

INSTRUCTION MANUAL

651203900B

AM SERIES

Agile Modulator with Emergency Alert System

<u>Model</u>	<u>Stock No.</u>
AM-40-550B	59402
AM-60-550B	59417
AM-40-750B	59403
AM-60-750B	59418



**BLONDER
TONGUE**
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AM Series Instruction Manual

The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert you to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electrical shock to persons.



CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN



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

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

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

NOTE TO CATV INSTALLERS

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.

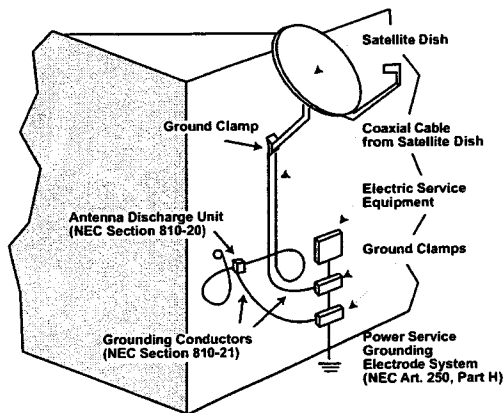
Safety Instructions

WARNING!



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

- ◆ Read all safety and operating instructions before you operate the modulator.
- ◆ Retain all safety and operating instructions for future reference.
- ◆ Heed all warnings on the modulator and in the safety and operating instructions.
- ◆ Follow all installation, operating, and use instructions.
- ◆ Unplug the modulator from the AC power outlet before cleaning. Use only a damp cloth for cleaning the exterior of the modulator.
- ◆ 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 modulator in high-humidity areas, or expose it to water or moisture.
- ◆ Do not place the modulator on an unstable cart, stand, tripod, bracket, or table. The modulator may fall, causing serious personal injury and damage to the modulator. Install the modulator only in a mounting rack designed for 19" rack-mounted equipment.
- ◆ Do not block or cover slots and openings in the modulator. These are provided for ventilation and protection from overheating. Never place the modulator near or over a radiator or heat register. Do not place the modulator in an enclosure such as a cabinet without proper ventilation. Do not mount equipment in the rack space directly above or below the modulator.
- ◆ Operate the modulator using only the type of power source indicated on the marking label. Unplug the modulator power cord by gripping the plug, not the cord.
- ◆ The modulator 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:



Safety Instructions - continued

- ◆ We strongly recommend using an outlet that contains surge suppression or ground fault protection. For added protection during a lightning storm, or when the modulator is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the lines between the modulator 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 modulator 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 modulator 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 modulator 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 modulator;
 - ☐ The modulator has been exposed to rain or water;
 - ☐ The modulator has been dropped or the chassis has been damaged;
 - ☐ The modulator 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 modulator or cause electrical shock or fire, and will void the warranty.
- ◆ Upon completion of any service or repair to the modulator, ask the service technician to perform safety checks to ensure that the modulator is in proper operating condition.

DESCRIPTION

General

AM Series frequency agile audio/video modulators provide visual and aural RF carrier outputs on any Broadcast or CATV channel over the full 50 to 550 MHz (AM xx-550B) or 750 MHz (AM xx-750B) frequency range. The Modulators feature a clean output signal with an exceptionally low out of band noise floor that permits the construction of multiple channel headends without auxiliary filtering. They are available in either 60 dBmV (AM 60-xxxB) or 40 dBmV (AM-40-xxxB) output versions. A selection of options are available to suit the product for a wide range of requirements.

The modulators accept standard (sync negative) polarity video from any common source, such as a satellite receiver, TV demodulator, video tape recorder or TV camera. DIP switches for setting the output frequency are accessible from the front panel as are the level controls and modulation indicators.

An external IF loop-thru enables the replacement of the standard internally generated IF signal with an alternate source of composite IF (such as an "all call" system) or the insertion of IF scrambling equipment.

Emergency Alert System (EAS) switching is done either automatically by connecting a jumper on the rear terminal block or manually by grounding the manual terminal (DO NOT INSERT JUMPER WHEN MANUALLY SWITCHING). When set to auto, the presence of a +28 dBmV IF signal on the EAS/ALT input connector will switch the unit to the EAS mode and the green front panel indicator will light.

