

RF Amplifier Maintenance

The HMS amplifier assembly consists mainly of a power amplifier subassembly and a power supply, as shown on the block diagram 102152. In most cases, field maintenance of the HMS amplifiers should not be attempted. However, if disassembly for repair is required, major components of the amplifier assemblies can be easily removed and replaced.

Removal of the Rf Amplifier: The RF amplifier assembly can be removed using the following steps:

1. Disconnect the cables from the RF input and RF output terminals on the amplifier.
2. Disconnect the power and signal connector on the right side of the amplifier.
3. Remove 6 screws, connecting the amplifier heat sink to the chassis. See the top view of the amplifier.
4. Remove 2 screws, connecting the amplifier heat sink to the rear panel. See the rear view of the amplifier.
5. Remove the RF amplifier from the top.

Removal of the Power Supply: The power supply can be removed using the following steps:

1. Make sure that AC power is disconnected from the HMS unit.
2. Remove the screws holding the rear panel. There are two screws on each side, two on the top and two on the bottom.
3. Carefully disconnect the cables from the interconnect board.
4. Remove the rear pannel.
5. Disconnect the two Molex connectors from the power supply.
6. Disconnect the AC and DC power cables to the supply.
7. Remove the 4 screws on the bottom of the HMS unit that connects the power supply.
8. Remove the power supply through the rear of the HMS unit.

METERING AND TEST POINTS ON CONTROLLER ASSEMBLY

The following signals and voltages are indicated on the front panel meter, a liquid crystal display. The voltage to be monitored is selectable via front panel momentary contact toggle switch. The display has two lines of text. The top line indicates the parameter to be measured while the bottom line indicates the measured value and its units. Refer to the front panel drawing in the illustrations section for the location of the meter and switch. The following is a list of display positions and functions:

DISPLAY POSITION	FUNCTION
AMP STATUS	Meter default position
FWD PWR	Output RF Forward Power Level
RFL PWR	Output RF Reverse (Reflected) Power Level
PTT STATUS	ON/OFF indication of PTT control signal
A VOLTS	DC Voltage of the "A" Amplifier Assembly
B VOLTS	DC Voltage of the "B" Amplifier Assembly
A CURR	DC Amperes of "A" Amplifier
B CURR	DC Amperes of "B" Amplifier
TOT CURR	Total DC Amperes

The switch can be toggled in either direction. If the switch is not toggled for approximately three minutes the display reverts to the AMP STATUS position.

The primary purpose for the front panel switch is to provide a tool for maintenance of the RF amplifier system. A table for recording values for each parameter shown by the panel meter is included as appendix I of this manual. It is strongly recommended that these parameters be entered in the table upon initial installation of the RF amplifier and at regularly scheduled intervals after that. In case of a system failure, values can be recorded in the table and the table faxed to TPL Communications. This will greatly aid our technical personnel to make any necessary repairs to the system.

In addition to the front panel metering, system monitoring is provided by front panel indicators. Five indicators are used and have the following functions and characteristics.

**Metering and Test Points
(Cont.)**

INDICATOR	FUNCTION/CHARACTERISTIC
DC ON Lamp	Steady green light indicating that DC is being supplied to the unit.
SWR Lamp	Flashing red alarm when output load VSWR is too high.
OTEMP Lamp	Flashing red alarm when amplifier chassis is too warm.
LOPWR Lamp	Flashing red alarm when RF output power is too low.
FANS Lamp	Flashing red alarm when a fan is not operating.

REMOTE MONITORING

The monitor and control functions are described in other sections. These are functions, some of which are displayed by LED's on the front panel, are available in the MONITOR connector on the rear panel. The outputs are as shown on the following chart:

Monitor Signals

High Power VHF/AM Amplifier

FUNCTION	PIN	Signal Definition	SOURCE	MODE	VOLTAGE
INS	2	Input RF Power	Source R = 5K	Analog	5V = 100
VDS	4	B Amp. Voltage	Source R = 5K	Analog	0.1V = 1V
IBS	5	B Amp. Voltage	Buffer Amp.	Analog	0.1V = 1A
LOPWR	6	Low Power	Open Collector, Series 100 Ohms	Active Low	15V Max.
SWR	7	Standing Wave Ratio	Open Collector, Series 100 Ohms	Active Low	15V Max.
OTEMP	8	Over Temperature	Open Collector, Series 100 Ohms	Active Low	15V Max.
PFS	10	Forward Power	Source R = 5K	Analog	5V = 750W
VCS	11	A Amp. Voltage	Source R = 5K	Analog	0.1V = 1V
IAS	12	A Amp. Current	Buffer Amp.	Analog	0.1V = 1A
RF ON	13	RF ON Indicator	Open Collector, Series 100 Ohms	Active Low	15V Max.
TEMP.	14	Temperature	Buffer Amp. with 1.0K Series R.	Analog	10V Max.
SFLT	15	System Fault	Open Collector, Series 100 Ohms	Active Low	15V Max.
FOF	16	Fan Failure	Open Collector, Series 100 Ohms	Active Low	15V Max
AOF2 (PTT)	18	Amp. OFF	Command Input	Active Low	15V Max. 0V Min.
GND.	1,9	Ground	Chassis and Signal Ground	-----	0V
PRS	3	Reflected Power	Source R = 10K	Analog	5V = 750W

OPERATOR ADJUSTMENT

A display contrast adjustment is provided on the front panel, between the LCD display and the meter select switch. This is a ten turn pot.

Other operator adjustments are accessible through the rear panel of the Control Unit. These are potentiometer VR3 through VR7. Their functions are as follows:

REF. DESIG.	FUNCTION/ADJUSTMENT
VR3	SWR threshold set to determine the alarm level for the front panel i indicator.
VR4	Determines the threshold for a valid PTT sensing level.
VR5	Low RF power output threshold adjustment to set the alarm level for the front panel indicator.
VR6	Meter calibration potentiometer for the RF power output.
VR7	Meter calibration potentiometer for the RF reflected power.

A basic understanding of RF principles is necessary before making any adjustments to the unit. This includes knowledge of the relationship of forward and reflected power relative to SWR etc. Adjustment also requires the familiarity and use of test equipment. If in doubt consult the factory about changes.

RF Adjustments

The necessary adjustment procedure to change amplifier settings is as follows:

Provide a proper low SWR RF termination for the amplifier. Monitor the output with a calibrated RF power meter. As a reference, set the adjustment to produce nominal RF output.

VR4 For AM operation, this potentiometer sets the level at which the input PTT signal is detected. With a 5 Volt signal, it is normally set to maximum.

VR5 Lower the RF input drive (from its nominal level) until the RF output drops to its lowest acceptable value. Adjust VR5 until the front panel lamp begins to flash. Restore normal drive power. The lamp should then extinguish.

OPERATOR ADJUSTMENTS
(Cont.)

RF Adjustments

- VR6 Toggle the front panel switch until the top line of the display reads FWD PWR. With the proper RF termination still in place, monitor the RF forward power output on a calibrated power meter. Set the input drive level to provide nominal power output. Adjust VR6 so that the front panel meter is in agreement with the calibrated power meter.
- VR7 Toggle the front panel switch until the top line of the display reads FWD PWR. Attach a 2:1 SWR load to the output and note the forward power. Toggle the front panel switch until the top line of the display reads RFL PWR and adjust VR7 so that the front panel meter reads the reflected power. This should be approximately 11% of the forward power level noted above.
- VR3 The optimum setting for this SWR threshold adjustment is to have the alarm trigger with a 2:1 SWR used in the previous step still terminating the amplifier, apply normal RF drive and adjust the potentiometer until the front panel SWR lamp begins to flash. The lamp should extinguish when the SWR is reduced or the normal load is connected.

WARRANTY

TPL COMMUNICATIONS has tested and found this unit to function properly and to operate within the parameters of its stated specifications.

TPL COMMUNICATIONS warrants that this product is free from defects in material and workmanship. If found to be defective within two (2) years from the date of purchase. **TPL**, at its discretion, will repair or replace the unit at no cost provided the unit is delivered to the factory intact. Warranty does not apply to any product which has been subjected to misuse, neglect, accident, improper installation, or used in violation of the instructions furnished by **TPL**, nor does it extend to unit which have been repaired or altered outside of our service department, nor where the serial number has been removed, defaced, or changed.

SERVICE

For service on this amplifier, contact:

TPL COMMUNICATIONS
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Phone: (323) 256-3000 (800) HI - POWER
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For information on other
TPL products visit our website at:
www.tplcom.com