

UM400a

TECHNICAL DATA

Digital Hybrid UHF Belt Pack Transmitter



The latest digital/analog hybrid technique is presented in a classic Lectrosonics wireless belt-pack transmitter. 24-bit digital audio is combined with optimized FM to create unprecedented audio quality and RF performance. The RF transmission is an aggressively optimized FM system with +/-75kHz wide deviation for a high signal to noise ratio. The overall system delivers full bandwidth audio frequency response up to 20kHz and the operating range of the finest analog wireless systems.

A 5-pin input jack provides taps for low impedance dynamic mics, electret lavalier mics with positive or negative bias and line level inputs. Input gain is adjustable over a 43 dB range using two LEDs to precisely match the audio input level for optimum modulation, minimum distortion and maximum S/N ratio.

Compatibility with earlier analog Lectrosonics receivers and even some receiver models from other manufacturers is provided by custom firmware emulations built into the DSP code. A simple procedure using the frequency and power switches selects the desired operating mode.

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 process eliminates a compandor and its artifacts.

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 compandor. Instead, it is a technique which can be accomplished only in the digital domain, even though the audio inputs and outputs are analog signals.

- Digital Hybrid Wireless® Technology
- 256 synthesized UHF frequencies
- 100 mW output power
- DSP controlled dual envelope input limiter
- DSP emulations for analog compatibility
- Dual bicolor LEDs indicate four different levels for precise gain adjustment
- DSP based pilot-tone signal
- Circulator/Isolator output stage
- Adjustable low frequency roll-off

The UM400a is powered by a single 9V battery and provides a full 100mW output for extended operating range. The housing and belt-clip are machined aluminum, powder coated and laser engraved for ruggedness and legibility.

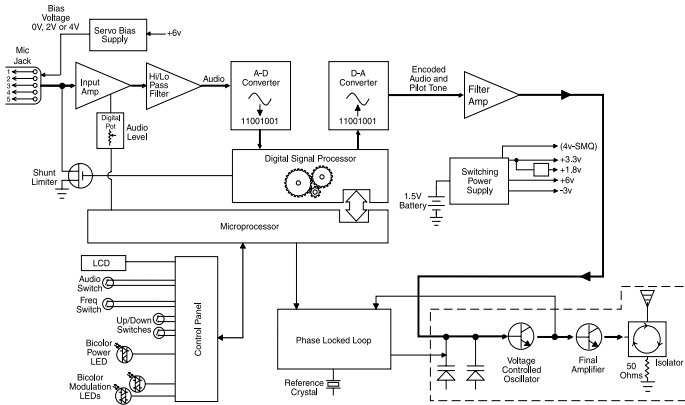
Two 16-position rotary switches adjust the operating frequency of the transmitter over a 25.6 MHz bandwidth in 100 kHz steps.



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



UM400a Block Diagram



The input includes a wide range limiter, a 24-bit A/D converter sampling at 88.2 kHz, followed by DSP filters to remove supersonic audio above 21 kHz. The resulting signal is then encoded with a proprietary DSP algorithm to produce an encoded data signal for RF transmission. The encoded data signal is mixed with a DSP derived pilot tone signal and sent to the VCO. The modulated output of the VCO is then delivered to the output stage.

The RF output stage includes a circulator/isolator to prevent IM products from occurring in the output amplifier. It allows the RF signal to be transmitted, but suppresses external RF signals from entering back into the output amplifier.

Operating Frequencies (MHz):

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
Block 27:	691.200 - 716.700
Block 28:	716.800 - 742.300
Block 29:	742.400 - 767.900
Block 30:	768.000 - 793.500
Block 31:	793.600 - 819.100
Block 32:	819.200 - 844.700
Block 33:	844.800 - 865.000
Block 944:	944.100 - 951.900

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



Specifications

Frequency selection:	256 frequencies in 100kHz steps
RF Power output:	100 mW (nominal)
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:	
Dynamic mic:	300 Ohms
Electret lavaliere:	Input is virtual ground with servo adjusted constant current bias
Line level:	2.7 k Ohms
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 +10 dB referenced to full modulation

Specifications subject to change without notice

Audio Performance (overall system)

Frequency Response:

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

THD:

0.2% (typical) SNR at receiver output:

(Note: the dual envelope "soft" limiter provides exceptionally good handling of transients using variable attack and release time constants. 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

Input Dynamic Range:

125 dB (with full Tx limiting) Low frequency roll-off

Adjustment:

-18 dB/octave; adjustable from 35Hz to 150Hz

Controls:

- Two position "ON-OFF" power switch
- Audio input gain knob
- Low frequency roll-off pot on side panel
- Two 16-position rotary switches adjust frequency

Audio Input Jack:

Switchcraft 5 pin locking (TA5F)

Antenna:

Detachable, flexible wire supplied

Battery:

50 Ohm port allows connection to test equipment

Battery Life:

Precision compartment auto-adjusts to accept any known 9 Volt battery

Battery Life:

5 hours (alkaline); 10 hours (lithium)

Weight:

6.98 ozs. - 198 grams (including battery & antenna)

Dimensions:

3.17 x 2.48 x .84 inches

Emission Designator:

180KF3E



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