BASE SITE
RF POWER AMPLIFIER
MODEL SLF2121A

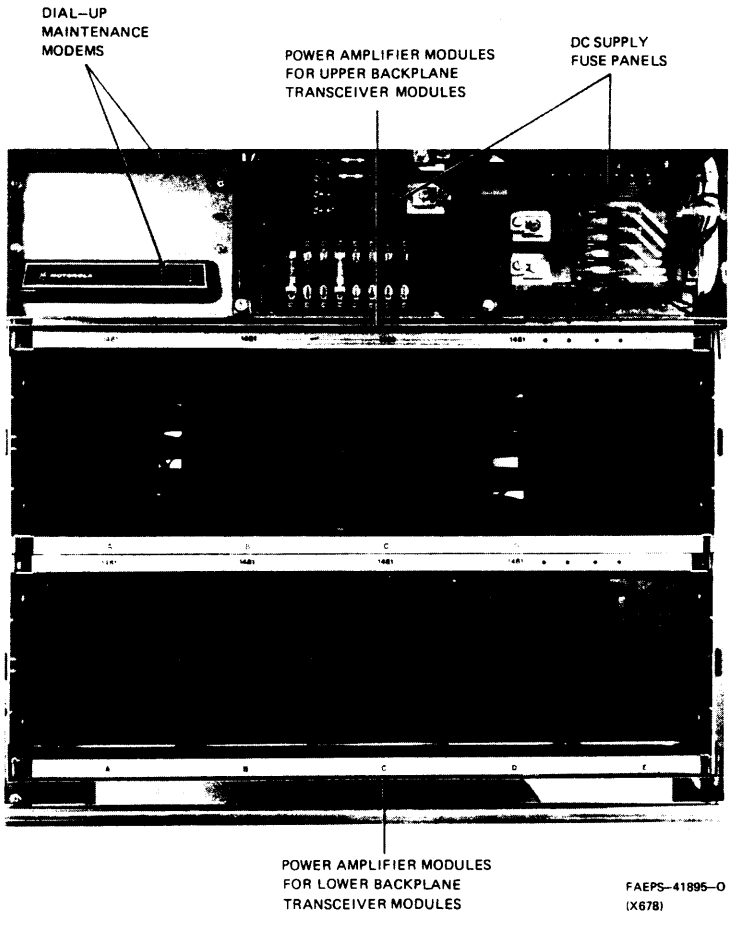


Figure 1. Power Amplifier Modules Mounted in Cages (Fan Panel Removed)

1. DESCRIPTION

1.1 The base site rf power amplifier amplifies the low level rf input signal from the exciter in the transceiver module to approximately 45 watts. The output of each power amplifier (PA) is connected through a 5-channel cavity combiner to the transmit antenna(s).

1.2 As shown in Figures 1 and 2, the base station rack contains two PA cages, both enclosed by a cover panel which houses three cooling fans. Each cage contains up to five PA modules. The inputs to each PA (labeled A thru E) are provided by coax cables which connect to the appropriate transceiver module via cannon connectors at the backplanes. Figure 3 provides detailed interconnection information for the PA modules.

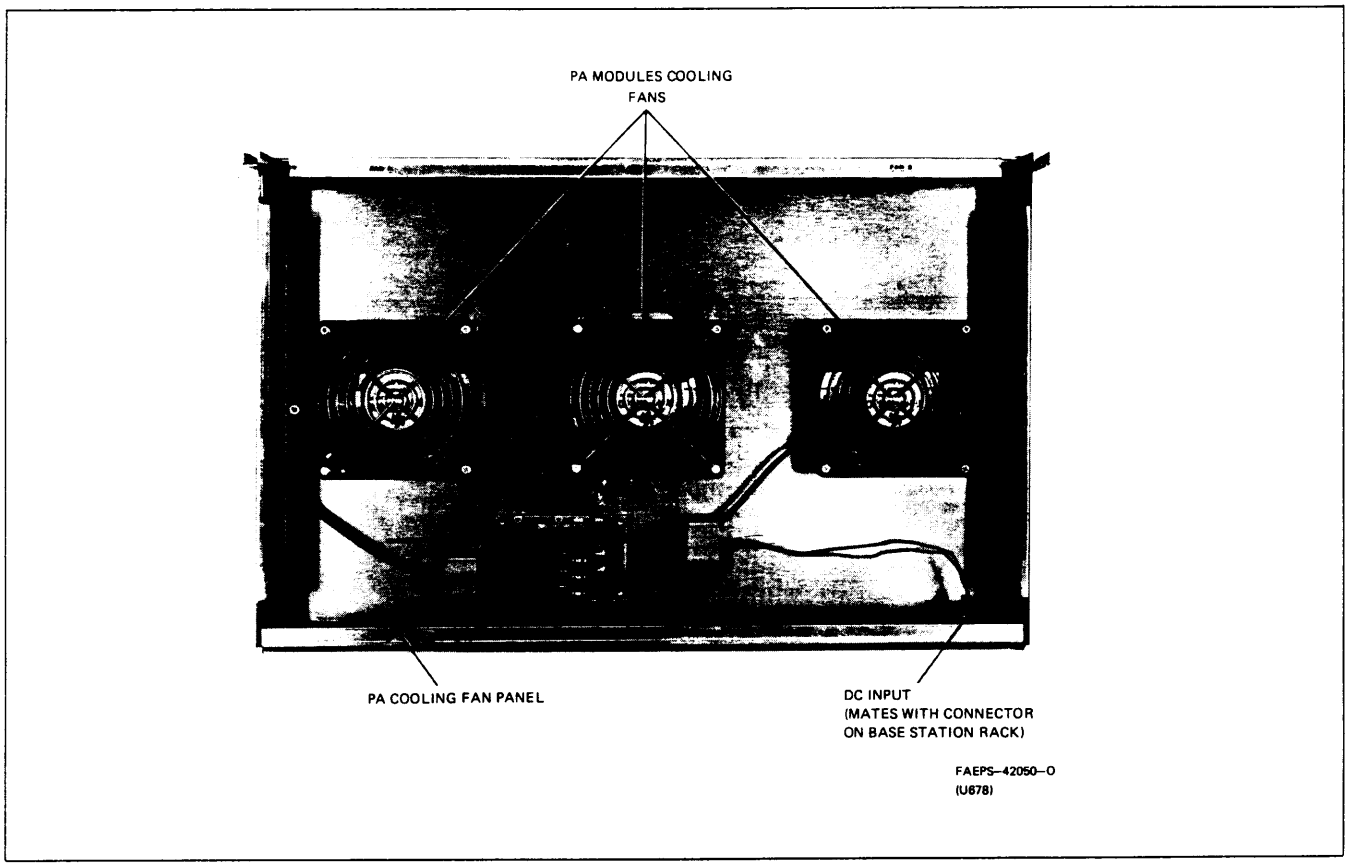


Figure 2. Cooling Fan Panel Removed From PA Cages

2. FUNCTIONAL THEORY OF OPERATION

(Refer to Figures 4 & 5)

2.1 Each PA amplifies the rf signal from each exciter to an adjustable level of up to 45 watts. The PA consists of a regulator board, predriver-driver and final amplifier modules and output isolator. Also included are two temperature-activated switches mounted on the heat sink which provide over-temperature protection for the PA components.

2.2 The rf signal input is applied through the input attenuator where the level is reduced by approximately 5 dB. The attenuator output is amplified by the predriver. When the transmitter is keyed, the power output regulator provides from +8 to +22 V to the predriver, setting the gain of that stage.

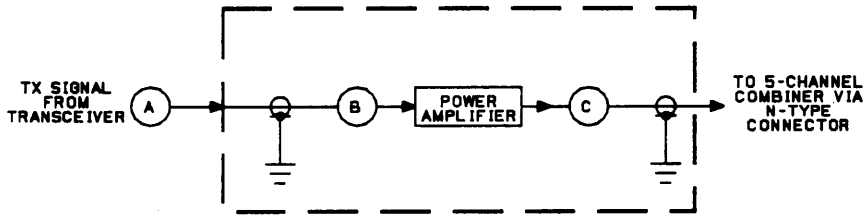
2.3 The predriver output is further amplified by the driver to provide a level of up to 14 W to the final amplifier module. The final amplifier output is applied to the output isolator.

2.4 The output isolator consists of a dual circulator (which protects the final amplifier from incident radiation and from VSWR mismatches) and an internal reverse power detector. Power is transmitted from the input port to the output port, while reflected or incident power is routed to internal terminating loads. A portion of the reverse power is detected and applied to the front panel reverse power meter.

2.5 A portion of the final amplifier output is coupled to the forward power detector. The detected voltage is proportional to the output power and is fed back to the power output regulator circuitry located on the regulator board. A decrease in output power causes the power output regulator to provide a higher power control voltage to the predriver; an increase in power lowers the voltage. This regulation maintains a relatively constant power output.

2.6 The forward power detect hybrid compares the forward power dc sample with the dc level set by the rf power output adjust and sends an rf power alarm to the transceiver if the sample is less than the adjusted level. Note that the alarm is generated when the PA is unkeyed.

2.7 As temperature increases the resistance of the thermistor decreases to slightly reduce the output power. Thermocouple S1 is located on the heat sink close to the final amplifier transistors which produce most of the



TRANSCEIVER	(A) CANNON	(B) CANNON	(C) CANNON
UPPER BACKPLANE A	CABLE 10A	PIN A4, SLOT A	PIN A1, SLOT A
B	10B	B	B
C	10C	C	C
D	10D	D	D
E	10E	E	E
LOWER BACKPLANE A	CABLE 5A	PIN A4, SLOT A	PIN A1, SLOT A
B	5B	B	B
C	5C	C	C
D	5D	D	D
E	5E	E	E

BEPS-41897-O

Figure 3. Power Amplifier, I/O Block Diagram

dissipated heat. S1 closes at 85°C (±3°), shorting out the thermistor. This causes an approximate 3 dB reduction in the output power.

