

UH400A UH400TM

Frequency Agile Plug-On UHF Transmitter



Featuring Digital Hybrid Wireless™ Technology
U.S. Patent 7,225,135

Fill in for your records:

Serial Number:

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This plug-on transmitter is an advanced design that has evolved since the first models appeared in the late 1980's serving ENG applications at television stations across the USA. In the mid-1990's, the first UHF versions became available and the use of plug-on transmitters in motion picture production increased significantly. The current UH400A model has evolved to include every improvement and feature developed since the first model was introduced.

The UH400A is a rugged, machined aluminum package with selectable phantom power for use with a wide variety of microphones. LEDs located on the top panel make quick and accurate level settings without having to view the receiver. The battery compartment accepts any 9 volt alkaline, LiPolymer or lithium battery and makes a positive connection via self-adjusting contacts.

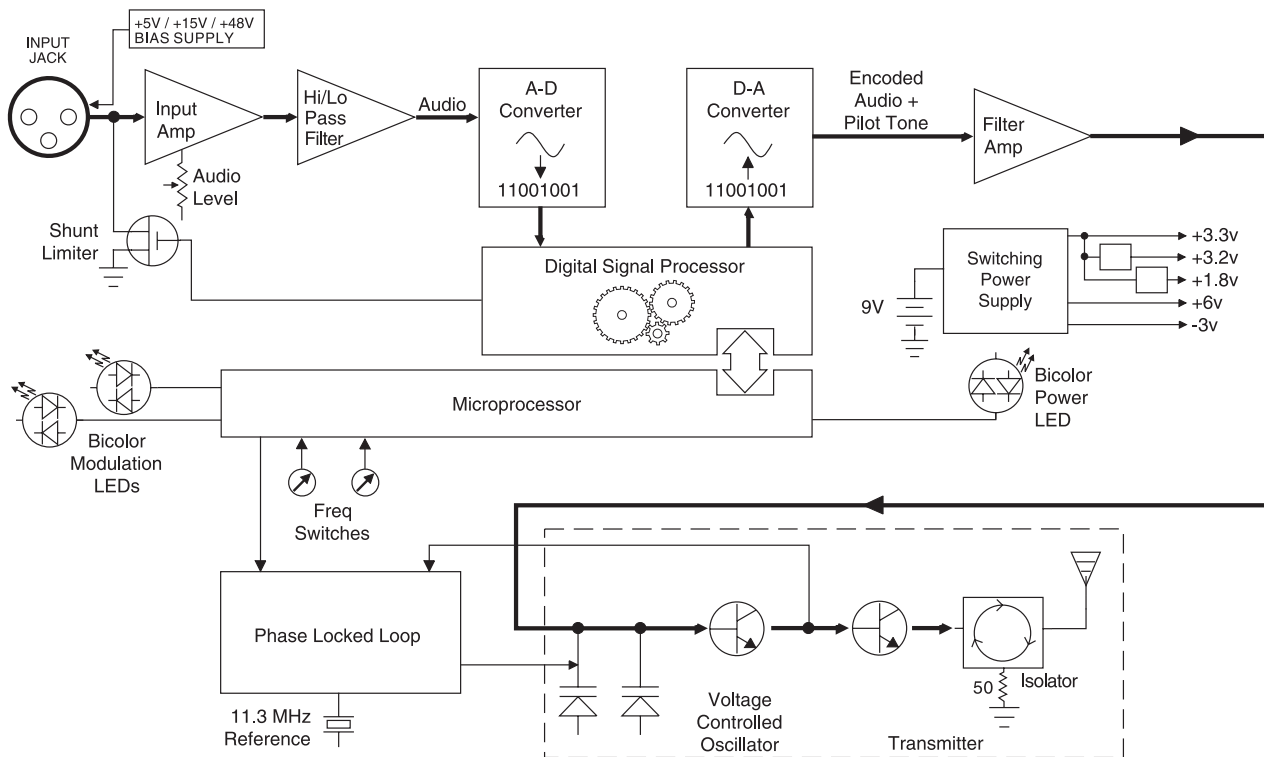
The UH400TM is a specialized version of the UH400A that is an integral part of a highly accurate wireless test and measurement system.

Only the UH400A and UH400TM transmitters are covered in this manual. Companion receivers are covered in separate manuals. The UH400A and UH400TM will operate with any 100 Series, 200 Series, 400 Series, IFB Lectrosonics receiver in the same frequency group, or selected analog receivers from other manufacturers operating in the same frequency range. (Contact factory for details.)

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General Technical Description



UH400A Block Diagram

Introduction

Digital Hybrid Wireless™ is a wideband design with ± 75 kHz deviation producing an excellent audio signal to noise ratio and wide dynamic range. The switching power supplies provide constant voltages to the transmitter circuits from the beginning (9.3 Volts) to the end (5.5 Volts) of battery life. The input amplifier uses an ultra low noise op amp for quiet operation. It is gain controlled with a wide range dual envelope input compressor which cleanly limits input signal peaks over 30 dB above full modulation.

