



WATKINS-JOHNSON



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NAME _____

COMPANY _____

ADDRESS _____

EQUIPMENT: *TYPE 112 RECEIVER*

DT: 2729

CS/20
11/20

CLASS C
INSTRUCTION MANUAL
FOR
TYPE 112 MICROWAVE RECEIVER

WATKINS-JOHNSON COMPANY
CEI DIVISION
6006 EXECUTIVE BOULEVARD
ROCKVILLE, MARYLAND 20852

WARNING

This equipment employs voltages which are dangerous and may be fatal if contacted. Extreme caution should be exercised in working with the equipment with any of the protective covers removed.

Table 1-1. Type 112 Microwave Receiver, Specifications

Types of Reception	AM, FM, or Pulse
Frequency Range	1-12 GHz, depending on tuning head in use
1st IF Center Frequency	160 MHz
2nd IF Center Frequency	21.4 MHz
IF Bandwidths	100 kHz, 10 MHz, and 20 MHz are standard: 500 kHz and 1 MHz or 2 and 4 MHz, customer selected
Outputs	Seven: a. Local oscillator output b. 160 MHz signal monitor output c. 21.4 MHz signal monitor output d. Narrow-band predetection output e. Wide-band predetection output f. Video output g. Audio output
Video Frequency Response	20 Hz to 15 MHz
Video Output Impedance	93 ohms, unbalanced
Video Output Level	2 volts, peak-to-peak
Audio Frequency Response	100 Hz to 20 kHz
Audio Output Impedance	600 ohms, balanced
Audio Output Level	100 mV, minimum
Panel Meters	Tuning and signal strength
Input Power	115 or 230 Vac, 50-400 Hz
Power Consumption	50 watts, approximately (includes tuning head)
Dimensions	19 inches wide, 3.5 inches high, and 19 inches deep

1.1 ELECTRICAL CHARACTERISTICS

1.1.1 The Type 112 Microwave Receiver is designed to tune AM, FM, and Pulse signals in the 1-12 GHz frequency range using optional, modular tuning heads. One tuning head can be installed in the receiver at a time. The receiver uses double conversion with a first IF of 160 MHz and a second IF of 21.4 MHz. Five IF bandwidths are provided. Of these, 100 kHz, 10 MHz and 20 MHz are standard. Two additional IF frequencies of 500 kHz and 1 MHz or 2 MHz and 4 MHz are customer selected. Selection of the desired bandwidth is by means of a front panel switch.

1.1.2 Seven outputs are provided: 160 MHz signal monitor output, 21.4 MHz signal monitor output, 160 MHz predetection output, 21.4 MHz predetection output, local oscillator output video output, and audio output. Two audio bandwidths are available; normal and narrow (AURAL ENHANCEMENT). The audio output can be taken at either the rear apron (TB1) or the front panel PHONES jack.

1.2 MECHANICAL CHARACTERISTICS

1.2.1 The front panel of the receiver mounts all the controls normally needed for the operation of the receiver. These are the IF BANDWIDTH, function, AFC, VIDEO GAIN, AURAL ENHANCEMENT, FINE TUNE, AUDIO GAIN, RF GAIN, PHONES, POWER and the tuning knob. In addition a SIGNAL STRENGTH METER and a TUNING METER are mounted on the front panel.

1.2.2 Located on the rear apron of the receiver are the RF INPUT jack J1, the LO OUTPUT jack J2, the 160 MHz SM OUTPUT jack J3, the 21.4 MHz SM OUTPUT jack J4, the NB PRE-DET OUTPUT jack J11, the VIDEO OUTPUT jack J12, the EXT AFC INPUT jack J13, Terminal board TB1, fuses F1 and F2, the 115/230 Vac input power selector switch S2 and the ac power cord. Jacks J1, J3, J4, J11, J12, J13 and J15 are type BNC connectors. Jack J2 is a type N connector.

1.2.3 The front, rear, and side panels of the receiver are made of aluminum as well as the top and bottom dust covers and main deck. The main chassis contains thirteen subassemblies. Eight of these are constructed on plug-in printed wiring boards. The five remaining subassemblies are in brass chassis which have been plated with precious metal for improved conductivity and durability.

1.3 EQUIPMENT SUPPLIED

This equipment consists of the Type 112 Microwave Receiver main chassis only. The dimensions are given in Table 1-1.

1.4 EQUIPMENT REQUIRED BUT NOT SUPPLIED

The Type 112 Microwave Receiver is designed to operate with the TH-Series Tuning Heads. It is not capable of independent operation.

1.5 UNPACKING AND INSPECTION

1.5.1 Examine the shipping carton for damage before the equipment is unpacked. If the carton has been damaged, try to have the carrier's agent present when the equipment is unpacked. If not, retain the shipping cartons and padding material for the carrier's inspection if damage to the equipment is evident after it has been unpacked.

1.5.2 See that the equipment is complete as listed on the packing slip. Contact Watkins-Johnson Company, CEI Division, or your Watkins-Johnson representative with details of any shortage.

1.5.3 The unit was thoroughly inspected and factory adjusted for optimum performance prior to shipment. It is, therefore, ready for use upon receipt. After uncrating and checking contents against the packing slip, visually inspect all exterior surfaces for dents and scratches. Inspect the internal components for apparent damage. Check the internal cables for loose connections and the printed wiring boards which may have been loosened from their receptacles.

1.6 INSTALLATION

1.6.1 Tuning Head Installation. - The Type 112 Microwave Receiver is designed to operate exclusively with the TH-Series Tuning Heads. To install a tuning head proceed as follows:

- DET
boar
cord
com
1. Turn unit upside down and remove bottom dust cover.
 2. Place tuning head in position and secure to main chassis with six screws.
 3. Connect power cable, RF INPUT, LO OUTPUT, and IF OUTPUT cables to respective jacks.
 4. Mount tuning knob on tuning shaft projecting out of front of receiver and reinstall bottom dust cover.
 5. Reverse above procedure to remove a tuning head.

1.6.2 112 Receiver Installation. - The Type 112 Receiver is designed for mounting in a standard 19-inch rack. The unit will occupy 3.5 inches of vertical space and will extend approximately 17 inches back into the rack. If used in a mobile installation, some means should be devised to support the sides and/or rear of the equipment. A brace extending along the sides from the front panel to the rear apron is preferred. Do not rely solely on the front-panel mounting hardware to support the unit. The rack installation should allow a free flow of air through the holes in the top and bottom dust covers. For this reason, at least 1/8-inch of clearance above and below the unit should be provided. The installation should also allow access to the rear panel so that the input and output connections can be made and changed if desired.

1.7 OPERATION

The operation of the controls and switches on the Type 112 Receiver are explained in the following paragraphs.

- 1.7.1 Power Switch. - The POWER toggle switch controls the ac input to the receiver. Make certain that the setting of the rear-apron voltage selector switch marked 115V/230V is set to match the power source before the receiver is energized.
- 1.7.2 RF Gain Control. - The RF GAIN control sets the gain of the receiver with the reception mode switch set for AM/MAN reception. Turning the control in a clockwise direction increases the gain.
- 1.7.3 Fine Tuning Control. - The FINE TUNING control is an electronic vernier on the main tuning control. With this control set initially at midrange, it is possible to increase or decrease the tuned frequency when the receiver is in the fine tuning mode.
- 1.7.4 Audio Gain Control. - The AUDIO GAIN control sets the level of all audio outputs from the receiver including the PHONES jack, and the balanced audio output at terminals 1 and 2 of TB1.
- 1.7.5 Video Gain Control. - The video level at the rear-apron VIDEO OUTPUT jack J12 is set by the VIDEO GAIN control.
- 1.7.6 Reception Mode Switch. - The four-position reception mode switch is used to select the type of reception desired when the receiver is in the MAN tuning mode. Either PULSE, FM, AM/AGC, or AM/MAN reception may be selected.
- 1.7.7 IF Bandwidth Switch. - The IF BANDWIDTH switch selects the desired bandwidth. Any one of five bandwidths can be selected.
- 1.7.8 Aural Enhancement. - The AURAL ENHANCEMENT switch inserts a filter into the audio amplifier which attenuates high audio frequencies.
- 1.7.9 Tuning Meter. - The TUNING meter indicates the relative position of a signal in the passband of the selected IF amplifier.
- 1.7.10 Signal Strength Meter. - The SIGNAL STRENGTH meter indicates the relative signal strength of received signals.
- 1.7.11 Phones Jack. - The PHONES jack provides an audio monitoring point on the front panel. The impedance of the headphones should be 600 ohms.
- 1.7.12 Main Tuning. - All of the tuning heads for the Type 112 Receiver operate in a similar manner. A main tuning knob with crank has been provided to manually tune a single frequency.

1.8 PREPARATION FOR RESHIPMENT AND STORAGE

1.8.1 If the unit must be prepared for reshipment, the packaging methods should follow the pattern established in the original shipment. If retained, the original materials can be reused to a large extent or will at a minimum provide guidance for the repackaging effort.

1.8.2 If time permits, contract packing and packaging firms can be found in many cities. Based on an examination of the equipment and the proposed method of shipment, these firms can usually perform a reliable repackaging service.

1.8.3 As a minimum, cover the painted surface of the unit with wrapping paper. Pack the unit securely in a strong corrugated container (350 lb/sq inch bursting test) with 2-inch rubberized hair pads placed along all surfaces of the equipment. If rubberized hair is not available, use a 6-inch layer of excelsior. If neither of these filler materials are available, use crumpled paper, rags, or any other available materials to provide as much cushioning as possible.

1.8.4 Conditions during storage and shipment should normally be limited as follows:

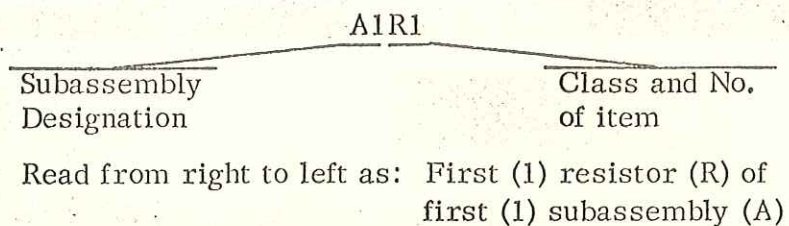
- (1) Maximum humidity: 95% (no condensation)
- (2) Temperature range: -30°C $+85^{\circ}\text{C}$.

1.7.7 IF Bandwidth Switch. - The IF BANDWIDTH switch selects the desired bandwidth. Any one of five bandwidths can be selected.

1.7.8 Aural Enhancement. - The AURAL ENHANCEMENT switch inserts a filter into the audio amplifier which attenuates high audio frequencies.

1.9 UNIT NUMBERING METHOD

The unit numbering method of assigning reference designations (electrical symbol numbers) has been used to identify assemblies, subassemblies (and modules), and parts. An example of the unit method follows:



As shown on the main chassis schematic, components which are an integral part of the main chassis have no subassembly designation.

1.10 REFERENCE DESIGNATION PREFIX

Partial reference designations have been used on the equipment and on the illustrations in this manual. The partial reference designations consist of the class letter(s) and identifying item number. The complete reference designations may be obtained by placing the proper prefix before the partial reference designations. Prefixes are provided on drawings and illustrations following the notation "REF DESIG PREFIX".

1.11 LIST OF MANUFACTURERS

<u>Mfr.</u> <u>Code</u>	<u>Name and Address</u>	<u>Mfr.</u> <u>Code</u>	<u>Name and Address</u>
01121	Allen-Bradley Company 1201 South 2nd Street Milwaukee, Wisc. 53204	06001	General Electric Co. Capacitor Department P. O. Box 158 Irmo, South Carolina 29063
02114	Ferroxcube Corp. of America Mt. Marion Road Saugerties, New York 12477	07263	Fairchild Camera & Instr. Corp. Semiconductor Division 313 Frontage Road Mountain View, Calif. 94040
04013	Taurus Corporation 1 Academy Hill Lambertville, N. J. 08530	07688	Changed to 80131
04713	Motorola Semiconductor Products, Inc. 5005 East McDowell Road Phoenix, Arizona 85008	13103	Thermalloy Company 8717 Diplomacy Row Dallas, Texas 75247

<u>Mfr. Code</u>	<u>Name and Address</u>	<u>Mfr. Code</u>	<u>Name and Address</u>
14632	Watkins-Johnson Company CEI Division 6006 Executive Boulevard Rockville, Maryland 20852	71785	Cinch Manufacturing Co. Howard B. Jones Division 1026 South Homan Avenue Chicago, Illinois 60624
16179	Omni-Spectra, Incorporated 24600 Hallwood Court Farmington, Michigan 48024	72136	Electro Motive Mfg. Co, Inc. South Park & John Streets Willimantic, Connecticut 06226
26805	American Corporation 87 Rumford Avenue Waltham, Mass. 02154	72982	Erie Technological Products, Inc. 644 West 12th Street Erie, Pennsylvania 16512
27193	Cutler-Hammer, Inc. Special Products Division 4201 North 27th Street Milwaukee, Wisconsin 53216	73138	Beckman Instruments, Inc. Helipot Division 2500 Harbor Boulevard Fullerton, California 92634
27956	Relcom 2164 East Middlefield Road Mountain View, Calif. 94040	73899	JFD Electronics Company Div. of Stratford Retreat House 15th at 62nd Street Brooklyn, New York 11219
28480	Hewlett-Packard Company 1501 Page Mill Road Palo Alto, Calif. 94304	74306	Piezo Crystal Company 100 K Street Carlisle, Penn. 17013
01121	Allison-Bradley Company	06001	General Electric Co.
49956	Raytheon Company Lexington, Wisc. 53204 Massachusetts 02173	74868	Bunker & Ramo Corporation The Amphenol RF Division 33 East Franklin Street Danbury, Connecticut 06810
56289	Sprague Electric Company Marshall Street North Adams, Mass. 01247	76854	Oak Manufacturing Company Div. of Oak Electro/Netics Corp. South Main Street Crystal Lake, Illinois 60014
71279	Cambridge Thermionic Corp. 445 Concord Avenue Cambridge, Mass. 02138	80131	Electronic Industries Assn. 2001 Eye Street, N. W. Washington, D. C. 20006
71590	Globe-Union Incorporated Centralab Division P. O. Box 591 Milwaukee, Wisc. 53201	80294	Bourns, Incorporated 1200 Columbia Avenue Riverside, California 92507

Mfr. Code	Name and Address	Mfr. Code	Name and Address
81312	Winchester Electronics Div. Litton Industries, Inc. Main Street & Hillside Avenue Oakville, Conn. 06779	95121	Quality Components, Inc. P. O. Box 113 St. Mary's, Penn. 15857
81349	Military Specifications	95146	Alco Electronics Products, Inc. 3 Wolcott Avenue Lawrence, Mass. 01843
82389	Switchcraft, Incorporated 5527 North Elston Avenue Chicago, Illinois 60630	99800	American Precision Industries Delevan Electronics Division 270 Quaker Road East Aurora, New York 14052
91293	Johanson Manufacturing Co. P. O. Box 329 Boonton, New Jersey 07005	99848	Wilco Corporation 4030 West 10th Street P. O. Box 22248 Indianapolis, Indiana 46222
91418	Radio Materials Company 4242 West Bryn Mawr Avenue Chicago, Illinois 60646		

24112 PARTS LIST - ~~Radio Company~~
1501 Page Mill Road

74506 ~~Radio Crystal Company~~
100 K Street

When ordering replacement parts from CEI Division, specify the type and serial number of the equipment, and the reference designation and description of each part ordered. The Manufacturers and Manufacturer Part Numbers listed are included as a guide to the user of the equipment in the field and do not necessarily agree with the parts installed in the equipment. Except in those cases specifically noted, the replacement part may be obtained from any manufacturer as long as the physical and electrical parameters of the part selected agree with the original part.

NOTE

As improved semiconductors become available it is the policy of CEI to incorporate them in proprietary products. For this reason some transistors and diodes installed in an equipment may not agree with those specified in the parts lists and schematic diagrams of this manual. However, the semiconductors designated in the manual may be substituted in every case with satisfactory results.

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
A1	+28/+150V POWER SUPPLY REGULATOR		1	76183	14632
A2	+6V POWER SUPPLY REGULATOR		1	76184	14632
A3	+15V POWER SUPPLY REGULATOR		1	76185	14632
A4	-15V POWER SUPPLY REGULATOR		1	76186	14632
A5	160/21.4 MHz CONVERTER		1	71285	14632
A6	160 MHz IF AMPLIFIER (10/20 MHz BW)		1	72304	14632
A7	160 MHz LIMITER/DISCRIMINATOR		1	79640	14632
A8	21.4 MHz IF AMPLIFIER (100 kHz BW)		1	72295	14632
A9	VIDEO AMPLIFIER		1	7361	14632
A10	AGC AMPLIFIER		1	7866	14632
A11	AUDIO AMPLIFIER		1	7444	14632
A12	AFC AMPLIFIER		1	79249	14632
A13	21.4 MHz IF AMPLIFIER (2/4 MHz BW) (112)		1	72301	14632
A13	21.4 MHz IF AMPLIFIER (0.5/1 MHz BW) (112-1)		1	72299	14632
A14	TUNING HEAD (SEPARATE DOCUMENTATION)		--	TH-	
C1	CAPACITOR, ELECTROL., ALUMINUM: 40/40 μ F, -10+75%, 250V	180079	1	TVL-2520	56289
C2	CAPACITOR, ELECTROL., ALUMINUM: 1400 μ F, -10+100%, 50V	300334	1	86F164M	06001
F1	FUSE, 3AG, SLOW-BLOW: 3/4A	130143	1	F02B250V3/4A	81349
F2	FUSE, 3AG, SLOW-BLOW: 3/8A	130142	1	F02B250V3/8A	81349

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EQUIPMENT DESCRIPTION 112, 112-1 RECEIVER

DATE Ma 22, 1969

BY R. Teg

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
FL1	FILTER, POWER	140033	1	JN33-694E	56289
J1	CONNECTOR, JACK, N SERIES, Part of W1		1	3004-7985	26805
J2	CONNECTOR, JACK, N SERIES, Part of W2	180148	1	UG-1095A/U	74868
J3	CONNECTOR, JACK, BNC SERIES, Part of W5	220086	5	17825	74868
J4	Same as J3, Part of W10				
J5	CONNECTOR, RECEPTACLE, MULTIPIN	180015	3	SLE-14SNSS	81312
J6	CONNECTOR, RECEPTACLE, MULTIPIN	110403	3	SLE-7SNSS	81349
J7	Same as J6				
J8	Same as J6				
J9	Same as J5				
J10	Same as J5				
J11	Same as J3, Part of W9				
J12	Same as J3				
J13	CONNECTOR, RECEPTACLE, BNC SERIES (PE 10175)	180146	1	UG-1094/U	81349
J14	CONNECTOR, PHONE JACK	140061	1	L-11	82389
J15	Same as J3, Part of W11				

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EQUIPMENT DESCRIPTION 112, 112-1 RECEIVER

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
M1	METER, SIGNAL STRENGTH	210253	1	14524-1	14632
M2	METER, TUNING	210254	1	14549-1	14632
P1	NOT USED				
P2	CONNECTOR, PLUG, OSM SERIES, Part of W1		1	201-2	16179
P3	CONNECTOR, PLUG, OSM SERIES, Part of W2	270113	1	521-1	16179
P4	CONNECTOR, PLUG, SUBMINIATURE SERIES, Part of W3	180152	17	UG-1466/U.	81349
P5	Same as P4, Part of W3				
P6	Same as P4, Part of W4				
P7	Same as P4, Part of W4				
P8	Same as P4, Part of W5				
P9	Same as P4, Part of W6				
P10	Same as P4				
P11	Same as P4, Part of W8				
P12	Same as P4, Part W8				
P13	Same as P4,				
P14	Same as P4, Part of W6				
P15	Same as P4, Part of W7				
P16	Same as P4, Part of W7				
P17	Same as P4, Part of W10				
P18	Same as P4, Part of W9				
P19	Same as P4, Part of W11				

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May 22, 1969

112, 112-1 RECEIVED

JATL

BY R. Teg

Courtesy of <http://BlackRadios.terryo.org>

EQUIPMENT DESCRIPTION

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME / CODE
S1	SWITCH, TOGGLE: SPST	300040	1	8280-K16	27193
S2	SWITCH, SLIDE: DPDT	200015	1	46256-LF	95146
S3	SWITCH, TOGGLE: SPDT	140142	1	MST-115D	76854
S4	SWITCH, ROTARY: 1 Section, 2 Pole, 6 Position	240195	1	267615-A1	71590
S5	SWITCH, ROTARY: 4 Section, 8 Pole, 4 Position	150071	1	PA117-499-AAA	76854
S6	SWITCH, ROTARY: 3 Section, 6 Pole, 6 Position, 2W	240192	1	266368-A3	
T1	TRANSFORMER		1	15948	14632
TB1	TERMINAL BOARD	250227	1	353-18-03-001	71785
W1	CABLE & CONNECTOR ASSEMBLY		Ref		14632
W2	CABLE & CONNECTOR ASSEMBLY		Ref		14632
W3	CABLE & CONNECTOR ASSEMBLY		Ref		14632
W4	CABLE & CONNECTOR ASSEMBLY		Ref		14632
W5	CABLE & CONNECTOR ASSEMBLY		Ref		14632
W6	CABLE & CONNECTOR ASSEMBLY		Ref		14632
W7	CABLE & CONNECTOR ASSEMBLY		Ref		14632
W8	CABLE & CONNECTOR ASSEMBLY		Ref		14632
W9	CABLE & CONNECTOR ASSEMBLY		Ref		14632

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+28V/+150V

SYM. NO.	DESCRIPTION	CBI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME / CODE
C1	CAPACITOR, ELECTROL., TANTALUM: 47 μ F, 10%, 35V	120071	2	CS13BF476K	81349
C2	CAPACITOR, ELECTROL., TANTALUM: 10 μ F, 10%, 35V	120061	1	CS13BF106K	81349
C3	Same as C1				
C4	CAPACITOR, CERAMIC, DISC: 0.01 μ F, 20%, 100V	120043	1	C023B101F103M	81349
C5	CAPACITOR, CERAMIC, DISC: 0.1 μ F, -20+80%, 100V	180087	1	TA(-1 μ FZ)	91418
C6	CAPACITOR, MICA, DIPPED: 47 pF, 5%, 500V	120088	1	CM05ED47QJ03	81349
CR1	DIODE	190147	2	1N4998	07688
CR2	Same as CR1				
CR3	DIODE	190099	1	1N462A	07688
CR4	DIODE	190138	2	1N3255	07688
CR5	Same as CR4				
Q1	TRANSISTOR	220167	3	2N4074	07688
Q2	Same as Q1				
Q3	Same as Q1				
Q4	TRANSISTOR	220265	1	2N4064	07688
Q5	TRANSISTOR	220155	1	2N3440	07688
R1	RESISTOR, FIXED, COMPOSITION: 6.8 k Ω , 5%, 1/4W	160132	2	RC07GF682J	81349
R2	Same as R1				
R3	RESISTOR, FIXED, COMPOSITION: 47 Ω , 5%, 1/4W	160021	1	RC07GF470J	81349

