



## INSTRUCTION MANUAL

# AQT Series

## ATSC to QAM Transcoder

Model	Stock No.	Description
AQT	6275	ATSC to QAM Transcoder
AQT-PCM	6276	ATSC to QAM Transcoder - Power and Control Module
QTRC	6233	QAM Transcoder Rack Chassis

## Accessories

Model	Stock No.	Description
AQT-SPS	6254	AQT Standby Power Supply Unit
QT-RFC	6234-1	8 Way RF Combiner
QT-RFS	6234-2	8 Way RF Splitter
QTHF	6235	QT Headend Fan
AQT-RCS	2736	AQT Remote Configuration Server

## Assemblies

QRA-3C-X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub>      6251-3C-000008      QAM Rack Assembly with AQT-PCM, Combiner/Splitter & 8 AQT Modules

Whereby X<sub>6</sub> in the sixth digit slot, represents the quantity of AQT Modules

Whereby X<sub>5</sub> in the fifth digit slot, represents the quantity of QTM-HD-NPU Modules

Whereby X<sub>4</sub> in the fourth digit slot, represents the quantity of AQD Modules

Whereby X<sub>3</sub> in the third digit slot, represents the quantity of QTM-HD Plus Modules

Whereby X<sub>2</sub> in the second digit slot, represents the quantity of QTM-HD Modules

Whereby X<sub>1</sub> , in the first digit slot, represents the quantity of QTM-II Modules

Whereby C represents an optional combiner & splitter assembly, A for combiner only, B for splitter only

Whereby 3 represents AQT-PCM, 1 for QT-PCM, 2 for AQD-PCM



651219100C

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

Purchase Location Name:	
Purchase Location Telephone Number:	
Digital Address of the AQT-PCM:	

The information contained herein is subject to change without notice. Revisions may be issued to advise of such changes and/or additions.

Correspondence regarding this publication should be addressed directly to:

Blonder Tongue Laboratories, Inc.  
One Jake Brown Road  
Old Bridge, NJ 08857

Printed in the United States of America.

All product names, trade names, or corporate names mentioned in this document are acknowledged to be the proprietary property of the registered owners.

This product incorporates copyright protection technology that is protected by U.S. patents and other intellectual property rights. Reverse engineering or disassembly is prohibited.

**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](http://www.blondertongue.com) for further information.

The lightning flash with arrow-head symbol within an equilateral triangle 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 persons.



**CAUTION**  
**RISK OF ELECTRIC SHOCK**  
**DO NOT OPEN**



The exclamation point within an equilateral triangle is intended to alert you to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

**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 that the cable distribution system should be grounded (earthed) in accordance with ANSI/NFPA 70, the National Electrical Code (NEC), in particular Section 820.93, Grounding of Outer Conductive Shield of a Coaxial Cable.

**For all pluggable equipment the socket-outlet shall be installed near the equipment and shall be easily accessible. The equipment outlet-socket must be of the three (3) prong type and have a protective earthing connection.**

#### Unpacking and Handling

Each unit is shipped with all equipment assembled, wired, factory tested, and then packaged in an appropriate shipping container.

Ensure that all accessories are removed from the container and packing material before they are discarded.

#### Mechanical Inspection

Inspect the front and rear of the equipment for shipping damage. Make sure the equipment is clean, and no wires, cables, or connectors are broken, damaged or loose.

#### Precautions

Adherence to the initial installation precautions outlined in the Table below will help prevent problems arising during the installation and future maintenance of the unit.

#### Damage in Shipment

Should any damage be discovered after unpacking the unit, immediately file a claim with the carrier. A full report of the damage shall be made and a copy forwarded to Blonder Tongue Laboratories Inc. The company will then advise what disposition is to be made of the equipment.

**Table 1 - Installation Precautions Table**

PRECAUTIONS	REQUIREMENTS
Avoid Heat Buildup	Allow (1) EIA rack space (1 <sup>3</sup> / <sub>4</sub> " ) between powered headend products in the equipment racks.
Ensure easy access to rack wiring.	Allow a minimum of 18" behind the equipment rack(s)
Facilitate servicing and maintenance.	Allow a minimum of 36" of clearance in front of the equipment rack(s).
Avoid direct heating or air conditioning.	If unavoidable, use deflector plates.
AC power source outlets.	Locate equipment near sufficient outlets to provide power for test equipment and power tools.
Rack Support.	Make certain rack supports are sufficiently rigid to support racks.
Building leakage.	Beware of dripping water onto equipment from leaky roofs, waveguide roof entries, and cold water pipe condensations.

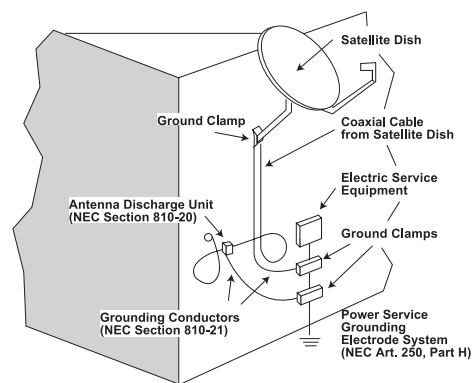
## Safety Instructions

### WARNING!



**You should always follow these instructions to help ensure against injury to yourself and damage to your equipment.**

- ▶ 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 other equipment. 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 an 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.



AQT



AQT Front Chassis

## Introduction

The Blonder Tongue ATSC to QAM Transcoder is a modular unit that allows the reception of a modulated 8VSB or QAM signal input and transcodes it to a QAM modulated output signal. The unit is designed to tune to an off-air 8VSB or QAM digital signal and convert it to a digital QAM signal to interface with digital TV displays with QAM tuners.

## Features

- 8VSB, 16VSB, Annex A QAM 16, 32, 64, 128 & 256 and Annex B QAM 64 & 256 Modulated RF Input Transport Streams Supported
- Modular & Compact Units Permit High Density — 8 Modules in 3 Rack Height
- Easy Set-up & Configuration via Front Panel LCD Controls
- Remote Computer Control Capability via Internet or RS-232 Interface
- Fully Agile QAM output frequency range of 54-864 MHz
- No multiplexing or changing of any MPEG table is performed with this unit
- In normal mode Null Packet Processing is performed
- Pass thru mode disables any Null Packet Processing

## Applications

Digital channel processing including:

- Changing the incoming QAM channel to a different output QAM channel
- Complete regeneration of a QAM input for optimal MER performance
- Convert one off-air ATSC 8VSB signal to a QAM output

