AQT8 Series
User Manual

ATSC/QAM
Transmodulator

Stock #	Model Name	Description
6280B	AQT8-IP	8x8VSB/QAM Input and IP Outputs
6281B	AQT8-QAM/IP	8x8VSB/QAM Input and QAM/IP Outputs

We recommend that you write the following information in the spaces provided below.

Purchase Location Name:	
Purchase Location Telephone Number:	
AQT8 Serial Number(s):	

Cross-Reference & Hyperlinking Usage

This guide makes use of hyperlinks for the Table of Contents, some cross-reference linking between sections, and external hyperlinking to web addresses. This has been done to assist the reader in finding the information they are seeking in a much quicker way. In addition to hyperlinking, the Table of Contents also makes use of the bookmarking feature present in the Adobe Reader application.

Product and Documentation Updates

Download the latest User Manual (PDF) by visiting our website. Navigate to the product page by entering the full Model Name or Stock Number in the search field. Upon reaching the product page, the "User Manual" download link will be located beneath the product image. **Firmware Updates** are available under "Tech Support" in the "Resources" section of the website. General instructions for the FTP site, as well as updating your firmware, are provided on this page.

Returning Product for Repair (or Credit)

A Return Material Authorization (RMA) Number is required on all products returned to Blonder Tongue, regardless if the product is being returned for repair or credit. Before returning product, please contact the Blonder Tongue Service Department at 1-800-523-6049, Ext. 4256 or visit our website: **www.blondertongue.com** for further information.

Table of Contents

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Section 1 – General & Safety Instructions

The STOP sign symbol is intended to alert you to the presence of REQUIRED operating and maintenance (servicing) instructions that if not followed, may result in product failure or destruction.

The YIELD sign symbol is intended to alert you to the presence of RECOMMENDED operating and maintenance (servicing) instructions.

The LIGHTNING flash symbol is intended to alert you to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electrical shock.

TO REDUCE THE RISK OF ELECTRICAL SHOCK, DO NOT REMOVE COVER FROM THIS UNIT.

NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE

NOTE TO CATV SYSTEM INSTALLER

This reminder is provided to call the CATV System Installer's attention to Article 820-40 of the NEC that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical.

You should always follow these Instructions to help ensure Against injury to yourself and damage to your equipment.

➡ Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature per Section 2.3.

➡ Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

➡ Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

➡ Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

➡ Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

➡ Read all safety and operating instructions before you operate the unit.

➡ Retain all safety and operating instructions for future reference.

➡ Heed all warnings on the unit and in the safety and operating instructions.

➡ Follow all installation, operating, and use instructions.

➡ Unplug the unit from the AC power outlet before cleaning. Use only a damp cloth for cleaning the exterior of the unit.

➡ Do not use accessories or attachments not recommended by Blonder Tongue, as they may cause hazards, and will void the warranty.

➡ Do not operate the unit in high-humidity areas, or expose it to water or moisture.

➡ Do not place the unit on an unstable cart, stand, tripod, bracket, or table. The unit may fall, causing serious personal injury and damage to the unit. Install the unit only in a mounting rack designed for 19" rack-mounted equipment.

➡ Do not block or cover slots and openings in the unit. These are provided for ventilation and protection from overheating. Never place the unit near or over a radiator or heat register. Do not place the unit in an enclosure such as a cabinet without proper ventilation. Do not mount equipment in the rack space directly above or below the unit.

➡ Operate the unit using only the type of power source indicated on the marking label. Unplug the unit power cord by gripping the plug, not the cord.

➡ The unit is equipped with a three-wire ground-type plug. This plug will fit only into a ground-type power outlet. If you are unable to insert the plug into the outlet, contact an electrician to replace the outlet. Do not defeat the safety purpose of the ground-type plug.

➡ Route power supply cords so that they are not likely to be walked on or pinched by items placed upon or against them. Pay particular attention to cords at plugs, convenience receptacles, and the point where they exit from the unit.

➡ Be sure that the outdoor components of the antenna system are grounded in accordance with local, federal, and National Electrical Code (NEC) requirements. Pay special attention to NEC Sections 810 and 820. See the example shown in the following diagram:
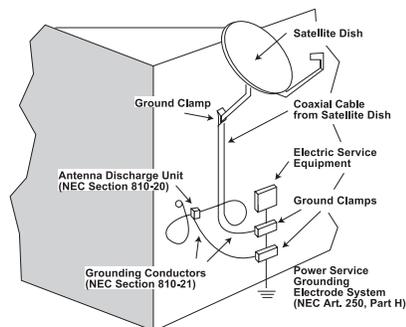
➡ We strongly recommend using an outlet that contains surge suppression or ground fault protection. For added protection during a lightning storm, or when the unit is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the lines between the unit and the antenna. This will prevent damage caused by lightning or power line surges.

➡ Do not locate the antenna near overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing the antenna, take extreme care to avoid touching such power lines or circuits, as contact with them can be fatal.

➡ Do not overload wall outlets or extension cords, as this can result in a risk of fire or electrical shock.

➡ Never insert objects of any kind into the unit through openings, as the objects may touch dangerous voltage points or short out parts. This could cause fire or electrical shock.

➡ Do not attempt to service the unit yourself, as opening or removing covers may expose you to dangerous voltage and will void the warranty. Refer all servicing to authorized service personnel.

➡ Unplug the unit from the wall outlet and refer servicing to authorized service personnel whenever the following occurs:

❏ The power supply cord or plug is damaged;
❏ Liquid has been spilled, or objects have fallen into the unit;
❏ The unit has been exposed to rain or water;
❏ The unit has been dropped or the chassis has been damaged;
❏ The unit exhibits a distinct change in performance.

➡ When replacement parts are required, ensure that the service technician uses replacement parts specified by Blonder Tongue. Unauthorized substitutions may damage the unit or cause electrical shock or fire, and will void the warranty.

➡ Upon completion of any service or repair to the unit, ask the service technician to perform safety checks to ensure that the unit is in proper operating condition.

Section 2 – Product Summary

2.1 Revision History & Reason

This is the first release of this manual.

2.2 Product Application & Features

Application:

The **AQT8 Series (AQT8-QAM/IP and AQT8-IP)** allows the user to create a custom IP and QAM output from off-air and/or QAM input sources. The unit accepts eight 8VSB off-air or QAM sources and simultaneously outputs these SPTS and/or MPTS programs in IP and/or QAM. At the same time, the AQT8-QAM/IP can be configured in Pass-through mode, which directly maps the demodulated RF port content in MPTS format to IP output.

The AQT8 Series can accept encrypted QAM sources, and output the encrypted IP transport streams programs in MPTS or SPTS formats, while preserving the MPEG tables (PAT, PMT, PSIP, VCT, and MGT) from the source. The unit allows the user to change the PID, program number, short name, and major/minor channel (PSIP) information on any program.

In addition, the AQT8 Series also features Emergency Alert System (EAS) program switching through either an ASI or IP format EAS input, and terminal block contacts for triggering EAS messages.

For off-air applications, the **AQT8-QAM/IP (Stock # 6281B)** has a 2:1 Mux Mode feature, which allows you to multiplex two off-air sources to one MPTS for QAM distribution. This model can support up to eight QAM-256 outputs that are agile from 54 to 1002 MHz as long as all eight outputs are kept within a 768 MHz span.

Features:

- Encrypted QAM sources can be mapped to IP MPTS or SPTS formats in Pass Through mode for Remote PHY and Switch Digital applications
- Accepts up to eight RF inputs in 8VSB/QAM format
- Provides one common 8VSB/QAM input port with an internal active splitter
- PSIP manipulation
- Accepts EAS input in ASI or IP formats
- Supports EAS switching-based on contact closure trigger, or +5 to +12 VDC input
- Comprehensive GUI-based remote monitoring and control via any standard Web browser
- 2:1 Multiplex Mode to configure eight ATSC 1.0 off-air channels to four MPTS for QAM (**AQT8-QAM/IP Only**)

2.2 Product Application & Description (Continued)

1 **-20dB QAM RF TEST (AQT8-QAM/IP Only):** "F" female connector for QAM RF output signal, 20dB lower than the actual QAM RF output. Used for test purposes, without taking the unit out of service.

2 **Input STATUS LEDS # 1 through 8:**

LED is Off = input channel tuner not locked.

LED is Green = input channel tuner is locked.

LED is RED = error detected in input stream.

LED blinks = corresponding QAM output is off or in CW mode

3 **Power LED:**

LED is Green = the AC power is detected.

LED is Off = indicates one of the following: (i) AC power is not connected, or (ii) AC power is connected but the power supply is defective. Unit must be sent to factory for repairs.

4 **INPUT POWER RECEPTACLE AND FUSE:** IEC 14 power inlet plug – rated 110-230 VAC; 0.7/0.35 A; 60/50 Hz; equipped with Slo-Blo, 3.0A, 250 V Fuse.

5 **EAS TRIGGER CONTACTS:** Terminal strip will activate the EAS messaging feature in the following ways:

a) 5-12 VDC between terminals 1 & 3 shown to the right.

b) Dry Contact between terminals 2 & 3 shown to the right.

NOTE: The current EAS behavior is an all or nothing program override. When EAS is activated, all transports will have their program content replaced with the EAS program content. EAS will not activate unless EAS is enabled and the EAS TS is detected. The EAS can be activated using the contact closure on the back of the unit or by a test button in the UI.

6 **ASI EAS IN:** BNC connector for SPTS EAS input stream.

7 **IP EAS IN:** RJ45 connector, 1000Base-T (GigE) interface for SPTS EAS IP input.
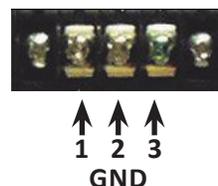
> It is recommended that EAS ASI or IP inputs should be SD with a TS bit rate of 2.5 Mbps (typical). Higher EAS TS bit rates can be used but they should not exceed the lowest bit rate program in all IP outputs.

8 **GbE CONTROL:** RJ45 connector for 1000Base-T Ethernet (GigE) interface for monitoring and configuring the unit via standard web browser. Only a static IP address can be assigned to this interface. (Factory Default: "172.16.70.1")

2.2 Product Application & Description (Continued)

9 **DATA OUT:** RJ45 for 1000Base-T Ethernet (GigE) interface for IP DATA outputs.

10 **IP RESET:** When pushed and held for about 10 seconds, temporarily resets the IP address, Usernames, and Passwords to Factory Default values as follows:

  IP address = 172.16.70.1

  Username = Admin (case-sensitive)

  Password = pass (case-sensitive)

  NOTE: Resetting or loss of power will revert IP and login credentials back to what was last configured by the user. If the values are changed while in the default state, they will be available after a power cycle.

11 **8VSB/QAM Inputs:** The 8 numbered dedicated 8VSB/QAM inputs with the "Common" RF input labeled located in the center.

12 **QAM Output (AQT8-QAM/IP Only):** "F" female connector for QAM RF output.

2.3 Product Specifications

Input

Connectors

8VSB/QAM:	8x "F" Female 1x Common "F" Female with Internal Active Splitter

8VSB Mode

Standard:	ATSC Digital Television A/53E
Tuning Range:	UHF (Ch. 14-83), VHF (Ch. 2-13)
Data Rate:	19.392 Mbps
Bandwidth:	6 MHz
Power Level:	-20 to +20 dBmV
Impedance:	75 Ω

QAM Mode

Standard:	ITU-T J.83 - Annex B (64 and 256 QAM)
Tuning Range:	CATV Ch. 2-158 (STD, HRC, IRC)
Data Rate:	38.8 Mbps (QAM 256); 26.97 Mbps (QAM 64) – Auto Detect
Bandwidth:	6 MHz
Power Level:	-15 to 20 dBmV (@ QAM 256) -20 to 20 dBmV (@ QAM 64)
Impedance:	75 Ω

Emergency Alert System

ASI

Connector:	1x BNC Female
Standard:	DVB-ASI; EN 50083-9 (SPTS)

IP

Connector:	1x RJ45
Standard:	1000Base-T (GigE)
UDP/RTP:	Supported (user-selectable)
Video Bit Rate:	The EAS program bit rate must not exceed the lowest program video bit rate it will replace. *Example:* EAS at 2.5 Mbps will not work for a program at 2.0 Mbps.
Trigger Connectors:	Terminal Block
Trigger Mechanism:	5-12 VDC & Dry Contact Closure

Alarms/Monitoring/Control

Local Monitoring:	8x Channel LEDs 1x Power LED
Local Control:	1x IP Reset Button
Remote Monitoring/Control:	GUI-based menu via standard Web browser (1xRJ45 on rear panel; 1000Base-T; GigE)

Output

IP

Connectors:	1x RJ45 (rear-panel)
Standard:	1000Base-T Ethernet (GigE)
UDP:	Supported
Address Assignment:	64x IPv4 SPTS address & port numbers 8x IPv4 MPTS address & port numbers

