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INSTRUCTION MANUAL

AQP Series

Model	Stock No.	Description
AQP	6268	ATSC/QAM Processor

Status	Date	Document No.	Issue No.	Author
Active	August 3, 2009	651223900A	1	AB

MADE IN USA

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

Purchase Location Name:	
Purchase Location Telephone Number:	
AQP Series Serial Number:	

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Blonder Tongue Laboratories, Inc.
One Jake Brown Road
Old Bridge, NJ 08857
Document Number: 651223900A
Printed in the United States of America.

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Section 1 — General & Safety Instructions

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

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

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

TO REDUCE THE RISK OF ELECTRICAL SHOCK, DO NOT REMOVE COVER FROM THIS UNIT.
NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

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

NOTE TO CATV SYSTEM INSTALLER

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

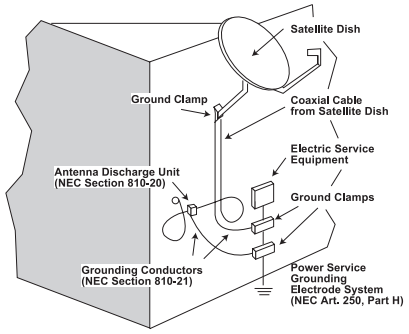
Safety Instructions

YOU SHOULD ALWAYS FOLLOW THESE INSTRUCTIONS TO HELP ENSURE AGAINST INJURY TO YOURSELF AND DAMAGE TO YOUR EQUIPMENT.

- Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature per Section 2.3.
- Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).
- Read all safety and operating instructions before you operate the unit.
- Retain all safety and operating instructions for future reference.
- Heed all warnings on the unit and in the safety and operating instructions.

Safety Instructions - continued

- Follow all installation, operating, and use instructions.
- Unplug the unit from the AC power outlet before cleaning. Use only a damp cloth for cleaning the exterior of the unit.
- Do not use accessories or attachments not recommended by Blonder Tongue, as they may cause hazards, and will void the warranty.
- Do not operate the unit in high-humidity areas, or expose it to water or moisture.
- Do not place the unit on an unstable cart, stand, tripod, bracket, or table. The unit may fall, causing serious personal injury and damage to the unit. Install the unit only in a mounting rack designed for 19" rack-mounted equipment.
- Do not block or cover slots and openings in the unit. These are provided for ventilation and protection from overheating. Never place the unit near or over a radiator or heat register. Do not place the unit in an enclosure such as a cabinet without proper ventilation. Do not mount equipment in the rack space directly above or below the unit.
- Operate the unit using only the type of power source indicated on the marking label. Unplug the unit power cord by gripping the plug, not the cord.
- The unit is equipped with a three-wire ground-type plug. This plug will fit only into a ground-type power outlet. If you are unable to insert the plug into the outlet, contact an electrician to replace the outlet. Do not defeat the safety purpose of the ground-type plug.
- Route power supply cords so that they are not likely to be walked on or pinched by items placed upon or against them. Pay particular attention to cords at plugs, convenience receptacles, and the point where they exit from the unit.
- Be sure that the outdoor components of the antenna system are grounded in accordance with local, federal, and National Electrical Code (NEC) requirements. Pay special attention to NEC Sections 810 and 820. See the example shown in the following diagram:



- We strongly recommend using an outlet that contains surge suppression or ground fault protection. For added protection during a lightning storm, or when the unit is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the lines between the unit and the antenna. This will prevent damage caused by lightning or power line surges.
- Do not locate the antenna near overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing the antenna, take extreme care to avoid touching such power lines or circuits, as contact with them can be fatal.
- Do not overload wall outlets or extension cords, as this can result in a risk of fire or electrical shock.
- Never insert objects of any kind into the unit through openings, as the objects may touch dangerous voltage points or short out parts. This could cause fire or electrical shock.
- Do not attempt to service the unit yourself, as opening or removing covers may expose you to dangerous voltage and will void the warranty. Refer all servicing to authorized service personnel.
- Unplug the unit from the wall outlet and refer servicing to authorized service personnel whenever the following occurs:
  - ❏ The power supply cord or plug is damaged;
  - ❏ Liquid has been spilled, or objects have fallen into the unit;
  - ❏ The unit has been exposed to rain or water;
  - ❏ The unit has been dropped or the chassis has been damaged;
  - ❏ The unit exhibits a distinct change in performance.
- When replacement parts are required, ensure that the service technician uses replacement parts specified by Blonder Tongue. Unauthorized substitutions may damage the unit or cause electrical shock or fire, and will void the warranty.
- Upon completion of any service or repair to the unit, ask the service technician to perform safety checks to ensure that the unit is in proper operating condition.

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

Section 2 — Product Summary

2.1 Revision History & Reason

This is the first issue of the Instruction Manual.

