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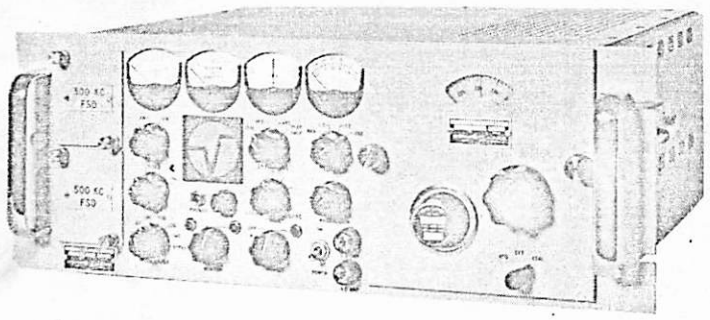
December 1965
ME-1628

NEMS CLARKE
EQUIPMENT

DUAL CHANNEL RECEIVER R-2074A-1



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Vitro ELECTRONICS
A DIVISION OF VITRO CORPORATION OF AMERICA

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Warranty for Equipment and Accessories

Vitro Electronics warrants each new equipment to be free of defects in material and workmanship, for a period of one (1) year after date of original shipment, except that tubes, fuses, transistors and diodes will be warranteed for a period of 90 days. Any instrument which is found within the one year period not to meet the foregoing standards, after examination by our factory, will be repaired or at the option of Vitro replaced without charge. This warranty does not apply to equipment which has been altered, improperly handled, or damaged in any way.

Changes in Specifications

The right is reserved to change the published specifications of equipment at any time, and to furnish merchandise in accordance with current specifications, without incurring any liability to modify equipment previously sold.

Returning Equipment to Factory

Factory service is available for repair and readjustment of this instrument; however, a description of the trouble, plus the model and serial numbers of the unit should be forwarded first, whereupon instructions for correcting the trouble or authorization for returning the equipment will be given. This applies to all units, whether under warranty or not.

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SECTION 1. INTRODUCTION

1.1 Scope of Manual.

This manual provides a comprehensive technical description of the operating and physical characteristics of the R2074A-1 Receiver shown in Figure 1-1. It outlines maintenance, alignment and adjustment procedures and provides sufficient information concerning the functional theory of operation to permit intelligent and effective operation and maintenance of the receiver.

This manual describes the basic R-2074A-1 receiver, however, since the receiver uses standard plug-in modules, appropriate selection of modules allows an extremely wide variety of receiver characteristics to be realized. Thus the R-2074A-1 can be easily arranged to fit many highly specialized applications.

In addition to the internal plug-in modules this receiver utilizes plug-in RF Tuners and Demodulators. Detailed information for these two types of units is not included in this manual. Tuners and Demodulators are described in their own individual instruction manuals.

1.2 R-2074A-1 Receiver Concept.

The R-2074A-1 Dual Channel VHF/UHF Receiver is composed of two complete receivers in only seven inches of vertical rack space. This compact, space-saving design has been achieved without any limitation on receiver performance or flexibility. In fact the main chassis, which serves as a basic module receptacle, contains unused receptacles which allow for the future growth that is essential in present day equipment.

The R-2074A-1 Receiver offers a choice of any two plug-in RF heads covering a frequency range of 55 to 2300 mc in discrete bands, two independent IF channels and two separate video channels. The R-2074A-1 is a double conversion, super heterodyne receiver with first and second intermediate frequencies of 30 mc and 10 mc respectively.

The plug-in modules are standard in size, have a 50 ohm input and output impedance and are easily interchangeable in the main chassis, thus allowing for an extremely wide variety of receiver characteristics.

The R-2074A-1 receiver lends itself ideally to applications requiring the greatest degree of versatility in signal reception, having requirements for predetection combining, predetection recording and playback.

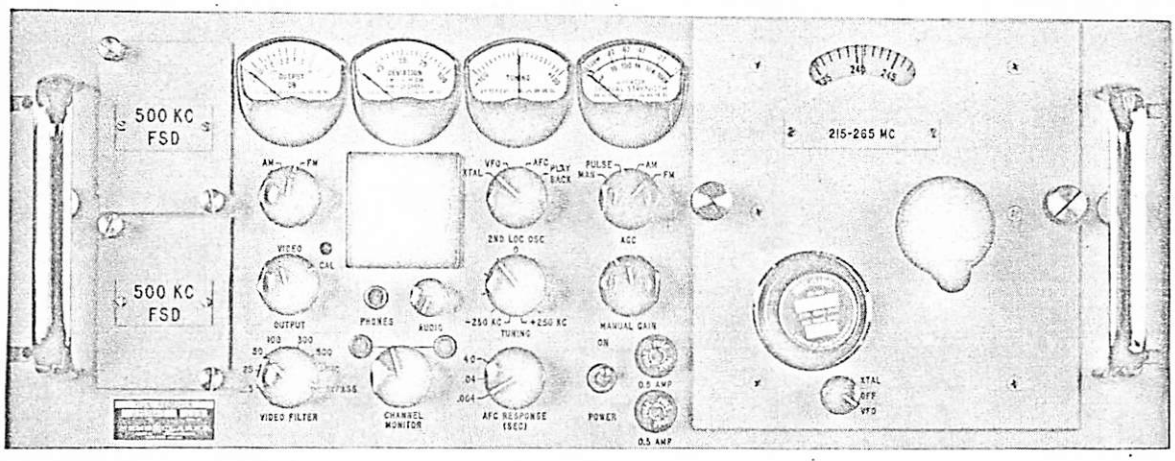


Figure 1-1. R-2074A-1 Dual Channel VHF/UHF Receiver

The wideband techniques employed minimize the number of tuning elements and prevents inferior performance due to misalignment by the operator. All tuning controls and visual monitors necessary to operate the receiver are located on the front panel; arranged in convenient groups to facilitate operation.

1.3 RF Tuner.

The RF Tuner used with the R-2074A-1 employs ceramic nuvistor design to achieve a wide dynamic operating range. The dual tuner consists of two separate RF and mixer stages and one common local oscillator. This allows both channels of the receiver to be tuned to the same frequency.

In addition to the dual tuner, single tuners are also available. The tuners are listed in Table 1-2.

Table 1-1. R-2074A-1 Receiver Specifications

Frequency Range	215 to 260 mc (using RFT-201D)
Image Rejection	better than 60 db
IF Rejection	better than 80 db
First IF Frequency	30 mc
First IF Bandwidth	4.0 mc typical, 1 mc when filter is employed around a 30 mc center frequency
Second Local Oscillator Modes	a) VFO - tunable ±250 kc by a front panel control. Stability is ±.001% per degree C b) XTAL - ±.005% stability c) AFC - pullable ±250 kc by AFC circuit d) PLAYBACK - disables front end for playback of Pre-D recorded data
Second IF Frequency	10.0 mc
Second IF Bandwidth and Shape Factor	determined by plug-in demodulator
High Level Video Output	
Frequency response	5 cps to 2.0 mc
Output level	adjustable (front panel control) to 10 volts peak-to-peak maximum with 75 ohm load; 8 volts peak-to-peak maximum with 1 K ohm load
Output impedance	75 ohms nominal
Video Filter	low pass switch selectable cutoff frequencies of 12.5, 25, 50, 100, 300, 500, 1000 kc and bypass
DC Video Output	
Frequency response	dc to 1/2 maximum IF bandwidth
Output level	4 volts peak-to-peak for a deviation equal to 1/5 the IF bandwidth
Output impedance	less than 1 K ohm
AM Video Output	
Frequency response	dc to 1 mc nominal

Table 1-1. R-2074A-1 Receiver Specifications (Cont.)

Output Level	1 volt peak-to-peak for 50% modulation with AGC off and 100 microvolts at receiver input
DC offset	6-12 volts nominal
Pre-D Recording Output (both limited and unlimited simultaneously available)	10 mc center frequency, 0.5 volts peak-to-peak minimum into 50 ohms
Combiner IF Output	for use with predetection combiners (isolated from record output), 50 ohms nominal output impedance, 100 mv nominal output level, 10 mc center frequency
1st IF SDU Output	for use with external spectrum display unit, 50 ohms output impedance, 30 mc center frequency. Gain from receiver front end to this output is approximately 18 db with AGC inoperative
First Local Oscillator Output	80 mv output into a 50 ohm load. Level is adequate for an HP-524 C counter
AGC Record Output	available from each channel, used to control ratio type combiners
Dimensions	mounts in a 19-inch rack 7 inches high, 16 inches deep
Weight	75 pounds
Power Requirements	117/234 vac ±10%, 50 to 400 cps, 80 watts nominal

1.4 Demodulators.

The Demodulators available for use with the R-2074A-1 are the Foster-Seeley FM (FSD-Series). In addition to the basic demodulator these units also contain the second IF bandwidth filter. This packaging technique allows each demodulator to be individually matched to the particular bandwidth in use. Available Demodulators and their associated bandwidths are listed in Tables 1-2.

1.5 Semiconductor Complement.

Table 1-3 lists all semiconductors by their type and function in the R-2074A-1 receiver.

Table 1-2. Front Panel Plug-In Units for the 2074A-1 Receiver

Demodulators

FSD Series	Bandwidth	Manuals
FSD-101E	12.5 kc	Not Available
FSD-102E	25 kc	Not Available
FSD-103E	50 kc	Not Available
FSD-104E	100 kc	ME-1496
FSD-105E	300 kc	ME-1497
FSD-106E	500 kc	ME-1498
FSD-107E	750 kc	Not Available
FSD-108E	1 mc	Not Available
FSD-109E	1.5 mc	Not Available
FSD-110E	2.4 mc	Not Available
FSD-111E	30 kc	Not Available
FSD-113E	3.3 mc	Not Available

RF Tuners

Single RF Tuners	Frequency Range	Manuals
RFT-109A	55 - 260	Not Available
RFT-100A	135 - 155	Not Available
RFT-101D-1	215 - 260	ME-1494
RFT-107A	215 - 315	Not Available
RFT-102A	370 - 410	Not Available
RFT-123A	400 - 560	Not Available
RFT-103A	920 - 1000	Not Available
RFT-100A	1435 - 1535	Not Available
RFT-105A	1700 - 1850	Not Available
RFT-106D	2200 - 2300	ME-1493

Dual RF Tuners	Frequency Range	Manuals
RFT-209A	55 - 260	Not Available
RFT-201D	215 - 260	ME-1495
RFT-206A	2200 - 2300	Not Available

Table 1-3. List of Semiconductors (Cont.)

Reference Designation	Type	Function
Second IF Amplifier, SIF-302 (Cont.)		
Q5	2N3291	1/2 Emitter Driven Amplifier
Q6	2N3291	1/2 Emitter Driven Amplifier
Q7	2N3227	Emitter Follower
Q8	2N3227	Amplifier
Q9	2N2218	Amplifier
Q10	2N708	Amplifier
Q11	2N2218	Emitter Follower
Q12	2N3391	Emitter Follower
Q13	2N708	Emitter Follower
CR1	1N4308	Variable Impedance
CR2	1N4308	Variable Impedance
CR3	1N277	1/4 Full Wave Rectifier
CR4	1N277	1/4 Full Wave Rectifier
CR5	1N277	1/4 Full Wave Rectifier
CR6	1N277	1/4 Full Wave Rectifier
Second Local Oscillator, SLO-303		
Q1	2N3291	Crystal Oscillator
Q2	2N3251	Buffer Amplifier
Q3	2N3291	Variable Frequency Oscillator
Q4	2N3251	Buffer Amplifier
Q5	2N3251	Amplifier
Q6	2N3251	Amplifier
CR1	1N457	Voltage Drop
CR2	1N457	Voltage Drop
CR3	1N823	Voltage Regulator

Table 1-3. List of Semiconductors (Cont.)

Reference Designation	Type	Function
Second Local Oscillator, SLO-303 (Cont.)		
CR4	1N823	Voltage Regulator
CR5	PC133	VFO Resonant Element
CR6	PC127	AFC Resonant Element
Automatic Gain Control, AGC-303		
Q1	2N708	Emitter Follower
Q2	2N708	Emitter Follower
Q3	2N929	Emitter Follower
Q4	2N3250	Emitter Follower
Q5	2N3250	1/2 Operational Amplifier
Q6	2N3250	1/2 Operational Amplifier
Q7	2N3391	Emitter Follower
Q8	2N2904	Emitter Follower
Q9	2N2350	Emitter Follower
Q10	2N708	Emitter Follower
Q11	2N708	Emitter Follower
Q12	2N929	Emitter Follower
Q13	2N3250	Emitter Follower
Q14	2N3250	1/2 Operational Amplifier
Q15	2N3250	1/2 Operational Amplifier
Q16	2N3391	Emitter Follower
Q17	2N2904	Emitter Follower
Q18	2N3250	Emitter Follower
CR1	1N4308	Biasing Diode
CR2	1N821	Voltage Regulator
CR3	1N4308	Biasing Diode

Table 1-3. List of Semiconductors (Cont.)

Reference Designation	Type	Function
Limiter, LIM-301A		
Q1	2N3291	Electronic Switch
Q2	2N3291	Electronic Switch
Q3	2N3291	Electronic Switch
Q4	2N3291	Electronic Switch
Q5	2N2218	Emitter Follower
Q6	2N2218	Emitter Follower
Video Amplifier, VAM-304		
Q1	2N2218	Amplifier
Q2	2N2904	Driver
Q3	2N2218	1/2 Complementry Amplifier
Q4	2N2904	1/2 Complementry Amplifier
Q5	2N1991	Emitter Follower
CR1	1N457	Voltage Divider
CR2	1N457	Voltage Divider
CR3	1N457	Biasing Diode
CR4	1N457	Biasing Diode
CR5	1N276	1/4 Full Wave Rectifier
CR6	1N276	1/4 Full Wave Rectifier
CR7	SV3141	Meter Protection
CR8	1N276	1/4 Full Wave Rectifier
CR9	1N276	1/4 Full Wave Rectifier
Audio Metering Amplifier, AMA-302		
Q1	2N1991	Emitter Follower
Q2	2N708	Emitter Follower

Table 1-3. List of Semiconductors (Cont.)

Reference Designation	Type	Function
Audio Metering Amplifier, AMA-302 (Cont.)		
Q3	2N3391	1/2 Differential Amplifier
Q4	2N3391	1/2 Differential Amplifier
Q5	2N1991	Emitter Follower
Q6	2N708	Emitter Follower
Q9	2N708	Amplifier
Q10	2N708	1/2 Complementry Amplifier
Q11	2N1991	1/2 Complementry Amplifier
CR1	1N457	Biasing Diode
CR2	1N457	Biasing Diode
CR3	1N457	Biasing Diode
CR4	1N457	Biasing Diode
Regulated Power Supply, RPS-301A		
Q1	2N708	Electronic Filter
Q2	2N1481	Electronic Filter
Q3	2N708	Reference Voltage Amplifier
Q4	2N1481	Series Regulator
Q5	2N3638	Electronic Filter
Q6	2N3133	Electronic Filter
Q7	2N3638	Reference Voltage Amplifier
Q8	2N3133	Series Regulator
CR1	1N753A	Voltage Regulator
CR2	1N753A	Voltage Regulator
CR3	1N646	Switch
CR4	1N646	Switch
CR5	1N3824	Overload Protection

Table 1-3. List of Semiconductors (Cont.)

Reference Designation	Type	Function
Regulated Power Supply, RPS-301A (Cont.)		
CR6	1N3824	Overload Protection
CR7	MDA942-2	Modular Full Wave Bridge Rectifier
CR8	MDA942-2	Modular Full Wave Bridge Rectifier
CR9	MDA942-2	Modular Full Wave Bridge Rectifier
Noise Figure Amplifier, NFA		
Q1	2N3222	Amplifier
Q2	2N3222	Amplifier
Q3	2N3222	Emitter Follower
AGC Distribution Board		
CR1	1N457	AGC Voltage Drop
CR2	1N457	AGC Voltage Drop
CR3	1N457	AGC Voltage Drop
CR4	1N277	AGC Voltage Drop
CR5	1N457	AGC Voltage Drop
CR6	1N457	AGC Voltage Drop
CR7	1N457	AGC Voltage Drop
CR8	1N277	AGC Voltage Drop
CR9	1N277	AGC Voltage Drop
CR10	1N277	AGC Voltage Drop
Main Chassis		
Q1	2N3789	Series Regulator
Q2	2N3713	Series Regulator

SECTION 2. INSTALLATION

2.1 Inspection.

Check the front panel of the receiver for damage to knobs, windows, meters and frequency indicator dials.

Operate the control knobs; examine them for looseness. Operate the tuning controls through their entire range. Binding indicates a damaged tuning system.

Remove the top and bottom covers of the receiver main chassis. Inspect the subchassis on the upper and lower decks of the receiver for security of modules and loose or disconnected wiring.

Check line voltage switch S2 located on the rear apron of the main chassis and make certain it is placed in the proper position for the line voltage at the particular installation. To avoid serious damage to the receiver, do not use any fuse other than the value specified.

2.2 Module Installation.

Module installation is accomplished by selecting the appropriate tuner or demodulator and plugging the module into the receiver main chassis.

2.3 Mounting.

The receiver can be rack mounted in a standard 19-inch rack installation; secured to the rack by four screws inserted through slots on the front panel and screwed into the rack frame. Because of the low internal power dissipation, no forced ventilation is required either internal or external to the receiver. Therefore, extreme care is not required to insure adequate ventilation of the receiver.

2.4 Connections.

Refer to Table 2-1 for relationship between jacks and module plugs and to Table 2-2 for the color code used to identify intercabling connections between modules. Also refer to Figure 2-1 Internal Module Location and to Figure 7-1 Receiver Main Chassis Schematic Diagram.

Table 2-1. Module/Receiver Connections for R-2074A-1

Module	Purpose	Connections Channel A	Channel B
RFT	Tuner	P1-J1	P2-J2
FIF-302	1st IF	P1-J8	P1-J16
FSD	Demodulator	P1-J9	P1-J10
SLO-303	2nd Local Oscillator	P1-J17	P1-J17
SIF-302	2nd IF	P1-J7	P1-J15
LIM-301	Limiter	P1-J6	P1-J14
AGC-303	Automatic Gain Control	P1-J13	P1-J13
IFF-304	1st IF Bandwidth Filter	P1-J3	P1-J11
VAM-304	Video Amplifier	P1-J4	P1-J12
AMA-302	Audio Amplifier	P1-J5	P1-J5
RPS-301A	Power Supply	P1-J18	P1-J18

Table 2-2. Module Intercabling Connections for R-2074A-1

From	To	Color Code Channel A	Channel B
J1-A2	J1, 1st IF	Black	
J2-A2	J1, 1st IF		Brown
J9-A2	J2, 1st IF	Red	
J9-A3	J1, 2nd IF	Orange	
J10-A2	J2, 1st IF		Yellow
J10-A3	J1, 2nd IF		Green

All external connections to the receiver are located on the rear apron. Refer to Table 2-3 for input and output jack connections by channel and function and to Figure 2-2 external connections for the receiver and to Figure 7-1 receiver main chassis schematic diagram.

NOTE

If the miniature RF connectors are not absolutely tight, the receiver will exhibit sensitivity as spurious responses. Use a pair of slip-joint pliers to tighten the connectors.

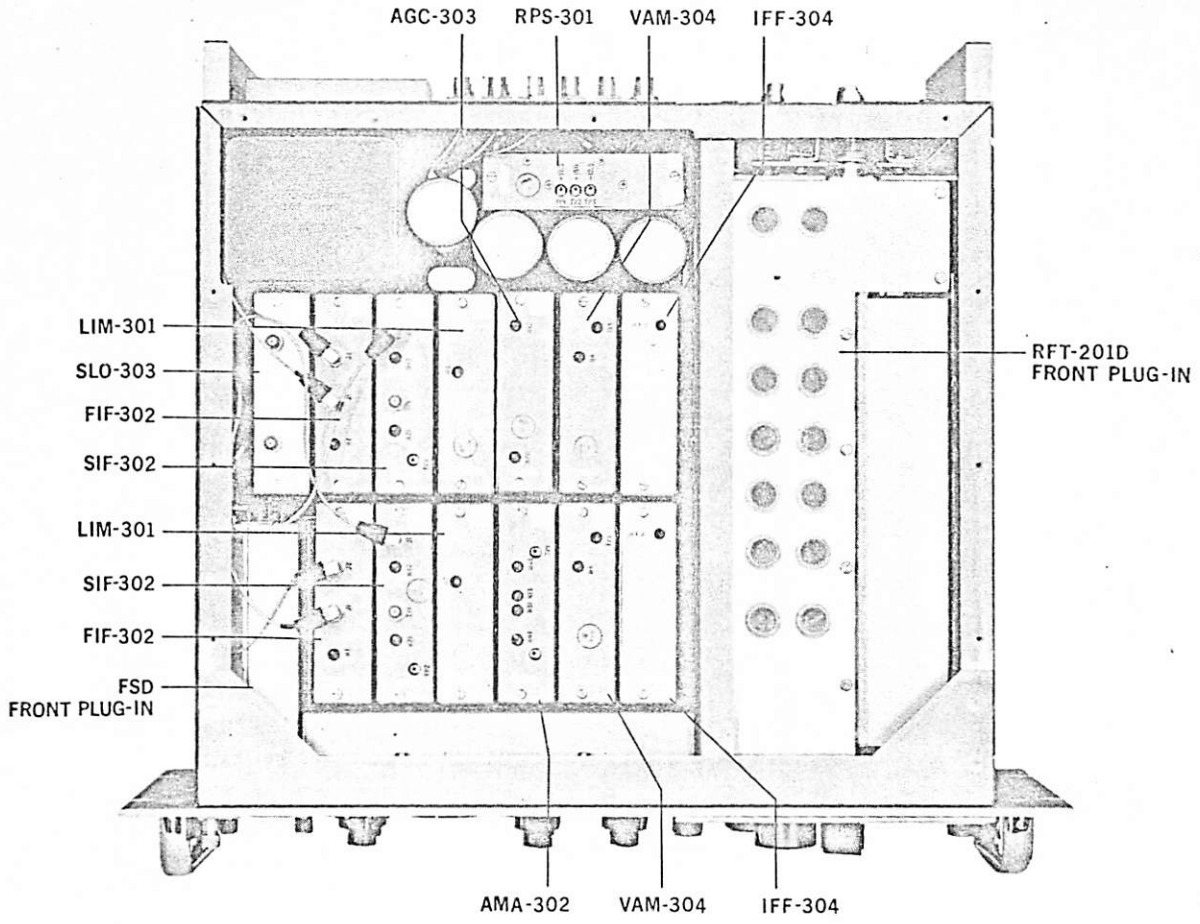


Figure 2-1. Internal Module Location in R-2074A-1 Receiver

Table 2-3. External Connections for R-2074A-1 Receiver

Jack Number Channel A	Jack Number Channel B	Name	Purpose
J21	J21	Power Input	Supplies primary ac power for proper operation of the receiver; 117 or 234 volts ±10% 50 to 400 cps as required (power cord supplied as standard).
J19A	J20A	Antenna Input	Supplies signal input from antenna at J3 for channel A and at J4 for Channel B.
J24	J27	1st IF SDU	IF signal output from 1st IF Filter for connection to spectrum display unit.
J25	J28	2nd IF Predet.	Unlimited IF signal for recording or other purposes.
J26	J29	Limited Predet.	Limited IF signal for recording or other purposes.
J30	J33	Video	Video output to recorders or other data processing equipment.
J31	J34	DC-FM	DC-FM output for connection to recorder or other data processing equipment.
J32	J35	AM	AM video output for connection to recorder or other data processing equipment.
J38	J41	Playback Input	IF signal input from recorder for playback demodulation.
J36	J39	AGC Output	The AGC record output from P1-A6 of the channel A video amplifier is applied to the combiner.
J37	J40	Noise Figure Output	Connect to Noise Figure meter for noise figure measurement
J22	J23	L.O.	1st local oscillator output for connection to an electronic counter for monitoring the 1st LO frequency.

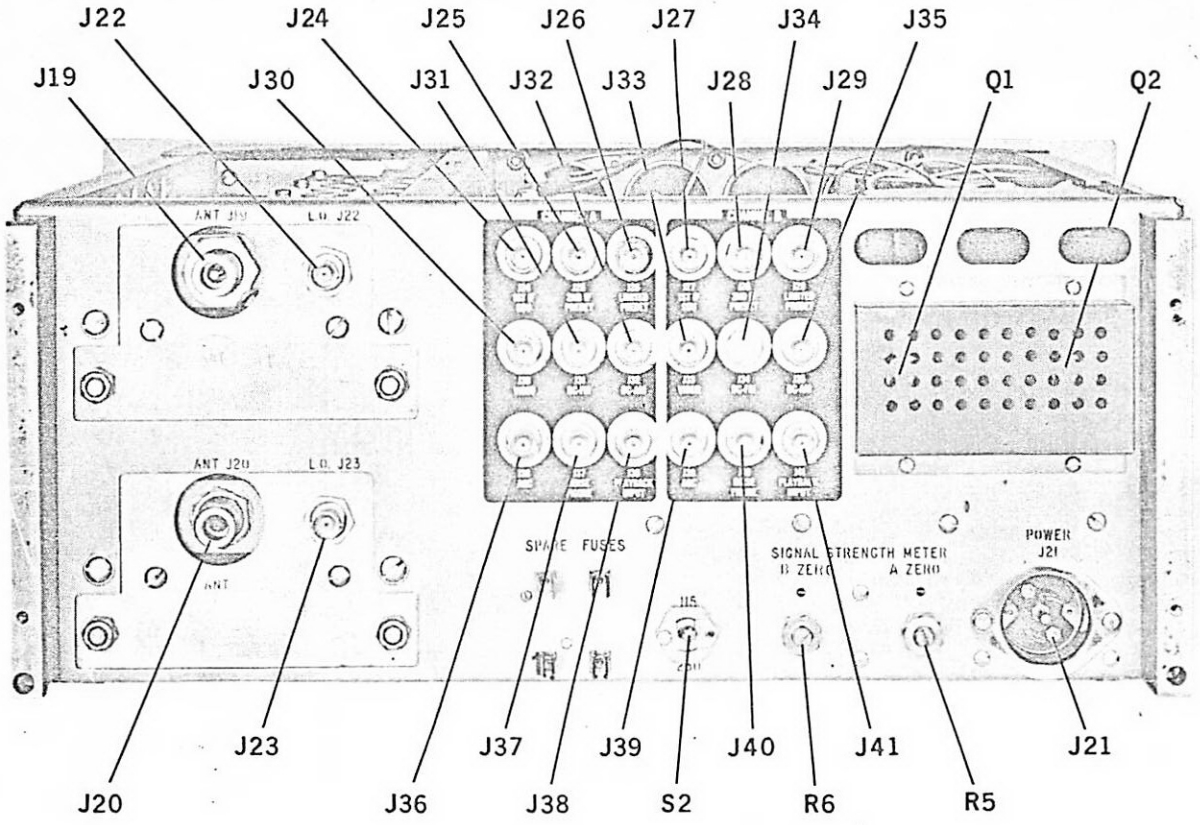


Figure 2-2. R-2074A-1, Rear View

SECTION 3. OPERATION

3.1 General.

Refer to Figure 3-1 for location of controls.

1. R-2074A-1 receiver being a dual channel type; i.e. two receivers in one chassis, has dual controls color coded red and black.
2. Black Knobs control Channel A
   Red Knobs control Channel B
3. Indicating meters read out for Channels A or B. Monitoring is switched between channels.

3.2 RF Tuning Module Controls.

Proper tuner operation requires the tuning knob be set at the desired operating frequency as noted on the front panel calibrated dial of the individual RF tuner. Also make certain that the first local oscillator is switched to either crystal or variable control. The OFF position of the local oscillator switch on the RF tuner permits standby operation of the receiver.

Table 3-1 lists the controls, their functions and sequence of operation for both the tuner and receiver.

For a detailed description of the RF tuners, refer to the applicable instruction manual for the tuner being used.

Table 3-1. Operating Controls, Functions, and Sequence

A. Tuner Controls

1. LO SELECTOR - Selects crystal oscillator, XTAL; variable frequency oscillator, VFO; OFF position disables both oscillators and places the tuner and receiver in a standby mode of operation.

2. TUNING KNOB - Adjusts RF amplifiers and local oscillator to desired frequency.

3. DIAL - Indicates within 1% of frequency dialed.

B. Receiver Controls

1. POWER ON Switch - Applies primary power for both channels, S1 on schematic.

2. CHANNEL MONITOR - Selects either Channel A or Channel B for visual indications on the meter faces and audio output. Switch S5 on the schematic.

3. 2ND LOC OSC (dual control) - Selects the mode of operation for the second local oscillator; i.e.
XTAL - Crystal controlled oscillator
VFO - Manually controlled oscillator
AFC - Automatic frequency control of VFO
PLAYBACK - Both oscillators disabled to allow playback of prerecorded tapes. (S3 for Chan. A, S4 for Chan. B on schematic).

4. TUNING (dual control) - Fine tunes 2nd L.O. in VFO; Fine tuning switched to the RF tuner when 2nd L.O. is in the crystal mode. (R2 Chan. A, R3 Chan. B)

5. AGC (SEC) Switch (dual control) - Selects time constant for AGC delay. MAN. Position disables AGC and allows gain to be manually controlled. (S8 for Chan. A, S9 for Chan. B).

