



**TECHNICAL MANUAL  
FOR  
EIGHT INPUT MULTIAN TENNA COUPLER  
MODEL MAC-1**



**THE TECHNICAL MATERIEL CORPORATION**  
**MAMARONECK, N.Y.** **OTTAWA, CANADA**

**IN 8033**

**30th S pt mb r, 1969**

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TMC will replace or repair any such defective items, F.O.B. factory, which may fail within the stated warranty period, PROVIDED:

1. That any claim of defect under this warranty is made within sixty (60) days after discovery thereof and that inspection by TMC, if required, indicates the validity of such claim to TMC's satisfaction.
2. That the defect is not the result of damage incurred in shipment from or to the factory.
3. That the equipment has not been altered in any way either as to design or use whether by replacement parts not supplied or approved by TMC, or otherwise.
4. That any equipment or accessories furnished but not manufactured by TMC, or not of TMC design shall be subject only to such adjustments as TMC may obtain from the supplier thereof.

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2. Serial Number of Equipment.
3. TMC Part Number.
4. Nature of defect or cause of failure.
5. The contract or purchase order under which equipment was delivered.

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When ordering replacement parts, the following information must be included in the order as applicable:

1. Quantity Required.
2. TMC Part Number.
3. Equipment in which used by TMC or Military Model Number.
4. Brief Description of the Item.
5. The *Crystal Frequency* if the order includes crystals.

### *PROCEDURE IN THE EVENT OF DAMAGE INCURRED IN SHIPMENT*

TMC's Warranty specifically excludes damage incurred in shipment to or from the factory. In the event equipment is received in damaged condition, the carrier should be notified immediately. Claims for such damage should be filed with the carrier involved and not with TMC.

All correspondence pertaining to Warranty Claims, return, repair, or replacement and all material or equipment returned for repair or replacement, within Warranty or otherwise, should be addressed as follows:

THE TECHNICAL MATERIEL CORPORATION  
Engineering Services Department  
700 Fenimore Road  
Mamaroneck, New York

TECHNICAL MANUAL CHANGE NOTICE

MODEL AFFECTED: Eight-input multiantenna coupler, MAC-1

MANUAL NUMBER: IN8033

SECTION 3. OPERATION

Page 3-1, Para 3-1-1

Delete whole para.

Insert: "Controls: Table 3-1 contains a list of the operating controls, indicators and fuse holders on the front panel of the MAC-1".

SECTION 5. MAINTENANCE

Page 5-1, Para 5-2-2 Line 4

Delete: word "dur"

Insert: word "due"

Page 5-1, Para 5-3-2 Line 3

Delete: word "foupler"

Insert: word "coupler"

SECTION 6, PARTS LIST

Page 6-1, Para 6-1-3 Line 3

Delete: word "came"

Insert: word "name"

Page 6-5

Delete: 1A2R1 Resistor fixed, film, 680 ohms,  $\frac{1}{4}$ W, 2%, RL07S680G.

Insert: 1A2R1 Resistor fixed, film, 68 ohms,  $\frac{1}{4}$ W, 2%, RL07S680G.

Page 6-7

Delete: 1A1OR1 Resistor fixed, film, 59 ohms,  $\frac{1}{4}$ W, 1%, RN60D59ROF.

Insert: 1A1OR1 Resistor fixed, film, 59 ohms,  $\frac{1}{4}$ W, 1%, RN60D59ROF.

Delete: 1A1OR2 Resistor fixed, film, 8.2K,  $\frac{1}{4}$ W, 2%, RL07S822G.

Insert: 1A1OR2 Resistor fixed, film, 8.2K,  $\frac{1}{4}$ W, 2%, RL07S822G.

Page 6-8

Delete: 1A1OR12 Resistor fixed, film, 59.0 ohms,  $\frac{1}{4}$ W, 1%, RN60D59ROF.

Insert: 1A1OR12 Resistor fixed, film, 52.3 ohms,  $\frac{1}{4}$ W, 1%, RN60D52R3F.

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## SECTION 1

# GENERAL DESCRIPTION

### 1-1 FUNCTIONAL DESCRIPTION

(1) The Eight Input Multiantenna Coupler, Model MAC-1 (Figure 1-1) is a broadband coupling unit, used for coupling from one to eight antennas to a single receiver. The coupler will provide a nominal 2db gain from any antenna to the receiver, with a wide dynamic range and low noise characteristic over the frequency range from 2MHz to 32MHz. The equipment has been designed to provide excellent isolation from antenna to antenna and from the receiver to each antenna. The Multiantenna Coupler is a solid state, transistor-type design.

(2) The multiantenna coupler consists of eight input preamplifiers, one output buffer amplifier and a regulated power supply. The eight input preamplifiers are connected to the output amplifier through a signal combining transformer.

(3) The input and output characteristic impedance is 75 ohms with a VSWR better than 1.5 to 1. Phase correlation of input signals appearing at the output is kept within 2 degrees over the range 2MHz to 32MHz.

### 1-2 PHYSICAL DESCRIPTION

(1) The MAC-1 is designed for mounting in a standard 19-inch rack. The operating controls are located on the front panel. The eight input connectors, output connector and power supply socket are mounted on the rear panel. The amplifiers and power supply regulator are mounted on printed circuit boards which are in turn bolted to the coupler chassis. Other components are mounted separately to the chassis.

(2) A list of semiconductors used in the MAC-1 are listed in Table 1-1.

Table 1-1 SEMICONDUCTOR AND INTEGRATED CIRCUIT COMPLEMENT

Reference Symbol	Type	Function
Power Supply		
1Z1	NW10005	Rectifier Bridge
1A1CR1	1N758	Bias Regulator
1A1CR2	1N252	Bias Regulator
1A1Q1	TX10001	Current Regulator
1A1Q2	2N5086	Voltage Regulator
1Q1	2N3055	Voltage Regulator
Preamplifiers (1A2 to 1A9)		
1A2CR1	1N456A	Temp. Compensator
1A2CR2	1N456A	Temp. Compensator
1A2Q1	2N5160	Buffer
1A2Q2	2N5160	Current Amplifier
1A2Q3	2N3866	Current Amplifier

Table 1-1 SEMICONDUCTOR AND INTEGRATED CIRCUIT COMPLEMENT (Con't)

Reference Symbol	Type	Function
Output Buffer Amplifier (1A10)		
1A10CR1	1N456A	Temp. Compensator
1A10CR2	1N456A	Temp. Compensator
1A10Q1	2N5160	Buffer
1A10Q2	2N5160	Current Amplifier
1A10Q3	2N3866	Current Amplifier

1-3 EQUIPMENT SUPPLIED

(1) The following table is a list of ancillary items supplied with each MAC-1.

Table 1-2 LOOSE ITEMS SUPPLIED, MAC-1

Name	Designation	Function	Qty
Power Cable Assembly	CA1-5-5	Connections to power connector 1J10	1
Technical Manual	1N8033	Instructions for operating and maintenance of MAC-1	1

1-4 TECHNICAL SPECIFICATIONS

Number of Inputs: Eight

Frequency Range: 2 MHz to 32 MHz

Input and output impedance: 75 ohms with a VSWR better than 1.5:1

Insertion gain: 2 db±0.5

Desensitization: 100 uV signal is compressed by 3dB maximum when a 7 V peak-to-peak signal between 2 to 6 MHz is applied at the same time.

