

TUBE TESTER I-177



WAR DEPARTMENT

3 AUGUST 1944

RESTRICTED. *DISSEMINATION OF RESTRICTED MATTER.*

The information contained in restricted documents and the essential characteristics of restricted materiel may be given to any person known to be in the service of the United States and to persons of undoubted loyalty and discretion who are cooperating in Government work, but will not be communicated to the public or the press except by authorized military public relations agencies. (See also par. 28, AR 280-5, 15 Mar. 1944.)

TECHNICAL MANUAL
TUBE TESTER I-177

CHANGES
No. 1

WAR DEPARTMENT
WASHINGTON 25, D. C., 24 October 1945

TM 11-2627, 3 August 1944, is changed as follows:

The classification RESTRICTED is removed from the manual by Section IX, War Department Circular 186, 1945.

Figure 1.—Tube Tester I-177 in wooden case, with cover raised.



Figure 1.1.—Tube Tester I-177 in metal case, with cover raised.

1. PURPOSE. Tube Tester I-177 * * * of vacuum tube. Later equipments are inclosed in metal cases instead of the original

*This change supersedes TB 11-2627-1, June 1945.

wooden cases but all operate the same. The purpose of * * * of this instrument.

2. TUBE TESTER I-177 (figs. 1 and 1.1).

a. (Superseded.) This instrument is furnished either as an individual unit or as part of Test Set I-56-K. As a part of Test Set I-56-K it fits into a compartment of Carrying Case CS-130 (fig. 1.2). The weights and dimensions of the tube tester and other components of the test set are given below.

| Equipment | Dimensions (in.) | | | Volume (cu. ft.) | Weight (lb) | |
|-------------------------|------------------|-------|-------|------------------|-------------|------------|
| | Height | Width | Depth | | Wooden case | Metal case |
| Voltohmmeter I-166----- | 5.5 | 6.0 | 7.0 | 0.13 | 4.75 | 5.5 |
| Test Unit I-176----- | 5.5 | 11.5 | 8.5 | 0.31 | 9.0 | 10.0 |
| Tube Tester I-177----- | 5.75 | 15.5 | 8.5 | 0.44 | 15.75 | 16.5 |
| Case CS-130----- | 14.75 | 20.5 | 9.75 | 1.76 | ----- | 25.6 |

The following table gives the dimensions and approximate weight of the packed units:

| Equipment | Dimensions (in.) | | | Volume (cu. ft.) | Weight (lb) |
|--|------------------|-------|-------|------------------|-------------|
| | Height | Width | Depth | | |
| Tube Tester I-177 (packed for domestic shipment)----- | 8 | 17.9 | 10.5 | 0.87 | 17 |
| Tube Tester I-177, two in carton (packed for domestic shipment)----- | 13.5 | 17 | 10.5 | 1.39 | 37 |
| Test Set I-56-K, one in a wooden case----- | 15 | 21 | 11 | 2.01 | 73 |
| Test Set I-56-K, three in a wooden case----- | 17.5 | 23.5 | 35 | 8.33 | 215 |

b. Tube Tester I-177 * * * and 0-15,000 microohms. **Most tube testers operate on 105- to 125-volt, 60-cycle alternating current. Some equipments on Orders No. 12139-Phila-45-10 and 28948-Phila-45-10 may be operated on 105 to 125 volts or on 210 to 250 volts, the range being determined by the setting of the switch mounted to the right of the SHORTS indicator. Tube testing data * * * of the cover.**

4. SHORTS TEST.

* * * * *

c. Determine the type * * * of the instrument. If the tube is marked with Signal Corps nomenclature, use the table in section V of this manual or the table on the back of the first card in the tester to determine the commercial equivalent.

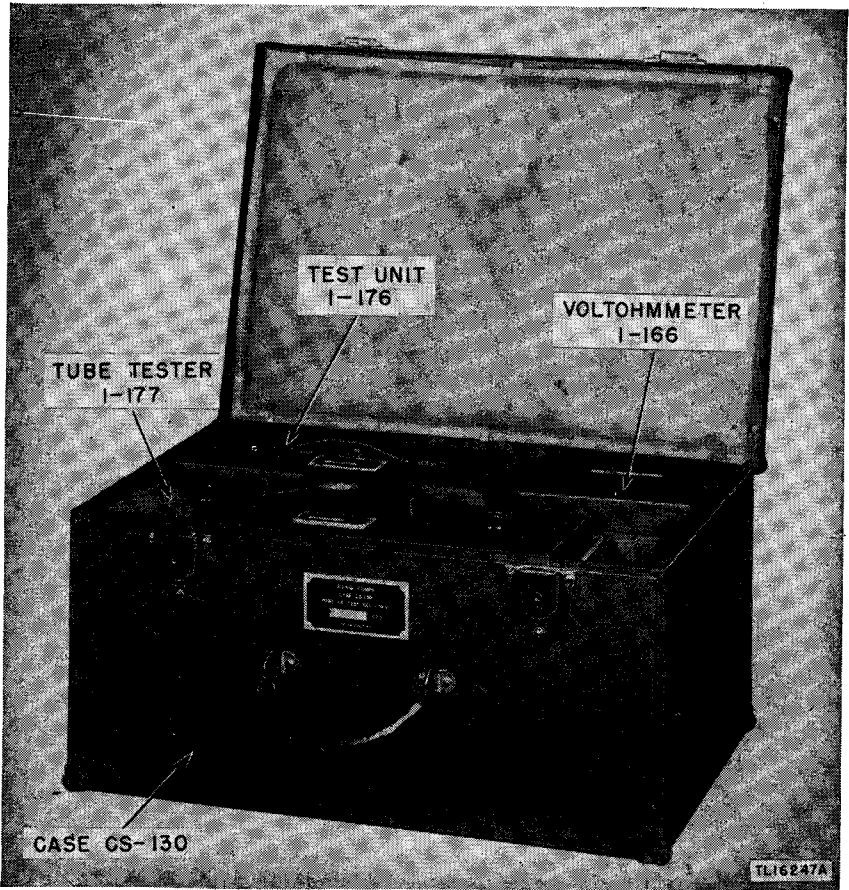


Figure 1.2.—Test Set I-56-K.

* * * * *

g. Insert the tube * * * headed Socket Letter. If the column headed Notations of the tube test data indicates the use of Adapter M-418* plug the adapter into the octal socket of the tester, and the tube into the adapter. Connect the left-hand lead to the left-hand plate pin and the right-hand lead to the right-hand plate pin. Proceed with the test in the normal manner.

* * * * *

7. GAS TEST.

* * * * *

* Adapter, Tube Socket: Signal Corps Adapter M-418. Signal Corps Stock No. 2Z299-418.

a. Carry out the shorts test procedure given in paragraph 4, then set the **SHORT-TUBE TEST** switch to **TUBE TEST**. If dealing with * * * or to rectifiers.

* * * * *

e. While holding down * * * free from gas.

NOTE: If the pointer cannot be brought down to **100** microohms by adjusting potentiometer R with the **GAS NO. 1** button pressed, set R at 82, note the position of the pointer, and press GAS NO. 2 button to see if the pointer moves upward more than one scale division. In some cases * * * period of time.

12. **GENERAL.** Individual circuits of * * * for unauthorized repairs.

NOTE (Added): The complete schematic diagram of Tube Tester I-177 appears in figure 13. Some tube testers are provided with a power transformer having a single primary winding designed to function only from 105- to 125-volt a-c source. Others have a power transformer with a two-section primary which may be connected in series for 210- to 250-volt a-c operation, or in parallel for 105- to 125-volt a-c operation.

SECTION IV

MAINTENANCE

NOTE (Superseded): Failure or unsatisfactory performance of equipment used by Army Ground Forces and Army Service Forces will be reported on **WD AGO Form 468 (Unsatisfactory Equipment Report)**; by Army Air Forces, on **Army Air Forces Form 54 (Unsatisfactory Report)**. If either form is not available, prepare letter containing the data elicited by the sample form shown in figure 8.1 without reproducing copies of the form.

26. (Superseded) **PREVENTIVE MAINTENANCE TECHNIQUES.**

a. *Meaning of Preventive Maintenance.* Preventive maintenance is a systematic series of operations performed at regular intervals on equipment, when turned off, to eliminate major break-downs, unwanted interruptions in service, and to keep equipment operating at top efficiency. To understand what is meant by preventive maintenance, it is necessary to distinguish between preventive maintenance, trouble shooting, and repair. The prime function of preventive maintenance is to *prevent break-downs* and, therefore, the need for

| WAR DEPARTMENT UNSATISFACTORY EQUIPMENT REPORT | | | |
|---|---|---|---|
| FOR | TECHNICAL SERVICE Signal Corps | MATÉRIEL | DATE 1 Feb 45 |
| FROM | ORGANIZATION 175 Signal Repair Co | STATION APO 102 | |
| TO | NEXT SUPERIOR HEADQUARTERS Supply Sec, Hq Fourth Army Sig Sv | STATION APO 110 | TECHNICAL SERVICE Signal Corps |
| COMPLETE MAJOR ITEM | | | |
| NOMENCLATURE Radio Transmitter | | TYPE Ground, vehicular | MODEL A |
| BC-123-A | | U. S. A. - SPEC. NO. Order No. 1234-Phila-45 | SERIAL NO. 12345 |
| MANUFACTURER American Radio Corp | | DATE RECEIVED 5 Jan 45 | |
| EQUIPMENT WITH WHICH USED (if applicable) Radio Set SCR-456-A in Tank, Medium, M4 | | | |
| DEFECTIVE COMPONENT—DESCRIPTION AND CAUSE OF TROUBLE | | | |
| PART NO. Sig C | TYPE Capacitor C20; fixed; | MANUFACTURER American Radio Corp | DATE INSTALLED When manufactured |
| Stk No. 3E47-2 | 1-mf; 500 vdcw | | |
| DESCRIPTION OF FAILURE AND PROBABLE CAUSE (if additional space is required, use back of form) Capacitor C20 shorts out due to humid operating conditions | | | |
| DATE OF INITIAL TROUBLE | | TOTAL PERIOD OF OPERATION BEFORE FAILURE | |
| 15 Jan 45 | | | |
| TOTAL TIME INSTALLED | | TOTAL PERIOD OF OPERATION BEFORE FAILURE | |
| YEARS MONTHS DAYS | | YEARS MONTHS DAYS HOURS MINES | |
| - | | 0 0 5 | |
| BRIEF DESCRIPTION OF UNUSUAL SERVICE CONDITIONS AND ANY REMEDIAL ACTION TAKEN Operation in tropics; heavy rainfall. Was replaced and set given moistureproofing and fungiproofing treatment, 20 Jan 45. | | | |
| TRAINING OR SKILL OF USING PERSONNEL | | RECOMMENDATIONS (if additional space is required, use back of form) | |
| POOR FAIR GOOD | | Substitute capacitor designed for tropical operation | |
| | | X | |
| ORIGINATING OFFICER | | | |
| TYPED NAME, GRADE, AND ORGANIZATION E. A. Wilson, 1st Lt, Sig C 175 Signal Repair Co | | SIGNATURE <i>E. A. Wilson</i> | |
| FIRST ENDORSEMENT | | | |
| TO CHIEF | TECHNICAL SERVICE | OFFICE | DATE |
| NAME, GRADE, AND STATION | | | |
| Instructions | | | |
| <ol style="list-style-type: none"> It is imperative that the chief of technical service concerned be advised at the earliest practical moment of any constructional, design, or operational defect in material. This form is designed to facilitate such reports and to provide a uniform method of submitting the required data. This form will be used for reporting manufacturing, design, or operational defects in material, petroleum fuels, lubricants, and preserving materials with a view to improving and correcting such defects, and for use in recommending modifications of material resulting from hit-and-run and accidental damage not for the replacement, repair or the issue of parts and equipment. It does not include currently authorized operational or performance records. Reports of malfunctions and accidents involving ammunition will continue to be submitted as directed in the manner described in A.R. 710-10 (change No. 2). It will not be practicable or desirable in all cases to fill all blank spaces of the report. However, the report should be as complete as possible in order to expedite necessary corrective action. Additional pertinent information not provided for in the blank spaces should be submitted as footnotes to the form. Photographs, sketches, or other illustrative material are highly desirable. When cases arise where it is necessary to communicate with a chief of service in order to secure safety to personnel, more expeditious means of communication are indicated. This form should be used to confirm reports made by more expeditious means. This form will be made out in triplicate by using or service organization. Two copies will be forwarded to the technical service; one copy will be forwarded through command channels. Necessity for using this form will be determined by the using or service troops. | | | |
| W. D. - A. G. O. Form No. 468 28 August 1944 | | | This form supersedes W. D. - A. G. O. Form No. 466, 1 December 1944, which may be used until existing stocks are exhausted. |
| U. S. GOVERNMENT PRINTING OFFICE 16-52887-1 | | | TL19589C |

Figure 8.1. WD AGO Form 468, with sample entries.

repair. On the other hand, the prime function of trouble shooting and repair is to locate and correct *existing* defects. The importance of preventive maintenance cannot be overemphasized. The entire system of communications depends upon the readiness and operating efficiency of each item of equipment when it is needed. In a similar manner, the test equipment by which this condition of readiness in

communications equipment is realized must be kept in excellent operating condition at all times.

NOTE: The operations in paragraphs 26.1 and 26.2 are user maintenance.

b. Description of Preventive Maintenance Techniques.

(1) **GENERAL.** Most of the electrical parts used in Tube Tester I-177 require routine preventive maintenance. This preventive maintenance varies. Some require a different kind of maintenance than others. Some require more, some less. Definite and specific instructions must be followed. Hit-or-miss techniques cannot be applied. This change contains specific instructions to guide personnel assigned to perform the six basic maintenance operations: Feel, Inspect, Tighten, Clean, Adjust, and Lubricate. Throughout this change the lettering system for the six operations will be as follows:

- F—Feel*
- I—Inspect
- T—Tighten
- C—Clean
- A—Adjust
- L—Lubricate

The first two operations show if the other four are needed. Selection of operations is based on a knowledge of field needs. For example, dust encountered on dirt roads during cross-country travel filters into equipment no matter how much care is taken to prevent it. Rapid changes in weather (such as heavy rain followed by blistering heat), excessive dampness, snow, and ice tend to cause corrosion of exposed surfaces and parts. Without frequent inspections and the necessary tightening, cleaning, and lubricating operations, equipment becomes undependable and subject to break-down when it is needed most.

(2) **FEEL*.** The feel operation is used most often to check rotating machinery such as dynamotors, blower motors, and drive motors, also to determine whether electrical connections and bushings are overheated. Feeling will show the need for lubrication or the existence of other defects requiring correction. The maintenance man *must* become familiar with the normal operating temperatures of motors, transformers, and other parts to recognize signs of overheating.

NOTE: It is important to perform the feel operation as soon as possible after shut-down and always before any other maintenance is done.

*The Feel operation does not apply to Tube Tester I-177.

(3) **INSPECT.** Inspection is the most important operation in preventive maintenance. A careless observer will overlook evidences of minor trouble. Although these defects may not at the moment interfere with performance of the equipment, invaluable time and effort can be saved if they are corrected *before* they lead to major and costly break-downs. To be able to recognize the signs of a defective set, make every effort to become thoroughly familiar with indications of *normal* functioning. Inspection consists of *carefully* observing all parts of the equipment, noticing their color, placement, state of cleanliness, etc. Inspect for the following conditions:

(a) Overheating, as indicated by discoloration, blistering, or bulging of the parts or surface of the container; leakage of insulating compounds; and oxidation of metal contact surfaces.

(b) Placement, by observing that all leads and cabling are in their original positions.

(c) Cleanliness, by carefully examining all recesses in the units for accumulation of dust, especially between connecting terminals and binding posts. Parts, connections, and joints should be free of dust, corrosion, and other matter. In tropical and high-humidity areas, look for fungus growth and mildew.

(d) Tightness, by testing any connection or mounting which appears to be loose.

(4) **TIGHTEN, CLEAN, AND ADJUST.** These operations explain themselves. Specific procedures to be followed in performing them are given wherever necessary throughout paragraph 26.1.

CAUTION: Screws, bolts, and nuts should not be tightened carelessly. Fittings tightened beyond the pressure for which they are designed will be damaged or broken.

Whenever a loose connection is tightened, it should be moistureproofed and fungiproofed again by applying the varnish with a small brush. See paragraph 27 for details of moistureproofing and fungiproofing.

(5) **LUBRICATE.** Lubrication refers to the application of grease or oil to the bearings of motors or rotating shafts. It may also mean the application of a light oil to door hinges or other sliding surfaces on the equipment.

26.1. ITEMIZED PREVENTIVE MAINTENANCE (Added).

a. Introduction. For ease and efficiency of performance, preventive maintenance on Tube Tester I-177 will be broken down into operations that can be performed at different time intervals. In this section the preventive maintenance work to be performed on the tube tester at the specified time intervals is broken down into units

of work called items. The general techniques involved and the application of the FITCAL operations in performing preventive maintenance on individual parts are discussed in this paragraph. When performing preventive maintenance, refer to *c* through *f* below. Perform all work with the power removed from the equipment. After preventive maintenance has been performed on a given day, put the equipment into operation and check it for satisfactory performance.

b. Preventive Maintenance Tools and Materials. The following materials will be needed in performing preventive maintenance: common hand tools, #0000 sandpaper, Solvent, Dry-cleaning.

NOTE: Gasoline will not be used as a cleaning fluid for any purpose. Solvent, Dry-cleaning, is available as a cleaning fluid through established supply channels. Oil, Fuel, Diesel, may be used for cleaning purposes when dry-cleaning solvent (SD) is not at hand. Carbon tetrachloride will be used as a cleaning fluid only in the following cases: where inflammable solvents cannot be used because of the fire hazard, and for cleaning electrical contacts including relay contacts, plugs, commutators, etc.

c. Item 1, Exterior of Case.

(1) **INSPECT (I).** Inspect for general cleanliness and condition of protective coating of paint. See that the hinges, the snap fastener, and the carrying handle are firmly secured to the case.

(2) **TIGHTEN (T).** If the hinges, the snap fastener, or the carrying handle are loose and cannot be tightened by the using personnel, return the tube tester to a higher echelon as soon as possible; otherwise, damage to controls on the panel may result.

(3) **CLEAN (C).** Do not allow dust, grease, mud, etc., to accumulate on the case. The tester contains small sliding contact switches and a delicately pivoted meter; thus, every effort must be made to keep the instrument free of foreign matter.

(4) **LUBRICATE (L).** Apply a light coat of oil to the hinge pins and pivots of the snap fastener. *If the equipment is used in an extremely dusty location omit this operation.*

d. Item 2, Panel.

(1) **INSPECT (I).** Check the tube sockets and pin jacks for proper tension of contact surfaces. Check all switches for smooth and positive action. (See **CAUTION**, par. 21, before doing any work on the equipment.) Check neon lamp and fuse lamp for tightness. See that all parts mounted on the panel are secure.

(2) **TIGHTEN (T).** Loose parts which can be tightened from the outside are to be taken care of by using personnel, otherwise the work is to be done by a higher echelon.

(3) CLEAN (C). Remove all dirt and grease from the panel and cover with a dry cloth or, if necessary, a cloth dampened with dry-cleaning solvent (SD).

e. Item 3, Meter.

(1) INSPECT (I). Check the glass cover for cracks or looseness. Since dust and moisture may enter through a defective glass, the accuracy and efficiency of the meter may be seriously affected.

(2) CLEAN (C). Clean the glass and case with a dry cloth or, if necessary, one *slightly* dampened with dry-cleaning solvent (SD).

(3) ADJUST (A). The meter in Tube Tester I-177 should indicate zero when the tester is not connected to the line or when the POWER ON-OFF switch is in the OFF position. The procedure for setting a meter to zero is not difficult. The tool required is the thinnest bladed screw driver available. Before deciding that a meter needs readjusting, tap the meter case *lightly* with the tip of one finger. This will help the meter to overcome the slight friction existing at the bearings which may prevent an otherwise normal unit from coming to rest at zero. If readjustment is needed, insert the tip of the screw driver in the slotted screw head located below the meter glass and *slowly* turn the adjusting screw until the pointer is at zero. Lightly tap the meter case again and view the meter face and pointer *full on* and not from either side. Avoid turning the screw too far, because the needle may be bent or the hairspring damaged.

f. Item 4, Cords.

(1) INSPECT (I). Inspect the length of the a-c cord and the short leads for cracked or worn insulation. Check a-c plug to see that the prongs are secure and clean. Check clips for cleanliness and proper tension.

(2) TIGHTEN (T). Any loose connections should be tightened.

(3) CLEAN (C). Corroded connections should be cleaned before tightening. Clips and prongs may be cleaned with #0000 sandpaper. Sand only enough to remove the corrosion.

26.2. PREVENTIVE MAINTENANCE CHECK LIST. The following check list is a summary of the preventive maintenance operations to be performed on Tube Tester I-177. The time intervals shown on the check list may be reduced at any time by the local commander. For best performance of the equipment, perform operations at least as frequently as called for in the check list. Operations are indicated by the letters of the word FITCAL. For example, if the letters ITCA appear in the "Operations" column, the item to be treated must be inspected (I), tightened (T), cleaned (C), and adjusted (A).

| Item No. | Operations | Item | When performed | | | |
|----------|------------|-----------------|------------------|-------|--------|---------|
| | | | Before operation | Daily | Weekly | Monthly |
| 1 | ITC | Outside of case | | X | | |
| 1 | L | Outside of case | | | | X |
| 2 | ITC | Panel | | X | | |
| 3 | A | Meter | X | | | |
| 3 | IC | Meter | | X | | |
| 4 | ITC | Cords | | | X | |

Note: X indicates when operations are to be performed.

F I T C A L
 Feel* Inspect Tighten Clean Adjust Lubricate

27. MOISTUREPROOFING AND FUNGIPROOFING.

* * * * * * *

c. Step-by-step Instructions.

* * * * * * *

(5) VARNISHING.

(a) Apply three coats of moistureproofing and fungiproofing varnish (**Lacquer, Fungus-resistant, Signal Corps stock No. 6G1005.3, or equal**) to all equipment to be treated, including inside of cases, allowing a 15- to 20-minute drying period after each coat.

* * * * * * *

(6) REASSEMBLY.

* * * * * * *

(c) (Superseded.) Mark the letters MFP and the date of treatment on the case, just above the nameplate.

EXAMPLE: MFP—30 May 45.

* * * * * * *

e. *Moistureproofing and Fungiproofing After Repair (Added).* If, during repair, the coating of protective varnish has been punctured or broken, and if complete treatment is not needed to reseal the equipment, apply a brush coat to the affected part. Be sure the break is completely sealed.

On figure 12.3, delete the tube-base diagrams for 8BH and 8BO.

Figure 12.3. Tube-base diagrams, 7AT to 8BU except 8BH and 8BO.

31. TUBE TEST DATA.

NOTE 1: A star (★) appearing * * * for that purpose.

NOTE 2 (Added): The values listed in the MUT. COND. column

*The Feel operation does not apply to Tube Tester I-177.

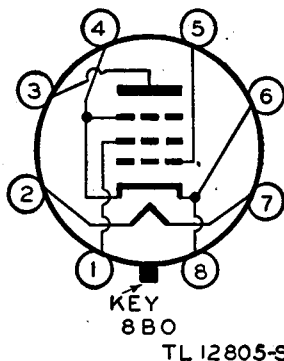
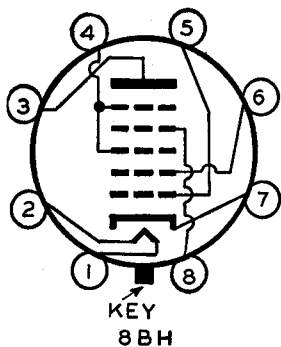


Figure 12.4—Tube-base diagrams, 8BH and 8BO.

TL 12805-5

of this tube test data differ from those appearing in Specification JAN-1A because the voltages applied to the tube under test are not the same as the voltages applied for mutual conductance values under Specification JAN-1A. *Disregard MUT. COND. values when checking tube quality.*

| Tube Type | Socket Letter | Select. A | Select. B | Fil. Volts | Potent. L | Potent. R | Mut. Cond. | Press | Notations |
|------------|---------------|-----------|-----------|------------|-----------|-----------|------------|-------------|--|
| OC3/VR-105 | G | 7 | 1 | Off | 30 | 0 | * | Gas No. 1 | Shorts on 4-5 |
| OD3/VR-150 | G | 7 | 1 | Off | 30 | 0 | * | Gas No. 1 | Shorts on 4-5 |
| 3B7/1291 | F | 6 | 6 | 2.5 | 35 | 25 | | Diode | Shorts on 4-5 Plate No. 1 Reads in Green |
| 3B7/1291 | F | 1 | 6 | 2.5 | 35 | 25 | | Diode | Shorts on 4-5 Plate No. 2 Reads in Green |
| 3B24 | A | 7 | 1 | 2.5 | 5 | 0 | | Rect. Std. | Shorts on 4-5 |
| 3D6/1299 | F | 6 | 2 | 2.5 | 55 | 30 | 2000 | Ampl. | Shorts on 1 |
| 3E29 | E | 7 | 2 | 12.6 | 70 | 14 | | Ampl. | Plate No. 1 Use Adapter M-418 |
| 3E29 | E | 4 | 2 | 12.6 | 70 | 14 | | Ampl. | Plate No. 2 Use Adapter M-418 |
| 3Q4 | H | 4 | 6 | 2.5 | 40 | 82 | | Press diode | Short on 3-4-5 But Reads in Green |
| * | * | * | * | * | * | * | * | * | * |
| 6AC7 | E | 4 | 2 | 6.3 | 40 | 24 | | Ampl. | |
| * | * | * | * | * | * | * | * | * | * |
| 6AG5 | K | 1 | 9 | 6.3 | 53 | 22 | | Ampl. | Shorts on 4-5 |
| * | * | * | * | * | * | * | * | * | * |
| 6AK5 | K | 1 | 9 | 6.3 | 44 | 23 | | Ampl. | Shorts on 4-5 |
| 6AL5 | K | 9 | 2 | 6.3 | 60 | 0 | | Diode | Shorts on 2-3 |
| 6AL5 | K | 4 | 2 | 6.3 | 60 | 0 | | Diode | Shorts on 2-3 |
| * | * | * | * | * | * | * | * | * | * |
| 6AS6 | K | 1 | 9 | 6.3 | 42 | 15 | | Ampl. | |
| * | * | * | * | * | * | * | * | * | * |

| Tube Type | Socket Letter | Select. | | Fil. Volts | Potent. | | Mut. Cond. | Press | Notations |
|-----------|---------------|---------|----|------------|---------|----|------------|-----------------|---|
| | | A | B | | L | R | | | |
| 7F7 | F | 12 | 5 | 6.3 | 50 | 0 | 1600 | Ampl. | No. 1 Plate |
| 7F7 | F | 2 | 9 | 6.3 | 50 | 0 | 1600 | Ampl. | No. 2 plate, Short on 1-4-5 |
| 7F8 | E | 12 | 5 | 6.3 | 72 | 0 | | Ampl. | Adapter No. 2 described below |
| 7F8 | E | 2 | 9 | 6.3 | 72 | 0 | | Ampl. | Adapter No. 2 described below |
| * | * | * | * | * | * | * | * | * | * |
| 12AH7GT | E | 11 | 9 | 12.6 | 60 | 35 | 2000 | Press Gas No. 1 | Plate No. 1 |
| 12AH7GT | E | 7 | 9 | 12.6 | 60 | 35 | 2000 | Press Gas No. 1 | Plate No. 2 |
| * | * | * | * | * | * | * | * | * | * |
| 12L8GT | E | 11 | 6 | 12.6 | 58 | 15 | | Ampl. | Plate No. 1 (Use Adapter No. 1 Described Below) |
| 12L8GT | E | 8 | 8 | 12.6 | 58 | 15 | | Ampl. | Plate No. 2 (Use Adapter No. 1 Described Below) |
| * | * | * | * | * | * | * | * | * | * |
| 12SF5 | E | 7 | 4 | 12.6 | 62 | 13 | 1600 | Ampl. | |
| * | * | * | * | * | * | * | * | * | * |
| 12SL7 | G | 10 | 4 | 12.6 | 49 | 0 | 1400 | Ampl. | Short on 2-3 Plate No. 1 |
| 12SL7 | G | 4 | 1 | 12.6 | 49 | 0 | 1400 | Ampl. | Plate No. 2 |
| * | * | * | * | * | * | * | * | * | * |
| 117P7GT | E | 8 | 10 | 117 | 70 | 25 | 4000 | Ampl. | |
| 117P7GT | E | 4 | 3 | 117 | 40 | 0 | | Rect. Std | Also Press 117N7 but Shorts on 2-3 |
| * | * | * | * | * | * | * | * | * | * |
| 811 | A | 9 | 4 | 6.3 | 17 | 15 | 700 | Ampl. | |
| * | * | * | * | * | * | * | * | * | * |
| 829/829B | E | 7 | 2 | 12.6 | 70 | 14 | | Ampl. | Plate No. 1 (Use Adapter M-418) |
| 829/829B | E | 4 | 2 | 12.6 | 70 | 14 | | Ampl. | Plate No. 2 (Use Adapter M-418) |
| 832 | E | 7 | 2 | 12.6 | 67 | 14 | 3000 | Ampl. | Plate No. 1 (Use Adapter M-418) |
| 832 | E | 4 | 2 | 12.6 | 67 | 14 | 3000 | Ampl. | Plate No. 2 (Use Adapter M-418) |
| * | * | * | * | * | * | * | * | * | * |
| 885 | B | 1 | 6 | 2.5 | 40 | * | | Rect. Std. | Strikes between 60-65 on R |
| * | * | * | * | * | * | * | * | * | * |
| 1006 | A | 2 | 7 | 1.5 | 68 | 0 | | OZ4 Button | |

| Tube Type | Socket Letter | Select. | | Fil. Volts | Potent. | | Mut. Cond. | Press | Notations |
|-----------|---------------|---------|---|------------|---------|----|------------|------------|---|
| | | A | B | | L | R | | | |
| 1008 | A | 3 | 7 | 1.5 | 68 | 0 | | OZ4 Button | * |
| 1291 | F | 6 | 6 | 2.5 | 35 | 25 | | Diode | Short on 4-5 Reads in Green, PIt. No. 1 |
| 1291 | F | 1 | 6 | 2.5 | 35 | 25 | | Diode | Shorts on 4-5 Reads in Green, PIt. No. 2 |
| 1299 | F | 6 | 2 | 2.5 | 55 | 30 | 2000 | Ampl. | Short on 1 |

31.1 CONSTRUCTION OF ADAPTER NO. 1 (Added). Adapter No. 1 for use in testing Tube Type 12L8GT can be fabricated from an octal (8-pin) socket and an octal (8-pin) plug or tube base. (Adapter No. 2 is used when testing Tube Type 7F8. This is fabricated from an octal (8-pin) socket and an octal plug or tube base). Connections made between socket lugs and plug pins in each case are indicated in the table below:

| Socket lug No. | Plug pin No. | |
|----------------|---------------|---------------|
| | Adapter No. 1 | Adapter No. 2 |
| 1 | 5 | 4 |
| 2 | 1 | 2 |
| 3 | 4 | 3 |
| 4 | 3 | 8 |
| 5 | 8 | 1 |
| 6 | 2 | 6 |
| 7 | 7 | 7 |
| 8 | 6 | 5 |

32. MAINTENANCE PARTS LIST FOR TUBE TESTER I-177.

NOTE: (Superseded) This list is for reference only. When ordering parts, refer to paragraph 33.

