

WATKINS-JOHNSON

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CLASS C INSTRUCTION MANUAL  
FOR  
TYPES MTF-100 AND MTF-101  
MICROWAVE TUNING FRAMES

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.



## 1.1 ELECTRICAL CHARACTERISTICS

1.1.1 The Type MTF-100 Microwave Tuning Frame is designed to mount two Types TH-Series microwave tuning heads and provide the necessary interface connections and power for their operation. When used in conjunction with a Type MTF-101 Microwave Tuning Frame, this capability is extended to a total of four tuning heads. A front-panel switch on the MTF-100 allows individual selection of each of the four tuning heads. The TH-Series microwave tuning heads presently available are:

TH-120(A)	1-2 GHz
TH-240(A)	2-4 GHz
TH-245(A)	2-4.5 GHz
TH-480(A)	4-8 GHz
TH-812(A)	8-12 GHz

With the combination of MTF-100 and MTF-101 any four of these can be switch selected and the active tuning head 160 MHz IF output is available at a rear-panel jack. The tuner IF output can then be demodulated with a unit such as the Type DM-112 Demodulator. The MTF-100 contains an AFC amplifier which allows automatic frequency control of the operating tuner when AFC voltage is supplied by the demodulator or other source.

1.1.2 The MTF-100 operates with either 115 or 230 Vac 50-400 Hz input power. All operating voltages are supplied to the switch selected tuning head. In addition, YIG heater voltage is constantly applied to all installed tuners as long as the MTF-100 power is on.

## 1.2 MECHANICAL CHARACTERISTICS

The MTF-100 and MTF-101 are designed for 19-inch rack mounting. Each unit requires 3.5 inches of vertical rack space. All signal and power connections are made at the rear panel of the units. Front panel controls of the MTF-100 include: PUSH ON/OFF POWER, FINE TUNING, TUNER SELECT, and AFC. Aluminum is used throughout in the construction of the units. The TH-Series tuning heads are drop-in modules which attach to the MTF-100 or MTF-101 main deck.

## 1.3 EQUIPMENT SUPPLIED

This equipment consists of the MTF-100 or MTF-101 only.

## 1.4 EQUIPMENT REQUIRED BUT NOT SUPPLIED

The MTF-100 and MTF-101 are designed to mount Type TH-( )A Tuning Heads. In addition an IF demodulator such as the Type DM-112 is required for the operation of this equipment.

## 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. Remove the dust covers and inspect the internal components for apparent damage. Check the internal cables for loose connections and plug-in items, such as printed wiring boards, which may have been loosened from their receptacles.

## 1.6 INSTALLATION

1.6.1 The MTF-100 and MTF-101 Microwave Tuning Frames are designed to mount in a 19-inch rack. Both units require 3.5 inches of vertical rack space. 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 around the units. The installation should also allow access to the rear panel so that connections can be made and changed if desired.

1.6.2 MTF-101 Tuning Head Installation. - Proceed as follows:

1. Remove the tuning frame top and bottom dust covers.
2. Remove the tuning knob and frequency coverage plate from the front of both tuning heads.
3. Turn the MTF-101 upside down.
4. Mount the inverted tuning heads in the tuning frame from the bottom by sliding the tuning shaft and frequency dial into the front panel and gently lowering the rear of the tuning head into the frame. Take care not to pinch interconnecting cables between the head and mounting frame.
5. Secure the tuning heads to the MTF-101 using eight 4-40 x 5/16" pan head screws from the top of the tuning frame. Use both standard and lock washers in the installation.
6. Plug the tuning head power plug (P11) into the appropriate tuning frame receptacle, either J8 for tuner three or J9 for tuner four.



7. Connect P1 of coaxial cable assembly W1 to the "PRE" input port of the tuner three YIG filter, FL1.
  8. Connect P1 of cable assembly W4 to the "PRE" input port of the tuner four YIG filter, FL1.
  9. Connect P2 of W2 to the top connector of tuner three 20 dB coupler Z4. This is the tuner three LO output connection to J2.
  10. Connect P8 of W2 to A1J2 on tuner three. This supplies the tuner three IF output to J3.
  11. Connect P6 to W6 to A1J2 on tuner four. This supplies the tuner four IF output to J6.
  12. Connect P5 to W5 to the top jack of the 20 dB coupler Z4, on tuner four. This supplies the tuner four LO output to J5.
  13. Install the tuning knobs on both tuning shafts and frequency range tag to the front panel using the screws originally used to hold the tags on the tuners.
- 1.6.3 MTF-100 Tuning Head Installation. - Proceed as follows:
1. Remove the tuning frame top and bottom dust covers.
  2. Remove the tuning knob and frequency coverage plate from the front of both tuning heads.
  3. Turn the MTF-100 upside down.
  4. Mount the inverted tuning heads in the tuning frame from the bottom by sliding the tuning shaft and frequency dial into the front panel and gently lowering the rear of the tuning head into the frame. Take care not to pinch interconnecting cables between the head and mounting frame.
  5. Secure the tuning head in TUNER position one to the MTF-100 using six 4-40 x 15/16" and two 4-40 x 1/2" pan head screws. The two 1/2" length screws also mount two cable clamps which are used for securing the cable harnesses on the left side of tuner one.
  6. Secure the tuning head in TUNER position two to the MTF-100 using eight 4-40 x 5/16" pan head screws from the top of the tuning frame. Use both standard and lock washers in the installation.
  7. Plug the tuning head power plugs (P11) into the appropriate tuning frame receptacle, either J8 for tuner one or J10 for tuner two.
  8. Connect P5 of coaxial cable assembly W3 to the "Pre" input port of the tuner one YIG filter, FL1.
  9. Connect P7 of coaxial cable assembly W5 to the "Pre" input port of the tuner two YIG Filter, FL1.
  10. Connect P6 of coaxial cable assembly W4 to the top connector of 20 dB coupler Z4 on tuner one. This output provides an LO sample signal from tuner one to rear apron jack J2.

11. Connect P8 of cable assembly W6 to the top connector of 20 db coupler Z4 on tuner two. This output provides an LO sample signal from tuner two to rear apron jack J4.
12. Connect P4 of W2 to A1J2 on tuner one. This supplies the tuner one IF output to jack J2 on IF Coupler module A4.
13. Connect P2 of W1 to A1J2 on tuner two. This supplies the tuner two IF output to jack J5 on IF Coupler module A4.
14. Install the two tuning knobs on both tuners tuning shafts. Replace the frequency range tags on the front panel of the MTF-100 using the screws originally used to hold the tags on the tuners.

1.6.4 MTF-100 Input and Output Connections. - Proceed as follows:

1.6.4.1 RF Input Connections. - Connect the microwave antenna inputs to RF IN jacks J1 and J3. Jack J1 connects to the TUNER one position and jack J3 connects to the TUNER two position.

1.6.4.2 IF Output Connections. - Connect the 160 MHz IF OUTPUT from jack A4J1 on the MTF-100 to the 160 MHz IF INPUT, jack J1, on the rear apron of the DM-112 Demodulator.

1.6.4.3 Power/Control Cable Connections. - Connect multipin jack J9 to multipin jack J7 on the rear apron of the MTF-101.

1.6.4.4 Tuner LO Output. - Local oscillator output jacks J2 (tuner one) and J4 (tuner two) are provided for general test and monitoring of each tuner's local oscillator.

