LECTROSONICS M2C Active Antenna Combiner Instruction Manual

INSTRUCTION MANUAL
M2C
Active Antenna Combiner

Fill in for your records:
Serial Number:
Purchase Date:

ISEDC Notices:
Per RSS-210
This device operates on a no-protection no-interference basis. Should the user seek to obtain protection from other radio services operating in the same TV bands, a radio license is required. Please consult Industry Canada's document CPC-2-1-28, Optional Licensing for Low-Power Radio Apparatus in the TV Bands, for details.

Per RSS-Gen

This device complies with Industry Canada's license-exempt RSS. Operation is subject to the following two conditions:

1. This device may not cause interference

2. This device must accept any interference, including interference that may cause undesired operation of the device.

Important Safety Instructions

⚠ This symbol, wherever it appears, alerts you to the presence of uninsulated dangerous voltage inside the enclosure — voltage that may be sufficient to constitute a risk of shock.

⚠ This symbol, wherever it appears, alerts you to important operating and maintenance instructions in the accompanying literature. Please read the manual.

1. Read these instructions.

2. Keep these instructions.

3. Heed all warnings.

4. Follow all instructions.

5. Do not use this apparatus near water.

6. Clean only with a dry cloth.

7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.

8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for the replacement of the obsolete outlet.

10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the

point where they exit from the apparatus.

11. Only use attachments/accessories specified by the manufacturer.

12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

13. Unplug this apparatus during lightning storms or when unused for long periods of time.

    WARNING:

    TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.

    CAUTION:

    TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE THE COVER. NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

14. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

15. Damage Requiring Service Unplug the apparatus from the wall outlet and refer servicing to qualified service personnel under the following conditions:

    A. When the power-supply cord or plug is damaged, +

    B. If liquid has been spilled, or objects have fallen into the apparatus,

    C. If the apparatus has been exposed to rain or water,

    D. If the apparatus does not operate normally by follow the operating instructions. Adjust only those controls that are covered by the operating instructions as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the apparatus to its normal operation,

    E. If the apparatus has been dropped or damaged in any way, and F. When the apparatus exhibits a distinct change in performance, this indicates a need for service.

16. **Object and Liquid Entry**

    Never push objects of any kind into the apparatus through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock.

17. If you install the apparatus in a built-in installation, such as a bookcase or rack, ensure that there is adequate ventilation.

Introduction

The M2C active antenna combiner is designed as an ideal matching component to Lectrosonics digital transmitters. Up to eight transmitters can feed a single antenna to minimize cabling in multi-channel systems. The inputs are isolated to minimize crosstalk and IM (intermodulation) between RF channels.
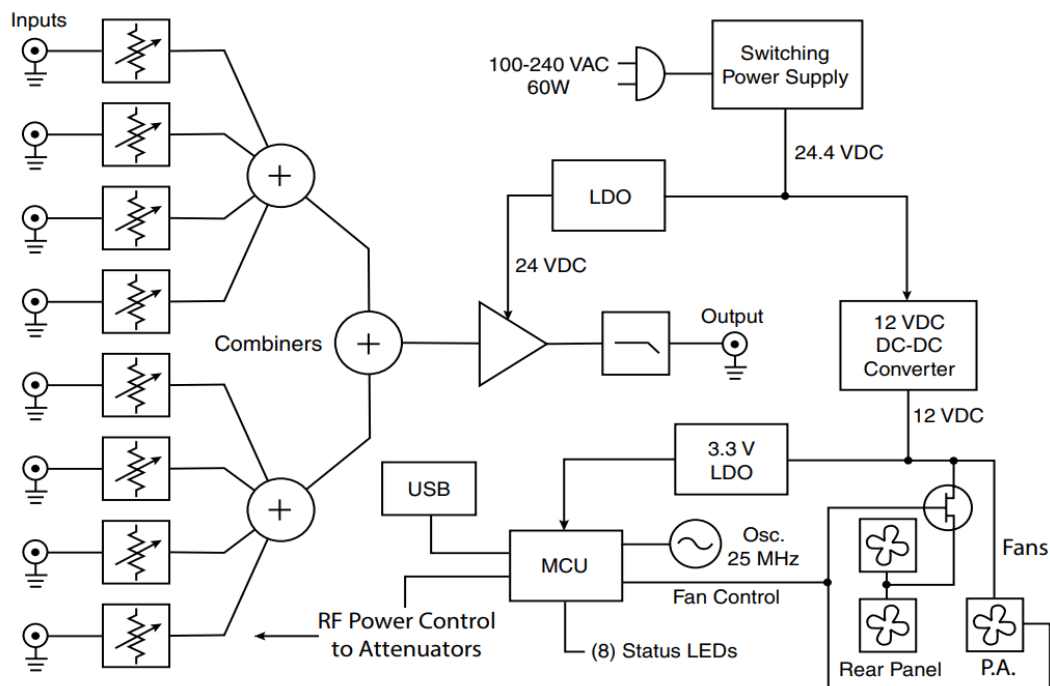
The overall architecture of the design provides excellent performance with low power consumption and heat buildup. Front panel indicators display the active status of RF inputs. A USB port on the front panel is provided for firmware updates.

