

THE SHURE WIRELESS

L SERIES WIRELESS MICROPHONE SYSTEMS



GENERAL

Shure L Series wireless microphone systems are single-channel systems operating in the VHF band between 169.445 MHz and 216.100 MHz. Each system consists of a hand-held L2 Microphone-Transmitter or an L11 Body-Pack Transmitter with a lavalier microphone or instrument adapter cable, and an L3 or L4 Receiver. Each component is briefly described below.

L2 Hand-Held Microphone-Transmitter. The L2 is a hand-held microphone with a built-in transmitter. It features superb frequency response, extended dynamic range, a battery test light, and heavy-duty grille with built-in pop filter. The L2 is supplied in four models:

- L2/58, which includes the world-famous Shure SM58 cardioid dynamic microphone
- L2/BETA58®, which includes the Shure BETA58 supercardioid dynamic microphone
- L2/87, which includes the Shure SM87 supercardioid condenser microphone
- L2/BETA87, which includes the Shure BETA87 supercardioid condenser microphone

L11 Body-Pack Transmitter. The L11 features extended dynamic range, a battery test light, noiseless muting, and a rugged case.

Lavalier Microphone. A lavalier electret condenser microphone plugs into the L11 Body-Pack Transmitter. Five microphone models are available with the L Series body-pack systems: the WL83A, WL84A, and WL93 lavalier type microphones, the WM98 instrument microphone, and the WCM16 headworn microphone. Each microphone features optimized frequency response, low distortion and low RF susceptibility.

WA302 Instrument Adapter Cable. The WA302 instrument adapter cable is used with electric guitars and other electric instruments instead of a lavalier microphone. The WA302 plugs into the microphone input on the L11 Body-Pack Transmitter.

L3 Receiver. The L3 offers interference-free operation, superior quieting, and highly effective noise reduction. It has a removable ¼-wave antenna and is rack-mountable with an optional mounting kit.

L4 Diversity Receiver. The L4 includes all of the features of the L3 receiver plus Shure's exclusive MARCAD® circuitry. MARCAD (MAXimum Ratio Combining Audio Diversity) goes beyond standard switching RF diversity. It constantly monitors the two signals and combines them when both signals are usable. The result is increased RF gain, improved reception, and exceptional freedom from dropouts.

PERFORMANCE CHARACTERISTICS

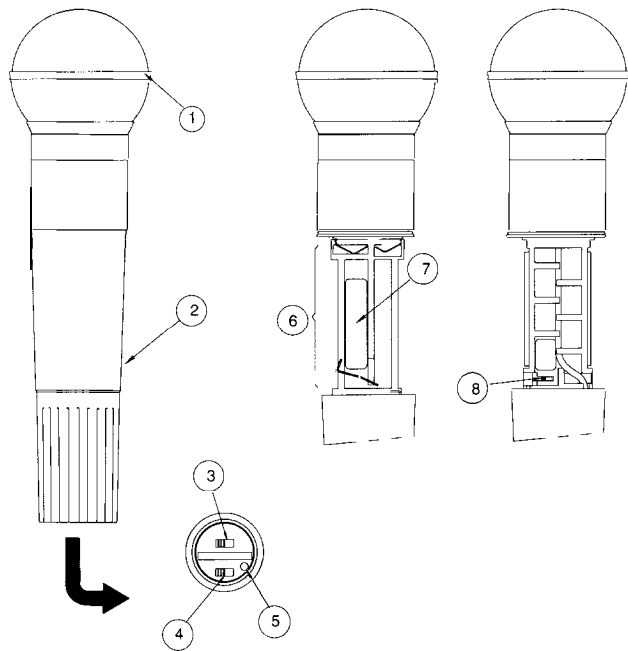
Operating Frequencies. A total of 28 frequencies, computer-selected for interference-free operation, are readily available. Other frequencies can be ordered on a special basis.

Multiple Miking. Up to ten L Series systems can be operated in a single sound installation, simultaneously and without intermodulation problems. However, each system must operate at a different frequency.

Transmitter Range. The maximum operating range for any L Series system is normally 100 meters (330 feet), although operation at 300 meters (1000 feet) is often possible. Conditions at the installation site (reflective surfaces, obstacles, radio interference, etc.) will ultimately dictate a system's limits. For best results, keep the distance between the transmitter and the receiver as short as possible.

Power Requirements. The L3 and L4 receivers are supplied with separate PS20 adapter for 120 VAC, 60 Hz power or a PS20E adapter for 220/240 VAC, 50 Hz power. The receivers can also be powered by any filtered 12.5 - 18 VDC power source. The L2 and L11 transmitters operate on a 9-volt alkaline or 8.4-volt nicad battery. Battery life depends on the type and brand of battery.

