An R F Bridge for Tuning the ATU

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Use this little gadget to tune up your antenna without risking your final P.A.

The bridge uses the well-known Wheatstone Bridge circuit and is suitable for all the HF bands. Careful attention to layout is, however, a prime consideration and for that reason I have made a component drawing viewed from the bottom in order to give an idea of how it should be built. The circuit diagram will be clear from this drawing.

The two 47 ohm resistors form the ratio arms of the bridge and should be selected as nearly equal as possible. Their actual value is not critical, but their equality is. The 75 and 150 ohm resistors must be 1% tolerance types as they form the other critical part of the bridge. If you only intend to use 50 ohm circuits the 150 ohm resistor and the SPDT switch can be omitted, in which case the 75 ohm resistor must be replaced with a 51 ohm 1% tolerance resistor.

The meter used is one of those small types used for VU meters or for Battery and S meters in portable radios. It is not necessary to use a very expensive meter in this application. The sensitivity of the bridge is adequate for transmitter output levels from 1 to 150 watts, the only criterion in the power used being the rating of the Dummy Load. A suitable low power dummy load could be made with 9, 470 ohm 1 watt resistors in parallel.

In use, Switch 1 is placed in the TUNE position and the transmitter is loaded into the dummy load to the limit desired. At this stage the transmitter output can be properly tuned for the band and frequency in use and this can be done right on top of a QSO without causing any noticeable interference, except to the ham next door! The signal level in the antenna even with 150 watts output from the transmitter will be less than 40 milliwatts, which is the maximum allowable spurious level for transmitters in the HF bands. The sensitivity control is then adjusted for a suitable reading on the meter and the ATU is tuned to find a dip in the meter. As tuning approaches the correct point the sensitivity control is adjusted to make the tuning more accurate. Once the ATU is tuned in this manner Switch 1 is then placed in the THROUGH position and the transmitter can be put on the air. Only a very small adjustment of loading should be required if at all.

The unit was constructed in an aluminium box 105 by 70 mm by 50 mm deep purchased from one of the usual emporia some time ago, but any small metal box can be used. The wires from the DPDT switch to the two output Coaxial sockets are of 2 mm insulated wire and should be laid as close to the case as possible. The purist can use short pieces of coaxial cable here, but I doubt if it will be worth the trouble.

Once you have used this unit you will wonder how you did without it. Happy constructing and good tuning, 73 Bill.