Rockwell-Collins | SERVICE BULLETIN
Collins Telecommunications Products Division/Rockwell International

350067

OR-5007/URC AND 719D-2A RECEIVER-TRANSMITTER GROUP (622-1407-XXX)
AM-5280/URC AND 549A-2 AMPLIFIER-COUPLER A3 (622-2149-001, -002, -003)
POWER AMPLIFIER A3A4 (629-3410-001)
RF SUBASSEMBLY A3A4A1 (601-3674-001, -002)

SERVICE BULLETIN NO 1

REDUCE T/R RELAY FAILURES

This service bulletin applies to OR-5007/URC and 719D-2A (622-1407-XXX) systems containing AM-5280/URC and 549A-2 (622-2149-001) units with serial numbers 1 through 688 and 878 through 911.

AM-5280/URC and 549A-2 production cut-in serial numbers are 689 through 877, 912 and above.

The high inrush current required to charge capacitor C13 on rf subassembly A3A4A1 causes premature failure of tr relay K1 on filter board A3A3A1. If failure of K1 is noted by abnormally low battery life, then incorporation of this service bulletin is required when the relay is being replaced. Bypass capacitor C13 may be removed without degrading performance because of the proximity of the low-impedance power source.

This service bulletin removes capacitor A3A4A1C13.

Estimated time required is 0.5 man-hour.

No modification parts are required, but a service bulletin information chart will be needed to record the service bulletin number after the modification has been made. The chart may be ordered free of charge for six months after the date of this bulletin. Orders should be sent to Collins Telecommunications Products Division/Rockwell International, Service Parts Department, Cedar Rapids, Iowa 52406. Include the Collins part number of the chart, the serial numbers of the units to be modified, and reference OR-5007/URC and 719D-2A Service Bulletin No 1.

No special tools or equipment are required.

This service bulletin references the 719D-2A Receiver-Transmitter Group Instruction Book, Collins part number (CPN) 523-0766774.

The second edition of the 719D-2A instruction book and the first editions of the AN/PRC-515 maintenance and parts list manuals will include the change covered in this bulletin.

MODIFICATION PROCEDURE

A. Disconnect all power from the equipment.

NOTE: Refer to the 719D-2A instruction book parts list section (CPN 523-0767337), figure 4, item 5, for location of rf subassembly A3A4A1.

B. Remove rf subassembly A3A4A1 from the AM-5280/URC or 549A-2 amplifier-coupler A3.

C. Refer to figure 1 of this bulletin for location of component and remove capacitor C13.

NOTE: Refer to figure 2 for before and after schematic diagrams of the rf subassembly.

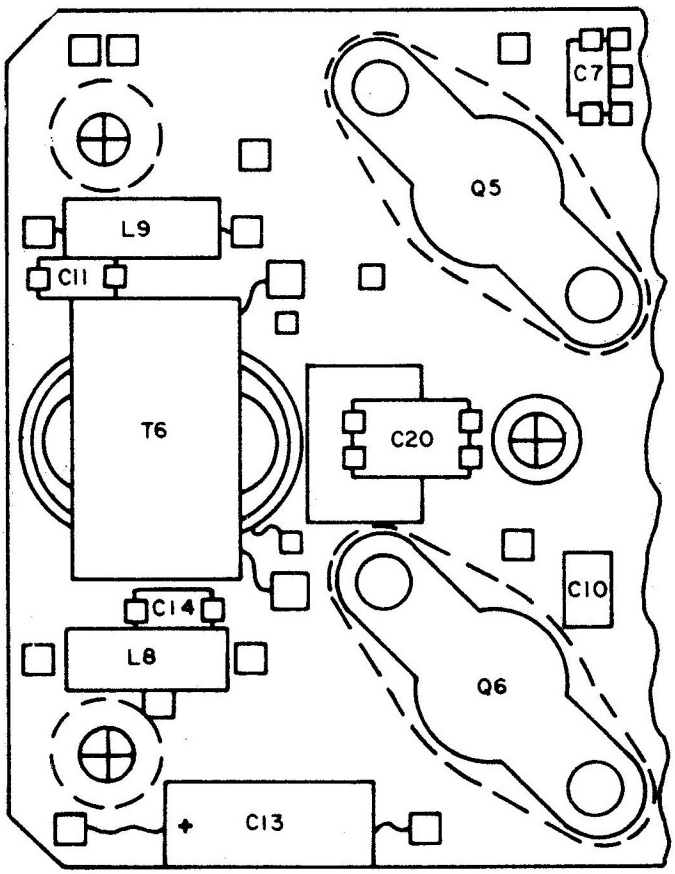
D. Reinstall the rf subassembly into the AM-5280/URC or 549A-2.

E. Install a service bulletin information chart (280-3778-010) near the AM-5280/URC or 549A-2 nameplate and mark SB 1 on the chart.

