

TX700.148

TX700.132

TX700.64

TX700.32

MICROGN

**700 SERIES-MULTI-FREQUENCY
POCKET TRANSMITTER**

MICRON

INSTRUCTION MANUAL

Covers the following models:

700 SERIES : TX700.148, TX700.132,
TX700.64, TX700.32,
Part No IMTX700-1.1

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General Description

The Micron TX700's sophisticated design is based around a low-noise VCO, with digitally controlled PLL circuit, producing the highest possible quality of transmitted signal. The lightweight, yet rugged aluminium extrusion case provides strength and durability, and is designed to withstand the heavy demands of location use, while being comfortable to wear - ideal for situations where concealment is important. The unique battery compartment design enables fast and easy battery replacement.

Adjustment of the audio level is straightforward, with the modulation level control easily accessible through the TX700's top panel, where peak-reading LEDs (-10 and 0dB) indicate the audio level, allowing repeatable levels to be set. The TX700 includes a soft audio limiting circuit, with the threshold user-adjustable to give a wide range of operation from fully automatic to no limiting action. The advanced design enables the limiter to be used as an automatic level control, without the pumping effect usually associated with audio AGC, and it can also be used as a 'distortionless' emergency limiter to prevent over-modulation.

Additional front-end protection is provided by a bass-cut switch, which may be used to reduce wind noise and counteract close-microphone effects. The use of dedicated audio input cables enables the transmitter to accept line and mic level signals, and to power a wide variety of microphone types. The TX700 is equipped with a battery condition indicator on the top panel, and also transmits an inaudible '*low battery voltage*' warning signal, which activates a visual indication on the matching Micron receiver.

The MICRON POCKET TRANSMITTER is available in 4 different models: -

Model Number:	Number of Channels:	Frequency Range:
TX700.148	100	470-865MHz
TX700.132	100	470-865MHz
TX700.64	64	470-865MHz
TX700.32	32	470-865MHz

This instruction manual can be used for all the above models, detail differences will be indicated where applicable

Main Features

Switchable Frequency

Operating frequencies can be selected from two BCD coded switches located in the switch panel label.

100 positions – TX700.148

100 positions – TX700.132

64 positions – TX700.64

32 positions – TX700.32

Unique Micron Companding System

The MICRON 700 series feature a double ended system which first compresses the dynamic range of the signal in the transmitter, and then expands it again in the receiver.

Automatic Gain Control Option

The design of the limiter in the MICRON transmitter enables it to be used as an automatic gain control system without the pumping effect associated with audio A.G.C. systems. It can also be used as a 'distortionless' limiter to prevent distortion due to over modulation.

'Overload proof' audio input amplifier

The variable gain microphone amplifier has a gain control range of 40dB. Distortion is less than 0.3% over the whole of this range.

L.E.D. Volume Indicator

One problem associated with radio microphones is the setting of the modulation level. As with tape recording, too low a setting results in a poor signal to noise ratio, too high a setting causes distortion. A common practice is to adjust the audio gain of the transmitter until distortion is heard and then 'back off a bit'. The MICRON transmitter is fitted with a simple L.E.D. volume indicator ('0' and '-10') to allow the modulation level to be set quickly and accurately, without having to monitor the receiver output.

Multiple Input microphone socket

The 6 way Lemo connector provides:

1. A high sensitivity input for dynamic and condenser microphones.
2. Direct powering connection for electret microphones (+ve and -ve bias).
3. Powering for 12V 'T' powered condenser microphones.
4. Powering for 12V 'Phantom' powered condenser microphones.
5. Powering for 48V 'Phantom' powered condenser microphones with Micron P48 in-line dc booster.
6. Line input capability.
7. External powering for transmitter.

Main Features

Automatic Warning of Transmitter battery failure

The battery warning system transmits an inaudible signal when the transmitter batteries are reaching the end of their life, causing LED's on the receiver to flash at a slow but steady rate. This gives the operator a warning period before the batteries must be changed. By keeping a continuous check on the transmitter batteries, the warning system provides protection against batteries, which appear to be fresh but fail unexpectedly after a short period of use.

Ruggedness

The lightweight aluminum extrusion transmitter case is strong by virtue of its shape. The shell strength is reinforced by the front and back panel and electronic circuitry is separated by the battery compartment.

Electronic Reliability

Exhaustive test procedures account for roughly half the manufacturing cost of a MICRON. The transmitters and receivers are constructed from pre-aligned electronic modules. The highest risk of component failure is usually early in its working life. The object of the lengthy test routine is to force the potential faults to occur before the unit leaves the factory.

Every module is tested and heat cycled. If the modules perform correctly, they are assembled into complete transmitters and receivers and given a 100-hour burn in, certain critical parts are given a further 100-hour reliability test. After alignment, every transmitter and receiver is checked for correct performance at 0oC, 25oC and 50oC, after a further complete test a MICRON is passed to leave the factory.

