## GUARANTEE

This instrument is made of the finest components and has been carefully tested before leaving the factory. We guarantee it against defects in material and workmanship, under normal usage, for a period of 90 days from the date of purchase. The warranty extends only to the original purchaser from an authorized Jackson dealer and is not assignable or transferrable.

Should any defect occur return the unit, to our factory for repair together with a letter giving details of the defect. Do not attempt to have the instrument repaired by anyone other than an authorized Jackson dealer, since this warranty is void if you should do so.

Be sure to fill out and mail the attached Warranty Registration Card within 10 days from the date of purchase or the Warranty is void.

JACKSON ELECTRICAL INSTRUMENT COMPANY
35 Windsor Ave., Mineola, N.Y. 11501

Schematic diagram for your 658-1 is located in bottom of the case.

# Model 658-1
# DYNAMIC OUTPUT TUBE TES

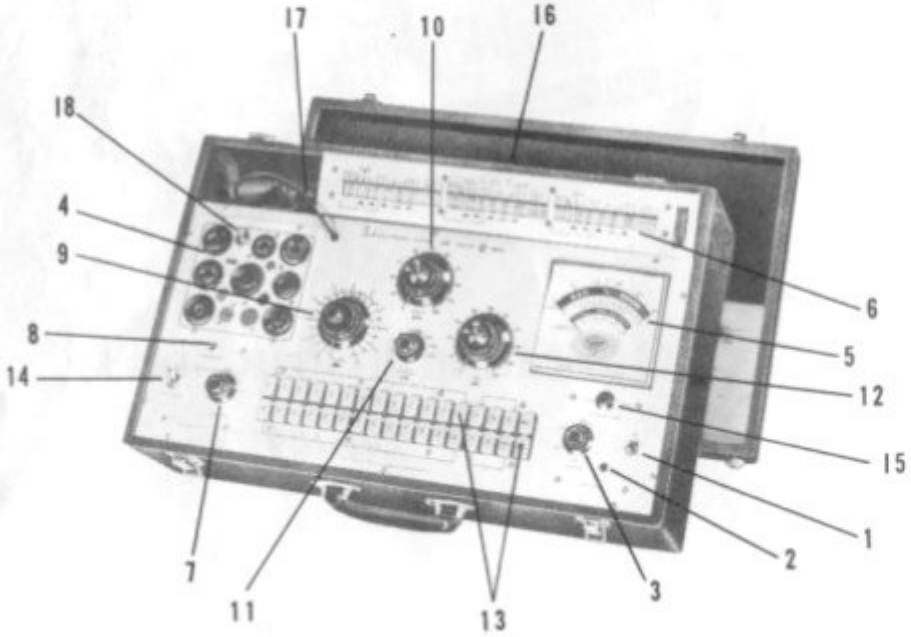
## Operating Instructions

Ser # 240168

Jackson Electrical Instrument C

Your new Jackson Model 658-1 Dynamic Output Tube Tester is the result of years of research, plus Jackson's wide experience in the manufacture of quality test equipment. It is, we believe, the finest service-type tube tester available.

You will find your new tester accurate, fast, and easy to use. Because it offers so many more tests than are normally available on a tube tester, you may find it a little unfamiliar when you first start to use it. That is why we ask you to read this instruction book thoroughly before using your tester. Complete understanding leads to complete satisfaction. By thoroughly understanding the operation, you will be able to derive greater precision and profit from its use.