2.8 Thermocouple S2 is located on the heat sink in an area where less heat is dissipated. If the temperature in this area rises to 85°C ±3°, S2 opens and removes reducing keying signal from the power output regulator, the power control voltage to near zero volts.

3. DETAILED CIRCUIT THEORY

(Refer to servicing diagram PEPS-44788)

3.1 VOLTAGE REGULATOR

3.1.1 The voltage regulator circuit continuously supplies regulated +25 V dc to the power output regulator, the forward power comparator, the driver, and the final amplifier. A+ (+25 to +30 V dc) from the power supply is applied to the voltage regulator via connector P1-A2 and P1-A3 (ground).

3.1.2 Zener diode VR101 and diodes CR101 and CR102 provide a reference voltage for error amplifier Q107/Q106. An output sample is developed from the R104 and R105, R106, and R107 voltage divider. As the regulated output decreases, current in Q107 and Q106 is increased, increasing conduction of Q105 and Q104 to raise the regulated output. Conversely, an increase in the regulated output results in a decreased conduction of Q105 and Q104 to maintain the output at +25 V.

3.1.3 Diodes CR101 and CR102 provide temperature compensation for Q106 and Q107. Current for the driver is provided by Q105. Should the collector voltage of Q105 drop below a nominal +23.5 V, diodes CR103 and CR104 conduct to provide driver current from Q104. Overvoltage conditions from the driver stage which occur as the transmitter is unkeyed or when the rf input is removed, are limited to +25.7 V by CR105.

3.2 POWER OUTPUT REGULATOR

3.2.1 The power output regulator provides the dc input power to the predriver stage. The class B predriver is supplied power only when the amplifier is keyed. The power output regulator controls the gain of the predriver stage to maintain the rf power output of the amplifier at the preset level.

3.2.2 The voltage regulator U101-pin 10 output controls the power control voltage (+8 to +22 V) output from Q103. When the transmitter is keyed, the high level at P1-pin 3 turns on Q101 to enable the U101-pin 10 output. When the transmitter is unkeyed, Q101 is turned off and U101-pin 10 is held at near 0 V dc.

3.2.3 The power control voltage is set by the dc level from rf output adjust R112 that is applied to the noninverting input at U101-pin 5. A dc level proportional to the output power is applied to the inverting input at U101-pin 4 to compensate for any output power fluctuations. Thermistor RT101 responds to temperature vari-

verting (-) input of voltage comparator U102A-pin 6 via connector P6-pin 2. The power set voltage across the RF OUTPUT ADJUST potentiometer is applied to the non-inverting (+) input at U102A-pin 5 through the unity gain buffer amplifier U102B and the resistor divider network comprised of R125, R126 and R127. The divider applies a voltage representative of the power set voltage to the non-inverting input of U102A at a level corresponding to 6 dB below the preset power level.

3.7.2 Under normal preset power operating conditions, the forward power sense voltage applied to the inverting (-) input of comparator U102A is greater than the voltage representative of the preset power applied to the non-inverting (-) input. The two inputs drive the output of the comparator appearing at U102A-pin 7 low which, in turn, turns off transistor Q108 and saturates Q109. The result is a TTL low signal output at connector P1-pin 2 that signifies normal (no alarm) preset power output from the power amplifier.

3.7.3 However, should the forward power detect voltage fall below the representative power set voltage, the output of comparator U102A is driven high, saturating Q108 and turning off Q109. The result is a TTL logic high PWR OUT ALARM signal which is sent to the base site controller via connectors P6-pin 1 and P1-pin 2.

3.7.4 Whenever the transmitter is unkeyed, XMIT KEY goes low, turning off Q101 and disabling U101-pin 10. This reduces the power control voltage at Q103 which, in turn, reduces the rf output below the 6 dB preset level, thereby causing PWR OUT ALARM to go high.

3.7.5 Connecting resistor R124 across comparator U102A and in series with the resistor divider network (R125, R126 and R127) introduces hysteresis lag into the triggering action of the PWR OUT ALARM signal. This lag prevents false triggering of the PWR OUT ALARM signal that might be caused from any residual AM present on the rf carrier.

3.8 THERMAL ALARM AND OVERTEMPERATURE CUT-OFF

3.8.1 The THERMAL ALARM signal and a -3 dB reduction in rf output power occurs whenever the chassis heat sink temperature near the final amplifier transistors exceeds 85°C ±5°. Also, the PWR OUT ALARM signal and shutdown of the amplifier occurs whenever the heat sink temperature near the regulator board exceeds 85°C ±5°.

3.8.2 The temperature activated switch S1, mounted on the chassis wall in the chamber near the final amplifier transistors, closes whenever the heat sink temperature at the switch exceeds 85°C ±5°. When S1 closes, Q102 is turned off, causing the collector to rise to TTL logic "1" level across resistor divider R115 and R116. This signal is output as THERMAL ALARM to the base site controller via connector P4-pin 1.

3.8.3 Concurrently, closing switch S1 grounds the cathode of diode CR106 which lowers the power set voltage applied to the non-inverting (+) input at U107-pin 5 by effectively shorting out thermistor RT101 from the reference voltage divider. Lowering the voltage applied to the non-inverting (+) input reduces the power control voltage level and thus reduces the gain of the predriver stage, causing a reduction of the rf power output.

3.8.4 The temperature activated switch S2, mounted on the chassis wall in the chamber near the regulator board, opens whenever the heat sink temperature at the switch exceeds 85°C ±5°. When S2 opens, the XMIT KEY signal line to the power output regulator is broken and unkeys the transmitter. This drops the power control voltage to near 0 V dc (shutting the PA down) and triggers the PWR OUT ALARM signal to the base site controller.

4. REFERENCE DIAGRAMS

Power Amplifier Module
Servicing Diagram PEPS-44788

ations to slightly reduce the output control voltage with an increase in temperature and to slightly increase it with a decrease in temperature.

3.2.4 Thermocouple S1, which is located near the final amplifiers and the greatest heat dissipation, provides over-temperature protection. At 85 ±5°C, S1 closes to short out thermistor RT101. This lowers the dc non-inverting input to U101-pin 5 and results in a 3 dB decrease in the power output.

3.3 PREDRIVER AND DRIVER STAGES

3.3.1 The rf input signal from the exciter is coupled to the power amplifier through coaxial connector P1-pin A4. The signal is passed through a 50 ohm T-pad attenuator and a matching network to the predriver transistor Q200. The attenuator reduces the rf input signal (0.75 to 1.6 W) by approximately 5 dB.

3.3.2 The predriver stage operates class B and amplifies the rf signal up to a nominal power of 2.0 watts. The rf gain of the predriver is varied by increasing or decreasing the power control voltage delivered from the power output regulator to the collector of transistor Q200 via connector P5-pin 4. The power control voltage is regulated by the power output regulator (refer to paragraph 3.2) to maintain the TRANSMIT RF signal output from the power amplifier at a preset level.

3.3.3 The transistor driver (Q201) operates class C and amplifies the output of the predriver to an rf level of approximately 14 watts. Regulated +25 V dc is provided to the driver collector by the voltage regulator circuitry (refer to paragraph 3.1) via connector P5-pin 3.

3.4 FINAL AMPLIFIER STAGE

Two possible final amplifier stages may be supplied with the SLF2121A RF Power Amplifier: SLF4011A or the alternate SLF4041A.

In the SLF4011A Amplifier, the rf output delivered from the driver stage is applied to final amplifier transistor Q1, operating class C. The rf power output of the final stage depends on the preset level of the power output regulator (refer to paragraph 3.2), and will be approximately 58 watts with 45 watts at the amplifier output connector. Regulated +25 V dc is continuously provided to the Q1 collector by the voltage regulator via a pin jack located on the regulator board.

In the SLF4041A Amplifier, the rf output from the driver stage is split equally by the Wilkinson input coupler to minimize transistor interaction and applied to final amplifier transistors Q1 and Q2. These transistors operate class C and in parallel. After amplification, the rf output from the transistors is recombined into a single line by the Wilkinson output coupler. The rf output of the final stage depends on the preset level of the power output regulator (refer to paragraph 3.2), and will be approximately 58 watts (with 45 watts at the amplifier output connector). Regulated +25 V dc is continuously provided to the Q1 collector by the voltage regulator via a pin jack located on the regulator board.

3.5 ISOLATOR

3.5.1 The transmit rf output from the final amplifier is coupled through the isolator to the transmit combiner via connector P1-pin A1. The isolator is comprised of two circulators connected in series. The isolator couples rf power from isolator port 1 input to port 2 outlet. Any transmit rf that reflects back into port 2 is re-routed to terminator resistors built into the unit.

3.5.2 The isolator protects the output of the final amplifier from rf that might reflect back because of load impedance mismatch. Without isolation protection, adjacent channel reflected power or incident radiation could also mix with the final amplifier output and produce intermodulation products. Internal 50 ohm ceramic loads dissipate reflected and incident power. The isolator provides greater than 40 dB reverse isolation over the transmitter operating frequency range (850-900 MHz).

3.5.3 A reverse power detector circuit is built into the isolator to provide a signal indicating the relative strength of the reflected power from the antenna line. The reflected power that is dissipated across the internal load resistor is sampled and rectified by the circuit into a dc voltage that is proportional to the reflected rf power level. This reverse power detect signal is fed back to the front panel meter (located on the transmitter combiner), as the RVRS PWR DETECT via connectors P5-pin 6 and P1-pin 4.

3.6 FORWARD AND REVERSE POWER DETECTORS

The transmit rf on the transmission line that connects the Wilkinson output coupler to the isolator is sampled by the forward power detect circuit. The sample rf is rectified by the circuit into a dc voltage that is proportional to the transmit rf signal power. It is fed back as the forward power detect dc voltage via connector P5-pin 5 to the voltage regulator inverting input at U101-pin 4, and to the forward power detector hybrid via connector P6-pin 2. It also is routed as the FWD PWR DETECT signal to connector P1-pin 5 (not used in this module).