1.6.4.5 Tune/Active Output. - Rear apron multipin jack J7 provides an analog output voltage from the active tuner mounted in either the MTF-100 or MTF-101. Any given dc level in the -10V to +10V analog range represents a frequency in the tuning range of the selected tuner. This output is useful for controlling external monitoring equipment.

1.6.4.6 AFC (Automatic Frequency Control) Input Connections. - Connect the AFC output from jack J13 on the rear apron of the DM-112 to AFC IN jack J5 on the rear apron of the MTF-100.

1.6.4.7 AGC (Automatic Gain Control) Input Connections. - Connect the AGC output from jack J9 on the rear apron of the DM-112 to AGC IN jack J6 on the rear apron of the MTF-100.

1.6.4.8 External RF Preamplifier Connections. - Provisions are provided for installing an external RF preamplifier for operation with each of the TH-series tuning heads. Installation of the preamplifier is identical for each tuning head position. Follow the procedure as outlined below:

1. Remove the rear apron cover plate marked EXTERNAL RF PREAMPLIFIER by removing the two retaining screws.



2. Install the two accessory preamplifier cables so that the Type N connectors extend from the rear apron.
3. Remove plugs P1 and P2 of cable assembly W1 from the preselector OUT port of FLIA and the IN port of isolator Z1.
4. Complete the installation as shown in Figure 1.

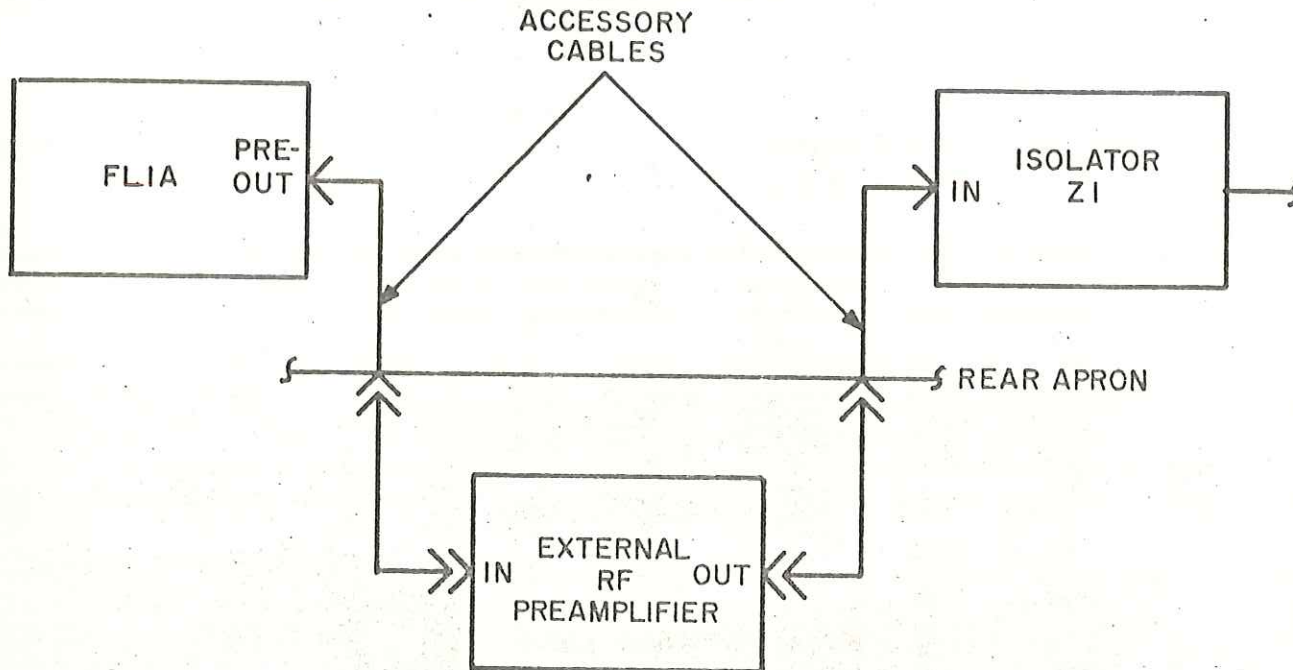


Figure 1. External RF Preamplifier Connections

1.6.5 MTF-101 Input and Output Connections. - Proceed as follows:

1.6.5.1 RF Input Connections. - Connect the microwave antenna inputs to RF IN jacks J1 and J4. Jack J1 connects to the TUNER three position and jack J4 connects to the TUNER four positions.

1.6.5.2 Tuner three IF Output Connections. - Connect IF OUT jack J3 on the rear apron of the MTF-101 to IF IN jack A4J3 on the rear apron of the MTF-100.

1.6.5.3 Tuner four IF Output Connections. - Connect IF OUT jack J6 on the rear apron of the MTF-101 to IF IN jack A4J4 on the rear apron of the MTF-100.

1.6.5.4 Tuner LO Output. - LO output jack J2 (tuner three) and J5 (tuner four) are provided for general test and monitoring of each tuner's local oscillator.

1.6.5.5 Power/Control Cable Connections. - Connect multipin jack J7 on the rear apron of the MTF-101 to multipin jack J9 on the rear apron of the MTF-100.



1.6.5.6 External RF Preamplifier Connections. - See paragraph 1.6.4.8.

## 1.7 OPERATION

1.7.1 Push ON/OFF Power Switch. - Push this control to apply line power to the MTF-100. Operating potentials for the MTF-101 are also supplied by the power supplies of the MTF-100.

1.7.2 TUNER SELECT Switch. - In Positions 1 or 2, the TUNER SELECT switch provides operating power and the necessary interconnections required for operation of the selected tuner mounted in the MTF-100. In positions 3 or 4, the selected tuner mounted in the MTF-101 is activated and its outputs are returned and made available on the rear apron of the MTF-100.

1.7.3 FINE TUNING Control. - The FINE TUNING control is an electronic vernier of the main tuning control. The tuned frequency of the selected tuner can be slightly increased or decreased when this control is set initially at midrange.

## 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 excellent 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 surfaces 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:

- (a) Maximum humidity: 95% (no condensation)
- (b) Temperature range: -30°C to +85°C.

## 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:



Read from right to left as: First (1) resistor (R) of first (1) subassembly (A)

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. Reference Designation Prefixes are provided on drawings and illustrations in parenthesis within the figure titles.

#### 1.11 LIST OF MANUFACTURERS

<u>Mfr. Code</u>	<u>Name and Address</u>	<u>Mfr. Code</u>	<u>Name and Address</u>
01121	Allen-Bradley Company 1201 South 2nd Street Milwaukee, Wisconsin 53204	13103	Thermalloy Company 8717 Diplomacy Row Dallas, Texas 75247
04713	Motorola Semiconductor Products 5005 East McDowell Road Phoenix, Arizona 85008	15818	Teledyne Semiconductor 1300 Terra Bella Avenue Mountain View, California 94040
07263	Fairchild Semiconductor A Division of Fairchild Camera and Instrument Corporation 464 Ellis Street Mountain View, California 94040	16179	Omni-Spectra, Incorporated 24600 Hallwood Ct. Farmington, Michigan 48024
09353	C & K Components, Inc. 103 Morse Street Watertown, Mass. 02172	17419	The Deutsch Company 7001 West Imperial Highway Los Angeles, California 90009
11139	Deutsch Company Electronic Component Division Municipal Airport Banning, California 92220	26805	Americon Corporation 87 Rumford Avenue Waltham, Mass. 02154



