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DATE: 11 JULY 47

AN 16-30CRT3-2

*Peter K. Stearns*  
Captain

HANDBOOK OF  
MAINTENANCE INSTRUCTIONS

for

RADIO SET

AN/CRT-3

**REVISION**  
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## *Destruction of Abandoned Materiel in the Combat Zone*

In case it should become necessary to prevent the capture of this equipment and when ordered to do so, DESTROY IT SO THAT NO PART OF IT CAN BE SALVAGED, RECOGNIZED, OR USED BY THE ENEMY. BURN ALL PAPERS AND BOOKS.

*Means:—*

1. Explosives, when provided.
2. Hammers, axes, sledges, machetes, or whatever heavy object is readily available.
3. Burning by means of incendiaries such as gasoline, oil, paper, or wood.
4. Grenades and shots from available arms.
5. Burying all debris or disposing of it in streams or other bodies of water, where possible and when time permits.

*Procedure:—*

1. Obliterate all identifying marks. Destroy nameplates and circuit labels.
2. Demolish all panels, castings, switch- and instrument-boards.
3. Destroy all controls, switches, relays, connections, and meters.
4. Rip out all wiring and cut interconnections of electrical equipment. Smash gas, oil, and water-cooling systems in gas-engine generators, etc.
5. Smash every electrical or mechanical part, whether rotating, moving, or fixed.
6. Break up all operating instruments such as keys, phones, microphones, etc.
7. Destroy all classes of carrying cases, straps, containers, etc.
8. Bury or scatter all debris.

DESTROY EVERYTHING!



## *Unsatisfactory Report*

*For U. S. Army Air Force Personnel:*

In the event of malfunctioning, unsatisfactory design, or unsatisfactory installation of any of the component units of this equipment, or if the material contained in this book is considered inadequate or erroneous, an Unsatisfactory Report, AAF Form No. 54, or a report in similar form, shall be submitted in accordance with the provisions of Army Air Force Regulation No. 15-54, listing:

1. Station and organization.
2. Nameplate data (type number or complete nomenclature if nameplate is not attached to the equipment).
3. Date and nature of failure.
4. Radio model and serial number.
5. Remedy used or proposed to prevent recurrence.
6. Handbook errors or inadequacies, if applicable.

*For U. S. Navy Personnel:*

Report of failure of any part of this equipment during its guaranteed life shall be made on Form N. Aer. 4112, "Report of Unsatisfactory or Defective Material," or a report in similar form, and forwarded in accordance with the latest instructions of the Bureau of Aeronautics. In addition to other distribution required, one copy shall be furnished to the inspector of Naval Materiel (location to be specified) and the Bureau of Ships. Such reports of failure shall include:

1. Reporting activity.
2. Nameplate data.
3. Date placed in service.
4. Part which failed.
5. Nature and cause of failure.
6. Replacement needed (yes—no).
7. Remedy used or proposed to prevent recurrence.

*For British Personnel:*

Form 1022 procedure shall be used when reporting failure of radio equipment.

### SAFETY NOTICE

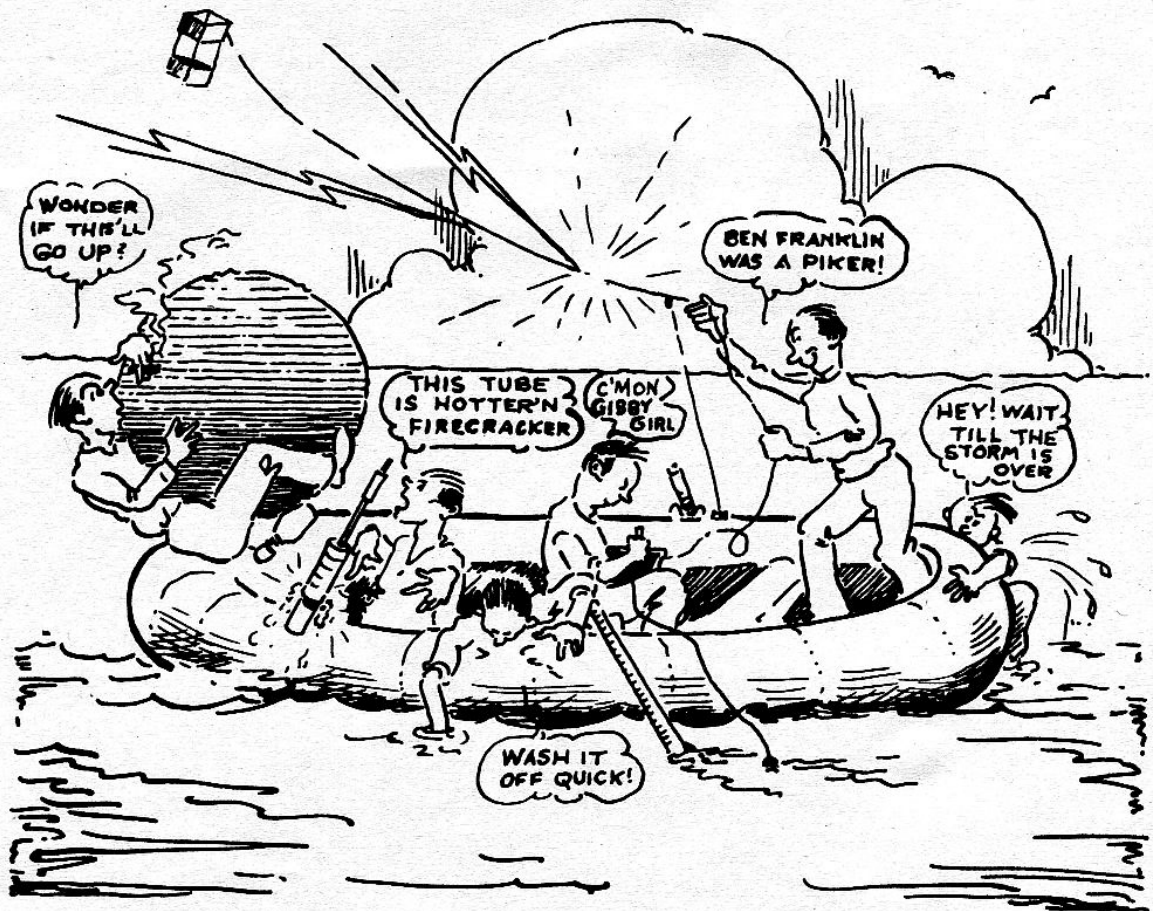
Do not raise the antenna during severe electrical storms. Observe this rule to prevent death or serious injury.

Observe the following precautions when using the hydrogen generator:

Permit no flames, coals, or sparks near the balloon or opened hydrogen generator, since hydrogen gas is explosive.

Do not allow the residue in the can to come in contact with the body or clothing, since it is caustic and will cause burns. Immediately wash in water any part of the body that is burned. Throw the hydrogen generator away immediately after use.

Do not touch the hydrogen generator while it is in use, since it generates large amounts of heat.



AN 16-30CRT3-2



Figure 1-1. Radio Set AN/CRT-3—Major Assemblies

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## SECTION I

### GENERAL DESCRIPTION

#### 1. GENERAL.

*a. PURPOSE.*—Radio Set AN/CRT-3 is a simple, rugged emergency transmitting system carried in aircraft designed for operation from a rubber life raft. The set may be dropped over water by means of the parachute supplied. Radio transmission is provided on two distinct frequencies intended for reception by two groups of stations, each having distinct rescue functions. Stations cooperating in rescue operations at long range generally make use of the 8280-kilocycle transmission whereas aircraft or ships locally engaged in rescue missions make use of the 500-kilocycle signal. The equipment is sufficiently buoyant to float and is brilliant orange-yellow, which color gives greatest visibility against dark backgrounds.

*b. TYPES OF OPERATION.*—The radio set automatically transmits in code the international distress signal (SOS). Provision is also made to allow manual keying of the transmitted code signals. Any operator, no matter how little training he has had, can send distress signals or messages which, when received, will permit bearings to be taken. The radio set may also be used to supply power for Signal Lamp M-308-B. This combination may be used as a hand-keyed signal light to convey messages visually.

#### *c. RADIO FREQUENCIES USED.*

(1) When manual keying is used, the radio set operates on the international distress frequency of 500 kilocycles with a 1000-cycle tone modulation.

(2) When automatic keying is used, the radio set transmits "SOS" signals on 500 kilocycles (with 1000-cycle modulation), and 8280 kilocycles (without tone modulation). The frequency automatically changes every 40 to 50 seconds.

*d. POWER OUTPUT.*—The power output is approximately 2-1/2 watts on 500 kilocycles and approximately 2 watts on 8280 kilocycles.

#### *e. DISTANCE RANGE.*

(1) ON 500 KILOCYCLES.—The signal on 500 kilocycles will be heard at distances from 200 to 300 miles under optimum conditions, that is, when transmitting at sea with the ground cap in the water. High atmospheric noise conditions reduce this range. At the center of an inland lake, the range will be 30 to 50 miles. At the edge of a lake or large stream, the range will be 10 to 20 miles, provided the ground lead is in the water. On land, with the ground cap buried in moist earth, and with a spare antenna assembly laid out as a counterpoise, the range may be only 5 to 10 miles.

(2) ON 8280 KILOCYCLES.—The receivable range of 8280 kilocycle signals will depend on factors influencing skip distance, such as time of day, season, latitude, etc. In general reception of signals transmitted at this frequency will not be possible within short distances of the transmitter but will be good at greater distances. Probable daytime range at 8280 kilocycles will lie between 750 and 1500 miles. The distance range will be affected by the type of ground to an even greater extent than at 500 kilocycles since mistuning with a poor ground is even greater. Night time range may be several thousand miles. (Refer to section VI for more detailed discussion.)

*f. POWER REQUIREMENTS.*—All electrical power for operating either the radio transmitter or the signal light is furnished by the hand-powered generator inside the transmitter cabinet.

**2. EQUIPMENT SUPPLIED.**

(See figure I-1.)

The following components are supplied in one complete Radio Set AN/CRT-3.

Quantity per Equipment	Name of Unit	Army Type Designation	Navy Type Designation	Overall Dimensions (inches)	Weight (pounds)
1	Radio Transmitter, including:	T-74/CRT-3	T-74/CRT-3	10-1/2 x 10 x 9 (dimensions excluding belt and wrench)	16.0 (weight including belt and wrench)
	1 Hand Crank	CG-18-A		6 x 4-1/4 x 1	0.5
	1 Wrench			6-5/8 x 2-1/2 x 7/16	0.1
	1 Antenna Assembly wound on:	AS-207/CRT-3	AS-207/CRT-3	310 ft. long	0.6
	1 Reel	RL-48		1-1/2 x 3 diam.	0.1
	Kite	M-357-A		19 x 4 diam.	0.8
2	Balloon (in container)	M-278-A		5-1/8 x 4-1/4 diam.	1.3 each
2	Generator (hydrogen), including:	M-315-B		11-5/8 x 4-1/4 diam. (dimensions excluding inflating tube)	3.3 each (weight including inflating tube)
	2 Inflating Tubes			19 x 1-1/4 diam.	0.5 each
1	Signal Lamp (in container)	M-308-B		3-1/8 x 3 diam.	0.3*
2	Antenna Assembly (wound on spare reel inside container)	AS-207/CRT-3	AS-207/CRT-3	2-1/2 x 3 diam.	0.7
1	Bag including:	BG-155-A		20-1/4 x 17 x 14-1/2	8.1 (weight including pads and bag)
	1 Bag (for kite and inflating tubes)			23 x 5-1/4	0.1
	1 Pad			15 x 11 x 1/2	
	1 Pad			14-1/2 x 10 x 1/2	0.4
	2 Pads			7 x 4 x 2	0.3 each
	2 Pads			14 x 4 x 2	0.6 each
1	Parachute	M-390-B		16 (packed) x 9 x 4	3.7
1	Handbook of Maintenance Instructions			8-3/8 x 10-7/8	0.5
				<b>Total Weight</b>	<b>40 pounds</b>

Note: Radio Transmitter T-74/CRT-3 is supplied with one JAN-128C7 vacuum tube, one JAN-12A6 vacuum tube, and one Crystal Unit CR-1A/AR installed in the proper sockets.

**3. EQUIPMENT REQUIRED BUT NOT SUPPLIED.**

a. Radio Set AN/CRT-3 is complete and includes all equipment needed for use at sea.

b. If Radio Set AN-CRT-3 is to be dropped on land, it is necessary to fasten Pad MC-539 to the bottom of Bag BG-155-A, or to substitute any standard AAF 24-foot aerial delivery parachute for Parachute M-390-B.

c. A receiver capable of receiving an MCW signal on 500 kilocycles (or 1000 kilocycles) and a CW signal on 8280 kilocycles is required for bench tests and 100-hour inspection.

d. Besides the receiver described in sub-paragraph c, above, and the usual test equipment, the following items are required for a complete depot test.

- (1) 660 mmf.  $\pm 1\%$  air or mica capacitor
- (2) 96 mmf.  $\pm 2\%$  air or mica capacitor
- (3) 0-500 RF milliammeter
- (4) 0-150 RF milliammeter
- (5) 34-ohm  $\pm 2\%$  non-inductive 5-watt resistor
- (6) 219-ohm  $\pm 2\%$  non-inductive 5-watt resistor

**4. DESCRIPTION OF MAJOR ASSEMBLIES****a. RADIO TRANSMITTER T-74/CRT-3.**

(See fig. 1-2.)

(1) The complete radio transmitter, including the power supply and keying assembly, is self-contained in an aluminum cabinet that is airtight and

waterproof. The cabinet is molded to the contour of the operator's legs. A belt is provided for securing the radio transmitter between the operator's legs.

(2) The operating controls are located in an elongated oval depression in the front panel. The controls consist of a three-position selector switch and a push-button telegraph key. No other controls are provided.

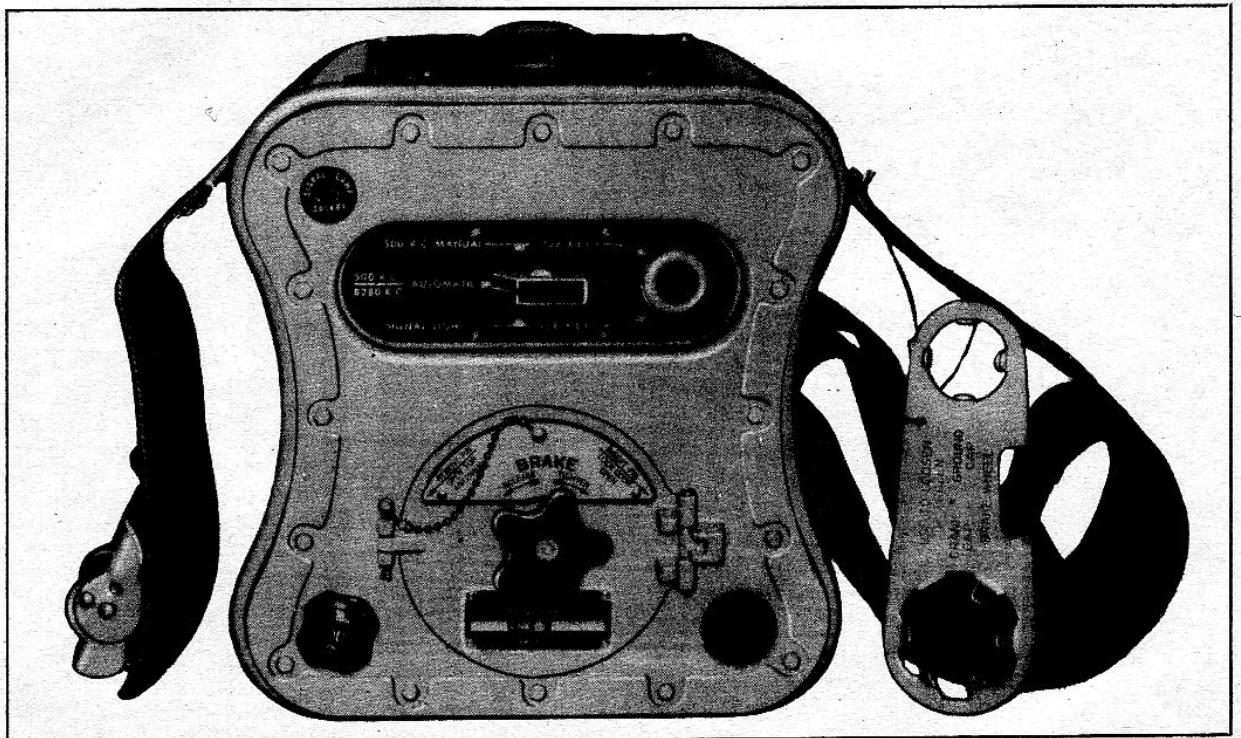
(3) In the upper left-hand corner of the panel is a jack for the plug in Signal Lamp M-308-B, described in this section.

(4) Reel RL-48 is fastened to the back of the door which opens in the lower half of the front panel. Antenna Assembly AS-207/CRT-3, which is described later in this section, is wound on this reel. A brake handle on the outside of the door controls the speed at which the antenna is unreeled.

(5) A ground well at the lower left of the front panel contains a bobbin with 8 feet of ground wire wound on it. The end of the ground wire is attached to the ground cap. When not in use this cap closes the ground well.

(6) A desiccator at the lower right of the front panel contains a bag filled with silica-gel crystals. These crystals absorb moisture from the interior through openings in the wall of the compartment and dry the air within the transmitter.

(7) The generator, automatic keying, and automatic frequency changing, are all operated by the



Revised 30 August 1945 Figure 1-2. Radio Transmitter T-74/CRT-3—Front View

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**Paragraph 4**

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turning of Hand Crank GC-18-A which screws into a socket in the top of the cabinet. When not in use, the crank fits into the crank well in the back of the cabinet where it is held by a special safety pin. The crank socket is covered by a cap when the crank is not in place.

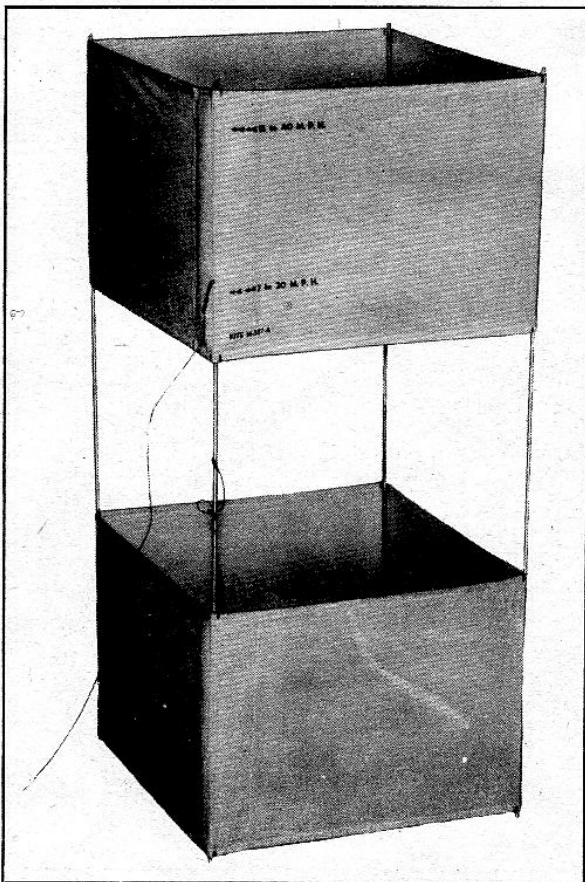
(8) A wrench is attached to the belt for use in removing the crank socket cap and ground cap, and in turning the antenna brake handle.

(9) Two indicator windows are provided at the top of the cabinet toward the front. One, marked "SPEED INDICATOR KEEP LIGHTED," is lit when the crank is turned at the proper speed of 80 revolutions per minute, or faster. The other indicator window is marked "RADIO OUTPUT" and is lit when the transmitter is on the air, flickering with the keying.

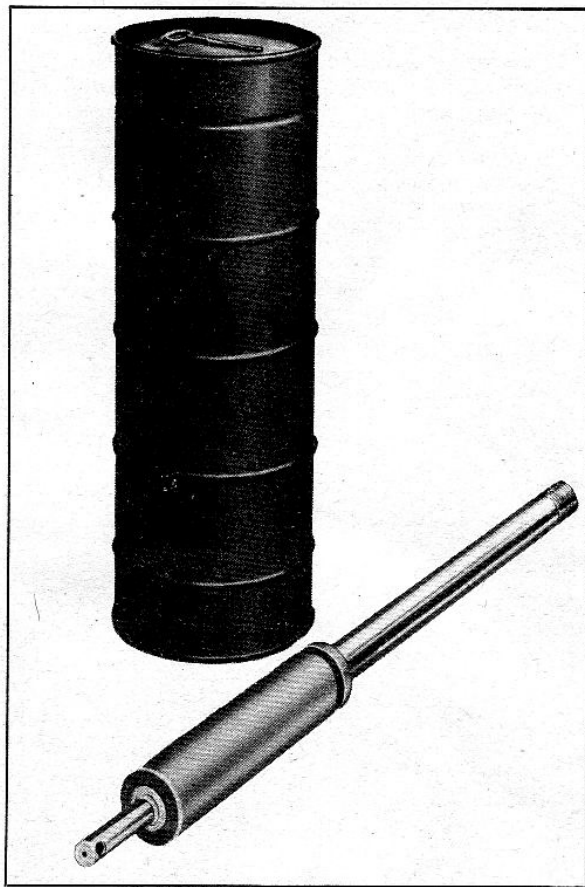
(10) Complete instructions for the use of the radio transmitter are given by extensive lettering on the top of the cabinet, along with markings on the control panel, door, ground cap, and antenna.

*b.* KITE M-357-A.—This collapsible box kite (see fig. 1-3) measures 17 x 17 x 36 inches when assembled, and is used to raise the antenna when a wind is blowing. Complete instructions for its assembly and

use are printed on the fabric of the kite. This kite will fly in wind velocities of from 7 to 40 miles per hour. The cloth of the kite has been made moisture-repellent. A section filled with kapok provides buoyancy; continued soaking, however, will eventually cause saturation and the kite will sink. The 36-inch longers are divided in the middle and equipped with sleeve fittings; this permits the kite to be stowed in a space approximately 19 inches long x 4 inches diameter.



**Figure 1-3. Kite M-357-A**



**Figure 1-5. Generator M-315-B**

*c.* BALLOON M-278-A.—The balloon (see fig. 1-4) is used to raise the antenna when lack of wind does not permit the use of the kite. The balloon is supplied in a can, 5-1/8 inches long x 4-1/4 inches in diameter, which is opened by a key. When inflated by means of the hydrogen generator described below, the diameter of the balloon is over four feet.

*d.* GENERATOR M-315-B.—This hydrogen generator (see fig. 1-5) is used to inflate the balloon. It consists of a large container opened at both ends by keys, and an inflating tube. Upon coming in contact with water, lithium hydride within the container generates hydrogen. The inflating tube serves as a handle to hold the container in the water and passes

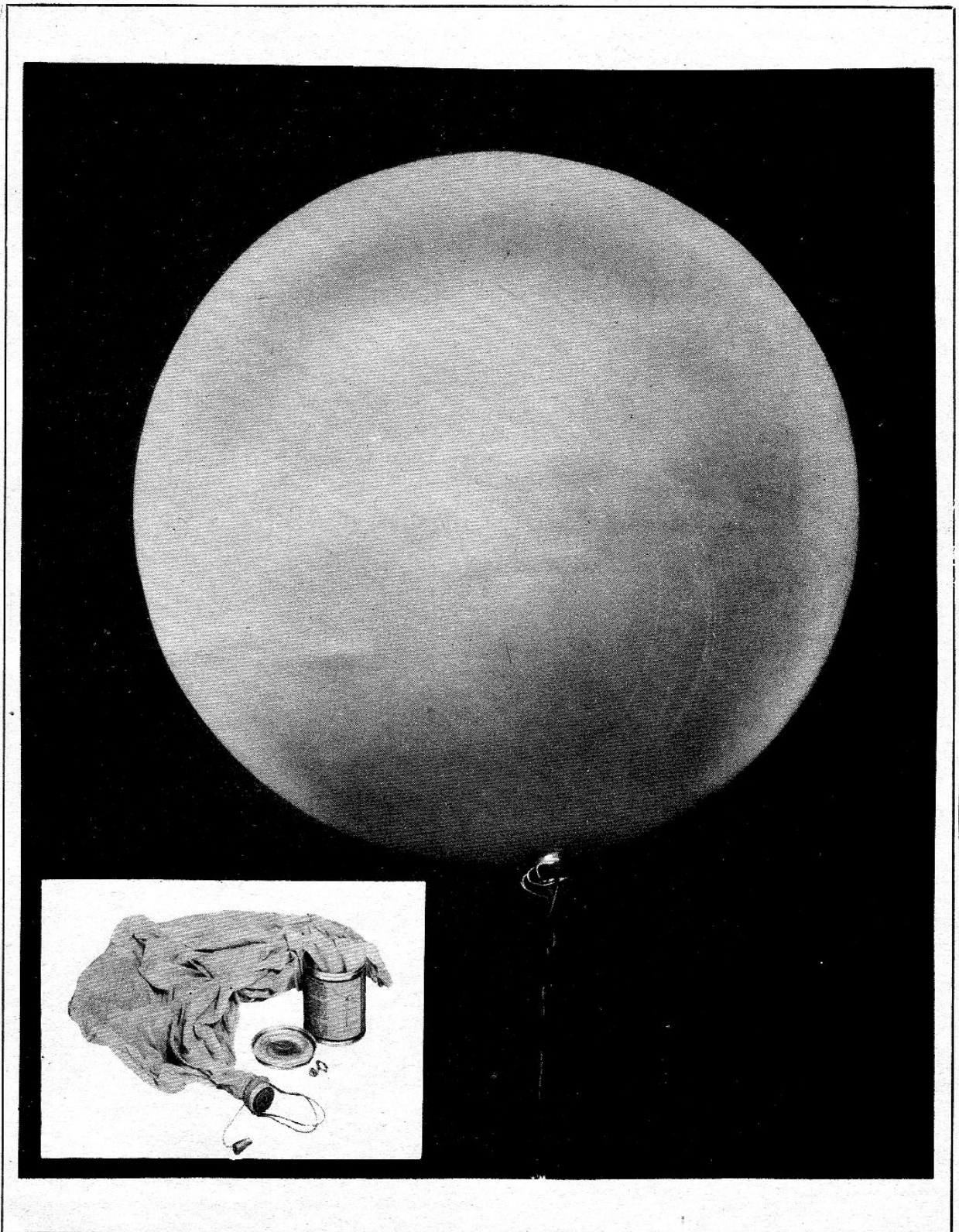


Figure 1-.4 Balloon M-278-A

Section I  
Paragraph 4

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the hydrogen to the balloon. Instructions for the use of this hydrogen generator are printed on tags attached to the container and to the inflating tube.

the manufacturer. The transmitter is pretuned to an antenna of this length, and no other length will give maximum performance.

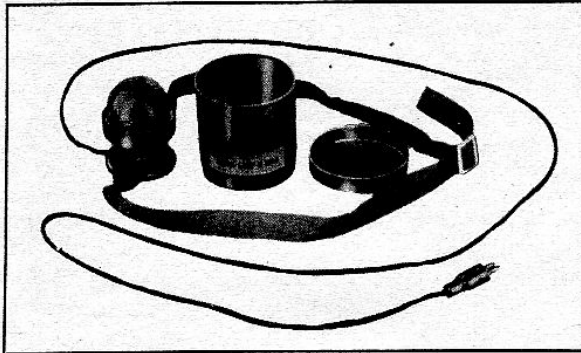


Figure 1-6. Signal Lamp M-308-B

e. SIGNAL LAMP M-308-B.—The signal lamp (see fig. 1-6) consists of a plug, cord, cylindrical bakelite lampholder with a lamp socket attached, a lamp, a domeshaped shield, and a strap to attach the lampholder to the top of the operator's head. A spare lamp is supplied in a clip next to the lamp socket. The signal lamp is omnidirectional.

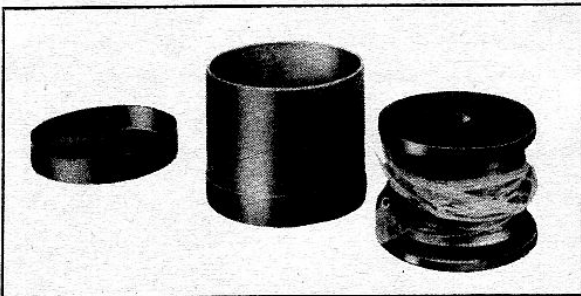


Figure 1-7. Antenna Assembly AS-207/CRT-3

f. ANTENNA ASSEMBLY AS-207/CRT-3.—This antenna assembly (see fig. 1-7) consists of a 306-foot length of wire, fitted with nylon insulating cords at both ends. At one end the short length of nylon cord is fastened to a swivel and clasp, which is part of the assembly and which serves to fasten it to a kite or balloon. At the other end, one length of the nylon cord serves to fasten the assembly to Reel RL-48 and the other is a securing cord which is fastened to the life raft during operation. One of these antenna assemblies, wound so that the clasp is on the outside of the winding, is furnished on Reel RL-48. Two spare assemblies are furnished on wooden bobbins, contained in cardboard cartons. These assemblies are wound in such a direction that when they are rewound on Reel RL-48 the clasp is on the outside of the winding.

The length of the wire of this assembly is critical, and is held within one foot of the nominal length by

**WARNING**

Wire W-147 or W-148 is *not* interchangeable with Antenna Assembly AS-207/CRT-3, although it is similar in appearance.

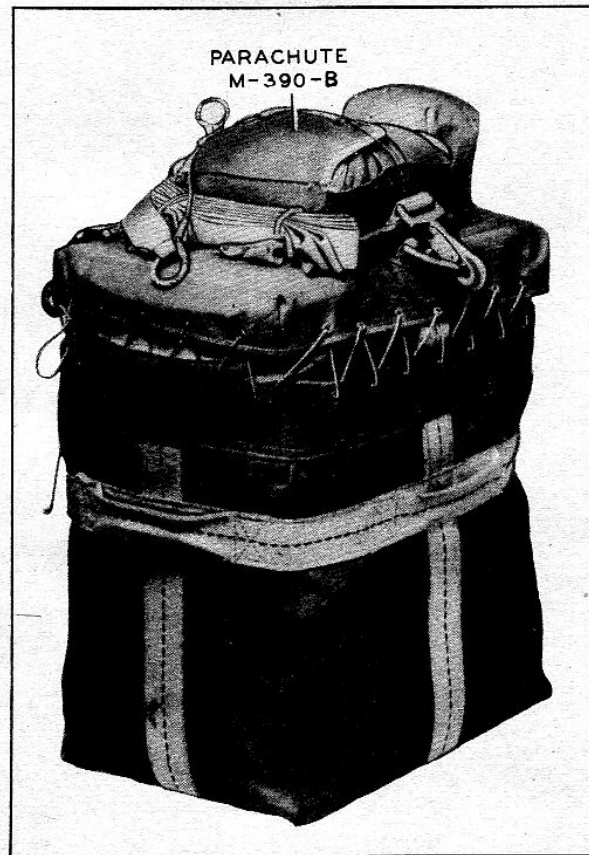


Figure 1-8. Bag BG-155-A

g. BAG BG-155-A.—The bag (see fig. 1-8), when packed, holds all components of the radio set except the parachute. This is attached to the top of the bag. Various pads and a smaller bag, which holds the kite and inflating tubes, are supplied as part of Bag BG-155-A.

b. PARACHUTE M-390-B.—This parachute (see fig. 1-9) employs a 12-foot nylon canopy. It has two snap hooks which attach to mating V-rings on Bag BG-155-A. A static line is folded at one side of the parachute. One end of the static line has a snap hook by which it may be attached to the airplane; the other end is fastened to the rip cord.

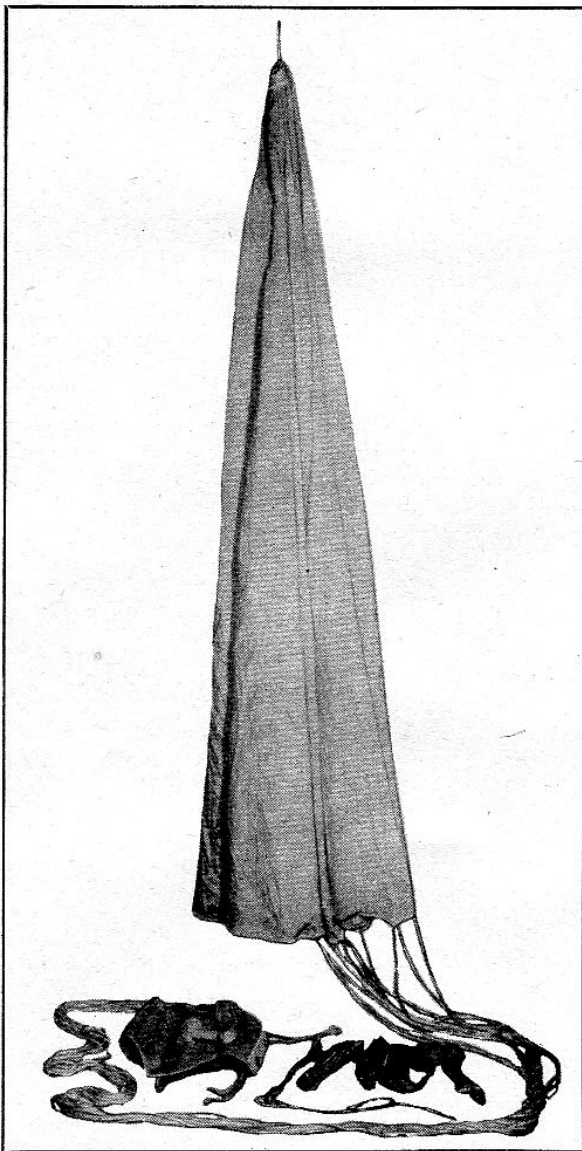


Figure 1-9. Parachute M-390-B

### 5. INTERCHANGEABILITY OF MAJOR ASSEMBLIES.

*a.* Some of the equipments which are part of Radio Set AN/CRT-3 bear nomenclature identical to that of corresponding items which are parts of Radio Sets SCR-578-A or SCR-578-B. Items which bear identical nomenclature are completely interchangeable.

*b.* In some instances equipments will bear the same type designation but different issue letters. The principal differences between such equipments which have been manufactured at the time of the issuance of this handbook are noted below.

(1) Parachute M-390-A employs a rayon canopy and shroud lines and an untreated pack. Parachute M-390-B employs a nylon canopy and shroud lines and a tropicalized pack. Their use is identical.

(2) Generator M-315-A (Hydrogen) is an earlier model of Generator M-315-B (Hydrogen). Access to Generator M-315-A is obtained by removing two screw plugs, while access to Generator M-315-B is obtained by removing the ends of the container. Generator M-315-A does not have an inner can. It employs the same inflating tube as does Generator M-315-B. It delivers the same amount of hydrogen when properly used, but it takes longer to complete generation. It is harder to use Generator M-315-A because it must be lowered slowly into the water over a period of about an hour, while Generator M-315-B can be plunged into the water at once. Instructions for its use are printed on tags attached to the container and the inflating tube.

(3) Signal Lamp M-308-A has a reflector and a flat lens in place of the dome of Signal Lamp M-308-B. Some of the earlier lamps did not have spare bulbs. Operation of both types is the same, but Signal Lamp M-308-A produces a beam of light in one direction while Signal Lamp M-308-B is omnidirectional.

## SECTION II

# INSTALLATION AND ADJUSTMENT

### 1. PRELIMINARY PROCEDURE.

*a.* BENCH TEST.—Depots and sub-depots are directed to inspect each radio set immediately before issuing it to the using activity. The same inspection is to be made at the time the set is stowed and subsequently at the time of each regular 100-hour airplane inspection. These tests are identical with the 100-hour inspection described in section V, paragraph 1.

*b.* REPACKING.—Figure 8-3 must be followed when repacking in order to avoid difficulty and possible damage to the equipment.

### 2. INSTALLATION IN AIRPLANE.

Locate the radio set in an aircraft in such a manner as to facilitate fast removal in the event of an emergency landing. Make a definite installation in the aircraft, providing brackets, hooks, and securing cords as required. Mounting dimensions and other data are given in figure 8-1. If the radio set is carried loose in the aircraft it may be damaged and it may not be readily available in an emergency.

### 3. REMOVAL FROM AIRPLANE.

*a.* If the airplane is ditched (crash-landed on water), throw the radio set out of the airplane into the water at the same time that the life raft is removed. Do not worry about its getting wet. It will float until picked up. Make sure, however, that it is recovered before paddling away. Obviously, the parachute is not used under these circumstances.

*b.* Only when the airplane is abandoned by parachute should the radio transmitter be dropped from aloft by parachute. Release it at the same time the life rafts are dropped. Complete the abandonment quickly so that the crew and equipment will land as closely together as possible.

*c.* If the radio set is to be dropped from a rescue airplane, to aid survivors who have been sighted, slow the airplane to its slowest flying speed and drop the equipment by parachute from an altitude of from 300 to 500 feet. If the speed is too great, damage or loss of the equipment may result. If the altitude at the time of release is too great, the radio set may drift too far while descending.

#### CAUTION

The parachute is designed to protect the equipment when it is dropped on water only. Damage to the equipment is likely if it is dropped on land.

*d.* If it is known in advance that Radio Set AN/CRT-3 will be dropped on land, obtain Pad MC-539 and strap it to the bottom of Bag BG-155-A. (See the instructions accompanying the pad.) As an alternate method, a standard 24-foot aerial delivery parachute can be substituted for Parachute M-390-B. Either of these additional items increases the total weight of the equipment required in the aircraft.

*e.* In dropping the equipment by parachute, observe the following steps:

(1) Securely fasten the loose end of the static line to the metal structure of the airplane.

#### WARNING

Do not attach the static line to any part of your body when throwing out the radio equipment.

(2) Be sure that the 12-foot static line is in the clear and cannot foul. Be sure that both the snaps on Parachute M-390-B are connected to the V-rings on Bag BG-155-A.

(3) Throw out the bag and parachute. The parachute will be opened by the static line.

### 4. SETTING UP EQUIPMENT.

#### CAUTION

Do not raise the antenna or leave it up during lightning as it may result in severe injury to personnel.

*a.* After the radio set has been recovered remove the transmitter from the bag.

*b.* Remove the cotter pin and open the door on the front panel of the transmitter. (See fig. 2-1.) Keep the door open by sliding the cotter pin into the holes provided on the door hinges. Take enough slack wire from the reel fastened to the back of this door to reach the kite or the balloon. Rotate the "BRAKE" knob clockwise to maintain a slight tension on the reel. Use the wrench attached to the belt to loosen the brake if it cannot be turned by hand: (See fig. 2-2.)

*c.* Unscrew the cap marked "GROUND" and remove the groundwire reel. (See fig. 2-1.) If necessary, use the wrench attached to the transmitter to loosen the cap. Unwind the wire and play it out into the water, using the cap as a weight to keep it submerged. When replacing the cap, hand force alone is sufficient. Never use a wrench.



AN 16-30CRT3-2

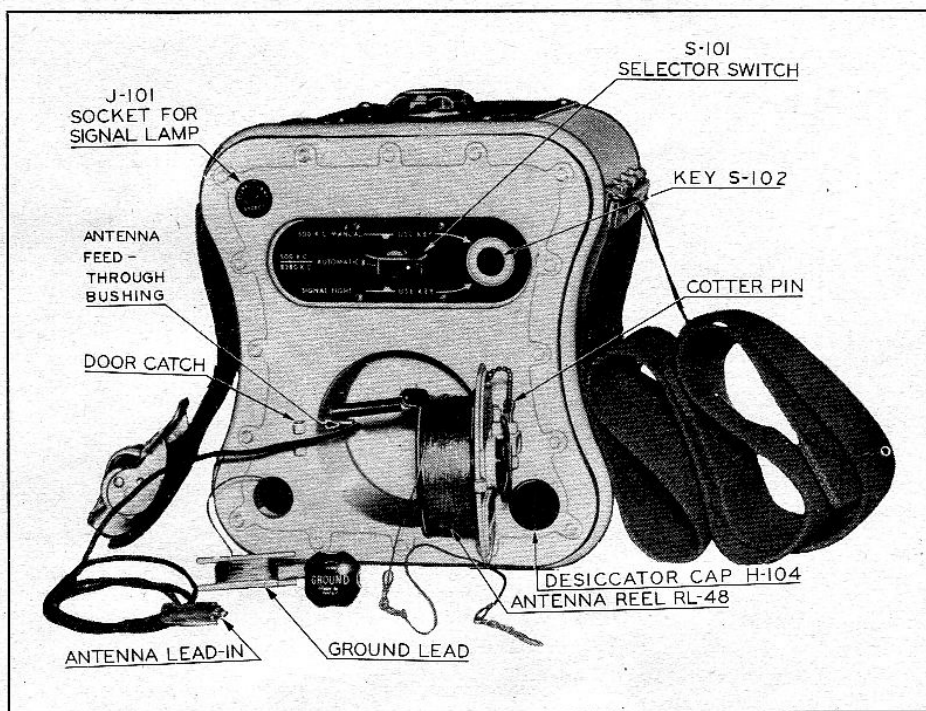


Figure 2-1. Radio Transmitter T-74/CRT-3—Front View

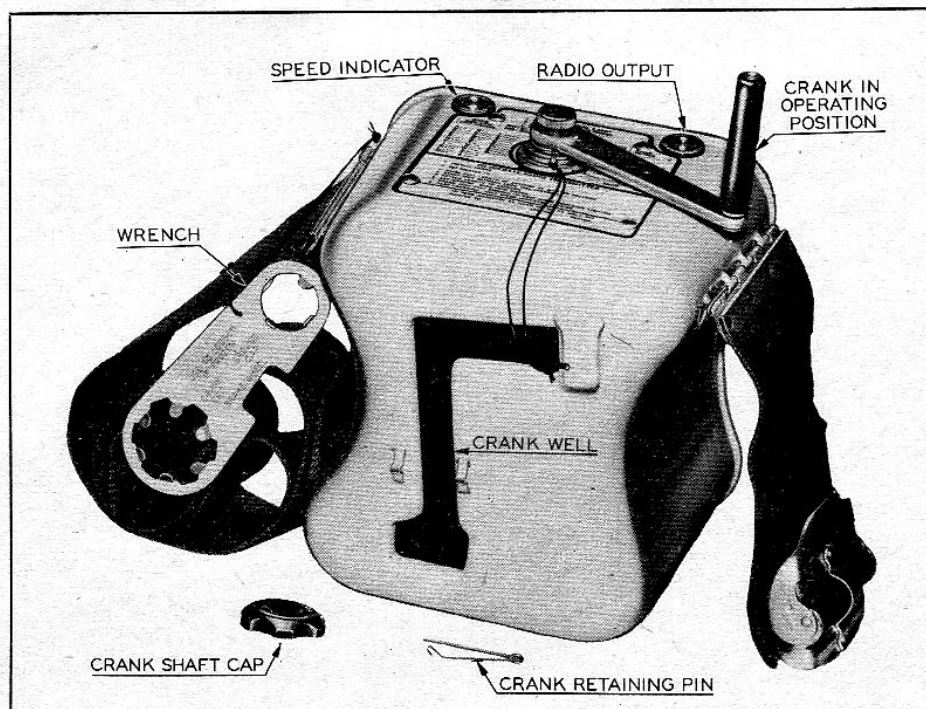


Figure 2-2. Radio Transmitter T-74/CRT-3—Rear View

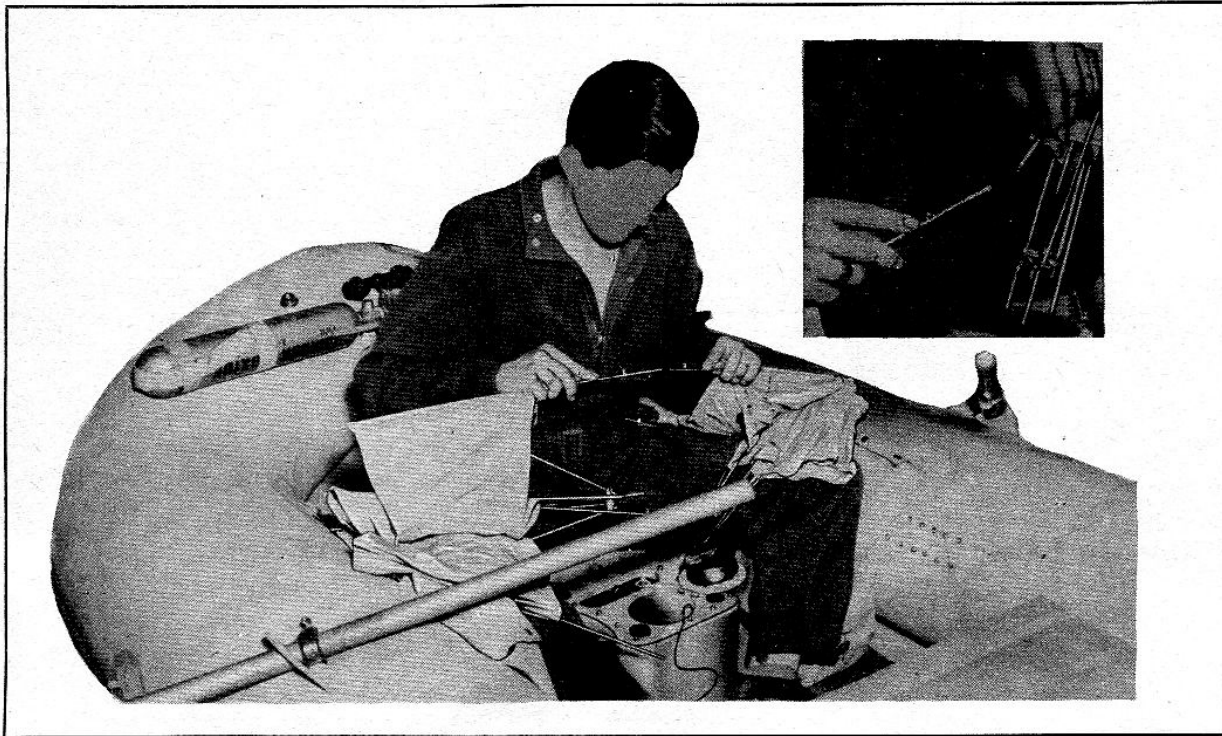


Figure 2-3. Kite M-357-A—Assembly, Step 1

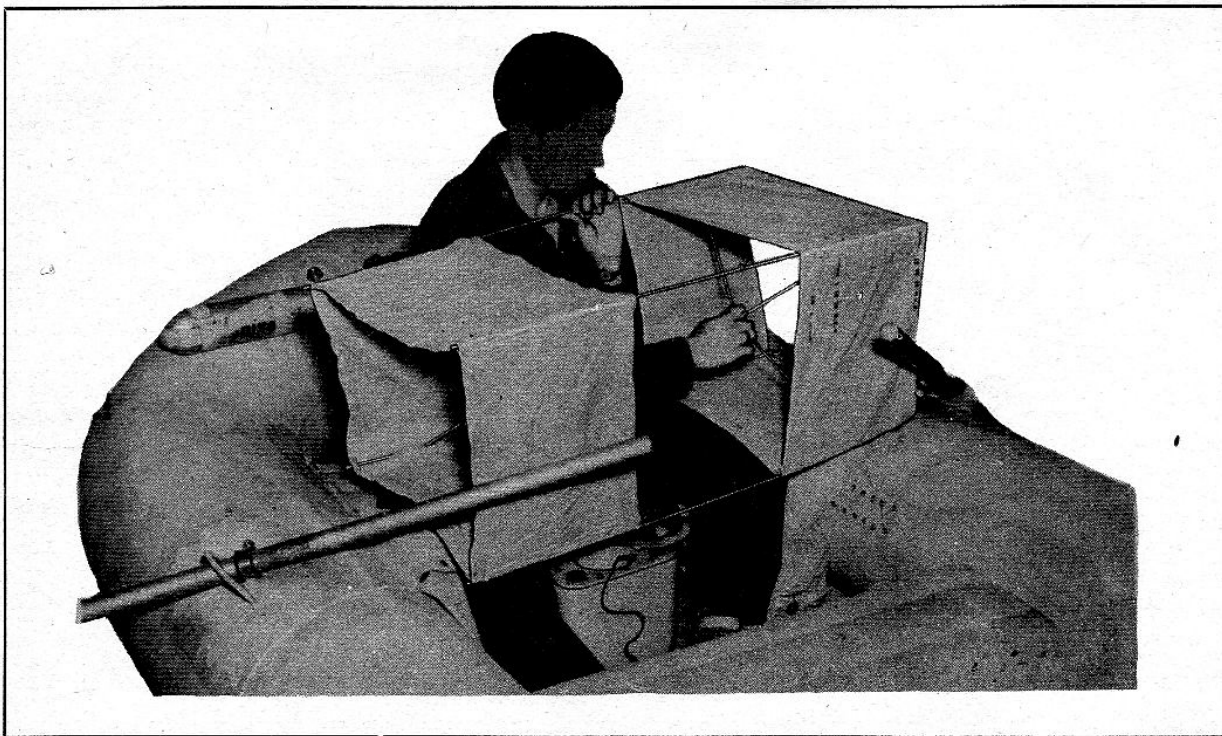


Figure 2-4. Kite M-357-A—Assembly, Step 2

**CAUTION**

Do not fail to put the ground wire into the water.