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME/CODE
R4	RESISTOR, FIXED, COMPOSITION: 1 k Ω , 5%, 1/4W	160112	2	RC07GF102J	81349
R5	RESISTOR, FIXED, FILM: 9.09 k Ω , 1%, 1/4W	170080	1	RN60D9091F	81349
R6	RESISTOR, VARIABLE, FILM: 1 k Ω , 30%, 1/2W	280052	1	62PAR1K	73138
R7	RESISTOR, FIXED, FILM: 2.74 k Ω , 1%, 1/4W	170147	1	RN60D2741F	81349
R8	RESISTOR, FIXED, COMPOSITION: 1.2 k Ω , 5%, 1/4W		1	RC07GF122J	81349
R9	Same as R4				
R10	RESISTOR, FIXED, COMPOSITION: 9.1 k Ω , 5%, 1/4W	160114	1	RC07GF912J	81349
R11	RESISTOR, FIXED, COMPOSITION: 10 k Ω , 5%, 1/4W	160136	1	RC07GF103J	81349
R12	RESISTOR, FIXED, COMPOSITION: 47 k Ω , 5%, 1/4W	160152	1	RC07GF473J	81349
R13	RESISTOR, FIXED, COMPOSITION: 160 k Ω , 5%, 1/2W	160201	1	RC20GF164J	81349
R14	RESISTOR, VARIABLE, FILM: 20 k Ω , 30%, 1/2W	280120	1	62PAR20K	73138
R15	RESISTOR, FIXED, COMPOSITION: 91 k Ω , 5%, 1/2W	160195	1	RC20GF913J	81349
R16	RESISTOR, FIXED, COMPOSITION: 1.3 M Ω , 5%, 1/4W		1	RC07GF135J	81349
RA1	RADIATOR, TRANSISTOR	130311	1	2225B	13103
TP1	TEST POINT	180104	2	TJ-203R	49956
TP2	Same as TP1				
VR1	VOLTAGE REGULATOR	190108	1	1N754A	07688
VR2	NOT USED				
VR3	VOLTAGE REGULATOR	190125	1	1N979A	07688

EQUIPMENT DESCRIPTION 76184 +6V POWER SUPPLY REGULATOR

DATE April 24, 1969

BY R. Teg

+6V POWER

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME / CODE
C1	CAPACITOR, ELECTROL., ALUMINUM: 450 μ F, -10+75%, 25V	250051	1	39D457G025FJ4	56289
C2	CAPACITOR, ELECTROL., ALUMINUM: 25 μ F, -10+75%, 25V	250037	1	30D256G025CB2	56289
C3	CAPACITOR, MICA, DIPPED: 180 pF, 5%, 500V	120102	1	CM05FD181J03	81349
C4	CAPACITOR, ELECTROL., TANTALUM: 22 μ F, 10%, 15V	120066	1	CS13BD226K	81349
C5	CAPACITOR, ELECTROL., TANTALUM: 10 μ F, 10%, 20V	120060	1	CS13BE106K	81349
CR1	DIODE	190137	2	1N3253	07688
CR2	Same as CR1				
CR3	DIODE	190099	1	1N462A	07688
Q1	TRANSISTOR	220167	3	2N4074	07688
Q2	Same as Q1				
Q3	Same as Q1				
R1	RESISTOR, FIXED, COMPOSITION: 6.8 k Ω , 5%, 1/4W	160132	2	RC07GF682J	81349
R2	RESISTOR, FIXED, COMPOSITION: 47 Ω , 5%, 1/4W	160021	1	RC07GF470J	81349
R3	Same as R1				
R4	RESISTOR, FIXED, COMPOSITION: 150 k Ω , 5%, 1/4W	160087	1	RC07GF154J	81349
R5	RESISTOR, FIXED, COMPOSITION: 1 k Ω , 5%, 1/4W	160112	1	RC07GF102J	81349
R6	RESISTOR, FIXED, COMPOSITION: 2.2 k Ω , 5%, 1/4W	160120	3	RC07GF222J	81349

COMMUNICATION ELECTRONICS INCORPORATED

EQUIPMENT DESCRIPTION 76185 +15V POWER SUPPLY REGULATOR

DATE April 24, 1969

BY R. Teg

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME / CODE
C1	CAPACITOR, ELECTROL., ALUMINUM: 450 μ F, -10+75%, 25V	250051	1	39D457G025FJ4	56289
C2	CAPACITOR, ELECTROL., ALUMINUM: 25 μ F, -10+75%, 25V	250037	1	30D256G025CB2	56289
C3	CAPACITOR, ELECTROL., ALUMINUM: 10 μ F, -10+75%, 25V	250032	1	30D106G025BB2	56289
C4	CAPACITOR, MICA, DIPPED: 180 pF, 5%, 500V	120102	1	CM05FD181J03	81349
C5	CAPACITOR, ELECTROL., TANTALUM: 22 μ F, 10%, 15V	120066	1	CS13BD226K	81349
CRI	DIODE	190099	1	1N462A	07688
Q1	TRANSISTOR	220167	2	2N4074	07688
Q2	TRANSISTOR	220152	1	2N3055	07688
Q3	TRANSISTOR	220156	1	2N3478	07688
Q4	Same as Q1				
R1	RESISTOR, FIXED, COMPOSITION: 47 Ω , 5%, 1/4W	160021	1	RC07GF470J	81349
R2	RESISTOR, FIXED, COMPOSITION: 6.8 k Ω , 5%, 1/4W	160132	2	RC07GF682J	81349
R3	Same as R2				
R4	RESISTOR, FIXED, COMPOSITION: 150 k Ω , 5%, 1/4W	160087	1	RC07GF154J	81349
R5	RESISTOR, FIXED, COMPOSITION: 1 k Ω , 5%, 1/4W	160112	1	RC07GF102J	81349
R6	RESISTOR, FIXED, COMPOSITION: 2.2 k Ω , 5%, 1/4W	160120	3	RC07GF222J	81349
R7	RESISTOR, VARIABLE, FILM: 1 k Ω , 30%, 1/2W	230052	1	62PAR1K	73138

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME/CODE
C1	CAPACITOR, ELECTROL., ALUMINUM: 200 μ F, -10+75%, 50V	250049	1	39D207G050FJ4	56289
C2	CAPACITOR, ELECTROL., ALUMINUM: 10 μ F, -10+75%, 25V	250032	2	30D106G025BB2	56289
C3	Same as C2				
C4	CAPACITOR, MICA, DIPPED: 200 pF, 5%, 500V	120103	1	CM05FD201J03	81349
C5	CAPACITOR, ELECTROL., TANTALUM: 47 μ F, 10%, 20V	120070	1	CS13BE476K	81349
CR1	DIODE	190099	1	1N462A	07688
Q1	TRANSISTOR	220152	1	2N3055	07688
Q2	TRANSISTOR	220166	3	2N4037	07688
Q3	Same as Q2				
Q4	Same as Q2				
R1	RESISTOR, FIXED, COMPOSITION: 470 Ω , 5%, 1/4W	160045	1	RC07GF471J	81349
R2	RESISTOR, FIXED, COMPOSITION: 6.8 k Ω , 5%, 1/4W	160132	2	RC07GF682J	81349
R3	Same as R2				
R4	RESISTOR, FIXED, COMPOSITION: 150 k Ω , 5%, 1/4W	160087	1	RC07GF154J	81349
R5	RESISTOR, FIXED, COMPOSITION: 2.2 k Ω , 5%, 1/4W	160120	3	RC07GF222J	81349
R6	RESISTOR, VARIABLE, FILM: 1 k Ω , 30%, 1/2W	280052	1	62PAR1K	73138
R7	RESISTOR, FIXED, COMPOSITION: 2.7 k Ω , 5%, 1/4W	160122	1	RC07GF272J	81349
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EQUIPMENT DESCRIPTION 71285 160/21.4 MHz CONVERTER

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
A1	BALANCED MIXER BOARD		1	16456	14682
C1	CAPACITOR, CERAMIC, DISC: 1000 pF, GMV, 500V	180028	9	SM(1000pF, GMV)	91418
C2	CAPACITOR, CERAMIC, STANDOFF: 1000 pF, GMV, 500V	180029	3	SS5D-102W	01121
C3	Same as C1				
C4	Same as C1				
C5	Same as C1				
C6	CAPACITOR, CERAMIC, FEEDTHRU: 1000 pF, GMV, 500V	130135	3	FA5C-102W	01121
C7	Same as C1				
C8	CAPACITOR, VARIABLE, AIR: 0.8-10 pF, 250V	240185	3	2954	91293
C9	Same as C1				
C10	CAPACITOR, COMPOSITION, TUBULAR: 0.82 pF, 10%, 500V	150118	1	QC(.82pF, K)	95121
C11	CAPACITOR, CERAMIC, TUBULAR: 2.7 pF, ±0.25 pF, 500V	250082	1	301-000-C0J0-279C	72982
C12	CAPACITOR, CERAMIC, TUBULAR: 22 pF, 5%, 500V	250109	2	301-000-C0G0-220J	72982
C13	Same as C8				
C14	Same as C8				
C15	CAPACITOR, CERAMIC, TUBULAR: 2.0 pF, ±0.25 pF, 500V	250078	1	301-000-C0K0-209C	72982
C16	Same as C2				
C17	Same as C6				
C18	CAPACITOR, CERAMIC, TUBULAR: 1.5 pF, ±0.1 pF, 500V	250074	1	301-000-C0K0-159B	72982
C19	Same as C2				
C20	Same as C12				

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME/CODE
C21	Same as C6				
C22	Same as C1				
C23	Same as C1				
C24	Same as C1				
C25	CAPACITOR, MICA, DIPPED: 100 pF, 5%, 500V	120096	1	CM05FD101J03	81349
C26	CAPACITOR, MICA, DIPPED: 15 pF, 5%, 500V	120077	1	CM05CD150J03	81349
E1	TERMINAL, FEEDTHRU				
E2	Same as E1	180045	2	SFU-16	04013
J1	CONNECTOR, RECEPTACLE, SUBMINIATURE SERIES	180150	5	UG-1464/U	81349
J2	Same as J1				
J3	Same as J1				
J4	Same as J1				
J5	Same as J1				
L1	COIL, FIXED		2	21210-34	14632
L2	COIL, FIXED: 0.24 μ H		3	200-1	99848
L3	Same as L1				
L4	COIL, FIXED		.1	21210-29	14632

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME / CODE
L5	Same as L2				
L6	COIL, FIXED		1	1131-37	14632
L7	Same as L2				
L8	COIL, FIXED		1	21210-37	14632
P1	CONNECTOR, PLUG, MULTIPIN	110401 110402	1	SLE-7P-NSSH13	81312
P2	CONNECTOR, PLUG, SUBMINIATURE SERIES, Part of W1	180151	2	UG-1465/U	81349
P3	Same as P2				
Q1	TRANSISTOR	250209	1	3N140	07688
Q2	TRANSISTOR	220156	2	2N3478	07688
Q3	Same as Q2				
R1	RESISTOR, FIXED, COMPOSITION: 150 k Ω , 5%, 1/4W	160087	1	RC07GF154J	81349
R2	RESISTOR, FIXED, COMPOSITION: 10 k Ω , 5%, 1/4W	160136	2	RC07GF103J	81349
R3	RESISTOR, FIXED, COMPOSITION: 10 Ω , 5%, 1/4W	160006	1	RC07GF100J	81349
R4	RESISTOR, FIXED, COMPOSITION: 4.7 k Ω , 5%, 1/4W	160128	5	RC07GF472J	81349
R5	Same as R4				
R6	Same as R2				
R7	RESISTOR, FIXED, COMPOSITION: 12 k Ω , 5%, 1/4W	160138	1	RC07GF123J	81349
R8	Same as R4				

EQUIPMENT DESCRIPTION 71285 160/21.4 MHz CONVERTER

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
R9	RESISTOR, FIXED, COMPOSITION: 22 Ω , 5%, 1/4W	160013	2	RC07GF220J	81349
R10	RESISTOR, FIXED, COMPOSITION: 300 Ω , 5%, 1/4W		2	RC07GF301J	81349
R11	Same as R9				
R12	RESISTOR, FIXED, COMPOSITION: 1 k Ω , 5%, 1/4W	160040	1	RC07GF102J	81349
R13	RESISTOR, FIXED, COMPOSITION: 47 Ω , 5%, 1/4W	160021	1	RC07GF470J	81349
R14	NOT USED				
R15	RESISTOR, FIXED, COMPOSITION: 470 Ω , 5%, 1/4W	160045	2	RC07GF471J	81349
R16	NOT USED				
R17	Same as R4				
* R18	RESISTOR, FIXED, COMPOSITION: 150 Ω , 5%, 1/4W	160033	2	RCR07G151JS	81349
R19	Same as R10				
R20	NOT USED				
R21	RESISTOR, FIXED, COMPOSITION: 18 k Ω , 5%, 1/4W	160142	1	RC07GF183J	81349
R22	Same as R4				
R23	Same as R15				
R24	Same as R18				
W1	CABLE & CONNECTOR ASSEMBLY		Ref		14632
Y1	CRYSTAL, QUARTZ: 138.600 MHz	300215	1	98202-03	14632
*	Nominal value. Final value to be factory selected.				

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REF DESIG	DESCRIPTION	CEI CONTROL NUMBER	UNITS PER ASSY	MANUFACTURER'S PART NO.	MFG. CODE
A1	AMPLIFIER		2	15164	1463
A2	Same as A1				
A3	VIDEO AMPLIFIER		1	15203	1463
C1	CAPACITOR, CERAMIC, FEEDTHRU: 1000 pF, GMV, 500V	130135	14	FA5C-102W	0112
C2	Same as C1				
C3	Same as C1				
C4	Same as C1				
C5	Same as C1				
C6	Same as C1				
C7	Same as C1				
C8	Same as C1				
C9	Same as C1				
C10	Same as C1				
C11	Same as C1				
C12	Same as C1				
C13	CAPACITOR, VARIABLE, AIR: 0.8-10 pF, 250V	240185	9	2954	9129
C14	CAPACITOR, CERAMIC, STANDOFF: 1000 pF, GMV, 500V	180029	17	SS5D-102W	0112
C15	CAPACITOR, CERAMIC, DISC: 470 pF, 20%, 1000V	110131	7	B(470pF, M)	9141
C16	CAPACITOR, CERAMIC, TUBULAR: 10 pF, ± 0.5 pF, 500V	250104	1	301-000-C0H0-100D	729
C17	Same as C14				
C18	Same as C14				

REF DESIG	DESCRIPTION	CEI CONTROL NUMBER	UNITS PER ASS'Y	MANUFACTURER'S PART NO.	MFG CODES
C19	Same as C14				
C20	Same as C14				
C21	Same as C14				
C22	Same as C13				
C23	Same as C13				
C24	Same as C14				
C25	Same as C14				
C26	CAPACITOR, COMPOSITION, TUBULAR: 0.82 pF, 10%, 500V	150118	1	QC(.82pF,K)	9512
C27	CAPACITOR, COMPOSITION, TUBULAR: 0.36 pF, 10%, 500V	150109	1	QC(.36pF,K)	9512
C28	Same as C13				
C29	Same as C13				
C30	Same as C15				
C31	Same as C15				
C32	Same as C1				
C33	Same as C14				
C34	Same as C14				
C35	Same as C14				
C36	Same as C13				
C37	Same as C15				
C38	Same as C15				
C39	Same as C13				
C40	Same as C14				
C41	Same as C15				

Courtesy of <http://BlackRadios.terryo.org>

EQUIPMENT DESCRIPTION 72304 - 160 MHz IF AMPLIFIER (10-20 MHz BW)

DATE September 23, 1969

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BY R. Teg

REF DESIG	DESCRIPTION	CEI CONTROL NUMBER	UNITS PER ASS'Y	MANUFACTURER'S PART NO.	MFG COD
C42	Same as C13				
C43	Same as C15				
C44	Same as C14				
C45	Same as C14				
C46	CAPACITOR, CERAMIC, TUBULAR: 4.7 pF, ±0.25 pF, 500V	250092	1	301-000-C0H0-479C 72	
C47	Same as C14				
C48	CAPACITOR, CERAMIC, DISC: 1000 pF, GMV, 500V	180028	4	SM(1000pF,GMV 914	
C49	Same as C13				
C50	CAPACITOR, CERAMIC, TUBULAR: 2.7 pF, ±0.25 pF, 500V	250082	1	301-000-C0J0-277E 72	
C51	Same as C14				
C52	Same as C14				
C53	Same as C48				
C54	Same as C48				
C55	Same as C14				
C56	Same as C48				
CR1	DIODE	190099	4	1N462A	076
CR2	Same as CR1				
CR3	Same as CR1				
CR4	Same as CR1				
CR5	DIODE	120402	1	5082-2800	284

Courtesy of <http://BlackRadios.terry.org>

REF DESIG	DESCRIPTION	CEI CONTROL NUMBER	UNITS PER ASS'Y	MANUFACTURER'S PART NO.	MFG COD
E1	TERMINAL, FEEDTHRU	180045	6	SFU-16	040
E2	Same as E1				
E3	Same as E1				
E4	Same as E1				
E5	Same as E1				
E6	Same as E1				
FB1	FERRITE BEAD	270099	3	56-590-65/4A	021
FB2	Same as FB1				
FB3	Same as FB1				
J1	CONNECTOR, RECEPTACLE, SUBMINIATURE SERIES	180150	4	UG-1464/U	1349
J2	Same as J1				
J3	Same as J1				
J4	Same as J1				
L1	COIL, FIXED		1	21210-68	14632
L2	COIL, FIXED		2	21210-69	14632
L3	Same as L2				
L4	COIL, FIXED		1	1131-40	14632
L5	COIL, FIXED: 0.24 μ H	230005	4	200-11	99848
L6	Same as L5				

EQUIPMENT DESCRIPTION 72304 - 160 MHz IF AMPLIFIER (10-20 MHz BW)DATE September 23, 1969BY R. Teg

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REF DESIG	DESCRIPTION	CEI CONTROL NUMBER	UNITS PER ASS'Y	MANUFACTURER'S PART NO.	MF COD
L7	Same as L5				
L8	Same as L5				
P1	CONNECTOR, PLUG, MULTIPIN				
Q1	TRANSISTOR	180299 180291	1	SRE-7PNSSH13	8131
Q2	Same as Q1	220165	8	2N3933	076
Q3	Same as Q1				
Q4	Same as Q1				
Q5	Same as Q1				
Q6	Same as Q1				
Q7	Same as Q1				
Q8	Same as Q1				
Q9	TRANSISTOR				
Q10	Same as Q9	110334	2	2N5109	076
R1	RESISTOR, FIXED, COMPOSITION: 270 Ω , 5%, 1/4W	160039	1	RCR07G271JS	8134
R2	RESISTOR, FIXED, COMPOSITION: 33 Ω , 5%, 1/4W	160017	1	RCR07G330JS	8134
R3	RESISTOR, FIXED, COMPOSITION: 120 Ω , 5%, 1/4W	160031		RCR07G121JS	8134
R4	RESISTOR, FIXED, COMPOSITION: 470 Ω , 5%, 1/4W	160045	3	RCR07G471JS	8134
R5	RESISTOR, FIXED, COMPOSITION: 160 k Ω , 5%, 1/4W	160088	2	RCR07G164JS	8134
R6	RESISTOR, FIXED, COMPOSITION: 10 k Ω , 5%, 1/4W	160136	8	RCR07G103JS	8134
R7	RESISTOR, FIXED, COMPOSITION: 22 Ω , 5%, 1/4W	160013	9	RCR07G220JS	8134

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Courtesy of <http://BlackRadios.terryc.org>

REF DESIG	DESCRIPTION	CEI CONTROL NUMBER	UNITS PER ASSY	MANUFACTURER'S PART NO.	MFG CO
R8	RESISTOR, FIXED, COMPOSITION: 1 k Ω , 5%, 1/4W	160112	6	RCR07G102JS	81
R9	RESISTOR, FIXED, COMPOSITION: 10 Ω , 5%, 1/4W	160006	8	RCR07G100JS	81
R10	Same as R6				
R11	RESISTOR, FIXED, COMPOSITION: 30 k Ω , 5%, 1/4W	160147	4	RCR07G303JS	81
R12	RESISTOR, FIXED, COMPOSITION: 2 k Ω , 5%, 1/4W	160119	4	RCR07G202JS	81
R13	RESISTOR, FIXED, COMPOSITION: 47 Ω , 5%, 1/4W	160021	3	RCR07G470JS	81
R14	Same as R9				
R15	Same as R9				
R16	Same as R7				
R17	Same as R7				
R18	Same as R6				
R19	Same as R6				
R20	Same as R11				
R21	Same as R11				
R22	Same as R6				
R23	Same as R6				
R24	Same as R9				
R25	Same as R12				
R26	Same as R12				
R27	Same as R13				
R28	RESISTOR, FIXED, COMPOSITION: 68 Ω , 5%, 1/4W	160025	1	RCR07G680JS	81349
R29	Same as R7				
R30	Same as R7				

Courtesy of <http://BlackRadios.terry.org>

Courtesy of <http://BlackRadios.terryo.org>

REF DESIG	DESCRIPTION	CEI CONTROL NUMBER	UNITS PER ASSY	MANUFACTURER'S PART NO.	MFG CODING
R31	Same as R8				
R32	Same as R7				
R33	Same as R4				
R34	Same as R5				
R35	Same as R6				
R36	Same as R8				
R37	Same as R4				
R38	RESISTOR, FIXED, COMPOSITION: 680 Ω , 5%, 1/4W	160108	1	RCR07G681JS	8134
R39	Same as R7				
R40	Same as R7				
R41	Same as R11				
R42	Same as R8				
R43	Same as R8				
R44	Same as R6				
R45	Same as R9				
R46	Same as R12				
R47	Same as R13				
R48	Same as R9				
R49	Same as R9				
R50	RESISTOR, FIXED, COMPOSITION: 2.7 Ω , 5%, 1/4W	160067	1	RCR07G2R7JS	8134
R51	RESISTOR, FIXED, COMPOSITION: 3 k Ω , 5%, 1/4W	160123	1	RCR07G302JS	8134
R52	RESISTOR, FIXED, COMPOSITION: 270 Ω , 5%, 1/4W	160039	1	RCR07G271JS	8134
R53	Same as R8				

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BY R. Teg

79640 160 MHz LIMITER/DISCRIMINATOR

EQUIPMENT DESCRIPTION

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME / CODE
C1	CAPACITOR, VARIABLE, AIR: 0.8-10 pF, 250V	240185	5	2954	92193
C2	CAPACITOR, CERAMIC, STANDOFF: 470 pF, 20%, 500V	180027	8	SS5A-4712	01121
C3	CAPACITOR, CERAMIC, FEEDTHRU: 470 pF, 20%, 500V	130132	7	FA5C-4712	01121
C4	Same as C2				
C5	CAPACITOR, MICA, DIPPED: 33 pF, 5%, 500V	120084	1	CM05ED330J03	81349
C6	Same as C3				
C7	Same as C2				
C8	Same as C1				
C9	CAPACITOR, MICA, DIPPED: 56 pF, 5%, 500V	120090	1	CM05ED560J03	81349
C10	Same as C3				
C11	Same as C2				
C12	Same as C1				
C13	Same as C2				
C14	CAPACITOR, CERAMIC, TUBULAR: 10 pF, ±0.5 pF, 500V	250104	5	301-000-C0H0-100D	72982
C15	Same as C14				
C16	Same as C3				
C17	Same as C2				
C18	Same as C2				
C19	Same as C2				
C20	Same as C1				
C21	Same as C1				
C22	Same as C14				
C23	Same as C14				

Courtesy of <http://BlackRadios.terry.org>

COMMUNICATION ELECTRONICS INCORPORATED

REF DESIG	DESCRIPTION	CEI CONTROL NUMBER	UNITS PER ASS'Y	MANUFACTURER'S PART NO.	MFG CODE
C24	CAPACITOR, ELECTROL., TANTALUM: 4.7 μ F, 10%, 35V	120057	1	CS13BF475K	8134
C25	Same as C3				
C26	CAPACITOR, MICA, DIPPED: 36 pF, 5%, 500V	120085	1	CM05ED360J03	8134
C27	Same as C3				
C28	CAPACITOR, CERAMIC, DISC: 0.1 μ F, -20+80%, 25V	130019	2	DFJ-3	7389
C29	Same as C14				
C30	Same as C28				
C31	Same as C3				
C32	CAPACITOR, CERAMIC, TUBULAR: 12 pF, \pm 0.5 pF, 500V	250106	1	301-000-C0G0-120J	7298
CR1	DIODE		10	5082-2303	2848
CR2	Same as CR1				
CR3	Same as CR1				
CR4	Same as CR1				
CR5	Same as CR1				
CR6	Same as CR1				
CR7	Same as CR1				
CR8	Same as CR1				
CR9	Same as CR1				
CR10	Same as CR1				
CR11	DIODE	110372	1	IN82AG	0768
CR12	DIODE	190114	3	IN914A	0768

