INSTRUCTION MANUAL
FOR
TYPE DMS-105A
TUNABLE DEMODULATOR

WATKINS—JOHNSON COMPANY
700 Quince Orchard Road
Gaithersburg, Maryland 20878

C/200/10/20/72/DCM
Revised 12/22/75/HWO
WJ/125/8/2/76
WJ/200/12/1/77

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.

ADDENDA

DMS-105A

The following changes should be incorporated into the Instruction Manual for the DMS-105A.

1. Table 1-1; Type DMS-105A Specifications

   A. Change "Size" from: 18 inches deep to 19.5 inches deep.

   B. Change "Weight" from: 31.0 lbs. to: 30.0 lbs.

2. Section II - Circuit Description

   A. Paragraph 2.2.1; Page 2-1

      1. Change the following sentence from: "------ A19 is applied to input attenuator A21" to: "------ A19 is applied to input attenuator A20".

   B. Paragraph 2.3.14.2; Page 2-7

      1. Change the following sentence from: "The high-band local oscillator is functionally identical to the low-band oscillator described above". to: "The low-band oscillator is functionally identical to the high-band oscillator described above."

   C. Paragraph 2.3.17; Page 2-8

      1. Change the following sentence from: "The board consists of a high performance monolithic operational amplifier U1, with integrated circuitry converting it to an inverting amplifier." to: "The board consists of a high performance monolithic operational amplifier U1, used as an inverting amplifier."

3. Section III - Installation and Operation

   A. Paragraph 3.1; Page 3-1

      1. Change the following sentence from: "It requires 5.25 inches of vertical space and extends 17.5 inches into the rack." to: "It requires 5.25 inches of vertical space and extends 19.5 inches into the rack."

   B. Figure 3-1; Critical Dimensions; Page 3-3

      1. Change the vertical dimension on the side view from: 17.5 to: 19.5.

4. Section IV - Maintenance

A. Paragraph 4.5.3; Power Supplies; Page 4-6

1. In step (5), change reference designation from: A14R7 to: A15R7.

B. Figure 4-4; Test Setup, Mixer Alignment; Page 4-8

1. Change the 2 MHz output frequency of the HP-606B Signal Generator to 1 MHz.

C. Paragraph 4.5.8; AM/MCW Demodulator; Page 4-9

1. In step (1) change the following sentence from: "------ in Figure 4-5 except connect the oscilloscope vertical input to the DMS-105A AM output jack J6". to: "------ in Figure 4-5 except connect the marker adder input to the DMS-105A AM output jack J6".

D. Paragraph 4.5.10; Overall Gain and AGC; Page 4-10, 4-11

1. Change step (2) i to: (2) f.
2. Change step (2) f to: (2) g.
3. Change step (2) g to: (2) h.
4. Change step (2) h to: (2) i.
5. Figure 4-7; Test Setup; Overall Gain and AGC Alignment; Page 4-11

   a. Change the following at DMS-105A Block

      1. (J1) to (J4).
      2. XA11 pin 8 to J6.

6. In step (6) change the following sentance from: (Note: If any IF bandwidth has less than -22 dBm IF output, adjust all other bandwidths to this particular lower output level.) to: (Note: Because of gain variations in field-effect transistors the -22 dBm level may not be obtained with some bandwidths. If this occurs with any IF bandwidth, adjust all other bandwidths to this lower level.)
7. Add the following note to step (7). (Note: If this level cannot be obtained, adjustment of IF boards A3, A4 and A5 should be checked to assure proper output levels.)
8. Change the following steps as indicated below.

   a. Change step (9) to: (10).
   b. Change step (10) to: (11).
   c. Change step (11) to: (13).

d. Change step (12) to: (14).

e. Change step (13) to: (15).

f. Change step (14) to: (16).

g. Change step (15) to: (17).

h. Change step (16) to: (18).

9. Add new step (9) as follows: Tune the Main Tuning to 494.0 kHz

10. Change step (10) from: Adjust A6R20 for -30 dBm IF output level." to: Adjust A6R20 for -30 dBm (7 mV rms) IF output level.

11. Add new step (12) as follows: Tune the Main Tuning to 504.0 kHz.

12. Change step (13) from: Adjust A6R4 for -30 dBm IF output level to: Adjust A6R4 for -30 dBm (7 mV rms) IF output level.

13. In step (15) change from: "------ 2.2 V dc to: "------ 2.4 V dc".

14. In step (17), change from: "------ 1.9 V dc to: "------ 2.0 V dc".

E. Paragraph 4.5.11; CW/SSB/FSK Demodulator; Page 4-12

1. Change the following sentence, in step (9) from: "------ 6 and 10 kHz, with an output level greater than 20 dB." to: "------ 6 and 10 kHz, with an output level greater than 2.0 volts peak-to-peak."

F. Paragraph 4.5.12; IF Translator; Page 4-13

1. Change step (6) to step (7).

2. Change step (8) from: Select the 100 kHz and record the output level. to: Select the 15 kHz Translator Output. Note the output level output on the oscilloscope. (Note: Step (8) was deleted and step (7) became step (8).)

3. Add new step (6) as follows: Select the 100 kHz Translator Output. Note the output level observed on the oscilloscope.

4. Table 4-3; Typical Transistor Element and Module Receptacle Pin Voltages; Page 4-13 and 4-14.

a. Change all 3N140 type transistors to 3N187.

b. At A9Q3 change the Gate 1 voltage from 0.0 to -1.40, and Gate 2 voltage from: ------ to: 1.62.

5. Section V - Replacement Parts List

   A. Paragraph 5.4.13; Type 79527-1 FM Demodulator (A12)

      1. Change the quantity of R6 from: 2 to: 1. (Page 5-44)

      2. Change R18* from: Same as R6 to: Resistor, Fixed, Composition: 3.3 MΩ, 5%, 1/4W; Qty. 1; Part Number RCR07G335JS; Mfr. Code: 81349; Recm. Vendor 01121. (Page 5-44)

   B. Paragraph 5.4.18; Type 79977 HF Counter Assembly (A17)

      1. Add P2 as follows: Connector, Plug; Qty. 2; Part Number 60598-5; Mfr. Code: 00779. (Page 5-53)

      2. Add P3 as follows: Same as P2. (Page 5-53)

   C. Paragraph 5.4.19.1.1; Part 15188 Local Oscillator (A18A1A1)

      1. Change C9 from: Capacitor, Ceramic, Tubular: 47 pF, 5%, 500 V; Qty. 2; Part Number 308-000C0G0-470J; Mfr. Code: 72982 to: Capacitor, Ceramic, Disc: 47 pF, 5%, 50 V (N450); Qty. 1; Part Number IT47AJ; Mfr. Code: 93958. (Page 5-67)

      2. Change C20 from: 33 pF, 5%, 500 V; Part Number 308-000C0G0-330J to: 33 pF, 5%, 500 V (N330); Part Number 301-000S2H0-330J. (Page 5-67)

      3. Change C21 from: Same as C9 (47 pF; Part Number 308-000C0G0-470J) to: Capacitor, Ceramic, Disc: 56 pF, 5%, 50 V (N330); Qty. 1; Part Number IS56AJ; Mfr. Code: 93958. (Page 5-67)

      4. Change CR2, CR3, CR5, and CR6 from: V27E; Mfr. Code: 01281 to: BB109-Yellow; Mfr. Code: 25088. (Page 5-67)

   D. Change all 3N140 transistors to: 3N187.

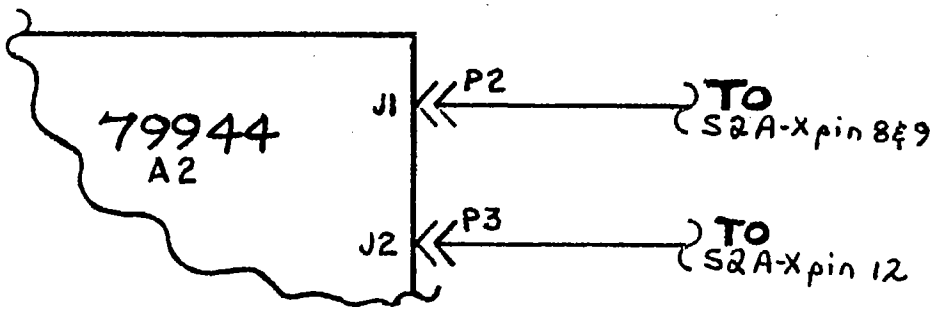
   E. Change all 2N3933 transistors to: 2N3478.

   F. Change all 2N4074 transistors to: 2N2222A.

6. Section VI - Schematic Diagrams

   A. Figure 6-14; Type 79977 HF Counter Assembly (A17) Page 6-29

      1. Add P2 and P3 as shown on the next page.



B. Figure 6-15; Type 79893 Gate Generator (A17A1) Page 6-31

1. Change R14 from: 2.4 MΩ to: 5.1 MΩ.

C. Figure 6-17; Type 71233 LO Tuning Assembly (A18) Page 6-35

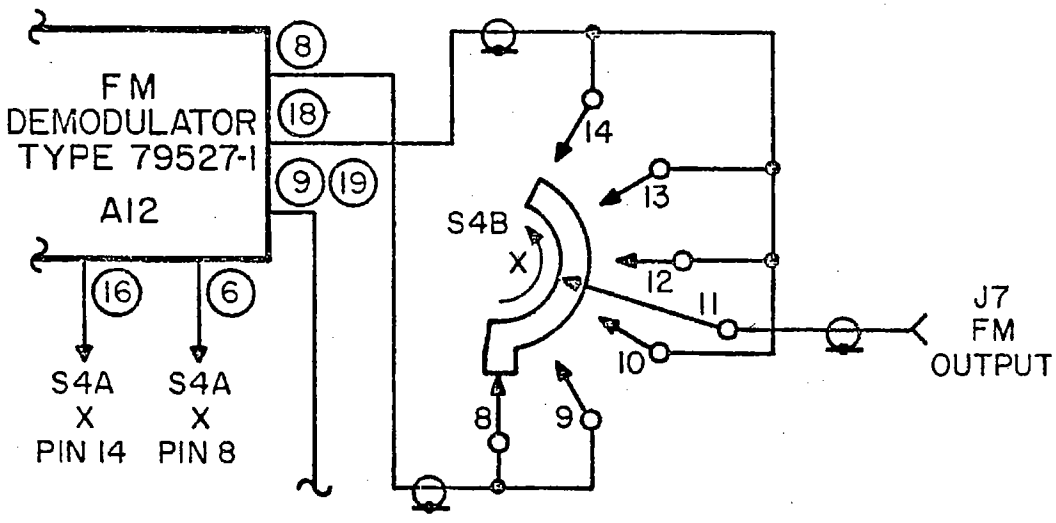
1. Add (L. B.) to C7.
2. Add (H. B.) to C6.

D. Figure 6-18; Part 15188 Local Oscillator (A18A1A1) Page 6-37

1. Change C21 from: 47 pF to: 56 pF.
2. Change CR2, CR3, CR5 and CR6 from: V27E to: BB109.

E. Figure 6-22, DMS-105A Tunable Demodulator, Page 6-45

1. At A12, Type 79527-1, add S4B-X as shown below and change the lettering at pins 6 and 16.



2. Change C3 from: 250 μF to: 200 μF.

F. Change all 3N140 Transistors to: 3N187.

G. Change all 2N3933 Transistors to: 2N3478.

H. Change all 2N4074 Transistors to: 2N2222A.

April 16, 1982
ADDENDUM

The following changes should be incorporated into the DMS-105A Tunable Demodulator Instruction Manual:

1.0 SECTION V, REPLACEMENT PARTS LIST

1.1 Paragraph 5.4.18, page 5-53, Type 79977 HF Counter Assembly

		REF. DESIG.	DESCRIPTION	QTY.	MFR. PART NO.	MFR. CODE	RECM. VENDOR
1.1.1	From:	J1	Connector, Receptacle	2	46625	74868	
	To:	J1	Connector, Receptacle	2	46025	74868	

1.2 Paragraph 5.4.18.1, page 5-55, Type 79893 Gate Generator

		REF. DESIG.	DESCRIPTION	QTY.	MFR. PART NO.	MFR. CODE	RECM. VENDOR
1.2.1	From:	U1	Integrated Circuit	6	868292	14632	
	To:	U1	Integrated Circuit	6	SN74196N	01295	

1.3 Paragraph 5.4.18.2, page 5-58, Type 79944 Count, Decode, and Display

		REF. DESIG.	DESCRIPTION	QTY.	MFR. PART NO.	MFR. CODE	RECM. VENDOR
1.3.1	From:	U3	Integrated Circuit	1	868290	14632	
	To:	U3	Integrated Circuit	2	SN74LS196N	01295	
1.3.2	From:	U7	Integrated Circuit	1	868280	14632	
	To:	U7	Same as U3				
1.3.3	From:	U4	Integrated Circuit	8	868292	14632	
	To:	U4	Integrated Circuit	8	SN74196N	01295	

1.4 Paragraph 5.4.19.1, page 5-65, Type 7749 Local Oscillator Tuning Assembly

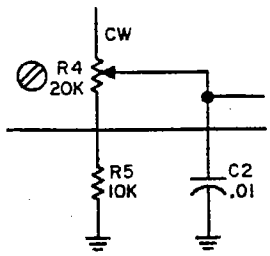
		REF. DESIG.	DESCRIPTION	QTY.	MFR. PART NO.	MFR. CODE	RECM. VENDOR
1.4.1	From:	C6	Capacitor, Variable Air: 6.5-62.36 pF, 500 V	2	C28-341-20/.012	23783	

		REF. DESIG.	DESCRIPTION	QTY.	MFR. PART NO.	MFR. CODE	RECM. VENDOR
1.4.1	To:	C6	Capacitor, Variable Air: 5.75-6.3 pF, 500 V	2	C28-241-16/.012	23783	

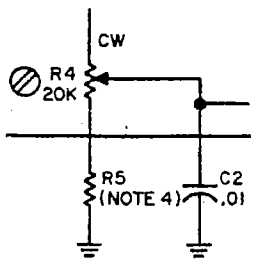
2.0 SECTION VI, SCHEMATIC DIAGRAMS

2.1 Figure 6-3, page 6-7, Types 72255, 72256, 72257 and 72258 IF Amplifier (A3 thru A6), Schematic Diagrams

2.1.1 Change schematic diagram from:



To:



2.1.2 Change note 4 from:

4. For FL1, FL2, R3, R19, and R12 Values, see chart below.

TYPE NO.	FL1	FL2	R3	R19	R12
72255	8kHz PART NO. 8197922	16kHz PART NO. 8197923	68K	68K	470
72256	5kHz PART NO. 8197920	7kHz PART NO. 8197921	68K	68K	470
72257	150Hz PART NO. 6093695	1kHz PART NO. 6093694	68K	68K	470
72258	LOWER S.B PART NO. 8197933	UPPER S.B. PART NO. 8197932	68K	150K	330
72325	150Hz PART NO. 6093695	500Hz PART NO. 6093715	68K	68K	470
72326	1kHz PART NO. 6093694	3kHz PART NO. 6093693	68K	68K	470
72401	1 kHz PART NO. 6093694	5kHz PART NO. 8197920	68K	68K	470

To: For FL1, FL2, R3, R5, R19 and R12 values, see Chart below.

TYPE NO.	FL1	FL2	R3	R19	R12	R5
72255	8kHz PART NO. 8197922	16kHz PART NO. 8197923	68K	68K	470	10K
72256	5kHz PART NO. 8197920	7kHz PART NO. 8197921	68K	68K	470	10K
72257	150Hz PART NO. 6093695	1kHz PART NO. 6093694	68K	68K	470	10K
72258	LOWER S.B. PART NO. 8197933	UPPER S.B. PART NO. 8197932	68K	150K	330	—
72325	150Hz PART NO. 6093695	500Hz PART NO. 6093715	68K	68K	470	10K
72326	1kHz PART NO. 6093694	3kHz PART NO. 6093693	68K	68K	470	10K
72401	1 kHz PART NO. 6093694	5kHz PART NO. 8197920	68K	68K	470	10K

2.2 Figure 6-15, page 6-31, Type 79893 Gate Generator (A17A1), Schematic Diagram

2.2.1 Change schematic diagram part numbers of U1, U2, U3, U4, U5, and U10

From: 868292
To: SN74196N

2.3 Figure 6-16, page 6-33, Type 79944 Count, Decode, and Display (A17A2) Schematic Diagram

April 16, 1982
ADDENDUM

2.3.1 Change schematic diagram part numbers of U3 and U7

From: 868290
To: SN74LS196N

2.3.2 Change schematic diagram part numbers of U4, U8, U11, U15, U16, U19 and U20

From: 868292
To: SN74196N

2.4 Figure 6-17, page 6-35, Type 71233 LO Tuning Assembly (A18), Schematic Diagram

2.4.1 Change schematic diagram value of capacitor C6

From: 6-62
To: 5.75-63

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LIST OF ILLUSTRATIONS

Table 1-1. Type DMS-105A Tunable Demodulator, Specifications

Frequency Range	1 kHz to 1600 kHz in two bands: Band 1: 1 kHz to 600 kHz Band 2: 540 kHz to 1600 kHz
Types of Reception	AM, FM, SSB, CW, MCW, and FSK
Input Impedance	50 ohms or 1000 ohms, selectable by front-panel switch
Sensitivity (at 50-ohm input impedance and 1 kHz IF bandwidth)	30 μV, minimum, for 20 dB (s plus n)/n, all modes
Input Attenuator	0 dB to 50 dB; 10 dB/step
IF Center Frequency	2.0 MHz
IF Bandwidths for FM, AM, CW, MCW, or FSK	150 Hz, 1, 5, 7, 8, and 16 kHz
IF Bandwidths for SSB	2.5, 3.5, 4, and 8 kHz upper or lower sideband
BFO	Disabled in FM and AM. Fixed at center of IF in upper and lower sideband. Controllable in BFO position as follows: 1. Zero beat (crystal-controlled) 2. 1-kHz offset (crystal-controlled) 3. Variable ±8 kHz
Image Rejection	70 dB, minimum
IF Rejection	60 dB, minimum
Digital AFC	Holds demodulator tuning within ±100 Hz of the indicated frequency in the normal AFC mode, and within ±10 Hz in the decimal shift AFC mode.
Input Monitor Switch	In the normal mode the unit functions as a normal demodulator; in the bypass mode the input is connected directly to the audio amplifier through the audio gain control.
Outputs	Nine: Front-panel phone jack (2000 ohms nominal), Rear-apron Audio (600-ohms ungrounded), 2-MHz IF Output, SM Output, Video Output, FM Detector Output, AM Detector Output, Local Oscillator Output, Translated IF Output (2V p-p into 50-ohm load; 100, 50, or 15 kHz output front-panel selected).
Audio Amplifier Bandwidth	50 Hz to 16 kHz, minimum
Audio Output Level	100 mW, 600Ω
Video Output Level	2 volts peak-to-peak into 50-ohm load
External LO Input	0 dBm, minimum
Size	5.25 inches high, 19 inches wide, and 19.5 inches deep, maximum
Power	115/220 Vac, 50-400 Hz, approximately 30 watts
Weight	30.0 lbs., approximately

LIST OF ILLUSTRATIONS (Cont)

LIST OF TABLES

EQUIPMENT MALFUNCTIONS

This unit was thoroughly inspected and factory adjusted for optimum performance prior to shipment. If an apparent malfunction is encountered after installation, verify that the correct input signals are present at the proper connectors. Prior to taking any corrective maintenance action or breaking any seals, contact your Watkins-Johnson representative, or the Watkins-Johnson Company Service Department to prevent the possibility of voiding the terms of the warranty. Contact the Watkins-Johnson Company via mail, telephone, wire, or cable at:

Watkins-Johnson Company
Company Service Department
700 Quince Orchard Road
Gaithersburg, Maryland 20878-1794

Toll Call: (301) 948-7550 Ext. 7201
TELEX: 89-8402
TWX: 710-828-0546
TELEFAX: (301) 921-9479
EASYLINK: 62928185

If reshipment is necessary, follow the instructions in the following paragraph (Preparation for Reshipment or Storage). Do not return the equipment until a Return for Maintenance Authorization (RMA) number has been obtained from the Watkins-Johnson Company's Customer Service Department. See Item 10 in the **General Terms and Conditions of Sale** paper (WJ Form # WJ-151-X) for more information on equipment returns.

PREPARATION FOR RESHIPMENT OR STORAGE

If the unit must be prepared for reshipment, the packaging method should follow the pattern established in the original shipment. Use the best packaging materials available to protect the unit during reshipment or storage. When possible, use the original packing container and cushioning materials. If the original packing materials are not available, use the following procedure:

1. Wrap the unit in sturdy paper or plastic.

2. Place the wrapped unit in a strong shipping container and place a layer of shock-absorbing material (3/4-inch minimum thickness) around all sides of the unit to provide a firm cushion and to prevent movement inside the container.

3. If shipping the unit for service, fill out all information on the 5x6 PRODUCT DISCREPANCY REPORT card (WJ Form # WJC-QA55-0) that was provided with the original shipment. Also ensure that the Return for Maintenance Authorization (RMA) number is recorded on the card. If this card is not available, attach a tag to the unit containing the following information:

   a. Return for Maintenance Authorization (RMA) number.
   b. The Watkins-Johnson Type/Model number of the equipment.
   c. Serial number.
   d. Date received.
   e. Date placed in service.
   f. Date of failure.
   g. Warranty adjustment requested, yes or no.
   h. A brief description of the discrepant conditions.
   i. Customer name and return address.
   j. Original Purchase Order/Contract number.

4. Thoroughly seal the shipping container and mark it **FRAGILE.**

5. Ship to:

   Watkins-Johnson Company
   700 Quince Orchard Road
   Gaithersburg, Maryland 20878-1794
   U.S.A

When storing the equipment for extended periods, follow the above packing instructions to prevent damage to the equipment. The safe limits for storage environment are:

Temperature: -40 to +70°C
Humidity: less than 95%

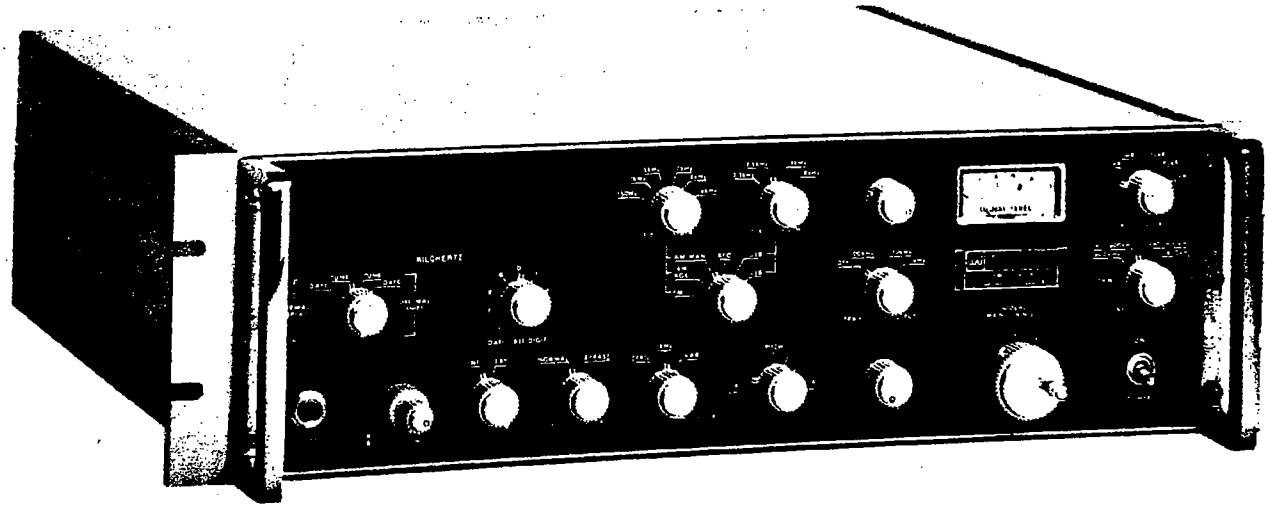


Figure 1-1. Type DMS-105A Demodulator, Front View

SECTION I

GENERAL DESCRIPTION

1.1 ELECTRICAL CHARACTERISTICS

1.1.1 The Type DMS-105A Demodulator is designed to receive, translate, and demodulate AM, FM, SSB, CW, and FSK signals in the 1-kHz to 1600-kHz frequency range. The unit tunes this range in two bands: 1 kHz to 600 kHz and 540 kHz to 1600 kHz. A single RF tuner is used to cover this range. Band Selection is by means of a front-panel switch which activates the desired local oscillator in the tuner and selects either 50 or 1000 ohms input impedance. The translated IF signal is front-panel selectable for 100, 50, or 15 kHz predetection output. The tuner frequency of the DMS-105A is displayed by a five digit LED readout located on the front panel. Readout resolution is plus or minus 100 Hz in the NORMAL DISPLAY mode, and plus or minus 10 Hz in the DECIMAL SHIFT mode. The dynamic range of the DMS-105A is expanded by means of a six-position, front-panel-controlled attenuator which provides up to 50 dB of attenuation in 10-dB steps.

1.1.2 Four IF bandwidths are available for use during the reception of upper or lower sideband signals: 2.5, 3.5, 4, and 8 kHz. Five additional bandwidths are provided for use when the remaining operating modes are selected: 150 Hz, 1, 5, 7, 8, and 16 kHz.

1.1.3 Provisions are made to select either the internal local oscillator, or an external oscillator by means of a front-panel switch. A digital automatic frequency control (DAFC) circuit in the DMS-105A permits locking the internal local oscillator to the electronic counter circuits for the frequency display with an accuracy approaching that of the counter's 1-MHz reference oscillator. A beat frequency oscillator is provided for use during the reception of CW, FSK, and SSB signals. The BFO has three operating modes: zero, 1 kHz offset, and variable plus or minus 8 kHz.

1.2 MECHANICAL CHARACTERISTICS

1.2.1 The DMS-105A front-panel, main chassis, and top and bottom dust covers are constructed of aluminum. The front panel is overlaid with a black-anodized bezel etched for control markings. The demodulator contains twenty-one subassemblies. Four of these, the input filter, input attenuator, LO tuning assembly, and counter assembly are constructed on a brass chassis. These subassemblies have been coated with precious metals to prevent tarnishing. The remaining subassemblies are constructed on etched circuit cards that plug into receptacles on the main chassis. The counter assembly contains two additional plug-in etched circuit boards. Figure 1-1 shows front-panel controls and Figure 5-2 illustrates the rear-panel connectors and controls.

1.3 EQUIPMENT SUPPLIED

This equipment consists of the Type DMS-105A Tunable Demodulator and various tuning and adjustment tools, only. The dimensions and weight of the unit are given in Table 1-1.

1.4 EQUIPMENT REQUIRED BUT NOT SUPPLIED

The DMS-105A requires only an input signal of the proper level and within its frequency range for normal operation. For monitoring the audio output, headphones such as the Telex HM-50 are required, or any 600 Ω device which contains a loudspeaker and can be connected to the rear-apron terminal strip.

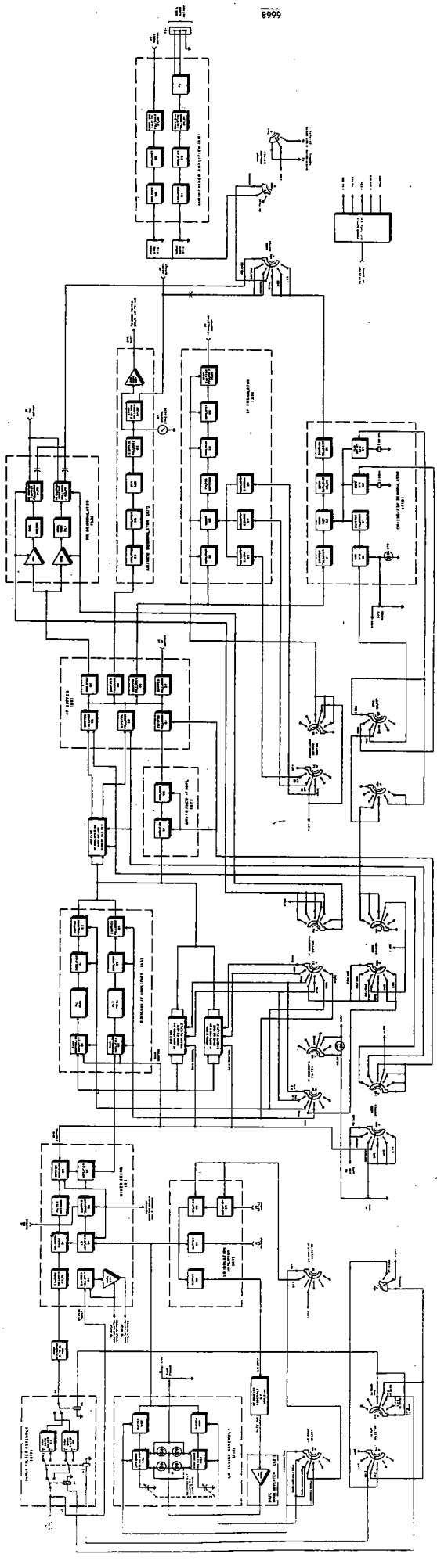


Figure 2-1. Type DMS-105A Demodulator, Functional Block Diagram

Figure 2-1

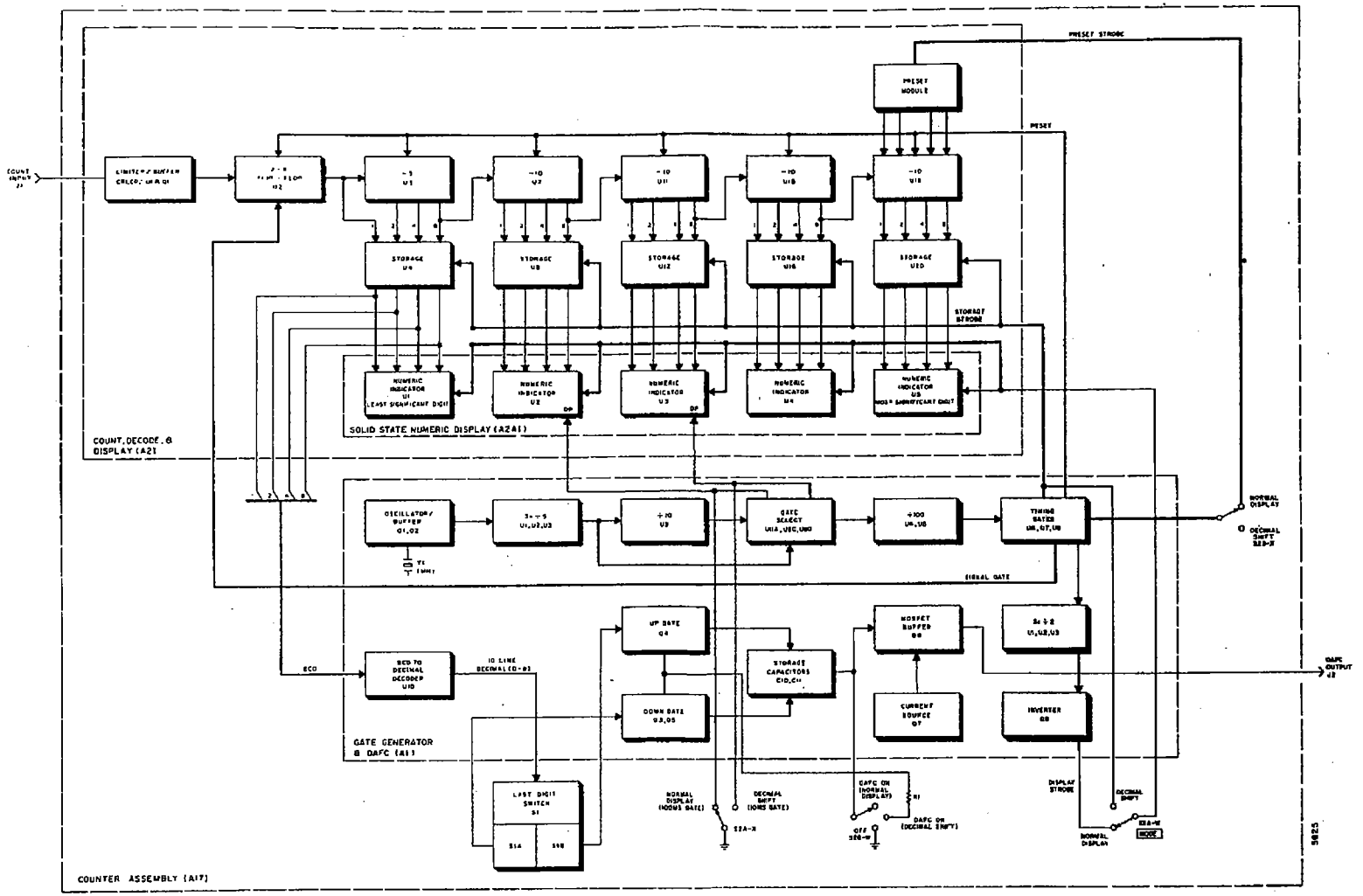


Figure 2-2. Type 79977 HF Counter, Functional Block Diagram

SECTION II
CIRCUIT DESCRIPTION

2.1 GENERAL

Operation of the various circuits in the DMS-105A Demodulator is described in the following paragraphs using the functional block diagram, Figure 2-1, and the schematic diagrams in Section VI of this manual. In addition, a functional block diagram for counter assembly A17 is provided in Figure 2-2. The unit numbering method is used for electrical components. This means that parts on subassemblies carry a prefix before the class letter and number of the item (such as A1Q1 and A6R1). These subassembly prefixes are omitted on illustrations and in the text, except in those cases where confusion might result from their omission.

2.2 FUNCTIONAL DESCRIPTION

2.2.1 The Type DMS-105A Demodulator tunes from 1 kHz to 1600 kHz in two bands: 1-600 kHz and 540-1600 kHz. Front-panel INPUT SELECTOR switch selects the desired band with either 50 or 1000 ohms input impedance. Input signals to the DMS-105A are applied to jack J1 of input filter assembly A19 which contains low band filter A19A1 and high band filter A19A2. Relay A19K1 routes the input signal to either the low band or high band filter through relay A19K2 which selects the desired input impedance. Output signals appearing at jack A19J2 are selected from the appropriate filter by A19K3. The filtered output signal from A19 is applied to input attenuator A20. The attenuator allows the operator to extend the dynamic range of the DMS-105A by an additional 50 dB. A range of 0 to 50 dB is provided in 10 dB steps. Signals from A20 are applied to mixer board A2 where they are converted to a 2-MHz IF.

2.2.2 Emitter followers A2Q3/Q4 connected in a complementary symmetry configuration drive double balanced mixer A2Z1. Local oscillator signals from LO tuning assembly A18, or an external LO, are applied to LO amplifier A2Q1 on the mixer board. After amplification by A2Q1 the signal is applied to the mixer. Sum and difference frequencies from the mixer are applied to a low-pass filter which performs an impedance step-up into FET amplifier A2Q5 and to rear panel signal monitor output jack J3. The filtered mixer output is applied to gain-controlled amplifier A2Q5 and then to output amplifier A2Q7. Both of these stages are tuned to the 2-MHz IF. Some of the LO signal from A2Q1 is also applied to A2Q2. The output from A2Q2 is applied to the output of balanced mixer A2Z1. This signal is 180° out of phase with the mixer LO feedthrough signal and cancels it from the mixer output. Emitter follower A2Q6 and integrated circuit linear amplifier A2AR1 are used to amplify signals which are applied to the DMS-105A signal input jack J1 when the demodulator is used in the BYPASS mode.

2.2.3 Local oscillator signals from LO tuning assembly A18, or an external oscillator can be selected for use with the DMS-105A by means of front-panel LO SELECTOR switch, S2. Transistor A18A1Q1 functions as the internal low band oscillator and A18A1Q3 is the high band oscillator. Both oscillators have varactor diodes in their frequency determining tank circuits for fine tuning and DAFC control of their frequency of oscillation. Transistors A18A1Q2 and A18A1Q4 are buffers to isolate the local oscillator in use from changing load conditions. Additional buffer stages in LO isolation amplifier A1 provide the LO signal to operate HF counter assembly A17 and DAFC mode inverter A21 and also provides an LO output at rear-panel jack, J1. When the DMS-105A is used with an external LO, transistors A1Q3 and A1Q4 drive A1Q1, A1Q2, and mixer board A2.

2.2.4 The 2 MHz center frequency IF signal from mixer board A2 is applied simultaneously to the input of IF amplifiers A3, A4, and A5. Each amplifier contains two identical channels except for the crystal bandpass filter. Only the selected IF channel will be energized depending upon the position of IF BANDWIDTH switches S3, S4, and MODE switch S5. When the MODE switch is in the LSB or USB position, four IF bandwidths are available: 2.5, 3.5, 4.0, and 8.0 kHz. In any of the remaining operating modes, 16 kHz, 8 kHz, 7 kHz, 5 kHz, 1 kHz, or 150 Hz bandwidth can be selected by IF BANDWIDTH switch S4.

2.2.5 The output from the selected bandwidth channel in IF amplifiers A3 through A5 is applied to the inputs of USB/LSB amplifier A6 and AM/FM/MCW IF amplifier A7. Intermediate frequency amplifier A6 is functionally identical to A3, A4, and A5 except that its crystal bandpass filters pass only the LSB or USB signal as selected by MODE switch S5. When the FM, AM, or BFO mode is selected, IF amplifier A7 is used.

2.2.6 Module A8 is an IF buffer used to drive IF OUTPUT jack J4, IF translator A9, and the appropriate demodulator. Emitter followers A8Q1 through A8Q3 are switched on depending upon the receiving mode selected. These transistors drive amplifiers A8Q4 through A8Q7 which in turn supply drive for modules A9 through A12.

2.2.7 Module A9 translates the 2-MHz center frequency IF signal to either 15 kHz, 50 kHz, or 100 kHz as selected by TRANSLATOR OUTPUT switch S6. The 2-MHz IF signal is amplified by A9Q1 and applied to mixer A9Q3. The appropriate oscillator to produce the desired output frequency is enabled by switch S6 and its signal is applied to A9Q3. The difference frequency from the mixer is applied to amplifier stages A9Q5, A9Q6, and A9Q8-Q9, and is available at rear panel jack J5 as the translated IF output. A low-pass filter following mixer A9Q3 eliminates the sum frequency signal resulting from the mixing action, as well as the local oscillator signal which feeds through the mixer.

2.2.8 A product detector is used to demodulate CW, SSB, and FSK signals in module A10. Signals from IF buffer A8 are buffered by emitter follower A10Q1 and applied to product detector A10Q2. The appropriate BFO signal is supplied by A10Q6, A10Q8, or A10Q9 depending upon the position of BFO SELECT switch S7 and/or BFO PITCH control R3. Either variable frequency, zero, or 1 kHz offset BFO can be selected. The difference frequency output from the product detector is amplified by complementary amplifier A10Q3/Q4 and emitter follower A10Q5. This audio signal is applied to MODE switch S5C-W and connected to the audio/video amplifier when either CW, SSB, or FSK modes are selected.

2.2.9 AM and MCW signals are demodulated and AGC voltage is developed by module A11. Amplifier stages A11Q1 and A11Q2 supply the IF signal to detector diode A11CR2. Emitter follower A11Q3 drives SIGNAL STRENGTH meter M1, AGC amplifier A11AR1, and complementary emitter followers A11Q4/Q5. Emitter follower A11Q4/Q5 drives rear-panel AM DET OUTPUT jack J6, and MODE switch S5C-W. Integrated circuit linear amplifier A11AR1 supplies the AGC voltage for all automatic gain controlled stages in the DMS-105A.

2.2.10 FM demodulator A12 contains two separate discriminators. Each discriminator is driven by an integrated circuit linear amplifier which functions as a limiter, and is followed by a dc-coupled emitter follower. Discriminator A12CR1-CR2 is a wide band FM demodulator used when either the 5, 7, 8, or 16-kHz IF bandwidth is selected. When either the 1-kHz or 150-Hz IF bandwidth is selected, narrowband crystal discriminator A12FL1 is used. The dc-coupled FM output drives rear panel FM OUTPUT jack J7, and the ac-coupled demodulated FM signal is connected to MODE switch S5C-W.

2.2.11 Module A13 is used to provide audio and video outputs from the DMS-105A. Input signals to the module are selected by MODE switch S5C-W and INPUT MONITOR SWITCH S8. In the NORMAL mode, input signals selected by the MODE switch are applied to the audio/video amplifier. In the BYPASS mode, signals applied to SIGNAL INPUT jack J1 and amplified in mixer board A2 are connected to the audio/video amplifier. Gain control of the amplifiers is provided by R4A and R4B, a dual concentric shaft front panel control. The audio and video channels are identical except that the audio amplifier drives transformer T1 to match the impedance of an external speaker. Each channel consists of two cascaded amplifier stages driving complementary symmetry emitter followers.

2.2.12 Operating voltages for the DMS-105A are supplied by modules A14 through A16. Module A14 provides regulated -18 volts output; A15 supplies regulated +18 volts and unregulated +24 Vdc. Module A16 provides regulated +5 and -5 Vdc for operation of counter assembly A17. All supplies operate from a common power transformer T1. Either 115 or 220 Vac, 50-400 Hz can be used for primary power.

2.3 CIRCUIT DESCRIPTION

2.3.1 Type 79521 LO Isolation Amplifier. - Figure 6-1 is the schematic diagram for this module; its reference designation prefix is A1. The circuit provides isolation between the DMS-105A local oscillator assembly and counter assembly A17. It also provides isolation between either the internal or external local oscillator and the LO output jack on the DMS-105A rear panel.

2.3.1.1 Transistors Q1 and Q2 are identical buffer amplifiers. Input signals applied to the transistor bases are amplified and coupled out by impedance matching transformers T1 and T2. Gain of the stages is controlled by the amount of emitter degeneration which is adjustable by potentiometers R7 and R13.

2.3.1.2 Transistors Q4 and Q3 form a cascade amplifier used when an external LO signal source is used with the DMS-105A. The collector supply voltage is switched to enable the transistors by LO SELECTOR switch, S2. The gain of transistor Q4 can be adjusted by potentiometer R24 which controls the amount of emitter degeneration and therefore the gain. Resistors R27 through R29 form an impedance matching network at the input to present a 50-ohm load to the external local oscillator. The output of Q3 is coupled through R15 and C10 to both Q1 and Q2.

2.3.2 Type 79522 Mixer Board. - Figure 6-2 is the schematic diagram for the mixer board; its reference designation prefix is A2. Input signals to the board are the RF signals from input attenuator A20 and either the internal local oscillator or an external local oscillator. In addition, the signals applied to the DMS-105A SIGNAL INPUT jack are applied to the bypass input (pin 7) of this board from J3 of input filter assembly A19. Output signals from the mixer board are the bypass output from pin 3, the 2-MHz IF signal from pin 2, and an output to operate an external signal monitor at pin 10.

2.3.2.1 RF input signals from input attenuator A20 are applied to pin 18 of the board. Capacitors C6 and C7 couple the signal to the bases of complementary symmetry emitter follower transistors Q3 and Q4. Transistors Q3 and Q4 are biased to operate class B. Silicon diodes CR1 and CR2 determine the idling currents of the transistors and eliminate crossover distortion while preventing thermal runaway. Since the transistors and diodes are made of the same material they exhibit the same temperature coefficient of voltage characteristics. A rise in temperature lowers the base-emitter voltage drop of the transistors tending to make them conduct harder. However, the diode voltage drop decreases by the same amount, so the voltage applied to the bases also decreases holding the collector current nearly constant. Positive going signals at the base of Q3 make it conduct while negative going half cycles cause Q4 to conduct. The ac signal return path is through the 50-ohm impedance presented by the balanced mixer Z1.

2.3.2.2 Local oscillator signals are applied to pin 21 of the board and are coupled to the base of Q1 through C5. Transformer T1 forms the collector load for Q1 and provides impedance matching to drive mixer Z1. A small amount of signal voltage developed across emitter resistor R8 of Q1 is coupled to the base of emitter follower Q2 through C8. Potentiometer R18 is the emitter resistor for Q2 and provides a means of adjusting the amplitude of the voltage coupled through C11 and L1 to the output of mixer Z1. Potentiometer R18 and capacitor C18 are adjusted to provide LO signal through L1 which is the same amplitude and 180° out of phase with the mixer LO feedthrough to neutralize it from the output. Inductor L2 with C13 and C14 form a resonant pi-network to transform the low impedance mixer output to the high impedance input of Q5 to obtain minimum noise figure. Transistor Q5, a dual-gate MOS FET, is a common drain amplifier and its gain is controlled by the voltage applied to gate 2. The double tuned tank circuit of Q5 is slightly overcoupled. Inductors L3 and L4 with their associated components form the double tuned tank. A single tuned circuit is used in the collector of Q7, a common emitter amplifier, to fill in the valley formed by the overcoupled double tuned circuit in the previous stage. Capacitors C31 and C32 form a voltage divider providing a low-impedance IF output at pin 2 of the mixer board.

2.3.2.3 The bypass input signals applied to pin 7 of the board are coupled to the base of Q6 through C17. Emitter follower Q6 drives integrated circuit linear amplifier AR1. The bypass signals are amplified by AR1 and coupled through C28 to pin 3 of the board.

2.3.3 Types 72255, 72256, 72257, and 72258 IF Amplifiers. - Figure 6-3 is the schematic diagram for these boards; the reference designation prefixes are A3 through A6.

2.3.3.1 The IF amplifier boards are identical except for the differences noted on the schematic diagram. The major difference is the type of crystal bandpass filter used. All the IF boards have two channels, one for each bandwidth. An IF center frequency of 2 MHz is used. Each channel consists of a gain controlled amplifier followed by the bandpass filter, an amplifier, and emitter follower. Only one channel will be described as each channel is functionally identical.

2.3.3.2 Intermediate frequency signals from mixer board A2 are coupled to one gate of dual-gate field effect transistor Q1. Either MGC or AGC voltage is applied to the other gate of Q1 through a voltage divider consisting of R3 through R5. The value of R3 and its counterpart R19 is determined by the amount of gain desired from the amplifier. Potentiometer R4 provides a means of setting the maximum gain. Output signals developed across drain load resistor R6 are coupled to bandpass filter FL1 through C4. Output signals from the filter are coupled to the base of Q2 through C5. Transistor Q2 functions as a common emitter amplifier. Signals developed across its collector load resistor are direct coupled to the base of emitter follower Q3. Output signals from the emitter

follower are coupled to pin 20 of the board through C7. The +18 Vdc supply voltage for the IF channel used is switched by the front-panel IF BANDWIDTH switches.

2.3.4 Type 72259 AM/FM/MCW IF Amplifier. - Figure 6-4 is the schematic diagram for this board; its reference designation prefix is A7. This board functions when the AM, FM, or MCW modes are selected. Input signals to the board are coupled to the base of Q1 through C1. Potentiometer R6 provides a means of setting the overall gain of this board by varying the degeneration of Q1. The collector load for Q1 is a double-tuned tank circuit consisting of L1, L2, and associated components. Resistors R7 and R8 reduce the Q of the inductors to insure sufficient bandwidth for the amplifier. The double-tuned circuit is slightly overcoupled. Transistor Q1 is followed by a single-tuned common emitter amplifier Q2 which provides a peaked response smoothing the overall response of the amplifier. Low impedance output signals from the amplifier are taken from the junction of C11 and C12.

2.3.5 Type 79523 IF Buffer. - Figure 6-5 is the schematic diagram for the IF buffer; its reference designation prefix is A8.

2.3.5.1 This board has three inputs and four outputs. It is used to switch and buffer signals from IF amplifier A6 or A7 to the IF translator and demodulators. AM, FM, and MCW type IF signals from A7 are applied to emitter follower Q1. Upper and lower sideband IF signals from A6 are applied to Q2 and Q3, respectively. Switched +18 volts from MODE switch S5B-X turns on IF amplifier A6 or A7 and switches on the appropriate emitter follower on this board. Output signals from the enabled emitter follower drive Q4 through Q7. Common emitter amplifier Q4 drives FM demodulator A12. This is a single-tuned stage to provide gain to insure that limiting occurs when processing low-level signals. Emitter follower Q5 drives AM/MCW demodulator and AGC amplifier board A11. Transistor Q6 provides low impedance drive for IF translator A9 and CW/SSB/FSK demodulator A10. The remaining emitter follower Q7 provides a predetection IF output at rear panel jack J4. Transistors Q4 through Q7 are always energized by the fixed +18 volts applied to them.

2.3.6 Type 79524 IF Translator. - Figure 6-6 is the schematic diagram for the IF translator; its reference designation prefix is A9. This board translates the 2-MHz IF signal to a 100-, 50-, or 15-kHz center frequency for predetection recording.

2.3.6.1 Transistor Q1, a dual insulated gate, field effect transistor is used to amplify the 2-MHz IF signal from IF buffer A8. The IF signal is applied to one gate and a gain control voltage is applied to the other gate. Potentiometer R4 sets the stage gain. The 2-MHz signal from Q1 is applied to one gate of mixer Q3. The signal applied to the other gate of mixer Q3 is generated by crystal oscillators Q2, Q4, or Q7. All oscillator circuits are identical, utilizing a single-gate IGFET in a Colpitts configuration. The appropriate crystal oscillator is turned on by +18 volts applied to the transistor drain by TRANSLATOR OUTPUT switch S6. The output from mixer Q3 is applied to a five-pole low pass filter consisting of C21, L2, C22, L3, and C26. The filter attenuates the mixer sum products and passes the 100-, 50-, and 15-kHz difference signals. Capacitor C25 couples the filter output signal to the base of Q5.

2.3.6.2 Transistor Q5 is an NPN transistor dc coupled to Q6, a PNP transistor. These two stages provide the necessary voltage gain to drive complementary symmetry emitter followers Q8 and Q9. The latter two transistors are biased to operate class B. Negative feedback to set the overall gain of the amplifier stage is taken from the junction of emitter resistors R36 and R37 and connected to the emitter of Q5 through R29. Silicon diodes CR1 and CR2 determine the idling currents of Q8 and Q9, and eliminate crossover distortion while preventing thermal runaway. Since the transistors and diodes are made of the same material they exhibit the same temperature coefficient of voltage characteristics. A rise in temperature lowers the base-emitter voltage drop of the transistors tending to make them conduct harder. However, the diode voltage drop decreases by the same amount so that the voltage applied to the bases also decreases holding the collector current nearly constant. Resistors R36 and R37 are included in the emitter circuit of Q8 and Q9 to provide additional feedback with low-input signal levels. These resistors eliminate distortion introduced by the difference between the voltage drops of CR1 and CR2, and the base-emitter junctions of Q8 and Q9. With little or no input signal the drop across the resistors is a few tenths of a volt. Large input signals would cause the drop to become excessive except that CR3 and CR4 become forward biased and limit the drop to approximately 0.6 volt. Capacitor C28 provides additional drive for Q9 through R31 during the negative-going portion of the input signal. The output from the emitter followers is coupled through C36 to pin 2 of the board. Resistor R40 provides a discharge path to ground for C36 if the IF translator is operated without a dc load.

2.3.7 Type 79525 CW/SSB/FSK Demodulator. - Figure 6-7 is the schematic diagram for this board; its reference designation prefix is A10. Input signals to this board are 2-MHz IF signals from the IF buffer. This demodulator is turned on by switched +18 volts from MODE switch S5B-X whenever CW, SSB, or FSK type signals are being received. These signals are demodulated and the audio/video output appears at pin 13 of the board.

2.3.7.1 Transistor Q1 is an emitter follower supplying the 2-MHz IF signal to one gate of product detector Q2 through C4. The selected BFO signal is applied to the other gate of Q2 through C21, C28, or C34. Three beat frequency oscillators are provided by Q6, Q8, and Q9. Transistor Q6 is a tunable Colpitts oscillator driving emitter follower Q7. The frequency determining tank circuit for Q6 consists of L3, C37, C19, C18, and CR2. Varactor diode CR2 permits voltage tuning of the oscillator by front-panel BFO PITCH potentiometer R3. The oscillator frequency can be varied ±8 kHz by R3. If, for example, the voltage across CR2 is increased, its capacitance decreases, causing the oscillator frequency to increase. Diode CR1 functions as a leveler. Increased RF signal flow through the diode causes a negative voltage to be developed across gate bias resistor R31 tending to reduce the current flow through Q6 and holding the output from the oscillator constant. Output signals developed across emitter resistor R37 of emitter follower Q7 are coupled through C21 to the product detector.

2.3.7.2 Transistors Q8 and Q9 are crystal-controlled Colpitts oscillators. Transistor Q8 oscillates at 2 MHz. Variable capacitor C22 provides a means of precisely setting the oscillator frequency to prevent distortion when demodulating single sideband signals. Output signals from source resistor R42 are coupled through C28 to the product detector. Transistor Q9 oscillates at 2.001 MHz and provides a 1-kHz offset BFO. Its output is coupled through C34 to Q2. The desired BFO is turned on by +18 volts from front-panel BFO switch S7. When either the USB or LSB receiving mode is selected, the zero offset oscillator, Q8, is turned on automatically.

2.3.7.3 The sum and difference frequencies developed across drain resistor R13 of Q2 are applied to an RC low pass filter consisting of R15, C7, R16, and C8 which eliminates the sum frequencies. At the filter output is a series tuned trap consisting of C9, C10, and L1 which removes any remaining 2-MHz signal. The audio/video signal is then coupled through C11 to Q3. Transistors Q3 and Q4 amplify the signal and emitter follower Q5 provides a low impedance output through C13 to pin 13 of the board.

2.3.8 Type 79526 AM/MCW Demodulator/AGC/MGC. - Figure 6-8 is the schematic diagram; the reference designation prefix is A11. This board demodulates AM and MCW signals, drives signal strength meter M1, and develops AGC voltage for the DMS-105A.

2.3.8.1 Input IF signals from IF buffer A8 are coupled to the base of common emitter amplifier Q1 through C1. Potentiometer R6 sets the stage gain by controlling the amount of ac degeneration. The collector circuit is double tuned by L1, C3, L2, C6, and C7 with output signals from the stage taken at the junction of C6 and C7 and applied to the base of Q2 through R9. Transistor Q2, also a common emitter circuit, drives detector diode CR2. Inductor L3 functions as an RF choke and L4 is the shunt-fed single tuned tank for Q2. Diode CR1 is used to compensate for the base-emitter voltage drop of Q3. This is done to provide zero volts output at the emitter of Q3 with no IF input signal to the demodulator. Some of the output developed across emitter resistor R20 of Q3 is coupled to the signal strength meter through R22. A portion of the audio signal drives complementary emitter followers Q4 and Q5 for audio output at pin 6 and a dc-coupled AM detector output at pin 8 of the board. The remainder of the signal is used to develop AGC voltage for the DMS-105A. The signal is coupled through R29 to modulation filter capacitor C16. The charge across C16 is equal to the average signal level detected by CR2. The voltage across C16 is coupled through CR3 to the inverting input of integrated circuit operational amplifier AR1. The noninverting input of AR1 is connected to a voltage divider consisting of R32 and potentiometer R33. Operational amplifier AR1 amplifies the difference between its two input voltages. The output voltage from the IC is approximately +12 volts with no signal applied to the demodulator. When the detected IF signal exceeds the threshold level set by potentiometer R33, the output of AR1 swings negative from the +12 volt level. Diode CR3 decouples AR1 from the detector emitter followers. The maximum AGC voltage swing is limited by negative feedback resistor R37. The AGC output voltage from the board is applied to the AGC buss.

2.3.9 Type 79527 FM Demodulator. - Figure 6-9 is the schematic diagram for the FM demodulator; its reference designation prefix is A12. The board contains two demodulator channels. The two channels are functionally identical with the exception of the bandwidth of the FM discriminators. A wideband demodulator is formed by limiter amplifier AR1, discriminator transformer T1, CR1, and CR2, and emitter followers Q1 and Q2. The narrowband channel is identical except that a narrowband crystal discriminator, FL1, is used.

2.3.9.1 Integrated circuit linear amplifier AR1 is used as a limiter amplifier driving a modified Foster-Seeley discriminator. The limiter removes amplitude variations from the input so that the discriminator receives a signal which varies only in frequency. Capacitor C5 couples the 2-MHz signal from the limiter to the primary of the discriminator formed by C6, C7, L3, L2, and the primary of T1. The voltage dividing action of L3, L2, and the primary of T1 sets the primary to secondary coupling of T1 and thus the bandwidth of the discriminator. Capacitors C9 and C10 resonate the secondary of T1 to 2-MHz and capacitor C8 couples the RF reference voltage from the primary to the secondary of T1. Diodes CR1 and CR2 demodulate the FM signal. The discriminator output is dc coupled to cascaded emitter followers Q1 and Q2. Inductor L3 is adjusted for peak amplitude output from the discriminator and symmetry of the discriminator response. The slug adjustment of T1 is set for zero output from the discriminator with a 2-MHz signal applied to the wideband channel.

2.3.9.2 The narrowband FM demodulator channel consisting of AR2, FL1, and cascaded emitter followers Q3 and Q4 is functionally identical to the wideband channel just described.

2.3.10 Type 7437 Audio/Video Amplifier. - Figure 6-10 is the schematic diagram for this board; its reference designation prefix is A13. The circuit consists of nearly identical amplifiers. Notable differences are the absence of an output transformer and associated negative feedback circuit in the video amplifier. In addition, resistor R27 in the video amplifier provides a discharge path to ground for C10 whenever the amplifier is used without a dc load.

2.3.10.1 The audio and video amplifiers are functionally identical to the output amplifier in IF translator A9. The circuit is described in paragraph 2.3.6.2.

2.3.11 Type 76160 -18V Power Supply Regulator. - Figure 6-11 is the schematic diagram; the reference designation prefix for this board is A14. Input ac voltage to this supply is provided by transformer T1 located on the DMS-105A main chassis.

2.3.11.1 Transistor Q1 functions as a series regulator whose conduction is controlled by Q2, a voltage amplifier. Transistors Q3 and Q4 are connected in a differential amplifier configuration. The base of Q4 is held at a fixed potential by Zener diode CR2. The base of Q3 is connected to the regulated output through a sampling network consisting of fixed resistors R5 and R7, and potentiometer R6. The signals at the bases of the two stages are summed in the common emitter circuit to produce an amplified signal at the collector of Q3 that is the difference between the two inputs. Thus, any fluctuation in the output voltage is sensed by Q3, amplified and inverted and fed to the base of Q2. For example, if the output voltage rises (becomes more negative) Q3 will conduct harder, causing an increased voltage drop across R2 and R3. This lowers the forward bias voltage and the current flow through Q2. As a result, the current flow through Q1 is reduced, returning the output voltage to its nominal value. Resistor R4 connects the base of Q3 to the input side of the regulator so that voltage fluctuations at this point can be sensed and compensated for by the gain of the differential amplifier. A differential amplifier is used in the comparison circuit as variations in base-emitter voltage due to temperature changes in one transistor will tend to cancel similar changes in the other. This configuration also permits the reference diode, CR2, to be placed in the base circuit rather than the emitter, as is the case with a one-stage error amplifier. Less current flows through the diode, resulting in a more stable reference voltage.

