

## TYPE ON/K CARRIER — REPEATERED HIGH-FREQUENCY LINE CARRIER LINE-UP — ADJUSTABLE DEVIATION EQUALIZER

The adjustable deviation equalizer is to be used at a repeater location for a noise and crosstalk advantage or at a terminal or junction location for a channel transmission characteristic improvement. Bridging measurements on the output of the equalizer may be made at the T and R jacks without removing the cover. Provisions are made to equalize up to 4 excess power levels and 4 low power levels. With the cover removed, the slotted shafts for screwdriver adjustment of eight variable capacitors and eight potentiometers are visible. Each potentiometer is associated with one variable capacitor by the number arrangements (R1-C1, etc) and one inductor to form a series resonant circuit. The capacitors are continuous turning (can be turned in either direction continuously), whereas a clockwise rotation of the potentiometer shaft will produce an increase in transmission level over the frequency range affected by the particular resonant circuit. Circuits 1 to 4 equalize the high power levels in the frequency ranges stamped on the chassis. These are the approximate maximum frequency ranges of each resonant circuit. Circuits 5 to 8 are series resonant, but, due to their location in the feed-back network of the amplifier, they function as parallel resonant circuits thereby equalizing the low power levels. More than one resonant circuit may be required to equalize a wide "valley" or "peak." It is possible to vary any resonant circuit out of the operating band if it is so desired.

The purpose of this test is to check the tubes, then perform an adjustment of the adjustable deviation equalizer.

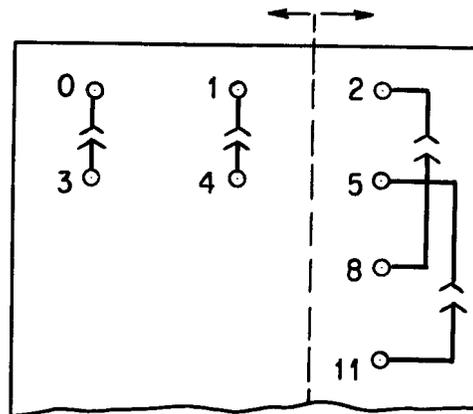
### APPARATUS:

- 1 — KS-15572 L1 Panoramic Ultrasonic Analyzer — Model SD-7A, Manufactured by Radio Products, Inc., of Mt. Vernon, N.Y.
- 1 — KS-14510 Volt-Ohm-Milliammeter
- 1 — 17B Oscillator
- 1 — 200 CD Oscillator or Equivalent (for 138 kc output)
- 1 — 31B Transmission Measuring Set
- 1 — ED-92717-30 G8 Adapter (used to connect 31B TMS)
- 1 — 3W7A Cord
- 1 — 30A Transmission Measuring Set
- 1 — Camera — The Fairchild Polaroid Oscilloscope Camera, Model F-286, Manufactured by the Fairchild Camera and Instrument Corp. of Syosset, N.Y., is satisfactory. (Optional)
- 1 — Signal Generator — If available
- 1 — Spectrum Wobbulator — If available
- 1 — 559A Filter
- 1 — Each of Figs. 1, 3 and 4