QAM (6281B Only)

Output Modules:	8x Fully Agile QAM
Connectors:	1x "F" Female (rear-panel; for combined output)
Modulation:	QAM 64 and 256
Standards:	ITU-T J.83; Annex B
DVB Symbol Rate:	5.360537 Msym/s (QAM 256) 5.056941 Msym/s (QAM 64)
Frequency Range:	54 to 1002 MHz
Tuning:	CATV Channel Selectable (CH. 2 to 158)
No. of Programs:	Variable (≤ 38.8 Mbps input source Pass-thru)
RF Level:	+40 dBmV, ± 1 dB
RF Level Range:	+30 to +45 dBmV, 1 dB increment
Frequency Tolerance:	± 0.5 kHz @ 77 °F (25 °C)
Frequency Stability:	± 5 kHz over 32 to 122 °F (0 to 50 °C)
Amplitude Flatness:	± 0.25 dB (over 6 MHz channel)
Phase Noise:	-98 dBc (@ 10 kHz)
Spurious:	-60 dBc
Broadband Noise:	-70 dBc (@ +40 dBmV output level, 5.5 MHz BW)
Impedance:	75 Ω
QAM Spectrum:	Inverted
Carrier Suppression:	45 dB
Return Loss:	14 dB typical
Signal-to-Noise Ratio (SNR):	42 dB typical
MER:	42 dB typical
I/Q Phase Error:	Less than 1 degree
I/Q Amplitude Imbalance:	Less than 1%

General

Dimensions: (W x D x H)	19.0" x 16.0" x 1.75" (483 mm x 363 mm x 44 mm)
Power Supply: Power Consumption:	110/230 VAC, 0.7/0.35A, 60/50 Hz 48 W (6281B - QAM/IP) 27 W (6280B - IP Only)
Weight:	7.4 lbs (3.35 kg)
Operating Temperature: Storage Temperature:	32 to 122 °F (0 to 50 °C) -13 to 158 °F (-25 to 70 °C)
Operating/Storage Humidity:	0 to 95% RH @ 35 °C max, non-condensing

Section 3 – Unpacking and Connecting the Unit

3.1 Unpacking

You will find the following items in the box:

- AQT8 Series Model (QTY=1)
- Power Cord with IEC C13 line socket and 3-pin Type B NEMA 5 plug (QTY=1)
- Blonder Tongue part# 515102875A containing Ethernet cable (QTY=1; see Section 3.3 for details)

> ⚠ **For safe and reliable operation, the ground pin of the power cord must be grounded properly.**

3.2 Installation and Power-Up

The AQT8 Series is designed to be installed in a standard 19-inch (483 mm) rack (EIA 310-D, IEC 60297, and DIN 41494 SC48D).

1 To install, secure the unit's front panel to the rack by inserting four (4) machine screws, with cup washers, through the four (4) mounting holes in the front panel. A 1RU open space is recommended above the unit for ventilation.

> ⚠ **DO NOT BLOCK THE UNIT'S AIR INTAKE OR AIR DISCHARGE OPENINGS.**
>
> **Unit performance will be degraded without proper ventilation.**
> **Excessive heat will shorten the life of the unit.**

2 To power the unit up, connect the IEC line cord to the receptacle on the rear panel. Then connect the other end to a 120 VAC power outlet. The input power receptacle is equipped with a fuse-holder and fuse (SLO-BLO, 3.0 Amp, 250V).

> ⚠ **AQT8 and the GigE Switch are considered as elements of an integrated solution. When a power cycle or re-boot is deemed necessary for one element, it may be necessary to power cycle one or all of the other elements as well.**

3.3 Setting up Ethernet Access

Local or remote communication with the unit is only possible through a GUI-based menu via web browser (Chrome or Firefox is recommended). Before you can communicate with the unit, you must configure your computer's IP address to be in the same subnet as the unit's default IP address. To do so, follow these steps:

1 Plug one end of the Ethernet cable to the "**GigE Control**" port on the unit's rear-panel interface. Plug the other end of the Ethernet cable to your computer.

2 The factory default IP address of the Control port is "**172.16.70.1**". In order to communicate with the Control port, you must first change your computer's IP address.

The following steps explain how to do this for a computer with **Windows 7**, **Windows 8.x** or **Windows 10** operating software:

   (a) On your computer, navigate to the "Network and Sharing Center".

   (Note: It can be found using the search box in the Start Menu or for Windows 8.x, the Start Screen)

   (b) Once open, click on "Change Adapter Settings" on left hand side of the window.

   (c) Right-click on the "Local Area Connection", and then click on the "Properties".

   (d) A dialog box entitled "Local Area Connection Properties" will appear. In this box, double-click on the "Internet Protocol Version 4 (TCP/IPv4)".

3.3 Setting up Ethernet Access (Continued)

(e) A dialog box entitled "Internet Protocol Version 4 (TCP/IPv4) Properties" will appear. Select the "Use the following IP address" option and enter the following addresses:

IP address: **172.16.70.2**

Subnet mask: **255.255.255.0**

No need to enter a value for the Default Gateway.

Click OK to close the dialog box. Your computer is now ready to communicate with the unit.

3.4 Accessing the User Interface via the Web Browser

You must complete the steps described in Section 4.1 before proceeding as follows:

1 Open a web browser on your computer (Chrome or Firefox is recommended) and enter the following URL address **(http://172.16.70.1)**. The "**Log In**" screen (Figure 4.2a) will appear.

2 Enter the following case-sensitive factory-default Username and Password, and click on the [**LOG IN**] button.

NOTE: When logged in as Admin, the user has read and write permission. Only one Admin can be logged in at a time.

| Username = **Admin** (case-sensitive) |
| Password = **pass** (case-sensitive) |
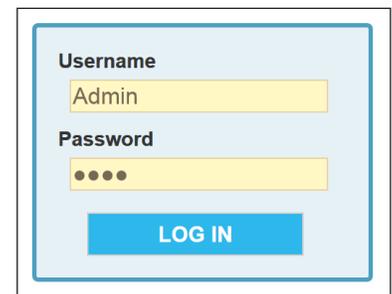
Figure 4.2a - "Login" Screen

Monitoring and configuration of the unit is achieved via a series of web pages as described in the Sections below. The following read-only information is displayed in a "**Page Header**" (Figure 4.2b) at the top of each web page:

Name: displays the user-defined name to make identification easier. See Section 11.4, **6** to configure this setting.

Location: displays the user-defined location to make identification easier. See Section 11.4, **7** to configure this setting.

ESN: displays the unit's serial number.

Uptime: displays the time elapsed since the last time the unit was turned on.

Version: displays the software version of the unit.

Figure 4.2b - Page Header and Navigation

As shown in Figure 4.2b, under the "**Page Header**" the following Navigation tabs and links will appear:

- Navigation Menu (Left): "**Status**", "**RF Input**", "**Cherry Picking (Transport Stream)**", "**2:1 Multiplexing**", "**IP Output**", "**RF Output**", and "**EAS Config**"

- Navigation Menu (Right): "**Time**", "**Log**", "**Update**" and "**System**"

- In addition, in the upper right corner above the navigation, the user can access the "**Admin**" screen through a link, alongside the [**LOG OUT**] button.

Each Navigation bar tab is described in the subsequent Sections.

Section 4 – Status

The "**Status**" tab (Figure 4) displays the general health and unit information at a glance. The information is provided as a quick way to monitor the unit or assist with troubleshooting any issues that may arise.

Status	RF Input	Cherry Picking	2:1 Multiplexing	IP Output	RF Output	EAS Config				Time	Log	Update	System

System Status

System Status	Ok
System Temperature	131.0°F / 55°C
System Uptime	1 days, 00:45:03
Model Number	AQT8-QAM/IP

Detected Issues

No issues detected

RF Input Status

	Source	RF Channel	SNR
RF Input 1	Common	Ch. 36 / 605 MHz	SNR Ok : 33.3 dB
RF Input 2	Common	Ch. 13 / 213 MHz	SNR Ok : 30.1 dB
RF Input 3	Common	Ch. 26 / 545 MHz	SNR Ok : 31.6 dB
RF Input 4	Common	Ch. 11 / 201 MHz	SNR Ok : 26.4 dB
RF Input 5	Dedicated	Ch. 51 / 387 MHz	SNR Ok : 38.6 dB
RF Input 6	Common	Ch. 7 / 177 MHz	SNR Ok : 28.9 dB
RF Input 7	Dedicated	Ch. 53 / 399 MHz	SNR Ok : 38.2 dB
RF Input 8	Common	Ch. 24 / 533 MHz	SNR Ok : 27.9 dB

IP Output Status

Link Status: 1000 Mb/S	Link Usage: 101.87 Mb/S (0%)
TS Source	Output IP:Port
RF Input 1	239.10.10.13:2001
TS 1	239.10.10.11:2001
MTS 1	239.10.10.14:2001

RF Output Status

	TS Source	RF Channel
RF Output 1	RF Input 1	Ch. 2 / 57 MHz
RF Output 2	TS 1	Ch. 3 / 63 MHz
RF Output 3	MTS 2	Ch. 4 / 69 MHz
RF Output 4	RF Input 4	Ch. 5 / 79 MHz
RF Output 5	RF Input 5	Ch. 6 / 85 MHz
RF Output 6	RF Input 6	Ch. 7 / 177 MHz
RF Output 7	RF Input 7	Ch. 8 / 183 MHz
RF Output 8	TS 2	Ch. 9 / 189 MHz

System Information

Serial Number	2019050624
Software Version	1.0.0.1_20190716
Firmware Version	1.4
Modulator Version	1.0

Figure 4 - "Status" Tab - Full View

4.1 System Status

In the section entitled "**System Status**" (Figure 4.1a), the following parameters about the unit's health are displayed:

System Status

①	System Status	Ok
②	System Temperature	131.0°F / 55°C
③	System Uptime	1 days, 00:45:03
④	Model Number	AQT8-QAM/IP

Figure 4.1a - "Status" Tab - System Status

① **System Status:** Indicates the current status of the unit. Status Levels and colors shown below:

 Ok - No issues at the current time. (Text will appear as black in this state)

 Error - One or more errors have occurred. A short summary of the error message is shown under "Detected Issues". Check system log for more information on error(s). (Text will appear as red in this state)

② **System Temperature:** Indicates the temperature of the unit. (Figure 4.1b)

③ **System Uptime:** Indicates the time elapsed since the last time the unit was turned on.

④ **Model Number:** Indicates the model name of the unit is indicated here as either AQT8-QAM/IP or AQT8-IP.

165.0 °F	175.0 °F
73.9 °C	79.4 °C

Normal Temperature	Warning	Error

Figure 4.1b - System Temperature Range

4.2 Detected Issues

In the section entitled "**Detected Issues**", the following system information is indicated:

Detected Issues
No issues detected

Figure 4.2 - "Status" Tab - Detected Issues

If any issues arise, the problem will be shown here and the color will correlate to the urgency of the issue. When there are no issues, the text will say "No issues detected" and remain black text color. When there is an Error, the text will change to red and indicate what is causing the error.

4.3 RF Input Status

In the section entitled "**RF Input Status**", the following system information is indicated:

RF Input Status	① Source	② RF Channel	③ SNR
RF Input 1	Common	Ch. 36 / 605 MHz	SNR Ok : 33.3 dB
RF Input 2	Common	Ch. 13 / 213 MHz	SNR Ok : 30.1 dB
RF Input 3	Common	Ch. 26 / 545 MHz	SNR Ok : 31.6 dB
RF Input 4	Common	Ch. 11 / 201 MHz	SNR Ok : 26.4 dB
RF Input 5	Dedicated	Ch. 51 / 387 MHz	SNR Ok : 38.6 dB
RF Input 6	Common	Ch. 7 / 177 MHz	SNR Ok : 28.9 dB
RF Input 7	Dedicated	Ch. 53 / 399 MHz	SNR Ok : 38.2 dB
RF Input 8	Common	Ch. 24 / 533 MHz	SNR Ok : 27.9 dB

Figure 4.3a - "Status" Tab - RF Input Status

① The **Source** column indicates if the RF input is "Dedicated" or "Common". See Section 6 for more information.

② The **RF Channel** column displays which RF channel the input is locked to.

③ The **SNR** column indicates the Signal-to-Noise Ratio (SNR) status information for each RF Input. See Figure 4.3b (QAM256) and Figure 4.3c (8VSB) for information on SNR status ranges.

