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INSTRUCTION MANUAL

AM Series

Agile Modulator with Emergency Alert System

Model	Stock No.
AM-45-550	59404
AM-60-550	59416
AM-60-806	59419

Status	Date	Document No.	Issue No.	Author
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c UL us LISTED 45A6

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

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

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

Correspondence regarding this publication should be addressed directly to:

Blonder Tongue Laboratories, Inc.

One Jake Brown Road

Old Bridge, NJ 08857

Document Number: USA 651217400E

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.

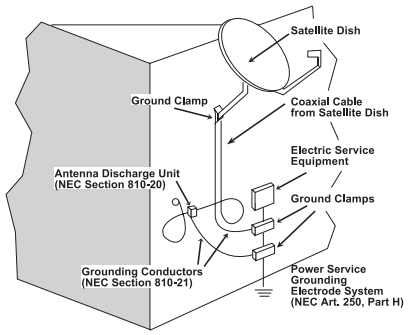
Safety Instructions

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 manufacturer's recommendation.
- 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.

Description

The AM Series are professional quality agile audio/video modulators equipped with an Emergency Alert System (EAS) feature, which can also be used for an alternate IF input. The units provide an audio and video modulated RF carrier on any channel from 54 to 550 or 806 MHz depending upon the model. Any standard audio/video source can be used, such as satellite receivers, television cameras, video tape recorders, or television demodulators.

Channel tuning is easily accomplished with the use of front panel channel up/down push buttons. Frequency plans include CATV Standard EIA, IRC, HRC & Broadcast. All channel frequency information with appropriate FCC offsets is pre-programmed and tuned electronically via a microprocessor.

The AM Series have optional features to fit many different applications. A stereo audio option, Option 05, also allows the integration of a BTSC stereo encoder module into the AM Series. This optional stereo encoder converts stereo left and right audio into a composite BTSC stereo audio signal. The factory installed option provides 20 dB of stereo separation, less than 1.0% total harmonic distortion and 60 dB signal to noise ratio.

The EAS / Alternate IF feature allows a choice between manual and automatic selection of the EAS/ALT IF input signal. This is done through a 3 position terminal strip on the rear of the unit. In the manual mode the EAS/ALT IF feature is activated by a contact closure switch, which completes a ground connection. In the automatic mode, two positions on the terminal strip are jumpered together enabling an automatic detection circuit in the unit. When an EAS/ALT IF signal is routed to the EAS/ALT IF port the unit automatically switches to that alternate signal.

The AM Series meets FCC Docket 21006 aeronautical frequency offset requirements (5 kHz video carrier accuracy). A high in-channel carrier to noise performance of 63 dB typical is achieved by the unit. A custom SAW IF filter is employed to provide true vestigial sideband selectivity with built-in FCC group delay equalization. A state of the art converter design with pre-programmed microprocessor controlled channel tuning ensures that the Blonder Tongue AM Series are the ideal agile modulator for any demanding CATV headend need.

Options

02	Video Input Connector BNC 75 Ohm
04	Sub Band Output (AM-60-550 only)
05	Stereo Audio
07	Video AGC
08	Audio AGC
09	Balanced Audio Input

