



Multiple Carrier Power Amplifiers

Model: 45W UMTS 850 MHz MCPA

Operation Instruction

Date: January 25, 2007

Version. 1.0

Ref# RE: FCC ID S8L-100252MCPA

Introduction

This document presents description of the Andrew Corporation 45W UMTS 850MHz MCPA (Multi-Carrier Power Amplifier). The MCPA amplifier is a high power, low distortion RF amplifier intended to provide signal amplification and conditioning. The MCPA amplifier is compatible with the UMTS WCDMA air interfaces operating in U.S. domestic cell sites where FCC compliance is mandatory.

The 45W UMTS 850MHz MCPA operates in the Cell band (869 MHz to 894 MHz) and is capable of amplifying up to 2 input signals of the same UMTS WCDMA modulation types to a composite power level of 45 Watts.

MCPA Specifications

The 45W 850MHz MCPA provides linear amplification of multi-carrier UMTS signals in the cellular bands. The MCPA has the following specifications:

Parameter	Specification
Operating RF Band	869-894 MHz
Instantaneous BW	10 MHz
Input DC Power	357Watts max
DC voltage input range	-36 VDC to -60 VDC, -48 VDC, nominal
Rated Output Power @ -48 VDC input	45W average
DC-RF Efficiency	14%, rated output power, nominal input voltage
Input signal types	UMTS WCDMA
Physical dimensions	335mm(H)X450mm(W)X400mm(D)
Weight	< 23.2 lbs
Cooling technique	Integral forced convection heat sink. Need external fan tray for forced air cooling.
Temperature Range	-5°C to +55°C operational and meeting specifications.

Table 1 MCPA Specifications



The MCPA amplifier has been designed to support a max instantaneous bandwidth of 10 MHz which is equivalent to the 2 carrier UMTS WCDMA signal. The MCPA amplifier has a nominal gain of 46.5dB and is less than 1dB variation over the operating temperatures. The nominal RF input power is 0dBm.

Functional Blocks:

The Andrew MCPA is comprised of the following functional areas:

- Pre-distortion circuit which comprise small signal gain stage, vector modulator and coaxial delay line
- Main amplifier stage which comprise two high power modules, output isolator and gain control circuit
- 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 -36V to -60V. The DC power is brought into the amplifier through a 3 pins D-Sub connector located on the front panel of the amplifier. A switch also located on the front panel is to turn on/off the DC power of amplifier.

A 25-pin D-Sub connector located on the amplifier front panel is used for RS-485 communication. Alarms and operating state are communicated to the outside world through the RS-485 communications bus, and visible bi-color LED located on the amplifier front panel.

The RF signal is brought into the amplifier through a pair of female SMA type connectors located on the front panel of the amplifier. The RF1 input connector is used by default and the RF2 input is for backup. The amplifier RF signal is brought out of the amplifier through an N type connector located on the front panel of the amplifier.

Control System:

The MCPA will work with the customer BTS which control and monitor the MCPA by the specified interface protocol.

A microprocessor controller is inside the MCPA to be compatible with the customer interface protocol and assures the MCPA performance meet the specification. The microprocessor controller is used to enable the PA to start/stop working, control the amplifier alarm system, control environmental compensation of the amplifier, and to maintain a linearization solution for the pre-distortion circuit.

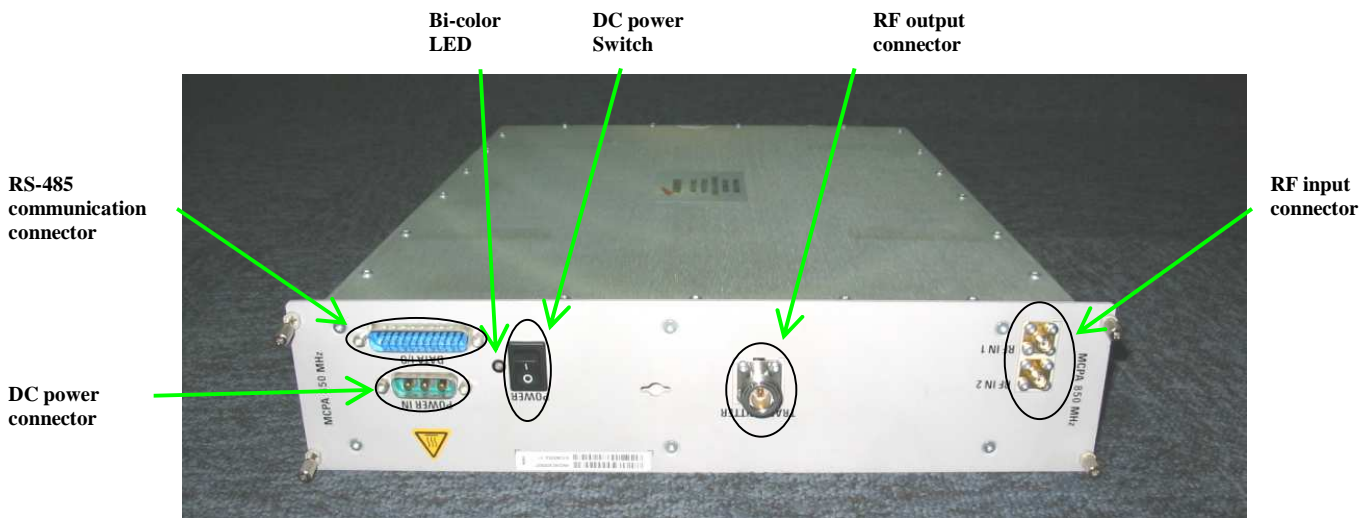


Figure 1 45W UMTS 850MHz MCPA Front Panel

The following table is a summary of detailed alarms within the PA Module. The alarms are mapped to front panel bi-color LED behavior, as indicated. Additionally, the alarms messages are sent to the BTS by the RS-485 communication bus.

Condition	Alarm Type	LED color	Comments
Initial Power On (RF disabled), no alarms	-	Red	Wait for RF enable command
Normal Operation – RF enabled	-	Green	-
High temp,	Major	Red	Happen when the MCPA internal detected temperature is higher than 90C. The MCPA will shut down
DC power consumption overload	Major	Red	Happen when the DC consumption Power exceed the maximum available DC power. The MCPA will shut down
RF overdrive	Minor	Red	Happen when the RF input power is 6dB higher than the nominal value. The MCPA will Shut down
Linearizer	Minor	Red	Happen when the MCPA linearity performance worsens than the pre-defined threshold and the condition last more than 30 seconds. The MCPA will shut down
Device health and Internal Voltages out of range	Minor	Red	This alarms include many scenarios, but all related with the device performance degradation So it's always others alarms accompany with this alarms
Gain out of range	Minor	Red	Gain is not in the specified range even with the gain compensation. The MCPA will Shut down
DC-DC Converter shut down	Major	Red	The MCPA will Shut down

Table 2 Alarm mapping for PA Module



Installation and Operation Set-Up

The MCPA is easy to operate and use. All the require connections is located on the front panel of the MCPA where is easy to access. The MCPA will be installed on slide-in rack first. Make sure the DC power switch is in the OFF position, and then connect the DC power, the communication and the RF input/output cable to the MCPA. After check the all connection is correct and reliable, the last step is to turn on the DC power switch.

FCC Statements:

FCC ID S8L-100252MCPA

This devise complies with Part 2, 15 & 22 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 equipments.