6. MANUAL GAIN (dual control) - Manually varies receiver's gain when selected by AGC switch. (R9 Chan. A, R10 Chan. B).

7. VIDEO (dual control) - Selects AM signals from the 2nd IF or FM signals from the demodulator, to be read out. (S7 for Chan. A, S6 for Chan. B).

8. VIDEO FILTER (dual control) - Selects the cut-off frequency for the video signal. The frequencies, in KC, are: 12.5, 25, 50, 100, 300, 500, 1000 and BYPASS. The Bypass position eliminates the filter from the circuit. (S11 for Chan. A, S12 for Chan. B).

Table 3-1. Operating Controls, Functions, and Sequence (Cont.)

9. CALIBRATE - Calibrates the OUTPUT meter. (R7 for both channels).
10. OUTPUT - Sets the video output level. (R12 for Chan. A, R11 for Chan. B). (dual control)
11. AUDIO - Volume control for audio output at the speaker. (R8 for both channels).
12. PHONES - Provides use for headset and bypasses speaker when phones are plugged in.

C. Meter Functions

1. OUTPUT - Indicates level of video output in db.
2. DEVIATION % OF IF BANDWIDTH - Indicates amount of frequency deviation of signal received; accurate for single frequency modulation, approximate or relative for complex modulation.
3. TUNING - Indicates proper tuning of receiver when centered.
4. SIGNAL STRENGTH - Indicates signal strength of received signal in microvolts and in dbm.

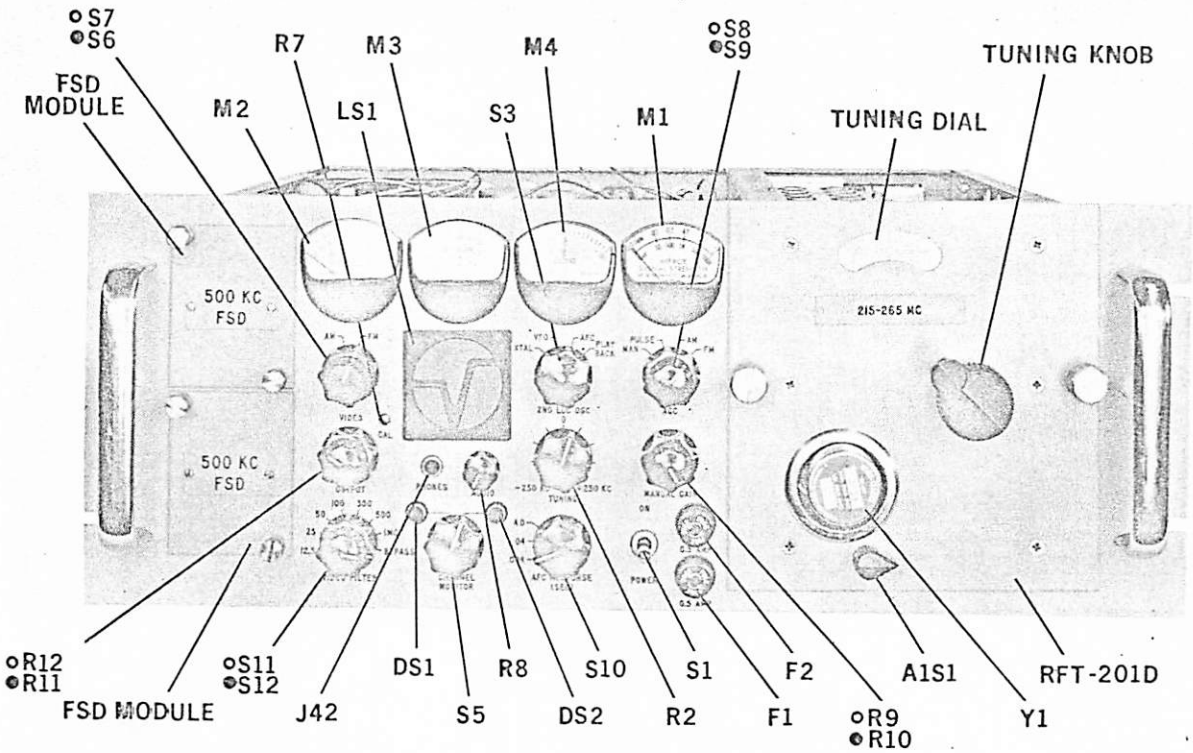


Figure 3-1. Front Panel Controls and Indicators for the R-2074A-1 Receiver

SECTION 4. THEORY OF OPERATION

4.1 General.

The R-2074A-1 Dual Channel Receiver is shown in the functional block diagram of Figure 4-1. The receiver main chassis schematic diagram is shown in Figure 7-1. The path of signal flow through channel A will be discussed in order. The path of signal flow through channel B is similar as the path of signal flow through channel A.

The received signal is fed from the antenna to the plug-in RF tuner. In general the signal is applied to a preselector. The output from the preselector is applied to an RF amplifier and then to a mixer. The mixer also receives a signal from the first local oscillator which is tuned 30 mc above the received signal. The output from the mixer drives a tuned circuit, tuned to 30 mc.

The first local oscillator can be operated in either crystal or VFO mode. The mode of operation is selected by a front panel mounted switch. The oscillator is operated in common with both sections RF tuners. An output from the first local oscillator is applied to J22 for channels A and to J23 where it can be used in conjunction with an electronic counter for monitoring the frequency of the first local oscillator. For a complete description of the RF tuner see the instruction manual, RFT-201D.

The 30 mc output from the Tuner is applied through J1 to the First IF Filter which is used when the bandwidth of the receiver is less than 500 kc otherwise it goes to the First IF Amplifier and Second Mixer module. The First IF amplifier, centered on 30 mc has a typical bandwidth of 4 mc. A 30 mc signal taken from the input to the First IF Filter is applied to J24 for channel A or J27 for channel B for use with an external spectrum display unit.

The 30 mc output from the First IF Filter is applied to the First IF amplifier and then to the second mixer where it is mixed with a signal from the Second Local Oscillator.

The Second Local Oscillator can be operated in either XTAL, VFO, AFC, or PLAYBACK mode. The mode of operation is selected by a front panel switch. The Second Local Oscillator is common to both channels of the receiver.

The 40 mc output from the Second Local Oscillator is applied to the second mixer where it is mixed with the 30 mc signal from the First IF amplifier. The second mixer produces a difference frequency of 10 mc.

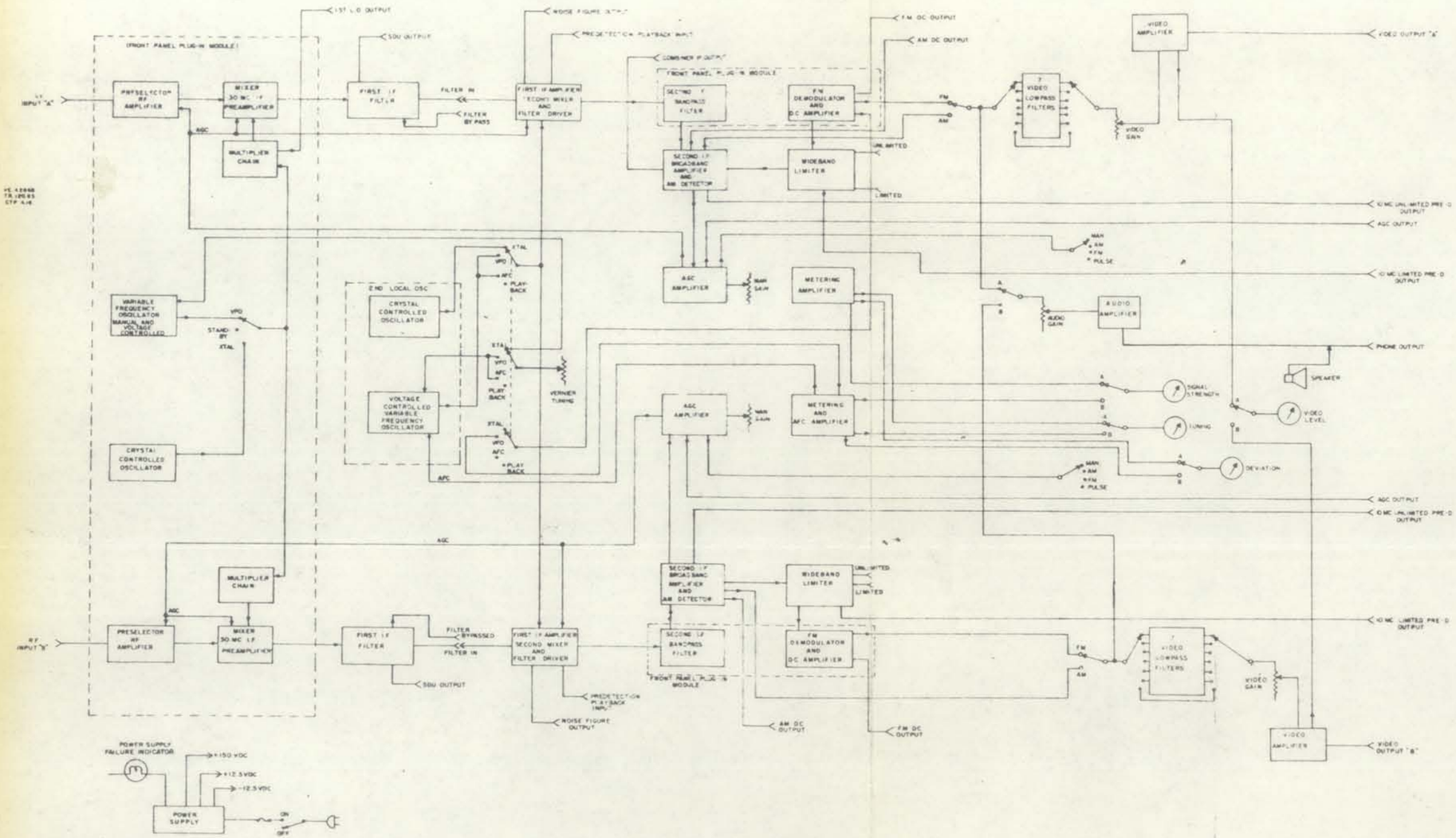


Figure 4-1. Type II, Dual Channel Receiver, R-2074A-1

The 10 mc second IF frequency from the First IF Amplifier and Second Converter module is applied to the IF bandwidth filter. The IF bandwidth filter is a part of the FSD-100 Series demodulator module which is plugged in through the front panel of the receiver. Thus, with FSD modules of various bandwidths the overall bandwidth of the receiver can be altered. For a complete description of the particular FSD module being used see the Instruction Manual for that module.

The 10 mc IF signal from the IF bandwidth filter is applied to the Second IF Amplifier module. There are five outputs taken from the second IF amplifier. Two AM outputs and three IF outputs. One of the IF outputs is applied to a jack located on the rear apron of the receiver. This output is applied to J25 for channel A and J28 for channel B for use with the DCA-5100A-1 Predetection Combiner. This is the Predetection Output that is used for recording. One IF output is applied to the AGC Amplifier module and one to the Limiter module. One of the AM outputs is applied to J32 for channel A and J35 for channel B and the other AM output is applied to the AM position of the Video Selector switch.

The AGC amplifier module supplies AGC voltage to the RF tuner and to the first and second IF amplifiers. The AGC amplifier also incorporates outputs for use with the DCA-5100A-1 Combiner.

The Limiter module supplies two outputs. The Limited Predetection IF output is applied to J26 for channel A and to J29 for channel B and a Limited IF output which is applied to the discriminator section of the FSD module.

The FSD module supplies three outputs. The DC FM output, the Video Output and the Audio Output is applied to the Audio Metering and AFC module and the Video Output is applied to the FM position of the Video Selector switch.

The Video Selector switch selects video from the AM output of the Second IF Amplifier or the FM output from the FSD module. The output from the Video Selector switch is applied to the Video Bandwidth Filter selector switch and to the Channel Monitor switch.

The output from the Video Bandwidth Filter selector switch is fed through the Video Bandwidth Filter to the Video Gain control which is mounted on the front panel of the receiver. The desired video level is then applied to the Video Amplifier.

The Video Amplifier supplies three outputs. Two of these are video outputs - one is the receiver video output which is applied to J30 for channel A and to J33 for channel B, the other video output is supplied to the CHANNEL MONITOR switch for use by the OUTPUT meter. The Video Amplifier also furnishes an AGC output for the control of the combiner. In channel B this output is routed to J39. In channel A this output is routed to J36. These two outputs are

connected to the combiner.

The Channel Monitor switch selects either channel A or channel B monitoring points. Thus the monitoring information is fed to the OUTPUT meter and SIGNAL STRENGTH meter, for which ever channel is selected.

The video AM from the Second IF Amplifier or the video FM from the FSD module is applied through the CHANNEL MONITOR switch and the AUDIO GAIN control to the Audio Metering and AFC Amplifier.

The Audio Metering Amplifier supplies information through the CHANNEL MONITOR switch to the DEVIATION meter and to the TUNING meter as well as supplying an audio signal to a speaker or phone jack located on the front panel. The Audio Metering and AFC Amplifier module also supplies AFC control voltage to the Second Local Oscillator.

4.2 Detailed Circuit Description.

4.2.1 Intermediate Frequency Filter, IFF-304.

The Intermediate Frequency Filter is shown on schematic diagram, Figure 7-2. The physical location of the components on the printed circuit board is shown on Figure 6-2.

The filter is composed of three amplifiers and a four pole Butterworth LC network, having a center frequency of 30 mc and a bandwidth of 1.2 mc. The filter, with its sharp skirt selectivity, determines the bandwidth of the First IF Amplifier.

The RF Tuner's output is connected to the filter module at P1. At A1 and A4 on P3 the Spectrum Display Unit and Noise Figure Amplifier outputs, respectively, for channels A and B are taken. This is done to take advantage of the wideband signal before the band is restricted by filtering. The 30 mc signal is also coupled to the base of Q1 through C1. Q1 functions as an isolation amplifier between the SDU and the filter. Isolation is necessary for the SDU so that it only sees the wideband signal from the tuner and not distorted reflections from the filter. The output of Q1 is connected to the first pole of the filter composed of C5, C6 and L2. Inductor L2 is tuned by variable capacitor C5. Energy from the first pole or resonant circuits capacitively coupled through C7 to the second pole. The coupling capacitances and the L to C ratios of the four resonant circuits vary to obtain the required maximally flat response and bandwidth. The tapped inductor L5, of the fourth pole, is the output of the filter and it is coupled to the base of Q2 through C18. Transistors Q2 and Q3 are two amplifiers connected in cascade to overcome the insertion loss of the filter. The output of Q3 is coupled to the output of the module through C20

The 10 mc second IF frequency from the First IF Amplifier and Second Converter module is applied to the IF bandwidth filter. The IF bandwidth filter is a part of the FSD-100 Series demodulator module which is plugged in through the front panel of the receiver. Thus, with FSD modules of various bandwidths the overall bandwidth of the receiver can be altered. For a complete description of the particular FSD module being used see the Instruction Manual for that module.

The 10 mc IF signal from the IF bandwidth filter is applied to the Second IF Amplifier module. There are five outputs taken from the second IF amplifier. Two AM outputs and three IF outputs. One of the IF outputs is applied to a jack located on the rear apron of the receiver. This output is applied to J25 for channel A and J28 for channel B for use with the DCA-5100A-1 Predetection Combiner. This is the Predetection Output that is used for recording. One IF output is applied to the AGC Amplifier module and one to the Limiter module. One of the AM outputs is applied to J32 for channel A and J35 for channel B and the other AM output is applied to the AM position of the Video Selector switch.

The AGC amplifier module supplies AGC voltage to the RF tuner and to the first and second IF amplifiers. The AGC amplifier also incorporates outputs for use with the DCA-5100A-1 Combiner.

The Limiter module supplies two outputs. The Limited Predetection IF output is applied to J26 for channel A and to J29 for channel B and a Limited IF output which is applied to the discriminator section of the FSD module.

The FSD module supplies three outputs. The DC FM output, the Video Output and the Audio Output is applied to the Audio Metering and AFC module and the Video Output is applied to the FM position of the Video Selector switch.

The Video Selector switch selects video from the AM output of the Second IF Amplifier or the FM output from the FSD module. The output from the Video Selector switch is applied to the Video Bandwidth Filter selector switch and to the Channel Monitor switch.

The output from the Video Bandwidth Filter selector switch is fed through the Video Bandwidth Filter to the Video Gain control which is mounted on the front panel of the receiver. The desired video level is then applied to the Video Amplifier.

The Video Amplifier supplies three outputs. Two of these are video outputs - one is the receiver video output which is applied to J30 for channel A and to J33 for channel B, the other video output is supplied to the CHANNEL MONITOR switch for use by the OUTPUT meter. The Video Amplifier also furnishes an AGC output for the control of the combiner. In channel B this output is routed to J39. In channel A this output is routed to J36. These two outputs are

The filter module may be removed from the receiver circuit when use of the receiver's wideband capability is desired. This is done by connecting the tuner directly to the First IF Module.

4.2.2 First IF Amplifier, FIF-302.

The First IF Amplifier is shown on schematic Diagram, Figure 7-3. The location of components is shown on Figure 6-3.

The module consists of three sections: a 30 mc IF amplifier, a mixer, and a 10 mc IF amplifier. The IF amplifiers are all emitter coupled stages and both the 10 mc and 30 mc sections are first double tuned and then single tuned.

The 30 mc signal is fed to the First IF Amplifier through J1. Emitter follower Q1 samples the input signal and its emitter drives the Noise Figure Amplifier and also provides an SDU output when the Intermediate Frequency Filter is not utilized. The 30 mc signal is coupled through C16 to the Emitter Coupled amplifier Q2 and Q3. Q2 acts as an emitter follower and drives the emitter of Q3. Q2 provides isolation between the input and the amplified output of Q3. Q3's output is tuned by the tank circuit L1 and C8. The output of the tank is inductively coupled through L2 to another tuned tank composed of C13, C12 and L3. The output is taken from the junction between C13 and C12 and is applied to the base of Q4. Q4 and Q5 form another Emitter coupled amplifier that functions in a similar manner to Q2 and Q3. The output of Q5 is tuned by tank circuit C14, C15 and L4. The output of this tank is coupled to the emitter follower Q6. The output of Q6 is applied to the wiper of R41. This signal is then applied to the base of Q7 and the emitter of Q8. Q7 and Q8 compose a dual balance mixer. The local oscillator signal from the Second Local Oscillator module is applied to J3 of the FIF-302. This 40 mc signal is connected to the wiper of R44 and is applied to the base of Q8 and the emitter of Q7. Both the 40 mc and 30 mc signals are amplified by Q7 and Q8. The collector outputs of Q7 and Q8 are 180° out of phase and therefore cancel. The 10 mc difference that is left is the Second IF Signal. This signal is then double tuned by two tank circuits and applied to the Emitter Coupled amplifier Q9 and Q10. The emitter circuit contains a potentiometer that controls the signal level and the gain of the module. The output of Q10 is tuned by tank circuit C46, C47 and L8. The output of the tank is then connected to the Emitter Coupled amplifier Q11 and Q12. The output of Q12 is connected to the output amplifier Q13. The output of Q13 is fed back to the base of Q12. This reduces the impedance of the collector of Q13 so that the output impedance of the module at J4 is not controlled by variations of transistors but by the fixed resistance R69.

The module is AGC controlled two ways. One is by diode AGC and the other by reverse AGC applied to all the tuned stages. This method gives very linear AGC action and assures cut off of the stages when maximum AGC is applied. The AGC voltage, developed in the AGC module, is applied through the AGC Distribution Board A25 to R25 in the first IF Amplifier.

R25 sets the level of the AGC voltage applied and then the voltage goes in two directions. One direction is to the cathode of CR2. This direction is the diode AGC that controls the input level to the base of Q2. Diodes CR1, CR2 and resistors R1, R3, R4 and R6 function as a variable ladder attenuator, proportional to the AGC voltage. Diodes CR1 and CR2 are the variable components of the attenuator, and their impedance varies proportionally to the amount of current flow through them.

The other direction taken by the AGC is to the bases of Q2, Q4 and Q9. The reverse AGC as it increases toward its maximum level, increases the voltage level on these bases causing the voltage levels in the emitters to decrease. The current in the emitter circuit increases to ground through the 5.1 K ohm resistors causing the transistors to cut off.

The PLAYBACK function of the receiver also has an effect on the First IF Amplifier. When the 2ND LOC OSC switch S3 on the front panel is placed in the PLAYBACK position a -12.5 vdc is applied to the base of Q11. The playback input is connected to the emitter of Q12 through an equalization network C64, C65, R65, and R66. When the signal is applied the voltage level on the emitter of Q11 rises to approximately -10 volts dc causing Q11 to be reversed bias and completely cut off, thereby allowing the playback information to go through the receiver without interference from the front end.

4.2.3 Second IF Amplifier, SIF-302

The Second IF Amplifier is shown on Figure 7-5. The physical location of components on the printed circuit board is shown in Figure 6-4.

The Second IF Amplifier consists of one stage of double tuned amplification, one stage of single tuned amplification and four stages of broad band amplification. The module also contains an AM detector and furnishes a Pre-detection output, AGC output, AM output, DC AM output and an output to drive the Limiter.

The filtered 10 mc signal, from the IF Bandwidth Filter, is coupled to the base of emitter follower Q1 through coupling capacitor C3. The emitter output of Q1 is coupled through C5 to the emitter of the common base amplifier Q2. The amplified output of Q2 is tuned to 10 mc by the tuned tank C6 and L3. This tuned output is inductively coupled through L4 to another tuned tank composed of C10, C11 and L5. The output of this tank is connected to the base of emitter follower Q3. The output of Q3 drives the emitter of the common base amplifier Q4. The amplified output of Q4 is tuned by the tank circuit C17, C18 and L6. The output of this tank is directly coupled to the base of emitter follower Q5. The output of Q5 is coupled to the wiper of potentiometer R23 in the emitter circuit of Q6. R23 varies the level of the signal at this point and the level set controls the gain of the Second IF Module. The output

of Q6 is capacitively coupled through C25 to the base of emitter follower Q7. The output of Q7 is the Limiter output of A5 on P1. Q7's output is also direct coupled to the base of the broad band amplifier Q9. The output of Q9 is the Pre-detection output that is used for Combining purposes. The emitter output of Q7 is coupled to the base of broad band amplifier Q8. Q8 is used for a BFO signal, if required, and has no other function in this receiver. The emitter output of Q7 also drives the base of Q10, another broad band amplifier. The output of Q10 is directly coupled to the base of emitter follower Q11. The emitter output of Q11 drives the step-up transformer T1. The secondary of T1 drives the full wave bridge CR3, CR4, CR5, and CR6. This is the AM detector circuit. The output of the bridge is filtered by the low pass filter C37, C38, and L7. This filtering action removes any 10 mc carrier signal that may still be present. The AM signal is connected to the base of emitter follower Q12. The output of Q12 is the signal used by the AGC module to develop the AGC voltage. The output of Q12 is also dc coupled to the base of emitter follower Q13, whose output is the DC AM output.

The AGC voltage developed in the AGC module is applied to the Second IF Amplifier at A1 of P1. The slope of the AGC voltage is set by R5 and is coupled to the base of Q1 through C3. C1 and C2 provide decoupling to keep the 10 mc RF signal from the AGC voltage in the receiver. Diodes CR1, CR2 and resistors R1, R2, R3 function as a variable ladder attenuator, proportional to the AGC voltage. Diodes CR1 and CR2 are the variable components of the attenuator, and their impedance varies proportionally to the amount of current flow through them. The point at which these diodes conduct is set by the slope adjustment R5.

4.2.4 Automatic Gain Control, AGC-303

The Automatic Gain Control Module is shown in schematic diagram Figure 7-6. The physical location of the components on the module printed circuit board is shown in Figure 6-5.

The module contains two independent, identical AGC amplifier circuits that supply AGC voltages to both channels of the receiver.

When the receiver is operated in conjunction with a combiner, the receiver supplies the AGC voltage from P1-A6 of the Video Amplifier Module through J36, channel A, J38, channel B to the combiner.

Since both AGC amplifiers are identical, only channel A will be discussed.

The output of the second IF at P1-A6 is detected video that is applied to P1-A1 of the AGC module. This signal is applied to the base of emitter follower Q2. The output of Q2, in the FM or AM positions of the AGC selector switch S8, is through R8 to pin 10 of J13. This point is connected to the wiper of S8C, then to the wiper of S8A and back to J13 pin 15. This point is connected to the base of Q5. Transistors

Q5 and Q6 comprise a differential amplifier. The balance for the difference amplifier is provided by Q1. The base bias of Q1 is set by R3 and the output of its emitter provides the bias on the base of Q6. When the positive signal at the base of Q5 exceeds the preset balance, Q5's collector will go negative. This signal is applied to the base of emitter follower Q7. Q7's output goes in two directions; one is direct coupled to the base of emitter follower Q8. The output of Q8 is the AGC voltage that is applied to the RF tuner, the second IF module and the AGC Distribution Board A25. The AGC distribution board delays application of the AGC voltage to the first IF module until the AGC voltage is above a preset threshold voltage and thus provides a more linear AGC curve. The second output of Q7 is coupled through R14 to potentiometer R37. R37 sets the AGC slope and full scale deflection of the Signal Strength meter. It also functions in conjunction with the Signal Strength OFFSET control which sets the low end of the Signal Strength meter. The optimum setting of these controls insures precise tracking of the AGC voltage by the Signal Strength meter. The level set by the adjustments presets the base bias of emitter follower Q9, whose output is the AGC voltage present at J36.

In the FM position of S8 capacitor C4 in the emitter of Q7 develops the time constant required for AGC. C4 in conjunction with the differential amplifier Q5 and Q6 form an operation amplifier; i.e., the total capacitance or delay is equal to the gain of the amplifier times the capacitance in parallel with it.

In the AM position of S8 capacitor C5 is paralleled to C4 thereby increasing the delay by a factor of its capacitance.

In the PULSE position of S8 the output of Q2 is coupled to the base of Q3 through diode CR1. When a pulse is received the output of Q2 is positive and CR1 is turned on, charging capacitor C3. After the pulse interval the output of Q2 is negative, thereby turning off CR1. The charge in C3 must discharge through emitter follower Q3. The output os Q3 is direct coupled to the base of emitter follower Q4. The output of Q4 is then the AGC voltage required for pulse operation. The decay time for the AGC is very slow due to the time constant estabilshed between C3 and the impedance of Q3.

4.2.5 Second Local Oscillator, SLO-303

The Second Local Oscillator is shown in schematic diagram Figure 7-4. The physical location of components on the printed circuit board is shown in Figure 6-6.

The Second Local Oscillator may be operation in XTAL, VFO, AFC or Playback modes. The mode of operation is selected by the 2ND LOC OSC switch, S3, located on the front panel of the receiver.

With S3 in the XTAL position, +12.5 vdc is applied to the collector of Q1 and the emitter of Q2, and -12.5 vdc is applied to the emitter of Q1. Q2 has a -12.5 vdc applied to its collector all the time. Application of these voltages causes

crystal oscillator Q1 to oscillate. Transistor Q1 is connected in a modified Hartley circuit which operates the series mode crystal Y1 at 40.0 mc. The resonant circuit is composed of coil L1 and capacitors C3 and C4. The feedback loop is composed of Y1 and C2. The 40.0 mc output from the oscillator is capacitively coupled to the base of buffer amplifier Q2 through C6. The output of Q2 has a tank circuit C8, C9 and L2 tuned to 40.0 mc. The output of the tank is capacitively coupled through C27 to the base of the output amplifiers Q5 and Q6. The 40.0 mc is also capacitively coupled through C26 to counter test point J3 where the signal may be monitored by a counter. The resistive combination of R23 and R24 develop a 50 ohm output impedance for J3.

The 40.0 mc signal present at the base of Q5 is amplified and the output of Q5 is coupled to J1 through two tuned circuits. Capacitor C30 and L5 form one tank circuit and its output is inductively coupled through L6 to the second tuned tank C32 and L7. Capacitor C31 is an isolation capacitor between the two tank circuits. The resistive combination of R34 and R35 provide the 50 ohm output impedance.

Output amplifier Q6 functions in a like manner for channel B. It may also be noted that all input power lines are heavily decoupled by LC networks to provide better isolation between channels.

With S3 in the VFO mode, Q1 and Q2 are disabled and Q3 and Q4 are enabled, by applying a positive and negative 12.5 vdc. Transistor Q3 is a Clapp oscillator which operates with the series resonant circuit composed of CR5, C20, CR6, C19, and L22. This circuit is resonant at 40.0 mc and may be varied ±250 kc about the center frequency by R2, the TUNING control on the front panel. Zener diodes CR3 and CR4 are temperature compensating components for Q3 that keep the oscillator stable. Diodes CR1 and CR2 are temperature compensating components for the voltage across the varicaps CR5 and CR6. The output of Q3 is taken at the junction of the tank circuit between C11 and C12. This 40.0 mc signal is then capacitively coupled to the base of buffer amplifier Q4. The output circuitry functions as explained in the XTAL position of S3. The capacitance of CR6 remains fixed in this due to the preset level of R7. R7 is switched out of the circuit in the AFC mode and varicap CR6, becomes sensitive to any drift in frequency that is noted in the Audio Metering module. This drift is fed back as a voltage proportional to the amount of drift from center frequency. This voltage causes the capacitance of CR6 to change and correct the oscillator's output. The TUNING control R2 still remains functional in this mode.