Noise figure: 7 dB maximum.

Intermodulation: With two 0.5 volts rms input signals, into 75 ohms  
 2nd order products, -65 dB 2 to 32 MHz.  
 3rd order products, -65 dB 2 to 32 MHz.

Isolation: -40 dB minimum, input to input.  
 -55 dB minimum, output to input.

Phase correlation between inputs: ±2 degrees between any two inputs.

## SECTION 2

# INSTALLATION

### 2-1 INITIAL INSPECTION

(1) Each MAC-1 coupler is thoroughly tested and adjusted at the factory before being shipped. Upon receipt of the unit, check the packing case and its contents for possible damage. Unpack the equipment carefully taking care also to check the packing material for parts shipped as loose items. (See Table 1-2). With respect to damaged equipment for which the carrier is liable, TMC (Canada) Limited will assist in describing methods of repair as well as furnishing of replacement parts.

### 2-2 POWER REQUIREMENTS & ELECTRICAL INSTALLATION

(1) The MAC-1 operates from a 115 volt ac, 50 to 60 Hz power source. The input is protected by two 0.5 amp fuses, one on each side of the line.

(2) The following external connections must be made to the MAC-1:

(a) Antennas: The antenna cables, fitted with BNC connectors, are connected to the ANTENNA INPUT jacks J1 to J8 on the rear

panel of the MAC-1.

(b) Power: Connect primary power to the unit by plugging the supplied power cable assembly into connector J10 (POWER INPUT) on the rear panel, ensuring that the notch on the cable lines up with the pin at the top of J10.

(c) Output: Connect the output to the associated receiver via the BNC connector, J9 on the rear panel.

(3) All MAC-1 equipment should be located in such a way that sufficient clearance is obtained at the rear of the unit for making connections to the BNC connectors. The front panel controls should be within easy reach of an operator. The solid state design of the MAC-1 eliminates heat problems, allowing the installation of several coupler units one above the other in a rack.

### 2-3 PERFORMANCE CHECK

(1) When the MAC-1 has been installed and appropriate power connections have been made, turn POWER switch to the ON position. The POWER lamp with light, indicating that the MAC-1 coupler is ready for use.

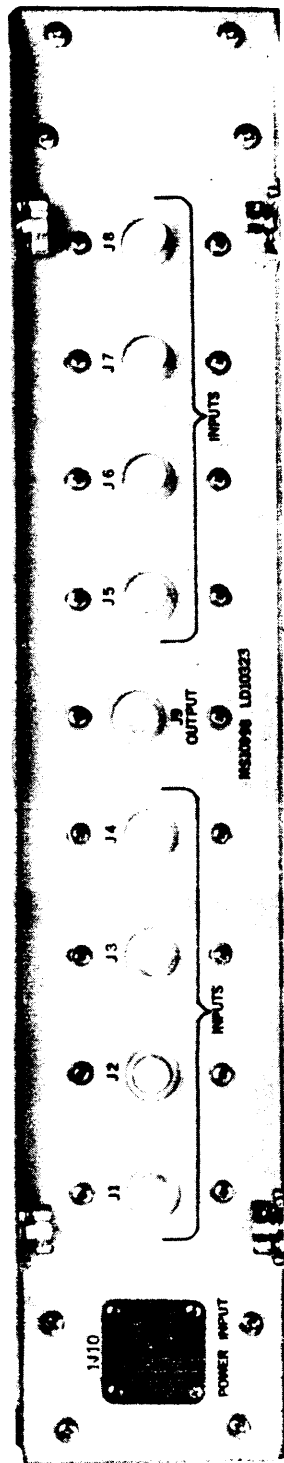


Figure 2-1 Rear Panel,MAC-1

## SECTION 3

# OPERATION

### 3-1 GENERAL

(1) Controls: Table 3-1 contains a list of the operating, indicators and fuse holders on the front panel of the MAC-1.

(2) Procedures: After connecting antennas, receiver and power supply, and turning on the POWER switch, no operating procedures are required for the MAC-1. The unit is now fully operational without further adjustment.

Table 3-1 CONTROLS AND INDICATORS, MAC-1

Item	Description
Power ON/OFF switch 1S1	Controls primary power to MAC-1.
POWER lamp 1DS1	Lights when primary power is connected to the MAC-1 and switch 1S1 is turned on.
Fuse holders for 1F1 and 1F2	Failure of a fuse is indicated by illumination of the fuseholder
SPARE fuses	Two spare fuses are contained in the spare fuseholders which are located on the front panel.

## SECTION 4

# PRINCIPLES OF OPERATION

### 4-1 GENERAL

(1) The Eight Input Multiantenna Coupler is a broadband antenna combining system, designed to couple from one to eight antennas to a single high-frequency communications receiver. The multi-coupler thereby permits the use of a receiver with a number of antennas for such purposes as space diversity, frequency diversity, polarization diversity of one of the several forms of steerable antennas.

(2) Both the input and output impedance of the MAC-1 coupler are nominally 75 ohms, with a voltage standing-wave ratio characteristic better than 1.5 to 1 over the frequency range of 2MHz to 32 MHz.

(3) The MAC-1 coupler provides a nominal insertion gain of 2 decibels from each antenna input to the connected receiver. The coupler is designed to ensure a minimum of noise generation, and to provide a high degree of intermodulation rejection and isolation between input antennas. The rejection and isolation figures are stated in Paragraph 1-4 for this equipment.

(4) The MAC-1 multicoupler consists of four major sections, as shown in Figure 4-1, System Block Diagram, MAC-1, and as described in the following paragraphs. These sections consist of the eight preamplifier printed wiring board assemblies, (1A2 to 1A9), the output buffer amplifier assembly (1A10), the power combiner (1T2) and the regulated power supply.

### 4-2 PREAMPLIFIERS

(1) The eight preamplifier printed circuit boards, 1A2 to 1A9, are identical, wideband, negative feedback amplifier circuits. Each antenna input is resistance-capacity coupled to the preamplifier, with an input impedance

of 75 ohms. The input signals are applied to the voltage amplifier Q1, followed by a complementary symmetrical push-pull amplifier circuit consisting of Q2 and Q3. Diodes CR1 and CR2 in the biasing circuit have been selected to provide temperature compensation for stabilized operation of the push-pull amplifier stage. Feedback is provided by R6 and C6, providing attenuation of the intermodulation products and improved gain stability in the preamplifier circuit. The preamplifier output is obtained through the dc blocking capacitor C12, and the rf signals are fed through coaxial cables to the power combining transformer 1T2.

### 4-3 OUTPUT BUFFER AMPLIFIER

(1) The power combining transformer output is connected with a coaxial cable to the output amplifier, 1A3. This amplifier is similar to the preamplifiers, with the exception of the input resistor, R1, the feedback circuit R6, C10, C6, and modification to the output to provide 75 ohms nominal impedance to the receiver through C13 and R12. The overall insertion gain from the antenna input to the coupler output is  $2\text{db} \pm 0.5$  over the 2MHz to 32 MHz frequency range.

### 4-4 POWER SUPPLY AND REGULATOR

(1) The components comprising the power supply are all chassis mounted except for the regulator circuit which is mounted on printed circuit assembly 1A1. The latter is described in 4-4, paragraphs (3) and (4).

