

# SMV Series

## Miniature Transmitters

### TECHNICAL DATA

- Selectable output power to maximize battery life or operating range
- Ultra-lightweight, corrosion resistant housing
- Water resistant seals for use in damp environments
- LCD interface with lockout option
- Programmable compatibility modes for use with a wide variety of different receivers
- Servo Bias input circuitry



To meet the demand for both extended operating range and extended battery life, the “V” series SM transmitters offer selectable output power ranging from 50, 100 and 250 mW on the single and dual battery model. With higher power output, the operating range is improved at the expense of battery life. When range is not an issue, the power can be reduced to extend the battery life.

Both models are compatible with the RM and RM2 remote control units for *hands free* setup and adjustment using audible tones delivered into the microphone from a tiny loudspeaker in the remote control unit. The transmitter can be put to sleep to conserve battery power during setup while the transmitter is buried deep inside costumes, then awakened for normal operation when the production begins. Other features include frequency and audio level adjustment and control lockout.

**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 compandor. Instead, it is a technique which can be accomplished only in the digital domain.

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

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.

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 distortion.

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.



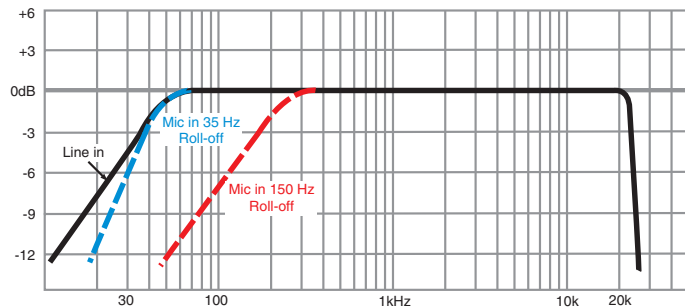
Rio Rancho, NM, USA  
www.lectrosonics.com

## High Power Output and Long Battery Life

Variable power provides the choice of maximum power output for extended operating range and interference suppression, or lower power output for extended battery life when operating in less demanding RF conditions.

## Adjustable Low Frequency Roll-off

The low frequency roll-off can be set for 3 dB down points of 35, 50, 70, 100, 120 or 150 Hz to control subsonic and very low frequency audio content.



## DSP-Based Pilot Tone & Compatibility

The DSP generated pilot tone eliminates the need for fragile crystals and allows a different pilot tone frequency for each of the 256 carrier frequencies in the tuning range of the wireless system. Individual pilot tones significantly reduce squelch problems in multichannel systems where a pilot tone signal can appear in the wrong receiver via intermodulation products.

The DSP also offers compatibility modes to allow backward compatibility with all Lectrosonics IFB systems, 100/200 Series systems and analog receivers from some other manufacturers in addition to its native Digital Hybrid operating mode.

## Input Limiter

A DSP-controlled analog audio limiter is employed before the analog-to-digital 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. The limiter recovers quickly from brief transients, so that its action is hidden from the listener, but recovers slowly from sustained high levels, to keep audio distortion low and preserve short term dynamic changes.