<u>Mfr. Code</u>	<u>Name and Address</u>	<u>Mfr. Code</u>	<u>Name and Address</u>
28480	Hewlett Packard Company 1501 Page Mill Road Palo Alto, California 94304	80058	Joint Electronic Type Designation System
56289	Sprague Electric Company Marshall Street North Adams, Massachusetts 01247	80131	Electronic Industries Association 2001 Eye Street, N. W. Washington, D. C. 20006
71400	Bussman Manufacturing Division of McGraw-Edison Co. 2536 W. University Street St. Louis, Missouri 63107	81312	Winchester Electronics Division Litton Industries, Incorporated Main Street & Hillside Avenue Oakville, Connecticut 06779
71785	Cinch Manufacturing Company Howard B. Jones Division 1026 South Homan Avenue Chicago, Illinois 60624	81349	Military Specifications
72136	Electro Motive Manufacturing Co. South Park & John Streets Willimantic, Connecticut 06226	82389	Switchcraft, Inc. 5555 North Elston Avenue Chicago, Illinois 60630
73138	Beckman Instruments, Inc. Helipot Division 2500 Harbor Boulevard Fullerton, California 92634	87034	Marco-Oak Industries, Div. of Oak Electro/Netics Corporation 207 South Helena Street Anaheim, California 92803
74868	Bunker Ramo Corporation The Amphenol RF Division 33 East Franklin Street Danbury, Connecticut 06810	91506	Augat, Incorporated 33 Perry Avenue Attleboro, Massachusetts 02703
75042	IRC Division of TRW Incorporated 401 North Broad Street Philadelphia, Pennsylvania 19108	94144	Raytheon Company Components Division Industrial Components Operation Quincy, Mass.
75915	Littelfuse, Incorporated 800 E. Northwest Highway Des Plaines, Illinois 60016	99800	American Precision Industries Dlevan Electronics Division 270 Quaker Road East Aurora, New York 14052

## 1.12 PARTS LIST

The parts list which follows contains all electrical parts used in the equipment and certain mechanical parts which are subject to unusual wear or damage. When ordering replacement parts from the Watkins-Johnson Co., specify the type and serial number of the equipment and the reference designation and description of each part ordered. The list of manufacturers provided in paragraph 5.3 and the manufacturer's part numbers for components are included as a guide to the user of the equipment in the field. These parts may not necessarily agree with the parts installed in the equipment, however the parts specified in this list will provide satisfactory operation of the equipment. Replacement parts may be obtained from any manufacturer as long as the physical and electrical parameters of the part selected agree with the original indicated part. In the case of components defined by a military or industrial specification, a vendor which can provide the necessary component is suggested as a convenience to the user.

### NOTE

As improved semiconductors become available it is the policy of CEI Division to incorporate them in proprietary products. For this reason some transistors, diodes, and integrated circuits installed in the 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.



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TYPE NUMBER MTF-100

REVISION J

SCHEMATIC

TITLE - MICROWAVE TUNING FRAME

REF DESIG	DESCRIPTION	QTY/ EQPT	PART NUMBER	CODE IDENT
AT1	TERMN/RESISTIVE 50 OHM 5PCT 0.25W	2	CT-NM	93459
AT2	S/A AT1			
A1	AFC /+150V PWR SUPPLY PC ASSY	1	76213 (SEP PL)	
A2	PDRM 15V PWR SUPPLY PC ASSY	1	76210-1 (SEP PL)	
A3	+6V & +12V PWR SUPPLY PC ASSY	1	76214 (SEP PL)	
A4	IF COUPLER	1	79925 (SEP PL)	
C1	CAP/ELEC/ALUM 40UF M10P50 350V	2	39D406F350GL4	56289
C2	S/A C1			
C3	CAP/ELEC/ALUM 1100UF M10P75 40V	2	39D118G040HL4	56289
C4	S/A C3			
C5	CAP/ELEC/ALUM 2200UF M10P75 25V	1	39D228G025HP4	56289
C6	CAP/ELEC/TANT 47UF 10PCT 35V	1	CS13BF476K	81349
DS1	LAMP/NEON	7	A1H	87034
FL1	FILTER/L-P	1	JN33-694B	56289
F1	FUSE/CARTRIDGE 3/4 AMP 3AG SLOW	1	MDL3/4	71400
F2	FUSE/CARTRIDGE 3/8 AMP 3AG SLOW	1	MDL3/8	71400
J1	CONN/JACK/N	2	3004-7141-10	26805

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TYPE NUMBER MTF-100

REVISION J

SCHEMATIC

TITLE - MICROWAVE TUNING FRAME

REF DESIG	DESCRIPTION	QTY/ EQPT	PART NUMBER	CODE IDENT
J2	CONN/PLUG	2	UG1095AU	80058
J3	S/A J1			
J4	S/A J2			
J5	CONN/RECEP	3	17825-1002	74868
J6	S/A J5			
J7	CONN/RECEP	1	DS00-7S	11139
J7	CONN/PLUG	1	DS07-7P059	11139
J8	CONN/RECEP	2	SLE14SNSS	81312
J9	CONN/RECEP	1	DS00-27S	11139
J10	S/A J8			
J11	S/A J5			
P1	CONN/PLUG/SMA	2	521-3	16179
P2	CONN/PLUG	2	UG1466/U AEP ONLY	80058
P3	S/A P1			
P4	S/A P2			
P5	CONN/PLUG/SMA	2	501-1	16179
P6	CONN/PLUG/SMA	2	521-1	16179
P7	S/A P5			
P8	S/A P6			
Q1	TRANSISTOR	2	2N3055	80131
Q2	S/A Q1			
R1	RES/FIXED/COMPO 27K 5PCT .5W	1	RCR20G273JS	81349



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TYPE NUMBER MTF-100

REVISION J

SCHEMATIC

TITLE - MICROWAVE TUNING FRAME

REF DESIG	DESCRIPTION	QTY/ EQPT	PART NUMBER	CODE IDENT
R2	RES/FIXED/COMPO 10K 5PCT .25W	1	RCR07G103JS	81349
R3	RES/VAR/COMPO 10K 10PCT 2W LINEAR	1	RV4NAYSD103A	81349
R4	RES/FIXED/COMPO 1.0 OHM 5PCT .5W	2	RCR20G1R0JS	81349
R5	S/A R4			
S1	SWITCH PUSH BUT SPDT	1	671-6A1H	87034
S2	SWITCH	1	11A1211	82389
S3	SWITCH/TOGGLE	1	7101	09353
S4	SWITCH, MODIFIED	1	1128-59	14632
T1	TRANSFORMER	1	16587	14632
W1	CABLE ASSY	1	30020-1832	14632
W2	CABLE ASSY	1	30020-1833	14632
W3	CABLE ASSY	1	30020-1834	14632
W4	CABLE ASSY	1	30020-1835	14632
W5	CABLE ASSY	1	30020-1836	14632
W6	CABLE ASSY	1	30020-1837	14632
XA1	CONN/PC BD	3	250-22-30-170	71785
XA2	S/A XA1			
XA3	S/A XA1			
XF1	FUSEHOLDER	2	357001	75915
XF2	S/A XF1			
XQ1	SOCKET/TRANS	2	8038-1G1	91506

