

TM 11-437

WAR DEPARTMENT TECHNICAL MANUAL

CODE TRAINING SET

AN/GSC-T1

RESTRICTED. DISSEMINATION OF RESTRICTED MATTER.
The information contained in restricted documents and the essential characteristics of restricted material may be given to any person known to be in the service of the United States and to persons of undoubted loyalty and discretion who are co-operating in Government work, but will not be communicated to the public or to the press except by authorized military public relations agencies. (See also par. 23b, AR 380-5, 15 Mar 1944.)

WAR DEPARTMENT 30 November 1944

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WAR DEPARTMENT,
WASHINGTON 25, D. C., 15 November 1944.

TM 11-437, Code Training Set AN/GSC-T1, is published for the information and guidance of all concerned.

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(For explanation of symbols see FM 21-6.)

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DESTRUCTION NOTICE

WHY — To prevent the enemy from using or salvaging this equipment for his benefit.

WHEN — When ordered by your commander.

HOW —

1. Smash — Use sledges, axes, handaxes, pickaxes, hammers, crowbars, heavy tools.
2. Cut — Use axes, handaxes, machetes.
3. Burn — Use gasoline, kerosene, oil, flame throwers, incendiary grenades.
4. Explosives — Use firearms, grenades, TNT.
5. Disposal — Bury in slit trenches, fox holes, other holes. Throw in streams. Scatter.

USE ANYTHING IMMEDIATELY AVAILABLE FOR DESTRUCTION OF THIS EQUIPMENT.

WHAT —

1. Smash — Tubes, vibrators, sockets, speaker, headsets, keys, switches, capacitors, resistors, and transformers.
2. Cut — All wiring, headset cords, key cords and power cords.
3. Burn — Cords, wires, technical manuals, written material and smashed parts.
4. Bend — Chassis, shields and panels.
5. Bury or scatter — All remaining parts mentioned above.

DESTROY EVERYTHING

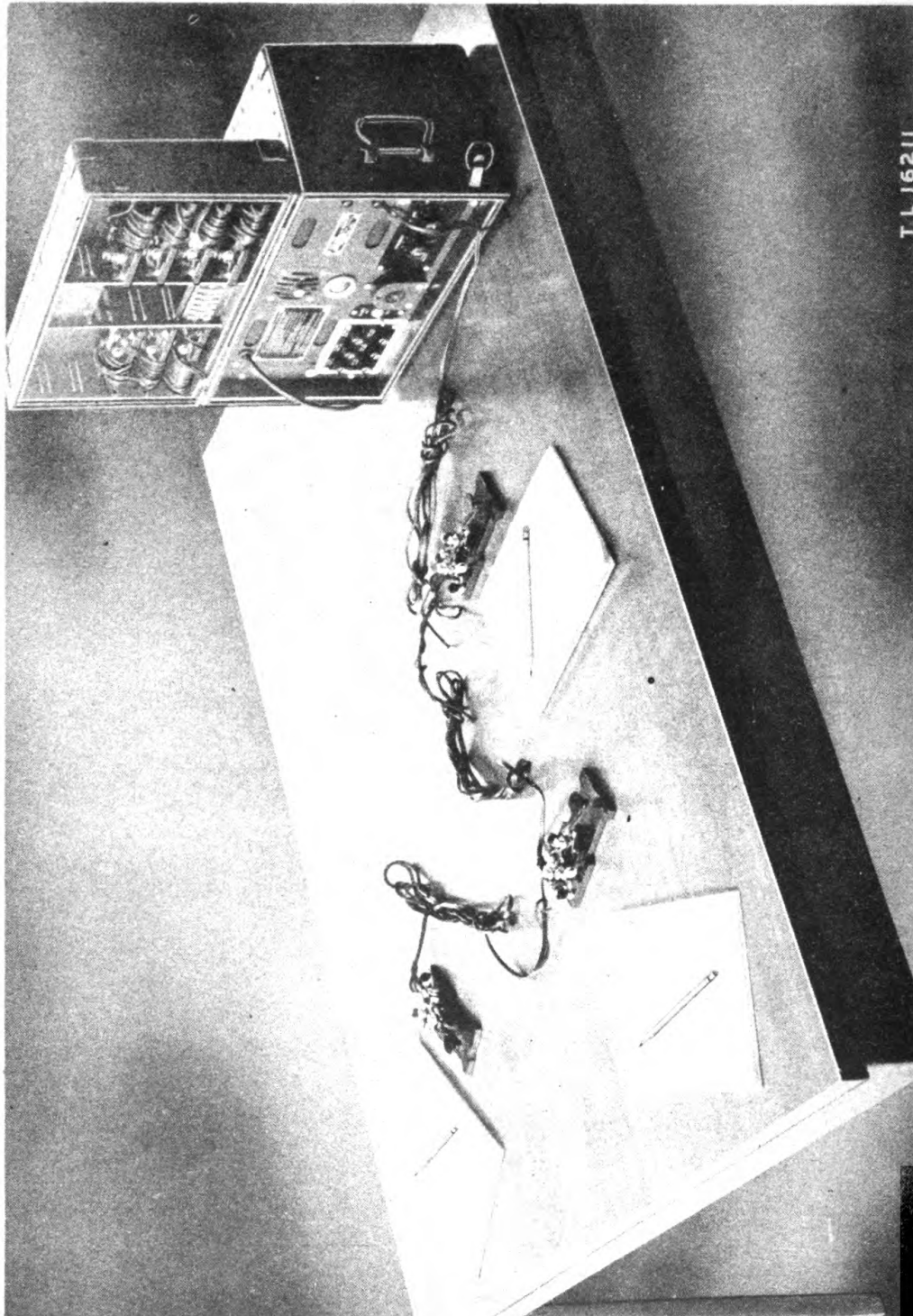


Fig. 1 Code Training Set AN/GSC-T1.

RESTRICTED

SECTION I DESCRIPTION

1. PURPOSE.

The purpose of Code Training Set AN/GSC-T1 (fig. 1) is to provide operators and others with a device for practicing transmission and reception of International Morse signals, by both visual and audio methods, to maintain code speed after school training is completed.

2. APPLICATION.

a. Code Training Set AN/GSC-T1 operates from various power sources such as storage batteries, 115-volt a-c (alternating-current) or d-c (direct-current) lighting systems, and 230-volt a-c power sources. The set may be used at camps, aboard transports, in hospitals, and in rehabilitation centers.

b. The equipment includes hand telegraph keys with which each member of a practice group of ten keys the circuit. The hand keying produces an audio tone adjustable in pitch and volume, or blinker flashes visible to all members of a practice group. The audio tone is delivered by a loudspeaker with adequate volume to overcome room noises. The unit can be used out of doors with members of the practice group 40 feet distant, and with ambient (surrounding) noise levels of 60 db (decibels).

c. Code Training Set AN/GSC-T1 is moistureproofed and fungi-proofed to insure reliable service in tropical zones. All materials apt to support fungus growth have been treated with fungus-resistant lacquer. All soldered connections are coated with varnish.

d. All components of Code Training Set AN/GSC-T1 that are apt to radiate interference have been shielded so that the set can be used in the vicinity of radiotelephone and telegraph equipment, direction finding equipment, and telephone and telegraph equipment, without causing interference to these services.

3. DIMENSIONS AND WEIGHT.

a. The set is contained in one carrying case, which measures 17 by $10\frac{1}{4}$ by 13 inches. Dimensions of package packed for shipment are $17\frac{1}{2}$ x $20\frac{1}{2}$ x 17 inches.

b. The set weighs 40 pounds; when packed for shipment, it weighs 100 pounds.

4. VOLTAGE REQUIREMENTS

Code Training Set AN/GSC-T1 will operate on any of the following sources of power:

6 volts dc	115 volts dc
12 volts dc	115 volts ac
24 volts dc	230 volts ac

5. TUBE COMPLEMENT.

<i>Quan used</i>	<i>Ref No.</i>	<i>Signal Corps type</i>	<i>JAN type</i>	<i>Circuit</i>
1	V-3	VT-126-B	JAN-6X5GT	Rectifier.
1	V-1	VT-198-A	JAN-6G6G	Audio-oscillator.
1	V-2	VT-198-A	JAN-6G6G	Audio-amplifier.

