4 T858/859 Fault Finding

The following test procedures and fault finding flow charts may be used to help locate a hardware problem, however they are by no means a complete fault finding procedure. If the fault still exists after having progressed through them in a logical manner, contact your nearest authorised Tait Dealer or Service Centre. Further assistance may be obtained from the Customer Support Group, Radio Infrastructure Division, Tait Electronics Ltd, Christchurch, New Zealand.

Refer to Section 5 where the parts lists, grid reference index and diagrams will provide detailed information on identifying and locating components.

The following topics are covered in this section.

4.1 Visual Checks

Remove the cover from the T858/859 and inspect the PCB for damaged or broken components, paying particular attention to the surface mounted devices (SMD's).

Check for defective solder joints. If repair or replacement is considered necessary, refer to Sections 3, 4 and 5 of Part A.

4.2 Component Checks

If a transistor is suspected of faulty operation, an indication of its performance can be assessed by measuring the forward and reverse resistance of the junctions. First make sure that the transistor is not shunted by some circuit resistance (unless the device is completely desoldered). A 20k ohm/V or better multimeter should be used for taking the measurements, using only the medium or low resistance ranges.

The collector current drawn by multi-junction transistors is a further guide to their performance.

If an IC is suspect, the most reliable check is to measure the DC operating voltages. Due to the catastrophic nature of most IC failures, the pin voltages will usually be markedly different from the recommended values in the presence of a fault. The recommended values can be obtained from either the circuit diagram or the component data catalogue.

4.3 DC Checks

Note: No RF power is to be applied during these checks.

Check that +13.8V is present on the collectors of Q3, Q4, Q5, Q6 and Q7. Make this measurement when the transmitter is not keyed.

Check that approximately 12-13V is present on the collector of Q1 (in the T859 the level is dependent on RV69 being set to maximum).

T858 Only Check that +13.8V is present at pin 4 of IC1 and IC3.

T859 Only Check that +13.8V is present at pin 4 of IC3.

Check that approximately +12V is present at pin 4 of IC1 (the level is dependent on RV69 being set to maximum).

Check that +7.0V is present at the output of regulator IC2.

4.4 RF Checks

4.4.1 General

In circuit RF levels around Q1 and Q3 may be measured with an RF probe on which the earth lead has been shortened to a minimum (i.e. 13mm); refer to the PA Fault Finding Charts (Section 4.6.1 or Section 4.6.3 as appropriate). All other stages must be measured with a power meter at the 50 ohm points in the circuit.

