mAT-10

Automatic Tuner with QRP Transceivers

Instruction Manual Version V1.0

INTRODUCTION

The mAT-10 is a compact and exquisite tuner designed for YAESU FT-817/818, it can also be used in other QRP transceivers. When it is connected to FT-817/818 through a dedicated control cable mAT-CY, it is a dedicated tuner, which can achieve convenient "one-key tuning". If no control cable is used, it is a universal QRP tuner for all low-power transceivers.

mAT-10 is used for QRP transmission and its ACC interface is only designed for YAESU FT-817/818. It can not be used for other YAESU transmitters. If you use other high-power YAESU transmitters, mAT-10 is not appropriate, you can choose mAT-30 tuner, visit our website to learn about mAT-30 information.

The mAT-10 is connected to the ACC port of the FT-817/818 transceiver through 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, transmit a carrier, 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 in other QRP transceivers, it does not need control cables and work only by connecting RF cables. The tuning process can be completed by pressing the Multi-function key on the panel, its operation is very simple.

The tuner can work 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. It will match an amazing range of antennas and impedances, far greater than some other tuners you may have considered, including the built-in tuners on many transceivers.

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 work for a long time after it is fully charged. It is very suitable for outdoor use. 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 tuners, the package of mAT-10 includes control cable mAT-CY, special lithium battery charger and user manual. They are provided to users along with tuners, and do not need to

be purchased separately. The user manual can also download the latest version directly from our web page. The control cable mAT-CY can also be used in the mAT-30 tuner. The control cable of mAT-10 is the same as the control cable of mAT-30.

SPECIFICATIONS

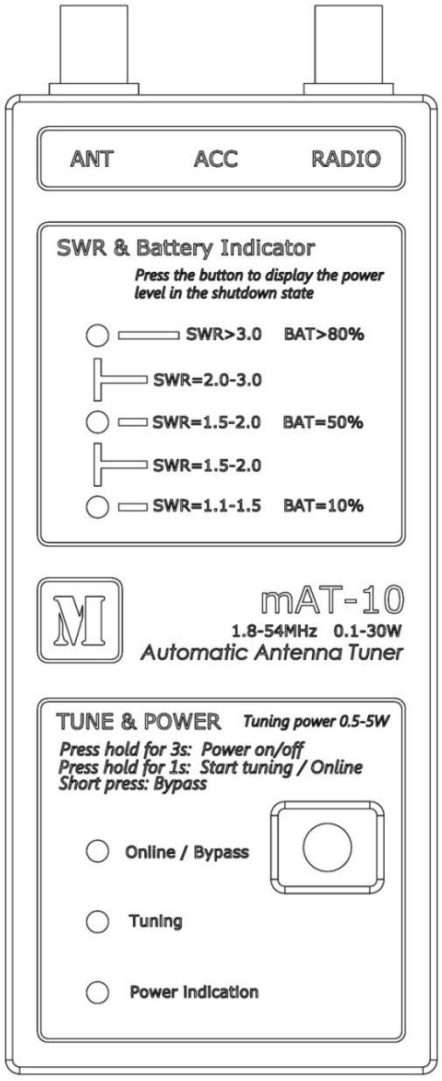
- Max 30 watts SSB and CW peak power, 5 watts on PSK and digital modes.
- 1.8 to 54.0 MHz coverage. 16,000 memories for instantaneous frequency
- Tuning time: 0.1 to 5 seconds full tune, 0.1 seconds memory tune.
- For dipoles, verticals, Vees, beams, long wire or any coax-fed antenna.
- Dimensions: 13.8cm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

AN IMPORTANT WORD ABOUT POWER LEVELS

The mAT-10 is rated at 30 watts maximum power input at most. Power levels that significantly exceed specifications will definitely damage or destroy your mAT-10. Be sure to observe the specified power limitations.

PANEL

The mAT-10 has a multi-function key and six indicator lights. The Multi-function key has power switch, on-line/off-line, start tuning cycle, battery power level display function. (*NOTE: This picture is for reference only and may change later.*)



The functions of the indicator are as follows:

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 lights out, it means that the tuner is in an bypass state.

Tuning: When the tuner starts the tuning process, the indicator lights up. This indicator lights out to indicate the end of the tuning process.

Power Indicator: This is the power indicator. Lighting means that the tuner is working, extinguishing means shutting down.

