

Appendix A



Operations Guide

MULTI-CHANNEL CDMA POWER AMPLIFIER MAP800-70S

**869-894 MHz
70-110 WATTS AVERAGE POWER**

**Paradigm Wireless Systems, Inc.
1672 McGaw Avenue
Irvine, CA 92614**

**Tel: 949-260-1840
Fax: 949-260-0883
www.mcpa.com**

TABLE OF CONTENTS

	Section 1	
	Overview	Page
1.1	Introduction	4
1.2	General Description	4
1.3	Functional and Physical Specifications	4
	Section 2	
	Installation	
2.1	Introduction	8
2.2	Electrical Service Recommendations	8
2.3	Unpacking and Inspection	8
2.4	Installation Instructions	8
2.5	Amplifier Module Power, Alarm, Control, and RF Connector	9
	Section 3	
	Operating Instructions	
3.1	Introduction	10
3.2	Initial Start-Up and Operating Procedures	10
	Section 4	
	Principles of Operation	
4.1	Introduction	10
4.2	RF Input Signal	10
4.3	RF Output Load	10
4.4	Amplifier Functional Description	10
4.5	Amplifier Module Cooling	10
4.6	Power Distribution	10

TABLE OF CONTENTS (Continued)

	Section 5 Maintenance	Page
5.1	Field Replacement of the Module	11

	Section 6 Troubleshooting	
6.1	Introduction	12
6.2	Troubleshooting	12
6.3	Return for Service Procedures	13
6.3.1	Obtaining an RMA	13
6.3.2	Repackaging for Shipment	13

LIST OF ILLUSTRATIONS

Figure		Page
1-1	MAP800-70S Amplifier Showing Front , Side, and Rear Views	5
1-2	MAP800-70S Amplifier Showing Subrack and Module	6
2-1	Power, Alarm, Control, and RF Connector	7

LIST OF TABLES

Table		Page
1-1	MAP800-70S Multi-channel Power Amplifier Functional Specifications	7
2-1	Amplifier Module Power, Alarm, Control, and RF Connector Definition	9
6-1	Troubleshooting	12

SECTION 1 OVERVIEW

1.1 INTRODUCTION

This manual contains information and procedures for installation, operation, and maintenance of Paradigm's MAP800-70S multi-carrier RF power amplifier for CDMA. The manual is organized into six sections as follows:

- Section 1. General Description
- Section 2. Installation
- Section 3. Operating Instructions
- Section 4. Principles of Operation
- Section 5. Maintenance
- Section 6. Troubleshooting

1.2 GENERAL DESCRIPTION

The MAP800-70S (see figures 1-1 and 1-2) is a linear, multi-carrier power amplifier that operates in the cellular frequency band from 869 MHz to 894 MHz. It is designed as a self-contained module with EMI containment for use in cellular base stations. The MAP800-70S accepts single and multi-channel CDMA signals as input. The MAP800-70S does not use a pilot signal, and is linear across the full band. Since it does not use feed-forward circuitry, the MAP800-70S should be a comparatively much more reliable amplifier.

Each amplifier module has a power, alarm, and control connector that allows the host system to monitor the system status. Primary power for the amplifier is +27 Vdc.

1.3 FUNCTIONAL AND PHYSICAL SPECIFICATIONS

Functional and physical specifications are listed in table 1-1.

