



Futurecom Systems Group, ULC

## PDR8000 Portable Digital Repeater Programming Guide

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## Document 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

**The PDR8000 operation described in this document requires the following:**

Repeater Module Firmware 4C088X01: R3.0

IF Module Firmware 4C088X05: R3.0

Tweaker Programming Software 6V088X01: R3.0



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**Modified:** Yes

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# 1 RF ENERGY EXPOSURE COMPLIANCE, AWARENESS AND CONTROL INFORMATION AND OPERATIONAL INSTRUCTIONS

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

## **ATTENTION!**

Changes or separation distances specified in the RF Safety Booklet (available on the Futurecom website: modifications not expressly approved by Futurecom Systems Group, ULC. could void the User's authority to operate the equipment. To satisfy FCC/ISED RF Exposure requirements for mobile transmitting devices, the minimum <http://www.futurecom.com/support/documentation-software/> should be maintained to ensure compliance, operations at closer than this distance is not allowed.

## **ATTENTION!**

Futurecom requires the PDR8000 operator to ensure FCC Requirements for Radio Frequency Exposure are met. The minimum distance between all possible personnel and the antenna is specified in the RF Safety Booklet (available on the Futurecom website: <http://www.futurecom.com/support/documentation-software/>). 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 PDR8000 operator to ensure MPE limits are observed at all times during transmissions. The PDR8000 operator must ensure at all times that no person comes within MPE distance from the antenna.

## 2 PDR8000 PROGRAMMING BASICS

### 2.1 INSTALLING AND UNINSTALLING THE TWEAKER PROGRAMMING SOFTWARE

<b>Operating Systems</b>	Windows 7, Windows 10
<b>Processor</b>	400MHz or higher Pentium grade processor
<b>Peripherals</b>	USB Port

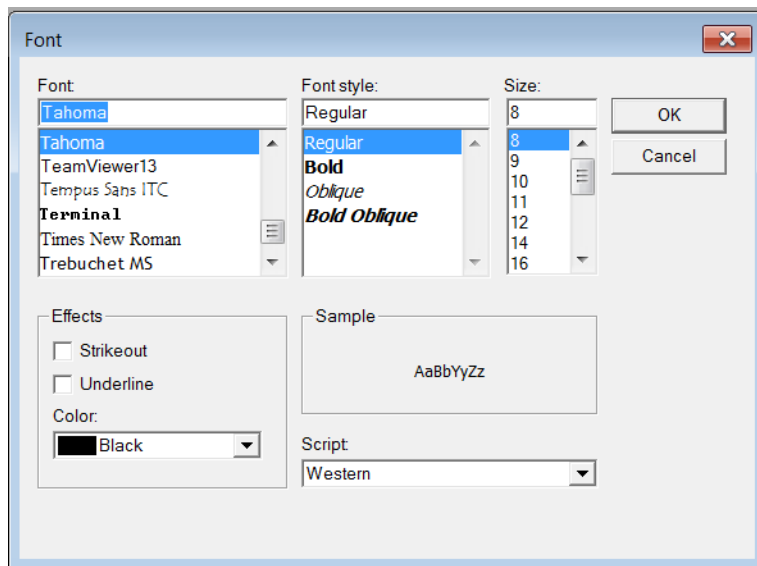
If you have an older Tweaker version already installed, you can either uninstall it first OR you can simply install the new Tweaker in a new folder.

To uninstall Tweaker – go to the Control Panel, Add and Remove Programs, find the PDR8000 Tweaker and select the Remove option.

To access Tweaker programming software, download the application from the Futurecom website into the desired location on your PC.

For optimum view of the Tweaker menu windows on the PC, following are the recommended settings for Windows 7 & 10.

- The Windows display resolution set to 1920 x 1080 and text size no greater than 125%.
- The Tweaker font size should not be greater than 9.
- It is recommended to use 'Tahoma' Regular 8 Font. Please see the screen below.



## 2.2 USING THE TWEAKER PROGRAMMING SOFTWARE OFF-LINE

The Tweaker programming software can be used off-line to review, modify and save new personality templates (dpd) files.

### 2.2.1 VIEWING PDR8000 PERSONALITY FILES

Run the Tweaker.

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

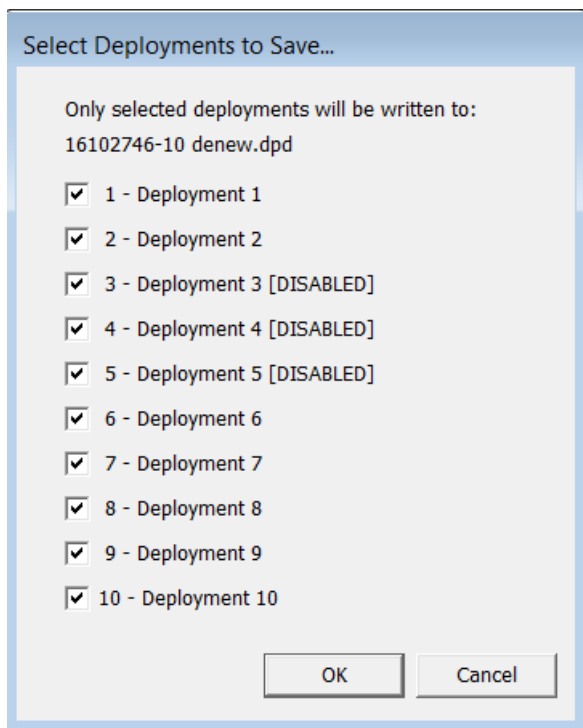
### 2.2.2 MODIFYING PDR8000 PERSONALITY FILES

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

### 2.2.3 SAVING PDR8000 PERSONALITY FILES

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

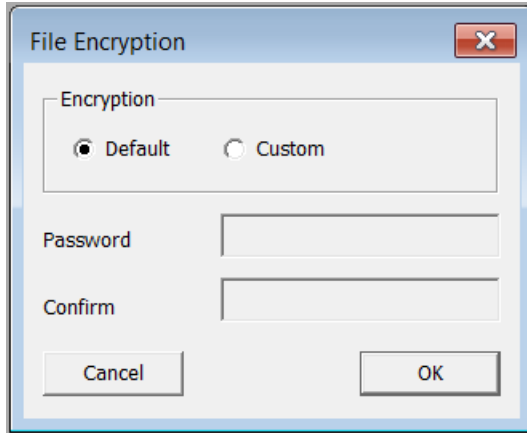
The User can select the Deployments to be saved in the Pop-up window as shown below.



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 be created.



**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.

## 2.3 USING THE TWEAKER PROGRAMMING SOFTWARE ON-LINE

To use the Tweaker on-line the following is required:

1. Tweaker software installed on the PC.
2. Powered up PDR8000.
3. Programming cable (USB cable directly connected to the PDR8000).

### 2.3.1 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. The 'Power' LED and 'DC /Battery' LED should be green.
3. On the Tweaker click on 'Ports' under 'COM Options' menu.
4. Check if the 'Futurecom USB modem' is displayed on the Com port field.
5. If the com port display is blank, check the USB connection or change the USB Port on the computer.

## 2.3.2 COM OPTIONS: PORTS

Field Name	Range	Description	Notes
COM Port	na	Drop down list of ports available when connecting directly to the PDR8000 USB Port.	

## 2.3.3 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 Tweaker.

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. Used for 'cloning'.

## 2.3.4 READING FROM THE PDR8000 (UPLOADING DATA)

To read a PDR8000 unit:

1. Establish On-Line communication with the PDR8000.
2. Select **PDR8000 → Load Data from PDR8000 Repeater** OR Press **F2**.
3. The personality data of the currently connected PDR8000 unit will be loaded into the Tweaker memory for reviewing and / or editing.

## 2.3.5 WRITING TO THE PDR8000 (DOWNLOADING DATA)

### 2.3.5.1 APPLYING DPD FILE ('CLONING')

Select **File → DPD Files (Templates) → Apply DPD to The Repeater**. Specify the desired .dpd file name and location when prompted.

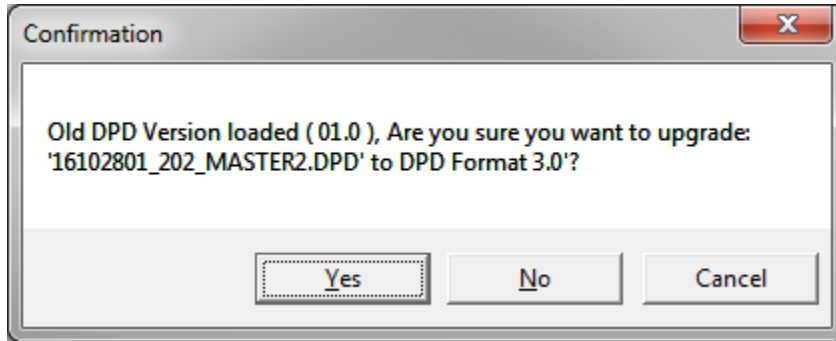
If the user has an old dpd file created with R1.0 or R2.0, the Tweaker upgrades this file to Dpd format 3.0 prior to applying it to the PDR8000.