* * * * *

33. MAINTENANCE PARTS FOR TUBE TESTER I-177 (Added).

The following information was compiled on 22 June 1945. The appropriate pamphlets of the ASF Signal Supply Catalog for Tube Tester I-177 are:

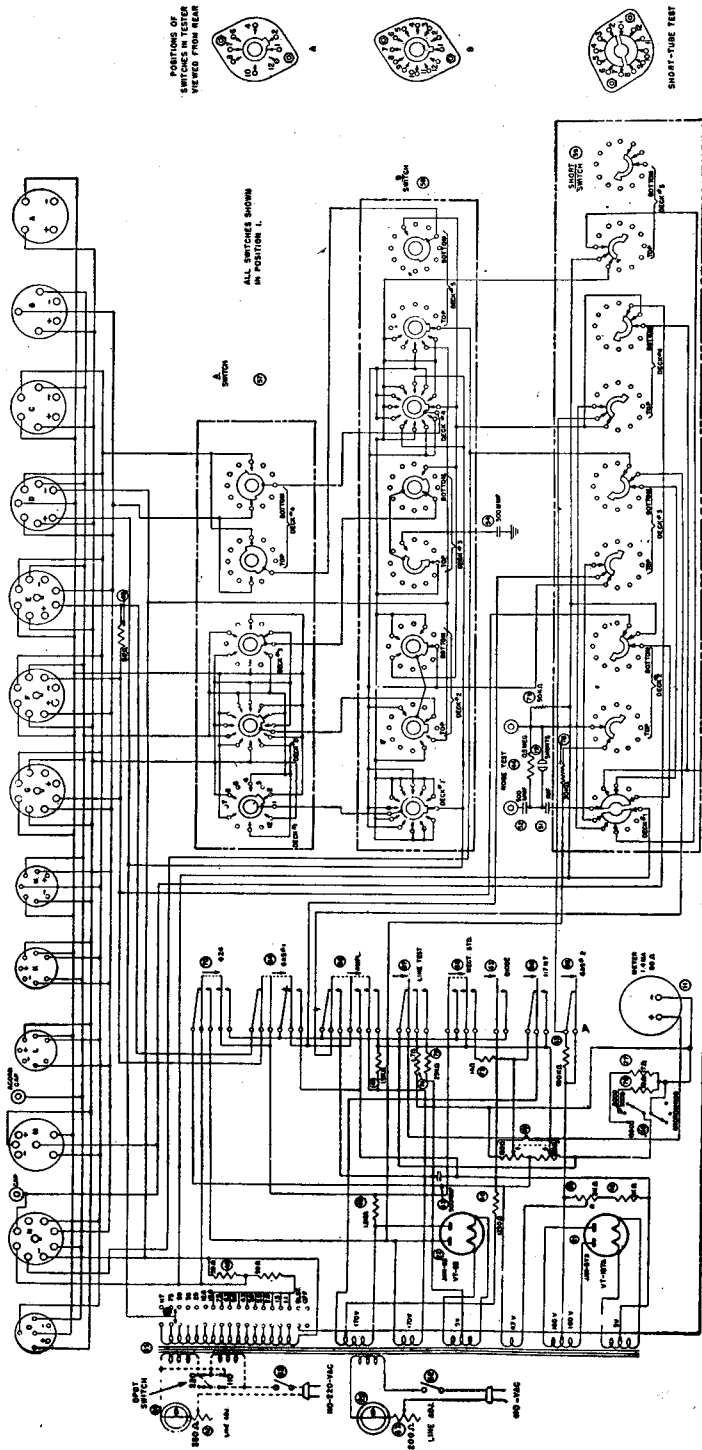
Organizational Spare Parts

SIG 7-I-56

Higher Echelon Spare Parts

SIG 8-I-177

For an index of available catalog pamphlets see the latest issue of ASF Signal Supply Catalog SIG 2.



T. 34498

Figure 13. Tube Tester I-177, schematic diagram.

BY ORDER OF THE SECRETARY OF WAR:

OFFICIAL:

EDWARD F. WITSELL
Major General
Acting the Adjutant General

G. C. MARSHALL
Chief of Staff

DISTRIBUTION:

AAF (5); AGF (5); ASF (2); T of Opns (5); Dept (2); Base Comd (2); Island Comd (2); Arm & Sv Bd (1); S Div ASF (1); Tech Sv (2); SvC (2); Air Tech SvC (2); Dep 11 (2); Lab 11 (2); 4th Ech Maint Shops 11 (2); 5th Ech Maint Shops 11 (2); Three (3) copies to each of the following: T/O & E 1-37; 1-47; 1-50-1; 1-67; 1-100-1; 1-100-1S-2; 1-127; 1-157; 1-167; 1-177; 1-252; 1-267; 1-310-1; 1-312; 1-317; 1-392S; 1-407; 1-417; 1-437S; 1-452T; 1-457T; 1-469S; 1-487; 1-497S; 1-500-1; 1-547; 1-618; 1-637S; 1-652; 1-687; 1-727; 1-757; 1-759; 1-768; 1-800-1; 1-907; 1-911; 1-977; 1-978S; 1-1062S; 1-1077; 1-1087; 2-12; 2-26; 2-27; 4-37; 4-62; 4-66; 4-104; 4-156; 4-260-1; 5-16; 5-216; 5-226; 6-10-1; 6-12; 6-20-1; 6-26; 6-36; 6-46; 6-50-1; 6-56; 6-76; 6-77; 6-86; 6-110-1; 6-150-1; 6-160-1; 6-169; 6-176; 6-216; 6-216T; 6-226; 6-226T; 7-12; 7-16; 7-29; 7-32; 7-52; 7-56; 7-96; 7-132; 7-136; 7-416; 11-7; 11-18; 11-57; 11-86S; 11-88S; 11-97; 11-107; 11-127; 11-137; 11-147S; 11-217; 11-247; 11-257; 11-267; 11-277; 11-297; 11-327; 11-336; 11-338; 11-357; 11-400, Sig AW Orgn—(A), (C), (M); 11-450-1; 11-460-1; 11-477; 11-488; 11-500, Sig Sv Orgn—(GR), (IO), (IT), (EG); 11-557; 11-577T; 11-587; 11-592; 11-597; 17-19; 17-29; 17-49; 17-56; 17-60-1; 17-116; 17-126; 18-26; 18-36; 19-56; 19-57; 19-217; 19-500, MP Sv Orgn—(Rad Team No. 3 Type AN); 44-1-3S; 44-7; 44-10-1; 44-12; 44-26; 44-76; 44-116; 44-126; 44-136; 44-147S; 44-226.

Refer to FM 21-6 for explanation of distribution formula.

TECHNICAL MANUAL
TUBE TESTERS I-177, I-177-A, AND I-177-B

CHANGE }
No. 3 }

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., 5 March 1954

TM 11-2627, 3 August 1944, is changed as follows:

The title of the manual is changed to read—TUBE TESTERS
I-177, I-177-A, AND I-177-B

SECTION I
DESCRIPTION

Note 1. Tube Tester I-177-A * * * in this change.

Note 2. (Added) Tube Tester I-177-B is similar to Tube Testers I-177 and I-177-A except for the following: On the I-177-B, the two latches on the carrying case are of the spring-loaded type with retainer bracket. The tube clamps are of the overhead type, which fit style ST-16 and T-9 tubes. The tube cap test leads are fitted with improved type insulated clips. The power cable connector (U-120/U) is detachable.

10. Testing Pilot Lamps

* * * * *

d. On Tube Testers I-177, I-177-A, and I-177-B, hold the lamp in the center of socket D after adjusting the line voltage. If the lamp lights with normal brilliancy, the lamp is good; if it does not light the lamp is bad.

32. Maintenance Parts List for Tube Tester I-177

Rescinded

33. Maintenance Parts for Tube Tester I-177

Rescinded

Appendix

(As added by C 2)

Rescinded

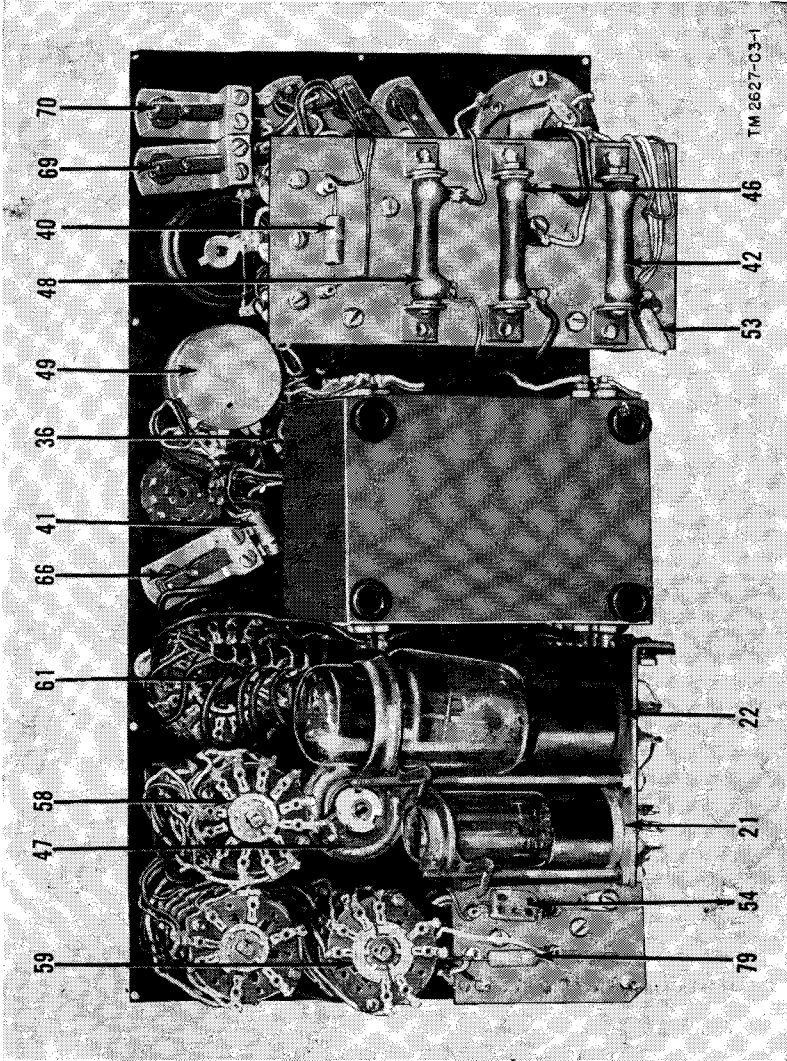


Figure 9.4 (Added) Bottom view of chassis of Tube Tester I-177-B.

- 21 Electron tube 5Y3GT
- 22 Electron tube 83
- 36 Tube socket O
- 40 Resistor, 1,200 ohms
- 41 Resistor, 15,000 ohms
- 42 Resistor, 6,000 ohms
- 46 Resistor, 100 ohms
- 47 Resistor, LINE ADJ rheostat, 200 ohms
- 48 Resistor, 1,800 ohms
- 49 Resistor, L potentiometer, 2 sections, 150 ohms each section
- 53 Capacitor, 510 μf
- 54 Capacitor, 510 μf
- 58 Switch B
- 59 Switch, SHORTS
- 61 Switch, FIL
- 66 Switch, AMPL TEST
- 69 Switch, RECTIFIER TEST STD
- 70 Switch, RECTIFIER TEST OZ4
- 79 Resistor, 51,000 ohms

Figure 9.4—Continued

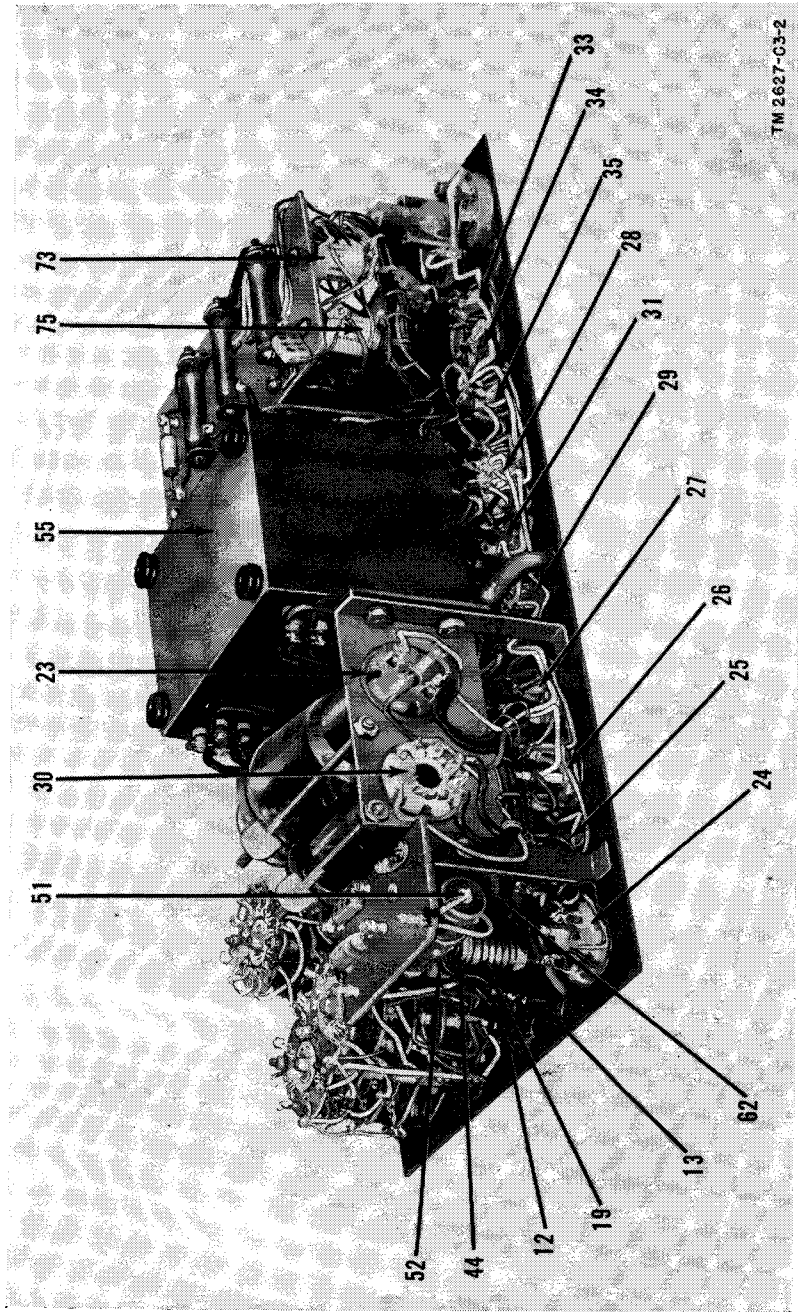


Figure 9.5 (Added) Bottom left view of chassis of Tube Tester I-177-B.

- 12 Binding post, NOISE TEST
- 13 Binding post, NOISE TEST
- 19 Indicator lamp, SHORTS
- 23 Tube socket, 4 contacts
- 24 Tube socket A
- 25 Tube socket B
- 26 Tube socket C
- 27 Tube socket D
- 28 Tube socket G
- 29 Tube socket E
- 30 Tube socket, 8 contacts
- 31 Tube socket F
- 33 Tube socket L
- 34 Tube socket K
- 35 Tube socket H
- 44 Resistor, 510,000 ohms
- 51 Capacitor, 100,000 $\mu\mu\text{f}$
- 52 Capacitor, 510 $\mu\mu\text{f}$
- 55 Power transformer
- 62 Switch, ON-OFF
- 73 Resistor, 14 ohms
- 75 Resistor, 25,000 ohms

Figure 9.5—Continued

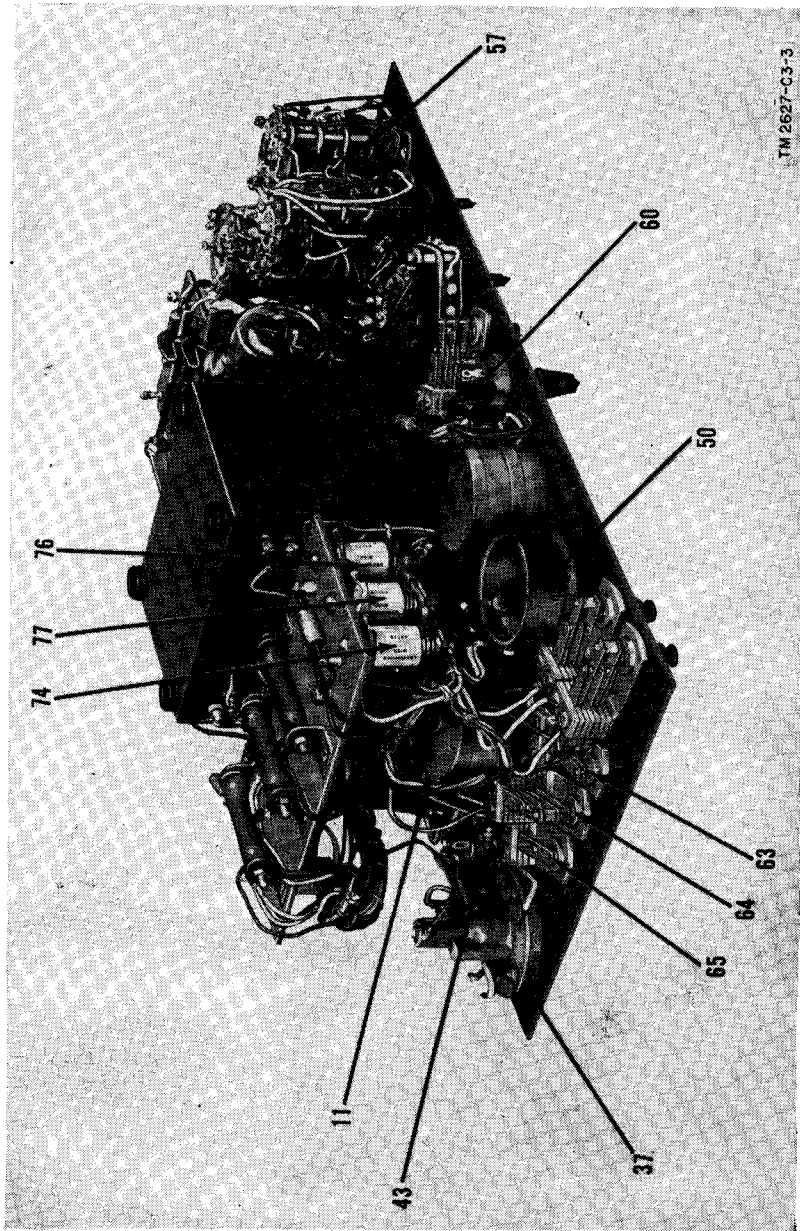


Figure 9.6 (Added) Bottom right view of chassis of Tube Tester I-177-B.

- 11 Meter
- 37 Tube socket M
- 43 Resistor, 180,000 ohms
- 50 Resistor, R potentiometer, 3,000 ohms
- 57 Switch A
- 60 Switch, MICROMHOS
- 63 Switch, DIODE TEST
- 64 Switch, GAS NO. 1
- 65 Switch, GAS NO. 2
- 74 Resistor, 17 ohms
- 76 Resistor, 70 ohms
- 77 Resistor, 17 ohms

Figure 9.6—Continued

BY ORDER OF THE SECRETARY OF THE ARMY:

M. B. RIDGWAY,
General, United States Army,
Chief of Staff.

OFFICIAL:

WM. E. BERGIN,
Major General, United States Army,
The Adjutant General.

DISTRIBUTION:

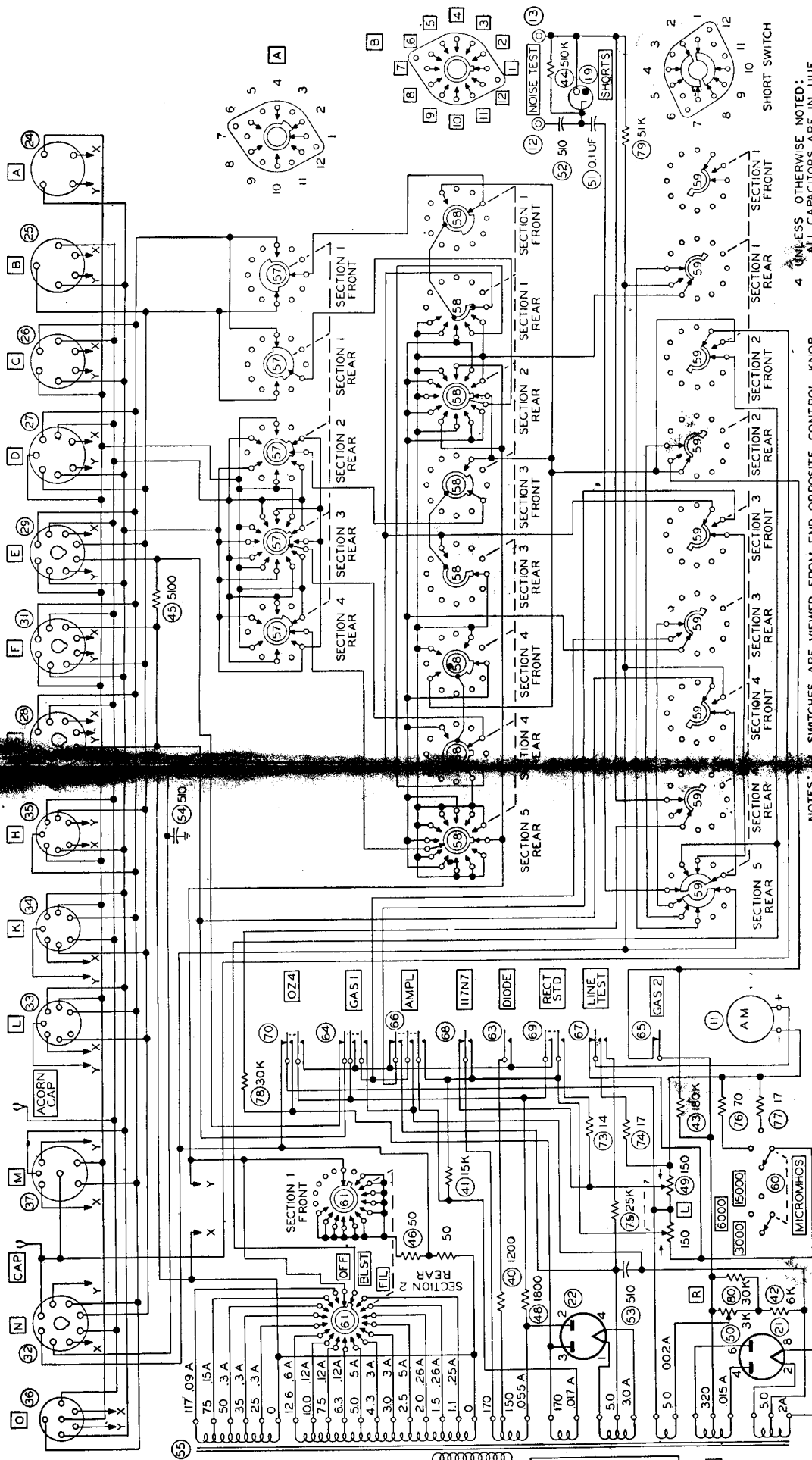
Active Army:

Tech Svc (1); Tech Svc Bd (1); AFF Bd (ea Svc Test Sec) (1); AFF (5); AA Comd (2); OS Maj Comd (5); Base Comd (5); MDW (2); Log Comd (5); A (5); CHQ (2); FT (2); Sch (5) except 11 (25); Gen Dep (2); Dep 11 (20) except Sig Sec, Gen Dep (10); Tng Div (2); POE (2), OSD (2); Lab 11 (5); Mil Dist (1); Field Maint Shops 11 (3); Mil Mis (2); Two (2) copies to each of the following T/O&E's: 5-415A; 5-500A; AA-AC; 9-500A AA-AC; 11-107; 11-127; 11-128; 11-500A, GA-GP, KA, KB, KC; 11-587; 11-592; 11-597; 12-17; 19-55A; 19-56A; 19-57A; 19-500A AA-AC; 32-500A AA-AC; 55-68; 55-116.

NG: Same as Active Army except one copy to each unit.

USAR: None.

For explanation of distribution formula, see SR 310-90-1.



NOTES:
 1. SWITCHES ARE VIEWED FROM END OPPOSITE CONTROL KNOB.
 2. SECTIONS DESIGNATED NO1 ARE NEAREST THE KNOB END.
 3. SWITCHES SHOWN ARE IN NO1 POSITION.

4. UNLESS OTHERWISE NOTED:
 ALL CAPACITORS ARE IN μ UF.
 ALL RESISTORS ARE IN OHMS.

Figure 13.9 (Added) Schematic Diagram of Tube Tester I-177-B.

WAR DEPARTMENT,
WASHINGTON 25, D. C., 3 AUGUST 1944.

TM 11-2627, Tube Tester I-177, is published for the information and guidance of all concerned.

[A. G. 300.7 (20 June 44).]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

J. A. ULIO,
Major General,
The Adjutant General.

DISTRIBUTION:

X

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

TABLE OF CONTENTS

| | <i>Par.</i> | <i>Page</i> |
|---|-------------|-------------|
| SECTION I. Description | | |
| Purpose | 1 | 1 |
| Tube Tester I-177 | 2 | 1 |
| II. Operation | | |
| Preliminary instructions | 3 | 2 |
| Shorts test | 4 | 2 |
| Quality test | 5 | 4 |
| Measuring mutual conductance | 6 | 5 |
| Gas test | 7 | 5 |
| Noise test | 8 | 6 |
| Testing cathode-ray indicator tubes | 9 | 6 |
| Testing pilot lamps | 10 | 7 |
| Servicing radio equipment with Tube Tester I-177 | 11 | 7 |
| III. Functioning of parts | | |
| General | 12 | 8 |
| Line test | 13 | 8 |
| Short test | 14 | 9 |
| Noise test | 15 | 9 |
| Gas test | 16 | 10 |
| Rectifier test | 17 | 10 |
| Quality test for amplifier tubes | 18 | 10 |
| Theory of operation of quality test circuit . . . | 19 | 12 |
| Mutual conductance measurements | 20 | 13 |
| IV. Maintenance | | |
| General description | 21 | 14 |
| Fuse lamp replacement | 22 | 14 |
| Neon lamp replacement | 23 | 14 |

TABLE OF CONTENTS (*Continued*)

| | <i>Par.</i> | <i>Page</i> |
|---|-------------|-------------|
| Tube chart replacement | 24 | 14 |
| Tube replacement | 25 | 16 |
| Preventive maintenance | 26 | 16 |
| Moistureproofing and fungiproofing | 27 | 18 |
| V. Supplementary data | | |
| Tube-base chart for Signal Corps and commercial tubes | 28 | 22 |
| Commercial equivalents of Signal Corps tubes | 29 | 31 |
| Signal Corps equivalents of commercial tubes | 30 | 33 |
| Tube test data | 31 | 37 |
| Maintenance parts list for Tube Tester I-177.. | 32 | 52 |

LIST OF ILLUSTRATIONS

| <i>Fig. No.</i> | <i>Title</i> | <i>Page</i> |
|-----------------|--|-------------|
| 1. | Tube Tester I-177 with cover raised | VI |
| 2. | Tube Tester I-177, simplified line test circuit | 8 |
| 3. | Tube Tester I-177, simplified noise and shorts test circuit | 9 |
| 4. | Tube Tester I-177, gas test circuit | 9 |
| 5. | Tube Tester I-177, simplified rectifier test circuit | 10 |
| 6. | Tube Tester I-177, simplified quality test circuit | 11 |
| 7. | Tube Tester I-177, rectifier diagram illustrating theory | 12 |
| 8. | Tube Tester I-177, simplified mutual conductance test circuit .. | 12 |
| 9. | Tube Tester I-177, bottom view of chassis | 15 |
| 10. | Tube Tester I-177, bottom view, masking for moistureproofing and fungiproofing | 19 |
| 11. | Tube Tester I-177, front view, masking for moistureproofing and fungiproofing | 20 |
| 12. | Tube base diagrams | 28-29-30 |
| 13. | Tube Tester I-177, schematic diagram | 51 |

DESTRUCTION NOTICE

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

WHEN—When ordered by your commander.

HOW —1. *Smash*—Use sledges, axes, handaxes, pickaxes, hammers, crow-bars, heavy tools.

2. *Cut*—Use axes, handaxes, machetes.

3. *Burn*—Use gasoline, kerosene, oil, flame throwers, incendiary grenades.

4. *Explosives*—Use firearms, grenades, TNT.

5. *Disposal*—Bury in slit trenches, fox holes, other holes. Throw in streams. Scatter.

USE ANYTHING IMMEDIATELY AVAILABLE FOR DESTRUCTION OF THIS EQUIPMENT

WHAT—1. *Smash*—Meters, controls, panels.

2. *Cut*—Cables and all wiring.

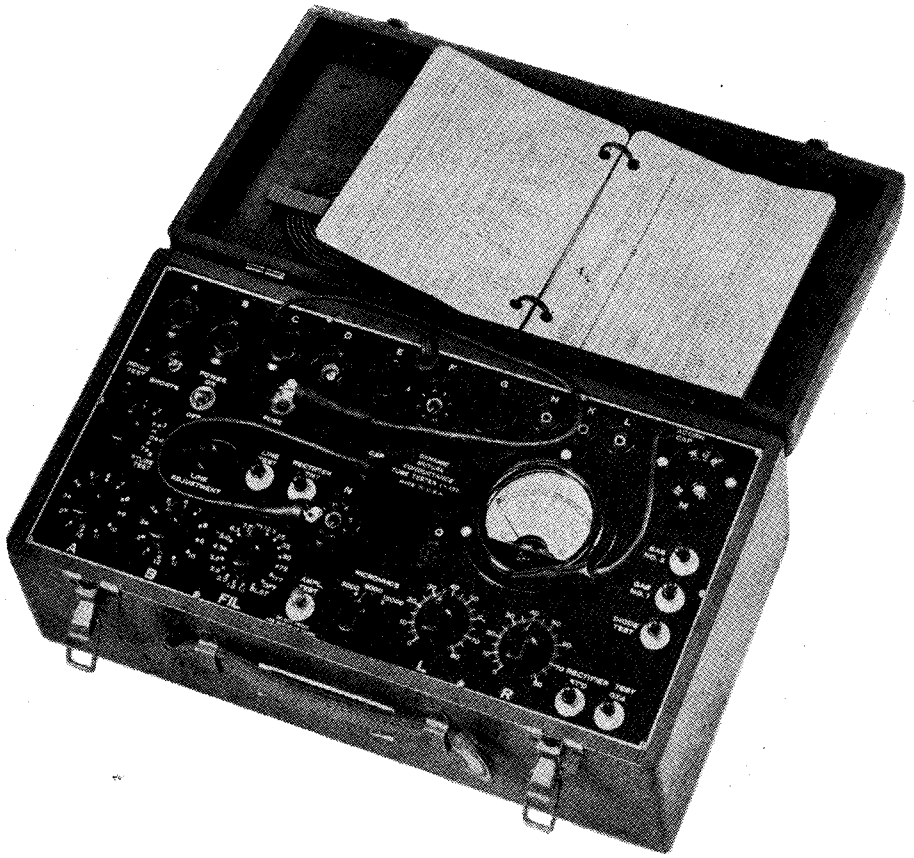
3. *Burn*—Resistors, capacitors, all technical manuals, instruction books, tube charts.

4. *Bury or scatter*—Any or all of the above pieces after destroying their usefulness.

D E S T R O Y E V E R Y T H I N G

SAFETY NOTICE

THE PRESENCE OF HIGH VOLTAGES IN THIS EQUIPMENT IS DANGEROUS TO LIFE. OPERATING PERSONNEL MUST EXERCISE EXTREME CARE. SAFETY REGULATIONS AND CAUTION NOTICES WHICH APPEAR THROUGHOUT THIS MANUAL MUST BE OBSERVED AT ALL TIMES. MAKE TESTS EXACTLY AS DIRECTED. PERSONNEL NOT FAMILIAR WITH THE SERVICING OF HIGH-VOLTAGE CIRCUITS SHOULD NEVER MAKE TESTS INVOLVING SUCH CIRCUITS.



TL-14593

Figure 1. Tube Tester I-177 with cover raised.

RESTRICTED

SECTION I

DESCRIPTION

1. PURPOSE. Tube Tester I-177 is an instrument used to test and measure mutual conductance values of vacuum tubes. The purpose of this manual is to acquaint the repairman with the construction, operating principles, maintenance, and use of this instrument.