Digital Hybrid 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 compressors for enhanced signal to noise ratio, at the cost of subtle artifacts known as “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.

The Lectrosonics Digital Hybrid Wireless™ system (hereafter called Digital Hybrid) 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 but a technique which can be accomplished only in the digital domain, even though the inputs and outputs are analog signals.

Channel noise still has an impact on received signal quality and will eventually overwhelm the receiver. The Digital Hybrid simply encodes the signal to use a noisy channel as efficiently and robustly as possible, yielding audio performance that rivals that of wholly digital systems, without the power and bandwidth problems inherent in digital transmission. As always, these advantages come at a cost. The Digital Hybrid system requires fairly intensive digital processing in both the transmitter and the receiver. These processors cost money, take up space and consume power. The Digital Hybrid system also requires that the underlying RF link be of excellent quality, with better frequency response and distortion characteristics than that required by conventional systems.

Because it uses an analog FM link, the Digital Hybrid enjoys all the benefits of conventional FM wireless systems, such as excellent range, efficient use of RF spectrum, and long battery life. However, unlike conventional FM systems, the Digital Hybrid has done away with the analog compander and its artifacts.

Input Limiter

The Digital Hybrid Wireless™ transmitters employ a digitally-controlled analog audio limiter just 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. It can be thought of as two limiters in series, connected as a fast attack and release limiter followed by a slow attack and release limiter. The limiter recovers quickly from brief transients, so that its action is hidden from the listener, but recovers slowly from sustained high levels, to both keep audio distortion low and preserve short term dynamic changes.

Generally speaking, some limiting is desirable in normal operation to improve the signal to noise ratio of the system. The limiting action is not audible and does not create distortion. A highly trained ear would hear only the compression of the peaks in the audio signal, which is desirable with most recorders and many sound reinforcement systems.

No Pre-Emphasis/De-Emphasis

The signal to noise ratio of the Digital Hybrid Wireless™ system is high enough to preclude the need for conventional pre-emphasis (HF boost) in the transmitter and de-emphasis (HF roll off) in the receiver. Pre-emphasis and de-emphasis in an FM radio system usually provides about a 10 dB improvement in the signal to noise ratio of the system, but the high frequency boost in the transmitter must be removed in a purely complementary manner or else the frequency response of the original audio signal will be altered.

Pre-emphasis can also cause distortion in the receiver. As this signal is passed through the IF filters in the receiver, distortion can be produced, most noticeably at full modulation. De-emphasis cannot be applied until the signal is converted into audio, so there is no way around this problem short of eliminating pre-emphasis altogether. Neither of these problems occur in the Digital Hybrid system.

Pilot Tone Squelch

The Digital Hybrid Wireless™ system uses one of 256 different ultrasonic tones between 25 and 32 kHz, that modulate the carrier to operate the receiver squelch. The pilot tone frequency is chosen according to which of the 256 channels has been selected by the frequency switch setting. The basic benefit of the pilot tone squelch system is that the receiver will remain muted until it receives the pilot tone from the matching transmitter, even if a strong RF signal is present on the carrier frequency of the system.

Wide-Band Deviation

A ± 75 kHz deviation improves the capture ratio, signal to noise ratio and AM rejection of a wireless system dramatically, compared to the more commonly used ± 15 kHz deviation.

Long Battery Life

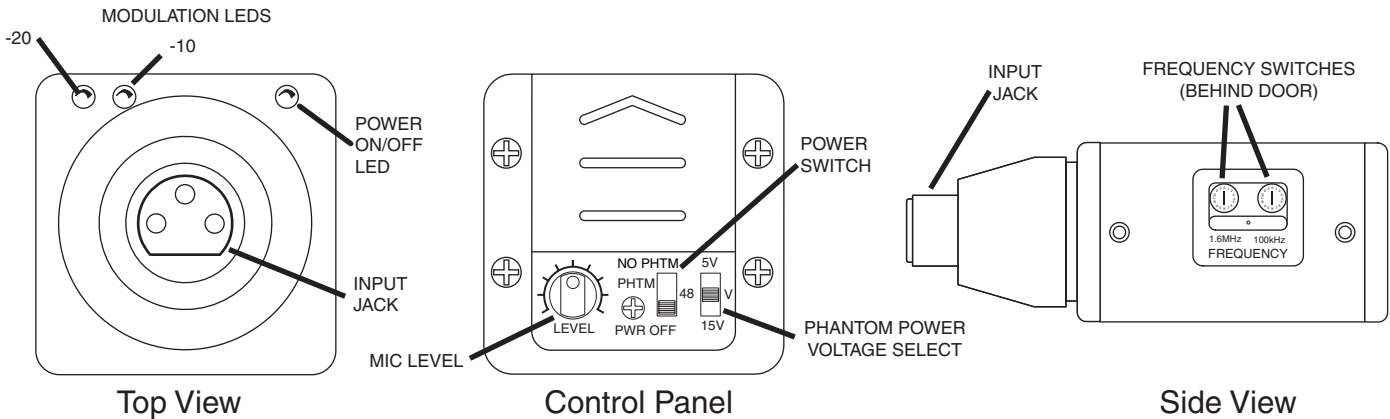
Switching power supplies throughout the design allow over 4.5 hours of operation using a single 9 Volt alkaline battery. The battery contacts are spring loaded to prevent “rattle” as the unit is handled.

