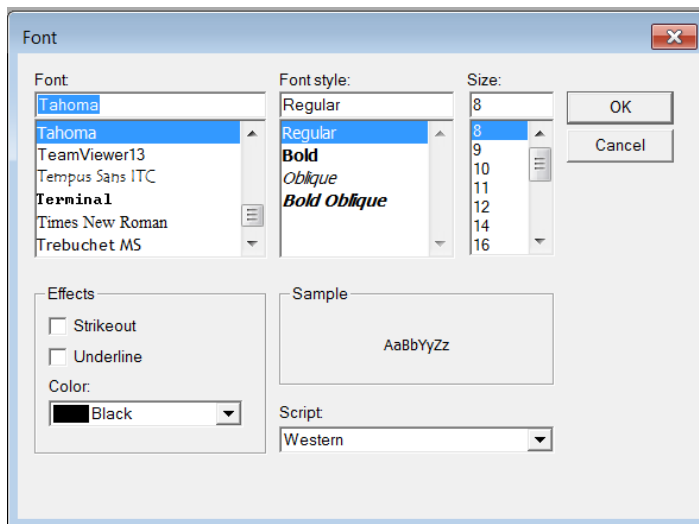
Using the Futurecom Repeater Configurator (FRC) Off-Line

The Futurecom Repeater Configurator (FRC) can be used off-line to review, modify and save new personality templates (dpd) files.

Viewing PDR8000 Personality Files

Run the Futurecom Repeater Configurator (FRC).

Select *File → Templates* (*DPD Files) → Load DPD Template* and specify the dpd file location and name when prompted.
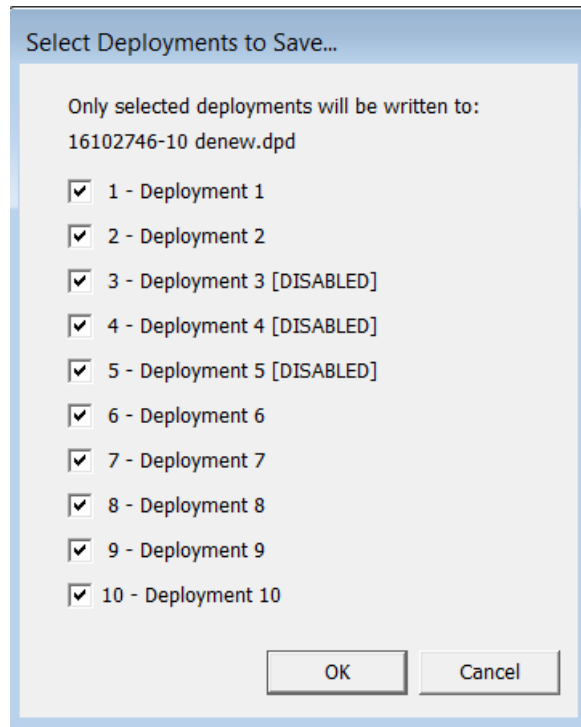
Modifying PDR8000 Personality Files

Once a dpd file is successfully opened (as described in the previous section), the dpd settings are available for reviewing and modification off-line.

Saving PDR8000 Personality Files

After editing the personality setting, the dpd file can be saved by selecting *File → Templates (DPD Files) → Save DPD File* and specifying a new or the same dpd file name and location.

The User can select the Deployments to be saved in the Pop-up window as shown below.

Select Deployments to Save…

Only selected deployments will be written to:
16102746-10 denew.dpd

- ☑ 1 - Deployment 1
- ☑ 2 - Deployment 2
- ☑ 3 - Deployment 3 [DISABLED]
- ☑ 4 - Deployment 4 [DISABLED]
- ☑ 5 - Deployment 5 [DISABLED]
- ☑ 6 - Deployment 6
- ☑ 7 - Deployment 7
- ☑ 8 - Deployment 8
- ☑ 9 - Deployment 9
- ☑ 10 - Deployment 10

OK   Cancel

The saved dpd file will consist of the Deployments selected above.

Next there will be a prompt to select the File Encryption type to Default or Custom.

If the user selects 'Custom', a password is required to create the file.
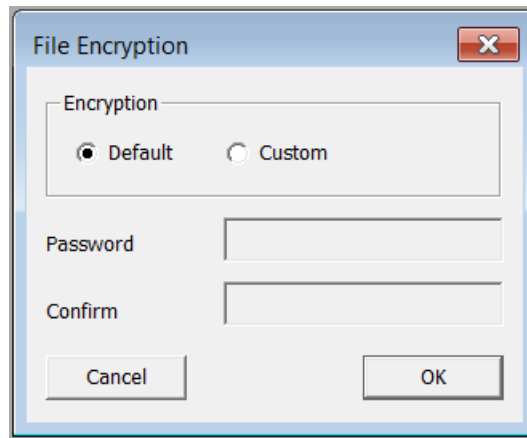
Note:

After the PDR8000 is programmed as per the user's requirements and the unit has been tested successfully with this template, it is recommended to save the template as dpd file on the computer for future use.

Menu Bar

The top Menu Bar is a strip of menu items that, when clicked, display a dropdown menu of other options and commands.

Field	Description	Dropdown Menus (Keyboard Shortcuts in parentheses)
File	Commands for file operations, including applying, loading, saving	Templates (DPD Files) ○ Apply DPD Template to PDR8000 ○ Save DPD Template ○ Load DPD Template **(Ctrl+F6)** Futurecom Support (EPR Files) ○ Save EPR Support File ○ Load EPR Support File **(F6)** Apply Rescue File to PDR8000 Apply License File Preferences Exit
PDR	Commands for PDR8000, including load, save, reset	Load Data from PDR8000 **(F2)** Save Changes to PDR8000 **(F4)** Reset PDR8000 **(F3)** EEprom Maintenance **(Ctrl+E)** Set Device Date and Time Configure Deployments
Application	Log information for Futurecom support purposes.	Log Windows ○ RS232 Log (Save, Clear) ○ Application Log (Show, Save, Clear) ○ Status Report ○ Status Log ○ EEprom Log Clear All Data
User	For Futurecom support purposes.	Change User
Options		COM Ports (opens Ports window)
Help	Links to support documentation and compatibility charts, provides search functionality.	Help About Find **(Ctrl+F)**

Options Menu

Create Support Package

Create Support Package helps create standard support files required for the Support team to debug VR issues. This can be accessed through the **Options** Drop down menu.
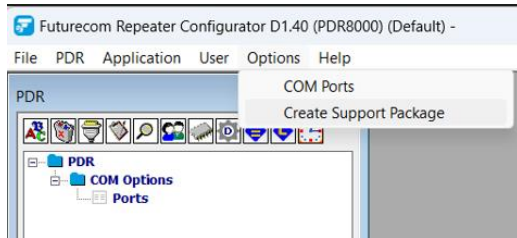
FRC takes over and creates the standard support package including

1. EPR file
2. DPD file
3. Com Port Trace
4. App Log Trace

At the end of saving all the FRC support files an additional compress file will be created:
SN_SP_Timestamp_SupportPackage.gz

Using the Futurecom Repeater Configurator (FRC) On-Line

To use the Futurecom Repeater Configurator (FRC) on-line the following is required:

1. Futurecom Repeater Configurator (FRC) software installed on the PC.

2. Powered up PDR8000.

3. Programming cable (USB cable directly connected to the PDR8000).

Setting up Communications with the PDR8000

1. Ensure the USB cable is plugged into your PC and connected to the USB port on the PDR8000.

2. Ensure the PDR8000 is powered up. Check the LED Display on the panel.

3. The 'Power' LED and 'DC /Battery' LED should be green.

4. On the FRC splash screen, select PDR8000 – by clicking the labeled button on the bottom right.

5. On the Futurecom Repeater Configurator (FRC) click on 'COM Ports' under 'Options' menu.

6. Check if the 'Futurecom USB modem' is displayed on the COM Port field.

7. If the COM Port display is blank, check the USB connection or change the USB Port on the computer.

Options: COM Ports
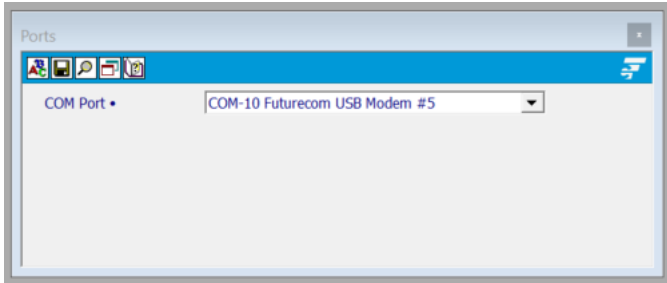
Field Name	Range	Description	Notes
COM Ports	N/A	Drop down list of ports available when connecting directly to the PDR8000 USB Port.	The save icon sets the selected COM port as the default USB Port so it is the first port accessed for any read/write operation.

Documentation Conventions

The following table provides information on conventions used throughout the document.

Convention	Description	Examples
Window Name→Field Name	Used through field descriptions to refer to a specific FRC field on a specific FRC window	Channel Enabled: This field is also updated based on RF Configuration window → Repeater Operation
Vertical Field Name	Field grouping / Box title for a set of fields logically grouped together on an FRC window	Personality Information → Date of Programming is the group name for the following fields: DAY, MONTH, YEAR
Range	Valid values allowed for a field with units of measurement (where appropriate) and default value identified where default value exists	Display Unit → Timeout for Menu: 5-60 **(10)** Seconds Indicates that this field has a range of 5-60 seconds; 10 seconds is the default.
Bold Text in Range Column	Factory default value	Start-Up → BSI Interval: 1-60 **(30)** minutes
Italic Field Names	Fields displayed without a title / label	
Description	Explains what the field represents and provides details on each field value where appropriate.	Frequency band Configuration Base → Rx Frequency: Indicates the base receive frequency for this PDR8000
Notes	Restrictions / limitations related to the programming of the field; identifies dependencies on other fields, or if a feature license is required.	Common Settings → Variable Fan: Variable Fan feature is only operational with PDRs version 4 hardware and later.
Blue, Italic, Bold text in Notes column	Feature license required for this field to be editable.	
Field Name*	Model specific fields	
Field Name ¤	Fields that are only applicable to the connected PDR. These fields will NOT be propagated to another Repeater via a template file (DPD). These fields are greyed out during offline editing except for Hardware/Software Info screen.	Deployment General Configuration → DFSI Fixed Station IP Address¤
Field Name ¤§	Fields that are only applicable to the connected PDR. These fields will NOT be propagated to another Repeater via a template file (DPD). These fields are greyed out during offline editing.	Deployment General Configuration window → DFSI Fixed Station Port¤§
Field Name ●	Fields that are only applicable to the installed FRC and stored locally on PC. These fields will NOT be propagated to another Repeater via a template file (DPD).	Ports → COM Port ● COM Port setting specific to the version of FRC installed on the PC

Convention	Description	Examples
Greyed Out (Disabled) Fields	Greyed out fields cannot be edited. Two scenarios exist: 1) Parameters displayed are ignored by PDR either due to licensing, or configuration of other fields. 2) Parameters displayed are fixed based on PDR unit hardware/software.	Examples: 1) Observed with V.24 Transmit Clock 2) Observed with Hardware/Software info

Reading the PDR8000 Electronic Label

The Electronic Label of the PDR8000 contains information regarding the firmware currently loaded in the PDR8000, the hardware model and serial number.

To read the PDR8000 Electronic Label, open the Hardware/Software Information window in the Futurecom Repeater Configurator (FRC).

The Electronic Label can be read either on-line or by loading a previously saved epr or dpd file.

The Electronic Label is also stored in the dpd file, even though the information contained in it does not overwrite the electronic labels of the PDR8000s during 'cloning'.

> **Note:**
>
> An epr file contains the personality and calibration data of a specific PDR8000 unit. A dpd file contains the personality settings of a PDR8000 unit which may be used as a template to copy into other PDR8000 units.

Reading from the PDR8000 (Uploading Data)

To read a PDR8000 unit:

1. Establish On-Line communication with the PDR8000.

2. Select *PDR → Load Data from PDR8000* OR Press **F2**.

3. The personality data of the currently connected PDR8000 unit will be loaded into the Futurecom Repeater Configurator (FRC) memory for reviewing and / or editing.

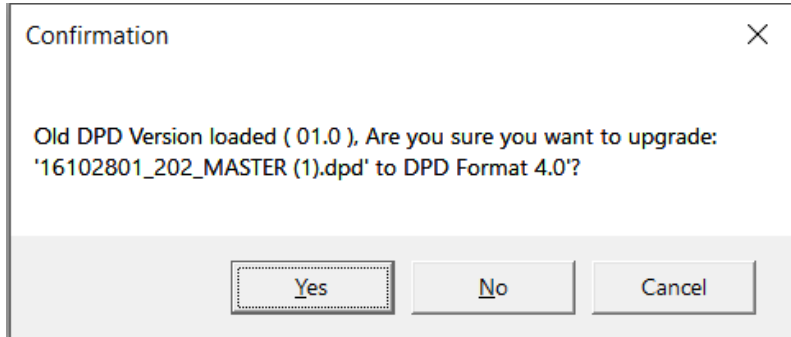## Writing to the PDR8000 (Downloading Data)

Applying dpd File ('Cloning')

This action reads (uploads) data from the attached PDR8000, applies a selected DPD Template, and then writes (downloads) the modified configuration to the PDR8000.
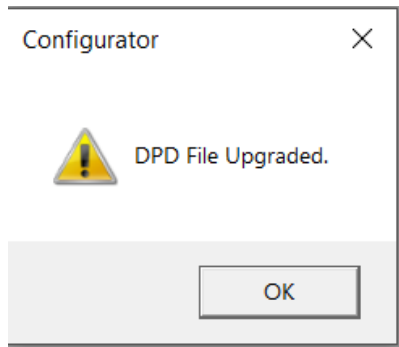
Select *File → Templates (DPD Files) → Apply DPD Template to PDR8000.* Specify the desired. dpd file name and location when prompted.

If the user has an old dpd file created with R1.0 or R2.0 or R3.0, the Futurecom Repeater Configurator (FRC) upgrades this file to the current dpd format prior to applying it to the PDR8000.

Upon loading an old dpd file, this dialogue window will appear:

Confirmation   ✕

Old DPD Version loaded (01.0), Are you sure you want to upgrade:
'16102801_202_MASTER (1).dpd' to DPD Format 4.0'?

| Yes | No | Cancel |

If the user selects "Yes", this message will appear:

Configurator   ✕

⚠ DPD File Upgraded.

OK

This message indicates that the program created a new file with the same name as the old file, but with the suffix "_v2_to_v4_updated.dpd"

For example, if the original file was named: Myfile.dpd

The upgraded file would be: Myfile_v2_to_v4_updated.dpd

After closing this message, it will immediately load the new upgraded dpd file.

Writing Selected Changes to the PDR8000

If any changes are made while reviewing the personality data of a PDR8000 (On-Line), the fields containing changes are shaded in green (if the changes are valid). If the changes are not valid, the fields will be marked red, and the new settings cannot be saved to the repeater.