4.2.6 Limiter, LIM-301

The Limiter is shown in the schematic diagram of Figure 7-7. Figure 6-7 shows the physical location of components of the module printed circuit board.

The second IF frequency enters the module through connector A5 and is fed to transistor Q1. Transistors Q1 and Q2 act as a switching network. Q2 is saturated and becomes unsaturated only when a positive going voltage is fed to the base of Q1. The positive voltage then permits conduction of Q1. This switching occurs at the second IF rate.

The first stage drives the next stage consisting of transistors Q3 and Q4. The second stage is similar to the first. Transistor Q1 drives Q3 which becomes unsaturated when Q1 is conducting. Since Q2 becomes unsaturated while Q1 is conducting, the collector voltage of Q2 rises and causes Q4 to conduct. Emitter follower output stages are connected to the collectors of Q3 and Q4. These output stages Q5 and Q6 supply the same information but offer isolation between the limited IF signal and the limited Predetection Output. Resistor R3 is the limiting threshold control, adjusted for best AM rejection as viewed at limited predetection IF output A2.

4.2.7 Video Amplifier, VAM-304

The Video Amplifier is shown in the schematic diagram of Figure 7-8. Figure 6-8 shows the physical location of components on the module printed circuit board.

Three stages of video amplification are used with a full wave bridge rectifier to drive the OUTPUT meter and an emitter follower to provide a low impedance for the AGC output.

The input signal, selected from the FM demodulator or AM detector is connected to the base of transistor Q1. Capacitance values are quite large to insure adequate low frequency response. The combination of capacitor C2 and R3 provide an effective high input impedance to Q1. The amplified signal appearing at collector resistor R5 is directly coupled to the base of transistor Q2. Resistor R4, in the emitter circuit of Q1, is a zero set adjustment set for zero volts dc at test point TP1.

Diodes CR1 and CR2 provide a fixed voltage across R4, which also compensates for ambient temperature changes. The collector of Q2 is coupled directly to the base of transistors Q3 and Q4. These transistors, having complementry symmetry, can perform in a push pull manner without the need for phase opposition at their bases.

Transistors Q3 and Q4 are biased to function as class AB amplifiers to provide a high fidelity medium power signal output through R19 which provides a 50 ohm output impedance at J30 for channel A and J33 for channel B. The signal is also coupled through coupling capacitor C3 and resistor R12, to the full wave diode bridge composed of CR5 through CR9. This circuit rectifies the signal to provide a

dc actuating voltage for the OUTPUT meter located on the receiver front panel. Diode CR7 prevents the output from going in a reverse direction and damaging the meter. The AGC voltage is applied to the base of emitter follower Q5 which provides a low impedance output.

4.2.8 Audio Metering Amplifier, AMA-302

The Audio Metering Amplifier is shown in the schematic diagram of Figure 7-9. Figure 6-9 shows the physical location of components on the module printed circuit board.

The Audio Metering Amplifier contains the metering circuits for channels A and B; selected by a receiver front panel switch and connected to the meters on the receiver front panel. The module also contains the monitor audio amplifier for each, selected by the same switch to the speaker of the receiver front panel.

The signal flow through channel A is discussed; channel B is similar.

A1 is the video input for channel A. Test point TP1 is connected to the input point along with Q1 and Q2. Transistors Q1 and Q2 act as rectifiers. Q1 conducts when a negative going signal reaches its base and Q2 conducts when a positive signal reaches its base. The polarity of the pulse at the emitter of Q1 is opposite to the polarity of the pulse at the emitter of Q2.

These pulses are filtered by capacitors C3 and C4 to produce a dc voltage proportional to the amplitude of the input signal across resistors R7 and R8. Since this voltage has equal but opposite amplitudes, the voltage at the junction of R7 and R8 is zero volts dc.

If the receiver should drift off frequency, the output of the discriminator is no longer zero but becomes some dc voltage. This voltage causes either Q1 or Q2 to conduct slightly more than the other, according to the polarity of the voltage. This shifts the voltage at the junction of R7 and R8 one way or the other relative to the discriminator dc output voltage. Since the TUNING meter is effectively between the base of Q3 and the dc output voltage divider combination of R13 and R14, the meter will respond to small changes in voltages at the base of Q3 with respect to the voltage set by zero set potentiometer R13.

Transistors Q3 and Q4 make up the AFC circuit. When the voltage at the base of Q3 goes positive, the collector of Q4 will also go positive. The collector voltage of Q3 sent through R47 to the second local oscillator where it controls the receiver frequency, by "pulling" the oscillator back on frequency. Channel B does not require an AFG circuit since the channel A circuit controls the second local oscillator which is used in channels A and B.

The audio portion of the module is controlled by Q9, Q10 and Q11.

The audio input on pin 12 comes from the wiper arm of the AUDIO GAIN control R8. It is coupled to the base of Q9 where it is amplified, and applied to the bases of Q10 and Q11. These two transistors have complimentry symmetry and for this reason they react in a push pull manner without the need of phase opposition imposed upon their bases. The amplified audio output is coupled to P1-A3 where it drives the speaker. When head phones are used, the speaker is removed from the circuit.

4.2.9 Regulated Power Supply, RPS-301A

The Regulated Power Supply is shown in the schematic diagram of Figure 7-10. Figure 6-10 shows the physical location of components on the module printed circuit board.

The regulated power supply module supplies both positive and negative regulated 12.5 vdc and 150 vdc for receiver operation.

The ac voltage for the 150 volt supply enters the module through pins 36 and 37 of P1-J18. This voltage is rectified by an encapsulated bridge circuit CR9. The dc voltage is fed through pins 31 and 32. Pins 30, 33 and 34 are grounded. The dc voltage is filtered by a "pi" type filter, C7, C8 and R1. The regulated 12.5 vdc is supplied when approximately 22 vac enters pins 20 and 21 of module plug P1-J18 and becomes rectified by an encapsulated full bridge rectifier circuit CR7.

The dc voltage is electronically filtered by the Darlington emitter follower Q1 and Q2. The load current flows through series regulator transistor Q2, external to the module, and connected by pins 14, 15 and 16 of P1-J18. Any change in output voltage is sensed by the reference voltage regulator Q3 through the series combination of R8, R9 and R10. Zener diode CR1 maintains the emitter of Q3 at a constant voltage. Variations in output voltage are sensed by Q2 and Q3 and then placed on the base of Q4. This voltage changes the resistance of externally mounted Q2, in a direction that opposes the original output shift.

The Darlington emitter followers are a high impedance collector load for Q3. CR5 and CR3 are short circuit protection for the regulator. If the load current increases above 2 amperes, the voltage drop across R14 causes CR3 and CR5 to conduct. The emitter followers then approach cut-off, limiting current into the collector of Q3 and increasing the resistance of externally connected series transistor Q2. An equilibrium point is reached where the load current is limited to 2 amperes, should the output be shorted.

4.2.10 Noise Figure Amplifier, NFA

The Noise Figure Amplifier is shown in the schematic diagram of Figure 7-11. Figure 6-12 shows the physical location of components on the printed circuit board.

The noise figure amplifier contains two stages of amplification and an emitter follower to provide maximum output into a 50 ohm load. The output of the noise figure amplifier is available for monitoring at J37 channel A and J40 channel B on the rear apron of the receiver.

The 30 mc input signal is coupled from J1 through C1 to the base of Q1. The collector output of Q1 has a tank circuit C2, L1 which has a wide response centered at 30 mc. The output of the tank circuit is capacitively coupled through C6 to the base Q2. The amplified output at the collector of Q2 to applied to the base of emitter follower Q3. C7 and L2 in the collector circuit of Q2 form a 40 mc trap which greatly attenuates signals at the second L0 frequency of 40 mc and reduce overall frequency response of the Amplifier. The output of emitter follower Q3 is coupled through C10 to output jack J2.

SECTION 5. MAINTENANCE

5.1 General.

This section contains the necessary information for overall performance and testing of the R-2074A-1 receiver.

In the event a malfunction should occur, the troubleshooting procedure outlined in the subsequent paragraphs should be followed.

5.2 Test Equipment Required.

1. Oscilloscope, Tektronix Type 541
2. Signal Generator, Hewlett-Packard 606A
3. Audio Oscillator, Hewlett-Packard 200CD
4. VTVM, RCA WV98B
5. VOM, Simpson 260
6. Sweep Generator, Jerrold 900B
7. Electronic Counter, Hewlett-Packard 5245C
8. RF VTVM, Boonton 91D
9. Signal Generator, Boonton 202D
10. Module Extender
11. Digital Voltmeter, Hewlett-Packard 3460A
12. 50 ohm 6 db pad, Applied Research Inc., HFA 50
13. Alignment Tool, Cambion 3033
14. Miscellaneous BNC and Microdot Fittings
15. Voltage Source, Hewlett-Packard 721

5.3 Troubleshooting.

If the receiver malfunctions, the following troubleshooting procedures should be followed before any attempt is made at individual module alignment, described in this section.

Inspect the receiver for proper interconnection of all equipment and inter-module cabling.

Check fuses on front panel to insure they are operative and 0.75 ampere.

Check for proper voltages at test points on the power supply wraparound. Use TP3 for +150 vdc unregulated. Test points are also provided on the printed circuit boards for plus and minus 12.5 vdc.

If a malfunction occurs, first determine which channel of the receiver is at fault and then interchange that channel's modules with the other channel's modules, one at a time, to isolate the difficulty to a particular module. When the trouble has been isolated to a particular module, refer to that module's alignment procedures for further testing. Also refer to Table 5-1 for approximate voltages on semiconductors.

5.4 Preliminary Alignment Checks

The following preliminary alignment checks describe a method by which a malfunction can be isolated to a particular section of the receiver, such as the RF, IF, audio metering, video, or AGC.

5.4.1 Preliminary Audio Metering and Video

Refer to Figure 7-1, R-2074A-1 Receiver, Main Chassis Schematic Diagram while conducting the following preliminary alignment checks:

1. Turn the CHANNEL MONITOR switch to the channel that is being checked.

2. Turn the VIDEO AM FM switch to the FM position.

3. Remove theIF bandwidth filter and demodulator and connect the HP-200 CD audio oscillator to pin 1 of J9 when checking channel A or to pin 1 of J10 when checking channel B.

4. Set the output level of the HP-200 CD audio oscillator to 2.5 volts p-p at 1 kc rate.

5. The DEVIATION meter should read approximately 100%. Reduce the output level of the HP-200 CD audio oscillator to 1.25 volts p-p.

   The DEVIATION meter should read approximately 50%.

6. Readjust the output level of the HP-200 CD audio oscillator to 2.5 volts p-p.

7. Disconnect the HP-200 CD audio oscillator and reconnect it to pin 10 of J9 when checking channel A or to pin 10 of J10 when checking channel B.

8. Turn the AUDIO GAIN control CW until a 1 kc tone is heard, then connect a pair of headphones to PHONE JACK J42 located on the front panel and check that audio is disconnected from the speaker and connected to the headphone.

9. Connect the Tektronix 541 oscilloscope to the VIDEO output jack J30 for channel A or J33 for channel B. These jacks are located on the rear apron of the receiver. Adjust the VIDEO OUTPUT control for 4 volts p-p on the oscilloscope.

10. Check that OUTPUT meter reads 0 db. This point is established with the CAL control on the front panel and may be adjusted to read 0 db at the desired VIDEO OUTPUT LEVEL.

11. Readjust the VIDEO OUTPUT level control for 10 volts p-p on the oscilloscope. The OUTPUT meter should read approximately 4 db.

12. Remove the HP-200 CD audio oscillator and apply a DC voltage of +1.25 volts to pin 1 of J9 for channel A or pin 1 of J10 for channel B.

13. Check that the TUNING meter swings through its range as the voltage is varied from +1.25 to -1.25 vdc.

14. Remove the oscilloscope and the DC voltage source and replace the IF bandwidth filters and demodulator.

5.4.2 Second IF and Demodulator Preliminary Check

1. Use the Boonton 202D signal generator and the Boonton 207D univerter and connect a 10 mc IF signal at a level of 1 mv to J1 of the second IF amplifier module, SIF-302.

2. Set the 202D signal generator for FM operation at a 1 kc rate with deviation equal to 50% of the IF bandwidth.

3. Turn the CHANNEL MONITOR switch to the channel being checked.

4. The DEVIATION meter should read approximately 50%.

5. The TUNING Meter should be approximately at the center and should produce an indication of tuning as the input frequency is varied.

6. Connect the Tektronix 541 oscilloscope to the video output jack J30 for channel A or J33 for channel B. The 1 kc modulation frequency should be observed on the oscilloscope.

7. Remove the oscilloscope and reconnect it to DC FM output jack J31 for channel A or J34 for channel B. The 1 kc modulation frequency should be observed on the oscilloscope.

8. Place the Boonton 202D signal generator and the receiver in the AM position and set the signal generator for 30% AM.
9. Use the oscilloscope and check to see if the demodulated video appears at the DC AM output jacks and at the Video output jacks.

5.4.3 First IF and Second Local Oscillator Preliminary Check

1. Connect the Boonton 202D signal generator and the Boonton 207D univerter to J1 of the first IF amplifier module, FIF-302.
2. Set the output level to 300 microvolts at a frequency of 30 mc.
3. Set the second LOC OSC selector to the crystal position.
4. Repeat steps 2 through 9 under 5.4.2 above.
5. Set the second LOC OSC selector to the VFO position and check the TUNING control for an indication of proper tuning as indicated by the TUNING Meter.

5.4.4 RF Tuner Preliminary Checks

1. Connect the Boonton 202D signal generator to the antenna input jack J19A for channel A or J20A for channel B.
2. Repeat steps 2 through 9 under 5.4.2 above with 10 microvolts signal input level.
3. Connect the Tektronic 541 oscilloscope to the second IF PREDETECTION OUTPUT, J25 for channel A or J28 for channel B and terminate the line with a 50 ohm load.
4. Place the AGC selector switch in the FM position. Vary the CW input signal level from 0 to 100 mv and check that the output is held constant at 500 mv p-p ± 10%.
5. Repeat step 4 with the AGC selector switch in the AM position and in the PULSE position.
6. Check the calibration of the Signal Strength meter with variations of input signal level. All points should be within 1/2 of a division.
7. With the signal input (100 mv tuned) slightly off center frequency as indicated by the Tuning Meter, place the second LOC OSC selector in the AFC position and check that the Tuning Meter is recentered within ±2 divisions. This check can be made utilizing channel A only since the second local oscillator is common and the AFC loop is connected to the channel A discriminator.

5.5 Intermediate Frequency Filter Alignment.

Refer to Figure 7-1, R-2074A-1 Main Chassis Schematic Diagram and to Figure 7-2, IFF 304 Schematic Diagram.

1. Connect sweep generator Jerrold 900B to J1 of the module.
2. Tune the generator to 30 mc with a sweepwidth of 5 mc.
3. Connect H/P 606A signal generator to sweep generator. This will supply the required markers.
4. Connect the oscilloscope to the top of L2 through the detector in the sweep generator.
5. Short circuit L3 to ground and adjust C5 for a maximum response centered at 29.2 mc. (Use counter to check H/P 606A's frequency.)
6. Remove the short from L3 and short circuit L4.
7. Connect the detector to L3 and tune C8 for a minimum response centered at 30 mc.
8. Remove the short from L4 and short circuit C16 to ground.
9. Connect the detector to the top of L4 and adjust C12 for maximum response centered at 30 mc.
10. Remove short from C12 and connect detector to J2 of the module.
11. Adjust C17 for a symmetrical response centered at 30 mc.
12. Readjust C8 and/or C12 as needed, to remove any tilt that may be present in the overall response. Do not readjust C5.

5.6 First IF Module Alignment.

Refer to Figure 7-1, R-2074A-1 Main Chassis Schematic Diagram and to Figure 7-3, First IF Amplifier Schematic Diagram.

1. Connect sweep generator, Jerrold 900B to J1 of the module and tune to 30 mc with at least 10 mc sweepwidth, and 10 millivolt output level.
2. Connect the H/P 606A signal generator to the sweep generator and tune to 30 mc. This will supply the 30 mc marker.
3. Place the 2nd LOC OSC switch in the PLAYBACK position.
4. Connect the oscilloscope to the detector of the sweep generator, and connect the 50 ohm detector to J2 of the module.
5. Place AGC selector on the front panel to MANUAL and set MANUAL control clockwise.
6. Set R41 and R44 to their mid positions.

7. Adjust L1, L3 and L4 for a symmetrical response centered at 30 mc. The top of the response should be slightly rounded and approximately 6 mc at -1 db.
8. Remove detector from J2 and connect it to J4.
9. Reduce output level of the sweep generator to 1 millivolt.
10. Place the 2ND LOC OSC switch on the front panel to the XTAL position.
11. Adjust L5, L6 and L8 for a symmetrical response centered at 10 mc that is approximately 6 mc wide at its 3 db down points.

5.6.1 Gain and AGC Check.

NOTE

Perform gain and AGC check only if AGC circuit malfunctions.

1. Set MANUAL Gain control, on the front of the receiver, maximum counter-clockwise. (Minimum gain)
2. Connect signal generator H/P 606A set for 1 mv at 30 mc to J1 of the module. Adjust R70 for an output level of 180 millivolts.
3. Set the MANUAL GAIN control for -8 volts at TP1 on the AGC module and adjust the H/P 606A output for 180 millivolt.
4. Connect RF VTVM, Boonton 91D, terminated into 50 ohms, to J4 of the FIF module.
5. Keeping the AGC voltage constant at TP1 of the AGC module, adjust R25 for a 180 millivolt reading on the RF VTVM.
6. Reset the level of the HP/606A to 1 millivolt output.
7. Set the MANUAL Gain control to maximum gain. (Fully clockwise)
8. Reading on the RF VTVM should be 180 millivolts. If not adjust R70 to attain desired reading and then repeat steps 3 through 5.
9. Turn the receiver power off.
10. Disconnect all test equipment.
11. Remove module extender and module.
12. Replace the covers and install module in receiver chassis.

5.7 Second IF Amplifier Alignment.

Refer to Figure 7-1, R-2074-1 Main Chassis Schematic and Figure 7-5; Second IF Amplifier Schematic

1. Connect sweep generator, Jerrold 900B to J1 of the module and tune to 10 mc with at least 10 mc sweep range, and 10 millivolt output level.
2. Connect the H/P 606A signal generator to the sweep generator and tune to 10 mc. This will supply the 10 mc marker.
3. Connect the oscilloscope to the detector of the sweep generator, and connect the detector to J25 at the rear of the receiver.
4. Place AGC selector on the front panel to MANUAL and set AGC to "0".
5. Adjust L3, L5 and L6 for a symmetrical response centered at 10 mc. The top of the response should be flat and have a 5 mc bandwidth at the 3 db points.
6. Reduce output level of the sweep generator to 1 millivolt.
7. Adjust R23 for a 180 millivolt deflection on the oscilloscope.

5.8 Automatic Gain Control Module Alignment.

Refer to Figure 7-1, R-2074A-1 Main Chassis Schematic and Figure 7-6, Automatic Gain Control Schematic.

1. Connect the Boonton 202D to J19A the ANT input for channel A.
2. Tune the receiver and generator to 225 mc and set the output level of the generator to 500 microvolts.
3. Connect the RF VTVM in parallel with a 50 ohm load to J25 on the rear of the receiver.
4. Adjust R3 for a .180 volt rms reading on the RF VTVM.
5. Set level of the 202D to 100,000 microvolts and adjust R37 for full scale deflection of the Signal Strength Meter.
6. Reduce level of the 202D to 1 microvolt and adjust R5 for zero.
7. Repeat steps 5 and 6 until settings are optimized. (Signal strength meter reads properly)
8. For channel B adjustments repeat steps 1 through 7 using components particular to that channel as indicated on Figures 7-1 and 7-6.

5.9 Limiter Module, LIM-301 Alignment.

Refer to Figure 7-1, R-2074A-1 Main Chassis Schematic Diagram and to Figure 7-7, Limiter Schematic Diagram.

1. Connect the Boonton 202D Signal Generator to J19A for channel A or to J20A for channel B.
2. Place the CHANNEL MONITOR selector to the channel being checked.
3. Connect the Tektronix 541A oscilloscope to the LIMITED PREDETECTION output jack J26 for channel A or J29 for channel B.
4. Turn on the receiver power.
5. Set the receiver and the signal generator for AM operation and set the signal generator for 30% AM at a 1 kc rate at the receiver center frequency.
6. Set the output line of the signal generator to 1 mv.
7. Adjust R3 on Limiter Module LIM-301 for symmetrical clipping of the R6 output signal.
8. Turn off the receiver power.
9. Disconnect all test equipment.

5.10 Video Amplifier Module, VAM-301 Alignment.

Refer to Figure 7-1, R-2074A-1 Main Chassis Schematic Diagram and to Figure 7-8, Video Amplifier Schematic Diagram.

1. Connect the Boonton 202D Signal Generator to the antenna input, J19A for channel A or J20A for channel B.
2. Place the CHANNEL MONITOR selector to the channel being tested.
3. Place VIDEO AM FM selector in the FM position.
4. Connect the Tektronix 541A Oscilloscope to VIDEO output jack, J30 for channel A or J33 for channel B.
5. Set the signal generator for AM operation and set for 30% AM and tuned to the receiver center frequency with an output level of 1 mv.
6. Adjust the VIDEO OUTPUT level control for 5 volts p-p as read on the oscilloscope.
7. Remove the modulation (CW signal) and place the oscilloscope in DC operation.
8. Adjust R4 on Video Amplifier Module, VAM-304 for 0 vdc as indicated by the oscilloscope.
9. Connect the DC VTVM to the AGC OUTPUT jack J36 for channel A, J39 for channel B.

10. Place AGC selector know to MANUAL position on the front panel.
11. Vary the MANUAL GAIN control to minimum and maximum. The VTVM should indicate from approximately +0.8 v to -8.0 v.
12. Turn off the receiver power.
13. Disconnect all test equipment.

5.11 AFC and Audio Metering Module AMA-302 Alignment.

Refer to Figure 7-1, R-2074A-1 Main Chassis Schematic Diagram, and to Figure 7-9, Audio Metering Schematic Diagram.

1. Operating Controls
   a) AGC at FM position
   b) Second LO in XTAL position
   c) Video selector on FM position
   d) Channel Monitor selector on A position
2. Short circuit TP1 to ground.
3. Adjust R13 to center (zero) tuning meter.
4. Remove short circuit and connect the signal generator to the 1ST IF/ SDU J24 for channel A or J27 for channel B and tune to exactly 30 mc.
5. Connect the counter to the 2ND IF PRE DETECTION output J25 and adjust the frequency of the signal generator until the receiver is properly tuner (10 mc on the counter).
6. With 2ND LO selector in VFO position, adjust TUNING control for 10 mc on counter.
7. With 2ND LO selector in AFC position, adjust R43 for 10 mc output on counter.
8. Set signal generator for FM deviation equal to 50% of IF bandwidth and connect oscilloscope to video output.
9. Tune signal generator slightly off center frequency while 2nd LO selector is in VFO position, then switch to AFC. Signal should return to center of passband. Repeat by tuning off to the other side.
10. Short circuit TP2 to ground.
11. Place channel monitor selector in B position and adjust R31 to center (zero) on tuning meter

5.12 Second Local Oscillator, SLO-303 Alignment.

Refer to Figure 7-1, R-2074A-1 Main Chassis Schematic Diagram and to Figure 7-4, Second Local Oscillator Schematic Diagram.

1. Connect Boonton 91D to J3 in parallel with 50 ohm load.
2. Set 2ND LOC OSC switch to XTAL.
3. Adjust C3 for stable reading on 91D.
4. Adjust C8 for maximum reading on 91D (100 mv).
5. Disconnect 91D from J3 and connect counter to J3. Counter should read 40 mc ±2 kc.
6. Connect 91D with a 50 ohm load to J1 and terminate J2 into 50 ohms.
7. Tune C30 and C32 for maximum reading on 91D.
8. Terminate J1 into 50 ohms and connect 91D to J2 and adjust C34 and C39 for maximum reading on 91D.
9. Connect the WV98B VTVM to P1-9.
10. Switch to VFO mode and with TUNING pot still on center, set R7 for 3.3 volts on VTVM.
11. Adjust L22 for 40.0 mc at J3.
12. Vary TUNING control on front panel and note variation in output.
13. Set TUNING control for minimum output on 91D.
14. Adjust C34 and/or C39 slightly to increase reading on 91D.
15. Return TUNING control to center and note reading.
16. Vary TUNING control over entire range. Variation total should not be be greater than ±1 db, from center position.
17. Repeat steps 12 through 16 for J1 using C30 and C32.
18. Output levels at J1 and J2 in XTAL and VFO positions should read nominally 0.7 v rms.

5.13 Alignment and Test Procedure for RPS-301A.

1. Turn the receivers power switch ON.
2. With Hewlett-Packard digital voltmeter, measure the ±12.5 vdc and the +150 vdc supplies

+12.5 vdc - Adjust R9 - Limit (+11.25 - +13.75)

-12.5 vdc - Adjust R12 - Limit (-11.25 - -13.75)

+150 vdc - - Limit (+135 - +165)

Table 5-1. Semiconductor Voltage Measurements

Reference Designation	Type	Voltage Reading On: Emitter	Base	Collector
IFF-302				
Q1	2N3478	-7.4	-6.6	0.0
Q2	2N3478	+1.45	+2.2	+5.1
Q3	2N2219	+4.6	+5.1	+8.2
FIF-302				
Q1	2N3227	-0.68	0	+11.3
Q2	2N3291	-1.15	-0.45	+11.8
Q3	2N3291	-1.15	-0.45	+11.8
Q4	2N3291	-1.15	-0.45	+11.4
Q5	2N3291	-1.15	-0.45	+11.8
Q6	2N3227	-6.4	-5.8	0
Q7	2N3291	-0.75	-0.04	+11.8
Q8	2N3291	-0.75	-0.04	+11.8
Q9	2N3291	-1.3	-0.62	+11.7
Q10	2N3291	-1.3	-0.62	+11.7
Q11	2N3227	-0.78	-0.1	+6.4
Q12	2N3227	-0.86	-0.17	+2.7
Q13	2N3251	+3.4	+2.7	0
SLO-303				
Q1	2N3291	-0.7	0	+6
Q2	2N3251	+1.2	+0.5	-11.5

Table 5-1. Semiconductor Voltage Measurements (Cont.)

Reference Designation	Type	Voltage Reading On: Emitter	Base	Collector
SLO-303 (Cont.)				
Q3	2N3291	-1.7	-1.0	+6.2
Q4	2N3251	+1.2	+0.5	-11.5
Q5	2N3251	+0.7	0	-11.5
Q6	2N3251	+0.7	0	-11.5
SIF-302A				
Q1	2N3291	-1.15	-0.45	+11.8
Q2	2N3291	-1.15	-0.45	+11.8
Q3	2N3291	-1.15	-0.45	+11.4
Q4	2N3291	-1.15	-0.45	+11.8
Q5	2N3291	-1.3	-0.62	+11.7
Q6	2N3291	-1.3	-0.62	+11.7
Q7	2N3227	-3.4	-2.7	+12.0
Q8	2N3227	-4.1	-3.4	+11
Q9	2N2218	-4.1	-3.4	+11
Q10	2N708	-4.1	-3.4	+11
Q11	2N2218	-10.3	+11	+12.5
Q12	2N3391	-4.7	-5.5	+12.5
Q13	2N708	-2.8	-3.5	+12.5
LIM-301A				
Q1	2N3291	+2.15	+2.83	+8.3
Q2	2N3291	+2.15	+2.83	+8.3
Q3	2N3291	+7.6	+8.3	+11.9
Q4	2N3291	+7.6	+8.3	+11.9
Q5	2N2218	-0.8	-1.5	0

Table 5-1. Semiconductor Voltage Measurements (Cont.)

Reference Designation	Type	Voltage Reading On: Emitter	Base	Collector
LIM-301A (Cont.)				
Q6	2N2218	-0.8	1.5	0
AGC-303				
Q1	2N708	+0.9	+1.5	+12.5
Q2	2N708	+0.9	+1.5	+12.5
Q3	2N929	-0.3	+0.3	+12.5
Q4	2N3250	+0.3	-0.3	-12.5
Q5	2N3250	+1.5	+1.5	0 to -8
Q6	2N3250	+1.5	+0.9	0 to -8
Q7	2N3391	-0.6 to -8.6	0 to -8	+12
Q8	2N2904	0 to -8	-0.6 to -8.6	-12
Q9	2N2350	0 to -5	+0.6 to -4.4	-12
Q10	2N708	+0.9	+1.5	+12.5
Q11	2N708	+0.9	+1.5	+12.5
Q12	2N929	-0.3	+0.3	+12.5
Q13	2N3250	+0.3	-0.3	-12.5
Q14	2N3250	+1.5	+1.5	0 to -8
Q15	2N3250	+1.5	+0.9	0 to -8
Q16	2N3391	-0.6 to -8.6	0 to -8	+12
Q17	2N2904	0 to -8	-0.6 to -8.6	-12
Q18	2N2350	0 to -5	+0.6 to -4.4	-12
VAM-304				
Q1	2N2218	-0.63	0	+11.6
Q2	2N2904	+12.2	+11.6	+0.96
Q3	2N2218	+0.29	+0.96	+12.3

Table 5-1. Semiconductor Voltage Measurements (Cont.)

