mAT-10

Automatic Tuner with QRP Transceivers

Instruction Manual Version V1.0

INTRODUCTION

The mAT-10 is a compact and tuner designed for YAESU FT-817/818, that can also be used with any QRP transceiver. When connected to YAESU FT-817/818 through the supplied dedicated control cable model mAT-CY, it is controlled by “one touch” tuning through the transceiver. If no control cable is used, it is a universal QRP tuner for all low-power transceivers.

The mAT-10 is used for QRP transmission and its ACC interface is only designed for the YAESU FT-817/818. It can not be used for other YAESU transmitters. Higher power YAESU transceivers can control the mAT-TUNER mAT-30 tuner. Visit our website to learn about the mAT-30.

The mAT-10 is connected to the ACC port of the FT-817/818 transceiver through supplied control cable mAT-CY. The ACC interface allows an external device such as a PC or the mAT-10 to control the FT-817/818 by sending it serial commands. The mAT-10 has the function of "one key tuning". When the multi-function key on tuner is pressed, the mAT-10 command FT-817/818 switches to FM mode and transmits a carrier to initiate a tuning cycle. After waiting for the tuning cycle to complete, it stops transmitting the carrier, saves the settings, and restores the transmitter to its previous mode. This process is automated and does not require manual operation.

When mAT-10 is used with other QRP transceivers, it does not need a control cable and works only by connecting RF cables. The tuning process is completed by pressing the the TUNE & POWER multi-function button on the panel. Press and hold for 1 second and the tuning cycle will start.

The tuner operates within the range of 1.8MHz to 54MHz, at power levels up to 30 watts.
It will tune dipoles, verticals, Yagis, or virtually any coax-fed antenna. The impedance matching range is 5-1500 ohms, in excess of automatic tuners used in many HF transceivers or other available external automatic tuners.

The mAT-10 has 16,000 frequency memories. When tuning on or near a previously tuned frequency, the mAT-10 uses “Memory Tune” to recall the previous tuning parameters in a fraction of a second. If no memorized settings are available, the tuner runs a full tuning cycle, storing the parameters for memory recall on subsequent tuning cycles on that frequency. In this manner, the mAT-10 “learns” as it is used, adapting to the bands and frequencies as it goes. You can also start a tuning cycle manually whenever necessary.

Two 10440 lithium batteries are installed in the interior of the mAT-10, which provides power for the tuner. Because of the use of advanced magnetic retaining relays, the power consumption of mAT-10 is very small. The lithium battery can operate for a long time after it is fully charged. Special chargers are provided with tuners. You must use its own charger to charge the tuner. It is dangerous to charge with an incorrect charger.

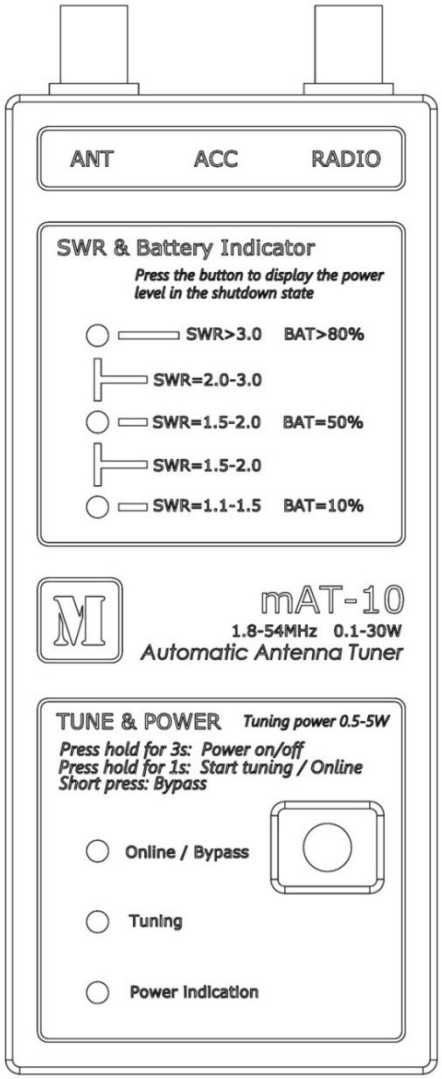
In addition to the mAT-10 tuner, the package includes the mAT-CY control cable mAT-CY, lithium battery charger and user manual. Latest version of user manuals can also be downloaded directly from our web page. The same control cable mAT-CY can also be used with the mAT-30 tuner. They are identical.