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TYPE NUMBER

MTF-100

REVISION J

SCHEMATIC

TITLE - MICROWAVE TUNING FRAME

REF DESIG	DESCRIPTION	QTY/ EQPT	PART NUMBER	CODE IDENT
XQ2	S/A XQ1			



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PAGE 1

TYPE NUMBER

MTF-101

REVISION J

SCHEMATIC

TITLE - MICROWAVE TUNING FRAME

REF DESIG	DESCRIPTION	QTY/ EQPT	PART NUMBER	CODE IDENT
AT1	TERMN/RESISTIVE 50 OHM 5PCT 0.25W	2	CT-NM	93459
AT2	S/A AT1			
J1	CONN/JACK/N	2	3004-7141-10	26805
J2	CONN/PLUG	2	UG1095AU	80058
J3	CONN/RECEP	2	17825-1002	74868
J4	S/A J1			
J5	S/A J2			
J6	S/A J3			
J7	CONN/RECEP	1	DS00-27P	11139
J8	CONN/RECEP	2	SLE14SNSS	81312
J9	S/A J8			
P1	CONN/PLUG/SMA	2	501-1	16179
P2	CONN/PLUG/SMA	2	521-1	16179
P3	CONN/PLUG	2	UG1466/U AEP ONLY	80058
P4	S/A P1			
P5	S/A P2			
P6	S/A P3			
W1	CABLE ASSY	1	30020-1838	14632
W2	CABLE ASSY	1	30020-1839	14632
W3	CABLE ASSY	1	30020-1840	14632
W4	CABLE ASSY	1	30020-1841	14632
W5	CABLE ASSY	1	30020-1842	14632

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TYPE NUMBER MTF-101

REVISION J

SCHEMATIC

TITLE - MICROWAVE TUNING FRAME

REF DESIG	DESCRIPTION	QTY/ EQPT	PART NUMBER	CODE IDENT
W6	CABLE ASSY	1	30020-1843	14632



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TYPE NUMBER 76213 REVISION C SCHEMATIC

TITLE - AFC/+150V POWER SUPPLY PC ASSY

REF DESIG	DESCRIPTION	QTY/ EQPT	PART NUMBER	CODE IDENT
CR1	DIODE	3	1N4449	80131
CR2	S/A CR1			
CR3	S/A CR1			
CR4	DIODE CONSTANT CURRENT 1 MILI-AMP	1	1N5297	04713
C1	CAP/ELEC/TANT 10UF 10PCT 20V	2	CS13BE106K	81349
C2	S/A C1			
C3	NOT USED			
C4	CAP/ELEC/TANT 1.0 UF 10PCT 35V	2	CS13BF105K	81349
C5	S/A C4			
C6	CAP/ELEC/TANT 0.10UF 10PCT 35V	2	150D104X9035A2	56289
C7	S/A C6			
JW1	SOCKET/I.C.	1	8058-1G49	91506
Q1	TRANSISTOR	1	2N4064	80131
Q2	TRANSISTOR	1	2N929	80131
Q3	TRANSISTOR	1	2N3440	80131
Q4	TRANSISTOR	1	U1899E	15818
RA1	HEATSINK	1	2225B	13103
R1	NOT USED			
R2	RES/FIXED/COMPO 30K 5PCT 1W	1	RCR32G303J	81349
R3	RES/FIXED/COMPO 470 OHMS 5PCT 1W	1	RCR32G471JS	81349

REF DESIG	DESCRIPTION	QTY/ EQPT	PART NUMBER	CODE IDENT
2034-002-01	W-J, CEI DIVISION		DATE 01/29/73	PAGE 2
TYPE NUMBER	76213	REVISION C	SCHEMATIC	
TITLE - AFC/+150V POWER SUPPLY PC ASSY				
R4	RES/FIXED/COMPO 2.2K 5PCT .25W	1	RCR07G222JS	81349
R5	RES/FIXED/COMPO 15 OHMS 5PCT .25W	1	RCR07G150JS	81349
R6	RES/FIXED/COMPO 100K 5PCT .25W	4	RCR07G104JS	81349
R7	RES/TRIM/FILM 10K 10PCT .5W	1	62PAR10K	73138
R8	RES/FIXED/COMPO 22K 5PCT .25W	1	RCR07G223JS	81349
R9	S/A R6			
R10	S/A R6			
R11	RES/FIXED/COMPO 10K 5PCT .25W	2	RCR07G103JS	81349
R12	S/A R11			
R13	RES/TRIM/FILM 10K 10PCT 0.75W	1	89PR10K	73138
R14	S/A R6			
R15	RES/FIXED/COMPO 75K 5PCT .25W	1	RCR07G753JS	81349
R16	RES/FIXED/COMPO 47K 5PCT .25W	1	RCR07G473JS	81349
TP1	JACK/TIP RT ANGLE RED	1	TJ203R	49956
U1	RECTIFIER ASSY	1	MDA940A7	04713
U2	INTEGRATED CKT	1	U5B7741393	07263
VR1	DIODE ZENER 91V SILICON	1	1N4763A	80131



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TYPE NUMBER 76210-1

REVISION C

SCHEMATIC 41662

TITLE - POWER SUPPLY

REF DESIG	DESCRIPTION	QTY/ EQPT	PART NUMBER	CODE IDENT
C1	CAP/MICA/DIPPED 500PF 5PCT 500V	2	DM15-501J	72136
C2	CAP/ELEC/TANT 2.2UF 20PCT 35V	2	196D225X0035JA1	56289
C3	S/A C1			
C4	S/A C2			
Q1	TRANSISTOR	2	2N3055	80131
Q2	S/A Q1			
RA1	HEATSINK	2	6103B	13103
RA2	S/A RA1			
R1	RES/FIXED/COMPO 3.3K 5PCT .25W	2	RCR07G332JS	81349
R2	RES/TRIM/FILM 1K 10PCT .5W	2	62PAR1K	73138
R3	RES/FIXED/COMPO 2.7K 5PCT .25W	2	RCR07G272JS	81349
R4	S/A R1			
R5	S/A R2			
R6	S/A R3			
U1	DIODE ASSY.	2	MDA920A3	04713
U2	INTEGRATED CKT	2	U6A7723393	07263
U3	S/A U1			
U4	S/A U2			

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TYPE NUMBER 76214

REVISION A

SCHEMATIC

TITLE - +16 AND +12V POWER SUPPLY/AGC AMPL PC ASSY

REF DESIG	DESCRIPTION	QTY/ EQPT	PART NUMBER	CODE IDENT
CR1	DIODE	2	1N4998	80131
CR2	S/A CR1			
CR3	DIODE	1	1N4449	80131
C1	CAP/MICA/DIPPED 500PF 5PCT 500V	2	DM15-501J	72136
C2	CAP/ELEC/TANT 10UF 10PCT 20V	2	CS13BE106K	81349
C3	S/A C1			
C4	S/A C2			
C5	NOT USED			
C6	CAP/ELEC/TANT 1.0 UF 10PCT 35V	2	CS13BF105K	81349
C7	S/A C6			
R1	RES/FIXED/W-W 0.62 OHM 5PCT 2W	1	BWH0.62J	75042
R2	RES/FIXED/COMPO 7.5K 5PCT .25W	1	RCR07G752JS	81349
R3	RES/TRIM/FILM 10K 10PCT .5W	2	62PAR10K	73138
R4	RES/FIXED/COMPO 18K 5PCT .25W	1	RCR07G183JS	81349
R5	RES/FIXED/COMPO 6.8K 5PCT .25W	1	RCR07G682JS	81349
R6	S/A R3			
R7	RES/FIXED/COMPO 43K 5PCT .25W	1	RCR07G433JS	81349
R8	RES/FIXED/COMPO 9.1K 5PCT .25W	1	RCR07G912JS	81349

