

SDR770.132

SDR770.64

SDR770.32

MICROGN

700 SERIES-MULTI-FREQUENCY
UHF SMALL DIVERSITY RECEIVER

MICRON

INSTRUCTION MANUAL

Covers the following models:
700 Series: SDR770.132, SDR770.64
SDR770.32

Part No. IMSDR770-1.1



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General Description

The MICRON SDR small diversity receiver is designed for use in all mobile applications where reliability and performance are the foremost requirements.

Housed in a strong lightweight aluminium extrusion case, with protected controls and reliable connectors it will withstand the rigours of location work.

The SDR receiver is small and light and is easily mounted on the side of a camera or attached to a recorder. Fitting easily in an equipment bag it is ideal for a portable multi-channel system.

Although small in size the SDR receiver has not compromised quality or versatility. RF stages feature outstanding sensitivity and selectivity (depending on the model), while the audio performance comfortably exceeds broadcast requirements.

The switchable frequency is achieved by using a crystal controlled Phase Locked Loop (PLL) which uses a very low noise voltage controlled oscillator (VCO).

Both Mic level and high level audio outputs are available simultaneously on the 6-pin multi-way connector. The high level output is variable by means of a recessed control on the top panel for feeding line inputs.

The MICRON 700 Series companding system used by the receivers gives a level of performance - with improved sound quality and trouble free operation to low signal levels, even in hostile R.F environments - that is unmatched by other systems.

Two conveniently positioned switches on the SDR770 gives a choice of up to 100 operating frequencies.

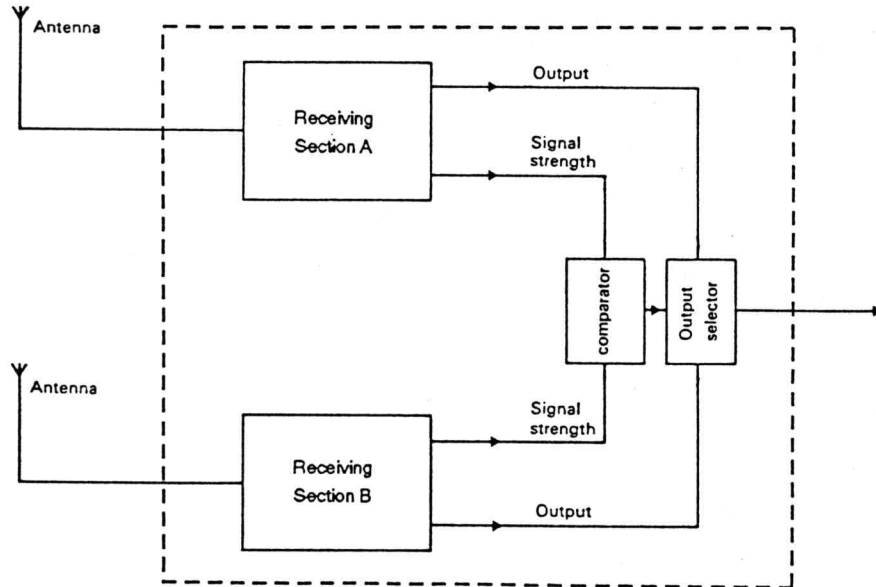
Powering can be from a 9V internal battery or externally from a 7.5-16V dc supply. The external power can be fed to the receiver either through the 6-pin multi-way connector or through the antenna input.

A three-colour LED display on the top panel provides continuous information on received signal strength, tuning and transmitter battery condition. A tri-colour LED allows for continuous monitoring of the internal/external battery condition.

The two RF inputs are miniature 50-ohm co-axial SMA connectors allowing direct connection of antennas or the use of extension cables. When a MICRON SDA antenna distribution amplifier is used the receiver is externally powered through the antenna connections.

Diversity

Each SDR Diversity Receiver comprises two receiving sections and combining unit. The receivers operate on the same frequency with their antennas spaced apart; the comparator automatically rejecting the output from the receiver with the weakest received signal. If signals of similar strength are received the audio outputs are mixed to improve the signal to noise ratio. This audio mixing gives a 3dB improvement over conventional switched diversity receivers and results in a greater operating range.



A diversity receiving system gives a dramatic improvement to the dead spot (signal dropout) problem, when compared to a simple receiver. This is because the diversity receiver has a choice of two RF signals, and when one antenna is receiving a weak signal, the other antenna will be receiving a stronger signal.

