TA-1A

DISTRIBUTION AMPLIFIER

MI-26155

RADIO CORPORATION OF AMERICA
ENGINEERING PRODUCTS DEPARTMENT CAMDEN, N. J.

IB-36009-2

TYPE TA-1A
DISTRIBUTION AMPLIFIER
MI-26155

INSTRUCTIONS

Manufactured by
RADIO CORPORATION OF AMERICA
ENGINEERING PRODUCTS DEPARTMENT
Camden, N. J., U. S. A.

Printed in U. S. A.

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Figure 1—Distribution Amplifier, Front View

TECHNICAL SUMMARY

ELECTRICAL CHARACTERISTICS

Frequency Range	Upper Frequencies—greater than 8 mc Lower Frequencies—pass 60 cycle square wave undistorted
Input	High Impedance
Output (nominal)	75 ohms
Normal Voltage Input	2 volts, peak-to-peak
Maximum Voltage Input (Pulse signals only)	4 volts, peak-to-peak
Overall Gain (each amplifier)	Unity
Power Source Required	105 to 125 volts, 50/60 cycles
Power Consumption	50 watts

TUBE COMPLEMENT (EACH AMPLIFIER)

Input	1 RCA type 6AC7
Output	1 RCA type 6AG7

MECHANICAL SPECIFICATIONS

Height	12.25 inches
Width	19 inches
Depth	8 inches
Weight	35 pounds

EQUIPMENT

The following tables list the equipment supplied and the accessory equipment necessary for operation of the Distribution Amplifier.

EQUIPMENT SUPPLIED

Quantity	Description
1	TA-1A Distribution Amplifier including: 1 Set of tubes, comprising: 5 RCA-6AC7 5 RCA-6AG7 1 Jones Plug 5 Terminating Plugs, 75-ohm 10 Coaxial Connectors

ACCESSORY EQUIPMENT (NOT SUPPLIED)

Quantity	Description
1	Power Cable (4-wire cable)
1	Power Supply, capable of delivering 280 volts d-c at 300 milliamperes, such as the RCA Type 580-C Power Supply
1	Rack or Cabinet
	Necessary lengths of 75-ohm coaxial cable (for interconnections between equipment)

DESCRIPTION

The purpose of the Distribution Amplifier, MI-26155, is to provide a means of distributing over coaxial lines a composite picture signal, or synchronizing generator signals, to a number of points at relatively short distances from the signal source.

The Distribution Amplifier consists of five individual amplifiers, each of which can deliver the same signal level and polarity it receives to a coaxial line (nominally 75 ohms). The input circuit of each amplifier has a relatively high impedance so that several amplifiers can be connected in parallel without disturbing the driving circuit. Each amplifier has been designed to give unity gain. Connecting two amplifiers in parallel will almost double the output voltage for the same input voltage.

Each amplifier has been designed for a normal composite picture signal input and output level of 2 volts, peak-to-peak, with negative polarity. A positive polarity input (and therefore a positive polarity output) may be used if it is desired.

Provision has been made to increase the input and output levels to 4 volts, peak-to-peak. This type of operation is for use with pulse signals only.

The parallel input connectors may be used to provide a means of "looping" the signals through to additional equipment. Where the amplifiers are not looped through to other equipment, the signal line must be terminated in its characteristic impedance. This is accomplished by inserting one of the terminating plugs (provided) into the unused input connector of the amplifier.

Parallel output connectors are also provided for each amplifier to permit the paralleling of the output circuits and in making other cross connections of the amplifiers, depending upon the particular requirements.

A gain control has been provided for each amplifier so that all output levels can be accurately adjusted to the required level.

All five amplifiers are mounted on a recessed panel type of chassis to facilitate repair and replacement.

The chassis has been designed for mounting in a standard, 19-inch relay rack, or cabinet. It occupies a space in the rack of 12¼ inches.

An external power supply, such as the RCA type 580-C is required. The power supply must be capable of delivering 280 volts d-c at 300 milliamperes.

CIRCUITS

Each amplifier contains an RCA type 6AC7 tube in the input stage, and an RCA type 6AG7 tube in the output stage of a frequency compensated, resistance-coupled amplifier circuit. The frequency range covered by each amplifier (when working at a signal voltage input of 2 volts, peak-to-peak) is greater than 8 megacycles.