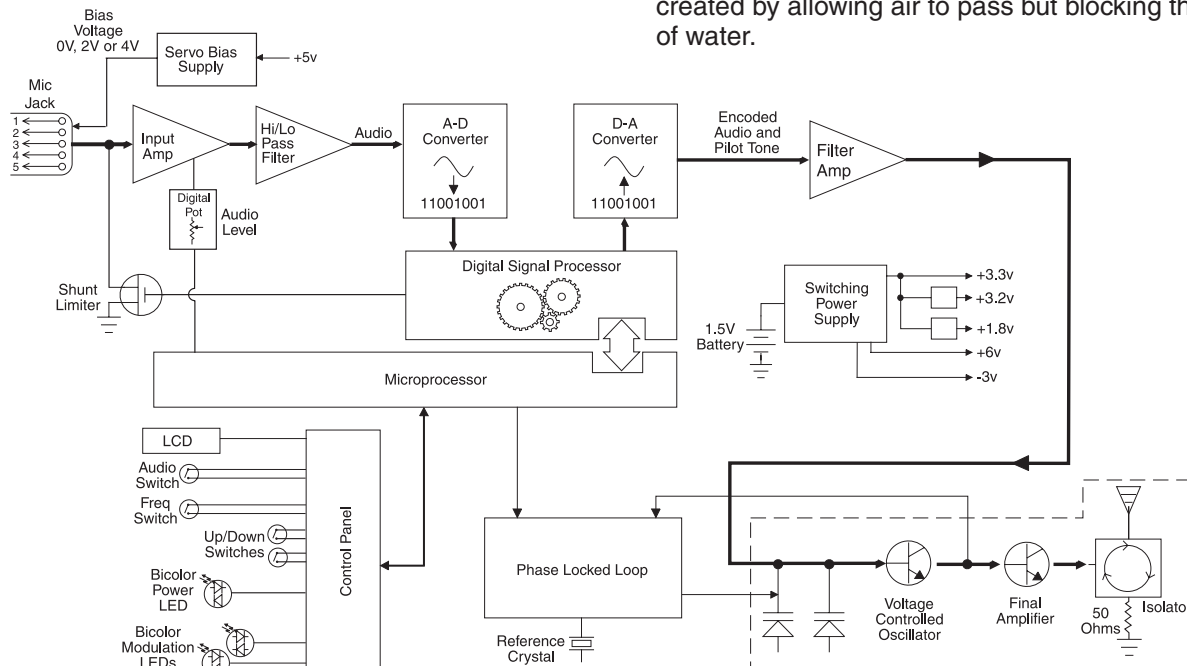
The bicolor LEDs indicate limiter activity accurately to assist in setting the input gain for optimal signal to noise ratio and dynamic range.

## Circulator/Isolator

The transmitter RF output circuit includes a specialized RF device called a “circulator/isolator” or simply “isolator” using a magnetically polarized ferrite to allow RF signals to pass through to the antenna, but block them from coming backward into the transmitter output section. This greatly reduces RF intermodulation produced in the transmitter output stages when multiple units are used in close proximity (a few feet apart). The isolator also helps protect the output stage from electrostatic shock delivered to the antenna. Isolators are common in broadcast and commercial applications, but because of their high cost it is unusual to find them in wireless microphone systems.

## GORE-TEX® Vent

In special circumstances it is possible for moisture to be pulled into the housing when a unit is moved from a warm, damp operating environment, turned off and stored in a cool place. As the warm air inside the unit cools a vacuum is created, pulling air in past the exterior of the housing, bringing moisture with it. A special vent in the battery door prevents a vacuum from being created by allowing air to pass but blocking the passage of water.



# Remote Control

## RM Remote Control

The RM gives you remote control of SMV 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 turned 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 transmtter. **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 RM is supplied with a quick-release lanyard*

The **Lock** and **Unlock** functions on the 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 RM can be used to unlock or lock the transmitter controls with a brief dweedle tone. The only way to unlock the controls with the transmitter itself is to remove the battery.

The **Sleep** mode on the SMV 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.

## RM2 Remote Control

The RM2 is a lower cost alternative remote control with a simple push button interface for the SMV Series transmitters. Adjustments can be made to:

- Turn the transmitter Sleep Mode On and Off
- Lock or Unlock transmitter controls
- Adjust transmitter Audio Input Gain



## 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 23	588.800 - 607.900
Block 19	486.400 - 511.900		614.100 - 614.300
Block 20	512.000 - 537.500	Block 24	614.400 - 639.900
Block 21	537.600 - 563.100	Block 25	640.000 - 665.500
Block 22	563.200 - 588.700	Block 26	665.600 - 691.100