The file can be selected by pressing Ctrl+F6, or from the menu:

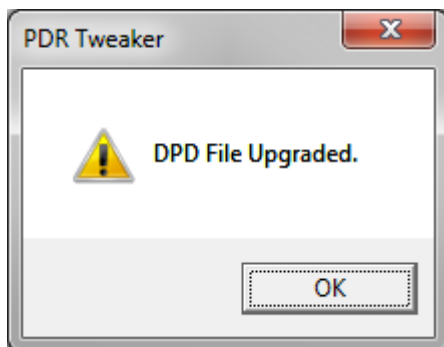
**File-> DPD Files (Templates)->Apply DPD File**

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





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



This message indicates that the program created a new file with the same name as the old file, but with the suffix "\_v2\_to\_v3\_updated.dpd"

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

The upgraded file would be: Myfile\_v2\_to\_v3\_updated.dpd

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

### 2.3.5.2 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 Tweaker screens, the new personality can be saved to the PDR8000 by executing any of the following:

- **PDR** → **Save Changes to PDR Repeater**
- OR
- **F4**
- OR
- **PDR** → **EEprom Maintenance (Ctrl+E) → Changes ->PDR**
- OR
- Click on the EEPROM Maintenance Icon → **Changes -> PDR**

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

- ***PDR → Reset PDR Repeater***
- OR
- ***F3***
- OR
- ***EEprom Maintenance → Reset Repeater***

When the PDR8000 personality has been changed and the changes are not causing any detected errors, the EEPROM maintenance icon is flashing 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 is flashing 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.

## 2.4 PDR8000 PROGRAMMING GUIDELINES

### Programming Steps Overview

The PDR8000 operation depends on the following:

- PDR8000 firmware and programming settings
- PSU type, firmware and programmed personality
- System infrastructure

## 2.5 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 Tweaker 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 Tweaker. 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.

## 2.6 PDR8000 CONFIGURATION

### 2.6.1 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) or Wideband (25 kHz). Ensure the correct spacing (Set 1 or Set 2) is selected to match the portable radio programming on each PDR8000 channel – see “Channel Configuration Deployment x” screen, ‘Bandwidth’ field.

Frequency Band Configuration

Selected Frequency: 136-174 RX Band: 136-174 TX Band MHz: 136-174

Base Rx Frequency: 136.00000 MHz (136.00000)

Max. Rx Frequency: 174.00000 MHz (174.00000)

Base Tx Frequency: 136.00000 MHz (136.00000)

Max. Tx Frequency: 174.00000 MHz (174.00000)

Channel-0 Base Frequency: 136.00000 MHz (136.00000)

Set 1

Adjacent Channel Offset/FM Deviation: 12.5 kHz / 1.5 kHz

Rx Synthesizer Frequency Step: 2.5000 kHz (2.5000)

Tx Synthesizer Frequency Step: 2.5000 kHz (2.5000)

Set 2

Adjacent Channel Offset/FM Deviation: 25 kHz(NBPF) / 3 kHz

Rx Synthesizer Frequency Step: 2.5000 kHz (2.5000)

Tx Synthesizer Frequency Step: 2.5000 kHz (2.5000)

Set 3

Adjacent Channel Offset/FM Deviation: 12.5 kHz / 1.5 kHz

Rx Synthesizer Frequency Step: 2.5000 kHz (2.5000)

Tx Synthesizer Frequency Step: 2.5000 kHz (2.5000)

Restore Factory Defaults

Field Name	Options / Units	Description	Notes
<b>Selected Frequency RX Band</b>	MHz	Indicates the band supported by this hardware platform.  VHF R1 138 - 174 UHF R1 380 - 430 UHF R2 450 - 470 UHF R3 470 – 512 700 764 - 806 800 806 - 870	Read Only
<b>Selected Frequency TX Band</b>	MHz	Indicates the band supported by this hardware platform.  VHF R1 138 - 174 UHF R1 380 - 430 UHF R2 450 - 470 UHF R3 470 – 512 700 764 - 806 800 806 - 870	Read Only
<b>Base Rx Frequency</b>	MHz	Indicates the base receive frequency for this PDR8000.	This field is read only. The value in brackets is the factory default.
<b>Max. Rx Frequency</b>	MHz	Indicates the maximum receive frequency for this PDR8000.	This field is read only. The value in brackets is the factory default.
<b>Base Tx Frequency</b>	MHz	Indicates the minimum transmit frequency for this PDR8000.	This field is read only. The value in brackets is the factory default.
<b>Max. Tx Frequency</b>	MHz	Indicates the maximum transmit frequency for this PDR8000.	This field is read only. The value in brackets is the factory default.
<b>Channel-0 Base Frequency</b>	MHz	Indicates the lowest frequency for this PDR8000- either transmit or receive.	This field is read only. The value in brackets is the factory default.
<b>Adjacent Channel Offset/FM Deviation</b>	12.5 kHz/1.5 kHz 25 kHz/3 kHz	Offset indicates the width of each channel; used to determine the frequency of the next channel.	
<b>Channel No. Spacing</b>	2.5000 kHz* 5.0000 kHz* 7.5000 kHz* 6.25000 kHz 12.50000 kHz 18.75000 kHz 25.00000 kHz * valid for VHF only	The spacing between the centre frequencies of the adjacent channels.	Channel-0 Base Frequency plus an integer multiple of this field defines the valid values for Rx Freq. and Tx Freq. fields in the Channel Configuration window. The value in brackets is the factory default.
<b>Rx Synthesizer Frequency Step</b>	2.5000 kHz* 5.0000 kHz* 6.2500 kHz * valid for VHF only	Frequency step size used by the receive synthesizer.	The value in brackets shown in the Tweaker window is the factory default.
<b>Tx Synthesizer Frequency Step</b>	2.5000 kHz* 5.0000 kHz* 6.2500 kHz * valid for VHF only	Frequency step size used by the transmit synthesizer.	The value in brackets shown in the Tweaker window is the factory default.

## 2.6.2 PERSONALITY INFORMATION

Personality Information

Date of Programming

DAY 20

MONTH 07

YEAR 18

Personality Name PDR800

Personality Description PDR8000 Futurecom Systems ULC

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

### 2.6.3 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.

The screenshot shows a window titled "Hardware/Software Information" with a blue header bar. Below the header are three icons: a globe, a refresh symbol, and a magnifying glass. The window is divided into two main sections: "Repeater Module" on the left and "IF Module" on the right. Each section contains a list of fields with corresponding values in text boxes. The "Repeater Module" section has 17 fields, and the "IF Module" section has 7 fields. The "App. Software Part Number", "App. Software Version", and "App. Software Release Date" fields in the Repeater Module section are highlighted in blue.

Field	Value
Serial Number	16102746
Hardware Part Number	7V083X04
Hardware Model and Revision	007.00
Hardware Release Date	10/04/08
App. Software Part Number	4C088X01
App. Software Version	03.0A
App. Software Release Date	17/07/2018 12:56
Base DSP SW Part Number	4C083X04
Base DSP SW Version	01.49
Base DSP SW Release Date	06/07/2018
Transceiver DSP SW Part Number	4C083X03
Transceiver DSP SW Version	01.18
Transceiver DSP SW Release Date	17/03/2017
Boot Software Part Number	4C088X02
Boot Software Version	01.00
Boot Software Release Date	30/05/2018 14:33

**IF Module**

- Hardware Part Number
- Hardware Model and Revision
- Hardware Release Date
- App. Software Part Number
- App. Software Version
- App. Software Release Date
- Boot Software Part Number
- Boot Software Version
- Boot Software Release Date

## 2.6.4 COMMON SETTINGS

This Menu screen is used for configuring V.24 Wireline operation, enabling or disabling the Deployment profile capability, configuring Deployments, setting password for the dpd template and selecting display unit menu.

The screenshot shows a window titled "Common Settings" with the following configuration options:

- V.24 Wireline Operation: Enabled
- Deployment Profiles Capability: Enabled
- Power Up on Last Deployment: Enabled
- Start Up Deployment: 1 - Deployment 1

Buttons:

- Configure Deployments...
- Set Repeater Password...
- Reset Repeater Password...

Display Unit section:

- Menu Scroll RollOver: Enabled
- Save Selected On Timeout: Disabled
- Keypad Beep: Enabled
- Backlight Timeout: 0 [minutes]
- Timeout for Menu: 10 [seconds]
- Deployments Menu: Enabled
- Channels Menu: Enabled
- Time/Date Menu: Enabled
- User Language: English

Buttons:

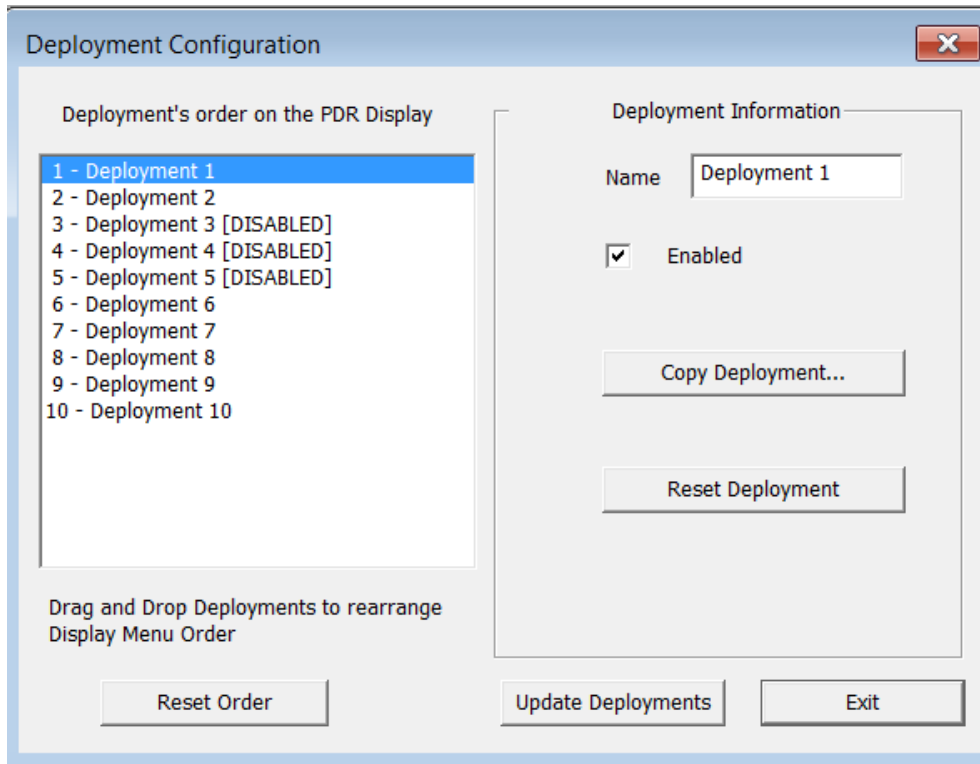
- Display Settings...



Field Name	Options / Units	Description	Notes
<b>V.24 Wireline Operation</b>	Enabled/Disabled	Purchased Option	Read only
<b>Deployment Profiles Capability</b>	Enabled/Disabled	Purchased Option	Read only
<b>Power up on Last Deployment</b>	Enabled/Disabled	When Enabled the PDR8000 powers up on the last selected Deployment.	
<b>Start Up Deployment</b>	1-10	Selects the Start Up Deployment.	
<b>Configure Deployments</b>		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
<b>Set Repeater Password</b>		Set Password for the PDR8000	Refer section 2.6.4.1.1
<b>Reset Repeater Password</b>		Reset the PDR8000 Password.	Refer section 2.6.4.1.1
<b>Display Unit</b>			
<b>Menu Scroll RollOver</b>	Enabled/Disabled	When Enabled the Menu can be scrolled over on the display	
<b>Save Selected On Timeout</b>	Enabled/Disabled	When Enabled, in the event of Timeout, saves the last selected menu.	
<b>Backlight Timeout</b>	0-60 Minutes <b>0 Min</b>		
<b>Keypad Beep</b>	Enabled/Disabled	Enables/Disables Keypad Beeps	
<b>Timeout for Menu</b>	5-60 Seconds <b>10 Sec</b>	The menu display will get timed out after the programmed time	
<b>Deployments Menu</b>	Enabled/Disabled	The Deployment menu on the Display panel is Enabled or Disabled.	
<b>Channels Menu</b>	Enabled/Disabled	The Channel menu on the Display panel is Enabled or Disabled	
<b>Time/Date Menu</b>	Enabled/Disabled	The Time/Date menu on the Display panel is Enabled or Disabled	
<b>User Language</b>	<b>English</b> French Spanish	User can select preferred language on the display.	
<b>Display Settings</b>	Upon clicking opens up menu to reset Display Contrast and Brightness.	Resets Display Contrast and Brightness.	

### 2.6.4.1.1 DEPLOYMENTS CONFIGURATION

Enables the user to configure Deployments as per the Order placed for PDR8000.



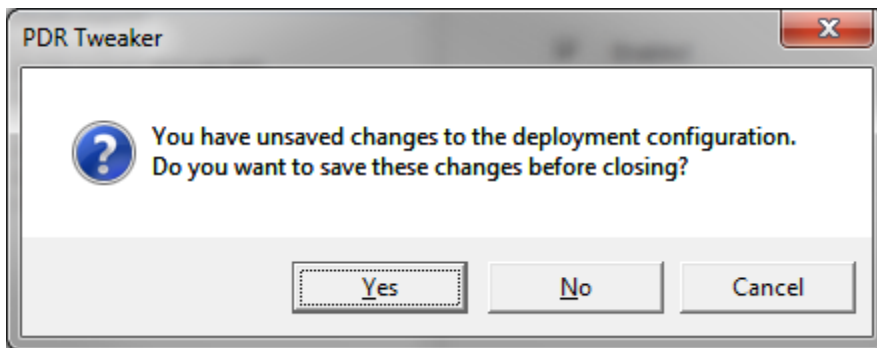
**NOTE:**

The order of the Deployments can be rearranged by dragging and dropping the deployments in the list of Deployments.

Field Name	Options / Units	Description	Notes
<b>Deployments order on the PDR8000 Display</b>		List of Deployments and theirs Status	Enabled or Disabled
<b>Deployment Information</b>			
<b>Name</b>		Deployment name - upto 15 max characters	
<b>Enabled</b>		Deployment enabled when checkbox is checked	Deployment status is displayed in the list of Deployments. Deployment 1 is always enabled
<b>Copy Deployment</b>		Allows to copy Deployment X configuration to Deployment Y selected from the list.	

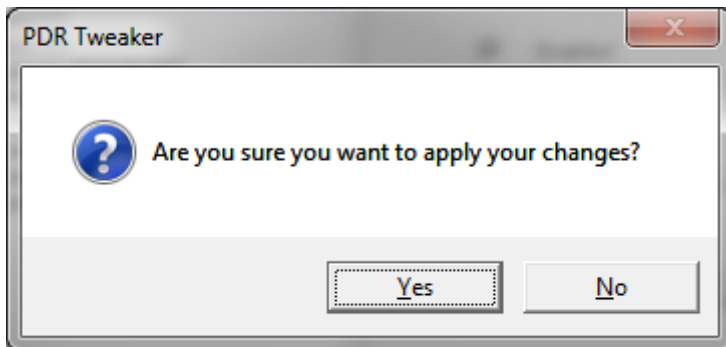
Field Name	Options / Units	Description	Notes
<b>Reset Deployment</b>		Resets the currently selected Deployment to Factory default.	
<b>Reset Order</b>		Resets to factory order.	
<b>Update Deployment</b>		Update the Deployments as Configured	
<b>Exit</b>		Prompts to confirm the changes made to the Deployment before the window closes.	

If the user clicks “Exit” and no modifications have been made to the deployment order or any deployment name/enable status, the dialogue will close. If any of the aforementioned changes have been made, the user will be prompted with this message:



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, but not close the Deployment Configuration dialogue.

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



Selecting “Yes” will apply the changes to the Deployment configuration.

## 2.7 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 up the same PDR8000 to a Motorola comparator or infrastructure core utilizing a wireline link and potentially different RF frequencies. 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 Tweaker 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 types. If the Deployment Profile Capability is not enabled, PDR8000 has the ability to 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 Tweaker to modify/load the new set of configuration parameters into the PDR8000. Note that within any Deployment Profile created to operate PDR8000 as a **standalone Repeater**, the PDR8000 can be configured with a mixture of P25/digital channels, analog channels, and mixed-mode channels. PDR8000 configured as Base, Satellite Rx or Tx, cannot have the selection of Analog & Mixed Mode channels. However, if a Deployment Profile is configured to utilize the V.24 wireline interface, that Deployment Profile is capable of supporting **P25/digital channels** only. Please see the Table below for PDR8000 Channel & Hardware Platform Configuration.

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

## 2.7.1 GENERAL CONFIGURATION

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

Wireline or RT/RT mode is selected in this menu. Many other general parameters pertaining to the specific deployment can be programmed.

**Station Configuration**

Deployment Name: Deployment 1  
 Deployment: Enabled  
 Station Name: A1  
 Hardware Platform: PDR  
 System Type: Conventional  
 Site ID: 19

**Wireline Configuration**

Wireline Interface: V.24  
 V.24 Transmit Clock: Internal  
 RT/RT Configuration: Enabled

**Packet Data**

Repeat Packet Data: Enabled  
 Wireline Data Drop Out Delay: 1 sec

**In-Cabinet Repeat**

Fallback In-Cabinet Repeat: Disabled  
 Fallback Determination Time: 100 ms

Local PTT Test Tone

**Repeater**

Repeater Operation: Repeater  
 Repeater Gate Update: Enabled  
 Repeater Gate Startup State: Set Up

**Start up**

Start on Last Active Channel: Enabled  
 Startup Channel: 1

**BSI Interval**

BSI Interval: 30 min

**Astro Fade Tolerance**

Astro Fade Tolerance: 3

**P25 Frame Sync Detect. Timer**

P25 Frame Sync Detect. Timer: 100 ms

**P25 Preamble Length**

P25 Preamble Length: 40.00 ms

**RSSI**

RSSI Off Hysteresis: 5.0 dB  
 RSSI Speed: 5.0 ms

**Squelch**

Squelch Speed: 25 ms

**PL STE Duration**

PL STE Duration: 140 ms

**FM Deviation**

	12.5 kHz Channel	25.0 kHz Channel
Audio Limit	1.50 kHz	3.00 kHz
PL	0.40 kHz	0.79 kHz

