BLONDER TONGUE LABORATORIES, INC.

BROADBAND
REFERENCE GUIDE

Rev 8.0

**BLONDER
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Thank you for requesting our Broadband Reference Guide. We hope you find this latest update helpful as we strive to provide technical information for the broadband industry in a convenient pocket size book.

Remember to look for previous versions of the reference guide on the Blonder Tongue website. We welcome any suggestion for further improvement, simply e-mail: feedback@blondertongue.com.

Bob Pallé
President

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Company Profile

Have you looked at us lately?

Founded in 1950, Blonder Tongue Laboratories, Inc. has been an innovative designer and manufacturer of products for the cable television industry. Initially, the focus was to develop technology for niche cable television applications, and this focus gave the Company a dominant position in the private cable market. The Company has evolved from a manufacturer of electronic equipment for the private cable market to a principal provider of integrated network solutions and technical services to broadband service providers in several related markets. The Company designs, manufactures, and supplies a comprehensive line of equipment to deliver video (Analog, Standard Digital, and High Definition Digital), high speed data and voice services over existing integrated coaxial and fiber optic broadband networks and maintains ongoing research and development efforts to enable the delivery of such services over packet based, Internet Protocol networks of the future.

The Company serves both the franchised and private cable markets and is a provider of integrated network solutions to all of the related video markets, including the multi-dwelling unit "MDU" market, the lodging/hospitality market and the institutional market consisting of hospitals, prisons and schools.

Our philosophy is to offer the highest quality in both product and services. The Blonder Tongue Technical Solutions Group, supported by our Engineers and Product Managers, can handle your most challenging questions and provide expert product information, site surveys, installation, on-site system engineering, turn-key system construction, system design or complete test and measurement of any installed system.

From our MASTERBUILT pre-built headends, to the latest in Digital and High Definition technology – we have the products, and your solution!

For more information about Blonder Tongue, visit our website at: www.blondertongue.com

Headend Products

A specification summary is provided in this section to aid in installing and setting up common headend equipment. For more detailed information, please see Blonder Tongue's full line catalog, website or the instruction manual(s) provided with the individual headend equipment. Blonder Tongue provides a full line of headend equipment such as:

- 8VSB/QAM Demodulators
- Digital to Analog Processors
- QPSK/QAM Transcoders
- Integrated Receiver/ Descramblers
- Commercial Satellite Receivers
- Commercial Digital Satellite Receivers
- Agile Audio/Video Modulators
- Channelized Audio/Video Modulators
- Channelized Agile Audio/Video Modulators
- Modular Headend Systems
- Agile Heterodyne Processors
- Agile Audio/Video Demodulators
- Stereo Encoders
- Combiners
- 8VSB Heterodyne Processors
- QAM Modulators
- Channel Elimination Filters
- Headend Racks & Housings
- Low Cost Headend Products
- Complete Headend Fabrication Services

Headend Product Overview - Comparison Tables

Modulators

Analog	Maximum Frequency MHz	Broadband Noise	Type	IF Loops	Output Level
AM-60-860	860	76	Agile	Single	+60 dBmV
AM-45-550	550	76	Agile	Single	+45 dBmV
AM-60-550	550	76	Agile	Single	+60 dBmV
AM-60-806	806	76	Agile	Single	+60 dBmV
FAxM-860	860	70	Agile	No	+50 dBmV
AMCM-860	860	78	Agile	No	+45 dBmV
AMM-806	806	75	Agile	No	+45 dBmV
MICM-45C/S	860	95	Channelized	No	+45 dBmV
CAMS-60	860	110	Channelized Agile	Single	+60 dBmV
MAVM-40	860	95	Channelized Agile	Single	+40 dBmV
MAVM-60	860	110	Channelized Agile	Single	+60 dBmV
BAVM-860SAW	860	90	Channelized	No	+55 dBmV

Digital					
AQM	860	75	Agile	No	+40 dBmV
DQX	860	75	Agile	No	+40 dBmV

Processors

Analog	Maximum Frequency MHz Input	Output	Broadband Noise	Type	IF Loops	Output Level
AP-60-550B	806	550	76	Agile	Single	+60 dBmV
AP-60-750B	806	750	76	Agile	Single	+60 dBmV
AP-40-550B	806	550	76	Agile	Single	+40 dBmV
AP-40-750B	806	750	76	Agile	Single	+40 dBmV

Digital	Input	Output				
DHDP	806	806 (8VSB)	76	Agile	No	+45 dBmV
DAP	860	860 (Analog)	77	Agile	Single	+60 dBmV
AQT	860	860 (QAM)	75	Agile	No	+40 dBmV

Demodulators

	Maximum Frequency MHz	Type	IF Loops	Output Level
AD-1 Analog	806	Agile	No	A/V
AQD Digital	860	Agile	No	A/V

Switch Settings - AP/AD-1

Blonder Tongue has improved the simplicity of the channel tuning switch settings for the following products:

Stock No.	Model	Stock No.	Model
59802	AP-40-550B	59803	AP-40-750B
59817	AP-60-550B	59818	AP-60-750B
5932	AD-1B		

2 banks of switches are presented. Switch 1 has 4 positions and Switch 2 has 8 positions. Position 1, 2 & 3 of Switch 1 are used to set the unit operating mode and position 4 turns the FCC Offsets ON or OFF.

Switch 2 is used to set the unit output channel number.

Channel setting is accomplished by setting the switch to the desired output channel.

	SWITCH 1			
	1	2	3	4
STD	□	□	□	□
IRC	□	□	□	□
HRC	□	□	□	□
Broadcast	□	□	□	□
Sub Band (optional)	□	□	□	□

Switch 2 is divided into 2 sections, the Tens section and the Ones section.

In each section, there are 4 switches labeled 8,4,2,1. This corresponds to the switch value.

To set the switch, a user invokes the corresponding value of the switch.

The values are then added and equated into a channel number by the unit microprocessor.

A simple chart, shown on the next page, gives the corresponding switch position for numbers 1 to 12.

The user then sets the Tens section and the Ones section together to reflect the desired channel.

Example: For CH 116, you set 11 Tens and 6 ones for 116. For single digit channels, the Tens switch is set to zero.

Switch Settings

Below are examples of the switch settings.

	SWITCH 2								
	Tens				Ones				
	8	4	2	1	8	4	2	1	
0 =									= 0
1 =									= 1
2 =									= 2
3 =									= 3
4 =									= 4
5 =									= 5
6 =									= 6
7 =									= 7
8 =									= 8
9 =									= 9
10 =									
11 =									
12 =									

SWITCH 2							
8	4	2	1	8	4	2	1
Tens				Ones			
#00-12				#0-9			

Examples:

= CH 2

= CH 58

= CH 87

= CH 116

For previous AP/AD-1 model switch settings, see the Reference Card with the unit or please visit our website: www.blondertongue.com/switchsettings

AQD - ATSC/QAM Demodulator

The Blonder Tongue ATSC/QAM Demodulator is a modular unit that allows the reception and demodulation from a modulated 8VSB or QAM signal input to a baseband NTSC video & audio output. The unit is designed to lock to an off-air 8VSB or QAM annex B digital signal and provide a NTSC video and audio output to permit the easy interface with any equipment which accepts baseband video & audio inputs such as TV displays or existing Blonder Tongue analog modulators.

Features

• 8VSB, QAM 64 & QAM 256 (Annex B) 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
• Demodulates any of the 18 ATSC Video Formats
• Left & Right Stereo Audio Output
• NTSC Video Output

AQD - ATSC/QAM Demodulator

Unit Front Panel
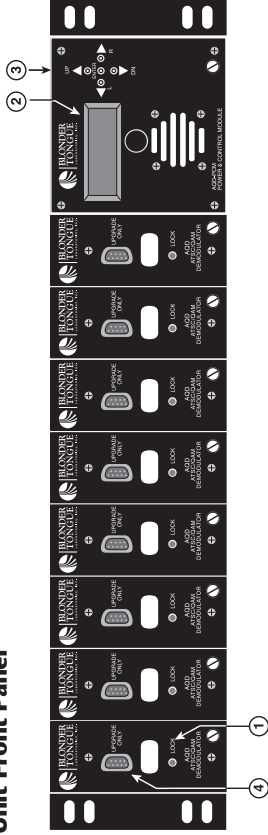
1. **Unit Status Indicator** - Provides feedback to user based on the following LED conditions:
   Solid Green ON - Indicates valid lock to the RF input signal
   Flashing Green LED - Indicates Not Locked or Scanning in process

2. **Backlit LCD** - 16 character, 2 line Liquid Crystal Display screen used to interact with user to display unit information

3. **Push Button Navigation Controls** - Buttons used to navigate between menus and operate the units

4. **9-Pin RS-232 Connector** - Used for Future AQD Module upgrade only
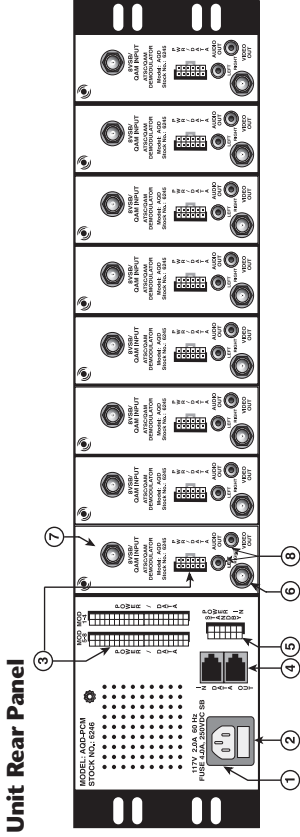
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AQD - ATSC/QAM Demodulator

Unit Rear Panel

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** - 2 cable sets with a 12-pin male connector used to deliver power and data to each AQD unit
4. **RS232 Serial Data Ports** - Used to plug into and daisy chain AQD units for remote monitoring and configuration
5. **Power IN** - 12-pin female connector used to plug-in the optional Standby Power unit
6. **Video OUT** - NTSC Composite Video output via F Connector
7. **8VSB/QAM INPUT** - RF Connector for feeding appropriate 8VSB off-air or QAM modulated RF input signal
8. **Left/Right Audio OUT** - RCA Connectors for Left/Right Audio Output

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AQD - ATSC/QAM Demodulator

Operating Interface Instructions

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.

```
┌─────────┐  ┌─────────┐  ┌─────────┐  ┌─────────┐  ┌─────────┐  ┌─────────┐
│ PRIMARY │→ │ AQD-PCM │→ │ #1 IS   │→ │ #2 NOT  │→ │ #3 IS   │→ │ #4 IS   │
│ POWER   │  │ ADDRESS │  │ PRESENT │  │ PRESENT │  │ PRESENT │  │ PRESENT │─┐
│         │  │00004455 │  │         │  │         │  │         │  │         │ │
└─────────┘  └─────────┘  └─────────┘  └─────────┘  └─────────┘  └─────────┘ │
┌───────────────────────────────────────────────────────────────────────────┘
│┌─────────┐  ┌─────────┐  ┌─────────┐  ┌─────────┐  ┌─────────┐
└│ #5 IS   │→ │ #6 IS   │→ │ #7 IS   │→ │ #8 IS   │→ │ AQD IS  │→
 │ PRESENT │  │ PRESENT │  │ PRESENT │  │ PRESENT │  │ READY   │
 └─────────┘  └─────────┘  └─────────┘  └─────────┘  └─────────┘
```
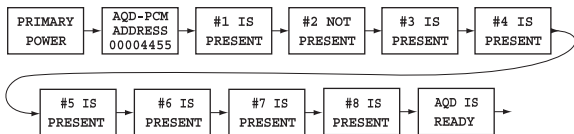
Boot-Up Display Sequence

1. Each control module has a unique module address that is set at the factory which is displayed immediately following the primary or secondary power source status. This address is used for remote software capability only.

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. Upon completion of the boot-up sequence the AQD is ready for use and will proceed to the loop display sequence.

AQD - ATSC/QAM Demodulator

Loop Display Sequence & Left/Right 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 right column in the diagram below. This is referred to 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 the any of the arrow keys. The diagram is divided into 8 rows to reflect the eight respective modules that can populate the rack chassis. Information for Modules Not Present is not displayed during the loop sequence.

```
            ┌──────────────────┐     ┌──────────────────┐
- - - →     │ #1 AQD LOCK 16:9  │ →   │ #1 AQD LOCK       │
MODULE 1    │ 02-1 WCBS-HD      │     │ SNR = 38.50 dB    │
            └──────────────────┘     └──────────────────┘
                    │                         │
                    ↓                         ↓
            ┌──────────────────┐     ┌──────────────────┐
MODULE 8    │ #8 AQD LOCK 16:9  │     │ #8 AQD LOCK       │
            │ 12-2 WPDQ-HD      │     │ SNR = 25.50 dB    │ - - - →
            └──────────────────┘     └──────────────────┘
```
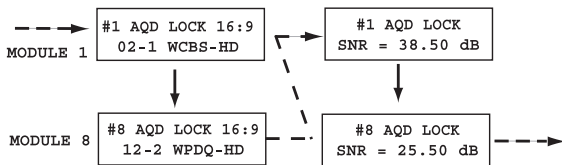
AQD - Left/Right Sequence

The Left/Right Sequence will display two basic LCD screens for each installed module. This information will be displayed when a user depresses the ◄ (L) or ► (R) arrow navigation keys. The AQD NOT PRESENT LCD messages will only be displayed when using the ◄ (L) or ► (R) arrow keys. Then L/R Sequence allows the user to scroll to a particular module to which specific setting adjustments are desired in the Interactive ▲ (UP) / ▼ (DN) Menu.

AQD - ATSC/QAM Demodulator

Left/Right Sequence Details

• SNR is displayed when an AQD 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
Excellent =	>30 dB	>38 dB	>38 dB
Good =	25—30 dB	30—38 dB	35—38 dB
Marginal =	18—25 dB	23—30 dB	30—35 dB
Non-Functional =	<18 dB	<23 dB	<30 dB

• NO PROGRAM will be displayed if a valid lock is acquired but no program signal is actually being detected

• NO SIGNAL indicates that the input signal was not detected (no RF input)

• PLEASE SCAN indicates a scan was not performed or is required again

• AUDIO ONLY indicates no video signal

• NO AUDIO indicates no audio signal present

• SCRAMBLED PRG indicates the signal has encryption

NOTE: The AQD Not Present message will be displayed when the optional Remote Configuration Server (RCS) Module is installed in a particular chassis slot.

```
  #8 AQD
NOT PRESENT
```

AQD - ATSC/QAM Demodulator

Interactive & Up/Down Sequence

The interactive menu is easily accessible by depressing the ▲ (UP) or ▼ (DN) arrow keys on the front of the control module. 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 variables with the modify options listed below. See the following page for specific variable function details.