(2) Primary power is supplied through two ac line RF filters (1FL1 and 1FL2) to the ON/OFF switch 1S1. When 1S1 is in the ON position, power is supplied through the two fuses 1F1 and 1F2 to the power transformer 1T1, and also to the front panel indicator lamp 1DS1. The secondary of transformer

1T1 produces 27 vac which is rectified by bridge rectifier 1Z1, and filtered by capacitor 1C1.

(3) The regulator board and transistor 1Q1 provide the voltage and current regulation required for the -27v supply. All components in this section, with the exception of transistor 1Q1, are mounted on printed circuit assembly 1A1. Potentiometer 1A1R7 is

used to set up the initial -27v required by the MAC-1 (see 5-5, Adjustments).

(4) The transistor 1A1Q2 and diode pair 1A1CR1 and 1A1CR2 form a voltage reference circuit (sensitive to temperature and load changes) which in turn control Darlington-connected transistors 1A1Q1 and 1Q1, providing the necessary voltage and current regulation for the power supply, including short-circuit protection.

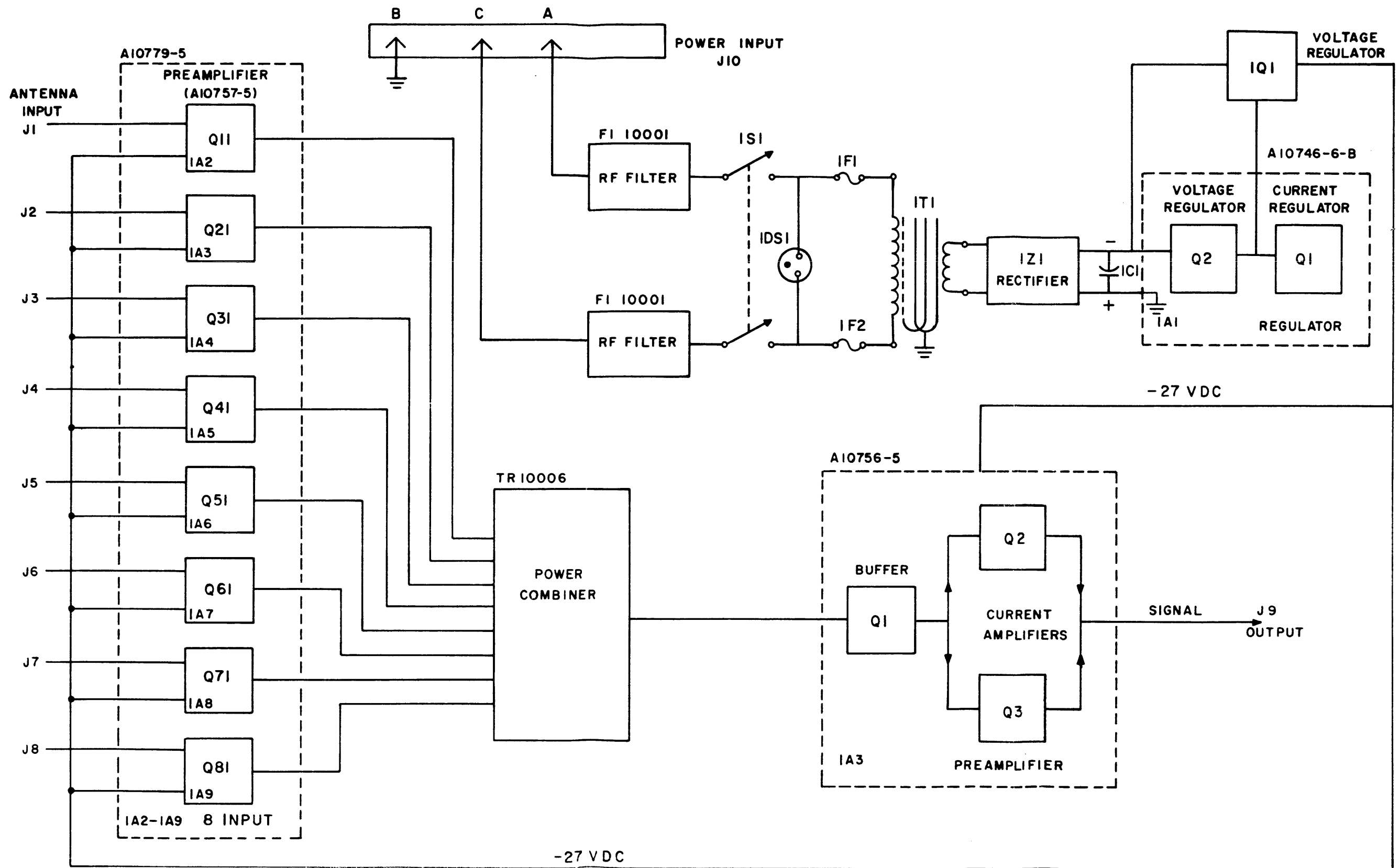


Figure 4-1 System Block Diagram, MAC-1



## SECTION 5

# MAINTENANCE

### 5-1 GENERAL

(1) This section describes the preventive maintenance, trouble-shooting and repair procedures for the MAC-1. The following equipment is suggested in order to perform these procedures properly:

- (a) RF Signal Generator, Hewlett Packard Model 606A, or equivalent.
- (b) Oscilloscope, Tektronix Model 545 or equivalent.
- (c) Standard Volt-ohmmeter.

(2) For aid in the location of components, refer to Figures 5-1 to 5-4 inclusive.

### 5-2 PREVENTIVE MAINTENANCE

(1) Preventive maintenance for the MAC-1 consists of routine functions such as visual inspection and cleaning. Periodic cleaning is recommended as dust may build up on components, reducing the efficiency of the coupler unit and may possibly cause circuit failure. To facilitate cleaning the unit, use a vacuum cleaner or a low-pressure filtered compressed air supply.

(2) A simple visual check of the unit when it is opened up for servicing or cleaning will often reveal potential trouble and hence reduce downtime due to component failure. Signs of trouble may be found in discoloration, warped printed circuit boards and damaged wiring or cables. Any deteriorating component should be replaced immediately. All hardware should be checked for tightness during preventive maintenance inspections.

### 5-3 TROUBLESHOOTING

(1) During operation of the MAC-1, the following failure symptoms may be observed:

1. No signal output from the receiver.
2. Weak or noisy signals at the receiver output.
3. Apparent failure of one or more of the diversity modes of reception.

(2) The primary objective of the troubleshooting procedures is to localize the fault to a particular section of the coupler unit. Table 5-1 provides a guide to location and correction of the possible failures.