**DC Voltage Alarm Levels**

Low Voltage Alarm (10-14V): OFF V  
 High Voltage Alarm (16-17V): OFF V

**Temperature Alarm (50-100°C)**

Temperature Alarm (50-100°C): OFF °C

**Output Power Alarm**

Output Power Alarm: OFF dB

**Antenna Switch**

Antenna Switch: Disabled

**AFC Fast**

AFC Fast: Enable

Field Name	Options / Units	Description	Notes
<b>Station Configuration</b>			
<b>Deployment Name</b>	Maximum 16 alphanumeric character.	Name of the curent Deployment	
<b>Deployment</b>	Enabled/Disabled		
<b>Station Name</b>	Maximum 31 alphanumeric characters except for _"?' % * .	A unique name or alias that identifies the PDR8000.	
<b>Hardware Platform</b>	<b>PDR</b> Satellite Rx Satellite Tx	Identifies the hardware platform for this PDR8000.	
<b>System Type</b>		System type supported is Conventional.	This is a ready only field.
<b>Site ID</b>	1-62	When the Wireline Interface is set to V.24, this field is used as the Terminal Endpoint Identifier number.	
<b>Wireline Configuration</b>			
<b>Wireline Interface</b>	<b>None</b> V.24	Indicates if V.24 Wireline support is enabled.	If None is selected, the other Wireline Configuration fields are disabled.
<b>V.24 Transmit Clock</b>	<b>Internal</b> External	This specifies the source of the V.24 Tx Clock. This is needed for PDR8000 cross connect (RT/RT) and some microwave modems <b>Internal:</b> The PDR8000 provides the clock. This choice is typically selected when the radio is connected directly to an infrastructure device. <b>External:</b> An external device (e.g. a Modem) is providing the V.24 clock.	This field is disabled when Wireline Interface is set to None.
<b>RT/RT Configuration</b>	<b>Disabled</b> Enabled	<b>Disabled:</b> PDR8000 cannot be used in RT/RT configuration. <b>Enabled:</b> PDR8000 used in RT/RT (back to back) configuration.	When Wireline Interface is set to None, this field is disabled.
<b>Packet Data</b>			
<b>Repeat Packet Data</b>	<b>Disabled</b> Enabled	When Disabled Data is sent to Infrastructure. When Enabled Data is repeated locally.	
<b>Wireline Data Drop Out Delay</b>	<b>0 sec</b> 0-255 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.
<b>In-Cabinet Repeat</b>			

Field Name	Options / Units	Description	Notes
<b>Fallback In-Cabinet Repeat</b>	<b>Disabled</b> Link Failure Link Failure or Timer	<b>Disabled:</b> when the V.24 link failure is detected, the PDR8000 does not automatically activate its local repeat capabilities.  <b>Link Failure:</b> when the V.24 link is disconnected, the PDR8000 does automatically activate its local repeat capabilities.  <b>Link Failure or Timer:</b> when the V.24 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.
<b>Fallback Determination Time</b>	<b>180ms</b> 50-10000ms	Amount of time the PDR8000 waits for an outbound payload from the infrastructure after sending an inbound payload via the V.24 link.	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.
<b>Local PTT Test Tone</b>	Check box	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.	
<b>Repeater</b>			
<b>Repeater Operation</b>	Base <b>Repeater</b>	Specifies whether station is operating as a Base Station or a Repeater.	<b>Base-</b> local repeat is unavailable (Full Duplex, Half Duplex and Simplex all supported) <b>Repeater-</b> local repeat available on Full Duplex channels only (depending on Gate Parameters)
<b>Repeater Gate Update</b>	<b>Disabled</b> Enabled	Specifies how the station determines its state after a reset. <b>Enabled:</b> the station comes up in the state last requested by the console (Repeater Set Up or Repeater Knocked Down) <b>Disabled:</b> the station comes up in the state specified by the Repeater Gate Startup State field.	This field is only accessible when Repeater Operation is set to Repeater.
<b>Repeater Gate Startup State</b>	<b>Repeat Set Up</b> Repeat Knocked Down	Specifies the station's state after a reset: Repeat Set Up or Repeater Knocked Down	This field is only accessible when Repeater Operation is set to Repeater AND Repeater Gate Update is Disabled.

Field Name	Options / Units	Description	Notes
<b>Start up</b>			
<b>Start on Last Active Channel</b>	<b>Disabled</b> Enabled	Specifies if the station starts on the last active channel after a reset.	
<b>Startup Channel</b>	1-64 <b>1</b>	Specifies the channel to which station is set after a reset.	This field is ignored when Startup on Last Active Channel field is set to Enabled.
<b>BSI Interval</b>	1-60 minutes <b>30 min</b>	Specifies the time interval at which the FCC assigned station call sign is broadcast.	
<b>Astro Fade Tolerance</b>	1-3 frames <b>1</b>	Specifies the number of missed frames before ASTRO message is considered terminated.	
<b>P25 Frame Sync Detection Timer</b>	30-255 ms <b>100 ms</b>	Specifies for how long the PDR8000 digital decoder waits for P25 digital signaling (Frame Sync) before it assumes that the received signal is analog.	
<b>P25 Preamble Length</b>	7.50-265.00 ms <b>40 ms</b>	Specifies the duration of bit sync preamble packets that are sent at the beginning of all ASTRO transmissions.	
<b>RSSI</b>			
<b>RSSI Off Hysteresis</b>	2-20dB <b>5 dB</b>	Sets the Received Signal Strength Indicator Off threshold in dB below the Received Signal Strength On Threshold (see Channel Configuration)	Typically set to 5dB.
<b>RSSI Speed</b>	1-10ms <b>5ms</b>	Sets the Received Signal Strength Indicator averaging integration time.	Typically set to 5ms.
<b>Squelch</b>			
<b>Squelch Speed</b>	10-150ms <b>25 ms</b>	Squelch Averaging Integration Time.	Affects Analog Mode only.  Typical setting is 25ms.
<b>PL STE Duration</b>	120-250ms <b>140 ms</b>	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.



Field Name	Options / Units	Description	Notes
<b>FM Deviation</b>			
<b>Audio Limit</b>			Affects Analog Mode only.
<b>12.5kHz</b>	0.75–2.52 kHz	Typically set to 2.12kHz (12.5kHz channel spacing) or 4.24 kHz (25kHz channel spacing).	Depends on the selected Channel Spacing – refer to the <b>Frequency Band Setup</b> menu.
<b>2.12 kHz</b>			
<b>25kHz</b>	1.5 – 5.04 kHz		
<b>4.24 kHz</b>			
<b>PL</b>			Affects Analog Mode only.
<b>12.5kHz</b>	0.19-0.60 kHz	Typically set to 0.38kHz (12.5kHz channel spacing) or 0.75kHz (25kHz channel spacing).	Depends on the selected Channel Spacing – refer to the <b>Frequency Band Setup</b> menu.
<b>0.38 kHz</b>			
<b>25kHz</b>	0.38-1.2 kHz		
	0.76 kHz		
<b>DC Voltage Alarm Levels</b>			
<b>Low Voltage Alarm</b>	0, 10 - 14 Volts (0 = disabled, displays as OFF) <b>0 Volts</b>	Voltage level that triggers the Low Battery Alarm.	Typically set to OFF
<b>High Voltage Alarm</b>	0, 16.0V to 17.0V (0 = disabled, displays as OFF) <b>Disabled</b>	Voltage level that triggers the DC Voltage High Alarm.	Typically set to OFF
<b>Temperature Alarm</b>			
<b>Temperature Alarm</b>	50 –100 deg C <b>0 = OFF</b>	PDR8000 activates the temperature alarm if the RF transmitter module temperature exceeds this threshold.	Typically set to OFF
<b>Output Power Alarm</b>	1-5dB <b>0 = OFF</b>	PDR8000 activates the output power alarm if the difference in the measured RF Tx power and programmed Tx power exceed this threshold.	Typically set to OFF
<b>Antenna Switch</b>	<b>Disabled</b> Enabled	Specifies whether the external antenna switch is used for single antenna operation.	This field is only accessible when Repeater Operation is set to Base in the RF Configuration window.
<b>AFC Fast</b>	<b>Enable/Disable</b>	Enables or Disables the Fast AFC	Default setting is Enable. Set to disable during calibration.
<b>NOTE:</b> In the Options/Units column, the option in <b>bold text</b> indicates the default value.			

## 2.7.2 CHANNEL CONFIGURATION

The V.24 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.

Analog, Digital and Mixed-mode channels are supported for full-duplex operation only.

Ch. #	Enabled	Channel Name	Channel Type	Channel Mode	Rx Freq. (MHz)	Tx Freq. (MHz)	Tx Pwr (dBm)	Tx Pwr (Watts)	NAC Table	NAC Code Table	ANA Table	Analog Code Table	PTT Priority	RSSI Thresh. (dBm)	W.T.O.T. (sec)
1	Yes	Digital	Digital	F Duplex	480.00000	475.00000	43.00	20.0	1	Table1	1		W>R	-115.0	OFF
2	Yes	Analog	Analog	F Duplex	480.00000	475.00000	43.00	20.0	1	Table1	2	2	W>R	-115.0	OFF
3	Yes	Mixed	Mixed	F Duplex	480.00000	475.00000	43.00	20.0	1	Table1	2	2	W>R	-115.0	OFF

Field Name	Options / Units	Description	Notes
<b>Ch. #</b>	1-64	Identifies the current channel as one of 64 possible channels.	This field is read only.
<b>Enabled</b>	No Yes	Used to enable/disable channels relevant to the location the PDR8000 is deployed in.	This field is also updated based on Repeater Operation (as configured in the RF Configuration window). Ch1 has to be enabled.
<b>Channel Name</b>	Maximum 16 alphanumeric characters	Name that identifies the channel.	
<b>Channel Type</b>	Analog Digital Mixed	Determines the PDR8000 Channel type.	Analog & Mixed Channels work with PDR8000 in Repeater mode only.
<b>Channel Mode</b>	<b>F.Duplex</b> 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.

