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EC WIRELESS MICROPHONE SYSTEMS

Specification Sheet

GENERAL

The Shure EC Series wireless microphone systems are configurable, single-channel systems operating in the VHF band between 169.445 MHz and 216.100 MHz. All EC systems feature state-of-the-art, phase-locked loop (PLL) digital frequency control to generate an exceptionally clean, low-noise signal. This built-in frequency control makes EC systems ideal for installations where multiple wireless systems are to be used. The PLL frequency control circuit is also programmable, so any factory-authorized technician can change the carrier frequency of any EC transmitter and receiver.

SYSTEM COMPONENTS

Each EC wireless system consists of a handheld EC2 Microphone-Transmitter or an EC1 Body-Pack Transmitter with a lavalier microphone or a WA302 instrument adapter cable, and an EC4 Receiver.

EC2 Hand-Held Microphone-Transmitter. The EC2 is a hand-held microphone with a built-in transmitter. It features PLL frequency control, an external antenna for increased range and freedom from dropouts, superb frequency response, extended dynamic range, an LED status indicator, rugged metal handle, and heavy-duty grille with built-in pop filter. The EC2 is supplied in four models:

- EC2/58, which includes the world-famous Shure SM58 cardioid dynamic microphone.
- EC2/87, which includes Shure's SM87 supercardioid condenser microphone.
- EC2/Beta 58, which features Shure's premium supercardioid dynamic Beta 58 vocal microphone.
- EC2/Beta 87, which features Shure's premium supercardioid condenser Beta 87 vocal microphone.

EC1 Body-Pack Transmitter. The EC1 features PLL frequency control, extended dynamic range, a universal input, a battery test light, noiseless muting, and a rugged case.

WL93A Micro-Lavalier Microphone: The WL93A is an omnidirectional micro-lavalier electret condenser microphone that plugs into the microphone input on the EC1 Body-Pack Transmitter. It features smooth frequency response, low distortion and low RF susceptibility. The WL93 can also be used as a pickup for acoustic instruments such as guitar, woodwinds and strings. The WL84 supercardioid lavalier is also available.

WA302 Instrument Adapter Cable: The WA302 instrument adapter cable plugs into the EC1 Body-Pack Transmitter. It is designed for use with electric guitar and other electric instruments.

EC4 Diversity Receiver. The EC4 features Shure's exclusive MARCAD® (MAximum Ratio Combining Audio Diversity) circuitry.

With MARCAD, the EC4 constantly monitors signals on each of two receivers and combines them when both signals are usable. The result is increased RF gain, improved reception, and exceptional freedom from dropouts. The EC4 also uses PLL frequency control to lock onto a precise carrier frequency, reducing the possibility of interference from local sources.

PERFORMANCE CHARACTERISTICS

Operating Frequencies. Shure EC wireless systems are configured to operate interference-free on one of 28 standard frequencies. Frequency changes can be made by factory authorized service personnel.

Multiple System Installations. Up to 15 EC Series systems can be operated simultaneously in a single installation without intermodulation problems. However, each system must operate at a different frequency.

Directional Sensitivity. The EC Series transmitters are omnidirectional in the horizontal plane; that is, they radiate equal amounts of RF energy in all directions. Similarly, the receiver antenna is equally sensitive in all directions in the horizontal plane when mounted vertically.

Operating Range. The recommended maximum operating range for any EC system is 600 feet (182.8 meters), although successful operation at up to 1000 feet (300 meters) is often accomplished. Conditions at the installation site (reflective surfaces, obstacles, radio interference, etc.) will ultimately dictate the system's operating range.

Power Requirements. The EC4 receiver can be operated from any filtered 12.5 to 18 Vdc, 200 mA power source. A separate 120 Vac adapter is included with each system. The EC2 and EC1 transmitters operate on most 9 volt alkaline batteries. Battery life depends on the type and brand of battery (Duracell MN1604 recommended).

FURNISHED ACCESSORIES

Rack Panel Bracket (EC4)	48A8012
Swivel Adapter (EC2)	WA370A
Storage Bag (EC1)	26A13
Storage Bag (EC2)	26A14

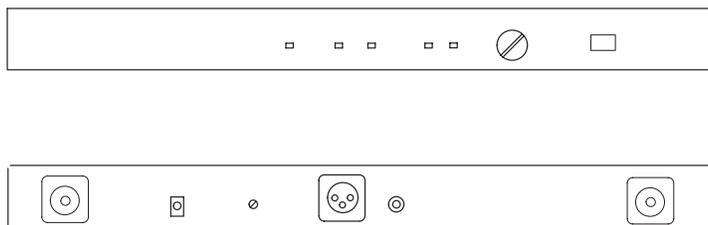
OPTIONAL ACCESSORIES

Miniature 4-Socket Connector (EC1 Body-Pack)	WA330
In-Line Audio Switch (EC1)	WA360
1/2-Wave Antenna (EC4; specify frequency) .	WA380A/B/C/D
Antenna Distribution System	WA400
Antenna/Power Distribution System	WA404
Antenna Cable Kit (EC4)	WA420*
Antenna Rack Mount Kit (EC4)	WA440