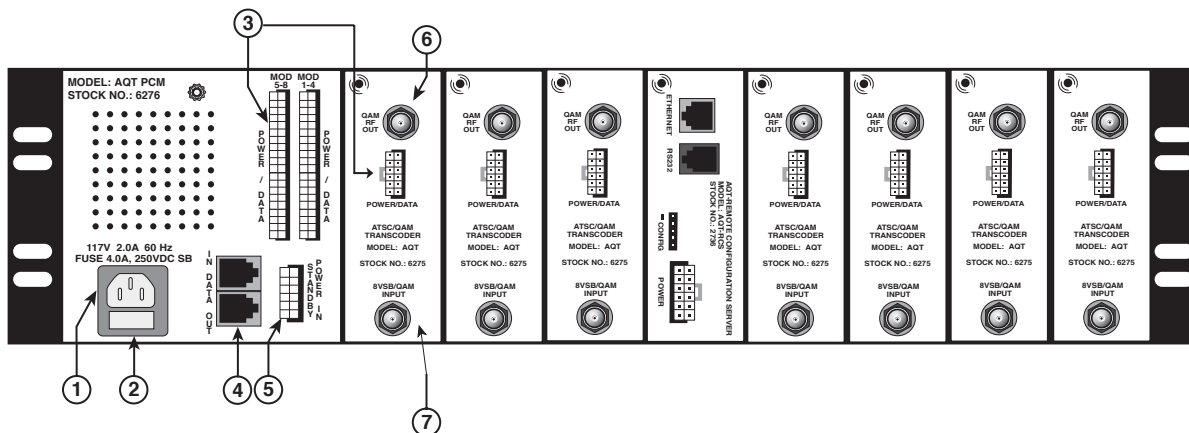
## The Unit

### Front Panel - AQT



1. **Unit Status Indicator** - Provides feedback to user based on the following LED indications:  
Solid Green LED - Indicates valid lock to the RF input signal and valid lock to the RF output  
Flashing Green LED - Indicates not locked status on either RF input or RF output
2. **Backlit LCD** - 16 character, 2 line Liquid Crystal Display LCD screen used to interact with user to display unit information
3. **Push Button Navigation Controls** - Buttons used to navigate between menus and set variables

### Rear Panel - AQT



1. **Power Cord Socket** - The unit power cord plug socket
2. **Fuse Holder** - 4.0 Amp., 250V DC, Slo Blo fuse
3. **Module Power/Data Cable Sockets** - Sockets for power/data cable use, PCM unit is equipped with two 50-pin female connectors and AQT module is equipped with a 12-pin female connector. Use supplied power/data cables to connect the PCM unit to the appropriate module, ensure proper wiring by module number slot
4. **RS232 Serial Data Ports** - Used to plug into and daisy chain AQT-PCM units for remote monitoring and configuration
5. **Standby Power In** - 12-pin female connector used to plug-in the optional Standby Power unit
6. **QAM RF Out** - RF Connector with QAM modulated output signal
7. **8VSB/QAM Input** - RF Connector for feeding appropriate 8VSB off-air or QAM modulated input signal

## Specifications

### Off Air 8VSB/QAM Input

Demod Mode:

ATSC: 8VSB or 16VSB

ITU A: 16, 32, 64, 128, 256 QAM

ITU B: 64, 256 QAM

QAM Input Range:

54-864 MHz

Bandwidth: 6 MHz

Symbol Rate: 1 to 6.9 Msps

Level: -20 dBmV Min. for QAM64

-15 dBmV Min. for QAM256

8VSB Input Range:

VHF & UHF 54-806 MHz

Bandwidth: 6 MHz

Symbol Rate: Up to 19.4 Mbps

Level: -28 dBmV Min. for 8VSB

-25 dBmV Min. for 16VSB

Input Impedance: 75  $\Omega$

### QAM Output

Output Frequency Range:

Agile 54-864 MHz (CATV 2-135)

QAM Bandwidth: Variable

Frequency Step: 6 MHz

Output Level: +40 dBmV\*

Display Error:  $\pm 2$  dB

Level Adjustment Range: 10 dB

Modulation Mode:

16, 32, 64, 128, 256 QAM

Symbol Rate: Variable rate QAM up to 7 Mbaud

Spectral Inversion: Auto Recognition

Carrier Suppression: 45 dB

Roll Off: 12, 15, 18 %

QAM SNR: >40 dB

QAM MER: >40 dB

RF Output Impedance: 75  $\Omega$

Spurious: -60 dBc

Broadband Noise:

-75 dBc min.

(4 MHz BW @ 40 dBmV)

Phase Noise @ 10 kHz: -95 dBc min.

Frequency Stability:  $\pm 10$  kHz

QAM I/Q Phase Error: < 1 degree

I/Q Amplitude Imbalance: < 1 dB

### Controls

Backlit Liquid Crystal Display (LCD)

5 Navigation/Enter Push Buttons

AQT Unit Status Indicator:

1 Green LED Per Module

### Connectors

AQT-PCM

Computer Control:

2 RJ11 Rear Panel RS232

Power/Data: 2 50-pin Female

AQT

Input: "F" Female

Output: "F" Female

Power/Data: 12-pin Female

### Mechanical

Rack Chassis Dimensions (W x H x D):

5.25 x 19.0 x 12 in.

133.4 x 482.6 x 304.8 mm

AQT Dimensions (W x H x D):

5.25 x 10.6 x 1.5 in.

133.4 x 269.9 x 38.1

Mounting:

Standard EIA Unit Height

5.25 x 19.0 in. Wide Rack Mount

133.4 x 482.6 mm

AQT Unit Weight: 1.7 lbs., 0.77 kg

Fully Loaded Chassis Weight:

28 lbs., 12.7 kg

### Power

Requirement: 100 to 265 VAC

Frequency: 50 to 60 Hz

Power Consumption:

17 to 107 W

Fuse: 4 Amp, 250 VDC, Slo Blo

### Environmental

Operating Temperature: 0 to 50  $^{\circ}$ C

Storage Temperature: -20 to 70  $^{\circ}$ C

Humidity: 0 to 90 % RH

\*Average Measurement



## Installing the AQT

### Installing the Unit in a Rack

---

#### Mounting

The chassis is 5.25 inches tall, 19 inches wide, and 12 inches deep.

You can mount the chassis in a standard EIA, 24 inch deep, enclosed rack. Secure the chassis front panel to the rack by inserting four machine screws, with cup washers, through the four mounting holes in the front panel.

#### IMPORTANT!



**DO NOT block the unit's ventilation holes.**

When installing one or more AQT Chassis units in a headend rack, it is recommended to leave a 1 rack unit space (1.75" high) between the chassis units to maximize air flow, but it is not required. This space helps to reduce heat build-up in a headend rack and will help to extend the product life span.

#### WARNING!



**For safe and reliable operation, the Power Supply requires a proper ground connection for the third prong of the power cord plug**

## Mechanical Assembly

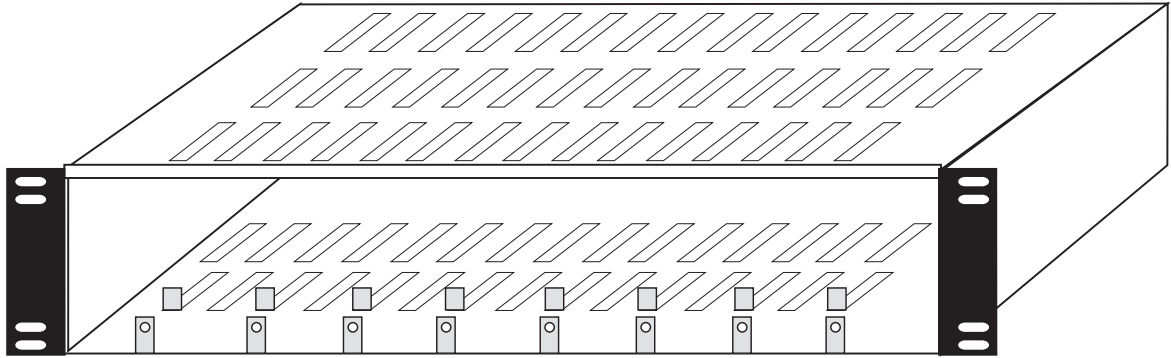
### The Modules

The AQT consists of 3 core modules.