Table 5-1 TROUBLESHOOTING PROCEDURES

SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
1. No signal output from the receiver.	<ul style="list-style-type: none"> <li>(a) Receiver failure.</li> <li>(b) Interconnection, coupler to receiver.</li> </ul>	<ul style="list-style-type: none"> <li>(a) Refer to receiver manual.</li> <li>(b) Check rf cable between the coupler and receiver.</li> </ul>

Table 5-1 TROUBLESHOOTING PROCEDURES (Cont'd)

SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
	(c) Power supply failure in the coupler.	(c) If POWER ON lamp 1DS1 is not illuminated, check for power input failure or defective input filter 1FL1 and 1FL2. If POWER ON lamp is on, check fuses 1F1, 1F2 and replace with spare if necessary. If both fuses are intact, proceed to check transformer 1T1, bridge rectifier 1Z1 and the voltage regulator 1A1. -27 vdc should be available at terminal 6 of the regulator board.
	(d) Output buffer amplifier failure.	(d) If dc voltage is present at the output of the regulator and at the output buffer amplifier, possible failure of a component in the output amplifier is indicated. Removal, testing and repair of the module 1A10 will be necessary.
	(d) Power combiner failure.	(e) If the output buffer amplifier is found to be serviceable, failure of the interconnection cable to the power combiner 1T2, the power combiner unit, or a short circuit in a preamplifier connection to the power combiner should be investigated and corrected.
2. Weak or noisy signals at the receiver output.	(a) Receiver noise.	(a) Refer to receiver manual.
	(b) Interconnection, coupler to receiver.	(b) Check the rf cable between coupler and receiver.
	(c) Amplifier defect in the coupler.	(c) Using the rf signal generator and the oscilloscope, test for gain & noise generation between the input jack of each preamplifier and the output buffer amplifier receiver connect-

Table 5-1 TROUBLESHOOTING PROCEDURES (Cont'd)

SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
<p>3. Apparent failure of one or more input modes.</p>	<p>(a) Preamplifier defect in the coupler.</p> <p>(b) Power combiner defect.</p>	<p>ion. If signal attenuation or noise appears on all inputs, check for defective components in the output amplifier, or a defect between the power combiner and the output amplifier. If attenuation or noise appears on only one input, check for a defect in the associated input amplifier or interconnection to the power combiner. If no abnormal attenuation or noise generation is found in the receiver or coupler, check for antenna or antenna cable defects.</p> <p>(a) Using the rf signal generator and oscilloscope, test for a defective preamplifier in the associated antenna circuit.</p> <p>(b) If the preamplifier is found to be serviceable, test for continuity of the rf signal through the power combiner.</p>

#### 5-4 REPAIR

(1) Repair work generally consists of the replacement of the defective component. The following cautions should be observed:

- (a) Ensure replacement of a component with an exact duplicate. This is particularly important in the amplifier modules.
- (b) Place any new component in the

same location as the part it replaces. The dressing of wire runs should not be altered.

- (c) Observe standard practice when replacing semiconductor components, using a low wattage soldering iron and heat sink tools.
- (d) Avoid damage to the printed circuitry when handling or repairing amplifier and regulator modules.

## 5-5 ADJUSTMENTS

(1) Only one adjustment is required in the MAC-1 multiantenna coupler:

- (a) Power Supply Regulator 1A1: a screwdriver - adjustable potentiometer, R7, has been factory-set to provide -27vdc. If the output volt-

age is found to require adjustment, use an accurate voltmeter and set to -27vdc by clockwise (lowering) or anticlockwise (raising) rotation of the potentiometer control.

- (2) The amplifiers do not require any adjustment, as all components are of fixed values.

