

TL MICROWAVE RADIO POWER SUPPLY GENERAL

1. GENERAL

1.01 The TL power supply, J86499A, Lists 1 through 4, has the following working limits:

(a) **AC Input:** Single phase 60 \pm 2 per cent cps, 117 \pm 10 per cent volts rms. Normal input power is 230 watts in addition to a 110 volts-amperes reactive. Recharge input power is 410 watts in addition to a 300 volts-amperes reactive.

(b) **DC Input:** 24-volt dc nominal battery. Battery voltage may be between 22 and 28.1 volts dc during charging and discharging.

(c) **DC Outputs:**

VOLTS	AMPERES
-600	0.010
-400	0.064 to 0.100
10.5 (-400 to -410.5)	1.64 to 1.88
-20	0.630 to 0.750
-27.6	0.5

(d) **AC Outputs:**

VOLTS	AMPERE
43 (2 circuits)	0.010

(e) **DC Output Regulation:** Within the rated working limits, the regulation of the -600 and -400 volt outputs is within \pm 0.45 of 1 per cent for input voltage and frequency variations. Line and load regulation on the -20 volt output is less than \pm 2 per cent. The -600 and -400 volt outputs are provided with taps on transformer T2 so that the individual outputs may be adjusted within \pm 5 per cent for loads within the working limits.

(f) **DC Filament Output Regulation:** Within the working limits, the load regulation is less than \pm 1 per cent.

(g) **Ambient Temperature:** The working range is from -40° to +140 F.

(h) **Minimum Loads:**

(1) This power supply is designed to operate the loads as given above and should not be used when not loaded. External loads must be provided when the power supply is tested without the normal load.

(2) If the regulated (filament) direct current is less than specified in 1.01(c) and the dc output loads are at the minimum specified in 1.01(c), the power supply may fail to meet the requirements at the extremes of battery voltage.

(i) **Ripple:**

(1) The ripple output on the -600 volt supply is less than +33 dbrn C message weighting, when read with a 3A noise measuring set. The ripple output on the -400 volt supply is less than +25 dbrn -C message weighting, measured with a 3A noise measuring set.

(2) The high-frequency ripple on the -400 volt output is less than -67.5 dbm when measured across a 75-ohm impedance between 36 and 68 kilocycles and -77.5 dbm between 68 and 1000 kilocycles. Above 1 megacycle, the ripple may increase 6 db per octave.

(3) The ripple on the 10.5-volt (filament) output is less than 0.85 volt peak to peak.

(4) The ripple output on the -20 volt (IF and baseband) supply is below 1 millivolt rms.

(j) **Battery Charger:**

(1) DC output is for charging 12 cells of lead acid high-gravity batteries in series. A current limiting feature is provided

SECTION 409-308-500

for automatically recharging the battery after a power failure.

(2) The ripple output is below 300 millivolts rms at 6 amperes and 1200 millivolts at 20 amperes.

(3) The output voltage while charging the batteries is 27.1 to 28.1 volts between 2 and 11 amperes for an input voltage between 105 and 129 volts.

1.02 Associated sections covering the power supply are as follows:

409-300-105 Description — Power Supply

409-308-501 Voltage Checks

409-308-502 Component and Subassembly Replacement

1.03 The power supply is basically made up of three sections: the removable 5-ampere regulator and inverter (J86499C) located in the lower left-hand corner; the removable 20-volt 3/4-ampere regulator (J86499D) located in the lower right-hand corner; and associated rectifier equipment (channel shaped panel) located in the upper half on hinges to allow access to the equipment in the rear. The battery voltage alarm subassembly (J86499E) for J86499A, Lists 1 and 3, is mounted on the (J86499D) regulator.

1.04 Test procedures in sections listed in 1.02 are based on the premise that maintenance personnel are familiar with the operating of test equipment in accordance with the practices or manuals separately issued for that purpose.

Only such specific instructions are further included, directly covering the test equipment, as are considered necessary or convenient for the proper performance of the tests.