Electrical

All modulator functions are carried out on two printed circuit boards. The A/V Modulator PCB generates the visual and aural carriers at IF and modulates them with processed video and audio signals. The Output Converter PCB converts the IF signals to the final RF frequency and amplifies the selected channel to the required output level.

On the A/V Modulator PCB the video signal is passed through a low pass filter, buffered and DC restored. A LED overmodulation indicator lights if the video signal exceeds a calibrated preset level, corresponding to 87.5% modulation. The audio signal is first pre-emphasized (to 75 microseconds) and then it frequency-modulates a 4.5 MHz oscillator. A preset comparator samples the audio and lights a LED when a level required for 25 KHz deviation is reached. A high quality MC 1374 modulator chip generates a crystal controlled 45.75 MHz visual carrier that is modulated with the processed video signal in an integral balanced modulator. Concurrently the visual carrier and the 4.5 MHz audio subcarrier create a 41.25 frequency-modulated aural IF carrier. The combined IF carriers are amplified and passed through a SAW filter that produces a near-ideal bandpass response for a true vestigial sideband output.

In the Output Converter PCB the IF signal is applied to a CATV type up/down converter. There a 1st LO (nominally held at 836 MHz by a PLL, but capable of small frequency offsets, set by DIP switches) produces a 880 MHz IF. A 2nd PLL oscillator, also controlled by DIP switches, then converts the signal to the selected output frequency. An appropriate broadband amplifier gives the final RF output level.

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Options

01	4.5 MHz Aural Carrier Input
02	Video Input Connector BNC 75 Ohm
04	Sub Band Output, 7 - 550 MHz (T7 - T14)
05	Stereo Audio

07	Video AGC
09	600 Ohm Balanced Audio Input
10	Composite Video and 4.5 MHz Aural Carrier Input

Specifications

RF	Typical	VIDEO	Typical
Output Frequency Range		Video Input for 87.5% Modulation:	1.0 Vp-p, std. NTSC video
AM xx-550B:		Input Impedance:	75 Ohm, 30 dB return loss
Ch. 2 to Ch. 78	54 - 547.25 MHz	Video Over-Modulation LED Indicator Calibration:	87 - 92 %
AM xx-750B:		Differential Gain:	2 % p-p
Ch. 2 to Ch. 116	54 - 745.25 MHz	Differential Phase:	1 ° p-p
Output Level		Group Delay:	Meets FCC specs.
AM 40-xxxB:	+42 dBmV	AUDIO	
AM 60-xxxB:	+60 dBmV	Audio Input Sensitivity:	140 mVrms
Output Level Control Range		Input Impedance:	10 K Ohm, unbalanced
Continuously Adjustable		Audio Frequency Response	
AM 40-xxxB:	32 to 42 dBmV	(30 Hz to 15 KHz) :	±0.5 dB
AM 60-xxxB:	50 to 60 dBmV	(Ref. to std. 75 µsec pre-emphasis)	
Aural/Visual Carrier Ratio Control:	-11 to -22 dB	Audio Distortion:	0.6 %
(Continuously Adjustable Factory Set to -15 dB)		(30 Hz to 15 KHz @25 KHz Dev.)	
Visual Carrier Frequency Tolerance		Aural Over-Modulation	
Standard Channels:	±20 KHz	LED Indicator Calibration:	25 KHz, ±2 KHz
Aeronautical Channels:	±5.0 KHz	GENERAL	
4.5 MHz Inter Carrier Frequency Tolerance:	±300 Hz	Power Requirements:	105-129 VAC, 60 Hz, 3/8 A Fuse, Slo-Blo
Channel Passband Response:		Temperature Range:	0° to 50° C
fv -0.5 to fv +4.2 MHz:	+1 dB	MECHANICAL	
VSB Response		Dimensions	
fv -1.50 MHz:	-38 dB, lower channel aural	AM 40:	19 x 1-3/4 x 9-1/2 in., WxHxD
fv -2.42 MHz:	-40 dB, lower channel color	AM 60:	19 x 1-3/4 x 14-1/4 in., WxHxD
fv -3.58 MHz:	-40 dB, color carrier image	Shipping Weight	
fv -6.00 MHz:	-55 dB, lower channel visual	AM 40:	7 lbs. (Approximate)
fv + 6.00 MHz:	-55 dB, upper channel visual	AM 60:	8 lbs. (Approximate)
In Channel Carrier-To-Noise Ratio:	67 dB	Signal Connectors	
Broadband Noise:	-78 dBc	RF OUT:	Type "F"
Spurious output for A/V = -15 dB & C/V = -17 dB		IF IN:	Type "F"
In Channel:	-66 dBc	IF Out:	Type "F"
Out of Channel (50 to 1000 MHz):	-64 dBc	Audio IN:	Phono Jack
Output Impedance (14 dB Return Loss on Channel):	75 Ohm	Video IN:	Type "F"
IF		EAS/ALT Input Control:	3 Position Terminal Strip
IF Loop Level:	+35 dBmV@ 45.75 MHz	EAS/ALT IF Input:	Type "F"
IF Output Return Loss:	16 dB, over 41 to 47 MHz		
IF Input Return loss:	16 dB, over 41 to 47 MHz		
EAS/ALT Input Level:	+28 dBmV, @ 45.75 MHz		