2. TUBE TESTER I-177 (fig. 1).

a. This instrument is furnished both as an individual unit or as a part of Test Set I-56-K. As a part of Test Set I-56-K it fits into a compartment of Carrying Case CS-130. The weights and dimensions of the tube tester and carrying case are given below.

| <i>Equipment</i> | <i>Height</i> | <i>Dimension (in.)</i> | | <i>Weight (lb.)</i> |
|----------------------|---------------|------------------------|--------------|---------------------|
| | | <i>Width</i> | <i>Depth</i> | |
| Tube Tester I-177 | 5¾ | 15½ | 8½ | 15.75 |
| Carrying Case CS-130 | 14¾ | 20½ | 9¾ | 25.6 |

b. Tube Tester I-177 is fundamentally a dynamic mutual conductance tube tester designed to provide either REPLACE-GOOD readings or mutual conductance values in micromhos for Signal Corps and commercial receiving tubes and small transmitting tubes. Noise tests of tubes can be made by connecting the input of a radio receiver to two NOISE TEST jacks. An extra topcap lead permits testing of transmitting tubes having plate connections to envelope topcaps. Special switches are provided for making gas tests of tubes. Mutual conductance values of tubes can be measured in three ranges: 0-3,000 micromhos, 0-6,000 micromhos and 0-15,000 micromhos. The tube tester operates on 105- to 125-volt, 60-cycle alternating current. Tube testing data is given in a loose-leaf booklet attached to the inside of the cover of the instrument. The power cord is wound on brackets on the inside of the cover.

SECTION II

OPERATION

3. PRELIMINARY INSTRUCTIONS. Before handling Tube Tester I-177, read the operating instructions carefully. This is a delicate electrical instrument containing a meter and parts that can easily be damaged by mishandling. Pay particular attention to caution notices.

CAUTION: After testing tubes *always* set all controls to off or safety positions as indicated in the following table. Tubes may be burned out if inserted in test sockets before the controls have been properly set.

| <i>Control</i> | <i>Safety position</i> |
|-----------------|--------------------------|
| POWER | OFF |
| SHORT-TUBE TEST | 1 |
| LINE ADJUSTMENT | Extreme counterclockwise |
| A | 1 |
| B | 1 |
| FIL | OFF |
| MICROMHOS | 15,000 |
| L | 80 |
| R | 80 |

4. SHORTS TEST.

- a. Make sure all controls are in safety positions (par. 3).
- b. Plug the power cord of the tester into a suitable a-c power outlet (105 to 125 volts).
- c. Determine the type number of the tube to be tested, and locate this type number in the column headed Tube Type on the loose-leaf test data cards fastened inside the cover of the instrument. If the tube is marked

with Signal Corps nomenclature, use the table in section V or the table on the back of the first card in the tester to determine the commercial equivalent.

- d. Set selector switch A to the number indicated in column A.
- e. Set selector switch B to the number indicated in column B.
- f. Set selector switch FIL to the number indicated in the column headed Fil. volts.
- g. Insert the tube in the socket indicated in the column headed Socket Letter.

NOTE: When inserting or removing a loctal or acorn tube from a socket, handle the tube as gently as possible. Tube pins pass directly through the glass seals and excessive force will crack the glass. A slight sidewise pressure applied to a loctal tube will release the lock and permit easy removal of the tube from the socket.

h. If the tube has a topcap, attach the clip of the CAP lead to the cap. For acorn tubes, use the ACORN CAP lead and clip. For tubes having a star in the Notations column (such as 807, 871, etc.), connect the plate topcap of the tube to the upper left contact of 6-pin socket C with the 12-inch lead having a clip and banana plug.

- i.* Set POWER switch to ON position.
- j.* To adjust the line voltage, press and hold down the LINE TEST button and turn the LINE ADJUSTMENT knob until the meter pointer is exactly at the LINE TEST position (at 1,500, not at the ? on the scale); then release LINE TEST button.

k. After allowing at least 30 seconds for the tube to warm up, turn the SHORT-TUBE TEST switch slowly from position 1 to positions 2, 3, 4, and 5 successively while tapping the tube with a finger and watching the SHORTS neon lamp. If the neon lamp burns continuously or glows during tapping in any of the five positions, the tube contains shorted electrodes and should be discarded without further testing (to prevent damage to the meter) unless an exception is noted on the test data card. Disregard a momentary flash of the neon lamp while the switch is being turned from one position to the next, since this is due to charging of a capacitor in the lamp circuit.

NOTE: Before discarding the tube, refer to the Notations column on the test data card to see if the tube being tested normally appears to

be shorted on certain positions of the switch. Thus, for the 1LN5, the notation "Short on 4-5" on the card means that the neon lamp will normally glow at positions 4 and 5 for good tubes. This tube has no shorts if the neon lamp stays out for positions 1, 2, and 3.

l. On tubes having several sections, the shorts test need be made only once.

5. QUALITY TEST.

a. Test the tube for shorts by following the complete procedure given in paragraph 4. If the tube is shorted, discard it without making further tests.

b. If the tube is not shorted, turn the SHORT-TUBE TEST switch to the TUBE TEST position. Do not change any of the other controls used for the shorts test.

c. Set potentiometer L to the number indicated in column L on the test data card.

d. Set potentiometer R to the number indicated in column R.

e. Set the MICROMHOS range switch at 3,000.

f. Press the button indicated in the Press column on the test data card, and read the meter on the RED-GREEN scale.

g. Normally, if the pointer stops in the GREEN sector the tube is good; if in the RED sector, the tube is defective and should be discarded. If the pointer stops in the ? sector, the tube is usable for a few more hours but should be replaced soon. For tubes in the Notations column having a note such as "OK over 160" (for example, type 40), read the meter on the 0-3,000 micromhos scale. Tubes reading higher than the value given in the Notations column are good. Good diode sections may read in the portion of the RED scale marked DIODES O.K. Only diodes reading to the left of this section (to the left of A in REPLACE on the scale) should be considered defective.

CAUTION: Do not press the red AMPL. TEST button while testing rectifier tubes. When testing small diodes, do not press either the AMPL. TEST or a RECTIFIER TEST button, because the high voltage would damage the delicate cathode. Press only the DIODE TEST button as called for on the test data card.

h. If a tube is listed two or more times on the test data card, it has two or more sections requiring individual tests, or has two input grids (for example, 6A8 pentagrid converter) requiring separate dynamic tests.

*Remove the tube from the socket after the first test is completed. Then repeat the quality test in paragraph 5 for each additional listing in turn. The shorts test should be made *only* for the first listing, however. The tube section covered by a listing is identified in the Notations column on the test data cards.*

6. MEASURING MUTUAL CONDUCTANCE. This procedure gives a mutual conductance reading in micromhos for an amplifier tube or amplifier section, instead of a RED-GREEN reading.

a. Test the amplifier tube or section for shorts by following the complete procedure given in paragraph 4. If the tube is shorted, discard it without making further tests.

b. If the tube is not shorted, turn the SHORT-TUBE TEST switch to the TUBE TEST position. Do not change any of the other controls used for the shorts test.

c. Set potentiometer L at G_M (replaces 60 on dial).

d. Set potentiometer \bar{R} to the number indicated in column R on the test data card.

e. Set the MICROMHOS range switch to an appropriate range for measuring the value given in the Mut. Cond. column on the test data card.

f. Press the button called for in the Press column, and read the meter on the scale to which the MICROMHOS switch is set. This reading is the mutual conductance of the tube in micromhos under the element voltage conditions provided by the tube tester.

g. If a tube is listed two or more times on the test data card, remove the tube from its socket after the first test. Then repeat all tests except the shorts test for the next listing, as if testing another tube.

7. GAS TEST. This procedure determines whether or not an amplifier tube contains too much gas.

a. Carry out the shorts test procedure given in paragraph 4. If dealing with a multisection tube, the shorts test and gas test must be made on an amplifier section. The gas test does not apply to diode sections or to rectifiers.

b. Set potentiometer L at G_M (replaces 60 on dial).

c. Set the MICROMHOS range switch at 3000.

d. Hold down the GAS NO. 1 button and adjust potentiometer R until the meter reads 100 micromhos on the 0-3000 scale.

e. While holding down GAS NO. 1 button, press GAS NO. 2 button.

If the meter pointer moves upward more than one scale division, the tube contains too much gas for satisfactory operation. If the pointer movement is less than one division, the tube can be considered sufficiently free from gas.

NOTE: If the pointer cannot be brought down to 1000 micromhos by adjusting potentiometer R, set R at 82, note the position of the pointer, and press GAS NO. 2 button to see if the pointer moves upward more than one scale division. In some cases it may be necessary to let the tube warm up for a few minutes before making the gas test, since the tubes may develop gas only after filament current has been on for a period of time.

8. NOISE TEST. This procedure detects intermittent contacts between tube electrodes during the shorts test, even though the shorts are too brief to be detected by the neon SHORTS lamp.

a. After completing the conventional shorts test in paragraph 4, connect the NOISE TEST jacks on the panel of Tube Tester I-177 to the antenna and ground terminals of a radio receiver.

b. With the radio receiver turned on, with volume advanced, and with the tube tester still set as in paragraph 4*k*, tap the tube while turning the SHORT-TUBE TEST switch slowly from position 1 to 5. Loud static noises coming from the loudspeaker indicate intermittent shorts between electrodes, and mean that the tube is bad.

9. TESTING CATHODE-RAY INDICATOR TUBES. Since the function of these tubes is to indicate rather than amplify, conventional mutual conductance or quality tests cannot be made. Test data is therefore given on the last test data card rather than in numerical sequence, and is repeated here in greater detail. No shorts tests are made. The meter and controls L, R, and MICROMHOS are not used in this test. The procedure checks only the opening and closing action of the eye.

a. Turn on the tube tester and adjust the line voltage as in paragraph 4*j*.

b. Set the FIL switch at the correct filament voltage (2.5 for the 2E5 tube; 6.3 for tube types starting with 6).

c. For 2E5, 6AB5, 6E5, 6G5, 6H5, 6N5, and 6U5 tubes, set selector switch A at 12, set selector switch B at 3, and press the red AMPL. TEST button. The eye should open. Release the button, set selector switch B at 2, and again press the AMPL. TEST button. The eye should now close if the tube is good.

d. For 6AD6 and 6AF6 tubes, set selector switch B at 8, set selector switch A at 2, and press the red AMPL. TEST button. Eye No. 1 should

open, and eye No. 2 should close. Release the button, set selector switch A at 3, and again press the AMPL. TEST button. Eye No. 2 should open and eye No. 1 should close if the tube is good.

10. TESTING PILOT LAMPS.

a. To check a pilot lamp or other type of lamp having a miniature base, set selector switch FIL to the correct voltage for the lamp. This voltage is generally marked on the lamp base.

b. Turn ON the POWER switch, adjust line voltage as instructed in paragraph 4j and hold the lamp in the center of socket D. If the lamp lights with normal brilliancy, it is good; if it does not light, it is bad.

11. SERVICING RADIO EQUIPMENT WITH TUBE TESTER I-177.

Almost all receiving tubes and the lower-powered transmitting tubes may be tested with Tube Tester I-177. The repairman should be thoroughly familiar with the operation of the tube tester as outlined in previous paragraphs of this section before attempting to make any tests.

a. *Receiver Tubes.* Test all tubes in the receiver for internal shorts and for quality. Install new tubes in place of those found to be defective. To prevent replacing a tube in the wrong socket, check one tube at a time.

b. *Transmitter Tubes.* Test all tubes that can be handled by Tube Tester I-177 and check the remaining tubes by replacing them one at a time with good tubes of the same type, noting the effect on the transmitter performance.

WARNING: Voltages high enough to cause death on contact are used in transmitters. Before touching any part of a transmitter circuit or attempting to remove a tube from the transmitter or its power supply, *turn off all power.* Discharge capacitors and ground exposed circuit components with a tool having a well-insulated handle. Remove shorts and grounds after a repair has been made or a tube replaced, before applying power to the transmitter.

SECTION III

FUNCTIONING OF PARTS

12. GENERAL. Individual circuits of Tube Tester I-177 are presented and described below as they function for the various types of tests made with this instrument. The circuit diagrams in this section are included primarily for a better understanding of this equipment, and therefore have been simplified in some instances. These diagrams must not be used for unauthorized repairs.

13. LINE TEST (fig. 2). Pushing the LINE TEST button connects the meter of the tube tester in series with the type 83 rectifier across a secondary winding of the power transformer, with suitable series and shunt resistors 75 and 74 in this calibrating circuit so the meter will receive a d-c voltage proportional to the a-c voltage across the transformer primary. Factory calibration is such that, when 200-ohm LINE ADJUSTMENT rheostat 47 in series with the power transformer primary is adjusted so the meter pointer is exactly at 1500 (near the center of the scale), the a-c input voltage of the transformer is exactly 93 volts, the value at which the instrument was designed to operate. A small automobile-type lamp 20 is included in the transformer primary circuit as the FUSE LAMP to protect the entire instrument from dangerous overloads. It will burn out during an overload. Setting the FIL. switch to the rated filament voltage value of a tube, followed by the setting of the LINE ADJUSTMENT

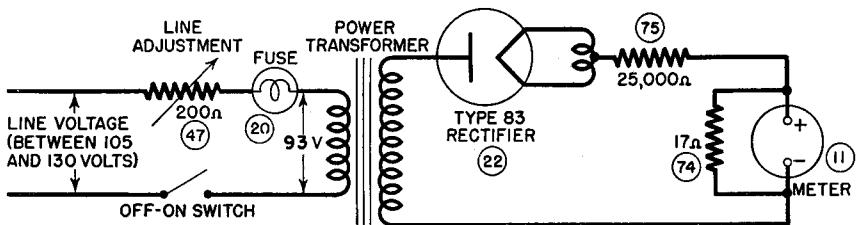


Figure 2. Tube Tester I-177, simplified line test circuit.

TL-14594

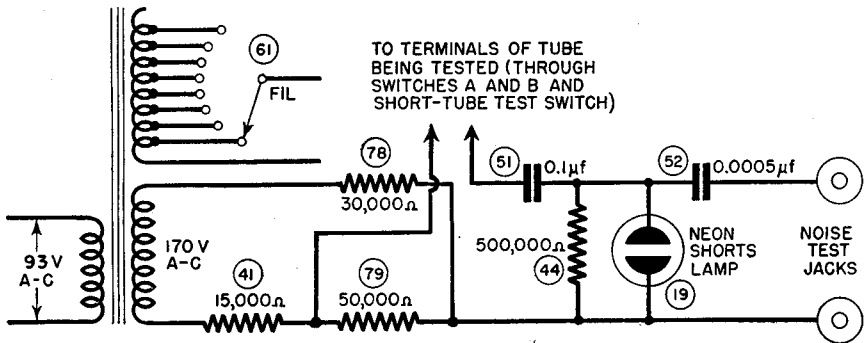


Figure 3. Tube Tester I-177, simplified noise and shorts test circuit.

TL-14595

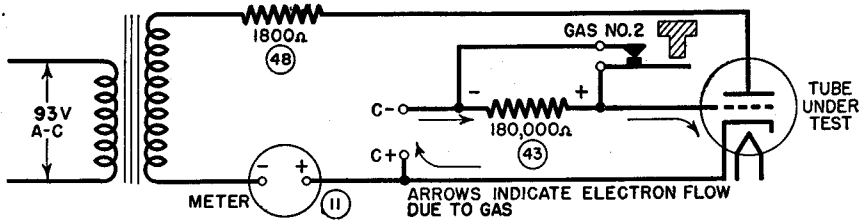


Figure 4. Tube Tester I-177, gas test circuit.

TL-14596

control, provides the correct filament voltage. For filament voltages of 12.6 volts and less, the switch places a center-tapped resistor in the filament circuit for use as a cathode return terminal.

14. SHORT TEST (fig. 3). Turning the SHORT-TUBE TEST switch through positions 1, 2, 3, 4, and 5 connects various pairs of tube electrodes in turn across the test terminals of the circuit. Tubes having shorts between elements complete the circuit and apply transformer voltage to neon SHORTS lamp 19, causing it to glow. Good tubes do not complete the circuit, and the lamp does not glow. Switches A and B (not shown) provide the proper tube socket connections for the tube under test, and the FIL. switch connects the tube filament to the correct tap on the filament winding.

15. NOISE TEST (fig. 3). This circuit is also used for making a noise test of vacuum tubes. With the antenna and ground terminals of a radio receiver connected to the NOISE TEST jacks, any intermittent short between tube electrodes momentarily permits alternating voltage from the power transformer to be applied to the neon lamp, causing a brief oscillation that will be reproduced as an audible signal in the receiver speaker.

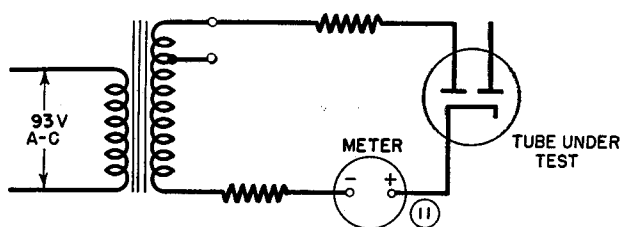


Figure 5. Tube Tester I-177, simplified rectifier test circuit.

TL-14597

16. GAS TEST (fig. 4). Pressing GAS NO. 1 button applies definite values of plate and grid voltages to the tube under test, causing a definite value of plate current to flow. Pressing GAS NO. 2 button inserts 180,000-ohm resistor 43 in the grid circuit. If the grid bias voltage source is sending current through the grid circuit due to gas in the tube, this current develops a voltage drop across resistor 43 that reduces the negative bias, causing a corresponding increase in the plate current being measured by the meter. A tube with negligible gas gives less than a scale division of plate current increase when GAS NO. 2 button is depressed.

17. RECTIFIER TEST (fig. 5). This circuit is used for making emission tests of standard full-wave rectifiers, diodes and OZ4 tubes. An a-c voltage of definite value is applied between a cathode and plate of the tube under test, through resistors and the meter. The total resistance and the voltage are set automatically to the correct values for a GOOD-REPLACE meter reading when selector switches A and B are set at the positions specified on the test data card for the tube being tested. As an example, one plate of a four-prong full-wave rectifier is connected into the circuit when selector A is set at position 1. The second plate is connected into the circuit when selector A is set at 3. The special pushbutton for OZ4 rectifier tubes provides a higher plate-cathode voltage than is used for heater or filament-type rectifiers, with a resistor in the circuit to limit the current if the tube elements are shorted. The special pushbutton for diodes provides a lower voltage than for regular tubes. It also provides a protective series resistance.

18. QUALITY TEST FOR AMPLIFIER TUBES (fig. 6).

a. The mutual conductance (g_m) of an amplifier-type vacuum tube, also called the grid-plate transconductance, is an expression representing the efficiency of performance of a tube as indicated by the *change in plate current* (ΔI_p) divided by the *change in grid voltage* (ΔE_g). The relation is generally written $g_m = \Delta I_p / \Delta E_g$. The value is expressed in micromhos

FUNCTIONING OF PARTS

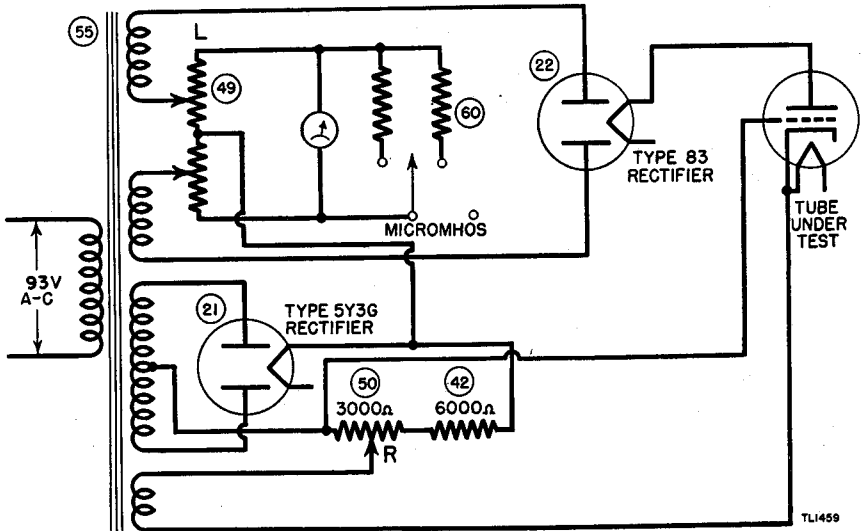


Figure 6. Tube Tester I-177, simplified quality test circuit.

and is a performance indication because it shows how effective a tube is in converting a small change in grid voltage (grid signal) to a large change in plate current. The mutual conductance values given on the test data cards are those supplied by tube manufacturers, and can be checked directly with Tube Tester I-177 by setting its controls for mutual conductance measurements. These values also form the basis for the dynamic quality tests during which the controls are adjusted so that the meter automatically reads GOOD if the mutual conductance is satisfactorily near the rated value for a particular tube.

b. For the RED-GREEN quality test based upon dynamic mutual conductance or for measurement of the mutual conductance value directly, the proper d-c grid voltage for the tube under test is supplied by a full-wave rectifier circuit using a 5Y3G tube. Setting potentiometer R at the value called for on the test data card adjusts this negative bias voltage to the correct value for the particular tube under test.

c. An alternating voltage of 4.7 volts rms, obtained from a separate secondary winding on the power transformer, acts in series with the grid bias as required for this type of test. This voltage alternately swings the grid in positive and negative directions from the d-c bias value, thereby producing the grid-voltage change (ΔE_g) required for a dynamic test.

d. The plate voltage for the tube under test is supplied by another full-wave rectifier circuit, using a type 83 tube. The return lead contains the meter circuit which serves to measure the plate-current change (ΔI_p). The meter circuit consists essentially of dual potentiometer L shunted across the meter. Adjusting control L on the panel adjusts the effective shunt

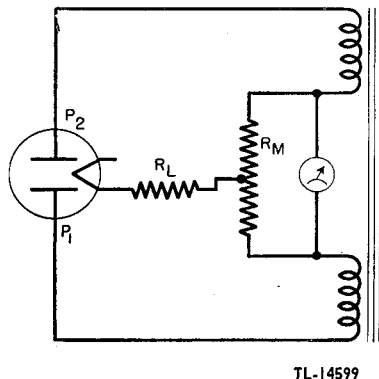


Figure 7. Tube Tester I-177, rectifier diagram illustrating theory.

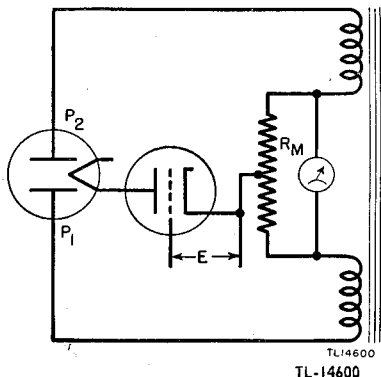


Figure 8. Tube Tester I-177, simplified mutual conductance test circuit.

resistance so the meter pointer will read in the GREEN section of the scale if the tube under test is good. Pressing the AMPL. test button completes the circuit as just outlined, and the meter then reads the quality of the tube.

19. THEORY OF OPERATION OF QUALITY TEST CIRCUIT.

a. Examine first the simple full-wave rectifier circuit shown in figure 7. The two power transformer secondary windings have their inner ends connected to a direct-current milliammeter. Across the milliammeter is a center-tapped resistor R_M . The load is shown as a resistance R_L , connected between the center tap and the rectifier filament as in any full-wave rectifier circuit. When rectifier plate P_2 is positive, electron flow is through the upper half of R_M , and the meter tends to deflect in one direction. When P_1 is positive, electron flow is through the lower half of R_M , and the meter tends to deflect in the other direction. With the load resistance fixed and equal forces acting on the meter in both cases, the meter stays at zero because it cannot follow variations at the power line frequency.

b. If the vacuum tube to be tested is substituted for the fixed load resistance, and a fixed bias E is applied to the tube as in figure 8, the meter will still read zero because a vacuum tube under steady-state conditions acts like a fixed resistance.

c. If an a-c potential is applied to the grid of the tube under test in addition to the d-c bias, the circuit becomes equivalent to that employed for quality and mutual conductance tests in Tube Tester I-177. When this a-c potential swings the grid positive, the plate current of the tube is increased, and when the plate-cathode resistance is correspondingly lowered, more current flows through R_M and the deflecting force on the meter is greater

than before. When the grid swings negative on the other half-cycle, the resistance of the tube under test is increased and the deflecting force on the meter is less. With unbalanced currents on adjacent half-cycles and consequent unequal forces on the meter, the meter reading becomes proportional to the difference in currents. Since this difference is created by the a-c grid potential, the meter indicates the plate-current changes produced by the applied grid voltage change, or in other words, the meter indicates mutual conductance.

20. MUTUAL CONDUCTANCE MEASUREMENTS. For mutual conductance measurements, the MICRQMHOS switch places additional fixed shunt resistors across the meter as required for the three ranges.

SECTION IV

MAINTENANCE

NOTE: Unsatisfactory performance of this equipment will be reported immediately on W.D., A.G.O. Form No. 468. If this form is not available, see TM 38-250.

21. GENERAL DESCRIPTION. Tube Tester I-177 contains two tubes, a fuse lamp, a neon lamp, and tube charts, all of which may require replacement. The fuse lamp, neon lamp, and tube charts can be replaced directly without removing the panel. The tubes can be replaced by removing the 10 screws that fasten the panel to the case, then lifting out the panel assembly.

CAUTION: The tube tester panel must be opened only to make necessary tube replacements. No other repairs should be attempted except by authorized Signal Corps repair shops or by the manufacturer.

22. FUSE LAMP REPLACEMENT. To replace the No. 81 6-8-volt, 6-cp auto bulb used as a fuse, press down on the bulb and twist it counterclockwise, then lift out the bulb. Insert the new bulb so its pins fit into the slots in the socket, then press down and twist clockwise.

23. NEON LAMP REPLACEMENT. The $\frac{1}{4}$ -watt, 105- to 125-volt neon lamp serving as a SHORTS indicator is replaced by unscrewing the lamp from its socket and screwing in a new lamp. This lamp should last indefinitely unless its glass bulb is broken.

24. TUBE CHART REPLACEMENT. Test data cards for Tube Tester I-177 may be replaced by opening the binding rings.

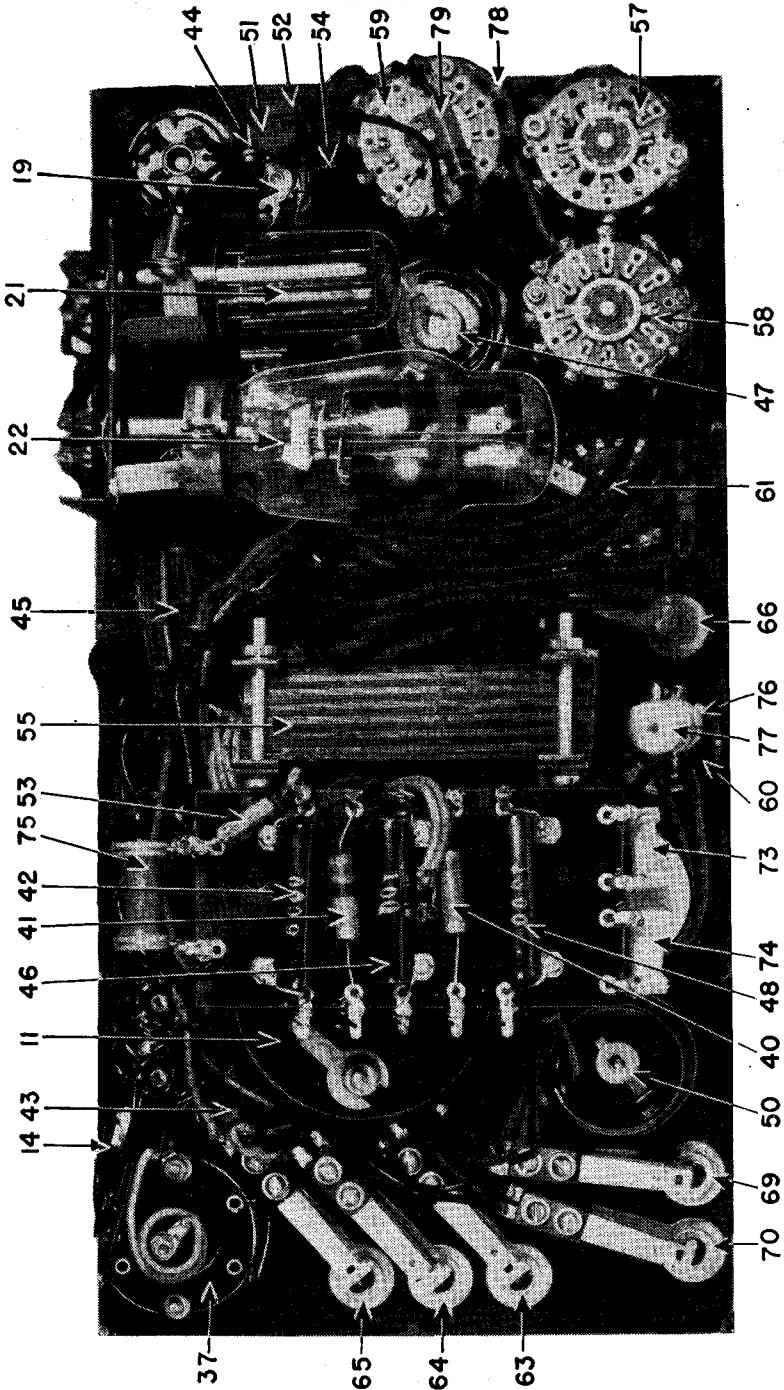


Figure 9 Tube Tester 1-177, bottom view of chassis

TL-14674

25. TUBE REPLACEMENT. To replace either the type 83 or 5Y3GT tubes, remove the panel mounting screws and lift the panel assembly carefully out of the case. Loosen the tube clamp bolt, then carefully pull the tube out of the socket and clamp, rocking the tube from side to side while pulling. Insert the new tube in its clamp and socket, and tighten the tube clamp bolt. Put the panel back in the case and replace all panel screws. If replacement of tubes does not restore correct operation, return the tester as defective. Do not attempt to repair the instrument because considerable damage can be done to the tube tester if the operator is not entirely familiar with the repair of this type of precision instrument.

26. PREVENTIVE MAINTENANCE.

a. General Instructions. The performance of the items of maintenance outlined in these paragraphs will provide, periodically, an indication of the operational condition of this test equipment and assure proper mechanical and electrical upkeep.

(1) The communication officer should schedule definite times for checks. The operator should take the readings indicated and check in the appropriate columns in the check sheets.

(2) Equipment not in use must be checked once a month for deterioration, rust, broken parts, and general operation.

(3) The maintenance items are listed in subparagraphs 26 *b*, *c*, *d*, and *e*. In paragraphs *b* and *c* the maintenance items are numbered consecutively with an explanation of the appropriate action appearing opposite each item. The items, arranged in the same order in check list form, appear in paragraphs *d* and *e*.

(4) Deficiencies must be reported to the communication officer of the unit.

b. Weekly Checks.

| <i>Item</i> | <i>Action</i> |
|---|--|
| (1) External surfaces. | Remove dust, dirt, grease, and rust. Note under remarks on weekly check list if touch-up painting is necessary. |
| (2) Meter. | See that the pointer is not bent, operates freely, and always returns to zero. |
| (3) Leads, clips, and cord. | Check condition of cord, plug, leads, and clips. Look for broken conductors inside insulation at sharp bends. |
| (4) Tube sockets. | Check contacts in all tube sockets. Note under remarks on weekly check-list if any contacts are loose or broken. |
| (5) Control knobs, switches, and pushbuttons. | See that all control knobs are tight and that all switches and pushbuttons operate normally. |

MAINTENANCE

c. Monthly Checks.

| Item | Action |
|---------------------------------|--|
| (1) Interior surfaces. | Remove dust and other foreign matter from the interior of the case. |
| (2) Pushbutton switch contacts. | Without disturbing adjustments, thoroughly clean all pushbutton switch contacts. |
| (3) Controls. | Check all controls for smoothness of operation. Clean or replace as necessary. Note under remarks in monthly check list. |
| (4) Paint. | Repaint where necessary. |
| (5) Wooden case. | Note condition of case. Repair if damaged. |

d. Weekly Check List (suggested form).

**PREVENTIVE MAINTENANCE—FIELD TEST
EQUIPMENT**

Tube Tester I-177

Serial No.