Unique Micron Companding System

The TX700 Series body-worn transmitters feature the Unique Micron Companding System. This double-ended system first compresses the dynamic range in the transmitter and then expands it again at the receiver.

The MICRON Companding System is a high performance symmetrical design. It offers many significant advantages over more conventional compandor techniques. These operate in parallel to supply a level-dependent, variable rate compressed signal, which is expanded in the receiver by a matching pair of circuits to complete the Companding processing. Graded pre-emphasis is used in the gain control paths, in order to eliminate low frequency modulation effects. When compared to standard 2:1 companding methods, this degree of sophistication provides the user with greatly improved operational performance and sound quality.

Because the signal to noise performance is so improved, the operating distance between transmitter and receiver antenna can be much greater; what were previously unusable weak signal areas are now usable. In outside broadcasts, sound and camera can now operate in synchronization over longer distances and the full potential of 20:1 zoom lenses can be realized.

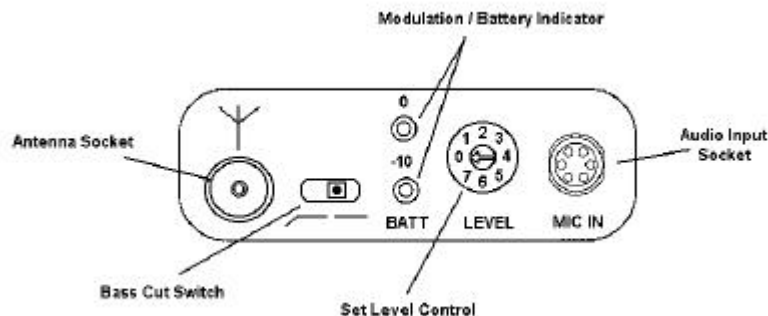
Similarly, there is greater immunity from interference; low-level interference signals are further depressed and the difference between wanted and unwanted signals is expanded. Impulsive interference such as switch clicks and motor hash greatly reduced.

Multi-channel performance, which previously suffered from low level interference from intermodulating signals (birdies), is significantly improved.

MICRON 700 Series transmitters are compatible with the SDR 700 series receivers

*** 700 Series are not compatible with 100 and 500 Series.**

Control Panel



Audio Input Socket

A 6 pin Lemo connector with gold plated pins. The microphone-input cable is connected by a push-pull action. The transmitter offers many audio input options depending on the pin configuration selected. The variations in pin selection is detailed under 'Transmitter cable connection data'.

Set Level Control: A screwdriver operated audio gain control, used to set the modulation level.

Modulation Level and Battery Status Indicators

The 2 light emitting diodes (LED's) act as a simple volume indicator. The '-10' light also doubles up as a battery status indicator.

Bass - Cut Switch

The Bass – Cut switch provides added front-end protection, where it may be used to reduce wind noise and counteract close microphone effects.

Antenna Socket: A SMA 50 Ohm coaxial socket. The antenna can be connected by a screw-on action.

Frequency change switch (TX700.148/TX700.132, TX700.64/TX700.32)

Two BCD coded switches give the user a choice of up to 100 operating frequencies (depending upon the model).

There are 4 models available:

Model	Switch Combination	Number of Channels	Switch Bandwidth
TX700.148	10 x 10	100	48 MHz
TX700.132	10 x 10	100	32 MHz
TX700.64	8 x 8	64	24 MHz
TX700.32	8 x 4	32	14 MHz

The frequencies are shown on the serial no label.

Serial No Label

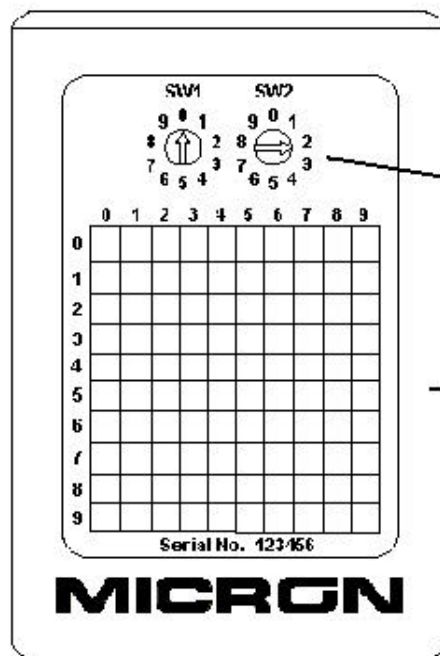
Gives information on:

- 1) Model type.
- 2) Serial No.
- 3) Switchable frequencies in MHz.