Reference Designation	Type	Voltage Reading On: Emitter	Base	Collector
VAM-304 (Cont.)				
Q4	2N2904	+0.15	-0.49	-12.3
Q5	2N1991	-8.65	-8.0	+10.6
AMA-302				
Q1	2N1991	+0.7	0	-12
Q2	2N708	-0.7	0	+12
Q3	2N3391	-0.7	0	+4.5
Q4	2N3391	-0.7	0	+12
Q5	2N1991	+0.7	0	-12
Q6	2N708	-0.7	0	+12
Q9	2N708	-6.7	-6.0	-7.0
Q10	2N708	0	+0.7	+12
Q11	2N1991	0	-0.7	-12
NFA				
Q1	2N3222	-11.0	-11.7	-1.5
Q2	2N3222	-10.8	-11.5	-1.7
Q3	2N3222	-1.0	-1.7	0

SECTION 6. SPARE PARTS

6.1 General

When ordering replacements parts, give the equipment name and model number and the reference designation number and description of each item ordered.

Table 6-1. Replaceable Parts, R-2074A-1, Main Chassis

Reference Designation	Name and Description	Part Number Vitro	Vendor
SIF-302	SECOND IF AMPLIFIER ASSEMBLY	301586-90	
LIM-301	LIMITER ASSEMBLY	200961-90	
AMA-301A	AUDIO METERING ASSEMBLY	201581-90	
AGC-303	AUTOMATIC GAIN CONTROL ASSEMBLY	201582-90	
VAM-304	VIDEO AMPLIFIER ASSEMBLY	200999-91	
FIF-302	FIRST IF AMPLIFIER ASSEMBLY	201595-90	
RPS-301A	REGULATED POWER SUPPLY ASSEMBLY	201595-90	
SLO-303	SECOND LOCAL OSCILLATOR ASSEMBLY	201584-90	
IFF-304	FIRST IF FILTER ASSEMBLY	201580-90	
NFA	NOISE FIGURE AMPLIFIER	201700-90	
	FILTER BOARD (±12 v)	201692-90	
	AGC DISTRIBUTION BOARD	201796-90	
C1, C2, C3, C4	CAPACITOR DISC. .005 mfd, GMV, 1400 v	90901740	Radio Materials Type U
C5, C6	CAPACITOR ELECTROLYTIC: 800 mfd, +100%, -10%, 25 v w/acetate sleeve MIL-C-62	90910282	Sprague CE41C801F
C7, C8	CAPACITOR ELECTROLYTIC: 220 mfd, +75%, -10%, 200 v w/ acetate sleeve	9091073	Sprague CE41C221K
C11	CAPACITOR: 1 mfd, ±20%, 25 v	90901910	Sprague 5C13
C12	CAPACITOR MONOLYTIC: 180 mfd, 20%, 25 v	90930506	Sprague 109D187X0025T2

Table 6-1. Replaceable Parts, R-2074A-1, Main Chassis (cont.)

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
C13	CAPACITOR, TANTALUM: 10 mfd, ±10%, 20 v	90930099	Sprague 150D106X9020B2
C14	CAPACITOR, TANTALUM: 100 mfd, ±20%, 20 v	90930425	Sprague 150D117X002052
C43, C44	CAPACITOR DISC. .01 mfd, GMV, 500 v	90901760	Sprague 29C9B8
C45, C46	CAPACITOR, TANTALUM: 22 mfd, ±20%, 15 v	90930139	Sprague 150D226X0015B2
C48	CAPACITOR, Monolytic: 2.2 mfd, ±20%, 25 v	90901940	Sprague 5C15
C50	Same as C13		
C51	Same as C14		
C52, C53	Same as C48		
CR1	DIODE: 1N457	91600160	
DS1	LAMP CARTRIDGE WITH LETTER (A) HOT STAMPED	92500041	Dialco 39-63-374
DS2	LAMP CARTRIDGE WITH LETTER (B) HOT STAMPED	92500042	Dialco 39-63-371
DS1, DS2	LAMP HOLDER	92490005	Dialco 7538
F1, F2	FUSE: 0.75 amp. Slo-Blo	91800200	Buss Type MDL
Spares	Same as F1		
J1, J2	CONNECTOR RECP.	91270947	Cannon DCM25W3S
J3, J4	CONNECTOR RECP.	91370921	Cannon DCMF-13W6S
J5	CONNECTOR RECP.	91370922	Cannon DCMF-17W5S
J6, J7, J8	Same as J3		

Table 6-1. Replaceable Parts, R-2074A-1, Main Chassis (cont)

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
J9, J10	CONNECTOR RECP.	91370944	Cannon DBMF-13W3S
J11, J12	Same as J3		
J14, J15, J16	Same as J3		
J17	Same as J5		
J18	CONNECTOR RECP.	91370924	Cannon DCMF-375
J19, J20	CONNECTOR ADAPTER: Type N UG30D/U	91370010	
J21	CONNECTOR POWER MODIFIED	103056-90	
J22 up to and incl. J41	CONNECTOR BULKHEAD JACK	91370075	Automatic Metal Products 011-B3800C-75C
J42	PHONE JACK	91370115	Switch Craft L12A
L1, L2	CHOKE: 3.1 uh	AA-15060-01	
L3, L4	CHOKE:38 uh	91150039	Wilco 3038-15
LS1	SPEAKER 12 ohm VOICE COIL	94650051	Oxford 2P42
M1	METER SIGNAL STRENGTH	103052-90	
M2	METER OUTPUT	101949-90	
M3	METER DEVIATION	101947-90	
M4	METER TUNING	101946-90	
Q1	TRANSISTOR: 2N3789		
Q2	TRANSISTOR: 2N3713		
R1	RESISTOR, Fixed Composition: 500 ohms, ±3%, 10 w	93580300	Dale RH-10
R2	RESISTOR, Variable Composition: 100 K, 10%, 2 w Dual Concentric	93150478	Allen Bradley JAIN056P104VA

Table 6-1. Replaceable Parts, R-2074A-1, Main Chassis (cont)

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
R4	RESISTOR, Fixed Composition: 1 meg, 5%, 1/4 w	93531210	RC07GF105J MIL-R-11
R5, R6	POTENTIOMETER, Composition: 10K, 10%, 2 w	93150250	Allen Bradley JAIL059S103UC
R7	RESISTOR, Variable Composition: 2.5 k, 10%, 1/2 w	93140022	RV6LAYSA252A
R8	RESISTOR, Variable Composition: 5 k, 10%, 1/2 w	91340026	Allen Bradley GAIN040P502UA
R9, R10	RESISTOR, Variable Composition: 10 k, 10%, 2 w, Dual Concentric	93150239	Allen Bradley JJC1N056P116P103UA
R11, R12	RESISTOR, Variable Composition: 500 ohm, 10%, 2 w Dual Concentric	93150071	Allen Bradley JJC1N056P116P501UA
R14	RESISTOR, Fixed Composition: 120 k, ±5%, 1/4 w	93530990	RC07GF124J MIL-R-11
R15	RESISTOR, Fixed Composition: 47 k, ±5%, 1/4 w	93530890	RC07GF473U MIL-R-11
R17	Same as R4		
R18	Same as R15		
R20	RESISTOR, Fixed Composition: 5.1 k, ±5%, 1/4 w	93530660	AC07GF512J MIL-R-11
R21	RESISTOR, Fixed Composition: 2.2 k, ±5%, 1/4 w	93530570	RC07GF222J MIL-R-11
S1, S2	SWITCH TOGGLE DPDT	94850535	Cutler Hammer 8363K7
S3, S4	SWITCH ROTARY DUAL CONCENTRIC	193001-01	Centralab (modified)
S5	SWITCH ROTARY	102803-01	
S6, S7	SWITCH ROTARY DUAL CONCENTRIC	102804-01	Centralab (modified)
S8, S9	SWITCH ROTARY DUAL CONCENTRIC	102803-01	Centralab (modified)
S10	SWITCH ROTARY	102805-02	
S11, S12	VIDEO FILTER SWITCH ASSEMBLY	201134-91	
T1	POWER TRANSFORMER	102760-90	
XF1, XF2	FUSE HOLDER	92120110	Buss HKP
XQ1, XQ2	SOCKET POWER TRANSISTOR	94450008	Augat 8038-1G3

Table 6-2. Replaceable Parts, First IF Amplifier Module, FIF-302

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
A1 thru A4	CONNECTOR, Contact Termination	91371415	Cannon DM-53740-5008
C1 thru C4	CAPACITOR, Fixed: .001 uf, ±20%, 500 v	90901641	R2CC60Z5U102M RS-198
C5, C6	CAPACITOR, Fixed: .005 uf, +80% -20%, 50 v	90901748	Sprague TG-D50
C7	Same as C1		
C8	CAPACITOR, Fixed: 39 pf, ±5%, 500 v	90921186	Elmenco DM15E390J03
C9 thru C11	Same as C1		
C12	CAPACITOR, Fixed: 68 pf, ±5%, 500 v	90921198	Elmenco DM15E680J03
C13	CAPACITOR, Fixed: 100 pf, ±5%, 500 v	90921211	Elmenco DM15F101J03
C14	CAPACITOR, Fixed: 82 pf, ±5%, 500 v	90921203	Elmenco DM15E820J03
C15	Same as C8		
C16	Same as C1		
C17	Same as C5		
C18 thru C20	Same as C1		
C21	CAPACITOR, Fixed: 10 pf, ±5%, 500 v	90921152	Elmenco DM15F100J03
C22, C23	Same as C5		
C24 thru C26	Same as C1		
C27	Same as C21		
C28, C29	Same as C5		
C30	Same as C1		
C31	Same as C5		
C32	CAPACITOR, Fixed: 62 pf, ±5%, 500 v	90921153	Elmenco DM15F620J03
C33	Same as C5		
C34	Same as C1		

Table 6-2. Replaceable Parts, First IF Amplifier Module, FIF-302 (Cont.)

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
C35	CAPACITOR, Fixed: 3.3 pf, ±5%, 500 v	90900343	Quality Components QC-3.3
C36	CAPACITOR, Fixed: 8.2 pf, ±5%, 500 v	90900624	Quality Components QC-8.2
C37	Same as C1		
C38	CAPACITOR, Fixed: 0.01 uf, +80% -20%, 50 v	90901758	Sprague 19C214
C39	Same as C13		
C40	CAPACITOR, Fixed: 180 pf, ±5%, 500 v	90921155	Elmenco DM15E181J03
C41	Same as C1		
C42 thru C45	Same as C5		
C46	Same as C14		
C47	CAPACITOR, Fixed: 56 pf, ±5%, 500 v	90921194	Elmenco DM15E560J03
C48, C49	Same as C5		
C50	CAPACITOR, Fixed: 33 pf, ±5%, 500 v	90921182	Elmenco DM15E330J03
C51 thru C54	Same as C5		
C55	Same as C50		
C56 thru C58	Same as C5		
C60 thru C62	Same as C5		
C63	Same as C38		
C64	Same as C5		
C65	Same as C13		
C66, C67	Same as C1		
C68 thru C72	Same as C5		
CR1, CR2	DIODE	91600400	1N4308
J1 thru J4	CONNECTOR, Receptacle:	91371810	Microdot 131-0135-0001

Table 6-2. Replaceable Parts, First IF Amplifier Module, FIF-302 (Cont.)

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
L1	CHOKE, RF Variable: 1.0 uh	91150000	Nytronics VIV-1.0
L2	CHOKE, RF: 2.7 uh	91150072	Nytronics WEE-2.7
L3, L4	Same as L1		
L5, L6	CHOKE, RF, Variable: 6.8 uh	91150087	Nytronics VIV-6.8
L7	CHOKE, RF: 6.8 uh	91150073	Nytronics WEE-6.8
L8	Same as L5		
P1	CONNECTOR, Plug:	91370523	Cannon DCM-13W6P
Q1	TRANSISTOR	95354120	2N3227
Q2 thru Q5	TRANSISTOR	95354080	2N3291
Q6	Same as Q1		
Q7 thru Q10	Same as Q2		
Q11, Q12	Same as Q1		
Q13	TRANSISTOR	95354102	2N3251
R1	RESISTOR, Fixed Composition: 390 ohms, ±5%, 1/4 w	93530390	RC07GF391J MIL-R-11
R2	RESISTOR, Fixed Composition: 56 ohms, ±5%, 1/4 w	93530184	RC07GF560J MIL-R-11
R3	Same as R1		
R4	RESISTOR, Fixed Composition: 560 ohms, ±5%, 1/4 w	93530430	RC07GF561J MIL-R-11
R5	RESISTOR, Fixed Composition: 1.0 K, ±5%, 1/4 w	93530490	RC07GF102J MIL-R-11
R6, R7	RESISTOR, Fixed Composition: 10 ohms, ±5%, 1/4 w	93530010	RC07GF100J MIL-R-11
R8	Same as R2		

Table 6-2. Replaceable Parts, First IF Amplifier Module, FIF-302 (Cont.)

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
R9	RESISTOR, Fixed Composition: 100 ohms, ±5%, 1/4 w	93530250	RC07GF101J MIL-R-11
R10	Same as R2		
R11	Same as R9		
R12	RESISTOR, Fixed Composition: 1.2 K, ±5%, 1/4 w	93530510	RC07GF122J MIL-R-11
R13, R14	RESISTOR, Fixed Composition: 120 ohms, ±5%, 1/4 w	93530270	RC07GF121J MIL-R-11
R15	RESISTOR, Fixed Composition: 1.5 K, ±5%, 1/4 w	93530530	RC07GF152J MIL-R-11
R16	RESISTOR, Fixed Composition: 2.2 K, ±5%, 1/4 w	93530570	RC07GF222J MIL-R-11
R17 thru R19	Same as R5		
R20	RESISTOR, Fixed Composition: 5.1 K, ±5%, 1/4 w	93530660	RC07GF512J MIL-R-11
R21	RESISTOR, Fixed Composition: 3.9 K, ±5%, 1/4 w	93530630	RC07GF393J MIL-R-11
R22	Same as R20		
R23	Same as R21		
R24	RESISTOR, Fixed Composition: 6.8 K, ±5%, 1/4 w	93530690	RC07GF682J MIL-R-11
R25	RESISTOR, Variable: 1 K, ±20%, 3/4 w	93140340	IRC 251-20
R26	Same as R5		
R27	Same as R13		
R28	Same as R9		
R29	RESISTOR, Fixed Composition: 820 ohms, ±5%, 1/4 w	93530470	RC07GF821J MIL-R-11
R30	Same as R5		
R31, R32	Same as R20		
R33 thru R35	Same as R21		
R36	Same as R20		

Table 6-2. Replaceable Parts, First IF Amplifier Module, FIF-302 (Cont.)

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
R37	RESISTOR, Fixed Composition: 510 ohms, ±5%, 1/4 w	93530420	RC07GF511J MIL-R-11
R38	Same as R13		
R39	RESISTOR, Fixed Composition: 680 ohms, ±5%, 1/4 w	93530450	RC07GF681J MIL-R-11
R40	RESISTOR, Fixed Composition: 68 ohms, ±5%, 1/4 w	93530190	RC07GF680J MIL-R-11
R41	RESISTOR, Variable: 50 ohms, ±20%	93140071	Helitrim 62P
R42,R43	Same as R5		
R44	Same as R41		
R45	Same as R29		
R46,R47	RESISTOR, Fixed Composition: 4.3 K, ±5%, 1/4 w	93530640	RC07GF432J MIL-R-11
R48	Same as R16		
R49	Same as R13		
R50	Same as R4		
R51,R52	Same as R16		
R53,R54	Same as R20		
R55,R56	RESISTOR, Fixed Composition: 12 K, ±5%, 1/4 w	93530750	RC07GF123J MIL-R-11
R57	RESISTOR, Fixed Composition: 330 ohms, ±5%, 1/4 w	93530370	RC07GF331J MIL-R-11
R58	Same as R1		
R59	Same as R16		
R60	RESISTOR, Fixed Composition: 51 ohms, ±5%, 1/4 w	93530180	RC07GF510J MIL-R-11
R61	RESISTOR, Fixed Composition: 220 ohms, ±5%, 1/4 w	93530330	RC07GF221J MIL-R-11
R62	Same as R24		
R63,R64	Same as R12		
R65	Same as R13		
R66	Same as R40		

Table 6-2. Replaceable Parts, First IF Amplifier Module, FIF-302 (cont.)

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
R67	RESISTOR, Fixed Composition: 33 ohms, ±5%, 1/4 w	93530035	RC-7GF330J MIL-R-11
R68	Same as R37		
R69	RESISTOR, Fixed Composition: 47 ohms, ±5%, 1/4 w	93530170	RC07GF470J MIL-R-11
R70	RESISTOR, Variable: 100 ohms, ±20%, 3/4 w	93140349	IRC 251-20
R71	Same as R60		
R72	RESISTOR, Fixed Composition: 39 ohms, ±5%, 1/4 w	93530050	RC07GF390J MIL-R-11
RT1	THERMISTOR: 3.5 ohm, ±20%, @25°C and .2 ohm @3.5A	95210100	Carborundum/ B2606H
XQ1	SOCKET, Transistor:	94450445	Nugent SD-18173
XQ2 thru XQ5	SOCKET, Transistor:	94450446	Nugent SD-18174
XQ6	Same as XQ1		
XQ7 thru XQ10	Same as XQ2		
XQ11 thru XQ13	Same as XQ1		

Table 6-3. Replaceable Parts, Second Local Oscillator Module, SLO-303

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
A2, A3	CONNECTOR, Coax Female	91371415	Cannon DM53740-5008
C1	CAPACITOR, Ceramic Disc: .01 mfd, +80% -20%, 50 v	90901758	Sprague 19C214
C2	CAPACITOR, Fixed Mica: 10 pf, ±5%, 500 v	90921163	Elmenco DM15C100J
C3	CAPACITOR, Variable: 9-35 pf	90950305	Erie 538-002-N650
C4	CAPACITOR, Ceramic Disc: .001 mfd, 20%, 500 v	90901641	R2CC60Z5U102M EIA Spec. RS-198
C5	Same as C1		
C6	CAPACITOR, Fixed Mica: 27 pf, ±5%, 500 v	90921173	Elmenco DM15E270J03
C7	Same as C1		
C8	Same as C3		
C9	Same as C4		
C10	Same as C1		
C11	CAPACITOR, Fixed Mica: 150 pf, ±5%, 500 v	90921215	Elmenco DM15F151J03
C12	CAPACITOR, Fixed Mica: 330 pf, ±5%, 500 v	90921251	Elmenco DM15F331J03
C13	Same as C4		
C14	Same as C1		
C16	CAPACITOR, Fixed Mica: 47 pf, ±5%, 500 v	90921192	Elmenco DM15C470J03
C17	CAPACITOR, Fixed Ceramic: .001 mfd, ±10%, 200 v	90901590	Mucon HPC 1000 RC
C18	Same as C1		
C19	CAPACITOR, Ceramic, Tubular: 15 pf, ±5%	90900795	Erie NPO-301
C20	CAPACITOR, Ceramic: 12 pf, ±5	90900733	Erie N330

Table 6-3. Replaceable Parts, Second Local Oscillator Module, SLO-303 (cont.)

Reference Designation	Name and Description	Part Number Vitro	Vendor
C21	CAPACITOR, Fixed Mica: 560 pf, ±5%, 500 v	90921261	Elmenco DM15F561J03
C22	Same as C1		
C23	Same as C21		
C24, C25	Same as C1		
C26	Same as C4		
C27	CAPACITOR, Fixed Mica: 180 pf, ±5%, 500 v	90921223	Elmenco DM15F181JO3
C28, C29	Same as C1		
C30	Same as C3		
C31	Same as C4		
C32	Same as C3		
C33	Same as C27		
C34	Same as C3		
C35	Same as C1		
C37	Same as C1		
C38	Same as C4		
C39	Same as C3		
C40 thru C45	Same as C1		
C47	Same as C1		
C48, C49, C50	Same as C1		
C51	CAPACITOR, Ceramic, Tubular: 15 pf, ±5%, 500 v	90900787	R1CC22S2H150J Eia Spec. RS-198
C52	Same as C1		
CR1, CR2	DIODE, Silicon	91600160	1N457
CR3, CR4	DIODE, Zener	91600228	1N823
CR5	DIODE, Varicap	91600386	Pacific PC133
CR6	DIODE, Varicap	91600384	Pacific PC127
J1 thru J3	CONNECTOR, Coax: Female Bulkhead Feedthru	91371810	Microdot MM Series
L1	COIL, Torroidal: Tapped 1-1/2 turns 0.45 uh	103634-90	
L2	COIL, Torroidal: Tapped 3 turns, 0.45 uh	103634-91	
L3, L4	CHOKE: 10 uh, 10%	91150078	Nytronics WEE-10

Table 6-3. Replaceable Parts, Second Local Oscillator Module, SLO-303 (cont.)

Reference Designation	Name and Description	Part Number Vitro	Vendor
L5	COIL, Torroidal: 0.45 uh	103643	
L6	CHOKE: 3.9 uh, 10%	91150088	Nytronics Deciductor DD3-90
L7	Same as L1		
L8	Same as L5		
L9	Same as L6		
L10	Same as L1		
L11, thru L14	Same as L3		
L16	Same as L3		
L18 thru 21	Same as L3		
L22	COIL, Variable: .68 uh	91150099	Nytronics VIV-.68
P1	CONNECTOR, Plug	91370524	Cannon DCM17W5P
Q1	TRANSISTOR	95354080	2N3291
Q2	TRANSISTOR	95354102	2N3251
Q3	Same as Q1		
Q4 thru Q6	Same as Q2		
R1	RESISTOR, Fixed Composition: 3.3 K, ±5%, 1/4 w	93530610	RC07GF332J MIL-R-11
R2	RESISTOR, Fixed Composition: 470 ohms, ±5%, 1/4 w	935300410	RC07GF471J MIL-R-11
R3	RESISTOR, Fixed Composition: 1.5 K, ±5%, 1/4 w	93530530	RC07GF152J MIL-R-11
R4	RESISTOR, Fixed Composition: 10 K, ±5%, 1/4 w	93530730	RC07GF103J MIL-R-11
R5	RESISTOR, Fixed Composition: 220 ohms, ±5%, 1/4 w	93530330	RC07GF221J MIL-R-11
R6	Same as R3		
R7	RESISTOR, Variable: 500 ohms, ±5%	93170089	Bourns 3250W-66-501
R9	Same as R5		
R10	RESISTOR, Fixed Composition: 1 K, ±5%, 1/4 w	93530490	RC07GF102J MIL-R-11

Table 6-3. Replaceable Parts, Second Local Oscillator Module, SLO-303 (Cont.)

Reference Designation	Name and Description	Part Number Vitro	Vendor
R11	RESISTOR, Fixed Composition: 10 ohms, ±5%, 1/4 w	93530010	RC07GF100J MIL-R-11
R12	RESISTOR, Fixed Composition: 4.7 K, ±5%, 1/4 w	93530650	RC07GF472J MIL-R-11
R13	RESISTOR, Fixed Composition: 330 ohms, ±5%, 1/4 w	93530370	RC07GF331 MIL-R-11
R14	Same as R10		
R15, R16	RESISTOR, Fixed Composition: 22 K, ±5%, 1/4 w	93530810	RC07GF223J MIL-R-11
R17	Same as R10		
R18	RESISTOR, Fixed Composition: 820 ohms, ±5%, 1/4 w	93530470	RC07GF821 MIL-R-11
R19	Same as R4		
R21	Same as R10		
R22	Same as R13		
R23	RESISTOR, Fixed Composition: 51 ohms, ±5%, 1/4 w	93530180	RC07GF510J MIL-R-11
R24	RESISTOR, Fixed Composition: 220 ohms, ±5%, 1/4 w	93530330	RC07GF221J MIL-R-11
R25	Same as R10		
R26	RESISTOR, Fixed Composition: 150 ohms, ±5%, 1/4 w	93530290	RC07GF151J MIL-R-11
R28	Same as R10		
R30	Same as R10		
R31	Same as R26		
R33	Same as R10		
R34	RESISTOR, Fixed Composition: 39 ohms, ±5%, 1/4 w	93530050	RC07GF390J MIL-R-11
R35	RESISTOR, Fixed Composition: 100 ohms, ±5%, 1/4 w	93530250	RC07GF101J MIL-R-11
R36	Same as R34		
R37	Same as R35		
Y1	CRYSTAL 40.000 mc ±.005%	91470028	Piezo CR55/U

Table 6-4. Replaceable Parts, Second IF Amplifier, SIF-302

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
A1 thru A6	CONNECTOR, Plug Terminations	91371415	Cannon DM53740-5008
C1 thru C5	CAPACITOR: .005 mfd, +80% -20%, 50 v	90901745	Sprague 40C172
C6	CAPACITOR, Dur-Mica: 56 pf, ±5%, 500 v	90921194	Elmenco DM15E560J03
C7 thru C9	Same as C1		
C10	CAPACITOR, Dur-Mica: 75 pf, ±5%, 500 v	90921201	Elmenco DM15E750J03
C11	CAPACITOR, Dur-Mica: 220 pf, ±5%, 500 v	90921231	Elmenco DM15E221J03
C12 thru C16	Same as C1		
C17	Same as C10		
C18	CAPACITOR, Dur-Mica: 33 pf, ±5%, 500 v	90921182	Elmenco DM15E330J03
C20 thru C32	Same as C1		
C33	CAPACITOR, Dur-Mica: 47 pf, ±5%, 500 v	90921192	Elmenco DM15E470J03
C34, C35	Same as C1		
C36	CAPACITOR: .1 mfd, ±20%, 25 v	90901805	Sprague 5C7
C37, C38	CAPACITOR: 9.1 pf, ±0.25 pf, 500 v	90900636	R1CC22COH919C Eia Spec. RS-198
C39	CAPACITOR: 1.0 mfd, ±20%, 500 v	90901910	Sprague 5C13
C40, C41	Same as C1		
C42	Same as C39		
C43 thru C48	Same as C1		
C49, C50	Same as C10		
C51	CAPACITOR: 470 pf, ±5%, 300 v	90921257	Elmenco DM15F471J03
CR1, CR2	DIODE	91600337	1N4308

Table 6-4. Replaceable Parts, Second IF Amplifier, SIF-302 (Cont.)

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
CR3 thru CR6	DIODE	91600137	1N277
J1	CONNECTOR, Receptacle	91371810	Microdot 131-0135-001
L2	CHOKE: 2.2 uh, 5%	91150068	Nytronics WEE-2.2
L3	INDUCTOR, Variable: 6.8 uh	91150087	Nytronics VIV-6.8
L4	CHOKE, RF: 8.2 uh	91150086	Nytronics WEE-8.2
L5, L6	Same as L3		
L7	CHOKE, RF: 270 uh	91150096	Nytronics WEE-270
P1	CONNECTOR, Plug	91370523	Cannon DCM-13W6P
Q1 thru Q6	TRANSISTOR	95354080	2N3291
Q7, Q8	TRANSISTOR	95354120	2N3227
Q9	TRANSISTOR	95350709	2N2218
Q10	TRANSISTOR	95350101	2N708
Q11	Same as Q9		
Q12	TRANSISTOR	95354105	2N3391
Q13	Same as Q10		
R1	RESISTOR, Fixed Composition: 51 ohms, ±5%, 1/4 w	93530180	RC07GF510J MIL-R-11
R2	RESISTOR, Fixed Composition: 470 ohms, ±5%, 1/4 w	93530410	RC07GF471J MIL-R-11
R3	RESISTOR, Fixed Composition: 4.7 K, ±5%, 1/4 w	93530650	RC07GF472J MIL-R-11
R4	Same as R2		
R5	RESISTOR, Variable: 5 K, ±20%, Infinite resolution	93140345	IRC 251-20

Table 6-4. Replaceable Parts, Second IF Amplifier, SIF-302 (Cont)

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
R6	RESISTOR, Fixed Composition: 2.2 K, ±5%, 1/4 w	93530570	RC07GF222J MIL-R-11
R7	RESISTOR, Fixed Composition: 120 ohms, ±5%, 1/4 w	93530270	RC07GF121J MIL-R-11
R8	RESISTOR, Fixed Composition: 2.7 K, ±5%, 1/4 w	93530590	RC07GF272J MIL-R-11
R9	RESISTOR, Fixed Composition: 820 ohms, ±5%, 1/4 w	93530470	RC07GF821J MIL-R-11
R10	Same as R8		
R11	Same as R6		
R12	RESISTOR, Fixed Composition: 910 ohms, ±5%, 1/4 w	93530475	RC07GF911J MIL-R-11
R13	Same as R6		
R14	Same as R7		
R15	Same as R8		
R16	RESISTOR, Fixed Composition: 560 ohms, ±5%, 1/4 w	93530430	RC07GF561J MIL-R-11
R17	Same as R8		
R18	Same as R6		
R19	Same as R1		
R20	Same as R6		
R21	Same as R7		
R22	Same as R6		
R23	RESISTOR, Variable: 100 ohms, ±20%, Infinite resolution	93140349	IRC 251-20
R24	RESISTOR, Fixed Composition: 1 K, ±5%, 1/4 w	93530490	RC07GF102J MIL-R-11
R25, R26	Same as R6		
R27	RESISTOR, Fixed Composition: 5.1 K, ±5%, 1/4 w	93530660	RC07GF512J MIL-R-11

Table 6-4. Replaceable Parts, Second IF Amplifier, SIF-302 (Cont.)

