Quasonix

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Installation and Operation Manual

for

QSX-TMOIP-12CH, RDMS IP2 option, and

Quasonix TMoIP Processor (QTP)

Quasonix, Inc.
6025 Schumacher Park Dr.
West Chester, OH 45069
28 April 2023

Revision 1.0.3

Applies to QTP ™ Software Version 1.1

MADE IN USA

Specifications subject to change without notice.
All Quasonix receiver products are under U.S. Department of Commerce jurisdiction categorized as 5A991; not covered by ITAR

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1 Introduction

1.1 Description

This document describes the installation and operation of the Quasonix TMoIP Processor.

While the hardware described in this manual refers to the 12 channel, 1U, Rack-Mount TMoIP system (part number QSX-TMOIP-12CH), this manual also applies to the QSX-TMOIP-6CH part number, as it uses the same hardware and software.

In addition, the RDMS™ receiver with IP2 option, while built with different hardware, also uses the same Quasonix TMoIP Processor (QTP) core, so the Browser Interface described in this manual also applies to the RDMS™ with IP2.

The Quasonix TMoIP Processor (QTP) core provides IRIG 218-20 compliant telemetry transport in both a 12-channel, 1U form factor (QSX-TMOIP-12CH) and a 3-channel integrated solution embedded in a 1U or 3U RDMS™ receiver (RDMS with the IP2 option). Both form factors provide accurate, reliable transport of all received telemetry data streams from receivers to the range network, while offering a multitude of features. The 3-channel solution differs in the number of channels and that it is PCM IN only (packetizes telemetry data).

The QSX-TMOIP-12CH, QSX-TMOIP-6CH, and RDMS™ with IP2 option are manufactured by:

Quasonix, Inc.
6025 Schumacher Park Drive
West Chester, OH 45069
CAGE code: 3CJA9

1.2 Nomenclature

The Quasonix TMoIP Processor is available in three configurations:

- 1U standalone, 12 channels – Part number QSX-TMOIP-12CH
- 1U standalone, 6 channels (software upgradable to 12) – Part number QSX-TMOIP-6CH
- RDMS™ 3 channel, integrated – Add the IP2 option to the RDMS™ part number

Specifications are subject to change. Contact Quasonix for questions regarding your specific device.

1.3 Package Contents

The contents of the QSX-TMOIP-12CH/6CH box include the following:

- 1U Rack-Mount TMoIP Processor unit (QSX-TMOIP-12CH/6CH)
- Power cord
- 2 Ethernet cables (25 ft)
- Four (4) rubber feet with adhesive for lab bench use

This Installation and Operation manual is included with the Browser Interface software (Help option).

2 Specifications

Characteristic	Specification
PCM Section	
Minimum PCM Rate	100 kbps per channel
Maximum PCM Rate	50 Mbps per channel (max aggregate rate of all channels limited depending on specific user settings)
Signaling	TTL via 75 ohm BNC, RS-422 via MDM-25
PCM Code	NRZ-L
Auto Rate Detection	Yes
Channels	3 (Integrated into RDMS™), 6 or 12 (1U Standalone)
Bidirectional	Yes, per channel. (RDMS™ Integrated is PCM IN only)
Clock Edge Detection	Auto, Rising, Falling
Network Section	
Ports	2 (one for Control traffic, one for TMoIP/Data traffic)
Speed	1000BASE-T (1 Gbps per port)
Packet Format	IRIG 218-20 (218-10 also supported for PCM IN/packet out mode only)
Frame Alignment	DQE
Time	Manual, NTP, PTP
Environmental Section	
Operating Temperature	0°C to +50°C
Non-operating Temperature	-20°C to +70°C
Operating Humidity	0 to 95% (non-condensing)
Altitude	Up to 30,000 ft.
Physical Section	
Size	1U rack-mount chassis: 18.95” wide, 1.75” tall, 13.83” rack depth, 15.02” overall length
Weight	7.4 lbs.
Power	90-264 V-RMS, 47-63 Hz

3 Installation Instructions

3.1 Mechanical

3.1.1 1U TMoIP Processor

The 1U QSX-TMOIP-12CH enclosure fits in a standard 19” rack, occupying 1U of rack space. Mechanical layouts are provided in Figure 1 and Figure 2.

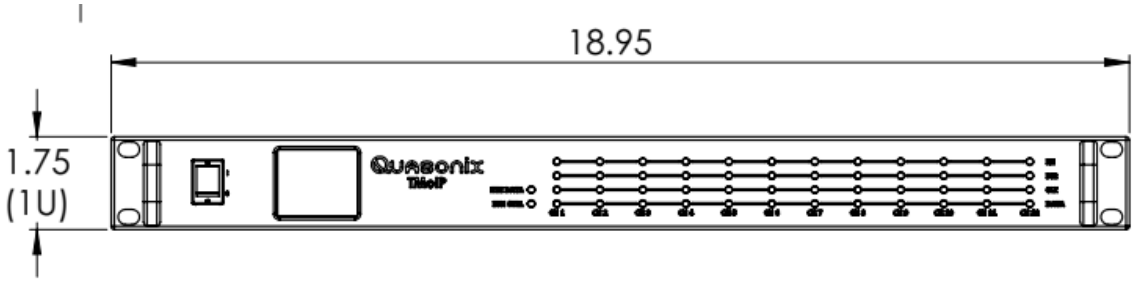

Figure 1: Mechanical Drawing – 1U Front View

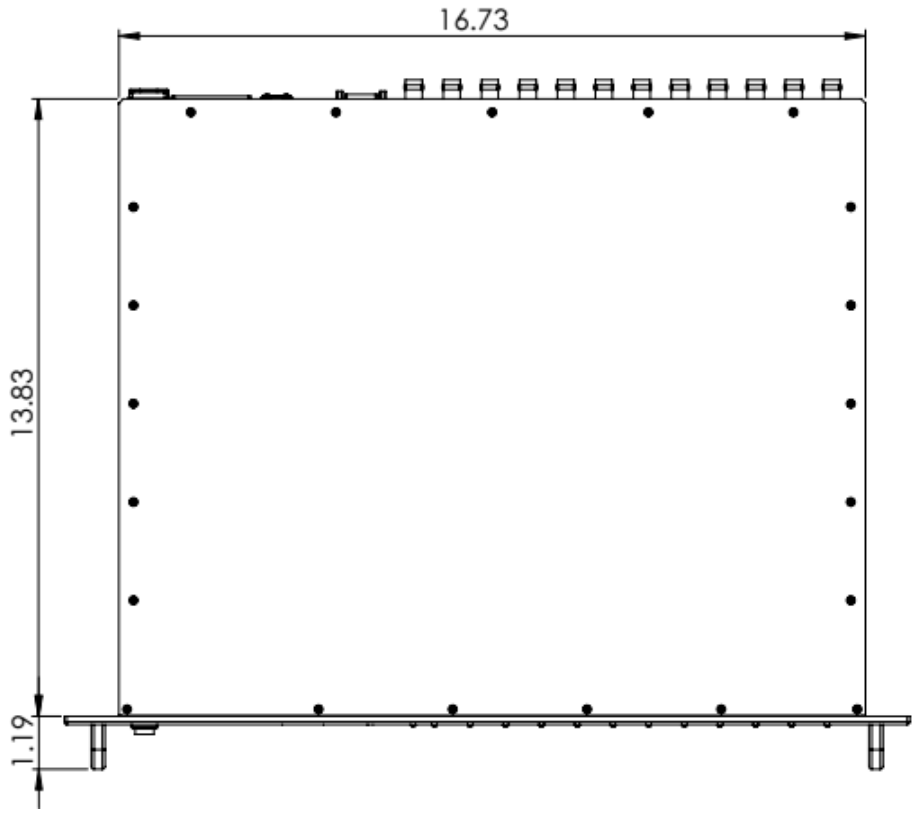

Figure 2: Mechanical Drawing – Top View

3.2 Thermal

The storage temperature of the unit is rated for -20°C to +70°C, while the operating temperature is rated for 0°C to +50°C. It is recommended that the unit be kept in a temperature-controlled environment to minimize the risk of operating (or storing) outside the ranges specified. In particular, the liquid crystal display on the front panel is extremely sensitive to low temperatures.

The unit features cooling vents on both sides of its aluminum chassis. These vents must be kept entirely unobstructed to allow for maximum airflow through the system. Whenever feasible, it is helpful to leave an open rack space above and below the unit for additional heat dissipation.

3.3 Electrical

The QSX-TMOIP-12CH is available in 6- or 12-channel configurations, with all pertinent electrical connections found on the rear panel.

3.3.1 Rear Panel Connections

Rear panel connectors are the same for 6- and 12-channel configurations, however, in 6-channel configuration all connectors are not active. In the 6-channel configuration, only channels 1-6 are active via BNC or MDM-25 connections.

Figure 3: Rear Panel

Table 1: 1U Rear Panel Connectors

Name	Description
CLK (1-12)	TTL 75 Ohm Clock signals for channels 1-12 Input or Output depending on software configuration
DATA (1-12)	TTL 75 Ohm PCM Data signals for channels 1-12 Input or Output depending on software configuration
CH 1-6	MDM-25 RS-422 clock/data signals for channels 1-6 Input or Output depending on software configuration
CH 7-12	MDM-25 RS-422 clock/data signals for channels 7-12 Input or Output depending on software configuration
CTRL	10/100/1000Base-T Ethernet connection for configuration of unit AKA Control Ethernet

Name	Description
TMoIP	10/100/1000Base-T Ethernet connection for TMoIP data packets AKA Data Ethernet
'Dot'	Hole for accessing Reset to Defaults button
Power	Supplies AC power to the unit

3.3.1.1 MDM-25 D-Sub Pinout Ch 1-6

The pinout for the Ch 1-6, an MDM-25 D-sub connector, is shown in Table 2. Pin locations are illustrated in Figure 4.

Table 2: MDM-25 D-Sub Pinout (Ch 1-6)

Pin	Electrical Char.	Pin	Electrical Char.
1	CH1 CLK 422 P	14	CH1 CLK 422 N
2	CH1 DATA 422 P	15	CH1 DATA 422 N
3	CH2 CLK 422 P	16	CH2 CLK 422 N
4	CH2 DATA 422 P	17	CH2 DATA 422 N
5	CH3 CLK 422 P	18	CH3 CLK 422 N
6	CH3 DATA 422 P	19	CH3 DATA 422 N
7	CH4 CLK 422 P	20	CH4 CLK 422 N
8	CH4 DATA 422 P	21	CH4 DATA 422 N
9	CH5 CLK 422 P	22	CH5 CLK 422 N
10	CH5 DATA 422 P	23	CH5 DATA 422 N
11	CH6 CLK 422 P	24	CH6 CLK 422 N
12	CH6 DATA 422 P	25	CH6 DATA 422 N
13	GND		

3.3.1.2 MDM-25 D-Sub Pinout Ch 7-12

The pinout for the Ch 7-12, an MDM-25 D-sub connector, is shown in Table 2. Pin locations are illustrated in Figure 4.