Frequency Agility

The transmitter section uses a synthesized, frequency selectable main oscillator. The frequency is extremely stable over a wide temperature range and over time.

Two rotary switches, located on the side panel of the unit, provide 256 frequencies in 100 kHz steps over a 25.5 MHz range. This alleviates carrier interference problems in mobile or traveling applications.

Controls and Functions



This transmitter may be used with a wide variety of microphones. The 3-pin XLR connector allows the transmitter to be used with any dynamic microphone, as well as many two wire positive bias lavalier systems (such as those supplied by Lectrosonics).

Power Switch

The three position switch turns the unit on or off, and selects either phantom power, or no phantom power. Regardless of which position the switch is set, the pilot tone muting system effectively prevents “thumps” or transients from occurring during power up or power down.

The PHTM (center) position of the power switch turns on the phantom power value selected by the Phantom Power Voltage Select switch, while the NO PHTM (fully on) position disables phantom power.

Note: In order to avoid damage to some microphones, be careful to use the center (PHTM) position only when necessary and keep the Phantom Power Voltage Select switch in the 5 V position. (See Phantom Power Voltage Select switch.)

Power ON/OFF LED

This LED glows green when the battery is good. When the lamp glows red, there will be about 20 minutes of battery life left with an alkaline battery. The lamp will blink red when there are only a few minutes of life remaining.

Note: A NiMH battery will give little or no warning when it is depleted. If you wish to use NiMH batteries in this unit, we recommend installing a fully charged batteries, noting the length of time that the batteries will run the unit and in the future use somewhat less than that time to determine when the battery needs to be replaced.

A weak battery will sometimes light the POWER LED to the “good” green indication immediately after being put in the unit, but will soon discharge to the point where the

LED will go red or shut down (just like a flashlight with “dead” batteries). If the Power LED fails to light when power is applied, replace the battery.

Phantom Power Voltage Select Switch

Note: The UH400TM can be used with the Earthworks M30 Test Microphone if pins 2 and 3 are reversed. A barrel adapter is provided for this purpose.

This switch selects from three phantom voltages when the PWR switch is in the mid position. The voltages are:

- 5 Volts for lavalier microphones,
- 15 Volts for some professional mics requiring high current and for many common stage mics that will operate over a wide phantom Voltage range of 12 to 48 Volts. With the proper adapter, this position can also be used with T power microphones. See our web site for details on finding or making the proper adapter.
- 48 Volts for microphones that do in fact require a supply greater than 18 Volts. (See below for a discussion of why 42 and not a “true” 48 Volts.)

For longest battery life use the minimum phantom voltage necessary for the microphone. Many stage microphones regulate the 48 Volts down to 10 Volts internally anyway, so you might as well use the 15 Volt setting and save some battery power. If you are not using a microphone for the input device, or are using a microphone that does not require phantom power, set the Power Switch to the NO PHTM position (No Phantom Power). This is the fully up position of the Power Switch. Phantom power should only be used with a fully floating, balanced device such as most microphones with a 3-pin XLR connector. If you use the phantom power with an unbalanced device or if pins 2 or 3 are DC connected to ground, then you will draw maximum current from the power supply. The UH400A is fully protected against such shorts but the 9 Volt battery will be drained at twice its normal rate.

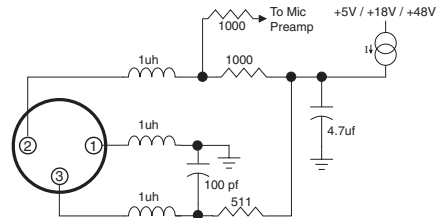
The transmitter can supply 4 mA at 42 Volts, 8 mA at 15 Volts, and 8 mA at 5 Volts. The 42 Volts setting actually supplies the same voltage to a 48 Volt microphone as the DIN standard arrangement due to a dynamic biasing scheme that does not have as much voltage drop as the DIN standard. The 48 Volt DIN standard arrangement protects against shorts and high fault current with high resistance in the power supply feeds to pins 2 and 3. This protects the supply if the supply current is accidentally shorted to ground and also keeps the microphone from being attenuated by the power supply. The UH400A improves on those functions and is able to use less power from the battery by using constant current sources and current limiters. With this dynamic arrangement the UH400A can also supply more than twice the current of competing 48 Volt plug on units and provide four times the current for some very high end 15 Volt microphones.