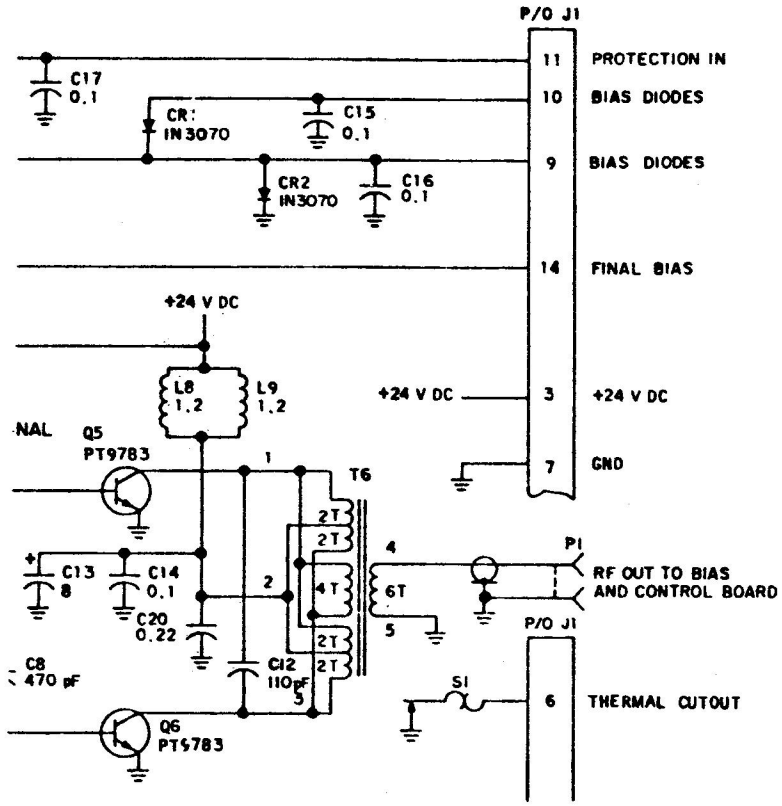
MATERIAL INFORMATION

The chart listed below is required to record the implementation of this service bulletin.

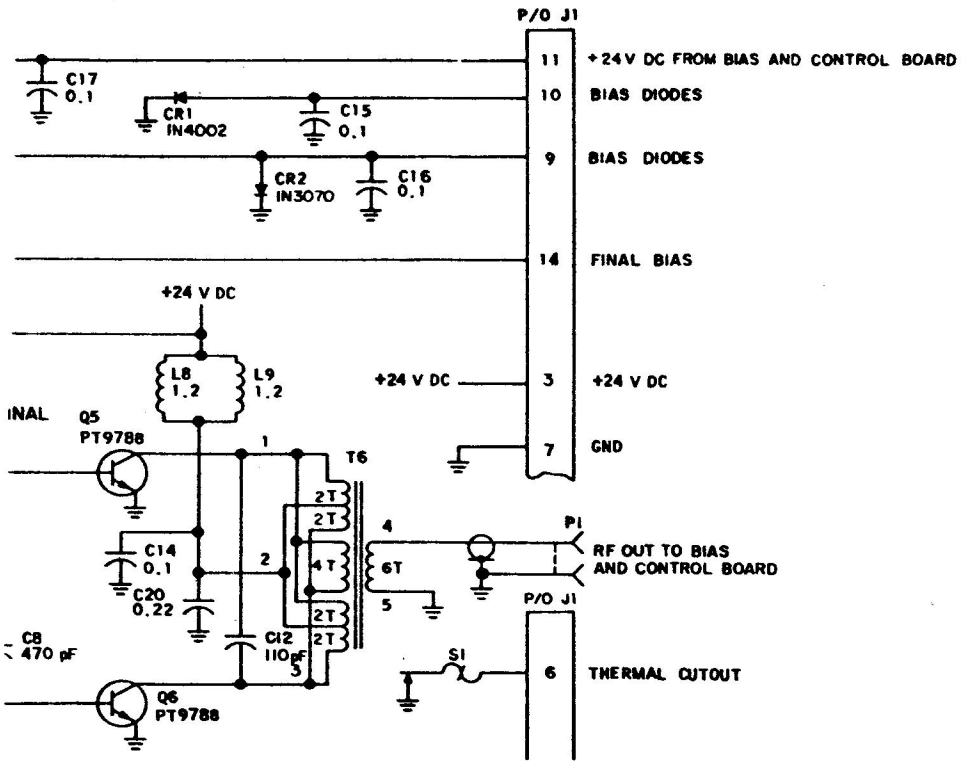
COLLINS PART NUMBER	QTY	UNIT PRICE	DESCRIPTION
280-3778-010	1		Chart, information



P/O Rf Subassembly A3A4A1
Figure 1



Before Modification



After Modification

Rockwell | SERVICE BULLETIN

Collins Telecommunications Products Division/Rockwell International

• 350605

549A-2 (AM-5280/URC) AMPLIFIER-COUPLER A3 (622-2149-001, -002, -003)
DISCRIMINATOR A3A6 (629-3409-001)
LOADING BOARD A3A6A2 (601-3686-001)
POWER AMPLIFIER A3A4 (629-3410-001, -002, -003)
BIAS/CONTROL A3A4A2 (601-3675-002)
PA SUBASSEMBLY A3A4A1 (623-7287-001, -002, -003)
RF SUBASSEMBLY P/O A3A4A1 (601-3674-002)

SERVICE BULLETIN NO 2

LIMIT TRANSISTOR CURRENT DURING TUNE

This service bulletin applies to 549A-2 (622-2149-001, -002, -003) units with serial numbers 1593 and below.

Production cut-in is serial number 1594. Production cut-in for the subassemblies affected by this revision is as follows:

Discriminator A3A6 (629-3409-001)	REV R
Loading board A3A6A2 (601-3686-001)	REV J
Bias/control A3A4A2 (601-3675-002)	REV Y
Rf subassembly A3A4A1 (601-3674-002)	REV V

Excessive transistor current during tune mode can cause failure of the amplifier transistors. This service bulletin incorporates several revisions that will limit transistor current. These modifications should not be made until the transistors need to be replaced.

One zener diode is removed from the discriminator to prevent saturation of ALC during tune mode. A zener diode is added to the loading board to limit ALC voltage to 12 volts. Peak bias current is limited by changing one resistor on the bias/control card and six resistors on the rf subassembly card. Amplifier gain variations when using various transistor vendors is kept to a minimum by test selecting five of the resistors.

Estimated time required is 4.0 man-hours.

The modification parts are itemized in the material information paragraph. For additional information concerning parts, contact Collins Telecommunications Products Division/ Rockwell International, Service Parts Department, Cedar Rapids, Iowa 52498. Reference 549A-2 Service Bulletin No 2 in all correspondence.

The following test equipment or equivalent is required.