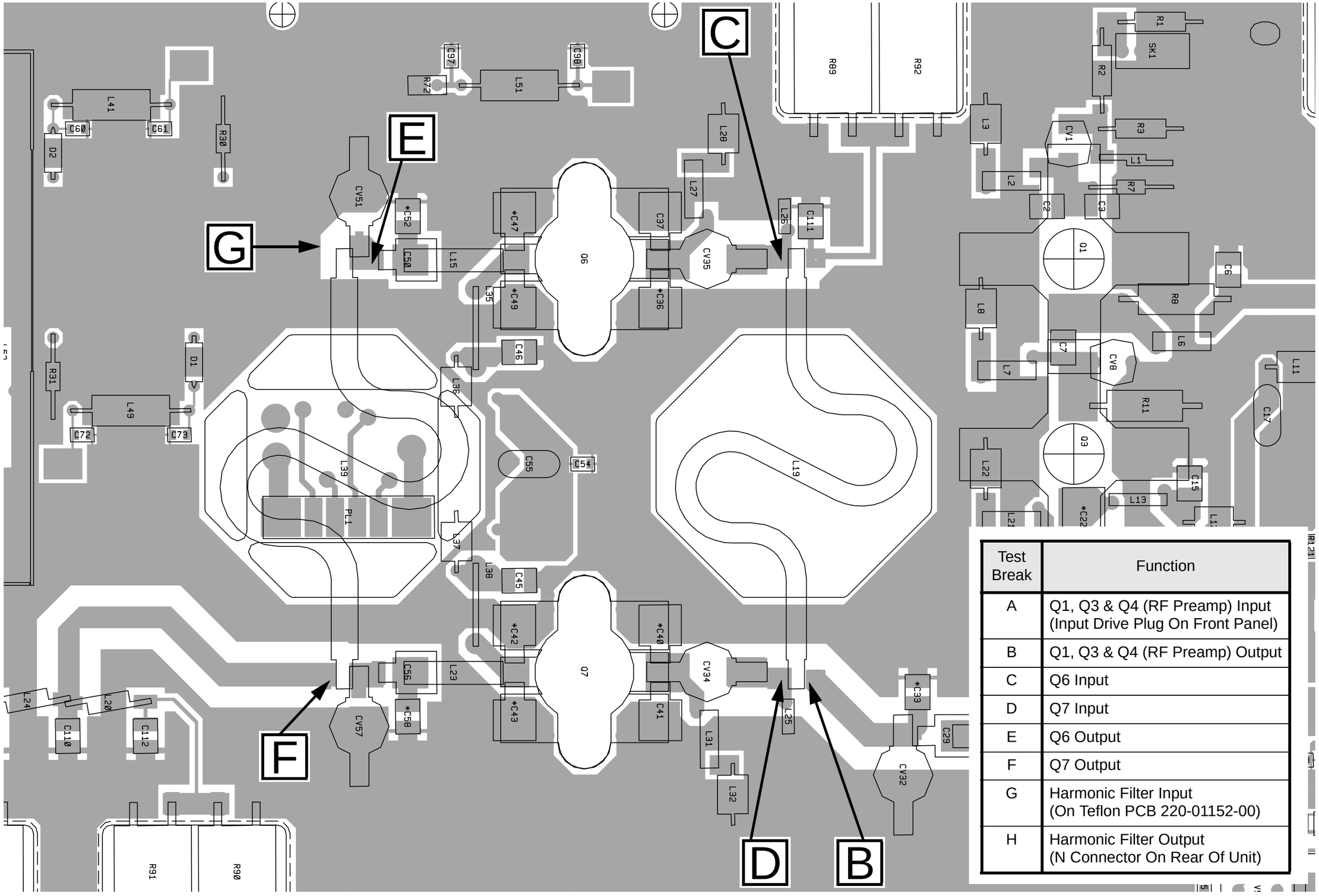
For problems with the power control circuitry, refer to the Power Control Fault Finding Charts (Section 4.6.2 or Section 4.6.4 as appropriate).

4.4.2 PA Faults

If a PA fault has occurred, or is suspected, it is easier to find if the various stages are isolated by use of the test breaks (refer to Figure 4.1) and each stage analysed individually.

Eight 50 ohm test break points have been included throughout the RF circuitry to enable individual transistor stages to be tested.

Test point A can be accessed from the input drive plug on the front panel and test point H from the N connector on the rear. No desoldering is required for these two test points. Testing may be performed from test break points B-G by desoldering the appropriate wireline and soldering a 50 ohm test lead in its place or to the wireline as appropriate in order to inject and / or measure RF power.



Test Break	Function
A	Q1, Q3 & Q4 (RF Preamp) Input (Input Drive Plug On Front Panel)
B	Q1, Q3 & Q4 (RF Preamp) Output
C	Q6 Input
D	Q7 Input
E	Q6 Output
F	Q7 Output
G	Harmonic Filter Input (On Teflon PCB 220-01152-00)
H	Harmonic Filter Output (N Connector On Rear Of Unit)

