

SECTION III INSTALLATION AND OPERATION

3.1 INSTALLATION

The type SM-8512 Signal Monitor is designed for mounting in a standard 19-inch rack. It requires 3-1/2 inches of vertical space (5-1/4 inches for type SM-8513) and will extend 15 inches back into the rack. The rack should be adequately ventilated.

3.1.1 Power Connections. - The power cord is permanently connected to the signal monitor and is equipped with a three-pin plug. When used with an appropriate receptacle, the third pin grounds the chassis. For use with a two-pin receptacle, use the adapter supplied with the device. Before installation, place switch S2 on the chassis rear apron in either the 230 VAC or 115 VAC position, depending on the power input source to be used.

3.1.2 Signal Input Connection. - Using the mating plug supplied, connect a 50-ohm coaxial cable to the SIGNAL INPUT receptacle (J2) and connect the other end of the cable to the signal monitor output from the receiver.

3.2 OPERATION

The operating controls are described in the following paragraphs. Front panel controls are shown in Figure 1-1; chassis controls are shown in Figure 5-1.

3.2.1 Power Switch. - The POWER switch applies ac to the equipment and should be turned on several minutes prior to using the equipment in order to allow a thorough warm up.

3.2.2 Gain Control. - The GAIN control governs the height of the signal trace and should be set to give the trace a height of about one inch.

3.2.3 Center Frequency Control. - The CENTER FREQ. control moves the trace left or right so that the center frequency of the bandwidth to which the receiver is tuned will correspond exactly to the center of the CRT screen. The best way to adjust this control is to tune in a signal of known frequency, preferably one with a simple display such as a CW signal, and turn the CENTER FREQ. control until the center of the display falls exactly on the center of the screen. If the signal does not stay at the center marker for all positions of the SWEEP WIDTH control, the Horiz Pos control needs readjustment.

3.2.4 Sweep Width Switch. - The SWEEP WIDTH switch governs the width of the frequency spectrum which is being viewed on the screen. When searching for signals, set this control at maximum clockwise (50 KC). Then, to narrow down the width to inspect certain signals more closely, this switch may be set to either 20 KC or 5 KC.

3.2.5 Intensity Control. - The INTENSITY control should be set to give the trace the desired brightness.

3.2.6 Vertical Display Switch. - Set the VERT DISPLAY switch to either the LIN or LOG position, depending on the type of vertical response desired (the operation of this control is described in Section II).

3.2.7 Focus Control. - The FOCUS control should be set to give the trace maximum sharpness.

3.2.8 Marker Switch. - When the MARKER switch is at the ON position, a marker pip is placed in the CRT trace which indicates the exact center of the SM display unit bandpass. Normal use of the crystal marker oscillator is to turn it on and then adjust the CENTER FREQ control until the center of the signal under display coincides with the position of the marker pip.

3.2.9 Chassis Controls. - The Sweep Range, Horiz Width, Horiz Pos, Mkr Gain, vertical position (R17) and log scale adjust (R3) controls are located on the top of the chassis. For adjustment of these controls see alignment instructions in Section IV. Most of these controls normally do not require adjustment when operating the signal monitor, but the vertical position (R17) and Horiz Pos control adjustments should be occasionally checked as follows:

- (1) Using a 5-kc sweep width, tune in a signal and position its pip to the exact center of the base line.
- (2) The pip should rest slightly above the base line or the vertical position (R17) control needs adjustment.
- (3) Increase the sweep width to 200 kc. If the signal pip does not remain at center, the Horiz Pos control needs adjustment.

3.3 INTERPRETATION OF SIGNALS

The following are some of the guides to interpreting the signal patterns.

- (1) A constant carrier appears as a deflection of fixed height.
- (2) An amplitude-modulated signal appears as a deflection of variable height. For example, an MCW signal appears like a CW signal of periodically varying height. If the modulation rate is high, sidebands may appear.
- (3) A single tone-modulated FM signal will appear as a group of spikes corresponding to the center frequency and the sidebands.
- (4) Transient disturbances which are periodic, such as automobile ignitions, vibrators, or buzzers, appear as signals moving along the base line; random transients appear as irregular deflections and flashes.
- (5) Noise appears as varying irregularities or "grass" along the base line and may sometimes be eliminated by gain reduction.
- (6) Image signals, if passed through the receiver, are distinguishable because they move in the opposite direction with respect to normal signals on the screen when the receiver is tuned.