AQT-PCM - AQT Power & Control Module

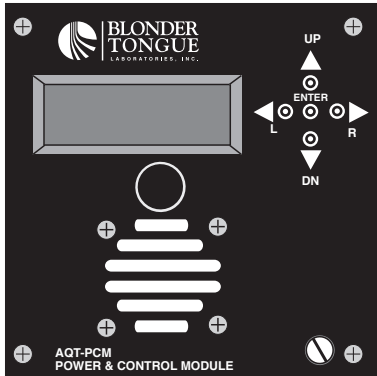
AQT - ATSC/QAM Transcoder Module

QTRC - QT Rack Chassis



**QT Rack Chassis**

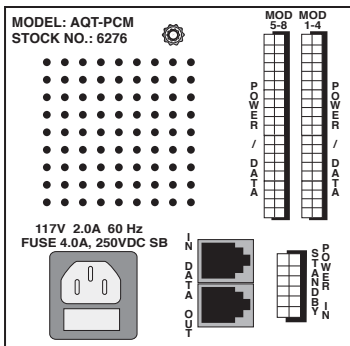
**Front**



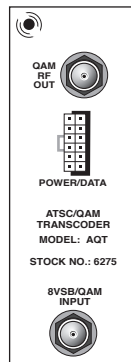
**Front**



**Rear**



**Rear**



**AQT - Power Supply & Control Module (AQT-PCM)**

**ATSC to QAM Transcoder**

## Installing the Modules in the Chassis

The following are the recommended instructions for installation of the modules in a chassis:

1. Mount the AQT-PCM module in the chassis by gently sliding it into position on the far right most position of the chassis (facing the front).
2. Tighten the front and rear retaining screws to secure the module in place.
3. Mount all of the appropriate AQT modules in the same manner.
4. Wire the appropriate 8VSB/QAM input coaxial cables to the AQT Modules 8VSB/QAM input F connector.
5. Wire the output of the AQT module's QAM RF OUT F connector to a combining device like the optional QT-RFC that can be specially mounted to the chassis & connect to the appropriate distribution network.
6. Insert the appropriate power/data cables into the AQT-PCM 50-pin female connectors labeled "MOD 1-4" and "MOD 5-8 POWER/DATA".
  - NOTE: Make sure the AQT-PCM connectors are secure and are connected to the appropriate location (MOD 1-4 or MOD 5-8). This is done to ensure that the correct module is displayed by the LCD and is actually being communicated with correctly.
7. Slightly loosen rear retaining screw on AQT-PCM and Module #8 (nearest to AQT-PCM). Slide the cable wire bracket down over the power/data cables (see example below. The cable wire bracket is provided to secure the cable harness in place). Position the cover notches under the retaining screws and tighten screws.
8. Connect the 12-pin power/data cables labeled modules 1 to 8 from the transcoders to the female 50-pin connector labeled "MOD 1-4 and MOD 5-8 POWER/DATA".
  - NOTE: Make sure the appropriately labeled cable is connected to the corresponding module. This is done to ensure that the correct module is displayed by the LCD and is actually communicating. Keep in mind that the modules are numbered 1 to 8 from left to right on the front and will then be housed 1 to 8 from right to left on the rear.
9. Connect the 12-pin power/cable from the standby power unit to the "Power In" connector of the AQT-PCM if applicable. The standby power unit can be mounted in the rack or in any easily accessible location.
  - NOTE: You must connect A/C power to the AQT-PCM before you connect power from the standby power unit to prevent the unit from immediately going to standby power mode.
10. Connect the A/C power cord to the AQT-PCM.

**WARNING!**

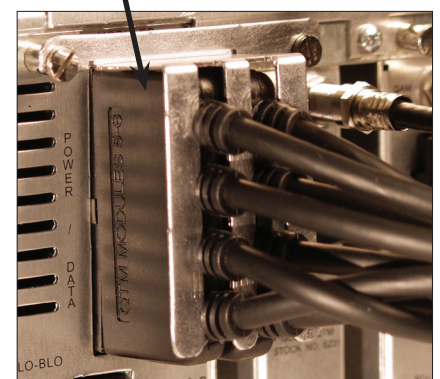


**CAUTION: The AQT-PCM unit is designed for use with AQT modules only! Accidentally plugging a QT Series module into a AQT-PCM will cause damage!**



**AQT - Module Loading Front View**

**Cable Wire Bracket**



## Replacing an ATSC to QAM Transcoder Module (AQT)

The following are the recommended instructions for replacing an AQT Module while the complete system is operating:

1. Disconnect the 12-pin power/data cable from the Module.
2. Disconnect the Input & Output RF cables.
3. Physically remove the module from the chassis by loosening the thumbscrew located on the front panel and the retaining screw on the rear.
4. Physically replace the new module in the chassis and tighten rear and front retaining screws.
5. Reconnect all RF coaxial cables. (Ensure the correct cable is wired to the input and output accordingly)
6. Reconnect the 12-pin power/data cable to the module from the AQT-PCM.
  - NOTE: Make sure the appropriately labeled cable is connected to the corresponding module. This is done to ensure that the correct module is displayed by the LCD and is actually communicating. Keep in mind that the modules are numbered 1 to 8 from left to right on the front and will then be housed 1 to 8 from right to left on the rear.
7. Reprogram all module variables as desired.

## Replacing a AQT-PCM

The following are the recommended instructions for replacing a Power Supply & Control Module (AQT-PCM):

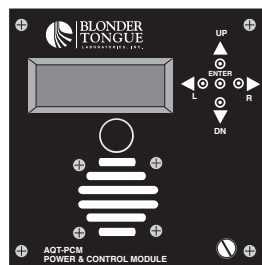
1. Remove the standby power cable from the "Standby Power In" port, if applicable.
2. Remove the A/C power from the AQT-PCM.
3. Loosen the rear retaining screw and remove the cable wire bracket.
4. Remove the 50-pin power/data cables from the AQT-PCM.
5. Loosen the front panel retaining thumbscrews.
6. Remove the module from the chassis.
7. Physically replace the new AQT-PCM in the chassis.
8. Tighten the rear and front retaining screws to secure the module in place.
9. Reconnect the 50-pin power/data cables to the new AQT-PCM.
  - NOTE: Make sure the appropriately labeled cable is connected to the corresponding module. This is done to ensure that the correct module is displayed by the LCD and is actually communicating. Keep in mind that the modules are numbered 1 to 8 from left to right on the front and will then be housed 1 to 8 from right to left on the rear.
10. Connect the A/C power cord to the AQT-PCM. The unit will now reboot.
11. Reconnect "Standby Power" after boot-up, if applicable.

