

Add A Modulation Meter

Before performing this or any other modification or adjustment procedure, be sure to read "Basic Modification Procedures."

This section will describe how to add the Modulation Meter function to almost any CB radio. First, let's consider its value to your CB operations. It is a quick and easy way to test the operation of the audio circuit, AMC circuit, and the microphone. If there is a problem, you'll see it.

Theory of operation: The modulation meter circuit continually samples the modulation (voice) input to the transmitter circuit, rectifies that signal into a varying DC voltage, and then feeds the signal to the standard S/R/F type meter that, once calibrated, accurately displays modulation percentage in either a "peak" or "average" reading format.

To use the analog style S/R/F meter inside of the CB radio, it is necessary for a switch to be installed to change its indication from S/R/F to Modulation. An alternate method is to install a connection on the back of the CB radio, then plug in an external meter. If the external connection method is used, the proper jack installation techniques **must** be used. Refer to Basic Modification Techniques for instructions concerning these techniques. An external modulation meter adds a fair amount of flexibility. For instance, all meter indications can be displayed simultaneously. Also, you can use the meter style of your own choice-- even certain VOM's (multitesters) may be used.

There are two main methods for modulation meter circuit installation:

1. Specific installation instructions for particular units.
2. A kit that can be installed in almost any CB radio.

Specific installation instructions are provided for many CB radios that are designed to have the modulation meter function, but do not have one. In these units, locations are provided on the main circuit board for the necessary components. Simply install them, then connect wires to the appropriate places.

The kit can be constructed on a small piece of perfboard. Installation requires only that the kit's seven wires be connected as indicated in the general instructions given here.

The **orange wire** connects to the point in the CB radio where the audio circuit feeds the "driver" and "final" in the transmitter circuit. This is where modulation is sampled.

The **red wire** is connected to a point in the CB radio's power supply circuit that delivers +8VDC (7 to 9 VDC is acceptable). This is the modulation meter circuit's main power source.

The **black wire** connects to circuit ground.

The **blue wires** connect to an SPST two-position switch (SW-1). This is how the average or peak reading format is selected.

The **green (+) and gray (-) wires** are the main output of the modulation meter circuit. They connect either to a DPDT two-position switch (when the internal S/RF meter is to be used), or to a chassis mounted jack on the back of the CB radio. Refer to *Basic Modification Techniques*.

After the installation is complete, the only remaining task is to calibrate the modulation meter circuit. Assuming that the CB radio's AMC and transmitter circuits are properly adjusted, key the mic and hum at a constant volume into the mic. While doing so, adjust the modulation meter circuit's variable resistor until the meter's needle points to 100%. The 100% indication is determined by which meter is used. If the existing S/RF meter is used, 100% would be at 10 dB on the "S" scale. Since the "S" scale has lower indications of 1, 3, 5, 7, and 9, these numbers will correspond with 10%, 30%, 50%, 70%, and 90%. Uniden's model PC-77 has a meter scale that indicates S, RF, SWR, and Modulation. This part may be ordered from Uniden and installed in many different CB radios. If an external meter is used, select a point on its scale of approximately 90% deflection. This allows room for indications above 100%.

Modulation Meter - Parts List

C-1 & C-2= .47 uf, 16 volt polarized electrolytic capacitor.

C-3= .0047 uf ceramic disc capacitor.

C-4= 33 uf, 16 volt polarized electrolytic capacitor.

D-1 & D-2= 1N914 diode.

Q-1= 2SC945 transistor.