The 5 Volt setting is provided for lavalier microphones made by us and others. Do not power lavaliers from the 15 or 48 Volt setting as the microphone will most likely be destroyed. Lectrosonics makes an adapter, MCA5X, that will adapt our standard TA5F 5 pin microphones to the UH400A. This adapter also provides protection against excessive phantom voltage. If voltages higher than 5 Volts are applied to the adapter, a Zener diode will shunt excess voltage to ground. The microphone won't work until the voltage is correctly reduced to 5 Volts. If you have an older lavalier mic that was wired directly to an XLR for use with the earlier UH200's, we strongly recommend building our protection circuit into the XLR to prevent accidental destruction of the lavalier.

The 1.6 MHz is a coarse adjustment and the 100 kHz is the fine adjustment. Each transmitter is factory aligned at the center of its operating range. The default position of the frequency select switches is in the center of the transmitter's range.

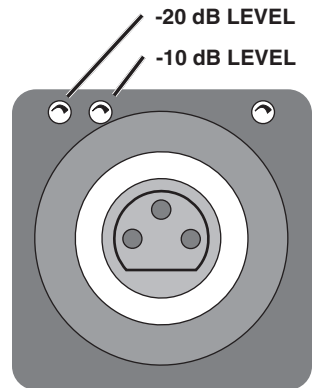
Input Jack

Standard 3-pin Switchcraft XLR type with locking collar. Pin 2 is signal, pin 3 is a floating signal ground, and pin 1 is case ground (see schematic below).



Modulation LEDs

The Modulation LEDs indicate the proper setting of the MIC LEVEL control. There are two bicolor modulation LEDs that can light either red or green depending on the amount of gain applied. The transmitter should be set so that both LEDs glow green, with the -20 LED occasionally blinking red.



Frequency Select Switches

Two 16 position rotary switches adjust the operating frequency and are also used for setting Compatibility Modes.



Left Switch
1.6 MHz

Right Switch
100 kHz

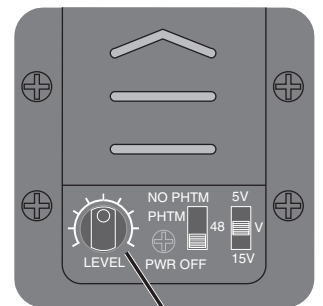
Signal Level	-20 LED	-10 LED
Less than -20 dB	Off	Off
-20 dB to -10 dB	Green	Off
-10 dB to +0 dB	Green	Green
+0 dB to +10 dB	Red	Green
Greater than +10 dB	Red	Red

Input Signal Level

LEDs on the panel next to the input coupler display the modulation level for proper input gain adjustment.

Input Gain Adjustment

The rotary control on the recessed panel adjusts the gain over a 43 dB range to set the proper modulation.



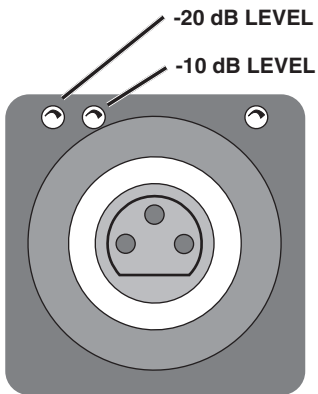
INPUT GAIN ADJUSTMENT

Compatibility Mode Indicators

At power up, all three LEDs will blink together red, then green, followed by the -20 and -10 dB LEVEL LEDs blinking together to indicate the operating mode.

The -20 and -10 LEDs will blink:

- Once for 100 Series mode
- Twice for 200 Series mode
- Three times for mode 3
(Contact Factory for Details)
- Four times for 400 Series mode
(Native Hybrid mode)
- Five times for IFB Series mode
- Six times for mode 6
(Contact Factory for Details)



Block Numbers and Frequency Ranges

The transmitter will tune to any of 256 different frequencies within a factory assigned block.



Two 16-position switches adjust the operating frequency in 100 kHz steps yielding the 256 in a block (16 x 16 = 256).

Block Numbers and Frequency Ranges (MHz):

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 (lower)	588.800 - 607.900
Block 23 (upper)	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

Part of block 23 (TV channel 37) is not available since it covers a 608 to 614 MHz band that is allocated for radio astronomy.