2.2 Product Application & Description

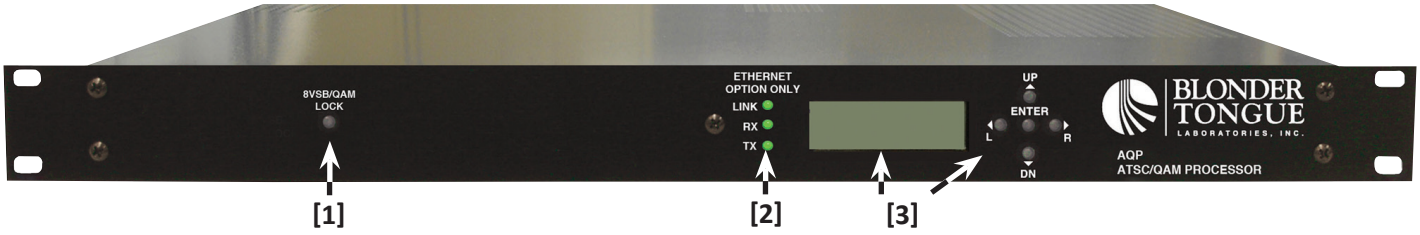
Application:

ATSC/QAM Processor (AQP) receives one (1) ATSC digital off-air input (8VSB), or (1) digital cable input (QAM 64/256), and delivers one (1) QAM channel in the 54-864 MHz range.

In the off-air input mode, the unit input can only be 8VSB, and therefore, the unit can tune to channels 2-13 VHF and 14-69 UHF.

In the CATV input mode, the input can be either 8VSB or QAM, and therefore, the unit can tune to channels 2-13 VHF and 14-69 UHF; sub-band NTSC channels T7-T13; and standard NTSC channels 2-135. Please see Appendix A for details.

Below are the front and rear pictures of the unit:



[1] 8VSB/QAM LOCK:
Provides visual information about the status of the unit as follows:

I. Solid Green: Unit is locked to the input signal.

II: Flashing Green: Unit cannot lock to the input signal, or unit is in browse mode, or unit's "OUTPUT QAM MODE" is set to CW or OFF (Please see Section 5.5 for details).

[2] ETHERNET OPTION ONLY:
For future optional remote monitoring/control feature. Not operational at this release.

[3] LCD SCREEN & NAVIGATION KEY-PAD:
The LCD has 2 lines, each capable of displaying 16 characters. The Key-pad has 5 push-down buttons used to navigate between menus and to program unit parameters.

[4] POWER SOCKET & FUSE:

The IEC Power socket and fuse holder (SLO-BLO, 1.0 Amps, 250VDC).

[5] QAM RF OUT:

"F" female connector for QAM output.

[6] REMOTE INTERFACE:

For future optional remote monitoring/control feature. Not operational at this release.

[7] SUB BAND INPUT:

“F” female connector for sub-band input.

[8] SUB BAND ON/OFF SWITCH:

The unit accepts input in the following frequency ranges:

(1) the standard CATV (CATV channels 2-135) and off-air (VHF NTSC channels 2-13, & UHF NTSC channels 14-69); and

(2) the sub-band CATV (CATV channels T7-T13).

When the input to the unit is off-air or standard CATV channels, this switch must be in OFF position.

When the input to the unit is sub-band CATV channels, this switch must be in ON position. This will allow the unit to receive the sub-band input present at connector [7] and to block-upconvert it to QAM which will ouput at connector [9] – for example if the input at [7] is sub-band channel T13, then the QAM output at [9] will be channel 13.

FOR SUB-BAND APPLICATIONS, CONNECTOR [9] MUST BE LOOPED TO CONNECTOR [10].

[9] RF OUT:

“F” female connector for up-converted RF output when switch [8] is in the ON position.

[10] RF IN:

“F” female connector for the 8VSB, QAM, and looped sub-band input.

2.3 Product Specification

Input

Connector:	"F" Female
Standards **8VSB/16VSB:** **QAM:**	 ATSC Digital Television A/53E ITU-T J.83 - Annex A & B (16, 32, 64, 128, and 256 QAM)
8VSB/16VSB Modes **Tuning Range:** **Data Rate:** **Bandwidth:** **8VSB Power Level:** **16VSB Power Level:**	 VHF (NTSC Ch. 2-13), UHF (NTSC Ch. 14-69) 19.392 Mbps 6 MHz -28 to 20 dBmV -25 to 20 dBmV
QAM Mode **Tuning Range:** **Data Rate:** **Bandwidth:** **Power Level:**	 CATV (NTSC Ch. T7-T13; 2-135) 38.8 Mbps (QAM 256); 26.97 Mbps (QAM 64) – Auto Detect 6 MHz -20 to +20 dBmV
Impedance:	75 Ω