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TYPE NUMBER 76214

REVISION A

SCHEMATIC

TITLE - +16 AND +12V POWER SUPPLY/AGC AMPL PC ASSY

REF DESIG	DESCRIPTION	QTY/ EQPT	PART NUMBER	CODE IDENT
R9	RES/FIXED/W-W 1.5 OHM 5PCT 2W	1	BWH1.5J	75042
R10	RES/FIXED/COMPO 470K 5PCT .25W	1	RCR07G474JS	81349
R11	RES/FIXED/COMPO 1.0M 5PCT .25W	1	RCR07G105JS	81349
R12	RES/FIXED/COMPO 47K 5PCT .25W	1	RCR07G473JS	81349
TP1	JACK/TIP RT ANGLE RED	2	TJ203R	49956
TP2	S/A TP1			
U1	INTEGRATED CKT	2	U6A7723393	07263
U2	S/A U1			
U3	INTEGRATED CKT	1	U5B7741393	07263



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TYPE NUMBER 79925 REVISION B SCHEMATIC

TITLE - IF COUPLER

REF DESIG	DESCRIPTION	QTY/ EQPT	PART NUMBER	CODE IDENT
CR1	SWITCH	4	BA136E	25088
CR2	S/A CR1			
CR3	S/A CR1			
CR4	S/A CR1			
C1	CAP/CER/FDTHRU 1000PF GMV 500V	4	FA5C102W	01121
C2	S/A C1			
C3	S/A C1			
C4	S/A C1			
C5	CAP/CER/DISC 0.01UF 20PCT 200V	1	8131A200Z5U0-103M	72982
J1	CONN/RECEP	3	UG1094U	80058
J2	CONN/RECEP/SMA	2	2058-0000	26805
J3	S/A J1			
J4	S/A J1			
J5	S/A J2			
R1	RES/FIXED/COMPO 1.0K 5PCT .25W	8	RCR07G102JS	81349
R2	S/A R1			
R3	S/A R1			
R4	S/A R1			
R5	S/A R1			
R6	S/A R1			
R7	S/A R1			

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TYPE NUMBER 79925

REVISION B

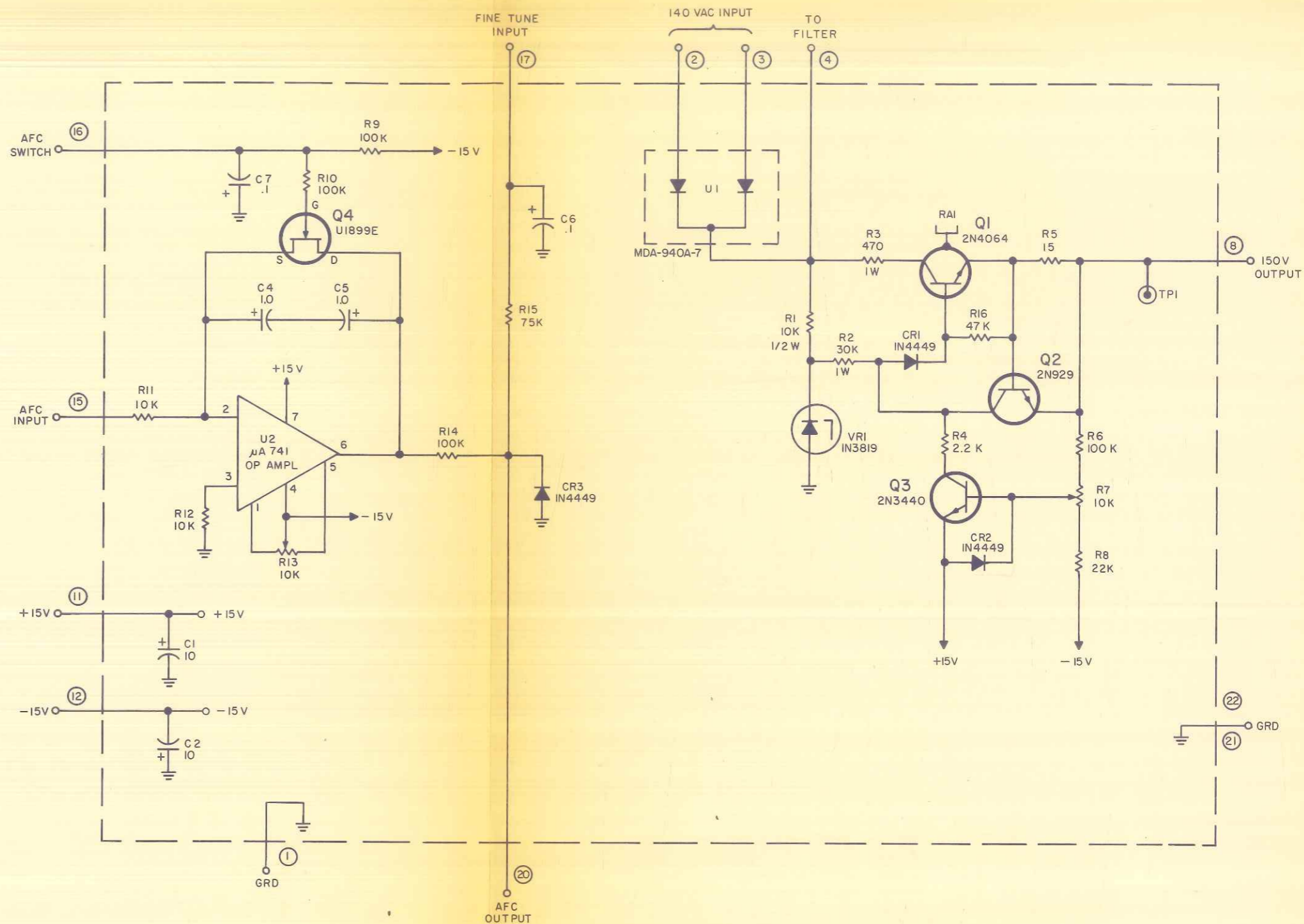
SCHEMATIC

TITLE - IF COUPLER

REF DESIG	DESCRIPTION	QTY/ EQPT	PART NUMBER	CODE IDENT
R8	S/A R1			
R9	RES/FIXED/COMPO 470 OHMS 5PCT .25W	1	RCR07G471JS	81349

