

Miniature Transmitter

- Selectable output power to optimize battery life or operating range
- Superb audio quality
- Ultra-lightweight, corrosion resistant housing
- Water resistant seals for use in damp environments
- Programmable compatibility modes for use with a wide variety of different receivers

To meet the demand for both extended operating range and extended battery life, the “V” series SM transmitters offer selectable output power of 100 or 250 mW. A third selection at 50 mW is provided for some theatrical applications where the system design specifies lower transmitter power.

The input section features the unique servo bias input circuitry with a standard TA5M type jack for use with electret lavalier mics, dynamic mics, or line level signals. A DSP-controlled analog audio limiter is employed before the A-D converter. The limiter has a range of more than 30 dB for excellent overload protection and a dual release envelope that makes the limiter acoustically transparent while maintaining low distortion. The limiter recovers quickly from brief transients, with no audible side effects, and also recovers slowly from sustained high levels to keep audio distortion low while preserving short term dynamics.



A water resistant control panel with LCD, membrane switches and multi-color LEDs make input gain adjustments, frequency and compatibility mode selection quick and accurate. The battery compartment accepts lithium or rechargeable AA batteries.

The housings are machined from solid aluminum blocks to provide an extremely lightweight and rugged package. A special non-corrosive finish resists salt water exposure and perspiration in extreme environments.

The DSP-based design works with all Digital Hybrid receivers, and is backward compatible for use with Lectrosonics 200 and 100 Series and IFB receivers and some other brands of analog wireless receivers. Companion receivers are covered in separate manuals.

Digital Hybrid Wireless® is a revolutionary new design that combines digital audio with an analog FM radio link to provide outstanding audio quality and the exemplary RF performance of the finest analog wireless systems.

This overcomes channel noise in a dramatically new way, digitally encoding the audio in the transmitter and decoding it in the receiver, yet still sending the encoded information via an analog FM wireless link. This proprietary algorithm is not a digital implementation of an analog compander. Instead, it is a technique which can be accomplished only in the digital domain.

The process eliminates compander artifacts, expanding the applications to include test and measurement of acoustic spaces and musical instruments.

Servo Input

The input is a radically different system than previous Lectrosonics transmitter microphone inputs. The improvements are audible and make the transmitters easier to use and much harder to overload. It is no longer necessary on some mics to introduce pads to prevent overload of the input stage, divide the bias voltage down for some low voltage mics, or reduce the limiter range at minimum gain settings.

Digital Hybrid Wireless® Technology

All wireless links suffer from channel noise to some degree, and all wireless microphone systems seek to minimize the impact of that noise on the desired signal. Conventional analog systems use compandors for enhanced dynamic range, at the cost of subtle artifacts (typically “pumping” and “breathing”). Wholly digital systems defeat the noise by sending the audio information in digital form, at the cost of some combination of power, bandwidth and resistance to interference.

Digital Hybrid systems overcome channel noise in a dramatically new way, digitally encoding the audio in the transmitter and decoding it in the receiver, yet still sending the encoded information via an analog FM wireless link. This proprietary algorithm is not a digital implementation of an analog compandor but a technique that can be accomplished only in the digital domain, even though the inputs and outputs are analog.

Because it uses an analog FM link, the Digital Hybrid system enjoys all the benefits of conventional FM wireless systems and it does away with the analog compandor and its artifacts.

No Pre-Emphasis/De-Emphasis

The Digital Hybrid design results in a signal-to-noise ratio high enough to preclude the need for conventional pre-emphasis (HF boost) in the transmitter and de-emphasis (HF roll off) in the receiver. This eliminates the potential for distortion of signals with abundant high-frequency information.

