

# **Quasonix Ruggedized Handheld Programmer**

## **User Manual**

**QS-PROG001800**

**QS-PROG0021050**



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## 1 Introduction

### 1.1 Description

This document describes the operation of the Quasonix Ruggedized Handheld Programmer (PDA Utility). The Quasonix Handheld Programmer is designed to facilitate setting transmitters and receivers for operation. With an intuitive touch screen interface, all basic settings are provided to get your transmitter or receiver up and running quickly.

#### 1.1.1 Package Contents

Package contents are described in Table 1.

**Table 1: Package Contents**

Quantity	Description
1	Quasonix CD
1	Quasonix Handheld Programmer User Manual
1	Nomad™ Ruggedized PDA with Quasonix Utility Application and Battery Preinstalled
1	International Power Adapter
1	USB cable
1	Stylus
1	Stylus Lanyard
2	Screen Protectors
1	Hand Strap
1	Nomad™ Getting Started Guide
1	Nomad™ Getting Started CD
1	Windows Mobile Device Center

## 2 Operating Instructions

The Quasonix Handheld Programmer is operated by using the touch screen interface of a ruggedized Nomad™ PDA. Your Handheld Programmer has the Quasonix Utility Application preloaded. This software utility automatically loads when the Handheld Programmer is turned ON.

### 2.1 Handheld Programmer Keypad Overview

Figure 1 provides a close-up look at the Handheld Programmer keypad.



Figure 1: Handheld Programmer Keypad

#### 2.1.1 Power Key

The Power key allows different operations depending on how it is pressed.



Figure 2: Power Key

- **Press and hold** the Power key to display and activate a countdown timer that will reboot the device.
- **Press and release** the Power key when the countdown timer is activated to display a menu that allows the device to be completely shut down, soft booted, or hard booted.

- **Press** the Power key quickly to put the Handheld Programmer to sleep.

### **2.1.2 Tab Key**

The Tab key allows the user to quickly move through the Quasonix Programmer Utility settings.



**Figure 3: Tab Key**

### **2.1.3 Enter Key**

The Enter key allows toggling check boxes for settings that are ON or OFF.



**Figure 4: Enter Key**

### **2.1.4 Backspace Key**

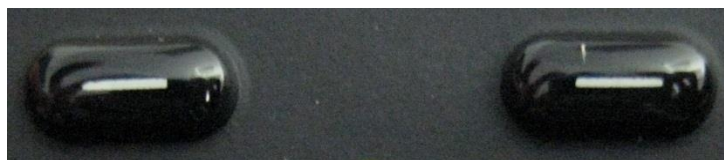
The Backspace key moves the cursor backward to erase data typed on any numeric setting.



**Figure 5: Backspace Key**

### **2.1.5 Screen Menu Keys**

The Screen Menu keys are used to select the corresponding left and right menu options displayed on the bottom of the Programming screen.



**Figure 6: Screen Menu Keys**



### 2.1.6 Numeric Keys

The Numeric keys are used on settings that require a numeric value.



**Figure 7: Numeric Keys**

## 2.2 Quasonix Utility Application – Getting Started

1. Connect the Handheld Programmer to a Quasonix transmitter or receiver using a pre-wired MDM-15 wiring harness for TTL units (Part Number: QSX-AC-MDM15-HARNESS-SOCK). Optionally, you can wire your own MDM-15 harness using the prewired MDM-15 with pigtails. (Part Number: QSX-AC-MDM15-36-SOCK). Refer to the documentation that came with your Quasonix transmitter or receiver for the proper wiring harness to use.



**Figure 8: MDM-15 Wiring Harness**

2. Using the wire harness, plug the female DB-9 connector directly into the bottom of the Handheld Programmer.

3. Power on the Quasonix transmitter or receiver. (Refer to the documentation that came with the transmitter or receiver for the correct voltages and connections.)
4. If the Handheld Programmer is not powered on, press the green Power key on the keypad.



Figure 9: Power Key

After the Handheld Programmer boots up, it automatically starts the Quasonix Utility Application. The application automatically attempts to connect to a device.

If the Handheld Programmer is already powered on and the Quasonix application is running, tap on the Test Connection button to automatically attempt to sense the connected device type and acquire settings. If the cable was unplugged or power was not applied to the connected device, the application displays the Connection Failed screen shown in Figure 10. Resolve the device issue then tap on the Test Connection button again.

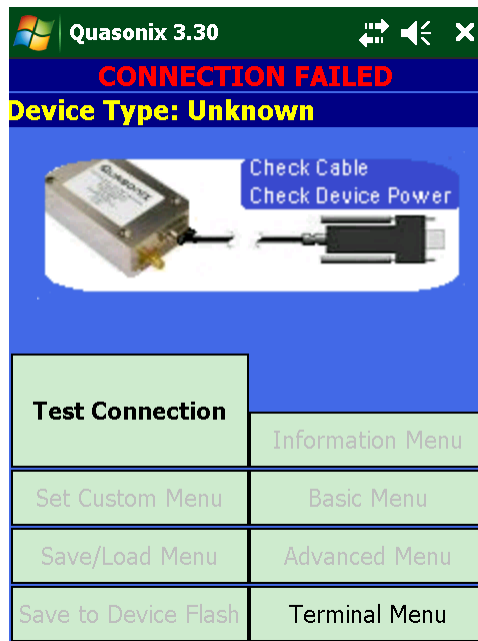


Figure 10: Main Menu Screen After Failed Test Connection

The application should display the device type at the top of the Main Menu screen, as shown in Figure 11 when a transmitter is connected, or as shown in Figure 12 when a receiver is connected.

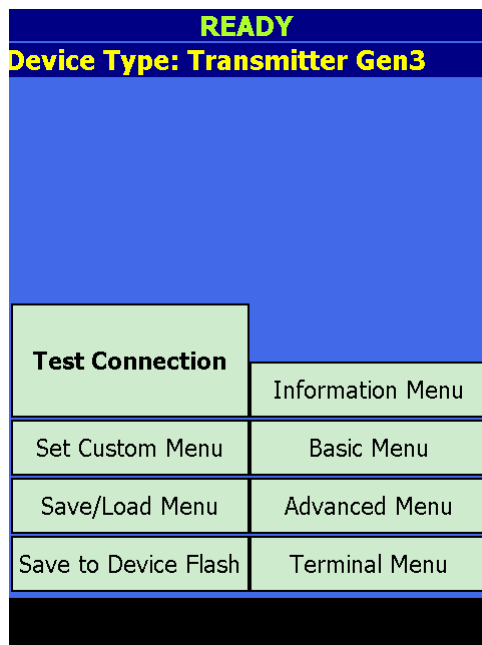


Figure 11: Main Menu Device Type: Connected to Transmitter

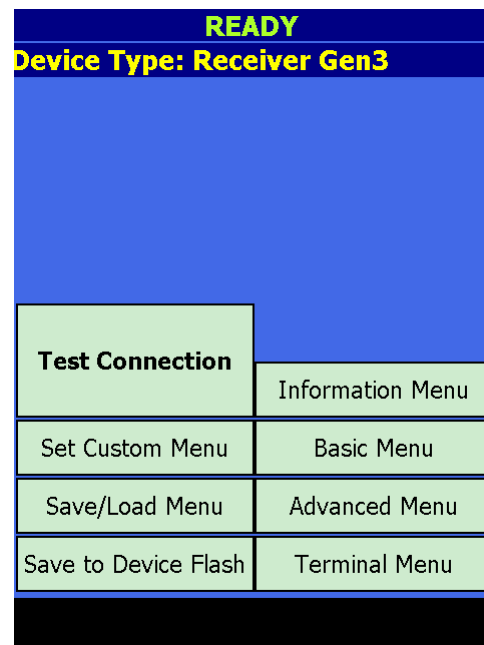


Figure 12: Main Menu Device Type: Connected to Receiver


The available Device Types are: Transmitter, Transmitter Gen3, Receiver, Receiver Gen3, or Unknown. A Dual Transmitter option will be available soon.

If the Device Type displays a value of “Unknown”, a communication problem has occurred. Refer to the Troubleshooting section at the end of this manual for assistance.

## 2.3 Quasonix Utility Application – Main Menu

The Main Menu is where all settings are accessed. Depending on the device type, not all settings will be present. For example, receivers do not have RF output so this menu option is hidden. Other menu items, such as Bit Rate B, are also hidden if the device does not support AUQPSK as a mode option and this mode is not actively selected.

Representative settings and descriptions are described in this document. For details about specific modes or options not mentioned here, refer to the appropriate Quasonix receiver or transmitter manual.

Selecting the  icon in the upper right corner of the Main Menu closes the application completely. (The application will not be running as a Nomad background task.) To run the application after it has been closed, select the following from the Windows Menu option at the top of the screen: **Start > Programs > Quasonix**, then click on the Quasonix application icon.

### 2.3.1 Main Menu Selections

There are currently eight on screen selections used to access transmitter or receiver functionality. A brief description of each is provided in Table 2. Detailed explanations follow. Tap on a selection to display associated screens.

**Table 2: Main Menu Selections**

Selection Name	Description
Test Connection	Enable automatic detection of a connected device
Set Custom Menu	Allow a user to create a customized menu
Save/Load Menu	Load or save presets
Save to Device Flash	Save all current settings to flash memory on the connected device
Information Menu	Display current configuration settings for the connected device
Basic Menu	View or change basic parameter settings on the connected device
Advanced Menu	View or change advanced parameter settings on the connected device
Terminal Menu	Access a Terminal window with functionality like a PC-based Terminal program

## 2.3.1.1 Test Connection

As described in section 2.2, Test Connection allows for automatic detection of a new device. When configuring multiple devices, move the serial connector from one device to another, then tap the Test Connection screen button to establish a new connection and retrieve settings.

The application indicates READY along with the Device Type when a connection is established.

## 2.3.1.2 Save/Load Menu

The Save/Load Menu is used to access the Load/Save presets screen, shown in Figure 13. A preset is simply an XML database file containing a snapshot of a connected device configuration from a particular point in time. This manual describes presets in the context of the Handheld Programmer. For specific details about software presets, refer to the appropriate Quasonix receiver or transmitter manual.

The Load/Save presets screen provides a list of saved preset file names stored in the My Documents folder on the Handheld Programmer and allows the user to load a preset or save new presets.

### 2.3.1.2.1 Save a Preset

The Save option saves the current connected device configuration to a user-selected preset name on the Handheld Programmer.

- Presets remain until someone deliberately deletes them.
- The number of presets is only limited by the amount of space available in the flash memory of the Handheld Programmer.
- It is possible to copy preset files onto a PC (using Windows Mobile Device Center) for backup purposes or to easily move them from one Handheld Programmer to another.

The Load/Save screen provides Save to Device Flash option. When the Save to Device Flash option is checked, the preset is also saved in flash memory *on the connected device* after the handheld save is complete. This option is equivalent to the SV ASCII terminal command. The Validate File Load option only applies to the Load function.

To save a new preset:

1. Tap on Save to create a new preset file. A Save As screen displays, as shown in Figure 14.

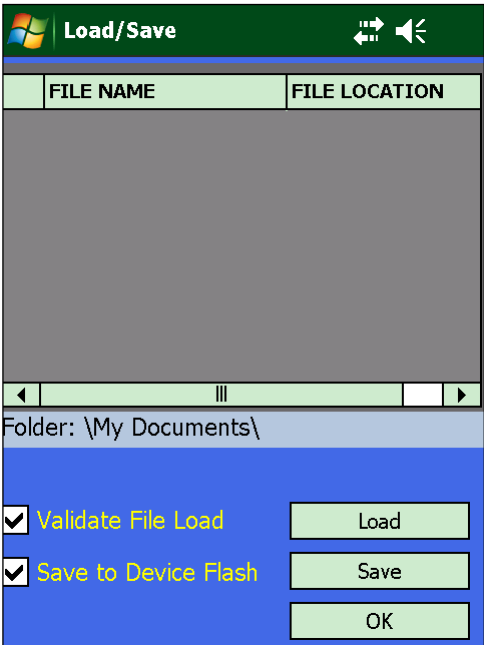


Figure 13: Load/Save Save As Screen

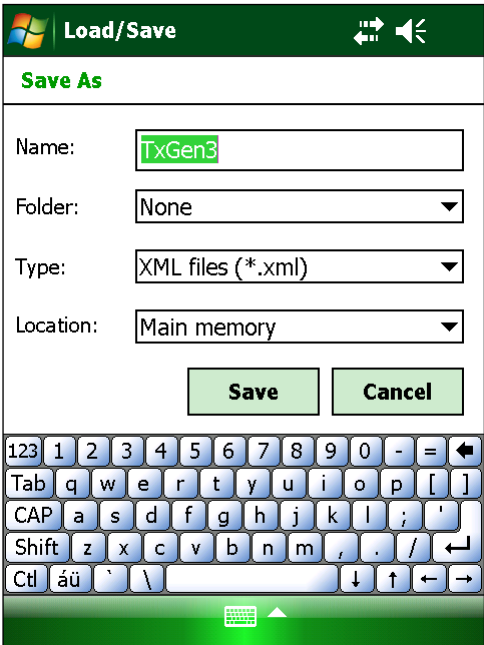


Figure 14: Save As New File Name

The Quasonix application defaults the file name to the type of connected device detected. Use the keyboard on the screen to tap the desired characters to give the preset file a unique name, as shown in Figure 15, then tap on the Save button. A Profile Save message, shown in Figure 16, indicates a successful save.