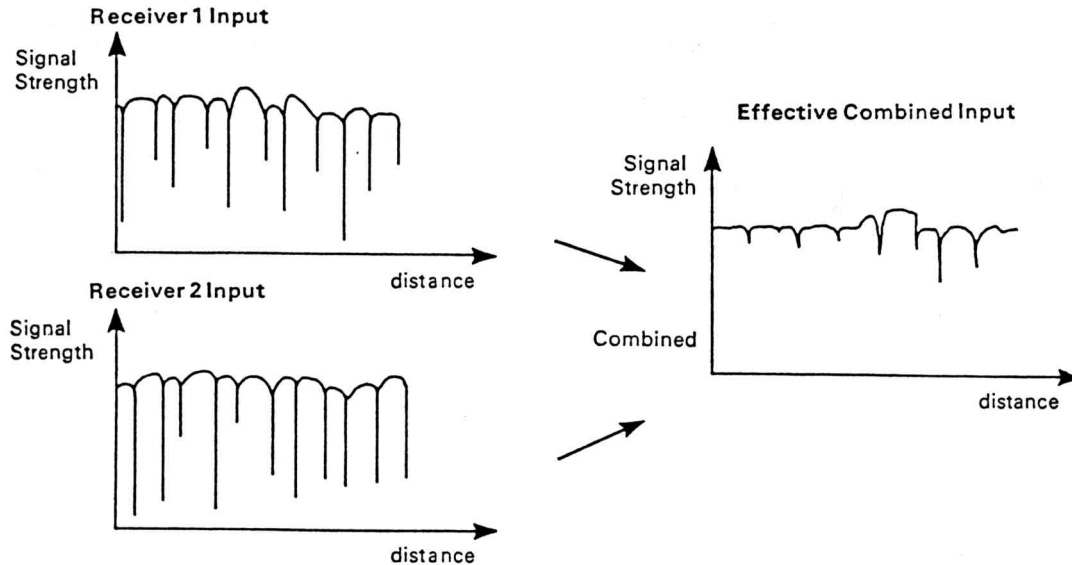
Signal dropout is usually caused by the direct and reflected signals happening to cancel each other out at the antenna. In reflective steel lined rooms such as studios these dead spots happen regularly at $\frac{1}{2}$ wavelength intervals as the transmitter is moved.

In the MICRON diversity receiver the combining circuitry automatically rejects the output from the receiving section with the weaker RF signal before it can degrade the audio output. By this means the best signal to noise ratio can be maintained over a large safe operating area.

The same result could not be achieved just by connecting two antennas in parallel, either directly or through simple amplifiers. The relative phase of the signals from the two antennas would change as the transmitter was moved and cancellation effects would still occur at the summing point.

Diversity

The diagram illustrates how a 2 way diversity system fills in almost all of the dips in received signal strength by utilising the stronger signal at all times.



Unique Micron Companding System

The 700 Series SDR small diversity receivers 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 synchronisation over longer distances and the full potential of 20:1 zoom lenses can be realised.

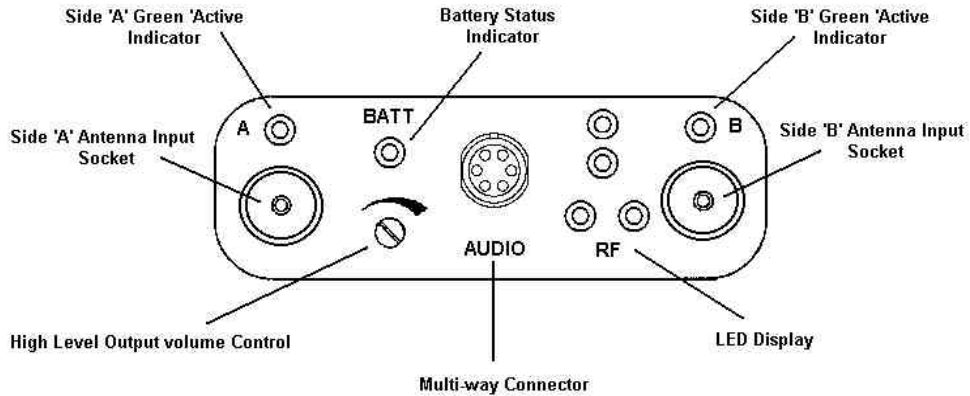
Similarly, there is greater immunity from interference; low-level interference signals are further depressed and the difference between wanted and unwanted signals is expanded. Impulsive interference such as switch clicks and motor hash greatly reduced.