3.7 POWER OUT ALARM

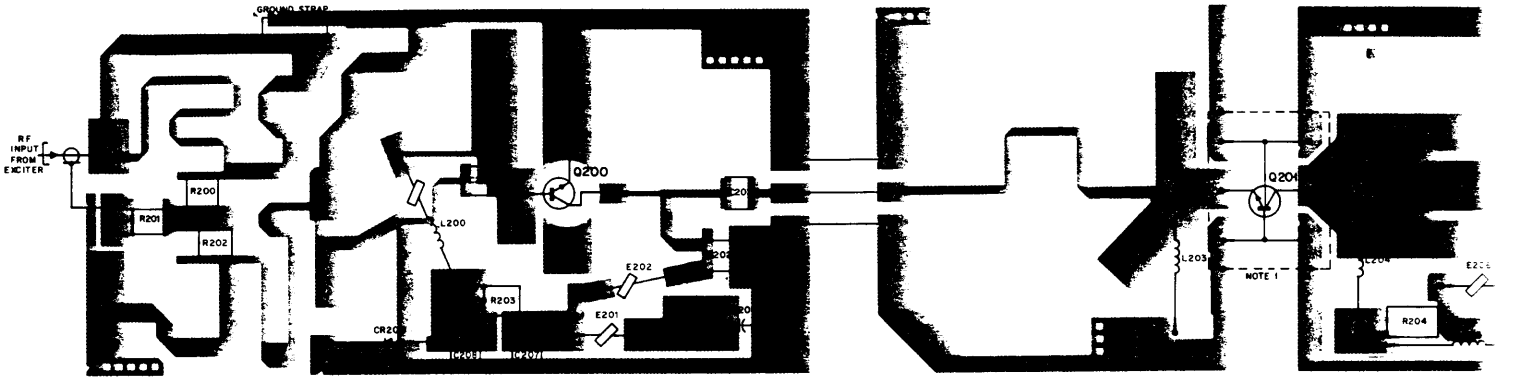
3.7.1 The PWR OUT ALARM signal is generated by the forward power detector hybrid and routed to the base site controller via connectors P6-pin 7 and P1-pin 2 whenever the rf output power falls 6 dB below the preset level. The forward sense dc voltage is applied to the in-

MOTOROLA CONFIDENTIAL PROPRIETARY

POWER AMPLIFIER

MODEL SLF2121A

SLF4031A PREDRIVER-DRIVER MODULE



NOTES:
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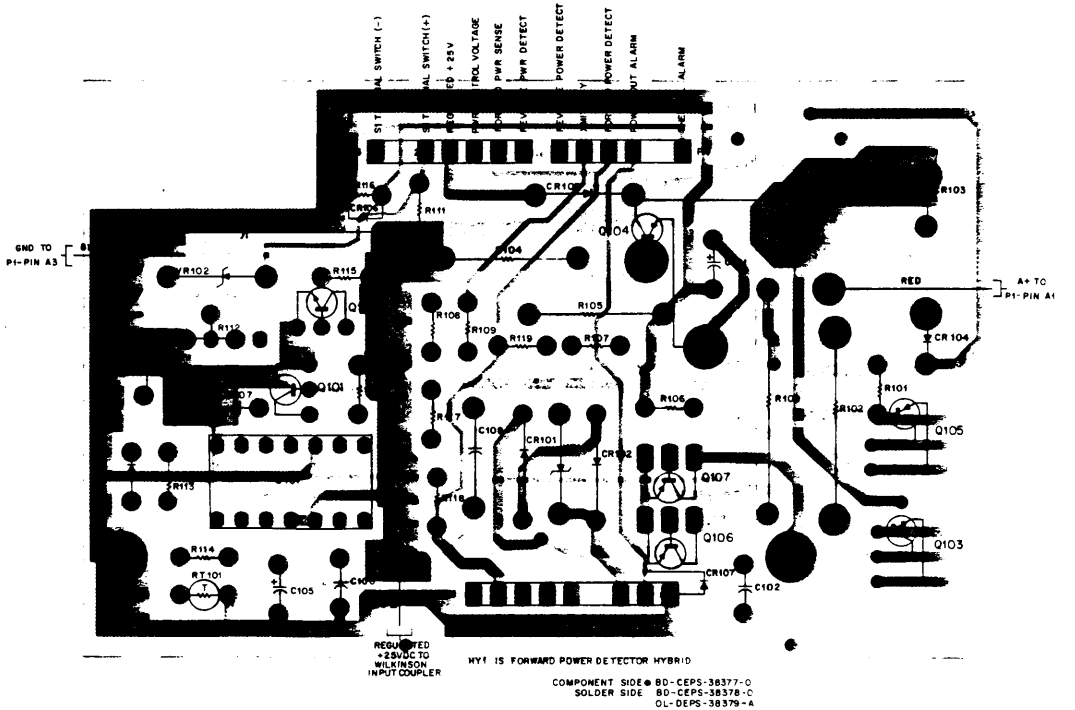
TRN5231A REGULATOR BOARD



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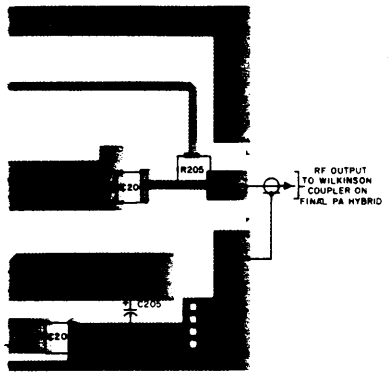


CATE ELECTRICAL CONNECTION
ETALLIC BRACKET TO TRANSISTOR
T INCREASES OUTPUT POWER

parts list

TRN5231A Regulator Board — PL-8930-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed:
C101	23-11019A09	1 uF ±20%; 50 V
C102	21-11021D03	.01 uF +80-20%; 50 V
C103	23-82783B12	4.7 uF ±20%; 50 V
C104	21-11015C07	.01 uF +80-20%; 100 v
C105	23-11019A20	10 uF ±20%; 25 V
C106	21-11015C01	.001 uF +80-20%; 100 V
C107	21-11015D01	100 pF ±10%; 100 V
C108	8-82905G08	.033 uF ±10%; 50 V
		diode: (see note)
CR101, 102	48-82466H13	silicon
CR103, 104	48-82525G09	silicon
CR105	48-83654H01	silicon
CR106, 107	48-82466H13	silicon rectifier
		connector, receptacle:
J4	28-82983M05	male, single contact
J5	28-82983M04	male, single contact
		transistor: (see note)
Q101, 102	48-869642	NPN; type M9642
Q103	48-869806	NPN; type M9806
Q105	48-869807	PNP; type M9807
Q106	48-84413L08	NPN; type M1308
Q107	48-869641	PNP; type M9641
Q108, 109	48-869642	NPN; type M9642
		resistor, fixed ±5%; 1/4 W: unless otherwise stated
R101	6-11009E35	270
R102	6-126A49	1k; 1 W
R103	6-127A37	330; 2 W
R104	6-125A56	2k; 1/2 W
R105	6-125A42	510; 1/2 W
R106	6-11009E63	3.9k
R107	6-11009E73	10k
R108	6-11009E99	120k
R109	6-11009F22	1 meg
R110	6-11009E99	120k
R111	6-11009E81	22k
R112	18-82150K09	variable; 5k
R113	6-11009E65	4.7k
R114	6-11009E71	8.2k
R115	6-11009E81	22k
R116	6-11009A66	5.1k
R117	6-11009E41	470
R118	6-11009E65	4.7k
R119	6-11009E73	10k
		thermistor:
RT101	6-82462G01	569k @ 25°C
		integrated circuit: (see note)
U101	51-83629M92	ADJUSTABLE POSITIVE or NEGATIVE VOLTAGE REGULATOR
U102	51-83629M16	DUAL LOW POWER OPERATIONAL AMPLIFIER
		voltage regulator: (see note)
VR101	48-82256C61	Zener type: 5.1 V
VR102	48-82256C15	Zener type: 5.8 V
		mechanical parts
	9-82287A02	SOCKET, transistor
	29-83757N01	LUG, terminal; 3 used
	29-84209P01	TERMINAL, chain form; 10 used