2.3.12 Type 76162 +18V Power Supply Regulator. - The schematic diagram for this board is Figure 6-12; the reference designation prefix is A15. The operation of this supply is similar to the -18 volt regulator described in the previous paragraph. The polarity of the diodes, transistors, and capacitors has been reversed to supply the positive voltage. Transistor Q2 functions as an emitter follower in this case to amplify the low current output of Q3. This configuration is used to provide sufficient current drive for the low-input impedance at the base of Q1.

2.3.13 Type 76211 +5 and -5V Power Supply Regulator. - Figure 6-13 is the schematic diagram for this board; its reference designation prefix is A16. Input ac voltage to this supply is provided by transformer T1, located on the DMS-105A main chassis. Q1 is the series regulator for the +5V supply. Electrolytic capacitors C2 and C3 provide the filtering for the positive and negative supplies respectively. Q1, C2, and C3 are located on the DMS-105A main chassis (Refer to Figure 6-22).

2.3.13.1 Transistor A16Q1 is used as a series regulator for negative supply. The conduction of Q1 is controlled by Q3, which senses and responds to any fluctuations of the negative output from its nominal -5V level. Tran-

sistor Q2, a constant current source for zener diode VR1, provides a reference voltage on the base of Q3. The constant output of Q2 maintains the base of Q3 at the 5.6V zener level, which improves the regulation of the negative supply. In a typical example of this operation, assume that the output level begins to rise or becomes more positive. The forward bias on the emitter of Q3 increases, since the base is held at 5.6V by the zener diode VR1. The conduction of Q3 increases and a larger voltage is dropped across the load resistors R2 and R3. The base of Q1 becomes more positive and increases in conduction until the output level returns to its nominal 5V level. Should the -5V output increase in the negative direction, the opposite circuit action occurs to return the -5V output to its correct level. Resistor R5 is an overload protection for the negative supply. If the output current should become excessive, the voltage drop across R5 will limit the emitter-base junction forward bias on Q3, reducing the conduction of Q1, limiting the output voltage.

2.3.13.2 Conduction of the main chassis mounted transistor Q1 is controlled by a feedback loop, consisting of a differential amplifier, Q5 and Q6, which drives amplifier Q4, which in turn drives emitter follower Q7. The output of the emitter follower Q7 is connected to the base of the series regulator chassis mounted transistor Q1, through module pin 16. The output of the negative supply is used as the reference voltage for the positive supply. It is connected to a sampling network, comprised of R11, R12, and R13. By adjusting potentiometer R12, the positive output can be set to precisely +5 volts. When properly set, the base voltage of Q5 and Q6 will be 0 Vdc. If the output voltage deviates from the set value, the difference is sensed by Q6 as an error signal, and the feedback circuit supplies the series regulator with a compensating voltage to return the output to its nominal value. Overload protection of the positive supply is provided by resistor R10 in conjunction with silicon diodes CR6, CR7, and CR8. If excessive current is drawn from the supply, the voltage drop across R10 will forward bias the diodes and the base of Q7 will be pulled down to the voltage at the output terminal. This will result in the base of the series regulator being driven sufficiently negative to limit the current drawn from the transistor to a safe value. Diodes CR9, CR10, and CR11 are used for temperature compensation. The negative temperature coefficient of the germanium diodes counteracts a tendency of the positive voltage to increase at elevated temperatures.

2.3.14 Type 71233 LO Tuning Assembly. - Figure 6-17 is the schematic diagram for the assembly; its reference designation prefix is A18. The assembly consists of a Type 8584 Gear Train and a Type 7749 Local Oscillator Assembly.

2.3.14.1 Type 7749 Local Oscillator Assembly. - The reference designation prefix for the local oscillator assembly is A18A1. It contains a ganged tuning capacitor for both the high band and low band oscillators, C6-C7. In addition to the main tuning capacitor, trimmer capacitors C5 and C8, and printed circuit LO board A18A1A1 are included in the assembly. Switched +18 volts, from LO SELECTOR switch S2, is applied to the assembly to enable the appropriate oscillator. In addition, the variable fine tuning and DAFC voltages are applied to the assembly. The active oscillator operates 2 MHz above the tuned frequency of the DMS-105A. The low-band oscillator tunes from 2.001 to 2.600 MHz and the high-band oscillator tunes from 2.540 to 2.600 MHz.

2.3.14.2 Part 15188 LO Board. - Figure 6-18 is the schematic diagram for the LO board; its reference designation prefix is A18A1A1. Transistor Q1, an IGFET, functions as a Colpitts oscillator when the low-band is selected. Zener diode VR1 provides a stable voltage for the transistor drain from the switched +18 volts applied to it by the LO SELECTOR switch. Diode CR1 functions as an output leveler in conjunction with gate bias resistor R3. Increased RF current flow through CR1 causes an increase in the negative voltage developed across R3 which decreases current flow through the transistor. This action tends to keep the oscillator output constant over its frequency range. The frequency determining tank circuit for the low-band oscillator consists of C6, varactor CR2, C8, varactor CR3, tuning capacitor C6 and trimmer C5 of the main LO assembly, and L2. Varactor diodes CR2 and CR3 are semiconductor devices whose capacitance varies inversely with the reverse bias applied to them. Thus, as the reverse bias increases the capacitance decreases, increasing the frequency of oscillation of the circuit. Diode CR2 is used in conjunction with a DAFC voltage from counter assembly A17 to control the oscillator frequency and CR3 is used for fine tuning. Output signals from Q1 are coupled through C10 to emitter follower Q2. Potentiometer R9 sets the desired output level from the emitter follower. The output signal is coupled through C11 to terminal E7 of the LO board. The low-band oscillator is functionally identical to the high-band oscillator described above.

2.3.15 Type 79531 Input Filter Assembly. - Figure 6-19 is the schematic diagram for this assembly; its reference designation prefix is A19. The assembly contains switching relays K1 through K3, low-band filter A1, and high-band filter A2. Input signals to the DMS-105A are applied to jack J1 of the filter assembly. Resistor R1 couples the signals to jack J3 where they are routed to amplifier stages in mixer assembly A2 when the

DMS-105A is operated in the BYPASS mode. In the NORMAL mode, signals from A19J1 are applied to relay A19K1 which connects them to the appropriate filter input transformer through relay A19K2 which selects the desired input impedance by means of the tapped transformer primary windings. Output signals from the appropriate filter are selected by relay A19K3 and applied to output jack A19J2.

2.3.15.1 Type 79553 Low-Band Filter. - The reference designation for the low-band filter is A19A1. The filter contains impedance matching transformer A19A1T1 and low-band filter board A19A1A1. The filter board consists of a seven-pole low-pass filter composed of L1 through L3 and C1 through C4. The type 79553 low-band filter is constructed in a shielded enclosure to prevent the pickup of 60-Hz radiation from the DMS-105A's power transformer and outside sources.

2.3.15.2 Part 15131 High-Band Filter. - This filter is constructed on a printed circuit board; its reference designation prefix is A19A2. The filter consists of impedance matching transformer T1 and a fourteen-pole bandpass filter composed of L1 through L7 and C1 through C11.

2.3.16 Type 79382 Input Attenuator. - Figure 6-20 is the schematic diagram for the input attenuator; its reference designation prefix is A20. The input attenuator is used to expand the dynamic range of the DMS-105A by allowing manual attenuation of signals before they are applied to mixer A2. A maximum of 50 dB of attenuation is provided in 10-dB steps. A zero attenuation position is also provided. The circuit consists of input and output jacks, switch S1, and resistors R1 through R23. The switch connects the input signal directly from the input jack to the output jack in the zero attenuation position. In the remaining positions, the signal is routed through resistive networks to provide the desired attenuation.

2.3.17 Type 16070 DAFC Mode Inverter. - Figure 6-21 is the schematic diagram for this assembly; its reference designation prefix is A21. The input signal to this board is the DAFC output from the HF Counter Assembly A17. The board consists of a high performance monolithic operational amplifier U1, used as an inverting amplifier. The DAFC Mode Inverter is turned on by +18 and -18 volts developed by power supplies A14 and A15. The DAFC inverted output is applied to the LO Tuning Assembly A18.

2.4 COUNTER ASSEMBLY

2.4.1 Type 79977 Counter Assembly. - Figure 6-14 is the schematic diagram for the counter assembly; its reference designation prefix is A17. This assembly is constructed as a self-contained shielded unit to prevent the radiation of RFI. The external inputs to this unit are the +5 Vdc and -5 Vdc regulated supply inputs and the DMS-105A LO signal from LO isolation amplifier A1. The block diagram, Figure 2-2, shows the functional interconnections between the gate generator and DAFC plug-in card A17A1, and the count, store, and display plug-in card, A17A2.

2.4.1.1 Counter Operating Principle. - The function of the frequency counter is to display the tuned frequency of the demodulator, and to provide DAFC (digital automatic frequency control). The DMS-105A tunes the frequency range of 1 to 1600 kHz in two bands. The intermediate frequency is 2 MHz; providing a LO frequency range of 2.001 MHz to 3.600 MHz which is applied to COUNT INPUT jack J1. The counter operates in two basic modes; the NORMAL DISPLAY mode and the DECIMAL SHIFT mode. In the NORMAL DISPLAY mode the counter provides 100 Hz resolution by displaying only the hundreds-of-Hz digit in the least significant readout (000.X). This is accomplished by presetting the most significant digit to 8 before the LO signal is counted. A typical example of the preset function follows:

Typical TUNED FREQUENCY 1300.0 kHz

LOCAL OSCILLATOR FREQUENCY		3300.0 kHz (2 MHz +1300 kHz)
PRESET COUNTER VALUE		+8000.0
DISPLAYED COUNTER VALUE	1	1300.0
		Overflow

Note that the overflow number (1) is not displayed on the readout. In the DECIMAL SHIFT mode of operation,

the preset function is not required and it is disabled. In this mode the counter provides 10 Hz resolution. Otherwise, the least significant digit is the tens-of-Hz digit (000.0X). Presetting is not required since the maximum readout frequency displayed would be 999.99 kHz. This mode of operation would be utilized when it is necessary to tune very accurately to a given frequency. In a typical example of counter operation, assume that the tuned frequency is 800 kHz and the counter is in the DECIMAL SHIFT mode. The 2.800 MHz LO signal is gated into five decade counters for a precise period of 100 ms. This sample time is controlled by the counter gate generator circuits. This action provides a count of 2,800,000 Hz x 0.1 second or a value of 280,000 in the five counting decades. Since there is not a decade counter or readout to display the most significant digit, the displayed count is 80000. The display has a resolution of 10 Hz since the least significant displayed digit is the tens-of-Hz digit. A decimal point is placed in the display so that the final displayed count represents kilohertz, or 800.00 kHz.

2.4.2 Gate Generator and DAFC (A17A1). - The principle function of the gate generator circuits is to supply the various timing waveforms required by the count, store, and display card. DAFC circuits also located on the board are used to provide long term stabilization of the DMS-105A local oscillator.

2.4.2.1 Gate Generator. - Oscillator/buffer stages Q1 and Q2 develop a stable 1 MHz clock input to a divide-by-125 network consisting of divide-by-five counters U1, U2, and U3. This output is further divided by either 1000 or 100 through decade counters U9, U4, and U5 depending on which mode of counter operation is selected. In the NORMAL DISPLAY mode division by 100 is obtained by bypassing decade counter U9 and applying the output of U3 to a divide-by-one hundred circuit consisting of counters U4 and U5. This is accomplished by the gate select circuit consisting of U11A, U8C, and U8D, and switch S2A-X. The switch also grounds the decimal point (D.P.) enables line to numeric indicator A2A1U2, placing a decimal point between the hundreds-of-Hz digit and the thousands-of-Hz digit (XXXX.X). In the DECIMAL SHIFT mode, decade counter U9 is enabled by S2A-X and the gate select circuit providing division by 1000 for the output of U3 through U9, U4, and U5. The decimal point enable line to A2A1U3 is also grounded by S2A-X providing a decimal point between the tens-of-Hz digit and the hundreds-of-Hz digit (XXX.XX). Various BCD outputs from decade counters U4, and U5 are applied to timing gates U6, U7, and U8 which develop the SIGNAL GATE, RESET, STORAGE STROBE, and PRESET timing pulses. The SIGNAL GATE waveform is formed by inverting the BCD-8 output of U5 through a portion of gate U8 (U8B). This signal has a cycle period of 12.5 ms in the NORMAL DISPLAY mode and 125 ms in the DECIMAL SHIFT mode of operation. After inversion, the signal gate is high (logic 1) for either 10 or 100 ms and is low (logic 0) for 2.5 or 25 ms. During the high period the LO signal is counted in A2, and during the low period the RESET, STORAGE STROBE, and PRESET commands are developed by other gates contained in U6 and U7. The DISPLAY STROBE output from the gate generator, which is used in the NORMAL DISPLAY mode only, is developed by dividing the STORAGE STROBE output of U6B by a factor of 8 through the divide-by-two sections of U1, U2, and U3. The output from U3 is inverted through Q8 and applied to S2A-W. When the NORMAL DISPLAY mode is selected, the DISPLAY STROBE is applied to the numeric indicators in the count, decode, and display assembly. The development of the gate generator waveforms will be discussed further in the gate generator detailed description.

2.4.2.2 DAFC. - The DAFC circuits contained in the counter assembly provide an analog correction voltage to the demodulator local oscillator circuits which prevents long term drift. This DAFC action is accomplished by sampling the BCD output of the least significant digit of the display, decoding the BCD information to decimal information, and encoding the decimal information in the DAFC LAST DIGIT switch to provide an up or down command. These commands are integrated with a long time constant integrator/buffer, developing the DAFC output voltage. The analog DAFC voltage is used to control the frequency of the DMS-105A local oscillator. Voltage variable capacitance diodes located in the frequency determining tank circuit of both oscillators in LO tuning assembly A18 vary the demodulator local oscillator frequency. A voltage variable capacitance diode is a semiconductor device whose capacitance is inversely related to the reverse-bias applied to it. As the reverse-bias increases, the capacity of the diode decreases causing the local oscillator frequency to increase. The DAFC circuits on the gate generator and DAFC card, A17A1, are controlled by LAST DIGIT switch A17S1, and DAFC mode switch A17S2. Switch A17S1 selects the least significant digit of the display when the DAFC is activated. The BCD output from storage IC A17A2U4 is decoded by A17A1U10 and applied to A17S1 as decimal information. If the decimal output from A17A1U10 does not agree with the digit selected by A17S1, an up or down command pulse is applied to either down gate transistors A17A1Q3 and A17A1Q5 or up gate transistor A17A1Q4. These two circuits charge back to back storage capacitors A17A1C10 and A17A1C11 in either a positive or negative direction. The polarity of the charge is dependent on whether the drift error is above or below the selected digit on the LAST DIGIT switch. The charge is buffered by FET A17A1Q6. A current source consisting of A17A1Q7, A17A1CR1, and A17A1CR2 supplies source current for the FET. MODE switch S2B-W sets the DAFC

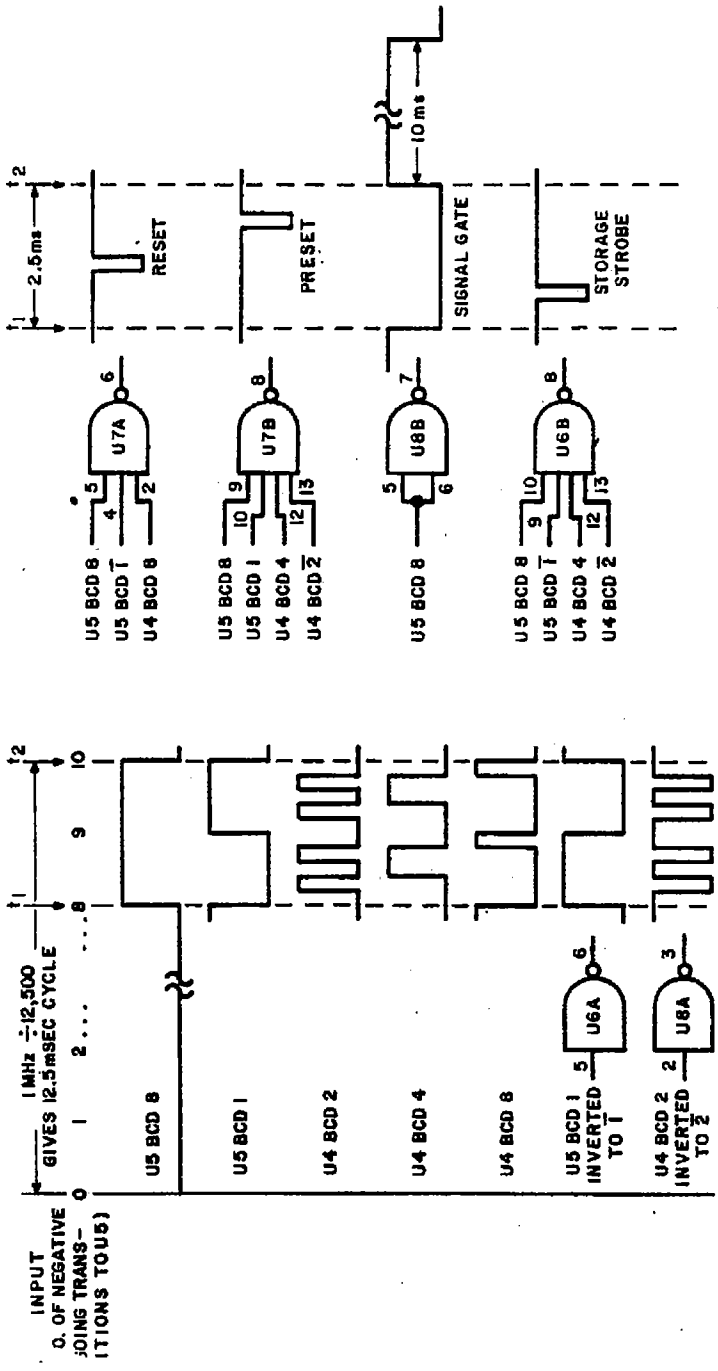


Figure 2-3. Gate Generator Timing Chart

correction rate and S2A-W turns the DAFC functions on or off.

2.4.3 Count, Store, and Display (A17A2). - The LO signal from LO Isolation Amplifier A1 is applied to COUNT IN jack A17J1 and is cabled to the count, decode, and display card. The LO inputs are initially peak limited by diodes CR1 and CR2 before application to wideband amplifier U1. The output from U1 is applied to buffer Q1 for additional amplification and pulse forming. This signal is used to toggle J-K Flip-Flop U2, which is gated on during the high period of the signal gate waveform supplied by the gate generator timing circuits. J-K Flip-Flop U2 and count-by-five IC U3 form the first decade and least significant digit of the count. The output from U2 (BCD 1) and the BCD 2, 4, and 8 outputs from U3 are applied to the parallel data inputs of storage IC U4. The BCD inputs to U4 are held in storage and are updated each time the storage strobe pulse from the gate generator occurs. The BCD outputs from U4 connect to LED (light emitting diode) numeric indicator A1U1. This IC decodes the BCD inputs and displays the decimal equivalent. The numeric indicator updates its display each time the gate generator storage strobe (DECIMAL SHIFT mode) or DISPLAY STROBE (NORMAL DISPLAY mode) occurs. For each ten pulses counted by U2 and U3 a carry pulse is applied to decade counter U7. This IC develops the second least significant digit of the display. The BCD outputs from U7 are stored in U8, and are then decoded and displayed in numeric indicator A1U2. Decade counter U7 also passes a carry pulse to the next decade of counting after it has counted to 9 and resets to zero. This count and carry process is continued until the five decades of counting are developed. After the signal gate goes to a logic 0 level the count period is completed. During the low period of the signal gate, other pulses from the gate generator update the storage and indicator IC's, reset the counters to zero, and preset the most significant digit to 8 (NORMAL DISPLAY mode only) prior to the new count (high) period of the signal gate waveform.

2.4.4 Gate Generator and DAFC (A17A1). - Figure 6-15 is the schematic diagram for this assembly; its reference designation prefix is A17A1. This assembly generates timing signals to control the count, decode, and display assembly (A17A2). The gate generator also contains digital automatic frequency control (DAFC) circuitry.

2.4.4.1 Oscillator. - Transistor Q1 is operated as a modified Colpitts 1 MHz crystal controlled oscillator. Resistors R1 and R2 bias the base of Q1. Capacitors C1 and C2 provide additional circuit capacitance required by Y1, and capacitor C3 is used to adjust the frequency to exactly 1 MHz. Capacitors C4 and C5 form a voltage divider to provide the necessary impedance step-up and to provide regenerative feedback. Resistor R4 sets the emitter current and capacitor C6 couples the output of Q1 to amplifier Q2. Resistors R5 and R6 bias the base of Q2. This transistor is normally conducting to saturation. Negative half cycles of the oscillator output switch Q2 off providing positive pulses at the collector. The output of Q2 is coupled to the C2 toggle input of counter U1.

2.4.4.2 Divide-by-Five IC's U1, U2, and U3. - Integrated circuits U1, U2, and U3 are decade counter IC's which are connected in a divide-by-five configuration. This is accomplished by applying the input to the C2 input of each IC. The 1-MHz clock input from Q2 is divided by a factor of 125 through U1, U2, and U3 providing an 8 kHz pulse train at the D or BCD 8 output of U3. Note that an additional input is applied to the C1 input of U1. This input signal is the output of quad NAND gate U6B which is divided by a factor of 8 through the unused divide-by-two sections of U1 through U3. This output (U3 pin 5) is inverted through Q8 and applied to module pin C as a display strobe output. The display strobe for the numeric indicators in the count, store, and display module is provided by the storage strobe pulse output from the gate generator in the DECIMAL SHIFT mode. The display strobe is used only in the NORMAL DISPLAY mode of counter operation.

2.4.4.3 Decade Dividers U9, U4, and U5. - The 8 kHz pulse train output from U3 is applied to the C_1 input of decade divider U9 and to pin 1 of NAND gate U11A. In the NORMAL DISPLAY mode, module pin 1 is grounded through switch S2A-X, disabling NAND gate U8D. Module pin 2 is left in a floating condition allowing the 8 kHz output of U3 to pass through U11A. NAND gate U8C passes the output of U11A since pin 9 is held in a logic 1 condition by the output of U8D. In the DECIMAL SHIFT mode of operation, module pin 2 is grounded through S2A-X, disabling U11A. This allows the 800 Hz pulse train output of U9 to pass through NAND gates U8C and U8D. The 8 kHz or 800 Hz output of gate U8C is applied to the C_1 input of decade divider U4. The 80 Hz or 800 Hz pulse train output of U4 is applied to the C_1 input of U5. This IC divides its input by 10 providing either 8 Hz or 80 Hz pulse train at its BCD 8 output (pin 12). This output is inverted through U8B and is designated the SIGNAL GATE. The signal gate occurs 8 times/second in the NORMAL DISPLAY mode and 80 times/second in the DECIMAL SHIFT mode providing cycle times of 125 ms and 12.5 ms respectively. The U5 BCD 8 is symmetrical with an 80%-20% relationship between its logic 1 and logic zero states. Therefore, the output from U5 (signal gate), after inversion, is low for 25 ms or 2.5 ms and high for 100 ms or 10 ms.

2.4.4.4 Control Signal Generation. - Refer to Figure 2-3 which shows the various BCD waveforms which are combined to produce the gate generator timing pulses. The waveforms illustrate outputs from various dividers and gates in the gate generator in the NORMAL DISPLAY mode of operation. It should be noted that the waveforms should be increased in time by a factor of ten to illustrate the gate generator output in the DECIMAL SHIFT mode. The U5 BCD8 is combined with two other waveforms to produce the reset pulse. The inverted U5 BCD 1 divides the 20% portion of the U5 BCD 8 into halves, and is high during the first half. The U4 BCD 8 is high for 0.25 ms of the time that the two previous waveforms are high. When these three waveforms are combined and inverted in NAND gate U7A, the reset pulse is the result. To produce the preset pulses, the U5 BCD 8 waveform is combined with the U5 BCD 1 without inversion, which puts the output pulses in the latter half of the 20% portion of the U5 BCD 8. These waveforms are combined with the U4 BCD 4 and the inverted BCD 2 from U4 in NAND gate U7B to produce the negative-going preset pulse. To provide the signal gate waveform, it is only necessary to invert the U5 BCD 8, and this is done by NAND gate U8B. To produce storage strobe pulses, the inverted U5 BCD 1 is again used to locate the output pulse in the first half of the 20% portion of the U5 BCD 8. Otherwise the same BCD waveforms are used as were used to produce the preset. The waveforms are combined in U6B. All of these four output timing waveforms connect directly to module pins which route them to the count, decode and display board to control its function.

2.4.4.5 DAFC Circuit. - Figure 2-4 is the block diagram for the DAFC Loop. The DAFC circuit on the gate generator card consists of the BCD-to-decimal decoder U10 and transistors Q3 through Q7 which provide a drift correction voltage to the LO assembly. Other DAFC circuitry consists of the front panel counter mode switch and the LAST DIGIT selector switch. The DAFC circuitry is activated when the mode switch is placed in either the DECIMAL SHIFT (DAFC) or NORMAL DISPLAY (DAFC) position.

2.4.4.5.1 In a typical example of DAFC operation, assume that the DMS-105A has been properly locked onto a last digit, and the decimal information present at the output of decoder A1A1U10 agrees with the last digit selected by switch A1S1. This assumption is of course hypothetical since the unit always has a small amount of frequency drift. In this condition both the UP GATE and DOWN GATE would be turned off and there would be no change in the voltage charge held by integrator capacitors C10 and C11. Capacitors C10 and C11 are connected in series "back-to-back" to reduce the leakage path to a minimum. The demodulator tuned frequency would be a function of the main and fine tuning controls only. Next, assume that the LO drifts to a frequency which causes the BCD output of least significant digit storage latch A17A2U4 to change in value. The amount of frequency drift must be greater than 10 Hz in the DECIMAL SHIFT mode and greater than 100 Hz in the NORMAL DISPLAY or hundreds-of-Hz mode since the least significant digit is the tens-of-Hz digit. The changing BCD output from A17A2U4 is applied to decoder A17A1U10 where it is translated to decimal information. Decoder A17A1U10 provides a logic zero on the active output line while the remaining lines are logic one. The 10 decimal output lines from A17A1U10 connect to LAST DIGIT switch A17S1 section A and B. This switch is wired to provide an open circuit for the selected digit. The remaining switch contacts are held to a logic one by the other outputs of the decoder. When the LO drifts and the logic zero output of the decoder switches to a digit which is not selected by A17S1, a logic zero is applied to either the UP GATE or the DOWN GATE. The UP GATE, which consists of transistor A17A1Q4, connects to the wiper of switch A17S1A. When the LO frequency drifts below the selected last digit a logic zero turn-on voltage (DAFC UP) is applied to A17A1Q4. An example of this action would be if the selected last digit is XXX.XO (zero) and the VFO drifts down to XXX.X9. The DAFC UP signal turns on Q4, charging integrator capacitors A17A1C10 and A17A1C11 in a positive direction. The charge held on C10 and C11 is applied to the LO assembly through integrator buffer Q6. The DAFC correction voltage is applied to a diode in the local oscillator assembly. The varactor will shift the oscillator frequency upward until the display is XXX.XO, shutting off the DAFC UP signal from A17S1. When the LO drifts to a higher frequency, switch A17S1B applies a logic zero (DAFC DOWN) to inverter A17A1Q3, turning on A17A1Q5. This stage (Q5) charges capacitors C10 and C11 in a negative direction. The negative charge is buffered by A17A1Q6 and is applied to the LO assembly as a correction voltage.

2.4.4.5.2 Refer to Figure 6-15. The charge stored in C10 and C11 is buffered by the very high input impedance of MOSFET Q6. Current for Q6 is supplied by a constant current source consisting of Q7 and CR1 and CR2. The Diodes are forward biased by the -5V supply through R18. The voltage drop across the two diodes is approximately 1.4 Vdc. Since the voltage drop across the base emitter junction of Q7 is about 0.7 Vdc, approximately 0.7 Vdc is applied to potentiometer R17. The potentiometer is set to adjust the collector current of Q7. The collector supplies the source current for Q6. The current through Q6 is set so that there is zero offset voltage between the gate and source. This sets the DAFC output at module pin H to zero volts when the MODE switch is set to either the NORMAL DISPLAY (tune) or DECIMAL SHIFT (tune) position. Capacitor C12 is a filter to remove

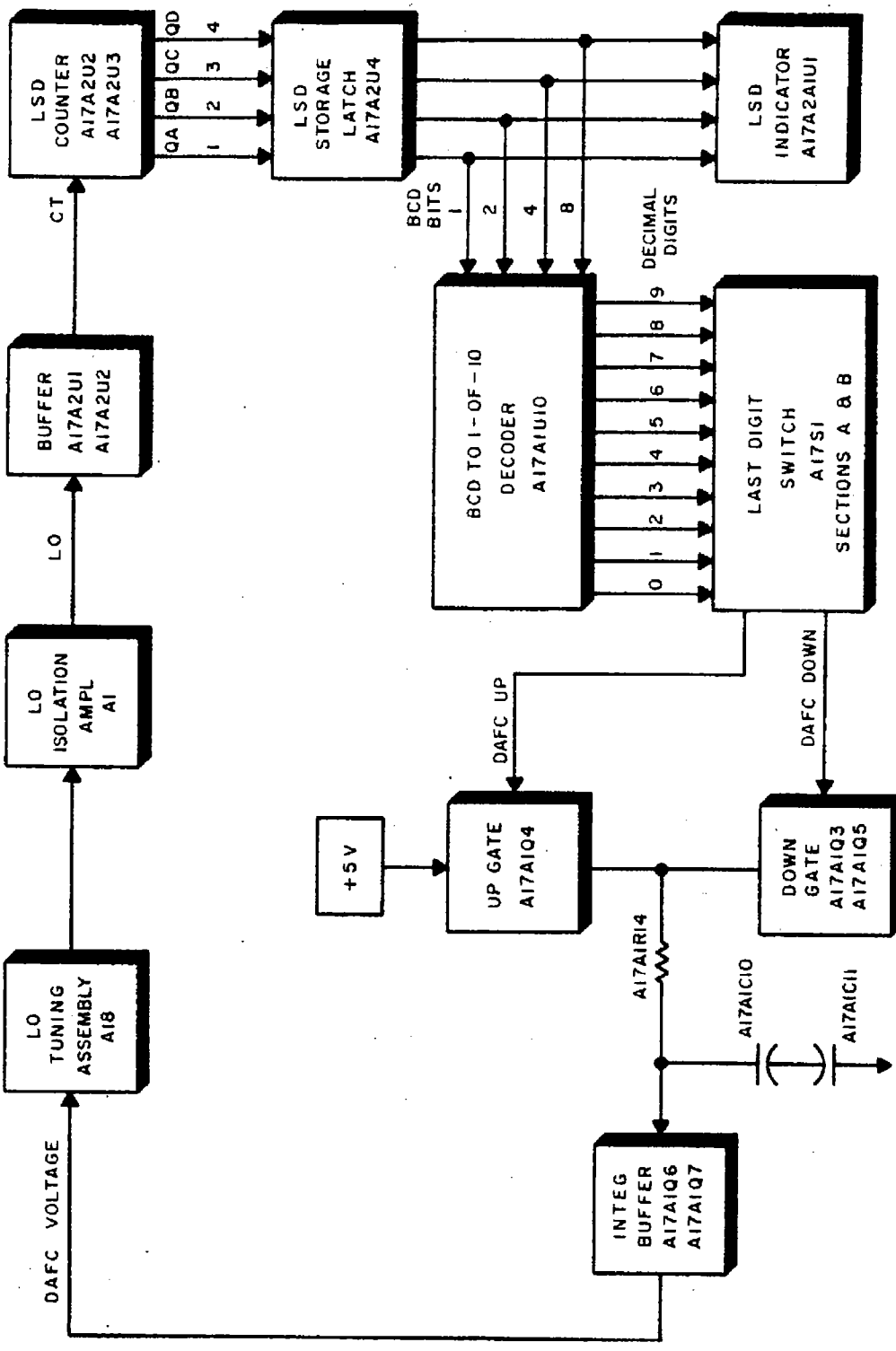


Figure 2-4. DAFC Loop, Functional Block Diagram

noise from the DAFC line.

2.4.5 Count, Decode, and Display (A17A2). - Figure 6- is the schematic diagram for this assembly; its reference designation prefix is A17A2. The Part 16537 Solid State Numeric Display mounts on assembly A17A2; its reference designation prefix is A17A2A1.

2.4.5.1 Input Limiter/Amplifier. - Input 2.001-3.600-MHz LO signals from the LO are (A18) applied to module pin 17. Peak limiting diodes CR1 and CR2 limit the negative and positive input cycles to prevent overloading of wideband amplifier U1. The output from pin 7 of U1 is coupled through C4 to the base of common emitter amplifier Q1. Diode CR3 clips the negative excursion of the input cycle to provide reverse bias protection for the transistor.

2.4.5.2 J-K Flip-Flop. - The output from Q1 is applied to pin 3 (clock input) of J-K Flip-Flop U2. Pins 1, 14, 6, and 7 are held high by the positive supply. The SIGNAL GATE input from the gate generator is applied through module pin 20. During the 100 ms or 10 ms logic one condition of the SIGNAL GATE waveform pins 2 and 5 of the J and K inputs are also enabled, allowing the input LO signal to toggle U2.

2.4.5.3 Least Significant Digit. - The least significant digit of the display is developed by applying the Q output from U2 to pin 4 of storage latch U4. This input is one-half the input LO frequency and provides the BCD 1 input for the first decade of counting. The BCD 2, 4, and 8 output from count-by-five divider U3 are used to supply the remaining BCD inputs to storage latch U4. The storage strobe pulse is applied to pin 1 of U4. The storage strobe is the first output from the gate generator after the signal gate goes to a logic zero level. The storage strobe transfers the BCD values present at the output of U2 and U3 into the storage latch. The storage strobe is also used to enable the input to numeric indicator A1A1U1 in the DECIMAL SHIFT mode. This pulse is applied to pin 5 of A1A1U1 through module pin 1 which is externally wired to switch S2A-W. In the NORMAL DISPLAY mode, switch S2A-W connects the display strobe output of the gate generator to A1A1U1. Each numeric indicator contains a 4 bit storage latch, a BCD to decimal dot matrix encoder, and 28 light emitting diodes. The RESET pulse, which occurs just before the SIGNAL GATE goes to a logic 1, sets U2 and U3 to zero before the new 100 ms counting period. This signal connects to pin 13 of each counter through module pin 13.

2.4.5.4 Remaining Decades. - Decade counters U7, U11, U15, and U19 with their associated storage latch and numeric indicator operate similarly to the least significant digit described in paragraph 2.4.5.3. As inputs, each decade of counting receives a "carry" pulse from the preceeding counter. These input pulses are counted, stored, and displayed as a decimal number up to a count of nine. When the tenth pulse is received, they reset to zero and pass a carry pulse to the following decade of counting. The reset, storage, and display update functions are identical to the least significant decade of counting.

2.4.5.5 Preset Functions. - The preset module pairs associated with the four most significant decades of counting are normally used to preset each of the data input lines (pins 3, 4, 10, and 11 of U7, U11, U15, and U19) to a predetermined number. Presetting is necessary when it is desired to start the counting functions at a number other than zero. In the DECIMAL SHIFT mode of operation, the preset pulse output from the gate generator is not connected to the count, decode, and display assembly since presetting is not required. In the NORMAL DISPLAY Mode switch S2B-X applies the preset strobe to each of the decade counters enabling their data input lines. However, only the most significant decade (U19) is preset to the number 8 (refer to paragraph 2.4.1.1 for details).

SECTION III

INSTALLATION AND OPERATION

3.1 INSTALLATION

The DMS-105A is designed for mounting in a standard 19-inch rack. It requires 5.25 inches of vertical space and extends 19.5 inches into the rack. For a mobile installation additional physical support must be provided at the sides or rear of the unit. A brace extending along the sides from the front panel to the rear apron is preferred. Figure 3-1 illustrates the DMS-105A critical dimensions.

3.1.1 Power Connection. - Before proceeding, make certain that the POWER switch on the DMS-105A front panel is set to the off position and that 115/220 Vac input power selector switch S10 on the rear apron is set to match the input voltage. A small screwdriver can be used to operate this switch. External bonding is not required for the DMS-105A because the third pin on the power plug provides chassis grounding. However, if the two-pin adapter must be used, make certain that the adapter ground wire is securely grounded before plugging the power cord into a 115 or 220 Vac, 50-400 Hz source. The locations of the DMS-105A rear-panel controls and connectors are illustrated in Figure 5-2.

3.1.2 RF Input Connection. - The input signal to the DMS-105A is applied to rear panel jack A19J1, a BNC connector. Input impedance is either 50 or 1000 ohms.

3.1.3 Audio Output Connection. - The balanced 600-ohm audio output from the DMS-105A is available at rear-panel terminal, TB1. A front panel PHONES jack is also provided.

3.1.4 Video Output. - Video output from the DMS-105A is provided at rear-panel BNC jack J8.

3.1.5 FM Output. - DC coupled FM output is available at rear-panel jack J7, a BNC connector.

3.1.6 AM DET Output. - AM detector output is available at rear-panel jack J6, a BNC connector.

3.1.7 Translator Output. - A front-panel selectable predetection output of 100 kHz, 50 kHz, or 15 kHz is provided at rear-panel BNC jack J5.

3.1.8 IF Output. - The 2 MHz IF signal is available at rear-panel BNC jack J4.

3.1.9 SM Output. - A 2 MHz output for use with a signal monitor is available at SM OUTPUT jack J3, a BNC connector.

3.1.10 LO Output. - The DMS-105A internal local oscillator signal is available at rear-panel jack J1, a BNC connector.

3.1.11 LO Input. - An external local oscillator source can be used with the DMS-105A by applying the signal to rear-panel EXT LO INPUT jack J2, a BNC connector.

3.2 OPERATION

The use of the DMS-105A front-panel operating controls is explained in the following paragraphs. These controls are shown in Figure 1-1, a front view of the unit.

3.2.1 Tuning Control. - The 1-1600 kHz MAIN TUNING knob is used for coarse tuning of the DMS-105A. Approximately thirty-seven turns of the control are required to tune the unit throughout its entire frequency range.

3.2.2 Fine Tuning Control. - The FINE TUNING control is used for small adjustments to the DMS-105A tuning.

3.2.3 Input Selector. - The INPUT SELECTOR switch selects the desired tuning range and input inpedance of

the DMS-105A.

3.2.4 Input Attenuator. - The front-panel INPUT ATTENUATOR switch provides 0-50 dB attenuation of the DMS-105A input signal in 10-dB steps. Operate as required to prevent overloading.

3.2.5 Operating Mode. - Select the desired operating mode by placing the front-panel MODE switch in the appropriate position.

3.2.6 IF Bandwidth. - Select the desired IF bandwidth appropriate to the DMS-105A operating mode.

3.2.7 BFO. - Three operating modes are provided for the BFO: zero, 1-kHz, and variable. The ZERO position of the BFO switch provides the BFO signal at the 2-MHz IF center frequency. The 1-kHz position provides the BFO signal at 2.001 MHz, and the VAR position activates the variable BFO which is controlled by the front-panel PITCH control. When using the VAR position, the operator can tune the BFO from plus to minus 8-kHz through the IF center frequency.

3.2.8 IF Gain. - The IF GAIN control is used to vary the DMS-105A gain in the AM-MAN, BFO, USB, and LSB operating modes.

3.2.9 IF Translator. - The output frequency of the predetection IF output is controlled by the front panel TRANSLATOR OUTPUT switch. This switch has four positions: OFF, 100 kHz, 50 kHz, and 15 kHz.

3.2.10 Input Monitor. - The INPUT MONITOR switch selects either the NORMAL or BYPASS mode of operation for the DMS-105A. In the BYPASS mode, input signals applied to the rear panel RF input jack are switched to the DMS-105A audio/video amplifiers. In the NORMAL position the DMS-105A functions as a tunable demodulator.

3.2.11 LO Selector. - This control selects the internal local oscillator in the DMS-105A in the INT position. Placing the switch to the EXT position allows the use of an external local oscillator.

3.2.12 Audio Gain/Video Gain. - These controls vary the gain of the respective audio/video amplifiers.

3.2.13 Counter Mode. - The counter MODE switch determines the resolution of the frequency display and switches the DAFC on or off. In the NORMAL mode, the display resolution is ±100 Hz with the DAFC operating in the DAFC position and the DAFC off in the TUNE position. In the DECIMAL SHIFT mode, the readout resolution is ±10 Hz with the DAFC operating in DAFC and OFF in TUNE.

3.2.14 DAFC Last Digit Switch. - This switch functions when the MODE switch is in either of the DAFC positions. It sets the last digit of the frequency display and locks the DMS-105A's local oscillator to this digit. When locking the DMS-105A to a frequency in the DAFC mode, first tune as closely as possible to the frequency with the MODE switch in a TUNE position. Then place the MODE switch in a DAFC position with the DAFC LAST DIGIT switch set to the last digit of the desired frequency. If the demodulator is to be retuned when in the DAFC mode to a new frequency which is more than ±4 digits from the last frequency, place the MODE switch in a TUNE position, and then reset DAFC as previously described.

3.2.15 Adaption to 230 Vac Operation. - The input transformer of the DMS-105A has been designed to operate with a nominal input voltage of 230 Vac, by simply repositioning a wire on the transformer. If a nominal input voltage of 230 Vac is to be utilized, refer to Note 7 of the DMS-105A Main Chassis Schematic, Figure 6-22.

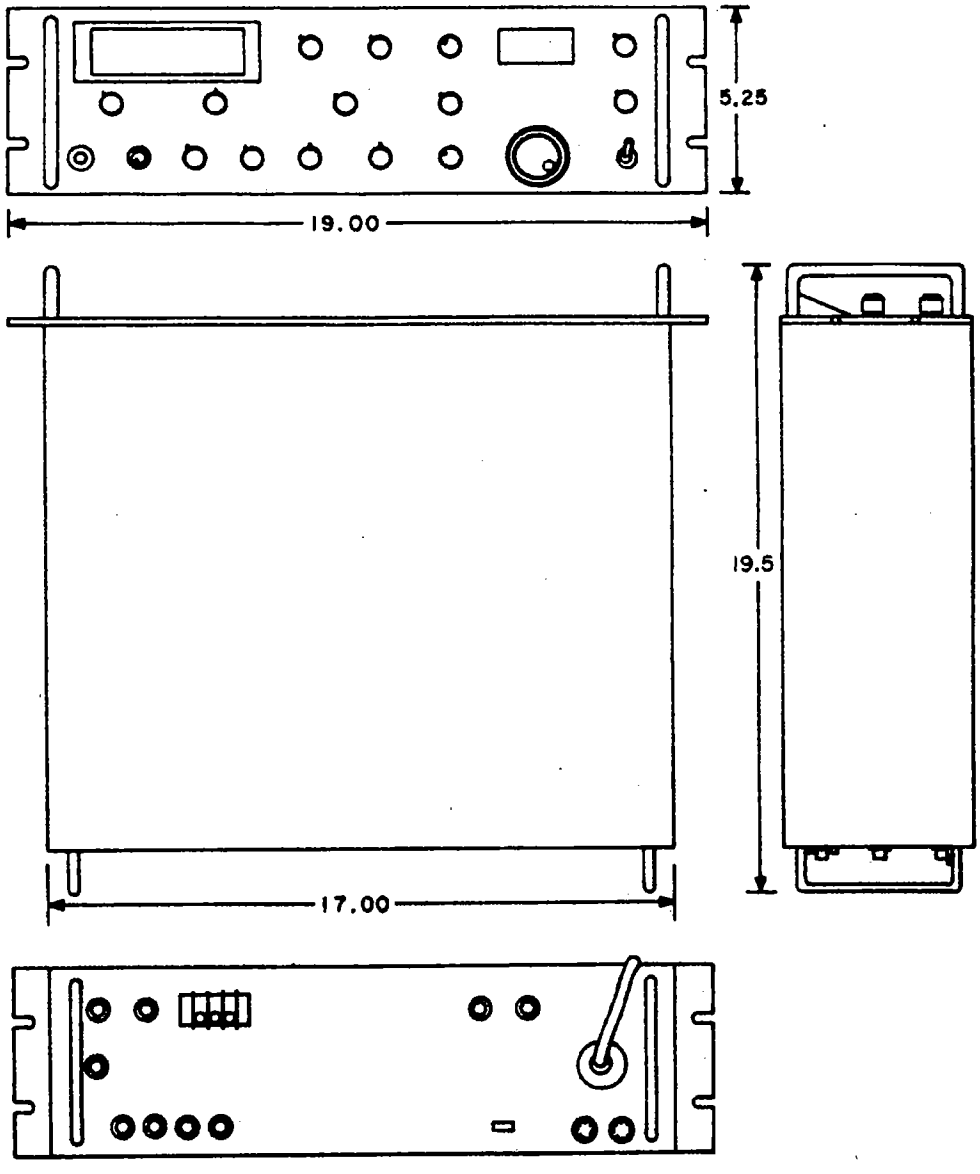


Figure 3-1. Type DMS-105A Demodulator, Critical Dimensions

SECTION IV
MAINTENANCE

4.1 GENERAL

The DMS-105A is conservatively designed to give trouble-free service. It presents no special maintenance problems, and normally requires no care beyond being kept clean. Should trouble occur, down time will be minimized if the maintenance technician is thoroughly familiar with Section II of this manual in which the circuits are described before beginning the troubleshooting. Field maintenance should be confined to cleaning and the replacement of fuses and plug-in modules. All other maintenance should be carried out in a well-equipped shop and performed only by experienced personnel.

4.2 PLUG-IN MODULE REMOVAL

The plug-in modules can be easily removed by simply pulling them upward from the receptacles into which they are fitted. The numbers on the module pins correspond to the numbers indicated on the schematic diagrams at the points where the connecting leads pass through the lines outlining each module. All plug-in modules have their type numbers etched on the back of the cards. By referring to the schematic diagrams their reference designation prefixes can be found, and thus their proper location in the unit.

4.3 TROUBLE SHOOTING, RECEIVING CIRCUITS

Trouble shooting efforts should first be directed toward localizing the problem to a particular module or circuit group. Once the faulty module has been located, the defective component should be isolated using data obtained from the circuit descriptions, voltage measurements, and the schematic diagrams.

4.3.1 Troubleshooting. - The following table lists several probable trouble indications and diagnostic procedures to be followed.

Table 4-1. Receiver Troubleshooting

TROUBLE INDICATION	PROBABLE FAULT	DIAGNOSTIC PROCEDURE
1. Unit totally inoperative;	Fuse F1 or F2 blown; power switch S9 defective; line cord and filter FL1 defective; no primary input power; faulty transformer T1; failed power supply board, A14, A15.	Use an AC voltmeter to check the primary power wiring and transformer T1. With a DC-VTVM, measure the +18 Vdc output from A15 and the -18 Vdc output from A14.
2. Unit inoperative; tuned frequency displayed on counter; no audio or video output; any reception mode.	Failed audio/video amplifier.	Place INPUT MONITOR switch S8 in the BYPASS mode and supply a 1 KHz 10 MV audio input to A19J1. Use an oscilloscope to trace the signal from A19J1 through board A2 (1V nominal) INPUT MONITOR switch J8, gain potentiometers R4A-B and audio/video amplifier A13. Observe the video at J8, and the audio at TB1 pins 1 and 2 while varying the audio and video gain controls.
	Failed INPUT MONITOR switch S8.	Check the function of S8.
	Failed MODE switch S5C-W.	Check function of S5C-W.

TROUBLE INDICATION	PROBABLE FAULT	DIAGNOSTIC PROCEDURE
	Failure of mixer board A2.	Check operation of mixer A2; substitute a spare board known to be good. Supply a 3 mVCW input to the DMS-105A at its tuned frequency in the AM/AGC mode. Using a wideband oscilloscope check for 2 MHz IF output at XA2 pin 2 check LO input to pin 1 of balanced mixer A2Z1 (nominal 1V P-P).
	Failed input filter assembly A19 or input attenuator A20.	Apply input at the DMS-105A tuned frequency to jack A19J1 check A19J2 for the signal with an RF voltmeter or wideband oscilloscope; check for the input signal at XA2 pin 18.
3. Unit inoperative, 1-600 kHz band only; counter readout normal.	Failed input filter assembly A19.	Apply a 1-600 kHz input signal to A19J1 and check A19J2 for the signal with an RF voltmeter or wideband oscilloscope.
4. Unit inoperative, 1-600 kHz band only; counter readout tubes all zero.	Failed low band oscillator A18A1Q1 or buffer A18A1Q2.	Check LO output frequency and level at A2Z1 pin 1. Level should be 1V P-P nominal.
5. Unit inoperative, 540-1600 kHz band only; counter readout normal.	Failed input filter assembly A19.	Apply a 1-600 kHz input signal to A19J1 and check A19J2 for signal with an RF voltmeter or wideband oscilloscope.
6. Unit inoperative 540-1600 kHz band only; counter readout tubes all zero.	Failed high band oscillator A18A1Q3 or buffer A18A1Q4.	Check LO output frequency and level at A2Z1 pin 1. Level should be 1V P-P, nominal.
7. Unit inoperative, single IF bandwidth.	Failed IF amplifier.	Apply an input signal, check appropriate IF channel on module A3, A4, A5, or A6 using a wideband oscilloscope.
	Failed IF BANDWIDTH switch S3 or S4.	Check switched enable voltages to the affected IF amplifier boards.
8. Unit inoperative in USB or LSB modes only.	Failed USB/LSB IF amplifier A6.	Supply an input signal at the DMS-105A tuned frequency; observe XA6 pin 14 (input) and XA6 pin 20 (output) for the 2-MHz IF signal with a scope when in the LSB position, and XA6 pin 11 (input) and XA6 pin 5 (output) when in the USB position.
	Failed mode switch S5B-X.	Check for +18V on XA6 pin 13 (LSB position) and XA6 pin 10 (USB position).
9. Unit inoperative in FM/AGC, AM/AGC, AM/MAN, or BFO modes only.	Failed AM/FM/MCW IF amplifier A7.	Supply an input signal at the DMS-105A tuned frequency, switch to AM/AGC and observe XA7 pin 5 (input) and XA7 pin 18 (output) for the 2 MHz IF signal.
	Failed MODE switch S5B-X.	Observe XA7 pin 11 for +18V in the FM/AGC, AM/AGC, AM/MAN, and BFO modes.

TROUBLE INDICATION	PROBABLE FAULT	DIAGNOSTIC PROCEDURE
10. Unit inoperative in AM/MAN, BFO, USB and LSB mode only.	Failed Zener VR1 or IF GAIN control R2 or MODE switch S5B-W.	Check R2 for +10.4V at the high end and check the arm for 0 to +10.4V. Check the operation of S5B-W by observing XA5 pin 11 for the same voltage obtained at the arm of R2 when in the AM/MAN, BFO, USB or LSB modes.
11. Unit inoperative in the FM or AM/AGC modes only.	Failure of A11AR1 or associated AGC circuitry.	Supply an input at the tuned frequency to the DMS-105A and observe the AGC buss voltage at XA11 pin 16 while in the AM/AGC mode. Vary the input level; the AGC voltage should vary from 12V at no signal to 4V at 3mV.
12. Unit inoperative in FM mode 5-7-8-16 kHz BW only.	Failure of WB-FM demodulator on module A12 or associated enable switching circuitry (S4-X).	Provide an input to the DMS-105A at the tuned frequency at 1 mV. Check for 2 MHz IF signal at XA12 pin 14. Check for +18V at XA12 pin 16. Check WB discriminator of channel (A12AR1, CR1-CR2, Q1-A2).
13. Unit inoperative in FM mode 150 Hz, 1 kHz BW only.	Failure of NB-FM demodulator on A12 or associated enable switching circuitry (S4-X).	Provide an input to the DMS-105A at the tuned frequency at 1 mV. Check for 2 MHz IF signal at XA12 pin 14. Check for +18V at XA12 pin 16. Check WB discriminator channel (A12AR1, CR1-CR2, Q1-A2). Check for 2 MHz IF at XA12 pin 4. Check for +18V at XA12 pin 6. Check NB disc AR2-Q3-Q4.
14. No FM output all BW affected.	Failure of IF buffer A8 or associated enable voltage switching (S5B-X).	Supply input to DMS-105A. Check for 2 MHz IF at XA8 pin 2. Check for 2 MHz IF at XA8 pin 19. Check enable voltage at XA8 pin 16 (+18V).
15. No demodulator output in BFO, USB, and LSB demodulation modes.	Failure of IF buffer A8 or associated enable voltage switching (S5B-X).	Supply input to DMS-105A. Check for 2 MHz IF at XA8 pin 4, check for 2 MHz IF at XA8 pin 19 (BFO mode). Check for 2 MHz IF input at XA8 pin 20 (USB) and XA8 pin 21 (LSB). Check for +18V enable voltage at XA8 pin 16 (BFO mode) and XA8 pin 14 (USB) and XA8 pin 15 (LSB).
16. No IF translator output all translator output positions; CW/SSB/FSK demodulator function also failed.	Failure of IF buffer A8 or associated enable voltage switching (S5B-X).	Supply input to DMS-105A. Check for 2 MHz IF at XA8 pin 4, check for 2 MHz IF at XA8 pin 19 (BFO mode). Check for 2 MHz IF input at XA8 pin 20 (USB) and XA8 pin 21 (LSB). Check for +18V enable voltage at XA8 pin 16 (BFO mode) and XA8 pin 14 (USB) and XA8 pin 15 (LSB).

TROUBLE INDICATION	PROBABLE FAULT	DIAGNOSTIC PROCEDURE
17. Loss of IF output.	Failure of IF buffer A8 or enable voltage switching.	Supply DMS-105A input signal and check for IF output at XA8 pin 6.
18. Loss of AM output; other reception modes function normally.	Failure of AM/MCW/AGC/MGC demodulator (A11).	Check for IF input at XA11 pin 20. Check for AM detector output voltage at XA11 pin 3. Use a wideband oscilloscope and check 2 MHz IF signal through A11Q1 and A11Q2. Trace AM detector voltage through A11Q4 and A11Q5.
19. Loss of BFO or USB or LSB operation.	Failure of CW/SSB/FSK demodulator (A10).	Check for IF input to XA10 pin 19. Use a wideband oscilloscope to trace IF signal to A11Q2. Check for operation of appropriate oscillator A11Q6, A11Q8, or A11Q9. Trace difference (translated signal) output from A11Q2 through A11Q3, Q4, Q5.
20. Loss of IF translator output; other functions normal.	Failure of IF translator (A9).	Using a wideband oscilloscope, trace IF signal through A9Q1. Check for LO input to mixer A9Q3. Check operation of appropriate oscillator A9Q2, Q4, or Q7. Trace translated output signal through amplifier stages A9Q5, Q6, Q8, and Q9.
21. Loss of LO output or faulty operation with external LO output other functions normal.	Failure of LO isolation amplifier (A1).	Use a wideband oscilloscope and trace LO signal through LO isolation amplifier A1.

4.4 TROUBLESHOOTING, COUNTER CIRCUITS

Troubles within counter assembly A17 will be most easily located by using a wideband oscilloscope to isolate the fault to a particular board. Then, voltage measurements will usually isolate the fault to a defective component. Several probable trouble indications have been listed along with a suggested diagnostic procedure.

Table 4-2. Counter Troubleshooting

TROUBLE INDICATION	PROBABLE FAULT	DIAGNOSTIC PROCEDURE
1. LED indicators do not light.	Faulty +5V power supply.	Check A2 pin 19 for +5V output.
2. One or more LED indicators show incomplete character.	Defective LED IC.	Replace LED IC.
3. LED indicators light but the frequency display is unstable or at the wrong frequency.	(a) Oscillating +5V power supply.	(a) Replace +5V power supply with one known to be operational and check counter operation.
	(b) Defective logic IC.	(b) Inject 1.5 MHz 100 mV test signal into jack A17J1. Signal trace through count, store and display module A2 with a wideband oscilloscope.

TROUBLE INDICATION	PROBABLE FAULT	DIAGNOSTIC PROCEDURE
4. One LED indicator displays a single steady count; indicators to the left readout a normal display.	(a) Defective storage IC on assembly A2.	(a) Check storage IC and replace if defective.
	(b) Defective LED indicator on assembly A2A1.	(b) Check LED indicator and replace if defective.
5. One LED indicator fails and the LED indicators to the left also fail.	Failure of a decade counter IC on assembly A2.	Isolate the defective decade counter by signal tracing with wideband oscilloscope. Replace defective component.
6. Only readout is zero on LED indicators with or without input signal.	(a) Reset pulse from A1 fails, stays low (active).	(a) Check for proper reset waveform.
	(b) Signal gate waveform from A1 fails, stays low (inactive).	(b) Check for proper signal gate waveform.
7. Only readout is a stable count with or without input.	Storage strobe pulse from A1 fails, stays high (inactive).	Check for proper storage strobe waveform.
8. Readout displays a rapid frequency count.	Storage strobe pulse from A1 fails, stays low (active).	Check for proper storage strobe waveform.
9. Stable readout with flashing background.	Signal gate pulse from A1A1 fails, stays low (active).	Check for proper signal gate waveform.
10. Slow free-running count with normal input to A17J1.	Reset pulse from A1 fails, stays high (inactive).	Check for proper reset waveform.
11. In the DAFC ON position, the DAFC will not lock on the digit (±digit) selected by the LAST DIGIT switch.	(a) Defective decoder IC.	(a) Check A1U10.
	(b) Defective LAST DIGIT switch.	(b) Check A17S1.
	(c) Defective up command and down command circuits.	(c) Check stages A1Q3 through A1Q5.
	(d) Defective DAFC output circuits.	(d) Check stages A1Q6 and A1Q7.
	(e) Defective MODE switch.	(e) Check S2B-W.

4.5 ALIGNMENT PROCEDURES

4.5.1 General. - The alignment procedures given here are suitable when making adjustments after replacing transistors or components. Only those controls specifically referred to within a series of steps given for aligning a particular circuit affect the alignment of that circuit. Those controls not mentioned in any one series of steps may be left in any position. The alignment of the DMS-105A should be performed only with suitable equipment by technicians thoroughly familiar with the unit. If the limits and tolerances specified in the following procedures cannot be obtained, then a factory alignment is necessary.