Courtesy of <http://BlackRadios.terryo.org>

BY _____

REF DESIG	DESCRIPTION	CEI CONTROL NUMBER	UNITS PER ASSY	MANUFACTURER'S PART NO.	MFG CODI
CR13	Same as CR12				
CR14	Same as CR12				
E1	TERMINAL FEEDTHRU	180045	5	SFU-16	0401
E2	Same as E1				
E3	Same as E1				
E4	Same as E1				
E5	Same as E1				
J1	CONNECTOR, RECEPTACLE, SUBMINIATURE SERIES	180150	4	UG-1464/U	8134
J2	Same as J1				
J3	Same as J1				
J4	Same as J1				
L1	COIL, FIXED		1	21210-4I	1463
L2	COIL, FIXED		1	21210-8	1463
L3	COIL, FIXED: 0.24 μH	230005	3	200-11	9984
L4	Same as L3				
L5	COIL, FIXED		1	1131-24	1463
L6	COIL, FIXED		1	1131-86	1463

Courtesy of <http://BlackRadios.terryo.org>

EQUIPMENT DESCRIPTION 79640 160 MHz LIMITER/DISCRIMINATOR

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REF DESIG	DESCRIPTION	CEI CONTROL NUMBER	UNITS PER ASS'Y	MANUFACTURER'S PART NO.	MFG. CODE
L7	Same as L3				
P1	CONNECTOR, PLUG, MULTIPIN	110402 110401	1	SLE-7P-NSSH13	81312
Q1	TRANSISTOR	220165	5	2N3933	7688
Q2	Same as Q1				
Q3	Same as Q1				
Q4	Same as Q1				
Q5	Same as Q1				
Q6	TRANSISTOR	220243	2	2N2222	7688
Q7	TRANSISTOR	220153	2	2N3251	7688
Q8	Same as Q6				
Q9	Same as Q7				
R1	RESISTOR, FIXED, COMPOSITION: 10 k Ω , 5%, 1/4W	160136	8	RC07GF103J	81349
R2	RESISTOR, FIXED, COMPOSITION: 2.2 k Ω , 5%, 1/4W	160120	5	RC07GF222J	81349
R3	RESISTOR, FIXED, COMPOSITION: 470 Ω , 5%, 1/4W	160045	6	RC07GF471J	81349
R4	RESISTOR, FIXED, COMPOSITION: 22 Ω , 5%, 1/4W	160013	11	RC07GF220J	81349
R5	Same as R4				
R6	Same as R2				

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FORM WJC-E2 5/6

REF DESIG	DESCRIPTION	CEI CONTROL NUMBER	UNITS PER ASSY	MANUFACTURER'S PART NO.	MFG CODE
R7	Same as R1				
R8	Same as R3				
R9	Same as R4				
R10	Same as R2				
R11	Same as R1				
R12	Same as R3				
R13	Same as R4				
R14	Same as R1				
R15	Same as R1				
R16	RESISTOR, FIXED, COMPOSITION: 56 Ω , 5%, 1/4W	I60023	1	RC07GF560J	81349
R17	Same as R2				
R18	Same as R3				
R19	Same as R1				
R20	Same as R1				
R21	Same as R2				
R22	Same as R3				
R23	Same as R4				
R24	Same as R4				
R25	RESISTOR, FIXED, COMPOSITION: 1.2 k Ω , 5%, 1/4W	I60114	3	RC07GF122J	81349
R26	Same as R25				
R27	RESISTOR, VARIABLE, WIRE-WOUND: 200 Ω , 5%, 1/2W		1	3300S-1-201	80294
R28	RESISTOR, FIXED, COMPOSITION: 3.3 k Ω , 5%, 1/4W	I60124	4	RC07GF332J	81349
R29	Same as R28				

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EQUIPMENT DESCRIPTION 79640 160 MHz LIMITER/DISCRIMINATOR

April 21, 1969

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REF DESIG	DESCRIPTION	CEI CONTROL NUMBER	UNITS PER ASS'Y	MANUFACTURER'S PART NO.	MFG CODE
R30	RESISTOR, FIXED, COMPOSITION: 1 k Ω , 5%, 1/4W	160112	1	RC07GF102J	81349
R31	RESISTOR, FIXED, COMPOSITION: 100 k Ω , 5%, 1/4W	160083	1	RC07GF104J	81349
R32	RESISTOR, FIXED, COMPOSITION: 20 k Ω , 5%, 1/4W	160143	1	RCR07G203IS	81349
R33	RESISTOR, VARIABLE, WIRE-WOUND: 10 k Ω , 5%, 1/2W		1	3300S-1-103	80299
R34	Same as R3				
R35	RESISTOR, FIXED, COMPOSITION: 680 Ω , 5%, 1/4W	160108	1	RC07GF681J	1349
R36	RESISTOR, FIXED, COMPOSITION: 120 Ω , 5%, 1/4W	160031	2	RC07GF121J	1349
R37	RESISTOR, FIXED, COMPOSITION: 5.1 k Ω , 5%, 1/4W	160129	1	RC07GF512J	1349
R38	RESISTOR, FIXED, COMPOSITION: 10 Ω , 5%, 1/4W	160006	1	RC07GF100J	1349
R39	Same as R25				
R40	Same as R4				
R41	Same as R4				
R42	Same as R4				
R43	Same as R4				
R44	RESISTOR, FIXED, COMPOSITION: 47 Ω , 5%, 1/4W	160021	1	RC07GF470J	1349
R45	Same as R4				
R46	RESISTOR, FIXED, COMPOSITION: 33 Ω , 5%, 1/4W	160017	1	RC07GF330J	81349
R47	Same as R36				
R48	RESISTOR, FIXED, COMPOSITION: 150 Ω , 5%, 1/4W	160033	1	RC07GF151J	81349
R49	Same as R28				
R50	Same as R28				

Courtesy of <http://BlackRadios.terry.org>

EQUIPMENT DESCRIPTION 21.4 MHz IF AMPLIFIER (100 kHz BW) - 72295

DATE April 22, 1969

BY R. Teg

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME / CODE
A1	IF INPUT AMPLIFIER		1	15295	14632
A2	IF OUTPUT AMPLIFIER		1	15298	14632
A3	FM LIMITER DISCRIMINATOR		1	15196	14632
C1	CAPACITOR, CERAMIC, FEEDTHRU: 1000 pF, GMV, 500V	130135	9	FA5C-102W	01121
C2	Same as C1				
C3	CAPACITOR, CERAMIC, DISC: 1000 pF, GMV, 500V	180028	2	SM(1000pF, GMV)	91418
C4	CAPACITOR, CERAMIC, DISC: 5000 pF, 20%, 500V	180030	3	SM(5000pF, M)	91418
C5	Same as C3				
C6	Same as C1				
C7	Same as C4				
C8	Same as C1				
C9	Same as C1				
C10	NOT USED				
C11	Same as C4				
C12	Same as C1				
C13	Same as C1				
C14	Same as C1				
C15	Same as C1				
E1	TERMINAL, FEEDTHRU	180045	1	SFU-16	04013

COMMUNICATION ELECTRONICS INCORPORATED

EQUIPMENT DESCRIPTION 21.4 MHz IF AMPLIFIER (100 kHz BW) - 72295

DATE April 22, 1969

BY R. Teg

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME / CODE
FB1	FERRITE BEAD	270099	4	56-590-65/4A	02114
FB2	Same as FB1				
FB3	Same as FB1				
FB4	Same as FB1				
FL1	FILTER, BAND-PASS: 21.4 MHz C. F., 100 kHz BW	280022	1	6063674	74306
J1	CONNECTOR, RECEPTACLE, SUBMINIATURE SERIES	180150	3	UG-1464/U	81349
J2	Same as J1				
J3	Same as J1				
P1	CONNECTOR, PLUG, MULTIPIN	180016	1	SLE-14P-NSSH13	81312
R1	RESISTOR, FIXED, COMPOSITION: 470Ω, 5%, 1/4W	160045	1	RCR07G471JS	81349
R2	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	160021	1	RCR07G470JS	81349
R3	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	160029	1	RCR07G101JS	81349
R4	RESISTOR, FIXED, COMPOSITION: 1 kΩ, 5%, 1/4W	160112	1	RCR07G102JS	81349
R5	RESISTOR, FIXED, COMPOSITION: 560 Ω, 5%, 1/4W	160047	1	RCR07G561JS	81349
R6	RESISTOR, FIXED, COMPOSITION: 15 kΩ, 5%, 1/4W	160140	1	RCR07G153JS	81349

COMMUNICATION ELECTRONICS INCORPORATED

15295 IF INPUT AMPLIFIER

DATE April 21, 1969

BY R. Teg

EQUIPMENT DESCRIPTION

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
C1	CAPACITOR, CERAMIC, DISC: 1000 pF, GMV, 500V	180028	2	SM(1000pF, GMV)	91418
C2	CAPACITOR, CERAMIC, DISC: 5000 pF, 20%, 500V	180030	8	SM(5000pF, M)	91418
C3	Same as C2				
C4	Same as C2				
C5	Same as C2				
C6	Same as C1				
C7	Same as C2				
C8	Same as C2				
C9	CAPACITOR, CERAMIC, TUBULAR: 1 pF, ±.25 pF, 500V	250071	1	301-000-C0K0-109C	72982
C10	CAPACITOR, VARIABLE, CERAMIC: 9-35 pF, 350V	270118	1	538-011-94D	72982
C11	Same as C2				
C12	Same as C2				
L1	COIL, FIXED	200023	1	1131-41	14632
Q1	TRANSISTOR	250209	1	3N140	07688
Q2	TRANSISTOR	220165	1	2N3933	07688

EQUIPMENT DESCRIPTION

BY R. Teg

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REF DESIG	DESCRIPTION	CEI CONTROL NUMBER	UNITS PER ASS'Y	MANUFACTURER'S PART NO.	MFG CODE
C1	CAPACITOR, CERAMIC, DISC: 5000 pF, 20%, 500V	180030	7	SM(5000pF, M)	9141
C2	Same as C1				
C3	Same as C1				
C4	Same as C1				
C5	Same as C1				
C6	CAPACITOR, CERAMIC, DISC: 1000 pF, GMV, 500V	180028	5	SM(1000pF, GMV)	9141
C7	Same as C6				
C8	Same as C1				
C9	Same as C6				
C10	CAPACITOR, COMPOSITION, TUBULAR: 0.68 pF, 10%, 500V	150115	1	QC(.68pF, K)	9512
C11	Same as C6				
C12	CAPACITOR, MICA, DIPPED: 62 pF, 5%, 500V	120091	1	CM05ED620J03	8134
C13	CAPACITOR, VARIABLE, CERAMIC: 5.5-18 pF, 350V	270123	1	DV11PS-18A	7389
C14	Same as C6				
C15	CAPACITOR, MICA, DIPPED: 620 pF, 5%, 300V	130057	1	DM15-621J	7213
C16	CAPACITOR, MICA, DIPPED: 150 pF, 5%, 500V	120100	1	CM05FD151J03	8134
C17	CAPACITOR, MICA, DIPPED: 470 pF, 5%, 500V	130053	1	DM15-471J	7213
C18	Same as C1				
C19	CAPACITOR, CERAMIC, DISC: 0.01 μF, 20%, 100V	120043	2	C023B101F103M	562
C20	Same as C19				

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BY R. Teg

REF DESIG	DESCRIPTION	CEI CONTROL NUMBER	UNITS PER ASSY	MANUFACTURER'S PART NO.	MF COD
CRI	DIODE	120402	1	5082-2800	284
L1	COIL, FIXED: 22 μ H		1	1537-44	998
L2	COIL, FIXED	200023	1	1137-41	146
Q1	TRANSISTOR	250209	1	3N140	0768
Q2	TRANSISTOR	220165	1	2N3933	0768
Q3	TRANSISTOR	220156	1	2N3478	0768
Q4	TRANSISTOR	220153	1	2N3251	0768
Q5	TRANSISTOR	220183	1	2N929	0768
R1	RESISTOR, FIXED, COMPOSITION: 150 k Ω , 5%, 1/4W	160087	1	RCR07G154JS	8134
R2	RESISTOR, FIXED, COMPOSITION: 10 k Ω , 5%, 1/4W	160136	5	RCR07G103JS	8134
R3	Same as R2				
R4	RESISTOR, FIXED, COMPOSITION: 22 Ω , 5%, 1/4W	160013	2	RCR07G220JS	8134
R5	RESISTOR, FIXED, COMPOSITION: 330 Ω , 5%, 1/4W	160041	1	RCR07G331JS	8134
R6	RESISTOR, FIXED, COMPOSITION: 47 Ω , 5%, 1/4W	160021	6	RCR07G470JS	8134
R7	Same as R6				
R8	Same as R2				
R9	RESISTOR, FIXED, COMPOSITION: 4.7 k Ω , 5%, 1/4W	160128	3	RCR07G472JS	8134

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EQUIPMENT DESCRIPTION

15298 - IF OUTPUT AMPLIFIER (100 kHz BW)

DATE

September 24, 1969

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BY R. Teg

REF DESIG	DESCRIPTION	CEI CONTROL NUMBER	UNITS PER ASS'Y	MANUFACTURER'S PART NO.	MFG CODE
R10	RESISTOR, FIXED, COMPOSITION: 470 Ω , 5%, 1/4W	160045	2	RCR07G471JS	81349
R11	Same as R4				
R12	RESISTOR, FIXED, COMPOSITION: 820 Ω , 5%, 1/4W	160110	1	RCR07G821JS	81349
R13	RESISTOR, FIXED, COMPOSITION: 10 Ω , 5%, 1/4W	160006	3	RCR07G100JS	81349
R14	RESISTOR, FIXED, COMPOSITION: 100 Ω , 5%, 1/4W	160029	1	RCR07G101JS	81349
R15	Same as R9				
R16	Same as R13				
R17	Same as R10				
R18	Same as R6				
R19	Same as R2				
R20	RESISTOR, FIXED, COMPOSITION: 1 k Ω , 5%, 1/4W	160112	3	RCR07G102JS	81349
R21	RESISTOR, FIXED, COMPOSITION: 5.1 k Ω , 5%, 1/4W	160129	1	RCR07G512JS	81349
R22	RESISTOR, FIXED, COMPOSITION: 3.3 k Ω , 5%, 1/4W	160124	1	RCR07G332JS	81349
R23	Same as R6				
R24	Same as R13				
R25	Same as R6				
R26	Same as R20				
R27	Same as R2				
R28	Same as R6				
R29	Same as R9				
R30	Same as R20				
T1	TRANSFORMER		1	21092-7	14632

WATKINS - JOHNSON COMPANY - CEI DIVISION - 6006 EXECUTIVE BLVD., ROCKVILLE, MD. 20852

FORM WJC-F2 5/69

EQUIPMENT DESCRIPTION 15196 FM LIMITER DISCRIMINATOR

DATE April 21, 1969

BY R. Teg

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
C1	CAPACITOR, MICA, DIPPED: 43 pF, 5%, 500V	120087	1	CM05ED430J03	81349
C2	CAPACITOR, MICA, DIPPED: 33 pF, 5%, 500V	120084	2	CM05ED330J03	81349
C3	CAPACITOR, CERAMIC, DISC: 5000 pF, 20%, 500V	180030	2	SM(5000pF, M)	91418
C4	CAPACITOR, VARIABLE, CERAMIC: 2-8 pF, 350V	270043	2	538-011-89A	72982
C5	Same as C3				
C6	Same as C2				
C7	CAPACITOR, MICA, DIPPED: 10 pF, ±0.5 pF, 500V	120075	1	CM05CD100D03	81349
C8	Same as C4				
C9	CAPACITOR, MICA, DIPPED: 15 pF, 5%, 500V	120077	1	CM05CD150J03	81349
C10	CAPACITOR, MICA, DIPPED: 22 pF, 5%, 500V	120080	1	CM05ED220J03	81349
C11	CAPACITOR, CERAMIC, DISC: 0.1 µF, -20+80%, 25V	130019	2	DFJ-3	73899
C12	Same as C11				
C13	CAPACITOR, CERAMIC, DISC: 0.01 µF, 20%, 100V	120043	1	C023B101F103M	56289
CR1	DIODE	270121	2	5082-2900	28480
CR2	Same as CR1				
L1	COIL, FIXED: 0.68 µH	230008	1	203-11	99848
L2	COIL, FIXED		1	20681-12	14632
L3	COIL, FIXED	200022	1	1131-37	14632

COMMUNICATION ELECTRONICS INCORPORATED

EQUIPMENT DESCRIPTION 15196 FM LIMITER DISCRIMINATOR

DATE April 21, 1969

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
Q1	TRANSISTOR	220153	2	2N3251	07688
Q2	TRANSISTOR	220183	2	2N929	07688
Q3	Same as Q2				
Q4	Same as Q1				
R1	RESISTOR, FIXED, COMPOSITION: 100 Ω , 5%, 1/4W	160029	3	RC07GF101J	81349
R2	RESISTOR, FIXED, COMPOSITION: 51 k Ω , 5%, 1/4W	160076	1	RC07GF513J	81349
R3	RESISTOR, FIXED, COMPOSITION: 47 k Ω , 5%, 1/4W	160152	2	RC07GF473J	81349
R4	Same as R3				
R5	RESISTOR, FIXED, COMPOSITION: 22 Ω , 5%, 1/4W	160013	4	RC07GF220J	81349
R6	RESISTOR, FIXED, COMPOSITION: 1 k Ω , 5%, 1/4W	160112	2	RC07GF102J	81349
R7	Same as R6				
R8	Same as R1				
R9	Same as R5				
R10	Same as R1				
R11	RESISTOR, FIXED, COMPOSITION: 10 k Ω , 5%, 1/4W	160136	2	RC07GF103J	81349
R12	Same as R11				
R13	Same as R5				
R14	Same as R5				
R15	RESISTOR, FIXED, COMPOSITION: 82 Ω , 5%, 1/4W	160027	1	RC07GF820J	81349
	COMMUNICATION ELECTRONICS INCORPORATED				

EQUIPMENT DESCRIPTION 7361 VIDEO AMPLIFIER

DATE April 24, 1969

BY R. Teg

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
C1	CAPACITOR, ELECTROL., TANTALUM: 4.7 μ F, 10%, 35V	120057	1	CS13BF475K	81349
C2	CAPACITOR, ELECTROL., TANTALUM: 47 μ F, 10%, 20V	120070	2	CS13BE476K	81349
C3	CAPACITOR, CERAMIC, TUBULAR: 2.2 pF, \pm 0.25 pF, 500V	250080	1	301-000-C0J0-229C	72982
C4	Same as C2				
CR1	DIODE	190114	3	1N914A	80131
CR2	Same as CR1				
CR3	Same as CR1				
L1	COIL, FIXED: 0.68 μ H	230008	1	203-11	99848
Q1	TRANSISTOR		1	2N3423	80131
Q2	TRANSISTOR	220153	3	2N3251	80131
Q3	TRANSISTOR	220243	1	2N2222	80131
Q4	Same as Q2				
R1	RESISTOR, FIXED, COMPOSITION: 470 Ω , 5%, 1/4W	160045	3	RC07GF471J	81349
R2	RESISTOR, FIXED, COMPOSITION: 680k Ω , 5%, 1/4W	160103	1	RCR07G684JS	81349
R3	RESISTOR, FIXED, COMPOSITION: 24 k Ω , 5%, 1/4W	160145	1	RC07GF243J	81349
R4	Same as R1				

COMMUNICATION ELECTRONICS INCORPORATED

EQUIPMENT DESCRIPTION 7866 AGC AMPLIFIER UPPER I.F.

DATE April 22, 1969

BY R. Teg

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME / CODE
C1	CAPACITOR, CERAMIC, DISC: 0.01 μ F, 20%, 100V	120043	1	C023BI01F103M	56289
C2	CAPACITOR, ELECTROL., TANTALUM: 1.0 μ F, 10%, 35V	120050	3	CS13BF105K	81349
C3	CAPACITOR, ELECTROL., TANTALUM: 2.2 μ F, 10%, 35V	120053	1	CS13BF225K	81349
C4	Same as C2				
C5	CAPACITOR, ELECTROL., TANTALUM: 47 μ F, 10%, 35V	120071	1	CS13BF476K	81349
C6	Same as C2				
CR1	DIODE	190114	1	1N914A	07688
CR2	DIODE	190099	3	1N462A	07688
CR3	Same as CR2				
CR4	Same as CR2				
Q1	TRANSISTOR	220153	2	2N3251	07688
Q2	TRANSISTOR	220243	4	2N2222	07688
Q3	Same as Q1				
Q4	Same as Q2				
Q5	Same as Q2				
Q6	Same as Q2				
R1	RESISTOR, FIXED, COMPOSITION: 1 k Ω , 5%, 1/4W	160112	4	RC07GF102J	81349
R2	RESISTOR, FIXED, COMPOSITION: 10 k Ω , 5%, 1/4W	160136	5	RC07GF103J	81349
R3	Same as R2				
R4	RESISTOR, FIXED, COMPOSITION: 270 Ω , 5%, 1/4W	160093	1	RCR07G274JS	81349

EQUIPMENT DESCRIPTION

7866 AGC AMPLIFIER

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BY R. Teg

REF DESIG	DESCRIPTION	CEI CONTROL NUMBER	UNITS PER ASSY	MANUFACTURER'S PART NO.	MFG COD
R5	RESISTOR, FIXED, COMPOSITION: 560 Ω , 5%, 1/4W	160047	1	RC07GF561J	81349
R6	RESISTOR, FIXED, COMPOSITION: 100 k Ω , 5%, 1/4W	160083	1	RCR07G104JS	81349
R7	Same as R2				
R8	RESISTOR, FIXED, COMPOSITION: 100 Ω , 5%, 1/4W	160029	2	RC07GF101J	81349
R9	RESISTOR, FIXED, COMPOSITION: 33 k Ω , 5%, 1/4W	160148	1	RCR07G333JS	81349
R10	RESISTOR, FIXED, COMPOSITION: 4.7 k Ω , 5%, 1/4W	160128	2	RC07GF472J	1349
R11	RESISTOR, FIXED, COMPOSITION: 39 k Ω , 5%, 1/4W	160150	3	RC07GF393J	1349
R12	RESISTOR, FIXED, COMPOSITION: 51 k Ω , 5%, 1/4W	160076	1	RCR07G513J	1349
R13	RESISTOR, FIXED, COMPOSITION: 1 k Ω , 5%, 1/4W	160112	1	RCR07G102J	1349
R14	RESISTOR, FIXED, COMPOSITION: 47 k Ω , 5%, 1/4W	160152	1	RC07GF473J	1349
R15	NOT USED				
R16	NOT USED				
R17	RESISTOR, FIXED, COMPOSITION: 33 k Ω , 5%, 1/4W	160148	1	RC07GF333J	1349
R18	Same as R1				
R19	RESISTOR, FIXED, COMPOSITION: 2 k Ω , 5%, 1/4W	160119	1	RC07GF202J	1349
R20	Same as R1				
R21	RESISTOR, FIXED, COMPOSITION: 270 k Ω , 5%, 1/4W	160093	1	RC07GF274J	81349
R22	NOT USED				
R23	Same as R10				
R24	Same as R2				
R25	Same as R8				
R26	RESISTOR, FIXED, COMPOSITION: 3.9 k Ω , 5%, 1/4W	160126	1	RC07GF392J	81349
R27	Same as R1				

WATKINS - JOHNSON COMPANY - CEI DIVISION - 6006 EXECUTIVE BLVD., ROCKVILLE, MD. 20852

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EQUIPMENT DESCRIPTION 7444 AUDIO MODULE