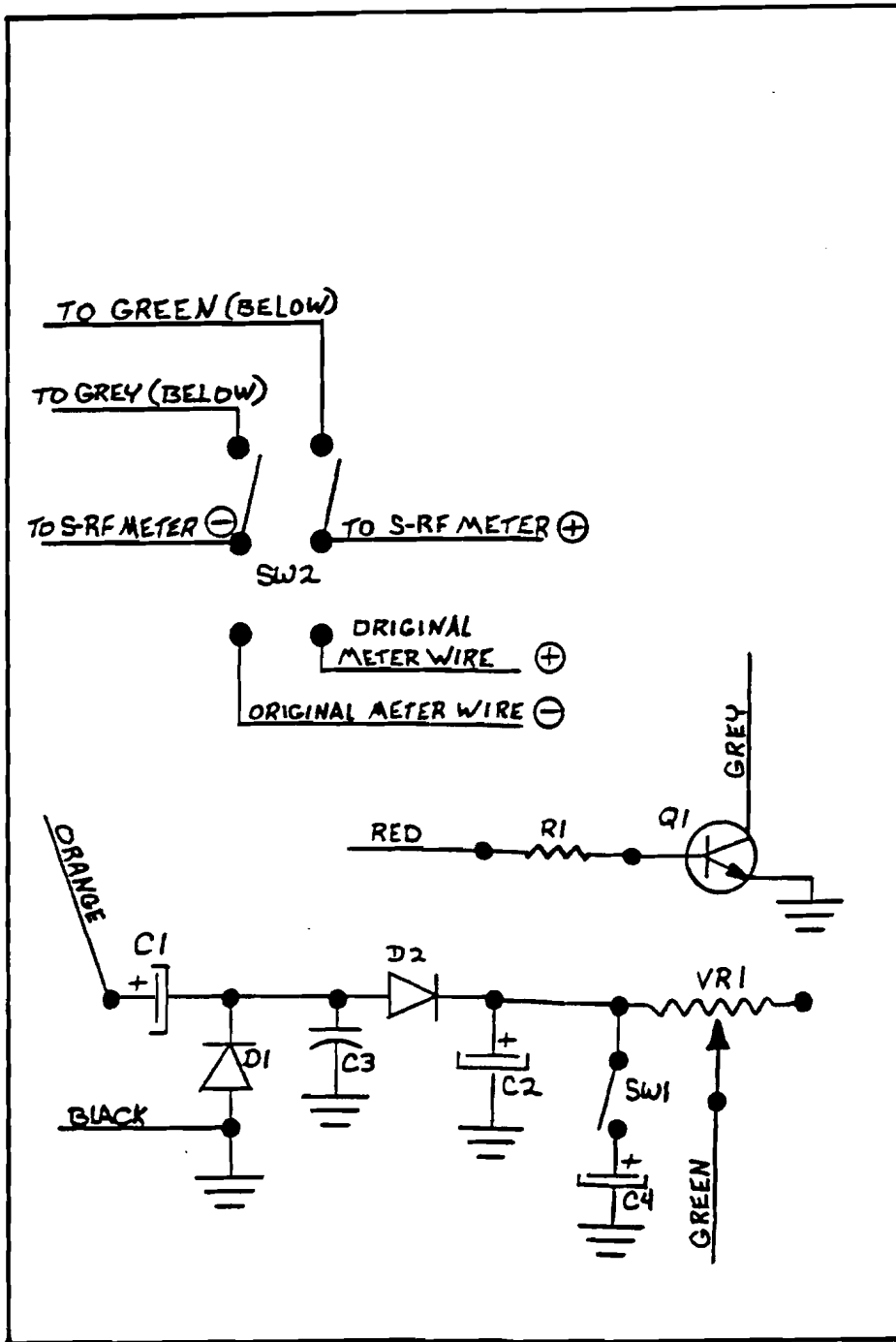
R-1= 10K ohm, $\frac{1}{4}$ -watt resistor.

SW-1= SPST two-position mini toggle switch.

SW-2= DPDT two-position mini toggle switch (if existing S/RF meter to be used).

VR-1= 250K ohm, PC mount variable resistor.

Modulation Meter Kit Schematic diagram.



Modulation Meter Circuit Installation Instructions

**Cobra 146-GTL, Midland 79-012, Midland 79-260, Realistic TRC-451,
Sears 663.3810050, Uniden President AR-144, Uniden President AX-244,
Uniden President P-300, Uniden President PC-244**

Parts required:

- 1 50K ohm PC mount variable resistor.
- 1 .47 uf, 16 volt polarized electrolytic capacitor.
- 1 1N914 diode.
- 1 2SC945 transistor.
- 1 10K ohm, $\frac{1}{4}$ -watt resistor.
- 1 Mini DPDT two-position toggle switch.
- 3 ft. 22 gauge insulated, stranded hookup wire.