| STEP | PROCEDURE   |
|------|---|
| 1    | <p>Connect dc voltmeter to the FIL ACT test jacks 1 and 2 (1 is +) for a filament activity test.</p> <p><b>Requirement:</b> 0.9 to 1.8 volts.</p>   |
| 2    | <p>Depress the FIL ACT key.</p> <p><b>Requirement:</b> If the measurement is greater than 18% less than the reading in Step 1 after a 2-minute wait for space current stabilization, replace the tube using the following procedure:</p> <p>(a) Insert a new tube in the empty tube socket.</p> <p>(b) After a few minutes, remove the old tube. A tube can operate permanently in either the ALT or REG tube socket.</p>   |
|      | <p><b>Initial Line-Up Using 17B Oscillator</b></p> <p><b>Caution:</b> System must be out of service before this procedure can be done.</p> <p><b>Transmitting Terminal</b></p>  |
| 3    | <p>Remove regular connector from J8 or J9 and insert the proper modified connector per Fig. 1.</p>  |
| 4    | <p>Measure with the 30A TMS the output of the 200 CD oscillator supplying the 138 kc and adjust for a 0 dbm oscillator output.</p>  |
| 5    | <p>Connect the 138 kc pilot signal into the OSC 2 jack of the combining circuit of Fig. 2 and Fig. 3.</p>   |
| 6    | <p>Measure with the 30A TMS the output of the 17B oscillator set at a 100 kc and adjust for +5.0 dbm output.</p>  |
| 7    | <p>Connect the 17B oscillator to the OSC 1 jack of the combining circuit.</p>   |
| 8    | <p>Remove the regular connector from J9 or J8 and insert the modified adapter per Fig. 4. Connect this modified adapter to the AMPL INPUT jack of the combining circuit with a 3W7A cord. (Fig. 4)</p> <p><b>Note:</b> With both the modified connector and modified adapter connected to J8 and J9, the circuit from the ON terminal to the TRSG AMPL will be open. The only signals on the line will be from OSC 1 and OSC 2. The replacement of the regular connector with the modified adapter and connection of oscillators should be done quickly to minimize regulator action in the ON/K transmitting amplifiers.</p> |
|      | <p><b>Equalizing Point</b></p>  |
| 9    | <p>Connect the panoramic analyzer to the T and R jacks of the equalizer.</p>  |
| 10   | <p>Turn potentiometers R1 to R4 fully clockwise and R5 to R8 fully counterclockwise, and capacitors C1, C2, C5, and C6 to maximum capacitance and C3, C4, C7, and C8 to minimum capacitance. The equalizer now has a minimum effect in the ON/K frequency spectrum.</p>   |

| STEP | PROCEDURE  |
|------|--|
| 11   | <p>Have the transmitting end adjust the 17B oscillator through the band from 68 kc to 134 kc and observe the general line characteristic to be equalized.</p> <p><b>Note 1:</b> The high-frequency peaks should be at least 5 db below the 138 kc pilot signal level as seen on the analyzer screen so as not to interfere with regulation.</p> <p><b>Note 2:</b> It is advisable at this point to take either a picture or a sketch of the bare line characteristic for future reference.</p> |
| 12   | <p>Fig. 5 shows a typical characteristic to be equalized. As a first approximation select an imaginary line that divides the area under and above the line equally, as shown in Fig. 5.</p>  |
| 13   | <p>The operator can decide for himself which peaks and valleys require equalization (see requirement) and which should be equalized first. One method would be to equalize the largest deviations first. Depending on the degree of sharpness and the amplitude of deviations it may be necessary to move the imaginary line.</p>  |
| 14   | <p>Run the 17B oscillator <i>slowly</i> through the range of the first peak or valley to be equalized stopping the 17B at the midfrequency.</p>  |
| 15   | <p>When it has been decided which circuit will be used, turn the potentiometer maximum counterclockwise for R1 to R4 and maximum clockwise for R5 to R8.</p>   |
| 16   | <p>Vary the capacitance until the center of equalizer net and peak (or valley) coincide. For circuits 1 to 4 this will result in a maximum reduction of the peak and for circuits 5 to 8 the result will be a maximum rise of the 17B signal.</p> <p><b>Note:</b> Circuits 3, 4, 7, and 8 have the broadest tuning. These circuits should be used for broad valleys or peaks. If the frequency is too low, this may not be possible.</p>   |
| 17   | <p>Vary the potentiometer to the desired level while the 17B is being rotated.</p>   |
| 18   | <p>Repeat Steps 14 through 17 with the remaining R's and C's until all peaks and valleys have been minimized.</p>  |
| 19   | <p>Sweep entire band.</p> <p><b>Requirement:</b> Equalize for minimum deviations.</p> <p><b>Max. deviation:</b> <math>\pm 1.0</math> db across entire band and a maximum of 1 db slope across any 4 kc band. Return circuit to normal.</p>   |
|      | <p><b>Initial Line-Up Using Spectrum Generator and Spectrum Wobbulator</b></p>   |
|      | <p><b>Caution:</b> <i>System must be out of service before this procedure can be done.</i></p>   |
|      | <p><b>Transmitting End</b></p>   |
| 20   | <p>Connect the spectrum generator (with an "N" low-group filter inserted in it) to the ON/K applique unit and the wobbulator. (Information is to be supplied for local construction of the wobbulator.)</p>  |
| 21   | <p>With the wobbulator turned off, connect a 31B TMS to the output of the applique unit and adjust the spectrum generator for a measurement of <math>-25</math> dbm at 96 kc.</p>  |
| 22   | <p>Repeat Step 3.</p>  |

| STEP | PROCEDURE  |
|------|--|
| 23   | Connect the output of the wobulator to the modified adapter of Fig. 4.   |
| 24   | Insert the modified adapter in either J8 or J9.  |
| 25   | Turn the wobulator on.   |
|      | <b>Equalizing Point</b>  |
| 26   | Follow Steps 9 through 19 except omit any step referring to the 17B oscillator. The entire band will be visible on the screen of the analyzer. |
| 27   | Return circuit to normal after requirements have been met.   |