DATE April 21, 1969

BY R. Teg

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SYM. NO.	DESCRIPTION	CBI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
C1	CAPACITOR, ELECTROL., TANTALUM: 1.0 μ F, 10%, 35V	120050	1	CS13BF105K	81349
C2	CAPACITOR, CERAMIC, DISC: 0.01 μ F, 20%, 100V	120043	1	C023B101F103M	56289
C3	CAPACITOR, ELECTROL., TANTALUM: 2.2 μ F, 10%, 35V	120053	2	CS13BF225K	81349
C4	Same as C3				
C5	CAPACITOR, ELECTROL., TANTALUM: 22 μ F, 10%, 15V	120066	1	CS13BD226K	81349
C6	CAPACITOR, ELECTROL., TANTALUM: 100 μ F, 10%, 20V	120073	1	CS13BE107K	81349
CR1	DIODE	190114	1	1N4446	07688
CR2	DIODE	190099	4	1N462A	07688
CR3	Same as CR2				
CR4	Same as CR2				
CR5	Same as CR2				
Q1	TRANSISTOR	220183	3	2N929	07688
Q2	Same as Q1				
Q3	Same as Q1				
Q4	TRANSISTOR	220153	2	2N3251	07688
Q5	TRANSISTOR	220197	1	2N2270	07688
Q6	Same as Q4				

COMMUNICATION ELECTRONICS INCORPORATED

EQUIPMENT DESCRIPTION 7444 AUDIO MODULE

DATE April 21, 1969

BY R. Teg

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME / CODE
R1	RESISTOR, FIXED, COMPOSITION: 1 k Ω , 5%, 1/4W	160112	2	RC07GF102J	81349
R2	RESISTOR, FIXED, COMPOSITION: 100 k Ω , 5%, 1/4W	160083	1	RC07GF104J	81349
R3	RESISTOR, FIXED, COMPOSITION: 43 k Ω , 5%, 1/4W	160151	1	RC07GF433J	81349
R4	RESISTOR, FIXED, COMPOSITION: 100 Ω , 5%, 1/4W	160029	5	RC07GF101J	81349
R5	RESISTOR, FIXED, COMPOSITION: 3.9 k Ω , 5%, 1/4W	160126	2	RC07GF392J	81349
R6	Same as R4				
R7	Same as R4				
R8	Same as R5				
R9	Same as R4				
R10	Same as R1				
R11	RESISTOR, FIXED, FILM: 301 k Ω , 1%, 1/4W	170045	1	RN60D3013F	81349
R12	RESISTOR, FIXED, FILM: 13.7 k Ω , 1%, 1/4W	170083	1	RN60D1372F	81349
R13	RESISTOR, FIXED, COMPOSITION: 2 k Ω , 5%, 1/4W	160119	1	RC07GF202J	81349
R14	RESISTOR, FIXED, FILM: 20 k Ω , 1%, 1/4W	170088	1	RN60D2002F	81349
R15	RESISTOR, FIXED, FILM: 562 Ω , 1%, 1/4W	170130	1	RN60D5620F	81349
R16	Same as R4				
R17	RESISTOR, FIXED, COMPOSITION: 1.5 k Ω , 5%, 1/4W	160116	2	RC07GF152J	81349
R18	Same as R17				
R19	RESISTOR, FIXED, COMPOSITION: 47 Ω , 5%, 1/4W	160021	2	RC07GF470J	81349
R20	Same as R19				
R21	RESISTOR, FIXED, COMPOSITION: 2.7 M Ω , 5%, 1/4W	160314	1	RC07GF275J	81349
T1	TRANSFORMER		1	13335	14632

COMMUNICATION ELECTRONICS INCORPORATED

EQUIPMENT DESCRIPTION 79249 AFC AMPLIFIER

DATE April 22, 1969

BY R. Teg

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
C1	CAPACITOR, CERAMIC, DISC: 0.01 μ F, 20%, 100V	120474	1	8131-M100-65I-104M	72982
C2	CAPACITOR, ELECTROL., TANTALUM: 2.2 μ F, 10%, 35V	120053	2	CS13BF225K	81349
C3	Same as C2				
C4	CAPACITOR, ELECTROL., TANTALUM: 47 μ F, 10%, 35V	120071	1	CS13BF476K	81349
Q1	TRANSISTOR	220243	1	2N2222	07688
R1	RESISTOR, FIXED, COMPOSITION: 33k Ω , 5%, 1/4W	160148	1	RC07GF33J	81349
R2	RESISTOR, FIXED, COMPOSITION: 100 k Ω , 5%, 1/4W	160083	1	RC07GF104J	81349
R3	RESISTOR, FIXED, COMPOSITION: 1 M Ω , 5%, 1/4W	160306	1	RC07GF105J	81349
R4	RESISTOR, FIXED, COMPOSITION: 560 Ω , 5%, 1/4W	160047	1	RC07GF561J	81349
R5	RESISTOR, FIXED, COMPOSITION: 4.7 k Ω , 5%, 1/4W	160128	1	RC07GF472J	81349
R6	RESISTOR, FIXED, COMPOSITION: 470 Ω , 5%, 1/4W	160045	2	RC07GF471J	81349
R7	RESISTOR, FIXED, COMPOSITION: 10 k Ω , 5%, 1/4W	160136	2	RC07GF103J	81349
R8	RESISTOR, FIXED, COMPOSITION: 2.7 k Ω , 5%, 1/4W	160122	1	RC076F272J	81349
R9	RESISTOR, FIXED, COMPOSITION: 1.5 k Ω , 5%, 1/4W	160123	1	RC076F152J	81349
R10	RESISTOR, FIXED, COMPOSITION: 150 Ω , 5%, 1/4W	160033	1	RC07GF151J	81349
R11	Same as R7				
R12	RESISTOR, FIXED, COMPOSITION: 2.2 k Ω , 5%, 1/4W	160120	1	RC07GF222J	81349
R13	Same as R6				

COMMUNICATION ELECTRONICS INCORPORATED

EQUIPMENT DESCRIPTION 72301 21.4 MHz IF AMPLIFIER (2 MHz/4 MHz BW)

DATE April 30, 1969

BY R. Teg

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME/CODE
A1	21.4 MHz IF AMPLIFIER (2.0-4.0 MHz BW)		1	21974	14632
A2	21.4 MHz FM LIMITER/DISCRIMINATOR BOARD		1	15624	14632
C1	CAPACITOR, CERAMIC, FEEDTHRU: 1000 pF, GMV, 500V	130135	8	FA5C-102W	01121
C2	Same as C1				
C3	Same as C1				
C4	Same as C1				
C5	Same as C1				
C6	Same as C1				
C7	CAPACITOR, CERAMIC, FEEDTHRU: 470 pF, 20%, 500V	130132	3	FA5C-4712	01121
C8	CAPACITOR, CERAMIC, DISC: 5000 pF, 20%, 500V	180030	2	SM(5000pF, M)	91418
C9	Same as C1				
C10	Same as C8				
C11	Same as C1				
C12	Same as C7				
C13	Same as C7				
E1	TERMINAL, FEEDTHRU	180045	1	SFU-16	04013

COMMUNICATION ELECTRONICS INCORPORATED

EQUIPMENT DESCRIPTION

21974 21.4 MHz IF AMPLIFIER (2 MHz/4 MHz BW)

DATE

BY

R. Teg

Page 2

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME / CODE
C1	CAPACITOR, CERAMIC, DISC: 1000 pF, GMV, 500V	180028	9	SM(1000pF, GMV)	91418
C2	CAPACITOR, CERAMIC, DISC: 5000 pF, 20%, 100V	120042	26	C023B101E502M	56289
C3	Same as C2				
C4	Same as C2				
C5	Same as C2				
C6	Same as C1				
C7	Same as C2				
C8	Same as C1				
C9	Same as C2				
C10	Same as C2				
C11	Same as C2				
C12	Same as C2				
C13	CAPACITOR, MICA, DIPPED: 47 pF, 5%, 500V	120088	1	CM05ED470J03	81349
C14	NOT USED				
C15	CAPACITOR, MICA, DIPPED: 39 pF, 5%, 500V	120086	1	CM05ED390J03	81349
C16	CAPACITOR, CERAMIC, TUBULAR: 3.9 pF, ±0.25 pF, 500V	250089	1	301-000-C0J0-399C	72982
C17	Same as C2				
C18	CAPACITOR, VARIABLE, CERAMIC: 2-8 pF, 350V	270043	9	538-011-89A	72982
C19	Same as C18				
C20	CAPACITOR, CERAMIC, TUBULAR: 1.5 pF, 0.1 pF, 500V	250074	4	301-000-C0K0-159B	72982
C21	Same as C2				
C22	CAPACITOR, MICA, DIPPED: 18 pF, 5%, 500V	120078	2	CM05CD180J03	81349
C23	Same as C20				

COMMUNICATION ELECTRONICS INCORPORATED

May 1, 1965

DATE

BY R. Teg

21974 21.4 MHz IF AMPLIFIER (2 MHz/4 MHz BW)

EQUIPMENT DESCRIPTION

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
C24	Same as C18				
C25	Same as C18				
C26	NOT USED				
C27	CAPACITOR, CERAMIC, TUBULAR: 2.0 pF, ±0.25 pF, 500V	250078	1	301-000-C0K0-209C	72982
C28	Same as C22				
C29	CAPACITOR, CERAMIC, TUBULAR: 1.8 pF, ±0.25 pF, 500V	250077	1	301-000-C0K0-189C	72982
C30	Same as C18				
C31	Same as C18				
C32	NOT USED				
C33	Same as C20				
C34	CAPACITOR, MICA, DIPPED: 10 pF, ±0.1 pF, 500V	120075	1	CM05CD100D03	81349
C35	Same as C20				
C36	NOT USED				
C37	Same as C18				
C38	Same as C18				
C39	NOT USED				
C40	NOT USED				
C41	Same as C2				
C42	Same as C2				
C43	Same as C1				
C44	Same as C2				
C45	Same as C2				
C46	Same as C2				

DATE May 9, 1969
BY R. Teg

21974 21.4 MHz IF AMPLIFIER (2 MHz/4 MHz BW)

EQUIPMENT DESCRIPTION

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME / CODE
C47	Same as C2				
C48	Same as C2				
C49	Same as C2				
C50	Same as C1				
C51	Same as C2				
C52	Same as C2				
C53	Same as C1				
C54	Same as C1				
C55	Same as C2				
C56	Same as C2				
C57	Same as C2				
C58	Same as C2				
C59	Same as C18				
C60	CAPACITOR, CERAMIC, TUBULAR: 6.8 pF, ±0.5 pF, 500V	250099	1	301-000-C0H0-689D	72982
C61	Same as C1				
C62	Same as C1				
C63	CAPACITOR, MICA, DIPPED: 68 pF, 5%, 500V	120092	1	CM05ED680J03	81349
C64	CAPACITOR, MICA, DIPPED: 33 pF, 5%, 500V	120084	1	CM05ED330J03	81349
C65	CAPACITOR, MICA, DIPPED: 150 pF, 5%, 500V	120100	2	CM05FD151J03	81349
C66	Same as C65				
C67	CAPACITOR, CERAMIC, DISC: 0.01 µF, 20%, 100V	120043	2	C023B101F103M	56289
C68	Same as C67				
C69	CAPACITOR, MICA, DIPPED: 500 pF, 5%, 500V	130054	1	DM15-501-J	72136

COMMUNICATION ELECTRONICS INCORPORATED

EQUIPMENT DESCRIPTION 21974 21.4 MHz IF AMPLIFIER (2 MHz/4 MHz BW)

DATE May 9, 1969

BY R. Teg

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
C70	Same as C2				
CR1	DIODE	190114	4	IN914A	07688
CR2	Same as CR1				
CR3	Same as CR1				
CR4	Same as CR1				
CR5	NOT USED				
CR6	DIODE	120402	1	5082-2800	28480
CR7	DIODE	190099	1	1N462A	07688
L1	COIL, FIXED		4	20681-26	14632
L2	COIL, FIXED		4	20681-43	14632
L3	Same as L1				
L4	Same as L2				
L5	Same as L1				
L6	Same as L2				
L7	Same as L1				
L8	Same as L2				
L9	COIL, FIXED		1	20681-65	14632
L10	COIL, FIXED		1	1131-37	14632
L11	COIL, FIXED		1	1131-15	14632

COMMUNICATION ELECTRONICS INCORPORATED

EQUIPMENT DESCRIPTION 21974 21.4 MHz IF AMPLIFIER (2 MHz/4 MHz BW)

DATE May 9, 1969

BY R. Teg

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
Q1	TRANSISTOR	250209	2	3N140	07688
Q2	TRANSISTOR	220165	3	2N3933	07688
Q3	Same as Q2				
Q4	Same as Q1				
Q5	Same as Q2				
Q6	TRANSISTOR	110334	2	2N5109	07688
Q7	Same as Q6				
Q8	TRANSISTOR	220153	1	2N3251	07688
Q9	TRANSISTOR	220243	1	2N2222	07688
R1	RESISTOR, FIXED, COMPOSITION: 150 k Ω , 5%, 1/4W	160087	1	RC07GF154J	81349
R2	RESISTOR, FIXED, COMPOSITION: 10 k Ω , 5%, 1/4W	160136	5	RC07GF103J	81349
R3	RESISTOR, FIXED, COMPOSITION: 1 k Ω , 5%, 1/4W	160112	8	RC07GF102J	81349
R4	Same as R2				
R5	RESISTOR, FIXED, COMPOSITION: 330 Ω , 5%, 1/4W	160041	1	RC07GF331J	81349
R6	RESISTOR, FIXED, COMPOSITION: 100 Ω , 5%, 1/4W	160029	4	RC07GF101J	81349
R7	RESISTOR, FIXED, COMPOSITION: 470 Ω , 5%, 1/4W	160045	3	RC07GF471J	81349
R8	RESISTOR, FIXED, COMPOSITION: 22 Ω , 5%, 1/4W	160013	2	RC07GF220J	81349
R9	RESISTOR, FIXED, COMPOSITION: 15 k Ω , 5%, 1/4W	160140	4	RC07GF153J	81349
R10	Same as R3				

COMMUNICATION ELECTRONICS INCORPORATED

EQUIPMENT DESCRIPTION 21974 21.4 MHz IF AMPLIFIER (2 MHz/4 MHz BW)

DATE May 9, 1969

BY R. Teg

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME / CODE
R11	Same as R3				
R12	Same as R9				
R13	RESISTOR, FIXED, COMPOSITION: 4.7 k Ω , 5%, 1/4W	160128	3	RC07GF472J	81349
R14	Same as R13				
R15	RESISTOR, VARIABLE, FILM: 100 Ω , 30%, 1/2W		2	62PR100	73138
R16	RESISTOR, FIXED, COMPOSITION: 820 Ω , 5%, 1/4W	160110	3	RC07GF821J	81349
R17	Same as R15				
R18	Same as R16				
R19	RESISTOR, FIXED, COMPOSITION: 47 Ω , 5%, 1/4W	160021	6	RC07GF470J	81349
R20	Same as R19				
R21	Same as R6				
R22	RESISTOR, FIXED, COMPOSITION: 1.2 k Ω , 5%, 1/4W	160114	1	RC07GF122J	81349
R23	Same as R6				
R24	Same as R8				
R25	RESISTOR, FIXED, COMPOSITION: 3.3 k Ω , 5%, 1/4W	160124	2	RC07GF332J	81349
R26	Same as R3				
R27	RESISTOR, FIXED, COMPOSITION: 2.2 k Ω , 5%, 1/4W	160120	4	RC07GF222J	81349
R28	RESISTOR, FIXED, COMPOSITION: 33 k Ω , 5%, 1/4W	160148	2	RC07GF333J	81349
R29	Same as R28				
R30	Same as R3				
R31	RESISTOR, FIXED, COMPOSITION: 27 k Ω , 5%, 1/4W	160146	3	RC07GF273J	81349
R32	Same as R31				
R33	Same as R3				

COMMUNICATION ELECTRONICS INCORPORATED

EQUIPMENT DESCRIPTION

21974 21.4 MHz IF AMPLIFIER (2 MHz/4 MHz BW)

DATE May 9, 1969

BY R. Teg

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
R34	Same as R2				
R35	Same as R3				
R36	Same as R2				
R37	RESISTOR, FIXED, COMPOSITION: 330 Ω , 5%, 1/4W	160041	1	RC07GF331J	81349
R38	RESISTOR, FIXED, COMPOSITION: 22 Ω , 5%, 1/4W	160013	3	RC07GF220J	81349
R39	NOT USED				
R40	RESISTOR, FIXED, COMPOSITION: 2.7 k Ω , 5%, 1/4W	160122	1	RC07GF272J	81349
R41	Same as R13				
R42	RESISTOR, FIXED, COMPOSITION: 47 Ω , 5%, 1/4W	160021	3	RC07GF470J	81349
R43	Same as R7				
R44	Same as R2				
R45	RESISTOR, FIXED, COMPOSITION: 4.7 k Ω , 5%, 1/4W	160128	2	RC07GF472J	81349
R46	Same as R16				
R47	Same as R38				
R48	Same as R42				
R49	Same as R7				
R50	RESISTOR, FIXED, COMPOSITION: 10 Ω , 5%, 1/4W	160006	2	RC07GF100J	81349
R51	Same as R38				
R52	RESISTOR, FIXED, COMPOSITION: 150 Ω , 5%, 1/4W	160033	1	RC07GF151J	81349
R53	RESISTOR, FIXED, COMPOSITION: 33 Ω , 5%, 1/4W	160017	1	RC07GF330J	81349
R54	Same as R9				
R55	RESISTOR, FIXED, COMPOSITION: 6.8 k Ω , 5%, 1/4W	160132	1	RC07GF682J	81349
R56	Same as R45				

COMMUNICATION ELECTRONICS INCORPORATED

EQUIPMENT DESCRIPTION 15624 21.4 MHz FM LIMITER/DISCRIMINATOR

DATE May 9, 1969

BY R. Teg

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
C1	CAPACITOR, MICA, DIPPED: 43 pF, 5%, 500V	120087	1	CM05ED430J03	81349
C2	CAPACITOR, MICA, DIPPED: 33 pF, 5%, 500V	120084	1	CM05ED330J03	81349
C3	CAPACITOR, CERAMIC, DISC: 5000 pF, 20%, 500V	180030	2	SM(5000pF, M)	91418
C4	Same as C3				
C5	CAPACITOR, VARIABLE, CERAMIC: 2-8 pF, 350V	270043	2	538-011-89A	72982
C6	CAPACITOR, CERAMIC, TUBULAR: 2.2 pF, ±0.1 pF, 500V	250079	2	301-000-C0J0-229B	72982
C7	CAPACITOR, MICA, DIPPED: 10 pF, ±0.5 pF, 500V	120075	1	CM05CD100D03	81349
C8	Same as C5				
C9	Same as C6				
C10	CAPACITOR, MICA, DIPPED: 22 pF, 5%, 500V	120080	1	CM05ED220J03	81349
C11	CAPACITOR, CERAMIC, DISC: 0.1 μF, -20+80%, 25V	130019	2	DFJ-3	73899
C12	Same as C11				
C13	CAPACITOR, CERAMIC, DISC: 2200 pF, 20%, 1000V	140035	1	JF(2200pF, M)	91418
C14	CAPACITOR, MICA, DIPPED: 150 pF, 5%, 500V	120100	1	CM05FD151J03	81349
CR1	DIODE	270121	2	5082-2900	28480
CR2	Same as CR1				
L1	COIL, FIXED: 0.68 μH	230008	1	203-11	99848
L2	COIL, FIXED		1	20681-42	14632

COMMUNICATION ELECTRONICS INCORPORATED

EQUIPMENT DESCRIPTION 15624 12.4 MHz FM LIMITER/DISCRIMINATOR

DATE May 9, 1979
BY R. Teg

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
L3	COIL, FIXED	200022	2	1131-37	14632
L4	Same as L3				
Q1	TRANSISTOR	220153	2	2N3251	07688
Q2	TRANSISTOR	220183	2	2N929	07688
Q3	Same as Q2				
Q4	Same as Q1				
R1	RESISTOR, FIXED, COMPOSITION: 100 Ω , 5%, 1/4W	160029	3	RC07GF101J	81349
R2	RESISTOR, FIXED, COMPOSITION: 6.8 k Ω , 5%, 1/4W.	160132	1	RC07GF682J	81349
R3	RESISTOR, FIXED, COMPOSITION: 18 k Ω , 5%, 1/4W	160142	1	RC07GF183J	81349
R4	RESISTOR, FIXED, COMPOSITION: 22 k Ω , 5%, 1/4W	160144	1	RC07GF223J	81349
R5	RESISTOR, FIXED, COMPOSITION: 22 Ω , 5%, 1/4W	160013	4	RC07GF220J	81349
R6	RESISTOR, FIXED, COMPOSITION: 1 k Ω , 5%, 1/4W	160112	2	RC07GF102J	81349
R7	Same as R6				
R8	Same as R1				
R9	Same as R5				
R10	Same as R1				
R11	RESISTOR, FIXED, COMPOSITION: 10 k Ω , 5%, 1/4W	160136	2	RC07GF103J	81349
R12	Same as R11				
R13	Same as R5				

COMMUNICATION ELECTRONICS INCORPORATED

EQUIPMENT DESCRIPTION 72299 21.4 MHz IF AMPLIFIER (500 kHz/1 MHz BW)

DATE April 21, 1969

Page 2

BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
A1	21.4 MHz IF AMPLIFIER (0.5/1.0 MHz BW)		1	21954	14632
A2	FM LIMITER/DISCRIMINATOR BOARD		1	15170	14632
C1	CAPACITOR, CERAMIC, FEEDTHRU: 1000 pF, GMV, 500V	130135	8	FA5C-102W	01121
C2	Same as C1				
C3	Same as C1				
C4	Same as C1				
C5	Same as C1				
C6	Same as C1				
C7	CAPACITOR, CERAMIC, FEEDTHRU: 470 pF, 20%, 500V	130132	3	FA5C-4712	01121
C8	CAPACITOR, CERAMIC, DISC: 5000 pF, 20%, 500V	180030	2	SM(5000pF, M)	91418
C9	Same as C1				
C10	Same as C8				
C11	Same as C1				
C12	Same as C7				
C13	Same as C7				
E1	TERMINAL, FEEDTHRU	180045	1	SFU-16	04013

EQUIPMENT DESCRIPTION 21954 21.4 MHz IF AMPLIFIER (500 kHz/1 MHz BW)

DATE April 24, 1994

BY R. Teg

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME / CODE
C1	CAPACITOR, CERAMIC, DISC: 1000 pF, GMV, 500V	180028	10	SM(1000pF, GMV)	91418
C2	CAPACITOR, CERAMIC, DISC: 5000 pF, 20%, 100V	120042	26	C023B101E502M	56289
C3	Same as C2				
C4	Same as C2				
C5	Same as C2				
C6	Same as C1				
C7	Same as C2				
C8	Same as C1				
C9	Same as C2				
C10	Same as C2				
C11	Same as C2				
C12	Same as C2				
C13	CAPACITOR, MICA, DIPPED: 100 pF, 5%, 500V	120096	2	CM05FD101J03	81349
C14	Same as C1				
C15	CAPACITOR, MICA, DIPPED: 91 pF, 5%, 500V	120095	8	CM05FD910J03	81349
C16	CAPACITOR, VARIABLE, CERAMIC: 9-35 pF, 350V	270118	8	538-011-94D	72982
C17	Same as C2				
C18	Same as C16				
C19	Same as C15				
C20	CAPACITOR, CERAMIC, TUBULAR: 2.7 pF, ±0.25 pF, 500V	250082	1	301-000-C0J0-279C	72982
C21	Same as C2				
C22	Same as C15				
C23	CAPACITOR, CERAMIC, TUBULAR: 3.3 pF, ±0.25 pF, 500V	250086	2	301-000-C0J0-339C	72982