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



Antenna Input Sockets

50 ohm SMA coaxial sockets. For direct connection of the antenna, or connection of 50-ohm antenna extension cables. The receiver can also be phantom powered from a 7.5-16V DC supply via these sockets (see powering). The antenna SMA connector is disconnected by unscrewing its outer shell.

Battery Voltage Indicator (Tri-colour LED)

A tri-colour LED continuously displays the internal/external battery condition.

High Level Output Volume Control

A recessed screwdriver operated volume control. This control only affects the high level output, the separate Mic output is fixed level.

Multi-way Connector

A 6-pin multi-way connector with gold plated sockets provides the audio outputs and DC input connections to the receiver. The different receiver audio output options depend on the pin configuration selected. See 'Connections'.

The output cable is disconnected by pulling back the outer sleeve of the plug.

Green Active Indicators

- 1) These indicators operate independently and show green when that section of the SDR is contributing audio to the main output. Either or both can illuminate depending on received signal strength. When both ACTIVE indicators are on, the audio outputs are summed to give an improvement in signal to noise ratio at low received signal strengths.
- 2) When the received signal strength is very low at both inputs, the ACTIVE indicators show when mute is opened.

LED Display

See following pages

LED Display

The 3-colour LED display combines two indicating functions. These are continuously displayed: Received signal strength and transmitter battery warning.

- green - lamp 4
- yellow - lamp 3
- Lamp 2 - red ○ ○ red - lamp 1

Received signal strength

In normal use the height of the LED column of the display indicates the received signal strength, with the bottom pair of red LED's (1&2) acting together.

○
○
○ ○
Good Signal $>50\mu\text{V}$

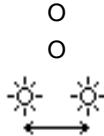
○
○ ○
Usable Signal $>5\mu\text{V}$

○ ○
Weak Signal $>1\mu\text{V}$

All lamps off = Muted

Transmitter battery warning

When the batteries in the matching MICRON transmitter are going flat a sub audio tone is transmitted in addition to the usual signal. This is indicated on the receiver by the bottom pair of red LED's flashing alternately 2 - 3 times per second.



Receiver battery condition

A tri-colour LED continuously displays SDR's battery voltage.

