



# 1960 CDMA Multiple Carrier Power Amplifier

**Model: RF100978**

# Operation Instruction



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Version. 1.1

**Ref# FCC ID S8L-100978MCPA**



## Introduction

This document presents description of the Andrew Corporation 1960 CDMA Band MCPA (Multi-Carrier Power Amplifier) amplifier. The MCPA amplifier is a high power, RF amplifier intended to provide signal amplification and conditioning. The MCPA amplifier is compatible with CDMA air interfaces operating in U.S. domestic cell sites where FCC compliance is mandatory.

The 1960 CDMA band (1930 MHz to 1990 MHz) RF power amplifier is capable of amplifying multiple carriers to a composite power level of 75 Watts.

## MCPA Specifications

The RF100978 provides linear amplification of multi-carrier signals in the CDMA frequency band. The specifications are:

Parameter	Specification
Operating RF Band	1930MHz – 1990MHz
Instantaneous BW	15MHz
Input DC Power	+24 VDC, nominal
DC voltage input range	+18VDC to +30VDC
Rated Output Power @ $\geq 18$ to 30 VDC input	75W composite average
Rated Power per Carrier	37.5W (2 carriers) 25W (3 carriers)
DC-RF Efficiency	>27%, rated output power, nominal input voltage @ 25°C
Input signal type	CDMA (IS-95)
Physical dimensions	16.1” (H) x 3.54” (W) x 15.7”(D)
Weight	35lbs
Cooling technique	External fan tray or shelf
Temperature Range	-5°C to +55°C operational

*Table 1 MCPA Specifications*



The amplifier has been designed to support an instantaneous bandwidth of 15 MHz. Multiple carriers may be placed within a continuous 15 MHz span in the CDMA band and the product shall meet specified performance marks.

The amplifier has a nominal gain of 47.5 dB. The MCPA is designed to meet IS-95 specifications over frequency, temperature (-5°C to +55°C), and power level (up to a maximum of 75W RF output power).

### **Functional Blocks:**

The 1960 CDMA MCPA is comprised of the following functional areas:

- Predistortion Circuit
- Main amplifier Stage
- Power conversion and conditioning circuit
- Controller circuit
- Communications circuit

### **Inputs and Outputs:**

The amplifier is powered from a DC supply voltage which can range from +18V to +30V. The DC power is brought into the amplifier through a D-Sub connector located on the front faceplate of the amplifier.

A second D-Sub connector located on the amplifier front faceplate is used for RS-485 communication. This connector is used for amplifier configuration, monitoring and alarms.

Alarms and operating state are communicated to the outside world through the RS-485 communications bus and a visible bi-color LED located on the amplifier front faceplate.

The RF signal is brought into the amplifier through one SMA type connector located on the front faceplate of the amplifier. The amplifier RF signal is brought out of the amplifier through a N type connector located on front faceplate of the amplifier

### **Control System:**

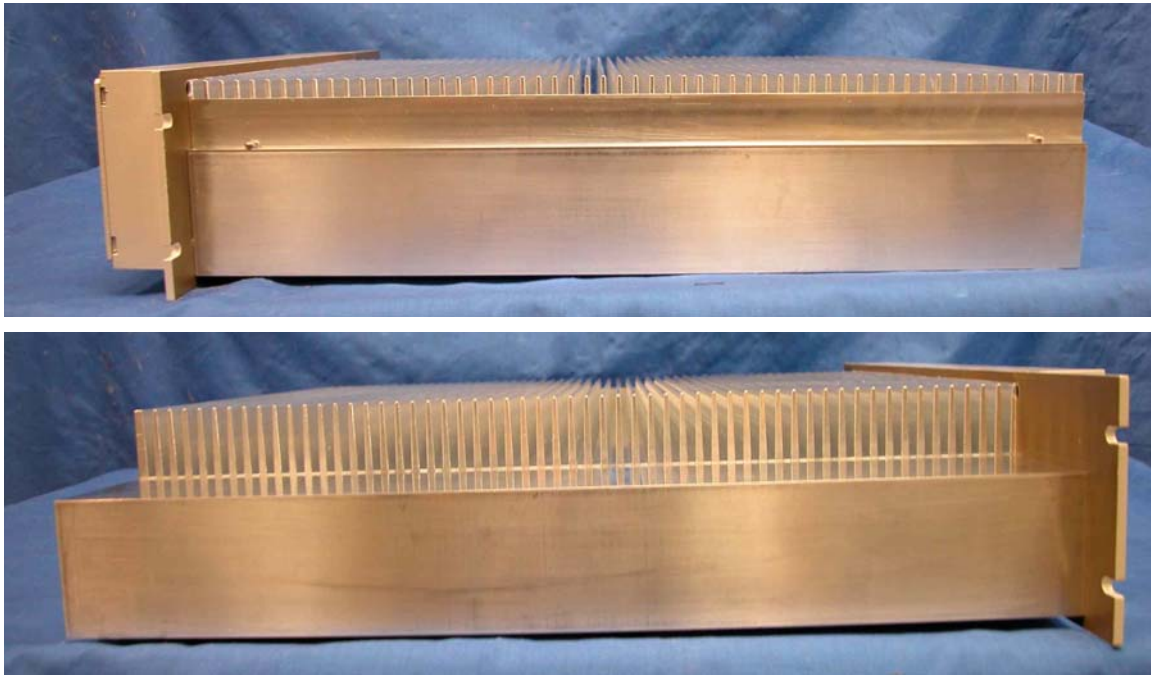
A microprocessor controller is used to control the amplifier alarm system, control environmental compensation of the amplifier, and to maintain a linearization solution for the predistortion circuit.



**Figure 1** *RF100978 MCPA Front Panel*



**Figure 2** *RF100978 MCPA Back Panel*



**Figure 3** *RF100978 MCPA Top & Bottom Panels*



**Figure 4** *RF100978 MCPA Side Panels*

The following table is a summary of detailed alarms within the MCPA. The alarms are mapped to front panel LED behavior, as indicated. Additionally, the alarms are available at the D-Sub connector at on the front faceplate of the MCPA.

Condition	Alarm Type	Description	LED Color
Initial Power On, no alarms	-	-	Red
Gain Control	Minor	Automatic Gain Control Loop out of specification	Green
Linearization	Minor	Output Inter-modulation Products are out of specification	Green
High Temperature Warning	Minor	High Temperature Warning	Green
DC voltage regulation	Minor	DC Voltage regulation out of range Warning	Green
High DC power consumption	Minor	High DC Power Consumption Warning	Green
Partial Main Amp Failure	Minor	Partial failure within RF chain, RF output is backed off	Green
Temperature Overload	Major	Overload Temperature threshold reached. Unit will shutdown	Red
DC/DC converter Shutdown	Major	Failure within DC/DC converter. Unit will shutdown	Red
DC Power Consumption Overload	Major	Overload DC Power Consumption. Unit will shutdown	Red

*Table 2 Alarm mapping for MCPA*

**Note 1:** During a Minor Alarm event, RF output is enabled, however, the product may be out of specification. Minor Alarms are recoverable.

**Note 2:** During a Major Alarm event, the unit will shutdown for self-protection. Major Alarms are non-recoverable and require a Reset or cycling of the power switch

**Note 3:** Details as to the specific alarm event are retrieved through the front panel RS-485 interface.



The following table shows the pin out for the D-sub connector including the alarm pins.

<b>Signal</b>	<b>Description</b>	<b>Pin Number</b>
Manual Control	Control ON/OFF	1
GND	Ground	2
PA-Enable-Actif +	Control	3
PA-Enable-Actif -	Control	4
PA_Presence_Reset	Towards Micro Controller	5
GND_Presence_Reset	Ground	6
Reserved	Not allowed for the MCPA	7
GND	Ground	8
Reserved	Not allowed for the MCPA	9
Reserved	Not allowed for the MCPA	10
GND	Ground	11
Reserved	Not allowed for the MCPA	12
Red LED	LED	13
UART TX + (TRM to MCPA)	Exchanged Information	14
UART TX - (TRM to MCPA)	Exchanged Information	15
Reserved	Not allowed for the MCPA	16
UART RX + (MCPA to TRM)	Exchanged Information	17
UART RX - (MCPA to TRM)	Exchanged Information	18
GND	Ground	19-24
Green LED	LED	25

*Table 3: Pin out for D-Sub connector*



## **Installation and Operation Set-Up**

The MCPA must be installed into a shelf that provides fan-cooling. The MCPA requires +24VDC with a current handling capacity of up to 12.4A. An RS-485 interface is provided and must be utilized to configure the PA for operation and monitoring of alarms and status. RF cables connect from a radio source to the SMA-type input; from the N-type output to a filter-duplexer module.

### **FCC Statements:**

#### **FCC ID S8L-100978MCPA**

This device complies with Part 2, 15 & 24 of the FCC Rules. Operation 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**

Changes of modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.