Figure 4.1 Test Break Point Location

4.5 Voltage Chart

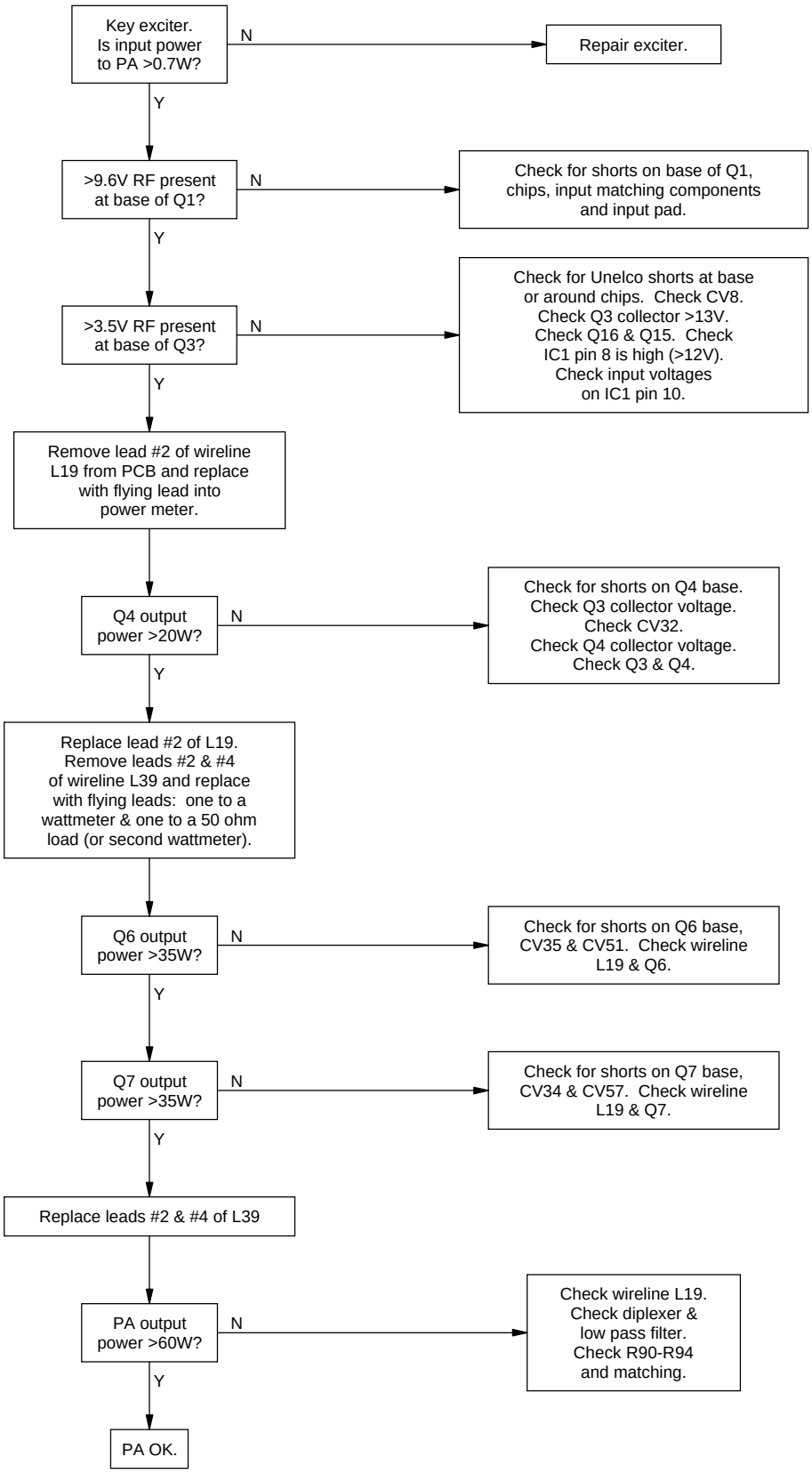
Test conditions:

- typical DC voltages measured with Fluke 77 DVM
- supply voltage 13.8V at socket
- transmitter unkeyed
- allow ±20% for spread of transistor characteristics.