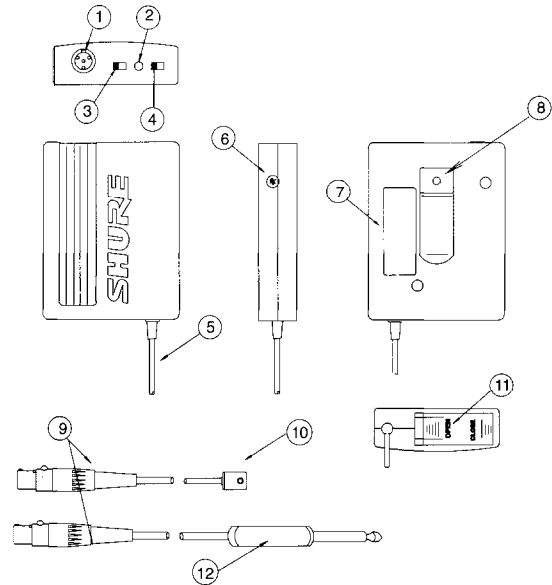
**L2 HAND-HELD MICROPHONE-TRANSMITTER
FEATURES AND CONTROLS (Figure 1)**



L2 MICROPHONE-TRANSMITTER FEATURES AND CONTROLS
FIGURE 1

1. **Grille:** Protects the microphone cartridge and helps reduce breath sounds and wind noise.
Note: The grilles for the L2/58, L2/BETA58, the L2/87, and the L2/BETA87 differ in appearance.
2. **Antenna (Internal; not shown):** The L2's internal antenna consists of a special wire loop attached to a printed circuit board.
3. **MIC ON/OFF Switch:** Mutes the microphone without turning the transmitter off, so no "pop" sounds occur. Also prevents receiver from picking up unwanted signals.
4. **POWER ON/OFF Switch:** Turns transmitter on and off.
5. **Battery Test Light:** glows when the POWER switch is turned on and a "good" battery is installed. When this light starts to dim, the transmitter will continue to operate for a short time (typically 1/2 to 1 hour). If this light does not glow, the battery should be replaced.
6. **Battery Compartment:** Unscrewing the handle and sliding it downward exposes the battery compartment and the audio GAIN Switch (8).
7. **Frequency Identification Label:** Located inside the battery compartment, this label lists the transmitter's operating frequency.
8. **Audio Level Control Switch:** Controls the audio level of the microphone.

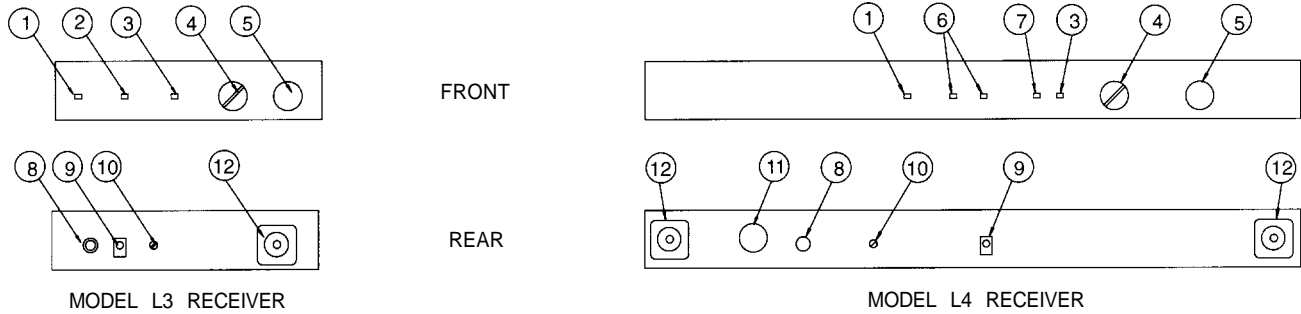
**L11 BODY-PACK TRANSMITTER FEATURES AND
CONTROLS (Figure 2)**



L11 BODY-PACK TRANSMITTER FEATURES AND CONTROLS
FIGURE 2

1. **Microphone Input Connector:** This 4-pin, miniature male connector mates with Switchcraft TA4F connectors. The microphone cable and the WA302 instrument adapter cable plug into this connector.
2. **Battery Test Light:** glows when the POWER switch is turned on and a "good" battery is installed. If this light does not glow, the transmitter will not work.
3. **MIC ON/OFF Switch:** "Mutes" the microphone without turning the transmitter off, so no "pop" sounds occur.
4. **POWER ON/OFF Switch:** Turns transmitter on and off
5. **Antenna:** A flexible antenna wire is permanently attached to the bottom of the body-pack transmitter. *For proper operation, the antenna must hang in the vertical position, not coiled or bundled.*
6. **Audio Level Control:** Allows audio level adjustments for various sound sources. A small screwdriver is supplied to make adjustments.
7. **Frequency Identification Label:** Identifies the transmitter's original operating frequency.
8. **Belt Clip:** Allows the transmitter to be worn on a belt, waistband or guitar strap. It can be removed, if desired.
9. **Microphone Cable Connector:** Switchcraft TA4F 4-pin connector (female) plugs into 4-pin socket on body-pack transmitter.
10. **Lavalier Microphone (WL93 shown):** Condenser lavalier microphone supplied with a mount that clips onto a tie, lapel, or acoustic instrument.
11. **Battery Compartment:** Hinged cover on bottom surface exposes the battery compartment.
12. **WA302 Instrument Adapter:** Plugs into electric guitar and other electric instruments.

