

Technical Manual

MRA4100C

Continuous Duty

AMPLIFIER TECHNOLOGIES

26802 Via LLano
Mission Viejo, CA 92691

Phone: 949-830-6778

Fax: 949-830-5720

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Section II

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PCB Locations
Over-all Amplifier Block Diagram
DC Interconnection Diagram

Section III

PCB Technical Description, Layout, Schematic, and B.O.M.'s

100-023	Driver Module
100-023	Final Module
100-104	2-Way Splitter / Combiner
100-022	7 Pole Low Pass Filter
100-110	Display & Status Board
100-120	Fuse Board

Overall Technical Description

Model Series MRA4100

This is a continuous duty amplifier operating in the 450-470 MHz frequency band with 100 Watts of output power and is intended for repeater and/or trunking applications.

The amplifier has been designed to work with a wide range of power input drives, however, each amplifier is factory set to work with a specific input drive which may not be exceeded. For example, the maximum input drive for model MRA4100C is 20 Watts and requires two stages of amplification to produce 100 Watts of output power.

The first amplification (driver) stage, provides approximately 20 Watts of drive to each of the two final stages via a 2-way splitter. The two final modules are then combined for a minimum of 100 Watts of RF output power. This RF power is then fed through a 7-pole low pass filter to a type "N" output connector. Double shielded Teflon cables are used for all high power RF interconnections.

An RF sampling circuit is mounted on the Low Pass Filter and provides a DC voltage when the amplifier is operating. This DC voltage provides a reference voltage to the Display Bargraph located on the Front Panel. It also provides a voltage to activate a LED which is used to provide a visual means of verifying RF Power is being produced in case of meter failure.

The DC Fuse board provides protection from DC shorts on all RF modules and the Display board.

More detailed information on the modules in this amplifier can be found in their individual technical descriptions.

GENERAL SPECIFICATIONS

MODEL TYPE

MRA4100C

Frequency Range:	450-470 MHz. (20 MHz. Nominal Bandwidth)
Operative Voltage:	12.6 VDC
Current Draw:	17-24 Amperes (Typical)
Duty Cycle:	100% (Continuous)
Power Input:	10 - 20W Typical
Power Output:	100 Watts CW
RF Power Adjustment Range:	-3dB (Nominal)
Spurious & Harmonics:	-65 dBc
Input / Output Impedance	50 Ohms
Load VSWR Tolerance:	20:1 (Max) 30 Seconds
Input / Output Connector:	Type 'N' Female
Operating Temp. Range:	-30 degree C. to +60 degree C.
Storage & Transport:	-40 degree C. to +70 degree C.
Humidity:	80% At +40 degree C. (non-condensing)
Altitude:	10,000 feet maximum
Size:	3.25" W x 10.5" H x 13" D
Weight:	14 pounds nominal

NOTE: The Rated Output Power of this Equipment is for Single Carrier Operation

POWER INPUT RANGE

MODEL DESCRIPTION	REQUIRED POWER INPUT	SPECIFIED POWER OUTPUT
MRA4100C	10W	100 Watts
MRA4100C	15 Watts	110 Watts
MRA4100C	20 Watts	120 Watts

INSTALLATION

General

Before shipment, all power amplifiers undergo three levels of test and inspection:

1. Individual module testing
2. Complete power amplifier assembly testing
3. Final test and alignment

The amplifier is then packed in a special shipping carton along with the following accessories:

1. DC Power Cable
2. Packing Slip

Initial Inspection

Check for damage to the shipping carton and the equipment upon initial unpacking. If damage to the shipping carton is evident, report the extent of damage to the carrier's agent. Save all packing materials until the amplifier is inspected mechanically and electrically.

Relay Rack Mounting

The amplifier is shipped ready to mount on a standard EIA 19" relay rack or equivalent enclosed cabinet. There must be enough space to the rear of the mounted amplifier to permit unobstructed flow of cooling air.

RF Connections

The RF input/output connectors are Type N female located in the back of the amplifier.

Confirm that the excite power output level is compatible with the amplifier power input requirements. Do not exceed the maximum drive level indicated in the amplifier specifications. The specification tables show the power-input range for the different power amplifier models.

Connect the exciter output cable to the Type N connector on the power amplifier. Connect the output of the power amplifier to the antenna or combiner input.

DC Power Connections

DC power interconnections are simplified by the use of an Amplifier Technologies power cord that is keyed to prevent reverse polarity damage to the unit or the power supply.

Return for Service Procedures

A Return Material Authorization (RMA) number must be obtained prior to returning equipment to the Factory for service. Please contact our service department to obtain this number. Phone Number (949) 830-6778. Failure to obtain this RMA number will result in considerable delays in receiving repair service.

Repackaging for Shipment

To insure safe shipment of the amplifier, it is recommended that the package designed for the amplifier be used. The original packaging material is reusable. If it's not available, contact Amplifier Technologies Customer Service Department for packing materials and information.

SERVICE PROCEDURES

Since the field adjustments are minimal, if required at all, the primary service function is that of verifying the proper operation of the amplifier and troubleshooting failures to the module level. Refer to the Layout Diagram for all adjustment locations.

The power output connection to the wattmeter should be made using a 50 OHM cable that is capable of handling the continuous power provided by the amplifier. The power output specifications of the amplifier should be determined before any testing is done. Use of the correctly rated interconnecting cable and its length are required to obtain accurate test results of the amplifier. Any deviations or incorrect cable type or lengths may result in a disagreement on the published specifications for this amplifier.

The transmitter/exciter the amplifier will be used with, may be substituted for a sweep oscillator and broad band power amplifier. Additionally, a spectrum analyzer is not an absolute necessity, however, the use of it, using calibrated equipment will assure accurate measurements.

A well-regulated DC supply should be used as a source for the operating voltage. Power Amplifiers require a considerable amount of current and therefore the power supply used must be well regulated and free of voltage transients, or damage to the amplifier may occur during on/off cycles.

AMPLIFIER ADJUSTMENT INSTRUCTIONS

MODEL: MRA4100C

NOTE:

There are no field adjustable components on any of the circuitry, which provides RF power gain.

Amplifier Technologies Land Mobile Series amplifiers are tested, calibrated, re-tested, and carefully packed prior to shipment. If you suspect your amplifier is not meeting the rated specifications, contact Amplifier Technologies Customer Service at (949) 830-5720, Monday through Friday 8:00 a.m. to 5:00 p.m. (Pacific Time). Do not open the unit or break any warranty seals prior to receiving authorization from an Amplifier Technologies Customer Service Representative. Breaking a warranty seal without permission **will void** all remaining coverage of the original 3 year warranty or any warranty on repairs.

REPLACEMENT PARTS AND INSTRUCTIONS

Introduction

Each following section contains the Technical Description, Module Layout, Schematic, and Parts list for the module in that section.

Correspondence and Ordering of Spare Parts

When ordering spare and replacement parts, the user should follow the procedures Outlined in this Section. When parts are required, contact the Service Department at the location and numbers listed below.

Amplifier Technologies
26802 Via LLano
Mission Viejo, CA 92691

Telephone:(949) 830-5720
Fax: (949) 830-6778

When requesting information, or ordering spare replacement parts from Amplifier Technologies, the following information should be supplied:

- A. Model No. and serial number of the amplifier
- B. Part number and frequency of the part required