Output

Connector:	"F" Female
QAM Modulation Modes:	16, 32, 64, 128, & 256
DVB Symbol Rate:	Variable; 1 to 7 MSymbols/sec (Mbaud)
Frequency Range:	54 to 864 MHz
QAM Tuning **NTSC:** **PAL:**	 Per channel's number from 2 to 135 Per channel's center-frequency (12.5 kHz increments)
RF Level:	+55 dBmV (115 dBµV)
RF Level LCD Screen Error:	± 2 dB
RF Level Adjustment Range:	45 to 55 dBmV
Frequency Tolerance:	± 0.5 kHz @ 77 °F (25 °C)
Frequency Stability:	± 5 kHz over 32 to 122 °F (0 to 50 °C)
Amplitude Flatness:	± 0.25 dB (over 6 MHz channel)
Phase Noise:	-98 dBc (@ 10 kHz)
Spurious:	-60 dBc
Broadband Noise:	-75 dBc (@ +55 dBmV output level, 4 MHz bandwidth)
Impedance:	75 Ω
Return Loss:	12 dB
Spectral Inversion:	Auto Recognition
Carrier Suppression:	55 dB
SNR:	Greater than 40 dB
MER:	Greater than 40 dB
I/Q Phase Error:	Less than 1 degree
I/Q Amplitude Imbalance:	Less than 1%

General

Dimensions (WxDxH):	19 x 18.125 x 1.75 inches (483 x 460 x 44m)
Power:	105 to 135 VAC; 60 Hz (Fuse:1 A, 250 VDC, SloBlo)
Power Dissipation:	23 W
Weight:	7 lbs (3.2 kg)
Operating Temperature:	32 to 122 °F (0 to 50 °C)
Storage Temperature:	-13 to 158 °F (-25 to 70 °C)
Operating Humidity:	0 to 95% RH @ 35 °C max, non-condensation
Storage Humidity:	0 to 95% RH @ 35 °C max, non-condensation

Alarms/Monitoring/Control

Indicators **8VSB/QAM:**	 Lock Status (Green LED)
Local Monitoring: **Local Control:**	Front-panel 16-character, 2-line LCD screen Front-panel Navigational Key-pad Sub-band input on/off switch
Remote Monitoring/Control:	Not Available

Section 3 – Installation & Power-up

3.1 Unpacking

AQP is shipped with one (1) power cord with IEC C13 line socket and 3-pin Type B NEMA 5 plug.

3.2 Installation

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

To install the AQP, secure its front panel to the rack by inserting four machine screws, with cup washers, through the four mounting holes in the front panel. It is recommended to leave 1 rack unit space (1RU = 1.75 inch = 44.45 mm) between each unit to reduce heat build-up in the rack which helps to extend the product's life span.

DO NOT BLOCK THE UNIT'S AIR INTAKE OR AIR DISCHARGE OPENINGS. FOR SAFE AND RELIABLE OPERATION, THE GROUND PIN OF THE POWER CORD PLUG MUST BE GROUNDED PROPERLY.

3.3 Power-up

THE POWERING REQUIREMENT OF AQP IS 105 to 135 VAC/60 HZ ONLY

There is no power on-off switch on this unit. To turn the unit on or off, simply connect/disconnect the power cord to/from the unit. The unit is also equipped with a fuse-holder and fuse (SLO-BLO, 1.0 Amps, 250V).

The following messages will be displayed on the LCD screen when AQP is first powered-up:

AQP POWER

AQP ADDRESS 000 123 45

AQP IS READY

Since the input source is not yet connected to the unit, the following message will be displayed on the LCD screen:

INPUT STATUS NOT LOCKED

The "INPUT STATUS" screen is the default screen indicating the status of the input: Not Locked, or its Signal-to-Noise Ratio (SNR) value when locked.

THE KEY-PAD REMAINS UNOPERATIONAL DURING THE POWER-UP SEQUENCE. DO NOT ADJUST ANY CONTROLS UNTIL THE SEQUENCE IS COMPLETED AND THE "AQP IS READY" MESSAGE IS DISPLAYED.

Section 4 – Quick Configuration

4.1 General

The Quick Configuration instructions are provided as the minimum steps required to configure the unit. Please see Section 5 for Advanced Configuration.

The front-panel key-pad has five push-down buttons as follows:

The LEFT button denoted as ◀ (L) in this document

The RIGHT button denoted as ▶(R) in this document

The UP button denoted as ▲(UP) in this document

The DOWN button denoted as ▼(DN) in this document

The ENTER button denoted as **ENTER** in this document

The ◀(L), ▶(R) buttons are primarily used to toggle between the menus of AQP .

The ▲(UP), ▼(DN) buttons are primarily used to toggle between the "parameter fields" within each menu.

The **ENTER** button is used to initiate a parameter value change and to lock the new value after changes are made.

Two looped display sequences, the left/right sequence and the up/down sequence, provide the basic input/output status of the unit and allows for configuring several input/output parameters.

4.2 Left/Right Looped Sequence

Using the ◀(L), ▶(R) buttons you can toggle among the following available parameter fields which will be displayed on the LCD screen:

[1] INPUT STATUS:

This is a read-only parameter that displays the measured SNR (Signal-to-Noise Ratio) if the unit is locked to an input signal. A "NOT LOCKED" message is displayed if the unit cannot lock to the input. It is also the front-panel LCD's default mode – it is displayed when not navigating through the different menu/parameter options.

