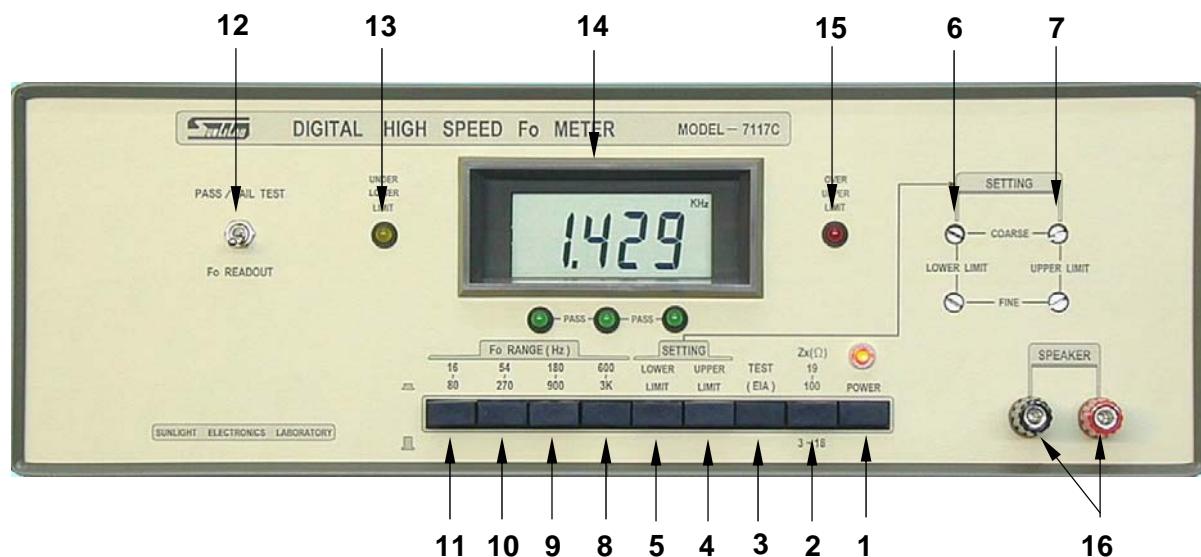


## DIGITAL HIGH SPEED Fo METER MODEL – 7117C



### I . Function:

**Model – 7117C has the following two main functions:**

- A. Model-7117C can measure the Fo value of a loudspeaker fully automatically, no need of manual adjustment of the instrument. The correct Fo value of a loudspeaker is being displayed on the " DISPLAY PANEL" ( 14 ) in just 1 to 1.5 seconds. It has many advantages than by using a voltmeter with a needle indicator for measuring the Fo value of a loudspeaker:
  - ( a ) Easy to read; ( b ) No visual error; ( c ) High accuracy.
- B. Model-7117C can be used in a production line: , high speed judging if Fo value of every loudspeaker is within the qualified range, Judging speed is as fast as in just 0.3 to 0.7 second, the " PASS / FAIL Test" functions will be indicated instantly.

### II . Specification:

- A. Display: Displayed in  $3\frac{3}{4}$  digits.
- B. Accuracy: Fo readout error less than  $\pm ( 1\% + 1\text{Hz} )$
- C. Measuring Range: 4 ranges from 16Hz to 3KHz,
  - ( a ) 16Hz - 80Hz ; ( b ) 54Hz - 270Hz.
  - ( c ) 180Hz - 900Hz ; ( d ) 600Hz - 3KHz.
- D. Fo measuring voltage added on the pre-measure loudspeaker: 1V r.m.s.  $\pm 10\%$  ( complies with EIA standard ).

- E. Can test the impedance of an under-testing loudspeaker: Divided into two ranges, which are (1)  $3\Omega$  to  $18\Omega$ ; (2)  $19\Omega$  to  $100\Omega$ .
- F. Measuring Speed: "Fo Readout" in 1 to 1.5 seconds.  
"PASS / FAIL Test" in 0.3 to 0.7 second.
- G. Limit Setting: Both the upper & lower limits of a loudspeaker can be preset independently from 16Hz to 3KHz, and have no interference with each other.
- H. Limitation in usage: Model-7117C can not be used to measure the Fo value of an air suspension loudspeaker, including those loudspeakers which are air tight frame, since their Q.o. values are too low to measure.

### III. Usage:

- A. Based on the impedance of an under-testing loudspeaker, choose either press in or press out the "Impedance range push-button" (2). Which is  $3\Omega \sim 18\Omega$  or  $19\Omega \sim 100\Omega$  range.
- B. Determine roughly the Fo value of a pre-measure loudspeaker, and choose the most appropriate range from "Fo frequency range push-buttons" (8) to (11).
- C. To measure the "value" of Fo, user is required to flick down switch (12) to "Fo Readout" position, (when switch (12) is being flicked down, and if a pre-measure loudspeaker is not yet been connected, although "DISPLAY PANEL" will still display digits, user can ignore it. Once the loudspeaker is being connected, the correct Fo value will display instantly). And press-in the "Test (3) push-button", to execute the testing, user may temporarily ignore the lower limit (5) and upper limit (4) push-buttons, then, connect the pre-measure loudspeaker to the output testing terminals at the lower right corner of the instrument (16), then, the actual Fo value will be displayed at once on the "DISPLAY PANEL", measuring time is approx. 1 to 1.5 seconds.
- Note: Before selecting the "Fo frequency range" push-buttons (8-11) and press in the "Test" push-button (3), please don't connect any loudspeaker or load on the "Output testing terminals" (16); user should select first the desired "Fo frequency range" and press in the "Testing" push-button, then, user may connect the under-testing loudspeaker to the instrument, to test the correct Fo value.
- D. When used in a production line, more speedy measuring time is needed, besides, it is unnecessary to know the exact Fo value, user needs to know only on whether the Fo value of a pre-measure loudspeaker is within a qualified range, then, user may set on Model-7117C, the upper and lower limits of this qualified range, and to test if the Fo of the pre-measure loudspeaker is within the range of the upper and lower limits. The procedures are: After doing steps (A) to (C), press in "Upper limit" push-button (4), adjust vernier (7) with a small minus screwdriver, to let the displayed value be equal to

