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Thank you for using our products.

**INSTALLATION INSTRUCTIONS
SUPERVISED SELF-AMPLIFIED SPEAKER STROBE
(CEILING MOUNT VERSION)**

Use this product according to this instruction manual. Please keep this instruction manual for future reference.

MODEL NUMBERS:

Speaker Strobe SA-S90-24MCC-FR Supervised Self-Amplified Speaker with Multi-Candela
Speaker Strobe SA-S90-24MCC-FW Sync/Non-Sync Strobe, Ceiling Mount

GENERAL:

The Multi-Candela Supervised Self-Amplified Speaker Strobe provides a choice of 6 different sound output levels and operates with audio input levels of 0.5 V RMS (e.g., from Wheelock’s SALL-15S or any other 0.5V-RMS audio output source Listed for Fire Protective Signaling Service) and 25 V RMS, all by means of selectable switch settings. The Low Profile design incorporates a high efficiency speaker for maximum output at minimum power across a frequency range of 400Hz to 4000Hz, and features a sealed back construction for extra protection and improved audibility. The appliance mounts onto a 4” square deep backbox with an extension ring. (See Mounting Options.) All inputs are polarized for compatibility with standard reverse polarity supervision of circuit wiring via a Control Panel.

The SA Series Multi-Candela Speaker Strobe provides four selectable light output intensities in one unit and can provide a non-synchronized strobe appliance when connected directly to a Fire Alarm Control Panel (FACP), or provide a synchronized strobe appliance when used in conjunction with a Sync Module (SM), Dual Sync Module (DSM) or Wheelock’s Power Supplies listed for synchronization. The Strobe uses a Xenon flashtube with solid-state circuitry enclosed in a rugged Lexan® lens to provide maximum visibility and reliability for effective visible signaling. The SA Series is listed for indoor use, ceiling mount only with the backboxes specified in these instructions (see Mounting Options).

NOTE: “Lexan” is a registered trademark of General Electric Company.

NOTE: All **CAUTIONS** and **WARNINGS** are identified by the symbol . All warnings are printed in bold capital letters.

WARNING: THE SPEAKER STROBE APPLIANCE IS A "FIRE ALARM DEVICE - DO NOT PAINT."

WARNING: PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE USING THIS PRODUCT. THE SUPERVISED SELF-AMPLIFIED SPEAKER STROBE MUST BE FIELD SET TO THE DESIRED SOUND OUTPUT LEVEL BEFORE IT IS INSTALLED. THIS IS DONE BY PROPERLY ADJUSTING A FOUR-POSITION SWITCH IN ACCORDANCE WITH THESE INSTRUCTIONS. INCORRECT SETTINGS WILL RESULT IN IMPROPER PERFORMANCE AND MAY DAMAGE THE PRODUCT, WHICH COULD RESULT IN PROPERTY DAMAGE AND SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS.

NOTE: THE MAXIMUM WIRE IMPEDENCE BETWEEN STROBES SHALL NOT EXCEED 35 OHMS. THE MAXIMUM NUMBER OF STROBES ON A SINGLE NOTIFICATION APPLIANCE CIRCUIT SHALL NOT EXCEED 47.

WARNING: THIS APPLIANCE WAS TESTED TO THE OPERATING VOLTAGE LIMITS OF 16-33 VOLTS USING FILTERED (DC) OR UNFILTERED FULL-WAVE-RECTIFIED (FWR) POWER FOR THE STROBE. THE AMPLIFIER WAS TESTED TO THE OPERATING VOLTAGE LIMITS OF 16-33 VOLTS REGULATED POWER. DO NOT APPLY 80% AND 110% OF THESE VOLTAGE VALUES FOR SYSTEM OPERATION.

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⚠ WARNING: CHECK THE MINIMUM AND MAXIMUM OUTPUT OF THE POWER SUPPLY AND STANDBY BATTERY AND SUBTRACT THE VOLTAGE DROP FROM THE CIRCUIT WIRING RESISTANCE TO DETERMINE THE APPLIED VOLTAGE TO THE STROBES.