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
R29	RESISTOR, Fixed Composition: 150 ohms, ±5%, 1/2 w	93530290	RC20GF151J MIL-R-11
R30	Same as R24		
R31	Same as R1		
R32	RESISTOR, Fixed Composition: 220 ohms, ±5%, 1/4 w	93530025	RC07GF220J MIL-R-11
R33	RESISTOR, Fixed Composition: 270 ohms, ±5%, 1/2 w	93550430	RC20GF271J MIL-R-11
R34	Same as R1		
R35	Same as R32		
R36	Same as R2		
R37	RESISTOR, Fixed Composition: 75 ohms, ±5%, 1/4 w	93530220	RC07GF750J MIL-R-11
R38	Same as R24		
R39	RESISTOR, Fixed Composition: 680 ohms, ±5%, 1/2 w	93550560	RC20GF681J MIL-R-11
R40 thru R42	Same as R1		
R43	RESISTOR, Fixed Composition: 10 K, ±5%, 1/4 w	93530730	RC07GF103J MIL-R-11
R44,R45	Same as R24		
R46	RESISTOR, Fixed Composition: 3.9 K, ±5%, 1/4 w	93530630	RC07GF392J MIL-R-11
R47	RESISTOR, Fixed Composition: 510 ohms, ±5%, 1/4 w	93530420	RC07GF511J MIL-R-11
R48,R49	Same as R24		
R50	Same as R1		
R51	RESISTOR, Fixed Composition: 330 ohms, ±5%, 1/4 w	93530270	RC07GF331J MIL-R-11
R52	Same as R1		
R53	RESISTOR, Fixed Composition: 33 ohms, ±5%, 1/4 w	93530035	RC07GF330J MIL-R-11

Table 6-4. Replaceable Parts, Second IF Amplifier, SIF-302 (Cont.)

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
R54	RESISTOR, Fixed Composition: 470 ohms, ±5%, 1/2 w	93530510	RC20GF471J MIL-R-11
R55, R56	Same as R7		
T1	TRANSFORMER	95300005	Aladdin 65-122-03

Table 6-5. Replaceable Parts, Automatic Gain Control, AGC-303

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
A1, A2	CONNECTOR, Termination Contact	91371415	Cannon DM53740-5008
C1	CAPACITOR, Fixed: .01 mfd, 50 v	90901758	Sprague 19C214
C2	CAPACITOR, Monolytic: .1 mfd, ±20%, 25 v	90901805	Sprague 5C7
C3	CAPACITOR, Fixed: .0033 mfd, ±10%, 200 vdc	90990235	Sprague 192P33292
C4	CAPACITOR, Fixed: .047 mfd, ±20%, 200 vdc		Sprague 3C13
C5	CAPACITOR, Electrolytic: 40 mfd, +80% -20%, 200 v		Sprague 150D406X001082
C6, C7	Same as C1		
C8	Same as C2		
C9	Same as C3		
C10	Same as C4		
C11	Same as C5		
C12, C13	Same as C1		
CR1	DIODE	91600337	1N4308
CR2	DIODE		1N821
CR3	Same as CR1		
P1	CONNECTOR, Plug	91370538	Cannon DCM27W2P
Q1, Q2	TRANSISTOR	95350101	2N708
Q3	TRANSISTOR	95350160	2N929
Q4, Q5, Q6	TRANSISTOR	95354099	2N3250
Q7	TRANSISTOR	95354106	2N3391
Q8	TRANSISTOR	95354050	2N2904
Q9	Same as Q4		
Q10, Q11	Same as Q1		
Q12	Same as Q3		
Q13, Q14, Q15	Same as Q4		

Table 6-5. Replaceable Parts, Automatic Gain Control, AGC-303 (Cont.)

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
Q16	Same as Q7		
Q17	Same as Q8		
Q18	Same as Q4		
R1	RESISTOR, Fixed Composition: 33 K, ±5%, 1/4 w	93530850	RC07GF333J MIL-R-11
R2	RESISTOR, Fixed Composition: 910 ohms, ±5%, 1/4 w	93530475	RC07GF911J MIL-R-11
R3	RESISTOR, Variable: 1 K, ±5%, 1 w	93170092	Bourns 3250W-66-102
R4	RESISTOR, Fixed Composition: 180 ohms, ±5%, 1/4 w	93530315	RC07GF181J MIL-R-11
R5, R6	RESISTOR, Fixed Composition: 1.2 K, ±5%, 1/4 w	93530510	RC07GF122J MIL-R-11
R7	RESISTOR, Fixed Composition: 510 K, ±5%, 1/4 w	93531140	RC07GF514J MIL-R-11
R8	RESISTOR, Fixed Composition: 5.1 K, ±5%, 1/4 w	93530660	RC07GF512J MIL-R-11
R9	RESISTOR, Fixed Composition: 220 ohms, ±5%, 1/4 w	93530330	RC07GF221J MIL-R-11
R10	RESISTOR, Fixed Composition: 10 K, ±5%, 1/4 w	93530730	RC07GF103J MIL-R-11
R11	Same as R9		
R12	RESISTOR, Fixed Composition: 15 K, ±5%, 1/4 w	93530770	RC07GF153J MIL-R-11
R13, R14	RESISTOR, Fixed Composition: 1 K, ±5%, 1/4 w	93530490	RC07GF102J MIL-R-11
R15	RESISTOR, Fixed Composition: 1.5 K, ±5%, 1/4 w	93530530	RC07GF152J MIL-R-11
R16	Same as R10		
R17	RESISTOR, Fixed Composition: 120 K, ±5%, 1/4 w	93530990	RC07GF124J MIL-R-11
R18	RESISTOR, Fixed Composition: 470 ohms, ±5%, 1/4 w	93530410	RC07GF471J MIL-R-11

Table 6-5. Replaceable Parts, Automatic Gain Control, AGC-303 (Cont.)

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
R19	Same as R1		
R20	Same as R2		
R21	Same as R3		
R22	Same as R4		
R23	Same as R8		
R24, R25	Same as R5		
R26	Same as R7		
R27	Same as R12		
R28	Same as R9		
R29	Same as R10		
R30	Same as R9		
R31	Same as R12		
R32, R33	Same as R13		
R34	Same as R15		
R35	Same as R10		
R36	Same as R17		
R37, R38	RESISTOR, Variable: 5 K, ±5%, 1 w	93170093	Bourns 3250W-66-502
R39, R40	Same as R13		
R41	Same as R12		
R42, R43	RESISTOR, Fixed Composition: 5.6 K, ±5%, 1/4 w	93530670	RC07GF562J MIL-R-11
R44	RESISTOR, Precision: 121 K, ±1%, 1/8 w	93585318	RN60B1213F MIL-R-10509
R45, R46	RESISTOR, Fixed Composition: 2.4 meg, ±5%, 1/4 w	93531291	RC07GF245J MIL-R-11
R47	Same as R44		
R48, R49	RESISTOR, Fixed Composition: 22 ohms, ±5%, 1/4 w	93530025	RC07GF220J MIL-R-11
R50, R51	RESISTOR, Fixed Composition: 47 K, ±5%, 1/4 w	93530890	RC07GF473J MIL-R-11
R52, R53	Same as R8		
TP1, TP2	CONNECTOR, Test Jack	91370124	Ucinite 119437

Table 6-6. Replaceable Parts, Limiter Module, LIM-301

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
A1, A2, A5	CONNECTOR, Contract Termination Plug	91371415	Cannon DM-53740-5008
C1	CAPACITOR: .01 mfd, +80% -20%, 50 v	90901758	Sprague 19C214
C2 thru C4	CAPACITOR, Monolytic: .1 mfd, ±20%, 25 v	90901805	Sprague 5C7
C5	Same as C1		
C6	Same as C2		
C7	CAPACITOR, Mica: 910 mmf, ±5%, 500 v	90921237	Elmenco DM15F911J03
C8	Same as C1		
C9	Same as C2		
C10	Same as C7		
C11, C12	CAPACITOR: .005 mfd, +80% -20%, 50 v	90901748	Sprague TG-D50
P1	CONNECTOR, Plug	91370523	Cannon DCM-13W6P
Q1 thru Q4	TRANSISTOR	95354080	2N3291
Q5, Q6	TRANSISTOR	95350709	2N2218
R1	RESISTOR, Fixed Composition: 51 ohms, ±5%, 1/4 w	93530180	RC07GF510J MIL-R-11
R2	RESISTOR, Fixed Composition: 680 ohms, ±5%, 1/4 w	93530450	RC07GF681J MIL-R-11
R3	RESISTOR, Variable: 100 ohms, ±20%, 3/4 w	93140350	IRC 251-20
R4	RESISTOR, Fixed Composition: 270 ohms, ±5%, 1/4 w	93530350	RC07GF271J MIL-R-11
R5	RESISTOR, Fixed Composition: 220 ohms, ±5%, 1/4 w	93530330	RC07GF221J MIL-R-11
R6	RESISTOR, Fixed Composition: 330 ohms, ±5%, 1/4 w	93530370	RC07GF331J MIL-R-11
R7	Same as R5		

Table 6-6. Replaceable Parts, Limiter Module, LIM-301 (Cont.)

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
R8	RESISTOR, Fixed Composition: 1 K, ±5%, 1/4 w	93530490	RC07GF102J MIL-R-11
R9	RESISTOR, Fixed Composition: 470 ohms, ±5%, 1/4 w	93530410	RC07GF471J MIL-R-11
R10	RESISTOR, Fixed Composition: 100 ohms, ±5%, 1/4 w	93530250	RC07GF101J MIL-R-11
R11	Same as R10		
R12	RESISTOR, Fixed Composition: 750 ohms, ±5%, 1/4 w	93530460	RC07GF511J MIL-R-11
R13	RESISTOR, Fixed Composition: 10 ohms, ±5%, 1/4 w	93530010	RC07GF100J MIL-R-11
R14	Same as R5		
R15	Same as R13		
R16	RESISTOR, Fixed Composition: 2.2 K, ±5%, 1/4 w	93530570	RC07GF222J MIL-R-11
R17	RESISTOR, Fixed Composition: 22 K, ±5%, 1/4 w	93530810	RC07GF223J MIL-R-11
R18	Same as R8		
R19	RESISTOR, Fixed Composition: 39 ohms, ±5%, 1/4 w	93530050	RC07GF390J MIL-R-11
R20	Same as R13		
R21	Same as R16		
R22	Same as R17		
R23	Same as R8		
R24	Same as R19		

Table 6-7. Replaceable Parts, Audio Metering Amplifier Module AMA-302

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
A1, A2, A3, A4 A5, A6	CONNECTOR, Termination Plug	91371415	Cannon DM-53740-5008
C1, C2	CAPACITOR: 1.0 mfd, 20%, 25 v	90901910	Sprague 5C13
C3, C4	CAPACITOR, Monolytic: 2.2 mfd, 20%, 25 v	90901940	Sprague 5C15
C5	Same as C1		
C6	CAPACITOR Monolytic: .1 mfd, 20%, 25 v	90901810	Sprague 3C21
C7, C8, C9	Same as C1		
C10, C11	Same as C3		
C13	Same as C6		
C14	Same as C1		
C15	Same as C6		
C16, C17	CAPACITOR: 100 mfd, 20%, 15 v Tantalum	90930420	Sprague 150D107X0015S2
C18	Same as C1		
CR1 thru CR4	DIODE	91600160	1N457
P1	CONNECTOR, Plug	91370524	Cannon DCM17W5P
Q1	TRANSISTOR	95350510	2N1991
Q2	TRANSISTOR	95350101	2N708
Q3, Q4	TRANSISTOR	95354106	2N3391
Q5	Same as Q1		
Q6	Same as Q2		
Q9, Q10	Same as Q2		
Q11	Same as Q1		
R1, R2	RESISTOR, Fixed Composition: 100 K, ±5%, 1/4 w	93530970	RC07GF104J MIL-R-11
R3, R4	RESISTOR, Fixed Composition: 15 K, ±5%, 1/4 w	93530770	RC07GF153J MIL-R-11

Table 6-7. Replaceable Parts, Audio Metering Amplifier Module, AMA-302 (Cont.)

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
R5, R6	RESISTOR, Fixed Composition: 270 K, ±5%, 1/4 w	93531070	RC07GF274J MIL-R-11
R7, R8	RESISTOR, Fixed Composition: 10 K, ±5%, 1/4 w	93530730	RC07GF103J MIL-R-11
R9	RESISTOR, Fixed Composition: 3.9 K, ±5%, 1/4 w	93530630	RC07GF392J MIL-R-11
R10	Same as R7		
R11	RESISTOR, Fixed Composition: 12 K, ±5%, 1/4 w	93530750	RC07GF123J MIL-R-11
R12	RESISTOR, Fixed Composition: 18 K, ±5%, 1/4 w	93530790	RC07GF183J MIL-R-11
R13	RESISTOR, Variable: 1 K, ±5%, 1 w	93170092	Bourns 3250W-66-102
R14	Same as R9		
R15, R16, R17	RESISTOR, Fixed Composition: 10 ohms, ±5%, 1/4 w	93530010	RC07GF100J MIL-R-11
R18	Same as R1		
R19	Same as R15		
R20	Same as R1		
R21, R22	Same as R3		
R23, R24	Same as R5		
R25, R26	Same as R7		
R27	Same as R9		
R28	Same as R7		
R30	RESISTOR, Fixed Composition: 910 ohm, ±5%, 1/4 w	93530475	RC07GF911J MIL-R-11
R31	Same as R13		
R32	Same as R9		
R33, R34	Same as R15		
R35	RESISTOR, Fixed Composition: 2 K, ±5%, 1/4 w	93530560	RC07GF202J MIL-R-11
R36	RESISTOR, Fixed Composition: 8.2 K, ±5%, 1/4 w	93530710	RC07GF822J MIL-R-11
R37	RESISTOR, Fixed Composition: 1 K, ±5%, 1/4 w	93530490	RC07GF102J MIL-R-11
R38	RESISTOR, Fixed Composition: 820 ohms, ±5%, 1/4 w	93530470	RC07GF821J MIL-R-11

Table 6-7. Replaceable Parts, Audio Metering Amplifier Module, AMA-302 (Cont.)

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
R39	RESISTOR, Fixed Composition: 150 ohms, ±5%, 1/4 w	93530290	RC07GF151J MIL-R-11
R40, R41	Same as R15		
R42	Same as R35		
R43	Same as R13		
R44	Same as R9		
R45, R46	RESISTOR, Fixed Composition: 1 meg. ±5%, 1/4 w	93531210	RC07GF105J MIL-R-11
R47	Same as R1		
R49	RESISTOR, Fixed Composition: 1.6 K, ±5%, 1/4 w	93530535	RC07GF162J MIL-R-11
R50	Same as R37		
R51	Same as R7		
TP1, TP2	CONNECTOR, Test Jack White	91370124	Ucinite 119437

Table 6-8. Replaceable Parts, Video Amplifier Module, VAM-304

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
A1, A2, A5	CONNECTOR, Plug Terminal	91371415	Cannon DM-53740-5008
C1	CAPACITOR, Tantalum: 200 mfd, +15% -10%	90910283	Cornell-Dublier NLW-200-15
C2	CAPACITOR, Tantalum: 100 mfd, 20%, 15 v	90930420	Sprague 150D107X0015S2
C3	CAPACITOR: 2.2 mfd, ±20%, 25 v	90901940	Sprague 5C15
C4	Same as C1		
C5, C6	Same as C3		
CR1, CR2, CR3, CR4	DIODE	91600160	1N457
CR5, CR6	DIODE	91600136	1N276
CR7	DIODE	91600297	Transitron SV3141
CR8, CR9	Same as CR5		
P1	CONNECTOR	91370523	Cannon DCM-13W6P
Q1	TRANSISTOR	95350709	2N2218
Q2	TRANSISTOR	95354050	2N2904
Q3	Same as Q1		
Q4	Same as Q2		
Q5	TRANSISTOR	95350101	2N1991
R1	RESISTOR, Fixed Composition: 10 ohms, ±5%, 1/4 w	93530010	Allen Bradley CB1005
R2	RESISTOR, Fixed Composition: 820 K, ±5%, 1/4 w	93531185	Allen Bradley CB8245
R3	RESISTOR, Fixed Composition: 2.2 K, ±5%, 1/4 w	9350570	RC07GF222J MIL-R-11
R4	RESISTOR, Variable: Wirewound, 1 K, ±5%, 1 w	93170092	Bourns 3250W-66-102

Table 6-8. Replaceable Parts, Video Amplifier Module, VAM-304 (Cont)

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
R5, R6	RESISTOR, Fixed Composition: 1 K, ±5%, 1/4 w	93530490	Allen Bradley CB1025
R7, R8	RESISTOR, Fixed Composition: 150 ohms, ±5%, 1/4 w	93530290	Allen Bradley CB1515
R9	Same as R5		
R10, R11	RESISTOR, Fixed Composition: 22 ohms, ±5%, 1/4 w	93530025	Allen Bradley CB2205
R12	RESISTOR, Fixed Composition: 3 K, ±5%, 1/4 w	93530595	Allen Bradley CB3025
R13	Same as R1		
R16	RESISTOR, Fixed Composition: 220 ohms, ±5%, 1/4 w	93530410	Allen Bradley CB2215
R17	RESISTOR, Fixed Composition: 3.9 K, ±5%, 1/4 w		Allen Bradley CB3925
R18	Same as R3		
R19	RESISTOR, Fixed Composition: 51 ohms, ±5%, 1/4 w	93530810	Allen Bradley CB5105
TP1	CONNECTOR, Test Point	91370124	Ucinite 119437

Table 6-9. Replaceable Parts, Regulated Power Supply, RPS-301A

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
C1, C2	CAPACITOR, Tantalum: 100 mfd, ±20%, 30 v	90910206	Sprague 109D107C2030T2
C3, C4	CAPACITOR, Tantalum: 100 mfd, 15 v	90910207	Sprague TE1162
CR1, CR2	DIODE, Zener:	91600206	1N753A
CR3, CR4	DIODE		1N646
CR5, CR6	DIODE, Zener:	91600339	1N3824
CR7, CR8, CR9	DIODE, Bridge Rectifier:	93360200	Motorola MDA942-2
P1	CONNECTOR, Plug:	91370945	Cannon DCM-37P
Q1	TRANSISTOR	95350101	2N708
Q2	TRANSISTOR	95350228	2N1481
Q3	Same as Q1		
Q4	Same as Q2		
Q5	TRANSISTOR	95354141	2N3638
Q6	TRANSISTOR	95354100	2N3133
Q7	Same as Q5		
Q8	Same as Q6		
R1	RESISTOR, Fixed Composition: 39 K, ±5%, 1/2 w	93551250	Allen Bradley EB3935
R2	RESISTOR, Fixed Composition: 220 K, ±5%, 1/2 w	93551560	Allen Bradley EB2245
R3	Same as R1		
R4	Same as R2		
R5	RESISTOR, Fixed Composition: 1.5 K, ±5%, 1/2 w	93550690	Allen Bradley EB1525
R6, R7	RESISTOR, Fixed Composition: 390 ohms, ±5%, 1/2 w	93550480	Allen Bradley EB3915
R8	RESISTOR, Fixed Composition: 100 ohms, ±5%, 1/2 w	93550290	Allen Bradley EB1015

Table 6-9. Replaceable Parts, Regulated Power Supply, RPS-301A (Cont)

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
R9	RESISTOR, Variable: 100 ohms, 1/2 w	93140059	Beckman 62PR100
R10	RESISTOR, Fixed Composition: 150 ohms, ±5%, 1/2 w	93530340	Allen Bradley EB1515
R11	Same as R8		
R12	Same as R9		
R13	Same as R10		
R14, R15	RESISTOR, Precision: 1 ohm, ±3%, 5 w	93580276	Dale RH-5
TP1, TP2	CONNECTOR, Test Point:	91370124	Ucinite 119437

Table 6-10. Replaceable Parts, Intermediate Frequency Filter, IFF-304

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
A1, A4	CONNECTOR, Terminal	91371417	Cannon DM53741-5000
C1 thru C4	CAPACITOR, Fixed: .01 mfd, +80% -20%, 50 v	90901758	Sprague 19C214
C5	CAPACITOR, Variable: 1.2-16 pf	90950099	JFD 461
C6	CAPACITOR, Fixed: 82 pf, ±20%, 500 v	90921208	Elmenco DM15E910G
C7	CAPACITOR, Ceramic: 3.3 pf, ±.25 pf, 500 v	90900312	R1CC22C0J339C
C8	Same as C5		
C9	CAPACITOR, Dur-Mica: 39 pf, ±20%, 500 v	90921186	Elmenco DM15E390G
C10	CAPACITOR, Dur-Mica: 47 pf, ±20, 500 v	90921192	Elmenco DM15E470G
C11	CAPACITOR, Ceramic: 2.7 pf, ±.25 pf, 500 v	90900261	R1CC22C0J279C
C12	Same as C5		
C13	Same as C10		
C14	Same as C9		
C15	Same as C7		
C16	Same as C6		
C17	Same as C5		
C18 thru C21	Same as C1		
J1, J2	CONNECTOR, Receptacle:	91371810	Microdot 131-0135-0001
L1	CHOKE, RF: 47 uh, ±5%	91150052	Essex WEE-47
L2 thru L4	INDUCTOR ASSEMBLY	103489-90	
L5	INDUCTOR ASSEMBLY		
L6	Same as L1		
P1	CONNECTOR, Plug	91370523	Cannon DCM-13W6P

Table 6-10. Replaceable Parts, Intermediate Frequency Filter, IFF-304 (Cont.)

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
Q1, Q2	TRANSISTOR	95354143	2N3478
Q3	TRANSISTOR	95350710	2N2219
R1	RESISTOR, Fixed Composition: 100 ohms, ±5%, 1/4 w	93530250	RC07GF101J MIL-R-11
R2	RESISTOR, Fixed Composition: 75 ohms, ±5%, 1/4 w	93530220	RC07GF750J MIL-R-11
R3	Same as R1		
R4	Same as R2		
R5, R6	RESISTOR, Fixed Composition: 470 ohm, ±5%, 1/4 w	93530410	RC07GF471J MIL-R-11
R7	RESISTOR, Fixed Composition: 270 ohms, ±5%, 1/4 w	93530350	RC07GF271J MIL-R-11
R8	Same as R1		
R9	RESISTOR, Fixed Composition: 1.5 K, ±5%, 1/4 w	93530490	RC07GF152J MIL-R-11
R10	RESISTOR, Fixed Composition: 1.3 K, ±5%, 1/4 w	93530515	RC07GF132J MIL-R-11
R11	RESISTOR, Fixed Composition: 820 ohms, ±5%, 1/4 w	93530290	RC07GF821J MIL-R-11
R12	RESISTOR, Fixed Composition: 910 ohms, ±5%, 1/4 w	93530475	RC07GF911J MIL-R-11
R13	RESISTOR, Fixed Composition: 120 ohms, ±5%, 1/4 w	93530270	RC07GF121J MIL-R-11
R14	RESISTOR, Fixed Composition: 240 ohms, ±5%, 1/4 w	93530335	RC07GF241J MIL-R-11
R15	RESISTOR, Fixed Composition: 51 ohms, ±5%, 1/4 w	93530180	RC07GF510J MIL-R-11
R16	Same as R7		

TABLE 6-11. VIDEO BANDWIDTH FILTER ASSEMBLY, REPLACEABLE PARTS

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
C1, 2	CAPACITOR, Fixed Film 0.033 uf, ±5%, 200 v	90990270	Sprague 192P33352
C3, 4	CAPACITOR, Fixed Film 0.015 uf, ±5%, 200 v	90990258	Sprague 192S15352
C5, 6	CAPACITOR, Fixed Film 0.0068 uf, ±5%, 200 v	90990246	Sprague 192P68252
C7, 8	CAPACITOR, Fixed Film 0.0022 uf, ±5%, 200 v	90990228	Sprague 192P22252
C9, 10	CAPACITOR, Fixed Film 0.0015 uf, ±5%, 200 v	90990222	Sprague 192P15252
C11, 12	CAPACITOR, Dur-Mica 680 pf, ±5%, 500 v	90921271	Elmenco DM20F681J03
C13, 14	CAPACITOR, Dur-Mica 220 pf, ±5%, 500 v	90921231	Elmenco DM15F221J03
L2	CHOKE 10000 uh, ±5%	91150350	Delevan 2500-76
L3	CHOKE 6800 uh, ±5%	91150325	Delevan 2500-68
L4	CHOKE 3600 uh, ±5%	91150300	Delevan 2500-54
L5	CHOKE 1800 uh, ±5%	91150247	Delevan 2500-40
L6	CHOKE 560 uh, ±5%	91150225	Delevan 2500-16
L7	CHOKE 360 uh, ±5%	91150195	Delevan 2500-06
L8	CHOKE 180 uh, ±5%	91150047	Delevan 1537-98

Table 6-12. Replaceable Parts, Noise Figure Amplifier, NFA

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
C1	CAPACITOR, Fixed: .001 mfd, ±20%, 500 v	90901641	R2CC6025U102M EIA Spec RS-198
C2	CAPACITOR, Fixed: 1.8 pf, ±.1 pf, 500 v	90900150	Erie NPO-301
C3	CAPACITOR, Dur-Mica: 470 pf, ±5%, 300 v	90921257	Elmenco DM15F471J03
C4	CAPACITOR, Monolytic 1.0 mfd, ±20%, 25 v	90901910	Sprague 5C13
C5	Same as C1		
C6	CAPACITOR, Dur-Mica: 22 pf, ±5%, 500 v	90921172	Elmenco DM15E220J03
C7	CAPACITOR, Fixed: 15 pf, ±2%, 500 v	90900780	Erie NPO-301
C8	Same as C3		
C9	Same as C4		
C10, C11	Same as C1		
C12, C13	CAPACITOR, Feed thru: .001 mfd GMV, 500 v	90901543	Allen Bradley FB3B
C14	Same as C1		
J1, J2, J3	CONNECTOR, Receptacle:	91371810	Microdot 31-33
L1, L2	CHOKE, RF: 1.0 uh	91150101	Nytronics Super WEE-1.0
Q1, Q2 Q3	TRANSISTOR	95354120	Motorola/2N3222
R1	RESISTOR, Fixed Composition: 51 ohm, ±5%, 1/4 w	93530180	RC07GF510J MIL-R-11
R2	RESISTOR, Fixed Composition: 5.1K, ±5%, 1/4 w	93530660	RC07GF512J MIL-R-11
R3	RESISTOR, Fixed Composition: 10K, ±5%, 1/4 w	93530730	RC07GF103J MIL-R-11

Table 6-12. Replaceable Parts, Noise Figure Amplifier (continued)

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
R4	RESISTOR, Fixed Composition: 1K, ±5%, 1/4 w	93530490	RC07GF102J MIL-R-11
R5	RESISTOR, Fixed Composition: 680 ohm, ±5%, 1/4 w	93570450	RC07GF681J MIL-R-11
R6	RESISTOR, Fixed Composition 33 ohm, ±5%, 1/4 w	93530035	RC07GF330J MIL-R-11
R7	Same as R3		
R8	Same as R4		
R9	RESISTOR, Fixed Composition: 620 ohm, ±5%, 1/4 w	93530440	RC07GF621J MIL-R-11
R10, R11	Same as R6		
R12	RESISTOR, Fixed Composition 470 ohm, ±5%, 1/4 w	93530410	RC07GF471J MIL-R-11
R13	RESISTOR, Fixed Composition: 56 ohm, ±5%, 1/4 w	93530184	RC07GF560J MIL-R-11

Table 6-13. Replaceable Parts, Filter Board

Reference Designation	Name and Description	Part Number Vitro	Part Number Vendor
C1, C2	CAPACITOR, Ceramic: .001 mfd, 20%, 500 v	90901641	R2CC60Z5U102M Eia Spec. RS-198
C3, C4	CAPACITOR: 2.2 mfd, 20%, 25 v	90901940	Sprague 5C15

Table 6-14. Replaceable Parts, AGC Distribution Board

CR1, CR2, CR3	DIODE: 1N457	91600160	
CR4	DIODE: 1N277	91600137	
CR5, CR6, CR7	Same as CR1		
CR8, CR9, CR10	Same as CR4		
R2, R5	RESISTOR, Fixed Composition: 18 K, ±5%, 1/4 w	93530790	RC07GF183J MIL-R-11

