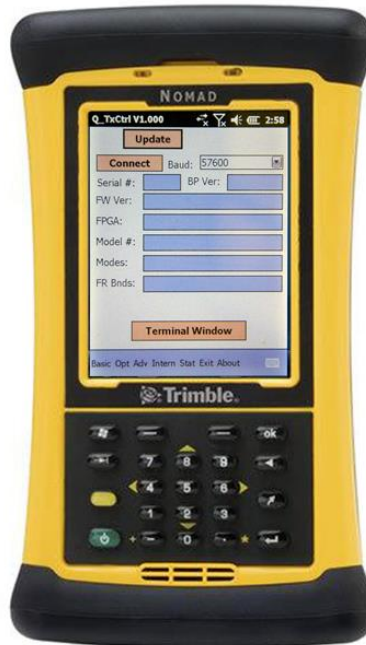


2nd Generation Ruggedized Handheld Programmer

User Manual

QSX-AC-HHPRG-1050N-B



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West Chester, OH 45069
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Specifications subject to change without notice.

All Quasonix transmitter products are under U.S. Department of Commerce jurisdiction categorized as EAR99; not covered by ITAR

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1 Introduction

1.1 Description

This document describes the operation of the 2nd Generation Quasonix Ruggedized Handheld Programmer. The Quasonix Handheld Programmer is designed to facilitate setting up transmitters for operation. With an intuitive touch screen interface, all basic settings are provided to get your transmitter up and running quickly.

1.1.1 Package Contents

Package contents are described in Table 1.

Current Quasonix user manuals and technical guides are always available from the Quasonix web site: <http://www.quasonix.com>.

Table 1: Package Contents

Quantity	Description
1	Nomad™ Ruggedized PDA with Quasonix Handheld Programmer software 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

2 Operating Instructions

The 2nd Generation Quasonix Handheld Programmer is operated by using the touch screen interface of a ruggedized Nomad™ PDA. Your Handheld Programmer has the Quasonix Transmitter Control application preloaded.

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 operates differently depending on how long 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 Transmitter Control 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 Numeric Keys

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



Figure 6: Numeric Keys

2.2 Quasonix Utility Application – Getting Started

1. Connect the Handheld Programmer to a Quasonix transmitter using the standard Quasonix wiring harness for your transmitter. Refer to the documentation that came with your Quasonix transmitter for the proper wiring harness to use.



Figure 7: MDM-15 Wiring Harness

2. If your transmitter supports the standard RS-232 control interface, then plug the female DB-9 connector directly into the bottom of the Handheld Programmer. If the transmitter is an RS-422 control interface unit, then an appropriate RS-422 to RS-232 converter must be used to connect to the Handheld Programmer.
3. Power on the Quasonix transmitter. Refer to the documentation that came with the transmitter for the correct voltages and connections.
4. If the Handheld Programmer is not powered on, press the green Power key on the keypad.



Figure 8: Power Key

5. After the Handheld Programmer boots up, it should automatically open the Quasonix Transmitter Control application, as shown in Figure 9.

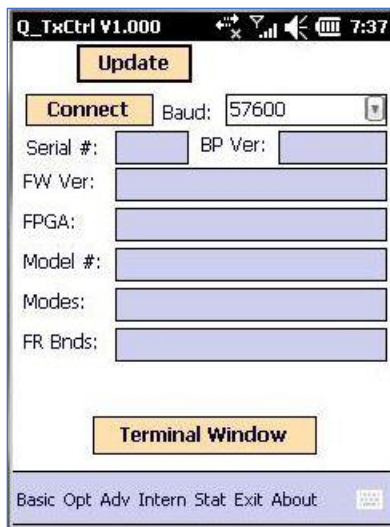


Figure 9: TxCtrl Screen

If for some reason, the user must start from the Windows screen, select the TxCtrl application to start the program.

6. Ensure the Baud rate on the Handheld Programmer matches the baud rate set on the transmitter. If it doesn't, select the correct baud rate from the drop down menu to change it.

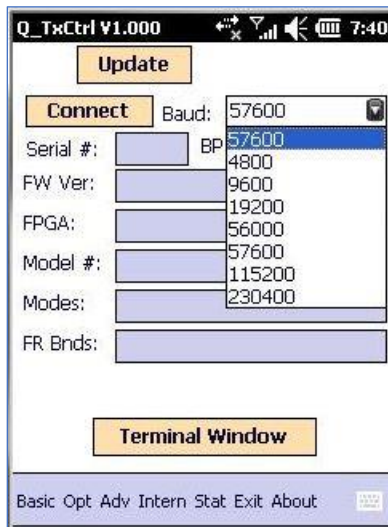


Figure 10: TxCtrl Screen, Baud Rate Menu

7. Tap the Connect button (Figure 11) to connect to the Quasonix transmitter. When connected, the Connect button changes to a Disconnect button (Figure 12) and the Handheld Programmer updates the display from the connected transmitter.

