



[www.westmountainradio.com](http://www.westmountainradio.com)

## ***CLRspkr***

### **Noise Reducing Loudspeaker Owners Manual**

**November, 2010**

Thank you for purchasing the CLRspkr..... a small loudspeaker containing the “ClearSpeech<sup>®</sup>” noise reduction circuit and audio amplifier You will find this noise reducing speaker extremely effective in improving communication clarity. Mobile and base operation is less fatiguing and more fun.

It is ideal for mobile radio operation. Noise reduction is superb. The Digital Signal Processor (DSP) passes voice and CW sounds, while attenuating noise, such as hum, hiss, whistles, and static. It effectively removes heterodynes, ignition noise, lightening crashes, power line noise, and hum. The process is dynamic and changes with the interference and the signal, but the effect is rewarding. Mobile voice operation is fun without all the background noise.

The DSP recognizes the intermittent nature of CW and allows it to pass noise free.

The CLRspkr may be mounted in any convenient location. The bracket permits tilt aiming. Its audio cable plugs into the headphone or mono speaker output on the radio. Connect the Powerpoles<sup>®</sup> to any convenient 12-volt supply. The 6-foot cables may be lengthened with extensions, if needed.

The CLRspkr works well in the home station too. There is a 1/8-inch phone jack on the back for connection to an external 8 or 4 ohm loudspeaker. Plugging in disconnects the internal speaker.

CLRspkr is a high-tech, low cost solution to enhance the audio quality of communication for ham radio, mobile operation, car and truck fleets, emergency vehicles, and marine radio.

### **Choosing a Mounting Location**

The CLRspkr may be mounted in any convenient location. It can rest on a tabletop or mount to any surface. The bracket has two holes for mounting with the included screws. The two side knobs permit tilt aiming.

Keep the unit close to your radio and power supply. The cables are 6 feet long, but can be lengthened with extensions, if needed.

Try not to place the unit in direct sunlight. It is black and can get real hot. . .and heat is not the best thing for electronics. Keep out of rain.

## Connections

Audio input is via the 1/8 inch mono plug. Plug it into the headphone output or the mono speaker output on the radio.

Note: The audio connector is mono. It is not intended to plug into a “stereo” loudspeaker socket. Damage may occur.

The CLRspkr comes with a 6 foot power cable with Powerpole connectors for your convenience. The RED connector is for plus 12 Vdc, and the BLACK is for ground.

If you use other connectors, just remove the Powerpoles and connect the red wire to plus 12 volts and the black wire to ground.

There is a diode in the unit to prevent damage from reverse polarity connection.

## External Loudspeaker

An external loudspeaker may be plugged into the 1/8 inch mono socket on the back of the CLRspkr. The internal speaker is switched off. You may use a 4 or 8 ohm speaker.

## Operating

CLRspkr is easy to operate. With the DSP switch in the “OUT” position, simply turn the power ON. The GREEN LED will light. Adjust the radio’s output volume control to produce a comfortable listening level. Then turn the DSP switch to the amount of noise reduction...LO, MED, HI, Max. The noise will reduce leaving the voice or CW signal at the same volume.

If the incoming audio level is too high the CLIPPING LED will flash. Reduce the input just below flashing. Clipping disrupts the noise reduction circuit.

## Noise Reduction Performance

There are four levels of noise reduction, LO, MED, HI, and MAX. The measured random noise reduction is:

LO	– 6 dB or 0.50 original value
MED	– 10 dB 0.32 original value
HI	– 13 dB or 0.22 original value
MAX	–17 dB or 0.14 original value.

Note that the noise reduction is dynamic and adaptive. It senses the random character of the voice or CW and permits it to pass through. The repetitive nature of the noise is sensed and reduced according to the patented algorithms. You will notice the DSP battling the difference between the voice and the noise when both are at equal level and the noise is constantly varying.

When the signal is CW, its intermittent character is sensed and the CW is passed through. The noise is attenuated.

When the noise is steady, such as a pure tone (carrier whistle), it is attenuated greatly to over 50 dB or about 0.003 times the original value.

If the noise is a varying siren, it is greatly reduced as well but not as much as a pure tone.

Transient sounds are greatly reduced, especially if they are repetitious.

The net effect of the Digital Signal Processor is to reduce static, hiss, ignition noise, power line noise, carriers, hum, and heterodynes, while passing voice and CW signals.

The adaptive nature of the noise reduction is apparent by observing its convergent time. You will hear a single tone vanish in about 1 second. White noise diminishes in 1 to 2 seconds. Typical car noise and emergency alarms take about 2 seconds to reduce.

## **Power Amplifier**

CLRspkr contains a power amplifier integrated circuit. It produces 4 watts maximum into the 8 ohm internal loudspeaker, when supplied with a 13.8 volt dc source. It will produce around 6 watts if connected to a 4 ohm loudspeaker. Note that the circuit has protection for a shorted speaker, and protection for overheating.

## **ClearSpeech Adaptive Speech Filter**

The ClearSpeech Adaptive Speech Filter is a patented algorithm designed to filter noise from audio signals containing both speech and noise. It is implemented in a circuit board containing DSP circuitry and a small audio power amplifier. The circuit board is purchased under license from the manufacturer, NCT Group, Inc.

## **Immunity from RF Interference**

CLRspkr contains circuitry to reduce interference from transmitted radio signal. There are filters on all input wires, and decoupling capacitors at key points throughout the electronics. There is a ferrite inductor in series with the positive power lead.

Audio input is via a coupling transformer. The audio input ground is not connected to the power return. This helps reduce any ground loops.

## **Specifications**

**Dimensions:** 5.5 x 4.3 x 2.5 inches

**Power Requirements:** 9 to 18 Vdc

**Audio Input:** High impedance, 0.5 volts ac.

**Frequency Response:** 300 Hz to 3400 Hz

### **Noise Reduction Characteristics:**

Adaptive, white noise greater than 15 dB

Single tone, greater than 50 dB.

ClearSpeech® is a registered trademark of NCT Group, Inc.

Powerpole® is a registered trademark of Anderson Power Products