

**APPENDIX B**  
**OPERATING/SERVICE/INSTRUCTION MANUAL**

USER  
MANUAL  
LMS SERIES  
RF POWER  
AMPLIFIERS

***TPL*** COMMUNICATIONS  
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## PRODUCT DESCRIPTION

The LMS series of TPL power amplifiers are intended for use in base station or repeater applications. They are all medium power units (100 watt range) and in various configurations will cover the frequency range extending from Low Band VHF to 960 MHz.

An LMS amplifier is a self contained unit which allows operation, metering, and monitoring of an RF power amplifier. It's major components are: enclosure, front panel, rear panel, power amplifier, power supply, cooling fans, and metering and monitoring circuits. The entire assembly is designed to be installed in a nineteen inch rack.

For operator convenience views of the front and rear of the amplifier are presented in the illustrations section.

**OPTIONS:**

TPL LMS power amplifiers are available in several options and configurations, when specified at the time of order.

**Repeater Configuration (standard):**

Supplied without a carrier operated relay (COR).

**Base Station Configuration:**

Supplied with a COR.

**Remote Connector Option:**

A remote connector for access to test points and alarms is available if specified at the time of order.

**NOTE:**

This amplifier has been factory-tuned to the frequency specified at the time of order and will operate within  $\pm 5\text{MHz}$  of that frequency, unless otherwise specified.

**CAUTION!**

Check the amplifier upon receipt for visible damage. If any is noticed, please call TPL at 800 HI POWER to request a RMA number (Return Material Authorization). If purchased through a dealer, ask them to follow this procedure for best results.

**EXPENSIVE COMPONENTS MAY BE DESTROYED IF THE AMPLIFIER IS TURNED ON IN A DAMAGED CONDITION.**

**OPERATING PRECAUTIONS**

**CAUTION:** This amplifier produces RF voltages that can cause painful and dangerous RF burns. Use caution! Connect and disconnect all RF connections with the DC power and drive power off.

**DRIVE POWER:** RF power transistors, although quite rugged in most respects, are easily damaged by overdrive. Be careful not to overdrive this amplifier, even for an instant. Higher than rated drive power may destroy the transistors and **VOID ANY WARRANTY.**

**TERMINATIONS:** The efficiency of this amplifier will degrade if it is operated into anything but a 50 Ohm load. Lowered efficiency may mean any, or all, of the following; lower power output, increased current drain, higher operating temperature, and reduced life.

## METERING AND TEST POINTS

The following signals and voltages are indicated on the front panel meter. The voltage to be monitored is selectable via the front panel rotary switch. Refer to the front panel drawing in the illustrations section for the location of the meter and switch. The following is a list of switch positions and functions:

Switch Position	Function
PF . . . . .	Output RF Forward Power Level
PR . . . . .	Output RF Reverse (Reflected) Power Level
IT . . . . .	Total System DC Amperes
IA . . . . .	Amplifier "A" DC Amperes, usually the final stage.
IB . . . . .	Amplifier "B" DC Amperes, usually the driver stages.
VF . . . . .	DC Voltage, Final Amplifier
VD . . . . .	DC Voltage, Driver Amplifier
T1 . . . . .	Input RF Power Level (Relative Reading Only)
T2 Thru T5 . . . . .	Spares

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.

Indicator	Function/Characteristic
RF ON Lamp . . . . .	Steady green light indicating that RF is output being supplied by the amplifier
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
DCON . . . . .	Steady green light indicating that DC power is being supplied to the amplifier.

## DC Adjustments

Made all DC adjustments with AC power on, RF drive reduced to 0 (zero) and the RF output terminated.

P2 Set the front panel switch to the IB position. Adjust the potentiometer to get an upscale reading on the front panel meter, then back off the adjustment until the meter just reads 0 (zero).

P8 Set the front panel switch to the IA position. Adjust the potentiometer to get an upscale reading on the front panel meter, then back off the adjustment until the meter just reads 0 (zero).

## RF Adjustments

The necessary adjustment procedure to change the RF power level is as follows:

Provide a proper low SWR RF termination for the amplifier.

SW1 Set this switch to the up (DC Feedback) position.

P1 This is the basic power adjustment for the unit. It is a 10 turn potentiometer which sets the RF output power level. Changing its setting may require resetting all other adjustments. To make this adjustment it is necessary to monitor the output with a calibrated RF power meter. As a reference, set the adjustment to produce nominal RF output with nominal RF input power.

P4 Set the RF input drive to a level 6 dB below the nominal drive level. Adjust P4 to activate the amplifier and its fans at this threshold.

P5 Lower the RF input drive (from its nominal level) until the RF output drops to its lowest acceptable value. Adjust P5 until the front panel lamp begins to flash. Restore normal drive power. The lamp should then extinguish.

SW1 Return the switch to the down (RF Feedback) position.