Table 3: MDM-25 D-Sub Pinout (Ch 7-12)

Pin	Electrical Char.	Pin	Electrical Char.
1	CH7 CLK 422 P	14	CH7 CLK 422 N
2	CH7 DATA 422 P	15	CH7 DATA 422 N
3	CH8 CLK 422 P	16	CH8 CLK 422 N
4	CH8 DATA 422 P	17	CH8 DATA 422 N
5	CH9 CLK 422 P	18	CH9 CLK 422 N
6	CH9 DATA 422 P	19	CH9 DATA 422 N
7	CH10 CLK 422 P	20	CH10 CLK 422 N

Pin	Electrical Char.	Pin	Electrical Char.
8	CH10 DATA 422 P	21	CH10 DATA 422 N
9	CH11 CLK 422 P	22	CH11 CLK 422 N
10	CH11 DATA 422 P	23	CH11 DATA 422 N
11	CH12 CLK 422 P	24	CH12 CLK 422 N
12	CH12 DATA 422 P	25	CH12 DATA 422 N
13	GND		

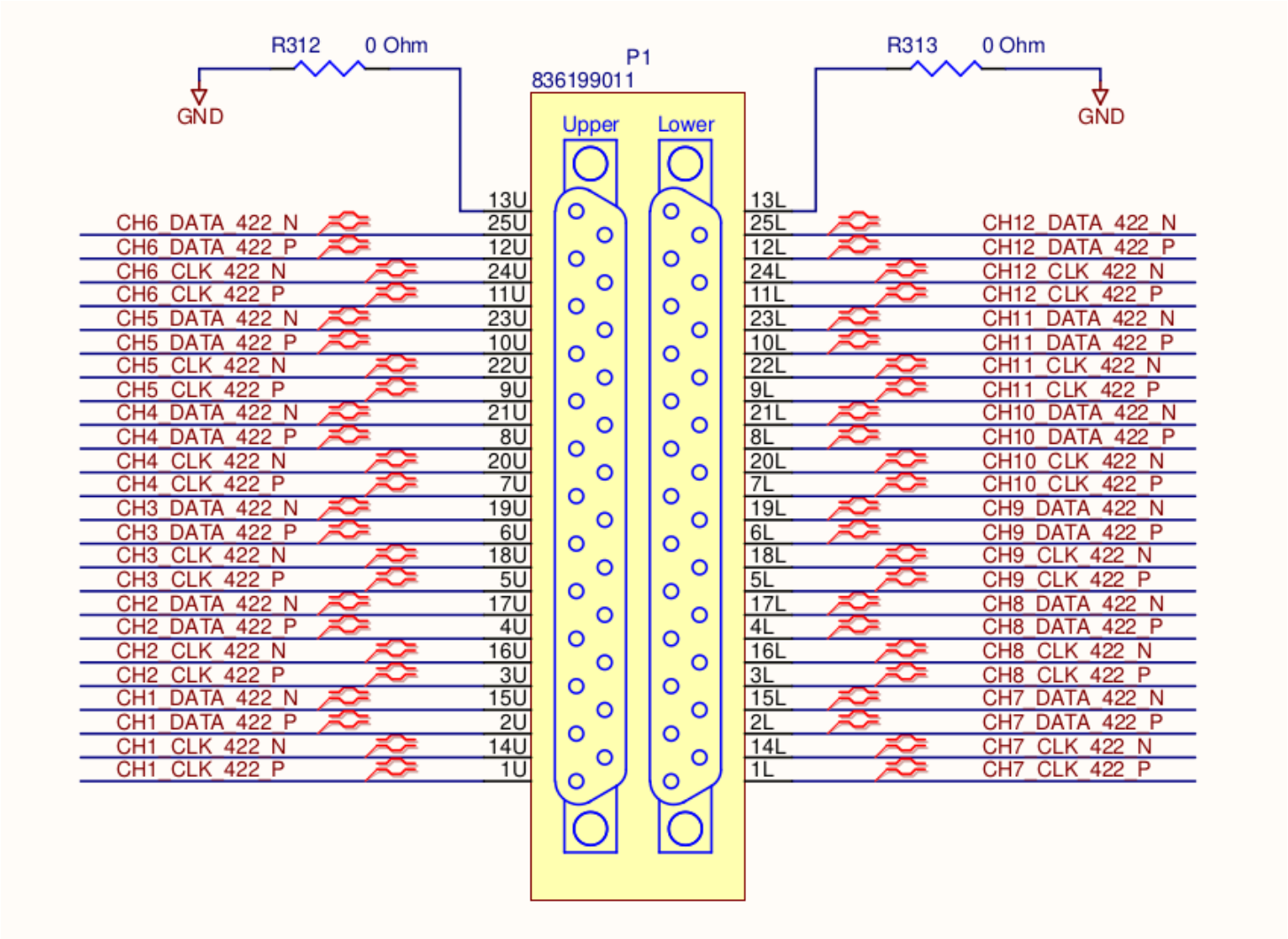

Figure 4: MDM-25 D-Sub Pin Locations for Ch 1-6 and Ch 7-12

3.3.1.3 RJ-45 Ports

The Ethernet connectivity to the QSX-TMOIP-12CH unit is established through the use of two RJ-45 ports on the back panel, labeled CTRL and TMoIP. Both ports accept 10/100/1000 BASE-T links. The CTRL Ethernet port is used exclusively for configuring, monitoring, and updating the QTP, as well as for network time sync via NTP and PTP. The TMoIP port is used exclusively for incoming and outgoing TMoIP data packets.

Figure 5: Back Panel RJ-45 CTRL and TMoIP Ports, LEDs

Figure 6: CTRL and TMoIP Ports, Example Green and Orange LEDs

The LEDs on the RJ-45 connectors convey the following information:

- Left LED
  - Off – There is no active network connection.
  - Green – There is an active 10/100/1000 BASE-T Ethernet connection.
  - Flashing – There is activity on the network connection.
- Right LED
  - Orange – There is a 1000 BASE-T Ethernet connection.
  - Off – If the Left LED is green, then this connection is a 10/100 BASE-T link. If the Left LED is Off, there is no Ethernet connection.

3.3.1.4 Network Segmentation

The Quasonix TMoIP Processor operates two distinct Ethernet interfaces, one for Control traffic (CTRL), and one for Data traffic (TMoIP). This design decision was made to reduce the potential for traffic disruption to the TMoIP data streams from ancillary network traffic and to isolate TMoIP data streams from potential security concerns. For these reasons, Quasonix recommends that two distinct, non-overlapping networks and LANs be allocated to the QTP, one for Control traffic and one for TMoIP/Data traffic. For example:

- **Control Network:** 10.1.1.123/24 – IP address of 10.1.1.123 with subnet mask of 255.255.255.0, giving a network of 10.1.1.X. Any devices wanting to access the QTP for configuration and monitoring would also be on this network, or could access this network through a router.
- **TMoIP/Data Network:** 10.1.2.1/24 – IP address of 10.1.2.1 with subnet mask of 255.255.255.0, giving a network of 10.1.2.X. Any devices receiving TMoIP traffic from the QTP, or sending TMoIP traffic to it, would also be on this network, or could access this network through a router.

Note: While not recommended by Quasonix, in the case where two separate LANs cannot be deployed to support Control and TMoIP independently, it is possible to configure Control and Network on separate interfaces as described above, but run them over a single LAN.

3.3.1.5 Reset to Defaults Button

Immediately to the right of the RJ-45 ports is a printed 'dot' with a small hole above it. This hole provides access to the reset to defaults button.

Figure 7: Back Panel Reset Button Access

To set the unit back to factory defaults, including the IP addresses, insert a small paperclip straight into this hole until it makes contact with a button. Depress the button and hold it for 5 seconds. When this 5 second threshold is reached, watch for a dynamic pattern to be displayed on the front panel LEDs. After this pattern displays ,the paperclip can be removed. The unit stops passing TMoIP data, resets all settings to factory defaults, and reboots.

After the system fully boots, all settings are set back to factory defaults. The control IP address is set back to 10.1.1.123, and all channels are disabled.

3.3.2 Electrical Signals

Figure 8 shows the relative timing of clock and data signals when Falling Edge is selected for RX or TX Clock Edge. Note, only NRZ-L signaling is supported at this time.

Baseband Signal Timing - 0 degree clock

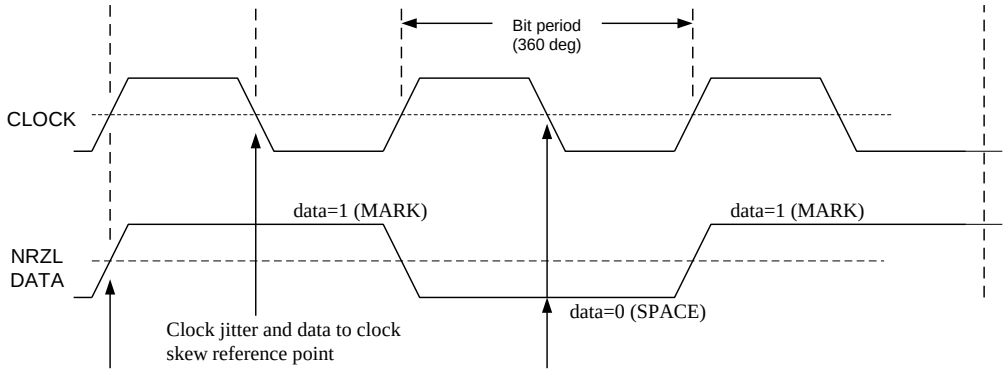

Figure 8: NRZ-L Signal Timing

The BNC Clock and Data connectors are 75 Ohm BNC and utilize TTL signaling.

The MDM-25 connectors use RS-422 signaling.

3.4 Browser Interface

The Quasonix TMoIP Processor contains a built-in web server. The system's browser-based graphical user interface (GUI) enables configuration and monitoring of the device on the user's IP network. While the Browser Interface works with most modern browsers, the latest version of Chrome is recommended (at least Version 110.0.5481.77 (Official Build) (64-bit)). The Browser Interface (BI) provides easy-to-read, real-time status information to the user, thus eliminating the need for direct access to the front panel.

Browser Interface is laid out intuitively with all primary control and monitoring functionality for the entire system in one window.

To access the Browser Interface:

1. Plug a network cable into the QSX-TMOIP-12CH Control RJ-45 connector or the RDMS™ IP2 Control / J35 connector.
2. Apply power to the system, and flip the power switch up, to '|'.
3. Open a browser on the PC. Google Chrome is the only officially supported browser at this time.

   The unit has a control IP address assigned to it when the user sets it up. The default control IP address is 10.1.1.123 with a netmask of 255.255.255.0. This address can be changed by the operator through the Browser Interface. The operator needs to know this IP address. The LCD screen on the QSX-TMOIP-12CH front panel displays the IP address, and it is available through the RDMS™ IP2 user interface (System Settings -> Ethernet).
4. Type the Control IP address into the browser as:

   http://XXX.XXX.XXX.XXX

   where the Xs represent the Control IP address of the QTP.

The main Browser Interface web page displays in the browser window, and the user has control of the rack.

For issues that occur during installation, call Quasonix Technical Support at 513-942-1287.

4 Operating Instructions

The QTP can be operated solely through the web-based browser interface. The Browser Interface is capable of configuring, monitoring, and updating the device while on the Control network.

Note: Images of the hardware interfaces refer to the QSX-TMOIP-12CH hardware. For help with the interfaces of the RDMS with IP2 option, please refer to the Quasonix Installation and Operation Manual, 3rd Generation Rack-Mount RDMS™ Telemetry Receiver.

4.1 Front-Panel Display

The QSX-TMOIP-12CH front panel display can be used solely for monitoring the status of the unit. All configuration is performed through the Browser Interface. The Front Panel consists of an LCD screen and a series of status LEDs, as shown in Figure 9.

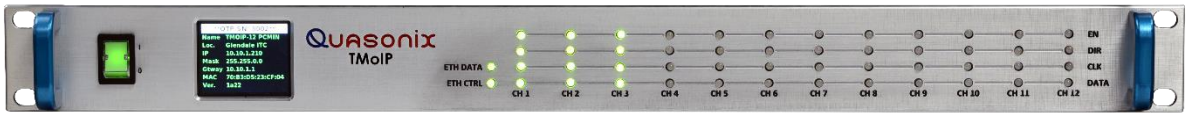

Figure 9: TMoIP Front Panel Display

4.1.1 Front Panel LCD

The front panel LCD displays a variety of system settings to help the user in identifying and communicating with the system. Figure 10 shows the display.