Input

Connector	
Standard:	"F" Female
Option 2:	BNC Female
Impedance:	75 Ω
Return Loss:	18 dB
Video Input Level	
Standard:	0.7 volt Peak-to-Peak (87.5% depth of modulation)
Option 7 (Video AGC):	0.4 to 2.5 volts Peak-to-Peak (87.5% ±2.5% depth of modulation)
Video-to-RMS Hum Ratio:	65 dB Peak-to-Peak
Signal-to-Noise Ratio:	58 dB (Weighted; at 4MHz bandwidth)
Differential Gain:	2.0%
Differential Phase:	1.0 degree
Over-modulation Indicator:	87 to 92%
Chrominance/Luminance Delay:	Per FCC Requirements
Mono Audio (Standard)	
Connector:	RCA
Option 9 (Balanced Audio Input):	Terminal Strip
Input Impedance:	Greater than 10 kΩ, unbalanced
Option 9 (Balanced Audio Input):	600 Ω, balanced
Input Level	
Standard:	0.5 to 4.0 volt Peak-to-Peak
Option 8 (Audio AGC):	0.5 to 4.0 volt Peak-to-Peak (constant 25 kHz deviation)
Frequency Range:	50 Hz to 15 kHz
Frequency Response:	± 0.5 dB
Total Harmonic Distortion:	1% @ 25 kHz deviation
Signal-to-Noise Ratio:	59 dB
Over-modulation Threshold:	25 ± 2 kHz peak deviation
Stereo Audio (Option 5)	
Connector:	RCA
Input Impedance:	Greater than 10 kΩ, unbalanced
Input Sensitivity	
Standard:	1.0 volt Peak-to-Peak (55 kHz peak deviation with pilot tone)
Option 8 (Audio AGC):	0.5 to 4.0 volt Peak-to-Peak (constant 55 kHz deviation with pilot tone)
Frequency Response:	±0.75 dB (50 Hz to 14 kHz)
Separation:	20 dB (50 Hz to 10 kHz)
Harmonic Distortion:	Less than 1% (@ 1kHz)

Output

Connector:	"F" Female
Impedance:	75 Ω
Return Loss:	12 dB
Frequency Range	
AM-60-806 Model:	54 to 806 (NTSC CATV Ch. 2-125)
AM-60-550 & AM-45-550 Models:	54 to 550 MHz (NTSC CATV Ch. 2 -78 & 95-99)
AM-60-550 with Option 4 (Sub-band):	7 to 550 MHz (NTSC CATV Ch. T7 -78 & 95-99)
NTSC Channel Modes:	UHF, VHF, CATV (Standard, HRC, IRC)
Power Level	
AM-45-550 Model:	+45 dBmV
All other Models:	+60 dBmV
Power Level Range	
AM-45-550 Model:	+35 to +45 dBmV (in 0.2 dB increments)
All other Models:	+50 to +60 dBmV (in 0.2 dB increments)
Video Flatness:	fv-0.5 to fv+4.2 MHz (1.0 dB Peak-to-Valley)
Carrier-to-Noise: (In Channel)	63 dB
Broadband Noise: (4 MHz bandwidth)	-77 dBc (@ +45/60 dBmV output level)
Spurious Outputs:	-63 dBc
Aural/Visual Carrier Ratio:	-15 ±5 dB
4.5 MHz Aural Inter-carrier Freq. Tolerance:	±150 Hz; 32 to 122 °F (0 to 50 °C)
Channel Selectivity	
Adjacent Aural & Below:	-40 dB
Adjacent Picture & Above:	-40 ±5 dB
Visual Carrier Frequency Tolerance	
Standard Channels:	±5.0 kHz; 32 to 122 °F (0 to 50 °C)
FCC Aeronautical Channels:	±2.5 kHz; 32 to 122 °F (0 to 50 °C)
IF (Intermediate Frequency)	
Input/Output Connector:	"F" Female / "F" Female
Aural Frequency:	41.25 MHz
Visual Frequency:	45.75 MHz
Composite IF Output	
Aural Carrier Level:	+20 dBmV
Visual Carrier Level:	+35 dBmV
Input/Output Impedance:	75 Ω
Input/Output Return Loss:	16/15 dB
EAS/Alternative IF	
Connector:	"F" Female
Input Level:	+38 dBmV @ 45.75 MHz
Switch Isolation:	Greater than 60 dB

General

Dimensions (W x D x H):	19.0 x 14.25 x 1.75 in. (483 x 362 x 44 mm)
Power:	117 VAC ±10%; 60Hz (Fuse: 0.40 Amp) Also available in 220 VAC; 50Hz
Power Dissipation:	28 W (max)
Weight:	7 lbs (3.18 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-condensing
Storage Humidity:	0 to 95% RH @ 35 °C max, non-condensing

Alarms/Monitoring/Control

Front-Panel Indicators	
Channel / Mode / RF Output:	3-Digit LED Display
Video Over-modulation:	Red LED
Audio Over-modulation:	Red LED
EAS/Alternative IF:	Red LED
Stereo:	Green LED
Front-Panel Controls	
Channel / Mode /RF Output:	Navigation Key-pad
Video Level:	Potentiometer
Audio Level:	Potentiometer
Aural Carrier Level:	Potentiometer

Controls and Connections

Operating Controls

All operating controls and indicators for the modulator are located on, or are accessible from the front panel.