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 the HF RF output of transceiver through the RF cable. "ACC" uses control cable mAT-CY to connect the ACC socket of FT-817/818.

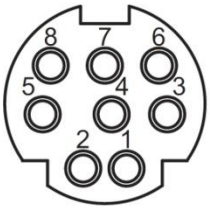
The charging hole of the mAT-10 is at the bottom of it. Two 10440 lithium batteries installed inside tuner to provide power for the tuner. Tuner can only be charged with its attached charger, the charger has the highest output voltage of 8.4VDC. mAT-10 uses little power while tuning, when the equipment is full of electricity, it can work for a long time. These 10440 lithium batteries do not have a protective circuit, and the protection function is completed by tuner.

Important Note: 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.

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 software matching FT-817/818 will be invoked to start running. If it is not connected to FT-817/818, the general tuner software will be tuned to run. Whether the tuner matches FT-817/818 or not can be achieved without additional manual operation.

The supplied transceiver control cable is 50 centimeters long. If it is desired that the mAT-10 is positioned 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.

Compatible Transceivers

The mAT-10 has a specially designed function for matching YAESU FT-817/818 transceiver. When the tuner is applied to the FT-817/818 transceiver, 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.

a. Connect the HF/50 MHz antenna jack on the transceiver to the "RADIO" jack on the top of the mAT-10.

b. 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.

c. Connect the antenna feed line coax to the "ANT" jack on the rear of the mAT-10.

If the tuner is used with other transceivers, the cable connection step should ignore Part b above.

OPERATION

Battery level indication When the mAT-10 is turned off, its multi-function key is pressed, the three indicator lights in the upper half of the tuner are used to indicate the battery's power level. The key is released and the indicator lights are turned off, and the tuner is still turned off.

Turn on and off Since the tuner detects which transceiver is currently connected to at startup, please turn on the power of the transceiver first, and then turn on the power of the tuner. When the mAT-10 is turned off, press and hold the multi-function key, the tuner will display the battery power level. If the multi-function key is maintained until the "Power indicator" light in the lower half of the tuner is lit, the tuner will start. When the mAT-10 is on, press and hold the multi-function key until all the lights including the "Power indicator" lights are off, then the tuner has been turned off.

Online/Bypass By pressing the multi-function key, mAT-10 can switch between "Online" and "Bypass". The indicator lamp marked "Online/Bypass" is lit to indicate that the tuner is in online, this indicator lights out, indicating that the tuner is bypass.

Tuning process, when connecting YAESU FT-817/818

Press and hold the multi-function key until the "Tuning" light is turned on and loosen 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, 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. The coils and capacitors in the mAT-10 will be selected/ adjusted for optimum SWR.

d. When tuning is complete, the transmission will cease, and you will be ready for operation on this frequency. The tuner stores the configuration data of the current capacitor and pole in the memory corresponding to the current frequency. The data in the memory can still be stored effectively after shutdown until it is covered by the new data next time the frequency is tuned.

Tuning process, when connecting 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. Make the power reduced to 5 watts or less.

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

d. The mode and power level of the transceiver are restored to the previous settings. The

tuning process is over and the transmitter can work properly. The front panel's three lights are used to display the current VSWR.

Tips: In the tuning process of the tuner, the larger wall SWR can be detected by the transmitter. There are very few transmitters that stop transmitting when SWR is large and cause tuning failure. The mAT-10 tuner may not work properly with these transmitters. This has happened when we applied mAT-10 to YAESU FT-857D with low transmit power.

Batteries and Charging Two 10440 lithium batteries installed inside mAT-10 to provide power for the tuner. Tuner is charged, can only be used with prescribed charger, the charger has the highest output voltage of 8.4VDC. mAT-10 uses little power while tuning, and essentially zero power when in standby, when the equipment is full of electricity, it can work for a long time. These 10440 lithium batteries do not have a protective circuit, and the protection function is completed by tuner. When batteries need to be replaced, please choose the same type of batteries.

The indicator on the charger shows the charging process. The yellow indicator indicates that the charging is in progress, and the green indicator indicates that the 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. It could be banned from air transportation.

TECHNICAL SUPPORT

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

The website provides links to product manuals, just in case you lose this one! When you are thinking about the purchase of other **MAT-TUNER** products our website also has complete product specifications and photographs you can use to help make your purchase decision. Don't forget the links to all of the quality **MAT-TUNER** Dealers also ready to help you make that purchase decision.

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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