



FMR2000
Commercial FM Stereo Receiver

Owner's Manual

DECLARATION OF CONFORMITY

We, the Manufacturer


**R.L. Drake Company
230 Industrial Drive
Franklin, OH 45005**

declare that the product

**FMR2000 FM Stereo Receiver
Model 2464**


Is in conformity with Part 15 of the FCC Rules. Operation of this product is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

WARNING: TO PREVENT FIRE OR ELECTRICAL SHOCK DO NOT EXPOSE THIS PRODUCT'S AC ADAPTER TO RAIN OR MOISTURE



!WARNING!

RISK OF ELECTRIC SHOCK
DO NOT OPEN



WARNING:
TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER OF AC ADAPTER
NO USER-SERVICEABLE PARTS INSIDE
REFER SERVICING TO QUALIFIED PERSONNEL



An appliance and cart combination should be moved with care. Quick stops, excessive force and uneven surfaces may cause the appliance and cart combination to overturn.



The lightning flash with arrow head symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS PRODUCT'S AC ADAPTER TO RAIN OR MOISTURE. DO NOT OPEN THE CABINET, REFER SERVICING TO QUALIFIED PERSONNEL ONLY.

CAUTION: TO PREVENT ELECTRIC SHOCK, DO NOT USE THE AC ADAPTER WITH AN EXTENSION CORD RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES OF THE AC ADAPTER CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

ATTENTION: POUR PREVENIR LES CHOCS ELECTRIQUES, NE PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR, UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS EN LAISSER AUCUNE PARTIE A DECOUVERT.

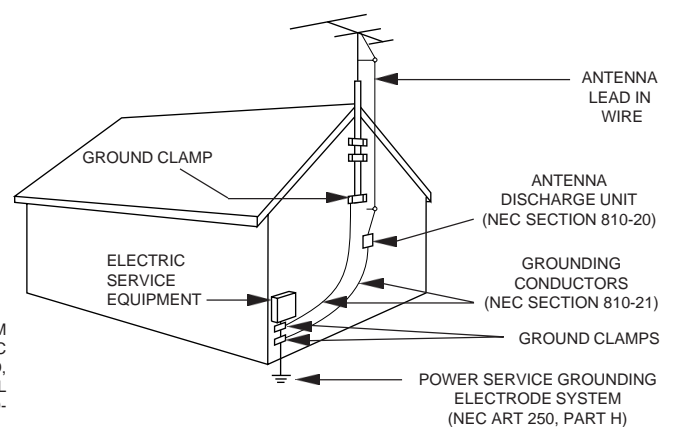
Important Safety Instructions

1. **Read Instructions**—All the safety and operating instructions should be read before the product is operated.
2. **Retain Instructions**—The safety and operating instructions should be retained for future reference.
3. **Heed Warnings**—All warnings on the product and in the operating instructions should be adhered to.
4. **Follow Instructions**—All operating and use instructions should be followed.
5. **Cleaning**—Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleansers. Use a damp cloth for cleaning.
6. **Attachments**—Do not use attachments that are not recommended by the product manufacturer as they may cause hazards.
7. **Water and Moisture**—Do not use this product near water—for example, near a bathtub, wash bowl, kitchen sink or laundry tub; in a wet basement; or near a swimming pool; and the like.
8. **Accessories**—Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious injury to a child or adult, and serious damage to the product. Use only with a cart, stand, tripod, bracket, or table recommended by the manufacturer, or sold with the product. Any mounting of the product should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.
9. A product and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the product and cart combination to overturn.
10. **Ventilation**—Slots and openings in the cabinet are provided for ventilation and to ensure reliable operation of the product and to protect it from overheating, and these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or similar surface. This product should not be placed in a built-in installation such as bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.
11. **Power Sources**—This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supplied to your home, consult your product dealer or local power company. For products intended to operate from battery power, or other sources, refer to the operating instructions.
12. **Grounding or Polarization**—This product may be equipped with a polarized alternating-current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug should still fail to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug.
Alternate Warnings—If this product is equipped with a three-wire grounding-type plug, a plug having a third (grounding) pin, the plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding-type plug.
- 12 a. **Mise à la terre ou Polarisation**—Cet appareil est équipé avec un cordon d'alimentation à trois fils. Il est à brancher sur une prise ayant un connecteur à la terre. Assurez-vous que la connection à la terre ne manque pas.
13. **Power-Cord Protection**—Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the product.
14. **Outdoor Antenna Grounding**—If an outside antenna or cable system is connected to the product, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Article 810 of the National Electrical Code, ANSI/NFPA 70, provides information with regard to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode.
See Figure A.
15. **Lightning**—For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna or cable system. This will prevent damage to the product due to lightning and power-line surges.
16. **Power Lines**—An outside antenna system should not be located in the vicinity of overhead power lines, other electric light or power circuits, where it can fall into such power lines or circuits. When installing an outside antenna system, extreme care should be taken to keep from touching such power lines or circuits as contact with them may be fatal.