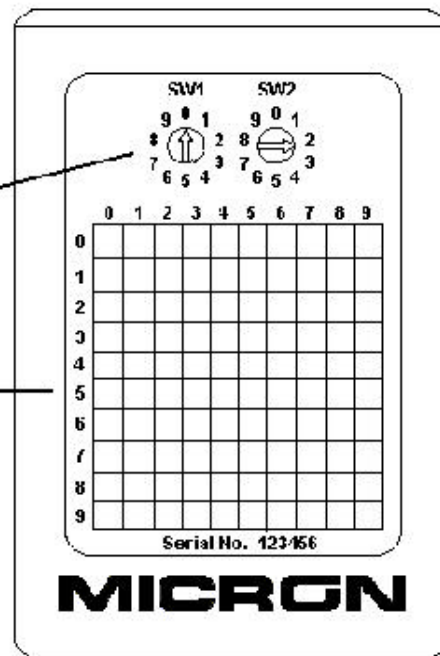
NB. The arrow on the switch is used as indicator

Switch Panel

TX700.148



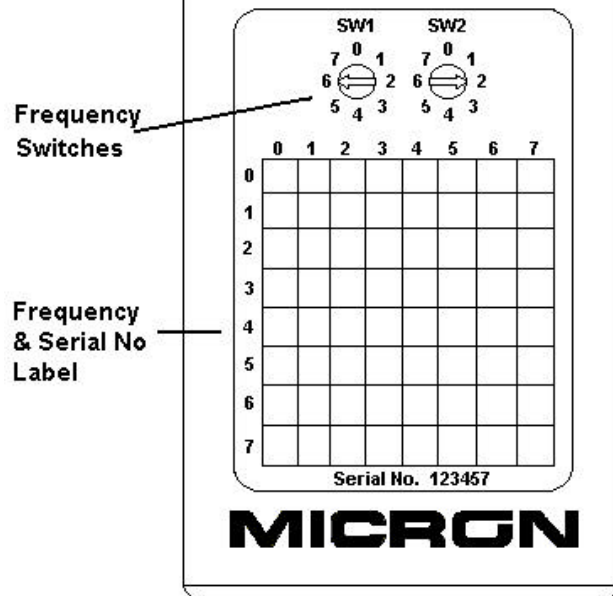
TX700.132



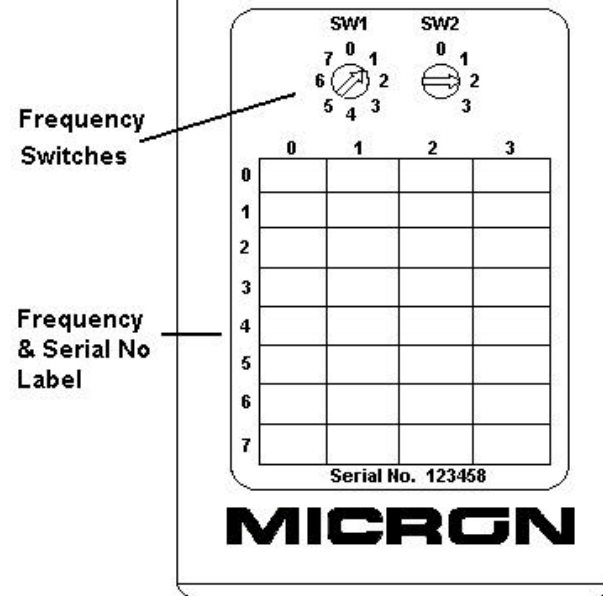
Frequency
Switches

Frequency
& Serial No
Label

TX700.64



TX700.32



Transmitter Powering

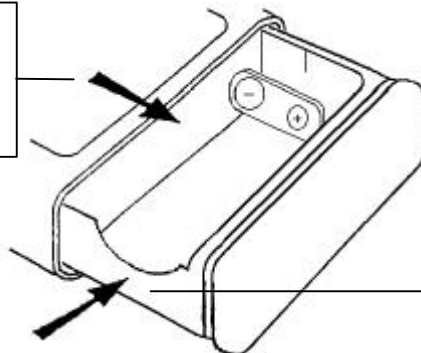
1) Internal 9V Battery

Alkaline battery types are recommended.

As the transmitter RF driver stage is stabilized, the output power remains virtually constant as the battery voltage falls. There will be no loss of range or performance as the battery volts fall from 9 to 6 volts. The transmitter battery-warning signal starts when the supply voltage has fallen to 6.5 volts (approx.)

Opening the battery compartment

The battery compartment is opened by pressing the button on the back of the unit on the front there is slot for the 9V battery to fit into.



The battery can be easily released with the aid of the thumb cut-out.

2) External Powering

It is recommended that external power be only applied via a MICRON TLP lead as this lead includes a 9V voltage regulator and dc filtering.

NOTE: Using a transmitter supply greater than 9 volts will not increase the output power and may cause damage to the transmitter.