## PURPOSES OF CONTROLS

Index numbers refer to illustration of panel on opposite page.

| Index Number | Control | Function and Purpose |
|---|---|---|
| 1. | On-Off Switch | Turns the entire tube tester "on" 'off' when line cord is plugged i source of 100-125 volt, 50-60 cy single phase alternating current. |
| 2. | Line Input Pilot Light | Indicates when tube tester is on. |
| 3. | Line Control | Adjusts tester to line voltage of source. When control is adjusted meter pointer is centered at "Li dication, control will show the a line voltage. |
| 4. | Tube Test Sockets | For plugging in tube to be teste ped with a compact socket asse which includes the 5 and 7 nuvi miniature, 8 loctal and octal, 9 combination (for noval and sylva 10 pins), 9 novar, 10 decal, and compactron sockets.<br><br>Also available at extra cost fro distributor a plug in panel (PIP) includes the 4, 5, 6, 7 Combinat and 8 sub-miniature sockets, for type tubes. |
| 5. | Test Meter | Top Scale–VR Voltage Range, volts<br>Merit Scale–GOOD/BAD, plus R Micro-mho indications<br>Grid Scale–Shows general range ceptable and non-acceptable gri conditions. Dot indicates that a on chart having a dot (●) after t setting may be given grid leaka<br>Heater Current Scale – Shows cu milliamperes used by heater. |

| Index Number | Control | Function and Purpose |
|---|---|---|
| 6. | Roll Chart | Indicates correct settings for each listed tube type. Booklet in lid of case provides information on special and rarely-tested types. |
| 7. | Shorts Test Control | Used in making heater continuity test, and shorts test. Must be in "Test" position when making other tests. |
| 8. | Indicator Lamp | When control is in "HEATER TEST" position, lamp indicates heater continuity. When control is in K, P, G2, or G1 position, serves as indicator for shorts and leakage between elements. |
| 9. | Heater Voltage Control | Dual concentric switch. Outer switch selects numerical voltage range. Inner switch selects alphabetical voltage range. |
| 10. | Plate Control | Selects proper meter sensitivity for tube under test. |
| 11. | Plate Voltage Control | Selects proper B+ voltage for plate and screen for tube under test. |
| 12. | Grid Control | Selects proper grid voltage for all tubes having a control grid. Also used as voltage control for VR tubes. |
| 13. | Sequence Switch | Selects proper circuits and pin connections for each test.<br>TOP ROW: Buttons A, B, and C select heater and cathode circuits. Numerical buttons connect elements into heater and cathode circuits. Buttons V, W, and X are spring-return "Push-To-Test" buttons. Release button releases all buttons in that row.<br>BOTTOM ROW: Buttons a, b, and c select plate and grid circuits. Numerical buttons connect elements into plate and grid circuits. Y and Z buttons are spring-return "Push-To-Test" buttons. "Grid" button is for making grid leakage test. Release button releases all buttons in that row. |
| 14. | Life Test | Drops normal heater voltage by predetermined amount to check on cathode condition. |
| 15. | Fuse | Contains overload protection fuse fo B+ circuit. Replace with 100MA. Sl fuse when required. |
| 16. | Chart Replacement Screw | Remove when installing a new roll c |
| 17. | Grid/Plate Connector | Connect to grid or plate cap on tube equipped. |
| 18. | Special Test Switch | Noted on the chart for types or sect to be used. All other types to be in or normal position. |

## TUBE TEST DATA

Data for testing more than 1200 types of tubes is contained in t chart, and in the booklet located in the case lid. The booklet con information on special tubes and those types which are tested inf ly. In addition, new data is published monthly. New roll charts ar printed regularly. *You will automatically receive new charts as i for one year, by mailing in your warranty Registration Card.*

The data in the roll chart and booklet is divided into columns, headings for which are printed on the roll chart cover. An explana of the data under these headings is shown in the table below:

**Type** – This column lists the type designation of the tube. If the cannot be found, check the booklet and the "Similar Types" se of the booklet. If the tube is found in the "Similar Types" sect test the tube with data supplied for the similar type shown.

**Section** – This column indicates the type of tube or the particula of multi-section tubes. For example, note that the 5CG8 has tw each with corresponding data in the other columns. The "P" i Pentode Section, "T", triode section. Letters used and their m are:

D – Diode or Rectifier
H – Heptode
P – Pentode or tetrode
T – Triode or Thyratron
VR – Voltage Regulator or Voltage Reference Tube
B – Split Beam (Color TV Type)
Blank Space – Used for Indicators and other special tubes.