## AQT - Operating Interface Instructions

### Introduction

The Blonder Tongue AQT series uses an easy to read Back-lit LCD and push button switches to control and monitor the AQT Modules.

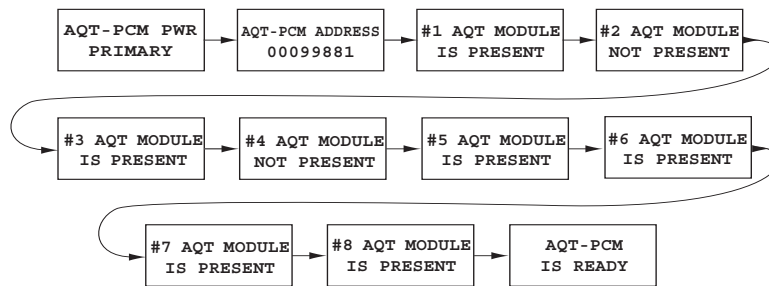
The following information describes the LCD methodology and approach.



**AQT PCM - LCD & Front Panel Navigation Controls**

## Boot-Up Display Sequence

When the unit is first plugged in for use, the PCM displays the appropriate module condition on the LCD readout as depicted below.



### AQT - Boot-Up Display Sequence

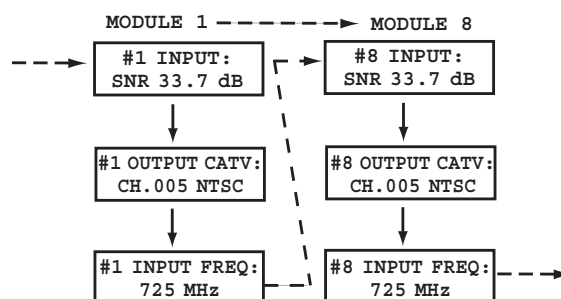
1. Each control module has a unique module address that is set at the factory and is displayed immediately following the primary or secondary power source status. This address is used for remote software capability only using AQT-RCS (Stock # 2736).
2. Each module status is identified and reported on the LCD. If a module is identified it is listed as "PRESENT" or "NOT PRESENT" if not connected or identified by the PCM.
3. The AQT "NOT PRESENT" message will be displayed when the optional Remote Configuration Server (RCS) Module is installed in a particular chassis slot.
4. Upon completion of the boot-up sequence the AQT-PCM is ready for use and will proceed to the loop display sequence.
5. DO NOT push any switches on the control module during this sequence, as it will NOT respond until it displays "AQT-PCM IS READY".

## Loop Display Sequence

After the unit has displayed the boot-up sequence it proceeds to the loop sequence. In this mode the LCD displays the actual module status as depicted by the diagram below. This information is referred as the loop sequence because this information is constantly displayed in a scrolling fashion on the LCD readout. The loop sequence may be interrupted at any time by pressing any of the arrow keys. In the loop sequence the back light LCD is off; however, after pressing any navigation button the backlight automatically turns on for ease of viewing.

During the loop sequence the LCD displays 3 valuable parameters for each installed ("PRESENT") AQT module. Modules "NOT PRESENT" will not have information displayed during the loop sequence.

- Input: Displays the actual input signal to noise ratio (SNR) if locked
- Output: Displays the channel number the output is programmed
- Input Freq: Displays the center frequency of the input signal programmed



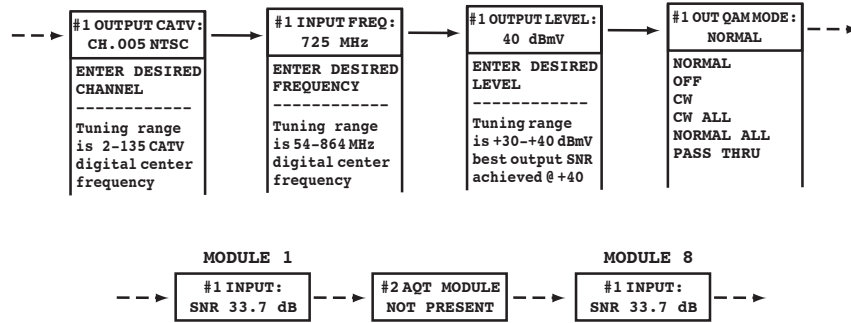
### AQT - LCD Loop Display Sequence



**Detailed Quick Set-up Instructions can be found on page 16.**

### Left/Right Sequence Details

The Left / Right sequence is where the core variables of the AQT are programmed. It is accessed when a user depresses the ◀ (L) or ▶ (R) arrow navigation keys. There are 4 main adjustable variables for each module.



### AQT - LCD Left/Right Variable Sequence

- **OUTPUT CATV** — permits the entry of the desired output channel number to program the AQT module, tuning range is NTSC CATV channel 2—135, (See 'Appendix A' for digital center frequency)
- **INPUT FREQ** — permits the entry of the desired input signal center frequency to program the AQT module, tuning in frequency range of 54—864 MHz, (See 'Appendix A' for digital center frequency)
- **OUTPUT LEVEL** — permits the entry of the desired output signal level in dBmV as an average power measured signal, range is +30 to +40 dBmV, optimum SNR performance is achieved by setting the unit output @ +40 dBmV
- **OUT QAM MODE** — permits the entry of the desired QAM mode, the unit has six available QAM modes:
  - o **NORMAL:** The "NORMAL" QAM mode outputs a 6 MHz QAM modulated signal and must be used with 8VSB input
  - o **OFF:** The OFF QAM mode outputs no signal from the module (*When a module is placed in the QAM off mode, the status LED indicator will blink*)
  - o **CW:** The CW (carrier wave) mode outputs a CW signal that is very useful for measuring the output level of the unit, the CW signal is a true representation of the QAM signal level (*When a module is placed in the QAM CW mode, the status LED indicator will blink*) (See the QAM Signal Level Testing section on page 16 for more detail)
  - o **CW ALL:** Puts all modules installed in a rack chassis into CW mode for ease of level adjustment
  - o **NORMAL ALL:** Returns all modules installed in a rack chassis to "NORMAL" mode required for normal operation
  - o **PASS THRU:** Disables null packet processing - This mode must be used when the input to the AQT is QAM

Each of the modules are displayed in order by scrolling through the sequence to find the desired variable on a respective installed module. Modules not installed are listed by the "MODULE IS NOT PRESENT" message. The SNR value for each module is displayed together for each of the installed eight modules at the end of the sequence.