Battery Test and Transmitted Warning

Alkaline manganese batteries are the most suitable because of their long life and reliability. They have a long shelf life and can be relied on to yield their full rated capacity. The conventional 9-volt transistor radio battery is NOT recommended.

Lithium and Mercury batteries have a high capacity and long shelf life but, as they maintain an almost constant voltage in use and then fail suddenly at the end of their life, the transmitter alarm system can only give a brief warning of impending failure.

Battery Life; 6 to 7 hours continuous

Figures are based on a 30mW transmitter @ 20°C

Battery data is approximate since battery capacity varies with age and ambient temperature, and transmitter consumption varies with antenna position.

Battery test

With an input plug connected the –10dB LED indicator also operates as a battery voltage indicator.

-10 LED > 6.5V: No Audio – LED not 'ON'
 : With Audio – LED 'ON' GREEN

'-10' LED <6.5V: No Audio – LED 'ON' RED
 : With Audio – LED 'ON' AMBER

Transmitted battery warning

A pair of lamps on the LED display of the matching MICRON receiver flash regularly 2-3 times per second when the TX battery volts fall to 6.5 Volts. The TX batteries should be changed at the first opportunity.

TX Battery Warning Limits

If the TX is already in use, continue until convenient to change, but within the limit of 20 to 30 minutes.

Automatic Level Control System

The level control is, in principle, a peak limiter. Its function is to prevent distortion due to overmodulation. Because of the definitive design, it can be used as an audio AGC system with characteristics much improved over the 'automatic record' facility of most tape recorders. The center of the system is a voltage controlled variable gain amplifier with a control range of 40dB.

The Automatic Level Control (ALC) system can be set so that it operates only in an emergency ('Normal' mode) or so that it adjusts the gain to suit the user's voice level ('Automatic' mode) or so that it never operates at all, except in an extreme emergency ('Low modulation' mode).

When used in the 'Automatic' mode, the control system sets the audio gain so that the average speech level is about 9dB below peak modulation level. This leaves headroom for the short sharp transients, which occur frequently in speech patterns. Having set the gain, the short transients pass without distortion and without further need to change the gain.

Receiver (RX) setting up - (SDR770 series)

Set up the receiver referring to the relevant instruction manual

Transmitter (TX) Setting Up

- Fit a PP3 9V battery
 - Connect provided TX antenna (*flexible SMA antenna*)
 - Set your TX frequency same as RX
 - Switch on TX (*by connecting microphone cable to 6-way multi-way socket*)
 - Check TX battery status LED, if RED (*with no audio to the microphone*) replace TX battery with a new one
 - Check RX RSSI indicator – all lights should lit
 - Adjust SET LEVEL gain control, while performer speaks at correct level
- '-10' lamp flashes regularly and '0' lamp flashes occasionally

(For any electret microphones the setting will be 'Level 4 or 5')

Interference Check

Switch off TX - by disconnecting microphone cable.

Observe signal strength indicator and listen for possible interfering signals from other transmitters (slight flickering of lowest lamps is acceptable.)

Reconnect microphone cable and adjust SET LEVEL control by one of the following methods

Operating Instructions

'NORMAL'

This method suits most situations when there is time for a rehearsal and gives the optimum balance between dynamic range and signal to noise ratio. Unless an unexpectedly loud sound occurs, the limiter will not operate.

Adjust SET LEVEL control, while performer speaks at correct level, so that -10 lamp flashes regularly and '0' lamp flashes occasionally.

TX is now ready for use.

'FULLY AUTOMATIC'

This procedure is for News reporting, interviews and other situations where there is no opportunity for rehearsal with the performer. The objective is to preset the audio gain slightly too high and allow the limiter to control the level.

Speak in an average to quiet voice with the microphone in a realistic position, while adjusting the SET LEVEL control, so the '0' lamp flashes regularly.

TX is now ready for use.

LOW MODULATION LEVEL

This procedure is for those situations where the dynamic balance of the dialogue must not be altered at all, such as Theatre Musicals or for stereo productions. In this mode the automatic leveling threshold is set to be above the highest expected input level.

Adjust SET LEVEL control, while performer speaks at normal level, so the -10 lamp flashes occasionally and the '0' lamp never flashes at all. (For Musicals, it may be preferable to adjust the SET LEVEL control on the loudest passage so the '0' does not flash).

TX is now ready for use.

How To Get The Best From a MICRON

Transmitter

The end of the antenna is most sensitive to body absorption so keep away from the wearer's body if at all possible. Keep the TX antenna reasonably straight and away from the microphone lead. Avoid coiling the antenna, especially near the transmitter case.

Receiver

Whenever possible use a MICRON diversity receiver to ensure optimum operating reliability. A standard non-diversity receiver will also give good results if the following suggestions are applied.