**Note**

Although Radio Set AN/CRT-3 is designed and tuned to operate with Antenna Assembly AS-207/CRT-3, supported over the water and with the ground wire submerged, it may also be used from land. When possible, operate the equipment from a boat or life raft some distance off shore. If this is impossible, locate a body of water and operate on its edge with a counterpoise extending away from the edge of the water and with the ground wire submerged. If there is no nearby body of water the equipment can be operated over land. Roll out one or both of the spare antenna assemblies along the ground to act as a counterpoise. Connect them to the ground wire and if the ground is moist, bury the ground wire.

*d.* Set the radio transmitter in the bottom of the boat or life raft so that it will be ready to be secured to the operator later by means of the straps provided at the sides of the unit.

*e.* Kite M-357-A is packed in an inner bag within Bag BG-155-A together with the inflating tubes for Generator M-315-B. It can be assembled as described below.

(1) Untie the tie tapes and remove the kite. Do not lose the inflating tubes.

(2) Assemble the kite as follows:

*(a)* Put together the two halves into which the kite is divided by fitting the ends of the four longerons on one half into their respective sockets on the other half. (See fig. 2-3.) Start by fitting together the longerons which are fastened together by a short length of cord, and then fit together the other corresponding longerons one by one around the kite. Be sure that each pair of longerons is pressed tightly together so that the two halves are held firmly in position.

*(b)* Holding the kite with one hand, reach with the other hand into its center and partially unfurl the kite.

*(c)* Place one hand on one spider and push toward the end of the kite. Turn the kite and push with the hand on the spider at the opposite end. (See figs. 2-4 and 2-5 for method of holding longerons and pushing the spiders into place. When these have been sufficiently extended, they will lock into position. Stop pushing on the spiders just as soon as you feel them jump. The process may be thought of as similar to that of opening an umbrella.

**Note**

To dismantle the kite when it is no longer in use, push in on the spiders, allowing it to collapse. Then separate the pairs of longerons one by one.

(3) After assembling the kite, estimate the wind velocity.

(4) There are two eyelets on the kite, one at a corner marked "15 to 40 M.P.H." and another farther in near a marking "7 to 20 M.P.H." (See fig. 2-6.) Attach the antenna-wire clasp to whichever of these two eyelets more nearly corresponds to the estimated wind velocity. If in doubt, use the eyelet indicated for low wind velocity.

(5) Exercising due caution, rise up as far as possible in the boat. Toss the kite into the air to clear the turbulent area to leeward of the operator. The kite will be found a ready flyer in winds as low as 7 miles per hour, provided only that the wind is blowing steadily. Always maintain a steady tension at the "BRAKE" sufficiently strong to prevent the kite from dropping into the water. On occasions it will be found more practicable to pay out the wire by hand. Pay out all of the 306 feet of antenna wire on the reel.

**WARNING**

Erect the entire antenna. The transmitter is tuned to the whole length of the wire. It will not work well into any other length. Do not kink the antenna wire. This weakens it and it will break at the kink if pulled. If the wire breaks do not use a part of the antenna but use one of the two spares Antenna Assembly AS-207/CRT-3 that are furnished with the radio set.

(6) Release the antenna-securing cord from the insulating cord by removing the three small pieces of tape holding the two together and attach the antenna-securing cord to the life raft. (See fig. 2-7.)

(7) Connect the antenna lead-in from the transmitter to the antenna.

**CAUTION**

Never permit the antenna to drag in the water while transmitting. Try to keep the antenna wire as high in the air as possible.

*f.* Use Generator M-315-B and Balloon M-278-A only if the wind velocity does not permit using the kite. Complete all the above instructions, through paragraph 4*d*, before starting this operation.

(1) Remove one of the sealed balloon cans in Bag BG-155-A.

(2) Open the can with the key provided and carefully remove the balloon. Care must be exercised to avoid breaking the metal tab while unwinding the sealing strip.

**CAUTION**

Handle the balloon very carefully and exercise extreme caution to prevent abrasions or punctures in the process of inflation.

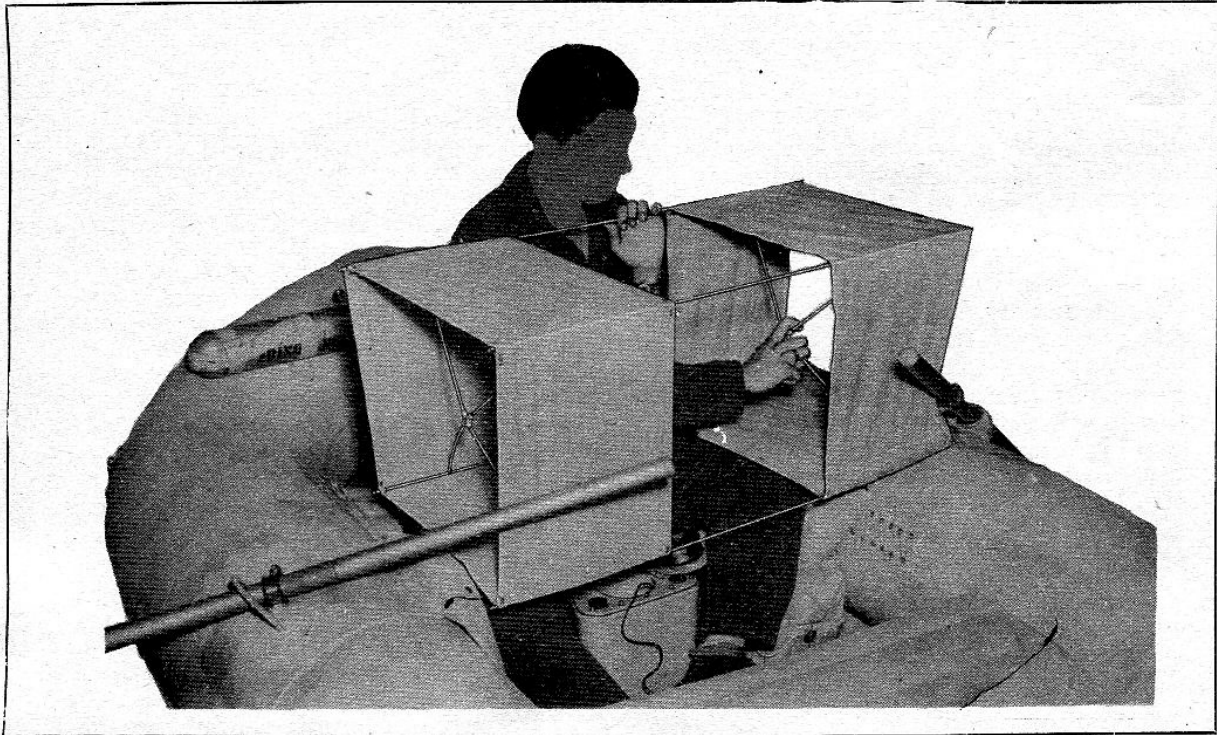


Figure 2-5. Kite M-357-A—Assembly, Step 3

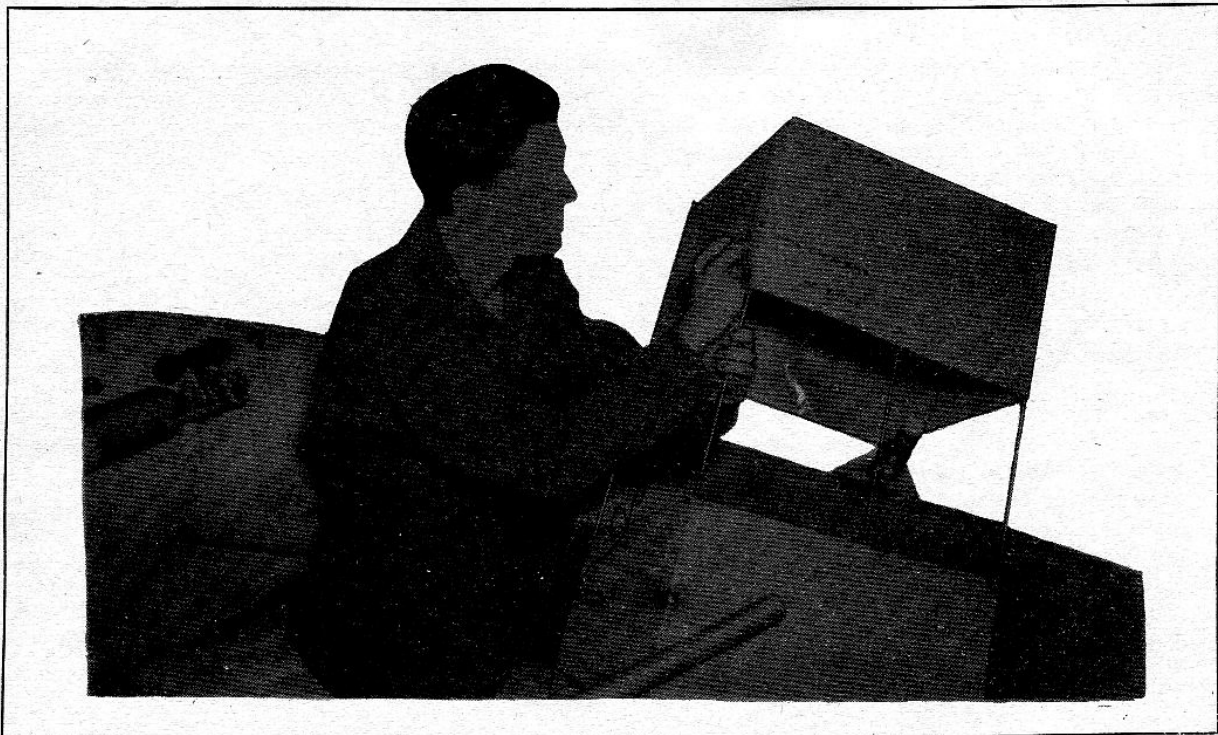


Figure 2-6. Kite M-357-A—Attachment of Antenna Wire

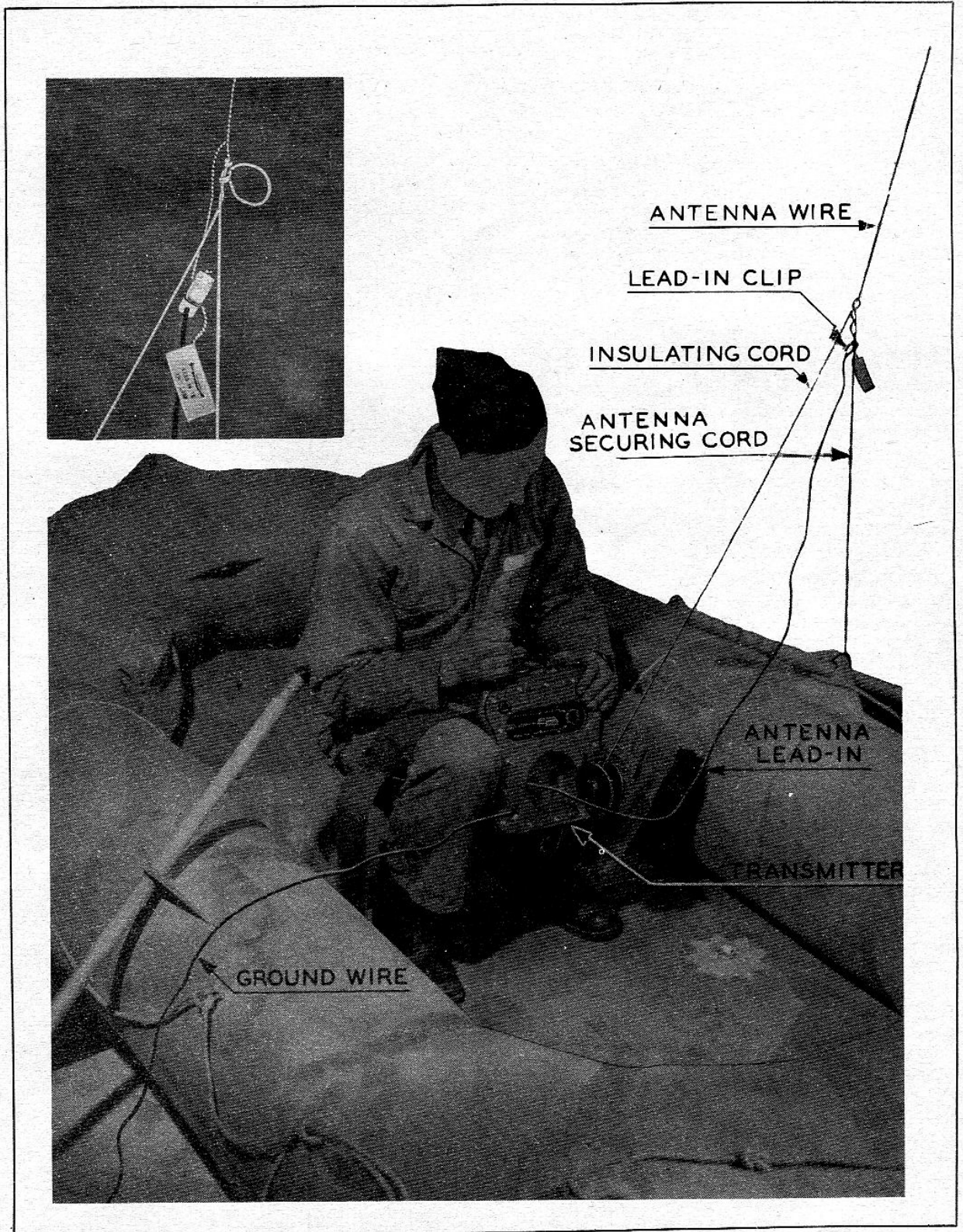


Figure 2-7. Antenna Connection

**Section II**  
**Paragraph 4**

**AN 16-30CRT3-2**

(3) If the balloon is stiff from cold, do not try to bend any part of it. It must be thawed before use. This can be done in either one of two ways:

(a) Hold the balloon in water. Unfold it gently as the outer layers thaw. This will require between one and two minutes.

**Note**

The balloon stiffens only with the extreme cold of high altitude (at about  $-25^{\circ}\text{C}$ ) and hence can be thawed in near-freezing water, (about  $0^{\circ}\text{C}$ ). However, this method *should not be used* when the air temperature is below freezing, since ice will form on the balloon.

(b) Put the balloon under an arm between the inner and outer clothing. After the outer layers have thawed, unfold them carefully and put the balloon back under the arm. Repeat the process until all parts of the balloon are flexible. This will require between 15 to 30 minutes.

(4) After the balloon is removed, attach the antenna to the loops provided at the balloon valve.

(5) Remove one of the two hydrogen generators and one of the inflating tubes. Use care in handling the inflating tube. It will *not* float.

(6) Remove the top end of the generator first, then the bottom end, using the keys attached to the generator. While turning the key, observe the strip to make certain that it tears straight. Keep the key perpendicular to the end of the generator.

**CAUTION**

Exercise care while unwinding the sealing strip to avoid breaking the metal tab.

(7) Allow the inner can to drop down from the bottom of the generator. (See fig. 2-8.) Then pull the can out a little farther until it locks into position. Twist it slightly if necessary.

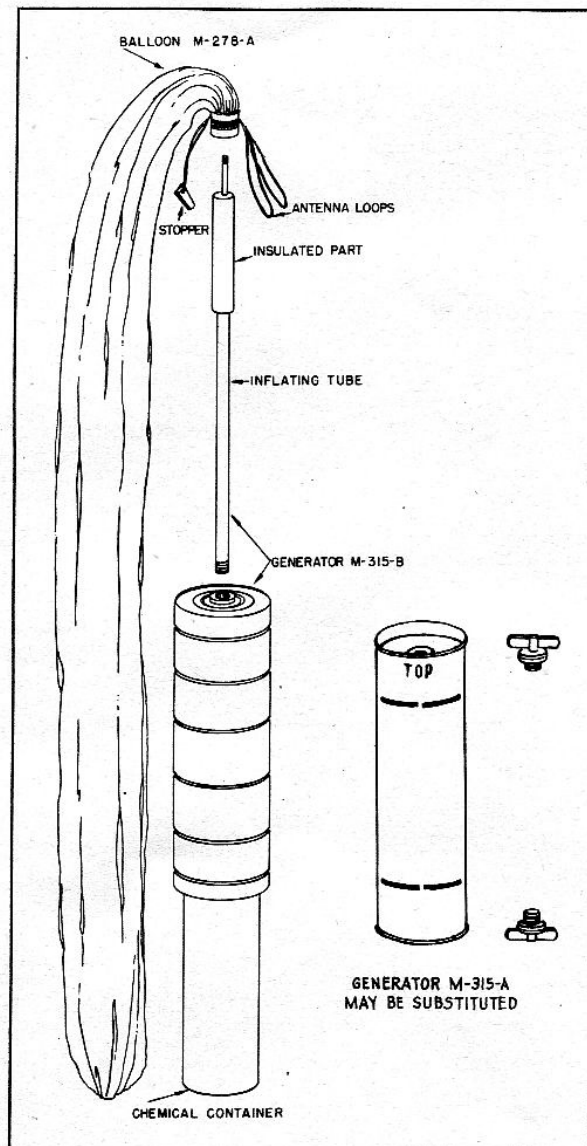
(8) Screw the inflating tube into the top of the generator. (See fig. 2-3.)

(9) Wet the tip of the inflating tube and the balloon neck so the two will slide together more easily.

(10) Hold the neck of the balloon. Force the tip of the inflating tube into the neck of the balloon as far as it will go, that is, until the handle touches the bottom of the balloon neck. Twist the inflating tube back and forth slightly while pushing on it, to make it go into the balloon valve more easily. Do not twist more than one-half turn in either direction, or the valve may become blocked.

**CAUTION**

The inflating tube must be pushed all the way in in order to open the valve in the balloon neck. If this is not done, the gas will bubble out of the bottom of the generator.



**Figure 2-8. Balloon M-278-A—Inflation Setup**

(11) Holding the balloon up to prevent crimping its neck, immerse the generator into the water until it is completely submerged. Keep the top of the can level with the surface of the water. The generator will vibrate slightly and hydrogen will be generated.

**CAUTION**

Hydrogen gas is explosive even when in the balloon. Do not smoke or permit sparks in its vicinity. Do not touch the generator while it is in use, since it generates large amounts of heat. Hold the inflating tube by the insulated part at the top.

(12) If gas bubbles out from the bottom of the generator, try pushing the inflating tube farther into

the neck of the balloon. Check to make sure that the top of the generator is not out of the water.

(13) Inflate the balloon until the generation of gas stops. Do not stop the inflation procedure until all vibration from the generator has ceased for several minutes. The entire inflating operation will take about 45 minutes.

#### IMPORTANT

Use all the hydrogen provided. Inflating the balloon is a tedious process, but do not quit too soon. For adequate lift and maximum time aloft, use *all* the hydrogen.

(14) If excessive liquid has been deposited in the balloon during inflation, hold the generator out of the water and permit the liquid to drain out of the balloon through the inflating tube. Do not permit an excessive amount of hydrogen to escape.

#### Note

The minimum amount of water needed to generate the gas to fill the balloon completely is approximately 50 gallons.

(15) Remove the balloon from the inflating tube.

(16) Wet the stopper and insert it firmly into the neck of the balloon.

(17) Unscrew the inflating tube and retain it as a spare in even the other inflating tube should become lost.

#### CAUTION

Throw away the generator to avoid possible damage to clothes, equipment, or the body from the caustic residue. Immediately wash off with water any caustic residue which comes in contact with the eyes, skin, or clothing.

(18) With the antenna fastened to the balloon, release the "BRAKE" and allow the balloon to pull out *all* the wire on the reel.

(19) Attach the antenna-securing cord to the life raft and connect the antenna lead-in from the transmitter to the antenna. (See fig. 2-4.)

g. If a wind rises while using the balloon, it may be desirable to employ the kite. In general, the change from

balloon to kite should be made when the wind rises above 20 miles per hour. The balloon can be made captive to the raft by using the lacing cord of Bag BG-155-A. Prevent the captive balloon from striking objects that might cause it to burst and from interfering with the antenna.

b. If the original antenna wire should become lost or broken, it may be replaced by a spare Antenna Assembly AS-207/CRT-3. Two spares are provided. The wire on the spare rolls is wound on backwards so that it may be reeled directly on Reel RL-48.

i. Remove the cap located at the top center of the transmitter, making the crank socket available. If necessary, use the wrench attached to the transmitter to loosen the cap. (See fig. 2-1.) In the well on the back of the transmitter is Hand Crank GC-18-A. (See fig. 1-3.) It is fastened to the case by a leash and is made available by the removal of the locking pin. The leash is long enough to enable the crank to reach the socket and must not be broken. Insert the crank into its socket and tighten the thumb screw. Save the cap, it should be replaced if the crank is removed.

#### Note

In replacing the cap, hand force alone is sufficient. Never use the wrench.

j. Operating the transmitter requires a comparatively high turning torque. To assure stability, a belt assembly is attached to the case of the transmitter and employed to fasten the transmitter to the operator. (See fig. 2-4.) Attach the transmitter as follows:

(1) Assume a sitting position and place the transmitter between the legs just above the knees, with the front panel facing outward.

(2) Pass the long strap over the left leg.

(3) Bring the long strap underneath both legs and buckle it to the short strap at the side of the right leg.

#### Note

The buckle is of the quick release type. If the operator falls overboard with the transmitter fastened to him, he can free himself by opening the buckle and kicking clear of the transmitter. The transmitter will float.

## SECTION III

### OPERATION

#### IMPORTANT

International law provides for ships' radio operators to maintain a watch on the distress frequency of 500 kilocycles, during 3 minutes after the quarter hour and three-quarter hour; that is, from 15 to 18 minutes and from 45 to 48 minutes after the hour. Probability of interception, therefore, will be greatly increased if transmission is conducted during these periods. Operate the transmitter for several minutes during and after these periods to allow rescue parties to take bearings.

#### 1. AUTOMATIC RADIO TRANSMISSION.

##### a. STARTING RADIO TRANSMITTER T-74/CRT-3

(1) Set the selector switch pointer to "500 K.C.-8280 K.C.-AUTOMATIC." (See fig. 2-1.)

(2) To start transmission rotate the crank (see fig. 2-2) in a clockwise direction at approximately 80 to 100 revolutions per minute. When sufficient speed has been attained the lamp marked "SPEED INDICATOR KEEP LIGHTED" (see fig. 2-2) located on the top of the transmitter will light. Faster crank speeds are ineffective since the transmitter contains automatic voltage regulation, and undesirable since they will speed up the transmitter code characters.

(3) Continue cranking. Allow at least 20 seconds for the filaments of the vacuum tubes to heat, after which time the "RADIO OUTPUT" light should flash on and off with the keying of the transmitted signal. There are no further adjustments.

(4) In the "500 K.C.-8280 K.C.-AUTOMATIC" selector switch position, the transmitter automatically sends a signal consisting of six groups of "SOS" followed by a sustained dash of about 20 seconds duration. This occurs first on 500 kilocycles and then on 8280 kilocycles, automatically switching from one frequency to the other about every 40 or 50 seconds.

b. STOPPING RADIO TRANSMITTER T-74/CRT-3.—To stop transmission, stop cranking.

##### c. GENERAL INSTRUCTIONS FOR TRANSMISSION.

(1) The note at the beginning of this section tells when ships' operators are most likely to be on watch. Most shore stations and even some ship and

aircraft stations maintain continuous watch. Therefore, if no timepiece is available the exact time for transmission is not of great concern.

(2) Transmit for at least 5 minutes at a time to enable stations to determine bearings after the signal is heard.

(3) Transmit at least once every half hour during the day. Many short transmissions, close together, are better than one continuous transmission for hours followed by a long period of silence. An airplane using the radio transmissions as a guide for the rescue needs frequent signals, so it can keep on the correct course.

(4) Transmit both at night and during the day to take advantage of the changes in range. Always transmit several times in the periods near dawn and near dusk.

(5) Radio stations engaged in the rescue operation may be far from the life raft and from each other. They must communicate with each other and with rescue agencies close by before the rescue can be accomplished. The operator, therefore, must not use all of his strength the first day.

(6) Transmit continuously if a ship or airplane is heard or sighted. At night, use both radio transmission and the signal lamp as circumstances warrant.

(7) Share the work of cranking. Interchange hands to ease the effort. If possible, let others crank the transmitter while one man holds it between his legs.

#### 2. MANUAL RADIO TRANSMISSION.

##### a. STARTING RADIO TRANSMITTER T-74/CRT-3.

(1) Set the selector switch pointer to the "500 KC MANUAL" position. (See fig. 2-1.)

(2) To start transmission rotate the crank (see fig. 2-2) in a clockwise direction at approximately 80 to 100 revolutions per minute. When sufficient speed has been attained, the lamp marked "SPEED INDICATOR KEEP LIGHTED" (see fig. 2-2) located on the top of the transmitter will light. Faster crank speeds are ineffective, since the transmitter contains automatic voltage regulation. Continue cranking for about 20 seconds to allow the filaments to heat.

(3) To transmit a signal, the push button marked "KEY" must be pressed. This button is manipulated most conveniently by the operator with one of the



first two fingers of the left hand. If another person is present, he might telegraph with his right hand while the other cranks. The indicator lamp marked "RADIO OUTPUT" (see fig. 2-2) should light when the "KEY" is depressed. This light provides a means for visually monitoring the message transmitted. The International Morse code is printed on the top of the transmitter.

**b. STOPPING RADIO TRANSMITTER**  
T-74/CRT-3.

(1) To stop transmission for a few moments only, release the "KEY" button; continue cranking.

(2) To stop operation completely, merely stop cranking.

**c. GENERAL INSTRUCTIONS FOR MANUAL TRANSMISSION.**

(1) Send slowly, about five words per minute at most. It is difficult to send readable code with this transmitter.

(2) Monitor the transmission by reading the "RADIO OUTPUT" light as a blinker.

(3) At intervals transmit a sustained dash to enable planes which may be homing on the transmission to get a bearing.

(4) Use manual keying only when you have a particular message to send.

(5) Never use manual keying alone; switch to "AUTOMATIC" for five minute intervals occasionally. Transmission on 8280 kilocycles, available on automatic keying only, gives the greatest range.

**3. OPERATION OF SIGNAL LAMP.**

(See figure 1-6.)

Signal Lamp M-308-B may be used for visual signaling at night if an aircraft is heard. This does not require the antenna.

*a.* Obtain the signal lamp from the accessory bag. Plug the cord attached to the signal lamp into the "SIGNAL LAMP SOCKET" at the upper left corner of the transmitter panel.

*b.* Strap the transmitter between the legs.

*c.* Set the selector-switch knob at the "SIGNAL LIGHT" position.

*d.* Strap the signal lamp on top of the head with the straps under the chin. The lamp is nondirectional, and its light may be seen from any direction.

*e.* Depress the push-button "KEY."

*f.* Crank the transmitter at a speed where maximum brilliancy of the signal light is obtained.

**Note**

If the lamp bulb does not light or if it burns out during use, unscrew the dome of the signal lamp, replace the bulb with the spare bulb supplied in the spare clip next to the socket, and then replace the dome.

*g.* To telegraph with the signal light, manipulate the push-button key.

**WARNING**

No radio transmission occurs when the signal lamp is used.

## SECTION IV

### THEORY OF OPERATION

#### 1. GENERAL.

*a.* Radio Set AN/CRT-3 is a simple, rugged, emergency, dual-frequency radio transmitting system designed for use from a rubber life raft. No receiving equipment is supplied. The set provides fully automatic transmission of distress signals so that any operator, no matter how untrained, can send distress signals which, when received by rescue parties, will permit bearings to be taken. The set operates, when switched to the "8280 K.C.-500 K.C.-AUTOMATIC" position, on the international distress frequency of 500 kilocycles with a 1000-cycle tone modulation, transmitting six groups of "SOS" followed by a sustained dash of approximately 20 seconds length, after which an internal arrangement automatically shifts the frequency to 8280 kilocycles and six groups of "SOS" are again transmitted followed by a sustained dash of approximately 20 seconds duration. This sequence is repeated over and over with continued cranking. The 8280-kilocycle frequency is unmodulated and crystal controlled. The long dashes provide a sustained signal necessary for accurate bearings to be taken. A light visible through a window is provided for cranking speed indication, and another light visible through another window is used for r-f indication. All power requirements are supplied by hand cranking.

*b.* The radio set may be used as a hand-powered signal light with manual keying. Signal Lamp M-308-B is provided with a 5-foot cord and plugs into the radio transmitter which provides all necessary power for operation. If the signal light is employed, no transmission of radio takes place. A spare lamp is supplied in a clip under the dome of the signal lamp.

*c.* The radio set may be manually keyed on 500 kilocycles only.

*d.* All electrical power for operating either the radio transmitter or the signal light is furnished by the hand-powered generator in the transmitter case.

*e.* Two tubes are used in the radio transmitter: type JAN-12SC7 (Tube VT-268) as an audio oscillator and amplifier, and type JAN-12A6 (Tube VT-134) as an r-f oscillator. While the radio transmitter is operating on 8280 kilocycles, only JAN-12A6 (Tube VT-134) is employed.

#### 2. OVERALL OPERATION.

(See figure 4-1.)

*a.* The hand crank operates two gear units; one of which furnishes a step-up ratio to drive the generator, while the other furnishes two step-down ratios to drive a frequency changing cam and a code cam.

*b.* An audio oscillator stage generates a 1000-cycle tone. This tone is amplified in an audio amplifier stage and fed to the r-f oscillator stage. However, during 8280-kilocycle operation, B+ is removed by a frequency selecting relay from both audio stages and they do not function. The coil circuit of the frequency selecting relay will be discussed later.

*c.* An r-f oscillator stage operates at either 500 kilocycles or 8280 kilocycles as determined by other frequency-selecting relay contacts. These contacts switch either a 500-kilocycle tuning network or an 8280-kilocycle crystal into the circuit. Two more sets of frequency-selecting relay contacts connect both the input and output of either 500-kilocycle or 8280-kilocycle tank between the r-f oscillator plate and the antenna.

*d.* A selector knob operates a complicated wafer switch which, for purposes of clarification, has been shown as several individual switches on the diagram.

(1) In the "AUTOMATIC" position, the cathode circuit of the r-f oscillator is placed in series with the code cam to provide automatic keying, the tube filaments are connected, and the frequency-selecting relays are placed in series with the frequency-changing cam to provide the automatic change from 500 to 8280 kilocycles and back again.

(2) In the "MANUAL" position, the cathode circuit of the r-f oscillator is placed in series with the manual key, and the tube filaments are connected. No connection is made to the coils of the frequency-changing relays.

(3) In the "SIGNAL LIGHT" position, the signal lamp is placed in series with the manual key and the 28-volt power supply. The tube filaments are not connected.

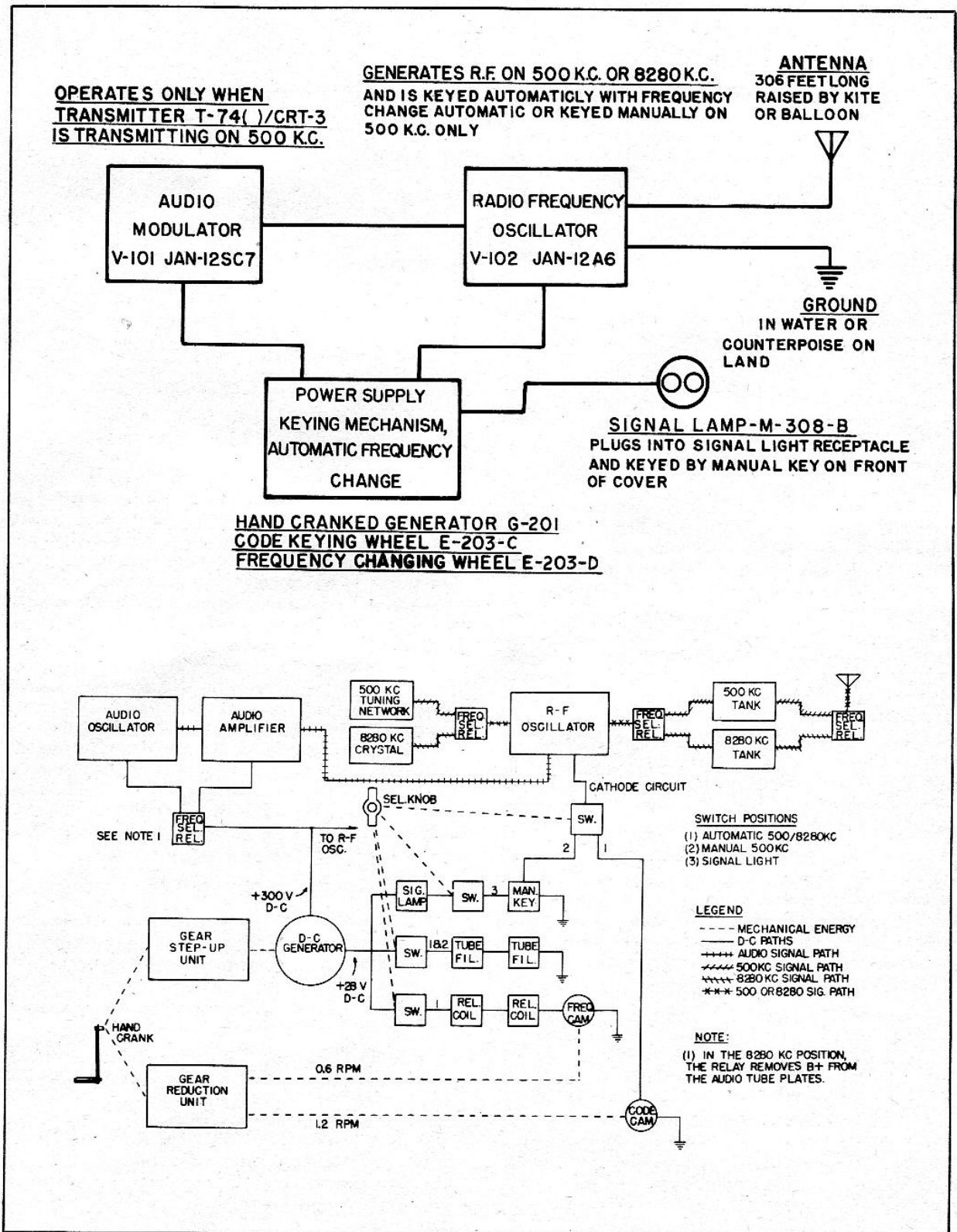
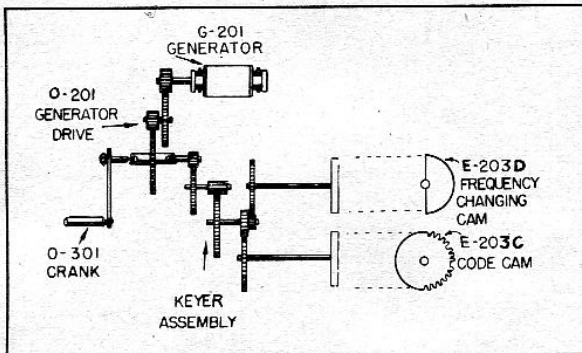


Figure 4-1. Radio Transmitter T-74/CRT-3—Block Diagrams

**3. DETAILED FUNCTIONING.**

*a.* MECHANICAL PARTS.

(1) Crank O-301 fits into a socket in the crank shaft of generator drive O-201. The main driving gear attached to the crank shaft actuates an assembly of two gears, which in turn drives a pinion attached to the end of the generator shaft. This gear train provides the step-up ratio necessary to drive generator G-201. (See fig. 4-2.)



**Figure 4-2. Radio Transmitter T-74/CRT-3—  
Functional Diagram of Mechanical Parts**

(2) At the end of the crank shaft opposite the crank socket is a second socket which fits into a projection on keyer assembly O-204. The keyer assembly likewise contains a gear train, which in this case provides the step-down ratios required by the code and frequency-changing cams (E-203-C and E-203-D). The difference of two-to-one in the speeds of cams (E-203-C and E-203-D, respectively) is obtained by operating each cam from a different gear, and driving these gears by two pinions of different size on the shaft of the preceding gear.

(3) Cam E-203-C turns approximately once every 50 seconds and is coded for six repeating "SOS" sequences followed by a 25-second dash. The intervals in this and the next paragraph are based on the normal crank speed of 80 revolutions per minute. With faster crank speeds, the intervals will be shorter.

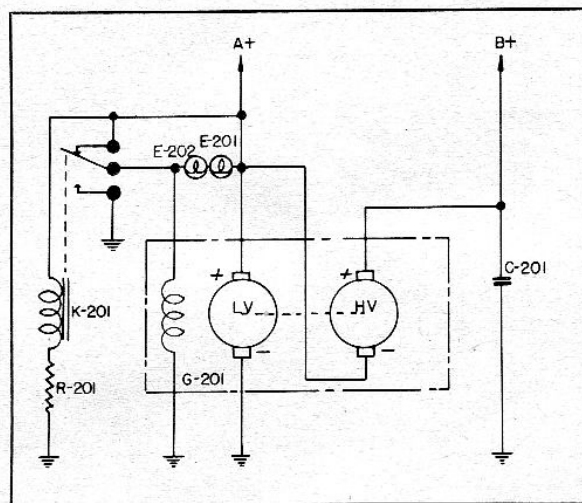
(4) Cam E-203-D turns approximately once every 100 seconds. It serves to change frequencies every 50 seconds.

*b.* POWER SUPPLY.

(See figure 4-3.)

(1) Generator G-201 contains two windings. One winding furnishes the power for the filaments of the tubes, for the signal lamp when used, for ballast lamps E-201 and E-202, and for the relays. The two windings in series furnish the high-voltage power for the tube plates and screens.

(2) Resistor R-201, in series with the coil of relay K-201, limits the current in this circuit so that



**Figure 4-3. Radio Transmitter T-74/CRT-3—  
Functional Diagram of Power Supply**

the relay will not be energized unless the voltage across the circuit exceeds the predetermined proper level. When a higher voltage is generated by rotating the crank, the relay contact arm is energized and first inserts the ballast lamps in series with the field coil and then grounds the field coil intermittently. In each case the ballast lamps are lighted. These ballast lamps are placed beneath the window and serve as speed-indicator lights. As soon as the field coil is grounded, the turns in the generator armature windings cut fewer lines of force; hence the output voltage is lowered. When the low-voltage winding output drops sufficiently to release the relay contact arm, the field coil is again energized. The relay vibrates rapidly when it is operating properly. This oscillation of the relay contact arm continues to hold the voltages at the correct values unless the crank speed is reduced below the proper speed, (when the "SPEED INDICATOR KEEP LIGHTED" lamps go out).

*c.* AUDIO CIRCUITS.

(See figure 4-4.)

(1) V-101 is a 12SC7 double triode. One half serves as an audio-oscillator, while the other half serves as an audio-amplifier. R-101 in the common cathode circuit furnishes a bias of approximately 4 volts for both sections of the tube.

(2) The audio oscillator transformer is T-101, which is tuned to approximately 1000 cycles by C-101. The d-c load for the oscillator plate circuit is R-102; however, r-f oscillations are by-passed through C-102 into the primary coil of T-101. The oscillations in the primary are induced into the secondary of T-101. This feed-back voltage is then impressed on the oscillator grid. A shunt-fed Hartley oscillator circuit is thus formed.