SPECIFICATIONS

- Max 30 watts SSB and CW peak power, 5 watts on PSK and digital modes.
- 1.8 to 54.0 MHz coverage. 16,000 memories for instantaneous frequency
- Tuning time: 0.1 to 5 seconds full tune, 0.1 seconds memory tune.
- For dipoles, verticals, Vees, beams, long wire or any coax-fed antenna.
- Dimensions: 13.8cm x 6.1cm x 2.3cm (L x W x H).
- Weight: 300g.

FRONT PANEL

The mAT-10 has a multi-function key and six indicator lights. The multi-function key has main power switch, on-line/off-line, start tuning cycle, battery power level display function.



SWR & Battery Indicator: When the tuner is turned on, the three lights show the current SWR. When the tuner is turned off, after pressing the multi-function key, the three indicators show the battery's power level.

Online/Bypass: The tuner is online when the indicator lights up. When the indicator light is off, it means the tuner is in an bypass state.

Tuning: When the tuner starts the tuning process, the indicator lights up. Indicator light goes off to indicate the end of the tuning process.

Power Indicator: Light on means the tuner is operational, off means power off

There are two BNC RF sockets and one ACC socket at the top of the mAT-10. The "ANT" connector is used to connect the antenna. The "RADIO" connector is connected to RF output of transceiver via coaxial cable. "ACC" uses control cable mAT-CY to connect the ACC socket of FT-817/818.

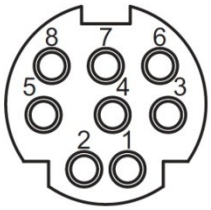
The charging socker of the mAT-10 is on the bottom. Two 10440 lithium batteries installed inside tuner to provide power for the tuner. Tuner can only be charged with its attached 8.4 vDC charger.

Important Note: Before the first use of the tuner or after the battery is replaced, the tuner must be charged by the charger.

CONTROL CABLE mAT-CY

The mAT-10's control cable mAT-CY provides control signals between FT-817/818 and the tuner. When the mAT-10 is turned on, it will automatically detect whether it is connected to YAESU FT-817/818 through the control cable. If so, the internal software matching FT-817/818 will start running. If it is not connected to FT-817/818, the internal general tuner software will be run.

The supplied mAT-CY transceiver control cable is 50 centimeters long. If desirable to position mAT-10 farther from the transceiver than this cable length allows, a custom cable will need to be constructed. This can be accomplished in two ways: Cut the supplied cable and solder a jumper wire between all the connections, or purchase new connectors and cable to construct a custom length control cable from scratch.



1、+13.5V　　2、TX GND
3、GND　　4、DATA IN
5、DATA OUT　　6、SENSE
7、RESET　　8、TX INH

INSTALLATION

The mAT-10 tuner is designed for indoor operation only, it is not water resistant. If you use it outdoors (Field Day, for example), you must protect it from the rain. Always turn your transceiver off before plugging or unplugging anything. The transceiver may be damaged if cables are connected or disconnected while the power is on.

CONNECTING YAESU FT-817/818 TRANSCEIVERS

When the tuner is connected to FT-817/818 transceivers, the cable connection between the tuner and the transceiver is completed by the following steps. Make sure that both the transceiver and the tuner are shut down during cable connection operation.

1. Connect the HF/50 MHz antenna jack on the transceiver to the “RADIO” jack on the top of the mAT-10 with coaxial cable.
2. Connect the control cable mAT-CY to the mini-DIN 8-pin jack on the rear of the mAT-10 marked “ACC” and other end of this cable to the ACC jack on the rear of the FT-817/818 transceiver.
3. Connect the antenna feed line coaxial cable to the “ANT” jack on the rear of the mAT-10.

