

OPERATING INSTRUCTIONS

3-1. INTRODUCTION

This section contains operating instructions for the Multicarrier Cellular Amplifier System.

3-2. LOCATION AND FUNCTION OF AMPLIFIER MODULE CONTROLS AND INDICATORS

Primary +27 Vdc power is applied to the amplifier via a 100-amp circuit breaker (ON-OFF) located on the left side of the amplifier front panel.

The plug-in amplifier module RF control and indicators, located in the center of the amplifier front panel between the cooling fans, are shown in figure 3-1. The status and RF control functions are described in detail in table 3-1. The alarms are described in detail in table 3-2.

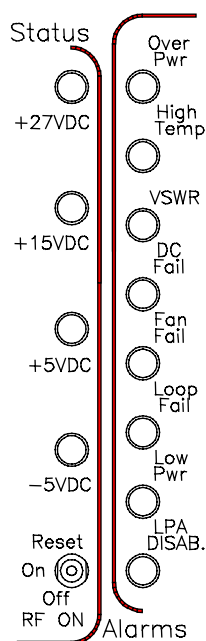


Figure 3-1. G3X-800 Series (NTL107AA) Amplifier Module Control and Indicators

Table 3-1. Amplifier Module Status Indicators and RF Control

NAME	FUNCTION (Note: MCPA = Multicarrier Power Amplifier)
+27VDC Indicator	Green LED. When lit, indicates that the +27 Vdc supply is greater than +21 Vdc and less than +31 Vdc. If the +27 Vdc indicator goes out, the DC FAIL indicator will illuminate. This indicates that the +27 Vdc voltage dropped below +21 Vdc.
+15VDC Indicator	Green LED. When lit, indicates that the +15 Vdc supply is greater than +12 Vdc and less than +17 Vdc. If the +15 Vdc indicator goes out, the DC FAIL indicator will illuminate. This indicates that the +15 Vdc voltage dropped below +12 Vdc or increased above +17 Vdc.
+5VDC Indicator	Green LED. When lit, indicates that the +5 Vdc supply is greater than +2 Vdc and less than +7 Vdc. If the +5 Vdc indicator goes out, the DC FAIL indicator will illuminate. This indicates that the +5 Vdc voltage dropped below +2 Vdc or increased above +7 Vdc.
-5VDC Indicator	Green LED. When lit, indicates that the -5 Vdc supply is greater than -7 Vdc and less than -2 Vdc. If the -5 Vdc indicator goes out, the DC FAIL indicator will illuminate. This indicates that the -5 Vdc voltage dropped below -7 Vdc or increased above -2 Vdc.
RF ON Switch	Three position switch: Off (down position) - Turns off amplifier module. On (center position) - Normal amplifier on position. Reset (up position) - When toggled to reset position, all the red LED indicators will turn on one at a time in sequence followed by all the green indicators one at a time in sequence; this will also reset the fault latches. If the switch is held in the reset position, a microcontroller reset will occur. This will be verified by the LEDs toggling state again. The switch is spring loaded to return to the normal ON position when released. If a fault occurs and the MCPA is disabled, the alarms can be cleared and the MCPA enabled by this reset position. The functions of the switch are disabled for five seconds after a power-up condition.

Table 3-2. Amplifier Module Alarm Indicators

Definition

A 'Minor Alarm' will flag a potential fatal problem by the LEDs and the MCPA fault will be in evaluation. A 'Critical Alarm' is indicative of a fatal problem. The fault indicator will latch on and the MCPA module will be disabled. A 'Major Alarm' indicates a major problem but the MCPA module will not be disabled. Both 'Major Alarm' and 'Critical Alarm' will be sent to the host system via J1 in the back plane of the MCPA subrack (see figures 2-1 and 2-2).