Figure 1 - Front Panel

[1] **EAS/ALT INDICATOR:** Lights Red when EAS/ALT is active.
[2] **VIDEO OVERMODULATION LED:** Lights when modulation is above 87.5%.
[3] **VIDEO MODULATION LEVEL:** Adjusts percentage of modulation.
[4] **AURAL-TO-VISUAL CARRIER RATIO:** Controls amplitude of aural RF carrier relative to visual RF carrier.
[5] **AUDIO MODULATION LEVEL:** Adjusts aural carrier modulation.
[6] **AUDIO OVERMODULATION LED:** Lights when peak deviation of aural carrier is over 25 kHz.
[7] **DISPLAY MODE BUTTON:** Used to scroll through channel configuration, output level and modes.
[8] **CHANNEL, CHANNEL CONFIGURATION/OUTPUT LEVEL DISPLAY**
[9] **UP/DOWN BUTTONS:** Used to scroll through the channel, and channel configuration/output display.
[10] **ENTER BUTTON:** Evokes the current settings in the channel/output display when depressed.
[11] **STEREO INDICATOR:** Green LED lights when equipped with stereo option (AM Opt 5), the audio select switch (on rear panel) in the stereo position and video is applied to the modulator.

Note: All connections to the unit are made at the rear panel.

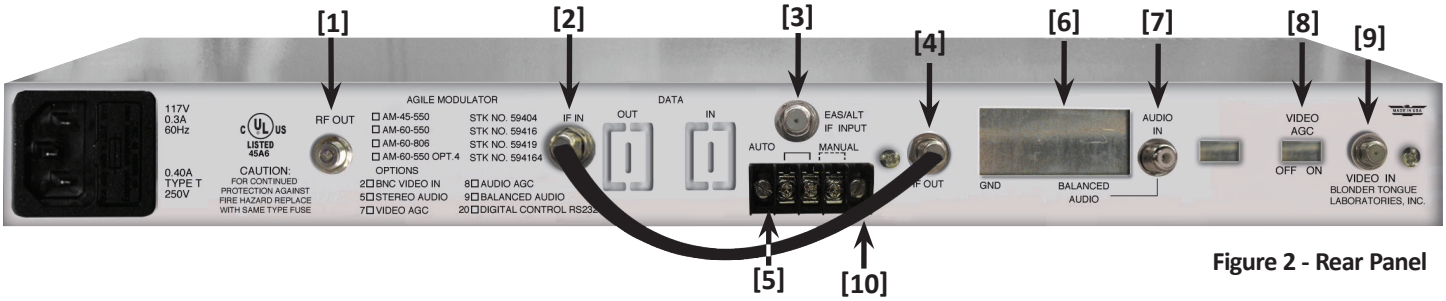
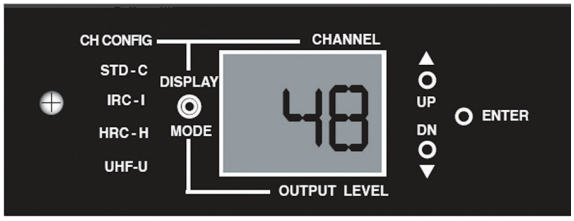
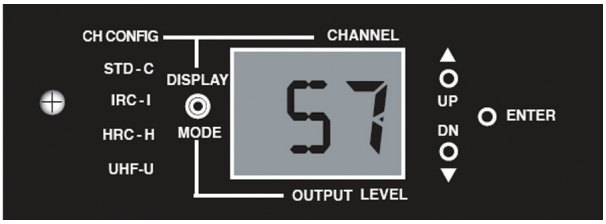


Figure 2 - Rear Panel

[1] **RF OUTPUT** - + 45/60 dBmV RF output depending on model
[2] **IF INPUT:** +35 dBmV IF Input
[3] **EAS/ALT IF INPUT:** Emergency Alert or Alternate IF Input
[4] **IF OUT:** +35 dBmV IF Output (See note #10 below)
[5] **EAS/ALT IF TERMINAL:** EAS / ALT IF mode selection (See page 9)
[6] **BALANCED AUDIO INPUT:** Balanced Audio Input (Option 9 units only)
[7] **AUDIO INPUT:** Audio input (standard)
[8] **VIDEO AGC ON/OFF:** Video AGC switch (Option 7 units only)
[9] **VIDEO INPUT:** 1 Volt PP video input
[10] **IF LOOP CABLE:** The IF loop cable (supplied) must be installed to provide RF continuity. The modulator will not have an RF output without the IF loop installed.