GREEN



Good >7.0V

AMBER



Usable >6.5V

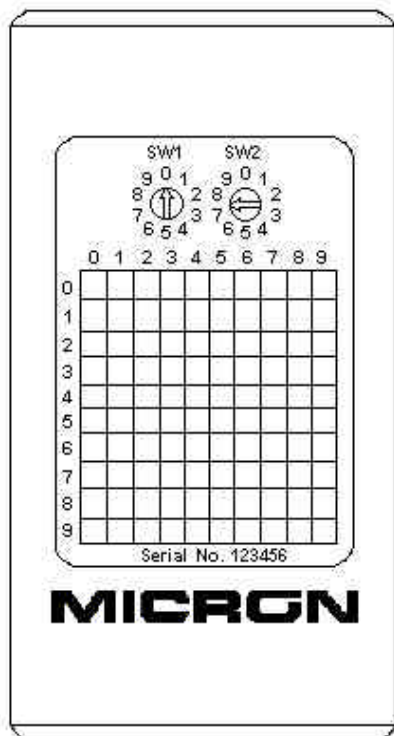
RED



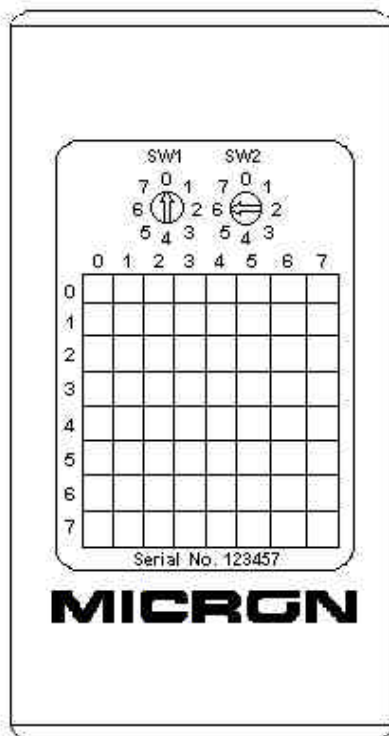
Low <6.5V

All lamps off = Flat

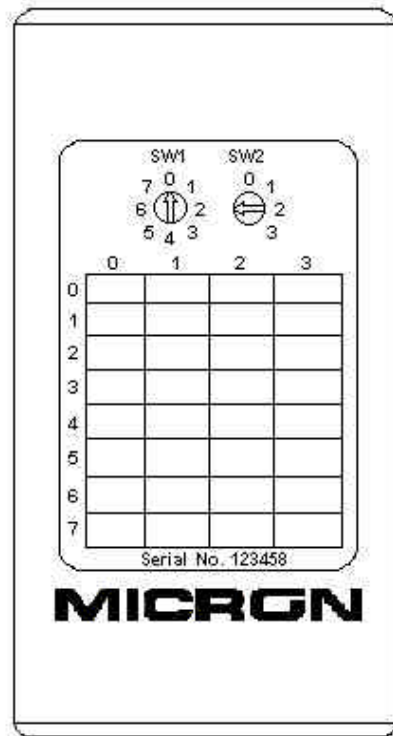
Switch Panel



SDR770.132



SDR770.64



SDR770.32

Frequency change switch

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

There are 3 models available:

- 1) SDR770.32; uses two 8 way switches which are programmed as an 8 x 4 combination (32 frequencies) in a 14 MHz bandwidth.
- 2) SDR770.64; uses an 8 x 8 combination to give 64 frequencies in a 24 MHz bandwidth.
- 3) SDR770.132; uses the 10 x 10 combination to give 100 frequencies in a 32 MHz bandwidth

The frequencies are shown on the serial number label.

Serial Number Label

Gives information on:

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

Powering

The SDR receiver can be powered from an internal battery or from an external 7.5-16V DC source.

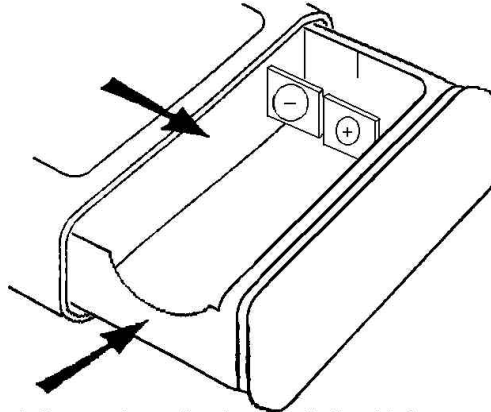
Internal Powering

The internal battery should be PP3 9V Alkaline type IEC 6LR61 (MN1604) this type will give a continuous life of more than 4 hours.

Connecting the appropriate standard MICRON audio output lead to the receiver will switch ON the receiver if it is being powered from its internal battery.

Opening the battery compartment

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



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

External Powering

The external 7.5 -16V DC can be supplied by a separate mains unit or from the camera, mixer or tape recorder batteries, providing they are not +ve earth, always use recommended MICRON CP770H6 or CP770M6 combinational cable. (These cables are fitted with in-line dc regulator and additional dc. filtering)

The SDR receiver is capable of being externally powered in two ways: via the antenna socket or through the 6-pin multi-way connector.

The antenna socket will take the phantom power supply from a MICRON SDA antenna distribution amplifier.

For powering through the 6-pin multi-way connector a combinational lead is required e.g. CP770H6 or CP770M6.

It is recommended that the internal batteries be removed from the receiver when it is externally powered.

Internal / External Powering

The standard Combinational leads have the switching link fitted in the multi-way connector between pins 5 and 6. The same lead can be used for both internal and external powering methods. With an internal battery fitted, the receiver will stay ON when the external supply is switched OFF, unless the lead is unplugged from the receiver.

If the link is not fitted in the output cable the internal battery supply will not be connected, even with the cable plugged into the receiver.

Operating Instructions

Connect the appropriate MICRON audio output lead to the receiver, this will switch ON the receiver if it is being powered from its internal battery.

When the receiver is to be externally powered, the receiver should be switched from the external source. (see powering.)

Connect both the antennae, either directly or via an antenna extension cable.

Check the receiver internal battery supply voltage using the LED display on the receiver.