To determine a frequency from a block number:

$25.6 \times \text{Block Number} = \text{Lowest freq. (MHz) in the block}$

Example: $25.6 \times 24 = 614.400$

To determine a block number from a frequency:

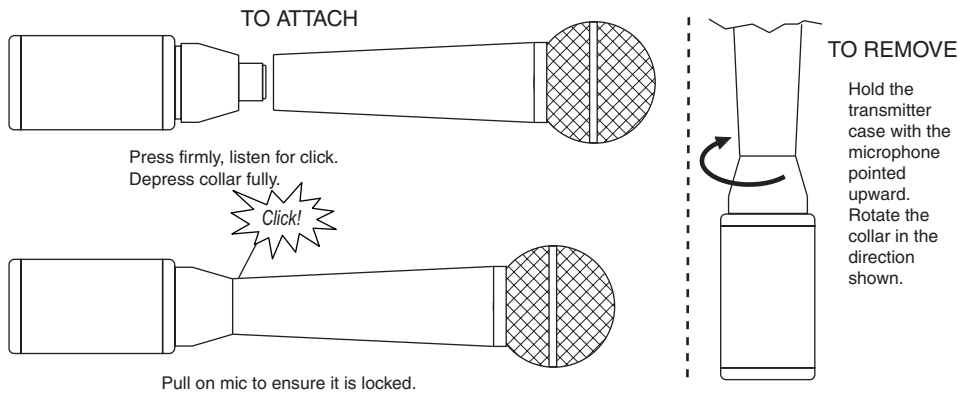
$\text{Freq. (MHz) divided by } 25.6 = \text{Block number}$
(first two digits are the block number)

Example: $685.500 \text{ divided by } 25.6 = 26.77734375$

The first two digits left of the decimal are the block number. In this case, 685.500 MHz falls within block 26.

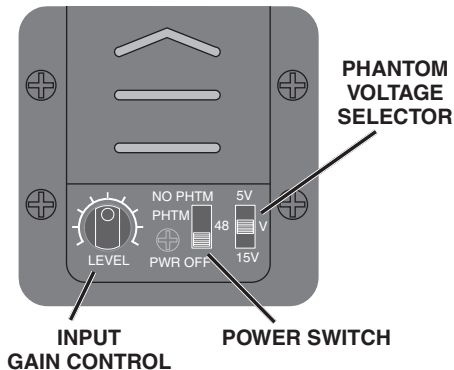
It is handy to remember these formulas, in case you do not have a copy of the table.

Operating Instructions



Attaching the Microphone

1. Set the correct phantom power voltage for the mic. If the mic does not require phantom voltage, set the Phantom Voltage Select switch to 5 VDC to reduce the possibility of damage to the mic when the transmitter is powered up.
2. Insert the UH400A into the XLR connector on the bottom of the selected microphone. Listen for the “click” that indicates the transmitter assembly has locked on to the microphone. Gently pull on the mic to ensure proper locking has occurred.
3. Set the LEVEL control to minimum (fully counterclockwise).



4. Turn on the transmitter by setting the Power Switch to PHTM if the mic requires phantom power, or to NO PHTM if the mic does not require phantom power. (Refer to the specifications for the mic you are using to determine if phantom power is required.)
5. Position the mic as it will be used and speak into it at the same voice level that will actually be used during the program or production.
5. Start with the Input Gain Control control at maximum counterclockwise, then observe the Modulation LEDs next to the input coupler as you turn the gain control up. Turn the gain up until the -20 LED glows red and the -10 dB glows green with occasional red flicker. This indicates full modulation.

The Input Gain Control on the transmitter should not be used to control the volume of your sound system or recording level. The control is used only to achieve optimal modulation with the voice level and mic position.

If the audio level is too high — both red LEDs will glow solid red. This condition may reduce the dynamic range of the audio signal with compression being audible in severe cases.

If the audio level is too low — neither LED will glow, or only the -20 LED will glow green. This condition may cause hiss and noise in the audio.

6. Once the gain has been adjusted, leave the gain control where it is and adjust the receiver output level to match the recorder or sound system.

Different voices will usually require different settings of the gain control, so check this adjustment as each new person uses the system. If several different people will be using the transmitter and there is not time to make the adjustment for each individual, it is generally best to adjust it for the loudest voice.

Selecting the Compatibility Mode

This unit is capable of working with Lectrosonics 400 series digital hybrid receivers, 200 Series, 100 Series and IFB analog receivers. It is also capable of working with analog wireless receivers from other manufacturers (contact the factory for details). Select the compatibility mode for the matching receiver.

Note: The UH400A is supplied from the factory in the Digital Hybrid (400 series mode).

1. If the Power LED lights up when the Power Switch is set to PHTM or NO PHTM, the battery is good and correctly installed.
2. Turn off the transmitter.
3. With a small screwdriver (included with your unit), set the frequency change switches to CC. (for Change, Change). To gain access to these switches, slide the access door open with a fingernail.

4. Set the Power Switch to NO PHTM briefly – just a couple of seconds for the front panel LED’s to light up, then turn the unit off.
5. Change the Frequency Select switches to one of the following settings:

MODE SWITCH SETTINGS	
100 Series	1,1
200 Series	2,2
Mode 3*	3,3
400 Series (Digital Hybrid)	4,4
IFB Mode	5,5
Mode 6*	6,6

*Contact factory for details.