Operation





Option 4: (AM 60 550 Opt 4) Subchannel display in standard configuration mode (only)

Display Mode

This button scrolls through the selection of Channel, Channel Configuration, Output Level mode in this order.

The resting state (default) of the AM's display mode is the channel number.

Channel Selection

The output channel is selected by pressing the UP or DN button when in the channel display mode.

The LED display will blink indicating a transition state.

The actual channel is not changed until the ENTER button is pressed.

If the ENTER button is not pressed, the display will return to resting state after 30 seconds.

Pressing and holding the UP or DN button will allow for faster scrolling of channel.

All internal attenuators are temporarily set for maximum attenuation during channel change.

Channel Configuration

The Channel Configuration is changed by pressing the UP or DN button when in the Channel Configuration display mode.

The LED display will blink indicating a transition state.

The channel configuration is not changed until the ENTER button is pressed.

If the ENTER button is not pressed, the display will return to resting state after 30 seconds.

If the mode is to be changed and it is not a valid mode for the existing channel, when the ENTER button is pressed, the new mode will be selected, and the channel will default to channel-2.

The available Channel Configurations are as follows:

C = Standard (default from factory)

I = IRC

H = HRC

U = Broadcast VHF/UHF

Error Conditions

The Display will show a flashing "EE1" if the PLL1 is not locked.

The Display will show a flashing "EE2" if the PLL2 is not locked.

The Display will show a flashing "EE3" if both PLL1 and PLL2 are not locked.

All internal attenuators are automatically set for maximum attenuation in any of the above conditions.

Please contact our Service Department should any of these errors conditions occur.

Adjustments

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.

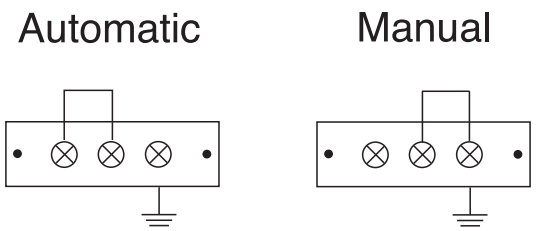
OUTPUT LEVEL: The Output Level is adjusted by pressing the UP or DN button when in the Output Level display mode. The LED display will blink indicating a transition state. The output level is not changed until the ENTER button is pressed. If the ENTER button is not pressed, the display will return to its resting state after 30 seconds. Pressing and holding the UP or DN button will allow for faster scrolling. The Level increments in 0.2 dB steps. Output level accuracy is typically +/- 1 dB of display, +/- 2 dB worst case.

A/V CARRIER RATIO: To adjust the aural-to-visual carrier ratio, tune the RF indicator device to the aural carrier frequency and 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 switch on 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.



Stereo Compatibility Of The Modulator

The AM Series modulator are shipped configured for standard TV monaural operation (rear panel audio select switch is set to mono audio). To defeat the audio pre-emphasis for use with an external MTS Stereo Generator or when using Option 5 Stereo, move the audio select switch on the rear panel to the stereo position.

Option 5

Stereo Audio

Description

The stereo audio option integrates a BTSC stereo encoder module to the AM Series. The optional stereo encoder converts stereo left and right audio into a composite BTSC stereo audio signal. This Option provides 20 dB of stereo separation, less than 1.0% total harmonic distortion and 60 dB signal to noise ratio.