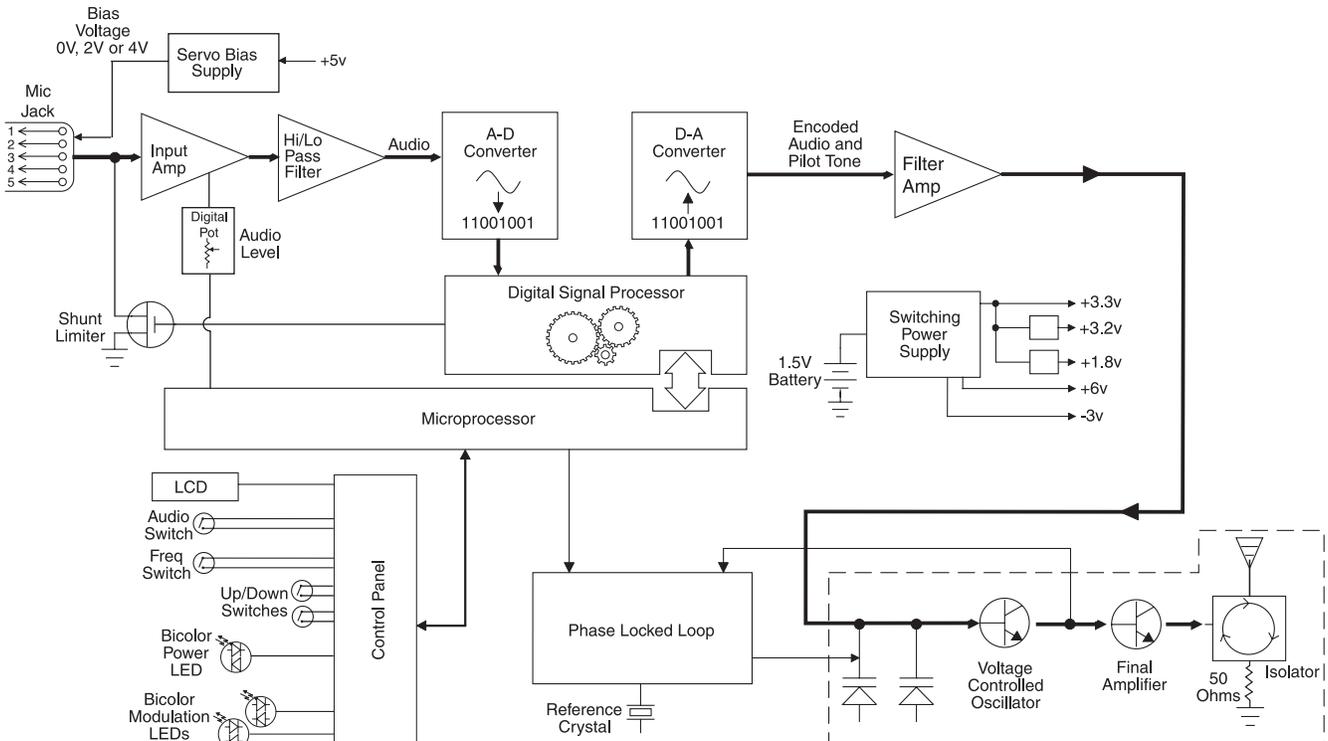
Low Frequency Roll-Off

The low frequency roll-off can be set for a 3 dB down point at 35, 50, 70, 100, 120 and 150 Hz to control subsonic and very low frequency audio content in the audio. The actual roll-off frequency will vary slightly depending upon the low frequency response of the microphone.

Excessive low frequency content can drive the transmitter into limiting, or in the case of high level sound systems, can even cause damage to loudspeaker systems. The roll-off is normally adjusted by ear while listening as the system is operating.

Input Limiter

A DSP-controlled analog audio limiter is employed before the A-D converter. The limiter has a range of more than 30 dB for excellent overload protection. A dual release envelope makes the limiter acoustically transparent while maintaining low distortion. It can be thought of as two limiters in series, a fast attack and release limiter followed by a slow attack and release limiter. The limiter recovers quickly from brief transients, with no audible side effects, and also recovers slowly from sustained high levels to keep audio distortion low and while preserving short term dynamics.



RM Remote Control for SMQV Transmitter

The RM gives you remote control of SM Series Transmitters using an audible tone delivered to the microphone in the wireless system. Operating parameters on the wireless transmitter can be set by holding the speaker on the RM close to the microphone and pressing the pushbutton. A “dweedle” tone will play from the RM speaker into the microphone and the parameter on the transmitter will be set immediately. Adjustments can be made to set:

- Audio input gain
- Frequency
- Lock or Unlock Modes
- Sleep Mode ON/OFF



The flexible, intuitive interface on the RM makes setting these parameters quick and easy. The “dweedle” tones used to signal the transmitter are complex and can be detected in the midst of noise, yet they cannot be mistaken for the natural sound entering the microphone.