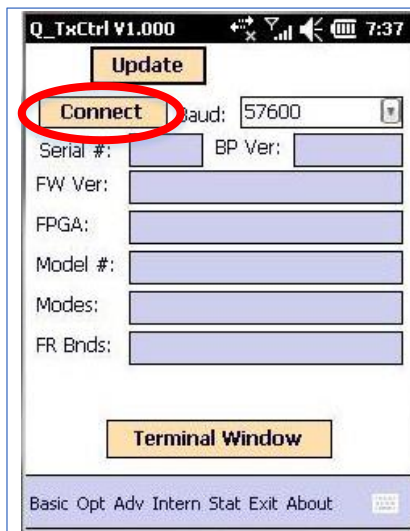


Figure 11: TxCtrl Screen, Connect Button Highlighted

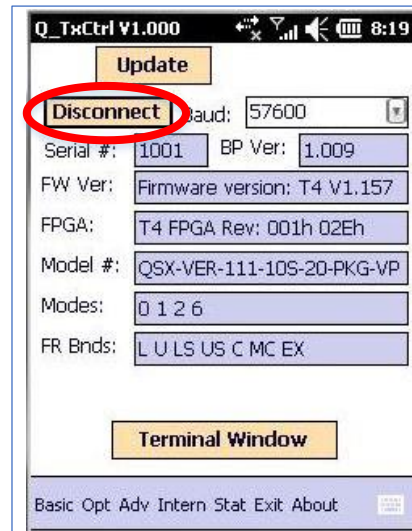


Figure 12: TxCtrl Screen, Disconnect Button Highlighted

3 Handheld Programmer Screens

3.1 Edit Transmitter Parameters

To change parameters on any screen, all or part of a field may be selected using the stylus or finger. Use the numeric keypad on the Handheld Programmer to type numbers, or use the on-screen keyboard to select parameters.

Fields with a Set button, require a Set to send the command to the transmitter.

3.1.1 General Notes About Changing Parameters

Some of the fields (parameters) described in the tables for each screen only display when certain Modes are selected or specific device options are enabled. Some selections are dependent on the type of Quasonix transmitter being used—Legacy, Single channel, or Dual Transmitter. Selections that are not supported by the transmitter are not shown on the Handheld Programmer.

The Update button refreshes the current screen.

To change specific parameters, use the stylus to select the parameter field, then use the Handheld Programmer buttons or the keypad to enter the desired values. Tap on the Set button adjacent to the field to send the command to the transmitter.

Some fields are Enable/Disable, where green indicates Enabled, and tan indicates NOT Enabled. Tap the button to toggle the state. Tap the Set button adjacent to the field to send the command to the transmitter. Note that just toggling the state of a parameter does NOT cause the parameter to change if there is a Set button to the left. Tap the Set button to send the command to the transmitter for a change to take effect. If the Update button is tapped without having done the Set, the previous state is read back from the transmitter, and redisplayed.

The buttons at the bottom of the screen control functions with only two states (On/Off, Enabled/Disabled, etc.).

When connected to a Dual Transmitter, a DTX Chan box shows the current channel on the Dual Transmitter. This box does not display for single channel transmitters. To change the channel on screens which allow it, enter a new channel, then tap the Set button.

The Act_RF (Act_RF1 and Act_RF2 for Dual Transmitters) indicators on screens which show them indicate the actual RF state of the transmitter. Green indicates RF is actually On, and tan indicates RF is NOT actually On. This may differ from the RF control state. For example, if the RF control is set to on, but the RF on/off pin of the transmitter is set in the OFF state, then actual RF will remain OFF.

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

Note the 1 or 2 in any of the button names at the bottom of a screen applies ONLY to Dual Transmitters and refers to the transmitter channel. For example, RF1 sets RF Output state for channel 1. RF2 sets the RF Output state for channel 2. Buttons that do not have a number apply to the transmitter as a whole, and are not channel specific.

3.2 TxCtrl Screen

When connected, the following transmitter information displays on the TxCtrl screen: Serial Number, Binary Protocol Version supported, Firmware Version, FPGA Version, Model Number, Modes available on the transmitter, and Frequency Bands enabled. The figures show the TxCtrl screen when connected to a Dual Transmitter, a single channel transmitter, and a legacy transmitter. The Update button refreshes the TxCtrl screen.

Broadly defined, there are three transmitter types that may be connected to the Handheld Programmer. They behave differently: Legacy refers to any Quasonix transmitter which has binary protocol version 1.005 or older. These have a fairly limited set of capabilities, but the basic setup of the transmitter can still be accomplished.

The current Quasonix single transmitters generally support binary protocol versions 1.006 or higher, and have significantly more capability to access features on the transmitter.

The Quasonix Dual Transmitter has two fully functional RF transmitters and a number of features that now may be accessed by RF channel. This includes status and some control items. The fully independent mode of transmitter operation is not yet available, so some control items (like Mode) have only one setting at this time.

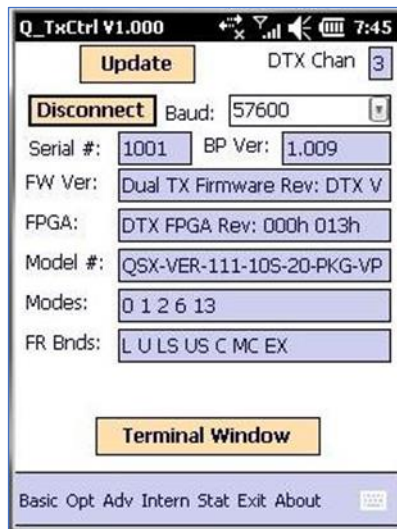


Figure 13: TxCtrl Screen, Transmitter Information Displayed for Dual Transmitter



Figure 14: TxCtrl Screen, Transmitter Information Displayed for Single Channel Tx

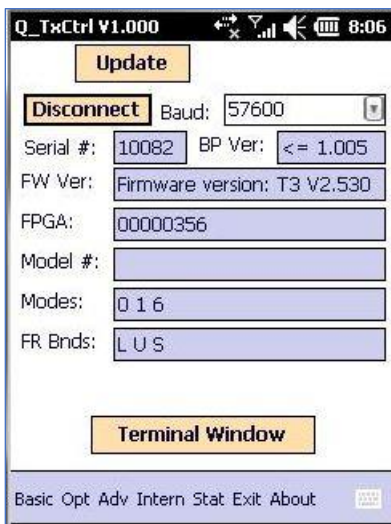


Figure 15: TxCtrl Screen, Transmitter Information Displayed for Legacy Single Channel Tx

When connected to a Dual Transmitter, a DTX Chan box shows the current channel. This box does not display for single channel transmitters.