After making the necessary changes to all the settings on the various Futurecom Repeater Configurator (FRC) screens, the new personality can be saved to the PDR8000 by executing any of the following:

- *PDR → Save Changes to PDR8000 (F4)*

  OR

- *PDR → EEprom Maintenance (Ctrl+E) → Changes → Repeater*

  OR

- Click on the EEprom Maintenance Icon → *Changes → Repeater*

Reset the repeater (after the changes are saved) to ensure the changes are in effect. Resetting of the PDR8000 can be done by executing any of the following methods:

- *PDR → Reset PDR8000 (F3)*

  OR

- *PDR → EEprom Maintenance → Reset Repeater*

When the PDR8000 personality has been changed and the changes are not causing any detected errors, the EEprom maintenance icon flashes yellow. Clicking on the icon opens the EEprom screen which offers the options of saving the changes to the PDR8000 and resetting the PDR8000. If the data changes contain errors, the EEprom icon flashes red and the screens containing conflicting data will be marked with a red exclamation mark. In this case, the changes cannot be written to the PDR8000 EEPROM until the errors are eliminated.

Futurecom Repeater Configurator (FRC) Icons

The Futurecom Repeater Configurator (FRC) window on the top of the menu tree (left-hand side) displays icons for quick access to some of the menu items. The icons and their functionality are described below.
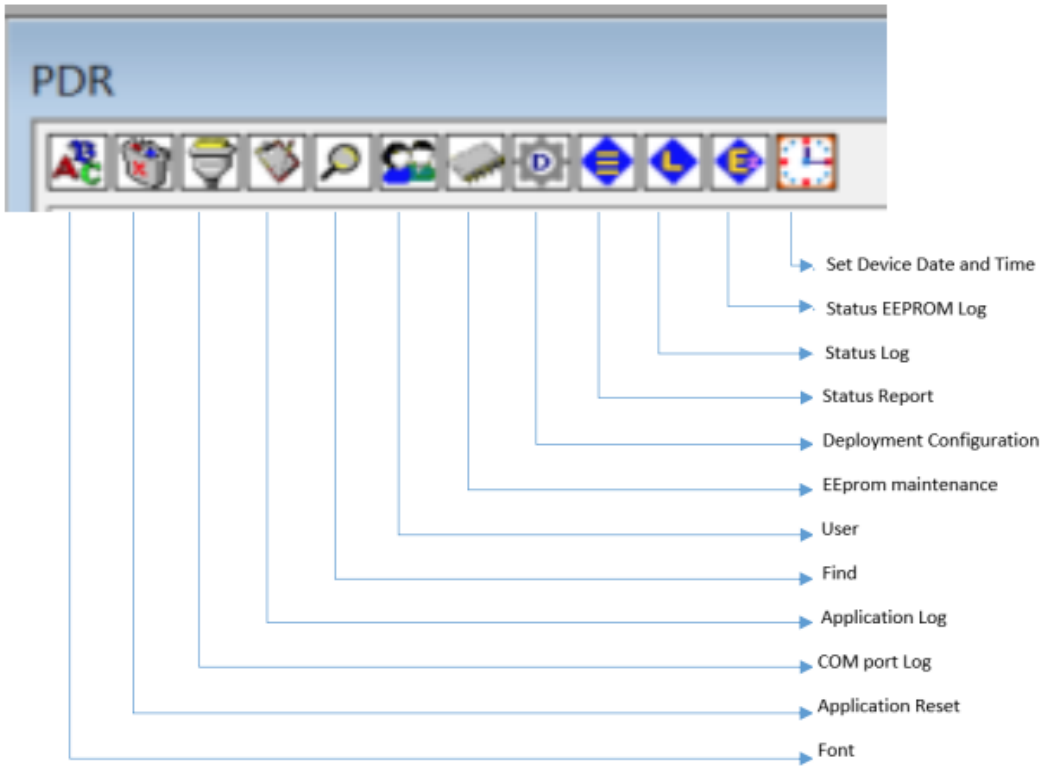
The icons on the individual Futurecom Repeater Configurator (FRC) menu denote the following:
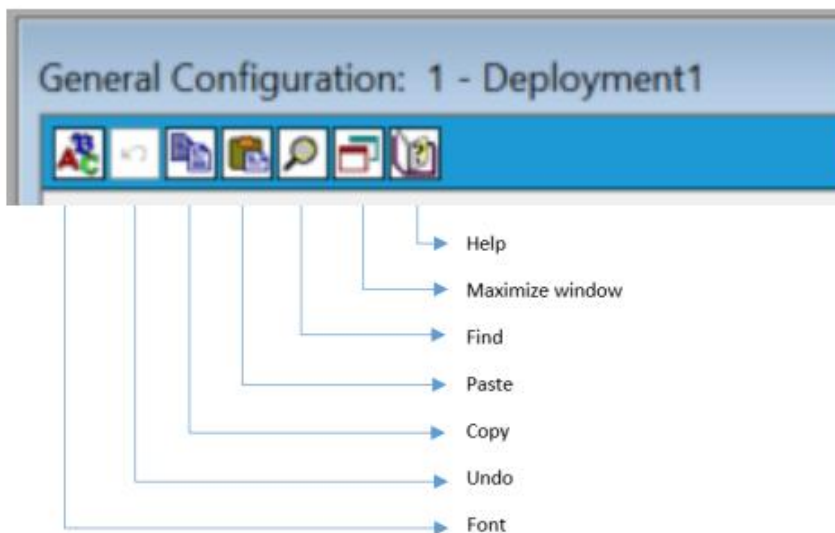
PDR8000 Programming Guidelines

Programming Steps Overview

The PDR8000 operation depends on the following:

1. PDR8000 firmware and programming settings
2. Subscriber Unit type, firmware and programmed personality
3. System infrastructure

PDR8000 Programming

The following paragraphs provide detailed PDR8000 programming information.


IMPORTANT!

Do not change PDR8000 settings unless fully familiar with the meaning of a specific option.

The Futurecom Repeater Configurator (FRC) program reports any obvious errors and does not allow invalid data to be saved to the PDR8000, however, not all inconsistencies can be reported by the Futurecom Repeater Configurator (FRC). Successful PDR8000 programming requires thorough understanding of the PDR8000 and PSU programming as well as the specific User / System requirements. Only when all templates (PDR8000 and PSU) are matched, the PDR8000 will operate properly.
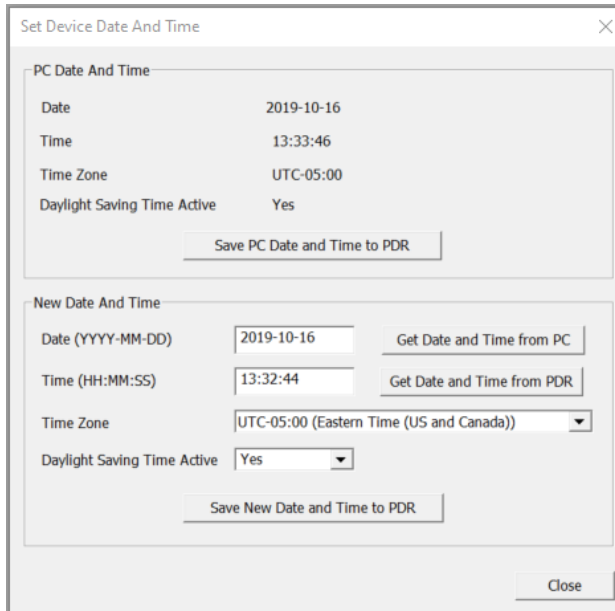

PDR8000 Configuration

Set Device Date and Time

To set the PDR8000 date and time connect the PDR8000 to the PC. Click on the PDR menu of the Futurecom Repeater Configurator (FRC). From the dropdown list select 'Set Device Date and Time'.
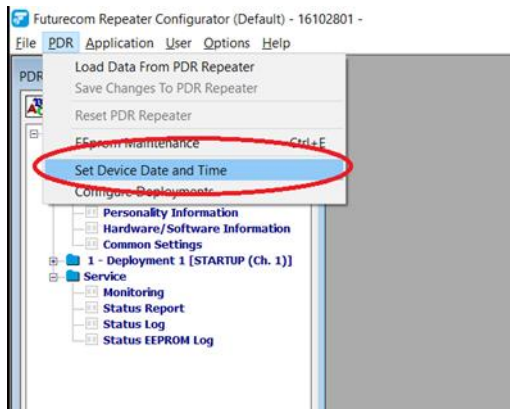
Pop Up window opens as shown below

The table below describes the fields of the 'Set Device Date and Time' menu.

	Field Name	Options/Units	Description	Notes
PC Date and Time	**Date**	YYYY-MM-DD	Displays the current PC date.	Display only
	Time	HH:MM:SS	Displays the current PC time.	Display only
	Time Zone		Displays the Time Zone.	Display only
	Daylight Saving Time Active	**Yes** / No	Displays Daylight Saving Time.	Display only
	Save PC Date and Time to PDR		Saves the PC Date and Time to the PDR8000.	
New Date and Time	**Get Date and Time from PC**	YYYY-MM-DD	Current Date and Time will be obtained from the PC connected to the PDR.	User can manually change
	Get Date and Time from PDR	HH:MM: SS	Clicking on this button will get the current Date, Time and Time Zone information from the PDR8000 connected to the PC.	User can manually change
	Time Zone		Select world Time Zones from the dropdown menu.	
	Daylight Saving Time Active	**Yes** / No	Enables/Disables Daylight Saving time.	Adds one hour to the DST.
	Save Time to PDR		Date and Time programmed above is saved to the PDR8000 upon clicking on this button.	

Frequency Band Configuration

This Menu Screen is used for selecting the Adjacent Channel Separation. Three selections are possible – Set 1, Set 2 and Set 3, which can be either Narrowband (12.5 kHz / 1.5 kHz) or Wideband (25 kHz / 3 kHz) or NPSPAC (25 kHz / 4kHz). Ensure the correct spacing (Set 1, Set 2, or Set 3) is selected to match the portable radio programming on each PDR8000 channel – see "Channel Configuration Deployment x" screen, 'Bandwidth' field.

Figure 1 - Frequency Band Configuration window

Field Name	Options / Units	Description	Notes
Selected Frequency RX Band	MHz	Indicates the band supported by this hardware platform. VHF R1 136 - 174 UHF R1 380 - 430 UHF R2 450 - 470 UHF R3 470 – 512 700 794 - 806 800 806 – 825	Read Only
Selected Frequency TX Band	MHz	Indicates the band supported by this hardware platform. VHF R1 136 - 174 UHF R1 380 - 430 UHF R2 450 - 470 UHF R3 470 – 512 700 764 - 776 800 851 - 870	Read Only
Base Rx Frequency	MHz	Indicates the base receive frequency for this PDR8000.	This field is read only. The value in parentheses is the factory default.
Max. Rx Frequency	MHz	Indicates the maximum receive frequency for this PDR8000.	This field is read only. The value in parentheses is the factory default.
Base Tx Frequency	MHz	Indicates the minimum transmit frequency for this PDR8000.	This field is read only. The value in parentheses is the factory default.
Max. Tx Frequency	MHz	Indicates the maximum transmit frequency for this PDR8000.	This field is read only. The value in parentheses is the factory default.
Channel-0 Base Frequency	MHz	Indicates the lowest frequency for this PDR8000- either transmit or receive.	This field is read only. The value in parentheses is the factory default.

Field Name	Options / Units	Description	Notes
Adjacent Channel Offset/FM Deviation	12.5 kHz/1.5 kHz 25 (NBPF) kHz/3 kHz 25 kHz/4 kHz (NPSPAC)	Offset indicates the width of each channel; used to determine the frequency of the next channel.	
Rx Synthesizer Frequency Step	2.5000 kHz* 5.0000 kHz* 6.2500 kHz * valid for VHF only	Frequency step size used by the receive synthesizer.	The value in parentheses shown in the Futurecom Repeater Configurator (FRC) window is the factory default.
Tx Synthesizer Frequency Step	2.5000 kHz* 5.0000 kHz* 6.2500 kHz * valid for VHF only	Frequency step size used by the transmit synthesizer.	The value in parentheses shown in the Futurecom Repeater Configurator (FRC) window is the factory default.
Restore Factory Default		Resets all the values to the factory pre-set values.	

Personality Information

	Field Name	Options / Units	Description	Notes
Date of Programming	**DAY**	2 digits	Indicates the day for the date of programming for this personality template.	
	MONTH	2 digits	Indicates the month for the date of programming for this personality template.	
	YEAR	2 digits	Indicates the year for the date of programming for this personality template.	
	Personality Name	Maximum 14 alphanumeric, characters	Name used to reference this personality template.	
	Personality Description	Maximum 32 alphanumeric characters	Descriptive text used to reference this personality template.	

Hardware/Software Information

This screen is for information purposes only and displays information relating to the Repeater Module and the IF Module: serial number, part numbers, revision/version numbers and release dates.

Common Settings

This screen is used for configuring deployments, choosing the desired channel, setting password and selecting the display unit menu. It also indicates if the V.24 or DFSI Wireline operation and Deployment Profile capability options installed.

Field Name	Options / Units	Description	Notes
V.24 Wireline Operation	Enabled/Disabled	Allows V.24 Wireline Operation.	Read only. Purchased Option *Feature License*
Deployment Profiles Capability	Enabled/Disabled	Allows use of multiple deployment profiles.	Read only. Purchased Option *Feature License*
DFSI	Enabled/Disabled	Allows DFSI Wireline Operation.	Read only. Purchased Option *Feature License*
Rackmount Booster	Enabled/Disabled	(Rackmount PDR8000 only)	Read only. Purchased Option *Feature License*
Power up on Last Deployment	**Enabled**/Disabled	When enabled, the PDR8000 powers up on the last active Deployment Profile. When Disabled the PDR8000 powers up on the deployment profile configured in "Start Up Deployment" (below).	When enabled, then the channel within the deployment profile that is active upon power up is determined by configuration within that Deployment Profile's "General Configuration" window
Start Up Deployment	**(1)**-10	Selects the Start Up Deployment.	Not applicable if Power up on Last Deployment is enabled.
Start on Last Active Channel of Start Up Deployment	Enabled/**Disabled**	If enabled, the PDR8000 will switch to the last active channel upon starting up	Not applicable if Power up on Last Deployment is enabled. In that case, the channel activated at power up is determined by configuration within that Deployment Profile's "General Configuration" window.
Startup Channel of Start Up Deployment	**(1)**-X	Channel number of the Start Up Deployment on which the PDR8000 shall start up on. Max channel number is the highest channel configured in the Start Up Deployment.	Not applicable if Start on Last Active Channel of Start Up Deployment is Enabled, or if Power up on Last Deployment is enabled.

