

# YouKits MT-1 QRP Antenna Tuner Kit

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The YouKits MT-1 Antenna Tuner is designed primarily for QRP portable operation for use with a simple end fed wire antenna. Its small  $2\frac{3}{4} \times 5\frac{1}{2} \times 2\frac{3}{4}$  inch size makes it suitable for a small backpack, and it is a good companion for the YouKits EK1A CW QRP transceiver reviewed last month. The MT-1 will provide a low SWR for transmitted power up to 20 W PEP on the 40 through 10 meters amateur bands, provided a suitable ground or counterpoise is used.

## Overview

The MT-1 can be purchased in either kit or assembled form. Tuning is accomplished using a simple parallel LC circuit, with a variable capacitor and a switched value inductor. The 12 tap toroid inductor is soldered directly to the back of the inductance switch (Figure 9). This construction technique reduces loss while taking up little space. Tucked next to the inductor are the tuning capacitor and the meter/sensor board. A BNC connection is used at the RF input and binding posts provide connections for the antenna wire and ground lead.

Controls are simple, with knobs for the tuning capacitor and inductor, and a meter switch for power/SWR readings. The  $1\frac{3}{8}$  inch diameter meter is actually a repurposed VU meter; its two scales read 20 – +3 dB and 0 – 100. The 0 – 100 scale is used for power measurements and can be calibrated using capacitor C1 on the meter board to set the 100 reading to a known power level. We adjusted C1 for a reading of 100 equal to 5 W input at 1:1 SWR.

SWR measurements are relative, with the best match attained with the lowest meter reading with the meter switched to the SWR



position. If needed, the user can create a table of SWR and power by comparing the MT-1 to a power meter of known accuracy.

## Construction and Operation

ARRL Laboratory volunteer Pete Turbide, WIPT, assembled the kit version. He completed construction in a few hours, using the clearly written and well illustrated

**Table 3**  
**YouKits MT-1 QRP Long Wire Antenna Tuner**

Frequency range: 40 to 10 meters.  
Matching range: 7 – 10 MHz, 2000  $\Omega$ ; 10 – 28 MHz, 3000  $\Omega$ ; see measurements below.  
Power rating: 10 W (20 W PEP).  
Dimensions (H WD): 2.7  $\times$  5.5  $\times$  2.7 inches (including protrusions).  
Weight: 9 Ounces.  
Price: \$69 kit, \$89 assembled.

### ARRL Lab Resistive Load and Loss Testing

SWR	Load ( $\Omega$ )		80 m	40 m	20 m	15 m	10 m
2:1	25	Power Loss%	10	11	10	15	15
		SWR	1.8	1.8	1.1	1.1	1.7
1:1	50	Power Loss%	1	2	5	6	5
		SWR	1.1	1.1	1.1	1.0	1.1
2:1	100	Power Loss%	3	2	1	1	3
		SWR	1.7	1.1	1.1	1.3	1.4
4:1	200	Power Loss%	6	2	2	1	NT
		SWR	1.9	1.2	1.3	1.2	–
7.6	380	Power Loss%	4	1	2	3	NT
		SWR	1.6	1.0	1.4	1.4	–
16:1	800	Power Loss%	NT	2	2	1	NT
		SWR	–	1.1	1.3	1.0	–

The MT-1 would not tune on any band with either a shorted or open antenna jack. It also tunes into a 2000  $\Omega$  resistor just fine on 40 through 10 meters.  
NT= No Tune; an SWR below 2:1 could not be achieved.  
– = No measurement

## Bottom Line

The YouKits MT-1 is a compact, rugged QRP antenna tuner for use with random wires.



**Figure 9** — Inside the YouKits MT-1, showing the meter/sensor board at left, tuning and inductor assembly at right.

instructions available on the YouKits website. The only challenging part of the construction is winding two toroids — a small toroid on the sensor board and a larger toroid, the size of a quarter, for the tapped inductor. All other components are through-hole, with no surface mount soldering needed. A sturdy steel enclosure and tough plastic meter cover makes the MT-1 ready for any outdoor adventure or indoor misadventure.

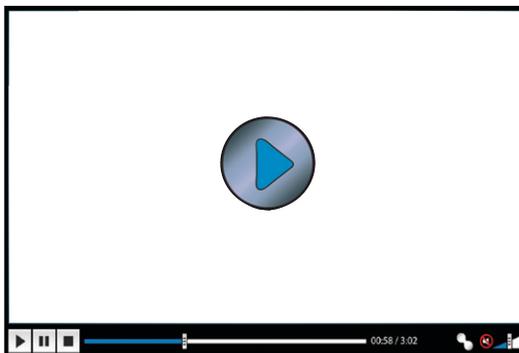
The efficiency of the tuner is quite good, as shown in Table 3. Although it's specified for 40 – 10 meters, I found that the MT-1 can also tune a limited impedance range on the 80 meter amateur band, provided the user stays away from multiples of half wave lengths of wire.

If a ground system is not available, you can use a counterpoise, preferably a quarter wavelength long for the band in use. I did just that at my backyard shed shack, using wire salvaged from a discarded extension

cord cut to length for 40 meters. With a 33 foot vertical wire and a 30 foot counterpoise, I attained nearly a 1:1 SWR with the MT-1 and made several DX contacts with 5 W RF output during good band conditions. Using my 88 foot long inverted L antenna at the house, I was able to attain low SWR on 80 through 10 meters.

All in all, the YouKits MT-1 exceeded my expectations.

*Manufacturer:* YouKits, 1736 Arborwood Dr, Oshawa, ON L1K 0R6, Canada; [www.youkits.com](http://www.youkits.com). Distributed in the US by Vibroplex, 1001 N Broadway St, Knoxville, TN 37917; tel 865-309-5073; [www.vibroplex.com](http://www.vibroplex.com).



**See the Digital Edition of *QST* for a video overview of the YouKits MT-1 QRP antenna tuner kit.**