3.4 MODIFICATION OF R-390 RECEIVER

The R-390 Receiver, frequently used in conjunction with the types SM-8512 and SM-8513 Signal Monitors, requires a slight modification to provide an IF output with wide-bandwidth characteristics. This modification is performed as outlined in the following paragraphs.

3.4.1 Material Required for Modification. - The following materials are used in the modification.

- (1) Type 6BE6 tube, qty. 1
- (2) Carbon Resistor, 150K $\pm 5\%$ 1/2W, qty. 1
- (3) Carbon Resistor, 240K $\pm 5\%$ 1/2W, qty. 1
- (4) Carbon Resistor, 24K $\pm 5\%$ 1/2W, qty. 1
- (5) Carbon Resistor, 2.2K $\pm 5\%$ 1/2W, qty. 1
- (6) Capacitor, Ceramic disc, 0.005 μf $\pm 20\%$ 500V, qty. 2
- (7) Capacitor, Ceramic disc, 470 pf $\pm 20\%$ 500V, qty. 1
- (8) Connector, BNC, UG-1094/U, qty. 1
- (9) Ground Lug, 3/8" (IRC Type QCL), qty. 1
- (10) RG-174/U Coaxial Cable, 3 ft.

3.4.2 Modification Instructions. - Proceed as follows:

- (1) Remove the RF subchassis as described in the unit Technical Manual.
- (2) Remove the type 6C4 third mixer tube and replace with a type 6BE6 tube.
- (3) Change the wiring around the third mixer tube socket as shown in the modified circuit diagram, Figure 3-1. The existing 2.2K resistor and 0.005 μf capacitor on pin 7 of the third mixer tube socket should be removed and discarded. New components of the same value should be installed on pin 2.
- (4) Route the RG-174/U coax through the openings in the chassis divider sections and out the grommet in the RF subchassis with the other cables.
- (5) Drill the connector mounting hole in the rear apron of the receiver as shown in Figure 3-2.
- (6) Install the BNC type (UG-1094/U) connector with the ground lug in the mounting hole.
- (7) Replace the RF subchassis in the receiver as described in the unit Technical Manual.
- (8) Connect the inner conductor of the RG-174/U cable to the BNC connector. Connect the outer shield to the ground lug.
- (9) Make all necessary changes in the receiver Technical Manual to reflect the work performed in this modification.
- (10) The modification is now complete. The receiver should not require an alignment as a result of these changes.