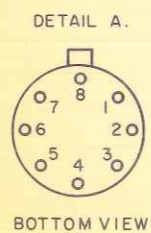




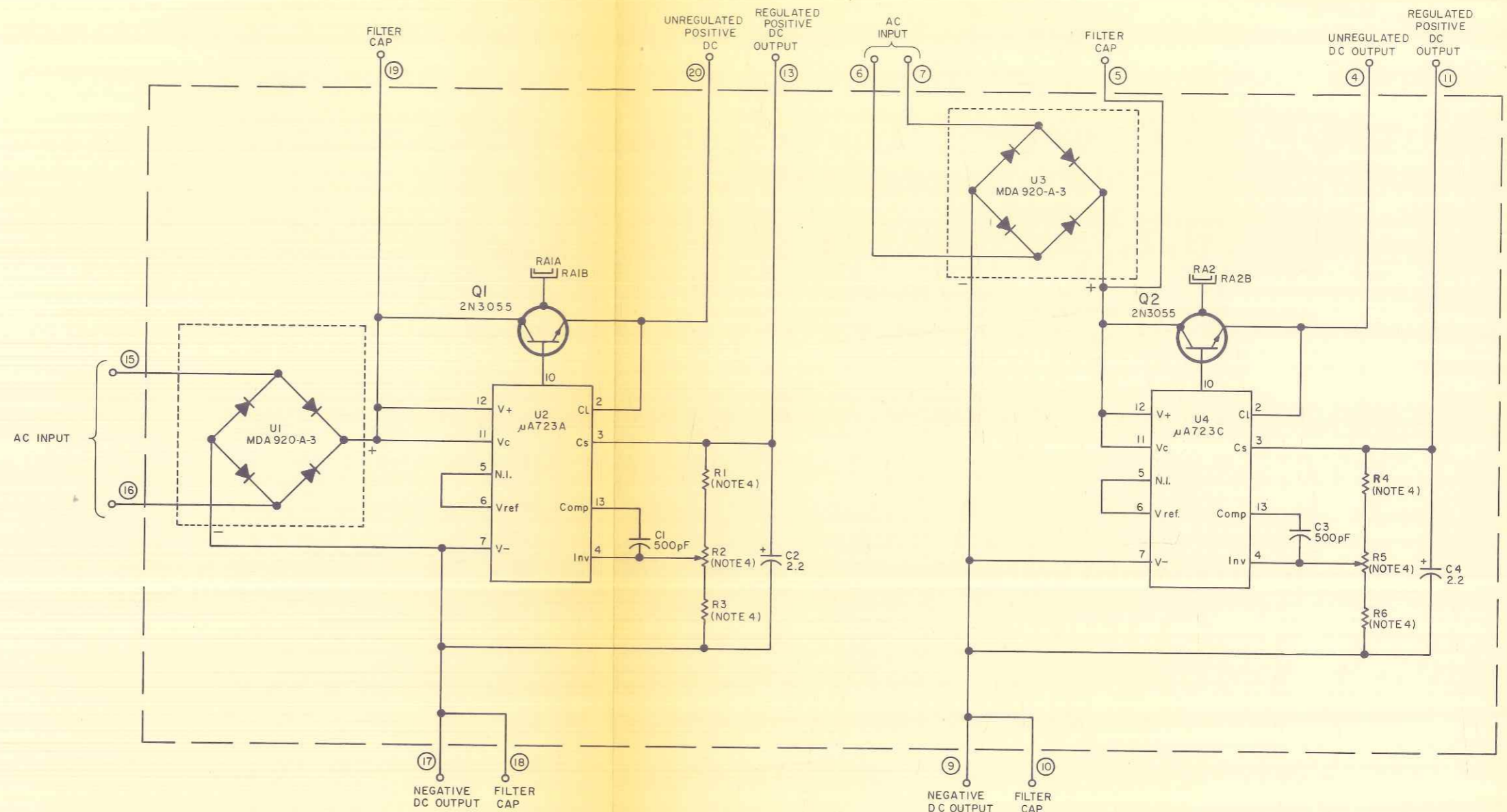


NOTES:

1. UNLESS OTHERWISE SPECIFIED.
  - a) RESISTANCE IS MEASURED IN OHMS  $\pm$  5% 1/4 W.
  - b) CAPACITANCE IS MEASURED IN  $\mu$ F.
2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS.
3. FOR LEAD ARRANGMENTS OF U2 SEE DETAIL A.



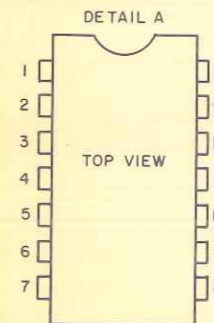
Type 76213 AFC/+150V Power Supply (A1), Schematic Diagram



- NOTES:
1. UNLESS OTHERWISE SPECIFIED:
    - a) RESISTANCE IS MEASURED IN OHMS  $\pm 5\%$ , 1/4W
    - b) CAPACITANCE IS MEASURED IN  $\mu F$
  2. ENCIRCLED NUMBERS ARE PIN MODULE NUMBERS
  3. FOR LEAD ARRANGEMENT OF U2 & U4, SEE DETAIL "A"
  4. THE DIFFERENCE BETWEEN TYPES IS SHOWN IN TABULATION BLOCK
  5. TYPE 76210-3 USED ON G472C00000-1 RECEIVER.

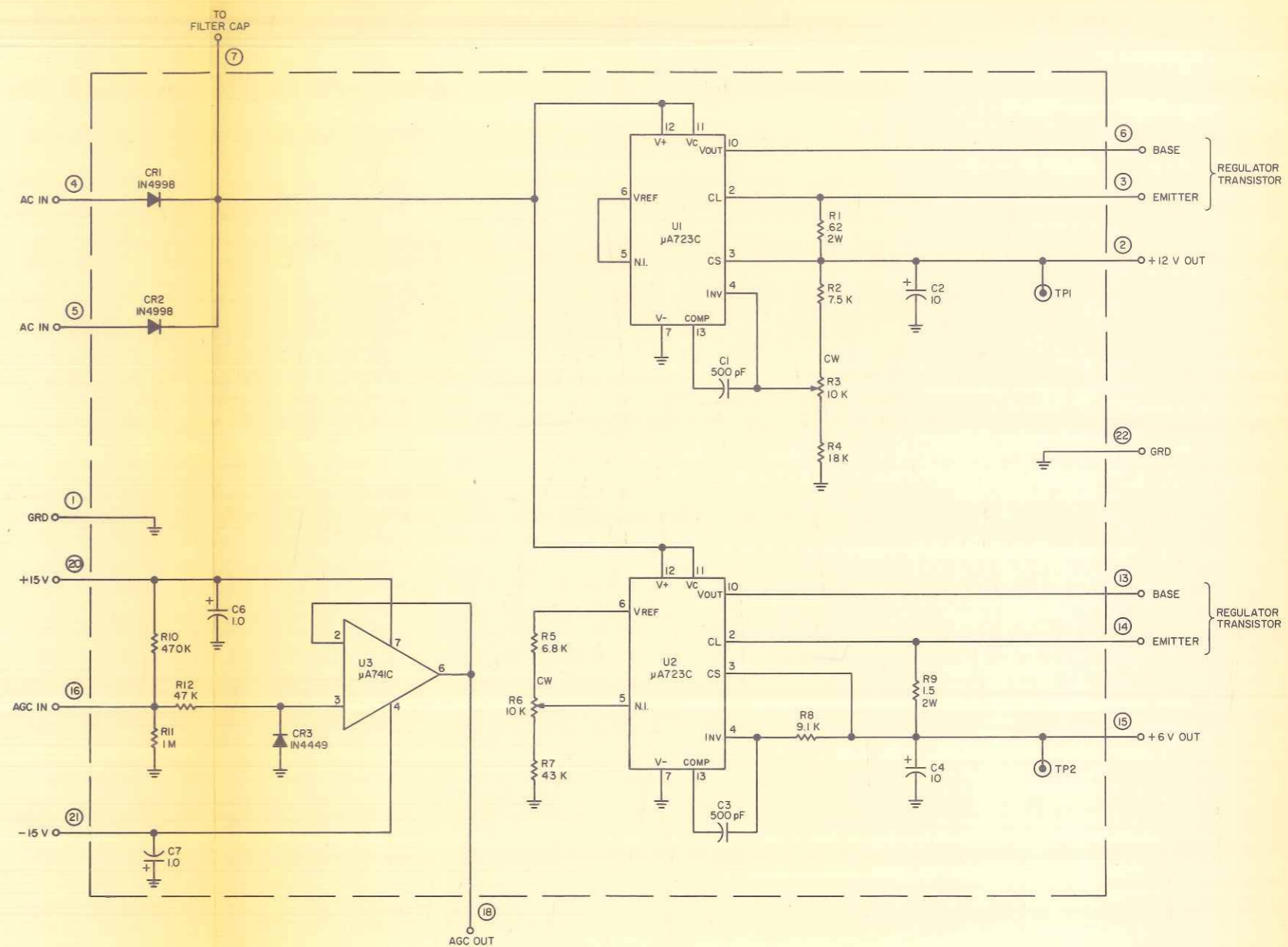
TYPE	VOLTAGE OUT	R1	R2	R3	R4	R5	R6
76210-1	$\pm 15-18$	3.3K	1K	2.7K	3.3K	1K	2.7K
76210-2	$\pm 15 \& 24$	5.1K	1K	2K	3.3K	1K	2.7K
76210-3	$\pm 15-18$	3.3K	1K	2.7K	3.3K	1K	2.7K
76210-4	$\pm$						
76210-5	$\pm$						