Device	Emitter	Base	Collector
Q1	0.0V	0.0V	13.0V
Q3	0.0V	0.0V	13.8V
Q4	0.0V	0.0V	13.8V
Q6	0.0V	0.0V	13.8V
Q7	0.0V	0.0V	13.8V
Q11	1.8V	2.2V	5.9V
Q13	0.0V	0.0V	5.9V
Q15	13.0V	13.6V	13.6V
Q16	13.8V	13.6V	13.0V

4.6 Fault Finding Charts

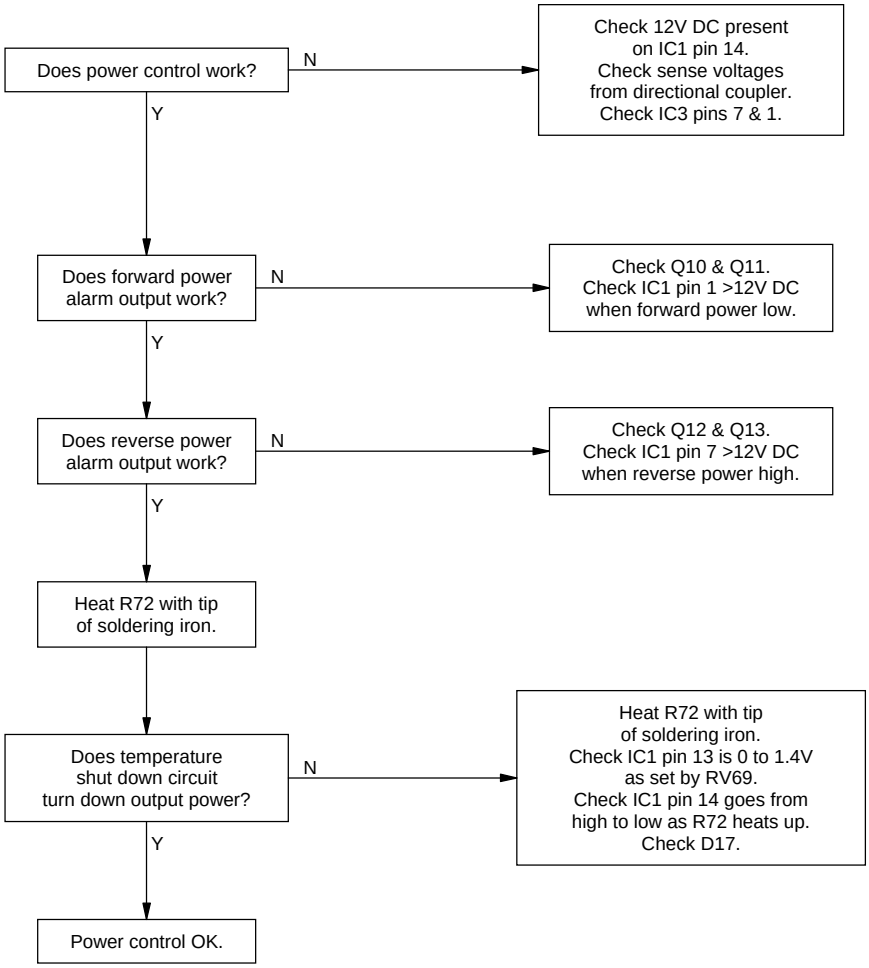