(3) C-104 couples the audio amplifier to the audio oscillator stage. R-103 is the grid leak and R-104 the

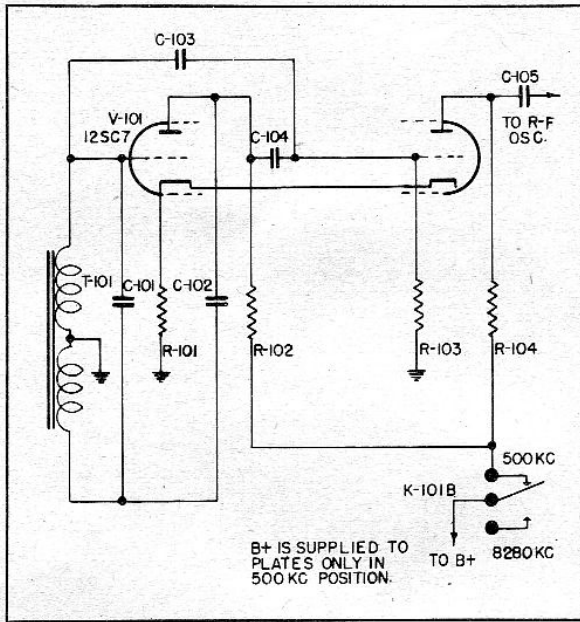


Figure 4-4. Radio Transmitter T-74/CRT-3—  
Functional Diagram of Audio Circuits

plate load in the audio-amplifier stage. Since the audio positive peaks are so high as to make the grid positive, grid current flows and R-103 develops a grid bias of approximately 9 volts, which is added to the cathode bias to make a total bias of 13 volts.

(4) Inverse feedback, to produce stability, is provided by C-103, which connects the grids of the two stages.

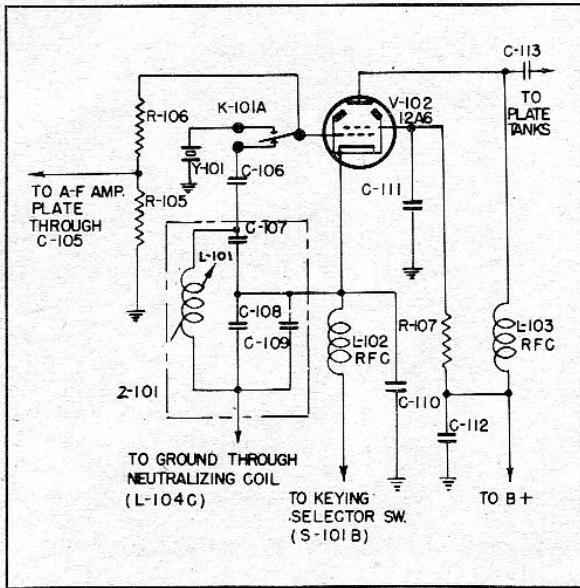


Figure 4-5. Radio Transmitter T-74/CRT-3—  
Functional Diagram of R-F Oscillator Circuits

(5) C-105 couples the audio-amplifier and r-f oscillator stages.

(6) Plate voltage is supplied to the audio stages through the normally closed contacts of relay K-101. However, when the relay is operated to the 8280 kilocycle position, the plate voltage is removed from these two stages and they do not operate.

d. R-F OSCILLATOR CIRCUITS.

(See figure 4-5.)

(1) V-102 is a 12A6 beam-power amplifier. It functions as an r-f oscillator.

(2) The input from the audio-amplifier stage is fed into the junction of R-105 and R-106, two voltage-divider resistors which serve as the grid leak for V-102. These resistors develop a high bias on the grid; at 500 kilocycles, this bias is approximately -65 volts.

(3) The contacts of relay K-101 connect the grid to either Z-101, a 500-kilocycle tuning network, or Y-101, an 8280-kilocycle crystal. Z-101 consists of a coil L-101 with a movable slug core which is tuned by C-107, C-108, and C-109 in a series-parallel arrangement. This tuning network is grounded through neutralizing coil L-104C, which is coupled to the plate tank in order to provide negative feedback. Y-101 is connected directly between grid and ground.

(4) L-103 blocks r-f oscillations, which are thus forced to pass through C-113 into one of the plate tanks. C-111 is a screen by-pass condenser which serves to pass r-f oscillations directly to ground. R-107 is a screen dropping resistor. C-112 is a by-pass condenser which serves to keep any stray r-f oscillations from getting into the power supply.

(5) L-102, in the cathode circuit, blocks the r-f oscillations traveling from ground to cathode, forcing

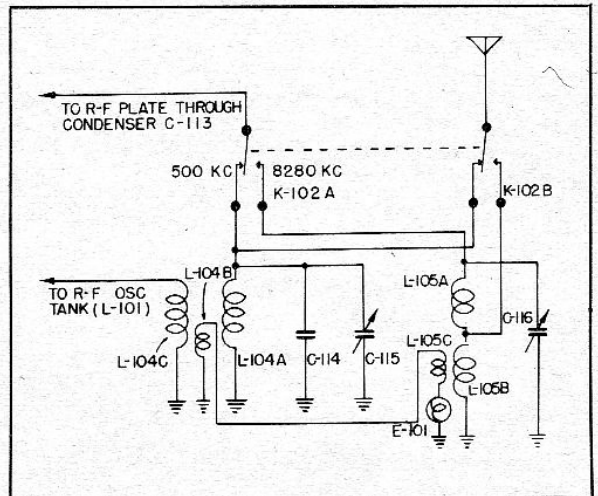


Figure 4-6. Radio Transmitter T-74/CRT-3—  
Functional Diagram of Plate Tank Circuits

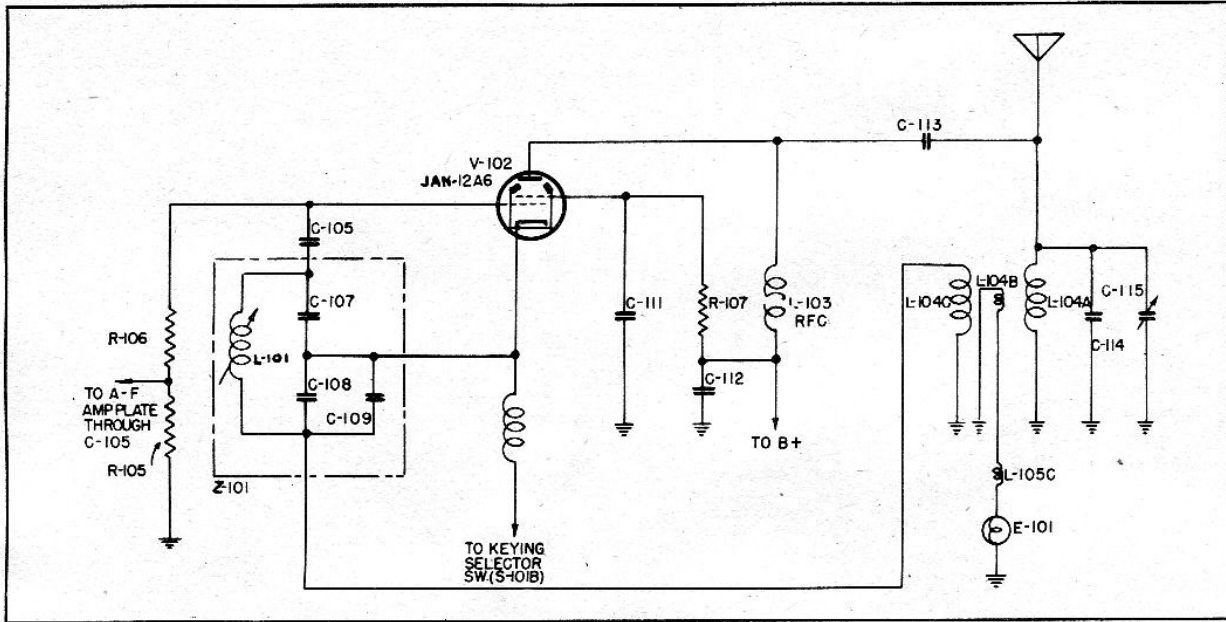


Figure 4-7. Radio Transmitter T-74/CRT-3—Functional Diagram of R-F Circuits for 500 Kilocycles

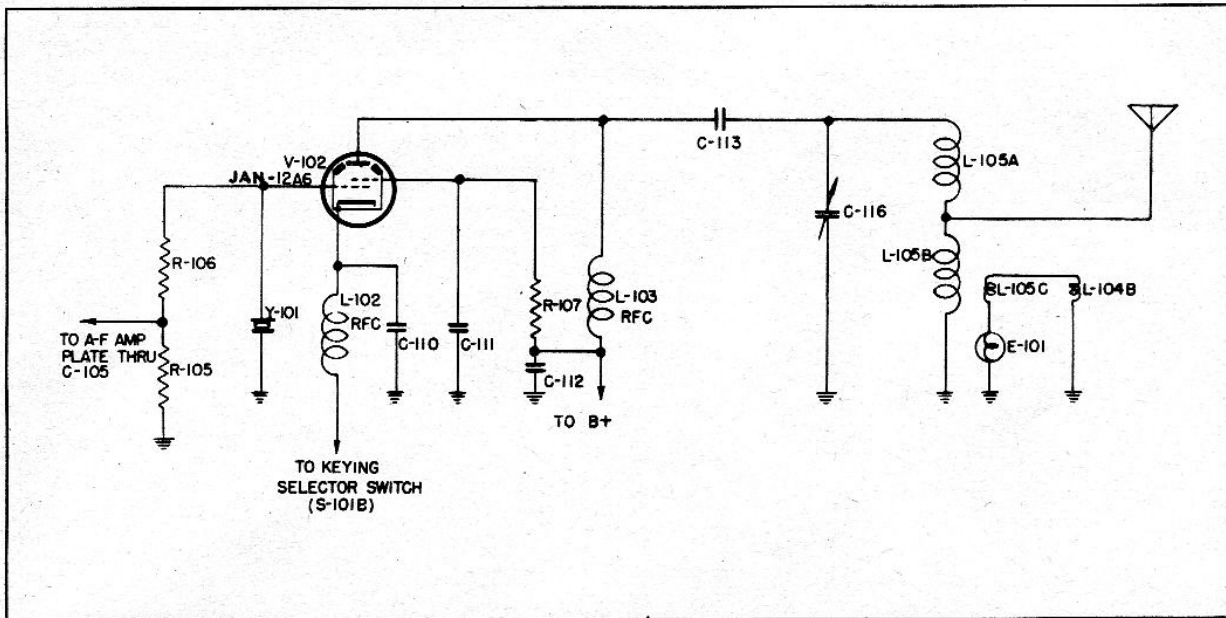


Figure 4-8. Radio Transmitter T-74/CRT-3—Functional Diagram of R-F Circuits for 8280 Kilocycles

them to pass from ground to cathode by another route. In the 500-kilocycle position these oscillations pass through L-104, C-108, and C-109. This arrangement provides feedback between the screen and the junction of the grid tank capacitors, and produces a typical Colpitts electron-coupled oscillator circuit. Since the 8280-kilocycle position provides a crystal-controlled oscillator circuit, no feedback is required other than that provided by the small inter-electrode capacity between the grid and plate. Capacitor C-110 is provided to serve as a direct path between cathode and ground for r-f signals at 8280 kilocycles.

#### e. PLATE TANK CIRCUITS.

(See figure 4-6.)

(1) Relay K-102A connects the output from capacitor C-113 and the r-f plate to one of the plate tank coils, either L-104A or L-105A, depending upon the desired frequency. Coil L-104A is tuned by a fixed and a variable capacitor in combination, C-114 and C-115 respectively. Coils L-105A and L-105B, which are in series and act as a single coil with a tap, are tuned by C-116, a variable capacitor. Relay K-102B connects the antenna either to L-104A or L-105B, as required by the transmitting frequency. Tank tuning does not affect the oscillation frequency at either 500 or 8280 kilocycles, since there is no coupling between the plate and grid circuits.

(2) L-104B and L-105C are loops coupled to coils L-104A and L-105B respectively. These are in series with each other and E-101, the "RADIO OUTPUT" indicator lamp. E-101 is returned to ground only because ground provides a convenient return path to complete the circuit back to the loop coil L-104B.

#### f. SELECTION OF TRANSMITTER FREQUENCY.

(See figures 4-7 and 4-8.)

(1) In the "MANUAL" position, S-101A does not connect A+ to the coils of the frequency-selecting relays. Hence, the normally closed contacts of the relays provide connections for continuous 500-kilocycle operation.

(2) In the "AUTOMATIC" position, S-101A does connect A+ to the coils of the frequency-selecting relays. Therefore, operation of the relays is dependent upon the position of cam E-203-D, and the relays cause the transmitter to shift every 50 seconds from one frequency to the other.

#### g. SELECTION BETWEEN RADIO TRANSMISSION AND SIGNAL LIGHT.

(See figures 4-9 and 4-10.)

(1) In both the "MANUAL" and "AUTOMATIC" positions, S-101A connects A+ to the filaments of both tubes.

(2) In the "SIGNAL LIGHT" position S-101B connects the manual "KEY" to one side of J-101. Low voltage (A+) is permanently connected to the other side of T-101. When the manual "KEY" is depressed, it grounds the first side of J-101, completing the circuit through the signal lamp.

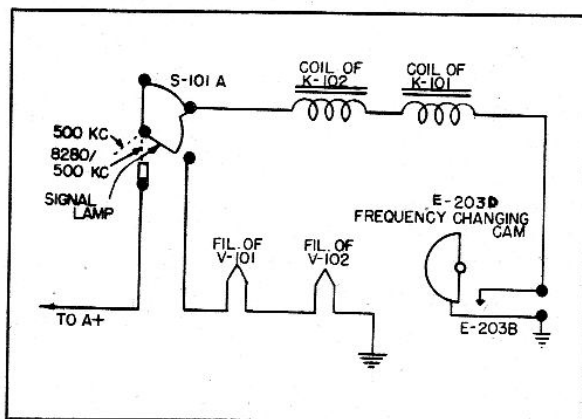


Figure 4-9. Radio Transmitter T-74/CRT-3—Functional Diagram of Circuits Affected by Switch S-101A

#### b. SELECTION OF MANUAL OR AUTOMATIC KEYING.

(See figures 4-9 and 4-10.)

(1) In the "MANUAL" position of S-101B, the cathode of V-102 is placed in series with S-102, the manual key.

(2) In the "AUTOMATIC" position of S-101B, the cathode of V-102 is placed in series with E-203A, the contacts operated by E-203-C, the code cam.

(3) In the "SIGNAL LIGHT" position, the signal light jack is placed in series with S-102.

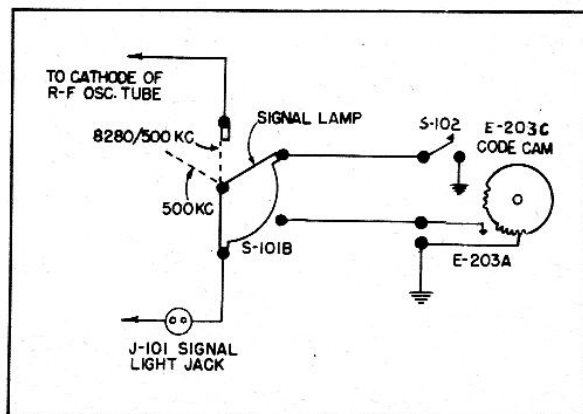


Figure 4-10. Radio Transmitter T-74/CRT-3—Functional Diagram of Circuits Affected by Switch S-101B

## SECTION V

### MAINTENANCE

#### 1. INSPECTION OF RADIO SET AN/CRT-3.

*a. EQUIPMENT REQUIRED.*—A radio receiver capable of receiving a 500- and a 1000-kilocycle "MCW" signal and an 8280-kilocycle "CW" signal is required. If two such receivers are available, the test procedure can be greatly simplified.

#### *b. REQUIRED INSPECTIONS.*

(1) The inspection procedure must be performed at the time Radio Set AN/CRT-3 is installed in an airplane.

(2) The inspection procedure must be performed at the time of the regular 100-hour inspection of any aircraft on which Radio Set AN/CRT-3 is installed.

#### IMPORTANT

Radio sets which fail to pass any of the following tests must not be issued. Sets found defective after issue must be returned to a depot and a replacement drawn.

#### *c. VISUAL INSPECTION.*

(1) Unpack Bag BG-155-A, and check to determine that each piece of equipment listed in section I, paragraph 2, is present. Make sure that the proper quantities are present.

(2) Examine each piece of equipment for evidence of mechanical damage. Make sure that the kite and inflating tubes in the inner bag are undamaged. Examine the cans of Generator M-315-B and Balloon M-278-A. Check that keys are present and that opening tabs are not broken.

#### CAUTION

Do not open the sealed cans containing the balloons or the hydrogen generators.

#### *d. TEST OF RADIO TRANSMITTER T-74/CRT-3.*

(1) Open the antenna-reel compartment door on the front of Radio Transmitter T-74/CRT-3 (see fig. 2-1) and lock it in the open position by inserting the cotter key in the hole provided. Unwind the antenna lead-in wire, and check the operation of Reel RL-48 and its brake.

(2) Remove the crank shaft cap and insert Hand Crank CG-18-A.

(3) Extend the antenna lead-in wire out in a straight line on a wooden floor or over a wooden chair or box. The antenna clip must not touch the ground or any metal object. The transmitter must be fairly close to the test receiver described in paragraph 1*a*, above.

(4) Set the selector switch in the "MANUAL" position.

(5) Tune the receiver used to 1000 kilocycles and turn the beating oscillator switch (BFO) on the receiver off.

#### Note

The receiver is tuned to 1000 kilocycles because Radio Transmitter T-74/CRT-3, without an antenna load, emits a stronger second harmonic signal than a fundamental.

(6) Turn the crank at a speed of about 80 to 100 revolutions per minute. Check that the "SPEED INDICATOR" lamps are lit. Continue cranking for 20 or 30 seconds.

(7) Depress the "KEY" button. Check that the "RADIO OUTPUT" light is lit. (It will be very dim without an antenna load.) Check that a signal is received on the monitoring receiver. Be sure that the signal is tone modulated.

(8) Set the selector switch in the "500-K.C.-8280 K.C.-AUTOMATIC" position.

(9) Continue cranking until a signal is heard on the monitoring receiver (tuned to 1000 kilocycles). Check the automatic keying signal for six groups of "SOS" followed by a long dash of about 20 seconds duration.

(10) Tune the monitoring receiver to 8280 kilocycles and turn the beat frequency oscillator (BFO) switch on the receiver on. The 8280-kilocycle signal is "CW" and cannot be heard on a receiver without a beating oscillator.

(11) Continue cranking until a signal is heard on the monitoring receiver. Check that the "RADIO OUTPUT" light is lit. It should go on and off with the automatic keying, and will usually be very dim while the transmitter is on 500 kilocycles, and then



will usually be very bright during the 8280-kilocycle transmission. Check the signal heard on the monitoring receiver for the same coding cycle as in step (9) above.

(12) Unscrew the cap of the desiccator well and examine the silica gel. If it is not blue in color, replace it with fresh desiccant. Replace the cap, *tightly*.

#### CAUTION

Make certain that the desiccator sack is securely tied so that the granules cannot spill out.

#### e. TEST OF SIGNAL LAMP M-308-B.

(1) Insert the plug of Signal Lamp M-308-B into the "SIGNAL LAMP SOCKET."

(2) Set the selector switch to the "SIGNAL LIGHT" position.

(3) Rotate the crank at a speed of about 80 to 100 revolutions per minute and depress the "KEY" button. Check that the lamp is lit, and that it can be keyed with the "KEY" button.

#### f. INSPECTION OF PARACHUTE M-390-B.

The inspection and repacking of Parachute M-390-B must be accomplished by authorized parachute personnel in accordance with Technical Order 13-5-5. All parachutes issued for service will be visually inspected for general condition at least once every 60 days and more frequently if conditions demand. If as a result of this periodic inspection, conditions are found that indicate need of repair or more thorough inspection, the parachute will be opened and completely inspected and repacked. Parachutes will be repacked by qualified parachute personnel when issued for use and whenever exposed to water or moisture or whenever a complete inspection is accomplished.

#### g. REPACKING RADIO SET AN/CRT-3.

(1) Replace the crank in the well on Radio Transmitter T-74/CRT-3. Be sure to secure it with the pin provided. Replace the crank socket cap.

(2) Coil the antenna lead-in and close the antenna-reel door. Be sure it is not jammed with the lead-in wire and that it opens easily. Lock it with the cotter key.

(3) Repack the equipment in Bag BG-155-A. Follow the arrangement shown in figure 8-3 to avoid possible damage to the equipment.

(4) Lace Bag BG-155-A carefully. Snap both snaps of Parachute M-390-B to the V-rings of the bag.

### 2. REPAIR OF INSTALLED EQUIPMENT.

a. If the inspection directed above shows that one or more pieces of equipment are defective, those individual items of equipment may be replaced without replacing the entire Radio Set AN/CRT-3.

b. Repairs should not be attempted without adequate facilities.

### 3. PERFORMANCE CHECKS AT DEPOTS AND SUB-DEPOTS.

#### a. RADIO POWER OUTPUT MEASUREMENTS.

—Radio power output measurements can be made without taking off the front cover. The following items of test equipment are required.

1—660 micromicrofarad air or mica capacitor,  $\pm 1\%$ .

1—96 micromicrofarad air or mica capacitor,  $\pm 2\%$ .

1—0 to 500-milliamperere r-f milliammeter.

1—0 to 150-milliamperere r-f milliammeter.

1—34-ohm,  $\pm 2\%$ , non-inductive, 5-watt resistor (Ohmite type D-100, 34-ohm dummy antenna recommended).

1—219 ohm,  $\pm 2\%$ , non-inductive, 5-watt resistor (Ohmite type D-100, 34-ohm dummy antenna recommended).

In addition, a receiver capable of receiving 500 and 8280 kilocycles (or harmonics of these frequencies) is required.

#### (1) TO CHECK R-F POWER OUTPUT, 500 KILOCYCLES TRANSMISSION.

(a) Unwind the antenna lead-in and connect it to the 34-ohm, non-inductive resistor, in series with the 660 micromicrofarad capacitor and the 0-500 milliamperere r-f milliammeter. These components are all in series, with one terminal of the meter going directly to a rim screw or chassis ground. Keep all the leads as short as possible.

(b) Uncoil antenna lead-in. It must be kept away from all metal objects (including the transmitter).

(c) Adjust the monitoring receiver to 500 kilocycles (or a harmonic frequency). The beating oscillator (BFO) switch on the receiver should be in the "OFF" position.

(d) Set Selector Switch S-101 (see fig. 2-1) to "500 K.C. MANUAL" and crank for 20 seconds to heat the tube filaments.

(e) Depress the "KEY" (see fig. 2-1) and read the r-f current. The r-f current should be at least 225 milliamperes.

(f) Change the setting of selector switch S-101 to "500 K.C.-8280 K.C.-AUTOMATIC" position and note if the same value of r-f current is produced when the wave-change mechanism is in the 500-kilocycle transmission position (check with monitoring receiver) and the coding mechanism is producing the sustained dash. It is important to remember that when the selector switch is in the "500 K.C.-8280 K.C.-AUTOMATIC" position the transmitter is operating on 500 kilocycles one-half of the time, and on 8280 kilocycles the balance of the time, with each frequency transmission lasting approximately 40 seconds. Disregard the r-f meter readings when the transmitter is transmitting on 8280 kilocycles but connected to the 500-kilocycle dummy antenna.

(g) Check the signal in the receiver to be sure the transmitted wave is tone modulated with the 1000-cycle note.

(b) Check the automatic code sequence for 6 groups of "SOS" followed by a sustained dash of approximately 20 seconds.

(2) TO CHECK R-F POWER OUTPUT, 8280-KILOCYCLE TRANSMISSION.

(a) Unwind the antenna-lead-in and connect it to the 219 ohm non-inductive resistor; in series with the 96 micromicrofarad capacitor and the 0 to 150 milliamperere r-f milliammeter. These components are connected in series, with one terminal of the meter going directly to a rim screw or chassis ground. Keep all leads as short as possible.

(b) The antenna-lead-in should be uncoiled. It must be kept away from all metal objects (including the transmitter).

(c) Adjust the monitoring receiver to 8280 kilocycles. The beating oscillator (BFO) switch on the receiver should be in the "ON" position.

(d) Set selector switch S-101 (see fig. 2-1) to "500 K.C.-8280 K.C.-AUTOMATIC" and crank for 20 seconds to heat the tube filaments.

(e) Read the r-f current when the wave-change mechanism is in the 8280-kilocycle position (check with the monitoring receiver) and the coding mechanism is producing the sustained dash. The minimum r-f current should be 85 milliamperes. Disregard the r-f meter readings when the transmitter is transmitting on 500 kilocycles during this test. The monitor-receiver prevents confusion in determining which frequency is being transmitted as well as a means of checking the coding sequence.

b. LOW VOLTAGE MEASUREMENT.—The low voltage supply can be checked without removing the front cover of transmitter T-74/CRT-3. Set selector switch S-102 to "SIGNAL LIGHT," insert 0-50-volt, d-c voltmeter into the signal light receptacle J-101. Crank the transmitter until the speed indicator lamps E-201 and E-202 are lit and depress "KEY" S-102. The limits of this measurement are 24 to 31 volts d-c.

#### 4. MAJOR CAUSES OF TROUBLE.

##### CAUTION

Do not remove the front cover of Radio Transmitter T-74/CRT-3 unless it is definitely ascertained that repairs are required. Repairs should be undertaken only by authorized personnel and then only when parts and proper test equipment are available. Whenever the front cover of the radio transmitter is removed for any reason, the silica gel desiccant must be renewed before it is placed in service again.

a. TUBES V-101 AND V-102.—To remove tubes for testing or replacement, first remove the springs holding them in their sockets. Slide the small end of the spring out of the groove, then push the large end off the top of the tube, and finally slide the spring away to one side. Then take the tube out in the usual manner. Be sure to replace the spring after putting the tube back. It is advisable to check the power output as described in paragraph 2a, this section, after changing tube V-102 (JAN-12A6). It is usually unnecessary to resonate the plate-tank circuits with a change of tubes unless a decided loss of r-f power is experienced. If loss of power is experienced, try substituting another JAN-12AG tube. Sometimes tube selection is required, as about one tube in ten will have low output.

b. CRYSTAL Y-101.—In cases where there is no 8280-kilocycle transmission, but Radio Transmitter T-74/CRT-3 functions on 500 kilocycles, check crystal Y-101. (See fig. 8-4.) The best method of checking the 8280-kilocycle crystal Y-101, is to substitute a crystal known to be good. A dummy antenna and an r-f meter should be used as described in paragraph 2a, this section. Minimum r-f current under such conditions should be 85 milliamperes. Be sure the clamp, which holds crystal Y-101 in its socket, is replaced before closing up the transmitter.

c. LAMPS E-101, E-201, AND E-202.—To test or replace ballast lamps E-201 and E-202 or the r-f Indicator Lamp E-101 (see figs. 8-5 and 8-6), remove the lamps from their sockets and check continuity. To test or replace the bulb in Signal Lamp M-308-B unscrew the clear dome.

##### d. RELAYS.

(1) WAVE-CHANGE RELAYS K-101, K-102.—The wave-change relays K-101 and K-102 (see figs. 8-4 and 8-5) should both close with approximately 20 volts or less being generated by generator G-201 between terminals No. 2 and No. 6 of plug P-101. (See figs. 8-4 and 8-5.) This lower voltage can be obtained by cranking the transmitter at a slow speed. The relays are adjusted at the factory, and should require no further adjustment. If it is found necessary to readjust the relays, a screw located on each relay determines the voltage at which the relay will close. To cause the relay to close at a lower voltage, adjust the screw in a clockwise direction. To clean the contact points, use an ordinary paper strip, do not use a file. The relay coil resistance is 250 ohms.

(2) VOLTAGE REGULATOR RELAY K-201.—The voltage regulator relay K-201 (see figs. 8-6 and 8-7) determines the voltage of Radio Transmitter T-74/CRT-3. With the radio transmitter in an operating condition and during the transmission of the sustained 20-second dash on either frequency, the voltage between terminals No. 2 and No. 6 of plug P-101 (see figs. 8-4 and 8-5) should be between 24 and 31 volts d-c at a cranking speed of 80 to 100

revolutions per minute. If the measured voltage is outside of these limits the regulator should be re-adjusted by means of the screw located on relay K-201. (See fig. 8-7.) To lower the voltage turn the screw in a clockwise direction. There is no adjustment of the high voltage potential. For each volt change of the low voltage, the high voltage will change approximately 10 volts. The spacing of contacts should be approximately 0.003 inches. To clean the contact points use an ordinary paper strip, do not use a file. The coil resistance is 1000 ohms.

**e. CODE AND WAVE-CHANGE CONTACTS.—**

Contacts E-203A and E-203B (see figs. 8-6 and 8-7) on the code and wave-change assembly may be checked by disconnecting jack J-201 from the cover and checking it with a continuity meter while cranking the unit. Connect the low range of the continuity meter between terminals No. 1 and No. 2 of J-201 for checking wave-change operation, and between terminals No. 2 and No. 4 of J-201 for checking the "SOS" sustained dash sequence (see fig. 8-6).

**f. VARIABLE CAPACITORS.—**The two air variable capacitors C-115 and C-116 (see figs. 8-4 and 8-5) should be examined for metal particles between the plates. Use paper strips to clean them. Check for damaged rotor plates touching the stator plates. Do not change setting of either variable air capacitors, unless the special equipment for readjustment (refer to paragraph 8, this section) is available. This equipment is *not* the same as the equipment required for realignment of any other transmitter or receiver.

**5. TESTING PROCEDURE.**

**a.** Testing procedure is based on a breakdown of major divisions to localize the source of trouble. After the trouble is localized, point to point testing is begun. These tests require the removal of the front cover.

(1) **POWER SUPPLY TESTING.—**The following steps should be followed in the testing of the power supply:

(a) If another power supply for Radio Transmitter T-74/CRT-3 is available, simply switch power supplies and note if the transmitter functions normally.

(b) Check regulator relay K-201 as directed in paragraph 4*d*, this section.

(c) Be sure plug P-101 (see figs. 8-4 and 8-5) is inserted in receptacle J-201 (see fig. 8-6). Crank the transmitter at a speed of approximately 80 to 100 revolutions per minute and measure the high potential voltage between terminals No. 2 and No. 3 of J-201. The normal voltage should be between 280 and 360 volts d-c and may show some unsteadiness. Measure the low potential voltage between terminals No. 2 and No. 6 of receptacle J-201. The normal voltage should be between 24 and 31 volts d-c. The speed

indicator lamps (see fig. 8-6) should light. If the above voltages are obtained and contact tests of paragraph 4*d*, this section, prove satisfactory it is reasonable to assume that the power supply is operating normally.

(d) If the tests of paragraph *c*, preceding, prove that the voltage is sub-normal or non-existent, proceed as follows.

1. Disconnect plug P-101 from receptacle J-201. If the voltages now become normal, it can be assumed that a short circuit exists in the cover.

2. Unsolder filter capacitor C-201 (see figs. 8-6 and 8-7) and repeat the tests in paragraph *c*, preceding. If the voltages are now normal the filter capacitor is evidently shorted. Replace it.

(e) Check the continuity of all wiring, especially that to receptacle J-201 (see fig. 8-6) for broken leads.

(f) Check the "SPEED INDICATOR" lamps E-201, E-202 according to paragraph 4*c*, this section.

(2) **COVER TESTING.—**The cover testing should be divided into the following two classifications: first, when one frequency (either 500 kilocycles or 8290 kilocycles) operates normally; second, when neither frequency operates normally.

(a) **ONE FREQUENCY OPERATES NORMALLY.**

1. If frequency transmission of 500 kilocycles is normal but transmission of 8280 kilocycles is defective:

**a.** Selector switch S-101 must be in the "500 K.C.-8280 K.C.-AUTOMATIC" position.

**b.** Check crystal Y-101 (see fig. 8-4) by substitution. (Refer to paragraph 4*b*, this section.)

**c.** Check selector switch S-101 (see figs. 8-4 and 8-5) for continuity and contact operation.

**d.** Check the wave-change relays K-101, K-102. (See fig. 8-4 and refer to par. 4*d*, this section.)

(1) Visually check if relays K-101 and K-102 open and close with continued cranking of the transmitter.

(2) Clean the contacts of relays K-101 and K-102 by drawing a strip of ordinary paper through the contacts. Do not use a file.

(3) Check all the leads on relays K-101 and K-102.

(4) Check the variable capacitor C-116 (see fig. 8-4) for metal particles shorting the plates. Check for damaged rotor plates touching the stator plates. Do not change the setting of this capacitor.

(5) Check the mica capacitor C-110. (See fig. 8-4.)

(6) Check all leads to L-105-A, L-105-B and L-105-C.

**Section V**  
**Paragraphs 5-6**

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- (7) Check resistor R-106, 27,000 ohms.
- (8) Check resistor R-105, 33,000 ohms.

2. If transmission of 8280 kilocycles is normal, but transmission of 500 kilocycles is defective:

- a. Check continuity of L-101. (See figs. 8-4 and 8-5.)
- b. Check all the leads on and to Z-101. (See fig. 8-4.) Check capacitors C-107, C-108, and C-109.
- c. Check wave-change relays K-101 and K-102. (See fig. 8-4 and refer to par. 4d (1), this section.)

(1) Visually check if relays open and close with continued cranking of the transmitter.

(2) Clean the contacts of relays K-101 and K-102 by drawing a strip of ordinary paper through the contacts. Do not use a file.

(3) Check all the leads on, and to relays K-101 and K-102 and selector switch S-101. (See fig. 8-4.)

d. Check the variable capacitor C-115 (see figs. 8-4 and 8-5) for metal particles shorting between plates, or damaged plates. *Do not change setting of this capacitor.*

e. Check capacitor C-114. (See figs. 8-4 and 8-5.)

f. Check all leads to L-104-A, B, and C. (See fig. 8-4.) Check continuity of L-104-A, B, and C.

g. Check capacitor C-106. (See fig. 8-4.)

3. If the 500-kilocycle frequency is functioning, but is unmodulated, check JAN-12SC7 (V-101) and all components associated with this tube.

4. If the 500-kilocycle frequency functions with the selector switch S-101 (see fig. 2-1) in the "500 K.C.-8280 K.C.-AUTOMATIC" position but not in the "500 KC MANUAL" position, check "KEY" S-102 for broken leads and selector switch S-101 (see fig. 8-4) for continuity.

(b) **RADIO TRANSMITTER T-74/CRT-3 INOPERATIVE ON BOTH FREQUENCIES.**—(The power supply is assumed to have been tested and found normal.)

1. Check JAN-12SC7 tube (V-101), and JAN-12A6 tube (V-102).

2. Check coil L-102 (see fig. 8-4) for open circuit. The resistance of coil L-102 is 23 ohms.

3. Check coil L-103 (see fig. 8-4) for open circuit. The resistance of coil L-103 is 38 ohms.

4. Check resistor R-107 (see fig. 8-4) for open circuit. The resistance of resistor R-107 is 33,000 ohms.

5. Check leads to relays K-101 and K-102. (See fig. 8-4.)

6. Check continuity of switch S-101. (See fig. 8-4.)

- 7. Check capacitor C-113. (See fig. 8-4.)
- 8. Check capacitor C-112. (See fig. 8-4.)
- 9. Check capacitor C-110. (See fig. 8-4.)
- 10. Check capacitor C-111. (See fig. 8-4.)

(c) **RADIO TRANSMITTER T-74/CRT-3 OPERATIVE ON BOTH FREQUENCIES, BUT SIGNAL LAMP M-308-B INOPERATIVE.**

1. Check bulb, socket, cord, and plug of Signal Lamp M-308-B for continuity.

2. Check jack J-101, switch S-101-B, and key S-102 for continuity.

**6. REPAIR DATA.**

a. **TROUBLE CHART.**—The following chart lists probable symptoms, trouble locations and probable remedies.

**CAUTION**

Special test equipment is required for adjustment of variable capacitors C-115 and C-116. See par. 8d (1) and 8e (1), this section.

Symptom	Trouble Location	Remedy
No high voltage, low voltage present	Capacitor C-201	Replace
	Capacitor C-111	Replace
	Capacitor C-113	Replace
	Capacitor C-112	Replace
	Generator G-201	Replace
	Relay K-201	Replace or repair
	Tube V-101 (JAN-12SC7)	Replace
No low voltage or high voltage	Tube V-102 (JAN-12A6)	Replace
	Generator G-201	Replace
No voltage regulation	Relay K-201	Replace or repair
	Resistor R-201 Lamps E-201, E-202	Replace
No. 8280-kilocycle transmission (500-kilocycle normal)	Relay K-201	Replace or repair
	Crystal Y-101	Replace
	Switch S-101	Replace
	Relay K-101, K-102	Replace or repair
	Variable Capacitor C-116	Clean, repair or replace
	Capacitor C-110	Replace
	Resistor R-105 Resistor R-106 Coil L-105-AB	Replace Replace Replace or repair
No. 500-kilocycle transmission (8280-kilocycle normal)	Coil L-101	Replace Z-101
	Capacitor C-107	Replace Z-101
	Capacitor C-108, C-109	Replace Z-101
	Capacitor C-106	Replace
	Capacitor C-114	Replace
	Relays K-101 and K-102	Repair or replace
	Variable Capacitor C-115	Clean, repair or replace
	Selector switch S-101-A, B	Replace
	Coil L-104-A, B, C	Repair or replace

a. TROUBLE CHART (Cont'd)

Symptom	Trouble Location	Remedy
No 8280-kilocycle or 500-kilocycle transmission	Tube V-101 (JAN-12SC7)	Replace
	Tube V-102 (JAN-12A6)	Replace
	Coil, Choke L-102	Replace
	Coil, Choke L-103	Replace
	Capacitor C-111	Replace
	Capacitor C-113	Replace
	Capacitor C-112	Replace
	Capacitor C-110	Replace
	Switch S-101-A, B	Replace
	Relays K-101-A, B, K-102-A, B	Replace or repair
Resistor R-107	Replace	
No signal light Operation	Switch S-101-A, B	Replace
	Switch S-102	Replace
No frequency switching in "AUTOMATIC" operation	Wheel E-203-D	Tighten
	Contacts E-203-B	Adjust
	Relays K-101, K-102	Replace or repair
	Selector Switch S-101-A, B	Replace
No automatic code ("MANUAL" operation normal)	Gear Train	Replace
	Wheel E-203-C	Tighten
	Contacts E-203-A	Adjust
Low r-f power on both frequencies	Selector Switch S-101-A, B	Replace
	Gear Train	Replace
	Weak tube V-102 (12AG)	Replace tube
	Relay K-102	Readjust
	Capacitor C-115 (on 500 kilocycles)	Retune
	Capacitor C-116 (on 8280 kilocycles)	Retune
	Capacitor C-111	Replace
Capacitor C-113	Replace	
Resistor R-107	Replace	
No modulation (used on 500 kilocycles)	Tube V-101 (12SC7)	Replace
	Transformer T-101	Replace
	Capacitor C-103	Replace
	Capacitor C-101	Replace
	Capacitor C-102	Replace
	Capacitor C-104	Replace
	Capacitor C-105	Replace
	Resistor R-101	Replace
	Resistor R-103	Replace
	Resistor R-104	Replace
	Resistor R-105	Replace
	Resistor R-106	Replace
	No "500 KC MANUAL"	Switch S-101-A, B
Switch S-102		Replace

## b. RESISTANCE VALUES.

(1) RESISTANCE CHECK POINTS ON THE COVER.—Resistance check points on the cover are shown in figure 8-12. The points between which the readings are taken are indicated by lines. The selector switch S-101 is in the "500 KC MANUAL" position.

The power supply is disconnected from the cover by removing plug P-101 from receptacle J-102.

(2) RESISTANCE CHECK POINTS ON THE POWER SUPPLY.—Resistance check points on the power supply are shown in figure 8-10. The points are taken above ground point indicated on diagram. The power supply is disconnected from the cover by removing plug P-101 from receptacle J-201. The crank is rotated until the wave-change contacts, E-203-B, and the code contacts, E-203-A, are both in the "closed" position.

c. TUBE SOCKET VOLTAGES.—The tube socket voltages between the pins and chassis ground are shown in figure 8-11. Set the selector switch S-101 to "500 KC MANUAL" and depress "KEY." The crank speed should be between 80 and 100 revolutions per minute and the "SPEED INDICATOR" should be lit. Two types of voltmeter readings are listed, namely, 1000-ohms-per-voltmeter readings, and 20,000-ohms-per-voltmeter readings. Readings are based upon a low voltage potential supply to the cover of 25 volts d-c and a high-potential voltage supply of 320 volts d-c. The actual readings may vary  $\pm 15$  per cent from the voltages shown in figure 8-11 and still be acceptable. The antenna lead-in should be unwound and stretched out, free from all metallic objects.

## d. VOLTAGE VALUES.

(1) Voltage check points on the cover of Radio Transmitter T-74/CRT-3 are shown in figure 8-11. Readings refer to chassis ground and are listed for 1000-ohms-per-voltmeter (above line), 20,000-ohms-per-voltmeter (below line), and in some cases for vacuum tube voltmeter (VTVM) readings. All readings may be  $\pm 15$  per cent of the stated voltage. The voltages are given for the transmitter operating on "500 KC MANUAL" with "KEY" depressed. The antenna lead-in should be unwound and stretched out, free from all metallic objects. The crank speed should be between 80 and 100 revolutions per minute with the "SPEED INDICATOR" lit.

(2) Approximate voltages above ground for the power supply of Radio Transmitter T-74/CRT-3 are shown in figure 8-9. Readings are given for 1000-ohms-per-voltmeter and 20,000-ohms-per-voltmeter. The crank speed should be between 80 and 100 revolutions per minute. The "SPEED INDICATOR" lamps should light. The cover should be disconnected from the power supply by unplugging plug J-201. All readings  $\pm 15$  percent of given values are acceptable.

(3) External power supplies may be used while testing or adjusting. The low voltage supply should be between 24 and 31 volts d-c, connect the negative to chassis ground or terminal No. 2 of plug P-101 and the positive to terminal No. 6 of plug P-101. The high voltage supply should be approximately 320 volts d-c. Connect the negative to chassis ground or terminal No. 2 of plug P-101 and the positive lead to terminal No. 3 of plug P-101. Terminal No. 4 should be grounded for a constant signal. For 500-kilocycle

transmission, terminal No. 1 should be open; for 8280-kilocycle operation No. 1 terminal should be grounded, as this closes the wave-change relays K-101 and K-102.

### 7. SPECIAL MAINTENANCE OPERATIONS.

*a.* The chassis may be removed from the cover by the removal of three No. 6 screws. The necessary wiring must be unsoldered.

*b.* Adequate lubrication is provided on all components for the normal life of the equipment. Additional lubrication may be detrimental to its operation. Check to be sure that the brushes are free in the brush-holder. The brushes of the generator should not require replacement, however, if the generator brushes must be replaced, fit them to the contour of commutator.

#### CAUTION

Be sure the transmitter generator is rotated a few times once every month to keep the grease from freezing or packing in the bearings.

*c.* The wave-change cam E-203-D and code wheel E-203-C are indexed at the factory for properly synchronizing the transmissions, to allow six full groups of "SOS" and one sustained dash of approximately 20 seconds duration, to be transmitted on each frequency alternately. Should this sequence become broken by misalignment of the two wheels E-203-D and E-203-C, (see fig. 8-7) it is necessary to loosen the top nut No. 10-32 which secures code wheel E-203-C to the shaft. Remove the code wheel and check that the 1/2-inch nut securing wave-change wheel E-203-D to its shaft is tight. Rotate the power unit with the crank until the two indexing holes in the wave-change wheel are in line with the corresponding holes in the assembly plate. Replace the code wheel E-203-C in such a manner that the two index holes in the assembly plate, wave-change wheel E-203-D, and code wheel E-203-C are all in line. This line up process should be done by placing two 3/16-inch rods or equivalent size drills through the above mentioned holes. Be sure all nuts are tight before removing the alignment rods. Check contacts E-203-A and E-203-B to be sure they open and close properly with continued cranking. When the index holes in the code and wave-change wheels are properly aligned with those in the plate, the cam blades of contacts E-203-A and 203-B should be in such a position as to require about 1/16-inch travel of the wheels to cause contacts E-203-A and E-203-B to open a little ahead of contact 203-B. Turn the crank just enough to open both contacts and check the contact spacing. The cam blades themselves are normally sprung enough to allow them to drop to the bottom level of code wheel E-203-C and to the ledge provided on the trailing edge of wave-change wheel E-203-D. The contact spacing should be not less than 0.010-inch and not more than 0.018-inch

and, as near as possible, the same on both sets of contacts.

*d.* In case it is impossible to replace the desiccator unit due to a shortage of supplies, reactivate the desiccant as follows: Open the cloth bag containing the silica gel and remove the gel, placing it in a flat pan. Heat the silica gel to a temperature of 177° C (350° F) until it assumes a deep blue color. During this heating it is advisable to stir the particles occasionally so that all are evenly heated. Do not exceed a temperature of 400° C or the activity of the silica may be permanently impaired. Dry out the cloth bag thoroughly by heating, being careful not to burn the cloth. Refill the bag and replace it in the equipment.

#### CAUTION

If the silica gel turns amber, brown or black, it has been raised to an excessive temperature and must not be used.