1.05 When tests or adjustments are made on a power supply operating as part of a nondiversity system, service may be interrupted or impaired depending upon the tests or adjustments to be performed. In a diversity system, the power supply for the regular channel is independent of the power supply for the diversity channel, except for the ac power source. When tests or adjustments are made on a power supply operating as part of a diversity system, they may be done without interrupting or impairing service by confining the tests and adjustments to either the regular or diversity channel equipment while service is maintained by the other equipment of the regular diversity pair. For this operation, refer to Section 409-303-501.

Warning: *Voltages inside the power supply are higher than those usually encountered in telephone power plants. Avoid all contact with terminals as high voltages are present. When maintenance work is required on any part of the power supply, care should be taken that these parts are properly disconnected and then restored to normal when the work is completed. Disconnect the power before removing the internal plastic grids to work inside the power supply.*

1.06 Procedures for removing and restoring service on diversity and nondiversity systems are given in Fig. 1.

Diversity System

(Steps 1 through 4 cover Manual Switch Operation; 5 and 6, Removal and Restoral of Transmitter; 7 and 8, Removal and Restoral of Receiver)

<u>STEP</u>	<u>FUNCTION</u>	<u>ACTION</u>	<u>NOTES</u>
1	Coordinate with Alarm Center	Obtain permission to perform manual switch at receiving station of section under test. a. If Note 1 applies, go to Step 3. b. If Note 2 applies, go to Step 2.	1. If no diversity alarm from station under test, proceed to Step 3. 2. If diversity alarm from station under test, find which pair involved (Step 2). a. If one of pair under test, locate and clear trouble before switching; b. If one of another pair terminating at same station, manual switch permissible on pair under test.
2	Find source of diversity alarm	Measure dc due to pilot in each J99262L Diversity Switch Panel in station under test, until source located: 1. Remove dust cover. 2. With KS-14510 Meter measure dc on PIL MON LEV jacks for each channel in turn (See Note 2). a. Tone present if -5 to -10V. b. Tone absent if -3V or less. 3. Close hinged panel and restore dust cover.	1. Diversity alarm conditions: a. Tone present on both, no alarm; b. Tone absent on both, no diversity alarm (but major alarm due to total absence of pilot); c. Tone present on one, absent on other, diversity alarm. 2. PIL MON LEV jacks for regular channel accessible on left side of panel behind dust cover; those for diversity channel accessible behind hinged panel on right.
3	Find active channel	With KS-14510 Meter (on 3-volt dc scale) measure from K4 jack to ground, Diversity Switch Panel under test. a. If no voltage, Regular channel active; b. If between -2 and -3V, Diversity channel active.	
4	Manuel switch	Operate the MAN switch from AUTO to the MAN position desired, Regular or Diversity.	The <u>idle</u> channel may now be removed from service for maintenance. a. Do Steps 5 and 6 to remove and restore transmitter from service. b. Do Steps 7 and 8 to remove and restore receiver from service.
5	Remove transmitter from service. CAUTION: Steps 1 through 4 must be done first.	1. Remove patch to Transmitter Baseband IN jack. 2. Terminate open patch at once (See Note).	Open output of diversity split-pad must be terminated to minimize effects of change of level on working line. A terminating jack for this purpose provided with TL Test Set.
6	Restore transmitter to service	When maintenance done: 1. Remove terminating jack applied in Step 5. 2. Restore transmitter input patch to IN jack of Transmitter BB Ampl. 3. At receiving location verify that service is now being received on the idle channel. See Note. 4. Restore the MAN switch to the AUTO position if no further maintenance required, or to other MAN position if the other channel is to be maintained.	Determine from the alarm center that a diversity alarm is not being received from the receiving location.
7	Remove receiver from service. CAUTION: Steps 1 through 4 must be done first.	No special action required	
8	Restore receiver to service	1. Verify that service is now being received on idle channel. See Note. 2. Restore the MAN switch to the AUTO position if no further maintenance required, or to other MAN position if the other channel is to be maintained.	Determine from the alarm center that a diversity alarm is not being received from the receiving location.

Non-Diversity System

1. Secure permission from Alarm and Control Center.
2. Perform needed maintenance.
3. Restore service.
4. Verify service restoral with Alarm and Control Center.

Determine from the alarm center that no alarms are present.

Fig. 1 – Procedures for Removing and Restoring Service