



## *SRR60 Sound Reinforcement Receiver*



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# *Users' Manual*



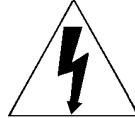
## 2 Caution Statements

WARNING: TO PREVENT FIRE OR ELECTRICAL SHOCK DO NOT EXPOSE TO RAIN OR MOISTURE

	<b>CAUTION</b> RISK OF ELECTRIC SHOCK DO NOT OPEN	
<p>CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER NO USER-SERVICEABLE PARTS INSIDE REFER SERVICING TO QUALIFIED PERSONNEL</p>		



A product and cart combination should be moved with care. Quick stops, excessive force and uneven surfaces may cause the product and cart combination to overturn.



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



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

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE.  
DO NOT OPEN THE CABINET, REFER SERVICING TO QUALIFIED PERSONNEL ONLY.

CAUTION: TO PREVENT ELECTRIC SHOCK, DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

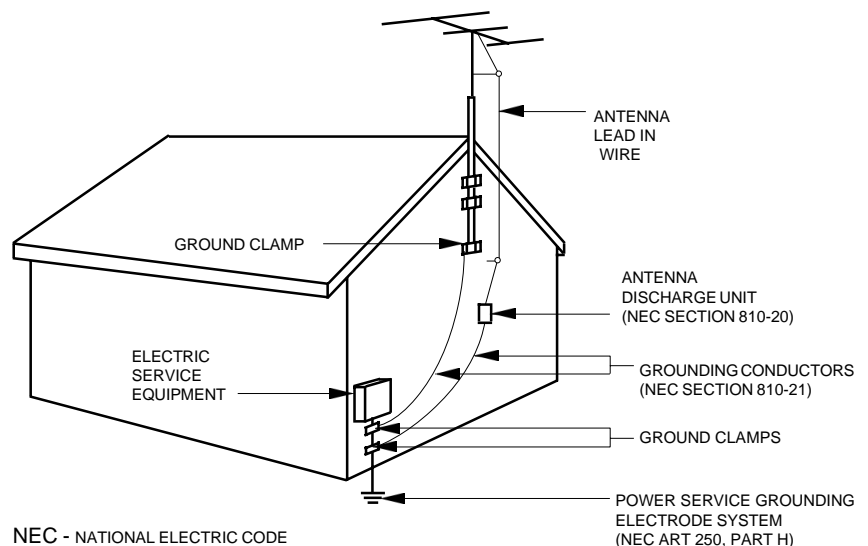
ATTENTION: POUR PREVENIR LES CHOCS ELECTRIQUES, NE PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR, UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS EN LAISSER AUCUNE PARTIE A DECOUVERT.

- 1. Read Instructions**—All the safety and operating instructions should be read before the product is operated.
- 2. Retain Instructions**—The safety and operating instructions should be retained for future reference.
- 3. Heed Warnings**—All warnings on the product and in the operating instructions should be adhered to.
- 4. Follow Instructions**—All operating and use instructions should be followed.
- 5. Cleaning**—Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleansers. Use a damp cloth for cleaning.
- 6. Attachments**—Do not use attachments that are not recommended by the product manufacturer as they may cause hazards.
- 7. Water and Moisture**—Do not use this product near water—for example, near a bathtub, wash bowl, kitchen sink or laundry tub; in a wet basement; or near a swimming pool; and the like.
- 8. Accessories**—Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious injury to a child or adult, and serious damage to the product. Use only with a cart, stand, tripod, bracket, or table recommended by the manufacturer, or sold with the product. Any mounting of the product should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.
- 9.** A product and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the product and cart combination to overturn.
- 10. Ventilation**—Slots and openings in the cabinet are provided for ventilation and to ensure reliable operation of the product and to protect it from overheating, and these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or similar surface. This product should not be placed in a built-in installation such as bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.
- 11. Power Sources**—This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supplied to your home, consult your product dealer or local power company. For products intended to operate from battery power, or other sources, refer to the operating instructions.
- 12. Grounding or Polarization**—This product may be equipped with a polarized alternating-current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug should still fail to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug. Alternate Warnings—If this product is equipped with a three-wire grounding-type plug, a plug having a third (grounding) pin, the plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding-type plug.
  - 12 a. Mise à la terre ou Polarisation**—Cet appareil est équipé avec un cordon d'alimentation à trois fils. Il est à brancher sur une prise ayant un connecteur à la terre. Assurez-vous que la connection à la terre ne manque pas.
- 13. Power-Cord Protection**—Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the product.

- 14. Outdoor Antenna Grounding**—If an outside antenna or cable system is connected to the product, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Article 810 of the National Electrical Code, ANSI/NFPA 70, provides information with regard to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See Figure A.
- 15. Lightning**—For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna or cable system. This will prevent damage to the product due to lightning and power-line surges.
- 16. Power Lines**—An outside antenna system should not be located in the vicinity of overhead power lines, other electric light or power circuits, where it can fall into such power lines or circuits. When installing an outside antenna system, extreme care should be taken to keep from touching such power lines or circuits as contact with them may be fatal.
- 17. Overloading**—Do not overload wall outlets, extension cords, or integral convenience receptacles as this can result in a risk of fire or electric shock.
- 18. Object and Liquid Entry**—Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.
- 19. Servicing**—Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
- 20. Damage Requiring Service**—Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
  - a. When the power-supply cord or plug is damaged,
  - b. If liquid has been spilled, or objects have fallen into the product,
  - c. If the product has been exposed to rain or water,
  - d. If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation,
  - e. If the product has been dropped or damaged in any way, and
  - f. When the product exhibits a distinct change in performance—this indicates a need for service.
- 21. Replacement Parts**—When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutes may result in fire, electric shock or other hazards.
- 22. Safety Check**—Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.
- 23. Wall or Ceiling Mounting**—The product should be mounted to a wall or ceiling only as recommended by the manufacturer.
- 24. Heat**—The product should be situated away from heat sources such as radiators, heat registers, stoves, or other products (including amplifiers) that produce heat.

**NOTE TO CATV SYSTEM 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.

Figure A  
 Example of antenna grounding as per National Electrical Code, ANSI/NFPA 70



NEC - NATIONAL ELECTRIC CODE

# 4 Table of Contents / Specifications

## TABLE OF CONTENTS

2	Caution Statements	10	BP60 Belt Pack Controls & Connections
3	Important Safety Instructions	11	HHM60 Microphone Controls & Connections
4	Table of Contents / Specifications	12	Battery installation & Charging
5	Purpose	13	Daily Operation
6	General Description & Installation	16	General Usage Tips
7	Additional System Components	17	Troubleshooting Guide
8	Front Panel Controls & Connections	18	Service / If you Need To Call For Help
9	Rear Panel Controls & Connections	19	Warranty

## SPECIFICATIONS for SRR60 and related system components

### SRR60 RECEIVER

**Inputs:** 5 total  
IR Microphone Channels: 2 (CH A and CH B)  
AUX Input, RCA jacks, front: 1  
AUX Input, 3.5mm jack, front: 1  
AUX Input, 3.5mm jack, rear: 1

**3 Band Equalizers:** 3 sets  
MIC Channel A: 1  
MIC Channel B: 1  
AUX1, AUX2 combined: 1

**Volume Controls, front panel:** 6  
MIC, Channel A: 1  
MIC, Channel B: 1  
AUX 1: 1  
AUX 2: 1  
AUX 3: 1  
MASTER VOLUME (speakers): 1

**Outputs:** 6  
Speaker, rear panel terminals: 4 sets  
Line level AUX, front panel: 1  
Line level AUX, rear panel: 1

**Volume Controls, recessed screwdriver set:** 6  
Trim for each speaker output: 4  
Trim for each AUX Line output: 2

**Amplifier Output Power:** 60 W maximum @ <10% THD (15W nominal per speaker output)

**Total Harmonic Distortion (THD):** < .5 %, 1 kHz, .01 to 10 W/ CH into 8 ohms

**Output Impedance, speaker outputs:** 8 ohms, nominal

**Receiver Frequency Response:** 20 Hz to 20 kHz

**Remote IR pickup sensor inputs:** 3 (1, 2, or 3 may be used depending on room size and dimensions.)

**Speaker Muting:** Contact Closure and Audio Sensing Inputs

**Safety :** Safety certified to ANSI/UL 60065, 7th ed. dated 6/30/04, rev 11/20/06  
CAN/CSA-C22.2 No. 60065:03 (2006)

**FCC:** Part 15 B

### SRR60 RECEIVER (Continued)

**Receiver Power Requirement:** 120 VAC, +/- 20 %  
50/60 Hz / 150 W Max.  
  
75 W nominal @ full output / 8 ohm speakers.  
  
150 W during fault condition such as shorted outputs.

### BP60 BELT PACK with EM60LAVALIERE MIC

Channels: 2 user selectable  
  
IR Subcarrier Frequencies: CH 1 - 2.06 MHz  
CH 2 - 2.56 MHz  
  
Battery Current: mA low (LO): 100 mA  
mA high (HI): 160 mA  
  
Battery Type: AA, Ni-MH rechargeable, (2 used)  
minimum of 2000 mAH  
  
Charging Time: Approx 12 - 14 hours to charge depleted 2100 mAH cells using supplied charger.  
  