A single RM is capable of controlling any SM Series transmitter in any frequency block. Since it can simultaneously control multiple transmitters, the loudness of the tone is adjustable to suit different situations. With the volume turned up, changes can be made at a distance of up to 6 feet from the microphone. The volume can also be tuned down so that only microphones within a few inches of the speaker will pick up the tone.

The RM eliminates the need to disturb wardrobe or talent other than to make a quick, hands-free pause to send the dweedle tone into the microphone. Since the microphone is always positioned to pick up sound from the talker’s voice, it is always accessible for setup changes using the the RM. Even with the microphone concealed under fabric, the tone will still reach the microphone. A remote control system using an IR (infrared) signal would require a line of sight between remote module and transmitter.

Input gain is adjusted by setting the desired value on the LCD on the RM in the same manner as it is adjusted on the transmitter. A single pushbutton press and a brief tone burst then transfers the setting to the transmitter. **Frequency** is adjusted in the same manner, with the options of setting it directly by hex switch code or adjusting it by block and frequency in MHz.



The **Lock** and **Unlock** functions on SM Series transmitters may be used to safeguard the settings and prevent accidental adjustment. When Lock mode is enabled, the switches on the transmitter control panel will not operate. The only way to unlock the controls with the transmitter itself is to remove the battery. The RM can be used to unlock or lock the transmitter controls with a brief dweedle tone while the transmitter remains in position.

The **Sleep** mode on the SM Series transmitters extends battery life during idle conditions. This is very useful when lengthy preparations are necessary or with extensive costuming. The transmitter and microphone can be placed and concealed early in the process and the transmitter then put to sleep with the RM, which reduces power consumption by a factor of 5. When the production is ready to start, a quick dweedle tone wakes up the transmitter and normal operation resumes.

The life of the single AA battery that powers the RM itself is extremely long. A lithium AA battery may run the unit for several years depending upon how often the unit is used, how loud the tone is played and storage conditions.

The machined aluminum housing and corrosion-resistant finish protect against damage from rough handling and moisture. A membrane switch panel helps protect the LCD and internal circuits from moisture and dust.



The RM is supplied with a quick-release lanyard

Frequency Tuning Range

RF-intense multichannel and mobile venues must have a broad selection of frequencies available to alleviate interference problems, especially with the emergence of DTV telecasts. 256 frequencies are selectable in 100kHz steps across the 25.6MHz tuning range of each frequency block. Nine different blocks are available.

Battery Compartment

AA battery technology has advanced significantly in recent years, with a variety of high capacity dry cell and rechargeable formats. SM Series transmitters and the RM remote module are designed to take advantage of this new technology and provide extended operating times at high RF power.

Specifications

Operating frequencies:	Block 470 470.100 - 495.600 Block 19 486.400 - 511.900 Block 20 512.000 - 537.500 Block 21 537.600 - 563.100 Block 22 563.200 - 588.700 Block 23 588.800 - 607.900 and 614.100 - 614.300 Block 24 614.400 - 639.900 Block 25 640.000 - 665.500 Block 26 665.600 - 691.100
Frequency range:	256 frequencies in 100 kHz steps for one 25.5 MHz wide block
Channel Spacing:	100 kHz
Frequency selection:	Control panel mounted membrane switches
RF Power output:	Switchable; 50, 100 or 250 mW
Compatibility Modes (6)	Digital Hybrid Wireless® (400 Series), 200 Series, 100 Series, Mode 3, Mode 6, IFB
Pilot tone:	25 to 32 kHz; 5 kHz deviation (in 400 Series Mode)
Frequency stability:	± 0.002%
Deviation:	± 75 kHz max. (in 400 Series Mode)
Spurious radiation:	60 dB below carrier
Equivalent input noise:	-125 dBV, A-weighted
Input level:	
If set for dynamic mic:	0.5 mV to 50 mV before limiting. Greater than 1 V with limiting.
If set for electret lavalier mic:	1.7 uA to 170 uA before limiting. Greater than 5000 uA (5 mA) with limiting.
Line level input:	17 mV to 1.7 V before limiting. Greater than 50 V with limiting.
Input impedance:	
Dynamic mic:	300 Ohms
Electret lavalier:	Input is virtual ground with servo adjusted constant current bias
Line level:	2.7 k Ohms
Input limiter:	DSP Controlled Soft limiter, 30 dB range
Bias voltages:	Fixed 5 V at up to 5 mA Selectable 2 V or 4 V servo bias for any electret lavalier.
Gain control range:	40 dB; panel mounted membrane switches