Do a quick interference check. With the transmitter OFF check the signal strength indicator on the receiver for any interfering signals. Flickering of the red LEDs (lamps 1&2) is OK. If the received interference is higher than this, try altering antenna positioning, (See interference.), or switch to another frequency.

Ensure the operating frequency is set correctly to match the transmitter. Switch ON and set up the matching MICRON transmitter. (See transmitter operating book.)

Check receiver signal strength indicator all lights should be lit. Set your transmitter mic level according to transmitter operating book.

For most electret microphones set MIC IN LEVEL to position '4' or '5'.

For line input use MICRON TL20CF6 and set MIC Level to position '3' or '4' as before.

THE SYSTEM IS NOW READY.

FREQUENCY GROUPS:

Group 1: 470 – 530MHz

Group 2: 522 – 580MHz

Group 3: 555 – 618MHz

Group 4: 630 – 692MHz

Group 5: 692 – 760MHz

Group 6: 744 – 804MHz

Group 7: 765 – 828MHz

Group 8: 816 – 877MHz

Switching Bandwidths as standard 14 to 32MHz can be manufactured to your specification within above frequency groups.

Interference

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 Radio Frequencies from electronic equipment such as: TV sets, digital displays, computers, mobile phones and the like.

When checking during rehearsal, ensure that all potential sources of interference are switched on and in position e.g. Cameras and viewfinder, motor generators, arc lights, switchgear, TV monitors, HMI lighting drive units, PC's, Walkie Talkies, mobile phones. Note: Unterminated TV video cables are a particular hazard.

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.

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

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

Connect only one antenna at a time for this test, then repeat with only the second antenna connected. Having optimised each antenna separately reconnect both antennae.

TRY TO IDENTIFY THE SOURCE OF THE INTERFERENCE:

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 polarisation.

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

Place the receiving antennae as close as possible to the transmitter. One possibility is to use directional antennae, mounted on a microphone boom, and to follow the action. If the antennae have to be fixed and the acting area is large, use a walk test to find the best site for the antennae.

Interference

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

(Noise in this case means a twittering type of sound i.e. '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

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.

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.

There are some situations where frequencies which are incompatible have to be used. The following precautions may help to minimise the problems. Separate all the receivers (or the antennas). Try to avoid producing strong unwanted signals in each receiving antenna. Site the receiver's antennae to favour their own channels. As far as possible, keep all transmitters at least 0.5 metres (20ins) apart.

Antenna Details

Antenna Input Socket

The 50 ohm SMA coaxial socket fitted to the top panel of the receiver gives the user a choice of antenna connection possibilities:

Direct Antenna Connection

Three MICRON antenna types can be directly connected to the receiver:

SMAS quarter wave semi-flexible straight antenna for frequencies above 700 MHz

SMAR quarter wave semi-flexible right-angled antenna for frequencies above 700 MHz.

SMASH quarter wave helical straight antenna for frequencies below 700MHz

SMARH quarter wave helical right-angled antenna for frequencies below 700MHz.

Antenna extension cables.

The standard MICRON SMAE10BM and SMAE10BF cables (1 metre long SMA to BNC plug/socket) allow the use of any 50 Ohm BNC fitted antennas or extension cables with the SDR receiver. If the required cable run is short i.e. less than 5 metres, then longer versions of the SMAE cables can simply be used. For longer distances RG58u cable should be used to extend beyond the 1 metre SMAE10BF cable. The standard MICRON AEC Antenna Extension Cables are made in URM76 cable and are available in 3, 5, 10 and 20 metre lengths.

As a general rule it is better to take the receiver as close to the action as possible than to have long antenna cables, but if the antenna is well placed the increase in received signal will compensate for cable losses.

If it is necessary to run long antenna cables, perform a test with the cable in position - if the LED signal strength indicator never falls below the 'all lights on' state, the long antenna cable is not effectively degrading the signal. If the signal does fall below the 'all lights on' level, the best solution is to take the receiver closer to the action to reduce the losses in the antenna cable and to put the antenna in a better position.

The Antenna SMA connector is disconnected by unscrewing its outer shell.