4.5.2 Test Equipment. - The following test instruments, or their equivalents are required to align the DMS-105A.

(1) VTVM, RCA WV-98C

(2) Digital Voltmeter, Dana, Type 5500/112

(3) AC VTVM, Hewlett Packard Type HP-400L

(4) Signal Generator, Hewlett Packard Type HP-606B

(5) Oscilloscope, Tektronix Type 503 and 544

(6) Frequency Counter, Computer Measurements Company CMC-738A

(7) Sweep Generator, Telonic SM-2000 with VR-2M Sweep Head

(8) Detector, Telonic XD-3A

(9) Detector, High Impedance (See Figure 4-1)

(10) Assorted Cables, Connectors, Alignment Tools

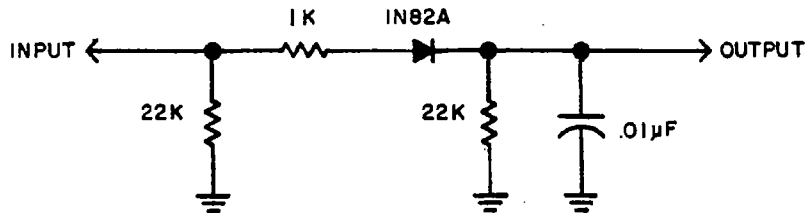


Figure 4-1. High Impedance Detector

4.5.3 Power Supplies. - Proceed as follows:

(1) Apply power to the DMS-105A and the test equipment.

(2) Connect the digital voltmeter test leads to XA14 pin 14 and ground.

(3) Adjust A14R6 for a reading of -18.0 Vdc.

(4) Connect the DVM test leads to XA15 pin 12 and ground.

(5) Adjust A15R7 for a reading of +18.0 Vdc.

(6) Connect the DVM test leads to XA16 pin 18 and ground.

(7) Adjust A16R12 for +5.00 Vdc.

(8) Connect the DVM to XA16 pin 6. Reading should be between -4.6 and -5.4 Vdc.

4.5.4 Counter 1 MHz Oscillator and DAFC Adjustment. - Proceed as follows:

(1) Connect the equipment as shown in Figure 4-2, and allow 30 minute warmup.

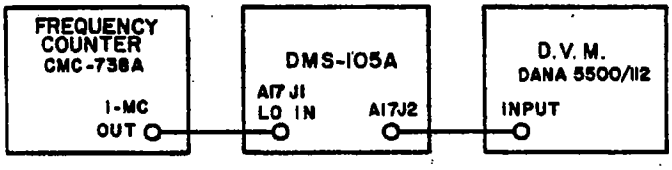


Figure 4-2. Test Setup, Counter 1 MHz Oscillator and DAFC Alignment

(2) Place the DMS-105A Counter's MODE switch to the DECIMAL SHIFT - TUNE position.

(3) Adjust A17A1C3 for a readout of 000.00 on the Counter in the DMS-105A.

(4) Disconnect Counter from A17J1 and connect DVM to A17J2.

(5) Adjust A17A1R17 for a 0.00 volt reading on the digital voltmeter.

4.5.5 LO Tuning Assembly/LO Isolation Amplifier. - Proceed as follows:

(1) Make the following DMS-105A control settings:

a. FINE TUNING - CENTER

b. LO SELECTOR - INT

c. INPUT SELECTOR - 1-600 kHz, 50 Ω

d. MODE - TUNE

(2) Set A18A1A1R9 and A18A1A1R18 maximum CW.

(3) Set the MAIN TUNING control to obtain the lowest frequency reading (i.e., maximum CCW). Adjust A18A1C8 for a counter reading of 000.5.

(4) Set the MAIN TUNING control to the high end of the tuning range and note the readout. A readout of 610±10 kHz should be obtained. If not, adjust the number of turns or the turns spacing of A18A1A1L4 to obtain the correct readout. Prior to adjusting A18A1A1L4, remove the Q-dope from the coil using Q-dope thinner. Reapply Q-dope to the coil after the adjustment procedure has been completed.

(5) Repeat steps 3 and 4 as necessary to obtain the required LO range.

(6) Set the INPUT SELECTOR switch to 540-1600 kHz, 50 Ω.

(7) Set the MAIN TUNING control to obtain the lowest frequency reading (i.e., maximum CCW). Adjust A18A1C5 for 535.0 kHz.

(8) Set the MAIN TUNING control to high end of the tuning range. The readout should be 1610±10 kHz. If not, adjust the number of turns or the turns spacing of A18A1A1L2 to obtain the correct readout.

(9) Set the INPUT SELECTOR to 1-600 kHz, 50 Ω, and connect an AC-VTVM, loaded with 50 Ω, to J1, LO output.

(10) Set A1R13 to midrange.

(11) Adjust A1R7 for minimum LO output, as read on AC-VTVM.

(12) Set MAIN TUNING control for 1 kHz.

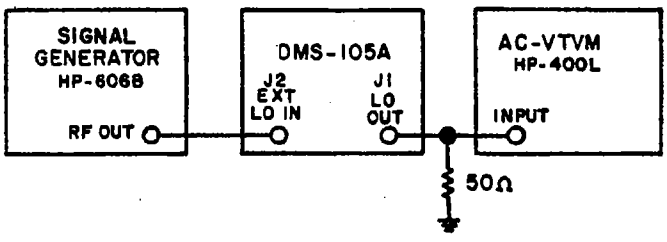


Figure 4-3. Test Setup, LO Isolation Amplifier Alignment

(13) Adjust A18A1R18 for 50 mV rms LO output.

(14) Change INPUT SELECTOR to 540-1600 kHz, 50 Ω.

(15) Adjust A18A1R9 for 50 mV rms LO output.

(16) Set the LO SELECTOR switch to EXT and connect the equipment as shown in Figure 4-3.

(17) Adjust the signal generator controls for a 2.5-MHz CW signal at a level of 220 mV rms.

(18) Adjust A1R24 for a level of 50 mV rms on the AC VTVM.

4.5.6 Mixer. - Proceed as follows:

(1) Connect the equipment as shown in Figure 4-4.

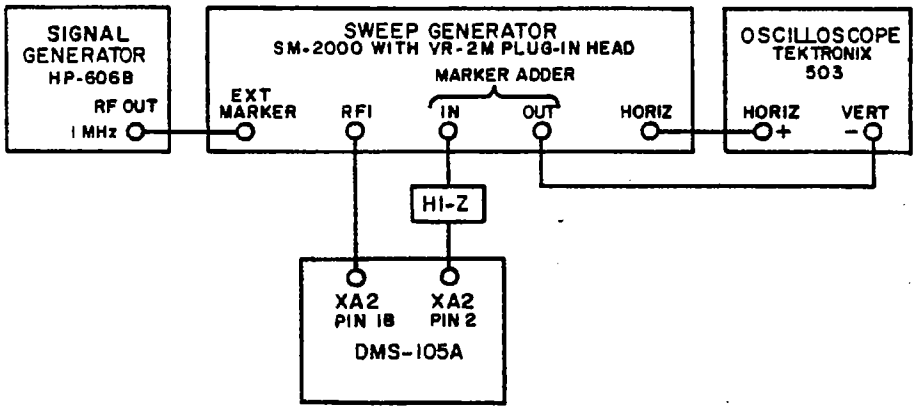


Figure 4-4. Test Setup, Mixer Alignment

(2) Make the following initial control settings:

a. INPUT SELECTOR - 540-1600 kHz, 50 Ω

b. MAIN TUNING - For Counter readout of 1000.0

c. Counter MODE - NORMAL DISPLAY - TUNE

d. MODE - AM/MAN

e. IF GAIN - MAX CW

f. LO SELECTOR - INT

(3) Adjust the sweep generator for a 1-MHz C.F. and 100 kHz sweep width.

(4) Adjust the oscilloscope controls to display the mixer response.

(5) Adjust A2L3 through A2L5 for a maximum amplitude symmetrical response.

(6) Remove the RF output of the sweep generator from XA2 pin 18. Select the 1-600 kHz band and the 1 kHz IF bandwidth. Tune the receiver to 0000.6 kHz.

(7) Adjust the IF GAIN control to the SET LEVEL reading on the signal strength meter.

(8) Adjust A2R18 and A2C11 for minimum LO feedthrough as indicated by a minimum reading on the signal strength meter.

(9) Typical LO Reduction: From set level to below '2' on SS meter.

4.5.7 IF Amplifiers. - Proceed as follows:

(1) Connect the equipment as shown in Figure 4-5.

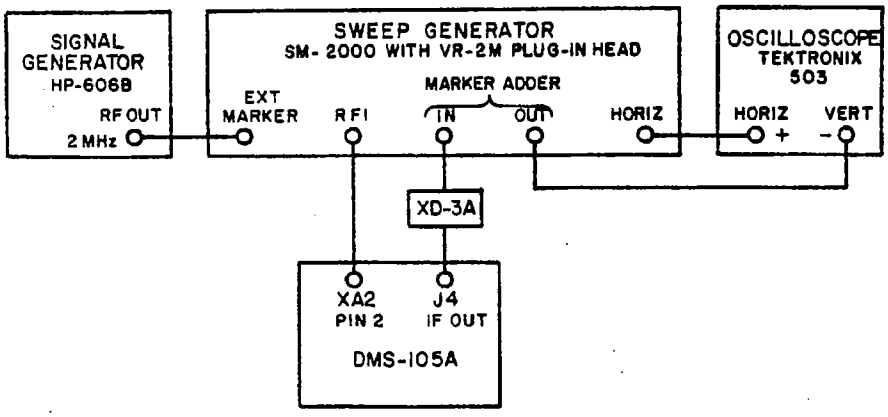


Figure 4-5. Test Setup IF Alignment

(2) Make the following initial control settings:

a. LO SELECTOR - EXT

b. MODE - AM/MAN

c. IF GAIN - MAX CW

d. IF BANDWIDTH - 16 kHz

e. GAIN POTENTIOMETERS R20 and R4 on A3 through A6 - MAX CW

f. GAIN POTENTIOMETER A7R6 - MAX CW

g. SWEEP GENERATOR - 2 MHz C.F. and ±15 kHz sweep

(3) Adjust the oscilloscope controls to display the IF response.

(4) Adjust A7L1 through A7L3 for maximum output and symmetrical response.

4.5.8 AM/MCW Demodulator. - Proceed as follows:

(1) Make initial control settings as in 4.5.7 (steps 2a through 2d above). Connect the equipment as shown in Figure 4-5 except connect the marker adder input to the DMS-105A AM output jack J6. Keep the sweep generator output level low to avoid overloading the DMS-105A IF amplifiers.

(2) Adjust the DMS-105A IF GAIN to obtain a useful output level on the oscilloscope.

(3) Set A11R6 maximum CW.

(4) Adjust A11L1, A11L2, and A11L4 for maximum amplitude and symmetrical response.

4.5.9 FM Demodulator/IF Buffer. - Proceed as follows:

(1) Connect the equipment as shown in Figure 4-6.

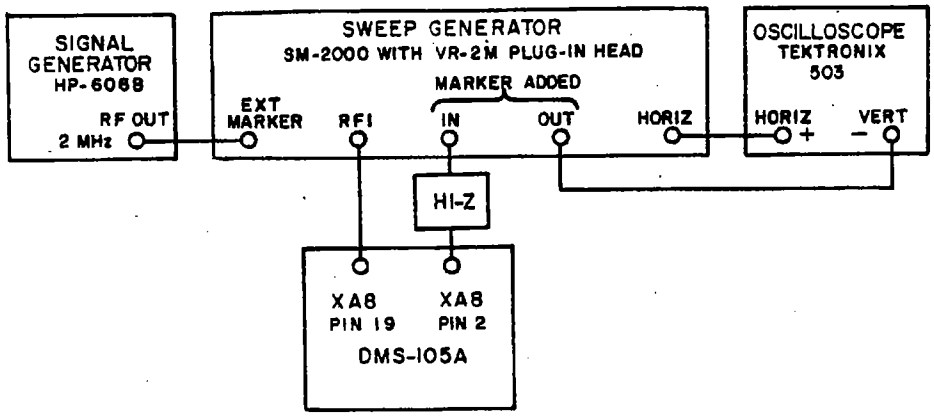


Figure 4-6. Test Setup, FM Demodulator Alignment

(2) Make the following initial control settings:

a. LO SELECTOR - EXT

b. MODE - FM

c. IF GAIN - MAX CCW

d. IF BANDWIDTH - 16 kHz

(3) Adjust the sweep generator controls for a 2-MHz center frequency. Adjust the oscilloscope controls to display the response curve. Set the HP-606B controls to provide a 2-MHz marker.

(4) Adjust A8L1 to center the response at precisely 2.000 MHz.

(5) Remove the high impedance detector and connect J7 (FM output) to marker adder input of sweeper.

(6) Adjust A12T1 and A12L3 for linear response and zero crossing at 2.000 MHz. (Typical response slope = 4V/16 kHz.)

(7) Set the IF BANDWIDTH switch to 1 kHz.

(8) Readjust sweep generator controls for narrowband sweep.

(9) Adjust A12L4 for linear response. (Typical response slope = 4V/1 kHz.)

4.5.10 Overall Gain and AGC. - Proceed as follows:

(1) Connect the equipment as shown in Figure 4-7.

(2) Make the following initial control settings:

a. MODE - AM/MAN

b. LO SELECTOR - INT

c. COUNTER MODE - Normal Display - Tune

d. INPUT MONITOR - Normal

e. INPUT ATTENUATOR - Zero

f. INPUT SELECT - 1-600 kHz, 50Ω

g. MAIN TUNING - Counter Readout 500.0 kHz

h. IF GAIN - Maximum CW

i. IF BANDWIDTH - 16 kHz

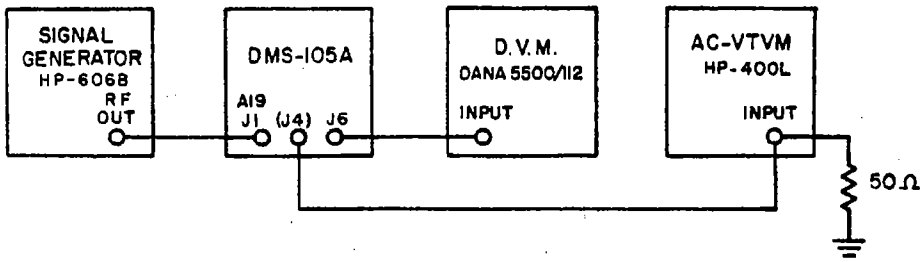


Figure 4-7. Test Setup, Overall Gain and AGC Alignment

(3) Adjust the signal generator for a CW signal at 500 kHz, with an output level of 30 μV.

(4) Adjust the gain pots, R4 and R20 on the IF Amplifier, A3-A6 for maximum gain (maximum CW) and adjust A11R6 and A7R6 for maximum gain (maximum CW).

(5) Observe the IF Output in all bandwidths.

(6) If all levels are above -22 dBm (18 mV rms), adjust the gain pots on the IF amplifiers A3-A5 for -22 dBm (18 mV rms). (Note: Because of gain variations in field effect transistors, the -22 dBm level may not be obtained with some bandwidths. If this occurs with any IF bandwidth, adjust all other bandwidths to this lower level.)

(7) Adjust A7R6 for -30 dBm (7 mV rms) IF output level. (Note: If this level cannot be obtained, adjustment of IF boards A3, A4, and A5 should be checked to assure proper output levels.)

(8) Change MODE to USB and set IF bandwidth to 8 kHz.

(9) Tune the Main Tuning to 494.0 kHz.

(10) Adjust A6R20 for -30 dBm (7 mV rms) IF output level.

(11) Change MODE to LSB and set IF bandwidth to 8 kHz.

(12) Tune the Main Tuning to 504.0 kHz.

(13) Adjust A6R4 for -30 dBm (7 mV rms) IF output level.

(14) Change MODE to AM/MAN and set IF bandwidth to 16 kHz.

(15) Adjust A11R6 until signal strength meter indicates "set", (approximately 2.4 V dc on the DVM).

(16) Change MODE to AM/AGC.

(17) Adjust A11R33 until signal strength meter indicates "6", (approximately 2.0 V dc on the DVM).

(18) Increase signal level by 30 dB; set meter should stay below "10".

4.5.11 CW/SSB/FSK Demodulator. - Proceed as follows:

(1) Connect the equipment as shown in Figure 4-8.

(2) Make the following initial control settings:

a. MODE - BFO

b. BFO - Zero

c. IF GAIN - Maximum

d. COUNTER MODE - Decimal Shift, Frequency set to 500.00 kHz

e. VIDEO GAIN - Maximum

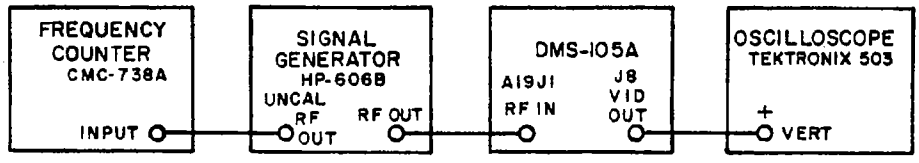


Figure 4-8. Test Setup, CW/SSB/FSK Demodulator Alignment

(3) Adjust the frequency of the signal generator for precisely 500.00 kHz with an output level of 30 μV.

(4) Adjust A10C22 for a zero beat.

(5) Switch the BFO to the 1 kHz position. Insure that the output frequency is approximately 1 kHz and the video output level is greater than 2.0V P-P.

(6) Set the BFO to VAR.

(7) Adjust the pitch to zero.

(8) Adjust A10C37 for a zero beat.

(9) Set the pitch to +8 kHz mark and insure that the output frequency is between 6 and 10 kHz, with an output level greater than 2.0 volts peak-to-peak.

(10) Set the pitch to -8 kHz mark and insure that the output frequency is between 6 and 10 kHz.

4.5.12 IF Translator. - Proceed as follows:

(1) Connect the equipment as shown in Figure 4-9.

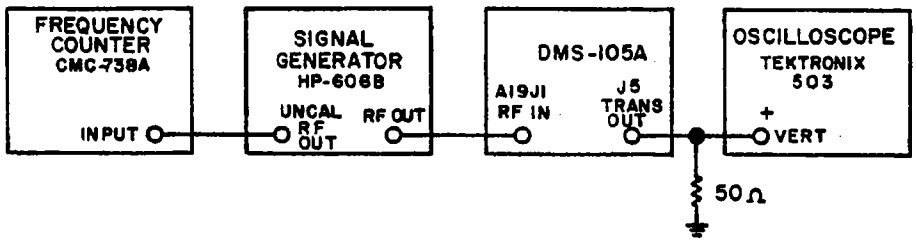


Figure 4-9. Test Setup, IF Translator Alignment

(2) Make the following control settings:

a. MODE - AM MAN

b. IF GAIN - MAX CW

c. LO SELECTOR - INT

d. TRANSLATOR OUTPUT - 100 kHz

e. BAND - 1-600 kHz (50 Ω)

f. TUNED FREQUENCY - 500 kHz

(3) Adjust the signal generator controls for a 500 kHz CW output at 30 μV.

(4) Set A9R4 to its maximum CW position.

(5) Adjust A9L1 for a maximum indication on the oscilloscope. Note the output.

(6) Select the 100 kHz TRANSLATOR OUTPUT. Note the output level on the oscilloscope.

(7) Select the 50 kHz TRANSLATOR OUTPUT. Note the output level on the oscilloscope.

(8) Select the 15 kHz TRANSLATOR OUTPUT. Note the output level on the oscilloscope.

(9) Adjust A9R4 to obtain a 2.0V P-P output level from the lowest signal level translated output recorded in steps (6), (7), and (8).

Table 4-3. Typical Transistor Element and Module Receptacle Pin Voltages

Ref. Desig.	Type	Gate 1	Gate 2	Drain	Source	Emitter	Base	Collector
A1Q1	2N4935					2.44	1.87	16.6
A1Q2	2N4935					2.36	1.80	16.6
A1Q3	2N4935					3.25	2.54	9.34
A1Q4	2N4935					3.19	2.48	9.19
A2Q1	2N4935					2.54	1.78	15.6
A2Q2	2N4935					7.52	6.85	15.0
A2Q3	2N2270					0.26	0.89	17.4
A2Q4	2N2904					0.06	-0.59	-17.4
A2Q5	3N187	0.87	3.68	14.0	1.40	*AM/AGC NO SIGNAL		
A2Q6	2N4935					8.77	8.05	17.7
A2Q7	2N4935					3.38	2.63	13.3
A3Q1	3N187	0.90	3.57	12.1	1.50	*AM/AGC NO SIGNAL		
A3Q2	2N4935					2.11	1.36	10.4
A3Q3	2N4935					10.8	10.0	16.5
A3Q4	3N187	0.93	5.47	11.5	1.70	*AM/AGC NO SIGNAL		
A3Q5	2N4935					2.10	1.37	10.5
A3Q6	2N4935					10.3	9.61	16.5
A4	Same as A3							
A5	Same as A3							
A6	Same as A3							
A7Q1	2N4935					3.51	2.80	14.0
A7Q2	2N4935					3.50	2.77	14.0
A8Q1	2N4935					1.86	1.14	16.3
A8Q2	2N4935					1.91	1.21	16.3
A8Q3	2N4935					1.82	1.10	16.5
A8Q4	2N4935					6.25	5.52	14.6
A8Q5	2N4935					6.15	5.46	14.5
A8Q6	2N4935					6.26	5.53	14.5
A8Q7	2N4935					5.43	4.68	12.5
A9Q1	3N187	1.03	1.63	11.3	1.46			

Table 4-3. (Continued)

Ref. Desig.	Type	Gate 1	Gate 2	Drain	Source	Emitter	Base	Collector
A9Q2	3N128							
A9Q3	3N187	-1.40	1.62	13.9	6.43			
A9Q4	3N128	0.0	---	14.9	5.30			
A9Q5	2N4074					1.09	1.68	15.8
A9Q6	2N3281					16.5	15.8	13.2
A9Q7	3N128	0.0	---	13.4	6.88			
A9Q8	2N2270					12.6	13.2	17.1
A9Q9	2N4037					12.0	11.5	0.0
A10Q1	2N4074					0.48	1.06	17.0
A10Q2	3N187	1.57	1.80	9.8	2.57			
A10Q3	2N4074					0.90	1.35	16.3
A10Q4	2N3251					16.9	16.3	6.54
A10Q5	2N4074					5.93	6.54	16.7
A10Q6	3N128	0.0	---	6.52	0.59			
A10Q7	2N3933					9.12	9.68	16.4
A10Q8	3N128	0.0	---	13.3	6.09			
A10Q9	3N128	0.0	---	15.7	3.30			
A11Q1	2N4935					3.04	2.31	12.4
A11Q2	2N5109					2.06	2.79	14.4
A11Q3	2N4074					-0.08	0.49	13.2
A11Q4	2N3251					0.56	-0.08	-16.6
A11Q5	2N4074					-0.04	0.56	15.1
A12Q1	2N3251					0.1	-0.55	-17.5
A12Q2	2N4074					-0.47	0.09	16.9
A12Q3	2N3251					0.59	-0.03	-17.6
A12Q4	2N4074					-0.02	0.6	16.8
A13Q1	2N4074					0.79	1.36	17.3
A13Q2	2N3251					17.9	17.3	10.0
A13Q3	2N2270					9.5	10.1	18.0
A13Q4	2N4037					9.0	8.34	0.0
A13Q5	2N4074					1.52	1.94	17.1
A13Q6	2N3251					17.8	17.1	8.51
A13Q7	2N2270					8.04	8.51	18.0
A13Q8	2N4037					7.35	6.59	0.0
A14Q1	2N3055					29.7	29.1	-18.0
A14Q2	2N4037					-18.0	-18.6	29.1
A14Q3	2N4037					-6.75	-18.6	-7.33
A14Q4	2N4037					-6.75	-7.37	-17.5
A15Q1	2N3055					18.0	18.6	27.0
A15Q2	2N4074					18.5	19.1	26.9
A15Q3	2N4074					6.93	7.50	19.1
A15Q4	2N4074					6.93	7.35	17.3
A16Q1	2N4074					6.0	6.58	10.3
A16Q2	2N3055					6.59	7.18	10.2
A16Q3	2N4074					3.04	3.59	7.18
A16Q4	2N4074					3.04	3.65	5.73
A17A1Q1	2N929					2.22	2.67	4.19
A17A1Q2	2N4074					0.00	0.45	1.22
A17A1Q3	2N3251					4.95	4.95	-4.90
A17A1Q4	2N3251					4.94	4.19	4.93
A17A1Q5	2N929					-4.90	-4.90	4.93
A17A1Q6	3N139	4.86	1.21	1.21	1.31			
A17A1Q7	2N4074					-4.04	-3.38	-0.04
A17A1Q8	2N4074					4.84	2.00	4.87

Table 4-3. (Continued)

Ref. Desig.	Type	Gate 1	Gate 2	Drain	Source	Emitter	Base	Collector
A17A2Q1	2N709A					0.00	0.22	2.21
A18A1A1Q1	3N128	0.0	---	6.71	0.6			
A18A1A1Q2	2N3933					11.4	10.8	16.8
A18A1A1Q3	3N128	0.0	---	6.74	0.3			
A18A1A1Q4	2N3933					11.4	10.4	16.8

TEST CONDITIONS: All readings are positive dc with respect to the chassis unless otherwise noted. Readings were taken with a digital voltmeter; 115 Vac applied to the DMS-105A; no signal input. Control Settings: IF BANDWIDTH in position being tested, MODE switch to enable circuits being tested, AUDIO/VIDEO gain controls fully CCW, INPUT SELECTOR to enable circuit being tested, INPUT MONITOR to enable circuit being tested, counter MODE in NORMAL DISPLAY-TUNE position, FINE TUNING in center of range. The DAFC was energized for measurement of A17A1Q6.

XA14

Pin	5	6	7	14
Volts	22.5 Vac	22.5 Vac	-31.5	-18.0

XA15

Pin	5	6	7	12
Volts	22.5 Vac	22.5 Vac	27.5	+18.0

XA16

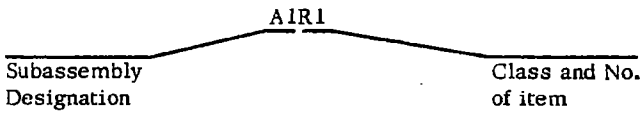
Pin	2	3	1	4	6	16	18-19	22
Volts	8.2 Vac	8.2 Vac	8.8	-10.3	-4.9	5.9	5.0	5.2

SECTION V

REPLACEMENT PARTS LIST

5.1 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:



Identify 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.

5.2 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.

5.3 LIST OF MANUFACTURERS

Mfr. Code	Name and Address
01121	Allen-Bradley Company 1201 South 2nd Street Milwaukee, Wisconsin 53204
01281	TRW Semiconductors, Inc. 14520 Aviation Boulevard Lawndale, California 90260
01351	Dynamic Gear Company, Inc. 175 Dixon Avenue Amityville, New York 11701
02114	Ferroxcube Corporation Post Office Box 359 Mt. Marion Road Saugerties, New York 12477
02735	RCA Corporation Solid State Division Route 202 Somerville, New Jersey 08876
04713	Motorola Semiconductor Products Inc. 5005 East McDowell Road Phoenix, Arizona 85008
04941	Walsco Electronics Corporation 4 South Wyman Rockford, Illinois 61101
06001	General Electric Company Capacitor Department Post Office Box 158 Irmo, South Carolina 29063
06978	Aladdin Electronics, Division of Aladdin Industries, Inc. 703 Murfreesboro Road Nashville, Tennessee 37210
07263	Fairchild Camera and Instrument Corp. Semiconductor Division 464 Ellis Street Mountain View, California 94040

Mfr. Code	Name and Address
07387	The Birtcher Corporation 4371 Valley Boulevard Los Angeles, California 90032
12498	Teledyne Crystalonics 147 Sherman Street Cambridge, Massachusetts 02140
14482	Watkins-Johnson Company 3333 Hillview Avenue Palo Alto, California 94304
14632	Watkins-Johnson Company 700 Quince Orchard Road Gaithersburg, Maryland 20878
18324	Signetics Corporation 811 East Argues Avenue Sunnyvale, California 94086
21604	The Buckeye Stamping Company 555 Marion Road Columbus, Ohio 43207
23783	British Radio Electronics, Ltd. 1742 Wisconsin Avenue, N. W. Washington, D. C. 20007
25088	Siemens America, Incorporated 350 5th Avenue New York, New York 10001
27193	Cutler-Hammer, Incorporated Special Products Division 4201 North 27th Street Milwaukee, Wisconsin 53216
28480	Hewlett-Packard Company 1501 Page Mill Road Palo Alto, California 94304
37942	P. R. Mallory and Company, Incorporated 3029 East Washington Street Indianapolis, Indiana 46206
49956	Raytheon Company 141 Spring Street Lexington, Massachusetts 02173
56289	Sprague Electric Company Marshall Street North Adams, Massachusetts 01247
70417	Chrysler Corporation Amplex Division 6501 Harper Avenue Detroit, Michigan 48211
70674	A. D. C. Products Division of Magnetics Controls Company 4900 West 78th Street Minneapolis, Minnesota 55435
71279	Cambridge Thermionic Corporation 445 Concord Avenue Cambridge, Massachusetts 02138
71400	Bussman Manufacturing Division of McGraw-Edison Company 2536 West University Street St. Louis, Missouri 63107
71482	C. P. Clare and Company 3101 Pratt Boulevard Chicago, Illinois 60645
71590	Globe-Union Incorporated Centralab Division Post Office Box 591 Milwaukee, Wisconsin 53201
71785	Cinch Manufacturing Company Howard B. Jones Division 1026 South Homan Avenue Chicago, Illinois 60624
72136	Electro Motive Manufacturing Company, Incorporated South Park & John Streets Willimantic, Connecticut 06226
72982	Erie Technological Products, Inc. 644 West 12th Street Erie, Pennsylvania 16512
73138	Beckman Instruments, Incorporated Helipot Division 2500 Harbor Boulevard Fullerton, California 92634
73445	Amperex Electronic Corporation 230 Duffy Avenue Hicksville, Long Island, New York 11801

Mfr. Code	Name and Address
73734	Federal Screw Products Incorporated 3917 North Kenzie Avenue Chicago, Illinois 60618
73899	JFD Electronics Company Division of Stratford Retreat House 15th at 62nd Street Brooklyn, New York 11219
74306	Piezo Crystal Company 100 K Street Carlisle, Pennsylvania 17013
74868	Bunker-Ramo Corporation The Amphenol RF Division 33 East Franklin Street Danbury, Connecticut 06810
75042	IRC Division of TRW Incorporated 401 North Broad Street Philadelphia, Pennsylvania 19108
75915	Littelfuse, Incorporated 800 East Northwest Highway Des Plaines, Illinois 60016
76854	Oak Manufacturing Company Division of Oak Electro/Netics Corporation South Main Street Crystal Lake, Illinois 60014
79136	Waldes Kohinoor Incorporated 47-16 Austel Place Long Island City, New York 11101
80058	Joint Electronic Type Designation System
80131	Electronic Industries Association 2001 Eye Street, N. W. Washington, D. C. 20006
81312	Winchester Electronics Division Litton Industries, Incorporated Main Street & Hillside Avenue Oakville, Connecticut 06779
81349	Military Specifications
82389	Switchcraft, Incorporated 5555 North Elston Avenue Chicago, Illinois 60630
83086	New Hampshire Ball Bearings, Inc. Peterborough, New Hampshire 03458
91293	Johanson Manufacturing Company Post Office Box 329 Boonton, New Jersey 07005
91418	Radio Materials Company 4242 West Bryn Mawr Avenue Chicago, Illinois 60646
91506	Augat, Incorporated 33 Perry Avenue Attleboro, Massachusetts 02703
93332	Sylvania Electric Products, Inc. Semiconductor Products Division 100 Sylvan Road Woburn, Massachusetts 01801
93958	Republic Electronics Corporation 176 East 7th Street Paterson, New Jersey 07524
94144	Raytheon Company Components Division Industrial Components Operation 465 Centre Street Quincy, Massachusetts 02169
96906	Military Standards
99800	American Precision Industries Delevan Electronics Division 270 Quaker Road East Aurora, New York 14052
99848	Wilco Corporation 4030 West 10th Street Post Office Box 22248 Indianapolis, Indiana 46222

5.4 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 Company, 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.

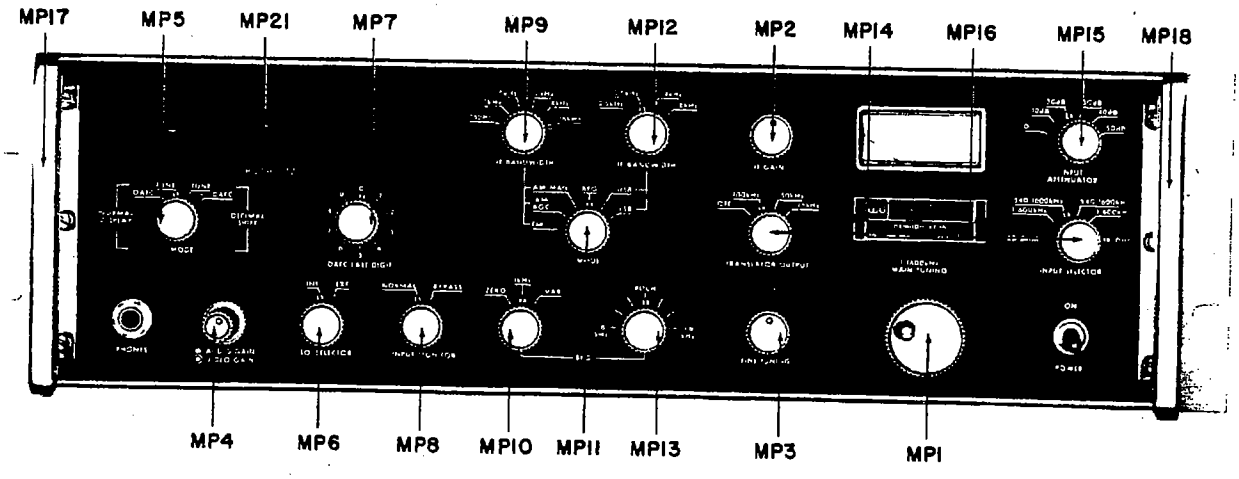


Figure 5-1. Type DMS-105A Demodulator, Front View

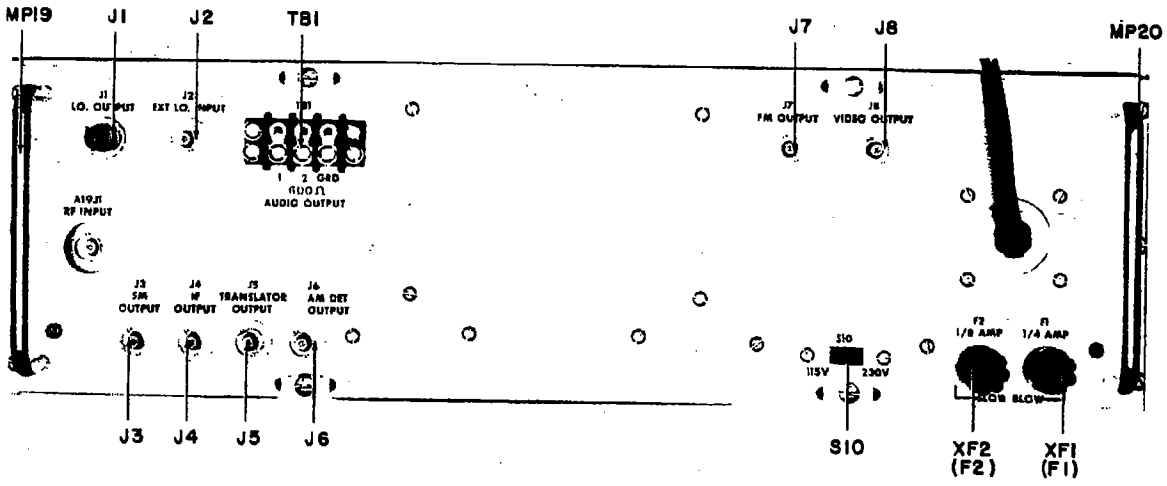


Figure 5-2. Type DMS-105A Demodulator, Rear View

5.4.1 DMS-105A Demodulator, Main Chassis

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
A1	LO ISOLATION AMPLIFIER	1	79521	14632	
A2	MIXER	1	79522	14632	
A3	IF AMPLIFIER	1	72255	14632	
A4	IF AMPLIFIER	1	72256	14632	
A5	IF AMPLIFIER	1	72257	14632	
A6	UPPER & LOWER SIDE BAND IF AMPLIFIER	1	72258	14632	
A7	AM/FM/MCW IF AMPLIFIER	1	72259	14632	
A8	IF BUFFER	1	79523	14632	
A9	IF TRANSLATOR	1	79524-1	14632	
A10	CW/SSB/FSK DEMODULATOR	1	79525	14632	
A11	AM/MCW DEMODULATOR/AGC/MGC	1	79526	14632	
A12	FM DEMODULATOR	1	79527-1	14632	
A13	AUDIO/VIDEO AMPLIFIER	1	7437	14632	
A14	-18V REGULATED POWER SUPPLY	1	76160	14632	
A15	+18V REGULATED POWER SUPPLY	1	76162	14632	
A16	+5 & -5V POWER SUPPLY	1	76211	14632	
A17	HF COUNTER ASSEMBLY	1	79977	14632	
A18	LO ASSEMBLY	1	71233	14632	
A19	INPUT FILTER ASSEMBLY	1	79531	14632	
A20	INPUT ATTENUATOR	1	79382	14632	
A21	DAFC MODE INVERTER	1	16070	14632	
C1	NOT USED				
C2	CAPACITOR, ELECTROLYTIC, ALUMINUM: 2500 μF, -10+75%, 25V	1	43F3003CA4	06001	
C3	CAPACITOR, ELECTROLYTIC, ALUMINUM: 200 μF, -10+75%, 25V	1	39D207G025EJ4	56289	
C4	CAPACITOR, ELECTROLYTIC, ALUMINUM: 200 μF, -10+75%, 50V	1	39D207G050FJ4	56289	
F1	FUSE, 3AG, SLOW-BLOW: 1/4A	1	MDL-1/4	71400	
F2	FUSE, 3AG, SLOW-BLOW: 1/8A	1	MDL-1/8	71400	
FL1	FILTER, LOWPASS	1	JN33-694B	56289	
J1	NOT USED				
J2	CONNECTOR, JACK BNC SERIES	7	17825-1002	74868	
J3	Same as J2				
J4	Same as J2				
J5	Same as J2				
J6	Same as J2				

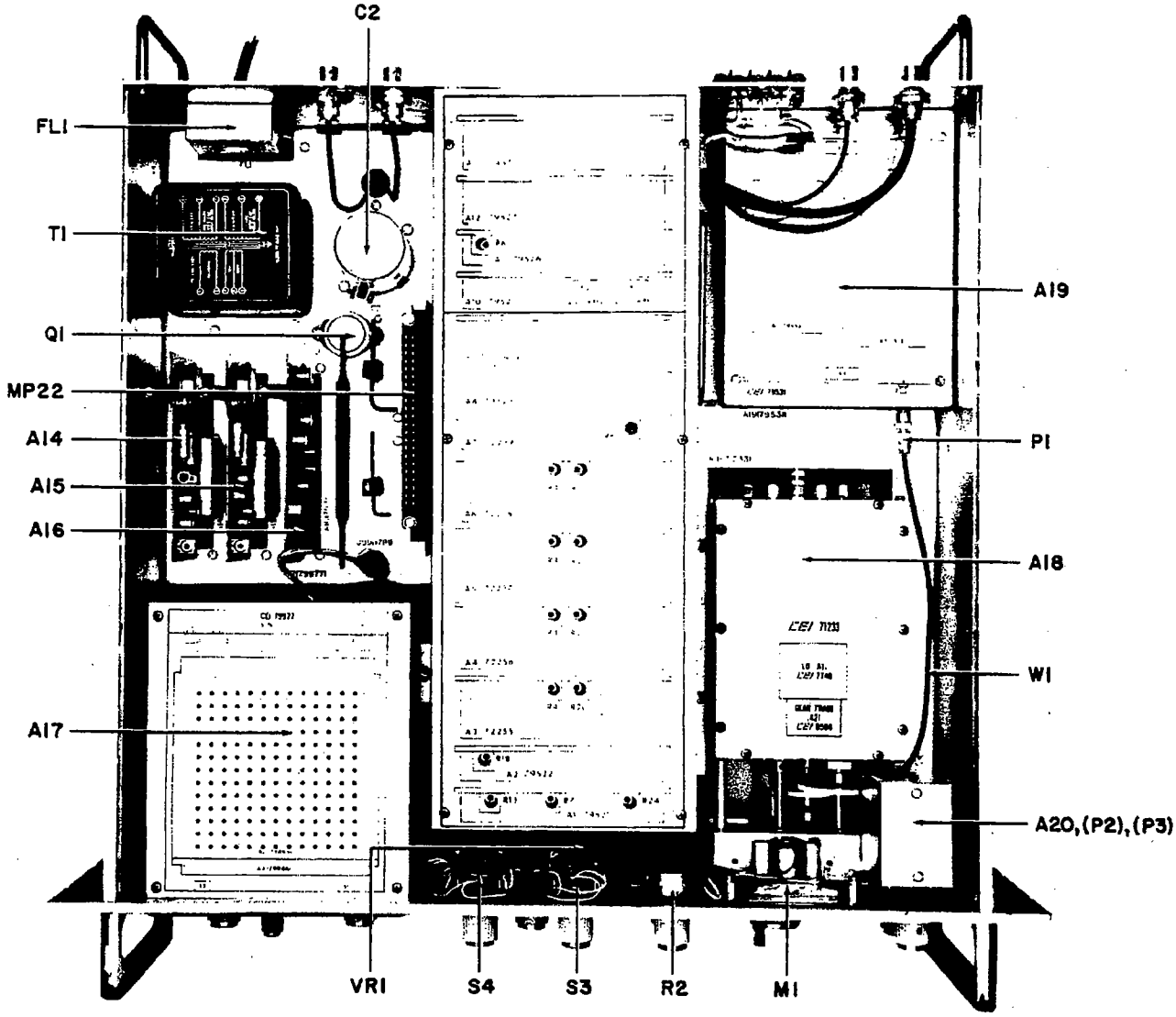


Figure 5-3. Type DMS-105A Demodulator, Top View

REF DESIG	DESCRIPTION		QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
J7	Same as J2					
J8	Same as J2					
J9	CONNECTOR, RECEPTACLE, MULTIPIN		1	M4SLRN	81312	
J10	JACK, TELEPHONE		1	L11	82389	
M1	METER, SIGNAL LEVEL		1	15691-1	14632	
MP1	CRANK ASSEMBLY		1	11755-4	14632	
MP2	KNOB		3	PS70D2 (GREY)	21604	
MP3	Same as MP2					
MP4	Same as MP2					
MP5	KNOB		11	PS70PL1B	21604	
MP6	Same as MP5					
MP7	Same as MP5					
MP8	Same as MP5					
MP9	Same as MP5					
MP10	Same as MP5					
MP11	Same as MP5					
MP12	Same as MP5					
MP13	Same as MP5					
MP14	Same as MP5					
MP15	Same as MP5					
MP16	KNOB		1	PS50D3/70C5(GREY)	21604	
MP17	HANDLE		2	32306-1	14632	
MP18	Same as MP17					
MP19	HANDLE		2	415-1280-03-02-00	71279	
MP20	Same as MP19					
MP21	FILTER GLASS		1	12584-17	14632	
MP22	EXTENDER CARD		1	79554	14632	
MP23	COVER, TOP AND BOTTOM		2	32574-3	14632	
MP24	Same as MP23					
P1	CONNECTOR, PLUG, MB SERIES	Part of W1	4	44950	74868	
P2	Same as P1	Part of W1				
P3	Same as P1					
P4	Same as P1					
P5	CONNECTOR, PLUG, MB SERIES		3	45775	74868	
P6	Same as P5					
P7	Same as P5					

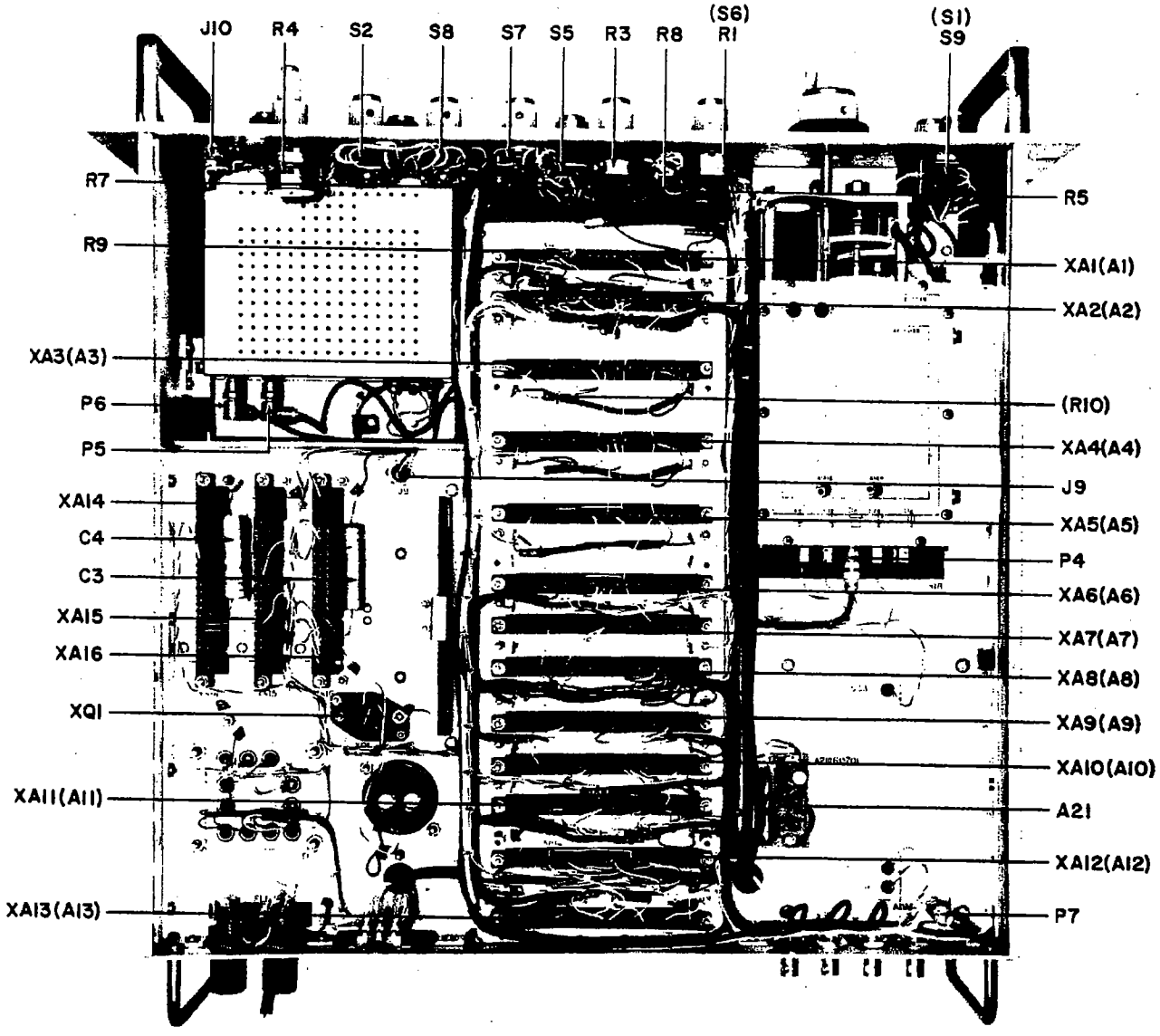


Figure 5-4. Type DMS-105A Demodulator, Bottom View

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
Q1	TRANSISTOR	1	2N3055	80131	04713
R1	RESISTOR, VARIABLE, COMPOSITION: 50 kΩ, 10%, 2W	2	RV4NAYSD503A	81349	01121
R2	RESISTOR, VARIABLE, COMPOSITION: 25 kΩ, 10%, 2W	1	RV4NAYSD253A	81349	01121
R3	Same as R1				
R4	RESISTOR, VARIABLE, COMPOSITION: 25 kΩ/25 kΩ 10%, 1/2W	1	70-08913-2	37942	
R5	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4W	3	RCR07G103JS	81349	01121
R6	NOT USED				
R7	Same as R5				
R8	Same as R5				
R9	RESISTOR, FIXED, COMPOSITION: 270 Ω, 5%, 1/4W	1	RCR07G271JS	81349	01121
R10	RESISTOR, FIXED, COMPOSITION: 51 Ω, 5%, 1/4W	1	RCR07G510JS	81349	01121
S1	SWITCH, ROTARY	1	1128-03	14632	
S2	SWITCH, ROTARY	4	1128-43	14632	
S3	Same as S2				
S4	SWITCH, ROTARY	1	5-25841-310	76854	
S5	SWITCH, ROTARY	1	1128-02	14632	
S6	Same as S2				
S7	Same as S2				
S8	SWITCH, ROTARY	1	1128-42	14632	
S9	SWITCH, TOGGLE	1	8280K16	27193	
S10	SWITCH, SLIDE: DPDT	1	11A-1211	82389	
T1	TRANSFORMER	1	16703	14632	
TB1	TERMINAL BOARD	1	353-18-03-001	71785	
VR1	DIODE	1	1N756A	80131	04713
W1	CABLE ASSEMBLY	1	30020-1185	14632	
XA1	CONNECTOR, PRINTED CIRCUIT CARD	16	250-22-30-170	71785	
XA2	Same as XA1				
XA3	Same as XA1				
XA4	Same as XA1				
XA5	Same as XA1				
XA6	Same as XA1				
XA7	Same as XA1				
XA8	Same as XA1				
XA9	Same as XA1				
XA10	Same as XA1				

REF. DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
XA11	Same as XA1				
XA12	Same as XA1				
XA13	Same as XA1				
XA14	Same as XA1				
XA15	Same as XA1				
XA16	Same as XA1				
XF1	FUSEHOLDER	2	342004	75915	
XF2	Same as XF1				
XQ1	SOCKET, TRANSISTOR	1	8038-1G1	91506	

5.4.2 Type 79521 LO Isolation Amplifier REF DESIG PREFIX A1

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	CAPACITOR, ELECTROLYTIC, TANTALUM: 2.2 μF, 10%, 35V	2	CS13BF225K	81349	56289
C2	CAPACITOR, CERAMIC, DISC: 0.01 μF, 20%, 100V	3	C023B101F103M	56289	
C3	Same as C1				
C4	CAPACITOR, CERAMIC, DISC: 0.1 μF, +80-20%, 25V	5	DFJ3	73899	
C5	CAPACITOR, MICA, DIPPED: 270 pF, 5%, 500V	1	CM05FD271J03	81349	72136
C6	Same as C2				
C7	Same as C4				
C8	CAPACITOR, MICA, DIPPED: 100 pF, 5%, 500V	1	CM05FD101J03	81349	72136
C9	NOT USED				
C10	CAPACITOR, MICA, DIPPED: 15 pF, 5%, 500V	1	CM05CD150J03	81349	72136
C11	Same as C4				
C12	Same as C4				
C13	Same as C2				
C14	CAPACITOR, MICA, DIPPED: 1000 pF, 5%, 100V	2	DM15-102J	72136	
C15	Same as C4				
C16	CAPACITOR, CERAMIC, DISC: 1000 pF, GMV, 500V	1	SM1000PFGMV	91418	
C17	Same as C14				
FB1	FERRITE BEAD	6	56-590-65-4A	02114	
FB2	Same as FB1				
FB3	Same as FB1				
FB4	Same as FB1				
FB5	Same as FB1				
FB6	Same as FB1				
Q1	TRANSISTOR	4	A473	73445	
Q2	Same as Q1				
Q3	Same as Q1				
Q4	Same as Q1				
R1	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	4	RCR07G470JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 39 kΩ, 5%, 1/4W	2	RCR07G393JS	81349	01121
R3	RESISTOR, FIXED, COMPOSITION: 8.2 kΩ, 5%, 1/4W	3	RCR07G822JS	81349	01121
R4	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	4	RCR07G101JS	81349	01121
R5	Same as R1				
R6	RESISTOR, FIXED, COMPOSITION: 330 Ω, 5%, 1/4W	2	RCR07G331JS	81349	01121
R7	RESISTOR, VARIABLE, FILM: 1 kΩ, 30%, 1/2W	3	62PAR1K	73138	
R8	Same as R2				

REF DESIG PREFIX A1

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R9	Same as R3				
R10	Same as R4				
R11	Same as R1				
R12	Same as R6				
R13	Same as R7				
R14	Same as R4				
R15	Same as R1				
R16	Same as R4				
R17	RESISTOR, FIXED, COMPOSITION: 1 kΩ, 5%, 1/4W	4	RCR07G102JS	81349	01121
R18	RESISTOR, FIXED, COMPOSITION: 2.2 kΩ, 5%, 1/4W	2	RCR07G222JS	81349	01121
R19	Same as R17				
R20	RESISTOR, FIXED, COMPOSITION: 56 kΩ, 5%, 1/4W	2	RCR07G563JS	81349	01121
R21	RESISTOR, FIXED, COMPOSITION: 18 kΩ, 5%, 1/4W	2	RCR07G183JS	81349	01121
R22	Same as R17				
R23	Same as R18				
R24	Same as R7				
R25	Same as R20				
R26	Same as R21				
R27	RESISTOR, FIXED, COMPOSITION: 51 Ω, 5%, 1/4W	2	RCR07G510JS	81349	01121
R28	Same as R17				
R29	Same as R27				
T1	TRANSFORMER, COUPLING	2	70-148	06978	
T2	Same as T1				

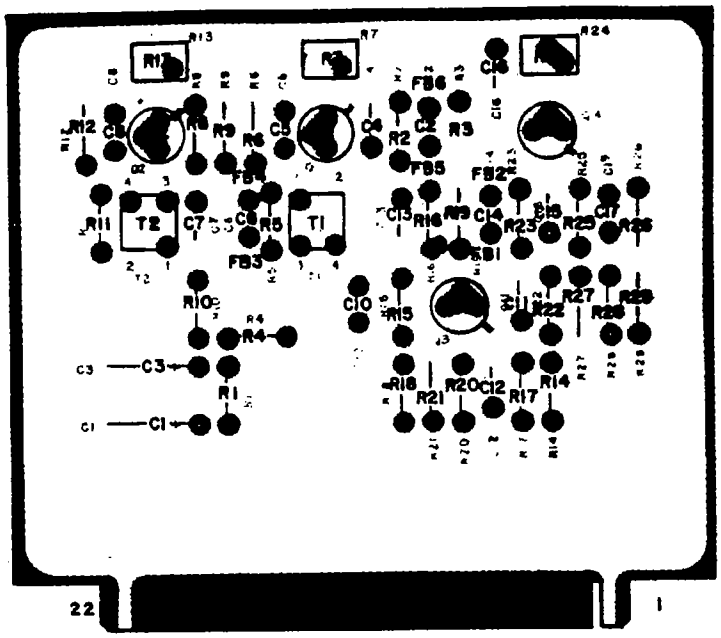


Figure 5-5. Type 79521 LO Isolation Amplifier (A1), Component Locations

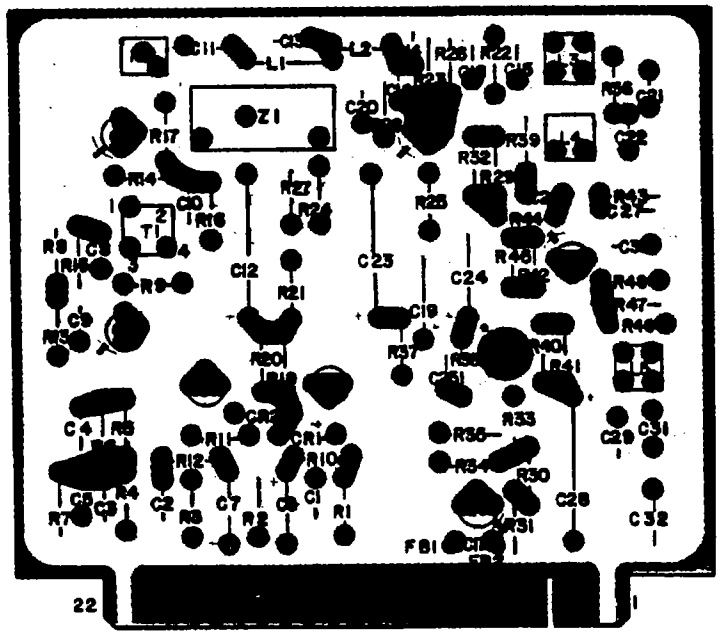


Figure 5-6. Type 79522 Mixer Board (A2), Component Locations

5.4.3 Type 79522 Mixer REF DESIG PREFIX A2

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
AR1	INTEGRATED CIRCUIT	1	MC1550G	04713	
C1	CAPACITOR, CERAMIC, DISC: 0.1 μF, -20+80%, 25V	9	DFJ3	73899	
C2	Same as C1				
C3	Same as C1				
C4	Same as C1				
C5	CAPACITOR, CERAMIC, DISC: 0.05 μF, -20+80%, 25V	1	UK20-503	71590	
C6	CAPACITOR, ELECTROLYTIC, TANTALUM: 1.0 μF, 10%, 35V	2	CS13BF105K	81349	56289
C7	Same as C6				
C8	CAPACITOR, CERAMIC, DISC: 5000 pF, 20%, 100V	3	C023B101E502M	56289	
C9	Same as C1				
C10	CAPACITOR, CERAMIC, DISC: 0.01 μF, 20%, 100V	3	C023B101F103M	56289	
C11	CAPACITOR, VARIABLE, CERAMIC: 9-35 pF, 350V	1	538-011D9-35	72982	
C12	CAPACITOR, ELECTROLYTIC, TANTALUM: 47 μF, 10%, 35V	3	CS13BF476K	81349	56289
C13	CAPACITOR, MICA, DIPPED: 1000 pF, 5%, 100V	1	DM15-102J	72136	
C14	CAPACITOR, MICA, DIPPED: 330 pF, 5%, 500V	1	CM05FD331J03	81349	72136
C15	Same as C1				
C16	Same as C8				
C17	Same as C1				
C18	Same as C8				
C19	CAPACITOR, ELECTROLYTIC, TANTALUM: 2.2 μF, 10%, 35V	2	CS13BF225K	81349	56289
C20	Same as C10				
C21	CAPACITOR, MICA, DIPPED: 500 pF, 5%, 500V	1	DM15-501J	72136	
C22	CAPACITOR, MICA, DIPPED: 10 pF, ±0.5 pF, 500V	1	CM05CD100D03	81349	72136
C23	Same as C12				
C24	Same as C19				
C25	Same as C1				
C26	CAPACITOR, MICA, DIPPED: 910 pF, 5%, 100V	1	DM15-911J	72136	
C27	CAPACITOR, MICA, DIPPED: 1100 pF, 5%, 500V	1	CM06FD112J03	81349	72136
C28	Same as C12				
C29	Same as C1				
C30	Same as C10				
C31	CAPACITOR, MICA, DIPPED: 560 pF, 5%, 300V	1	DM15-561J	72136	
C32	CAPACITOR, MICA, DIPPED: 5100 pF, 2%, 500V	1	DM19-512G	72136	