Up to 100mW can be delivered to each input port without generating IM (intermodulation) signals due to the use of high overload components. Input signals above 50mW are attenuated automatically to maintain the 50mW maximum output. Front panel LEDs indicate the operating status and various fault modes.
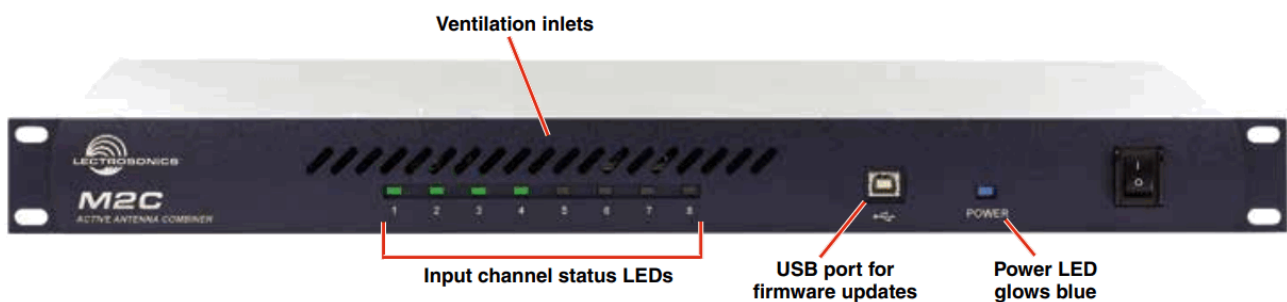
Three cooling fans are employed to maintain the operating temperature. One fan is dedicated to the output amplifier and runs all the time. Two variable speed fans are mounted on the rear panel to exhaust heat from the
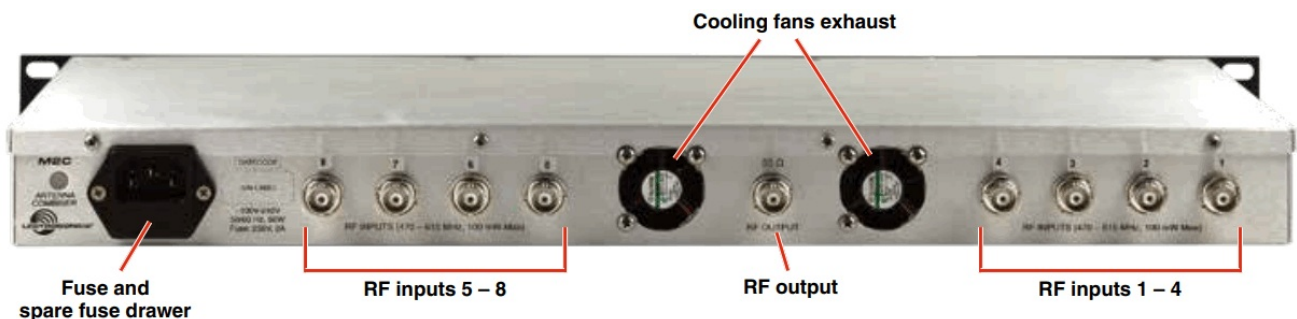
interior of the chassis.

M2C Combiner Block Diagram

Front Panel

Ventilation inlets

Input channel status LEDs

USB port for firmware updates

Power LED glows blue

Rear Panel

Cooling fans exhaust

Fuse and spare fuse drawer

RF inputs 5 – 8

RF output

RF inputs 1 – 4

System Configuration

Up to eight transmitters can be connected to the M2C on frequencies from 470.100 to 614.375 MHz. The combiner mixes the incoming RF signals and delivers the mix to the final amplifier. The maximum RF output power is 50mW.

