INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

TYPE JY TONE TRANSMITTERS

CAUTION Before working on this equipment, turn off the power supply and ground or open circuit the RF lead to the carrier set assembly.

APPLICATION

The Type JY tone transmitters are used primarily for tone modulating the Type JY carrier transmitters to send over the carrier channel audio impulses required to operate telemetering, supervisory control and remote trip equipment. They provide the means of operating ten such functions over a single carrier channel. The tone transmitters can also be used to perform similar functions over a telephone line.

CONSTRUCTION AND OPERATION

These units are made up of two parts, one of which is a basic unit common to all frequencies and is covered by S#1352594A. The other contains the frequency determining components for the particular frequency required. The complete tone transmitter is mounted on a panel arranged for installation on the swinging rack of a Type JY Cabinet.

The frequency determining units are mounted as a sub-assembly on a removable panel, and connect to the basic Unit through six plainly marked wires. Since the frequency determining units are all interchangeable, a tone transmitter may be changed from one frequency to another by simply changing the frequency determining unit.

The outline dimensions of this Unit are in Fig. 2. The Single tube is accessible from the front of the Unit. The output control is normally covered by a hexagon-cap to prevent its setting from being accidentally disturbed. It is adjusted by means of a screw driver. The dial for the output control is marked with arbitrary numbers; i.e., it is not calibrated. The test push-button is of the non-locking type.

The circuits of this unit are shown in Fig. 1a. When the unit is energized, the frequency-determining circuit (transformer T-1 and capacitor C-1), which is connected to the plate of the tube, oscillates. A winding on transformer T-1 excites the grid of the tube with voltages of the oscillation frequency, and this, together with the amplifying action of the tube, causes the oscillations to be maintained. A third winding on transformer T-1 connects to the potentiometer, which in turn connects to the load. The unit oscillates so long as it is energized but no voltage is delivered to the load until external keying contacts or the push button contacts are closed. Figure 1 shows three possible methods of connecting the keying contacts and the audio output. Figure 1b shows connections normally used with a continuous carrier signal and Figure 1c shows connections normally used with an intermittent carrier signal. Figure 2d shows the circuit for cathode keying.

The accessories for 125 or 250 volt operation consist of a type 25L6 or 6L6 tube, respectively. These are covered by style numbers as follows:

Accessory Style No.	
867944	Type 25L6 tube (V1) for 125-volt d.c. operation.
867945	Type 6L6 tube (V101) for 250-volt d.c. operation.