SPECIFICATIONS (AMPLIFIER):

<i>Table 1A: Sound Output Level</i>	
Sound Level	Rated Reverberant dBA at 10 ft per UL 1480 for 0.5-V and 25-V Settings
6	84
5	81
4	77
3	74
2	71
1	68

NOTE: See Table 5 *Sound Output Level Selection* for use of settings “A” and “B”.

Power Input Voltage: 16.0 to 33.0 VDC, regulated
 Current Consumption: 120 mA RMS maximum
 Appliance Input Level: 0.5 V RMS or 25 V RMS (Switch selectable)
 Appliance Input Impedance: 0.5-V Setting:
 Greater than 400 Ohms, or equivalent to less than 1/1000 W (0.001 W or 1 mW) load
 25-V Setting:
 Greater than 20 kOhms, or equivalent to less than 1/32 W (0.03125 W or 31.25 mW) load

Sound pressure level measurements were made at 16 VDC with audio inputs of 0.5 V RMS in the 0.5-V setting and with 25 V RMS in the 25-V setting. Current measurements were made at 33 VDC with audio inputs of 0.5 V RMS in the 0.5-V setting and with 25 V RMS in the 25-V setting.

Reverberant dBA is a minimum UL rating based on sound measurements in a reverberant test room.

<i>Table 1B: Strobe</i>			
Regulated Voltage VDC/VRMS	Voltage Range VDC/VRMS	Candela	Mounting Options
24	16.0-33.0	15/30/75/95	A,B

NOTES:

1. The strobe will produce 1 flash per second over the "Regulated Voltage" range.

⚠ WARNING: CANDELA SETTING WILL DETERMINE THE CURRENT DRAW OF THE PRODUCT.

Table 2: UL Current Ratings (AMPS)					
Maximum RMS Current					
UL Voltage		15cd	30cd	75cd	95cd
DC	16-33.VDC	0.065	0.105	0.189	0.249
FWR	16-33.VRMS	0.110	0.170	0.280	0.375

⚠ WARNING: MAKE SURE THAT THE TOTAL RMS CURRENT REQUIRED BY ALL APPLIANCES THAT ARE CONNECTED TO THE SYSTEM'S PRIMARY AND SECONDARY POWER SOURCES, NAC CIRCUITS, SM, DSM SYNC MODULES OR WHEELOCKS POWER SUPPLIES DO NOT EXCEED THE POWER SOURCES' RATED CAPACITY OR THE CURRENT RATINGS OF ANY FUSES ON THE CIRCUITS TO WHICH THESE APPLIANCES ARE WIRED. OVERLOADING POWER SOURCES OR EXCEEDING FUSE RATINGS COULD RESULT IN LOSS OF POWER AND FAILURE TO ALERT OCCUPANTS DURING AN EMERGENCY, WHICH COULD RESULT IN PROPERTY DAMAGE AND SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS.

When calculating the total currents: Use Table 2 to determine the highest value of "RMS Current" for an individual strobe (across the expected operating voltage range of the strobe), then multiply these values by the total number of strobes; be sure to add the currents for any other appliances, including audible signaling appliances, powered by the same source and include any required safety factors.

If the peak current exceeds the power supplies' peak capacity, the output voltage provided by the power supplies may drop below the listed voltage range of the appliances connected to the supply and the voltage may not recover in some types of power supplies. For example, an auxiliary power supply that lacks filtering at its output stage (either via lack of capacitance and/or lack of battery backup across the output) may exhibit this characteristic.

⚠ CAUTION: The Speaker Strobe is not designed to be used on coded systems in which the applied voltage is cycled on and off.

LIGHT DISTRIBUTION:

Table 3A: Horizontal Plane								
Horizontal Angle (in deg.)	15cd		30cd		75cd		95cd	
	UL Min.	Typ. 15cd	UL Min.	Typ. 30cd	UL Min.	Typ. 75cd	UL Min.	Typ. 95cd
0	15.0	20.5	30.0	43.3	75.0	102.6	95.0	146.0
5	13.5	20.5	27.0	43.3	67.5	102.6	85.5	146.0
10	13.5	20.1	27.0	43.0	67.5	102.0	85.5	145.0
15	13.5	20.2	27.0	42.7	67.5	102.0	85.5	145.0
20	13.5	18.8	27.0	40.0	67.5	97.1	85.5	134.1
25	13.5	16.9	27.0	35.0	67.5	85.5	85.5	121.3
30	11.3	15.3	22.5	32.7	56.3	80.0	71.3	111.6
35	11.3	14.8	22.5	31.1	56.3	74.0	71.3	106.3
40	11.3	14.1	22.5	29.0	56.3	70.6	71.3	100.7
45	11.3	12.8	22.5	25.9	56.3	62.3	71.3	90.7
50	8.3	11.3	16.5	23.3	41.3	57.1	52.3	81.2
55	6.8	11.9	13.5	23.8	33.8	57.7	42.8	84.5
60	6.0	11.3	12.0	22.3	30.0	52.2	38.0	78.1
65	5.3	10.1	10.5	20.9	26.3	48.9	33.3	69.1
70	5.3	9.7	10.5	19.8	26.3	44.7	33.3	64.7
75	4.5	12.3	9.0	25.0	22.5	57.8	28.5	81.7
80	4.5	10.6	9.0	21.9	22.5	51.3	28.5	69.4
85	3.8	5.4	7.5	12.1	18.8	28.7	23.8	37.2
90	3.8	7.6	7.5	16.6	18.8	39.8	23.8	49.7

Table 3B: Vertical Plane								
Vertical Angle (in deg.)	15cd		30cd		75cd		95cd	
	UL Min.	Typ. 15cd	UL Min.	Typ. 30cd	UL Min.	Typ. 75cd	UL Min.	Typ. 95cd
0	15.0	20.5	30.0	43.3	75.0	102.6	95.0	146.0
5	13.5	20.5	27.0	43.3	67.5	102.6	85.5	146.0
10	13.5	18.3	27.0	38.4	67.5	93.6	85.5	127.4
15	13.5	19.0	27.0	40.6	67.5	97.4	85.5	131.9
20	13.5	18.7	27.0	40.9	67.5	99.5	85.5	132.7
25	13.5	17.4	27.0	36.9	67.5	88.5	85.5	121.9
30	11.3	16.6	22.5	34.3	56.3	81.9	71.3	114.3
35	11.3	14.4	22.5	29.2	56.3	70.2	71.3	101.5
40	11.3	13.4	22.5	26.9	56.3	65.1	71.3	92.5
45	11.3	13.0	22.5	27.0	56.3	66.5	71.3	93.1
50	8.3	10.8	16.5	21.6	41.3	51.8	52.3	74.1
55	6.8	8.7	13.5	17.9	33.8	43.0	42.8	60.2
60	6.0	8.0	12.0	16.5	30.0	40.1	38.0	55.8
65	5.3	6.4	10.5	13.2	26.3	31.5	33.3	44.8
70	5.3	6.3	10.5	13.0	26.3	31.6	33.3	44.7
75	4.5	7.3	9.0	15.3	22.5	36.9	28.5	51.9
80	4.5	5.4	9.0	11.0	22.5	27.2	28.5	37.7
85	3.8	5.0	7.5	10.6	18.8	25.8	23.8	36.0
90	3.8	4.8	7.5	9.5	18.8	23.8	23.8	33.7

SETTINGS:

The switch on the PCB (SW1) is used to select the input voltage and sound output level, see Figure 1.

Figure 1:

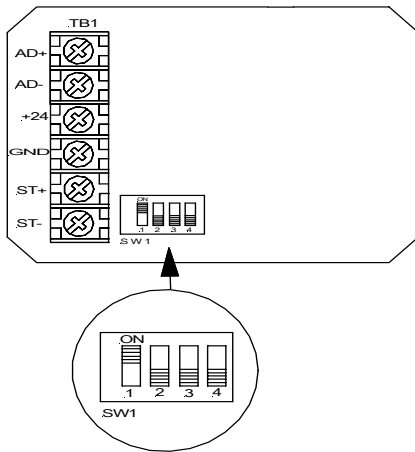


Figure 2:

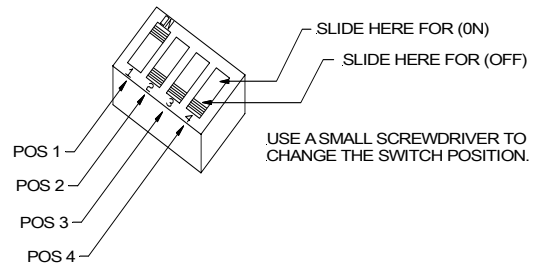


Table 4: Audio Input Voltage Mode Selection	
Audio Input Voltage Mode	Switch Settings (SW1)
	0.5 V RMS
25 V RMS	ON
	OFF

Sound Output Level	Relative Level (dB)	Switch Settings (SW1)		
		POS 4	POS 3	POS 2
A ¹	+6 (typical)	OFF	ON	OFF
B ¹	+3 (typical)	OFF	ON	ON
6 ²	0 (Reference)	OFF	OFF	OFF
5	-3 ³ (typical)	OFF	OFF	ON
4	-6 ³ (typical)	ON	ON	OFF
3	-9 ³ (typical)	ON	ON	ON
2	-12 ³ (typical)	ON	OFF	OFF
1	-15 ³ (typical)	ON	OFF	ON

NOTES

1. **These settings are not to be used in UL Listed applications** and should be used in non-UL Listed applications only when the audio input level is not at the rated value – 0.5 V RMS for the 0.5-V mode and 25 V RMS for the 25-V mode – to provide 3- or 6-dB compensation for line losses and/or low drive levels. *Using these settings while applying the rated audio input to the appliance will cause excessive distortion and increased current consumption, and it is not a recommended operating condition.*
2. This is the setting used as a reference level for the other settings in this table.
3. These are *typical* values with respect to the reference level (Sound Output Level 6: 0 dB), and are included only to assist the user in choosing a setting during installation. *However, use the values in Table 1, not these values, for the actual sound output levels.*

⚠ WARNING: DOUBLE CHECK SWITCH (SW1) SETTINGS TO MAKE SURE THEY ARE CORRECT. IMPROPER SETTINGS CAN DAMAGE THE UNIT OR RESULT IN A DISTORTED OUTPUT OR A dBA SOUND OUTPUT LEVEL THAT IS BELOW CODE REQUIREMENTS FOR PUBLIC MODE FIRE PROTECTION, WHICH COULD RESULT IN PROPERTY DAMAGE AND SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS.

WIRING DIAGRAMS:

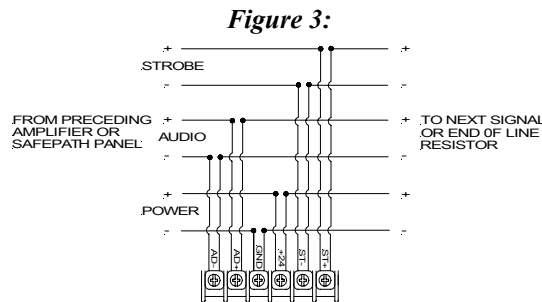
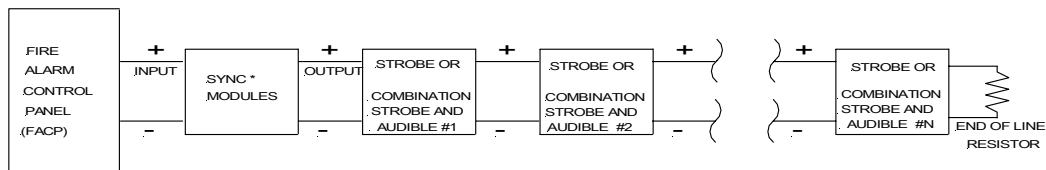


Figure 4: Sync Modules/ Sync Strobes Connection Diagram



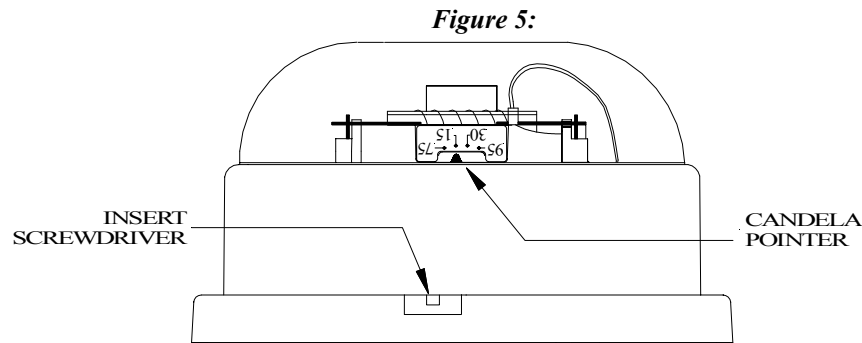
NOTE: All wiring must be all power-limited or all non-power-limited.