*e.* Since the gears in each of these two units are matched so as to obtain a perfect fit, individual gears are not supplied as spares. Obtain a complete unit to replace the defective one, or attempt to match individual gears from stocks of salvaged parts.

### 8. SPECIAL ADJUSTMENTS.

*a.* GENERAL.—Three radio-frequency circuits of Radio Transmitter T-74/CRT-3 are adjustable. These are:

- (1) The 500-kilocycle grid tank circuit (Z-101).
- (2) The 500-kilocycle plate tank circuit (L-104, C-114, and C-115).
- (3) The 8280-kilocycle plate tank circuit (L-105, C-116)

The first of these adjustments sets the frequency of the transmitter; the other two pre-tune the transmitter to the 306-foot antenna which it will be required to feed in operation. All are preset at the factory and should normally require no adjustment. When the need for readjustment has been definitely ascertained, the procedure described herein must be followed.

#### *b.* EQUIPMENT REQUIRED.

- (1) An external power supply such as is described in paragraph 6*d* (3) above.

#### Note

If an external power supply is unavailable, the power supply of the transmitter itself may be used. One man must be available to crank while another performs the adjustments. As many as three men may be needed and modification in the process below will be necessary.

- (2) The equipment required for radio power output measurements as listed in paragraph 3*a*, this section.

(3) A frequency meter (such as Frequency Meter Set SCR-211-J) or a wave-meter covering the frequencies used.

c. ADJUSTMENT OF 500-KILOCYCLE GRID TANK CIRCUIT.

**CAUTION**

Do not attempt this adjustment unless accurately calibrated frequency measuring equipment is available. If this adjustment is improperly made, the transmitter will operate in a perfectly normal fashion, but it will transmit on the wrong frequency so that rescue stations monitoring 500 kilocycles cannot hear its signals.

(1) Perform this adjustment whenever coil and capacitor assembly Z-101 is replaced, or when inspection indicates that the 500-kilocycle signals from Radio Transmitter T-74/CRT-3 are off frequency. The measurement described in steps (2), (3), and (4) below should be part of any major overhaul of the transmitter.

(2) Operate Radio Transmitter T-74/CRT-3 in the manner prescribed in paragraph 3a (2) above for measurement of power output on 500 kilocycles. Note the power output.

(3) Measure the frequency of the transmitter with the frequency meter. (If the 1000-cycle modulation interferes with the measurement, remove it by opening the transmitter, and placing a piece of paper between the points of section K-101-B of relay K-101. Do not disturb the other sections of this relay. Close the transmitter case before proceeding with the measurement.)

(4) If the frequency of Radio Transmitter T-74/CRT-3 is within 750 cycles of 500 kilocycles, do not attempt to retune it. If the frequency of the transmitter is further off frequency than this limit, note the frequency measurement.

(5) Remove the cover from the case, disconnect it from the hand cranked power supply, and connect it to the external power supply. Produce a steady 500-kilocycle signal by setting the selector switch to "500 K.C.-8280 K.C.-AUTOMATIC" and by grounding terminal 4 of plug P-101.

(6) Remeasure the frequency.

(7) Subtract the frequency measured with the transmitter in the case (see sub-paragraph (4) above) from the frequency measured with the transmitter outside the case (see sub-paragraph (6) above). Add the difference (it will be about 300 to 400 cycles) algebraically (that is, with proper regard for sign) to 500 kilocycles and set the frequency meter to this frequency.

(8) Loosen the jam nut holding the grid tuning screw.

(9) Adjust the grid tuning screw until the frequency of Radio Transmitter T-74/CRT-3 is the same as the frequency set on the frequency meter.

(10) Tighten the jam nut and check that this has not changed the frequency.

(11) Disconnect the external power supply and put the transmitter back in its case. Repeat steps (2) and (3) above.

(12) If the frequency of the transmitter is not within 250 cycles of 500 kilocycles, repeat the adjustments above until it is within this limit.

(13) If the power output is more than 5 per cent less than the power output noted in step (2), retune the 500-kilocycle plate tank circuit as described below.

**Note**

Do not forget to remove the paper from relay K-101 if the modulation was disconnected in that manner.

(14) Close the transmitter tightly; renew the desiccant; and perform the inspection described in paragraph 1, this section.

**Caution**

Do not attempt the following adjustments unless accurate phantom antennas are available. If this adjustment is improperly made, the transmitter will operate in a perfectly normal fashion, but it will be tuned to operate into an antenna of different length than the 306 feet of Antenna Assembly AS-207/CRT-3, so that when connected to the antenna furnished it will be mismatched and considerable power will be lost. The "RADIO OUTPUT light will not indicate this mismatch.

d. ADJUSTMENT OF 500-KILOCYCLE PLATE TANK CIRCUIT.

(1) Perform this adjustment whenever capacitor C-114 or C-115, or coil L-104 are repaired or replaced, or whenever capacitor C-115 has had its setting disturbed. Perform this adjustment also if the power output on 500 kilocycles is below the limit required in paragraph 3a (2), this section.

**Note**

Check the power supply voltages, and try substituting several other JAN-12A6 vacuum tubes before attempting to increase the power by performing the adjustment.

(2) Remove the cover from the case of Radio Transmitter T-74/CRT-3, and disconnect it from the power supply. Connect it to an external power supply. Connect the transmitter to the proper phantom antenna for 500-kilocycle operation as described in

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paragraph 3a (2), this section. Be sure that the antenna lead-in is in one loop, clear of the transmitter and dummy antenna. Produce a steady 500-kilocycle signal by setting the selector switch to "500 K.C.-8280 K.C.-AUTOMATIC" and by grounding terminal 4 of plug P-101.

(3) Loosen the lock nut on the shaft of variable capacitor C-115.

(4) Change the setting of capacitor C-115, using an aligning tool or a phenolic rod sharpened to a screw driver point, until the reading of the r-f milliammeter in the phantom antenna is a maximum.

(5) Tighten the lock nut, and check to be sure that the reading on the r-f milliammeter is unchanged.

(6) Put the transmitter back in its case; close it tight; renew the desiccant, and perform the inspection described in this section, paragraph 1.

**e. ADJUSTMENT OF 8280-KILOCYCLE  
PLATE TANK CIRCUIT.**

(1) Perform the adjustment whenever capacitor C-116 or coil L-105 are repaired, replaced, or whenever capacitor C-116 has had its setting disturbed. Perform this adjustment also if the power output on 8280-kilocycle is below the limit required in paragraph 3a (3), this section.

**Note**

Check the power supply voltages, and try substituting several other JAN-12A6 vacuum tubes before attempting to increase the power by performing this adjustment.

(2) Remove the cover from the case of Radio Transmitter T-74/CRT-3 and disconnect it from the power supply. Connect to an external power supply. Connect the transmitter to the proper phantom antenna for 8280-kilocycle operation as described in paragraph 3a (3), this section. Be sure that the antenna lead-in is in one loop, clear of the transmitter and dummy antenna. Produce a steady 8280-kilocycle signal by setting the selector switch to "500 K.C.-8280 K.C.-AUTOMATIC" and by grounding terminals 1 and 4 of plug P-101.

(3) Loosen the lock nut on the shaft of variable capacitor C-116.

(4) Change the setting of capacitor C-116, using an aligning tool or a phenolic rod sharpened to a screw-driver point, until the reading of the r-f milliammeter in the phantom antenna is a maximum.

(5) Tighten the lock nut. Check to be sure that the reading on the r-f milliammeter is unchanged.

(6) Put the transmitter back in its case, close it tightly, renew the desiccant, and perform the inspection described in this section, paragraph 1.

**Note**

In cases where the specialized test equipment for Radio Transmitter T-74/CRT-3 is available the instructions supplied with the test set should be followed.



## SECTION VI

### SUPPLEMENTARY DATA

#### 1. MISCELLANEOUS.

*a.* There is one JAN-12SC7 (VT-268) V-101 tube, and one JAN-12A6 (VT-134) V-102 tube.

*b.* The functions of Radio Transmitter T-74/CRT-3 are as follows:

(1) Transmission of 500 kilocycles by use of the key.

(2) "500 K.C.-8280 K.C.-AUTOMATIC" radio transmission of "SOS" code groups and a 20 second sustained dash, transmission alternating every 40 seconds on each frequency.

(3) Signal light by hand keying.

*c.* All radio transmissions are pre-set and require no adjustment on the part of the operator.

*d.* Transmission of 500 kilocycles is 100 per cent modulated by a 1000-cycle tone.

*e.* Transmission of 8280 kilocycles is unmodulated and crystal controlled.

*f.* It is necessary to use an antenna 306 feet in length as supplied.

*g.* Automatic code sequence consists of six groups of "SOS" followed by a sustained dash transmitted alternately on 500 kilocycles and 8280 kilocycles.

*h.* The r-f power output on each frequency is approximately 2.5 watts (less on 8280 kilocycles).

*i.* All power requirements are supplied by hand cranking.

*j.* The average high-voltage supplied to tubes is approximately 320 volts d-c.

*k.* The filaments of the tubes are in series.

*l.* The average low voltage supplied to the chassis is 28 volts d-c. The generator is rated for a continuous output of 28 volts at 0.175 ampere, and 300 volts at 0.040 ampere. The two windings are connected in series in Radio Transmitter T-74/CRT-3 to give a high voltage output of approximately 330 volts at 0.040 ampere.

*m.* Equipment should operate at ambient temperatures from  $-35^{\circ}\text{C}$  to  $+60^{\circ}$  ( $-31^{\circ}\text{F}$  to  $+140^{\circ}\text{F}$ ).

*n.* Storage temperatures may be between  $-65^{\circ}\text{C}$  and  $+85^{\circ}\text{C}$  ( $-85^{\circ}\text{F}$  and  $+185^{\circ}\text{F}$ ) without permanent damage to the equipment.

*o.* The kite or balloon may be used for raising the antenna.

*p.* Operation of hydrogen generators involves certain dangers. Caution in handling them must be exercised and directions must be carefully followed.

*q.* Radio Set AN/CRT-3 must not be dropped on land unless absolutely necessary. If precautions enumerated in paragraph 3*d*, section II, are not taken, Transmitter T-74/CRT-3 may not operate when the set is dropped on land.

*r.* It is absolutely necessary to use a good ground when transmitting.

*s.* If one is forced to use the transmitter on land, try to find a large stream or lake. Signals will travel 10 times further on a lake than when used on land. (Refer to par. 4*c* (CAUTION), sec. II.

*t.* Do not kink the antenna wire when raising the antenna.

*u.* The range of the signal on 8280 kilocycles is dependent upon the time of day, the time of year, and the latitude. In general the signal on this frequency cannot be received at a relatively short distance from the transmitter, (i. e., within the skip zone) but will be received very well at greater distances. Thus, under some particular daytime conditions a station 50 miles and another 300 miles from the transmitter might not receive the high frequency signal while a station 500 miles from the transmitter, received it clearly. Both the extent of the skip zone and the maximum range are greater at night than during the day. In daytime hours the maximum range may be from 750 to 1500 miles; at night the maximum range may be increased to several thousand miles.

*v.* Do not realign the transmitter unless it is imperative to do so. And then only if adequate test equipment and proper dummy antennas are available.

*w.* Wave-change relays K-101 and K-102 are closed only when transmitter is transmitting on 8280 kilocycles.

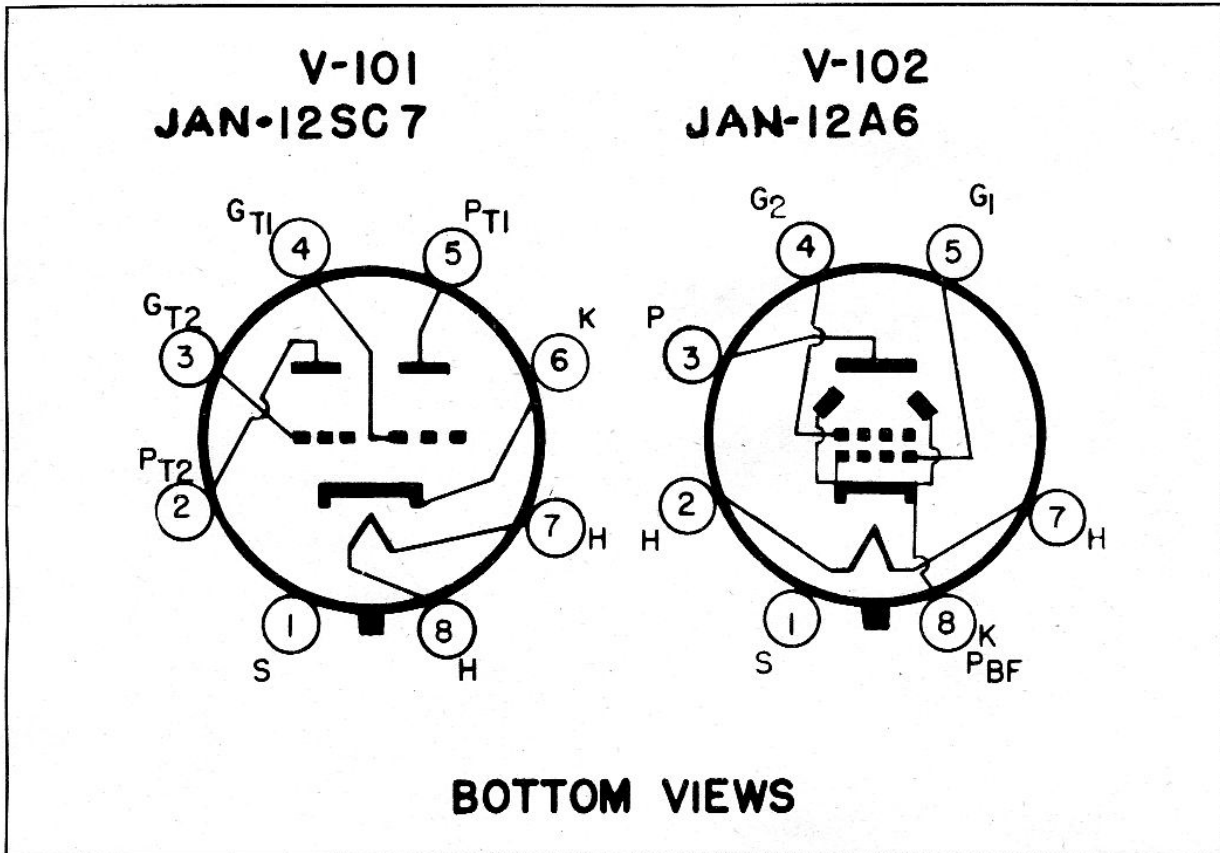


Figure 6-1. Radio Transmitter T-74/CRT-3—Tube Base Diagram

x. It is impossible to hand key Radio Transmitter T-74/CRT-3 on 8280 kilocycles.

y. When changing from signal lamp operation to radio transmission allow time for the tubes to heat. The tubes are not in circuit when the signal lamp is used.

**2. OVERALL METHOD OF OPERATION.**

The signals from this dual frequency radio transmitting system are intended for two different types of receiving stations, each having a specific function in rescue work.

Fixed radio-direction-finding stations located on land in permanent or semi-permanent locations are expected to receive the 8280 kilocycle signals. Because of the long range of these signals and the numerous monitoring stations located throughout the world, several such stations are bound to receive these signals if transmitted periodically throughout the day and night. Each direction-finding station determines the bearing of the transmitter. These bearings are sent to a control station which evaluates them and determines the approximate position of the transmitter.

Once this approximate position is known, mobile receiving stations, either aircraft or surface vessels, equipped with radio compasses, are dispatched to that location. Once there, they are within the range of the 500-kilocycle signals. The mobile stations can then proceed to home on these signals by the use of the radio compass, thus precisely locating the transmitter in distress.

The signals sent by automatic transmission from the transmitter are designed to be of maximum use in this method of location. The frequency shifts so that the signals needed by the fixed and mobile direction-finding stations are on the air alternately without attention from the operator. Transmission on each frequency begins with a series of "SOS" groups to attract attention, after which a long dash is transmitted to give the steady signal needed for an accurate bearing. The 500-kilocycle signals are tone-modulated so that they can be received on all types of receivers. The 8280-kilocycle signals are "CW" because a clearer indication on some types of remote direction-finding stations is obtained when no modulation is present.

## SECTION VII

## TABLE OF REPLACEABLE PARTS

## 1. CONTENT AND ARRANGEMENT OF TABLE.

*a.* Listings in the Table of Replaceable Parts do not constitute a complete breakdown of the equipment but consist of all electrical parts and such operative mechanical parts, with the exception of structural and minor parts such as standard bolts, screws, nuts, etc., that are subject to loss or failure.

*b.* Parts are grouped by major assemblies. Under each major assembly they are listed (1) alphabetically according to type and (2) numerically under each type.

## 2. ORDERING SPARE PARTS.

*a.* GENERAL.—Each Service using the Table of Replaceable Parts has established certain depots and service groups for the storage and issue of spare parts. The regulations of each Service should be studied to determine the method of requisitioning spare parts and the sources from which they may be obtained. Information in the table pertaining to manufacturers' or contractors' names, types, models, or drawing numbers is not to be interpreted as authorization to field agencies to attempt to purchase identical or comparable spare parts directly from wholesale or retail stores except under emergency conditions as covered by the existing regulations of the Service concerned.

*b.* U. S. ARMY PERSONNEL.—The Table of Replaceable Parts is for information *only* and is not to be construed as a list of allowances of maintenance parts or components. Organizations using this equipment will consult applicable AAF Technical Orders of the 00-30 and 00-30A series. Higher maintenance and supply echelons will consult applicable Combat Supply Tables XIII, XIIB, and XIII.

## 3. EXPLANATION OF SYMBOLS USED.

*a.* REFERENCE SYMBOLS (COLUMN ONE).—To identify parts of an equipment referred to in the text, in illustrations, and in the Table of Replaceable Parts, a reference symbol is assigned to each part making up a major assembly of an equipment. Each symbol consists of an alphabetical portion and a numerical portion, separated by a hyphen. (Example C-101.) The alphabetical portion denotes the type of part, classified in accordance with the following list:

<i>Alphabetical Portion of Reference Symbol</i>	<i>Type of Part</i>
A .....	Structural parts, panels, frames, castings, etc.
C .....	Capacitors of all types
E .....	Miscellaneous electrical parts, insulators, knobs, brushes, etc.

<i>Alphabetical Portion of Reference Symbol</i>	<i>Type of Part</i>
G .....	Generators, exciters, etc.
H .....	Hardware, screws, bolts, studs, pins, snap-slides, tools, etc.
I .....	Indicating devices (except meters and thermometers), pilot lamps, etc.
J .....	Jacks and receptacles (stationary)
K .....	Contactors, relays, circuit breakers, etc.
L .....	Inductors, radio-frequency, and audio-frequency
O .....	Mechanical parts, bearings, shafts, couplings, gears, ferrules, flexible shafts, housings, etc.
P .....	Plugs
Q .....	Diaphragms (microphone, telephone, projector, etc.)
R .....	Resistors, fixed and variable (potentiometers, etc.)
S .....	Switches, interlocks, thermostats
T .....	Transformers, radio-frequency, audio-frequency and power
V .....	Vacuum and gaseous discharge tubes
W .....	Wires, interconnecting cables, without plugs
X .....	Sockets
Y .....	Mechanical oscillators, crystals, magnetostriction tubes, etc.
Z .....	Impedances, such as traps (wave) etc.

The numerical portion of the reference symbol is assigned as follows: Each part in each of the classifications of parts within a major assembly is assigned a number running consecutively for 99 numbers—from 101 to 199 for the first major assembly listed in the table, from 201 to 299 for the second major assembly, etc. If parts in one or more classifications of parts within a major assembly exceed 99, however, the next hundred series, e.g. 301 to 399, is assigned to that major assembly even though only part of the numbers in that series are used. The next major assembly listed then begins with the next series, e.g. 401 to 499. The block of numbers assigned to each major assembly is shown in paragraph 5, this section.

Only one reference symbol is assigned to a part, but suffix letters are sometimes added to distinguish between multiple electrical or mechanical characteristics of a part. Example: C-101A, C-101B, and C-101C identify each part of a triple capacitor C-101; K-101A identifies the coil and K-101B the contacts of a relay K-101.

*b.* CROSS-HATCH SYMBOL (COLUMN TWO).—Cross-hatch symbols (#) appearing in column two indicate that corresponding parts are not included in any concurrently procured spare parts group. However, many of the parts so marked may be obtained from stocks left over from Radio Set SCR-578-A or SCR-578-B.

4. ABBREVIATIONS.

Abbreviations used in the Table of Replaceable Parts are as follows:

Abbreviation	Definition
amp	ampere(s)
amplr	amplifier(s)
ant	antenna(s)
assem	assembly
BP	Bendix Aviation Corp., Pacific Division
ckt	circuit
cont	contact(s); contractor(s)
cps	cycles per second
d	depth or deep
DC	direct current
deg	degree(s)
desig	designation(s)
diam	diameter(s)
DPDT	double-pole, double-throw
DPST	double-pole, single-throw
dwg	drawing(s)
freq	frequency(ies)
ft	foot (feet)
GE	General Electric
gen	generator(s)
gnd	ground
govt	government
h	height or high
HV	high-voltage
ID	inside-diameter(s)
JAN	joint Army-Navy
kc	kilocycle(s)
lb	pound(s)
lg	length or long
LV	low-voltage
ma	milliampere(s)
max	maximum
mf	microfarad(s)
mh	millihenry(s)
min	minimum or minute(s)
mmf	micromicrofarad(s)
mtd	mounted
mtg	mounting
mtg/c	mounting center(s)
ND	New Departure Division, General Motors Corporation
neg	negative
OD	outside diameter
osc	oscillator
p/o	part of
pos	positive
pri	primary
ref	reference
RF	radio frequency
rpm	revolutions per minute
secd	secondary
sect	section(s)
Sig C	Signal Corps
spec	specification(s)
sq	square
std	standard(s)
sw	switch(es)
thk	thick or thickness
transf	transformer(s)
v	volt(s) or voltage
vdcw	DC working volts
w/	with

Abbreviation	Definition
wd	wide or width
xtal	crystal(s)
x	by
"	inch(es)
#	number
%	per cent
±	plus or minus

5. INDEX OF MAJOR ASSEMBLIES.

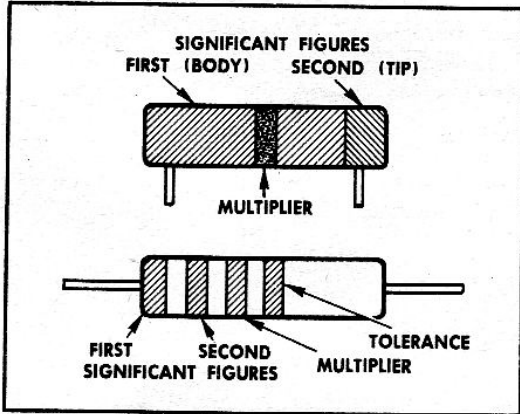
Major Assembly	Numerical Series of Reference Symbols	Page
Chassis and Panel Assembly	101-199	7-6 —7-10
Power Supply and Keying Assembly	201-299	7-11—7-13
Miscellaneous Parts	301-399	7-13—7-15
Accessories	401-499	7-15—7-16

6. DECIMAL EQUIVALENTS OF WIRE SIZES OF AWG AND SWG (BRITISH).

Size AWG	Diameter Inches	Size SWG	Diameter Inches
0000	.46000	0000	.4000
000	.40964	000	.3720
00	.36480	00	.3480
0	.32486	0	.3240
1	.28930	1	.3000
2	.25763	2	.2760
3	.22942	3	.2520
4	.20431	4	.2320
5	.18194	5	.2120
6	.16202	6	.1920
7	.14428	7	.1760
8	.12849	8	.1600
9	.11442	9	.1440
10	.10190	10	.1280
11	.09074	11	.1160
12	.08081	12	.1040
13	.07196	13	.0920
14	.06408	14	.0800
15	.05707	15	.0720
16	.05082	16	.0640
17	.04526	17	.0560
18	.04030	18	.0480
19	.03589	19	.0400
20	.03196	20	.0360
21	.02846	21	.0320
22	.02535	22	.0280
23	.02257	23	.0240
24	.02010	24	.0220
25	.01790	25	.0200
26	.01594	26	.0180
27	.01420	27	.0164
28	.01264	28	.0148
29	.01126	29	.0136
30	.01003	30	.0124
31	.008928	31	.0116
32	.007950	32	.0108
33	.007080	33	.0100
34	.006305	34	.0092
35	.005615	35	.0084
36	.005000	36	.0076
37	.004453	37	.0068
38	.003965	38	.0060
39	.003531	39	.0052
40	.003145	40	.0048

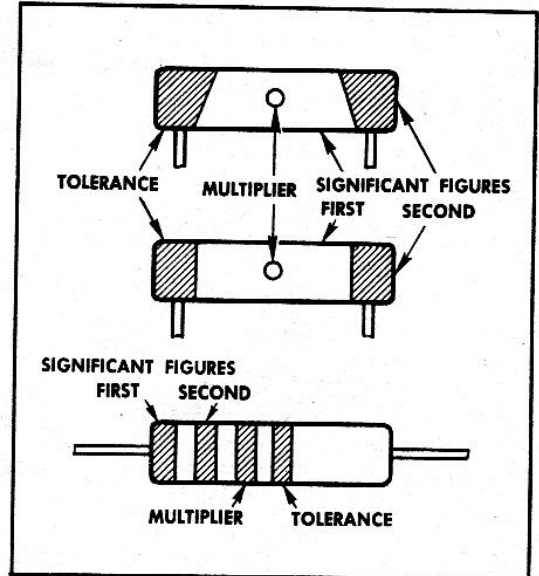
# RESISTOR COLOR CODES

**RMA COLOR CODE FOR  
FIXED COMPOSITION RESISTORS**



Insulated fixed composition resistors with axial leads are designated by a natural tan background color. Non-insulated fixed composition resistors with axial leads are designated by a black background color.

**AWS COLOR CODE FOR  
FIXED COMPOSITION RESISTORS**



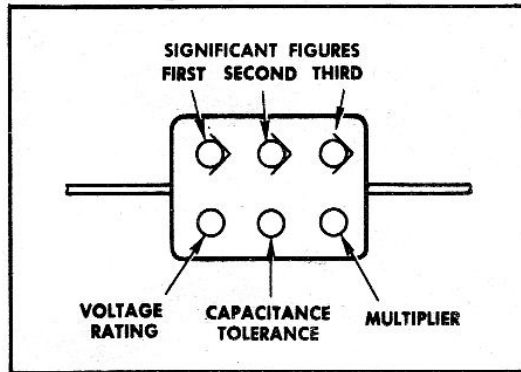
The exterior body color of insulated resistors may be any color except black. The usual color is natural tan. The exterior body color of uninsulated resistors with axial leads may be either black or white. The exterior body color of uninsulated resistors with radial leads may be black or it may be the color of the first significant figure of the resistance value.

COLOR	SIGNIFICANT FIGURE	MULTIPLIER	TOLERANCE (PERCENT)
BLACK	0	1	
BROWN	1	10	
RED	2	100	
ORANGE	3	1000	
YELLOW	4	10,000	
GREEN	5	100,000	
BLUE	6	1,000,000	
VIOLET	7	10,000,000	
GRAY	8	100,000,000	
WHITE	9	1,000,000,000	
GOLD		0.1	5
SILVER		0.01	10
NO COLOR			20

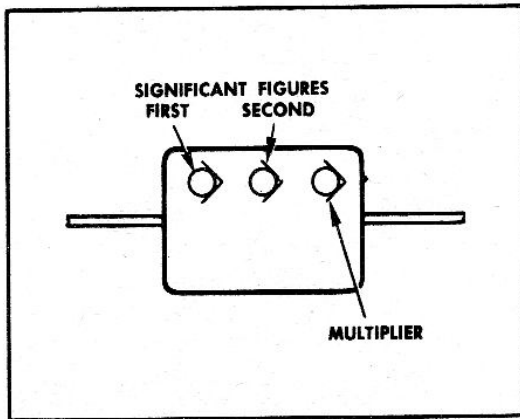
**RMA:** Radio Manufacturers Association  
**AWS:** American War Standard  
 (American Standards Association)

# CAPACITOR COLOR CODES

**RMA 6-DOT COLOR CODE FOR  
MICA-DIELECTRIC CAPACITORS**

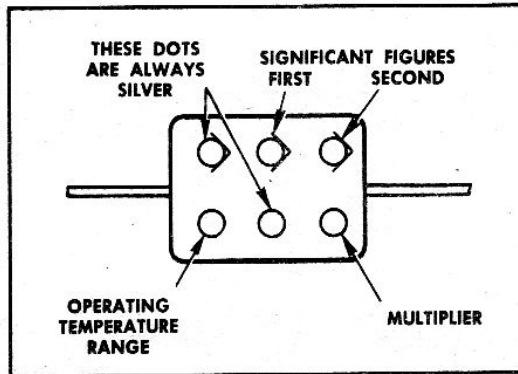


**RMA 3-DOT COLOR CODE FOR  
MICA-DIELECTRIC CAPACITORS**



Capacitors marked with this code have a voltage rating of 500 volts.

**AWS 6-DOT COLOR CODE FOR  
PAPER-DIELECTRIC CAPACITORS**

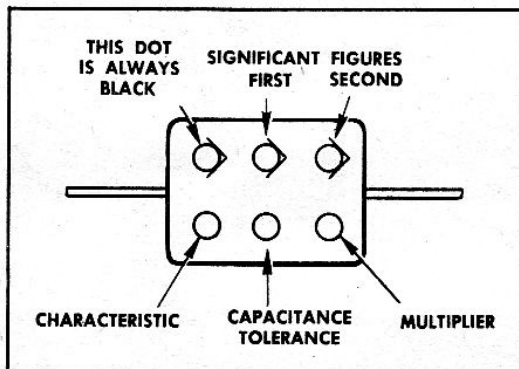


The silver dots serve to identify this marking. The sixth dot shows whether the capacitor has a maximum operating temperature of 167°F (black) or 185°F (brown).

COLOR	SIGNIFICANT FIGURE	MULTIPLIER		VOLTAGE RATING (VOLTS)	CHARACTERISTIC (AWS MICA-DIELECTRIC)
		RMA MICA- AND CERAMIC-DIELECTRIC AWS MICA- AND PAPER-DIELECTRIC	AWS CERAMIC-DIELECTRIC		
BLACK	0	1	1		A
BROWN	1	10	10	100	B
RED	2	100	100	200	C
ORANGE	3	1000	1000	300	D
YELLOW	4	10,000		400	E
GREEN	5	100,000		500	F
BLUE	6	1,000,000		600	G
VIOLET	7	10,000,000		700	
GRAY	8	100,000,000	0.01	800	
WHITE	9	1,000,000,000	0.1	900	
GOLD		0.1		1000	
SILVER		0.01		2000	
NO COLOR				500	

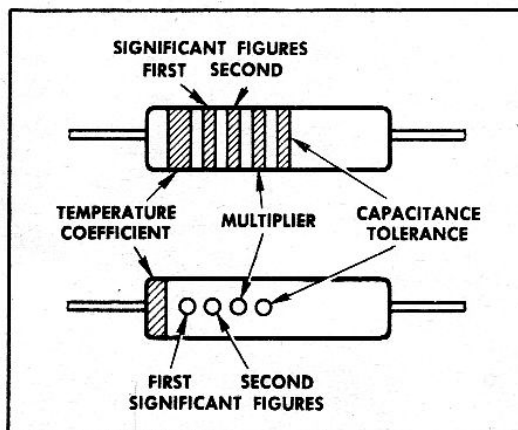
AN 16-30CRT3-2

**AWS 6-DOT COLOR CODE FOR MICA-DIELECTRIC CAPACITORS**



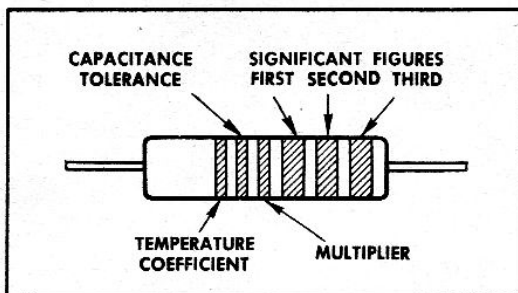
The black dot serves to identify the AWS marking. Capacitors marked with this code are rated at 500 volts, except the following. AWS type CM35 capacitors with capacitances of 6,800, 7,500, and 8,200 micromicrofarads, and AWS type CM40 capacitors with capacitances of 9,100 and 10,000 micromicrofarads are rated at 300 volts.

**AWS COLOR CODE FOR TUBULAR CERAMIC-DIELECTRIC CAPACITORS**



Capacitors marked with this code have a voltage rating of 500 volts.

**RMA COLOR CODE FOR TUBULAR CERAMIC-DIELECTRIC CAPACITORS**



Capacitors marked with this code have a voltage rating of 500 volts.

**RMA:** *Radio Manufacturers Association*  
**AWS:** *American War Standard (American Standards Association)*

**NOTE:** These color codes give all capacitances in *micromicrofarads*.

CAPACITANCE TOLERANCE				TEMPERATURE COEFFICIENT OF CAPACITANCE $\times 10^{-6}$ MMF/MMF/ $^{\circ}$ C
RMA & AWS MICA- AND PAPER-DIELECTRIC (PERCENT)	RMA CERAMIC-DIELECTRIC (PERCENT)	AWS CERAMIC-DIELECTRIC GREATER THAN 10 MMF (PERCENT)	AWS CERAMIC-DIELECTRIC LESS THAN 10 MMF (MMF)	
20	20	20	2.0	0
1	1	1		- 30
2	2	2		- 80
3	3	2.5	0.25	- 150
4	4			- 220
5	5	5	0.5	- 330
6	6			- 470
7	7			- 750
8	2.5			+ 30
9	10	10	1.0	Not specified
5				
10				
20				

TL 13417

## TABLE OF REPLACEABLE PARTS

MODEL: RADIO SET AN/CRT-3

MAJOR ASSEMBLY: CHASSIS AND PANEL ASSEMBLY

Reference Symbol	Army Stock No. Navy Stock No. British Ref. No.	Name of Part and Description	Function	Mfr. and Desig. or Standard Type	Cont. or Govt. Dwg. or Spec. No.
101-199 series	#	CHASSIS AND PANEL ASSEMBLY: consists of chassis, front panel, and all operating parts of transmitter proper.		BP	BP dwg #450216
C-101	#	CAPACITOR, fixed: mica; 3000 mmf $\pm 5\%$ ; 500 vdcw; $5\frac{3}{64}$ " max lg x $5\frac{3}{64}$ " max wd x $\frac{3}{32}$ " max thk; (molded bakelite case; 2 wire leads $1\frac{1}{8}$ " min lg).	Audio osc tuning	JAN type #CM30A302J	JAN spec #JAN-C-5
C-102	#	Same as ref C-101.	Audio osc plate blocking		
C-103	#	CAPACITOR, fixed: mica; 1500 mmf $\pm 10\%$ ; 500 vdcw; $5\frac{3}{64}$ " max lg x $5\frac{3}{64}$ " max wd x $\frac{3}{32}$ " max thk; (molded bakelite case; 2 wire leads $1\frac{1}{8}$ " min lg).	Audio osc feedback	JAN type #CM30A152K	JAN spec #JAN-C-5
C-104	#	Same as ref C-101.	Audio inter-stage coupling		
C-105	#	CAPACITOR, fixed: mica; 1000 mmf $\pm 20\%$ ; 500 vdcw; $5\frac{3}{64}$ " max lg x $5\frac{3}{64}$ " max wd x $\frac{3}{32}$ " max thk; (molded bakelite case; 2 wire leads $1\frac{1}{8}$ " min lg).	Audio amplr to RF osc coupling	JAN type #CM30A102M	JAN spec #JAN-C-5
C-106	#	CAPACITOR, fixed: mica; 470 mmf $\pm 10\%$ ; 500 vdcw; $5\frac{1}{64}$ " max lg x $1\frac{3}{32}$ " max wd x $\frac{3}{32}$ " max thk; (molded bakelite case; 2 wire leads $1\frac{1}{8}$ " min lg).	RF grid blocking	JAN type #CM20A471K	JAN spec #JAN-C-5
C-107	#	CAPACITOR, fixed: mica; 3000 mmf $\pm 5\%$ ; 500 vdcw; $5\frac{3}{64}$ " max lg x $5\frac{3}{64}$ " max wd x $1\frac{1}{32}$ " max thk; (molded bakelite case; 2 wire leads $1\frac{1}{8}$ " min lg). P/o ref Z-101; cannot be replaced independently.	RF osc grid coil tuning	JAN type #CM35D302J	JAN spec #JAN-C-5
C-108	#	CAPACITOR, fixed: mica; 3900 mmf $\pm 5\%$ ; 500 vdcw; $5\frac{3}{64}$ " max lg x $5\frac{3}{64}$ " max wd x $1\frac{1}{32}$ " max thk; (molded bakelite case; 2 wire leads $1\frac{1}{8}$ " min lg). P/o ref Z-101; cannot be replaced independently.	RF osc grid coil tuning	JAN type #CM35D392J	JAN spec #JAN-C-5
C-109	#	Same as ref C-108. P/o ref Z-101; cannot be replaced independently.	RF osc grid coil tuning		
C-110	#	CAPACITOR, fixed: mica; 300 mmf $\pm 5\%$ ; 500 vdcw; $5\frac{1}{64}$ " max lg x $1\frac{3}{32}$ " max wd x $\frac{3}{32}$ " max thk; (molded bakelite case; 2 wire leads $1\frac{1}{8}$ " min lg).	RF osc cathode by-pass	JAN type #CM20C301J	JAN spec #JAN-C-5
C-111	#	CAPACITOR, fixed: mica; 1000 mmf $\pm 10\%$ ; 2500 vdcw; $1\frac{3}{8}$ " $\pm \frac{1}{64}$ " lg x $1\frac{1}{8}$ " $\pm \frac{1}{64}$ " wd x $2\frac{3}{64}$ " max thk; (molded bakelite case; 2 insulated solder lug terminals on ends with $1\frac{3}{4}$ " $\pm \frac{1}{32}$ " centers; 2 mtg feet with 0.144" diam holes on 1.314" centers).	RF osc screen by-pass	JAN type #CM45B102K	JAN spec #JAN-C-5
C-112	#	Same as ref C-111.	RF osc plate supply by-pass		
C-113	#	Same as ref C-111.	RF plate blocking		
C-114	#	CAPACITOR, fixed: mica; 150 mmf $\pm 5\%$ ; 2500 vdcw; $1\frac{3}{8}$ " $\pm \frac{1}{64}$ " lg x $1\frac{1}{8}$ " $\pm \frac{1}{64}$ " wd x $2\frac{3}{64}$ " max thk; (molded bakelite case; 2 insulated solder lug terminals on ends with $1\frac{3}{4}$ " $\pm \frac{1}{32}$ " centers; 2 mtg feet with 0.144" diam holes on 1.314" centers).	Ant fixed tuning for 500 kc	JAN type #CM45B151J	JAN spec #JAN-C-5
C-115	#	CAPACITOR, variable: air; 6.0 to 73.2 mmf; 0.020" max air gap; $1\frac{1}{8}$ " lg x $3\frac{1}{32}$ " wd x $1\frac{7}{32}$ " h; (25 plates; ceramic insulation; 2 mtg holes tapped #4-40 on $2\frac{1}{32}$ " mtg/c).	Ant variable tuning for 500 kc	BP	BP dwg #450235



## AN 16-30CRT3-2

## TABLE OF REPLACEABLE PARTS (Continued)

MODEL: RADIO SET AN/CRT-3

MAJOR ASSEMBLY: CHASSIS AND PANEL ASSEMBLY

Reference Symbol	Army Stock No. Navy Stock No. British Ref. No.	Name of Part and Description	Function	Mfr. and Desig. or Standard Type	Cont. or Govt. Dwg. or Spec. No.
C-116		CAPACITOR, variable: air; 4.5 to 43.7 mmf; 0.020" max air gap; 1- $\frac{3}{16}$ " lg x $\frac{3}{32}$ " wd x 1- $\frac{7}{32}$ " h; (15 plates; ceramic insulation; 2 mtg holes tapped #4-40 on $\frac{21}{32}$ " mtg/c).	Ant variable tuning for 8280 kc	BP	BP dwg #450234
E-101	2Z5952	LAMP, incandescent: Sig C Lamp LM-52, Navy Lamp TB-14; 6 to 8 v, 0.15 amp; T-3- $\frac{1}{4}$ clear; 1- $\frac{3}{16}$ " lg overall; miniature bayonet base; (C-2 filament; burn any position).	RF indicator	GE part #47	BP spec #BX19-10
E-102		BOARD, terminal: 1 solder-lug terminal; phenolic; 1- $\frac{17}{32}$ " lg x 1- $\frac{1}{4}$ " wd x $\frac{1}{8}$ " thk overall; (one 0.152" mtg hole).	Term point for ref C-105	BP	BP dwg #450228
E-103		BOARD, terminal: 4 solder-lug terminals; phenolic; 1- $\frac{11}{32}$ " lg x 1- $\frac{1}{16}$ " wd x $\frac{1}{16}$ " thk overall; (one 0.152" mtg hole).	Mtg for ref C-101 and C-102	BP	BP dwg #450230
E-104		BOARD, terminal: 10 solder-lug terminals; phenolic; 1- $\frac{3}{4}$ " lg x 1- $\frac{11}{32}$ " wd x $\frac{1}{16}$ " thk overall; (two 0.152" mtg holes on 1- $\frac{1}{8}$ " centers).	Mtg for ref C-103, C-104, R-102, and R-107	BP	BP dwg #450225
E-105	#	CONTACT, push-button: 1- $\frac{3}{16}$ " lg x 1" diam; (2 insulated inserts used both as terminals and push-button contacts; 1 insert mtd in center, other mtd $\frac{9}{32}$ " from center; insulating material black phenolic; body threaded #1-20).	Contacts for push-button key	BP	BP dwg #450217
E-106	# 2Z1480.32	BUTTON, push: brass; silver-plated; $\frac{3}{8}$ " lg x $\frac{1}{4}$ " diam.	Plunger of push-button key	BP	BP dwg #15254
E-107		KNOB, bar: molded black phenolic; for $\frac{1}{4}$ " shaft diam; single #8-32 set-screw; groove on pointer end filled with white and painted with radio-active paint; 1- $\frac{1}{4}$ " x $\frac{3}{4}$ " x 1- $\frac{1}{16}$ "; (brass insert; shaft hole $\frac{7}{16}$ " d; coated with fungicidal lacquer).	Selector sw knob	BP	BP dwg #450211
E-108		INSULATOR, feedthru: round threaded tube with lug in one end; brown bakelite; 1- $\frac{13}{32}$ " lg overall; (0.139" ID tapering to 0.129" ID; $\frac{7}{16}$ "-20 threads for $\frac{3}{8}$ " at center).	Ant lead-in insulator	BP	BP dwg #450218
H-101	#	CLAMP, receptacle: phosphor bronze; cadmium-plated; two 0.141" diam holes for rivets on 1" mtg/c; 1- $\frac{3}{32}$ " x 1- $\frac{5}{16}$ " x $\frac{25}{32}$ " overall; (accommodates Bendix #450169 connector).	Holds ref J-201	BP	BP dwg #15025
H-102	#	CLAMP, crystal: spring bronze; cadmium-plated; one 0.152" diam insulated mtg hole; 1- $\frac{5}{16}$ " lg x $\frac{3}{8}$ " wd with 1- $\frac{3}{32}$ " mtg leg at one end and $\frac{1}{32}$ " clamp leg at other end; (accommodates Army-Navy Crystal CR-1A/AR).	Holds xtal in place	BP	BP dwg #450162
H-103	#	CLAMP ASSEMBLY, antenna lead-in: phosphor bronze clamp with copper wire attached; clamp cadmium-plated; clamp 1- $\frac{7}{16}$ " lg x $\frac{1}{2}$ " wd x $\frac{3}{16}$ " thk overall, wire reaches 2- $\frac{1}{4}$ " beyond end of clamp; (designed to hold wire 0.040" diam).	Antenna lead-in	BP	BP dwg #450324
H-104	# 2Z5042-16	SPRING, shaft packing: coil; 0.055" diam music wire; cadmium-plated; 1- $\frac{1}{16}$ " lg x $\frac{7}{16}$ " diam.	Holds washer and gaskets in place on sw shaft	BP	BP dwg #15343
H-105	# 2Z8876.37	SPRING, push-button: 0.031" diam music wire; silver-plated; 1- $\frac{13}{32}$ " lg x $\frac{5}{8}$ " OD; (8 coils tapering from $\frac{3}{8}$ " OD to $\frac{27}{64}$ " ID; 7 active coils; coil length $\frac{3}{4}$ "; straight end from large end of coil extends $\frac{27}{32}$ ").	Keeps push-button cont open	BP	BP dwg #15253

