*HF-MT Dummy Load

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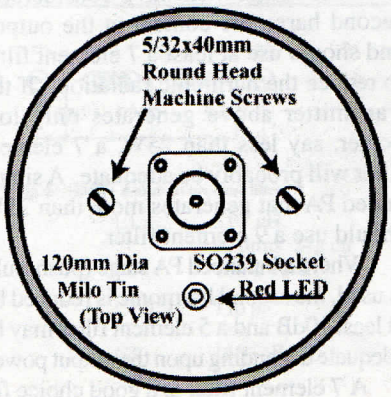
This is a handy piece of test equipment, useful for frequencies from 1.8MHz to 30MHz. It can absorb a modulated carrier power of 200 watts continuous for about 2 minutes (Ref 1), enabling transmitter tuning off-air and so minimising interference to other spectrum users. Its construction is straightforward and it uses readily available parts. It is housed in a Milo tin or similar, and part filled with dry sand which aids in its power dissipation.

A DUMMY LOAD IS an artificial antenna that represents to the output of the transmitter an essentially ideal load. Therefore, the transmitter can be tuned to deliver its output into a correct load. Once the transmitter is tuned, it can be matched to the antenna. Ideally the dummy load will be exactly 50 ohms (the same as the output impedance of the transmitter) and also be able to absorb the power output from the transmitter. A dummy load is especially useful for tuning of a transmitter with valves in the final output stage. This is because a valve based output stage has to be manually tuned into a load. (Solid-state transmitters are generally broad-band amplifiers which are tuned by design and manufacture.)

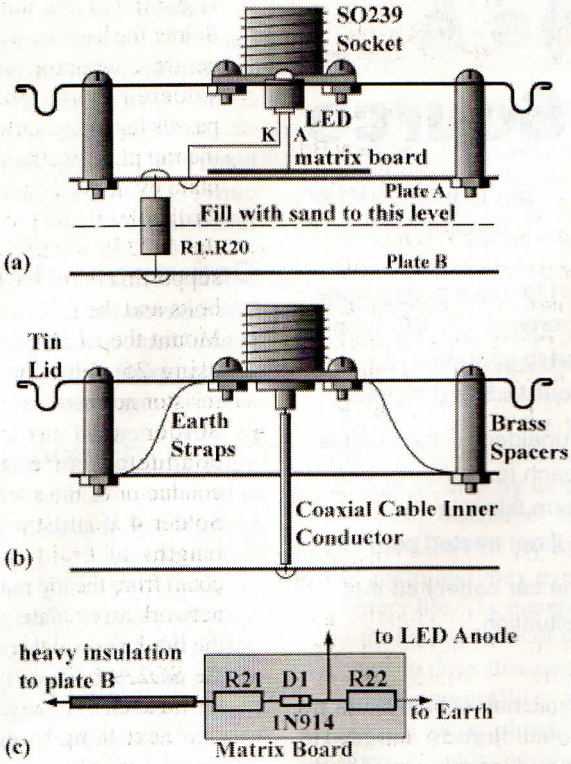
Construction method

This article is essentially a re-production of the high-frequency dummy load described by F C Judd (Ref 1). Figures 1, 2 and 3 should give any potential constructors sufficient information for making the dummy load but I shall also describe my construction method: -



- The dummy load is housed in a Milo tin measuring 122 mm high and 105 mm in diameter. Obviously, any similar container would be suitable.
- Cut two circular plates (90 mm diameter) from other discarded tins (I used old coffee tin lids) and file off rough or sharp edges. It is also a good idea to clean the plate surfaces with a kitchen scourer or steel wool to assist soldering later on.
- Drill or punch holes (about 1 mm diameter) for the resistors in both plates. Lay one plate on top of the other so that the holes match up (refer Fig 3).
- Drill holes in the top plates for the support bolts and also in the centre for the centre conductor to pass through. Also at this stage drill a small hole on the outside of the top plate for the heavy wire leading from R21 (2.2 kohm, 0.25 watt) to the bottom plate of the resistor network assembly. The main reason for using heavy wire at this point is to provide mechanical support for the matrix board assembly. Also drill a hole in the centre of the top plate for the centre conductor to pass through.
- Insert all of the resistors between the top plate and the bottom plate and solder them in. I found that a good method for doing this is first to put the resistors through one plate, bend the resistor lead and solder it to the same plate and then line up the next plate and solder the other side of the resistor to it.
- Once the resistor network assembly is complete the hard part is done. Solder the heavy wire in place and the centre conductor wire so that it is soldered to the bottom plate and passes through a hole in the centre of the top plate extending above the top plate by about 30 mm.
- Drill holes in the top of the tin lid for the SO239 socket and the socket supporting bolts, the main supporting bolts and the LED.
- Mount the LED, SO239 socket and, using 25 mm spacers, secure the resistor network assembly to the lid.
- Solder the protruding centre conductor wire to the centre conductor of the socket.
- Solder 4 earth straps (I used short lengths of braid from RG-58C/U coax) from the top plate of the resistor network assembly to the underside of the lid. I also soldered link wire from the SO239 bolts to the underside of the lid to ensure satisfactory earthing.
- The next thing to do is the matrix board assembly. See Fig.1 for the wiring diagram. I soldered R22 (5.6 kohm) from the matrix board assembly directly to the top of the lid. The heavy wire from the bottom plate of the resistor network assembly is soldered to one end of R21 (2.2 kohm).
- To complete the assembly I put a piece of stiff cardboard behind the matrix board assembly and using a cable tie secured it to one of the resistor network assembly bolts. This was to ensure that the matrix board assembly didn't accidentally short against one of the spacers and also to keep the matrix board assembly in place.
- The final thing to do is to put the sand into the tin. I used Sydney sand (which has about the same consistency as sugar). I also made certain that it was completely dry by baking it in a cake tin in a conventional oven for 30 to 45 minutes on 200 degrees Celsius. If the sand contains foreign particles it might be a good idea to sift. Once the sand is clean and dry put enough into the tin to fill it half way up the resistor network assembly.

**HF-MT stands for "High Frequency — Milo Tin"*



References:

1. F C Judd (G2BCX) RF Dummy Loads Part 1, Practical Wireless, Jan. 1983

Related articles:

1. Drew Diamond (VK3XU) Power Meter/Dummy Load (with notes on PEP), Amateur Radio, April 1993
2. Hank Prunckun (VK5NCA) Build a Simple Dummy Load for Your Shack, Radio and Communications, February 1998
3. F C Judd (G2BCX) RF Dummy Loads Part 2, Practical Wireless, Feb. 1983

Parts:

20 x 1 kOhm, 2 watt, 5%, carbon resistor (R1 to R20)
* I obtained R1 to R20 at RS Components, Phone: (02) 9737 9966
1 x 2.2 kOhm, 0.25 watt, 5%, carbon resistor (R21)
1 x 5.6 kOhm, 0.25 watt, 5%, carbon resistor (R22)
1 x 1N4148 (or 1N914) diode (D1)
1 x square SO-239 UHF socket
Miscellaneous: Metal container (122mm x 105mm); 2 x 90mm circular tin plates; 5/32" x 40mm round-head bolts and nuts; 1/8" x 12mm round-head bolts and nuts; 2 x 25mm spacers; matrix board (40mm x 30mm); 1 x 5mm Red LED plus holder; earth straps; stiff cardboard (40mm x 30mm); cable tie.

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