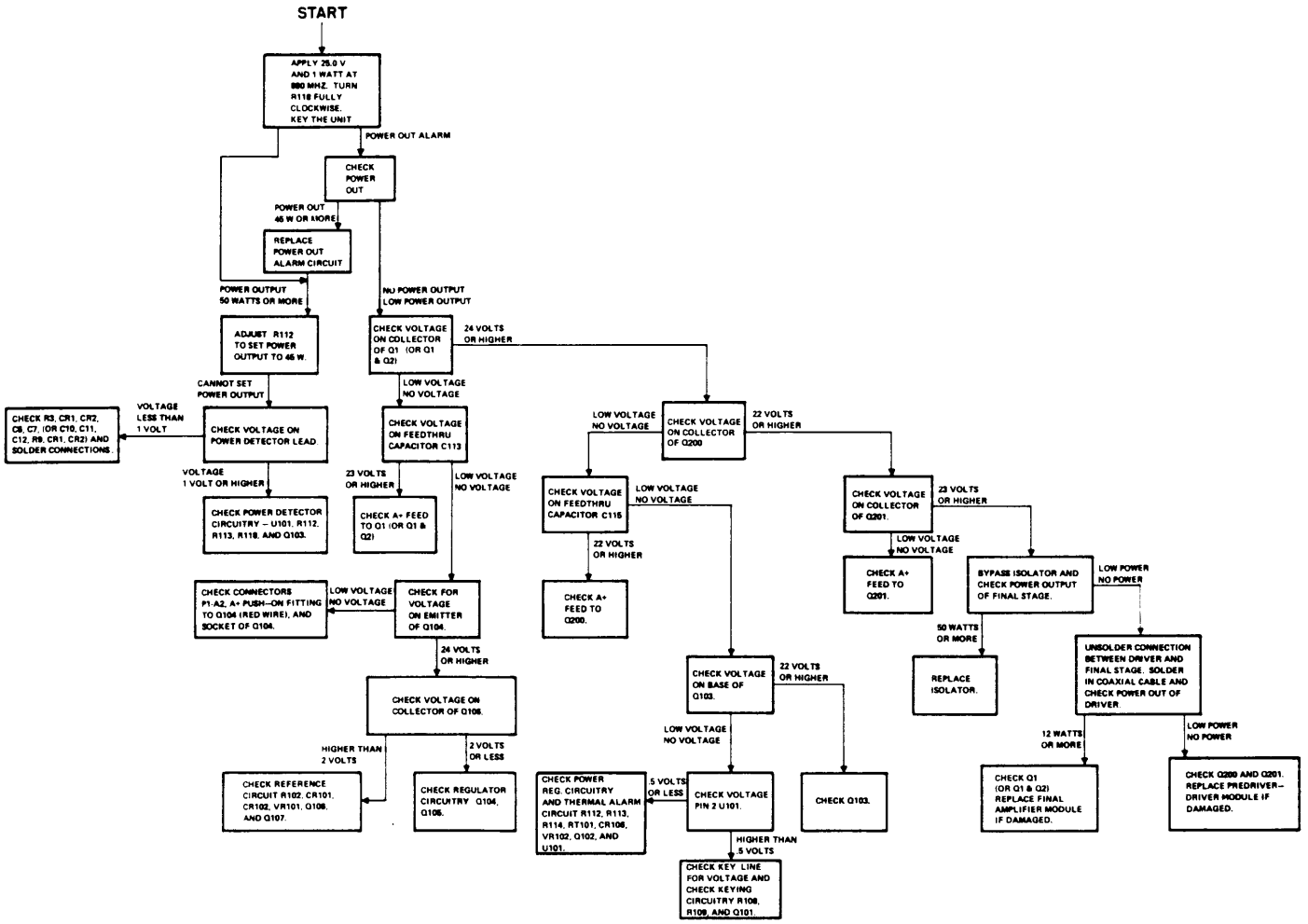
SLN4465A Hardware Kit — PL-10879-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed:
C111, 112	21-82805H05	1000 pF; feed-thru
C114, 115	21-82805H05	1000 pF; feed-thru
C118	21-82805H05	1000 pF; feed-thru
C1113	21-82805H05	1000 pF; feed-thru
C1117	21-82805H05	1000 pF; feed-thru
		core:
E220 thru 223	76-84069B04	ferrite bead
		isolator
HY1	58-83289R01	4-port
		connector, receptacle:
P100		consists of:
	9-82997M01	CONNECTOR, female: 5 contact; 9 position
	39-82640R01	CONTACT, coax; 2 used
	39-82995M01	CONTACT, plug; 2 used
P4		consists of:
	15-84301K04	HOUSING; 6 position
	39-82717M01	CONTACT; 5 used
	28-84302K01	PLUG, key
P5		consists of:
	15-84301K05	HOUSING, 7 position
	39-82717M01	CONTACT; 6 used
	28-84302K01	PLUG, key
P8, 9		consists of:
	28-87317C02	CONNECTOR, cable; 2 used
	30-859004	CABLE, coaxial RG 188/U; 2 used
		transistor: (see note)
Q104	48-869717	PNP; type M9717
		switch:
S1	40-83141M03	thermostatic, normally open
S2	40-83141M04	thermostatic, normally closed
		mechanical parts
	2-131435	NUT, 4-40 × 1/4 × 3/32"
	3-139380	SCREW, tapping: 4-40 × 3/8"; 2 used
	3-140230	SCREW, tapping: 4-40 × 5/16"; 38 used
	3-140268	SCREW, tapping: 4-40 × 1"
	3-140463	SCREW, machine: 4-40 × 1/2; 2 used
	3-140464	SCREW, machine: 4-40 × 3/8; 7 used
	4-82074R01	WASHER, shoulder; 3 used
	7-82148N01	BRACKET
	7-83086P01	BRACKET, thermostat
	14-84651N01	INSULATOR, transistor
	14-83311P03	INSULATOR, transistor; 2 used
	15-83468R01	COVER, PA
	26-83410R01	HEAT SINK, PA
	30-859004	CABLE, coaxial: RG188/U
	38-84204P01	BUTTON, plug
	42-10217A02	STRAP, tie: .091 × 3.62 WHT; 4 used
	42-82927R01	CLIP, cable; 2 used
	46-83458N04	GUIDE, pin
	29-83426B02	LUG, terminal; 3 used
	42-82167N01	RING, stabilizer; 4 used
	64-83233N01	PLATE

SLF4031A Predriver-Driver Module — PL-10880-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed; pF: unless otherwise stated
C200	21-11078B24	25.5 ±5%; 50 V
C201	23-84677D13	10 uF ±10%; 35 v
C202, 203, 204	21-11078B24	25.5 ±5%; 50 V
C205	23-84677D13	10 uF ±10%; 25 V
C206, 207, 208	21-84736E10	25.5 ±5%; 50 V
		diode: (see note)
CR200	48-82466H13	silicon
		bead:
E201, 202	1-80702T04	assembly wire and bead
E206	1-80702T04	assembly wire and bead
		coil, rf:
L200	24-80202B01	3 turns; left hand
L203, 204	24-80202B01	3 turns; left hand
L205	24-82723H50	choke; .085 uH
		transistor: (see note)
Q200	48-84411L51	NPN; type M1151
Q201	48-82233P16	NPN; type M3316
		mechanical parts
	2-84628A01	NUT, transistor mounting
	14-83253N02	INSULATOR
	29-82910N01	LUG, soldering; 2 used
	29-83206M01	LUG, soldering; 4 used
	42-84452N02	STRAP, connector
	42-84510M04	STRAP, PA; 2 used
	42-84510M03	STRAP, PA
	64-83442R02	PLATE
	64-84255K09	PLATE, ground strap

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.



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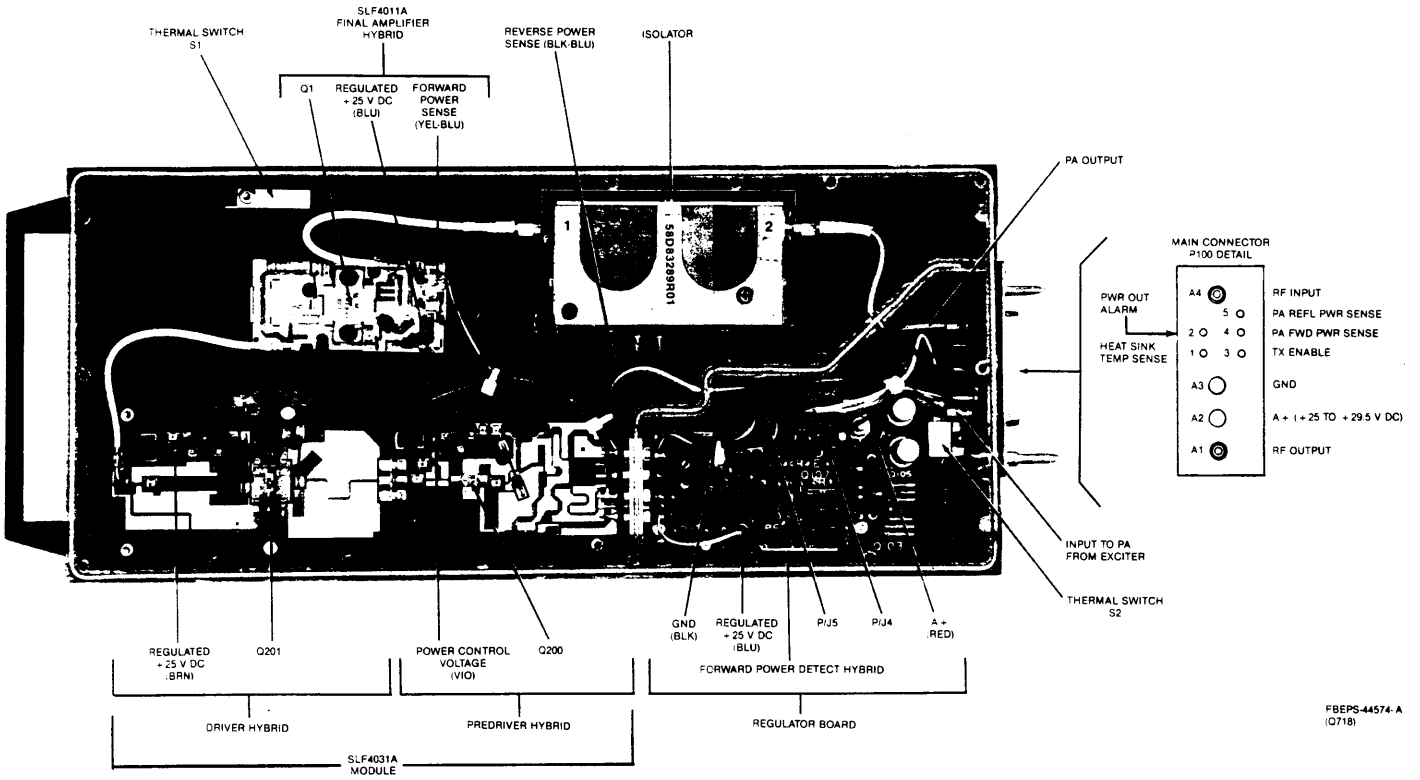
NOTE:
COMPONENTS ASSOCIATED WITH SLF4041A FINAL AMPLIFIER ARE SHOWN IN PARENTHESES.



NOTE:

The SLF4041A FINAL AMPLIFIER MODULE IS AN ALTERNATE KIT FOR THE SLF4011A AMPLIFIER.