28   31

Error	Warning	Normal Range

Figure 4.3b - SNR Status Range - QAM256

17   19

Error	Warning	Normal Range

Figure 4.3c - SNR Status Range - 8VSB

4.4 IP Output Status

In the section entitled "**IP Output Status**", the following system information is indicated:

IP Output Status	
① Link Status: 1000 Mb/S	Link Usage: 101.87 Mb/S (0%)
② TS Source	Output IP:Port
③ RF Input 1	239.10.10.13:2001
④ TS 1	239.10.10.11:2001
⑤ MTS 1	239.10.10.14:2001

Figure 4.4 - "Status" Tab - IP Output Status

① **Link:** The following 2 parameters are displayed as follows:

> **Status** - Displays the link speed that is plugged in.

> **Usage** - Displays the amount of data used on that link.

② **TS Source:** Indicates the port on the unit for the Transport Stream source.

③ **RF Input 1:** Indicates the time elapsed since the last time the unit was turned on.

④ **TS 1:** Indicates the IP and port assigned to Transport Stream 1.

⑤ **MTS 1:** Indicates the IP and port assigned to MTS.

4.5 RF Output Status

In the section entitled "**RF Output Status**", all 8 RF Output Transport stream sources are displayed along with their output QAM RF channel and frequency.

RF Output Status		
	TS Source	RF Channel
RF Output 1	RF Input 1	Ch. 2 / 57 MHz
RF Output 2	TS 1	Ch. 3 / 63 MHz
RF Output 3	MTS 2	Ch. 4 / 69 MHz
RF Output 4	RF Input 4	Ch. 5 / 79 MHz
RF Output 5	RF Input 5	Ch. 6 / 85 MHz
RF Output 6	RF Input 6	Ch. 7 / 177 MHz
RF Output 7	RF Input 7	Ch. 8 / 183 MHz
RF Output 8	TS 2	Ch. 9 / 189 MHz

Figure 4.5 - "Status" Tab - RF Output Status

4.6 System Information

In the section entitled "**System Information**", the following system information is indicated:

System Information	
❶ Serial Number	2019050624
❷ Software Version	1.0.0.1_20190716
❸ Firmware Version	1.4
❹ Modulator Version	1.0

Figure 4.6 - "Status" Tab - System Information

❶ **Serial Number:** Indicates the serial number of the unit.

❷ **Software Version:** Indicates the software version of the unit. Please see *Section 11.3* for instructions on updating the software version.

❸ **Firmware Version:** Indicates the firmware version for the unit. Firmware version is only needed for tech support and software debugging.

❹ **Modulator Version:** Indicates the modulator version for the unit.

Section 5 – RF Input

The "RF Input" tab (Figure 5a) is "user-configurable" with the following parameters and status information:

Figure 5a - "RF Input" Tab

① RF Source: Indicates the physical port of the 8 RF inputs.

> **Dedicated:** The input is connected to one of 8 dedicated RF ports located on the rear panel of the unit. Each of these ports are labeled from 1 to 8.

> **Common:** The input is connected to a single RF port labeled "Common" located on the rear panel of the unit. It is then split internally into 8 identical inputs.

② Modulation Mode: Select the appropriate modulation mode to match the input. See chart (Fig 5b) for a list of supported Modulation modes.

③ Channel Map: Select the appropriate Channel Map. Options available are: STD, HRC, IRC, and Air.

④ Ch/Frequency: The input channel and frequency as related to the Modulation Mode and Channel Map. From the pull-down menu, select the desired channel/frequency (center) for each input.

⑤ Live Status: Displays the SNR and the live status of the input signal. Status will be indicated as shown in Figures 4.3b and 4.3c on page 13.

⑥ [Save] Press to save changed configurations.

RF Input Modulation Modes
8VSB
QAM256B
QAM64B

Figure 5b - Modulation Modes

Section 6 – Cherry Picking

Once the user clicks on the Cherry Picking tab on the menu, the options within "**TS** (Transport Stream) **Select**" tab (Figure 6) are shown. The controls on this screen allows the user to construct custom multiplexed transport streams (TS). These can be output both QAM and/or IP depending on the model.

NOTE: Clicking the small arrow (⯈⋯collapsed; ⯆⋯ expanded) beside each program will show or hide further choices or read-only data.
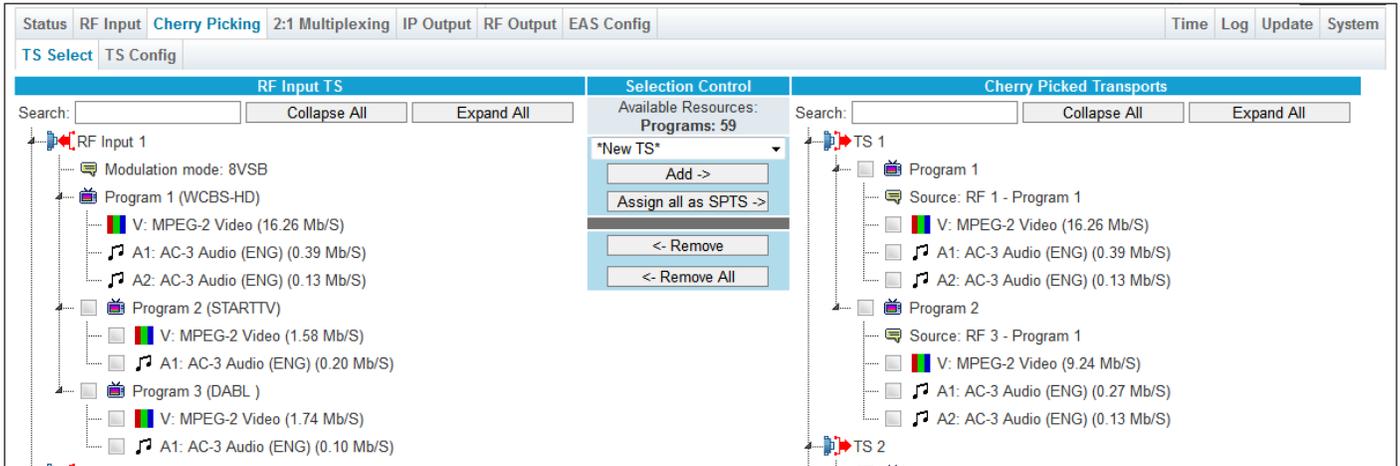
Figure 6 - "Cherry Picking" > "TS Select" Tab - Full View

⚠️ **IMPORTANT: The bandwidth transport stream should be no greater than 38.8 Mb/S.**

⚠️ **CAUTION: Some programs may be statmuxed from the provider. Allow overhead in order to not exceed the maxiumum bitrate (38.8 Mb/S) for a QAM 256 channel.**

6.1 TS Select > Configuration Settings and Parameters

The "**RF Input TS**" (Figure 6.1a) column shows a list of all programs available which can be added to the TS Map. The following read-only information is shown:

🔌 **RF Input #:** Displays programs sourced from all RF inputs within the unit.

💬 **Modulation Mode:** Displays which modulation mode the RF input is set to. (See Section 5 for a list of modes)

📺 **Program #:** Displays the program number and may display its source. An empty checkbox (☐) can be checked (✅) to select one or more programs to be added to the Output Transports column. If there is no checkbox, the program has already been selected and can be seen in the right column, "**Cherry Picked Transports**".

While the line is expanded, the following data for each program is shown:

Figure 6.1a - Available Inputs

① **V:** Displays the Video encoding and bandwidth (Mb/S).

② **A#:** Displays the Audio encoding, Language, and bandwidth (Mb/S). Here "#" represents the number which helps to differentiate between similar audio streams. Example: A1, A2, etc.

Note: Audio language will only be shown correctly when tagged from Off-Air Provider

6.1 TS Select > Configuration Settings and Parameters (continued)

3 **O#:** Displays as "Other", indicating the system did not recognize it as an audio or video element. The other icon appears as a pair of files. Here "#" represents the number which helps to differentiate between similar "Other" type streams. Example: O1, O2, etc.

The "**Selection Control**" (Figure 6.1b) column provides controls to **"Add"** and **"Remove"** programs and/or program elements from the TS Output as well as the following read-only information:

Available Resources

4 **Programs:** Displays the available number of programs that may be added to the selected TSO. As each program is added, the number decreases accordingly.

5 **TS # Selection:** Allows the user to select a new or existing transport stream output that they want to add one or more programs or program elements to.

6 [Add ->] When one or more programs are selected from the "RF Input TS" column, pressing the "Add" button will immediately add the program(s) to the "Cherry Picked Transports" column, indicating the program has been mapped to that TS #.
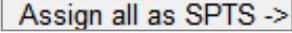
7 [Assign all as SPTS ->] Pressing the "Assign all as SPTS" button will assign ALL available, or unused, programs as SPTS.

Figure 6.1b - Selection Control

8 [<- Remove] When one or more programs or program elements are selected from the "Cherry Picked Transports" column, pressing the "Remove" button will immediately remove the program(s) from the Output Transports column, indicating the program has been unmapped and removed from the TSO #.

9 [<- Remove All] Pressing the "Remove All" button will remove ALL program(s) or program element(s) from the "Cherry Picked Transports" column, indicating all programs have been unmapped and removed from the entire TS Map. A confirmation pop-up box will appear. Press "OK" to complete the process of removing all programs.

The "**Cherry Picked Transports**" (Figure 6.1c) column shows a list of all programs that have been added to the TS Output. This column displays the following information:

TS #: Only programs which are being encoded will show up in this column.

Program # (Short Channel Name): Displays the Program # and Short Channel Name, 7-letter name for the channel. An empty checkbox (▢) can be checked (✅) to select one or more program or program elements to be removed from the Cherry Picked Transports column.

When the line is expanded, the following data for each program is shown:

10 **Source:** Displays the RF source that the program is being sourced from as well as the source stream name.

11 **Video, Audio and Other:** See Fig. 6.1a "RF Input TS" (1, 2, and 3) for more information.
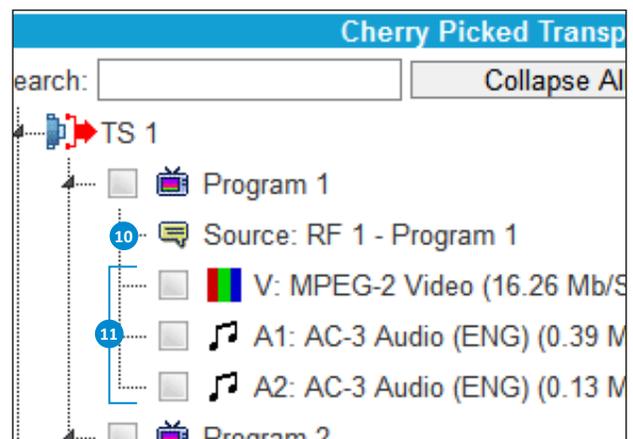
Figure 6.1c - Cherry Picked Transports

6.2 TS Select > Adding Additional Programs to Cherry Picked Transports

Within the "**RF Input TS**" column and under each numbered RF Input, the user can locate the program(s) available for adding to a Transport Stream under the "**Cherry Picked Transports**" column. (See Figure 6.2)
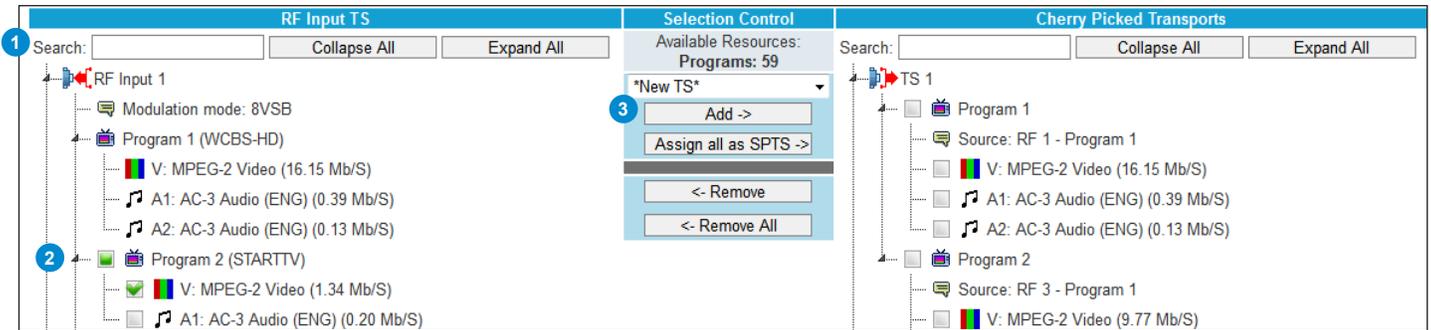
Figure 6.2 - "TS Select" Tab - Adding Programs

1 **Locating Program(s):** Each program can be located manually by clicking the arrows within either column in order to view more in-depth information about each program. The additional controls at the top of "**RF Input TS**" are a Search field, if the user knows which program(s) they are intending to add to the Cherry Picked Transports, and the **Collapse All/Expand All** buttons, allowing the user to view all information at once. This is especially useful when first setting up the **"Cherry Picked Transports"**.