6. COMPONENTS.

a. **Power Transformer.** The power transformer (fig. 2) raises the input voltages to the required a-c voltage which is then rectified.

b. **Vibrators.** Two vibrators (fig. 2) are used to change a d-c power supply to pulsating dc for input to the power transformer. One of these vibrators is used with power supplies of 6, 12, and 24 volts dc. The other is used with 115-volt d-c power supply.

c. **Voltage Selector Switch.** The voltage selector switch (fig. 3) is adjustable to agree with the power available, either ac or dc of the proper voltage, and is so constructed that the switch must be in the OFF position when the equipment carrying case is closed.

d. **Electrical Noise Suppressor.** The purpose of the electrical noise suppressor (fig. 2) is to prevent any noise radiation from the set, thus eliminating interference with radio and other services in the vicinity.

e. **FREQUENCY Control and BLINKER Switch.** The FREQUENCY control (fig. 3) allows the audio pitch to be changed. The BLINKER switch, which is part of this control, allows either the loudspeaker to be used, or switches the blinker lamp into the circuit.

f. **Oscillator Transformer.** The oscillator transformer (fig. 2) in conjunction with the other circuit components produces audio-frequency oscillations.

g. VOLUME Control. The **VOLUME** control (fig. 3) adjusts the intensity of the output tone.

h. Output Transformer. The output transformer (fig. 2) matches the output impedance of the amplifier tube to the loudspeaker, or headset connected to the output jack.

i. Neon Blinker Lamp. The neon lamp (fig. 3), when actuated by the output of the unit, flashes on and off with the keying, thus serving as a visible signal to a practice group.

j. Loudspeaker. The loudspeaker (fig. 3), produces an audio output which can be heard through distracting room noises. The mechanical resonance of the loudspeaker diaphragm is adjusted with the resonator thumbscrew, and greatly increases the audible signals with ambient noise levels of 60 db.

k. HEADSET Jack. The **HEADSET** jack (fig. 3) allows a headset to be connected to the output of the unit.

l. Housing. The housing (case) encloses the entire unit and contains 10 practice transmitting keys. The case cannot be closed unless the **POWER** switch is in the **OFF** position.

m. Transmitting Keys. The 10 transmitting keys are used for keying the oscillator, causing it to emit an audible tone or to flash the blinker lamp, as desired.

n. Power Cord. The power cord is permanently connected to the unit at one end and has a plug on the other end for connecting the various sources of power to the unit.

o. Battery Leads. The battery leads are fitted at one end with an adaptor to be attached to the power cord, and at the other end with non-polarized battery clips, for connecting the various battery supplies to the unit.

SECTION II

INSTALLATION AND OPERATION

CAUTION: DO NOT OPERATE THIS UNIT OUTSIDE OF ITS CASE. BE SURE THE FUSE PANEL COVER IS IN PLACE AND THE HOLDING SCREWS ARE TIGHT. FAILURE TO HEED THIS WARNING WILL CAUSE RADIATION OF INTERFERENCE.

7. INSTALLATION FOR USE.

a. Unclamp the housing cover and swing the cover up until the cover-holding latch is engaged. This gives access to the oscillator unit as well as the 10 transmitting keys which are stowed in racks built into the cover. Remove as many of these keys as required and connect in parallel.

b. Connect the first key to the terminals on the panel of the unit and the cable connections of the second key to the terminals on the base of the first key. Connect the next key cable connections to the terminals on the base of the second key. All keys to be used are thus connected in tandem.

CAUTION: Before connecting the power to the unit, determine what the input voltage to the power supply is, and whether the input power is ac or dc.

c. When the nature of the input power supply voltage is known, use the power line plug to rotate the voltage selector switch to its proper position.

d. Connect the power cord plug directly into a power outlet. If a battery is used, connect one end of the battery leads to the battery, and the other end to the power cord. Disregard the polarity of d-c power supplies.

e. Throw the **POWER** switch on the panel of the unit to **ON**. Allow a brief interval for the tubes to warm up before making adjustments.

8. ADJUSTMENTS.

a. **Tone.** (1) Turn the resonator adjustment screw out until the stop is reached.

(2) With one of the keys closed, turn the **FREQUENCY** control until a suitable tone is heard.

b. Volume. (1) The **VOLUME** control is used to adjust the intensity of the signals to operating conditions.

(2) To increase the audible signals, turn the resonator adjustment screw in the loudspeaker until the end of the screw applies pressure to the resonator button. Adjust this resonator screw until the sound output is greatest. The point of resonance is quite sharp and the screw must be adjusted carefully so that the resonance peak will not be missed.

9. OPERATION.

For blinker operation, rotate the **FREQUENCY** control to its extreme counterclockwise position. This will throw a switch which disconnects the loudspeaker from the circuit and connects the blinker lamp. The **VOLUME** control must be advanced to *maximum* output to give sufficient output to actuate the lamp.

10. CLOSING THE UNIT.

a. Throw the **POWER** switch on the front of the panel to **OFF** position.

CAUTION: Never rotate the voltage selector switch with the **POWER** switch **ON** and with the unit connected to a source of power.

b. Disconnect the power cord from the power source. Use the plug at the end of the power cord to rotate the voltage selector switch to **OFF**. This permits the case cover to be closed and clamped.

c. Wrap the key cords around the keys and stow them in the case. The power cord and battery leads are wrapped and placed in the compartment provided for them between the keys. *If a storage battery has been used for power supply, wipe the battery leads with a damp cloth to make sure that no battery acid is on the leads.* Battery acid destroys the key cords.

d. Close and clamp the case cover.

NOTE: The cover cannot be closed unless the voltage selector switch is in the **OFF** position.

SECTION III

FUNCTIONING OF PARTS

11. OSCILLATOR SECTION.

a. A Hartley type audio oscillator is used. Oscillator Tube JAN-6G6G (V-1) (fig. 4) obtains feedback from plate to grid through the center-tapped winding of the audio-frequency oscillation transformer (T-1). The inductance and distributed capacitance of the center-tapped winding of this transformer and the capacitor (C-3) determine the frequency of the produced tone.

b. The oscillator frequency may be changed by varying the amount of direct current flowing through the untapped winding of the oscillator transformer. The amount of current flowing is controlled by the FREQUENCY control, variable resistor R-8. The FREQUENCY control, in this manner, varies the permeability of the core of the transformer, which in turn, varies the inductance of the center-tapped winding of transformer T-1. This method of frequency control permits the frequency of the tone to be varied without changing the output volume.

c. The system is keyed by completing the cathode return circuit to ground. The keying circuit is shunted by capacitor C-4B which prevents key clicks.

d. Capacitor C-4A places the center tap of the oscillator winding at audio ground potential. Capacitor C-1B is a blocking capacitor preventing plate voltage from being applied to the grid of tube V-1.

e. Resistor R-6 acts as a bleeder and voltage regulator. Resistor R-7 drops the plate voltage of the oscillator.

f. Grid bias is developed by cathode resistor R-4 in combination with grid resistor R-2.

g. The output of the oscillator tank circuit is fed through coupling capacitor C-1A.

12. AMPLIFIER AND OUTPUT SECTIONS.

a. Tube JAN-6G6G (V-2) is used to amplify the oscillations developed in the oscillator stage. VOLUME control R-3 determines the amount of signal voltage applied to the control grid of the amplifier tube, and

thus, the output. Capacitor C-5 acts as a cathode audio bypass and is a low impedance path to ground for the range of frequencies developed by the oscillator.

b. The bias for the amplifier is developed across 500-ohm cathode resistor R-5.

c. Output transformer T-2 matches the impedance of the plate of the amplifier tube to the output circuits (either loudspeaker or headset).

d. The blinker lamp is coupled to the output of the amplifier tube through capacitor C-2 and resistor R-1. The switch (part of the FREQUENCY control R-8) connects the signal output to the blinker lamp when the FREQUENCY control is set at its extreme counter-clockwise position.

e. High-frequency parasitic oscillations are bypassed to ground through capacitor C-6.