REF DESIG PREFIX A2

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
CR1	DIODE	2	1N462A	80131	93332
CR2	Same as CR1				
FB1	FERRITE BEAD	6	56-590-65-4A	02114	
FB2	Same as FB1				
FB3	Same as FB1				
FB4	Same as FB1				
FB5	Same as FB1				
FB6	Same as FB1				
L1	COIL, FIXED	1	2500-08	99800	
L2	COIL, FIXED	1	1025-54	99800	
L3	COIL, VARIABLE	3	7107-27	71279	
L4	Same as L3				
L5	Same as L3				
Q1	TRANSISTOR	4	A473	73445	
Q2	Same as Q1				
Q3	TRANSISTOR	1	2N2270	80131	02735
Q4	TRANSISTOR	1	2N2904	80131	04713
Q5	TRANSISTOR	1	3N187	80131	02735
Q6	Same as Q1				
Q7	Same as Q1				
R1	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	9	RCR07G101JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 1.3 kΩ, 5%, 1/4W	1	RCR07G132JS	81349	01121
R3	Same as R1				
R4	Same as R1				
R5	Same as R1				
R6	RESISTOR, FIXED, COMPOSITION: 20 kΩ, 5%, 1/4W	1	RCR07G203JS	81349	01121
R7	RESISTOR, FIXED, COMPOSITION: 3.9 kΩ, 5%, 1/4W	1	RCR07G392JS	81349	01121
R8	RESISTOR, FIXED, COMPOSITION: 330 Ω, 5%, 1/4W	2	RCR07G331JS	81349	01121
R9	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	9	RCR07G470JS	81349	01121
R10	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4W	7	RCR07G103JS	81349	01121
R11	Same as R1				
R12	Same as R10				
R13	RESISTOR, FIXED, COMPOSITION: 30 Ω, 5%, 1/4W	1	RCR07G300JS	81349	01121
R14	Same as R10				
R15	Same as R10				
R16	RESISTOR, FIXED, COMPOSITION: 1.0 kΩ, 5%, 1/4W	4	RCR07G102JS	81349	01121

REF DESIG PREFIX A2

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R17	Same as R9				
R18	RESISTOR, VARIABLE, FILM: 10 kΩ, 10%, 1/2W	1	62PAR10K	73138	
R19	RESISTOR, FIXED, COMPOSITION: 22 Ω, 5%, 1/4W	2	RCR07G220JS	81349	01121
R20	Same as R19				
R21	Same as R9				
R22	RESISTOR, FIXED, COMPOSITION: 150 kΩ, 5%, 1/4W	1	RCR07G154JS	81349	01121
R23	Same as R10				
R24	Same as R1				
R25	RESISTOR, FIXED, COMPOSITION: 43 kΩ, 5%, 1/4W	1	RCR07G433JS	81349	01121
R26	RESISTOR, FIXED, COMPOSITION: 18 kΩ, 5%, 1/4W	1	RCR07G183JS	81349	01121
R27	Same as R1				
R28	Same as R8				
R29	Same as R9				
R30	Same as R10				
R31	Same as R10				
R32	RESISTOR, FIXED, COMPOSITION: 510 Ω, 5%, 1/4W	1	RCR07G511JS	81349	01121
R33	Same as R1				
R34	Same as R9				
R35	RESISTOR, FIXED, COMPOSITION: 4.7 kΩ, 5%, 1/4W	1	RCR07G472JS	81349	01121
R36	RESISTOR, FIXED, COMPOSITION: 39 kΩ, 5%, 1/4W	2	RCR07G393JS	81349	01121
R37	Same as R9				
R38	Same as R9				
R39	Same as R36				
R40	Same as R1				
R41	RESISTOR, FIXED, COMPOSITION: 2.0 kΩ, 5%, 1/4W	1	RCR07G202JS	81349	01121
R42	RESISTOR, FIXED, COMPOSITION: 22 kΩ, 5%, 1/4W	1	RCR07G223JS	81349	01121
R43	RESISTOR, FIXED, COMPOSITION: 7.5 kΩ, 5%, 1/4W	1	RCR07G752JS	81349	01121
R44	Same as R9				
R45	Same as R16				
R46	Same as R9				
R47	Same as R16				
R48	Same as R16				
T1	TRANSFORMER, COUPLING	1	70-148	06978	
Z1	MIXER, BALANCED	1	M6	14482	

5.4.4 Type 72255 IF Amplifier REF DESIG PREFIX A3

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	CAPACITOR, CERAMIC, DISC: 0.01 μF, 20%, 100V	6	C023B101F103M	56289	
C2	Same as C1				
C3	CAPACITOR, CERAMIC, DISC: 0.02 μF, 20%, 100V	2	C023B101H203M	56289	
C4	CAPACITOR, CERAMIC, DISC: 0.05 μF, 20%, 100V	4	29C212A7	56289	
C5	Same as C1				
C6	CAPACITOR, CERAMIC, DISC: 0.1 μF, -20+80%, 25V	2	DFJ3	73899	
C7	Same as C4				
C8	Same as C1				
C9	Same as C1				
C10	Same as C3				
C11	Same as C4				
C12	Same as C1				
C13	Same as C6				
C14	Same as C4				
FB1	FERRITE BEAD	4	56-590-65-4A	02114	
FB2	Same as FB1				
FB3	Same as FB1				
FB4	Same as FB1				
FL1	FILTER, BANDPASS	1	8197922	81349	
FL2	FILTER, BANDPASS	1	8197923	12498	
Q1	TRANSISTOR	2	3N187	80131	02735
Q2	TRANSISTOR	4	A473	73445	
Q3	Same as Q2				
Q4	Same as Q1				
Q5	Same as Q2				
Q6	Same as Q2				
R1	RESISTOR, FIXED, COMPOSITION: 330 kΩ, 5%, 1/4W	2	RCR07G334JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 20 kΩ, 5%, 1/4W	2	RCR07G203JS	81349	01121
R3	RESISTOR, FIXED, COMPOSITION: 68 kΩ, 5%, 1/4W	2	RCR07G683JS	81349	01121
R4	RESISTOR, VARIABLE, FILM: 20 kΩ, 30%, 1/2W	2	62PAR20K	73138	
R5	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4W	2	RCR07G103JS	81349	01121
R6	RESISTOR, FIXED, COMPOSITION: 1 kΩ, 5%, 1/4W	2	RCR07G102JS	81349	01121
R7	RESISTOR, FIXED, COMPOSITION: 330 Ω, 5%, 1/4W	2	RCR07G331JS	81349	01121
R8	RESISTOR, FIXED, COMPOSITION: 2.2 kΩ, 5%, 1/4W	8	RCR07G222JS	81349	01121
R9	RESISTOR, FIXED, COMPOSITION: 15 kΩ, 5%, 1/4W	2	RCR07G153JS	81349	01121
R10	Same as R8				

REF DESIG PREFIX A3

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R11	Same as R8				
R12	RESISTOR, FIXED, COMPOSITION: 470 Ω, 5%, 1/4W	2	RCR07G471JS	81349	01121
R13	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	4	RCR07G470JS	81349	01121
R14	Same as R8				
R15	Same as R13				
R16	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	2	RCR07G101JS	81349	01121
R17	Same as R1				
R18	Same as R2				
R19	Same as R3				
R20	Same as R4				
R21	Same as R5				
R22	Same as R6				
R23	Same as R7				
R24	Same as R8				
R25	Same as R9				
R26	Same as R8				
R27	Same as R8				
R28	Same as R12				
R29	Same as R13				
R30	Same as R8				
R31	Same as R13				
R32	Same as R16				

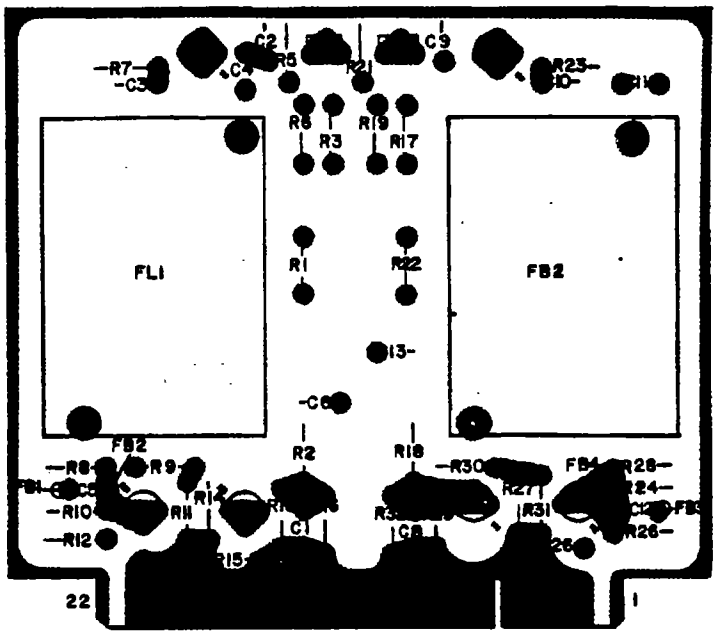


Figure 5-7. Type 72255 IF Amplifier (A3), Component Locations

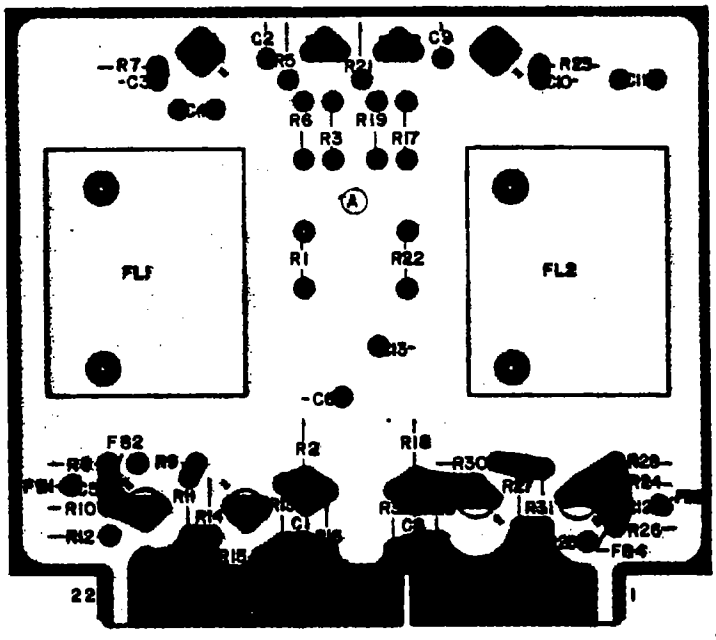


Figure 5-8. Type 72256 IF Amplifier (A4), Component Locations

5.4.5 Type 72256 IF Amplifier REF DESIG PREFIX A4

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	CAPACITOR, CERAMIC, DISC: 0.01 μF, 20%, 100V	6	C023B101F103M	56289	
C2	Same as C1				
C3	CAPACITOR, CERAMIC, DISC: 0.02 μF, 20%, 100V	2	C023B101H203M	56289	
C4	CAPACITOR, CERAMIC, DISC: 0.05 μF, 20%, 100V	4	29C212A7	56289	
C5	Same as C1				
C6	CAPACITOR, CERAMIC, DISC: 0.1 μF, -20+80%, 25V	2	DFJ3	73899	
C7	Same as C4				
C8	Same as C1				
C9	Same as C1				
C10	Same as C3				
C11	Same as C4				
C12	Same as C1				
C13	Same as C6				
C14	Same as C4				
FB1	FERRITE BEAD	4	56-590-65-4A	02114	
FB2	Same as FB1				
FB3	Same as FB1				
FB4	Same as FB1				
FL1	FILTER, BANDPASS	1	8197920	70674	
FL2	FILTER, BANDPASS	1	8197921	07263	
Q1	TRANSISTOR	2	3N187	80131	02735
Q2	TRANSISTOR	4	A473	73445	
Q3	Same as Q2				
Q4	Same as Q1				
Q5	Same as Q2				
Q6	Same as Q2				
R1	RESISTOR, FIXED, COMPOSITION: 330 kΩ, 5%, 1/4W	2	RCR07G334JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 20 kΩ, 5%, 1/4W	2	RCR07G203JS	81349	01121
R3	RESISTOR, FIXED, COMPOSITION: 68 kΩ, 5%, 1/4W	2	RCR07G683JS	81349	01121
R4	RESISTOR, VARIABLE, FILM: 20 kΩ, 30%, 1/2W	2	62PAR20K	73138	
R5	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4W	2	RCR07G103JS	81349	01121
R6	RESISTOR, FIXED, COMPOSITION: 1 kΩ, 5%, 1/4W	2	RCR07G102JS	81349	01121
R7	RESISTOR, FIXED, COMPOSITION: 330 Ω, 5%, 1/4W	2	RCR07G331JS	81349	01121
R8	RESISTOR, FIXED, COMPOSITION: 2.2 kΩ, 5%, 1/4W	8	RCR07G222JS	81349	01121
R9	RESISTOR, FIXED, COMPOSITION: 15 kΩ, 5%, 1/4W	2	RCR07G153JS	81349	01121
R10	Same as R8				

REF DESIG PREFIX A4

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R11	Same as R8				
R12	RESISTOR, FIXED, COMPOSITION: 470 Ω, 5%, 1/4W	2	RCR07G471JS	81349	01121
R13	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	4	RCR07G470JS	81349	01121
R14	Same as R8				
R15	Same as R13				
R16	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	2	RCR07G101JS	81349	01121
R17	Same as R1				
R18	Same as R2				
R19	Same as R3				
R20	Same as R4				
R21	Same as R5				
R22	Same as R6				
R23	Same as R7				
R24	Same as R8				
R25	Same as R9				
R26	Same as R8				
R27	Same as R8				
R28	Same as R12				
R29	Same as R13				
R30	Same as R8				
R31	Same as R13				
R32	Same as R16				

5.4.6 Type 72257 IF Amplifier REF DESIG PREFIX A5

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	CAPACITOR, CERAMIC, DISC: 0.01 μF, 20%, 100V	6	C023B101F103M	56289	
C2	Same as C1				
C3	CAPACITOR, CERAMIC, DISC: 0.02 μF, 20%, 100V	2	C023B101H203M	56289	
C4	CAPACITOR, CERAMIC, DISC: 0.05 μF, 20%, 100V	4	29C212A7	56289	
C5	Same as C1				
C6	CAPACITOR, CERAMIC, DISC: 0.1 μF, -20+80%, 25V	2	DFJ3	73899	
C7	Same as C4				
C8	Same as C1				
C9	Same as C1				
C10	Same as C3				
C11	Same as C4				
C12	Same as C1				
C13	Same as C6				
C14	Same as C4				
FB1	FERRITE BEAD	4	56-590-65-4A	02114	
FB2	Same as FB1				
FB3	Same as FB1				
FB4	Same as FB1				
FL1	FILTER, BANDPASS	1	6093695	74306	
FL2	FILTER, BANDPASS	1	6093694	74306	
Q1	TRANSISTOR	2	3N187	80131	02735
Q2	TRANSISTOR	4	A473	73445	
Q3	Same as Q2				
Q4	Same as Q1				
Q5	Same as Q2				
Q6	Same as Q2				
R1	RESISTOR, FIXED, COMPOSITION: 330 kΩ, 5%, 1/4W	2	RCR07G334JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 20 kΩ, 5%, 1/4W	2	RCR07G203JS	81349	01121
R3	RESISTOR, FIXED, COMPOSITION: 68 kΩ, 5%, 1/4W	2	RCR07G683JS	81349	01121
R4	RESISTOR, VARIABLE, FILM: 20 kΩ, 30%, 1/2W	2	62PAR20K	73138	
R5	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4W	2	RCR07G103JS	81349	01121
R6	RESISTOR, FIXED, COMPOSITION: 1 kΩ, 5%, 1/4W	2	RCR07G102JS	81349	01121
R7	RESISTOR, FIXED, COMPOSITION: 330 Ω, 5%, 1/4W	2	RCR07G331JS	81349	01121
R8	RESISTOR, FIXED, COMPOSITION: 2.2 kΩ, 5%, 1/4W	8	RCR07G222JS	81349	01121
R9	RESISTOR, FIXED, COMPOSITION: 15 kΩ, 5%, 1/4W	2	RCR07G153JS	81349	01121
R10	Same as R8				

REF DESIG PREFIX A5

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R11	Same as R8				
R12	RESISTOR, FIXED, COMPOSITION: 470 Ω, 5%, 1/4W	2	RCR07G471JS	81349	01121
R13	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	4	RCR07G470JS	81349	01121
R14	Same as R8				
R15	Same as R13				
R16	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	2	RCR07G101JS	81349	01121
R17	Same as R1				
R18	Same as R2				
R19	Same as R3				
R20	Same as R4				
R21	Same as R5				
R22	Same as R6				
R23	Same as R7				
R24	Same as R8				
R25	Same as R9				
R26	Same as R8				
R27	Same as R8				
R28	Same as R12				
R29	Same as R13				
R30	Same as R8				
R31	Same as R13				
R32	Same as R16				

Figure 5-9
Figure 5-10

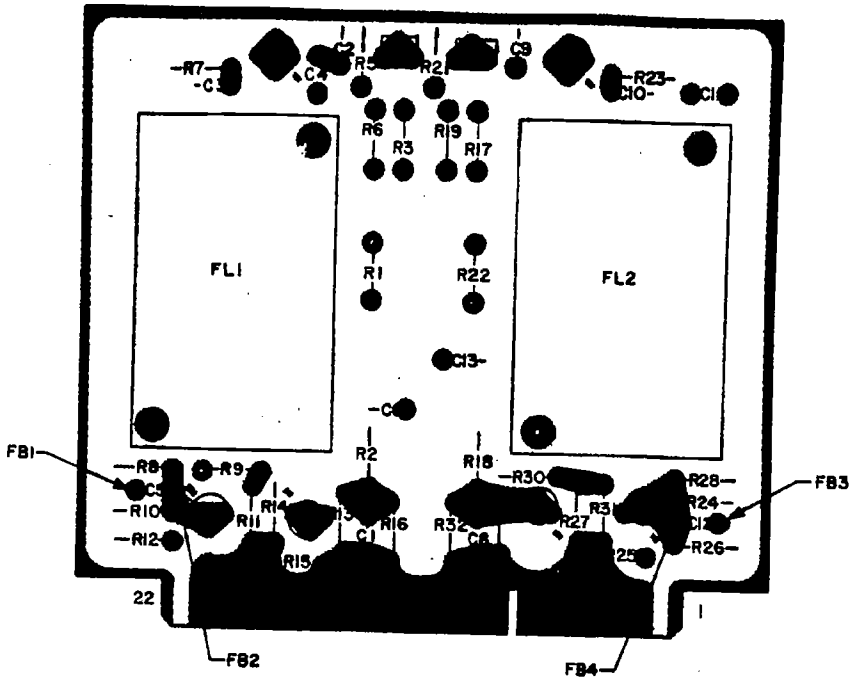


Figure 5-9. Type 72257 IF Amplifier (A5), Component Locations

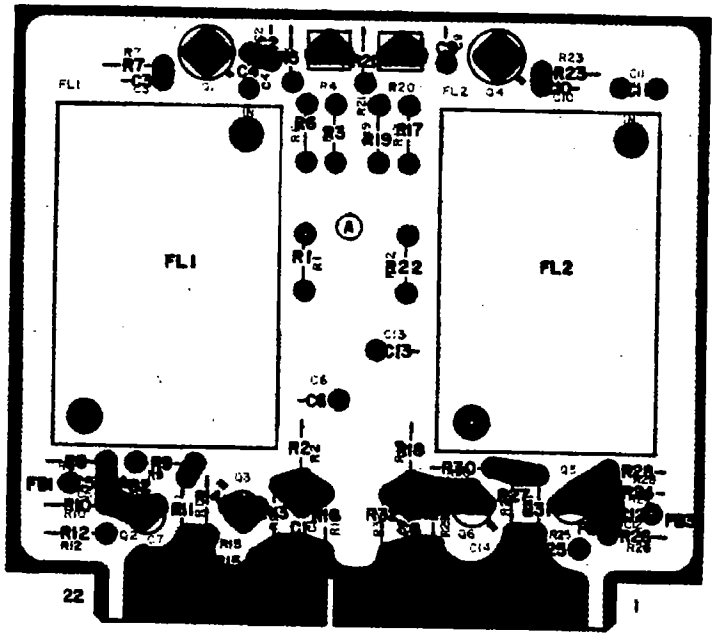


Figure 5-10. Type 72258 IF Amplifier (A6), Component Locations

5.4.7 Type 72258 Upper & Lower Side Band IF Amplifier REF DESIG PREFIX A6

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	CAPACITOR, CERAMIC, DISC: 0.01 μF, 20%, 100V	6	C023B101F103M	56289	
C2	Same as C1				
C3	CAPACITOR, CERAMIC, DISC: 0.02 μF, 20%, 100V	2	C023B101H203M	56289	
C4	CAPACITOR, CERAMIC, DISC: 0.05 μF, 20%, 100V	4	29C212A7	56289	
C5	Same as C1				
C6	CAPACITOR, CERAMIC, DISC: 0.1 μF, -20+80%, 25V	2	DFJ3	73899	
C7	Same as C4				
C8	Same as C1				
C9	Same as C1				
C10	Same as C3				
C11	Same as C4				
C12	Same as C1				
C13	Same as C6				
C14	Same as C4				
FB1	FERRITE BEAD	4	56-590-65-4A	02114	
FB2	Same as FB1				
FB3	Same as FB1				
FB4	Same as FB1				
FL1	FILTER, BANDPASS	1	8197933	25088	
FL2	FILTER, BANDPASS	1	8197932	81349	
Q1	TRANSISTOR	2	3N187	80131	02735
Q2	TRANSISTOR	4	A473	73445	
Q3	Same as Q2				
Q4	Same as Q1				
Q5	Same as Q2				
Q6	Same as Q2				
R1	RESISTOR, FIXED, COMPOSITION: 330 kΩ, 5%, 1/4W	2	RCR07G334JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 20 kΩ, 5%, 1/4W	2	RCR07G203JS	81349	01121
R3	RESISTOR, FIXED, COMPOSITION: 150 kΩ, 5%, 1/4W	2	RCR07G154JS	81349	01121
R4	RESISTOR, VARIABLE, FILM: 20 kΩ, 30%, 1/2W	2	62PAR20K	73138	
R5	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4W	2	RCR07G103JS	81349	01121
R6	RESISTOR, FIXED, COMPOSITION: 1 kΩ, 5%, 1/4W	2	RCR07G102JS	81349	01121
R7	RESISTOR, FIXED, COMPOSITION: 330 Ω, 5%, 1/4W	2	RCR07G331JS	81349	01121
R8	RESISTOR, FIXED, COMPOSITION: 2.2 kΩ, 5%, 1/4W	8	RCR07G222JS	81349	01121
R9	RESISTOR, FIXED, COMPOSITION: 15 kΩ, 5%, 1/4W	2	RCR07G153JS	81349	01121
R10	Same as R8				

REF DESIG PREFIX A6

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R11	Same as R8				
R12	RESISTOR, FIXED, COMPOSITION: 470 Ω, 5%, 1/4W	2	RCR07G471JS	81349	01121
R13	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	4	RCR07G470JS	81349	01121
R14	Same as R8				
R15	Same as R13				
R16	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	2	RCR07G101JS	81349	01121
R17	Same as R1				
R18	Same as R2				
R19	Same as R3				
R20	Same as R4				
R21	Same as R5				
R22	Same as R6				
R23	Same as R7				
R24	Same as R8				
R25	Same as R9				
R26	Same as R8				
R27	Same as R8				
R28	Same as R12				
R29	Same as R13				
R30	Same as R8				
R31	Same as R13				
R32	Same as R16				

5.4.8 Type 72259 AM/FM/MCW IF Amplifier REF DESIG PREFIX A7

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	CAPACITOR, CERAMIC, DISC: 0.01 μF, 20%, 100V	2	C023B101F103M	56289	
C2	CAPACITOR, CERAMIC, DISC: 0.1 μF, -20+80%, 25V	3	DFJ3	73899	
C3	Same as C2				
C4	CAPACITOR, MICA, DIPPED: 510 pF, 5%, 500V	1	DM15-511J	72136	
C5	CAPACITOR, MICA, DIPPED: 500 pF, 5%, 500V	1	DM15-501J	72136	
C6	CAPACITOR, MICA, DIPPED: 10 pF, ±0.5 pF, 500V	1	CM05CD100D03	81349	72136
C7	CAPACITOR, MICA, DIPPED: 1000 pF, 5%, 100V	2	DM15-102J	72136	
C8	Same as C7				
C9	Same as C2				
C10	Same as C1				
C11	CAPACITOR, MICA, DIPPED: 560 pF, 5%, 300V	1	DM15-561J	72136	
C12	CAPACITOR, MICA, DIPPED: 5100 pF, 2%, 500V	1	DM19-512G	72136	
FB1	FERRITE BEAD	2	56-590-65-4A	02114	
FB2	Same as FB1				
L1	COIL, VARIABLE	3	7107-27	71279	
L2	Same as L1				
L3	Same as L1				
Q1	TRANSISTOR	2	A473	73445	
Q2	Same as Q1				
R1	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	1	RCR07G101JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 22 kΩ, 5%, 1/4W	2	RCR07G223JS	81349	01121
R3	RESISTOR, FIXED, COMPOSITION: 7.5 kΩ, 5%, 1/4W	2	RCR07G752JS	81349	01121
R4	RESISTOR, FIXED, COMPOSITION: 1 kΩ, 5%, 1/4W	3	RCR07G102JS	81349	01121
R5	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	3	RCR07G470JS	81349	01121
R6	RESISTOR, VARIABLE, FILM: 1 kΩ, 30%, 1/2W	1	62PAR1K	73138	
R7	RESISTOR, FIXED, COMPOSITION: 39 kΩ, 5%, 1/4W	2	RCR07G393JS	81349	01121
R8	Same as R7				
R9	Same as R2				
R10	Same as R3				
R11	Same as R4				
R12	Same as R5				
R13	Same as R4				
R14	RESISTOR, FIXED, COMPOSITION: 510 Ω, 5%, 1/4W	1	RCR07G511JS	81349	01121
R15	Same as R5				

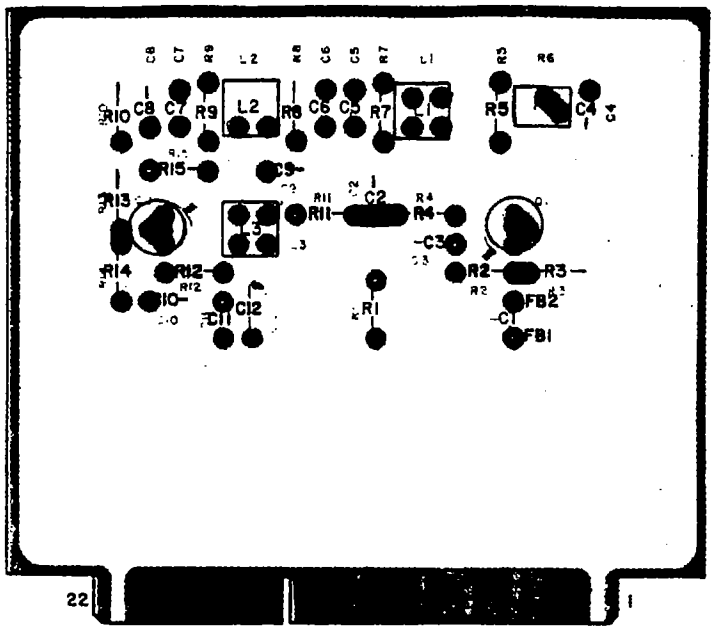


Figure 5-11. Type 72259 AM/FM/MCW IF Amplifier (A7), Component Locations

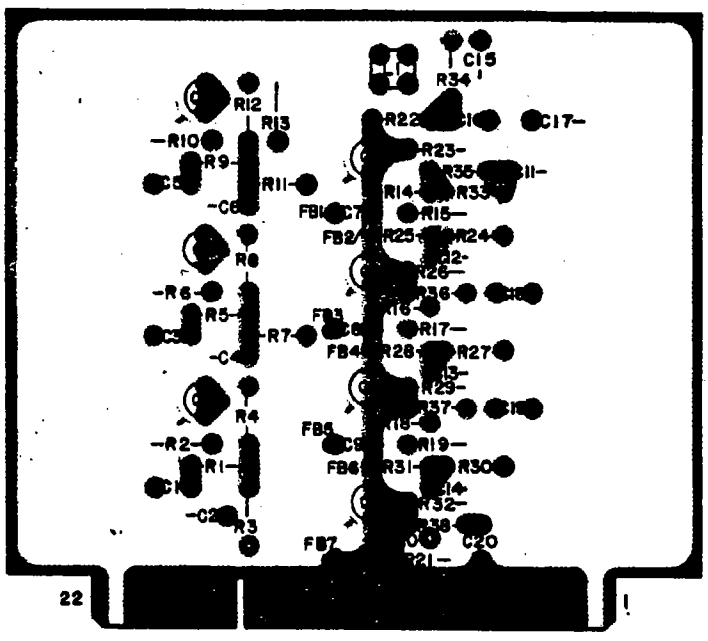


Figure 5-12. Type 79523 IF Buffer (A8), Component Locations

5.4.9 Type 79523 IF Buffer REF DESIG PREFIX A8

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	CAPACITOR, CERAMIC, DISC: 0.01 μF, 20%, 100V	18	C023B101F103M	56289	
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	Same as C1				
C14	Same as C1				
C15	Same as C1				
C16	CAPACITOR, MICA, DIPPED: 560 pF, 5%, 300V	1	DM15-561J	72136	
C17	CAPACITOR, MICA, DIPPED: 5100 pF, 2%, 500V	1	DM19-512G	72136	
C18	Same as C1				
C19	Same as C1				
C20	Same as C1				
FB1	FERRITE BEAD	8	56-590-65-4A	02114	
FB2	Same as FB1				
FB3	Same as FB1				
FB4	Same as FB1				
FB5	Same as FB1				
FB6	Same as FB1				
FB7	Same as FB1				
FB8	Same as FB1				
L1	COIL, VARIABLE	1	7107-27	71279	
Q1	TRANSISTOR	7	A473	73445	
Q2	Same as Q1				
Q3	Same as Q1				
Q4	Same as Q1				
Q5	Same as Q1				
Q6	Same as Q1				
Q7	Same as Q1				

REF DESIG PREFIX A8

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R1	RESISTOR, FIXED, COMPOSITION: 150 kΩ, 5%, 1/4W	3	RCR07G154JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 22 kΩ, 5%, 1/4W	3	RCR07G223JS	81349	01121
R3	RESISTOR, FIXED, COMPOSITION: 1 kΩ, 5%, 1/4W	9	RCR07G102JS	81349	01121
R4	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	9	RCR07G470JS	81349	01121
R5	Same as R1				
R6	Same as R2				
R7	Same as R3				
R8	Same as R4				
R9	Same as R1				
R10	Same as R2				
R11	Same as R3				
R12	Same as R4				
R13	Same as R3				
R14	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4W	4	RCR07G103JS	81349	01121
R15	RESISTOR, FIXED, COMPOSITION: 7.5 kΩ, 5%, 1/4W	4	RCR07G752JS	81349	01121
R16	Same as R14				
R17	Same as R15				
R18	Same as R14				
R19	Same as R15				
R20	Same as R14				
R21	Same as R15				
R22	Same as R4				
R23	RESISTOR, FIXED, COMPOSITION: 2.2 kΩ, 5%, 1/4W	3	RCR07G222JS	81349	01121
R24	Same as R3				
R25	Same as R4				
R26	Same as R23				
R27	Same as R3				
R28	Same as R4				
R29	Same as R23				
R30	Same as R3				
R31	Same as R4				
R32	Same as R3				
R33	Same as R3				
R34	RESISTOR, FIXED, COMPOSITION: 39 kΩ, 5%, 1/4W	1	RCR07G393JS	81349	01121
R35	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	1	RCR07G101JS	81349	01121
R36	Same as R4				

REF DESIG PREFIX A8

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R37	Same as R4				
R38	RESISTOR, FIXED, COMPOSITION: 56 Ω, 5%, 1/4W	1	RCR07G560JS	81349	01121

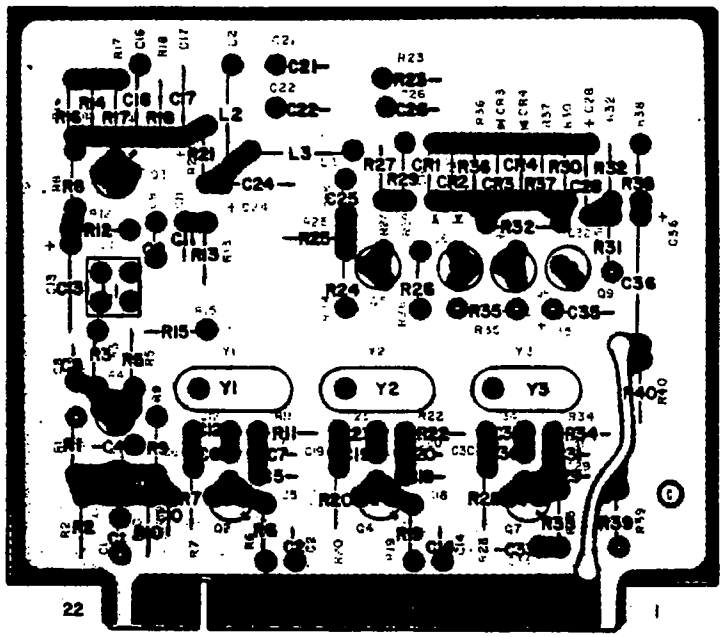


Figure 5-13. Type 79524 IF Translator (A9), Component Locations

5.4.10 Type 79524-1 IF Translator REF DESIG PREFIX A9

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	CAPACITOR, CERAMIC, DISC: 5000 pF, 20%, 100V	3	C023B101E502M	56289	
C2	CAPACITOR, CERAMIC, DISC: 0.01 μF, 20%, 100V	7	C023B101F103M	56289	
C3	NOT USED				
C4	Same as C1				
C5	Same as C2				
C6	CAPACITOR, MICA, DIPPED: 47 pF, 5%, 500V	6	CM05ED470J03	81349	72136
C7	Same as C6				
C8	Same as C2				
C9	CAPACITOR, MICA, DIPPED: 1000 pF, 5%, 100V	2	DM15-102J	72136	
C10	Same as C1				
C11	Same as C9				
C12	CAPACITOR, MICA, DIPPED: 18 pF, 5%, 500V	3	CM05CD180J03	81349	72136
C13	CAPACITOR, ELECTROLYTIC, TANTALUM: 4.7 μF, 10%, 35V	1	CS13BF475K	81349	56289
C14	Same as C2				
C15	NOT USED				
C16	CAPACITOR, ELECTROLYTIC, TANTALUM: 1.0 μF, 10%, 35V	6	CS13BF105K	81349	56289
C17	Same as C16				
C18	Same as C2				
C19	Same as C6				
C20	Same as C6				
C21	CAPACITOR, MICA, DIPPED: 3300 pF, 5%, 500V	2	CM06FD332J03	81349	72136
C22	CAPACITOR, MICA, DIPPED: 5100 pF, 2%, 500V	1	DM19-512G	72136	
C23	Same as C12				
C24	Same as C16				
C25	CAPACITOR, CERAMIC, DISC: 0.1 μF, -20+80%, 25V	1	DFJ3	73899	
C26	Same as C21				
C27	NOT USED				
C28	Same as C16				
C29	Same as C2				
C30	Same as C6				
C31	Same as C6				
C32	Same as C16				
C33	Same as C2				
C34	Same as C12				

REF DESIG PREFIX A9

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C35	Same as C16				
C36	CAPACITOR, ELECTROLYTIC, TANTALUM: 10 μF, 10%, 35V	1	CS13BF106K	81349	56289
CR1	DIODE	2	1N462A	80131	93332
CR2	Same as CR1				
CR3	DIODE	2	1N4446	80131	93332
CR4	Same as CR3				
L1	COIL, VARIABLE	1	7107-27	71279	
L2	COIL, FIXED	2	2500-28	99800	
L3	Same as L2				
Q1	TRANSISTOR	2	3N187	80131	02735
Q2	TRANSISTOR	3	3N128	80131	02735
Q3	Same as Q1				
Q4	Same as Q2				
Q5	TRANSISTOR	1	2N2222A	80131	04713
Q6	TRANSISTOR	1	2N3251	80131	04713
Q7	Same as Q2				
Q8	TRANSISTOR	1	2N2270	80131	02735
Q9	TRANSISTOR	1	2N4037	80131	02735
R1	RESISTOR, FIXED, COMPOSITION: 150 kΩ, 5%, 1/4W	3	RCR07G154JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 15 kΩ, 5%, 1/4W	2	RCR07G153JS	81349	01121
R3	RESISTOR, FIXED, COMPOSITION: 47 kΩ, 5%, 1/4W	1	RCR07G473JS	81349	01121
R4	RESISTOR, VARIABLE, FILM: 10 kΩ, 10%, 1/2W	1	62PR10K	73138	
R5	RESISTOR, FIXED, COMPOSITION: 8.2 kΩ, 5%, 1/4W	1	RCR07G822JS	81349	01121
R6	RESISTOR, FIXED, COMPOSITION: 2.2 kΩ, 5%, 1/4W	6	RCR07G222JS	81349	01121
R7	RESISTOR, FIXED, COMPOSITION: 1.0 M, 5%, 1/4W	3	RCR07G105JS	81349	01121
R8	RESISTOR, FIXED, COMPOSITION: 1.0 kΩ, 5%, 1/4W	4	RCR07G102JS	81349	01121
R9	RESISTOR, FIXED, COMPOSITION: 22 Ω, 5%, 1/4W	1	RCR07G220JS	81349	01121
R10	RESISTOR, FIXED, COMPOSITION: 330 Ω, 5%, 1/4W	1	RCR07G331JS	81349	01121
R11	Same as R6				
R12	Same as R1				
R13	Same as R2				
R14	RESISTOR, FIXED, COMPOSITION: 82 kΩ, 5%, 1/4W	1	RCR07G823JS	81349	01121
R15	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4W	2	RCR07G103JS	81349	01121
R16	RESISTOR, FIXED, COMPOSITION: 470 Ω, 5%, 1/4W	2	RCR07G471JS	81349	01121
R17	RESISTOR, FIXED, COMPOSITION: 560 Ω, 5%, 1/4W	2	RCR07G561JS	81349	01121

REF DESIG PREFIX A9

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R18	Same as R16				
R19	Same as R6				
R20	Same as R7				
R21	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	5	RCR07G470JS	81349	01121
R22	Same as R6				
R23	Same as R17				
R24	Same as R1				
R25	RESISTOR, FIXED, COMPOSITION: 20 kΩ, 5%, 1/4W	1	RCR07G203JS	81349	01121
R26	Same as R8				
R27	RESISTOR, FIXED, COMPOSITION: 680 Ω, 5%, 1/4W	1	RCR07G681JS	81349	01121
R28	Same as R7				
R29	RESISTOR, FIXED, COMPOSITION: 6.8 kΩ, 5%, 1/4W	1	RCR07G682JS	81349	01121
R30	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	1	RCR07G101JS	81349	01121
R31	Same as R8				
R32	Same as R8				
R33	Same as R6				
R34	Same as R6				
R35	Same as R21				
R36	Same as R21				
R37	Same as R21				
R38	RESISTOR, FIXED, COMPOSITION: 10 Ω, 5%, 1/4W	1	RCR07G100JS	81349	01121
R39	Same as R21				
R40	Same as R15				
Y1	CRYSTAL, QUARTZ	1	CR18AU2.1MHZ	81349	74306
Y2	CRYSTAL, QUARTZ	1	CR18AU2.05MHZ	81349	74306
Y3	CRYSTAL, QUARTZ	1	91804-10	14632	

5.4.11 Type 79525 CW/SSB/FSK Demodulator REF DESIG PREFIX A10

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	CAPACITOR, MICA, DIPPED: 470 pF, 5%, 500V	1	CM06FD471J03	81349	72136
C2	CAPACITOR, CERAMIC, DISC: 0.1 μF, -20+80%, 25V	5	DFJ3	73899	
C3	Same as C2				
C4	CAPACITOR, MICA, DIPPED: 510 pF, 5%, 500V	1	DM15-511J	72136	
C5	CAPACITOR, ELECTROLYTIC, ALUMINUM: 25 μF, -10+75%, 25V	1	30D256G025CB2	56289	
C6	CAPACITOR, ELECTROLYTIC, ALUMINUM: 10 μF, -10+75%, 25V	1	30D106G025BB2	56289	
C7	CAPACITOR, MICA, DIPPED: 1000 pF, 5%, 100V	2	DM15-102J	72136	
C8	Same as C7				
C9	CAPACITOR, MICA, DIPPED: 18 pF, 5%, 500V	1	CM05CD180J03	81349	72136
C10	CAPACITOR, MICA, DIPPED: 150 pF, 5%, 500V	1	CM05FD151J03	81349	72136
C11	CAPACITOR, ELECTROLYTIC, TANTALUM: 4.7 μF, 10%, 35V	1	CS13BF475K	81349	56289
C12	Same as C2				
C13	CAPACITOR, ELECTROLYTIC, TANTALUM: 1.0 μF, 10%, 20V	1	CS13BF105K	81349	56289
C14	Same as C2				
C15	CAPACITOR, CERAMIC, DISC: 0.05 μF, 20%, 100V	1	29C212A7	56289	
C16	CAPACITOR, MICA, DIPPED: 100 pF, 5%, 500V	7	CM05FD101J03	81349	72136
C17	Same as C16				
C18	CAPACITOR, MICA, DIPPED: 20 pF, 5%, 500V	1	CM05ED200J03	81349	72136
C19	CAPACITOR, MICA, DIPPED: 68 pF, 5%, 500V	1	CM05ED680J03	81349	72136
C20	CAPACITOR, CERAMIC, TUBULAR: 7.1 pF, ±0.5 pF, 500V	1	301-000C0H0-759D	72982	
C21	Same as C16				
C22	CAPACITOR, VARIABLE, CERAMIC: 2.5-11 pF, 350V	1	538-011-B2.5-11	72982	
C23	CAPACITOR, MICA, DIPPED: 33 pF, 5%, 500V	2	CM05ED330J03	81349	72136
C24	Same as C16				
C25	Same as C16				
C26	CAPACITOR, CERAMIC, DISC: 0.01 μF, 20%, 100V	4	C023B101F103M	56289	
C27	Same as C26				
C28	CAPACITOR, MICA, DIPPED: 30 pF, 5%, 500V	2	CM05ED300J03	81349	72136
C29	Same as C23				
C30	Same as C16				
C31	Same as C16				
C32	Same as C26				

REF DESIG PREFIX A10

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C33	Same as C26				
C34	Same as C28				
C35	CAPACITOR, MICA, DIPPED: 47 pF, 5%, 500V	1	CM05ED470J03	81349	72136
C36	Same as C2				
C37	CAPACITOR, VARIABLE, CERAMIC: 5.5-18 pF, 350V	1	DV11PS18A	72982	
CR1	DIODE	1	1N4446	80131	93332
CR2	DIODE, VARICAP	1	V27E	01281	
L1	COIL, FIXED	1	1035-15	99848	
L2	COIL, FIXED	1	2500-42	99800	
L3	COIL, TOROIDAL	1	20681-39	14632	
Q1	TRANSISTOR	3	2N2222A	80131	04713
Q2	TRANSISTOR	1	3N187	02735	
Q3	Same as Q1				
Q4	TRANSISTOR	1	2N3251	80131	04713
Q5	Same as Q1				
Q6	TRANSISTOR	3	3N128	80131	02735
Q7	TRANSISTOR	1	2N3478	80131	02735
Q8	Same as Q6				
Q9	Same as Q6				
R1	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	7	RCR07G101JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 220 kΩ, 5%, 1/4W	1	RCR07G224JS	81349	01121
R3	RESISTOR, FIXED, COMPOSITION: 15 kΩ, 5%, 1/4W	2	RCR07G153JS	81349	01121
R4	Same as R1				
R5	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	4	RCR07G470JS	81349	01121
R6	RESISTOR, FIXED, COMPOSITION: 1.0 kΩ, 5%, 1/4W	2	RCR07G102JS	81349	01121
R7	Same as R1				
R8	RESISTOR, FIXED, COMPOSITION: 150 kΩ, 5%, 1/4W	1	RCR07G154JS	81349	01121
R9	Same as R3				
R10	RESISTOR, FIXED, COMPOSITION: 82 kΩ, 5%, 1/4W	1	RCR07G823JS	81349	01121
R11	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4W	1	RCR07G103JS	81349	01121
R12	RESISTOR, FIXED, COMPOSITION: 10 Ω, 5%, 1/4W	1	RCR07G100JS	81349	01121
R13	RESISTOR, FIXED, COMPOSITION: 5.6 kΩ, 5%, 1/4W	2	RCR07G562JS	81349	01121
R14	RESISTOR, FIXED, COMPOSITION: 2.0 kΩ, 5%, 1/4W	3	RCR07G202JS	81349	01121
R15	RESISTOR, FIXED, COMPOSITION: 470 Ω, 5%, 1/4W	4	RCR07G471JS	81349	01121
R16	Same as R15				

REF DESIG PREFIX A10

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R17	Same as R15				
R18	RESISTOR, FIXED, COMPOSITION: 130 kΩ, 5%, 1/4W	1	RCR07G134JS	81349	01121
R19	RESISTOR, FIXED, COMPOSITION: 12 kΩ, 5%, 1/4W	1	RCR07G123JS	81349	01121
R20	RESISTOR, FIXED, COMPOSITION: 2.2 kΩ, 5%, 1/4W	6	RCR07G222JS	81349	01121
R21	RESISTOR, FIXED, COMPOSITION: 560 Ω, 5%, 1/4W	1	RCR07G561JS	81349	01121
R22	Same as R13				
R23	RESISTOR, FIXED, COMPOSITION: 1.1 kΩ, 5%, 1/4W	1	RCR07G112JS	81349	01121
R24	Same as R20				
R25	Same as R1				
R26	Same as R5				
R27	Same as R20				
R28	Same as R1				
R29	Same as R6				
R30	Same as R15				
R31	RESISTOR, FIXED, COMPOSITION: 22 kΩ, 5%, 1/4W	1	RCR07G223JS	81349	01121
R32	RESISTOR, FIXED, COMPOSITION: 470 kΩ, 5%, 1/4W	1	RCR07G474JS	81349	01121
R33	RESISTOR, FIXED, COMPOSITION: 51 kΩ, 5%, 1/4W	1	RCR07G513JS	81349	01121
R34	RESISTOR, FIXED, COMPOSITION: 100 kΩ, 5%, 1/4W	1	RCR07G104JS	81349	01121
R35	Same as R5				
R36	Same as R5				
R37	Same as R20				
R38	RESISTOR, FIXED, COMPOSITION: 1.0 M, 5%, 1/4W	2	RCR07G105JS	81349	01121
R39	Same as R1				
R40	Same as R20				
R41	RESISTOR, FIXED, COMPOSITION: 200 Ω, 5%, 1/4W	2	RCR07G201JS	81349	01121
R42	Same as R14				
R43	Same as R38				
R44	Same as R1				
R45	Same as R20				
R46	Same as R41				
R47	Same as R14				
VR1	DIODE, ZENER	1	1N754A	80131	04713
XY1	SOCKET, CRYSTAL	2	8000AG2	91506	
XY2	Same as XY1				
Y1	CRYSTAL, QUARTZ	1	91804-05	14632	
Y2	CRYSTAL, QUARTZ	1	91804-02	14632	

Figure 5-14
Figure 5-15

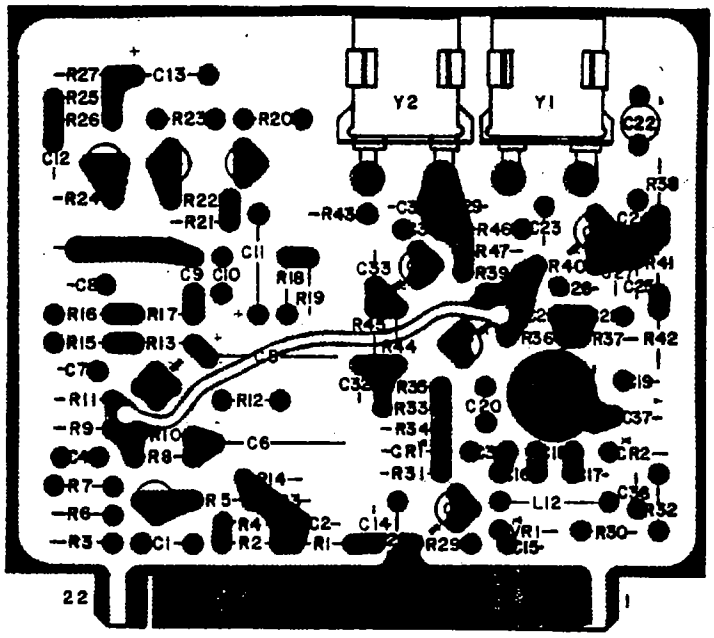


Figure 5-14. Type 79525 CW/SSB/FSK Demodulator (A10), Component Locations

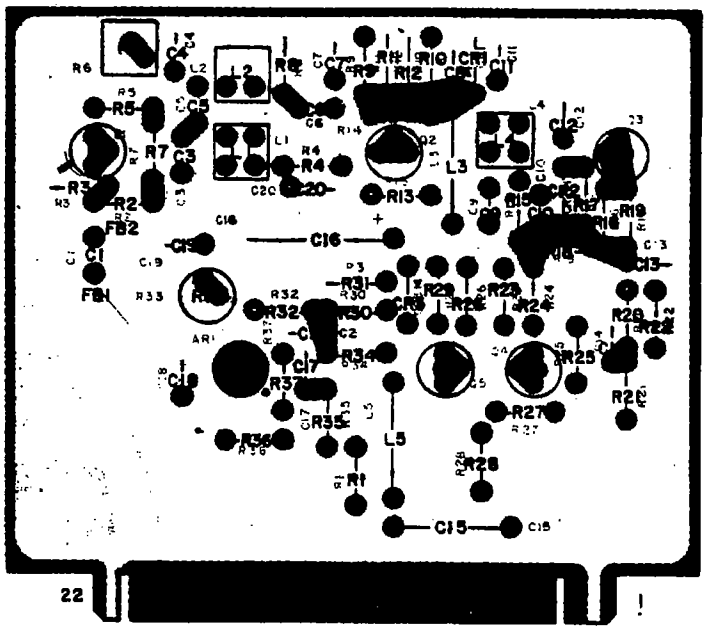


Figure 5-15. Type 79526 AM/MCW Demodulator and AGC/MGC (A11), Component Locations

5.4.12 Type 79526 AM/MCW Demodulator REF DESIG PREFIX A11

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
AR1	INTEGRATED CIRCUIT	1	U5B7741393	07263	
C1	CAPACITOR, CERAMIC, DISC: 0.01 μF, 20%, 100V	2	C023B101F103M	56289	
C2	CAPACITOR, CERAMIC, DISC: 0.1 μF, -20+80%, 25V	9	DFJ3	73899	
C3	CAPACITOR, MICA, DIPPED: 500 pF, 5%, 500V	2	DM15-501J	72136	
C4	CAPACITOR, MICA, DIPPED: 510 pF, 5%, 500V	1	DM15-511J	72136	
C5	CAPACITOR, MICA, DIPPED: 10 pF, ±0.5 pF, 500V	1	CM05CD100D03	81349	72136
C6	CAPACITOR, MICA, DIPPED: 1000 pF, 5%, 100V	2	DM15-102J	72136	
C7	Same as C6				
C8	Same as C2				
C9	Same as C1				
C10	Same as C3				
C11	Same as C2				
C12	CAPACITOR, MICA, DIPPED: 200 pF, 5%, 500V	1	CM05FD201J03	81349	72136
C13	Same as C2				
C14	Same as C2				
C15	CAPACITOR, ELECTROLYTIC, ALUMINUM: 2.3 μF, 10%, 10V	1	151D235X9010W2	56289	
C16	CAPACITOR, ELECTROLYTIC, TANTALUM: 100 μF, 10%, 20V	1	CS13BE107K	81349	56289
C17	Same as C2				
C18	Same as C2				
C19	Same as C2				
C20	Same as C2				
CR1	DIODE	2	1N462A	80131	93332
CR2	DIODE	1	5082-2800	28480	
CR3	Same as CR1				
FB1	FERRITE BEAD	2	56-590-65-4A	02114	
FB2	Same as FB1				
L1	COIL, VARIABLE	3	7107-27	71279	
L2	Same as L1				
L3	COIL, FIXED	2	2500-42	99800	
L4	Same as L1				
L5	Same as L3				
Q1	TRANSISTOR	1	A473	73445	
Q2	TRANSISTOR	1	2N5109	80131	02735
Q3	TRANSISTOR	2	2N2222A	80131	04713

REF DESIG PREFIX A11

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
Q4	TRANSISTOR	1	2N3251	80131	04713
Q5	Same as Q3				
R1	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	6	RCR07G101JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 22 kΩ, 5%, 1/4W	2	RCR07G223JS	81349	01121
R3	RESISTOR, FIXED, COMPOSITION: 7.5 kΩ, 5%, 1/4W	4	RCR07G752JS	81349	01121
R4	RESISTOR, FIXED, COMPOSITION: 1.0 kΩ, 5%, 1/4W	3	RCR07G102JS	81349	01121
R5	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	6	RCR07G470JS	81349	01121
R6	RESISTOR, VARIABLE, FILM: 1 kΩ, 10%, 1/2W	1	62PAR1K	73138	
R7	RESISTOR, FIXED, COMPOSITION: 39 kΩ, 5%, 1/4W	2	RCR07G393JS	81349	01121
R8	Same as R7				
R9	Same as R5				
R10	Same as R2				
R11	Same as R3				
R12	RESISTOR, FIXED, COMPOSITION: 330 Ω, 5%, 1/4W	1	RCR07G331JS	81349	01121
R13	Same as R5				
R14	Same as R1				
R15	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4W	1	RCR07G103JS	81349	01121
R16	RESISTOR, FIXED, COMPOSITION: 1.0 M, 5%, 1/4W	1	RCR07G105JS	81349	01121
R17	RESISTOR, FIXED, COMPOSITION: 100 kΩ, 5%, 1/4W	1	RCR07G104JS	81349	01121
R18	Same as R4				
R19	Same as R5				
R20	Same as R3				
R21	Same as R1				
R22	RESISTOR, FIXED, COMPOSITION: 33 kΩ, 5%, 1/4W	1	RCR07G333JS	81349	01121
R23	Same as R1				
R24	Same as R3				
R25	Same as R5				
R26	Same as R5				
R27	RESISTOR, FIXED, COMPOSITION: 2.2 kΩ, 5%, 1/4W	1	RCR07G222JS	81349	01121
R28	Same as R4				
R29	RESISTOR, FIXED, COMPOSITION: 6.8 kΩ, 5%, 1/4W	1	RCR07G682JS	81349	01121
R30	RESISTOR, FIXED, COMPOSITION: 10 M, 5%, 1/4W	1	RCR07G106JS	81349	01121
R31	RESISTOR, FIXED, COMPOSITION: 30 kΩ, 5%, 1/4W	1	RCR07G303JS	81349	01121
R32	RESISTOR, FIXED, COMPOSITION: 2.2 kΩ, 5%, 1/4W	1	RCR07G222JS	81349	01121
R33	RESISTOR, VARIABLE, FILM: 100 kΩ, 10%, 1/2W	1	62PR100K	73138	
R34	RESISTOR, FIXED, COMPOSITION: 36 kΩ, 5%, 1/4W	1	RCR07G363JS	81349	01121

REF DESIG PREFIX A11

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R35	Same as R1				
R36	Same as R1				
R37	RESISTOR, FIXED, COMPOSITION: 300 kΩ, 5%, 1/4W	1	RCR07G304JS	81349	01121

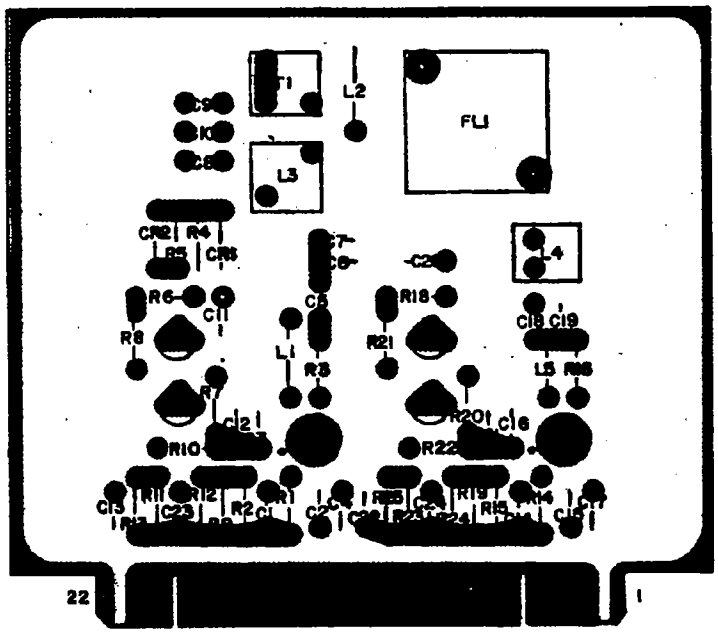


Figure 5-16. Type 79527 FM Demodulator (A12), Component Locations

5.4.13 Type 79527-1 FM Demodulator

REF DESIG PREFIX A12

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
AR1	INTEGRATED CIRCUIT	2	U5F7719393	07263	
AR2	Same as AR1				
C1	CAPACITOR, CERAMIC, DISC: 0.01 μF, 20%, 100V	5	C023B101F103M	56289	
C2	CAPACITOR, CERAMIC, DISC: 0.02 μF, 20%, 100V	2	C023B101H203M	56289	
C3	CAPACITOR, CERAMIC, DISC: 0.05 μF, 20%, 100V	6	29C212A7	56289	
C4	Same as C1				
C5	Same as C1				
C6	CAPACITOR, MICA, DIPPED: 160 pF, 5%, 500V	1	CM05FD161J03	81349	72136
C7	CAPACITOR, MICA, DIPPED: 100 pF, 5%, 500V	1	CM05FD101J03	81349	72136
C8	CAPACITOR, MICA, DIPPED: 51 pF, 5%, 500V	1	CM05ED510J03	81349	72136
C9	CAPACITOR, MICA, DIPPED: 180 pF, 5%, 500V	1	CM05FD181J03	81349	72136
C10	CAPACITOR, MICA, DIPPED: 82 pF, 5%, 500V	1	CM05ED820J03	81349	72136
C11	CAPACITOR, MICA, DIPPED: 500 pF, 5%, 500V	1	DM15-501J	72136	
C12	Same as C3				
C13	Same as C3				
C14	Same as C1				
C15	Same as C2				
C16	Same as C3				
C17	Same as C1				
C18	CAPACITOR, MICA, DIPPED: 820 pF, 5%, 300V	2	DM15-821J	72136	
C19	Same as C18				
C20	CAPACITOR, MICA, DIPPED: 1000 pF, 5%, 100V	1	DM15-102J	72136	
C21	Same as C3				
C22	Same as C3				
C23	CAPACITOR, CERAMIC, DISC: 0.1 μF, -20+80%, 25V	2	DFJ3	73899	
C24	Same as C23				
CR1	DIODE	2	1N4446	80131	93332
CR2	Same as CR1				
FL1	DISCRIMINATOR, CRYSTAL	1	8198926	81349	
L1	COIL, FIXED	1	2500-28	99800	
L2	COIL, FIXED	1	201-11	99848	
L3	POT CORE ASSEMBLY	1	30705-19	14632	
L4	COIL, VARIABLE	1	7107-27	71279	
L5	COIL, FIXED	1	1025-84	99800	
Q1	TRANSISTOR	2	2N3251	80131	04713
Q2	TRANSISTOR	2	2N2222A	80131	04713

REF DESIG PREFIX A12

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
Q3	Same as Q1				
Q4	Same as Q2				
R1	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	6	RCR07G101JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 300 Ω, 5%, 1/4W	2	RCR07G301JS	81349	01121
R3	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	6	RCR07G470JS	81349	01121
R4	RESISTOR, FIXED, COMPOSITION: 100 kΩ, 5%, 1/4W	2	RCR07G104JS	81349	01121
R5	Same as R4				
R6*	RESISTOR, FIXED, COMPOSITION: 12 M, 5%, 1/4W	1	RCR07G126JS	81349	01121
R7	RESISTOR, FIXED, COMPOSITION: 30 kΩ, 5%, 1/4W	2	RCR07G303JS	81349	01121
R8	Same as R3				
R9	Same as R1				
R10	Same as R3				
R11	RESISTOR, FIXED, COMPOSITION: 4.7 kΩ, 5%, 1/4W	2	RCR07G472JS	81349	01121
R12	RESISTOR, FIXED, COMPOSITION: 470 Ω, 5%, 1/4W	2	RCR07G471JS	81349	01121
R13	Same as R1				
R14	Same as R1				
R15	Same as R2				
R16	Same as R3				
R17	NOT USED				
R18*	RESISTOR, FIXED, COMPOSITION: 3.3 MΩ, 5%, 1/4W	1	RCR07G335JS	81349	01121
R19	Same as R1				
R20	Same as R7				
R21	Same as R3				
R22	Same as R3				
R23	Same as R11				
R24	Same as R12				
R25	Same as R1				
T1	POT CORE ASSEMBLY	1	30705-20	14632	
*	Nominal value. Final value to be factory selected.				