Figure 5. Power Amplifier Module

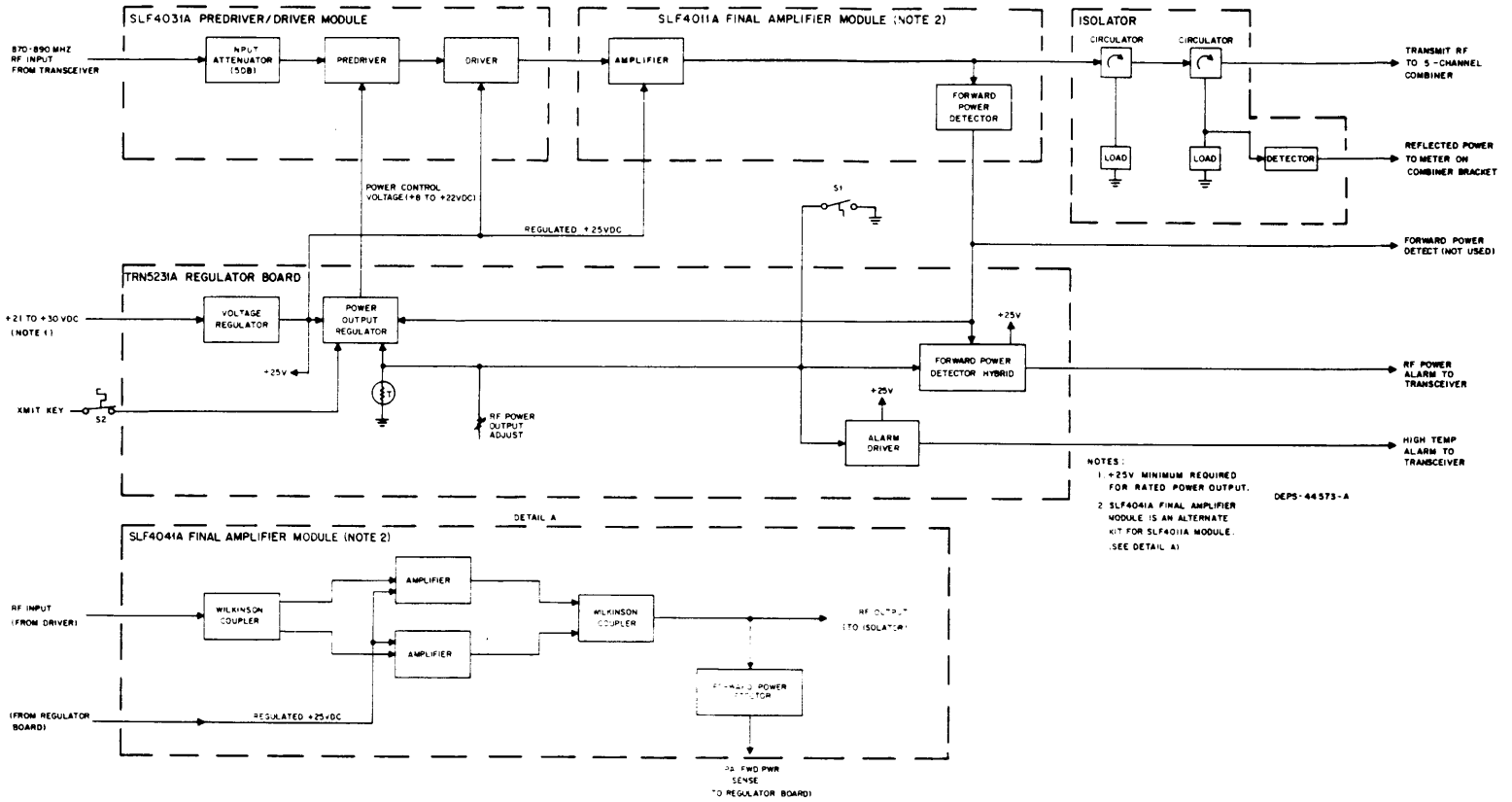
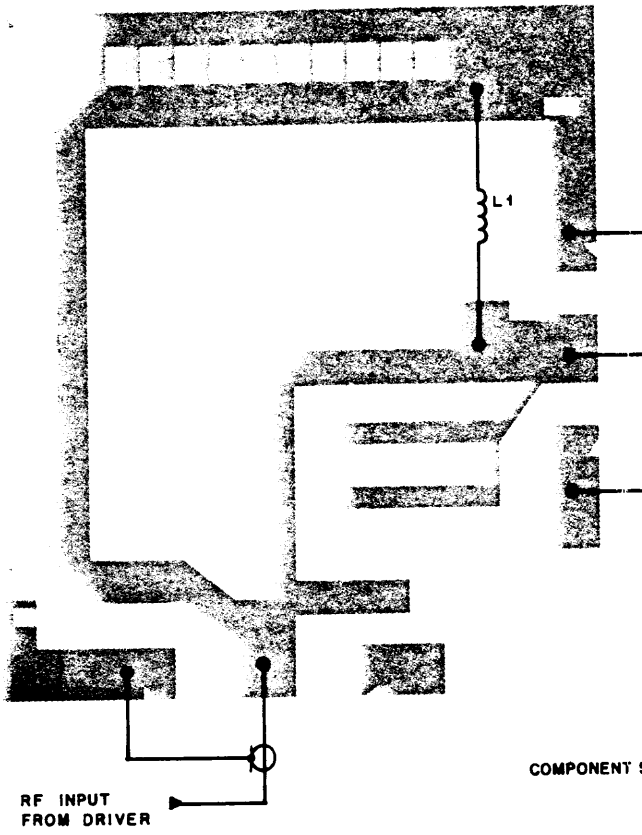


Figure 4. Power Amplifier Block Diagram

POWER AMPLIFIER
MODEL SLF2121A



parts list

SLF4011A Final Amplifier Module

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTIO
		capacitor fixed: chip, uF ± unless otherwise stated
C6	2111078B15	12
C7	2111078B24	25
C3,5	2111078B32	39
C4	2384677D13	tant 10 ± 10% 35V
		diode: (see note)
CR	4884616A01	hot carrier
		core:
E1	7683960B01	ferrite bead w/wire
		coil, rf:
L1,2	2480202B06	2 turns

Motorola No. PEPS-44788-O
(Sheet 3 of 3)
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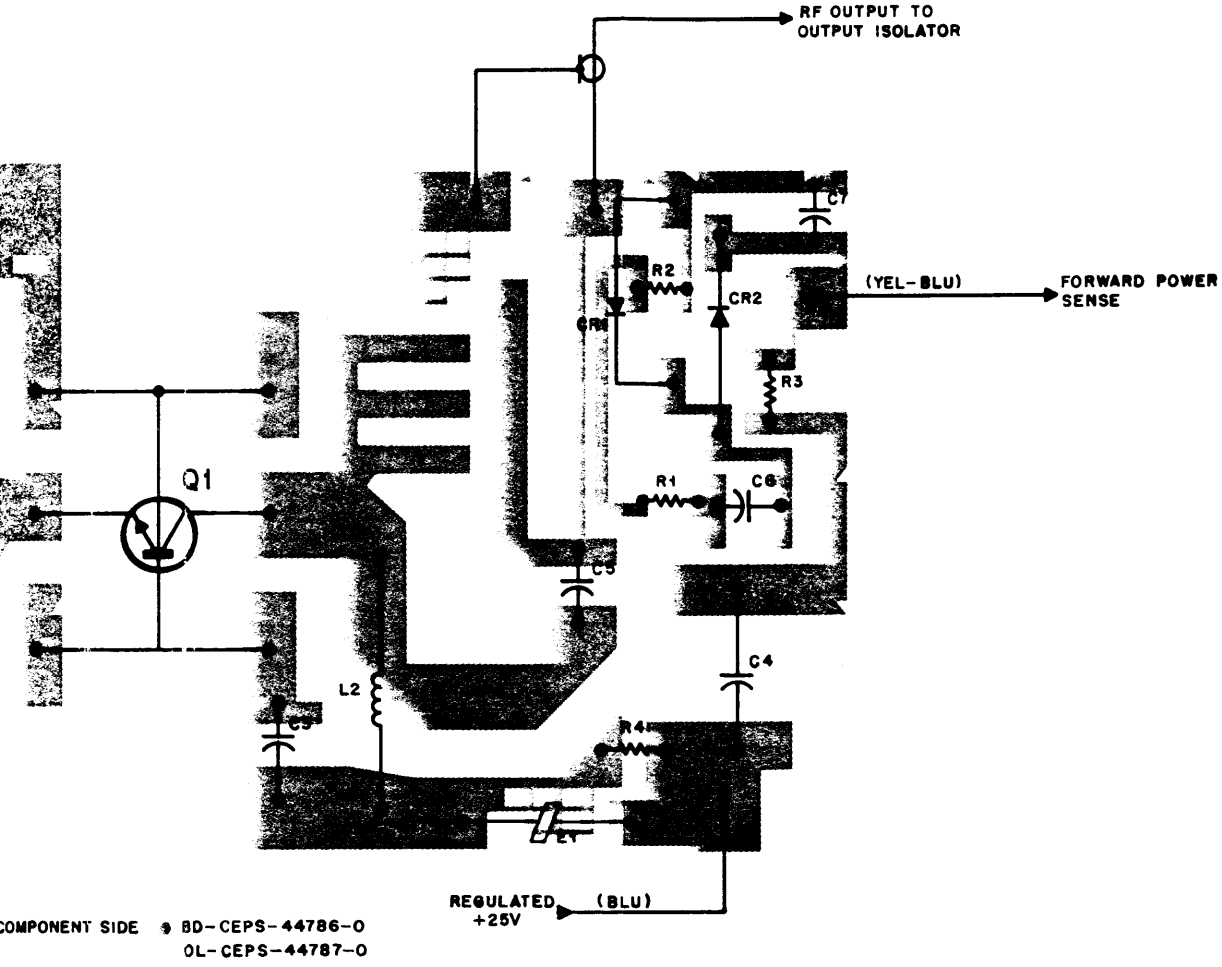
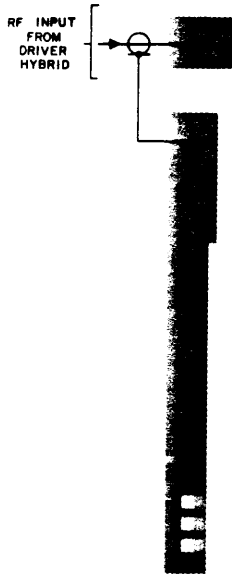
SLF4011A FINAL AMPLIFIER