L3 AND L4 RECEIVER FEATURES AND CONTROLS (Figure 3)



L3 AND L4 RECEIVERS, EXTERNAL FEATURES AND CONTROLS

FIGURE 3

1. **POWER ON Indicator:** This green LED glows when power is turned on.
2. **RF Signal Indicator (L3 Only):** Yellow light glows to show that received RF signal exceeds squelch threshold level. This light is *not* an indicator of signal *strength*, although a barely flickering light indicates marginally acceptable signals.
3. **AUDIO PEAK Indicator:** Red light glows to show approaching audio overload condition. Normal operation is shown by occasional glowing of light on loud signals; constant glowing indicates excessive audio level and need to lower transmitter Audio Level control.
4. **VOLUME Rotary Control:** Determines signal level at receiver OUTPUT connector(s). Also permits matching signal level to input level requirements of a mixer or amplifier.
5. **POWER On/Off Button:** Applies power from the DC power input jack to the receiver. Green POWER light glows and remains on when power is applied to the receiver.
6. **DIVERSITY Signal Indicators (L4 Only):** Yellow lights glow to show usable RF signals are being received from antenna A, antenna B, or both.
7. **AUDIO NORMAL Indicator (L4 Only):** Green light flashes, showing normal audio operation.
8. **Phone Jack Output Connector:** ¼-inch phone jack provides unbalanced output to audio mixer or amplifier.
9. **12 VDC Negative Ground Coaxial Power Jack:** Accepts power from the supplied AC adapter, or from any well-filtered 12-18 VDC supply.
10. **SQUELCH MIN-MAX Screwdriver Control:** The squelch circuit automatically quiets or “mutes” the receiver when no transmitter signal is being received. The squelch control is factory-set for best operation in most applications, but can be adjusted for unusual conditions (see *Receiver Squelch* paragraph).
11. **XLR Output Connector (L4 Only):** XLR connector provides balanced low-impedance microphone-level output.
12. **Antenna Connector:** SO-239 UHF-type connector provides connection to ¼-wave vertical antenna.

RECEIVER SETUP

L3 and L4 Receiver Installation

1. Place the receiver in its operating location, either on a horizontal surface or in a rack panel (rack panel mounting brackets are supplied with L4 receivers). If placed on a horizontal surface, attach the four adhesive bumpers to the bottom corners of the receiver. If installing an L4 receiver in a rack panel, remove the screws on each side of the receiver, position the mounting brackets supplied with the L4 over the holes, and secure the brackets with the two removed screws and the two screws supplied with the L4.
2. Connect the supplied PS20 AC adapter to the POWER input connector on the rear panel. Plug the AC adapter into a 120 VAC, 60 Hz power source.

NOTE: If the receiver is to be plugged into a 230 VAC, 50 Hz power supply, connect the PS20E AC adapter to the POWER input connector on the rear panel.

3. Attach the supplied ¼-wave antennas to the ANTENNA connector(s). Make sure the antennas are pointed upward.

IMPORTANT The receiver antenna(s) should be within line-of-sight of the transmitter. Obstructions or reflective objects will degrade system performance. Improved L4 diversity performance may be obtained by remotely locating one or both antennas so that they are separated by 1.5 meters (60 inches) or more. Optional Shure WA380 ½ Wave High Gain Antennas are recommended for such applications. They may be mounted directly on the receiver or remotely located using two Shure WA420 Antenna Cable Kits. With rack-mounted receivers, both antennas must extend above the rack cabinet or be remotely located. To operate as many as four receivers with only two antennas, use the Shure WA404 amplified Antenna/DC Power Distribution System.

4. Obtain an audio cable (Shure WA410 or equivalent) with appropriate connectors to connect the receiver to audio mixer or amplifier.

NOTE: To connect the L3 output to the high-impedance input of an audio mixer or amplifier, use a cable with ¼-inch phone plugs on both ends.

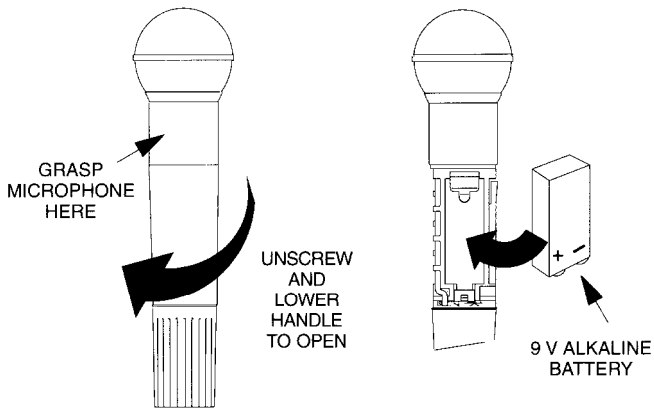
5. Connect the cable between the OUTPUT connector on the receiver and the mixer/amplifier input.

NOTE: When a long cable run is required, or when the mixer input has phantom power present, add a low- to high-impedance line matching transformer at the L3 output jack (Shure A95U or equivalent). A conventional low-impedance microphone cable can then be used between the A95U output and the mixer input.

TRANSMITTER SETUP

L2 Microphone-Transmitter Battery Installation

1. Make sure the transmitter POWER ON/OFF switch is in the OFF position.
2. While holding the upper part of the transmitter, unscrew (turn counterclockwise) the handle and slide it downward, as shown below in Figure 4.



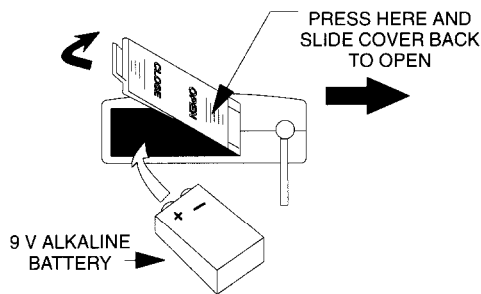
L2 MICROPHONE-TRANSMITTER BATTERY INSTALLATION
FIGURE 4

3. Insert a fresh 9-volt alkaline battery and make sure the battery polarity (“+/-”) is correct. A fresh 9-volt alkaline battery should provide a minimum 14-20 hours of operation. However, nickel-cadmium batteries will only provide approximately 3 hours of operation.