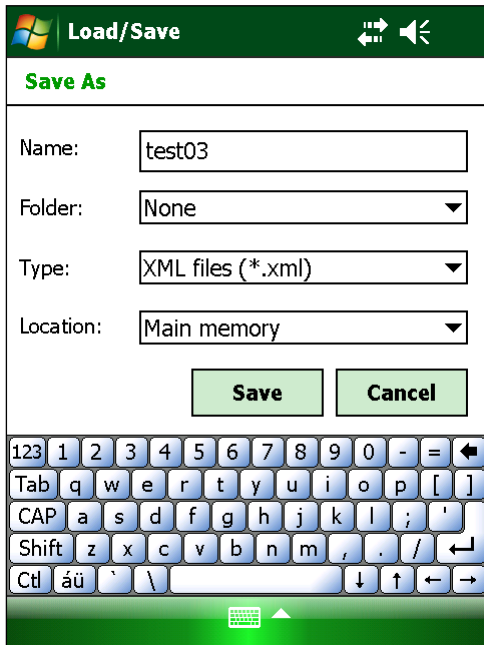


Figure 15: User Created File Name

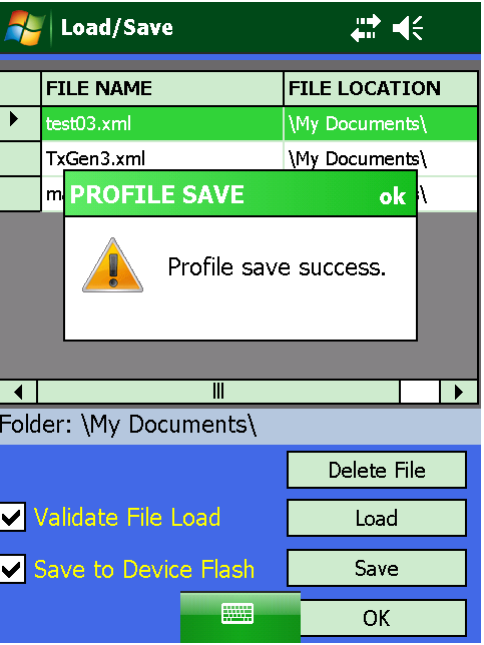


Figure 16: Profile Save Message

2. Tap on the OK button in the Profile Save message.
3. The new preset file “test03” displays in the preset list on the Load/Save screen, as shown in Figure 17.

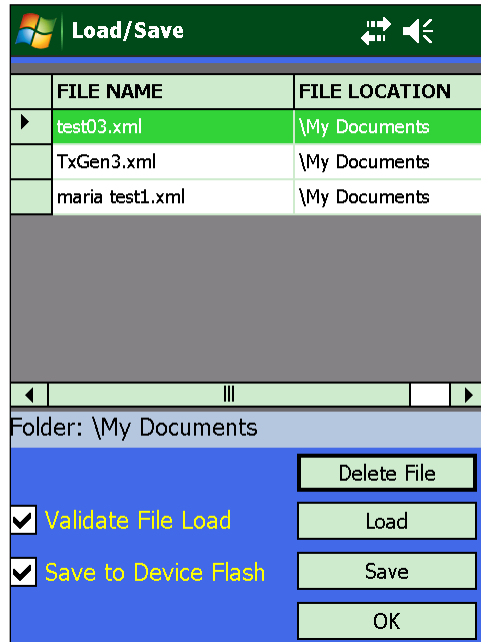


Figure 17: Load/Save Screen with New Preset Added

#### 2.3.1.2.2 Load a Preset

The Load/Save presets screen provides a list of saved preset file names stored in the My Documents folder on the Handheld Programmer. Some users set up multiple configurations that they prefer to use over and over again.

Since it is common to swap devices connected to the Handheld Programmer, it is best to select the desired preset from the list and reload it whenever a new device is detected. Don't assume that a previously loaded preset is still the active configuration running on the connected device.

The Load/Save screen provides a Validate File Load option. When the Validate File Load option is checked, it causes the Quasonix application to query the configuration settings after a preset load to ensure they were set correctly. This option only applies to the Load function.

**Note:** All presets saved on the handheld programmer display in the saved list, regardless of the device type. While presets are specific to the device type and have the device type embedded in them, the files are not currently sorted based on the connected device type.

If a user attempts to load a transmitter preset with a receiver connected to the handheld programmer, a warning message, shown in Figure 18, displays.

Attempting to load a transmitter preset with a receiver connected to the handheld programmer can produce unpredictable results. Only settings recognized by the connected device are loaded and validated. If the Validate File Load option is checked, a message displays when mismatched settings are detected for those settings that are recognized by the connected device, as shown in Figure 19. Tap on OK to close the message and view the mismatched settings as they display on the Load/Save screen (Figure 20).

When the preset was created on an older transmitter but the handheld programmer is connected to a Gen3 transmitter, the warning may be overridden and the file loaded successfully.

In general, *overriding the warning message is NOT recommended.*

When a handheld programmer is being used for multiple device types, a mismatch may be avoided by including a Tx, Rx, or something similar in the file name when the preset is saved.

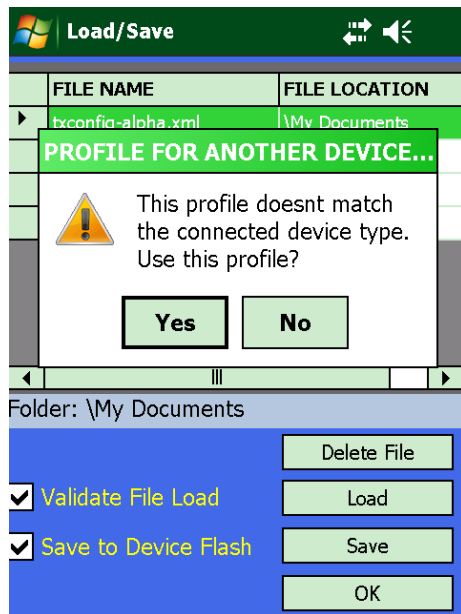


Figure 18: Load Presets--Device Mismatch

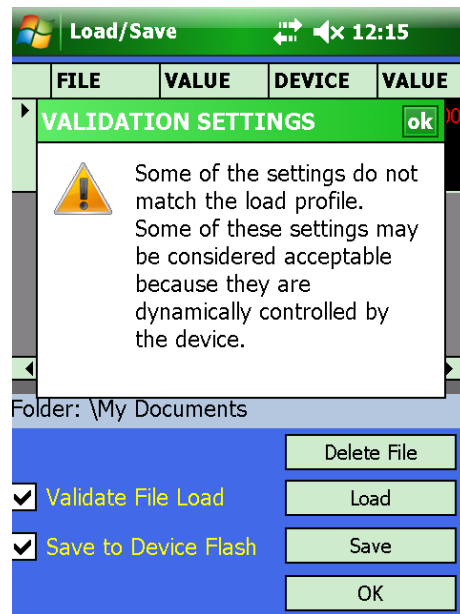


Figure 19: Validate Load Mismatch Message

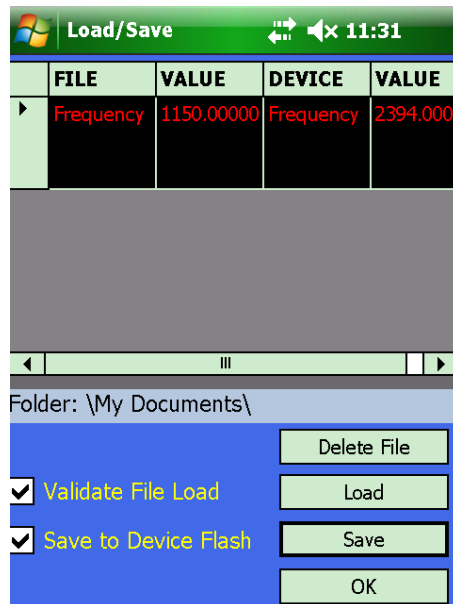


Figure 20: Preset Load Mismatches Due to Device Mismatch

To load an existing preset configuration:

- 1. Tap on Load in the Load/Save screen (Figure 21).
- 2. In the Load/Save Open screen, tap on the desired file name from the list to load it (Figure 22).

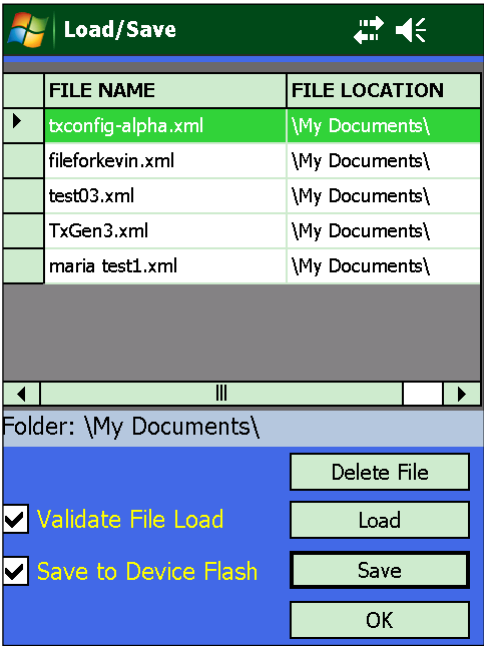


Figure 21: Load/Save Presets Screen

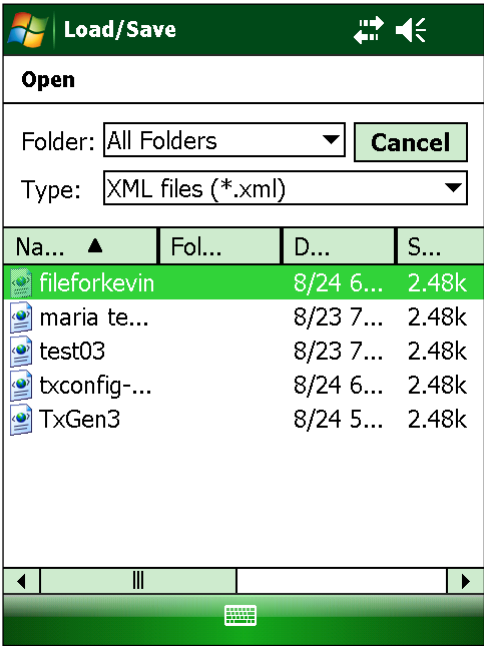


Figure 22: Load/Save Open Screen

The Quasonix application may display a processing message like the one shown in Figure 23.



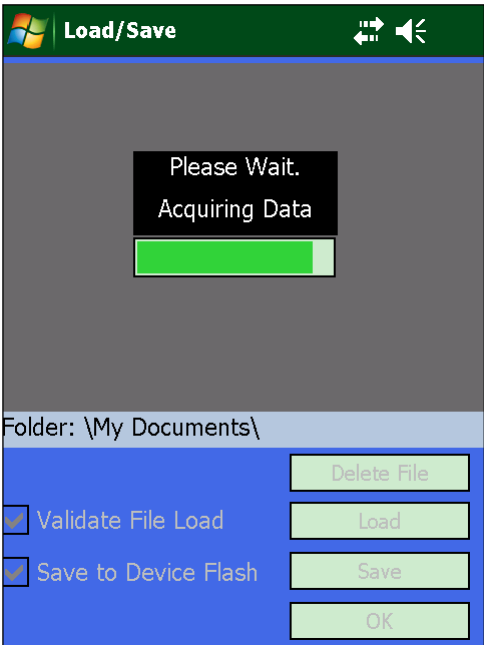


Figure 23: Load/Save Presets--Wait Message

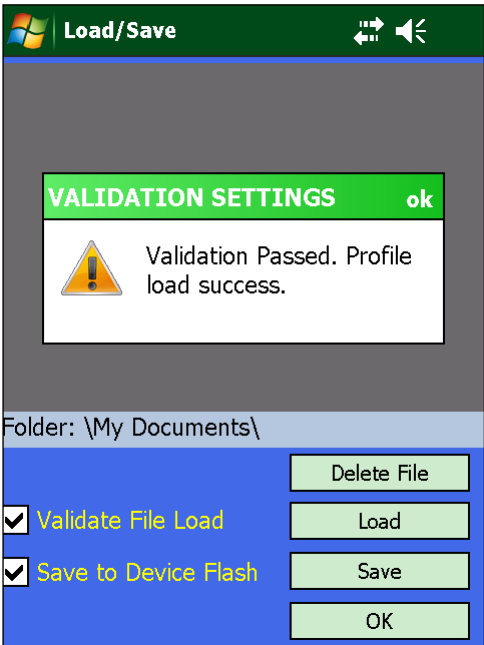


Figure 24: Load/Save Open Screen

When the preset is loaded, a Validation Settings message displays if the Validate File Load option is checked and the load was successful. If the Validate File Load option is not checked, there is no message when the load is complete. The Load/Save screen redisplay, as shown in Figure 25.

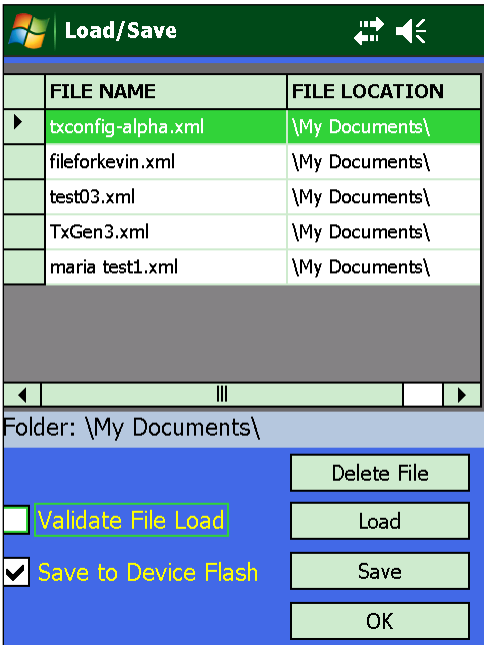


Figure 25: Load/Save After a Preset Load--No Message, Validate File Load Not Checked

If a Quasonix application software upgrade is installed on the Handheld Programmer, all presets previously created are retained. Any connected device with associated presets will operate as it did before the upgrade--same preset files, newer software.

### 2.3.1.2.3 Delete a Preset

Sometimes a preset has outlived its usefulness or must be deleted for some reason. This is also accomplished via the Save/Load Menu.

To delete a preset:

1. On the Load/Save screen, tap on the file to be deleted to highlight it, as shown in Figure 26.
2. Tap on the Delete File button.
3. A File Delete message displays, as shown in Figure. This gives the user one last chance before deleting the selected preset.
4. Tap No if you aren't sure this is the correct file to delete or you decided not to delete it for any reason.
5. Tap Yes to continue deleting the preset. The Load/Save screen redisplay without the deleted file, as shown in Figure 28.