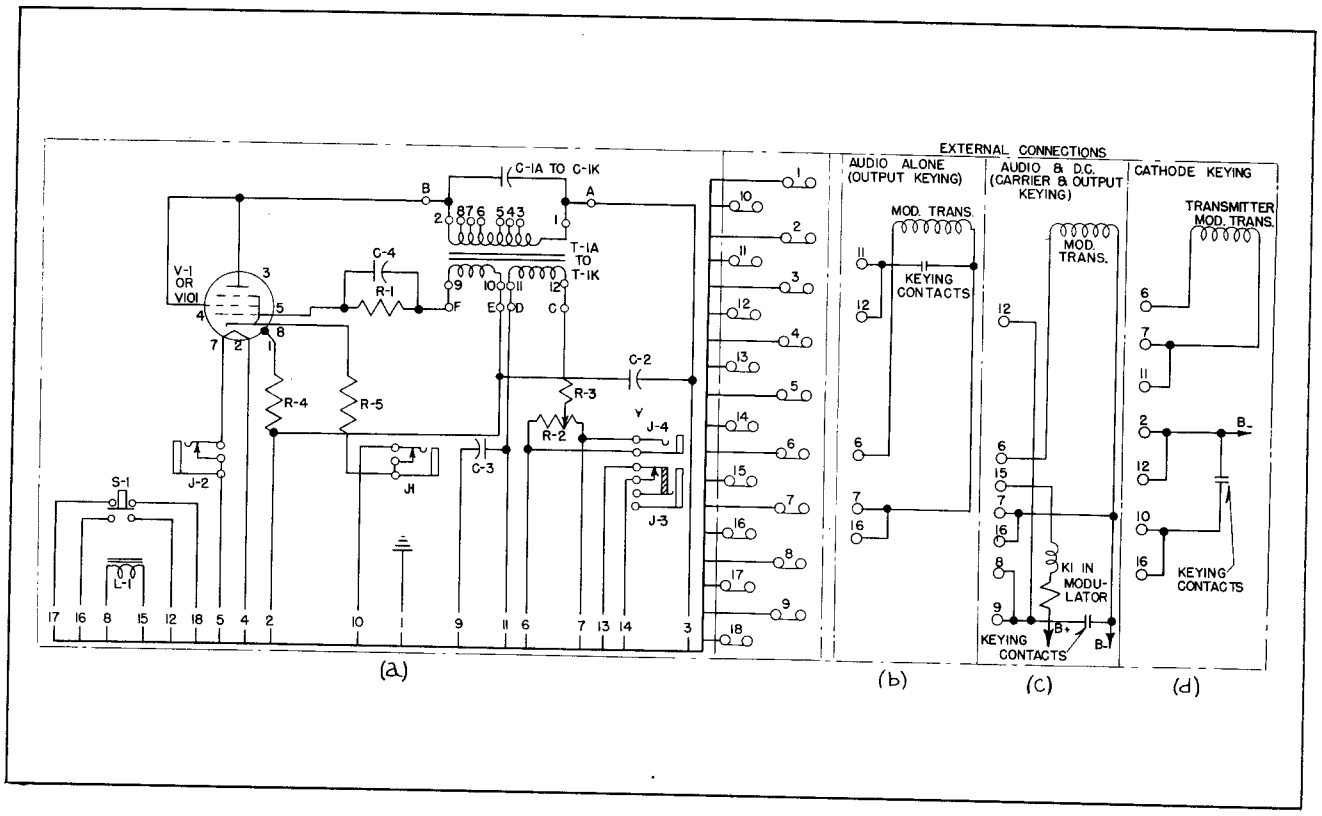

Fig. 1—Internal Schematic Of The Type JY Tone Transmitter.

CHARACTERISTICS

Tone transmitter units are supplied for the following frequencies by combining the proper style of the frequency determining component to the basic units S#1352594.

Frequency	Style Number Frequency Component	Complete Tone Trans.
150	1352595	1352605
209	1353596	1352606
290	1352597	1352607
403	1352598	1352608
560	1352599	1352609
778	1352600	1352610
1080	1352601	1352611
1500	1352602	1352612
2085	1352603	1352613
2900	1352604	1352614

Tone transmitter units can be operated from either a 125 or 250 volt station battery or from a 50 or 60 cycle a-c source in conjunction with suitable power supply units. For 125 volt d-c and 50-60 cycle applications, a 25L6 tube is used, and for 250 volt d-c operation a 6L6 tube is used. Metering jacks are provided to measure the plate current and the tube heater current. A jack is also provided for aurally checking the output of the tone transmitter with a handset.

The energy requirements are as follows:

Operating Voltage	Plate Load Milliamperes	Heater Amps a-c or d-c.
125 dc	10-20	0.3
250 dc	20-30	0.9
115 ac	10-20	0.3

INSTALLATION

The tone transmitter is usually supplied as part of a type JY power line carrier equipment assembly. In these cases, it is shipped assembled with the other units in a cabinet, completely wired.