Field Name	Options / Units	Description	Notes
<b>Rx Freq. (MHz)</b>	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 PSU Transmit Frequency.
<b>Tx Freq. (MHz)</b>	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 PSU Receive Frequency.
<b>Tx Pwr (dBm)</b>	30-43 dBm <b>37.81 dBm</b>	Specifies the transmit power at the Power Amplifier output of the PDR8000	When Hardware Platform is set to Satellite Rx, this field is read only and is disregarded.
<b>Tx Pwr (Watts)</b>	1-20 Watts <b>6 Watts</b>	Specifies the transmit power at the Power Amplifier output of the PDR8000.	This field is read only and is disregarded.
<b>NAC Table Index</b>	1-64	Identifies which of the 64 possible Access Code Tables applies to the current channel.	
<b>NAC Code Table</b>	Link, Maximum 10 alphanumeric characters	Identifies by name and provides a link to open up the Channel – Access Code Table ASTRO NAC Assignments window associated with the current channel.	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.
<b>ANA Table Index</b>	1-64	Identifies which of the 64 possible PL/DPL Tables applies to the current channel.	
<b>Analog Code Table</b>	Link, Maximum 10 alphanumeric characters	Identifies by name and provides a link to open up 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.

Field Name	Options / Units	Description	Notes
<b>PTT Priority</b>	<b>W&gt;R</b> R>W R=W	Specifies priority order of two types of PTT requests: <ul style="list-style-type: none"> <li>• W = Wireline</li> <li>• R = Rx of the Repeater</li> </ul>	<ul style="list-style-type: none"> <li>• W &gt; R: Wireline has priority over Repeater</li> <li>• R &gt; W: Repeater Rx has priority over Wireline</li> <li>• R = W: Repeater Rx and Wireline have equal priority. Whichever occurs first takes and maintains PTT control.</li> </ul>
<b>RSSI Thresh. (dBm)</b>	-50 to -127dBm <b>-115dBm</b>	Received Signal Strength Indicator Threshold specifies the signal level at the input of the PDR8000 receiver, required to validate the signal	
<b>W.T.O.T. (sec)</b>	0-2550 seconds, in increments of 10 seconds (0 = disabled, displays as OFF) <b>120 seconds</b>	Wireline Time Out Timer specifies the maximum amount of time the transmitter may be continuously activated by the console through the wireline.	Any value entered that is not an increment of 10 is rounded up to the next valid value.
<b>R.T.O.T. (sec)</b>	0-2550 seconds, in increments of 10 seconds (0 = disabled, displays as OFF) <b>60 seconds</b>	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.
<b>R.D.O.D. (sec)</b>	0-2550 seconds <b>0 seconds</b>	Repeater Drop Out Delay specifies the amount of time repeater mode is maintained following loss of received signal.	
<b>Monitor Before Data Tx</b>	<b>Disabled</b> Enabled	<p><b>Disabled:</b> PDR8000 does not monitor or notify the infrastructure of any co-channel users.</p> <p><b>Enabled:</b> PDR8000 monitors the Rx channel for co-channel users and notifies the infrastructure</p>	<b>Enabled:</b> If a co-channel user is detected, the station 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 station will again notify the infrastructure (wireline). The PDR8000 will resume data transmission once it receives this message.
<b>Tx Inhibit</b>	<b>Disabled</b> Enabled	<p><b>Disabled:</b> PDR8000 transmits on the selected channel. This is default setting.</p> <p><b>Enabled:</b> PDR8000 does not transmit if this field enabled.</p>	
<b>Base Station ID</b>	Maximum 20 alphanumeric characters (uppercase letters only)	Used for automatic, periodic, over-the-air transmission of the PDR8000's call sign.	Assigned on a per channel basis, allowing pre-configuration of different call signs on channels that are used for different geographical deployments.
<b>Sq. On Tr</b>	4-28 dB SINAD	Squelch ON Threshold	When Trigger is selected as Squelch

Field Name	Options / Units	Description	Notes
<b>Sq.Off Tr</b>	3-25 dB SINAD	Squelch OFF Threshold	When Trigger is selected as Squelch
<b>ON/OFF Trigger</b>	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.
<b>Bandwidth</b>	Set 1 Set 2 Set 3	Selects the FM channel bandwidth (12.5kHz or 25KHz) as programmed in the 'Frequency Band Setup' menu.	See ' <b>Frequency Band Configuration</b> ' Screen.
<b>NOTE:</b> In the Options/Units column, the option in <b>bold text</b> indicates the default value.			

### 2.7.2.1.1 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.

Astro NAC Assignments for Deployment 1 - Deployment 1
X

Channel    Digital
Access Code Table Name

< Prev. CH  Next CH >

< Prev. Tbl  Next Tbl >

Only Channel 1 Uses Access Table Number 1

Configuration

Rx NAC Operation

Tx NAC Selected By Last Received Rx NAC

Tx NAC Selected By Last Rx NAC Duration [1-30 min.]

- Normal
- Receiver Monitor \$F7E
- Community Repeater \$F7F
- Multi NAC

Multi-NAC Table

Enabled	Rx NAC (hex)	Tx NAC (hex)	Delete
1. <input checked="" type="checkbox"/>	<input type="text" value="293"/>	<input type="text" value="293"/>	<input type="button" value="Delete"/>
2. <input checked="" type="checkbox"/>	<input type="text" value="294"/>	<input type="text" value="294"/>	<input type="button" value="Delete"/>
3. <input checked="" type="checkbox"/>	<input type="text" value="296"/>	<input type="text" value="296"/>	<input type="button" value="Delete"/>
4. <input checked="" type="checkbox"/>	<input type="text" value="F7E"/>	<input type="text" value="298"/>	<input type="button" value="Delete"/>
5. <input type="checkbox"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="button" value="Delete"/>
6. <input type="checkbox"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="button" value="Delete"/>
7. <input type="checkbox"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="button" value="Delete"/>
8. <input type="checkbox"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="button" value="Delete"/>

Error Report:

[4] NOTE: Be aware that Rx [\$F7E] has a special meaning!

Digital

Description of the fields for the above Access code Table is given below.

Field Name	Options / Units	Description	Notes
<b>Channel</b>	1-64 Channels	Identifies the name of the channel for the current access code table	
<b>&lt; Prev.CH</b>	1-64	Decrements Channel by 1	Changes the Access Code Table accordingly.
<b>&lt; Next CH</b>	1-64	Goes to the next channel	Changes the Access Code Table accordingly.
<b>Access Code Table Name</b>	Maximum 10 alphanumeric characters	Name that identifies the current access code table.	
<b>&lt; Prev.Tbl</b>	1-64	Decrements Access Code Table by 1	
<b>&lt; Next Tbl</b>	1-64	Goes to the next Access Channel Table	
<b>Channels Using This Table:</b>	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
<b>Rx NAC Operation</b>	<p>Normal</p> <p>Receiver Monitor \$F7E</p> <p>Community Repeater \$F7F</p> <p>Multi NAC</p>	<p>Controls the mode of received Network Access Code operation.</p> <p><b>Normal-</b> 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.</p> <p><b>Receiver Monitor \$F7E</b> - Receiver operation allows a station to accept incoming RF frames containing any NAC value. Repeater and console calls are transmitted using the same fixed NAC.</p> <p><b>Community Repeater \$F7F</b> - Community Repeater operation allows a station 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.</p> <p><b>Multi NAC</b> - 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)</p>	
<b>Tx NAC Selected by Last Received Rx NAC</b>	<p>Enabled</p> <p>Disabled</p>	<p>Specifies how Tx NAC is selected for transmitting the infrastructure audios.</p> <p><b>Enabled:</b> When the Tx NAC Selected by Last Rx NAC Duration has not expired, the Tx NAC is selected according to following rules:</p> <p>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.</p> <p>For \$F7E and \$F7F, Tx NAC is set to the last received Rx NAC.</p> <p><b>Disabled:</b> 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.</p>	



Field Name	Options / Units	Description	Notes
<b>Tx NAC selected by Last Rx NAC Duration</b>	1-30 min <b>5 min</b>	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.
<b>Multi-NAC Table</b>	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.
<b>Enabled</b>	Checkbox	Identifies if current row of the table is enabled for use.	
<b>Rx NAC (hex)</b>	000-FFF	Defines receive ASTRO Network ID.	
<b>Tx NAC (hex)</b>	000-FFF	Defines transmit ASTRO Network ID	
<b>Error report:</b>		Displays any warnings or errors related to the creation of Rx/Tx NAC pairs in the Multi-NAC table.	
<b>Delete</b>		Clears Rx NAC and Tx NAC entry	
<b>Apply ACT # xx to CH # yy</b>		Clicking on this tab applies the NAC values ACT # xx to CH yy  In the "Channel Configuration" Channel no.yy	
<b>Update Access Code Table # xx</b>		Updates the Access Code Table ACT# xx in the "Channel Configuration"	
<b>Exit</b>		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:

- Normal
- Receiver Monitor \$F7E
- Community Repeater \$F7E
- Multi NAC

Within each digital Access Code Table, exists a **Multi-NAC table** defining the particular NAC values 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 during configuration.)