(NOTE 5)

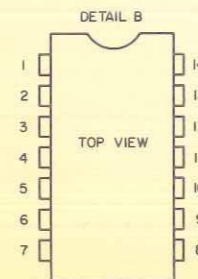
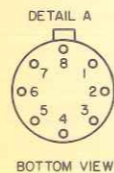


Type 76210-1  $\pm 15V$  Power Supply (A2), Schematic Diagram



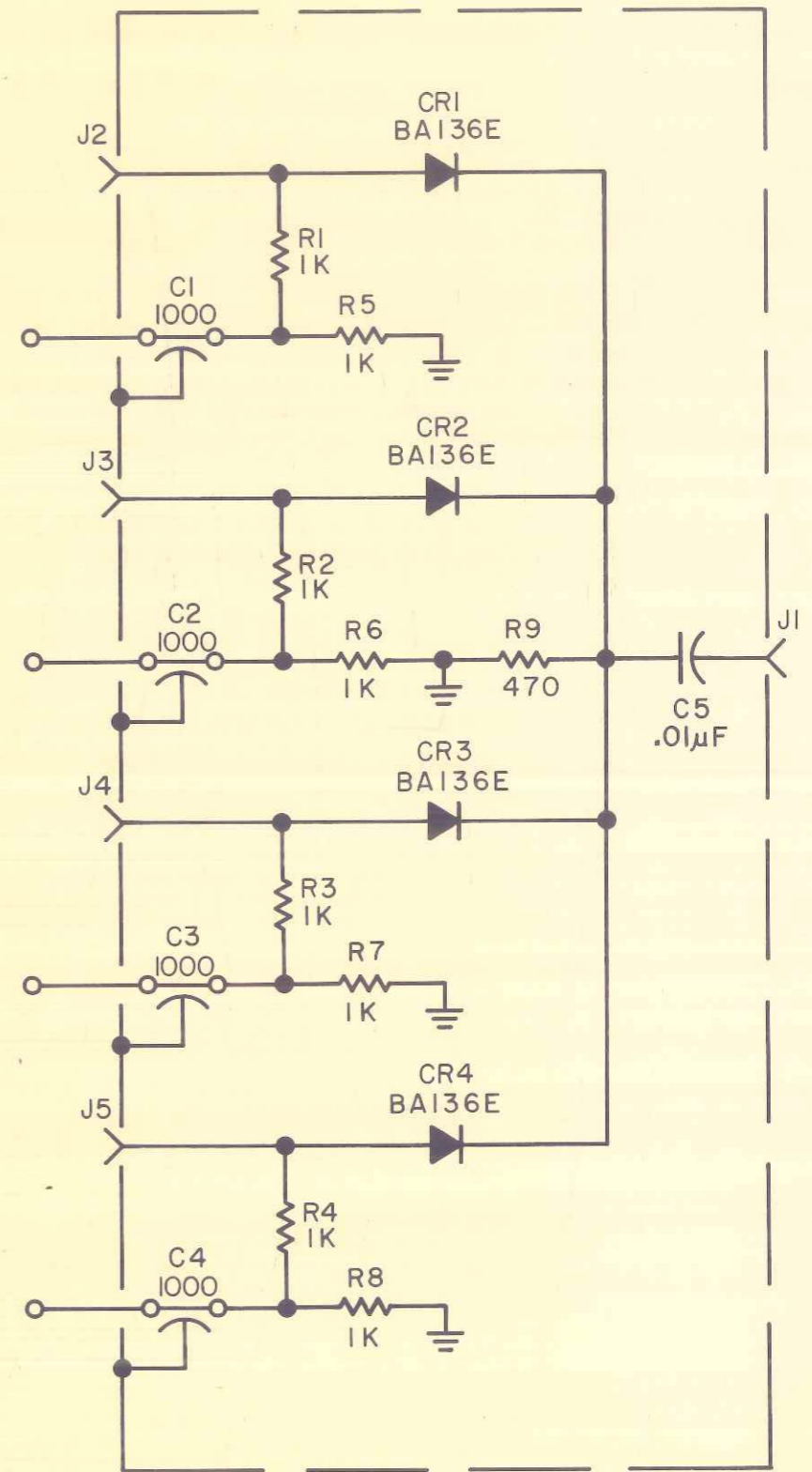


- NOTES:
- UNLESS OTHERWISE SPECIFIED:
    - RESISTANCE IS IN OHMS,  $\pm 5\%$ , 1/4 W.
    - CAPACITANCE IS IN  $\mu\text{F}$ .
  - ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS.
  - CW ON R3 & R6 INDICATES CLOCKWISE ROTATION OF ACTUATOR.
  - FOR PIN ARRANGEMENT OF U1 SEE DETAIL A.
  - FOR PIN ARRANGEMENT OF U2 & U3 SEE DETAIL B.