13. RECTIFIER SECTION.

a. Tube JAN-6X5GT (V-3) is used in a full-wave rectifier circuit. The filter section includes 10-h (henry), 30-ma (milliampere) choke L-1 and the two 5-mf (microfarad) capacitors C-9A and C-9B. Capacitor C-8 connected across the plates of the rectifier tube acts as a filter for high-frequency voltages developed by the vibrators.

b. The circuit rectifies the high-voltage ac from power transformer T-3 and provides d-c plate voltage for the oscillator and amplifier tubes.

c. Filament voltage for the three tubes is provided by a separate winding on power transformer T-3.

d. The secondary of the power transformer has an r-m-s (root-mean-square) voltage output of 420 volts at 30 ma ac. The primary of the power transformer is multitapped so that any suitable input voltage will be applied with the proper ratio between primary and secondary turns to give the desired output voltages to both the high-voltage and filament-voltage windings.

14. VIBRATORS, VOLTAGE SWITCHING, AND POWER-INPUT SECTIONS.

a. Two vibrators are used to provide a pulsating direct current to the power transformer when a d-c power source is used.

(1) Vibrator V-6428 functions when a 6-volt storage battery is used to operate the unit.

(2) Vibrator V-6428 functions when a 12-volt power supply is used to operate the unit. The voltage is dropped to 6 volts by resistor R-11.

(3) Vibrator V-6428 functions when a 24-volt power supply is used to

operate the unit. The voltage is dropped to 6 volts by resistors R-11 and R-12.

(4) Vibrator V-6429 functions when a 115-volt d-c power supply is used to operate the unit. The voltage is dropped by resistor R-14 and is applied as pulsating dc to a special tap on the primary of the power transformer T-3. This arrangement is made because the pulsating 115-volt dc does not equal the peak voltage of a 115-volt, 60-cycle, a-c power source. Resistors R-10 and R-13 and capacitor C-7 aid the suppression of arcing at the vibrator contacts.

b. The circuits are fused as follows:

<i>Fuse</i>	<i>Rating</i>	<i>Circuit</i>
F-1	$\frac{1}{4}$ amp	115-volt dc
F-2	$\frac{3}{4}$ amp	24-volt dc
F-3	$\frac{1}{4}$ amp	115-volt ac
F-4	$1\frac{1}{2}$ amp	12-volt dc
F-5	$\frac{1}{8}$ amp	230-volt ac
F-6	3 amp	6-volt dc

c. The voltage selector switch makes all the necessary circuit changes to accomodate the various voltages from which this unit may work. The voltage selector switch is the rotary switch (S-1).

d. The electrical noise suppressor 3 is a low-pass filter which filters high-frequency voltages from the input power. One electrical noise suppressor is provided with the set as a spare.

e. Capacitor C-10 acts as an additional power line filter.

f. The power to the unit is turned on and off with switch S-2 on the panel of the unit.

SECTION IV

MAINTENANCE

NOTE: Failure or unsatisfactory performance of equipment used by Army Ground Forces and Army Service Forces will be reported on W.D., A.G.O. Form No. 468 (Unsatisfactory Equipment Report). If Form No. 468 is not available, see TM 38-250. Failure or unsatisfactory performance of equipment used by Army Air Forces will be reported on Army Air Forces Form No. 54 (unsatisfactory report).

CAUTION: TO PREVENT RADIATION OF INTERFERENCE, DO NOT OPERATE THIS UNIT OUT OF ITS CASE. BE SURE THE FUSE PANEL COVER IS IN PLACE AND THE HOLDING SCREWS ARE TIGHT. WHEN MAKING REPAIRS, REPLACE ALL GROUNDING WIRES AND SHIELDS.

15. NORMAL VOLTAGE AND CURRENT READINGS.

Normal voltage and current readings with the unit in operating condition and connected to the various power supplies, are indicated in the following table. A defect in any component electrical part will cause one or several of these readings to be abnormal:

Tube type No.	Tube function	Measurement made		Line voltages					
		From	To	230 ac	115 ac	115 dc	24 dc	12 dc	5.8 dc
6X5	Rectifier	Plate pin 3	Plate pin 5 (volts ac)	430	420	410	420	420	310
6X5		Cathode pin 8	Chassis (volts fc)	230	218	210	220	220	175
6X5		Heater pin 2	Heater pin 7 (volts ac)	6.3	6.3	6.0	6.3	6.3	4.8
6X5		Heater current	(ma ac)	300	300	300	300	300	280
6G6	Oscillator	Heater pin 2	Heater pin 7 (volts ac)	6.3	6.3	6.0	6.3	6.3	4.8
6G6	Oscillator	Plate or screen pins 3 or 4	Chassis (volts dc)	44	42	41	42	42	34
6G6	Oscillator	Control grid pin 5	Chassis (volts dc)	-3.2	-3.1	-2.9	-3.1	-3.1	-2.3
6G6	Oscillator	Cathode pin 8	Chassis (volts dc)	2.6	2.5	2.3	2.5	2.5	1.9
6G6	Oscillator	Cathode current (FREQUENCY control clockwise)	(ma dc)	1.4	1.3	1.3	1.3	1.3	0.99
6G6	Oscillator	Control grid current (FREQUENCY control clockwise)	(ma dc)	0.1	0.1	0.1	0.1	0.1	0.1
6G6	Oscillator	Plate and screen current (FREQUENCY control clockwise)	(ma dc)	1.3	1.2	1.2	1.2	1.2	0.98

6G6	Oscillator	Heater current	Heater pin 7	150	150	150	150	150	140
6G6	Amplifier	Heater pin 2	(ma ac)	6.3	6.3	6.3	6.3	6.3	4.8
6G6		Plate pin 3	(volts ac)	207	198	198	198	198	160
6G6		Screen pin 4	(volts dc)	216	210	210	210	210	165
6G6		Cathode pin 8	(volts dc)	10.8	10.5	10.5	10.5	10.5	5.5
6G6	Amplifier	Plate current (VOLUME control clockwise)	(ma dc)	16	16	16	16	16	9
6G6	Amplifier	Plate current (VOLUME control counterclockwise)	(ma dc)	18.1	17.5	18.0	18.0	18.0	11.0
6G6	Amplifier	Screen current (VOLUME control clockwise)	(ma dc)	6.5	6.0	6.0	6.0	6.0	2.8
6G6	Amplifier	Screen current (VOLUME control counterclockwise)	(ma dc)	3.9	3.5	3.5	3.5	3.5	2.0
6G6	Amplifier	Cathode current (VOLUME control clockwise)	(ma dc)	22.5	22.0	22.0	22.0	22.0	13.0
6G6	Amplifier	Cathode current (VOLUME control counterclockwise)	(ma dc)	22.0	21.0	21.0	21.0	21.0	11.8
6G6	Amplifier	Heater current	(ma dc)	150	150	150	150	150	140

16. TROUBLE SHOOTING.

a. General. The most common causes of operating failures will be defective fuses, vacuum tubes, and vibrators. Check these components carefully when trouble develops. Sufficient spares are provided to check each suspected component by substituting a good one.

- (1) To replace a defective vibrator, remove it from its socket and plug in a new one.
- (2) If trouble develops in the noise suppressor 3, do not replace part of the component. Replace the entire component with the spare provided.
- (3) When replacing any parts of the unit or making other repairs, clean the connecting leads of all coating material before soldering. Wherever the lacquer film is broken, recoat after soldering.

b. Visual Check.

- (1) When trouble is suspected in Code Training Set AN/GSC-T1, make a visual check of the entire unit. This test should include:
 - (a) Power cords, connections, and batteries (if battery is used).
 - (b) Key and headset cords.
 - (c) All jacks and plugs.
 - (d) Switches and control.
 - (e) Loudspeaker and blinker light connections.
 - (f) Tube filaments.
- (2) If the above general check fails to reveal the defect, refer to troubleshooting chart, paragraph 17. By use of this chart, the defect can be isolated to a stage within the unit.

c. Continuity Check. When the symptoms of the trouble are determined, check each component part in that stage that would be the probable cause of trouble. Be sure the battery or power cord is disconnected before checking for continuity. Use an ohmmeter and refer to schematic diagram, figure 4.

d. Tubes. Tubes should be checked with a tube tester, if available. When a tube tester is not available, check the tubes by substituting with tubes which are known to be in good condition.