Legacy binary protocol does not support the transmitter Model number, so the field is blank.

The TxCtrl screen contains a menu bar at the bottom of the screen, as shown in Figure 16. The menu items are: Basic, Options, Advanced, Internal, Status, Exit, and About, as shown in Figure. The menu bar also contains a keyboard icon. When a different screen, such as Internal, is selected, the screen name on the Menu bar is replaced by TxCtrl, as shown in Figure 17. Tap on TxCtrl to go back to the main screen.



Figure 16: TxCtrl Screen, Menu Bar



Figure 17: Internal Screen, Menu Bar – Internal Replaced by TxCtrl in Menu

Table 2: Transmitter Control Application Menu Selections

Selection Name	Description
TxCtrl	Connect to a transmitter, display basic transmitter information, open a Terminal window, access other screens
Basic	View or change basic parameter settings on the connected device
Options	Allow user to change some items associated with common options, such as dual power, modulation scaling, convolutional encoding (NRZ encoding), auto carrier, channel delay (for DTX only)
Advanced	Save and Recall transmitter settings ASCII Passthrough controls and display
Internal	Used for testing the transmitter using internal clock and data to verify operation when other things might not seem to be working; Duplicated Mode, Frequency, RF On/Off, etc., for convenience so it can all be tested from this one screen
Status	View certain transmitter status items, such as temperature, PA current, and PA voltage

3.2.1 Terminal Window

Tap the Terminal Window button, as shown in Figure 18, to display a standard Terminal screen, as shown in Figure 19. The Terminal window works just like a PC-based Terminal program to configure a Quasonix transmitter.

Features on the Handheld Programmer that are not available through the binary protocol can always be accessed via the terminal screen.

Use the Handheld Programmer stylus to tap commands into the keypad. Tap the Enter key on the keypad to transmit the command.

Commands display in the window in the middle of the screen, and results display in the top window, as shown in Figure 20. Both windows are scrollable using the stylus. Numbers may be tapped into the keypad with the stylus or entered using the numeric keys on the Handheld Programmer.

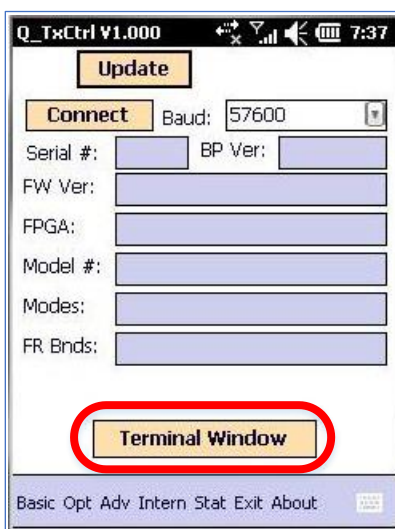


Figure 18: TxCtrl Screen, Terminal Window Button

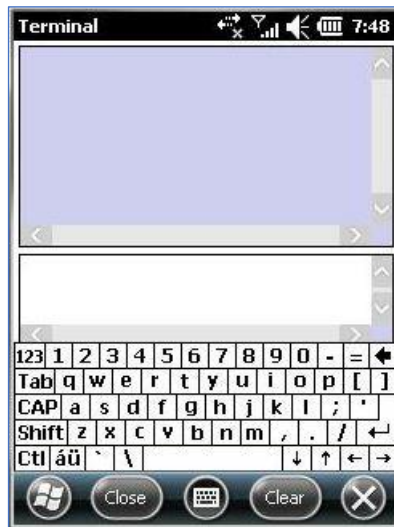


Figure 19: Terminal Screen

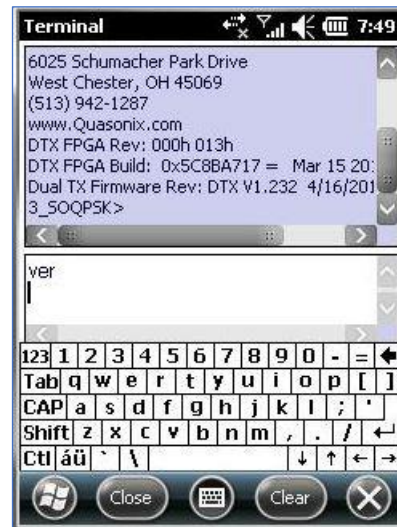


Figure 20: Terminal Screen with Command and Response

The Terminal screen buttons, shown in Figure 21, work as follows:

- **Windows** – Functions the same as the Windows button on the Handheld Programmer keypad; On this screen, it toggles between the Windows screen and the Terminal screen
- **Close** – Closes the Terminal screen and redisplay the TxCtrl screen
- **Keyboard** – Displays or hides the Terminal keypad
- **Clear** – Clears the Terminal display windows
- **X** – Closes the Terminal screen and redisplay the TxCtrl screen; it does not close the keypad; tap on the keyboard icon in the menu bar to close it



Figure 21: Terminal Screen Buttons

3.3 Basic Screen

The fields on the Basic Menu screen, shown in Figure 22, are described in Table 3.