Antenna

Raise the antenna as high as possible and keep it away from metal objects. Place the antenna as close to the 'action' as possible. Put the receiver as near to its antenna as possible, i.e. use long audio cables rather than long RF cables. A full sized half wave dipole will give a slightly higher output than the short helical antenna, the increase being a few dB. A properly designed multi element directional antenna will give greater improvement because of its gain. It is also a useful means of rejecting a known source of interference if it can be placed with its 'back' to the interfering source.

Walk test

Whenever possible during rehearsal move the transmitter through all the positions in which it is likely to operate during the actual performance. Look for possible dead spots by observing the signal strength indicated on the receiver. If the top lamp goes out during the walkthrough, it is a warning that the signal level has fallen to a low level and that the background noise could possibly rise unacceptably. If possible move the receiving antenna and repeat the test until the lamps stay on throughout the walk. As it is difficult to simulate precisely the conditions, which will exist during the actual performance, it is more satisfactory to operate with a safety margin.

How To Get The Best From a MICRON

Safety margin - [Only necessary when the full dynamic range of the system is being utilized]

Reduce the receiver sensitivity by fitting a 50 Ohm 10dB attenuator between the antenna and the receiver. Repeat the walk about test and move the receiving antenna as necessary to keep the top lamp on. When the attenuator is removed a safety margin of 10dB has been created. The received signal can fall by 10dB during the performance without causing an increase in background noise.

For extreme range

For large area coverage a diversity system should be used.

For golf tournaments and other long-range events, use high gain receiving antennas mounted on tall poles or masts. Where appropriate use a remote transmitter antenna as high as possible. Use thin low loss 50-Ohm coaxial cable to connect between the transmitter and its antenna.

Public address, fold back and sound reinforcement applications

When using a Micron together with a loudspeaker system, it is important to make the setting up adjustments in the correct sequence to avoid the danger of acoustic feedback during quiet pauses.

1. Connect up the Micron and adjust the SET LEVEL control by the 'Low modulation' procedure.
2. Walk through the positions in which the Micron will be used and adjust the public address amplifier gain as necessary to avoid 'howl round'.

Note. If the microphone is static then a cardioid type is preferable, but if the microphone is to be moved around then an omni type should be used.

There are many possible sources of interference. Examples are: Other transmitters on the same frequency, harmonics of lower frequency transmissions, intermodulation products from two other incompatible transmitters (see "Multichannel Operation") man made static from electrical machinery, motor vehicles, and RF from electronic instruments such as TV sets, digital displays, pocket calculators, mobile phones and the like.

Interfering signals can cause an apparent loss of range. Before suspecting a defect in the MICRON check the system in another location, which is free from interference.

When checking during rehearsal, ensure that all potential sources of interference are switched on and in position e.g. TV cameras, PCs, motor generators, arc lights, switchgear, TV monitors, HMI lighting drive units. Note: Unterminated TV video cables are a particular hazard.

DIVERSITY - If a diversity system is being used, make sure that ALL antennas are spaced well away from possible sources of interference. To check this, disconnect all antennas and then connect one antenna at a time and make sure each one is free from local interference.

To improve the situation as far as possible, take the following precautions:

MAKE THE INTERFERING SIGNAL AS WEAK AS POSSIBLE at the receiving antenna:

Switch off the transmitter. Try to identify the source of interference and move the receiving antenna away from it. If the interference is continuous use the signal strength indicator on the receiver to find a 'weak signal' zone in which to place the antenna. For a distant interfering signal, moving the antenna may not weaken the received signal. In this situation a directional antenna with its 'back' to the interfering source, could help. The addition of an earth shield 'behind' the antenna may also help. Rotate the antenna to change the polarization.

MAKE THE WANTED SIGNAL AS STRONG AS POSSIBLE to swamp the interference:

Place the receiving antenna as close as possible to the transmitter. One possibility is to use a directional antenna, mounted on a microphone boom, and to follow the action. If the antenna has to be fixed and the acting area is large, use the 'safety margin walkabout test' to find the best site for the antenna.

KEEP THE AUDIO MODULATION LEVEL AS HIGH AS POSSIBLE to give the best signal to noise ratio.

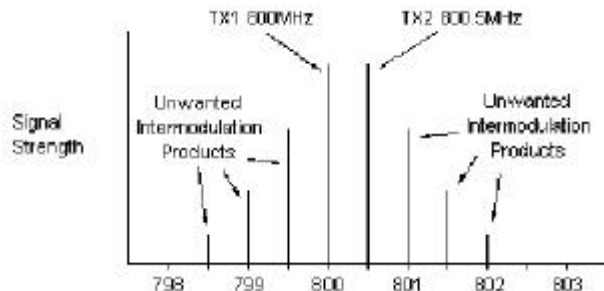
Interference

(Noise in this case means a twittering type of sound 'birdies' from the interfering signal). With the Companding system, interfering signals are held down in quiet passages but rely on the masking effect during loud passages. Under severe interference or under weak signal conditions, sudden large audio input level changes can produce a short period of increased background noise. In this situation the wanted signal strength should be increased to prevent this happening.