The combiner applies maximum attenuation to each input channel until an RF signal is present at +5dBm or greater. Once the input channel is "active," the signal power is monitored and attenuation is applied as needed. If

the signal is greater than +17dBm (50mW), the attenuator will reduce it to +17dBm.

When the transmitters are placed close to the combiner, the type of coaxial cable is not critical, but a low loss 50-ohm cable is recommended. At longer cable runs, the low-loss cable is more important.

If the transmitters are greater than 50mW, cable loss is generally not a concern, unless the loss is considerable and the resulting signal entering the combiner is less than 50mW. The combiner does not apply gain to increase the incoming RF signal level.
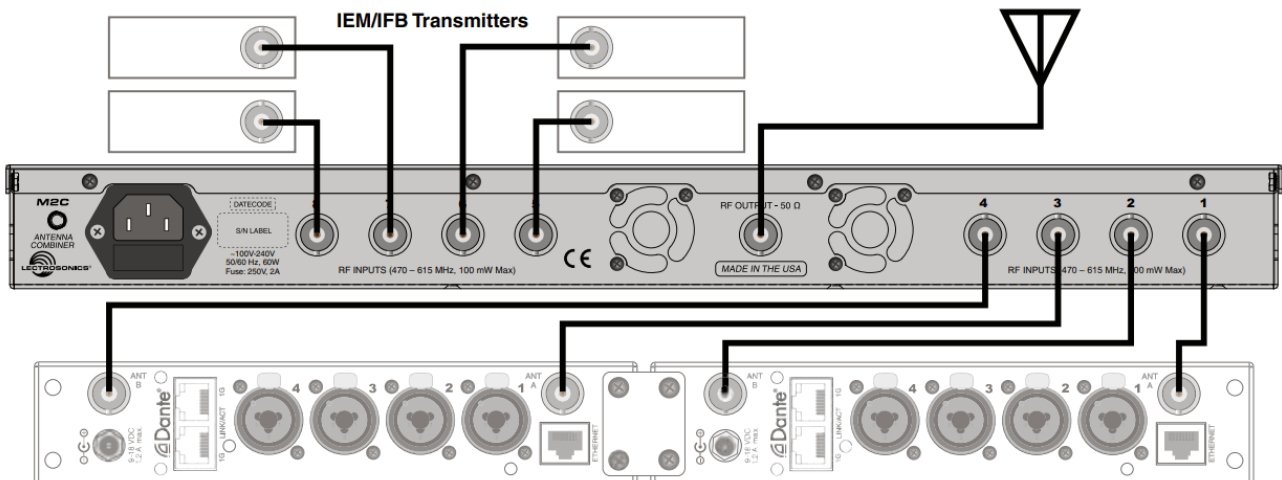
Lectrosonics M2T IEM/IFB Transmitter

Setup and Operation

Installation

The M2C antenna combiner can be installed in a 19-inch rack with other devices directly above and below it. Adequate ventilation in normal conditions is provided by the front and side panel vent openings and the rear panel fans. If another device that generates excessive heat is mounted below this combiner, it is possible that the internal temperature could reach a high enough point to cause the combiner to shut down. If this happens, the front panel LEDs will indicate the condition as described under LED Indicators.

Setup

1. Turn the power switch off and then connect the AC power to the main outlet and the combiner.

2. Connect the output antenna to the rear panel jack.

3. Connect the coaxial cables from the transmitters to the input jacks on the rear of the combiner.

4. Turn the power on and observe the front panel LEDs.

5. The LED for each input channel will indicate the status as described under **LED Indicators.**

LED Indicators

Front panel LEDs glow and blink different colors to indicate various operating modes and fault conditions.