*Refer to Sync Module instruction sheets SM (P83123), DSM (P83177) or Wheelock’s Power Supplies for additional information.

MOUNTING PROCEDURES:

⚠ CAUTION: Check that the installed product will have sufficient clearance and wiring room prior to installing backboxes and conduit, especially if sheathed multiconductor cable or 3/4" conduit fittings are used.

1. The SA Series has an integrated Speaker Mounting Plate.
2. The Speaker Mounting Plate must be oriented correctly when it is mounted to the backbox. Turn the Speaker Mounting Plate so that the arrow above the words "Horizontal Strobe" points to the top side of the Speaker Mounting Plate.
3. First mount the Speaker Mounting Plate to the backbox. Next slide the grille over the Speaker Mounting Plate strobe and attach with (2) screws.
4. When terminating field wires, do not use more lead length than required. Excess lead length could result in insufficient wiring space for the signaling appliance.
5. To move selector switch, insert screwdriver into slot shown on the bottom side of the strobe. The setting is indicated by a pointer and can be seen on the bottom side of the lens. See Figure 5.
6. Conduit entrances to the backbox should be selected to provide sufficient wiring clearance for the installed product.
7. Do not pass additional wires (used for other than the signaling appliance) through the backbox. Such additional wires could result in insufficient wiring space for the signaling appliance.
8. Mounting hardware for each mounting option is supplied.
9. The SA Series can be flush mounted to a 4" square by 1-1/2" deep backbox with a 4" square 1-1/2" extension ring (Figure A) or surface mounted to a Surface Backbox (Figure B).
10. Use care and proper techniques to position the field wires in the backbox so that they use minimum space and produce minimum stress on the product. This is especially important for stiff, heavy gauge wires and wires with thick insulation or sheathing.



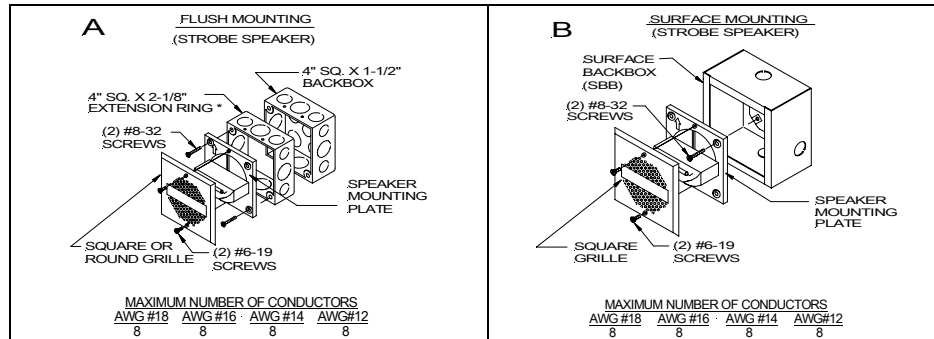
NOTE: The SA Series comes pre-set at 15cd.

⚠ WARNING: THE CANDELA SELECT SWITCH MUST BE FIELD SET TO THE REQUIRED CANDELA INTENSITY BEFORE INSTALLATION. WHEN CHANGING THE SETTING OF THE CANDELA SELECT SWITCH, MAKE CERTAIN THAT IT "CLICKS" IN PLACE. AFTER CHANGING THE CANDELA SETTING, THE APPLIANCE MUST BE RETESTED TO VERIFY PROPER OPERATION. IMPROPER SETTING OF THE CANDELA SELECT SWITCH, MAY RESULT IN OPERATION AT THE WRONG CANDELA, WHICH COULD RESULT IN PROPERTY DAMAGE AND SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS.

MOUNTING OPTIONS:

⚠ CAUTION: The following figures show the maximum number of field wires (conductors) that can enter the backbox used with each mounting option. If these limits are exceeded, there may be insufficient space in the backbox to accommodate the field wires and stresses from the wires could damage the product.