NOTE TO CATV SYSTEM INSTALLERS:
THIS REMINDER IS PROVIDED TO CALL THE CATV SYSTEM INSTALLER'S ATTENTION TO ARTICLE 820 - 40 OF THE NEC THAT PROVIDES GUIDELINES FOR PROPER GROUNDING AND, IN PARTICULAR, SPECIFIES THAT THE CABLE GROUND SHALL BE CONNECTED TO THE GROUNDING SYSTEM OF THE BUILDING, AS CLOSE TO THE POINT OF CABLE ENTRY AS PRACTICAL.

17. **Overloading**—Do not overload wall outlets, extension cords, or integral convenience receptacles as this can result in a risk of fire or electric shock.
18. **Object and Liquid Entry**—Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.
19. **Servicing**—Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
20. **Damage Requiring Service**—Unplug this product 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 product,
 - c. If the product has been exposed to rain or water,
 - d. If the product does not operate normally by following 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 product to its normal operation,
 - e. If the product has been dropped or damaged in any way, and
 - f. When the product exhibits a distinct change in performance—this indicates a need for service.
21. **Replacement Parts**—When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutes may result in fire, electric shock or other hazards.
22. **Safety Check**—Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.
23. **Wall or Ceiling Mounting**—The product should be mounted to a wall or ceiling only as recommended by the manufacturer.
24. **Heat**—The product should be situated away from heat sources such as radiators, heat registers, stoves, or other products (including amplifiers) that produce heat.

EXAMPLE OF ANTENNA GROUNDING



Frequency Range: 72 - 108 MHz.

Usable Sensitivity

(30 dB S/N, mono): 2 μ V at 75 Ohms.

Sensitivity

(50 dB S/N, mono): 5 μ V at 75 Ohms.

(50 dB S/N, stereo): 15 μ V at 75 Ohms.

Selectivity

(Alternate CH, \pm 400 kHz): 65 dB.

Image Rejection: 70 dB minimum.

Stereo Separation

(1 kHz audio tone): 25 dB.

Audio Outputs: 3 sets, L, R, and Mono balanced or unbalanced screw terminals.
3 sets, L, R, and Mono unbalanced RCA phono connectors.

Audio Output Level:

Nominal 250 mV.

Audio Output Impedance:

600 Ohms, balanced. Will drive 600 Ohm or higher impedance loads.

Audio Frequency Response

(600 Ohm load):

+1, -3 dB of 75 μ Sec de-emphasis curve from 30 to 15,000 Hz.

(10K to 47K Ohm load):

\pm 1 dB of 75 μ Sec de-emphasis curve from 20 to 15,000 Hz.

Audio Distortion:

Typically 0.25%.

Power Requirements:

12 VDC at 200 mA.
120 VAC adapter included.

Size:

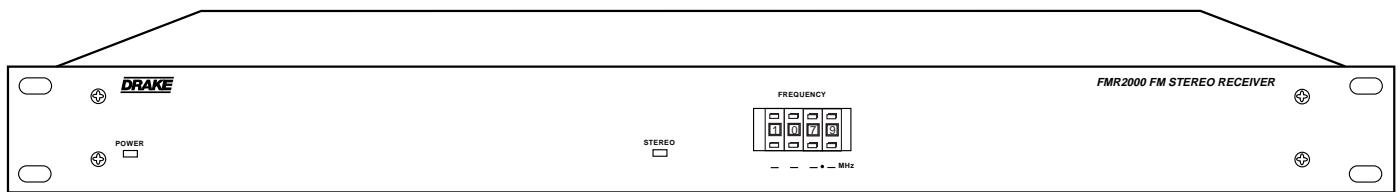
1.75" (4.5 cm) H x
19" (48.3 cm) W x
4.5" (11.4 cm) D.