Enter a check in the form below if the item has been found satisfactory.

| ITEM | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------------------------------|---|---|---|---|---|---|---|---|---|----|
| (1) External surfaces. | | | | | | | | | | |
| (2) Meter. | | | | | | | | | | |
| (3) Leads, clips, cord. | | | | | | | | | | |
| (4) Tube sockets. | | | | | | | | | | |
| (5) Control knobs, switches. | | | | | | | | | | |

Enter a check in the form below if the action has been completed.

| ITEM | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|----|
| (6) Unsatisfactory items brought to attention of communication officer. | | | | | | | | | | |
| (7) Previously reported unsatisfactory items completed. | | | | | | | | | | |

REMARKS:

Date Through Signature

Rating

e. *Monthly Check List (suggested form)*

PREVENTIVE MAINTENANCE—FIELD TEST EQUIPMENT

Tube Tester I-177

Serial No.

Enter a check in the form below if the item has been found satisfactory.

| ITEM | 1 | 2 | 3 | 4 | 5 | 6 |
|---------------------------------|---|---|---|---|---|---|
| (1) Interior surfaces. | | | | | | |
| (2) Pushbutton switch contacts. | | | | | | |
| (3) Controls. | | | | | | |
| (4) Paint. | | | | | | |
| (5) Wooden case. | | | | | | |

Enter a check in the form below if the action has been completed.

| ITEM | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| (6) Unsatisfactory items brought to attention of communication officer. | | | | | | |
| (7) Previously reported unsatisfactory items corrected. | | | | | | |

REMARKS:

Date Through Signature
 Rating

27. MOISTUREPROOFING AND FUNGIPROOFING.

a. *General.* Communication failures commonly occur when Signal Corps equipment is operated in tropical areas where temperature and relative humidity are extremely high. The following problems are typical:

- (1) Resistors and capacitors fail.
- (2) Electrolytic action takes place in coils, chokes, transformer windings, etc., causing eventual break-down.
- (3) Hook-up wire and cable insulation break down. Fungus growth accelerates deterioration.

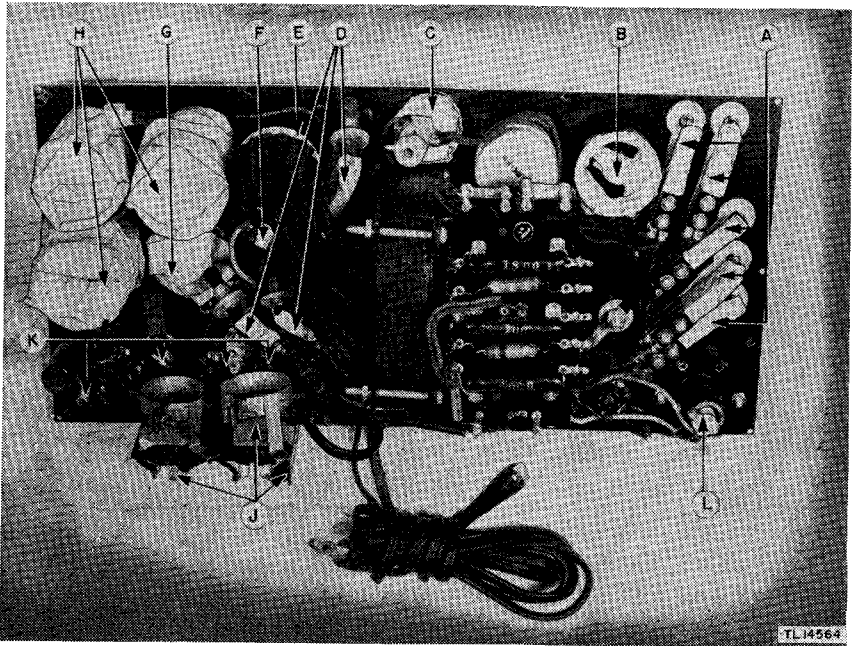


Figure 10. Tube Tester I-177, bottom view, masking for moistureproofing and fungiproofing.

(4) Moisture forms electrical leakage paths on terminal boards and insulating strips, causing flash-overs and crosstalk.

(5) Moisture provides leakage paths between battery terminals.

b. Treatment. A moistureproofing and fungiproofing treatment has been devised which, if properly applied, provides a reasonable degree of protection against fungus growth, insects, corrosion, salt spray, and moisture. The treatment involves the use of a moisture-resistant and fungi-resistant varnish applied with a spray gun. A brief description of the method of application follows:

- (1) Make all repairs and adjustments necessary for the proper operation of the equipment.
- (2) Thoroughly clean equipment to be processed of all dirt, dust, rust, fungus, oil, grease, etc.
- (3) Partially disassemble equipment and cover with masking tape certain points, such as relay contacts, open switches, air capacitors, sockets, bearings, etc.
- (4) Thoroughly dry equipment by heat to expel moisture which the circuit elements have absorbed.

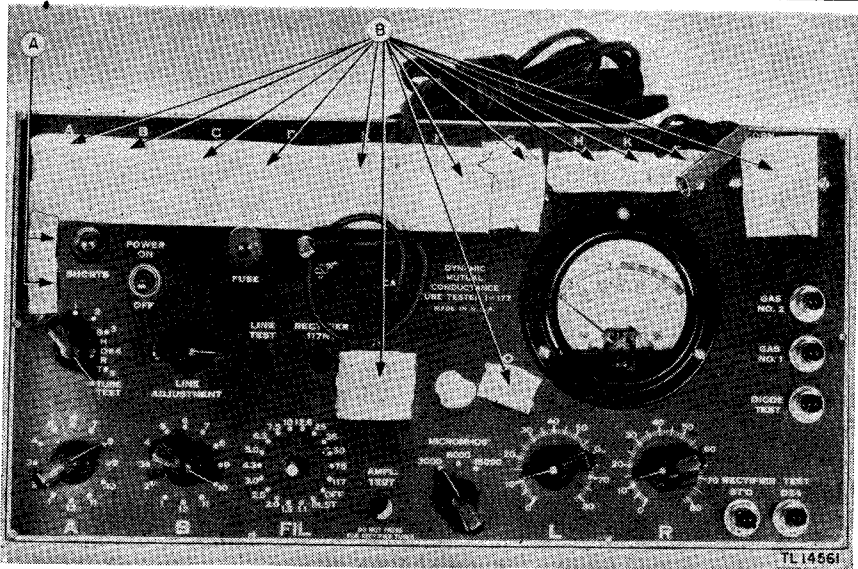


Figure 11. Tube Tester I-177, front view, masking for moistureproofing and fungiproofing.

(5) Spray or paint all circuit elements and all parts of the equipment with three coats of moistureproofing and fungiproofing varnish.

(6) Give the equipment a final operational check.

c. Step-by-step instructions.

(1) **DISASSEMBLY:**

(a) Remove cover by disengaging hinges.

(b) Remove 10 screws holding front panel to case. Remove front panel assembly.

(c) Loosen screws and nuts on tube clamps and remove vacuum tubes 83 and 5Y3 from their sockets.

(d) Remove locknuts holding the following pushbutton switches to front panel, allowing LINE TEST switch, RECTIFIER 117N7 Switch, and AMPL. TEST switch to hang freely on wiring.

(e) Loosen setscrew on knob of filament selector switch and remove knob.

(f) Loosen nut on filament switch and push shaft through hole in front panel, allowing switch to hang freely on wiring.

(2) **MASKING:** Cover the following components with masking tape as shown in figures 10 and 11:

- (a) Contacts of 5 pushbutton switches, item A, figure 10.
- (b) Variable rheostat, item B, figure 10.
- (c) Holes in wafer and casing of micromhos selector switch, item C, figure 10.
- (d) Three pushbutton switches, item D, figure 10.
- (e) Holes in case of filament switch, item E, figure 10.
- (f) Switch contacts on rear of filament selector switch, item F, figure 10.
- (g) Line adjustment rheostat, item G, figure 10.
- (h) Three wafer switches (A, B, and SHORT-TUBE TEST), item H, figure 10.
- (i) Contacts of sockets for vacuum tubes 83 and 5Y3, item J, figure 10.
- (j) Contacts on tube sockets A, B, C, and D, item K, figure 10.
- (k) Contact on acorn socket, item L, figure 10.
- (l) Faces of noise test jacks, item A, figure 11.
- (m) Faces of all sockets mounted on front panel, item B, figure 11.

(3) PREPARATION. Thoroughly clean all equipment to be treated by removing all oil, dirt, rust, or fungus adhering to components.

(4) DRYING.

- (a) Place components to be treated in heat chamber.
- (b) Bake for 2 or 3 hours at 160° F. Do not exceed 160° F.
- (c) If wax should begin to melt on any of the components, decrease the temperature and increase the baking time approximately 1 hour for each 10° drop in temperature.

(5) VARNISHING.

- (a) Apply 3 coats of moistureproofing and fungiproofing varnish to all equipment to be treated, including inside of cases, allowing a 15- to 20-minute drying period after each coat.
- (b) Using a brush, apply varnish to those portions not reached by spray gun, making sure that all components are adequately protected by varnish.

(6) REASSEMBLY.

- (a) Remove all masking tape.
- (b) Reassemble unit by following instructions for disassembly in the reverse order.
- (c) Mark cases MFP with date of treatment.
- (d) Check overall performance of equipment.

CAUTION: Varnish spray may have toxic effects. Use respirator if available. Otherwise fasten cheesecloth or other cloth material over nose and mouth.

d. Reference. For a full description of the varnish spray method of moistureproofing and fungiproofing, refer to TB SIG 13.

SECTION V

SUPPLEMENTARY DATA

28. TUBE-BASE CHART FOR SIGNAL CORPS AND COMMERCIAL TUBES.

a. Signal Corps Tubes. (See tube-base connection diagrams in Fig. 12.)

| <i>Tube</i> | <i>Base</i> | <i>Tube</i> | <i>Base</i> | <i>Tube</i> | <i>Base</i> | <i>Tube</i> | <i>Base</i> |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| VT-7 | 4D | VT-51 | 4D | VT-86-A | 7R | VT-105 | 8S |
| VT-24 | 4D | VT-52 | 4D | VT-86-B | 7R | VT-107 | 7AC |
| VT-25 | 4D | VT-54 | 4M | VT-87 | 7T | VT-107-A | 7AC |
| VT-25-A | 4D | VT-56 | 5A | VT-87-A | 7T | VT-107-B | 7AC |
| VT-26 | 4K | VT-57 | 6F | VT-88 | 7V | VT-112 | 8N |
| VT-27 | 4D | VT-58 | 6F | VT-88-A | 7V | VT-114 | 5T |
| VT-28 | 5E | VT-62 | 4D | VT-89 | 6F | VT-115 | 7AC |
| VT-29 | 5A | VT-63 | 5C | VT-90 | 7Q | VT-115-A | 7AC |
| VT-30 | 4D | VT-65 | 6Q | VT-91 | 7R | VT-116 | 8N |
| VT-31 | 4D | VT-66 | 7S | VT-91-A | 7R | VT-116-B | 8N |
| VT-33 | 5K | VT-67 | 4D | VT-92 | 7V | VT-117 | 8N |
| VT-35 | 5E | VT-68 | 7D | VT-92-A | 7V | VT-119 | 4AB |
| VT-36 | 5E | VT-69 | 6F | VT-93 | 8E | VT-120 | 5BB |
| VT-37 | 5A | VT-70 | 7E | VT-94 | 6Q | VT-121 | 5BC |
| VT-38 | 5F | VT-72 | 4D | VT-94-A | 6Q | VT-124 | 6X |
| VT-40 | 4D | VT-73 | 5A | VT-94-D | 6Q | VT-125 | 6X |
| VT-41 | 4K | VT-74 | 5L | VT-95 | 4D | VT-126 | 6S |
| VT-44 | 4K | VT-75 | 6G | VT-96 | 8B | VT-126-A | 6S |
| VT-45 | 4D | VT-76 | 5A | VT-97 | 5T | VT-126-B | 6S |
| VT-46 | 4P | VT-77 | 6F | VT-98 | 6R | VT-131 | 8N |
| VT-46-A | 4P | VT-78 | 6F | VT-99 | 8G | VT-132 | 8K |
| VT-47 | 5B | VT-80 | 4C | VT-100 | 5AW | VT-133 | 8Q |
| VT-48 | 6B | VT-83 | 4C | VT-101 | 6BM | VT-134 | 7AC |
| VT-49 | 5F | VT-84 | 5D | VT-103 | 8Q | VT-135 | 6Q |
| VT-50 | 4D | VT-86 | 7R | VT-104 | 8Q | VT-135-A | 6Q |

SUPPLEMENTARY DATA

| Tube | Base | Tube | Base | Tube | Base | Tube | Base |
|----------|------|----------|------|----------|------|--------|------|
| VT-136 | 5AZ | VT-173 | 6AR | VT-201 | 7AC | VT-235 | 3P |
| VT-137 | 6Q | VT-174 | 7BA | VT-201-C | 7AC | VT-237 | 5BD |
| VT-138 | 7AL | VT-175 | 7S | VT-202 | 7BS | VT-238 | 5BB |
| VT-139 | 4AJ | VT-176 | 8N | VT-203 | 7BD | VT-239 | 4AA |
| VT-145 | 4C | VT-177 | 5AG | VT-205 | 8Q | VT-241 | 8BN |
| VT-146 | 5Y | VT-178 | 7AK | VT-206-A | 5L | VT-243 | 4AH |
| VT-147 | 7E | VT-179 | 7AO | VT-207 | 8BE | VT-244 | 5T |
| VT-148 | 8AJ | VT-180 | 6BB | VT-208 | 8X | VT-245 | 8BA |
| VT-149 | 8AS | VT-181 | 5AB | VT-209 | 8BK | VT-247 | 8Y |
| VT-150 | 8R | VT-182 | 7BE | VT-210 | 7AV | VT-260 | 4AJ |
| VT-151 | 8A | VT-183 | 4AH | VT-211 | 8BK | VT-264 | 7BA |
| VT-151-B | 8A | VT-184 | 4AJ | VT-212 | 5BD | VT-266 | 4P |
| VT-152 | 7S | VT-185 | 6BB | VT-213-A | 6Q | VT-268 | 8S |
| VT-153 | 8E | VT-188 | 8W | VT-214 | 7Q | VT-269 | 8BK |
| VT-161 | 8R | VT-189 | 8AC | VT-215 | 6R | VT-288 | 8BK |
| VT-162 | 8N | VT-190 | 8V | VT-216 | 4P | VT-289 | 8BD |
| VT-163 | 8G | VT-192 | 5AC | VT-221 | 7AP | | |
| VT-167 | 8K | VT-193 | 8V | VT-223 | 5Z | | |
| VT-168 | 7AC | VT-194 | 8AR | VT-224 | 7BL | | |
| VT-168-A | 7AC | VT-195 | 5AQ | VT-225 | 5J | | |
| VT-169 | 8E | VT-196 | 6S | VT-227 | 6BO | | |
| VT-170 | 5Y | VT-197-A | 5T | VT-229 | 8BD | | |
| VT-171 | 7AT | VT-198-A | 7S | VT-231 | 8BD | | |
| VT-171-A | 7AT | VT-199 | 8N | VT-233 | 8Q | | |
| VT-172 | 6AU | VT-200 | 4AJ | VT-234 | 2T | | |

b. Commercial Tubes. (See tube-base connection diagrams in Fig. 12.)

| Tube | Base | Tube | Base | Tube | Base | Tube | Base |
|------|------|-------|------|--------|------|-------------|------|
| AD | 4G | PZ | 5B | 1 | 4G | 1B4 | 4M |
| AF | 4C | PZH | 5B | D-1 | 4C | 1B5/25S | 6M |
| AG | 4C | Wnd A | 6N | KR-1 | 4G | 1B7-G | 7Z |
| AX | 4Q | XXD | 8AC | RA-1 | 4Q | 1B8 | 8AW |
| B | 4E | XXL | 5AC | RE-1 | 4C | 1C1 | 4A |
| BA | 4J | 00 | 4D | SO-1 | 4Q | 1C5-G | 6X |
| BH | 4J | 00A | 4D | 1A1 | 4A | 1C6 | 6L |
| BR | 4H | 0A4 | 4V | 1A3 | 5AP | 1C7 | 7Z |
| BX | 4D | 0Z3 | 5N | 1A4-P | 4M | 1C21 | 4V |
| DE | 4D | 0Z4 | 4R | 1A4-T | 4K | 1D1 | 4A |
| E | 4D | 01 | 4D | 1A5-G | 6X | 1D5, 1D5-GP | 5Y |
| G | 4D | 01A | 4D | 1A6-GT | 6L | 1D5-GT | 5R |
| GA | 5B | 01AA | 4D | 1A6-S | 6L | 1D7-G | 7Z |
| H | 4D | 01B | 4D | 1A7-G | 7Z | 1D8-GT | 8AJ |
| LA | 5B | D-½ | 4B | 1B1 | 4A | 1E1 | 4A |

| <i>Tube</i> | <i>Base</i> | <i>Tube</i> | <i>Base</i> | <i>Tube</i> | <i>Base</i> | <i>Tube</i> | <i>Base</i> |
|---------------|-------------|--------------|-------------|--------------|-------------|---------------|-------------|
| 1E4-G | 5S | 1S4 | 7AV | 0A3/VR75 .. | 4AJ | 6A4/LA | 5B |
| 1E5-G | 5R | 1S5 | 6AU | 0B3/VR90 .. | 4AJ | 6A5-G | 6T |
| 1E5-GP | 5Y | 1SA6 | 6BD | 0C3/VR105 .. | 4AJ | 6A6 | 7B |
| 1E7-G | 8C | 1SB6 | 6BE | 0D3/VR150 .. | 4AJ | 6AB5 | 6R |
| 1F1 | 4A | 1T1-G | 4T | 3A4 | 7BB | 6AB6 | 7AU |
| 1F4 | 5K | 1T4 | 6AR | 3A5 | 7BC | 6AB7/1853 ... | 8N |
| 1F5-G | 6X | 1T5 | 6AF | 3A8-GT | 8AS | 6AC5-G | 6Q |
| 1F6 | 6W | 1T5-GT | 6X | 3B5-GT | 7AP | 6AC6-G | 7W |
| 1F7-G, GH, GV | | 1-V | 4G | 3B7/1291 ... | 7BE | 6AC7/1852 ... | 8N |
| | 7AD | 1V1 | 4A | 3B21 | 4C | 6AD5-G | 6Q |
| 1G1 | 4A | 1Y1 | 4A | 3B22 | 4C | 6AD6-G | 7AG |
| 1G4-G | 5S | 1Z1 | 4A | 3B23/RK22 .. | 4AN | 6AD7-G | 8AY |
| 1G5-G | 6X | 2 | 4A | 3C5-GT | 7AQ | 6AE5-GT | 6Q |
| 1G6-G | 7AB | G-2 | 5D | 3D6/1299 ... | 6BB | 6AE6-G | 7AH |
| 1H4-G | 5S | G-2S | 5D | 3LE4 | 6BA | 6AE7-GT ... | 7AX |
| 1H5-G | 5Z | KR-2 | 4G | 3LF4 | 6BB | 6AF5-G | 6Q |
| 1H6-G | 7AA | RE-2 | 4B | 3Q4 | 7BA | 6AF6-G | 7AG |
| 1J1 | 4A | SO-2 | 4D | 3Q5-GT | 7AP | 6AF7 | 8AG |
| 1J5-G | 6X | 2A3 | 4D | 3S4 | 7BA | 6AG5 | 7BD |
| 1J6-G | 7AB | 2A3-H | 4Q | 4 | 4A | 6AG7 | 8Y |
| 1K1 | 4A | 2A4-G | 5S | G-4 | 5D | 6AH5-G | 6AP |
| 1L1 | 4T | 2A5 | 6B | G-4 S | 5D | 6AH7-GT .. | 8BE |
| 1L4 | 6AR | 2A6 | 6G | 4A6-G | 8L | 6AK5 | 6BD |
| 1LA4 | 5AD | 2A7 | 7C | 4B24 | 4C | 6AK6 | 7BK |
| 1LA6 | 7AK | 2B4 | 5A | 4B25 | 4C | 6AL6-G | 6AM |
| 1LB4 | 5AD | 2B6 | 7J | 4S | 5D | 6A7 | 7C |
| 1LB6 | 8AX | 2B7 | 7D | 5 | 4A | 6A7-M | 8A |
| 1LC5 | 7AO | 2C4 | 5AS | A(5) | 5H | 6A7-S | 7C |
| 1LC6 | 7AK | 2C21/RK33 .. | 7BH | KR5 | 5B | 6A8 | 8A |
| 1LD5 | 6AX | 2C22 | 4AM | IN5-GT | 5Y | 6B4-G | 5S |
| 1LE3 | 4AA | 2C34/RK34 .. | 7BL | 5R4-GY | 5T | 6B5 | 6AS |
| 1LH4 | 5AG | 2E5 | 6R | 5T4 | 5T | 6B6-G | 7V |
| 1LN5 | 7AO | 2E22 | 5J | 5U4-G | 5T | 6B7 | 7D |
| 1N1 | 4T | 2G5 | 6R | 5V4-G | 5L | 6B8 | 8E |
| 1N5-G | 5Y | 2S/4S | 5D | 5W4 | 5T | 6C4 | 6BG |
| 1N6-G | 7AM | 2V3-G | 4Y | 5X3 | 4C | 6C5 | 6Q |
| 1P1 | 4T | 2W3 | 4X | 5X4G | 5Q | 6C5-G | 6Q |
| 1P5-G | 5Y | 2X2/879 | 4AB | 5Y3-G | 5T | 6C6 | 6F |
| 1Q1 | 4T | 2X3 | 4E | 5Y4-G | 5Q | 6C7 | 7G |
| 1Q5-GT | 6AF | 2Y2 | 4AB | 5Z3 | 4C | 6C8-G | 8G |
| 1R1-G | 4T | 2Y3 | 4C | 5Z4 | 5L | 6D5 | 6Q |
| 1R4/1294 ... | 4AH | 2Y4 | 5D | 6 | 4A | 6D6 | 6F |
| 1R5 | 7AT | 2Z2 | 4B | A(6) | 6N | 6D7 | 7H |
| 1S1-G | 4T | 3 | 4A | 6A3 | 4D | 6D8-G | 8A |

SUPPLEMENTARY DATA

| <i>Tube</i> | <i>Base</i> | <i>Tube</i> | <i>Base</i> | <i>Tube</i> | <i>Base</i> | <i>Tube</i> | <i>Base</i> |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 6E5 | 6R | 6S7-G | 7R | 7A6 | 7AJ | 12C8 | 8E |
| 6E6 | 7B | 6SA7 | 8R | 7A7-LM | 8V | 12E5-GT | 6Q |
| 6E7 | 7H | 6SA7-GT | 8AD | 7A8 | 8U | 12F5-GT | 5M |
| 6F5 | 5M | 6SC7 | 8S | 7B4 | 5AC | 12G7 | 7V |
| 6F5-G | 5M | 6SD7-GT | 8N | 7B5 | 6AE | 12H6 | 7Q |
| 6F6 | 7S | 6SE7-GT | 8N | 7B6 | 8W | 12J5-GT | 6Q |
| 6F7 | 7E | 6SF5 | 6AB | 7B7 | 8V | 12J7-GT | 7R |
| 6F7-S | 7E | 6SF7 | 7AZ | 7B8 | 8X | 12K7-GT | 7R |
| 6F8-G | 8G | 6SG7 | 8BK | 7C4/1203A | 4AH | 12K8 | 8K |
| 6G5 | 6R | 6SH7 | 8BK | 7C5 | 6AA | 12L8-GT | 8BU |
| 6G6-G | 7S | 6SJ7 | 8N | 7C6 | 8W | 12Q7-GT | 7V |
| 6G7 | 7N | 6SK7 | 8N | 7C7 | 8V | 12SA7 | 8R |
| 6G7-S | 7N | 6SL7-GT | 8BD | 7E5/1201 | 8BN | 12SA7-GT | 8AD |
| 6H4-GT | 5AF | 6SN7-GT | 8BD | 7E6 | 8W | 12SC7 | 8S |
| 6H5 | 6R | 6SQ7 | 8Q | 7E7 | 8AE | 12SF5 | 6AB |
| 6H6 | 7Q | 6SR7 | 8Q | 7F7 | 8AC | 12SF7 | 7AZ |
| 6H7 | 7P | 6SS7 | 8N | 7G7 | 8V | 12SG7 | 8BK |
| 6H7-S | 7P | 6ST7 | 8Q | 7H7 | 8V | 12SH7 | 8BK |
| 6H8 | 8F | 6T5 | 6R | 7J7 | 8AR | 12SJ7 | 8N |
| 6J5 | 6Q | 6T7-G | 7V | 7K7 | 8BF | 12SK7 | 8N |
| 6J6 | 7BF | 6U5/6G5 | 6R | 7L7 | 8V | 12SL7-GT | 8BD |
| 6J7 | 7R | 6U6-GT | 7AC | 7N7 | 8AC | 12SN7-GT | 8BD |
| 6J7-G | 7R | 6U7-G | 7R | 7P7 | 8V | 12SQ7 | 8Q |
| 6J7-GT | 7R | 6V4 | 5D | 7Q7 | 8AL | 12SR7 | 8Q |
| 6J8-G | 8H | 6V6 | 7AC | 7R7 | 8AE | 12Z3 | 4G |
| 6K5-G | 5U | 6V7-G | 7V | 7S7 | 8BL | 12Z5 | 6K |
| 6K6-G | 7S | 6W5-G | 6S | 7T7 | 8V | 14 | 5E |
| 6K7 | 7R | 6W6-GT | 7AC | 7V7 | 8V | 14A4 | 5AC |
| 6K8 | 8K | 6W7-G | 7R | 7W7 | 8BJ | 14A5 | 6AA |
| 6L5-G | 6Q | 6X5 | 6S | 7Y4 | 5AB | 14A7 | 8V |
| 6L6 | 7AC | 6X6 | 7AL | 7Z4 | 5AB | 14AF7 | 8AC |
| 6L6-GX | 7S | 6Y3 | 4AG | 8 | 4A | 14B6 | 8W |
| 6L7 | 7T | 6Y5 | 6J | 9 | 4A | 14B8 | 8X |
| 6N5 | 6R | 6Y6-G | 7AC | 10 | 4D | 14C5 | 6AA |
| 6N6-G | 7AU | 6Y7-G | 8B | WX-12 | 4D | 14C7 | 8V |
| 6N7 | 8B | 6Z3 | 4G | 12A | 4D | 14E6 | 8W |
| 6P5-G | 6Q | 6Z4 | 5D | 12A5 | 7F | 14E7 | 8AE |
| 6P7-G | 7U | 6Z5 | 6K | 12A6 | 7AC | 14F7 | 8AC |
| 6Q5 | 6Q | 6Z6 | 7Q | 12A7 | 7K | 14H7 | 8V |
| 6Q6-G | 6Y | 6Z7-G | 8B | 12A8-GT | 8A | 14J7 | 8AR |
| 6Q7 | 7V | 6ZY5-G | 6S | 12AH7-GT | 8BE | 14N7 | 8AC |
| 6R6-G | 6AW | 7 | 4A | 12B6 | 8V | 14Q7 | 8AL |
| 6R7 | 7V | 7A4 | 5AC | 12B7 | 6Y | 14R7 | 8AE |
| 6S6-GT | 5AK | 7A5 | 6AA | 12B8-GT | 8T | 14S7 | 8BL |

| Tube | Base | Tube | Base | Tube | Base | Tube | Base |
|-----------|------|------------|------|----------|------|----------|------|
| 14W7 | 8BJ | 27S | 5A | 46 | 5C | 75S | 6G |
| 14Y4 | 5AB | K27 | 5A | 46A1 | 2S | VR75-30 | 4AJ |
| 14Z3 | 4G | A28 | 4D | 46B1 | 2S | 76 | 5A |
| 15 | 5F | 29 | 6N | 47 | 5B | 77 | 6F |
| 17 | 5A | 30 | 4D | RK47 | 5J | 77M | 7R |
| 18 | 6B | A-30 | 4Q | 48 | 6A | 78 | 6F |
| 19 | 6C | R-30 | 4D | A48 | 4Q | 78S | 6F |
| RK19 | 4AN | 31 | 4D | 50 | 4D | 79 | 6H |
| 20 | 4D | KR31 | 4G | VR50 | 4W | 80 | 4C |
| KR20 | 6N | 32 | 4K | 50A5 | 6AA | 81 | 4B |
| RK21 | 4AB | A32 | 4Q | 50C6-G | 7AC | 82V | 4L |
| 22 | 4K | 32L7-GT | 8Z | 50L6-GT | 7AC | 83 | 4C |
| A-22 | 4D | 33 | 5K | 50Y6-GT | 7Q | 83V | 4L |
| AC22 | 5E | RK33/2C21 | 7BH | 50Z6-G | 7Q | 84/6Z4 | 5D |
| KR22 | 6N | 34 | 4M | 50Z7-G | 8AN | G-84 | 5D |
| RK22/3B23 | 4AN | RK34/2C34 | 7BL | 51 | 5E | 85 | 6G |
| K24 | 5E | 35 | 5E | 52 | 5C | 85AS | 6G |
| RK24 | 4D | 35A5-LT | 6AA | 53 | 7B | 85L7 | 8AB |
| 24A | 5E | 35L6-GT | 7AC | 55 | 6G | 85M | 7V |
| 24S | 5E | 35Y4 | 5AL | 56 | 5A | 85S | 6G |
| 25 | 6M | 35Z3-LT | 4Z | 56AS | 5A | 86M | 6Q |
| KR25 | 6B | 35Z4-GT | 5AA | 56S | 5A | 87S | 6F |
| 25A6 | 7S | 35Z5-GT | 6AD | 57 | 6F | 88 | 4C |
| 25A7-G | 8F | 35Z6-G | 7Q | 57AS | 6F | 88M | 7R |
| 25AC5-GT | 6Q | 36 | 5E | 57S | 6F | 88S | 6F |
| 25B5 | 6D | 37 | 5A | 58 | 6F | 89 | 6F |
| 25B6-G | 7S | 38 | 5F | 58AS | 6F | 89RS | 7N |
| 25B8-GT | 8T | 39/44 | 5F | 58S | 6F | VR105-30 | 4AJ |
| 25C6-G | 7AC | RK-39 | 5AW | 59 | 7A | 112A | 4D |
| 25D8-GT | 8AF | 40 | 4D | 59A | 7A | 113HY | 5K |
| 25L6 | 7AC | A40 | 4Q | 59S | 7A | HY-114B | 2T |
| 25N6-G | 7W | 40Z5 | 6AD | HY61/807 | 5AW | 115HY | 5K |
| 25S | 6M | 41 | 6B | RK62 | 4D | 117L7-GT | 8AO |
| 25X6-GT | 7Q | 41M | 7S | 64 | 5E | 117M7-GT | 8AO |
| 25Y4-GT | 5AA | 42 | 6B | 65 | 5E | 117N7-GT | 8AV |
| 25Y5 | 6E | 42A2 | 3S | 67 | 5A | 117P7-GT | 8AV |
| 25Z3 | 4G | 42B2 | 3S | 68 | 5E | 117Z4-GT | 5AA |
| 25Z4 | 5AA | 43 | 6B | 69 | 5E | 117Z6-GT | 7Q |
| 25Z5 | 6E | 43-MG | 7S | 70 | 6N | 125HY | 5K |
| 25Z6 | 7Q | 44 | 5F | 70A7-GT | 8AB | VR150-30 | 4AJ |
| 26 | 4D | 45 | 4D | 70L7-GT | 8AA | 165R | 4A |
| A26 | 4D | 45 special | 4D | 71A | 4D | 165R4 | 4A |
| 27 | 5A | 45Z3 | 5AM | 75 | 6G | 165R8 | 4A |
| 27HM | 5A | 45Z5-GT | 6AD | 75M | 7V | 181 | 4D |