Microphone Gain: User Adjustable - access inside battery compartment

### HHM60 HAND HELD MICROPHONE

Channels: 2 user selectable  
  
IR Subcarrier Frequencies: CH 1 - 2.06 MHz  
CH 2 - 2.56 MHz  
  
Battery Current: mA low (LO) - 230 mA  
mA high (HI) - 350 mA  
  
Battery Type: AA, Ni-MH rechargeable, (2 used)  
minimum of 2000 mAH  
  
Charging Time: Approx 12 - 14 hours to charge depleted 2100 mAH cells using supplied charger.  
  
Microphone Gain: Set by factory

**PURPOSE**

In a typical classroom environment, a teacher in front of the room lectures to a room filled with 30 or 40 students. Those students in the first few rows can easily hear what the teacher is saying, but those further back in the classroom frequently find that hearing the teacher over the ambient noise of the room can be considerably more difficult. This frequently leads to lack of comprehension, inattention, disorder, teacher fatigue, and a generally less than ideal learning environment.

The R. L. Drake SRR60 Sound Reinforcement Receiver and associated system microphones, IR sensors, and speakers, successfully addresses this problem by supplying the teacher with a lavalier microphone which transmits his or her voice by infrared (IR) signals to sensors placed at strategic locations around the classroom. These sensors pick up the infrared signals and feed them to the SRR60 Receiver which, in turn detects and amplifies them and feeds the teacher's voice to loudspeakers placed in such a way as to provide equal sound volume to all points in the room. In this way, all students in the room have equal access to what

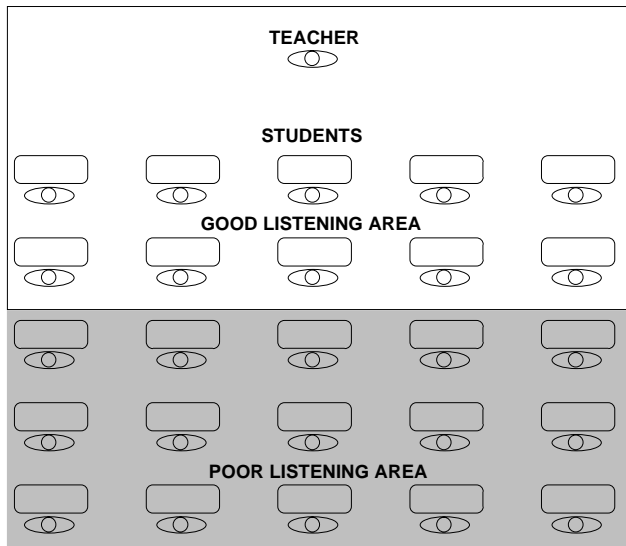
the teacher is saying, which greatly improves attentiveness and comprehension for those students farthest from the teacher, which in turn results in less teacher stress.

A hand held IR microphone is typically used with the system and can be passed to students who are responding to questions, or are otherwise contributing in class discussions. The SRR60 Receiver also accepts external audio inputs from various audio-visual aids such as CD and DVD players, VCRs, TVs and computers.

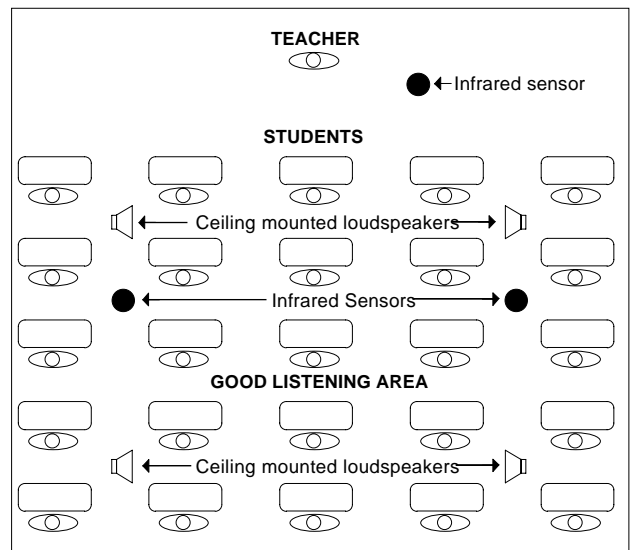
Two audio outputs are provided for feeding audio recorders, or assistive listening transmitters to accommodate those with impaired hearing.

While the SRR60 was designed with classrooms in mind, it will provide just as great a benefit when used in any similar environment such as meeting rooms, large conference rooms, churches, etc.

**TYPICAL CLASSROOM**



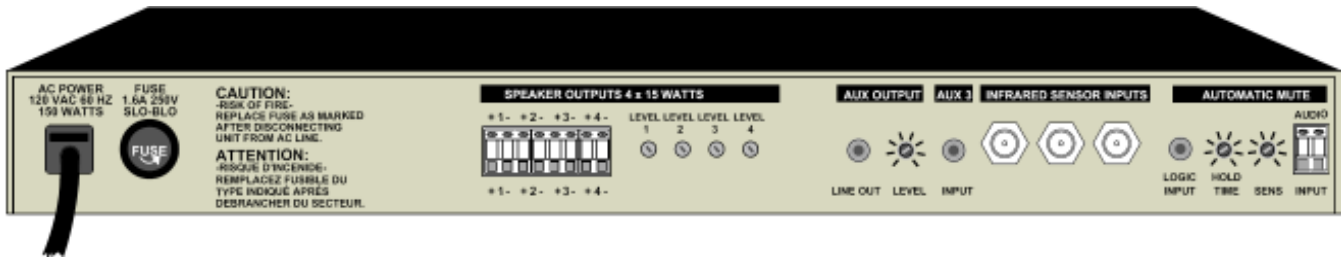
**CLASSROOM WITH SRR60 SYSTEM**



## 6 General Description & Installation



*SRR60 Sound Reinforcement Receiver Front View*



*SRR60 Sound Reinforcement Receiver Rear View*

### GENERAL DESCRIPTION

The R.L. Drake model SRR60 is a professional quality Sound Reinforcement Receiver which accepts audio modulated infrared (IR) signals from up to two separate IR transmitters, such as hand held and/or lavalier microphones. The SRR60 can accommodate up to three external infrared sensors, statically placed throughout a classroom or other similar facility, which detect the transmitted IR microphone signals. The SRR60 demodulates these signals, provides audio shaping by means of two, three-band equalizers, one for each IR transmitter, and provides up to 15 watts of audio output to each of four external speakers placed throughout the classroom or other facility.

The SRR60 can also accept up to three additional audio sources for connection to audio/visual equipment such as CD or cassette players,

VCRs, DVD players, TVs, computers, etc. An additional three-band equalizer is provided for audio shaping of two of the three external audio sources.

Two AUX audio outputs are also provided for connection to assistive listening transmitters or to audio recording devices.

When connected to an external public address system, the SRR60 can be automatically or manually muted whenever this public address system is active.