**Heater** – This column gives the settings for the two sections of t concentric Heater Voltage Control rotary switch (Index 9 of Fi

The larger of the two knobs (the one closest to the panel) is set at the numerical indication given in the Heater Column. The smaller knob is set at the letter indication which appears in the outside circle on the panel surrounding the switch knob. Note that in the case of gaseous thratrons, such as the OA4G, the heater voltage is used as operating test voltage.

**Circuit** – These settings are for the push-button switches (Index 13 of Fig. 1). The first group of letters and numbers under the column "H-K" (Heater Cathode) are for the settings of the top row of buttons. The letters in this row are upper case or capital letters. The settings for the lower row of buttons are given in the second column, headed "P-G" (Plate-Grid). The letters in the lower row are lower case or small letters. All buttons should be pushed in the sequence given in the chart.

**Plate** – Under this heading will be found numbers followed by a letter. The numbers refer to the setting for the Plate Control (Index 10 of Figure 1), while the letter refers to the setting for the Plate Voltage Control (Index 11 of Figure 1).

**Grid Test** – This column shows numbers, letters, and in some cases a dot (•). The numbers are for the setting of the Grid Control (Index 12 of Figure 1). The letters are for the Merit Test and refer to the spring-return push buttons in both rows on the right-hand side of the sequence switches (Index 13 of Figure 1). When the dot (•) appears after the letters it indicates that a grid test may be made, which is done by pressing the "Grid" button at the right hand side of the bottom row of push buttons. Merit Test buttons need not be pressed when making grid test.

**Heater Current** – In this column will be found the correct settings for making the heater current test. Information is provided only for series-string tubes. The information is divided in two columns. In the first column is the letter "A" followed by a numerical indication and another letter. This indicates that the "A" button in the top row of sequence switch push buttons is to be depressed. The numbers and letter which follow are for resetting the Heater Voltage Switches. In the second column under this heading will be found the letter "Z" followed by a group of three numbers. This indicates that the "Z" push button is to be depressed. The numbers give the correct heater current rating in milliamperes. This means that when the "Z" button is depressed, the meter should read within ±6% of the indicated value as shown on the bottom scale of the meter. In this column may also be found miscellaneous information for special tubes. See operation information which follows for full explanation.

## How to Test Receiving Tubes, Rectifiers and Diodes

1. Plug in the line cord to a source on 100-125 volt, 50-60 cycl
   Flick the line toggle switch to "ON." The Line Pilot Light
   glow. If it does not, be sure power is available. Check the f
   the instrument if power is available but tube tester is not "o
2. Rotate the Line Control until the meter pointer is centered o
   "Line" indication on the top scale, or as near centered as p
   The Line Control Switch knob pointer will then indicate the
   line voltage.
3. Rotate the roll chart to data for the tube to be tested.
4. Make the heater settings indicated in the roll chart. For gas
   rectifiers, such as the 0Z4, the large knob should be set to
   and the smaller knob can be left on any of the lettered positi
5. Make the settings shown for the top row of buttons (H-K).
6. Check to be sure the "PLATE V." switch is on one of its s
   lettered positions (not one of the VR positions).
7. Insert tube in correct socket and attach Grid/Plate cap if re
   Rotate the Shorts Test Control (Index 7 of Figure 1) to "Hea
   Test." Indicator Lamp above the switch will glow if heater
   continuity. This test is not applicable to gaseous rectifiers
   as 0Z4, voltage regulators or voltage reference tubes.
8. If heater continuity is present, rotate Shorts Test Control on
   position clockwise to the "Test" position.
9. Make balance of settings – bottom row of buttons (P-G), bot
   Plate Control settings and Grid Control where applicable. F
   multi-section tubes, two rows or more of settings are given.
   those settings in the top row only at this time.
10. Allow tube to warm up . . . approximately 30 seconds.
11. Rotate Shorts Test Control to K, P, G1 and G2 positions. If
    cator lights up and remains lighted, a short is indicated. Fo
    example, a heater-cathode short will show up when the Short
    Test Control is in the "K" position. A cathode-grid short w
    indicate on both the G1 and K positions. A flash of light do
    not indicate a short – only a steady or continuously flickeri
    Tapping the tube while making the shorts tests will help in
    ing intermittent shorts. If tube is shorted, discard without m
    further tests. **CONTINUING TO TEST A SHORTED TUBE C
    RESULT IN DAMAGE TO THE TUBE TESTER.**
12. Return the Shorts Test Control to the "Test" position.
13. Dynamic Output Merit Test. Press the indicated spring-retur
    lettered push buttons and observe the meter. A good tube sh
    read in the "Good" section of the scale – above 70% Relati