## Section VII

AN 16-30CRT3-2

## TABLE OF REPLACEABLE PARTS (Continued)

MODEL: RADIO SET AN/CRT-3

MAJOR ASSEMBLY: CHASSIS AND PANEL ASSEMBLY

Reference Symbol	Army Stock No. Navy Stock No. British Ref. No.	Name of Part and Description	Function	Mfr. and Desig. or Standard Type	Cont. or Govt. Dwg. or Spec. No.
H-106	# 2Z7780-9	SPRING, tube retainer: 0.051" diam music wire; cadmium-plated; 1" diam x 1" lg overall; (one end of coil $2\frac{9}{32}$ " ID, other end $\frac{9}{16}$ " ID).	Holds tube in socket	BP	BP dwg #4640
H-107	# 6L20924-13-.81CS	SCREW, machine: hex head; steel, cadmium-plated; $\frac{1}{4}$ "-20; $1\frac{3}{16}$ " lg overall, $\frac{3}{8}$ " lg thd; head $\frac{7}{16}$ " across flats, $\frac{3}{16}$ " thk; (shoulder $\frac{1}{64}$ " lg; 0.114" diam hole drilled $1\frac{1}{32}$ " d through head of screw and tapped #6-32 $\frac{1}{4}$ " d).	Gnd term	BP	BP dwg #15998
H-108	#	WASHER, flat: brass, cadmium-plated; $\frac{9}{32}$ " ID x 0.495" OD x $\frac{1}{32}$ " thk.	Retains gaskets on selector sw shaft	BP	BP dwg #15286
H-109	# 6LK3510-24.1	NUT, hexagon: die cast Zamak #5; $\frac{5}{8}$ "-24; $\frac{1}{8}$ " thk; 1" wd across flats.	Secures ref J-101	BP	BP dwg #4698
J-101	#	CONNECTOR, female contact: 2 round female cont; straight; $1\frac{3}{16}$ " lg x $\frac{7}{8}$ " diam overall; designed for 28 v, 170 ma; cylindrical bakelite body with extended rim: cadmium-plated brass inserts with solder-lug term at rear; body thd $\frac{3}{8}$ "-24; body lettered "SIGNAL LAMP SOCKET").	Jack for signal light plug	BP	BP dwg #450213
J-102		LAMPHOLDER ASSEMBLY: miniature bayonet; steel shell and bracket; $1-1\frac{1}{16}$ " x $1-1\frac{1}{4}$ " x $1-3\frac{1}{16}$ " overall; (designed for 6-8 v, 0.15 amp; one 0.144" diam hole, and one 0.114" diam hole threaded #6-32; solder-lug at base of shell).	Holds ref E-101	BP	BP dwg #450237
K-101		RELAY, general purpose: DPDT; $1-3\frac{1}{4}$ " x $1-7\frac{1}{16}$ " x $1-1\frac{1}{8}$ " overall; ( $\frac{9}{32}$ " diam cont; cont designed for 330 v, 4 ma DC, or for 2- $\frac{1}{2}$ w RF; multiple wound coil, 14 v DC, 0.056 amp, 250 ohms; fast acting; coil varnish impregnated and tropicalized; all phenolic parts tropicalized; single mtg stud threaded #6-32).		BP	BP dwg #450236
K-101A	#	P/o ref K-101.	Selection of RF osc grid ckt		
K-101B	#	P/o ref K-101.	Supplying of HV to audio section for 500 kc operation		
K-102		Same as ref K-101.			
K-102A	#	P/o ref K-102.	Selection of plate tank ckt		
K-102B	#	P/o ref K-102.	Ant transfer		
L-101	#	COIL ASSEMBLY, radio, RF: osc; integral type; 2 pie; shielded only by chassis; $2-5\frac{1}{16}$ " lg x $1-3\frac{3}{8}$ " wd x 2" h overall; (black plastic solid form; form 0.375" diam x $1-1\frac{1}{8}$ " lg with rectangular base $2-5\frac{1}{16}$ " lg x $1-3\frac{3}{8}$ " wd; adjusted at assembly by changing relative positions of pies, adjusted at final assembly by adjusting iron screw in center of form; two 0.151" diam mtg holes on 2" centers in base; 4 solder lug terminals on base; coil varnished and baked). P/o ref Z-101; cannot be replaced independently.	500 ks osc grid coil	BP	Shown on BP dwg #450360

## AN 16-30CRT3-2

## TABLE OF REPLACEABLE PARTS (Continued)

MODEL: RADIO SET AN/CRT-3

MAJOR ASSEMBLY: CHASSIS AND PANEL ASSEMBLY

Reference Symbol	Army Stock No. Navy Stock No. British Ref. No.	Name of Part and Description	Function	Mfr. and Desig. or Standard Type	Cont. or Govt. Dwg. or Spec. No.
L-102		COIL, radio, RF: choke; integral type; single pie; unshielded; 2.35 mh; $1\frac{1}{32}$ " lg x $1\frac{1}{8}$ " diam excluding terminals; (ceramic core; core $\frac{1}{2}$ " diam x $\frac{7}{16}$ " lg; $\frac{3}{16}$ " diam axial mtg hole; 2 solder-lug term on bottom; varnish-impregnated and baked in).	RF osc cathode choke	BP	BP dwg #450363
L-103		COIL, radio, RF: integral type; five pie; unshielded; 2.5 mh; $1\frac{1}{16}$ " lg x $1\frac{7}{32}$ " max diam excluding leads; (ceramic core; core $\frac{7}{16}$ " diam x $1\frac{7}{16}$ " lg; two $1\frac{15}{32}$ " leads serve both for term and for mtg; varnish-impregnated and baked; coated with fungicidal lacquer).	RF osc plate choke	BP	BP dwg #450090
L-104	3C323-150B	COIL ASSEMBLY, radio, RF: integral type; 3 windings, one single pie universal wound, other two single layer wound; 47, 2, and 5 turns respectively; 2" lg x $1\frac{3}{16}$ " diam overall; (bakelite form, air core; form $1\frac{3}{4}$ " lg x $1\frac{7}{16}$ " OD; mtg base in end w/ two 0.152" holes on $\frac{3}{8}$ " mtg/c; 4 lug term; form and base coated w/ fungicidal lacquer).		BP	BP dwg #450092
L-104A	#	P/o ref L-104.	Plate tank coil for 500 kc		
L-104B	#	P/o ref L-104.	RF indicator coupling loop		
L-104C	#	P/o ref L-104.	Neutralizing coil		
L-105	3C323-150A	COIL ASSEMBLY, radio, RF: integral type; 3 windings, all single layer wound; unshielded; 12, $3\frac{1}{2}$ , and $1\frac{1}{4}$ turns respectively; 3" lg x $1\frac{1}{2}$ " diam overall; (bakelite-impregnated form, air core; form $2\frac{1}{16}$ " lg x $1\frac{5}{16}$ " OD; mtg base in end w/ two 0.152" holes on $\frac{3}{8}$ " mtg/c; 5 lug term; form and base coated w/ fungicidal lacquer).		BP	BP dwg #450091
L-105A	#	P/o ref L-105.	Plate tank for 8280 kc		
L-105B	#	P/o ref L-105.	Ant coupling coil		
L-105C	#	P/o ref L-105.	RF indicator coupling loop		
P-101	#	CONNECTOR, male contact: 6 flat parallel blades; straight; $1\frac{1}{32}$ " x $1\frac{3}{16}$ " x $1\frac{1}{16}$ " overall; (5 amp, 45 v; molded bakelite body; two 0.149" diam mtg holes on 1" centers; laminated phenolic parts impregnated with bakelite and coated with fungicidal lacquer).	Connects audio and RF sect to power supply and keying assem	Jones HB part #P-306-AB	BP dwg #450170
Q-101	# 3ZK3618/D1	DIAPHRAGM, push-button: neoprene; $5\frac{9}{16}$ " diam x $\frac{1}{4}$ " thk, depression $\frac{1}{2}$ " diam x $\frac{7}{32}$ " deep; (washer thermo-welded to brim).	Water seal for push-button key	BP	BP dwg #4639
R-101	#	RESISTOR, fixed; composition; 1000 ohms $\pm 10\%$ ; $\frac{1}{2}$ w; 0.468" max lg x 0.249" max diam; (bakelite insulation; 2 axial wire leads $1\frac{1}{2}$ " lg).	Cathode bias for ref V-101	JAN type #RC20AF102K	JAN spec #JAN-R-11
R-102	#	RESISTOR, fixed; composition; 47,000 ohms $\pm 10\%$ ; $\frac{1}{2}$ w; 0.468" max lg x 0.249" max diam; (bakelite insulation; 2 axial wire leads $1\frac{1}{2}$ " lg).	Audio osc plate load	JAN type #RC20AF473K	JAN spec #JAN-R-11
R-103	#	Same as ref R-102.	Audio amplr grid leak		

## TABLE OF REPLACEABLE PARTS (Continued)

MODEL: RADIO SET AN/CRT-3

MAJOR ASSEMBLY: CHASSIS AND PANEL ASSEMBLY

Reference Symbol	Army Stock No. Navy Stock No. British Ref. No.	Name of Part and Description	Function	Mfr. and Desig. or Standard Type	Cont. or Govt. Dwg. or Spec. No.
R-104	#	RESISTOR, fixed: composition; 100,000 ohms $\pm 10\%$ ; $\frac{1}{2}$ w; 0.468" max lg x 0.249" max diam; (bakelite insulation; 2 axial wire leads $1\frac{1}{2}$ " lg).	Audio amplr plate load	JAN type #RC20AF104K	JAN spec #JAN-R-11
R-105	#	RESISTOR, fixed: composition; 33,000 ohms $\pm 10\%$ ; $\frac{1}{4}$ w; 0.406" max lg x 0.170" max diam; (bakelite insulation; 2 axial wire leads $1\frac{1}{2}$ " lg).	RF osc grid leak	JAN type #RC10AF333K	JAN spec #JAN-R-11
R-106	#	RESISTOR, fixed: composition; 27,000 ohms $\pm 10\%$ ; $\frac{1}{4}$ w; 0.406" max lg x 0.170" max diam; (bakelite insulation; 2 axial wire leads $1\frac{1}{2}$ " lg).	Isolates audio amplr from RF osc	JAN type #RC10AF273K	JAN spec #JAN-R-11
R-107	#	Same as ref R-105.	RF screen dropping		
S-101		SWITCH, rotary: 2 wipers, 3 positions; 2 sections; bakelite body; $1\frac{7}{8}$ " x $1\frac{7}{8}$ " x $1\frac{1}{2}$ "; (designed for 28 v operation; two #5-40 screws project from wafer on $1\frac{9}{16}$ " mtg/c; shaft $\frac{1}{4}$ " diam; 8 solder lug term; all bakelite parts varnish-impregnated and coated with fungicidal lacquer).	Selects type of operation	BP	BP dwg #450233
S-102	#	This ref symbol is used on the schematic diagram to refer to the function performed by ref E-105 and E-106.	Manual telegraph key		
T-101	#	TRANSFORMER, AF: audio osc; pri 78 mh $\pm 15\%$ at 0.825 v RMS, secd 3.2 hy $\pm 15\%$ at 5.2 v RMS, inductances to be measured at 1000 cps; open steel frame; 2" lg x 1" wd x $1\frac{1}{8}$ " h overall; (turns ratio of pri to secd 1:6.3; designed to operate only at fixed freq of 1000 cycles; 4 solder lug term at top; two $\frac{5}{32}$ " diam mtg holes on $1\frac{5}{8}$ " centers; covered with fungicidal lacquer).	Audio osc transf	BP	BP dwg #450398
V-101	# 2J12SC7	TUBE, electron: Sig C Tube VT-268; (double triode).	Audio osc and amplr	JAN type #JAN-12SC7	JAN spec #JAN-1A
V-102	# 2J12A6	TUBE, electron: Sig C Tube VT-134; (beam power).	RF osc	JAN type #JAN-12A6	JAN spec #JAN-1A
X-101	#	SOCKET, tube: standard octal; low-loss mica-filled bakelite; $1\frac{7}{8}$ " lg x $1\frac{3}{16}$ " wd x $1\frac{3}{16}$ " h overall; (two 0.136" diam mtg holes on $1\frac{1}{2}$ " centers; coated with fungicidal lacquer).	Tube mtg	BP	BP dwg #450168
X-102		SOCKET, crystal: 2-prong wafer; bakelite; $1\frac{1}{2}$ " lg x $\frac{3}{4}$ " wd x $\frac{3}{8}$ " h; (two 0.144" diam mtg holes on $1\frac{3}{16}$ " mtg/c).	Mtg for xtal	BP	BP dwg #450231
Y-101		CRYSTAL UNIT, quartz: Army-Navy Crystal Unit CR-1A/AR; freq 8280 kc; molded bakelite holder; $1\frac{1}{8}$ " wd x $1\frac{13}{16}$ " h x $\frac{7}{16}$ " thk; transmitting; (two $\frac{3}{8}$ " lg x $\frac{1}{8}$ " diam pin terminals spaced $\frac{1}{2}$ " c to c).	Determines freq of 8280 kc osc	Government furnished	
Z-101	#	COIL ASSEMBLY, radio, RF: $2\frac{3}{16}$ " lg x $1\frac{3}{8}$ " wd x $2\frac{1}{8}$ " h overall; (adjusted by means of iron screw in center of form; two 0.151" diam mtg holes on 2" centers in base; 4 solder-lug term on base; complete assembly varnished and baked). Includes ref C-107, C-108, C-109, and L-101.	500 kc osc grid tank	BP	BP dwg #450360

AN 16-30CRT3-2

## TABLE OF REPLACEABLE PARTS (Continued)

MODEL: RADIO SET AN/CRT-3

MAJOR ASSEMBLY: POWER SUPPLY AND KEYING ASSEMBLY

Reference Symbol	Army Stock No. Navy Stock No. British Ref. No.	Name of Part and Description	Function	Mfr. and Desig. or Standard Type	Cont. or Govt. Dwg. or Spec. No.
201-299 series	#	POWER SUPPLY AND KEYING ASSEMBLY: includes generator, generator drive, voltage regulator components, keyer assembly, and related parts.		BP	BP dwg #450186
C-201		CAPACITOR, fixed: dry electrolytic; 8 mf; 450 vdcw; 1-1 <sup>1</sup> / <sub>16</sub> " lg x 1 <sup>3</sup> / <sub>16</sub> " diam; (aluminum can enclosed in cardboard case; hermetically sealed; cardboard case treated with approved fungus resistant wax or fungicidal varnish; 2 tinned copper wire leads 2-1/2" lg). P/o ref E-204.	HV filter	Magnavox part #12D3462, treated w/ fungicidal lacquer by BP	BP dwg #450391; Sig C spec #71-1116
E-201	# 2Z5949	LAMP, incandescent: Sig C Lamp LM-49; 28 v 0.1 amp; T-3-1/4 clear; 1-3/16" lg overall; miniature bayonet base; (C-2 filament; burn any position).	Gen speed indicator	GE part #1820	BP spec #BX19-4
E-202	#	Same as ref E-201.	Gen speed indicator		
E-203 A/B		CONTACT ASSEMBLY, switch: DPST; 2 steel fingers and 2 mating contact strips assembled with spacers, screws, nuts, and washers; 1/8" diam silver contacts on both steel fingers and contact strips; adjustable screw stops; 2-1/8" x 1 <sup>3</sup> / <sub>16</sub> " x 3/4" overall; (4 solder-lug terminals at end). P/o ref O-202.		BP	BP dwg #450239
E-203A	#	P/o ref E-203 A/B.	Automatic RF osc keying		
E-203B	#	P/o ref E-203A/B.	Automatic freq changing		
E-203C	#	CAM, code: die-cast zinc; 3" diam x 5/16" h; (one half of rim coded with 6 SOS sequences, other half coded with single long dash; 0.187" diam mtg hole in center; two 0.187" alignment holes in long dash half). P/o ref O-202.	Automatic keying	BP	BP dwg #450179
E-203D	#	CAM, frequency changing: die-cast zinc; half wheel 3" diam x 3/16" h; (0.500" diam mtg hole in center; two 0.187" alignment holes corresponding in position to similar holes in ref E-203C). P/o ref O-202.	Automatic freq changing	BP	BP dwg #450180
E-204		BOARD ASSEMBLY, terminal: 5 solder-lug term, 1 condenser, 1 relay, 1 resistor; phenolic board 2-5/16" x 2-1/4" x 3/32" thk attached by 2 rivets in 0.140" diam holes to aluminum alloy bracket 3-3/16" lg x 1-9/16" wd x 0.064" thk bent to form 60 deg angle with phenolic board; (two 0.177" diam mtg holes on 1-3/8" centers in edge of bracket to mount assem to gen). Includes ref C-201, K-201, and R-201.	Filtering and voltage regulation	BP	BP dwg #450386
E-205	# 3H1528.2/B7	BRUSH, electrical contact: pos LV; brush material MC grade carbon; brush 0.262" x 0.189" x 7/16" lg, spring 1" x 3/8" diam; (stamped "+" on one side of brush; U-shaped type-A cap). P/o ref G-201.	Gen brush	BP	BP dwg #406242
E-206	# 3H1528.2/B7	BRUSH, electrical contact: neg LV; brush material MC grade carbon; brush 0.262" x 0.189" x 7/16" lg, spring 1" x 3/8" diam; stamped "-" on one side of brush; U-shaped type-A cap). P/o ref G-201.	Gen brush	BP	BP dwg #406243

## AN 16-30CRT3-2

## TABLE OF REPLACEABLE PARTS (Continued)

MODEL: RADIO SET AN/CRT-3

MAJOR ASSEMBLY: POWER SUPPLY AND KEYING ASSEMBLY

Reference Symbol	Army Stock No. Navy Stock No. British Ref. No.	Name of Part and Description	Function	Mfr. and Desig. or Standard Type	Cont. or Govt. Dwg. or Spec. No.
E-207	# 3H1528.2/B6	BRUSH, electrical contact: pos HV; brush material CMC grade carbon; brush 0.278" x 0.091" x 7/16" lg, spring 1" x 5/8" diam; (stamped "+" on one side of brush; U-shaped type-A cap). P/o ref G-201.	Gen brush	BP	BP dwg # 406244
E-208	# 3H1528.2/B6	BRUSH, electrical contact: neg HV; material CMC grade carbon; brush 0.278" x 0.091" x 7/16" lg, spring 1" x 5/8" diam; (stamped "-" on one side of brush; U-shaped type-A cap). P/o ref G-201.	Gen brush	BP	BP dwg # 406245
E-209	# 3H135-7	ARMATURE ASSEMBLY, generator: 300 v and 28 v windings; 5" lg x 1.625" diam; (two 7/32" ID bearings; shaft threaded in longer end for #6-40 screw; 2 commutators, one for LV, one for HV). Includes ref O-205. P/o ref G-201.	Rotating part of gen	BP	BP dwg # 4757
E-210	#	WINDING ASSEMBLY, generator field: consists of yoke, windings, and pole pieces; 28 v DC; 2-3/4" OD x 2-1/2" lg; (two leads from center hole; two leads from one end, both terminating in same solder lug).	Gen field	BP	BP dwg # 405605
G-201	3H1528.2	GENERATOR, DC: 17 w; 300 v and 28 v, 5 wire; open frame; shaft 5" x 3/8" at widest point; 5-1/4" lg x 3-1/4" diam; (5000 rpm; manual drive; self-excited; fixed mtg base; 3 mtg holes for #8 screws equally spaced about 3" circle). Includes ref E-205 through E-210 and ref O-206.	HV and LV power supply	BP model # 3975-1	BP dwg # 2873
H-201	#	NUT, hexagon: brass; 1/2"-27; 3/32" thk; 3/4" wd across flats.	Nut for ref O-202	BP	BP dwg # 450209
J-201	#	CONNECTOR, female contact: 6 flat parallel cont; straight; 1" x 1 1/16" x 1-3/8" overall; (5 amp, 45 v; formed metal cap with Black Crystal finish; cable opening 3/8" diam; cable clamp attached; laminated phenolic parts impregnated with bakelite and coated with fungicidal lacquer).	Connects power supply and keying assem to audio and RF sect	Jones HB part # S-306-CCT	BP dwg # 450169
J-202	#	LAMPHOLDER ASSEMBLY: assem of 2 miniature bayonet lampholders on bracket; lampholders have steel shells; 1-3/8" x 1-3/4" x 1 5/16" including bracket; lampholder 3/8" ID; (one 0.144" diam mtg hole in end of bracket; 2 solder lugs, one at base of each lampholder).	Holds ref E-201 and E-202	BP	BP dwg # 450238
K-201	#	RELAY, general purpose: SPDT; 1-3/4" x 1-5/8" x 7/8"; (1/8" silver contacts; contact rating 200 watts; multiple wound coil, rated 32 v DC at 0.032 amp, 1000 ohms; fast acting; coil varnish impregnated and coated with fungicidal lacquer; all bakelite parts coated with fungicidal lacquer; #6-32 stud and extruded boss on 7/16" mtg/c). P/o ref E-204.	Voltage regulation	BP	BP dwg # 450387
O-201	#	DRIVE, generator: assembly of 4 gears completely enclosed in gearcase divided into halves; gen drive operated from manual crank; 6-1/8" lg x 5-1/2" wd x 1-1/2" thk; mtd to cabinet by 4 #10-32 screws and collet nut fitting over bushing threaded 1-1/4"-18; (main driving gear shaft located inside bushing; sq socket for manual crank in bushing end of shaft; slot-type socket for tongue of governor gear train assem at opposite end of shaft).	Gen drive gear train	BP	BP dwg # 450389 less part # 2873

## AN 16-30CRT3-2

## TABLE OF REPLACEABLE PARTS (Continued)

MODEL: RADIO SET AN/CRT-3 MAJOR ASSEMBLY: POWER SUPPLY AND KEYING ASSEMBLY

Reference Symbol	Army Stock No. Navy Stock No. British Ref. No.	Name of Part and Description	Function	Mfr. and Desig. or Standard Type	Cont. or Govt. Dwg. or Spec. No.
O-202	3Z4875-89	KEYER ASSEMBLY: gear reduction unit with code cam and freq changing cam attached; 6-1/4" x 2-15/16" x 1-3/4" overall; (3 mtg holes for #6 screws arranged irregularly; tongue on gear #1 fits slot-type socket in ref O-203). Includes ref E-203A/B, E-203C, and E-203D.	Automatic keying and automatic frequency changing	BP	BP dwg #450315
O-205	#	BEARING, ball: single row radial, double shield; steel; 0.7480" OD x 0.1969" ID x 0.2362" wd overall. P/o ref E-209.	Reduces gen arm shaft friction	ND part #77035	BP spec #BX72-20
O-206	3H1528-7/C1	CAP, contact brush: black molded bakelite; 5/16" diam x 5/16" h; (bore 0.344" diam x 1 1/64" deep, tapped 3/64"-32 NS-3; straight fine knurl; 5/16" x 1/16" groove in top for screw driver). P/o ref G-201.	Holds brush in place	BP	BP dwg #4274
R-201	#	Same as ref R-101. P/o ref E-204.	Relay current limiting		

MODEL: RADIO SET AN/CRT-3

MAJOR ASSEMBLY: MISCELLANEOUS PARTS

301-399 series	#	MISCELLANEOUS PARTS OF RADIO TRANSMITTER: consist of cabinet and all other parts of Radio Transmitter T-74/CRT-3 not in either chassis and panel assem, or power supply and keying assem.		BP	
A-301		CABINET, radio transmitter: 0.064" aluminum alloy, except for fittings; empty; for transmitter, power supply, and automatic keying device; 10" h x 9-3/4" wd x 8" d; 2 hinges for attaching belt; (felt-lined crank well in back; hole for crank bushing in top; painted orange-yellow; instruction lettering on top).	Waterproof housing	BP	BP dwg #450384
A-302	#	STRAP, leg: olive drab cotton webbing; 9-3/8" lg x 5" wd x 2" thk overall; (one end terminated w/metal buckle 3-11/16" wd x 3-5/8" lg x 1-1/2" h overall; other end terminated w/aluminum alloy painted hinge).	Buckle end of belt	BP	BP dwg #450380
A-303	#	STRAP, leg: olive drab cotton webbing; 44-3/8" lg x 5" wd x 1/4" thk overall; (one end terminated w/aluminum alloy painted hinge; other end terminated w/tongue overlapping 18-3/4" and extending 8-1/4" beyond end of main strap, end of which is stiffened by thermo-setting plastic impregnation).	Tip end of belt	BP	BP dwg #450378
A-304	# 2Z3352.92	CAP, ground well: Zamak #5; 1-3/16" diam x 1 1/16" thk overall; (swivel in center of rear; marked "Turn" with accompanying arrow, "Ground," and "Throw into water").	Cover for ground well	BP	BP dwg #4574
A-305	2C6596-778A/C1	CAP, crank socket: black tanite finished with fungicidal lacquer; cover; 2" diam x 1 3/32" thk; (hole in under side of cap 1-3/16" diam x 7/32" d, tapped 1-1/4"-18 NS-2; marked "Turn," with accompanying arrow, and "Crank socket remove" in raised lettering; 6 finger grooves in rim).	Cover for crank socket	BP	BP dwg #450377
A-306	2Z1607-21	CAP, desiccator: die cast Zamak #5; dipped in caustic bath and Edonol Z, finished in clear lacquer; 1-3/16" diam x 1 3/32" d; (3/32" threaded 1-20 NS-3; screw-driver slot in top 3/4" lg x 3/64" wd x 3/32" d).	Cover for desiccator compartment	BP	BP dwg #4573

## TABLE OF REPLACEABLE PARTS (Continued)

MODEL: RADIO SET AN/CRT-3

MAJOR ASSEMBLY: MISCELLANEOUS PARTS

Reference Symbol	Army Stock No. Navy Stock No. British Ref. No.	Name of Part and Description	Function	Mfr. and Desig. or Standard Type	Cont. or Govt. Dwg. or Spec. No.
A-307	# 6Z477-1 filled with 6G250-2	DESICCANT ASSEMBLY, silica gel: cotton bag containing crystals; 2-3/4" lg x 1" wd overall; (crystals change from blue to pinkish white upon absorbing moisture).	Dehydrating agent	BP	BP dwg #450489
E-301	# (for spare see ref E-402)	ANTENNA, kite or balloon supported: Army-Navy Antenna Assembly AT-207/CRT-3; cadmium-copper alloy wire, Sig C Antenna Wire W-147, with addition of fastenings; 16 strands 306 ft lg x 0.040" max diam; 65 lb test; (cadmium-plated steel thimble on each end of ant; one thimble attached to nylon cord 106" lg folded to give lg of 43", w/ instruction tag attached to loop; other thimble attached to waterproof nylon cord 12" lg w/swivel on end). P/o ref O-302.	RF radiation	BP	Shown on BP dwg #450320
H-301	#	GASKET, synthetic rubber: neoprene or Hycar; 9-3/4" lg x 9-1/8" wd x 1/8" thk overall; (16 holes 0.170" diam; holes located at 2" intervals around gasket).	Water seal between cabinet and panel	BP	BP dwg #450232
H-302	# 2C6596- 778A/G3	GASKET, vellumoid: 1-13/32" OD x 1-1/4" ID x 3/32" thk.	Crank bushing water seal	BP	BP dwg #4764
H-303	#	GASKET, vellumoid: 7/16" OD x 1-3/64" ID x 3/32" thk.	Water seal for screws holding power supply and keying assem	BP	BP dwg #451575
H-304	# 2C6596- 778/G8	GASKET, vellumoid: 6-1/4" lg x 5-5/16" wd x 3/32" thk overall; (four 0.213" diam holes arranged in trapezoid: 1-5/16" diam hole for crank bushing).	Gear housing water seal	BP	BP dwg #4739
H-305	#	GASKET, synthetic rubber: neoprene 1" OD x 5/8" ID x 0.045" thk.	Water seal for windows	BP	BP dwg #450135
H-306	# 2C6596- 778A/G10	GASKET, synthetic rubber: neoprene; 1-11/64" diam x 1/16" thk.	Crank cap water seal	BP	BP dwg #4765
H-307	2SK578/W1	WRENCH, double end box: 6-5/8" lg x 2-1/2" wd x 0.064" thk; 2-1/10" diam opening one end, with flanges to fit crank cap; 1" diam opening other end, with flange to fit ground cap; 1-5/16" lg x 1/2" opening in side to fit brake wheel; (aluminum alloy; handle tapers from 2-1/2" at widest end).	Loosens crank cap, ground cap, and brake wheel	BP	BP dwg #15403
H-308	# 6LK3919	PIN, safety: music wire; cadmium-plated; 2-1/4" lg x 1-1/16" wd x 1/4" thk overall.	Holds crank in well	BP	BP dwg #4730
H-309	# 6L3941-85C	PIN, hinge: steel wire; cadmium-plated 5-5/16" lg x 3/8" wd x 0.080" thk overall; (7-1/4" lg x 0.080" diam wire bent at one end to form spring loop; heat treated under pressure per AN-QQ-H-201).	Fastens belt to cabinet	BP	BP dwg #15249
H-310	# 6L58050-2C	WASHER, flat: steel, cadmium-plated; 1.260" ID x 1-5/8" OD x 0.020" thk.	Washer under ref H-313	BP	BP dwg #15977
H-311	#	Same as ref H-109.	Secures windows		
H-312	# 6L3768- 32.10N	NUT, cap: brass, nickel-plated; # 8-32; 0.281" max h; 0.312" max across flats.	Holds panel to cabinet	BP	BP dwg #461599
H-313	# 6L2800-18.3	NUT, collet: cadmium-plated steel; 1-1/4"-18; 1/8" thk; 1-5/8" OD; (2 slots 3/32" d x 3/16" wd on opposite ends of center line).	Secures crank bushing	BP	BP dwg #4549



## AN 16-30CRT3-2

## TABLE OF REPLACEABLE PARTS (Continued)

MODEL: RADIO SET AN/CRT-3

MAJOR ASSEMBLY: MISCELLANEOUS PARTS

Reference Symbol	Army Stock No. Navy Stock No. British Ref. No.	Name of Part and Description	Function	Mfr. and Desig. or Standard Type	Cont. or Govt. Dwg. or Spec. No.
I-301	#	WINDOW, indicator: molded lucite; 1" diam x 1/2" lg overall; (body diam 5/8", 1 1/4" threaded 3/8"-24; 3/8" diam hole in center of body 1/4" d; rim projects 3/16" beyond body to hold window in cabinet).	Makes indicator light visible externally	BP	BP dwg #450210
O-301	# 4B462A	CRANK, generator: Sig C Hand Crank GC-18-A; assem of steel L-shaped frame with black plastic rotating hand grip on shorter leg, ratchet, ratchet pawl, pawl spring, and hub screw; all metal parts cadmium-plated; (ratchet and ratchet pawl enclosed within arm permit application of force clockwise only; finger-operated hub screw locks projection on crank to socket in main driving gear shaft; cord attached to frame to fasten crank to cabinet).	Application of power	BP	BP dwg #4506
O-302		ANTENNA ASSEMBLY, kite or balloon supported: cir door w/Sig C Reel RL-48 attached, and Army-Navy Antenna Assembly AS-207/-CRT-3 wound on reel; 4-3/8" diam x 2-1/4" d overall; (pin-hinged door; cotter-pin bolt attached by chain; reel fixed to back of door by axial rivet; collapsible handle on reel; brake handle on front of door; raised lettering on front of door "Open for Antenna," "Brake," and "Lock Open" with accompanying indicating arrows: hinge holes 0.149" diam; latch hole 0.141" diam; lock-open holes 0.136" diam). Includes ref E-301.	Provides and mounts ant	BP	BP dwg #450318; Sig C spec #271-1198
W-301	# 2C6596-778A/A4	WIRE ASSEMBLY, bare: 8 ft of Sig C Wire W-147 wound on reel and with lug on one end; cadmium-copper alloy wire; wire 0.040" max diam; 12 to 16 strands; (65 lb test; wire wound on H shape metal reel 2-1/4" lg x 3/4" wd x 1/32" thk overall).	Grounds transmitter	BP	BP dwg #4711

MODEL: RADIO SET AN/CRT-3

MAJOR ASSEMBLY: ACCESSORIES

401-499 series	#	ACCESSORIES: consist of Bag BG-155-A and all parts packed therein, with the exception of Radio Transmitter T-74/CRT-3.		See individual listings	BP dwg #450490
A-401	# 2Z551-155A	BAG, radio set: Sig C Bag BG-155-A; canvas, yellow; 17" lg x 14-1/2" wd x 20-1/4" h; (lined with 3/8" thk hair felt; 1 webbing hand grip on each of four sides; permanently attached cover with 4" x 4" x 3-1/2" projecting compartment to accommodate kite and inflating tube bag; cover secured by lacing cord through metal eyelets; 2 metal loops projecting through cover for attaching parachute; supplied with cushioning strips, pads, and smaller bag for kite and inflating tubes. Includes ref A-402.	Contains all other components of radio set	Government furnished	Sig C spec #71-5015
A-402	# 2A1680	BAG, kite and inflating tube; preshrunk canvas, yellow; 23" lg x 5-1/4" wd; (draw string in top; warnings and list of contents printed on outside). P/o ref A-401.	Contains kite and inflating tube	Government furnished	

## TABLE OF REPLACEABLE PARTS (Continued)

MODEL: RADIO SET AN/CRT-3

MAJOR ASSEMBLY: ACCESSORIES

Reference Symbol	Army Stock No. Navy Stock No. British Ref. No.	Name of Part and Description	Function	Mfr. and Desig. or Standard Type	Cont. or Govt. Dwg. or Spec. No.
A-403	# 2Z6970-390A	PARACHUTE: Sig C Parachute M-390; yellow nylon; 12 ft diam; 40 lb cap; sixteen 1/4" flat white nylon webbing shrouds 11 ft lg; (yellow canvas bag; 300 to 500 ft safety altitude; 2 snap hooks provided on pack to engage loops on Bag BG-155-A; olive drab webbing rip cord terminating in snap hook; pack tropicalized).	Checks velocity of descending radio set	Government furnished	
A-404	# 2A1678-357A or 2Z1678-357A	KITE: Sig C Kite M-357-A; metal framework; packed, 18" lg x 4" diam overall; assembled, 17" x 17" x 36" overall; (instructions imprinted on fabric; 4 kapok-filled pockets in fabric; 2 alternative bridling eyes for attaching antenna swivel clasp).	Raises and supports antenna	Government furnished	Sig C spec # 271-1198
A-405	# 6Z4315B	GENERATOR, hydrogen: Sig C Hydrogen generator M-315-B; steel cylinder and separate inflating tube; cylinder 3-3/4" diam x 11-3/8" lg overall; total generating time 30 min; (cylinder filled with lithium hydride; operated by immersion in water; key and tongue on each end for opening cylinder). Includes ref A-406.	Produces hydrogen to inflate balloon	Government furnished	Sig C spec # 271-1198
A-406	#	PIPE, balloon inflating: aluminum, with fiber insulating grip; 1-3/16" diam x 19" lg overall; (assembly of tube, spiral strip running lg of tube, needle insert in end of tube, and insulating grip; 3/8" of tube threaded; 1/16" diam vertical hole into top of needle, 1/4" diam horizontal hole through top of needle; tag fastened by cord to groove in bottom of insulating grip). P/o ref A-405.	Carries hydrogen from generator to balloon	Government furnished	
A-407	# 2A299-278A	BALLOON, neoprene: Sig C Balloon M-278-A; antenna lifting; gray; deflated diam 6-3/4"; inflated diam 4 ft; neck 1 1/2" OD x 1 1/2" ID x 1-3/8" lg; (spherical; with 2 cord loops 3-3/4" lg for attaching antenna; rubber cork stopper tied to neck; packed in steel can 4-1/4" diam x 5-1/8" lg with key and tongue on 1 end).	Raises and supports antenna	Government furnished	Sig C spec # 271-1198
A-408	# 6B698B	LIGHT ASSEMBLY, signal: Sig C Signal Lamp M-308-B; molded bakelite base, molded clear polystyrene shield, bulb, spare bulb, cord and plug, and olive drab cotton web strap; 24 v. 170 ma DC; 2-13/16" h x 2-3/16" diam, with 95" lg cord, and 36" lg strap attached; (designed to be strapped to top of head; packed in cardboard container 3" diam x 3-1/8" h). Includes ref A-409 and E-401.	Visual signaling	BP	BP dwg # 450493; Sig C spec # 271-1198
A-409	#	SHIELD, lamp: molded clear polystyrene; 1-13/16" OD x 1-3/4" ID x 1-9/16" h; (1/4" of base threaded 2-1/16"-14, class 2 fit). P/o ref A-408.	Protects signal lamp	BP	BP dwg # 15805
E-401	# 2Z5958A	LAMP, incandescent: Sig C Lamp LM-58-A; 24 v, 170 ma; bulb T-3 clear, 1-1/4" lg overall; miniature screw base; (C-2V filament; burn any position). P/o ref A-408.	Visual signal	GE part # 1477	BP dwg spec # BX19-5
E-402	2A264-207	ANTENNA ASSEMBLY, spare kite or balloon supported; spare Army-Navy Antenna Assembly AS-207/CRT-3, ref E-301, wound on phenolic spool 2-3/4" wd x 2-1/4" diam, w/ drum 1-13/16" wd x 3/4" diam.	Spare for ref E-301	BP	BP dwg # 450491

AN 16-30CRT3-2

**SECTION VIII  
DRAWINGS**

MOUNTING NOTES

1. The preferable mounting position is with the parachute at the top.
2. When straps are used to hold the packed equipment in place in the airplane, they must be equipped with quick releasing snaps.
3. The packed equipment must be stowed in a location from which it is readily removable in case of an emergency landing on water.

BOTH ENDS OF PARACHUTE STATIC LINE MUST COME OUT FROM THIS END.

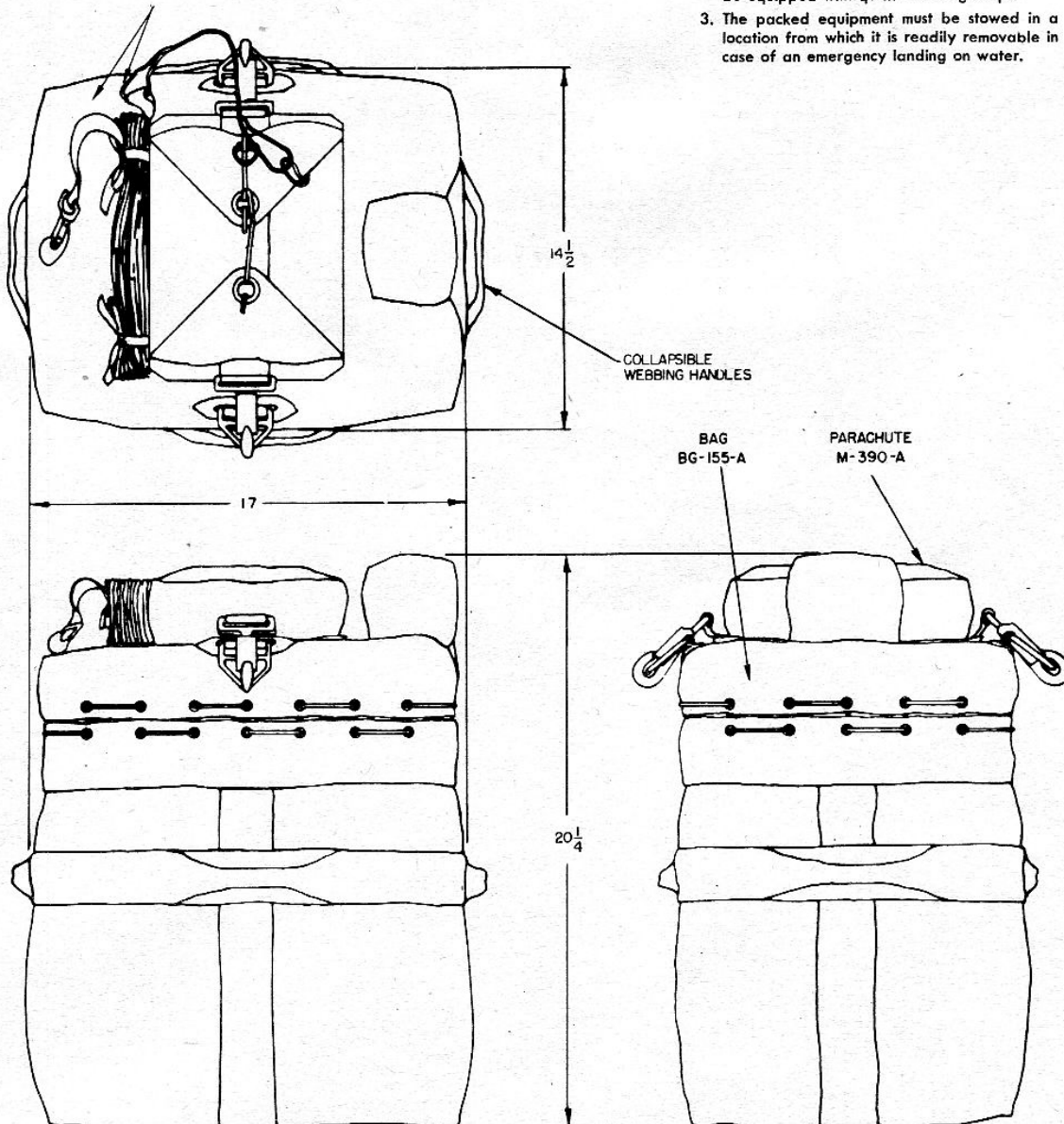


Figure 8-1. Radio Set AN/CRT-3—Outline Dimensional Drawing

AN 16-30CRT3-2

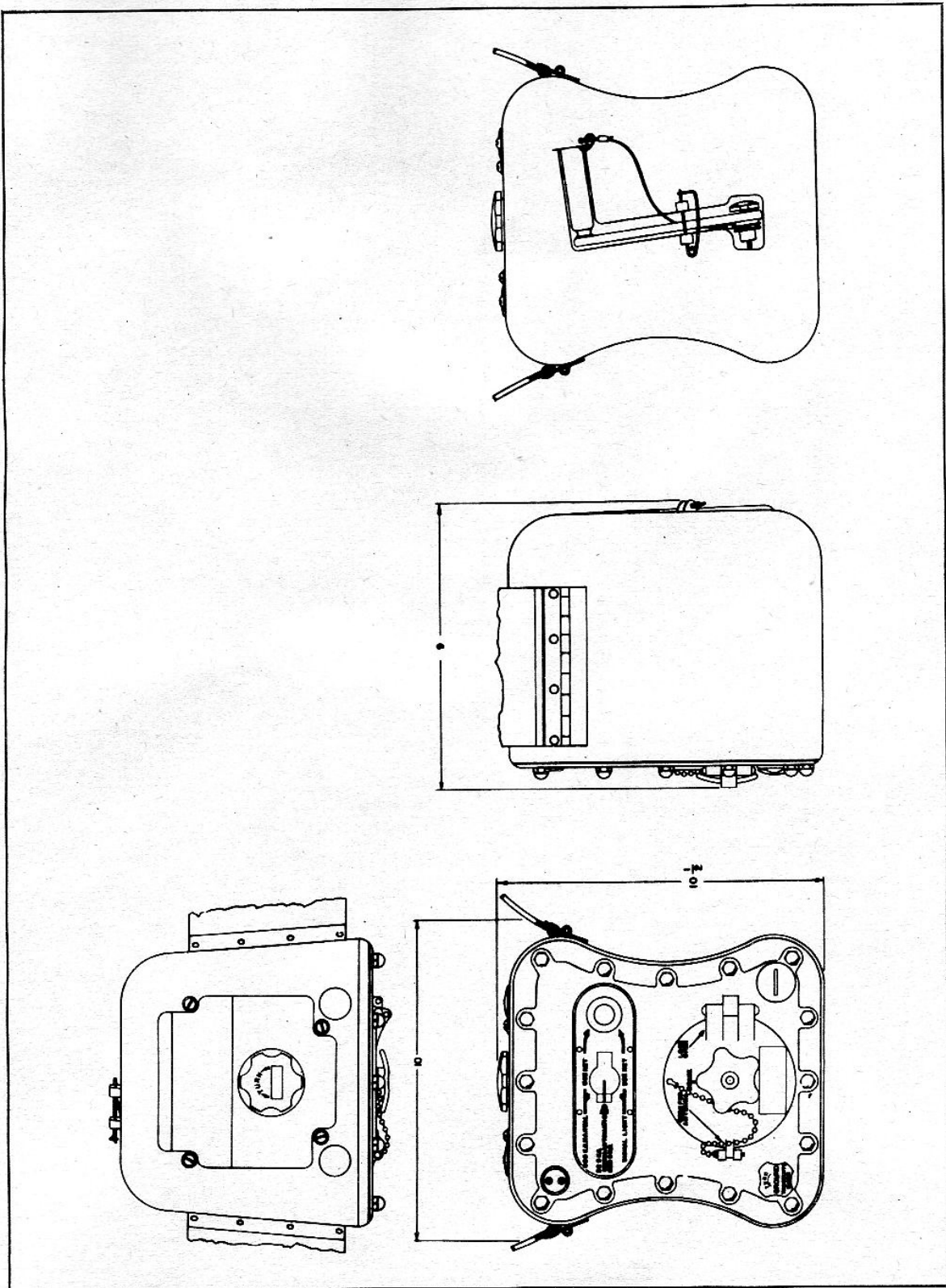
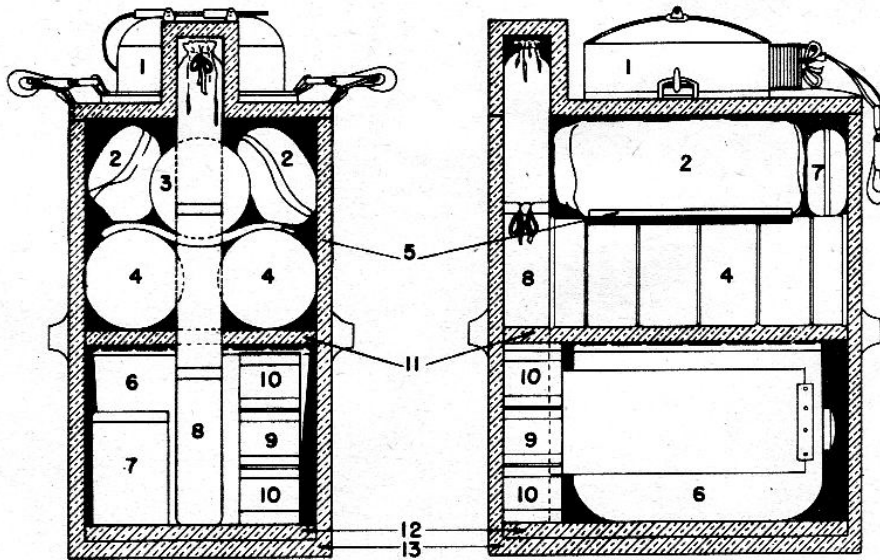


