BZ5MX30VX
Application for FCC Certification
Heterodyne Processor Input
30 Watt VHF Translator

ACTIVE DEVICES AND FUNCTION LIST

DEVICE	TYPE	FUNCTION
MODULE: Phase Shifter #10A1354G4 (High Band)		
U2	MHW6185	Hybrid Amplifier
U3	MC7824CT	+24V Voltage Regulator
U4	MWA330	RF Amplifier
MODULE: Phase Shifter #10A1354G5 (Low Band)		
U2	MHW6185	Hybrid Amplifier
U3	MC7824CT	+24V Voltage Regulator
MODULE: Power Amplifier #30C1054G3		
Q1	SRF3943-2	RF Power
MODULE: Power Metering PCB #20B1235G7		
Q1, Q2	MPS8598	Amplifier
U2, U3, U4	LM358N	Op Amp
MODULE: Control PCB #30C1829G2		
U3	ILQ1	Optical Isolator

Contents:

List of Figures:

1. RF Metering Board 20B1235G7: Figures 1 and 2.

The function of this board is to monitor the forward & reflected power. Except for their functions and input names, metering boards have identical RF detectors. For this reason, Detector #1 for "Forward" will be described, and #2 for "Reflected" will be referenced by its component numbers inside parentheses ( ).

a) RF Detectors:

The #1 Forward (#2 Reflected) RF power sample is applied to J1 (J2) and is terminated by R2 (R4). A small amount of forward bias is applied to CR1 (CR2) via R1 and R5 (R3, R6) to overcome the threshold voltage of the diode and enhance its detection linearity at low signal levels. The opposing connection of CR1 (CR2) diode junction and Q1 (Q2) emitter-base junction provides temperature compensation.

Q1 (Q2) buffer amplifier provides a low impedance source to drive the trap C3, C4, and L1 (C5, C6, L2), through R9 (R10). This trap is broadly resonant to 4.3 MHz, and significantly attenuates 3.58 MHz NTSC color subcarrier as well as any 4.5 MHz intercarrier that may be generated in CR1 or CR2 due to the presence of visual and aural RF signals together in the system. Removal of these subcarrier components before the signal is peak detected, enables the circuit to be responsive to sync peak power only (for visual) or just CW (aural) power, and relatively immune to undesired carriers.

CR3 (CR4) is a peak detector with a time constant set by C7 and R11 (C8, R12). The signal from this peak detector is fed to op-amp U1 (U2) pin 5 and . The gain of this stage is 0.5x (0.5x), and its output on pin 7 feeds the meter which is located on the front panel of the amplifier.

U1 (U2) output pin 7 zero-offset voltage is controlled by R18 (R20). This pot should be set with no RF input, so that while you watch the voltage on TP1 (TP2) as you are setting the pot, you will observe the decrease of the voltage towards zero. When it ceases decreasing, stop adjusting. Expect about 50 mV offset

Comment: The footer date stamp must agree with the revision date.

voltage when the op-amp output is almost touching ground. If the pot is turned beyond this point, the output stage of the op-amp will be driven into saturation thus unable to respond to low power levels.

1. RF Metering Board 20B1235G7: Figures 1 and 2. (continued).

The output of U1-7 (U2-7) drives the RF power meter through R32 (R30) which set the meter deflection with a known RF signal. U1-7 (U2-7) drives. Forward calibration is done with full rated power and a forward RF sample from the directional coupler applied to J1. R32 is adjusted for a 100% reading on the forward power meter position.

For Reflected calibration, the same forward RF sample is then applied to J2, R30 is set for a 100% reading on the Reflected Power meter.

2. RF Metering Board Test and Calibration:
(Refer also to the Pin Attenuator section of this manual)

a) **Forward Power Meter Calibration - Zero Adjust**

With no RF input connected, measure the DC voltage at U1-7 (or TP1) and adjust R18 until the output voltage at U1-7 (TP1) drops to a minimum, approximately 10 to 50 mVDC. A DC coupled scope will make the adjustment easier to see; the objective is to place the U1 output as near the op-amp ground rail as possible without the op-amp going into saturation. Turning the pot farther will decrease the sensitivity of the system for small signals. Once this minimum voltage has been reached, do not re-adjust R18.

b) **Reflected Power Meter Calibration - Zero Adjust**

With no RF input connected, measure the DC voltage at U2-7 (or TP2) and adjust R20 for a minimum, which should be approximately 50 mVDC. Once this minimum voltage has been reached, do not re-adjust R20. This adjustment is done in precisely the same way as in step a) above.

c) **Forward Power calibration**

Set the exciter RF output for the transmitter to run at its operating power. Adjust R32 for a forward power meter reading of 100%.

NOTE: Before proceeding to the next step, ensure that the Pin Attenuator Board has been setup according to the procedure on the Pin Attenuator Board section of this manual (see page 34a-1).