17. TROUBLE-SHOOTING CHART.

<i>Symptoms</i>	<i>Probable trouble</i>	<i>Corrections</i>
<p>1. No plate voltage on any tube. Filaments do not light. All fuses functioning properly.</p>	<p>1. Open windings on transformer T-3. Open noise suppressor S. Defective switch S-2. Defective switch S-1. Defective vibrators (when using d-c input). Open resistor R-11 (12-volt d-c input). Open resistor R-11 or R-12 (24-volt d-c input). Open resistor R-14 (115-volt d-c input). No input voltage or defective battery.</p>	<p>1. Replace defective parts. (Replace entire noise suppressor) Replace weak or defective battery. Check input supply voltage.</p>
<p>2. No plate voltage. Filaments light.</p>	<p>2. Defective rectifier Tube JAN-6X5GT/G. Open high voltage winding on transformer T-3. Open choke L-1.</p>	<p>2. Replace defective parts.</p>
<p>3. No plate voltage on oscillator Tube JAN-6G6G. Filaments light. Plate voltage on amplifier Tube JAN-6G6G.</p>	<p>3. Open resistor R-7. Shorted resistor R-6. Open oscillator winding on transformer T-1. Shorted capacitor C-4A.</p>	<p>3. Replace defective parts.</p>
<p>4. No plate voltage on amplifier Tube JAN-6G6G. Filaments light. All other voltages normal.</p>	<p>4. Open primary winding on transformer T-2.</p>	<p>4. Replace defective parts.</p>

14 17. TROUBLE-SHOOTING CHART (contd).

<i>Symptoms</i>	<i>Probable trouble</i>	<i>Corrections</i>
<p>5. Fuses blow when power is applied</p> <p>6. Oscillator does not operate. Plate voltage measured at plates of tubes. No audio voltage can be measured at grid of amplifier Tube JAN-6G6G.</p> <p>7. No output from speaker or lamp. Oscillator functioning. Audio voltage measured at grid of amplifier Tube JAN-6G6G. Plate voltage measured at plates of tubes.</p> <p>8. Lamp does not light when key is pressed. All controls set correctly. Tone can be obtained from speaker when controls are set in speaker position.</p>	<p>5. Switch S-1 in wrong position. Defective vibrator (when using d-c input). Shorted capacitor C-7 (12-volt and 24-volt input). Defective transformer T-3. Shorted capacitors C-8, C-9A, C-9B, or C-6. Defective rectifier Tube JAN-6X5 GT/G. Grounded winding on choke L-1. Grounded primary winding on transformer T-2. Shorted capacitor C-2 (when switch on control R-8 is in speaker position).</p> <p>6. Defective oscillator Tube JAN-6G6G. Defective capacitor C-1A, C-1B, C-3, or C-4B. Defective resistor R-2, R-3, or R-4. Defective transformer T-1.</p> <p>7. Defective amplifier Tube JAN-6G6G. Open resistor R-5. Defective transformer T-2.</p> <p>8. Defective lamp I-1. Open capacitor C-2. Open resistor R-1. Defective switch on control R-8.</p>	<p>5. Replace defective parts. Check position of switch S-1.</p> <p>6. Replace defective parts.</p> <p>7. Replace defective parts.</p> <p>8. Replace defective parts.</p>

<p>9. No output from speaker. Lamp functions properly.</p> <p>10. Continuous output obtained with key disconnected.</p> <p>11. Varying FREQUENCY control R-8 does not change pitch of output tone. Rest of set functioning properly.</p>	<p>9. Defective speaker LS-1. Defective switch on control R-8. Defective secondary on transformer T-2. Headset jack J-1 shorted.</p> <p>10. Shorted capacitor C-4B. Key terminals shorted, Shorted elements in Tube JAN-6G6G.</p> <p>11. Defective control R-8. Defective transformer T-1. Defective resistor R-9.</p>	<p>9. Inspect jack J-1 and remove short. Replace other defective parts.</p> <p>10. Replace capacitor C-4B. Check key terminals for shorts. Replace oscillator tube.</p> <p>11. Replace defective parts.</p>
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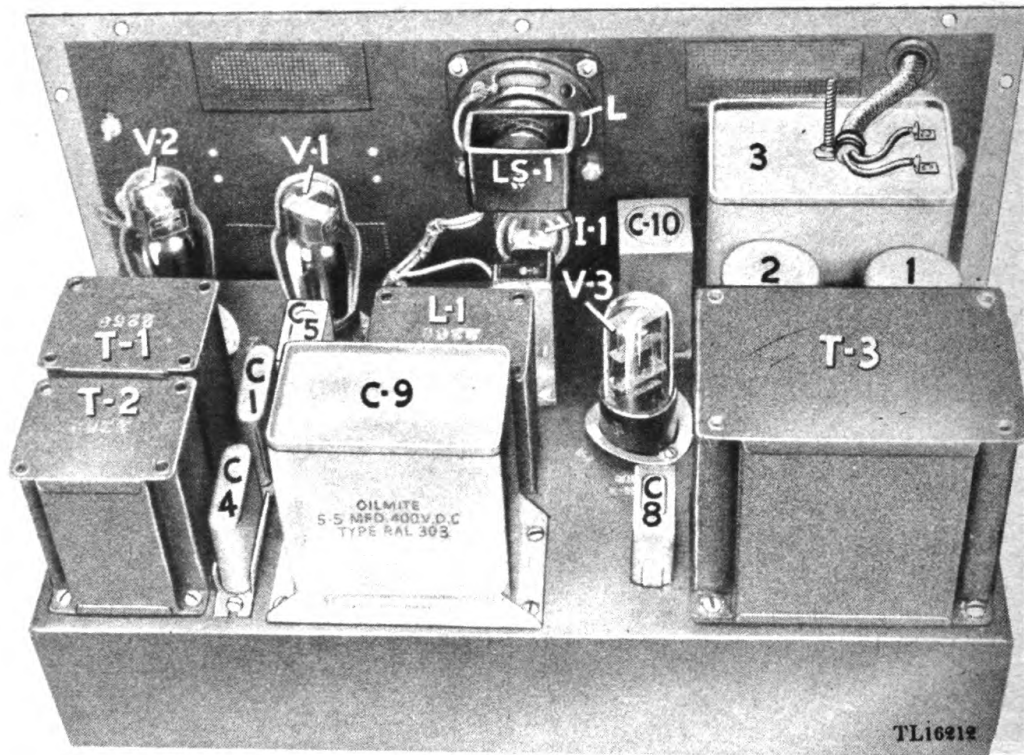


Fig. 2 Code Training Set AN/GSC-T1, top internal view.