The battery door rotates to open and close on the SMQV transmitter. A knurled knob is tightened to maintain pressure on the battery contacts.



Modulation indicators:	Dual bicolor LEDs indicate modulation of -20, -10, 0, +10 dB referenced to full modulation.																
Controls:	Control panel with LCD and four membrane switches.																
Low frequency roll-off:	Adjustable from 35 to 150 Hz.																
Audio Frequency Response:	35 Hz to 20 kHz, +/-1 dB (The low frequency roll-off is adjustable - see graph above)																
Signal to Noise Ratio (dB): (overall system, 400 Series mode)	<table border="1"> <thead> <tr> <th></th> <th>SmartNR</th> <th>No Limiting</th> <th>w/Limiting</th> </tr> </thead> <tbody> <tr> <td>OFF</td> <td></td> <td>103.5</td> <td>108.0</td> </tr> <tr> <td>NORMAL</td> <td></td> <td>107.0</td> <td>111.5</td> </tr> <tr> <td>FULL</td> <td></td> <td>108.5</td> <td>113.0</td> </tr> </tbody> </table>		SmartNR	No Limiting	w/Limiting	OFF		103.5	108.0	NORMAL		107.0	111.5	FULL		108.5	113.0
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<small>(Note: the dual envelope "soft" limiter provides exceptionally good handling of transients using variable attack and release time constants. The gradual onset of limiting in the design begins below full modulation, which reduces the measured figure for SNR without limiting by 4.5 dB)</small>																	
Total Harmonic Distortion:	0.2% typical (400 Series mode)																
Audio Input Jack:	Switchcraft 5-pin locking (TA5F)																
Antenna:	Flexible, unbreakable steel cable.																
Batteries:	1.5 Volt AA lithium or rechargeable NiMH recommended																
Battery Life:	<table border="0"> <tr> <td>SMQV 250mW:</td> <td>1.75 hours (alkaline); 7.5 hours (lithium), 5 hours with 2500mAh NiMH</td> </tr> <tr> <td>SMQV 100mW:</td> <td>5.75 hours (alkaline); 14.25 hours (lithium), 8.5 hours with 2500mAh NiMH</td> </tr> <tr> <td>SMQV 50mW:</td> <td>5.75 hours (alkaline); 14.25 hours (lithium), 8.5 hours with 2500mAh NiMH</td> </tr> </table>	SMQV 250mW:	1.75 hours (alkaline); 7.5 hours (lithium), 5 hours with 2500mAh NiMH	SMQV 100mW:	5.75 hours (alkaline); 14.25 hours (lithium), 8.5 hours with 2500mAh NiMH	SMQV 50mW:	5.75 hours (alkaline); 14.25 hours (lithium), 8.5 hours with 2500mAh NiMH										
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Weight:	RM: 2.3 oz.. (65.8 grams) with lithium battery SMQV: 3.7 oz.. (105 grams) with lithium batteries																
Overall Dimensions:	<table border="0"> <tr> <td>RM:</td> <td>2.3 x 1.8 x 0.64 inches (not including microphone/lanyard) 58 x 46 x 16 mm (not including microphone/lanyard)</td> </tr> <tr> <td>SMQV:</td> <td>2.3 x 2.4 x 0.64 inches (not including microphone) 58 x 60 x 16 mm (not including microphone)</td> </tr> </table>	RM:	2.3 x 1.8 x 0.64 inches (not including microphone/lanyard) 58 x 46 x 16 mm (not including microphone/lanyard)	SMQV:	2.3 x 2.4 x 0.64 inches (not including microphone) 58 x 60 x 16 mm (not including microphone)												
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Emission Designator: 180KF3E
Specifications subject to change without notice.



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