ITEM	RECOMMENDED TYPE
Power amplifier test adapter TS-5119/PRM-502	Rockwell-Collins 622-2790-002, -003
Power supply PP-5290/PRM-502	Rockwell-Collins 622-2779-001
Attenuator, 6 dB (2 required)	Measurements 80-ZH3

ITEM	RECOMMENDED TYPE
Digital voltmeter	Fluke 8000A
Load, 50 ohms	Bird 8085
Multimeter	Hewlett-Packard 410C
Variable attenuator	Weinschel 905
Power divider	Weinschel 1506A
Probe coaxial T-connector	Hewlett-Packard 11042A
Rf signal generator (2 required)	Hewlett-Packard 8640B
Spectrum analyzer	Hewlett-Packard 141T

This service bulletin references the AN/PRC-515 Radio Set instruction book, part number 523-0769144.

MODIFICATION PROCEDURE

A. Remove radio set battery.

NOTE: Refer to AN/PRC-515 instruction book, paragraph 2.4.2, for amplifier-coupler A3 disassembly.

B. Remove power amplifier A3A4 according to paragraph 2.4.2.1.

C. Remove bias/control A3A4A2 according to paragraph 2.4.2.2.1.

D. Remove discriminator A3A6 according to paragraph 2.4.2.6.

E. Refer to instruction book, figure 3-27, item 8, for location of zener diode A3A6VR1. Remove and discard VR1.

NOTE: Refer to figure 1 of the service bulletin while performing steps G and H. Refer to figure 2 for a schematic diagram that includes the new diode.

F. Insert a pin (372-2601-033) into hole next to symbol Z in figure 1.

G. Install 1N4106 zener diode VR1 (353-3591-080) from new pin (cathode) to hole (anode) shown in figure 1.

H. On test adapter TS-5119/PRM-502, set UNIT POWER, KEY, and FAN to OFF. Install power amplifier A3A4 on test adapter, and perform test setup as shown in figure 3.

NOTE: Refer to figures 4 and 5 for location of components. Refer to figures 6 and 7 for schematic diagrams that include the changes made by this bulletin.

I. On A3A4A1 card (figure 4), remove 39-Ω resistors R15 and R16, and replace them with 150-Ω resistors (745-0718-000).

J. Leave the original 10-Ω test select resistors R3, R4, R7, and R8 on rf subassembly A3A4A1. All four resistors must be the same value.

K. Install bias/control A3A4A2 onto power amplifier.

L. With bias controls R1 and R4 full ccw, set test adapter and power supply POWER to ON. Set test adapter FAN to ON. Increase dc voltage to 25.2 volts while monitoring current demand. Current should not exceed 0.5 A.

M. Connect voltmeter across R3 or R4 on rf subassembly.

N. Adjust R1 on bias/control for a voltage equivalent to 1.5 mA (0.0015 × resistance selected).

O. Adjust R4 on bias/control for a current demand of 150 mA.

P. On test adapter, set BAND switch to 8 and KEY switch to ON.

Q. Set signal generator for 29.9999 MHz, and adjust output for 31.6 V rms measured on multimeter. Current should not exceed 2.6 A. Note signal generator level.

R. On test adapter, set KEY switch to OFF.

S. On test adapter, set BAND to 1. Set signal generator rf output to minimum and frequency to 2.0 MHz.

T. On test adapter, set KEY to ON, and increase signal generator drive to develop 31.6-V rms power output indication on multimeter. The signal generator drive voltage should be NMT 2.50 V rms or NLT 1.20 V rms. The dc current should not exceed 2.6 A.

U. Test-select resistors R3, R4, and R7, and R8 (table 1) to meet the drive voltage and dc current requirements of step T. When a resistor is removed, install a pin (372-2601-033) in each hole where a resistor lead is removed. The new resistors will be connected between the pins. Resistors R7 and R8 can be one step higher or lower than R3/R4, but R7 and R8 must be the same value. When the test selects are changed, the bias must be readjusted according to steps M through Q.

Table 1. Test-Select Resistors R3, R4, R7, and R8.

PART NUMBER	QTY	VALUE
745-0688-000	4	22 Ω
745-0687-000	4	20 Ω
745-0685-000	4	18 Ω
745-0682-000	4	15 Ω
745-0679-000	4	12 Ω
745-0676-000	4	10 Ω

V. On test adapter, set KEY to OFF.

W. Repeat steps S through V with the signal generator set to the following frequencies and the test adapter BAND switch set to the proper band.

3.5 MHz	BAND 2
5.0 MHz	BAND 3
7.0 MHz	BAND 4
10.0 MHz	BAND 5
15.0 MHz	BAND 6
20.6 MHz	BAND 7
29.9 MHz	BAND 8

X. On test adapter, set KEY switch to ON, set signal generator frequency to 29.99 MHz, and increase signal generator drive to produce output of 31.6 V rms measured on multimeter.

Y. Measure dc voltage at bias/control card Q2 collector. Test-select resistor R8 (table 2) on bias/control card for a voltage of +10.0 to +15.0 V dc at Q2-C.

Table 2. Test-Select Resistor R8.

PART NUMBER	QTY	VALUE
745-3321-000	1	180 Ω
745-3314-000	1	120 Ω
745-3335-000	1	39 Ω
745-3331-000	1	330 Ω
745-3328-000	1	270 Ω
745-3324-000	1	220 Ω
745-3317-000	1	150 Ω
745-3307-000	1	82 Ω

Z. Set one signal generator on, and assure the other signal generator is off. Tune signal generator for 2 MHz, approximately 1.5 V rms. Turn signal generator off.

AA. Set second signal generator on and tune for 2.001 MHz, approximately 1.5 V rms.

AB. Set dc voltage to 22 volts and select BAND 1.

AC. On test adapter, set KEY to ON. Adjust variable attenuator to drive pa to 31.6 volts measured across 50-ohm load. The dc current should not exceed 2 A.

AD. Adjust spectrum analyzer to measure intermodulation products. The highest products level should be NMT -25 dB. Bias adjustment R4 may be touched up (maximum bias current 250 μA).

AE. Repeat steps Z through AD with signal generators set to following frequencies and test adapter BAND switch set to proper band.