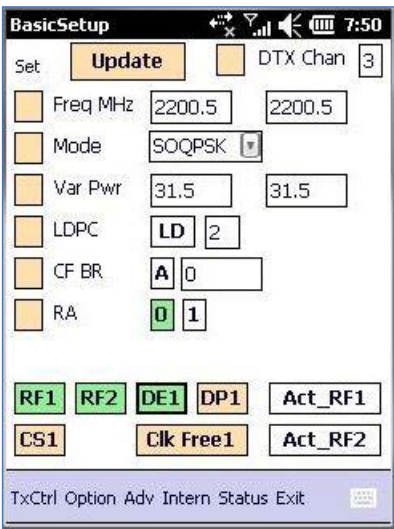


Figure 22: Basic Screen for Dual Tx

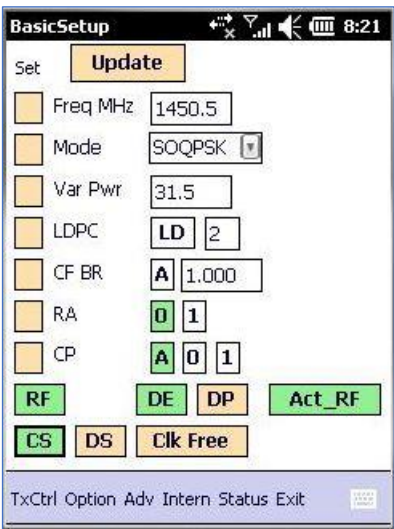


Figure 23: Basic Screen for Single Channel Tx

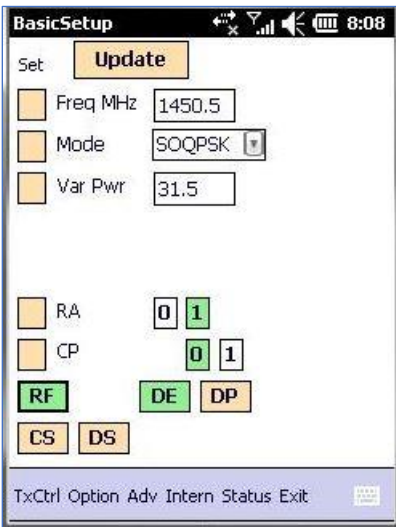


Figure 24: Basic Screen for Legacy Single Channel Tx

Table 3: Basic Screen Field Descriptions

Menu Field	Values	Description
Frequency	Numeric value	Type the desired frequency. Tap the Set button. Frequency units are in MHz. Sets frequency for both channels on a Dual Transmitter

Menu Field	Values	Description
Mode	Available Mode	<p>Modulation choices vary depending on the modes ordered with the transmitter.</p> <p>Select the desired mode.</p> <p>Tap the Set button.</p> <p>Refer to the appropriate Quasonix transmitter manual for additional information about modes.</p>
Variable Power	Numeric value	<p>This setting allows fine adjustments to RF power output.</p> <p>Not all transmitters support this command, and the VP option is required.</p> <p>Type the desired value.</p> <p>Tap the Set button.</p> <p>Channel 1 and Channel 2 values are set when the Set button is tapped on a Dual Transmitter</p>
LDPC	Enabled/Disabled and numeric value	<p>Enable/disable Low Density Parity Check (LDPC) encoder, and set LDPC code, if the LD6 option is enabled</p> <p>Requires the LD or LD6 option</p> <p>Valid only with *PSK modes</p> <p>Automatically disables differential encoding (*PSK modes default to DE enabled)</p> <p>Automatically re-enables DE for SOQPSK mode if LDPC is disabled</p> <p>Not supported on Legacy transmitters through the binary protocol, but may be controlled from the Terminal screen if the transmitter has the LD or LD6 option</p> <p>Refer to the appropriate Quasonix transmitter manual for additional information about LDPC.</p>
Clock Free Bit Rate	Bit rate in Mbps	<p>Type the desired bit rate.</p> <p>Tap the Set button.</p> <p>Requires the CF option</p> <p>Not supported on Legacy transmitters through the binary protocol, but may be controlled from the Terminal screen if the transmitter has the CF option</p>
RA	Off, IRIG On, CCSDS On	<p>Randomizer</p> <p>Tap to toggle between values. Sets Randomizer to Off (0), IRIG-106 randomizer On (1), or CCSDS randomizer On (2)</p> <p>RA 2 requires the LD6 option and LDPC enabled</p>

Menu Field	Values	Description
CP	Automatic, Normal, Inverted	<p>Clock Polarity</p> <p>Tap to toggle between values. 0 is normal Clock polarity; 1 sets the clock polarity to inverted. The selected value displays in green.</p> <p>Automatic, selects the most reliable clock edge, (A) not supported on Legacy transmitters through the binary protocol, but may be set using Terminal mode</p> <p>Clock polarity does not currently apply to Dual Transmitters since they always default to AUTO.</p>

Menu Field	Values	Description
RF or RF1	RF On, RF Off CH1	<p>Tap to toggle Channel 1 RF.</p> <p>Green is On, Tan is Off</p>
RF2	RF On, RF Off CH2	<p>Tap to toggle Channel 2 RF.</p> <p>Green is On, Tan is Off</p> <p>Channel 2 only exists on Dual Transmitters</p>
Actual RF or Actual RF1	On or Off CH1	<p>Display only field shows the actual (Channel 1) RF Output state</p> <p>Green is On, Tan is Off</p>
Actual RF2	On or Off CH2	<p>Display only field shows the actual (Channel 2) RF Output state</p> <p>Green is On, Tan is Off</p> <p>Channel 2 only exists on Dual Transmitters</p>
DE or DE1	Enabled, Disabled	<p>Differential Encoding for Channel 1</p> <p>Tap to toggle between values.</p> <p>Green is Enabled, Tan is Disabled</p> <p>Differential encoding only applies to *PSK modes—typically disabled for other modes</p>
DP or DP1	Normal, Inverted	<p>Data Polarity for Channel 1</p> <p>Tap to toggle between values;</p> <p>Tan is normal, Green is inverted</p>
CS or CS1	Internal, External	<p>Enable internal Clock Source for Channel 1</p> <p>Tap to toggle between values;</p> <p>Green = Internal clock enabled</p> <p>Tan = Internal clock NOT enabled</p>

Menu Field	Values	Description
DS	Internal, External	Enable internal Data Source Tap to toggle between values; Green = Internal data enabled Tan = Internal data NOT enabled
Clk Free or Clk Free1	Internal (clock free) bit sync enabled or not	Clock Free for Channel 1 Tap to toggle between values. When Green, the transmitter uses an internally synthesized (clock free) bit sync obtained from the data stream. When Tan, it does NOT use the clock free generated bit sync Requires the CF option Not supported on Legacy transmitters through the binary protocol, but may be controlled from the Terminal screen if the transmitter has the option

3.4 Options Screen

The Options screen provides access to some of the less common settings on the transmitter. Some of these require specific options to be enabled in order to work.