#1 DEMOD MODE 8VSB	#1 CH. PLAN BROADCAST	#1 SCAN MENU ALL MODULES	#1 TUNE CH. 02-1 WCBS-HD	#1 AQD LOCK 16:9 UHF:44=653 MHz
8VSB QAM B	BROADCAST STANDARD CATV HRC IRC	EXIT YES ALL MODULES STATUS STOP SCAN	DISPLAYS AVAILABLE CHANNELS FROM SCAN Press UP to access all major & minor channels. Press DN to skip to major channels only.	DISPLAYS LOCK STATUS AND ACTUAL CH. TUNING INFO.

#1 PICT SHAPE ZOOM2 16:9	#1 OUTPUT VOL. 99% STEREO	#1 AUDIO MODE STEREO	#1 CC:EIA-608 ENABLE	#1 AQD PWR RES RESET NO	#1 MODULE VER X.XX
LETTER BOX FULL ZOOM1 ZOOM2 SMART ZOOM1 SMART ZOOM2	RANGE IS 0 TO 100% 0% Mutes Audio	STEREO MONO	ENABLE DISABLE	EXIT YES ALL MODULES	DISPLAY ONLY

AQD-PCM ADDRESS 00004159	AQD-PCM FIRMWARE V1.11	3.3V IN = 3.5V	6V IN = 6.2V	10V IN = 9.5V	29V IN = 28.5V	POWER STATUS PRIMARY
DISPLAY ONLY	DISPLAY ONLY	DISPLAY ONLY ––––––––– RANGE IS 3.1 TO 3.6	DISPLAY ONLY ––––––––– RANGE IS 5.5 TO 6.5	DISPLAY ONLY ––––––––– RANGE IS 9.4 TO 10.8	DISPLAY ONLY ––––––––– RANGE IS 26.0 TO 31.5	PRIMARY STANDBY

AQD - LCD Interactive Variable Sequence

AQD - ATSC/QAM Demodulator

Programming a Variable

1. Use the ◄ (L) or ► (R) arrow navigation keys to scroll to the installed module you desire to adjust.

2. Press the ▲ (UP) or ▼ (DN) arrow navigation keys to scroll to the desired interactive variable.

3. When a user arrives at a screen whose variable needs to be changed, the user should depress the ENTER button until the blinking cursor is displayed.

4. 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.

5. 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.

6. The LCD displays an affirmative response after information is entered correctly for several of the variables. The controller will display the "Entry Accepted" response as demonstrated below.

```
ENTRY
ACCEPTED
```

Entry Accepted

AQD - ATSC/QAM Demodulator

Variable Details

DEMOD MODE: The AQD is capable of locking to a terrestrial (off-air) 8VSB or CATV QAM Annex B modulated RF input signal. The selection of the appropriate signal type must be made by the user to ensure signals are properly identified during a scan. By setting the Demod Mode the Channel Plan is automatically set to Broadcast for 8VSB signals and Standard CATV for QAM signals or 8VSB signals on the CATV channel plan.

CHANNEL PLAN: The Channel Plan mode allows the user to the select the appropriate frequency mode. This setting alerts the user to the appropriate center frequency plan the AQD will use during the scan process.

• The Broadcast option must be selected for off-air 8VSB reception, this is automatically set if the Demod Mode is set to 8VSB. Reception is limited to VHF & UHF center frequencies.

• The Standard CATV mode is capable of locking to QAM Annex B and 8VSB signals. This channel plan is automatically set when the QAM B mode is selected in the Demod Mode command menu. Reception is limited to CATV center frequencies.

o It is only required to choose the HRC or IRC option when these frequency off-sets are used with the CATV plan.

➣ NOTE: See Appendix for additional details.

SCAN MENU: The scan menu command allows the AQD module to auto search for available programming. It is required that each module perform a scan in order to function properly. All modules will perform a scan when the Scan All Modules command is selected.

• **YES –** The YES Command performs a scan on only the selected active module

• **ALL MODULES –** The ALL MODULES Command performs a new scan on all of the installed modules

• **STATUS –** The STATUS Command displays the channels found during the scan process for the selected active module

• **STOP SCAN –** The STOP SCAN Command permits an operator to stop an in-process scan. It is important to note that once a scan starts the previously found channel data is immediately erased. If the scan is stopped, only the completed scan channel data will be available for selection

• **EXIT –** The EXIT Command exits the scan menu without making any modifications

AQD - ATSC/QAM Demodulator

```
#2 SCAN
IN PROGRESS
```

The unit will display the SCAN IN PROCESS message during the scan process if interaction is attempted within the active scanning AQD module.

TUNE CHANNEL: The Tune Channel command allows a user to select the desired program from the list of available channels from the unit scan. To select a program scroll to the desired item in the channel list and press the Enter key.

• Depress the ▲ (UP) arrow navigation key to scroll through all the available channels (major and minor sub-channel)

• Depressing the ▼ (DN) arrow navigation key permits faster tuning by 'jumping' to each major channel available from the scan.

o Tuning to the desired minor sub-channel is then easy by pressing the ▲ (UP) arrow navigation key

The LCD will show the ENTRY ACCEPTED message and all TV's will briefly display a banner at the top of the screen. The banner contains the major & minor sub-channel designation and the time (time displayed comes from the broadcast stream).

AQD STATUS - The AQD Status command screen displays valuable status information on the selected program channel. Signal Status:

A. **LOCK** is indicated when a valid signal acquisition has been achieved by the AQD module as well as the signal aspect ratio.

NOT LOCKED will be displayed if the module fails to acquire the desired program signal Channel Frequency Data:

B. INPUT SIGNAL TYPE IS DISPLAYED – Such as UHF or 64 or 256 QAM

C. THE INPUT SIGNAL CH. IS DISPLAYED – for example, CH 44

D. **THE CORRESPONDING FREQUENCY FOR THE INPUT CH. –** 653 MHz for CH 44 UHF

```
          Ⓐ
    ┌──────────────────┐
    │ #8 AQD LOCK 4:3   │
    │ Q256:10=195 MHz   │
    └──────────────────┘
       ↑    ↑    ↑
       Ⓑ    Ⓒ    Ⓓ
```

15
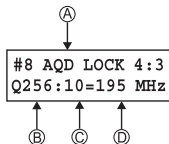
AQD - ATSC/QAM Demodulator

PICTURE SHAPE:

The AQD operator can adjust the picture shape to the desired setting for converting 16:9 images to 4:3 images as required for traditional television ratio viewing.

(**The Smart Zoom 2 setting is recommended in most applications**)

• **FULL** displays the entire picture while stretching vertically to fit the screen and may present with black bars at the sides

• **LETTER BOX** displays the entire picture image and presents with black bars on top/bottom and left/right to fit the screen

• **ZOOM 1** has a vertical/horizontal cut with black bars

• **ZOOM 2** has a vertical/horizontal cut without black bars

• **SMART ZOOM 1** is a modified version of ZOOM 1 to adjust to differences in the picture shape data sent by a broadcaster

• **SMART ZOOM 2** expands the image to fit the screen while cropping some images on the left/right and presents without black bars

➢ **NOTE:** See Appendix B for additional details on picture shape (Screen Aspect Ratio).

```
#2 PICTURE SHAPE
WARNING —> 4:3
```

If the incoming signal is 4:3 Format, the unit will display a warning message to alert the operator that no effect will be made by changing the picture shape. The change will still be permitted, but is not recommended.

AQD - ATSC/QAM Demodulator

OUTPUT VOLUME: The output volume can be adjusted within a range of 0 to 100%.

AUDIO MODE: The audio mode command allows for the selection of mono or stereo audio.

➢ **NOTE:** It is extremely important to change the AUDIO MODE to mono if using a non-stereo (mono) modulator in conjunction with the AQD unit. This will present the full combined mono audio output on both RCA connectors.

CC:EIA-608: This is the Closed Captioning command mode. The closed captioning, also known as line 21 captions is per EIA-608, the standard for Closed Captioning for NTSC Broadcasts in the United States. An operator can globally enable or disable closed captioning for each module eliminating the need to adjust individual TV viewing locations.

AQD PWR RESET: The AQD Power Reset command allows an operator to reset the power or "cold boot" an individual or all the modules installed in a rack. To perform a reset for a single module navigate to the AQD Power Reset command for that particular module (the module number is displayed first on each LCD screen), then press the Enter key, when the blinking cursor appears press the up/down arrow keys to toggle to the YES entry, Press Enter to select. A reset to all modules can be performed at any module reset command screen.

AQD - ATSC/QAM Demodulator

AQD 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 ATSC/QAM Demodulator.

1. Verify RF input levels

   a. Signal acquisition range is -20 to +20 dBmV — -10 to +10 dBmV is the desired optimum level

2. 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

3. Program the appropriate DEMOD MODE for each module — *8VSB or QAM* (Refer to page 16 for detailed variable instructions)

4. Program the appropriate CHANNEL PLAN for each module — *Broadcast, Standard CATV, HRC or IRC*

5. Perform a SCAN on each or all modules — *it is not recommended to operate the unit when a scan is in process*

   a. A scan must also be performed each time the Demod Mode is changed

6. Program the appropriate desired channel in the TUNE CHANNEL menu sequence

   a. **NOTE: A scan must be performed prior to selecting a program channel**

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AQM - Agile QAM Modulator

The AQM is designed to accept a DVB ASI (Asynchronous Serial Interface) digital transport stream and modulate it into a QAM (Quadrature Amplitude Modulation) signal. The QAM modulator in the AQM achieves state-of-the-art performance with capabilities to improve bandwidth efficiency by supporting advanced QAM modes like 256, 512 & 1024 QAM. Plus, the built in advanced bit stuffing circuitry ensures that Null Packets are inserted into the ASI transport stream if needed to ensure the correct baud rate is transmitted.

Excellent RF performance is vital to the health of every cable system. Incorporating digital signals into that cable system increases the complexity required to keep it operating smoothly. The AQM's integrated upconverter is designed to accomplish this very goal. The BT Agile QAM Modulator incorporates a custom design approach utilizing the latest generation technology available to ensure extremely low phase noise and a highly stable output signal. This eliminates the hassles and potential for problems caused by module based interconnects, especially when using products without integrated upconverters.

The AQM is easily accommodated in Blonder Tongue's standard HE Series of micro-modular rack chassis units (MIRC-12V) and the MIPS power supply units. This allows existing modulators or demodulators to coexist effortlessly.

Features

• AQM Unit Integrates the QAM Modulator and a High Performance Upconverter
• Compact Design allows 6 Modules in a 2 RU Rack Chassis
• DVB ASI Input, Complies with DVB ASI Standards
• Improve Bandwidth Efficiency with Support for All Advanced QAM Modes including, 256, 512 & 1024 QAM
• Agile QAM Output 54—864 MHz, (NTSC Mode Channel 2—135 & 12.5 kHz Steps in MHz Frequency Mode)
• NTSC & PAL B/G Capable
• Self Test PRBS Mode Built In
• Optional IF Output Available via Special Order
• Optional LVDS Input Available via Special Order

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AQM - Agile QAM Modulator
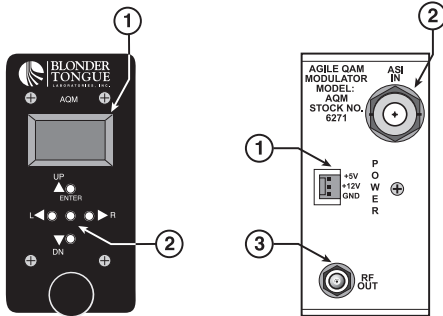
Unit Front Panel

1. **LCD Display** - 2 line Liquid Crystal Display screen used to interact with user to display unit information.

2. **Push Button Navigation Controls** - Buttons used to navigate between menus and enter unit information.

Unit Rear Panel

1. **Power** - 3 pin female connector used to plug-in cable for respective modulator to deliver power.

2. **ASI IN** - BNC connector for ASI (Asynchronous Serial Interface) input.

3. **RF OUT** - 75 Ohm QAM RF Output.

Boot-Up Display Sequence

When the unit is in Normal Mode and is first plugged in for use, the AQM checks for the presence of input data. If data is not detected, it displays the appropriate module condition on the LCD readout as depicted below.

```
NO INPUT
  DATA
```

If unit is set to CW or Off Mode, the following will be displayed by the LCD. **Note:** Factory default values depicted in Box

```
QAM OUT          QAM OUT
  CW               OFF
```

AQM - Agile QAM Modulator

Main Interactive Sequence

The main interactive sequence is where all the core module programming is performed. This sequence is accessed anytime a user depresses one of the ◄ (L) or ► (R) and ▲ (UP) ▼ (DN) arrow navigation keys. The following diagram depicts the LCD screens available in the main interactive sequence.

Note: Factory Reset Default values depicted in illustration.

QAM MODE ITU-A	ENCODER DVB	QAM 64	ALPHA 15%	INTERLVR 112,J17		BD RATE 5.0000 M	INPUT ASI
ITU-A	DVB	16	12	I128,JI	I112,J17	RANGE IS 1 TO 6.9M	ASI
ITU-B	DAVIC	32	15	I128,J2	I17,J12		PRBS 23M
		64	18	I128,J3	I34,J6		PRBS 23
		128		I128,J4	I51,J4		PRBS 15M
		256		I128,J5	I68,J3		PRBS 15
		512		I128,J6	I102,J2		
		1024		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			
				ITU-B	ITU-A		

RF OUT NTSC 100	OUTPUT 509.0875	QAM OUT NORMAL	OUT LVL 40 dBmV	VERSION 1.5a AQM	BIT RATE 41.205 M
NTSC MHz	NTSC 134 509.0875	NORMAL	RANGE IS 28-42 dBmV	DISPLAY ONLY	DISPLAY ONLY
NTSC range is CH 2-135, 6 MHz steps	NTSC mode displays CH #	OFF			
Freq range is 54-864 MHz, 12.5 kHz steps	MHz mode displays actual center freq	CW			Displayed in Normal Mode only

AQM - Agile QAM Modulator

Programming a Variable

1. When a user arrives at a screen whose variable needs to be changed, the user depresses the ENTER button until the blinking cursor is displayed.

2. 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.

3. When the user reaches the desired setting the ENTER button is pressed again to save the change, then the corresponding AQM module stores the new information.

Interactive Sequence Detail

QAM Mode

The AQM can be set to comply with the ITU-TJ-83 Annex A & Annex B specifications.

ITU-A - is used for DVB operation

ITU-B - is used for DigiCiper II operation

Encoder

The Encoder selection is only used in ITU-A Mode. If set to ITU-B Mode, then the Encoder shows NONE.

QAM

The QAM modulation type is user selectable. If the unit is set to ITU-B Mode, then only QAM 64 or 256 are available.