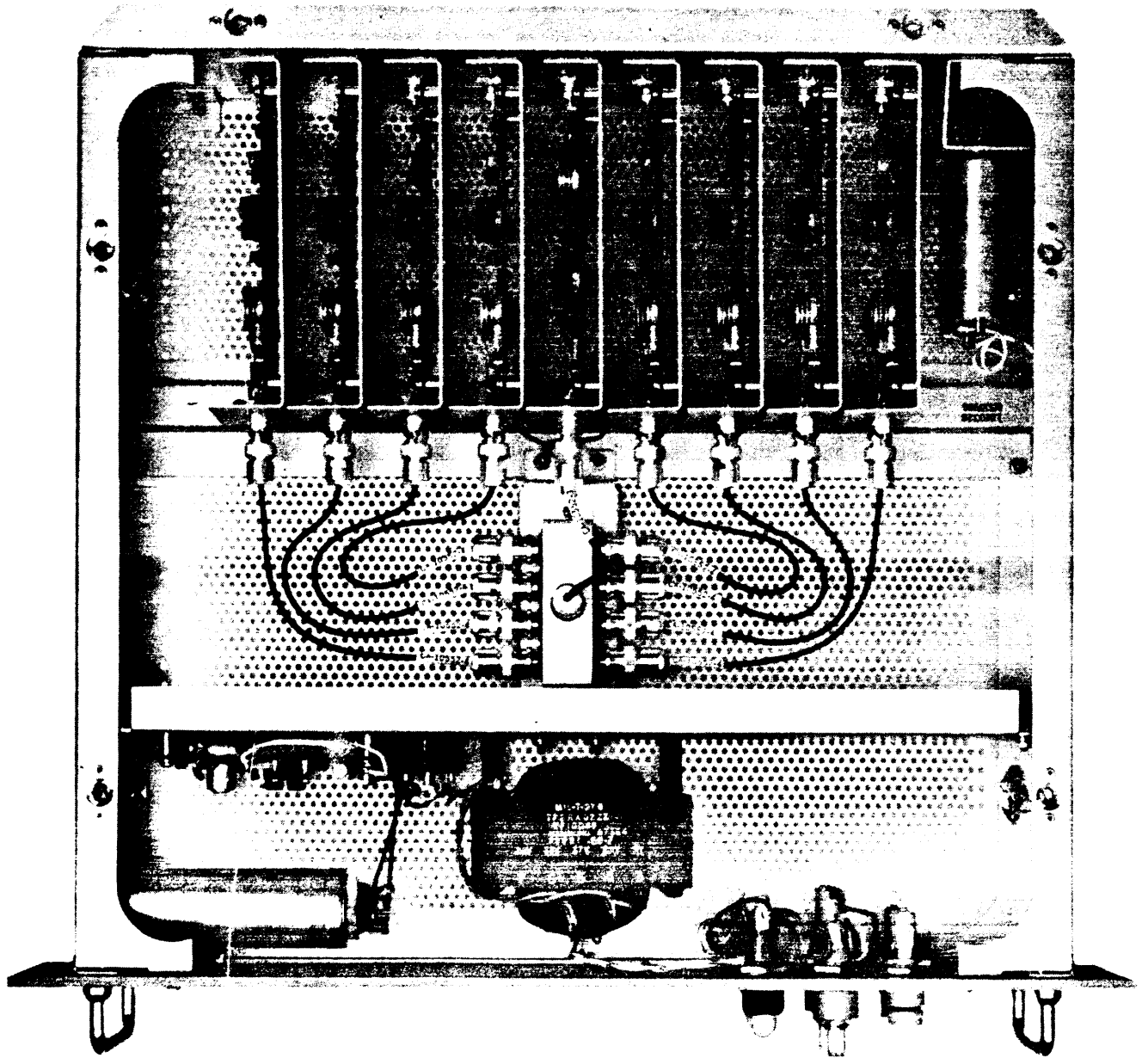


Figure 5-1 Top View With Cover Off, MAC-1

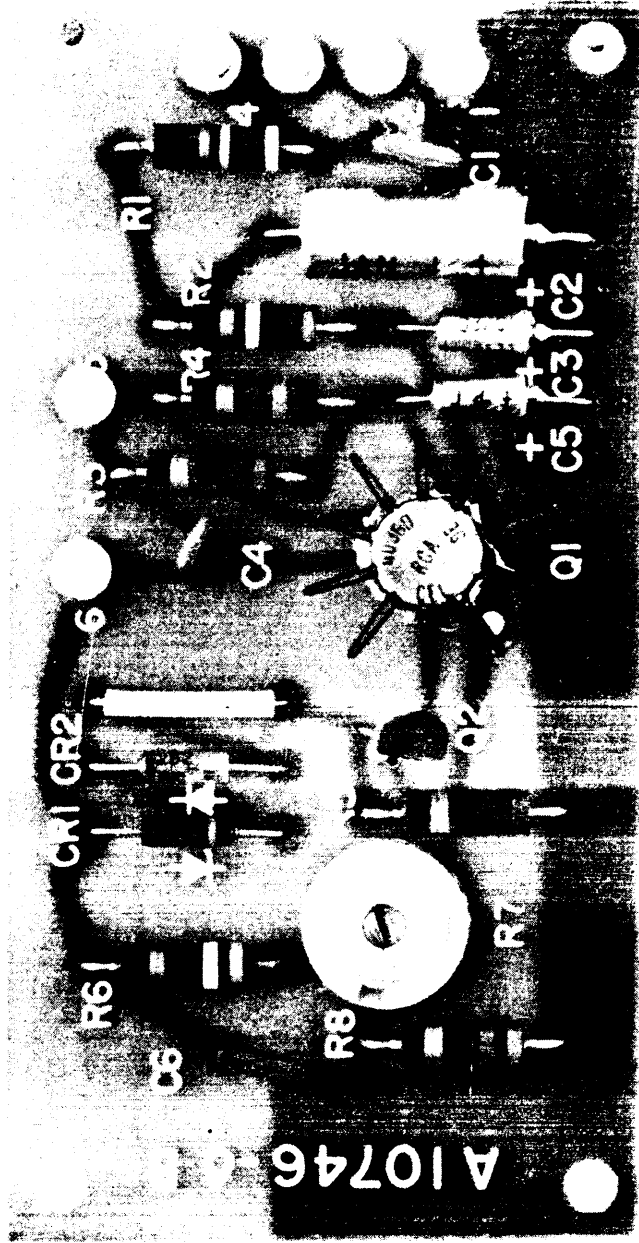


Figure 5-2 Power Supply (Regulator) Assembly 1A1



Figure 5-3 Input Preamplifier Assemblies 1A2 through 1A9

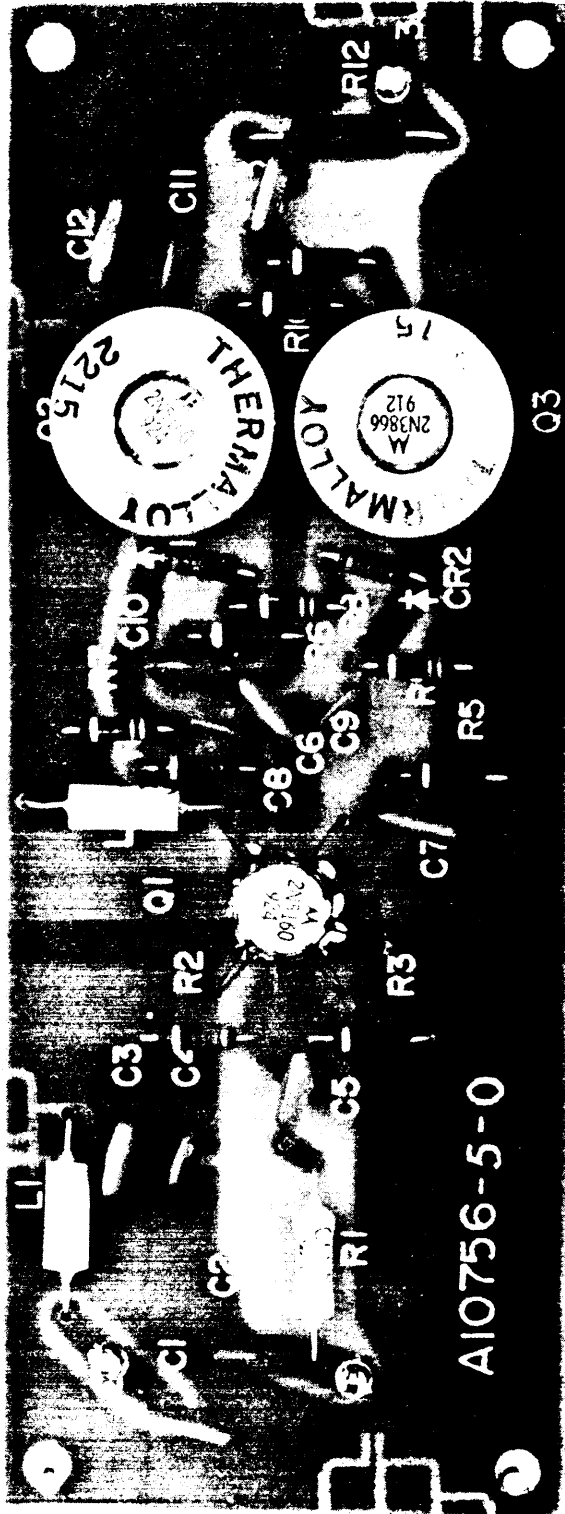


Figure 5-4 Output Amplifier Assembly 1A10



## SECTION 6

# PARTS LIST

### 6-1 INTRODUCTION

(1) Reference symbols have been assigned to identify all electrical parts. These symbols are marked on the equipment adjacent to the parts that they identify and are included on all drawings, diagrams and part lists. The letters of a reference symbol indicate the generic group of the part, such as capacitor, resistor, transistor etc. The numeral identifies parts of the same generic group. Sockets associated with any particular plug-in device, such as a transistor or fuse, are identified by a reference symbol which incorporates the symbol used for that device as well as a prefix symbol.

(2) Prefix symbols have also been assigned to each separate printed circuit board assembly (1A1, 1A2 etc).

(3) To expedite delivery when ordering replacement parts, specify the TMC part number and the name and model number of the equipment.

### 6-2 NOTE

(1) Re RF Cable Assemblies CA1-552-3 and CA10552-4.

(a) The RF cable assemblies are coaxial cables having a male connector at each end.

MAIN CHASSIS, FRONT AND REAR PANELS

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
1A1	PRINTED CIRCUIT ASSEMBLY: Regulator	A10746-6
1A2	PRINTED CIRCUIT ASSEMBLY: Preamplifiers	A10779-5
1A3	SAME AS 1A2	
1A4	SAME AS 1A2	
1A5	SAME AS 1A2	
1A6	SAME AS 1A2	
1A7	SAME AS 1A2	
1A8	SAME AS 1A2	
1A9	SAME AS 1A2	
1A10	PRINTED CIRCUIT ASSEMBLY: Output Buffer Amplifier	1A10756-5
1CA	CABLE: RF, coaxial with connectors	CA10552-4
1CB	CABLE: RF, coaxial with connectors	CA10552-4
1CC	CABLE: RF, coaxial with connectors	CA1-552-4
1CD	CABLE: RF, coaxial with connectors	CA10552-4
1CE	CABLE: RF, coaxial with connectors	CA10552-4
1CF	CABLE: RF, coaxial with connectors	CA10552-4
1CG	CABLE: RF, coaxial with connectors	CA10552-4
1CH	CABLE: RF, coaxial with connectors	CA10552-4
ICJ	CABLE: RF, coaxial with connectors	CA10552-3
IC1	CAPACITOR: Electrolytic, 2200 uf	CE44C222G
1DS1	LAMP: Neon	BI100-51
1F1	FUSE: Slo-blo, 0.5 amp	FU102-.5