IMPORTANT: Use only a 9-volt alkaline battery or a heavy-duty, rechargeable 8.4-volt nicad battery. Carbon-zinc and zinc-chloride batteries will not provide sufficient power for proper operation and are not recommended.

L11 Body-Pack Transmitter Battery Installation

1. With the transmitter POWER ON/OFF switch in the OFF position, press down on the OPEN side of the battery compartment cover, slide it back and flip it open, as shown below in Figure 5.



L11 BODY-PACK TRANSMITTER BATTERY INSTALLATION
FIGURE 5

2. Insert a fresh 9-volt alkaline battery, and make sure the battery polarity (“+/-”) is correct. A fresh 9-volt alkaline battery should provide a 14 - 20 hours of operation. However, nickel-cadmium batteries will only provide 1.5 to 2 hours of operation.

IMPORTANT: Use only a 9-volt alkaline battery or a heavy-duty, rechargeable 8.4-volt nicad battery. Carbon-zinc and zinc-chloride batteries will not provide sufficient power for proper operation and are not recommended.

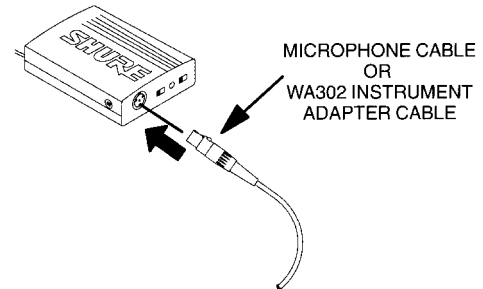
Checking the Transmitter Battery

To check the battery in either the L11 or L2 transmitter, turn the transmitter POWER switch on and observe the Battery Test light. The light should be bright and clearly visible, indicating adequate

voltage. If the light is dim, the battery voltage has dropped below 6.5 volts and the battery should be replaced (alkaline or recharged nickel-cadmium only). If the light does not glow at all, the transmitter will not operate and the battery should be replaced.

L11 Body-Pack Transmitter Microphone Connections

1. Plug the connector end of the lavalier microphone cable or the WA302 instrument adapter cable into the 4-pin connector on the Body-Pack Transmitter. See Figure 6 below.



L11 BODY-PACK TRANSMITTER CABLE CONNECTION
FIGURE 6

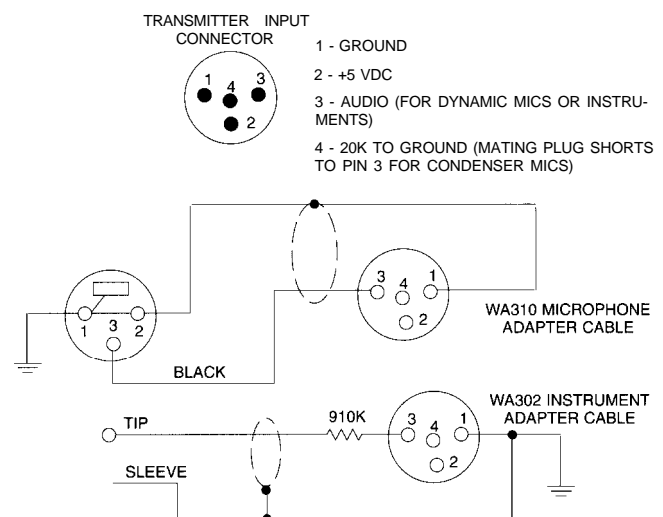
2. If you are using a lavalier microphone, press the microphone into the necktie mounting block and clip it to your tie or lapel. If you are using an electronic instrument, plug the WA302 instrument adapter cable into your guitar or instrument.

IMPORTANT: Other manufacturer’s microphones specified for wireless use are generally not compatible, as supplied, with Shure wireless systems.

Connecting Other Microphones to the L11 Transmitter

Any Shure lavalier microphone or accessory cable with a Switchcraft TA4F type 4-pin (female) connector will plug directly into the transmitter input connector. Many other condenser microphones will operate using the transmitter’s regulated +5 VDC power available on pin 2. Low-impedance dynamic or ribbon microphones with pin 2 output can be used with an optional WA310 adapter cable. See Figure 7 below.

NOTE: Condenser microphones requiring phantom power will not normally operate with the L11/WA310 transmitter configuration.



L11 TRANSMITTER CONNECTIONS
FIGURE 7

OPERATING THE SYSTEM

1. Turn on the receiver by pressing the receiver POWER button.
2. Slide the transmitter POWER and MIC switches to the “on” position. The green POWER light on the transmitter should glow, indicating a good battery.
3. Verify that the yellow RF light (L3) or the yellow DIVERSITY lights (L4) glow steadily. This indicates that the transmitter signal is being received.

NOTE: Flickering RF/DIVERSITY lights indicate marginal operation.