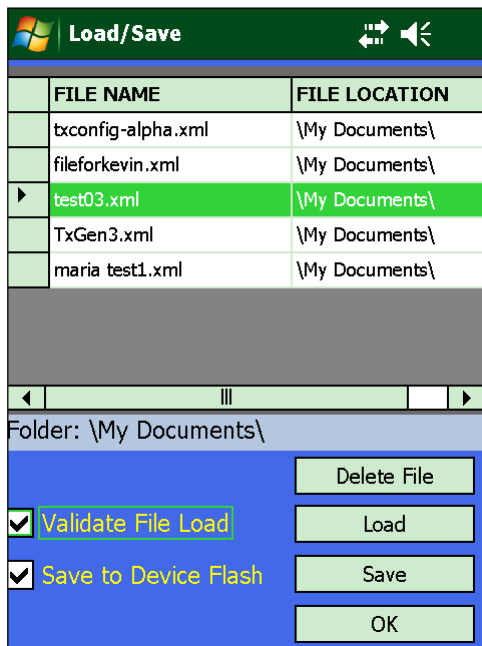


Figure 26: Load/Save--File to Delete

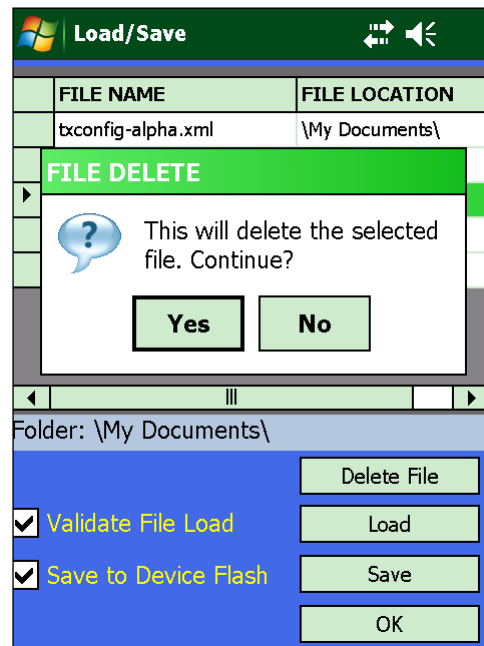


Figure 27: Load/Save--File Delete Yes or No

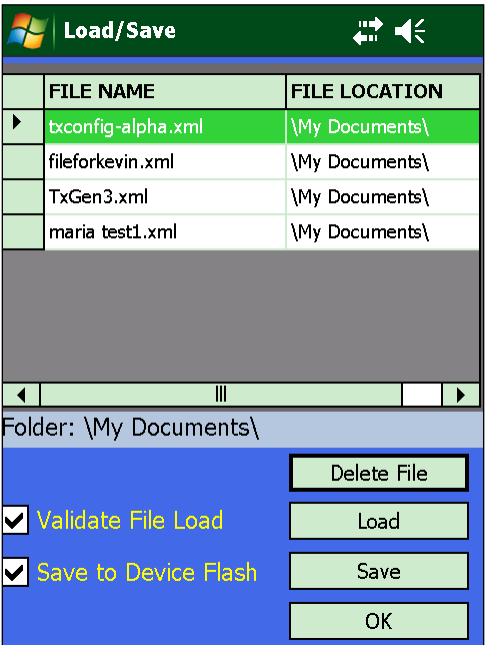


Figure 28: Load/Save--Minus Deleted File

2.3.1.3 Information Menu

The Info Menu, shown in Figure 29, displays connected device settings that **cannot** be controlled by the operator. All range limits display regardless of the modes enabled on the connected device.

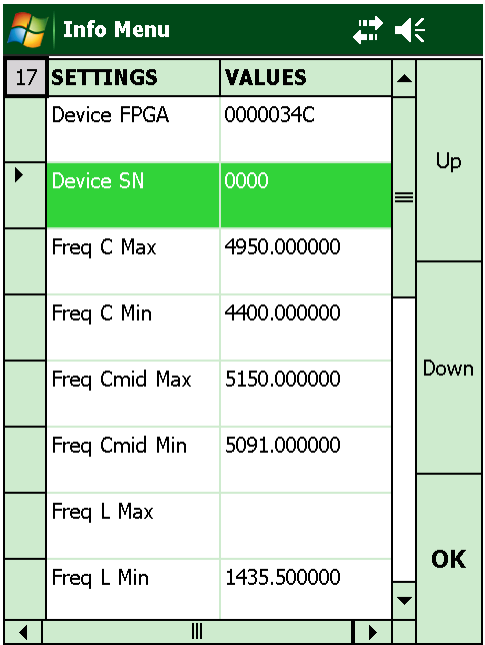


Figure 29: Information Menu

#### 2.3.1.4 Basic Menu

The fields on the Basic Menu screen, shown in Figure 30, are described in Table 3. Some of the fields (parameters) described in the table only display when certain Modes are selected or device options enabled. This menu is especially useful for someone who may not be familiar with telemetry settings.

To change specific parameters, tap on the Values field for the desired Setting. Some fields toggle between values while others may require numeric entry (described below). Settings are changed as soon as the “tap” takes place. For example, if Clock Polarity is set to Inverted and a tap toggles it to Normal, the change is applied. Tap on OK when finished making changes.

For details about specific modes or options not mentioned here, refer to the appropriate Quasonix receiver or transmitter manual.



Basic Menu			 	
12	SETTINGS	VALUES		
	Clock Polarity	Normal	Up	
▶	Clock Source	External		
	Data Polarity	Normal	Down	
	Data Source	External		
	Diff Decoding	Enabled		
	Frequency	2370.500000	OK	
	Internal Clock	5.00000000		
	Mode	SOQPSK		
◀			▶	

Figure 30: Basic Menu Example

**Table 3: Basic Menu Field Descriptions**

Menu Field	Values	Description
Clock Polarity	Normal, Inverted	Tap to toggle between values. Clock polarity is usually set to Normal.
Clock Source	Internal, External	Tap to toggle between values. Clock Source Internal only applies to transmitters. When an external clock is not available, setting this option allows the transmitter to source its own clock. The default value is Internal.
Data Polarity	Normal, Inverted	Tap to toggle between values. Data Polarity is usually set to Normal.
Data Source	Internal, External	Tap to toggle between values. Data Source only applies to transmitters. When an external data source is not available, setting this option allows the transmitter to source its own data PN pattern. The default value is External.
Differential Encoding	Enabled, Disabled	Tap to toggle between values. Differential encoding only applies to the modulation type SOQPSK. The default value is Enabled. When a transmitter is connected differential encoding will be displayed. When a receiver is connected differential decoding will be displayed.
Frequency	Numeric value	Tap to display the Numeric Entry screen. Tap the numbers for the desired frequency, then tap OK. Frequency units are in MHz. If the device is multi band, the frequency ranges for the given bands may be entered into this text box. All or part of the frequency may be selected using a stylus or finger to highlight the entry. Use the numeric keypad on the Handheld Programmer to enter the desired frequency.

Menu Field	Values	Description
Internal Clock	Numeric value	<p>Tap to display the Numeric Entry screen. Tap the numbers for the desired internal clock frequency, then tap OK.</p> <p>Internal Clock units are in MHz.</p> <p>Internal Clock only applies to transmitters.</p> <p>Internal Clock is dependent on “Clock Source Internal” being selected.</p> <p>Internal Clock configures the transmitter's internal clock.</p> <p>Digitally synthesized internal clock frequency range is 0.150 MHz – 22.0 MHz, in steps of approximately 1424.15 Hz. Exact values available are <math>N * 93.333 / 65536</math> (in MHz)</p>
Mode	Available Mode	<p>Modulation settings.</p> <p>Common modulation types are PCMFM and SOQPSK. More modulations types may be available depending on the device settings that were ordered when the Handheld Programmer was purchased.</p>
Internal Data	PN Pattern	<p>Data Pattern units are defined as PN patterns.</p> <p>Data Pattern only applies to transmitters.</p> <p>Patterns may be one of four specified patterns (PN6 or PN06, PN11, PN15, PN23)</p>
Randomizer	Enabled, Disabled	Sets Randomizer
RF On/Off	RF On, RF Off	RF On/Off only applies to transmitters.
Temperature	<b>Read only</b>	<p>Device temperature is displayed in Celsius and Fahrenheit.</p> <p>Use this information to determine proper heat dissipation or overheating of the device.</p>

## 2.3.1.5 Advanced Menu

The fields on the Advanced Menu screen are shown in Figure 31. Many fields match those displayed on the Basic Menu. Some fields unique to the Advanced Menu are described in Table 4. As with the Basic Menu, some of the fields (parameters) described in the Advanced table only display when certain Modes are selected or device options enabled. This menu is especially useful for someone who is very familiar with telemetry settings.

To change specific parameters, tap on the Values field for the desired Setting. The change is applied immediately. Tap on OK when finished.

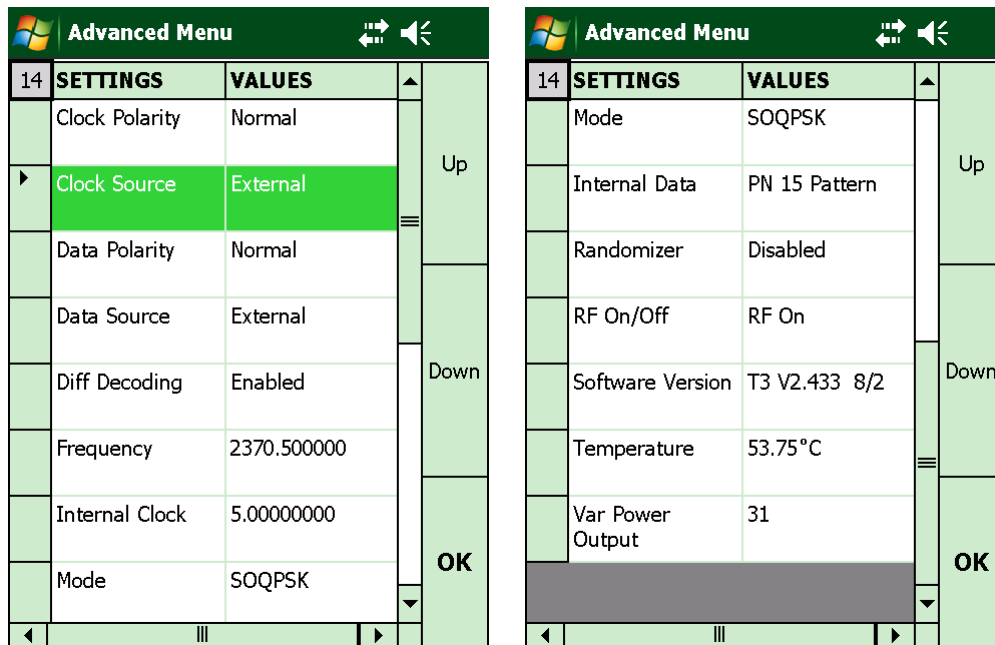


Figure 31: Advanced Menu Example

Table 4: Advanced Menu Unique Field Descriptions

Menu Field	Values	Description
Software Version	<b>Read only</b>	Displays the Quasonix software version number associated with the connected unit.
Variable Power	Numeric value	This setting allows fine adjustments to RF power output. Variable power is specific only to transmitters. Not all transmitters support this option. The default value is 0. Acceptable range is from 0 to 31 spanning 24 dB.

### 2.3.1.6 Set Custom Menu

Set Custom Menu displays the Custom Menu Options screen, shown in Figure 32. This screen enables creation of a custom menu containing settings most often used by a particular operator. This menu is especially useful for someone who is very familiar with telemetry settings and only cares about certain parameters **or** for someone very familiar with telemetry settings who is setting up the Handheld Programmer for someone who may only understand a few telemetry settings.

- Only one custom menu may be saved for a device type (TxGen3, RxGen3, Tx, Rx, etc).
- The order in which parameters are added to the custom menu list enable the user to reorganize the order in which they display in the custom menu. The first parameter selected displays at the top of the menu list, the second below the first, etc.
- The Custom Menu may be changed at any time should other parameters be desired.

- The Custom Menu is tied to the specific device it was created for. A Custom Menu created for a Transmitter Gen3 device does not apply to a Receiver Gen3 device.

For example, assume a Handheld Programmer was connected to a TxGen3 device and the device was unplugged then replaced by a RxGen3 device. When Test Connection is tapped, the Quasonix application finds the device parameters associated with the connected receiver type. If a Custom Menu was created for the Gen 3 receiver, the Custom Menu option displays on the Main Menu. If a Custom Menu does not exist for the connected receiver type, the Custom Menu option does not display.

To create a custom menu:

1. Scroll to the desired setting and tap to select it.
2. Tap on Add to add it to the custom menu.
3. Continue until all desired settings have been added.
4. If a setting was added by mistake, tap on the setting in the Custom Menu List, then tap on Remove.
5. Tap on Save Menu to save the Custom Menu.
6. The Custom Menu may be changed at any time should other parameters be desired.

An example of custom menu creation is shown in Figure 33.

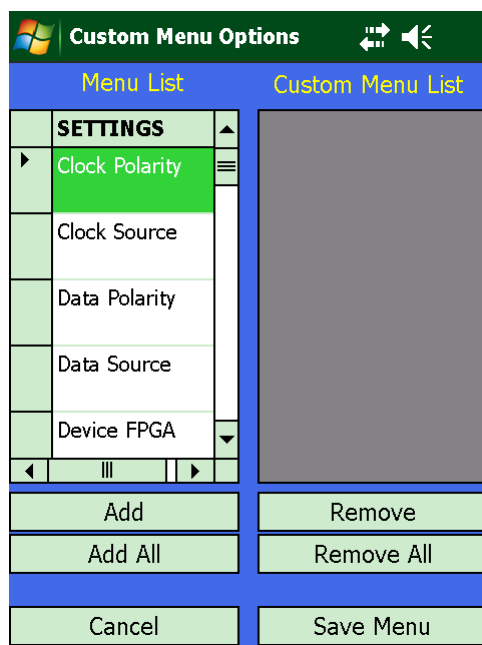


Figure 32: Custom Menu Options Screen

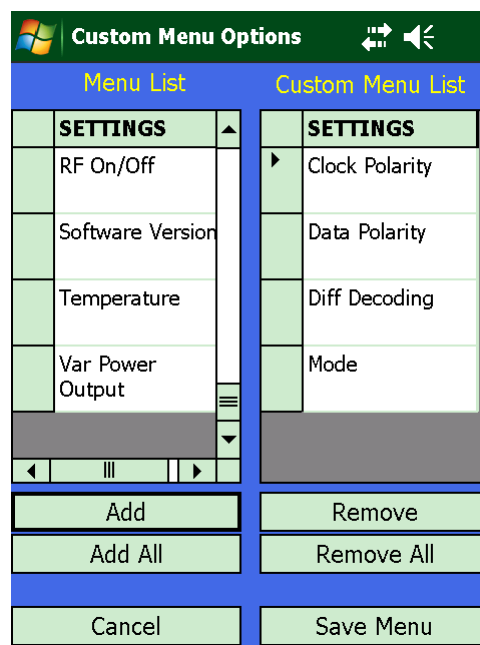


Figure 33: Creating a Custom Menu

After a custom menu is saved, the application returns to the Main Menu. Notice a new Custom Menu selection displays to the right of the Test Connection selection, as shown in Figure 34. Tap on the Custom Menu selection to display the Custom Menu. It is used just like the other menus. Tap on OK when finished.