If Power up on Last Deployment is enabled, then the channel activated at power up is determined by configuration within that Deployment Profile's "General Configuration" window. |

Field Name	Options / Units	Description	Notes
Variable Fan	**Enabled**/Disabled	Controls the speed of the suitcase PDR and Booster Pack's internal cooling fans. When **Enabled**, fan speed is automatically adjusted depending on the internal temperature of the unit. When Disabled, fans always run at full speed.	Variable Fan feature is only operational with PDRs version 4 hardware and later. (Earlier hardware always ran fans at full speed.) Disabling this feature also disables PDR's ability to query a suitcase Booster Pack for its RF Band information. This prevents PDR from warning a user if a non-matching RF Band booster is connected to a PDR.
Time Zone	**UTC-5:00 Eastern Time** (US and Canada)	Select time Zone from the drop-down menu.	Follows the settings in 'Set Device Date and Time'
Daylight Saving Time Active	**Yes** No	Enables/Disables Daylight saving time.	Follows the settings in 'Set Device Date and Time'
Configure Deployments		Allows the user to enable/disable deployments as per the PDR8000 Order. Any Deployment can be copied to any other Deployment. Deployments can be reset to factory default.	Opens a new window. If 'Deployment Profile Capability' is enabled. Refer section 2.6.4.1.1 of the PDR8000 Programming Guide
Set Repeater Password		Set Password for the PDR8000	
Reset Repeater Password		Reset the PDR8000 Password.	
Display Unit	**Enabled**/Disabled	Enables functionality on the front panel keypad display.	Only affects PDR units equipped with display unit.
Keypad Lock Password		Set Password to Lock the keypad	Refer Section 2.6.4.1.2 of the PDR8000 Programming Guide.
Keypad Lock Timeout	0-60 Minutes **(OFF)**	The keypad gets locked after the programmed time.	
Menu Scroll RollOver	**Enabled**/Disabled	When Enabled the Menu can be scrolled over on the display	

Display Unit (row label spanning Keypad Lock Password, Keypad Lock Timeout, and Menu Scroll RollOver)

Field Name	Options / Units	Description	Notes
Save Selected on Timeout	**Enabled**/Disabled	When enabled, PDR saves any setting changed on display unit when '**Timeout for Menu**' elapses.	Settings can also be saved by pressing '**Select**.'
Keypad Beep	**Enabled**/Disabled	Enables/Disables Keypad Beeps	
Backlight Timeout	**(0)** - 60 Minutes **(0)** = Always ON	The backlight will get timed out after the programmed time.	Default setting is **Always ON**; timer can be set from 1-60 minutes. Enter **(0)** to select '**Always ON**'
Timeout for Menu	5-60 **(10)** Seconds	The menu display will get timed out after the programmed time.	'**Save Selected on Timeout**' can be configured to save selection after elapsed time.
Deployments Menu	**Enabled**/Disabled	The Deployment menu on the Display panel is Enabled or Disabled.	
Channels Menu	**Enabled**/Disabled	The Channel menu on the Display panel is Enabled or Disabled	
Time/Date Menu	**Enabled**/Disabled	The Time/Date menu on the Display panel is Enabled or Disabled	
User Language	**English** French Spanish	User can select preferred language on the display.	
Display Settings	Upon clicking opens menu to reset Display Contrast and Brightness.	Resets Display Contrast and Brightness.	

Configure Deployment Profiles

Enables the user to configure Deployment profiles as per the Order placed for PDR8000.
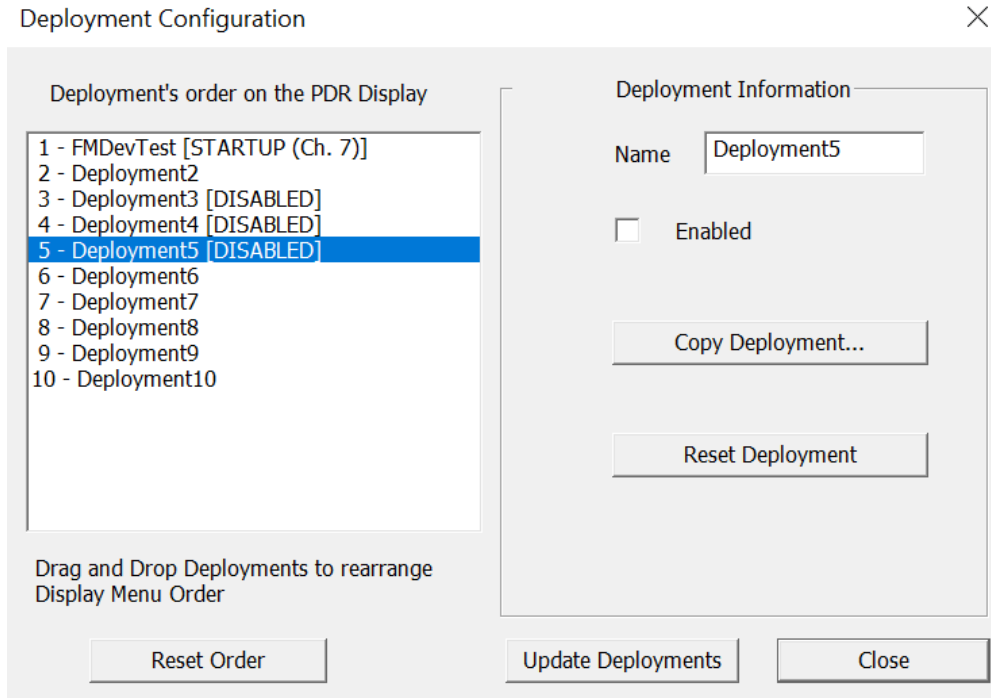
Figure 2 - Deployment Configuration window

Note:

The order of the deployment profiles can be rearranged by dragging and dropping up/down within the list of deployment profiles.

	Field Name	Options/Units	Description	Notes
Deployment Information	Deployments order on the PDR8000 Display		List of Deployment Profiles and their Status	Enabled or Disabled
	Name	Maximum 16 alphanumeric characters.	Name of the current Deployment Profile	Underscore may not be used in the Deployment name as it will be displayed as space on the PDR8000 display.
	Enabled	Enabled/Disabled	Deployment Profile enabled when checkbox is checked	Deployment status is displayed in the list of Deployments. Deployment 1 is always enabled
	Copy Deployment		Allows to copy Deployment Profile X configuration to Deployment Profile Y selected from the list.	
	Reset Deployment		Resets the currently selected Deployment Profile to Factory default.	
	Reset Order		Resets to factory order.	
	Update Deployments		Update the Deployments Profiles as Configured	
	Close		Prompts to confirm the changes made to the Deployment Profiles before the window closes.	

If the user clicks "Close" and no modifications have been made to the Deployment Profile order or any Deployment Profile name/enable status, the dialogue will close. If any of the changes have been made, the user will be prompted with this message:

Configurator   ✕

?   You have unsaved changes to the deployment configuration.
    Do you want to save these changes before closing?

                    Yes   No   Cancel
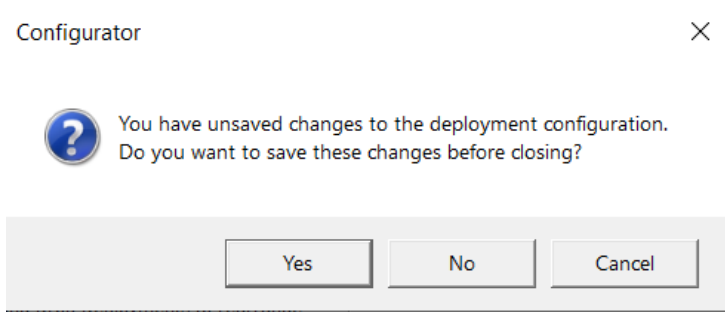
Selecting "Yes" will apply the changes and close the Deployment Configuration dialogue.
Selecting "No" will not apply the changes and close the Deployment Configuration dialogue.
Selecting "Cancel" will not apply the changes and will not close the Deployment Configuration
dialogue.

Upon clicking 'Update Deployments' user is prompted to confirm the changes.

Configurator   ✕

?   Are you sure you want to apply your changes?

                          Yes   No
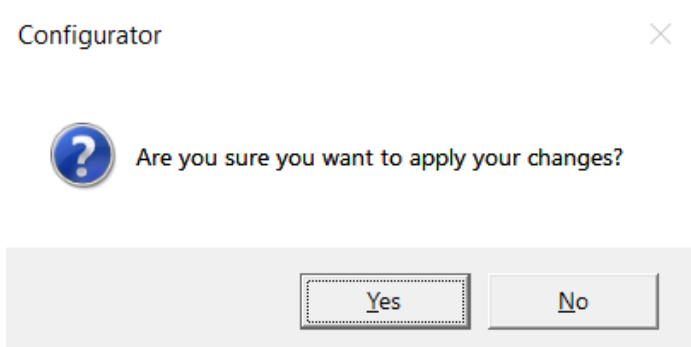
Selecting "Yes" applies the changes to the Deployment Profile configuration.

Keypad Password

Set password to lock the PDR8000 keypad.

Field Name	Range	Description	Notes
Password	4-10 directional arrows	Select the sequence of the directional arrow signs (up, down, left, right) from the drop-down menu to set the password.	The keypad password is unlocked using the Arrow keys on the PDR8000 display panel. The duration between the key presses must be less than 10sec.
Save		Save the password to the PDR8000	
Clear Password		Clears the password	
Close		Close the window	

Deployment Data Configuration

PDR8000 is intended to be utilized in a variety of different scenarios, each supported by customizing PDR8000's configuration parameters to match the needs of a given deployment. Since PDR8000 is intended to be an easily re-deployed unit, it offers an optional feature allowing multiple Deployment Profiles to be pre-programmed. The desired pre-configured Deployment Profile is easily activated from the unit's front panel keypad/display.

If the option for Deployment Profile Capability is enabled, PDR8000 can be programmed with up to ten different Deployment Profiles, each uniquely defining the operational characteristics of the PDR8000.

This capability can be used, for example, to pre-provision the PDR8000 with one Deployment Profile used when the unit is deployed as a Standalone Repeater, utilizing a set of frequencies, timings, access codes, etc., and then having a separate Deployment Profile defined for connecting the same PDR8000 to a Motorola comparator or infrastructure core utilizing a wireline link and potentially different RF frequencies.

Another convenient use of Deployment Profiles is to manage a PDR8000 that utilizes different physical duplexers. Sometimes different duplexers have different values for Insertion Loss (Duplexer Tx/Rx Losses). The values for Duplexer Losses are configured into PDR8000 on a per Deployment Profile basis. Therefore, when a duplexer is swapped into the PDR8000, the user can choose a Deployment Profile that has been pre-configured with the Tx/Rx Duplexer Loss values that correspond to the duplexer being connected to the PDR8000 unit.

By utilizing the ten possible Deployment Profiles, PDR8000 can be ready to "pick up and go" for a large number of common use case scenarios. The PDR8000 can be configured to power-up to a specific Deployment Profile or can power to the "last active" Deployment Profile. During field use the active Deployment Profile can be changed, through the front-panel display.

This capability also makes it possible to keep some common configurations on-board in PDR8000's Deployment Profile set, and then utilize one or more of the other Deployment Profiles as "temporary" set-ups, which can be configured without having to overwrite the commonly used ones.

PDR8000's Futurecom Repeater Configurator (FRC) configuration software provides the ability to create new Deployment Profiles from scratch, or to duplicate a known Deployment Profile and allow minor modifications to it, for use when operational requirements are similar but not the same.

The PDR8000 can be configured for 10 different Deployment profiles. If the Deployment Profile Capability is not purchased, PDR8000 can be programmed with a single set of configuration parameters. In this case, any need to switch to a different set of operational parameters requires a PC running Futurecom Repeater Configurator (FRC) to modify/load the new set of configuration parameters into the PDR8000. Please see the Table below for supported Hardware Platform, Wireline Interface, Repeater Operation and Channel Types.

Hardware Platform	Wireline Interface	Repeater Operation	Channel Type
PDR	None	Repeater	Digital, Analog & Mixed Channels
PDR	V.24	Base/Repeater	Digital Channels only
PDR	DFSI	Base/Repeater	Digital, Analog & Mixed Channels
Satellite Rx	V.24	Base	Digital Channels only
Satellite Tx	V.24	Base	Digital Channels only

Each Deployment consists of General Configuration data and Channel Configuration as described below.

High-Level categories of configuration parameters are:

- **General Configuration**
- **Channel Configuration**

General Configuration

The Deployment data is configured in the 'General Configuration' screen. The Deployment Profile can be Enabled or Disabled. The PDR8000 Hardware platform can be specified.

Wireline or RT/RT mode is selected on this screen. Many other general parameters pertaining to the specific Deployment Profile can be programmed.
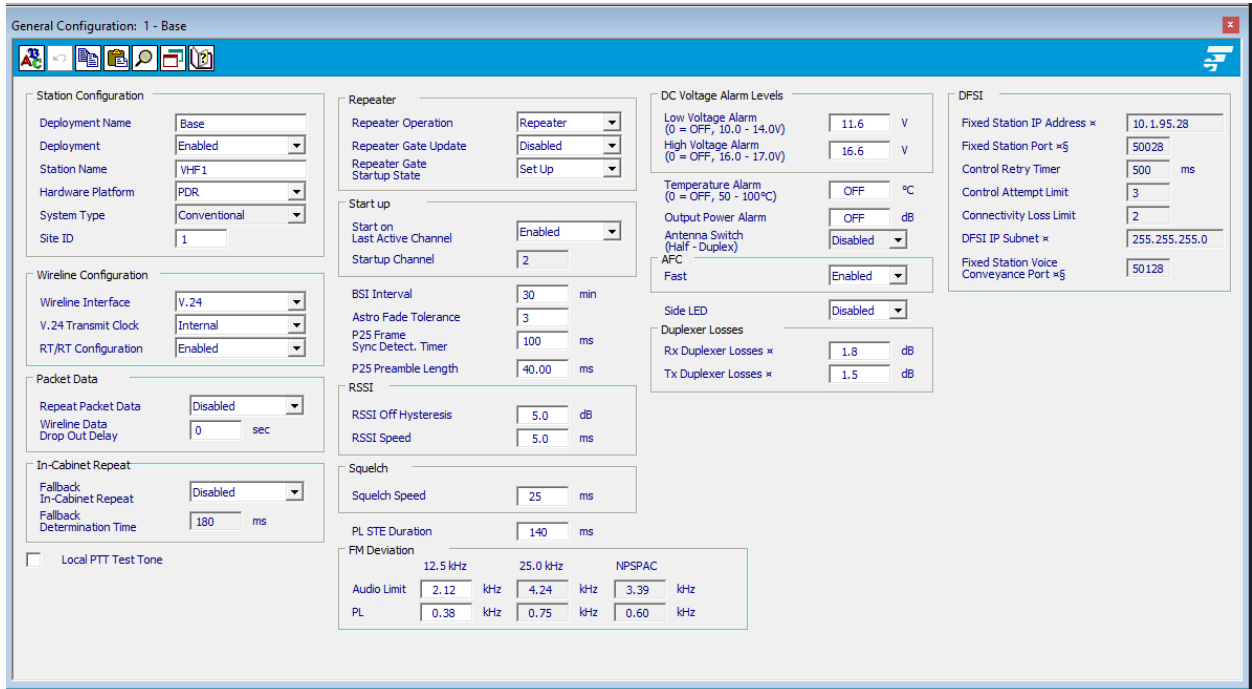
Figure 3 - General Configuration window

	Field Name	Options / Units	Description	Notes
Station Configuration	**Deployment Name**	Maximum 16 alphanumeric characters.	Name of the current Deployment Profile	Underscore may not be used in the Deployment name as it will be displayed as space on the display.
	Deployment	Enabled/Disabled	Enables/Disables the Deployment Profile	
	Station Name	Maximum 31 alphanumeric characters except for _ ”? ’ % * .	A unique name or alias that identifies the PDR8000.	
	Hardware Platform	**PDR** Satellite Rx Satellite Tx	Identifies the hardware platform for this PDR8000.	
	System Type	**Conventional**	System type supported is Conventional.	This is a read only field.
	Site ID	1-62 **(1)**	When the Wireline Interface is set to V.24, this field is used as the Terminal Endpoint Identifier number.	
Wireline Configuration	**Wireline Interface**	**None** V.24 DFSI	Select the wireline interface to be used.	If None is selected, the other Wireline Configuration fields are disabled.
	V.24 Transmit Clock	**Internal** External	This specifies the source of the V.24 Tx Clock. This is needed for PDR8000 cross connect (RT/RT) and some modems. **Internal:** The PDR8000 provides the clock. This choice is typically selected when the radio is connected directly to an infrastructure device. **External:** An external device (e.g., a Modem) is providing the V.24 clock.	This field is enabled when Wireline Interface is set to V.24. Only available if *V.24* license is purchased.