### 2.7.2.1.2 ANALOG CODE TABLE

#### 2.7.2.2 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 may capture behavior shared by multiple channels.

Within each Analog Code Table, exists a Multi-PL/DPL table defining the particular 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 2.7.2.4) 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).

### 2.7.2.3 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.

#### 2.7.2.4 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 up the PL/DPL Code Table for current Deployment.' Table excerpt is shown below with the description of each field in the following table.

PL/DPL Code Table for Deployment 2 - Deployment 2

Channel Analog PL/DPL Code Table Name 2

< Prev. CH 2 Next CH > < Prev. Tbl 2 Next Tbl >

Channels Using This Table: 2,3

Configuration

Multi-PL/DPL Enabled

Tx PL/DPL Selected By Last Received Rx PL/DPL Disabled

Tx PL/DPL Selected By Last Rx PL/DPL Duration [min.] 5

PL/DPL Table

Enabled	Rx PL/DPL STE	Rx PL/DPL	Tx PL/DPL	Tx PL/DPL STE	Delete
<input checked="" type="checkbox"/>	-135	67.0	67.0	-135	Delete
<input type="checkbox"/>	OFF	OFF	OFF	OFF	Delete
<input type="checkbox"/>	OFF	OFF	OFF	OFF	Delete
<input type="checkbox"/>	OFF	OFF	OFF	OFF	Delete
<input type="checkbox"/>	OFF	OFF	OFF	OFF	Delete
<input type="checkbox"/>	OFF	OFF	OFF	OFF	Delete
<input type="checkbox"/>	OFF	OFF	OFF	OFF	Delete
<input type="checkbox"/>	OFF	OFF	OFF	OFF	Delete
<input type="checkbox"/>	OFF	OFF	OFF	OFF	Delete
<input type="checkbox"/>	OFF	OFF	OFF	OFF	Delete
<input type="checkbox"/>	OFF	OFF	OFF	OFF	Delete
<input type="checkbox"/>	OFF	OFF	OFF	OFF	Delete
<input type="checkbox"/>	OFF	OFF	OFF	OFF	Delete
<input type="checkbox"/>	OFF	OFF	OFF	OFF	Delete
<input type="checkbox"/>	OFF	OFF	OFF	OFF	Delete

Error Report:

Apply Table # 2 To CH # 2 Update PL/DPL Code Table # 2 Exit



Field Name	Options / Units	Description	Notes
<b>Tx PL/DPL Selected by Last Received Rx PL/DPL</b>	<p><b>Enabled</b></p> <p><b>Disabled</b></p>	<p>Specifies how Tx PL/DPL is selected for transmitting the infrastructure audios.</p> <p><b>Enabled:</b> 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:</p> <p>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.</p> <p><b>Disabled:</b> 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.</p>	
<b>Tx PL/DPL selected by Last Rx PL/DPL Duration</b>	<p>1-30 min</p> <p><b>5 min</b></p>	<p>Defines how long the last Rx PL/DPL is used for transmissions after the last received call. Each received call restarts the timer.</p>	<p>This field is accessible only when Tx PL/DPL Selected By Last Rx PL/DPL is Enabled.</p>
<b>Multi-PL/DPL Table</b>	<p>Maximum 14 pairs</p>	<p>Defines up to 14 Rx and Tx Network Access Code pairs for the specified Analog Code Table.</p>	<p>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.</p>
<b>Enabled</b>	<p>Checkbox</p>	<p>Identifies if current row of the table is enabled for use.</p>	
<b>Rx PL/DPL</b>	<p>PL: 67.0-254.1</p> <p>DPL: d-023-d-754</p>	<p>Defines receive PL/DPL.</p>	
<b>Tx PL/DPL</b>	<p>67.0-254.1</p> <p>DPL: d-023-d-0754</p>	<p>Defines transmit PL/DPL</p>	

Field Name	Options / Units	Description	Notes
<b>Error report:</b>		Displays any warnings or errors related to the creation of Rx/Tx L/DPL pairs in the Multi-PL/DPL table.	
<b>Clear</b>		Clears Rx PL/DPL and Tx PL/DPL entry	
<b>Apply ACT # xx to CH # yy</b>		Clicking on this tab applies the PL/DPL values ACT # xx to CH yy  In the "Channel Configuration" Channel no.yy	
<b>Update Access Code Table # xx</b>		Updates the Access Code Table ACT# xx in the "Channel Configuration"	
<b>Exit</b>		Exits the Table	



## 2.8 SERVICE

The Tweaker'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 Tweaker, 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.**

## 2.8.1 MONITORING

The screenshot displays the 'Monitoring' window of the PDR8000 software. The interface is organized into several sections:

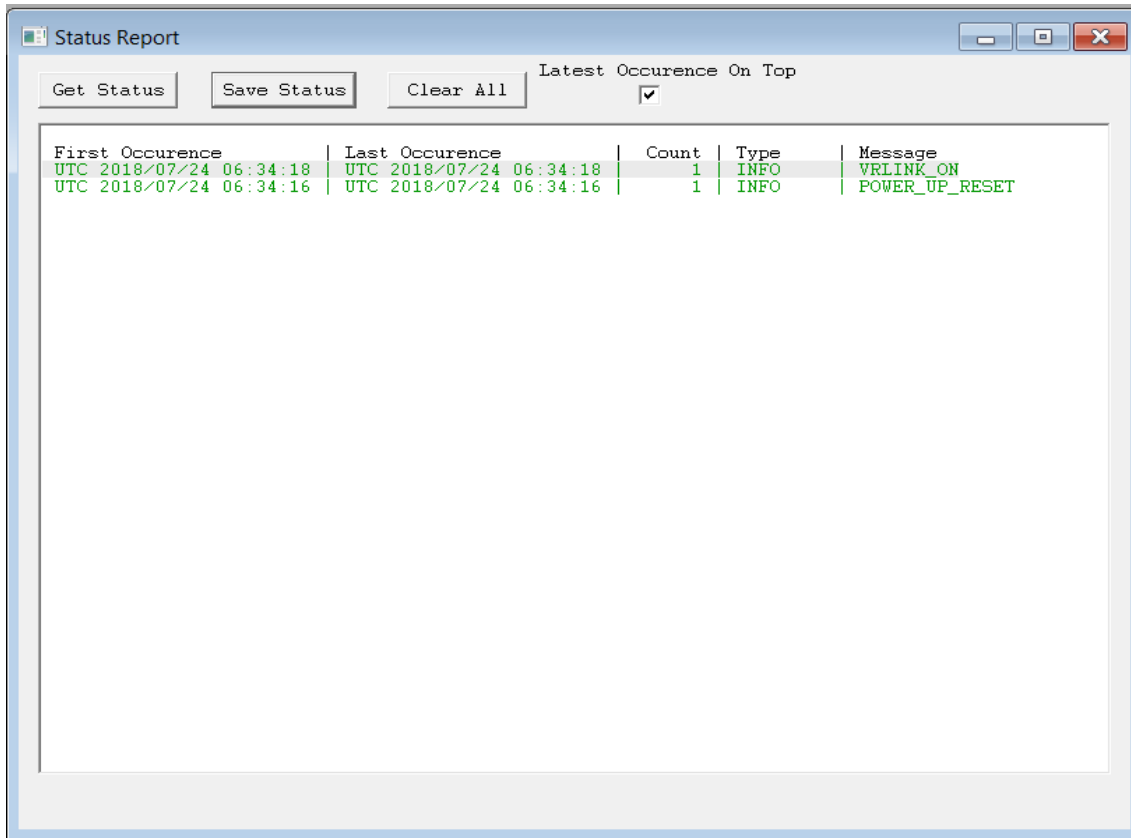
- Operational Mode:** PDR Operating Mode is set to 'Normal', PDR Status is 'Active', PTT is 'PTT Off', and Repeater State is 'Repeat (Set Up)'.
- Deployment Info:** Deployment is '2' (Deployment 2) and Channel is '2' (Ch. Analog : Analog).
- Receiver Activity:** Rx is 'Idle'. Fields for Rx Source, RxNAC, Rx PL/DPL, TalkGroup, and Subscriber ID (decimal) are all '---'.
- Transmitter Activity:** Tx is 'Idle'. Fields for Tx Source, Tx NAC, Tx PL/DPL, TalkGroup, and Tx Power Alarm are all '---'.
- Signal Quality:** Sig. Quality Metric is 'Idle', SINAD (db) Equivalent is '---'.
- RSSI:** RSSI State is 'Idle', RSSI (dbm) is '-130.4', and RSSI (µV) is '0.07'.
- RF Power:** RF Pow. (dBm) is 'Off' and RF Pow. (W) is '0.00'.
- Infrastructure Activity:** Link State is 'Fail', Link Type is 'V.24', Rx is 'Idle', and Tx is 'Idle'.
- Antenna Switch:** Set to 'Normal'.
- Thresholds and Temperature:** Squelch ON Thresh. is 10 dB SINAD, Squelch OFF Thresh. is 5 dB SINAD, Temp (°C) is 27, and PA Temp (°C) is 25.
- Other Parameters:** RSSI ON Threshold is -100.0 dBm, Synthesizer is 'Locked', and DC Voltage is 'Normal'.
- P25 Rx Modem Test:** BER Rx Test is 'No', BER is 0.00%, and BERm is 0.00%.