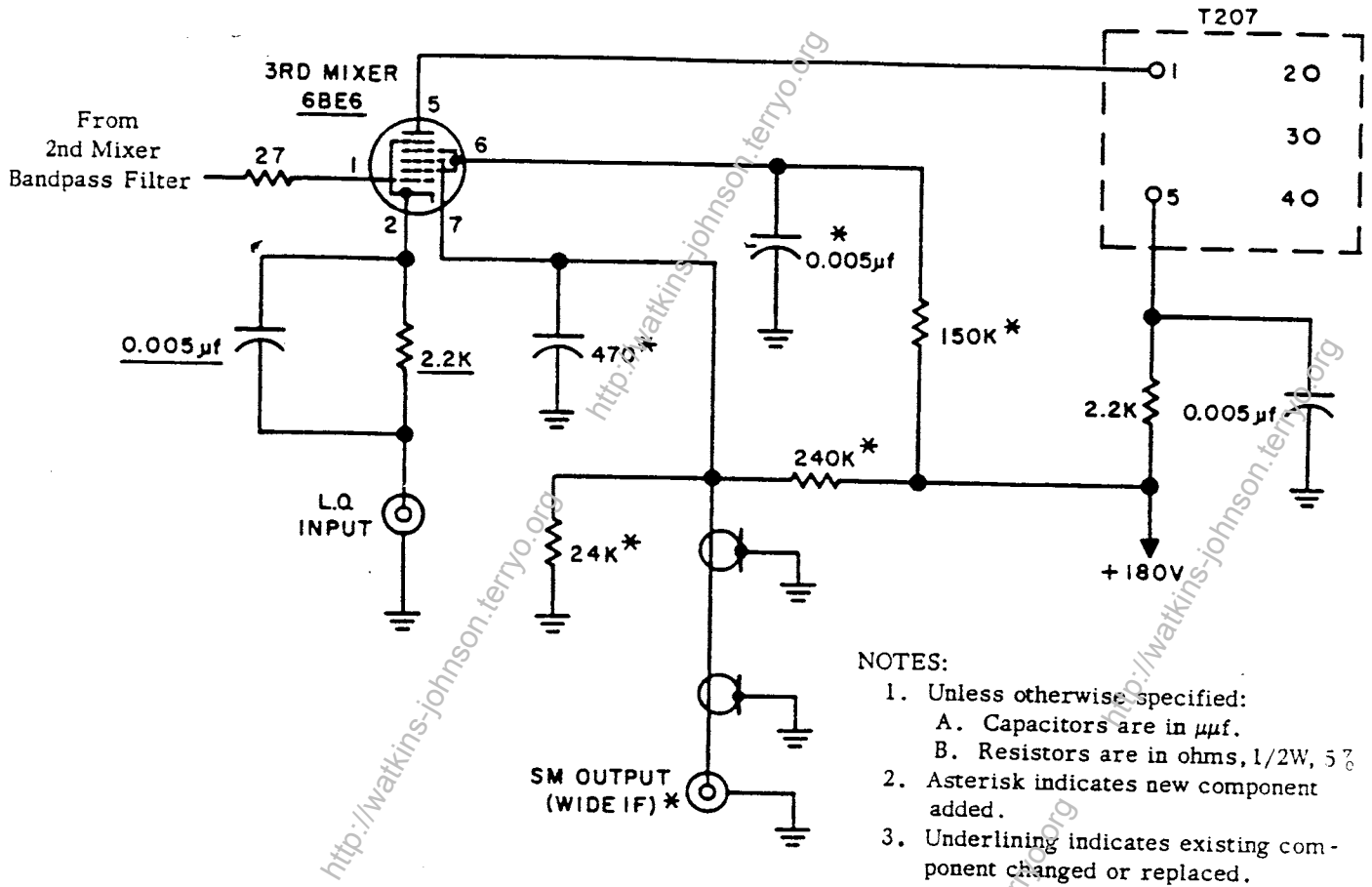


Figure 3-1. R390 Receiver, Modifications to Third Mixer Stage

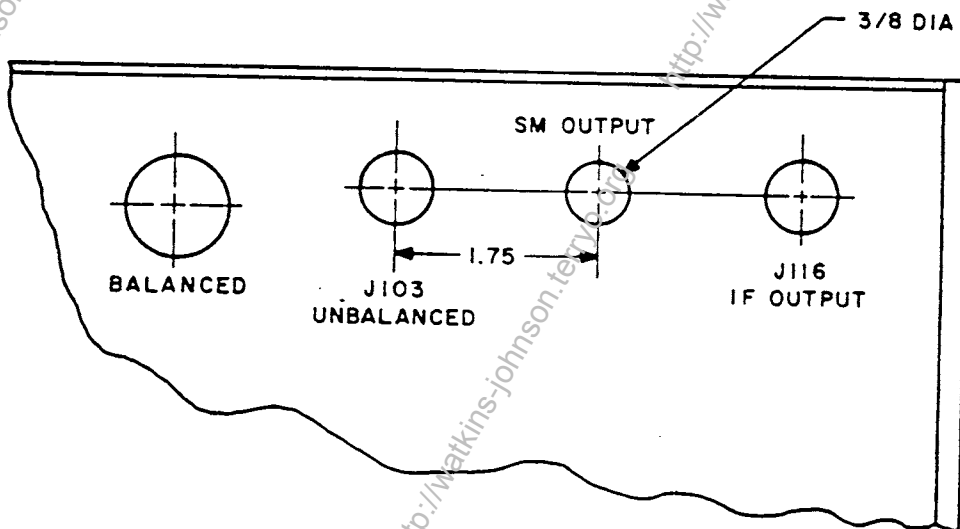


Figure 3-2. R390 Receiver, Modifications to Rear Apron