MULTICHANNEL OPERATION

If two radio microphones are used simultaneously at the same location, their operating frequencies should be chosen with care. Multichannel sets of frequencies have been calculated by Audio Engineering for operation in most frequency bands. The use of these sets is recommended and should be chosen (in whole or in part) whenever possible. When any two mobile radio transmitters operate close together, unwanted intermodulation signals will be produced due to interaction between the transmitters. The closer the transmitters are together and the closer they are in frequency, the stronger the intermodulation signals will be. If the intermodulation signals fall within the band of a third channel, interference effects can occur when the received signal from the third transmitter is weak. Similar intermodulation effects can occur in the input stage of a receiver if the unwanted signals are very strong. There are many situations where frequencies, which are incompatible, have to be used. The following precautions may help to minimize the problems. Separate all the receivers (or the antennas). Try to avoid producing strong unwanted signals in each receiving antenna. Site the receivers (or the antennas) to favour their own channels. As far as possible, keep all transmitters at least 0.5 metres (20ins) apart.

Typical Transmitter Intermodulation Products



Technical Data

Except where stated, data applies to all MICRON 700 Series transmitters, although there may be minor variations for some countries.

RF TRANSMISSION SYSTEM

Carrier frequency (to order).....	470-865MHz
Number of frequencies.....	up to 100
Switching range	up to 48 MHz
Modulation system.....	F3 EGN
Maximum Deviation	75kHz
Reference Deviation.....	40kHz
RF Output (erp)	50mW

AUDIO

System S/N Ratio	>100dB
Frequency Response	80Hz to 20kHz ± 1 dB (nom.)
Distortion (@ ref. Deviation level).....	1kHz tone <0.3% THD
	1kHz tone @ -10dB:0.1%THD(typ)

Technical Data

BASS CUT	Fixed Bass Cut: -5dB at 50 Hz (nom.) Additional 6dB cut at 60Hz
LEVEL CONTROL	Manual pre-set, 40dB in 8 steps
VOLUME LED INDICATORS	'0' light at ALC threshold '-10' light at 10dB below ALC threshold (ALC system allows short transients to pass up to +6dB)
FREQUENCY CONTROL	Screwdriver pre-set
BATTERY CONDITION INDICATOR (-10dB LED)	LED at <6.5V
TX LOW BATTERY INDICATOR	Signal transmitted at <6.5V
BATTERY TYPE	IEC 6LR61 (MN1604) PP3 size 9V (alkaline or lithium)

Technical Data

Current consumption	65mA $\pm$ 10%
Battery Life	Approx. 6 hours
External Power	7.5 to 16V dc (with 'TP' cables)

DIMENSIONS

Width	63mm
Depth	22mm
Height	97mm
Weight	146 grams

ACCESSORIES SUPPLIED	Antenna
.....	Instruction manual
.....	Belt clip

Antenna Data for Flexible Wire Antennae

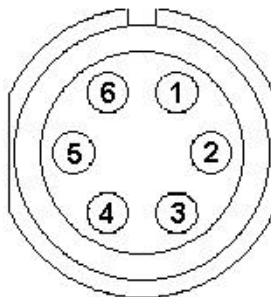
COLOUR CODE	CENTRE FREQUENCY	USABLE FREQUENCY RANGE	ACTIVE LENGTH (mm)	
			RX	TX
BLACK	177.00	169.0 - 186.0	*417	
BLUE	196.00	186.0 - 206.0	*376	
GREEN	204.00	191.0 - 217.0	*362	
BLACK	500.00	470.0 - 530.0	134	129
BROWN	550.00	520.0 - 580.0	115	110
RED	570.00	554.0 - 615.0	112	107
ORANGE	660.00	630.0 - 692.0	103	93
YELLOW	730.00	698.0 - 757.0	95	85
GREEN	767.00	726.0 - 792.0	88	78
BLUE	788.00	764.0 - 850.0	86	76
WHITE	846.00	780.0 - 890.0	81	71

FREQUENCIES IN MHz

***NOTE: RX AND TX ANTENNA LENGTHS ARE SAME IN THESE FREQUENCY RANGES.**

Transmitter Input Connectors

PCB Mounted Multi-Way Lemo or ODU Connector.

