

# mAT-K100

## Automatic Tuner For Kenwood & Icom Transceivers

*Instruction Manual Version V3.0*

### INTRODUCTION

The mAT-K100 is an automatic antenna tuner specially designed for modern Kenwood and Icom HF transceivers. Each is controlled from a separate control cable. Cable mAT-CK for Kenwood is supplied with the tuner. Cable mAT-CI for Icom is sold as an accessory.

When the tuner is used with Kenwood transceivers via the mAT-CK control cable it is compatible with Kenwood AT-300 tuner protocol. TS-2000, 50, 450, 480SAT (excluding HX version), 570, 590, 850, 870, 990, etc.

When the mAT-K100 is used with Icom transceivers via the mAT-CI control cable, it is compatible with the original AH-3 and AH-4 automatic tuner protocol. Transceivers that can use either Icom external tuner can also use the mAT-K100, including IC-706, 703, 718, 7000, 7100, 7200, 7300, 7410, 746, 756, 7600, 7610 series transceivers.

In addition to controlling the mAT-K100 tuning operation, the transceiver also supplies power to the tuner through the control cable. Tuners do not need external power. Like the original tuner operation of mAT-K100 is simple. After setting transceiver menu, tuning operation can be completed by pressing the tuning button on the front panel of the transceiver.

The mAT-K100 covers 1.8 to 54MHz, at power levels up to 120 watts. It will tune dipoles, verticals, Yagis, or virtually any coax-fed antenna. Matching range 5-1500 ohms, in excess of the internal automatic antenna tuner.

The mAT-K100 has 16,000 frequency memories. When tuning on or near a previously tuned frequency, the mAT-K100 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-K100 "learns" as it is used, adapting to the bands and frequencies as it goes. You can also start a tuning cycle manually whenever necessary.

### SPECIFICATIONS

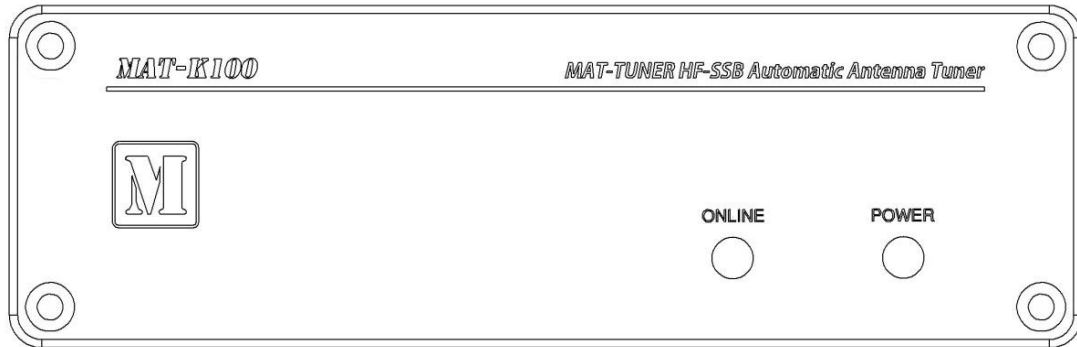
- 0.1 to 120 watts SSB and CW peak power, 30 watts on PSK and digital modes, and 100 watts on 6 meters.
- 16,000 memories for instantaneous frequency and band changing.
- Tuning time: 0.1 to 5 seconds full tune, 0.1 seconds memory tune.
- 1.8-54.0 MHz coverage. Built-in frequency sensor.
- Tunes 5 to 1500 ohm loads.
- For dipoles, verticals, Vees, beams, whip, wire or any coax-fed antenna.
- Dimensions: 20cm x 13cm x 4cm (L x W x H).
- Weight: 0.8kg.

### AN IMPORTANT WORD ABOUT POWER LEVELS

**The mAT-K100 is rated at 120 watts maximum power input at most. Some ham transceivers virtually all amplifiers, output well over 120 watts. Power levels that significantly exceed specifications will definitely damage or destroy your mAT-K100. If your tuner fails during overload, it could also damage your transmitter or transceiver. Be sure to observe the specified power limitations.**

**FRONT PANEL**

On the front panel there are two LED indicator lights.  
**ONLINE:** tuner’s status, online or bypass.  
**POWER:** the tuner’s power light.



**REAR PANEL**

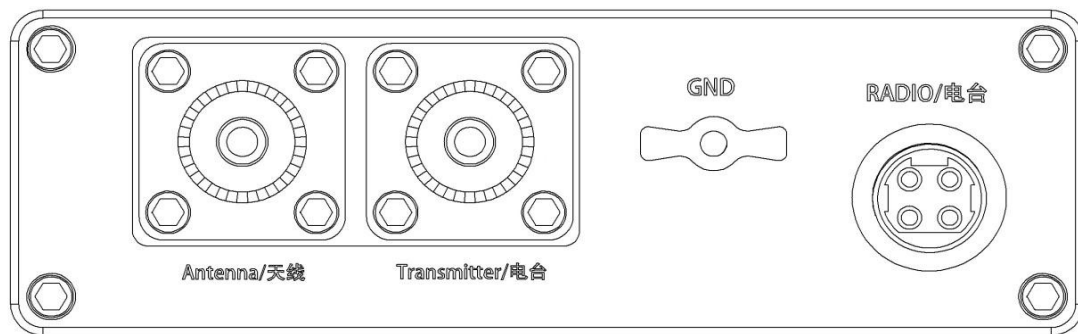
The rear panel of the mAT-K100 features four connectors.