Steps:

1. With the CB radio removed from its power source, install and solder the absent PC mount variable resistor (50K ohm), polarized electrolytic capacitor (.47 uf, 16 volt), and diode (1N914) in the locations provided behind VR-1 on the main circuit board (refer to diagrams). Be sure to observe proper polarity on the diode and capacitor.

2. Install and solder the absent transistor (2SC945), and resistor (10K ohm, $\frac{1}{4}$ -watt) in the locations provided under the mic socket on the main circuit board (refer to diagrams).

3. Install and solder a jumper wire. It goes from the open end of the newly installed 10K ohm resistor to JP 28, on the copper foil side of the main PC board (refer to diagrams).

4. Cut the copper foil trace leading to the center pin of the newly installed 2SC945 transistor. It should be cut at a point $\frac{1}{4}$ -inch from the new transistor (refer to diagrams).

5. Desolder and disconnect the existing S/RF meter from its connection points (refer to diagrams).

6. Using two six inch pieces of 22 gauge insulated, stranded hookup wire, connect the CB radio's S/RF meter to the DPDT switch as shown (refer to diagrams).

7. Using two six inch pieces of 22 gauge insulated, stranded hookup wire, connect the new DPDT switch to the S/RF meter's original connection points (refer to diagrams).

8. Using one six inch piece of 22 gauge insulated, stranded hookup wire, connect the new DPDT switch to the center lead of the newly installed 2SC945 transistor (refer to diagrams).

9. Using one six inch piece of 22 gauge insulated, stranded hookup wire, connect the new DPDT switch to the location on the main PC board by VR-1 (refer to diagrams).

10. At this point, go back and thoroughly check your work.

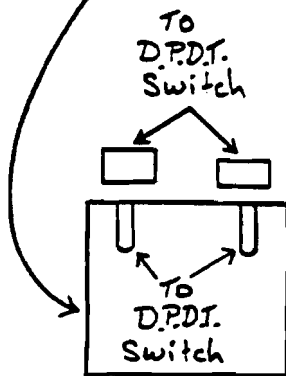
11. Connect the CB radio to its power source, to an external modulation meter, and to a CB antenna or dummy load. Set the new DPDT switch to the normal position. Test S/Rf (and SWR if present). They should function normally, and no readjustment should be necessary. Set the new DPDT switch to the Modulation position. Normal meter operation should stop. Modulation will be the meter's only function.

12. Hum into the keyed mic at a sufficient volume to generate a reading of 100% modulation on the external modulation meter. While doing so, adjust the newly installed 50K PC mount variable resistor until the desired reading is indicated on the internal S/Rf meter (10 dB on the "S" scale corresponds to 100%).

13. Mount the new DPDT switch in a convenient location.

14. Reassemble the CB radio.

Rear View Of S-RF Meter

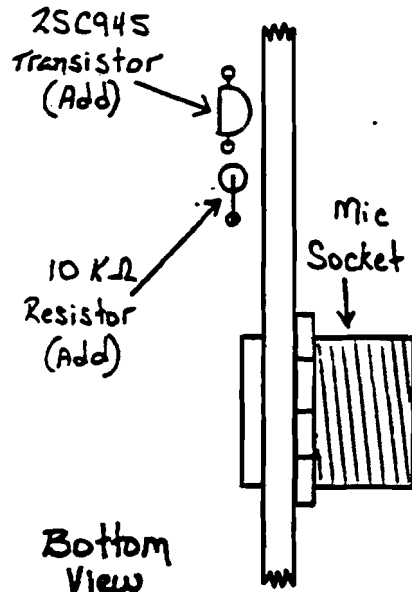


2SC945 Transistor (Add)