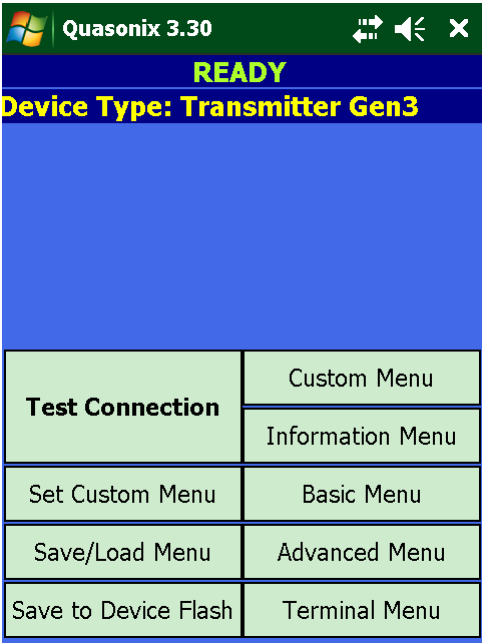


Figure 34: Main Menu with Custom Selection

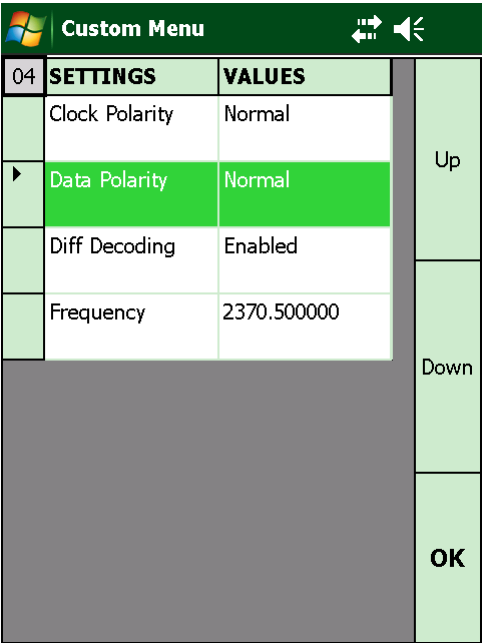


Figure 35: Custom Menu Screen

A new custom menu may be created at any time, however, the new menu will replace the previous menu for the connected device type, as shown in Figure 36.

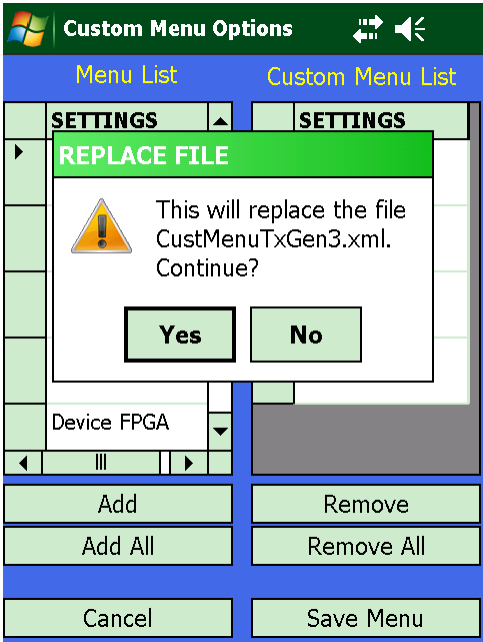


Figure 36: Custom Menu Options with Replace File Message

If a Quasonix application software upgrade is installed on the Handheld Programmer, all custom menus previously created are retained. Any connected device with an associated custom menu will operate as it did before the upgrade--same parameter settings, newer software.

It is possible to delete a custom menu for the connected device type.

To delete a custom menu:

1. From the Main Menu, tap on Set Custom Menu.
2. Tap on Remove All to remove the parameters from the custom menu (Figure 37 and Figure 38).
3. Tap on Save Menu to save the Custom Menu.
4. A Custom Menu Empty message displays, as shown in Figure 40. With no parameters to save, the message asks whether the user wants to remove the custom menu from the Handheld Programmer.
5. Tap on Yes in the message to complete the operation.
6. A Custom Menu Removed message displays, as shown in Figure 41, to confirm that the custom menu was successfully deleted from the Handheld Programmer.
7. Tap on OK in the Custom Menu Removed message.
8. The Main Menu redisplay with a Custom Menu option (Figure 42).

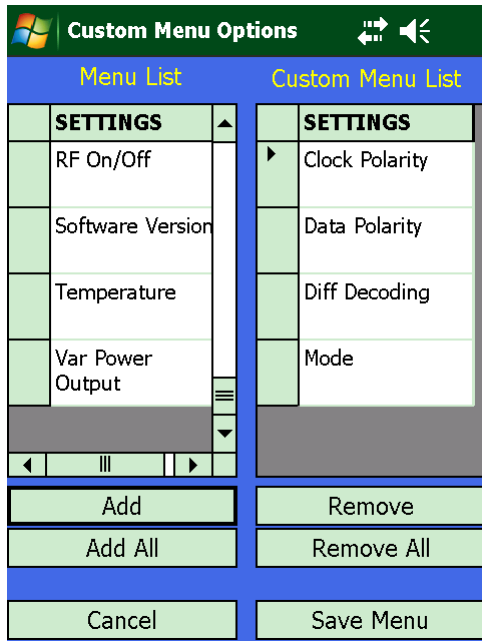


Figure 37: Custom Menu Options Screen

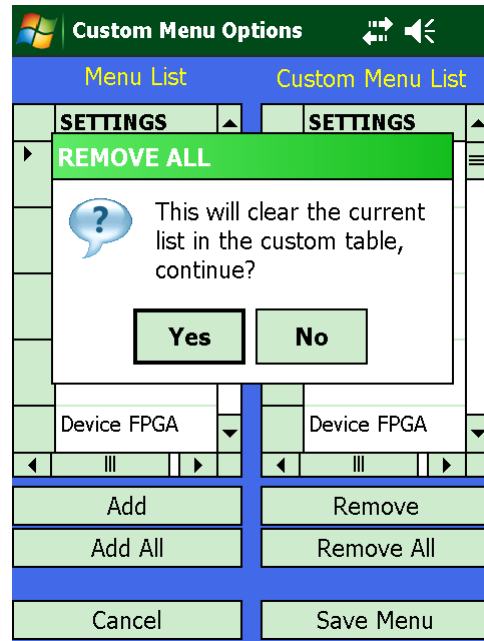


Figure 38: Custom Menu Screen--Remove All

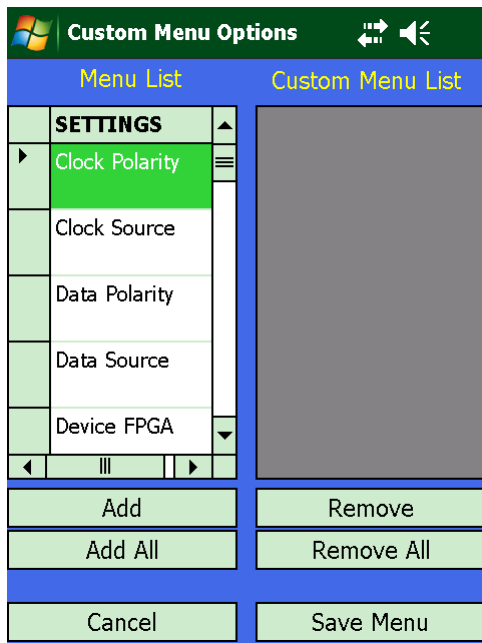


Figure 39: Custom Menu Options Screen--Custom Menu List Now Empty

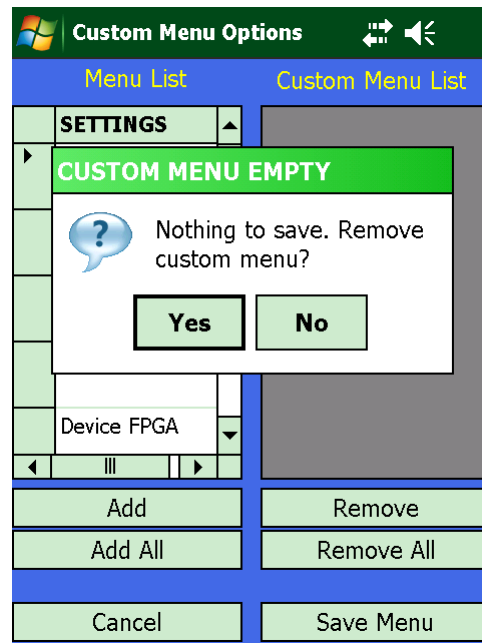


Figure 40: Custom Menu Screen--Save Menu Remove Custom Menu Message

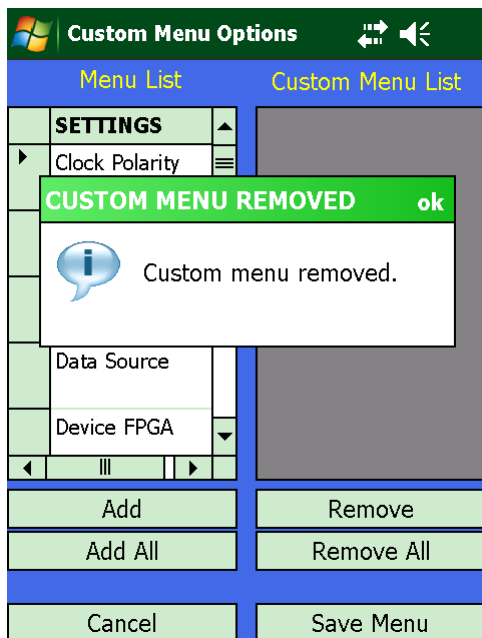


Figure 41: Custom Menu Options Screen--Custom Menu Removed Message

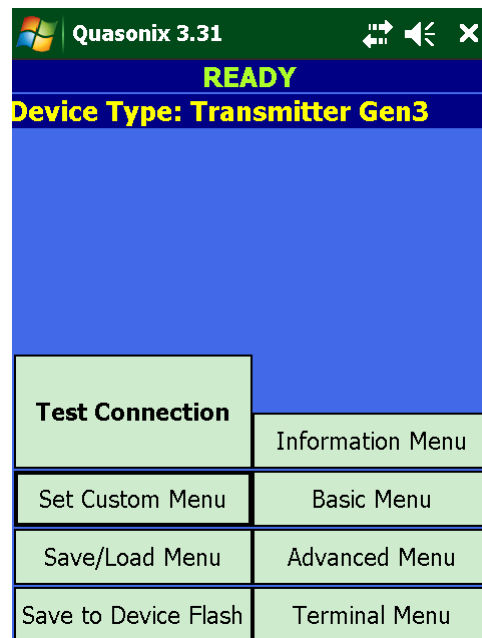


Figure 42: Main Menu--Custom Menu Selection Removed

## 2.4 Quasonix Utility Application – Terminal

The Terminal window is where all advanced settings can be configured. Depending on the device type, not all settings will be available. For example, receivers do not have RF output so this menu option will not be available on the menu help list. The Terminal window works just like a PC-based Terminal program.

### 2.4.1 Using the Touch Keyboard

The Terminal window, shown in Figure 43, automatically opens a touch keyboard on the screen that can be operated using the PDA stylus. A list of basic help commands for the connected device also displays.

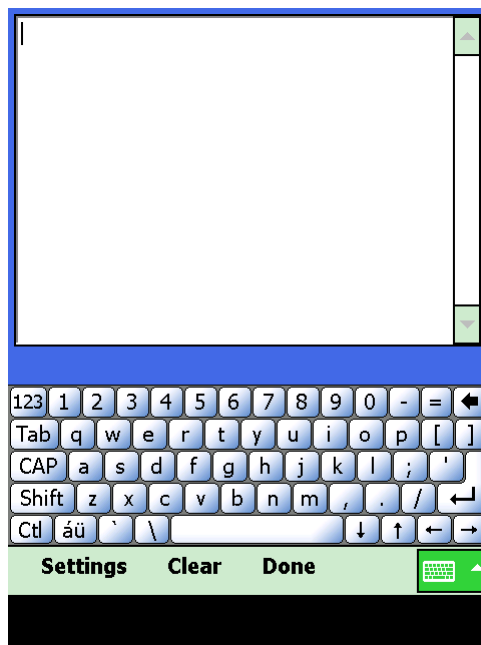


Figure 43: Terminal Window

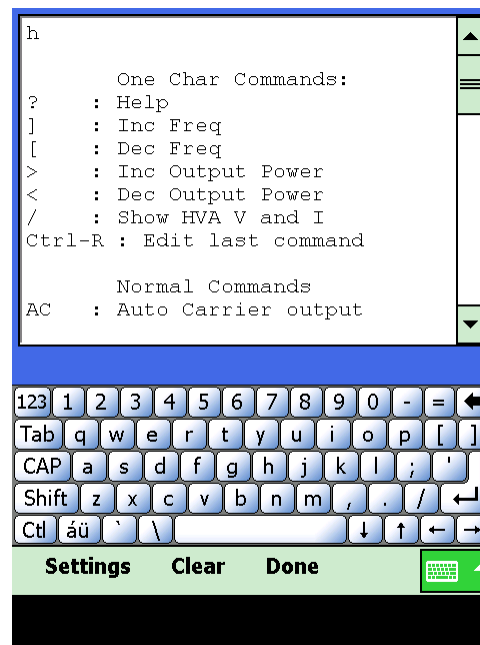


Figure 44: Help Command Display

To display a list of advanced commands available from the terminal window:

1. Using the stylus, tap on the “h” key on the terminal keyboard for a connected transmitter; tap “Shift” “?” for a connected receiver.
2. Tap on the Return key on the terminal keyboard or press the Return key on the Handheld Programmer keypad to issue the command to the device.