[2] OUTPUT CATV:

Indicates the output channel number of the unit.

The equipment is shipped with the OUTPUT CATV set to CATV channel 101.

To change this parameter, follow these steps:

(1) Use the ◀(L), ▶(R) buttons to toggle between the "parameter fields" until you see the "OUTPUT CATV" field on the LCD screen.

(2) Press and hold for three seconds the **ENTER** button. The current value will flash, indicating that you can enter a new value. Use the ◀(L), ▶(R) buttons to select the position and the ▲(UP), ▼(DN) buttons to enter the desired digits – for example 002 for channel 2.

(3) Press the **ENTER** button to enter and lock the new parameter. The following message will then appear on the LCD screen to confirm your selection:

ENTRY
ACCEPTED

[3] INPUT CHANNEL:

Indicates the input channel number of the unit.

The range is OFF-AIR VHF 2-13 & UHF 14-69; CATV sub-band channels T7-T13; and CATV standard channels 2-135.

The equipment is shipped with the INPUT CHANNEL set to OFF-AIR VHF channel 07.

To change this parameter, follow these steps:

(1) Use the ◀(L), ▶(R) buttons to toggle between the "parameter fields" until you see the "INPUT CHANNEL" field on the LCD screen.

(2) Press and hold for three seconds the **ENTER** button. The current value will flash, indicating that you can enter a new value. Use the ◀(L), ▶(R) buttons to select the position and the ▲(UP), ▼(DN) buttons to enter the desired digits. Please note that (a) if the INPUT MODE is set to OFF-AIR, then input channel number has two digits – for example 02 for VHF channel 2, (b) if the INPUT MODE is set to CATV, then the input channel number has three digits – for example 002 for CATV channel 2.

FOR ENTERING A SUB-BAND CHANNEL, ENTER 002 FIRST, THEN PLACE THE CURSOR ON THE LEAST SIGNIFICANT DIGIT (I.E. 2) AND USE THE (DN) BUTTONS TO TOGGLE FROM T13 TO T7.

(3) Press the **ENTER** button to enter and lock the new parameter. The following message will then appear on the LCD screen to confirm your selection:

ENTRY ACCEPTED

Please see Appendix A for the CATV and off-air channel frequency chart.

[4] OUTPUT LEVEL:

Indicates the output signal level in dBmV as an average-measured signal power.

The range is +40 to +55 dBmV.

The equipment is shipped with the OUTPUT LEVEL set at +55 dBmV.

To change this parameter, follow these steps:

(1) Use the ◀(L), ▶(R) buttons to toggle between the "parameter fields" until you see the "OUTPUT LEVEL" field on the LCD screen.

(2) Press and hold for three seconds the **ENTER** button. The current value will flash, indicating that you can enter a new value. Use the ◀(L), ▶(R) buttons to select the position and the ▲(UP), ▼(DN) buttons to enter the desired digits.

(3) Press the **ENTER** button to enter and lock the new parameter. The following message will then appear on the LCD screen to confirm your selection:

ENTRY ACCEPTED

THE OPTIMUM OUTPUT SNR RATIO IS ACHIEVED BY SETTING THE OUTPUT LEVEL TO +55 dBmV. IF LOWER LEVELS ARE REQUIRED, IT'S RECOMMENDED TO ATTENUATE THE LEVEL EXTERNALLY.

[5] OUTPUT QAM MODE:

Indicates the output QAM mode.

Four (4) options are available: NORMAL, OFF, CW, and PASSTHRU.

The equipment is shipped with the OUTPUT QAM MODE set at NORMAL.

The OFF option turns off the QAM output of the unit – no output will be available.

The CW (Carrier Wave) option is only applicable for testing purposes, and must not be selected when operating the unit for its intended use. See Appendix B for details.

The PASSTHRU allows the output QAM to have the same characteristics of the input QAM – for example if input QAM is 64 Annex B, then the output QAM will also be 64 Annex B.

For normal operation, the mode must be NORMAL, however, to change this parameter, follow these steps:

(1) Use the ◀(L), ▶(R) buttons to toggle between the "parameter fields" until you see the "OUTPUT QAM MODE" field on the LCD screen.

(2) Press and hold for three seconds the **ENTER** button. The current value will flash, indicating that you can enter a new value. Use the ▲(UP), ▼(DN) buttons to arrive at the desired value.

(3) Press the **ENTER** button to enter and lock the new parameter. The following message will then appear on the LCD screen to confirm your selection:

ENTRY ACCEPTED

AFTER A POWER CYCLE, I.E. UTILITY POWER LOSS AND RECOVERY, ALL CONFIGURABLE VALUES WILL REVERT BACK TO THE LAST PROGRAMMED VALUE AND THE UNIT WILL POWER-UP WITH THE SAME VALUES PROGRAMMED BEFORE THE POWER CYCLE.