- SNR is displayed when an AQT module locks to an input program channel and indicates the signal to noise ratio of the input signal and is expressed in dB. The following are the desired input SNR ranges for the appropriate signal modulation type:

	8VSB	64 QAM	256 QAM
<b>Excellent =</b>	>30 dB	>38 dB	>38 dB
<b>Good =</b>	25—30 dB	30—38 dB	35—38 dB
<b>Marginal =</b>	18—25 dB	23—30 dB	30—35 dB
<b>Non-Functional =</b>	<18 dB	<23 dB	<30 dB

### Programming a Variable

1. Use the ◀ (L) or ▶ (R) arrow navigation keys to scroll to the installed module you desire to adjust.
3. Press the ▲ (UP) or ▼ (DN) arrow navigation keys to scroll to the desired interactive variable.
4. When a user arrives at a screen whose variable needs to be changed, the user should depress and hold **ENTER** until the blinking cursor is displayed.
5. After the blinking cursor is displayed the user simply presses the ▲ (UP) or ▼ (DN) arrow buttons to increment or decrement to the appropriate desired value.
6. When the user reaches the desired value the user should press the ENTER button again to apply the change to the PCM memory. The PCM then programs the corresponding module to the new setting.

### Interactive & Up/Down Sequence

The advanced interactive menu is easily accessible by depressing the ▲ (UP) or ▼ (DN) arrow keys on the front of the control module. Each of the adjustable settings are issued to the particular module that is actively displayed. Some variables are global for the unit and not module specific. The user may scroll through the menu screens depicted by continuing to press the up and down navigation keys. The following diagram depicts the available, advanced variables with the modify options listed below.

<b>#1 INPUT BROWSE:</b> OFF	<b>#1 INPUT DEMOD:</b> VSB-8	<b>#1 INPUT RATE:</b> 5.381119 M	<b>#1 OUT QAM: 64</b> ANNEX A	<b>#1 ALPHA:</b> 15%	<b>#1 INTERLEAVER</b> 112,J17	<b>#1 OUT BD RATE:</b> 5.000 M	<b>AQT-PCM ADDRESS</b> 00004159
ACTIVATE OFF	VSB-8 VSB-16 QAM:64 ANNEX B QAM:256 ANNEX B QAM:16 ANNEX A QAM:32 ANNEX A QAM:64 ANNEX A QAM:128 ANNEX A QAM:256 ANNEX A	USER SELECTABLE  Auto tuned if an 8VSB signal is used or input browse is activated	16 ANNEX A 32 ANNEX A 64 ANNEX A 128 ANNEX A 256 ANNEX A 64 ANNEX B 256 ANNEX B	12% 15% 18%	I128,J1 I12,J17 I128,J2 I17,J12 I128,J3 I34,J6 I128,J4 I51,J4 I128,J5 I68,J3 I128,J6 I102,J2 I128,J7 I204,J1 I128,J8 I1,J204 I64,J2 I2,J102 I32,J4 I3,J68 I16,J8 I4,J51 I8,J16 I16,J34 I4,J32 I2,J64 I1,J128 ANNEX B:ANNEX A	USER SELECTABLE  Auto tuned if an 8VSB signal is used or input browse is activated	DISPLAY ONLY

<b>AQT-PCM FIRMWARE</b> VERSION 3.0	<b>#1 AQT MODULE</b> VERSION 5.0	<b>AQT-PCM</b> 3.3V"=3.5V	<b>AQT-PCM</b> 6V"=6.2V	<b>AQT-PCM</b> 10V"=9.5V	<b>AQT-PCM</b> 29V"=28.5V	<b>AQT-PCM POWER:</b> PRIMARY
DISPLAY ONLY	DISPLAY ONLY	DISPLAY ONLY ----- RANGE IS 3.1 TO 3.6	DISPLAY ONLY ----- RANGE IS 5.6 TO 6.5	DISPLAY ONLY ----- RANGE IS 9.4 TO 10.8	DISPLAY ONLY ----- RANGE IS 26.0 TO 31.5	PRIMARY STANDBY

### AQT - LCD Interactive Variable Sequence

- INPUT BROWSE — when "activated" the input browse function automatically scans the input signal for the 8VSB/QAM rates as per the chart below. Then, if found, automatically sets the input and output parameters. If no valid signal is found it will default to the last locked state. Factory default is 8VSB.
- INPUT DEMOD — permits the selection of any of the listed input demod modes, the unit is factory set for 8VSB signals
- INPUT RATE — permits the entry of the desired input baud rate, this is automatically set to one of the factory values listed above (input browse) if a standard 8VSB input signal is used or the input browse function is activated
- OUT QAM — permits the entry of the desired output QAM mode, the unit has six available QAM modes
- ALPHA — permits the entry of the appropriate alpha setting to match the output QAM mode
- INTERLEAVER — permits the entry of the appropriate interleaver setting to match the output QAM mode
- OUT BD RATE — permits the entry of the desired output QAM baud rate. The QAM output baud rate is automatically set to the corresponding values for the respective input baud rate as listed in the chart below.

INPUT RATE	OUTPUT RATE
VSB-8: 5.3811 Mbaud	QAM 64-B: 5.0569 Mbaud
VSB-16: 5.3811 Mbaud	QAM 256-B: 5.3605 Mbaud
QAM 64-B: 5.0569 Mbaud	QAM 64-B: 5.0569 Mbaud
QAM 256-B: 5.3605 Mbaud	QAM 256-B: 5.3605 Mbaud
QAM 16-A: 5.0000 Mbaud	QAM 16-A: 5.0000 Mbaud
QAM 32-A: 5.3333 Mbaud	QAM 32-A: 5.3333 Mbaud
QAM 64-A: 5.0000, 4.4444 or 3.3333 Mbaud	QAM 64-A: 5.0000, 4.4444 or 3.3333 Mbaud
QAM 128-A: 5.0000 or 4.7619 Mbaud	QAM 128-A: 5.0000 or 4.7619 Mbaud
QAM 256-A: 5.5895 Mbaud	QAM 256-A: 5.5895 Mbaud

\* In order for the input browse to work, the Input/Output parameters are paired and must match this chart.



## AQT Quick Set-Up Instruction Guide

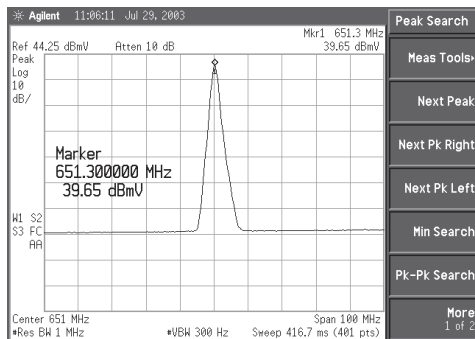
The Quick Set-Up instructions are provided as a checklist of the minimum steps required to install and program the AQT.

1. Verify all cable connections — (Refer to page 11 for detailed instructions)
    - a. Check to make sure the power/data cables are connected to the correct location on the PCM and the respective modules to ensure proper communication
    - b. Check to make sure the correct RF cable is connected to the Input and Output F connector
  2. Verify RF input levels
    - a. Signal acquisition range is -20 to +20 dBmV — -10 to +10 dBmV is the desired optimum input level
  3. Program the desired Input Frequency for each appropriate module — *Tuning Range 54-864 MHz*
  4. Program the desired Output Channel for each appropriate module — *Tuning Range CATV 2-135*
    - a. +40 dBmV is recommended for optimum level for SNR performance
  5. Verify the Module Lock state — *Press the ► (R) arrow key until the SNR value is shown for the appropriate module*
    - a. If not locked, activate the Input Browse mode for the module, this will auto search & tune all pre-programmed modes
    - b. Verify input signal level, feed/cable
- Repeat as appropriate for each module**

## QAM Signal Level Testing

This section describes the preferred method for measuring and setting the QAM output level of the AQT module using a spectrum analyzer. It requires the operator to set the AQT module to CW (carrier wave) mode.