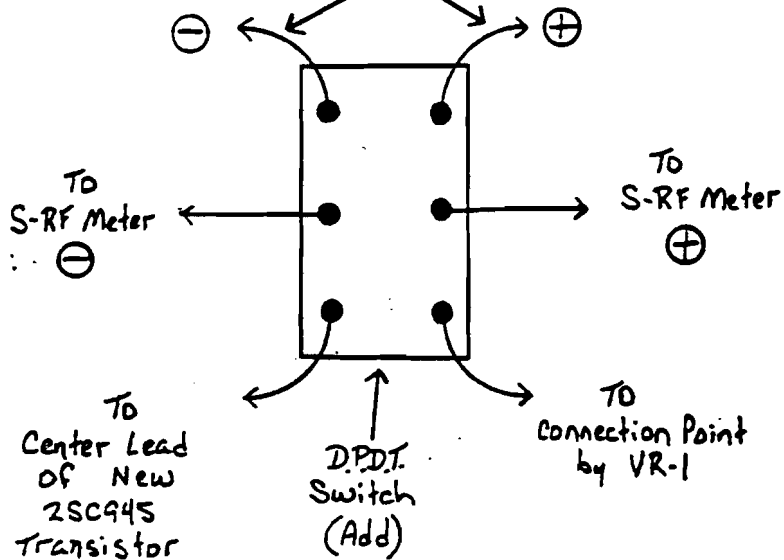
10 K Ω Resistor (Add)

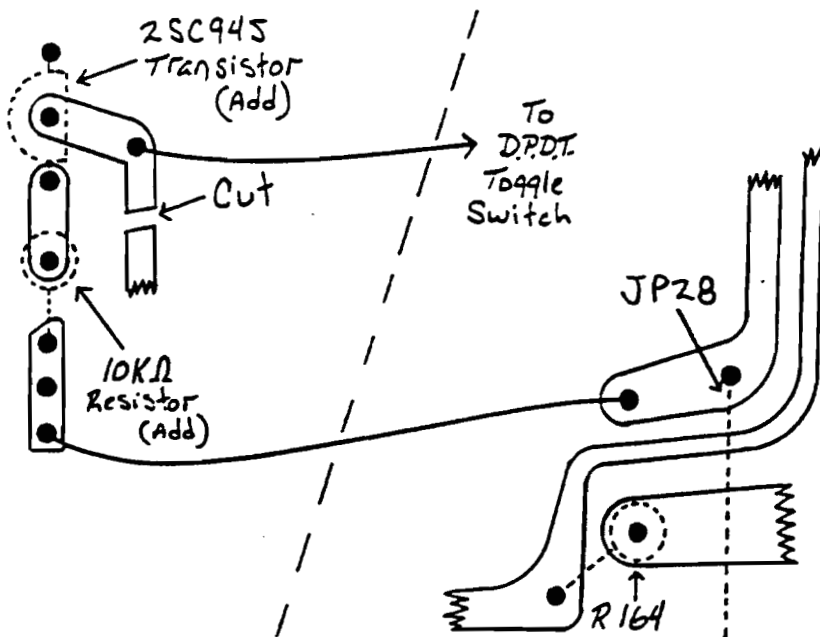
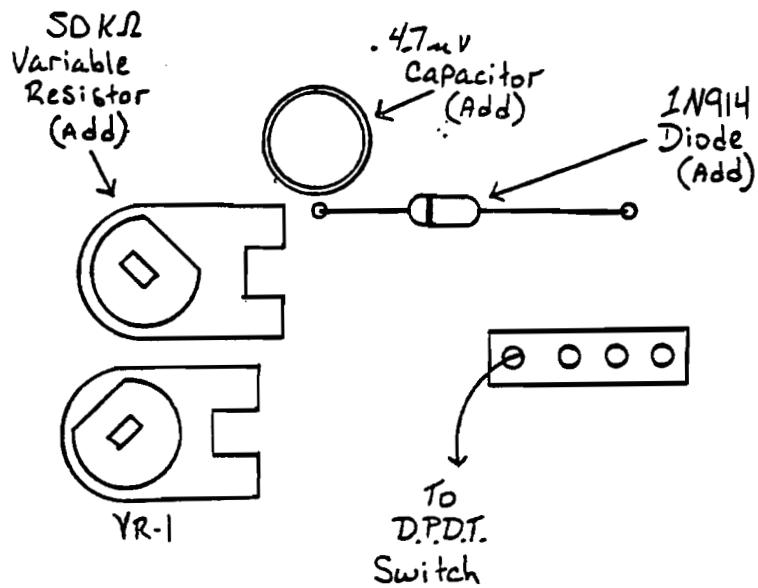
Mic Socket