Left Switch
1.6 MHz



Right Switch
100 kHz

6. Turn the transmitter on, four about 1 sec. then back off.
7. Change the switches to 0,0.
8. Turn the transmitter on and verify the new compatibility mode. The front panel -20 and -10 LEDs will blink:
 - Once for 100 Series mode
 - Two times for 200 Series mode
 - Three times for mode 3 (contact factory)
 - Four times for 400 Series mode
 - Five times for IFB mode
 - Six times for mode 6 (contact factory)

The Compatibility Mode will remain as set until changed with the above procedure.

Adjusting the Transmitter Frequency

The receiver is normally used to find and verify a clear frequency for operation. Some receiver models have built-in scanning capability to quickly find a clear frequency. In other cases you may need to use pre-coordinated frequencies from the Lectrosonics tables or someone else. Set the left and right switches on the transmitter to match the receiver. The alpha-numeric settings are displayed as a pair, ie. A-6, 8-5, 4-B, etc., with the left character for the left hand switch and the right character for the right hand switch.

Battery Replacement

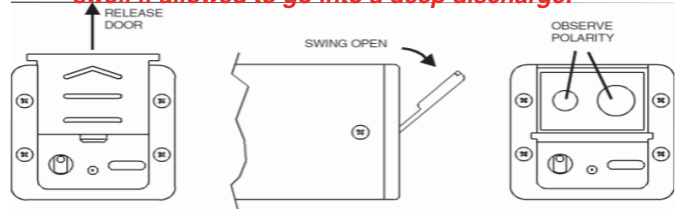
The transmitter is powered by a standard 9 volt battery. Alkaline, Li Polymer rechargeable and lithium types can be used. Standard zinc-carbon batteries marked “heavy duty” or “long-lasting” are not adequate. They will provide only about five minutes of operation. Similarly, ni-cad rechargeable batteries only give one hour of operation, and will also run down quite abruptly. Alkaline batteries provide about 4.5 hours of operation while lithium batteries will run the unit for about 12 hours.

To open the battery compartment, press upward on the cover door in the direction of the arrow as shown in the drawing. Only slight, sliding pressure is needed to open and close the battery door.

Swing the door open and take note of the location of the positive (+) and negative (-) terminals. Insert the new battery correctly and close the cover by reversing the opening procedure. Note that the battery door will NOT close if the battery is inserted incorrectly, since the terminals will hit a protective polarity barrier. Don’t force the battery door closed. If it is difficult to close, the battery is in backwards.

The battery life will be affected by the amount of phantom power supplied to any microphones that require it. A high drain 48 volt microphone can shorten battery life by 40% or more. A light drain 18 volt microphone will make little or no difference in battery life. The only way to be sure is to test the transmitter and microphone combination with a brand new battery.

CAUTION: Lithium batteries will expand and swell if allowed to go into a deep discharge.



Battery Compartment Action

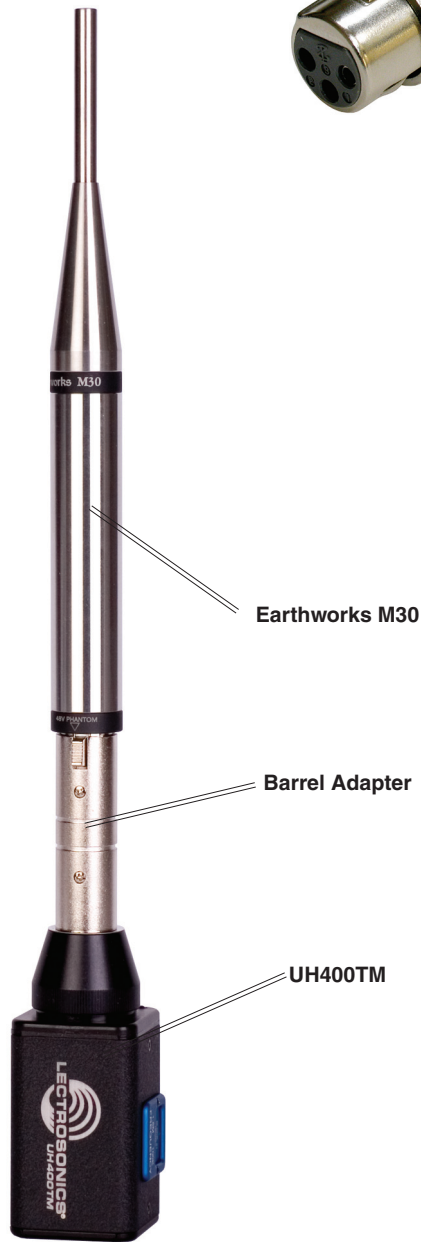
Be sure to remove them as soon as the battery is depleted. Stuck lithium batteries can be avoided by removing the label wrapping around the battery before use. This will allow the battery to swell but will still leave enough room in the compartment for the battery to be removed normally.

