1.1.1 PA Power Control Theory of Operation

Power control of the MASTR III Power Amplifier is accomplished with a feedback control loop. The two possible feedback signals are representation of forward power and representation of reflected power. Both of these signals are input to a diode-summing junction that selects the largest of the two for use as the feedback signal.

The directional coupler on the output board samples the output power and produces a voltage, Vf, proportional to the forward output power. The diode (D2) detector circuitry is used to convert this level to a DC voltage proportional to forward power. Potentiometer R1 on the driver board is used to scale Vf to 2.5V at 110W PA output power. The forward power signal will be selected as the feedback signal if the VSWR is less than 3:1. The power control circuitry compares a scaled representation of the detected forward voltage to a reference voltage at U8-C. The output of U8-C adjusts the control voltage at pin 5 of variable attenuator U100 so that the both voltages are equal.

The circulator load port on the output board samples the output reflected power and produces a proportional voltage Vr. VSWR cutback begins when VSWR reaches 3:1, where the reflected power voltage becomes larger than the forward power voltage and is selected as the feedback signal. Potentiometer R9 on the driver board is used to scale Vr to 2.5 volts at 27.5 watts PA output power. The power control circuitry compares a scaled representation of the detected reflected voltage to a reference voltage at U8-C. The output of U8-C adjusts the control voltage at pin 5 of variable attenuator U100 so that both voltages are equal. The result is that the power control circuit reduces the output power in order to limit the reflected power to 25% of the set power.

1.1.2 Power Amplifier DC Voltage and Current

The Power Amplifier is rated to operate over a range of +22 to +30 Volts DC, with a nominal operating voltage of 26.5 Volts DC. Typical operating DC supply currents are shown in the table below as a function of output power level:

Table Error! No text of specified style in document.**-1: Typical Power Amplifier Currents (at 26.5 VDC)**

OUTPUT POWER	TYPICAL CURRENT
110 watts	8.5 – 10 amps
75 watts	5.9 – 6.8 amps
50 watts	4.6 – 5.4 amps
25 watts	3.3 – 4.0 amps
10 watts	2.3 – 2.7 amps