	Field Name	Options / Units	Description	Notes
	RT/RT Configuration	Enabled / **Disabled**	**Disabled:** PDR8000 cannot be used in RT/RT configuration. **Enabled:** PDR8000 used in RT/RT (back-to-back) configuration.	This field is enabled when Wireline Interface is set to V.24. Only available if _**V.24**_ license is purchased.
Pocket Data	**Repeat Packet Data**	Enabled / **Disabled**	When Disabled Data is sent to Infrastructure. When Enabled Data is repeated locally.	Packet Data is not applicable to DFSI deployments.
	Wireline Data Drop Out Delay	0-255 **(0)** sec	Specifies the duration of the transmission of idle packets following the transmission of an infrastructure originated data packet.	A value of 0 means disabled.
In-Cabinet Repeat	**Fallback In-Cabinet Repeat**	**Disabled** Link Failure Link Failure or Timer	**Disabled:** when the link failure is detected, the PDR8000 does not automatically activate its local repeat capabilities. **Link Failure:** when the link is disconnected, the PDR8000 does automatically activate its local repeat capabilities. **Link Failure or Timer:** when the link is disconnected, or the Fallback Determination Time expires, then the PDR8000 does automatically activate its local repeat capabilities.	This field is not applicable to channels in Half Duplex or Simplex Mode. When Wireline Interface is set to None, this field must be set to Disabled.
	Fallback Determination Time	50-10000 **(180)** ms	Amount of time the PDR8000 waits for an outbound payload from the infrastructure after sending an inbound payload via the wireline interface.	This timer is used when the Fallback In-Cabinet Repeat is set to Link Failure or Timer. This field is disregarded when Fallback In-Cabinet Repeat is set to Disabled or Link Failure.

	Field Name	Options / Units	Description	Notes
	Local PTT Test Tone	Check box **(checked)**	When disabled, pushing the Local PTT button transmits an RF carrier on the active channel. When enabled, pushing the Local PTT button transmits a 1 kHz test tone on the active channel.	
Repeater	**Repeater Operation**	**Repeater** / Base	Specifies whether a station is operating as a Base mode or Repeater mode.	**Repeater:** local repeat available on Full Duplex channels only (depending on Gate Parameters) Base: local repeat is unavailable (Full Duplex, Half Duplex and Simplex are supported)
	Repeater Gate Update	Enabled / **Disabled**	Specifies how the station determines its state after a reset. **Enabled:** the station comes up in the state last requested by the console (Repeater Set Up or Repeater Knocked Down) **Disabled:** the station comes up in the state specified by the Repeater Gate Startup State field.	Accessible only when Repeater Operation is set to Repeater
	Repeater Gate Startup State	**Repeat Set Up** / Repeat Knocked Down	Specifies the station's state after a reset: Repeat Set Up or Repeater Knocked Down	Accessible only when Repeater Operation is set to Repeater AND Repeater Gate Update is Disabled.
Start-up	**Start on Last Active Channel**	**Enabled** / Disabled	Specifies if the PDR800 starts on the last active channel after a reset.	
	Startup Channel	1-64 **(1)**	Specifies the channel to which PDR8000 is set after a reset.	Ignored when Startup on Last Active Channel field is set to Enabled.
	BSI Interval	1-60 **(30)** minutes	Specifies the time interval at which the FCC assigned station call sign is broadcast.	

	Field Name	Options / Units	Description	Notes
	Astro Fade Tolerance	1-3 **(3)** frames	Specifies the number of missed frames before ASTRO message is considered terminated.	
	P25 Frame Sync Detection Timer	30-255 **(100) ms**	Specifies for how long the PDR8000 digital decoder waits for P25 digital signaling (Frame Sync) before it assumes that the received signal is analog.	
	P25 Preamble Length	7.50-265.00 **(40)** ms	Specifies the duration of bit sync preamble packets that are sent at the beginning of all ASTRO transmissions.	
RSSI	RSSI Off Hysteresis	2-20 **(5)** dB	Sets the Received Signal Strength Indicator Off threshold in dB below the Received Signal Strength On Threshold (see Channel Configuration)	
	RSSI Speed	1-10 **(5)** ms	Sets the Received Signal Strength Indicator averaging integration time.	
Squelch	Squelch Speed	10-150 **(25)** ms	Squelch Averaging Integration Time.	Affects Analog Mode only.
	PL STE Duration	120-250 **(140)** ms	PL Squelch Tail Elimination Delay. Must be set to match the portable setting. Typical setting is 140ms.	Affects Analog Mode only. If this field is programmed too short, the squelch tail will not be fully eliminated. If it is programmed too long, the portable may unmute unnecessarily.
FM Deviation	**Audio Limit** **12.5 kHz** **25 kHz** **NPSPAC**	 0.75–2.52 **(2.12)** kHz 1.5 – 5.04 **(4.24)** kHz 1.20-4.03 **(3.39)** kHz	Typically set to 2.12kHz (12.5kHz channel spacing) or 4.24 kHz (25kHz channel spacing or 3.41 kHz (25 kHz NPSPAC channel spacing).	Affects Analog Mode only. Depends on the selected Channel Spacing – refer to the **Frequency Band Setup** menu. Note: corresponding values for 25kHz channel spacing & NPSPAC are calculated based on entry for 12.5kHz

	Field Name	Options / Units	Description	Notes
	PL **12.5 kHz** **25 kHz** **NPSPAC**	 0.19-0.60 **(0.38)** kHz 0.38-1.2 **(0.75)** kHz 0.30-0.96 **(0.60)** kHz	Typically set to 0.38kHz (12.5kHz channel spacing) or 0.75kHz (25kHz channel spacing) or 0.60 kHz (25 kHz NPSPAC channel spacing).	Affects Analog Mode only. Depends on the selected Channel Spacing – refer to the **Frequency Band Setup** screen.
DC Voltage Alarm Levels	**Low Voltage Alarm**	0, 10 – 14 **(11.6)** Volts 0 = disabled, displays as OFF	Voltage level that triggers the Low Battery Alarm.	
	High Voltage Alarm	0, 16.0V to 17.0V **(16.6)** 0 = disabled, displays as OFF	Voltage level that triggers the DC Voltage High Alarm.	
	Temperature Alarm	50 –100 **(70)** deg C 0 = disabled, displays as OFF	PDR8000 activates the temperature alarm if the RF transmitter module temperature exceeds this threshold.	
	Output Power Alarm	**(0)**1-5dB **(0) = disabled, displays as OFF**	PDR8000 activates the output power alarm if the difference in the measured RF Tx power and programmed Tx power exceeds this threshold.	An alarm is indicated if the transmit power level is too low. This could be caused by limits of the PDR8000 hardware (per product specification) compared to programmed levels.
	Antenna Switch	Enable/**Disable**	Specifies whether the external antenna switch is used for single antenna operation.	Only accessible when Repeater Operation is set to Base in the RF Configuration window.
	AFC Fast	**Enable**/Disable	Enables or Disables the Fast AFC	Set to disable during calibration.
	Side LED	**Enable**/Disable	When Enabled, the user can view operational status when case is closed. When Disabled, the LED is not visible.	PDR8000 Suitcase only. See PDR Deployment Guide for additional information.

	Field Name	Options / Units	Description	Notes
Duplexer Losses	**Rx Duplexer Losses**	0-3.0 **(*)** dB *Losses corresponding to the Duplexer shipped in the PDR8000	Displays the Rx Duplexer Losses. Allows the PDR8000 to compensate for the Rx Signal losses due to the Duplexer.	This field is preconfigured during production of the PDR8000 and should only be adjusted if or when the Duplexer connected to the unit is changed or replaced. The values entered in this field should match the RX IL value shown on the label affixed to each Futurecom-supplied duplexer. (See **Error! Reference source not found.**.)
	Tx Duplexer Losses	0-3.0 dB **(*)** *Losses corresponding to the Duplexer shipped in the PDR8000	Displays the Tx Duplexer Losses. Allows the PDR8000 to compensate for the Tx Signal losses due to the Duplexer.	This field is preconfigured during production of the PDR8000 and should only be adjusted if or when the Duplexer connected to the unit is changed or replaced. The value entered in this field should match the TX IL value shown on the label affixed to each Futurecom-supplied duplexer. (See **Error! Reference source not found.**.)
DFSI* - Only applicable if the _DFSI_ license has been purchased.	**Fixed Station IP Address**	0.0.0.0-255.255.255.254	Standard IP address for the fixed station. This value shall match what's programmed in the DFSI host to connect to this station.	
	Fixed Station Port	0-65535 **(50006)**	UDP Port at which the fixed station supplies the Control Service	
	Control Retry Timer	200-2000 **(500)** ms In 100ms increments	Retry period for control messages. This period shall be used for all control messages except for Heartbeat and Acknowledgements.	

Field Name	Options / Units	Description	Notes
Control Attempt Limit	1-10 **(3)**	Maximum number of attempts for control messages This number shall be used for all control messages except for Heartbeat and Acknowledgements	
Connectivity Loss Limit	1-10 **(2)**	Maximum number of heartbeat losses to allow.	
DFSI IP Subnet	255.x.x.x	Standard subnet mask usually set to 255.255.255.0 for C class network	
Fixed Station Voice Conveyance Port	2-65534 **(51000)**	UDP Port at which RTP traffic is conveyed to the PDR8000. The port number shall be even	Even values only
	Note: In the Options/Units column, the option in **bold text** indicates the default value. * Fields in this group are applicable and editable only when Wireline Interface field is set to DFSI		

Figure 4 - Duplexer label (with identified Insertion Losses)

Channel Configuration

The wireline interface to PDR8000 is a full-duplex link, able to send and receive information at the same time. However, there are different configurations for the RF aspect of a PDR8000 that govern whether the PDR8000 can both Transmit and Receive on the RF channel at the same time (full duplex), or whether only one side of the RF channel is serviced at once (half-duplex). This (Full/Half) Duplex mode is configurable on a per-channel basis.

Figure 5 - Channel Configuration window

Field Name	Options / Units	Description	Notes
Ch. #	1-64	Identifies the current channel as one of 64 possible channels.	This field is read only.
Enabled	No Yes	Used to enable/disable channels relevant to the location the PDR8000 is deployed in.	This field is also updated based on RF Configuration window → Repeater Operation Ch1 must be enabled.
Channel Name	Maximum 16 alphanumeric characters.	Name that identifies the channel.	Underscore may not be used in the Channel name as it will be displayed as space on the PDR8000 display.
Channel Type	Analog Digital Mixed	Determines the PDR8000 Channel type.	Analog & Mixed Channels are not compatible with V.24 wireline operation.
Channel Mode	**F.Duplex** Simplex H.Duplex	Determines the PDR8000 mode of operation for the current channel, Full Duplex, Half Duplex.or Simplex	- Repeater Mode: only Full Duplex Channels are enabled - Base Station Mode: Full Duplex, Half Duplex or Simplex channels are enabled.
Rx Freq. (MHz)	MHz	Receive frequency for the current channel.	When Hardware Platform is set to Satellite Tx or channel mode to Simplex, this field is read only and is disregarded. Must equal Channel-0 Base Frequency plus an integer multiple of Channel No. Spacing as defined in Frequency Band Configuration window. Must also match the subscriber unit Transmit Frequency.
Tx Freq. (MHz)	MHz	Transmit frequency for the current channel.	When Hardware Platform is set to Satellite Rx, this field is read only and is disregarded. Must equal Channel-0 Base Frequency plus an integer multiple of Channel No. Spacing as defined in Frequency Band Configuration window. Must also match the subscriber unit Receive Frequency.

Field Name	Options / Units	Description	Notes
Tx Pwr (dBm)	30-43 **(40)** dBm	Specifies the transmit power at the Power Amplifier output of the PDR8000	TX power levels are those desired at the PDR8000 antenna port, either with or without a duplexer. PDR8000 *attempts* to adjust its transmit power level to compensate for duplexer losses, however it is limited to the transmitter's maximum output power. When Hardware Platform is set to Satellite Rx, this field is read only and is disregarded.
Tx Pwr (Watts)	1-20 **(10)** Watts	Specifies the transmit power at the Power Amplifier output of the PDR8000 in (W)	Read only
NAC Table Index	1-64	Identifies which of the 64 possible Access Code Tables applies to the current channel.	
NAC Code Table	Link, Maximum 10 alphanumeric characters		This is a read only field that displays the name of the Access Code Table only when configured in Channel → Access Code Table ASTRO NAC Assignments window.
ANA Table Index	1-64	Identifies which of the 64 possible PL/DPL Tables applies to the current channel.	
Analog Code Table	Link, Maximum 10 alphanumeric characters	Identifies by name and provides a link to open the Channel – Analog Code Table PL/DPL Assignments window associated with the current channel.	This is a read only field that displays the name of the Analog Code Table only when configured in Channel – Analog Code Table PL/DPL Assignments window.
PTT Priority	**W>R** R>W R=W	Specifies priority order of two types of PTT requests: • W = Wireline • R = Rx of the Repeater	• W > R: Wireline has priority over Repeater • R > W: Repeater Rx has priority over Wireline • R = W: Repeater Rx and Wireline have equal priority. Whichever occurs first takes and maintains PTT control.

Field Name	Options / Units	Description	Notes
RSSI Thresh. (dBm)	-50 to -127 (**-115**) dBm	Received Signal Strength Indicator Threshold specifies the signal level at the input of the PDR8000, required to validate the signal	RSSI Threshold levels correspond to the level at the PDR8000 antenna port. PDR8000 attempts to compensate for duplexer losses but is limited to the maximum receiver sensitivity.
W.T.O.T. (sec)	**(0)**-2550 seconds, in increments of 10 seconds **(0) = disabled, displays as OFF**	Wireline Time Out Timer specifies the maximum amount of time the transmitter may be continuously activated through the wireline signal.	Any value entered that is not an increment of 10 is rounded up to the next valid value.
R.T.O.T. (sec)	**(0)**-2550 seconds, in increments of 10 seconds **(0) = disabled, displays as OFF**	Repeater Time Out Timer specifies the maximum amount of time repeater mode may be continuously activated by subscriber through receiver.	Any value entered that is not an increment of 10 is rounded up to the next valid value.
R.D.O.D. (sec)	0-2550 seconds **0 seconds**	Repeater Drop Out Delay specifies the amount of time repeater mode is maintained following loss of received signal.	This is also known as hang-time.
Monitor Before Data Tx	**Disabled** Enabled	Disabled: PDR8000 does not monitor or notify the infrastructure of any co-channel users. Enabled: PDR8000 monitors the Rx channel for co-channel users and notifies the infrastructure	**Enabled:** If a co-channel user is detected, the PDR8000 will notify the infrastructure (wireline) every 5 seconds. The PDR8000 will not transmit data once it receives this message. When co-channel activity stops, the PDR8000 will again notify the infrastructure (wireline). The PDR8000 will resume data transmission once it receives this message.
Tx Inhibit	**Disabled** Enabled	Disabled: PDR8000 transmits on the selected channel. Enabled: PDR8000 does not transmit if this field enabled.	
Base Station ID	Maximum 20 alphanumeric characters (uppercase letters only)	Used for automatic, periodic, over-the-air transmission of the PDR8000's call sign. If empty BSID will not be transmitted.	Assigned on a per channel basis, allowing pre-configuration of different call signs on channels that are used for different geographical deployments.