Using the Polarity-Reversing Barrel Adapter

The UH400TM transmitter comes with a polarity-reversing XLR barrel adapter for use with Earthworks M30 measurement microphones. Simply connect the adapter between the transmitter and microphone.



Part #21750



Accessories

PHTRAN2

Cordura Pouch with belt clip and velcro flap. (Included with TX)

MC5AX (optional)

TA5 to XLR adapter for connecting a lavalier microphone to the UH400.

PHTRAN2



MC5AX



Troubleshooting

Before going through the following chart, be sure that you have a good battery in the transmitter. It is important that you follow these steps in the sequence listed.

Symptom

Possible Cause

Transmitter Battery LED Off

1. Battery is inserted backwards.
2. Battery is dead.

No Transmitter Modulation LEDs

1. Gain control turned all the way down.
2. Battery is in backwards. Check power LED.
3. Mic capsule is damaged or malfunctioning.
4. Mic cable damaged or mis-wired.
5. Phantom power not enabled for mic that requires it.

Receiver RF Lamp Off

1. Transmitter not turned on.
2. Transmitter battery is dead.
3. Receiver antenna missing or improperly positioned.
4. Transmitter and receiver not on same frequency. Check switches/display on transmitter and receiver.
5. Operating range is too great.

No Sound (or Low Sound Level), Receiver Mod Level LEDs Are On

1. Receiver output level set too low.
2. Receiver output is disconnected; cable is defective or mis-wired.
3. Sound system input is turned down.

No Sound (or Low Sound Level), Receiver Mod Level LEDs Are Off

1. Transmitter gain (audio level) set too low.
2. Faulty microphone
3. Phantom power not enabled for mic that requires it.
4. Not enough current to power microphone. (Earthworks M30 is only known microphone we've found to exhibit this issue.)

Distorted Sound

1. Transmitter gain (audio level) is far too high. Check mod level lamps on transmitter and receiver as it is being used. (Refer to the Operating Instructions section for details on gain adjustment)
2. Receiver output may be mismatched with the sound system or recorder input. Adjust output level on receiver to the correct level for the recorder, mixer or sound system.
3. Excessive wind noise or breath "pops." Reposition microphone and/or use a larger windscreen.
4. Transmitter is not set to same frequency as receiver. Check that frequency select switches on receiver and transmitter match.

Hiss and Noise - Audible Dropouts

1. Transmitter gain (audio level) far too low.
2. Receiver antenna missing or obstructed.
3. Operating range too great.

Excessive Feedback

1. Transmitter gain (audio level) too high causing the limiter to reduce the dynamic range which in turn causes feedback. Check gain adjustment and/or reduce receiver output level. (Refer to the Operating Instructions section for details on gain adjustment)
2. Transmitter too close to speaker system.
3. Mic is too far from user's mouth.

Specifications and Features

Operating frequencies:	470.100 to 607.900 MHz; 614.100 to 767.900 MHz
Frequency selection:	256 frequencies in 100 kHz steps
RF Power output:	100 mW
Pilot tone:	25 to 32 kHz; 5 kHz deviation (in 400 Series (hybrid) mode)
Frequency stability:	± 0.002%
Deviation:	± 75 kHz max. (in 400 Series mode)
Spurious radiation:	60 dB below carrier
Equivalent input noise:	-118 dBV, A-weighted
Input level:	Nominal 2 mV to 300 mV, before limiting; Greater than 1.0 V maximum, with limiting.
Input impedance:	1 k Ohm
Phantom power:	Selectable; 5, 15, 48 VD (see details in Controls and Functions section)
Input limiter:	Soft limiter, >30 dB range
Gain control range:	43 dB; semi-log rotary control
Modulation indicators:	Dual bi-color LEDs indicate modulation of -20, -10, 0 and +10 dB referenced to full modulation.
Low frequency roll-off:	-12 dB/octave; 70 Hz (35 Hz for UH400TM)
Controls:	Control panel knob adjusts audio gain. Rotary switches on bottom panel adjust transmitter frequency.
Audio Frequency Response:	90 Hz to 20 kHz, +/- 1 dB (40 Hz to 20 kHz, +/- 1 db for UH400TM) <i>Note: The audio is deliberately rolled off at 70Hz using a 12 dB/octave filter on the UH400A. This filter cannot be disabled.</i>

Signal to Noise Ratio (dB):

Note: The dual envelope "soft" limiter provides exceptionally good handling of transients using variable attack and release time constants. Once activated, the limiter compresses 30+ dB of transmitter input range into 4.5 dB of receiver output range, thus reducing the measured figure of or SNR *without limiting* by 4.5 dB

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

Total Harmonic Distortion:	0.2% typical (400 Series mode)
Antenna:	Built-in; housing and input coupler form a dipole configuration
Battery Type:	9V Li Polymer rechargeable, Lithium
Battery Life:	4.5 Hours with alkaline or Li Polymer, 12 hrs with lithium <i>(Battery life will vary with battery brand, phantom power voltage setting and mic current drain.)</i>
Weight:	7.873 oz. 223.2 grams with lithium battery, no mic
Overall Dimensions:	1.5 x 1.5 x 4.2 inches <i>(Not including microphone.)</i>
Emission Designator:	190KF3E

Specifications subject to change without notice.