A one-megohm variable resistance is connected in series with the grid return of the output stage to correct for low-frequency phase shift that may occur as the result of variations in the components of the low frequency compensating circuit.

The "GAIN" control is a 200-ohm variable resistor in the cathode circuit of the output stage.

The input circuit of each amplifier is isolated (by means of a coupling capacitor) from any d-c voltages that may be present in the output circuit of the external equipment. The coupling capacitor in the output circuit prevents the d-c plate voltage of the output tube from being introduced into the external equipment.

The transformer, T6, is included in the unit to supply the required operating voltage for all of the tube filaments.

Figure 3 shows the schematic diagram of the unit.

INSTALLATION

After unpacking the equipment, inspect it thoroughly to ascertain no damage has resulted due to shipment. Make sure that all tubes are firmly seated in their respective sockets.

Mount the unit in the space allotted to it in the rack or cabinet (not furnished).

Connect two wires from the power cable (accessory equipment) to terminals number 10 and 12 of the Jones plug (furnished) and to the external power supply. These wires should be capable of handling at least 300 milliamperes of current at 300 volts. The negative (−) terminal of the power supply should be connected to terminal number 12 of the Jones plug and the positive (+) terminal to terminal number 10.

The two additional wires of the cable must be connected from terminals 7 and 8 of the Jones plug to the a-c circuit of the external power supply. This wiring should include the "ON-OFF" switch of the power supply, as no switch is supplied on the Distribution Amplifier.

Connections from the "ON-OFF" switch of the RCA type 580-C Power Supply are brought out to an a-c terminal board for connection to this or other equipment.

When the wiring is completed between the external power supply and the Jones plug, insert the Jones plug into the receptacle on the rear of the chassis.

Insert a 75-ohm terminating plug into one of the output connectors of any one amplifier.

Connect the input of the amplifier to a 60-cycle square wave source of voltage having an amplitude of 2 volts, peak-to-peak.

Throw the "ON-OFF" switch of the external power supply to its "ON" position and allow sufficient time for the tubes to reach proper operating temperature.

Measure the peak-to-peak voltage with an oscilloscope at the input of the amplifier and then move the oscilloscope connections to the terminating plug in the output connector of the amplifier.

Adjust the gain control of the amplifier to the same peak-to-peak voltage as measured at the input.

With the oscilloscope connected to the output, adjust the "L. F. Phase" control to obtain the proper low frequency response. This is determined by comparing the input and output wave forms (on the oscilloscope) until the output wave form is identical to that which appears at the input.

Repeat the above procedure for each of the remaining amplifiers.

After the above adjustments have been completed the input and output connections should be made to the amplifier to be used. Either of the connectors in the parallel pairs may be used. These connections have been designed for use with 75-ohm (Type RG 11/U) coaxial cable, and adaptors have been provided for use with a smaller 75-ohm (Type RG 59/U) cable.

In cases where the signal is not "looped through" the input connectors of the amplifier, it is necessary to terminate the line at the input of the amplifier. The 75-ohm terminating plugs have been provided for this purpose.

Where the inputs of two or more amplifiers are connected in parallel, and a signal is not "looped through" to other equipment, it is necessary to terminate the signal source cable by one of the terminating plugs at the input of one of the paralleled amplifiers.

Two amplifiers may be used to combine the R. M. A. synchronizing signal and the picture signal to provide a complete video signal. In such a case it will be necessary to attenuate the normal 4-volt peak-to-peak amplitude of the synchronizing signal to a value of one-third that of the picture signal. This adjustment is required to obtain a mixed signal having the R. M. A. standard ratio of the synchronizing signal to picture signal.

NOTE: Where it is required to use a signal input and output greater than 2 volts, peak-to-peak, but no greater than 4 volts, peak-to-peak (such as signals from a synchronizing generator), it is necessary to remove the 5600-ohm resistor in the plate circuit of the input tube. This change reduces the high-frequency range of the amplifier, and operation under this condition is limited to pulse-type signals and should not be used for picture signals.

OPERATION

Connect the input signal to the amplifier to be used, and the output of the amplifier to the equipment (as described previously).

