# Example Impedance Bridge Instrumentation Setup For Delta Electronics OIB-3 and RG-4 To Measure ATU Input Impedance

The instruments that are used to check the tuning of the ATU are a Delta Electronics operating impedance bridge model OIB-3, and a Delta Electronics receiver/ generator model RG-4. The configuration of these instruments is shown in figure No. 1.

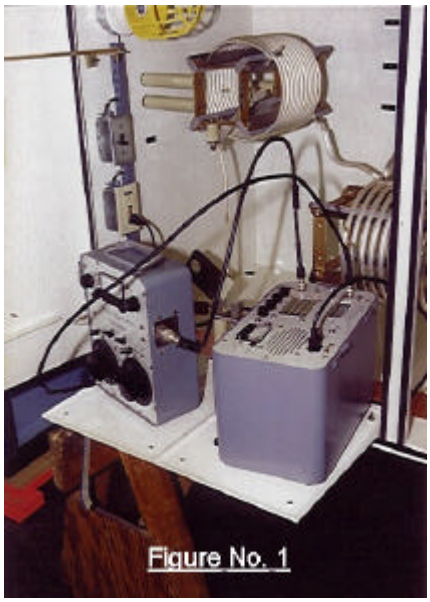

Figure No. 1

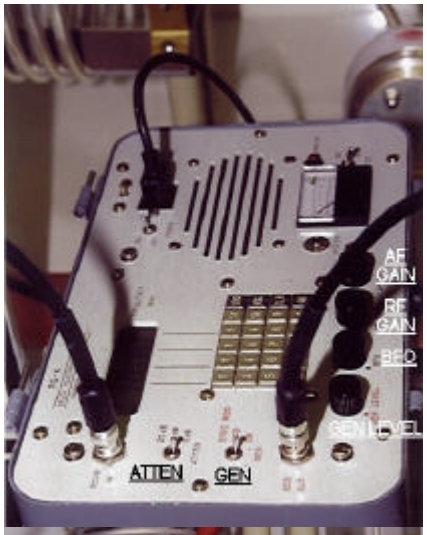



Figure No. 3

## The Setup Procedure For Measuring Input Impedance Is As Follows:

The OIB-3 bridge is used in conjunction with the RG-4 as illustrated in figure No. 1. Two small coaxial test cables with BNC male connectors on either end are provided to make the connections between the RG-4 and the OIB-3. These two cables are approximately 3 feet in length. An adapter is supplied in the lid of the OIB-3 to give a BNC female terminal on the input port of the OIB-3. Also in this lid are the two sets of alligator clip type leads that are typically used for connecting to the ports of the OIB-3. Only one of these alligator clip type leads will be used on the output port of the OIB-3. The OIB-3 output port is then connected to the matching network side of the input test jack J1 in the ATU with the shorting bar removed from this test jack. The red alligator clip is connected to the right side spring clip of jack J1. The black alligator clip is connected to the ground post immediately below test jack J1. Check to ensure that the shorting bar at output test jack J2 is in place and the ATU output is connected to the antenna.

## The Procedure For Measuring The Input Impedance Is As Follows:

1. Turn on the RG-4 power. Check to be sure that the battery is fully charged on the RG-4 by switching the “METER” selector switch to BATT and turning the RG-4 on briefly. The meter should indicate a full charge. If not, either charge the battery or use direct AC power to run the unit. Return the “METER” selector switch on the RG-4 to the “RCVR” position.
2. Set the frequency of operation using the keypad on the RG-4. See figure No. 2. Before entering the frequency you must press the “CLR” button. Then enter the frequency and press the “GO” button.
3. Set the knobs and switches on the RG-4 as follows. See figure No. 2. Check to see that the “METER” switch is set to “RCVR”. Set the “GEN” switch to “CW”. Set the “ATTEN” switch to “0dB”. Set the “GEN LEVEL” knob all the way on then back off ¼turn when you are ready to make a measurement. Set the “AF GAIN” knob all the way on then back off ¼turn. The “RF GAIN” knob is adjusted during the tuning process. The “BFO” knob should be off.
4. Set the knobs and switches on the OIB-3 as follows. See figure No. 3. Set the flip-switch in the upper left to the DIR

position. Set all four of the 3-position course adjustment flip-switches to the zero position. Dial the X/F knob, which indicates the reactive component of the measured impedance, (the largest knob on the left) to zero. Dial the R knob, which indicates the resistive component of the measured impedance, (the largest knob on the right) to 50.

5. If the meter on the RG-4 shows in the green area, turn the “RF GAIN” knob counter-clockwise (ccw) to reduce the gain. Turn this gain knob ccw just enough to cause the needle to move out of the green area, but no more. (NOTE: the meter on the OIB-3 itself will not be used at any time in this procedure.)
6. The two large knobs on the OIB-3 must now be gradually adjusted alternately to locate a point where the meter on the RG-4 dips to a minimum deflection. During this searching process, as the actual impedance is being approached, the “RF GAIN” knob on the RG-4 will have to be turned up several small steps so that the needle dips at full gain. If during this process the needle goes into the green area, the “RF GAIN” knob must be turned back ccw just enough to move the needle out of the green area.
7. Slowly adjust the large R knob on the bridge to either side of 50 ohms while carefully watching for any drop in the meter reading on the RG-4. The dip in the needle may be very subtle at first.
8. Slowly adjust the large X/F knob on the bridge upward from zero. If the meter gives no indication of dipping, or if it even increases the needle deflection, switch the position of the L/C selector switch located between the R and X/F knobs on the bridge. Then try again increasing the knob upward from zero to see if any decrease occurs in the meter reading.
9. Alternate between the R and the X/F knobs seeking to minimize the needle deflection on the RG-4 meter. Once the meter dips to its lowest point, turn up the “RF GAIN” knob on the RG-4 until the meter is peaked just outside the green area.
10. Repeat the fine tuning of the R and the X/F knobs seeking the deepest null on the meter possible. Once the meter reads a deep null while the GAIN knob on the RG-4 is set to its highest point, the bridge is “nulled”. The impedance can now be read from the knobs on the OIB-3.
11. Most likely, the impedance measured on the OIB-3 will not be 50 +/- j 0 ohms. If this is the case, fine tuning of the ATU will be necessary. Remember to correct the reactance shown on the X/F dial by multiplying the dial reading by the measurement frequency in MHz. Eg. For 1100KHz, multiply by 1.1