Figure 1-1

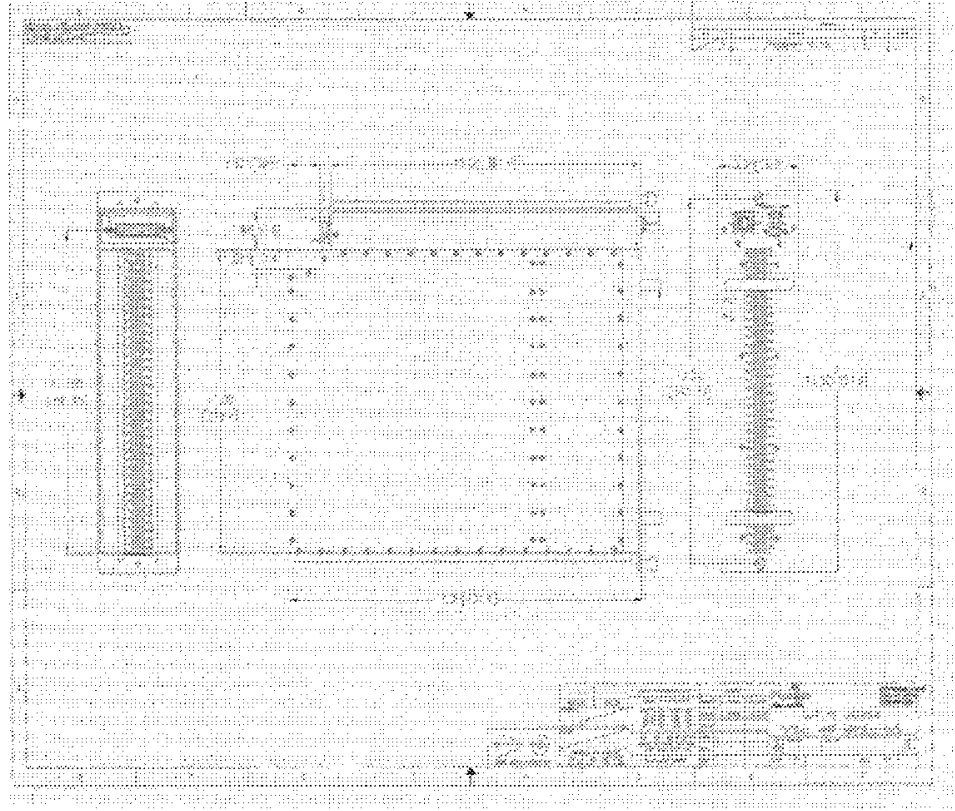


Figure 1-2

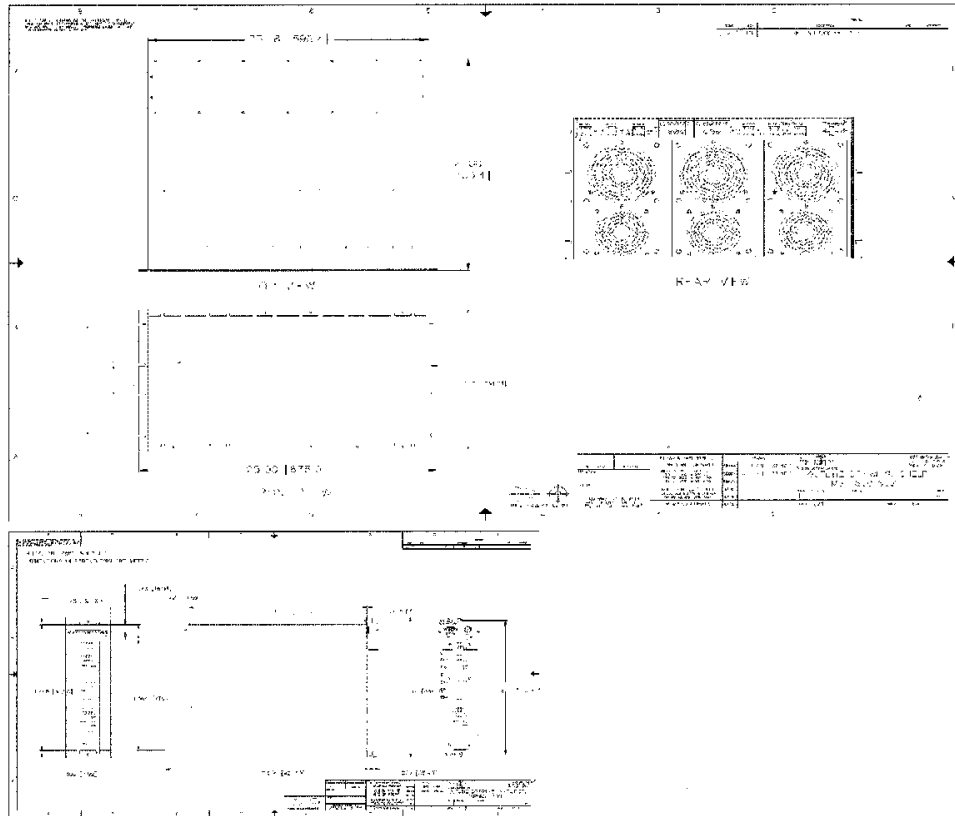


Table 1-1.
MAP800-70S Multi-Channel Power Amplifier Functional Specifications
MAP800-70S Technical Specifications
Multicarrier Amplifier