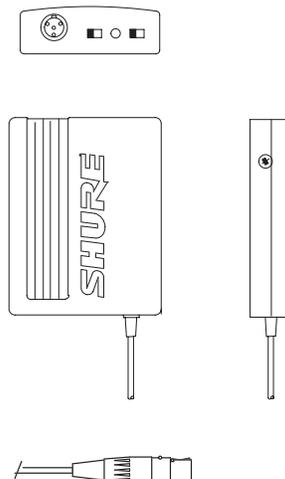
*Includes cable, UHF adapter, and wall-mount bracket.



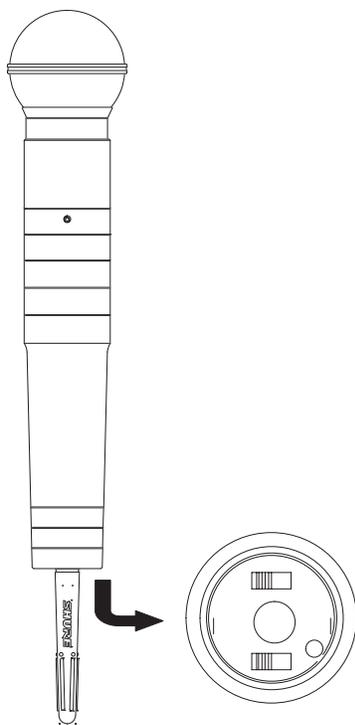
EC4 RECEIVER



EC11 BODY-PACK TRANSMITTER



EC2 MICROPHONE-TRANSMITTER



OVERALL SYSTEM SPECIFICATIONS

RF Carrier Frequency Range

169.445 MHz to 216.100 MHz

Frequency Stability

±32.5 ppm, ±5.5 kHz (Complies with FCC regulations)

Working Range (average conditions)

600 feet (182.8 m) at 50 mW

Modulation

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

Total Harmonic Distortion (ref. ±15 kHz deviation, 1 kHz modulation)

0.4% typical, 0.7% maximum

Dynamic Range

>102 dB A-weighted

Audio Frequency Response

80 to 15,000 Hz, ±2 dB (**NOTE:** Overall system response depends on microphone element; refer to microphone frequency response curves on page 4)

Operating Temperature Range

-20° to 50° C (-4° to 122° F)

EC4 RECEIVER SPECIFICATIONS

RF Sensitivity

0.45 μ V for 12 dB SINAD typical

Image Rejection

90 dB typical

Spurious Rejection

80 dB typical

Ultimate Quieting (reference 15 kHz deviation)

>94 dB A-weighted

Squelch Quieting (reference 15 kHz deviation)

>94 dB A-weighted

Squelch Threshold

2.0 μ V preset, adjustable from 2.0 to 50 μ V

Output

-2 dBV, 1 k Ω output impedance, unbalanced; -18 dBV, 150 Ω output impedance, balanced (volume full clockwise; full deviation; unloaded)

Antenna Input Impedance

50 Ω nominal

Antenna

Plastic sheathed stainless steel, $\frac{1}{4}$ wavelength, 428 mm, PL-259 UHF connectors

Power Requirements

12.5 to 18 VDC (negative ground), 200 mA; 120 Vac, 60 Hz Model PS20 external AC adapter supplied (Model PS20E 220/240 Vac, 50/60 Hz available optional)

Overall Dimensions

1.75 in. H x 17.125 in. W x 7.87 in. D
(44.5 mm x 435 mm x 200 mm)

Includes front panel controls and rear panel UHF connectors; does not include antennas or rack ears

Weight

4.32 lbs (1.962 kilograms)

Certification

Complies with FCC Part 15 (FCC ID: DD4L4)
Power supply UL listed, CSA listed as Certified
Conforms to European Union Directives, eligible to bear CE marking; meets European EMC Immunity Requirements (EN 50 082-1, 1992); ESD (IEC 801-2); RF radiated (IEC 801-3); EFT (IEC 801-4).

EC1 BODY-PACK TRANSMITTER SPECIFICATIONS

RF Power Output

50 mW maximum

Modulation

FM (40K0F3E, FCC Part 90, FCC Part 74) \pm 15 kHz deviation, 62 μ sec pre-emphasis

Audio Gain Adjustment Range

40 dB

Input Impedance

Actual: 17 k Ω , pin 4 wired to pin 3 for WL93 or other wireless condenser microphone; 100 k Ω , pin 4 open for dynamic microphone or instrument pickup

Power Requirements

Battery Type: 9 volt alkaline (Duracell 1604 or equivalent)
8.4-volt nicad optional

Battery Life: 7 hours minimum (alkaline)
1.5 to 2 hours typical (nicad, per charge)

Current Drain: 55 mA typical

Antenna

Attached, 15.2 in. (386 mm), flexible wire

Modulation Limiter

Internal compressor

Audio Polarity

EC1 Transmitter with Shure Wireless Microphones:

Positive pressure on microphone diaphragm produces positive voltage on pin 2 with respect to pin 3 of low-impedance output, and on tip with respect to ground of aux output.

EC1 Transmitter with WA302 or WA310 Cable:

Positive voltage applied to tip of WA302 phone plug or to pin 3 of WA310 XLR connector results in positive voltage at pin 2 with respect to pin 3 of low-impedance output or on trip with respect to ground of aux output.

Dimensions (excluding antenna and belt clip)

82.6 mm High x 63.5 mm Wide x 26.2 mm Deep
(3 $\frac{1}{4}$ in. x 2 $\frac{1}{2}$ in. x 1 $\frac{1}{32}$ in.)

Weight

Without Battery: 96.4 g (3.4 oz)

With Battery: 142 g (5 oz)

Certification

Complies with FCC Parts 74 and 90 (FCC ID: DD4L11)
Conforms to European Union Directives, eligible to bear CE marking; meets European EMC Immunity Requirements (EN 50 082-1, 1992); ESD (IEC 801-2); RF radiated (IEC 801-3); EFT (IEC 801-4).

EC2 TRANSMITTER SPECIFICATIONS

RF Power Output

50 mW maximum

Modulation

FM (60K0F3E) \pm 15 kHz deviation, 62 μ s pre-emphasis

Modulation Limiter

Internal compressor

Audio Polarity

Positive pressure on microphone diaphragm produces positive voltage on tip (with respect to ground) of unbalanced output, and on pin 2 (with respect to pin 3) of balanced output

Audio Gain Adjustment Range

15 dB (2-position switch); additional -6 dB internal pad

Antenna

Removable, external $\frac{1}{4}$ -wave helical antenna (antenna is color-keyed to transmitter frequency range).

Power Requirements

Battery Type: 9 volt alkaline (Duracell MN1604 or equivalent)
8.4-volt nicad optional

Battery Life: 7 hours minimum (alkaline)
1.5 to 2 hours typical (nicad, per charge)

Current Drain: 55 mA typical

EC2 Transducer Type

EC2/58, EC2/Beta 58: Dynamic
EC2/87, EC2/Beta 87: Electret bias condenser

Overall Dimensions (excluding antenna)

EC2/58, EC2/Beta 58: 237 mm x 50.8 mm (9 $\frac{5}{16}$ in. x 2 in.)
EC2/87, EC2/Beta 87: 213 mm x 50.8 mm (8 $\frac{3}{8}$ in. x 2 in.)

Weight

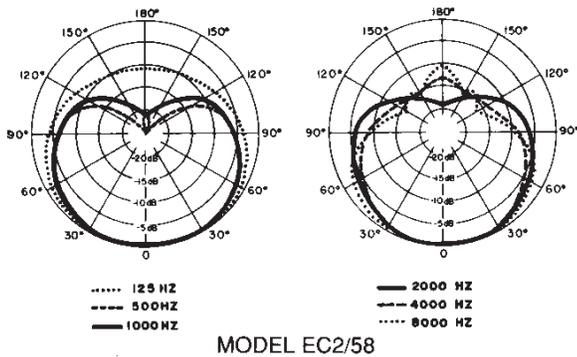
Model	Without Battery	With Battery
EC2/58	453.6 g (16.0 oz)	496.1 g (17.5 oz)
EC2/Beta 58	411.1 g (14.5 oz)	453.6 g (16.0 oz)
EC2/87	337.2 g (11.9 oz)	382.7 g (13.4 oz)
EC2/Beta 87	337.2 g (11.9 oz)	382.7 g (13.4 oz)

Certification

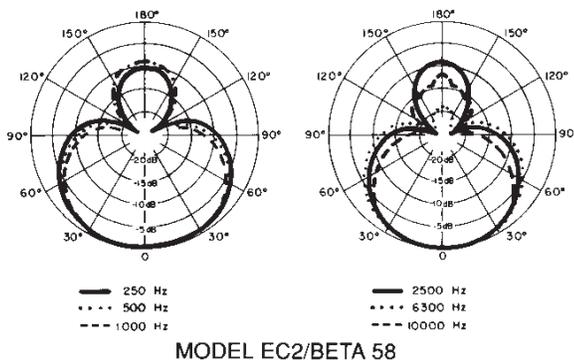
Complies with FCC Parts 74 and 90 (FCC ID: DD4L2)
Conforms to European Union Directives, eligible to bear CE marking; meets European EMC Immunity Requirements (EN 50 082-1, 1992); ESD (IEC 801-2); RF radiated (IEC 801-3); EFT (IEC 801-4).

EC2 Polar Patterns

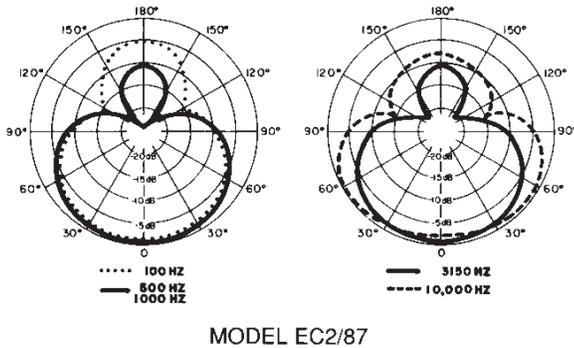
Uniform with frequency, symmetrical about axis
 Cardioid (EC2/58)
 Supercardioid (EC2/Beta 58, EC2/87, EC2/Beta 87)



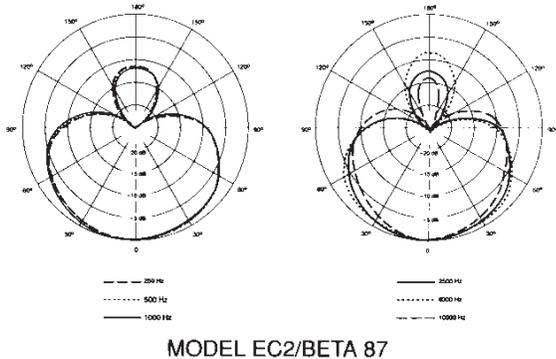
MODEL EC2/58



MODEL EC2/BETA 58



MODEL EC2/87

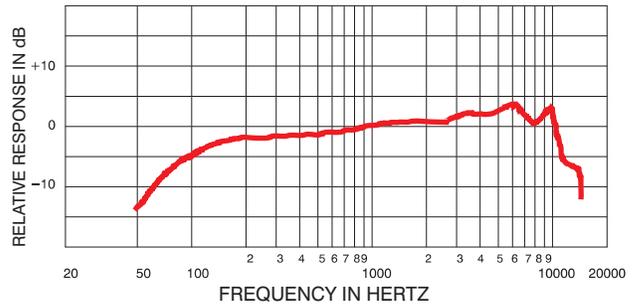


MODEL EC2/BETA 87

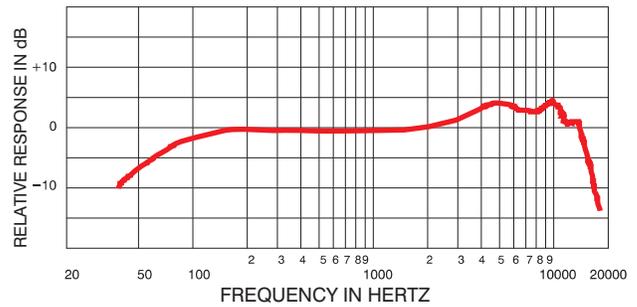
TYPICAL POLAR PATTERNS

EC2 Frequency Response

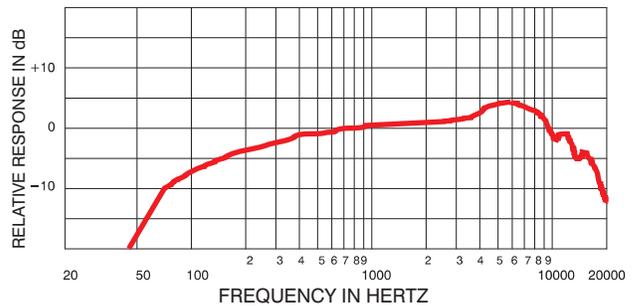
Frequency response curves below were measured in a free field at a distance of 0.6 meters (2 feet) from the sound source.



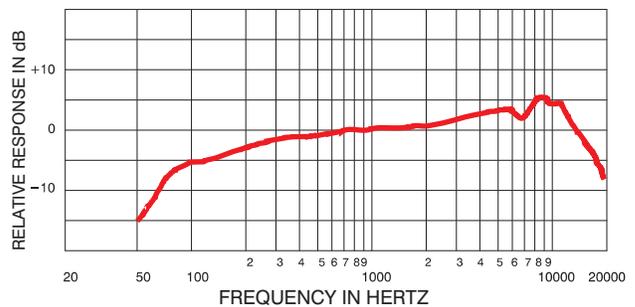
MODEL EC2//58



MODEL EC2/BETA 58



EC2/87



EC/BETA 87

TYPICAL FREQUENCY RESPONSE CURVES