5.4.14 Type 7437 Audio/Video Amplifier REF DESIG PREFIX A13

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	CAPACITOR, ELECTROLYTIC, TANTALUM: 0.10 μF, 10%, 35V	1	150D104X9035A2	56289	
C2	CAPACITOR, ELECTROLYTIC, TANTALUM: 22 μF, 10%, 15V	1	CS13BD226K	81349	56289
C3	CAPACITOR, ELECTROLYTIC, ALUMINUM: 100 μF, -10+75%, 25V	2	30D107G025DD2	56289	
C4	CAPACITOR, ELECTROLYTIC, TANTALUM: 27 μF, 10%, 35V	2	196D276X9035MA3	56289	
C5	CAPACITOR, ELECTROLYTIC, TANTALUM: 2.2 μF, 10%, 35V	1	CS13BF225K	81349	56289
C6	CAPACITOR, ELECTROLYTIC, TANTALUM: 1 μF, 10%, 35V	2	CS13BF105K	81349	56289
C7	CAPACITOR, ELECTROLYTIC, TANTALUM: 22 μF, 10%, 35V	1	CS13BF226K	81349	56289
C8	Same as C4				
C9	Same as C4				
C10	Same as C3				
CR1	DIODE	6	1N462A	80131	93332
CR2	Same as CR1				
CR3	Same as CR1				
CR4	Same as CR1				
CR5	Same as CR1				
CR6	Same as CR1				
CR7	DIODE	2	1N4446	80131	93332
CR8	Same as CR7				
Q1	TRANSISTOR	2	2N2222A	80131	04713
Q2	TRANSISTOR	2	2N3251	80131	04713
Q3	TRANSISTOR	2	2N2270	80131	02735
Q4	TRANSISTOR	2	2N4037	80131	02735
Q5	Same as Q1				
Q6	Same as Q2				
Q7	Same as Q3				
Q8	Same as Q4				
R1	RESISTOR, FIXED, COMPOSITION: 470 Ω, 5%, 1/4W	3	RCR07G471JS	81349	01121
R2	RESISTOR, FIXED, FILM: 274 kΩ, 1%, 1/4W	1	RN60D2743F	81349	75042
R3	RESISTOR, FIXED, FILM: 24.3 kΩ, 1%, 1/4W	2	RN60D2432F	81349	75042
R4	RESISTOR, FIXED, COMPOSITION: 2.2 kΩ, 5%, 1/4W	1	RCR07G222JS	81349	01121
R5	RESISTOR, FIXED, FILM: 681 Ω, 1%, 1/4W	2	RN60D6810F	81349	75042

REF DESIG PREFIX A13

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R6	RESISTOR, FIXED, COMPOSITION: 2.7 Ω, 5%, 1/4W	1	RCR07G2R7JS	81349	01121
R7	RESISTOR, FIXED, FILM: 10 kΩ, 1%, 1/4W	1	RN60D1002F	81349	75042
R8	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	2	RCR07G101JS	81349	01121
R9	RESISTOR, FIXED, COMPOSITION: 1 kΩ, 5%, 1/4W	5	RCR07G102JS	81349	01121
R10	Same as R9				
R11	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	6	RCR07G470JS	81349	01121
R12	Same as R11				
R13	Same as R1				
R15	RESISTOR, FIXED, FILM: 178 kΩ, 1%, 1/4W	1	RN60D1783F	81349	75042
R16	Same as R3				
R17	Same as R9				
R18	Same as R5				
R19	RESISTOR, FIXED, FILM: 4.75 kΩ, 1%, 1/4W	1	RN60D4751F	81349	75042
R20	Same as R11				
R21	Same as R8				
R22	Same as R9				
R23	Same as R9				
R24	Same as R11				
R25	Same as R11				
R26	Same as R11				
R27	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4W	1	RCR07G103JS	81349	01121
T1	AUDIO TRANSFORMER ASSEMBLY	1	14006-1	14632	

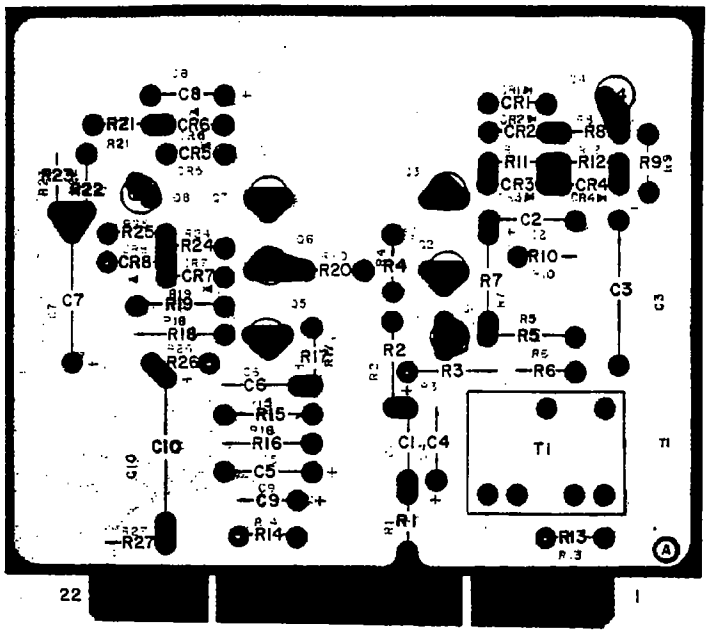


Figure 5-17. Type 7437 Audio/Video Amplifier (A13), Component Locations

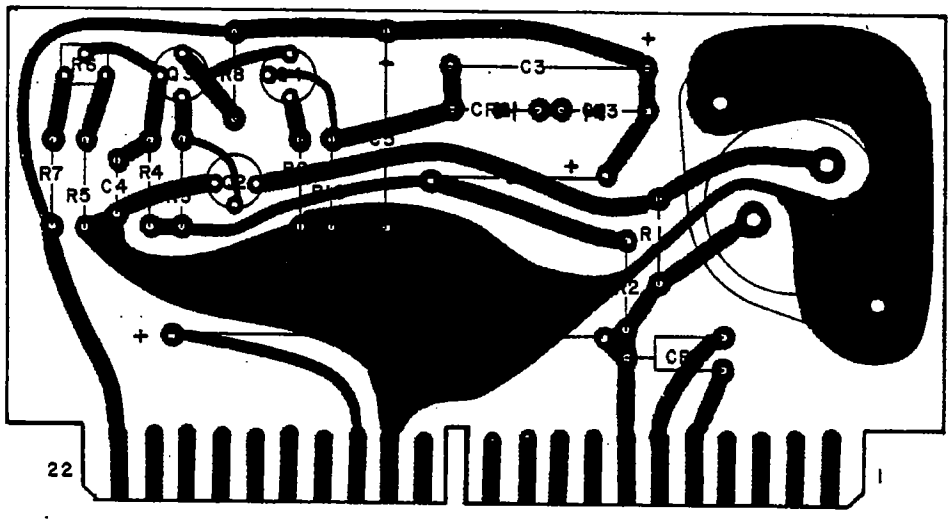


Figure 5-18. Type 76160 -18V Regulated Power Supply (A14), Component Locations

5.4.15 Type 76160 -18V Regulated Power Supply Board REF DESIG PREFIX A14

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	CAPACITOR, ELECTROLYTIC, ALUMINUM: 200 µF, -10+75%, 50V	1	39D207G050FJ4	56289	
C2	CAPACITOR, ELECTROLYTIC, ALUMINUM: 10 µF, -10+75%, 50V	1	30D106G050CB2	56289	
C3	CAPACITOR, ELECTROLYTIC, ALUMINUM: 10 µF, -10+75%, 25V	1	30D106G025BB2	56289	
C4	CAPACITOR, MICA, DIPPED: 200 pF, 5%, 500V	1	CM05FD201J03	81349	72136
C5	CAPACITOR, ELECTROLYTIC, TANTALUM: 47 µF, 10%, 20V	1	CS13BE476K	81349	56289
CR1	DIODE	2	1N4003	80131	
CR2	DIODE	1	1N754A	80131	04713
CR3	DIODE	1	1N462A	80131	93332
CR4	Same as CR1				
Q1	TRANSISTOR	1	2N3055	80131	04713
Q2	TRANSISTOR	3	2N4037	80131	02735
Q3	Same as Q2				
Q4	Same as Q2				
R1	RESISTOR, FIXED, COMPOSITION: 470 Ω, 5%, 1/4W	1	RCR07G471JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 6.8 kΩ, 5%, 1/4W	2	RCR07G682JS	81349	01121
R3	Same as R2				
R4	RESISTOR, FIXED, COMPOSITION: 150 kΩ, 5%, 1/4W	1	RCR07G154JS	81349	01121
R5	RESISTOR, FIXED, COMPOSITION: 5.6 kΩ, 5%, 1/4W	1	RCR07G562JS	81349	01121
R6	RESISTOR, VARIABLE, FILM: 1 kΩ, 10%, 1/2W	1	62PAR1K	73138	
R7	RESISTOR, FIXED, COMPOSITION: 3.9 kΩ, 5%, 1/4W	1	RCR07G392JS	81349	01121
R8	RESISTOR, FIXED, COMPOSITION: 2.2 kΩ, 5%, 1/4W	2	RCR07G222JS	81349	01121
R9	RESISTOR, FIXED, COMPOSITION: 220 Ω, 5%, 1/4W	1	RCR07G221JS	81349	01121
R10	Same as R8				

5.4.16 Type 76162 +18V Regulated Power Supply

REF DESIG PREFIX A15

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	CAPACITOR, ELECTROLYTIC, ALUMINUM: 200 μF, -10+75%, 50V	1	39D207G050FJ4	56289	
C2	CAPACITOR, ELECTROLYTIC, ALUMINUM: 10 μF, -10+75%, 50V	1	30D106G050CB2	56289	
C3	CAPACITOR, ELECTROLYTIC, ALUMINUM: 10 μF, -10+75%, 25V	1	30D106G025BB2	56289	
C4	CAPACITOR, ELECTROLYTIC, TANTALUM: 15 μF, 10%, 20V	1	CS13BE156K	81349	56289
CR1	DIODE	1	MDA940A3	04713	
CR2	DIODE	1	1N754A	80131	04713
CR3	DIODE	1	1N462A	80131	93332
Q1	TRANSISTOR	1	2N3055	80131	04713
Q2	TRANSISTOR	3	2N2222A	80131	04713
Q3	Same as Q2				
Q4	Same as Q2				
R1	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	1	RCR07G470JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 6.8 kΩ, 5%, 1/4W	2	RCR07G682JS	81349	01121
R3	Same as R2				
R4	RESISTOR, FIXED, COMPOSITION: 220 kΩ, 5%, 1/4W	1	RCR07G224JS	81349	01121
R5	RESISTOR, FIXED, COMPOSITION: 1 kΩ, 5%, 1/4W	1	RCR07G102JS	81349	01121
R6	RESISTOR, FIXED, COMPOSITION: 5.6 kΩ, 5%, 1/4W	1	RCR07G562JS	81349	01121
R7	RESISTOR, VARIABLE, FILM: 1 kΩ, 30%, 1/2W	1	62PAR1K	73138	
R8	RESISTOR, FIXED, COMPOSITION: 3.9 kΩ, 5%, 1/4W	1	RCR07G392JS	81349	01121
R9	RESISTOR, FIXED, COMPOSITION: 1.8 kΩ, 5%, 1/4W	1	RCR07G182JS	81349	01121
R10	RESISTOR, FIXED, COMPOSITION: 220 Ω, 5%, 1/4W	1	RCR07G221JS	81349	01121
R11	RESISTOR, FIXED, COMPOSITION: 4.7 kΩ, 5%, 1/4W	1	RCR07G472JS	81349	01121

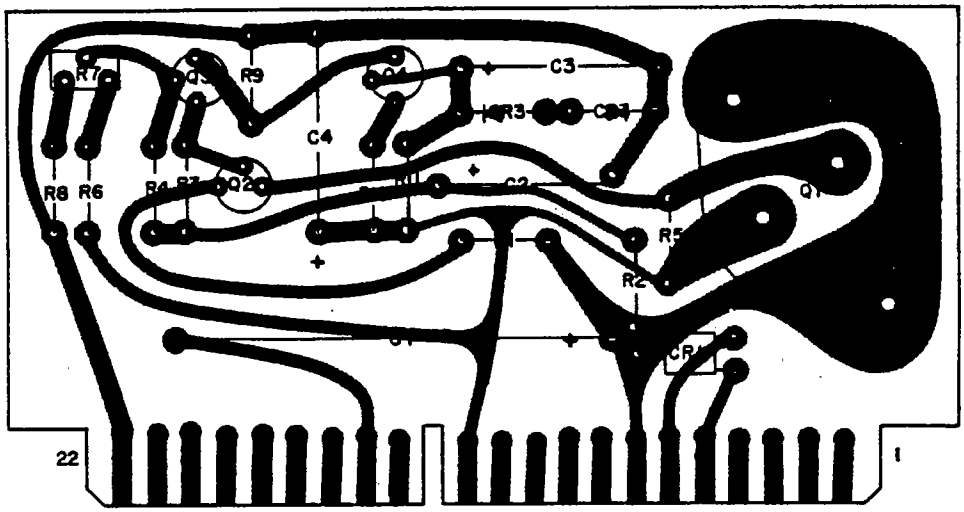


Figure 5-19. Type 76162 +18V Regulated Power Supply (A15), Component Locations

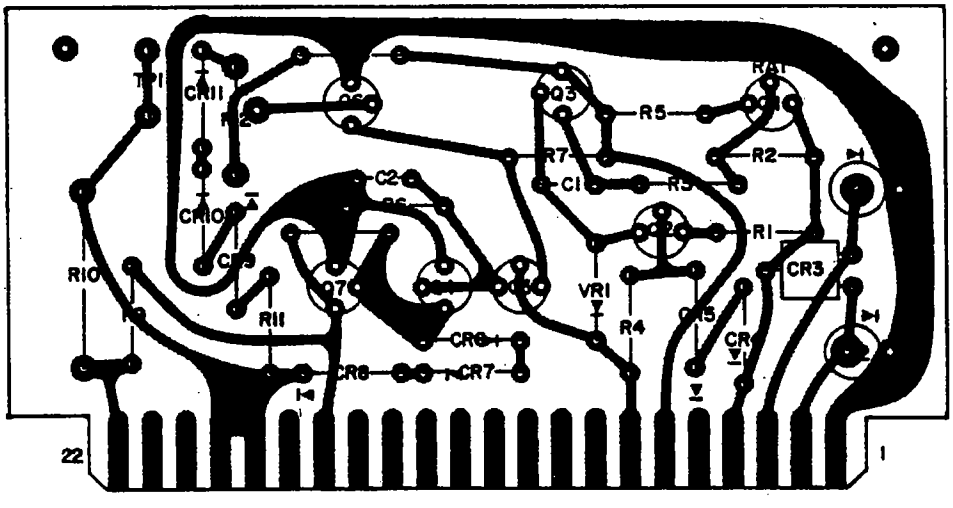


Figure 5-20. Type 76211 +5V & -5V Regulated Power Supply (A16), Component Locations

5.4.17 Type 76211 +5V and -5V Power Supply REF DESIG PREFIX A16

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	CAPACITOR, CERAMIC, DISC: 0.05 μF, +80-20%, 25V	2	DFJ1	73899	
C2	Same as C1				
CR1	DIODE	2	1N4998	80131	04713
CR2	Same as CR1				
CR3	NOT USED				
CR4	DIODE	5	1N462A	80131	93332
CR5	Same as CR4				
CR6	Same as CR4				
CR7	Same as CR4				
CR8	Same as CR4				
CR9	DIODE	3	1N198A	80131	93332
CR10	Same as CR9				
CR11	Same as CR9				
Q1	TRANSISTOR	3	2N2270	80131	02735
Q2	Same as Q1				
Q3	TRANSISTOR	1	2N4037	80131	02735
Q4	TRANSISTOR	1	2N3251	80131	04713
Q5	TRANSISTOR	2	2N929	80131	04713
Q6	Same as Q5				
Q7	Same as Q1				
R1	RESISTOR, FIXED, COMPOSITION: 75 Ω, 5%, 1/4W	1	RCR07G750JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 6.2 kΩ, 5%, 1/4W	1	RCR07G622JS	81349	01121
R3	RESISTOR, FIXED, COMPOSITION: 620 Ω, 5%, 1/4W	1	RCR07G621JS	81349	01121
R4	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4W	1	RCR07G103JS	81349	01121
R5	RESISTOR, FIXED, COMPOSITION: 10 Ω, 5%, 1/4W	1	RCR07G100JS	81349	01121
R6	RESISTOR, FIXED, COMPOSITION: 39 kΩ, 5%, 1/4W	1	RCR07G393JS	81349	01121
R7	RESISTOR, FIXED, COMPOSITION: 120 kΩ, 5%, 1/4W	1	RCR07G124JS	81349	01121
R8	RESISTOR, FIXED, COMPOSITION: 2 kΩ, 5%, 1/4W	2	RCR07G202JS	81349	01121
R9	RESISTOR, FIXED, COMPOSITION: 470 kΩ, 5%, 1/4W	1	RCR07G474JS	81349	01121
R10	RESISTOR, FIXED, WIRE-WOUND: 0.33 Ω, 5%, 2W	1	BWH0.33J	75042	
R11	Same as R8				
R12	RESISTOR, VARIABLE, FILM: 500 Ω, 10%, 3/4W	1	89PR500	73138	
R13	RESISTOR, FIXED, COMPOSITION: 2.4 kΩ, 5%, 1/4W	1	RCR07G242JS	81349	01121
RA1	HEATSINK	2	3AL635-2R	07387	
RA2	Same as RA1				

REF DESIG PREFIX A16

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
TP1	JACK, TIP	1	TJ203R	94144	
VR1	DIODE	1	1N752A	80131	04713

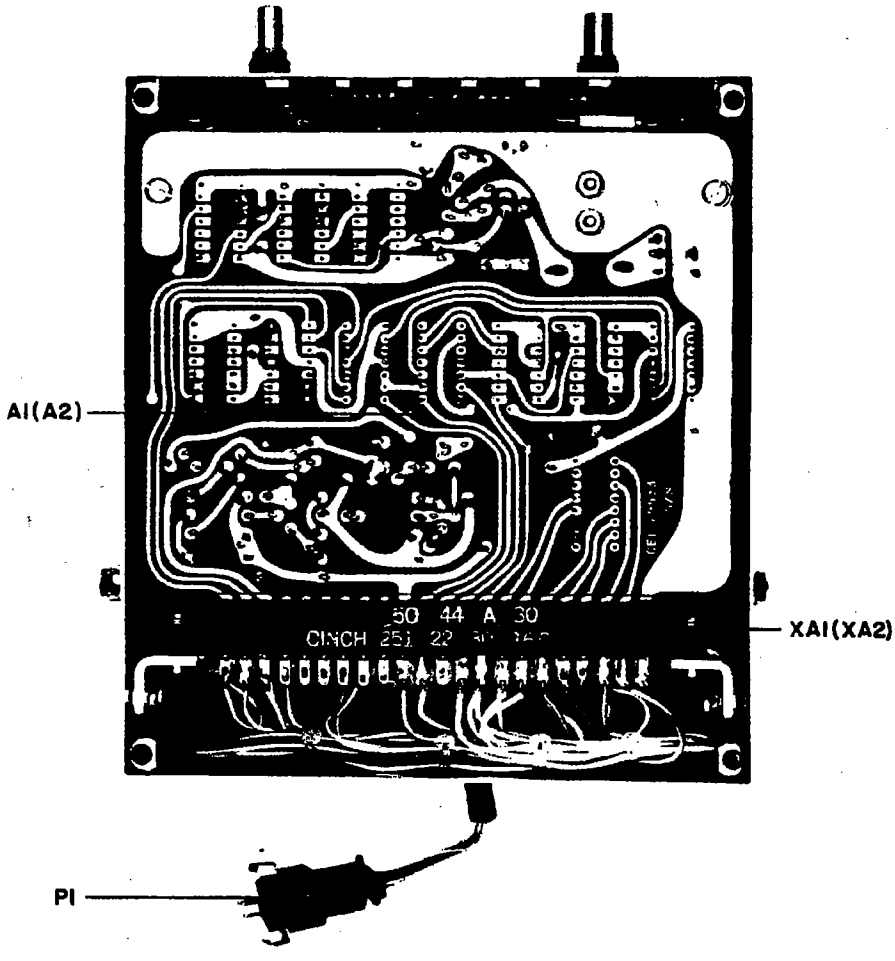


Figure 5-21. Type 79977 HF Counter Assembly (A17) Top View, Component Locations

5.4.18 Type 79977 HF Counter Assembly REF DESIG PREFIX A17

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
A1	GATE GENERATOR	1	79893	14632	
A2	COUNT, DECODE AND DISPLAY	1	79944	14632	
C1	CAPACITOR, FIXED, PAPER: 0.01 μF, 20%, 600V	2	102P515	56289	
C2	Same as C1				
J1	CONNECTOR, RECEPTACLE	2	46225	74868	
J2	Same as J1				
MP1	COVER	1	22930-1	14632	
P1	CONNECTOR, PLUG	1	M4PLSH10C	81312	
P2	CONNECTOR, PLUG	2	60598-5	00779	
P3	Same as P2				
R1	RESISTOR, FIXED, COMPOSITION: 20 MΩ, 5%, 1/4W	1	RCR07G206JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/8W	1	RCR05G103JS	81349	01121
S1	SWITCH, ROTARY	1	263283BA2	76854	
S2	SWITCH, ROTARY	1	1128-3	14632	
XA1	CONNECTOR, PRINTED CIRCUIT CARD	2	251-22-30-160	71785	
XA2	Same as XA1				

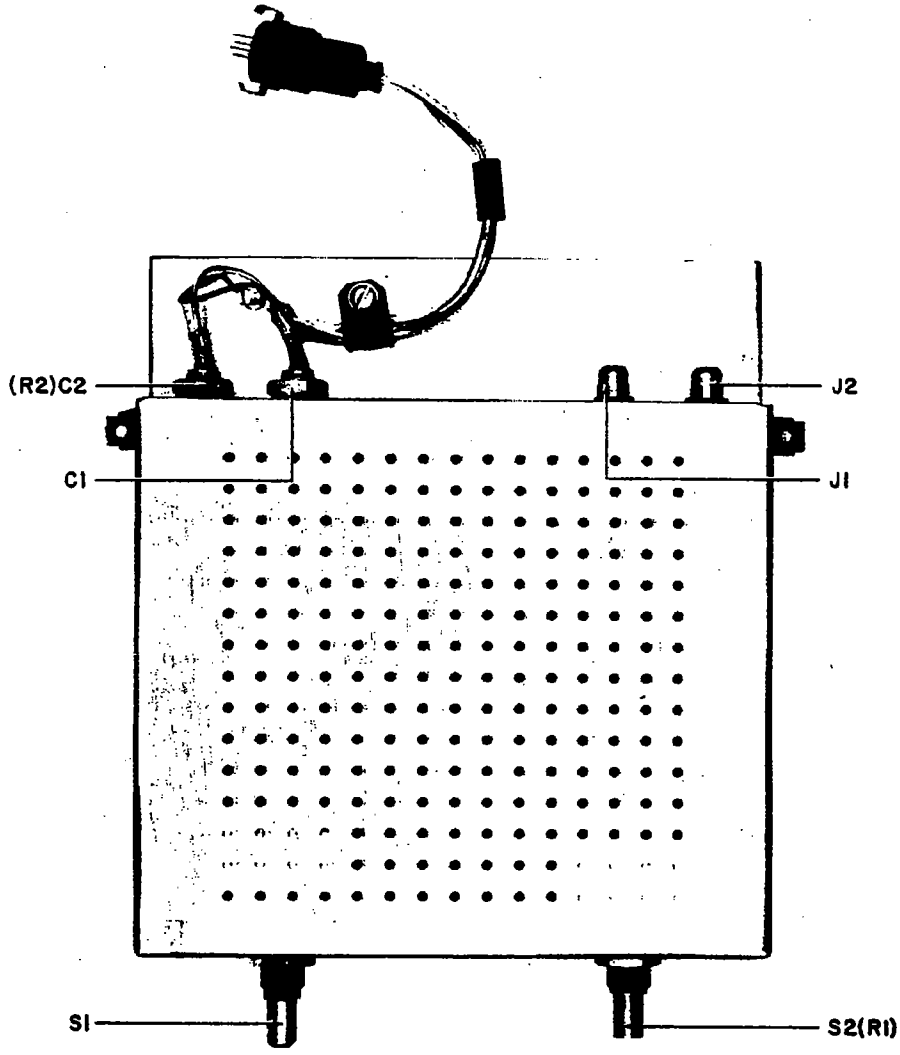


Figure 5-22. Type 79977 HF Counter Assembly (A17) Bottom View, Component Locations

5.4.18.1 Type 79893 Gate Generator REF DESIG PREFIX A17A1

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	CAPACITOR, CERAMIC, TUBULAR: 10 pF, ±0.5 pF, 500V	1	301-000C0H0-100D	72982	
C2	CAPACITOR, MICA, DIPPED: 15 pF, 5%, 500V	1	CM05CD150J03	81349	72136
C3	CAPACITOR, VARIABLE, AIR: 0.8-10 pF, 250V	1	2954	91293	
C4	CAPACITOR, MICA, DIPPED: 750 pF, 5%, 300V	2	DM15-751J	72136	
C5	Same as C4				
C6	CAPACITOR, CERAMIC, DISC: 0.01 μF, 20%, 200V	1	8131A200Z5U0-103M	72982	
C7	CAPACITOR, ELECTROLYTIC, TANTALUM: 10 μF, 10%, 20V	3	CS13BE106K	81349	56289
C8	CAPACITOR, CERAMIC, DISC: 5000 pF, 20%, 100V	1	C023B101E502M	56289	
C9	CAPACITOR, ELECTROLYTIC, TANTALUM: 4.7 μF, 10%, 35V	1	CS13BF475K	81349	56289
C10	Same as C7				
C11	Same as C7				
C12	CAPACITOR, CERAMIC, DISC: 0.1 μF, -20+80%, 25V	5	DFJ3	73899	
C13	Same as C12				
C14	Same as C12				
C15	NOT USED				
C16	Same as C12				
C17	Same as C12				
CR1	DIODE	2	1N462A	80131	93332
CR2	Same as CR1				
Q1	TRANSISTOR	2	2N929	80131	04713
Q2	TRANSISTOR	3	2N2222A	80131	04713
Q3	TRANSISTOR	2	2N3251	80131	04713
Q4	Same as Q3				
Q5	Same as Q1				
Q6	TRANSISTOR	1	3N139	80131	02735
Q7	Same as Q2				
Q8	Same as Q2				
R1	RESISTOR, FIXED, COMPOSITION: 100 kΩ, 5%, 1/4W	1	RCR07G104JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 150 kΩ, 5%, 1/4W	1	RCR07G154JS	81349	01121
R3	RESISTOR, FIXED, COMPOSITION: 1.0 kΩ, 5%, 1/4W	5	RCR07G102JS	81349	01121
R4	RESISTOR, FIXED, COMPOSITION: 3.0 kΩ, 5%, 1/4W	1	RCR07G302JS	81349	01121
R5	RESISTOR, FIXED, COMPOSITION: 51 kΩ, 5%, 1/4W	1	RCR07G513JS	81349	01121
R6	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4W	1	RCR07G103JS	81349	01121
R7	Same as R3				

REF DESIG PREFIX A17A1

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R8	RESISTOR, FIXED, COMPOSITION: 5.6 kΩ, 5%, 1/4W	2	RCR07G562JS	81349	01121
R9	RESISTOR, FIXED, COMPOSITION: 4.7 kΩ, 5%, 1/4W	3	RCR07G472JS	81349	01121
R10	Same as R8				
R11	Same as R9				
R12	Same as R9				
R13	RESISTOR, FIXED, COMPOSITION: 22 Ω, 5%, 1/4W	1	RCR07G220JS	81349	01121
R14	RESISTOR, FIXED, COMPOSITION: 5.1 M, 5%, 1/4W	1	RCR07G515JS	81349	01121
R15	RESISTOR, FIXED, COMPOSITION: 10 Ω, 5%, 1/4W	1	RCR07G100JS	81349	01121
R16	Same as R3				
R17	RESISTOR, VARIABLE, FILM: 500 Ω, 10%, 1/2W	1	62PR500	73138	
R18	Same as R3				
R19	Same as R3				
U1	INTEGRATED CIRCUIT	6	868292	14632	
U2	Same as U1				
U3	Same as U1				
U4	Same as U1				
U5	Same as U1				
U6	INTEGRATED CIRCUIT	2	86961	14632	
U7	Same as U6				
U8	INTEGRATED CIRCUIT	2	86143	14632	
U9	Same as U1				
U10	INTEGRATED CIRCUIT	1	867445	14632	
U11	Same as U8				
XY1	SOCKET, CRYSTAL	1	8000AG2	91506	
Y1	CRYSTAL, QUARTZ	1	91804-11	14632	

Figure 5-23
Figure 5-24

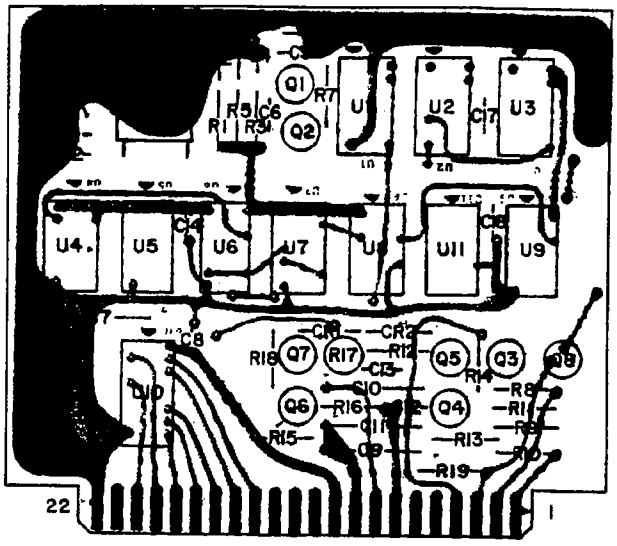


Figure 5-23. Type 79893 Gate Generator (A17A1), Component Locations

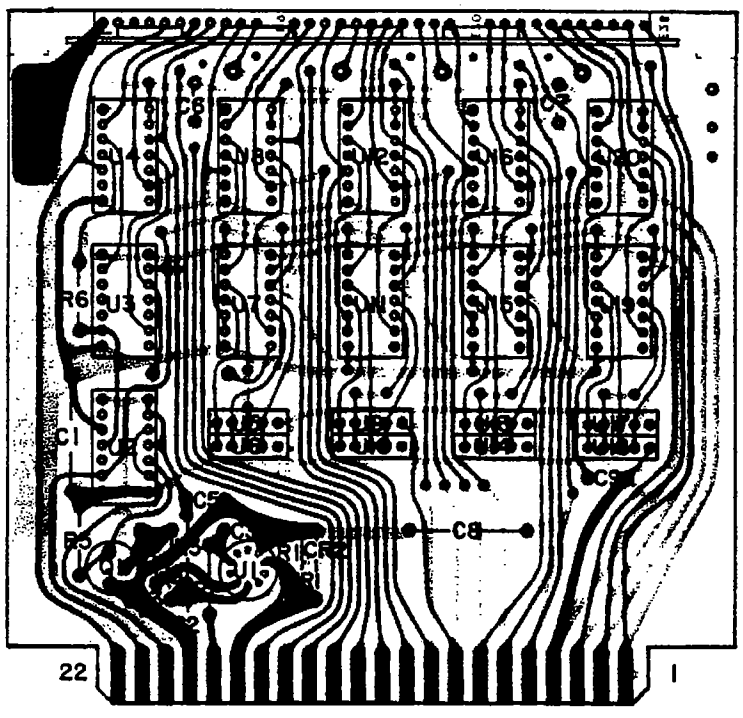


Figure 5-24. Type 79944 Count, Decode and Display (A17A2), Component Locations

5.4.18.2 Type 79944 Count, Decode and Display REF DESIG PREFIX A17A2

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
A1	SOLID STATE NUMERIC DISPLAY	1	16537	14632	
C1	CAPACITOR, ELECTROLYTIC, TANTALUM: 10 μF, 10%, 20V	2	CS13BE106K	81349	56289
C2	CAPACITOR, CERAMIC, DISC: 0.1 μF, -20+80%, 25V	7	DFJ3	73899	
C3	Same as C2				
C4	Same as C2				
C5	Same as C2				
C6	Same as C2				
C7	Same as C2				
C8	Same as C1				
C9	Same as C2				
CR1	DIODE	3	5082-2900	28480	
CR2	Same as CR1				
CR3	Same as CR1				
J1	CONNECTOR, RECEPTACLE	4	60599-3	00779	
J2	Same as J1				
J3	Same as J1				
J4	Same as J1				
Q1	TRANSISTOR	1	2N709A	80131	02735
R1	RESISTOR, FIXED, COMPOSITION: 620 Ω, 5%, 1/4W	1	RCR07G621JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	2	RCR07G470JS	81349	01121
R3	Same as R2				
R4	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4W	1	RCR07G103JS	81349	01121
R5	RESISTOR, FIXED, COMPOSITION: 1.0 kΩ, 5%, 1/4W	1	RCR07G102JS	81349	01121
R6	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	1	RCR07G101JS	81349	01121
R7	RESISTOR, FIXED, COMPOSITION: 200 Ω, 5%, 1/4W	1	RCR07G201JS	81349	01121
U1	INTEGRATED CIRCUIT	1	N5733K	18324	
U2	INTEGRATED CIRCUIT	1	RF3202DC	49956	
U3	INTEGRATED CIRCUIT	1	868290	14632	
U4	INTEGRATED CIRCUIT	8	868292	14632	
U5*	PRESET MODULE	1	31689-10	14632	
U6	PRESET MODULE	4	31689-20	14632	
U7	INTEGRATED CIRCUIT	1	868280	14632	
U8	Same as U4				
U9*	PRESET MODULE	1	31689-10	14632	
U10	Same as U6				

* Choice is customer's option; not always furnished.

REF DESIG PREFIX A17A2

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
U11	Same as U4				
U12	Same as U4				
U13*	PRESET MODULE	1	31689-10	14632	
U14	Same as U6				
U15	Same as U4				
U16	Same as U4				
U17*	PRESET MODULE	1	31689-18	14632	
U18	Same as U6				
U19	Same as U4				
U20	Same as U4				
*	Choice is customer's option; not always furnished.				

5.4.18.2.1 Part 16537 Solid State Numeric Display REF DESIG PREFIX A17A2A1

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	CAPACITOR, ELECTROLYTIC, TANTALUM: 4.7 μF, 10%, 10V	1	CS13BC475K	81349	56289
C2	CAPACITOR, CERAMIC, DISC: 0.1 μF, -20+80%, 25V	1	DFJ3	73899	
U1	INTEGRATED CIRCUIT	5	5082-7300	28480	
U2	Same as U1				
U3	Same as U1				
U4	Same as U1				
U5	Same as U1				

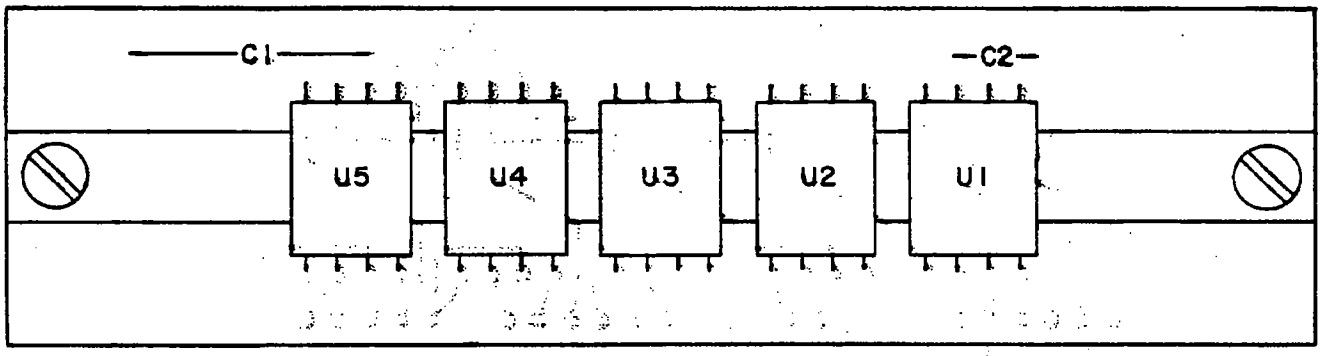


Figure 5-25. Part 16537 Solid State Numeric Display (A17A2A1), Component Locations

5.4.19 Type 71233 LO Tuning Assembly REF DESIG PREFIX A18

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
A1	LOCAL OSCILLATOR TUNING ASSEMBLY	1	7749	14632	
MP1	LO COVER	1	21619-1	14632	
MP2	LO COVER	1	21620-1	14632	

NOTE: Tuning Drive 8584 is used with this assembly.
See exploded view for all parts.

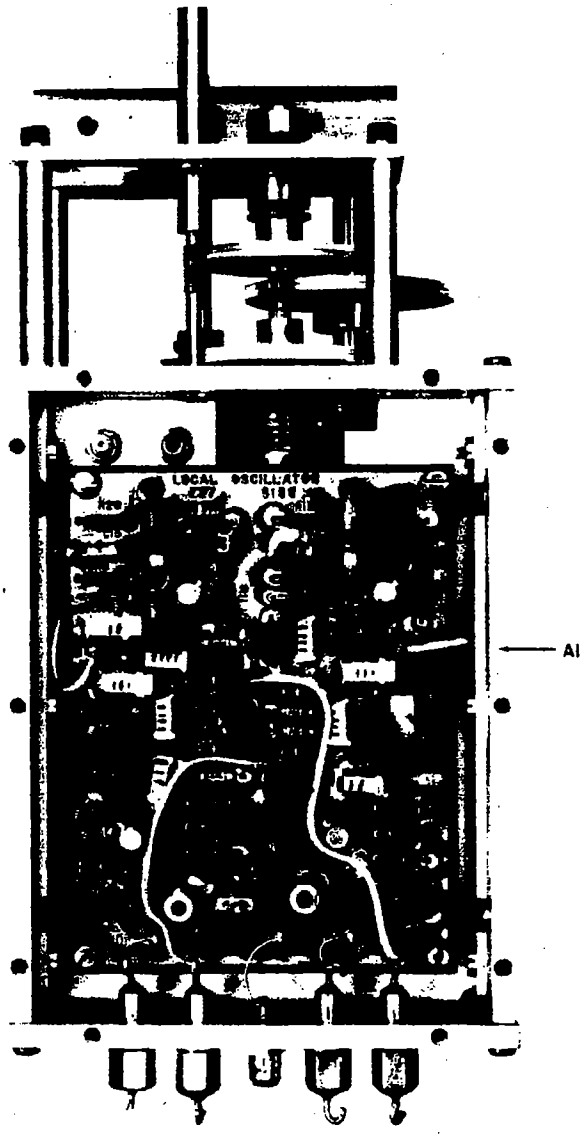


Figure 5-26. Type 71233 LO Tuning Assembly (A18), Component Locations

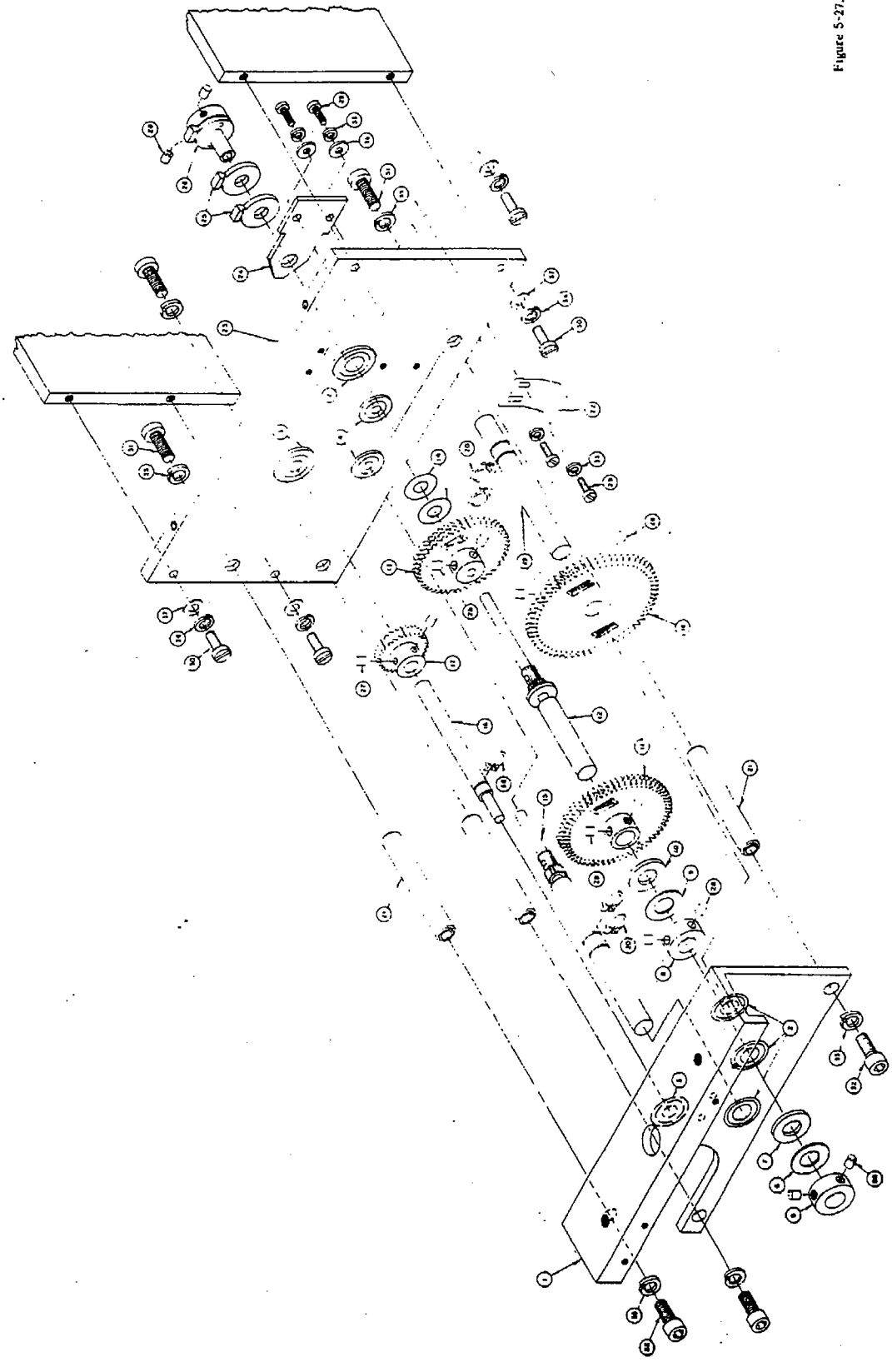


Figure 5-27. Type 8584 Tuning Drive Assembly, Exploded View

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
1	ANGLE PLATE	1	21898-1	14632	
2	BALL BEARING	4	SFR-1883MM	83086	
3	BALL BEARING	2	SFR-33MM	83086	
4	BALL BEARING	2	SFR-63MM	83086	
5	SPACER	1	1451-1	14632	
6	SPRING FRICTION WASHER	AR	7754	04941	
7	THRUST BEARING	1	TT-504	70417	
8	SPACER	1	1451-1	14632	
9	SPRING FRICTION WASHER	AR	7754	04941	
10	THRUST BEARING	1	TT-504	70417	
11	GEAR, ANTI-BACKLASH	1	20466-15	14632	
12	SHAFT ASSEMBLY	1	14190-2	14632	
13	GEAR, ANTI-BACKLASH	1	20184-5	14632	
14	SHIM SPACER	AR	SSS-33	01351	
15	TUNING SHAFT ASSEMBLY	1	21414-1	14632	
16	SHAFT	1	12974-6	14632	
17	GEAR, SPUR	1	20191-8	14632	
18	GEAR, ANTI-BACKLASH	1	20466-16	14632	
19	SHAFT	1	1002-87	14632	
20	RING, RETAINING	4	5100-25	79136	
21	SPACER	3	20757-15	14632	
22	GROUNDING CLIP	1	14308-1	14632	
23	REAR GEAR PLATE	1	21899-1	14632	
24	STOP PLATE	1	14255-1	14632	
25	STOP WASHER	5	13863	14632	
26	STOP RETAINER ASSEMBLY	1	13865	14632	
27	SET SCREW #2-56 x 1/4	AR	MS51021-3	96906	73734
28	SET SCREW #4-40 x 1/8	AR	MS51021-9	96906	73734
29	MACHINE SCREW #2-56 x 1/4	AR	MS51957-3	96906	73734
30	MACHINE SCREW #4-40 x 3/8	AR	MS51957-15	96906	73734
31	MACHINE SCREW #6-32 x 3/8	AR	MS51957-28	96906	73734
32	#6-32 x 3/8 CAP SCREW	AR	MS35459-7	96906	73734
33	#2 LOCK WASHER (SPLIT)	AR	MS35338-134	96906	73734
34	#4 LOCK WASHER (SPLIT)	AR	MS35338-135	96906	73734
35	#6 LOCK WASHER (SPLIT)	AR	MS35338-136	96906	73734
36	#2 FLAT WASHER	AR	MS15795-802	96906	73734
37	#4 FLAT WASHER	AR	MS15795-803	96906	73734
38	RING, RETAINING	1	5100-18	79136	

Figure 5-28

5.4.19.1 Type 7749 Local Oscillator Tuning Assembly

REF DESIG PREFIX A18A1

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
A1	LOCAL OSCILLATOR BOARD	1	15188	14632	
C1	CAPACITOR, CERAMIC, FEEDTHRU: 1000 pF, 20%, 500V	4	CK70AW102M	81349	
C2	Same as C1				
C3	Same as C1				
C4	Same as C1				
C5	CAPACITOR, VARIABLE, GLASS: 1-28 pF, 1000V	2	MC603	73899	
C6	CAPACITOR, VARIABLE, AIR: 6.5-62.36 pF, 500V	2	C28-341-20/.012	23783	
C7	Same as C6				
C8	Same as C5				
J1	CONNECTOR, RECEPTACLE	1	46025	74868	

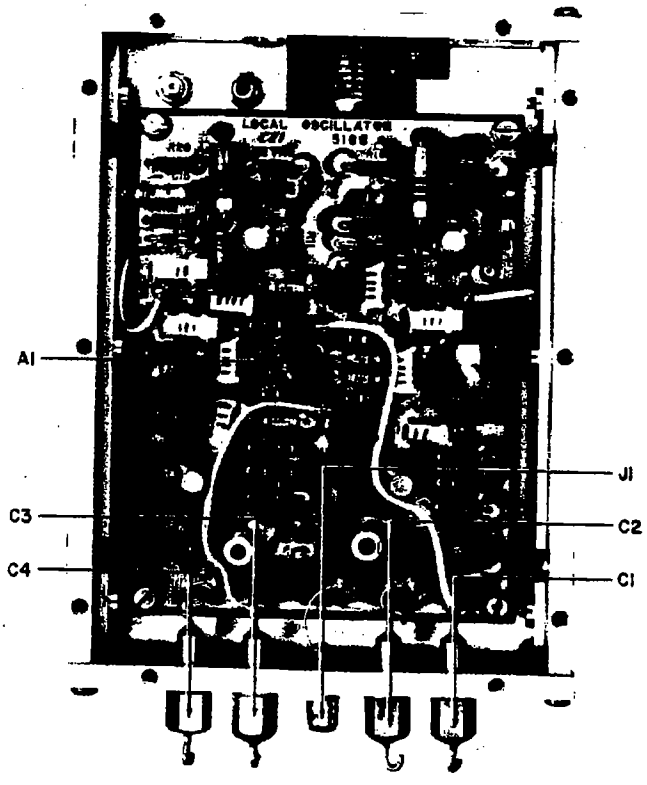


Figure 5-28. Type 7749 LO Tuning Assembly (A18A1) Bottom View, Component Locations

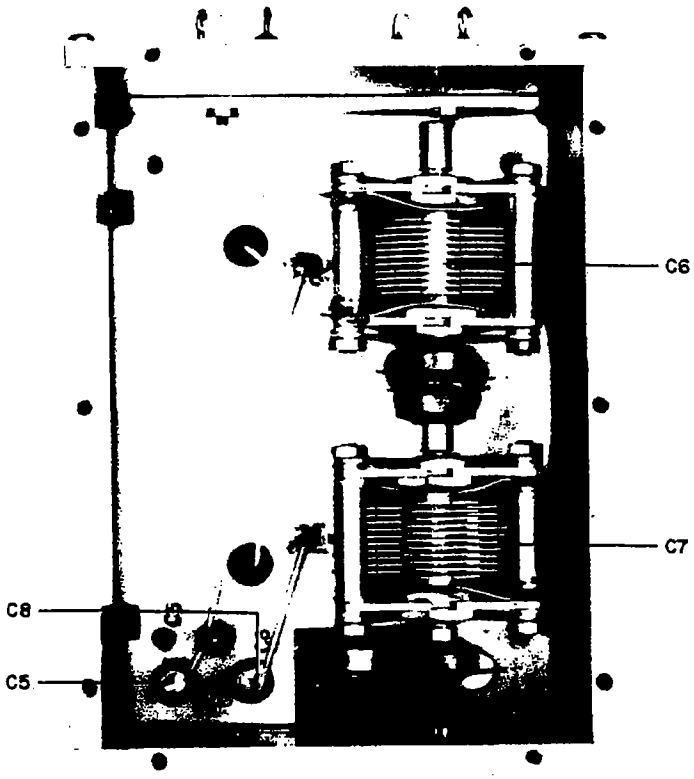


Figure 5-29. Type 7749 LO Tuning Assembly (A18A1) Top View, Component Locations

5.4.19.1.1 Part 15188 Local Oscillator Board REF DESIG PREFIX A18A1A1

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	CAPACITOR, CERAMIC, DISC: 0.05 µF, -20+80%, 25V	8	UK20-503	71590	
C2	Same as C1				
C3	CAPACITOR, CERAMIC, DISC: 100 pF, 5%, 75V	3	1U100RJ	93958	
C4	Same as C3				
C5	Same as C1				
C6	CAPACITOR, CERAMIC, TUBULAR: 10 pF, ±0.5 pF, 500 V	4	301-000U2J0-100D	72982	
C7	Same as C1				
C8	Same as C6				
C9	CAPACITOR, CERAMIC, DISC: 47 pF, 5%, 50V (N450)	1	1T47AJ	93958	
C10	CAPACITOR, CERAMIC, TUBULAR: 5.0 pF, ±0.25 pF, 500V	2	301-000C0H0-509C	72982	
C11	CAPACITOR, MICA, DIPPED: 15 pF, 5%, 500V	2	CM05CD150J03	81349	72136
C12	Same as C1				
C13	Same as C1				
C14	Same as C3				
C15	CAPACITOR, CERAMIC, DISC: 150 pF, 5%, 75V	1	1U150RJ	93958	
C16	Same as C1				
C17	Same as C6				
C18	Same as C1				
C19	Same as C6				
C20	CAPACITOR, CERAMIC, TUBULAR: 33 pF, 5%, 500V (N330)	1	301-000S2H0-330J	72982	
C21	CAPACITOR, CERAMIC, DISC: 56 pF, 5%, 50V (N330)	1	1S56AJ	93958	
C22	Same as C10				
C23	Same as C11				
CR1	DIODE	2	1N4446	80131	93332
CR2	DIODE, VARICAP	5	BB109-YELLOW	25088	
CR3	Same as CR2				
CR4	Same as CR1				
CR5	Same as CR2				
CR6	Same as CR2				
FB1	FERRITE BEAD	4	56-590-65-4A	02114	
FB2 Thru FB4	Same as FB1				
L1	COIL, FIXED	2	2500-42	99800	

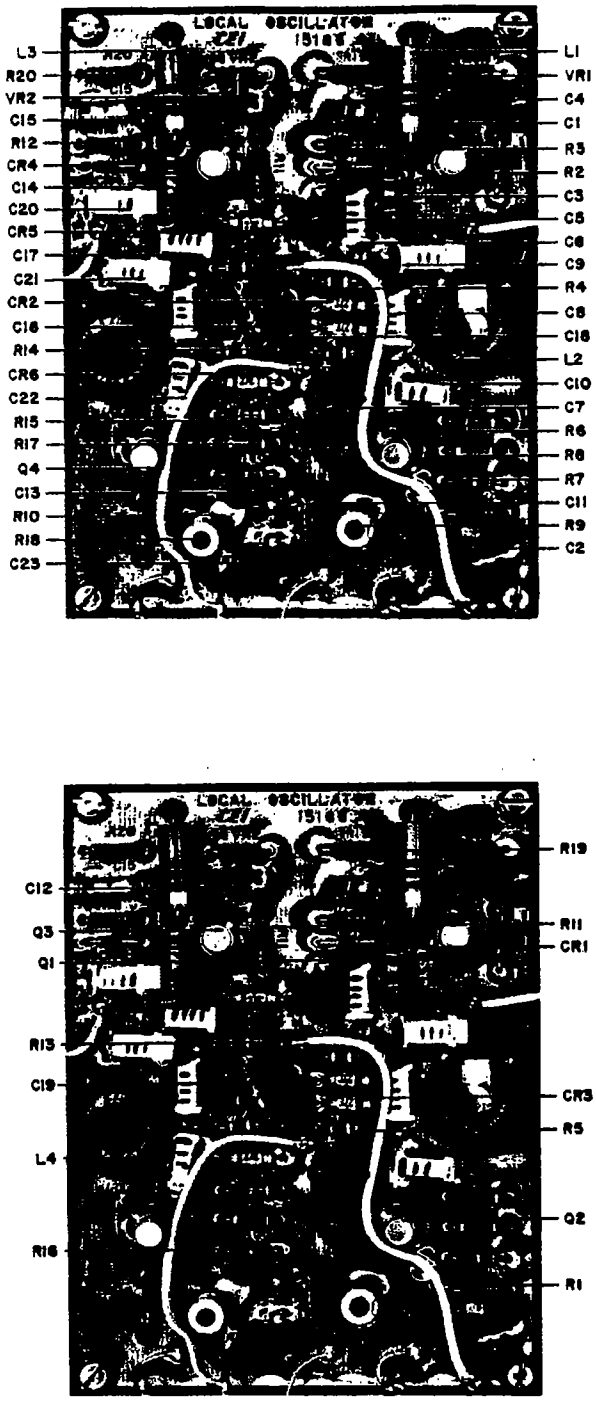


Figure 5-30. Part 15188 Local Oscillator Board (A18A1A1), Component Locations

REF DESIG PREFIX A18A1A1

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
L2	COIL, TOROIDAL	1	20681-35	14632	
L3	Same as L1				
L4	COIL, TOROIDAL	1	20681-36	14632	
Q1	TRANSISTOR	2	3N128	80131	02735
Q2	TRANSISTOR	2	2N3478	80131	02735
Q3	Same as Q1				
Q4	Same as Q2				
R1	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	2	RCR07G101JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 1.0 kΩ, 5%, 1/4W	2	RCR07G102JS	81349	01121
R3	RESISTOR, FIXED, COMPOSITION: 22 kΩ, 5%, 1/4W	2	RCR07G223JS	81349	01121
R4	RESISTOR, FIXED, COMPOSITION: 470 kΩ, 5%, 1/4W	4	RCR07G474JS	81349	01121
R5	Same as R4				
R6	RESISTOR, FIXED, COMPOSITION: 51 kΩ, 5%, 1/4W	2	RCR07G513JS	81349	01121
R7	RESISTOR, FIXED, COMPOSITION: 100 kΩ, 5%, 1/4W	2	RCR07G104JS	81349	01121
R8	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	2	RCR07G470JS	81349	01121
R9	RESISTOR, VARIABLE, FILM: 10 kΩ, 10%, 1/2W	2	62PR10K	73138	
R10	Same as R1				
R11	Same as R2				
R12	Same as R3				
R13	Same as R4				
R14	Same as R4				
R15	Same as R6				
R16	Same as R7				
R17	Same as R8				
R18	Same as R9				
R19	RESISTOR, FIXED, COMPOSITION: 330 Ω, 5%, 1/4W	2	RCR07G331JS	81349	01121
R20	Same as R19				
VR1	DIODE	2	1N754A	80131	04713
VR2	Same as VR1				