2 **Choosing Program(s)** To add, locate the desired program or program data and check the empty box next to it.

3 **Adding Program(s):** From the pull-down menu, select which TS the chosen programs will be added to. Click **"Add"** and the program will be added to the "**Cherry Picked Transports**" column for the selected Transport Stream.

> **NOTE:** An empty check box will always appear next to available programs. This check box will not appear next to a program under the "**RF Input TS**" column if a program has already been added to the "**Cherry Picked Transports**" column.

6.3 TS Select > Removing Programs from Cherry Picked Transports

Within the "**Cherry Picked Transports**" column, and under each numbered TS, the user can locate the program(s) they wish to remove and make them selectable once again under the "**RF Input TS**" column. (See Figure 6.3)
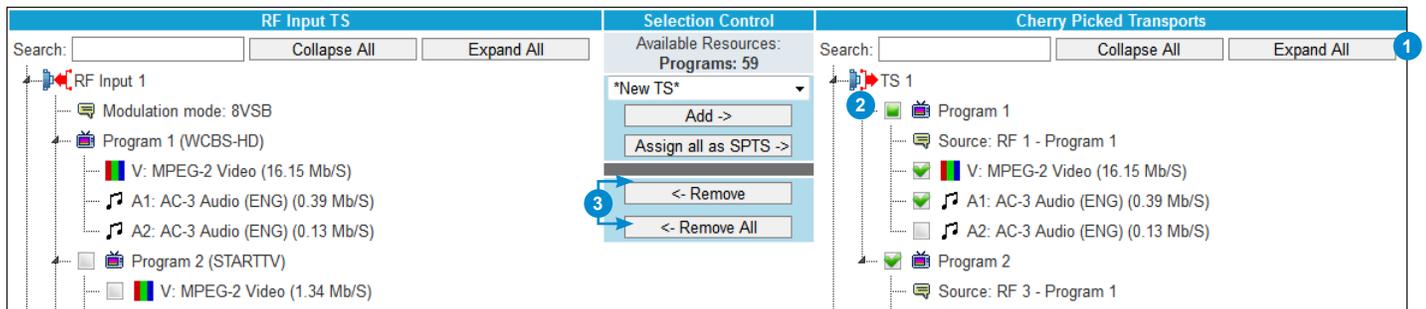
Figure 6.3 - "TS Map" Tab - Removing Programs

1 **Locating Program(s):** Each program can be manually located by clicking open the programs in order to view more in-depth information about each program. Additional controls at the top of "**Cherry Picked Transports**" are a Search field, if the user knows which program(s) they intend to remove, and the **Collapse All/Expand All** buttons, allowing the user to see all information at once.

2 **Choosing Program(s):** To remove, locate the desired program and check the box next to the program or program data to select.

6.3 TS Select > Removing Programs from the Transport Stream Output (continued)

3   **Removing Program(s):** Click **"Remove"** and the program will be made available once again within the "**RF Input TS**" column and removed from the "**Cherry Picked Transports**" column. In addition, the user is able to click the "**Remove All**" button and clear out all programs from all Transport Stream Outputs. This is useful for starting over completely.

6.4 TS Select > Search Function and Additional Controls

As pointed out in the prior sections, the search field and additional controls are provided for easier management and setup of the programs. (See Figure 6.4)

The **"Search"** function is provided as a way to easily find a program within a list. This standard function is real-time, acting as a filter to isolate matches as the user types into the input field.

The **"Collapse All"** and **"Expand All"** buttons are also provided, in addition to the search function, in order to further filter data.

Figure 6.4 - Search and Additional Controls

As shown in Figure 6.4, when a search is performed, the filtered lines with the matching search terms will highlight as ***bold italic red-colored*** text, while the rest of the programs will be hidden until the search input is cleared out or a new search is performed.

6.5 TS Config > Basic Configuration

The "**TS** (Transport Stream) **Config**" tab (Figure 6.5) is a read and write screen which allows a user to assign TS parameters.
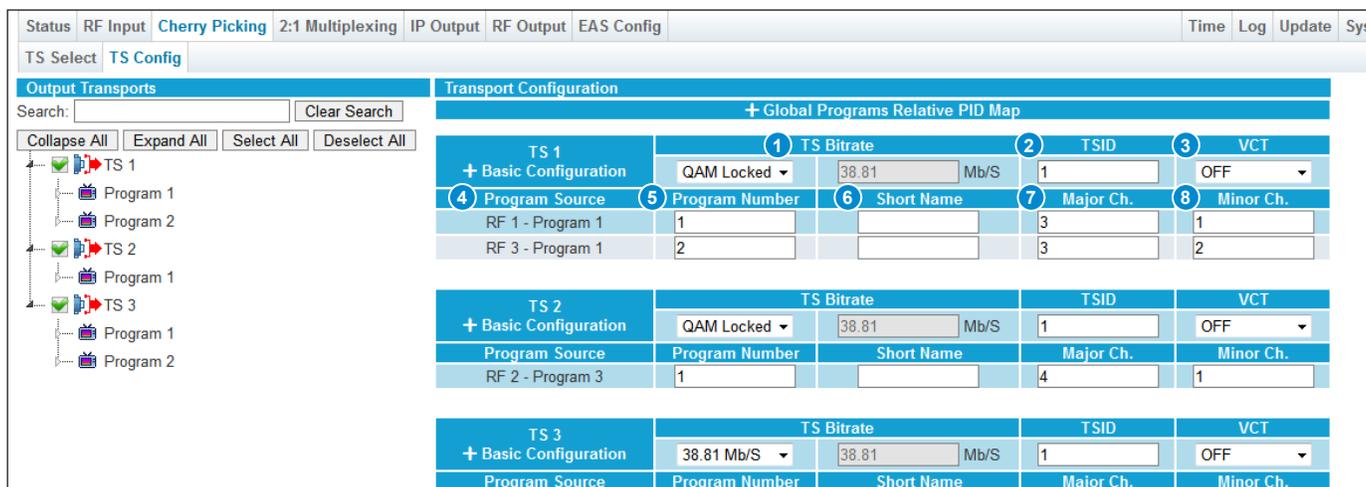
Figure 6.5 - "Cherry Picking" > "TS Config" Tab - Full View (Basic Configuration)

The "**Transport Configuration**" column allows the user to set up and assign parameters within each TS Output. The transport streams can be set up in either "**Basic Configuration**" or "**Advanced Configuration**".

In **Basic Configuration** (Figure 6.5), the following parameters can be set:

1   **TS Bitrate:** The user can use the drop down list to set the bitrate or choose custom bitrate and input the desired bitrate. When the Transport Stream has been assigned to a QAM Output, the TS is QAM Locked.

> ⚠ **NOTE: When the Transport Stream is set as QAM Locked, it cannot be changed and is set to a 38.81 Mb/S bitrate.**

2   **TSID:** The user must enter the identification number for the output TS. The range is 0 to 65535. The TS ID assigned must be unique. Duplicates are not allowed.

6.5 TS Config > Basic Configuration (continued)

3 **VCT:** Virtual Channel Table (VCT) allows the user to choose from the following options:

CVCT: Cable Virtual Channel Table

TVCT: Terrestrial Virtual Channel Table

OFF: Turns the VCT off.

4 **Program Source:** Displays the RF Input that the channel is being sourced from as well as the source stream name.

5 **Program Number:** The user must enter a unique output program number for each program.

6 **Short Name:** The user may enter a short name for the channel. Up to 7 alphanumeric characters are allowed.

7 **Major Ch.:** The user may enter a major channel number for the output program. The range is 1 to 99 for Terrestrial and 1 to 999 for Cable.

8 **Minor Ch.:** The user may enter a minor channel number for the output program. The range is 1 to 99 Terrestrial and 0 to 999 for Cable.

> **NOTE: For one-part channel numbers (CVCT only), set the minor channel to 0, and the major channel to the desired one-part channel number.**

6.6 TS Config > Advanced Configuration

To toggle into "**Advanced Configuration**" (Figure 6.6), click the plus sign (➕) next to Basic Configuration. The additional following parameters will then be shown:

TS 1 Advanced Configuration		TS Bitrate		TSID	VCT
	QAM Locked ▾	38.81	Mb/S	1	OFF ▾
Program Source	**Program Number**	**Short Name**		**Major Ch.**	**Minor Ch.**
RF 1 - Program 1	1			3	1
RF 3 - Program 1	2			3	2
① Pgm PID Base		**② Next Pgm PID Base**		**③ QAM Status**	
48		64		Assigned	
④ Input				**⑤ Input PID**	**⑥ Output PID**
RF 1 - Program 1 - PMT				48	48
RF 1 - Program 1 - MPEG-2 Video (15.97 Mb/S)				49	50
RF 1 - Program 1 - AC-3 Audio (ENG) (0.39 Mb/S)				52	51
RF 1 - Program 1 - AC-3 Audio (ENG) (0.13 Mb/S)				53	52
RF 3 - Program 1 - PMT				48	64
RF 3 - Program 1 - MPEG-2 Video (6.46 Mb/S)				49	66
RF 3 - Program 1 - AC-3 Audio (ENG) (0.27 Mb/S)				52	67
RF 3 - Program 1 - AC-3 Audio (ENG) (0.13 Mb/S)				53	68

Figure 6.6 - "Cherry Picking" > "TS Config" Tab - Full View (Advanced Configuration)

1 **Pgm PID Base:** The Program PID Base sets the first programs output PID number to this starting base number.

2 **Next Pgm PID Base:** The Next Program PID Base sets the next programs starting output PID number by incrementing this value higher than the previous program's output PID number.

> **NOTE: It is recommended that this value be +16 above the Pgm PID base value. This is not a requirement, but will help in guiding a user who is changing things but does not understand what they are doing. By default, this value is set to 64 which is 48+16 (48 being the default program pid base value).**

6.6 TS Config > Advanced Configuration (continued)

③ **QAM Status:** A read-only parameter indicating the QAM output status. This parameter is set under the "**RF Output**" tab.

The following columns are used to display the PID numbers used for programs within the TS Output.

④ **Input**: Indicates the inputs that the PIDs are being assigned to.

⑤ **Input PID**: Indicates automatically assigned PIDs for each input.

⑥ **Output PID**: Indicates automatically assigned PIDs for each output.

> ⚠ **NOTE: PIDs are automatically assigned and use the parameters set through 1 and 2 and when used, through "Global Programs Relative PID Map" (Section 6.8)**

6.7 TS Config > Output Transports

Within the "**Output Transports**" (Figure 6.7a and 6.7b) column, the user is able to narrow down the Transport Stream Outputs viewable under the Transport Configuration column in order to isolate one or more specific streams to configure. This column is only used to filter and does not affect the configuration in any other way. The controls and parameters are as follows:

The **"Search"** function is provided as a way to easily find a program within a list. This standard function is real-time, acting as a filter to isolate matches as the user types into the input field. Use of "**Clear Search**" will wipe out the typed in words or numbers.

The **"Collapse All"** and **"Expand All"** buttons are also provided, in addition to the search function, in order to further filter data.

"**Select All**" and "**Deselect All**" will either fill in or remove the check from the boxes. The user can also manually check or uncheck any boxes they wish to show or hide from the list.
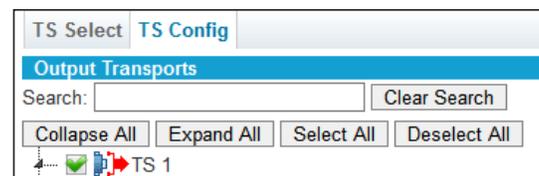
Figure 6.7a - "TS Config" Tab - Controls

The "**Output Transports**" column shows a list of all programs have been added to the TS Output. This column displays the following information:

TS #: Only programs which are being encoded will show up in this column. A checkbox (✓) can be unchecked (☐) to select one or more Transport Streams to be removed from the column.

Stream Name: Displays the Source Stream Name.

When the line is expanded, the following read-only data for each program is shown:

① **Source:** Displays the RF Port number that this program is being sourced from as well as the source stream name.

② **V:** Displays the Video Encoding and Bandwidth (Mb/S).