CONTROLS AND CONNECTIONS

Operating Controls

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

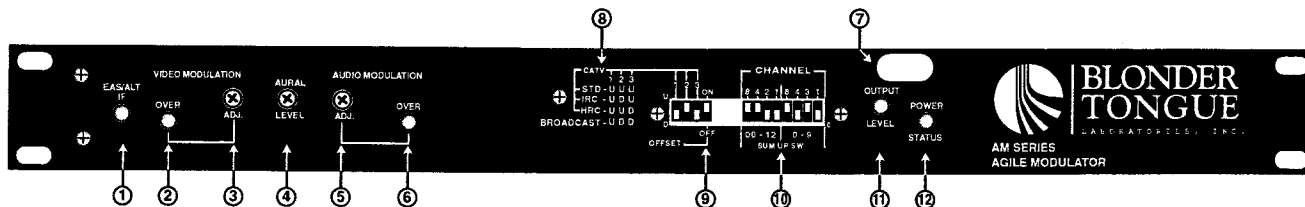


Figure 1 - Front Panel View

Connections

1. **EAS/ALT INDICATOR** - Lights Green 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. **CHANNEL NUMBER MARKER** - Attached by user for reference.
8. **OPERATING MODE SWITCH** - Positions 1, 2 & 3 used to select CATV or Broadcast mode.
9. **OFFSET SELECTOR** - Position 4 used to turn FCC offset ON or OFF.
10. **CHANNEL SELECT SWITCH** - Used to set output channel.
11. **OUTPUT LEVEL** - Simultaneously adjusts amplitude of aural and visual carriers.
12. **"POWER-ON" INDICATOR LIGHT**

All connections to the unit are made at the rear panel

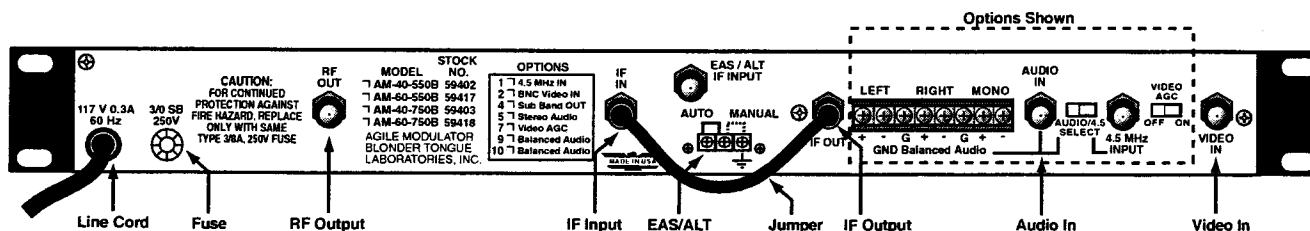


Figure 2 - Rear Panel View

UNPACKING AND INSTALLATION

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.

Unpacking and Handling

Each Modulator is shipped with all equipment assembled, wired, factory-system tested, and then packaged in an appropriate shipping container. Ensure that all accessories are removed from the container and packing material before they are discarded.