the presetting upper limit ( Ex.:  $F_o = 100\text{Hz} \pm 15\%$ , the upper limit should be equal to 115Hz, the lower limit should be equal to 85Hz ). After presetting, press in “Lower limit” push-button ( 5 ), and adjust vernier ( 6 ) with a small minus screwdriver, to set the lower limit, after setting both the upper & lower limits, press “Test” push-button ( 3 ), & flick upward ( 12 ) to “PASS / FAIL Test” position, at this stage, the digits displayed on the “Display Panel” (14) will disappear, but once the user have connected the under testing loudspeaker to Model-7117C, either one of the following states will occur:

- Note: Upper limit adjusting potentiometer (7) and lower limit adjusting potentiometer (6) each has the Coarse and Fine potentiometers , this will enable the adjustment to be more precise, therefore, user can be able to make more easily and precisely adjustment in order to attain to his demand upper, lower limits frequency values, this is the one of the differences between the old Model-7117K and the new Model-7117C.

(a) The first state:

If the  $F_o$  value of the loudspeaker is within the specification of the specified upper and lower limits (which means that the loudspeaker is a qualified one), then, in just 0.3 to 0.7 second, the “DISPLAY PANEL” will display the digits instantly , and the three green LED indicators accompanied with the words “PASS” will light up, this means that the under testing loudspeaker is qualified, the judging time is quite short!, As long as there is a digit displayed on the “Display PANEL” and the three green indicators light up, it means that the under testing loudspeaker is qualified. User please take note that if he wishes to know the actual displayed  $F_o$  value , he has to wait for a longer time (around 1.5 seconds), since normally it will take a longer time before the digital voltmeter can display the actual  $F_o$  value, the instantly displayed value is not the real  $F_o$  value.

(b) The second state:

If the  $F_o$  value of the pre-measure loudspeaker is higher than the upper limit, the “ DISPLAY PANEL” will not display any digits, instead a red indicator at the right corner of (15) will light up, which indicates that  $F_o$  value is higher than the upper limit.

(c) The third state:

If the  $F_o$  value of the pre-measure loudspeaker is lower than the lower limit, the “DISPLAY PANEL” will not display any digits, instead a yellow indicator at the left corner of (13) will light up, which indicates that  $F_o$  value is lower than the lower limit.

The  $F_o$  value of the under-testing loudspeaker can be sorted at a very fast speed based on the aforementioned 3 states, since Model-7117C is indicated by LED, visual error can be avoided, besides, it response faster than a needle indicator.

#### IV. Caution:

- A. No matter "PASS / FAIL Test" or "Fo Readout" mode is being used, all the adjustment and pre-setting must be done before performing any measurement. If a loudspeaker is connected first, then, the result will not be accurate. Under this condition, users should detach first the connecting wires for half a second, to let Model-7117C goes back to normal.
- B. The "Upper Limit" and "Lower Limit" should be preset only after an adequate "Fo frequency range" push-button [ either from ( 8 ) to ( 11 ) ] had been chosen, otherwise, if setting first the upper, lower limits before selecting the Fo Freq. range push-buttons, then, the upper and lower limits will be changed subsequently .

Since Model-7117C uses the phase lock loop to measure the Fo value, if the Q value of a loudspeaker is too low ( Ex.: the frame of a certain mid-range or tweeter is completely sealed, thus, the Q value will be very low ), consequently, the measured Fo value will not be accurate.

Such loudspeaker with a low Q value, when tested by Model-7117C, it might have a " PHASE LOCK FAIL " symptom that generate a sound similar to sweeping or oscillation, consequently, it will not display an accurate Fo value.

For the loudspeaker whose Q value is not too low, but not highly enough either, when making the measurement with Model-7117C, although it will not generate a sound similar to oscillation, instead, it can display the Fo value, but the error of displayed Fo value might be slightly bigger than the specification set in Model-7117C, since the Q value of the loudspeaker is not highly enough.

#### Summary:

Every measuring instrument has its " LIMITED CAPABILITY " in measurement, so with Model-7117C, thus, it is not suitable to measure a loudspeaker with a low Q value.

- C. Influenced by the temperature and humidity, the Fo value of some loudspeaker will not be the same in different time of testing, the length of testing time even will affect the result of the Fo value, this is due to the fact that the edge, damper and cone of the loudspeaker will be unhardened and stabled in a longer time of testing, hence, the Fo value obtained from the initial test will be different from the Fo tested in a longer period of time, user must realize that this outcome is due to the feature of the loudspeaker, it is not caused by the inaccuracy of the instrument , in fact, instrument only display accurately the testing result occurred in the real time of testing.