③ **A:** Displays the Audio Encoding, Language and Bandwidth (Mb/S).
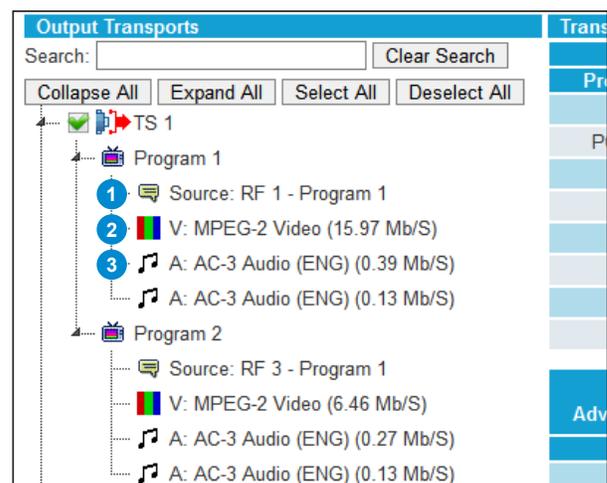
Figure 6.7b - "TS Config" Tab - Output Transports

6.8 TS Config > Global Programs Relative PID Map

The **Global Programs Relative PID Map** (Figure 6.8), allows the user to offset the PID from the PMT. To open the Map, click the plus sign (+) next to the Map's title at the top of the **Transport Configuration** column section. The additional following parameters will then be shown:

Transport Configuration			
─ Global Programs Relative PID Map			
① Program Element	② Relative Offset from PMT	Program Element	Relative Offset from PMT
PMT	0	Other 3	8
PCR (as needed)	1	Other 4	9
Video 1	2	Other 5	10
Audio 1	3	Other 6	11
Audio 2	4	Other 7	12
Audio 3	5	Other 8	13
Other 1	6	Other 9	14
Other 2	7	Other 10	15

Figure 6.8 - "TS Config" Tab - Transport Configuration - Global Programs Relative PID Map

1   **Program Element:** Displays each program element that a PID gets assigned to.

2   **Relative Offset from PMT:** Allows user to instruct the unit to offset the assigned PID # relative to the PMT (Program Map Table). When modifying this setting, it is recommended to use values 1 - 15.

⚠   **WARNING: Duplicate numbers are not permitted and the page will reject a "save" until all entered values are unique.**

Section 7 – 2:1 Multiplexing

Once the user clicks on the "2:1 Multiplexing" tab on the main navigation menu, the options within "**TS** (Transport Stream) **Select**" tab (Figure 7.1) are shown. The AQT8's 2:1 Multiplexing is capable of running simultaneously with Cherry Pick.

NOTE: Clicking the small arrow (⊟ collapsed; ⊞ expanded) beside each program will show or hide further choices or read-only data.

7.1 TS Select

This section allows the user to select two 8VSB transports to be merged into a single 38.8 Transport Stream (TS).

The controls in this section operate in a similar way to those described in Section 6, from Section 6.1 ("**TS Select > Configuration Settings and Parameters**") to Section 6.4 ("**TS Select > Search Function and Additional Controls**").
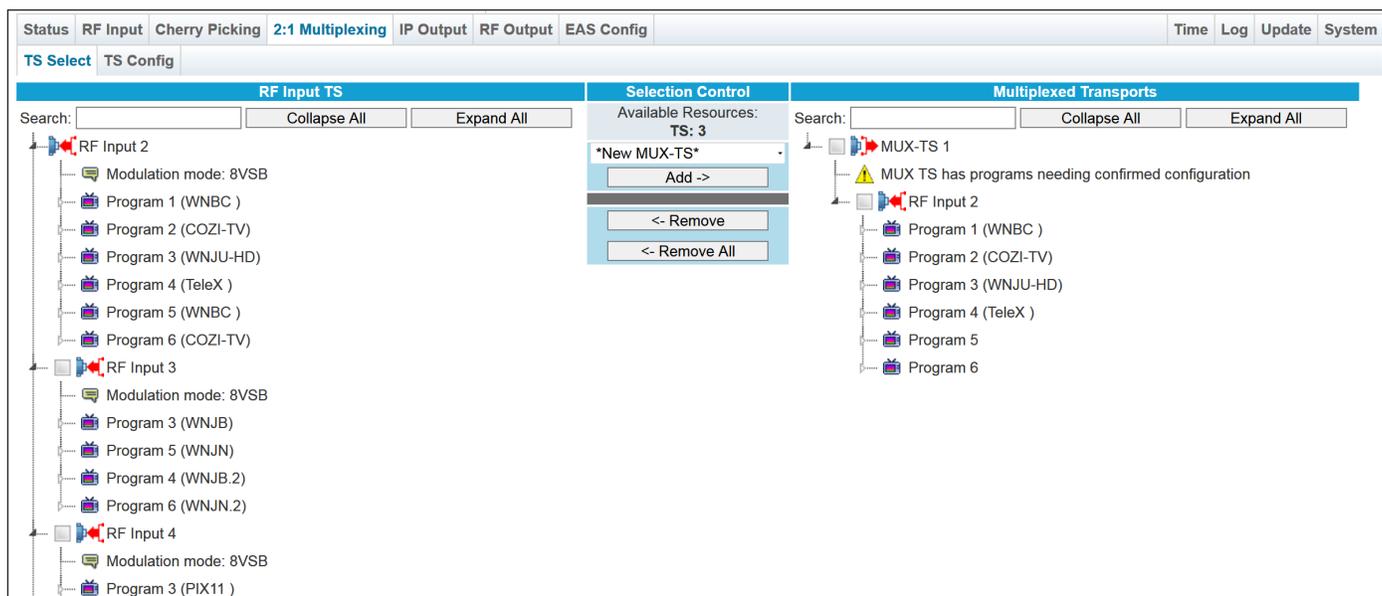
Figure 7.1a - "2:1 Multiplexing" > "TS Select" Tab - Full View

⚠️ **NOTE: The TS Config page should always be saved first. The user can also change the short name or major and minor channels if desired to change the input VCT information.**

The 2:1 Multiplexing will only allow selection of 8VSB modulation mode. (Figure 7.1b)

1 If an RF Input is not set to 8VSB modulation mode, the following warning will show and the input will not be selectable:

⚠️ Required modulation mode for MUX use: 8VSB
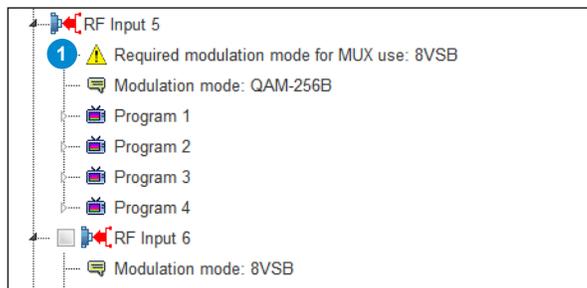
Figure 7.1b - Modulation Mode Warning

7.2 TS Config

The "**TS Config**" tab (Figure 7.2) allows the user to change the TS Bitrate, TSID, VCT, Short Name, Program Number, Major Channel and Minor Channel as well as additional advanced configurations of the Program PID Base and the Next Program PID Base. In addition, the Programs Relative PID Map has additional Global configurations that can be set or left as is.

The user controls in this section are set up in a similar way to those described in Section 6, from Section 6.5 ("**TS Config > Basic Configuration**") to Section 6.8 ("**TS Config > Global Programs Relative PID Map**").

Status	RF Input	Cherry Picking	2:1 Multiplexing	IP Output	RF Output	EAS Config			Time	Log	Update	System

TS Select **TS Config**

Output Transports

Search: [   ] [Clear Search]

[Collapse All] [Expand All] [Select All] [Deselect All]

- ☑ MTS 1
  - Program 1 (WCBS-HD)
  - Program 2 (STARTTV)
  - Program 3 (DABL)
  - Program 4 (WNET-HD)
  - Program 5 (KIDS)
  - Program 6 (WMBQ-CD)
  - Program 7 (WNDT-CD)
- ☑ MTS 2
  - Program 1 (WFUT-DT)
  - Program 2 (WXTV-DT)
  - Program 3 (GetTV)
  - Program 4 (Bounce)
  - Program 5 (Justice)
  - Program 6 (PIX11)
  - Program 7 (Antenna)
  - Program 8 (ThisTV)
  - Program 9 (TBD)

Transport Configuration

— Global Programs Relative PID Map

Program Element	Relative Offset from PMT	Program Element	Relative Offset from PMT
PMT	0	Other 3	8
PCR (as needed)	1	Other 4	9
Video 1	2	Other 5	10
Audio 1	3	Other 6	11
Audio 2	4	Other 7	12
Audio 3	5	Other 8	13
Other 1	6	Other 9	14
Other 2	7	Other 10	15

MTS 1 Advanced Configuration	TS Bitrate		TSID	VCT
	38.81 Mb/S	38.81 Mb/S	1	OFF
Program Source	**Program Number**	**Short Name**	**Major Ch.**	**Minor Ch.**
RF 1 - Program 1	1	WCBS-HD	2	1
RF 1 - Program 2	2	STARTTV	2	2
RF 1 - Program 3	3	DABL	2	3
RF 2 - Program 3	4	WNET-HD	13	1
RF 2 - Program 4	5	KIDS	13	2
RF 2 - Program 5	6	WMBQ-CD	46	1
RF 2 - Program 6	7	WNDT-CD	14	1

Pgm PID Base	Next Pgm PID Base	QAM Status
48	64	Not assigned

Input	Input PID	Output PID
RF 1 - Program 1 - PMT	48	48
RF 1 - Program 1 - MPEG-2 Video (16.78 Mb/S)	49	50
RF 1 - Program 1 - AC-3 Audio (ENG) (0.39 Mb/S)	52	51
RF 1 - Program 1 - AC-3 Audio (ENG) (0.13 Mb/S)	53	52
RF 1 - Program 2 - PMT	64	64
RF 1 - Program 2 - MPEG-2 Video (1.74 Mb/S)	65	66
RF 1 - Program 2 - AC-3 Audio (ENG) (0.20 Mb/S)	68	67
RF 1 - Program 3 - PMT	80	80
RF 1 - Program 3 - MPEG-2 Video (1.77 Mb/S)	81	82
RF 1 - Program 3 - AC-3 Audio (ENG) (0.10 Mb/S)	83	83
RF 2 - Program 3 - PMT	48	96
RF 2 - Program 3 - MPEG-2 Video (8.56 Mb/S)	49	98
RF 2 - Program 3 - AC-3 Audio (ENG) (0.39 Mb/S)	52	99
RF 2 - Program 3 - AC-3 Audio (ENG) (0.13 Mb/S)	53	100
RF 2 - Program 3 - AC-3 Audio (ENG) (0.13 Mb/S)	54	101
RF 2 - Program 4 - PMT	64	112
RF 2 - Program 4 - MPEG-2 Video (3.74 Mb/S)	65	114
RF 2 - Program 4 - AC-3 Audio (ENG) (0.20 Mb/S)	68	115
RF 2 - Program 4 - AC-3 Audio (ENG) (0.13 Mb/S)	69	116
RF 2 - Program 4 - AC-3 Audio (ENG) (0.13 Mb/S)	70	117
RF 2 - Program 5 - PMT	80	128
RF 2 - Program 5 - MPEG-2 Video (2.25 Mb/S)	81	130
RF 2 - Program 5 - AC-3 Audio (ENG) (0.20 Mb/S)	84	131
RF 2 - Program 6 - PMT	96	144
RF 2 - Program 6 - MPEG-2 Video (4.99 Mb/S)	97	146
RF 2 - Program 6 - AC-3 Audio (ENG) (0.20 Mb/S)	100	147

MTS 2 Basic Configuration	TS Bitrate		TSID	VCT
	QAM Locked	38.81 Mb/S	1	OFF

Figure 7.2 - "2:1 Multiplexing" > "TS Config" Tab - Full View

Section 8 – IP Output

The "IP Output" tab (Figure 8) on the main navigation menu allows the user to select programs for IP output.

NOTE: Clicking the small arrow ([··· collapsed; ◀··· expanded) beside each program will show or hide further choices or read-only data.

Figure 8 - "IP Output" Tab - Full View

8.1 Add Output Streams Configuration

The parameters under "**Add Output Streams Configuration**" (Figure 8.1) are configurable for each stream output upon adding. The user begins by assigning destination IP information as shown below:

Figure 8.1 - "Add Output Streams Configuration"

1. **Destination IP:** User must enter the IP address or desired multicast IP address of the receiving equipment.

2. **Destination Port:** User must enter the IP Port of the receiving equipment. The range is 1 to 65535.

3. **Time-to-Live (TTL):** A limit setting on the time that an IP packet can exist in an IP network. The value is set by the sender of the packet, and is reduced by every host on the route to packet's final destination. If the Time to Live reaches zero before the packet arrives at its final destination, then the packet is discarded. The purpose of this field is to avoid an undeliverable packet from circulating on an IP network perpetually. The range is 1 to 255.

8.2 IP Output Assignment

The "**TS Available for IP Output Assignment**" (Figure 8.2) column allows the user to select programs from the available TS to add to IP Output. To select, check the box (✅) next to the programs to add to the IP Output. After configuration details have been completed and the streams have been selected, the user can click [Add] to add the Input Stream to the IP Port. The TS will then appear under the "TS Assigned as IP Output" column.