5.4.20 Type 79531 Input Filter Assembly REF DESIG PREFIX A19

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
A1	LOW BAND FILTER	1	79553	14632	
A2	HIGH BAND FILTER	1	15131	14632	
C1	CAPACITOR, CERAMIC, FEEDTHRU: 1000 pF, GMV, 500V	3	FA5C102W	01121	
C2	Same as C1				
C3	Same as C1				
J1	CONNECTOR, RECEPTACLE	1	UG1094U	80058	74868
J2	CONNECTOR, RECEPTACLE	2	46025	74868	
J3	Same as J2				
K1	RELAY, ARMATURE	3	RP9817G1	71482	
K2	Same as K1				
K3	Same as K1				
R1	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4W	1	RCR07G103JS	81349	01121

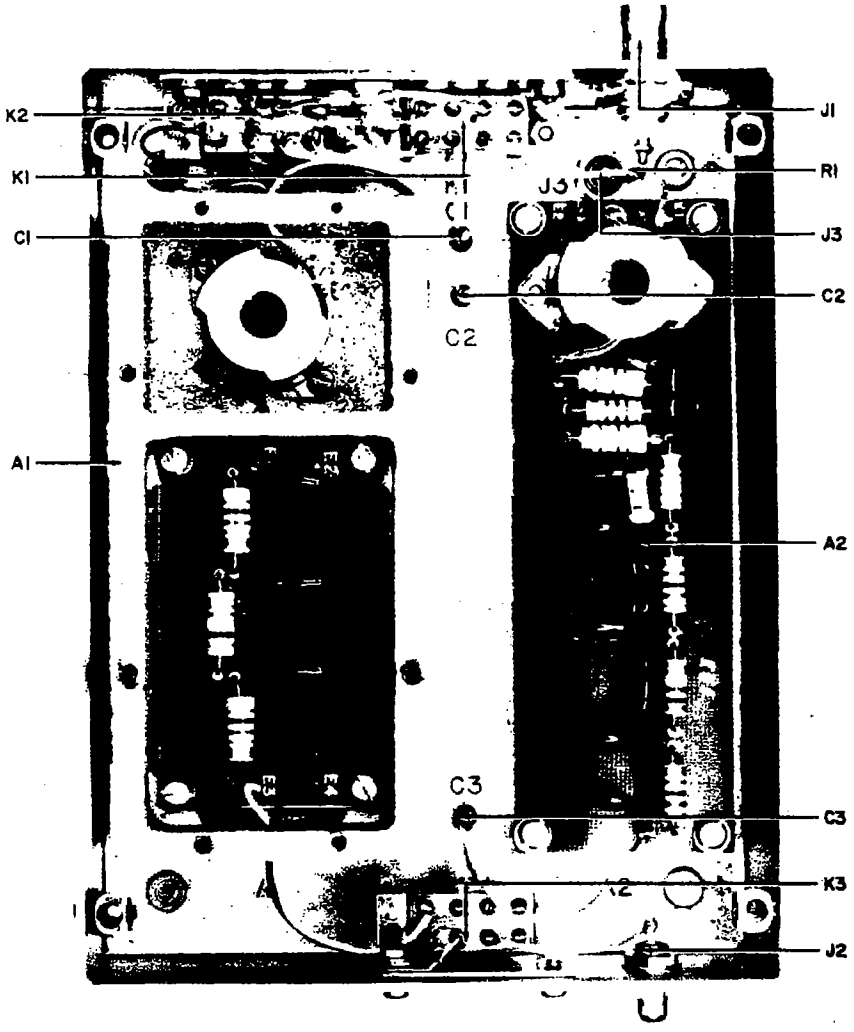


Figure 5-31. Type 79531 Input Filter Assembly (A19), Component Locations

5.4.20.1 Type 79553 Low Band Filter REF DESIG PREFIX A19A1

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
A1	LOW PASS FILTER PRINTED CIRCUIT ASSEMBLY	1	14898	14632	
MP1	COVER	1	15300-1	14632	
T1	TRANSFORMER	1	20021-8	14632	

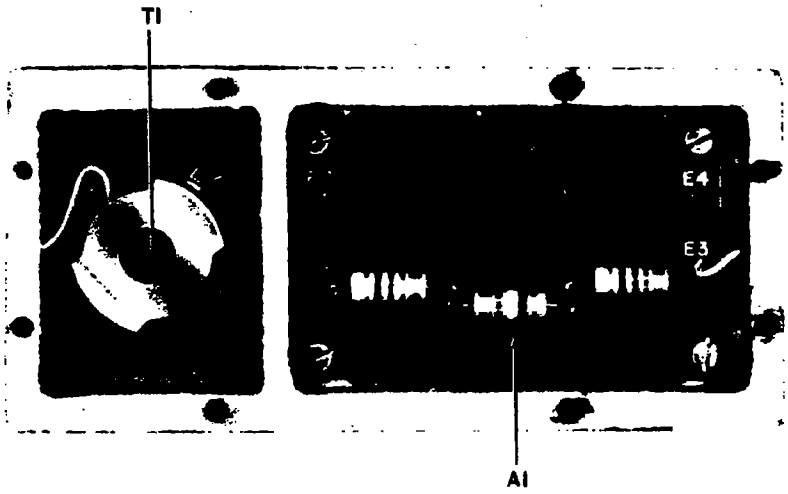


Figure 5-32. Type 79553 Low Band Filter (A19A1), Component Locations

5.4.20.1.1 Part 14898 Low Pass Filter Printed Circuit Assembly REF DESIG PREFIX A19A1A1

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	CAPACITOR, MICA, DIPPED: 390 pF, 5%, 500V	2	CM05FD391J03	81349	72136
C2	CAPACITOR, MICA, DIPPED: 620 pF, 5%, 300V	2	DM15-621J	72136	
C3	Same as C2				
C4	Same as C1				
L1	COIL, FIXED	2	2500-06	99800	
L2	COIL, FIXED	1	2500-08	99800	
L3	Same as L1				

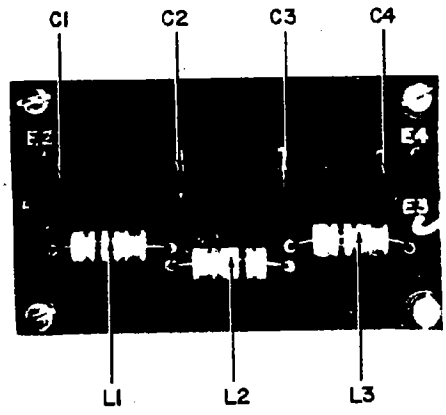


Figure 5-33. Part 14898 Low Pass Filter Printed Circuit Assembly (A19A1A1), Component Locations

5.4.20.2 Part 15131 High Band Filter Printed Circuit Assembly REF DESIG PREFIX A19A2

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	CAPACITOR, MICA, DIPPED: 220 pF, 5%, 500V	1	CM05FD221J03	81349	72136
C2	CAPACITOR, MICA, DIPPED: 200 pF, 5%, 500V	1	CM05FD201J03	81349	72136
C3	CAPACITOR, MICA, DIPPED: 120 pF, 5%, 500V	1	CM05FD121J03	81349	72136
C4	CAPACITOR, CERAMIC, TUBULAR: 8.2 pF, ±0.5 pF, 500V	1	301-000C0H0-829D	72982	
C5	CAPACITOR, MICA, DIPPED: 180 pF, 5%, 500V	1	CM05FD181J03	81349	72136
C6	CAPACITOR, MICA, DIPPED: 56 pF, 5%, 500V	1	CM05ED560J03	81349	72136
C7	CAPACITOR, MICA, DIPPED: 150 pF, 5%, 500V	1	CM05FD151J03	81349	72136
C8	CAPACITOR, MICA, DIPPED: 68 pF, 5%, 500V	1	CM05ED680J03	81349	72136
C9	CAPACITOR, MICA, DIPPED: 150 pF, 5%, 500V	1	CM05FD151J03	81349	72136
C10	CAPACITOR, MICA, DIPPED: 36 pF, 5%, 500V	1	CM05ED360J03	81349	72136
C11	CAPACITOR, MICA, DIPPED: 10 pF, ±0.5 pF, 500V	1	CM05CD100D03	81349	72136
L1	COIL, FIXED	1	2500-02	99800	
L2	COIL, FIXED	1	1537-84	99800	
L3	COIL, FIXED	1	1537-90	99800	
L4	COIL, FIXED	1	1537-82	99800	
L5	COIL, FIXED	2	1537-76	99800	
L6	COIL, FIXED	1	1537-74	99800	
L7	Same as L5				
T1	TRANSFORMER	1	20021-7	14632	

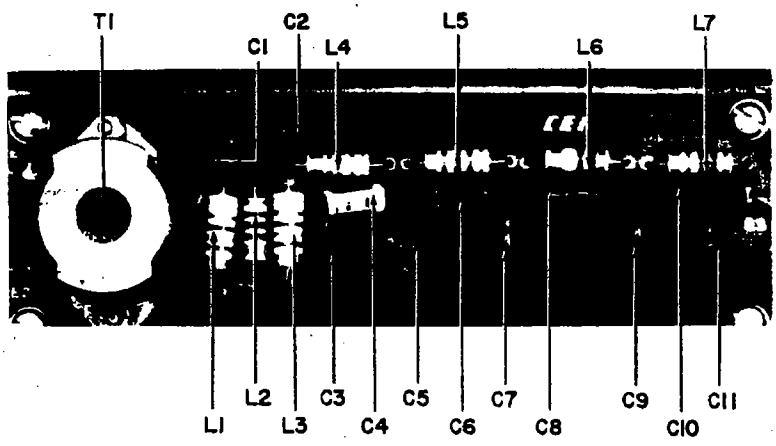
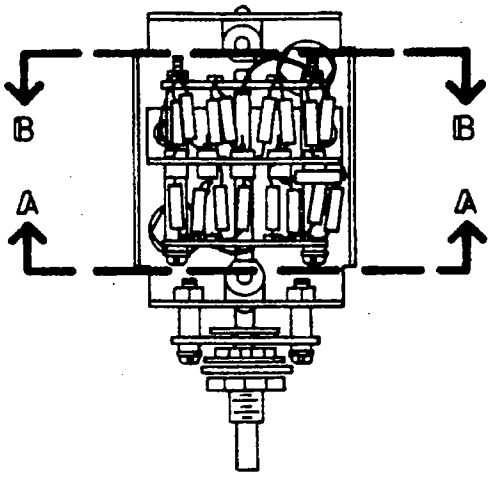


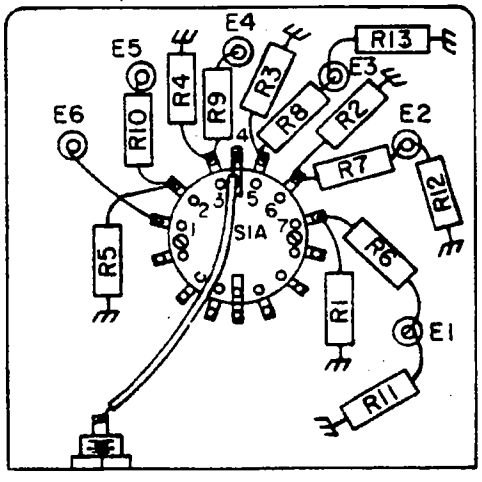
Figure 5-34. Part 15131 High Band Filter Printed Circuit Assembly (A19A2), Component Locations

5.4.21 Type 79382 Input Attenuator REF DESIG PREFIX A20

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
E1	TERMINAL, FEEDTHRU, INSULATED	6	SFU16	04013	
E2	Same as E1				
E3	Same as E1				
E4	Same as E1				
E5	Same as E1				
E6	Same as E1				
J1	CONNECTOR, RECEPTACLE	2	46025	74868	
J2	Same as J1				
MP1	COVER	1	21421-1	14632	
R1	RESISTOR, FIXED, COMPOSITION: 1.1 kΩ, 5%, 1/4W	2	RCR07G112JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 1.2 kΩ, 5%, 1/4W	4	RCR07G122JS	81349	01121
R3	RESISTOR, FIXED, COMPOSITION: 1.5 kΩ, 5%, 1/4W	2	RCR07G152JS	81349	01121
R4	Same as R2				
R5	RESISTOR, FIXED, COMPOSITION: 2 kΩ, 5%, 1/4W	2	RCR07G202JS	81349	01121
R6	RESISTOR, FIXED, COMPOSITION: 9.1 kΩ, 5%, 1/4W	2	RCR07G912JS	81349	01121
R7	RESISTOR, FIXED, COMPOSITION: 5.1 kΩ, 5%, 1/4W	2	RCR07G512JS	81349	01121
R8	RESISTOR, FIXED, COMPOSITION: 2.7 kΩ, 5%, 1/4W	3	RCR07G272JS	81349	01121
R9	Same as R8				
R10	RESISTOR, FIXED, COMPOSITION: 750 Ω, 5%, 1/4W	2	RCR07G751JS	81349	01121
R11	RESISTOR, FIXED, COMPOSITION: 560 Ω, 5%, 1/4W	1	RCR07G561JS	81349	01121
R12	RESISTOR, FIXED, COMPOSITION: 620 Ω, 5%, 1/4W	1	RCR07G621JS	81349	01121
R13	Same as R10				
R14	Same as R6				
R15	Same as R7				
R16	Same as R8				
R17	RESISTOR, FIXED, COMPOSITION: 2.2 kΩ, 5%, 1/4W	1	RCR07G222JS	81349	01121
R18	RESISTOR, FIXED, COMPOSITION: 680 Ω, 5%, 1/4W	1	RCR07G681JS	81349	01121
R19	Same as R1				
R20	Same as R2				
R21	Same as R3				
R22	Same as R2				
R23	Same as R5				
S1	SWITCH, ROTARY	1	21424-3	14632	



SECTION
A – A



SECTION
B – B

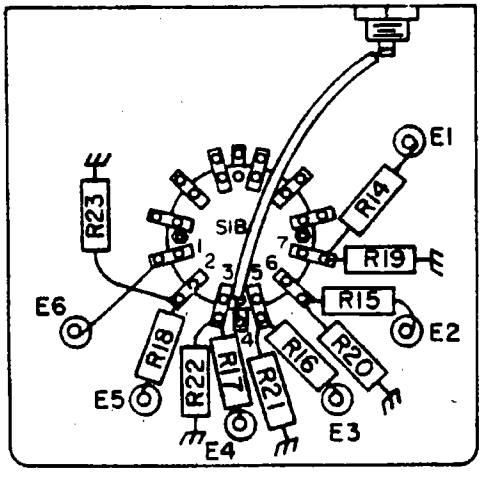


Figure 5-35. Type 79382 Input Attenuator (A20), Component Locations

5.4.22 Part 16070 DAFC Mode Inverter

REF DESIG PREFIX A21

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	CAPACITOR, ELECTROLYTIC; TANTALUM: 1 μF, 10%, 35V	1	CS13BF105K	81349	56289
CR1	DIODE	1	1N198A	80131	93332
R1	RESISTOR, FIXED, COMPOSITION: 100 kΩ, 5%, 1/4W	1	RCR07G104JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 200 kΩ, 5%, 1/4W	1	RCR07G204JS	81349	01121
R3	RESISTOR, FIXED, COMPOSITION: 36 kΩ, 5%, 1/4W	1	RCR07G363JS	81349	01121
R4	RESISTOR, FIXED, COMPOSITION: 240 kΩ, 5%, 1/4W	1	RCR07G244JS	81349	01121
R5	RESISTOR, FIXED, COMPOSITION: 39 kΩ, 5%, 1/4W	1	RCR07G393JS	81349	01121
R6	RESISTOR, FIXED, COMPOSITION: 82 kΩ, 5%, 1/4W	1	RCR07G823JS	81349	01121
R7	RESISTOR, FIXED, COMPOSITION: 1 kΩ, 5%, 1/4W	1	RCR07G102JS	81349	01121
U1	INTEGRATED CIRCUIT	1	U5B7741393	07263	
XU1	SOCKET, INTEGRATED CIRCUIT	1	8058-1G49	91506	

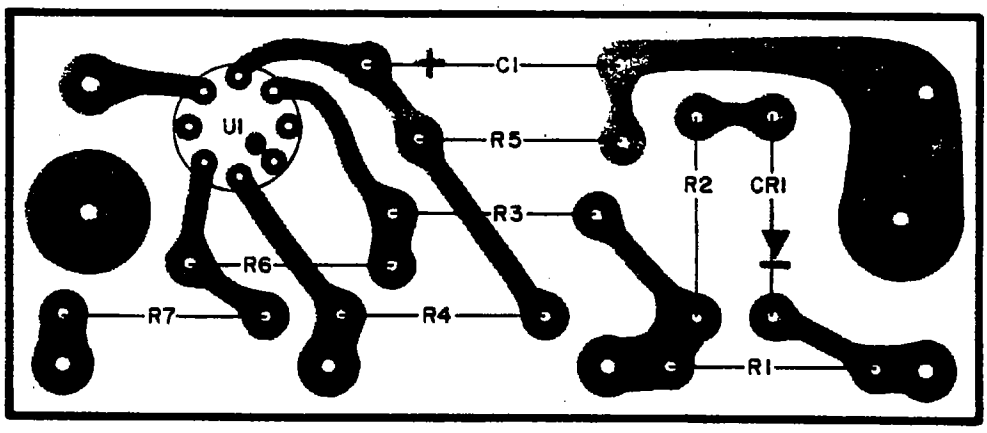


Figure 5-36. Part 16070 DAFC Mode Inverter (A21), Component Locations

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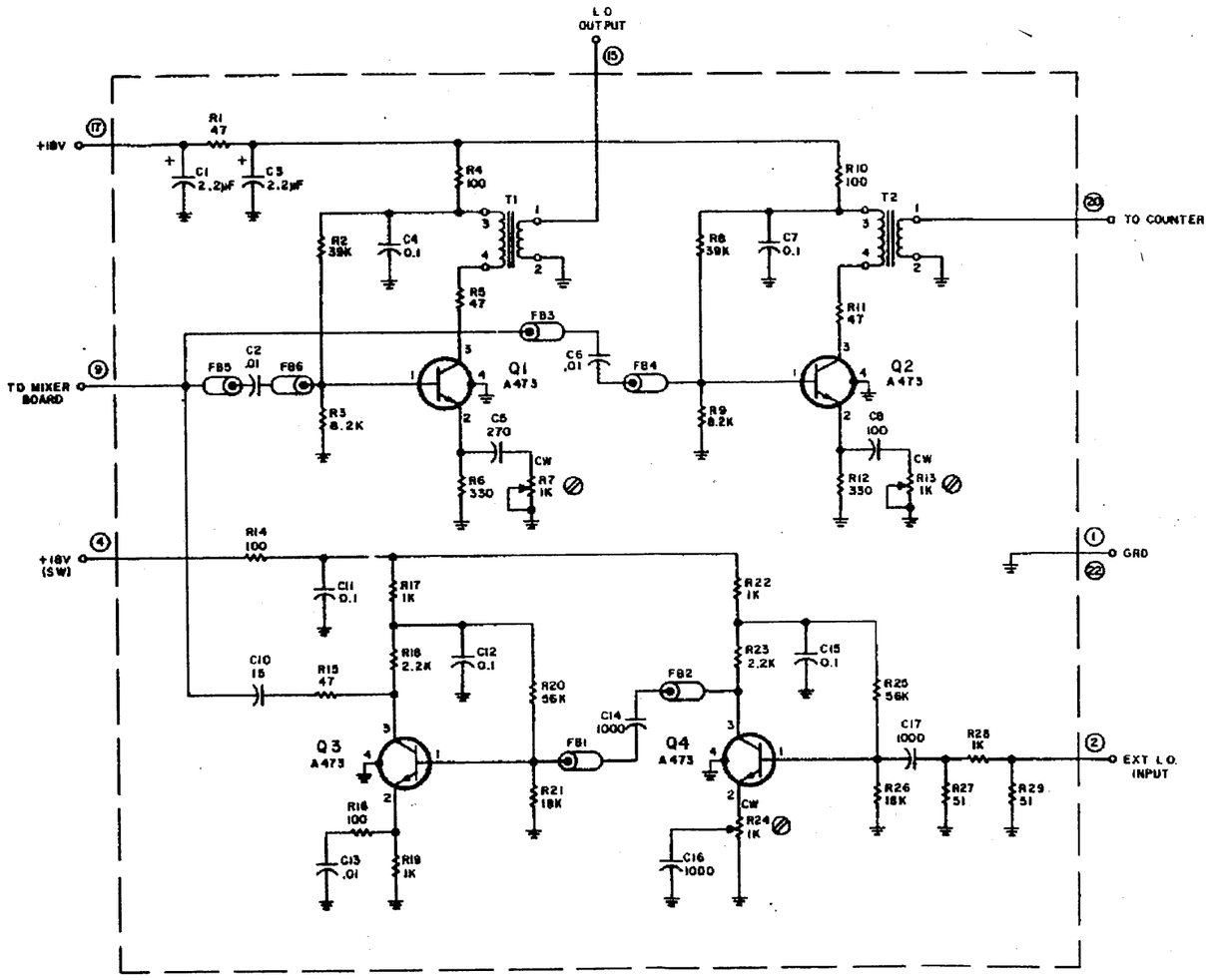
SECTION VI
SCHEMATIC DIAGRAMS

Figure 6-1



NOTES
1. UNLESS OTHERWISE SPECIFIED.
   a) RESISTANCE IS MEASURED IN OHMS, ±5%, 1/4W
   b) CAPACITANCE IS MEASURED IN pF
2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS.
3. FOLLOWING NOTATIONS ARE USED ON POTENTIOMETES
   CW INDICATES CLOCKWISE ROTATION
   ⊘ INDICATES SCREWDRIVER ADJUSTMENT

Figure 6-1. Type 79521 LO Isolation Amplifier (A1) Schematic Diagram

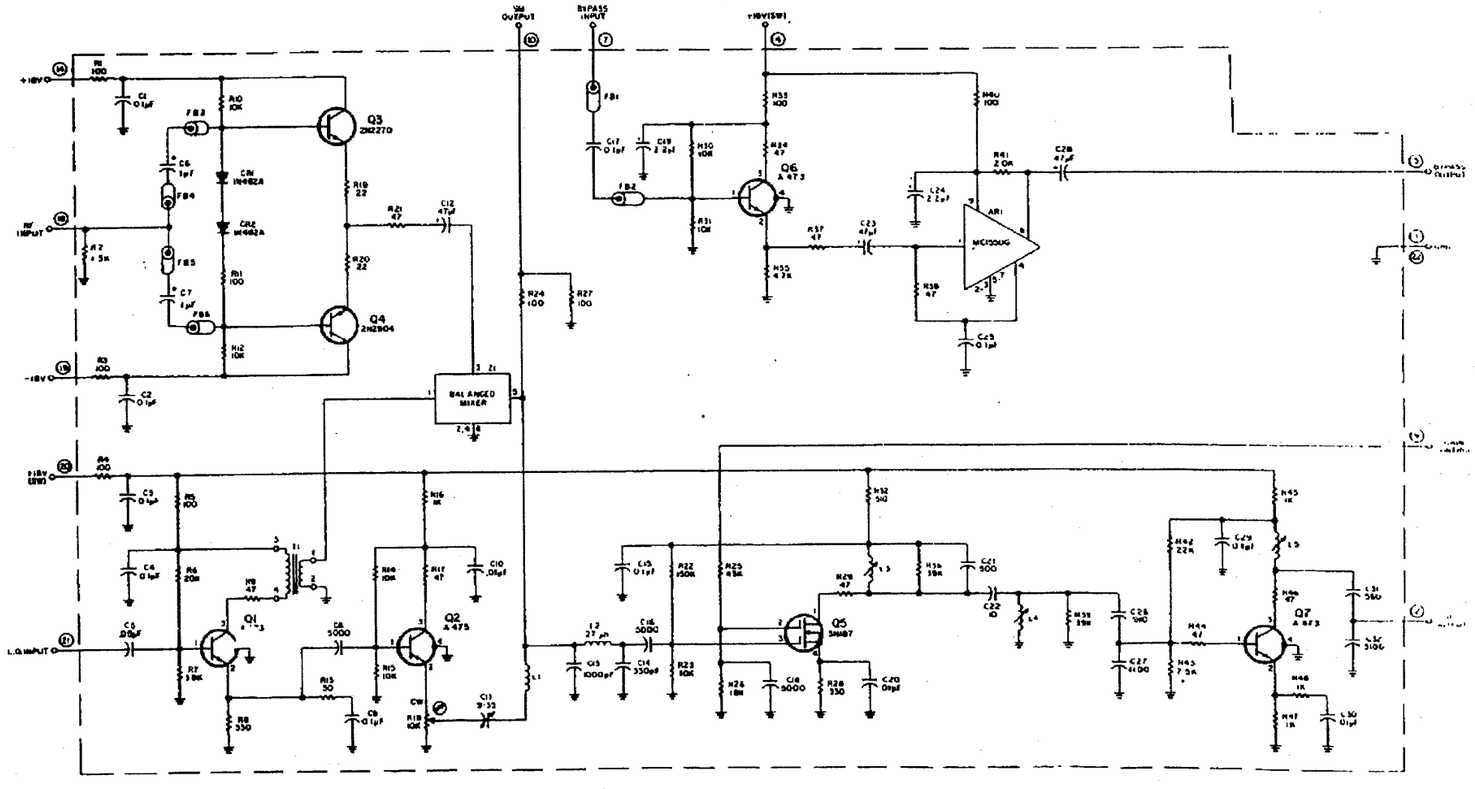
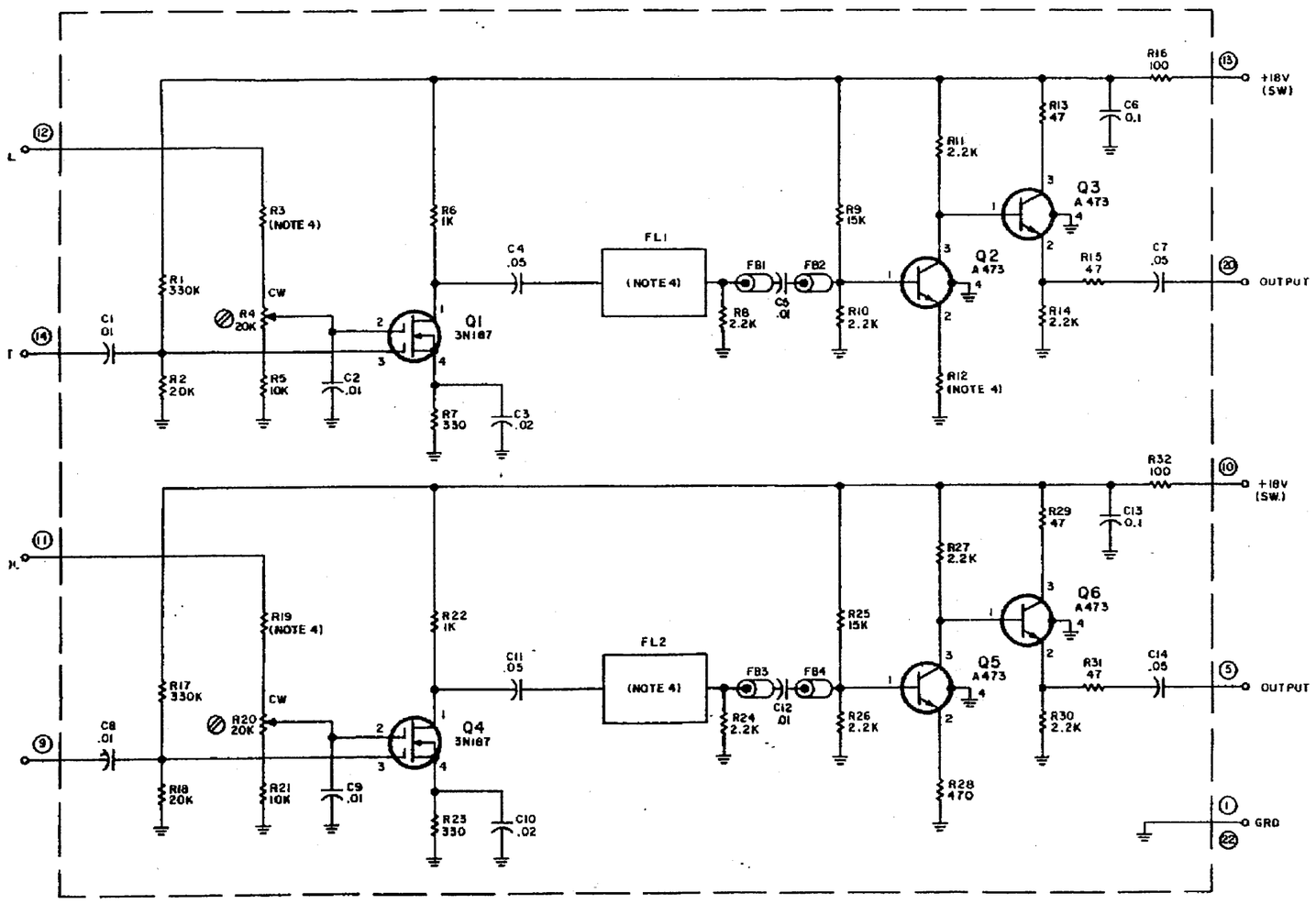


Figure 6-2. Type 79522 Mixer board (A1) Schematic Diagram

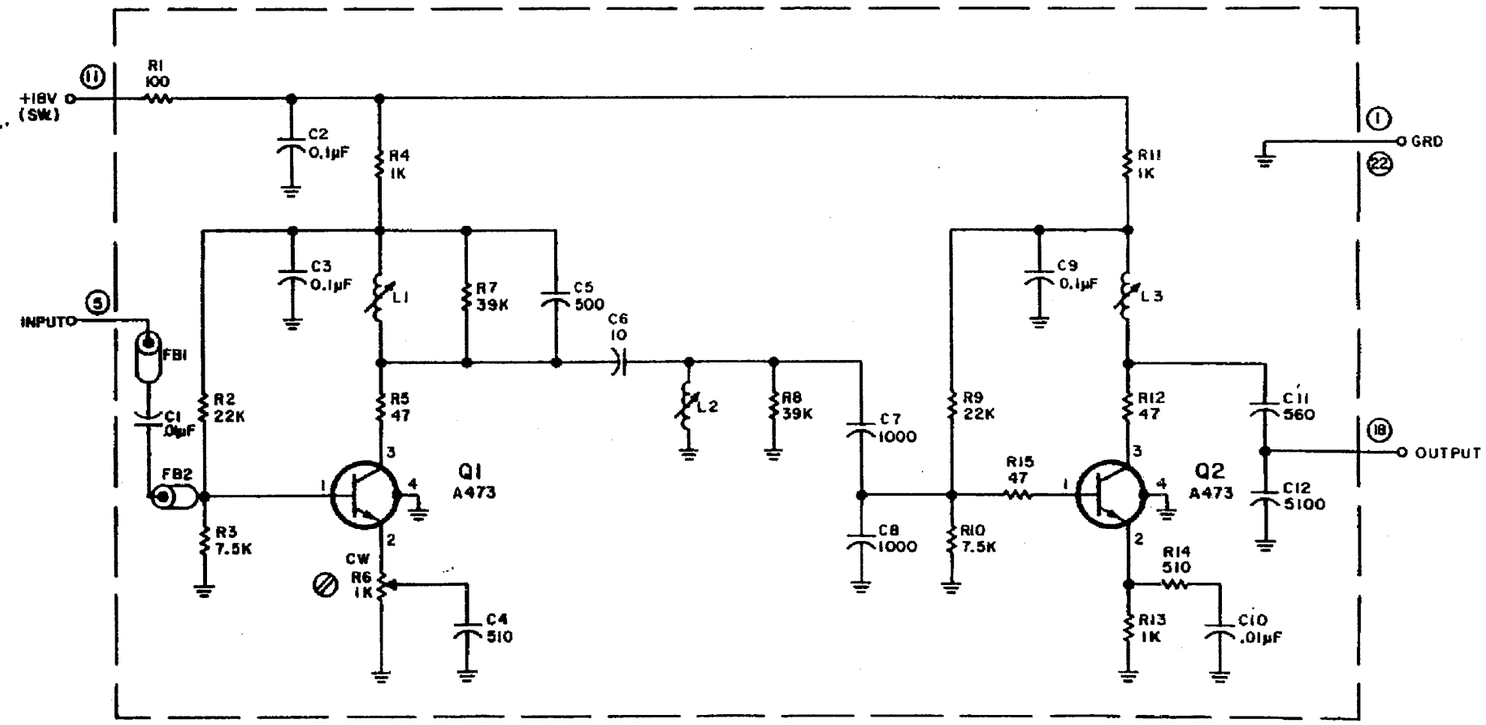


NOTES

1 UNLESS OTHERWISE SPECIFIED
  a) RESISTANCE IS MEASURED IN OHMS, ±5% .1/4
  b) CAPACITANCE IS MEASURED IN μF
2 ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS
3 FOLLOWING NOTATIONS ARE USED ON POTENTIOMETERS
  CW INDICATES CLOCKWISE ROTATION
  ⊘ INDICATES SCREWDRIVER ADJUSTMENT
4 FOR FL1, FL2, R3, R19 & R12 VALUES, SEE CHART BELOW

TYPE NO	FL1	FL2	R3	R19	R12
72255	8kHz PART NO 8197922	16kHz PART NO 8197923	68K	68K	470
72256	5kHz PART NO 8197920	7kHz PART NO 8197921	68K	68K	470
72257	150Hz PART NO 6093695	1kHz PART NO 6093694	68K	68K	470
72258	LOWER S B PART NO. 8197933	UPPER S B PART NO 8197932	68K	150K	330
72325	150 Hz PART NO. 6093695	500Hz PART NO. 6093715	68K	68K	470
72326	1kHz PART NO. 6093694	3kHz PART NO. 6093693	68K	68K	470
72401	1 kHz PART NO 6093694	5kHz PART NO 8197920	68K	68K	470

Figure 6-3 Types 72255, 72256, 72257 and 72258 IF Amplifier (A4 thru A6), Schematic Diagram



NOTES:

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

Figure 6-4. Type 72259 AM/FM/MCW IF Amplifier (A7), Schematic Diagram

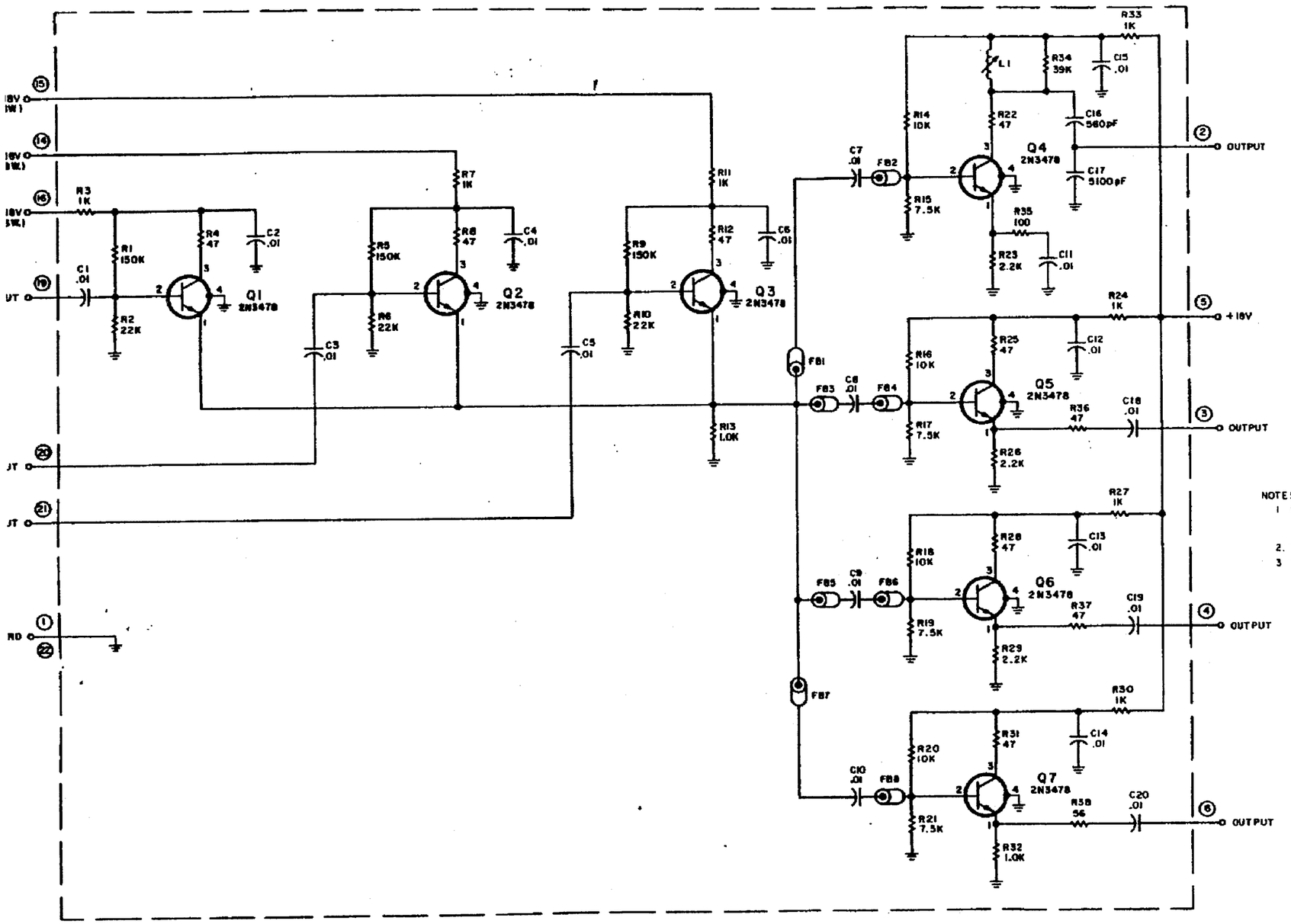


Figure 6-5. Type 79523, IF Buffer (A8), Schematic Diagram 41027 (D)

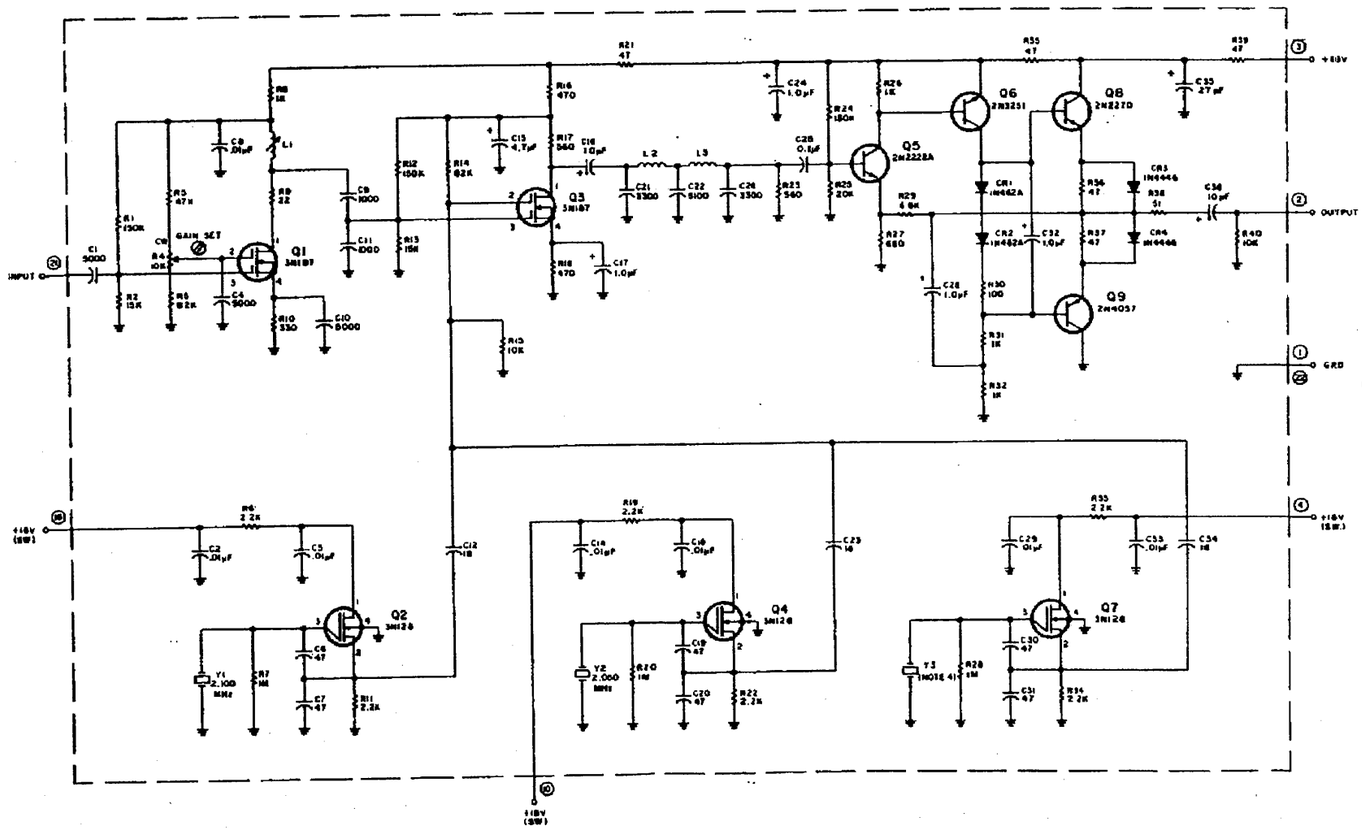


Figure 6-6. Type 79524 IF Translator (A9), Schematic Diagram

Figure 6-6

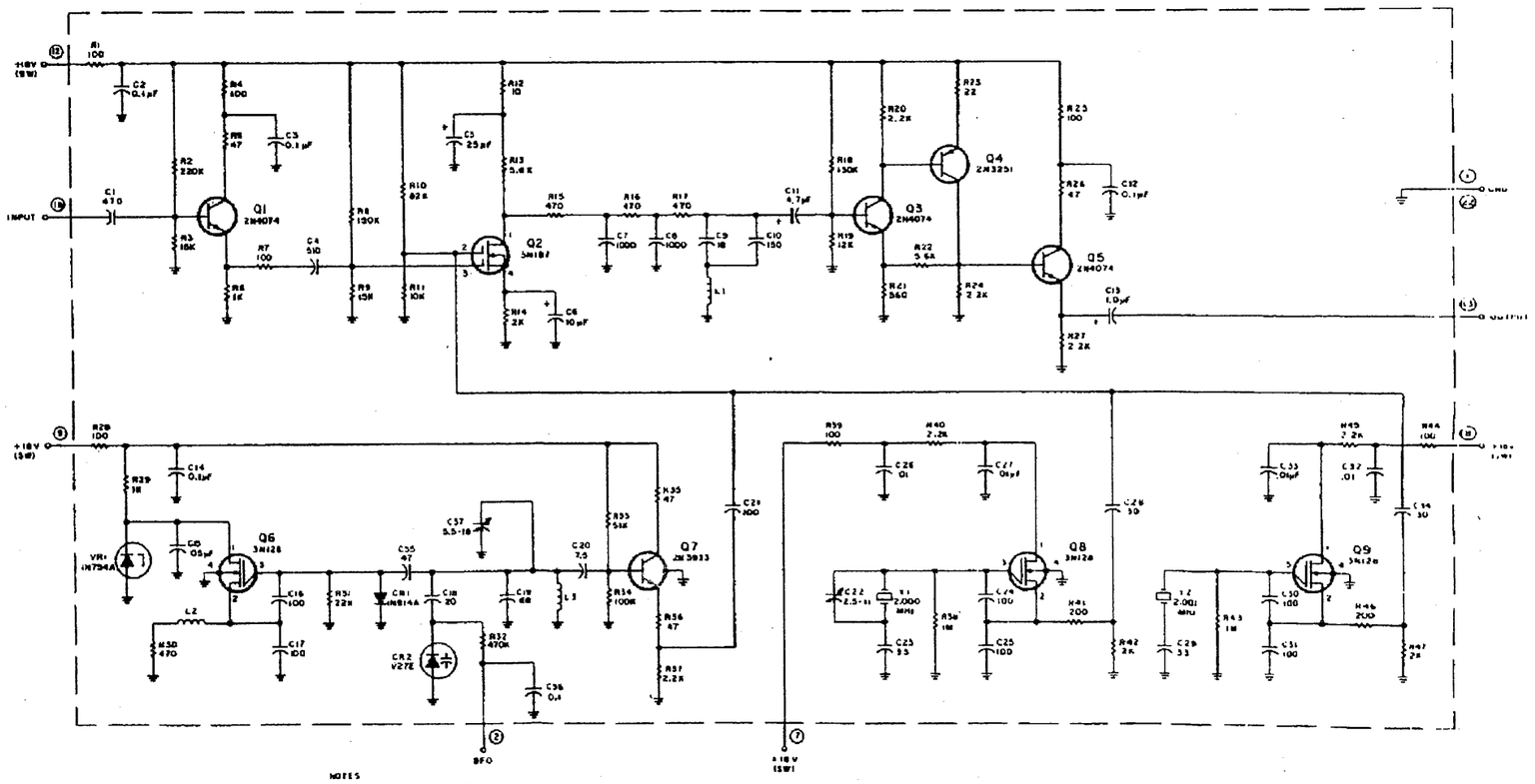


Figure 6-7. Type 79525 CW/SSB/FSK Demodulator (A10), Schematic Diagram

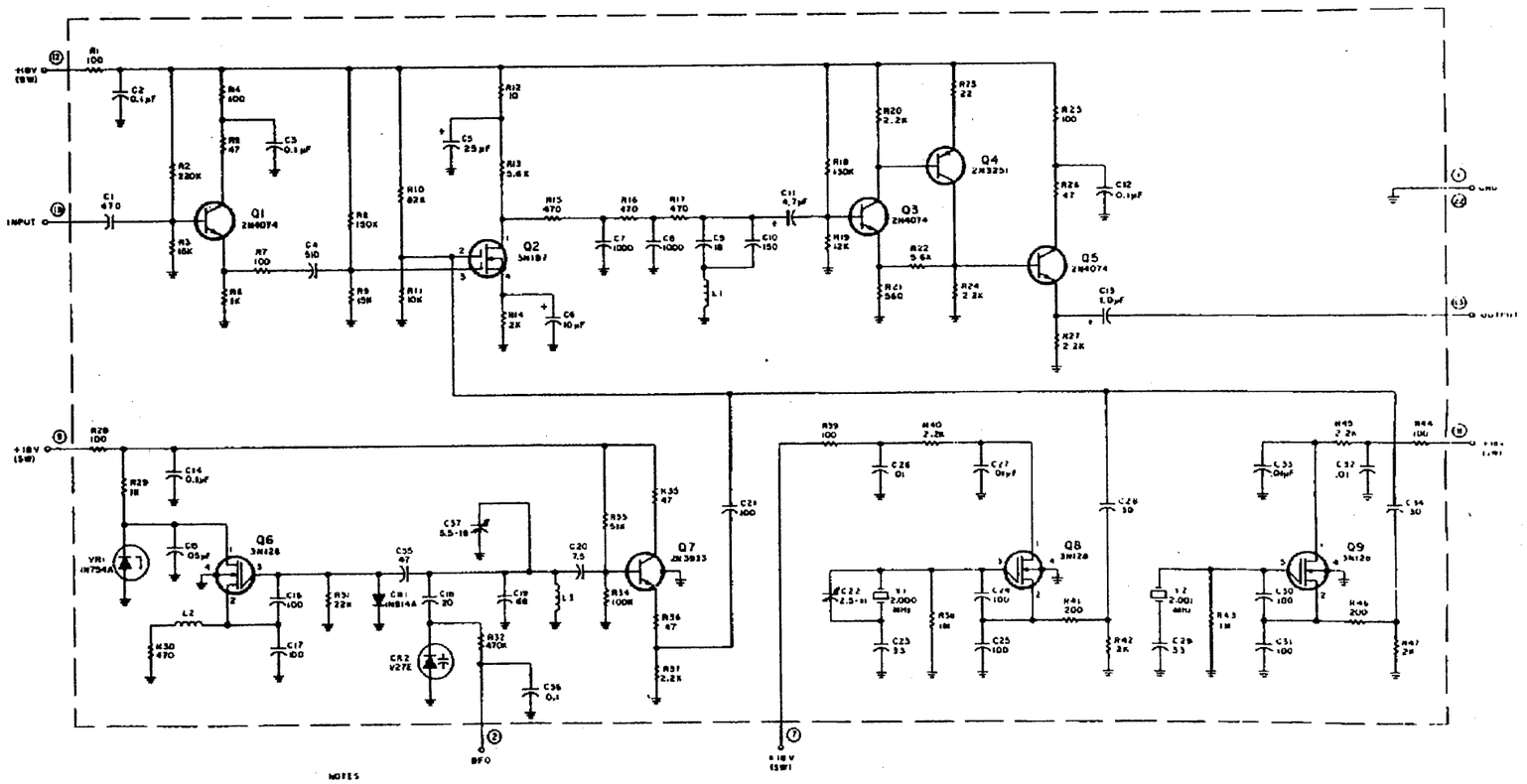
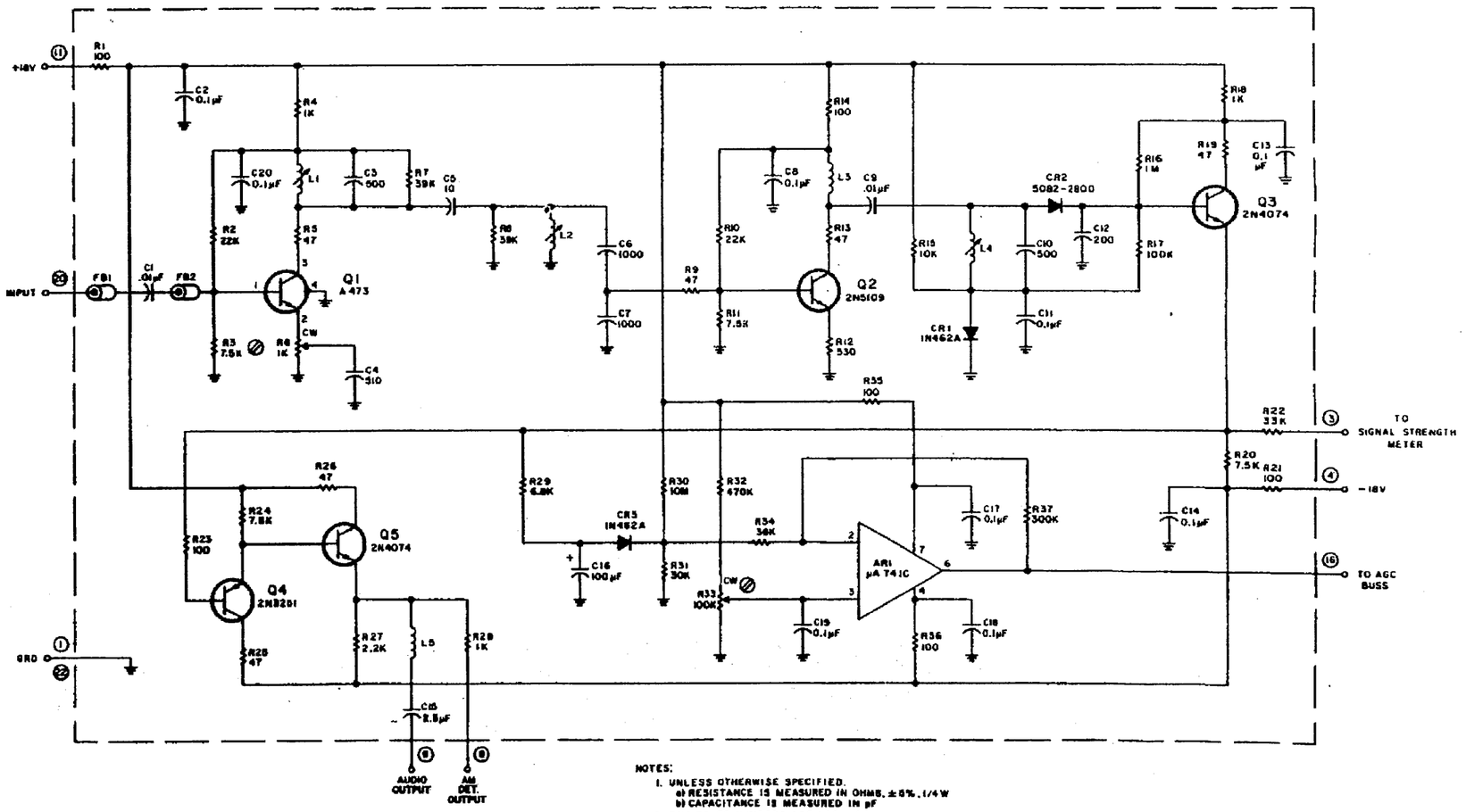
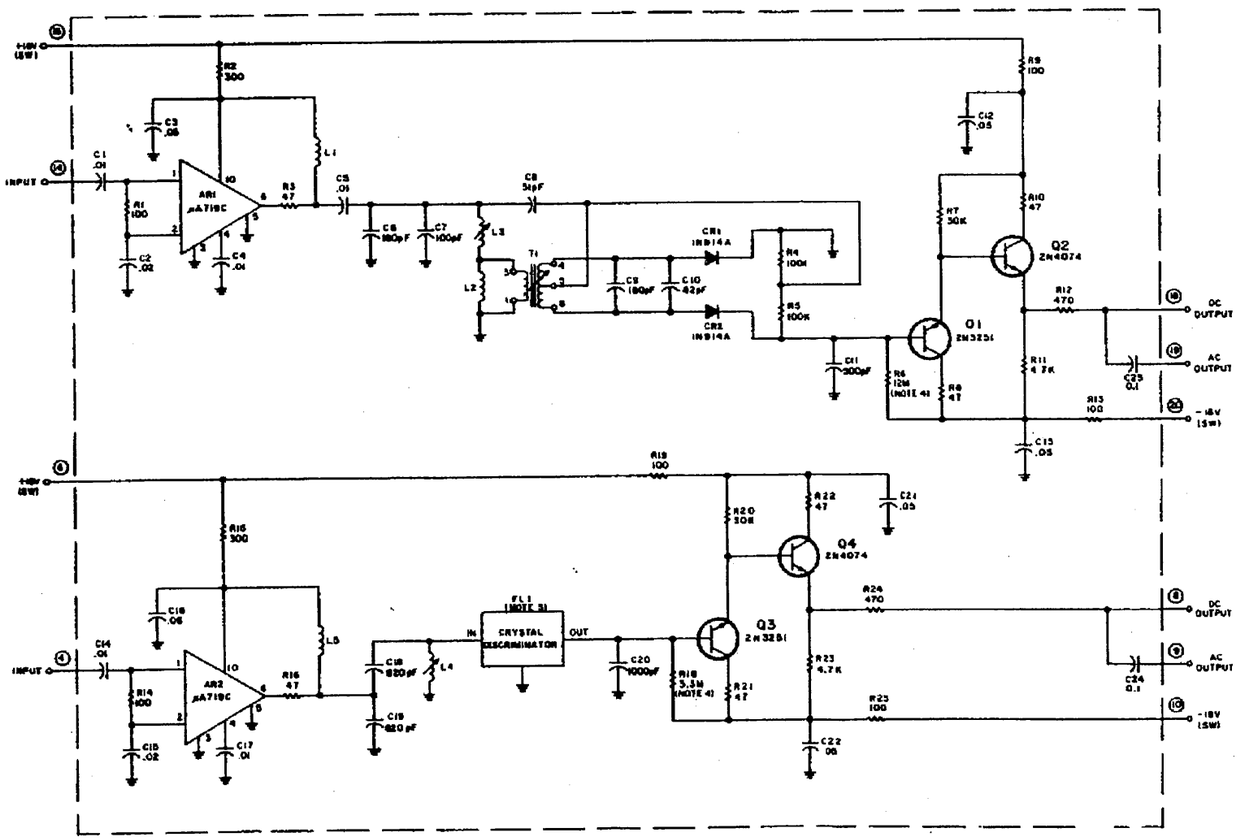


Figure 6-7. Type 79525 CW/SSB/FSK Demodulator (A10). Schematic Diagram



NOTES:
1. UNLESS OTHERWISE SPECIFIED.
   a) RESISTANCE IS MEASURED IN OHMS, ±5%, 1/4 W
   b) CAPACITANCE IS MEASURED IN pF
2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS.
3. FOLLOWING NOTATIONS ARE USED ON POTENTIOMETERS.
   CW INDICATES CLOCKWISE ROTATION
   ⊘ INDICATES SCREWDRIVER ADJUSTMENT