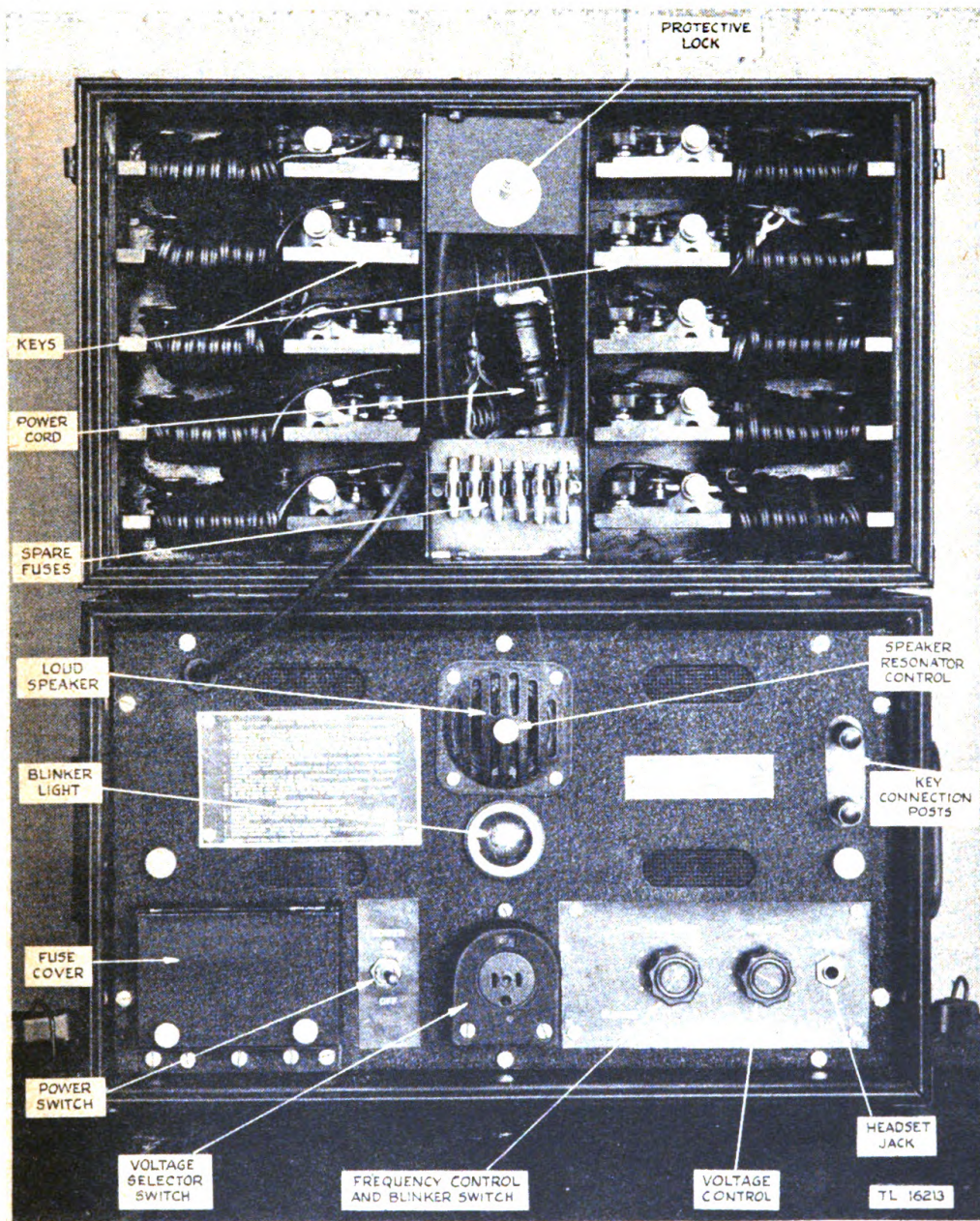


Fig. 3 Code Training Set AN/GSC-T1, front view

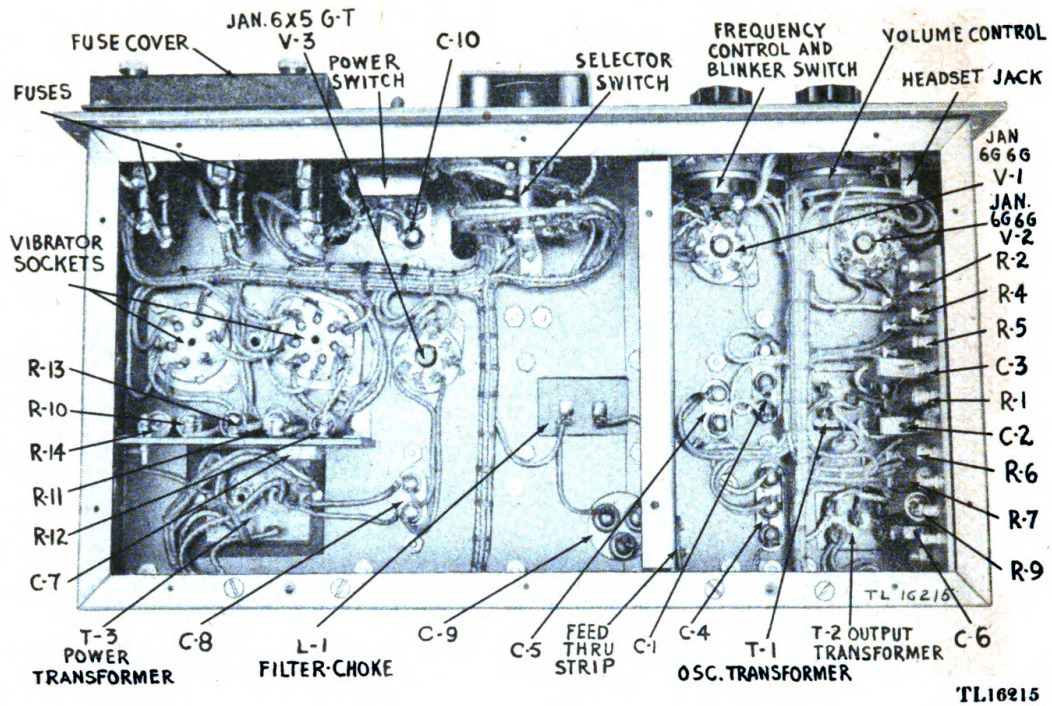


Fig. 5 Code Training Set AN/GSC-T1, bottom view.

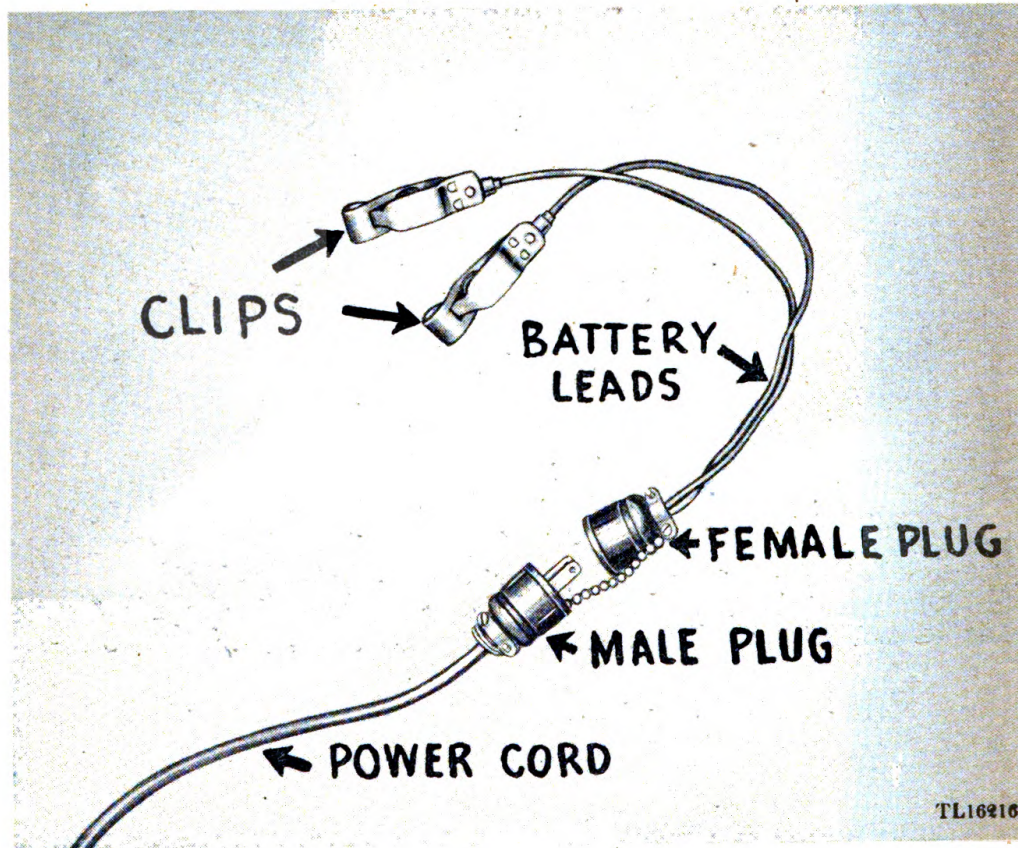


Fig. 6 Power cord and battery leads.