Alpha

The Alpha setting is used to set the roll-off factor. Settings are typical depending on the Operation Mode. The standard settings are as follows:

ITU-A - 15%

ITU-B - 18%

AQM - Agile QAM Modulator

Interleaver

The Convolutional Interleaver is user selectable. Various choices are available depending on the Operation Mode. The standard settings are as follows:

ITU-A - I 12, J17
ITU-B - I 128, J1

Baud Rate

The Baud Rate needs to be programmed based on the Input Data and QAM Mode used. The range is from 1 to 6.9 MBaud.

Input

The AQM Input Signal is fed to the module via the BNC connector on the rear panel. ASI (Asynchronous Serial Interface) data is typically used. The unit is also programmed with the ability to generate a PRBS (Pseudo Random Binary Sequence) test signal. The PRBS signal is a polynomial sequence that is determined by the Input Selection choice. The following settings are available.

PRBS 25M
PRBS 23
PRBS 15M
PRBS 15

These selections are also valuable if an Input ASI signal is not available. This can be helpful in balancing the Output Level of several units without the need for an Input ASI signal.

AQM - Agile QAM Modulator

RF OUT

The unit presents a fully modulated QAM RF output. There are two modes that determine the upconversion programming.

NTSC: The NTSC mode permits programming the RF output using a standard NTSC channel number.

MHz: The MHz or Frequency Tuning mode permits programming the RF output to the desired frequency.

Output

In the NTSC Mode it can be upconverted in 6 MHz increments to any NTSC standard channel, 2-135 (center frequency). See Appendix A for Frequency details.

In the MHz or Frequency Mode it can be upconverted to any desired frequency in 12.5 kHz increments. Press the ▲ (UP) or ▼ (DN) arrow buttons to increment or decrement to the appropriate desired value for each digit, press and hold the button to quickly scroll.

QAM Out

The unit has three QAM modes.

NORMAL: The NORMAL QAM mode outputs a QAM modulated signal.

OFF: The OFF QAM mode outputs no signal from the module.

CW: The CW QAM mode outputs a CW signal that is very useful for measuring the output level of the unit. (See the QAM Signal Level Testing section for more detail).

Output Level

The AQM features electronic output level control.

• Can be adjusted in any of the QAM modes listed above.

• Displayed and measured as an average value. (See the QAM Signal Level Testing section for more detail).

• QAM CW output level is a true representation of a QAM signal level.

  The output level range is +30 dBmV to +40 dBmV.

NOTE: For optimum noise performance, output level for each module should be set nominally at +40 dBmV.

AQM - Agile QAM Modulator

Bit Rate

This is the actual input date rate that the QAM signal is locked to. This is only displayed in the QAM Out Normal Mode.

Factory Reset

The unit has a "Factory Reset" capability built in that allows a user to erase all the current programming information for the AQM and restore it to it's factory default setting.

To perform this function, press and hold the ENTER and ▼ (DN) arrow navigation keys simultaneously until the LCD displays "Factory Reset" and then release. This will cause the unit to reset the programmed information to the factory default settings shown in the Main Interactive Sequence illustration on page 10.

```
FACTORY
RESET
```

Factory Reset

CAUTION **This will reset all programming information for the unit and is only recommended when an error condition is displayed by the LCD that cannot be corrected by a normal power cycle!**

AQT - ATSC to QAM Transcoder

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 permit interface with digital TV displays with QAM tuners.

Applications

Digital channel processing including:

• Changing the incoming QAM channel to a different RF QAM channel

• Complete regeneration of a QAM input for optimal MER performance

• Convert one off-air ATSC 8VSB signal to a QAM output

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

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AQT - ATSC to QAM Transcoder

Unit Front Panel
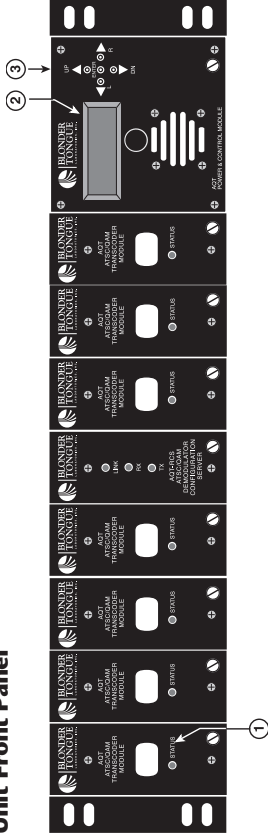
1. **Unit Status Indicator** - Provides feedback to user based on the following LED indications:

   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 screen used to interact with user to display unit information

3. **Push Button Navigation Controls** - Buttons used to navigate between menus and set variables
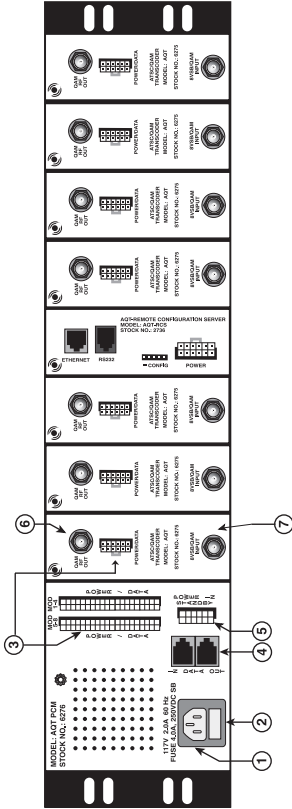
Unit Rear Panel

AQT - ATSC to QAM Transcoder

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 RF input signal

AQT - ATSC to QAM Transcoder

Operating Interface Instructions

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-PCM PWR │→  │ AQT-PCM     │→  │ #1 AQT      │→  │ #2 AQT      │
│ PRIMARY     │   │ ADDRESS     │   │ MODULE      │   │ MODULE      │
│             │   │ 00099881    │   │ IS PRESENT  │   │ NOT PRESENT │
└─────────────┘   └─────────────┘   └─────────────┘   └─────────────┘
                                                            │
┌─────────────┐   ┌─────────────┐   ┌─────────────┐   ┌─────────────┐
│ #3 AQT      │→  │ #4 AQT      │→  │ #5 AQT      │→  │ #6 AQT      │
│ MODULE      │   │ MODULE      │   │ MODULE      │   │ MODULE      │
│ IS PRESENT  │   │ NOT PRESENT │   │ IS PRESENT  │   │ IS PRESENT  │
└─────────────┘   └─────────────┘   └─────────────┘   └─────────────┘
                                                            │
┌─────────────┐   ┌─────────────┐   ┌─────────────┐
│ #7 AQT      │→  │ #8 AQT      │→  │ AQT-PCM     │
│ MODULE      │   │ MODULE      │   │ IS READY    │
│ IS PRESENT  │   │ IS PRESENT  │   │             │
└─────────────┘   └─────────────┘   └─────────────┘
```
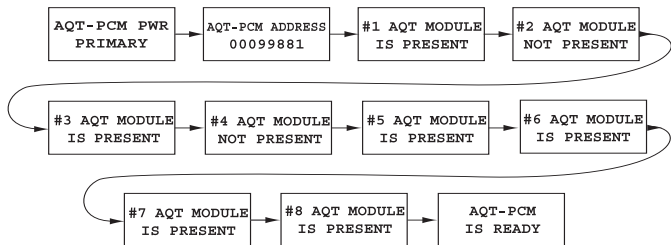
AQT - Boot-Up Display Sequence

1. Each control module has a unique module address that is set at the factory which 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".

AQT - ATSC to QAM Transcoder

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
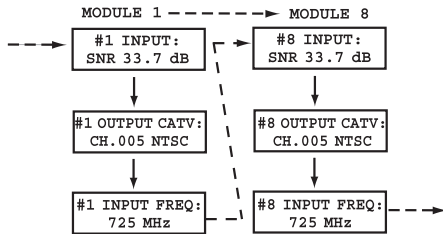
AQT - LCD Loop Display Sequence

AQT - ATSC to QAM Transcoder

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.

#1 OUTPUT CATV: CH.005 NTSC	#1 INPUT FREQ: 725 MHz	#1 OUTPUT LEVEL: 40 dBmV	#1 OUT QAM MODE: NORMAL
ENTER DESIRED CHANNEL ------------ Tuning range is 2-135 CATV digital center frequency	ENTER DESIRED FREQUENCY ------------ Tuning range is 54-864 MHz digital center frequency	ENTER DESIRED LEVEL ------------ Tuning range is +30-+40 dBmV best output SNR achieved @ +40	NORMAL OFF CW CW ALL NORMAL ALL PASS THRU

MODULE 1		MODULE 8
#1 INPUT: SNR 33.7 dB	#2 AQT MODULE NOT PRESENT	#1 INPUT: SNR 33.7 dB

AQT - LCD Left/Right Variable Sequence

AQT - ATSC to QAM Transcoder

- **OUTPUT CATV** — permits the entry of the desired output channel number to program the AQT module, tuning range is NTSC CATV channel 2—135, (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, (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 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

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AQT - ATSC to QAM Transcoder

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
Excellent =	>30 dB	>38 dB	>38 dB
Good =	25—30 dB	30—38 dB	35—38 dB
Marginal =	18—25 dB	23—30 dB	30—35 dB
Non-Functional =	<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.

2. Press the ▲ (UP) or ▼ (DN) arrow navigation keys to scroll to the desired interactive variable.

3. When a user arrives at a screen whose variable needs to be changed, the user should depress and hold the ENTER button until the blinking cursor is displayed.

4. 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.

5. 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.

■

AQT - ATSC to QAM Transcoder

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.

#1 INPUT BROWSE: OFF	#1 INPUT DEMOD: VSB-8	#1 INPUT RATE: 5.381119 M	#1 OUT QAM: 64 ANNEX A	#1 ALPHA: 15%	#1 INTERLEAVER 112,J17	#1 OUT BD RATE: 5.000 M	AQT-PCM ADDRESS 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

AQT-PCM FIRMWARE VERSION 3.0	#1 AQT MODULE VERSION 5.0	AQT-PCM 3.3V"=3.5V	AQT-PCM 6V"=6.2V	AQT-PCM 10V"=9.5V	AQT-PCM 29V"=28.5V	AQT-PCM POWER: 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

AQT - ATSC to QAM Transcoder

- 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 prder for the input browse to work, Input/Output parameters are paired and must match this chart.

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AQT - ATSC to QAM Transcoder

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

   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 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

   NOTE: Repeat as appropriate for each module

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DAP - Digital to Analog Processor

The Digital to Analog Processor (DAP) is a complete single channel solution for delivering digital television programming over existing analog networks. The DAP is housed in a one rack high unit and features a backlit 2 x 16 character LCD screen and push button navigation switches to allow interaction with the simple to follow user menu functions for programming. Input and output tuning is easily accomplished with either the front panel menu interface or via the optional Remote Network Card; only one RNC per headend is needed for complete configuration and control of all DAPs that are daisy chained in the headend. The DAP supports standard EIA CATV, IRC, HRC and Broadcast channel plans in the 54—864 frequency range. All channel frequency information, with appropriate FCC offsets, is pre-programmed and tuned electronically via microprocessor. The unit is also equipped with the Emergency Alert System (EAS) feature which can also be used as an alternate IF input.

Features

- Decodes HDTV or SDTV Digital Signals and Modulates to Analog for Transmission to Traditional Televisions

- Accepts All ATSC Digital Input Standards, 8VSB, 64 QAM, 256 QAM

- Outputs All Broadcast and CATV Channel Assignments in the 54-864 MHz Range

- Remotely Configure All DAPs in a Headend with Optional Remote Network Card in one DAP unit

- Perfect Digital Transition Solution to Offer Analog Versions from Digital Sources

- +60 dBmV Output

- EAS IF Input
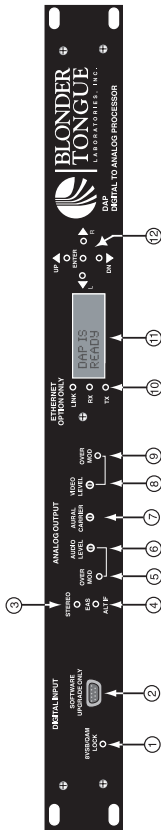
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Unit Front Panel

1. **Unit Status Indicator -** Provides feedback to user based on the following LED conditions:
   Solid Green LED indicates valid lock to the RF input signal
   Flashing Green LED indicates NOT LOCKED or SCANNING in process
2. **9-Pin RS-232 Connector -** Used for future software upgrade of digital input section only
3. **Stereo LED -** Green stereo LED light
4. **EAS/ALT Indicator -** Red LED when EAS/ALT IF is active
5. **Audio Over Modulation LED -** Lights when peak deviation of aural carrier is over 25 kHz
6. **Audio Modulation Level -** Adjusts aural carrier modulation
7. **Aural Carrier -** Controls amplitude of aural RF carrier relative to visual RF carrier
8. **Video Modulation Level -** Adjust percentage of modulation
9. **Video Over Modulation LED -** Lights when modulation is above 87.5%
10. **Ethernet Link, Receive and Transmit LED -** LED indicator for optional ethernet connectivity. The LED's will only light if RNC option is installed and in use, without RNC installed all LED's will be off.
11. **Backlit LCD -** 16 character, 2 line Liquid Crystal Display screen used to interact with user to display unit info
12. **Push Button Navigation Controls -** Buttons used to navigate between menus and operate the unit

DAP - Digital to Analog Processor
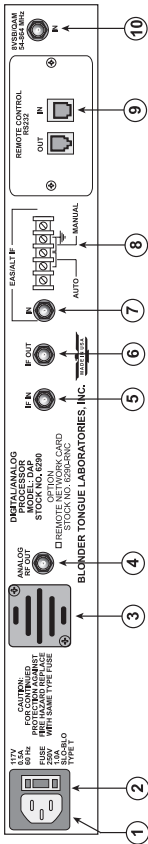
1. **Power Cord Socket** - The Unit Power Cord Plug Socket

2. **Fuse Holder** - 1.0 Amp., 250V DC, Slo Blo Fuse

3. Air Circulation Fan

4. **Analog RF Out** - NTSC Analog Output via "F" Connector

5. **IF IN** - "F" Connector IF Input

6. **IF OUT** - "F" Connector IF Output

7. **EAS/ALT IF** - "F" Connector for Emergency Alert System/ALT IF

8. **EAS/ALT IF Terminal Strip** - Terminal Connector for Auto/Manual EAS

9. **Optional RS232 Computer Control** - RJ-11 Connector, used to daisy chain DAP for optional computer control. Requires Remote Network Card (not shown) to be installed in one DAP unit per headend.

10. **8VSB/QAM INPUT** - RF Connector for feeding appropriate 8VSB off-air or QAM modulated RF input signal

DAP - Digital to Analog Processor

Boot-Up Display Sequence

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

```
┌─────────────┐   ┌─────────────┐   ┌─────────────┐
│POWER STATUS │ → │DAP ADDRESS  │ → │    DAP      │
│INITIALIZING │   │  00007259   │   │  IS READY   │
└─────────────┘   └─────────────┘   └─────────────┘
```

Boot-Up Display Sequence

1. Each DAP unit has a unique digital address that is set at the factory which is displayed immediately following the power status initialization. This address is used for remote software capability only.

2. Upon completion of the boot-up sequence the DAP is ready for use and will proceed to the loop display sequence.

CAUTION

DO NOT push any switches on the control module during this sequence as it will NOT respond until it displays "DAP IS READY".

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DAP - Digital to Analog Processor

Main LCD Lock Display

After the unit has displayed the boot-up sequence it will display the main LCD lock display. In this mode the LCD displays the actual status as depicted in the diagram below. The LCD lock display may be interrupted at any time by pressing the any of the arrow keys.