SUPPLEMENTARY DATA

| <i>Tube</i> | <i>Base</i> | <i>Tube</i> | <i>Base</i> | <i>Tube</i> | <i>Base</i> | <i>Tube</i> | <i>Base</i> |
|-----------------|-------------|----------------|-------------|---------------|-------------|---------------|-------------|
| 182A | 4D | 310A | 6F | 840 | 5J | 1299/3D6 ... | 6BB |
| 182B | 4D | 311A | 5F | 841 | 4D | 1602 | 4D |
| 183/483 | 4D | 312A | 6BK | 842 | 4D | 1603 | 6F |
| 185R | 4A | 323A | 5AU | 843 | 5A | 1608 | 4D |
| 185R4 | 4A | 328 | 6F | 864 | 4D | 1609 | 5K |
| 185R8 | 4A | 348A | 7R | 865 | 4AR | 1610 | 5B |
| 210T | 4D | 349A | 7S | 866, 866A ... | 4P | 1612 | 7T |
| 213, 213B | 4C | 350A, WE 350A | | 874 | 4S | 1613 | 7S |
| 216, 216B | 4B | | 5AW | 878 | 4AU | 1614 | 7AC |
| 231D, WE 231D | | 350B | 7S | 879 | 4AB | 1616 | 4P |
| | 4D | 351A | 6S | 884 | 6Q | | |
| 239A | 4G | 383A | 5AT | 885 | 5A | 1619 | 7AC |
| 242C | 4D | 385A | 6BL | 941 | 4D | 1620 | 7R |
| 244A | 5A | 482A, 482B ... | 4D | 942 | 4D | 1621 | 7S |
| 245A | 4D | 483 | 4D | 942 | 4D | 1622 | 7AC |
| 249B | 4AU | 484 | 5A | 950 | 5K | 1625 | 5AZ |
| | | | | 951 | 4K | 1626 | 6Q |
| 252A | 4D | 485 | 5A | 954 | 5BB | 1629 | 7AL |
| 257 | 5B | 486 | 5S | 955 | 5BC | 1631 | 7AC |
| 257A, WE 257A | | WL578/8020 .. | 4P | 956 | 5BB | 1632 | 7AC |
| | 3Q | 585 | 4D | 957 | 5BD | 1633 | 8BD |
| 259A | 5E | 586 | 4D | 958 | 5BD | 1634 | 8S |
| 264 | 4D | HY-615B | 3P | 959 | 5BE | 1635 | 8B |
| 271A | 5A | 713, 713A, WE- | | 985 | 5D | 1642 | 7BH |
| 274-A | 4C | 713A | 8BK | 986 | 4C | 1851 | 7R |
| 274-B | 5T | 717, 717A, WE- | | 1005, CK1005 | 5AQ | 1852 | 8N |
| 275-A | 4D | 717A | 8BK | 1201/7E5 ... | 8BN | 1853 | 8N |
| 282-A | 4AR | 801, 801A ... | 4D | 1203 | 4AH | 2050 | 8BA |
| 283-A | 5A | 802 | 6BM | 1203/7C4 ... | 4AH | 7184, KR 7184 | 6BO |
| 287A | 5AU | 803 | 5J | 1204 | 8BO | 8005 | 3O |
| 291 | 5G | 804 | 5J | 1221 | 6F | 8013A | 4P |
| 293 | 5G | 807 | 5AW | 1223 | 7R | 8020/WL578 .. | 4P |
| 295 | 5G | 811 | 3O | 1231 | 8V | 9001 | 7BD |
| WE 300A | 4D | 812 | 3O | 1232 | 8V | 9002 | 7BS |
| WE 300B | 4D | 813 | 5BA | 1284 | 8V | 9003 | 7BD |
| 301A | 4C | 814 | 5J | 1291/3B7 ... | 7BE | 9004 | 4BJ |
| 307A, WE 307-A | | 816 | 4P | 1293 | 4AA | 9005 | 5BG |
| | 5J | | | | | | |
| 310 | 4D | 837 | 6BM | 1294 | 4AH | 9006 | 6BH |

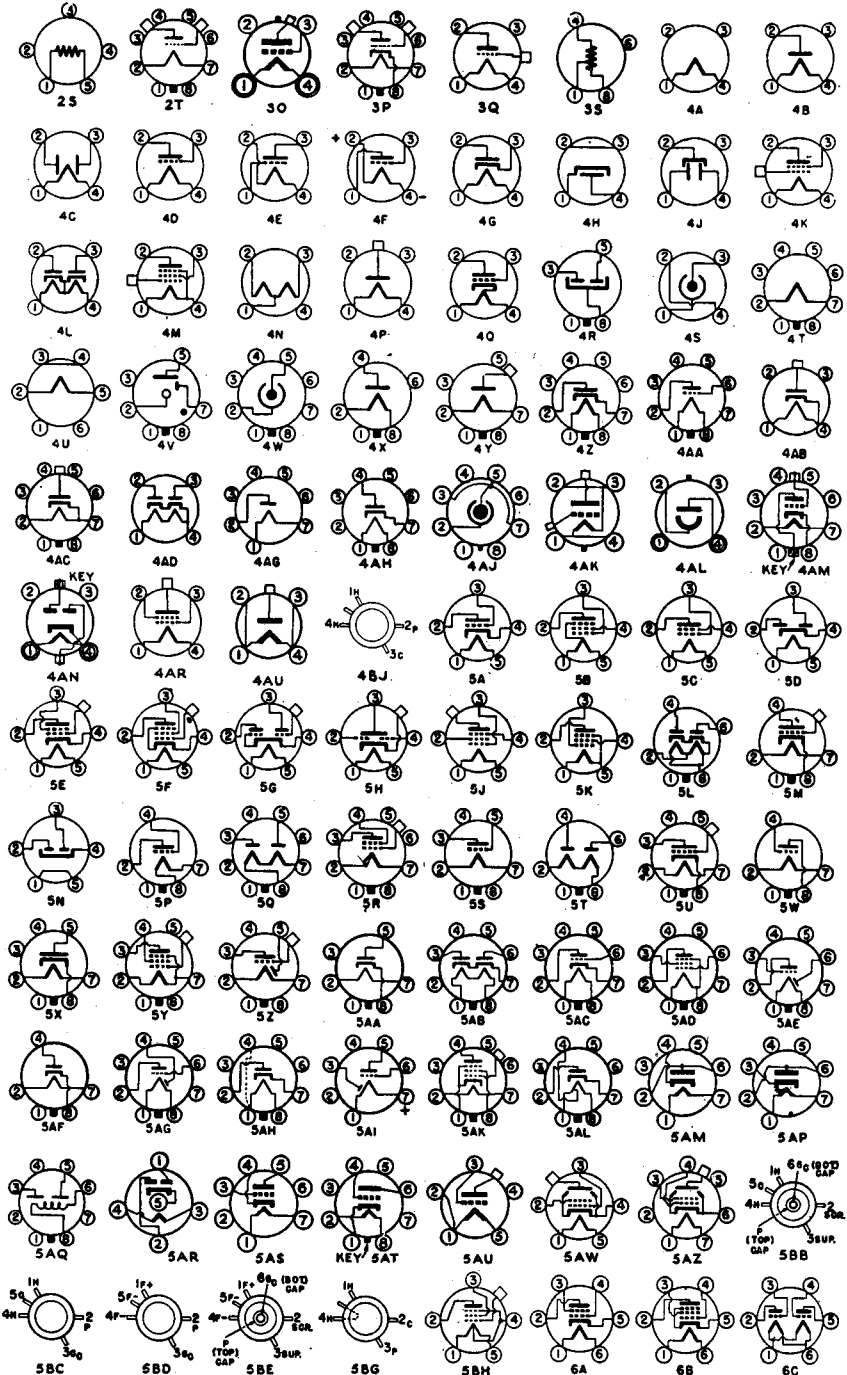


Figure 12.1. Tube base diagrams, 2S to 6C.

TL-7493a

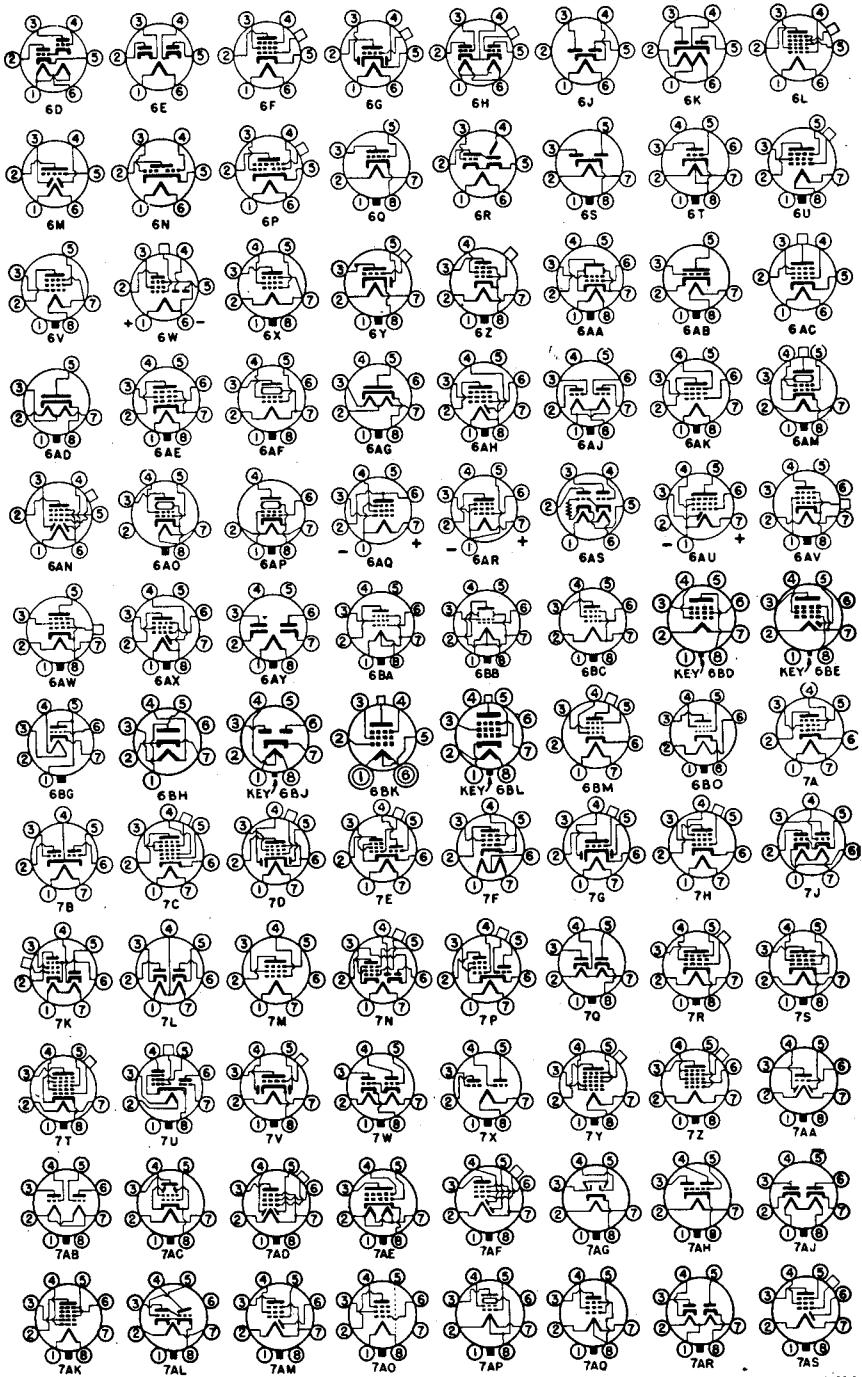


Figure 12.2. Tube base diagrams, 6D to 7AS.

TL-7494a

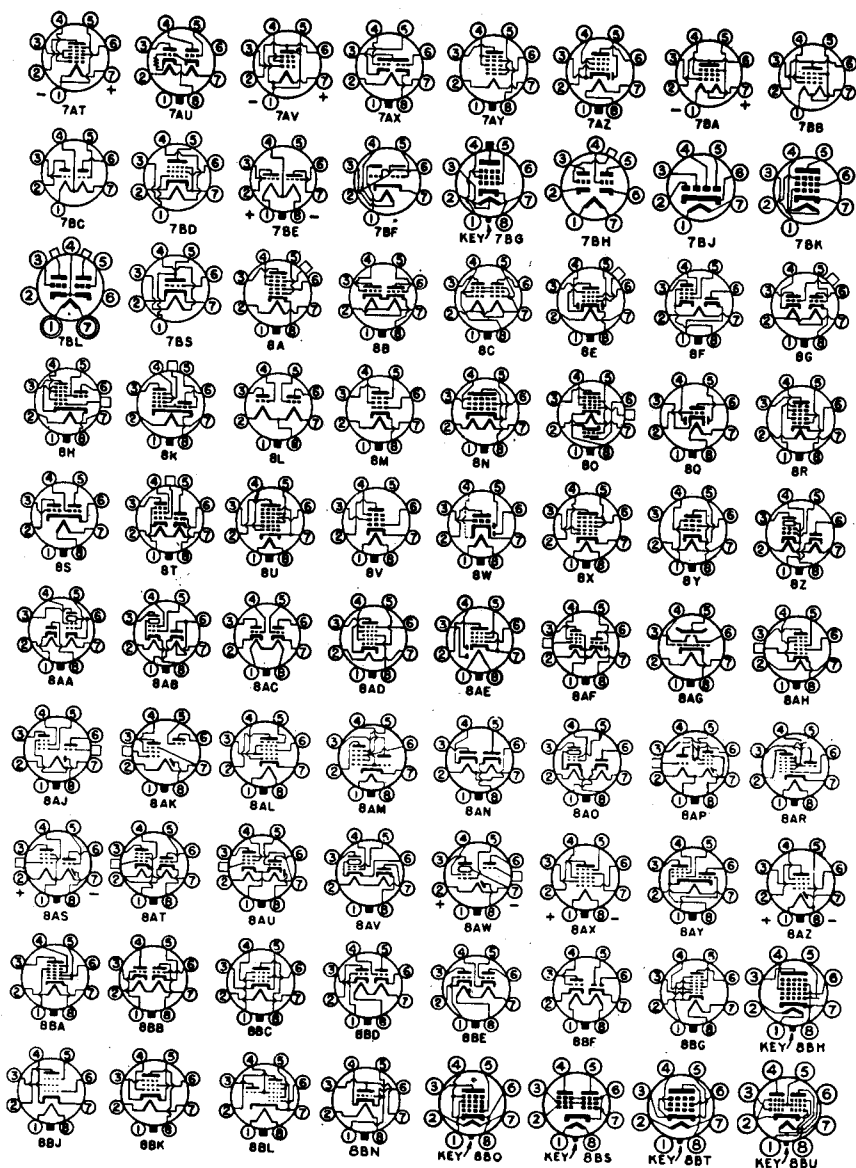


Figure 12.3. Tube base diagrams, 7AT to 8BU

TL-7495a

29. COMMERCIAL EQUIVALENTS OF SIGNAL CORPS TUBES.

| <i>Signal Corps tube</i> | <i>Commercial tube equivalent</i> | <i>Signal Corps tube</i> | <i>Commercial tube equivalent</i> | <i>Signal Corps tube</i> | <i>Commercial tube equivalent</i> |
|--------------------------|-----------------------------------|--------------------------|-----------------------------------|--------------------------|-----------------------------------|
| VT-2 | WE205B | VT-51 | 841, PT841, 941 | VT-90-A | |
| VT-4-B | 211, 242A, 311 | VT-52 | 45 Special | | 6H6GT, 6H6GT/G |
| VT-4-C | 211 Special | VT-54 | 34 | VT-91 | 6J7 |
| VT-5 | WE215A, 215A | VT-55 | 865 | VT-91-A | 6J7GT |
| VT-7 | WX12 | VT-56 | 56 | VT-92 | 6Q7 |
| VT-17 | 860 | VT 57 | 57 | VT-92-A | 6Q7G |
| VT-19 | 861 | VT-58 | 58 | VT-93 | 6B8 |
| VT-22 | 204A | VT-60 | 850 | VT-93-A | 6B8G |
| VT-24 | 864 | VT-62 | 801, 801A, 310 | VT-94 | 6J5 |
| VT-25 | 10 | VT-63 | 46 | VT-94-A | 6J5G |
| VT-25-A | 10 Special, 10Y | VT-64 | 800, RK30 | VT-94-D | 6J5GT |
| VT-26 | 22 | VT-65 | 6C5 | VT-95 | 2A3 |
| VT-27 | 30 | VT-65-A | 6C5G | VT-96 | 6N7 |
| VT-28 | 24, 24A | VT-66 | 6F6 | VT-97 | 5W4 |
| VT-29 | 27 | VT-66-A | 6F6G | | |
| VT-30 | 01A, 01 | VT-67 | 30 Special | VT-98 | |
| VT-31 | 31 | VT-68 | 6B7 | | 6U5/6G5, 6G5, 6U5 |
| VT-33 | 33 | VT-69 | 6D6 | VT-99 | 6F8G |
| VT-34 | 207, F307 | VT-70 | 6F7 | VT-100 | 807, RK39, HY61, HY61/807 |
| VT-35 | 35/51 | VT-72 | 842, 942 | VT-100-A | |
| VT-36 | 36, 36A | VT-73 | 843 | | 807, 807A, Modified |
| VT-37 | 37, 37A | VT-74 | 5Z4 | VT-101 | 837, RK44 |
| VT-38 | 38, 38A | VT-75 | 75 | VT-103 | 6SQ7 |
| VT-39 | 869 | VT-76 | 76 | VT-104 | 12SQ7 |
| VT-39-A | 869A, F369B | VT-77 | 77 | | |
| VT-40 | 40 | VT-78 | 78 | VT-105 | 6SC7 |
| VT-41 | 851, 951 | VT-80 | 80 | VT-106 | |
| VT-42 | 872, F-353A | VT-83 | 83 | | 803, RKE8A, WE322A |
| VT-42-A | 872 Special filament | VT-84 | 84/6Z4 | VT-107 | 6V6 |
| | | VT-86 | 6K7 | | |
| VT-43 | A45, 845, 945, WE284D, 384D | VT-86-A | 6K7G | VT-107-A | |
| VT-44 | 32 | VT-86-B | 6K7GT | | 6V6GT, 6V6GT/G |
| VT-45 | 45 | VT-87 | 6L7 | VT-107-B | 6V6G |
| VT-46 | 866, 966 | VT-87-A | 6L7G | VT-108 | 450TH, WL450, HK854H |
| | | VT-88 | 6R7 | | |
| VT-46-A | 866A, 966A | VT-88-A | 6R7G | VT-109 | 2051, WL630 |
| VT-47 | 47 | VT-88-B | 6R7GT | VT-111 | 2525D5, 5BP4/1808P4, 1802P4 |
| VT-48 | 41 | VT-89 | 89 | VT-112 | 6AC7/1852, 1852 |
| VT-49 | 39/44 | VT-90 | 6H6 | VT-114 | 5T4 |
| VT-50 | 50, 585, 586 | | | | |

| <i>Signal Corps tube</i> | <i>Commercial tube equivalent</i> | <i>Signal Corps tube</i> | <i>Commercial tube equivalent</i> | <i>Signal Corps tube</i> | <i>Commercial tube equivalent</i> |
|----------------------------------|---|----------------------------------|---|----------------------------------|---|
| VT-115 | 6L6 | VT-141 | 53L, WL531 | VT-178 | 1LC6 |
| VT-115-A | 6L6G, 6L6GA | VT-142 | WE31DY1 | VT-179 | 1LN5 |
| VT-116, VT-116-B... | 6SJ7 | VT-143 | 805, WE331A, 905, RK57 | VT-180 | 3LF4 |
| VT-116A | 6SJ7GT | VT-144 | 813 | VT-181 | 7Z4 |
| VT-116-B | 6SJ7Y, 6SJ7 special (micanol or ceramic base) | VT-145 | 5Z3 | VT-182 | 3E7/1291, 3B7, 1291 |
| VT-117 | 6SK7 | VT-146 | IN5GT, IN5GT/G | VT-183 | 1R4/1294, 1294, 1R4 |
| VT-117-A | 6SK7GT | VT-147 | 1A7GT | VT-184 | VR90-30, OB3/VR90, VR90 |
| VT-118 | 832 | VT-148 | 1D8GT | VT-185 | 3D6/1299, 3D6, 1299 |
| VT-119 | 2X2/879 | VT-149 | 3A8GT | VT-187 | 575A, F375A, 975A, GL512 |
| VT-120 | 954 | VT-150 | 6SA7 | VT-188 | 7E6 |
| VT-121 | 955 | VT-150-A | 6SA7GT | VT-189 | 7F7 |
| VT-122 | WL530, 530 | VT-151 | 6A8G | VT-190 | 7H7 |
| VT-124 | 1A5GT, 1A5GT/G | VT-151-B | 6A8GT | VT-191 | 316A |
| VT-125 | 1C5GT, 1C5GT/G | VT-152 | 6K6GT, 6K6GT/G | VT-192 | 7A4 |
| VT-126 | 6X5 | VT-152-A | 6K6G | VT-193 | 7C7 |
| VT-126-A | 6X5G | VT-153 | 12C8 special | VT-194 | 7J7 |
| VT-126-B | 6X5GT, 6X5GT/G | VT-154 | 814, 12C8Y, RK47 | VT-195 .. | CK1005, 1005 |
| VT-127 | 100TS | VT-161..814(GL), 12SA7 | 12SJ7 | VT-196 | 6W5C |
| VT-127-A | 100TS modified | VT-162 | 6C8G | VT-197-A | 5Y3GT/G, 5Y3GT |
| VT-128 | 1630, A5588 | VT-163 | 1619 | VT-198-A | 6G6G |
| VT-129 | 304TL, WL525, HK304L | VT-164 | 1624 | VT-199 | 6SS7 |
| VT-130 250TL, HK454L | | VT-165 | 371A, | VT-200 | VR105-30, VR105 |
| VT-131 | 12SK7 | VT-166 | AmpereX 221A, WE371A | VT-201 | 25L6 |
| VT-132 | 12K8 special, 12K8 | VT-167 | 6K8 | VT-201-C | 25L6GT, 25L6GT/G |
| VT-133 | 12SR7 | VT-167-A | 6K8G | VT-202 | 9002 |
| VT-134 | 12A6 | VT-168-A | 6Y6G | VT-203 | 9003 |
| VT-135 | 12J5GT | VT-169 | 12C8 | VT-204 ... | 3C24, HK24G |
| VT-135-A | 12J5 | VT-170 | 1E5GP | VT-205 | 6ST7 |
| VT-136 | 1625 | VT-171 | 1R5 | VT-206-A .. | 5V4G, 274B |
| VT-137 | 1626 | VT-171-A ... | 1R5 loctal | VT-207 | 12AH7GT |
| VT-138 | 1629 | VT-172 | 1S5 | VT-208 | 7B8 |
| VT-139 .. | OD3/VR150, VR150-30, VA150 | VT-173 | 1T4 | VT-209 | 12SG7 |
| | | VT-174 | 3S4 | VT-210 | 1S4 |
| | | VT-175 ... | 1613, 6L6GX | VT-211 | 6SG7 |
| | | VT-176 | 6AB7/1853, 6AB7, 1853 | | |
| | | VT-177 | 1LH4 | | |

SUPPLEMENTARY DATA

| <i>Signal Corps tube</i> | <i>Commercial tube equivalent</i> | <i>Signal Corps tube</i> | <i>Commercial tube *</i> <i>equivalent</i> | <i>Signal Corps tube</i> | <i>Commercial tube equivalent</i> |
|--------------------------|-----------------------------------|--------------------------|---|--------------------------|--|
| VT-212 | 958 | VT-232 | | VT-251 | WL441 series, 2J30 to 2J34S "K" series |
| VT-213-A | 6L5G | 1148, E1148, HYE1148 | | VT-252 | 923 |
| VT-214 | 12H6 | VT-233 | 6SR7 | VT-254 | 304TH, WL535, HK304M |
| VT-215 | 6E5 | VT-234 | | | |
| VT-216 | .816, 866JR, 2B26 | | HY/114B, NU114B | | |
| VT-217 | 811 | VT-235 | HY615, NU615 | VT-255 | |
| VT-218 | 100TH, RK38 | VT-236 | 836 | 705A, 8021, WE705A | |
| VT-219 | 8007 | VT-237 | 957 | VT-256 | GL486, ZP486 |
| VT-220 | | VT-238 | 956 | VT-257 | K-7 |
| | 250TH, RK63, HK454 | VT-239 | 1LE3 | VT-259 | 829 |
| VT-221 | | VT-240 | 710A, WL538, 8011, WE710A | VT-260 | VR75-30 |
| | 3Q5GT, 3Q5GT/G | VT-241 | | VT-264 | 3Q4 |
| VT-222 | 884 | | 7E5/1201, 7E5, 1201 | VT-266 | .1616, 866JR, 660 |
| VT-223 | | VT-243 | | VT-267 | 578, WL578 |
| | 1H5GT, 1H5GT/G | | 7C4/1203A, 7C4, 1203 | VT-268 | 12SC7 |
| VT-224 | RK34 | VT-244 | 5U4G | VT-269 | .717A, WE717A |
| VT-225 | WE307A, 307A | VT-245 | 2050 | VT-277 | 417, WL417 |
| VT-226 | 3EP1/1806P1, 3EP1, 1806P1 | VT-246 | .918, CE1, PJ23 | VT-279 | GY2, D161831 |
| VT-227 | 7184, KR7184 | VT-247 | 6AG7 | VT-282 | ZG489 |
| | | | | VT-286 | 832A |
| VT-228 | 8012 | VT-248 | 3CP1/1808P1, 3CP1-S1, 3CP1, 1808P1 | VT-287 | 815 |
| VT-229 | 6SL7GT | VT-249 | CK1006, 1006 | VT-288 | 12SH7 |
| VT-230 | 350A | VT-250 | EF50 | VT-289 | 12SL7GT |
| VT-231 | 6SN7GT | | | | |

30. SIGNAL CORPS EQUIVALENTS OF COMMERCIAL TUBES.

| <i>Commercial type</i> | <i>Signal Corps equivalent</i> | <i>Commercial type</i> | <i>Signal Corps equivalent</i> | <i>Commercial type</i> | <i>Signal Corps equivalent</i> |
|------------------------|--------------------------------|------------------------|--------------------------------|-------------------------|--------------------------------|
| 01, 01A | VT-30 | 1LE3 | VT-239 | 2A3 | VT-95 |
| CE1 | VT-246 | 1LH4 | VT-177 | 2B26 | VT-46-A |
| 1A5GT, 1A5GT/G | | 1LN5 | VT-179 | 2J30 to 2J34 "K" series | VT-251 |
| | VT-124 | 1N5GT, 1N5GT/G | | 2X2/879, 2X2 | VT-119 |
| 1A7GT | VT-147 | | VT-146 | | |
| 1C5GT, 1C5GT/G | | 1R4, 1R4/1294 | VT-183 | OA3/VR75 | VT-260 |
| | VT-125 | 1R5 | VT-171 | OB3/VR90 | VT-184 |
| 1D8GT | VT-148 | 1R5 (loctal) | VT-171-A | OC3/VR105 | VT-200 |
| 1E5GP | VT-170 | 1S4 | VT-210 | OD3/VR150 | VT-139 |
| 1H5GT, 1H5GT/B | | 1S5 | VT-172 | 3A8GT | VT-149 |
| | VT-223 | 1T4 | VT-173 | 3B7, 3B7/1291 | VT-182 |
| 1LC6 | VT-178 | GY2 | VT-279 | 3C24 | VT-204 |

| <i>Commercial type</i> | <i>Signal Corps equivalent</i> | <i>Commercial type</i> | <i>Signal Corps equivalent</i> | <i>Commercial type</i> | <i>Signal Corps equivalent</i> |
|-------------------------------------|--------------------------------|---------------------------------|--------------------------------|-------------------------------|--------------------------------|
| 3CP1, 3CP1/1808P1, 3CP1-S1 | VT-248 | 6G6G | VT-198-A | 6U5, 6U5/6G5 .. | VT-98 |
| 3D6, 3D6/1299 .. | VT-185 | 6H6 | VT-90 | 6V6 | VT-107 |
| 3EP1, 3EP1/1806P1 VT-226 | | 6H6GT, 6H6GT/G VT-90-A | | 6V6GT, 6V6GT/G VT-107-A | |
| 3LF4 | VT-180 | 6J5 | VT-94 | 6V6G | VT-107-B |
| 3Q4 | VT-264 | 6J5G | VT-94-A | 6W5-6 | VT-196 |
| 3Q5GT, 3Q5GT/G | VT-221 | 6J6GT | VT-94-D | 6X5 | VT-126 |
| 3S4 | VT-174 | 6J7 | VT-91 | 6X5G | VT-126-A |
| | | 6J7GT | VT-91-A | 6X5GT, 6X5GT/G VT-126-B | |
| | | 6K6G | VT-152-A | | |
| 5BP4, 5BP4/1802P4 VT-111 | | 6K6GT, 6K6GT/G VT-152 | | 6Y6G | VT-168-A |
| 5T4 | VT-114 | 6K7 | VT-86 | 6Z4, 6Z4/84 | VT-84 |
| 5U4G | VT-244 | 6K7G | VT-86-A | K-7 | VT-257 |
| 5V4G | VT-206-A | 6K7G F | VT-86-B | 7A4 | VT-192 |
| | | | | 7B8 | VT-208 |
| 5W4 | VT-97 | 6K8 | VT-167 | 7C4, 7C4/1203A . | VT-243 |
| 5Y3-GT, 5YGT/G VT-197-A | | 6K8G | VT-167-A | 7C7 | VT-193 |
| 5Z3 | VT-145 | 6L5G | VT-213-A | 7E5, 7E5/1201 .. | VT-241 |
| 5Z4 | VT-74 | 6L6 | VT-115 | 7E6 | VT-188 |
| | | 6L6G, 6L6GA.. | VT-115-A | 7F7 | VT-189 |
| 6A8G | VT-151 | 6L6GX | VT-175 | 7H7 | VT-190 |
| 6A8GT | VT-151-B | 6L7 | VT-87 | 7J7 | VT-194 |
| 6AB7, 6AB7/1853 VT-176 | | 6Q7 | VT-92 | 7Z4 | VT-181 |
| 6AC7, 6AC7/1852 VT-112 | | 6Q7G | VT-92-A | 10 | VT-25 |
| | | 6R7 | VT-88 | 10Y, 10 special.. | VT-25-A |
| | | 6R7GT | VT-88-B | WX12 | VT-7 |
| 6AG7 | VT-247 | 6SA7 | VT-150 | 12A6 | VT-134 |
| 6B7 | VT-68 | 6SA7GT | VT-150-A | 12AH7GT | VT-207 |
| 6B8 | VT-93 | 6SC7 | VT-105 | 12C8 | VT-169 |
| 6B8G | VT-93-A | 6SG7 | VT-211 | 12C8Y, 12C8 special VT-153 | |
| 6C5 | VT-65 | 6SJ7 | VT-116 | | |
| 6C5G | VT-65-A | 6SJ7GT | VT-116-A | 12H6 | VT-214 |
| 6C8G | VT-163 | 6SJ7Y, 6SJ7 special VT-116-B | | 12J5 | VT-135-A |
| 6D6 | VT-69 | | | 12J5-GT | VT-135 |
| 6E5 | VT-215 | 6SK7 | VT-117 | 12K8, 12K8 special VT-132 | |
| 6F6 | VT-66 | 6SK7GT, 6SK7GT/G VT-117-A | | | |
| 6F6G | VT-66-A | 6SL7GT | VT-229 | 12SA7 | VT-161 |
| 6F7 | VT-70 | 6SN7GT | VT-231 | 12SC7 | VT-268 |
| 6F8G | VT-99 | 6SQ7 | VT-103 | 12SG7 | VT-209 |
| 6L7G | VT-87-A | 6SR7 | VT-233 | 12SH7 | VT-288 |
| 6N7 | VT-96 | 6SS7 | VT-199 | 12SJ7 | VT-162 |
| | | | | 12SK7 | VT-131 |
| 6G5 | VT-98 | 6ST7 | VT-205 | 12SL7-GT | VT-289 |

SUPPLEMENTARY DATA

| <i>Commercial type</i> | <i>Signal Corps equivalent</i> | <i>Commercial type</i> | <i>Signal Corps equivalent</i> | <i>Commercial type</i> | <i>Signal Corps equivalent</i> |
|------------------------|--------------------------------|------------------------|--------------------------------|------------------------|--------------------------------|
| 12SQ7 | VT-104 | 57 | VT-57 | 310 | VT-62 |
| 12SR7 | VT-133 | 58 | VT-58 | 311 | VT-4-B |
| 22 | VT-26 | HY61, HY61/807 | VT-100 | WE316A | VT-191 |
| PJ23 | VT-246 | RK63 | VT-220 | WE322A | VT-106 |
| 24, 24A | VT-28 | 75 | VT-75 | WE331A | VT-143 |
| HK24G | VT-204 | VR75-30 | VT-260 | WE350A | VT-230 |
| 25L6 | VT-201 | 76 | VT-76 | F353A | VT-42 |
| 25L6GT, 25L6GT/G | VT-201-C | 77 | VT-77 | F369B | VT-39-A |
| 27 | VT-29 | 78 | VT-78 | 371A, WE371A | VT-166 |
| | | 80 | VT-80 | F375A | VT-187 |
| RK28A | VT-106 | 83 | VT-83 | 384D | VT-43 |
| 30 | VT-27 | 84, 84/6Z4 | VT-84 | 417, WL417 | VT-277 |
| 30 special | VT-67 | 89 | VT-89 | WL441 series | VT-251 |
| RK30 | VT-64 | VR90, VR90-30 | VT-184 | 450TH, WL450 | VT-108 |
| 31 | VT-31 | 98 | VT-84 | HK454H | VT-220 |
| 32 | VT-44 | 100TH | VT-218 | HK454L | VT-130 |
| 33 | VT-33 | 100TS | VT-127 | ZP486, GL486 | VT-256 |
| 34 | VT-54 | 100TS modified | VT-127-A | ZG489 | VT-282 |
| RK34 | VT-224 | | | GL512 | VT-187 |
| 35, 35/51 | VT-35 | VR105, VR105-30 | VT-200 | WL525 | VT-129 |
| 36, 36A | VT-36 | HY114B, NU114B | VT-234 | 530, WL530 | VT-122 |
| 37, 37A | VT-37 | | | 531, WL531 | VT-141 |
| 38, 38A | VT-38 | VR150, VR150-30 | VT-139 | WL535 | VT-254 |
| RK38 | VT-218 | | | WL538 | VT-240 |
| 39, 39/44 | VT-49 | 204A | VT-22 | 575A | VT-187 |
| WE39DY1 | VT-142 | WE205B | VT-2 | 578, WL578 | VT-267 |
| RK39 | VT-100 | 207 | VT-34 | 585, 586 | VT-50 |
| 40 | VT-40 | 211 | VT-4-B | HY615, NU615 | VT-235 |
| 41 | VT-48 | 211 special | VT-4-C | WL630 | VT-109 |
| 44 | VT-49 | 215A, WE215A | VT-5 | WE705A | VT-255 |
| RK44 | VT-101 | Amperex 221A | VT-166 | 710A, WE710A | VT-240 |
| 45 | VT-45 | 242A | VT-4-B | WE717A | VT-269 |
| A45 | VT-43 | 250TH | VT-220 | 800 | VT-64 |
| 45 special | VT-52 | 250TL | VT-130 | 801, 801A | VT-62 |
| 46 | VT-63 | 274B | VT-206-A | 803 | VT-106 |
| 47 | VT-47 | WE284D | VT-43 | 805 | VT-143 |
| RK47 | VT-154 | HK304L | VT-129 | 807 | VT-100 |
| 50 | VT-50 | 304TH, HK304M | VT-254 | 807A, 807 modified | VT-100-A |
| EF50 | VT-250 | | | 811 | VT-217 |
| 51 | VT-35 | 304TL | VT-129 | 813 | VT-144 |
| 56 | VT-56 | F307 | VT-34 | 814, 814 (GL) | VT-154 |
| RK57 | VT-143 | 307A, WE307A | VT-225 | | |

| <i>Commercial type</i> | <i>Signal Corps equivalent</i> | <i>Commercial type</i> | <i>Signal Corps equivalent</i> | <i>Commercial type</i> | <i>Signal Corps equivalent</i> |
|------------------------|--------------------------------|------------------------|--------------------------------|------------------------|--------------------------------|
| 815 | VT-287 | 905 | VT-143 | 1613 | VT-175 |
| 816 | VT-216 | 918 | VT-246 | 1616 | VT-266 |
| 829 | VT-259 | 923 | VT-252 | 1619 | VT-164 |
| 832 | VT-118 | CW931 | VT-2 | 1624 | VT-165 |
| 832A | VT-286 | 941 | VT-51 | 1625 | VT-136 |
| 836 | VT-236 | 942 | VT-72 | 1626 | VT-137 |
| 837 | VT-101 | 945 | VT-43 | 1629 | VT-138 |
| 841, PT841 | VT-51 | 951 | VT-41 | 1630 | VT-128 |
| 842 | VT-72 | 954 | VT-120 | 1802P4 | VT-111 |
| 843 | VT-73 | 955 | VT-121 | 1806P1 | VT-226 |
| 845 | VT-43 | 956 | VT-238 | 1808P1 | VT-248 |
| 850 | VT-60 | 957 | VT-237 | 1852 | VT-112 |
| 851 | VT-41 | 958 | VT-212 | 1853 | VT-176 |
| HK854H | VT-108 | 966 | VT-46 | 2050 | VT-245 |
| 860 | VT-17 | 966A | VT-46-A | 2051 | VT-109 |
| 861 | VT-19 | 972 | VT-42 | 2525D5 | VT-111 |
| 864, 864 special .. | VT-24 | 975A | VT-187 | A5586 | VT-123 |
| 865 | VT-55 | 1005, CK1005 .. | VT-195 | A5588 | VT-128 |
| 866 | VT-46 | 1006, CK1006 .. | VT-249 | 7184, KR7184 .. | VT-227 |
| 866A, 866JR ... | VT-46-A | 1148, E1148, HY- | | 8007 | VT-219 |
| 869 | VT-39 | E1148 | • VT-232 | 8011 | VT-240 |
| 869A | VT-39-A | 1201 | VT-241 | 8012 | VT-228 |
| 872 | VT-42 | 1203A | VT-243 | 8021 | VT-255 |
| 872A | VT-42-A | 1291 | VT-182 | 9002 | VT-202 |
| 879 | VT-119 | 1294 | VT-183 | 9003 | VT-203 |
| 884 | VT-222 | 1299 | VT-185 | D161831 | VT-279 |

31. TUBE TEST DATA.

NOTE: A Star (★) appearing in Notations Column indicates that the PLATE CAP of the tube should be connected to the UPPER LEFT CONTACT of the 6-pin socket. A 12-inch lead with clip and banana plug is provided for that purpose.

| <i>Tube Type</i> | <i>Socket Letter</i> | <i>Select.</i> | | <i>Fil. Volts</i> | <i>Potent.</i> | | <i>Mut.</i> | | <i>Notations</i> |
|------------------|----------------------|----------------|----------|-------------------|----------------|----------|--------------|-----------------------------|------------------|
| | | <i>A</i> | <i>B</i> | | <i>L</i> | <i>R</i> | <i>Cond.</i> | <i>Press</i> | |
| 00A | A | 2 | 10 | 5 | 23 | 27 | 666 | Ampl. | |
| 0A4G | E | 10 | 2 | † | 15 | 0 | .... | Diode †Tube strikes at 50V. | |
| 01A | A | 2 | 10 | 5 | 26 | 39 | 725 | Ampl. | |
| 0Z4 | E | 4 | 8 | ... | ... | ... | .... | Check for Shorts | |
| 0Z4 | E | 2 | 9 | ... | 60 | 0 | .... | 0Z4 Button | |
| 0Z4 | E | 10 | 2 | ... | 60 | 0 | .... | 0Z4 Button | |
| 1A3 | H | 10 | 5 | 1.5 | 0 | 0 | .... | Diode Also Press 117N7 But. | |
| 1A4 | A | 2 | 5 | 1 | 27 | 24 | 750 | Ampl. | |
| 1A5G | E | 8 | 5 | 1.5 | 32 | 35 | 800 | Ampl. | |
| 1A6 | C | 1 | 5 | 2 | 0 | 29 | 500 | Ampl. Section | |
| 1A6 | C | 9 | 7 | 2 | 60 | 29 | 150 | Ampl. Osc. Sec. OK over 120 | |
| 1A7G | E | 7 | 7 | 1.5 | 32 | 20 | 800 | Ampl. Pent. Section | |
| 1A7G | E | 12 | 7 | 1.5 | 60 | 38 | 300 | Ampl. Osc. Sec. OK over 240 | |
| 1B4 | A | 2 | 5 | 2 | 18 | 29 | 640 | Ampl. | |
| 1B5 | C | 7 | 8 | 2 | 60 | 23 | 475 | Ampl. Sec. OK over 380 | |
| 1B5 | C | 10 | 8 | 2 | 0 | 0 | .... | Diode But. | |
| 1B5 | C | 12 | 3 | 2 | 0 | 0 | .... | Diode But. | |
| 1B7G | E | 7 | 7 | 1.5 | 32 | 20 | 800 | Ampl. Pent. Section | |
| 1B7G | E | 12 | 7 | 1.5 | 60 | 38 | 300 | Ampl. Osc. Sec. OK over 240 | |
| 1C5G | E | 8 | 5 | 1.5 | 55 | 36 | 1550 | Ampl. | |
| 1C6 | C | 1 | 5 | 2 | 20 | 24 | 560 | Ampl. Section | |
| 1C6 | C | 9 | 7 | 2 | 60 | 41 | 300 | Ampl. Osc. Sec. OK over 240 | |
| 1C7G | E | 2 | 5 | 2 | 20 | 24 | 650 | Ampl. Section | |
| 1C7G | E | 12 | 7 | 2 | 60 | 41 | 300 | Ampl. Osc. Sec. OK over 240 | |
| 1D5G | E | 2 | 5 | 2 | 27 | 24 | 750 | Ampl. | |
| 1D7G | E | 2 | 5 | 2 | 0 | 29 | 500 | Ampl. Section | |
| 1D7G | F | 12 | 7 | 2 | 60 | 35 | 200 | Ampl. Osc. Sec. OK over 160 | |
| 1D8GT | F | 8 | 5 | 1.5 | 35 | 41 | 925 | Ampl. Pent. Section | |
| 1D8GT | F | 11 | 5 | 1.5 | 11 | 9 | 575 | Ampl. Triode Section | |
| 1D8GT | E | 5 | 1 | 1.5 | 0 | 0 | .... | Diode Section | |
| 1E4G | E | 7 | 5 | 1.5 | 32 | 30 | 825 | Ampl. | |
| 1E5G | E | 2 | 5 | 2 | 18 | 29 | 640 | Ampl. | |
| 1E7G | E | 8 | 8 | 2 | 45 | 17 | 1150 | Ampl. No. 1 Plate | |
| 1E7G | E | 11 | 6 | 2 | 45 | 17 | 1150 | Ampl. No. 2 Plate | |
| 1F4 | B | 1 | 5 | 2 | 51 | 19 | 1400 | Ampl. | |
| 1F5G | E | 8 | 5 | 2 | 51 | 19 | 1400 | Ampl. | |
| 1F6 | C | 1 | 7 | 2 | 20 | 21 | 650 | Ampl. Section | |
| 1F6 | C | 11 | 1 | 2 | 0 | 0 | .... | Diode But. OK over 500 | |
| 1F6 | C | 5 | 5 | 2 | 0 | 0 | .... | Diode But. OK over 500 | |

| Tube Type | Socket Letter | Select. | | Fil. Volts | Potent. | | Mut. Cond. Press | | Notations |
|-----------|---------------|---------|----|------------|---------|----|------------------|---|-----------|
| | | A | B | | L | R | | | |
| 1F7G | E | 1 | 5 | 2 | 20 | 21 | 650 | Ampl. Pentode Sec. | |
| 1F7G | E | 4 | 5 | 2 | 0 | 0 | .... | Diode Button | |
| 1F7G | E | 7 | 1 | 2 | 0 | 0 | .... | Diode Button | |
| 1G4G | E | 7 | 5 | 1.5 | 33 | 40 | 825 | Ampl. | |
| 1G5G | E | 8 | 5 | 2 | 54 | 30 | 1500 | Ampl. | |
| 1G6G | E | 2 | 9 | 1.5 | 22 | 13 | 675 | Ampl. No. 1 Plate | |
| 1G6G | E | 12 | 5 | 1.5 | 22 | 13 | 675 | Ampl. No. 2 Plate | |
| 1H4G | E | 7 | 5 | 2 | 36 | 33 | 900 | Ampl. | |
| 1H5G | E | 8 | 5 | 1.5 | 60 | 13 | 275 | Ampl. OK over 220 | |
| 1H5G | E | 8 | 1 | 1.5 | 0 | 0 | .... | Diode Button | |
| 1H6G | E | 7 | 8 | 2 | 60 | 23 | 475 | Ampl. Section | |
| 1H6G | E | 10 | 8 | 2 | 0 | 0 | .... | Diode Button | |
| 1H6G | E | 11 | 3 | 2 | 0 | 0 | .... | Diode Button | |
| 1J5G | E | 8 | 5 | 2 | 37 | 37 | 950 | Ampl. | |
| 1J6G | E | 8 | 8 | 2 | 42 | 12 | 1000 | Ampl. No. 1 Plate | |
| 1J6G | E | 11 | 6 | 2 | 42 | 12 | 1000 | Ampl. No. 2 Plate | |
| 1L4 | H | 1 | 7 | 1.5 | 43 | 16 | 1025 | Ampl. Short on 4-5 | |
| 1LA4 | F | 6 | 2 | 1.5 | 32 | 35 | 800 | Ampl. | |
| 1LA6 | F | 6 | 3 | 1.5 | 32 | 20 | 800 | Ampl. Pent. Section | |
| 1LA6 | F | 2 | 8 | 1.5 | 60 | 38 | 300 | Ampl. Osc. Sec. OK over 240 | |
| 1LB4 | F | 6 | 2 | 1.5 | 38 | 42 | 925 | Ampl. | |
| 1LC5 | F | 6 | 2 | 1.5 | 30 | 24 | 775 | Ampl. Short on 4-5 | |
| 1LC6 | F | 6 | 3 | 1.5 | 41 | 19 | 1000 | Ampl. Pent. Sect. | |
| 1LC6 | F | 2 | 8 | 1.5 | 10 | 19 | 550 | Ampl. Osc. Sect. | |
| 1LD5 | F | 6 | 2 | 1.5 | 14 | 23 | 600 | Ampl. Pent. Sec. | |
| 1LD5 | F | 4 | 9 | 1.5 | 0 | 0 | .... | Diode | |
| 1LE3 | F | 6 | 2 | 1.5 | 50 | 0 | 1300 | Ampl. | |
| 1LH4 | F | 6 | 3 | 1.5 | 60 | 13 | 275 | Ampl. Sec. OK over 220 | |
| 1LH4 | F | 10 | 10 | 1.5 | 0 | 0 | .... | Diode Section | |
| 1LN5 | F | 6 | 2 | 1.5 | 28 | 9 | 750 | Ampl. Short on 4-5 | |
| 1N5G | E | 8 | 5 | 1.5 | 28 | 9 | 750 | Ampl. | |
| 1N6G | E | 8 | 5 | 1.5 | 31 | 35 | 800 | Ampl. | |
| 1P5G | E | 8 | 5 | 1.5 | 31 | 9 | 800 | Ampl. | |
| 1Q5G | E | 8 | 5 | 1.5 | 61 | 30 | 2100 | Ampl. | |
| 1R4 | F | 10 | 5 | 1.5 | 0 | 0 | .... | Diode | |
| 1R5 | H | 7 | 7 | 1.5 | 19 | 29 | 650 | Ampl. No. 1 Grid, Short on 4-5 | |
| 1R5 | H | 1 | 7 | 1.5 | 0 | 29 | 500 | Ampl. No. 2 Grid | |
| 1S4 | H | 4 | 6 | 1.5 | 34 | 82 | 850 | Diode Button, Short on 3-4-5 | |
| 1S5 | H | 6 | 6 | 1.5 | 9 | 28 | 525 | Ampl. Pent. Section | |
| 1S5 | H | 3 | 6 | 1.5 | 0 | 0 | .... | Diode | |
| 1SA6GT | E | 3 | 4 | 1.5 | 39 | 19 | 950 | Ampl. | |
| 1SB6GT | E | 2 | 5 | 1.5 | 20 | 22 | 650 | Ampl. | |
| 1T4 | H | 1 | 7 | 1.5 | 28 | 28 | 750 | Ampl. Short on 4-5 | |
| 1T5GT | E | 8 | 5 | 1.5 | 46 | 37 | 1150 | Ampl. | |
| 1V | A | 1 | 5 | 6.3 | 40 | 0 | .... | Rect. St. | |
| 2A3 | A | 2 | 10 | 2.5 | 67 | 55 | 3000 | Ampl. | |
| 2A4G | E | 7 | 5 | 2.5 | 76 | * | .... | Press Rect. Std. But. Tube strikes at about 60 | |
| 2A5 | C | 8 | 5 | 2.5 | 60 | 24 | 2000 | Ampl. | |

SUPPLEMENTARY DATA

| Tube Type | Socket Letter | Select. | | Fil. Volts | Potent. | | Mut. Cond. | Press | Notations |
|-----------|---------------|---------|----|------------|---------|----|------------|-------|--------------------------------|
| | | A | B | | L | R | | | |
| 2A6 | C | 7 | 6 | 2.5 | 28 | 9 | 750 | | Ampl. Section |
| 2A6 | C | 10 | 6 | 2.5 | 0 | 0 | .... |  | Diode Button |
| 2A6 | C | 10 | 3 | 2.5 | 0 | 0 | .... |  | Diode Button |
| 2A7 | D | 7 | 6 | 2.5 | 41 | 18 | 1000 | | Ampl. Section |
| 2A7 | D | 10 | 6 | 2.5 | 60 | 25 | 400 | | Ampl. Osc. OK over 320 |
| 2B6 | D | 3 | 2 | 2.5 | 15 | 30 | 600 | | Ampl. Input Section |
| 2B6 | D | 7 | 6 | 2.5 | 64 | 12 | 2500 | | Ampl. Output Sec. Short on 3 |
| 2B7 | D | 7 | 6 | 2.5 | 41 | 25 | 1000 | | Ampl. Pentode Section |
| 2B7 | D | 10 | 6 | 2.5 | 0 | 0 | .... |  | Diode Button |
| 2B7 | D | 10 | 3 | 2.5 | 0 | 0 | .... |  | Diode Button |
| 2C21 | D | 10 | 3 | 6.3 | 51 | 14 | 1375 | | Ampl. Plate No. 1 |
| 2C21 | D | 3 | 3 | 6.3 | 51 | 14 | 1375 | | Ampl. Plate No. 2 |
| 2C22 | E | 7 | 2 | 6.3 | 67 | 11 | 3000 | | Ampl. NOTE A |
| 2V3G | E | 7 | 1 | 2.5 | 0 | 0 | .... |  | Rect. Std. OK over 1000 |
| 2W3 | E | 4 | 11 | 2.5 | 33 | 0 | .... |  | Rect. Std. Button |
| 2X2 | A | 7 | 1 | 2.5 | 0 | 0 | .... |  | Rect. Std. OK over 1000 ★ |
| 2Z2 | A | 2 | 7 | 2.5 | 35 | 0 | .... |  | Rect. Std. Button |
| 3A4 | H | 11 | 2 | 1.1 | 0 | 0 | .... |  | Diode Short on 3-4-5 |
| 3A5 | H | 8 | 8 | 3 | 60 | 12 | 2000 | | Ampl. Plt. No. 1 Short on 4-5 |
| 3A5 | H | 6 | 2 | 3 | 60 | 18 | 2000 | | Ampl. Plt. No. 2 Short on 4-5 |
| 3A8GT | E | 8 | 5 | 2.5 | 28 | 10 | 750 | | Ampl. Pent. Sec. Short on 1 |
| 3A8GT | E | 11 | 5 | 2.5 | 0 | 10 | 500 | | Ampl. Triode Section |
| 3A8GT | E | 5 | 1 | 2.5 | 0 | 0 | .... |  | Diode Section |
| 3B5GT | E | 8 | 5 | 2.5 | 54 | 49 | 1500 | | Ampl. Short on 4-5 |
| 3D6 | F | 6 | 2 | 1.5 | 61 | 30 | 2100 | | Ampl. Short on 1 |
| 3Q4 | H | 4 | 6 | 1.5 | 34 | 82 | 850 | | Press Diode But Short on 3-4-5 |
| 3Q5GT | E | 8 | 5 | 3 | 58 | 31 | 1800 | | Ampl. Short on 4-5 |
| 3S4 | H | 4 | 6 | 2.5 | 28 | 82 | 750 | | Press Diode But Short on 3-4-5 |
| 4A6G | E | 2 | 9 | 3 | 41 | 0 | 1000 | | Ampl. No. 1 Plate |
| 4A6G | E | 12 | 5 | 3 | 41 | 13 | 1000 | | Ampl. No. 2 Plate |
| 5R4GY | E | 4 | 11 | 5 | 40 | 0 | .... |  | Rect. Std. Plt. No. 1 |
| 5R4GY | E | 5 | 11 | 5 | 40 | 0 | .... |  | Rect. Std. Plt. No. 2 |
| 5T4 | E | 4 | 11 | 5 | 40 | 0 | .... |  | Rect. Std. |
| 5T4 | E | 5 | 11 | 5 | 40 | 0 | .... |  | Rect. Std. |
| 5U4G | E | 4 | 11 | 5 | 40 | 0 | .... |  | Rect. Std. |
| 5U4G | E | 5 | 11 | 5 | 40 | 0 | .... |  | Rect. Std. |
| 5V4G | E | 4 | 11 | 5 | 40 | 0 | .... |  | Rect. Std. |
| 5V4G | E | 5 | 11 | 5 | 40 | 0 | .... |  | Rect. Std. |
| 5W4 | E | 4 | 11 | 5 | 33 | 0 | .... |  | Rect. Std. |
| 5W4 | E | 5 | 11 | 5 | 33 | 0 | .... |  | Rect. Std. |
| 5X4G | E | 7 | 9 | 5 | 40 | 0 | .... |  | Rect. Std. |
| 5X4G | E | 12 | 4 | 5 | 40 | 0 | .... |  | Rect. Std. |
| 5Y3 | E | 4 | 11 | 5 | 40 | 0 | .... |  | Rect. Std. |
| 5Y3 | E | 5 | 11 | 5 | 40 | 0 | .... |  | Rect. Std. |
| 5Y4G | E | 7 | 9 | 5 | 35 | 0 | .... |  | Rect. Std. |
| 5Y4G | E | 12 | 4 | 5 | 35 | 0 | .... |  | Rect. Std. |
| 5Z3 | A | 2 | 7 | 5 | 40 | 0 | .... |  | Rect. Std. |
| 5Z3 | A | 3 | 7 | 5 | 40 | 0 | .... |  | Rect. Std. |

| Tube Type | Socket Letter | Select. | | Fil. Volts | Potent. | | Mut. Cond. | Press | Notations |
|-----------|---------------|---------|----|------------|---------|----|------------|---|-----------|
| | | A | B | | L | R | | | |
| 5Z4 | E | 4 | 11 | 5 | 40 | 0 | .... | Rect. Std. | |
| 5Z4 | E | 5 | 11 | 5 | 40 | 0 | .... | Rect. Std. | |
| 6A3 | A | 2 | 10 | 6.3 | 67 | 55 | 3000 | Ampl. | |
| 6A4 | B | 1 | 5 | 6.3 | 60 | 23 | 2000 | Ampl. | |
| 6A5G | E | 7 | 5 | 6.3 | 67 | 55 | 3000 | Ampl. | |
| 6A6 | D | 1 | 5 | 6.3 | 53 | 10 | 1500 | Ampl. No. 1 Plate | |
| 6A6 | D | 12 | 5 | 6.3 | 53 | 10 | 1500 | Ampl. No. 2 Plate | |
| 6A7 | D | 7 | 6 | 6.3 | 41 | 18 | 1000 | Ampl. Pent. Section | |
| 6A7 | D | 10 | 6 | 6.3 | 60 | 25 | 400 | Ampl. Osc. Sec. OK over 320 | |
| 6A8 | E | 7 | 7 | 6.3 | 41 | 18 | 1000 | Ampl. Pent. Section | |
| 6A8 | E | 12 | 7 | 6.3 | 60 | 30 | 300 | Ampl. Osc. Sec. OK over 240 | |
| 6AB6G | E | 8 | 5 | 6.3 | 53 | 0 | 1450 | Ampl. | |
| 6AB7 | E | 4 | 2 | 6.3 | 69 | 0 | 3500 | Ampl. | |
| 6AC5G | E | 8 | 5 | 6.3 | 40 | 0 | 1000 | Ampl. | |
| 6AC6G | E | 8 | 5 | 6.3 | 63 | 0 | 2400 | Ampl. | |
| 6AC7 | E | 4 | 2 | 6.3 | 71 | 0 | 3500 | Ampl. | |
| 6AD7G | E | 8 | 5 | 6.3 | 60 | 24 | 2000 | Ampl. Pent. Sect. | |
| 6AD7G | E | 5 | 5 | 6.3 | 60 | 65 | 325 | Diode Triode Sec. OK over 260 | |
| 6AE5G | E | 7 | 5 | 6.3 | 47 | 56 | 1200 | Ampl. | |
| 6AE6G | E | 7 | 5 | 6.3 | 34 | 0 | 850 | Ampl. No. 1 Plate | |
| 6AE6G | E | 10 | 5 | 6.3 | 28 | 0 | 750 | Ampl. No. 2 Plate | |
| 6AE7GT | E | 1 | 8 | 6.3 | 54 | 27 | 1500 | Ampl. No. 1 Cathode | |
| 6AE7GT | E | 8 | 8 | 6.3 | 54 | 27 | 1500 | Ampl. No. 2 Cathode | |
| 6AF5G | E | 8 | 5 | 6.3 | 53 | 42 | 1500 | Ampl. | |
| 6AG7 | E | 4 | 2 | 6.3 | 72 | 15 | 5000 | Ampl. | |
| 6AH7GT | E | 7 | 9 | 6.3 | 60 | 35 | 2000 | Press Gas No. 1 Short on 2-3 | |
| 6AH7GT | E | 11 | 9 | 6.3 | 60 | 35 | 2000 | Press Gas No. 1 Short on 3-4-5 | |
| 6AK5 | K | 1 | 9 | 6.3 | 71 | 0 | 4500 | Ampl. Short on 4-5 | |
| 6AL6G | E | 8 | 5 | 6.3 | 73 | 19 | 5000 | Ampl. Connect Cap to Plate Contact of 5 Pin Socket | |
| 6B4G | E | 7 | 5 | 6.3 | 67 | 55 | 3000 | Ampl. | |
| 6B5 | C | 8 | 5 | 6.3 | 52 | 0 | 1500 | Ampl. | |
| 6B6 | E | 7 | 5 | 6.3 | 28 | 9 | 750 | Ampl. Section | |
| 6B6 | E | 10 | 5 | 6.3 | 0 | 0 | .... | Diode Button | |
| 6B6 | E | 10 | 2 | 6.3 | 0 | 0 | .... | Diode Button | |
| 6B7 | D | 7 | 6 | 6.3 | 41 | 25 | 1000 | Ampl. Pent. Section | |
| 6B7 | D | 10 | 6 | 6.3 | 0 | 0 | .... | Diode Button | |
| 6B7 | D | 10 | 3 | 6.3 | 0 | 0 | .... | Diode Button | |
| 6B8 | E | 7 | 5 | 6.3 | 42 | 25 | 1000 | Ampl. Pent. Section | |
| 6B8 | E | 10 | 5 | 6.3 | 0 | 0 | .... | Diode Button | |
| 6B8 | E | 10 | 2 | 6.3 | 0 | 0 | .... | Diode Button | |
| 6C4 | L | 2 | 9 | 6.3 | 67 | 20 | 3000 | Ampl. | |
| 6C5 | E | 7 | 5 | 6.3 | 60 | 17 | 2000 | Ampl. | |
| 6C6 | C | 1 | 7 | 6.3 | 49 | 17 | 1225 | Ampl. | |
| 6C7 | D | 7 | 6 | 6.3 | 49 | 24 | 1250 | Ampl. Section | |
| 6C7 | D | 10 | 6 | 6.3 | 0 | 0 | .... | Diode Button | |
| 6C7 | D | 10 | 3 | 6.3 | 0 | 0 | .... | Diode Button | |