Mechanical Inspection

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

Precautions

Adherence to the initial precautions outlined in Table 1 will help prevent problems arising during initial installation and ensure optimum service of the Modulator.

Unit Mounting

Mount the unit securely in a standard 19 inch EIA rack, ensuring access to rear connections and front controls. Make sure adequate ventilation exists in the vicinity of the unit.

Preparation For Use

Plug in the 3-prong connector of the AC power cord into a suitable 117 V 60 Hz AC outlet of adequate current carrying capacity. Use appropriate cables (75 Ohm coaxial) to connect the program source to the video and audio input connectors and the RF output of the unit to the system input.

Damage in Shipment

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

Returning Product for Repair (or Credit)

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

Table 1 - Installation Precautions

Precaution	Requirement
Avoid Heat Build-up	Allow (1) EIA rack space (1-3/4") between Modulators in the equipment racks.
Ensure Easy Access to Rack Wiring	Allow a minimum of 18" clearance behind equipment rack(s)
Facilitate Servicing and Maintenance	Allow a minimum of 36" clearance in front of equipment rack(s)
Avoid Direct Heating or Air Conditioning	If unavoidable, use deflector plates
AC Power Source Outlets	Locate equipment near enough to outlets to provide power for test equipment and power tools.
Rack Support	Make certain rack supports are sufficiently rigid to support rack(s)
Building Leakage	Beware of dripping water onto equipment from leaky roofs, waveguide roof entries, and cold water pipe condensations.

Setting The Unit Output Channel

Gently pull both access door retaining clips simultaneously to expose the offset channel selector switches.

Two 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 1			
	1	2	3	4
STD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IRC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HRC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broadcast	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sub Band (optional)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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 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 below, 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. (i.e., For CH 116, you set 11 Tens and 6 ones for 116. For single digit channels, the Tens switch is set to zero.)

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

TENS	SWITCH 2			
	8	4	2	1
0 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ONES	SWITCH 2			
	8	4	2	1
0 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 =	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Examples:

☐☐☐☐☐☐☐☐ = CH 2

☐☐☐☐☐☐☐☐ = CH 58

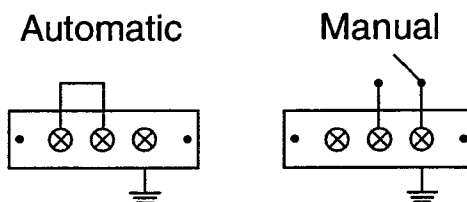
☐☐☐☐☐☐☐☐ = CH 87

☐☐☐☐☐☐☐☐ = CH 116



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 Over Modulation 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 -** Connect a suitable RF indicator such as a Field Strength Meter (tuned to the visual carrier frequency) or a Spectrum Analyzer to the RF output of the modulator or a system monitor point and adjust the Output Level control to the desired reading of the visual carrier.
- 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 +28 dBmV EAS IF signal is detected.
- MANUAL -** EAS is active with a ground connection on the manual position of the terminal strip.



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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 ref. refer to FCC regs
99	115.2750	115.2750	
14	121.2625	121.2625	
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

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

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 fiber optics receivers, transmitters, couplers and integrated receivers/distribution amplifiers (including TRAILBLAZER™, RETRO-LINX™ and TWIN STAR™ products) as well as for VideoCipher® & DigiCipher® satellite receivers, and (iii) for a period of three (3) years from the date of original purchase, with respect to all other BT products. Notwithstanding the foregoing, in some cases, the warranty on certain proprietary sub-assembly modules manufactured by third-party vendors and contained in BT products and on certain private-label products manufactured by third-parties for resale by BT are of shorter duration or otherwise more limited than the standard BT limited warranty. In such cases, BT's warranty with respect to such third-party proprietary sub-assembly modules and private-label products will be limited to the duration and other terms of such third-party vendor's warranty. In addition, certain products that are not manufactured, but are resold by BT, carry the original OEM warranty for such products.

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

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

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

All claims for shortages, defects, and non-conforming goods must be made by 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 complaint, 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. VideoCipher® & DigiCipher® are registered trademarks of Motorola Corp.