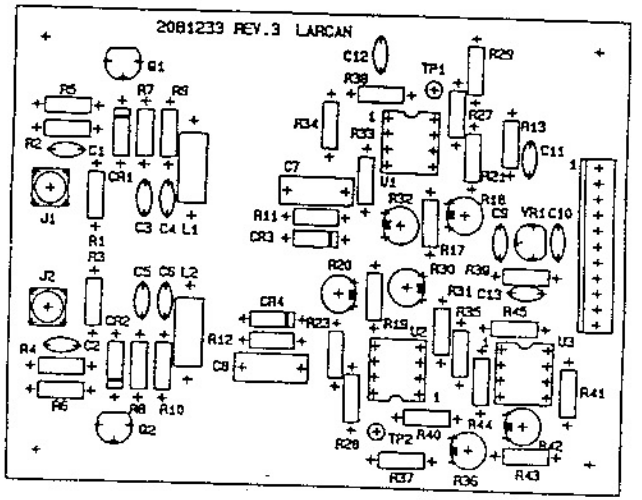
d) **Reflected Power calibration**

1. Temporarily defeat the VSWR cutback protection (if it's been initially setup) by adjusting R36 fully clocwise (CW). With the transmitter still at "full power", disconnect the RF input cable from J1 and connect it instead to the reflected power input J2. Switch to position `RFL' and adjust R30 so that the reflected power reads 100. This now corresponds to a reflected power of 100%.

2. Enable the VSWR cutback by turning R36 counter clockwise until the meter

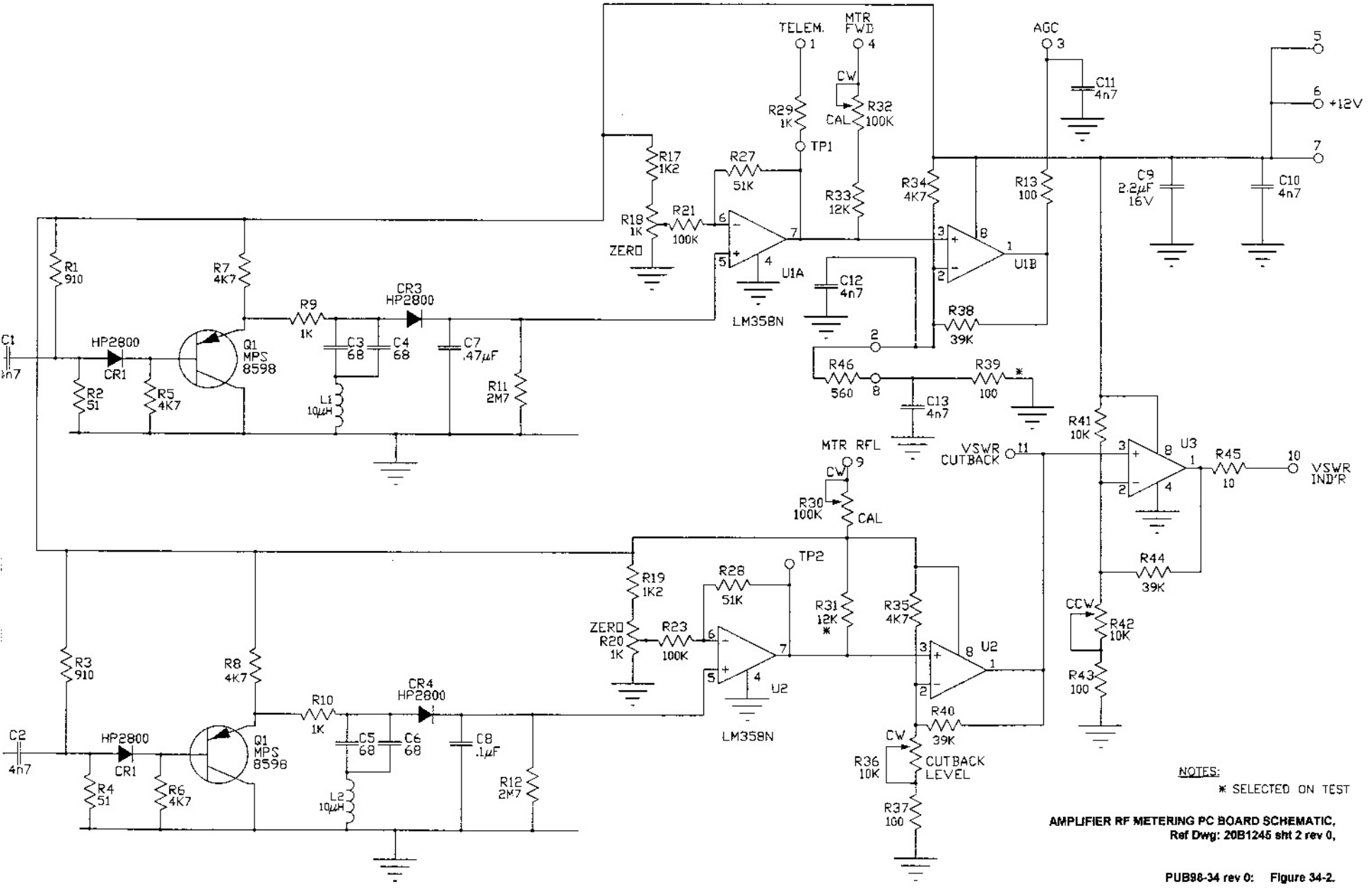
indicates 10% output. This means that in severe VSWR conditions such as in an open circuit, the amplifier will automatically cuts back to 10% thus protecting itself.

3. Replace the cables in their proper connections. RFL meter reading should be nill and the FWD meter reading should be back to 100%. If the FWD reading is much less than 100%, R36 was probably overadjusted.



AMPLIFIER RF METERING PC BOARD ASSEMBLY,
Ref Dwg: 20B1235G7 rev 0,

PUB98-34 rev 0: Figure 34-1.



NOTES:

* SELECTED ON TEST

AMPLIFIER RF METERING PC BOARD SCHEMATIC, Ref Dwg: 20B1245 sht 2 rev 0,

PUB98-34 rev 0: Figure 34-2.