### REMOTE MONITORING (OPTICNAL)

The monitored functions are described in the previous section. These same functions which are displayed by LED's on the front panel, are available in the REMOTE MONITOR connector on the rear panel. The outputs are as follows:

FUNCTION	PIN	SOURCE	MODE	VOLTAGE	CURRENT
RF ON	2	Open collector with series 100 ohms	Active Low	15 V Max.	50 ma Max.
SWR	5	Open collector with series 100 ohms	Active Low	15 V Max	50 ma Max.
OTEMP	3	Open collector with series 100 ohms	Active Low	15 V Max	50 ma Max.
LOPWR	4	Open collector with series 100 ohms	Active Low	15 V Max	50 ma Max.
14VDC	15	Power Supply	Continuous	14 V	2A Max.
GND.	1,9	Chassis and signal ground	-----	0 V	-----
TEMP.	7	Buffer Amp. with 1.0K series R.	Analog	10V Max.	10mA Max.
DISABLE	6	Command Input	Active Low	15V Max. 0V Min.	2ma Max.



## WARRANTY

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

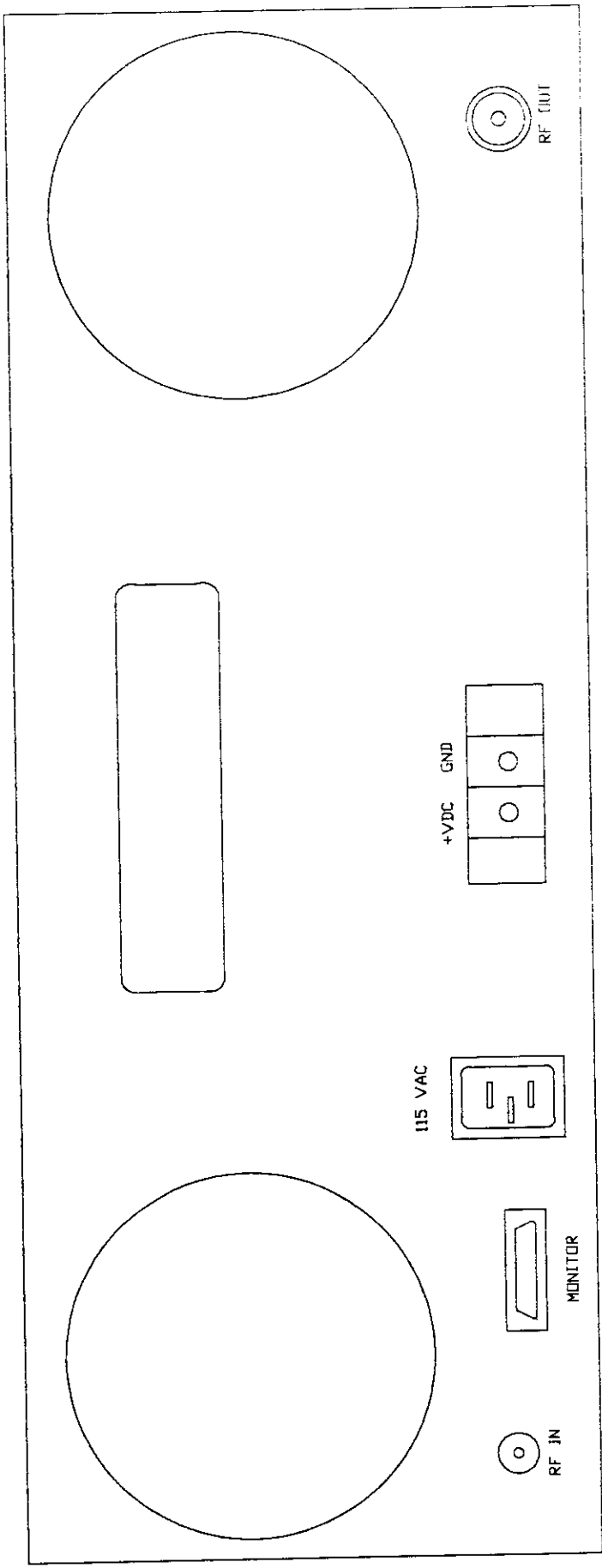
**TPL COMMUNICATIONS** warrants that this product is free from defects in material and workmanship. If found to be defective within two (2) years from the date of purchase, the factory at its discretion, will either repair or replace the unit at no cost provided the unit is delivered by the owner to 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 instructions furnished by us, nor does it extend to units which have been repaired or altered outside our service department, nor where the serial number has been removed, defaced or changed.

## SERVICE

For service on this amplifier, contact:

**TPL COMMUNICATIONS**  
Customer Service Department  
213 256-3000  
800 HI POWER  
FAX 213 254-3210

LMS AMPLIFIER  
REAR PANEL



LMS AMPLIFIER  
FRONT PANEL