ALARM	CATEGORY	LED	MCPA MODULE	MCPA DISABLE SIGNAL (Pin 4 in Table 2-5)	CONDITION
LPA DISAB.	Critical	Red	Disable	High	Unit is manually switched off using the front panel RF ON switch, or disabled by a serial command or auto shutdown by an alarm condition.
Fan Fail (one)	Major	Red	Enable	Low	Any fan failure
VSWR	Minor	Red	Enable	Low	Reflected power detected at output >25 W
VSWR	Critical	Red	Disable	High	Reflected power detected at output >80 W longer than approx. two min.
Low Pwr	Minor	Red	Enable	Low	Rack controller detected MCPA output is 3 dB below that of the other MCPA in the system.
Low Pwr	Critical	Red	Disable	High	Rack controller detected low power condition for more than approx. two minutes
DC Fail	Minor	Red	Enable	Low	One of the internal DC voltages dropped below or exceeded the safe threshold level
DC Fail	Critical	Red	Disable	High	Voltage out of range for longer than approx. two minutes (Note 2)
DC Fail (Over voltage)	Minor	Red	Disable	Low	+27 Vdc input >31 V detected (note 3)
DC Fail (Over voltage)	Critical	Red	Disable	High	+27 Vdc input >30 V for longer than one sec. after initial detection of DC input >31 V (Note 3)
High Temp	Minor	Red	Enable	Low	High temperature detected
High Temp	Critical	Red	Disable	High	High temperature detected for longer than two minutes
Loop Fail	Minor	Red	Enable	Low	Loop failure detected
Loop Fail	Critical	Red	Disable	High	Loop failure detected longer than two minutes
Over Pwr	Critical	Red	Disable	High	MCPA module output power >200 watts (Note 4)
Over Pwr	Critical	Red	Disable	High	Input power >5 dBm

NOTES:

1. RS-485 serial alarm will follow LED status.
2. The appropriate status LED shall turn off indicating which voltage is out of its range.
3. When overvoltage is detected:
 - a) MCPA shall shut down (disable)
 - b) Turn on red DC Fail LED
 - c) Set flag for DC Fail alarm

4. When overpower is detected:
 - a) MCPA shall shut down (disable)
 - b) Turn on Over Pwr LED
 - c) Set flag for Over Pwr alarm
 - d) The MCPA module shall use a peak power detector to determine the overpower fault.

3-3. INITIAL START-UP AND OPERATING PROCEDURES

Each amplifier module has two operating controls, both located on the front face of the module: the power ON - OFF switch and the RF ON - ON/OFF/RESET switch. To perform the initial start-up, proceed as follows:

1. Double 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 at 50 ohms. Do not operate the amplifier without a load attached. Refer to table 1-2 for input power requirements. Excessive input power may damage the amplifier

NOTE

The output coaxial cable between the amplifier and the antenna must be 50 ohm coaxial cable. Use of any other cable will distort the output.

2. Verify that all amplifier front panel switches are in the OFF position.
3. Turn on supply that provides +27 Vdc to the amplifier system. Do not apply an RF signal to the amplifier system
4. One at a time, place the ON - OFF circuit breaker on each amplifier in the ON position. Visually check the indicators on each amplifier module, and verify that the following indicators are on:
 - a. LPA DISAB. indicator (red) should be on.
 - b. The +27VDC, +15VDC, +5VDC and -5VDC indicators (green) on the amplifier module should be on.
5. Set both RF ON switches to the ON (center) position. All red LEDs should turn off after six seconds.
6. Turn on external exciter/transceiver and apply RF input signals.
7. The MCPA system is designed to:
 - a) Adjust the gain automatically to achieve the target output power during the initialization phase of the MCPA system in a cellsite. This will be done by an operator using a portable PC interfacing with the MCPA system with any number of radios transmitting.
 - b) After achieving the target power upon the completion of the initialization, the MCPA system will limit the power to a maximum of +0.7 dB above the available power (P_{max}). The available power with one module in the shelf is 100 watts. The available power with two modules in the shelf is 200 watts. The APC shall not engage until the output power has exceeded the threshold power ($P_{max} + 0.4$ dB). At this time an APC alarm will be declared. Note the gain will NOT be adjusted continuously after the initialization phase is complete.

If the MCPA system is driven such that the VVA runs out of dynamic range, then the MCPA will shut down immediately causing the ENABLE alarm to be activated as well as the critical alarm.