SUPPLEMENTARY DATA

| Tube Type | Socket Letter | Select. A B | | Fil. Volts | Potent. L R | | Mut. Cond. | Press | Notations |
|-----------|---------------|-------------|----|------------|-------------|----|------------|-------|-----------------------|
| 6C8G | E | 8 | 7 | 6.3 | 42 | 14 | 1000 | Ampl. | No. 1 Plate |
| 6C8G | E | 11 | 7 | 6.3 | 42 | 14 | 1000 | Ampl. | No. 2 Plate |
| 6D5 | E | 7 | 5 | 6.3 | 60 | 47 | 2000 | Ampl. | |
| 6D6 | C | 1 | 7 | 6.3 | 56 | 17 | 1600 | Ampl. | |
| 6D7 | D | 7 | 6 | 6.3 | 48 | 20 | 1225 | Ampl. | |
| 6D8G | E | 7 | 7 | 6.3 | 41 | 22 | 1000 | Ampl. | Pentode Section |
| 6D8G | E | 12 | 7 | 6.3 | 60 | 20 | 300 | Ampl. | Osc. Sec. OK over 240 |
| 6E6 | D | 1 | 5 | 6.3 | 52 | 23 | 1400 | Ampl. | No. 1 Plate |
| 6E6 | D | 12 | 5 | 6.3 | 52 | 23 | 1400 | Ampl. | No. 2 Plate |
| 6E7 | D | 7 | 6 | 6.3 | 55 | 20 | 1500 | Ampl. | |
| 6F5 | E | 10 | 5 | 6.3 | 43 | 10 | 1000 | Ampl. | |
| 6F6 | E | 8 | 5 | 6.3 | 60 | 24 | 2000 | Ampl. | |
| 6F7 | D | 7 | 6 | 6.3 | 45 | 23 | 1100 | Ampl. | Pent. Section |
| 6F7 | D | 10 | 6 | 6.3 | 60 | 23 | 450 | Ampl. | Tri. Sec. OK over 360 |
| 6F8G | E | 8 | 7 | 6.3 | 60 | 13 | 2000 | Ampl. | No. 1 Plate |
| 6F8G | E | 11 | 7 | 6.3 | 60 | 13 | 2000 | Ampl. | No. 2 Plate |
| 6G6G | E | 8 | 5 | 6.3 | 61 | 19 | 2100 | Ampl. | |
| 6H4GT | E | 4 | 8 | 6.3 | 50 | 0 | .... | Diode | Section |
| 6H6 | E | 7 | 2 | 6.3 | 50 | 0 | .... | Diode | Button |
| 6H6 | E | 7 | 5 | 6.3 | 50 | 0 | .... | Diode | Button |
| 6J5G | E | 7 | 5 | 6.3 | 60 | 24 | 2000 | Ampl. | |
| 6J6 | K | 1 | 2 | 6.3 | 72 | 0 | 5000 | Ampl. | Plt. No. 1 |
| 6J6 | K | 11 | 8 | 6.3 | 72 | 0 | 5000 | Ampl. | Plt. No. 2 |
| 6J7 | E | 1 | 9 | 6.3 | 48 | 18 | 1225 | Ampl. | |
| 6J8G | E | 8 | 5 | 6.3 | 41 | 15 | 1000 | Ampl. | Heptode Section |
| 6J8G | E | 11 | 5 | 6.3 | 0 | 25 | 500 | Ampl. | Triode Section |
| 6K5G | E | 7 | 5 | 6.3 | 40 | 17 | 1000 | Ampl. | |
| 6K6G | E | 8 | 5 | 6.3 | 55 | 28 | 1600 | Ampl. | |
| 6K7 | E | 8 | 5 | 6.3 | 54 | 16 | 1450 | Ampl. | |
| 6K8 | E | 8 | 5 | 6.3 | 41 | 9 | 1000 | Ampl. | Hexode Section |
| 6K8 | E | 11 | 5 | 6.3 | 63 | 9 | 2400 | Ampl. | Triode Section |
| 6L5G | E | 7 | 5 | 6.3 | 56 | 22 | 1500 | Ampl. | |
| 6L6 | E | 8 | 5 | 6.3 | 73 | 19 | 5000 | Ampl. | |
| 6L7 | E | 1 | 9 | 6.3 | 20 | 19 | 650 | Ampl. | Cap Grid |
| 6L7 | E | 8 | 5 | 6.3 | 20 | 22 | 650 | Ampl. | Pin Grid |
| 6N6MG | E | 8 | 5 | 6.3 | 52 | 0 | 1500 | Ampl. | |
| 6N7 | E | 2 | 9 | 6.3 | 53 | 10 | 1500 | Ampl. | No. 1 Plate |
| 6N7 | E | 12 | 5 | 6.3 | 53 | 10 | 1500 | Ampl. | No. 2 Plate |
| 6P5G | E | 7 | 5 | 6.3 | 53 | 24 | 1450 | Ampl. | |
| 6P7 | E | 3 | 12 | 6.3 | 45 | 23 | 1100 | Ampl. | Pent. Section |
| 6P7 | E | 6 | 12 | 6.3 | 60 | 23 | 450 | Ampl. | Tri. Sec. OK over 360 |
| 6Q6G | E | 7 | 5 | 6.3 | 40 | 14 | 1000 | Ampl. | Section |
| 6Q6G | E | 7 | 2 | 6.3 | 0 | 0 | .... | Diode | Button |
| 6Q7 | E | 7 | 5 | 6.3 | 33 | 14 | 800 | Ampl. | Section |
| 6Q7 | E | 10 | 5 | 6.3 | 0 | 0 | .... | Diode | Button |
| 6Q7 | E | 10 | 2 | 6.3 | 0 | 0 | .... | Diode | Button |

| Tube Type | Socket Letter | Select. | | Fil. Volts | Potent. | | Mut. Cond. | Press | Notations |
|-----------|---------------|---------|---|------------|---------|----|------------|-------|-------------------------|
| | | A | B | | L | R | | | |
| 6R7 | E | 7 | 5 | 6.3 | 60 | 17 | 1900 | Ampl. | Section |
| 6R7 | E | 10 | 5 | 6.3 | 0 | 0 | .... | Diode | Button |
| 6R7 | E | 10 | 2 | 6.3 | 0 | 0 | .... | Diode | Button |
| 6S7G | E | 8 | 5 | 6.3 | 57 | 22 | 1750 | Ampl. | |
| 6SA7 | E | 1 | 7 | 6.3 | 28 | 17 | 750 | Ampl. | Section |
| 6SA7 | E | 7 | 7 | 6.3 | 28 | 17 | 750 | Ampl. | Osc. Section |
| 6SC7 | G | 10 | 3 | 6.3 | 42 | 0 | 1000 | Ampl. | |
| 6SC7 | G | 1 | 3 | 6.3 | 42 | 0 | 1000 | Ampl. | |
| 6SD7GT | E | 4 | 2 | 6.3 | 64 | 13 | 2500 | Ampl. | |
| 6SF5 | E | 7 | 4 | 6.3 | 56 | 13 | 1600 | Ampl. | |
| 6SF7 | E | 6 | 7 | 6.3 | 60 | 0 | 2000 | Ampl. | |
| 6SF7 | E | 8 | 1 | 6.3 | 0 | 0 | .... | Diode | |
| 6SG7 | E | 4 | 2 | 6.3 | 68 | 10 | 3300 | Ampl. | |
| 6SH7 | E | 4 | 2 | 6.3 | 69 | 0 | 3400 | Ampl. | |
| 6SJ7 | E | 4 | 2 | 6.3 | 56 | 18 | 1575 | Ampl. | |
| 6SK7 | E | 4 | 2 | 6.3 | 59 | 18 | 1900 | Ampl. | |
| 6SL7 | G | 4 | 1 | 6.3 | 36 | 0 | 900 | Ampl. | |
| 6SL7 | G | 10 | 4 | 6.3 | 53 | 0 | 1400 | Ampl. | Short on 2-3 |
| 6SN7 | G | 4 | 1 | 6.3 | 56 | 24 | 1650 | Ampl. | Plt. No. 1 |
| 6SN7 | G | 10 | 4 | 6.3 | 56 | 24 | 1650 | Ampl. | Plt. No. 2 Short on 2-3 |
| 6SQ7 | G | 6 | 6 | 6.3 | 42 | 0 | 1000 | Ampl. | Triode Sec. |
| 6SQ7 | G | 3 | 7 | 6.3 | 0 | 0 | .... | Diode | Diode No. 1 |
| 6SQ7 | G | 7 | 1 | 6.3 | 0 | 0 | .... | Diode | Diode No. 2 |
| 6SR7 | G | 6 | 6 | 6.3 | 59 | 15 | 1900 | Ampl. | Triode Sect. |
| 6SR7 | G | 3 | 7 | 6.3 | 0 | 0 | .... | Diode | Diode No. 1 |
| 6SR7 | G | 7 | 1 | 6.3 | 0 | 0 | .... | Diode | Diode No. 2 |
| 6SS7 | E | 4 | 2 | 6.3 | 58 | 16 | 1850 | Ampl. | |
| 6ST7 | G | 6 | 7 | 6.3 | 59 | 12 | 1900 | Ampl. | Triode Section |
| 6ST7 | G | 3 | 7 | 6.3 | 0 | 0 | .... | Diode | Diode No. 1 |
| 6ST7 | G | 7 | 1 | 6.3 | 0 | 0 | .... | Diode | Diode No. 2 |
| 6T7G | E | 7 | 5 | 6.3 | 40 | 14 | 1000 | Ampl. | Triode Section |
| 6T7G | E | 10 | 5 | 6.3 | 0 | 0 | .... | Diode | Button |
| 6T7G | E | 10 | 2 | 6.3 | 0 | 0 | .... | Diode | Button |
| 6U6GT | E | 8 | 5 | 6.3 | 73 | 27 | 6200 | Ampl. | |
| 6U7G | E | 8 | 5 | 6.3 | 56 | 17 | 1600 | Ampl. | |
| 6V6G | E | 8 | 5 | 6.3 | 67 | 25 | 3000 | Ampl. | |
| 6V7G | E | 7 | 5 | 6.3 | 40 | 32 | 975 | Ampl. | Section |
| 6V7G | E | 10 | 5 | 6.3 | 0 | 0 | .... | Diode | Button |
| 6V7G | E | 10 | 2 | 6.3 | 0 | 0 | .... | Diode | Button |
| 6W5 | E | 2 | 9 | 6.3 | 40 | 0 | .... | Rect. | Std. |
| 6W5 | E | 10 | 2 | 6.3 | 40 | 0 | .... | Rect. | Std. |
| 6W6GT | E | 8 | 5 | 6.3 | 67 | 46 | 3000 | Ampl. | |
| 6W7G | E | 1 | 9 | 6.3 | 41 | 20 | 1000 | Ampl. | |
| 6X5 | E | 2 | 9 | 6.3 | 40 | 0 | .... | Rect. | Std. |
| 6X5 | E | 10 | 2 | 6.3 | 40 | 0 | .... | Rect. | Std. |
| 6Y5 | C | 9 | 8 | 6.3 | 40 | 0 | .... | Rect. | Std. |
| 6Y5 | C | 12 | 8 | 6.3 | 40 | 0 | .... | Rect. | Std. |
| 6Y6G | E | 8 | 5 | 6.3 | 74 | 36 | 7000 | Ampl. | |
| 6Y7G | E | 2 | 9 | 6.3 | 39 | 12 | 1000 | Ampl. | No. 1 Plate |
| 6Y7G | E | 12 | 5 | 6.3 | 39 | 12 | 1000 | Ampl. | No. 2 Plate |

SUPPLEMENTARY DATA

| Tube Type | Socket Letter | Select. A | Select. B | Fil. Volts | Potent. L | Potent. R | Mut. Cond. | Press | Notations |
|-----------|---------------|-----------|-----------|------------|-----------|-----------|------------|-------|----------------------------------|
| 6Z3 | A | 1 | 5 | 6.3 | 40 | 0 | .... |  | Rect. Std. |
| 6Z4-84 | B | 7 | 7 | 6.3 | 40 | 0 | .... |  | Rect. Std. |
| 6Z4-80 | B | 5 | 1 | 6.3 | 40 | 0 | .... |  | Rect. Std. |
| 6Z5 | C | 9 | 12 | 6.3 | 40 | 0 | .... |  | Rect. Std. |
| 6Z5 | C | 12 | 12 | 6.3 | 40 | 0 | .... |  | Rect. Std. |
| 6Z7G | E | 2 | 9 | 6.3 | 45 | 0 | 1200 | | Ampl. No. 1 Plate |
| 6Z7G | E | 12 | 5 | 6.3 | 45 | 0 | 1200 | | Ampl. No. 2 Plate |
| 6ZY5G | E | 7 | 2 | 6.3 | 40 | 0 | .... |  | Rect. Std. |
| 6ZY5G | E | 7 | 5 | 6.3 | 40 | 0 | .... |  | Rect. Std. |
| 7A4 | F | 6 | 2 | 6.3 | 66 | 14 | 2600 | | Ampl. |
| 7A5 | F | 6 | 2 | 6.3 | 71 | 23 | 6000 | | Ampl. |
| 7A6 | F | 8 | 5 | 6.3 | 40 | 0 | .... |  | Diode Short 1-4-5 |
| 7A6 | F | 11 | 5 | 6.3 | 40 | 0 | .... |  | Diode |
| 7A7 | F | 6 | 2 | 6.3 | 58 | 22 | 1750 | | Ampl. |
| 7A8 | F | 5 | 3 | 6.3 | 41 | 20 | 1000 | | Ampl. Section |
| 7A8 | F | 8 | 10 | 6.3 | 0 | 21 | 500 | | Ampl. Osc. Section |
| 7B4 | F | 6 | 2 | 6.3 | 43 | 10 | 1000 | | Ampl. |
| 7B5 | F | 6 | 2 | 6.3 | 56 | 28 | 1600 | | Ampl. |
| 7B6 | F | 2 | 3 | 6.3 | 28 | 9 | 750 | | Ampl. Sec. Short 1-4-5 |
| 7B6 | F | 8 | 3 | 6.3 | 0 | 0 | .... |  | Diode |
| 7B6 | F | 6 | 10 | 6.3 | 0 | 0 | .... |  | Diode |
| 7B7 | F | 5 | 4 | 6.3 | 57 | 22 | 1700 | | Ampl. |
| 7B8 | F | 5 | 3 | 6.3 | 40 | 22 | 1000 | | Ampl. Pentode Section |
| 7B8 | F | 8 | 10 | 6.3 | 0 | 15 | 500 | | Ampl. Osc. Section |
| 7C4 | F | 9 | 5 | 6.3 | 25 | 0 | .... |  | Diode |
| 7C5 | F | 6 | 2 | 6.3 | 67 | 25 | 3000 | | Ampl. |
| 7C6 | F | 2 | 3 | 6.3 | 15 | 8 | 600 | | Ampl. Sec. Short 1-4-5 |
| 7C6 | F | 8 | 3 | 6.3 | 0 | 0 | .... |  | Diode |
| 7C6 | F | 6 | 10 | 6.3 | 0 | 0 | .... |  | Diode |
| 7C7 | F | 6 | 2 | 6.3 | 49 | 18 | 1300 | | Ampl. Section |
| 7E5 | N | 12 | 4 | 6.3 | 67 | 0 | 3000 | | Ampl. Short on 1-2-5 |
| 7E6 | F | 2 | 3 | 6.3 | 59 | 15 | 1900 | | Ampl. Sec. Short 1-4-5 |
| 7E6 | F | 8 | 3 | 6.3 | 0 | 0 | .... |  | Diode |
| 7E6 | F | 12 | 10 | 6.3 | 0 | 0 | .... |  | Diode |
| 7E7 | F | 6 | 3 | 6.3 | 49 | 18 | 1300 | | Ampl. Pent. Section |
| 7E7 | F | 1 | 8 | 6.3 | 0 | 0 | .... |  | Diode |
| 7E7 | F | 4 | 8 | 6.3 | 0 | 0 | .... |  | Diode |
| 7F7 | F | 2 | 9 | 6.3 | 56 | 0 | 1600 | | Ampl. No. 1 Plate Short on 1 |
| 7F7 | F | 12 | 5 | 6.3 | 56 | 0 | 1600 | | Ampl. No. 2 Plate |
| 7H7 | F | 6 | 2 | 6.3 | 67 | 0 | 3000 | | Ampl. |
| 7J7 | F | 6 | 3 | 6.3 | 31 | 15 | 800 | | Ampl. Hexode Section |
| 7J7 | F | 2 | 8 | 6.3 | 42 | 15 | 1000 | | Ampl. Triode Section |
| 7K7 | F | 2 | 8 | 6.3 | 41 | 0 | 1000 | | Ampl. Triode Short on 1-4-5 |
| 7K7 | F | 9 | 2 | 6.3 | 0 | 0 | .... |  | Diode Diode No. 1 |
| 7K7 | F | 5 | 9 | 6.3 | 0 | 0 | .... |  | Diode Diode No. 2 |
| 7L7 | F | 6 | 2 | 6.3 | 60 | 10 | 2000 | | Ampl. |
| 7N7 | F | 2 | 9 | 6.3 | 60 | 13 | 2000 | | Ampl. Plate No. 1 Short on 1-4-5 |
| 7N7 | F | 12 | 5 | 6.3 | 60 | 13 | 2000 | | Ampl. Plate No. 2 |

| Tube Type | Socket Letter | Select. A | Select. B | Fil. Volts | Potent. L | Potent. R | Mut. Cond. | Press | Notations |
|-----------|---------------|-----------|-----------|------------|-----------|-----------|------------|-------|--------------------------------|
| 7Q7 | F | 6 | 2 | 6.3 | 33 | 17 | 800 | | Ampl. |
| 7R7 | F | 6 | 3 | 6.3 | 67 | 8 | 3000 | | Ampl. Pentode Section |
| 7R7 | F | 1 | 8 | 6.3 | 0 | 0 | .... |  | Diode Diode No. 1 |
| 7R7 | F | 4 | 8 | 6.3 | 0 | 0 | .... |  | Diode Diode No. 2 |
| 7S7 | F | 6 | 3 | 6.3 | 15 | 53 | 1500 | | Ampl. Hexode |
| 7S7 | F | 2 | 8 | 6.3 | 0 | 53 | 1500 | | Ampl. Triode |
| 7V7 | F | 6 | 2 | 6.3 | 72 | 5 | 4400 | | Ampl. |
| 7W7 | F | 6 | 2 | 6.3 | 67 | 9 | 3000 | | Ampl. Short on 1-4-5 |
| 7Y4 | F | 1 | 6 | 6.3 | 40 | 0 | .... |  | Rect. Std. |
| 7Y4 | F | 6 | 6 | 6.3 | 40 | 0 | .... |  | Rect. Std. |
| 7Z4 | F | 1 | 6 | 6.3 | 40 | 0 | .... |  | Rect. Std. |
| 7Z4 | F | 6 | 6 | 6.3 | 40 | 0 | .... |  | Rect. Std. |
| 10 | A | 2 | 10 | 7.5 | 50 | 32 | 1250 | | Ampl. |
| 10Y | A | 2 | 10 | 7.5 | 53 | 10 | 1500 | | Ampl. (Also 10 special) |
| 12A | A | 2 | 10 | 5 | 57 | 36 | 1650 | | Ampl. |
| 12A5 | D | 1 | 12 | 6.3 | .... | .... | .... |  | Check for Shorts |
| 12A5 | D | 2 | 10 | 12.6 | 58 | 42 | 1800 | | Ampl. |
| 12A6 | E | 8 | 5 | 12.6 | 67 | 10 | 3000 | | Ampl. |
| 12A7 | D | 7 | 6 | 12.6 | 39 | 39 | 975 | | Ampl. Pent. Section |
| 12A7 | D | 7 | 3 | 12.6 | 40 | 0 | .... |  | Rect. Std. |
| 12A8GT | E | 7 | 7 | 12.6 | 41 | 18 | 1000 | | Ampl. Pent. Section |
| 12A8GT | E | 12 | 7 | 12.6 | 60 | 30 | 300 | | Ampl. Osc. Sec. OK over 240 |
| 12AH7GT | E | 7 | 9 | 12.6 | 60 | 35 | 2000 | | Press Gas No. 1 Short on 2-3 |
| 12AH7GT | E | 11 | 9 | 12.6 | 60 | 35 | 2000 | | Press Gas No. 1 Short on 3-4-5 |
| 12B7 | F | 6 | 2 | 12.6 | 59 | 18 | 1900 | | Ampl. |
| 12B8GT | E | 7 | 7 | 12.6 | 0 | 0 | .... |  | Test for Shorts |
| 12B8GT | E | 1 | 7 | 12.6 | 58 | 18 | 1800 | | Ampl. Pent. Section |
| 12B8GT | E | 11 | 1 | 12.6 | 60 | 0 | 2000 | | Ampl. Triode Section |
| 12C8 | E | 7 | 5 | 12.6 | 45 | 20 | 1150 | | Ampl. Pent. Section |
| 12C8 | E | 10 | 5 | 12.6 | 0 | 0 | .... |  | Diode |
| 12C8 | E | 10 | 2 | 12.6 | 0 | 0 | .... |  | Diode |
| 12F5GT | E | 10 | 5 | 12.6 | 41 | 10 | 1000 | | Ampl. |
| 12H6 | E | 7 | 2 | 12.6 | 50 | 0 | .... |  | Diode |
| 12H6 | E | 7 | 5 | 12.6 | 50 | 0 | .... |  | Diode |
| 12J5GT | E | 7 | 5 | 12.6 | 60 | 24 | 2000 | | Ampl. |
| 12J7GT | E | 1 | 9 | 12.6 | 48 | 18 | 1225 | | Ampl. |
| 12K7GT | E | 8 | 5 | 12.6 | 54 | 20 | 1450 | | Ampl. |
| 12K8 | E | 8 | 5 | 12.6 | 41 | 9 | 1000 | | Ampl. Hex. Sec. |
| 12K8 | E | 11 | 5 | 12.6 | 63 | 9 | 2400 | | Ampl. Triode Sec. |
| 12Q7GT | E | 7 | 5 | 12.6 | 33 | 14 | 800 | | Ampl. Triode Sec. |
| 12Q7GT | E | 10 | 5 | 12.6 | 0 | 0 | .... |  | Diode |
| 12Q7GT | E | 10 | 2 | 12.6 | 0 | 0 | .... |  | Diode |
| 12SA7 | E | 1 | 7 | 12.6 | 28 | 17 | 750 | | Ampl. No. 1 Grid |
| 12SA7 | E | 7 | 7 | 12.6 | 28 | 17 | 750 | | Ampl. No. 2 Grid |
| 12SC7 | G | 10 | 3 | 12.6 | 42 | 0 | 1000 | | Ampl. |
| 12SC7 | G | 1 | 3 | 12.6 | 42 | 0 | 1000 | | Ampl. |
| 12SF5 | E | 7 | 4 | 12.6 | 56 | 13 | 1600 | | Ampl. |

SUPPLEMENTARY DATA

| Tube Type | Socket Letter | Select. | | Fil. Volts | Potent. | | Mut. Cond. | Press | Notations |
|-----------|---------------|---------|----|------------|---------|----|------------|-----------|-----------------------------|
| | | A | B | | L | R | | | |
| 12SF7 | G | 6 | 7 | 12.6 | 60 | 0 | 2000 | Ampl. | |
| 12SF7 | G | 8 | 1 | 12.6 | 0 | 0 | .... | Diode | |
| 12SG7 | 7 | 4 | 2 | 12.6 | 68 | 10 | 3300 | Ampl. | |
| 12SH7 | E | 4 | 2 | 12.6 | 69 | 0 | 3400 | Ampl. | |
| 12SJ7 | E | 4 | 2 | 12.6 | 56 | 18 | 1575 | Ampl. | |
| 12SK7 | E | 4 | 2 | 12.6 | 59 | 18 | 1900 | Ampl. | |
| 12SL7 | G | 4 | 1 | 12.6 | 53 | 0 | 1400 | Ampl. | Short on 2-3 |
| 12SL7 | G | 10 | 4 | 12.6 | 53 | 0 | 1400 | Ampl. | Short on 2-3 |
| 12SN7 | G | 4 | 1 | 12.6 | 67 | 0 | 3000 | Ampl. | Plt. No. 1 |
| 12SN7 | G | 10 | 4 | 12.6 | 67 | 0 | 3000 | Ampl. | Plt. No. 2 Short on 2-3 |
| 12SQ7 | G | 6 | 6 | 12.6 | 42 | 0 | 1125 | Ampl. | Triode Sect. |
| 12SQ7 | G | 3 | 7 | 12.6 | 0 | 0 | .... | Diode | Diode No. 1 |
| 12SQ7 | G | 7 | 1 | 12.6 | 0 | 0 | .... | Diode | Diode No. 2 |
| 12SR7 | G | 6 | 6 | 12.6 | 59 | 15 | 1900 | Ampl. | Triode Sect. |
| 12SR7 | G | 3 | 7 | 12.6 | 0 | 0 | .... | Diode | Diode No. 1 |
| 12SR7 | G | 7 | 1 | 12.6 | 0 | 0 | .... | Diode | Diode No. 2 |
| 12Z3 | A | 1 | 5 | 12.6 | 40 | 0 | .... | Rect. | Std. |
| 12Z5 | D | 6 | 1 | 6.3 | 40 | 0 | .... | Check for | Shorts |
| 12Z5 | D | 1 | 8 | 12.6 | 40 | 0 | .... | Rect. | Std. |
| 12Z5 | D | 12 | 8 | 12.6 | 40 | 0 | .... | Rect. | Std. |
| 14A4 | F | 6 | 2 | 12.6 | 66 | 14 | 2600 | Ampl. | |
| 14A7 | F | 6 | 2 | 12.6 | 59 | 18 | 1900 | Ampl. | |
| 14B6 | F | 2 | 3 | 12.6 | 44 | 0 | 1100 | Ampl. | Triode Sec. Short on 1-4-5 |
| 14B6 | F | 8 | 3 | 12.6 | 0 | 0 | .... | Diode | No. 1 |
| 14B6 | F | 12 | 10 | 12.6 | 0 | 0 | .... | Diode | No. 2 |
| 14B8 | F | 5 | 3 | 12.6 | 40 | 22 | 1000 | Ampl. | Pentode Section |
| 14B8 | F | 8 | 10 | 12.6 | 0 | 15 | 500 | Ampl. | Osc. Section |
| 14C5 | F | 6 | 2 | 12.6 | 69 | 19 | 3700 | Ampl. | |
| 14C7 | F | 6 | 2 | 12.6 | 63 | 9 | 2275 | Ampl. | |
| 14E6 | F | 2 | 3 | 12.6 | 58 | 10 | 1800 | Ampl. | Triode Sect. Short on 1-4-5 |
| 14E6 | F | 8 | 3 | 12.6 | 0 | 0 | .... | Diode | Diode No. 1 |
| 14E6 | F | 6 | 10 | 12.6 | 0 | 0 | .... | Diode | Diode No. 2 |
| 14E7 | F | 6 | 3 | 12.6 | 50 | 20 | 1300 | Ampl. | |
| 14E7 | F | 1 | 8 | 12.6 | 0 | 0 | .... | Diode | |
| 14E7 | F | 10 | 10 | 12.6 | 0 | 0 | .... | Diode | |
| 14F7 | F | 2 | 9 | 12.6 | 56 | 0 | 1600 | Ampl. | Plate 1 |
| 14F7 | F | 12 | 5 | 12.6 | 56 | 0 | 1600 | Ampl. | Plate 2 |
| 14H7 | F | 6 | 2 | 12.6 | 67 | 0 | 3000 | Ampl. | |
| 14J7 | F | 6 | 3 | 12.6 | 31 | 15 | 800 | Ampl. | Hex. Sec. |
| 14J7 | F | 2 | 8 | 12.6 | 42 | 15 | 1000 | Ampl. | Triode Sec. |
| 14N7 | F | 2 | 9 | 12.6 | 60 | 13 | 2000 | Ampl. | Short on 1-4-5 Plt. 1 |
| 14N7 | F | 12 | 5 | 12.6 | 60 | 13 | 2000 | Ampl. | Plt. 3 |
| 14Q7 | F | 6 | 2 | 12.6 | 31 | 14 | 800 | Ampl. | |
| 14R7 | F | 6 | 3 | 12.6 | 67 | 8 | 3000 | Ampl. | Pentode Section |
| 14R7 | F | 1 | 8 | 12.6 | 0 | 0 | .... | Diode | Diode No. 1 |
| 14R7 | F | 4 | 8 | 12.6 | 0 | 0 | .... | Diode | Diode No. 2 |
| 14S7 | F | 6 | 3 | 12.6 | 53 | 15 | 1500 | Ampl. | Heptode Section |
| 14S7 | F | 2 | 8 | 12.6 | 53 | 0 | 1500 | Ampl. | Triode Section |

| Tube Type | Socket Letter | Select. | | Fil. Volts | Potent. | | Mut. Cond. | Press | Notations |
|------------|---------------|---------|----|------------|---------|----|------------|------------------------|-----------|
| | | A | B | | L | R | | | |
| 14W7 | F | 6 | 2 | 12.6 | 67 | 9 | 3000 | Ampl. | |
| 14Y4 | F | 1 | 6 | 12.6 | 40 | 0 | .... | Rect. Std. | |
| 14Y4 | F | 6 | 6 | 12.6 | 40 | 0 | .... | Rect. Std. | |
| 14Z3 | A | 1 | 5 | 12.6 | 40 | 0 | .... | Rect. Std. | |
| 15 | B | 7 | 6 | 2 | 16 | 18 | 625 | Ampl. | |
| 19 | C | 8 | 8 | 2 | 42 | 12 | 1000 | Ampl. | |
| 19 | C | 11 | 6 | 2 | 42 | 12 | 1000 | Ampl. | |
| 22 | A | 2 | 5 | 3 | 0 | 37 | 500 | Ampl. | |
| 24 | B | 7 | 6 | 2.5 | 42 | 10 | 1000 | Ampl. Also 24A | |
| 25A6 | E | 8 | 5 | 25 | 62 | 35 | 2300 | Ampl. | |
| 25A7 | E | 11 | 5 | 25 | 40 | 0 | .... | Check for Shorts | |
| 25A7 | E | 11 | 5 | 25 | 40 | 0 | .... | Rect. Std. | |
| 25A7 | E | 8 | 5 | 25 | 58 | 35 | 1800 | Ampl. | |
| 25AC5 | E | 7 | 5 | 25 | 52 | 0 | 1500 | Ampl. | |
| 25B5 | C | 8 | 5 | 25 | 64 | 0 | 2500 | Ampl. | |
| 25B6G | E | 8 | 5 | 25 | 71 | 43 | 4000 | Ampl. | |
| 25B8GT | E | 1 | 7 | 25 | 60 | 18 | 2000 | Ampl. Pentode Section | |
| 25B8GT | E | 11 | 1 | 25 | 54 | 8 | 1500 | Ampl. Triode Section | |
| 25C6G | E | 8 | 5 | 25 | 74 | 36 | 7000 | Ampl. | |
| 25D8GT | E | 8 | 5 | 25 | 59 | 15 | 1900 | Ampl. Pent. Section | |
| 25D8GT | E | 11 | 5 | 25 | 45 | 0 | 1100 | Ampl. Triode Section | |
| 25D8GT | E | 5 | 1 | 25 | 0 | 0 | .... | Diode | |
| 25L6 | E | 8 | 5 | 25 | 75 | 15 | 8000 | Ampl. | |
| 25N6G | E | 8 | 5 | 25 | 64 | 0 | 2500 | Ampl. | |
| 25X6 | E | 7 | 2 | 25 | 40 | 0 | .... | Rect. Std. Plate No. 1 | |
| 25X6 | E | 7 | 5 | 25 | 40 | 0 | .... | Rect. Std. Plate No. 2 | |
| 25Y5 | C | 7 | 8 | 25 | 40 | 0 | .... | Rect. Std. | |
| 25Y5 | C | 12 | 8 | 25 | 40 | 0 | .... | Rect. Std. | |
| 25Z3 | A | 1 | 5 | 25 | 40 | 0 | .... | Rect. Std. | |
| 25Z4 | E | 7 | 2 | 25 | 35 | 0 | .... | Rect. Std. | |
| 25Z5 | C | 7 | 8 | 25 | 40 | 0 | .... | Rect. Std. | |
| 25Z5 | C | 12 | 8 | 25 | 40 | 0 | .... | Rect. Std. | |
| 25Z5MG | E | 7 | 2 | 25 | 40 | 0 | .... | Rect. Std. | |
| 25Z5MG | E | 7 | 5 | 25 | 40 | 0 | .... | Rect. Std. | |
| 25Z6 | E | 7 | 2 | 25 | 40 | 0 | .... | Rect. Std. | |
| 25Z6 | E | 7 | 5 | 25 | 40 | 0 | .... | Rect. Std. | |
| 26 | A | 2 | 10 | 1.5 | 46 | 35 | 1150 | Ampl. | |
| 27 | B | 1 | 6 | 2.5 | 40 | 34 | 1000 | Ampl. Also 27S | |
| 28D7 | F | 8 | 1 | 25 | 60 | 12 | 2000 | Diode Plt. No. 1 | |
| 28D7 | F | 3 | 6 | 25 | 60 | 12 | 2000 | Ampl. Plt. No. 2 | |
| 30 | A | 2 | 10 | 2 | 36 | 33 | 900 | Ampl. | |
| 30 special | A | 2 | 10 | 2 | 43 | 30 | 1025 | Ampl. | |
| 31 | A | 2 | 10 | 2 | 35 | 53 | 925 | Ampl. | |
| 32 | A | 2 | 5 | 2 | 19 | 30 | 640 | Ampl. | |
| 32L7GT | E | 11 | 5 | 35 | 0 | 0 | .... | Test for Shorts | |
| 32L7GT | E | 8 | 5 | 35 | 71 | 18 | 4800 | Ampl. | |
| 32L7GT | E | 11 | 5 | 35 | 40 | 0 | .... | Rect. Std. | |
| 33 | B | 1 | 5 | 2 | 50 | 29 | 1450 | Ampl. | |

SUPPLEMENTARY DATA

| Tube Type | Socket Letter | Select. | | Fil. Volts | Potent. | | Mut. Cond. | Press | Notations |
|-----------|---------------|---------|----|------------|---------|----|------------|--------------------------------------|-------------|
| | | A | B | | L | R | | | |
| RK33 | D | 3 | 3 | 6.3 | 42 | 28 | 1000 | Ampl. | |
| RK33 | D | 9 | 3 | 6.3 | 42 | 28 | 1000 | Ampl. | |
| 34 | A | 2 | 5 | 2 | 14 | 27 | 600 | Ampl. | |
| 35 | B | 7 | 6 | 2.5 | 42 | 20 | 1020 | Ampl. | Also 35S |
| 35A5' | F | 6 | 2 | 35 | 74 | 27 | 5900 | Ampl. | |
| 35L6GT | E | 8 | 5 | 35 | 71 | 32 | 5800 | Ampl. | |
| 35Z3 | F | 1 | 1 | 35 | 35 | 0 | .... | Rect. Std. | |
| 35Z4GT | E | 10 | 2 | 35 | 40 | 0 | .... | Rect. Std. | |
| 35Z5GT | E | 1 | 3 | BLST | 40 | 0 | .... | Short Test—Should light on 1-2-3-4-5 | |
| 35Z5GT | E | 11 | 1 | 35 | 40 | 0 | .... | Rect. Std. | |
| 35Z6G | E | 7 | 2 | 35 | 40 | 0 | .... | Rect. Std. Plate No. 1 | |
| 35Z6G | E | 7 | 5 | 35 | 40 | 0 | .... | Rect. Std. Plate No. 2 | |
| 36 | B | 7 | 6 | 6.3 | 43 | 20 | 1050 | Ampl. | |
| 37 | B | 1 | 6 | 6.3 | 36 | 34 | 900 | Ampl. | |
| 38 | B | 7 | 6 | 6.3 | 41 | 32 | 1050 | Ampl. | |
| 39-44 | B | 7 | 6 | 6.3 | 41 | 23 | 1000 | Ampl. | |
| 40 | A | 2 | 10 | 5 | 60 | 26 | 200 | Ampl. | OK over 160 |
| 41 | C | 8 | 5 | 6.3 | 55 | 28 | 1600 | Ampl. | |
| 42 | C | 8 | 5 | 6.3 | 60 | 24 | 2000 | Ampl. | |
| 43 | C | 8 | 5 | 25 | 62 | 35 | 2300 | Ampl. | |
| 45 | A | 2 | 10 | 2.5 | 59 | 50 | 1850 | Ampl. | |
| 45Z3 | H | 10 | 2 | 35 | 35 | 0 | .... | Rect. Std. also Press 117N7 | |
| 45Z5GT | E | 11 | 1 | 35 | 40 | 0 | .... | Rect. Std. | |
| 45Z5GT | E | 1 | 3 | BLST | 40 | 0 | .... | Short Test—Should light on 1-2-3-4-5 | |
| 46 | B | 1 | 5 | 2.5 | 60 | 25 | 2000 | Ampl. | |
| 47 | B | 1 | 5 | 2.5 | 60 | 18 | 2000 | Ampl. | |
| 48 | C | 8 | 5 | 25 | 60 | 48 | 2000 | Ampl. | |
| 49 | B | 1 | 5 | 2 | 45 | 40 | 1125 | Ampl. | |
| 50 | A | 2 | 10 | 7.5 | 53 | 50 | 1500 | Ampl. | |
| 50A5 | F | 6 | 2 | 50 | 74 | 25 | 7500 | Ampl. | |
| 50C6G | E | 8 | 5 | 50 | 74 | 36 | 7000 | Ampl. | |
| 50L6GT | E | 8 | 5 | 50 | 74 | 25 | 7500 | Ampl. | |
| 50Y6GT | E | 7 | 2 | 50 | 40 | 0 | .... | Rect. Std. Plate No. 1 | |
| 50Y6GT | E | 7 | 5 | 50 | 40 | 0 | .... | Rect. Std. Plate No. 2 | |
| 50Z7G | E | 7 | 6 | 50 | 40 | 0 | .... | Rect. Std. Plate No. 1 | |
| 50Z7G | E | 10 | 2 | 50 | 40 | 0 | .... | Short on 4-5 | |
| 50Z7G | E | 10 | 2 | 50 | 40 | 0 | .... | Rect. Std. Plate No. 2 | |
| 51 | B | 7 | 6 | 2.5 | 42 | 20 | 1020 | Ampl. | Also 51S |
| 52 | B | 1 | 5 | 6.3 | 63 | 27 | 2400 | Ampl. | |
| 53 | D | 1 | 5 | 2.5 | 53 | 10 | 1500 | Ampl. No. 1 Plate | |
| 53 | D | 12 | 5 | 2.5 | 53 | 10 | 1500 | Ampl. No. 2 Plate | |
| 55 | C | 7 | 6 | 2.5 | 40 | 32 | 975 | Ampl. | |
| 55 | C | 10 | 6 | 2.5 | 0 | 0 | .... | Diode OK over 500 | |
| 55 | C | 10 | 3 | 2.5 | 0 | 0 | .... | Diode OK over 500 | |
| 56 | B | 1 | 6 | 2.5 | 53 | 26 | 1450 | Ampl. | |
| 57 | C | 2 | 5 | 2.5 | 48 | 17 | 1225 | Ampl. | Also 57S |

| Tube Type | Socket Letter | Select. | | Fil. Volts | Potent. | | Mut. Cond. | Press | Notations |
|-----------|---------------|---------|----|------------|---------|----|------------|------------|-----------------------|
| | | A | B | | L | R | | | |
| 57A | A | 2 | 5 | 6.3 | 48 | 17 | 1225 | Ampl. | Also 57AS |
| 58 | C | 2 | 5 | 2.5 | 54 | 20 | 1450 | Ampl. | Also 58S |
| 58A | C | 2 | 5 | 6.3 | 54 | 20 | 1450 | Ampl. | Also 58AS |
| 59 | D | 8 | 8 | 2.5 | 60 | 18 | 2000 | Ampl. | |
| 70A7GT | E | 8 | 5 | 75 | 71 | 17 | 5800 | Ampl. | Short on 1-4-5 |
| 70A7GT | E | 11 | 5 | 75 | 0 | 0 | .... | Diode | OK over 300 |
| 70L7GT | E | 6 | 12 | 75 | 71 | 34 | .... | Check for | Shorts |
| 70L7GT | E | 7 | 7 | 75 | 71 | 34 | 5000 | Ampl. | |
| 70L7GT | E | 5 | 1 | 75 | 40 | 0 | .... | Rect. Std. | |
| 71A | A | 2 | 10 | 5 | 56 | 60 | 1650 | Ampl. | |
| 75 | C | 7 | 6 | 6.3 | 28 | 9 | 750 | Ampl. | Section |
| 75 | C | 10 | 6 | 6.3 | 0 | 0 | .... | Diode | |
| 75 | C | 10 | 3 | 6.3 | 0 | 0 | .... | Diode | |
| 75MG | E | 9 | 5 | 6.3 | 28 | 9 | 750 | Ampl. | Section |
| 75MG | E | 12 | 2 | 6.3 | 0 | 0 | .... | Diode | |
| 75MG | E | 12 | 5 | 6.3 | 0 | 0 | .... | Diode | |
| 76 | B | 1 | 6 | 6.3 | 53 | 24 | 1450 | Ampl. | |
| 77 | C | 2 | 5 | 6.3 | 48 | 17 | 1225 | Ampl. | |
| 78 | C | 2 | 5 | 6.3 | 54 | 20 | 1450 | Ampl. | |
| 79 | C | 2 | 10 | 6.3 | 39 | 12 | 1000 | Ampl. | No. 1 Plate |
| 79 | C | 5 | 10 | 6.3 | 39 | 12 | 1000 | Ampl. | No. 2 Plate |
| 80 | A | 2 | 7 | 5 | 35 | 0 | .... | Rect. Std. | |
| 80 | A | 3 | 7 | 5 | 35 | 0 | .... | Rect. Std. | |
| 81 | A | 2 | 7 | 7.5 | 33 | 0 | .... | Rect. Std. | |
| 82 | A | 2 | 7 | 2.5 | 40 | 0 | .... | Rect. Std. | |
| 82 | A | 3 | 7 | 2.5 | 40 | 0 | .... | Rect. Std. | |
| 82V | A | 2 | 7 | 2.5 | 40 | 0 | .... | Rect. Std. | |
| 82V | A | 2 | 7 | 2.5 | 40 | 0 | .... | Rect. Std. | |
| 83 | A | 2 | 7 | 5 | 40 | 0 | .... | Rect. Std. | |
| 83 | A | 3 | 7 | 5 | 40 | 0 | .... | Rect. Std. | |
| 83V | A | 2 | 7 | 5 | 40 | 0 | .... | Rect. Std. | |
| 83V | A | 3 | 7 | 5 | 40 | 0 | .... | Rect. Std. | |
| 84-6Z4 | B | 7 | 7 | 6.3 | 40 | 0 | .... | Rect. Std. | |
| 84-6Z4 | B | 5 | 1 | 6.3 | 40 | 0 | .... | Rect. Std. | |
| 85 | C | 7 | 6 | 6.3 | 40 | 32 | 975 | Ampl. | Section |
| 85 | C | 10 | 6 | 6.3 | 0 | 0 | .... | Diode | |
| 85 | C | 10 | 3 | 6.3 | 0 | 0 | .... | Diode | |
| 89 | C | 2 | 5 | 6.3 | 54 | 30 | 1550 | Ampl. | |
| 99 | A | 2 | 10 | 3 | 60 | 45 | 425 | Ampl. | OK over 340 |
| 112A | A | 2 | 10 | 5 | 57 | 36 | 1650 | Ampl. | |
| 117L7GT | E | 2 | 8 | 117 | 72 | 30 | 4000 | Ampl. | Short on 1-4-5 |
| 117L7GT | E | 5 | 8 | 117 | 40 | 0 | .... | Rect. Std. | |
| 117M7GT | E | 2 | 8 | 117 | 73 | 28 | 6000 | Ampl. | Short on 1-4-5 |
| 117M7GT | E | 5 | 8 | 117 | 40 | 0 | .... | Rect. Std. | |
| 117N7GT | E | 8 | 10 | 117 | 74 | 25 | 7000 | Ampl. | |
| 117N7GT | E | 4 | 3 | 117 | 40 | 0 | .... | Rect. Std. | Also Press 117N7 But. |

SUPPLEMENTARY DATA

| Tube Type | Socket Letter | Select. A | Select. B | Fil. Volts | Potent. L | Potent. R | Mut. Cond. Press | Notations |
|-----------|---------------|-----------|-----------|------------|-----------|-----------|------------------|--|
| 117P7GT | E | 8 | 10 | 117 | 70 | 25 | 4000 | Ampl. |
| 117P7GT | E | 4 | 3 | 117 | 40 | 0 | .... | Rect. Std. Also Press 117N7 |
| 117Z4GT | E | 10 | 2 | 117 | 40 | 0 | .... | Rect. Std. |
| 117Z6G | E | 2 | 7 | 117 | 75 | 0 | .... | Press Gas No. 1 |
| 117Z6G | E | 10 | 2 | 117 | 75 | 0 | .... | Press Gas No. 1 Early Tubes Short 1-3 Late Tubes Short 3 |
| 717A | E | 4 | 2 | 6.3 | 69 | 0 | 3500 | Ampl. |
| 801A | A | 2 | 10 | 7.5 | 53 | 0 | 1500 | Ampl. |
| 802 | D | 10 | 3 | 6.3 | 60 | 18 | 2000 | Ampl. ★ |
| 807 | B | 12 | 1 | 6.3 | 70 | 27 | 3800 | Ampl. ★ |
| 816 | A | 7 | 1 | 2.5 | 20 | 0 | .... | Rect. Std. ★ |
| 837 | D | 10 | 3 | 12.6 | 71 | 0 | 4000 | Ampl. ★ |
| 841 | A | 2 | 10 | 7.5 | 42 | 0 | 1000 | Ampl. |
| 842 | A | 2 | 10 | 7.5 | 46 | 50 | 1150 | Ampl. |
| 843 | B | 1 | 6 | 2.5 | 56 | 10 | 1625 | Ampl. |
| 864 | A | 2 | 10 | 1.5 | 18 | 37 | 650 | Ampl. |
| 865 | A | 10 | 4 | 7.5 | 16 | 28 | 625 | Ampl. ★ |
| 866A | A | 7 | 1 | 2.5 | 40 | 0 | .... | Rect. Std. ★ |
| 871 | A | 7 | 1 | 2.5 | 20 | 0 | .... | Rect. Std. ★ |
| XXB | F | 2 | 10 | 2.5 | 30 | 30 | 800 | Ampl. |
| XXB | F | 12 | 6 | 2.5 | 31 | 60 | 400 | Ampl. OK over 320 |
| XXD | F | 12 | 5 | 12.6 | 64 | 0 | 2500 | Ampl. Plt. No. 1 Short on 1-4-5 |
| XXD | F | 2 | 9 | 12.6 | 64 | 0 | 2500 | Ampl. Plt. No. 2 |
| XXFM | F | 1 | 2 | 6.3 | 30 | 0 | 900 | Ampl. Short 1-4-5 |
| XXFM | F | 12 | 8 | 6.3 | 0 | 0 | .... | Diode |
| XXFM | F | 7 | 3 | 6.3 | 0 | 0 | .... | Diode |
| XXL | F | 6 | 2 | 6.3 | 67 | 0 | 3000 | Ampl. |
| 879 | A | 7 | 1 | 2.5 | 0 | 0 | .... | Rect. Std. OK over 1000 ★ |
| 884 | E | 7 | 5 | 6.3 | 40 | * | .... | Rect. Std. Strikes at 60 on R |
| 885 | B | 1 | 6 | 2.5 | 40 | * | .... | Rect. Std. Strikes at 60 on R |
| 950 | B | 1 | 5 | 2 | 37 | 37 | 950 | Ampl. |
| 951 | A | 2 | 5 | 2 | 18 | 29 | 640 | Ampl. |
| 954 | M | 6 | 7 | 6.3 | 44 | 17 | 1100 | Ampl. |
| 955 | M | 9 | 7 | 6.3 | 59 | 18 | 1900 | Ampl. |
| 956 | M | 6 | 7 | 6.3 | 53 | 14 | 1500 | Ampl. |
| 957 | M | 9 | 7 | 1.1 | 19 | 23 | 650 | Ampl. Short on 4-5 |
| 958 | M | 9 | 7 | 1.1 | 47 | 34 | 1200 | Ampl. Short on 4-5 |
| 959 | M | 6 | 7 | 1.1 | 14 | 23 | 600 | Ampl. Short on 4-5 |
| 1201 | N | 12 | 4 | 6.3 | 67 | 0 | 3000 | Ampl. Short on 1-2-5 |
| 1203 | F | 9 | 5 | 6.3 | 25 | 0 | .... | Diode |
| 1204 | N | 3 | 9 | 6.3 | 58 | 0 | 1800 | Ampl. Short on 4-5 |
| 1231 | F | 5 | 4 | 6.3 | 71 | 10 | 4000 | Ampl. |
| 1232 | F | 5 | 4 | 6.3 | 60 | 15 | 2000 | Ampl. |
| 1284 | F | 6 | 2 | 12.6 | 60 | 23 | 2000 | Ampl. |
| 1291 | F | 1 | 6 | 1.5 | 0 | 15 | 2000 | Diode Short on 4-5 Reads in Green Plt. No. 1 |
| 1291 | F | 6 | 6 | 1.5 | 0 | 15 | 2000 | Diode Reads in Green Plt. No. 2 |
| 1293 | F | 6 | 2 | 1.5 | 50 | 25 | 1300 | Ampl. |

| <i>Tube Type</i> | <i>Socket Letter</i> | <i>Select.</i> | | <i>Fil. Volts</i> | <i>Potent.</i> | | <i>Mut. Cond.</i> | <i>Press</i> | <i>Notations</i> |
|------------------|----------------------|----------------|----------|-------------------|----------------|----------|-------------------|--------------|-------------------------------|
| | | <i>A</i> | <i>B</i> | | <i>L</i> | <i>R</i> | | | |
| 1294 | F | 10 | 5 | 1.5 | 0 | 0 | .... |  | Diode |
| 1299 | F | 6 | 2 | 1.5 | 61 | 30 | 2100 | | Ampl. Short on 1 |
| 1609 | B | 1 | 5 | 1.5 | 26 | 18 | 725 | | Ampl. |
| 1612 | E | 1 | 9 | 6.3 | 20 | 19 | 650 | | Ampl. Cap Grid |
| 1612 | E | 8 | 5 | 6.3 | 20 | 22 | 650 | | Ampl. Pin Grid |
| 1613 | E | 8 | 5 | 6.3 | 62 | 0 | 2250 | | Ampl. |
| 1616 | A | 7 | 1 | 2.5 | 35 | 0 | .... |  | Rect. Std. ★ |
| 1619 | E | 8 | 5 | 2.5 | 69 | 10 | 3400 | | Ampl. |
| 1620 | E | 1 | 9 | 6.3 | 48 | 18 | 1225 | | Ampl. |
| 1621 | E | 8 | 5 | 6.3 | 60 | 24 | 2000 | | Ampl. |
| 1622 | E | 8 | 5 | 6.3 | 73 | 19 | 5000 | | Ampl. |
| 1624 | B | 12 | 1 | 2.5 | 71 | 14 | 4000 | | Ampl. ★ |
| 1625 | D | 10 | 3 | 12.6 | 70 | 27 | 3800 | | Ampl. ★ |
| 1626 | E | 8 | 5 | 12.6 | 61 | 43 | 2100 | | Ampl. |
| 1631 | E | 8 | 5 | 12.6 | 73 | 19 | 5000 | | Ampl. |
| 1632 | E | 8 | 5 | 12.6 | 75 | 15 | 8000 | | Ampl. |
| 1633 | G | 4 | 1 | 25 | 75 | 0 | 8500 | | Ampl. Plt. No. 1 |
| 1633 | G | 10 | 4 | 25 | 69 | 0 | 3400 | | Ampl. Plt. No. 2 Short on 2-3 |
| 1634 | G | 10 | 3 | 12.6 | 42 | 0 | 1000 | | Ampl. Plt. No. 1 |
| 1634 | G | 1 | 3 | 12.6 | 42 | 0 | 1000 | | Ampl. Plt. No. 2 |
| 1851 | E | 8 | 5 | 6.3 | 71 | 10 | 4000 | | Ampl. |
| 1852 | G | 4 | 2 | 6.3 | 71 | 0 | 3500 | | Ampl. |
| 1853 | E | 4 | 2 | 6.3 | 71 | 10 | 3500 | | Ampl. |
| HY113 | O | 7 | 5 | 1.5 | 0 | 40 | 500 | | Ampl. |
| HY115 | O | 7 | 5 | 1.5 | 60 | 32 | 370 | | Ampl. OK over 290 |
| HY125 | O | 7 | 5 | 1.5 | 60 | 45 | 450 | | Ampl. OK over 360 |
| HY145 | O | 7 | 5 | 1.5 | 60 | 32 | 370 | | Ampl. OK over 290 |
| HY155 | O | 7 | 5 | 1.5 | 60 | 45 | 450 | | Ampl. OK over 360 |
| 2050 | E | 8 | 5 | 6.3 | 40 | * | .... |  | Rect. Std. Strikes at 32 on R |
| 2051 | E | 8 | 5 | 6.3 | 40 | * | .... |  | Rect. Std. Strikes at 32 on R |
| 7193 | E | 7 | 2 | 6.3 | 67 | 0 | 3000 | | Ampl. ★ |
| 9001 | K | 1 | 9 | 6.3 | 44 | 17 | 1100 | | Ampl. Short on 4-5 |
| 9002 | L | 2 | 9 | 6.3 | 59 | 18 | 1900 | | Ampl. Short on 4-5 |
| 9003 | K | 1 | 9 | 6.3 | 54 | 14 | 1500 | | Ampl. Short on 4-5 |
| 9006 | L | 2 | 9 | 6.3 | 20 | 0 | .... |  | Diode Short on 4-5 |
| 38142 | A | 2 | 10 | 7.5 | 62 | 30 | 2200 | | Ampl. |

TO TEST MAGIC EYE TUBES: Insert in Socket C. Set proper Filament Voltage.
Press "Amp." Button

2E5-6AB5-6E5-6G5-6H5-6N5-6T5-6U5

| | | |
|----|---|-------------|
| A | B | |
| 12 | 3 | Eye Open. |
| 12 | 2 | Eye Closed. |

6AD6-6AF6.

| | | |
|---|---|-------------------------------|
| A | B | |
| 2 | 8 | Eye No. 1 Open, No. 2 Closed. |
| 3 | 8 | Eye No. 2 Open, No. 1 Closed. |

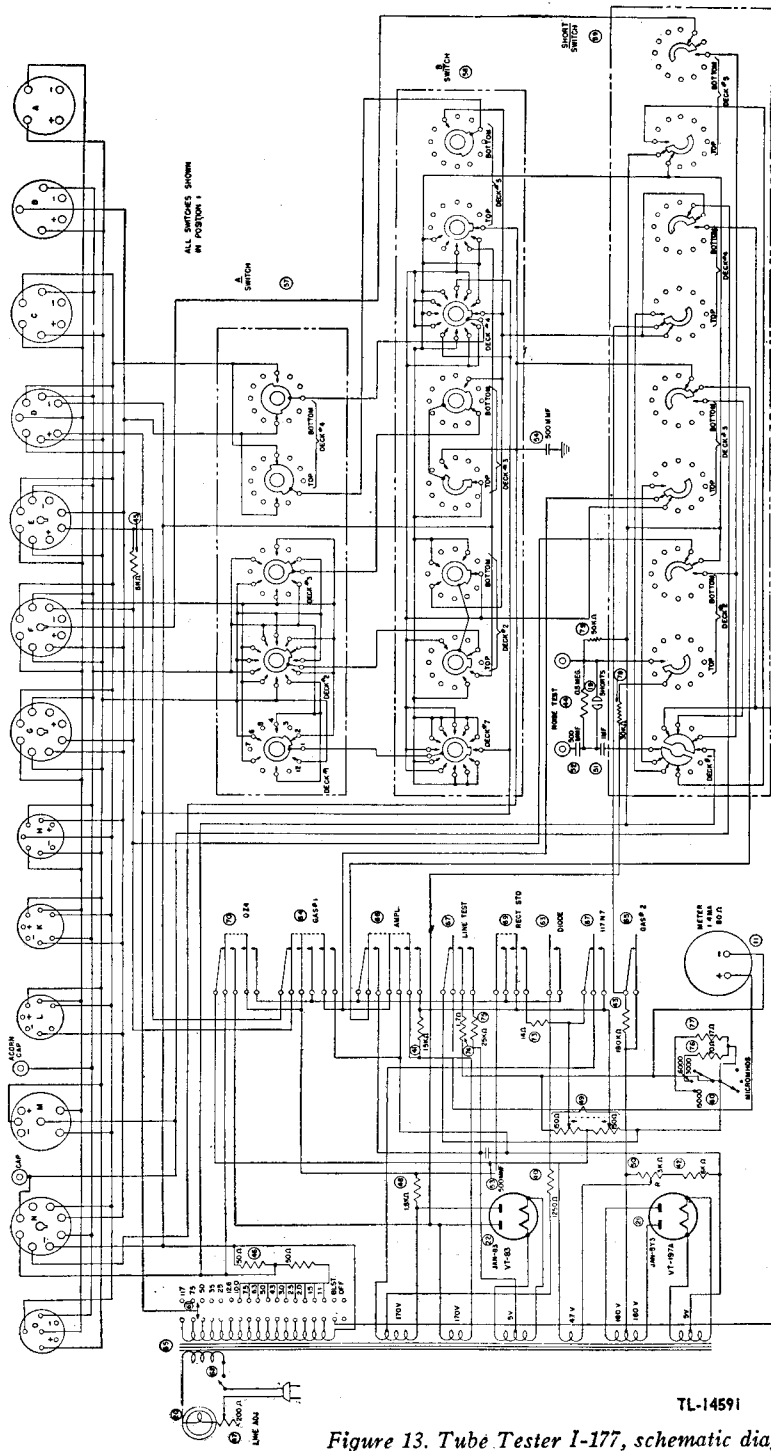


Figure 13. Tube Tester I-177, schematic diagram.

32. MAINTENANCE PARTS LIST FOR TUBE TESTER I-177.

NOTE: Order maintenance parts by stock number, name, and description.
Only maintenance parts can be requisitioned.

| Ref. symbol | Signal Corps stock No. | Name of part and description | Quan per unit | Run-ning spares | Orgn stock | 3d ech | 4th ech | 5th ech | Depot stock |
|-------------------------|------------------------|---|---------------|-----------------|------------|--------|---------|---------|-------------|
| 71 | 3Z9824-56 | BUTTON: plunger type; red bakelite; 1/4" diam; 1 1/4" long. | 1 | | | * | * | * | * |
| 72 | 3Z9824-56.1 | BUTTON: plunger type; black bakelite; 1/4" diam; 1 1/4" long. | 7 | | | * | * | * | * |
| 52, 53, 54 | 3DK9500-106 | CAPACITOR: moulded mica; 500-mmf ± 20%; 400 v dc (working); wire leads. | 3 | | | | * | * | * |
| 51 | 3DA100-250 | CAPACITOR: tubular; paper; 100,000-mmf ± 15%; 400 v dc (working). | 1 | | | | * | * | * |
| 56 | 3E7197 | CORD: line; with 2 No. 18 rubber-covered conductors 8 ft. long; with rubber plug. | 1 | | | * | * | * | * |
| 12, 13, 14, 15 | 2Z5581-5 | JACK: pin; black bakelite. | 4 | | | * | * | * | * |
| 3, 4, 5, 6, 7, 8, 9, 10 | 2Z5948 | KNOB: bar; 1 1/4" X 5/8"; moulded black bakelite with white index line; for 1/4" shaft. | 8 | | * | * | * | * | * |

SUPPLEMENTARY DATA

TM 11-2627
Par. 32

| | | | | | | |
|----|------------|---|---|---|---|---|
| 11 | 3F1350 | METER: 0-1.4-ma d-c milliammeter; resistance 80 ohms. | 1 | * | * | * |
| 49 | 2Z7284.44 | POTENTIOMETER: dual; wire-wound; 150 ohms per section; ¼" shaft. | 1 | * | * | * |
| 50 | 2Z7280-32 | POTENTIOMETER: wire-wound; 3,000-ohm; tapered; ¼" shaft. | 1 | * | * | * |
| 73 | 3Z6001D4-9 | RESISTOR: fixed; wire-wound; 14-ohm \pm ½ ohm; 1-watt. | 1 | * | * | * |
| 74 | 3Z6001G7-4 | RESISTOR: fixed; wire-wound; 17-ohm \pm ½ ohm; 1-watt. | 1 | * | * | * |
| 77 | 3Z6001G7-4 | RESISTOR: fixed; wire-wound; 17-ohm \pm ½ ohm; 1-watt; calibrated resistor for 15,000-mi-cromho range; special. | 1 | * | * | * |
| 76 | 3Z6007-6 | RESISTOR: fixed; wire-wound; 70-ohm \pm 1 ohm; 1-watt. | 1 | * | * | * |
| 46 | 3Z6010-110 | RESISTOR: fixed; wire-wound; 2-section; 50-ohms each \pm 2%; 10-watt. | 1 | * | * | * |
| 40 | 3Z6125-2 | RESISTOR: fixed; carbon; 1,250-ohm \pm 10%; 1-watt. | 1 | * | * | * |
| 48 | 3Z6180-14 | RESISTOR: fixed; wire-wound; 1,800-ohm \pm 10%; 10-watt. | 1 | * | * | * |

* Indicates stock available.

32. MAINTENANCE PARTS LIST FOR TUBE TESTER I-177. (continued)

| Ref. symbol | Signal Corps stock No. | Name of part and description | Quan per unit | Run-ning spares | Orgn stock | 3d ech | 4th ech | 5th ech | Depot stock |
|-------------|------------------------|---|---------------|-----------------|------------|--------|---------|---------|-------------|
| 45 | 3Z6500-176 | RESISTOR: fixed; carbon; 5,000-ohm \pm 15%; 1/2-watt. | 1 | | | | * | * | * |
| 75 | 3Z6625-118 | RESISTOR: fixed; wire-wound; 12,500-ohm; two in series to give 25,000 ohms. | 2 | | | | * | * | * |
| 41 | 3Z6615-27 | RESISTOR: fixed; carbon; 15,000-ohm \pm 5%; 1-watt. | 1 | | | | * | * | * |
| 78 | 3Z6630-72 | RESISTOR: 30,000-ohm \pm 15%. | 1 | | | | * | * | * |
| 79 | 3Z6650-137 | RESISTOR: 50,000-ohm \pm 15%; 1-watt. | 1 | | | | * | * | * |
| 43 | 3Z6718-14 | RESISTOR: carbon; 180,000-ohm \pm 15%; 1-watt. | 1 | | | | * | * | * |
| 44 | 3Z6700-91 | RESISTOR: carbon; 500,000-ohm \pm 15%; 1/2-watt. | 1 | | | | * | * | * |
| 47 | 3Z7200-5 | RHEOSTAT: wire-wound; 200-ohm \pm 15%; 25-watt; 1/4" shaft. | 1 | | | | * | * | * |
| 23, 24 | 2Z8674-8 | SOCKET: tube; 4-pin; bakelite. | 2 | | | | * | * | * |
| 25 | 2Z8687 | SOCKET: tube; 5-pin; bakelite. | 1 | | | | * | * | * |

SUPPLEMENTARY DATA

TM 11-2627
Par. 32

| | | | | | | |
|------------|-------------|--|---|---|---|---|
| 26 | 2Z8688 | SOCKET: tube; 6-pin; bakelite. | 1 | * | * | * |
| 27 | 2Z8677.6 | SOCKET: tube; 7-pin; bakelite. | 1 | * | * | * |
| 28, 29, 30 | 2Z8678.62 | SOCKET: tube; 8-pin; octal; bakelite. | 3 | * | * | * |
| 31, 32 | 2Z8678.21 | SOCKET: receiver tube; standard loctal. | 2 | * | * | * |
| 33, 34, 35 | 2Z8677.5 | SOCKET: receiver tube; miniature; 7-prong; bakelite. | 3 | * | * | * |
| 36 | 2Z8676.2 | SOCKET: receiver tube; bantam; 5-prong; bakelite. | 1 | * | * | * |
| 37 | 2Z8676.22 | SOCKET: receiver tube; acorn; 5-prong; bakelite. | 1 | * | * | * |
| 38 | 2Z5884-47 | SOCKET: candelabra. | 1 | * | * | * |
| 39 | 6Z8332 | SOCKET: lamp; bayonet; single-contact. | 1 | * | * | * |
| 63 | 3Z9826-11.1 | SWITCH: pushbutton; 2-blade, 1-make. | 1 | * | * | * |
| 65 | 3Z9826-11 | SWITCH: pushbutton; 2-blade, 1-break. | 1 | * | * | * |
| 68 | 3Z9826-11.2 | SWITCH: pushbutton; 3-blade, 1-make, 1-break. | 1 | * | * | * |
| 69 | 3Z9826-11.3 | SWITCH: pushbutton; 4-blade, 2-make. | 1 | * | * | * |
| 67 | 3Z9826-11.4 | SWITCH: pushbutton; 4-blade, 2-make, 1-break. | 1 | * | * | * |

*Indicates stock available.

32. MAINTENANCE PARTS LIST FOR TUBE TESTER I-177. (continued)

| Ref. symbol | Signal Corps stock No. | Name of part and description | Quan per unit | Run-ning spares | Orgn stock | 3d ech | 4th ech | 5th ech | Depot stock |
|-------------|------------------------|---|---------------|-----------------|------------|--------|---------|---------|-------------|
| 70 | 3Z9826-11.5 | SWITCH: pushbutton; 5-blade, 2-make, 1-break. | 1 | | | | * | * | * |
| 64 | 3Z9826-11.6 | SWITCH: pushbutton; 6-blade, 2-make, 1-break. | 1 | | | | * | * | * |
| 66 | 3Z9826-11.7 | SWITCH: pushbutton; 7-blade; 1 SPDT section, 1 DPST section. | 1 | | | | * | * | * |
| 60 | 3Z9825-55.11 | SWITCH: selector; rotary; 3-position; 2-pole. | 1 | | | | * | * | * |
| 59 | 3Z9825-62.49 | SWITCH: selector; rotary; 5-deck; 6-position; special contacts. | 1 | | | | * | * | * |
| 57 | 3Z9825-62.47 | SWITCH: selector; rotary; 4-deck; 12-position; special multicontact. | 1 | | | | * | * | * |
| 58 | 3Z9825-62.48 | SWITCH: selector; rotary; 5-deck; 12-position; special contacts. | 1 | | | | * | * | * |
| 61 | 3Z9580-9 | SWITCH: selector; rotary; 18-position. | 1 | | | | * | * | * |
| 62 | 3Z9858-8.1 | SWITCH: toggle; SPST; 3-amp; 250-volt; barrel $\frac{1}{2}$ " diam; $\frac{3}{8}$ " long. | 1 | | | | * | * | * |

SUPPLEMENTARY DATA

TM 11-2627
 Par. 32

| | | | | | | | | | |
|----|---------------|--|---|---|---|---|---|---|---|
| 18 | 3F5700-177/L2 | TEST LEAD: rubber covered; black; approx. 16" overall length with banana plug at one end. | 1 | * | * | * | * | * | * |
| 55 | 2Z9611.67 | TRANSFORMER: filament and plate; primary 93-v ac, 60 cycle, 2 170-volt secondaries, 1 320-volt center-tapped secondary, 2 5-volt secondaries; 1 18-tap universal filament winding. | 1 | * | * | * | * | * | * |
| 19 | 3F4056A/L2 | LAMP: neon; 1/4-watt; candelabra base; 105-125 volts. | 1 | * | * | * | * | * | * |
| 20 | 2Z5929-2 | LAMP: auto; 6-candlepower; 6.3 volt. | 1 | * | * | * | * | * | * |
| 21 | 2T197A | TUBE JAN 5Y3GT/G: VT-197A. | 1 | * | * | * | * | * | * |
| 22 | 2T183 | TUBE JAN 83: VT-83. | 1 | * | * | * | * | * | * |

*Indicates stock available.

Orders No. 6397-Phila.-44, 24475-Phila.-44 and 27612-Phila.-44; 14000; August 44.