Figure 8-2. Radio Transmitter T-74/CRT-3—Outline Dimensional Drawing



- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>1. Parachute M-390-A</li> <li>2. Pad (2 req.) (Part of BG-155-A)</li> <li>3. Balloon M-278-A (2 req.)</li> <li>4. Generator M-315-B Container (2 req.)</li> <li>5. Handbook</li> <li>6. Radio Transmitter T-74/CRT-3</li> <li>7. Pad (2 req.) (Part of BG-155-A)</li> </ul> | <ul style="list-style-type: none"> <li>8. Bag containing:<br/>Kite M-357-A<br/>Generator M-315-B Inflating Tubes (2 req.)</li> <li>9. Signal Lamp M-308-B</li> <li>10. Antenna Assembly AS-207/CRT-3 (2 req.)</li> <li>11. Pad (Part of BG-155-A)</li> <li>12. Pad (Part of BG-155-A)</li> <li>13. Bag BG-155-A</li> </ul> |
|--|--|

Figure 8-3. Radio Set AN/CRT-3—Packing Diagram

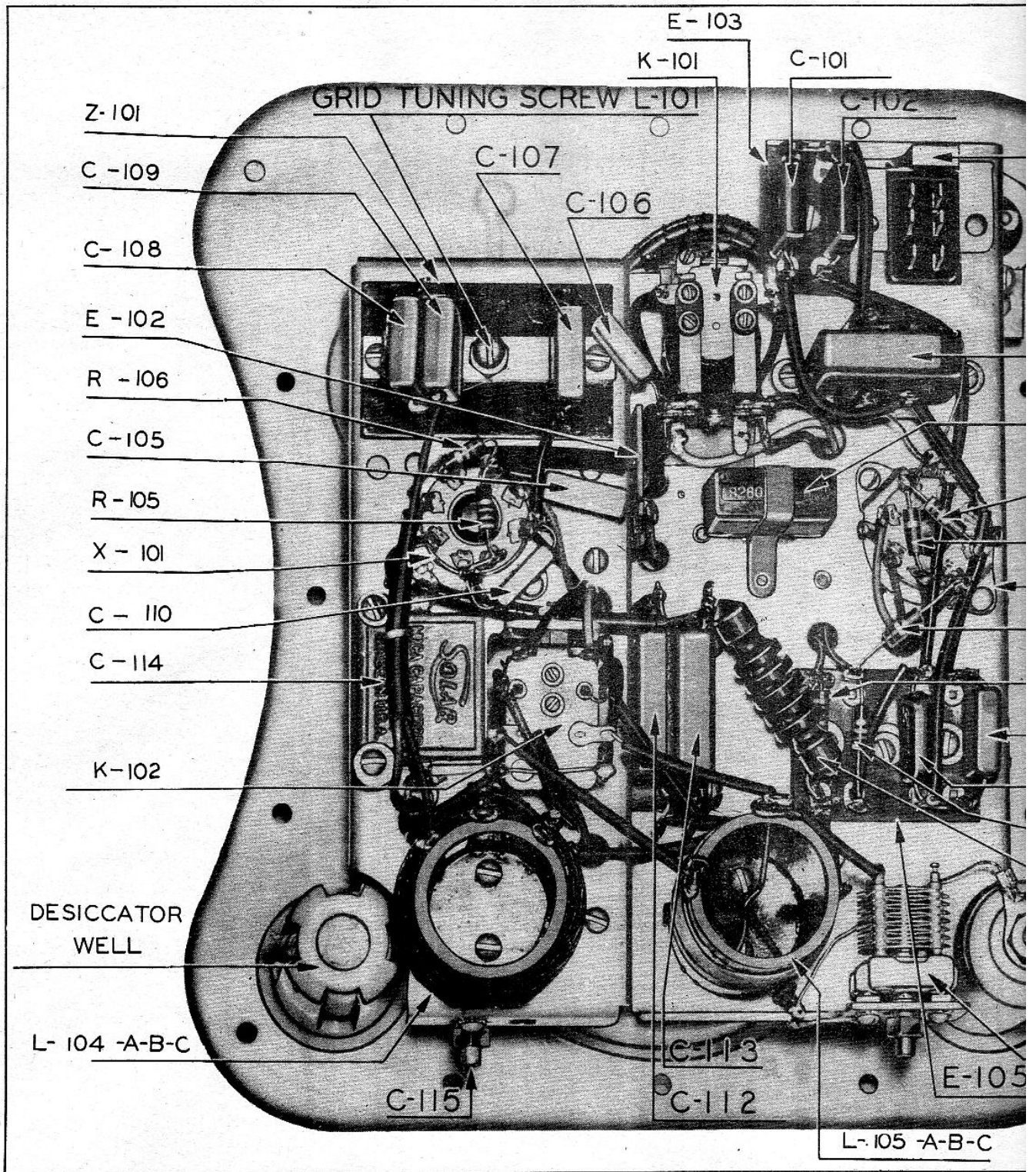


Figure 8-4. Radio Transmitter T-74/CRT-3—Parts Layout of Co

AN 16-30CRT3-2

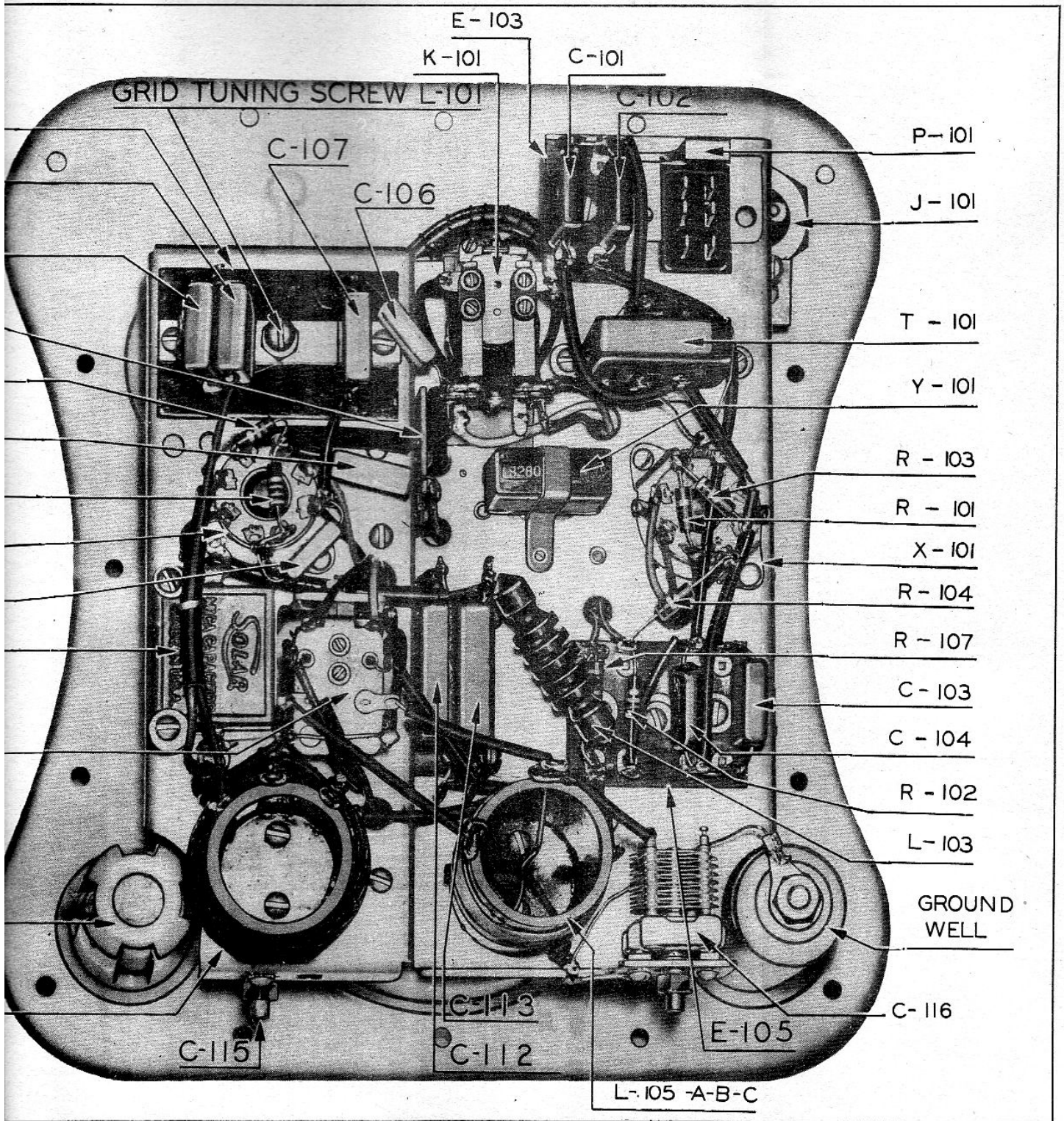
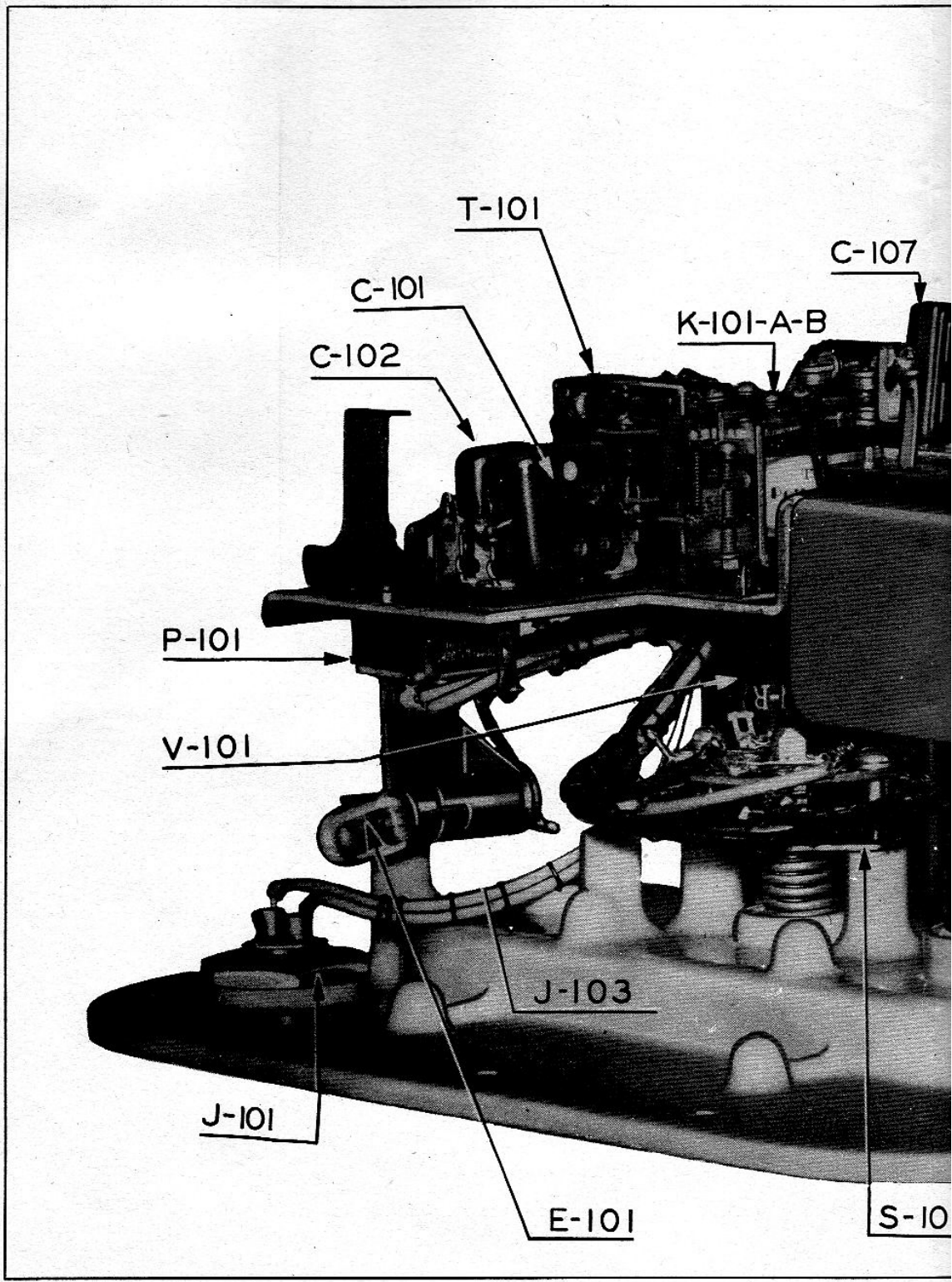


Figure 8-4. Radio Transmitter T-74/CRT-3—Parts Layout of Cover (Top View)





AN 16-30CRT3-2

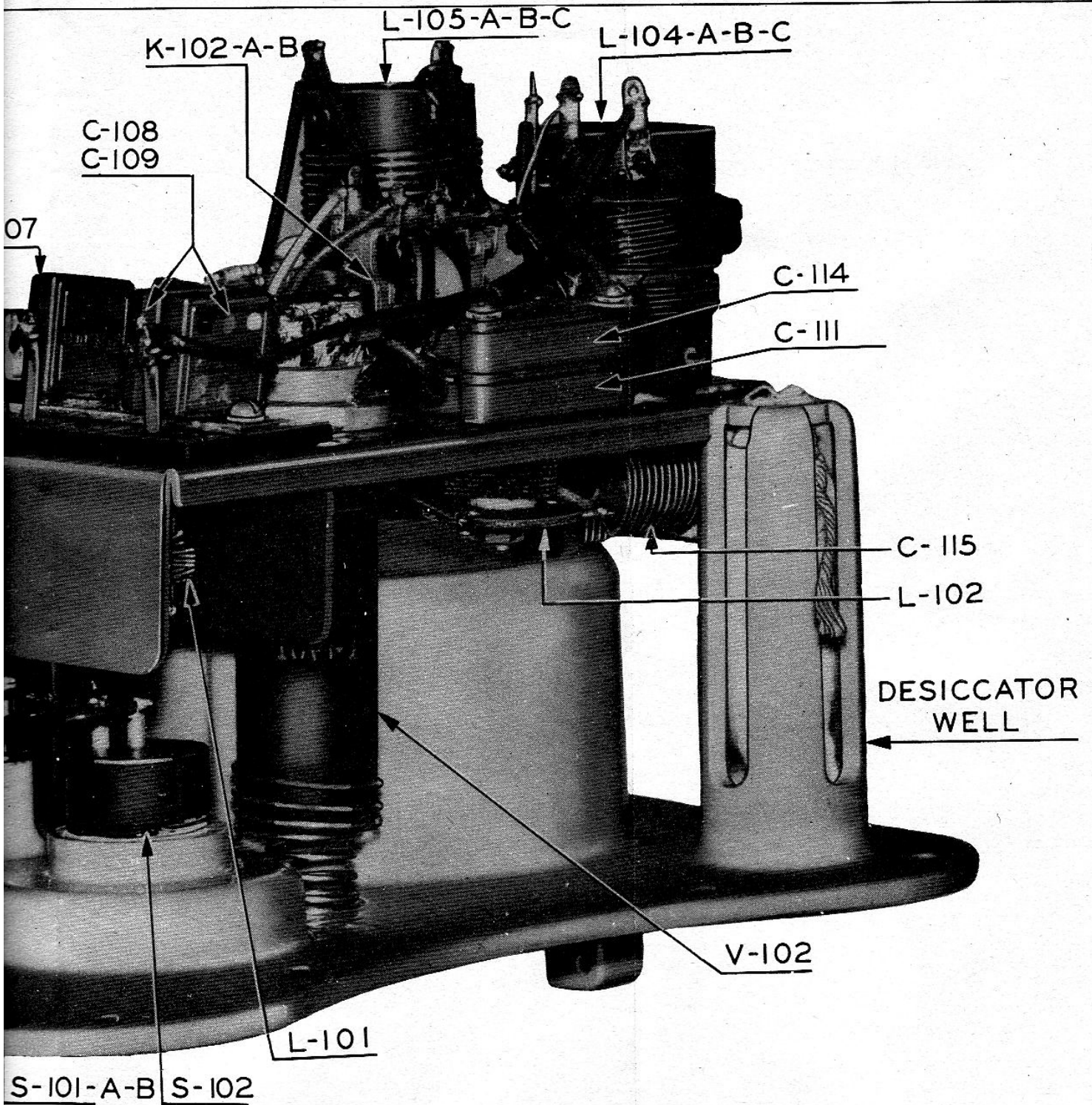


Figure 8-5. Radio Transmitter T-74/CRT-3—Parts Layout of Cover (Side View)

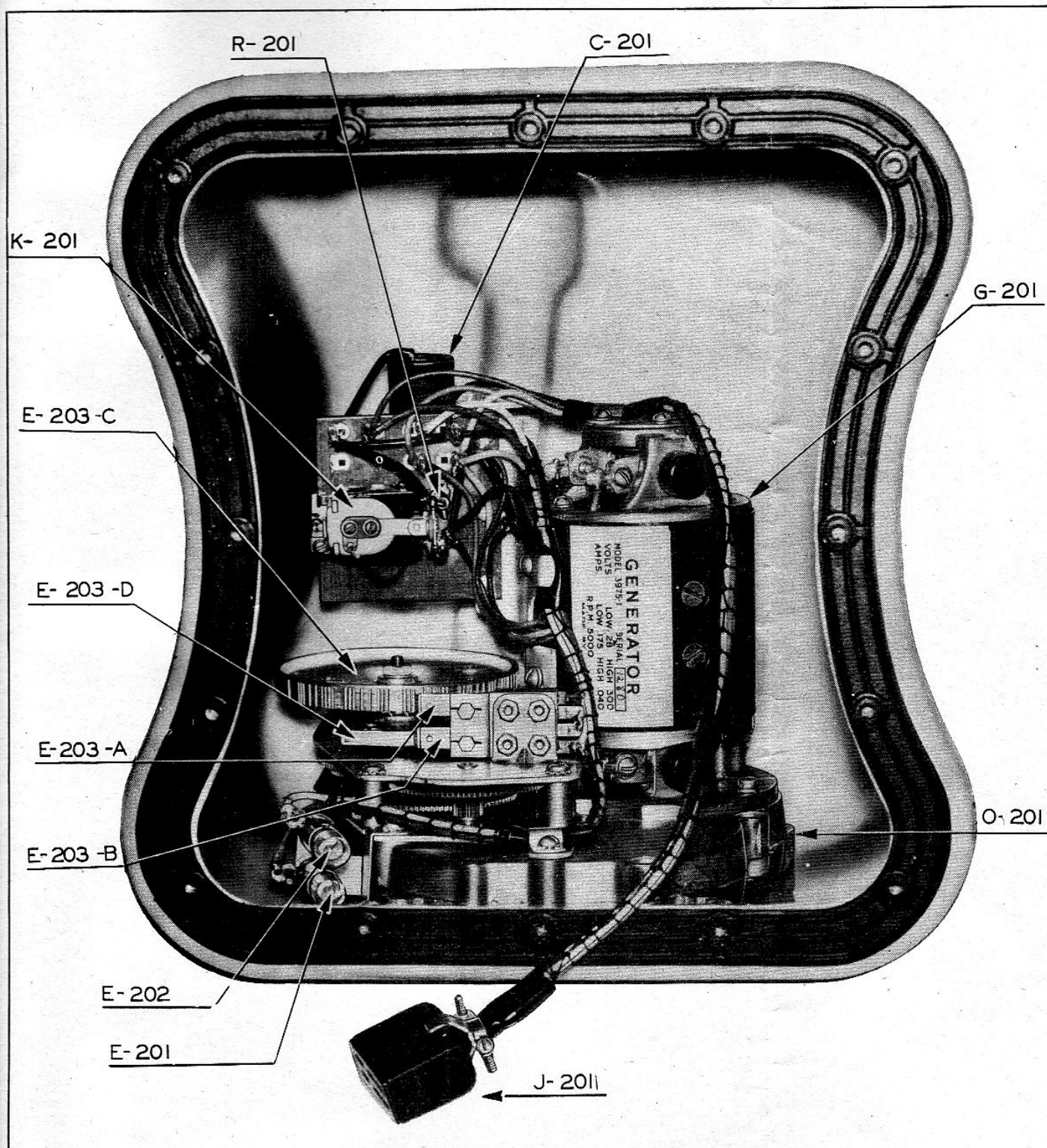


Figure 8-6. Radio Transmitter T-74/CRT-3—Parts Layout of Cabinet

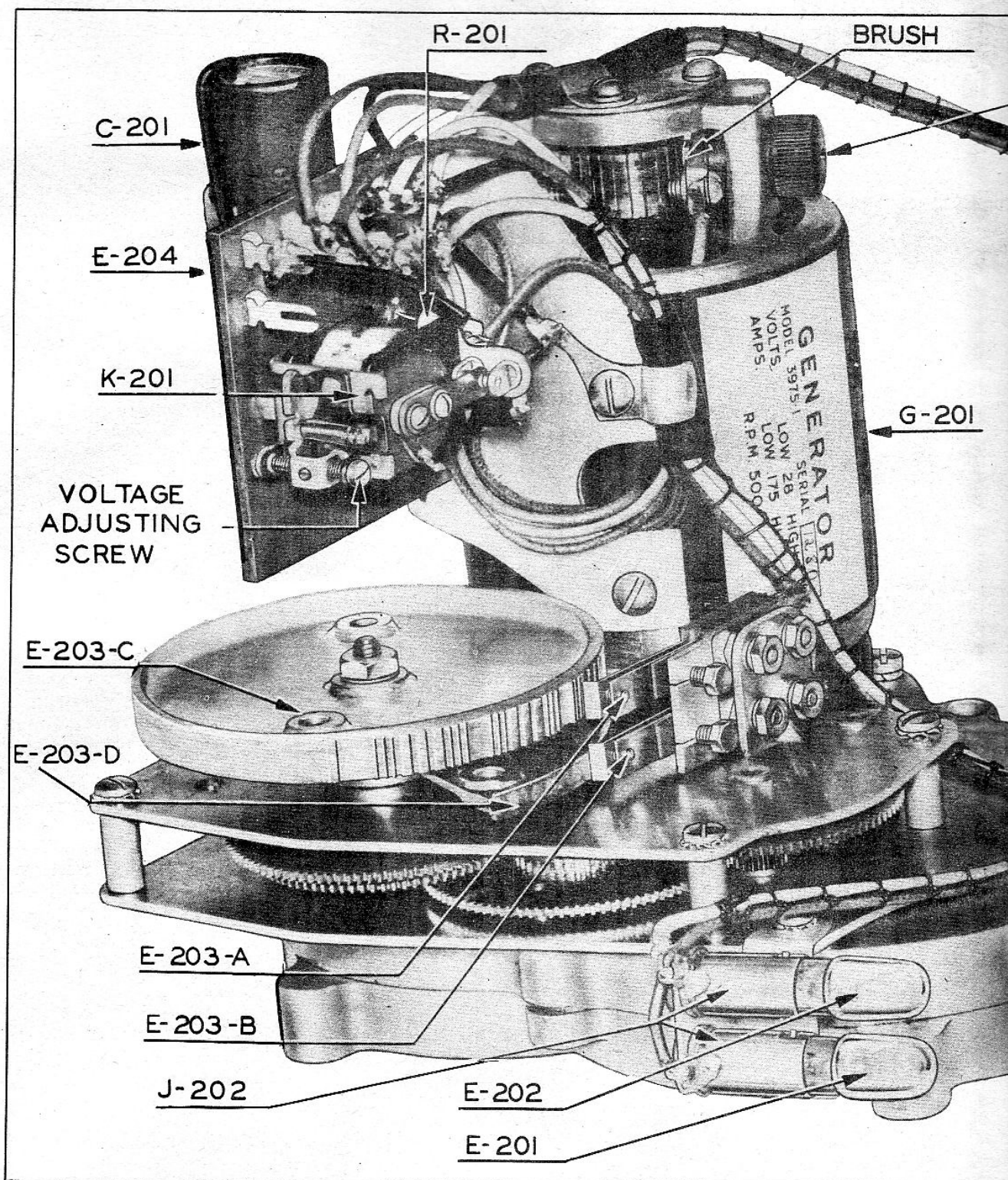


Figure 8-7. Gear Trai

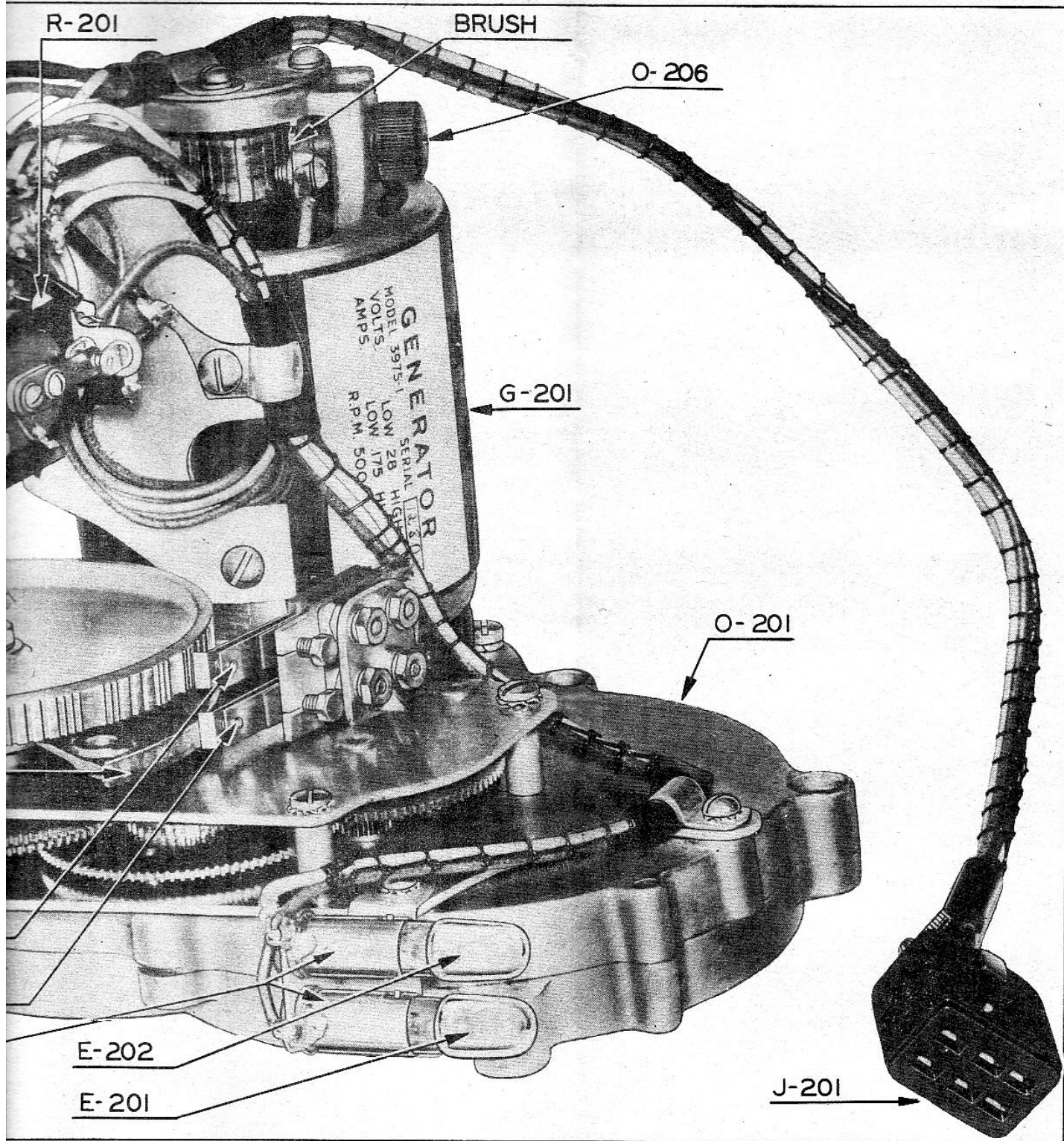
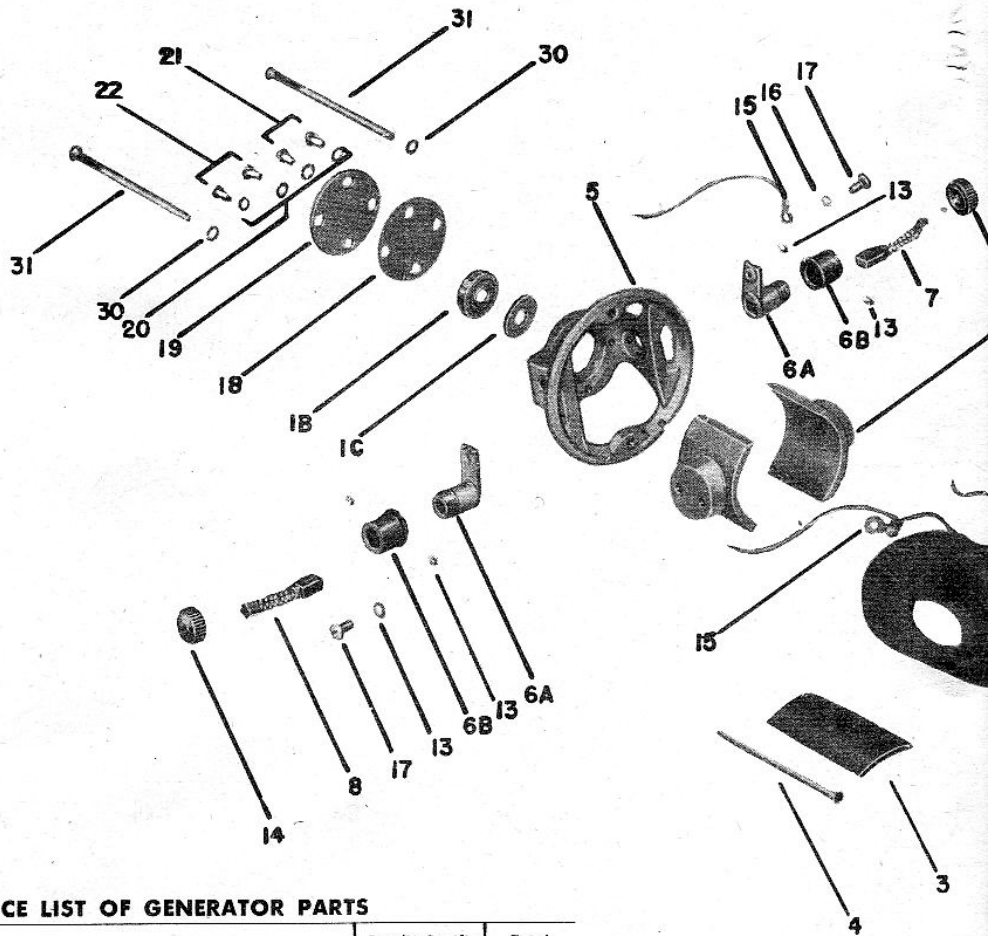


Figure 8-7. Gear Train and Keying Mechanism

AN 16-30CRT3-2



REFERENCE LIST OF GENERATOR PARTS

Reference No.	Parts Cat. Ref. No.	Name and Description	Bendix-Pacific Part Number	Total Quantity
	G-201	Generator, Direct-current (Model 3975-1)	2873 -	1
1	E-209	Armature assembly	4757	1
1A		Armature	450107	1
1B	O-205	Bearing	BX72-20	2
1C		Protector, Grease	4260	2
2	E-210	Field Assembly	405605	1
2A		Yoke	4423	1
2B		Coil assembly, Field	4959	1
2C		Pole	4546	2
2D		Screw	AN505-8-5	4
3		Strip, Insulating	15713	1
4		Tubing, Insulating	450937	1
5		Frame, Low-voltage end	4267	1
6		Holder assembly, Low-voltage brush	4281	2
6A		Holder, Brush	4279	2
6B		Sleeve	16484	2
7	E-205	Brush, Low-voltage positive	BXSP43-10	1
8	E-206	Brush, Low-voltage negative	BXSP43-11	1
9		Frame, High-voltage end	4654	1
10		Holder assembly, High-voltage Brush	4263	2
10A		Holder, Brush	4280	2
10B		Sleeve	16484	2
11	E-207	Brush, High-voltage positive	BXSP43-12	1
12	E-208	Brush, High-voltage negative	BXSP43-13	1
13		Setscrew, No. 6-32 x 1/8", 4-fluted socket head, cup point	451493	8
14		Cap, Brush	4274	4
15		Lug, No. 6 hole	BX55-27	4
16		Washer	AN935-6	4

AN 16-30CRT3-2

REFERENCE LIST OF GENERATOR PARTS (Cont'd)

Reference No.	Parts Cat. Ref. No.	Name and Description	Bendix-Pacific Part Number	Total Quantity
17		Screw	AN515-6-4	4
18		Gasket, Low-voltage end	4277	1
19		Plate, Low-voltage end	4259	1
20		Washer	AN935-6	4
21		Screw	AN515-6-4	2
22		Screw	AN515-6-5	2
23		Shim, 0.004" thick	4339	as req.
		0.006" thick	4339-1	as req.
		0.010" thick	4339-2	as req.
		0.020" thick	4339-3	as req.
24		Gasket, High-voltage end	4745	1
25		Plate, High-voltage end	4744	1
26		Washer	AN935-6	4
27		Screw, No. 6-32 x 1/4", binderhead	BX63-150	4
28		Pinion	4713	1
29		Fastener, No. 4-40 x 1/4", roundhead, internal shakeproof washer permanently attached	BX68-8	1
30		Washer	AN935-6	2
31		Screw	AN515-6-50	2

Note: Some generators may vary slightly from the diagram due to variations in manufacturing practice among the several suppliers. This model is a Bendix-Pacific type.

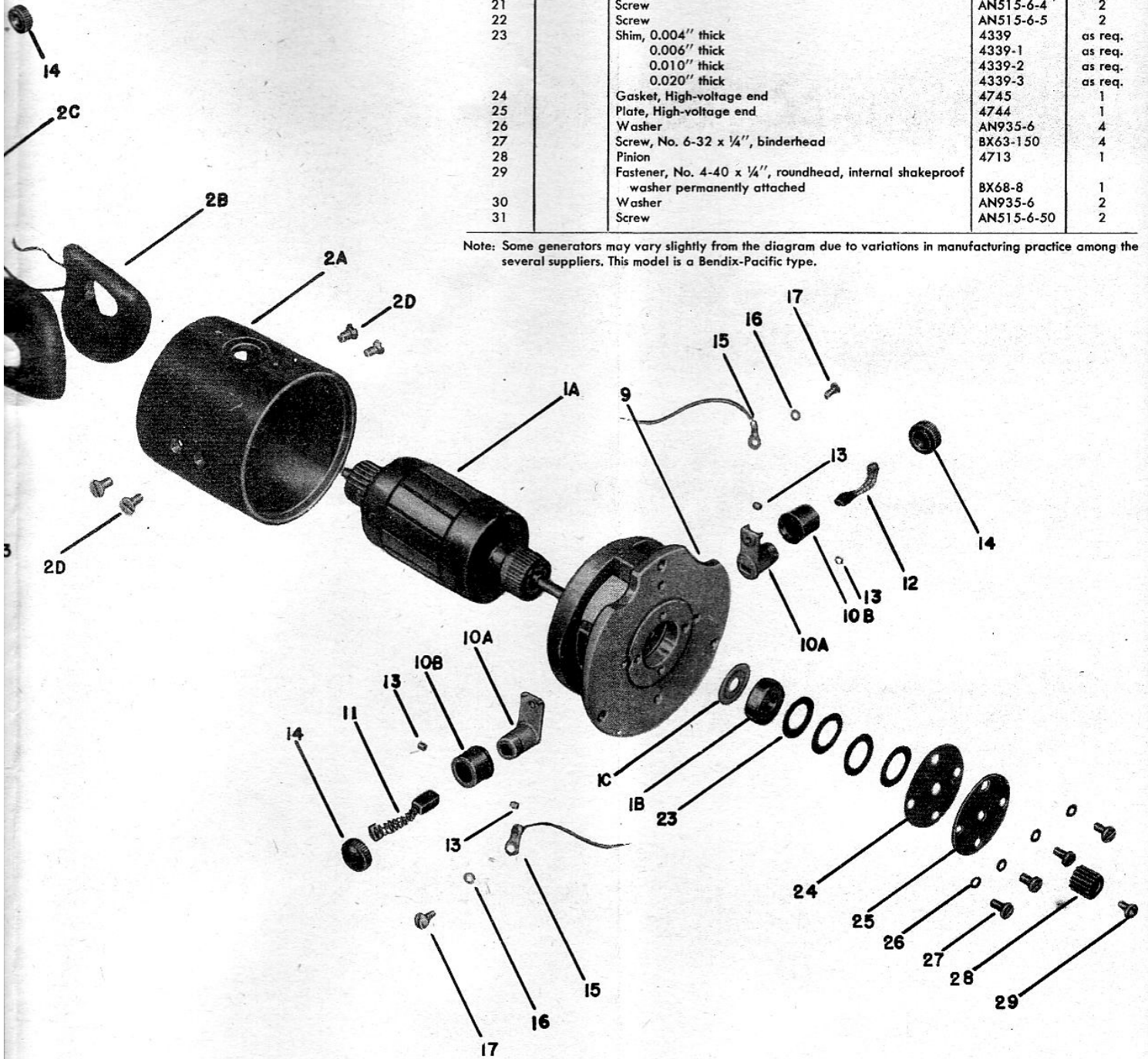


Figure 8-8. Generator for Radio Transmitter T-74/CRT-3—Exploded View

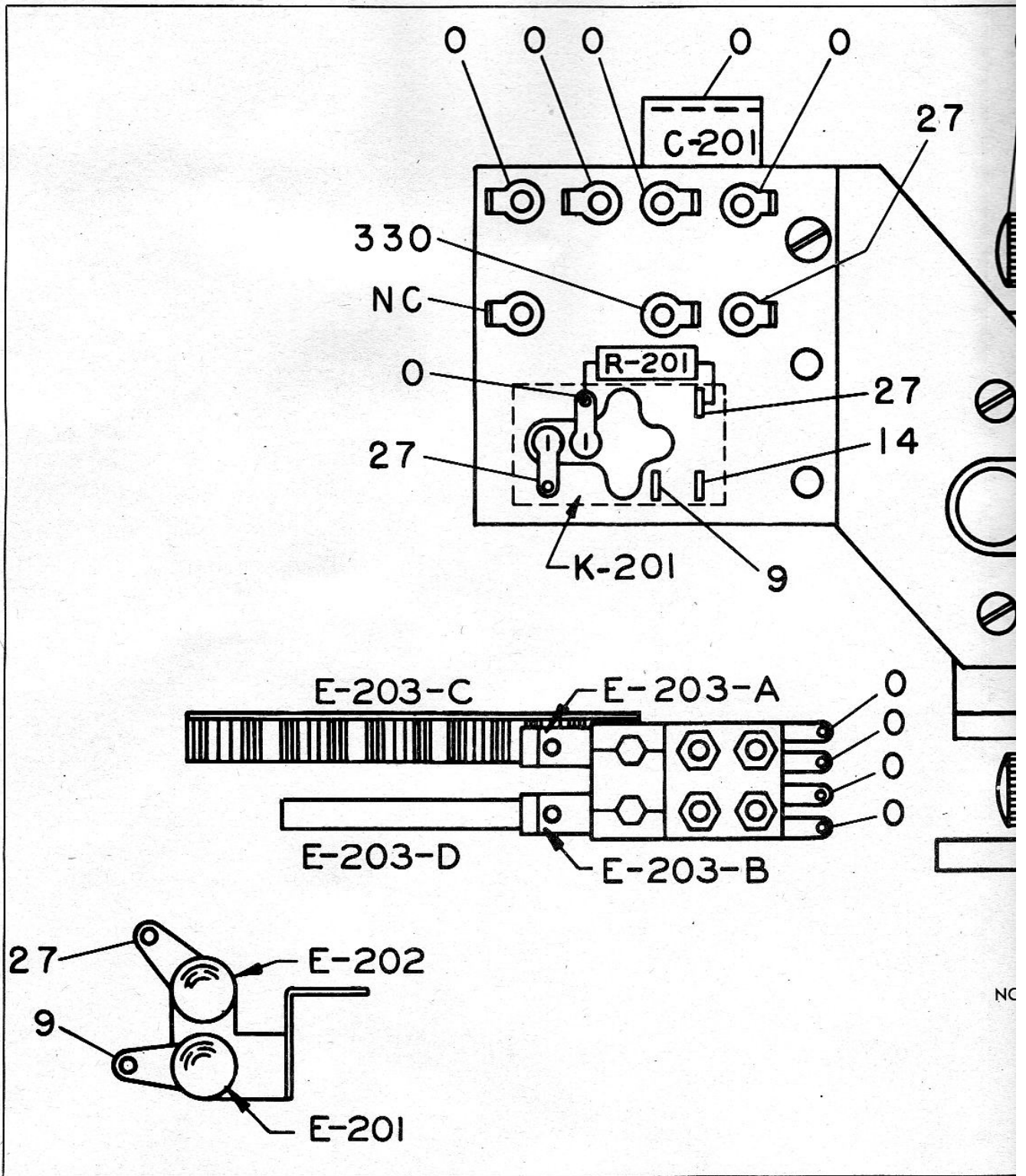
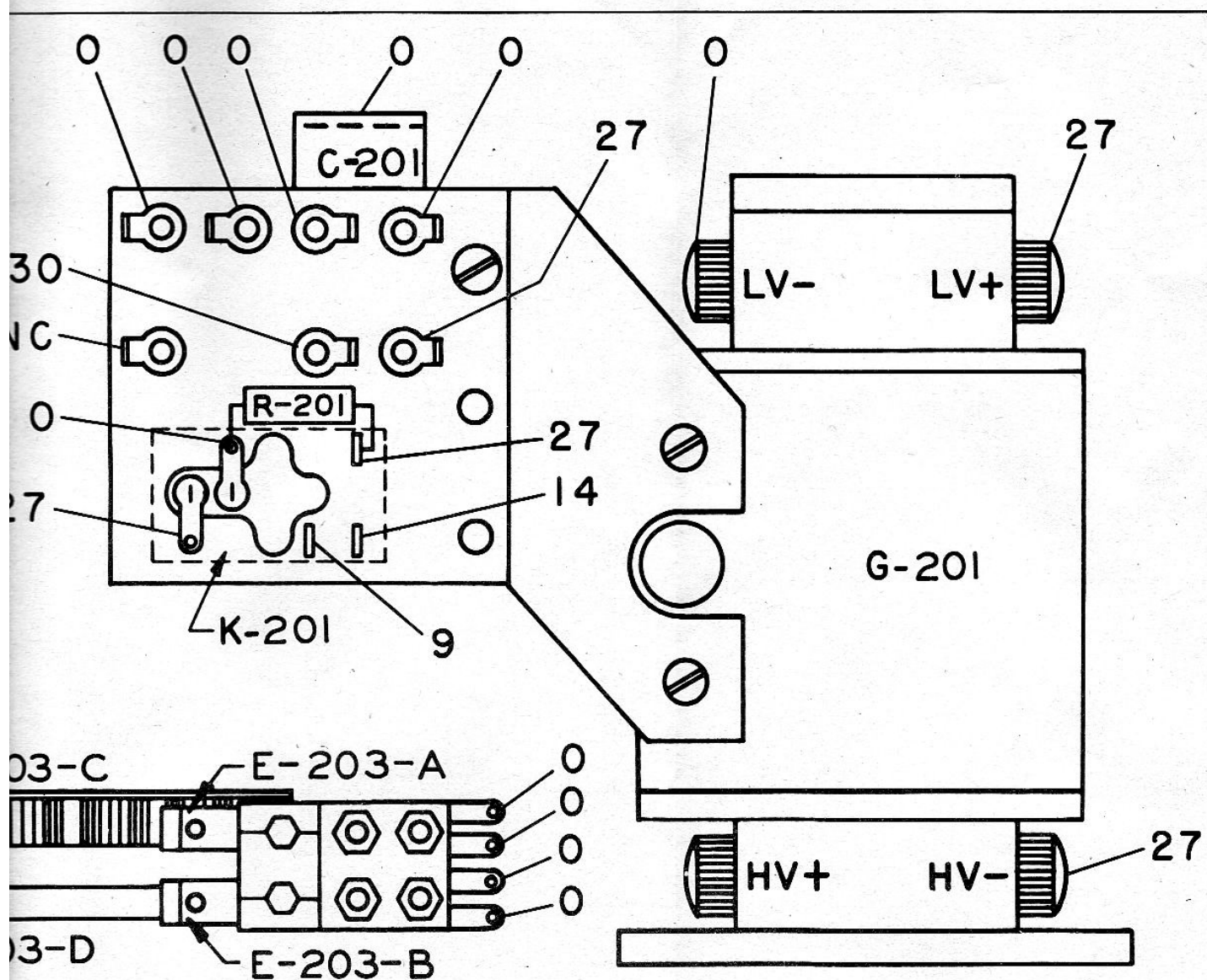


Figure 8-9. Radio Transmitter T-74/CRT.