Operating Modes:

Green
Channel active
Normal operation

Red
Out of band signal
Full attenuation

Yellow
Channel active
w/ attenuation

LED Off
No signal
Full attenuation
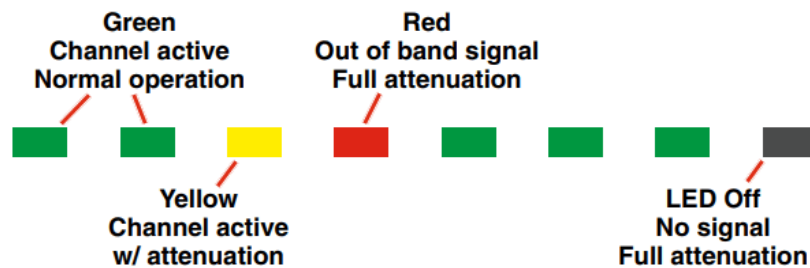
If a channel LED is off, it means there is no usable signal present and the attenuator will be at the maximum level (30 dB down) to suppress potential noise. When no channels are active, the RF amplifier is turned off.

Each channel will become active and the associated LED will glow green when an RF signal at +5dBm (3.16 mW) or greater is present. If the signal is greater than +17dBm (50 mW) the channel will be active, but the attenuator will reduce the signal to +17dBm and the channel LED will glow yellow.

If the incoming signal is out of the frequency band of the combiner, the channel LED will glow red and full attenuation will be applied.

Fan Operation Fault:

If one of the fans stops turning, all front panel LEDs with blink yellow.

High-Temperature Warning:

If the internal temperature rises to 80°C (176°F) the front panel LEDs will blink red, alternating with the operating mode indications.

High-Temperature Shutdown:

If the internal temperature reaches 85°C (185°F) the RF amplifiers will be turned off and the front panel LEDs will blink red rapidly. When the combiner is in this state, the power must be turned off and the unit allowed to cool before powering up again.

Replacement Power Cords

- P/N 21499: NEMA 5-15 plug to IEC 60320 C13 connector; 6 ft. length; North America
- P/N 21642: CEE 7/7 plug to IEC 60320 C13 connector; 2.4-meter length; Continental Europe
- P/N 21643: BS 1363 plug to C13 connector; 2.4-meter length; United Kingdom

Optional Accessories

- ARG2 coaxial cable; BNC male to male;
  RG-8X; Belden 9258; 0.25 dB loss; 2 ft. length
- ARG15 coaxial cable; BNC male to male; RG-8X;
  Belden 9258; 1.4 dB loss; 15 ft. length
- ARG25 coaxial cable; BNC male to male; RG-8/U;
  Belden 9913F7; 1.9 dB loss; 25 ft. length

- P/N 21499 power cord; NEMA 5-15 plug to IEC 60320 C13 connector; 6 ft. length; North America

Specifications

RF frequency range:	470.100 to 614.375 MHz
Input impedance:	50 ohm
Output impedance:	50 ohm
Input connectors:	(8) BNC; 50 ohm
Output connector:	BNC; 50 ohm
RF gain:	0dB
Indicators:	LEDs; glow green when the signal is present; blink red with fault
RF input threshold for LED indication:	5dBm
Operating temperature range:	–20 to 50° C
Power requirements:	100-240 VAC; 50/60 Hz
Power consumption:	60W maximum
Power inlet fuse:	250 VAC, 2A
Dimensions:	19.00 x 1.75 x 9.50 in. 483 x 45 x 241 mm.

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 from 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 ensure 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. 561 Laser Rd. NE, Suite 102 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 service.repair@lectrosonics.com	

Lectrosonics Canada:

Mailing Address: 720 Spadina Avenue, Suite 600 Toronto, Ontario M5S 2T9	**Telephone:** (416) 596-2202 (877) 753-2876 Toll-free (877-7LECTRO) (416) 596-6648 Fax	**E-mail:** Sales: **colinb@lectrosonics.com** Service: **joeb@lectrosonics.com**

LIMITED ONE YEAR WARRANTY

The equipment is warranted for one year from the date of purchase against defects in materials or workmanship provided it was purchased from an authorized dealer. This warranty does not cover equipment that 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.

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Documents / Resources

	LECTROSONICS M2C Active Antenna Combiner [pdf] Instruction Manual M2C, Active Antenna Combiner, M2C Active Antenna Combiner
	LECTROSONICS M2C Active Antenna Combiner [pdf] Instruction Manual M2C Active Antenna Combiner, Active Antenna Combiner, M2C Antenna Combiner, Antenna Combiner, Combiner, M2C

References

- **Lectrosonics: Quality wireless microphone, encrypted digital wireless and DSP audio processing systems**
- **The Wire-Lists**

Manuals+,