### INSTALLATION

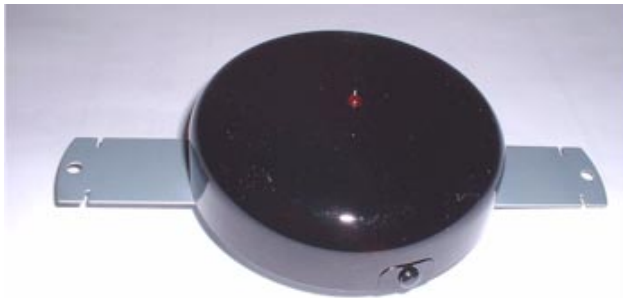
It is recommended that the SRR60 Sound Reinforcement Receiver be installed by a qualified installer. Once installed, this manual covers the required set up and also provides instructions for the day to day use of the system.

### **BP60 Belt Pack & EM60 Lavalier Mic/IR Emitter**



The lavalier microphone/IR emitter should be worn at the collarbone level by the instructor. It captures the wearer's voice and sends it to the battery powered belt pack. The belt pack uses the audio to modulate an RF signal which, in turn, modulates an IR emitter in the lavalier unit. Thus, the IR emitter bathes the room with the IR signal which is picked up by IR60 sensors strategically placed throughout the room. It is capable of transmitting on either of two channels so that two microphones can be in use in the same room without interfering with each other.

### **IR60 Dome Infrared Sensor**



The IR60 Dome Sensor contains six infrared sensor diodes. Its designed to be installed at a strategic location in a classroom, usually on the ceiling, to receive the IR signals from the hand held and lavalier microphones. The output of the device is an RF signal which is available at an "F" type connector on the back of the unit. The output RF signal is forwarded to the SRR60 receiver through RG59 75 ohm coaxial cable. The SRR60 receiver can accept input from up to three of these devices.

### **RMB60 Rack Mount Brackets for SRR60 Receiver**



Rack mount brackets are available if it is desirable to install the SRR60 receiver in a rack cabinet. The SRR60 Receiver is pictured below with the brackets installed.



### **HHM60 Hand Held IR Microphone**



The HHM60 is a battery powered hand held infrared microphone. When turned on, it captures the users voice and transmits it via an IR signal to IR60 sensors mounted at various locations around the room. IR emitters are located at the bottom end of the microphone and near the top opposite the power switch, so it is important that at least one of these locations is not covered when in use. The HHM60 is capable of transmitting on either of two channels so that two microphones can be in use in the same room without interfering with each other.

### **BC60 Battery Charger for Microphones**

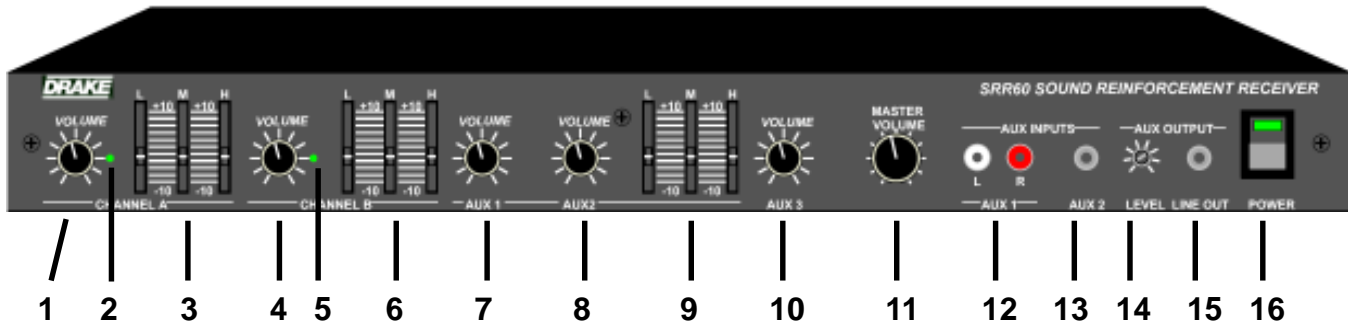


This battery charger plugs into the HHM60 or BP60 unit to charge the AA size Ni-MH batteries installed in them. Two outputs are provided so one charger can charge two microphones at once.

**Do not attempt to charge Ni-Cd batteries, or other rechargeable cells with less than 2000 mAh capacity, with this unit since the charging rate would be too high for them.**

**UNDER NO CIRCUMSTANCES SHOULD THIS UNIT (OR ANY CHARGER) BE USED TO CHARGE ALKALINE BATTERIES!!**

## 8 Front Panel Controls & Connections



**1. CHANNEL A VOLUME** - This control varies the volume of audio on the “A” channel relative to audio on the other audio input channels. The SRR60 “A” channel receives a microphone set to CH 1.

**2. CHANNEL A SIGNAL INDICATOR** - This green LED lights when a signal is being received from the microphone set for channel 1.

**3. CHANNEL A THREE BAND EQUALIZER** - The equalizer allows adjustment of the frequency response of the channel “A” audio to best suit the instructor’s voice characteristics. The “L” slider adjusts the bass response, the “M” slider adjusts the midrange response, and the “H” slider adjusts the treble response. Each slider allows a plus or minus 10 dB adjustment of its particular frequency range.

**4. CHANNEL B VOLUME** - This control varies the volume of audio on the “B” channel relative to audio on the other audio input channels. The SRR60 “B” channel receives a microphone set to CH 2.

**5. CHANNEL B SIGNAL INDICATOR** - This green LED lights when a signal is being received from the microphone set for channel 2.

**6. CHANNEL B THREE BAND EQUALIZER** - The equalizer allows adjustment of the frequency response of the channel “B” audio to best suit the instructor’s voice characteristics. The “L” slider adjusts the bass response, the “M” slider adjusts the midrange response, and the “H” slider adjusts the treble response. Each slider allows a plus or minus 10 dB adjustment of its particular frequency range.

**7. AUX 1 VOLUME** - This control varies the volume of audio from the AUX 1 input relative to audio on the other audio input channels.

**8. AUX 2 VOLUME** - This control varies the volume of audio from the AUX 2 input relative to audio on the other audio input channels.

**9. AUX 1 & 2 THREE BAND EQUALIZER** - The equalizer allows adjustment of the frequency response of the AUX 1 & AUX 2 audio to best suit the

instructor’s voice characteristics. The “L” slider adjusts the bass response, the “M” slider adjusts the midrange response, and the “H” slider adjusts the treble response. Each slider allows a plus or minus 10 dB adjustment of its particular frequency range.

**10. AUX 3 VOLUME** - This control varies the volume of audio from the AUX 3 input relative to audio on the other audio input channels.

**11. MASTER VOLUME** - The master volume control varies the volume of all audio inputs, keeping them in the proportion set with the Channel A, Channel B, and AUX 1, 2 and 3 volume controls.

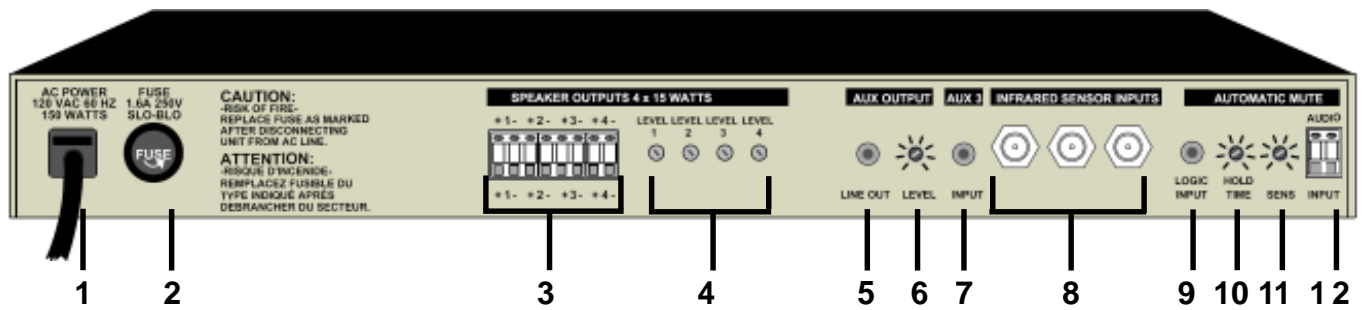
**12. AUX 1 INPUT** - The AUX 1 input connectors accept stereo audio input from such devices as CD players, VCR/DVD players, computers, etc. These are RCA Phono type connectors. The white connector is for the left input and the red one is for the right input.