Field Name	Options / Units	Description	Notes
Sq. On Tr	4-28 **(16)** dB SINAD	Squelch ON Threshold	When Trigger is selected as Squelch
Sq. Off Tr	3-25 **(10)** dB SINAD	Squelch OFF Threshold	When Trigger is selected as Squelch
ON/OFF Trigger	**RSSI** Squelch Sq &RSSI	Analog Mode – any ON/OFF trigger can be selected. Digital Mode – RSSI only allowed. Mixed Mode – RSSI only allowed.	Squelch is invalid setting in Digital or Mixed Mode PDR8000 Channels.
Bandwidth	Set 1 Set 2 Set 3	Selects the FM channel bandwidth (12.5kHz or 25KHz) as programmed in the 'Frequency Band Setup' menu.	See **'Frequency Band Configuration'** Screen.
Note: In the Options/Units column, the option in **bold text** indicates the default value.			

Channel – Access Code Table ASTRO NAC Assignments

In the Channel Configuration the **'NAC Code Table'** allows the user to configure NAC Assignment Table associated with that channel.

The Network Access Code or NAC is a feature of Project 25 digital radios that operates similarly to PL/DPL codes for analog radios. NAC codes minimize co-channel interference and allow repeater addressing by keeping the receiver squelched unless a signal with a matching NAC arrives. NACs are programmed as a 3-digit hexadecimal code that is broadcast along with the digital signal (Voice, Data, or Supplementary Data) being transmitted.
Since the NAC is 3-digit hexadecimal number (12 bits), it gives 4096 possible NACs for programming.

Three of these NACs have special meaning:

$293 - the default NAC

$F7E - Receiver Monitor; a receiver set for this NAC will unsquelch on any NAC received

$F7F - Community Repeater; a repeater receiver set for this NAC will allow all incoming signals to be repeated with the NAC intact.

PDR8000 allows each of its digital-enabled channels to be configured with a desired behavior for utilizing NACs. These behaviors are captured in **NAC Code Table**. Each configured channel in the PDR8000 can point to one of the configured Access Code Tables. Each Access

Code Table can be used to define NAC operation for a specific channel or may capture behavior shared by multiple channels.

The Channel-Access Code Table ASTRO NAC Assignments' Table excerpt is shown below with the description of each field in the following table.

See below for description of the fields in NAC table.

Figure 6 - NAC Table

Field Name	Options / Units	Description	Notes
Channel	1-64 Channels	Identifies the name of the channel for the current access code table	
< Prev.CH	1-64	Decrements Channel by 1	Changes the Access Code Table accordingly.
Next CH >	1-64	Goes to the next channel	Changes the Access Code Table accordingly.
Access Code Table Name	Maximum 10 alphanumeric characters	Name that identifies the current access code table.	
< Prev.Tbl	1-64	Decrements Access Code Table by 1	
Next Tbl >	1-64	Goes to the next Access Channel Table	
Channels Using This Table:	Comma separated list of numbers, 1-64	List of PDR8000 channel number(s) that use current access code table.	This field is read only

Field Name	Options / Units	Description	Notes
Rx NAC Operation (Configuration)		Controls the mode of received Network Access Code operation.	A DFSI-connected console may utilize this functionality by specifying Tx NAC of $F7E or may override this behavior by providing a specific Tx NAC as part of the transmission information.
	Normal	**Normal-** Receiver operation allows PDR8000 to accept incoming RF frames containing a specific NAC value as defined by the Rx NAC field in the first row of Multi-NAC table. Repeater and console calls are transmitted using the Tx NAC field value as defined in first row of Multi-NAC table.	
	Receiver Monitor $F7E	**Receiver Monitor $F7E** - Receiver operation allows a PDR8000 to accept incoming RF frames containing any NAC value. Repeater and console calls are transmitted using the same fixed NAC.	
	Community Repeater $F7F	**Community Repeater $F7F** - Community Repeater operation allows a PDR8000 to accept incoming RF frames containing any NAC value. ASTRO® packets are repeated with the same NAC that was received by the incoming transmission. Infrastructure packets are transmitted using a fixed Tx NAC.	
	Multi NAC	**Multi NAC** - Multi-coded squelch allows you to predefine a set of accepted Rx NAC and associated Tx NAC being used by repeat and infrastructure calls. (Requires Multi Coded Squelch Enabled)	

Field Name	Options / Units	Description	Notes
Tx NAC Selected by Last Received Rx NAC	Enabled **Disabled**	Specifies how Tx NAC is selected for transmitting the infrastructure audios. **Enabled:** When the Tx NAC Selected by Last Rx NAC Duration has not expired, the Tx NAC is selected according to following rules: For Multi-NAC operation, Tx NAC is set to the programmed Tx NAC from the row in the Multi-NAC table where Rx NAC is equal to the last received Rx NAC. For $F7E and $F7F, Tx NAC is set to the last received Rx NAC. **Disabled:** or Tx NAC Selected by Last Rx NAC Duration has expired, the Tx NAC is set to the programmed Tx NAC from the first row in the Multi-NAC table.	A DFSI-connected console may utilize this functionality by specifying Tx NAC of $F7E, or may override this behavior by providing a specific Tx NAC as part of the transmission information.
Tx NAC selected by Last Rx NAC Duration	1-30 min **5 min**	Defines how long the last Rx NAC is used for transmissions after the last received call. Each received call restarts the timer.	This field is accessible only when Tx NAC Selected By Last Rx NAC is Enabled. A DFSI-connected console may utilize this functionality by specifying Tx NAC of $F7E or may override this behavior by providing a specific Tx NAC as part of the transmission information.
Multi-NAC Table	Maximum 8 pairs	Defines up to eight Rx and Tx Network Access Code pairs for the specified Access Code Table.	If Rx NAC Operation is set to Multi-NAC, all rows in the Multi-NAC table are accessible. If Rx NAC Operation is not set to Multi-NAC, only the first row in the Multi-NAC table is accessible.

(Row group label along the left side: Multi-NAC Table)

Field Name	Options / Units	Description	Notes
Enabled	Checkbox	Identifies if current row of the table is enabled for use.	
Rx NAC (hex)	000-FFF **(293)**	Defines receive ASTRO Network ID.	
Tx NAC (hex)	000-FFF **(293)**	Defines transmit ASTRO Network ID	
Error report:		Displays any warnings or errors related to the creation of Rx/Tx NAC pairs in the Multi-NAC table.	
Delete		Pressing this button deletes all entries in this row of the table and shifts all rows beneath up by one row.	
Apply ACT # xx to CH # yy		Clicking on this tab applies the NAC values ACT # xx to CH yy In the "Channel Configuration' Channel # yy	
Update Access Code Table # xx		Updates the Access Code Table ACT# xx in the "Channel Configuration"	
Exit		Exits the Table	

Within each digital Access Code Table is a setting for the **Rx NAC Operation** mode to be utilized by channels pointing to this table. The four modes of Rx NAC Operation are:

1. Normal
2. Receiver Monitor $F7E
3. Community Repeater $F7F
4. Multi NAC

Within each digital Access Code Table, a **Multi-NAC table** defining the NAC values is used to govern squelch operation on the configured channel. The table consists of 8 rows, having an Rx NAC and corresponding Tx NAC value (each value 0-$FFF). In most cases, only one row of values is used. If the configured **'Rx NAC Operation'** operation is selected for Multi-NAC; then all 8 rows are available for use (each row can be enabled/disabled for use in configuration.)

Analog Code Table

Multi-Coded Squelch (PL/DPL)

Multi-Coded Squelch is a feature commonly used in analog radio operation. Operation is driven by the addition of a sub-audible tone on the RF carrier in addition to the voice payload. When an RF signal is received, the receiver checks for presence of PL/DPL, and modifies its behavior based upon detection of the decoded PL/DPL tones. In most cases, the receiving radio will choose to either unsquelch, or mute the incoming signal based on the presence of the detected PL/DPL.

PDR8000 allows each of its analog-enabled channels to be configured with a desired behavior for utilizing PLs/DPLs. These behaviors are captured in Analog Code Tables. Each configured channel in the PDR8000 can point to one of the configured Analog Code tables. Each table can be used to define PL/DPL operation for a specific channel or capture behavior shared by multiple channels.

Within each Analog Code Table, exists a Multi-PL/DPL table defining the PL/DPL values used to govern squelch code on the configured channel. The table consists of 14 rows, having an Rx Squelch Code, a corresponding Tx Squelch Code, as well as parameters to control Squelch Tail Elimination. In most cases, the table is configured for **Normal** operation, allowing only the first row of the table to be used (see Table 1). If, however, the table is configured for **Multi-PL/DPL** operation (see 0) then all 14 rows are available for use (each row can then be individually enabled/disabled as desired.)

Rx PL Operation	Normal / Multi-PL/DPL

Row Enabled	Rx Squelch Tail Elimination (STE)	Rx Squelch Code	Tx Squelch Code	Tx Squelch Tail Elimination (STE)
Y/N	Off / DPL / -135 / +135 / 180	Rx Code 1	Tx Code 1	Off / DPL / -135 / +135 / 180
Y/N	Off / DPL / -135 / +135 / 180	Rx Code 2	Tx Code 2	Off / DPL / -135 / +135 / 180
Y/N	Off / DPL / -135 / +135 / 180	Rx Code 3	Tx Code 3	Off / DPL / -135 / +135 / 180
Y/N	Off / DPL / -135 / +135 / 180	Rx Code 4	Tx Code 4	Off / DPL / -135 / +135 / 180
Y/N	Off / DPL / -135 / +135 / 180	Rx Code 5	Tx Code 5	Off / DPL / -135 / +135 / 180
Y/N	Off / DPL / -135 / +135 / 180	Rx Code 6	Tx Code 6	Off / DPL / -135 / +135 / 180
Y/N	Off / DPL / -135 / +135 / 180	Rx Code 7	Tx Code 7	Off / DPL / -135 / +135 / 180
Y/N	Off / DPL / -135 / +135 / 180	Rx Code 8	Tx Code 8	Off / DPL / -135 / +135 / 180
Y/N	Off / DPL / -135 / +135 / 180	Rx Code 9	Tx Code 9	Off / DPL / -135 / +135 / 180
Y/N	Off / DPL / -135 / +135 / 180	Rx Code 10	Tx Code 10	Off / DPL / -135 / +135 / 180
Y/N	Off / DPL / -135 / +135 / 180	Rx Code 11	Tx Code 11	Off / DPL / -135 / +135 / 180
Y/N	Off / DPL / -135 / +135 / 180	Rx Code 12	Tx Code 12	Off / DPL / -135 / +135 / 180
Y/N	Off / DPL / -135 / +135 / 180	Rx Code 13	Tx Code 13	Off / DPL / -135 / +135 / 180
Y/N	Off / DPL / -135 / +135 / 180	Rx Code 14	Tx Code 14	Off / DPL / -135 / +135 / 180

Table 1: Analog Code Table

PL and DPL codes are predefined in a common way, to allow use across radios manufactured by multiple vendors. The Rx and Tx squelch code entries in the table can be set to a defined PL Code, a defined DPL Code, or set to OFF (Carrier Squelch operation).

Squelch Tail Elimination is a method used to prevent the receiving radio from hearing a brief noise (squelch tail) at the end of each transmission. By having the transmitter provide a phase-

shifted signal (for PL), or a specific tone (for DPL), the receiver can quickly detect the end of the transmitted signal and mute the unwanted noise. When PL is used, Tx STE and Rx STE can be set to Off, -135° phase shift, +135° phase shift, or -180° phase shift. When DPL is used, Tx STE and Rx STE can be set to either Off or DPL (enabled).

Multi-Coded Squelch: Normal (Multi-PL/DPL not enabled)

If the active PDR8000 channel is configured to use an Analog Code Table for **Normal** PL/DPL operation, then the first row of the PL/DPL table is enabled. That row defines the Tx and Rx behavior associated with all traffic on the channel.

The PDR8000 only processes analog signals received over the air with PL or DPL that is equal to the Rx PL/DPL code entry found in the first row of the table. In the first row, if the Rx Squelch Code is set to OFF (Carrier Squelch), then all received signals on that channel that meet the Signal Strength and/or Signal Quality criteria (See Section 2.7.1.2) defined for this channel are processed by the PDR8000 (i.e., no PL/DPL filtering is done). Received signals not meeting the strength/quality criteria are ignored. PDR8000's Rx STE should be set to match the Tx STE sent by the subscriber units.

When the PDR8000 sends a transmission, it encodes Tx Squelch Code configured in the first row of the Analog Code table. At the end of the transmission, PDR8000 can be configured to send a configured STE (Squelch Tail Elimination) signal to help receiving radios quickly mute at the end of the transmission. The configuration for Tx STE should be set to match the Rx STE expected by the subscriber units.

Multi-Coded Squelch: Multi-PL/DPL

If the active PDR8000 channel is configured to use an Analog Code Table configured for **Multi-PL/DPL** operation, then the PDR8000 utilizes the full table to define filtering and translation. The PDR8000 only processes analog signals received over the air with PL or DPL that is equal to any of the Rx PL/DPL code entries found in any enabled row of the table. PDR8000's Rx STE in that row of the table should be set to match the Tx STE sent by the subscriber units.

When the PDR8000 repeats an over-the-air analog transmission it encodes the Tx PL/DPL found in the same table row as the received signal's Rx PL/DPL. At the end of the transmission, PDR8000 can be configured to send a configured STE (Squelch Tail Elimination) signal to help receiving radios quickly mute at the end of the transmission. The configuration for Tx STE should be set to match the Rx STE expected by the subscriber units.

The Analog Code Table when clicked opens the PL/DPL Code Table for current Deployment.' Table excerpt is shown below with the description of each field in the following table.

Figure 7: PL/DPL Code Table

See below for description of the fields in the PL/DPL Code Table.