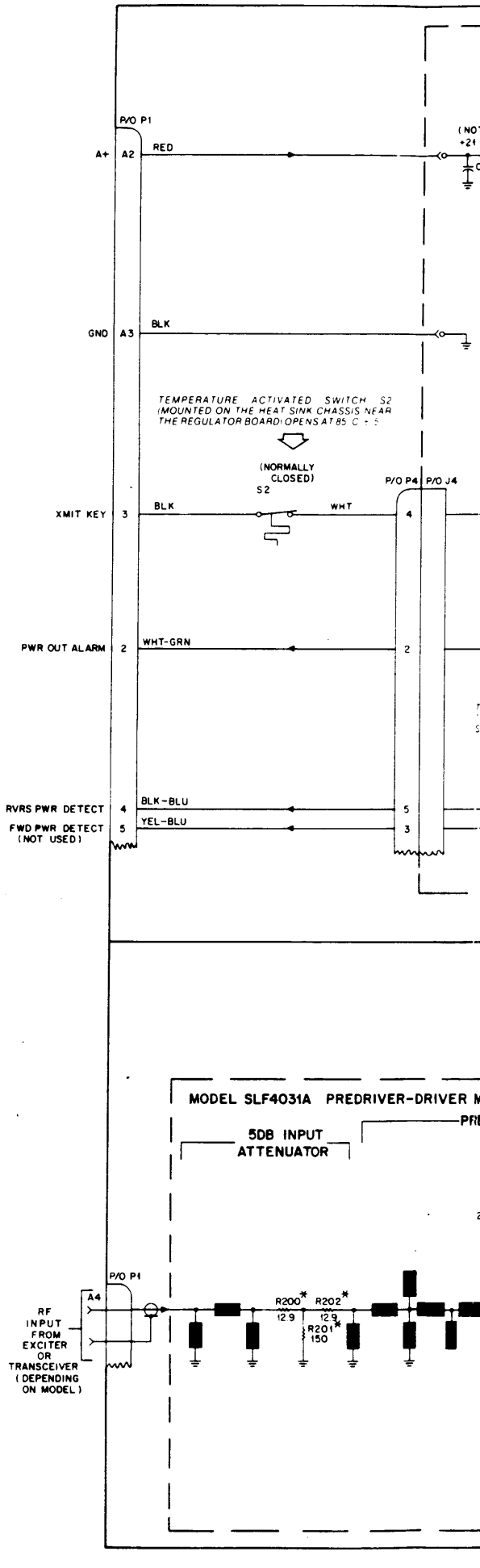
COMPONENT SIDE ● 8D-CEPS-44786-O
0L-CEPS-44787-O