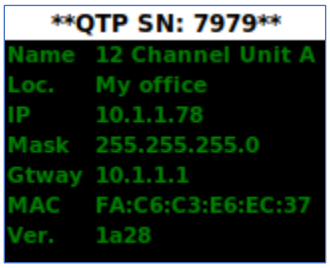

Figure 10: Front Panel LCD Display

The front panel LCD shows the following:

- Name – System name for the device
- Loc. – Location for the device
- IP – Control IP address
- Mask – Control subnet mask
- Gtway – Control network gateway

- MAC – Control network MAC address
- Ver. – System version number

All parameters except the MAC and Version can be modified through the Browser Interface.

4.1.2 Front Panel LEDs

The front panel contains two distinct sets of LEDs, the Ethernet status LEDs and the Channel status LEDs, as shown in Figure 11.

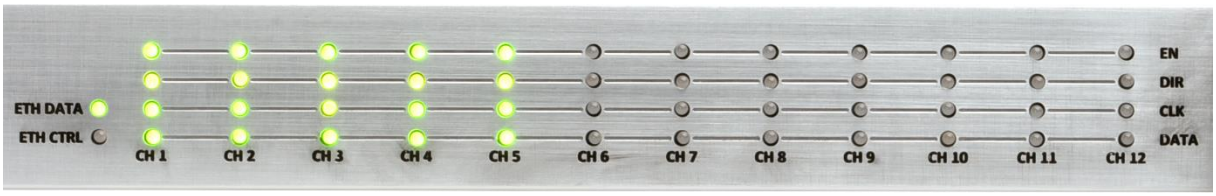

Figure 11: Front Panel LEDs

4.1.2.1 Ethernet Status LEDs

The two LEDs labeled ETH DATA and ETH CTRL, shown in Figure 12, indicate the status of the two respective Ethernet network connections on the back panel. These LEDs both share the following behavior:

- Off – There is no active network connection.
- Green – There is an active 10/100/1000 BASE-T network connection.
- Flashing – There is activity on the network connection

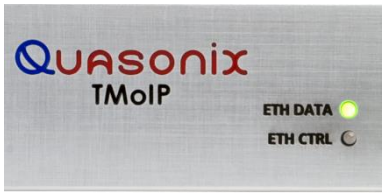

Figure 12: Front Panel Ethernet Status LEDs

4.1.2.2 Channel Status LEDs

Each channel in the system has an LED status display on the front panel, labeled CH1-CH12 from left to right, as shown in Figure 13. Each column represents a single channel and consists of four status items labeled from top to bottom as: EN, DIR, CLK, and DATA.

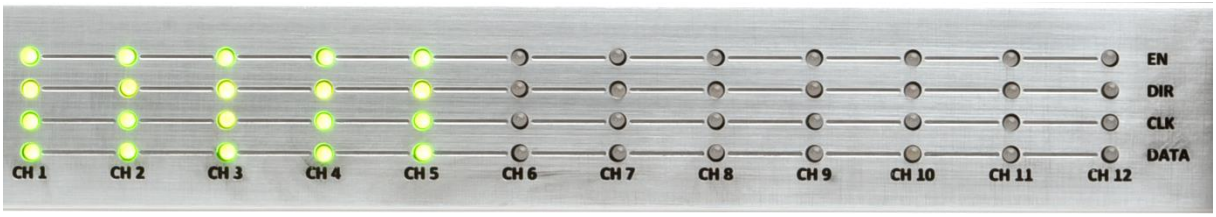

Figure 13: Front Panel Channel Status LEDs

These LEDs are updated at one second intervals and convey the following information, depending on the mode that each channel is configured for:

- EN
  - Off – The channel is disabled.
  - Green – The channel is enabled.
  - Red – The channel is enabled, but it is in an error condition.
- DIR
  - Off – The channel is disabled.
  - Green - The channel is configured for PCM input via BNC or MDM-25 connections and Ethernet packet output.
  - Orange – The channel is configured for Ethernet packet input and PCM output via BNC or MDM-25 connections.
- CLK
  - When this channel is in PCM Output mode, this LED is unused.
  - Green – The channel has a PCM Input clock of at least 100 kHz.
  - Red – The channel has a PCM Input clock of less than 100 kHz or no clock at all.
- DATA
  - When this channel is in PCM Output mode, this LED is unused.
  - Green – The channel has seen PCM Input data transitions in the last second.
  - Red – The channel has not seen PCM Input data transitions in the last second.

4.2 Browser Interface

Note: This section applies to all Quasonix TMoIP Processor (QTP) devices: QSX-TMOIP-12CH, QSX-TMOIP-6CH, and RDMS™ with IP2 option. Where the number of channels is mentioned, keep in mind that your specific view of the interface will change based on the number of channels your device supports (12, 6, or 3). Also, it is important to remember that the RDMS™ with IP2 option is a PCM *IN* only device. In any case where PCM *OUT* mode is mentioned or required, that section does not apply to the RDMS™ with IP2 option.

The Browser Interface provides the operator with full configuration, control, and monitoring capabilities for a single QTP device. For configuration management purposes, only one browser interface can configure a QTP at a given time. However, multiple browser interfaces can monitor an individual QTP's status at once.

Refer to section 0 for instructions on how to connect to the Browser Interface.

Figure 14 shows an example of the Configure System screen.

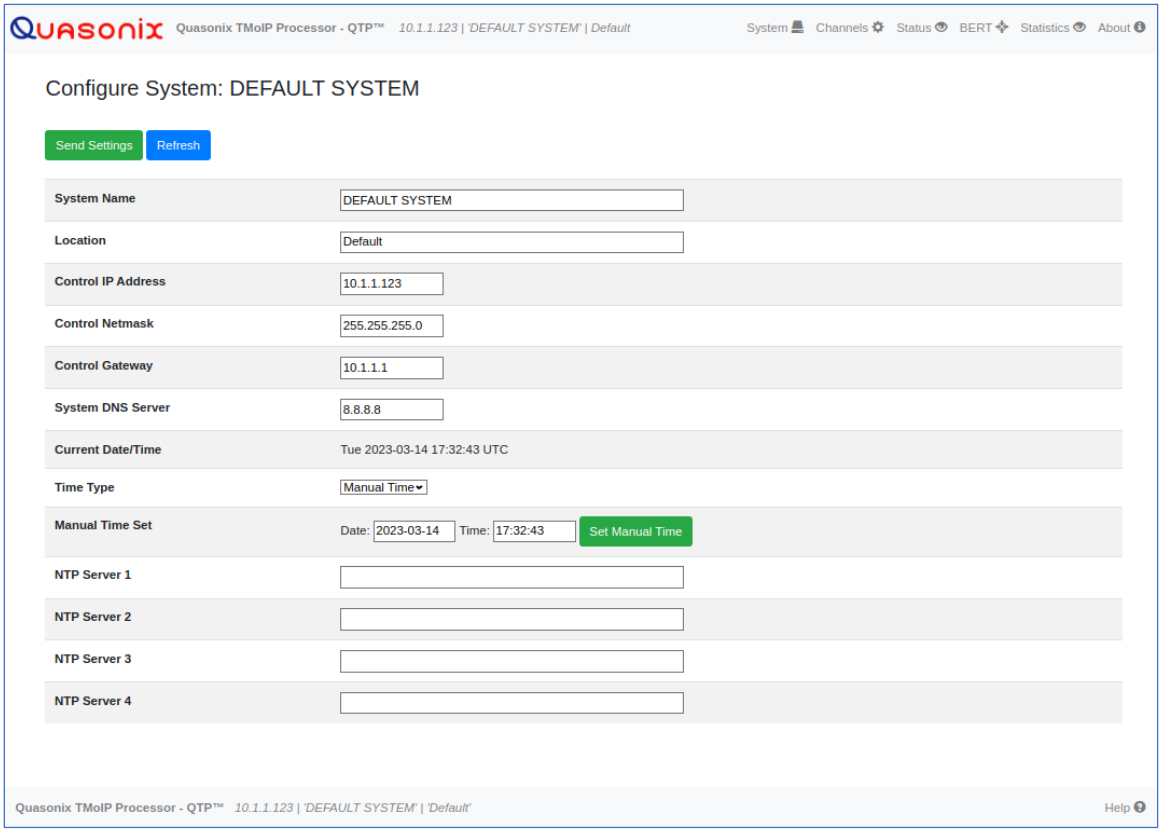

Figure 14: Browser Interface Configure System

Each page of the QTP Browser interface consists of three main sections: the frame header at the top, the main content, and the frame trailer at the bottom. The header and trailer are the same from page to page, but the main content will change. The header and trailer are described here, with the main content for each page described in the sections that follow.

4.2.1 Frame Header

The Frame Header, shown in Figure 15, provides identifying information about the system, as well as links to each page of the interface.

Figure 15: Browser Interface Frame Header

The left-hand portion of the Frame Header consists of:

- Quasonix Logo (with link to System page)
- Name of the system: Quasonix TMoIP Processor – QTP
- Control IP Address
- System Name
- System Location

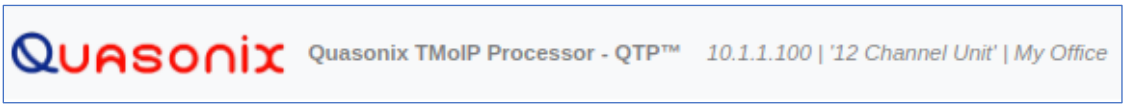

Figure 16: Browser Interface Frame Header, Left Side

The right-hand portion of the Frame Header, shown in Figure 17, consists of links to each page of the interface:

- System – Configuration of identifying information, control network, and time settings
- Channels – Configuration of all settings for each channel
- Status – Monitoring of various status information for the system and each channel
- BERT – BERT generating and analysis capabilities
- Statistics – Various system statistics
- About – System information and firmware update

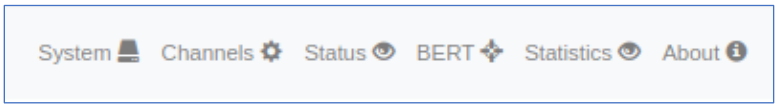

Figure 17: Browser Interface Frame Header, Right Side

4.2.2 Frame Trailer

The Frame Trailer, shown in Figure 18, provides identifying information about the system.

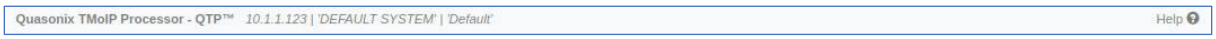

Figure 18: Browser Interface Frame Trailer

The Frame Trailer consists of:

- Name of the system: Quasonix TMoIP Process – QTP
- Control IP Address
- System Name
- System Location
- Link to Help screen

4.2.3 Help

The Help screen provides a link for downloading this QTP Installation and Operation Manual, as well as a link to the Quasonix web site. In addition, it provides the Quasonix mailing address and an email address for contacting Quasonix Support.

4.2.4 Configure System

The Configure System screen is used for configuring the high-level properties of the QTP.

There are two buttons above the system properties, as shown in Figure 19. The green Send Settings button is used to send (apply) settings to the system. After clicking on this button, any changed settings are sent to the device for validation and application.