Micromhos. Tubes reading below 60% should be replaced. Tubes reading off scale above 130% may be gassy. A wavering of the needle may also indicate a gassy tube. This can also be caused by fluctuating line voltage.

14. Life Test. While holding down the lettered push buttons, note the meter reading. Now, still holding down the lettered buttons, push the "Life Test" Toggle switch (Index 14 of Figure 1). If the meter drops back gradually more than 15%, tube will have a short balance of useful service.
15. Grid Test. If a dot (•) is shown on the chart following the Merit Test letters in the "Grid-Test" Column, a test can be made for grid leakage. This is done by pressing the "Grid" button in the bottom row of buttons. All other test settings should remain as set for the merit test, except the spring-return lettered merit test buttons are not pushed down. If the meter pointer swings up into the red grid leakage scale, the tube has excessive leakage and should be discarded. The red-green section is a questionable area, and indicates the tube may function in non-critical circuits, but should not be used in critical circuits where a small amount of grid leakage can upset the circuit balance.
16. Multi-Section Tubes. If more than one row of settings is indicated for a particular tube, refer to the second row and change settings as required. If settings change in either of the rows of push buttons, first push the "Release" button in that row, before making the new settings. This is the last button on the right-hand side of each row. Proceed with the test in the same manner as indicated above, making all applicable Merit and Grid tests. Continue in a similar manner if a third row of settings is given.
17. Heater Current Test. Where data is provided for the heater current test on series-string tubes, proceed as follows: All settings from the previous merit test can be left alone, with the exception of those indicated on the chart. Depress the "A" button at the left-hand side of the top row of push-buttons. Change the Heater Voltage settings as given under the "Heater Current" column. Depress the "Z" button and while holding it down, note the meter reading on the bottom meter scale. A reading within ±6% of the figure given on the chart after the letter Z indicates a satisfactory tube. Tubes which are above or below ±6% of the indicated figure should be discarded as they may cause excessive heater current in other tubes in the series string.
18. After all tests have been completed on a particular tube, press both release buttons in the Sequence Switch and proceed to the next type.



## CHECKING ELECTRON RAY TUBES

Electron Ray or "Eye" tubes are most satisfactorily checked by
ly observing the shadow angle under various grid voltage conditi
Your 658-1 provides this visual check and enables you to vary th
angle on certain types and visualize the target on others. Setting
and 90° shadow angle are provided in the data. Most electron ray
are listed in the Special Tube Data booklet in the lid of the case
ceed as follows:

1. Set up the tube tester as described in steps 1 through 6 unde
ceiving Tube test information.
2. Make the Heater Continuity test as in step 7 of the Receivin
tests.
3. Make the balance of the settings as described in steps 8 thr
of the Receiving Tube tests.
4. Now, press the lettered spring-return test buttons as shown
chart, and observe the shadow angle of the tube. With the G
trol on "0", the shadow angle should be 90°. While holding
the merit test buttons, rotate the Grid control to the figure i
for 0° opening. If the tube is good, the shadow angle will ch
reaching 0° before or by the time the Grid control has reach
indicated setting.