4.3 Up/Down Looped Sequence

Using the ▲(UP), ▼(DN) buttons you can toggle among the following available parameter fields which will be displayed on the LDC screen:

INPUT MODE: OFF-AIR	**INPUT MODE:** Allows selection of an input mode from two possible options: CATV and OFF-AIR. The equipment is shipped with the INPUT MODE set to OFF-AIR. Please see Section 5.1 for details and how to configure this parameter.
▲▼	
INPUT BROWSE: OFF	**INPUT BROWSE:** Automatically scans the input signal for standard-based 8VSB/QAM rates, and if found, automatically configures other relevant input and output parameters accordingly. If no valid signal is found it will default to the last locked state. Please see Section 5.2 for details and how to configure this parameter.
▲▼	
INPUT DEMOD: VSB-8	**INPUT DEMOD:** Allows selection of an input demodulation mode. Please see Section 5.3 for details and how to configure this parameter.
▲▼	
INPUT RATE: 5.381119M	**INPUT RATE:** Displays the input rate, in Mega Baud, that is automatically selected based on the INPUT DEMOD selection above. It also allows you to enter a different baud rate if you so desire. Please see Section 5.4 for details and how to configure this parameter.
▲▼	
OUTPUT QAM MODE: 64 ANNEX B	**OUTPUT QAM MODE:** Allows selection of an output QAM mode. OUTPUT QAM MODE is overridden by the input QAM mode when the CATV option is selected as the INPUT MODE – for example, when the input CATV mode is QAM 64, then the OUTPUT QAM MODE will be QAM 64 as well. Please see Section 5.5 for details and how to configure this parameter.
▲▼	
ALPHA: 12%	**ALPHA:** Allows selection of an ALPHA mode for the QAM output. Please see Section 5.6 for details and how to configure this parameter.
▲▼	
INTERLEAVER: I128, J1	**INTERLEAVER:** Allows selection of an INTERLEAVER mode for the QAM output. Please see Section 5.7 for details and how to configure this parameter.

▲▼

OUTPUT RATE:
5.056 M

OUTPUT RATE: Displays the QAM output rate, in Mega Baud, that is automatically selected based on the OUTPUT QAM MODE selection above. It also allows you to enter a different baud rate if you so desire. Please see Section 5.8 for details and how to configure this parameter.

▲▼

AQP ADDRESS:
000 123 45

AQP ADDRESS: Displays the address of the unit. Please see Section 5.9 for details.

▲▼

AQP CONTROLLER:
VERSION 1.3

AQP CONTROLLER: Displays the firmware version of the unit's internal controller. Please see Section 5.10 for details.

▲▼

AQP MODULE:
VERSION 5.7

AQP MODULE: Displays the firmware version of the unit's internal transcoder. Please see Section 5.11 for details.

▲▼

AQP 3.3V
IS x.x V

AQP 3.3V: Displays the measured DC voltage of the unit's circuitry. Please see Section 5.12 for details.

▲▼

AQP 6V
IS x.x V

AQP 6V: Displays the measured DC voltage of the unit's circuitry. Please see Section 5.13 for details.

▲▼

AQP 12V
IS x.x V

AQP 12V: Displays the measured DC voltage of the unit's circuitry. Please see Section 5.14 for details.

▲▼

AQP 21V
IS x.x V

AQP 21V: Displays the measured DC voltage of the unit's circuitry. Please see Section 5.15 for details.

4.4 Quick Configuration

The following steps provide the minimum requirements necessary to configure the AQP. Please see Section 5 for Advanced Configuration.

(1) Measure the RF input level with a signal level meter to make sure the input signal is within the -20 to +20 dBmV acquisition range of the unit. The recommended input signal level is -10 to +10 dBmV.

(2) Select the appropriate "INPUT MODE" - the unit is shipped with the INPUT MODE set to OFF-AIR. Please see Section 5.1 for details.

(3) Select the appropriate "INPUT CHANNEL" – the unit is shipped with the INPUT CHANNEL set to OFF-AIR VHF channel 07. Please see Section 4.2 for details.

(3) Select the appropriate "OUTPUT CATV" – the unit is shipped with the OUTPUT CATV set to channel 101. Please see Section 4.2 for details.

(4) Navigate to the "INPUT BROWSE" menu and select the "ACTIVATE" mode which will auto-search for and tune to all pre-programmed modes. See Section 5.2 for details. The front-panel "8VSB/QAM LOCK" LED will light solid green indicating that the unit has locked to the 8VSB/QAM input.

(5) Monitor the front-panel LCD to ensure that the unit displays sufficient SNR value as indicated in the table below:

Quality of Video	**8VSB modulation**	**QAM 64 modulation**	**QAM 256 modulation**
Excellent	Greater than 30 dB	Greater than 38 dB	Greater than 38 dB
Good	25 to 30 dB	30 to 38 dB	35 to 38 dB
Marginal	18 to 25 dB	23 to 30 dB	30 to 35 dB
Non-functional	Below 18 dB	Below 23 dB	Below 30 dB

Section 5 – Advanced Configuration

In this Section we provide an explanation of the "parameter values" described in Section 4.3, and instructions on how to change them.