Figure 8.2 - IP Output Assignment

8.3 Available Output Resources

The "**Available Resources**" table (Figure 8.3) displays, in real-time, the remaining available resources after factoring out the current assigned streams to the IP Output. The resources being monitored are as follows:

1 **TS Out:** Displays the remaining Transport Streams (TS) for each port. The transport streams allowed for input can be up to 256 per Port. As streams are added to Output, this number decreases accordingly.

2 **Out BW:** Displays the remaining bandwidth (Mb/S) for the data port. As streams are added to Output, this number decreases accordingly. If the Port is not linked, "No Link" will show in this field.

Figure 8.3 - "Available Resources"

8.4 Remove Configuration

The "**Remove Configuration**" table (Figure 8.4) provides a way of removing configured streams from the IP Output.

 # Streams: Displays the number of selected configured streams that the user wishes to remove. To select a stream, the user is able to check the empty box (✓) to select one or more programs to be removed from the Output configuration.

Once all streams that should be removed are selected, click Remove and all selected streams will instantly be removed in real-time.

Figure 8.4 - "Remove Config"

Alternately, the user can click Remove All to clear out all selected streams.

> **CAUTION: The remove function is instantaneous. There will be no warning before the function is completed, so ensure that a copy of the current configuration is saved. This can be done through the System tab.**

8.5 Transport Stream Search Functions

The **"Search"** field and additional controls (Figure 8.5) are provided for easier management and setup of the transport streams. The list of streams which have been configured and added will show below the configuration area and the following functions are shown above the list:

Figure 8.5 - Output Stream List Search Functions

1 The **"Search"** function is provided to find a program within a list. This standard function is real-time, acting as a filter to isolate matches as the user types into the input field.

2 The **"Collapse All"** and **"Expand All"** buttons are also provided, in addition to the search function, to further filter data.

Section 9 – RF Output

The "RF Output" tab (Figure 9) on the main navigation menu allows the user to select transports for each of up to 8 QAM outputs.

NOTE: Clicking the small arrow (⊳ collapsed; ⬢ expanded) beside each program will show or hide read-only data.

⚠️ **NOTE: The RF Input and TS List are available for view and search on the left side for ease of operation and setup.**

Figure 9 - "RF Output" Tab - Full View

The following parameters are Global Configurations for RF Output (Figure 9a):

① **Output Level:** Allows the user to set the combined RF Output Level. The range is 30 to 45 dBmV. The recommended output level is 40 dBmV.

② **Output Mode:** Allows the user to set the Output Mode. For normal operation the output mode should be set to QAM256B. CW is only used for testing and measuring level. (Options: QAM256B, QAM 64B, or CW)

Figure 9a - "Add Output Streams Configuration"

③ **Output Ch Map:** Allows the user to set the Output Channel Map. Options are: STD, HRC, and IRC. (Factory Default: "STD")

⚠️ **IMPORTANT: All channels must be set within a 768 MHz span.**

The following parameters are configurations for each RF Outputs 1 to 8 (Figure 9b):

① **Output Enable:** Allows the user to turn the RF Output "On" or "Off".

② **Output Ch/Freq:** Allows the user to set the Channel/Frequency. The range is channel 2 to 158.

Figure 9b - "Add Output Streams Configuration"

③ **Assigned TS:** Allows the user to assign any transport stream to RF output from the dropdown.

⚠️ **Remember to click on the SAVE button to apply the new values/configurations.**

Section 10 – EAS Config

The "EAS Config" tab (Figure 10) on the main navigation menu allows the user to configure the EAS settings for the unit. The EAS trigger is either by Dry contact closure or Voltage. The EAS source can be IP input or ASI input.

NOTE: Clicking the small arrow (collapsed; expanded) beside each program will show or hide read-only data.
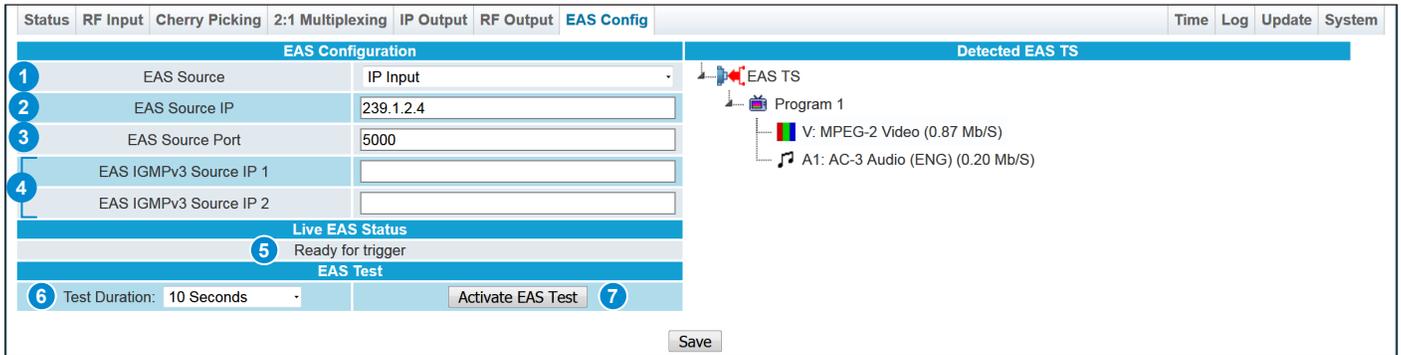
Figure 10 - "EAS Config" Tab - Full View

1. **EAS Source:** the user can select which source input to obtain EAS data. Options are Disabled, ASI Input, and IP Input.

2. **EAS Source IP:** Source unicast or multicast address for the EAS TS.

3. **EAS Source Port:** UDP port for the EAS TS.

4. **EAS IGMPv3 Multicast Src IP 1 & 2:** Source IPs for the EAS TS (when multicast and IGMPv3 is enabled)

5. **Live EAS Status:** Displays the system's current EAS status. The following message types may display:

   - **Waiting for EAS TS**: Displays if an EAS source is selected and will not enter EAS until a valid EAS TS is detected.

   - **Ready for Trigger**: Displays when a valid EAS TS is detected.

   - **EAS Active**: Displays if an EAS is triggered.

   - **Disabled**: Displays if no EAS source is present.

   - **EAS Test Active**: Displays during a local EAS test (using the test button on the User Interface), the status will count down the remaining time of the test until the test is complete.

6. **EAS Test - Test Duration:** Allows the user to select how long EAS will be active once the "Activate EAS Test" button is pressed. Options are 10, 30 or 60 seconds.

7. **EAS Test - Activate EAS Test:** This button will initiate an EAS test for the duration specified by "Test Duration".

Remember to click on the SAVE button to apply the new values/configurations.

Section 11 – General and System Configuration

11.1 "Time" Tab

The "**Time**" tab (Figures 11.1a to 11.1d) allows the user to configure the time settings for the system and the event log.
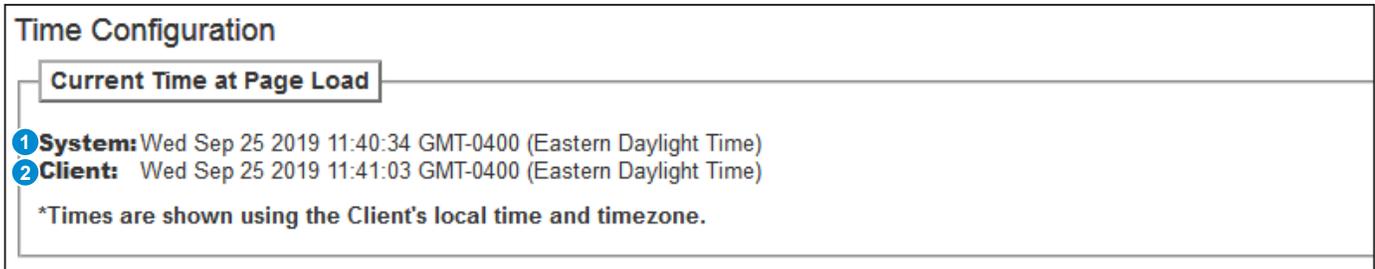
Figure 11.1a - "Current Time at Page Load"

Current Time at Page Load

1 **System:** read-only display of the unit's current date and time, shown in UTC format. The time is adjusted for states, territories and countries that use time change (ie. Eastern Standard Time and Eastern Daylight Time).

2 **Client:** read-only display of the Client, or local browser, current date and time, shown in UTC format with time zone. The time is adjusted for states, territories and countries that use time change (ie. Eastern Standard Time and Eastern Daylight Time).
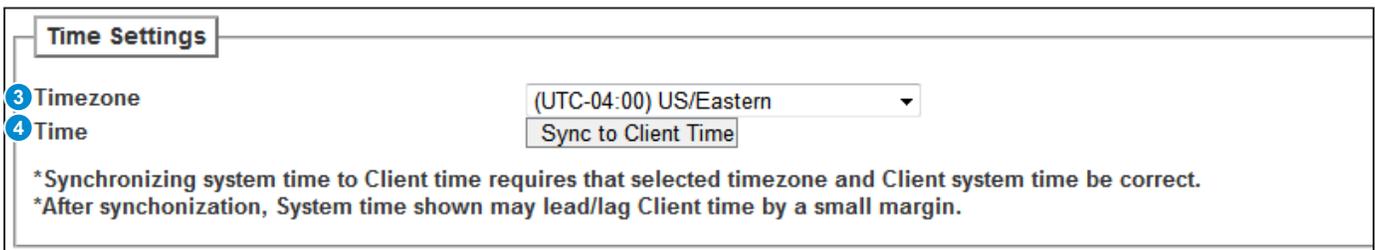
Figure 11.1b - "Time Settings"

Time Settings

3 **Time Zone:** user is able set the time zone, shown in UTC format.

4 **Time:** Clicking the button will synchronize the unit's time to Client time. This requires that the selected time zone and client system time are correct. After synchronization, the unit's time shown may lead or lag the Client time by a small margin.
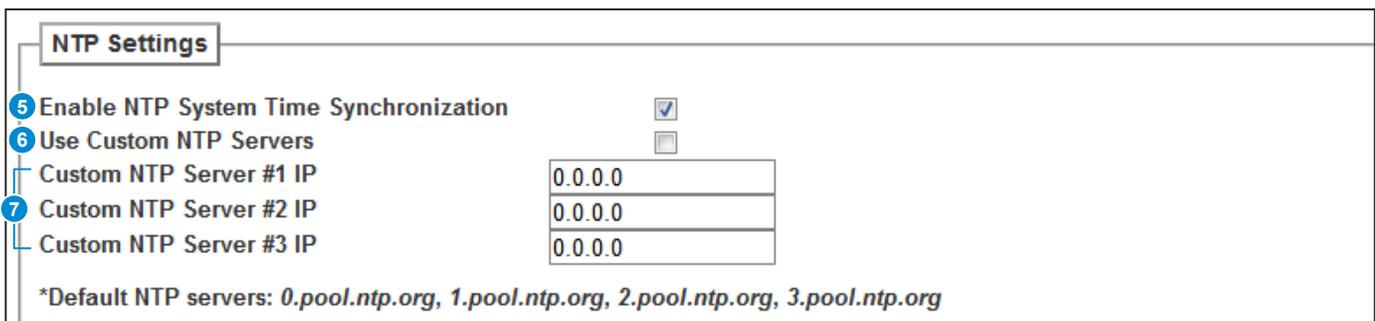
Figure 11.1c - "NTP Settings"

NTP Settings

5 **Enable NTP System Time Synchronization:** Enable (☑) or Disable (☐) System Time Synchronization.

11.1 "Time" Tab (continued)

6 **Use Custom NTP Servers:** Enable (☑) or Disable (☐) the Custom NTP Servers. Network Time Protocol (NTP) uses one or more IP addresses that the platform can sync time to. When enabled, the three fields under **7** are usable.

7 **Custom NTP Server IP (#1, #2, #3):** Enter the custom NTP server IP addresses within these fields. The time servers specified must support the Network Time Protocol (NTP) in order for automated time acquisition to work properly.

NOTE: Default NTP Servers are "*0.pool.ntp.org*", "*1.pool.ntp.org*", "*2.pool.ntp.org*", and "*3.pool.ntp.org*".

REMINDER: Internet access must be present in order to access the default NTP Servers.