Throw the "ON-OFF" switch of the external power supply to its "ON" position and allow sufficient time for the tubes to warm-up.

MAINTENANCE

Periodic inspections should be instituted from the date this equipment is placed in operation. These inspections should be no longer than 30 days apart if continual good operation is to be assured. During inspection periods all tubes should be checked on a reliable tube checker. Any tube showing weak or sluggish emission should be replaced with a tube known to be good.

Clean the dust out of the unit thoroughly.

After all dusting and tube checking has been completed, check the low frequency phasing controls for proper adjustment.

Adjust all "GAIN" controls by making whatever minor adjustments are necessary to obtain the original output levels.

The above adjustments should be made as described previously in "Installation."

In the event an amplifier is not functioning correctly, check the tubes. If the tubes check as good, measure the voltages at the pins of the tube sockets. These measurements should be compared to the table of typical tube voltages at the end of this section. Any reading differing from these by more than twenty percent is an indication of a fault in the circuit being measured.

Ascertain and clear the fault before proceeding further. Open resistors or shorted and leaky capacitors usually can be detected by use of an ohmmeter.

Where no one of the five amplifiers is functioning correctly, it is an indication of a fault in something common to each amplifier. This would indicate the power supply, especially if the d-c voltage to the amplifiers is low. The trouble should be cleared according to the instructions furnished for the power supply.

TABLE OF TYPICAL TUBE VOLTAGES

All measurements made at a line voltage of 117 volts.
All voltages measured to ground (except filament voltages).
All measurements taken with an RCA Voltohmyst, Jr.

Tube	1	2	3	4	5	6	7	8
6AC7	0	Fil.*	0	0	1.91	141	Fil.*	173
6AG7	0	Fil.*	N. C.	0	4.33	176	Fil.*	176

* 6.3 volts a-c measured between terminals number 2 and 7.

Peak-to-Peak A-C Voltages

Tube	1	2	3	4	5	6	7	8
6AC7				2.0*				5.5+
6AG7				5.4+				2.0*

* Positive Video Signal.
\+ Negative Video Signal.

REPLACEMENT PARTS LIST

When ordering replacement parts, please give Symbol, Description, and Stock Number of each item ordered.
The part which will be supplied against an order for a replacement item may not be an exact duplicate of the original part; however, it will be a satisfactory replacement, differing only in minor mechanical or electrical characteristics. Such differences will in no way impair the operation of the equipment.
When ordering replacement electrolytic capacitors, be sure to order the correct mounting plates (K-85558, fibre, or K-85559, metal).

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TELEVISION DISTRIBUTION AMPLIFIERS

SYMBOL No.	DESCRIPTION	STOCK No.
C1	Capacitor, fixed oil filled, 0.25 mfd., ±20%, 600 volts	51608
C2A, C28	Capacitor, dry electrolytic, 20-20 mfd., 450 volts	34889
C3	Capacitor, fixed mineral oil filled, 7 mfd., 600 volts	51603
C4, C5, C6, C7	Capacitor, fixed tubular mineral oil treated, 0.01 mfd., ±10%, 600 volts	51628
C8	Capacitor, dry electrolytic, '125 mfd., 350 volts	93406
C21	Capacitor, same as C1	
C22A, C22B	Capacitor, same as C2A, C2B	
C23	Capacitor, same as C3	
C24, C25, C26, C27	Capacitor, same as C4	
C28	Capacitor, same as C8	
C41	Capacitor, same as C1	
C42A, C42B	Capacitor, same as C2A, C2B	
C43	Capacitor, same as C3	
C44, C45, C46, C47	Capacitor, same as C4	
C48	Capacitor, same as C8	
C61	Capacitor, same as C1	
C62A, C62B	Capacitor, same as C2A, C2B	
C63	Capacitor, same as C3	
C64, C65, C66, C67	Capacitor, same as C4	
C68	Capacitor, same as C8	
C81	Capacitor, same as C1	
C82A, C82B	Capacitor, same as C2A, C2B	
C83	Capacitor, same as C3	
C84, C85, C86, C87	Capacitor, same as C4	
C88	Capacitor, same as C8	
F1	Fuse, cartridge, 1 ampere, 250 volts, S10-B10	53447
J1 to J20	Connector, co-axial	51800
J21	Connector, 6 contact, male	51604
R1	Resistor, fixed composition, 560,000 ohms, ±10%, 1 watt	32726
R2	Resistor, fixed composition, 100 ohms, ±10%, 1 watt	31215
R3	Resistor, fixed composition, 150 ohms, ±10%, ½ watt	30880
R4	Resistor, fixed composition, 56,000 ohms, ±10%, 1 watt	17440
R5	Resistor, fixed composition, 4700 ohms, ±5%, ½ watt	30494
R6	Resistor, fixed composition, 10,000 ohms, ±10%, 2 watts	44294
R7	Resistor, fixed composition, 1200 ohms, ±5%, ½ watt	30731
R8	Resistor, fixed composition, 5600 ohms, ±5%, ½ watt	30734
R9, R10	Resistor, fixed composition, 820,000 ohms, ±5%, 1 watt	58965
R11	Resistor, same as R2	
R12	Resistor, fixed composition, 270,000 ohms, ±10%, 1 watt	19232