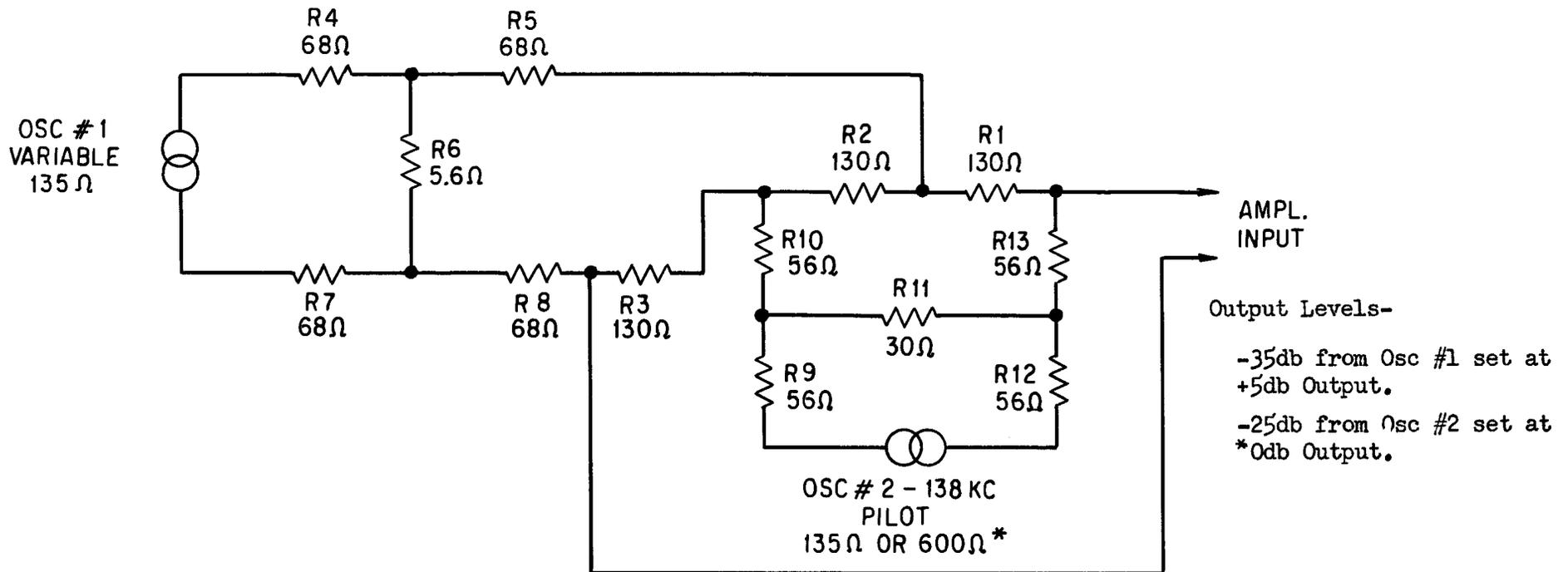


Note: Two ED-92309 G1 CONNECTORS required

No. One CONNECTOR - Remove Straps 0 - 3, 1 - 4 and indicate on cover that this is for testing TRSG. AMP. in J4.

No. Two CONNECTOR - Remove Straps 2 - 8, 5 - 11 and indicate on cover that this is for testing TRSG. AMP. in J5.