**13. AUX 2 INPUT** - The AUX 2 input connector is a 3.5 mm female audio connector and accepts monaural audio input from external devices.

**14. AUX OUTPUT LEVEL** - This adjustment controls the output level at the front panel LINE OUT jack. The relative audio level of all of the audio sources which were set by the other front panel volume controls is maintained as this adjustment is varied.

**15. LINE OUTPUT** - The line output jack is intended to provide audio output for such devices as cassette recorders, DVD recorders, computers, or assistive listening transmitters. The audio level at this 3.5 mm female audio connector is governed by the AUX OUTPUT LEVEL control described in 14 above.

**16. POWER** - The POWER switch turns the receiver’s mains voltage supply on and off. When power is turned on, the green LED on the switch is illuminated.



**1. POWER CORD** - The power cord connects the SRR60 Receiver to standard 120 VAC 60 Hz power.

**2. FUSE** - The fuse holder is in series with the AC power line. If fuse replacement is necessary, use a 1.6 amp 250 V slo-blo fuse. Rotate the fuse holder counterclockwise to remove the fuse when necessary.

**3. SPEAKER OUTPUT CONNECTIONS** - The speaker output connector consists of 8 screw type terminals, with a "+" and a "-" terminal for each of four speakers.

To connect a speaker wire, use a screw driver to loosen the screw on the appropriate terminal, insert the speaker wire, and tighten the screw on the inserted wire. Make sure the insulation is stripped from the last 1/4 inch of the wire before inserting it in the terminal.

Each "+" and "-" pair of terminals is labeled with a number. The number of the terminal pair corresponds with the number of one of the Speaker Output Level controls to the right of the connector.

When attaching speaker wires, it is very important to observe the polarity. A speaker with the wires attached with the polarity reversed with respect to the other speakers will produce sound which is out of phase with the other speakers, resulting in sound cancellation (dead spots) in various locations throughout the room.

**4. SPEAKER OUTPUT LEVEL CONTROLS** -

These controls adjust the relative volume of the corresponding speaker. LEVEL control 1 controls the speaker connected to "+" and "-" terminals labeled 1, LEVEL control 2 corresponds to terminal pair 2, etc. These controls should be adjusted so that the sound distribution around the room is uniform. In some cases, it may be necessary to reduce the volume from the speakers nearest the instructor somewhat to avoid acoustic feedback, which can produce a howl or squeal.

**5. AUX OUTPUT LINE OUT CONNECTOR** - The Line Out connector is a 3.5 mm female audio connector, and produces audio output which can be used for audio recording devices such as cassette recorders or computers, or for assistive listening transmitters.

**6. AUX OUTPUT LEVEL** - This screwdriver adjustable control varies the output of the AUX OUTPUT LINE OUT connector described in "5" above.

**7. AUX 3 INPUT CONNECTOR** - This is a 3.5 mm female audio input connector which is intended for inputting stereo audio from an external source such as a cassette tape, CD, or DVD player, a TV, or a computer. The audio input level for this jack is controlled by the AUX 3 VOLUME control on the front panel.

**8. INFRARED SENSOR INPUT** - These three female "F" connectors accept input from up to three infrared sensors placed throughout the classroom. The actual signals fed into these connectors are 2 to 3 MHz RF signals.

**9. LOGIC INPUT** - Grounding the center conductor of this RCA phono connector will mute the SRR60.

**10. HOLD TIME** - When the SRR60 is muted by external audio, this screwdriver adjustable control varies the length of time between the cessation of external audio and the unmuting of the SRR60. The approximate range is 1 second when fully CCW to approximately 15 seconds when fully CW.

**11. SENS** - This screwdriver adjustable control varies the audio level sensitivity at the AUDIO INPUT terminals required to mute the SRR60 from an external audio source. The approximate range is 90 volts when fully CCW to 5 volts when fully CW.

**12. AUDIO INPUT** - Audio from an external source such as a public address system is fed to these terminals for the purpose of muting the SRR60 whenever the external source is active. (See items 10 and 11 above.)

## 10 BP60 Belt Pack Controls & Connections



1 2 3 4

### 1. **EMITTER CONNECTOR** -

The Lavalier Mic/IR Emitter plugs into this connector as shown in the photo at right.



### 2. **POWER ON LIGHT** - This

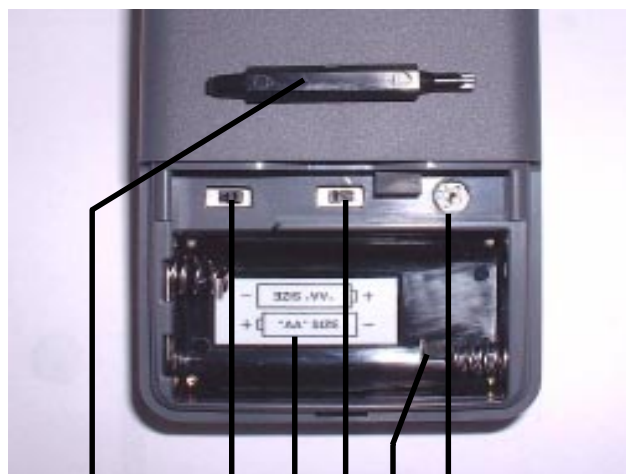
LED is illuminated green whenever charged batteries are installed and the POWER switch is turned on. When batteries are low, the color will change to red.

3. **POWER SWITCH** - This switch turns battery power on and off.

4. **BATTERY CHARGE CONNECTOR** - The BC60 Battery Charger plugs into this connector to charge the installed Nickel Metal Hydride (Ni-MH) batteries. Do not attempt to use this charger if Nickel Cadmium (Ni-Cd) batteries are installed as the charging rate is too high for them. **UNDER NO CIRCUMSTANCES SHOULD THE CHARGER BE USED IF ALKALINE OR CARBON ZINC BATTERIES ARE INSTALLED!**

5. **ADJUSTMENT TOOL** - This tool nests just above the Channel Switch (8) and Mic. Gain controls (10), and is used to set the Power and Channel switches and to adjust the Mic. Gain control.

6. **LO HI POWER SWITCH** - This switch is used to adjust the power applied to the IR transmitter in the Lavalier mic/IR transmitter. Setting the switch on LO (left) will consume less battery power but will give somewhat less IR range. Setting the switch on HI (right) will extend the IR range, but will cause the batteries to discharge sooner.