4.6.1 T858 PA



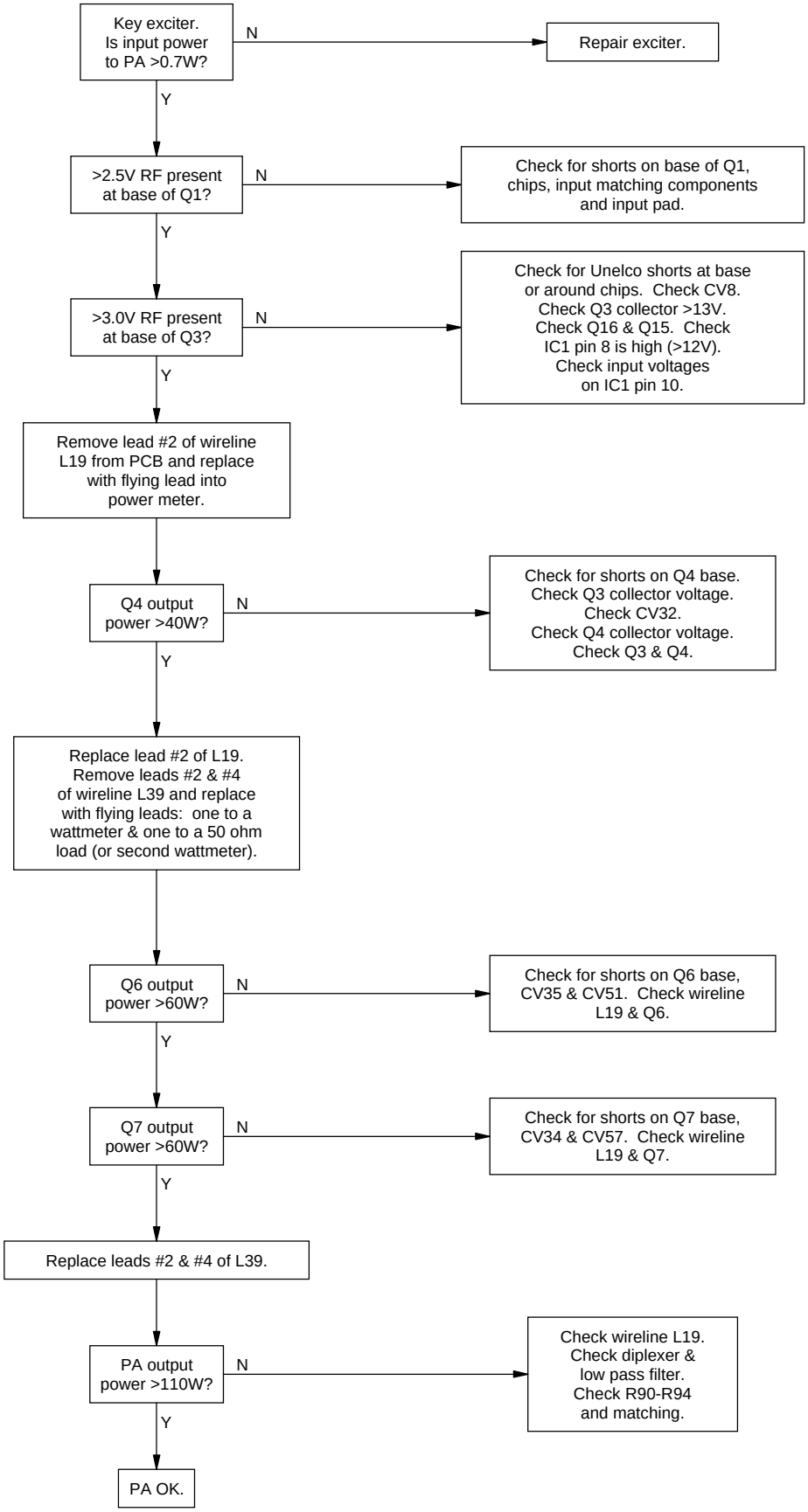
4.6.2 T858 Power Control

Approximate voltages under normal operating conditions:

Measurement	Output Power	
	20W	50W
forward power at "FWD-PWR" pad (beside IC3)	2.5V	4V
RV63 / R64 (RV63 wiper)	1.4V	2.1V