Although the limits shown for each mounting option comply with the National Electrical Code (NEC), Wheelock recommends use of the largest backbox option shown and the use of approved stranded field wires, whenever possible, to provide additional wiring room for easy installation and minimum stress on the product from wiring.



⚠ WARNING: IF A SUPERVISED SELF-AMPLIFIED SPEAKER STROBE APPLIANCE IS OPERATED WITHIN 15 INCHES OF A PERSON'S EAR, IT CAN PRODUCE A SOUND PRESSURE LEVEL THAT EXCEEDS THE MAXIMUM 120 dBA PERMITTED BY ADA AND OSHA RULES. EXPOSURE TO SUCH SOUND LEVELS CAN RESULT IN DAMAGE TO A PERSON'S HEARING.

⚠ WARNING: WHEN INSTALLING STROBES IN AN OPEN OFFICE OR OTHER AREAS CONTAINING PARTITIONS OR OTHER VIEWING OBSTRUCTIONS, SPECIAL ATTENTION SHOULD BE GIVEN TO THE LOCATION OF THE STROBES SO THAT THEIR OPERATING EFFECT CAN BE SEEN BY ALL INTENDED VIEWERS, WITH THE INTENSITY, NUMBER, AND TYPE OF STROBES BEING SUFFICIENT TO MAKE SURE THAT THE INTENDED VIEWER IS ALERTED BY PROPER ILLUMINATION, REGARDLESS OF THE VIEWER'S ORIENTATION. FAILURE TO DO SO COULD RESULT IN PROPERTY DAMAGE AND SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS.

⚠ WARNING: IF SYNCHRONIZED STROBES ARE NOT USED THEN A SMALL POSSIBILITY EXISTS THAT THE USE OF MULTIPLE STROBES WITHIN A PERSON'S FIELD OF VIEW, UNDER CERTAIN CIRCUMSTANCES, MIGHT INDUCE A PHOTOSENSITIVE RESPONSE IN PERSONS WITH EPILEPSY. STROBE REFLECTIONS IN A GLASS OR MIRRORED SURFACE MIGHT ALSO INDUCE SUCH A RESPONSE. TO MINIMIZE THIS POSSIBLE HAZARD, WHELOCK STRONGLY RECOMMENDS THAT THE STROBES INSTALLED SHOULD NOT PRESENT A COMPOSITE FLASH RATE IN THE FIELD OF VIEW WHICH EXCEEDS FIVE (5) Hz AT THE OPERATING VOLTAGE OF THE STROBES (SEE TABLE 2). WHELOCK ALSO STRONGLY RECOMMENDS THAT THE INTENSITY AND COMPOSITE FLASH RATE OF INSTALLED STROBES COMPLY WITH LEVELS ESTABLISHED BY APPLICABLE LAWS, STANDARDS, REGULATIONS, CODES AND GUIDELINES.

NOTE: NFPA 72/ANSI 117.1 provide means for determining equivalent illumination using fewer, higher intensity strobes within the same protected area.

This control unit does not generate a temporal pattern signal. If the distinctive three-pulse temporal pattern Fire Alarm Evacuation (or total evacuation) in accordance with NFPA 72, is required, the control unit must be used with appliances that can generate the temporal pattern signal. Refer to manufacturer's instruction manual for details.

⚠ CAUTION: Check the installation instructions of the manufacturers of other equipment used in the system for any guidelines or restrictions on wiring and/or locating Notification Appliance Circuits (NAC) and notification appliances. Some system communication circuits and/or audio circuits, for example, may require special precautions to assure immunity from electrical noise (e.g. audio crosstalk).

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IMPORTANT: READ SEPARATE "GENERAL INFORMATION" SHEET FOR INFORMATION ON THE PLACEMENT, LIMITATIONS, INSTALLATION, FINAL CHECKOUT, AND PERIODIC TESTING OF NOTIFICATION APPLIANCES.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: 1) Reorient or relocate the receiving antenna, 2) Increase the separation between the equipment and receiver, 3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected, and 4) Consult the dealer or an experienced radio/TV technician for help.

Limited Warranty

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