Antenna Extension Details

Recommended maximum cable lengths for Small Mobile Receivers

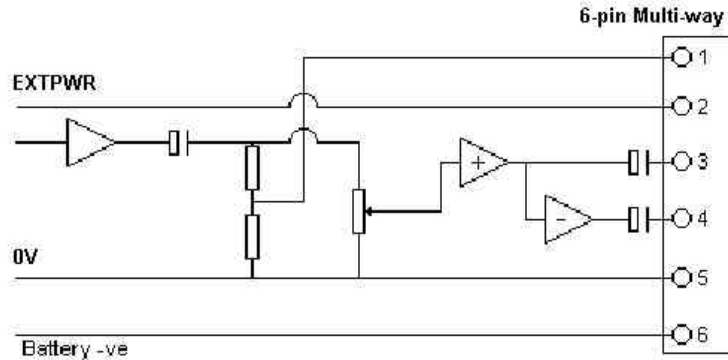
Freq. (MHz)	Loss per 10m (dB)		Suggested Maximum Cable Length	
	RG174u	URM76	RG174u	URM76
470	7	3.5	10m	18m
500	7	3.5	9m	17m
600	8	4.0	8m	16m
700	9	4.0	7.5m	15m
800	10	5.0	6m	12m
900	10	5.0	5m	10m

The table above gives the 50 ohm terminated losses of RG174u and URM76 coaxial cables at various frequencies, and suggested maximum cable lengths for both types.

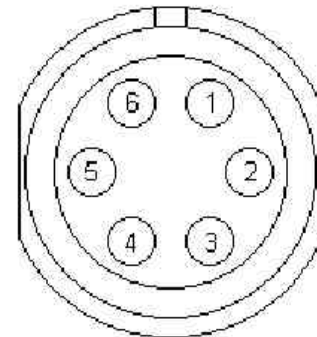
Example: If you are operating a 600MHz Small mobile receiver and have to use an antenna cable of 15m then URM76 should be chosen.

The maximum recommended lengths represent a 6dB cable loss and should not be exceeded without first considering the use of longer audio cables (to shorten the antenna cable run) or an antenna with more gain. It is possible to use an antenna amplifier but this will become the limiting factor in the receiver performance and is generally not recommended. However if fitted, it should be at the antenna end of the cable and its gain should not exceed the cable loss.

Connection Details



PCB MOUNTED MULTI-WAY CONNECTOR



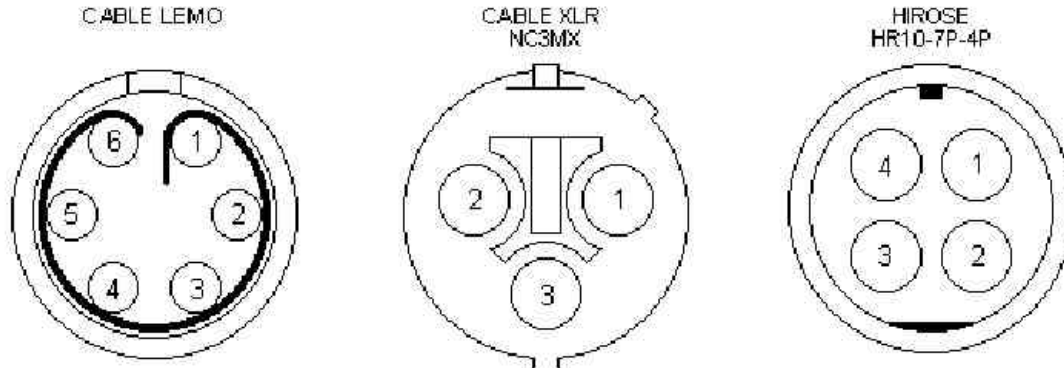
Top View

PIN CONNECTIONS

- 1) MIC LEVEL OUTPUT
- 2) EXTERNAL SUPPLY +VE
- 3) HIGH LEVEL OUTPUT SIGNAL +
- 4) HIGH LEVEL OUTPUT SIGNAL -
- 5) EXTERNAL SUPPLY -VE/GROUND
- 6) INTERNAL BATTERY -VE

Recommended Audio Output Cables

Cable Connectors

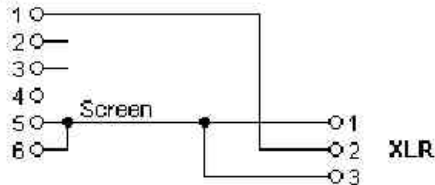


All connectors viewed from soldering side. The pin numbers indicate the standard set by MICRON and all cables in this manual. All LEMO or equivalent connectors must be fitted with a link between pins 5 and 6, and outer shell.