A list of commands displays in the terminal window, as shown in Figure 44.

- Use the scroll bar, located to the right of the terminal, to view any information that may have scrolled off the display screen.

If the “h” or the menu do not display, there may be a communications problem. Refer to the Troubleshooting section for assistance. Refer to the documentation that came with your Quasonix device for a complete list of User Commands. Refer to Tiers 0 / I / II Basic Serial Terminal Commands in this document for examples of Transmitter User Commands.

An example using the ZZ command is shown in the next four figures.

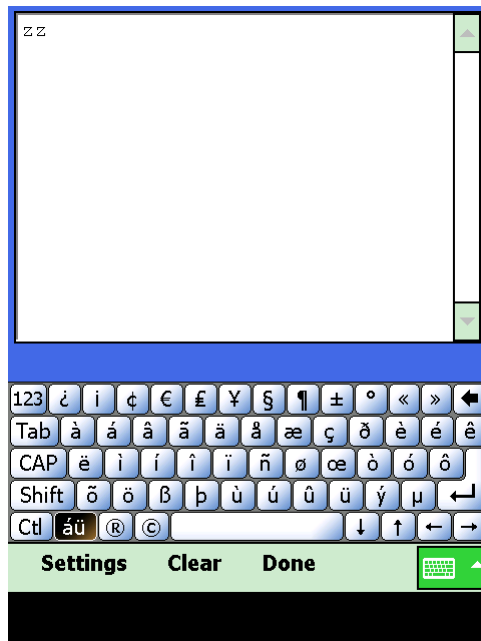


Figure 45: Terminal Window, ZZ Command

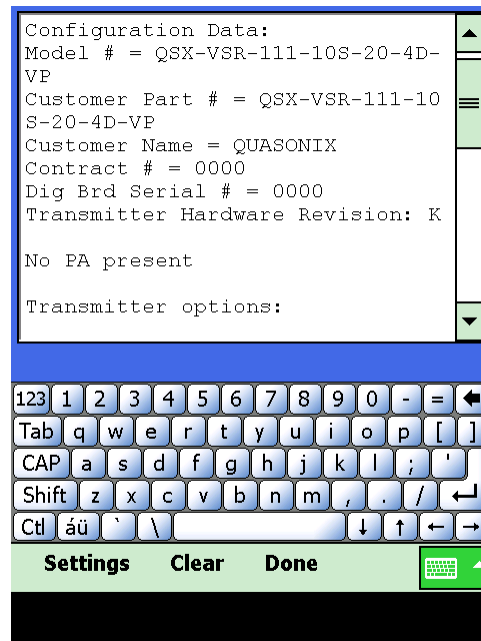


Figure 46: ZZ Display Part 1

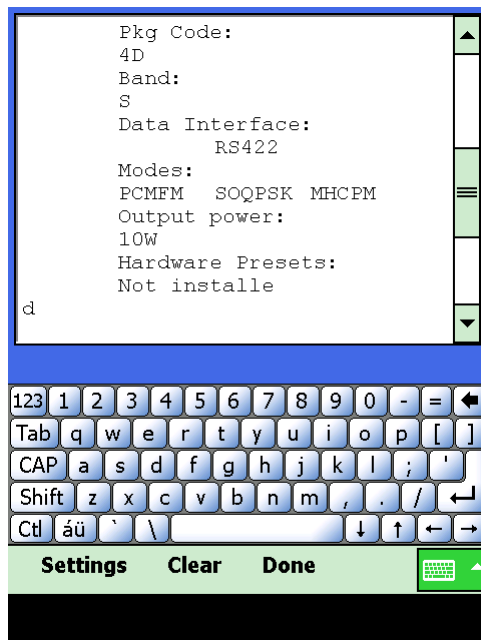


Figure 47: ZZ Display Part 2 (Scrolled)

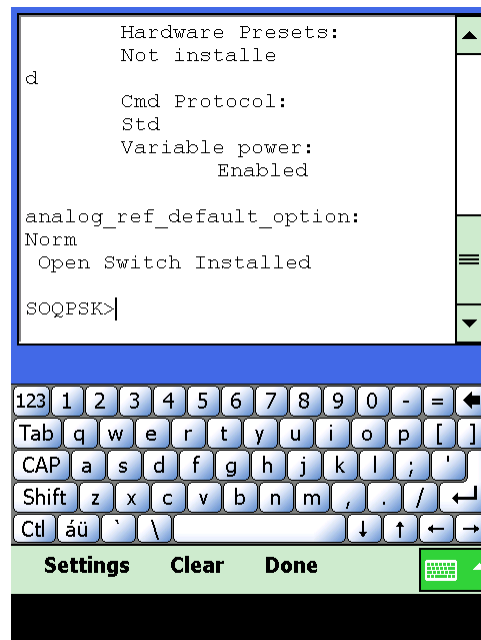


Figure 48: End of ZZ Display (Scrolled)

## 2.4.2 Using the Terminal Menu Options

There are three menu options at the bottom of the Terminal window: Settings, Clear, and Done.

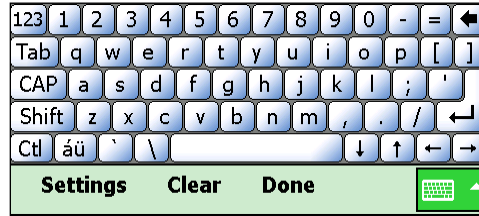


Figure 49: Terminal Menu Options – Settings, Clear, and Done

### 2.4.2.1 Settings

The terminal interface automatically configures its baud rate settings after discovering the connected device from the Main Menu. If you wish to use the terminal to communicate with other devices that support ASCII serial interfacing, use the Settings menu option to configure the serial communications settings. Refer to section 2.4.3 for specifics about serial port settings.

### 2.4.2.2 Clear

The Clear menu option erases all terminal information currently displayed.

### 2.4.2.3 Done

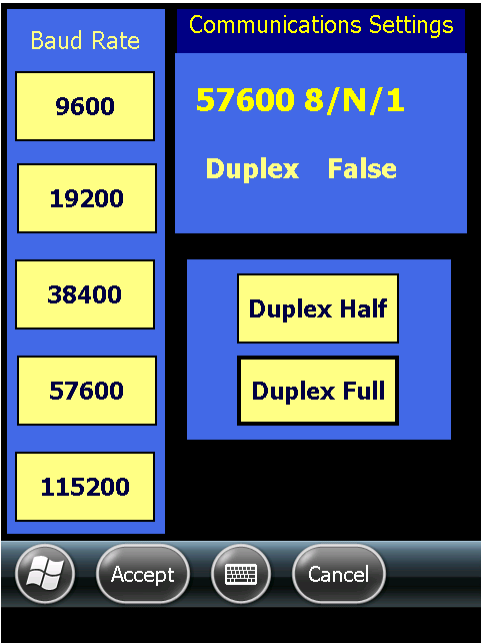
The Done menu option causes the application to exit out of the Terminal menu and back to the Main menu.

## 2.4.3 Serial Port Settings

Accessed by tapping on the Settings option in the Terminal window, the Serial Port Settings screen, shown in Figure 50, is used to configure the Handheld Programmer's serial port to communicate with just about any ASCII serial device.

1. Select the Baud Rate then full or half duplex based on the device you wish to communicate with.
2. Data bits, parity bits, and the stop bit are currently fixed at 8/N/1 and cannot be configured.
3. After selecting the Baud and Duplex, tap on Accept to apply the new communications settings.
4. Tap on Cancel to abandon any changes to communications settings.

**Note:** Custom serial port settings are only maintained while in the Terminal window. Exiting back to the Main menu and tapping on Test Connection restarts device detection which automatically configures communications settings and causes any serial port changes to be lost.



**Figure 50: Serial Port Settings**

### 3 Basic Serial Terminal Commands for Transmitters

Basic serial commands are programmed into the Quasonix PDA Utility. Your transmitter may have additional commands that are not currently available in the Handheld Programmer software. Refer to your Quasonix Transmitter manual for additional details.

**Table 5: Standard and Optional User Commands for Quasonix Transmitters**

Mnemonic Command	Name	Description	Option (s) Required	Setting Saved?	Factory Default
[	Frequency Step Down	Left square bracket key retunes the transmitter to the next lower frequency, as determined by the frequency step (FS) parameter Reply to the control window is the new frequency, in MHz <b>No Enter key required</b>	Standard	N/A	N/A
]	Frequency Step Up	Right square bracket key retunes the transmitter to the next higher frequency, as determined by the frequency step (FS) parameter Reply to the control window is the new frequency, in MHz <b>No Enter key required</b>	Standard	N/A	N/A
?	Help	Displays abbreviated list of available commands <b>No Enter key required</b>	Standard	N/A	N/A
<	Step Down Power	Incrementally steps down the output power level, from 31 down to 0 One step per key press <b>No Enter key required</b>	VP	N/A	N/A
>	Step Up Power	Incrementally steps up the output power level, from 0 up to 31 One step per key press <b>No Enter key required</b>	VP	N/A	N/A



Mnemonic Command	Name	Description	Option (s) Required	Setting Saved?	Factory Default
AC	Automatic Carrier Output	<p>Report or set automatic carrier output state</p> <p>With automatic carrier ON (AC 1), the unit will output an unmodulated, on-frequency carrier if there is no clock present. When automatic carrier is OFF (AC 0), the RF output will be muted in the absence of clock. Note that the AI, CF, and CS commands can create a clock, even when one is not externally applied.</p> <p>Examples:</p> <p>AC      Report the automatic carrier state</p> <p>AC 0    Set automatic carrier OFF</p> <p>AC 1    Set automatic carrier ON</p>	AC	Y	AC 1
AFMS	Analog FM	<p>Set analog FM mode</p> <p>Examples:</p> <p>AFMS 1.0      Set analog FM deviation in units of MHz per volt</p>	FM	Y	AFMS 0
AI	Aux Input Select	<p>Enable, disable, or show the current state of the auxiliary input</p> <p>With the auxiliary input active, the unit automatically switches to clock-free operation (CF 0).</p> <p>Examples:</p> <p>AI      Report the current value of AI</p> <p>AI 1    Enable the aux input</p> <p>AI 0    Disable the aux input</p>	AI	Y	AI 0

Mnemonic Command	Name	Description	Option (s) Required	Setting Saved?	Factory Default
AIR	Analog Input Reference Select	<p>Select the reference level for the analog input</p> <p>Examples:</p> <p>AIR     Report the current value of AIR</p> <p>AIR 1   Select 1.65V</p> <p>AIR 0   Select 0V</p> <p>Refer to section 3.1.1.1.2 for related IS command detail</p>	AI (also Rev J or newer T3D board)	Y	AIR 0
BR	Bit Rate	<p>Used when the Clock Free (CF) option is specified and internal transmitter clock is in use</p> <p>Report or set the bit rate of the bit sync that is locking to the externally applied data</p> <p>Not to be confused with "IC", which sets the rate of the internally generated clock</p> <p>Bit rate must be below 35 Mbps to use automatic bit rate detection</p> <p>Examples:</p> <p>BR     Report the bit rate</p> <p>BR 5   Set the bit rate to 5 Mbps</p> <p>BR A   Set the bit rate automatically</p>	CF	Y	BR 5
BT	Baseband Interface Type	<p>Report or set the clock and data input reference levels</p> <p>Clock and data interfaces are set to either TTL or RS-422. Clock interface and data interface are always the same type.</p> <p>Examples:</p> <p>BT     Report the ref level</p> <p>BT 1   Set the baseband type to TTL</p> <p>BT 3   Set the baseband type to RS-422</p>	Clock and Data Interface selection D or M required	Y	BT 3

Mnemonic Command	Name	Description	Option (s) Required	Setting Saved?	Factory Default
CC	Convolutional Encoder	<p>Enables or disables the convolutional encoder</p> <p>Examples</p> <p>CC     Report convolutional encoder state</p> <p>CC 0   Set the convolutional encoder to Disabled</p> <p>CC 1   Set the convolutional encoder to Enabled</p>	CE	Y	CC 0
CF	Clock Free	<p>Report or set the clock free state</p> <p>Examples:</p> <p>CF     Report the clock free state</p> <p>CF 0   Unit uses its internal bit sync (internally synthesized)</p> <p>CF 1   Unit uses its externally applied clock</p>	CF	Y	CF 1
CG	Clock Generator Source Select	<p>Report or set the clock generator output source</p> <p>Examples:</p> <p>CG     Report the clock free state</p> <p>CG 0   Clock Gen output Off</p> <p>CG 1   Use Internal clock</p> <p>Refer to section 3.1.1.1.1 for additional CG command detail</p>		CG	Clock Generator Source Select

Mnemonic Command	Name	Description	Option (s) Required	Setting Saved?	Factory Default
CP	Clock Polarity	Report or set clock polarity  Examples: CP     Display the current clock polarity CP 0   Set clock polarity to NOT inverted CP 1   Set clock polarity to inverted CP A   Set clock polarity to auto; Automatically selects the most reliable clock edge	Standard	Y	CP A
CR	Current Preset Read	Reports the currently selected software preset being used by the transmitter	Standard	N/A	N/A
CS	Clock Source	Report or set the clock source Unit always reverts to CS 0 (external) at power-up  Examples: CS     Display the current clock source CS 0   Set clock source to external CS 1   Set clock source to internal  When set to internal clock source, the data source must also be set to internal via the DS command in order to have synchronous, usable data.	Standard	N	CS 0