Weight:

3 lbs., 10 oz. (1.7 Kg).

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General Description

The FMR2000 is a high quality, high performance commercial rack mounted FM stereo receiver for reception of both monaural and stereo broadcasts in the frequency range from 72 - 108 MHz. The receive frequency is conveniently entered in 'MHz' using front panel accessible pushwheel switches. A stereo indicator lights when receiving a stereo broadcast of sufficient signal strength. Both balanced and unbalanced audio outputs are provided at the rear panel. The unbalanced audio output for 'MONO', 'LEFT' and 'RIGHT' are provided at both RCA phono jacks and screw terminals. The balanced audio outputs for 'MONO', 'LEFT' and 'RIGHT' are provided at screw terminals. The antenna connection is via a rear panel 75 Ohm 'F' type connector. The unit is powered by a supplied AC Adapter that operates from a nominal 120 VAC, 60 Hz source and provides a 12 VDC output.

2 Front Panel Controls and Indicators

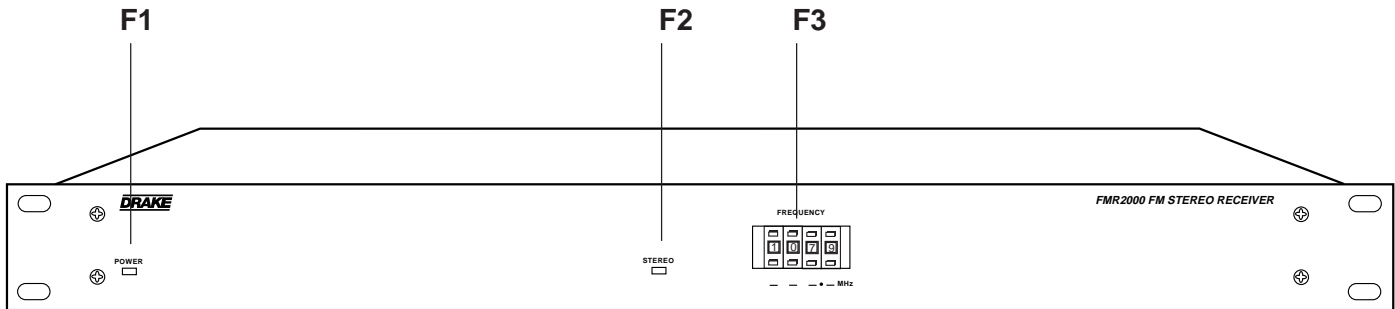


Figure 1

F1 -POWER Indicator

Lights to indicate that the AC Adapter is connected to the rear panel 'DC INPUT' connector of the FMR2000 and the AC Adapter is connected to a source of nominal 120 VAC power. This LED flashes to indicate that the frequency switches are set for an invalid frequency for this receiver, which is outside the range of 72.0 to 108.0 MHz inclusive.

F2 - STEREO Indicator

Lights to indicate that the receiver is tuned to a stereo FM broadcast of sufficient signal strength for proper stereo reception.

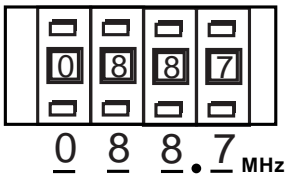
F3 - RECEIVE FREQUENCY Switches

Set the desired receive frequency in 'MHz' to the nearest 100 kHz.