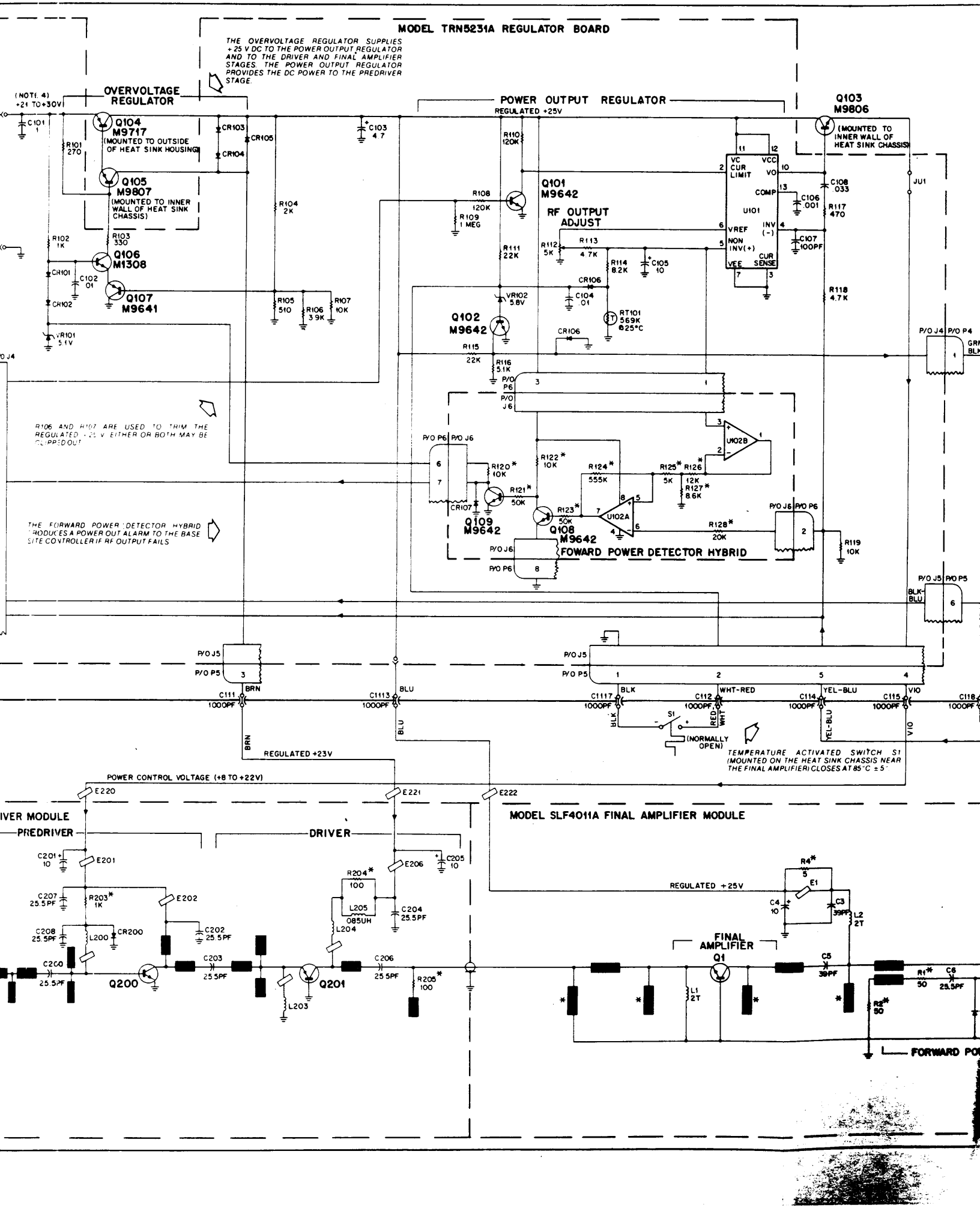
SHOWN FROM COMPONENT SIDE

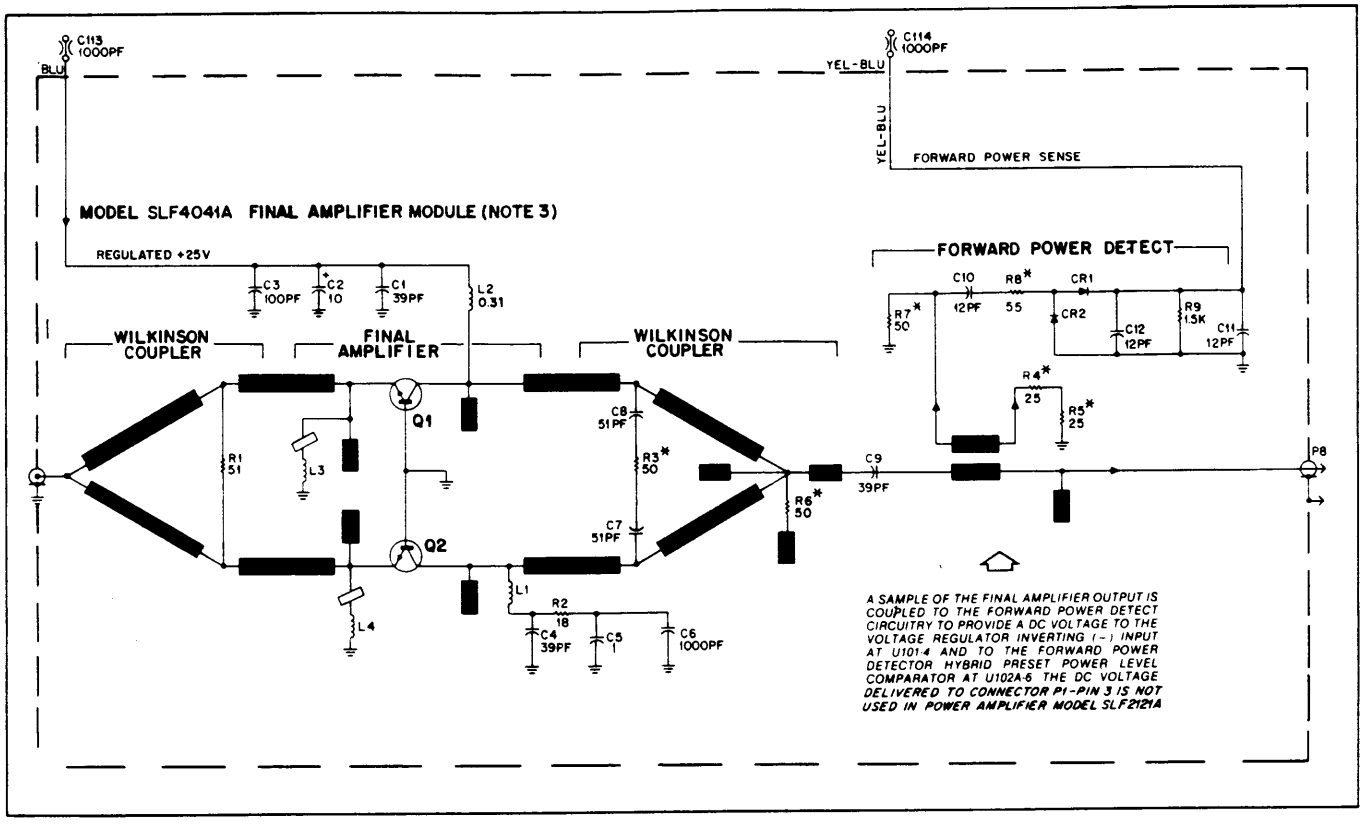
PL-10674-O

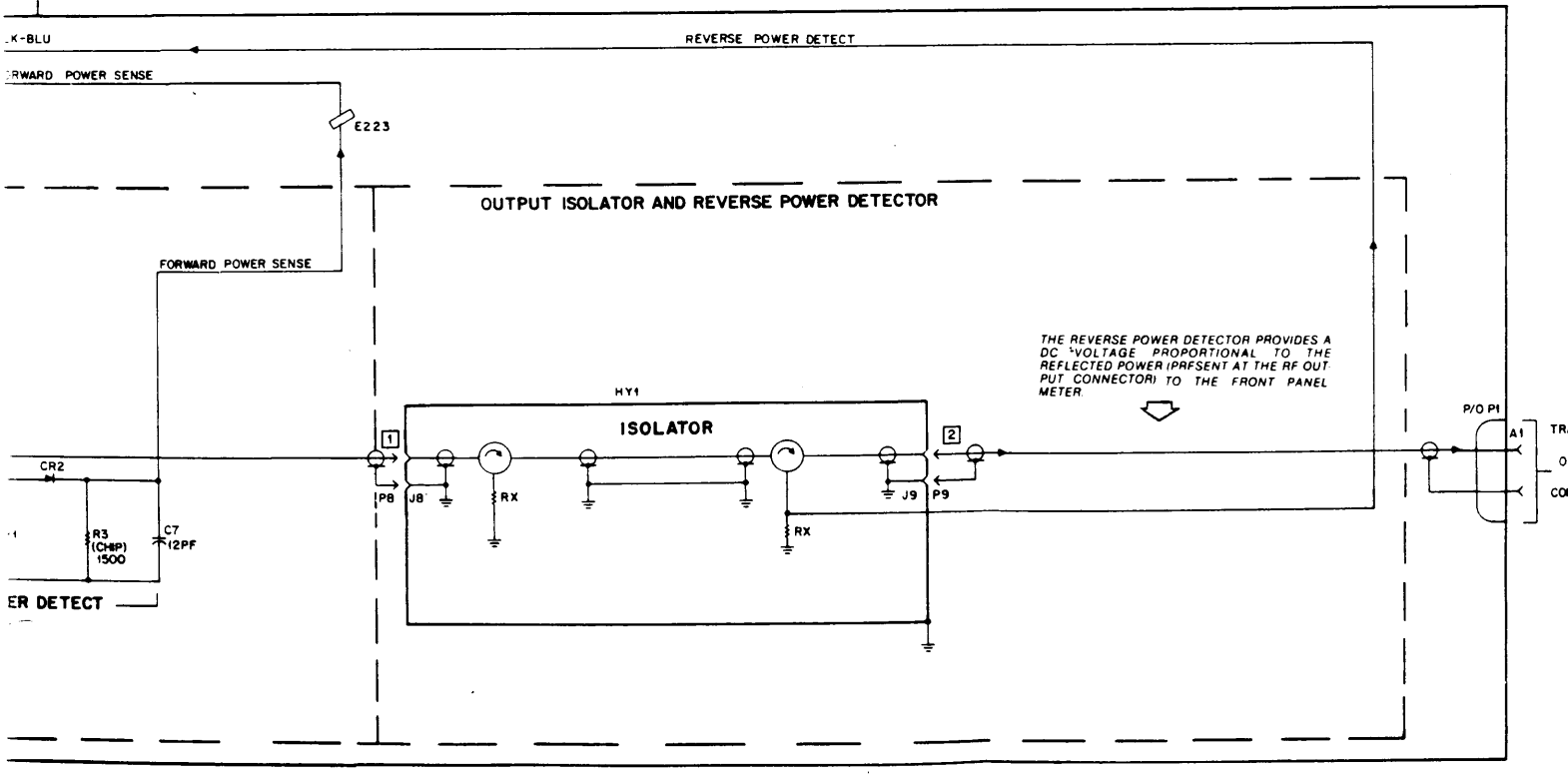
DESCRIPTION
od: chip, uF ±5% 100V
wise stated
% 35V
ote)
w/wire

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		transistor: (see note)
Q1	4883495P07	NPN; type M95P07
		resistor, fixed: unless otherwise stated
R1,2	—	screened
R3	0611024A53	chip 1500 ±5% 1/8W
R4	—	screened
	non-referenced items	
	1583262R01	SHROUD
	4283263R01	STRAP, PA; 2 used
	4283263R02	STRAP, PA; 4 used
	4283308P01	CLIP, retainer
	6483264R01	PLATE

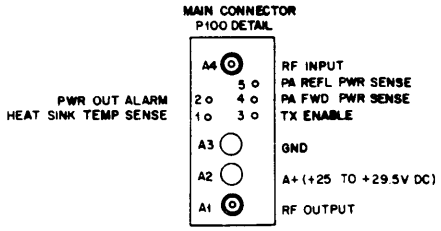

P/O P1
A+
A2
RED
GND
A3
BLK
TEMPERATURE ACTIVATED SWITCH S2
(MOUNTED ON THE HEAT SINK CHASSIS NEAR
THE REGULATOR BOARD) OPENS AT 85 C ± 5
(NORMALLY
CLOSED)
S2
P/O P4
P/O J4
XMIT KEY
3
BLK
WHT
4
PWR OUT ALARM
2
WHT-GRN
2
RVRS PWR DETECT
4
BLK-BLU
5
FWD PWR DETECT
(NOT USED)
5
YEL-BLU
3
MODEL SLF4031A PREDRIVER-DRIVER M
5DB INPUT
ATTENUATOR
P/O P1
A4
RF
INPUT
FROM
EXCITER
OR
TRANSCEIVER
(DEPENDING
ON MODEL)
R200*
12.9
R202*
12.9
R201*
150


MODEL TRN5231A REGULATOR BOARD
THE OVERVOLTAGE REGULATOR SUPPLIES +25 V DC TO THE POWER OUTPUT REGULATOR AND TO THE DRIVER AND FINAL AMPLIFIER STAGES. THE POWER OUTPUT REGULATOR PROVIDES THE DC POWER TO THE PREDRIVER STAGE.
OVERVOLTAGE REGULATOR
POWER OUTPUT REGULATOR
(NOTE 4) +21 TO +30V
Q104 M9717 (MOUNTED TO OUTSIDE OF HEAT SINK HOUSING)
Q105 M9807 (MOUNTED TO INNER WALL OF HEAT SINK CHASSIS)
Q106 M1308
Q107 M9641
Q101 M9642
RF OUTPUT ADJUST
Q102 M9642
Q103 M9806 (MOUNTED TO INNER WALL OF HEAT SINK CHASSIS)
REGULATED +25V
R106 AND R107 ARE USED TO TRIM THE REGULATED +25 V EITHER OR BOTH MAY BE CLIPPED OUT
THE FORWARD POWER DETECTOR HYBRID PRODUCES A POWER OUT ALARM TO THE BASE SITE CONTROLLER IF RF OUTPUT FAILS
Q109 M9642
Q108 M9642
FOWARD POWER DETECTOR HYBRID
TEMPERATURE ACTIVATED SWITCH S1 (MOUNTED ON THE HEAT SINK CHASSIS NEAR THE FINAL AMPLIFIER) CLOSES AT 85°C ± 5°
(NORMALLY OPEN)
REGULATED +23V
POWER CONTROL VOLTAGE (+8 TO +22V)
MODEL SLF4011A FINAL AMPLIFIER MODULE
PREDRIVER
DRIVER
FINAL AMPLIFIER
Q200
Q201
Q1
REGULATED +25V
FORWARD PO


C113
1000PF
BLU
C114
1000PF
YEL-BLU
YEL-BLU
FORWARD POWER SENSE
MODEL SLF4041A FINAL AMPLIFIER MODULE (NOTE 3)
REGULATED +25V
C3
100PF
C2
10
C1
39PF
L2
0.31
WILKINSON COUPLER
FINAL AMPLIFIER
WILKINSON COUPLER
FORWARD POWER DETECT
C10
12PF
R8*
55
CR1
R7*
50
CR2
C12
12PF
R9
1.5K
C11
12PF
R4*
25
R5*
25
Q1
C8
51PF
R1
51
L3
R3*
50
C9
39PF
P8
R6*
50
C7
51PF
Q2
L1
R2
18
L4
C4
39PF
C5
1
C6
1000PF
THERMAL ALARM
A SAMPLE OF THE FINAL AMPLIFIER OUTPUT IS COUPLED TO THE FORWARD POWER DETECT CIRCUITRY TO PROVIDE A DC VOLTAGE TO THE VOLTAGE REGULATOR INVERTING (-) INPUT AT U101-4 AND TO THE FORWARD POWER DETECTOR HYBRID PRESET POWER LEVEL COMPARATOR AT U102A-6. THE DC VOLTAGE DELIVERED TO CONNECTOR P1-PIN 3 IS NOT USED IN POWER AMPLIFIER MODEL SLF2121A


REVERSE POWER DETECT
FORWARD POWER SENSE
E223
OUTPUT ISOLATOR AND REVERSE POWER DETECTOR
FORWARD POWER SENSE
THE REVERSE POWER DETECTOR PROVIDES A DC VOLTAGE PROPORTIONAL TO THE REFLECTED POWER (PRESENT AT THE RF OUTPUT CONNECTOR) TO THE FRONT PANEL METER.
HY1
ISOLATOR
P/O P1
CR2
R3
(CHIP)
150Ω
C7
12PF
P8
J8
RX
RX
J9
P9
A1
TRANSM
RF
OUTPU
TO
COMBIN
ER DETECT