	Field Name	Options / Units	Description	Notes
	Channel	1-64 Channels	Identifies the name of the channel for the current Analog Code Table	
	< Prev.CH	1-64	Decrements Channel by 1	Changes the Analog Code Table accordingly.
	Next CH >	1-64	Goes to the next channel	Changes the Analog Code Table accordingly.
PL/DPL Table	**PL/DPL Code Table Name**	Maximum 10 alphanumeric characters	Name that identifies the current Analog Code Table.	
	< Prev.Tbl	1-64	Decrements Analog Code Table by 1	
	Next Tbl >	1-64	Goes to the next Analog Code Table	
	Channels Using This Table:	Comma separated list of numbers, 1-64	List of PDR8000 channel number(s) that use current Analog Code Table.	This field is read only.
	Multi PL/DPL		**Multi PL/DPL** - Multi-coded squelch allows you to predefine a set of accepted Rx PL/DPL and associated Tx PL/DPL being used by repeat calls.	
		Enabled	Receiver operation allows PDR8000 to accept incoming RF signal containing a specific PL/DPL value as defined by the Rx PL/DPL field in the first row of Multi-PL/DPL table. Repeater calls are transmitted using the Tx PL/DPL field value as defined in first row of Multi-PL/DPL table.	
		Disabled	Receiver operation allows PDR8000 to accept incoming RF signal containing a specific PL/DPL value as defined by the Rx PL/DPL field in all the 14 rows if 'Enabled' in the Multi-PL/DPL table. Repeater calls are transmitted using the Tx PL/DPL field value as defined in the Multi-PL/DPL table.	

Field Name	Options / Units	Description	Notes
Tx PL/DPL Selected by Last Received Rx PL/DPL	Enabled **Disabled**	Specifies how Tx PL/DPL is selected for transmitting the infrastructure audios. **Enabled:** When the Tx PL/DPL Selected by Last Rx PL/DPL Duration has not expired, the Tx PL/DPL is selected according to following rules: For Multi-NAC operation, Tx PL/DPL is set to the programmed Tx PL/DPLL from the row in the Multi-NAC table where Rx PL/DPL is equal to the last received Rx PL/DPL. **Disabled:** or Tx PL/DPL Selected by Last Rx NAC Duration has expired, the Tx PL/DPL is set to the programmed Tx NAC from the first row in the Multi-PL/DPL Table.	
Tx PL/DPL selected by Last Rx PL/DPL Duration	1-30 **(5)** min	Defines how long the last Rx PL/DPL is used for transmissions after the last received call. Each received call restarts the timer.	This field is accessible only when Tx PL/DPL Selected By Last Rx PL/DPL is Enabled.
Multi-PL/DPL Table	Maximum 14 pairs	Defines up to 14 Rx and Tx Network Access Code pairs for the specified Analog Code Table.	If Rx PL/DPL Operation is set to Multi-PL/DPL, all rows in the Multi-PL/DPL table are accessible. If Rx PL/DPL Operation is not set to Multi-PL/DPL, only the first row in the Multi-PL/DPL table is accessible.
Enabled	Checkbox	Identifies if current row of the table is enabled for use.	
Rx PL/DPL STE	deg/DPL	Analog PSU PL/DPL STE-Squelch Tail Elimination – must be programmed to match the PSU.	

Field Name	Options / Units	Description	Notes
Rx PL/DPL	PL: 67.0-254.1 DPL: d-023-d-754	Defines receive PL/DPL.	
Tx PL/DPL	67.0-254.1 DPL: d-023-d-0754	Defines transmit PL/DPL	
Tx PL/DPL STE	deg/DPL	Analog PSU PL/DPL STE-Squelch Tail Elimination – must be programmed to match the PSU	
Delete		Pressing this button deletes all entries in this row of the table and shifts all rows beneath up by one row.	
Error report:		Displays any warnings or errors related to the creation of Rx/Tx L/DPL pairs in the Multi-PL/DPL table.	
Update PL/DPL Code Table # xx		Updates the Access Code Table ACT# xx in the "Channel Configuration"	
Exit		Exits the Table	

Service

The Futurecom Repeater Configurator (FRC)'s Monitoring Screen is provided to assist the field technician with PDR8000 setup and troubleshooting. The Monitoring screen provides real time indication of the RSSI level, RF Power, NAC, PL/DPL detection, BER measurement & display of Signal quality as described below.
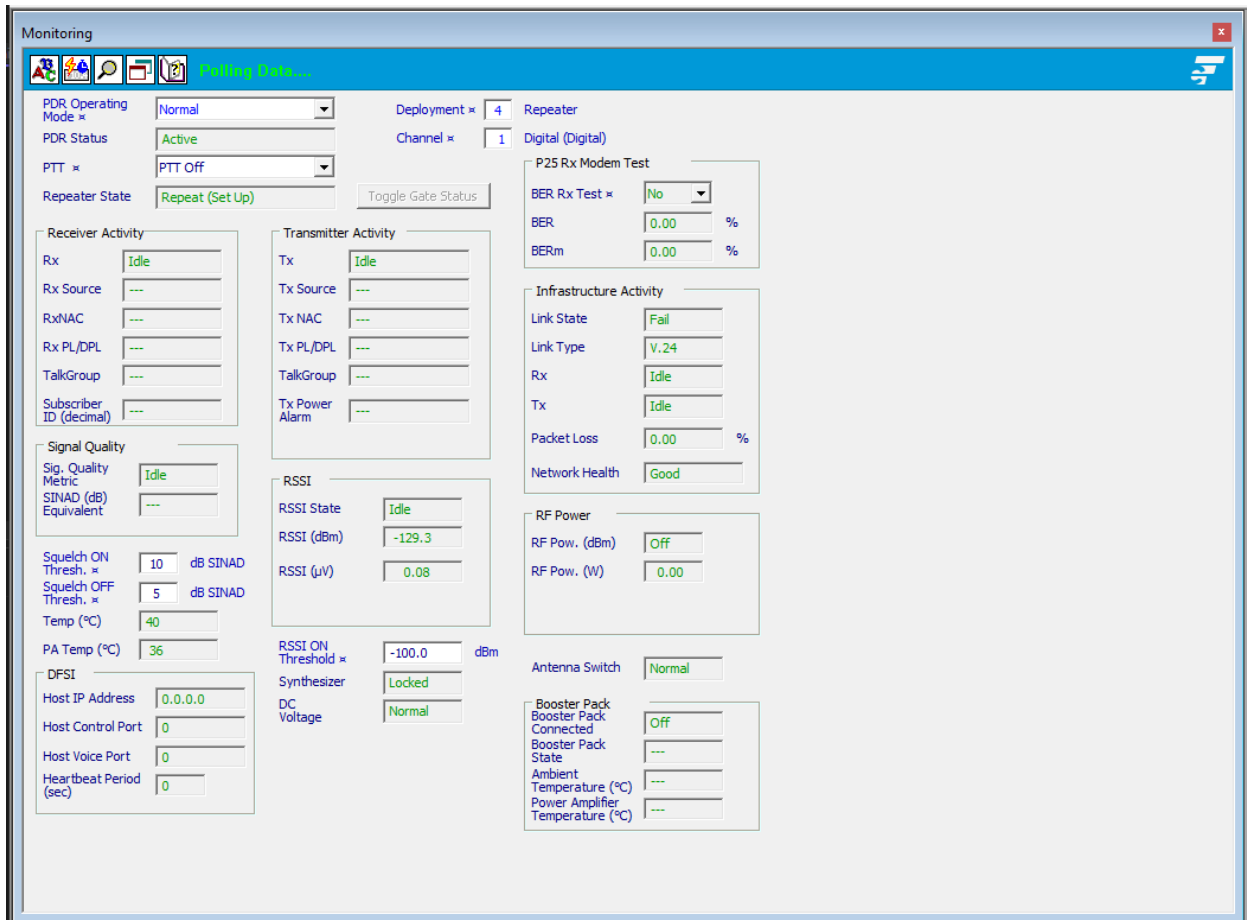
Note that the fields Squelch ON Thresh, Squelch OFF Thresh, RSSI ON Threshold may be temporarily modified in Monitoring Window for "tuning" the PDR, however leaving the Monitoring Screen will result in reverting to the previously programmed/saved values.

The user must make permanent changes to these configuration values via the normal editing screens in the Futurecom Repeater Configurator (FRC), not through the Monitoring screen.

> **IMPORTANT!**
> It must be noted that the Monitoring screen application is not intended to replace the use of properly calibrated test equipment in the field.

Monitoring

	Field Name	Options / Units	Description	Notes
	PDR Operating Mode	**Normal** Service	Specifies the current mode of operation **Normal:** PDR8000 is operating as programmed **Service:** PDR8000 is operating with user-initiated PTT Tx only	User configurable. When PDR8000 is operating in Service mode, transmissions are initiated only by using the front panel PTT button or the PTT configurable field in this window.
	PDR Status	Active /Idle	Displays the current PDR8000 status	Read only
	PTT	**PTT OFF** PTT ON CARRIER Test Tone V.52 Test Pattern	PTT OFF: PDR8000 not transmitting PTT ON: PDR8000 transmitting. CARRIER: Carrier Tx only Test Tone: Transmit 1011 digital test tone V.52 Test Pattern: digital test Signal	User configurable - available in-Service Mode only
	Repeater State	Repeat Set up) Repeat (Knocked Down) Base station	Indicates the PDR8000 repeat/base operation status	Read only.
	Deployment	1-10	Identifies the current Deployment of the 10 possible deployments	
	Channel	1-64	Identifies the current channel of the 16 possible channels	
	Toggle Gate Status	Set Up / Knocked Down	Toggles the Repeater Gate Status between 'Set Up' and 'Knocked Down'	PDR8000 must be configured as a Repeater (Deployment's General Configuration window → Repeater Operation) and be configured to use a wireline interface (Deployment's General Configuration window → Wireline Interface) to have this button enabled.
Receiver Activity	**Rx State**	Idle / Active	Specifies the Receiver Activity	

	Field Name	Options / Units	Description	Notes
	Rx Source	Inbound Outbound	Displays if the PDR8000 is receiving from the Subscriber or transmitting on V.24 Link.	
	Rx NAC		Displays the received NAC from the Subscriber	
	Rx PL/DPL		Displays the received PL/DPL from the Subscriber	
	TalkGroup		Displays the Subscriber Talkgroup ID	
	Subscriber ID(Decimal)		Displays the Subscriber ID in decimal format	
Transmitter Activity	**Tx**	**Idle /** Active	Specifies the Transmitter Activity	
	Tx Source	**Inbound** Outbound	Displays if the PDR8000 is receiving from the Subscriber or transmitting from the wireline Link.	
	Tx NAC		Displays the NAC transmitted to the Subscriber.	
	Tx PL/DPL		Displays the PL/DPL transmitted to the Subscriber.	
	TalkGroup		Displays the Talkgroup ID transmitted to the subscriber.	
	Tx Power Alarm	**<blank>** or Active	PDR8000 activates the Tx power alarm (Active) if the difference in the measured RF Tx power and programmed Tx power exceeds the configured threshold.	An alarm is indicated if the transmit power level is too low. This could be caused by limits of the PDR8000 hardware (per product specification) compared to programmed levels.
P25 Rx Modem Test	**BER Rx Test**	**NO /** YES	Bit Error Rate P25 Rx Modem Test control	User configurable-available in-Service Mode only
	BER	%	Current Bit Error Rate	Service Mode only
	BERm	%	Mean Bit Error Rate	Service Mode only

Field Name		Options / Units	Description	Notes
Infrastructure Activity	**Link State**	Active / Idle / Fail / NA	Current State of the Wireline Interface Link Active: Link is established with activity Idle: Link is established, no current activity Fail: Link is not established NA: Not applicable. PDR is not configured to use a wireline link	Read only
	Link Type	V.24 DFSI	Current Link type	Read only
	Rx	Idle / Active	Specifies the Link Activity	Read only
	Tx	Idle / Active	Specifies the Link Activity	Read only
	Packet Loss	%	Specifies percentage of Packet loss over the wireline interface	Read only
	Network Health	Good, Marginal, Poor	Specified the Link Quality of the wireline interface	Read only
Signal Quality	**Signal's Quality Metric**	Idle **/** Active	Idle: Below the SINAD threshold. Active: Above the SINAD threshold.	Read only
	SINAD Equivalent	dB	SINAD value	Read only
RSSI	**RSSI State**	**Idle /** Active	Specifies the state of the Receiver	Read only
	RSSI	dBm	Received signal strength in dBm	Read only RSSI Threshold level corresponds to the level at the PDR antenna port. PDR attempts to compensate for Rx duplexer losses but is limited to the maximum receiver sensitivity.

Field Name		Options / Units	Description	Notes
RF Power	**RSSI**	uV	Received signal strength in uV	Read only
	RF Power	dBm	PDR8000 transmitting RF power in dBm	Read only Indicates the programmed TX power level at the PDR8000 antenna port, either with or without a duplexer. PDR8000 attempts to adjust its power level to compensate for duplexer losses, however it is limited to the maximum output power.
	RF Power	W	PDR8000 transmitting RF power in W	Read only
	Squelch ON Threshold	4-28 **(16)** dB SINAD	Sets the Squelch ON Threshold.	Affects Analog Mode only. If this field is temporarily modified in Monitoring Window for "tuning" the PDR, however leaving the Monitoring Screen will result in reverting to the previously programmed/saved values
	Squelch OFF Threshold	3-25 **(10)** dB SINAD	Sets the Squelch OFF Threshold.	Affects Analog Mode only. If this field is temporarily modified in Monitoring Window for "tuning" the PDR, however leaving the Monitoring Screen will result in reverting to the previously programmed/saved values
	Temp	Celsius	PDR8000 internal temperature	Read only
	PA Temp	Celsius	RF Power Amplifier temperature	Read only

Field Name	Options / Units	Description	Notes
RSSI ON Threshold	-127 to -50 **(-115)** dBm	Sets the RSSI ON Threshold	If this field is temporarily modified in Monitoring Window for "tuning" the PDR8000, however leaving the Monitoring Screen will result in reverting to the previously programmed/saved values. The programmed RSSI Threshold level corresponds to the level at the PDR8000 antenna port. PDR8000 attempts to compensate for duplexer losses but is limited to the maximum receiver sensitivity.
Synthesizer	Locked Out of Lock	Current state of the Synthesizer	Read only
DC Voltage	Normal **/** High **/** Low	DC Voltage	Read Only
Antenna Switch	**Normal** Reverse	Current antenna switch position	Read Only
Host IP Address	0.0.0.0	Shows the IP Address of the DFSI Host	IPv4 address for the DFSI host. Provided to PDR8000 by the host when PDR8000 wireline interface is set to DFSI.
Host Control Port	Max 65535	UDP Port at which the fixed station supplies the Control Service.	Provided to PDR8000 by the host when PDR8000 wireline interface is set to DFSI.
Host Voice Port	Max 65535	UDP Port at which the fixed station supplies the Voice communication.	Provided to PDR8000 by the host when PDR8000 wireline interface is set to DFSI.
Heartbeat Period (sec)	5-55	Periodicity of Host Heartbeats at which the PDR8000 expects a heartbeat from the host.	Provided to PDR8000 by the host when PDR8000 wireline interface is set to DFSI.
Booster Pack Connected	ON / OFF	ON: Booster Pack connected to the PDR8000. OFF: Booster Pack not connected	The PDR8000 detects the Booster Pack when connected via the AUX Port.

(Note: "DFSI*" labels the Host IP Address through Heartbeat Period rows; "Booster Pack" labels the Booster Pack Connected row.)

Field Name	Options / Units	Description	Notes
Booster Pack State	ACTIVE	ACTIVE: When the Booster pack is connected and powered up.	Read Only. For Hardware Rel.4-Booster pack is connected and of matching frequency band.
Ambient Temperature	Celsius	Booster Pack Internal temperature.	Read Only
Power Amplifier Temperature	Celsius	RF Power Amplifier temperature.	Read Only
Note: Fields in Booster Pack group are populated only when connected to PDR8000. Not applicable to Rackmount PDR8000 with 50W PA option.			