The fields on the Options screen, shown in Figure 25, are described in Table 4.

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

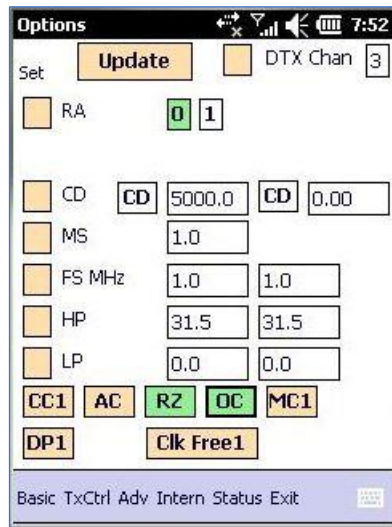


Figure 25: Options Screen for Dual Tx

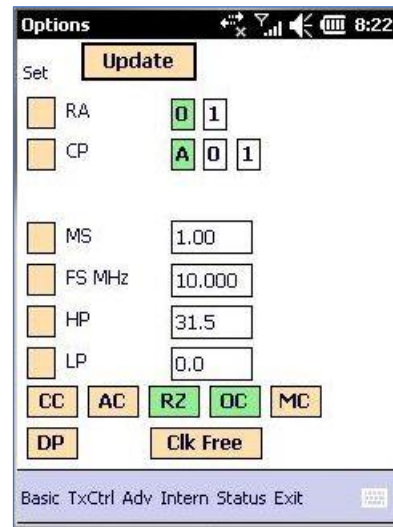


Figure 26: Options Screen for Single Channel Tx

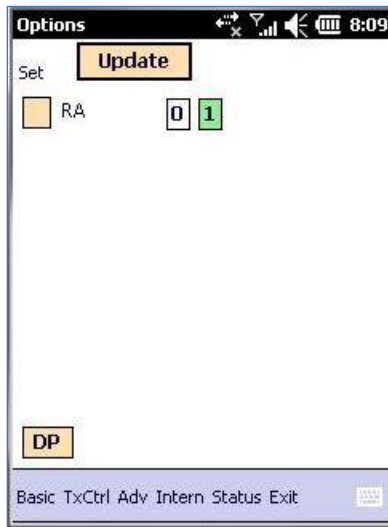


Figure 27: Options Screen for Legacy Single Channel Tx

Table 4: Options Screen Field Descriptions

Menu Field	Values	Description
RA	Off, IRIG On, CCSDS On	Randomizer Tap to toggle between values. Sets Randomizer to Off (0), IRIG-106 randomizer On (1), or CCSDS randomizer On (2) RA 2 requires the LD6 option and LDPC enabled

Menu Field	Values	Description
CP	Automatic, Normal, Inverted	<p>Clock Polarity Tap to toggle between values. 0 is normal Clock polarity; 1 sets the clock polarity to inverted. The selected value displays in green.</p> <p>Automatic, selects the most reliable clock edge, (A) not supported on Legacy transmitters through the binary protocol, but may be set using Terminal mode</p> <p>Clock polarity does not currently apply to Dual Transmitters since they always default to AUTO.</p>
CD	Set channel delay in nanoseconds	<p>Type the desired value in nanoseconds. Valid range is 0.00 to 5000.00 ns Select Enabled (green) or Disabled (tan) Tap the Set button. Valid only on Dual Transmitters</p>
MS	Numeric value	<p>Modulation Scaling Type the desired value. Valid range is 0.09 to 128.01 Tap the Set button. Requires the MS option</p>
FS	Numeric value in MHz	<p>Frequency Step Type the desired value. Smallest available step is 0.5 MHz Tap the Set button.</p>
HP	Numeric value in dB	<p>High Power Type the desired value. Valid range is 0-31 in 1 dB steps or 0-31.5 in 0.5 dB steps, depending on the transmitter Tap the Set button. Requires the DP (dual power) option to have any observable affect</p>
LP	Numeric value in dB	<p>Low Power Type the desired value. Valid range is 0-31 in 1 dB steps or 0-31.5 in 0.5 dB steps, depending on the transmitter Tap the Set button. Requires the DP (dual power) option to have any observable affect</p>

Menu Field	Values	Description
CC or CC1	Enable or Disable	Convolutional Encoding Tap to toggle between values. Sets Convolutional Encoding to Disabled (Tan) or Enabled (Green) Requires the CE option CC not supported on Legacy transmitters through the binary protocol, but may be set on some transmitters via the Terminal screen
AC	Off or On	Automatic Carrier Output Tap to toggle between values. Tan = Off, Green = On Requires the AC option AC not supported on Legacy transmitters through the binary protocol, but may be set on some transmitters via the Terminal screen
RZ	RF On/Off Pin polarity	Tap to toggle between values. RZ (Tan) sets RF On/Off polarity to “pin low = On”; RZ (Green) sets RF On/Off polarity to “pin high = On” RZ not supported on Legacy transmitters through the binary protocol, but may be set on some transmitters via the Terminal screen
OC	Enable or disable	Overtemperature Control Tap to toggle between values. Sets Overtemperature Control to Disabled (Tan) or Enabled (Green) OC not supported on Legacy transmitters through the binary protocol, but may be set on some transmitters via the Terminal screen
MC or MC1	Enable or Disable	Tap to toggle between values. Sets NRZ-L to NRZ-M conversion to Disabled (Tan) or Enabled (Green) Requires the CE option MC not supported on Legacy transmitters through the binary protocol, but may be set on some transmitters via the Terminal screen
DP or DP1	Normal, Inverted	Data Polarity for Channel 1 Tap to toggle between values; Tan is normal, Green is inverted