Specifications

Audio Input Sensitivity: 350 mV rms for 55 kHz peak dev.(w/pilot tone)

Video Input: 0.7 to 2 Vp-p

Frequency Response (Decoder output left or right channel):

- L+R (In Phase Inputs)
  - 50 Hz -10 kHz: 0.5 dB
  - 50 Hz -12 kHz: 0.75 dB
- L-R (Out of Phase Inputs)
  - 50 Hz -10 kHz: 2.5 dB
  - 50 Hz -12 kHz: 3.5 dB
- L or R (One Grounded)
  - 50 Hz -10 kHz: 1.5 dB
  - 50 Hz -12 kHz: 1.75 dB

Separation 50 Hz -10 kHz: 20 dB

Harmonic Distortion @ 1 kHz (Decode Output: Left or right channel):

- L+R: <1 %
- L-R: <1 %
- L or R: <1 %

Appendix A

Frequency Allocation Tables

EIA Chan.	Standard Video	Incremental Video (IRC)	Harmonic Video (HRC)
02	55.2500	55.2625	54
03	61.2500	61.2625	60
04	67.2500	67.2625	66
01	NA	73.2625	72
05	77.2500	79.2625	78
06	83.2500	85.2625	84
95	91.2500	91.2625	90
96	97.2500	97.2625	96
97	103.2500	103.2625	102
98	109.2750	109.2750	Cannot lock to comb
99	115.2750	115.2750	ref: refer to FCC regs
14	121.2625	121.2625	120
15	127.2625	127.2625	126
16	133.2625	133.2625	132
17	139.2500	139.2625	138
18	145.2500	145.2625	144
19	151.2500	151.2625	150
20	157.2500	157.2625	156
21	163.2500	163.2625	162
22	169.2500	169.2625	168
07	175.2500	175.2625	174
08	181.2500	181.2625	180
09	187.2500	187.2625	186
10	193.2500	193.2625	192
11	199.2500	199.2625	198
12	205.2500	205.2625	204
13	211.2500	211.2625	210
23	217.2500	217.2625	216
24	223.2500	223.2625	222
25	229.2625	229.2625	228
26	235.2625	235.2625	234
27	241.2625	241.2625	240
28	247.2625	247.2625	246
29	253.2625	253.2625	252
30	259.2625	259.2625	258
31	265.2625	265.2625	264
32	271.2625	271.2625	270
33	277.2625	277.2625	276
34	283.2625	283.2625	282
35	289.2625	289.2625	288
36	295.2625	295.2625	294
37	301.2625	301.2625	300
38	307.2625	307.2625	306
39	313.2625	313.2625	312
40	319.2625	319.2625	318
41	325.2625	325.2625	324
42	331.2750	331.2750	330
43	337.2625	337.2625	336
44	343.2625	343.2625	342
45	349.2625	349.2625	348
46	355.2625	355.2625	354
47	361.2625	361.2625	360
48	367.2625	367.2625	366
49	373.2625	373.2625	372
50	379.2625	379.2625	378
51	385.2625	385.2625	384
52	391.2625	391.2625	390
53	397.2625	397.2625	396
54	403.2500	403.2625	402
55	409.2500	409.2625	408
56	415.2500	415.2625	414
57	421.2500	421.2625	420
58	427.2500	427.2625	426
59	433.2500	433.2625	432
60	439.2500	439.2625	438
61	445.2500	445.2625	444
62	451.2500	451.2625	450