### QAM Signal Level in CW Mode



The CW QAM signal is used to provide the true equivalent signal level for the QAM carrier to be measured on a spectrum analyzer. The AQT Series is capable of supplying the output QAM signal in CW mode. This simplifies the level measurement process dramatically because the level does not need to be adjusted for the limitations in analyzer bandwidth settings.

After setting the appropriate level in CW mode the unit must be adjusted back to normal mode for operation.

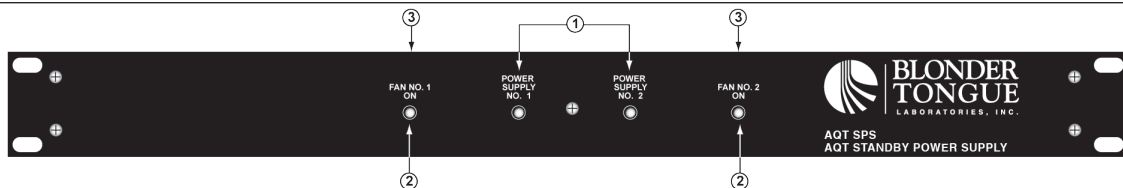
Any spectrum analyzer that can measure CW Carrier Power Level can be used. The CW Carrier Level is equal to the QAM Power Level that will be presented in normal mode.

## AQT SPS Description

Standby or redundant power support is provided by the AQT Standby Power Supply unit. The Standby Power unit consists of two independent standby power supply units. These secondary standby supply units are all housed in a 1.75" single rack height chassis unit. The unit features an independent connector on the rear panel for each of the power supply units. Only one standby power module unit is required to offer redundant support for up to 16 modules (2 chassis units). This unit is optional and may be added to a system at any time.

### The Unit

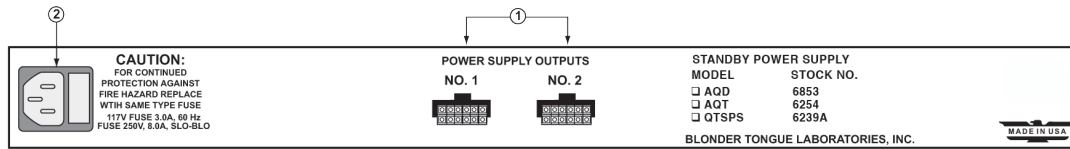
#### Front Panel



1. **2 LED Lights** - The lights are powered by the respective power supply built into the unit and will illuminate when power is present.
2. **2 Fan LED Lights** - A green LED illuminates when the fan is in operation. The LED will blink if the fan stops operating for any reason, such as being clogged or a malfunction.
3. **Air Circulation Fan** - Two air circulation fans (top of unit) are factory installed in the unit.



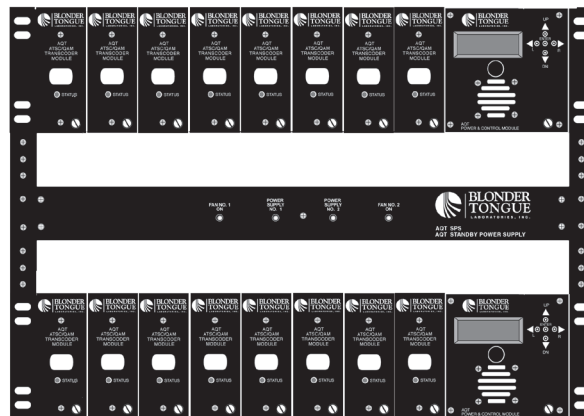
## Rear Panel



- 2, 12-Pin Power Supply Connector Ports** - When a particular LED is illuminated, the corresponding 12-pin connector port on the rear of the unit is ready for standby power use.
- Power Cord Socket & Fuse Holder Mechanical**  
 Dimensions (W x H x D): 19.0 x 1.75 x 14.5 inches  
 Weight: 6.5 lbs.

## Mounting

It is recommended to mount one (1) Standby Power unit between two (2) AQT Series rack chassis units. The fans draw airflow up for circulation. Optimum performance is achieved when a full rack space is used between the chassis and the SPS. This needs to occur when used in conjunction with the optional RF splitter system.



**QAM Rack Assembly Rack Chassis Units with AQT Standby Power**

## Operation

The Standby Power unit is intended to automatically provide power in the event of a loss of power, temporary or permanent, to the primary power supply. During this condition, when power is lost to the primary supply but not lost by the standby unit, the unit will automatically switch to standby power. The unit is programmed to verify that primary power is lost by checking the status to ensure it is not a temporary condition. The unit firmware was designed with a built-in small delay, approximately 6-8 seconds, to eliminate the potential for uncertainty or chatter regarding power loss. After this delay, the unit will automatically switch to the standby power unit. If power is restored to the primary power supply, the unit will verify the condition and automatically return to primary power.

## LCD Functional Interface

Blonder Tongue digital products use an LCD display panel to provide the operator with as much information as needed regarding the condition and status of the particular modules. This includes status information pertaining to standby power. The front panel of the PCM will display Standby Power when it is being used.

**Note:** If a primary failure is not due to AC power loss, it is recommended to have the PCM serviced.

POWER STATUS  
 STANDBY

### LCD Standby Power Indication

## Manual Standby Power Interaction

The unit menu system provides the ability to manually move to standby or back to primary power. This is extremely valuable in a testing condition but not encouraged during normal operation.

- The power status can be displayed by depressing the DOWN ▼ arrow key on the front of the control module.  
 Scroll up ▲ UP or ▼ DOWN through the variables to reach "Power Status."