REPLACEMENT PARTS LIST—Continued

SYMBOL No.	DESCRIPTION	STOCK No.
R13	Resistor, variable carbon, 1 megohm, ±20%, 2 watts	53007
R14	Resistor, variable carbon, 200 ohms, ±10%, 2 watts	52438
R15, R16	Resistor, same as R2	
R17	Resistor, fixed composition, 100 ohms, ±10%, ½ watt	34765
R18	Resistor, fixed wire wound, 3000 ohms, ±5%, 10 watts	54229
R19	Resistor, fixed composition, 100,000 ohms, ±10%, 1 watt	72635
R31	Resistor, same as R1	
R32	Resistor, same as R2	
R33	Resistor, same as R3	
R34	Resistor, same as R4	
R35	Resistor, same as R5	
R36	Resistor, same as R6	
R37	Resistor, same as R7	
R38	Resistor, same as R8	
R39, R40	Resistor, same as R9	
R41	Resistor, same as R2	
R42	Resistor, same as R12	
R43	Resistor, same as R13	
R44	Resistor, same as R14	
R45, R46	Resistor, same as R2	
R47	Resistor, same as R17	
R48	Resistor, same as R18	
R49	Resistor, same as R19	
R61	Resistor, same as R1	
R62	Resistor, same as R2	
R63	Resistor, same as R3	
R64	Resistor, same as R4	
R65	Resistor, same as R5	
R66	Resistor, same as R6	
R67	Resistor, same as R7	
R68	Resistor, same as R8	
R69, R70	Resistor, same as R9	
R71	Resistor, same as R2	
R72	Resistor, same as R12	
R73	Resistor, same as R13	
R74	Resistor, same as R14	
R75, R76	Resistor, same as R2	
R77	Resistor, same as R17	
R78	Resistor, same as R18	
R79	Resistor, same as R19	
R91	Resistor, same as R1	
R92	Resistor, same as R2	
R93	Resistor, same as R3	
R94	Resistor, same as R4	
R95	Resistor, same as R5	
R96	Resistor, same as R6	
R97	Resistor, same as R7	
R98	Resistor, same as R8	
R99, R100	Resistor, same as R9	
R101	Resistor, same as R2	
R102	Resistor, same as R12	
R103	Resistor, same as R13	
R104	Resistor, same as R14	
R105, R106	Resistor, same as R2	
R107	Resistor, same as R17	
R108	Resistor, same as R18	
R109	Resistor, same as R19	
R121	Resistor, same as R1	
R122	Resistor, same as R2	
R123	Resistor, same as R3	
R124	Resistor, same as R4	
R125	Resistor, same as R5	
R126	Resistor, same as R6	
R127	Resistor, same as R7	
R128	Resistor, same as R8	
R129, R130	Resistor, same as R9	
R131	Resistor, same as R2	
R132	Resistor, same as R12	
R133	Resistor, same as R13	
R134	Resistor, same as R14	
R135, R136	Resistor, same as R2	
R137	Resistor, same as R17	
R138	Resistor, same as R18	
R139	Resistor, same as R19	
T1, T2, T3, T4, T5	Coil, video, coil assembly	51907
T6	Transformer, heater	58619
X1 to X10	Socket, tube, octal	54414
	Connector, co-axial termination, male, including two 150 ohm ½ watt resistors	54256
	Connector, 6 contact, female	51607
	Connector, co-axial cable mounting, male	65956
	Holder, fuse	48551
	Tip Jack	18348