Logs and Reports

Option	Description
Get Status	Refreshes data
Save Status	Saves data as text file
Latest Occurrence On Top	When **checked** (default), items are listed with the most recent at the top
Clear All	Clears the contents

Status Report

The Status Report is a summary of occurrences for errors, warnings, and events for the active session.

This information is reset when PDR is powered down.
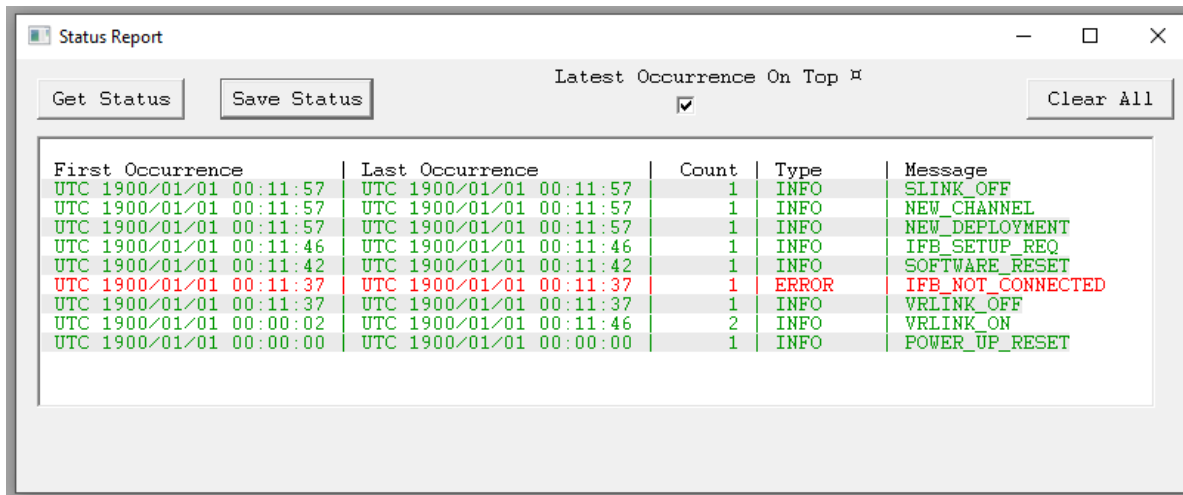
Status Log

The Status Log is a chronological list of errors, warnings, and other activity for the active session; each occurrence of an activity will appear on a separate line.
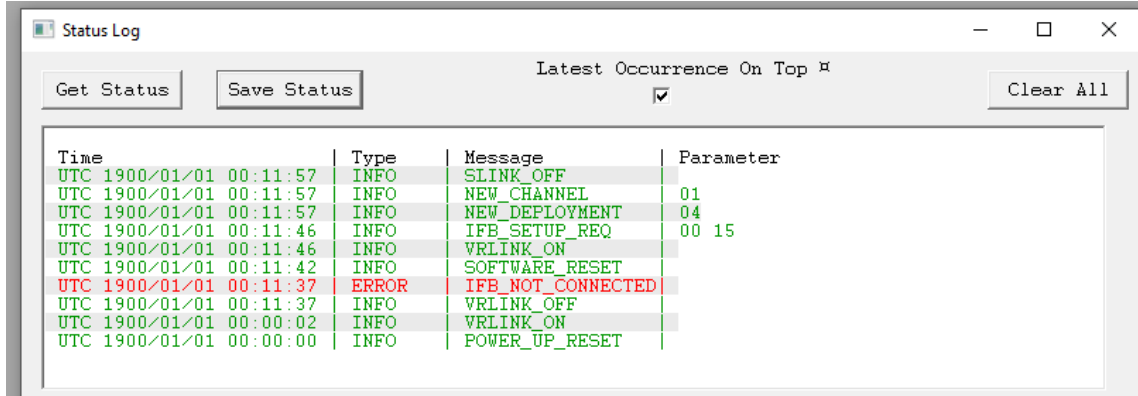
This information is reset when PDR is powered down.

Status EEPROM Log

The Status EEprom Log displays errors, warnings, channel or deployment changes, and system status.

Data is kept until cleared, or until the log reaches its maximum size causing the oldest entries to be deleted.
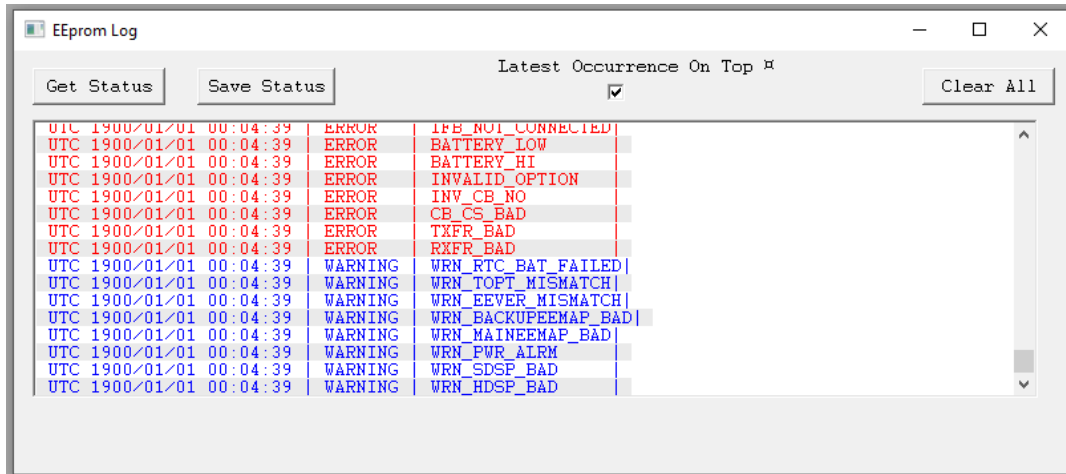
Booster Pack

For those agencies using Mobile Radios in their system, the PDR8000 Portable Digital Repeater Booster Pack can assist them with additional output from their 20Watt PDR8000. The Booster Pack is available in VHF, UHF 380-430, UHF 450-470, 700 MHz and 800 MHz bands. It is housed in a separate suitcase, which is the same size as the PDR8000 suitcase.

Note: Booster Pack not available for Rackmount PDR

During operation of the PDR8000 in a Booster Pack configuration, the PDR8000 automatically detects the presence of the Booster Pack and adjusts its operating parameters to be compatible with the Booster Pack, providing a pre-duplexer output signal of 50 Watts.

Booster Pack (Open Lid)   **PDR8000 (Open Lid)**

PDR8000 and Booster Pack hardware configurations

Multiple RF hardware configurations of the PDR8000 and the Booster Pack are supported, using accessible internal and external connection points to enable the desired configuration. The figures below show the interconnection between the PDR8000 and the Booster pack. These figures are also screened on the back of the removable top panel inside the PDR8000.
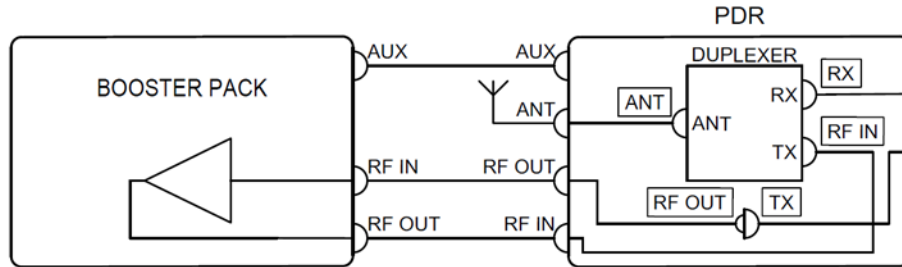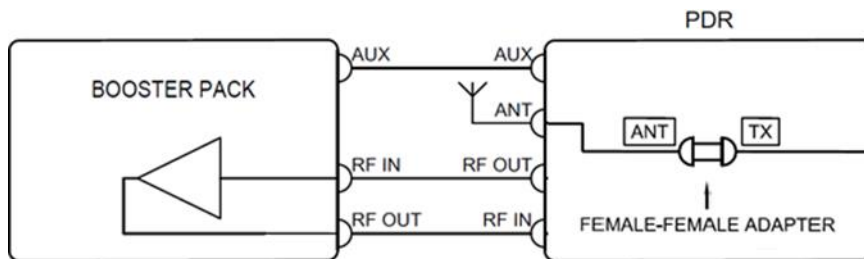

Figure 8 - Internal Duplexer and Booster Pack Hardware Configuration

Figure 9 - Simplex PDR8000 and Booster Pack Hardware Configuration
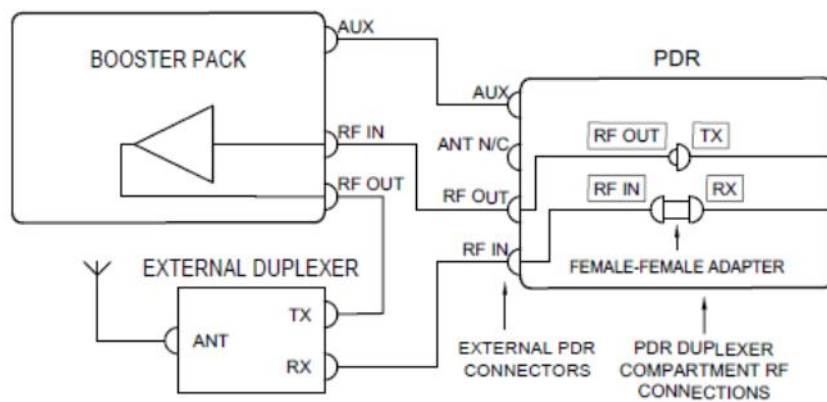
Figure 10 - External Duplexer and Booster Pack Hardware Configuration

PDR8000 operation with 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 max 20W (43 dBm) output power at its Antenna Port.

When the Booster pack is connected to the PDR8000 as shown in Fig 3 & Fig 4, the PDR8000 automatically detects the presence of the Booster pack and adjusts its Output Tx Power on the selected channel to 1.75W (32.5 dBm), to supply a compatible signal to the Booster Pack. The RF output using a Booster pack is 50W (47 dBm) when no Duplexer is connected to the PDR8000

When a Booster Pack is connected, the Tx Duplexer Losses configured in FRC are not compensated for, since 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.
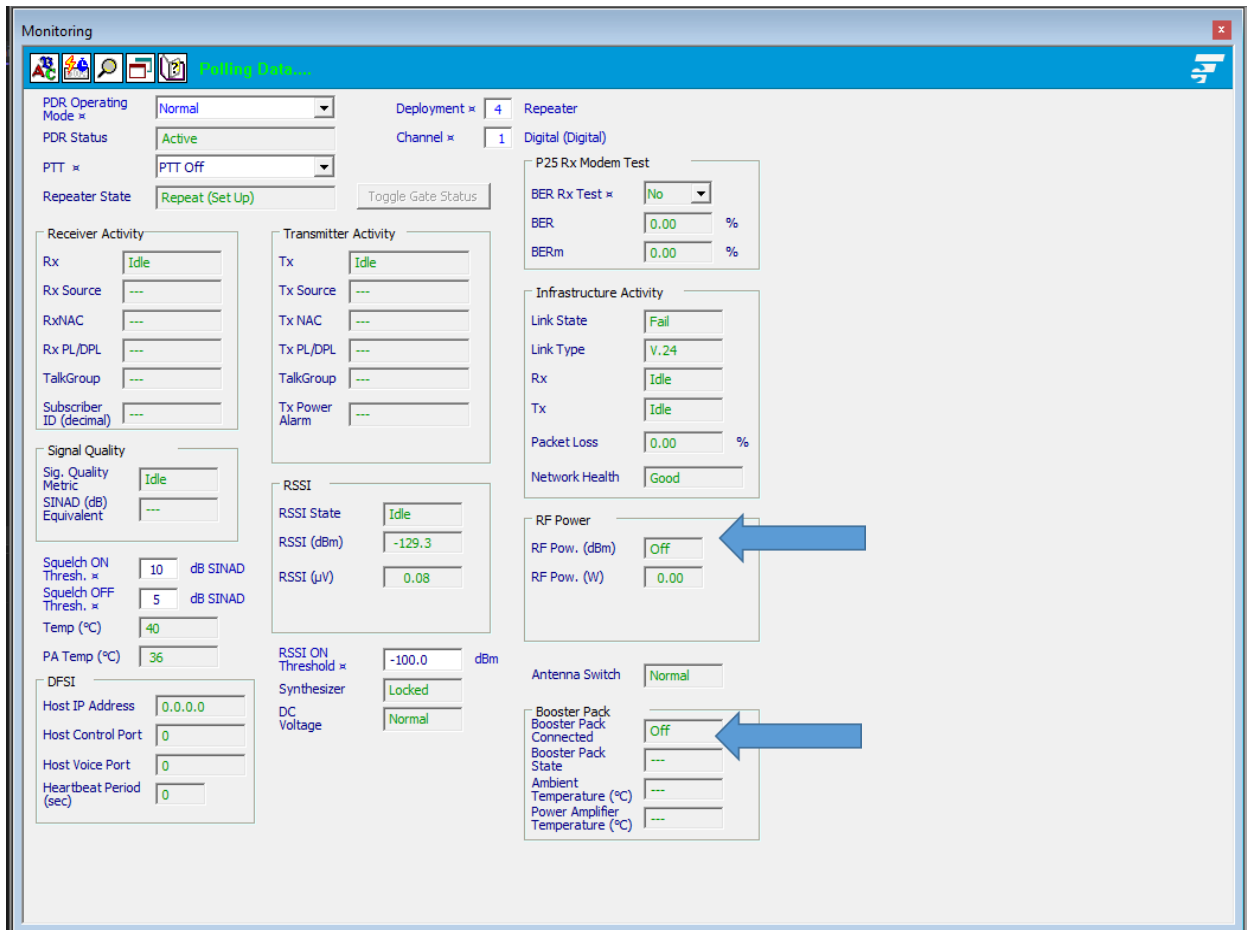
The screen shots below; of the PDR8000 Futurecom Repeater Configurator (FRC) Monitoring window indicate the Tx RF Power with and without the Booster pack connected to the PDR8000

- The Monitoring window indicates that PDR8000 is not transmitting, and no Booster pack connected to the PDR8000.
- The PDR8000 on Deployment1, Channel DIG. Programmed Tx Power 20W (43dBm).