Menu Field	Values	Description
Clk Free or Clk Free1	Internal (clock free) bit sync enabled or not	<p>Clock Free for Channel 1</p> <p>Tap to toggle between values.</p> <p>When Green, the transmitter uses an internally synthesized (clock free) bit sync obtained from the data stream.</p> <p>When Tan, it does NOT use the clock free generated bit sync</p> <p>Requires the CF option</p> <p>Not supported on Legacy transmitters through the binary protocol, but may be controlled from the Terminal screen if the transmitter has the option</p>

3.5 Advanced Screen

The Advanced screen, shown in Figure 28, provides access to the Save and Recall transmitter commands, and on transmitters which support it, ASCII Passthrough mode.

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

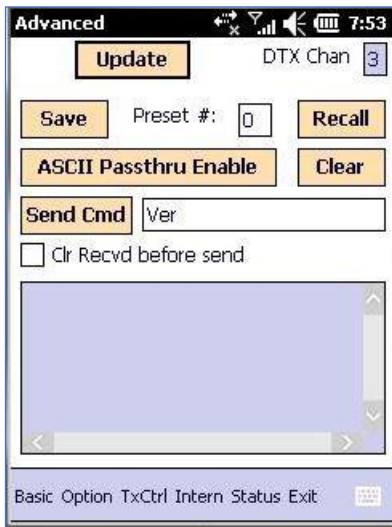


Figure 28: Advanced Screen for Dual Tx



Figure 29: Advanced Screen for Single Channel Tx

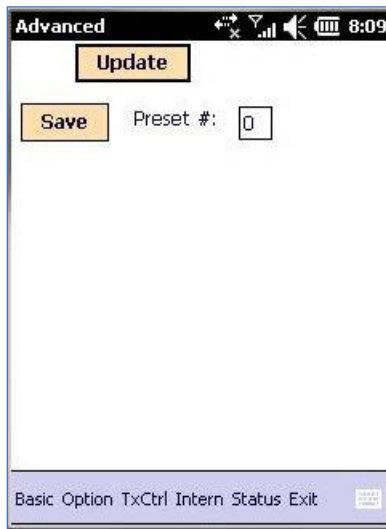


Figure 30: Advanced Screen for Legacy Single Channel Tx

- **ASCII Passthru Mode** - This feature, available only on newer transmitters which support binary protocol version 1.009 or newer, allows the user to send ASCII commands as might be sent via a Terminal interface, and see the responses. ASCII Passthru Mode can only be enabled on this screen, and is disabled automatically if the screen is exited. There is a Clear button to allow the user to clear the received message display box.

In some cases, it may be easier to access the Terminal window and use the Terminal commands.

- **Clr Recvd before send check box** – When checked, the ASCII Passthru received data display window is cleared before sending a new command. This can make it easier to see a specific response, rather than a string of previous responses. Check On or Off as desired.

Table 5: Advanced Screen Button Descriptions

Buttons	Values	Description
Update	N/A	Button used to refresh the Advanced screen
Save	Numeric value	Sends a Save command to the transmitter Type the desired preset number. Valid range is 0-15 and 0 is power-on default Tap the Save button.
Recall	Numeric value	Sends a Recall command to the transmitter Type the preset number to recall. Valid range is 0-15 and 0 is power-on default Tap the Recall button. Not supported on Legacy transmitters through the binary protocol, but may be sent via the Terminal screen

Buttons	Values	Description
ASCII Passthru Enable	On/Off	Tap the button to toggle ASCII Passthrough Green = Enabled, Tan = Disabled Not supported on Legacy transmitters
Clear	N/A	Clears display window
Send Cmd	Transmitter commands	When the ASCII Passthrough Enable button is On (green), transmitter terminal commands may be typed into the field next to the Send Cmd button. Tap the Send Cmd button to send the command to the transmitter. All responses display in the large window. Use the up/down arrows in the display window to scroll through the responses. Not supported on Legacy transmitters

3.6 Internal

The Internal screen is intended for quick testing of the RF functionality of the transmitter when no external clock or data source is available. The user may enable internal clock and data and get valid RF output from the transmitter to check on a Spectrum Analyzer, or in a closed loop receiver test.

The fields on the Internal screen, shown in Figure 31, are described in Table 6.