Examples:

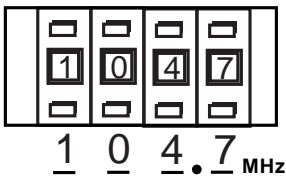
Set for 88.7 MHz:

FREQUENCY



Set for 104.7 MHz:

FREQUENCY



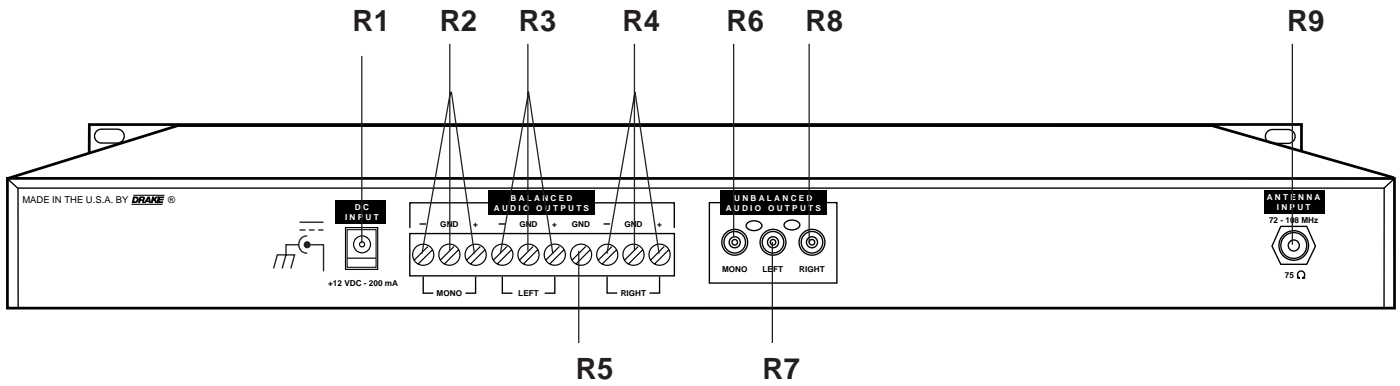


Figure 2

R1 - AC INPUT Connector

Receptacle for the AC Adapter output cable which supplies 12 VDC to the FMR2000. Connect the AC Adapter to a source of nominal 120 VAC, 60 Hz power after all connections are made.

R2 - MONO AUDIO OUTPUT

R3 - LEFT AUDIO OUTPUT

R4 - RIGHT AUDIO OUTPUT

Connect the audio outputs to a modulator or amplifier audio inputs as required. For balanced 600 Ohm output, use the two terminals labelled “-” and “+” for the appropriate output(s). If an unbalanced output is required, connect to the Ground (“GND”) and either the “-” or “+” terminal. In stereo applications, the LEFT and RIGHT outputs should be connected with care taken to maintain the correct phase. To feed a monaural modulator or amplifier, use only the MONO output. Left and Right stereo channels are summed internally and a L + R signal will be present at the MONO outputs. Additionally, an internal jumper can be set to supply the monaural audio to the LEFT and RIGHT outputs. Setting the internal jumper to the MONO position disables the stereo reception mode and inhibits the front panel STEREO indicator from lighting.

The receiver is factory shipped with the jumper set for STEREO operation. See the pictorial on this page describing the location and setting of the STEREO/MONO jumper.

R5 - GND (Ground)

Ground return connection to the chassis for any grounding requirements.

R6 - MONO AUDIO OUTPUT (Unbalanced)

R7 - LEFT AUDIO OUTPUT (Unbalanced)

R8 - RIGHT AUDIO OUTPUT (Unbalanced)

Connect the audio outputs to a modulator or amplifier audio inputs as required. In stereo applications, the LEFT and RIGHT outputs should be connected with care taken to maintain the correct phase. To feed a monaural modulator or amplifier, use only the MONO output. Left and Right stereo channels are summed internally and a L + R signal will be present.

R9 - ANTENNA INPUT Connector

Connect the nominal 75 Ohm coaxial feed line from an appropriate FM band antenna to this ‘F’ type connector.