Figure 6-8. Type 79526 AM/MCW Demodulator/AGC/MGC (A11), Schematic Diagram

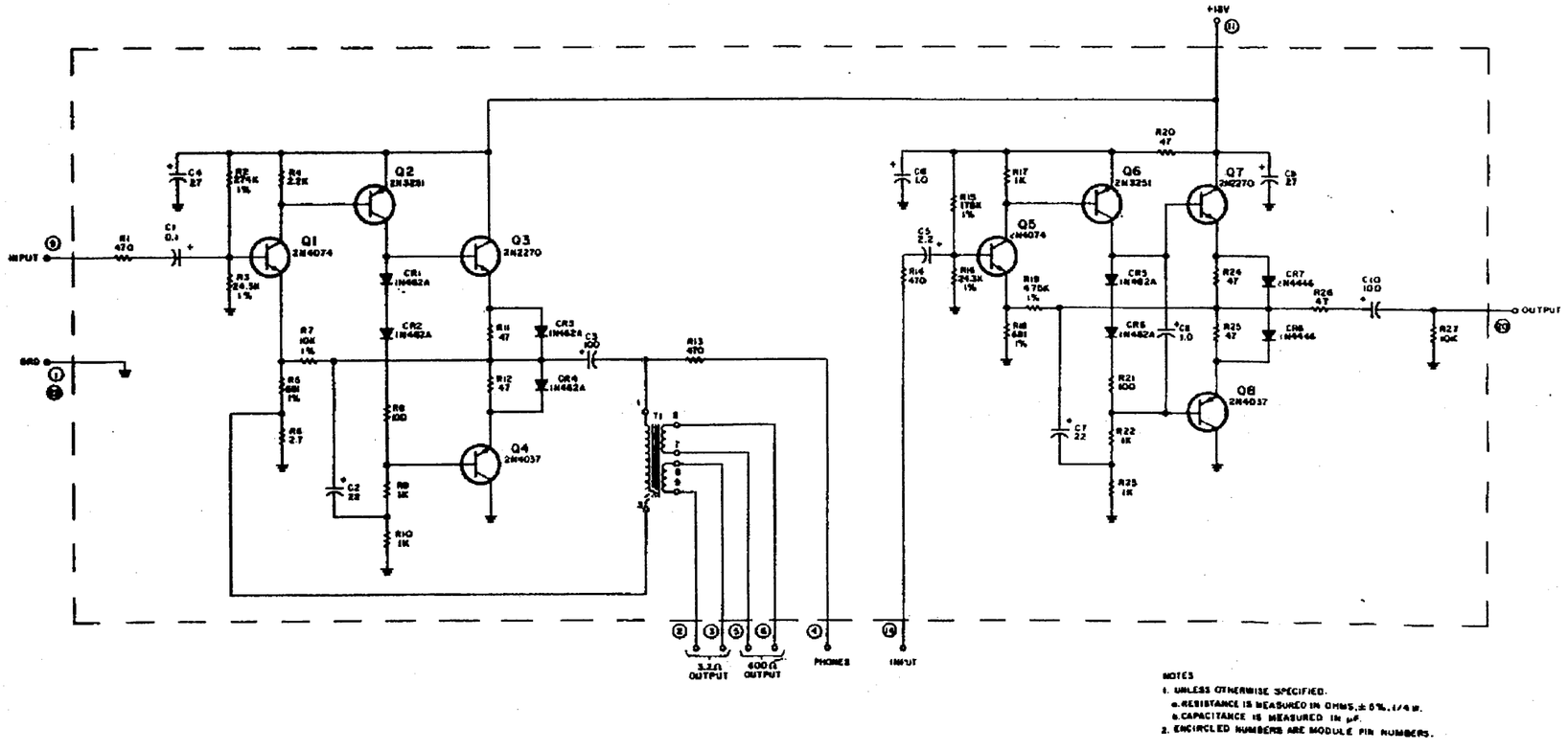


NOTES
1. UNLESS OTHERWISE SPECIFIED
   a) RESISTANCE IS MEASURED IN OHMS, ±5%, 1/4W
   b) CAPACITANCE IS MEASURED IN μF
2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS
3. DIFFERANCE BETWEEN TYPES

TYPE	FL1
79527-1	8197926
79527-2	8680034

4. NOMINAL VALUE, FINAL VALUE SELECTED BY FACTORY

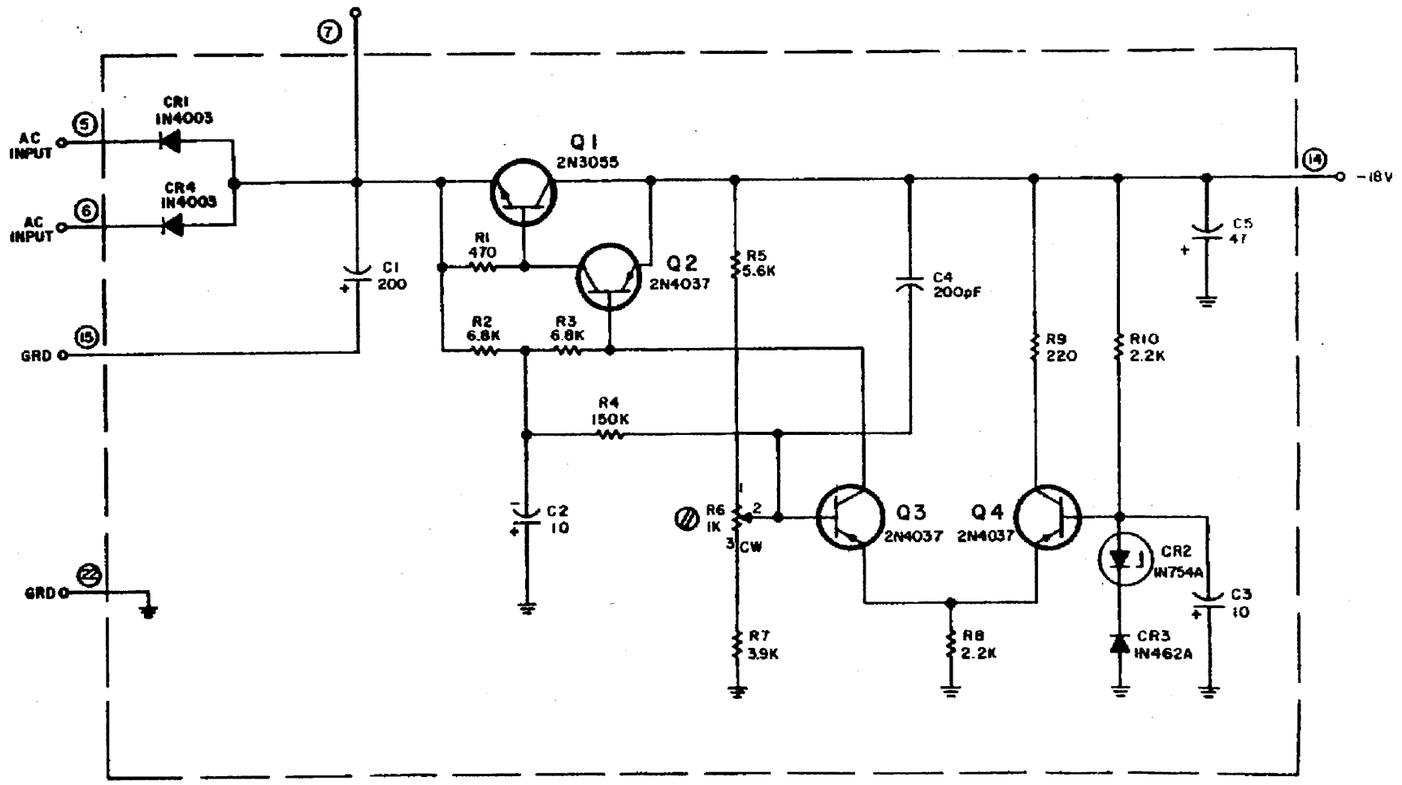
Figure 6-9. Type 79527 FM Demodulator (A12), Schematic Diagram



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

Figure 6-10. Type 7437 Audio/Video Amplifier (A13), Schematic Diagram

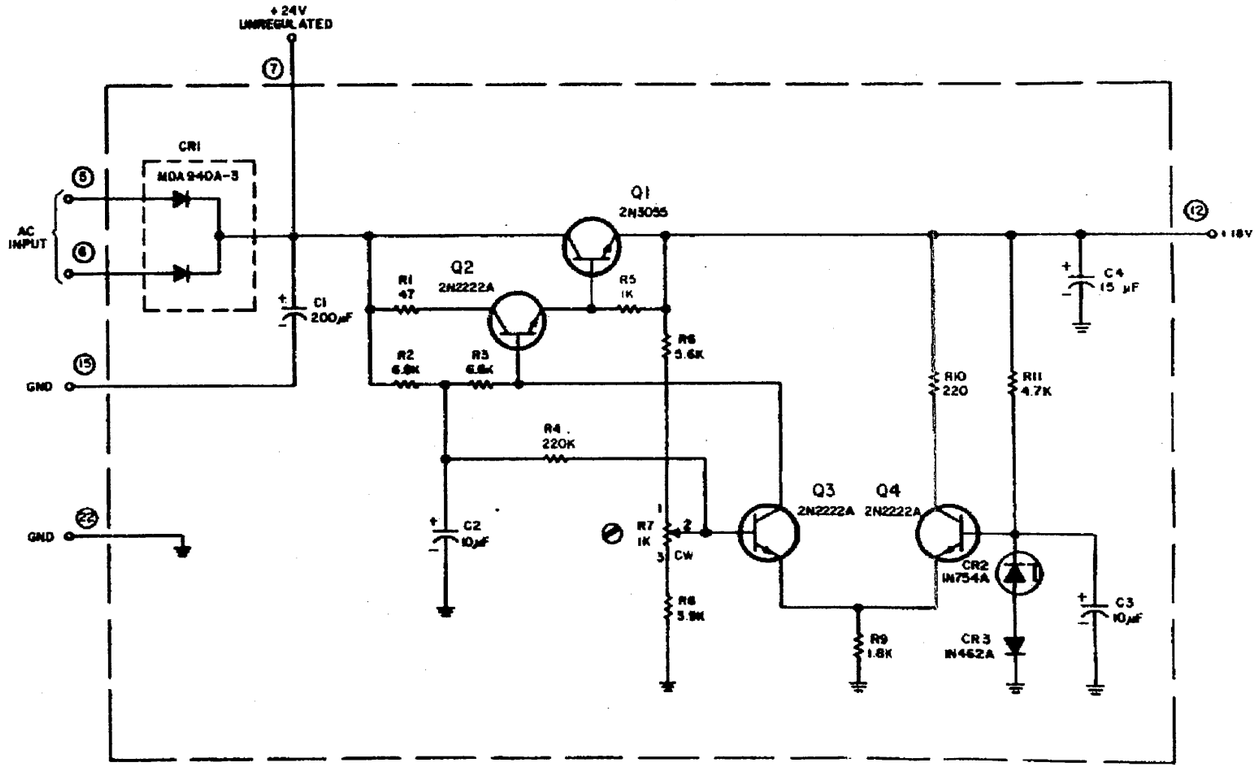
Figure 6-11



NOTES:

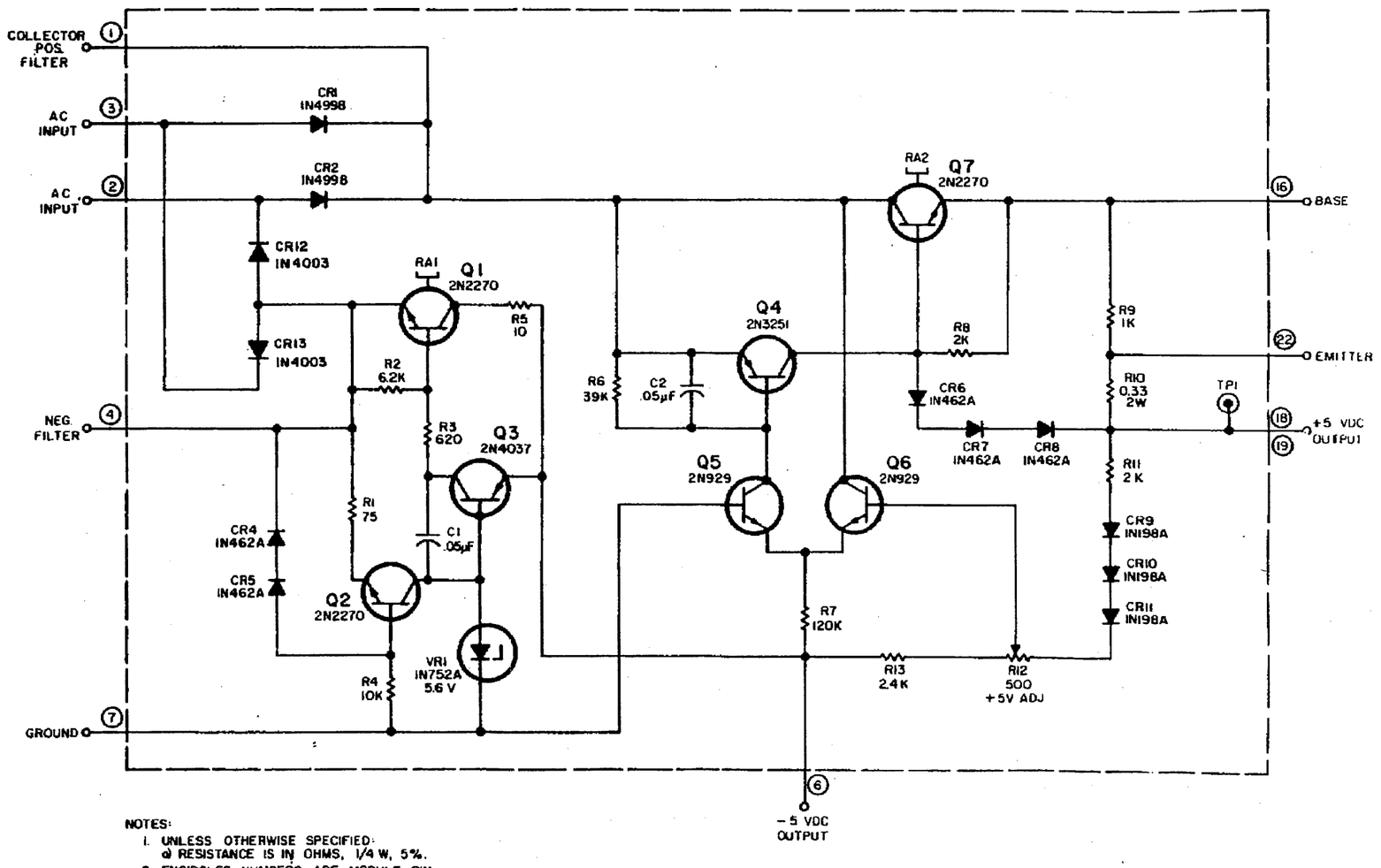
1. UNLESS OTHERWISE SPECIFIED:
   A. RESISTANCE IS MEASURED IN OHMS, ±5%, 1/4W.
   B. CAPACITANCE IS MEASURED IN μF.
2. THE FOLLOWING NOTATIONS ARE USED ON POTENTIOMETERS:
   CW INDICATES CLOCKWISE ROTATION
   ⊘ INDICATES SCREWDRIVER ADJUSTMENT.
3. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS.

Figure 6-11. Type 76160 -18V Power Supply Regulator (XTT) Schematic Diagram



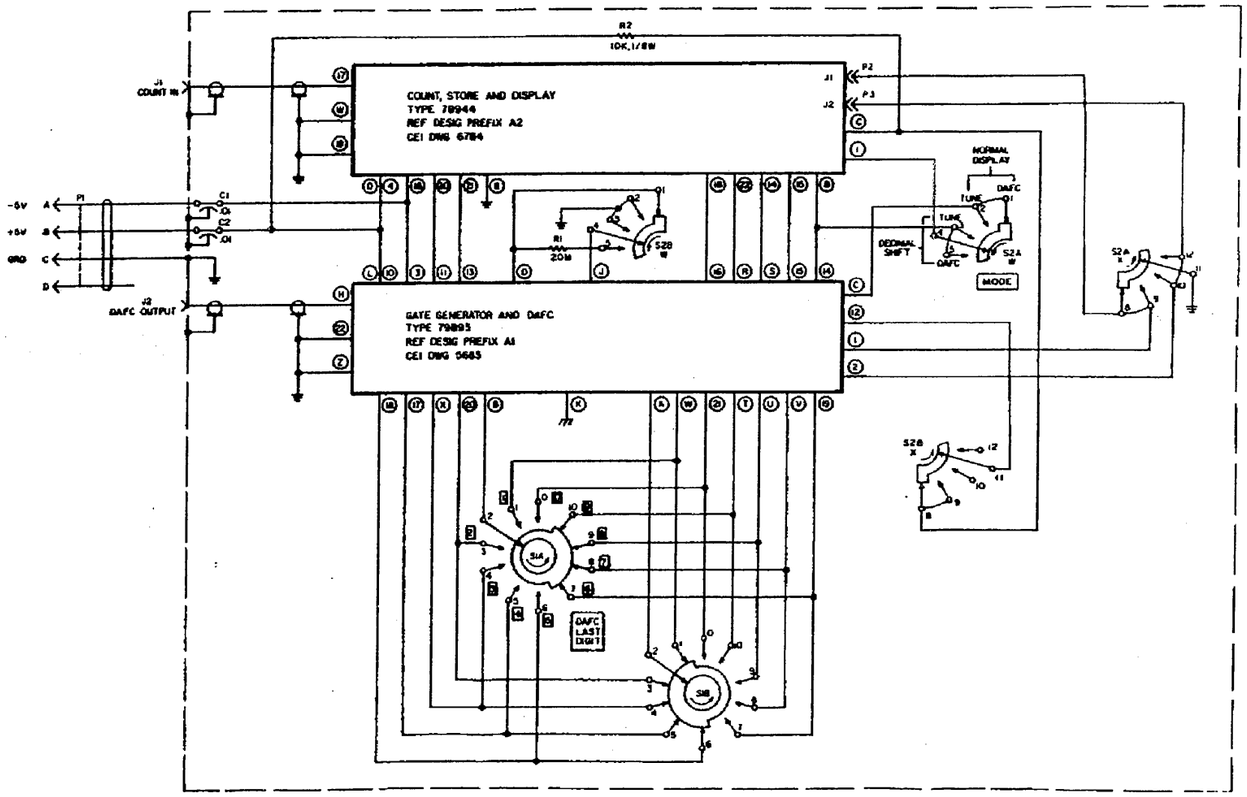
NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   RESISTANCE IS MEASURED OHMS, ±5%, 1/4 W
2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS
3. THE FOLLOWING NOTATIONS ARE USED ON POTENTIOMETERS
   CW INDICATES CLOCKWISE ROTATION
   ⊘ INDICATES SCREWDRIVER ADJUSTMENT

Figure 6-12. Type 76162 +18V Power Supply Regulator (A15), Schematic Diagram



NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, 1/4 W, 5%.
2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS.
3. REF DESIG PREFIX A16.

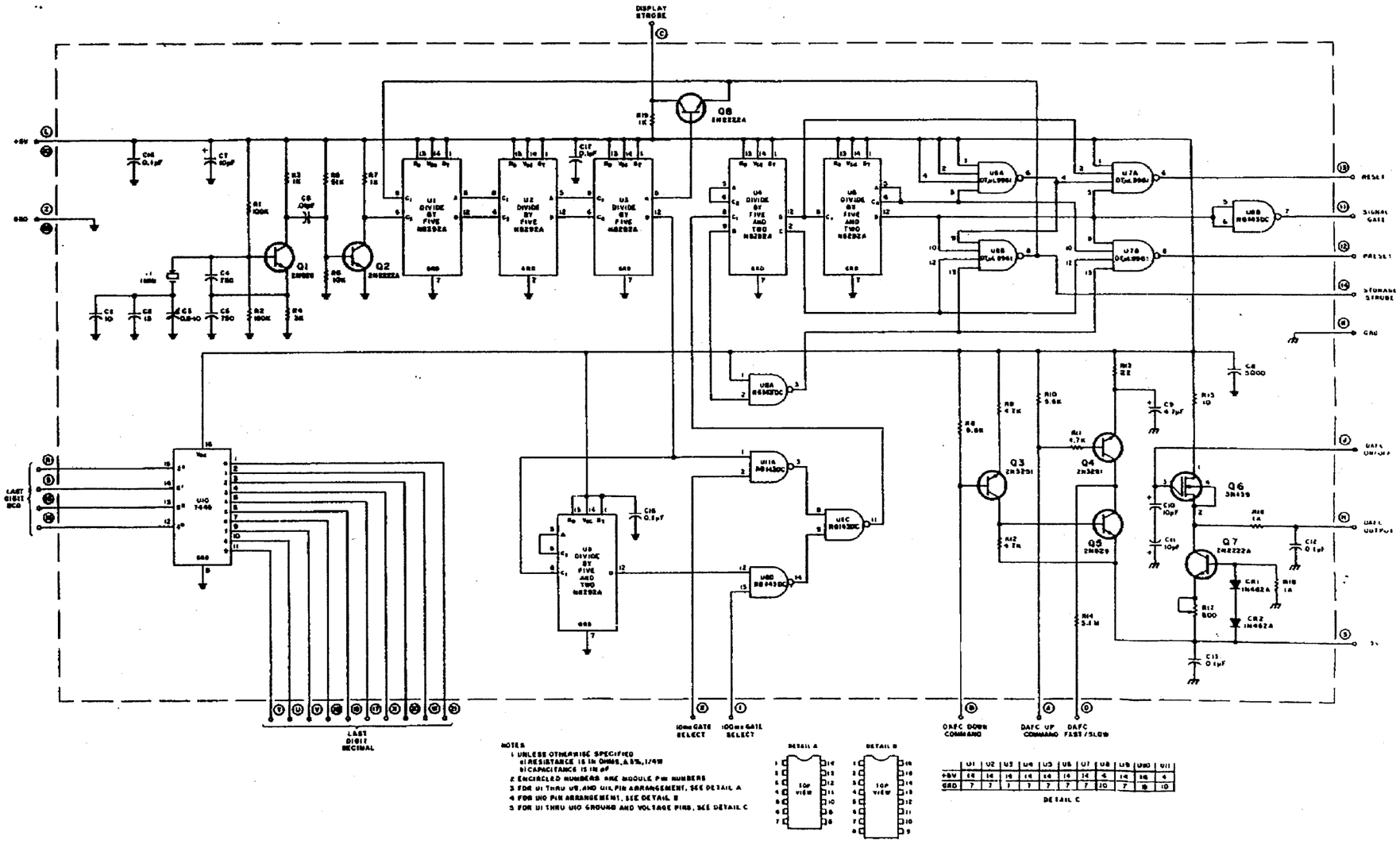
Figure 6-13. Type 76211 +5V and -5V Power Supply Regulator (A16) Schematic Diagram



NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, ± 5%, 1/4 W.
   b) CAPACITANCE IS IN pF.
2. ENCIRCLED NUMBERS AND LETTERS ARE MODULE PIN NUMBERS AND LETTERS.
3. [ ] INDICATES FRONT PANEL CONTROL.
4. SWITCHES S1 AND S2 ARE SHOWN IN EXTREME CCW POSITION AND ARE VIEWED FROM END OPPOSITE CONTROL KNOB. ARROW INDICATES CW ROTATION OF CONTROL KNOB. LETTERS A AND B DENOTE SWITCH SECTIONS. SECTION A IS NEAREST CONTROL KNOB. LETTERS W AND X DENOTE SEGMENT OF WAFER.
5. REF DESIG PREFIX A17.

Figure 6-14. Type 79977 HF Counter Assembly (A17), Schematic Diagram

Figure 6-15



NOTES
1. UNLESS OTHERWISE SPECIFIED
   a) RESISTANCE IS IN OHMS, ±5%, 1/4W
   b) CAPACITANCE IS IN pF
2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS
3. FOR U1 THRU U9, AND U11, PIN ARRANGEMENT, SEE DETAIL A
4. FOR U10 PIN ARRANGEMENT, SEE DETAIL B
5. FOR U1 THRU U10 GROUND AND VOLTAGE PINS, SEE DETAIL C

	U1	U2	U3	U4	U5	U6	U7	U8	U9	U10	U11
+5V	14	14	14	14	14	14	4	14	14	4	
GND	7	7	7	7	7	7	7	7	7	9	10

Figure 6-15. Type 79893 Gate Generator (A17A1), Schematic Diagram

Figure 6-16

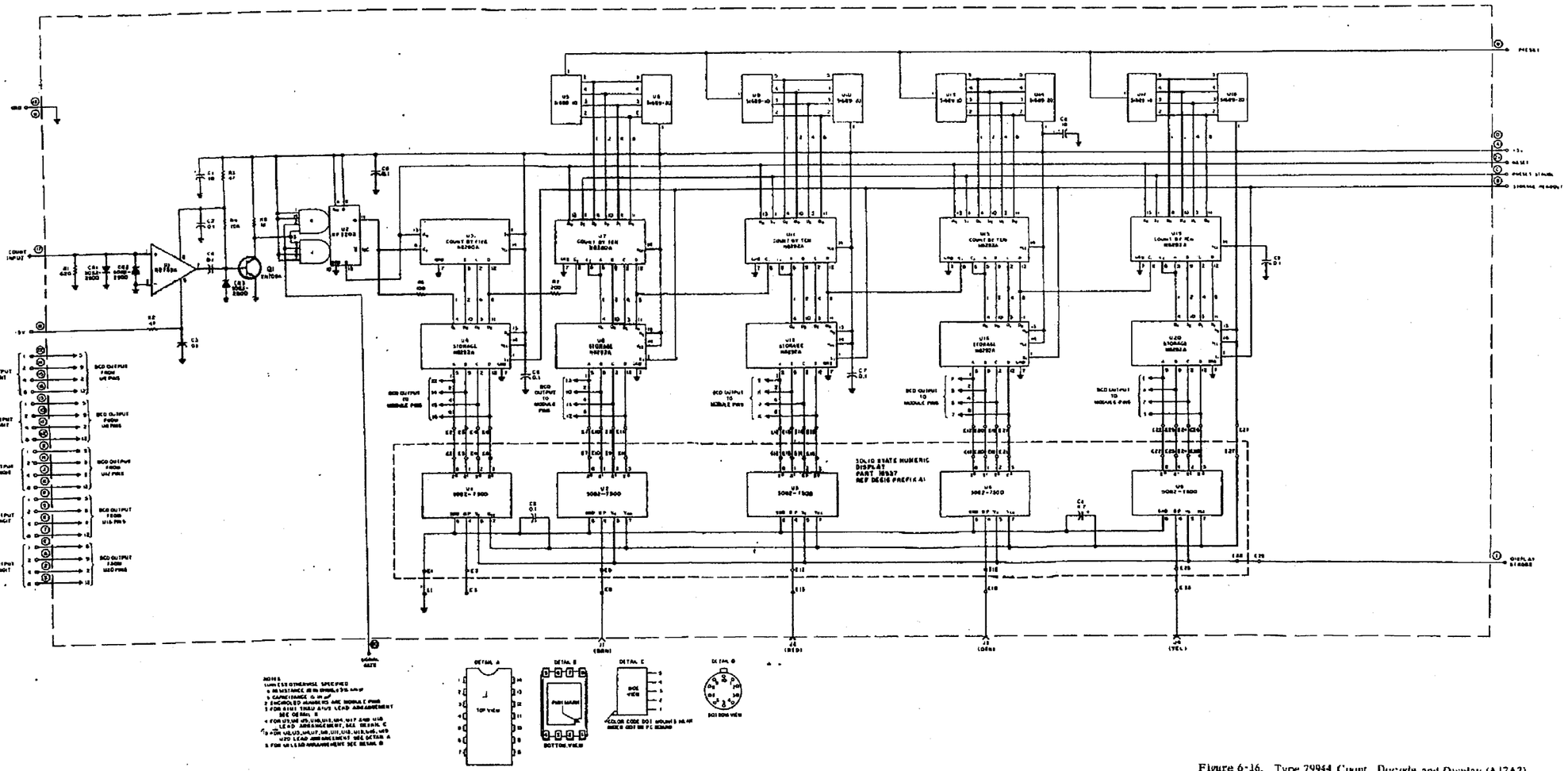
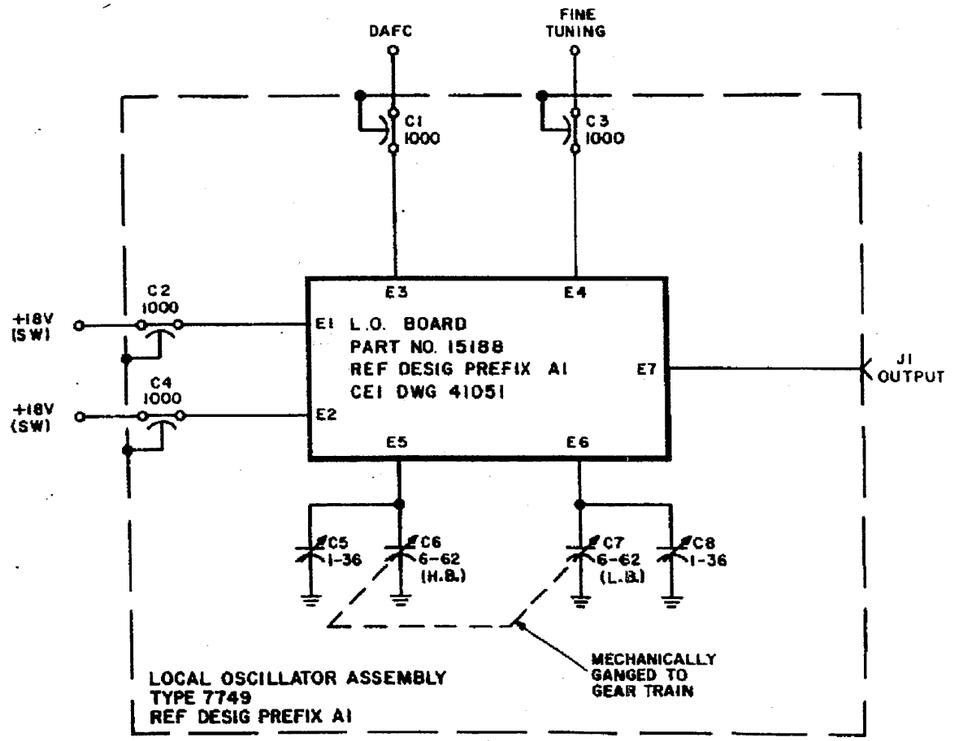


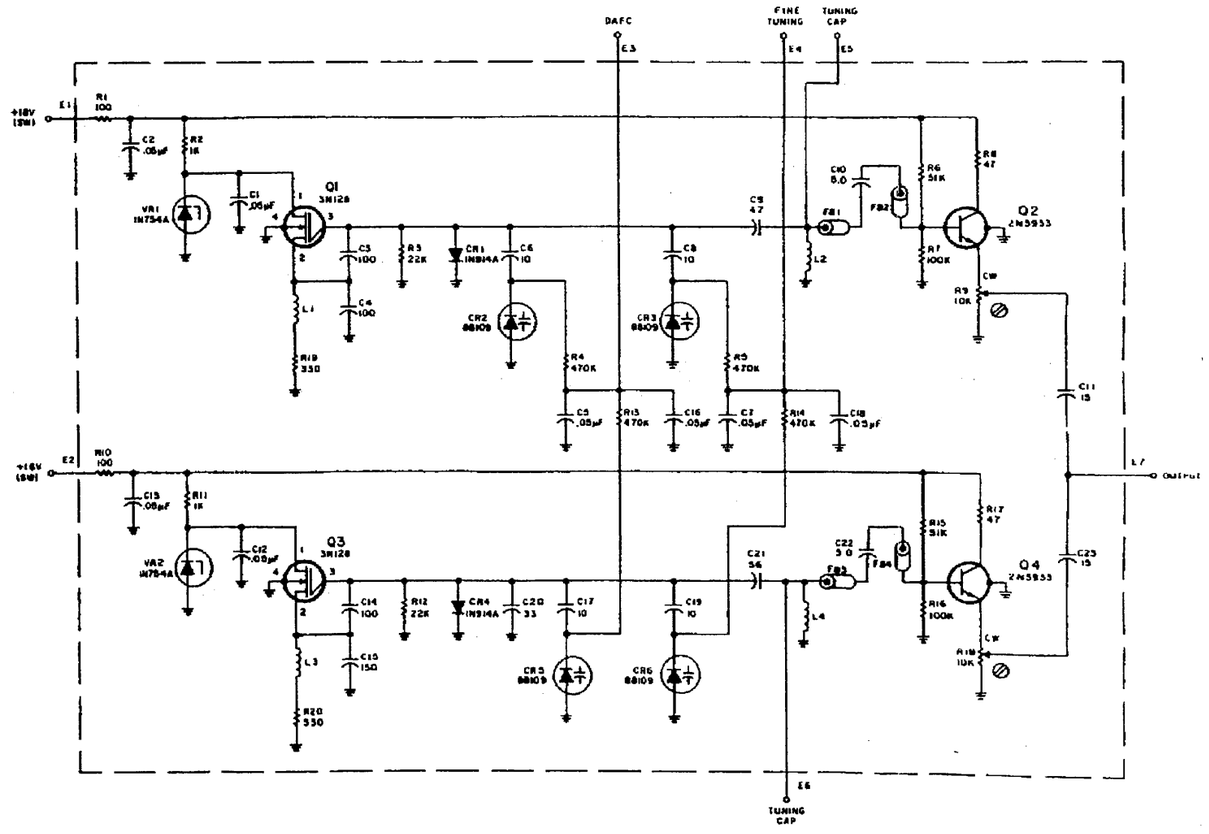
Figure 6-16. Type 79944 Count, Decode and Display (A17A2), Schematic Diagram



NOTES:
1. CAPACITANCE IS MEASURED IN pF.
2. TYPE 71233 USES A TYPE 8584 GEAR TRAIN.

Figure 6-17. Type 71233 LO Tuning Assembly (A18), Schematic Diagram

Figure 6-18



NOTES
1. UNLESS OTHERWISE SPECIFIED
   a) RESISTANCE IS MEASURED IN OHMS, ±5%, 1/4W
   b) CAPACITANCE IS MEASURED IN μF
2. FOLLOWING NOTATIONS ARE USED ON POTENTIOMETERS
   CW INDICATES CLOCKWISE ROTATION
   ⊘ INDICATES SCREWDRIVER ADJUSTMENT

Figure 6-18. Part 15188 Local Oscillator Board (A18A1A1), Schematic Diagram

Figure 6-19

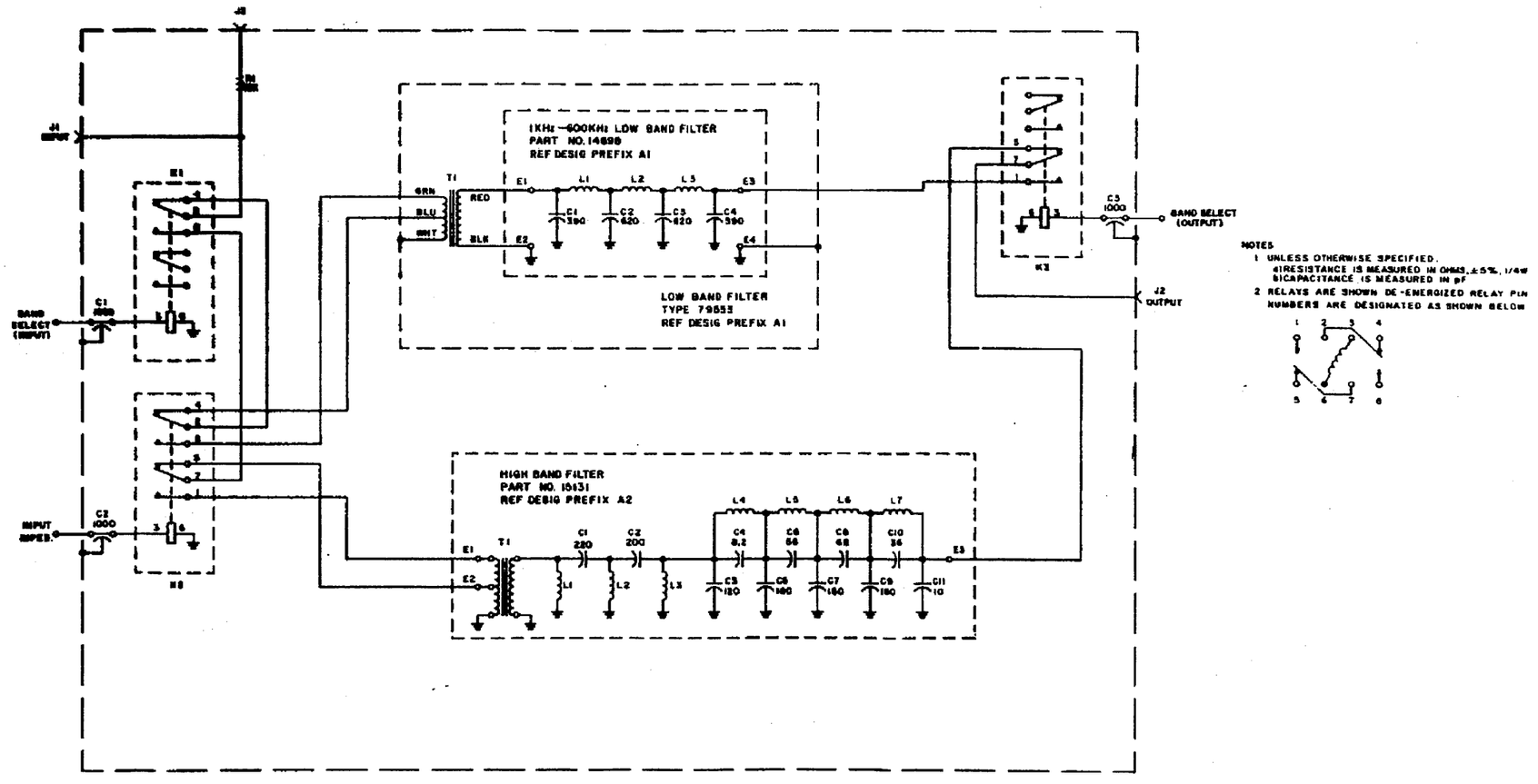
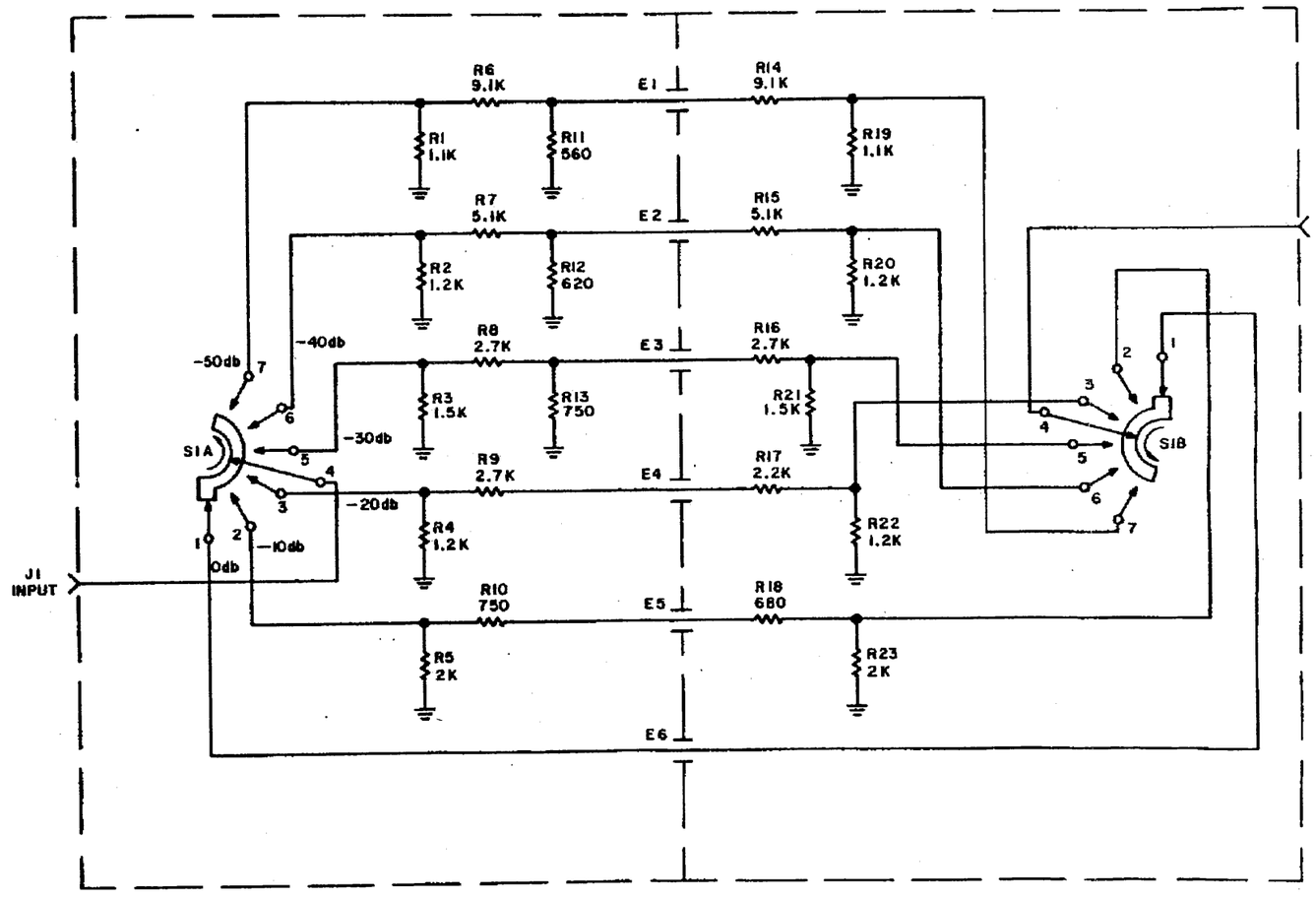


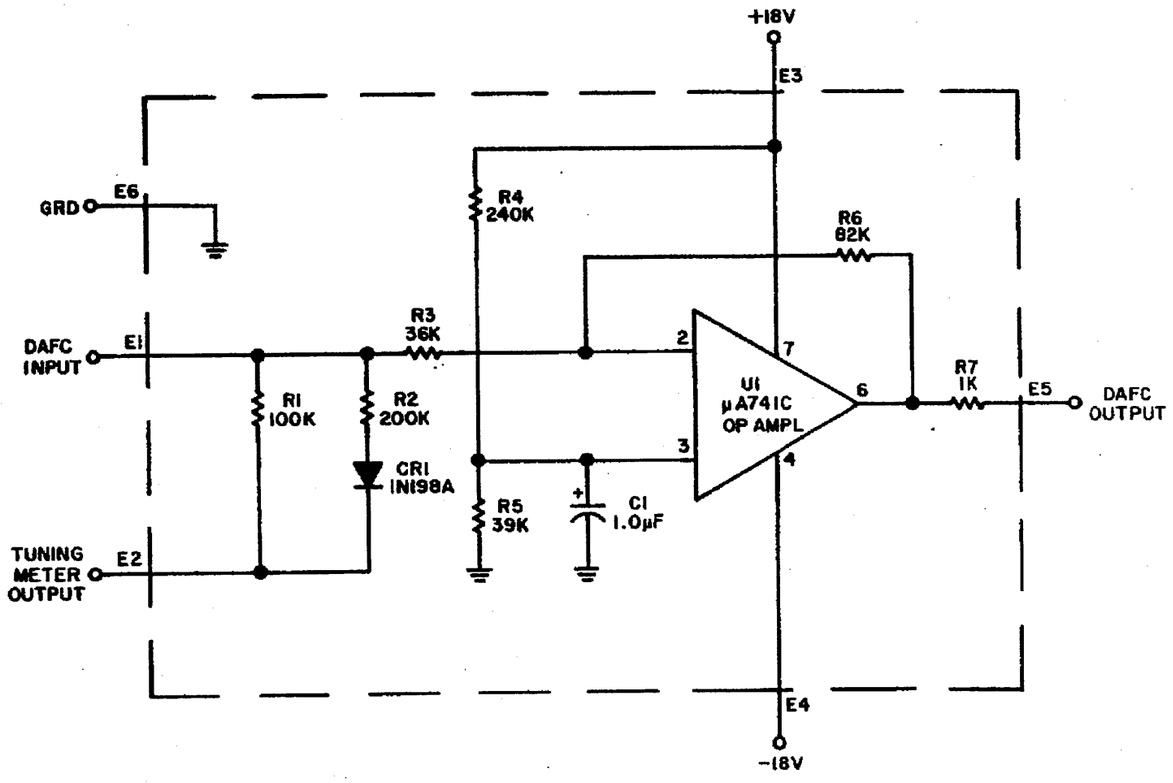
Figure 6-19. Type 79531 Input Filter Assembly (A19), Schematic Diagram



NOTES
1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS MEASURED IN OHMS, ±5%, 1/4W
2. SWITCH S1 IS SHOWN IN EXTREME CCW POSITION AND IS VIEWED FROM END OPPOSITE CONTROL KNOB. SECTION A IS NEAREST CONTROL KNOB. ARROW INDICATES CW ROTATION OF CONTROL KNOB.

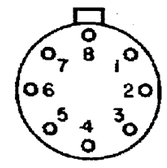
Figure 6-20. Type 79382 Input Attenuator (A20). Schematic Diagram

Figure 6-21



NOTES:
1. UNLESS OTHERWISE SPECIFIED
   a) RESISTANCE IS MEASURED IN OHMS, ±5%, 1/4W.
   b) CAPACITANCE IS MEASURED IN μF.
2. PIN ARRANGEMENT FOR U1 IS SHOWN IN DETAIL A.

DETAIL A



BOTTOM VIEW

Figure 6-21. Part 16070 DAFC Mode Inverter (A21) Schematic Diagram

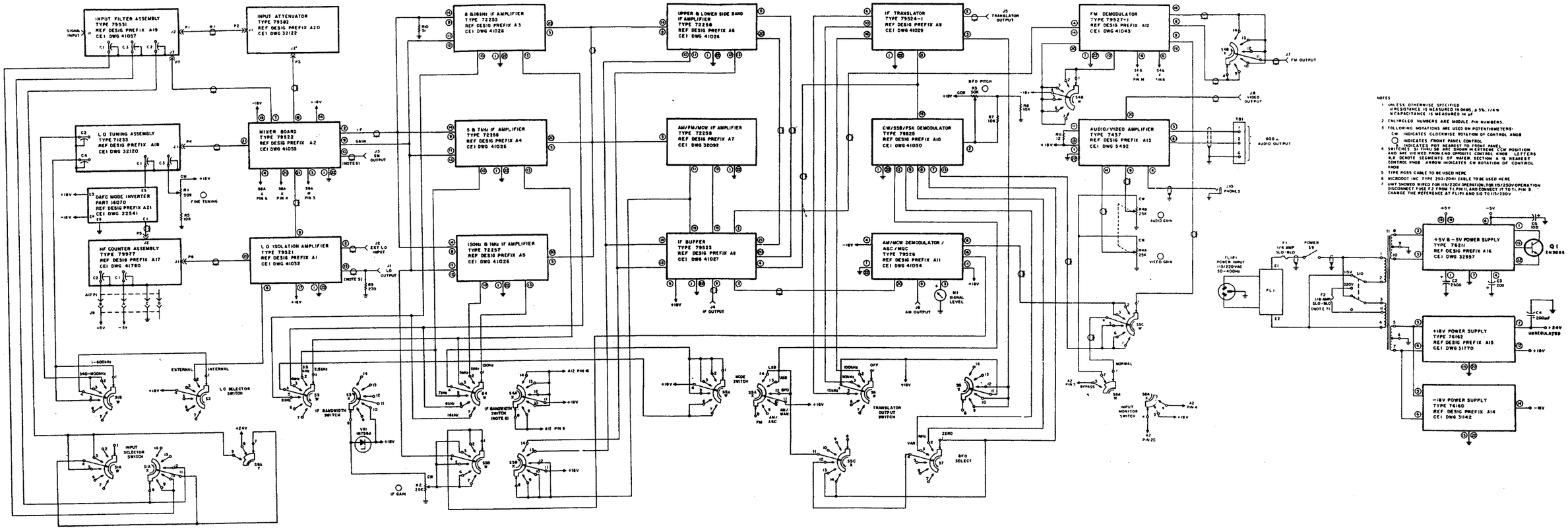


Figure 6-22. Type DMS-105A Tunable Demodulator, Schematic Diagram

INSTRUCTION MANUAL
FOR
TYPE DMS-105R
TUNABLE DEMODULATOR

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

C/200/11/3/72/DCM

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.

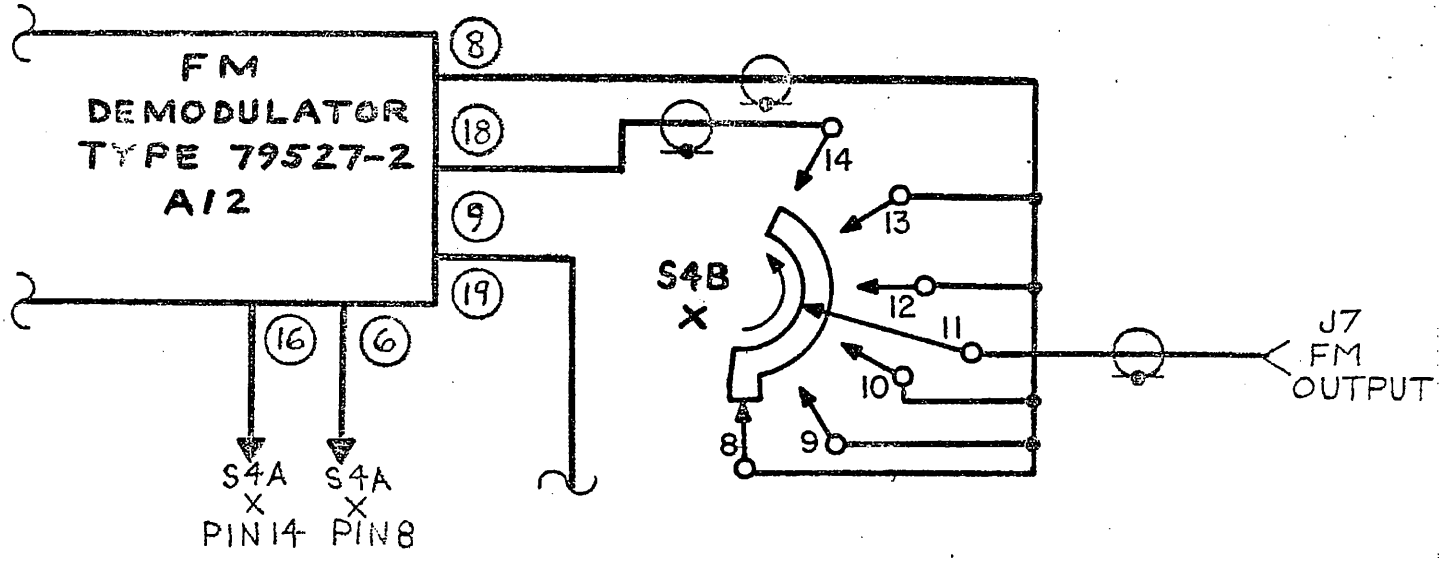
ADDENDA

DMS-105R

The following changes should be incorporated in the Instruction Manual for the DMS-105R Tunable Demodulator.

1. Main Chassis Schematic Diagram
(Figure 7-15, Page 7-21)

A. At A12, Type 79527-2, add S4B-X as shown below, and change destination marking at pins 6 and 16.



April 16, 1982
ADDENDUM

The following changes should be incorporated into the DMS-105R Tunable Demodulator Instruction Manual:

1.0 SECTION VII, SUPPLEMENT FOR TYPE DMS-105R TUNABLE DEMODULATOR

1.1 Paragraph 7.5.1, page 7-6, Type DMS-105R Demodulator Main Chassis Replacement Parts List

		REF. DESIG.	DESCRIPTION	QTY.	MFR. PART NO.	MFR. CODE	RECM. VENDOR
1.1.1	From:	FL1	Filter, LP	1	JN33-1616A	56289	
	To:	FL1	Power Line Filter Assembly	1	380279-1	14632	

1.2 Figure 7-15, page 7-27, Type DMS-105R Tunable Demodulator, Schematic Diagam

1.2.1 Change schematic diagram part number of FL1

From: JN33-1616A
To: 380279-1

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LIST OF ILLUSTRATIONS

LIST OF ILLUSTRATIONS (Cont)

LIST OF TABLES

Table 1-1. Type DMS-105R Tunable Demodulator, Specifications

Frequency Range	1 kHz to 1600 kHz in two bands: Band 1: 1 kHz to 600 kHz Band 2: 540 kHz to 1600 kHz
Types of Reception	AM, FM, SSB, CW, MCW, and FSK
Input Impedance	50 ohms or 1000 ohms, selectable by front-panel switch
Sensitivity (at 50-ohm input impedance and 1 kHz IF bandwidth)	30 μV, minimum, for 20 dB (s plus n)/n, all modes
Input Attenuator	0 dB to 50 dB; 10 dB/step
IF Center Frequency	2.0 MHz
IF Bandwidths for FM, AM, CW, MCW, or FSK	150 Hz, 1, 5, 7, 8, and 16 kHz
IF Bandwidths for SSB	2.5, 3.5, 4, and 8 kHz upper or lower sideband
BFO	Disabled in FM and AM. Fixed at center of IF in upper and lower sideband. Controllable in BFO position as follows: 1. Zero beat (crystal-controlled) 2. 1-kHz offset (crystal-controlled) 3. Variable ±8 kHz
Image Rejection	70 dB, minimum
IF Rejection	60 dB, minimum
Digital AFC	Holds demodulator tuning within ±100 Hz of the indicated frequency in the normal AFC mode, and within ±10 Hz in the decimal shift AFC mode.
Input Monitor Switch	In the normal mode the unit functions as a normal demodulator; in the bypass mode the input is connected directly to the audio amplifier through the audio gain control.
Outputs	Nine: Front-panel transducer output (2,000 Ω nominal), audio output, 2 MHz IF output, SM output, Video output, FM Detector output, AM Detector output, local oscillator output, translated IF output (500 mV P-P into 50 Ω load; 100, 50, or 10 kHz output front panel selected).
Audio Amplifier Bandwidth	50 Hz to 16 kHz, minimum
Audio Output Level	10 mW, 600 Ω
Video Output Level	500 mV peak-to-peak into 50-ohm load
External LO Input	0 dBm, minimum
Size	5.25 inches high, 19 inches wide, and 18 inches deep, maximum
Power	115/220 Vac, 50-400 Hz, approximately 30 watts
Weight	31.0 lbs., approximately

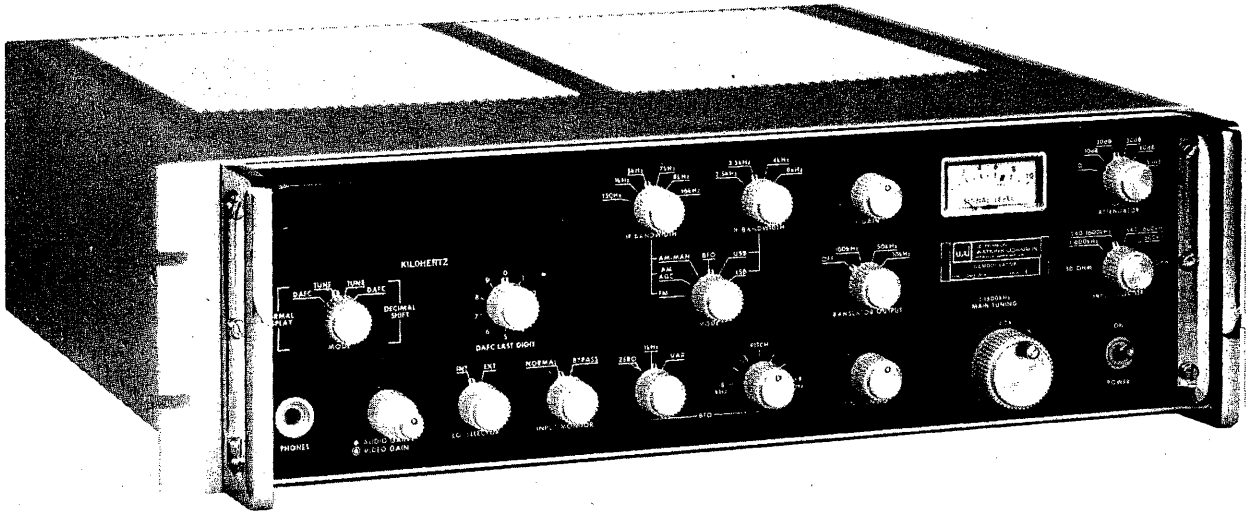


Figure 1-1. Type DMS-105R Demodulator, Front View

SECTION VII
SUPPLEMENT FOR TYPE DMS-105R
TUNABLE DEMODULATOR

7.1 GENERAL DESCRIPTION

The Type DMS-105R Demodulator is a special RFI modified version of the DMS-105A series. The IF translator A9 and the Audio/Video amplifier A13 have been replaced with special RFI type subassemblies. The FM demodulator A12 has been slightly modified and a Transducer assembly A22 has been added. An improved power line input filter is also utilized.

7.1.1 The Type 791002 IF Translator is utilized in lieu of a Type 79524-1. The 15 kHz translated output has been reduced to 10 kHz. The 100 kHz and 50 kHz outputs remain the same. Figure 7-12 is the schematic diagram for the Type 791002 IF Translator.

7.1.2 The Type 79527-2 FM Demodulator is utilized in lieu of a Type 79527-1, changing the narrowband discriminator from 1 kHz to 8 kHz output. The wideband discriminator of 16 kHz remains the same. Figure 6-9 is the schematic diagram for both FM demodulators. The proper discriminator is selected by switch S4X according to the IF bandwidth used. Changing the narrowband discriminator to 8 kHz necessitated the rewiring of switch section S4X. Figure 7-15 illustrates the switch modification.

7.1.3 The Type 7451 Audio/Video Amplifier is utilized in lieu of the Type 7437. This specially RFI designed subassembly produces a 10 mW, 600 Ω audio output at rear-panel connector J10 and a 500 mV peak-to-peak output, into a 50 Ω load, at rear-panel connector J8. Figure 7-13 is the schematic diagram for the Type 7451 Audio/Video Amplifier.

7.1.4 The Type 791005 Transducer Assembly was added to improve the quality of the phones output. The transducer output on the front-panel must be used with an accoustically coupled earphone, which is provided with the unit. Figure 7-14 is the schematic diagram for the Type 791005 Transducer Assembly.

7.1.5 The mechanical characteristics of the DMS-105R are basically the same as the DMS-105A, with the following exceptions:

(1) The physical appearance of the phone jack on the front-panel has changed.

(2) The 15 kHz position on the Translator output switch S6, has been changed to 10 kHz.

(3) On the rear apron, barrier strip TB1 has been replaced by jack J10, utilizing a Triaxial type connector having a twin lead balanced output, with a third lead used as a common shielded ground.

(4) BNC connectors, used for the translated output J5, the video output J8 have also been replaced with Triaxial type connectors.