5.1 "INPUT MODE" parameter

Indicates the input mode.

Two (2) options are available: CATV, and OFF-AIR.

The unit is shipped with the INPUT MODE set to OFF-AIR.

To change this parameter, follow these steps:

(1) Use the ▲(UP), ▼(DN) buttons to toggle between the "parameter fields" until you see the "INPUT MODE" field on the LCD screen.

(2) Press and hold for three seconds the **ENTER** button. The current value will flash, indicating that you can enter a new value. Use the ▲(UP), ▼(DN) buttons to arrive at the desired value.

(3) Press the **ENTER** button to enter and lock the new parameter. The following message will then appear on the LCD screen to confirm your selection:

ENTRY
ACCEPTED

5.2 "INPUT BROWSE" parameter

Two (2) options are available: Off, and ACTIVATE.

The unit is shipped with the INPUT BROWSE set to OFF.

When ACTIVATE is selected, the unit automatically scans the input signal for standard-based 8VSB/QAM rates, and if found, automatically configures other relevant input and output parameters according to the table below. If no valid signal is found it will default to the last locked state.

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

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

To change this option, follow these steps:

(1) Use the ▲(UP), ▼(DN) buttons to toggle between the "parameter fields" until you see the "INPUT BROWSE" field on the LCD screen.

(2) Press and hold for three seconds the **ENTER** button. The current option will flash, indicating that you can enter a new option. Use the ▲(UP), ▼(DN) buttons to arrive at the desired option.

(3) Press the **ENTER** button to enter and lock the new parameter. The following message will then appear on the LCD screen to confirm your selection:

ENTRY
ACCEPTED

5.3 "INPUT DEMOD" parameter

Nine (9) options are available: VSB – 8 & 16; Annex B QAM – 64 & 256; and Annex A QAM – 16, 32, 64, 128, 256.

The unit is shipped with the INPUT DEMOD set to VSB-8.

The unit can lock to a terrestrial (broadcast or off-air) 8VSB or CATV QAM-modulated RF input signal. You must select an appropriate input signal type for the unit to lock.

To change this parameter, follow these steps:

(1) Use the ▲(UP), ▼(DN) buttons to toggle between the "parameter fields" until you see the "INPUT DEMOD" field on the LCD screen.

(2) Press and hold for three seconds the **ENTER** button. The current value will flash, indicating that you can enter a new value. Use the ▲(UP), ▼(DN) buttons to arrive at the desired value.

(3) Press the **ENTER** button to enter and lock the new parameter. The following message will then appear on the LCD screen to confirm your selection:

ENTRY ACCEPTED

5.4 "INPUT RATE" parameter

Input Rate is the number of distinct symbol (or signaling) changes made per second to the input transmission. The measurement unit is typically in Mega Bauds (MBD) which is synonymous to Mega symbols per seconds (Msps).

It follows then, that the Baud Rate is dependent on the selection of the "INPUT DEMOD" modes referenced in Section 5.8. The unit automatically assigns the appropriate Baud Rate for each INPUT DEMOD type, for example:

The assigned Baud Rate is 5.381119 MBD, when INPUT DEMOD is VSB-8.

The assigned Baud Rate is 5.3605 MBD, when CATV QAM 256B is selected.

It is not recommended to change the rates that are selected automatically by the unit, however, to change this parameter, follow these steps:

(1) Use the ▲(UP), ▼(DN) buttons to toggle between the "parameter fields" until you see the "INPUT RATE" field on the LCD screen.

(2) Press and hold for three seconds the **ENTER** button. The current value will flash, indicating that you can enter a new value. Use the ▲(UP), ▼(DN) buttons to select the position and the ▲(UP), ▼(DN) buttons to enter the desired digits.

(3) Press the **ENTER** button to enter and lock the new parameter. The following message will then appear on the LCD screen to confirm your selection:

ENTRY ACCEPTED

5.5 "OUTPUT QAM MODE" parameter

Seven (7) options are available: Annex B QAM – 64 & 256; and Annex A QAM – 16, 32, 64, 128, 256.

The unit is shipped with OUTPUT QAM MODE set to Annex B 256.

To change this parameter, follow these steps:

(1) Use the ▲(UP), ▼(DN) buttons to toggle between the "parameter fields" until you see the "OUTPUT QAM MODE" field on the LCD screen.

(2) Press and hold for three seconds the **ENTER** button. The current value will flash, indicating that you can enter a new value. Use the ▲(UP), ▼(DN) buttons to arrive at the desired value.

(3) Press the **ENTER** button to enter and lock the new parameter. The following message will then appear on the LCD screen to confirm your selection:

ENTRY ACCEPTED

5.6 "ALPHA" parameter

The QAM passband spectrum is shaped by root raised cosine filtering with a roll-off factor Alpha.

Three (3) options are available: 12%, 15%, and 18%.