NOTES:

1. Cover Disconnected at Plug J-201.
2. Voltages Shown are Positive with Respect to Ground.

Figure 8-9. Radio Transmitter T-74/CRT-3—Voltage Test Points, Power Supply

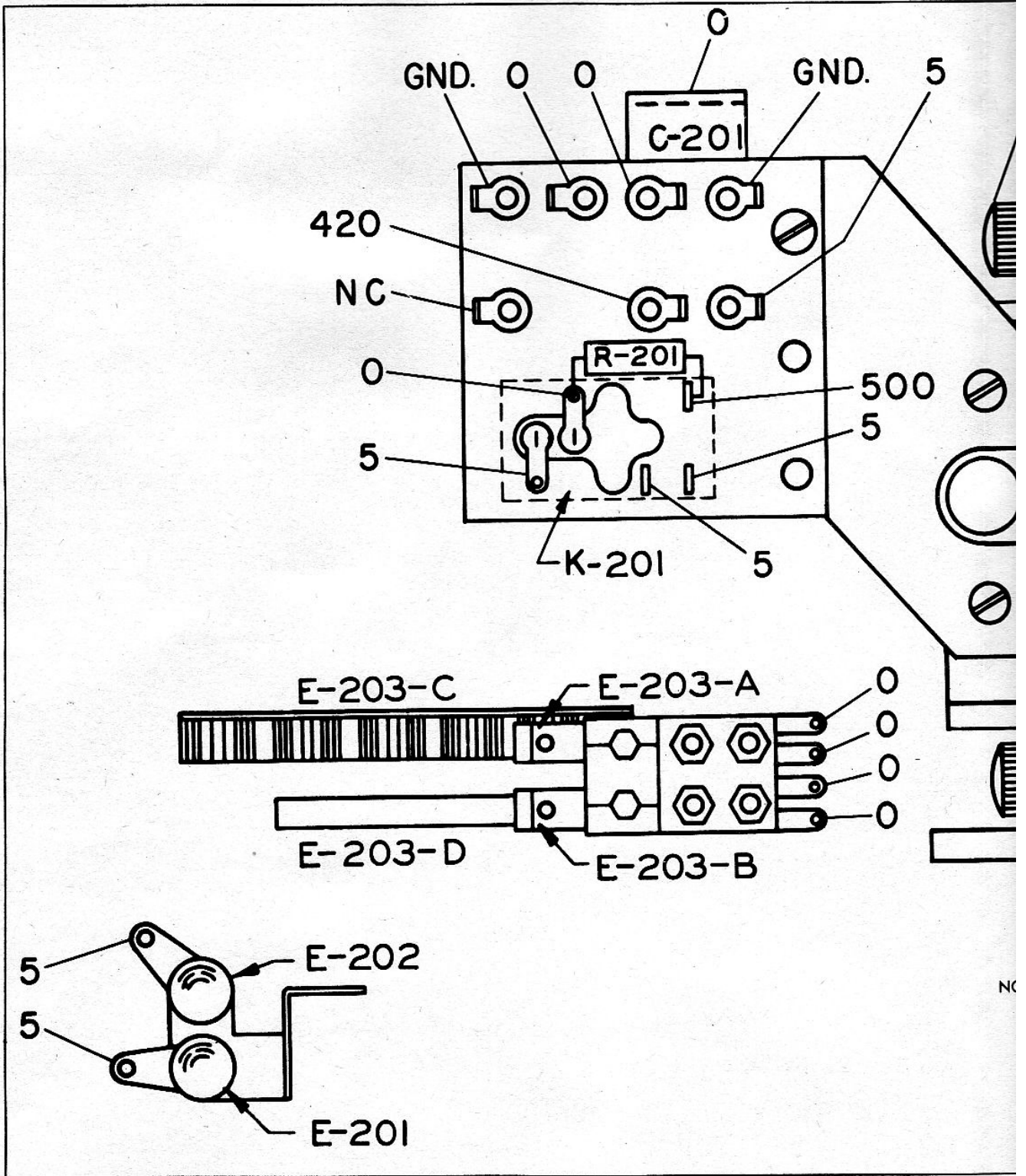
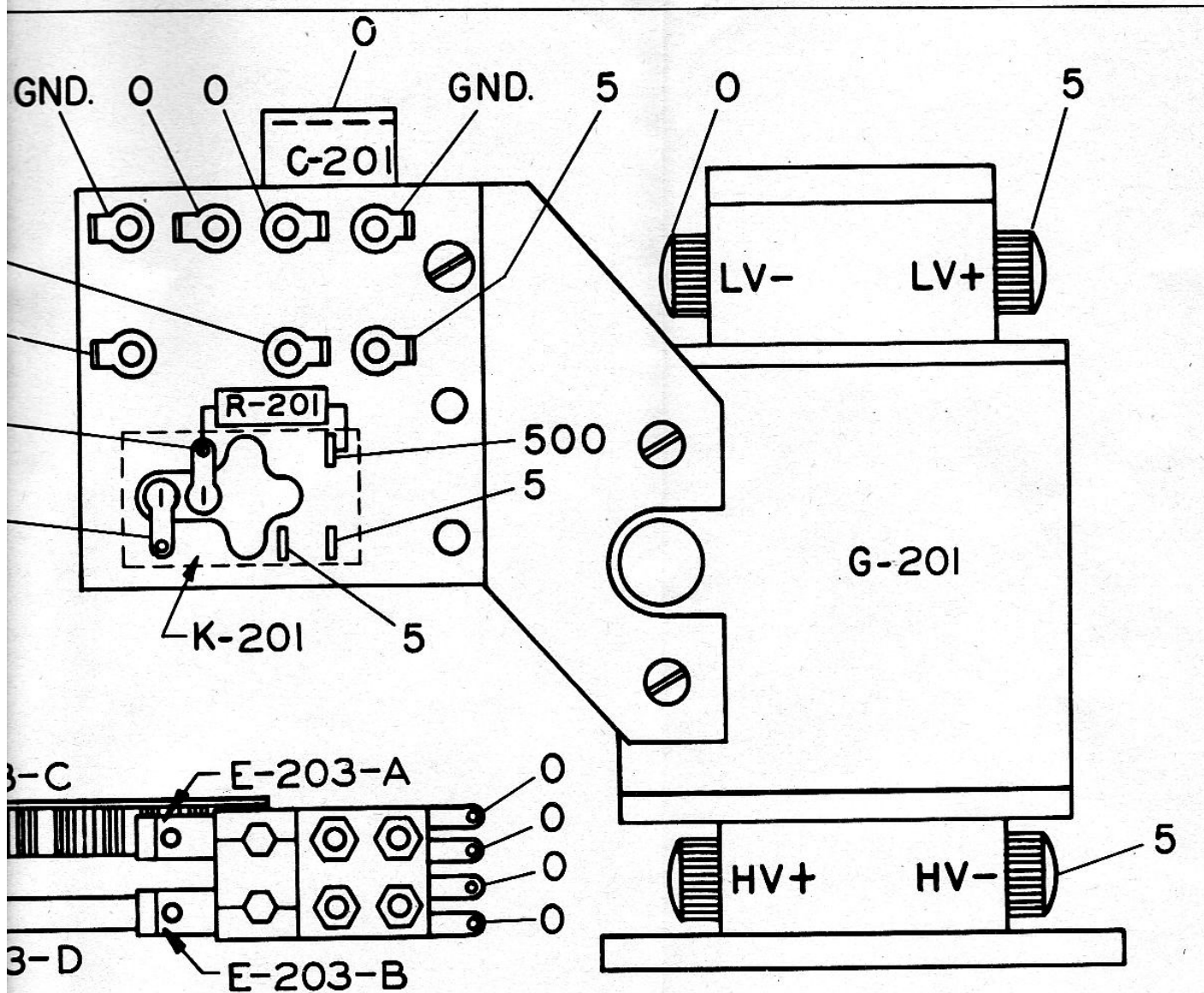


Figure 8-10. Radio Transmitter T-74/CRT-



NOTES:

1. Cover Disconnected at Plug J-201.
2. Cams in Position as shown.
3. Values Shown are Resistance to Ground.

Figure 8-10. Radio Transmitter T-74/CRT-3—Resistance Test Points, Power Supply

AN 16-30CRT3-2

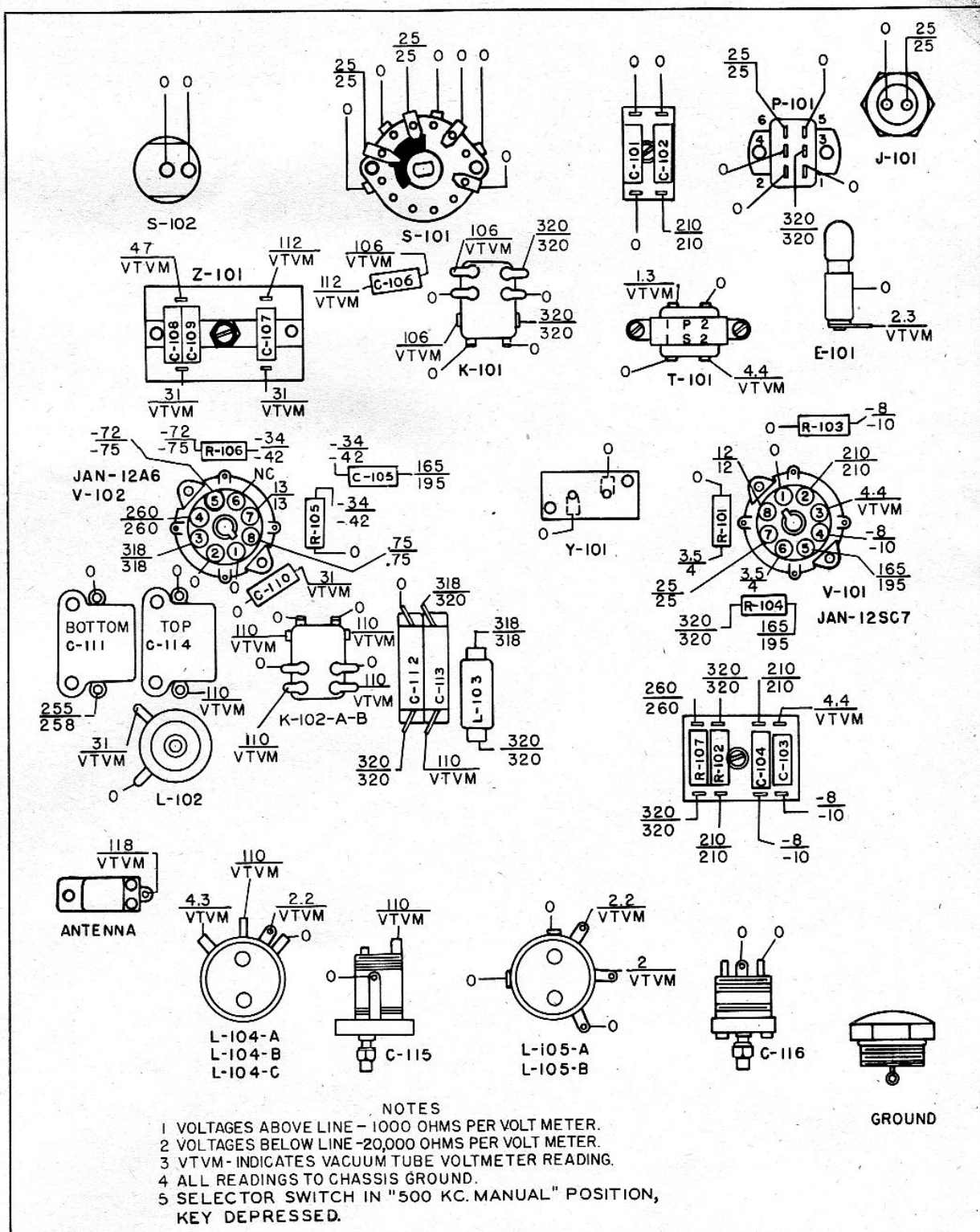
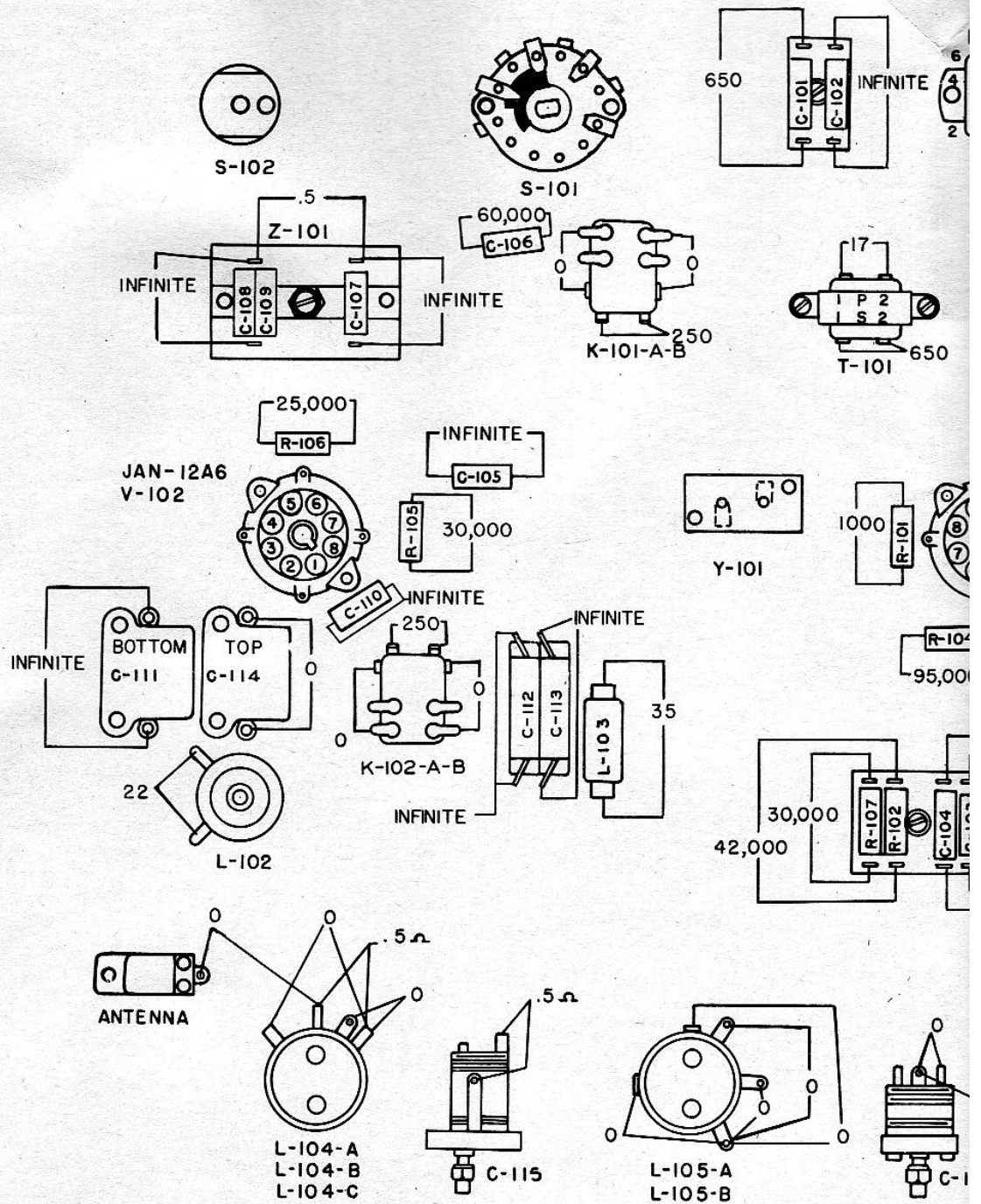


Figure 8-11. Radio Transmitter T-74/CRT-3—Voltage Test Points, Cover Assembly



NOTES

1. SELECTOR SWITCH IN "500 K.C. MANUAL" POSITION.
2. POWER SUPPLY DISCONNECTED AT PLUG J-201.

Figure 8-12. Radio Transmitter T-74/CRT-3—Resistance Test Po

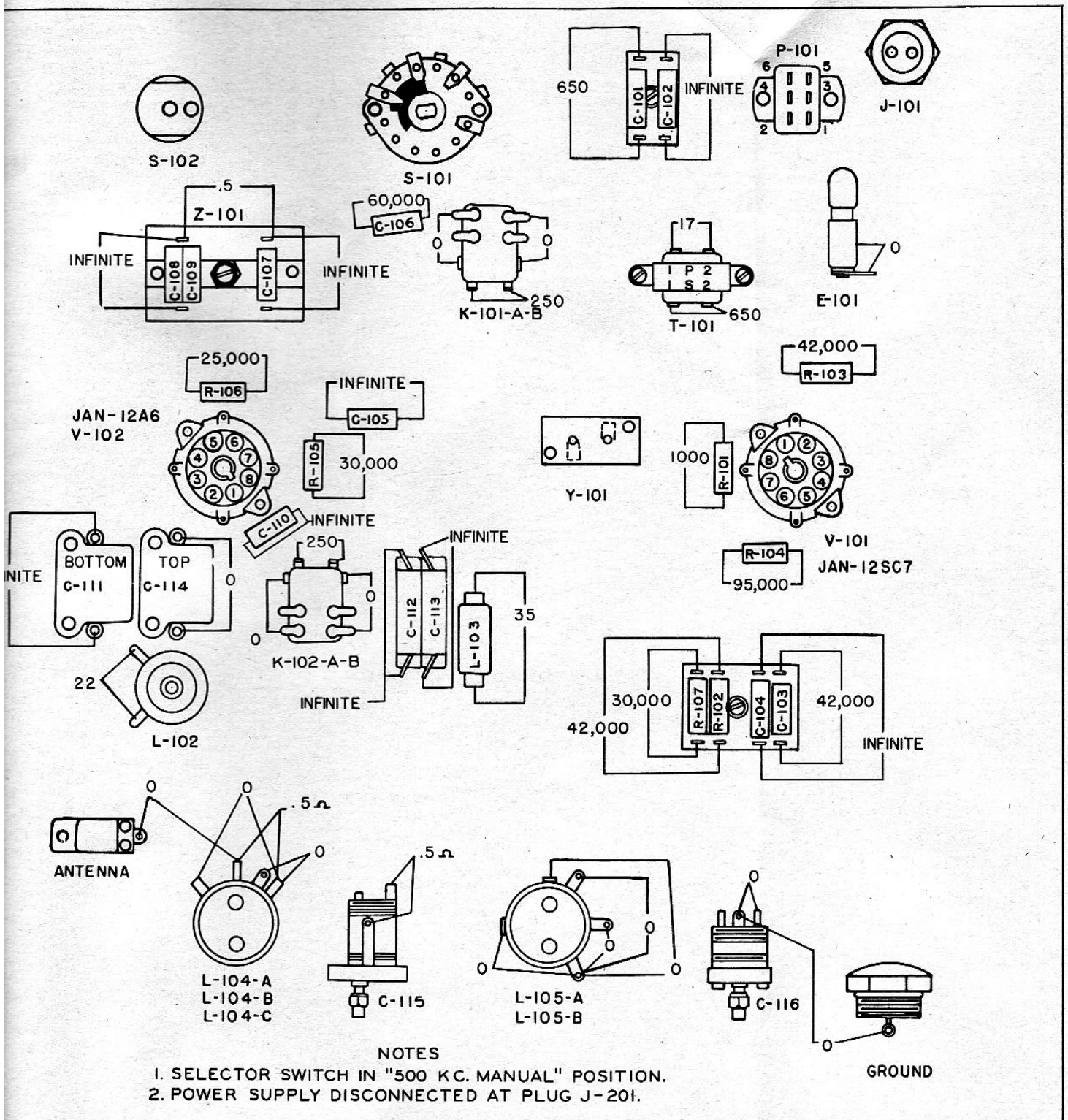


Figure 8-12. Radio Transmitter T-74/CRT-3—Resistance Test Points, Cover Assembly

AN 16-30CRT3-2

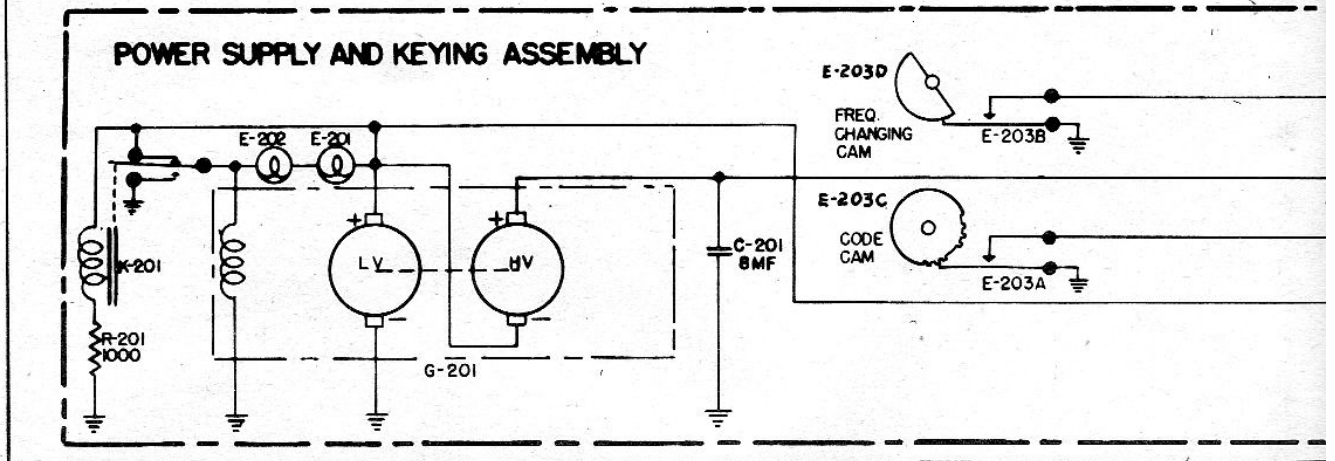
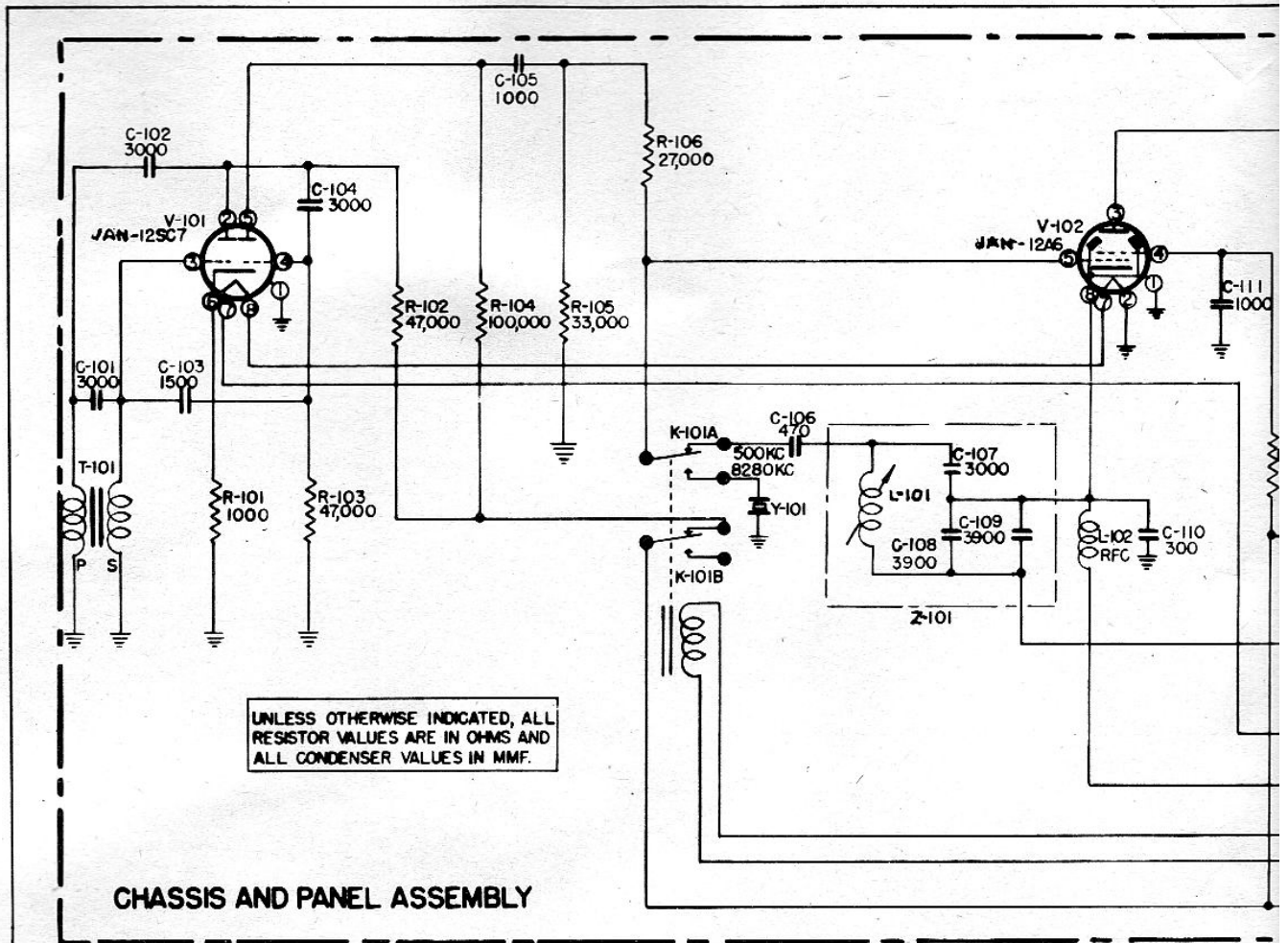


Figure 8-13. Ra

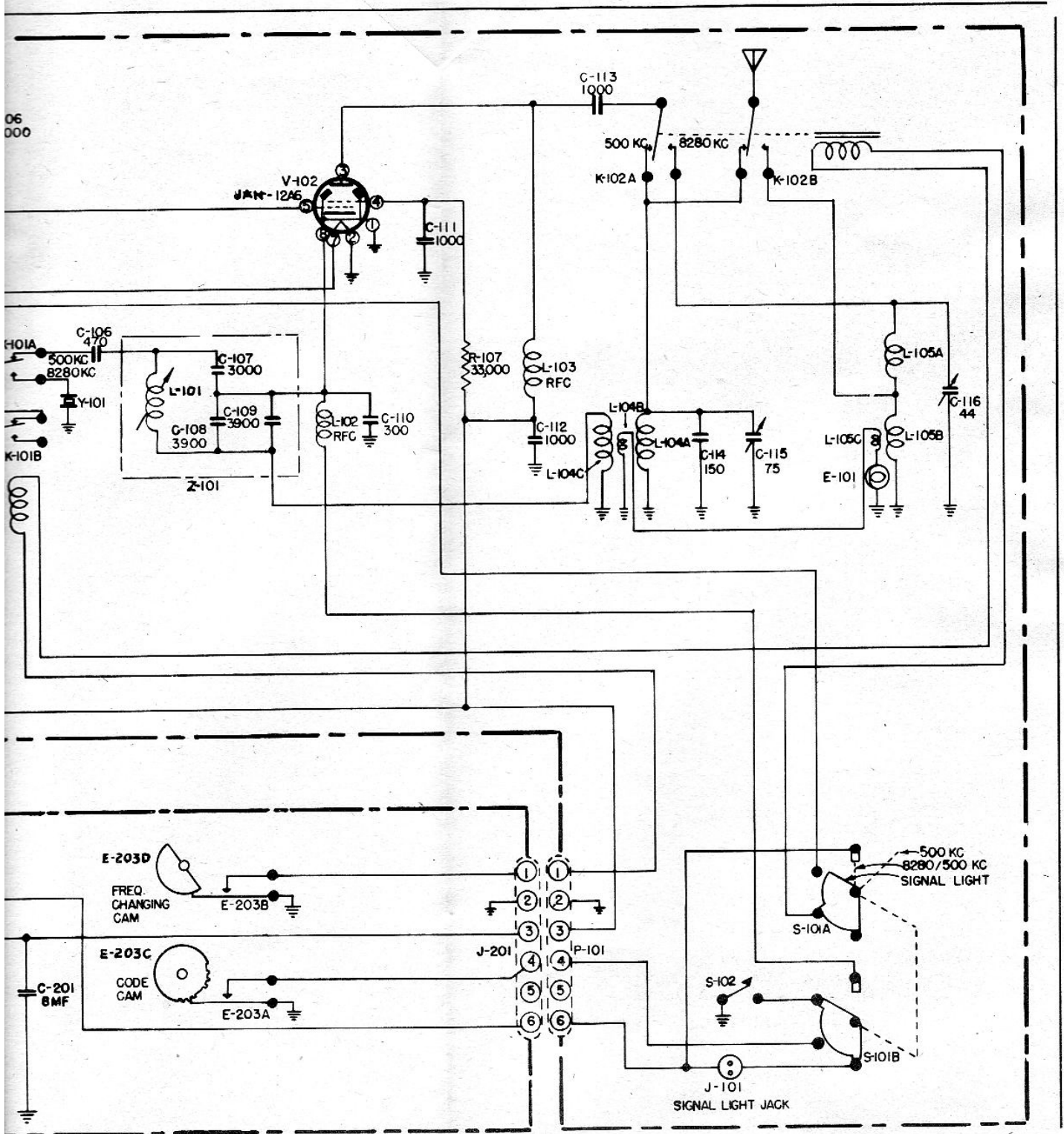


Figure 8-13. Radio Transmitter T-74/CRT-3—Schematic Diagram



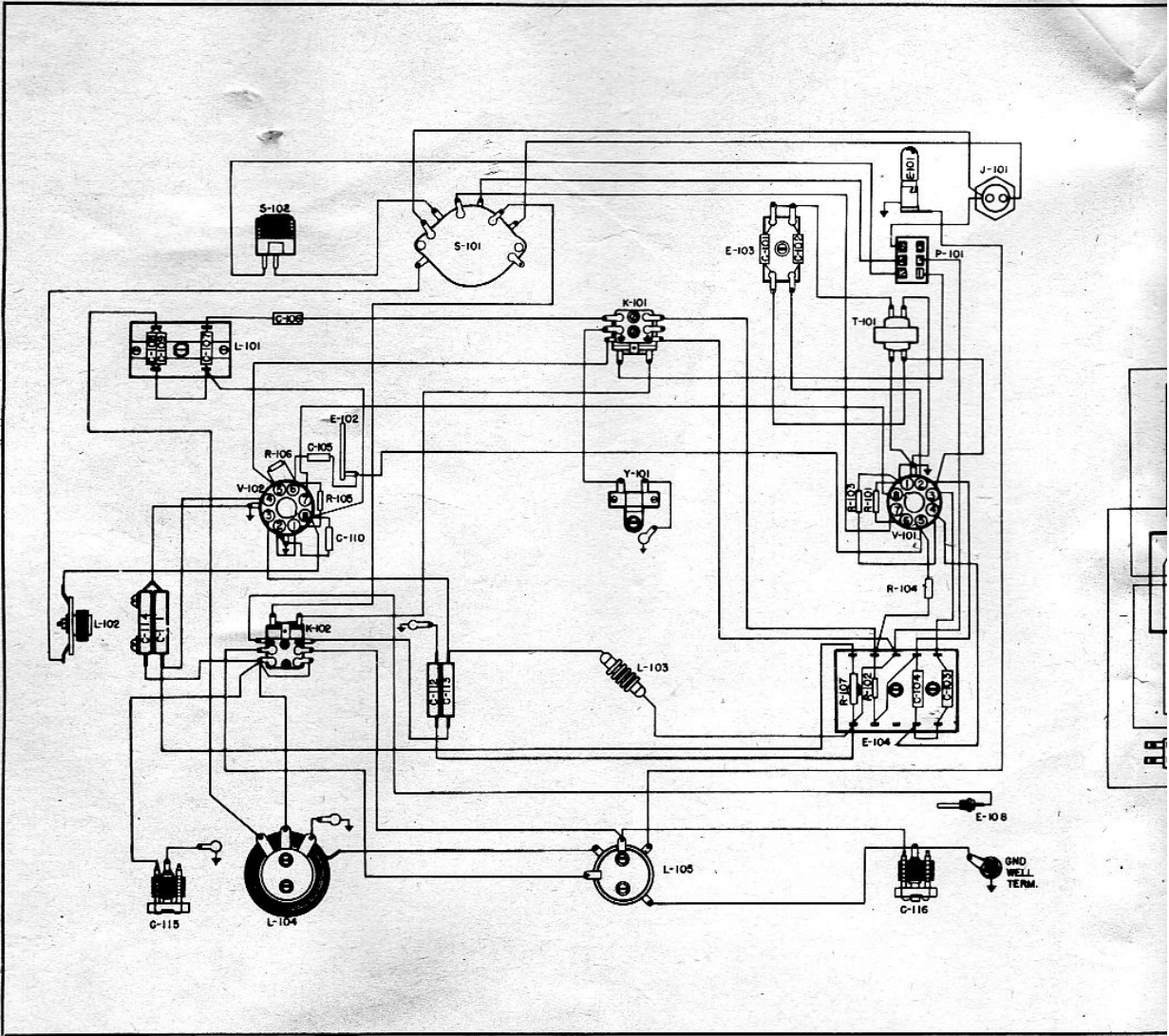


Figure 8-14. Radio Transmitter T-74/CRT-3—Practical Wiring Diagram

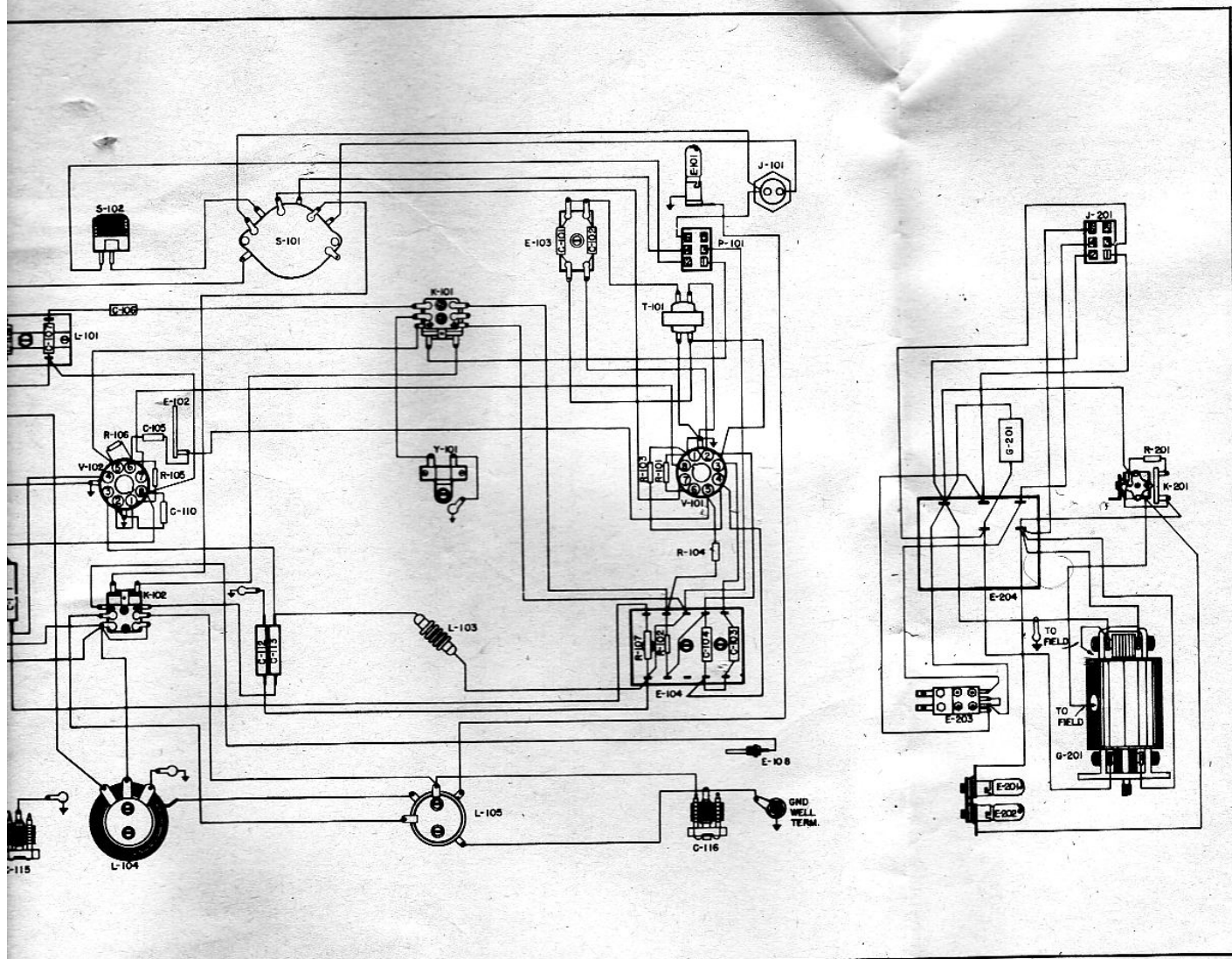


Figure 8-14. Radio Transmitter T-74/CRT-3—Practical Wiring Diagram

**SUPPLEMENT TO AN 16-30CRT3-2  
HANDBOOK OF MAINTENANCE INSTRUCTIONS**

*for*

**RADIO SET  
AN/CRT-3A**

**CONTAINS STANDARD NAVY STOCK NUMBERS  
BUREAU OF SHIPS MAINTENANCE PARTS**

KPC-23753-A

AUG. 15, 1951  
REV. FEB. 15, 1954

SUPPLEMENT TO AN 16-30CRT3-2

**TABLE OF REPLACEABLE PARTS**

Symbol Designation	Name and Description of Part	Function	Navy Aero Signal Corps & Standard Navy Stock Numbers	Jan-Designation	All Symbols Involved	Mfr's. Part Number	Contractor's Part/Dwg. Number
A-301	CABINET, ELECTRICAL EQUIPMENT: 0.064 in. aluminum alloy, except for fittings; empty; for transmitter, power supply, and automatic keying device; 10-9/32 in. h x 9-21/32 in. wd x 8 in. d; 2 hinges for attaching belt; (felt-lined crank well in back; hole for crank bushing in top; painted orange-yellow).	Waterproof housing	N16-C-10608-5501				23697
A-302	STRAP LEG: olive drab cotton webbing; 9-1/2 in. lg x approx. 5 in. wd x 2 in. thk overall; (one end terminated w/metal buckle 3-11/16 in. wd. x 3-3/4 in. lg x 1-1/2 in. h overall; other end terminated w/aluminum alloy painted hinge and stiffener, used on cabinet). Has mildew resistance Spec AXS-1247-Type 2.	Buckle end of belt	N16-S-691001-102				23749
A-303	STRAP, LEG: olive drab cotton webbing; approx 43-1/2 in. lg x 5 in. wd x 1/4 in. thk overall; (one end terminated w/aluminum alloy painted hinge and stiffener; other end terminated w/tongue overlapping 18-3/4 in. x 3 in. wd and extending 8 in. beyond end of main strap, end of which is stiffened by thermo-setting plastic impregnation, used on cabinet). Has mildew resistance Spec AXS-1247-Type 2.	Tip end of belt	N16-S-691001-101				23750
A-304	CAP; Zamak #5; 1-5/16 in. diam x 11/16 in. thk overall; (swivel in center of rear; top of cap marked "Turn" with indicating arrow, including gasket; Single flute each side top of cap.	Cover for ground well	#2Z3352 92 N16-C-145959-101 R16KP-22507				22507- 22525- 23476
A-305	CAP, black tenite finished with fungicidal lacquer; cover; 2 in. diam x 25/64 in. thk; (hole in under side of cap 1-3/16 in. diam x 3/16 in. d, tapped 1-1/4 in. 18 NS; marked "Turn" with accompanying arrow, and "Crank socket remove" in raised lettering; 6 finger grooves in rim). Including gasket H-306.	Cover for crank socket	2C6596-778A/C1 N17-C-201113-551 R16PD1-450377				22682- 23019
A-306	CAP, DESICCATOR: die cast Zamak #5; dipped in caustic bath and Edol Z, outer surface painted with telephone black; 1-3/16 in. diam x 15/32 in. d; (9/32 in. threaded 1-20 NS-3; screw-driver slot in top 3/4 in. lg x 3/64 in. wd x 3/32 in. d). Including gasket.	Cover for desiccator compartment	2Z1607-21 N16-C-145476-101 R16C4564-450				22508- 22525
A-307	DESICCANT ASSEMBLY, 3-1/4 in. x 1-1/2 in. silica gel; cotton bag containing crystals; 2-3/4 in lg x 1 in. wd overall; (crystals change from blue to pinkish white upon absorbing moisture).	Dehydrating agent	#6Z477-1 Filled with 6G250-2 N16-D-17174-6431				22885- 22503

\* Not furnished as a maintenance part to Bureau of Ships activities. If failure occurs, do not request replacement unless the item cannot be repaired or fabricated.