NOTE

Figure 1-1 shows the front-panel controls and Figure 7-6 shows the rear-panel connectors and controls.

7.2 CIRCUIT DESCRIPTION

Operation of the various circuits in the DMS-105A Series Demodulator is described in detail in Section II of this manual. The circuit differences between the DMS-105R and the DMS-105A are described in the following paragraphs.

7.2.1 Type 791002 IF Translator. - Figure 7-12 is the schematic diagram for the translator; its reference

designation prefix is A9. This translator is basically the same as the one utilized in the DMS-105A. Crystal Y3 has been changed from 2.015 MHz to 2.010 MHz. Transformer T1 is used on the output to produce a balanced output connected to rear-apron triaxial jack J5.

7.2.2 Type 79527-2 FM Demodulator. - Figure 6-9 is the schematic diagram for the demodulator; its reference designation prefix is A12. This demodulator is basically the same as the one utilized in the DMS-105A, except that the crystal discriminator FL1 has been changed from 1 kHz to 8 kHz.

7.2.3 Type 7451 Audio/Video Amplifier. - Figure 7-13 is the schematic diagram for this amplifier; its reference designation prefix is A13. This amplifier is basically the same as the one utilized in the DMS-105A. Operational amplifiers U1, U2, and U3 are used in lieu of transistors. Transformer T1 is coupled to the output of the video amplifier U1 to produce a balanced output connected to rear-apron triaxial jack J8. Transformer T2 is coupled to the output of the audio amplifier U2 to produce a balanced output connected to rear-apron triaxial jack J10. Audio amplifier U3 is used to produce the transducer output at pin 9.

7.2.4 Type 791005 Transducer Assembly. - Figure 7-14 is the schematic diagram for the transducer; its reference designation prefix is A22. The input of the transducer assembly is connected to pin 9 of the Audio/Video amplifier A13. The audio signal is accoustically coupled through transducer MT1 to produce a 2000 Ω nominal audio output at the transducer output (phones) located on the front-panel.

7.3 INSTALLATION AND OPERATION

The installation and operation of the DMS-105R is conducted as per Section III of this manual, with the following differences.

7.3.1 IF Translator Output. - A front-panel selectable predetection output of 100 kHz, 50 kHz, or 10 kHz is provided at rear-panel triaxial jack J5. The output frequency is selected by the front-panel Translated output switch.

7.4 MAINTENANCE

The DMS-105R is conservatively designed to give trouble free service. If problems should occur, the troubleshooting Tables 4-1 and 4-2 and the alignment procedures of Section IV of this manual apply, with the following exceptions.

7.4.1 FM Demodulator/IF Buffer. - Proceed as follows:

(1) Connect the equipment as shown in Figure 7-1.

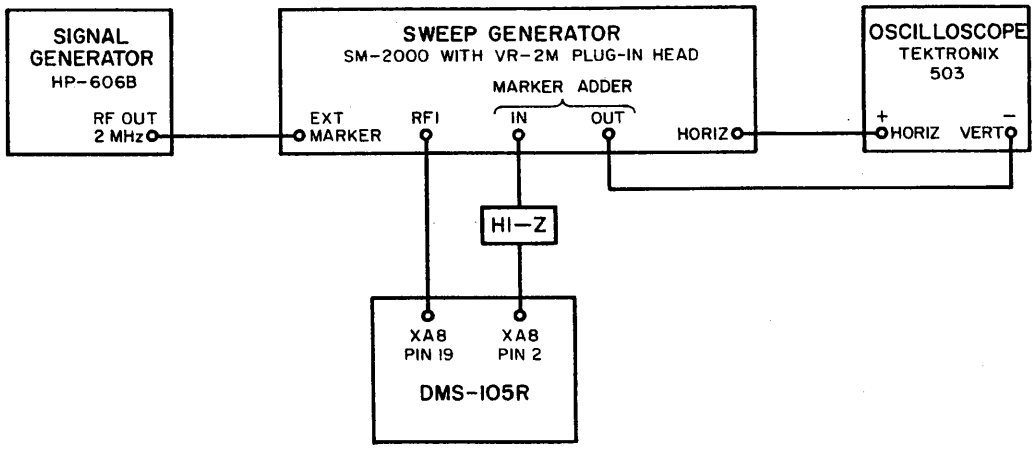


Figure 7-1. Test Setup, FM Demodulator Alignment

(2) Make the following initial control settings:

a. LO SELECTOR - EXT

b. MODE - FM

c. IF GAIN - MAX CCW

d. IF BANDWIDTH - 16 kHz

(3) Adjust the sweep generator controls for a 2-MHz center frequency. Adjust the oscilloscope controls to display the response curve. Set the HP-606B controls to provide a 2-MHz marker.

(4) Adjust A8L1 to center the response at precisely 2.000 MHz.

(5) Remove the high impedance detector and connect J7 (FM output) to marker adder input of the sweeper.

(6) Adjust A12T1 and A12L3 for a linear response and zero crossing at 2.000 MHz. (Typical response slope = 4V/16 kHz.)

(7) Set the IF BANDWIDTH switch to 8 kHz.

(8) Readjust the sweep generator controls for narrowband sweep.

(9) Adjust A12L4 for a linear response. (Typical response slope = 4V/8 kHz.)

7.4.2 Overall Gain and AGC. - Proceed as follows:

(1) Connect the equipment as shown in Figure 7-2.

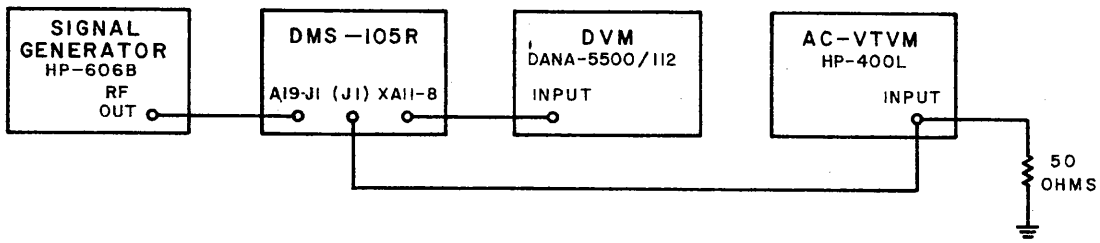


Figure 7-2. Test Setup, Overall Gain and AGC Alignment

(2) Make the following initial control settings:

a. MODE - AM/MAN

b. LO SELECTOR - INT

c. COUNTER MODE - Normal Display - Tune

d. INPUT MONITOR - Normal

e. INPUT ATTENUATOR - Zero

f. MAIN TUNING - Counter Readout 500.0 kHz

g. IF GAIN - Maximum CW

h. IF BANDWIDTH - 16 kHz

i. INPUT SELECT - 1-600 kHz, 50 Ω

(3) Adjust the signal generator for a CW signal at 500 kHz, with an output level of 30 μV.

(4) Adjust the gain pots, R4 and R20 on the IF Amplifier, A3 thru A6 for maximum gain (maximum CW) and adjust A11R6 and A7R6 for maximum gain (maximum CW).

(5) Observe the IF output in all bandwidths.

(6) If all levels are above -22 dBm (18 mV rms), adjust the gain pots on the IF amplifiers A3 thru A5 for -22 dBm (18 mV rms). (Note: If any IF bandwidth has less than -22 dBm IF output, adjust all other bandwidths to this particular lower output level.)

(7) Adjust A7R6 for -25 dBm (12 mV rms) IF output level.

(8) Change MODE to USB and set IF bandwidth to 8 kHz.

(9) Adjust A6R20 for -30 dBm IF output level.

(10) Change MODE to LSB and set IF bandwidth to 8 kHz.

(11) Adjust A6R4 for -30 dBm IF output level.

(12) Change MODE to AM/MAN and set IF bandwidth to 16 kHz.

(13) Adjust A11R6 until signal strength meter indicates "set", (approximately 2.2 Vdc on the DVM).

(14) Change MODE to AM/AGC.

(15) Adjust A11R33 until signal strength meter indicates "6", (approximately 1.9 Vdc on the DVM).

(16) Increase signal level by 30 dB; set meter should stay below "10".

7.4.3 CW/SSB/FSK Demodulator. - Proceed as follows:

(1) Connect the equipment as shown in Figure 7-3.

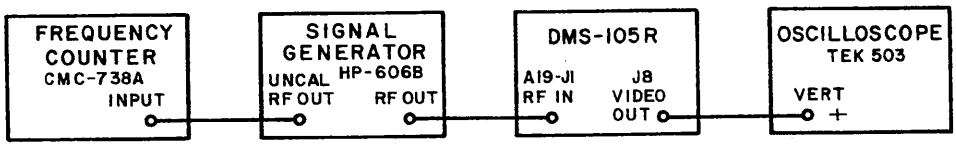


Figure 7-3. Test Setup, CW/SSB/FSK Demodulator Alignment

(2) Make the following initial control settings:

a. MODE - BFO

b. BFO - Zero

c. IF GAIN - Maximum

d. COUNTER MODE - Decimal Shift, Frequency set to 500.00 kHz

e. VIDEO GAIN - Maximum

(3) Adjust the frequency of the signal generator for precisely 500.00 kHz with an output level of 30 μV.

(4) Adjust A10C22 for a zero beat.

(5) Switch the BFO to the 1 kHz position. Insure that the output frequency is approximately 1 kHz and the video output level is approximately 500 mV P-P.

(6) Set the BFO to VAR.

(7) Adjust the pitch to zero.

(8) Adjust A10C37 for a zero beat.

(9) Set the pitch to +8 kHz mark and insure that the output frequency is between 6 and 10 kHz, with an output level greater than 20 dB.

(10) Set the pitch to -8 kHz mark and insure that the output frequency is between 6 and 10 kHz.

7.4.4 IF Translator. - Proceed as follows:

(1) Connect the equipment as shown in Figure 7-4.

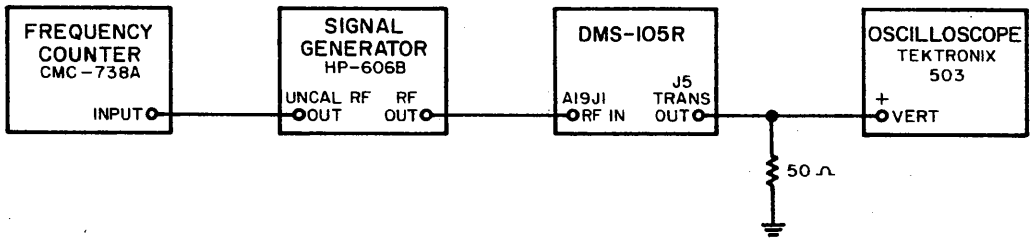


Figure 7-4. Test Setup, IF Translator Alignment

(2) Make the following control settings:

a. MODE - AM/MAN

b. IF GAIN - MAX CW

c. LO SELECTOR - INT

d. TRANSLATOR OUTPUT - 100 kHz

e. BAND - 1-600 kHz (50 Ω)

f. TUNED FREQUENCY - 500 kHz

(3) Adjust the signal generator controls for a 500 kHz CW output at 30 μV.

(4) Set A9R4 to its maximum CW position.

(5) Adjust A9L1 for a maximum indication on the oscilloscope. Note the output.

(6) Select the 50 kHz TRANSLATOR OUTPUT. Note the output level observed on the oscilloscope.

(7) Select the 10 kHz TRANSLATOR OUTPUT. Note the output level output on the oscilloscope.

(8) Select the 100 kHz and record the output level.

(9) Adjust A9R4 to obtain 500 mV P-P output level from the lowest signal level translated output recorded in steps (6), (7), and (8).

7.5 REPLACEMENT PARTS LIST AND SCHEMATIC DIAGRAMS

The following parts list and schematic diagrams is a supplement for the DMS-105R Demodulator and is to be used in conjunction with Section V and Section VI of this manual.

7.5.1 Type DMS-105R Demodulator, Main Chassis

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
A1	LO ISOLATION AMPLIFIER	1	79521	14632	
A2	MIXER	1	79522	14632	
A3	IF AMPLIFIER	1	72255	14632	
A4	IF AMPLIFIER	1	72256	14632	
A5	IF AMPLIFIER	1	72257	14632	
A6	UPPER & LOWER SIDE BAND IF AMPLIFIER	1	72258	14632	
A7	AM/FM/MCW IF AMPLIFIER	1	72259	14632	
A8	IF BUFFER	1	79523	14632	
A9	IF TRANSLATOR	1	791002	14632	
A10	CW/SSB/FSK DEMODULATOR	1	79525	14632	
A11	AM/MCW DEMODULATOR/AGC/MGC	1	79526	14632	
A12	FM DEMODULATOR	1	79527-2	14632	
A13	AUDIO/VIDEO AMPLIFIER	1	7451	14632	
A14	-18V REGULATED POWER SUPPLY BOARD	1	76160	14632	
A15	+18V REGULATED POWER SUPPLY BOARD	1	76162	14632	
A16	+5 & -5V POWER SUPPLY	1	76211	14632	
A17	HF COUNTER ASSEMBLY	1	79977	14632	
A18	LO ASSEMBLY	1	71233	14632	
A19	INPUT FILTER ASSEMBLY	1	79531	14632	
A20	INPUT ATTENUATOR	1	79382	14632	
A21	DAFC MODE INVERTER	1	16070	14632	
A22	TRANSDUCER ASSEMBLY	1	791005	14632	
C1	CAPACITOR, MICA, DIPPED: 3900 pF, 2%, 500V	1	CM06FD392G03	81349	72136
C2	CAPACITOR, ELECTROLYTIC, ALUMINUM: 2500 μF, -10+150%, 15V	1	43F3003CA4	06001	
C3	CAPACITOR, ELECTROLYTIC, ALUMINUM: 200 μF, -10+75%, 50V	2	39D207G050FJ4	56289	
C4	Same as C3				
F1	FUSE, 3AG, SLOW BLOW: 1/4A	1	MDL1/4	71400	
F2	FUSE, 3AG, SLOW BLOW: 1/8A	1	MDL1/8	71400	
FL1	FILTER, LOW PASS	1	JN33-1616A	56289	
J1	CONNECTOR, RECEPTACLE, BNC SERIES	1	2475	74868	
J2	CONNECTOR, JACK, BNC SERIES	5	17825-1002	74868	
J3	Same as J2				
J4	Same as J2				
J5	CONNECTOR, RECEPTACLE, TRIAXIAL SERIES	3	BJ-77	14949	

Figure 7-5
Figure 7-6

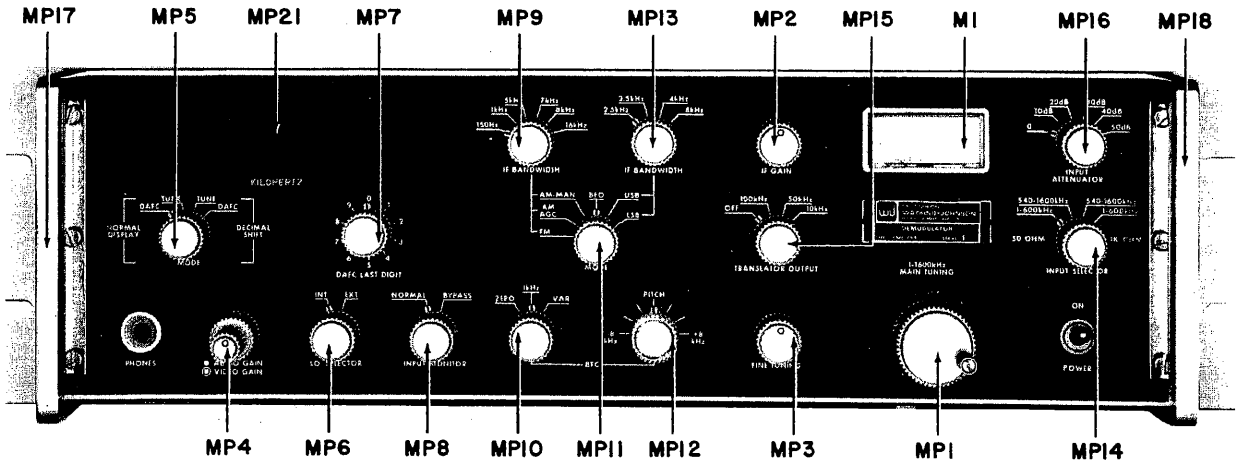


Figure 7-5. Type DMS-105R Demodulator, Front View

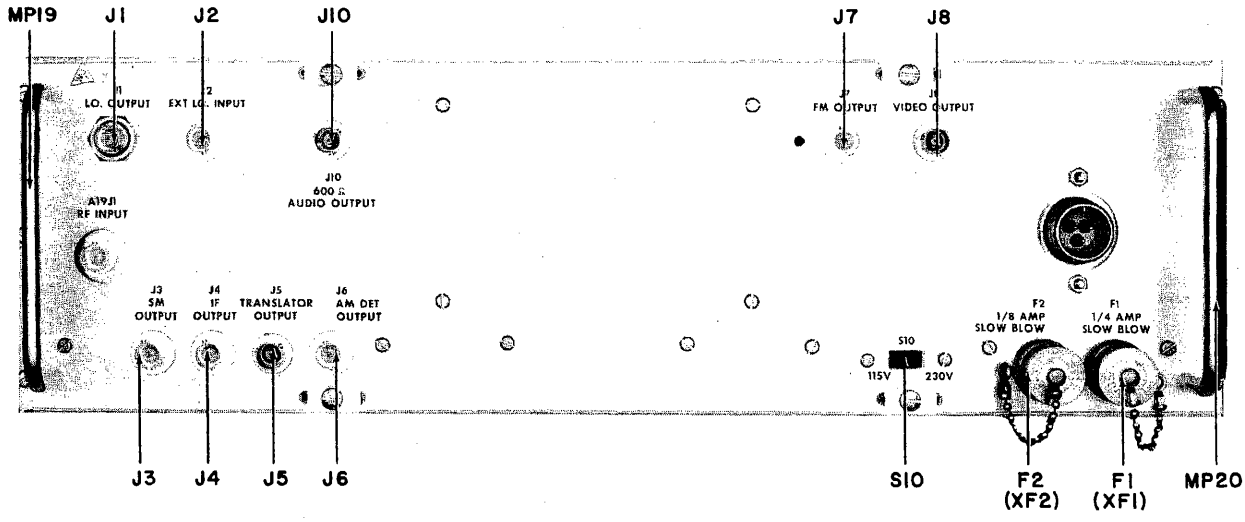


Figure 7-6. Type DMS-105R Demodulator, Rear View

REF DESIG	DESCRIPTION		QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
J6	Same as J2					
J7	Same as J2					
J8	Same as J5					
J9	CONNECTOR, RECEPTACLE, MULTIPIN		1	M4SLRN	81312	
J10	Same as J5					
L1	COIL, FIXED		1	3635-38	71279	
M1	METER, SIGNAL LEVEL		1	15691-1	14632	
MP1	CRANK ASSEMBLY		1	11755-4	14632	
MP2	KNOB		2	PS70D2 (GREY)	21604	
MP3	Same as MP2					
MP4	KNOB		1	PS50D3/70C5 (GREY)	21604	
MP5	KNOB		12	PS70PL2 (GREY)	21604	
MP6	Same as MP5					
MP7	Same as MP5					
MP8	Same as MP5					
MP9	Same as MP5					
MP10	Same as MP5					
MP11	Same as MP5					
MP12	Same as MP5					
MP13	Same as MP5					
MP14	Same as MP5					
MP15	Same as MP5					
MP16	Same as MP5					
MP17	HANDLE		2	32306-1	14632	
MP18	Same as MP17					
MP19	HANDLE		2	415-1280-03-02-00	71279	
MP20	Same as MP19					
MP21	FILTER GLASS		1	12584-17	14632	
MP22	EXTENDER CARD		1	79554	14632	
MP23	COVER, TOP AND BOTTOM		2	32574-3	14632	
MP24	Same as MP23					
P1	CONNECTOR, PLUG, MB SERIES	Part of W1	4	44950	74868	
P2	Same as P1	Part of W1				
P3	Same as P1					
P4	Same as P1					
P5	CONNECTOR, PLUG, MB SERIES		3	45775	74868	

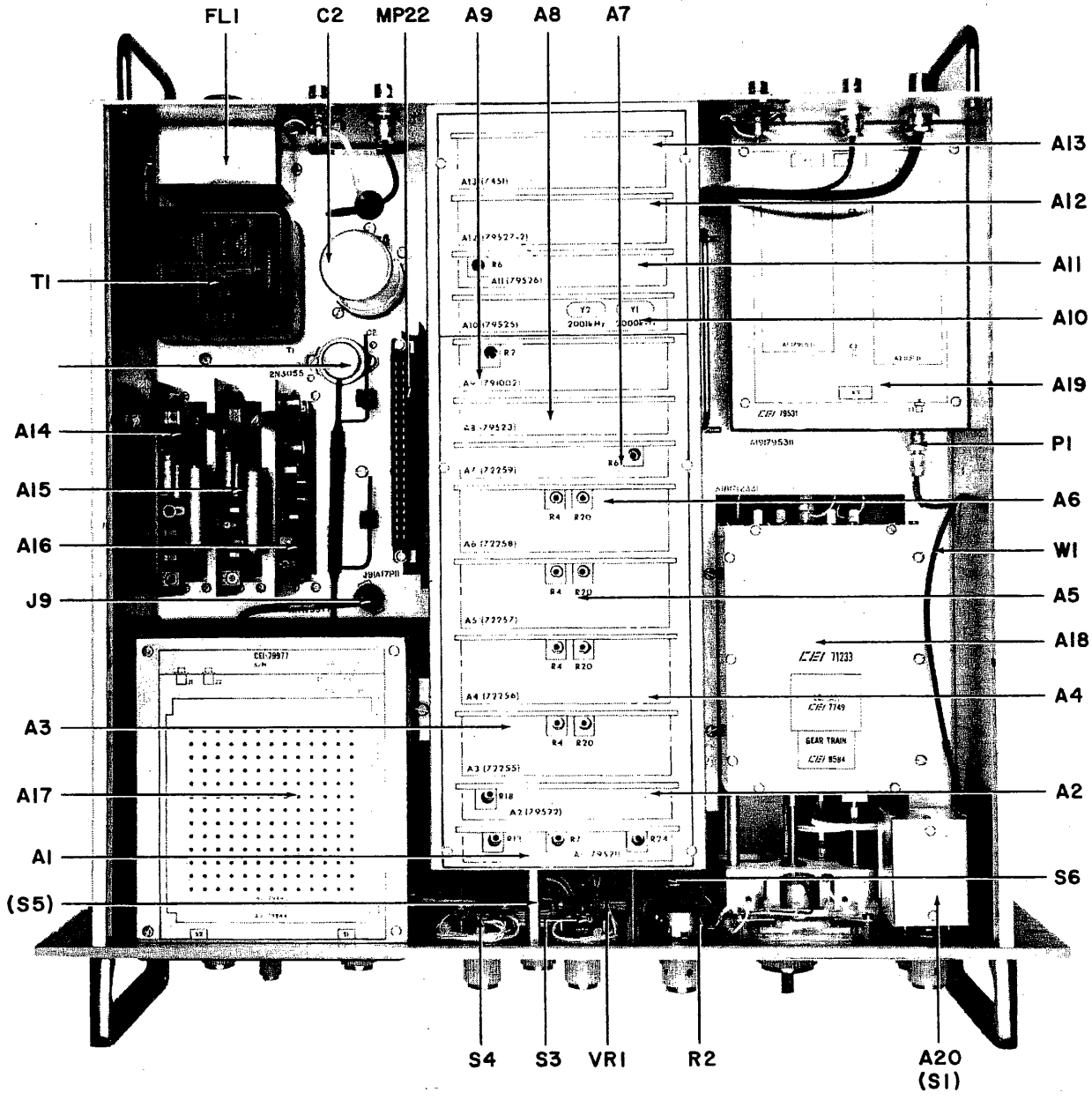


Figure 7-7. Type DMS-105R Demodulator, Top View

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
P6	Same as P5				
P7	Same as P5				
P8	CORD, POWER Part of W2	1	3598-181-007	71700	
P9	CONNECTOR, RECEPTACLE, MULTIPIN Part of W2	1	MS3106A14S7S	96906	74868
Q1	TRANSISTOR	1	2N3055	80131	04713
R1	RESISTOR, VARIABLE, COMPOSITION: 50 kΩ, 10%, 2W	2	RV4NAYSD503A	81349	01121
R2	RESISTOR, VARIABLE, COMPOSITION: 25 kΩ, 10%, 2W	1	RV4NAYSD253A	81349	01121
R3	Same as R1				
R4	RESISTOR, VARIABLE, COMPOSITION: 25 kΩ/25 kΩ, 10%, 1/2W	1	70-08913-2	37942	
R5	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4W	3	RCR07G103JS	81349	01121
R6	RESISTOR, FIXED, COMPOSITION: 1 kΩ, 5%, 1/4W	1	RCR07G102JS	81349	01121
R7	Same as R5				
R8	Same as R5				
R9	RESISTOR, FIXED, COMPOSITION: 270 Ω, 5%, 1/4W	1	RCR07G271JS	81349	01121
R10	RESISTOR, FIXED, COMPOSITION: 51 Ω, 5%, 1/4W	1	RCR07G510JS	81349	01121
S1	SWITCH, ROTARY	2	1128-03	14632	
S2	SWITCH, ROTARY	4	1128-43	14632	
S3	Same as S2				
S4	Same as S1				
S5	SWITCH, ROTARY	1	1128-02	14632	
S6	Same as S2				
S7	Same as S2				
S8	SWITCH, ROTARY	1	1128-42	14632	
S9	SWITCH, TOGGLE	1	8280K16	27193	
S10	SWITCH, SLIDE: DPDT	1	11A-1211	82389	
T1	TRANSFORMER	1	16703	14632	
VR1	DIODE	1	1N756A	80131	04713
W1	CABLE ASSEMBLY	1	30020-1185	14632	
W2	CABLE ASSEMBLY	1	23001	14632	
XA1	CONNECTOR, PRINTED CIRCUIT CARD	16	250-22-30-170	71785	
XA2	Same as XA1				
XA3	Same as XA1				
XA4	Same as XA1				
XA5	Same as XA1				

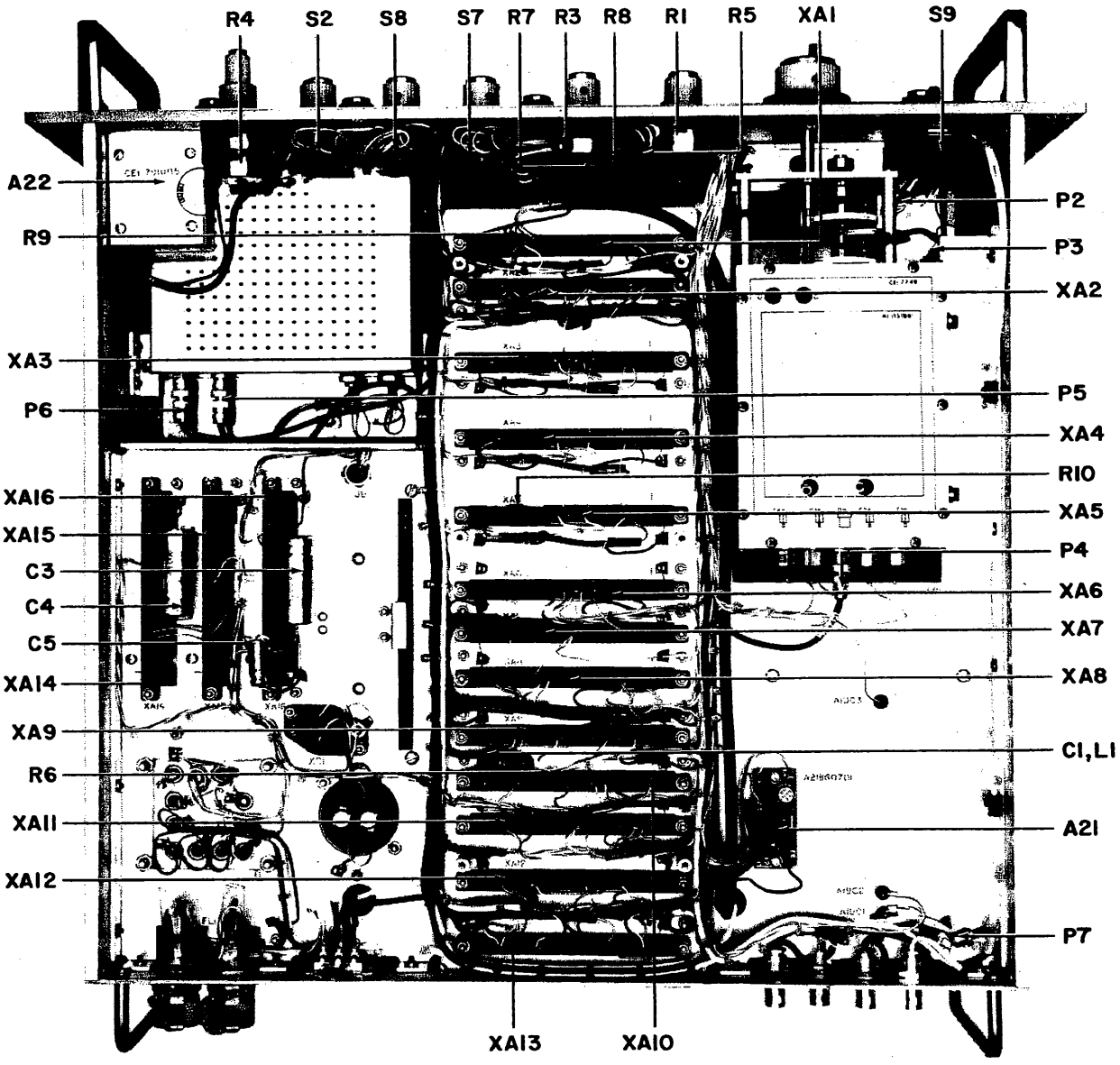


Figure 7-8. Type DMS-105R Demodulator, Bottom View

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
XA6	Same as XA1				
XA7	Same as XA1				
XA8	Same as XA1				
XA9	Same as XA1				
XA10	Same as XA1				
XA11	Same as XA1				
XA12	Same as XA1				
XA13	Same as XA1				
XA14	Same as XA1				
XA15	Same as XA1				
XA16	Same as XA1				
XF1	FUSEHOLDER	2	342004	75915	
XF2	Same as XF1				
XQ1	SOCKET, TRANSISTOR	1	8038-1G1	91506	
	Accessory mating external connectors to be furnished:				
--	CONNECTOR, PLUG, TRIAXIAL SERIES	3	PL76	14949	
--	HEADSET, MONAURAL - HEAVY DUTY	2	9RS500G43	31487	
--	CONNECTOR	2	31-006	74868	

7.5.2 Type 791002 IF Translator REF DESIG PREFIX A9

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	CAPACITOR, CERAMIC, DISC: 0.1 μF, -20+80%, 25V	9	DFJ3	73899	
C2	CAPACITOR, PLASTIC, TUBULAR: 0.01 μF, 10%, 100V	1	663UW103-9-1W	84411	
C3	CAPACITOR, CERAMIC, DISC: 0.01 μF, 20%, 100V	2	C023B101F103M	56289	
C4	Same as C1				
C5	CAPACITOR, MICA, DIPPED: 270 pF, 5%, 500V	1	CM05FD271J03	81349	72136
C6	Same as C3				
C7	Same as C1				
C8	CAPACITOR, ELECTROLYTIC, TANTALUM: 3.3 μF, 10%, 15V	2	CS13BD335K	81349	56289
C9	CAPACITOR, ELECTROLYTIC, TANTALUM: 22 μF, 10%, 35V	2	CS13BF226K	81349	56289
C10	CAPACITOR, ELECTROLYTIC, TANTALUM: 4.7 μF, 10%, 35V	2	CS13BF475K	81349	56289
C11	CAPACITOR, MICA, DIPPED: 1200 pF, 5%, 500V	2	CM06FD122J03	81349	72136
C12	CAPACITOR, MICA, DIPPED: 2000 pF, 5%, 500V	1	CM06FD202J03	81349	72136
C13	Same as C11				
C14	Same as C9				
C15	Same as C8				
C16	Same as C10				
C17	CAPACITOR, MICA, DIPPED: 47 pF, 5%, 500V	6	CM05ED470J03	81349	72136
C18	Same as C17				
C19	Same as C1				
C20	Same as C1				
C21	CAPACITOR, MICA, DIPPED: 27 pF, 5%, 500V	3	CM05ED270J03	81349	72136
C22	Same as C17				
C23	Same as C17				
C24	Same as C1				
C25	Same as C1				
C26	Same as C21				
C27	Same as C17				
C28	Same as C17				
C29	Same as C1				
C30	Same as C1				
C31	Same as C21				
L1	COIL, VARIABLE	1	7107-29	71279	
L2	COIL, FIXED	2	2500-28	99800	

REF DESIG PREFIX A9

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
L3	Same as L2				
Q1	TRANSISTOR	2	3N187	80131	02735
Q2	Same as Q1				
Q3	TRANSISTOR	1	2N2270	80131	02735
Q4	TRANSISTOR	3	3N128	80131	02735
Q5	Same as Q4				
Q6	Same as Q4				
R1	RESISTOR, FIXED, COMPOSITION: 22 Ω, 5%, 1/4W	4	RCR07G220JS	81349	01121
R2	RESISTOR, VARIABLE, FILM: 1 kΩ, 30%, 1/2W	1	62PAR1K	73138	
R3	RESISTOR, FIXED, COMPOSITION: 1 kΩ, 5%, 1/4W	2	RCR07G102JS	81349	01121
R4	RESISTOR, FIXED, COMPOSITION: 150 kΩ, 5%, 1/4W	1	RCR07G154JS	81349	01121
R5	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4W	2	RCR07G103JS	81349	01121
R6	RESISTOR, FIXED, COMPOSITION: 47 kΩ, 5%, 1/4W	2	RCR07G473JS	81349	01121
R7	RESISTOR, FIXED, COMPOSITION: 20 kΩ, 5%, 1/4W	1	RCR07G203JS	81349	01121
R8	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	1	RCR07G470JS	81349	01121
R9	RESISTOR, FIXED, COMPOSITION: 330 Ω, 5%, 1/4W	2	RCR07G331JS	81349	01121
R10	Same as R1				
R11	Same as R6				
R12	RESISTOR, FIXED, COMPOSITION: 2.2 kΩ, 5%, 1/4W	7	RCR07G222JS	81349	01121
R13	RESISTOR, FIXED, COMPOSITION: 82 kΩ, 5%, 1/4W	1	RCR07G823JS	81349	01121
R14	Same as R5				
R15	Same as R9				
R16	RESISTOR, FIXED, COMPOSITION: 820 Ω, 5%, 1/4W	1	RCR07G821JS	81349	01121
R17	RESISTOR, FIXED, COMPOSITION: 150 Ω, 5%, 1/4W	2	RCR07G151JS	81349	01121
R18	RESISTOR, FIXED, COMPOSITION: 3.9 kΩ, 5%, 1/4W	1	RCR07G392JS	81349	01121
R19	Same as R3				
R20	RESISTOR, FIXED, COMPOSITION: 560 Ω, 5%, 1/4W	1	RCR07G561JS	81349	01121
R21	Same as R17				
R22	Same as R1				
R23	RESISTOR, FIXED, COMPOSITION: 1 MΩ, 5%, 1/4W	3	RCR07G105JS	81349	01121
R24	Same as R12				
R25	Same as R12				
R26	Same as R23				
R27	Same as R12				
R28	Same as R12				
R29	Same as R23				

REF DESIG PREFIX A9

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R30	Same as R12				
R31	Same as R12				
T1	TRANSFORMER	1	58-130	06978	
Y1	CRYSTAL/QUARTZ	1	CR18AU 2.100MHZ	81349	74306
Y2	CRYSTAL/QUARTZ	1	CR18AU 2.05 MHZ	81349	74306
Y3	CRYSTAL/QUARTZ	1	91804-08	14632	

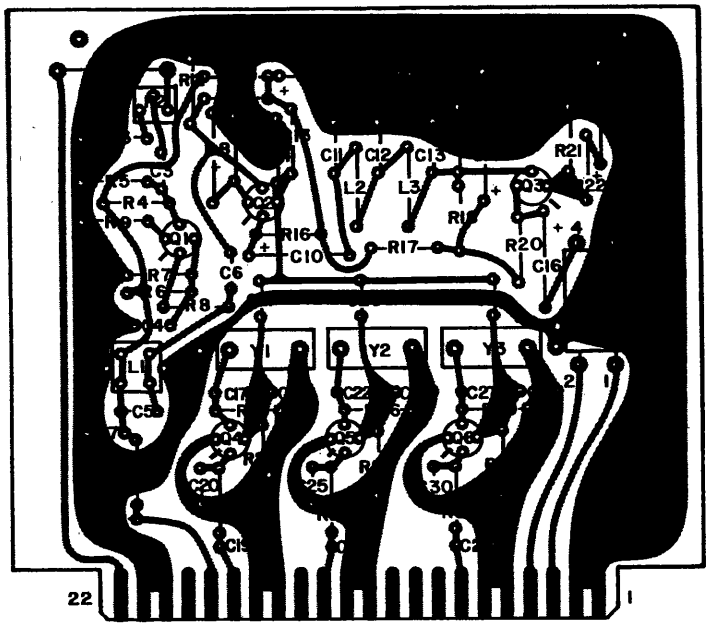


Figure 7-9. Type 791002 IF Translator (A9), Component Locations

7.5.3 Type 79527-2 FM Demodulator REF DESIG PREFIX A12

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
AR1	INTEGRATED CIRCUIT	2	U5F7719393	07263	
AR2	Same as AR1				
C1	CAPACITOR, CERAMIC, DISC: 0.01 μF, 20%, 100V	5	C023B101F103M	56289	
C2	CAPACITOR, CERAMIC, DISC: 0.02 μF, 20%, 100V	2	C023B101H203M	56289	
C3	CAPACITOR, CERAMIC, DISC: 0.05 μF, 20%, 100V	6	29C212A7	56289	
C4	Same as C1				
C5	Same as C1				
C6	CAPACITOR, MICA, DIPPED: 160 pF, 5%, 500V	1	CM05FD161J03	81349	72136
C7	CAPACITOR, MICA, DIPPED: 100 pF, 5%, 500V	1	CM05FD101J03	81349	72136
C8	CAPACITOR, MICA, DIPPED: 51 pF, 5%, 500V	1	CM05ED510J03	81349	72136
C9	CAPACITOR, MICA, DIPPED: 180 pF, 5%, 500V	1	CM05FD181J03	81349	72136
C10	CAPACITOR, MICA, DIPPED: 82 pF, 5%, 500V	1	CM05ED820J03	81349	72136
C11	CAPACITOR, MICA, DIPPED: 500 pF, 5%, 500V	1	DM15-501J	72136	
C12	Same as C3				
C13	Same as C3				
C14	Same as C1				
C15	Same as C2				
C16	Same as C3				
C17	Same as C1				
C18	CAPACITOR, MICA, DIPPED: 820 pF, 5%, 300V	2	DM15-821J	72136	
C19	Same as C18				
C20	CAPACITOR, MICA, DIPPED: 1000 pF, 5%, 100V	1	DM15-102J	72136	
C21	Same as C3				
C22	Same as C3				
C23	CAPACITOR, CERAMIC, DISC: 0.1 μF, -20+80%, 25V	2	DFJ3	73899	
C24	Same as C23				
CR1	DIODE	2	1N4446	80131	93332
CR2	Same as CR1				
FL1	DISCRIMINATOR, CRYSTAL	1	8680034	03040	
L1	COIL, FIXED	1	2500-28	99800	
L2	COIL, FIXED	1	201-11	99848	
L3	POT CORE ASSEMBLY	1	30705-19	14632	
L4	COIL, VARIABLE	1	7107-27	71279	
L5	COIL, FIXED	1	1025-84	99800	
Q1	TRANSISTOR	2	2N3251	80131	
Q2	TRANSISTOR	2	2N2222A	80131	

REF DESIG PREFIX A12

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
Q3	Same as Q1				
Q4	Same as Q2				
R1	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	6	RCR07G101JS	81349	01121
R2	RESISTOR, FIXED, COMPOSITION: 300 Ω, 5%, 1/4W	2	RCR07G301JS	81349	01121
R3	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	6	RCR07G470JS	81349	01121
R4	RESISTOR, FIXED, COMPOSITION: 100 kΩ, 5%, 1/4W	2	RCR07G104JS	81349	01121
R5	Same as R4				
R6*	RESISTOR, FIXED, COMPOSITION: 12 MΩ, 5%, 1/4W	2	RCR07G126JS	81349	01121
R7	RESISTOR, FIXED, COMPOSITION: 30 kΩ, 5%, 1/4W	2	RCR07G303JS	81349	01121
R8	Same as R3				
R9	Same as R1				
R10	Same as R3				
R11	RESISTOR, FIXED, COMPOSITION: 4.7 kΩ, 5%, 1/4W	2	RCR07G472JS	81349	01121
R12	RESISTOR, FIXED, COMPOSITION: 470 Ω, 5%, 1/4W	2	RCR07G471JS	81349	01121
R13	Same as R1				
R14	Same as R1				
R15	Same as R2				
R16	Same as R3				
R17	NOT USED				
R18*	Same as R6				
R19	Same as R1				
R20	Same as R7				
R21	Same as R3				
R22	Same as R3				
R23	Same as R11				
R24	Same as R12				
R25	Same as R1				
T1	POT CORE ASSEMBLY	1	30705-20	14632	
*	Nominal value. Final value to be factory selected.				

7.5.4 Type 7451 Audio/Video Amplifier REF DESIG PREFIX A13

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	CAPACITOR, ELECTROLYTIC, TANTALUM: 1 μF, 10%, 35V	6	CS13BF105K	81349	56289
C2	Same as C1				
C3	CAPACITOR, ELECTROLYTIC, TANTALUM: 4.7 μF, 10%, 35V	4	CS13BF475K	81349	56289
C4	Same as C1				
C5	Same as C1				
C6	Same as C3				
C7	Same as C1				
C8	Same as C1				
C9	Same as C3				
C10	Same as C3				
R1	RESISTOR, FIXED, COMPOSITION: 47 kΩ, 5%, 1/4W	3	RCR07G473JS	81349	01121
R2	Same as R1				
R3	RESISTOR, FIXED, COMPOSITION: 33 kΩ, 5%, 1/4W	1	RCR07G333JS	81349	01121
R4	RESISTOR, FIXED, COMPOSITION: 39 kΩ, 5%, 1/4W	2	RCR07G393JS	81349	01121
R5	RESISTOR, FIXED, COMPOSITION: 150 Ω, 5%, 1/4W	2	RCR07G151JS	81349	01121
R6	RESISTOR, FIXED, COMPOSITION: 100 kΩ, 5%, 1/4W	4	RCR07G104JS	81349	01121
R7	Same as R6				
R8	Same as R4				
R9	RESISTOR, FIXED, COMPOSITION: 22 kΩ, 5%, 1/4W	2	RCR07G223JS	81349	01121
R10	Same as R5				
R11	Same as R6				
R12	Same as R6				
R13	Same as R9				
R14	Same as R1				
R15	RESISTOR, FIXED, COMPOSITION: 270 Ω, 5%, 1/4W	1	RCR07G271JS	81349	01121
R16	RESISTOR, FIXED, COMPOSITION: 56 Ω, 5%, 1/4W	1	RCR07G560JS	81349	01121
T1	TRANSFORMER	1	13116	14632	
T2	TRANSFORMER, AUDIO	1	124-5K	70674	
U1	INTEGRATED CIRCUIT	3	U5B7741393	07263	
U2	Same as U1				
U3	Same as U1				
VR1	DIODE	2	1N4737A	80131	04713
VR2	Same as VR1				
XU1	SOCKET, INTEGRATED CIRCUIT	3	8058-1G49	91506	
XU2	Same as XU1				

REF DESIG PREFIX A13

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
XU3	Same as XU1				

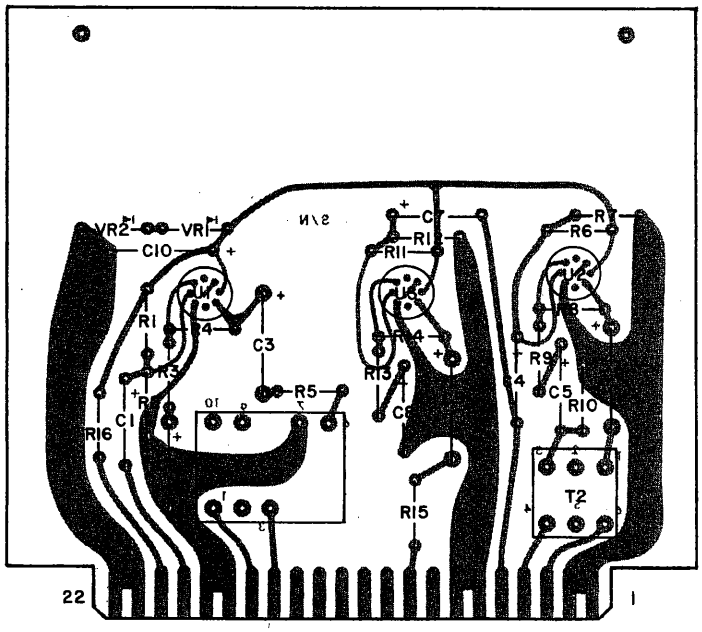


Figure 7-10. Type 7451 Audio/Video Amplifier (A13), Component Locations

7.5.5 Type 791005 Transducer Assembly REF DESIG PREFIX A22

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
E1	TERMINAL, FEEDTHRU, INSULATED	1	SFU16	04013	
MP1	COVER	1	16812-1	14632	
MT1	TRANSDUCER	1	9R1006G00A6MDL	31487	

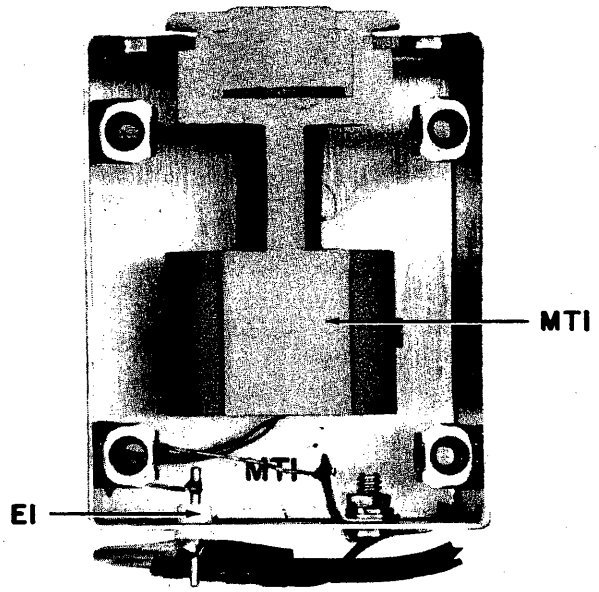
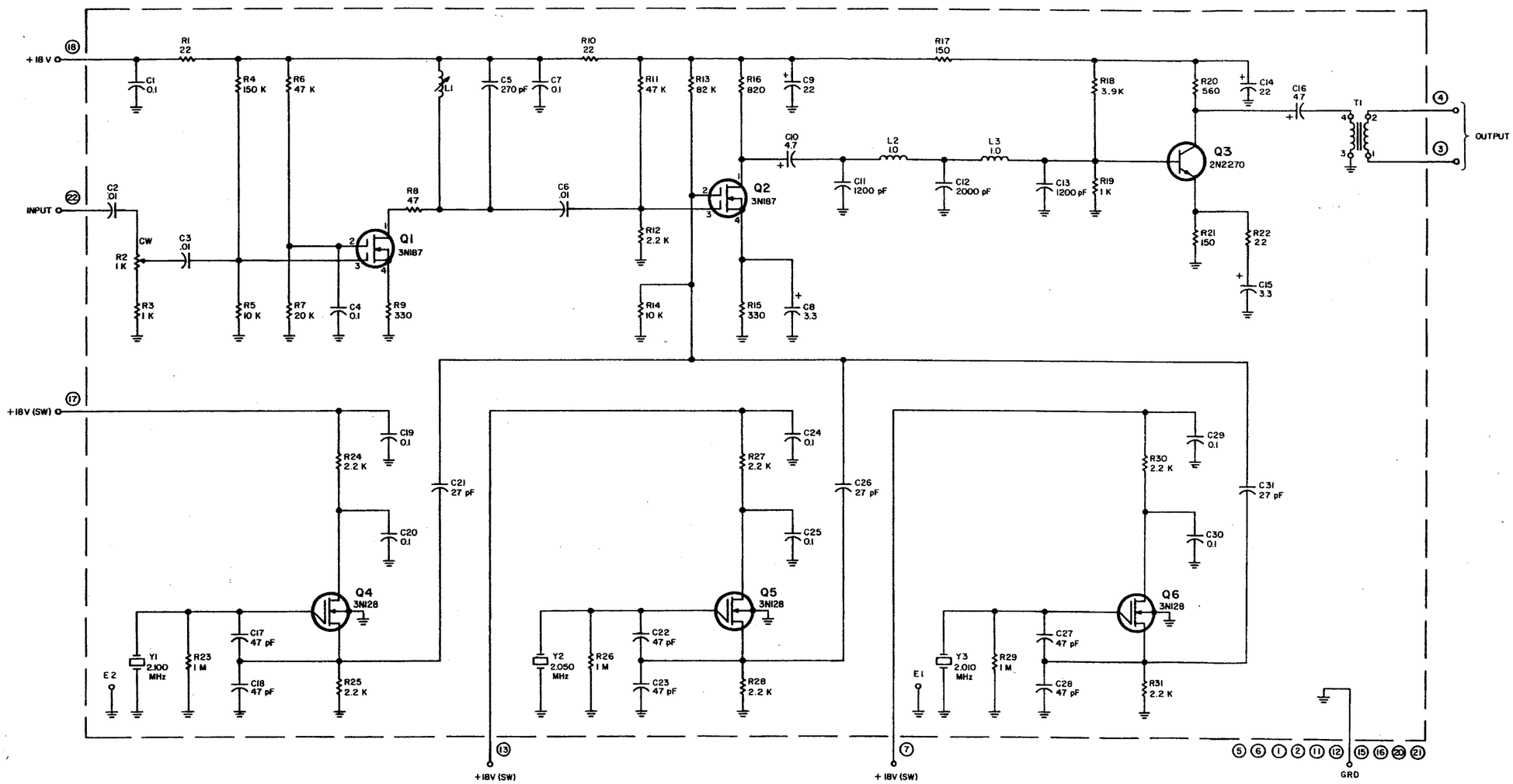


Figure 7-11. Type 791005 Transducer Assembly (A22), Component Locations

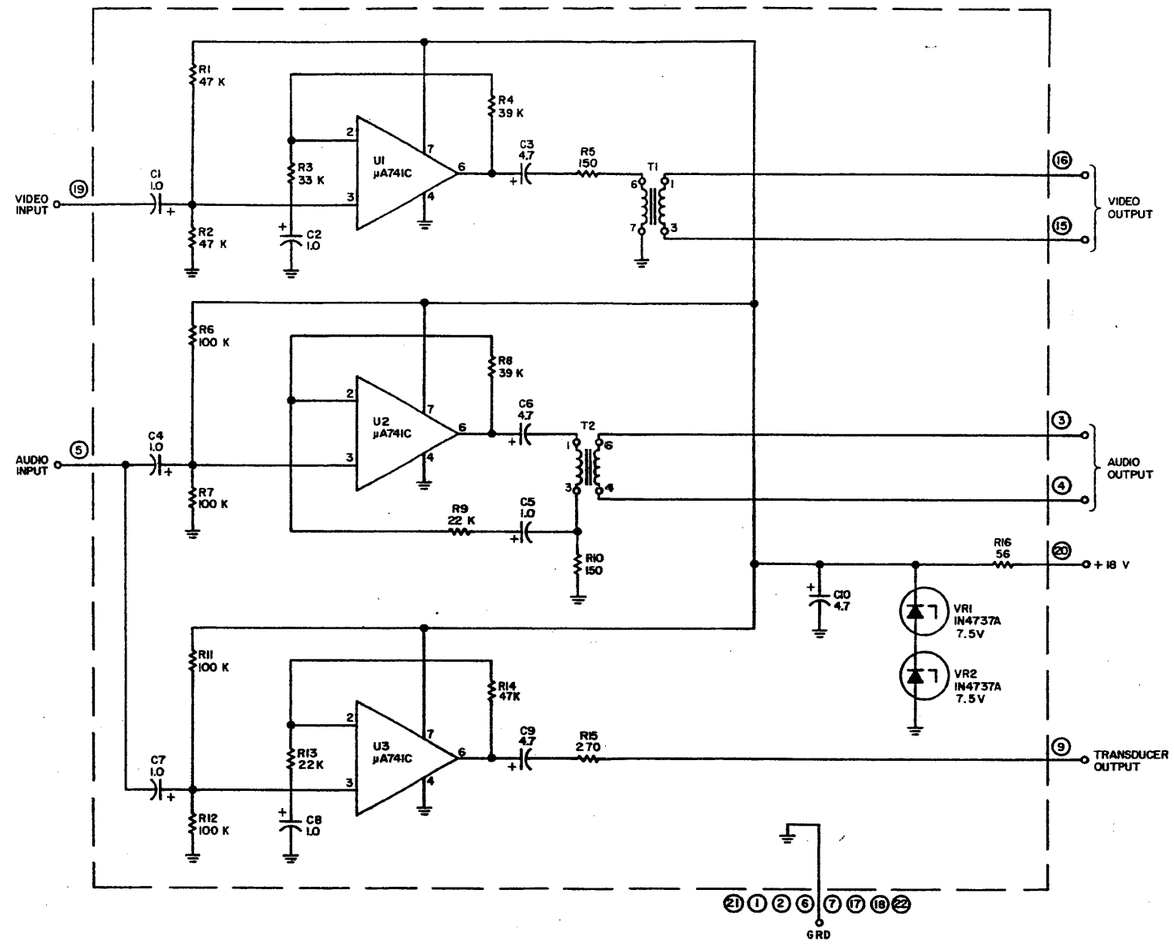
Figure 7-12



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, ±5%, 1/4 W.
   b) CAPACITANCE IS IN μF.
   c) INDUCTANCE IS IN mH.
2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS.
3. CW ON R2 INDICATES CLOCKWISE ROTATION OF ACTUATOR.

Figure 7-12. Type 791002 IF Translator (A9), Schematic Diagram



NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, ± 5 %, 1/4 W.
   b) CAPACITANCE IS IN µF.
2. FOR LEAD ARRANGEMENT OF U1, U2 & U3 SEE DETAIL A.
3. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS.

Figure 7-13. Type 7451 Audio/Video Amplifier (A13), Schematic Diagram

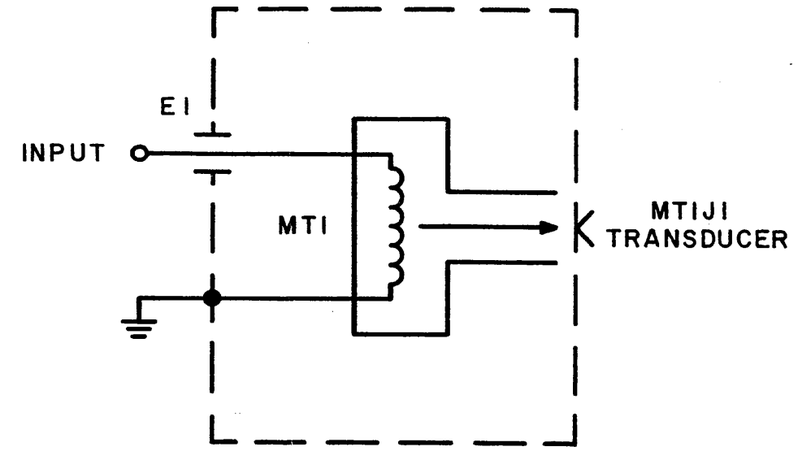


Figure 7-14. Type 791005 Transducer Assembly (A22), Schematic Diagram

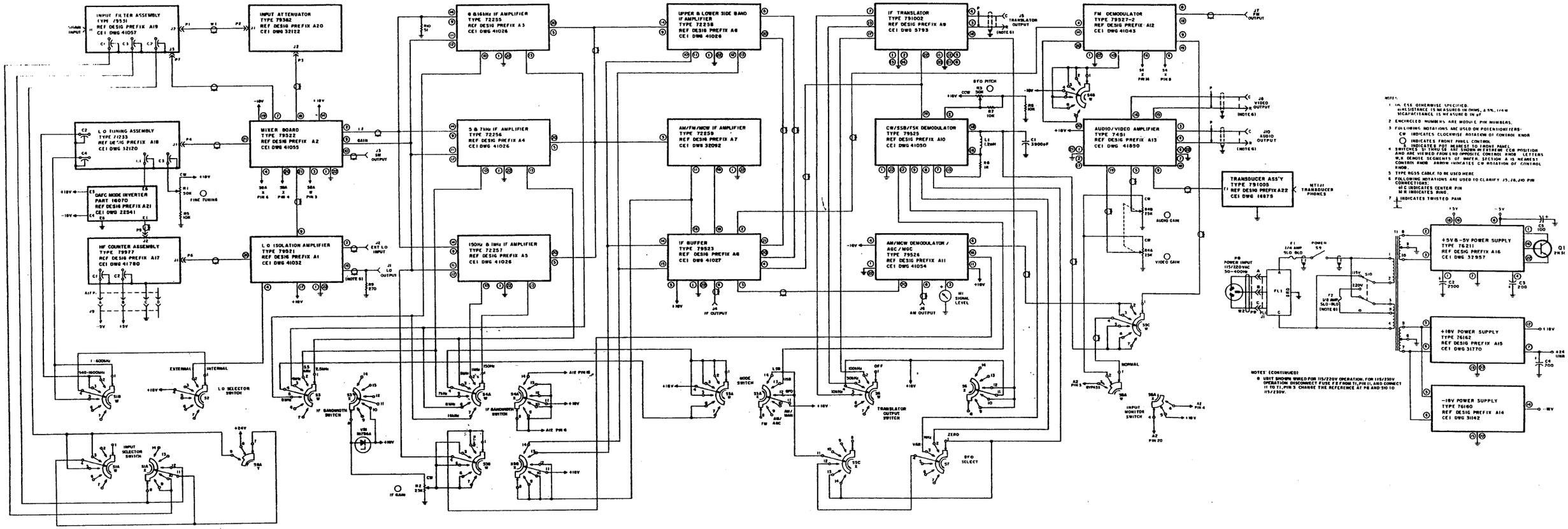


Figure 7-15. Type DMS-105R Demodulator Main Chassis, Schematic Diagram