Mnemonic Command	Name	Description	Option (s) Required	Setting Saved?	Factory Default
DD	Debounce Delay	<p>Report or set the time, in milliseconds (ms), that the unit will idle after a change is detected on the parallel interface before executing the change</p> <p>This command provides the user with the ability to either slow down changes to prevent accidental, and potentially illegal, frequency or mode alterations, or to reduce the time the transmitter takes to update after a hardware switch is altered.</p> <p>Valid entries are 500 – 9000 rounded to nearest 500 ms.</p> <p>Examples:</p> <p>DD Report the debounce delay</p> <p>DD 500 Set the debounce delay to 500 ms</p>	PM or PF	Y	DD 500
DE	Differential Encoding	<p>Report or set differential encoding for the SOQPSK-TG mode</p> <p>Examples:</p> <p>DE Report the differential encoding setting</p> <p>DE 0 Set differential encoding OFF</p> <p>DE 1 Set differential encoding ON</p>	Standard	Y	DE 0
DP	Data Polarity	<p>Report or set data polarity</p> <p>Examples:</p> <p>DP Display the current data polarity</p> <p>DP 0 Set data polarity to NOT inverted (OFF)</p> <p>DP 1 Set data polarity to inverted (ON)</p>	Standard	Y	DP 0

Mnemonic Command	Name	Description	Option (s) Required	Setting Saved?	Factory Default
DS	Data Source	Report or set data source state Unit always reverts to DS 0 (external) at power-up  Examples: DS     Display current data source DS 0   Set data source to external DS 1   Set data source to internal (value of internal source is set by ID command)	Standard	N	DS 0
FO	Frequency Offset	Offsets the synthesizer +X MHz and the FPGA -X MHz Example: FO 0.0055 offsets 5.5 kHz	FO	Y	FO 0
FP	Read Frequency Plugs	Report the transmit frequency designated by the parallel port	PF or PM	N/A	N/A

Mnemonic Command	Name	Description	Option (s) Required	Setting Saved?	Factory Default
FR	Frequency	<p>If no argument is passed, it reports the frequency. If an argument is passed, it sets the frequency. The argument specifies the frequency in MHz. If the command is entered with a '?', then the allowed frequency ranges for this unit display.</p> <p>This command rounds the frequency to the nearest 0.5 MHz. If the rounded frequency is within one of the transmitter's allowed bands, the transmitter will tune that frequency and confirm the change for the user.</p> <p>If the frequency is outside of the allowed range for the unit, the transmitter will NOT retune but will report an error to the user.</p> <p>Examples:  FR      Display the current frequency  FR ?    Display allowed frequency ranges  FR 1436.5      Set frequency to 1436.5 MHz</p>	Standard	Y	FR 1436.5
FS	Frequency Step	<p>If no argument is passed, it reports the current frequency step. If an argument is passed, it sets the frequency step size, which is activated by the left and right square bracket keys. The argument specifies the frequency step in MHz, with 0.5 MHz being the smallest available step.</p> <p>Examples:  FS      Display the current frequency step  FS 1    Frequency step = 1 MHz</p>	Standard	Y	FS 1

Mnemonic Command	Name	Description	Option (s) Required	Setting Saved?	Factory Default
H or HE	Help	Displays a list of available commands  Commands require a carriage return at the end of the line and may also accept parameters  Some commands may not be enabled depending on required options	Standard	N/A	N/A
HP	High Power	Report or set high power level Valid range is 0 to 31  Examples: HP Report the present high power level HP 31 Set high power to 31 HP Max Set high power to the highest allowable value for the unit HP Min Set high power to the minimum allowable value for the unit	DP	Y	HP 31
HX	eXtended Help	Displays a full list of available commands	Standard	N/A	N/A



Mnemonic Command	Name	Description	Option (s) Required	Setting Saved?	Factory Default
IC	Internal Clock Rate	<p>Report or set the internal clock rate</p> <p>This rate is used if the clock source is set to internal (CS 1) and the data source is set to internal (DS 1). It should not be confused with “BR”, which sets the rate of the internal bit sync, which phase locks to the externally applied data.</p> <p>If no argument is passed, the unit reports the clock frequency. If a valid frequency is given, the internal clock frequency is set. The frequency is in Mbps.</p> <p>Examples:</p> <p>IC        Display current internal clock rate</p> <p>IC 4.95 Set internal clock rate to 4.95 MHz</p> <p>Valid range is 0.002 MHz – 28.0 MHz</p> <p>Observes same bit rate limits as HR/LR cmds (PCM/FM half)</p>	Standard	Y	IC 5

Mnemonic Command	Name	Description	Option (s) Required	Setting Saved?	Factory Default
ID	Internal Data Gen	<p>Report or set the internal data pattern</p> <p>This setting is used if the Data Source is set to internal (DS 1) and the Clock Source is set to internal (CS 1).</p> <p>When setting the data, the argument must be "PN6" (or "PN06"), "PN11", "PN15", or "PN23", or a valid 4 digit hexadecimal value.</p> <p>Examples:</p> <p>ID        Report the internal data pattern</p> <p>ID PN15        Set internal data pattern to PN15</p> <p>ID AA55        Set internal data pattern to 0xAA55</p> <p>In SOQPSK mode, ID 5555 or ID AAAA will result in an unmodulated carrier, at the nominal carrier frequency.</p> <p><b>Note:</b> If the CP07 option is present, the input argument does not include the "PN" and a hexadecimal value requires the addition of a leading "x", as shown in the following example.</p> <p>CP07 Examples:</p> <p>ID        Report the internal data pattern</p> <p>ID 15        Set internal data pattern to PN15</p> <p>ID xAA55        Set internal data pattern to 0xAA55</p>	Standard	Y	ID PN15

Mnemonic Command	Name	Description	Option (s) Required	Setting Saved?	Factory Default
IS	Input Source Selection	<p>Selects the clock and data source (and user pattern and clock rate, where applicable) using a single command</p> <p>IS PN15 4.5    Sets unit to internal clock/data with a PN15 pattern at 4.5 Mbps</p> <p>IS AT AUTO    Sets unit to use the auxiliary TTL input in clock free mode with auto bit rate enabled</p> <p>IS EN 10       Sets unit to use the Ethernet interface for both clock and data and to set the desired bit rate to 10 Mbps</p> <p>Refer to section 3.1.1.1.2 for additional IS command detail</p>	Standard on all T3 units version 2.409 or greater	N/A	N/A
LC	List Configurations	<p>Lists the stored configurations on the unit</p> <p>If a configuration number is supplied, then the saved parameters for that configuration are displayed.</p> <p>Examples:</p> <p>LC       List all internal saved configurations</p> <p>LC 7    Show configuration 7 details</p>	Standard	N/A	N/A
LD	LDPC Encoding Enable	<p>Enable, disable, or show the current state of the Forward Error Correction (FEC) / Low Density Parity Check (LDPC) encoder</p> <p>Examples:</p> <p>LD       Show the current encoder state</p> <p>LD 1    Enable the LDPC encoder</p> <p>LD 0    Disable the LDPC encoder</p>	LD	Y	LD 0

Mnemonic Command	Name	Description	Option (s) Required	Setting Saved?	Factory Default
LP	Low Power	Report or set low power level Valid range is 0 to 31  Examples: LP      Report the present low power level LP 3    Set low power to 3 LP Max Set low power to the highest allowable value for the unit LP Min Set low power to the minimum allowable value for the unit	DP	Y	LP 0
MA	Modes Allowed	Reports the modes enabled on the transmitter, as determined by the part number	Standard	N/A	N/A
MJ	Modulation Scaling Step Size	Sets the current modulation scaling factor used when the single key Power Step Up and Power Step Down functions are used  Valid range is .0009 to 10.01	MS	Y	MJ 1.5

Mnemonic Command	Name	Description	Option (s) Required	Setting Saved?	Factory Default
MO	Modulation	<p>Report or set modulation setting</p> <p>Mode 6, Carrier only, is present on <b>every</b> transmitter</p> <p>Examples: (depending on modes ordered)</p> <p>MO Report the modulation setting</p> <p>MO 0 Set modulation to PCM/FM</p> <p>MO 1 Set modulation to SOQPSK-TG</p> <p>MO 2 Set modulation to MULTI-h CPM</p> <p>MO 3 Set modulation to BPSK</p> <p>MO 4 Set modulation to QPSK</p> <p>MO 6 Carrier only, no modulation</p> <p>MO 7 Set modulation to OQPSK</p> <p>MO 8 Set modulation to UQPSK</p> <p>MO 10 Set modulation to STDN</p> <p>MO 11 Set modulation to SQPN</p> <p>MO 12 Set modulation to Analog_FM</p>	<p>MO 12 requires FM option</p> <p>All other mode availability dependent on modes ordered</p>	Y	<p>MO 0 or the first one the customer has installed on the unit</p> <p>Example:</p> <p>MO 1 if no PCM/FM installed;</p> <p>MO 2 if only CPM installed</p>
MS	Modulation Scaling	<p>Scales the deviation (modulation index) of the transmitted signal relative to the standard default deviation</p> <p>Example:</p> <p>For PCM/FM – if the standard modulation index is 0.7, setting MS to 2.0 scales a modulation index of 1.4</p> <p>Value range is .09 to 10.01</p>	MS	Y	MS 1

Mnemonic Command	Name	Description	Option (s) Required	Setting Saved?	Factory Default
OC	Overtemperature Control Enable	<p>Enables or disables overtemperature control</p> <p>OC 0    Disable Overtemperature Control</p> <p>OC 1    Enable Overtemperature Control</p> <p>If the transmitter temperature goes above the set limit stored on the device and the current power level is over 25, the transmitter automatically starts to back off power in 2 dB steps to a maximum of 6 dB.</p>	Standard	Y	OC 1
PL	Power Level	<p>PL reports or sets the current power level setting for the dual power feature. If the user enters 1, the power level is set to current “high” power level (refer to HP command). If the user enters 0, then power is set to the current “low” power level (refer to LP command).</p> <p>Examples:</p> <p>PL      Report the current power level state</p> <p>PL 0    Set the current power level to “low”</p> <p>PL 1    Set the current power level to “high”</p> <p><b>Disabled in Parallel Mode</b></p>	DP	Y	PL 0
PR or RE	Restore Defaults	<p>Restores factory default parameters for the unit</p> <p>Default is currently the lowest number modulation supported by the transmitter with the selected band and frequency limits</p> <p>Default power level is Full power</p>	Standard	N/A	N/A
QA	Query All	<p>Displays common device settings in one compact display</p> <p>Display is a subset of SS or ST</p>	Standard	N/A	N/A
QT or TE	Query Temperature	Report the temperature in degrees Celsius	Standard	N/A	N/A

Mnemonic Command	Name	Description	Option (s) Required	Setting Saved?	Factory Default
RA or RN	Randomizer	Report or set IRIG-106 randomizer output state  Examples: RA      Report the randomizer state RA 0    Set randomizer OFF RA 1    Set randomizer ON	Standard	Y	RA 0
RC (or PP or RL)	Recall Configuration	Load a saved configuration into the active configuration if the configuration number entered is valid  If the selected configuration has no valid data or the command is issued without a configuration number, the transmitter is initialized with the default data and saved.  Example: RC      Load configuration 0 (default setup) RC 3    Load configuration 3	Standard	N/A	N/A
RF	RF Output	Report or set RF output control state  Note that there may be no RF output, even if the software control is set to ON. This can happen if there is no valid clock in use, or if the RF On/Off hardware pin is in the OFF state.  Examples: RF      Report the RF output state RF 0    Set RF output OFF RF 1    Set RF output ON	Standard	Y	RF 1 (if option CP07, default is RF 0)

Mnemonic Command	Name	Description	Option (s) Required	Setting Saved?	Factory Default
RZ	RF On/Off Pin Polarity	<p>Set or show the polarity of the RF On/Off pin, which is pulled high internally to 3.3 VDC</p> <p>RZ 0 means the RF is ON when the RF On/Off pin is low</p> <p>RZ 1 means the RF is ON when the RF On/Off pin is high (floating)</p> <p>Examples:</p> <p>RZ     Show the current RF On/Off polarity</p> <p>RZ 0   Set RF On/Off polarity to "pin low = on"</p> <p>RZ 1   Set RF On/Off polarity to "pin high = on"</p>	Standard	Y	RZ 1
SB	Cycles per Bit	<p>Report or set cycles per bit (The subcarrier frequency is cycles per bit times bit rate.)</p> <p>SB     Report cycles per bit</p> <p>SB x   Set cycles per bit</p>	STDN	Y	SB 0
SC	Startup Configuration	<p>Report or set startup configuration priority between nonvolatile settings and parallel port settings</p> <p>Examples:</p> <p>SC     Report startup configuration priority</p> <p>SC 0   Prioritize stored parameters</p> <p>SC 1   Prioritize parallel port settings</p> <p>SC 2   Always ignore parallel port settings</p> <p>SC 3   Always ignore serial frequency or mode command</p>	PM or PF	Y	SC 1



Mnemonic Command	Name	Description	Option (s) Required	Setting Saved?	Factory Default
SM	Modulation Sweep	<p>Sweeps the transmitter modulation between the provided limits with the provided step size at a fixed rate</p> <p>Examples:</p> <p>SM      Toggle sweep ON/OFF with current values</p> <p>SM ?    Displays current sweep state</p> <p>SM start stop step msec</p> <p>         start = low index</p> <p>         stop = high index</p> <p>         step = index step size</p> <p>         msec = milliseconds between steps</p>	MS	N	SM Disabled
SN	Serial/Part Number	Report the serial number and part number for the unit	Standard	N/A	N/A
SS	Show Settings	Displays most of the common device settings in one compact display	Standard	N/A	N/A
SV or SA (or PS or PW)	Save Configuration	<p>Saves the current transmitter configuration to a user-selected preset number, from 0 to 15 where 0 is the power-on default unless hardware presets are enabled</p> <p>The SV command also allows the user to assign an alias to the desired preset.</p> <p>Examples:</p> <p>SV 1    Save current configuration to preset 1</p> <p>SV 7 xyz      Save current configuration to preset 7 and assign alias name "xyz"</p> <p><b>*Refer to SV Note below for exception</b></p>	Standard	N/A	N/A

Mnemonic Command	Name	Description	Option (s) Required	Setting Saved?	Factory Default
SY	System Status	<p>Displays the system status of the transmitter</p> <p>The first argument specifies the period, in milliseconds, between status updates. Zero (0) disables continuous monitoring.</p> <p>The second argument specifies the number of status lines between header outputs.</p> <p>Examples:</p> <p>SY      Displays current status report settings</p> <p>SY 5    Sets status output period to 5 milliseconds</p> <p>SY 5 100      Sets status header output once every 100 status updates</p> <p>Refer to section 3.1.1.1.3 for additional SY command detail</p>	Standard	N/A	N/A
VE (or RV)	Version (Revision Information)	Report the current Firmware (software) version information for the transmitter	Standard	N/A	N/A
VF	Variable FIFO Depth	<p>Sets the FIFO depth for controlling latency time between bits in and bits out</p> <p>Valid range is 0 to 255</p> <p>Example: VF 120 (120 = Variable Power)</p>	VF	Y	VF 128
VP	Variable Power	<p>Report or set variable power level</p> <p>Valid range is 0-31</p> <p>Examples:</p> <p>VP      Report the variable power level</p> <p>VP 31   Set variable power to 31</p> <p>VP 5    Set variable power to 5</p> <p>VP Max Set variable power to the highest allowable value for the unit</p> <p>VP Min Set variable power to the minimum allowable value for the unit</p>	VP	Y	VP 0

Mnemonic Command	Name	Description	Option (s) Required	Setting Saved?	Factory Default
ZX	Show Preset Inputs	Displays the current preset inputs on the parallel connector Available presets depend on the number specified for the unit Values are PS2, PS4, PS8, or PS16	Standard	N/A	N/A
ZY	Show Connector	Displays the transmitter's baseband connector pinout with proper gender, numbering, and signal labeling Valid only with standard 15-pin transmitters	Standard	N/A	N/A
ZZ	Show Options	Displays the current hardware configuration and options on the transmitter	Standard	N/A	N/A

All commands generate a response of one or more lines, which indicate successful completion of the command or an error.