The FCC requires that the following statement be included in this manual:

This device complies with FCC radiation exposure limits as set forth for an uncontrolled environment. This device should be installed and operated so that its antenna(s) are not co-located or operating in conjunction with any other antenna or transmitter.

Service and Repair

If your system malfunctions, you should attempt to correct or isolate the trouble before concluding that the equipment needs repair. Make sure you have followed the setup procedure and operating instructions. Check the interconnecting cables and then go through the **Troubleshooting** section in this manual.

We strongly recommend that you **do not** try to repair the equipment yourself and **do not** have the local repair shop attempt anything other than the simplest repair. If the repair is more complicated than a broken wire or loose connection, send the unit to the factory for repair and service. Don't attempt to adjust any controls inside the units. Once set at the factory, the various controls and trimmers do not drift with age or vibration and never require readjustment. **There are no adjustments inside that will make a malfunctioning unit start working.**

LECTROSONICS' Service Department is equipped and staffed to quickly repair your equipment. In warranty repairs are made at no charge in accordance with the terms of the warranty. Out-of-warranty repairs are charged at a modest flat rate plus parts and shipping. Since it takes almost as much time and effort to determine what is wrong as it does to make the repair, there is a charge for an exact quotation. We will be happy to quote approximate charges by phone for out-of-warranty repairs.

Returning Units for Repair

For timely service, please follow the steps below:

- A.** DO NOT return equipment to the factory for repair without first contacting us by email or by phone. We need to know the nature of the problem, the model number and the serial number of the equipment. We also need a phone number where you can be reached 8 A.M. to 4 P.M. (U.S. Mountain Standard Time).
- B.** After receiving your request, we will issue you a return authorization number (R.A.). This number will help speed your repair through our receiving and repair departments. The return authorization number must be clearly shown on the **outside** of the shipping container.
- C.** Pack the equipment carefully and ship to us, shipping costs prepaid. If necessary, we can provide you with the proper packing materials. UPS is usually the best way to ship the units. Heavy units should be "double-boxed" for safe transport.
- D.** We also strongly recommend that you insure the equipment, since we cannot be responsible for loss of or damage to equipment that you ship. Of course, we insure the equipment when we ship it back to you.

Lectrosonics USA:

Mailing address:
Lectrosonics, Inc.
PO Box 15900
Rio Rancho, NM 87174
USA

Shipping address:
Lectrosonics, Inc.
581 Laser Rd.
Rio Rancho, NM 87124
USA

Telephone:
(505) 892-4501
(800) 821-1121 Toll-free
(505) 892-6243 Fax

Web:
www.lectrosonics.com

E-mail:
sales@lectrosonics.com

Lectrosonics Canada:

Mailing Address:
49 Spadina Avenue,
Suite 303A
Toronto, Ontario M5V 2J1

Telephone:
(416) 596-2202
(877) 753-2876 Toll-free
(877-7LECTRO)
(416) 596-6648 Fax

E-mail:
Sales: colinb@lectrosonics.com
Service: joe@lectrosonics.com

LIMITED ONE YEAR WARRANTY

The equipment is warranted for one year from date of purchase against defects in materials or workmanship provided it was purchased from an authorized dealer. This warranty does not cover equipment which has been abused or damaged by careless handling or shipping. This warranty does not apply to used or demonstrator equipment.

Should any defect develop, Lectrosonics, Inc. will, at our option, repair or replace any defective parts without charge for either parts or labor. If Lectrosonics, Inc. cannot correct the defect in your equipment, it will be replaced at no charge with a similar new item. Lectrosonics, Inc. will pay for the cost of returning your equipment to you.

This warranty applies only to items returned to Lectrosonics, Inc. or an authorized dealer, shipping costs prepaid, within one year from the date of purchase.

This Limited Warranty is governed by the laws of the State of New Mexico. It states the entire liability of Lectrosonics Inc. and the entire remedy of the purchaser for any breach of warranty as outlined above. **NEITHER LECTROSONICS, INC. NOR ANYONE INVOLVED IN THE PRODUCTION OR DELIVERY OF THE EQUIPMENT SHALL BE LIABLE FOR ANY INDIRECT, SPECIAL, PUNITIVE, CONSEQUENTIAL, OR INCIDENTAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THIS EQUIPMENT EVEN IF LECTROSONICS, INC. HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT SHALL THE LIABILITY OF LECTROSONICS, INC. EXCEED THE PURCHASE PRICE OF ANY DEFECTIVE EQUIPMENT.**

This warranty gives you specific legal rights. You may have additional legal rights which vary from state to state.