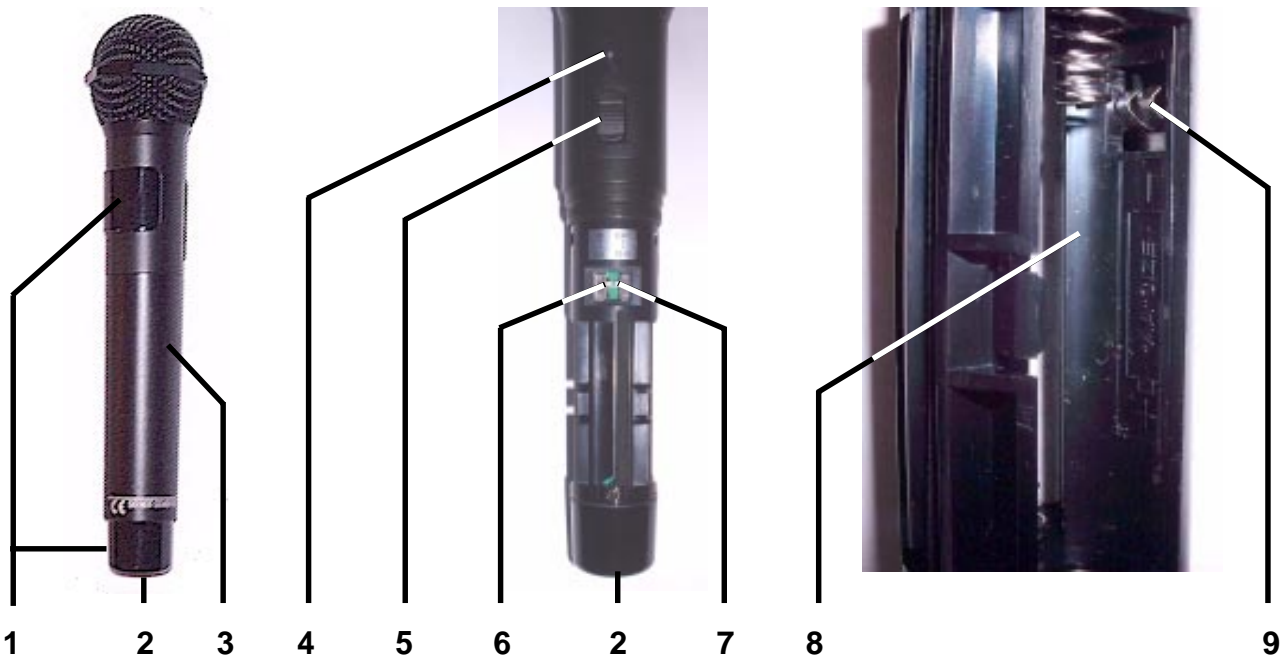
5 6 7 8 9 10

7. **BATTERY COMPARTMENT** - The battery compartment is designed to hold two "AA" sized batteries. Nickel Metal Hydride (Ni-MH) batteries should be used so that they can be recharged without taking them out of the unit. Nickel Cadmium (Ni-Cd) batteries can be used if they are removed for recharging using an external charging system. Carbon zinc or alkaline batteries can be used in a pinch, but **NO ATTEMPT SHOULD BE MADE TO RECHARGE THEM!**

8. **CHANNEL SWITCH** - The channel switch selects between channel 1 (A) and channel 2 (B). Units are shipped with the switch set to channel 1 (A). If channel 1 is selected, the CHANNEL A LED on the SRR60 Receiver will light and the CHANNEL A Volume and Equalizer controls will be used. If channel 2 is selected, the SRR60 CHANNEL B controls will be active. If two microphones are used it is important that one of them be on channel 1 and the other on channel 2 so that they don't interfere with each other.

9. **CHARGE CONTACT** - The battery compartment charge contact must make electrical contact with the Nickel Metal Hydride (Ni-MH) battery installed in this location so that charging can occur. It will be necessary to remove approximately 1/4 inch of insulation from the battery installed in this location. If this is not done, the batteries will not recharge when the charger is plugged in.

10. **MIC. GAIN** - This control varies the level of modulation of the signal that occurs when the lavalier wearer is speaking. Too low a setting will result in inadequate audio output from the speakers. Too high a setting can result in acoustic feedback (howl) or audio distortion. The correct setting must be determined by experimentation and may vary from one instructor to another.



**1. INFRARED TRANSMITTERS** - The HHM60 has two locations for the IR transmitters. One at the bottom of the microphone and one near the top. It is important to keep one of these areas uncovered when the microphone is in use so that the IR signals will reach the sensor.

**2. BATTERY CHARGING CONNECTOR** - This connector is located on the bottom of the unit. The BC60 Battery Charger plugs into this connector to charge the installed Nickel Metal Hydride (Ni-MH) batteries. Do not attempt to use this charger if Nickel Cadmium (Ni-Cd) batteries are installed as the charging rate is too high for them. *UNDER NO CIRCUMSTANCES SHOULD THE CHARGER BE USED IF ALKALINE OR CARBON ZINC BATTERIES ARE INSTALLED!*

**3. BATTERY COMPARTMENT SLEEVE** - This sleeve protects the batteries and microphone adjustments. To remove it, unscrew it by rotating it counterclockwise.

**4. POWER LED** - This LED lights green when charged batteries are installed and the power switch is turned on. The color changes to red when batteries are low.

**5. POWER SWITCH** - This switch turns the microphone on and off.

**6. LO HI POWER SWITCH** - This switch is used to adjust the power applied to the IR transmitters. Setting the switch on LO (down) will consume less battery power but will give somewhat less IR range.

Setting the switch on HI (up) will extend the IR range, but will cause the batteries to discharge sooner.

**7. CHANNEL SWITCH** - The channel switch selects between CH 1 and CH 2. If CH 1 is selected, the CHANNEL A LED on the SRR60 Receiver will light and the CHANNEL A Volume and Equalizer controls will be used. If CH 2 is selected, the SRR60 CHANNEL B controls will be active. The units are shipped with the switch in the CH2 (B) position. If two microphones are used it is important that one of them be on CH 1 and the other on CH 2 so that they don't interfere with each other.

**8. BATTERY COMPARTMENT** - The battery compartment is designed to hold two "AA" sized batteries. Nickel Metal Hydride (Ni-MH) batteries should be used so that they can be recharged without taking them out of the unit. Nickel Cadmium (Ni-Cd) batteries can be used if they are removed for recharging using an external charging system. Carbon zinc or alkaline batteries can be used in a pinch, but *NO ATTEMPT SHOULD BE MADE TO RECHARGE THEM!*

**9. CHARGE CONTACT** - The battery compartment charge contact must make electrical contact with the Nickel Metal Hydride (Ni-MH) battery installed in this location so that charging can occur. If new cells are purchased at retail, it will be necessary to remove approximately 1/4 inch of insulation from the battery installed in this location. If this is not done, the batteries will not recharge when the charger is plugged in. Do not attempt to charge other than the specified Ni-MH cells.

# 12 Battery Installation & Charging

## **Battery Preparation (batteries from retail source)**

For both the HHM60 Hand Held Microphone, and the BP60 Belt Pack, it will be necessary to remove approximately 1/2 inch of insulation from the negative end of one of the two batteries which will be installed in each unit. This must be done so that the CHARGE CONTACTS will make contact with them. This is shown in the following photo.

### **Insulation Removed from negative end**

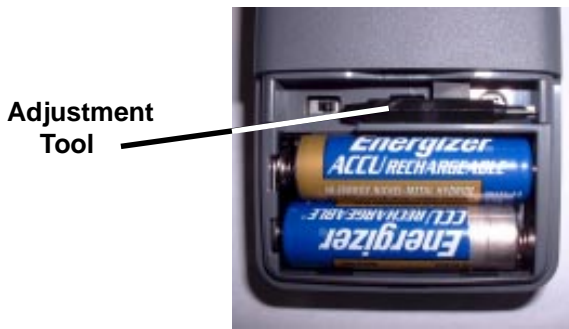


## **Installation in BP60 Belt Pack**

Insert a "AA" size Ni-MH rechargeable battery with the insulation removed as shown above, in the BP60 battery compartment location containing the CHARGE CONTACT, observing the polarity as shown below.



Then insert the other battery, again observing the polarity. Note that it is not necessary to remove the insulation from the negative end of the second battery. See the following photo.



Using the ADJUSTMENT TOOL, set the LO HI switch to LO (left), the CHANNEL SWITCH to CH 1 (left) and set the MIC.GAIN control to approximately 50% of its rotation.

Then return the ADJUSTMENT TOOL to its storage location, replace the battery compartment cover, and connect the battery charger to the CHG connector. Make sure that the POWER switch is off.

Plug the charger into a 120 VAC 60 HZ power source and allow the unit to charge for approximately 12 hours.

## **Installation in HHM60 Hand Held Microphone**

Insert a "AA" size rechargeable battery with the insulation removed (as shown opposite) in the HH60 battery compartment location with the CHARGE CONTACT, observing the polarity as shown below.