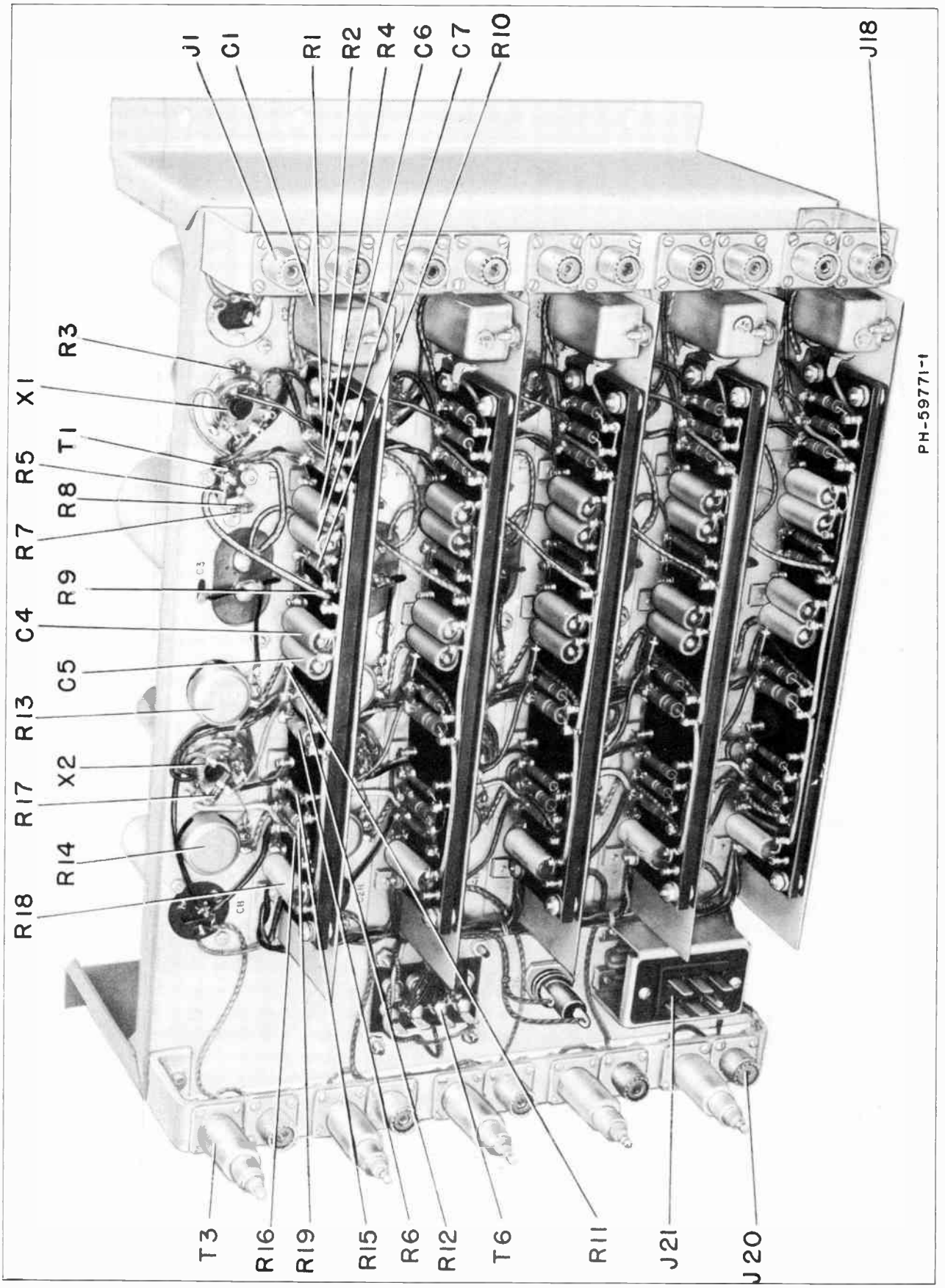

Figure 2—Distribution Amplifier, Rear View

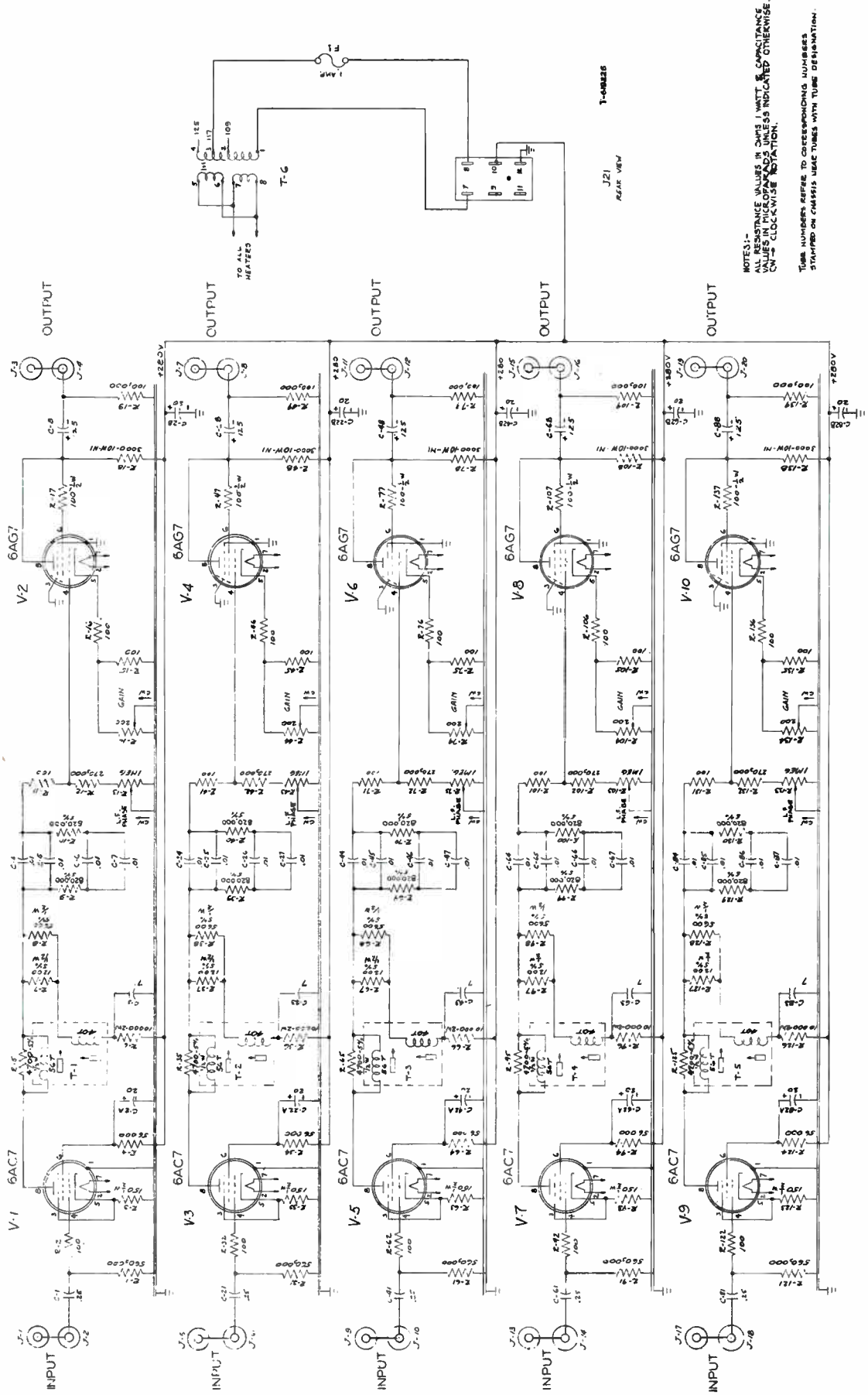

Figure 3—Schematic Diagram, T-619226

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