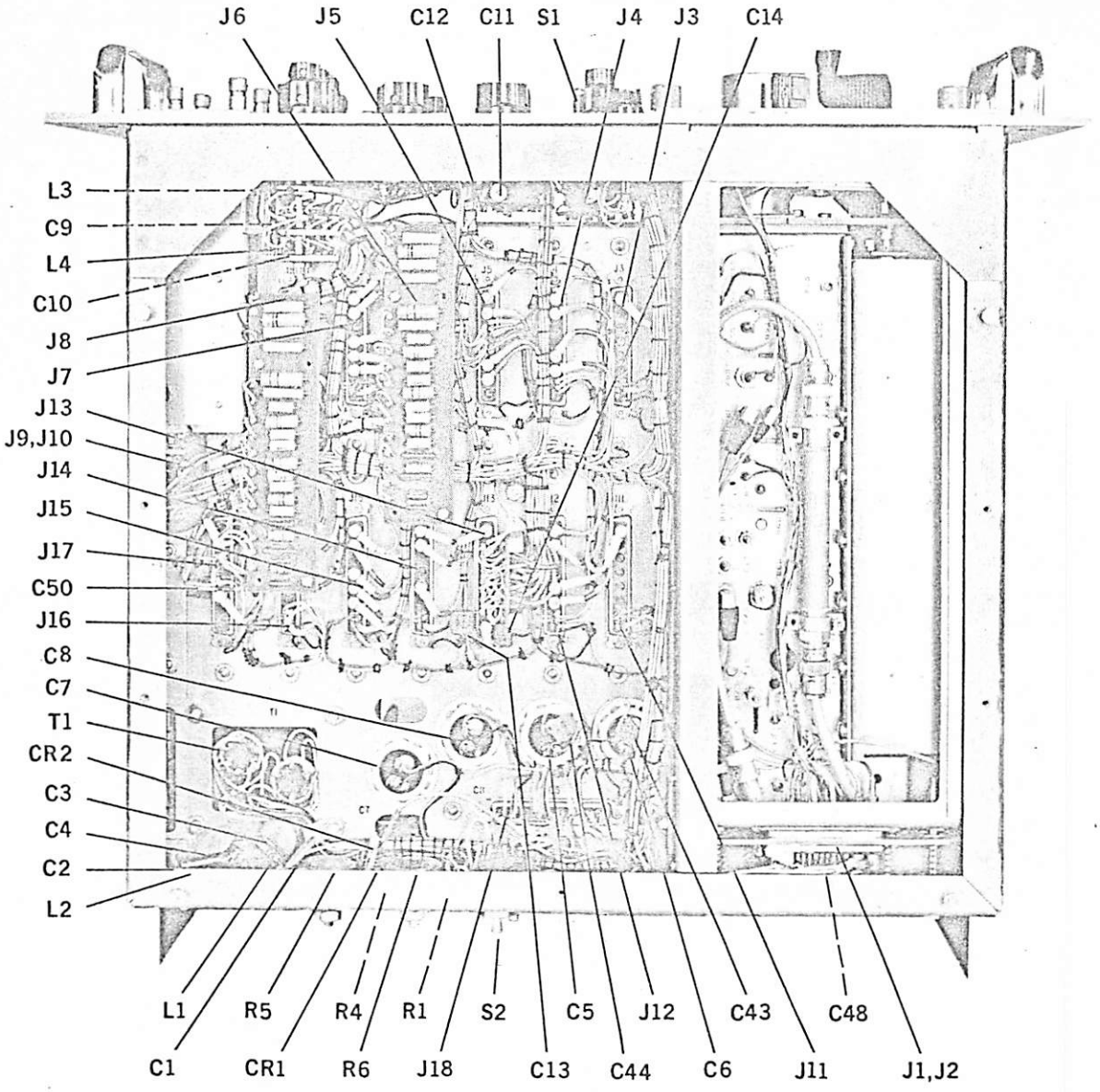


Figure 6-1. Main Chassis, Component Locations

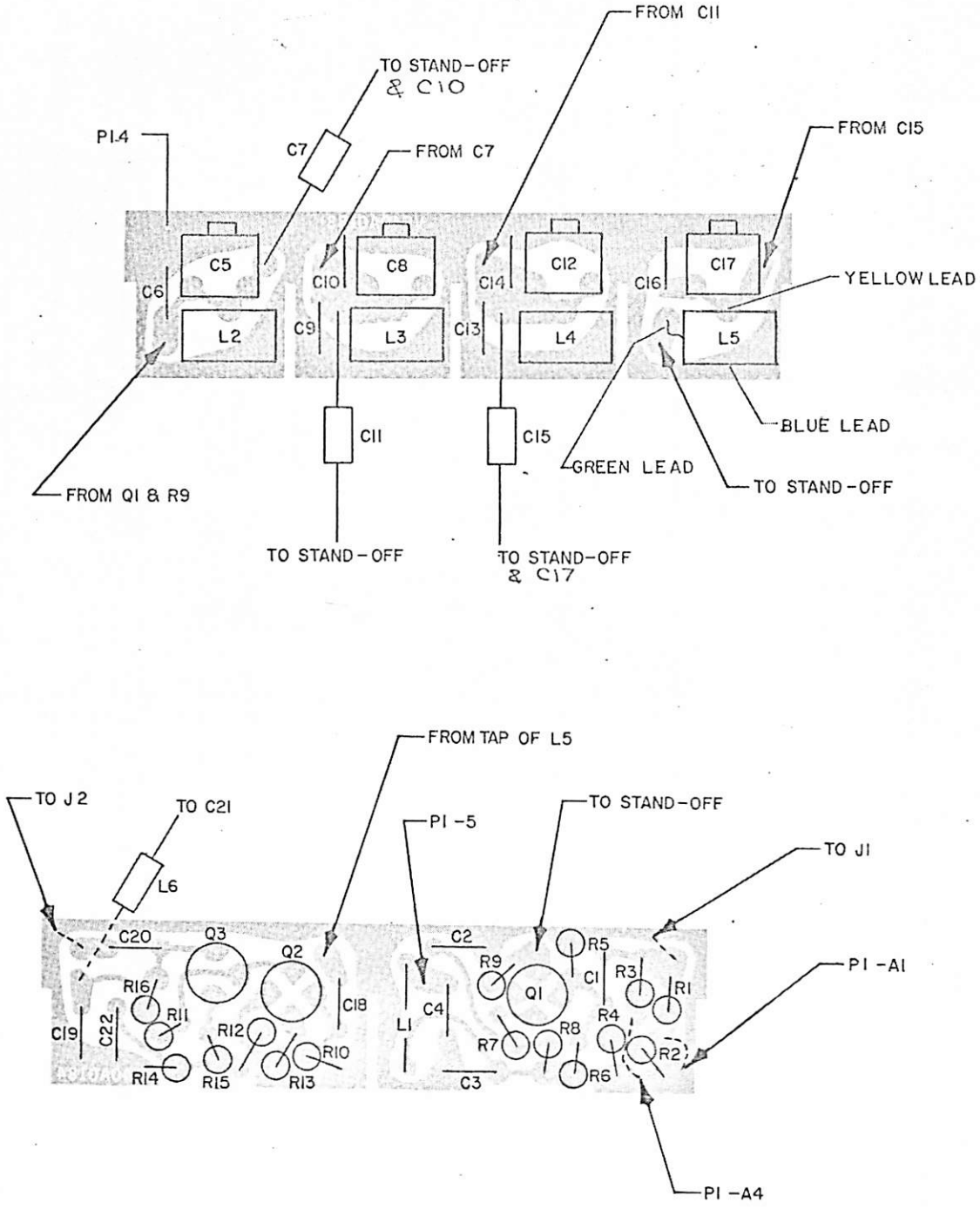


Figure 6-2. Intermediate Frequency Filter, IFF-304, Component Locations

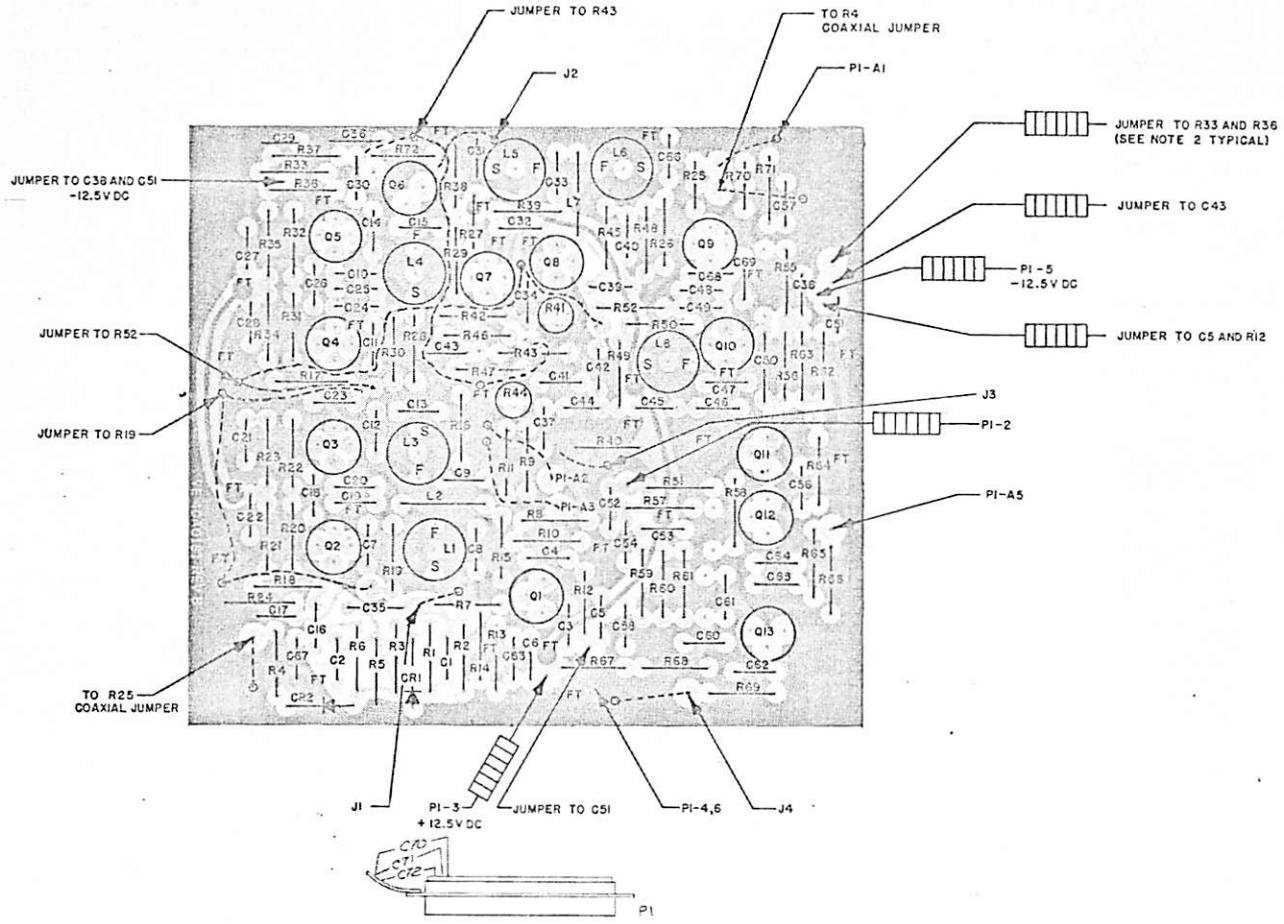


Figure 6-3. First IF, FIF-302, Component Locations, 201637F

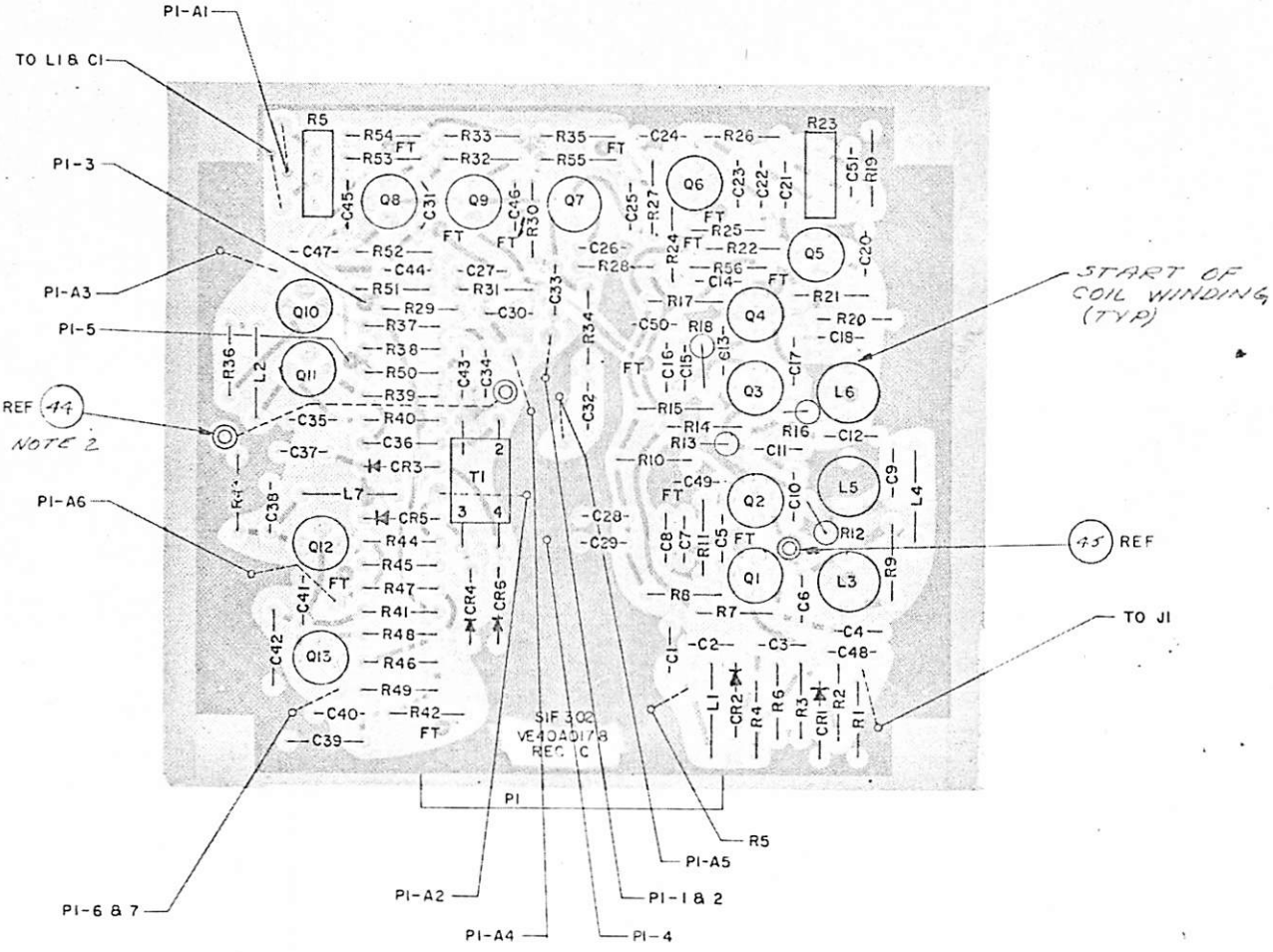


Figure 6-4. Second IF, SIF-302, Component Locations

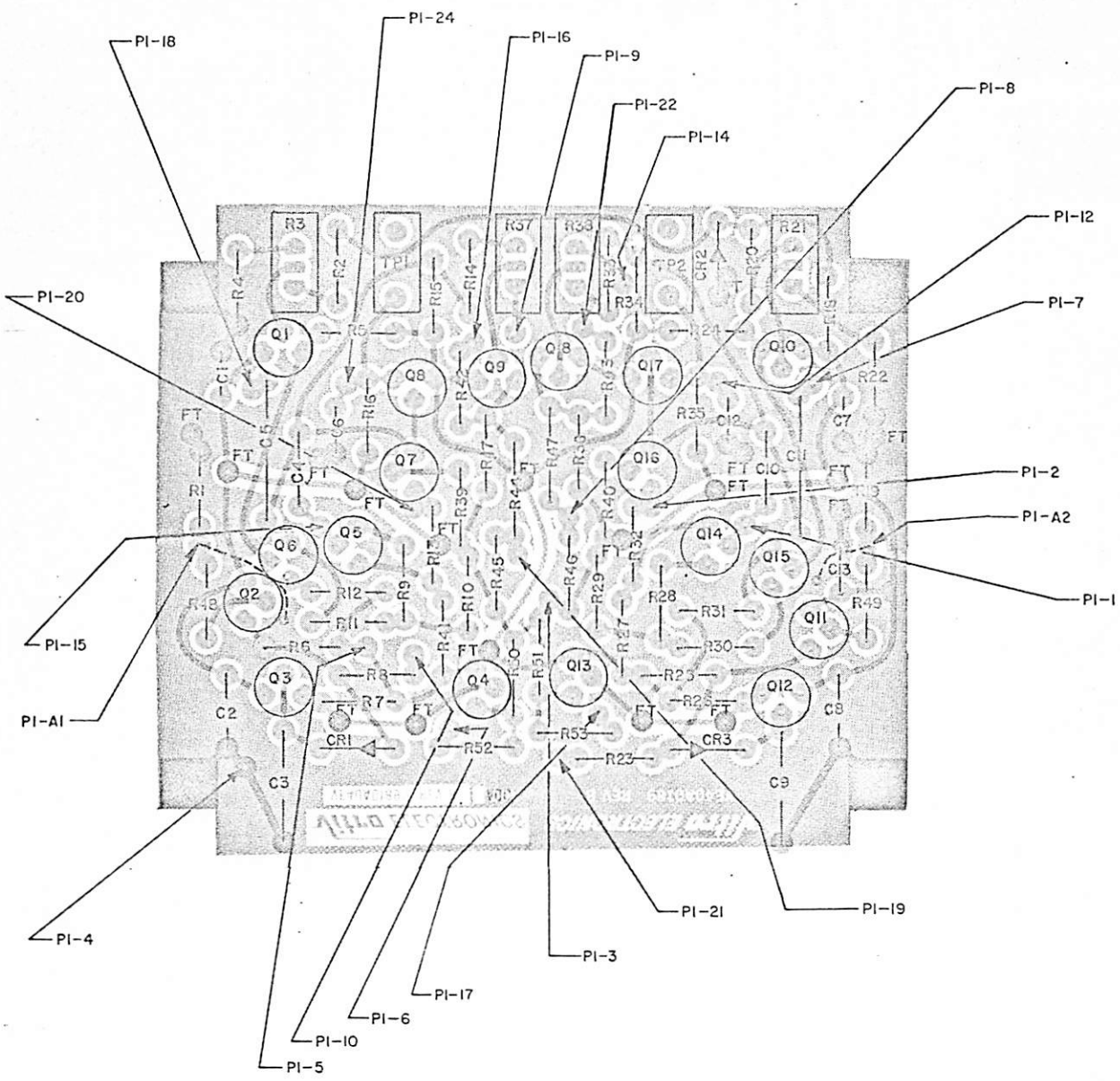


Figure 6-5. Automatic Gain Control, AGC-303, Component Locations, 201681C

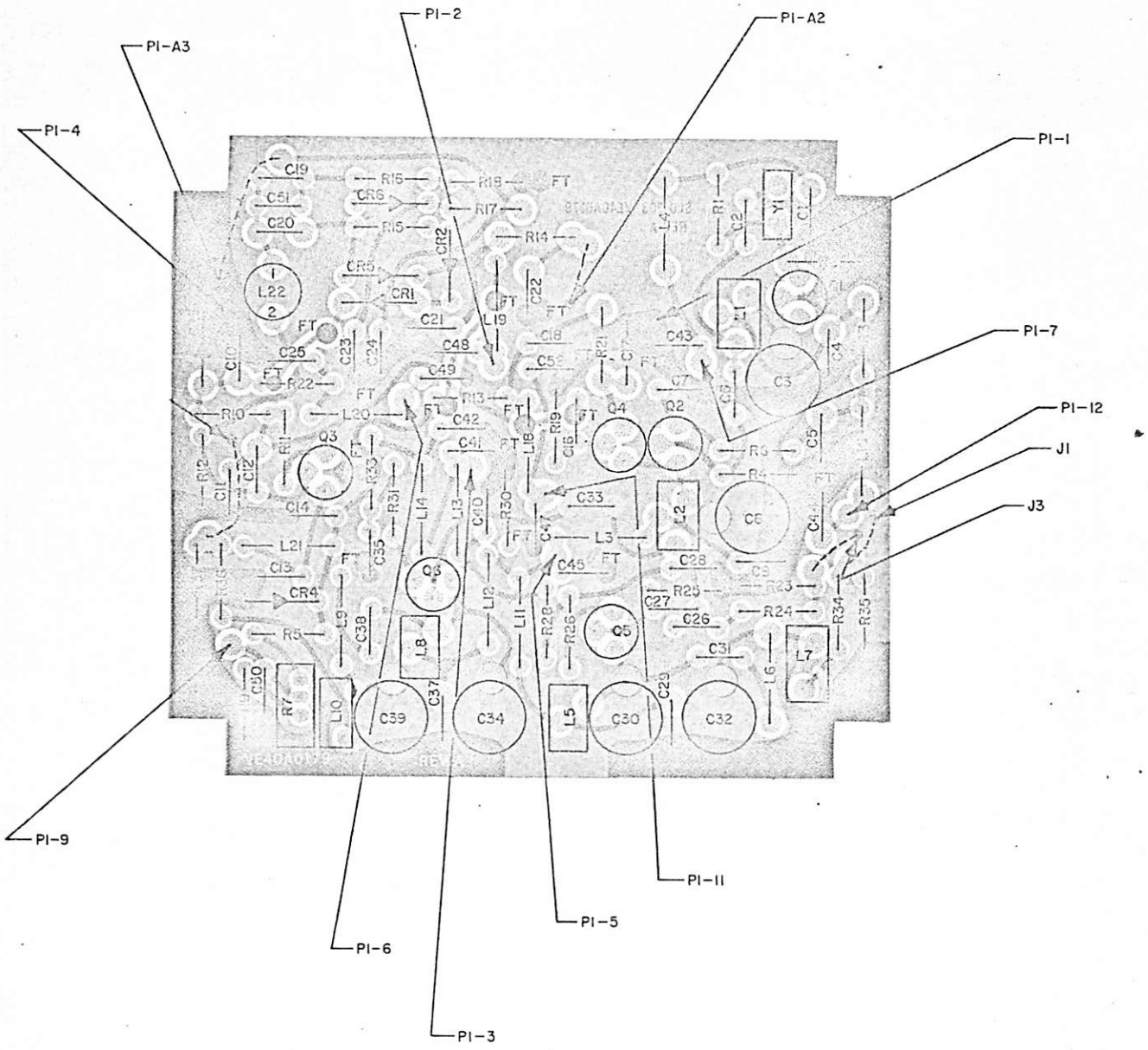


Figure 6-6. Second Local Oscillator, SLO-303, Component Locations 201619G

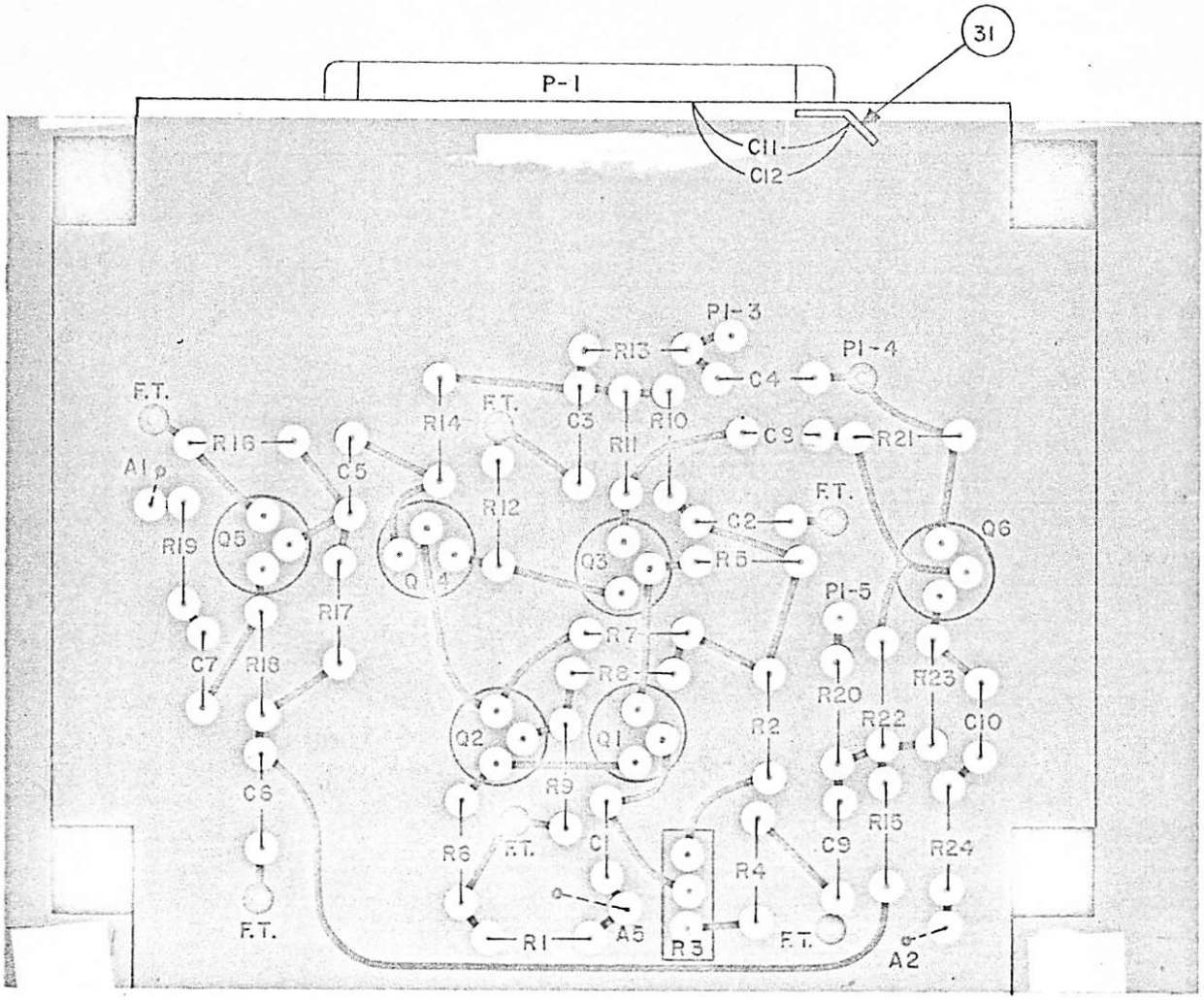


Figure 6-7. Limiter, LIM-301, Component Locations
200986F

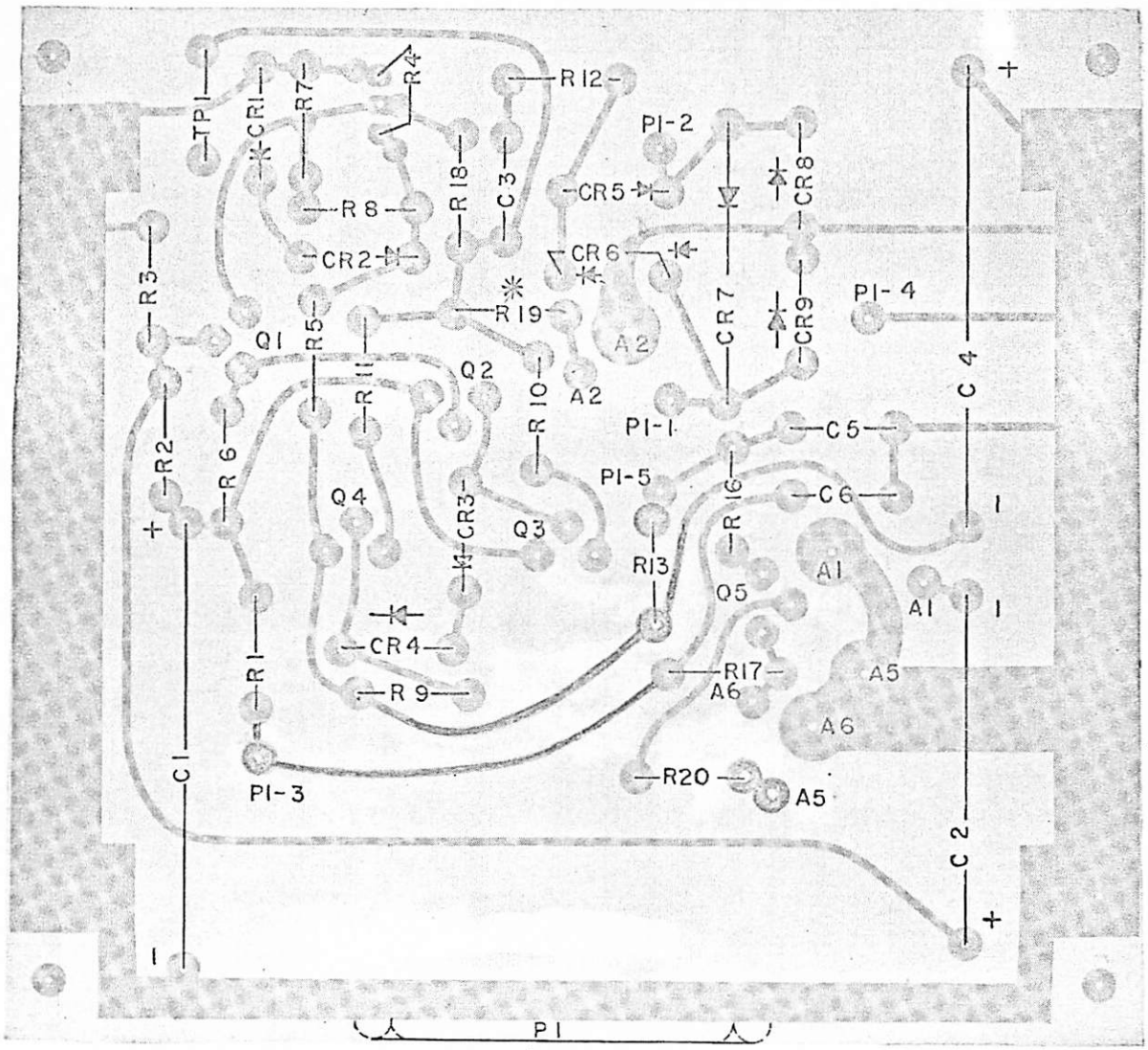


Figure 6-8. Video Amplifier, VAM-304, Component Locations

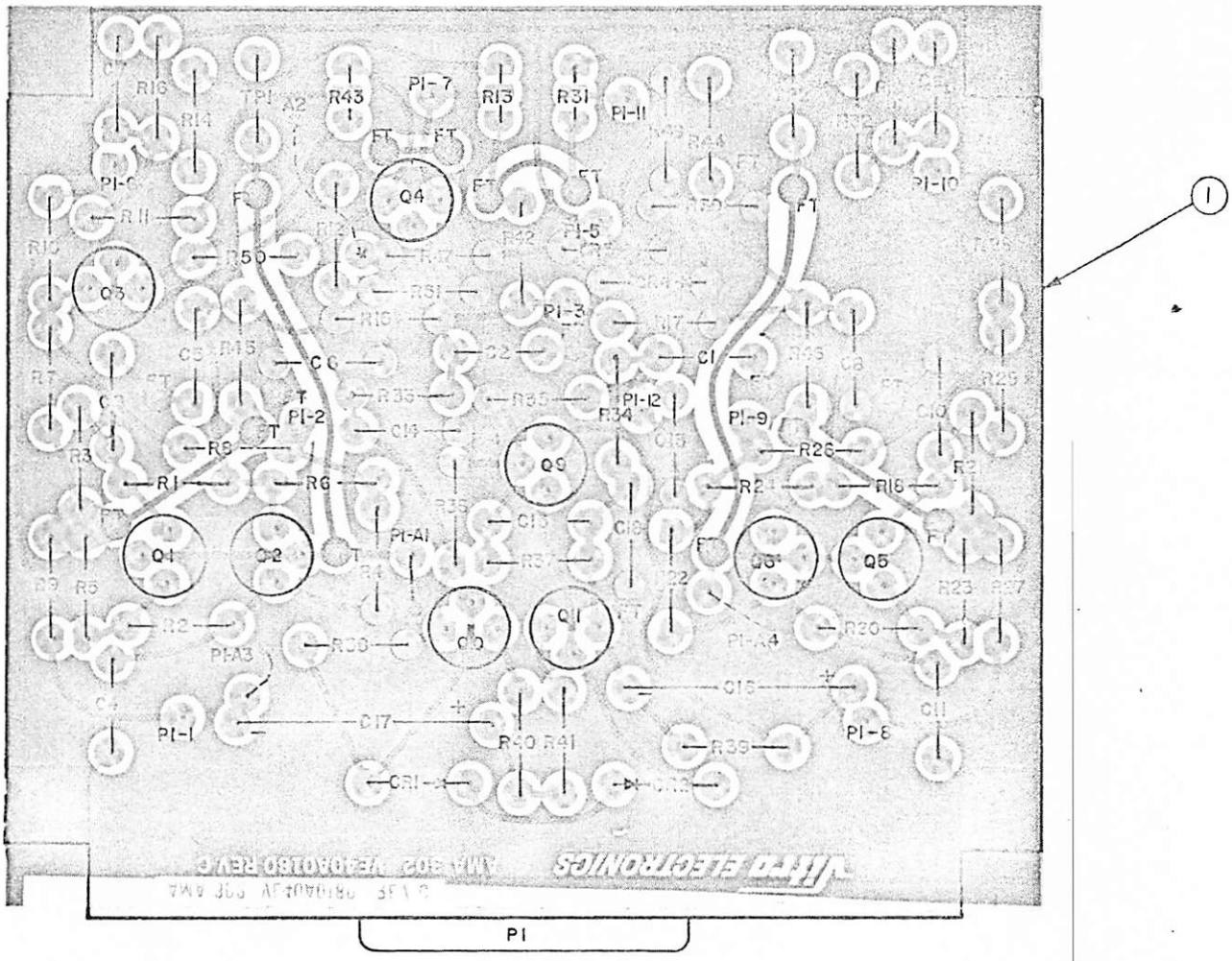


Figure 6-9. Audio/Metering Amplifier, AMA-302, Component Locations, 201641D

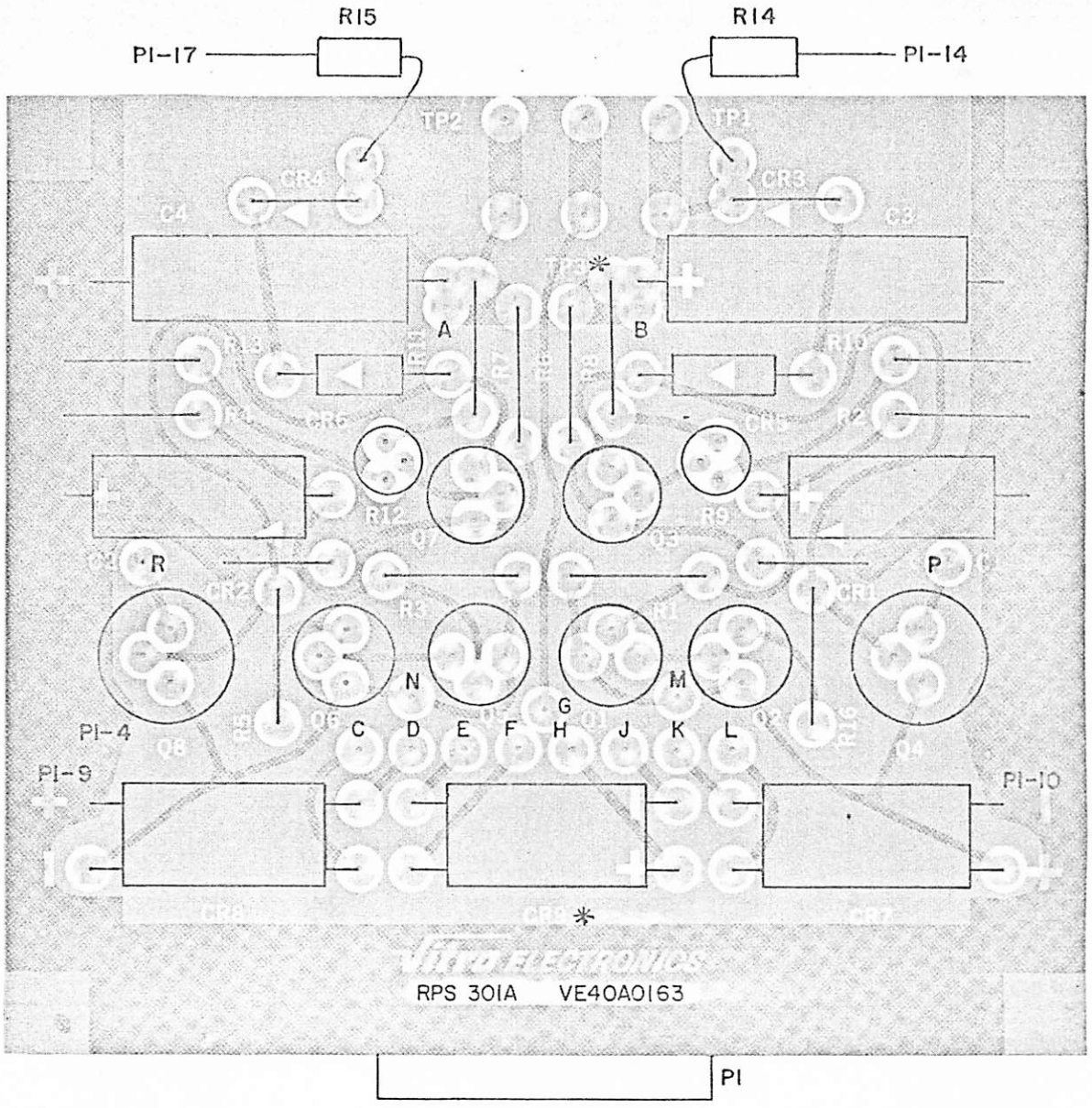