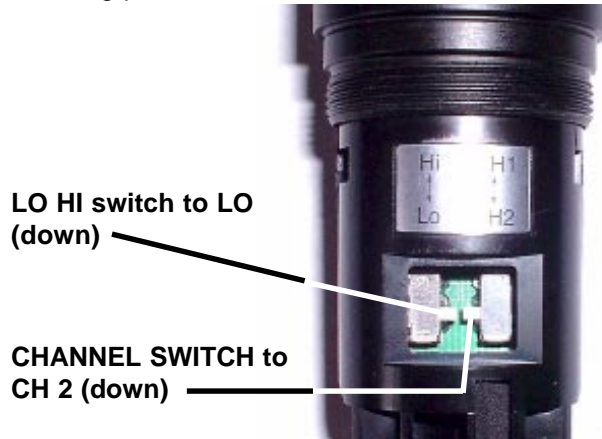
### **CHARGE CONTACT**



Then insert the other battery, observing the polarity. Note that it is not necessary to remove the insulation from the negative end of the second battery. See the following photo.



Set the LO HI switch to LO (down) and set the CHANNEL SWITCH to CH 2 (down). See the following photo.



Replace the battery compartment sleeve by screwing it on, rotating it clockwise until snug.

Make sure that the POWER SWITCH is off.

Then connect the battery charger to the CHARGING CONNECTOR, located on the bottom of the unit. (See item 2, page 11.) Plug the charger into a 120 VAC 60 Hz power source and allow the unit to charge for approximately 12 hours.

## **IMPORTANT!**

**DO NOT ATTEMPT TO CHARGE ALKALINE, CARBON ZINC, OR NICKEL CADMIUM BATTERIES!**

**BP60 Belt Pack & Lavalier Mic/IR Emitter**

1. Position the Lavalier microphone/IR emitter at the clavicle (collar bone) level either by clipping onto the instructor’s clothing, or by using the supplied lavalier lanyard. It is important that the openings in the unit are facing outward so that IR signals will not be blocked. See Photo below.



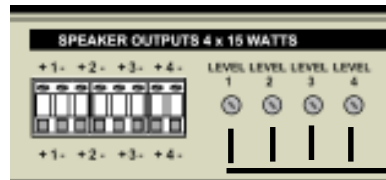
2. Remove the charger cord from the Belt Pack and remove the charger from the AC line.
3. Plug the Lavalier microphone connector into the Belt Pack EMITTER socket.
4. Secure the Belt Pack to an article of clothing such as a belt, pocket, or other convenient location using the clip on the back.
5. Turn the POWER switch on the Belt Pack to ON. The green POWER light should illuminate.
6. The BP60 is now ready for use.
7. At the end of the day, the belt pack should be turned off and reconnected to the charger so that it will be ready for use the next day.

**HHM60 Hand Held Microphone**

1. Remove the charge cord from the unit and remove the charger from the AC line.
2. Turn on the POWER switch. The green POWER LED should illuminate.
3. The unit is now ready to operate.
4. At the end of the day, the unit should be turned off and reconnected to the charger and the charger should be reconnected to the AC line so that the HHM60 will be ready for use the next day.

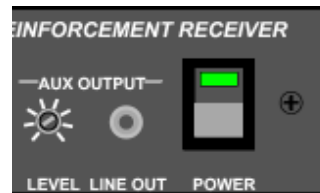
**SRR60 Receiver First Time Use - Level Setup**

1. Preset the rear panel SPEAKER OUTPUT LEVEL controls 1 through 4 to 100% of their clockwise rotation.



Speaker Output Level Controls

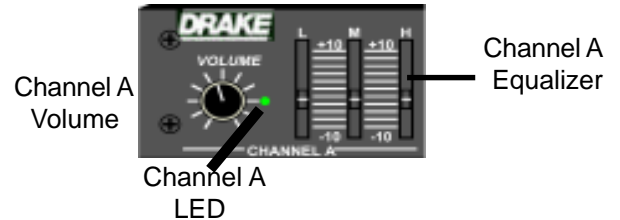
2. Preset the MASTER VOLUME to approximately 60% of its rotation. (About 1:00 o'clock.)
3. Plug the SRR60 into a 120 VAC 60 Hz power receptacle and turn it on using the front panel POWER switch. The green LED on the switch should light.



Power Switch

**CHANNEL A**

1 Turn on the Belt Pack POWER switch. The POWER LED on the Belt Pack should light. If CH 1 on the Belt Pack was selected as described on page 12, the green CHANNEL A LED on the SRR60 receiver should light. If it does not, check that the lavalier microphone/IR transmitter is positioned correctly and is not covered by clothing.



Channel A Volume

Channel A Equalizer

Channel A LED

2 While talking in a normal voice, adjust the CHANNEL A VOLUME until your voice is barely audible from the speakers in the room. This should correspond to a comfortable level for others. Advancing the volume too much may result in feedback, or contribute to student fatigue. Further volume adjustment should be made with the Master Volume control after setup is complete.

3 Then adjust the CHANNEL A equalizer “L”, “M”, and “H” sliders for most natural audio quality. These settings may vary considerably from one instructor to another depending on the characteristics of the individual’s voice. The equalizer can also be used to reduce feedback when higher volume levels are needed.

The BP60 has an internal microphone gain control that is accessible after removing the battery compartment cover. Use this adjustment, if necessary, if there is not enough range with the CHANNEL A VOLUME control on the SRR60 front panel.

# 14 Daily Operation (continued)

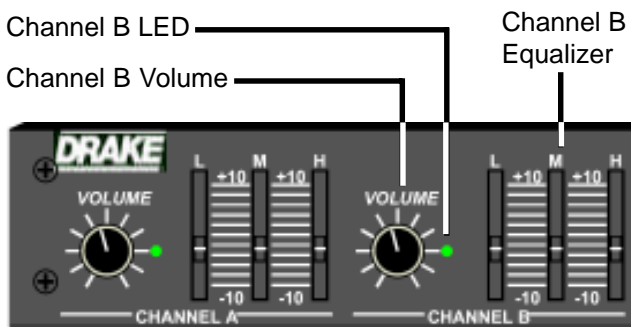
## INDIVIDUAL SPEAKER LEVELS

If one area of the room has too much volume and/or microphone feedback, use the individual speaker level adjustments (rear panel recessed) to reduce the appropriate speaker. Always start with all speaker outputs at max level (full CW viewing rear panel).

## CHANNEL B

1. Turn off the BP60 Belt Pack, and turn on the HHM60 Hand Held Microphone. Its POWER LED should light. If its CHANNEL SWITCH is set to CH 2 as described on page 12, the CHANNEL B LED on the SRR60 Receiver should light. If it does not, make sure that the IR lenses at the top and bottom of the microphone are not covered.

2. While talking into the HHM60 in a normal voice, adjust the B CHANNEL volume until it is at the same level as obtained when CHANNEL A was adjusted with MASTER VOLUME control set at 60%.



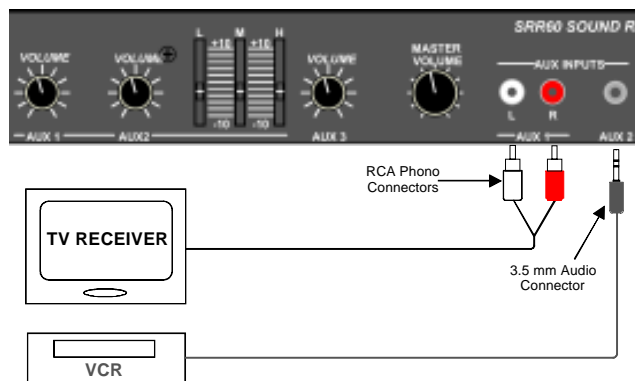
Final volume adjustment should be made with the MASTER VOLUME after setup is complete.

3. Then adjust the CHANNEL B equalizer for the most natural sounding audio using the same technique as used for channel A. The equalizer can also be used effectively to reduce feedback when higher volume levels are required.

## AUX INPUTS

1. The SRR60 Receiver can accept stereo input from external devices such as VCRs, DVD players, TVs, etc. by means of the AUX 1 and 2 input receptacles on the front panel, and the AUX 3 input on the rear panel. AUX 1 and 2 inputs share a common equalizer, but have separate VOLUME controls. AUX 3 has its own VOLUME control, but has no equalizer.

2. To utilize the AUX 1 and 2 inputs, run patch cables from the line audio output connectors of the devices in question to the front panel AUX connectors as shown in the example diagram at the top of the next column.

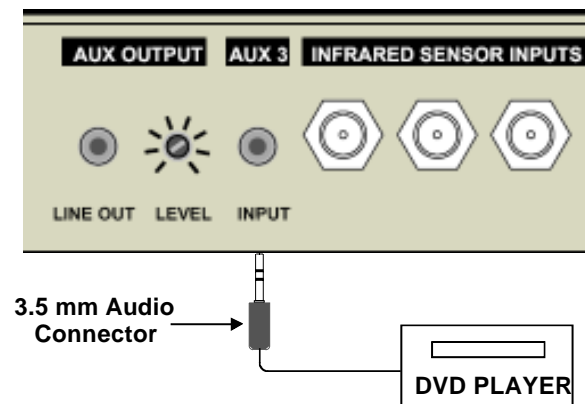


3. Turn on the device connected to AUX 1 (a TV in the above example) and adjust the AUX 1 VOLUME until the audio from the device is at a comfortable volume level throughout the room. It should be at approximately the same level as the voice level set from the Lavalier microphone.

4. Adjust the AUX 1 and 2 equalizer "L", "M", and "H" sliders for the most natural sound. Then turn off the device connected to AUX 1, and turn on the device connected to AUX 2 (a VCR in the above example).

5. Adjust the AUX 2 VOLUME for a comfortable volume level throughout the room. Since AUX 1 and AUX 2 share the same equalizer, some compromise may need to be made in the equalizer setting to obtain the most pleasing sound from both AUX 1 and AUX 2 connected devices. Then turn off the AUX 2 device.

6. To utilize the AUX 3 input, run a patch cable from the device in question (a DVD player in our example) to the AUX 3 receptacle on the rear panel as shown in the following illustration.

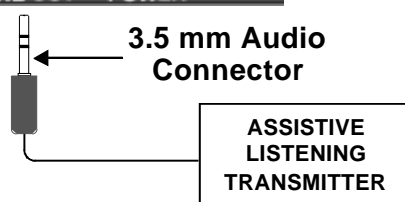
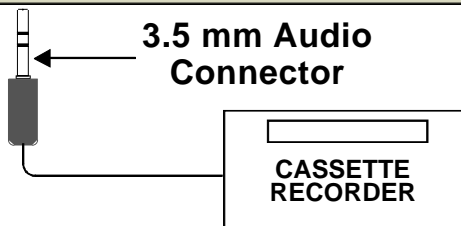
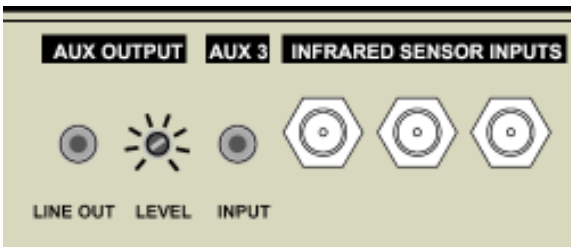


7. Turn on the device and adjust the front panel AUX 3 VOLUME control for approximately the same audio level as perviously set with the other devices. There is no equalizer for this input so no other adjustment for AUX 3 will be necessary.

**AUX OUTPUT**

The AUX output connectors on the front and rear panels, provide two independent audio outputs which may be used to drive such audio devices as cassette recorders, computers, or assistive listening transmitters.

1. Connect the audio devices to the front panel and rear panel AUX OUTPUT LINE OUT connectors using patch cables with 3.5 mm Audio connectors as shown in the following illustrations.



2. With the SRR60 receiver operating, insure that at least one audio source is providing sound output from the speakers in the classroom at the desired volume.
3. Then adjust the front and rear panel AUX OUTPUT LEVEL controls so that the respective devices connected to the AUX OUTPUT connections are receiving audio at the proper level. Note that turning the OUTPUT LEVEL controls up too far may result in audio distortion in the connected devices.

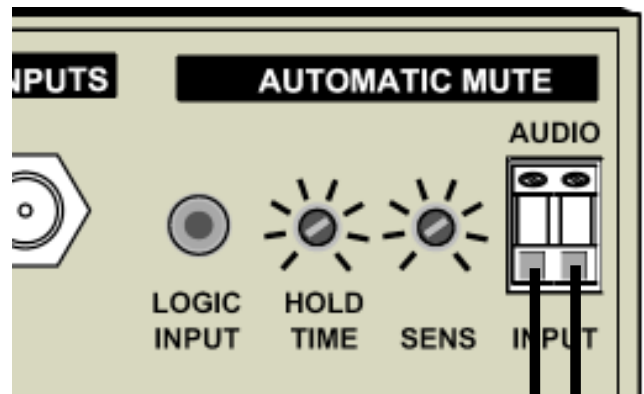
**MASTER VOLUME**

The MASTER VOLUME control varies the speaker volume of all sources proportionally. If all of the individual levels are set correctly, they will all have a comfortable level with the same 50 - 75% setting of the MASTER VOLUME. It provides a convenient means of increasing or decreasing the volume of all audio sources simultaneously to compensate for variations in ambient noise in the classroom. It will not change the relative volume of the individual audio sources with respect to each other.

The MASTER VOLUME control has no effect on the front panel and rear panel AUX output levels.

**MUTING**

If the SRR60 system is being used in a facility that has a public address (PA) or paging system, it may be desirable to mute it during the time that the external system is active with announcements etc. This can be accomplished by attaching audio from the external system to the SRR60 as shown in the following illustration.



TO AUDIO  
FROM PA  
SYSTEM

When attached as shown, and with the PA system active, adjust the SENS control clockwise until the SRR60 mutes (no audio output from the SRR60 connected speakers).

When audio from the PA system stops, the SRR60 will unmute with a delay time which is determined by the setting of the HOLD TIME control. The further clockwise the control is turned, the longer the time will be between the time the external audio stops and the SRR60 unmutes. The approximate delay time will range from 1 second with the control fully CCW to 15 seconds with the control fully CW.

Muting may be accomplished manually by grounding the center conductor of the LOGIC INPUT connector.

### **AT THE END OF THE DAY:**

1. Turn off the SRR60 Receiver and any external equipment connected to it such as TVs, DVD players, assistive listening transmitters, etc.
2. Turn off the BP60 Belt Pack, and the HHM60 Hand Held Microphone, attach them to the BC60 battery charger and plug the charger into a 120 VAC 60 Hz power source overnight.
3. The next morning, it should only be neces

sary to remove the charger from the BP60 and HHM60, turn them on, and turn on the SRR60 receiver. Unless the volume and equalizer controls were tampered with, further adjustment should be unnecessary.

### **A FEW WORDS ABOUT BATTERIES**

***Never attempt to recharge alkaline or carbon zinc batteries under any circumstances, and do not attempt to recharge Nickel Cadmium (Ni-Cd) using the BC60 Battery Charger as it will charge them at too high a rate. Use the charger with Nickel Metal Hydride (Ni-MH) batteries only.***

If the BP60 and HHM60 are not going to be used for a prolonged period of time (i.e. summer vacation), the batteries should be removed to avoid corrosion problems.

When the batteries will no longer hold a charge, consult your local authority as to the proper disposal method. Throwing them in the trash may be illegal in some areas.

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### **General Usage Tips**

- When using the system in a classroom, speak at a normal conversational level. With the SRR60 Sound Reinforcement System, it is not necessary to strain your voice.
- Be sure to turn off the BP60 Belt Pack when having a private conversation with a student. Failure to do so could be embarrassing, both for the student and the instructor.
- To avoid unnecessary system noise, do not wear jewelry which would rub against the lavalier microphone.
- Don't forget to recharge the Ni-MH batteries in the HHM60 Microphone, and the BP60 Belt Pack every night. When the batteries are fully charged, they should last throughout a normal school day.
- It is time to replace the batteries when they will no longer hold a charge for a reasonable period of time. When discarding old batteries, contact local authorities as to the proper disposal method. Simply throwing them in the trash may be illegal in some areas.
- When cleaning of the equipment becomes necessary, use a soft damp cloth. Do not allow water to enter the units.
- Take care to protect all system components from excessive heat, moisture, or mechanical shock.

<b><u>PROBLEM</u></b>	<b><u>CAUSE</u></b>	<b><u>CURE</u></b>
Receiver won't turn on.	Power cord not plugged in.  Fuse blown	Plug in power cord.  Replace with 1.6 250V Amp Slo-Blo.
No signal reception. Channel A and/or B signal indicator LED on receiver not lit.	BP60 Belt Pack and/or HHM60 Microphones not turned on.  BP60 Belt Pack and/or HHM60 batteries are discharged.  IR transmitters on Lavalier and/or HHM60 microphone are covered.	Turn on BP60 and/or HHM60 microphone.  Is Power light on microphones lit when turned on? If not, recharge batteries.  Make sure IR transmitters on Lavalier and HHM60 are unobstructed.
Weak or no speaker output.	Master Volume control set too low.  Channel A or Channel B Volume set too low.  Channel A or Channel B equalizers set too low.  BP60 Belt Pack gain adjustment set too low.	Increase setting of Master Volume.  Increase setting of low channel Volume control.  Increase equalizer L, M & H settings toward +10 for natural sounding audio.  Advance setting of BP60 gain adjustment (See Page 10, item 10).
Dead spots in classroom.	One or more speakers out of phase with the others.  One or more speaker output level controls are set incorrectly.	Check speaker wiring. All speakers must be wired with the same polarity. Correct any discrepancies (see page 9, item 3).  Determine which speaker is producing low output and adjust the corresponding rear panel level control (see page 9 item 4).
Acoustic feedback (howling or screeching).	Channel A or B VOLUME set too high.  Microphone is too close to a speaker.  Equalizer improperly adjusted.	Reduce the Channel A or B VOLUME and move microphone closer to mouth.  Move microphone further away from a speaker. Avoid mounting speakers in the instructors primary area.  Depending on the audio frequency of the feedback, adjusting the "H" slider on the equalizer for the offending microphone may help.

## **SERVICE INFORMATION**

You may contact the R.L. DRAKE Service Department for additional information or assistance by calling +1 (937) 746-6990, Monday through Friday, between 8:00 A.M. and 4:00 P.M. Eastern Time, except on holidays.

You may also contact the R.L. DRAKE Service Department by E-mail at the following address:  
TechSupport@rldrake.com  
or by Telefax:  
+1 (937) 806-1576.

Should you want to return your unit for service, package the unit carefully using the original carton or other suitable container.

Write your return address clearly on the shipping carton and on an enclosed cover letter describing the service required, symptoms or problems. Also include your daytime telephone number and a copy of your proof of purchase.

The unit will be serviced under the terms of R.L. DRAKE LLC Limited Warranty and returned to you.

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## **IF YOU NEED TO CALL FOR HELP**

Call our Customer Service/Technical Support line at +1 (937) 746-6990 between 8:00 A.M. and 4:00 P.M. Eastern Time, weekdays. Please have the unit's serial number available. We will also need to know the specifics of any other equipment connected to the unit.

When calling, please have the unit up and running, near the phone if possible. Our technician(s) will likely ask certain questions to aid in diagnosis of the problem. Also, have a voltmeter handy, if possible.

R.L. DRAKE also provides technical assistance by e-mail: TechSupport@rldrake.com  
or by Telefax: +1 (937) 806-1576.

Many of the products that are sent to us for repair are in perfect working order when we receive them. For these units, there is a standard checkout fee that you will be charged. Please perform whatever steps are applicable from the installation sections of the Owner's Manual before calling or writing—this could save unnecessary phone charges. Please do not return the unit without contacting R.L. DRAKE first: it is preferred to help troubleshoot the problem over the phone (or by mail) first, saving you both time and money.

Inside the carton, enclose a note with your name, address, daytime phone number, and a description of the unit's problem.  
The unit must be sent to the following address:

**Service Department  
R.L. DRAKE LLC  
230 Industrial Drive  
Franklin, Ohio 45005 U.S.A.**

Be sure to include your street address which will be needed for UPS return. UPS Surface (Brown Label) takes 7-10 days to reach us depending on your location, Blue takes 2-3 days.

Red is an overnight service. Send the unit in a way that it can be traced if we can't verify receipt of shipment. We suggest UPS or insured postal shipment.

If the unit is still under the original owner's warranty, R.L. DRAKE will pay the cost of the return shipment to you. Our return shipping policy is that we will return it UPS Brown if received Brown or by US Mail, it will be returned Blue if received Blue or Red—or it will be returned however you prefer if you furnish the return cost for the method you select.

If the unit is out of warranty, use one of the following methods for return shipment:

- 1) You designate billing to American Express, VISA, MasterCard or Discover card;
- 2) You prepay the service charges with a personal check, or
- 3) You specify some other method of return and payment.

When calling, the technician can estimate the repair charges for you over the phone. This is another good reason to call before sending a unit in for repair. Typically, equipment is repaired in five to ten working days after it arrives at R.L. DRAKE if we have all the facts. If we must call you, it may take longer. R.L. DRAKE is not responsible for damage caused by lightning, nonprofessional alterations, "acts of God", shipping damage, poor storage/handling, etc. R.L. DRAKE will make note of any shipping damage upon receipt.

You will need to send proof of purchase to receive warranty service. Typically, a copy of the invoice from an R.L. DRAKE dealer will suffice. The warranty is for the original owner only and is not transferable.

## Three Year Limited Warranty

R.L. DRAKE LLC warrants to the original purchaser this product shall be free from defects in material or workmanship for three (3) years from the date of original purchase.

During the warranty period R.L. DRAKE LLC or an authorized Drake service facility will provide, free of charge, both parts and labor necessary to correct defects in material and workmanship. At its option, R.L. DRAKE LLC may replace a defective unit.

To obtain such a warranty service, the original purchaser must:

- (1) Retain invoice or original proof of purchase to establish the start of the warranty period.
- (2) Notify R.L. DRAKE LLC or the nearest authorized service facility, as soon as possible after discovery of a possible defect, of:
  - (a) the model and serial number,
  - (b) the identity of the seller and the approximate date of purchase; and
  - (c) A detailed description of the problem, including details on the electrical connection to associated equipment and the list of such equipment.
- (3) Deliver the product to R.L. DRAKE LLC or the nearest authorized service facility, or ship the same in its original container or equivalent, fully insured and shipping charges prepaid.

Correct maintenance, repair, and use are important to obtain proper performance from this product. Therefore carefully read the Instruction Manual. This warranty does not apply to any defect that R.L. DRAKE LLC determines is due to:

- (1) Improper maintenance or repair, including the installation of parts or accessories that do not conform to the quality and specifications of the original parts.
- (2) Misuse, abuse, neglect or improper installation.
- (3) Accidental or intentional damage.

All implied warranties, if any, including warranties of merchantability and fitness for a particular purpose, terminate three (3) years from the date of the original purchase.

The foregoing constitutes R.L. DRAKE LLC's entire obligation with respect to this product, and the original purchaser shall have no other remedy and no claim for incidental or consequential damages, losses or expenses. Some states do not allow limitations on how long an implied warranty lasts or do not allow the exclusions or limitation of incidental or consequential damages, so the above limitation and exclusion may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state. This warranty shall be construed under the laws of Ohio.

For Service, contact:

**R.L. DRAKE LLC**  
230 Industrial Drive  
Franklin, Ohio 45005 U.S.A.  
**Customer Service and Parts Telephone:** +1 (937) 746-6990  
**Telefax:** +1 (937) 806-1576  
**World Wide Web Site:** <http://www.rldrake.com>



**R.L. Drake LLC**  
230 Industrial Drive  
Franklin, Ohio 45005 U.S.A.  
**Customer Service and Parts Telephone:** +1 (937) 746-6990  
**Telefax:** +1 (937) 806-1576  
**World Wide Web Site:** <http://www.rldrake.com>