Parameter	Specification
Frequency Range	869 MHz to 894 MHz
RF Output Power at Combiner output port	60 Watts max / (LPA + combiner) 120 Watts max / (LPA + combiner) 70W module alone
RF Output Power at LPA unit	70 Watts max / LPA unit (4 carriers) 90 Watts max/LPA unit (2 carriers) 110 Watts max/LPA (single carrier)
Gain (LPA without combiner)	
Gain (LPA unit with combiner) at 25° C +/- 3° C	63 +/- 0.5 dB @ from 869 MHz to 894 MHz, 27V +/- 1V, with max RF power) EX) 2WAY COMBINER 65+/-0.5dB with 2 LPAs 62+/-0.5dB with 1 LPA
Gain Flatness over any 2MHz Bandwidth	+/-0.2 dB
Gain variation: 0° C~60° C Out Power: 30~54.8dBm, DC: 21~28V	63+/- 1.0dB
IMD /Spurious: with max HP ESG CDMA 4 carriers, and Max RF power	31 dBc / 30KHz BW @ 750 KHz offset. 47 dBc / 30KHz BW @ 1980 KHz offset. 0° C ~ 60° C, DC: 24~ 28V
Receiver Band Noise Level at 824~849 MHz @ 300 Watts max power	-35 dBm maximum / 30 KHz BW
IMd /Spurious at 896~900 MHz @ 300 Watts max power	-23 dBm maximum / 30 KHz BW
Input CDMA carrier condition	HP ESG 9ch forward source: 1 pilot, 1 paging, 1 sync, 6 traffics. Max 4 carriers with HP ESG source (model: E4433B).
No. of input CDMA carrier	MAX 4 CARRIERS at rated power
Reverse Power Protection	Reverse power does not deteriorate the LPA IMD performance
Input / Output VSWR	1.5 : 1 maximum
Load Stability	VSWR ∞ : 1, all phases with forward output power up to MAX watts.
Normal DC Voltage	24V to 28V, @ 27V DC
Operating DC Voltage	21V to 30V

SECTION 2

INSTALLATION

2.1 INTRODUCTION

The Model MAP800-70S Multi-channel Power Amplifier is used in base stations offering wireless CDMA service. Please review this manual carefully before operating the amplifier.

2.2 ELECTRICAL SERVICE RECOMMENDATIONS

Paradigm Wireless recommends that proper AC line conditioning and surge suppression be provided on the primary AC input to the +27 VDC power source. All electrical service should be installed in accordance with the National Electrical Code, any applicable state or local codes, and good engineering practice. Special consideration should be given to lightning protection of all systems in view of the vulnerability of most transmitter sites to lightning. Lightning arrestors are recommended in the service entrance. Straight, short ground runs are recommended. The electrical service must be well grounded.

Each amplifier system should have its own circuit breaker, so a failure in one does not shut off the whole installation. Circuit breakers should be thermal type, capable of handling the anticipated inrush current, in a load center with a master switch.

2.3 UNPACKING AND INSPECTION

This equipment has been operated, tested and calibrated at the factory. Carefully open the container(s) and remove the amplifier module(s). Retain all packing material that can be reassembled in the event that the unit must be returned to the factory.

Visually inspect the amplifier module for damage that may have occurred during shipment. If the equipment is damaged, a claim should be filed with the carrier once the extent of any damage is assessed. If possible, inspect the equipment in the presence of the delivery person. If the equipment is damaged due to shipping, the carrier is your first avenue of recourse. If the equipment is damaged and must be returned to the factory, write or phone for a return authorization. Paradigm may not accept returns without a return merchandise authorization. We are unable to and will not guarantee the performance of the freight carrier.