SECTION V. SUPPLEMENTARY DATA

18. MAINTENANCE PARTS LIST FOR CODE TRAINING SET AN/GSC-T1.

Ref symbol	Signal Corps stock No.	Name of part and description	Quan per unit	Run-ning spares	Orgn stock	3d ech	4th ech	5th ech	Depot stock
E14	2Z602-1	BEZEL, neon bulb; 1 5/8" diam x 3/4" thick over-all; Rose Specialty Products Co No. 1 1/2"-102; mounts in 1 3/8" diam hole by means of spring clips.	1	1		*	*	*	*
E3	2Z9402.197	BOARD, terminal: 2 solder lug feed-through terminals; bakelite; 1" x 1" wide x 3/32" thick over-all; Ucinite No. 153170; (two 1/16" diam mtg holes on 5/8" mtg centers).	1				*	*	*
E4	2Z9410.84	BOARD, terminal: 10 solder lug terminals; for 5 resistors and 1 capacitor; bakelite; 4 1/2" long x 2 3/4" wide x 3/32" thick; Ucinite No. 153173; (furnished with two mtg brackets riveted to strip).	1				*	*	*
E2	2Z9420.32	BOARD, terminal: 20 solder lug terminals; for 7 resistors and 3 capacitors; bakelite; 5 1/8" long x 2 3/4" wide x 3/32" thick; Ucinite No. 153172; (two 3/16" diam mtg holes on 4 3/4" centers).	1				*	*	*
W1	3E4538	CABLE ASSEMBLY, power: general purpose; rubber-jacketed; round, 0.325" diam; 9' long; two No. 16 AWG stranded copper conductors, each comprising 26 No. 30 AWG strands; Belden No. 16 Trump; (includes Amphenol No. 61M11 2-prong male connector; Amphenol No. 61F11 2-prong female connector; 2 battery clips).	1			*	*	*	*

* Indicates stock available.

18. MAINTENANCE PARTS LIST FOR CODE TRAINING SET AN/GSC-T1 (contd).

Ref symbol	Signal Corps stock No.	Name of part and description	Quan per unit	Run-ning spares	Orgn stock	3d ech	4th ech	5th ech	Depot stock
C6	3D9250-89	CAPACITOR, fixed: mica; 250-mm $\pm 20\%$; 400 v dc (working); $1\frac{1}{8}$ " x $1\frac{1}{8}$ " x $\frac{3}{32}$ " thick; Tobe type A; molded bakelite, 2 wire leads $1\frac{1}{4}$ " long.	1			*	*	*	*
C7	3D9750-14	CAPACITOR, fixed: mica; 750-mmf $\pm 20\%$; 100 v dc (working); $1\frac{1}{8}$ " x $1\frac{1}{8}$ " x $\frac{3}{32}$ " thick; Tobe type A; molded bakelite, 2 wire leads $1\frac{1}{4}$ " long.	1			*	*	*	*
C3	3DA10-286	CAPACITOR, fixed: mica; 10,000-mmf $\pm 10\%$; 120 v dc (working); $1\frac{1}{8}$ " x $1\frac{1}{8}$ " x $\frac{1}{8}$ " thick; Tobe type D; molded bakelite; 2 wire leads $1\frac{1}{4}$ " long.	1			*	*	*	*
C8	3DA7-12	CAPACITOR, fixed: oil-filled; 7,000-mmf $+40\%$ -20% ; 1,000 v dc (working); $1\frac{1}{4}$ " x 1 " x $\frac{5}{8}$ " thick; Tobe No. MCE-G 702; metal case; hermetically sealed; insulated solder lug terminals on bottom spaced $\frac{1}{2}$ " on centers; brackets OMM.	1			*	*	*	*
C2	3DA10-159	CAPACITOR, fixed: oil-impregnated; 10,000-mmf $+60\%$ -20% ; 400 v dc (working); $1\frac{1}{8}$ " x $1\frac{1}{8}$ " x $\frac{1}{8}$ " thick; Tobe type DP; molded bakelite; 2 wire leads $1\frac{1}{4}$ " long.	1			*	*	*	*
C1 C4	3DA100-355	CAPACITOR, fixed: oil-filled; 2-section; each 100,000-mmf -20% ; 400 v dc (working); $1\frac{1}{4}$ " high x $1\frac{1}{4}$ " long x $\frac{1}{2}$ " thick; Tobe No. MCE-4EE 104; metal case; hermetically sealed; oil-impregnated; 3 insulated solder lug terminals on bottom spaced $\frac{1}{2}$ " on centers; two slotted mtg holes on $2\frac{1}{8}$ " centers; bracket CA-2558.	2			*	*	*	*

C5	3DB2.31	1	CAPACITOR, fixed: oil-filled; 2-mf +0 -40%; 100 v dc (working); 1½" x 1¼" x 5/8" thick; Tobe No. PHS-31; metal case; hermetically sealed; 2 insulated solder lug terminals on bottom spaced ½" on centers.	*	*	*	*	*	*
C10	3DB2.401	1	CAPACITOR, fixed: oil-filled; 2-mf ±20%; 400 v dc (working); 2¼" x 5/8" thick; Tobe No. OM-401; metal case; hermetically sealed; oil-impregnated; 2 insulated solder lug terminals on bottom spaced ½" on centers; brackets OM 601.	*	*	*	*	*	*
C9	3DB5-82	1	CAPACITOR, fixed: oil-filled; 2-section; 5-mf ±20%; 400 v dc (working); 3¼" x 3¼" x 2" thick; Tobe No. RAL 308; metal case; oil-impregnated; 3 insulated solder lug terminals on bottom, spaced 2/8" on centers; four 3/8" mounting holes on 3¼" x 1 1/8" centers.	*	*	*	*	*	*
L1	3C553	1	COIL, radio a-f; filter; 10-h; 30-ma; 2/8" high x 2¼" wide x 2 1/8" diam over-all; Merit Coil & Transformer Co No. 2260; two terminal lugs on bottom; four 3/8" diam mtg holes on 1¼" x 2" mtg centers; vacuum wax impregnated.	*	*	*	*	*	*
H7	2Z2642.4	2	CLAMP, tube: spring-steel; cadmium-plated; 1 1/8" OD; 1 3/8" ID; two 1/8" mtg holes on 1½" mtg centers; for small base tubes.	*	*	*	*	*	*
H6	2Z2638-1	1	CLAMP, tube: spring steel; cadmium-plated; 1 1/8" OD; 1 3/8" ID; two 1/8" mtg holes on 1½" mtg centers; for intermediate base tubes.	*	*	*	*	*	*

* Indicates stock available.



18. MAINTENANCE PARTS LIST FOR CODE TRAINING SET AN/GSC-T1 (contd).

Ref symbol	Signal Corps stock No.	Name of part and description	Quan per unit	Run-ning spares	Orgn stock	3d ech	4th ech	5th ech	Depot stock
H8	4A401-T1/C4	CLAMP, vibrator: spring steel; cadmium-plated; 1 3/8" OD; 1 1/4" ID; two 3/8" diam mtg holes on 1 7/8" mtg centers.	2					*	*
E13	3Z1086B-1	CLIP: test; 25-amp; Mueller No. 24A.	2		*	*	*	*	*
W2	3E4508-1	CORD, key: rubber-jacketed; Buna-S insulation; type POSJ-64; two stranded-copper conductors, each comprising 41 x 34AWG strands; Belden No. 18 Tandem; two tie cords attached by metal clamps; solderless spade lugs on one end and rectangular solderless lugs on the other end; 10' long.	10	2	*	*	*	*	*
O1	2Z9714-24	DIAL, calibrated disk: steel; black baked enamel finish; 1 7/8" max diam x 5/8" max thick over-all; marked OFF 6V DC 12V DC 24V DC 115V DC 115V AC 23 OV AC; mounts on 1/4" shaft 1/2" deep 8-32 set-screw.	1					*	*
F5	3Z2585	FUSE; 1/8-amp; 250-v; Littelfuse No. 1044, type 3AG.	1	1	*	*	*	*	*
F1	3Z2587	FUSE; 1/4-amp; 250-v; Littelfuse No. 1045; Bussman type 3AG.	2	2	*	*	*	*	*
F2	3Z2600A7	FUSE; 3/4-amp; 250-v nominal rating; Littelfuse No. 1047 or Bussman No. 3AG.	1	1	*	*	*	*	*
F4	3Z2601.5	FUSE; 1 1/2-amp; 250-v; Littelfuse No. 1041 or Bussman No. 3AG.	1	1	*	*	*	*	*