In the Monitoring window, select the PDR8000 operating mode 'Service', PTT: PTT ON.
Observe the RF Power in the Monitoring Window.
The Booster pack is still not connected to the PDR8000. The Booster pack State is OFF.
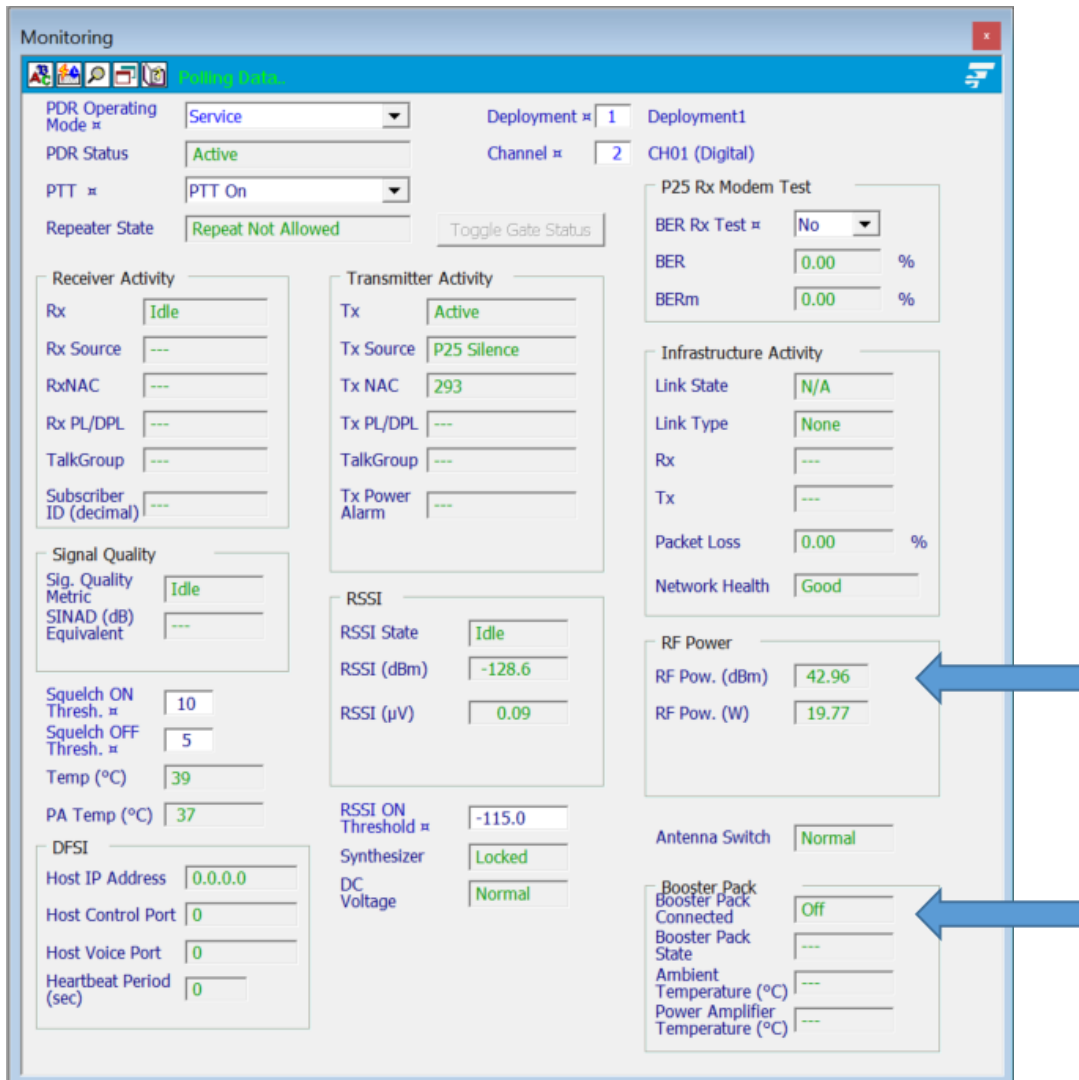
- The Booster Pack is now connected to the PDR8000 and powered up.
  The screen below indicates that the Booster pack is On and Active but the PDR8000 is not transmitting (PTT OFF).
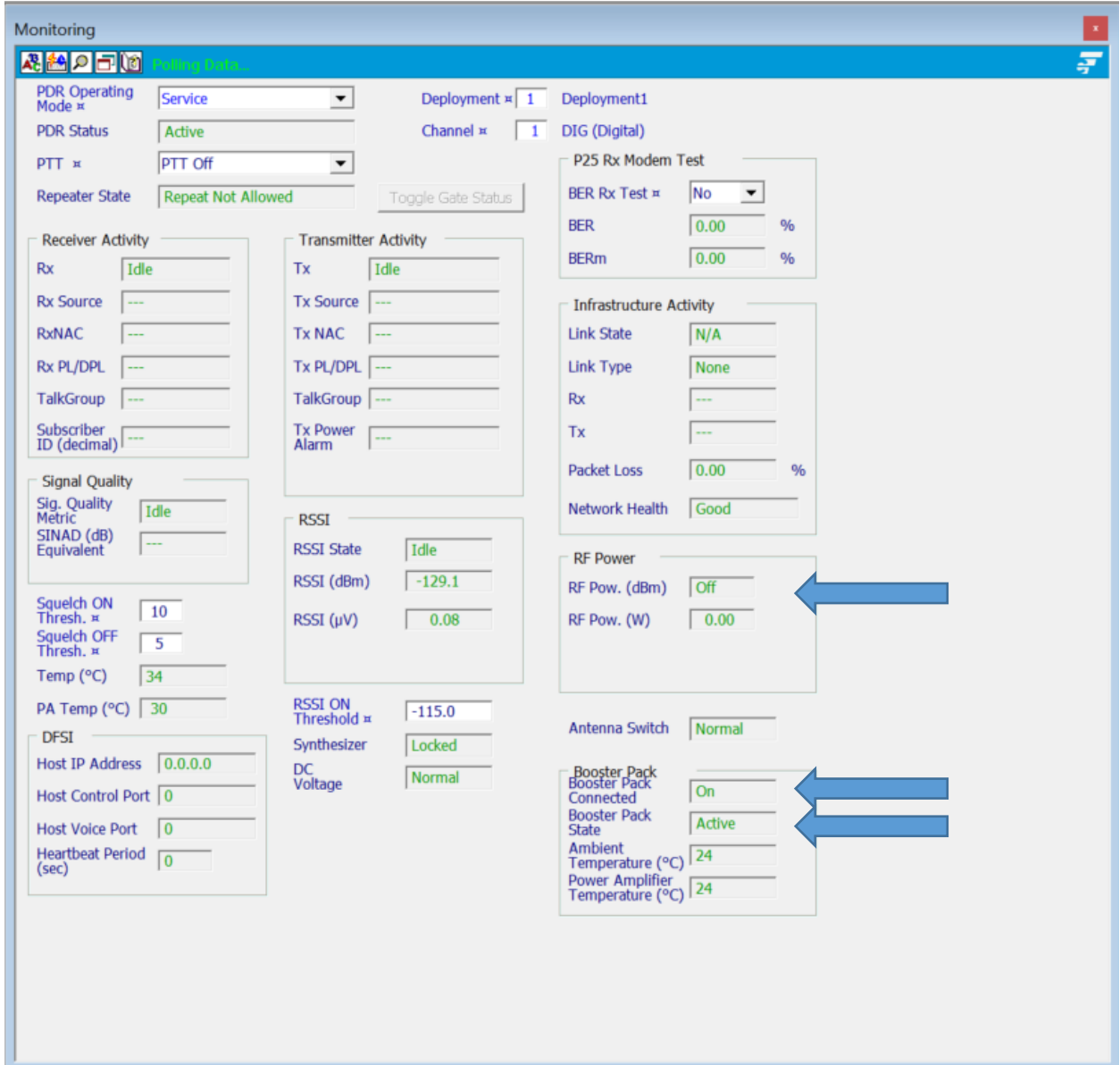
- Select the PDR8000 Operating mode as 'Service' and PTT: PTT ON.
  With the Booster connected and Active. The RF power of the PDR8000 drops down between 1-2 W (1.75 W) from the programmed 20W as displayed.

  The Power measured at **RF output of the Amplifier** of the Booster pack will be 50W.

Troubleshooting

If FRC PC has difficulty communicating with PDR:

1. Ensure only one instance of FRC is open
2. Make a second attempt to read PDR
3. Re-connect USB (disconnect / connect, wait few seconds for device to be recognized, try to read PDR again)
4. Power-cycle PDR by disconnecting and re-connecting power cord, wait few seconds until PDR is on and USB connects, then try to read PDR. If device not recognized or read fails again, try power-cycling PDR one more time.
5. If still unable to read, reboot PC

Errors/Warnings may be caused due to any of the following reasons:

- Improper PDR8000 Programming.
- PDR8000 Firmware upgrade is improperly done.
  (Make sure the PDR8000 is on the current released Firmware available on the Futurecom website.)

Errors/Warnings may be displayed in three locations:

1. LED front panel
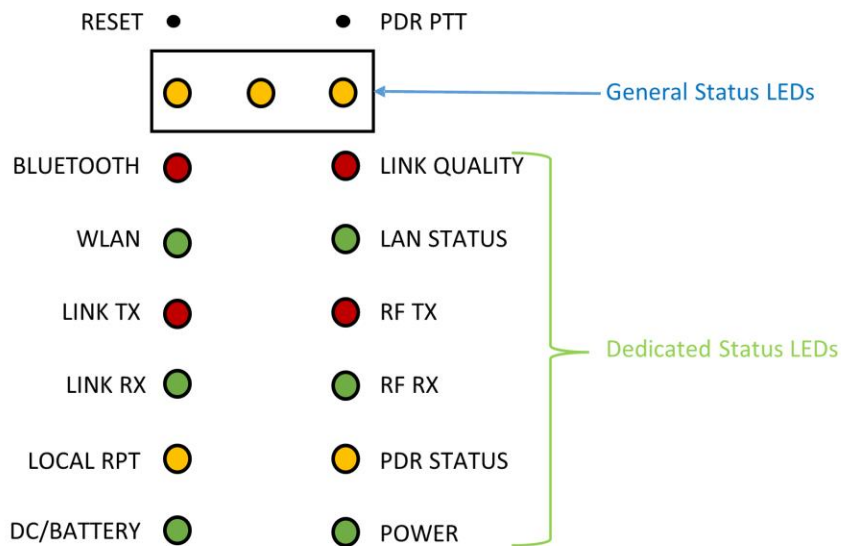2. LED side panel
3. Alphanumeric display

Figure 11 - Front Panel

PDR8000 Status	LED	LED Status ON/OFF/Flashing	Action
Power up	Power & DC/Battery LED	OFF	Disconnect the power source and replace the appropriate fuse.
Wireline Enabled	LINK Tx/Rx LED	Flashing	Check the Wireline connection and PDR8000 Deployment programming.
Repeater Fallback Mode	Top left Fallback LED	ON	Check Deployment programming.
Service Mode	Top Centre Status Warning LED	ON	Check Monitoring window, if PDR8000 is in Service mode.
Error	Top Right Error Status LED	ON	Indicates Errors in the PDR8000. Error codes are displayed.

Table 2 - LED Status on Front Panel

LED Status	Status	Action
Slow Flash	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 for further insight.
Fast Flash	PDR8000 is not functioning. A major error has occurred	

Table 3 - LED Status on Side Panel

Error & Warning Codes

The following Error codes may be displayed on the PDR8000 display.

Major Error Codes	
80000000	Incompatible BaseBand DSP code loaded
40000000	Incompatible Transceiver DSP code loaded
20000000	Invalid EEPROM repeater model data
10000000	Invalid EEPROM checksum (data corrupted, any block)
8000000	Invalid EEPROM MAP (bad index table)
4000000	Incompatible hardware detected
2000000	Invalid EEPROM data (BlockID not found)

1000000	Invalid data in options block
Minor Error Codes	
1000	Factory Calibration/Test Issue ("CALIBRATION ERROR")
800	RF band mismatch ("BOOSTER MISMATCH")
400	RTC Chip failure
200	Invalid deployment number ("INVALID DEPLOYMENT")
100	Disabled Channel Selected ("DISABLED CHANNEL")
80	IF board link down - V.24 programmed and needed
40	Low Battery alarm ("LOW BATTERY ERROR")
20	Hi Battery alarm ("HIGH BATTERY ERROR")
10	Invalid Customer Option Programmed ("INVALID CONFIG")
8	Invalid/unprogrammed channels selected ("INVALID CHANNEL")
4	Invalid channel block checksum
2	Invalid Tx frequency programmed ("INVALID TX FREQ")
1	Invalid Rx frequency programmed ("INVALID RX FREQ")
Warning Codes	
1	Low Battery warning ("LOW BATTERY WARN")
2	IF Board not connected - V.24 not programmed
4	Incompatible Baseband DSP
8	Incompatible Transceiver DSP
10	Temperature alarm on PA board ("HIGH TEMPERATURE")
20	Tx Power alarm (Outside range) ("LOW TX POWER")
40	Bad main EEPROM map data
80	Bad backup EEPROM map data
100	EE map version mismatch
200	Options mismatch ("INVALID CHANNELS")
400	RTC battery failed/time invalid ("DATE/TIME WARN")
800	PDR8000 fan control board failed
RF Error Codes	
8000	Baseband DSP alarm (failed to load/start)
4000	Transceiver DSP alarm (failed to load/start)
2000	Baseband DSP alarm (invalid checksum)
1000	Transceiver DSP alarm (invalid checksum)
800	Rx synthesizer lock alarm

400	Tx synthesizer lock alarm
Other Warnings	
Packet Loss on V.24 or Ethernet ("LOW QUALITY LINK")	
Unable to establish wireline connection ("LINK FAILURE")	

Glossary

Keyword	Description
ACK	Acknowledgement of communications.
Booster Pack	An optional hardware accessory for PDR8000 to boost the RF transmit power to 50W.
BSI	Base Station Identifier; sent over-the-air, sometimes as Morse Code, to identify the originating transmitter.
Channel	A group of characteristics, such as transmit / receive frequency pairs, radio parameters, encryption encoding etc.
Coded Squelch	Tone Private-Line (PL) or Digital Private-Line (DPL). Used on conventional channels for signal validation.
Conventional	Refers to radio-to-radio communications, sometimes through a base station repeater or vehicular repeater
Deployment	Complete personality setup of the PDR8000.
DFSI	Digital Fixed Station Interface. An industry standard protocol for radio voice communication over IP network between a host and station.
Dispatcher	An individual who has radio system management duties.
dpd File	PDR8000 personality file saved as **file_name.dpd**.
DPL Coded Squelch	A continuous sub-audible data signal (CDCSS) transmitted with the carrier. See Coded Squelch.
epr File	File containing PDR8000 personality (dpd) and calibration data of the specific PDR8000 unit. Typically saved in the following format **xxxxxxxx.epr** where xxxxxxxx is the SN of the specific PDR8000.
FCC	Federal Communications Commission.
FNE	Fixed Network Equipment – Trunking or Conventional System Infrastructure
Inbound Call	A Call transmitted by Local PSU and received by the PDR8000
NAC	Network Access Code – used in P25 mode for validation of P25 radio communications, similar to the use of PL/DPL in analog mode.

Keyword	Description
NID	Network ID - see Network Access Code (NAC)
Outbound Call	System Call received from the system.
PDR8000	Portable Digital Repeater
PL Coded Squelch	Private Line. A continuous sub-audible tone (CTCSS) transmitted with the Carrier. See Coded Squelch.
PSU	Portable Subscriber Unit
RF	Radio Frequency. Part of the general frequency spectrum 10kHz - 10,000,000 MHz
RSSI	Received Signal Strength Indicator
Talk Group	A group of radio users who communicate with each other by using the same communication path.
Futurecom Repeater Configurator (FRC)	PDR8000 Programming Software Application
V.24	A digital link better 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)

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