NOTE: Certain special multiple-target electron ray tubes such a
6AF6 are tested by visual test on each target without manipulati
the Grid control. No Grid Leakage test is made on electron ray t

## CHECKING VOLTAGE REGULATORS AND REFERENCE TUBES

With your Tester you can check Voltage regulators and reference
under actual operating conditions. You see the exact striking vo
on the top meter scale (VR Range) as well as the control voltag
Results are directly read in volts, so you know exactly the capa
the tube. In setting the Plate control, it is important to make a v
setting on 52 of the scale. This sets the range of the voltmeter,
meter scale is only as accurate as your setting of the Plate cont
Proceed as follows.

1. Plug in the tube tester, turn on and adjust Line Control as
in steps 1 through 3 of the Receiving Tube Test instruction

2. Make all settings for the tube to be tested. The larger heater voltage control knob is set at "0" and the smaller knob at any of the lettered positions.
3. Plug in the tube. No Heater Continuity check is made and no warm-up time allowed since these are gaseous tubes, employing no heater.
4. Press the indicated spring-return push buttons and while holding them down, slowly rotate the Grid control, watching the meter needle. Striking voltage is indicated at the point at which the needle drops back slightly. The maximum voltage obtained before this drop-back is the striking voltage. Compare this figure with that given on the chart after "St. V." If the tube striking voltage is less or the same as that shown on the chart, the tube has correct striking voltage. The figure given on the chart is the maximum allowable striking voltage.
5. After the tube strikes, the voltage will drop down, without further change in the Grid control. At that point the voltage should read somewhere in the range shown after the letters "O.V." on the chart. This stands for Operating Voltage.
6. While continuing to hold down the indicated spring-return push buttons, slowly advance the Grid control to the Max. figure given on the chart, observing the meter pointer as you advance the control. The meter should not vary by more than the voltage figure given opposite the "Reg." indication on the chart. This is the regulation range and is the maximum allowable for each type. **DO NOT ADVANCE THE GRID CONTROL FARTHER THAN THE MAXIMUM FIGURE SHOWN ON THE CHART.**

## CHECKING THYRATRONS

Your Tester will check both cold cathode thyratrons such as the 0A4G and heater types such as the 2D21, 6D4 and others. With the cold cathode types, the Heater Voltage controls are used to vary the grid voltage, while the Grid control is used with heater types. Here is the correct testing procedure:

1. Set up the tube tester as described in steps 1 through 6 under Receiving Tube Test information.
2. Make the heater continuity checks on heater types, making sure the Plate V. control is on one of its single-lettered positions.
3. Make the balance of the settings shown on the first line of test data and check for shorts.



4. Push the indicated spring-return lettered buttons and observe the meter. If the tube is conducting the meter will read in the "Good" portion of the scale. If the tube is not conducting the meter will read "0" or in the "Bad" portion, if conduction is insufficient. Such tubes should be replaced.

5a. **Cold Cathode Types:** Now change the "Heater V." setting to that shown on the second line of test data and observe the meter while making this change. The tube should stop conducting by the time you reach the setting shown on the chart. The tube is good if it stops conducting at the indicated setting or at any setting betwee the conducting and non-conducting points as shown on the chart. Non-conduction is indicated by the meter dropping back to zero.

5b. **Heater Types:** Now change the Grid setting to that shown on the second line of test data and observe the meter while making this change. The tube should stop conducting by the time you reach the setting shown on the second line of data on the chart. The tub is good if it stops conducting at any point before it reaches this second setting. Non-conduction is indicated by the meter dropping back to zero.

## HOW YOUR JACKSON 658-1 WORKS

### The Dynamic Output Test

This is the basic "merit" test of your Tester and is used for most receiving tubes. In this test, correct potentials are applied to all elements. DC plate and screen voltages are selected by the 8-position "Plate V." switch. The suppressor and cathode are connected to the zero point of the power supply. There are two voltages applied to the control grid. An AC voltage, variable from 0 to 26 VAC peak represent the signal. A DC voltage, variable from 0 to –26 VDC serves as the bias. The metering circuit is a low impedance bridge and measures **only** the AC component in the plate circuit of the tube under test.

