

FAST-CHECK TUBE TESTER



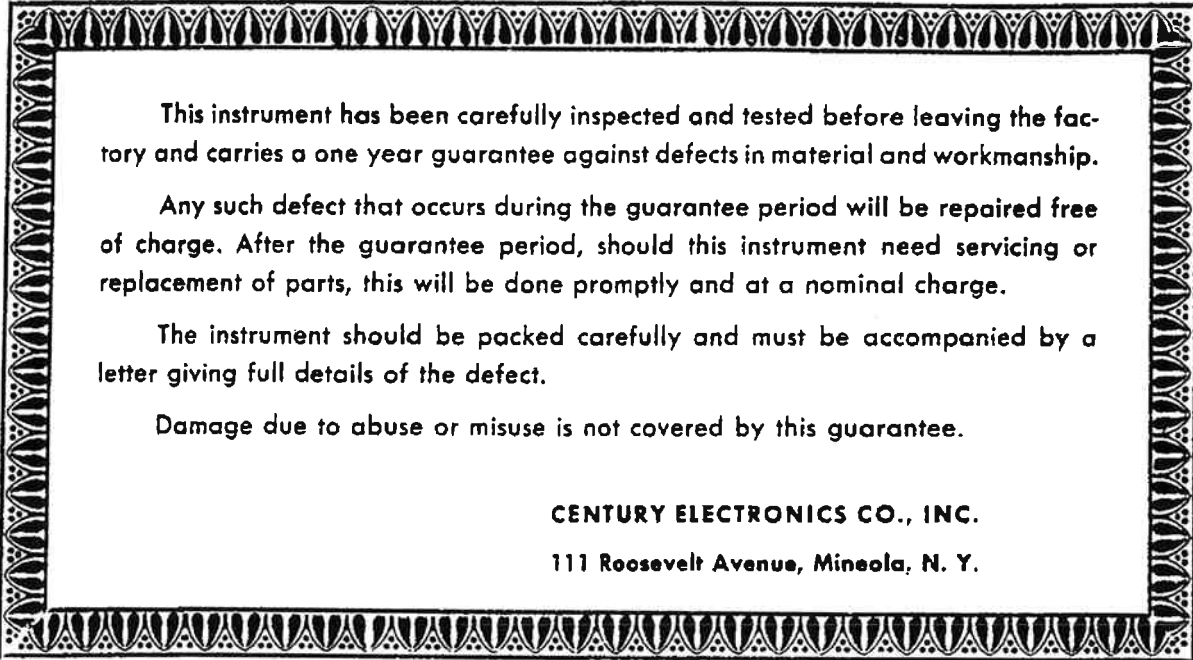
Model FC-2

INSTRUCTION MANUAL

Century Electronics Co., Inc.

manufacturers of electronic equipment

MINEOLA, N. Y.



This instrument has been carefully inspected and tested before leaving the factory and carries a one year guarantee against defects in material and workmanship.

Any such defect that occurs during the guarantee period will be repaired free of charge. After the guarantee period, should this instrument need servicing or replacement of parts, this will be done promptly and at a nominal charge.

The instrument should be packed carefully and must be accompanied by a letter giving full details of the defect.

Damage due to abuse or misuse is not covered by this guarantee.

CENTURY ELECTRONICS CO., INC.

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MINEOLA, N. Y.**

INTRODUCTION

Here is the instrument that is completely changing the picture in tube testing. With the FAST-CHECK you can forget about hit and miss substitution methods of tube testing ... do away with complicated and time-consuming multiple switch and roll charts. Just two settings enable you to make a complete tube test in seconds ... giving you an immediate reading of quality, shorts, gas content and life expectancy of over 700 tube types including picture tubes, the newest series-string TV tubes, 0Z4's, gas regulators, tuning eye indicators, special purpose HI-FI tubes and even foreign tubes.

With the FAST-CHECK you will welcome the opportunity to check tubes, for the test time is reduced to less than 10 seconds. To test any tube, you simply set only two controls, insert the tube in the proper socket and press the test button. That's all there is to it!

You'll find you actually spend less time on each call and make more money, and equally important, your swiftness and sureness in testing tubes will impress your customers with your ability. Their confidence in you will result in more recommendations and increase your good will tremendously.

The FAST-CHECK will enable you to locate those hard-to-detect weak tubes, reducing the possibility of non-profitable call-backs. You can also increase your earnings and sell more tubes by showing your customer the actual condition and life expectancy of the tube on the large three color meter.

A very important question most likely in your mind is "Will the FAST-CHECK become obsolete as new tube types come out?" The answer to this is "No"! The circuitry of the FAST-CHECK has been engineered to provide for all the possible combinations of pin connections of future tube types. In addition, new tube listings will be furnished at no charge as soon as new tube types are introduced. This will keep your FAST-CHECK right up-to-the minute at all times.

HOW IT WORKS

TUBE QUALITY

Tube quality is measured by the Dynamic Cathode Emission principle in which the rectified cathode current resulting from an A. C. input is measured. Tube quality may also be expressed by measurement of the Mutual Conductance, Plate Conductance or Amplification Factor.

Mutual Conductance (also known as trans-conductance or G-m) has limited usefulness in that it is valuable only for high gain amplifiers used in circuits where maximum gain is required. Thus, a measurement of Mutual Conductance has very little value for tubes used as sync. clippers, detectors, rectifiers, mixers, cathode followers, gas tubes, etc. The same is true for measurement of either Plate Conductance or Amplification Factor.

However, with the Dynamic Cathode Emission Principle employed in FAST-CHECK, *all* tubes can be checked regardless of tube type. In this way, we have been able to cover well over 700 type tubes on the Tube Chart with an accurate and complete check for the quality of every tube listed.

The FAST-CHECK is designed with special switching to handle the testing of multiple-section tubes. Each section is *tested separately* in tubes like 6SN7, 12AU7, etc. which contain two separate sections. Thus, if one section is "BAD" and the other section is "GOOD", the FC-2 will show such a tube to be "BAD".

Where two sections have a common emitter (such as in the 5U4) two tests are made. This is indicated on the tube chart in the following manner:

5U4)
5U4)

TUBE LEAKAGE AND GAS CONTENT

No tube test is complete without a check for inter-element leakage or gas content. The FAST-CHECK is extremely sensitive to leakage between Cathode-Heater (which is the most common type of inter-element leakage) . . . also Cathode-Grid leakage (which includes gas content). Thus, tubes which fail in service or perform in a sub-standard manner because of

leakage or shorts between elements or due to a gassy condition, will be found by the FAST-CHECK.

There are two indicators employed which allows for two sensitivities. In this way, leakage resistance all the way up to 5 megohms is picked up. One advantage of separating the indicators is to allow the experienced technician to judge whether the leakage is severe enough to warrant tube replacement.

TUBE LIFE EXPECTANCY

Tubes have a life expectancy which can be estimated by the rate of increasing emission from the Cathode, or by the ability of the Cathode to maintain a constant emission at normal level.

The first property is the familiar "warm-up" time. In general, if a tube takes an excessively long time to reach full output, its life expectancy is short.

The second property, which is always a sign of short life expectancy in a tube, is when the emission falls off after reaching normal output. This can be easily seen by holding down the "QUALITY" button. The meter needle should *not* "fade" back to a lower value after it reaches full output.

NEW TUBE TYPES

The tube types (well over 700) covered by the Tube Chart will be augmented periodically by new type listings which Century will issue at no cost to all FAST-CHECK owners. The circuitry of the FC-2 has been engineered to accommodate future tube types. As they are introduced, you will be informed of the proper settings to add to your Tube Chart.

PICTURE TUBES

The Picture Tube Adapter is designed for use with the FAST-CHECK only. With its use, you can check all picture tubes (including the new short-neck 110 degree types) for Cathode emission, shorts, gas and life expectancy. Weak picture tubes can also be rejuvenated and Cathode emission restored.

LINE VOLTAGE COMPENSATION

The FAST-CHECK incorporates compensation for line voltage variations from 100 Volts to 130 Volts.

SAFETY

The FAST-CHECK is entirely free of shock hazard because the panel is isolated from the line. In addition, possible damage to either tubes or meter due to error in test procedure has been eliminated by careful design of the unit.

DESCRIPTION OF THE PANEL

THE METER is a 4½" D'Arsonval type galvanometer. It is extremely sensitive with accuracy within 2% . . . yet rugged. It is heavily damped to avoid needle quiver and assures long-lasting service. Full protection against accidental burn-out has been provided. The scales are in three colors for easy readability. A "SPECIAL" scale is provided for use with high plate resistance tubes.

THE SELECTOR CONTROL provides for all filament voltage requirements from 1.5 volts to 117 volts.

THE LOAD CONTROL provides the proper load for each tube being tested.

THE GAS INDICATOR will glow when checking gassy, ionized or shorted tube grids. Reject any oscillator tube, I.F. tube, sync. tube, or AGC tube which causes a "GAS" indication. In Power amplifiers, a faint glow may be tolerable, as these tubes will still perform reasonably well with some gas content.

THE SHORT INDICATOR will glow if there is any Heater-to-Cathode leakage. At rated filament voltage, good tubes should not show any "short" indication. If you see a very faint, flickering indication, it means that the short is of a very high-resistance nature. Again, in the case of power amplifiers, the tubes may still be usable.

If both indicators light up, the tube should always be replaced, because it has strong combination of leakage and gas.

THE QUALITY BUTTON is a push-button that operates the specially-designed six-pole switch. When the quality button is depressed, the connections of this master switch are set to show tube "QUALITY". However, this push-button is normally in the "SHORT TEST" position so that leaky and shorted tubes can always be caught before making the "QUALITY TEST".

THE LINE ADJUST CONTROL will compensate the meter needle for correct operation at line voltage variations from a low of 100 volts to a high of 130 volts.

THE POWER INDICATOR is a jeweled light which glows when the instrument has been turned "on".

THE TOP CLIPS are provided to accommodate all tubes with elements brought out to top caps. The clip with the red wire is normally used for all tubes . . . except when otherwise directed in the tube chart.

THE PIN STRAIGHTENERS for both seven and nine pin miniature tubes are mounted very handily on the panel to save both time and temper in dealing with bent tube pins.

THE TUBE SOCKETS (41 in all) accommodate 99% of all octal, loctal, seven and nine pin tubes in use today. They will accommodate all future tube types also. Early tube types which use the old style base have not been included as the demand for them has fallen almost to zero and do not warrant the extra cost.

TEST PROCEDURE

- 1) Plug in the line cord.
- 2) Turn the instrument on by rotating the "Load Control" clockwise.
- 3) Rotate the "Line Adjust" knob so that the meter reads "50" at the "Line Adjust" marker on the meter.

Important: Set the "Line Adjust" *before* inserting any tube in socket. Do *not* re-adjust after tube is in socket.

- 4) Find the tube listing on your Tube Chart.
- 5) Turn the "Selector Control" to the proper setting.
- 6) Rotate the "Load Control" to its proper setting.
- 7) Insert tube into proper socket. (If tube has top cap, use the clip with the red wire unless otherwise indicated.)
- 8) Observe the "Short" and "Gas" indicator jewels.
If either one glows, the tube has internal leakage or excessive gas content. A Cathode-Heater short will cause the bottom jewel to glow. Gas content will cause the upper jewel to glow. A grid short, or a combination of leakage paths, will cause both jewels to glow.

NOTE: If leakage glow is very faint, or flickers dimly, the leakage is not bad, and in some cases the tube can still be used. But if the tube is used in a critical circuit as an oscillator tube, AGC tube, I.F. Amplifier tube or sync. tube, it should be replaced.

- 9) If there is no short, press the "Quality" button and read tube quality on the meter.

LIFE EXPECTANCY TEST

Poor life expectancy of a receiving tube can be estimated in two ways.

1. *Fading* – If the needle reaches the “Good” area on the meter, but then “fades” back into the “Weak” or “Bad” area, life expectancy is poor.
2. *Sluggishness* – If needle climbs sluggishly or unevenly, and takes too long to reach the “Good” area, tube life expectancy is short. Once a tube has heated up the needle should climb into the “Good” area in about one second after you push the “Quality” button.

PICTURE TUBE TEST PROCEDURE

- 1) Insert Picture Tube Adapter into Fast-Check socket #2.
- 2) Note whether the picture tube has standard 6.3 volt rating or uses one of the newer ratings of 2.68 volts and 8.4 volts.
For standard 6.3 Volt tubes, set SELECTOR at D
For new 2.68 Volt tubes, set SELECTOR at B
For new 8.4 Volt tubes, set SELECTOR at E
- 3) Set "Load" control to "70".
- 4) Attach adapter cap to the picture tube under test. Use the special 110 degree adapter cap for the short-neck 110 degree tubes.
- 5) Allow 10 seconds for the picture tube to warm up.
- 6) If the tube has any shorted elements one or both of the "Short" or "Gas" indicators will light. A strong glow indicates the tube has a dead short. A faint glow indicates the tube is gassy or has a high resistance short.
- 7) If the indicators do not light, depress the "Quality" push-button and read the picture tube quality on the numerical scale of the meter as follows:
 - a. Readings over 20... emission is good.
 - b. Readings from 5 to 20... emission is low, but the tube may still show a good raster.
 - c. Readings below 5... emission is very poor. The tube should be rejuvenated according to the procedure outlined on page 12. Tubes which have a quality reading below 5 and do not respond to rejuvenation should be replaced.

LIFE EXPECTANCY TEST

If the picture tube has been already tested and found to have no shorts, allow at least 2 minutes for the filament to cool off. Then plug the picture tube into the Fast-Check adapter again and depress the "Quality" button, and note how long it takes the meter needle to climb to a reading of 20 or over on the numerical scale.