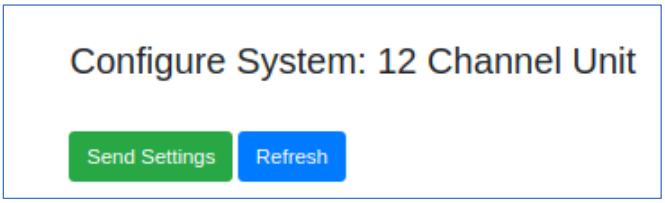

Figure 19: Browser Interface Configure System, Send Settings and Refresh Buttons

While the Send Settings process is executing, a message window displays, as shown in Figure 20.

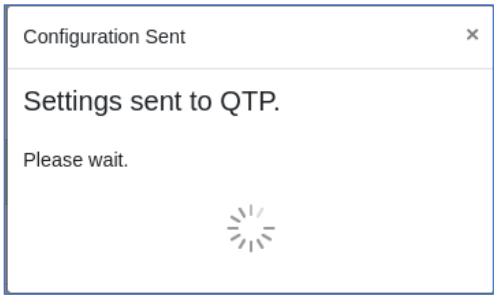

Figure 20: Browser Interface Configure System

If settings are valid and accepted, a message displays, as shown in Figure 21.

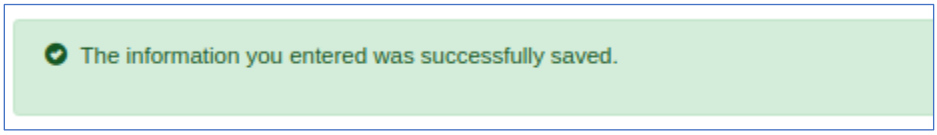

Figure 21: Example of Successful Configuration Message

If settings are not valid or another error occurs, a message will be displayed as in Figure 22.

Figure 22: Example of Error Message

In this case, correct the errors as indicated in the message, then click on the Send Settings button again.

Click on the blue Refresh button at any time to pull the current settings from the unit. Note that this resets any settings that have been changed on the page, but were not yet successfully submitted to the device.

4.2.4.1 System Name

The System Name is a text identifier given to the unit for identification purposes. It has a maximum of 100 characters. It is displayed in the browser window title, the frame header and trailer, and on the front panel LCD of the QSX-TMOIP-12CH.

4.2.4.2 Location

Location is a text identifier given to the unit for identification purposes. It has a maximum of 100 characters. It is displayed in the browser window title, the frame header and trailer, on the front panel LCD, and on the front panel LCD of the QSX-TMOIP-12CH.

4.2.4.3 Control IP Address

The Control IP address is applied to the Control Ethernet interface, which is available to the user via the top RJ-45 connector labeled CTRL on the back panel. This interface is available for configuration and monitoring of the device, firmware updates, and network time sync via NTP or PTP.

When choosing an IP address for the Control interface, it is critical that the address is unique on its network, otherwise, the unit will not operate properly and may be inaccessible. It is strongly recommended that the user contact their network administrator to receive a reserved address for this purpose.

The control and TMoIP (data) interfaces of the QTP are independent Ethernet interfaces. As such, they cannot be configured to be on the same subnet. For example, if the Control IP is configured as 10.1.1.123 with a netmask of 255.255.255.0, the network encompasses any address that matches 10.1.1.X, where X is 1-254. In this case, the TMoIP interface could not have any address in the 10.1.1.X subnet.

If the Control IP Address is forgotten or incorrectly entered, there are two methods for regaining contact with the unit. First, by resetting the system to defaults (refer to section 3.3.1.5) and connecting to the default Control IP address. Second, by reading the Control IP address from the Front Panel LCD and using that address to connect. Note, in the case of the RDMS™ with IP2 option, the Control IP address is also readable from the RDMS™ user interface.

Note: DHCP is not available for the Ethernet interfaces on the QTP.

4.2.4.4 Control Netmask

The Control Netmask is used in conjunction with the Control IP Address to determine the Control Subnet to which the Control interface belongs. It is essential that any external devices that will be used to configure or monitor this unit are part of the same subnet (or can access it through a router). For example, if the Control IP and Netmask are 10.1.1.123 and 255.255.255.0, then any external devices that will communicate with the QTP device should also be in the 10.1.1.X network.

4.2.4.5 Control Gateway

The Control Gateway should specify the router that allows the QTP to access networks outside of the Control Subnet defined by the Control IP and Netmask. This gateway must be an address within the Control Subnet as determined by the Control IP and Netmask.

The Control Gateway may be needed if any external devices accessing the QTP Browser Interface are not in the Control Subnet. Additionally, the Control Gateway may be needed if the NTP Server is not in the Control Subnet.

4.2.4.6 System DNS Server

The DNS Server provides an avenue for converting hosts/domain names into IP addresses. In the QTP, DNS is only utilized for resolving a NTP Server hostname, if it is used. If the NTP Server is provided as an IP address, the DNS Server setting is not needed.

If the System DNS Server is not needed, leave this field blank.

4.2.4.7 Current Date/Time

The Current Date/Time parameter displays the current system date and time, in UTC. This time is used in 218-20 TMoIP packets for timestamping the first bit in the payload.

4.2.4.8 Time Type

The QTP supports Manual Time, NTP (Network Time Protocol), and PTP (Precision Time Protocol, 1588, Version 2).

4.2.4.8.1 Manual Time

When the Time Type is set to Manual Time via the drop down menu, the system will not use any time server for setting the time. Instead, the user must provide a Date and Time in the corresponding boxes, as shown in Figure 23. These are initialized with the current system time, when the page is loaded or refreshed.

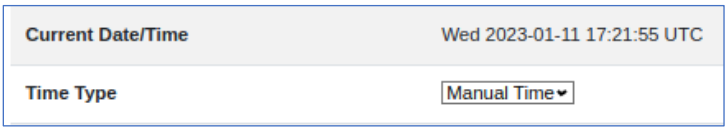

Figure 23: Configure System, Time Type Setting

If Manual Time is to be used, first, set the Time Type to Manual Time, then click on the Send Settings button. Wait for confirmation that the setting was applied.

Next, enter the UTC Date and Time adjacent to the Manual Time Set field, as described in section 4.2.4.8.1.1.

4.2.4.8.1.1 Manual Time Set

The Manual Time Set fields, Date and Time, are utilized only when Time Type is set to Manual Time.

The formats for the Date and Time fields are shown in Figure 24.

- Date
  - YYYY-MM-DD
    - YYYY – Year
    - MM – Month
    - DD – Day
- Time:
  - HH:MM:SS
    - HH – Hour (24-hour time)
    - MM – Minute
    - SS – Second

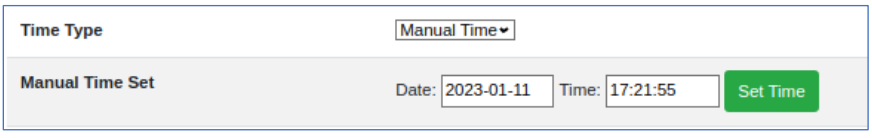

Figure 24: Example of Date/Time Parameters

After typing in the Date and Time, click on the Set Time button to manually set the time. The Configure System page refreshes approximately one (1) second after clicking on the button. The new time should display in the Current Date/Time field.

4.2.4.8.2 NTP (Network Time Protocol)

The QTP can automatically set its time based on communication with an NTP time server on the Control network. If automatic time setting is desired, choose NTP from the drop down menu labeled Time Type, fill in at least NTP Server 1, as described in section 4.2.4.9, then click on Send Settings.

When NTP setting is applied, the system immediately attempts to synchronize its time with the NTP server(s). This can take anywhere from 5 to 45 seconds, depending on the network and server. Click on the blue Refresh button to refresh the current Date/Time to check for sync.

If the NTP Servers are provided as hostnames as opposed to IP addresses, the System DNS, and likely the Control Gateway, must be provided.

If the NTP Server is not on the Control Subnet, the Control Gateway must be provided.

4.2.4.8.3 PTP (Precision Time Protocol)

The QTP can automatically set its time based on communication with a PTP time server on the Control network. PTP utilizes multicast and can provide much greater precision in time syncing than NTP. To utilize PTP, select PTP from the drop down menu labeled Time Type, then click on Send Settings. No time server configuration is necessary in order to use PTP. However, a PTP grandmaster must be accessible on the Control network. Multicast traffic from the PTP grandmaster must traverse any intermediate networks in order to reach the QTP.

Note: When PTP is used, the TSR (Timestamp Source Reference) in the 218-20 TMoIP packets will be set to 1, indicating International Atomic Time, which is currently 37 seconds ahead of UTC time.

4.2.4.9 NTP Server 1-4

The four NTP Server fields are utilized only if the Time Type is set to NTP. These entries can be provided either as a hostname or as an IP address. For example:

- Hostname: xxx.pool.ntp.org
- IP Address: yyy.yyy.yyy.yyy

When NTP Time Type is utilized, only NTP Server 1 is required, though more servers can be added to improve time sync reliability and accuracy.

4.2.5 Channel Configuration

The Channel Configuration screen, shown in Figure 26, provides access to every channel-specific setting. Each Channel in the QTP allows one stream of telemetry data to be packetized (PCM *IN*) or depacketized (PCM *OUT*), depending on the settings for that channel.

This screen displays the settings for all channels in columns. This facilitates comparing settings between channels and ensuring correct configuration, but it can be a bit overwhelming. To reduce the amount of information displayed at one time, the settings are broken up into four groups: Default, Network, Polarity, and Formatting. Each of these groups (aside from Default) has a Show link that shows or hides the group of settings when clicked on. Refer to Figure 25 for an example of this behavior.