## AQT Frequently Asked Questions

---

- 1.** **Question:** AQT does not lock to VHF channel 9.  
**Answer:** Please check the AQT firmware version. If the AQT firmware version is 5.1 then the AQT must be updated to 5.2 or later firmware version.  
**Solution:** Please check the AQT Firmware version. If the AQT firmware version is 5.1 then the AQT must be updated to 5.2 or later firmware version. As of 7/21/08 the AQT version is 5.5.
- 

- 2.** **Question:** My AQT does not lock to some input QAM channel from a cable feed.  
**Answer:** Yes, firmware version 5.1 and 5.2 or 5.3 does not lock to some QAM channels and the AQT firmware must be updated to 5.5 version.  
**Solution:** Blonder Tongue has released a firmware version to correct this issue. The firmware version is 5.5. Refer to question 6 for how to upgrade the AQT.
- 

- 3.** **Question:** Is there any software bug on firmware version 5.1 for AQT.  
**Answer:** Yes, firmware version 5.1 of AQT does not lock to Hi VHF channel. These channels are 8,9,10,11,12,13. Also this version does not lock to all QAM channels.  
**Solution:** Blonder Tongue has released a firmware version to correct this issue. The firmware version is 5.5. Refer to question 5 for how to upgrade the AQT.
- 

- 4.** **Question:** My AQT-PCM firmware version is 3.1 do I need to upgrade to the latest firmware?  
**Answer:** The AQT-PCM firmware version 3.1 will work just fine if the AQT is being used to transmodulate 8VSB to QAM; However, if the AQT input signal is QAM then the AQT-PCM needs to get upgraded to latest version which is 3.3.  
**Solution:** The latest firmware version for the AQT-PCM as of July 2008 is version 3.3. The AQT-RCS hardware is purchased separately. The AQT-RCS contains the latest firmware for AQT-PCM. Refer to question 6 for more details.
- 

- 5.** **Question:** What is the latest Software version on the AQT and AQT-PCM?  
**Answer:** There is a firmware version for the Power Supply and Controller which is called AQT-PCM. There is a firmware version for the AQT module itself  
**Solution:** The latest firmware version for the AQT-PCM as of July 2008 is version 3.3. The latest AQT firmware version is 5.5.
- 

- 6.** **Question:** How do I update the firmware for the AQT-PCM?  
**Answer:** The AQT-PCM can be remotely updated using an AQT-RCS (with a network connection) or a using an AQT-PCM Upgrader. If the firmware version of the AQT-PCM is 3.3 then there is no need to update the firmware. This is a latest update as of July 2008.  
**Solution:** The latest firmware version for the AQT-PCM as of July 2008 is version 3.3. The AQT-RCS hardware is purchased separately. The AQT-RCS contains the latest firmware for the AQT-PCM. A PC with the AQT-PCM Upgrader can also be used to update the unit. For more detailed descriptions refer to each manual.
- 

- 7.** **Question:** How do I update the firmware for the AQT?  
**Answer:** The AQT software can be updated using handheld programmer. Or the Units can be sent back to factory for an update.  
**Solution:** Use a Handheld programmer supplied by Blonder Tongue, then you will be able to upgrade the AQT Stock # 6275 at the headend without removing it from the rack assembly. Simply follow the instruction on the handheld programmer. The units can also be sent back to factory for the firmware update also.

## Frequently Asked Questions (continued)

---

8.

**Question:** I have both AQT version 5.5 and AQT-PCM 3.3, but still have issue locking to QAM at all time.

**Answer:** Please note that the QAM mode selection for locking to QAM must be set to "PASS THRU" mode. Do not set the QAM mode to "NORMAL".

**Solution:** In the normal mode, the AQT will perform packet processing which if the input clock rate is higher than the output clock rate then the QAM may not lock at all times. "PASS THRU" mode will resolve this issue by simply passing through the input signal to the output QAM block of the AQT. Refer to the updated manual for detail description of these modes.

---

9.

**Question:** Do I need to upgrade my AQT firmware if it is 5.1.

**Answer:** No, but it is important to note that the 5.1 firmware will not lock to HI VHF channels. Also the latest firmware version 5.5 resolved the issue that the AQT did not lock to some QAM channels.

**Solution:** If the AQT is used in the UHF frequency range only, then there is no need to update the firmware, however, it is important to note that the 5.1 firmware version will not lock to VHF channel 7 through 13 and also the AQT will not lock to some input QAM channel.

---

10.

**Question:** The AQT picture some times tiles or there is no picture at all.

**Answer:** The user needs to check the input Signal to Noise ratio (or SNR). This can be found by using the LCD front panel control. Please read the SNR for each module and verify that it is above the following values for different modulation formats.

	<b>8VSB</b>	<b>64 QAM</b>	<b>256 QAM</b>
<b>Excellent</b>	>30 dB	>38 dB	>38 dB
<b>Good</b>	25—30 dB	30—38 dB	35—38 dB
<b>Marginal</b>	18—25 dB	23—30 dB	30—35 dB
<b>Non-Functional</b>	Below 18 dB	Below 23 dB	Below 30 dB

**Solution:** Increase the SNR to the AQT by realigning the Antenna or improving Signal Distribution.

## Appendix A

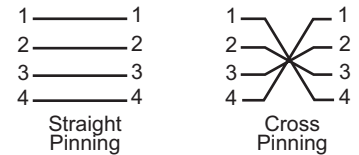
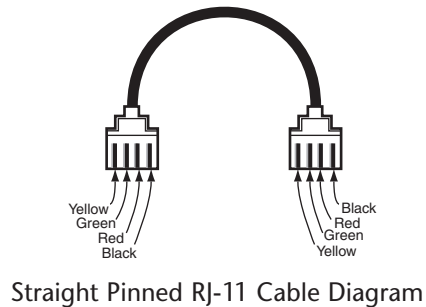
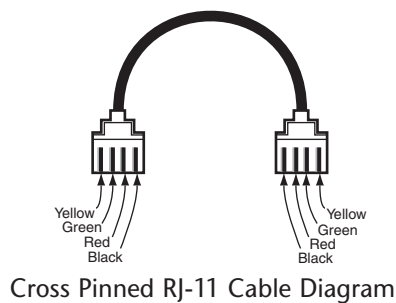
### CATV Channel Frequency Chart 54 MHz to 864 MHz

EIA Chan.	Center Frequency MHz	EIA Chan.	Center Frequency MHz	EIA Chan.	Center Frequency MHz
2	57	41	327	85	591
3	63	42	333	86	597
4	69	43	339	87	603
5	79	44	345	88	609
6	85	45	351	89	615
95	93	46	357	90	621
96	99	47	363	91	627
97	105	48	369	92	633
98	111	49	375	93	639
99	117	50	381	94	645
14	123	51	387	100	651
15	129	52	393	101	657
16	135	53	399	102	663
17	141	54	405	103	669
18	147	55	411	104	675
19	153	56	417	105	681
20	159	57	423	106	687
21	165	58	429	107	693
22	171	59	435	108	699
7	177	60	441	109	705
8	183	61	447	110	711
9	189	62	453	111	717
10	195	63	459	112	723
11	201	64	465	113	729
12	207	65	471	114	735
13	213	66	477	115	741
23	219	67	483	116	747
24	225	68	489	117	753
25	231	69	495	118	759
26	237	70	501	119	765
27	243	71	507	120	771
28	249	72	513	121	777
29	255	73	519	122	783
30	261	74	525	123	789
31	267	75	531	124	795
32	273	76	537	125	801
33	279	77	543	126	807
34	285	78	549	127	813
35	291	79	555	128	819
36	297	80	561	129	825
37	303	81	567	130	831
38	309	82	573	131	837
39	315	83	579	132	843
40	321	84	585	133	849
				134	855
				135	861

### Broadcast Chart

VHF Broadcast Channels	Center Frequency
2	57
3	63
4	69
5	79
6	85
7	177
8	183
9	189
10	195
11	201
12	207
13	213
UHF Broadcast Channels	Center Frequency
14	473
15	479
16	485
17	491
18	497
19	503
20	509
21	515
22	521
23	527
24	533
25	539
26	545
27	551
28	557
29	563
30	569
31	575
32	581
33	587
34	593
35	599
36	605
37	611
38	617
39	623
40	629
41	635
42	641
43	647
44	653
45	659
46	665
47	671
48	677
49	683
50	689
51	695
52	701
53	707
54	713
55	719
56	725
57	731
58	737
59	743
60	749
61	755
62	761
63	767
64	773
65	779
66	785
67	791
68	797
69	803

## Appendix B



**Note:** Straight pinning means that each contact is straight pinned to its respective contact. Cross pinning means that contacts are pinned to the opposite contact.