*Default NTP servers: 0.pool.ntp.org, 1.pool.ntp.org, 2.pool.ntp.org, 3.pool.ntp.org

8 Revert   **9** Apply

Figure 11.1d - "Save Settings"

8 Revert   Reverts the configuration back to the previous settings.

9 Apply   Click to apply and save the system configuration changes.

11.2 "Log" Tab

The "**Log**" tab (Figure 11.2) allows the user to view the system log messages as well as configure some changeable parameters. This includes choosing which event message types to display on the screen.
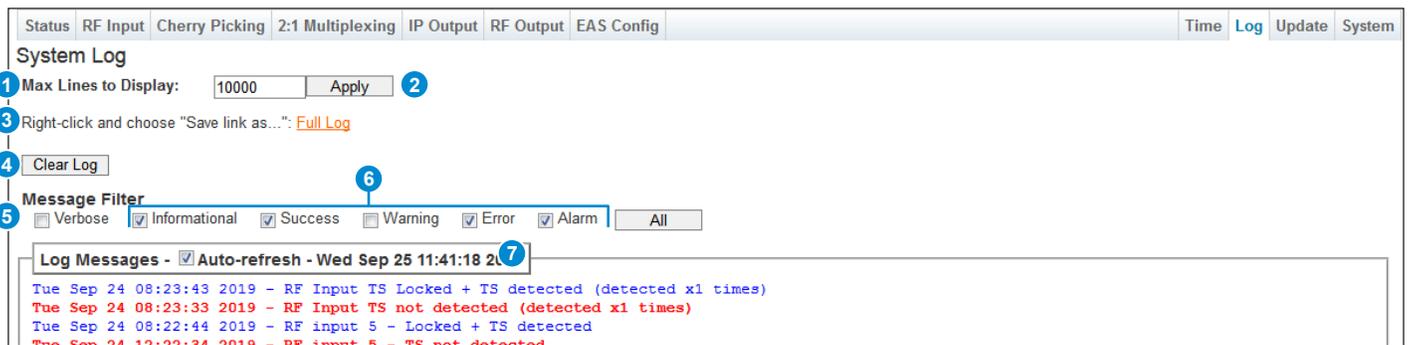
Figure 11.2 - "System Log"

1 **Max Lines to Display:** allows the user to select the maximum number of lines to display starting at the most recent. (Minimum: 1, Maximum: 100,000)

2 Apply   Click this to apply changes to Max Lines to Display setting.

3 **Full Log:** To save the full event log, right-click and choose "Save link as...". The log can then be saved to a user-chosen location.

4 Clear Log   Click this to clear the event log.

11.2 "Log" Tab (continued)

Message Filter

The following message filters can be set to enabled or disabled.

5 **Verbose:** Enable (☑) or Disable (☐) the Verbose setting. Verbose prevents log messages from being stacked and condensed down into one entry. For example, a loss of multiple inputs within a time window of 60 seconds will result in one to two log lines with verbose disabled. The resulting line will indicate that the issue was detected "*x*" times. With verbose on, all entries will populate the log.

6 **Event Message Types:** The following message types can be selected individually or enabling them all by clicking the "**All**" button.

- **Informational:** messages appear in **blue text** and indicates an informational-only event was logged.
- **Success:** messages appear in **green text** and indicates an event was logged where an operation was successful.
- **Warning:** messages appear in **dark orange text** and indicates an event was logged pertaining to an issue that did not cause a loss of service.
- **Error:** messages appear in **bold red text** and indicates an event was logged that caused or may cause loss of service.
- **Alarm:** messages appear as **bold white text on a red background** and indicates an ongoing event was logged that is actively causing a loss of service.

7 **Auto Refresh:** The user is able to set the auto-refresh on this page. The log messages will display real-time as they happen.

11.3 "Updates" Tab

The "**Update**" tab (Figures 11.3a to 11.3d) allows the user to review the currently installed firmware version and provides a quick and easy way to apply firmware updates. This tab is located on the right side of the main menu.
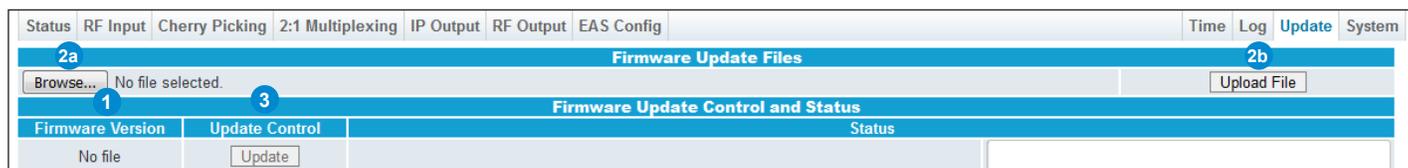
Figure 11.3a - "Firmware Update" Tab

1 Check "**Firmware Version**" to ensure you have the latest firmware. To determine if a new firmware update has been released, please go to our website at: (www.blondertongue.com/page/resources/tech-support/firmware-updates/)

Click the "Download Firmware Updates" link and then scroll down to the product folder to access the update file(s).

2 Under the "**Firmware Update Files**" section, the user can use Browse... and Upload File to select and send the update file(s) to the unit. Shown below in Figure 11.3b, is the file upload in-progress. The final step of the file upload is the validation process, shown below in Figure 11.3c. Once this is complete, the update process can be initiated.

Figure 11.3b - File Upload in Progress

Figure 11.3c - File Upload and Validation Complete

11.3 "Updates" Tab (continued)

3 Update the Firmware version by clicking the ⬚Update⬚ button. The update status and progress will show under the "**Status**" column. Below is the firmware update as it appears while in-progress (Figure 11.3d) and upon completion (Figure 11.3e).

Note: After clicking the "**Update**" button, please allow time for the file to install.

Firmware Version	Update Control	Status
1.0.0.1_20190716	**3** Update	Updating System Files

Figure 11.3d - Update In Progress

4 Once the update progress is complete, the user **MUST** click the ⬚Reboot⬚ button (as shown on Figure 11.3e) in order to apply and finalize the update.

Firmware Version	Update Control	Status
1.0.0.1_20190716	**4** Reboot	Update Complete
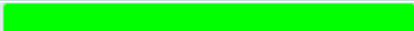
Figure 11.3e - Completed Update

While the unit is rebooting, the following screen (Figure 11.3f) will display. As directed, do not power the system down during the rebooting process.

Rebooting unit. Please wait...

Do Not Power Down The System!

Please wait 26 seconds...
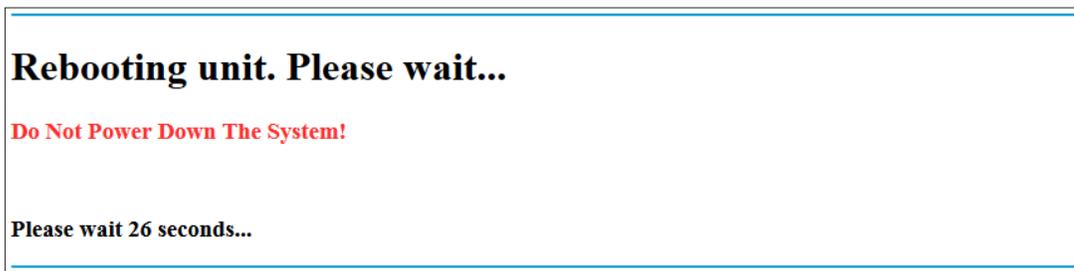
Figure 11.3f - Completed Update

11.4 "System" Tab

The "**System**" tab (Figure 11.4) allows the user to configure the general ethernet connection and user-defined identification data for the platform can be configured here. It is a "read and write" screen and is located on the right side of the main menu.

Figure 11.4 - "System Configuration"

11.4 "System" Tab (continued)

System Settings Configuration

This section allows the user to back-up and re-load the configuration settings.

1 Default Settings — Resets the unit back to the Factory defaults. It is always recommended to save the existing configuration file before resetting to the default values .
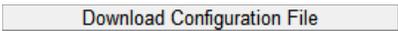
2 Download Configuration File — Downloads the current unit configuration file.
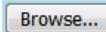
3 Browse... No file selected. — Browse and select a Configuration File.

4 Load & Apply Configuration File — After choosing file, click this to load and apply the configuration file.

Reboot

This section allows the user to reboot the unit from this screen.

5 Reboot — Click this button to reboot the unit.

General System Configuration

This section allows the user to enter user-defined identification data.

6 **Unit Name:** a user-defined field to more easily identify the unit by name. The character limit is 64 alphaumeric, however if other characters are used, the display limit is decreased and may truncate.

7 **Unit Location:** a user-defined field to more easily identify the unit's location. The character limit is 64 alphaumeric, however if other characters are used, the display limit is decreased and may truncate.

Ethernet Settings Configuration

This section allows the user to set up the network settings for the unit.

8 **Control Port IP Address:** the static IP address that is assigned to the **GbE Control** port, allowing the user to access the unit via the web interface. (Factory Default: "172.16.70.1")

9 **Control Port Subnet Mask:** the Subnet Mask address assigned to the **GbE Control** port of the unit, allowing the user to determine which subnet the Control Port IP address belongs to. (Factory Default: "255.255.255.0")

10 **Control Port Default Gateway:** the gateway address assigned to the **GbE Control** port, allowing the user to access the unit from another network via the web interface. (Factory Default: "172.16.70.254")

> **REMINDER: If the Control port's IP address is changed, the unit will reboot and be located at the new IP address.**

11 **Data Port IP Address:** the static IP address assigned to the **Data** port. (Factory Default: "192.168.253.1")

12 **Data Port Subnet Mask:** the subnet mask address assigned to the **Data** port. (Factory Default: "255.255.255.0")

13 **Data Port Default Gateway:** the gateway address assigned to the **Data** Port. (Factory Default: "192.168.253.254")

14 **EAS Port IP Address:** the static IP address assigned to the **IP EAS IN** Port. (Factory Default: "192.168.252.2")

15 **EAS Port Subnet Mask:** the Subnet Mask address assigned to the **IP EAS IN** Port. (Factory Default: "255.255.255.0")

16 **EAS Port IGMP Version:** the selection of IGMP version between IGMPv2 and IGMPv3. (Factory Default: "IGMPv2")

> **Remember to click on the SAVE button to apply the new values/configurations.**

11.5 "Admin" Screen

The "**Admin**" screen (Figure 11.5) settings allow a user to change or modify the Username and Password values for the unit while logged in. To access this screen, click the "Admin" link at the top right corner as shown below.
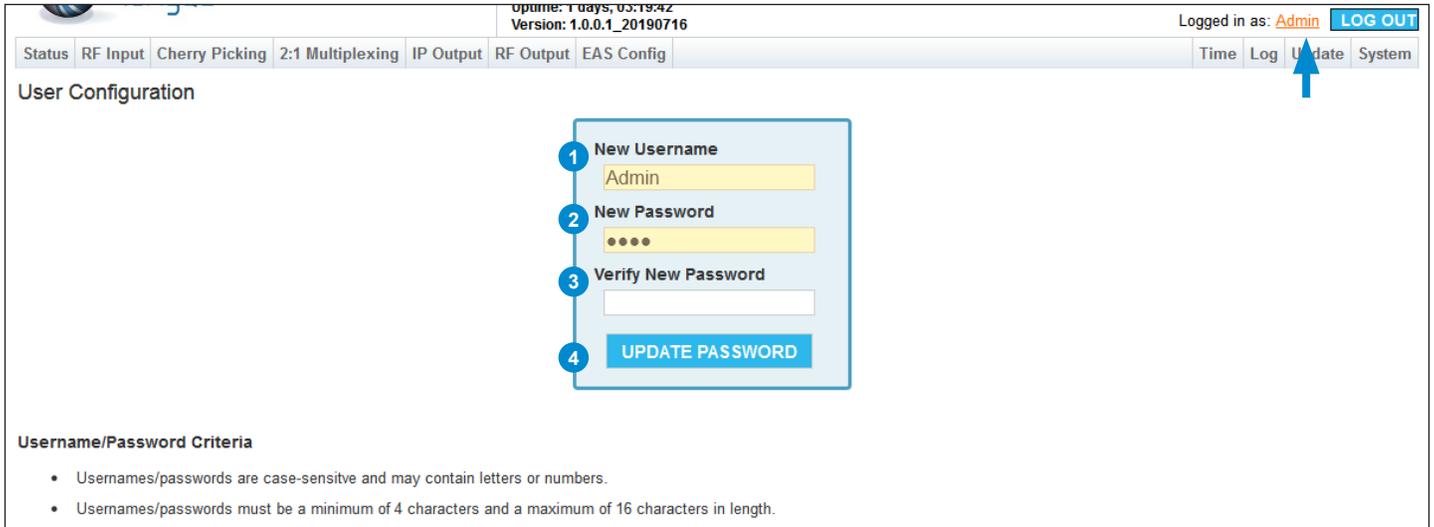
Figure 11.5 - "User Configuration"

1 **Username:** is the Administrator's login (16 characters maximum). This login allows the user to make changes to any area of the unit. (Factory Default: "**Admin**")

2 **New Password:** is only used when changing the current Administrator's password (16 characters maximum). The password will not be displayed. (Factory Default: "**pass**")

3 **Verify New Password:** is required when changing the current Administrator's password. It **MUST** match the "Password" field and will not be displayed.