REFER JUMPER SETTING TO A QUALIFIED TECHNICIAN ONLY

View of FMR2000 Main Circuit Board with top cover removed

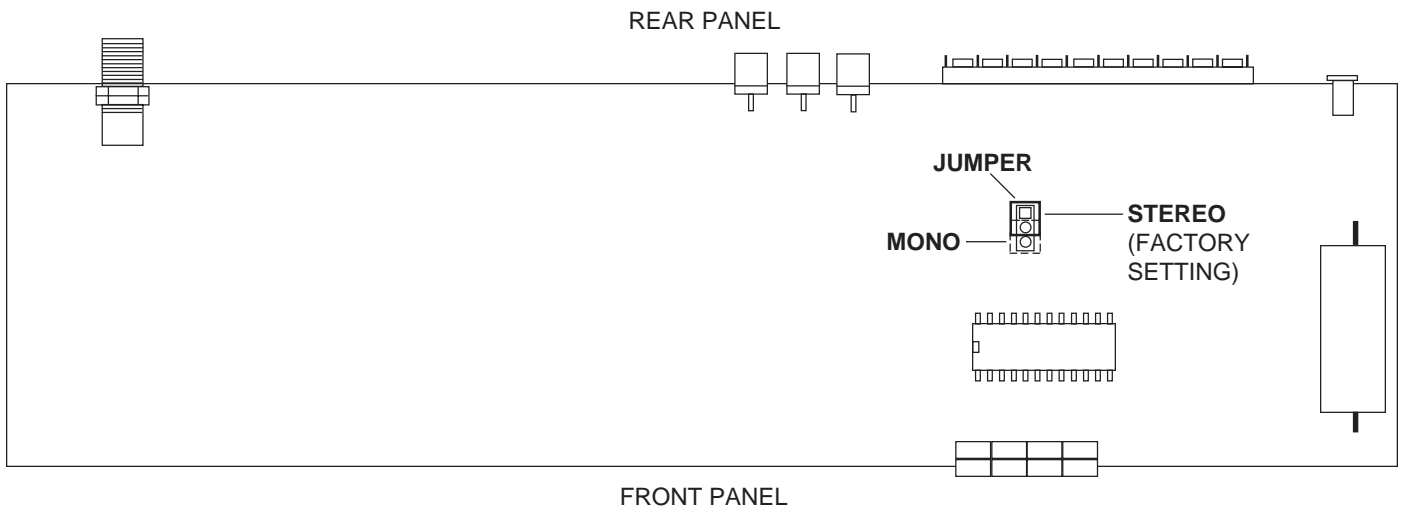


Figure 3 - Setting Internal STEREO/MONO Jumper

4 Installation

Carefully unpack the receiver from its packing carton and protective carton. Mount the receiver in the desired 1-3/4 inch high rack mount location. Fasten the receiver in place with four screws at each of the four corner mounting holes. Leave adequate spacing between units. Units should be spaced apart by at least one panel height wherever possible, and some air movement is advisable in enclosed rack cabinets. Even though the receiver is conservatively designed, excessive heat will shorten component life and receiver performance will be degraded without proper cooling.

The FMR2000 can be used to supply either monaural or stereo audio to any equipment that accepts low level audio input. Do not connect speakers directly to the FMR2000. Two possible applications for the FMR2000 are illustrated in this installation section: 1) using the FMR2000 with an audio amplifier to drive speakers; or 2) using the FMR2000 to provide audio to an Audio/Video Modulator.