SIGNAL GENERATOR #1	SIGNAL GENERATOR #2	BAND
8.0 MHz	8.001 MHz	5
12.0 MHz	12.001 MHz	6
24.0 MHz	24.001 MHz	8
29.9 MHz	29.901 MHz	8

AF. Repeat steps Z through AD at 2.0 and 29.9 MHz with dc voltage set to 30 volts.

AG. Turn off all power and disconnect test equipment.

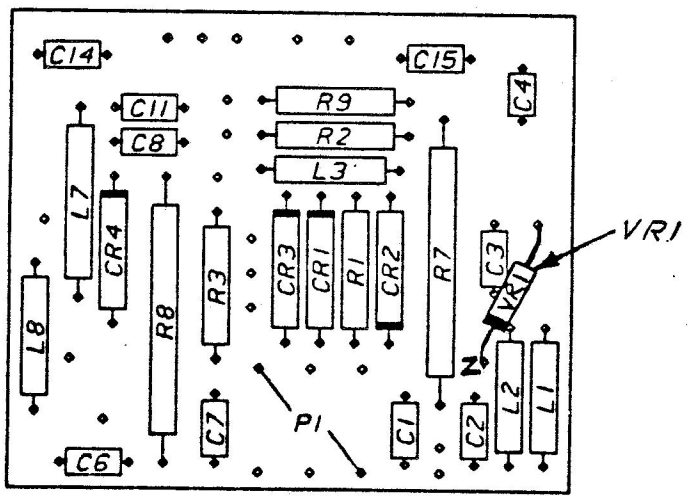
AH. Reassemble amplifier-coupler A3 in reverse order of disassembly.

AI. Attach service bulletin information chart (280-3778-010) near nameplate and mark SB 2 on chart.

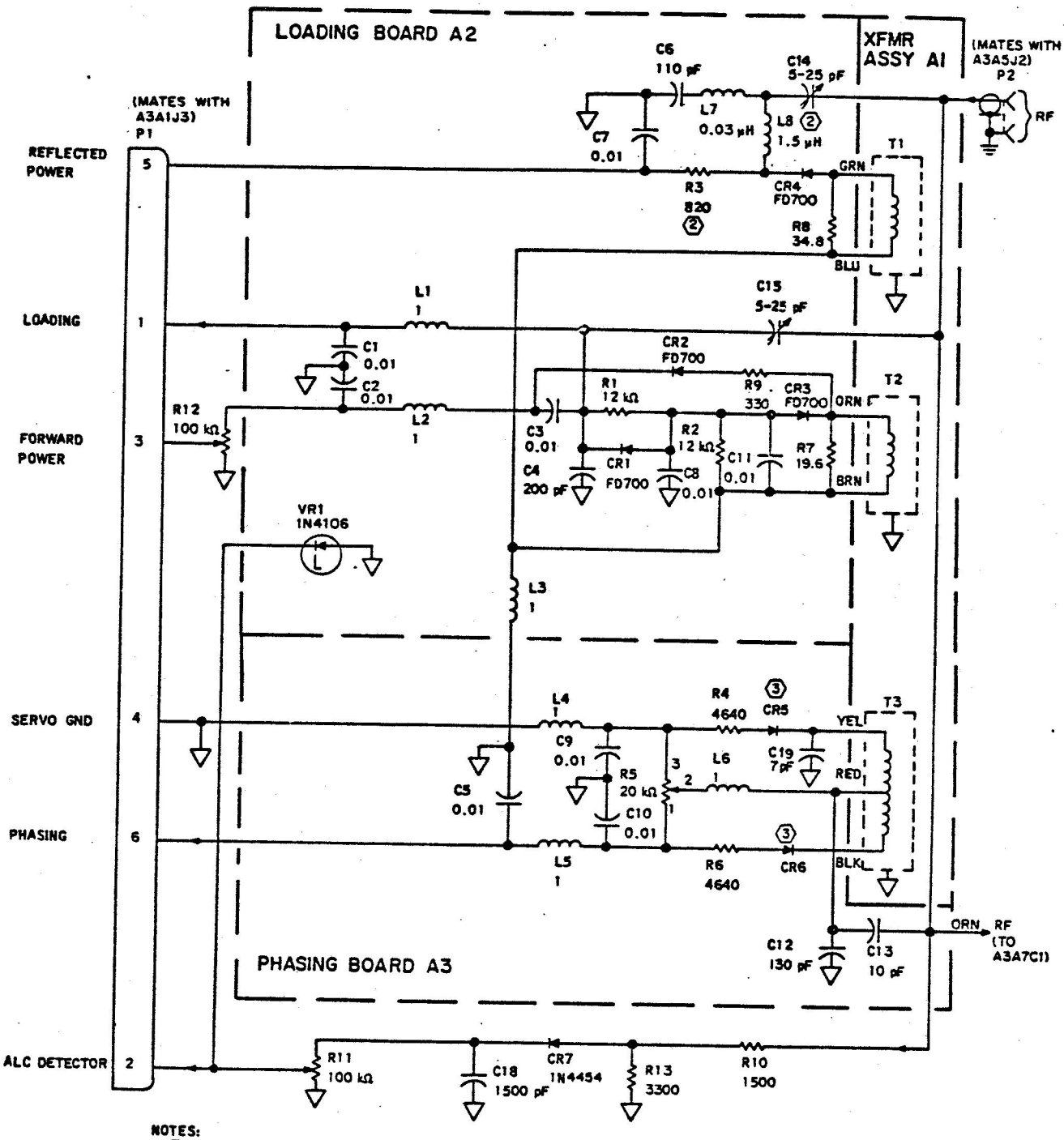
MATERIAL INFORMATION

The parts listed below are required to modify one 549A-2 (AM-5280/URC).

COLLINS PART NUMBER	QTY	UNIT PRICE	DESCRIPTION
372-2601-033	9		Pin
353-3591-080	1		Diode, zener, 1N4106, VR1
745-0718-000	2		Resistor, 150 Ω, R15, R16
745-0688-000	4		Resistor, 22 Ω, R3, R4, R7, R8
745-0687-000	4		Resistor, 20 Ω, R3, R4, R7, R8
745-0685-000	4		Resistor, 18 Ω, R3, R4, R7, R8
745-0682-000	4		Resistor, 15 Ω, R3, R4, R7, R8
745-0679-000	4		Resistor, 12 Ω, R3, R4, R7, R8
745-0676-000	4		Resistor, 10 Ω, R3, R4, R7, R8
745-3321-000	1		Resistor, 180 Ω, R8
745-3314-000	1		Resistor, 120 Ω, R8
745-3335-000	1		Resistor, 39 Ω, R8
745-3331-000	1		Resistor, 330 Ω, R8
745-3328-000	1		Resistor, 270 Ω, R8
745-3324-000	1		Resistor, 220 Ω, R8
745-3317-000	1		Resistor, 150 Ω, R8
745-3307-000	1		Resistor, 82 Ω, R8
280-3778-010	1		Chart, information



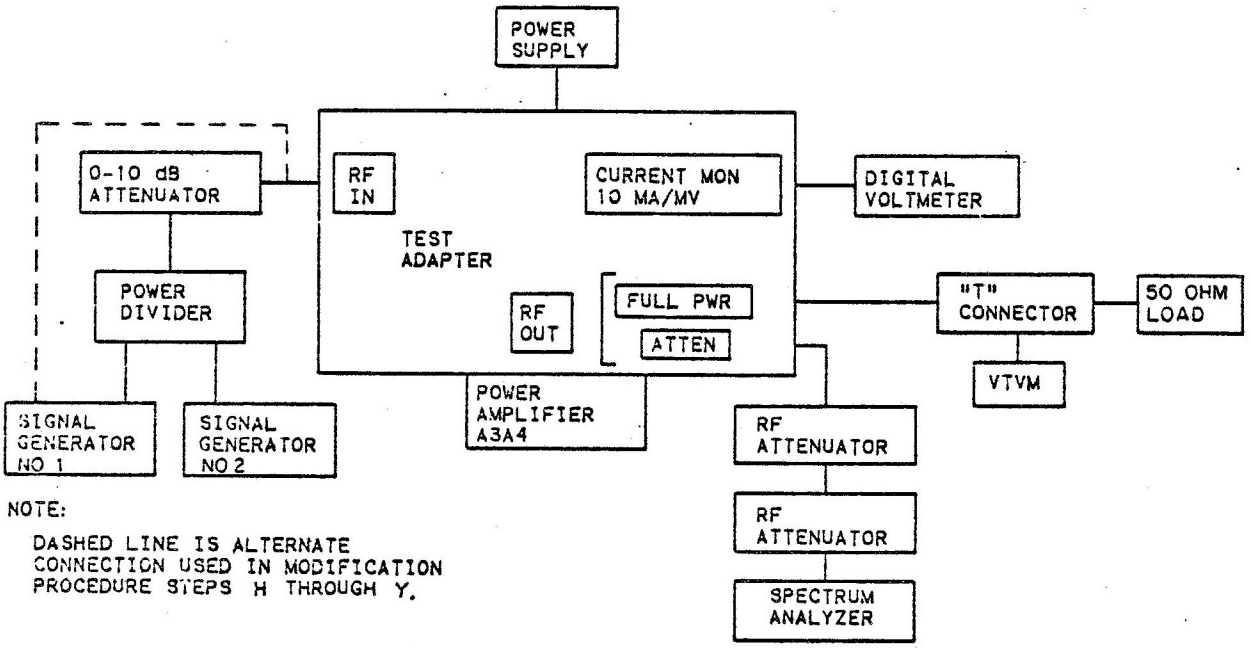
Loading Board A3A6A2
Figure 1



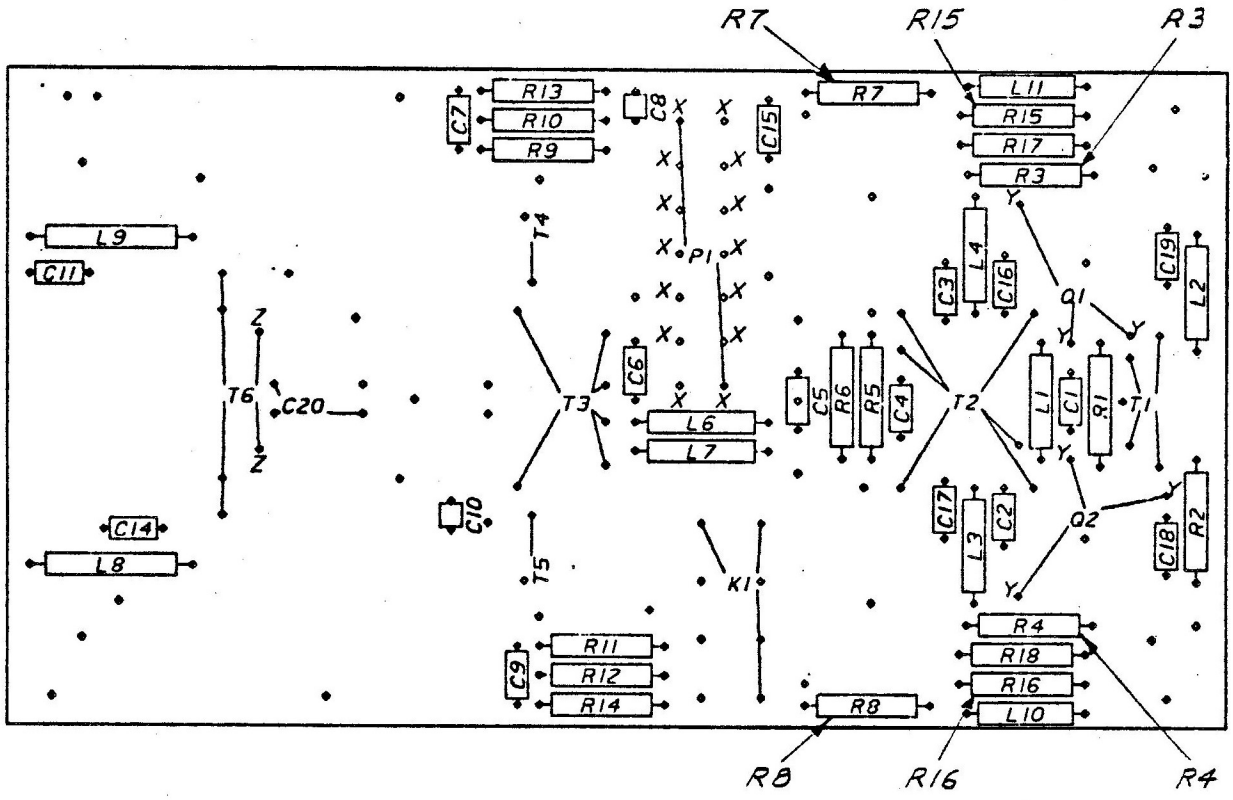
NOTES:
① UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS, AND INDUCTANCE VALUES ARE IN MILLIHENRYS.
② TEST SELECT. NOMINAL VALUE SHOWN.
③ CR5 AND CR6 ARE MATCHED PAIR. USE CPN 637-1960-001.

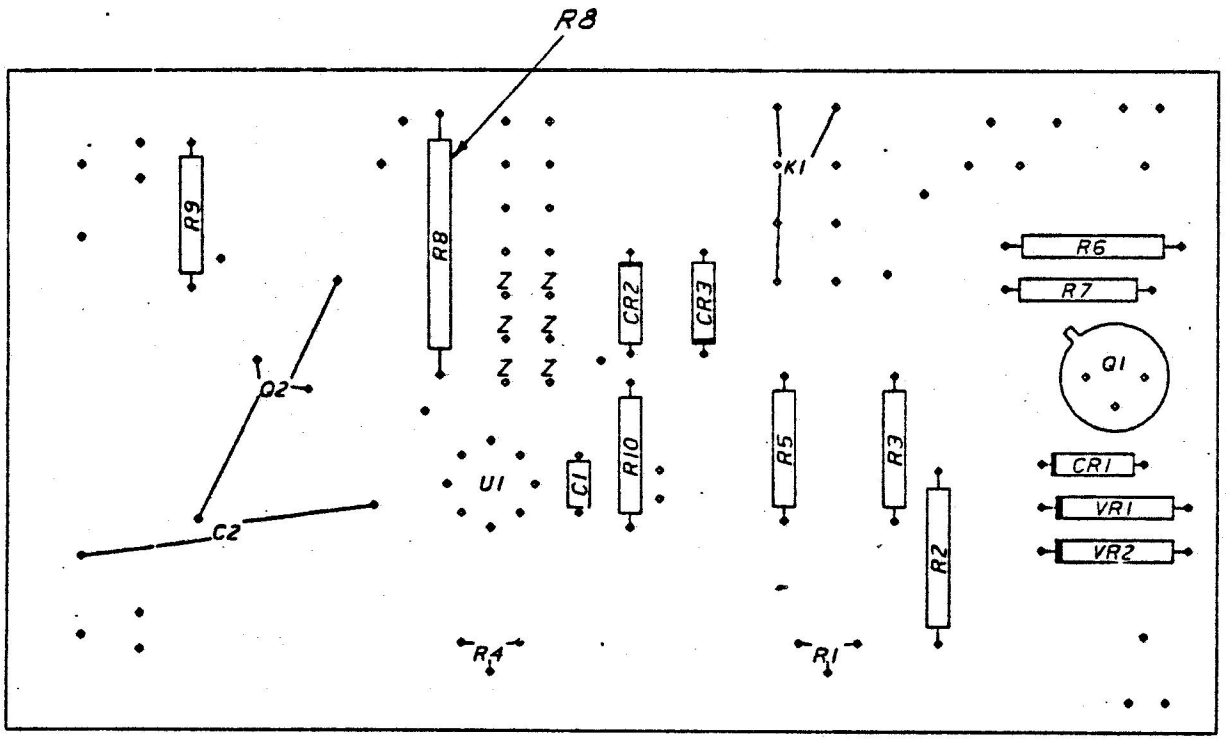
628-4265
TP4-4616-014

Discriminator A3A6, Schematic Diagram
Figure 2

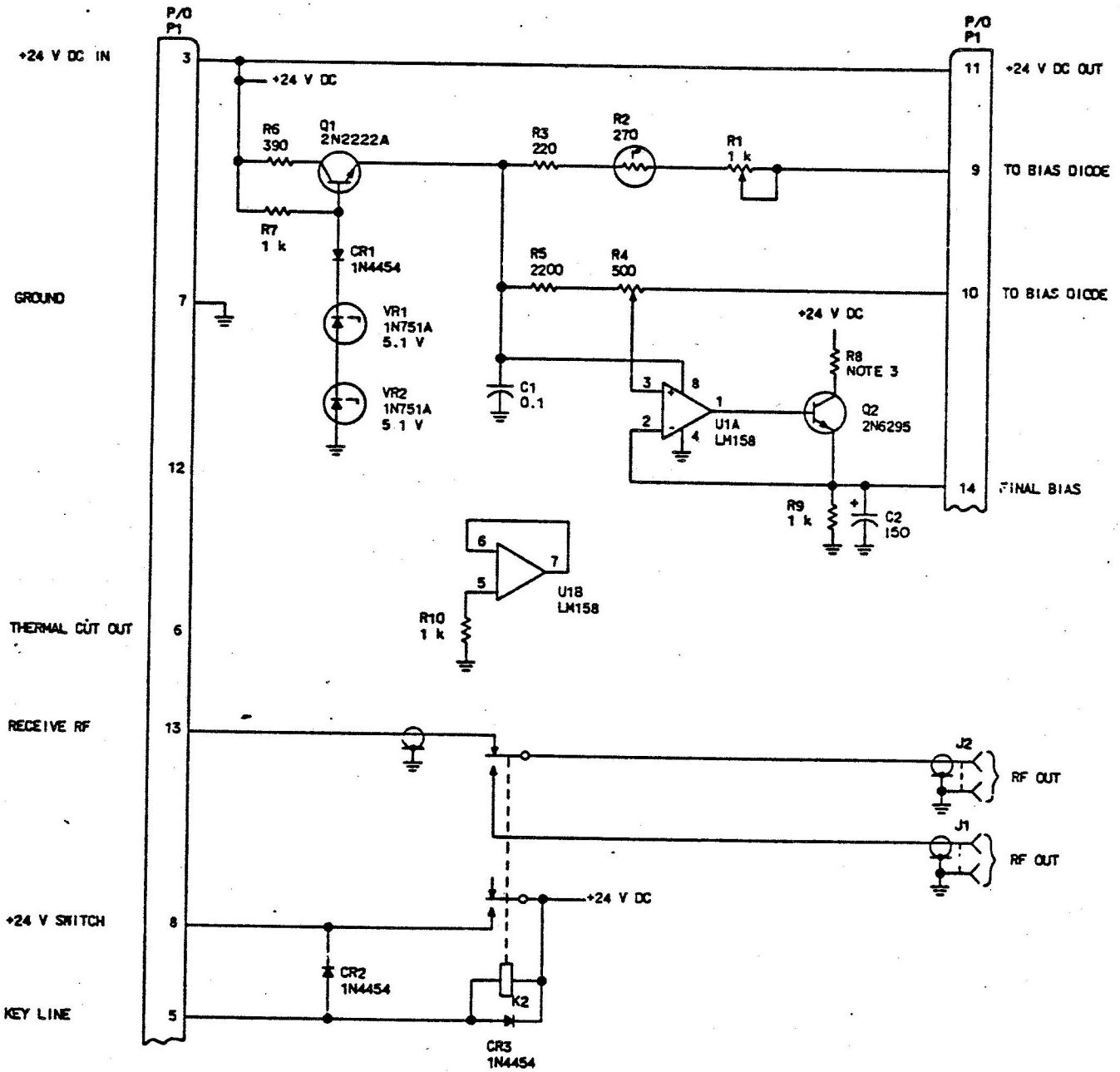


Test Setup Diagram
Figure 3





Bias/Control A3A4A2 (601-3675-002)
Figure 5



NOTES:

1. UNLESS OTHERWISE SPECIFIED; RESISTANCE VALUES ARE IN OHMS AND CAPACITANCE VALUES ARE IN MICROFARADS.
2. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATION, PREFIX WITH UNIT AND/OR ASSEMBLY DESIGNATION.
3. VALUE SELECTED DURING TEST.

634-6539

Bias/Control A3A4A2 (601-3675-002),
Schematic Diagram
Figure 6

I SERVICE BULLETIN

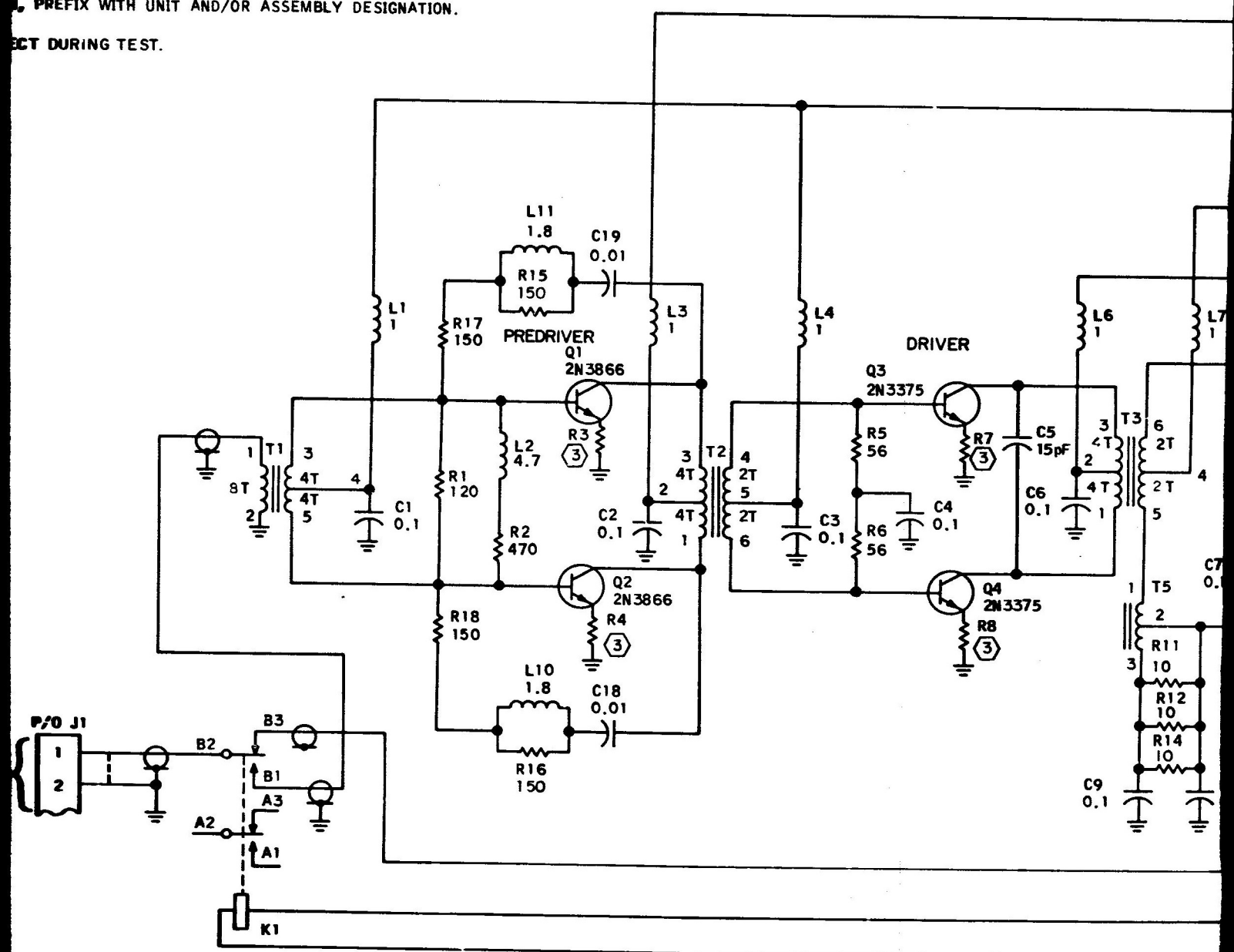
ecommunications Products Division/Rockwell International

ERWISE SPECIFIED, RESISTANCE VALUES ARE IN OHMS,
E VALUES ARE IN MICROFARADS, AND INDUCTANCE VALUES
HENRYS.

FERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE
, PREFIX WITH UNIT AND/OR ASSEMBLY DESIGNATION.

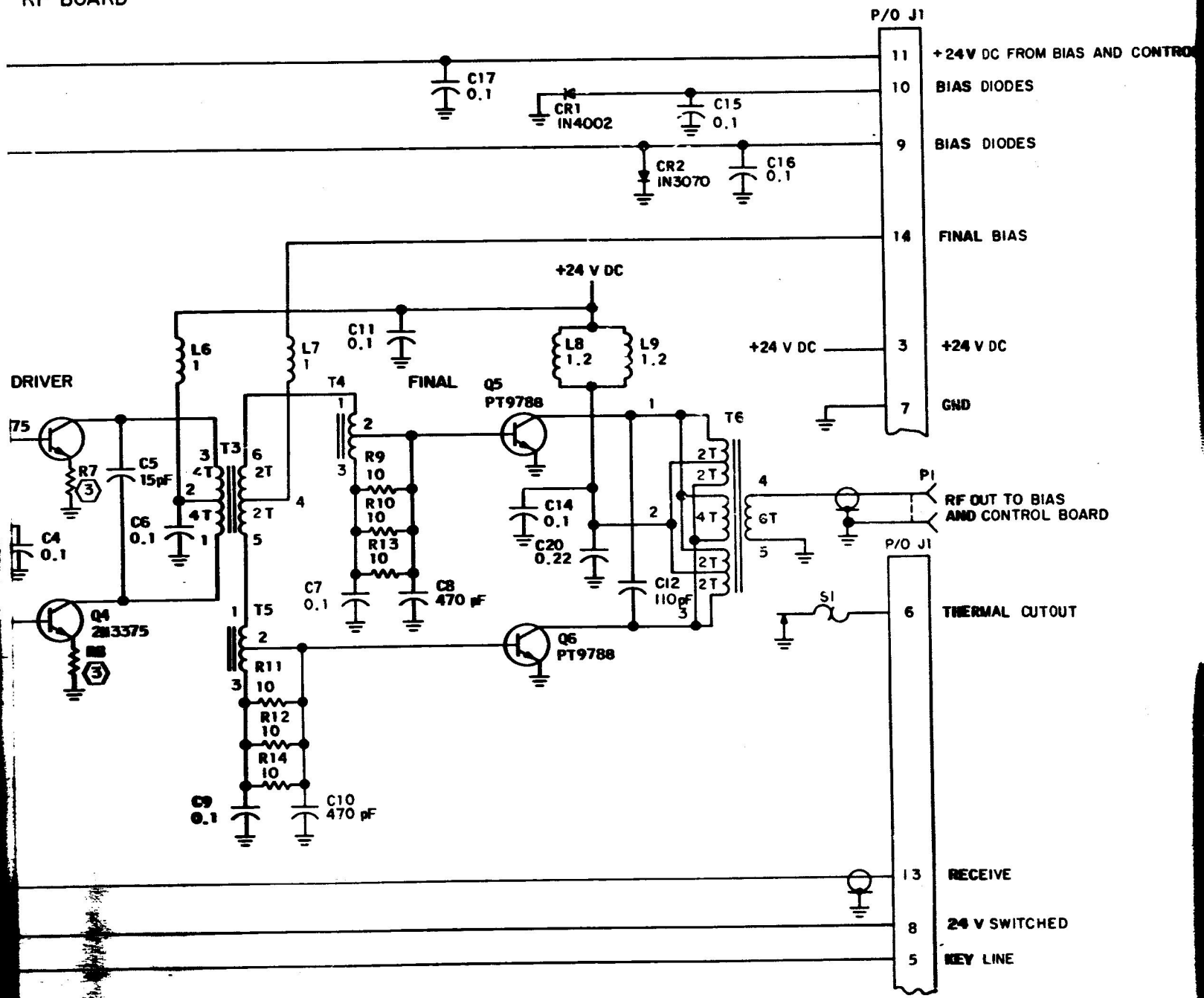
ECT DURING TEST.

RF BOARD



RF Subassembly A3A4A1 (601-3674-002), Schematic Diagram Figure 7

RF BOARD


P/O J1
11
+24V DC FROM BIAS AND CONTROL
10
BIAS DIODES
9
BIAS DIODES
14
FINAL BIAS
3
+24 V DC
7
GND
P1
RF OUT TO BIAS AND CONTROL BOARD
P/O J1
6
THERMAL CUTOUT
13
RECEIVE
8
24 V SWITCHED
5
KEY LINE
+24 V DC
DRIVER
FINAL
C17 0.1
CR1 IN4002
C15 0.1
CR2 IN3070
C16 0.1
C11 0.1
L6 1
L7 1
L8 1.2
L9 1.2
T3
T4
T5
T6
Q4 2N3375
Q5 PT9788
Q6 PT9788
R7
R8
R9 10
R10 10
R11 10
R12 10
R13 10
R14 10
C4 0.1
C5 15pF
C6 0.1
C7 0.1
C8 470 pF
C9 0.1
C10 470 pF
C12 110pF
C14 0.1
C20 0.22
S1
2T
4T
6T