Field Name	Options / Units	Description	Notes
<b>PDR Operating Mode</b>	<b>Normal</b> Service	Specifies the current mode of operation <b>Normal:</b> PDR8000 is operating as programmed <b>Service:</b> 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.
<b>PDR Status</b>	<b>Active</b> Idle	Displays the current PDR8000 status	
<b>PTT</b>	<b>PTT OFF</b> PTT ON CARRIER Test Tone V.52 Test Pattern	PTT OFF: PDR8000 not transmitting PTT ON: PDR8000 transmitting (factory use only) CARRIER: Carrier Tx only PTT Analog In: factory use only Test Tone: Transmit 1011 digital test tone V.52 Test Pattern: digital test Signal	User configurable- available in Service Mode only
<b>Repeater State</b>	Repeat Set up Repeat Knocked Down Base station	Indicates the PDR8000 operation as Base station or Repeater	Programmable in the Tweaker 'RF Configuration' menu
<b>Deployment</b>	1-10	Identifies the current Deployment of the 10 possible deployments	
<b>Channel</b>	1-64	Identifies the current channel of the 16 possible channels	
<b>Receiver Activity</b>			
<b>Rx State</b>	<b>Idle</b> Active	Specifies the Repeater Activity	
<b>Rx Source</b>	<b>Inbound</b> Outbound	Displays if the PDR8000 is receiving from the Subscriber or transmitting on V.24 Link.	
<b>Rx NAC</b>		Displays the received NAC from the Subscriber	
<b>Rx PL/DPL</b>		Displays the received PL/DPL from the Subscriber	
<b>TalkGroup</b>		Displays the Subscriber Talkgroup ID	
<b>Subscriber ID(Decimal)</b>		Displays the Subscriber ID in decimal format	
<b>Transmitter Activity</b>			
<b>Tx</b>	<b>Idle</b> Active	Specifies the Repeater Activity	
<b>Tx Source</b>	<b>Inbound</b> Outbound	Displays if the PDR8000 is receiving from the Subscriber or transmitting on V.24 Link.	

Field Name	Options / Units	Description	Notes
<b>Tx NAC</b>		Displays the NAC transmitted to the Subscriber	
<b>Tx PL/DPL</b>		Displays the PL/DPL received from the Subscriber	
<b>TalkGroup</b>		Displays the PDR8000 Talkgroup ID	
<b>Tx Power Alarm</b>			
<b>P25 Rx Modem Test</b>			
<b>BER Rx Test</b>	<b>NO</b> YES	Bit Error Rate P25 Rx Modem Test control	User configurable- available in-Service Mode only
<b>BER</b>	%	Current Bit Error Rate	Service Mode only
<b>BERm</b>	%	Mean Bit Error Rate	Service Mode only
<b>Infrastructure Activity</b>			
<b>Link State</b>	<b>Fail</b> Pass	Current State of the V.24 Link	
<b>Link Type</b>	V.24	Current Link type	
<b>Rx</b>	<b>Idle</b> Active	Specifies the Link Activity	
<b>Tx</b>	<b>Idle</b> Active	Specifies the Link Activity	
<b>Signal Quality</b>			
<b>Signal's Quality Metric</b>	<b>OFF</b> ON		
<b>SINAD Equivalent</b>	dB		
<b>RSSI</b>			
<b>RSSI State</b>	<b>Idle</b> Active	Specifies the state of the Receiver	
<b>RSSI</b>	dBm	Received signal strength in dBm	
<b>RSSI</b>	uV	Received signal strength in uV	
<b>RF Power</b>			
<b>RF Power</b>	dBm	PDR8000 transmitting RF power in dBm	
<b>RF Power</b>	W	PDR8000 transmitting RF power in W	
<b>Squelch ON Threshold</b>	dB SINAD	Sets the Squelch ON Threshold.	Affects Analog Mode only. Typical recommended setting ON: 16dB SINAD. 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

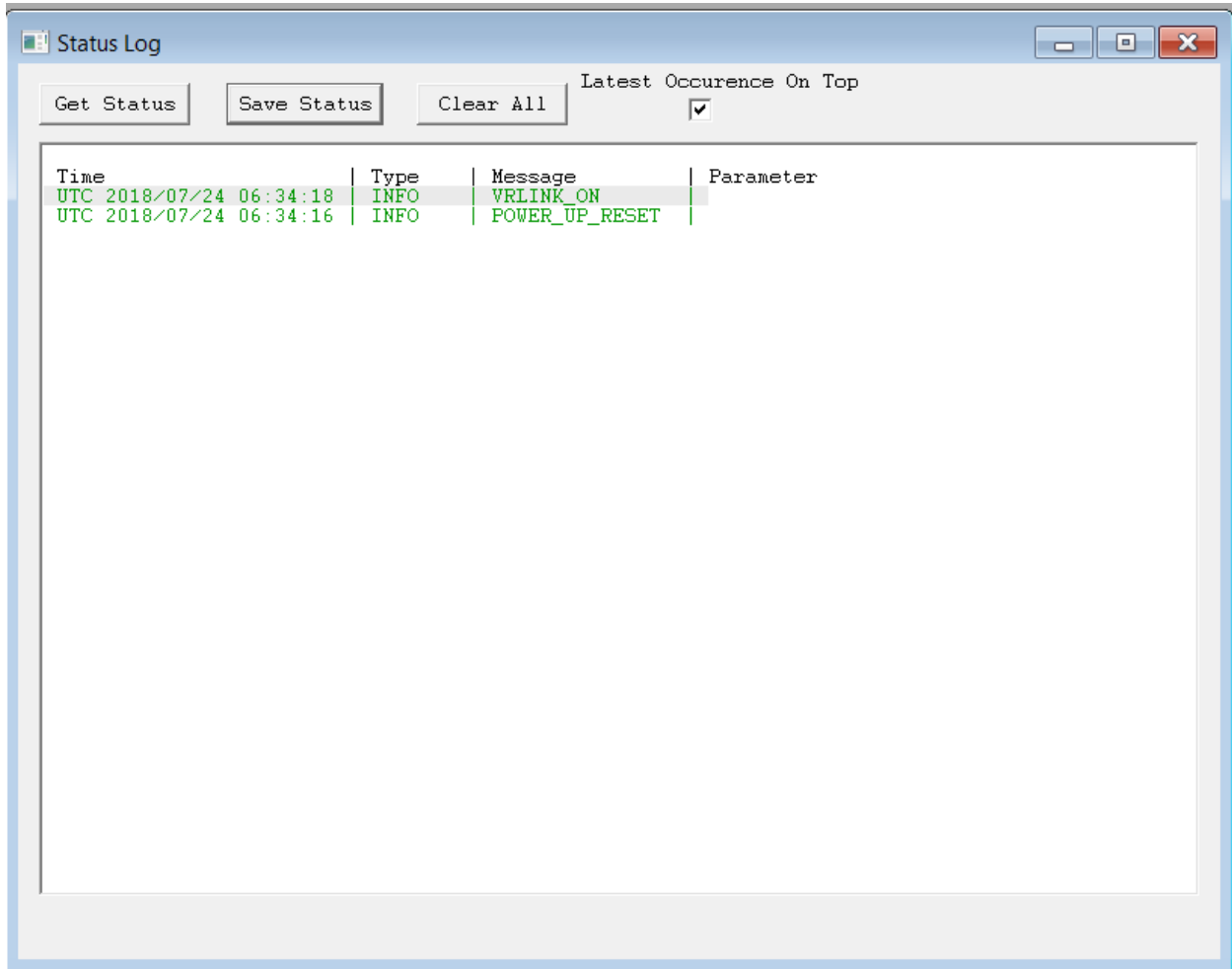
Field Name	Options / Units	Description	Notes
<b>Squelch OFF Threshold</b>	dB SINAD	Sets the Squelch OFF Threshold.	Affects Analog Mode only. Typical recommended setting OFF: 10dB SINAD. If this field is temporarily modified in Monitoring Window for "tuning" the PDR, however leaving the Monitoring Screen will result in reverting to the previously programmed/saved values
<b>Temp</b>	Celsius	PDR8000 internal temperature	
<b>PA Temp</b>	Celsius	RF Power Amplifier temperature	
<b>RSSI ON Threshold</b>	<b>dBm</b>	Sets the RSSI ON Threshold	Affects Digital Mode only. Typical recommended setting ON: -100 dBm. 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
<b>Synthesizer</b>	<b>Locked</b> Out of Lock	Current state of the Synthesizer	
<b>DC Voltage</b>	<b>Normal</b> High Low	DC Voltage	
<b>Antenna Switch</b>	<b>Normal</b> Reverse	Current antenna switch position	
<b>NOTE:</b> Fields in this screen are populated only when connected to PDR8000.			
<b>NOTE:</b> In the Options/Units column, the option in <b>bold text</b> indicates the default value.			