This type of Dynamic Output test has several distinct advantages ove any other types of tests used in commerical tube testers. Because the metering circuit is a bridge-type, it is not dependent upon careful bala ing of the transformer windings supplying the high voltage which is rectified for the plate of the tube under test. Since it is a low impedar circuit, it more nearly provides the "zero load resistance" condition required for true mutual conductance testing. Consequently the Jackso 658-1 Dynamic Output circuit takes into consideration the entire linea

portion of the tube output curve ($E_g$-$I_p$), not just a small portion of the curve.

The Jackson Dynamic Output circuit employs realistic voltages and loads – not watered-down versions. Up to 250 volts may be applied to plate and screen grid circuits, and up to 150 ma. can be drawn with ease.

### Rectification Test

For testing rectifiers, your Tester employs the Dynamic testing principle. An AC voltage is applied to each diode section, and the resultant DC plate current is measured. Because each section is measured individually, it may be compared for balance with other diode sections in the same tube. Here again, realistic voltages and loads are applied in testing. For example, a 5U4 is tested with 250 volts with sufficient load to draw 125 ma. for each section. This is equivalent to drawing 250 ma. in an actual rectifier circuit where both sections are used in full-wave rectification. This method is effective in testing small diodes and husky power rectifiers.

### Grid Leakage Test

For this test, a 6AV6 tube inside the Tester is normally biased to cut-off. A resistor is connected from grid to cathode of the tube under test. If the grid of this tube is drawing any grid current, it will cause a corresponding drop in the grid-cathode resistor. This voltage is applied to the 6AV6 taking it out of its cut-off condition and causing a tube current flow which is read on the meter. The Grid Leakage test has a sensitivity of 80 megohms, with the rejection point at 15 megohms. Consequently this is an excellent test for conditions where the flow of grid current can cause circuit difficulty. The Grid Leakage test can be made for any tube for which a dot (●) is shown on the chart.

### Heater Current Test

For this test the meter is converted to a milliammeter with a range of 0 to 1000 ma. full scale. The meter is inserted into the heater circuit for a direct reading of actual current drawn by the heater. An adjustment is required in the heater voltage setting for this test to compensate for the shunt required to convert the meter for this purpose. Consequently new settings are noted on the chart for the heat current test. It is important to first depress the "A" button before making the adjustment in heater voltage. This introduces the meter shunt into the circuit. Depressing it first will prevent placing a higher than normal voltage on the heater. With the "A" button depressed and the setting changed the tube will have applied to its heater the correct operating voltage within 3%.

### Heater or Filament Continuity

Since a very large percentage of tube difficulties are due to burned out heaters, your Jackson Tester provides a rapid means of determining whether the heater is burned out. You make this test without waiting for warm-up, and by making only a minimum number of settings. Consequently it is a very rapid means of determining whether the heater is good. Only the continuity test voltage is applied during this test, and there is no possibility of damage to the tube.

### Heater-Filament Voltages

Misleading results are quite common in other types of tube testers because the heater voltage or current capability is not correct for the tube under test. To avoid this difficulty your Jackson Tester offers 231 different voltages to test practically any tube with a heater voltage rating of anywhere from .7 to 120 volts. A power of 25 watts is available at any of these selected voltages. The great number of voltages available means that any selected voltage within the range will be accurate to 3% or better.

### Shorts Testing

In some tube testers, high shorts test voltages result in actual damage to the tube under test. However, all Jackson Tube Testers currently manufactured employ "Safety Bias" shorts testing to eliminate any possibility of damage to the tube, or changes in contact potential with hybrid types. Your Tester has three separate shorts sensitivities to suit every tube listed on the charts. Each tube element is separately tested against all other tube elements for shorts. Thus any short or high leakage will be detected.

### Voltage Reference and Regulator Test

The second section of the dual Grid Control potentiometer is used to vary the plate voltage supplied to VR and reference tubes. The meter is converted to a 0 - 250 full scale voltmeter. Thus you are able to read striking voltage, operating voltage and regulation range directly.