MAIN CHASSIS, FRONT AND REAR PANELS (Cont'd)

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
1F2	SAME AS 1F1	
1FL1	FILTER: RF, line	FI 10001
1FL2	SAME AS 1FL1	
J10	CONNECTOR: Receptacle, male	MS3102A-14S-7P
1S1	SWITCH: Toggle	ST22K
1T1	TRANSFORMER: Power	TF10049
1T2	POWER COMBINER	TR10006
1Q1	TRANSISTOR: NPN	2N3055
1Z1	NETWORK: Rectifier, diode bridge	NW10007
1XDS1	HOLDER: Lamp	LH77/1LC19CN
1XF1	HOLDER: Fuse	FHL17G1
1XF2	SAME AS 1XF1	
1XF1S	HOLDER: Spare fuse	FHN26G1
1XF2S	SAME AS 1XF1S	
1XQ1	SOCKET: Transistor	TS166-1

POWER SUPPLY (REGULATOR) ASSEMBLY 1A1

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
1A1C1	CAPACITOR: Fixed, ceramic, 0.1 uf	CC10015-X5V104M
1A1C2	CAPACITOR: Fixed, tantalum, 6.8 uf	CSR13G685ML
1A1C3	CAPACITOR: Fixed, tantalum, 0.47 uf	CSR13G474ML
1A1C4	CAPACITOR: Fixed, ceramic, 0.01 uf	CC10017-X5V103M
1A1C5	SAME AS 1A1C3	
1A1C6	SAME AS 1A1C1	
1A1CR1	DIODE: Zener	1N758A
1A1CR2	DIODE:	1N252
1A1R1	RESISTOR: Fixed, composition, 47K, 1/2 w, 5%	RC20GF473J
1A1R2	RESISTOR: Fixed, composition, 68K, 1/2 w, 5%	RC20GF683J
1A1R3	RESISTOR: Fixed, composition, 15 ohms, 1/2 w, 5%	RC20GF150J
1A1R4	RESISTOR: Fixed, composition, 560 ohms, 1/2 w, 5%	RC20GF561J
1A1R5	RESISTOR: Fixed, composition, 1.2K, 1/2 w, 5%	RC20GF122J
1A1R6	RESISTOR: Fixed, composition, 3.9K, 1/2 w, 5%	RC20GF392J
1A1R7	RESISTOR: Variable, composition, 1K, linear	RV111U102A
1A1R8	RESISTOR: Fixed, composition, 6.8K, 1/2 w, 5%	RC20GF682J
1A1Q1	TRANSISTOR: NPN, Silicon	TX10001
1A1Q2	TRANSISTOR: PNP, Silicon	2N5086

PREAMPLIFIER ASSEMBLY 1A2 THROUGH 1A9

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
	NOTE: The following components are common to all units 1A2 to 1A9 inclusive.	
1A2C1	CAPACITOR: Fixed, ceramic 0.1 uf	CC10015-X5V-104M
1A2C2	CAPACITOR: Fixed, mica 22 uuf, 2%	CM04ED220J03
1A2C3	SAME AS 1A2C2	
1A2C4	CAPACITOR: Fixed, ceramic, 0.01 uf	CC10017-X5V-103M
1A2C5	SAME AS 1A2C1	
1A2C6	SAME AS 1A2C1	
1A2C7	SAME AS 1A2C1	
1A2C8	SAME AS 1A2C4	
1A2C9	SAME AS 1A2C4	
1A2C10	SAME AS 1A2C1	
1A2C11	SAME AS 1A2C1	
1A2C12	SAME AS 1A2C4	
1A2CR1	DIODE:	1N456A
1A2CR2	SAME AS 1A2CR1	
1A2J1	CONNECTOR: BNC, receptacle	UG625B/U
1A2J11	SAME AS 1A2J1	
1A2R1	RESISTOR: Fixed, film 680 ohms, 1/4 w, 2%	RL07S680G
1A2R2	RESISTOR: Fixed, film 8.2 K, 1/4 w, 2%	RL07S822G
1A2R3	RESISTOR: Fixed, film 1K, 1/4 w, 2%	RL07S102G
1A2R4	RESISTOR: Fixed, film 620 ohms, 1/4 w, 2%	RL07S621G
1A2R5	RESISTOR: Fixed, film 100 ohms, 1/4 w, 2%	RL07S101G
1A2R6	RESISTOR: Fixed, film 180 ohms, 1/4 w, 2%	RL07S181G

PREAMPLIFIER ASSEMBLY 1A2 THROUGH 1A9

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
1A2R7	RESISTOR: fixed, film 3.3K, 1/4w, 2%	RL07S332G
1A2R8	RESISTOR: fixed, film 330 ohms, 1/4 w, 2%	RL07S331G
1A2R9	SAME AS 1A2R7	
1A2R10	RESISTOR: Fixed, film 100 ohms, 1/4 w, 2%	RL07S100G
1A2R11	SAME AS 1A2R10	
1A2L1	INDUCTOR: RF coil, 33 uh	CL275-330
1A2L2	INDUCTOR: RF coil, 3.3 uh	CL275-3R3
1A2Q1	TRANSISTOR: PNP	2N5160
1A2Q2	SAME AS 1A2Q1	
1A2Q3	TRANSISTOR: NPN	2N3866
<p style="text-align: center;">NOTE</p> <p>Input Amplifiers 1A3 through 1A9 are identical to assembly 1A2 with the exception of the BNC connectors Part #UG625B/U which are designated 1A3J2, 1A3J12, 1A4J3, 1A4J13, etc.</p>		

OUTPUT BUFFER AMPLIFIER ASSEMBLY 1A10

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
1A10C1	CAPACITOR: Fixed, ceramic 0.1 uf	CC10015-X5V104M
1A10C2	CAPACITOR: Fixed, mica 22 uuf	CM04ED220J03
1A10C3	SAME AS 1A10C1	
1A10C4	SAME AS 1A10C1	
1A10C5	SAME AS 1A10C1	
1A10C6	SAME AS 1A10C1	
1A10C7	SAME AS 1A10C1	
1A10C8	CAPACITOR: Fixed, ceramic .01 uf	CC10017-X5V-103M
1A10C9	SAME AS 1A10C3	
1A10C10	CAPACITOR: Fixed, mica 5uuf	CM04CD050D03
1A10C11	SAME AS 1A10C8	
1A10C12	SAME AS 1A10C1	
1A10J9	CONNECTOR: BNC, receptacle	UG625B/U
1A10J19	SAME AS 1A10J9	
1A10L1	INDUCTOR: RF coil, 33 MH	CL275-330
1A10L2	INDUCTOR: RF coil, 3.3 MH	CL275-3R3
1A10R1	RESISTOR: Fixed, cilm 59 ohms, 1/4 w, 1%	RN60D59ROF
1A10R2	RESISTOR: Fixed, cilm 8.2K, 1.4 w, 2%	RL07S822G
1A10R3	RESISTOR: Fixed, film 1K, 1/4 w, 2%	RL07S102G
1A10R4	RESISTOR: Fixed, film 620 ohms, 1/4 w, 2%	RL07S621G
1A10R5	RESISTOR: Fixed, film 100 ohms, 1/4 w, 2%	RL07S101G
1A10R6	RESISTOR: Fixed, film 150 ohms, 1/4 w, 2%	RL07S151G
1A10R7	RESISTOR: Fixed, film 3.3K, 1/4 w, 2%	RL07S332G