```
INPUT LOCKED      INPUT NOT LOCKED
SNR=26.28 dB        NO SIGNAL
```

DAP - Main LCD Display

Left/Right Sequence Details

The Left/Right Sequence will display four basic LCD screens. This information will be displayed when a user depresses the ◄ (L) or ► (R) arrow navigation keys.

IMPORTANT No unit adjustments are permitted in the ◄ (L) or ► (R), all modifications must be performed in the ▲ (UP) / ▼ (DN) sequence.

• SNR is displayed when the DAP 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
Excellent =	>30 dB	>38 dB	>38 dB
Good =	25—30 dB	30—38 dB	35—38 dB
Marginal =	18—25 dB	23—30 dB	30—35 dB
Non-Functional =	<18 dB	<23 dB	<30 dB

• NO SIGNAL indicates that the input signal was not detected (no RF input)
• PLEASE SCAN indicates a scan was not performed or is required again
• AUDIO ONLY indicates no video signal
• NO AUDIO indicates no audio signal present
• SCRAMBLED PRG indicates the signal has encryption
• NO PROGRAM will be displayed if a valid lock is acquired but no program signal is actually being detected

DAP - Digital to Analog Processor

The Unit LED has a backlit feature to illuminate the panel. It will illuminate when any of interactive buttons are pressed. It will automatically turn off if no button interaction is made after 10 seconds.

INPUT LOCKED SNR=26.28 dB	→	ANALOG RF OUTPUT CH 004 NTSC	→	OUTPUT LEVEL 47.8 dBmV	INPUT LOCKED 16:9 7-1 WABC-HD

DAP - Left/Right Display

Interactive & Up/Down Sequence

The interactive menu is easily accessible by depressing the ▲ (UP) or ▼ (DN) arrow keys on the front of the DAP unit. 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 variables with the options listed below. See the following page for specific variable function details.

INPUT SECTION COMMANDS

INPUT DEMOD MODE 8VSB	INPUT CH PLAN BROADCAST	SCAN MENU YES	TUNE CH 02-1 WCBS-HD	INPUT LOCK 16.9 UHF:44=653 MHz	PICTURE SHAPE FIRMWARE:V 1.0
8VSB QAM B	BROADCAST STANDARD CATV HRC IRC	EXIT YES STATUS STOP SCAN	DISPLAYS AVAILABLE CHANNELS FROM SCAN Press UP to access all major & minor channels. Press DN to skip to major channels only.	DISPLAYS LOCK STATUS AND ACTUAL CH TUNING INFO	FULL LETTERBOX CENTER CUT ZOOM1 ZOOM2 SMARTZOOM1

OUTPUT AUDIO 99% STEREO	AUDIO LANG. PRIMARY ENG.	CC:EIA-608 ENABLE	INPUT PWR RESET EXIT	DIGITAL INPUT VERSION X.XX
RANGE IS 0 TO 100% ------------ 0% mutes audio	PRIMARY ENG. PRIMARY ONLY SAP	ENABLE DISABLE	EXIT YES	DISPLAY ONLY

CONTROLLER BOARD COMMANDS

DAP ADDRESS 00007259	CONTROL MODULE FIRMWARE V:1.1	3.3V IN =3.5V	6V IN =6.2V	12V IN =11.8V	21V IN =21.5
DISPLAY ONLY	DISPLAY ONLY	DISPLAY ONLY ------------ RANGE IS 3.1 TO 3.6	DISPLAY ONLY ------------ RANGE IS 5.5 TO 6.5	DISPLAY ONLY ------------ RANGE IS 11.4 TO 12.8	DISPLAY ONLY ------------ RANGE IS 20.0 TO 22.5

OUTPUT SECTION COMMANDS

ANALOG MODULE FIRMWARE V:1.0	OUTPUT CH MODE STANDARD CATV	OUTPUT LEVEL 60.0 dBmV	ANALOG RF OUTPUT CH 007 NTSC
DISPLAY ONLY	STANDARD CATV FREQUENCY IRC HRC	ENTER DESIRED LEVEL ------------ Tuning range is +50 - +60 dBmV Best output SNR achieved @ +60	ENTER DESIRED CH. ------------ Tuning range is 2-135 CATV or 54-864 MHz digital center frequency

DAP - LCD Interactive Variable Sequence

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DAP - Digital to Analog Processor

Programming a Variable

1. Press the ▲ (UP) or ▼ (DN) arrow navigation keys to scroll to the desired interactive variable.

2. When a user arrives at a screen whose variable needs to be changed, the user should depress the ENTER button until the blinking cursor is displayed.

3. 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.

4. When the user reaches the desired value the user should press the ENTER button again to apply the change to the unit memory. The control board then programs the unit to the new setting.

5. The LCD displays an affirmative response after information is entered correctly for several of the variables. The controller will display the ENTRY ACCEPTED response as demonstrated below.

> **ENTRY**
> **ACCEPTED**

Entry Accepted

Variable Details

INPUT DEMOD MODE:

The DAP is capable of locking to a terrestrial (off-air) 8VSB or CATV QAM Annex B modulated RF input signal. The selection of the appropriate signal type must be made by the user to ensure signals are properly identified during a scan. By setting the DEMOD MODE the CHANNEL PLAN is automatically set to BROADCAST for 8VSB signals and STANDARD CATV for QAM signals or 8VSB signals on the CATV channel plan.

DAP - Digital to Analog Processor

INPUT CH PLAN:

The CHANNEL PLAN mode allows the user to the select the appropriate frequency mode. This setting alerts the user to the appropriate center frequency plan the DAP will use during the scan process.

• The BROADCAST option must be selected for off-air 8VSB reception, this is automatically set if the DEMOD MODE is set to 8VSB. Reception is limited to VHF & UHF center frequencies.

• The STANDARD CATV mode is capable of locking to QAM Annex B and 8VSB signals. This channel plan is automatically set when the QAM B mode is selected in the DEMOD MODE command menu. Reception is limited to CATV center frequencies.

o It is only required to choose the HRC or IRC option when these frequency off-sets are used with the CATV plan.

SCAN MENU:

The SCAN MENU command allows the DAP unit to auto search for available programming. It is required to perform a scan in order to function properly.

• YES – The YES command performs a scan of the incoming available signals by the DAP unit

• STATUS – The STATUS command displays the channels found during the scan process

• STOP SCAN – The STOP SCAN command permits an operator to stop an in-process scan. It is important to note that once a scan starts the previously found channel data is immediately erased. If the scan is stopped, only the completed scan channel data will be available for selection

• EXIT – The EXIT command exits the SCAN MENU without making any modifications

```
SCAN
IN PROGRESS
```

The unit will display the SCAN IN PROCESS message during the scan process if interaction is attempted.

DAP - Digital to Analog Processor

TUNE CHANNEL:

The TUNE CHANNEL command allows a user to select the desired program from the list of available channels from the unit scan. To select a program scroll to the desired item in the channel list and press the Enter key.

• Depress the ▲ (UP) arrow key to scroll through all the available channels (major and minor sub-channel)

• Depressing the ▼ (DN) arrow key permits faster tuning by 'jumping' to each major channel available from the scan.

  o Tuning to the desired minor sub-channel is then easy by pressing the ▲ (UP) arrow key

The LCD will show the ENTRY ACCEPTED message and all TV's will briefly display a banner at the top of the screen. The banner contains the major & minor sub-channel designation and the time (time displayed comes from the broadcast stream).

INPUT STATUS:

The Input Status command screen displays valuable status information on the selected program channel.

Signal Status:

A. INPUT LOCK is indicated when a valid signal acquisition has been achieved by the DAP unit as well as the signal aspect ratio.

  NOT LOCKED will be displayed if the module fails to acquire the desired program signal.

B. INPUT SIGNAL TYPE IS DISPLAYED – such as UHF or 64/256 QAM

C. INPUT SIGNAL CHANNEL IS DISPLAYED – for example, CH 10

D. CORRESPONDING FREQUENCY FOR THE INPUT CHANNEL – 195 MHz for CH 10 CATV

45
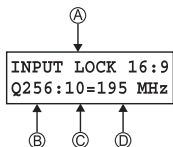
DAP - Digital to Analog Processor

PICTURE SHAPE:

The DAP operator can adjust the picture shape to the desired setting for converting 16:9 images to 4:3 images as required for traditional television ratio viewing.

(The Center Cut setting is recommended in most applications)

- FULL displays the entire picture while stretching vertically to fit the screen and may present with black bars at the sides
- LETTER BOX displays the entire picture image and presents with black bars on top/bottom and left/right to fit the screen
- CENTER CUT expands the image to fit the screen while cropping some images on the left/right and presents without black bars
- ZOOM 1 has a vertical/horizontal cut with black bars
- ZOOM 2 has a vertical/horizontal cut without black bars
- SMART ZOOM 1 is a modified version of ZOOM 1 to adjust to differences in the picture shape data sent by a broadcaster

```
PICTURE SHAPE
WARNING ──→ 4:3
```

If the incoming signal is 4:3 Format, the unit will display a warning message to alert the operator that no effect will be made by changing the picture shape.

OUTPUT AUDIO:

The output volume can be adjusted within a range of 0 to 100%.

AUDIO LANGUAGE:

The AUDIO LANGUAGE command allows for the selection of an available primary or secondary audio program.

- PRIMARY ONLY – Detects only a primary audio feed.
- PRIMARY PLUS LANGUAGE – The unit will display the language name of the primary language if transmitted by the programmer, this information will not be displayed if the programmer has not included it in the PSIP data.
- SAP PLUS LANGUAGE – The unit will display the language name of the SAP language if transmitted by the programmer, this information will not be displayed if the programmer has not included it in the PSIP data.

DAP - Digital to Analog Processor

CC:EIA-608:

This is the Closed Captioning command mode. The Closed Captioning, also known as line 21 captions per EIA-608 is the standard for Closed Captioning for NTSC Broadcasts in the United States. An operator can globally enable or disable Closed Captioning for each module eliminating the need to adjust individual TV viewing locations.

OUTPUT CHANNEL MODE:

The DAP OUTPUT CHANNEL MODE can be set to standard CATV, HRC or IRC offsets as well as frequency tuning mode.

The frequency tuning mode allows a user to program a desired output frequency in 12.5 kHz steps. The unit will automatically round an improper entry to the nearest appropriate value. This mode is generally not used in typically deployments and only intended for special applications such as PAL usage.

OUTPUT LEVEL:

The RF OUTPUT LEVEL is user adjustable by pressing the ▲ (UP) or ▼ (DN) arrow buttons. The output level is not changed until the ENTER button is pressed. The level increments in 0.2 dB steps. Pressing and holding the ▲ (UP) or ▼ (DN) buttons will allow for faster scrolling. The display range is 48—62 dBmV. Output level accuracy is typically +/- 1 dB of display, +/- 2 dB worst case. Optimum SNR performance is achieved by setting the unit output @ +60 dBmV.

ANALOG RF OUTPUT:

The ANALOG RF OUTPUT is programmable by channel or frequency. Entries are made by pressing the ▲ (UP) or ▼ (DN) arrow buttons to reach the desired channel. The RF output is not changed until the ENTER button is pressed. Pressing and holding the ▲ (UP) or ▼ (DN) buttons will allow for faster scrolling. The ANALOG RF OUTPUT mode is displayed with the desired entry.

DAP - Digital to Analog Processor

Analog Output Adjustments (Front Panel)

VIDEO LEVEL:

With the intended signal source connected and a representative video program present, turn the Video Level adjust control clockwise until the Video Overmodulation light just flashes, then back off slightly. Alternatively, while watching the picture on a good TV monitor, adjust the control to the highest (clockwise) level that does NOT cause the highlights (white portions of the picture) to become "washed out".

AUDIO LEVEL:

Turn the Audio Level adjust control clockwise until the Audio Overmodulation light just flashes slightly on the loudest peaks of the audio program material.

AURAL CARRIER:

To adjust the aural-to-visual carrier ratio, adjust the Aural Carrier control to obtain the desired Aural Carrier level. Recommended ratio is -15 dB.

EAS/ALT IF:

   Automatic - Connect a jumper to the terminal strip auto position. EAS will become active when a +38 dBmV EAS IF signal is detected.

   Manual - EAS is active with a ground connection on the manual position of the terminal strip.
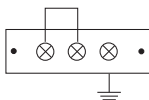
Automatic   Manual
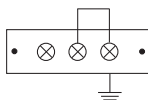
DAP - Digital to Analog Processor

DAP 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 Digital to Analog Processor.

1. Verify RF input levels
   a. Signal acquisition range is -20 to +20 dBmV — -10 to +10 dBmV is the desired optimum level
2. Program the appropriate DEMOD MODE for each module — 8VSB or QAM (Refer to page 13 for detailed variable instructions)
3. Program the appropriate CHANNEL PLAN for each module — Broadcast, Standard CATV, HRC or IRC
4. Perform a SCAN — it is not recommended to operate the unit when a scan is in process
   a. A scan must also be performed each time the DEMOD MODE is changed
5. Program the appropriate desired channel in the TUNE CHANNEL menu sequence
   a. **NOTE: A scan must be performed prior to selecting a program channel**
6. Program the appropriate desired RF Output Channel

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QT - Modular QPSK/QAM Transcoder

The QT Series is a Modular QPSK to QAM Transcoder supporting up to eight QAM Transcoder Modules, interfaced with a Power & Control Module housed in a specially designed 3RU chassis.

The unit transcodes any 24-36 MHz wide QPSK modulated satellite signal to a 6 MHz wide QAM modulated IF signal and translates it to any CATV RF channel assignment in the 54-864 MHz frequency band.

The QT Series features a back-lit LCD display with front panel accessible push button controls providing access to all vital unit information, facilitating easy set-up and troubleshooting.

Interfacing the QT with Blonder Tongue's QCentral computer software provides off-site, remote operation and control including digital adjustment of the QAM RF output level.

QT - Modular QPSK/QAM Transcoder

Unit Front Panel
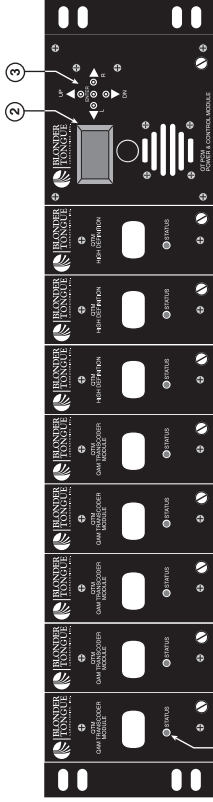
1. **Unit Status Indicator** - Provides feedback to user based on the following LED conditions:
   a) Solid Green ON - Indicates valid QPSK and QAM lock
   b) Flash ON/OFF - QAM signal is in OFF or CW mode
   c) Flash 1x, 2x or 3x and Pause OFF - Indicates possible upconverter problem, or possible problem with power cable
   d) Flash 4x and Pause OFF - Indicates possible QAM modulator problem, check input transponder frequency and data rate to correct (check to make sure in "Auto Mode")

2. **Backlit LCD** - 8 character, 2 line Liquid Crystal Display screen used to interact with user to display unit information.

3. **Push Button Navigation Controls** - Buttons used to navigate between menus and enter unit information.

QT - Modular QPSK/QAM Transcoder

Unit Rear Panel
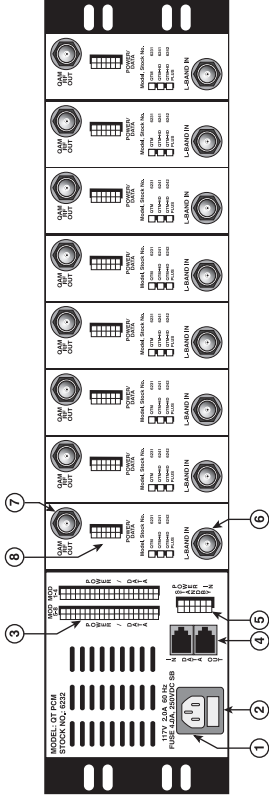
1. **Power Cord Socket** - The unit power cord plug socket.

2. **Fuse Holder** - 4.0 Amp, 250V DC, Slo Blo fuse.

3. **Module Power/Data Cables** - 2 cable sets with a 12-pin male connector used to deliver power and data to each QTM OR QTM-HD.

4. **RS232 Serial Data Ports** - Used to plug into and daisy chain QT units for remote monitoring and configuration.

5. **Power IN** - 12-pin female connector used to plug-in the optional Standby Power unit for redundant support.

6. **QPSK L-Band Input** - Independent 75 Ohm RF connector for feeding appropriate QPSK L-Band satellite input signal.

7. **QAM RF Output** - Independent 75 Ohm QAM RF Output.

8. **Power/Data** - 12-pin female connector used to plug-in cable for respective module to deliver power and data.

QPSK/QAM Transcoders

Boot-Up Display Sequence

When the unit is first plugged in for use, the control module interrogates the potential transcoder connections and displays the appropriate module condition on the LCD readout as depicted below.