## Appendix C

### Glossary of Useful Terms and Acronyms

**ATSC** — Advanced Television Systems Committee. This group was founded in 1985 and developed the ATSC standards covering SDTV & HDTV digital television that has been adopted as the standard in the United States. It has also been adopted by Canada, Mexico, Taiwan, Argentina, and South Korea, and being considered by other countries. The ATSC standards are intended to replace the NTSC system used mostly in North America. There are 18 different digital television formats, eight (8) are SDTV and six (6) are HDTV based.

**HDTV** — High Definition Television. HDTV is a broadcasting format with significantly higher resolution (at least twice that) than that of traditional formats such as NTSC, SECAM & PAL. Signal formats are 1080i (interlaced scan) and 720p (progressive scan) with a widescreen (16:9) aspect ratio as standard. The technical standards for broadcasting HDTV are also able to handle 16:9 aspect ratio pictures without using letterboxing or anamorphic stretching, thus further increasing the effective resolution for such content.

**QAM** — Quadrature Amplitude Modulation is a modulation scheme which conveys data by changing (modulating) the amplitude of two carrier waves. These two waves, usually sinusoids, are out of phase with each other by 90° and are thus called quadrature carriers, hence the name of the scheme. In QAM, the constellation points are usually arranged in a square grid with equal vertical and horizontal spacing, although other configurations are possible. The most common forms are 16-QAM, 64-QAM, 128-QAM and 256-QAM. By moving to a higher-order constellation, it is possible to transmit more bits per symbol.

**SDTV** — Standard Definition Television. SDTV signal formats are 480p and 480i, they provide lower resolutions than high definition, yet provides a very sharp, clear picture. Lower resolution allows broadcasters to transmit multiple programs per channel. The term SDTV is usually used in reference to digital television, in particular when broadcasting at the same (or similar) resolution as analog systems. Digital SDTV in 4:3 aspect ratio has the same appearance as traditional analog TV.

**Sub-Channel** — The compression of audio and video signal enables each digital channel to carry different programs on sub-channels. Typically, the main program is on channel 8-1, in the example for channel 8. In this case, 8 is the "major channel", and 1, 2, or 3 is the sub-channel.

**Vestigial Sideband** — Vestigial sideband (VSB) is a type of amplitude modulation (AM) technique that encodes data by varying the amplitude of a single carrier frequency. Portions of one of the redundant sidebands are removed to form a vestigial sideband signal - so-called because a vestige of the sideband remains.

**8VSB** — Developed by Zenith, it is the 8-level vestigial sideband modulation method adopted for terrestrial broadcast of the ATSC digital television standard in the United States and Canada.

**Notes:**

---

## Limited Warranty

Blonder Tongue Laboratories, Inc. (BT) will at its sole option, either repair or replace (with a new or factory reconditioned product, as BT may determine) any product manufactured by BT which proves to be defective in materials or workmanship or fails to meet the specifications which 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 (or such shorter period of time as may be set forth in the license agreement specific to the particular software being licensed), with respect to iCentral™ (hardware and software) and all other software products (including embedded software) licensed from BT, (ii) for a period of one (1) year from the date of original purchase, with respect to all MegaPort, IPTV products and fiber optics receivers, transmitters, couplers and integrated receivers/distribution amplifiers (including TRAILBLAZER™, RETRO-LINX™ and TWIN STAR™ products) as well as for VideoCipher® & DigiCipher® satellite receivers, and (iii) for a period of three (3) years from the date of original purchase, with respect to all other BT products. Notwithstanding the foregoing, in some cases, the warranty on certain proprietary sub-assembly modules manufactured by third party vendors and contained in BT products and on certain private-label products manufactured by third parties for resale by BT are of shorter duration or otherwise more limited than the standard BT limited warranty. In such cases, BT's warranty with respect to such third party proprietary sub-assembly modules and private-label products will be limited to the duration and other terms of such third party vendor's warranty. In addition, certain products, that are not manufactured but are resold by BT, carry the original OEM warranty for that product. The limited warranty set forth in this paragraph does not apply to any product sold by BT, which at the time of sale constituted a Closeout Product.

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

To obtain service under this warranty, the defective product, together with a copy of the sales receipt or other satisfactory proof of purchase and a brief description of the defect, must be shipped freight prepaid to: Blonder Tongue Laboratories, Inc., One Jake Brown Road, Old Bridge, New Jersey 08857.

This warranty does not cover 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) lack of reasonable care or (vi) wind, ice, snow, rain, lightning, or any other weather conditions or acts of God.

**OTHER THAN THE WARRANTIES SET FORTH ABOVE, BT 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 SUPERSEDE ANY ORAL OR WRITTEN WARRANTIES OR REPRESENTATIONS MADE OR IMPLIED BY BT OR BY ANY OF BT'S EMPLOYEES OR REPRESENTATIVES, OR IN ANY OF BT'S BROCHURES, MANUALS, CATALOGS, LITERATURE OR OTHER MATERIALS. IN ALL CASES, BUYER'S SOLE AND EXCLUSIVE REMEDY AND BT'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 BT IN ITS SOLE DISCRETION SHALL DETERMINE. BT 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 BT.**

All claims for shortages, defects and non-conforming goods must be made by Buyer 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 Buyer. Upon any such complaint, Buyer shall hold the goods complained of intact and duly protected, for a period of up to sixty (60) days. Upon the request of BT, Buyer shall ship such allegedly nonconforming or defective goods, freight prepaid to BT for examination by BT's inspection department and verification of the defect. BT, at its option, will either repair, replace or issue a credit for products determined to be defective. BT'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 BT 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 BT. Under no circumstances are products to be returned to BT without BT's prior written authorization. BT reserves the right to scrap any unauthorized returns on a no-credit basis. Any actions for breach of this contract must be commenced by Buyer within thirteen (13) months after the cause of action has accrued. A copy of BT's standard terms and conditions of sale, including the limited warranty, is available from BT upon request. Copies of the limited warranties covering third party proprietary sub-assembly modules and private label products manufactured by third parties are also available from BT on request. VideoCipher® & DigiCipher® are registered trademarks of Motorola Corp.



**BLONDER  
TONGUE**  
LABORATORIES, INC.

One Jake Brown Road  
Old Bridge, NJ 08857-1000 USA  
(800) 523-6049 • (732) 679-4000 • FAX: (732) 679-4353  
[www.blondertongue.com](http://www.blondertongue.com)