Type 76214 +6V and +12V Power Supply /AGC Amplifier (A3), Schematic Diagram





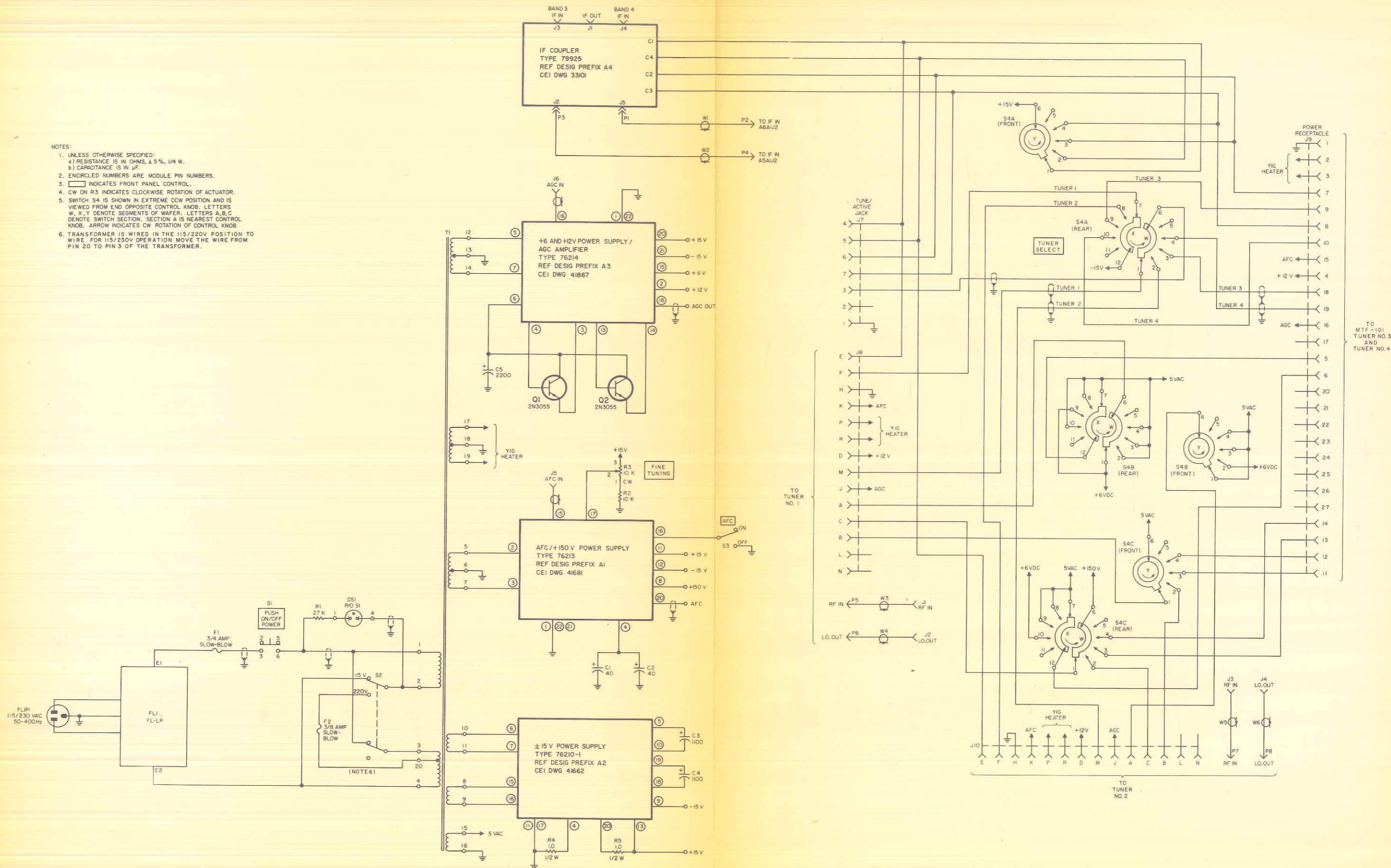
NOTES:

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

Type 79925 IF Coupler (A4),  
Schematic Diagram

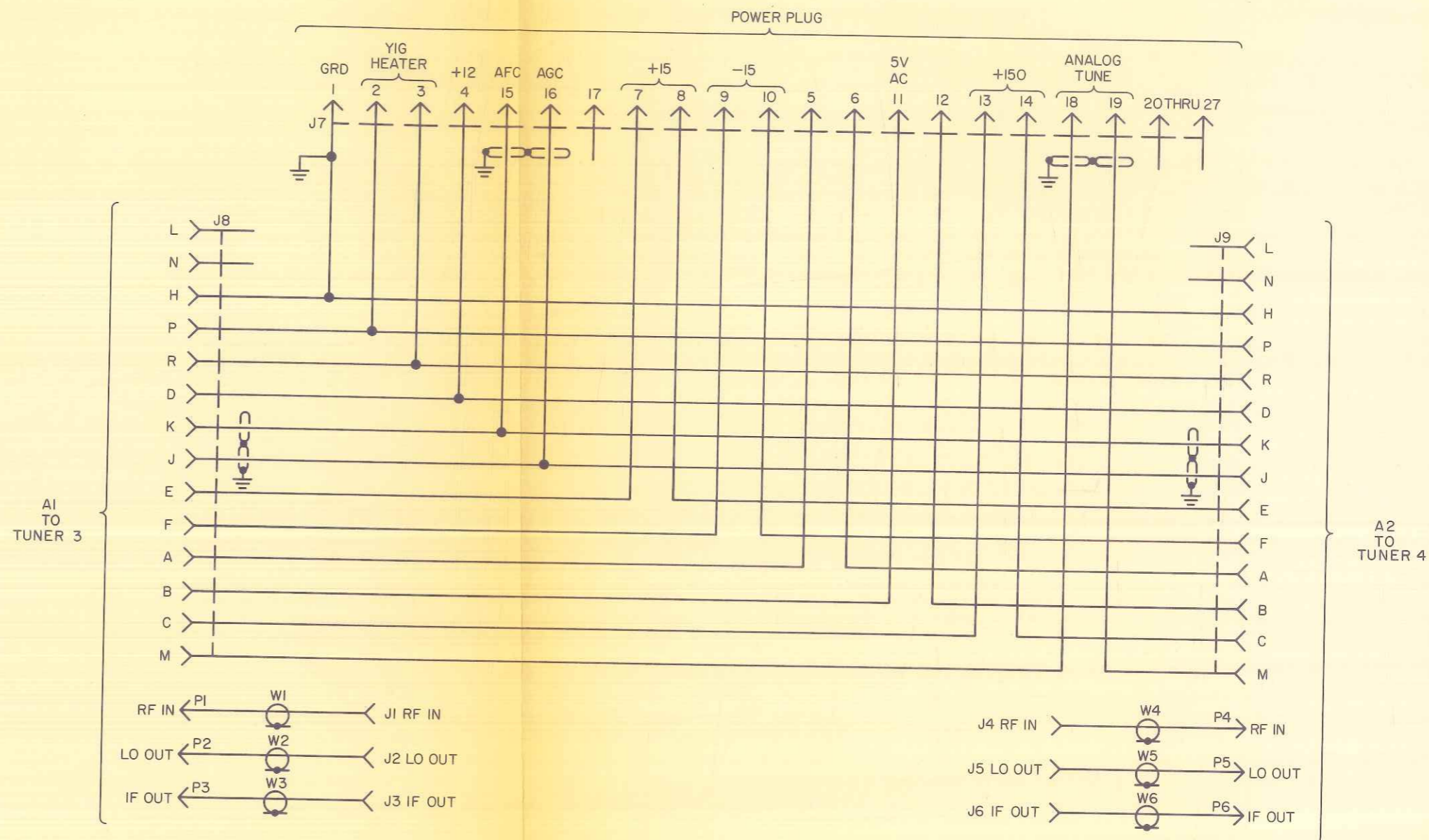
NOTES:

1. UNLESS OTHERWISE SPECIFIED:  
 a) RESISTANCE IS IN OHMS,  $\pm 5\%$ ,  $1/4$  W.  
 b) CAPACITANCE IS IN  $\mu$ F.
2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS.
3.   INDICATES FRONT PANEL CONTROL.
4. CW ON R3 INDICATES CLOCKWISE ROTATION OF ACTUATOR.
5. SWITCH S4 IS SHOWN IN EXTREME CCW POSITION AND IS VIEWED FROM END OPPOSITE CONTROL KNOB. LETTERS W, X, Y DENOTE SEGMENTS OF WAFER. LETTERS A, B, C DENOTE SWITCH SECTION. SECTION A IS NEAREST CONTROL KNOB. ARROW INDICATES CW ROTATION OF CONTROL KNOB.
6. TRANSFORMER IS WIRED IN THE 115/220V POSITION TO WIRE FOR 115/230V OPERATION MOVE THE WIRE FROM PIN 20 TO PIN 3 OF THE TRANSFORMER.



Type MTF-100 Microwave Tuning Frame, Main Chassis Schematic Diagram





Type MTF-101 Microwave Tuning Frame,  
Main Chassis Schematic Diagram





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