If the meter needle reaches 20 or higher after the "Quality" button has been depressed for:

10 to 15 seconds . . . life expectancy is HIGH

16 to 30 seconds . . . life expectancy is FAIR

over 30 seconds . . . life expectancy is POOR

REJUVENATION

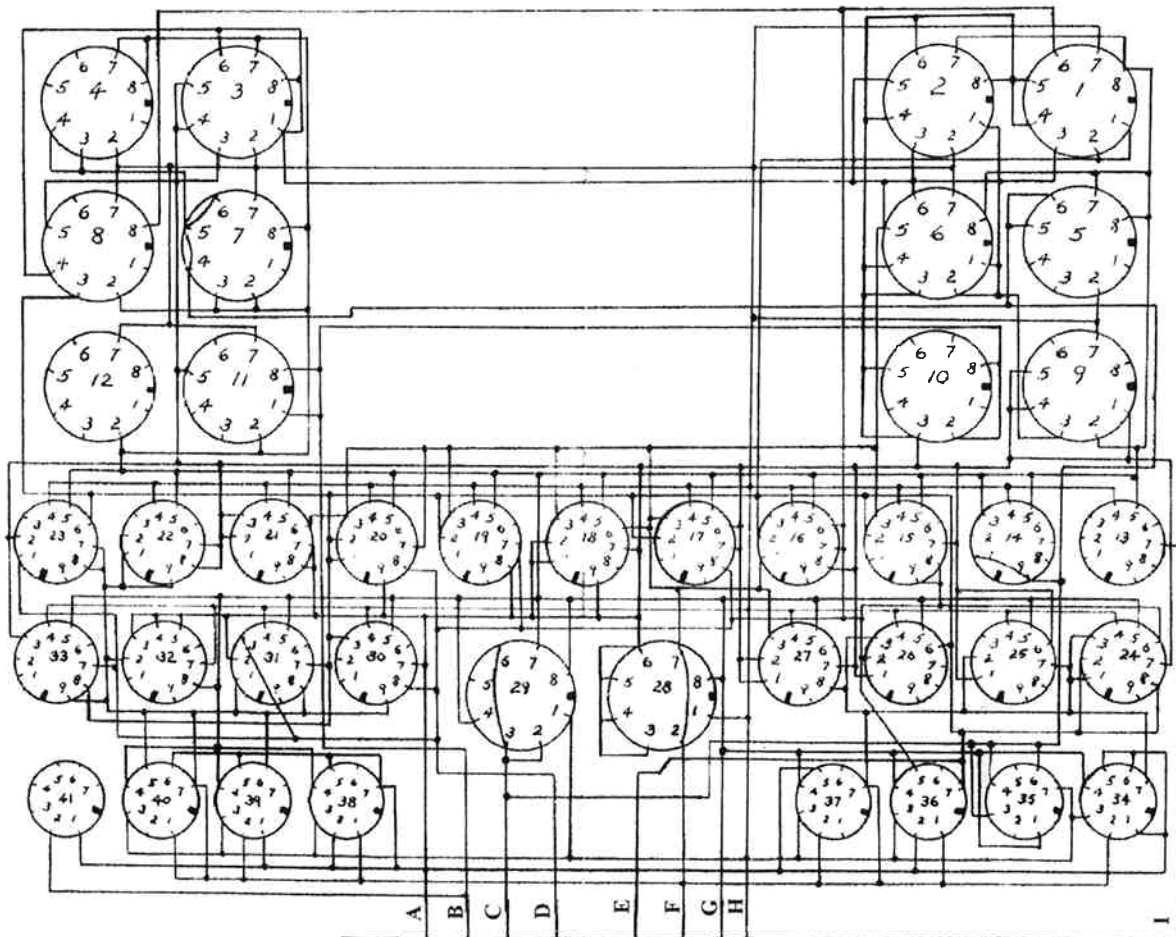
1) Advance SELECTOR clockwise to the next higher position and leave it there for one minute.

Note: A faint "Short" glow may appear when SELECTOR is advanced. The picture tube is not shorted provided the glow disappears when SELECTOR is returned to its original position.

2) At the end of one minute, return the SELECTOR to its original position.

3) Depress "Quality" button and note any improvement in Cathode emission.

4) This procedure may be repeated as long as further improvement is obtained each time.



FAST-CHECK TUBE TESTER

Model FC-1

Code 123

- R-1 33K Resistor
- R-2 200 W. W. Potentiometer
- R-3 1K Comp. Potentiometer
- R-4 2.2M Resistor
- R-5 6.8K Resistor
- R-6 3.9K Resistor
- C-1 200 Mfd. Condenser
- C-2 .01 Mfd. Condenser
- N-1 NE-2 Neon
- N-2 NE-2 Neon
- T-1 Power Transformer
- S-1 Short-Quantity Switch
- S-2 On-Off Switch (part of R-2)
- S-3 Selector Switch
- M-1 0-5 ma. Meter

Note:

S-1 shown in normal (short) position