2.4 INSTALLATION INSTRUCTIONS

The MAP800-70S amplifier module is designed for installation in a subrack that permits access to the subrack for connection of DC power, RF, and monitor cables. Forced air cooling is provided by fans integrated into the subrack.

To install the amplifier proceed as follows:

1. Install subrack in equipment rack or cabinet and secure in place.
2. Connect antenna cable(s) to appropriate sector output at back of subrack.
3. Connect the transceiver output(s) or combiner output to input(s) of subrack.
4. Connect alarm and control cables to subrack.

WARNING

Turn off external primary DC power before connecting DC power cables.

5. Connect positive primary power and negative primary power to the subrack. Tighten the

SECTION 3 OPERATING INSTRUCTIONS

3.1 INTRODUCTION

This section contains operating instructions for the MAP800-70S Multi-carrier RF Power Amplifier.

3.2 INITIAL START-UP AND OPERATING PROCEDURES

To perform the initial start-up, proceed as follows:

1. Check to ensure that all input and output cables are properly connected.

CAUTION

Before applying power, make sure that the input and output of the amplifier are properly terminated into 50 ohms. Do not operate the amplifier without a proper load (antenna + coax, or dummy load) attached. Refer to table 1-1 for input power requirements. Excessive input power may damage the amplifier, and cause an over power condition.

NOTE

The output coaxial cable between the amplifier and the antenna must be 50 ohm coaxial cable. Use of cable of other impedance may void the warranty, and will distort the output signal.

2. Place power on/off switch on the amplifier front panel in the "off" (down) position
3. Turn on supply that provides +27 Vdc to the amplifier system.
4. Place power on/off switch on the amplifier front panel in the "on" (up) position.
5. Turn on external transceiver/signal source and apply RF input signals.
6. Perform normal tests to verify base station RF output

SECTION 4 PRINCIPLES OF OPERATION

4.1 INTRODUCTION

This section contains a functional description of the MAP800-70S Multi-channel Power Amplifier.

4.2. RF INPUT SIGNAL

The maximum input power should not exceed the limits specified in table 1-1.

2. Loosen the two thumbscrews (top and bottom of the faceplate) that secure the amplifier module to the subrack.
3. With steady even pressure, use handle on front of amplifier to pull module out of subrack.
4. Install replacement in reverse order of steps 1 through 3 above.

SECTION 6

TROUBLESHOOTING

6.1 INTRODUCTION

This section contains a brief list of problems which users have encountered and a few suggested actions that may correct the problem. If the suggested corrective action does not eliminate the problem, please contact your Paradigm field representative or the factory for further instructions.

NOTE

Check your sales order and equipment warranty before attempting to service or repair the unit. Do not break the seals on equipment under warranty or the warranty will be null and void. Do not return equipment for warranty or repair service until proper shipping instructions are received from the factory.

6.2 TROUBLESHOOTING

Refer to table 6-1 for troubleshooting suggestions.

Table 6-1.
Troubleshooting.

SYMPTOM	SUGGESTED ACTION
MAP800-70S Inoperative	1. Check for proper power supply voltage. 2. Verify all RF connections. 3. Verify that unit does not have a major fault (red LED on front panel). Power cycle the amplifier.
RF Appears in Wrong Sector	1. The subrack may have multiple inputs and outputs for different sectors. Check that the correct input and output are used in the rack

6.3 RETURN FOR SERVICE PROCEDURES

When returning products to Paradigm, the following procedures will ensure optimum response.

6.3.1 Obtaining a RMA

A Return Material Authorization (RMA) number must be obtained prior to returning equipment to the factory for service. Please contact our Customer Service Department at (949) 260-1840 to obtain this number. Failure to obtain this RMA number may result in delays in receiving repair service or the shipment being refused at Paradigm.

6.3.2 Packaging for Shipment

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

Notes:

Notes:

Notes:

Notes:

Notes: