RFA-1 FM RF AMPLIFIER
INSTRUCTION BOOK

BELAR ELECTRONICS LABORATORY, INC.
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WARRANTY AND ASSISTANCE

All Belar products are warranted against defects in materials and workmanship. This warranty applies for one year from the date of delivery, FOB factory or, in the case of certain major components listed in the instruction manual, for the specified period. Belar will repair or replace products which prove to be defective during the warranty period provided that they are returned to Belar prepaid. No other warranty is expressed or implied. Belar is not liable for consequential damages.

For any assistance, contact your Belar Sales Representative or Customer Engineering Service at the Belar factory.

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SECTION 1

GENERAL INFORMATION

1-1 GENERAL DESCRIPTION

The Belar RFA-1 FM RF amplifier is a sensitive, high gain, all silicon, solid state amplifier designed to meet the requirements of the broadcaster for off-air monitoring of both monaural and multiplexed FM transmitters in the 88-108 mHz band.

The RFA-1 utilizes an IF of 10.7 mHz with a phase linear bandwidth of 600 kHz to insure low distortion of a multiplexed signal. The IF skirt selectivity is such that an adjacent channel 800 kHz removed is 50 dB down.

1-2 PHYSICAL DESCRIPTION

The RFA-1 is constructed on a standard 3½" x 19" rack mount. The RELATIVE OUTPUT meter and POWER indicator are located on the front panel. The AC power input, RF input and output, and the POWER ADJUST control are located on the rear chassis.

The RFA-1 is completely solid state utilizing all silicon transistors and integrated circuits for long, trouble-free life. The individual circuits are constructed on military grade, glass epoxy, plated printed circuit boards. High reliability industrial and military grade components are used throughout.

1-3 ELECTRICAL DESCRIPTION

The RFA-1 is a solid state, sensitive, high gain RF amplifier consisting of an RF preamp, a balanced mixer, a 10.7 mHz IF strip, a balanced modulator, an RF postamp, and a crystal oscillator. It utilizes a 10.7 mHz IF in order to obtain the required adjacent channel reaction. In addition the IF has a wide phase linear bandwidth of 600 kHz in order not to degrade high frequency stereo separation.

The dynamic range of the amplifier is such that no adjustments are necessary over an input range of 100 uV to over 0.5V (approx. 70 dB).

A POWER ADJUST control is provided that will vary the output level from approximately 0.2 to 1 W. A front panel meter indicates the relative RF output level. Although the amplifier is primarily designed to drive the Belar FMM-1 or FMM-2 monitors, the available output level is sufficient to drive most currently available monitors.

1-4 ELECTRICAL SPECIFICATIONS

RF Input Sensitivity.....100 uv for full output

RF Input Impedance.....50-75 ohms, BNC connector

RF Frequency Range.....88-108 mHz

Adjacent Channel Rejection
(800 kHz removed).....50 dB

Phase Linear Bandwidth.....600 kHz

Dynamic Range.....100 uv to 0.5 v (70 dB)

Image Rejection.....more than 60 dB

IF Rejection.....more than 90 dB

L.O. Radiation.....less than -80 dBm

RF Power Output.....0.2 to 1 watt

RF Output Impedance.....50 ohms

Signal to Noise Ration.....100 uv input: 75-80 dB
1 mv input: 85-90 dB

Power Consumption.....5 watts, 117 VAC (234 VAC opt) 50/60 Hz

1-5 MECHANICAL SPECIFICATIONS

Dimensions.....3½"H x 19"W x 11 7/8"D (EIA Rack Mount)

Net Weight.....7 lbs

Shipping Weight.....12 lbs

1-6 INSTRUMENT IDENTIFICATION

The instrument is identified by the model number and a six digit serial number. The model number and serial number appear on a plated located on the rear panel. All correspondence to your Belar representative or to the Belar factory in regard to the instrument should reference the model number and complete serial number.

1-7 ACCESSORIES

The Model MJ-10 series Belar Yagi Antennas are 6 element gamma matched receiving antennas intended for use with Belar FM RF Amplifiers. The MJ-10 antenna gain is 9 dB, with a 14 dB front to back ratio. The antenna is collapsible and provided with a built-in 75 ohm connector and matching F-59 connector with weather boot.

MODEL	BANDWIDTH
MJ-10L1	88 - 94 mHz
MJ-10L2	94 - 98 mHz
MJ-10H1	98 - 104 mHz
MJ-10H2	104 - 108 mHz

SECTION 2

INSTALLATION

2-1 INITIAL INSPECTION

Check the shipping carton for external damage. If the carton exhibits evidence of abuse in handling (holes, broken corners, etc.), ask the carrier's agent to be present when the unit is unpacked. Carefully unpack the unit to avoid damaging the equipment through use of careless procedures. Inspect all equipment for physical damage immediately after unpacking. Bent or broken parts, dents and scratches should be noted.

If damage is found, refer to paragraph 2-2 for the recommended claim procedure. Keep all packing material for proof of damage claim or for possible future shipping use.

2-2 CLAIMS

If the unit has been damaged, notify the carrier immediately. File a claim with carrier or transportation company and advise Belar of such action to arrange the repair or replacement of the unit without waiting for a claim to be settled with the carrier.

DO NOT RETURN DAMAGED MONITOR TO BELAR UNTIL CARRIER HAS INSPECTED AT PLACE OF DIRECT DELIVERY. DO NOT SHIP MONITOR TO CARRIER TO INSPECT, THIS COULD LEAD TO FURTHER DAMAGE TO THE MONITOR.

2-3 REPACKING FOR SHIPMENT

If the unit is to be returned to Belar, attach a label to the outside showing owner and owner's address. Also, include a letter stating what the problem is, or what you need done. This letter should contain owner's name, street address, telephone number and a contact to arrange for return delivery.

The original shipping carton and packaging material should be used for reshipment. However, if they are not available or reusable, either arrange for new packing from Belar or repackage the unit in the following manner:

1. Use a double-walled carton with a minimum test strength of 275 lbs.

2. Use heavy paper or sheets of cardboard to protect all surfaces.

3. Use at least 4" of tightly packed, industry approved, shock absorbing material such as extra firm polyurethane foam or rubberized hair. NEWSPAPER IN NOT SUFFICIENT FOR CUSHIONING

MATERIAL.

4. Use heavy duty shipping tape to secure the outside of the carton.

5. Use large FRAGILE labels on each surface.

6. Return the unit freight prepaid. Be sure to insure for full replacement value.

2-4 PREPARATION FOR USE

The RFA-1 RF Amplifier is designed to be mounted in a standard 19" rack mount. The unit should be mounted either immediately below or above the FMM-1 or FMM-2 monitor. This is so the RF output cable many be kept as short as possible and dressed away from the RF input cable. When the unit is mounted above high heat generation equipment, such as vacuum tube power supplies, consideration should be given to cooling requirements which allow free movement of cooler air around the RFA-1. In no instance should the ambient chassis temperature be allowed to exceed 50°C (122°F). Mount the RFA-1 to the rack mount using four No. 10 screws and four No. 10 countersunk finishing washers.

The RFA-1 is factory wired for 117V single phase operation. For use on 234V, modify T1 primary wiring as shown on the CHASSIS WIRING drawing.

Connect a 50 ohm coaxial cable between the RF output connector, J2, at the rear of the chassis and the RF input connector of the FMM-1 or FMM-2 monitor. Connect the antenna cable to the RF input connector, J1, at the rear of the chassis.

SECTION 3

OPERATION

3-1 INITIAL OPERATION

The following procedures should be followed for placing the unit into initial operation. Refer to the FRONT PANEL INDICATORS AND REAR CONNECTIONS AND ADJUSTMENT drawing for control locations.

1. Turn the POWER ADJUST control fully counterclockwise.

2. Connect to 117 VAC 50/60 Hz power source. Button will light indicating power is on.

3. Turn POWER ADJUST control clockwise. Note that the RELATIVE OUTPUT meter moves upscale.

NOTE: DO NOT OPERATE THE RFA-1FOR PROLONGED PERIODS WITHOUT A 50 OHM LOAD CONNECTED TO J2. TO DO SO WILL CAUSE EXCESSIVE DISSIPATION AND POSSIBLE FAILURE TO THE OUTPUT TRANSISTOR.

3-2 NORMAL OPERATION

For normal operation, leave the POWER ADJUST control turned down to minimum output necessary to reliably operate the monitoring equipment.

Because of the large dynamic range of the amplifier, no other controls are necessary. The amplifier limits at 100 uV and any signal above this level will insure proper operation.

SECTION 4

PRINCIPLES OF OPERATION

4-1 OVERALL CIRCUIT DESCRIPTION

The incoming RF signal is applied to the RF preamp A1Q1, where it is amplified and applied to the Balanced mixer, A2IC1. Here the signal is mixed with the output of the crystal oscillator, A2Q1, which is 10.7 mHz above the signal frequency. The 10.7 mHz signal which results is then applied to the IF strip consisting of A1T1, A3IC1, A3T1, A3IC2 and A3T2. The IF output along with the buffered local oscillator signal from A2Q2 is applied to the Balanced Ring Modulator consisting of A3T3, A3T4 and A3CR1 thru A3CR4. The output of the Balanced Modulator is a DSB suppressed carrier signal in which the lower sideband is the original RF carrier frequency. Since the same local oscillator is used to down-convert and up-convert, any frequency error in the local oscillator will cancel. Therefore, the LSB will be exactly the same as the input RF carrier frequency. However, the local oscillator must be stable enough to keep the signal centered in the IF passband to prevent non-linear phase distortion. The DSB signal from the Balanced Modulator is applied to the LSB filter amplifier consisting of A3Q1, A3L1 and A3L2. This amplifier passes the LSB while rejecting the residual carrier and USB. The output of the LSB filter is then applied to driver A4Q1 and power amplifier A4Q2 which raises the level to the required 1 W output. The RELATIVE OUTPUT Meter indicates the relative RF power level. The power supply provides unregulated plus and minus 20 VDC to the A2 and A4 Cards and Zener regulated plus and minus 6.2 VDC to the A1 and A3 Cards.

4-2 A1 BOARD DESCRIPTION - RF PREAMP AND BALANCED MIXER

The incoming RF is applied to the emitter of A1Q1 through the tuned circuit consisting of A1L1, A1C1 and A1C2. The signal is amplified by A1Q1 and applied in push-pull to the inputs (pins 1&7) of balanced mixer A1IC1 through the two mutually coupled tuned circuits A1L2, A1C3, A1L3 and A1C4. The balanced mixer is used because of its greatly reduced susceptibility to spurious responses. The three tuned circuits ahead of the mixer contribute more than 60 dB image rejection to the amplifier. The local oscillator signal is brought into the mixer on pin 3. The output of the mixer is applied to the first IF transformer A1T1 which is tuned to 10.7 mHz.

4-3 A2 BOARD DESCRIPTION - CRYSTAL OSCILLATOR AND BUFFER

Transistor A2Q1 and associated circuitry from a crystal overtone oscillator that operates directly 10.7 mHz above the RF carrier (98.7-118.7 mHz). This is to reduce the possibility of spurious responses caused by multiplication. Tuned circuit A2L1, A2C1 forces the crystal to operate in the proper overtone mode. The low level oscillator signal to the balanced mixer on the A1 card is obtained by tapping

down on the oscillator tank coil A2L1. Transistor A2Q2 and associated circuitry form a buffer amplifier. The output of this circuit is high level (1 V across 30 ohms) signal to drive the balanced ring modulator on the A3 card.

4-4 A3 BOARD DESCRIPTION - IF AMP, BALANCED RING MOD & LSB FILTER

The 10.7 mHz IF signal from the A1 card is applied to the IF strip consisting of A3IC1, A3T1, A3IC2 and A3T2. Since the IC inputs (pins 1 & 7) are both at DC ground, the zero-axis crossing is accurately preserved during limiting. The IF transformers are critically coupled (k=1.0) and have a phase linear bandwidth of 600 kHz. These design features insure that there will be no distortion introduced into the signal regardless of input signal level. The IF skirt selectivity is such that an interfering signal 800 kHz removed is 50 dB down. The IF output signal is coupled via a link on the output IF transformer to the Balanced Ring Modulator consisting of A3T3, A3T4 and A3CR1 thru A3CR4. The high level local oscillator signal is also applied to the Balanced Modulator. The action of a ring modulator is such that it requires both inputs to unbalance the bridge and cause an output. This output is in the form of a double side band suppressed carrier signal. In the RFA-1 the lower sideband (operating frequency -10.7) is the exact frequency as the RF input. Because the same local oscillator is used to down-convert and up-convert, any shift in local oscillator frequency is cancelled.

The output of the Balanced Ring Modulator is applied to the base of A3Q1. This transistor and tuned circuits A3L1, A3C11 and A3L3, A3C12 and A3C13 form a lower sideband filter which rejects the upper sideband and residual carrier output of the ring modulator.

4-5 A4 BOARD DESCRIPTION - RF DRIVER

The RF output of the A3 Card is coupled via A4C9 to the emitter of A4Q1. This transistor and associated circuitry form a driver amplifier capable of supplying the power required to drive A4Q2. A4Q2 is a class C power amplifier capable of supplying approximately 1 W output. A4L3, A4L4, A4C5 and A4C6 provide the tank circuit and the required impedance matching between the load and A4Q2's collector. The collector current for A4Q2 is supplied thru the POWER ADJUST pot located on the rear of the chassis. Diode A4CR1 and associated circuitry form an RF level detector which drives the RELATIVE OUTPUT meter on the front panel A5 CARD-POWER SUPPLY.

4-6 A5 BOARD DESCRIPTION - POWER AMPLIFIER

The POWER supply uses two conventional full wave center-tapped rectifiers. A5CR1 and A5CR3 provide +20 VDC and A5CR2 and A5CR4 provide -20 VDC. Filtering is provided by C1 and C2 located on the main chassis. Zener diodes A5CR5 and A5CR6 prevent high level transients that may damage components. A5R1 and A5CR7 form a regulator which supplies +6.2 VDC to the A1 and A3 Cards. A5R2 and A5CR8 form a regulator which supplies -6.2 VDC to the A1 and A3 Cards.

SECTION 5

RFA-1 PARTS LIST

MAIN CHASSIS

Reference Designation	Description	Part Number
A1	RF PREAMPLIFIER CARD ASS'Y	Belar
A2	CRYSTAL OSCILLATOR CARD ASS'Y	Belar
A3	IF AMP, BALANCED RING MOD CARD ASS'Y	Belar
A4	RF DRIVER & POWER AMP CARD ASS'Y	Belar
A5	POWER SUPPLY CARD ASS'Y	Belar
C1,C2	C: FIXED ELECT 1000uF 50V	0180-0002
C3,C4	C: FIXED CERAMIC 0.01uF 1kV	0151-0004
C5 thru C10	C: FIXED CERAMIC 0.001uF 1kV	0151-0002
DS1	LAMP: INCANDESCENT 28V @ 40 MA	2140-0003
F1	FUSE: CARTRIDGE ¼ A @ 250V	2110-0002
J1,J2	JACK: RF BNC	0360-0005
J3	JACK: POWER AC	0360-0004
L1,L2	INDUCTOR: RFC FERRITE	Belar
M1	METER: RELATIVE OUTPUT	1120-0008
R1	R: VAR WW 500 ohms 10% 2W	2100-0001
R2	R: FIXED COMP 1.2k 5% ½W	
RV1	VARISTOR: METAL OXIDE	Belar
T1	TRANSFORMER: POWER	9100-0004
XDS1	SOCKET: LAMP	1450-0004
XF1	FUSEHOLDER	2110-0003

REPLACEABLE PARTS

This section contains information for ordering replaceable parts for the monitor. The table lists the parts in alphanumerical order of their reference designations and provides a description of the part with the manufacturers' number and the Belar part number. Those parts with only a Belar part number should be obtained directly from Belar.

ORDERING INFORMATION

To order a replacement part from Belar, address the order or inquiry to Belar and supply the following information:

a. Model number and serial number of unit.

b. Description of part including the reference designation and location.

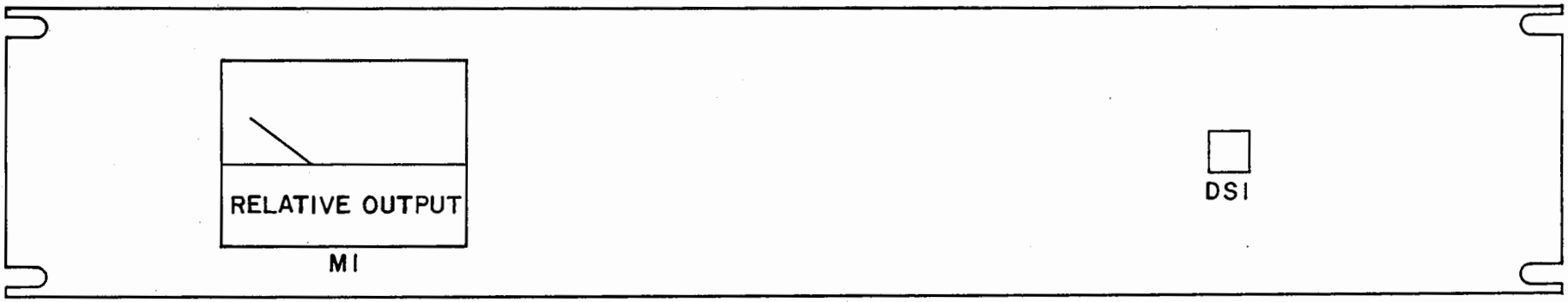
To order a part from a manufacturer other than Belar, provide the complete part description and the manufacturer's part number from the table.

REFERENCE DESIGNATORS

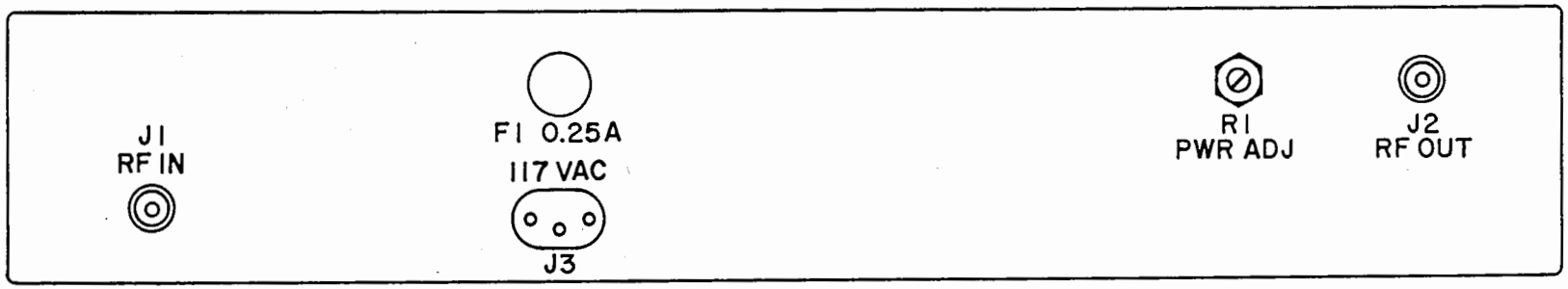
A	= assembly	J	= jack	S	= switch
C	= capacitor	L	= inductor	T	= transistor
DS	= device signaling (lamp)	P	= plug	W	= cable
F	= fuse	Q	= transistor	X	= oven
FL	= filter	R	= resistor	Y	= crystal

ABBREVIATIONS

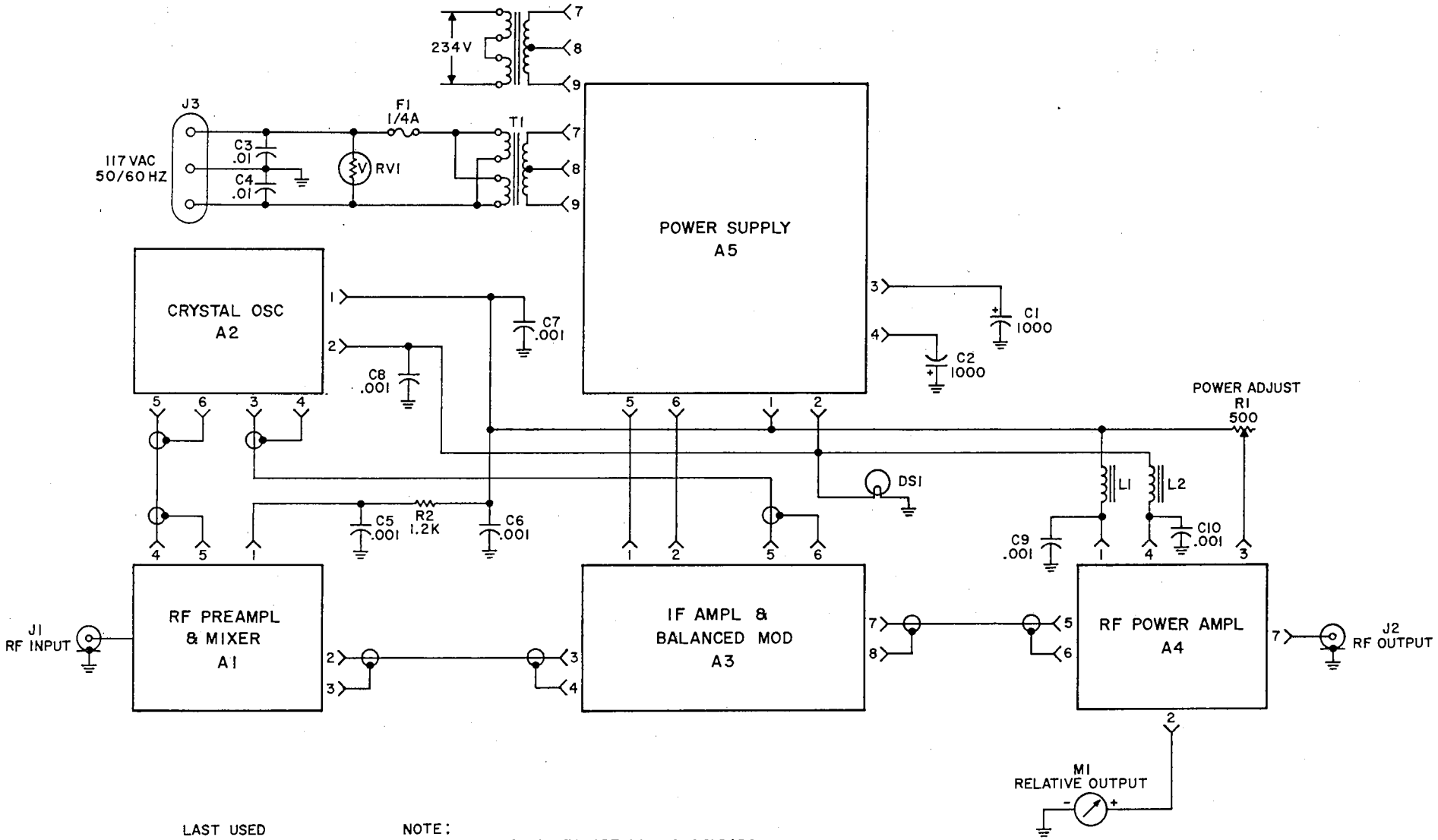
CER	= ceramic	COMP	= composition
CONN	= connector	ELEC	= electrolytic
F	= farads	FXD	= fixed
GE	= germanium	K	= kilo = 1000
MEG	= meg	METFLM	= metal film
MY	= mylar	PC	= printed circuits
PIV	= peak inverse voltage	POT	= potentiometer
POLY	= polystyrene	PORC	= porcelain
SEMICON	= semiconductor	SI	= silicon
U	= micro	VDCW	= dc working volts
W	= watts	WW	= wirewound



RFA-1 FRONT PANEL INDICATORS



RFA-1 REAR CHASSIS CONNECTORS & ADJUSTMENT



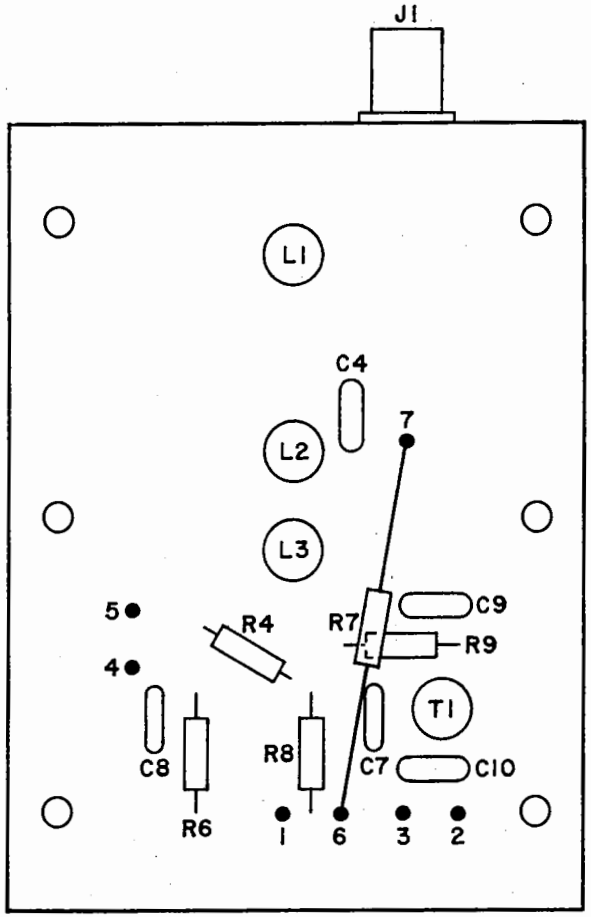
LAST USED
C10
DS1
F1
J3
L2
M1
R2
RV1
T1

NOTE:
CAPACITANCE VALUES ARE IN MICROFARADS.
RESISTANCE VALUES ARE IN OHMS.

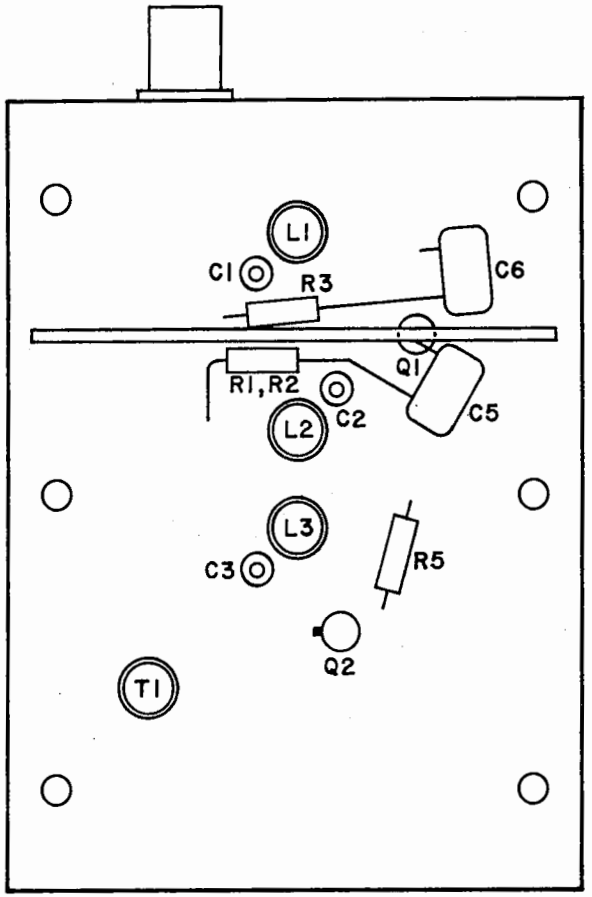
CHASSIS WIRING, RFA-1

A1 BOARD - RF PREAMPLIFIER

Reference Designation	Description	Part Number
C1 thru C3	C: FIXED CERAMIC 22pF 2%	0140-2205
C4 thru C6	C: FIXED MICA 500pF 5% 500V	0140-5015
C7,C8	C: FIXED CERAMIC 0.001uF 1kV	0151-0002
C9	C: FIXED MICA 180pF 5% 500V	0140-1815
C10	C: FIXED MICA 150pF 5% 500V	0140-1515
J1	CONNECTOR: RF BNC	0360-0005
L1	INDUCTOR: VAR, RF INPUT	Belar
L2	INDUCTOR: VAR, RF COLLECTOR	Belar
L3	INDUCTOR: VAR, MIXER INPUT	Belar
Q1,Q2	TRANISTOR: FET	1850-0026
R1	RESISTOR: FIXED COMP 220k 5% ½W	0686-2245
R2	RESISTOR: FIXED COMP 22k 5% ½W	0686-2235
R3	RESISTOR: FIXED COMP 180 ohms 5% ½W	0686-1815
R4	RESISTOR: FIXED COMP 150k 5% ½W	0686-1545
R5	RESISTOR: FIXED COMP 15k 5% ½W	0686-1535
R6	RESISTOR: FIXED COMP 180 ohms 5% ½W	0686-1815
R7	RESISTOR: FIXED COMP 100 ohms 5% ½W	0686-1015
R8	RESISTOR: FIXED COMP 150 ohms 5% ½W	0686-1515
R9	RESISTOR: FIXED COMP 2.2k 5% ½W	0686-2225
T1	TRANSFORMER: IF INPUT	Belar

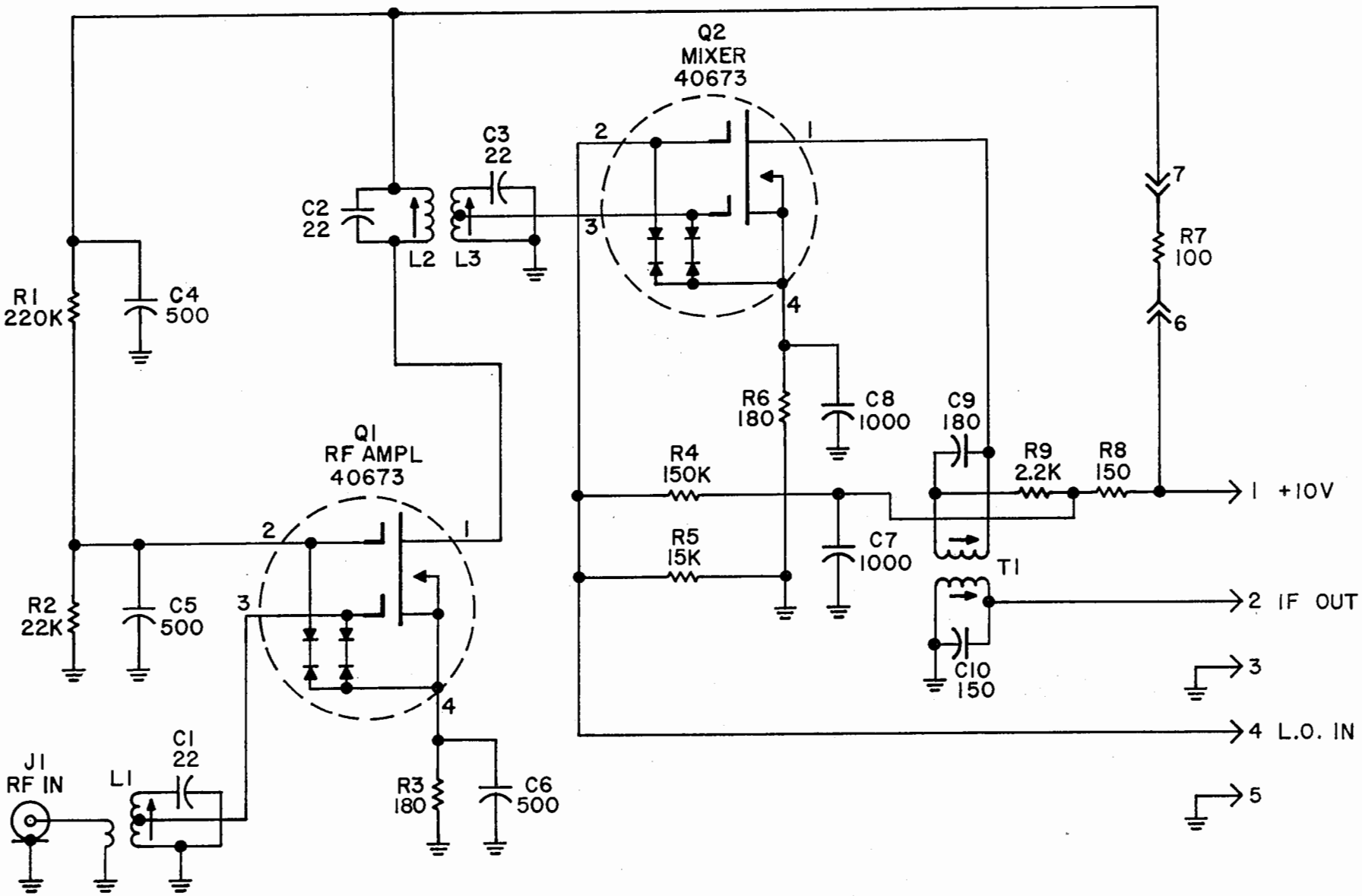


COMPONENT SIDE



SOLDER SIDE

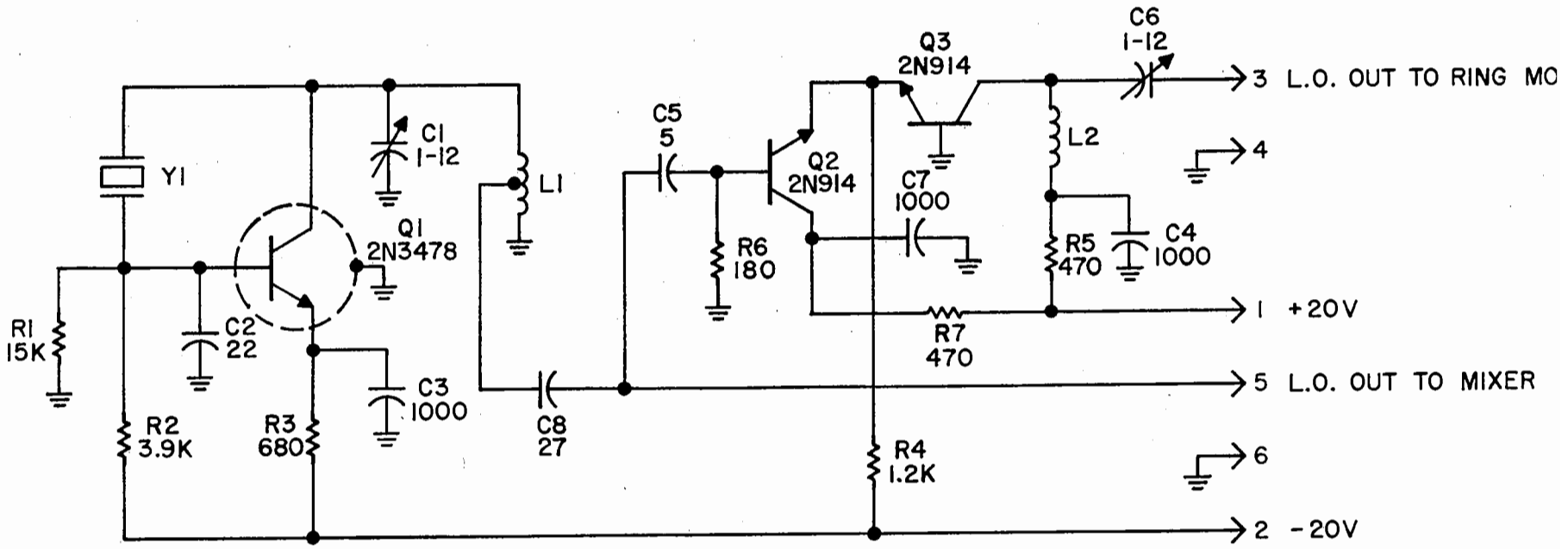
RF PREAMPLIFIER COMPONENTS - AI CARD



LAST USED
C10
J1
L3
Q2
R9
T1

NOTES:
RESISTANCE VALUES ARE IN OHMS.
CAPACITANCE VALUES ARE IN PICOFARADS.

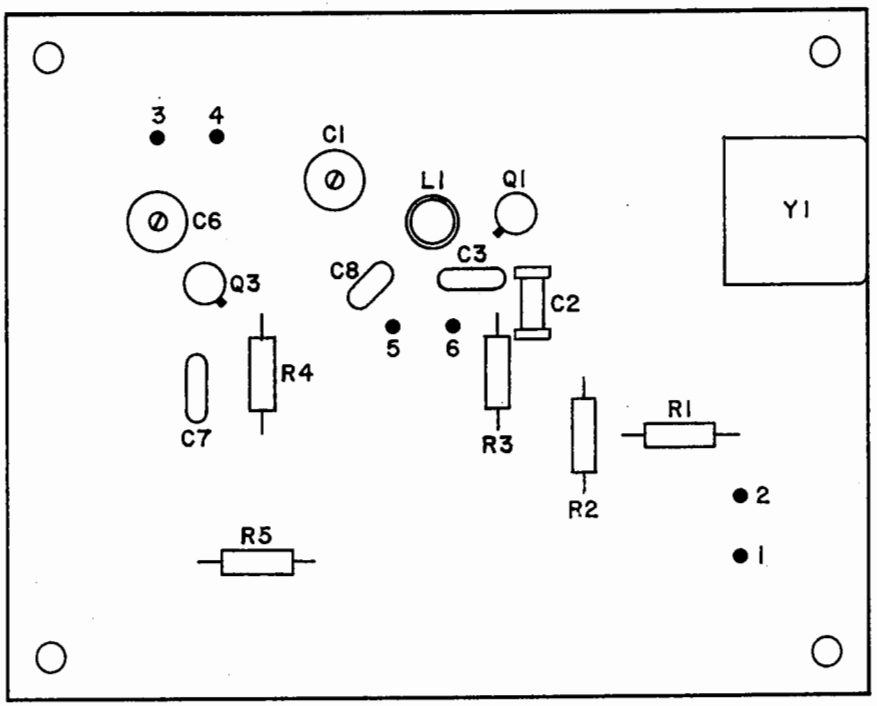
RF PREAMPLIFIER BOARD,
A1 - RFA-1



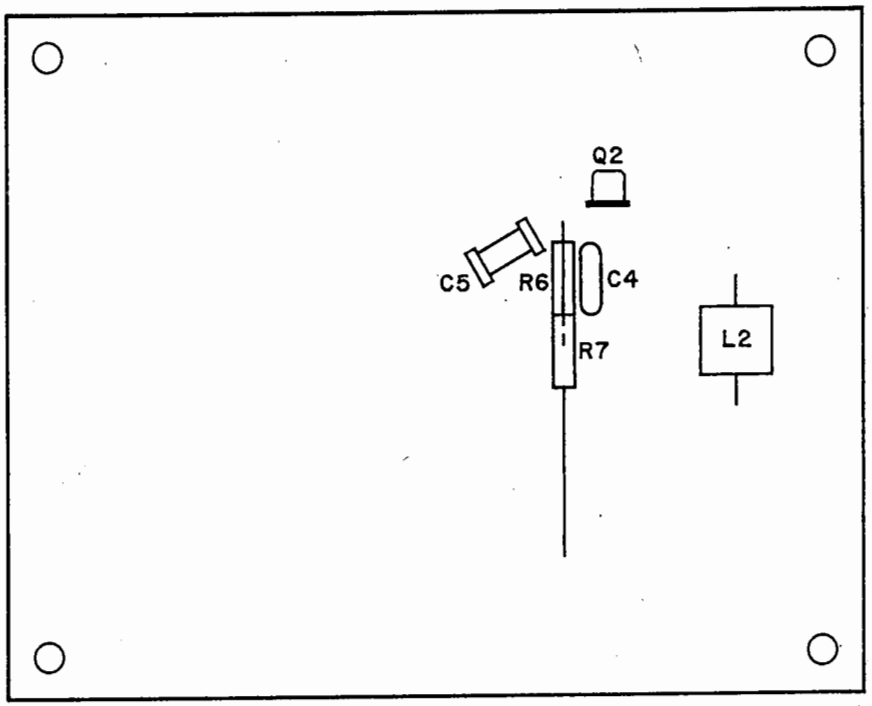
LAST USED
C8
L2
Q3
R7
Y1

NOTES:
RESISTANCE VALUES ARE IN OHMS.
CAPACITANCE VALUES ARE IN PICOFARADS.

CRYSTAL OSCILLATOR BOARD,
A2 - RFA - 1



COMPONENT SIDE

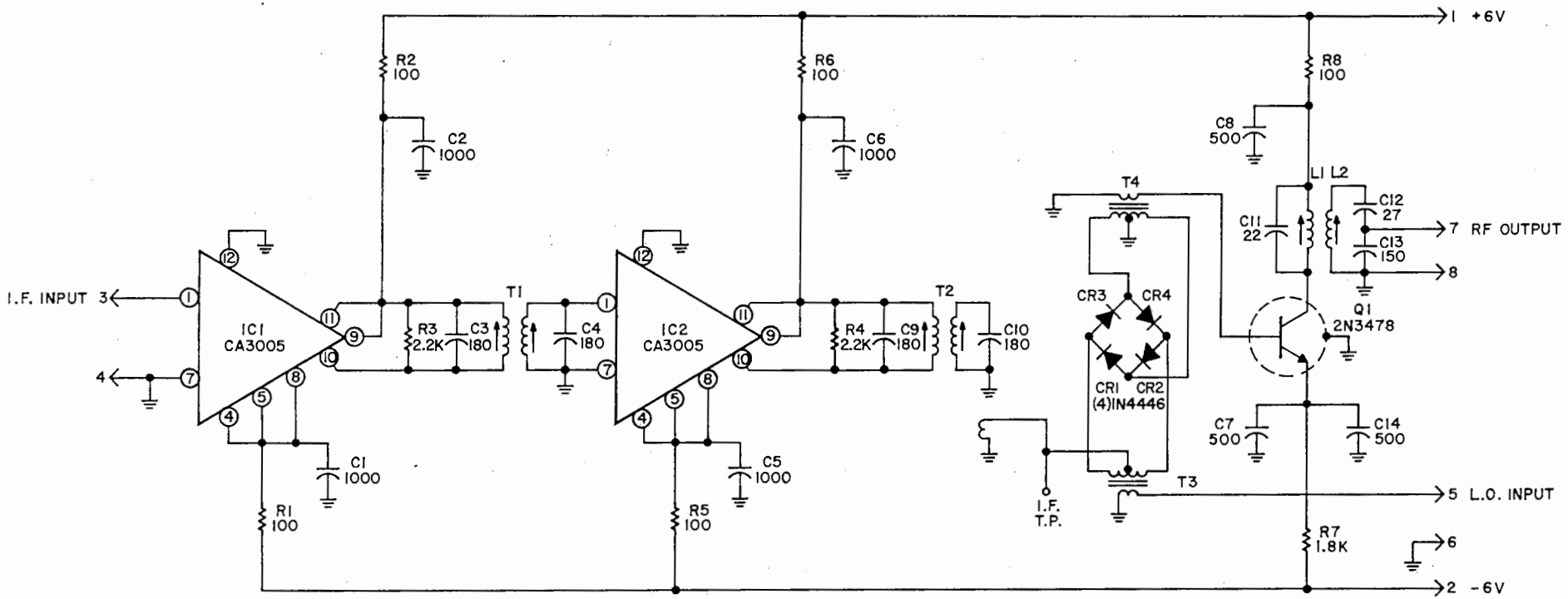


SOLDER SIDE

CRYSTAL OSCILLATOR COMPONENTS - A2 CARD

A2 BOARD - CRYSTAL OSCILLATOR

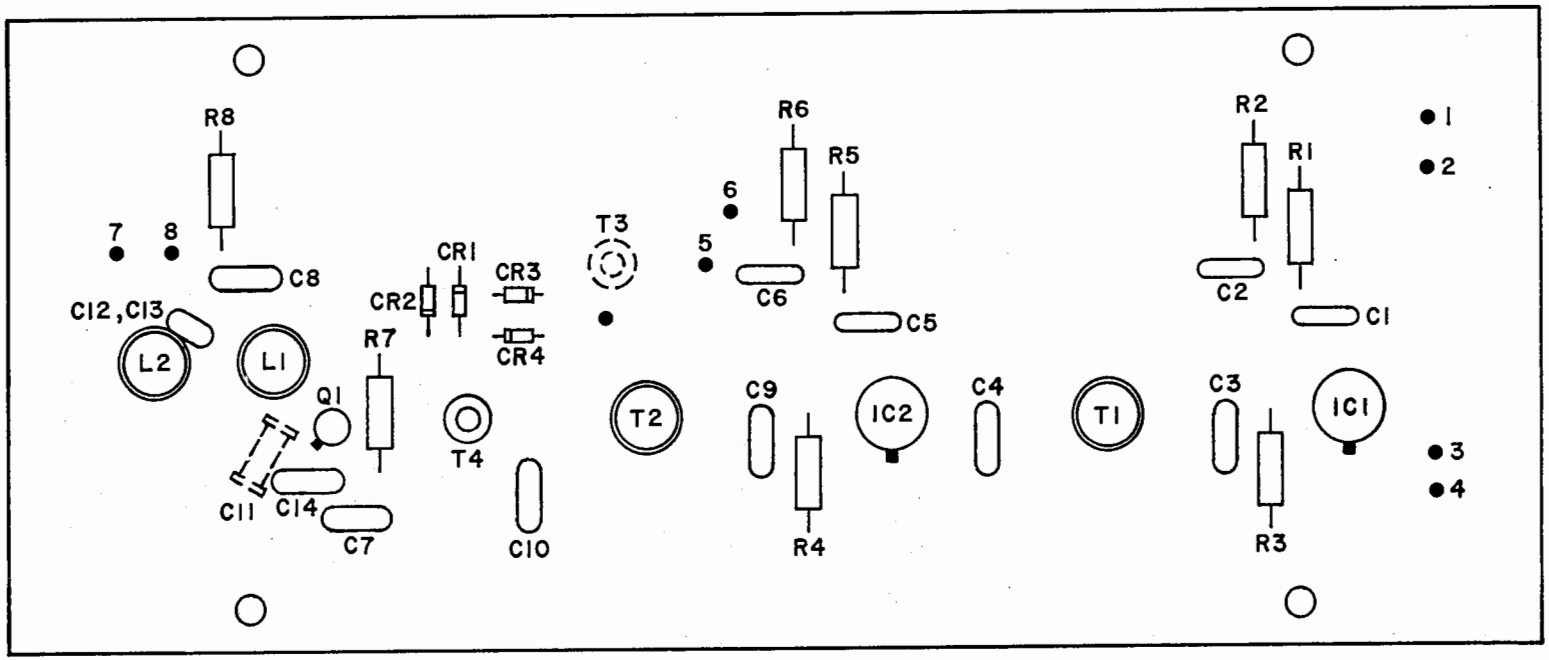
Reference Designation	Description	Part Number
C1	C: VAR MICA 1-12pF	0121-0005
C2	C: FIXED CERAMIC 22pF 2%	0140-2205
C3,C4	C: FIXED CERAMIC 0.001uF 1kV	0151-0002
C5	C: FIXED CERAMIC 5pF 2%	0155-0001
C6	C: VAR MICA 1-12pF	0121-0005
C7	C: FIXED CERAMIC 0.001uF 1kV	0151-0002
C8	C: FIXED MICA 27pF 5% 500V	0140-2705
L1	INDUCTOR: VARIABLE, OSCILLATOR	Belar
L2	INDUCTOR: FIXED OSCILLATOR DRIVER	Belar
Q1	TRANSISTOR: 2N3478	1850-0010
Q2,Q3	TRANSISTOR: 2N914	1850-0006
R1	RESISTOR: FIXED COMP 15k 5% ½W	0686-1535
R2	RESISTOR: FIXED COMP 3.9k 5% ½W	0686-3925
R3	RESISTOR: FIXED COMP 680 ohms 5% ½W	0686-6815
R4	RESISTOR: FIXED COMP 1.2k 5% ½W	0686-1225
R5	RESISTOR: FIXED COMP 470 ohms 5% ½W	0686-4715
R6	RESISTOR: FIXED COMP 180 ohms 5% ½W	0686-1815
Y1	CRYSTAL: FREQ, CARRIER FREQ. PLUS 10.7 mHz (Order by Frequency)	
XY1	SOCKET: CRYSTAL	1200-0004



LAST USED
C14
CR4
IC2
L2
Q1
R8
T4

NOTES:
RESISTANCE VALUES ARE IN OHMS.
CAPACITANCE VALUES ARE IN PICOFARADS.

I.F. AMPLIFIER BOARD,
A3 - RFA-1

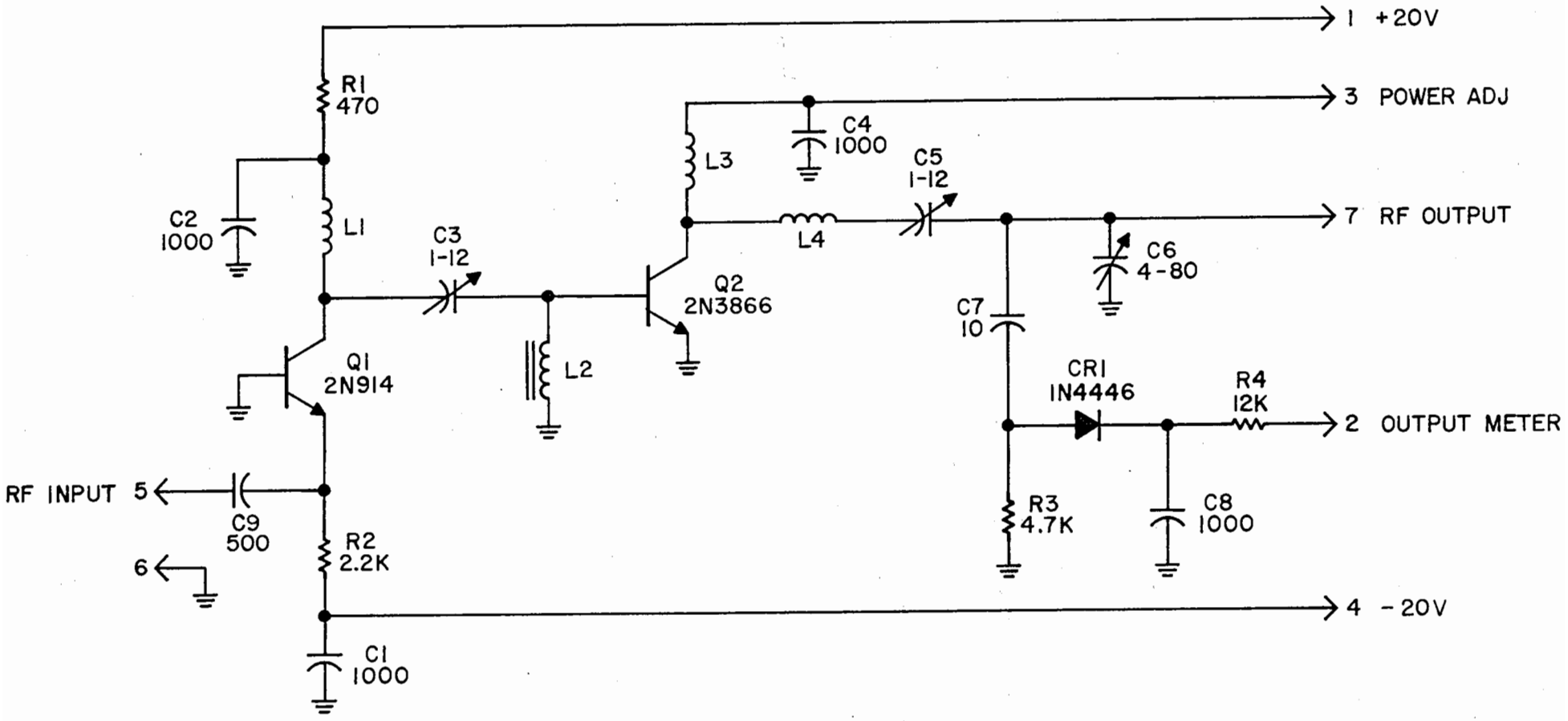


NOTE:
DOTTED COMPONENTS ON BOTTOM OF BOARD.

IF AMPLIFIER COMPONENTS - A3 CARD

A3 BOARD - IF AMP, BALANCED RING MODULATOR & LSB FILTER

Reference Designation	Description	Part Number
C1,C2	C: FIXED CERAMIC 0.001uF 1kV	0151-0002
C3,C4	C: FIXED MICA 180pF 5% 500V	0140-1815
C5,C6	C: FIXED CERAMIC 0.001uF 1kV	0151-0002
C7,C8	C: FIXED MICA 500pF 5% 500V	0140-5015
C9,C10	C: FIXED MICA 180pF 5% 500V	0140-1815
C11	C: FIXED CERAMIC 22pF 2%	0140-2205
C12	C: FIXED MICA 27pF 5% 500V	0140-2705
C13	C: FIXED MICA 150pF 5% 500V	0140-1515
C14	C: FIXED MICA 500pF 5% 500V	0140-5015
CR1 thru CR4	DIODE: 1N4446	1900-0002
IC1,IC2	IC: CA3005	1820-0002
L1,L2	INDUCTOR: VAR LSB FILTER	Belar
Q1	TRANSISTOR: 2N3478	1850-0010
R1,R2	R: FIXED COMP 100 ohms 5% ½W	0686-1015
R3,R4	R: FIXED COMP 2.2k 5% ½W	0686-2225
R5,R6	R: FIXED COMP 100 ohms 5% ½W	0686-1015
R7	R: FIXED COMP 1.8k 5% ½W	0686-1825
R8	R: FIXED COMP 100 ohms 5% ½W	0686-1015
T1	TRANSFORMER: IF INTERSTAGE	Belar
T2	TRANSFORMER: IF OUTPUT	Belar
T3	TRANSFORMER: BAL. MODULATOR	Belar
T4	TRANSFORMER: BAL. MODULATOR	Belar



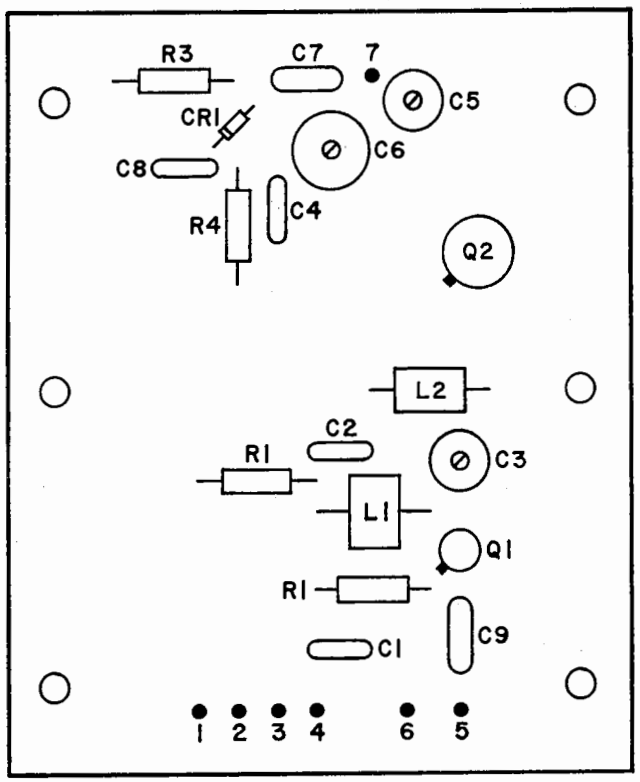
LAST USED

C9
CR1
L4
Q2
R4

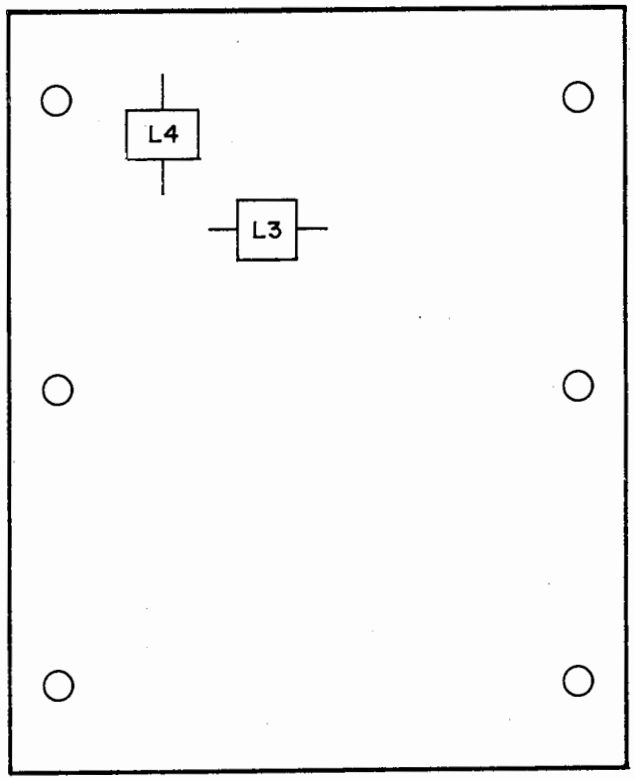
NOTES:

RESISTANCE VALUES ARE IN OHMS.
CAPACITANCE VALUES ARE IN PICOFARADS.

RF POWER AMPLIFIER
BOARD, A4 - RFA-1

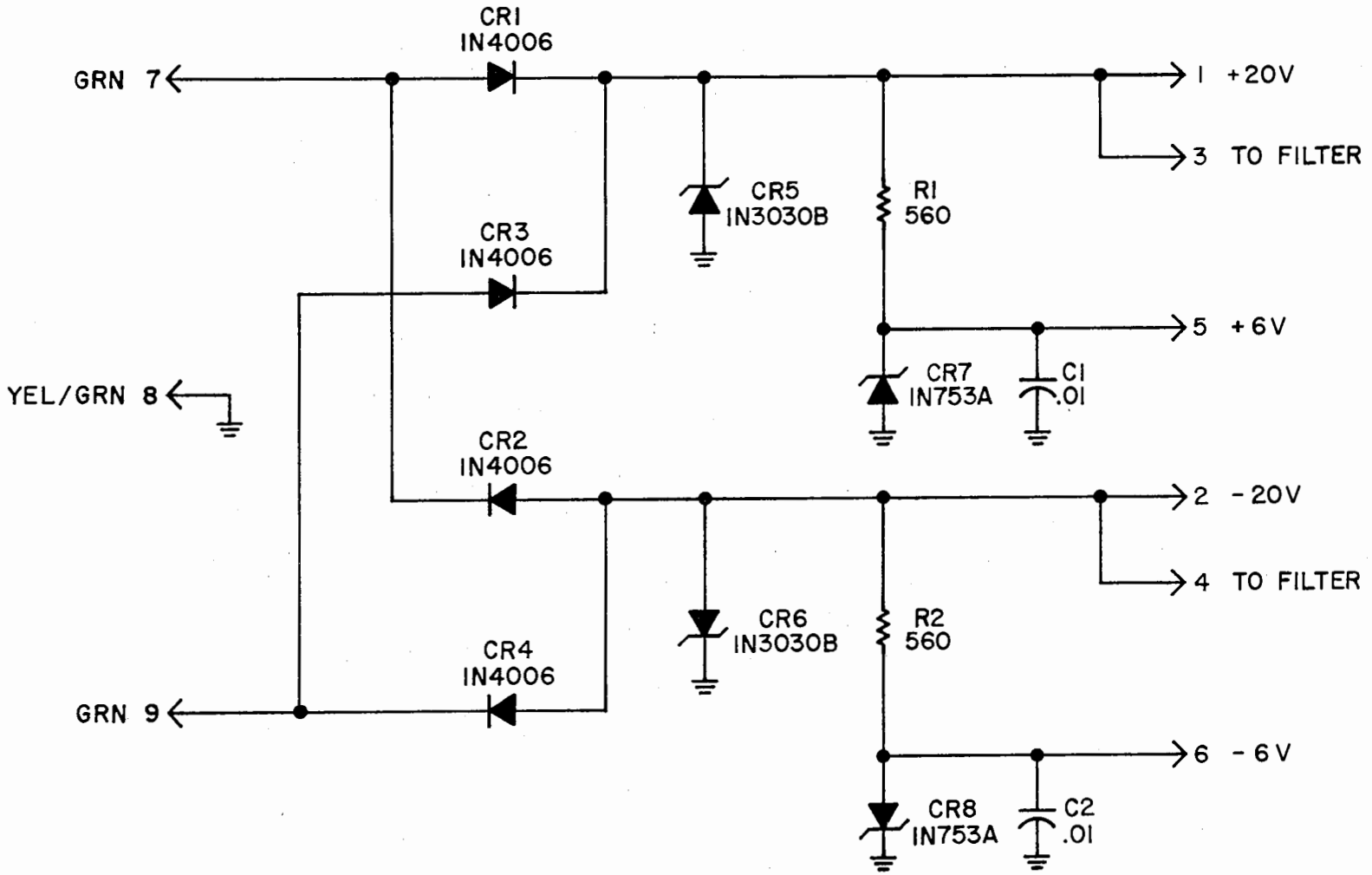


COMPONENT SIDE



SOLDER SIDE

RF DRIVER & POWER AMPLIFIER COMPONENTS - A4 CARD



LAST USED
C2
CR8
R2

NOTES:
RESISTANCE VALUES ARE IN OHMS.
CAPACITANCE VALUES ARE IN MICROFARADS.

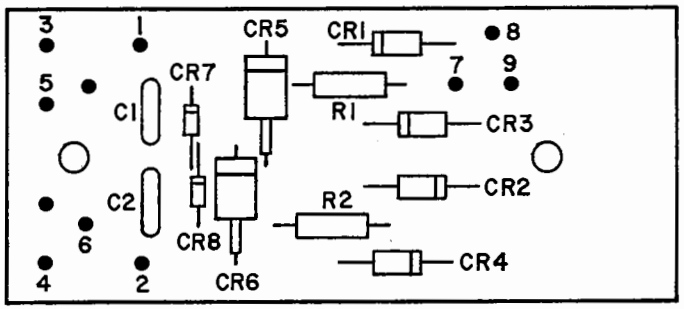
POWER SUPPLY BOARD,
A5 - RFA - 1

A4 BOARD - RF DRIVER AND POWER AMPLIFIER

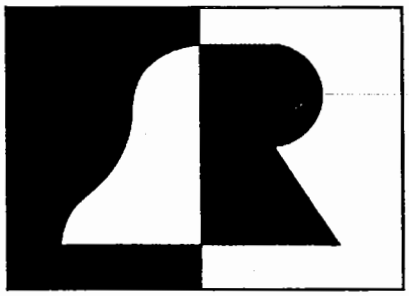
Reference Designation	Description	Part Number
C1,C2	C: FIXED CERAMIC 0.001uF 1kV	0151-0002
C3	C: VAR MICA 1-12pF	0121-0005
C4	C: FIXED CERAMIC 0.001uF 1kV	0151-0002
C5	C: VAR MICA 1-12pF	0121-0005
C6	C: VAR MICA 4-80pF	0121-1004
C7	C: FIXED MICA 10pF 5% 500V	0151-0002
C8	C: FIXED CERAMIC 0.001uF 1kV	0140-5015
C9	C: FIXED MICA 500pF 5% 500V	
CR1	DIODE: 1N4446	1900-0002
L1	INDUCTOR: FIXED RF DRIVER	Belar
L2	INDUCTOR: RFC FERRITE	Belar
L3,L4	INDUCTOR: FIXED RF POWER AMP	Belar
Q1	TRANSISTOR: 2N914	1850-0006
Q2	TRANSISTOR: 2N3866	1850-0014
R1	R: FIXED COMP 470 ohms 5% ½W	0686-4715
R2	R: FIXED COMP 2.2k 5% ½W	0686-2225
R3	R: FIXED COMP 4.7k 5% ½W	0686-4725
R4	R: FIXED COMP 12k 5% ½W	0686-1235

ITEM: A5 CARD - POWER SUPPLY

SYMBOL	DESCRIPTION	MFG. & PART NO.
C1,C2	CAPACITOR: FXD CER .01 UF @ 100V	Sprague Z5U
CR1 THRU CR4	DIODE: SI	1N4006
CR5,CR6	DIODE: ZENER	1N3030B
CR7,CR8	DIODE: ZENER	1N753A
R1,R2	RESISTOR: FXD COMP 560Ω 5% ½W	



POWER SUPPLY COMPONENTS - A5 CARD



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