After a command's response, the transmitter displays the mode name followed by the character ">" as a prompt, which may be interpreted as meaning the radio is ready to accept new characters. If the CP07 option is enabled, only the character ">" displays as a prompt.

**\*SV Note:** Users may save internal clock and data in presets for bench debug use BUT on a power up or when a *hardware* preset is restored, **CS** and **DS** will be forced to **0** (external clock and data). This action prevents a transmitter from powering up or changing hardware presets and being set to internal clock and/or data. The **ONLY** way to restore CS and/or **DS** as **1** from a saved configuration is by executing the **RC** command.

### 3.1.1.1 Additional Command Set Details

#### 3.1.1.1.1 Clock Generator Source Select Command - CG

CG is only active if the unit has the -CG option. CG 0 is the default to match legacy units.

The CG command allows the user to pick one of the following for the clock generator output source:

- 0 Clock Gen output Off
- 1 Internal clock always
- 2 External clock always
- 3 Clock Free clock always
- 4 Active clock:

Internal clock if CS = 1

External clock if (CS = 0, CF = 1)

Clock Free clock if (CS = 0, CF = 0)

Syntax: CG 1 // Set CG output to external clock always

CG ? // Display the choices

### 3.1.1.1.2 Input Source Selection Command - IS

The IS command is used to select the clock and data source (and the user pattern and clock rate where applicable) for the transmitter with one command. This command can conceivably replace CS, DS, ID, IC, BR, BT, AIR, CF, and EN. *This command is standard on all T3 units version 2.409 or greater.*

Syntax: IS [ds/?/pnxx/XXXX [cs/AUTO/rate]]

where **ds** is data source which can be:

ET - external TTL data	(if QSX-VxT or -VR enabled)
ER - external RS422 data	(if QSX-VxR or -VR enabled)
EL - external LVDS data	(if QSX-VxL or -VR enabled)
I - internal with currently selected data pattern	
PNxx - internal with specified PN sequence	
XXXX - internal with specified fixed 4 digit hex pattern	
AB - auxiliary input bipolar data	(if -CF and -AI enabled)
AT - auxiliary input TTL data	(if -CF and -AI enabled)
EN - Ethernet	(if -EN enabled)

If ds = ET, then cs MAY be:

- Nothing (defaults to ET for an external TTL clock)
- ET for an external TTL clock  
*Actions:* ds 0, cs 0, bt 1 (if needed), cf 1 (if needed)
- X for clock free with current BR (if -CF enabled)  
*Actions:* ds 0, cs 0, (bt 1 if needed), cf 0
- AUTO for clock free with BR = auto  
*Actions:* ds 0, cs 0, cf 0, br a (bt 1, ai 0, and en 0 if needed)
- XX.xxx for clock free with BR = XX.xxx  
*Actions:* ds 0, cs 0, cf 0, br XX.xxx (bt 1, ai 0, and en 0 if needed)

If ds = ER or EL, then cs MAY be:

- Nothing (defaults to ER for an external RS422 clock)
- ER for an external RS422 clock
- EL for an external LVDS clock  
*Actions:* ds 0, cs 0, bt 3 (if needed), cf 1 (if needed)

- X for clock free with current BR (if -CF enabled)  
*Actions:* ds 0, cs 0, (bt 3 if needed), cf 0
- AUTO for clock free with BR = auto  
*Actions:* ds 0, cs 0, cf 0, br a (bt 3, ai 0, and en 0 if needed)
- XX.xxx for clock free with BR = XX.xxx  
*Actions:* ds 0, cs 0, cf 0, br XX.xxx (bt 3, ai 0, and en 0 if needed)

If ds = I, then cs MAY be:

- Nothing (defaults to internal clock at current IC rate) (displayed)
- I for an internal clock at current IC rate (displayed)  
*Actions:* ds 1, cs 1, ic
- XX.xxx for internal clock with ic = XX.xxx  
*Actions:* ds 1, cs 1, ic XX.xxx

If ds = PNxx, then cs MAY be:

- Nothing (defaults to internal clock at current IC rate) (displayed)
- I for an internal clock at current IC rate (displayed)  
*Actions:* ds 1, cs 1, id pnxx, ic
- XX.xxx for internal clock with ic = XX.xxx  
*Actions:* ds 1, cs 1, id pnxx, ic XX.xxx

If ds = XXXX, then cs MAY be:

- Nothing (defaults to internal clock at current IC rate) (displayed)
- I for an internal clock at current IC rate (displayed)  
*Actions:* ds 1, cs 1, id XXXX, ic
- XX.xxx for internal clock with ic = XX.xxx  
*Actions:* ds 1, cs 1, id XXXX, ic XX.xxx

If ds = AB, then cs MAY be:

- Nothing (defaults to clock free at current BR) (displayed)  
*Actions:* ds 0, cs 0, ai 1, cf 0 AIR 0 br (en 0 if needed)
- X for clock free with current BR  
*Actions:* ds 0, cs 0, ai 1, cf 0 AIR 0 br (en 0 if needed)
- AUTO for clock free with BR = auto  
*Actions:* ds 0, cs 0, ai 1, cf 0 AIR 0 br a (en 0 if needed)

- XX.xxx for clock free with BR = XX.xxx  
*Actions:* ds 0, cs 0, ai 1, cf 0 AIR 0 br XX.xxx (en 0 if needed)

If ds = AT, then cs MAY be:

- Nothing (defaults to clock free at current BR) (displayed)  
*Actions:* ds 0, cs 0, ai 1, cf 0 AIR 1 br (en 0 if needed)
- X for clock free with current BR  
*Actions:* ds 0, cs 0, ai 1, cf 0 AIR 1 br (en 0 if needed)
- AUTO for clock free with BR = auto  
*Actions:* ds 0, cs 0, ai 1, cf 0 AIR 1 br a (en 0 if needed)
- XX.xxx for clock free with BR = XX.xxx  
*Actions:* ds 0, cs 0, ai 1, cf 0 AIR 1 br XX.xxx (en 0 if needed)

If ds = EN, then cs MAY be:

- Nothing (defaults to Ethernet clock at current IC rate) (displayed)  
*Actions:* ds 0, cs 0, en 1 (cf 1 if needed) (ai 0 if needed)
- EN for Ethernet clock at current IC rate) (displayed)  
*Actions:* ds 0, cs 0, en 1 (cf 1 if needed) (ai 0 if needed)
- XX.xxx for Ethernet clock with ic = XX.xxx  
: ds 0, cs 0, en 1 ic XX.xxx (cf 1 if needed) (ai 0 if needed)

**Notes:**

1. Numbers need only as many significant digits as necessary. For example, to specify 10 Mbps (for either BR or IC) you can enter 10, 10.0, 10.000, etc.
2. Some command versions require the unit to have specific options and will not work without those options. For instance, you cannot specify EN for Ethernet unless the unit has the -EN option in the part number.
3. While this command incorporates the functionality of nine (9) or more commands, those commands are still usable. For example, if the unit has the -VR option then the BT command can still be used by itself to switch between TTL and RS-422 inputs for clock and data.

**Examples:**

IS ET	Sets unit to 'normal' mode expecting external TTL clock and data to be applied to the unit inputs
IS PN15 4.5	Sets unit to internal clock/data with a PN15 pattern at 4.5 Mbps
IS AT AUTO	Sets unit to use the auxiliary TTL input in clock free mode with auto bit rate enabled
IS EN 10	Sets unit to use the Ethernet interface for both clock and data and to set the desired bit rate to 10 Mbps

## 3.1.1.1.3 System Status Command – SY

The SY command is defined as follows.

Mode	CF Rate (b/s)	Freq (Hz)	Tmp (C)	CRate (b/s)
0	10001252	2255000000	27.0	19999948

**Mode** - Current mode number (such as 0 = PCM/FM)

**CF Rate** - Clock free estimated data rate. This rate is based on the external data input (TTL or RS-422) even if internal data is presently in use (CS = 1).

**Freq** - Tuned frequency

**Tmp** - Current temperature

**CRate** - Clock filter clock rate. This is the actual over the air bit rate, regardless of the selected data source, and including any increases due to encoding (LDPC or convolutional). IN clock free automatic mode, it may differ from CF Rate because it will track the bit sync rate (exact, if locked) rather than the clock free estimated rate (approximate).

## 4 Basic Serial Terminal Commands for Receivers

Basic serial commands are programmed into the Quasonix PDA Utility. Your receiver may have additional commands that are not currently available in the Handheld Programmer software. Refer to your Quasonix RDMS Receiver manual for additional receiver commands.

**Table 6: Standard and Optional User Commands for Quasonix Compact Receivers**

Mnemonic	Name	Description	Option (s) Required	Mode Restriction
?	Help Message	Displays abbreviated list of available Help commands	Standard	None
ACU	Antenna Control Unit	Report or set antenna control unit automatic gain control (AGC) settings	-37	None
AEQ	Adaptive Equalizer	Report equalizer status and control adaptive equalizer settings	-EQ	None
AFC	Automatic Frequency Control	Report or set a variety of automatic frequency control parameters	Standard	None
AHM	Analog High Speed Mixer	Displays and controls high speed (video) output mixer settings	-37	None
AHO	Analog High Speed Output (Tape Output)	Displays and controls high speed (video) output settings	-37	PCM/FM
ALM	Analog Low Speed Mixer	Displays and controls low speed (video) output mixer settings	-37	None
ALO	Analog Low Speed Output	Displays and controls low speed (ACU) output settings	-37	PCM/FM
AL	Lock Status Command	Reports system lock status	Standard	None
BER	Bit Error Rate	For Bit Error Rate commands and information, refer to Appendix A, Bit Error Rate Testing	Standard	None



Mnemonic	Name	Description	Option (s) Required	Mode Restriction
BR	Bit Rate	Report or set baseband bit rate	Standard	For Asynch PSK (legacy) modes, BR A and BR B must be specified separately
CLH	Command Line History	Reports last 25 commands issued	Standard	None
CP	Clock Polarity	Report or set clock polarity inversion state	Standard	For Asynch PSK (legacy) modes, CP A and CP B must be specified separately
DA	Downconverting Antenna	Displays and controls receiver C band to P band downconverting antenna	P band enabled receiver	None
DAHO	Demod Analog High Speed Outputs	Source control command for the demod; controls source, for high speed analog outputs, scale, offset, and polarity	-37	None
DALO	Demod Analog Low Speed Outputs	Source control command for the demod; controls source, for low speed analog outputs, scale, offset, and polarity	-37	None
DD	Differential Decoding	Enable or disable differential decoding	Standard	SOQPSK
DDDO	Demod Digital Data Output	Source control command for the demod; controls source, for digital data outputs, scale, offset, and polarity	-37	None
DDO	Digital Data Outputs	Source control command for the platform; controls source, for digital data outputs, scale, offset, and polarity	-37	None
DOM	Digital Output Muting	Control shut down of clock and data outputs	Standard	None

Mnemonic	Name	Description	Option (s) Required	Mode Restriction
DP	Data Polarity	Report or set data polarity inversion state	Standard	For Asynch PSK (legacy) modes, DP A and DP B must be specified separately
DQE	Data Quality Encapsulation	Displays and controls data quality encapsulation	Standard	ARTM modes
DR	Derandomizer State	Report or set the derandomizer state	Standard	None
DSO	Digital Status Output	Controls the source, polarity, and override states	Standard	None
FEC	Forward Error Correction Mode	Report FEC status for enabled modes	-K7	Legacy PSK
FL	Force Lock Indication	Diagnostic tool to force the system to indicate locked or unlocked	Standard	None
FM	FM Demodulator Settings	Displays and controls FM demodulator settings	Standard	PCM/FM
FR	Frequency	Report or set receiver center frequency	Standard	None
HA	Advanced Help Command	Displays Help commands not frequently used or with more complex construction than the basic two character Help commands	Standard	None
IF	IF Filter Control	Display and control IF filter settings	Standard	None
MI	Modulation Index	Report or Set Modulation Index Tracking or Acquire	Standard	PCM/FM
MO	Modulation	Report or set modulation setting	Standard	Limited to modes installed
OCM	Output Clock Measurement	Displays measured output clock frequency	Standard	None
PDC	PCM Decoding	Controls digital decoding such as NRZ-L, NRZ-M, and bi-phase	Standard	None

Mnemonic	Name	Description	Option (s) Required	Mode Restriction
PER	Parameters Erase	Erases the stored parameter set for the current mode; Upon power cycle, resets current operating parameter set to factory default values	Standard	None
PERA	All Parameters Erase	Reset all modes to factory default values	Standard	None
PL	Input Power Level	Reports or sets the current input power level setting	Standard	None
PLD	Parameters Load	Loads the stored parameter set into the current operating parameter set	Standard	None
PNC	Phase Noise Compensation	Report or set phase noise compensation state	Standard	PCM/FM
PRS	Reset Defaults	Restores factory default parameters for the unit  Default is currently the lowest number modulation supported by the transmitter with the selected band and frequency limits	Standard	None
PSV	Parameters Save	Writes the current operating parameter set into a (previously erased) stored parameter set	Standard	None
RFD	Reset Defaults	Reset all parameters to factory default values Erases all parameter data Resets to default Mode	Standard	None
QT	Query Temperature	Report the temperature in degrees Celsius	Standard	None
SDI	Signal Degradation Information	Sets signal degradation information enable or disable parameters	Standard	SOQPSK
SI	Spectrum Inversion	Accounts for downconverting antenna spectral inversion	Standard	None
SN	Show Serial Number	Report the serial number for the unit	Standard	None

Mnemonic	Name	Description	Option (s) Required	Mode Restriction
SV	Save Parameters	Saves the current parameters in non-volatile memory, including frequency, modulation, bit rate, data polarity, clock polarity, AGC state, verbosity level, etc.	Standard	None
SYNC	Sync Detect	Configures the sync detector for synchronization time testing	Standard	None
SYS	System Status Tracking	Displays the system status of the receiver	Standard	Available for all EXCEPT PSK (legacy)
TOD	Time of Day	Sets the current calendar date and time of day	Standard	None
UP	Show Options	Displays the current hardware configuration and options on the receiver	Standard	None
VE	Version	Report the current Firmware (software) version information for the receiver; displays the current application, FPGA, and adaptive equalizer versions	Standard	None
VFF	Viterbi Forget Factor	Report or set the Viterbi forget factor, on a scale from 0.01 – 0.99	Standard	PCM/FM

## **5 Maintenance Instructions**

The Quasonix Handheld Programmer requires no regular maintenance. There are no serviceable parts.