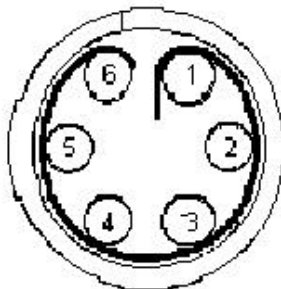


Top View

CONNECTIONS	FUNCTION	NOTES
1	Mic input	
2	M-	-5V out for negative biased microphones
3	BATT/EXTPWR	BATT+ Volts to power P48 or to externally power TX with TLP cable
4	Battery -	Link Battery - and
5	0V	0V to turn TX 'ON'
6	M+	+9V out for positive biased microphones

Transmitter Cables

MICRON numbering scheme for Lemo or ODU cable connector



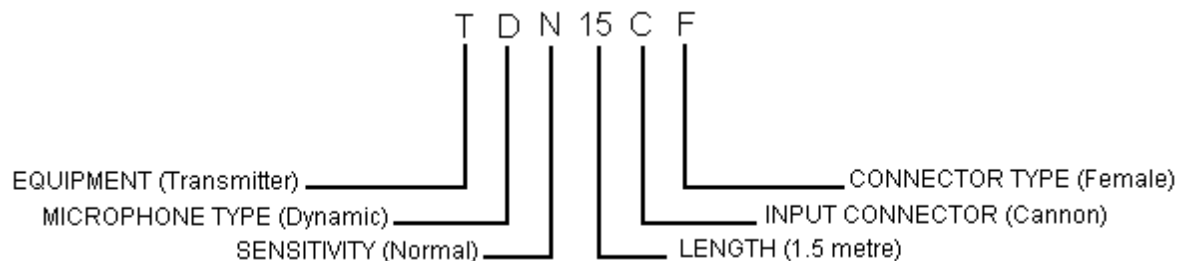
View from soldering side of connector

Lemo FGG.OB.306 CLAD31Z
Or
ODU S20BOC-TO6MCCO-30GP
6 Pin Microphone Input Cable Connector

The pin numbers indicate the wiring standard set by MICRON and all cables in this manual.

Dynamic Microphone Cable

TRANSMITTER CABLE CODING EXAMPLE



YELLOW

WHITE

GREEN

BLACK

BLACK (SPLIT CABLE)

DYNAMIC

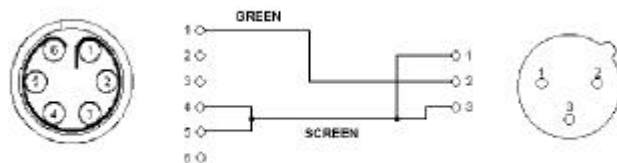
CONDENSER (A/B POWERED)

CONDENSER (12V PHANTOM)

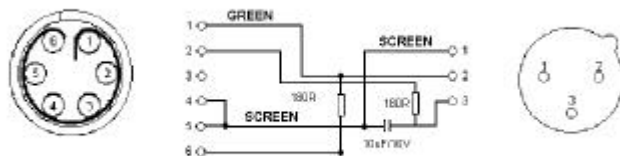
LINE

LINE (EXTERNAL POWERING)

TDN15CF6 (Dynamic Microphone Cable, Code Yellow)



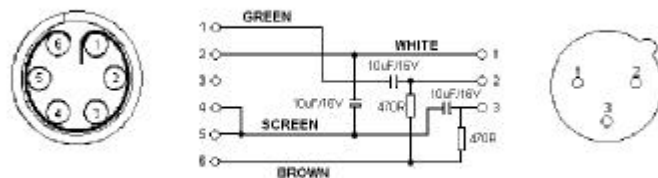
TCAB15CF6 (Condenser AB Powering Cable, Code White)



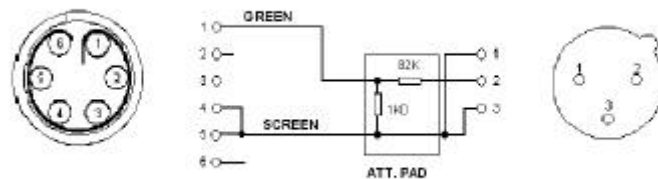
View of LEMO from soldering side of connector.

The pin numbers indicate the wiring standard set by MICRON and all cables in this manual.

TCP15CF6 (Low Voltage 12V Phantom Powering Cable, Code Green)



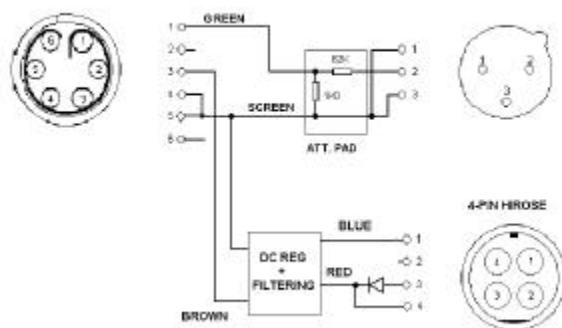
TL20CF6 (Line Input Cable, Code Black)



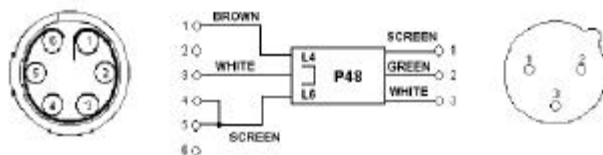
View of LEMO from soldering side of connector.