**SUPPLEMENT TO AN 16-30CRT3-2**  
**TABLE OF REPLACEABLE PARTS**

Symbol Designation	Name and Description of Part	Function	Navy Aero Signal Corps & Standard Navy Stock Numbers	Jan-Designation	All Symbols Involved	Mfr's Part Number	Contractor's Part/Dwg. Number
A-401	BAG, RADIO SET: Sig C Bag BG-115-A; canvas, yellow; 10-1/2 in. lg x 14-3/4 in. wd x 19-7/8 in. h; (lined with 1/2 in. thk hair felt; 1 webbing hand grip on each of four sides; permanently attached cover with 3-1/2 in. x 3-1/2 in. x 3-1/2 in. projecting compartment to accommodate kite and inflating tube bag; cover secured by lacing cord through metal grommets; 2 metal loops projecting through cover for attaching parachute; supplied with cushioning strips, pads, and smaller bag for kite and inflating tubes. Includes ref A-402.	Contains all other components of radio set	#2Z551-155A N16-B-110001-116 R16B1050-700			Fisher-Norwalk #BG-155A	23020
A-402	BAG: preshrunk canvas, yellow; 23 in. lg x 5-1/4 in. wd; (draw string in top; warnings and list of contents printed on outside). P/o ref A-401.	Contains kite and inflating tube	#2A1680 N16-B-110001-115				23751
A-404	KITE: Sig C Kite M-357-A; metal framework; packed, 18in. lg x 4 in. diam overall; assembled, 17-1/16 in. x 17-1/16 in. x 36 in. overall; (instructions imprinted on fabric; 4 kapok-filled pockets in fabric; 2 alternative bridling eyes for attaching antenna swivel clasp).	Raises and supports antenna	#2A1678-357A or 2Z1678-357A F16-K-550001-101 R16K3303			Heddon and Sons #M-357A	23004
A-405	GENERATOR, HYDROGEN: Sig C Hydrogen generator M-315-B; steel cylinder and separate inflating tube; cylinder 4-3/8 in. diam x 11-11/16 in. lg overall; total generating time 30 min; (cylinder filled with lithium hydride; operated by immersion in water; key and tongue on each end for opening cylinder). Includes ref A-406.	Produces hydrogen to inflate balloon	#6Z4315B F16-G-58751-1002 R16G3035			Government Furnished	23708
A-406	NOZZLE KITE BALLOON INFLATION: aluminum, with fibre insulating grip; 1-1/16 in. diam x 19 in. lg overall; (assembly of tube, spiral strip running lg of tube, needle insert in end of tube, and insulating grip; 3/8 in. of tube threaded; 1/16 in. diam vertical hole into top of needle, 1/4 in. diam horizontal hole through top of needle; tag fastened by cord to groove in bottom of insulating grip). P/o ref A-405.	Carries hydrogen from generator to balloon	N16-N-600001-102 R16KP-23698			Government Furnished	23698
A-407	BALLOON, KITE: Sig C Balloon M-278-A; Antenna lifting; gray; deflated diam 6-3/4 in; inflated diam 4 feet; neck 15/16 in. OD x 11/32 in. ID x 1-3/8 in. lg; (spherical; with 2 cord loops 3-3/4 in lg for attaching antenna; rubber cork stopper tied to neck; packed in steel can 4-1/4 in. diam x 5-1/8 in. lg with key and tongue on 1 end).	Raises and supports antenna	#2A299-278A F16-B-120021-102 R16B1400			Dewey-Almy Chemical M-278-A	23709

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SUPPLEMENT TO AN 16-30CRT3-2

TABLE OF REPLACEABLE PARTS

Symbol Designation	Name and Description of Part	Function	Navy Aero Signal Corps & Standard Navy Stock Numbers	Jan-Designation	All Symbols Involved	Mfr's Part Number	Contractor's Part/Dwg. Number
A-408	LIGHT, EXTENSION: Sig C Signal Lamp M-308-B; molded tenite base, molded clear polystyrene shield, bulb, spare bulb, cord and plug and olive drab cotton web strap; 28 v. 170 ma DC; 2-15/16 in. h x 2-3/16 in. diam, with 96 in. lg cord, and 36 in. lg strap attached; (designed to be strapped to top of head; packed in cardboard container 3 in. diam x 3-1/8 in h). Includes ref A-409 and E-401.	Visual signaling	#6B698B F17-L-76051-3233 R17L12932-360				23382
A-409	LENS, INDICATOR LIGHT: molded clear polystyrene; 2-1/16 in. OD x 1.80 in. ID x 1.525 in. h; (1/4 in. of base threaded 2-1/16 in.-14, class 2 fit). P/o ref A-408.	Protects signal lamp	N17-L-250216-595				22985
C-101	CAPACITOR, FIXED, MICA DIELECTRIC: 3000 mmf ± 5%; 500 vdcw; 53/64 in. max lg x 53/64 in. max wd x 9/32 in max thk; (molded bakelite case; 2 wire leads 1-1/8 in. min lg).	Audio osc tuning	N16-C-32193-2480	JAN type #CM30A302J	C-101,C-102 C-104	Cornell-Dubilier CM30A302J	23459
C-102	Same as ref C-101.	Audio osc plate blocking					23459
C-103	CAPACITOR, FIXED, MICA DIELECTRIC: 1500 mmf ± 10%; 500 vdcw; 53/64 in. max lg x 53/64 in. max wd x 9/32 in. max thk; (molded bakelite case; 2 wire leads 1 1/8 in. min lg).	Audio osc feedback	N16-C-31512-4559	JAN type #CM30A152K		Cornell-Dubilier CM30A152K	22558
C-104	Same as ref C-101.	Audio inter-stage coupling					23459
C-105	CAPACITOR, FIXED, MICA DIELECTRIC: 1000 mmf ± 20%; 500 vdcw; 53/64 in. max lg x 53/64 in. max wd x 9/32 in max thk; (molded bakelite case; 2 wire leads 1-1/8 in. min lg).	Audio amplr to RF osc coupling	N16-C-31095-6639	JAN type #CM30A102M		Micamold CM30A102M	22557
C-106	CAPACITOR, FIXED, MICA DIELECTRIC: 470 mmf ± 10%; 500 vdcw; 51/64 in. max lg x 15/32 in. max wd x 7/32 in max thk; (molded bakelite case; 2 wire leads 1-1/8 in. min lg).	RF grid blocking	N16-C-30114-4271	JAN type #CM20A471K		Micamold CM20A471K	23460
C-107	CAPACITOR, FIXED, MICA DIELECTRIC: 3000 mmf ± 5%; 500 vdcw; 53/64 in. max lg x 53/64 in. max wd x 11/32 in. max thk; (molded bakelite case; 2 wire leads 1-1/8 in. min lg). P/o ref Z-101; cannot be replaced independently.	RF osc grid coil tuning	N16-C-32193-2538 R-16C-10326-27	JAN type #CM35D302J		Sickles CM354302J	22561
C-108	CAPACITOR, FIXED, MICA DIELECTRIC: 3900 mmf ± 5%; 500 vdcw; 53/64 in. max lg x 53/64 in. max wd x 11/32 in. max thk; (molded bakelite case; 2 wire leads 1-1/8 in. min lg). P/o ref Z-101; cannot be replaced independently.	RF osc grid coil tuning	N16-C-32430 6138	JAN type #CM35D392J	C-108-C109	Sickles CM35D302J	22563

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SUPPLEMENT TO AN 16-30CRT3-2

TABLE OF REPLACEABLE PARTS

Symbol Designation	Name and Description of Part	Function	Navy Aero Signal Corps & Standard Navy Stock Numbers	Jan-Designation	All Symbols Involved	Mfr's. Part Number	Contractor's Part/Dwg. Number
C-109	Same as ref C-108. P/o ref Z-101; cannot be replaced independently.	RF osc grid coil tuning		JAN type #CM35D329J		Sickles CM35D329J	22563
C-110	CAPACITOR, FIXED, MICA DIELECTRIC: 300 mmf ± 5%; 500 vdcw; 51/64 in. max lg x 15/32 in. max wd x 7/32 in. max thk; (molded bakelite case; 2 wire leads 1-1/8 in. min lg).	RF osc cathode by-pass	N16-C-29660-9001	JAN type #CM20C301J		Micamold CM20C301J	23322
C-111	CAPACITOR, FIXED, MICA DIELECTRIC: 1000 mmf ± 10%; 2500 vdcw; 1-3/8 in. ± 1/64 in. lg x 1-1/8 in. ± 1/64 in. wd x 23/64 in. max thk; (molded bakelite case; 2 insulated solder lug terminals on ends with 1-3/4 in. ± 1/32 in. centers; 2 mtg feet with 0.144 in. diam holes on 1.314 in. centers).	RF osc screen by-pass	N16-C-31091-6114	JAN type #CM45B102K	C-111,C-112, C-113	Cornell Dubilier CM45B102K	23279
C-112	Same as ref C-111.	RF osc plate supply by-pass					23279
C-113	Same as ref C-111.	RF plate blocking					23279
C-114	CAPACITOR, FIXED, MICA DIELECTRIC: 150 mmf ± 5%; 2500 vdcw; 1-3/8 in. ± 1/64 in. lg x 1-1/8 in. ± 1/64 in. wd x 23/64 in. max thk; (molded bakelite case; 2 insulated solder lug terminals on ends with 1-3/4 in. ± 1/32 in. centers; 2 mtg feet with 0.144 in. diam holes on 1.314 in. centers).	Ant fixed tuning for 500 kc	N16-C-28976-3636	JAN type #CM45B151J		Cornell Dubilier CM45B151J	23280
C-115	CAPACITOR, VARIABLE, AIR DIELECTRIC: 6.0 to 73.2 mmf; 0.020 in. max air gap; 1-9/16 in. lg x 15/16 in. wd x 1-7/32 in. h; (25 plates; ceramic insulation; 2 mtg holes tapped #4-40 on 21/32 in. mtg/c).	Ant variable tuning for 500 kc	N16-C-60186-1462 R16C11922-200			All Star Products K-77-J	23323
C-116	CAPACITOR, VARIABLE, AIR DIELECTRIC: 4.5 to 43.7 mmf; 0.020 in. max air gap; 1-19/32 in. lg x 15/16 in. wd x 1-7/32 in. h; (15 plates, ceramic insulation; 2 mtg holes tapped #4-40 on 21/32 in. mtg/c).	Ant variable tuning for 8280 kc	N16-C-59564-5960 R16C11914-2			All Star Products K-44-J	23282
C-201	CAPACITOR, FIXED, ELECTROLYTIC: 8 mf; 450 vdcw; 1-11/16 in. lg x 13/16 in. diam; (aluminum can enclosed in cardboard case; hermetically sealed; cardboard case treated with approved fungus resistant wax or fungicidal varnish; 2 tinned copper wire leads 2-1/2 in. lg). Mounts on E-204.	HV filter	N16-C-19543-6776			Magnavox part #12D3462, treated w/ fungicidal lacquer by KPC	22560
E-101	LAMP, INCANDESCENT: Sig C Lamp LM-52, Navy Lamp TB-14; 6 to 8 v, 0.15 amp; T-3-1/4 clear; 1-3/16 in lg overall; miniature bayonet base; (C-6 filament; burn any position).	RF indicator	2Z5952 N17-L-6297			GE part #47	25205

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SUPPLEMENT TO AN 16-30CRT3-2

**TABLE OF REPLACEABLE PARTS**

Symbol Designation	Name and Description of Part	Function	Navy Aero Signal Corps & Standard Navy Stock Numbers	Jan-Designation	All Symbols Involved	Mfr's. Part Number	Contractor's Part/Dwg. Number
E-102	TERMINAL BOARD: 1 solder-lug terminal; phenolic; 1-15/32 in. lg x 1-1/4 in. wd x 1/8 in. thk overall; (one 0.152 in. mtg hole). Located 1/2 in. from end and 15/64 from side.	Term point for ref C-105	N17-B-77484-2471 *				23286
E-103	TERMINAL BOARD: 4 solder-lug terminals; phenolic; 1-11/32 in. lg x 13/16 in. wd x 9/16 in. thk overall; (one 0.152 in. mtg hole).	Mtg for ret C-101 and C-102	N17-B-77634-4385 *				23277
E-104	TERMINAL BOARD: 8 solder-lug terminals; phenolic; 1-3/4 in. lg x 1-11/32 in. wd x 9/16 in. thk overall; (two 0.152 in. mtg holes on 1-1/8 in. centers).	Mtg for ref C-103, C-104, R-102, and R-107	N17-B-77835-2531 * R17KP-23380				23380
E-105	CONTACT, ELECTRICAL: 1-3/16 in. lg x 1 in. diam; (2 insulated inserts used both as terminals and push-button contacts; 1 insert mtd in center, other mtd 9/32 in. from center; insulating material black phenolic; body threaded #1 in-20). Used with E-106, H-105, Q-101 to complete Reg ref S-102.	Contacts for push-button key	N17-C-80417-4245 R16C30350-7				22782
E-106	CONTACT, ELECTRICAL: brass; silver-plated; 7/16 in. lg x 21/32 in. diam. Used with E-105, H-105, Q-101 to complete ref S-102.	Plunger of push-button key	#2Z1480.32 N17-C-80397-9307 *				22787
E-107	KNOB, bar: molded black phenolic; for 1/4 in. shaft diam; one #8-32 set-screw; groove on pointer end filled with white and painted with radio-active paint; 1-1/4 in. x 1/8 in. x 9/16 in.; (brass insert; shaft hole 7/16 in. d; coated with fungicidal lacquer). Including set screw.	Selector sw knob	N16-K-700075-441 R16K3354-450				23325-23722
E-108	INSULATOR FEEDTHRU: round threaded tube with lug in one end; black bakelite; 1-13/32 in. lg overall; (0.139 in. ID tapering to 0.129 in. ID; 7/16 in.-20 threads for 3/8 in. at center). Including gasket.	Ant lead-in insulator	N17-I-59611-5101 R1616027-500				22796-22781
E-201	LAMP, INCANDESCENT: Sig C Lamp LM-49; 28 v 0.1 amp; T-3-1/4 clear; 1-3/16 in. lg overall; miniature bayonet base; S-2 filament; burn any position).	Gen speed indicator	#2Z5949 N17-L-6505-625		E-201, E-202	GE part #1820	22801
E-202	Same as ref E-201.	Gen speed indicator					22801
E-203 A/B	CONTACT, ASSEMBLY; DPST; 2 phosphor bronze fingers and 2 mating contact strips assembled with spacers, screws, nuts, and washers; 1/8 in. diam silver contacts on both fingers and contact strips; adjustable screw stops; 2-1/16 in. x 25/32 in. x 23/32 in. overall; (4 solder-lug terminals at end). P/o ref O-202.		N17-C-84091-1080 R16C30350-5				23356
E-203A	P/o ref E-203 A/B.	Automatic RF osc keying					23356
E-203B	P/o ref E-203A/B.	Automatic freq changing					23356

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**SUPPLEMENT TO AN 16-30CRT3-2**  
**TABLE OF REPLACEABLE PARTS**

Symbol Designation	Name and Description of Part	Function	Navy Aero Signal Corps & Standard Navy Stock Numbers	Jan-Designation	All Symbols Involved	Mfr's. Part Number	Contractor's Part/Dwg. Number
E-203C	CAM, CODE: die-cast zinc; 3in. diam x 5/16 in. h; (one half of rim coded with 6 SOS sequences, other half coded with single long dash; 0.187 in. diam mtg hole in center; two 0.187 in. alignment holes in long dash half). P/o ref O-202.	Automatic keying	N16-C-125001-259 R16KP-23351				23351
E-203D	CAM: die-cast zinc; half wheel 3 in. diam x 3/16 in. h; (0.500 in. diam mtg hole in center; two 0.187 in. alignment holes corresponding in position to similar holes in ref E-203C). P/o ref O-202.	Automatic freq. changing	N16-C-125001-297 R16KP-23352				23352
E-204	POWER SUPPLY, SUB- ASSEMBLY: 7 solder-lug term, 1 condenser, 1 relay, 1 resistor; phenolic board 2-5/16 in. x 2-1/4 in. x 3/32 in. thk attached by 2 rivets in 0.140 in. diam holes to steel bracker 3-5/16 in. lg x 1-9/16 in. wd x 0.064 in. thk bent to form 60 deg angle with phenolic board; (two 0.177 in. diam mtg holes on 1-3/8 in. centers in edge of bracket to mount assem to gen). Includes ref C-201, K-201, and R-201.	Filtering and voltage regulation	N17-B-77686-8312 * R16KP-23314				23314
E-205	BRUSH, ELECTRICAL CONTACT: pos LV; brush material MC grade carbon; metal graphite brush 0.262 in x 0.189 in. x 7/16 in. lg spring 1 in. shunt #29 AWG extra flexible (stamped "+" on one side of brush; U-shaped type-A cap). P/o ref G-201.	Gen brush	#3H1528.2/ B7 N17-B-86641-8347 R16B12207				22908
E-205A	BRUSH SET, ELECTRICAL CONTACT: consists of 1-E205 and 1-E 206. P/o ref G-101.	Set (2) gen brushes LV	N17-B-88403-6313				22908 22907
E-206	BRUSH, ELECTRICAL: neg LV; brush material MC grade carbon: brush 0.262 in x 0.189 in x 7/16 in. lg, spring 1 in. stamped "-" on one side of brush; U-shaped type-A cap). P/o ref G-201.	Gen brush	#3H1528.2/ B7 N17-B-88403-5891 R16B12207				22907
E-207	BRUSH, ELECTRICAL: pos HV; brush material CMC grade carbon; brush 0.278 in. x 0.091 in. x 7/16 in. lg, spring 1 in. (stamped "+" on one side of brush; U-shaped type-A cap). P/o ref G-201.	Gen brush	#3H1528.2/ B6 N17-B-88403-2286 R16B12207-25				22906
E-207A	BRUSH SET, ELECTRICAL CONTACT: consists of 1-E-207 and 1-E-208. P/o ref G-101.	Set gen (2) brushes HV	N17-B-88403-1772				22906 22905
E-208	BRUSH, ELECTRICAL; neg HV; material CMC grade carbon; brush 0.278 in. x 0.091 in. x 7/16 in. lg, spring 1 in. (stamped "-" on one side of brush; U-shaped type-A cap). P/o ref G-201.	Gen brush	#3H1528.2/ B6 N17-B-88403-2286 R16B12207-25				22905

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SUPPLEMENT TO AN 16-30CRT3-2

**TABLE OF REPLACEABLE PARTS**

Symbol Designation	Name and Description of Part	Function	Navy Aero Signal Corps & Standard Navy Stock Numbers	Jan-Designation	All Symbols Involved	Mfr's. Part Number	Contractor's Part/Dwg. Number
E-301	ANTENNA, kite or balloon supported; Army-Navy Antenna Assembly AT-207/CRT-3; cadmium-copper alloy wire, Sig C Antenna Wire W-147, with addition of fastenings; 16 strands 306 feet lg x 0.040 in. max diam; 65 lb test; (cadmium-plated steel thimble on each end of ant; one thimble attached to nylon cord 106 in. lg folded to give lg of 43 in., w/instruction tag attached to loop; other thimble attached to waterproof nylon cord 18 in. lg w/ swivel on end). P/o ref O-302. Single wire trailing.	RF radiation	# (for spare see ref E-402) N16-A-49924-4221				23301
E-401	LAMP, INCANDESCENT: Sig C Lamp LM-58-A; 24 v, 170 ma; bulb T-3 clear, 1-1/4 in. lg overall; miniature screw base; (C-2V filament; burn any position). P/o ref A-408.	Visual signal	#2Z5958A N17-L-6543-0015			GE part #1477	22767
E-402	ANTENNA: spare kite or balloon supported; spare Army-Navy Antenna Assembly AS-207/CRT-3, ref E-301, wound on phenolic spool 1-1/4 in. thick x 3-1/4 diam.	Spare for ref E-301	2A264-207 N16-A-49924-4226 R16AN-AS 207CRT3				23315
G-201	GENERATOR, DIRECT CURRENT: 17 w; 300 v and 28 v, 5 wire; open frame; shaft 5 in. x 3/8 in. at widest point; 5-5/32 in. lg x 3-1/4 in diam; (5000 rpm; manual drive; self-excited; fixed mtg base; 3 mtg holes for #8 screws equally spaced about 3 in. circle). Includes ref E-205 through E-210 and ref O-206.	HV and LV power supply	3H1528.2 N17-G-59751-7379 R16KP-22520			Electro Engineering Products #KPC-G1	22520
H-101	CLIP, ELECTRICAL: phosphor bronze; cadmium-plated; two 0.141 in. diam holes for rivets on 1 in. mtg/c; 1-3/32 in. x 1-5/16 in x 25/32 in. overall; (accommodates Bendix #450169 connector). Holds ref J-201.	Holds ref J-201	N17-C-813759-101 *				22534
H-102	CLIP, ELECTRICAL: spring bronze; cadmium-plated; one .152 in. diam insulated mtg hole; 1-5/16 in. lg x 15/16 in. wd with 15/32 in. mtg. leg at one end and 21/32 in. clamp leg at other end, attached to bakelite board; (accommodates Army-Navy Crystal CR-1A/AR).	Holds xtal in place	N17-C-813772-552 *				23657
H-103	CLAMP, ELECTRICAL: antenna lead-in; phosphor bronze clamp with copper wire attached; clamp cadmium-plated; clamp 1-13/32 in. lg x 1/2 in. wd x 1/4 in. thk overall, wire reaches 50 in. beyond end of clamp; (resigned to hold wire 0.040 in. diam).	Antenna lead-in	N17-C-782618-151 *				23711
H-104	SPRING, SHAFT PACKING: coil; 0.055 in. diam music wire; cadmium-plated; 11/16 in. lg x 7/16 in. diam. Used with ref S-101.	Holds washer and gasket in place on sw shaft	#2Z5042-16 N17-S-46651-1017 *				22901

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**SUPPLEMENT TO AN 16-30CRT3-2**

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H-105	SPRING, PUSH-BUTTON: 0.031 in. diam music wire; silver-plated; 1-15/32 in. lg x 5/8 in. OD; (8 coils tapering from 5/8 in. OD to 27/64 in. ID; 7 active coils; coil length 3/4 in; straight end from large end of coil extends 23/32 in.). Used with E-105, E-106, Q-101 to complete S-102.	Keeps push-button cont open	#2Z8876.37 N17-S-46651-1030 R16S8455-500				22786
H-106	SPRING, TUBE RETAINER: 0.051 in. diam music wire; cadmium-plated; 1 in. diam x 1-7/16 in lg overall; (one end of coil 61/64 in. ID, other end 9/16 in. ID). Used with ref V-101, V-102.	Holds tube in socket	#2Z7780-9 N17-S-46651-1028 R16KP-22536				22536
H-107	BOLT, MACHINE: hex head; brass, cadmium-plated; 1/4 in.-20; 13/16 in. lg overall, 5/8 in. lg thd; hex 7/16 in. across flats, 3/16 in. thk hd; 0.113 in. diam hole drilled 11/32 in d through head of screw and tapped #6-32 1/4 in. d).	Gnd term	#6L20924-13-81CS N43-B-99500-111 *				23076
H-108	WASHER, flat: brass, cadmium-plated; 17/64 in. ID x 0.495 in. OD x 1/32 in thk. Used with ref S-101.	Retains gaskets on selector sw shaft	N43-W-3041-1625 *				22887
H-109	NUT, PLAIN, HEXAGON: brass; 5/8 in.-24; 1/8 in. thk; 1 in. wd across flats. Used with ref J-101	Secures ref J-101	#6LK3510-24.1 N43-N-99500-171 R16N2150-500		H-109 H-311		22531
H-201	NUT, PLAIN, HEXAGON: brass; 1/2 in.-27; 3/32 in. thk; 3/4 in. wd across flats. Used with O-202.	Nut for ref O-202	N43-N-99500-224 * R43N-25075				23355
H-301	GASKET, SYNTHETIC RUBBER: neoprene; 9-3/4 in. lg x 9-1/8 in. wd x 7/64 in. thk overall; (16 holes 0.170 in. diam; holes located at 2 in. intervals around gasket).	Water seal between cabinet and panel	N17-G-150764 902 R16PDI-450232				22775
H-302	GASKET, VELLUMOID: 1-19/32 in. OD x 1-1/4 in. ID x 1/32 in. thk.	Crank bushing water seal	#2C6596-778A/G3 N17-G-161446-179				22521
H-304	GASKET, VELLUMOID: 5-1/2 in. lg x 4-5/8 in. wd x 1/32 in. thk overall; (four 0.213 in. diam holes arranged in trapezoid: 1-1/4 in. diam hole for crank bushing).	Gear housing water seal	#2C6596-778/G8 N17-G-156375-543				22658
H-305	GASKET, SYNTHETIC RUBBER: neoprene 1 in. OD x 5/8 in. ID x 0.045 in. thk. Used with I-301.	Water seal for windows	N17-G-161141-356 R16PDI-450135				23468
H-306	GASKET, SYNTHETIC RUBBER: neoprene; 1-13/64 in. diam x .050 in. thk. P/o A-305.	Crank cap water seal	#2C6596-778A/G10 * N17-G-161243-538				23019
H-307	WRENCH: 6-3/4 in. lg x 2-1/2 in. wd x 0.064 in. thk; 2-1/16 in. diam opening one end, with flange to fit crank cap; 1-3/8 in. diam opening other end, with flange to fit ground cap; 1-5/16 in. lg x 1/2 in. opening in side to fit brake wheel; (aluminum alloy; handle tapers from 2-1/2 in. at widest end). Stamped with instructions.	Loosens crank cap, ground cap, and brake	2SK578/W1 N17-W-920001 171 R16W4674-75				23037

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**TABLE OF REPLACEABLE PARTS**

Symbol Designation	Name and Description of Part	Function	Navy Aero Signal Corps & Standard Navy Stock Numbers	Jan-Designation	All Symbols Involved	Mfr's. Part Number	Contractor's Part/Dwg. Number
H-308	PIN, SAFETY: music wire; cadmium-plated; .0625 in. diam; 2-5/32 in. lg x 11/16 in. wd x 1/4 in thk overall.	Holds crank in well	#6LK3919 N42-P-11673 250 *				22858
H-309	PIN, HINGE: steel wire; cadmium-plated 5-1/4 in. lg x 3/8 in. wd x .160 in. thk overall; (7-1/4 in. lg x 0.080 in. diam wire bent at one end to form spring loop; heat treated under pressure per AN-QQ-H201).	Fastens belt to cabinet	#6L3941-85C N16-P-312501-113				23092
H-311	Same as ref H-109.	Secures windows			H-109,H-311		22531
H-313	NUT, PLAIN, ROUND: cadmium-plated steel; 1-1/4 in.-18; 1/8 in. thk; 1-5/8 in. OD; (2 slots 3/32 in. d x 3/16 in. wd on opposite ends of center line).	Secures crank bushing	#6L2800-18.3 N43-N-9633-4320 R16N2245				22501
I-301	LENS, INDICATOR LIGHT: molded lucite; 1 in. diam x 17/32 in. lg overall; (body diam 5/8 in., 17/64 in. threaded 5/8 in.-24; rim projects 3/16 in beyond body to hold window in cabinet. Including retaining nut.	Makes indicator light visible externally	N17-L-250197-649 R16W3177				23333-22531
J-101	CONNECTOR, RECEPTACLE: 2 round female cont; straight; 13/16 in. lg x 3/8 in. diam overall; designed for 28 v, 170 ma; cylindrical bakelite body with extended rim; cadmium-plated brass inserts with solder-lug term at rear; body thd 5/8 in.-24; body lettered "SIGNAL LAMP SOCKET)." Including gasket.	Jack for signal light plug	N17-C-73126-5249 R17H5974-137				22506-22524
J-102	LAMPHOLDER: miniature bayonet; steel shell and bracket; 1-3/8 in x 1-1/4 in. x 1-3/16 in. overall; (designed for 6-8 v, 0.15 amp; one 0.144 in. diam hole, and one 0.114 in. diam hole threaded #6-32; solder-lug at base of shell).	Holds ref E-101	N17-L-51629-7118 R17H5985-20				23266
J-201	CONNECTOR, RECEPTACLE: 6 flat parallel cont; straight; 1 in. x 11/16 in. x 1-3/8 in. overall; (5 amp, 45 v; formed metal cap with cadmium finish; cable opening 3/8 in. diam; cable clamp attached; phenolic parts impregnated with bakelite and coated with fungicidal lacquer).	Connects power supply and keying assem to audio and RF sect	N17-C-71224-1370			Jones HB part #S-306-CCT	22575
J-202	LAMPHOLDER ASSEMBLY: assem of 2 miniature bayonet lampholders on bracket; lampholders have steel shells; 1-3/8 in. x 1-3/16 in. x 15/16 in. including bracket; lampholder 3/8 in. ID; (one 0.144 in. diam mtg. hole in end of bracket; 2 solder lugs, one at base of each lampholder).	Holds ref E-201 and E-202	N17-L-52201-1026 R16PDI-450238				23377
K-101	RELAY, ARMATURE, general purpose: DPDT; 1-13/16 in. lg x 1-1/4 in. wd x 1-3/8 in. h overall; (3/32 in. diam cont; cont designed for 330 v, 4 ma DC, or for 2-1/2 w RF; multiple wound coil, 8-9 v DC, 0.056 amp, 250 ohms; fast acting; coil varnish impregnated and tropicalized; all phenolic parts tropicalized; single mtg stud threaded #6-32).		N17-R-64840-7001 R16R5042-150		K-101 K-102	Potter Brumfield KR-1479-1	23283

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**SUPPLEMENT TO AN 16-30CRT3-2**  
**TABLE OF REPLACEABLE PARTS**

Symbol Designation	Name and Description of Part	Function	Navy Aero Signal Corps & Standard Navy Stock Numbers	Jan-Designation	All Symbols Involved	Mfr's. Part Number	Contractor's Part/Dwg. Number
K-101A	P/o ref K-101.	Selection of RF osc grid ckt					
K-101B	P/o ref K-101.	Supplying of HV to audio section for 500 kc operation					
K-102	Same as ref K-101.						23283
K-102A	P/o ref K-102.	Selection of plate tank ckt					
K-102B	P/o ref K-102.	Ant transfer					
K-201	RELAY, ARMATURE, general purpose: SPDT; 1-3/4 in. lg x 1-5/16 in. wd x 1-5/8 in. h; (1/8 in. silver contacts; contact rating 200 watts; multiple wound coil, rated 32 v DC at 0.032 amp, 1000 ohms; fast acting; coil varnish impregnated and coated with fungicidal lacquer; all bakelite parts coated with fungicidal lacquer; #6-32 stud and extruded boss on 7/16 in. mtg/c). P/o ref E-204.	Voltage regulation	N17-R-64933-4168 R16R4895			Potter Brumfield KR-1478-1	22663
L-101	COIL ASSEMBLY, radio, RF: osc; integral type; 2 pie; shielded only by chassis; 2-5/16 in. lg x 1-3/8 in. wd x 2 in. h overall; (black plastic solid form; form 0.375 in. diam x 1-1/8 in. lg with rectangular base 2-5/16 in. lg x 1-3/8 in. wd; adjusted at assembly by changing relative positions of pies, adjusted at final assembly by adjusting iron screw in center of form; two 0.151 in. diam mtg holes on 2 in centers in base; 4 solder lug terminals on base; coil varnished and baked). P/o ref Z-101; cannot be replaced independently.	500 ks osc grid coil					
L-102	COIL, RADIO FREQUENCY: choke; integral type; single pie; unshielded; 2.35 mh; 19/32 lg x 1-1/8 in. diam excluding terminals; (ceramic core; core 1/2 in. diam x 19/32 in. lg; 3/16 in. diam axial mtg hole; 2 solder-lug term on bottom; varnish-impregnated and baked in).	RF osc cathode choke					23461
L-103	COIL, RADIO FREQUENCY: integral type; five pie; unshielded; 2.5 mh at 1000 KC; 1-7/16 in. lg x 5/8 in. max diam excluding leads; (ceramic core; core 7/16 in. diam x 1-7/16 in. lg; two 1 in. leads serve both for term and for mtg; varnish-impregnated and baked; coated with fungicidal lacquer).	RF osc plate choke					23318

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**SUPPLEMENT TO AN 16-30CRT3-2**  
**TABLE OF REPLACEABLE PARTS**

Symbol Designation	Name and Description of Part	Function	Navy Aero Signal Corps & Standard Navy Stock Numbers	Jan-Designation	All Symbols Involved	Mfr's. Part Number	Contractor's Part/Dwg. Number
L-104	COIL, RADIO FREQUENCY: integral type; 3 windings, one single pie universal wound, other two single layer wound; 47, 2, and 5 turns respectively; 2-1/8 in. lg x 1-3/4 in. diam overall; (bakelite form, air core; form 1-3/4 in. lg x 1-5/16 in. OD; mtg base in end w/ two 0.152 in. holes on 3/8 in. mtg/c; 4 lug term; form and base coated w/ fungicidal lacquer).		3C323-150B N16-C-72666-1571 R16KP-23316				23316
L-104A	P/o ref L-104.	Plate tank coil for 500 kc					
L-104B	P/o ref L-104.	RF indicator coupling loop					
L-104C	P/o ref L-104.	Neutralizing coil					
L-105	TRANSFORMER, R. F.: integral type; 3 windings, all single layer wound; unshielded; 12, 3-1/2, and 1.25 turns respectively; 3-1/16 in. lg x 1-3/8 in. diam overall; (bakelite-impregnated form, air core; form 2-11/16 in. lg x 1-5/16 in. OD; mtg base in end w/ two 0.152 in. holes on 3/8 in. mtg/c; 5 lug term; form and base coated w/ fungicidal lacquer).		3C323-150A N17-T-82061-5001 R16KP-23317				23317
L-105A	P/o ref L-105.	Plate tank for 8280 kc					
L-105B	P/o ref L-105.	Ant coupling coil					
L-105C	P/o ref L-105.	RF indicator coupling loop					
O-201	GEAR CASE: assembly of 4 gears completely enclosed in gearcase divided into halves; gen drive operated from manual crank 6-1/4 in. lg x 5-1/8 in. wd x 1-1/2 in. thk; mtd to cabinet by 4 #10-32 screws and collet nut fitting over bushing threaded 1-1/4 in.-18; (main driving gear shaft located inside bushing; sq socket for manual crank in bushing end of shaft; slot-type socket for tongue of governor gear train assem at opposite end of shaft).	Gen drive gear train	N17-G-43868-8021 R16KP-23631				23631
O-202	KEYER: gear reduction unit with code cam and freq changing cam attached; 6-1/4 in x 4 in. x 1-3/4 in. overall; (3 mtg holes for #6-32 thrd screws arranged irregularly; tongue on gear #1 fits slot-type socket in ref 0-201). Includes ref E-203A/B, E-203C, and E-203D.	Automatic keying and automatic frequency changing	3Z4875-89 N16-K-47674-6626 * R16KP-23409				23409

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SUPPLEMENT TO AN 16-30CRT3-2

**TABLE OF REPLACEABLE PARTS**

Symbol Designation	Name and Description of Part	Function	Navy Aero Signal Corps & Standard Navy Stock Numbers	Jan-Designation	All Symbols Involved	Mfr's. Part Number	Contractor's Part/Dwg. Number
O-203	GEAR ASSEMBLY, KEYER: assembly of 8 gears between aluminum plates; 6-1/4 in. x 2-3/8 in. x 1-3/4 in. overall; (3 mtg holes for #6 screws arranged irregularly; tongue on gear #1 fits slot-type socket in ref O-201). P/o ref O-202.	Keyer drive gear train	N16-K-47669-5517 R16KP-23357				23357
O-206	ELECTRICAL BRUSH HOLDER CAP: black molded bakelite; 9/16 in. diam x 5/16 in. h; (bore 0.344 in. diam x 11/64 deep, tapped 3/8 in. -32 NS-3; straight fine knurl; 5/16 in. x 1/16 in. groove in top for screw driver). P/o ref G-201.	Holds brush in place	3H1528-7/C1 N17-C-200543-768 R16C4515				23628
O-301	CRANK, HAND: Sig C hand Crank GC-18-A; assem of steel L-shaped frame with black plastic rotating hand grip on shorter leg, ratchet, ratchet pawl, pawl spring, and hub screw; all metal parts cadmium-plated; (ratchet and ratchet pawl enclosed within arm permit application of force clockwise only; finger-operated hub screw locks projection on crank to socket in main driving gear shaft; cord attached to frame to fasten crank to cabinet). 6-5/32 in. lg x 1-1/16 in. wd x 4-1/4 in. thk.	Application of power	#4B462A N16-C-920001-136 R16C38440				23321-22794
O-302	ANTENNA AND DOOR ASSEMBLY: kite or balloon supported: cir door w/Sig C Reel RL-48 attached, and Army-Navy Antenna Assembly AS-207/CRT-3 wound on reel; 3-1/4 in diam x 1-1/4 in thk overall; (pin-hinged door; cotter-pin bolt attached by chain; reel fixed to back of door by axial rivet; collapsible handle on reel; brake handle on front of door; raised lettering on front of door "Open for Antenna," "Brake," and "Lock Open" with accompanying indicating arrows; hinge holes 0.149 in. diam; latch hole 0.141 in. diam; lock-open holes 0.136 in. diam). Includes ref E-301.	Provides and mounts ant	N16-A-49924-4201 R16KP-23308				23308
P-101	CONNECTOR, RECEPTACLE: 6 flat parallel blades; straight; 1-11/32 in. x 1-3/16 in. x 1-1/16 in. overall; (5 amp, 45 v; molded bakelite body; two 0.149 in. diam mtg holes on 1 in. centers; laminated phenolic parts impregnated with bakelite and coated with fungicidal lacquer).	Connects audio and RF sect to power supply and keying assem	N17-C-73517-5483			Jones HB part #P-306-AB	22576
Q-101	COVER: neoprene; 59/64 in. diam x 1/4 in. thk, depression 17/32 in. diam x 9/32 in. deep; (washer thermowelded to brim). u/w E-105, E-106, H-105 to complete Key ref S-102.	Water seal for push-button key	#3ZK3618/D1 N17-C-945001-926 R16KP-22780				22780
R-101	RESISTOR, FIXED, COMPOSITION: 1000 ohms ±10%; 1/2 w; 0.406 in. max lg x 0.175 in. max diam; (bakelite insulation; 2 axial wire leads 1-1/2 in. lg).	Cathode bias for ref V-101	N16-R-49922-710	JAN type #RC20AF-102K		Stackpole Carbon Co.	22567

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SUPPLEMENT TO AN 16-30CRT3-2

**TABLE OF REPLACEABLE PARTS**

Symbol Designation	Name and Description of Part	Function	Navy Aero Signal Corps & Standard Navy Stock Numbers	Jan-Designation	All Symbols Involved	Mfr's. Part Number	Contractor's Part/Dwg. Number
R-102	RESISTOR, FIXED COMPOSITION: 47,000 ohms $\pm 10\%$ ; $\frac{1}{2}$ w; 0.468 in. max lg x 0.249 in. max diam; (bakelite insulation; 2 axial wire leads 1- $\frac{1}{2}$ in. lg).	Audio osc plate load	N16-R-50480-692	JAN type #RC20AF-473K	R-102, R-103	IRC BTS	23465
R-103	Same as ref R-102.	Audio amplr grid leak				IRC BTS	23465
R-104	RESISTOR, FIXED COMPOSITION: 100,000 ohms $\pm 10\%$ ; $\frac{1}{2}$ w; 0.468 in. max lg x 0.249 in. max diam; (bakelite insulation; 2 axial wire leads 1- $\frac{1}{2}$ in. lg).	Audio amplr plate load	N16-R-50633-781	JAN type #RC20AF-104K			22565
R-105	RESISTOR, FIXED COMPOSITION: 33,000 ohms $\pm 10\%$ ; $\frac{1}{4}$ w; 0.406 in. max lg x 0.170 in. max diam; (bakelite insulation; 2 axial wire leads 1- $\frac{1}{2}$ in. lg).	RF osc grid leak	N16-R-50417-811	JAN type #RC10AF-333K		Stackpole Carbon Co.	23463
R-106	RESISTOR, FIXED COMPOSITION: 27,000 ohms $\pm 10\%$ ; $\frac{1}{4}$ w; 0.406 in. max lg x 0.170 in. max diam; (bakelite insulation; 2 axial wire leads 1- $\frac{1}{2}$ in. lg).	Isolates audio amplr from RF osc	N16-R-50399-461	JAN type #RC10AF-273K		Stackpole Carbon Co.	22462
R-107	RESISTOR, FIXED COMPOSITION: 33,000 ohms $\pm 10\%$ ; 1 w; .565 max lg x .250 max diam; (bakelite insulation; 2 axial leads 1- $\frac{1}{2}$ in lg).	RF screen dropping	N16-R-50418-201	JAN type #RC30AF-333K		IRC BTA	23464
R-201	Same as ref R-102.	Regulator dropping resistor		JAN type #RC20AF-102K			22567
S-101	SWITCH, ROTARY: 2 wipers, 3 positions; 2 sections; bakelite body; 1- $\frac{7}{8}$ in x 1- $\frac{7}{8}$ in x 1- $\frac{1}{2}$ in; (designed for 28 v operation; two #5-40 screws project from wafer on 1-9/16 in mtg/c; shaft $\frac{1}{4}$ in. diam; 8 solder lug term; all bakelite parts varnish-impregnated and coated with fungicidal lacquer). Including gasket.	Selects type of operation	N17-S-59290-8561 R16S-11279-931-300				23379-22781
S-102	This ref symbol is used on the schematic diagram to refer to the function performed by ref E-105 and E-106.	Manual telegraph key					
T-101	TRANSFORMER, AUDIO FREQUENCY: audio osc; pri 78 mh $\pm 15\%$ at 0.825 v RMS, secd 3.2 hy $\pm 15\%$ at 5.2 v RMS, inductances to be measured at 1000 cps; open steel frame; 2 in lg x 1 in. wd x 1- $\frac{1}{4}$ in h overall; (turns ratio of pri to secd 1:6.3; designed to operate only at fixed freq of 1000 cycles; 4 solder lug term at top; two 5/32 in. diam mtg holes on 1- $\frac{5}{8}$ in. centers; covered with fungicidal lacquer).	Audio osc transf	N17-T-63384-6601 R16BP1D-450398				22743
V-101	ELECTRON TUBE: Sig C Tube VT-268; double triode).	Audio osc and amplr	#2J12SC7 N16-T-58307	JAN type #JAN-12SC7			22629
V-102	ELECTRON TUBE: Sig C Tube VT-134; (beam power).	RF osc	#2J12A6 N16-T-58228	JAN type #JAN-12A6			22630

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SUPPLEMENT TO AN 16-30CRT3-2

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Symbol Designation	Name and Description of Part	Function	Navy Aero Signal Corps & Standard Navy Stock Numbers	Jan-Designation	All Symbols Involved	Mfr's. Part Number	Contractor's Part/Dwg. Number
W-301	GROUND WIRE ASSEMBLY, bare: 8 feet of Sig C Wire W-147 wound on reel and with lug on one end; cadmium-copper alloy wire; wire 0.040 in. max diam; 12 to 16 strands; (65 lb test; wire wound on H shape metal reel 2-1/4 in. lg x 3/4 in. wd x 1/32 in. thk overall). Used with ref A-304.	Grounds transmitter	#2C6596-778A/A4 N22-W-3550-20 *				23712
X-101	SOCKET, ELECTRON TUBE: standard octal; low-loss mica-filled bakelite; 1-7/8 in. lg x 1-3/16 in. wd x 13/16 in. h overall; (two 0.136 in. diam mtg holes on 1-1/2 in. centers; coated with fungicidal lacquer).	Tube mtg	N16-S-63051-1015			National Fabricator 356LL-7	23332
X-102	SOCKET, CRYSTAL: 2 prong wafer; bakelite; 1-1/2 in. lg x 3/4 in. wd x 5/8 in. h; (two 0.144 in. diam mtg holes on staggered 1-1/8 in. mtg/c).	Mtg for xtal	N16-S-54255-8990 R16S-4403-500				23378
Y-101	CRYSTAL UNIT, QUARTZ: Army-Navy Crystal Unit CR-1A/AR; freq 8280 kc; molded bakelite holder; 1-1/8 in. wd x 1-1/4 in. h x 7/16 in. thk; transmitting; (two 5/8 in. lg x 1/8 in. diam pin terminals spaced 1/2 in. to c to c).	Determines freq of transmitter in high range	N16-C-97285-4101			Bliley Electric Co. CR-1A/AR	23285
Z-101	COIL, RADIO FREQUENCY: 2-5/16 in. lg x 1-3/8 in. wd x 2-5/16 in. h overall; (adjusted by means of brass screw in center of form; two 0.151 in. diam mtg holes on 2 in. centers in base; 4 solder-lug term on base; complete assembly varnished and baked). Includes ref C-107, C-108, C-109, and L-101.	500 kc osc grid tank	N16-O-66002-9271 R16C21447				22837
	Part of E 108 GASKET		R33P492-630				22781
	Part of J 101 GASKET		R17G369				22524
	Part of A 304 GASKET		R33MS-29513-116				22525
	Part of A 305 GASKET		R16KP-23019				23019
	Part of O 301 RING, RETAINING		R16KP-22794				22794
H-102-1	CLAMP ASSEMBLY, Crystal: ceramic socket, 3-13 mmf variable capacitor phosphor bronze clamp, 2 bakelite wafers, wiring and two 1/8" male contact pins 5/8" long .486" c to c. 1-15/16" x 1 3/8" x 1 1/2" overall, replaceable unit, socket to accommodate crystal unit CR-18/U.						KP-23820
Y-101-1	CRYSTAL UNIT QUARTZ: Frequency 8364 KC; metal holder; type CR-18/U, MIL spec. C-3098, 11/16" wd x 3/4" h x 5/16" thk, two terminal pins .050" dia spaced 1/2" c to c 7/32" long.						KP-23805A

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