OUTPUT BUFFER AMPLIFIER ASSEMBLY 1A10 (Cont'd)

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
1A10R8	RESISTOR: Fixed, film 300 ohms, 1.4 w, 2%	RL07S301G
1A10R7	SAME AS 1A10R7	
1A10R10	RESISTOR: Fixed, film 10 ohms, 1/4 w, 2%	RL07S100G
1A10R11	SAME AS 1A10R10	
1A10R12	RESISTOR: Fixed, film 59.0 ohms, 1/4 w, 1%	RN60D59ROF
1A10Q1	TRANSISTOR: PNP	2N5160
1A10Q2	SAME AS 1A10Q1	
1A10Q3	TRANSISTOR: NPN	2N3866
1A10CR1	DIODE:	1N456A
1A10CR2	SAME AS 1A10CR1	



**SECTION 7**

**SCHEMATIC DIAGRAM**

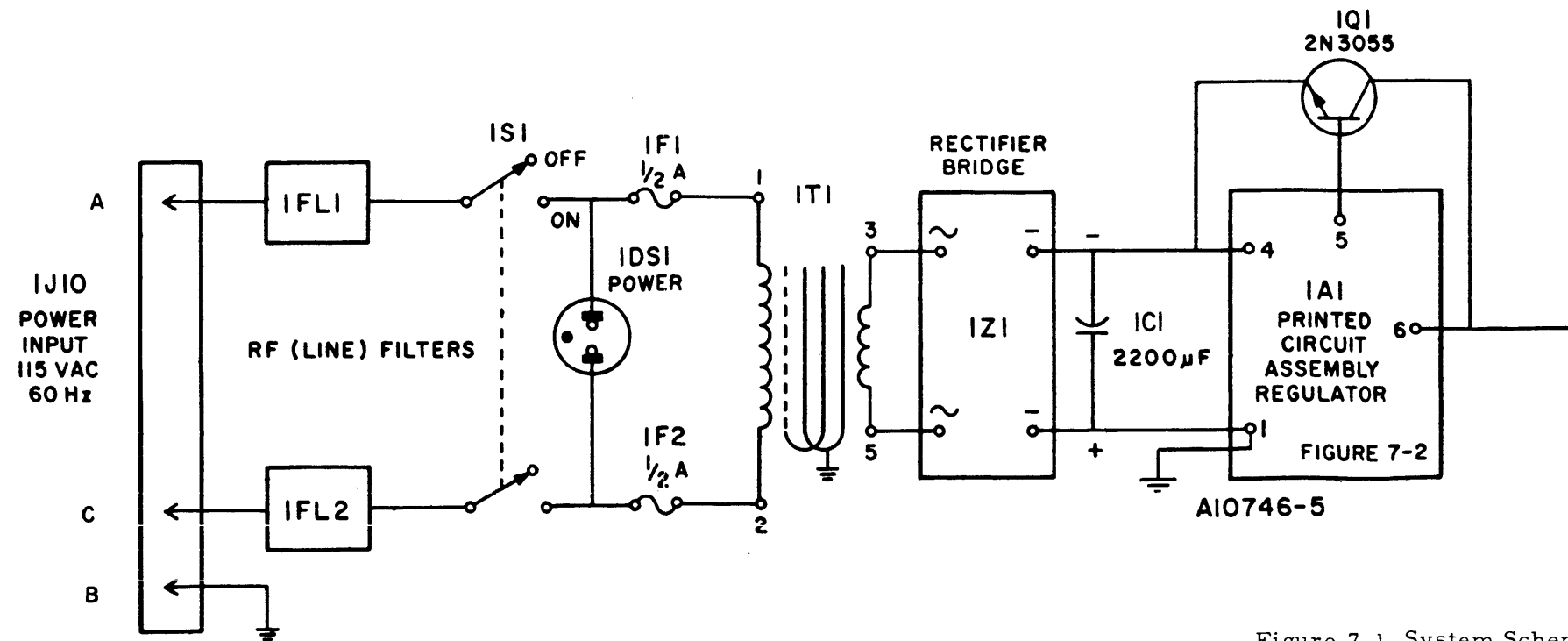
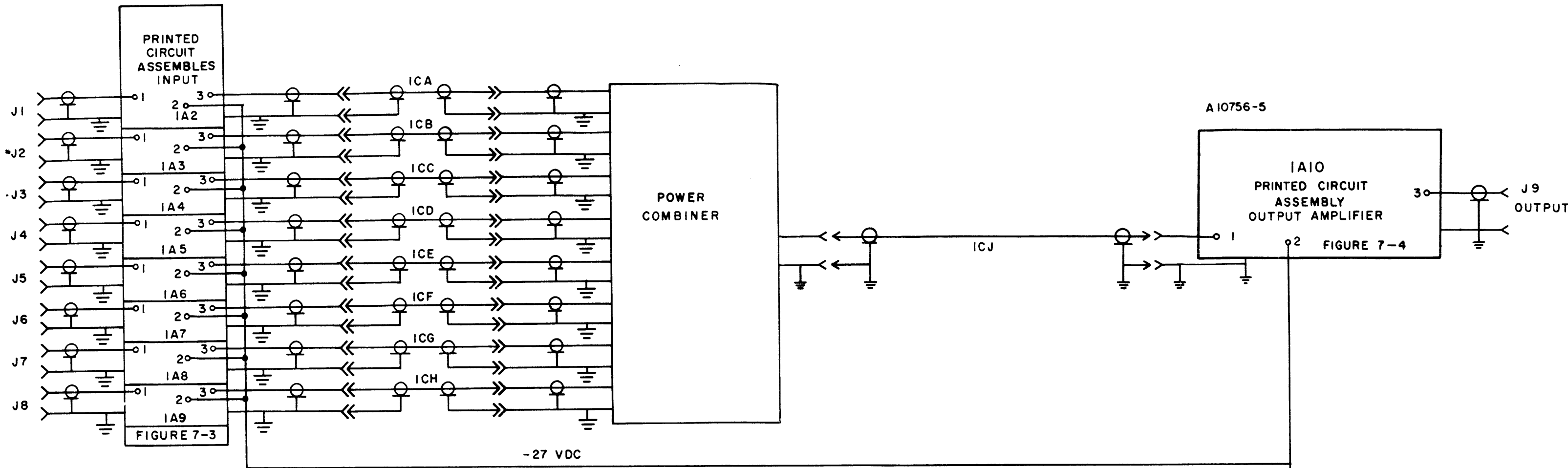