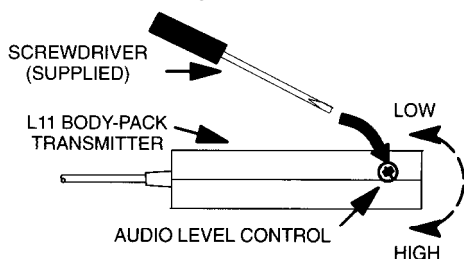
4. Talk into the microphone (or play a musical instrument) and observe the following on the receiver:
 - Steady glow of the RF light (L3) or DIVERSITY A or B lights (L4). If these lights are *not* glowing, the system’s range has been exceeded, or there are obstructions in the transmission path.
 - Steady glowing or flashing AUDIO NORM light (L4).
 - Flashing of the red AUDIO PEAK light *only* on loud peaks. If this indicator is always on or is always off, refer to the “Audio Gain Adjustments” paragraph below.
5. Adjust the receiver VOLUME control until the output level is proper for the mixer or amplifier input. Turning the VOLUME control counterclockwise decreases output; turning it clockwise increases output. Note that the L4 VOLUME control affects both balanced and unbalanced outputs.
6. Continue speaking or singing into the microphone (or playing an instrument) while moving around the performing area, to make sure no problems such as feedback or signal loss occur. Audio signal strength should only change when source volume levels change, not when the user moves around the performing area.

NOTE: Every wireless microphone installation is unique, and can present a variety of problems. *Never* attempt a live performance without a “walk-through” test first. If major changes were made since the last walkthrough (equipment, scenery, etc.), check the wireless microphone system again as close to performance time as possible.

Audio Gain Adjustments

If the AUDIO PEAK light is *constantly* glowing, the audio signal is too loud and may be distorted. If the AUDIO PEAK light *never* glows, the audio signal is too low and may be noisy. To correct these problems, adjust the transmitter as follows:

- **L11 Body-Pack Systems:** Using the supplied screwdriver, adjust the audio level control on the body-pack transmitter until the receiver AUDIO PEAK light flickers occasionally while the microphone is in use. See Figure 8 below.

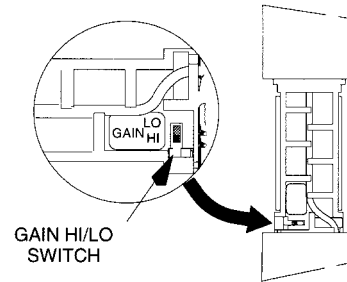


L11 BODY-PACK TRANSMITTER AUDIO GAIN ADJUSTMENT

FIGURE 8

IMPORTANT: Gain adjustments must be made while using the microphone (or playing an instrument) at a typical level.

- **L2 Hand-Held Systems:** Unscrew the handle of the L2 and locate the audio level control next to the battery holder. Select the LO or HI gain position so that the receiver AUDIO PEAK light flickers only occasionally. See Figure 9.



L2 MICROPHONE-TRANSMITTER AUDIO GAIN ADJUSTMENT

FIGURE 9

Changing Receiver Squelch Control Settings

The receiver SQUELCH control is factory preset for optimum performance. **Normally, no further adjustment to the SQUELCH control is required.** However, if adjustment is necessary (as indicated by continued glowing of the RF or AUDIO PEAK lights (L3) or DIVERSITY A or B, AUDIO NORM or PEAK lights (L4) with the transmitter *off*), proceed as follows:

1. Position the wireless system as it will be during use.
2. Turn off the wireless transmitter POWER switch.
3. Turn the receiver VOLUME control fully counterclockwise and turn the POWER switch on.
4. Observe the receiver lights. If the RF or AUDIO PEAK lights (L3) or DIVERSITY A or B, AUDIO NORM or PEAK lights (L4) are glowing, slowly turn the SQUELCH Control clockwise until the lights turn off. Continue turning the control clockwise *slightly* past this point.
5. To return the SQUELCH control to the factory setting, rotate it back to the midrange (straight up) position.

NOTE: Turning the SQUELCH control toward MIN (counterclockwise) makes the receiver more sensitive and increases the system’s range. However, it also allows the microphone signal to become noisier before it is muted. Turning the control toward MAX (clockwise) reduces the system’s range, but prevents interfering signals and noise from overriding the squelch when the transmitter signal is not present.

Feedback Control

The following guidelines can be used to control feedback:

- Make sure the loudspeakers are positioned properly relative to the microphone
- Maintain gain controls at the lowest levels required for the desired sound
- Use good microphone technique
- Make sure the sound system is properly equalized

Controlling Multipath Transmission (“Dropout”)

Multipath transmission (or “dropout”) occurs when the direct RF signal and a reflected signal arrive at the receiver at different times or out of phase, or when the signal path is obstructed. The result is excessive noise or temporary signal loss. To avoid multipath, observe the following precautions:

- Maintain line-of-sight transmission. The transmitter user should always be able to see at least one of the receiver antenna(s).
- Keep the distance between the transmitter and the receiver antennas as short as possible.
- Avoid operating the wireless microphone around reflective surfaces, especially metal surfaces.
- Make sure both transmitter and receiver antennas are positioned vertically.

TROUBLESHOOTING

If the installation and setup instructions have been followed and a problem still exists, perform the troubleshooting proce-

dures in the table below. If the problem persists, contact your dealer or Shure's Service Department.

PROBLEM	SOLUTION
No receiver sound; yellow RF light on L3 Receiver not glowing; neither DIVERSITY light on L4 Receiver glows.	Make sure POWER switches on transmitter and receiver are ON. Check transmitter battery and receiver power source. Check receiver squelch setting. Check receiver antenna connection(s). Make sure transmitter and receiver are on same operating frequency. Make sure transmitter and receiver antennas follow line of sight. If necessary, reduce the distance between the transmitter and the receiver. Higher gain antennas (WA380) may be required.
No receiver sound; RF light on L3 Receiver glows; one or both DIVERSITY lights on L4 Receiver glow.	With the microphone POWER switch ON, turn up the receiver volume control. Make sure transmitter MIC switch is ON. Make sure the microphone cable plug is locked into the transmitter connector. Check connection between receiver and microphone mixer. Talk into the microphone and observe the receiver AUDIO light. If the light glows, the problem is elsewhere in sound system.
Noise from receiver with transmitter off; DIVERSITY lights glowing or flickering.	Look for strong local interference sources such as other radio signals. (Nearby electrical motors or lighting equipment could also be the problem.) Reposition antennas. SQUELCH control may be set too low. Readjust as necessary.
Received signal is noisy or contains extraneous sounds with transmitter on.	Look for strong local interference sources such as other radio signals, nearby motors or lighting equipment. Remove the source of interference, reposition the receiver, or reposition the antennas. Two transmitters may be operating on the same frequency. Locate and turn one off. Signal may be too weak. Reposition antennas. If possible, move them closer to the transmitter. If necessary, install optional ½ wave high gain antenna(s) (WA380) and antenna cable kit (WA420). SQUELCH control may be set too low. Readjust as necessary (See Figure 5). AUDIO GAIN may be set too low. Increase for L11 (See Figure 8) switch to HI position for L2 (See Figure 9).

SPECIFICATIONS

• OVERALL SYSTEM

RF Carrier Frequency Range
169 to 216 MHz

Frequency Stability
0.005%, Crystal-Controlled

Total Harmonic Distortion
0.3% typical (ref. 15 kHz deviation, 1 kHz modulation)

Working Range (average conditions)
30 m (100 ft.) with >90 dB dynamic range; 90 m (300 ft.) with >80 dB dynamic range; 300 m (1,000 ft.) at 60 dB

Modulation
±15 kHz deviation compressor-expander system with pre- and de-emphasis

Dynamic Range
>102 dB A-weighted

Audio Frequency Response
50 to 15,000 Hz, ±2 dB

NOTE: Overall system frequency response depends on the microphone element used. Refer to the response curves in Figure 9 or the separate lavalier microphone data sheets.

Operating Temperature Range
-20° to 50° C (-4° to 122° F)

• L3 AND L4 RECEIVERS

RF Sensitivity
L3: 0.35 µV for 12 dB SINAD typical
L4: 0.45 µV for 12 dB SINAD typical

Image Rejection
65 dB typical

Spurious Rejection
75 dB typical

Ultimate Quieting (ref. 15 kHz deviation)
>94 dB A-weighted

Squelch Quieting (ref. 15 kHz deviation)
>94 dB A-weighted

Squelch Threshold
L3: 2.0 µV, adjustable
L4: 2.0 µV, adjustable

output
L3: -2 dBV (unloaded; volume full clockwise: full deviation); 3.3 kΩ output impedance. Compatible with high- and low-impedance inputs.
L4: -2 dBV, 1 kΩ output impedance, unbalanced; -18 dBV, 150 Ω output impedance, balanced (volume full clockwise; full deviation; unloaded)

Power Requirements
L3: 12 - 18 VDC nominal (negative ground), 85 mA
L4: 12.5 - 18 VDC (negative ground), 165 mA
Both models supplied with PS20 external AC adapter for 110 VAC, 60 Hz power (PS20E adapter for 220/240 VAC supplied with E versions)

Antenna
L3: Sheathed stainless steel, 1/4-wavelength, 406 mm (16 in.)
L4: 428 mm (16.85 in.), PL-259 UHF connectors

Overall Dimensions (excluding antennas)
L3: 42.9 mm H x 176 mm W x 127 mm D (11-11/16 x 6-15/16 x 5 in.)
L4: 44.5 mm H x 435 mm W x 200 mm D (1-3/4 x 17-1/8 x 7-7/8 in.)

Weight
L3: 556 grams (1 lb 3.5 oz)
L4: 1.36 kilograms (3 lb)

Certification
Type-accepted under FCC Part 15
FCC ID: DD4DL3 (L3), DD4DL4 (L4)
Certified by DOC under RS121, Issue 2, as a guide

• TRANSMITTERS

RF Power Output

50 mW maximum

Input Impedance (L11 only)

Actual: 17 kΩ pin 4 wired to pin 3 for condenser microphones;
100 kΩ, pin 4 open for dynamic microphone or instrument pickup

Gain Adjustment Range

L11: 40 dB

L2: 15 dB

Antenna

L11 : Attached, 386 mm (15.2 in.), omnidirectional, flexible wire

L2: Integral loop antenna mounted to RF printed circuit board

Power

Battery Type: 9 V alkaline (Duracell MN1604A recommended);
8.4 V nicad optional

Battery Life: 14-20 hours minimum typical for 9 V alkaline;
3 hours per charge typical for 8.4 V nicad

Current Drain

28 mA typical

Overall Dimensions (excluding antenna and belt clip)

L2/58, L2/BETA 58: 237 mm x 51 mm (9-5/16 x 2 in.)

L2/87, L2/BETA 87: 213 mm x 50.8 mm (8-3/8 x 2 in.)

L11: 82.6 mm High x 63.5 mm Wide x 26.2 mm Deep
(3-1/4 x 2-1/2 x 1-1/32 in.)

