

SMB/E01 Series

Miniature Transmitters

TECHNICAL DATA

- Digital Hybrid Wireless® Technology
US Patent 7,225,135
- 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 variety of different receivers
- AA battery powered with Sleep mode
- Servo Bias input circuitry
- Goretex® vent moisture prevention

SMB Series transmitters are ideal for motion picture and television production, live theater and other productions where costuming is prevalent and the wireless must be concealed. Despite their tiny size, the transmitters are feature rich and well suited to demanding production environments where outstanding audio quality and RF performance are mandatory in the midst of temperature and moisture extremes.

Both models are compatible with the RM remote control unit for **hands free** setup and adjustment using audible tones delivered into the microphone from a tiny loud-speaker 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 costuming, 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 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.



The transmitters work with LECTROSONICS Euro version Digital Hybrid receivers in the native mode, with DSP generated compatibility modes to emulate the compander in the Euro version IFB receiver. Telemetry is included to transmit battery status to receivers equipped to receive the data such as the Venue and SRa models.

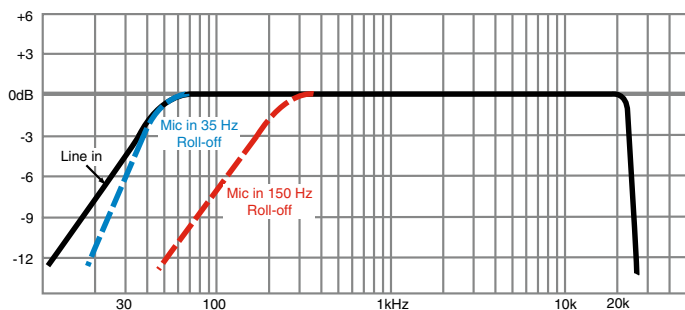
The input section features the unique servo bias input circuitry with a standard TA5M type jack for use with electret lavalier mics, dynamic mics, or line level signals. A DSP-controlled analog audio limiter is employed before the A-D converter. The limiter has a range of more than 30 dB for excellent 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.

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. The setting is normally made while listening to the audio with the microphone that is to be used in place.



DSP-Based Pilot Tone

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.

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.

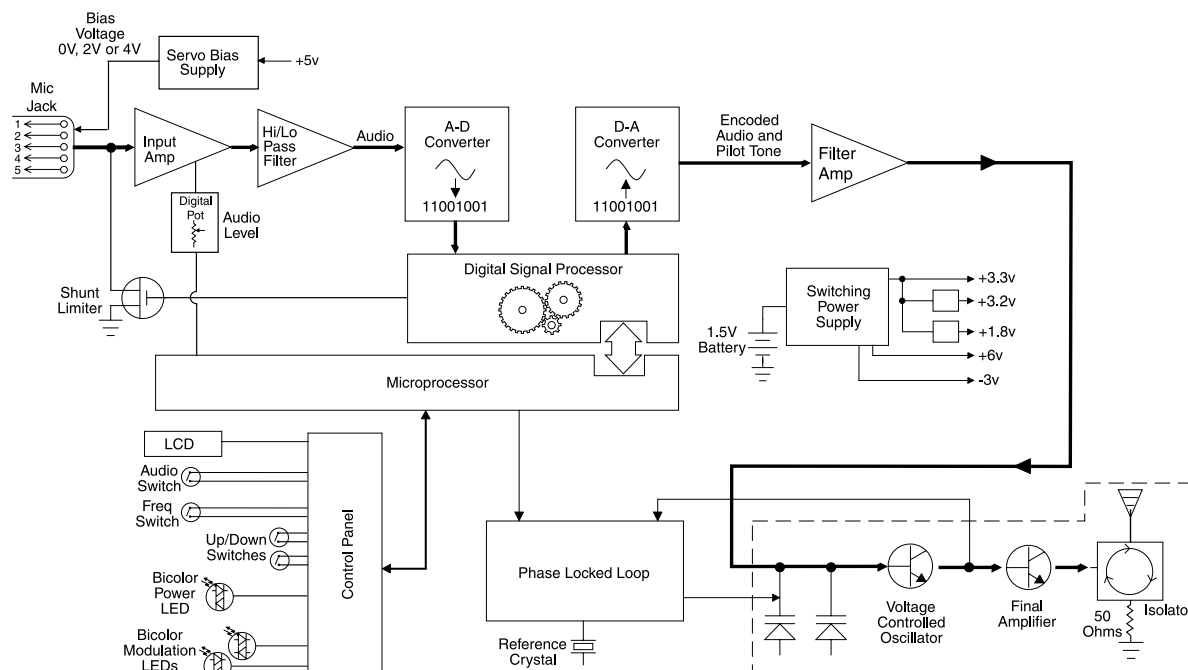
The limiter recovers quickly from brief transients, so that its action is hidden from the listener, but recovers slowly from sustained high levels, to keep audio distortion low and preserve short term dynamic changes. Bicolor LEDs indicate limiter activity accurately to assist in setting the input gain 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 passes air quickly to equalize the pressure but blocks the passage of moisture.



* GORE-TEX is a registered trademark of W. L. Gore & Associates, Inc.

Remote Control

RM Remote Control

The RM gives you remote control of the 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:

- Tx Input Gain
- Sleep/Unsleep
- Lock/Unlock
- Frequency
- Tuning in 25 kHz steps
- Changing the low frequency roll-off setting
- Turning on/off the PWR and Audio LEDs
- Gain up/down functions



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 natural sound entering the microphone.

A single RM is capable of controlling a 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 transmtter.

Frequency is adjusted in the same manner as input gain, 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 disable the control panel switches to safeguard the settings and prevent accidental changes to the settings. 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 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.

Specifications and Features

Operating frequencies:

Block 470	470.100 - 495.600	(100 kHz Steps)
Block 19	486.400 - 511.900	(Frequency usage varies by country)
Block 20	512.000 - 537.500	
Block 21	537.600 - 563.100	
Block 22	563.200 - 588.700	
Block 23	588.800 - 614.300	
Block 606	606.000 - 631.500	
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:

50 mW (nominal)

Compatibility Modes (6)

Digital Hybrid Wireless® (400 Series) and IFB

Pilot tone:

25 to 32 kHz; 3 kHz deviation in hybrid mode

Frequency stability:

± 0.002%

Deviation:

± 50 kHz max. in hybrid 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:

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

Modulation indicators:

Dual bicolor LEDs indicate modulation of
-20, -10, 0, +10 dB referenced to
full modulation.

Controls:

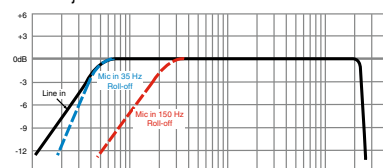
Control panel with LCD and four membrane switches.



The battery door rotates to open and close. A knurled knob secures the door 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

Battery Life:

SMB: 2 hours (alkaline); 7.25 hours (lithium),
5 hours with 2500mAh NiMH

SMDB: 6 hours (alkaline); 14.5 hours (lithium),
8.5 hours with 2500mAh NiMH

Weight:

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

Overall Dimensions:

SMB/RM: 2.3 x 1.8 x 0.64 inches
(not including microphone/lanyard)
58 x 46 x 16 mm
(not including microphone/lanyard)
SMDB: 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.



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