Figure 6-10. Regulated Power Supply, RPS-30/A, Component Locations

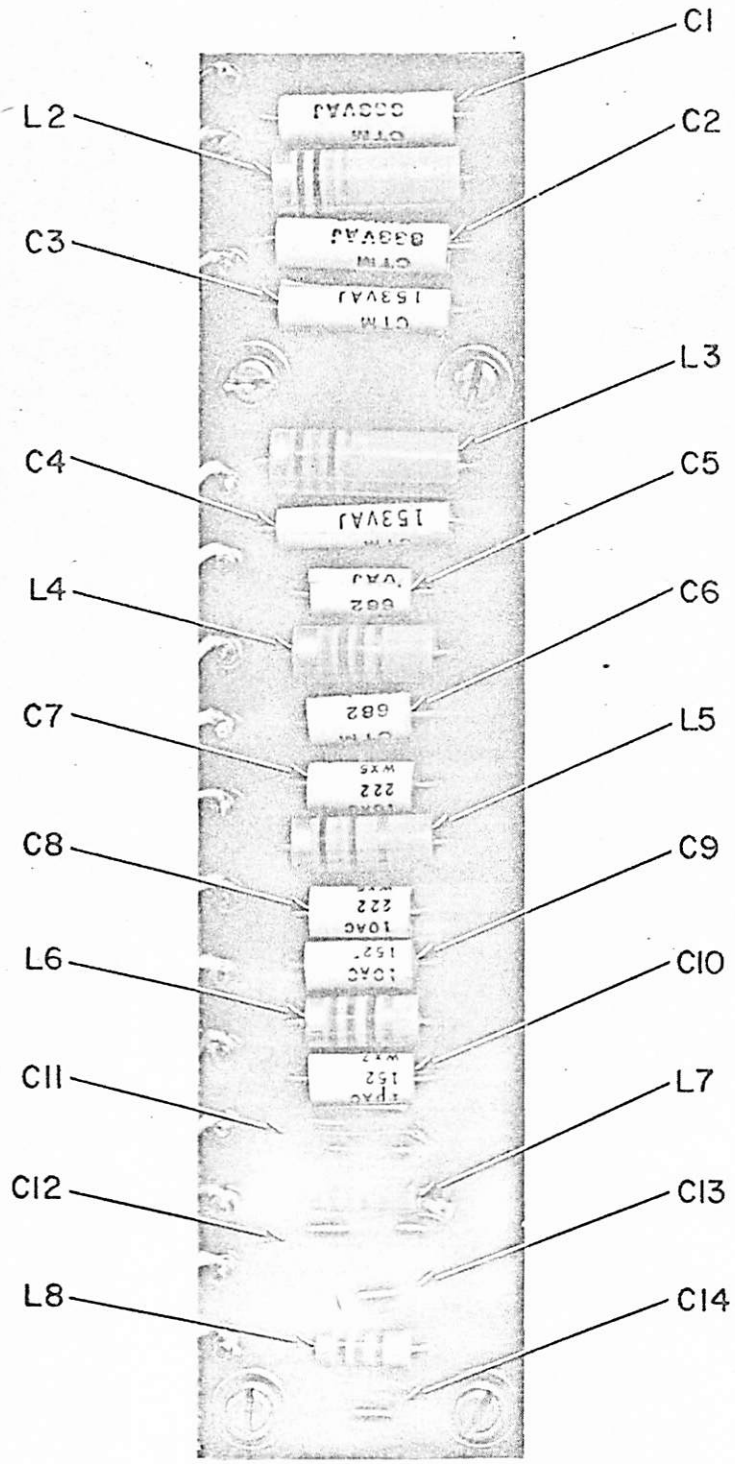


Figure 6-11. Video Filter Assembly, Component Locations

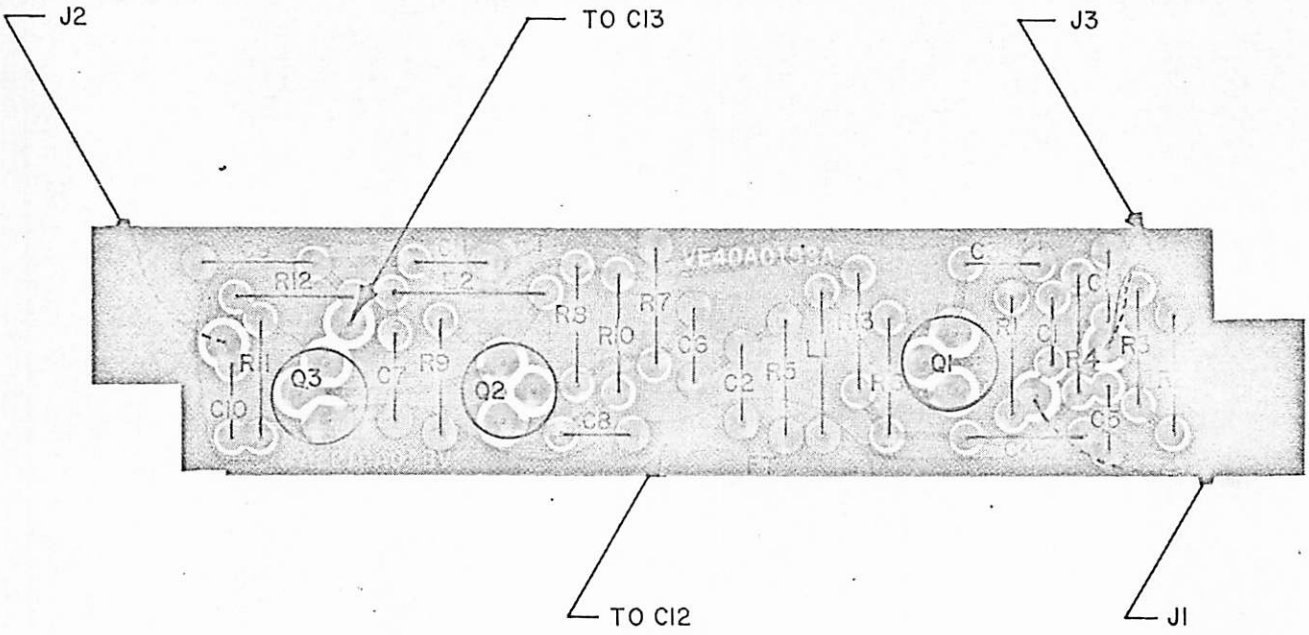


Figure 6-12. Noise Figure Amplifier, Component Locations, 103967A

SECTION 7. SCHEMATIC DIAGRAMS

7.1 General.

This section contains the schematic diagrams of the R-2074A-1.

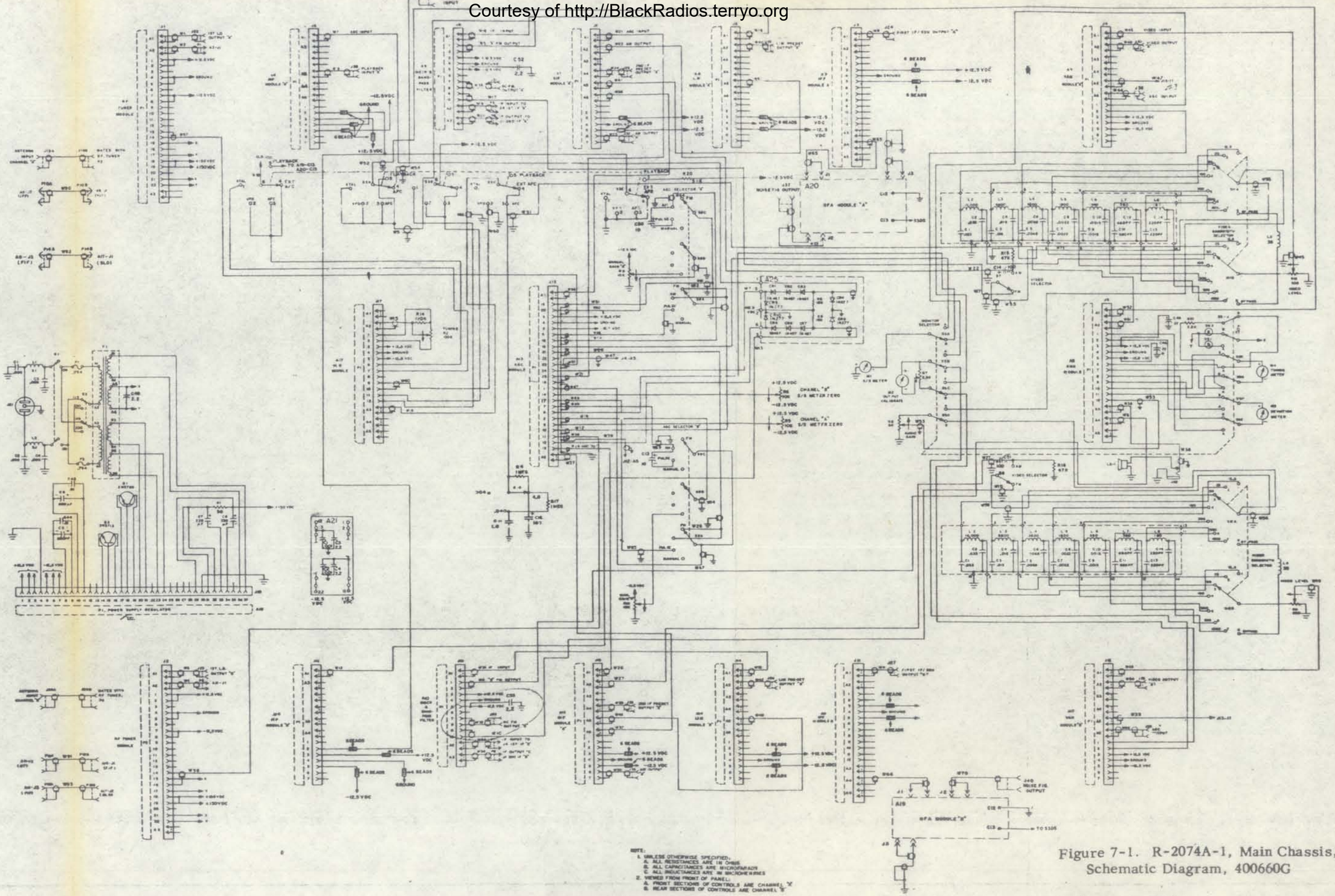
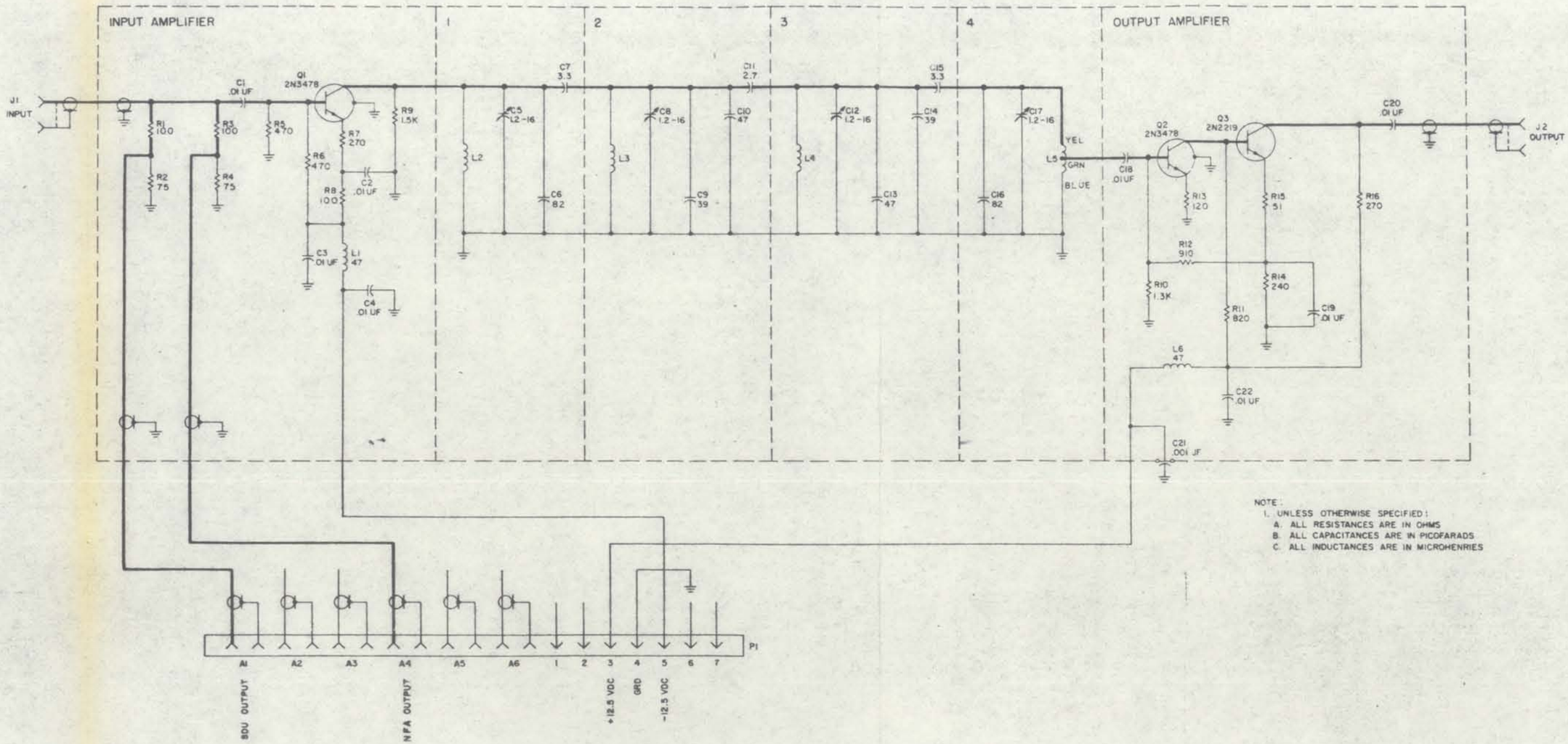
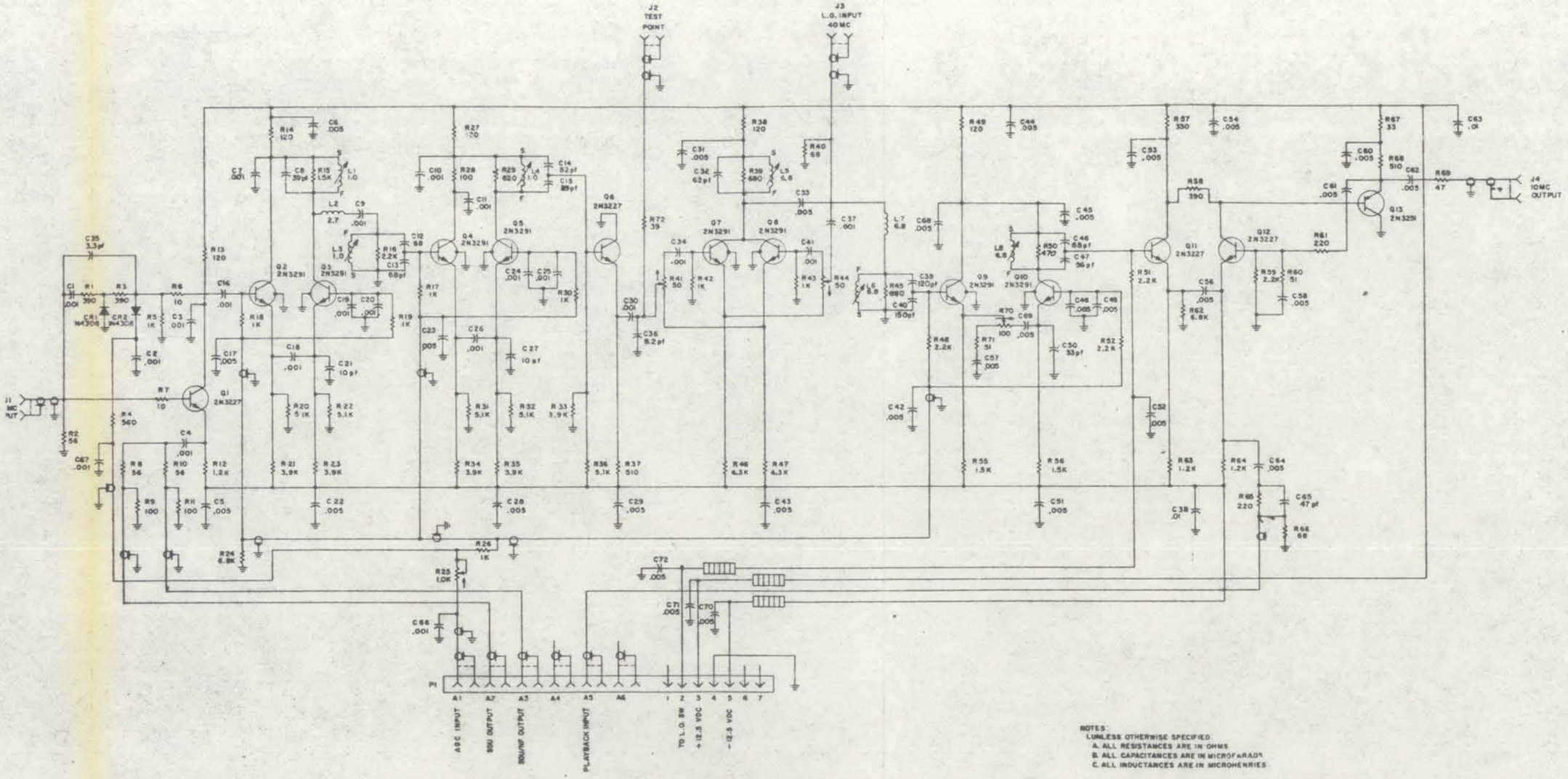


Figure 7-1. R-2074A-1, Main Chassis, Schematic Diagram, 400660G



NOTE:
1. UNLESS OTHERWISE SPECIFIED:
   A. ALL RESISTANCES ARE IN OHMS
   B. ALL CAPACITANCES ARE IN PICOFARADS
   C. ALL INDUCTANCES ARE IN MICROHENRIES

Figure 7-2. Intermediate Frequency Filter, IFF-304, Schematic Diagram, 301251



NOTES:
UNLESS OTHERWISE SPECIFIED
A. ALL RESISTANCES ARE IN OHMS
B. ALL CAPACITANCES ARE IN MICROFARADS
C. ALL INDUCTANCES ARE IN MICROHENRIES

Figure 7-3. First IF Amplifier and Second Mixer, FIF-302, Schematic Diagram 400705D