CONNECTING OTHER TRANSCEIVERS

Follow instructions for FT-817/818, skipping step 2 for the control cable.

OPERATION

BATTERY LEVEL INDICATION When the mAT-10 is turned off and the multi-function button is pressed, the three indicator lights in the upper half of the tuner are used to indicate the battery power level. When the button is released, the tuner is still turned off.

POWER ON AND OFF Since the tuner will detect if the FT-817/818 transceiver is currently connected at startup, turn on the power of the transceiver first and then turn on the power of the tuner. Press the multi-function button until the "Power Indication" light in the lower half of the tuner is lit. To turn power off, press and hold the multi-function button until all the lights including the "Power indication" light is off.

ONLINE / BYPASS By pressing the multi-function button, mAT-10 can switch between "Online" and "Bypass". The indicator lamp marked "Online/Bypass" will be lit to indicate that the tuner is in line and ready to use. When off, it indicates that the tuner is bypass.

TUNING PROCESS, YAESU FT-817/818

Press and hold the multi-function button until the "Tuning" light is turned on and then release it. The tuner will automatically control the transceiver to complete the following operations, without manual operation by the user.

a. The tuner sends control commands to FT-817/818 and the transmitter will be activated and a carrier signal will be sent out.

b. The tuner asks the current frequency data of FT-817/818 and reads the matching data from its own memory to match the capacitance and inductance in the LC circuit. Then the current SWR is detected. If the SWR is not higher than 1.5:1, the tuning is completed and the following step d is executed, otherwise step c is executed.

c. Start a complete tuning cycle. LC circuit in the mAT-10 will be selected/ adjusted for optimum SWR.

d. When tuning is complete, transmission will cease, and you will be ready for operation. The tuner stores the configuration data in the memory corresponding to the current frequency. The data in the memory can still be stored effectively after shutdown until overwritten by data the next time the tuner is used on the same frequency.

TUNING PROCESS, OTHER TRANSCEIVERS

For other transceivers, the tuning steps are different, requiring the user to complete the process manually as follows:

a. Set the transceiver to the FM, FSK or RTTY mode, in order to make the transceiver output a stable carrier signal.

b. Reduce power output to 5 watts or less.

c. Press and hold the PTT key of the transceiver, then press and hold the multi-function button of the tuner until the "Tuning" indicator lights up. Release the multi-function button. Continue to hold down the PTT of the transceiver until the tuning indicator of the tuner goes out and the tuning process ends.

d. Restore mode and power level of the transceiver to desired settings. The tuning process is over, The front panel's three lights are used to display the current SWR.

OPERATION NOTE

During the tuning process of the mAT-10 tuner, high SWR can be detected by the transmitter. There are a few transmitters that stop transmitting when SWR is high and cause the tuner to be unable to tune due to zero power output.

BATTERIES AND TUNING

Two 10440 lithium batteries installed inside mAT-10 provide power for the tuner. Tuner can only be charged with included 8.4 vD charger. The mAT-10 uses little power while tuning, and essentially zero power when in standby. If batteries need to be replaced, please use the same type of batteries.

The indicator on the charger shows the charging process. The yellow light indicates charging is in progress, and the green indicator indicates charging is completed.

Before the first use or after the battery is replaced, the tuner must be charged by the charger to activate the internal protection circuit before it can be used normally.

TRANSPORT

Because there are two lithium batteries installed inside the tuner, Please comply with local laws when transporting.

TECHNICAL SUPPORT

Visit the Support Center at: http://www.mat-tuner.com/en

PRODUCT FEEDBACK

We encourage product feedback! Tell us what you really think of your *MAT-TUNER* product. In an email tell us how you used the product and how well it worked in your application.

We like to share your comments with our staff, our dealers, and even other customers at the ***MAT-TUNER*** website.

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