COMMUNICATION ELECTRONICS INCORPORATED

EQUIPMENT DESCRIPTION

21954 21.4 MHz IF AMPLIFIER (500 kHz/1 MHz BW)

DATE April 22, 1962

BY R. Teg

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME / CODE
C24	Same as C16				
C25	Same as C16				
C26	Same as C15				
C27	CAPACITOR, CERAMIC, TUBULAR: 2.0 pF, ±0.25 pF, 500V	250078	1	301-000-C0K0-209C	72982
C28	Same as C15				
C29	CAPACITOR, CERAMIC, TUBULAR: 3.6 pF, ±0.25 pF, 500V	250087	1	301-000-C0J0-369C	72982
C30	Same as C16				
C31	Same as C16				
C32	Same as C15				
C33	CAPACITOR, CERAMIC, TUBULAR: 2.4 pF, ±0.25 pF, 500V	250081	1	301-000-C0J0-249C	72982
C34	Same as C15				
C35	Same as C23				
C36	NOT USED				
C37	Same as C16				
C38	Same as C16				
C39	Same as C15				
C40	Same as C13				
C41	Same as C2				
C42	Same as C2				
C43	Same as C1				
C44	Same as C2				
C45	Same as C2				
C46	Same as C2				

DATE April 23, 196,

BY R. Teg

21954 21.4 MHz IF AMPLIFIER (500 kHz/1 MHz BW)

EQUIPMENT DESCRIPTION

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SYM. NO.	DESCRIPTION	CBI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
C47	Same as C2				
C48	Same as C2				
C49	Same as C2				
C50	Same as C1				
C51	Same as C2				
C52	Same as C2				
C53	Same as C1				
C54	Same as C1				
C55	Same as C2				
C56	Same as C2				
C57	Same as C2				
C58	Same as C2				
C59	CAPACITOR, VARIABLE, CERAMIC, : 2-8 pF, 350V	270043	1	538-011-89A	72982
C60	CAPACITOR, CERAMIC, TUBULAR: 6.8 pF, ±0.5 pF, 500V	250099	1	301-000-C0H0-689D	72982
C61	Same as C1				
C62	Same as C1				
C63	CAPACITOR, MICA, DIPPED: 68 pF, 5%, 500V	120092	1	CM05ED680J03	81349
C64	CAPACITOR, MICA, DIPPED: 33 pF, 5%, 500V	120084	1	CM05ED330J03	81349
C65	CAPACITOR, MICA, DIPPED: 150 pF, 5%, 500V	120100	2	CM05FD151J03	81349
C66	Same as C65				
C67	CAPACITOR, CERAMIC, DISC: 0.01 μF, 20%, 100V	120043	2	C023B101FI03M.	56289
C68	Same as C67				
C69	CAPACITOR, CERAMIC, DISC: 2200 pF, 20%, 1000V	140035	1	JF(2200pF, M)	91418

COMMUNICATION ELECTRONICS INCORPORATED

April 24, 1967

DATE

BY R. Teg

21954 21.4 MHz IF AMPLIFIER (500 kHz/1 MHz BW)

EQUIPMENT DESCRIPTION

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
C70	Same as C2				
CR1	DIODE	190114	4	IN914A	07688
CR2	Same as CR1				
CR3	Same as CR1				
CR4	Same as CR1				
CR5	NOT USED				
CR6	DIODE	120402	1	5082-2800	28480
CR7	DIODE	190099	1	IN462A	07688
L1	COIL, FIXED		2	20681-8	14632
L2	COIL, FIXED		6	20681-15	14632
L3	Same as L2				
L4	Same as L2				
L5	Same as L2				
L6	Same as L2				
L7	Same as L1				
L8	Same as L2				
L9	COIL, FIXED		1	20681-49	14632
L10	COIL, FIXED		1	1131-37	14632
L11	COIL, FIXED		1	1131-41	14632

COMMUNICATION ELECTRONICS INCORPORATED

APR 24, 1979

DATE

BY R. Teg

21954 21.4 MHz IF AMPLIFIER (500 kHz/ 1 MHz ISW)

EQUIPMENT DESCRIPTION

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
Q1	TRANSISTOR	250209	2	3N140	07688
Q2	TRANSISTOR	220165	3	2N3933	07688
Q3	Same as Q2				
Q4	Same as Q1				
Q5	Same as Q2				
Q6	TRANSISTOR	110334	2	2N5109	07688
Q7	Same as Q6				
Q8	TRANSISTOR	220153	1	2N3251	07688
Q9	TRANSISTOR	220243	1	2N2222	07688
R1	RESISTOR, FIXED, COMPOSITION: 150 k Ω , 5%, 1/4W	160087	1	RC07GF154J	81349
R2	RESISTOR, FIXED, COMPOSITION: 10 k Ω , 5%, 1/4W	160136	5	RC07GF103J	81349
R3	RESISTOR, FIXED, COMPOSITION: 1 k Ω , 5%, 1/4W	160112	8	RC07GF102J	81349
R4	Same as R2				
R5	RESISTOR, FIXED, COMPOSITION: 330 Ω , 5%, 1/4W	160041	1	RC07GF331J	81349
R6	RESISTOR, FIXED, COMPOSITION: 100 Ω , 5%, 1/4W	160029	4	RC07GF101J	81349
R7	RESISTOR, FIXED, COMPOSITION: 470 Ω , 5%, 1/4W	160045	3	RC07GF471J	81349
R8	RESISTOR, FIXED, COMPOSITION: 22 Ω , 5%, 1/4W	160013	2	RC07GF220J	81349
R9	RESISTOR, FIXED, COMPOSITION: 15 k Ω , 5%, 1/4W	160140	4	RC07GF153J	81349
R10	Same as R3				

COMMUNICATION ELECTRONICS INCORPORATED

EQUIPMENT DESCRIPTION 21954 21.4 MHz IF AMPLIFIER (500 kHz/1 MHz BW) DATE April 24, 1967
 BY R. Teg

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SYM. NO.	DESCRIPTION	CBI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME / CODE
R11	Same as R3				
R12	Same as R9				
R13	RESISTOR, FIXED, COMPOSITION: 4.7 k Ω , 5%, 1/4W	160128	3	RC07GF472J	81349
R14	Same as R13				
R15	RESISTOR, VARIABLE, FILM: 100 Ω , 30%, 1/2W		2	62PR100	73138
R16	RESISTOR, FIXED, COMPOSITION: 820 Ω , 5%, 1/4W	160110	3	RC07GF821J	81349
R17	Same as R15				
R18	Same as R16				
R19	RESISTOR, FIXED, COMPOSITION: 47 Ω , 5%, 1/4W	160021	6	RC07GF470J	81349
R20	Same as R19				
R21	Same as R6				
R22	RESISTOR, FIXED, COMPOSITION: 1.2 k Ω , 5%, 1/4W	160114	1	RC07GF122J	81349
R23	Same as R6				
R24	Same as R8				
R25	RESISTOR, FIXED, COMPOSITION: 2.2 k Ω , 5%, 1/4W	160120	5	RC07GF222J	81349
R26	Same as R3				
R27	Same as R25				
R28	RESISTOR, FIXED, COMPOSITION: 33 k Ω , 5%, 1/4W	160148	2	RC07GF333J	81349
R29	Same as R28				
R30	Same as R3				
R31	RESISTOR, FIXED, COMPOSITION: 27 k Ω , 5%, 1/4W	160146	3	RC07GF273J	81349
R32	Same as R31				
R33	Same as R3				

COMMUNICATION ELECTRONICS INCORPORATED

EQUIPMENT DESCRIPTION

21954 21.4 MHz IF AMPLIFIER (500 kHz/1MHz BW)

DATE April 27, 1967

BY R. Teg

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SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
R34	Same as R2				
R35	Same as R3				
R36	Same as R2				
R37	RESISTOR, FIXED, COMPOSITION: 330 Ω , 5%, 1/4W	160041	1	RC07GF331J	81349
R38	RESISTOR, FIXED, COMPOSITION: 22 Ω , 5%, 1/4W	160013	3	RC07GF220J	81349
R39	NOT USED				
R40	RESISTOR, FIXED, COMPOSITION: 2.7 k Ω , 5%, 1/4W	160122	1	RC07GF272J	813491
R41	Same as R13				
R42	RESISTOR, FIXED, COMPOSITION: 47 Ω , 5%, 1/4W	160021	3	RC07GF470J	81349
R43	Same as R7				
R44	Same as R2				
R45	RESISTOR, FIXED, COMPOSITION: 4.7 k Ω , 5%, 1/4W	160128	2	RC07GF472J	81349
R46	Same as R16				
R47	Same as R38				
R48	Same as R42				
R49	Same as R7				
R50	RESISTOR, FIXED, COMPOSITION: 10 Ω , 5%, 1/4W	160006	2	RC07GF100J	81349
R51	Same as R38				
R52	RESISTOR, FIXED, COMPOSITION: 150 Ω , 5%, 1/4W	160033	1	RC07GF151J	81349
R53	RESISTOR, FIXED, COMPOSITION: 33 Ω , 5%, 1/4W	160017	1	RC07GF330J	81349
R54	Same as R9				
R55	RESISTOR, FIXED, COMPOSITION: 6.8 k Ω , 5%, 1/4W	160132	1	RC07GF682J	81349
R56	Same as R45				

COMMUNICATION ELECTRONICS INCORPORATED

EQUIPMENT DESCRIPTION 15170 21.4 MHz FM LIMITER

DATE April 24, 1969

BY R. Teg

Page 2

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME/CODE
C1	CAPACITOR, MICA, DIPPED: 43 pF, 5%, 500V	120087	1	CM05ED430J03	81349
C2	CAPACITOR, MICA, DIPPED 33 pF, 5%, 500V	120084	1	CM05ED330J03	81349
C3	CAPACITOR, CERAMIC, DISC: 5000 pF, 20%, 500V	180030	2	SM(5000pF, M)	91418
C4	Same as C3				
C5	CAPACITOR, VARIABLE, CERAMIC: 2-8 pF, 350V	270043	2	538-011-89A	72982
C6	CAPACITOR, CERAMIC, TUBULAR: 2.2 pF, ±0.1 pF, 500V	250079	2	301-000-C0J0-229B	72982
C7	CAPACITOR, MICA, DIPPED: 10 pF, ±0.5 pF, 500V	120075	1	CM05CD100D03	81349
C8	Same as C5				
C9	Same as C6				
C10	CAPACITOR, MICA, DIPPED: 22 pF, 5%, 500V	120080	1	CM05ED220J03	81349
C11	CAPACITOR, CERAMIC, DISC: 0.1 μF, -20+80%, 25V	130019	2	DFJ-3	73899
C12	Same as C11				
C13	CAPACITOR, CERAMIC, DISC: 0.01 μF, 20%, 100V	120043	1	C023B101F103M	56289
C14	CAPACITOR, CERAMIC, DISC: 1500 pF, 10%, 1000V	130016	2	DD-152	91418
C15	Same as C14				
CR1	DIODE	270121	2	5082-2900	28480
CR2	Same as CR1				
L1	COIL, FIXED: 0.68 μH	230008	1	203-11	99848
L2	COIL, FIXED		1	20681-42	14632

COMMUNICATION ELECTRONICS INCORPORATED

EQUIPMENT DESCRIPTION 15170 21.4 MHz FM LIMITER

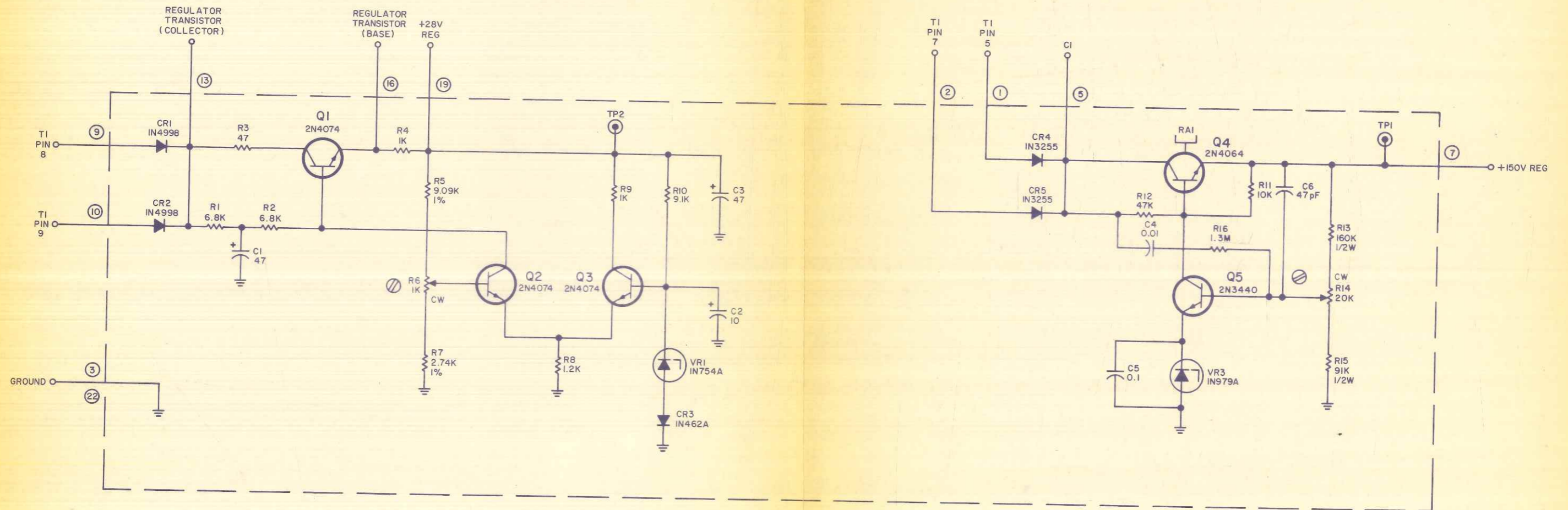
DATE April 22, 1969


BY R. Teg

Page 3

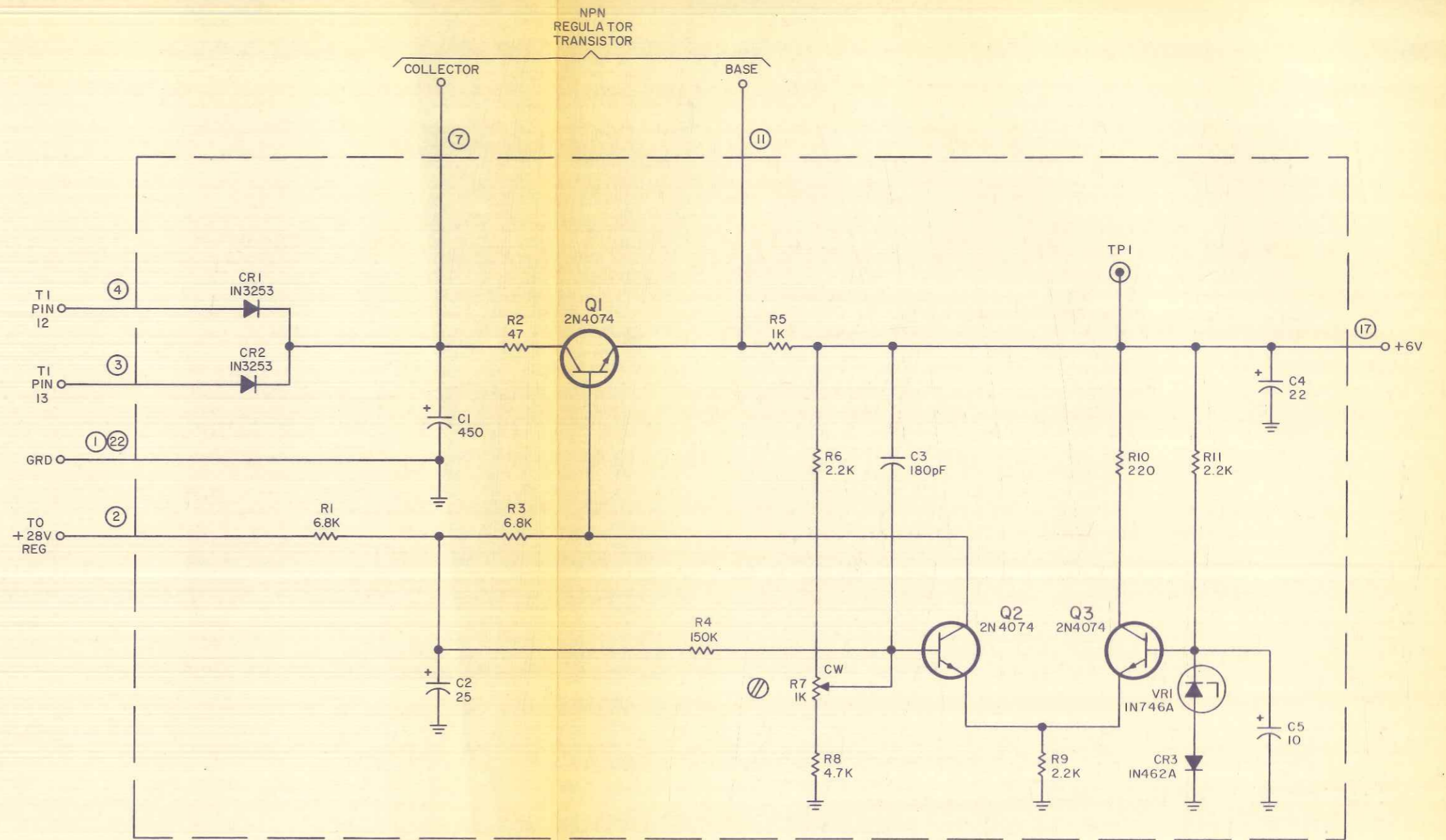
SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASSY	VENDOR PART NO.	VENDOR NAME / CODE
L3	COIL, FIXED	200022	2	1131-37	14632
L4	Same as L3				
Q1	TRANSISTOR	220153	2	2N3251	07688
Q2	TRANSISTOR	220183	2	2N929	07688
Q3	Same as Q2				
Q4	Same as Q1				
R1	RESISTOR, FIXED, COMPOSITION: 100 Ω , 5%, 1/4W	160029	3	RC07GF101J	81349
R2	RESISTOR, FIXED, COMPOSITION: 47 k Ω , 5%, 1/4W	160152	1	RC07GF473J	81349
R3	RESISTOR, FIXED, COMPOSITION: 18 k Ω , 5%, 1/4W	160142	1	RC07GF187J	81349
R4	RESISTOR, FIXED, COMPOSITION: 22 k Ω , 5%, 1/4W	160144	1	RC07GF223J	81349
R5	RESISTOR, FIXED, COMPOSITION: 22 Ω , 5%, 1/4W	160013	4	RC07GF220J	81349
R6	RESISTOR, FIXED, COMPOSITION: 1 k Ω , 5%, 1/4W	160112	2	RC07GF102J	81349
R7	Same as R6				
R8	Same as R1				
R9	Same as R5				
R10	Same as R1				
R11	RESISTOR, FIXED, COMPOSITION: 10 k Ω , 5%, 1/4W	160136	2	RC07GF103J	81349
R12	Same as R11				
R13	Same as R5				

COMMUNICATION ELECTRONICS INCORPORATED




- NOTES:
1. UNLESS OTHERWISE SPECIFIED:
 - a) RESISTANCE IS MEASURED IN OHMS, $\pm 5\%$, 1/4W.
 - b) CAPACITANCE IS MEASURED IN μF .
 2. THE FOLLOWING NOTATION ARE USED ON POTENTIOMETERS:
 - a) CW INDICATES CLOCKWISE ROTATION.
 - b)  INDICATES SCREWDRIVER ADJUSTMENT.

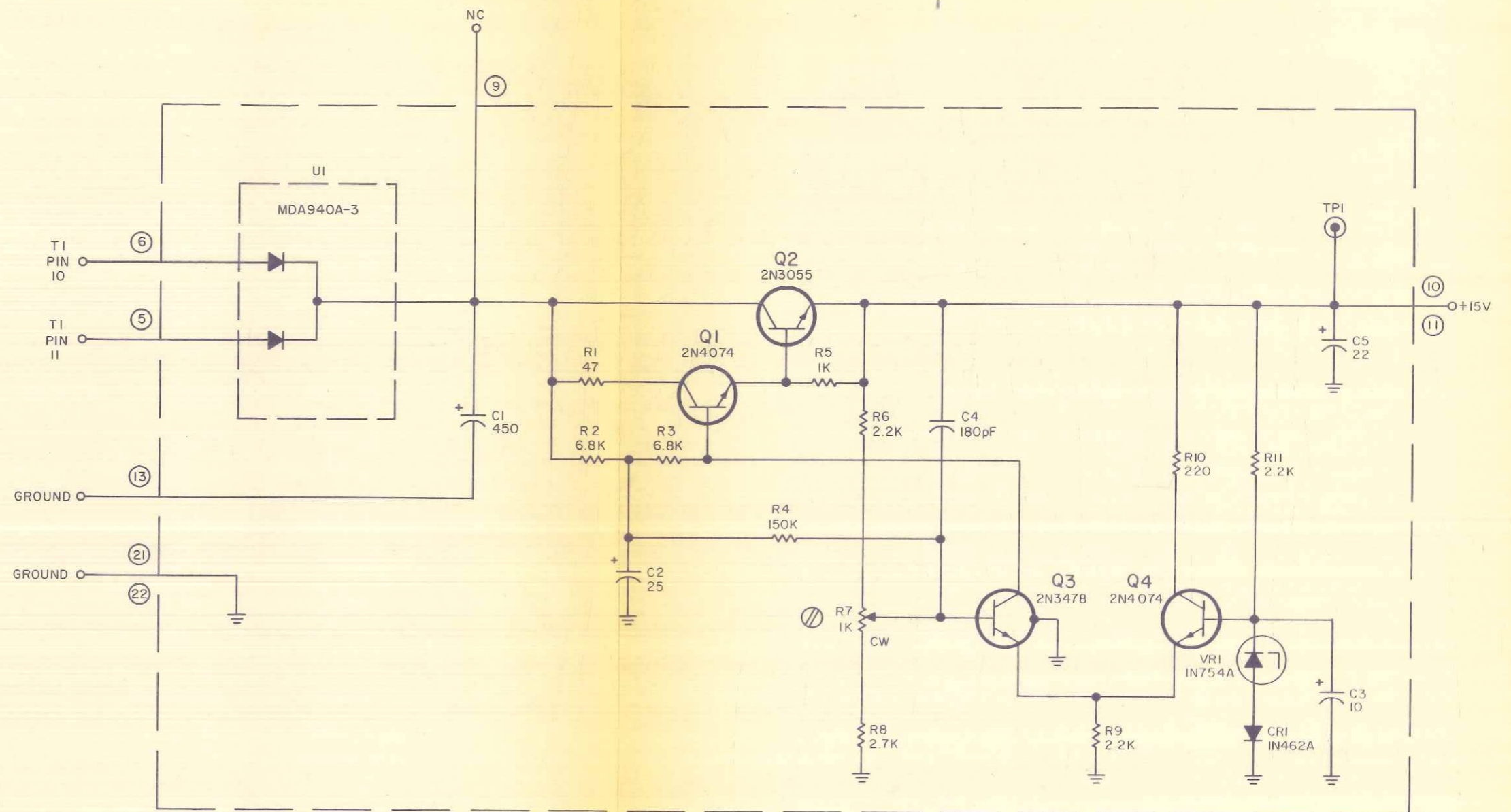
Type 76183 +28V/+150V Power Supply Board,
Schematic Diagram




NOTES:

1. UNLESS OTHERWISE SPECIFIED:
 - a) RESISTANCE IS MEASURED IN OHMS, $\pm 5\%$, 1/4W.
 - b) CAPACITANCE IS MEASURED IN μF .
2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS.
3. THE FOLLOWING NOTATIONS ARE USED ON POTENTIOMETERS:
 - a) CW INDICATES CLOCKWISE ROTATION.
 - b)  INDICATES SCREWDRIVER ADJUSTMENT.