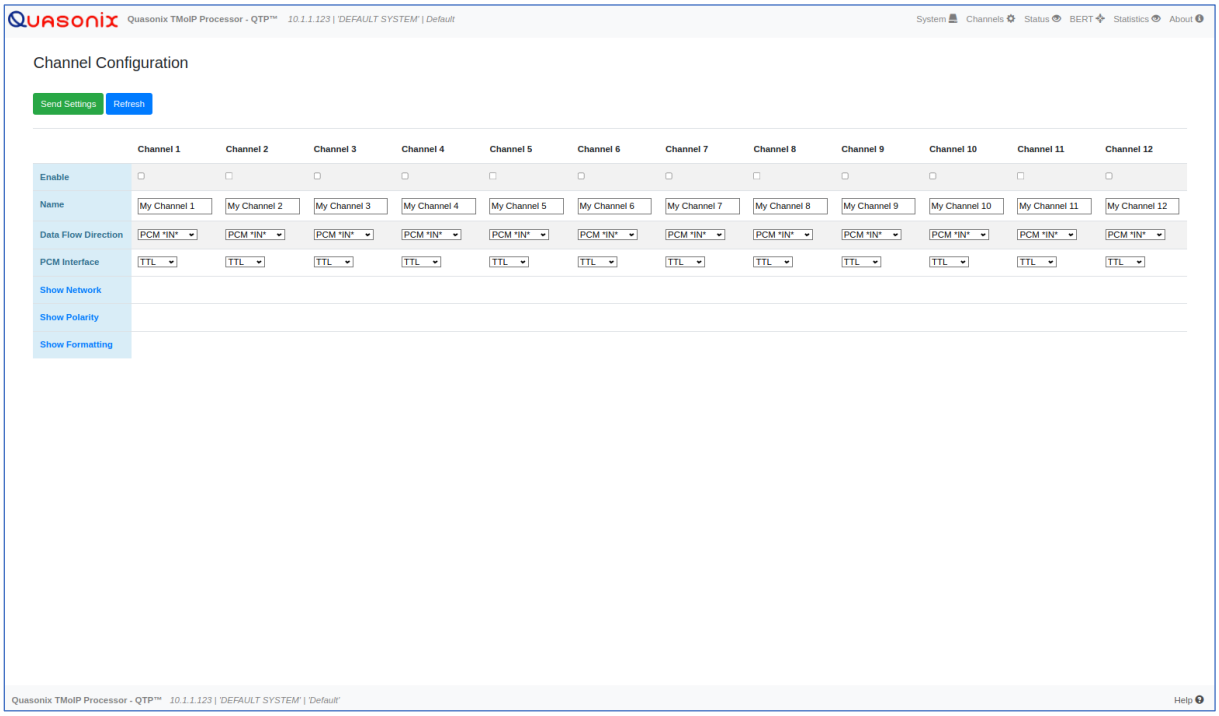

Figure 25: Channel Configuration Screen, Condensed

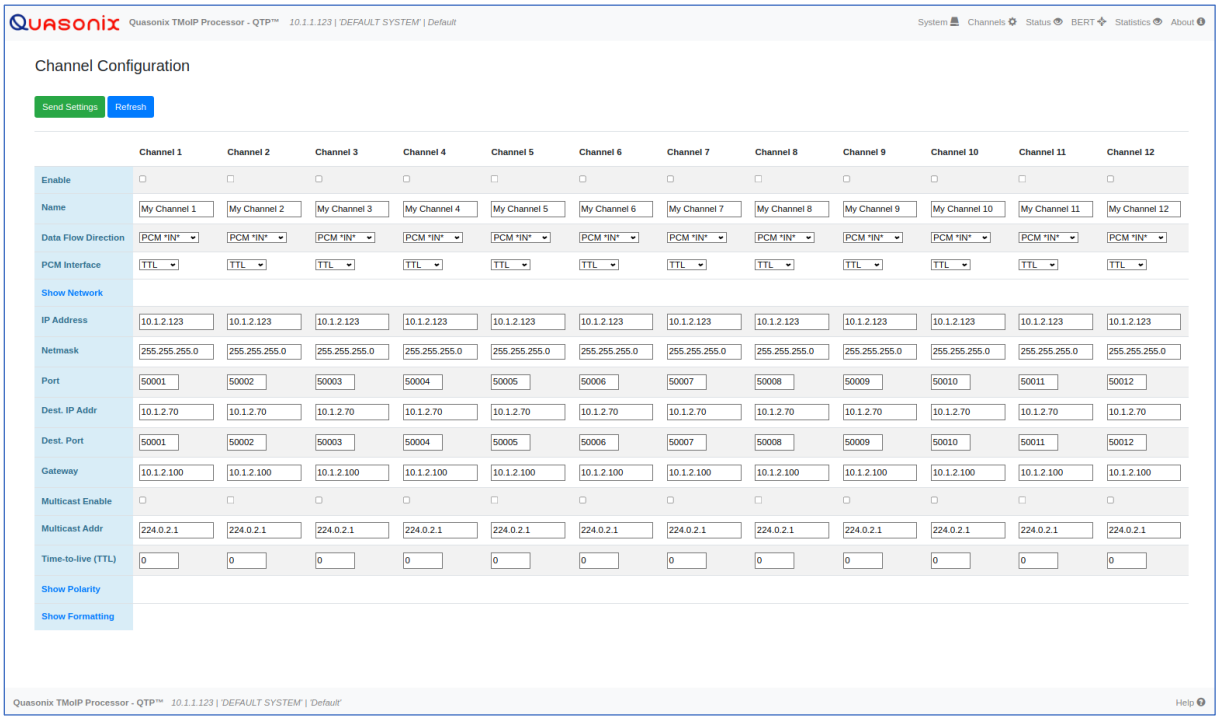

Figure 26: Channel Configuration Screen, Network Expanded

The settings available in each group are described in the following sections.

As described for the Configure System screen, the Channel Configuration screen contains a Send Settings button and a Refresh button that behave similarly to those on the Configure System screen. Here, the two buttons apply to all channels at once. After making changes to this screen, click on the Send Settings button for the settings to be applied to the individual channels.

As all channel settings are in columns, under labels specifying Channel 1-12, settings in each column only apply to the channel specified at the top of the column.

Note: If a channel setting is changed, applying it causes the channel to stop and start again, likely resulting in lost data. If changes are required, it is recommended to make them prior to starting any mission with critical data.

4.2.5.1 Default Group

The Default group is unlabeled and cannot be hidden, as shown in Figure 27. It contains high-level, critical settings, as described in the following sections.

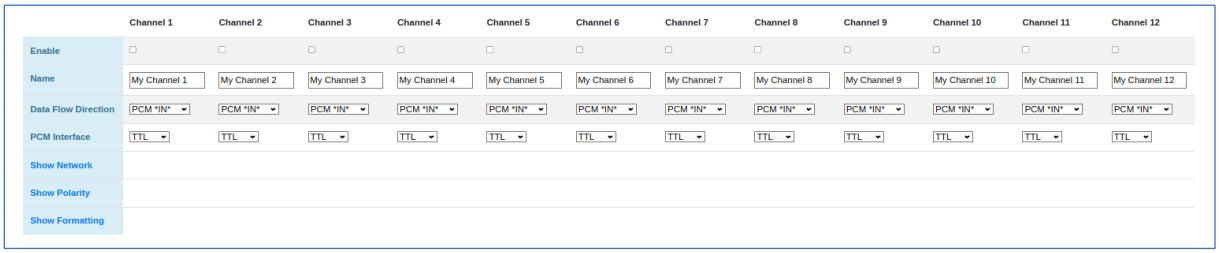

Figure 27: Channel Configuration Screen, Default View

4.2.5.1.1 Enable

This check box enables the channel when checked. When not checked, this channel is disabled.

If a channel's settings are not valid, errors are generated when enabling the channel. It is best to make changes to the channel's settings, then check the Enable box before clicking on the Send Settings button.

4.2.5.1.2 Name

The Channel Name is a text identifier given to the channel for identification purposes. It has a maximum of 100 characters.

4.2.5.1.3 Data Flow Direction

Each channel of the QTP can be independently configured to take PCM as input or transmit it as an output. There are two settings available via the drop down menu:

- PCM *IN*
    - In this mode, the QTP receives PCM clock and data via the BNC or MDM-25 connectors on the back panel (or internally on the RDMS with IP2 option), packetizes the data, and sends it out the TMoIP RJ-45 port.
- PCM *OUT*

- In this mode, the QTP receives IRIG 218-20 packetized telemetry data via the TMoIP RJ-45 port, depacketizes it, and sends it out as PCM via the BNC or MDM-25 connectors on the back panel.

Note: This setting is not available on the RDMS with IP2 option because it is set as a PCM *IN* only device. It always takes PCM internally from the RDMS, packetizes it, and sends it out the TMoIP RJ-45 port.

4.2.5.1.4 PCM Interface

The PCM Interface drop down menu allows the user to choose the electrical interface used for incoming/outgoing PCM telemetry on the back panel. This can be set to:

- TTL – PCM telemetry utilizes TTL signaling on the BNC clock and data connector assigned to the channel.
- RS-422 – PCM telemetry utilizes RS-422 signaling on the MDM-25 connector and pins assigned to the channel. Refer to Figure 4 for the MDM-25 pinout.

Note: This setting is not available on the RDMS with IP2 option because it only receives PCM internally via a inaccessible connection.

4.2.5.2 Network Group

The Network Group settings pertain to the network settings for each individual channel, as shown in Figure 28.

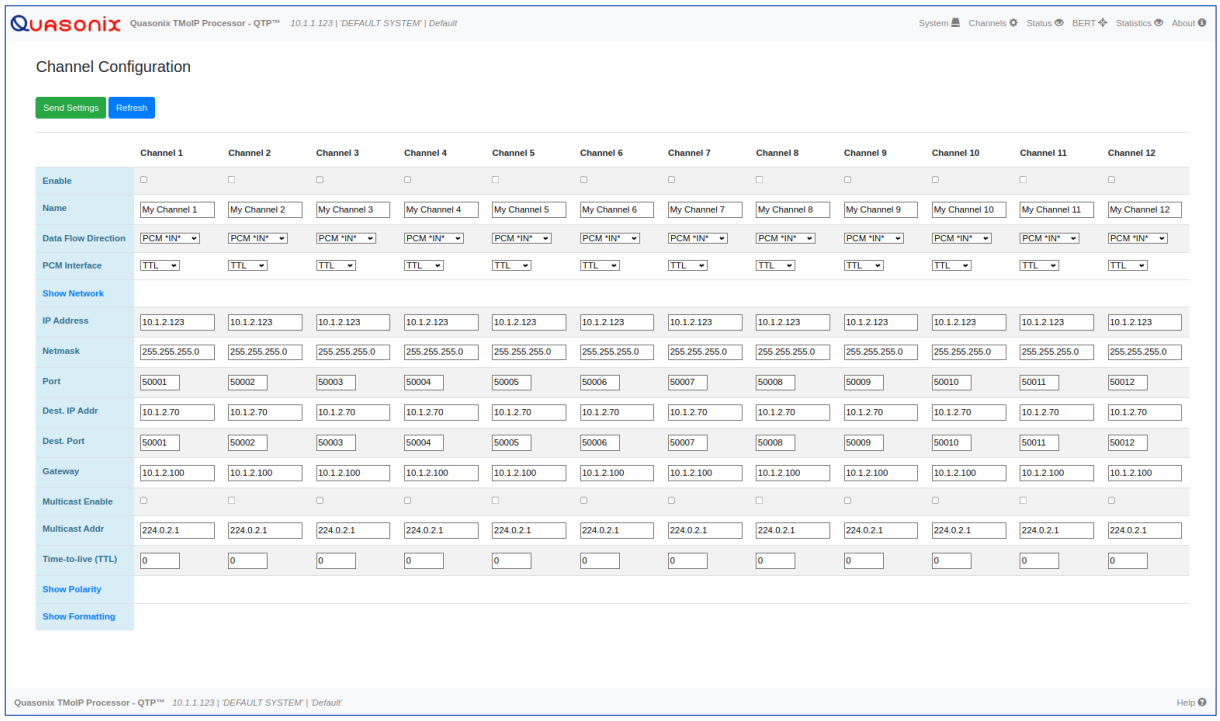

Figure 28: Channel Configuration Screen, Network Expanded

4.2.5.2.1 IP Address

The IP Address setting sets the TMoIP network interface address for each channel. This address is used as follows in the two Data Flow Direction modes:

- In PCM *IN* mode, this address serves as the sending/source address that generates TMoIP network packets to be sent to a depacketizing device. This address is put into the IP packet header source address field.
- In PCM *OUT* mode, this address serves as the listening/destination address that receives TMoIP network packets from a packetizing device. This must match the IP packet header destination address field in incoming packets.

Note: All channel IP Addresses on a single QTP device should be contained within the same subnet. For example, 10.1.2.1 through 10.1.2.12, all with Netmask 255.255.255.0.

4.2.5.2.2 Netmask

The Netmask setting determines the network subnet for each channel.

4.2.5.2.3 Port

The Port setting is used as follows in the two Data Flow Direction modes:

- In PCM *IN* mode, this port serves as the sending/source port that generates TMoIP network packets to be sent to a depacketizing device. This port is put into the UDP packet header source port field.
- In PCM *OUT* mode, this port serves as the listening/destination port that receives TMoIP network packets from a packetizing device. This port must match the UDP packet header destination port field in incoming packets.

Note: The (IP Address, Port) pair for a particular channel must be unique on a single system to avoid ambiguity in packet addressing.

4.2.5.2.4 Dest. IP Addr.

The Destination IP Address setting is only used when the Data Flow Direction for this channel is set to PCM *IN*. This address specifies the host to which the TMoIP packetized data will be sent. This address is put into the IP packet header destination address field.