Fig. 1 - Modified Connector — Terminals



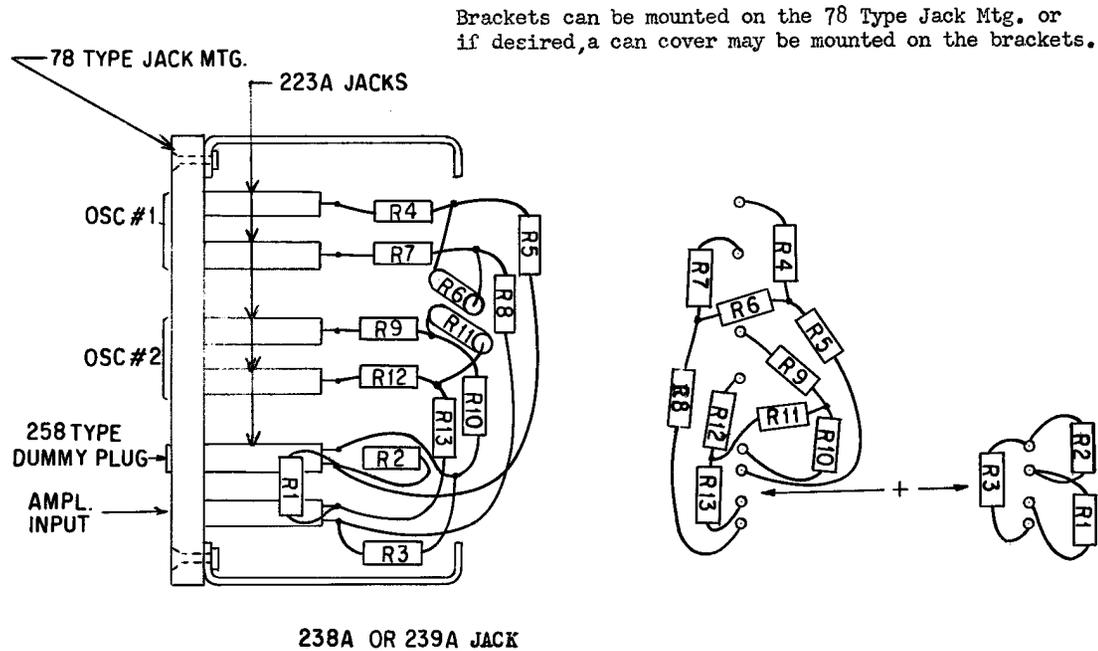
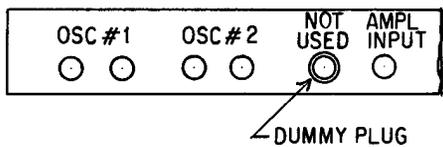
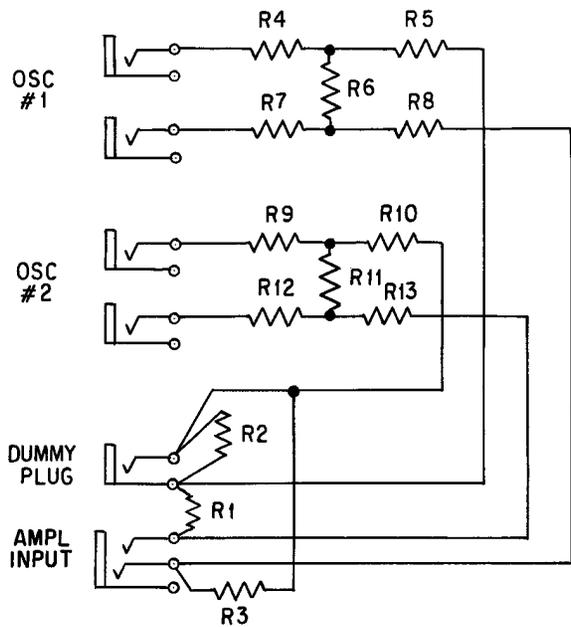
R4, R5, R6, R7, R8 = 34db PAD  
 R9, R10, R11, R12, R13 = 19db PAD  
 R1, R2, R3 = Hybrid Pad with 6db Loss for both oscillators

From Osc #1 Jacks to Ampl Input Jacks = 40db Loss. A 17B OSC with an Output set at +5db will have a level of -35db at the Ampl Input whereas a 0db Output from OSC #2 will be -25db at Ampl Input.

Resistance values were determined by selecting nearest RMA value to Computed value.