```
┌──────────┐   ┌──────────┐   ┌──────────┐   ┌──────────┐   ┌──────────┐   ┌──────────┐
│ ADDRESS  │ → │ #1 IS    │ → │ #2 NOT   │ → │ #3 IS    │ → │ #4 IS    │ → │ MQQT IS  │
│ 00004455 │   │ PRESENT  │   │ PRESENT  │   │ PRESENT  │   │ PRESENT  │   │ READY    │
└──────────┘   └──────────┘   └──────────┘   └──────────┘   └──────────┘   └──────────┘
```
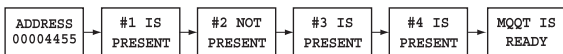
Boot-Up Display Sequence

Upon completion of the boot-up sequence the transcoder is ready for use and will proceed to the loop display sequence.

CAUTION

DO NOT push any switches on the module during this sequence as it will not respond until it displays or "QTM IS READY".

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Programming a Variable

Press the Left ◄ or Right ► arrow buttons to access the interactive variables.

1. When a user arrives at a screen that a variable needs to be changed, the user depresses and holds the ENTER button until the blinking cursor is displayed (approximately one second).

2. 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.

3. When the user reaches the desired setting the ENTER button is pressed again to save the change. The control module then programs the corresponding transcoder module to the new information.

4. The unit displays an affirmative response after information is entered correctly. The controller will display the "Entry Accepted" response as demonstrated below.

```
ENTRY
ACCEPTED
```

5. Entries can be made to the controller for all modules, even if not all modules are installed. The controller will display module "Not Present" response if the module is not installed.

```
#2 NOT
PRESENT
```

6. The controller also displays a response to inform the user if an incorrect entry has been made, such as an entry out of the programmed range. The controller does not accept this information and forces the user to re-enter the correct information.

```
#1 OUT OF      RANGE IS      RANGE IS
   RANGE         2-135        950-2150
```

Out of Range

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QPSK/QAM Transcoders

QAM Modes

The transcoders have three QAM modes.

NORMAL: The normal QAM mode outputs a 6 MHz QAM modulated signal.

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).

CW: The CW QAM mode outputs a carrier wave test signal that is very useful for measuring the output level of the transcoder. (See the QAM Signal Level Testing section for more detail). (When a module is placed in the QAM CW Mode, the STATUS LED indicator will blink).

Additional QT Series QAM Modes.

CW ALL: Puts all QTM or QTM-HD installed in rack chassis into CW mode for ease of level adjustment.

NORMAL ALL: Puts all QTM or QTM-HD installed in rack chassis into normal QAM mode.

Output Level

The transcoders features electronic output level control for each of the single transcoder modules. The output level can be adjusted in any of the QAM modes listed above. The output level is displayed and measured as an average value. (See the QAM Signal Level Testing section for more detail).

The output level range is +30 dBmY to +40 dBmV for the QT Series. The output level will be the same for a QAM CW or EAS IF Signal as a QAM normal signal.

Note: For optimum noise performance, the output level for each module should be set nominally at the maximum output.

Factory Reset

The units have a "Factory Reset" capability built in that allows a user to erase all the current programming information for the PSCM/PCM and restore it to it's factory default setting.

To perform this function, press and hold the (UP) ▲ and (DN) ▼ arrow navigation keys simultaneously until the LCD displays "Factory Reset" and then release. This will cause the unit to reset the programmed information to the factory default setting shown on the next page.