4 Click the **UPDATE PASSWORD** button to apply changes to the User Configuration.

> **NOTE: Login and Password are both case-sensitive.**

Extended Warranty Program

STANDARD TERMS & CONDITIONS OF THE EXTENDED WARRANTY

A.   THE EXTENDED WARRANTY AGREEMENT (EWA)

If during the period following the expiration of the Blonder Tongue Manufacturers' Standard Warranty (Copy Included) the products which constitute the subject matter of the extended warranty, manifest any manufacturing or similar such defects then Blonder Tongue shall at its option repair or replace the product. It is emphasized that the extended warranty is in effect an extension of the Blonder Tongue Warranty and covers the items stipulated in Paragraph B to the exclusion of the terms in Paragraph C of this agreement. Eligibility to purchase EW is limited to 90 days following initial shipment on selected products of sufficient value.

The product/products included in this extended warranty agreement are listed in the invoice that accompanies the EWA. Term of the extension will be _____ year(s). Purchase Order is required for extended warranty coverage.

B.   WHAT IS COVERED?
1.   If a product has been determined to have failed, which falls within the Terms & Conditions of this EWA, Blonder Tongue Inc. may at its sole discretion repair, modify or replace its component parts that are defective at 100% coverage for parts and labor.
2.   A loaner unit may be available on request; PO required.
3.   Product is manufactured by Blonder Tongue.
4.   Extended warranty period is up to and not to exceed 24 months and sold in increments of 12 months. Order # 9981 for 1 year and #9982 for 2 year extensions.
5.   Return of repair or replaced product shipping costs for ground shipments.
6.   Firmware upgrades at no charge with automatic notification.

C.   WHAT IS NOT COVERED?
1.   The warranty does not cover any defects caused by foreign objects /connection errors .
2.   Use other than by the customer at the declared address appearing in this document.
3.   Failure by the end user to comply with the manufacturers' instructions for installation, maintenance or use.
4.   The use of accessories which have not been approved by Blonder Tongue.
5.   The application and/or use of any incorrect or abnormal electrical supply to the product.
6.   Any defect in wiring or electrical connections which does not form part of the product at the time of the original purchase.
7.   Neglect, misuse, or willful abuse of the product.
8.   Any repairs or attempted repairs of the product by any person other than Blonder Tongue Service Department.
9.   Any modification of the product by any person other than Blonder Tongue Service Department.
10. Fire, flood, war, civil disturbance, industrial action, acts of God or any other causes beyond the reasonable control of Blonder Tongue.
11. Any defect caused by lightning strike or power surges.
12. Shipping costs to return products to Blonder Tongue for warranty service.
13. Blonder Tongue will not in any circumstances be liable for any consequential loss or damages suffered by the customer whether directly or indirectly related defect in the product to the extent permissible by law.
14. Repairs may not be effected without prior authorization from Blonder Tongue Laboratories.

D.   GENERAL
1.   The customer shall notify Blonder Tongue Laboratories in writing within ten days of any change of his or her address.
2.   Customer must provide original **purchase receipt** and **serial number** to initiate extended warranty coverage.
3.   The fee paid for the warranty is not refundable under any circumstances unless cancelled within seven days of purchase.
4.   The customer shall take all reasonable precautions to maintain the product is maintained in good working order.
5.   The warranty contract ceases to exist if the product is replaced or a credit is given to the customer. Any monies paid for the warranty contract are forfeited and not refundable. This is only applicable when the product is out of the manufacturer's warranty.
6.   The extended warranty period as stated on the Extended Warranty Agreement shall be the governing period notwithstanding any additional supplier warranty on specific components.
7.   The warranty shall in no way effect the terms and conditions of the sale agreement in terms of which the customer bought the product.
8.   The extended warranty is limited to the terms and conditions herein contained
9.   No agreement, varying, adding to, amended, deleting, or cancelling this warranty shall be effective unless given in writing (email is acceptable) and signed by or on behalf of both parties.
10. The cost of the extended warranty is 8% of the purchase price for a 1 or 2 year extension beyond the Blonder Tongue standard warranty. e.g. A product price of $1000 will be $80 for the 1st year (12 mos) and additional $80 for 2 year (24 mos) extension for a total of $160.
11. Warranty product return postage paid to: Blonder Tongue Laboratories, Inc.
Attn: Warranty Service Dept.
1 Jake Brown Road
Old Bridge, NJ 08857

Contact Blonder Tongue at 800-523-6049 ext. 555 to order extended warranty service.

Limited Warranty

Seller will at its sole option, either repair or replace (with a new or factory reconditioned product, as Seller may determine) any product manufactured or sold (or in the case of software, licensed) by Seller which is defective in materials or workmanship or fails to meet the applicable specifications that are in effect on the date of shipment or such other specifications as may have been expressly agreed upon in writing: (i) for a period of one (1) year from the date of original purchase for all stock hardware products (other than those specifically referenced herein below having a shorter warranty period); (ii) for a period of one (1) year from the date of original purchase, with respect to all MegaPort™, IPTV products, test equipment and fiber optics receivers, transmitters, couplers and integrated receiver/distribution amplifiers; (iii) for a period of one (1) year from the date of original purchase (or such shorter period of time as may be set forth in the license agreement specific to the particular software being licensed from Seller) with respect to all software products licensed from Seller (other than Core Product Software) that is (a) developed for a specific function or application, (b) complimentary to and does not function without the Core Product Software, and (c) listed with a specific model number and stock number in Seller's Price List ("**Non-Core Software**"); (iv) for a period of ninety (90) days from the date of original purchase, with respect to non-serialized products and accessories, such as parts, sub-assemblies, splitters and all other products sold by Seller (other than Core Product Software and Refurbished/Closeout Products) not otherwise referred to in clauses (i) through (iii) above. The warranty period for computer programs in machine-readable form included in a hardware product, which are essential for the functionality thereof as specifically stated in the published product specifications ("**Core Product Software**") will be coincident with the warranty period of the applicable hardware product within which such Core Product Software is installed.

Software patches, bug fixes, updates or workarounds do not extend the original warranty period of any Core Product Software or Non-Core Software.

Notwithstanding anything herein to the contrary,

(i) Seller's sole obligation for software that when properly installed and used does not substantially conform to the published specifications in effect when the software is first shipped by Seller, is to use commercially reasonable efforts to correct any reproducible material non-conformity (as determined by Seller in its sole discretion) by providing the customer with: (a) telephone or e-mail access to report non-conformance so that Seller can verify reproducibility, (b) a software patch or bug fix, if available or a workaround to bypass the issue if available, and (c) where applicable, replacement or damaged or defective external media, such as CD-ROM disk, on which the software was originally delivered;

(ii) Seller does not warrant that the use of any software will be uninterrupted, error-free, free of security vulnerabilities or that the software will meet the customer's particular requirements; and the customer's sole and exclusive remedy for breach of this warranty is, at Seller's option, to receive (a) suitably modified software, or part thereof, or (b) comparable replacement software or part thereof;

(iii) Seller retains all right, title and interest in and to and ownership of all software (including all Core Product Software and Non-Core Software) including any and all enhancements, modifications and updates to the same; and

(iv) in some cases, the warranty on certain proprietary sub-assembly modules manufactured by third-party vendors and contained in Seller's products, third party software installed in certain of Seller's products, and on certain private–label products manufactured by third-parties for resale by Seller, will be of shorter duration or otherwise more limited than the standard Seller limited warranty. In such cases, Seller's warranty with respect to such third-party proprietary sub-assembly modules, third-party software and private-label products will be limited to the duration and other terms of such third-party vendor's warranty, if any. In addition, certain products, that are not manufactured by Seller, but are resold by Seller, may carry the original OEM warranty for such products, if any. The limited warranty set forth above does not apply to any product sold by Seller, which at the time of sale constituted a Refurbished/Closeout Product, the limited warranty for which is provided in the following paragraph.

Seller will at its sole option, either repair or replace (with a new or factory-reconditioned product, as Seller may determine) any product sold by Seller which at the time of sale constituted a refurbished or closeout item ("**Refurbished/Closeout Product**"), which is defective in materials or workmanship or fails to meet the applicable specifications that are in effect on the date of shipment of that product or fails to meet such other specifications as may have been expressly agreed upon in writing between the parties, for a period of ninety (90) days from the date of original purchase. Notwithstanding the foregoing, in some cases the warranty on certain proprietary sub-assembly modules manufactured by third-party vendors and contained in Seller products, third party software installed in certain of Seller's products, and on certain private–label products manufactured by third-parties for resale by Seller will be of shorter duration or otherwise more limited than Seller limited warranty for Refurbished/Closeout Products. In such cases, Seller's warranty for Refurbished/Closeout Products constituting such third party proprietary sub-assembly modules, third party software, and private-label products will be limited to the duration and other terms of such third-party vendor's warranty, if any. In addition, notwithstanding the foregoing, (i) certain Refurbished/Closeout Products that are not manufactured (but are resold) by Seller, may carry the original OEM warranty for such products, if any, which may be longer or shorter than Seller's limited warranty for Refurbished/Closeout Products. All sales of Refurbished/Closeout Products are final.

To obtain service under this warranty, the defective product, together with a copy of the sales receipt, serial number if applicable, or other satisfactory proof of purchase and a brief description of the defect, must be shipped freight prepaid to Seller at the following address: One Jake Brown Road, Old Bridge, New Jersey 08857.

This warranty does not cover failure of performance or damage resulting from (i) use or installation other than in strict accordance with manufacturer's written instructions, (ii) disassembly or repair by someone other than the manufacturer or a manufacturer-authorized repair center, (iii) misuse, misapplication or abuse, (iv) alteration, (v) exposure to unusual physical or electrical stress, abuse or accident or forces or exposure beyond normal use within specified operational or environmental parameters set forth in applicable product specifications, (vi) lack of reasonable care or (vii) wind, ice, snow, rain, lightning, or any other weather conditions or acts of God.

OTHER THAN THE WARRANTIES SET FORTH ABOVE, SELLER MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND, EXPRESS OR IMPLIED, AS TO THE CONDITION, DESCRIPTION, FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR AS TO ANY OTHER MATTER, AND SUCH WARRANTIES SET FORTH ABOVE SUPERSEDE ANY ORAL OR WRITTEN WARRANTIES OR REPRESENTATIONS MADE OR IMPLIED BY SELLER OR BY ANY OF SELLER'S EMPLOYEES OR REPRESENTATIVES, OR IN ANY OF SELLER'S BROCHURES MANUALS, CATALOGS, LITERATURE OR OTHER MATERIALS. IN ALL CASES, BUYER'S SOLE AND EXCLUSIVE REMEDY AND SELLER'S SOLE OBLIGATION FOR ANY BREACH OF THE WARRANTIES CONTAINED HEREIN SHALL BE LIMITED TO THE REPAIR OR REPLACEMENT OF THE DEFECTIVE PRODUCT F.O.B. SHIPPING POINT, AS SELLER IN ITS SOLE DISCRETION SHALL DETERMINE. SELLER SHALL IN NO EVENT AND UNDER NO CIRCUMSTANCES BE LIABLE OR RESPONSIBLE FOR ANY CONSEQUENTIAL, INDIRECT, INCIDENTAL, PUNITIVE, DIRECT OR SPECIAL DAMAGES BASED UPON BREACH OF WARRANTY, BREACH OF CONTRACT, NEGLIGENCE, STRICT TORT LIABILITY OR OTHERWISE OR ANY OTHER LEGAL THEORY, ARISING DIRECTLY OR INDIRECTLY FROM THE SALE, USE, INSTALLATION OR FAILURE OF ANY PRODUCT ACQUIRED BY BUYER FROM SELLER.

All claims for shortages, defects, and non-conforming goods must be made by the customer in writing within five (5) days of receipt of merchandise, which writing shall state with particularity all material facts concerning the claim then known to the customer. Upon any such claim, the customer shall hold the goods complained of intact and duly protected, for a period of up to sixty (60) days. Upon the request of Seller, the customer shall ship such allegedly non-conforming or defective goods, freight prepaid to Seller for examination by Seller's inspection department and verification of the defect. Seller, at its option, will either repair, replace or issue a credit for products determined to be defective. Seller's liability and responsibility for defective products is specifically limited to the defective item or to credit towards the original billing. All such replacements by Seller shall be made free of charge f.o.b. the delivery point called for in the original order. Products for which replacement has been made under the provisions of this clause shall become the property of Seller. Under no circumstances are products to be returned to Seller without Seller's prior written authorization. Seller reserves the right to scrap any unauthorized returns on a no-credit basis. Any actions for breach of a contract of sale between Seller and a customer must be commenced by the customer within thirteen (13) months after the cause of action has accrued. A copy of Seller's standard terms and conditions of sale, including the limited warranty, is available from Seller upon request. Copies of the limited warranties covering third-party proprietary sub-assembly modules and private-label products manufactured by third-parties may also be available from Seller on request. **(Rev 1021)**