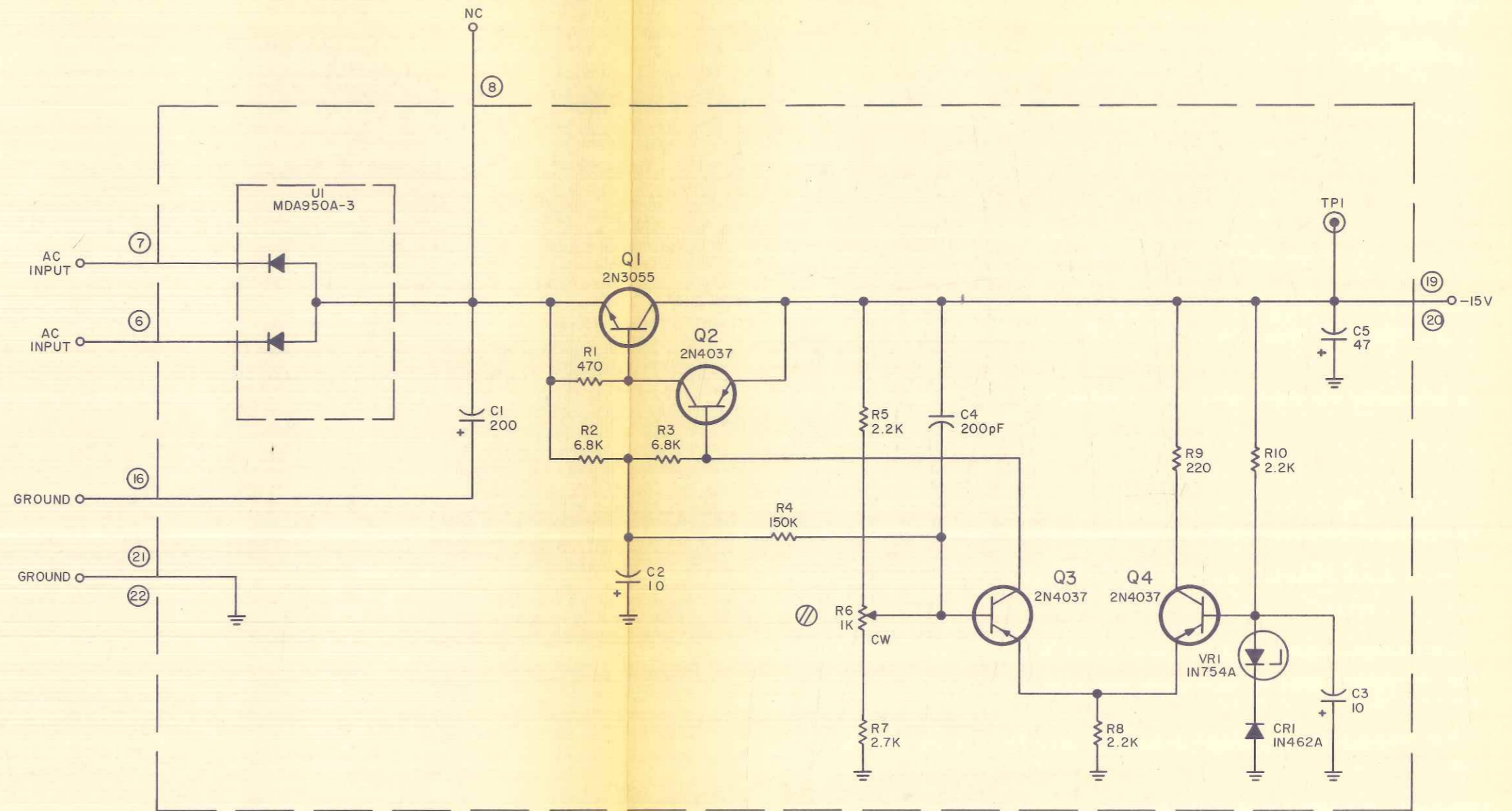
Type 76184 +6V Power Supply Regulator,
Schematic Diagram



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
 - a) RESISTANCE IS MEASURED IN OHMS, $\pm 5\%$, 1/4W.
 - b) CAPACITANCE IS MEASURED IN μF .
2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS.
3. THE FOLLOWING NOTATIONS ARE USED ON POTENTIOMETERS:
 - a)  INDICATES SCREWDRIVER ADJUSTMENT.
 - b) CW INDICATES CLOCKWISE ROTATION.

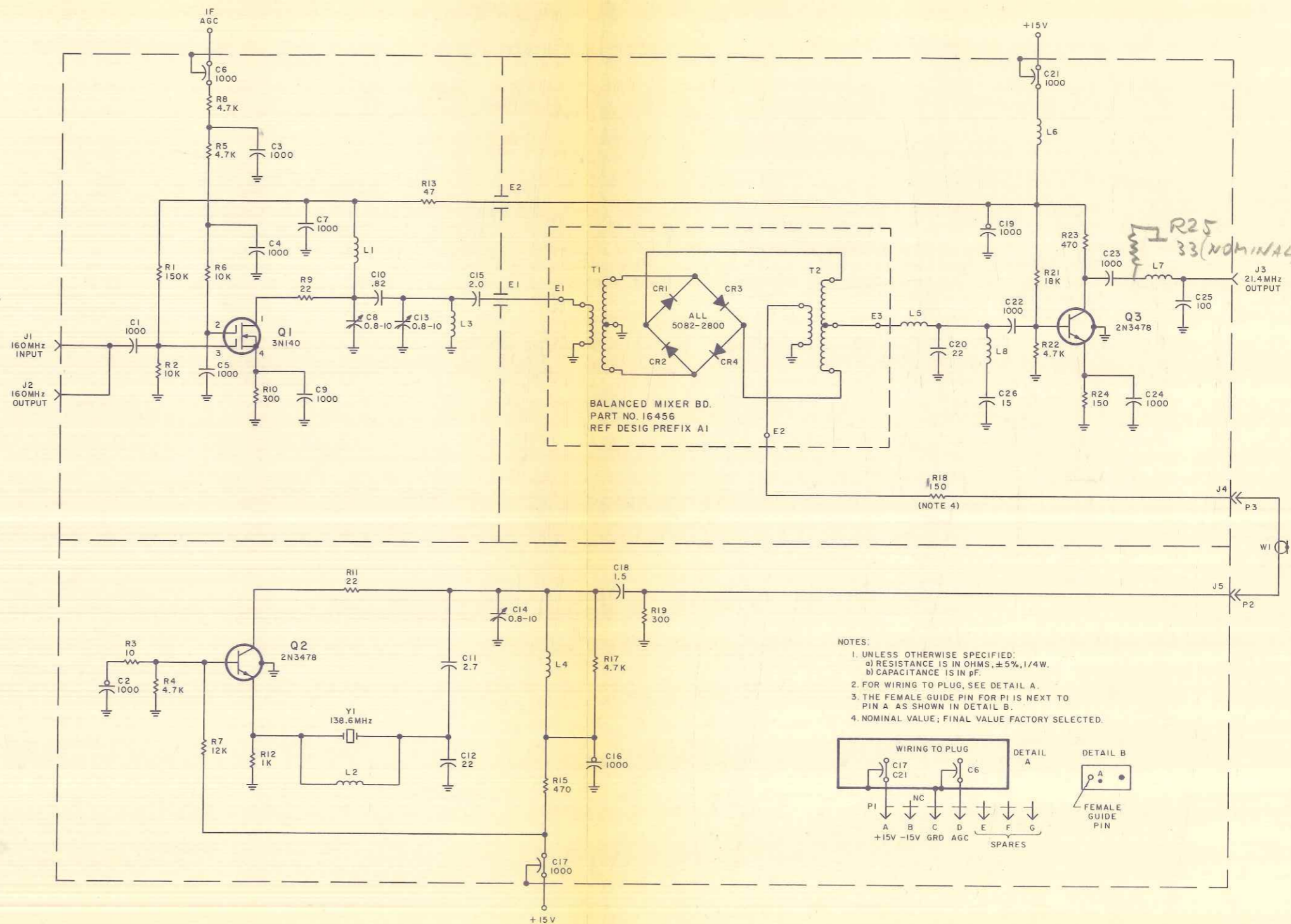
Type 76185 +15V Power Supply Regulator,
Schematic Diagram



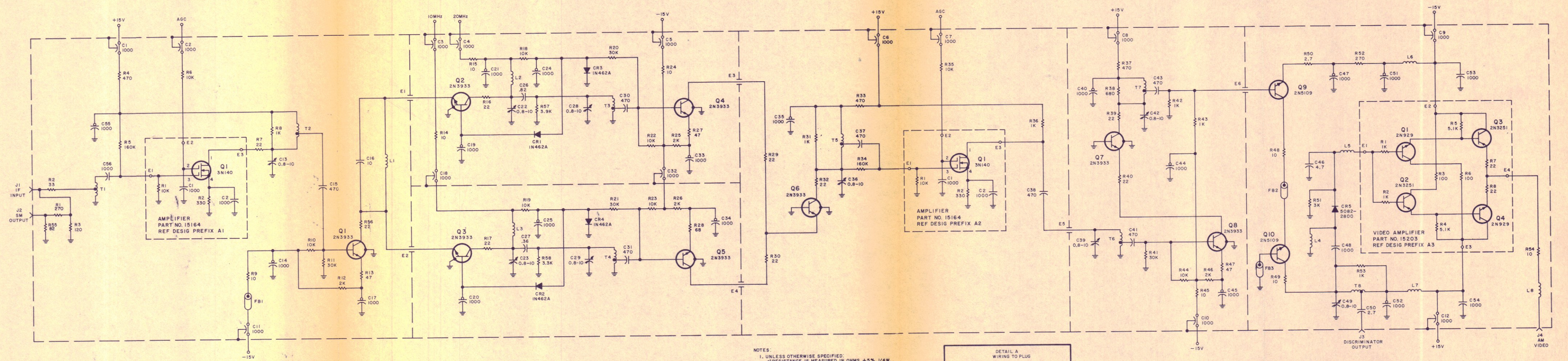
NOTES:

1. UNLESS OTHERWISE SPECIFIED:
 - a) RESISTANCE IS MEASURED IN OHMS, $\pm 5\%$, 1/4W.
 - b) CAPACITANCE IS MEASURED IN μF .
2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS.
3. THE FOLLOWING NOTATIONS ARE USED ON POTENTIOMETERS:
 - a) CW INDICATES CLOCKWISE ROTATION.
 - b) INDICATES SCREWDRIVER ADJUSTMENT.

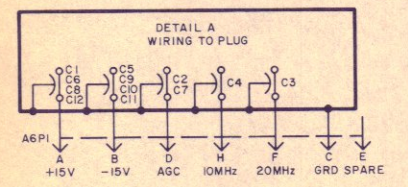
Type 76186 -15V Power Supply Regulator,
Schematic Diagram



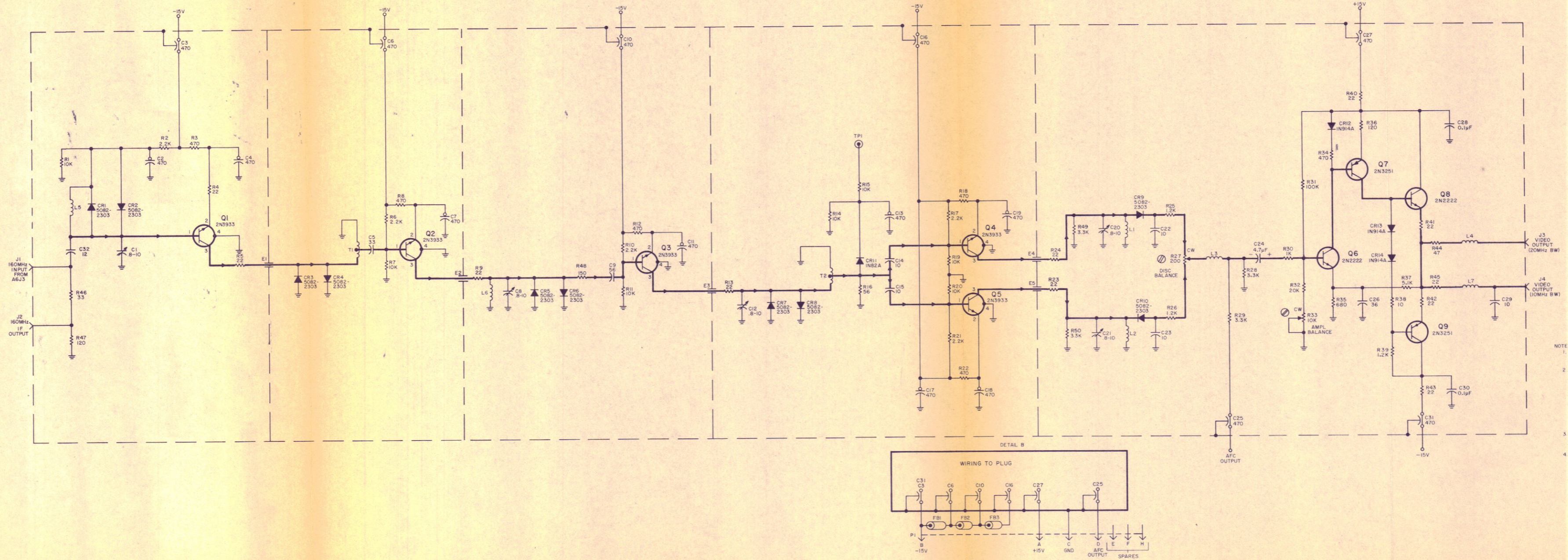
Type 71285 160/21.4 MHz Converter, Schematic Diagram



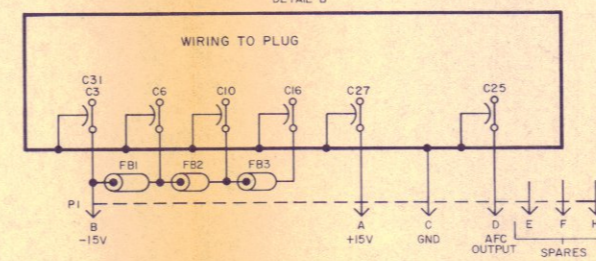
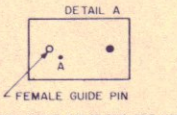
NOTES:
1. UNLESS OTHERWISE SPECIFIED:
a) RESISTANCE IS MEASURED IN OHMS, $\pm 5\%$, 1/4W.
b) CAPACITANCE IS MEASURED IN pF.
2. FOR WIRING TO PLUG, SEE DETAIL A.



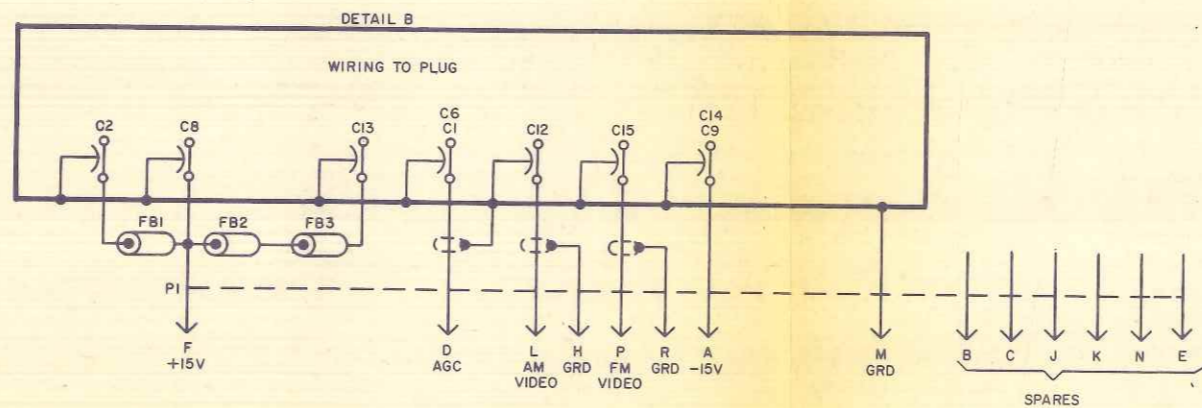
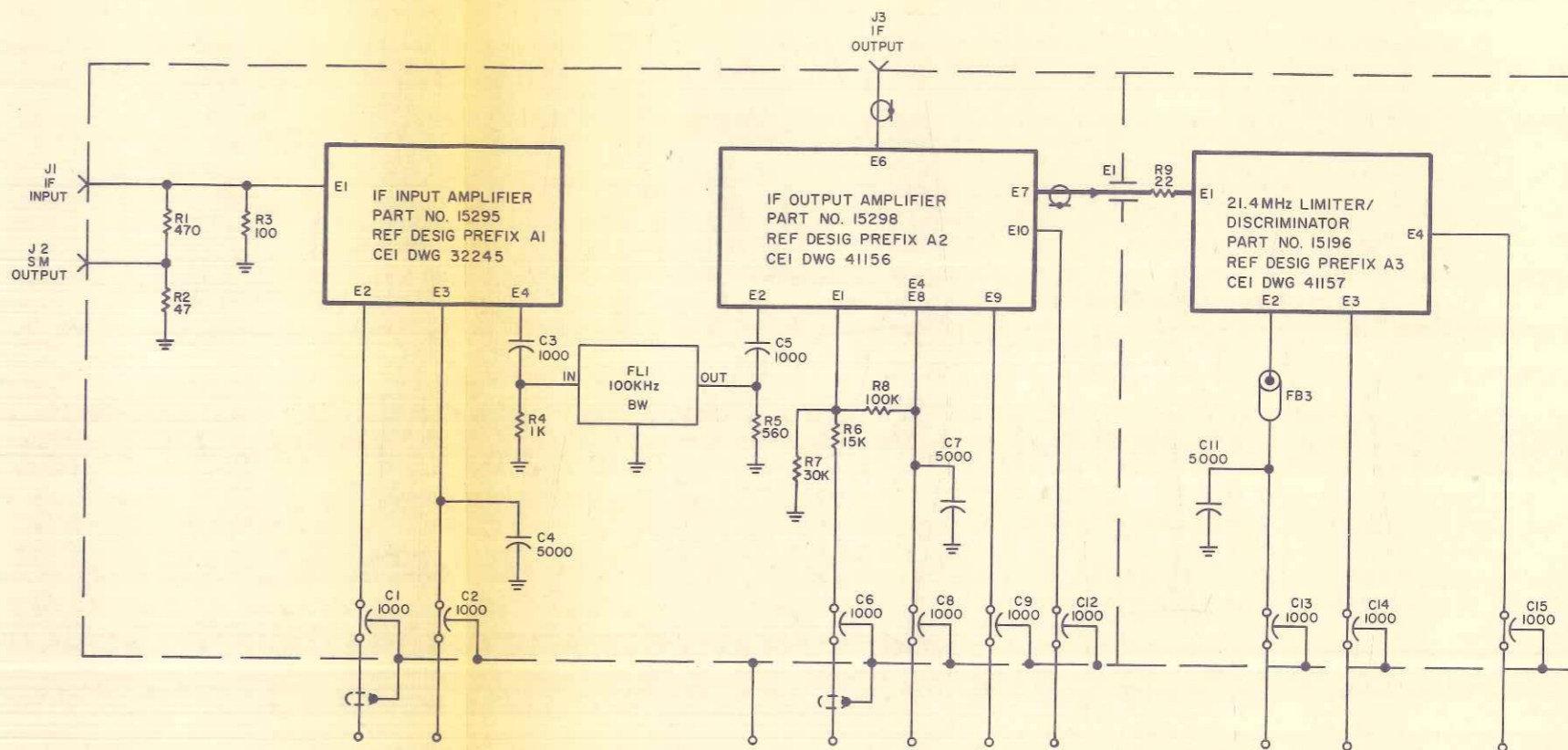
Type 72304 160 MHz IF Amplifier (10-20 MHz BW)
Schematic Diagram

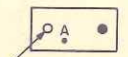


NOTES:
 1. UNLESS OTHERWISE SPECIFIED:
 a) RESISTANCE IS MEASURED IN OHMS, ±5%, 1/4W
 b) CAPACITANCE IS MEASURED IN pF
 2. ON P1 THE FEMALE GUIDE PIN IS NEXT TO PIN A AS SHOWN IN DETAIL A
 3. THE FOLLOWING NOTATIONS ARE USED ON POTENTIOMETERS:
 a) CW INDICATES CLOCKWISE ROTATION
 b) ⚙ INDICATES SCREWWORVE ADJUSTMENT
 4. FOR WIRING TO PLUG SEE DETAIL B.