## 2.8.2 STATUS REPORT



Field Name	Options / Units	Description	Notes
<b>Get Status</b>		Gets the PDR8000 Status Report	
<b>Save Status</b>		Saves the Status Report as text file	
<b>Clear All</b>		Clears the contents	

## 2.8.3 STATUS LOG



Field Name	Options / Units	Description	Notes
<b>Get Status</b>		Gets the PDR8000 current Status Log	
<b>Save Status</b>		Saves the Status Log as text file	
<b>Clear All</b>		Clears the contents	

### 3 PDR8000 SPECIFICATIONS

General Specifications	
Dimensions: Width / Height / Depth	488 mm (19.2") x 386 mm (15.2") x 185 mm (7.3")
Weight	27.4 lbs. (12.5kg)
IEC IP Rating During Operation and Storage (Closed Case)	IP65
AC Supply Voltage	95V AC to 264V AC, 47Hz to 63Hz
AC Current at 120V AC	2.9A
AC Supply Approvals	UL60950-1 and IEC60950-1
DC Supply Voltage	13.8V DC -15%/+20%
DC Current Drain	Standby/Receive Transmit 1.3A 7.0A
Operating Temperature, Full Power setting; At 50% Transmit Duty Cycle with case closed At 100% Transmit Duty Cycle with case open	-30°C to 60°C
PDR8000 Duty Cycle	50% Transmit
Antenna Impedance	50 Ohms
External Connectors	PDR8000 Antenna RF Input RF Output AC Input DC Input AUX V.24 LAN Ground N Female, with Dustcap N Female, with Dustcap N Female, with Dustcap powerCON TRUE1, NAC3MPX, with Sealing Cover LEMO push pull, EGL.2K.302.CLA, with Dustcap LEMO push pull, EGG.1K.306.CLL, with Dustcap RJ-45 Type, 17-111574, with Dustcap RJ-45 Type, 17-111574, with Dustcap Stainless steel stud, 0.5" long with 10-32 thread
Internal Connector	Computer Interface Channel Spacing Number of Channels USB (type B) Digital: 12.5kHz programmable Analog: 12.5 kHz or 25 kHz programmable 64 x 10
Equipment Type Acceptance	VHF UHF 700 MHz 800 MHz
FCC	LO6-DVRSVHF LO6-DVRSUHF LO6-DVRS700 LO6-DVRS800
Industry Canada	2098B-DVRSVHF 2098B-DVRSUHF 2098B-DVRS700 2098B-DVRS800
Transmitter Specification	VHF UHF 700 MHz 800 MHz
Frequency Band [MHz]	136-174 MHz 380-430 MHz 764-776 MHz 851-869 MHz 450-470 MHz 470-512 MHz
Typical Power Output (on Internal TX Port)	20W (programmable per channel from 1W to 20W)
TOT Option	10 seconds to 2550 seconds or Disabled
Max Spurious Output	-20dBm
FM Hum and Noise 12.5kHz	37dB
Receiver Specification	VHF UHF 700 MHz 800 MHz
Frequency Band [MHz]	136-174 MHz 380-430 MHz 794-806 MHz 806-824 MHz 450-470 MHz 764-776 MHz 851-869 MHz 470-512 MHz
Receiver Sensitivity – Digital P25 5% BER (on Internal RX Port)	-115dBm
Selectivity 12.5kHz	60dB
Intermodulation	70dB
FM Hum and Noise 12.5kHz	37dB

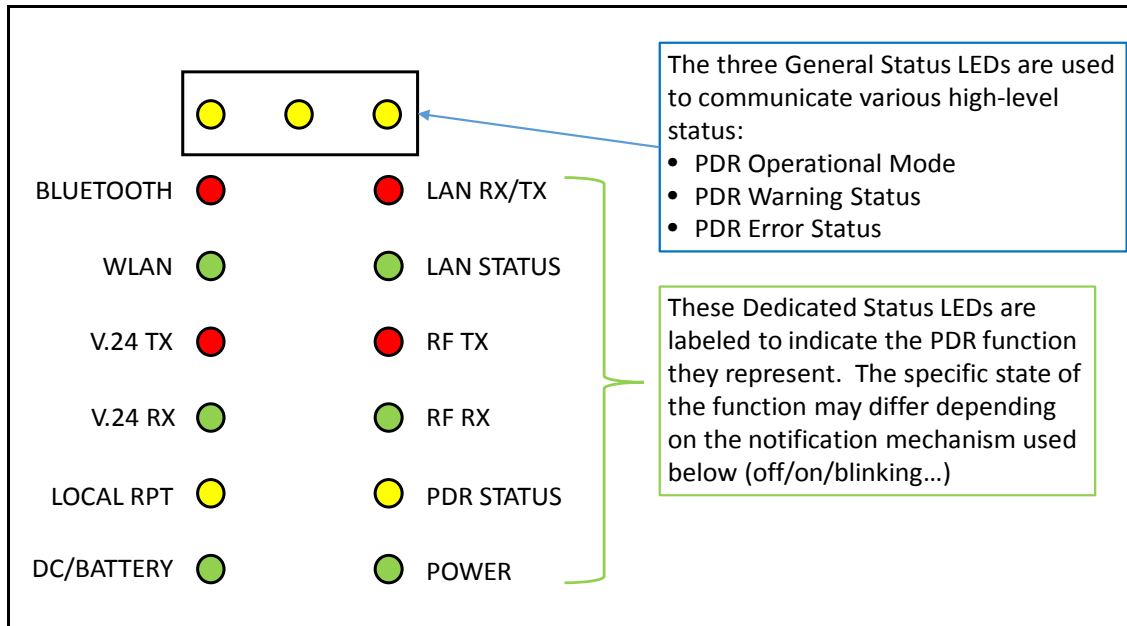


## 4 TROUBLESHOOTING

Errors/Warnings may be caused due to any or all 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.)

PDR8000 LED Status on the Display Panel



PDR8000 Status	LED	LED Status ON/OFF/ Blinking	Action
Power up	Power & DC/Battery LED	OFF	Disconnect the power source and replace the appropriate fuse.
Wireline Enabled	V.24 Tx/Rx LED	Blinking	Check the V.24 connection and PDR8000 Deployment programming.
Repeater Mode	Local Repeat LED	OFF	Check Deployment programming.
Base Mode	Operational Mode LED	OFF	Check Deployment programming.
Service Mode	Top Centre Status Warning LED	OFF	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.

## 5 ERROR CODES

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	
100	Disabled Channel Selected
80	IF board link down - V.24 programmed and needed
40	Low Battery alarm ("LOW BATTERY")
20	HI Battery alarm ("Hi BATTERY")
10	Invalid Customer Option Programmed
8	Invalid/unprogrammed channels selected
4	Invalid channel block checksum
2	Invalid Tx frequency programmed
1	Invalid Rx frequency programmed
Warning Codes	
1	Low Battery warning ("LOW BATTERY")
2	IF Board not connected - V.24 not programmed
4	Incompatible Baseband DSP
8	Incompatible Transceiver DSP

10	Temperature alarm on PA board
20	Tx Power alarm (Outside range)
40	bad main EEPROM map data
80	bad backup EEPROM map data
100	EE map version mismatch
200	Options mismatch
400	RTC battery failed/time invalid
<b>RF Alarm Codes</b>	
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

## 6 GLOSSARY

Keyword	Description
<b>ACK</b>	Acknowledgement of communications.
<b>BSI</b>	Base Station Identifier; sent over-the-air, sometimes as Morse Code, to identify the originating transmitter
<b>Channel</b>	A group of characteristics, such as transmit / receive frequency pairs, radio parameters, encryption encoding etc.
<b>Coded Squelch</b>	Tone Private-Line (PL) or Digital Private-Line (DPL). Used on conventional channels for signal validation.
<b>Conventional</b>	Refers to radio-to-radio communications, sometimes through a base station repeater or vehicular repeater.
<b>Deployment</b>	Complete personality setup of the PDR8000.
<b>Dispatcher</b>	An individual who has radio system management duties.
<b>dpd File</b>	PDR8000 personality file saved as <b>file_name.dpd</b> .
<b>DPL Coded Squelch</b>	A continuous sub-audible data signal transmitted with the carrier. See Coded Squelch.
<b>PDR8000</b>	Portable Digital Repeater.
<b>epr File</b>	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.
<b>FCC</b>	Federal Communications Commission.
<b>FNE</b>	Fixed Network Equipment – Trunking or Conventional System Infrastructure
<b>Inbound Call</b>	A Call transmitted by Local PSU and received by the PDR8000
<b>NAC</b>	Network Access Code – used in P25 mode for validation of P25 radio communications, similar to the use of PL/DPL in analog mode. Also used for PDRS Steering.
<b>NID</b>	Network ID - see Network Access Code (NAC)
<b>Outbound Call</b>	System Call received from the system.
<b>PL Coded Squelch</b>	Private Line. A continuous sub-audible tone transmitted with the Carrier. See Coded Squelch.
<b>PSU</b>	Portable Subscriber Unit

Keyword	Description
<b>RF</b>	Radio Frequency. Part of the general frequency spectrum 10kHz - 10,000,000 MHz.
<b>RSSI</b>	Received Signal Strength Indicator
<b>Talk Group</b>	A group of radio users who communicate with each other by using the same communication path.
<b>Trunking</b>	The automatic sharing of radio frequencies by large number of users based on communication path sharing for the length of a conversation.
<b>Tweaker</b>	PDR8000 Programming Software Application
<b>V.24</b>	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)

## Contact Information

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