TYPE JY TONE TRANSMITTERS

TONE TRANSMITTER PARTS LIST

Diagram Symbol	Number Req'd.	Functions	Rating
		CAPACITORS	
C-1A	*	Oscillator Tank	1.00 mfd. 600 Volt d-c..(150 cycle)
C-1B	*	" "	0.75 " " " (209 cycle)
C-1C	*	" "	0.50 " " " (290 cycle)
C-1D	*	" "	0.35 " " " (403 cycle)
C-1E	*	" "	0.25 " " " (560 cycle)
C-1F	*	" "	0.20 " " " (778 cycle)
C-1G	*	" "	0.125" " " (1080 ")
C-1H	*	" "	0.10 " " " (1500 ")
C-1J	*	" "	0.07 " " " (2085 ")
C-1K	*	" "	0.05 " " " (2900 ")
C-2	1	Plate By-Pass	2.0 " " "
C-3	1	Output Blocking	2.0 " " "
C-4	1	Grid Leak By-Pass	0.50 " " "
		JACKS	
J-1	1	Plate Current	One Circuit Opening
J-2	1	Heater Current	" " "
J-3	1	Audio Output	One Circuit and one break
J-4	1	Audio Output	One Circuit
		REACTOR	
L-1	1	Output	10 henries, 0.1 amp. d.c.
		RESISTORS	
R-1	1	Grid Leak	10,000 Ohms - 1 Watt
R-2	1	Output	1000 Ohms Potentiometer
R-3	1	Isolation	560 Ohms 1 Watt
R-4	1	Static Leak	150,000 " 1 Watt
R-5	1	Cathode	510 " 1 Watt
		SWITCH	
S-1	1	Test Push Button	1 Make - 1 Break
		TRANSFORMERS	
T-1A	*	Oscillator (150 cycle)	
T-1B	*	" (209 cycle)	
T-1C	*	" (290 cycle)	
T-1D	*	" (403 cycle)	
T-1E	*	" (560 cycle)	
T-1F	*	" (778 cycle)	
T-1G	*	" (1080 ")	
T-1H	*	" (1500 ")	
T-1J	*	" (2085 ")	
T-1K	*	" (2900 ")	

X-1	1	TUBE SOCKET V-1 Oscillator	Ceramic Wafer Octal Base
		TUBES	
V-1		Oscillator	25L6
V-101		Oscillator	6L6

*Note: Only 1 each of C-1A through C-1K and T-1A through T-1K required depending upon the frequency of the tone transmitter.