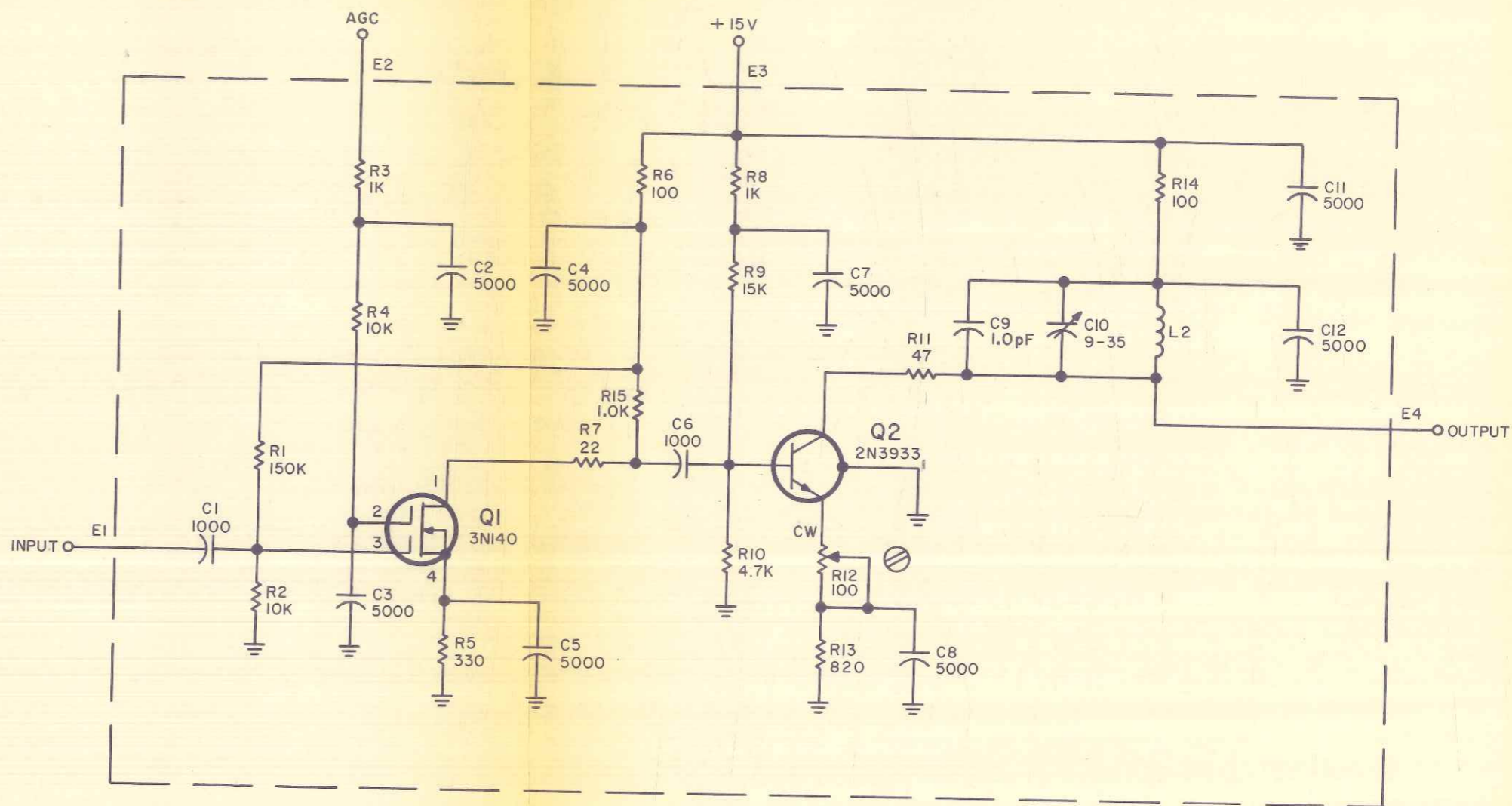


Type 79640 160 MHz Limiter/Discriminator Schematic Diagram




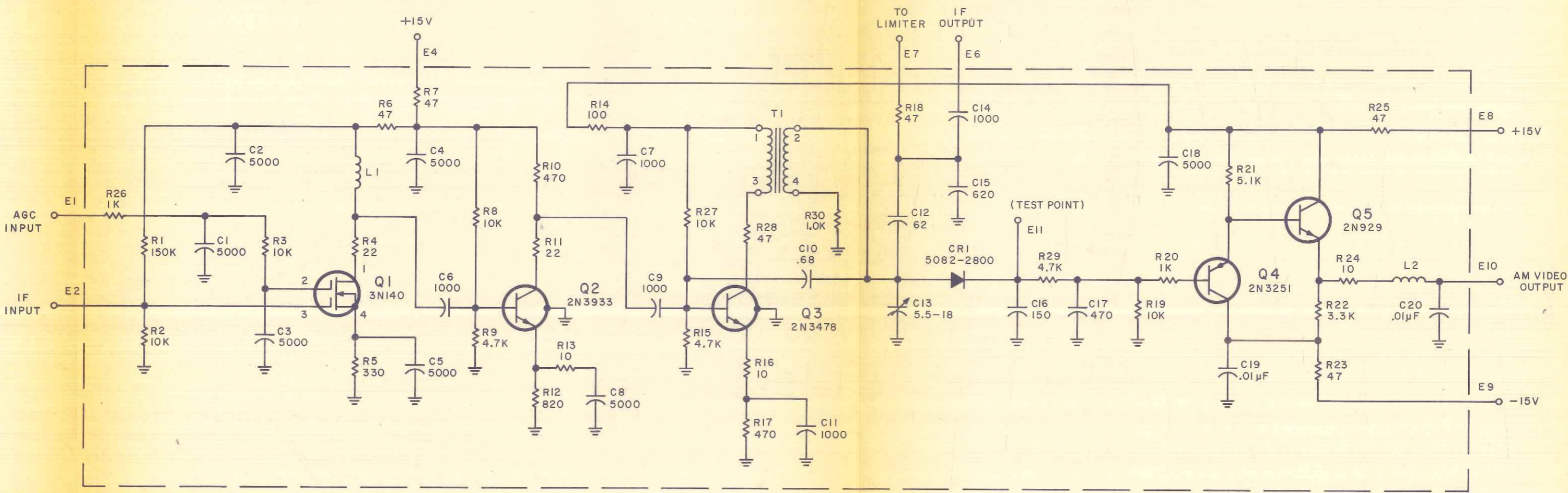
- NOTES:
1. UNLESS OTHERWISE SPECIFIED:
 - a) RESISTANCE IS MEASURED IN OHMS, $\pm 5\%$, 1/4W.
 - b) CAPACITANCE IS MEASURED IN pF.
 2. THE FEMALE GUIDE PIN FOR P1 IS NEXT TO PIN A AS SHOWN IN DETAIL A.
- 
- FEMALE GUIDE PIN
3. FOR WIRING TO PLUG SEE DETAIL B.

Type 72295 21.4 MHz IF Amplifier (100 kHz BW)
Schematic Diagram



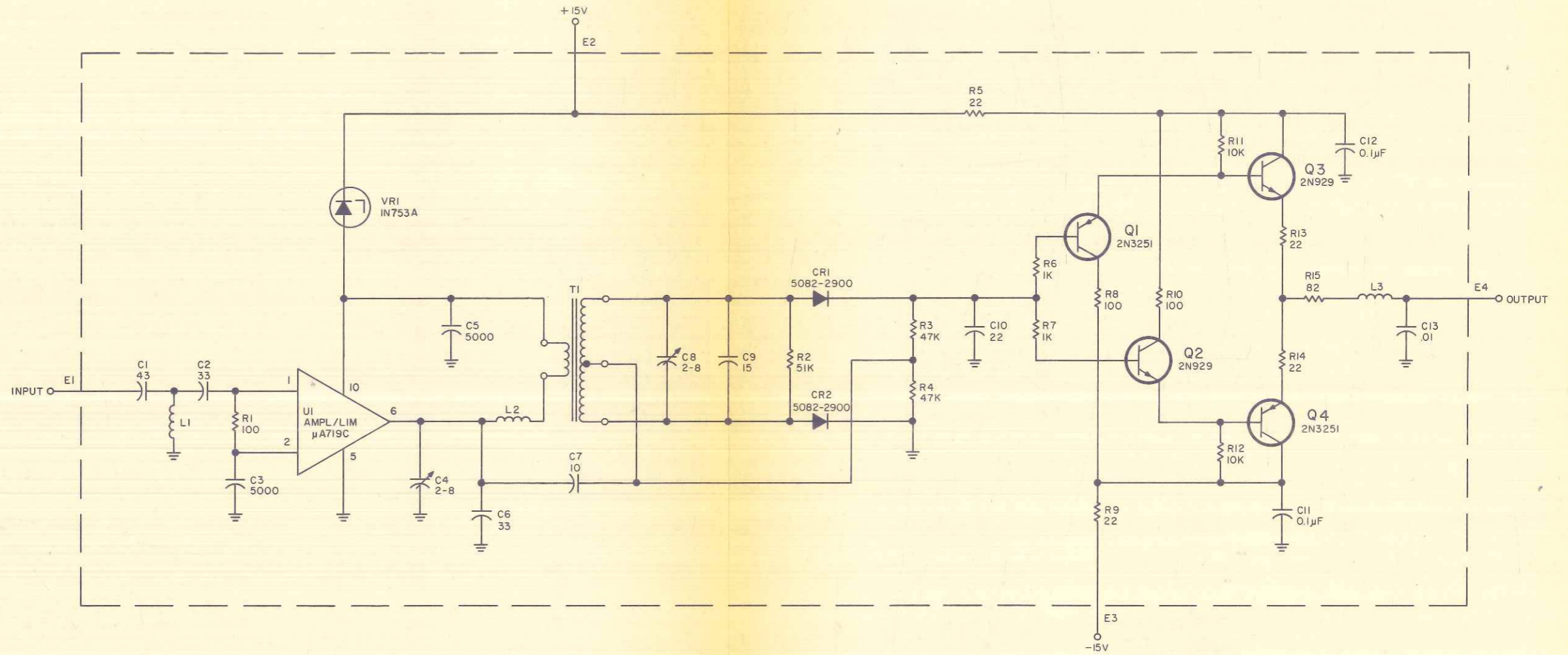
NOTES:

1. UNLESS OTHERWISE SPECIFIED:
 - a) RESISTANCE IS MEASURED IN OHMS, $\pm 5\%$, 1/4W.
 - b) CAPACITANCE IS MEASURED IN μF .
2. THE FOLLOWING NOTATIONS ARE USED ON POTENTIOMETERS:
 - a) CW INDICATES CLOCKWISE ROTATION.
 - b)  INDICATES SCREWDRIVER ADJUSTMENT.



NOTES:
1. UNLESS OTHERWISE SPECIFIED:
a) RESISTANCE IS MEASURED IN OHMS, $\pm 5\%$, 1/4W.
b) CAPACITANCE IS MEASURED IN pF.

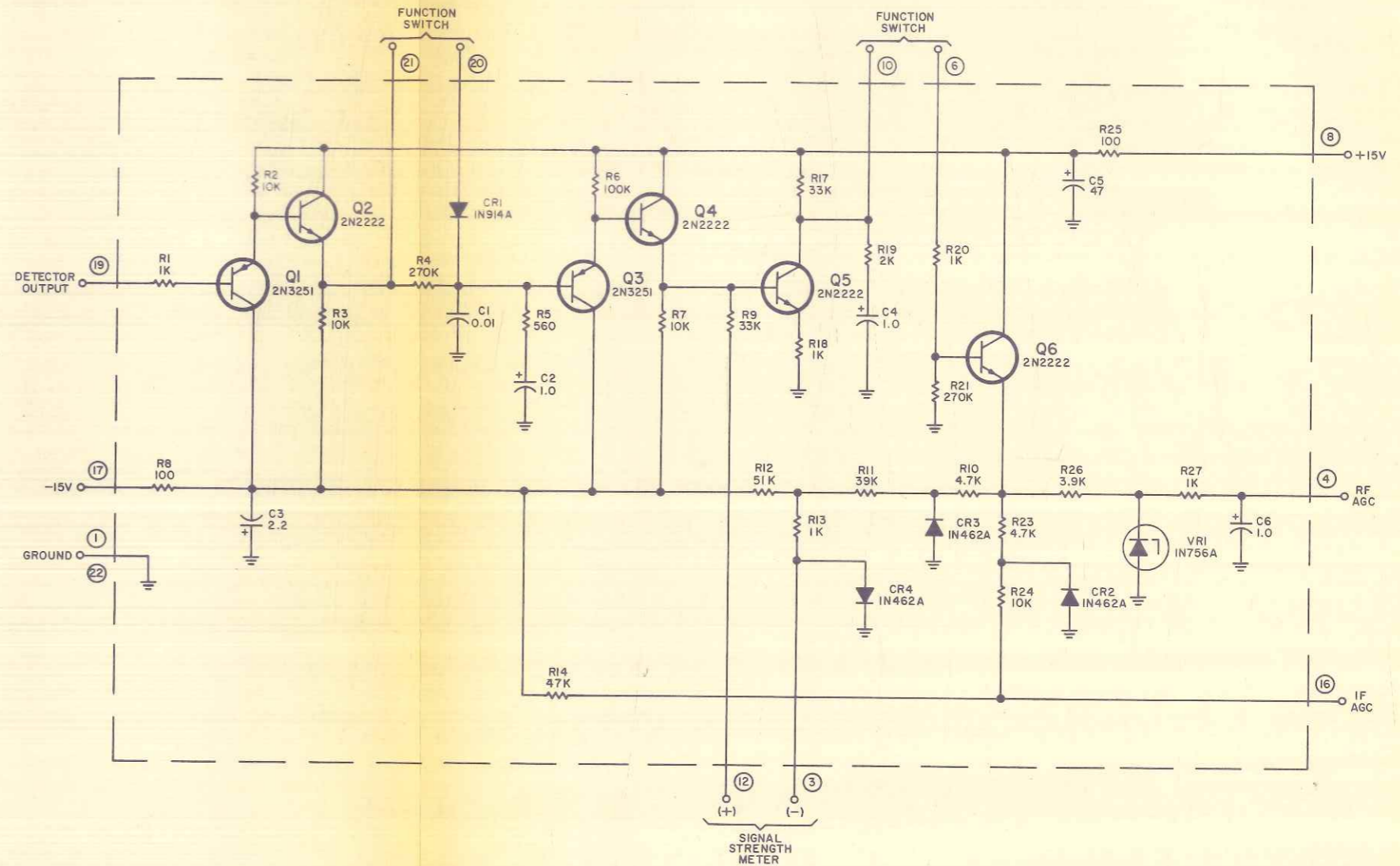
Part 15298 IF Output Amplifier (100 kHz BW)
Schematic Diagram



NOTES

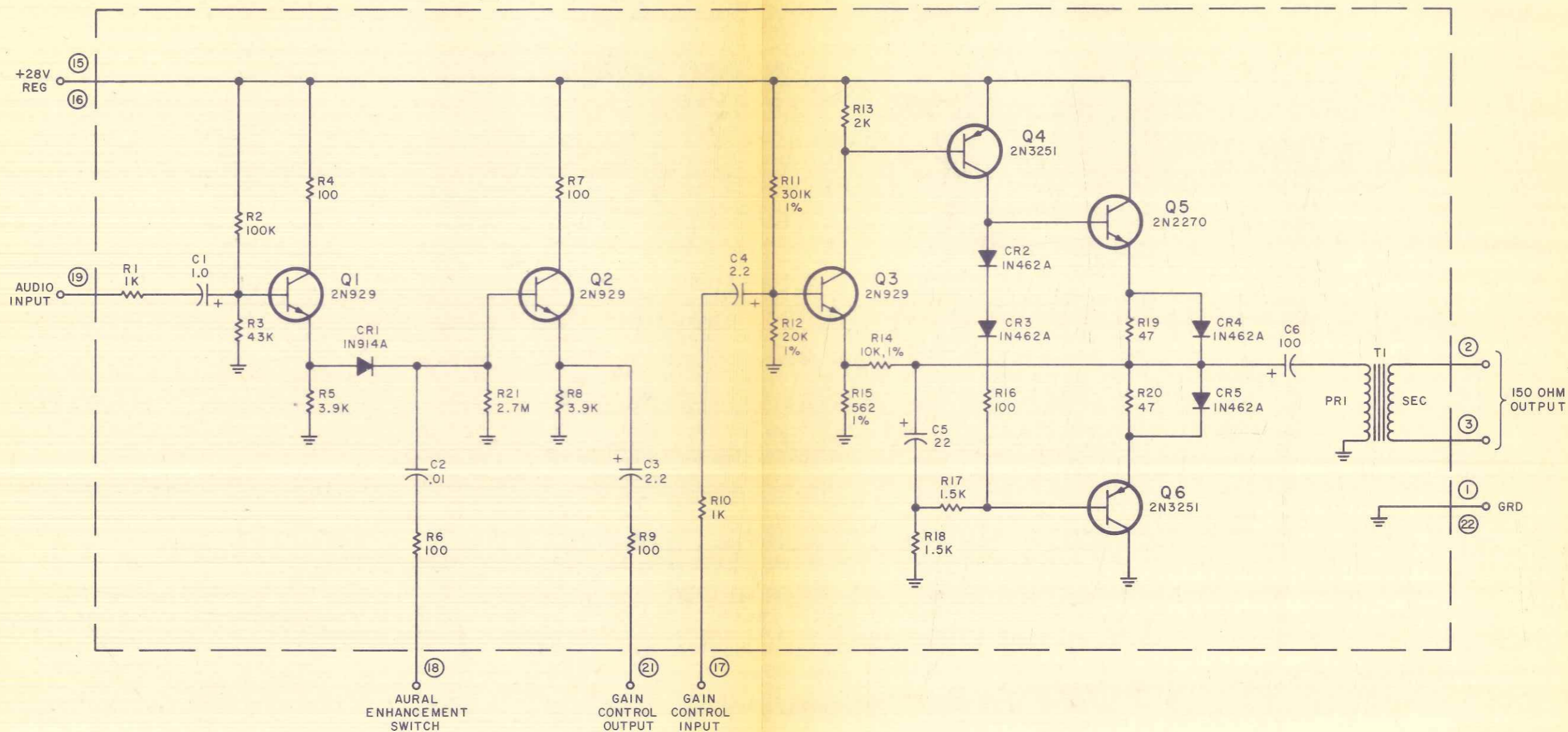
- 1. UNLESS OTHERWISE SPECIFIED:
 - a) RESISTANCE IS MEASURED IN OHMS, $\pm 5\%$, 1/4W.
 - b) CAPACITANCE IS MEASURED IN pF.

Part 15196 21.4 MHz FM Limiter/Discriminator,
(100 kHz BW), Schematic Diagram



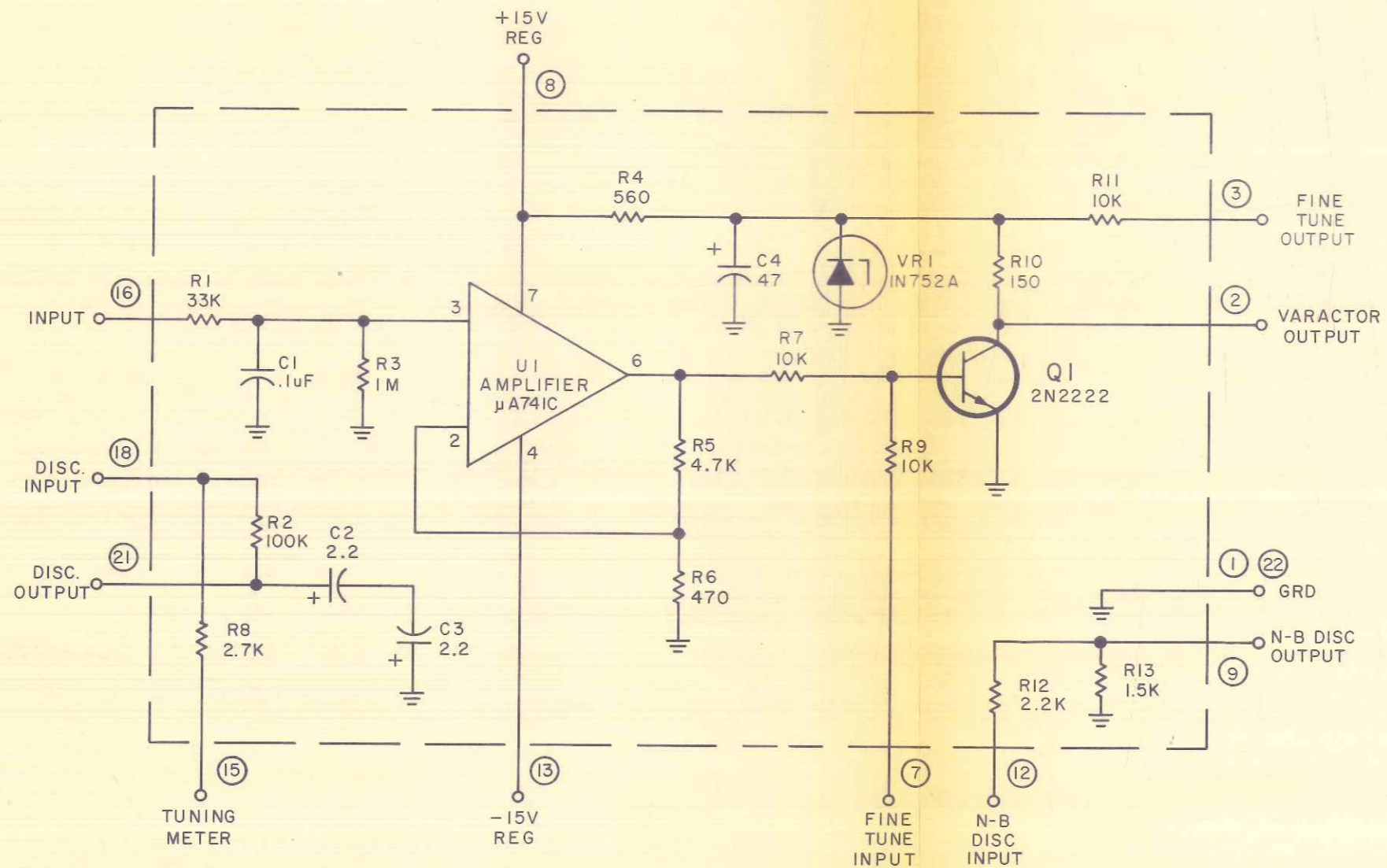
NOTES:
1. UNLESS OTHERWISE SPECIFIED:
a) RESISTANCE IS MEASURED IN OHMS, $\pm 5\%$, 1/4 W.
b) CAPACITANCE IS MEASURED IN μF .
2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS.

Type 7866 AGC Amplifier
Schematic Diagram

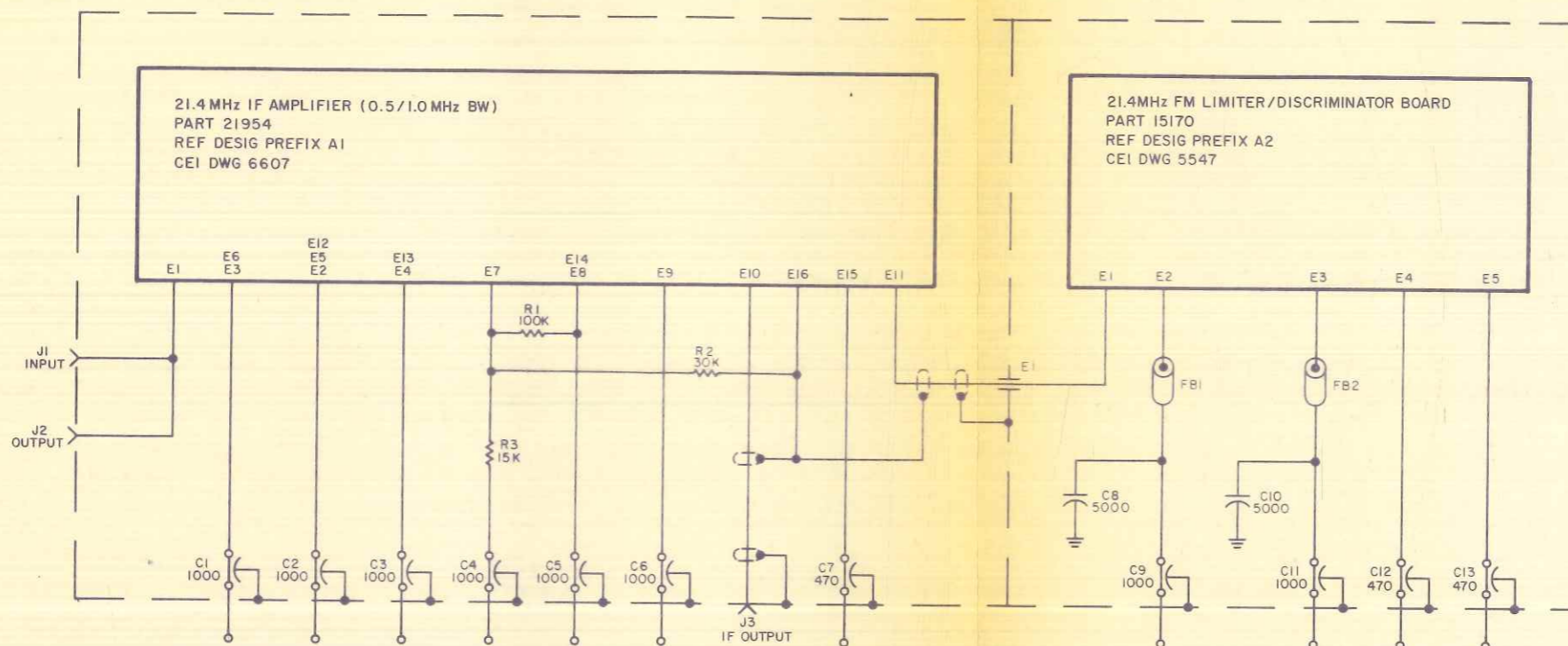


NOTES:
 1. UNLESS OTHERWISE SPECIFIED:
 a) RESISTANCE IS MEASURED IN OHMS, $\pm 5\%$, 1/4W
 b) CAPACITANCE IS MEASURED IN μF
 2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS.