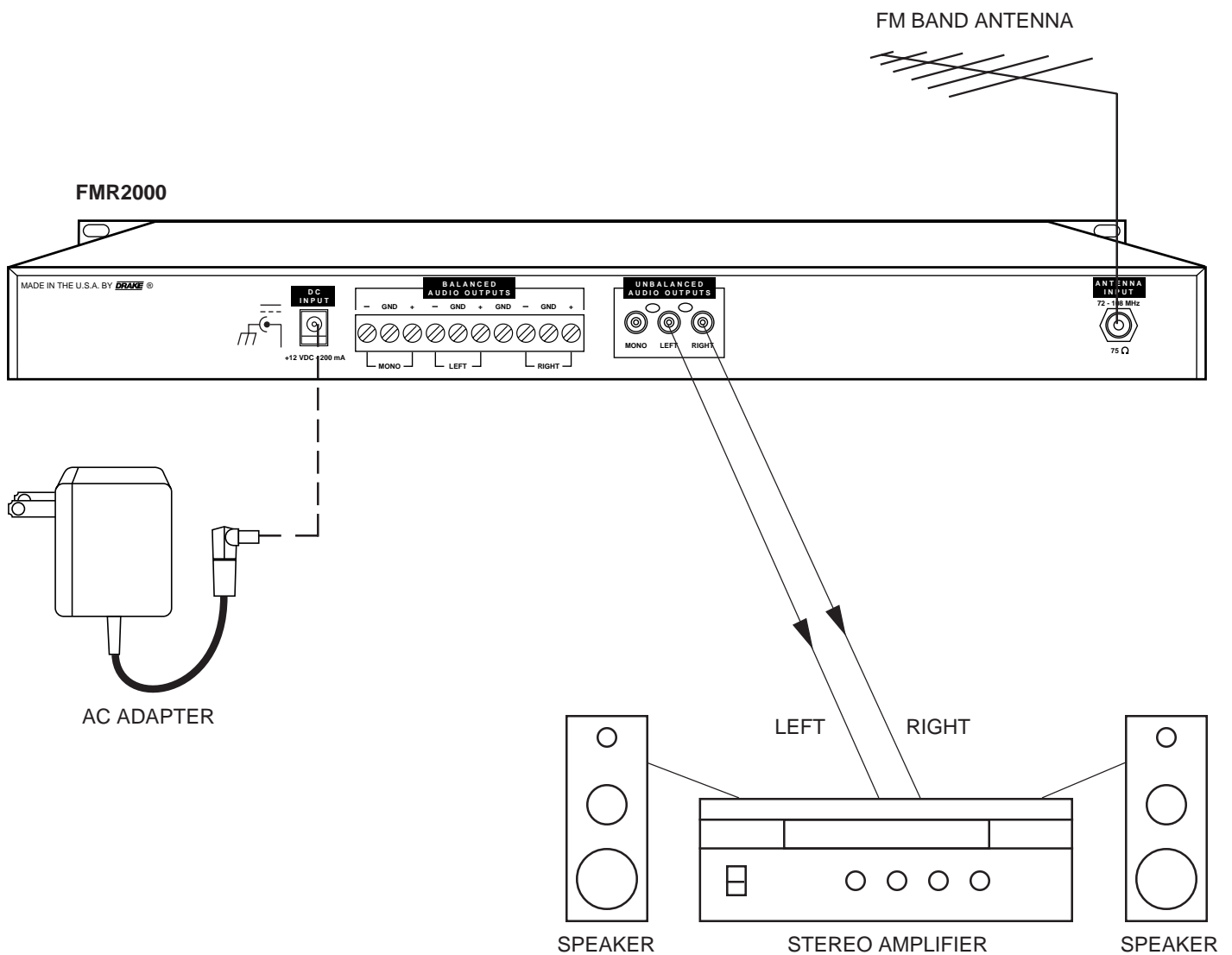


Figure 4 - Connection of FMR2000 to Audio Amplifier

The following application provides background audio (music) to video text or an information screen.