4.2.5.2.5 Dest. Port

The Destination Port setting is only used when the Data Flow Direction for this channel is set to PCM *IN*. This port specifies the UDP port to which the TMoIP packetized data will be sent. This port is put into the UDP packet header destination port field.

4.2.5.2.6 Gateway

The Gateway setting is only used when the Data Flow Direction for this channel is set to PCM *IN*. Additionally, the Gateway is only needed when the Destination IP Address is not part of the Channel Subnet defined by the IP Address and Netmask for this channel, and the generated packets must be sent to a router on their way to the Destination IP Address.

The Gateway address must be part of the Channel subnet defined by the Channel IP Address and Netmask.

When the Gateway address is provided, and required as defined above, it is used as the destination for a host route for the channel as follows:

- IP packets are generated with telemetry payload and destination IP/port set to Dest. IP Addr. and Dest. Port. The packets are then sent to the Gateway address to be routed to their destination.

4.2.5.2.7 Multicast Enable

The QTP is capable of both sending and receiving multicast-addressed 218-20 TMoIP payload packets, depending on the Data Flow Direction that each channel is configured for. Multicast enables the same telemetry data to be packetized and sent to more than one destination without broadcasting it to every device on a network.

Click on the 'Multicast Enable' check box in order to enable (check) multicast delivery of TMoIP network packets. The behavior is as follows:

- In PCM *IN* mode with Multicast Enable checked, incoming telemetry data from the PCM interface is packetized and sent to the address entered in the Multicast Addr field. The port entered in Dest. Port is still used as the UDP destination port.
- In PCM *OUT* mode with Multicast Enable checked, this channel accepts multicast traffic sent to the Multicast Addr and Port specified for the channel. In addition, this channel sends out an IGMP Report (Join) message to indicate to all attached switches and routers that this device wants to receive multicast traffic destined for the Multicast Addr. These IGMP messages are required when working with certain multicast-enabled switches and routers (which typically use IGMP Snooping to determine to which ports to send certain multicast traffic).

4.2.5.2.8 Multicast Addr

This setting indicates the address to use as the destination address when Multicast Enable is checked. The valid range is 224.0.0.1 to 239.255.255.255.

4.2.5.2.9 Time-to-live (TTL)

This setting indicates the time-to-live (TTL) value to be inserted in TMoIP UDP network packets when Multicast Enable is checked and the Data Flow Direction is set to PCM *IN*.

The TTL value is used to limit how far the multicast packets can traverse outside of the immediate subnet. If the destination for the multicast traffic is in the immediate subnet (not through a router), then this TTL value should be set to 0 (zero). For every router that the multicast packets must traverse on their way to their destinations, this TTL value must be incremented by 1.

4.2.5.3 Polarity Group

The Polarity Group contains settings related to PCM *IN* and *OUT* clocking edges, as well as inversion of data, as shown in Figure 29.

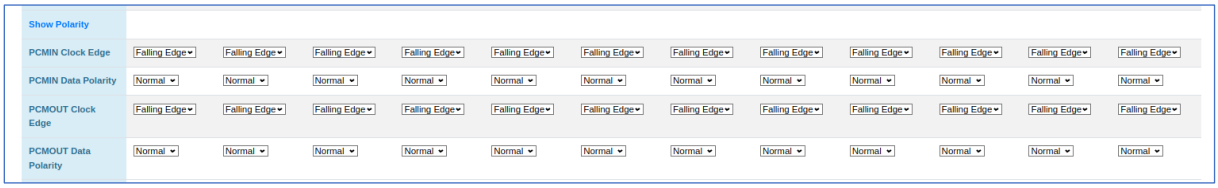

Figure 29: Channel Configuration Screen, Polarity Group

4.2.5.3.1 PCMIN Clock Edge

The PCMIN Clock Edge setting is only applicable when this channel is in PCM *IN* mode.

The PCMIN Clock Edge setting must match the incoming PCM data clocking. Three settings are available via the drop down menu:

- Auto – The QTP determines the most reliable clock edge to use based on the relationship between incoming clock and data.
- Falling Edge – The QTP clocks in data using the falling edge of the incoming clock. The data must be stable during the falling edge of the incoming clock. Refer to Figure 8 of NRZ-L clocking.

- Rising Edge – The QTP clocks in data using the rising edge of the incoming clock. The data must be stable during the rising edge of the incoming clock. Refer to Figure 8 of NRZ-L clocking, but with an inverted clock.

4.2.5.3.2 PCMIN Data Polarity

The PCMIN Data Polarity setting is only applicable when this channel is in PCM *IN* mode.

The PCMIN Data Polarity provides the ability to invert incoming PCM data, if necessary. Two settings are available via the drop down menu:

- Normal – Incoming PCM data is not inverted.
- Inverted – Incoming PCM data is inverted after being clocked in, prior to being packetized.

4.2.5.3.3 PCMOUT Clock Edge

The PCMOUT Clock Edge setting is only applicable when this channel is in PCM *OUT* mode.

The PCMOUT Clock Edge setting specifies the PCM data output clocking. Two settings are available via the drop down menu:

- Falling Edge – The QTP clocks out PCM data using the falling edge of the outgoing clock. The data output is stable during the falling edge of the outgoing clock.
- Rising Edge – The QTP clocks out PCM data using the rising edge of the outgoing clock. The data output is stable during the rising edge of the outgoing clock.

4.2.5.3.4 PCMOUT Data Polarity

The PCMOUT Data Polarity setting is only applicable when this channel is in PCM *OUT* mode.

The PCMOUT Data Polarity provides the ability to invert outgoing data, if necessary. Two settings are available via the drop down menu:

- Normal – Outgoing PCM data is not inverted.
- Inverted – Outgoing PCM data is inverted after being read from the incoming TMoIP data packet.

4.2.5.4 Formatting Group

The Formatting Group contains settings that pertain to the packetizing and depacketizing of telemetry data in IP packets, as shown in Figure 30.

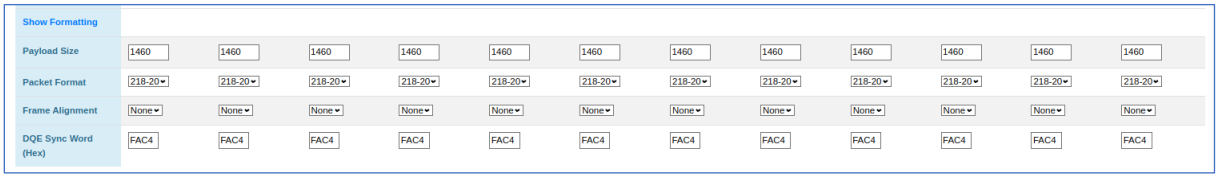

Figure 30: Channel Configuration Screen, Formatting Group

4.2.5.4.1 Payload Size

The Payload Size setting specifies the number of payload bytes contained in the TMoIP packets being received or sent. One byte equals 8 bits.

- In PCM *IN* mode, this setting determines how many incoming PCM telemetry bytes are packetized into each outgoing TMoIP network packet.
- In PCM *OUT* mode, this setting must match the number of PCM telemetry bytes that are packetized into each incoming TMoIP network packet.

In general, at high data rates, larger packet sizes should be used in order to increase the efficiency of processing and network utilization. Likewise, at low rates, smaller packet sizes should be used to reduce the amount of time it takes to fill the packet and send it.

For instance, at 50 Mbps, a 1460 byte payload takes approximately 233 us to be filled. However, at 100 kbps, that same payload takes almost 12 ms to fill. This adds significantly to the overall latency of the data transmission from source to destination.

On the other hand, at 100 kbps, a 50 byte payload requires just 250 packets per second to be sent across the network. However, at 50 Mbps, that same payload requires 125,000 packets per second. That inefficiency deteriorates system and network efficiency significantly and leads to poor performance.

Note: If DQE Frame Alignment is specified, the payload size must match the DQE frame size without header (refer to section 4.2.5.4.3 for details).

4.2.5.4.2 Packet Format

The Packet Format setting only applies when this channel is in PCM *IN* mode. It determines the TMoIP control word format to use in outgoing TMoIP network packets. Two settings are available via the drop down menu:

- 218-20 – Outgoing packets are formatted according to the IRIG 218-20 specification with control word Version identifier bits set to “0010”.
- 218-10 – Outgoing packets are formatted according to the IRIG 218-10 specification with control word Version identifier bits set to “0000”.

Note: In PCM *OUT* mode, only 218-20 TMoIP packets are processed. All other formats, including 218-10, are ignored.

4.2.5.4.3 Frame Alignment

The Frame Alignment setting indicates whether incoming and outgoing packets are aligned to PCM Data Quality Encapsulation (DQE) frames. Two settings are available:

- None – TMoIP payload data has no frame alignment.
- DQE – TMoIP payload data is aligned with PCM DQE frames. The first bit of the TMoIP packet payload is the first bit of a DQE frame header.

When this channel is in PCM *IN* mode, the QTP searches incoming PCM data for the DQE Sync Word (refer to section 4.2.5.4.4). When regularly found at the proper interval, the QTP indicates DQE Sync on the System and Channel Status screen (refer to section 4.2.6). The DQE header and payload will then be packetized into one TMoIP network packet.

When DQE frame alignment is chosen, the Payload Size must be set to match the DQE Frame payload size. For the Quasonix RDMS receiver, the DQE frame payload size is as follows:

Payload data is a user selectable length with a default of 4096 bits (512 bytes), unless block decoding is in use. In STC mode, the default is 3200 bits (400 bytes). In SOQPSK/LDPC or STC/LDPC mode, the default is the selected LDPC block size. When Reed-Solomon decoding is enabled, the default is 1024 bits (128 bytes).

4.2.5.4.4 DQE Sync Word (Hex)

The DQE Sync Word specifies the two-byte hex-formatted sync word to be used in searching for incoming PCM DQE frames. It is only used when the Frame Alignment setting is set to DQE.

The standard setting for this sync word is FAC4.

4.2.6 System and Channel Status

The System and Channel Status screen, shown in Figure 31, is a one-stop-shop for status information on the system and all channels during operation. The page is broken up into two sections, System Status and Channel Status.

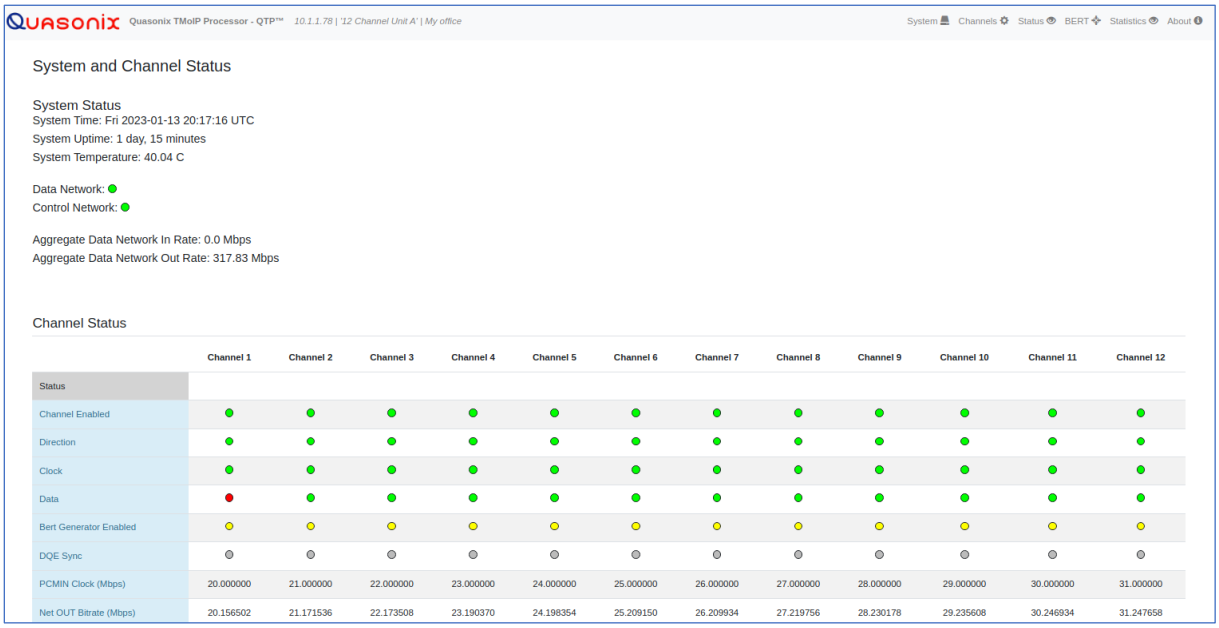

Figure 31: System and Channel Status Screen

4.2.6.1 System Status

The System Status section, shown in Figure 32, displays the following information. This display continually updates while this page is displayed.