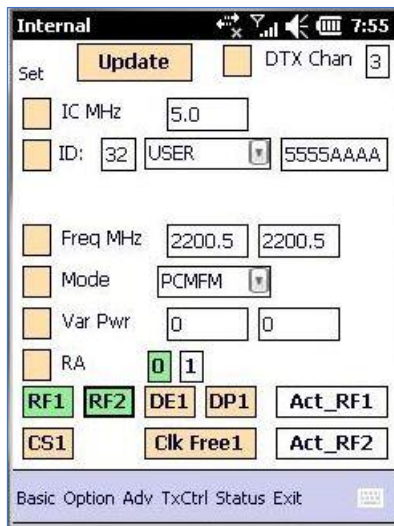


Figure 31: Internal Screen for Dual Tx

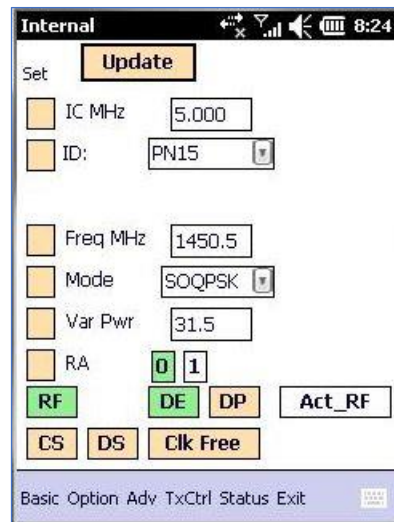


Figure 32: Internal Screen for Single Channel Tx

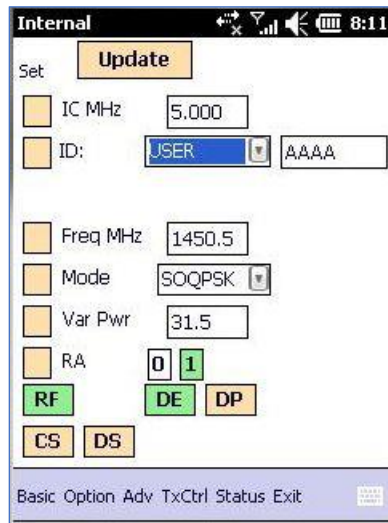


Figure 33: Internal Screen for Legacy Single Channel Tx

Table 6: Internal Screen Field Descriptions

Menu Field	Values	Description
IC MHz	Numeric value	Internal Clock Type the desired Internal Clock frequency. Valid range is 0.002 MHz-46.000 MHz Tap the Set button. Internal Clock is only used when Clock Source is set to Internal. (Refer to CS/CS1 button)
ID	Data Pattern	Internal Data Select the desired Internal Data pattern using the drop down menu If USER is selected, type the desired hexadecimal pattern in the adjacent field. Tap the Set button. Supported patterns vary depending on the transmitter; refer to the appropriate transmitter manual for details
Frequency	Numeric value	Type the desired frequency. Tap the Set button. Frequency units are in MHz. Sets frequency for both channels on a Dual Transmitter

Menu Field	Values	Description
Mode	Available Mode	<p>Modulation choices vary depending on the modes ordered with the transmitter.</p> <p>Select the desired mode.</p> <p>Tap the Set button.</p> <p>Refer to the appropriate Quasonix transmitter manual for additional information about modes.</p>
Variable Power	Numeric value	<p>This setting allows fine adjustments to RF power output.</p> <p>Not all transmitters support this command, and the VP option is required.</p> <p>Type the desired value.</p> <p>Tap the Set button.</p> <p>Channel 1 and Channel 2 values are set when the Set button is tapped on a Dual Transmitter</p>
RA	Off, IRIG On, CCSDS On	<p>Randomizer</p> <p>Tap to toggle between values. Sets Randomizer to Off (0), IRIG-106 randomizer On (1), or CCSDS randomizer On (2)</p> <p>RA 2 requires the LD6 option and LDPC enabled</p>

Menu Field	Values	Description
RF or RF1	RF On, RF Off CH 1	<p>Tap to toggle Channel 1 RF.</p> <p>Green is On, Tan is Off</p>
RF2	RF On, RF Off CH 2	<p>Tap to toggle Channel 2 RF.</p> <p>Green is On, Tan is Off</p> <p>Channel 2 only exists on Dual Transmitters</p>
Actual RF or Actual RF1	On or Off CH1	<p>Display only field shows the actual (Channel 1) RF Output state</p> <p>Green is On, Tan is Off</p>
Actual RF2	On or Off CH2	<p>Display only field shows the actual (Channel 2) RF Output state</p> <p>Green is On, Tan is Off</p> <p>Channel 2 only exists on Dual Transmitters</p>

Menu Field	Values	Description
DE or DE1	Enabled, Disabled	Differential Encoding for Channel 1 Tap to toggle between values. Green is Enabled, Tan is Disabled Differential encoding only applies to *PSK modes—typically disabled for other modes
DP or DP1	Normal, Inverted	Data Polarity for Channel 1 Tap to toggle between values; Tan is normal, Green is inverted
CS or CS1	Internal, External	Enable internal Clock Source for Channel 1 Tap to toggle between values; Green = Internal clock enabled Tan = Internal clock NOT enabled
DS	Internal, External	Enable internal Data Source Tap to toggle between values; Green = Internal data enabled Tan = Internal data NOT enabled
Clk Free or Clk Free1	Internal bit sync or external clock	Clock Free for Channel 1 Tap to toggle between values. When Green, the transmitter uses an internally synthesized (clock free) bit sync obtained from the data stream. When Tan, it does NOT use the clock free generated bit sync Requires the CF option Not supported on Legacy transmitters through the binary protocol, but may be controlled from the Terminal screen if the transmitter has the option

3.7 Status

The Status screen displays current transmitter sensor information, such as temperature, current, and voltage.

The fields on the Status screen, shown in Figure 34, are described in Table 7.