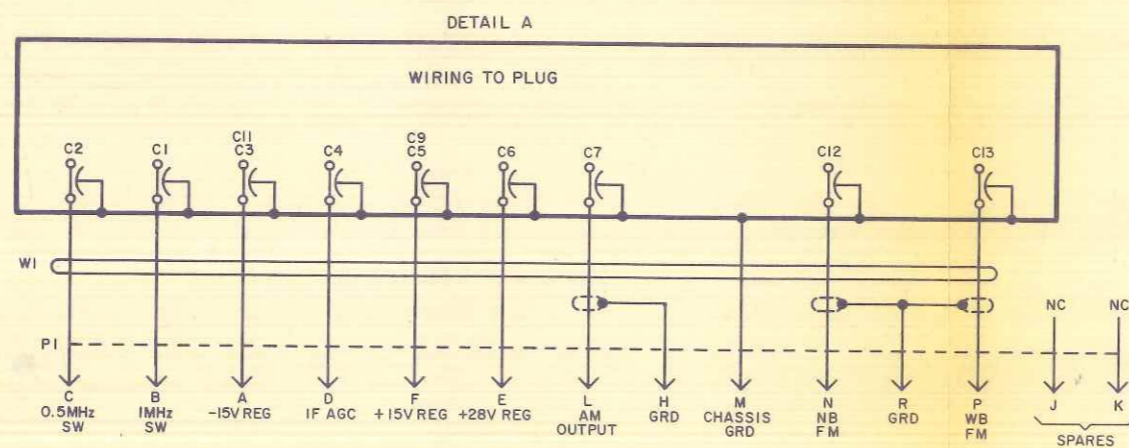
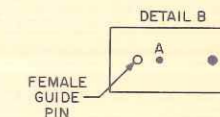
Type 7444 Audio Module Schematic Diagram



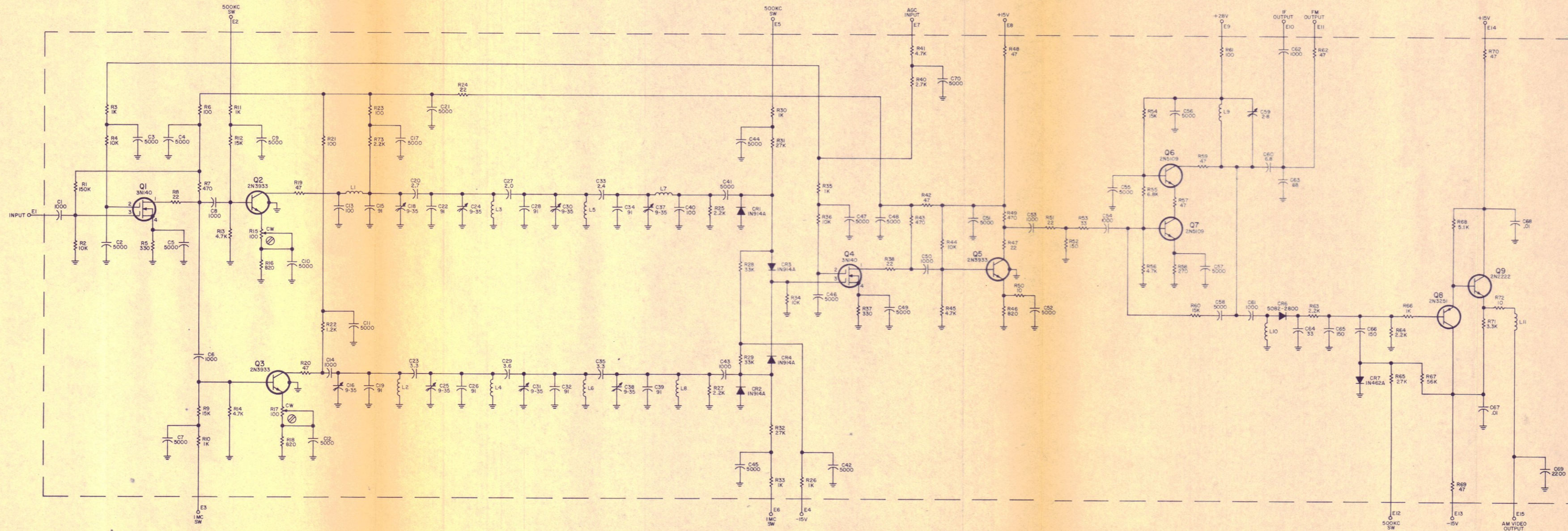
- NOTES:
1. UNLESS OTHERWISE SPECIFIED:
 - a) RESISTANCE IS MEASURED IN OHMS, $\pm 5\%$, 1/4W
 - b) CAPACITANCE IS MEASURED IN μF
 2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS.



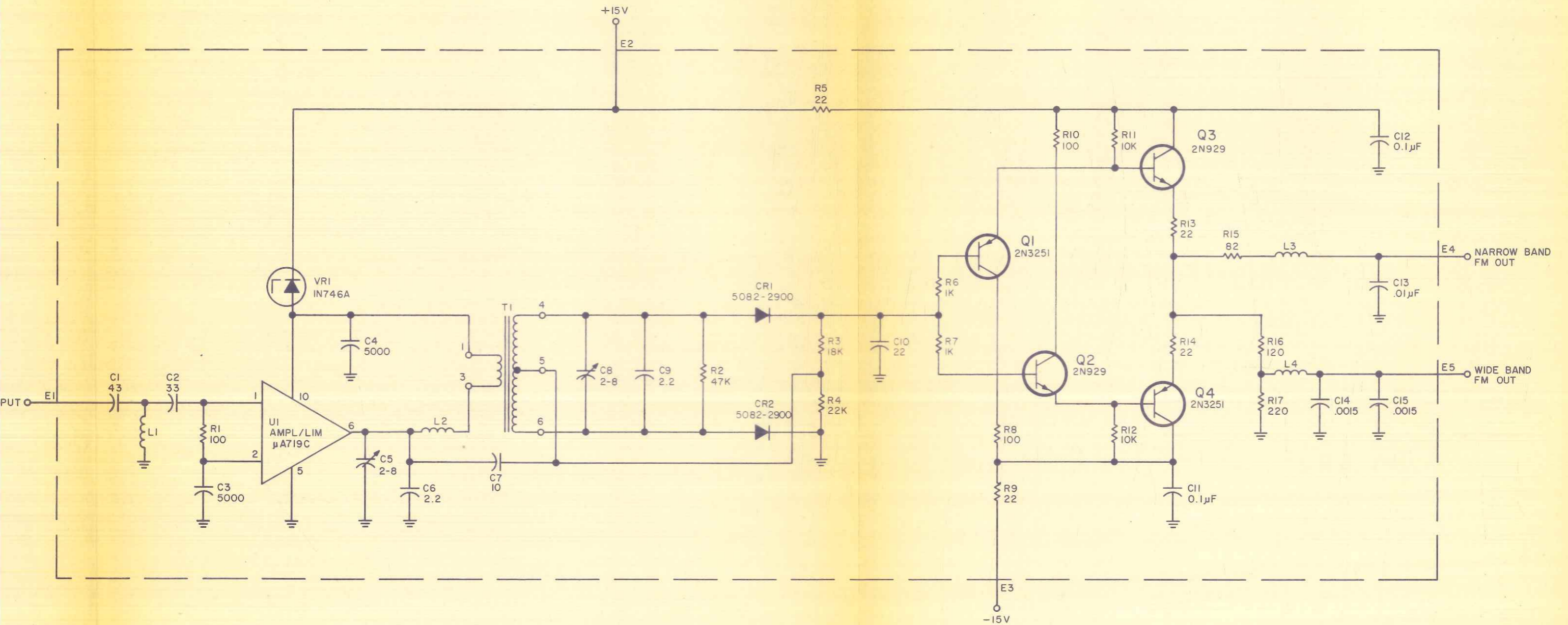
- NOTES:
1. UNLESS OTHERWISE SPECIFIED:
 - a) RESISTANCE IS MEASURED OHMS, $\pm 5\%$, 1/4W.
 - b) CAPACITANCE IS MEASURED IN pF.
 2. FOR WIRING TO PLUG SEE DETAIL A.
 3. THE FEMALE GUIDE PIN FOR P1 IS NEXT TO PIN A AS SHOWN IN DETAIL B.



Type 72299 21.4 MHz IF Amplifier (500 kHz/ 1 MHz BW), Schematic Diagram

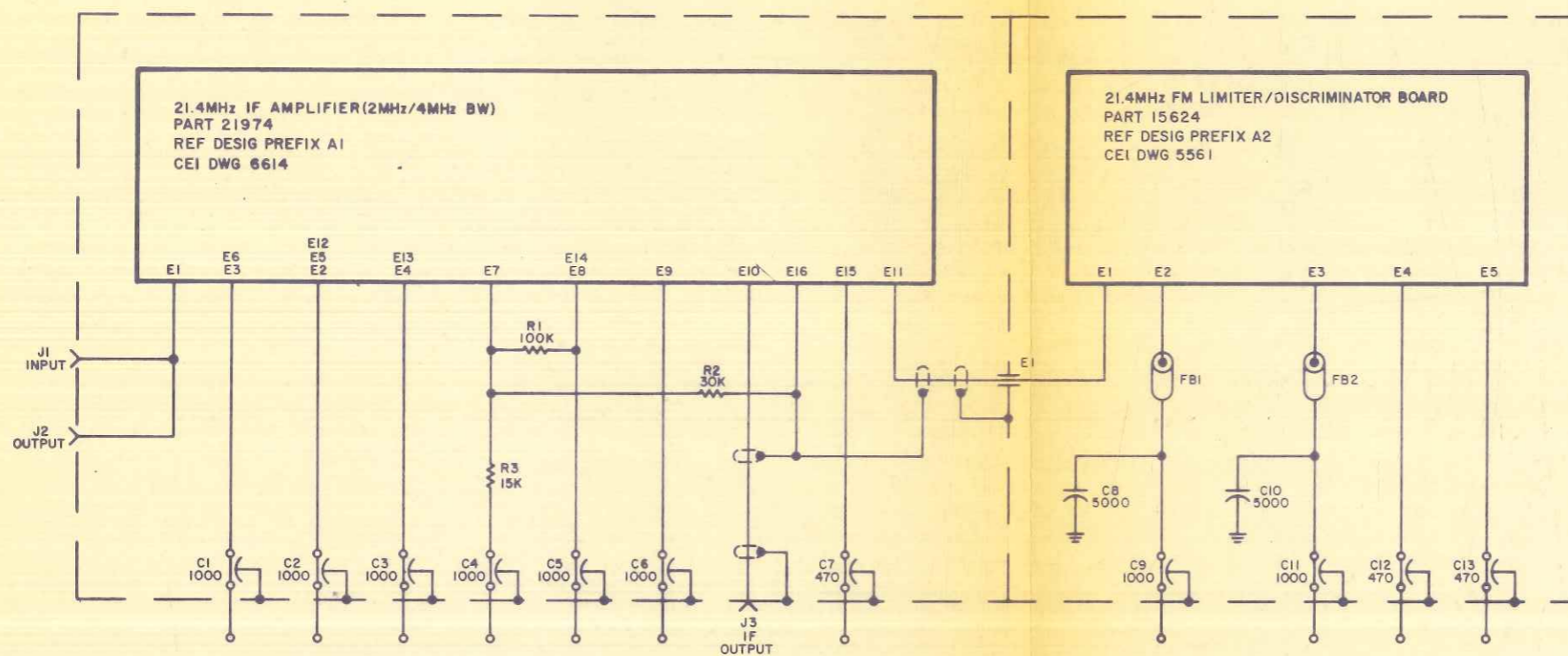


NOTES:
1. UNLESS OTHERWISE SPECIFIED,
a) RESISTANCE IS MEASURED IN OHMS, $\pm 5\%$, 1/4.
b) CAPACITANCE IS MEASURED IN pF.
2. THE FOLLOWING NOTATIONS ARE USED ON POTENTIOMETERS
a) CW INDICATES CLOCKWISE ROTATION
b) INDICATES SCREWDRIVER ADJUSTMENT

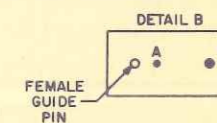


NOTES:

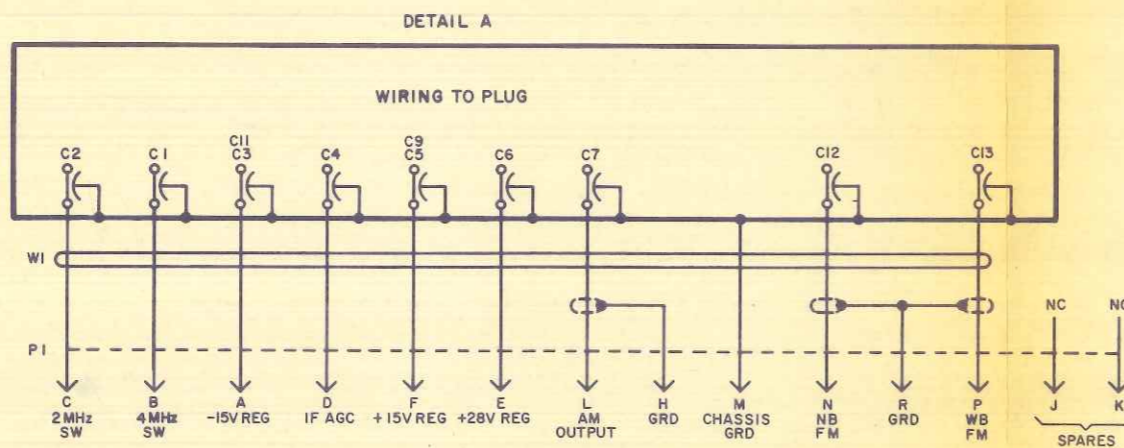
- I. UNLESS OTHERWISE SPECIFIED:
 - a) RESISTANCE IS MEASURED IN OHMS, $\pm 5\%$, 1/4W.
 - b) CAPACITANCE IS MEASURED IN pF.



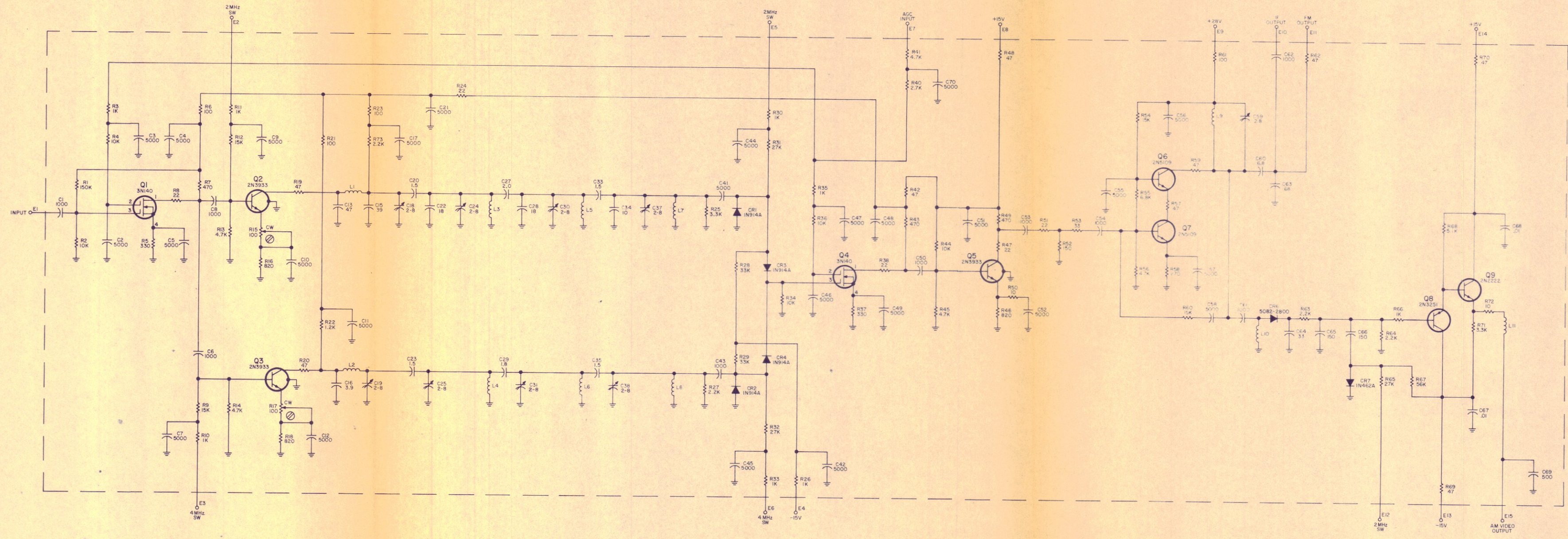
- NOTES:
1. UNLESS OTHERWISE SPECIFIED:
 - a) RESISTANCE IS MEASURED OHMS, $\pm 5\%$, 1/4W.
 - b) CAPACITANCE IS MEASURED IN pF.
 2. FOR WIRING TO PLUG SEE DETAIL A.
 3. THE FEMALE GUIDE PIN FOR P1 IS NEXT TO PIN A AS SHOWN IN DETAIL B.



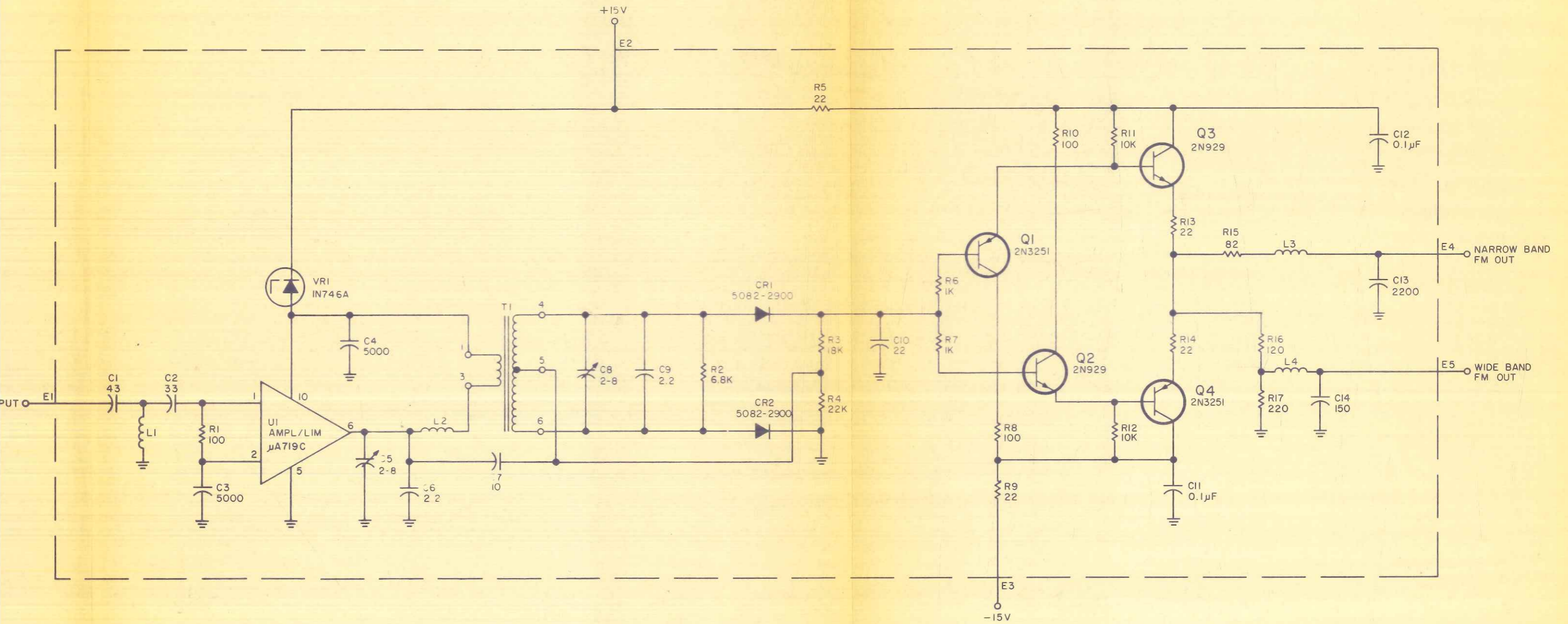
4. REF DESIG W1 IS ASSIGNED TO THE CABLE TERMINATING AT P1.



Type 72301 21.4 MHz IF Amplifier (2 MHz/ 4 MHz BW), Schematic Diagram

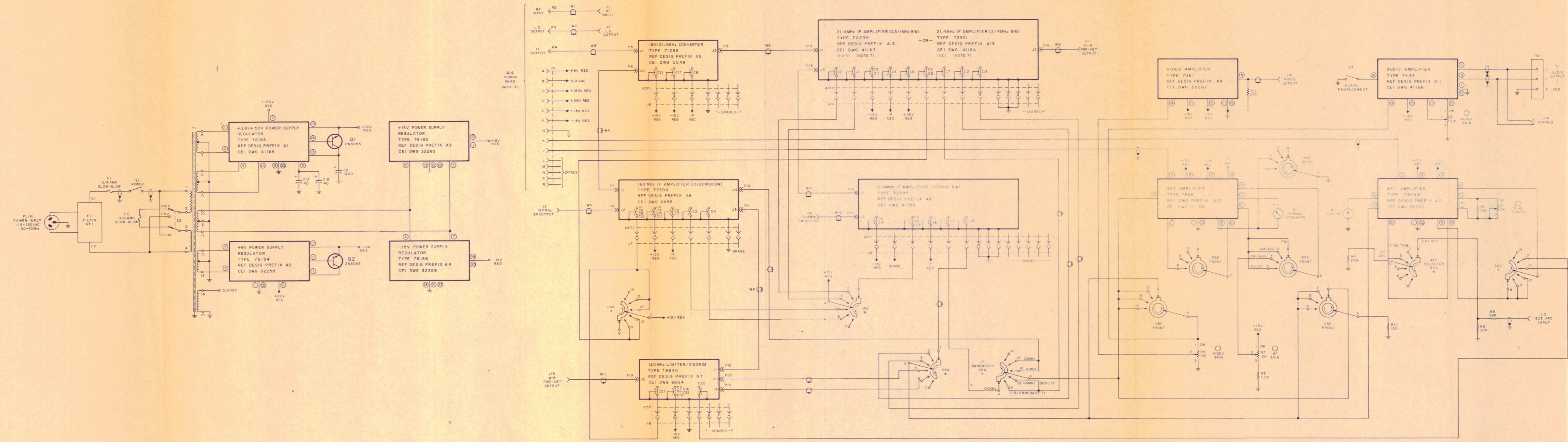


NOTES:
1. UNLESS OTHERWISE SPECIFIED:
a) RESISTANCE IS MEASURED IN OHMS, ±5%, 1/4 W.
b) CAPACITANCE IS MEASURED IN pF.
2. THE FOLLOWING NOTATIONS ARE USED ON POTENTIOMETERS:
a) CW INDICATES CLOCKWISE ROTATION OF CONTROL KNOB.
b) Ⓢ INDICATES SCREWDRIVER ADJUSTMENT.



NOTES:

- 1 UNLESS OTHERWISE SPECIFIED.
- a) RESISTANCE IS MEASURED IN OHMS, $\pm 5\%$, 1/4W.
- b) CAPACITANCE IS MEASURED IN pF.



- NOTES
1. UNLESS OTHERWISE SPECIFIED, RESISTANCE IS MEASURED IN OHMS, 1/4W CAPACITANCE IS MEASURED IN PF.
 2. ENCLOSED NUMBERS ARE MODULE PIN NUMBERS.
 3. OPTIONAL HP TUNING HEADS ARE DOCUMENTED AS SEPARATE ITEMS.
 4. THE FOLLOWING NOTATIONS ARE USED ON POTENTIOMETERS:
 - ⌚ INDICATES CLOCKWISE ROTATION OF CONTROL KNOB
 - ⌚ INDICATES FRONT PANEL CONTROL
 5. SWITCHES S4, S5, AND S6 ARE SHOWN IN EXTREME CCW POSITION AND ARE VIEWED FROM END OPPOSITE CONTROL KNOB. SECTION A IS NEAREST CONTROL KNOB. ARROW INDICATES CW ROTATION OF CONTROL KNOB. LETTERS W, X OR FRONT, DENOTE SEGMENTS OF WAFER.
 6. THE MALE GUIDE PIN FOR JACKS J5 THRU J10 IS LOCATED NEXT TO PIN A AS SHOWN BELOW.



7. DIFFERENCE BETWEEN TYPES IS AT A15.

Courtesy of <http://BlackRadios.terryo.org>