The recommended ALPHA values for different QAM modulation modes are: 18% for Annex B QAM 64; 12% for Annex B QAM 256; and 15% for Annex A QAM.

The unit is shipped with the ALPHA set to 12%.

To change this parameter, follow these steps:

(1) Use the ▲(UP), ▼(DN) buttons to toggle between the "parameter fields" until you see the "ALPHA" field on the LCD screen.

(2) Press and hold for three seconds the **ENTER** button. The current value will flash, indicating that you can enter a new value. Use the ▲(UP), ▼(DN) buttons to arrive at the desired value.

(3) Press the **ENTER** button to enter and lock the new parameter. The following message will then appear on the LCD screen to confirm your selection:

ENTRY ACCEPTED

5.7 "INTERLEAVER" parameter

Interleaving is a technique used in conjunction with FEC (Forward Error Correction) to correct for the QAM errors that are induced by burst noise. The unit employs a convolutional interleaver.
The unit is shipped with the INTERLEAVER set to I128, J1.
All possible INTERLEAVER values are shown in the table below.

Annex B	Annex A
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	

To change this parameter, follow these steps:

(1) Use the ▲(UP), ▼(DN) buttons to toggle between the "parameter fields" until you see the "INTERLEAVER" field on the LCD screen.

(2) Press and hold for three seconds the **ENTER** button. The current value will flash, indicating that you can enter a new value. Use the ▲(UP), ▼(DN) buttons to arrive at the desired value.

(3) Press the **ENTER** button to enter and lock the new parameter. The following message will then appear on the LCD screen to confirm your selection:

ENTRY
ACCEPTED

5.8 "OUTPUT RATE" parameter

Output Rate is the number of distinct symbol (or signaling) changes made per second to the QAM output. The measurement unit is typically in Mega Bauds (MBD) which is synonymous to Mega symbols per seconds (Msps).

It follows then, that the Baud Rate is dependent on the selection of the OUTPUT QAM modes referenced in Section 5.5. The unit automatically assigns the appropriate Baud Rate for each OUTPUT QAM type. It is not recommended to change the rates that are selected automatically by the unit, however, to change this parameter, follow these steps:

(1) Use the ▲(UP), ▼(DN) buttons to toggle between the "parameter fields" until you see the "OUTPUT RATE" field on the LCD screen.

(2) Press and hold for three seconds the **ENTER** button. The current value will flash, indicating that you can enter a new value. Use the ◀(L), ▶(R) buttons to select the position and the ▲(UP), ▼(DN) buttons to enter the desired digits.

(3) Press the **ENTER** button to enter and lock the new parameter. The following message will then appear on the LCD screen to confirm your selection:

ENTRY
ACCEPTED

5.9 “AQP ADDRESS” parameter

This is a read-only screen and displays the factory-set and unique 8-digit address of the unit, for example 00012345. You need to know what this address is for remote monitoring and control of the unit.

5.10 “AQP Controller” parameter

This is a read-only screen and displays the firmware version of the unit’s internal controller.

5.11 “AQP Module” parameter

This is a read-only screen and displays the firmware version of the unit’s internal transcoder.

5.12 “AQP 3.3V” parameter

This is a read-only screen and displays the actual DC voltage sent from the unit’s controller module to the “digital circuit-board” of the unit. The normal operating range is from 3.1 to 3.6 VDC.

5.13 “AQP 6V” parameter

This is a read-only screen and displays the actual DC voltage sent from the unit’s controller module to the “digital circuit-board” of the unit. The normal operating range is from 5.5 to 6.5 VDC.

5.14 “AQP 12V” parameter

This is a read-only screen and displays the actual DC voltage sent from the unit’s controller module to the “analog circuit-board” of the unit. The normal operating range is from 11.5 to 12.5 VDC.

5.15 “AQP 21V” parameter

This is a read-only screen and displays the actual DC voltage sent from the unit’s controller module to the “analog circuit-board” of the unit. The normal operating range is from 20.5 to 21.5 VDC.

5.16 Factory Reset

After a power cycle, i.e. utility power loss and recovery, all configurable values will revert back to the last programmed value and the unit will power-up with the same values stored before the power cycle.

In case the unit is not locking, or illegible characters are displayed on the front-panel LCD screen, it is recommended to reset the unit to clear and restore the configurable parameters in unit’s internal controller.

To reset the unit, press simultaneously and hold the ▲(UP), ▼(DN) buttons for approximately 10 seconds.