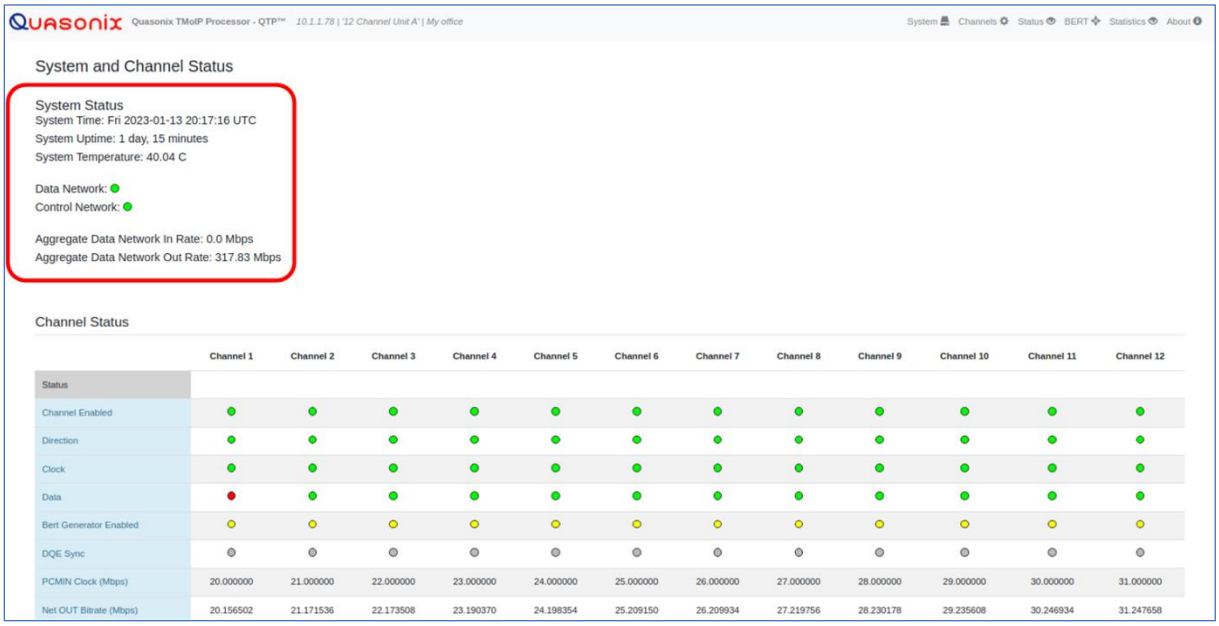

Figure 32: System and Channel Status Screen, System Status Section Circled

- System Time – Current system day, date, and time in UTC, formatted as Day YYYY-MM-DD HH:MM:SS
- System Uptime – Current system uptime in days and minutes
- System Temperature – Current internal system temperature in degrees Celsius
- Data Network – The state of Data Network connectivity; Green/connected or Red/disconnected
- Control Network – The state of Control Network connectivity; Green/connected or Red/disconnected
- Aggregate Data Network In Rate – The total incoming Ethernet traffic rate on the TMoIP network
- Aggregate Data Network Out Rate – The total outgoing Ethernet traffic rate on the TMoIP network

4.2.6.2 Channel Status

The Channel Status section, shown in Figure 33, provides status on several per-channel status items. This screen can be extremely useful to confirm test conditions and to ensure that data and clock rates are as expected. If DQE Alignment is enabled and DQE Frames are being received, it is also recommended to monitor for DQE Sync.

Note: The TMoIP Network connection must be active (network cable plugged in and also connected to an active device) in order for the Status screen to operate properly.

Figure 33: System and Channel Status Screen, Channel Status Section

- Channel Enabled – Gray if disabled, Green if enabled
- Direction – Green if PCM *IN* mode, Yellow if PCM *OUT* mode
- Clock – Gray if in PCM *OUT* mode, Green if PCM in clock is good, Red if PCM in clock is bad (refer to section 4.1.2.2 for more information)
- Data – Gray if in PCM *OUT* mode, Green if PCM in data is good, Red if PCM in data is bad (refer to section 4.1.2.2 for more information)
- Bert Generator Enabled – Gray if BERT generator is disabled; Yellow if it is enabled; refer to section 4.2.7.1.1 for details on the BERT Generator. If the BERT Generator is enabled, any data that would normally be output is replaced with BERT Generator data.
- DQE Sync – Gray if in PCM *OUT* mode or DQE Alignment not enabled; Green if QTP syncs on incoming PCM DQE Frames; Red otherwise
- PCMIN Clock (Mbps) – PCM *IN* mode only; Measured rate of incoming PCM IN clock
- Net Out Bitrate (Mbps) – PCM *IN* mode only; Measured rate of outgoing UDP payload sent by this channel
- Net In Bitrate (Mbps) – PCM *OUT* mode only; Measured rate of incoming UDP packets sent to this channel's IP and Port
- PCMOUT Clock (Mbps) – PCM *OUT* mode only; Measured rate of outgoing PCM OUT clock
- Underflow Errors – Displays a 1 if any Underflow errors have occurred in the PCM OUT processing
- Overflow Errors – Displays a 1 if any Overflow errors have occurred in the PCM IN processing
- OOO Packets – PCM *OUT* mode only; Number of packets received with sequence numbers Out of Order; These events should not result in lost data if the packets can be reordered, and no Sequence Errors occur.
- Sequence Errors – PCM *OUT* mode only; Number of times the incoming TMoIP packets could not be reordered in a timely fashion, or an expected packet was never received; This error will result in lost data.

The Clear All button at the bottom of the System and Channel Status screen is used to clear all channel status items. This also resets all BERT statistics on the BERT screen. This button can be useful if monitoring a particular setup for errors or out of order packets. After starting up a test and allowing a brief period for a steady state to be reached, the operator can click on this button to reset all error counts. This page can then be monitored for a period of time to determine whether any errors are occurring.

If OOO Packets or Sequence Errors are occurring, it can be indicative of a problem with the network being used to carry the TMoIP data traffic. These errors can frequently occur when a switch or router is overloaded.

4.2.7 BERT Utilities

The Bit Error Rate Test (BERT) Utilities screen, shown in Figure 34, is intended to be used during set up and pre-mission to ensure that all systems are connected and configured properly. The BERT has two main capabilities:

- To generate PN pattern data and send it out the PCM interface or packetized in TMoIP packets
- To analyze PN pattern data that is received either via PCM interface or network TMoIP packets

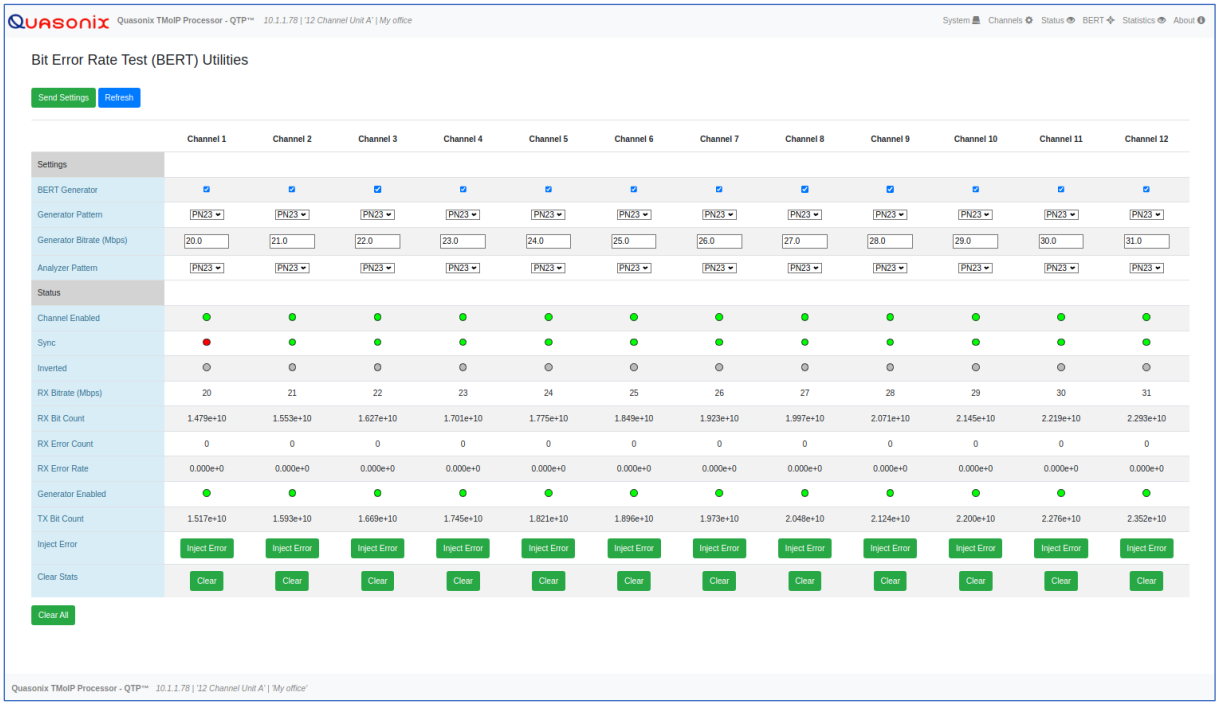

Figure 34: Bit Error Rate Test (BERT) Utilities

The BERT Analyzer is always analyzing the incoming data, regardless of which mode the channel is in. In PCM *IN* mode, the BERT Analyzer is looking at the PCM data coming in via the BNC or MDM-25 connectors (or internally from the RDMS with the IP2 option). In PCM *OUT* mode, the BERT Analyzer is looking at the TMoIP data coming in via 218-20 network packets.

Note: The TMoIP Network connection must be active (network cable plugged in and also connected to an active device) in order for the BERT page to operate properly.

This page consists of three sections: Settings, Status, and Buttons, as described in the following sections.

4.2.7.1 BERT Settings

The BERT Settings are used to configure the BERT Generator and Analyzer behavior.

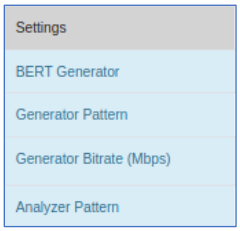

Figure 35: Bit Error Rate Test (BERT) Settings

4.2.7.1.1 BERT Generator

Check the BERT Generator check box to enable the generation of BERT data and send it out the proper interface as defined by the current Data Flow Direction:

- PCM *IN* - BERT data is packetized and sent out the TMoIP network interface as configured by Channel settings.
- PCM *OUT* - BERT data is sent out the PCM interface as configured by Channel settings.

