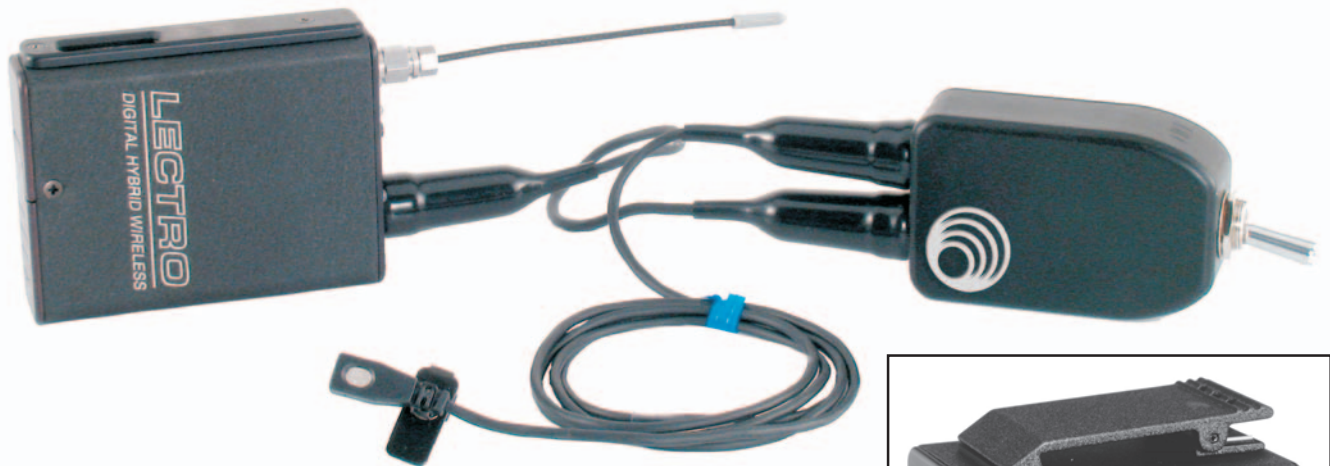


Referee Transmitter



- Externally switched “no pop” audio muting
- Digital Hybrid Wireless™ (U.S. Patent Pending)
- Compatible with older Lectrosonics analog receivers
- 256 synthesized UHF frequencies and 100 mW output power
- Adjustable low frequency roll-off
- Rugged machined aluminum construction

A Complete System Includes:

- REFUM transmitter
- REFSWITCH external mute with Interface cable
- M152 or other electret microphone

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 extended operating range of the finest analog wireless systems. The design eliminates the audio companding process.

The design 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, even though the audio inputs and outputs are analog signals.

US Patent Pending

The referee transmitter offers sports officials the latest digital/analog hybrid technology in a convenient, weather-resistant package. Using the REFSWITCH external belt-pack switch assembly, the audio in the REFUM transmitter can be muted or engaged, without pops or clicks in the audio.

A 5-pin input jack provides taps for low impedance dynamic mics, electret lavalier mics (positive or negative bias) and a pin designated for audio muting using an external switch. Input gain is adjustable over a 43 dB range to perfectly match the audio input level for optimum modulation, minimum distortion and maximum signal to noise ratio. Input levels are accurately indicated by two LEDs on the control panel.

The input is gain controlled with a wide range dual envelope input limiter, which cleanly limits input signal peaks over 30 dB above full modulation. Along with the Digital Hybrid Wireless™ audio path, the RF transmission is an aggressively optimized FM system with +/- 75 kHz wide deviation for a high signal to noise ratio. The overall system delivers full bandwidth audio frequency response up to 20 kHz plus excellent operating range and resistance to interference.

The REFUM is powered by a single 9 V battery and provides a full 100 mW output for extended operating range. The housing and belt-clip are machined aluminum, powder coated and laser engraved for ruggedness and legibility.

REFUM TRANSMITTER



The low frequency roll-off is adjustable from 35 Hz to 150 Hz to control the presence of low frequency audio in the program material.

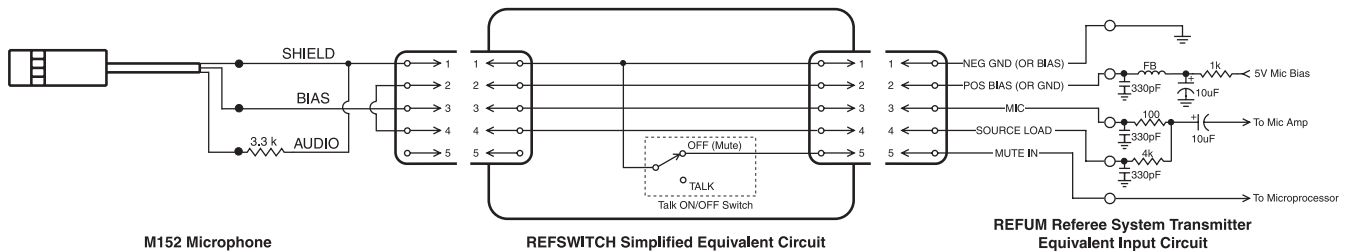
The machined aluminum battery door is hinged to the housing. Battery contacts automatically adjust to a wide variety of alkaline and lithium 9 V batteries.

Rugged machined aluminum housing and spring loaded belt clip



Transmitter and Microphone Jacks

REFSWITCH



Specifications

Operating Frequencies (MHz): Block 21 537.600 - 563.100
Block 25 640.000 - 665.500

Frequency selection: 256 frequencies in 100kHz steps

Channel Separation: 100 kHz

RF Power output: 100 mW

Pilot tone: 25 to 32 kHz; 5kHz deviation

Frequency stability: ± 0.002%

Deviation: ± 75 kHz (max)

Spurious radiation: 90 dB below carrier

Equivalent input noise: -120 dBV (A-weighted)

Input level: Nominal 2 mV to 300 mV, before limiting. Greater than 1V maximum, with limiting.

Input impedance: Taps provided for 200, 4k, 40k Ohm

Input limiter: Dual envelope "soft" limiter; greater than 30 dB range

Gain control range: 43 dB; semi-log rotary control

Modulation indicators: Dual bicolor LEDs indicate modulation of -20, -10, 0 and +10dB referenced to full modulation

Audio Performance (overall system):

Frequency Response: 32 Hz to 20 kHz (+/-1dB)

Low freq. roll-off adjustment: -18 dB/octave; adjustable from 35Hz to 150Hz

SNR at receiver output:

(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 clipping level, 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

THD: 0.2% (typical)

Input Dynamic Range: 125 dB (with full Tx limiting)

Controls: Two position "ON-OFF" power switch
Audio input gain knob
Low rolloff pot on side panel

Audio Input Jack: Switchcraft 5 pin locking (TA5F)

Antenna: Detachable, flexible wire supplied; 50 Ohm port allows connection to test equipment

Battery: Precision compartment auto-adjusts to accept any known alkaline 9 Volt battery. (We've tried 243 different ones.)

Battery Life: 5 hours (alkaline); 10 hours (lithium)

Weight: 6.98 ozs. - 198 grams (including lithium 9V battery and antenna)

Dimensions: 3.17 x 2.48 x .84 inches

Emission Designator: 180KF3E