Bottom View



To S-RF Meter's Original Connection Points





Modulation Meter Circuit Installation Instructions

Cobra 148-GTL

Parts required:

- 1 100K ohm PC mount variable resistor.
- 1 mini DPDT two position toggle switch.
- 2 .47 uf. 16 volt polarized electrolytic capacitors.
- 1 1N914 diodes.
- 1 10K ohm $\frac{1}{4}$ -watt resistor.
- 1 2SC945 transistor.
- 1 .0047 uf ceramic disc capacitor.
- 3 ft. 22 gauge insulated, stranded hookup wire.

Steps:

1. With the CB radio disconnected from its power source, install and solder TR-40 (2SC945) and R-192 (10K ohm $\frac{1}{4}$ -watt) in the marked locations near the front edge of the main PC board. Be sure to observe orientation diagram on PC board for TR-40.

2. Desolder and remove VR-7, and save for later use. Install and solder a 100K PC mount variable resistor in its place.

3. Remove the existing diode between VR-7 and the space marked D-57. Reverse it, then reinstall and solder it in the space marked D-57. Be sure to observe proper polarity.

4. Install and solder a .0047 uf ceramic disc capacitor between D-57 and VR-7 in the marked location provided.

5. Install and solder C-90 (.47 uf, 16 volt) in the marked location by VR-7. Be sure to observe proper polarity.

6. Desolder and remove the end of the white six inch jumper wire from the vacant R-130 location by L-2. Solder the loose end of that white wire to the new DPDT switch (refer to diagrams).

7. Install and solder the anode of a 1N914 diode in the hole by L-2 vacated by the white wire in Step #6 (refer to diagrams).

8. Solder the original VR-7 to L-30, and to the cathode of the 1N914 diode in Step #7 (refer to diagrams).

9. Solder one end of an eight inch piece of 22 gauge insulated, stranded hookup wire to the location provided next to TR-40 that connects to TR-40's center lead. Solder the other end of this wire to the new DPDT switch (refer to diagrams).

10. Cut the copper foil trace connecting C-90 to VR-7 (refer to diagrams).

11. Solder a 1N914 diode and a .47 uf 16 volt electrolytic capacitor as shown (refer to diagram). Be sure to observe proper polarity.

12. Desolder and disconnect the two wires (black and white) that are connected to the S/RF meter. Lengthen them if necessary and solder them to the new DPDT switch (refer to diagrams).

13. Using two eight inch pieces of insulated, stranded hookup wire, connect the CB radio's S/RF meter to the new DPDT switch (refer to diagrams). Be sure to observe proper polarity.

14. At this point, go back and thoroughly check your work.

15. Connect the CB radio to its power source, to an external modulation meter, and to a CB antenna or dummy load, then readjust the AMC circuit for 100% modulation. Refer to "Transmitter Adjustments." Remember that the AMC adjustment is now soldered to L-30; and VR-7 is now the modulation meter adjustment.

16. Set the new DPDT switch to the normal position. Test S, RF, and SWR meter operation. They should function normally, and no readjustment should be necessary.

17. Set the new DPDT switch to the Modulation position. Normal meter operation should stop. Modulation will be the meter's only function.

18. Hum into the keyed mic at a sufficient volume to generate a reading of 100% on the external modulation meter. While doing so, adjust VR-7 until the desired reading is indicated on the internal S/RF meter (10 dB on the "S" scale corresponds to 100%).

19. With the radio again disconnected from its power source, mount the new DPDT switch in a convenient location.

20. Reassemble the CB radio, connect to power source.