POWER AMPLIFIER
MODEL SLF2121A

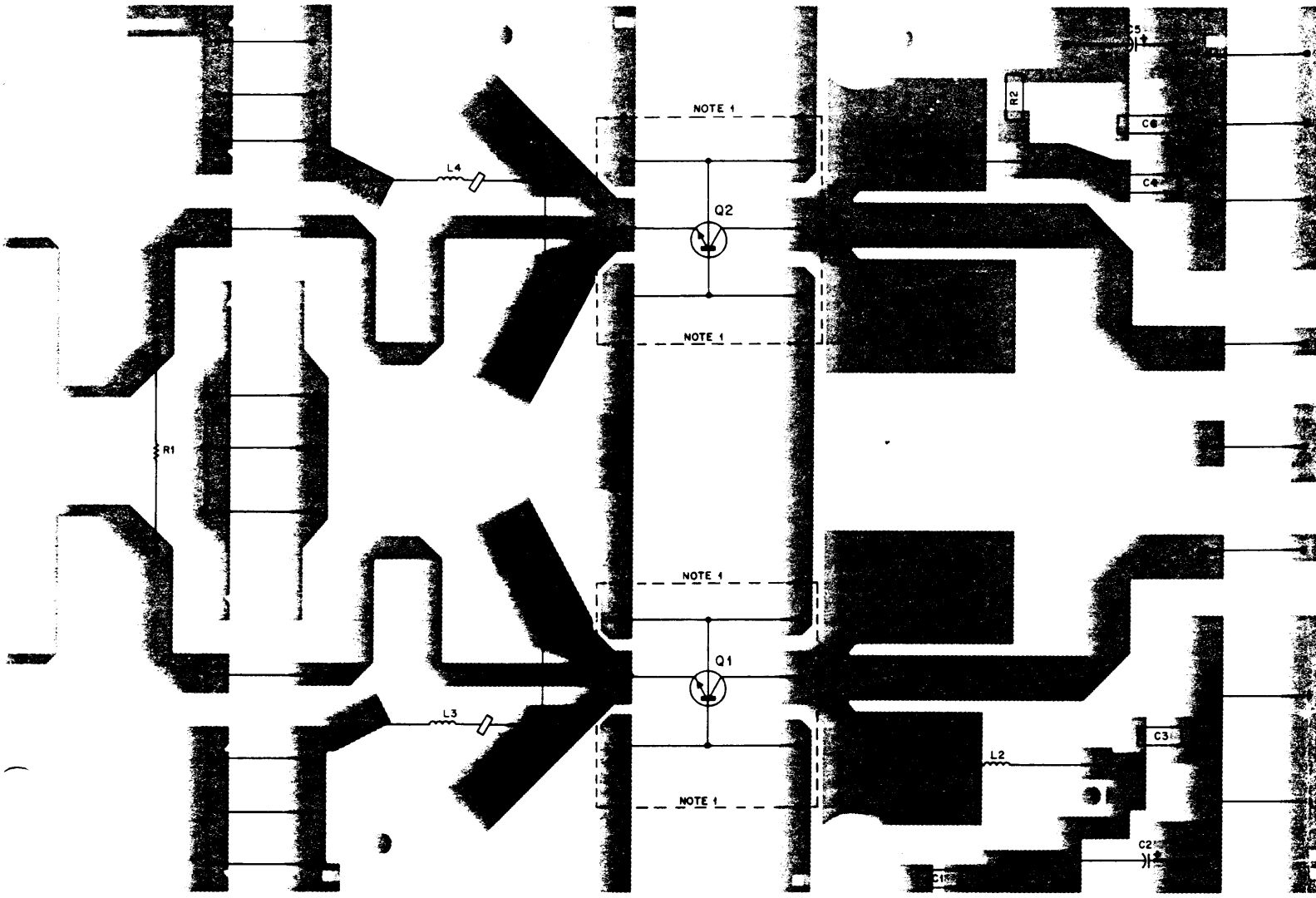


NOTES:

1. Unless otherwise stated, all resistor values are in ohms and capacitors values are in microfarads.
2. Components marked with an asterisk (*) are screened on the substrate and are considered non-serviceable.
3. The SLF2121A Power Amplifier may contain either an SLF4011A Final Amplifier Module or an SLF4041A Final Amplifier Module.
4. +25 V minimum required for rated power output.

TRANSMIT RF OUTPUT TO COMBINER

SLF4041A FINAL AMPLIFIER (ALTERNATE)



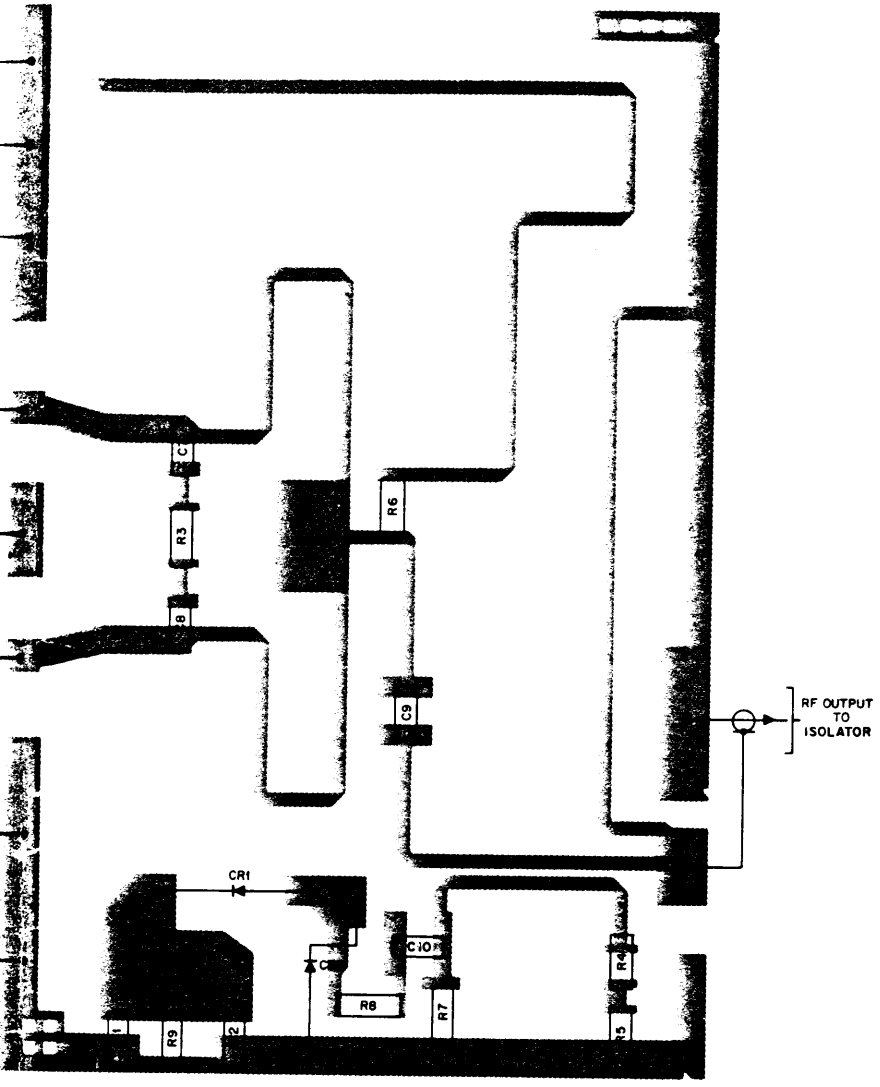
COMPONENT SIDE ● BD-DEPS-38388-O
OL-DEPS-38389-O

SLF4041A Power Amplifier Final Module PL-10678-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed:
C1	21-11078B32	39 pF ±5%; 50 V (chip)
C2	23-84677D13	10 uF ±10%; 35 V
C3	21-84873H59	100 pF ±5%; 50 V
C4	21-11078B32	39 pF ±5%; 50 V (chip)
C5	23-84677D10	1 uF ±1-%; 35 V
C6	21-84547A01	1000 pF ±20%; 50 V
C7, 8	21-84873H58	51 pF ±5%; 50 V
C9	21-11078B32	39 pF ±5%; 50 V (chip)
C10	21-11078B15	12 pF ±10%; 50 V (chip)
C11, 12	21-84873H20	12 pF ±5%; 50 V
		diode: (see note)
CR1, 2	48-84616A01	hot carrier
		coil,rf:
L1	24-80202B02	3 turns; right hand
L2	24-82723H54	choke; 0.31 uH
L3, 4	24-80202B03	3 turn; left hand

REFERENCE SYMBOL	M P
Q1, 2	48-82
R1	6-12
R2	6-11
R9	6-11
	3-13
	14-8
	29-8
	29-8
	42-8
	42-8
	42-8
	42-8
	64-8

note: For optimum perfo
be ordered by Motorola p



NOTES:
1. DASHED LINES INDICATE ELECTRICAL CONNECTION OF WATTGETTER METALIC BRACKET TO TRANSISTORS Q1 AND Q2. THESE BRACKETS INCREASE OUTPUT POWER OF THE DEVICES.

MOTOROLA PART NO.	DESCRIPTION
	transistor: (see note)
48-82233P02	NPN; type M3302
	resistor, fixed:
6-124A18	51 ±5%; 1/4 W
6-11024A07	18 ±5%; 1/8 W (chip)
6-11024A53	1.5k ±5%; 1/8 W (chip)
	mechanical parts
3-138651	SCREW, machine: 2-56 × 1/8"; 4 used
14-83390P01	INSULATOR, rectangular
29-82910N01	LUG, terminal; 2 used
29-83208M01	LUG, soldering; 4 used
32-84452N02	STRAP, connector; 2 used
32-84453N01	STRAP, PA; 4 used
32-84510M04	STRAP, PA; 3 used
32-84510M03	STRAP, PA; 4 used
54-83442R01	PLATE

erformance, diodes, transistors, and integrated circuits must
ola part numbers.