Important: When the BERT Generator is enabled on a channel, any data that would normally be sent out the PCM or TMoIP network interfaces is replaced by BERT generated data. For example, in PCM *IN* mode, if PCM data is being received via the back panel BNC or MDM-25 interfaces, that data will be analyzed by the incoming BERT Analyzer, but it will not be packetized. Instead, the BERT Generator data will be packetized and sent out in network packets. Likewise, in PCM *OUT* mode, if TMoIP packets are being received, their payload will be analyzed by the BERT Analyzer, but it will not be sent out the PCM out interface. Instead, the BERT Generator data will be sent out the PCM interface instead. Be sure to turn off the BERT Generator on each channel before actual data is transported.

4.2.7.1.2 Generator Pattern

The Generator Pattern is the repeating PN pattern used in generating BERT data and is selected via this drop down menu:

- PN6 – Pseudorandom pattern 2^6 -1 bits in length
- PN11 – Pseudorandom pattern 2^11 -1 bits in length
- PN15 – Pseudorandom pattern 2^15 -1 bits in length
- PN23 – Pseudorandom pattern 2^23 -1 bits in length

4.2.7.1.3 Generator Bitrate (Mbps)

The Generator Bitrate is the bit rate at which BERT data is generated and sent out. Entered in Mbps, this value can range from .001 to 50 (1 kbps to 50 Mbps).

4.2.7.1.4 Analyzer Pattern

The Analyzer Pattern is the PN pattern against which all incoming data is analyzed. Refer to section 4.2.7.1.2 (Generator Pattern) for options.

Note: In general, the Generator and Analyzer Patterns should be set to the same value across all connected systems, though there could be situations in which it would be helpful to set them differently.

4.2.7.2 BERT Status

As mentioned previously, the BERT Analyzer is always running and analyzing incoming data on every channel, regardless of the interface it comes in. This can be invaluable when setting up an end-to-end system or testing pre-mission.

The BERT Status display continually updates while the screen is displayed. The following items are displayed within BERT Status, shown in Figure 36.

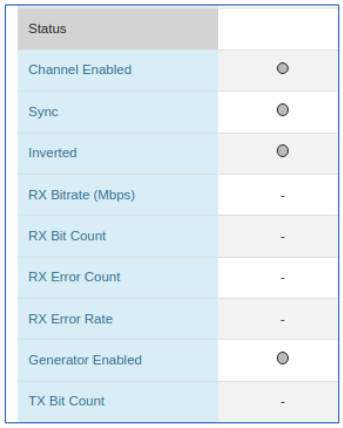

Figure 36: Bit Error Rate Test (BERT) Status

4.2.7.2.1 Channel Enabled

This LED image indicates whether the channel is enabled. It is gray if disabled, green if enabled.

All following indicators apply only if the channel is enabled.

4.2.7.2.2 Sync

This LED image indicates if the BERT Analyzer has achieved sync with the PN pattern data incoming via the PCM or TMoIP network interface. It is green if Sync'd, red if not Sync'd.

4.2.7.2.3 Inverted

This LED image indicates if the BERT Analyzer detects an inverted PN pattern. It is gray if not inverted, yellow if inverted.

4.2.7.2.4 RX Bitrate (Mbps)

This status indicates the approximate bitrate of incoming data, in Mbps.

4.2.7.2.5 RX Bit Count

This indicates the number of incoming bits analyzed by the BERT Analyzer.

4.2.7.2.6 RX Error Count

This indicates the number of incoming bits in error, as detected by the BERT Analyzer.

4.2.7.2.7 RX Error Rate

This indicates the bit error rate of the incoming data, as detected by the BERT Analyzer.

4.2.7.2.8 Generator Enabled

This LED image indicates whether the BERT Generator is enabled. Green is enabled.

4.2.7.2.9 TX Bit Count

This indicates the number of bits generated and output by the BERT Generator.

4.2.7.3 BERT Buttons

The buttons at the bottom of the Bit Error Rate Test (BERT) Utilities screen, shown in Figure, perform the following functions:

- Inject Error – When the BERT Generator is enabled for a channel, clicking on this button one time injects a single bit error into the BERT data stream (one bit in the pattern is inverted).
- Clear – Clicking on this button clears the BERT statistics for a single channel.
- Clear All – Clicking on this button clears the BERT statistics for all channels.

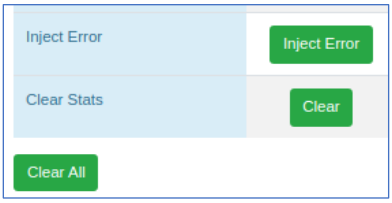

Figure 37: Bit Error Rate Test (BERT) Utilities Buttons

Note: The Clear and Clear All buttons also clear the Channel Status pertaining to that channel(s) on the Configuration Status screen.

4.2.8 Statistics

The Statistics screen, shown in Figure 38, displays a variety of statistics that may be of use in debugging a troublesome setup:

- CTRL Eth – Ethernet statistics for the Control network
- Data Eth – Ethernet statistics for the TMoIP/Data network
- Net Stats – Additional network statistics
- Time Stats – Statistics related to NTP or PTP time synchronization
- Channel 1-12 – Statistics and measurements for each channel

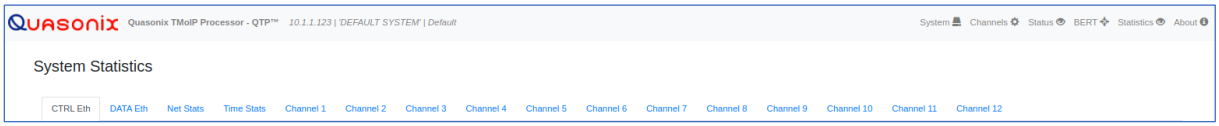

Figure 38: Statistics

4.2.9 System Information

The System Information (About) screen, shown in Figure 39, displays a variety of identifying information about the system.

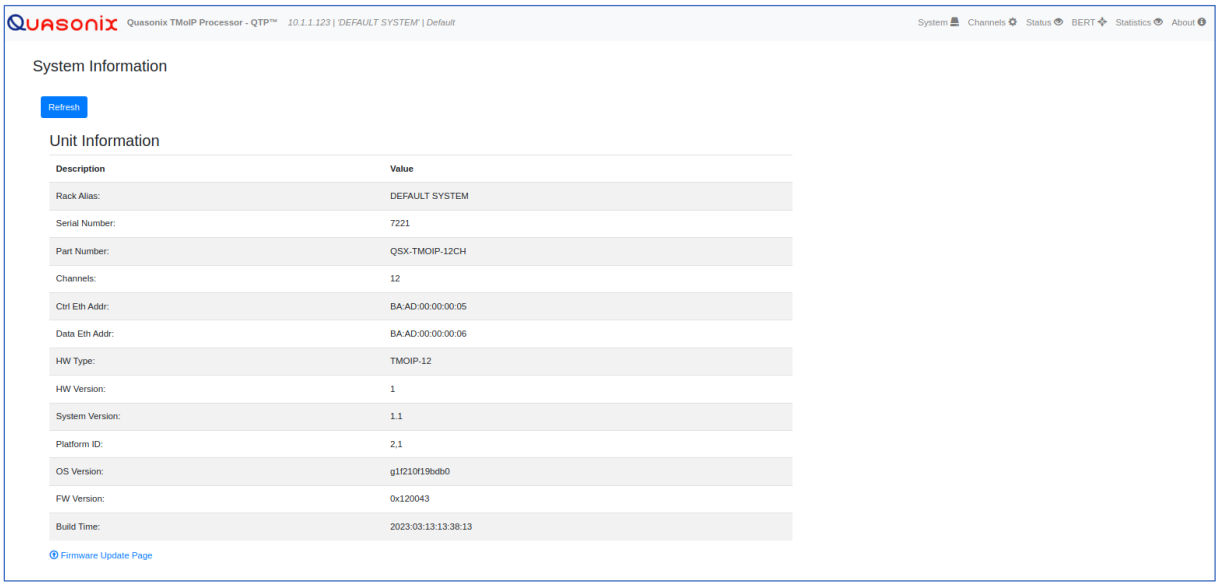

Figure 39: System Information

- Rack Alias – The System Name as defined on the System page
- Serial Number – The unit serial number provided by Quasonix
- Part Number – The unit part number
- Channels – The number of channels available for use, based on the part number
- Ctrl Eth Addr – The MAC address of the Control Network Interface
- Data Eth Addr – The MAC address of the Data Network Interface
- HW Type – The physical hardware type
- HW Version – The hardware version number
- System Version – The system software version number

Additional items vary by release and may be requested by Quasonix if support is necessary.

The About screen also includes a link to the Firmware Update screen. While this functionality is enabled, it is recommended that this link not be clicked until Quasonix provides a firmware update file and instructions.

4.2.10 Firmware Update

A description of this screen will be provided along with firmware updates, as necessary.

Note: Clicking on the Load Update File button stops and disables all channels and requires a power cycle to turn them back on.

5 Appendix A – Acronym List

Acronym	Description
AGC	Automatic Gain Control
AM	Amplitude Modulation
AQPSK	Variant of Quadrature Phase Shift Keying
ARTM	Advanced Range Telemetry
AUQPSK	Variant of Quadrature Phase Shift Keying
BEP	Bit Error Probability
BER	Bit Error Rate
BERT	Bit Error Rate Test
BNC	Bayonet Neill-Concelman Connector (RF Connector)
BPSK	Binary Phase Shift Keying
CCSDS	Consultative Committee for Space Data Systems (coding standard)
CD	Compact Disk
CPM	Continuous Phase Modulation
DB-9	D-subminiature 9 pin Serial Connector
DC	Diversity Combiner
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name Server
DPM	Digital Phase Modulation
DQE	Data Quality Encapsulation
DQM	Data Quality Metric
EVTM	Ethernet Via Telemetry
FPGA	Field Programmable Gate Array
GUI	Graphical User Interface
IF	Intermediate Frequency
IP	Internet Protocol
kbps	Kilobits per second
KHz	Kilohertz
LAN	Local Area Network

Acronym	Description
LCD	Liquid Crystal Display
LDPC	Low Density Parity Check
LED	Light Emitting Diode
Mbps	Megabits per second
MCX	Snap on subminiature connector
MHCPM	multi-h Continuous Phase Modulation
MHz	Megahertz
N	(connector type) Threaded RF connector
NTP	Network Time Protocol
OQPSK	Offset Quadrature Phase Shift Keying
PCMFM	Pulse Code Modulation/Frequency Modulation
PM	Phase Modulation
PSK	Phase Shift Keying
PTP	Precision Time Protocol
QPSK	Offset Quadrature Phase Shift Keying
QTP	Quasonix TMoIP Processor
RDMS	Receiver DeModulator Synchronizer
RF	Radio Frequency
RJ-45	Ethernet Connection Jack
RM	Rack-Mount
RS-232	Recommended Standard 232 (Serial Communications)
SAW	Surface Acoustic Wave
SDI	System Degradation Indication
SNR	Signal to Noise Ratio
SOQPSK	Shaped Offset Quadrature Phase Shift Keying
SOQPSK-TG	Shaped Offset Quadrature Phase Shift Keying –Telemetry Group
STC	Space-Time Coding
TMoIP	Telemetry Over Internet Protocol
TRL	Tracking Loop
TSR	Timestamp Source Reference

Acronym	Description
TTL	Transistor Logic
UDP	User Datagram Protocol
UQPSK	Unbalanced Quadrature Phase Shift Keying
USB	Universal Serial Bus
UTC	Coordinated Universal Time
VAC	Voltage Alternating Current
WAN	Wide Area Network