FIXED MIC LEVEL (-27dBV) INTERNAL POWER ONLY

C770MF6

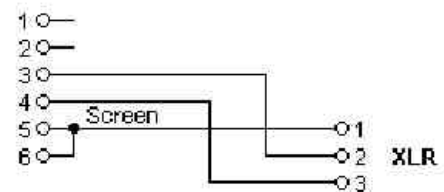
**6-pin
Lemo**



**ELECTRONICALLY BALANCED HIGH LEVEL
(0dBV variable) INTERNAL POWER ONLY**

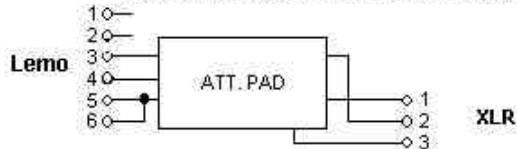
C770H6

**6-pin
Lemo**

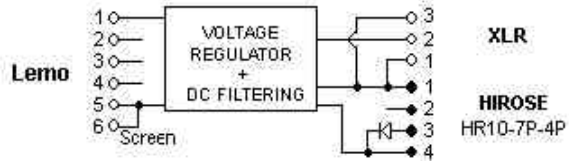


Recommended audio Output Cables

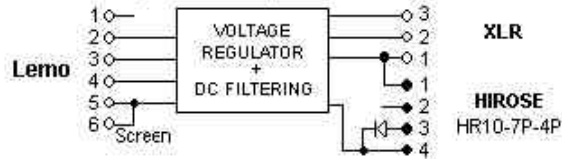
C770M6 ELECTRONICALLY BALANCED MIC LEVEL (-27dBV variable) INTERNAL POWER ONLY



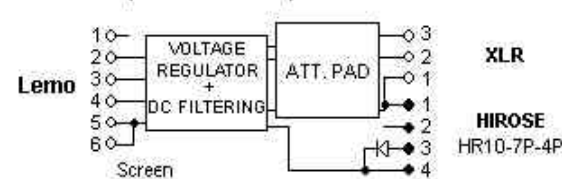
CP730MF6 FIXED MIC LEVEL (-27dBV) WITH EXTERNAL POWER



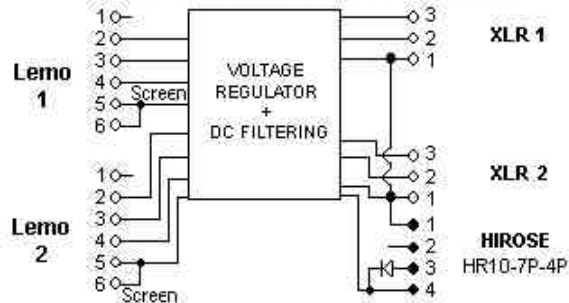
CP730H6 ELECTRONICALLY BALANCED HIGH LEVEL (0dBV variable) WITH EXTERNAL POWER



CP730M6 ELECTRONICALLY BALANCED MIC LEVEL (-27dBV variable) WITH EXTERNAL POWER



2CP730H6 DOUBLE ELECTRONICALLY BALANCED HIGH LEVEL (0dBV variable) WITH EXTERNAL POWER



Note: SDR570, SDR530 series combination audio output and d.c. powering cables, such as CP530H, CP530L and CP530M may be used.

A variable HIGH level cable with volume control pot at maximum gives line level, while at minimum gives mic level.
A variable MIC level cable with volume control pot at maximum gives mic level.

Technical Data

Data applies to all SDR receivers, although there may be minor variations from one frequency band to another.

Type.....	SDR770.32	SDR770.64	SDR770.132
Frequency range	470-865MHz	470-865MHz	360-865MHz
Switching range	14MHz	24MHz	32MHz
Channels	32	64	100
Modulation classification.....			F3EGN
Deviation at limiting level			40kHz \pm 1dB
Muting level			1.0 μ V nominal

Receiver output at line-up level

Mic level output.....	-27dBV \pm 2dB
High level output (Level control at max)	0dBV \pm 2dB

Peak Signal to Noise Ratio (RMS, A weighted)

Received signal 630 μ V (strong signal)	>105dB
Received signal 5 μ V (weak signal).....	>75dB
Frequency response.....	88Hz-20kHz \pm 2dB
Distortion (1kHz tone at limiting level)	<0.2% THD