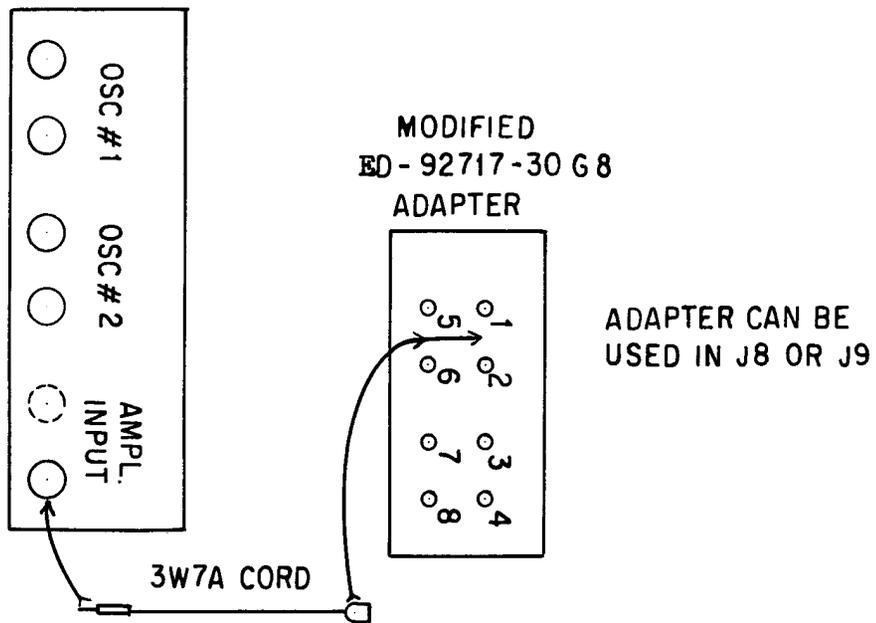
The Pads and Hybrid Pad were calculated to accommodate 135Ω oscillators. With the High Pad Losses (60db between OSC #1 and OSC #2 JACKS) a 600-Ohm Osc may be connected directly to the OSC #2 Jacks.

Fig. 2



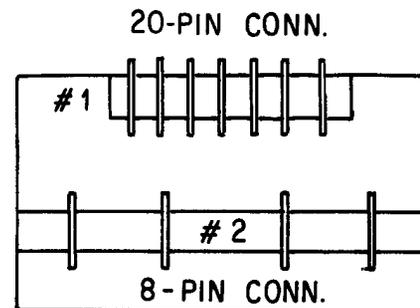
(Or any other jack which will fit the 78 Type Jack Mtg. and accommodate the plug on the 3W7A cord.)

Fig. 3

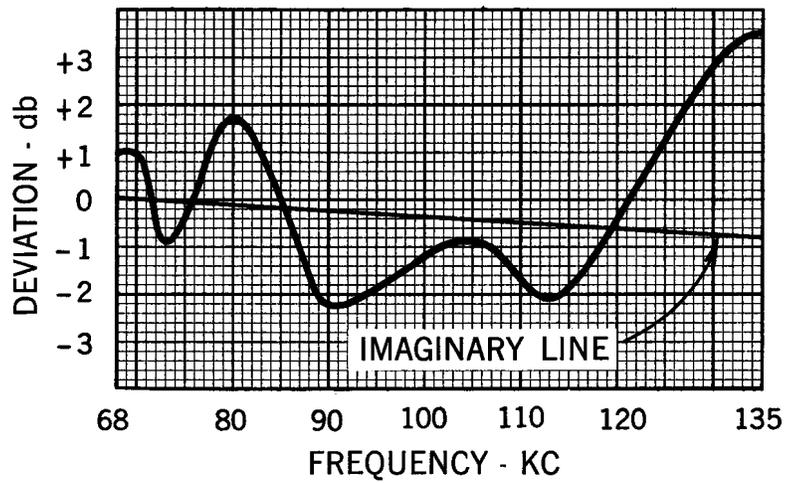


Only the INPUT TERMINALS on the ADAPTER will be used. The modification involves only the INPUT (1 and 2, 5 and 6) TERMINALS.

Fig. 4 - Modified Adapter



| NORMAL WIRING | MODIFIED WIRING |
|---------------|-----------------|
| #2 to #1      | #2 to #1        |
| 1 to 0        | 1 to 3          |
| 2 to 1        | 2 to 4          |
| 5 to 2        | 5 to 8          |
| 6 to 5        | 6 to 11         |



### TYPICAL CHARACTERISTIC BEFORE EQUALIZATION

Fig. 5 – Typical Characteristic Before Equalization