<b>Channel Spacing:</b>	100 kHz
<b>Frequency selection:</b>	Control panel mounted membrane switches
<b>RF Power output:</b>	Switchable; 50 or 100 mW SMV: SMQV: Switchable; 50, 100 or 250 mW
<b>Compatibility Modes (6)</b>	Digital Hybrid Wireless™ (400 Series), 200 Series, 100 Series, Mode 3, Mode 6, IFB
<b>Pilot tone:</b>	25 to 32 kHz; 5 kHz deviation (in 400 Series Mode)
<b>Frequency stability:</b>	± 0.002%
<b>Deviation:</b>	± 75 kHz max. (in 400 Series Mode)
<b>Spurious radiation:</b>	60 dB below carrier
<b>Equivalent input noise:</b>	-125 dBV, A-weighted
<b>Input level:</b>	
<b>If set for dynamic mic:</b>	0.5 mV to 50 mV before limiting. Greater than 1 V with limiting.
<b>If set for electret lavalier mic:</b>	1.7 uA to 170 uA before limiting. Greater than 5000 uA (5 mA) with limiting.
<b>Line level input:</b>	17 mV to 1.7 V before limiting. Greater than 50 V with limiting.
<b>Input impedance:</b>	
<b>Dynamic mic:</b>	300 Ohms
<b>Electret lavalier:</b>	Input is virtual ground with servo adjusted constant current bias
<b>Line level:</b>	2.7 k Ohms

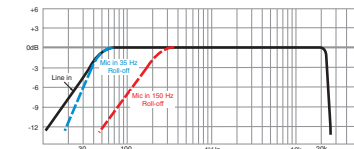
<b>Input limiter:</b>	Soft limiter, 30 dB range
<b>Bias voltages:</b>	Fixed 5 V at up to 5 mA Selectable 2 V or 4 V servo bias for any electret lavalier.
<b>Gain control range:</b>	40 dB; panel mounted membrane switches
<b>Modulation indicators:</b>	Dual bicolor LEDs indicate modulation of -20, -10, 0, +10 dB referenced to full modulation.
<b>Controls:</b>	Control panel with LCD and four membrane switches.

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



### 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)  
(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)

SmartNR	No Limiting	w/Limiting
OFF	103.5	108.0
NORMAL	107.0	111.5
FULL	108.5	113.0

### 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

		Alkaline	Lithium	2500 mA NiMH
<b>Battery Life:</b>	SMV 50 mW (1 AA):	2 hrs	7.25 hrs	5 hrs
	SMV 100 mW (1 AA):	1.5 hrs	5.5 hrs	4 hrs
	SMV 250 mW (2 AA):	N/R*	3 hrs	2.25 hrs
	SMQV 50 mW (2 AA):	6 hrs	14.5 hrs	8.5 hrs
	SMQV 100 mW (2 AA):	5.5 hrs	14 hrs	8.5 hrs
	SMQV 250 mW (2 AA):	1.75 hrs	7.5 hrs	5 hrs

\*Alkaline is not recommended at the 250 mW level. Battery tests lasted less than 1/2 hour

### Weight:

RM: 2.3 oz.. (65.8 grams) with lithium battery  
SMV: 2.7 oz.. (75.9 grams) with lithium battery  
SMQV: 3.7 oz.. (105 grams) with lithium batteries

### Overall Dimensions:

RM:	2.3 x 1.8 x 0.64 inches (not including microphone/lanyard) 58 x 46 x 16 mm (not including microphone/lanyard)	SMV:	2.3 x 1.8 x 0.64 inches (not including microphone/lanyard) 58 x 46 x 16 mm (not including microphone/lanyard)
RM2:	2.125 x 1.25 x 1.125 inches (not including microphone/lanyard) 54 x 32 x 29 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)

### Emission Designator: 180KF3E

Specifications subject to change without notice.



581 Laser Road NE • Rio Rancho, NM 87124 USA • www.lectrosonics.com  
(505) 892-4501 • (800) 821-1121 • fax (505) 892-6243 • sales@lectrosonics.com

16 August 2010