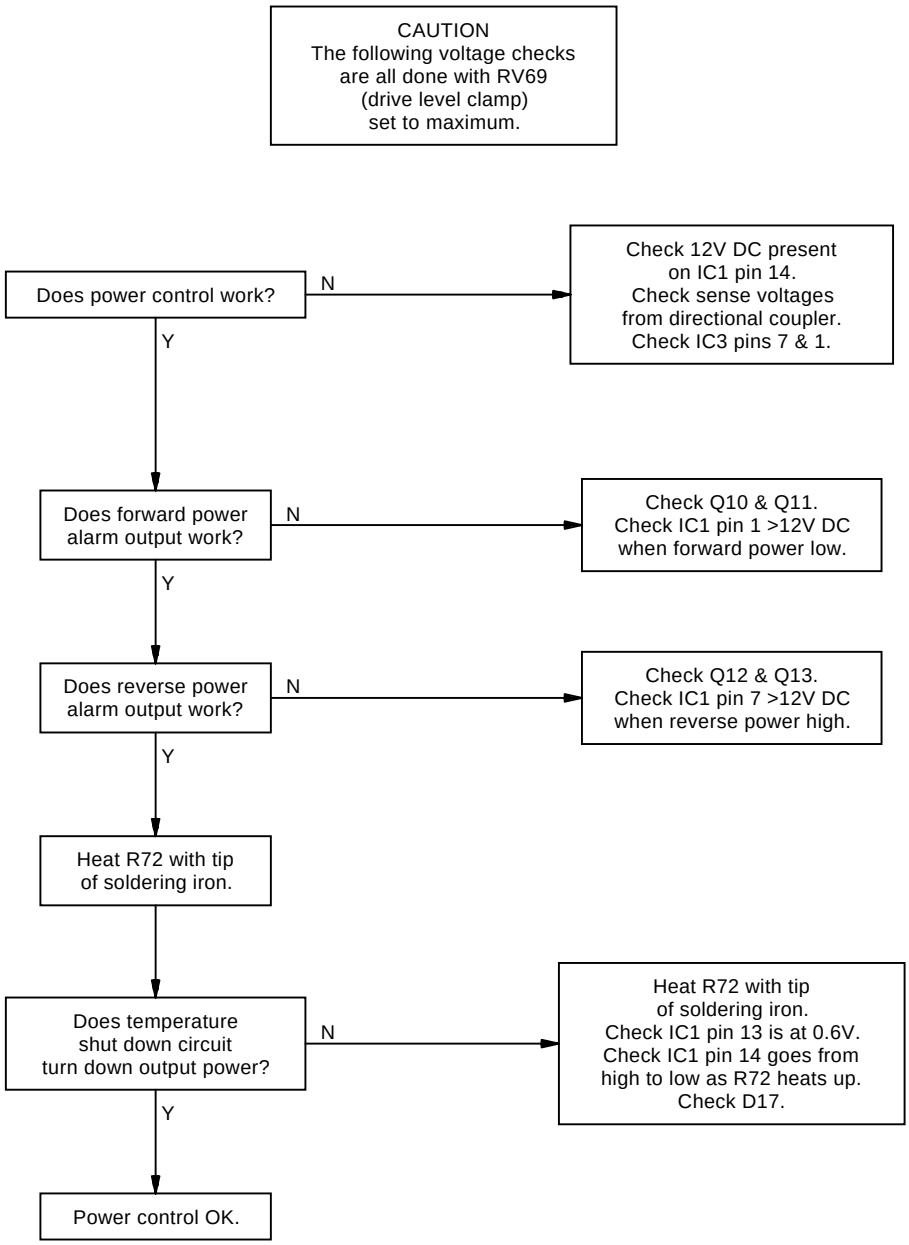
4.6.3 T859 PA



4.6.4 T859 Power Control

Approximate voltages under normal operating conditions:

Measurement	Output Power	
	20W	50W
forward power at "FWD-PWR" pad (beside IC3)	2.5V	4V
RV63 / R64 (RV63 wiper)	1.4V	2.1V



4.6.5 T859 Fan Control Circuitry