F6	SZ1950	FUSE FU-50: 3-amp; 250-v; type 3AG.	1	1	*	*	*	*	*	*
E1	SZ1939.1	FUSE POST: Bussman No. HCM; for 4AG fuse.	6			*	*	*	*	*
E5	SZ3982-23	HOLDER, spare fuse: clip-type; holds 6 3AG fuses; 3 1/8" long x 1 1/2" wide x 3 7/8" thick; XXP bakelite; two 5/8" diam mtg holes on 2 3/8" centers.	1				*	*	*	*
E11	3G1770-32.4	INSULATOR, washer: fiber; 1/2" OD; 1/4" diam x 1 1/8" high shoulder; 3/8" hole.	1				*	*	*	*
J1	2Z5534A	JACK JK-34-A.	1				*	*	*	*
K1	SZ3437	KEY J-37.	10		*	*	*	*	*	*
E10	2Z3786.32	KNOB, round: black bakelite; for 1/4" diam shaft; single No. 8-32 setscrew; 1 1/4" diam x 5/8" high over-all; Crowe No. 6537; brass insert; shaft hole 1/2" deep; finger grip knurl; white arrow engraved on face.	2				*	*	*	*
I1	2Z5890-13	LAMP, glow: 105- to 125-v; 1-w; bulb G-10 clear; 2" long over-all; d-c; bayonet base.	1	1	*	*	*	*	*	*
X3	2Z5881-7	LAMPHOLDER: candelabra, dual contact; bayonet base; 1 1/8" high x 1 3/8" long x 1" wide over-all; Rose Specialty Products Co. No. 9-S-4634-L (bakelite insulation).	1				*	*	*	*
H9	4A407-T1/P3	PIN, aligning: steel; cadmium-plated; 1 1/4" max diam x 1 5/8" long; 1/8" diam mtg holes on 7/8" mtg centers; MCE No. CTS-H9.	1				*	*	*	*
J3	6Z7567-1	PLUG: female, 2-pole; Amphenol No. 67-F11.	1				*	*	*	*

* Indicates stock available.

18. MAINTENANCE PARTS LIST FOR CODE TRAINING SET AN/GSC-T1 (contd).

Ref symbol	Signal Corps stock No.	Name of part and description	Quan per unit	Run-ning spares	Orgn stock	3d ech	4th ech	5th ech	Depot stock
J2	6Z7567-5	PLUG; male; Amphenol No. 61-M11.	1			*	*	*	*
H4	3Z737-6.1	POST, binding: screw-type; Eby No. 39 Ensign.	2			*	*	*	*
H5	3Z737-28	POST, binding: screw-type; 7/8" long x 1/2" diam over-all; No. 6-32 x 3/8" long mtg stem; Eby; No. Ace-33; black bakelite cap; 1/8" wire hole in neck; metal base.	20			*	*	*	*
R4	3Z4526	RESISTOR, fixed: composition; 2,000 ohms ±10%; 1/2-w.	1			*	*	*	*
R2	3Z6650-45	RESISTOR, fixed: composition; 50,000 ohms ±10%; 1/2-w.	1			*	*	*	*
R5	3Z6050-44	RESISTOR, fixed: composition; 500 ohms ±10%; 1-w.	1			*	*	*	*
R6	3Z6625-52	RESISTOR, fixed: composition; 25,000 ohms ±10%; 1-w.	1			*	*	*	*
R1	3RC41BE472K	RESISTOR, fixed: composition; 4,800 ohms ±10%; 2-w.	1			*	*	*	*
R7	3Z6650-7	RESISTOR, fixed: composition; 50,000 ohms ±10%; 2-w.	1			*	*	*	*
R11	3Z6002-53	RESISTOR, fixed: wire-wound; 20 ohms ±15%; 5-w; 1 3/4" max length x 1/4" max diam; Sprague Koolohm 5K; ceramic insulation; two axial wire leads 2 3/4" long.	1			*	*	*	*

R12	SZ6004E6-7	RESISTOR, fixed; wire-wound; 45 ohms \pm 15%; 5-w; 1 3/4" max length x 1 1/2" max diam; Sprague Koolohm 5K; ceramic insulation; two axial wire leads 2 3/4" long.	1	*	*	*	*	*	*
R13	SZ6220-34	RESISTOR, fixed; wire-wound; 2,200 ohms \pm 15%; 5-w; 1 1/8" long x 1 1/2" max diam; Sprague type Koolohm 5K; ceramic insulation; two axial wire leads 2 3/4" long.	1	*	*	*	*	*	*
R10	SZ6610-162	RESISTOR, fixed; wire-wound; 10,000 ohms \pm 15%; 1 1/8" max length x 1 1/2" max diam; Sprague type Koolohm 5K; ceramic insulation; two axial wire leads 2 3/4" long.	1	*	*	*	*	*	*
R9	SZ6630-71	RESISTOR, fixed; wire-wound; 30,000 ohms \pm 15%; 1 1/8" max length x 1 1/2" max diam; Sprague type Koolohm 5K; ceramic insulation; two axial wire leads 2 3/4" long.	1	*	*	*	*	*	*
R14	SZ6005-115	RESISTOR, fixed; wire-wound; 50 ohms \pm 5%; 10-w; 1 3/4" max length x 1 1/2" max diam; Sprague type Koolohm 10K; ceramic insulation; two axial wire leads 2 3/4" long.	1	*	*	*	*	*	*
R3	2Z7272-200	RESISTOR, variable; carbon; 500,000 ohms; 1/2-w; 3 terminals; body 1 1/4" diam x 1/2"; shaft 1/4" diam x 3/8" long; Centralab No. 500 M6; (enclosed body, washer and hex, nut included for mtg; bushing 3/8"-32 x 3/8" long).	1	*	*	*	*	*	*

* Indicates stock available.

18. MAINTENANCE PARTS LIST FOR CODE TRAINING SET AN/GSC-T1 (contd).

Ref symbol	Signal Corps stock No.	Name of part and description	Quan per unit	Run-ning spares	Orgn stock	3d ech	4th ech	5th ech	Depot stock
R8	2Z7279-87	RESISTOR, variable; carbon; 1-megohm; $\frac{1}{4}$ -w; 3 terminals; body $1\frac{1}{4}$ " diam x $\frac{11}{16}$ " deep; shaft $\frac{1}{4}$ " diam x $\frac{3}{8}$ " long; Centralab No. 1000M1; (en-closed body; includes DPST switch; washer and hex. nut included for mounting; bushing $\frac{3}{8}$ "-32 x $\frac{3}{8}$ ").	1			*	*	*	*
H2	6L17109-16	SCREW, speaker resonator: 1" long x $\frac{1}{2}$ " diam over-all; consists of knurled head $\frac{1}{8}$ " of No. 8-40 thread, $\frac{1}{2}$ " long x $\frac{1}{8}$ " bearing point; MCE No. CTS-H2.	1				*	*	*
X4	2Z8676.59	SOCKET: tube; 6-contact; National No. CIR-6.	1			*	*	*	*
X1 } X2 } X5 }	2Z8678.32	SOCKET: tube; octal; Ucinite No. 11500-1.	3			*	*	*	*
X6	2Z8677.39	SOCKET, vibrator: 7-prong S; ceramic; $1\frac{3}{8}$ " diam x $\frac{3}{4}$ " high over-all; National CIR-7S: (mounts by means of cadmium-plated metal saddle).	1			*	*	*	*
LS1	6C34-8	SPEAKER, dynamic; $\frac{2}{8}$ " diam cone; permanent mag-net; output 2-w; voice coil impedance 4 ohms; $3\frac{5}{16}$ " diam x $1\frac{3}{4}$ " deep over-all; Cinaudagraph model No. 2-ZM; (mounts by four holes $\frac{5}{16}$ " evenly spaced on cone mtg flange; resonated at 500 cycles by thumb-screw adjustment of diaphragm).	1			*	*	*	*