The pin numbers indicate the wiring standard set by MICRON and all cables in this manual.

TLPO7CF6 (Line Input With External Powering Cable – Y Cable, Code Black)



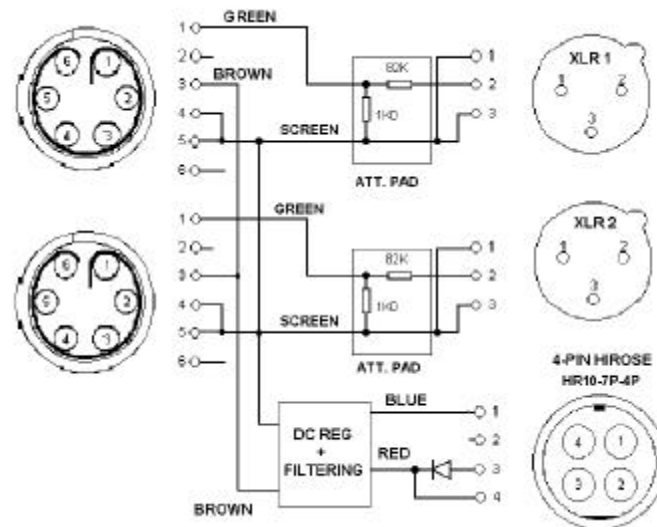
P48 MICRON (Phantom Powering 48V)



View of LEMO from soldering side of connector.

The pin numbers indicate the wiring standard set by MICRON and all cables in this manual.

2TLPO7CF6 (Double Line Input with External Powering Cable, Code Red/Blue)

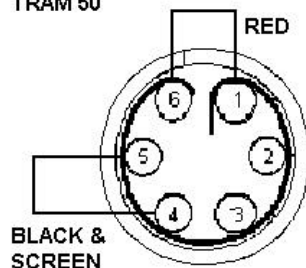


View of LEMO from soldering side of connector.

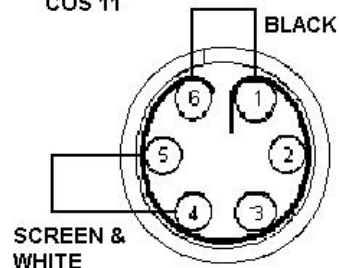
The pin numbers indicate the wiring standard set by MICRON and all cables in this manual.

Cable Ended Microphones

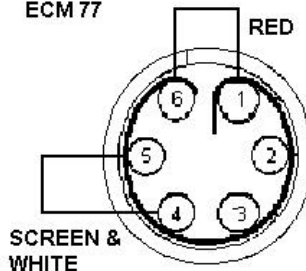
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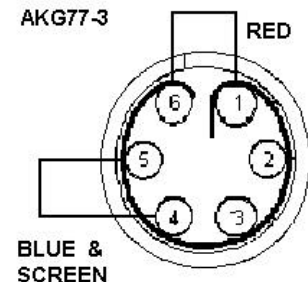
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ECM 77



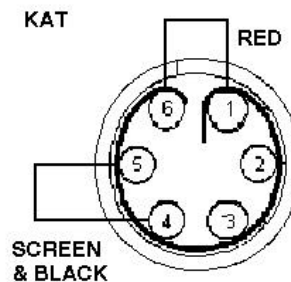
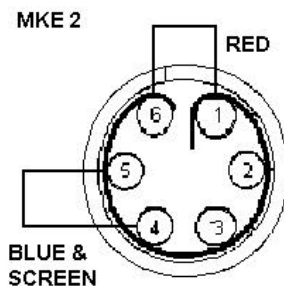
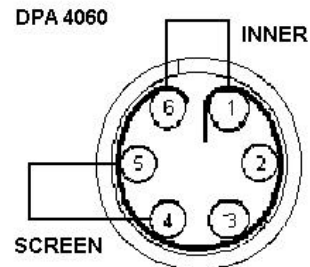
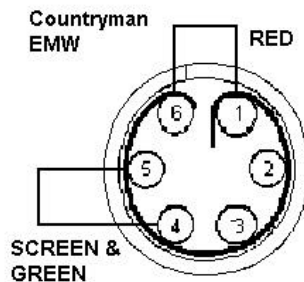
AKG77-3



View of LEMO from soldering side of connector.

The pin numbers indicate the wiring standard set by MICRON and all cables in this manual.

Cable Ended Microphones



View of LEMO from soldering side of connector.

The pin numbers indicate the wiring standard set by MICRON and all cables in this manual.

Appendix

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