Net Weight

Model	Without Battery	With Battery
L11	2.8 oz (80.5 g)	4.3 oz (123 g)
L2/58	11.6 oz (330 g)	13.1 oz (372.5 g)
L2/BETA 58	11.6 oz (330 g)	13.1 oz (372.5 g)
L2/87	15.8 oz (450 g)	17.3 oz (492.5 g)
L2/BETA 87	15.8 oz (450 g)	17.3 oz (492.5 g)

L2 Transducer Type

L2/58, L2/BETA 58: Dynamic

L2/87, L2/BETA 87: Condenser (electret bias)

Audio Polarity

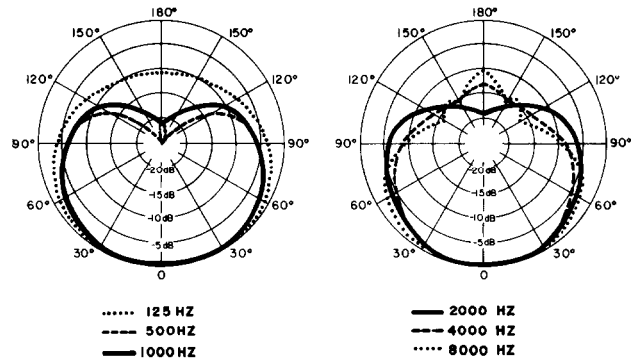
L11 with WL84A, WL93, WCM16 or WM98 Shure Wireless Microphones: Positive pressure on microphone diaphragm produces positive voltage (with respect to ground) on tip of receiver output (L3), auxiliary output (L4), or pin 2 with respect to pin 3 of low-impedance output (L4)

L11 with WA310 or WA302 Cable: Positive voltage applied to pin 3 of WA310 XLR connector, or to tip of WA302 phone plug produces positive voltage on tip (with respect to ground) of receiver output (L3), on tip with respect to ground of unbalanced output (L4), and on pin 2 (with respect to pin 3) of balanced output (L4)

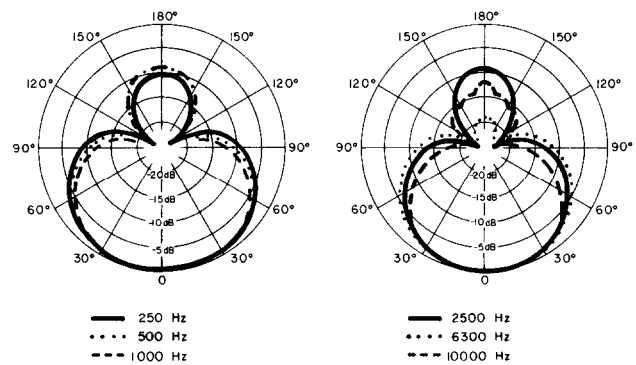
L2/58, L2/BETA 58, L2/87, and L2/BETA 87: Positive pressure on microphone diaphragm produces positive voltage on tip (with respect to ground) of receiver output (L3), on tip with respect to ground of unbalanced output (L4), and on pin 2 (with respect to pin 3) of balanced output (L4)

L2 Polar Patterns (See Figure 10 below)

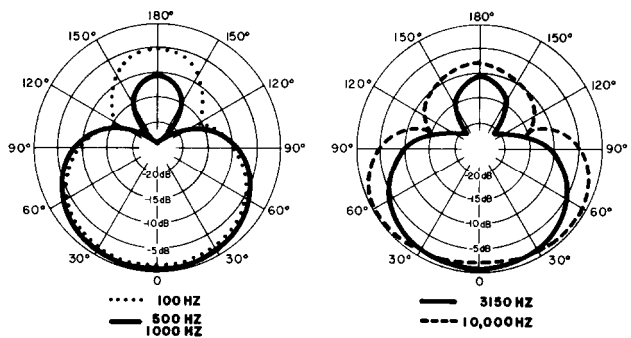
Note: All measurements taken at a distance of 2 feet from the sound source. Refer to separate data sheets for L11 lavalier microphone polar patterns and frequency response curves.