```
FACTORY
RESET
```

Factory Reset

| **CAUTION** | **This will reset all programming information for all modules!** |

QPSK/QAM Transcoders

The following are the default factory settings the unit will reset to:

QT Series

# 1 OUT CH 101 # 1 INPUT 974 MHz QAM: NORMAL LEVEL: 40 dBmV	# 7 OUT CH 107 # 7 INPUT 974 MHz QAM: NORMAL LEVEL: 40 dBmV
# 2 OUT CH 102 # 2 INPUT 974 MHz QAM: NORMAL LEVEL: 40 dBmV	# 8 OUT CH 108 # 8 INPUT 974 MHz QAM: NORMAL LEVEL: 40 dBmV
# 3 OUT CH 103 # 3 INPUT 974 MHz QAM: NORMAL LEVEL: 40 dBmV	MODE: AUTO DECODER: DVB IN RATE: 20.000 M QAM: 128 ALPHA: 15% INTERLV: I12, J17 BD RATE: 4.761M POWER: PRIMARY
# 4 OUT CH 104 # 4 INPUT 974 MHz QAM: NORMAL LEVEL: 40 dBmV	
# 5 OUT CH 105 # 5 INPUT 974 MHz QAM: NORMAL LEVEL: 40 dBmV	
# 6 OUT CH 106 # 6 INPUT 974 MHz QAM: NORMAL LEVEL: 40 dBmV	

Broadband Amplifier Specifications Chart

STOCK #	MODEL	FREQ. RANGE	GAIN	*GAIN RANGE	*SLOPE RANGE	NOISE FIGURE	OUTPUT LEVEL	CH. LOADING	CTB
5400-53	BIDA 550-30	47-550	33	15	10	7	36/44	77	-64
5400-55	BIDA 550-50	47-550	50	15	10	7	36/44	77	-64
5400-73	BIDA 750-30	47-750	31	15	10	9	36/44	110	-60
5400-##	BIDA SERIES	5-30	24	12	12	6	42	2	-60
5800-53	BIDA-55A-30	49-550	32	10	8	7.0	36/44	77	-64
5800P53	BIDA-55A-30P	49-550	32	10	8	7.0	36/44	77	-71
5800-54	BIDA-55A-43	49-550	43	10	8	7.0	36/44	77	-63
5800P54	BIDA-55A-43P	49-550	43	10	8	7.0	36/44	77	-68
5800-55	BIDA-55A-50	49-550	50	10	8	7.5	36/44	77	-63
5800-73	BIDA-75A-30	49-750	32	10	8	8.5	36/44	110	-60
5800P73	BIDA-75A-30P	49-750	32	10	8	8.5	36/44	110	-64
5800-74	BIDA-75A-43	49-750	43	10	8	8.5	36/44	110	-56
5800P74	BIDA-75A-43P	49-750	43	10	8	8.5	36/44	110	-64
5800-83	BIDA-86A-30	49-860	32	10	8	8.5	36/44	129	-54
5800P83	BIDA-86A-30P	49-860	32	10	8	8.5	36/44	129	-62
5800-84	BIDA-86A-43	49-860	44	10	8	8.5	36/44	129	-56
5800P84	BIDA-86A-43P	49-860	43	10	8	7.0	36/44	129	-60
5800-13	BIDA-100A-30	49-1000	32	10	8	8.5	36/44	150	-59
5800-##	BIDA SERIES	5-36	20	18	NA	6.0	42	3	-60
5818	LPA-860-36G	53-860	36	FIXED - PLUG-INS		7	36/46	79	-80
	LPA-860-36G	5-42	18.5	FIXED - PLUG-INS		6	40	4	-87

* Specifications do not include optional plug-in attenuators and equalizers.
* CTB distortion measured at listed output level and channel loading.

Directional Couplers Insertion Loss

Indoor

STOCK #	TAP VALUE (dB)	NO. OF OUTPUTS	THRU-LINE LOSS (dB)	
			@450 MHz	@1000 MHz
SRT-1			@450 MHz	@1000 MHz
1940-4	4		4.0	4.5
1940-6	6		3.5	4.0
1940-9	9		1.6	2.0
1940-12	12	1	1.5	2.0
1940-16	16		0.7	1.5
1940-20	20		0.7	1.5
1940-24	24		0.6	1.5
1940-27	27		0.6	1.5
1940-30	30		0.6	1.5
SRT-2A			@450 MHz	@1000 MHz
1942-4	4		Terminated	
1942-8	8		3.2	3.5
1942-11	11		2.5	3.0
1942-14	14		1.2	2.2
1942-17	17	2	1.0	1.8
1942-20	20		0.9	1.2
1942-23	23		0.9	1.2
1942-26	26		0.7	1.2
1942-29	29		0.7	1.2
1942-32	32		0.7	1.2
SRT-4A			@450 MHz	@1000 MHz
1944-8	8		Terminated	
1944-11	11		3.8	4.4
1944-14	14		2.3	2.5
1944-17	17		1.5	2.0
1944-20	20	4	1.2	1.4
1944-23	23		1.0	1.2
1944-26	26		0.9	1.0
1944-29	29		0.8	1.0
1944-32	32		0.8	1.0
1944-35	35		0.8	1.0
SRT-8A			@450 MHz	@1000 MHz
1948-11	11		Terminated	
1948-14	14		3.8	4.3
1948-17	17		2.1	2.3
1948-20	20		1.3	1.8
1948-23	23	8	0.8	1.2
1948-26	26		0.7	1.0
1948-29	29		0.6	0.8
1948-32	32		0.6	0.8
1948-35	35		0.6	0.8

Outdoor

MODEL STOCK NO.	TAP VALUE (dB)	THRU-LINE LOSS (dB)	
		@450 MHz	@1000 MHz
DMT-1000-2 #3852	4	Terminated	
	8	4.1	4.8
	11	2.2	3.7
	14	1.7	2.4
	17	1.4	2.2
	20	1.0	1.5
	23	1.0	1.5
	26	1.0	1.5
	29	1.0	1.5
	32	1.0	1.5
	35	1.0	1.5
DMT-1000-4 #3854	8	Terminated	
	11	4.0	4.9
	14	2.2	3.7
	17	1.6	2.2
	20	1.3	2.0
	23	1.2	1.8
	26	1.0	1.5
	29	1.1	1.5
	32	1.2	1.5
	35	1.2	1.5
DMT-1000-8 #3858	11	Terminated	
	14	4.2	4.9
	17	2.4	3.5
	20	1.7	2.6
	23	1.3	2.2
	26	1.2	1.5
	29	1.2	1.5
	32	1.2	1.5
	35	1.2	1.5

MODEL STOCK NO.	TAP VALUE (dB)	THRU-LINE LOSS (dB)	
		@450 MHz	@1000 MHz
TL-PI-1000 #3850	N/A	1.2	1.5
TLS-1000 #3851	8	2.9	3.2
	12	1.2	2.2
	16	1.2	2.2
TLS-1000-2 #3855	N/A	4.6	5.7
TLS-1000-3 #3856	N/A	7.0	9.0
TLS-1000-3U #3857 (unbalanced)	N/A	5.0/8.5	6.0/9.2

Please refer to the Blonder Tongue catalog for more detailed specifications common to indoor and outdoor passives.

MegaPort Components

MegaPort Gateway (MPG)

This is the interface between the trunk data network and the coax. Each MPG supports up to 64 MPOs and is connected at the coax's point of entry to the building, community, campus or individual home.

RF Connector | LAN | WAN | Power Cable
Ethernet Port
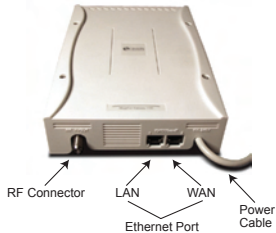
The connection to the LAN Port will be made directly with a cross cable via MegaPort manager or http web interface.

The Port ID is: 172.16.70.1 C Class

MegaPort Intelligent Outlet (MPO)

Replacing ordinary TV outlets, the IO is connected to the coax infrastructure providing TV and network connections(10BaseT & USB). An MPO may be installed complementary to an existing outlet for ease of installation.

MegaPort Methods of Installation

Case Study

The diagram below is an example of multiple users situated between amplifiers.
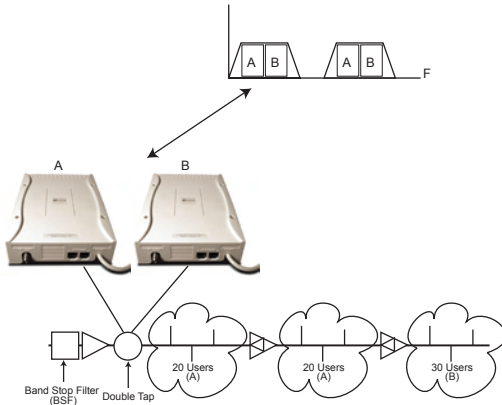
Upstream and Downstream Signal Settings

Frequency Diversity

Frequency Diversity is when each MPG DS and US carrier are set at a different frequency. This is typically used when multiple MPG's are on the same cable leg.

Frequency Re-Use

Frequency Re-Use is when each MPG DS and US carrier are set at the same frequency. This can only occur when MPG's are not on the same cable leg.

MegaPort Software Utilities - ConfigIO

ConfigIO Utility Software

ConfigIO is an application designed to let the technician see the link stat settings.

There is a protocol that needs to be installed in the connection properties.

Ethernet - TMT Management Protocol Driver

USB - Ndisuio.inf protocol

ConfigIO Utility - Version:1.0.6 (Windows XP)

Summary | IO Settings | Link Status | About |

		US Characteristics	
Board Version:	0.0.0.1	US Constellation:	QPSK
FPGA Version:	0.0.0.1	US Frequency:	17000000
Firmware Version:	0.0.0.50	US Symb Rate:	3000000
MAC Address:	00:09:00:00:32:57	Power:	38 dBmV

DS Charactristics

		Timing Offset:	5
DS Constellation:	QAM64	Outlet ID:	54
DS Frequency:	52000000		
DS Symbol Rate:	1000000		
DS InverseSync:	1		Refresh

Exit | Copy Summary to ClipBoard

In order to see data of the IO/MPO components, go to the 'Summary' tab. You can see the version of the IO hardware and software, the IO MAC address (or- serial number), its ID and other parameters as shown in the screenshot.

For more information please refer to the User's Manual.

MegaPort Manager

MegaPort Manager Main Screen - with MPO's installed.

Note: Visit the Blonder Tongue FTP Site for the latest software releases and updates at
ftp://ftp1.blondertongue.com

MegaPort Manager - RF Data

In order to adjust an RF parameter, open the "Configure MPG" dialog box. You can do that by double-clicking the "MPG" node, or by pressing Ctrl+B. Click the Downstream or Upstream tab.

MPG Downsteam Center Frequency

MPO Downsteam Center Frequency

MPG Downstream Bandwidth

MPG Downstream Symbol Rate

MPG Downsteam Modulation

MPG Transmission Power

RF Parameters

Downstream   Upstream

Channel Number

Frequency (Hz)   52000000   Modulation   QAM 64

Outlet Frequency (Hz)   52000000   Power (dBuV)   50

Bandwidth (Hz)   1200000

Symbol Rate (Sym/Sec)

OK   Reset Values   Exit

Note: If DS parameter is being changed you have to change the same parameter manually in every IO with the ConfigIO software.

MegaPort Manager

IO Upstream Frequency

IO Upstream Bandwidth

IO Upstream Symbol Rate

IO Upstream Modulation

MPG Receiving Level
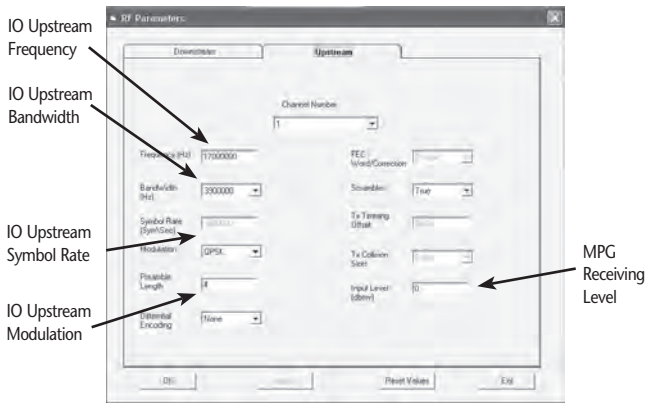
Note: If US parameter is being changed the change will take effect for the IO automatically.

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MegaPort Manager - Tips

By clicking on the column header of the detail pane, the user can sort in ascending or descending order.

To add remove columns, you can either right-click the columns header or click on the 'View' menu, and then choose 'Customize Current View…'.

To change column order, you can either use 'drag and drop' and move the header left/right, or use the form opened by 'Customize Current View…', mark the field you want to change, and press 'Move Up' or 'Move Down'.

IMPORTANT! If the message box 'Request Timed Out' appears often, it could mean that the SNMP Session parameters 'Time Out' or 'No. of Retries' are too low.

You can change this in the 'Application Setting' form, which can be opened from the View-> Settings menu or using Ctrl + T.

F5 and the 'Refresh' toolbar button don't refresh all data presented in the main window. They refresh only data that are likely to change, such as counters. To make a full refresh, you must click on the 'View' menu, and choose 'Refresh All'.

If some IOs or Users were deleted by someone else after you connected to a specific MPG the application will not update these changes even if a full refresh is done. You have to disconnect from the MPG, and then reconnect to it, and then the new configuration window will be updated.

MegaPort Manager - Troubleshooting

How to verify that the IO is working properly

Important: All these steps are related to a MPG that has other MPO's that are working properly

Connect the PC to the MPO and the ping the RF port of the MPG @ 192.168.0.1. No response, go to #1.

1. Ensure the MPO MAC is defined in the system using the MegaPort Manager Software.

2. Open the ConfigIO and verify a green light in the link status. If the light is red press the summary tab and observe if the IO parameters are matching this MPG, If it matches, check for DS RF problem.

3. Check the RF cable connection- check the cable is connected properly.

4. Press the Monitor RF status tab and observe if the upstream power is stable. If it is not stable check for US RF problem

5. On the PC, observe that the IO-NETWORK-DEVICE receives an IP from the DHCP server. Open a DOS window type "ipconfig/ release" and then "ipconfig/renew".

6. In the ConfigIO software, go to IO settings, click the "Automatic US Power "(Uncheck the box √) Enter 10 at the "Static US Power Value", and click set.

7. Click the "Automatic US Power " (Uncheck the box √ again) and click set, observe if the upstream power is stable. If it is not stable continue to number 8. Open a DOS window, type "ipconfig/release" and then "ipconfig/renew".

8. Connect this IO to another PC.

9. Connect this IO at another known good location that has been tested with a PC.

Addressable Products

Addressable off-premise interdiction can be used in a total deployment where all homes are controlled by interdiction, or a limited deployment where a subset of homes are controlled. The "interdiction" terminology comes from the fact that the interfering or jamming signal is introduced into the premium channel at the subscriber's location, not at the headend as with conventional scrambling systems.

There are four addressable product lines:

- VideoMask™ Interdiction (VMI)

- TV Channel Blocker (TVCB)

- TV Channel Blocker Parental Controlled (TVCB-PC)

- Subscriber Module Interdiction (SMI)
  (Formerly known as Scientific Atlanta addressable interdiction system.)

- Addressable Multi-Port Tap Interdiction Unit (AMT)

For each product line, the following information is provided:
1. System Design
2. Installation
3. Troubleshooting

For additional information from previous Reference Guide versions, please visit our website: www.blondertongue.com

Jamming Capability

Each Addressable Field Unit consists of various oscillator configurations that are used to generate the jamming signals. Each oscillator may be shared among multiple channels within a set band of frequencies. The VMI, SMI and TVCB oscillator configurations are shown below for example.

VMI

Bands: Lowband | Midband | Highband

- 9461,2 (Chs 14-22) 9 channels (120-170 MHz)
- 9463 (Chs 23-45) 23 channels (216-350 MHz)
- 9465 (Chs 46-72) 27 channels (350-512 MHz)
- 9468 (Chs 70-94, 100) 27 channels (496-650 MHz)
- 9471 (Chs 2-40) 40 channels (54-85, 114-321 MHz)
- 9472 (Chs 38-72) 30 channels (321-513 MHz)
- 9473-2 (Chs 70-86) 17 channels (496-596 MHz)

Frequency axis: 120 MHz, 174 MHz, 216 MHz, 300 MHz, 450 MHz, 550 MHz, 600 MHz, 650 MHz

SMI

Bands: Lowband | Midband | Highband

- Osc. 1 (Chs 9, 14-22) 9 channels (120-170 MHz)
- Osc. 2 (Chs 13, 23-34) 13 channels (210-284 MHz)
- Osc. 3 (Chs 35-47) 13 channels (288-366 MHz)
- Osc. 4 (Chs 48-63) 16 channels (366-458 MHz)
- Osc. 5 (Chs 64-78) 15 channels (458-548 MHz)

Frequency axis: 120 MHz, 174 MHz, 216 MHz, 300 MHz, 450 MHz, 550 MHz, 600 MHz, 650 MHz

TVCB

Bands: Lowband | Midband | Highband

- Osc. 8 (Chs 2-6) 5 channels (54-85 MHz)
- Osc. 1 (Chs 99, 14-22, 7) 11 channels (114-177 MHz)
- Osc. 2 (Chs 8-13, 25-28) 12 channels (189-249 MHz)
- Osc. 3 (Chs 29-40) 12 channels (252-321 MHz)
- Osc. 4 (Chs 39-50) 12 channels (312-381 MHz)
- Osc. 5 (Chs 49-62) 14 channels (372-453 MHz)
- Osc. 6 (Chs 6-74) 14 channels (444-453 MHz)
- Osc. 7 (Chs 73-86) 14 channels (516-597 MHz)

Frequency axis: 108 MHz, 174 MHz, 216 MHz, 300 MHz, 450 MHz, 550 MHz, 600 MHz, 650 MHz

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VMI System Design

VMI Directional Coupler (DC) Table

0, 4, 8, 11, 14, 17 dB							
Insertion Loss	0	4	6	8	11	14	17	
5 MHz:	NA	4.0	3.0	2.1	1.3	1.7	1.1	dB
54 MHz:	NA	3.3	2.9	1.2	0.8	.08	.06	dB
550 MHz:	NA	4.3	4.2	2.3	1.4	1.3	1.0	dB
750 MHz:	NA	4.8	4.5	2.7	1.7	1.7	1.1	dB
860 MHz:	NA	4.7	4.5	2.9	2.0	1.8	1.4	dB

VMI Equalizer (EQ) Table

VMI-CEQ8V 860 MHz Equalizers					
EQ Value	Tilt Comp @ 860 MHz	Loss @ 54 MHz	Loss @ 550 MHz	Loss @ 750 MHz	Loss @ 860 MHz
-4	-2.56	-1.12	-2.37	-3.19	-3.68
-3	-1.87	-0.97	-1.96	-2.50	-2.84
-2	-1.23	-0.65	-1.15	-1.54	-1.88
-1	-0.87	-0.03	-0.31	-0.67	-0.90
0	0.00	0.00	0.00	0.00	0.00
1	1.07	-1.52	-1.23	-0.60	-0.46
2	1.89	-2.23	-1.24	-0.16	-0.35
3	2.88	-3.05	-1.38	-0.10	-0.17
4	3.47	-3.81	-2.01	-0.79	-0.35
5	3.86	-4.35	-2.13	-0.94	-0.49
6	4.45	-4.85	-2.32	-0.80	-0.40
7	5.42	-5.67	-2.42	-0.62	-0.25
8	5.99	-6.37	-2.00	-0.79	-0.38
9	7.08	-7.21	-2.68	-0.68	-0.13
10	7.47	-7.89	-2.94	-0.90	-0.43
11	8.21	-8.55	-3.24	-0.96	-0.34
12	9.01	-9.25	-1.60	-0.51	-0.24
13	9.85	-10.27	-4.00	-1.32	-0.42
14	10.76	-10.89	-1.37	-0.36	-0.14
15	11.18	-11.30	-1.40	-0.36	-0.13
16	12.04	-12.29	-1.63	-0.55	-0.25
17	12.69	-12.87	-1.50	-0.48	-0.18
18	13.64	-13.84	-1.86	-0.56	-0.20
19	14.36	-14.52	-1.75	-0.50	-0.16
20	14.94	-15.15	-1.92	-0.58	-0.21

Note: For additional design information, see the 2000 CATV Reference Guide found on our website: www.blondertongue.com

VMI System Design

VMI Power Consumption

Current Consumption (mA)			
Volts (VAC)	1 Jammer Module	w/2 Jammer Modules	w/3 Jammer Modules
45.00	325	410	515
50.00	330	375	465
55.00	310	355	420
60.00	295	360	390
65.00	240	315	385
70.00	230	300	360
75.00	220	285	340
80.00	205	265	325
85.00	195	255	310
90.00	190	245	295

VMI Installation

Power Supply Pinout

Pin#	7	6	5	4	3	2	1
Voltage	28 VDC	NOT USED	12 VDC	GND	6.2 VDC	GND	60 VAC
Minimum	26.0		11.4		6.1		45
Maximum	30.0		12.6		6.3		60

TVCB Systems Design

Insertion Loss Specifications for Equalizers (EQ)

VMI-CEQ8V 860 MHz Equalizers					
EQ Value	Tilt Comp @ 860 MHz	Loss @ 54 MHz	Loss @ 550 MHz	Loss @ 750 MHz	Loss @ 860 MHz
-4	-2.56	-1.12	-2.37	-3.19	-3.68
-3	-1.87	-0.97	-1.96	-2.50	-2.84
-2	-1.23	-0.65	-1.15	-1.54	-1.88
-1	-0.87	-0.03	-0.31	-0.67	-0.90
0	0.00	0.00	0.00	0.00	0.00
1	1.07	-1.52	-1.23	-0.60	-0.46
2	1.89	-2.23	-1.24	-0.16	-0.35
3	2.88	-3.05	-1.38	-0.10	-0.17
4	3.47	-3.81	-2.01	-0.79	-0.35
5	3.86	-4.35	-2.13	-0.94	-0.49
6	4.45	-4.85	-2.32	-0.80	-0.40
7	5.42	-5.67	-2.42	-0.62	-0.25
8	5.99	-6.37	-2.00	-0.79	-0.38
9	7.08	-7.21	-2.68	-0.68	-0.13
10	7.47	-7.89	-2.94	-0.90	-0.43
11	8.21	-8.55	-3.24	-0.96	-0.34
12	9.01	-9.25	-1.60	-0.51	-0.24
13	9.85	-10.27	-4.00	-1.32	-0.42
14	10.76	-10.89	-1.37	-0.36	-0.14
15	11.18	-11.30	-1.40	-0.36	-0.13
16	12.04	-12.29	-1.63	-0.55	-0.25
17	12.69	-12.87	-1.50	-0.48	-0.18
18	13.64	-13.84	-1.86	-0.56	-0.20
19	14.36	-14.52	-1.75	-0.50	-0.16
20	14.94	-15.15	-1.92	-0.58	-0.21

Note: For the EQ Loss table @ 750 MHz, please visit our website: www.blondertongue.com

TVCB Systems Design

Power Consumption

The TVCB can be powered a number of ways:

1. House powered via 120VAC outlet:
   Power consumption 11.8W @ 24VAC (550 mA)

2. Auxiliary or Line Powered:
   Power consumption 8.0W @ 60VAC (200 mA)
   8.8W @ 90VAC (150 mA)

Below are the power consumptions of the TVCB:

Volts	Curr.	Watts
24.00	580 mA	11.8
60.00	200 mA	8.0
90.00	150 mA	8.8

Power Selection

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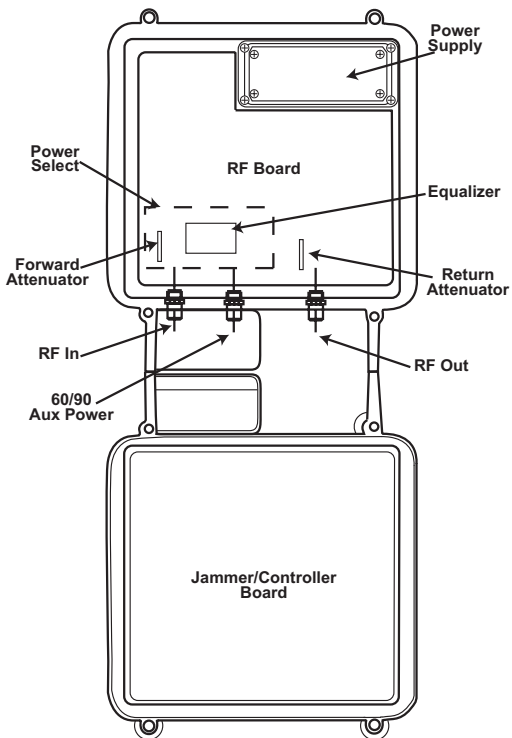
TVCB Installation

Power Selection

P1   P2

Feeder Power

P1 J 11	P1 J 12	P1 J 13	P2 J 14

3 2

House Power

P1 J 11	P1 J 12	P1 J 13	P2 J 14

2 1

Auxillary Power

P1 J 11	P1 J 12	P1 J 13	P2 J 14

3 2
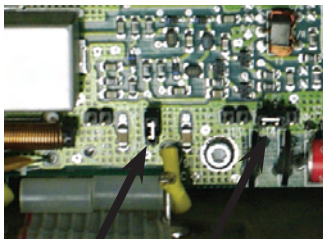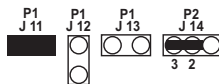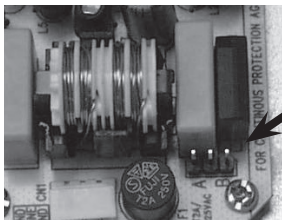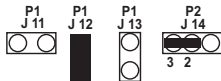
Position A

**60/90 VAC
Network Powering**

Position B

**26 VAC
House Powering**

TVCB Installation

Tightening Sequence
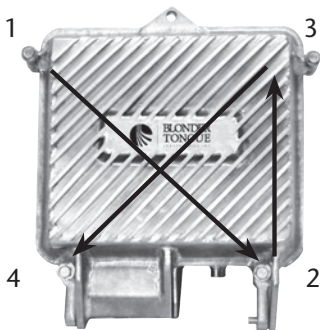
Tightening:

Use a criss-cross pattern to tighten the housing bolts.

Tighten closure bolts between 5-7 ft. lbs.

TVCB Troubleshooting

Fault Action - Pulse Disconnect

Pulse Disconnect has the following codes to identify which fault has occurred:

- Tamper   1 Flash of Disconnect
- Unit Time Out   2 Flashes of Disconnect
- Unit Address   3 Flashes of Disconnect
- Calibration   4 Flashes of Disconnect
- EEPROM   5 Flashes of Disconnect

TVCB-PC (Parental Controlled) System Design

TV Channel Blocker Parental Controlled (TVCB-PC) enables cable television customers to block unwanted channels when they presently lack the equipment necessary to prevent unwanted channels from being viewed.

The TVCB-PC provides channel blocking (ch. 2-86) to all televisions in the dwelling. The TVCB-PC is a stand alone unit that has push button control inside, that allows you to change blocked channels quickly and easily without cable company reprogramming.

Cable TV Feed

TVCB-PC

RF

RF IN

RF OUT

RF w/Blocking | Power

TV#2

RF w/Blocking

TV#1

TV#4   TV#3

TVCB Power Pack
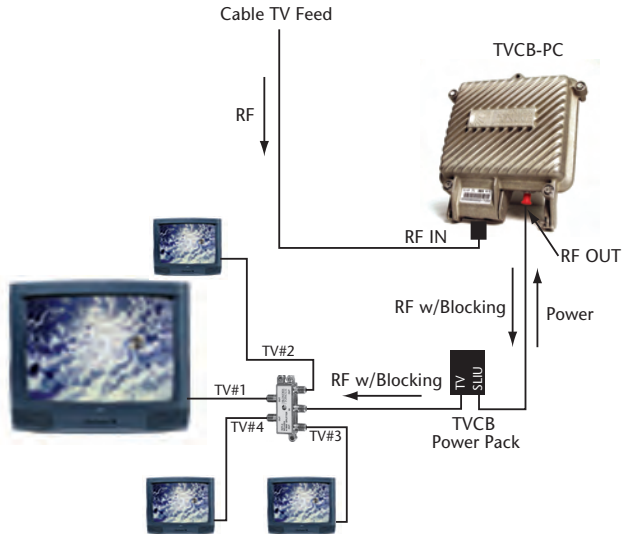
Note: The TVCB-PC Self Install/Consumer (#9111) is an end user ready unit conditioned for home installaton and does not require measurment of RF input levels or adjustments to EQ or AT's.

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TVCB-PC Installation

1. Determine mounting location, install screws for wall mounting bracket

2. Determine power source location and power supply option, position P1 appropriately

3. Power the unit, from RF Input, Subscriber Port, or Auxiliary Port (default from the factory)

4. Measure RF Input Levels at the tap port of the external Directional Coupler (Channels 2 & 78)

Note: When measuring input levels, check adjacent channels for response flatness, use the highest value when selecting plug-in values

Minimum Input Requirements

- 9.0 dBmV @ 54 MHz (Ch. 2)
- 15.0 dBmV @ 550 MHz (Ch. 78) 5. If required for application, select Attenuator (AT) & Equalizer (EQ) from chart

5. Items 6 - 9 are not required for the 9111
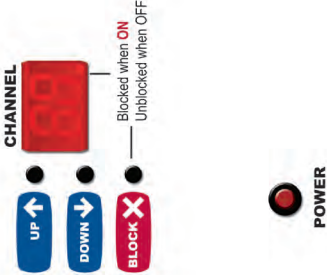
For 9110 only	6. Plug-in appropriate EQ and Fwd AT	**For 9110 only**
	7. Verify AGC Voltage	
	3.1 VDC optimum; 3.0 – 3.2 VDC acceptable	
	8. Verify unit RF Output Levels	
	Subscriber Port Output	
	• 10.0 dBmV @ 54 MHz (Ch. 2)	
	• 16.0 dBmV @ 600 MHz (Ch. 78)	
	9. Adjust EQ and AT (if necessary)	
	10. Select Parental Controlled Channels to be Blocked (do not block more than 4 channels sequentially)	
	11. Verify blocked and unblocked channels at output port	
	12. Educate the customer on how to change blocked channels on the unit, leave customer pamphlet	

TVCB-PC Installation

CHANNEL BLOCKER
Parental Controlled

For more information, visit
www.TVChannelBlocker.com

To Block / Unblock Channels

Use the UP↑ and DOWN↓ buttons to find the channels you wish to block.

Press the BLOCK✗ button to block or unblock channels.

The RED DOT next to the channel number indicates that the channel is blocked.

To Turn OFF / ON Viewing

Press **both** the UP↑ and DOWN↓ buttons simultaneously for a count of five (5) seconds to totally turn viewing off or on for all channels.

CHANNEL
Blocked when ON
Unblocked when OFF

UP↑ DOWN↓ BLOCK✗

POWER

TVCB-PC Installation

Power Selection - 9110

The TVCB-PC can be powered from the RF Input, Subscriber Port, or Auxiliary Port (default). The unit is configured for HOUSE POWER from the factory.

Power Supply Voltages & Power Selection

Use Jumper located on the power supply board to select between 26 or 60/90 VAC input.

PS Jumper, From Factory Set to B
A = 60/90 VAC
B = 26 VAC (House)

NOT REQUIRED FOR 9111
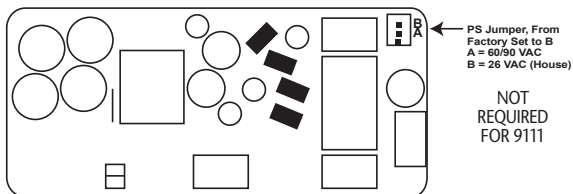
Power Supply Jumper Determines Voltage

Automatic Gain Control

Broadband AGC using carriers in 140 - 240 MHz range with dynamic range of ±3 dB.

TVCB-PC Troubleshooting

In case of failure, the small round LED may flash 4 times.

Please refer to the Instruction Manual for further information

SMI System Design

750 MHz Directional Coupler (DC) Insertion Loss

Tap Loss		DC Feeder (through) Insertion Loss				
		Reverse Path		Forward Path		
DC Value	Stock #	5 MHz	40 MHz	51 MHz	550 MHz	750 MHz
0.0	291659	Terminating		Terminating		
1.0	291611	Terminating		Terminating		
2.0	378224	Terminating		Terminating		
3.0	378225	Terminating		Terminating		
4.0	562958	2.5	2.5	3.5	3.9	4.2
5.0	562959	2.4	2.4	3.5	3.9	4.2
6.0	562960	2.3	1.8	2.1	2.4	2.7
7.5	562961	2.3	1.8	2.1	2.5	2.7
9.0	562962	2.1	1.4	1.4	2.1	2.4
10.5	562963	2.1	1.4	1.4	2.1	2.4
12.0	562964	1.4	1.0	0.8	1.3	1.7
13.5	562965	1.4	1.0	0.8	1.3	1.7
15.0	562966	1.2	0.8	0.8	1.3	1.7
16.5	562967	1.2	0.8	0.7	1.1	1.4