Figure 7-1 System Schematic, MAC-1



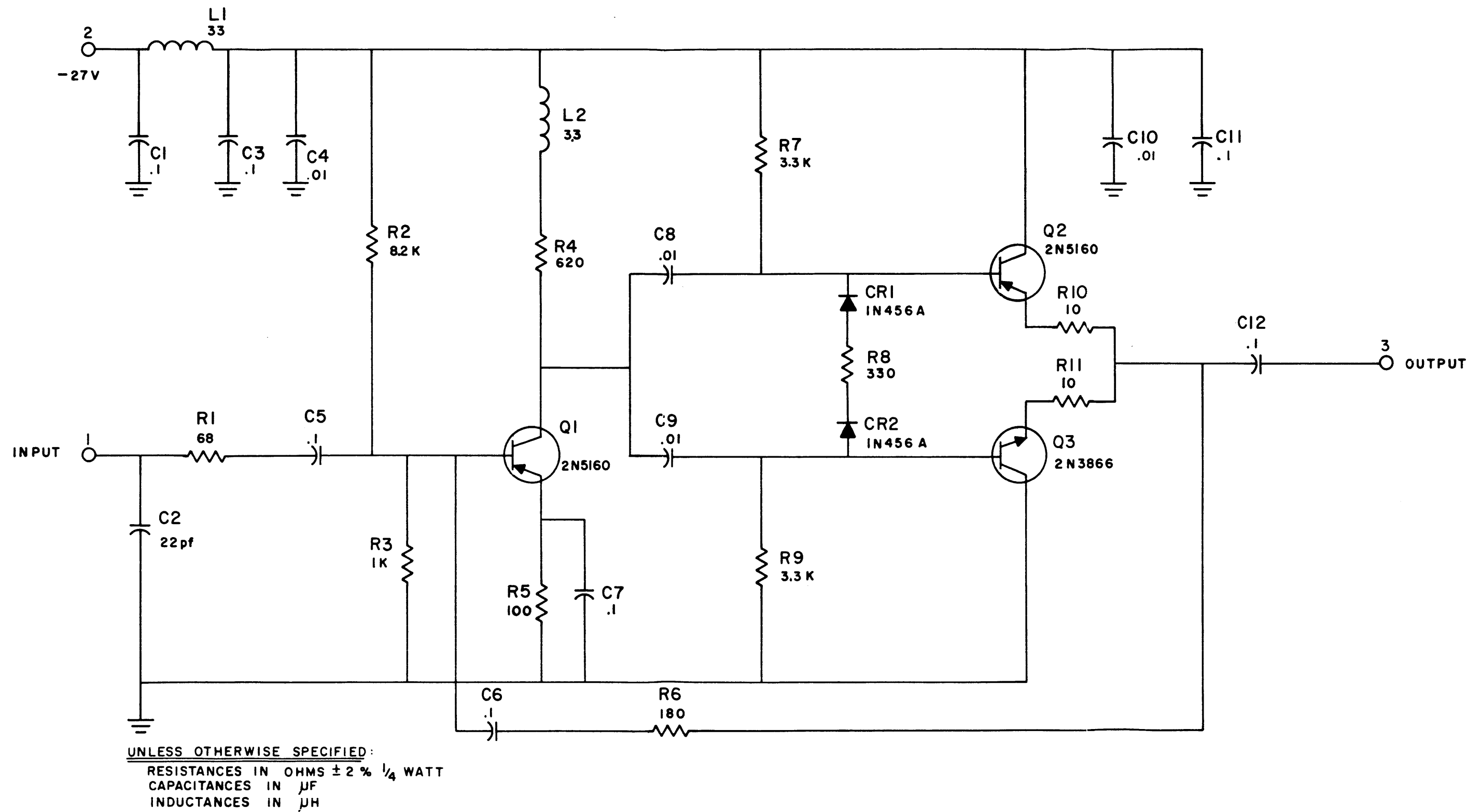


Figure 7-3 Preamplifier Schematic (1A2 through 1A9)

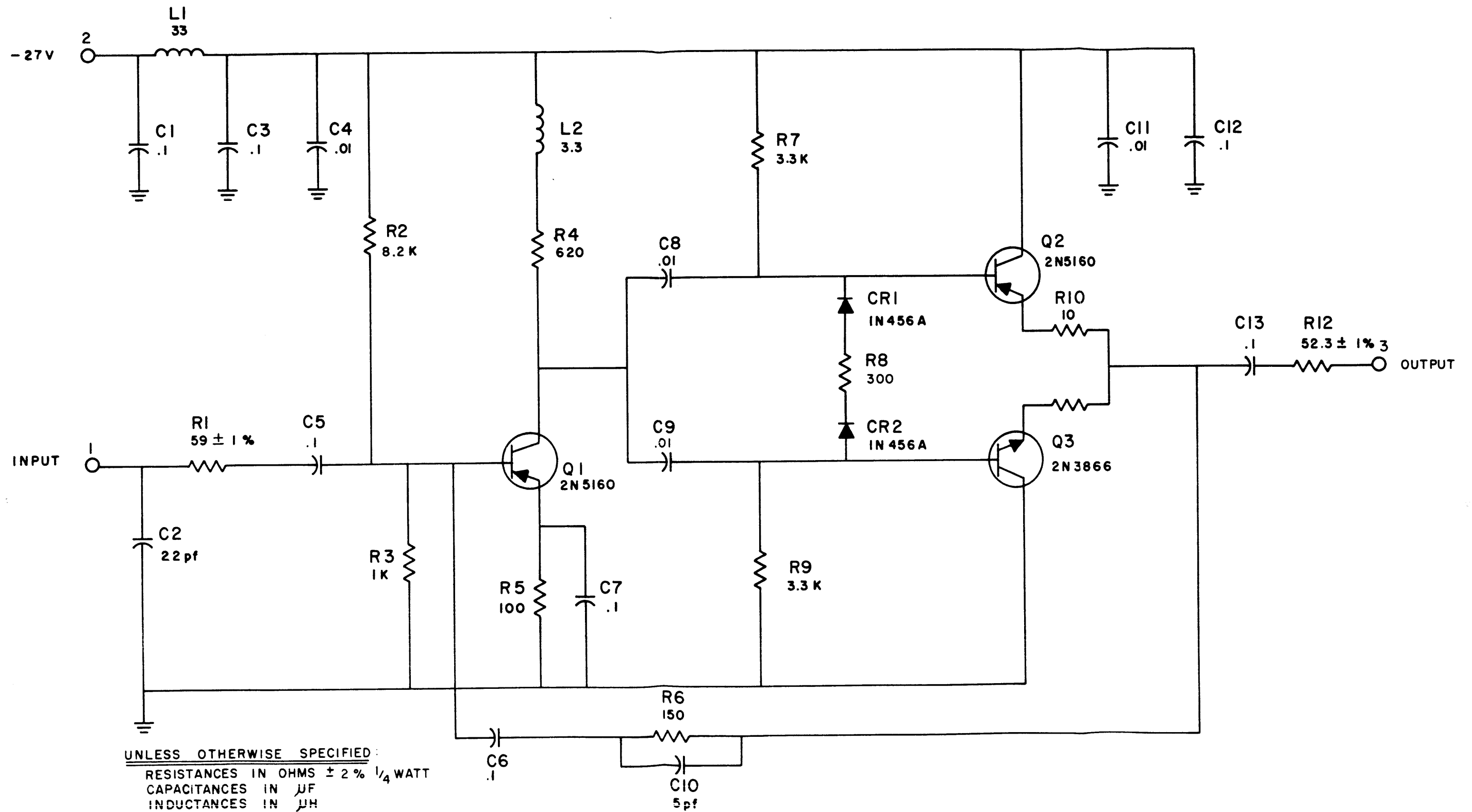


Figure 7-4 Output Amplifier Schematic (1A10)