H3	6C34-8/R1	SPRING, speaker resonator: 1 1/8" long x 1 1/8" wide x 3/4" diam over-all; No. 24 gauge; spring steel; 1 1/4" diam mtg hole; MCE No. CTS-H-3.	1				*	*	*	*
3A	3Z1891-12.1	SUPPRESSOR, electrical noise; liquid impregnated; capacitor and coil type; 3 3/4" long x 1 7/8" wide x 4 1/8" high over-all; Tobe Filterette No. 1176; (3-amp, 250-volt a-c/d-c; rectangular metal case; mounted by two spade bolt brackets on 4 1/8" mtg centers; four solder lug terminals.	1				*	*	*	*
3B										
3C										
3D										
3E										
3F										
S1	3Z9826-16.2	SWITCH, rotary; 7-position, 2-section, wafer-type; open body; 2" diam x 2 1/4" long over-all; Ucinite Co. No. 198199; shaft 1/4" diam x 1/2" long; bushing 3/8" diam x 3/8" long; solder lug terminals; mtg brackets attached.	1				*	*	*	*
S2	3Z9858-23	SWITCH, toggle; SPST; 250-volt, 3-amp; bakelite insulation; 1 3/4" long x 1 3/4" wide x 1 1/8" diam over-all; AWS spec C75.15; Arrow-Hart & Hageman Electric Co. type ST-16-A; 1/2" lg x 1/2" mtg bushing, includes 2 hex. nuts; solder lug terminals.	1				*	*	*	*
T1	2Z9638-37	TRANSFORMER, a-f; oscillation; steel frame; 2 7/8" high x 2 1/4" wide x 2 1/8" diam over-all; Merit Coil & Transformer Corp No. A-2258; 5 terminal lugs on bottom 3/16" diam mtg holes on 1 1/2" x 2" mtg centers; vacuum wax impregnated.	1				*	*	*	*
T2	2Z9632.273	TRANSFORMER, a-f; output; steel frame; 2 7/8" high x 2 1/4" wide x 2 1/8" diam over-all; Merit Coil & Transformer Corp. No. A-2259; (5 terminal lugs on bottom; four 3/16" diam mtg holes on 1 1/2" mtg centers; vacuum wax impregnated.	1				*	*	*	*

* Indicates stock available.

18. MAINTENANCE PARTS LIST FOR CODE TRAINING SET AN/GSC-T1 (contd).

Ref symbol	Signal Corps stock No.	Name of part and description	Quan per unit	Run-ning spares	Orgn stock	3d ech	4th ech	5th ech	Depot stock
TS	2Z9608-40	TRANSFORMER, power: plate and filament; fully enclosed steel case; 4 1/2" wide x 3 7/8" high x 3 1/4" diam over-all; Merit Coil & Transformer Corp No. P-2261; (pri tapped for 6-12-24-115 v/dc, 115-230 v/ac, 50/60 cycles; Sec No. 1 420-v, 30-ma; Sec No. 2 6.3-v, 0.9-amp; four 1/4" diam mtg holes on 3/8" x 2 1/8" mtg centers; 14 solder lugs on bottom; vacuum wax impregnated.	1			*	*	*	*
V1	2J6G6G	TUBE JAN-6G6G.	2	2	*	*	*	*	*
V2	2J6X5GT/G	TUBE JAN-6X5GT/G.	1	1	*	*	*	*	*
V3	3H6694-20	VIBRATOR, non-synchronous; input 6 v dc; 3-amp; tubular aluminum case; 3 1/2" long x 1 1/2" diam over-all; 7-prong S base; Oak Mfg. Co No. V-6428.	1	1	*	*	*	*	*
2	3H6694-19	VIBRATOR, non-synchronous; input 115 v dc; 1/4-amp; tubular aluminum case; 3 1/2" long x 1 1/2" diam over-all; 6-prong std base; Oak Mfg. Co No. V-6429.	1	1	*	*	*	*	*

* Indicates stock available.

19. MOISTUREPROOFING AND FUNGIPROOFING.

a. General. The operation of Signal Corps equipment in tropical areas where temperature and relative humidity are extremely high requires special attention. The following items represent problems which may be encountered in operation:

- (1) Resistors, capacitors, coils, chokes, transformer windings fail.
- (2) Electrolytic action takes place in resistors, coils, and transformer windings causing eventual break-down.
- (3) Hook-up wire and cable insulation break down. Fungus growth accelerates deterioration.
- (4) Moisture forms electrical leakage paths on terminal boards and insulating strips.

b. Treatment. A moistureproofing and fungiproofing treatment has been devised which, if properly applied, provides a reasonable degree of protection against fungus growth, insects, corrosion, salt spray, and moisture. The treatment involves the use of a moisture- and fungi-resistant varnish applied with a spray gun or brush. Refer to TB SIG 13, Moistureproofing and Fungiproofing Signal Corps Equipment, for a detailed description of the varnish-spray method of moistureproofing and fungiproofing and the supplies and equipment required in this treatment.

CAUTION: Varnish spray may have toxic effects if inhaled. To avoid inhaling spray, use respirator if available; otherwise, fasten cheesecloth or other cloth material over nose and mouth.

c. Step-by-step Instructions for Treating Code Training Set AN/GSC-T1.

(1) PREPARATION.

Make all repairs and adjustments necessary for proper operation of the equipment.

(2) DISASSEMBLY.

- (a) Open and latch cover into upright position.
- (b) Remove power cord with adapter and battery clips from the center storage compartment of the cover.
- (c) Remove the 9 panel holding screws from the panel and 2 chassis holding screws from the bottom rear of the case.
- (d) Grasp the panel grip knobs and pull panel and chassis assembly from the carrying case. (Carrying case not to be treated.)
- (e) Remove the chassis bottom cover plate exposing the wiring. (Cover plate not to be treated.)
- (f) Remove the key mounts with cord assemblies from the cover storage racks.
- (g) Thoroughly clean the unit by removing all oil, dirt, rust, or fungi adhering to any of the components.

(3) MASKING UNDERSIDE OF CHASSIS.

- (a) Mask contacts of the rotary voltage selector switch.
- (b) Mask the jack spring contacts.
- (c) Mask the flange around the skirt of the chassis to which the chassis bottom cover plate is attached.
- (d) Leave tubes and vibrators in their respective sockets.

(4) DRYING.

- (a) Place equipment in drying oven and bake from 2 to 3 hours at 160° F. *Do not exceed 160° F.*
- (b) If wax should begin to melt on any of the components, lower baking temperature and increase baking time. For each 10° drop in baking temperature increase baking time one hour.

(5) VARNISHING.

(a) Apply 3 coats of moistureproofing and fungiproofing varnish (Lacquer, Fungus-resistant, Spec. No. 71-2202, Stock No. 6G1005.3 or equal) with spray gun. Allow each coat to dry 15 to 20 minutes before applying the next coat.

(b) The butted ends of the key cords and stay cords at the point where the wires leave the jacket shall be coated by applying moistureproofing and fungiproofing varnish.

(c) Inspect treated equipment and apply varnish with a brush to those portions not reached by spray gun. Be sure all components are adequately protected by varnish.

(d) Brush coat all exposed wiring and terminals above the chassis and which are connected to components mounted on the panel.

(6) REASSEMBLE AND TEST OPERATIONS.

Reassemble and test for proper operation from the following power sources:

- (a) 6, 12, or 24 volts d-c.
- (b) 115 volts d-c.
- (c) 115 volts 60 cycles a-c.

(7) MARKING.

Mark M.F.P. followed by date of treatment.

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