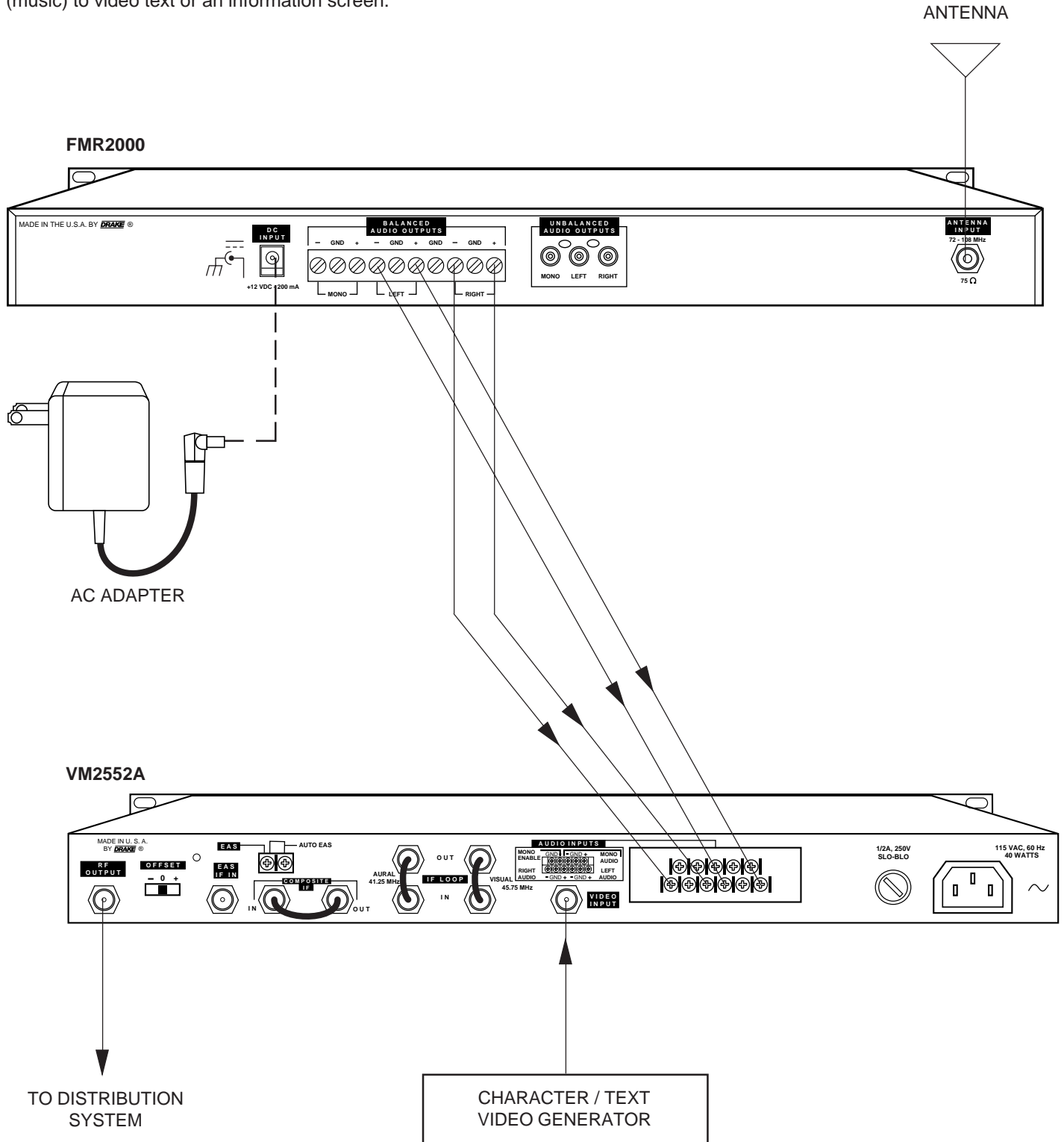


Figure 5 - FMR2000 Providing Stereo Audio Input to a Stereo Modulator

SERVICE INFORMATION

You may contact the R.L. DRAKE Service Department for additional information or assistance by calling +1 (937) 746-6990, Monday through Friday, between 8:00 A.M. and 4:00 P.M. Eastern Time, except on holidays.

You may also contact the R.L. DRAKE Service Department by E-mail at the following address:
service@rldrake.com
or by Telefax:
+1 (937) 743-4576.

Should you want to return your unit for service, package the unit carefully using the original carton or other suitable container.

Write your return address clearly on the shipping carton and on an enclosed cover letter describing the service required, symptoms or problems. Also include your daytime telephone number and a copy of your proof of purchase.

The unit will be serviced under the terms of the R.L. DRAKE COMPANY Limited Warranty and returned to you.

IF YOU NEED TO CALL FOR HELP

Call our Customer Service/Technical Support line at +1 (937) 746-6990 between 8:00 A.M. and 4:00 P.M. Eastern Time, weekdays. Please have the unit's serial number available. We will also need to know the specifics of any other equipment connected to the unit. When calling, please have the unit up and running, near the phone if possible. Our technician(s) will likely ask certain questions to aid in diagnosis of the problem. Also, have a voltmeter handy, if possible.

R.L. DRAKE also provides technical assistance by e-mail: service@rldrake.com
or by Telefax: +1 (937) 743-4576.

Many of the products that are sent to us for repair are in perfect working order when we receive them. For these units, there is a standard checkout fee that you will be charged. Please perform whatever steps are applicable from the installation sections of the Owner's Manual before calling or writing—this could save unnecessary phone charges. Please do not return the unit without contacting R.L. DRAKE first: it is preferred to help troubleshoot the problem over the phone (or by mail) first, saving you both time and money.