EIA Chan.	Standard Video	Incremental Video (IRC)	Harmonic Video (HRC)
63	457.2500	457.2625	456
64	463.2500	463.2625	462
65	469.2500	469.2625	468
66	475.2500	475.2625	474
67	481.2500	481.2625	480
68	487.2500	487.2625	486
69	493.2500	493.2625	492
70	499.2500	499.2625	498
71	505.2500	505.2625	504
72	511.2500	511.2625	510
73	517.2500	517.2625	516
74	523.2500	523.2625	522
75	529.2500	529.2625	528
76	535.2500	535.2625	534
77	541.2500	541.2625	540
78	547.2500	547.2625	546
79	553.2500	553.2625	552
80	559.2500	559.2625	558
81	565.2500	565.2625	564
82	571.2500	571.2625	570
83	577.2500	577.2625	576
84	583.2500	583.2625	582
85	589.2500	589.2625	588
86	595.2500	595.2625	594
87	601.2500	601.2625	600
88	607.2500	607.2625	606
89	613.2500	613.2625	612
90	619.2500	619.2625	618
91	625.2500	625.2625	624
92	631.2500	631.2625	630
93	637.2500	637.2625	636
94	643.2500	643.2625	642
100	649.2500	649.2625	648
101	655.2500	655.2625	654
102	661.2500	661.2625	660
103	667.2500	667.2625	666
104	673.2500	673.2625	672
105	679.2500	679.2625	678
106	685.2500	685.2625	684
107	691.2500	691.2625	690
108	697.2500	697.2625	696
109	703.2500	703.2625	702
110	709.2500	709.2625	708
111	715.2500	715.2625	714
112	721.2500	721.2625	720
113	727.2500	727.2625	726
114	733.2500	733.2625	732
115	739.2500	739.2625	738
116	745.2500	745.2625	744
117	751.2500	751.2625	750
118	757.2500	757.2625	756
119	763.2500	763.2625	762
120	769.2500	769.2625	768
121	775.2500	775.2625	774
122	781.2500	781.2625	780
123	787.2500	787.2625	786
124	793.2500	793.2625	792
125	799.2500	799.2625	798

VHF Broadcast Channels	
Channel	**Video (MHz)**
2	55.25
3	61.25
4	67.25
5	77.25
6	83.25
7	175.25
8	181.25
9	187.25
10	193.25
11	199.25
12	205.25
13	211.25

UHF Broadcast Channels	
Channel	**Video (MHz)**
14	471.25
15	477.25
16	483.25
17	489.25
18	495.25
19	501.25
20	507.25
21	513.25
22	519.25
23	525.25
24	531.25
25	537.25
26	543.25
27	549.25
28	555.25
29	561.25
30	567.25
31	573.25
32	579.25
33	585.25
34	591.25
35	597.25
36	603.25
37	609.25
38	615.25
39	621.25
40	627.25
41	633.25
42	639.25
43	645.25
44	651.25
45	657.25
46	663.25
47	669.25
48	675.25
49	681.25
50	687.25
51	693.25
52	699.25
53	705.25
54	711.25
55	717.25
56	723.25
57	729.25
58	735.25
59	741.25
60	747.25
61	753.25
62	759.25
63	765.25
64	771.25
65	777.25
66	783.25
67	789.25
68	795.25
69	801.25

Sub Band Channels	
Channel	**Standard Video**
T7	7
T8	13
T9	19
T10	25
T11	31
T12	37
T13	43
T14	49

Limited Warranty

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

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

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

This warranty does not cover damage resulting from (i) use or installation other than in strict accordance with manufacturer's written instructions, (ii) disassembly or repair by someone other than the manufacturer or a manufacturer-authorized repair center, (iii) misuse, misapplication or abuse, (iv) alteration, (v) lack of reasonable care or (vi) wind, ice, snow, rain, lightning, or any other weather conditions or acts of God.

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All claims for shortages, defects, and non-conforming goods must be made by the customer in writing within five (5) days of receipt of merchandise, which writing shall state with particularity all material facts concerning the claim then known to the customer. Upon any such claim, the customer shall hold the goods complained of intact and duly protected, for a period of up to sixty (60) days. Upon the request of BT, the customer shall ship such allegedly non-conforming or defective goods, freight prepaid to BT for examination by BT's inspection department and verification of the defect. BT, at its option, will either repair, replace or issue a credit for products determined to be defective. BT's liability and responsibility for defective products is specifically limited to the defective item or to credit towards the original billing. All such replacements by BT shall be made free of charge f.o.b. the delivery point called for in the original order. Products for which replacement has been made under the provisions of this clause shall become the property of BT. Under no circumstances are products to be returned to BT without BT's prior written authorization. BT reserves the right to scrap any unauthorized returns on a no-credit basis. Any actions for breach of a contract of sale between BT and a customer must be commenced by the customer within thirteen (13) months after the cause of action has accrued. A copy of BT's standard terms and conditions of sale, including the limited warranty, is available from BT upon request. Copies of the limited warranties covering third-party proprietary sub-assembly modules and private-label products manufactured by third-parties are also available from BT on request. DigiCipher ® is a registered trademark of Motorola Corp. (**Rev 0509)**

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