## 6 Product Warranty

The Quasonix Handheld Programmer carries a standard parts and labor warranty of one (1) year from the date of delivery.

### 6.1 Quasonix Limited Warranty Statement

This Limited Warranty Statement (this “Limited Warranty”) applies to all hardware and software products and internal components of such products (the “Products”) sold by Quasonix, or its representatives, authorized resellers, or country distributors (collectively referred to herein as “Quasonix”). EXCEPT AS EXPRESSLY SET FORTH IN THIS LIMITED WARRANTY, QUASONIX MAKES NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ANY PRODUCTS SOLD BY IT. Quasonix expressly disclaims all warranties and conditions not stated in this limited warranty. There are no warranties which extend beyond the description on the face hereof. Capitalized terms not otherwise defined herein shall have the meaning set forth in those certain General Terms and Conditions of Sale for Standard Product, as amended from time to time.

Quasonix warrants to customer that for one (1) year from the date of shipment of the Products by Quasonix (the “Warranty Period”), such Products purchased from Quasonix or its authorized affiliate will materially conform to the specifications set forth in the applicable Quasonix Specifications, if any, and are free from defects in materials and workmanship under normal use during the Warranty Period. As used herein, “normal use” means the intended use of the Products for which it was designed by Quasonix.

This Limited Warranty extends only to the original purchaser of the Products and is not transferable to anyone who obtains ownership of the Products from the original purchaser.

Quasonix’s software, whether incorporated into the Products or sold separately, is warranted solely to the extent that problems or “bugs” are found in the software and affect the functional operation of the Products. At no time shall requests for changes in the software architecture or visual esthetics be considered a warranty item.

The Products are manufactured using new materials only. Replacement parts may be new or equivalent to new. Replacement parts are warranted to be free from defects in material or workmanship for thirty (30) days or for the remainder of the Warranty Period of the Products in which they are installed, whichever is longer.

During the Warranty Period, Quasonix will repair or replace the defective Products. All components or hardware products removed from the Products under this Limited Warranty become the property of Quasonix. All warranties are limited to the repair or replacement of the Products.

In no event shall Quasonix be liable for any special, consequential, incidental or indirect damages of any kind, including, without limitation, loss of profits, loss of data, “down-time,” loss of use or damage to other equipment, or personal injury or death, whether or not Quasonix has been advised of the possibility of such loss.

Notwithstanding anything to the contrary herein, Quasonix’s entire liability hereunder from any cause whatsoever and regardless of the form of action shall be limited to the amount actually received by Quasonix.

Quasonix shall not be liable for a breach of the warranty set forth in this Limited Warranty unless: (i) the customer gives written notice of the defect, reasonably described, to Quasonix’s Contracts Administrator within thirty (30) days of the time when customer discovers or ought to have discovered the defect and obtains a Return Materials Authorizations (“RMA”) number; (ii) Quasonix is given a reasonable opportunity after receiving the notice to examine such Products and customer (if requested to do so by Quasonix) returns such Products to Quasonix’s facility in Moorpark, CA, unless otherwise approved by Quasonix; and (iii) Quasonix reasonably verifies customer’s claim that the Products are defective.

Subject to the foregoing, with respect to any such Products during the Warranty Period, Quasonix shall, in its sole discretion, either: (i) repair or replace such Products (or the defective part) or (ii) credit or refund the price of such

Products at the pro rata contract rate provided that, if Quasonix so requests, customer shall, at Quasonix's expense, return such Products to Quasonix.

The customer is responsible for all costs associated with packaging and shipping of the defective Products to Quasonix's facility and clearly marking or affixing the given RMA number on the shipping label. Quasonix is not responsible for any loss or damage during shipment to Quasonix's facility. Following repair or replacement of covered Products, Quasonix will assume responsibility for the costs associated with the return of the material to the customer to an address provided by the customer. Notwithstanding the foregoing, items returned to Quasonix's facility and found to be operational or otherwise not covered by this Limited Warranty shall be returned to the customer at the customer's expense.

This Limited Warranty does not apply to expendable parts, such as cables, lamps, fuses, connectors, etc. This Limited Warranty does not extend to any Products which have been damaged or rendered defective (a) as a result of accident, misuse, abuse, or external causes; (b) by operation outside the usage parameters stated in the user documentation that shipped with the Products; (c) as a result of a failure to follow the instructions in the Operations & Maintenance Manual (d) by the use of parts not manufactured or sold by Quasonix; or (e) by modification or service by anyone other than (i) Quasonix, (ii) an Quasonix authorized service provider, or (iii) your own installation of end-user replaceable Quasonix or Quasonix approved parts if available for the Products in the servicing country.

THE TERMS OF THE WARRANTIES CONTAINED HEREIN DO NOT IN ANY WAY EXTEND TO ANY PRODUCT OR PART THEREOF OR SOFTWARE MATERIALS WHICH WERE NOT MANUFACTURED BY SELLER OR PREPARED BY SELLER OR ANY OF ITS AFFILIATES.

These terms and conditions constitute the complete and exclusive warranty agreement between the customer and Quasonix regarding the Products purchased. This Limited Warranty is applicable in all countries and may be enforced in any country where Quasonix or its authorized affiliates offer warranty service subject to the terms and conditions set forth in this Limited Warranty.

These terms and conditions supersede any prior agreements or representations (including representations made in Quasonix sales literature or advice given to the customer by Quasonix or an agent or employee of Quasonix) that may have been made in connection with the purchase of the Products. No change to the conditions of this Limited Warranty is valid unless it is made in writing and signed by an authorized representative of Quasonix.

### 6.1.1 Extended Warranties

Extended warranties or extra coverage are available upon request. Please contact Quasonix for details and pricing.

**THE REMEDIES SET FORTH IN THIS LIMITED WARRANTY STATEMENT SHALL BE THE BUYER'S SOLE AND EXCLUSIVE REMEDY AND SELLER'S ENTIRE LIABILITY FOR ANY BREACH OF THE LIMITED WARRANTY SET FORTH HEREIN.**

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## **7 Technical Support and RMA Requests**

In the event of a product issue, customers should contact Quasonix via phone (1-513-942-1287) or e-mail (support@quasonix.com) to seek technical support. If the Quasonix representative determines that the product issue must be addressed at Quasonix, a returned materials authorization (RMA) number will be provided for return shipment.

Authorized return shipments must be addressed in the following manner:

**Quasonix, Inc.  
ATTN: Repair, RMA #  
6025 Schumacher Park Drive  
West Chester, OH 45069**

**To ensure that your shipment is processed most efficiently, please include the following information with your product return:**

- Ship To – Company name, address, zip code, and internal mail-drop, if applicable
- Attention/Contact person – Name, Title, Department, Phone number, email address
- Purchase Order Number – If applicable
- RMA Number – provided by the Quasonix representative

Please note that Quasonix reserves the right to refuse shipments that arrive without RMA numbers.



## 8 Troubleshooting

Problem	Solution
Device Type is reporting Unknown on the Main Menu	<p>This message is reported if the Handheld Programmer is turned ON and is running the Quasonix Utility Application without a powered device connected to it. Tap on Test Connection on the Main menu to attempt to re-establish communication with the device.</p> <p>This message is also reported when a device other than a Quasonix transmitter or receiver is connected. When using the Handheld Programmer to communicate with other serial devices, select "Terminal" on the Main menu.</p> <p>This message may also display when unplugging from one device and connecting to another device. Tap on Test Connection after connecting to the new device.</p>
Tapping on Test Connection on the Main menu still reports Device Type: Unknown.	<p>There may be a physical wiring problem with the serial cable connected to the device. Try connecting the Handheld Programmer to a computer serial port running a terminal program. Be sure to use a null modem cable when connecting a Handheld Programmer to a computer for proper communication. From the Quasonix Utility Application select "Terminal" then "Settings" and configure the communication settings to match the computer's terminal settings. Anything typed in the Quasonix Utility Application should display on the computer's terminal screen and anything typed in the computer screen should display on the Quasonix Utility Application terminal screen. If this is the case, then the Handheld Programmer is functioning correctly and the problem may be in the transmitter or receiver cabling.</p>
Connecting the Handheld Programmer to a computer using the Handheld terminal and a computer terminal was successful. Why does the Device type still report Unknown for the device type when connected to the transmitter or receiver device?	<p>There may be a physical wiring problem with the serial cable connected to the device. Try connecting the transmitter or receiver to a computer serial port running a terminal program. Refer to your device's documentation for the correct baud rate. Common settings are 57600 8/N/1 and 115200 8/N/1. If you can communicate with the transmitter or receiver, make note of the device's baud settings and attempt the connection using the Quasonix Handheld Programmer terminal with the same baud rate settings.</p>
The Handheld Programmer communicates with the transmitter or receiver using the Quasonix Utility Application terminal and selected baud settings Why does the Device type still report Unknown for the device type?	<p>Make sure the transmitter or receiver is a Quasonix device. If the device is a Quasonix transmitter or receiver, it may too old to use the binary interface which allows the Main menu to operate. If so, the terminal dialog on the Quasonix Utility Application may still be used to configure these devices. Please refer to section 3.0 Basic Serial Terminal Commands for Transmitters or 4.0 Basic Serial Terminal Commands for Receivers for setting older devices.</p>

## 9 Appendix A - Installing the Quasonix Utility Application

From time to time, software upgrades may be available for a previously purchased Quasonix Ruggedized Handheld Programmer. The following procedure enables a customer to install an upgrade supplied by Quasonix.

1. If the Quasonix application is running on the Handheld Programmer, shut it down by tapping the (X) icon located in the upper right corner of the Main Menu. Newer versions of the Handheld Programmer can be shut down by tapping on “Quasonix” from the Main Menu.
2. Install the Windows Mobile Device Center on your PC if it is not already installed. This file is located on the compact disk in the folder called (Windows Install) WindowsMobileDeviceCenter.

For 32 bit Windows, refer to subfolder *MobileDeviceCenter\_32bit*.

For 64 bit Windows, refer to subfolder *MobileDeviceCenter\_64bit*.

3. Connect your Quasonix Handheld Programmer (Nomad or Recon) to your computer using the included USB cable, then wait 5 to 10 seconds for the device to connect.



**Figure 51: Windows Mobile Device Center Quick Connect Screen**

4. From the compact disk, run the install file *Quasonix Handheld Installer.exe* located in the folder (Windows Install) HandheldApp. This file runs from your PC and automatically updates and installs the application on your Handheld Programmer (Nomad or Recon). The installer Setup Wizard Main Menu is shown in Figure 52.



**Figure 52: Quasonix Handheld Installer Setup Wizard Main Menu**

5. During the installation, the Handheld Programmer may display a message indicating that a previously installed Dot Net support file is an older version than the one trying to install. Tap on OK to continue the install. The older support file will work fine with the Quasonix application.

If you would like to install the newer version, you will have to remove the Dot Net CF 3.5 from the Handheld Programmer (Start > drop down menu Settings option > System tab > Remove Programs icon), then reinstall the Quasonix application.

6. After the files are installed, the Handheld Programmer will reboot and automatically run the Quasonix application. If a transmitter or receiver is attached, it will auto detect the device. If not, tap on Test Connection on the Quasonix application Main Menu to connect to a transmitter or receiver at any time.

## 10 Appendix B – Acronym List

Acronym	Description
AGC	Automatic Gain Control
AM	Amplitude Modulation
AQPSK	Variant of Quadrature Phase Shift Keying
ASCII	American Standard Code for Information Interchange
AUQPSK	Variant of Quadrature Phase Shift Keying
BPSK	Binary Phase Shift Keying
CD	Compact Disk
DB-9	D-subminiature 9 pin Serial Connector
DHCP	Dynamic Host Configuration Protocol
DPM	Digital Phase Modulation
FEC	Forward Error Correction
FPGA	Field Programmable Gate Array
IF	Intermediate Frequency
IP	Internet Protocol
kbps	Kilobits per second
KHz	Kilohertz
LSB	Least Significant Bit
mbps	Megabits per second
MHCPM	multi-h Continuous Phase Modulation
MHz	Megahertz
OQPSK	Offset Quadrature Phase Shift Keying
PCMFM	Pulse Code Modulation/Frequency Modulation
PDA	Personal Device Assistant
PN	Pattern Number
QPSK	Offset Quadrature Phase Shift Keying
RDMS	Receiver DeModulator Synchronizer
RF	Radio Frequency
RX	Receive

Acronym	Description
SDI	System Degradation Indication
SOQPSK	Shaped Offset Quadrature Phase Shift Keying
SOQPSK-TG	Shaped Offset Quadrature Phase Shift Keying –Telemetry Group
TRL	Tracking Loop
TTL	Transistor Transistor Logic
TX	Transmit