

OPERATIONAL DESCRIPTION

1. DESCRIPTION

a) Individual Stages

The Power Series 1 250W Power Amplifier is divided into the following sections:

- Driver Stage: includes attenuation network and intermediate power amplification. The attenuation level is varied via an AGC line. A 30W LDMOS power transistor amplifies the RF signal to an intermediate level. The RF signal then goes through several 3dB hybrid splitters.
- Final Stage: consists of 4 100W LDMOS power transistors that further amplify the RF signal to a final level before it gets recombined at the output.
- Strip Line Combiner
- Circulator: provides protection for the PA.
- Lowpass filter: suppresses the harmonic spur at the PA output.
- PA Control: contains input signals, microprocessor and output signals sections.

b) Overall Lineup

The RF input is fed through an attenuation network before being routed to a driver amp. The driver amp's output is then passed through a series of 3dB hybrid splitters/combiners to have the signal split into 4 equally signals. These 4 output signals are then fed to 4 separate final amps. A strip line combiner is used to combine all 4 signals. The final result is passed through a circulator and then a low pass filter before going out to the PA's output port. Refer to the PA Lineup Diagram.

There are sensors and couplers placed through out the PA to monitor the PA's input level, forward and reflected power output levels, as well as the ambient and heat sink temperature. There is also coupler to detect any final amps failure. These sensor and coupler voltages are utilized by the on-board HC11 microprocessor to provide various PA alarm and protection. Refer to the PA Control Diagram.

2. FEATURES

The 250W Power Series 1 PA provides numerous alarm monitor and protection features.

a) Fold Back Mode

The PA will go to the Fold Back Mode and reduce its power by 3dB (125W) when

- Load VSWR is between 2:1 to 3:1
- Ambient temperature is between 45 to 60°C

b) Bypass Mode

The Bypass Mode is available when the PA is used in conjunction with an optional relay box. The PA will automatically switch to the Bypass Mode and take itself out of the system's lineup when any of the following conditions is true:

- Input power is greater than 50 Watts

- Any final amp pallets fail
- Ambient temperature is greater than 60°C
- Heat sink temperature is greater than 90°C
- Load reflection is greater than 3:1 VSWR
- DC supply voltage is less than 22V or greater than 30V
- Output power is less than 125W

c) Alarm Indicators

Note: When the PA is used without the optional RF Bypass Relay Module, the Low Pwr/Bypass LED represents a low power output condition. Otherwise, the LED indicates whether the PA is operated in the Bypass Mode.

Alarms	LED Status	Condition
DC Power	Solid Green LED	Between 25V-28V
	Flashing	Greater than 28V but less than 30V or Greater than 22V but less than 25V
	Off	Less than 22V or Greater than 30V or No power at all
TX On	Solid Green LED	PA is transmitting
	Off	PA is not transmitting
RF Input	Solid Red LED	No input power
	Flashing	Over/Under limit
	Off	Input power is within limit
High VSWR	Solid Red LED	Greater than 2:1 VSWR
	Off	No alarm
Over Temp	Solid Red LED	Ambient Temp is greater than 60°C or Heat sink Temp is greater than 90°C
	Flashing	Ambient Temp is greater than 45°C but less than 60°C
	Off	No alarm
	Off	No alarm
Low Pwr /Bypass	Solid Red LED	PA is being bypassed or power output is below 125W
	Off	PA is in operation

Table 1. Alarms

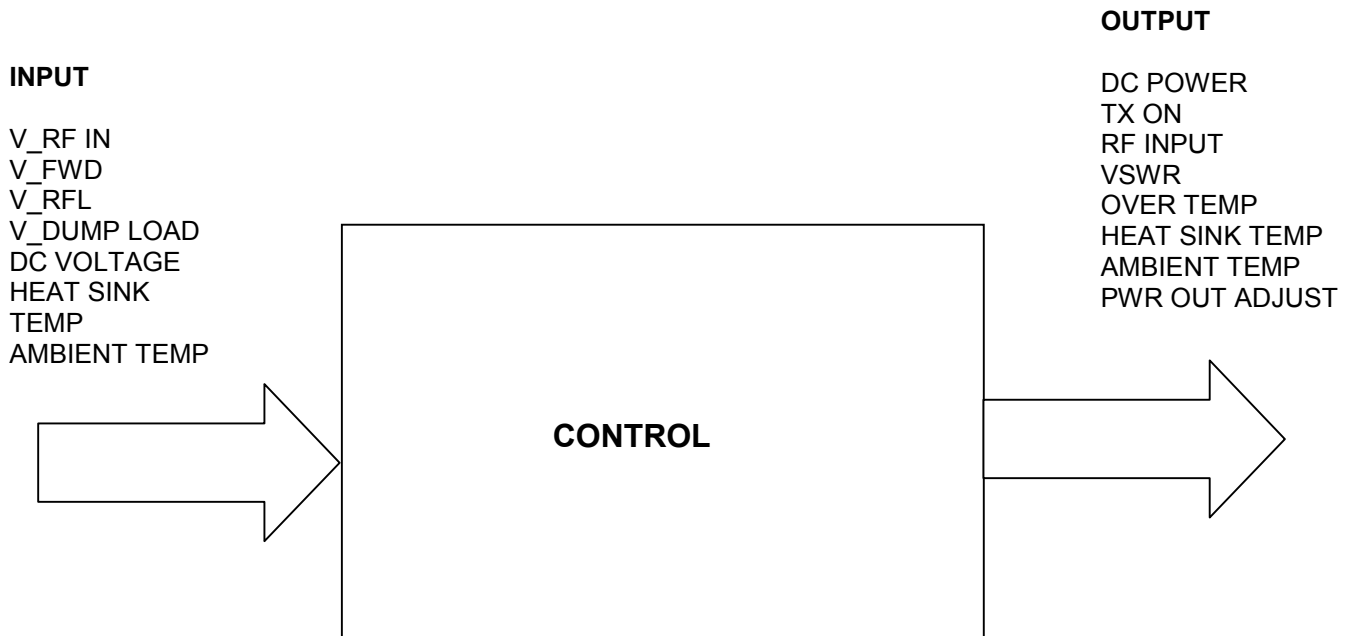
3. INTERFACE SIGNALS

Pin #	Signals
1	Low output power/Bypass (0V-no fault, 5V-fault)
2	Over temperature (0V-no fault, 5V-fault)
3	Input Power (0V-no fault, 5V-fault)
4	Form C relay, NC
5	Form C relay, NO
6	Ground
7	VSWR (0V-no fault, 5V-fault)
8	External Reset
9	Form C relay, COMMON

Table 2. DB9 Alarms Out Connector

Alarms out connector provides external monitor and control capabilities.

Pin #	Signals
1	Power Supply 26.5V
2	Ground
3	TTL Relay Input
4	NC
5	NC
6	Power Supply 26.5V
7	Ground
8	TTL Relay Output
9	NC

Table 3. DB9 Relay Bypass Connector**FIGURE 1. PA CONTROL DIAGRAM**