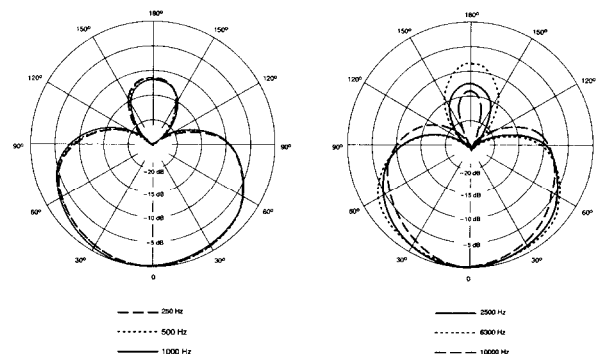
MODEL L2/58



MODEL L2/BETA 58



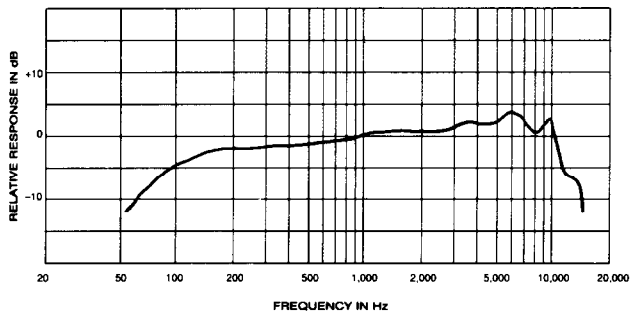
MODEL L2/87



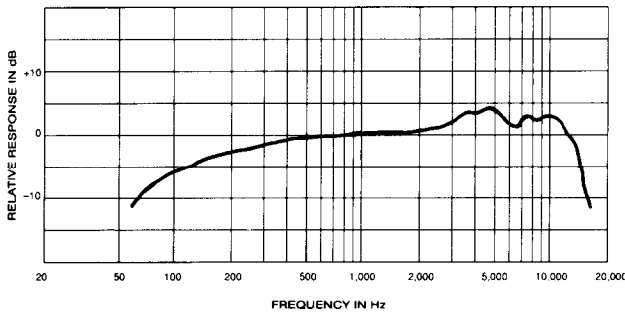
MODEL L2/BETA 87

FIGURE 10

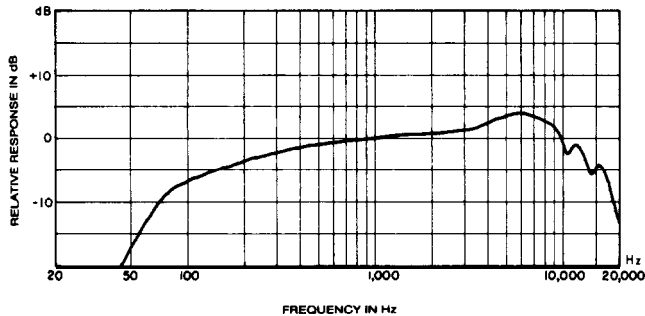
L2 Microphone-Transmitter Frequency Response
(See Figure 11 below) NOTE: All measurements taken at a distance of 2 ft. from sound source



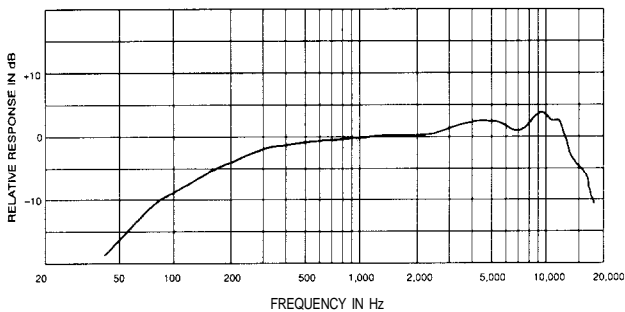
MODEL L2/58



MODEL L2/BETA 58



MODEL L2/87



MODEL L2/BETA 87

FIGURE 11

Certification

Type-accepted under FCC Parts 74 and 90

FCC ID: DD4L11A (L11, 166-174 MHz), DD4L11 (L11, 174-216 MHz), DD4L2A (L2, 166-174 MHz), DD4L2 (L2, 174-216 MHz)

Certified by DOC under RS214, as a guide (174-216 MHz only)

L3 & L4 comply with FCC Part 15 under Notification Procedures

FURNISHED ACCESSORIES

Screwdriver (L11)	65A1659
Rack Panel Bracket (L4)	48A8012
Instrument Adapter Cable (L11)	WA302

OPTIONAL ACCESSORIES

Line Matching Output Transformer (L3)	A95U
Instrument Adapter Cable (L11)	WA302
Microphone Adapter Cable (L11)	WA310
Switchcraft TA4F Connector (L11)	WA330
In-Line Audio Switch (L11)	WA360
Swivel Adapter (L2)	WA370A
½-Wave Antenna Assembly (169-185 MHz)	WA380A
½-Wave Antenna Assembly (185-200 MHz)	WA380B
½-Wave Antenna Assembly (200-216 MHz)	WA380C
Single/Double Rack Mount Kit (L3)	WA390
Antenna Distribution System (L3, L4)	WA400
Antenna/Power Distribution System	WA404
Receiver-Mixer Cable (1.8 m – 6 ft.) (L3, L4)	WA410
Antenna Cable Kit (L3, L4)	WA420*
Antenna Rack Mount Kit (L4)	WA440

*Includes cable, UHF adapter, and wall-mount bracket.

REPLACEMENT PARTS

SM58 Cartridge	R158
BETA 58 Cartridge	R160
SM87 Cartridge	R128
BETA 87 Cartridge	N/A*
SM58 Grille	RK143G
BETA 58 Grille	RK265G
SM87 Grille	90E3014
BETA 87 Grille	90B3955
L11 Belt Clip	53A8247A
L3, L4 AC Adapter	PS20 (120V), PS20E (220/240V)
L3, L4 ¼-Wave Antenna Assembly	90C8342

*Replacement cartridges for the Beta 87 are available only through factory exchange or through Shure Distribution Centers.

INFORMATION TO THE USER

The L3 and L4 Receivers have been tested and found to comply with the limits of Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. Operation is subject to the condition that this equipment does not cause harmful interference.

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 L3 or L4 receiver and the radio or TV receiver.
- (3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- (4) Consult a dealer or an experienced radio/TV technician for help.

CAUTION: Changes or modifications not expressly approved by Shure Brothers, Inc. could void your authority to operate the equipment.

FCC LICENSING INFORMATION

Shure Model L11 and L2 Transmitters are Type-Accepted under FCC Parts 90 and 74. **IMPORTANT: Licensing of Shure wireless microphone equipment is the user's responsibility, and licensability depends on the user's classification and application, and on the selected frequency.** Shure strongly urges the user to contact the appropriate telecommunications authority concerning proper licensing.