### Testing Hybrid Types

So-called hybrid tubes are designed for use in portable equipment where only the battery voltage is applied to the plate. Most of these tubes have a maximum plate voltage rating of 30-volts, and some are even less. In addition special types, such as the space-charge grid tubes draw con-

siderable grid current for the type of operation involved. Because of these factors they usually cannot be tested satisfactorily on most tube testers. The average tube tester will not provide correct plate potentials, and does not have the current capability to test adequately the high plate-current types.

Your Tester has been designed to test correctly all hybrid tubes. Correct plate voltages, more than ample current capacity, and correct shorts test conditions mean you can check any hybrid type with complete accuracy and safety.

### Some Points to Remember

1. Always double-check your settings, especially if a tube is shown as bad.
2. When making the heater continuity check be sure the "Plate V." control is on Q, R, S, T or U. The heater-continuity test is disconnected when this switch is on any of its VR positions.
3. After making a shorts test, be sure to return the Shorts Test Selector switch to its "test" position. Otherwise, the meter will read "zero" on the subsequent merits test.
4. When the chart shows two buttons to be depressed for the merits test, depress them both simultaneously.
5. You don't have to leave the tester on, as with generators and other alignment equipment. Your Tester is ready for use instantly and requires no warm-up period for stability.
6. After use, depress the release buttons on the push-button sequence switches and turn the large Heater V. knob to "0." This will prevent any possibility of damage to a tube if someone plugs in a tube without first setting the correct heater voltage.

## MAINTENANCE OF YOUR 658-1

Your Tester will require very little maintenance, outside of changing the roll chart and occasionally checking the 6AV6 Tube. In case of other difficulties, it is recommended that you return Tester to the factory service department, accompanied by a letter indicating the difficulty. All Jackson equipment is repaired at the factory at a nominal cost and in short time.

### Changing the Roll Chart

Remove one screw (Index 16 of Figure 1) and lift out the roll chart assembly. Roll the chart onto the lower roll. Remove the taped end of the chart from the upper roller. Now pull the chart off the lower roller and discard the old chart.

Lay a new piece of masking tape on the top edge of the new chart so that half its width is on the chart and half off the top edge of the chart. Carefully apply the free edge of the masking tape to the upper roller, being sure the chart is centered from left to right and straight. Roll the new chart onto the upper roller, keeping it moderately taut and straight When the chart is rolled completely onto the upper roller, tape the botto end to the lower roller in the same manner as the top end was attached. Replace the chart assembly being sure that the front edge of the assembly fits behind and below the main panel.

New charts are issued regularly as required. You will receive free char service for one year from date of purchase, by mailing in your Warranty Registration Card. After the one year period you may secure charts directly from Jackson, or from your parts jobber, from whom you purcha your Tester. In ordering charts, be sure to specify the model number of your tube testers.

Latest tube test data is published monthly. Each of these shows the latest chart number. The chart number on your 658-1 is shown at the lower right hand corner of the roll chart.

### Checking the 6AV6 Tube

The 6AV6 is the only vacuum tube used in your 658-1. It is used only i the grid leakage test. This tube should be checked occasionally. Remo the 10 machine screws holding the tester main panel assembly in its case. Lift up the main panel and remove the 6AV6 from its socket. Tes the tube in your Tester. All the tests except the grid leakage test can be made.

Another method of checking the grid leakage test is to simulate a grid leak condition. For this purpose connect a wire from the top cap connector to pin 1 of the octal socket. A heavy wire such as a paper clip will do. Depress buttons C and 0 on the top row of buttons, and b and 7 on the bottom row. Depress the Grid button. The meter should read clos to full scale if the test is functioning properly. If a reading below 700 on the Heater Current Scale is encountered, replace the 6AV6 tube.

### Checking the High Voltage Power Supply

An overall check of the high voltage supply can be made as follows: Set the Plate Control to 52 and the Plate V. control to VR1. Set the Grid Control to 100. Depress the YZ buttons simultaneously. You shoul get a reading on the VR range scale of approximately 225 volts.