Technical Data

Signal Strength Indicator

Lower two lamps light.....	1 μ V \pm 3dB
Centre lamp lights	5 μ V \pm 3dB
Top lamp lights.....	50 μ V \pm 3dB
Tuning indicator range	\pm 30kHz

Battery Status LED

Green	>7.0V
Amber	>6.5V
Red	<6.5V
No light	Flat

Powering

DC supply voltage (use MICRON CP770H6 cable)	7.5V – 16V
Nominal current consumption	95mA \pm 10%
Internal battery, IEC6 LR61, PP3 9V	

Dimensions

Weight.....	185gm
Size	W. 62mm
	D. 22mm
	H. 128mm

Appendix

Agents

COUNTRY	ADDRESS	Phone	Fax
AUSTRALIA	dB AUDIO VISUAL PTY LTD 8 Guest Street, Hawthorn Victoria 3122. Australia	+61 3 9819 3630	+61 3 9819 3636
BELGIUM	ES VIDEO FACILITIES Technologielaan 3, Heverlee 3001. Belgium	+32 1640 4020	+32 1640 5160
BRAZIL	STERLING DO BRAZIL Rua Miguel De Frias, 77-Sala 1101 Icarai Seventy Seven, Niteroi, RJ, CEP24220-000 Brasil	+55 21 622 1536	+55 21 622 1825
CANADA	AUDIO SERVICES CORP. (CANADA) LTD 1545 The Queensway, Toronto, Ontario M8Z 1T8. Canada	+1 416 251 5409	+1 416 251 7438
DENMARK	DANMON - DENMARK Nybrovej 99, 2820 Gentofte. Denmark	+45 4 596 8800	+45 4 593 4150

INTERNATIONAL CODES IN BOLD

Agents

COUNTRY	ADDRESS	Phone	Fax
E. EUROPE	DENIS TYLER LTD 59 High Street, Great Missenden, Buckinghamshire, HP16 0AL. England	+44 1494 866262	+44 1494 864959
FRANCE	GEDIS SARL 112 Rue de Crimee, 75019 Paris. France	+33 1 42 39 8080	+33 1 42 39 8687
GERMANY *	AMBIENT RECORDING GMBH Konradinstr. 3, D-81543 Munchen 90. Germany	+49 89 651 8535	+49 89 651 8558
NETHERLANDS	MATTIJSEN AUDIO ELECTRONICS Rijksstraatweg 125A An Duivendrecht 115 Netherlands	+31 20 699 0480	+31 20 699 3641
NORWAY	DANMON NORGE A/S Postboks 733, N-1411 Kolbotn. Norway	+47 66 99 5400	+47 66 99 5499
SWEDEN	JOSON AB Strindbergsgatan 58, 11528 Stockholm. Sweden	+46 8 667 5920	+46 8 667 1812
U.S.A.	AUDIO RESOURCES LTD 1153 Bergen Parkway, Suite M127	+1 303 674 0721	+1 303 670 5915

Agents

Evergreen, CO 80439. USA

COUNTRY	ADDRESS	Phone	Fax
FAR EAST	V.W. MARKETING 13 Yew Tree Gardens, Epsom, Surrey KT18 7HH, England	+44 137 272 8481	+44 137 272 4009
HONG KONG AND CHINA	HIROSHI SYSTEMS LTD. Unit K 9th Floor, Kaiser Estate (Phase 2), 51 Man Yue Street, Hung Horn, Kowloon, Hong Kong	+852 2330 5683	+852 2363 7930
TURKEY	NEFAN Ltd. STi Vefa Bey Sokak No:26 Yesil Apt. A Blok D:5 Yildiz Posta Caddesi, Esentepe Istanbul, Turkey	+90 212 288 4139	+90 212 266 9558
UK	AUDIO ENGINEERING LTD Micron House, 3 New Road, London N8 8TA	+44 020 8341 3500	+44 020 8341 5100

* Dealer.

Please contact Audio Engineering Ltd. direct if you do not see a local distributor or dealer.



INTERNATIONAL CODES IN BOLD

AUDIO ENGINEERING LIMITED, MICRON HOUSE, 3 NEW ROAD , LONDON N8 8TA
Telephone: **+44** (0) 20 8341 3500 Fax: **+44** (0) 20 8341 5100