All configurable values will revert back to the last programmed value, except the following parameters that will be reset as follows:

INPUT MODE = Off-Air

OUTPUT CATV = 101

INPUT CHANNEL = 07

OUTPUT LEVEL = +55 dBmV

OUTPUT QAM MODE = Normal

Appendix A

CATV Channel Frequency Chart

EIA Chan.	Center Frequency MHz	EIA Chan.	Center Frequency MHz	EIA Chan.	Center Frequency MHz	EIA Chan.	Center Frequency MHz
T7	8.75	34	285	78	549	127	813
T8	14.75	35	291	79	555	128	819
T9	20.75	36	297	80	561	129	825
T10	26.75	37	303	81	567	130	831
T11	32.75	38	309	82	573	131	837
T12	38.75	39	315	83	579	132	843
T13	44.75	40	321	84	585	133	849
2	57	41	327	85	591	134	855
3	63	42	333	86	597	135	861
4	69	43	339	87	603		
5	79	44	345	88	609		
6	85	45	351	89	615		
95	93	46	357	90	621		
96	99	47	363	91	627		
97	105	48	369	92	633		
98	111	49	375	93	639		
99	117	50	381	94	645		
14	123	51	387	100	651		
15	129	52	393	101	657		
16	135	53	399	102	663		
17	141	54	405	103	669		
18	147	55	411	104	675		
19	153	56	417	105	681		
20	159	57	423	106	687		
21	165	58	429	107	693		
22	171	59	435	108	699		
7	177	60	441	109	705		
8	183	61	447	110	711		
9	189	62	453	111	717		
10	195	63	459	112	723		
11	201	64	465	113	729		
12	207	65	471	114	735		
13	213	66	477	115	741		
23	219	67	483	116	747		
24	225	68	489	117	753		
25	231	69	495	118	759		
26	237	70	501	119	765		
27	243	71	507	120	771		
28	249	72	513	121	777		
29	255	73	519	122	783		
30	261	74	525	123	789		
31	267	75	531	124	795		
32	273	76	537	125	801		
33	279	77	543	126	807		

Broadcast Chart

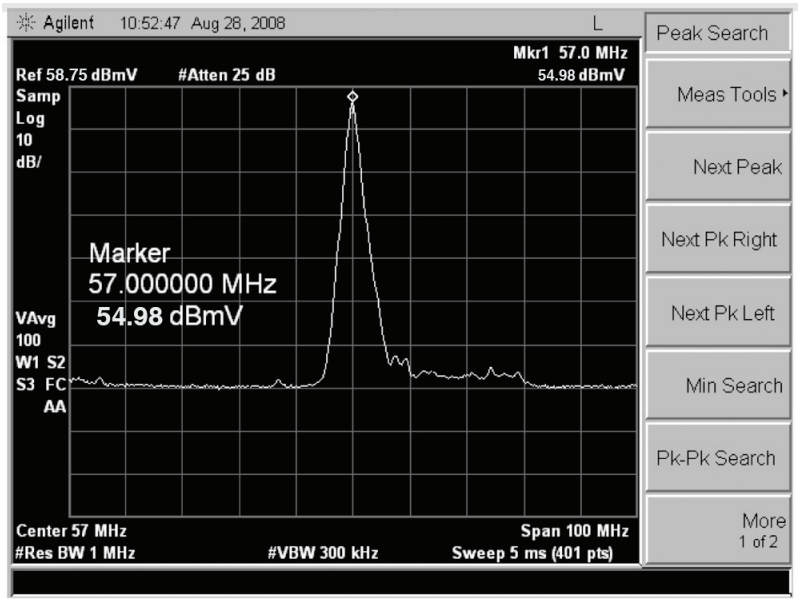
VHF Broadcast Channels	
Channel	Center Frequency
2	57
3	63
4	69
5	79
6	85
7	177
8	183
9	189
10	195
11	201
12	207
13	213
UHF Broadcast Channels	
Channel	Center Frequency
14	473
15	479
16	485
17	491
18	497
19	503
20	509
21	515
22	521
23	527
24	533
25	539
26	545
27	551
28	557
29	563
30	569
31	575
32	581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

Appendix B: Measuring the QAM Output Signal Level

To ensure that the QAM output power level indicated on the LCD screen is indeed accurate, you can also measure the true equivalent signal level for the QAM carrier using the CW (Carrier Wave) signal. The unit is capable of supplying the CW signal which simplifies the measurement process because the output level does not need to be adjusted for the bandwidth setting limitations of the spectrum analyzer.

Once the QAM mode is set at CW (please see Section 5.5 for instructions), then any meter that can measure CW power level can be used to compare the output level entered via the key-pad and the CW power level which is equal to the true QAM power level that will be presented in the NORMAL mode.

The diagram below shows the measurement made on a typical unit when the output level was selected at 55 dBmV using the navigation key-pad. The actual measured output (in CW mode) is 54.98 dBmV.



AQP Frequently Asked Questions

1.

Question: Sometimes the AQP picture tiles or there is no picture at all.

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

	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	Below 18 dB	Below 23 dB	Below 30 dB

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

2.

Question: I have AQP, it does have issue locking to QAM at all time.

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

Solution: In the normal mode, the AQP will perform packet processing. If the input clock rate is higher than the output clock rate, then the QAM may not lock at all times. "PASS THRU" mode will resolve this issue by simply passing through the input signal to the output QAM block of the AQP. Refer to Section 4.2 of this manual for detail description of these modes.

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