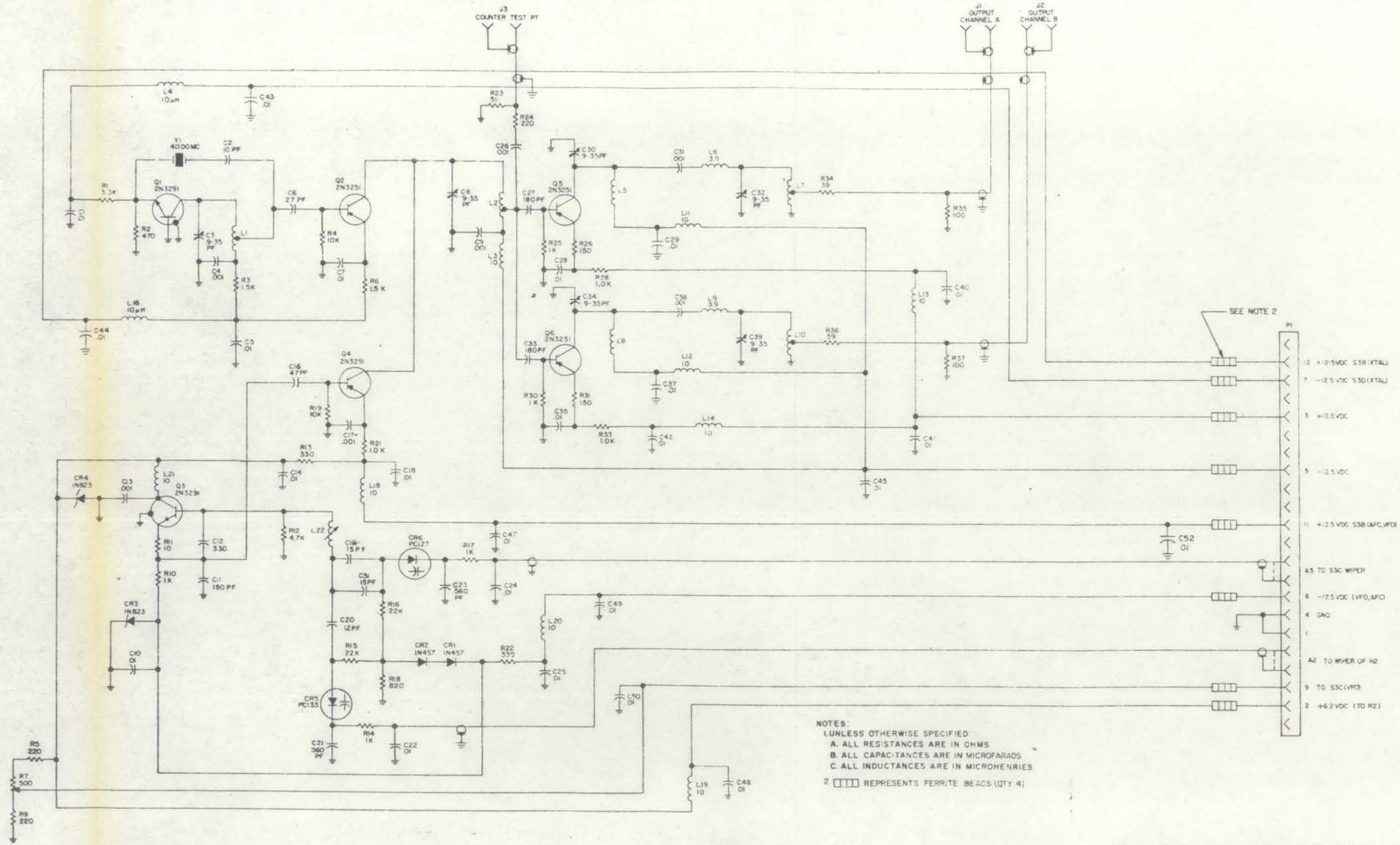
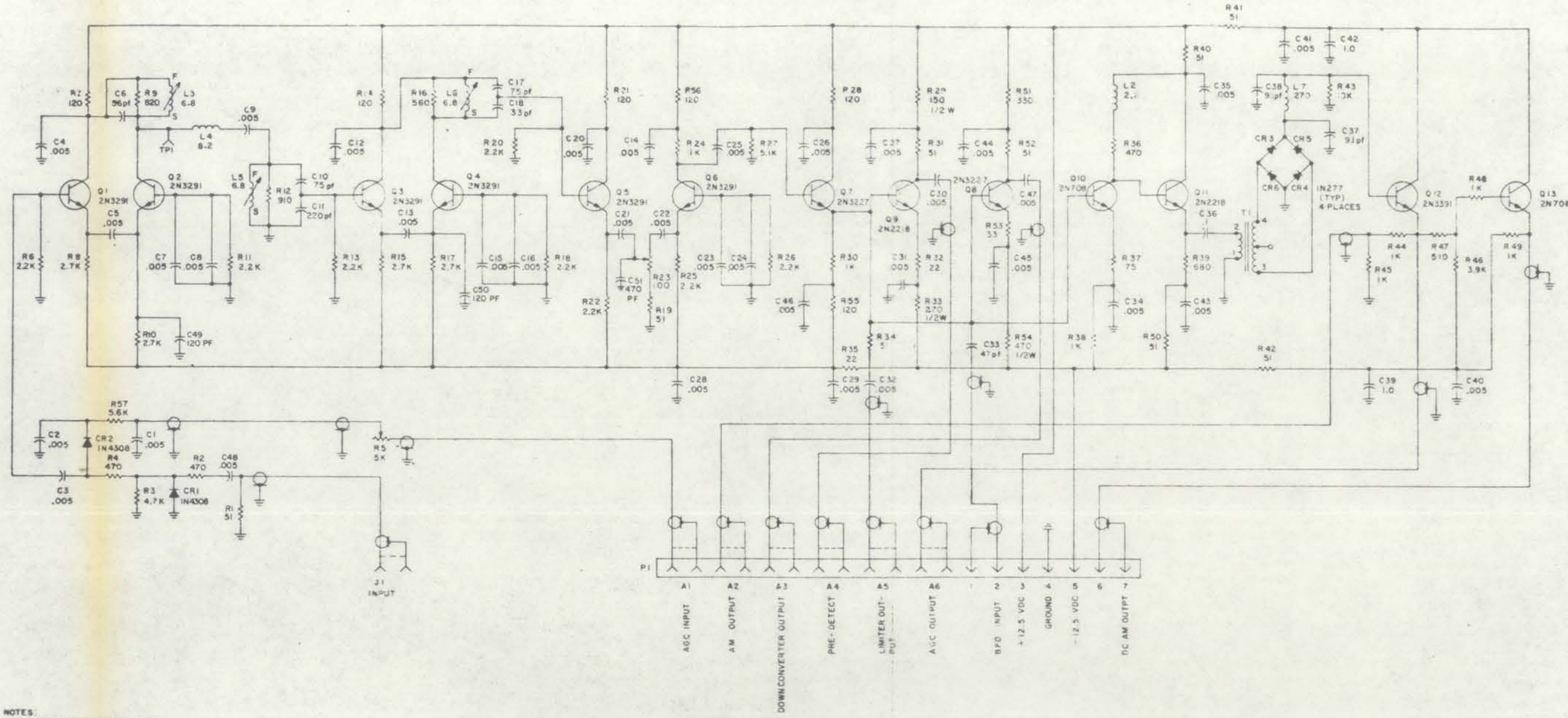


Figure 7-4. Second Local Oscillator, SLO-303 Schematic Diagram, 301215D



NOTES:
UNLESS OTHERWISE SPECIFIED
A. ALL RESISTANCES ARE IN OHMS
B. ALL CAPACITANCES ARE IN MICROFARADS
C. ALL INDUCTANCES ARE IN MICROHENRIES

Figure 7-5. Second IF Amplifier, SIF-302A, Schematic Diagram, 301261C

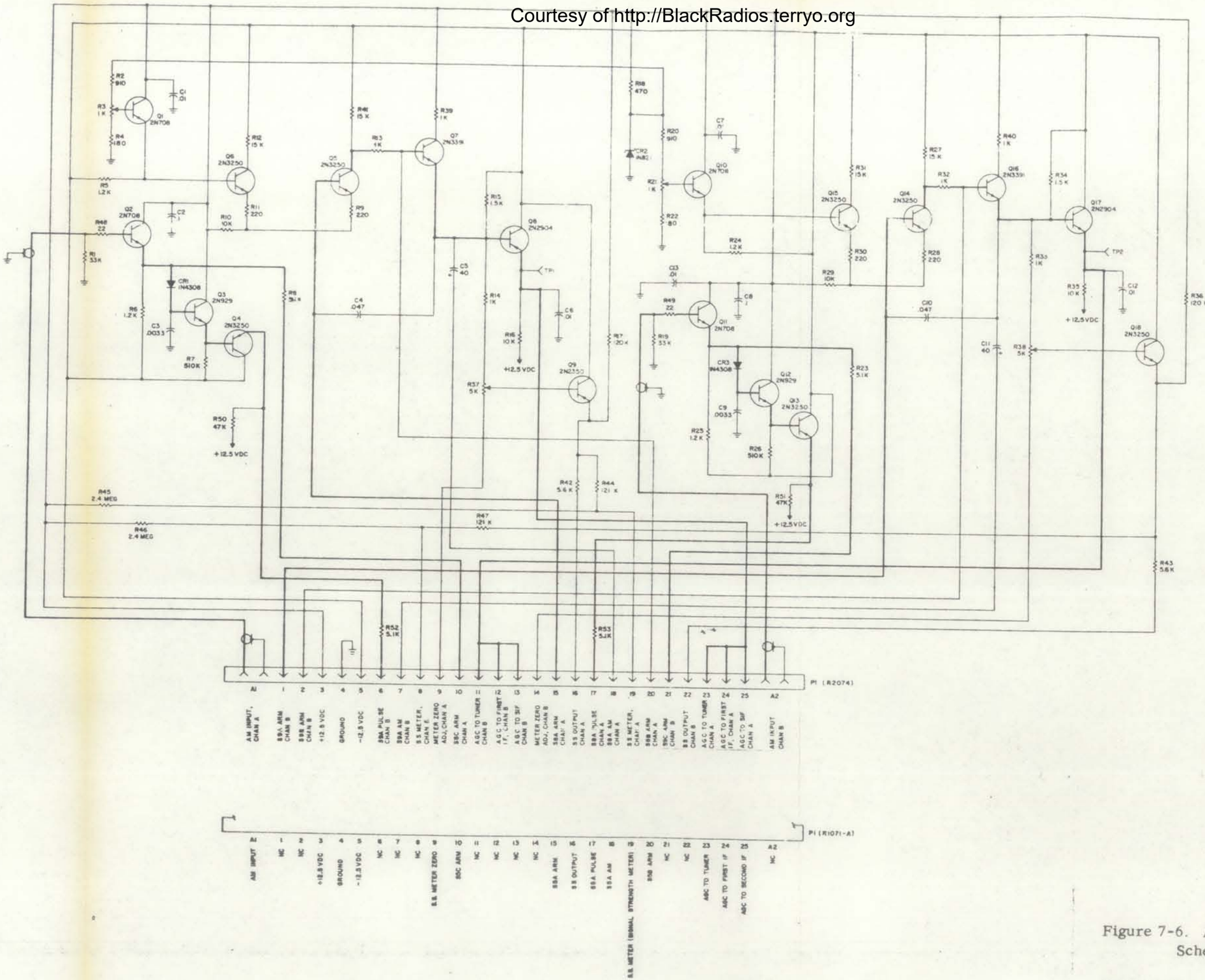
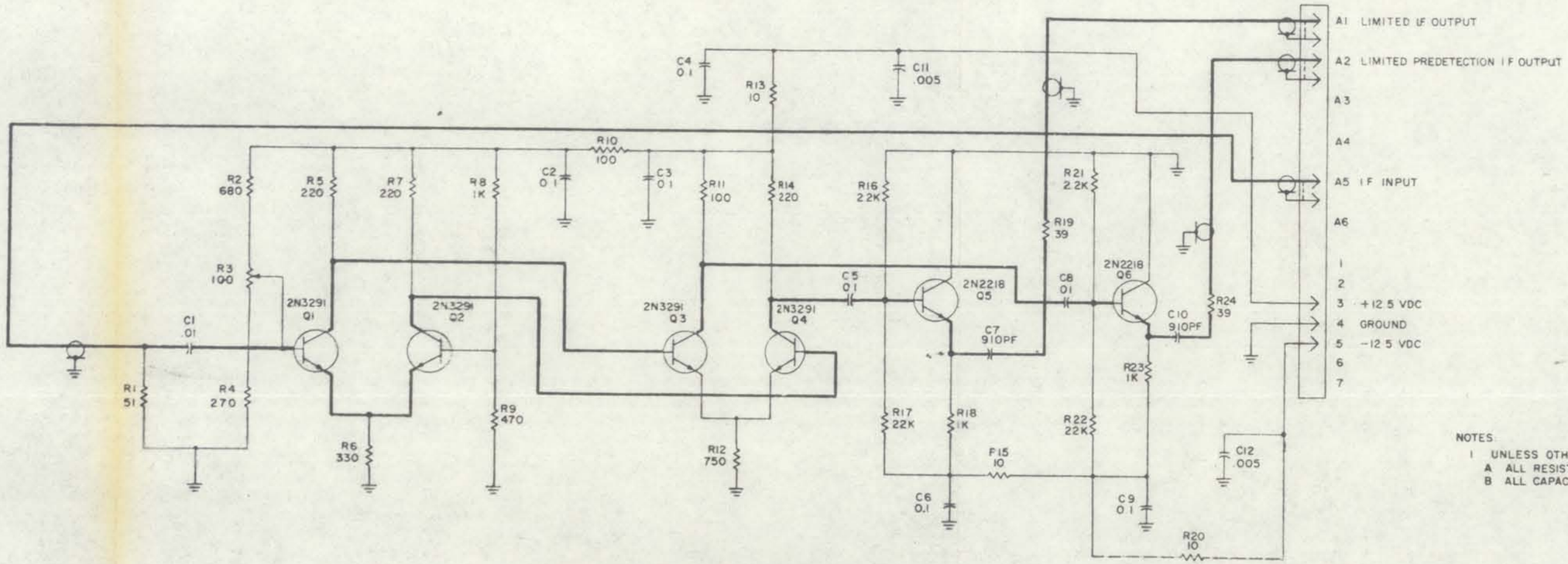


Figure 7-6. Automatic Gain Control, AGC-303, Schematic Diagram, 400703B



NOTES:
1 UNLESS OTHERWISE SPECIFIED
A ALL RESISTORS ARE IN OHMS
B ALL CAPACITORS ARE IN μF

Figure 7-7. Limiter, LIM-301A, Schematic Diagram, 300731B

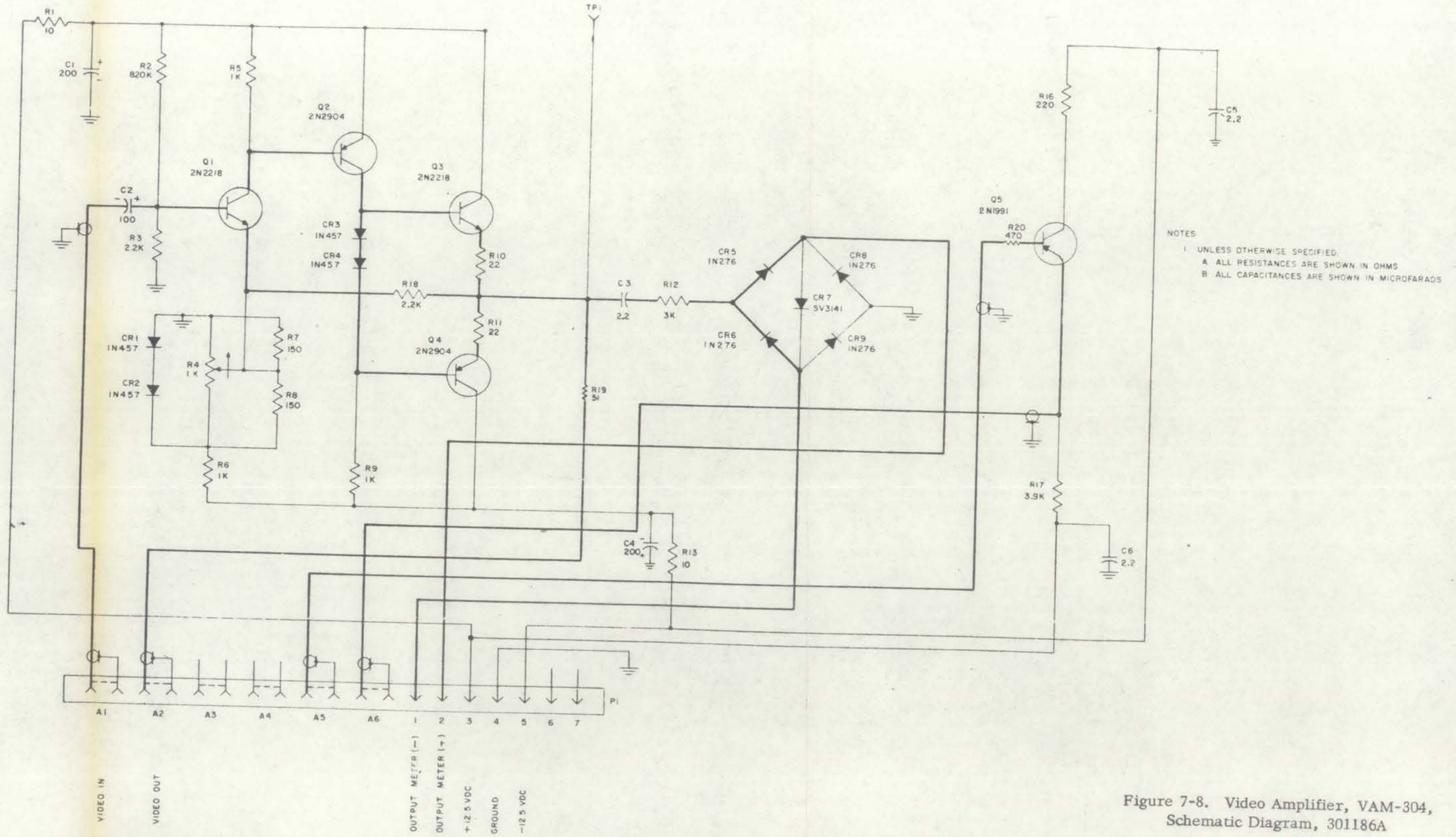
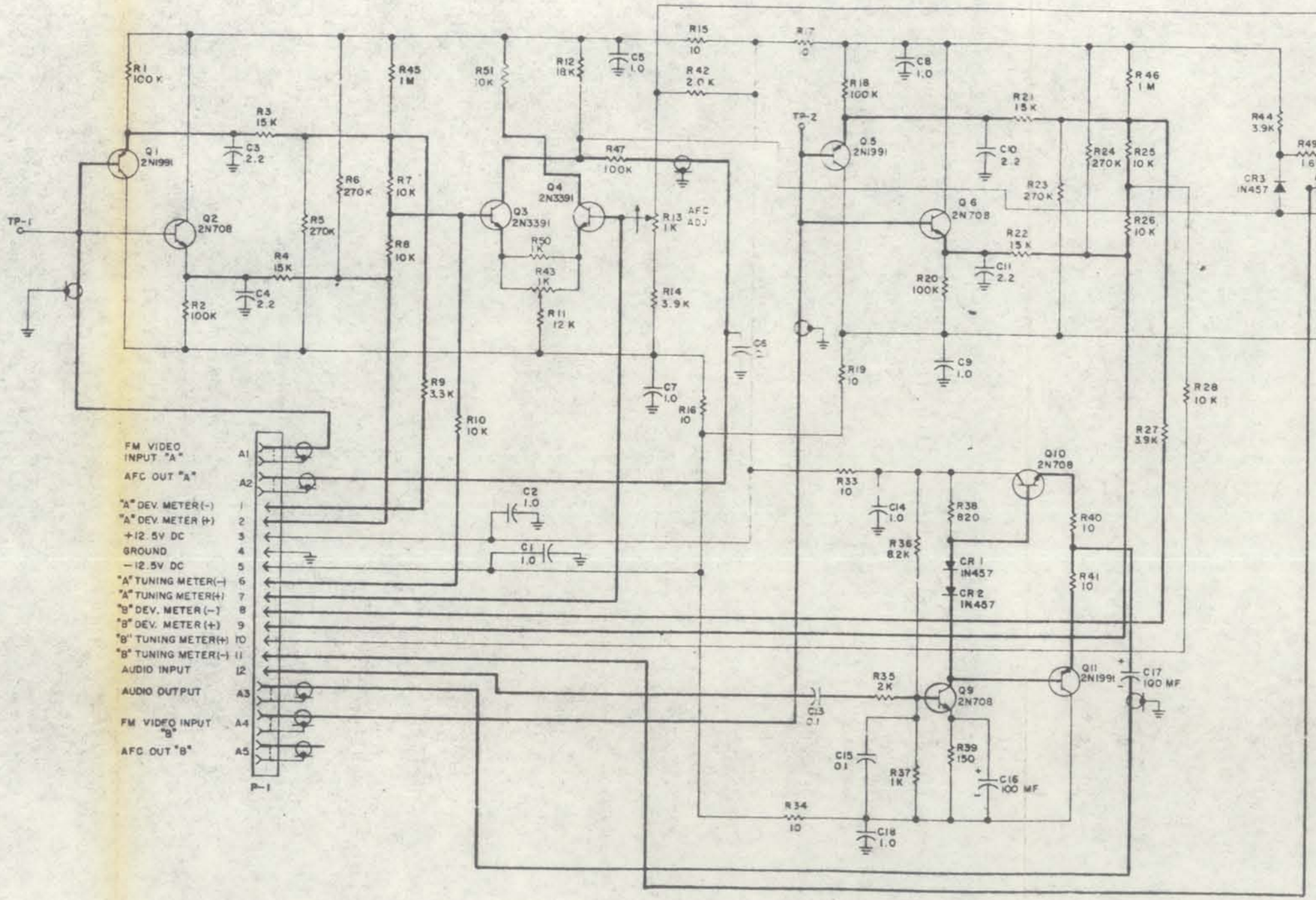
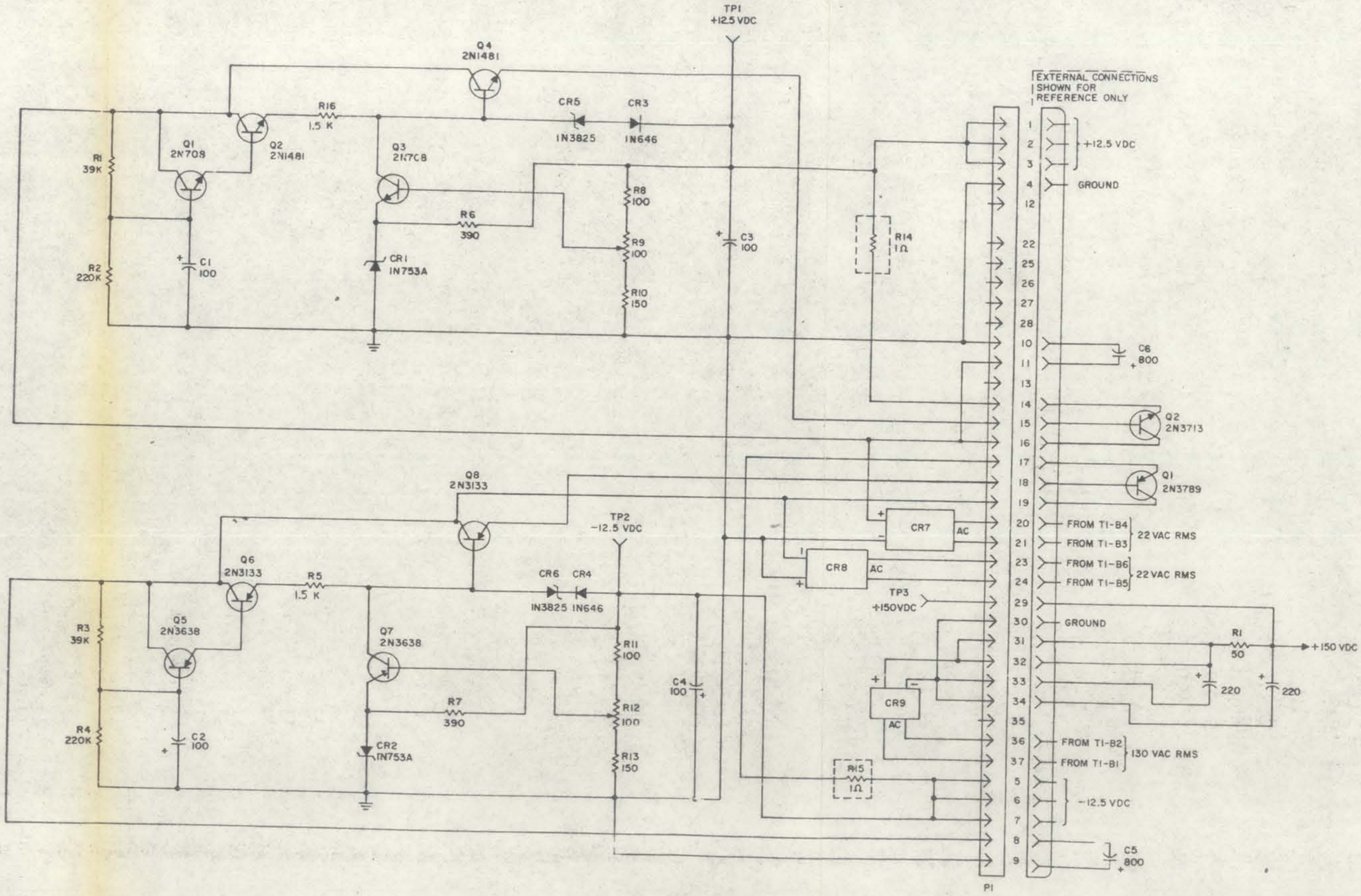


Figure 7-8. Video Amplifier, VAM-304, Schematic Diagram, 301186A



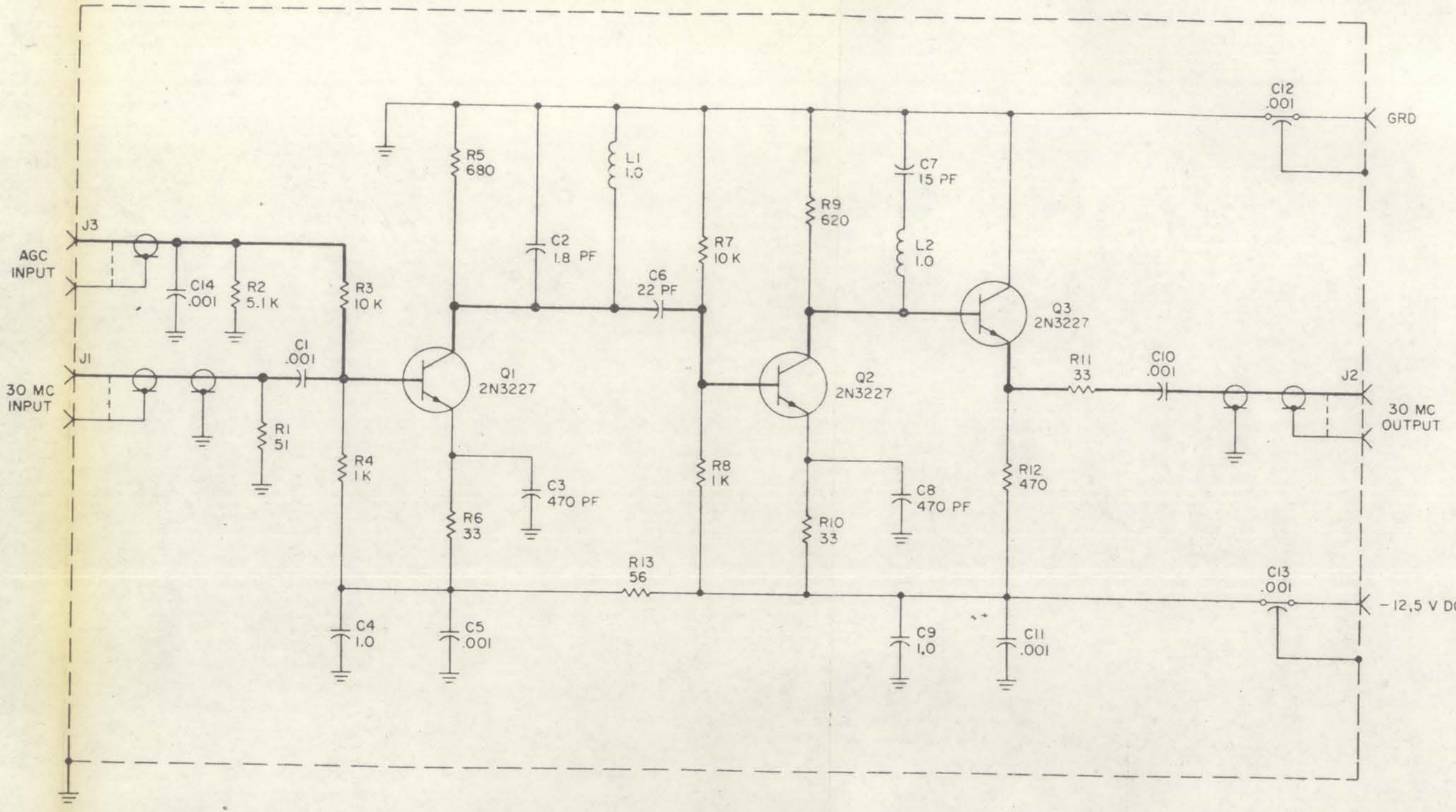
NOTES
1. UNLESS OTHERWISE SPECIFIED:
   A. ALL RESISTORS ARE SHOWN IN OHMS.
   B. ALL CAPACITORS ARE SHOWN IN MICROFARADS

Figure 7-9. Audio Metering Amplifier, AMA-302, Schematic Diagram, 301224B



NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   A. ALL RESISTANCES ARE IN OHMS
   B. ALL CAPACITANCES ARE IN MICROFARADS

Figure 7-10. Regulated Power Supply Module RPS-301A Schematic Diagram, 301115



NOTES:
1. UNLESS OTHERWISE STATED:
   A. ALL RESISTANCES ARE IN OHMS
   B. ALL CAPACITANCES ARE IN MICROFARADS
   C. ALL INDUCTANCES ARE IN MICROHENRIES

Figure 7-11. Noise Figure Amplifier, NFA. Schematic Diagram, 201701