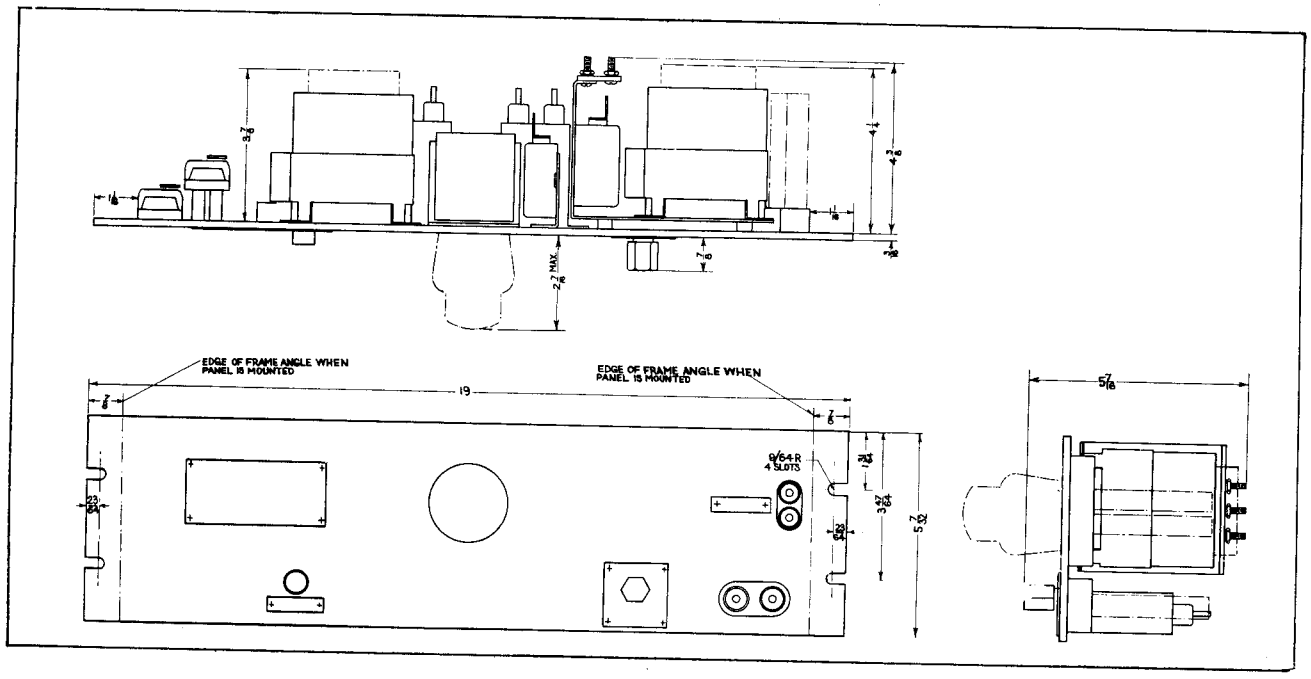

Fig. 2—Outline Of The Type JY Tone Transmitter. For Reference Only.

When the unit is shipped separately proceed as follows. Unpack the unit and install it on a standard relay rack in the equipment assembly with which it is to be used. The mounting screws are contained in a bag attached to the unit. Make the external connections in accordance with Figure 1 depending on the type of audio output circuit used.

An external heater resistor must be used for 125 and 250 volt d-c applications. This resistor must be adjustable and should be 450 ohms using a 25L6 tube, (125 volt d-c) and 300 ohms, using a 6L6 tube (250 volt d-c).

ADJUSTMENTS AND MAINTENANCE

The adjustments required for this unit are the heater current and the audio output. If the unit is received as a part of an equipment assembly, make these adjustments in accordance with the instructions in the book of the equipment assembly. If the unit is received alone, make these adjustments as follows:

1. Connect a 1-ampere ammeter in Jack 2, and a 0.05 ampere ammeter in Jack 1 to measure the heater and plate currents respectively. These quantities can also be measured by connecting the 1-ampere ammeter in series with the lead to terminal 4, and the 0.05 ampere ammeter in series with the lead to terminal 2.

2. For 125 volt d-c operation (25L6 tube) set the 450 ohm heater resistor for maximum resistance, close the power switch, and then adjust the resistor so that, after two minutes the heater current is 0.28 ampere. Now remove the hexagon-cap from the audio output control

and turn this control to its maximum clockwise position (which puts minimum load on the oscillator) and then measure the plate current. It should be between 10 and 20 milliamperes. Now turn the audio output control counter-clockwise until the desired output is obtained and replace the hexagon-cap. The plate current should not have changed more than 20%.

3. If a 6L6 tube is used, (250 Volt d-c operation) set the 300 ohm heater resistor for maximum resistance, close the power switch, and then adjust the resistor so that, after two minutes, the heater current is 0.85 ampere. Now remove the hexagon-cap from the audio output control, turn this control to its maximum clockwise position, and then measure the plate current. It should be between 15 and 25 milliamperes. Now turn the audio output control counter-clockwise until the desired output is obtained and replace the hexagon-cap:

The setting of the audio control as mentioned in the foregoing paragraphs 2 and 3, is covered in the general instructions for the equipment assembly of which the tone transmitter is a part.

No frequency adjustments are normally necessary on the tone transmitter since this adjustment has been made at the factory. However, it is possible to adjust the frequency slightly, and to do this proceed as follows:

1. Connect the output of the tone transmitter to one set of plates on a cathode ray oscilloscope.

2. Use a calibrated audio signal generator for the standard frequency source and connect its output to the other pair of plates in the cathode ray oscilloscope screen.

3. Change the taps on transformer T-1 until a stationary circular figure is obtained on the oscilloscope screen.

Note: Taps 1, 3, 4 and 5 are for fine adjustment and taps 2, 6, 7 and 8 are for coarse adjustment.

RENEWAL PARTS

When ordering renewal parts for the tone transmitter, include the following data from the nameplate.

(1) The name of the unit.

(2) The style or DL number.

(3) The serial number.

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