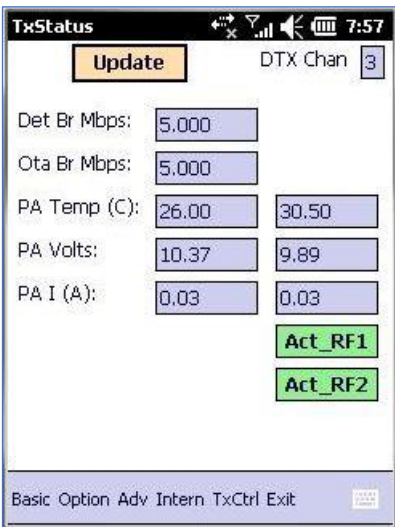


Figure 34: Status Screen for Dual Tx

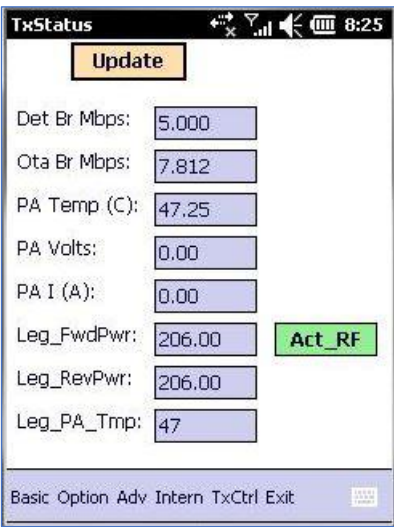


Figure 35: Status Screen for Single Channel Tx

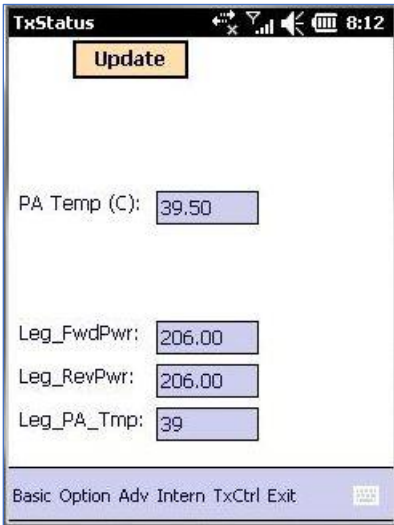


Figure 36: Status Screen for Legacy Single Channel Tx

Table 7: Status Screen Field Descriptions

Menu Field	Description
Det BR	Displays the current Detected Baseband Bit Rate for Channel 1 If a Dual Transmitter is connected, the value for Channel 2 also displays Not supported in Legacy transmitters

Menu Field	Description
OTA BR	Displays the current Over the Air Bit Rate for Channel 1 If a Dual Transmitter is connected, the value for Channel 2 also displays Not supported in Legacy transmitters
PA Temp	Displays the current PA temperature in degrees Centigrade If a Dual Transmitter is connected, the value for Channel 2 also displays
PA Volts	Displays the current PA drain voltage in Volts If a Dual Transmitter is connected, the value for Channel 2 also displays
PA I	Displays the current PA drain current in Amps If a Dual Transmitter is connected, the value for Channel 2 also displays
Actual RF or Actual RF1	Display only field shows the actual Channel 1 RF Output state Green = On
Actual RF2	Display only field shows the actual Channel 2 RF Output state Green = On Channel 2 only exists if a Dual Transmitter is connected
Leg_FwdPwr	Displays current approximate value of forward power on a Legacy transmitter Valid only for Legacy transmitters
Leg_RevPwr	Displays current approximate value of reverse power on a Legacy transmitter Valid only for Legacy transmitters
Leg_PA_Tmp	Displays current PA temperature, in degrees Centigrade Valid only for Legacy transmitters

3.8 About

The About selection on the Menu bar displays the current version information for the Quasonix Handheld Programmer software.



Figure 37: About Message

3.9 Exit

The Exit selection on the Menu Bar closes the Quasonix Handheld application. A message window provides a chance for the user to change their mind.

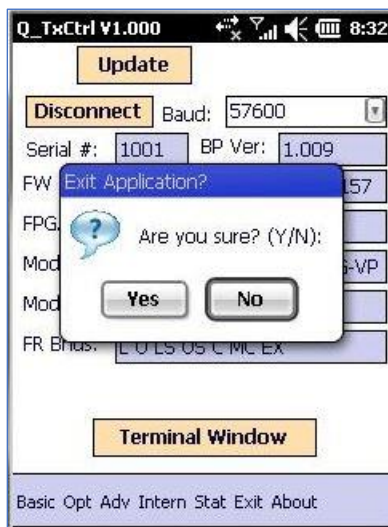


Figure 38: Exit Message

4 Maintenance Instructions

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

5 Product Warranty

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

5.1 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.

5.1.1 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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6 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.

7 Troubleshooting

Problem	Solution
Tapped the Connect button, got a very slow Updating TxCtrl message, then the Disconnect button, but nothing displays in any of the on-screen fields	<p>This may happen for several reasons:</p> <p>The Handheld Programmer is turned ON and is running the Quasonix Transmitter Control utility without a powered transmitter connected to it.</p> <p>OR</p> <p>There is a baud rate mismatch. The transmitter baud rate and the Handheld Programmer baud rate should match.</p> <p>OR</p> <p>There may be a physical wiring problem with the serial cable connected to the device.</p> <p>OR</p> <p>The device connected to the Handheld Programmer was not manufactured by Quasonix.</p> <p>The Handheld Programmer software always opens a communications port when the Connect button is tapped.</p> <p>Be sure a cable is securely connecting the Handheld Programmer to a Quasonix transmitter, and that there is power to the transmitter.</p> <p>After the connection issue is resolved, tap the Disconnect button, then re-Tap the Connect button to attempt to re-establish communication with the transmitter. The transmitter information should display on the Handheld.</p> <p>Check the baud rate. Try connecting the transmitter to a computer serial port running a terminal program. Refer to your transmitter documentation for the correct baud rate. The Quasonix default is 57600, however CP07 Dual Transmitters default to 9600 baud. If you can communicate with the transmitter via a PC Terminal program, make note of the device's baud rate setting, and attempt the connection using the Quasonix Handheld Programmer with the same baud rate settings.</p>
Timeout Detected Message	<p>The Timeout Detected message says: "Message tag xxxxx response was timeout. Is a Quasonix Transmitter still connected."</p> <p>Check the following items:</p> <p>Be sure the transmitter is powered on and the cable is securely attached to both the transmitter and the Handheld Programmer. The user may have accidentally loosened a cable, or disconnected one transmitter to replace it with a different transmitter.</p> <p>After correcting the problem, tap the OK button in the timeout message. Then tap the Update button to refresh the display.</p>

8 Appendix A – Acronym List

Acronym	Description
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
DB-9	D-subminiature 9 pin Serial Connector
DPM	Digital Phase Modulation
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
PN	Pseudorandom Number, as in “PN sequence”
QPSK	Quadrature Phase Shift Keying
RF	Radio Frequency
SOQPSK	Shaped Offset Quadrature Phase Shift Keying