Inside the carton, enclose a note with your name, address, daytime phone number, and a description of the unit's problem.
The unit must be sent to the following address:

**Service Department
R.L. DRAKE COMPANY
230 Industrial Drive
Franklin, Ohio 45005 U.S.A.**

Be sure to include your street address which will be needed for UPS return. UPS Surface (Brown Label) takes 7-10 days to reach us depending on your location, Blue takes 2-3 days.

Red is an overnight service. Send the unit in a way that it can be traced if we can't verify receipt of shipment. We suggest UPS or insured postal shipment.

If the unit is still under the original owner's warranty, R.L. DRAKE will pay the cost of the return shipment to you. Our return shipping policy is that we will return it UPS Brown if received Brown or by US Mail, it will be returned Blue if received Blue or Red—or it will be returned however you prefer if you furnish the return cost for the method you select.

If the unit is out of warranty, it will be returned by UPS Brown label COD (UPS does not accept cash/currency) unless:

- 1) It was received UPS Blue/Red, in which case it will be returned UPS Blue/Red COD;
- 2) You designate billing to American ExPress, VISA, MasterCard or Discover card;
- 3) You prepay the service charges with a personal check, or
- 4) You specify some other method of return.

When calling, the technician can estimate the repair charges for you over the phone. This is another good reason to call before sending a unit in for repair. Typically, equipment is repaired in five to ten working days after it arrives at R.L. DRAKE if we have all the facts. If we must call you, it may take longer. R.L. DRAKE is not responsible for damage caused by lightning, nonprofessional alterations, "acts of God", shipping damage, poor storage/handling, etc. R.L. DRAKE will make note of any shipping damage upon receipt. Should your warranty card not be on file at R.L. DRAKE, you will need to send proof of purchase to receive warranty service. Typically, a copy of the invoice from an R.L. DRAKE dealer will suffice. The warranty is for the original owner only and is not transferable.

Three Year Limited Warranty

R.L. DRAKE COMPANY warrants to the original purchaser this product shall be free from defects in material or workmanship for three (3) years from the date of original purchase.

During the warranty period the R.L. DRAKE COMPANY or an authorized Drake service facility will provide, free of charge, both parts and labor necessary to correct defects in material and workmanship. At its option, R.L. DRAKE COMPANY may replace a defective unit.

To obtain such a warranty service, the original purchaser must:

- (1) Retain invoice or original proof of purchase to establish the start of the warranty period.
- (2) Notify the R.L. DRAKE COMPANY or the nearest authorized service facility, as soon as possible after discovery of a possible defect, of:
 - (a) the model and serial number,
 - (b) the identity of the seller and the approximate date of purchase; and
 - (c) A detailed description of the problem, including details on the electrical connection to associated equipment and the list of such equipment.
- (3) Deliver the product to the R.L. DRAKE COMPANY or the nearest authorized service facility, or ship the same in its original container or equivalent, fully insured and shipping charges prepaid.

Correct maintenance, repair, and use are important to obtain proper performance from this product. Therefore carefully read the Instruction Manual. This warranty does not apply to any defect that R.L. DRAKE COMPANY determines is due to:

- (1) Improper maintenance or repair, including the installation of parts or accessories that do not conform to the quality and specifications of the original parts.
- (2) Misuse, abuse, neglect or improper installation.
- (3) Accidental or intentional damage.

All implied warranties, if any, including warranties of merchantability and fitness for a particular purpose, terminate three (3) years from the date of the original purchase.

The foregoing constitutes R.L. DRAKE COMPANY'S entire obligation with respect to this product, and the original purchaser shall have no other remedy and no claim for incidental or consequential damages, losses or expenses. Some states do not allow limitations on how long an implied warranty lasts or do not allow the exclusions or limitation of incidental or consequential damages, so the above limitation and exclusion may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state. This warranty shall be construed under the laws of Ohio.

For Service, contact:

R.L. DRAKE COMPANY
230 Industrial Drive
Franklin, Ohio 45005 U.S.A.
Customer Service and Parts Telephone: +1 (937) 746-6990
Telefax: +1 (937) 743-4576
World Wide Web Site: <http://www.rldrake.com>



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