18.0	562968	1.3	0.8	0.7	1.1	1.4
19.5	562969	1.3	0.8	0.7	1.1	1.4
21.0	562970	1.3	0.8	0.7	1.1	1.4
22.5	562971	1.3	0.8	0.7	1.1	1.4
24.0	562972	1.3	0.8	0.7	1.1	1.4
25.5	562973	1.3	0.8	0.7	1.1	1.4
27.0	562974	1.3	0.8	0.7	1.1	1.4
28.5	562975	1.3	0.8	0.7	1.1	1.4
30.0	562976	1.3	0.8	0.7	1.1	1.4
31.5	562977	1.3	0.8	0.7	1.1	1.4

(DC) Coupled Port Loss

Tap Loss		DC Coupled Port Loss*				
		Reverse Path		Forward Path		
DC Value	Stock #	5 MHz	40 MHz	51 MHz	550 MHz	750 MHz
0.0	291659	0.3	0.8	0.7	0.7	0.7
1.0	291611	0.8	1.3	1.7	1.7	1.7
2.0	378224	1.8	2.3	2.7	2.7	2.7
3.0	378225	2.8	3.3	3.7	3.7	3.7
4.0	562958	8.2	6.1	5.4	5.2	5.3
5.0	562959	8.8	7.0	6.3	6.4	6.7
6.0	562960	6.7	7.5	7.0	7.4	9.8
7.5	562961	7.7	8.4	8.0	8.3	10.6
9.0	562962	9.5	10.5	10.2	9.3	9.4
10.5	562963	0.4	11.3	11.1	10.0	9.9
12.0	562964	12.0	12.8	12.7	11.1	11.6
13.5	562965	13.5	14.3	14.2	12.3	12.2
15.0	562966	15.0	15.7	15.6	13.3	13.4
16.5	562967	16.4	17.1	17.0	14.8	14.6
18.0	562968	17.8	18.4	18.4	15.1	14.3
19.5	562969	19.6	20.2	20.2	16.4	15.6
21.0	562970	20.9	21.4	21.4	17.1	15.9
22.5	562971	22.3	22.9	22.9	18.3	16.9
24.0	562972	23.9	24.5	24.5	19.5	17.8
25.5	562973	25.5	26.1	26.2	21.5	20.3
27.0	562974	26.8	27.4	27.4	22.1	20.5
28.5	562975	28.3	28.8	29.0	22.8	20.4
30.0	562976	29.8	30.3	30.5	23.4	20.5
31.5	562977	30.9	31.3	31.6	23.7	20.4

* All forward and reverse DC coupled port losses include the additional loss of the duplex filter.

SMI System Design

750 MHz Equalizer Insertion Loss

EQ Value	Stock #	51 MHz	550 MHz	750 MHz
-9.0	562996	2.7	9.1	10.4
-7.5	562995	1.9	7.5	8.5
-6.0	562994	1.4	5.9	6.2
-4.5	562993	1.6	4.4	4.8
-3.0	562992	0.1	2.7	3.0
-1.5	562991	0.1	1.3	1.5
0.0	566057	0.1	0.1	0.2
1.5	562978	1.9	1.2	0.9
3.0	562979	2.9	1.3	0.8
4.5	562980	4.1	1.5	0.8
6.0	562981	5.4	1.8	0.9
7.5	562982	6.5	1.9	0.7
9.0	562983	7.5	2.1	0.7
10.5	562984	8.8	2.5	0.9
12.0	562985	10.0	2.9	1.0
13.5	562986	11.4	3.4	1.3
15.0	562987	12.2	3.3	0.9
16.5	562988	13.6	3.8	1.0
18.0	562989	14.7	3.8	0.8
19.5	562990	15.6	4.0	0.9

SMI System Design

4-Port Power Consumption *

Volts	Housing Only		w/2 Module		w/4 Modules	
	Current	Watts	Current	Watts	Current	Watts
35.00	0.09	2.35	0.26	7.74	0.50	14.74
40.00	0.08	2.45	0.23	7.85	0.43	14.25
45.00	0.08	2.56	0.20	7.95	0.37	13.76
50.00	0.07	2.64	0.19	7.99	0.33	13.60
55.00	0.07	2.73	0.18	8.02	0.30	13.44
60.00	0.07	2.88	0.17	8.04	0.28	13.30
65.00	0.06	3.04	0.16	8.06	0.26	13.17
70.00	0.06	3.04	0.15	8.25	0.24	13.43
75.00	0.06	3.04	0.15	8.44	0.23	13.69
80.00	0.07	3.15	0.14	8.52	0.22	13.81
85.00	0.07	3.25	0.14	8.61	0.21	13.94
90.00	0.07	3.36	0.13	8.69	0.21	14.07

*Measurements are adjusted to compensate for changes over temperature.

SMI System Design

8-Port Power Consumption *

	Housing Only		w/2 Module		w/4 Modules	
Volts	Current	Watts	Current	Watts	Current	Watts
35.00	0.18	5.25	0.36	10.33	0.57	16.74
40.00	0.17	5.20	0.32	10.36	0.50	16.24
45.00	0.15	5.15	0.28	10.40	0.43	15.75
50.00	0.14	5.27	0.26	10.50	0.50	18.80
55.00	0.13	5.40	0.25	10.61	0.36	15.65
60.00	0.13	5.48	0.23	10.71	0.34	15.77
65.00	0.13	5.57	0.22	10.82	0.32	15.90
70.00	0.13	5.85	0.22	11.08	0.30	16.03
75.00	0.13	6.13	0.21	11.34	0.29	16.17
80.00	0.13	6.44	0.21	11.66	0.28	16.31
85.00	0.13	6.76	0.21	11.98	0.26	16.45
90.00	0.13	7.08	0.20	12.31	0.25	16.59

	w/6 Modules		w/8 Modules	
Volts	Current	Watts	Current	Watts
35.00	0.80	22.58	0.97	28.81
40.00	0.71	22.39	0.84	27.96
45.00	0.62	22.20	0.71	27.11
50.00	0.57	22.02	0.65	26.84
55.00	0.52	21.84	0.59	26.57
60.00	0.48	21.68	0.55	26.81
65.00	0.45	21.53	0.51	27.05
70.00	0.44	21.70	0.49	27.02
75.00	0.43	21.88	0.47	26.99
80.00	0.41	22.09	0.45	27.21
85.00	0.39	22.30	0.44	27.43
90.00	0.37	22.51	0.43	27.66

* Measurements are adjusted to compensate for changes over temperature.

SMI Installation

Torque Patterns

Start Here 4-PORT

1   **3**

4   **2**

Start Here 8-PORT

1   **3**

5

6

4   **2**
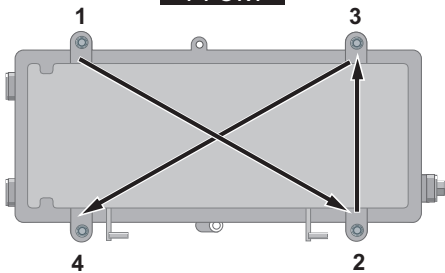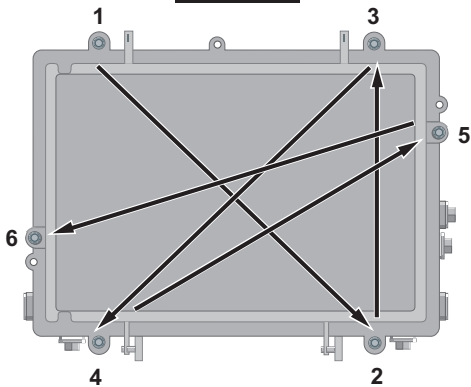
SMI Installation

Strand Mount (4-port) Configurations

Signal Direction ←

RECOMMENDED

Forward Signal ←

J2 Thru **J1 In**
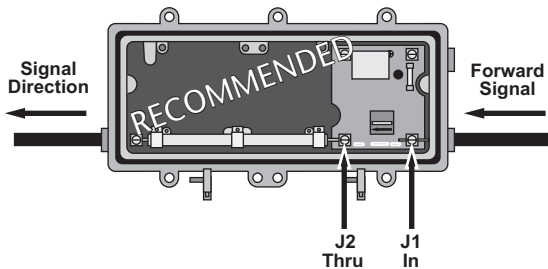
Pedestal Mount (4-port) Configurations

RECOMMENDED

J2 Thru **J1 In**

Foward Signal **Foward Signal**

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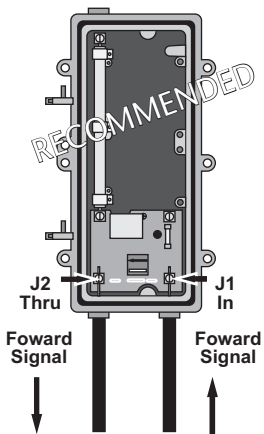
SMI Installation

Balancing and Alignment

The SMI unit has a series of jumpers whose position is determined by the RF and AC status of the unit. The selection of DC determines the RF status: values 0, 1, 2, or 3 dB are terminating and the remaining DCs (4-31.5 dB) are non-terminating DC's.
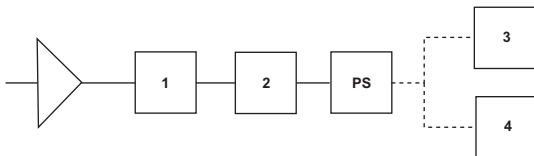
	Scenario 1	Scenario 2	Scenario 3	Scenario 4
DC Value	4-31.5 dB	4-31.5 dB	4-31.5 dB	0, 1, 2, 3 dB
AC Termination	No	Yes	Yes	Yes
RF Termination	No	No	Yes - Add 75 Ohm Term	Yes - DC Term
Input Seizure Block	J1 or J2	J1 Only	J1 Only	J1 Only
Jumper Configuration	P1 - Leave	P1 - Leave	P1 - Leave	P1 - Pull
	P2 - Leave	P2 - Pull	P2 - Leave	P2 - Leave
	P5 - Discard	P5 - Discard	P5 - Discard	P5 - Install Term Board

SMI Installation

Passing Power to the Home

Some 750 MHz SMI units and subscriber modules are capable of passing 37-90 VAC power to each subscriber port. This capability provides power to a telephony or data network interface unit (NIU)/customer interface unit (CIU).

• If a CIU is not in the home: Make sure during installation that power is not present at the subscriber port. Use the proper 750 MHz housing/power supply/subscriber module combination so as not to pass power.

• If a CIU is in the home: Power passes from the subscriber port to the CIU, so install the optional power passing jumper P/N 568839 in the direction indicated on the subscriber module P/N 564265.

Passing Power to Unused Feeder Ports

If 750 MHz housing is equipped with a...	You can use...
non-power passing power supply	any subscriber module.
power passing power supply	P/N 564265 (without optional power passing jumper installed), or P/N 566024 (no power passing capability).

CAUTION

If no CIU is present at the subscriber drop, do not install a power passing subscriber module in a 750 MHz housing equipped with a power passing power supply or severe damage to the subscribers TV or VCR may result.

SMI Troubleshooting

Diagnostics

The SMI unit has factory default parameters that immediately activate all ports upon initial installation. There are no jamming frequencies assigned at the factory. This allows the full spectrum of channels to pass, "in the clear," to the subscriber drop port once you install a sub module.

- Tamper   1 Flash
- Refresh Timer   2 Flashes
- VCO Failure   4 Flashes

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AMT System Design

LGTC Directional Couplers, Insertion Loss

Frequency	LTC0	LTC4	LTC7	LTC10	LTC13	LTC16	LTC19	LTC22	LTC25
AVE									
5	N/A	3.75	1.67	1.19	0.80	0.93	0.60	0.60	0.60
10	N/A	3.65	1.68	1.25	0.85	1.02	0.65	0.65	0.65
30	N/A	3.45	1.48	1.02	0.66	0.75	0.50	0.50	0.50
40	N/A	3.45	1.49	1.02	0.67	0.75	0.50	0.50	0.50
50	N/A	3.45	1.50	1.01	0.67	0.75	0.50	0.50	0.50
100	N/A	3.55	1.58	1.06	0.73	0.80	0.55	0.06	0.55
300	N/A	3.91	1.85	1.23	0.88	0.93	0.70	0.70	0.70
450	N/A	4.08	2.05	1.35	0.98	1.02	0.80	0.80	0.80
550	N/A	4.15	2.19	1.42	1.04	1.08	0.87	0.87	0.87
650	N/A	4.20	2.32	1.51	1.12	1.15	0.95	0.95	0.95
750	N/A	4.23	2.43	1.60	1.20	1.22	1.05	1.05	1.05
860	N/A	4.26	2.54	1.72	1.31	1.30	1.15	1.15	1.15
1000	N/A	4.30	2.68	1.90	1.45	1.40	1.30	1.30	1.30
MAX									
5	N/A	4.00	1.90	1.40	1.10	1.20	0.85	0.85	0.85
10	N/A	3.80	1.90	1.40	1.10	1.20	0.90	0.90	0.90
30	N/A	3.75	1.85	1.20	0.90	1.00	0.70	0.70	0.70
40	N/A	3.75	1.80	1.20	0.90	1.00	0.70	0.70	0.70
50	N/A	3.75	1.80	1.20	0.90	1.00	0.70	0.70	0.70
100	N/A	3.80	1.80	1.25	0.90	1.00	0.70	0.70	0.70
300	N/A	4.10	2.10	1.45	1.07	1.15	0.85	0.85	0.85
450	N/A	4.30	2.35	1.60	1.20	1.25	1.00	1.00	1.00
550	N/A	4.40	2.50	1.70	1.29	1.33	1.10	1.10	1.10
650	N/A	4.50	2.65	1.80	1.38	1.42	1.20	1.20	1.20
750	N/A	4.53	2.80	1.90	1.47	1.50	1.30	1.30	1.30
860	N/A	4.65	2.95	2.03	1.58	1.60	1.40	1.40	1.40
1000	N/A	4.70	3.15	2.20	1.70	1.70	1.55	1.55	1.55

AMT System Design

LGT 8-Port Tap Losses

Frequency	LTC0	LTC4	LTC7	LTC10	LTC13	LTC16	LTC19	LTC22	LTC25
AVE									
5	10.1	13.2	17.4	19.9	22.8	26.2	29.4	32.5	35.5
10	10.1	13.2	17.4	19.9	22.8	26.2	29.4	32.5	35.4
30	10.0	13.2	17.3	19.7	22.7	26.0	29.3	32.4	35.3
40	10.0	13.2	17.3	19.7	22.7	26.0	29.2	32.3	35.2
50	10.0	13.2	17.3	19.7	22.7	26.0	29.2	32.3	35.2
100	10.0	13.3	17.3	19.8	22.8	26.1	29.3	32.4	35.3
300	10.5	13.6	17.6	20.1	23.2	26.3	29.5	32.5	35.4
450	10.8	14.0	17.8	20.2	23.3	26.5	29.5	32.4	35.6
550	11.1	14.3	17.9	20.3	23.4	26.5	29.5	32.3	35.5
650	11.3	14.7	18.3	20.5	23.7	26.8	29.7	32.5	35.8
750	11.6	15.1	18.9	20.9	24.1	27.2	30.1	33.1	36.5
860	11.9	15.5	19.5	21.2	24.5	27.6	30.5	33.8	37.4
1000	12.2	16.3	20.5	21.7	25.0	28.1	31.0	34.6	38.3
MAX									
5	10.9	14.0	18.2	20.7	23.6	27.0	30.2	33.3	36.3
10	10.9	14.0	18.2	20.7	23.6	27.0	30.2	33.3	36.2
30	10.8	14.0	18.1	20.5	23.5	26.8	30.1	33.2	36.1
40	10.8	14.0	18.1	20.4	23.5	26.8	30.0	33.1	35.9
50	10.7	13.9	18.0	20.5	23.4	26.7	29.9	33.0	35.9
100	10.7	14.0	18.0	20.8	23.5	26.8	30.0	33.1	36.0
300	11.2	14.3	18.3	21.0	23.9	27.0	30.2	33.2	36.1
450	11.5	14.8	18.6	21.2	24.1	27.3	30.3	33.2	36.4
550	12.0	15.2	18.8	51.5	24.3	27.4	30.4	33.2	36.4
650	12.3	15.7	19.3	22.0	24.7	27.8	30.7	33.5	36.8
750	12.7	16.2	20.0	22.0	25.2	28.3	31.2	34.2	37.6
860	13.2	16.8	20.8	22.5	25.8	28.9	31.8	35.1	38.7
1000	13.8	17.9	22.1	23.3	26.6	29.7	32.6	36.2	39.9

AMT System Design

AMT Tap Losses

Frequency	LTC0	LTC4	LTC7	LTC10	LTC13	LTC16	LTC19	LTC22	LTC25
AVE									
5	11.3	14.4	18.6	21.1	24.0	27.4	30.6	33.7	36.7
10	10.9	14.0	18.2	20.7	23.6	27.0	30.2	33.3	36.2
30	11.2	14.4	18.5	20.9	23.9	27.2	30.5	33.6	36.5
40	11.5	14.7	18.8	21.2	24.2	27.5	30.7	33.8	36.7
50	11.7	14.9	19.0	21.4	24.4	27.7	30.9	34.0	36.9
100	12.1	15.4	19.4	21.9	24.9	28.2	31.4	34.5	37.4
300	12.9	16.0	20.0	22.5	25.6	28.7	31.9	34.9	37.8
450	12.9	16.1	19.9	22.3	25.4	28.6	31.6	34.5	37.7
550	12.7	15.9	19.5	21.9	25.0	28.1	31.1	33.9	37.1
650	12.9	16.3	19.9	22.1	25.3	28.4	31.3	34.1	37.4
750	12.7	16.2	20.0	22.0	25.2	28.3	31.2	34.2	37.6
860	12.7	16.3	20.3	22.0	25.3	28.4	31.3	34.6	38.2
1000	13.3	17.4	21.6	22.8	26.1	29.2	32.1	35.7	39.4
MAX									
5	12.1	15.2	19.4	21.9	24.8	28.2	31.4	34.5	37.5
10	11.7	14.8	19.0	21.5	24.4	27.8	31.0	34.1	37.0
30	12.0	15.2	19.3	21.7	24.7	28.0	31.3	34.4	37.3
40	12.3	15.5	19.6	21.9	25.0	28.3	31.5	34.6	37.4
50	12.4	15.6	19.7	22.2	25.1	28.4	31.6	34.7	37.6
100	12.8	16.1	20.1	22.9	25.6	28.9	32.1	35.2	38.1
300	13.6	16.7	20.7	23.4	26.3	29.4	32.6	35.6	38.5
450	13.6	16.9	20.7	23.3	26.2	29.4	32.4	35.3	38.5
550	13.6	16.8	20.4	53.1	25.9	29.0	32.0	34.8	38.0
650	13.9	17.3	20.9	23.6	26.3	29.4	32.3	35.1	38.4
750	13.8	17.3	21.1	23.1	26.3	29.4	32.3	35.3	38.7
860	14.0	17.6	21.6	23.3	26.6	29.7	32.6	35.9	39.5
1000	14.9	19.0	23.2	24.4	27.7	30.8	33.7	37.3	41.0

AMT Installation

Mounting Configurations

AMT Installation

Mounting Configurations