**ANTENNA:** SO-239 connector for coax cable from antenna.

**RF IN:** Connect a 50 ohm coax jumper cable from this standard SO-239 connector to the ANT jack on the back of the transceiver.

**Radio:** This 4-pin mini-DIN connector is connected to the tuner control socket of the transceiver through a matching control cable. DC power is also supplied over this jack.

**GND:** Connect to antenna system ground.

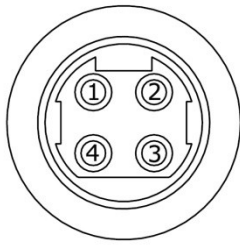


**CONTROL CABLE**

Control cables are used to transmit control commands between transceivers and tuners. Standard length is 50 centimeters. If it is desired that the mAT-K100 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 interface cable from scratch.

The socket used to connect the control cable on the tuner is shown below.

**Radio**



- 1 GND
- 2 KEY / TS
- 3 +13.8V
- 4 START / TT

If you make your own customized length control cable, make sure the connection is correct. The wrong connection will cause the tuner not to work properly. Long control cable may cause RF interference to tuner and affect its operation. When the length requirement is satisfied, the length of control cable should be shortened as far as possible, and appropriate anti-interference measures should be taken.

**INSTALLATION**

The mAT-K100 tuner is designed for indoor operation only. If you use it outdoors (Field Day, for example), you must protect it from rain or moisture. Always turn your radio off before plugging or unplugging anything. The radio may be damaged if cables are connected or disconnected while the power is on.

**COMPATIBLE TRANSCEIVERS**

Any ICOM 100 watt transceiver that supports the AH-3 or AH-4 Icom tuner protocol. This includes: IC-706, 703, 718, 7000, 7100, 7200, 7300, 7410, 746, 756, 7600, 7610 series transceivers.

Any KENWOOD 100 watt transceiver that supports the AT-300 Kenwood tuner protocol. This includes: TS-2000, 50, 450, 480SAT (excluding HX version), 570, 590, 850, 870, 990, etc.

**INSTALLATION**

1. Connect the HF/50 MHz antenna jack on the transceiver to the “RF IN” jack on the back of the mAT-K100, using a 50 ohm coax cable rated 120 watts or greater.  
For some transceivers with built-in tuners, such as Kenwood TS-2000 the external tuner must be connected to the ANT1 jack. Different transceivers handle bypass of internal tuners differently and vary for which antenna output jack to use. Consult transceiver operation manual for information.
2. Connect the supplied transceiver control cable to the mini-DIN 4-pin jack on the rear of the mAT-K100, marked “RADIO”. Connect the other end of this cable to the “TUNER” jack on the rear of the transceiver. For Icom transceivers, the control cable is mAT-CI, with four-pin plug for connecting the transceiver. For Kenwood transceivers the control cable is mAT-CK, using a six-pin plug for connecting the transceiver.
3. Connect the antenna feedline coax to the “ANTENNA” jack on the rear of the mAT-K100.
4. Grounding the mAT-K100 tuner will enhance its performance and safety. We recommend that you connect your tuner to a suitable ground; a common ground rod connected to buried radials is preferred, but a single ground rod or cold water pipe can suffice. We strongly recommend the use of a properly installed, high quality lightning arrestor on all antenna cables.

## TRANSCEIVER SETTING

Some transceivers can directly use external tuners without any menu set up. If you are not sure whether your transceiver needs a menu setup to find an external antenna tuner, read the section on external tuners in the operation manual.

Following is an example of ICOM IC-718 to illustrate the menu settings:

- Hold down [PWR] for 1 second to turn power OFF.
- While pushing and holding [SET], push [PWR] to turn ON the power.
- Push [UP] or [DN] one or more times to select [TUNER].
- Rotate the main dial to select "4." AH-4TUNER is selected.
- Hold down [PWR] for 1 second to turn power OFF.
- Push [PWR] to turn ON the power.

## OPERATION FROM THE TRANSCEIVER

The operation of the mAT-K100 tuner is simple. It only needs a pushbutton on the front panel of the transceiver. On an Icom transceiver, this button may be [TUNER](most models), [TUNER/CALL] (IC-7100, 706) or [TUNE] (IC-M710). On Kenwood transceivers, it is usually marked as [AT]. In the following description, we call it [TUNER].

## START A TUNING PROCESS

Kenwood and Icom transceivers operate the same way. Press and hold the [TUNER] button for more than 2 seconds, and the transceiver will automatically start a tuning process. The following operations are performed automatically by transceiver, without manual operation.

1. The radio will switch to CW mode, reduce power, and begin to transmit a carrier.
2. The tuner will begin a memory tuning cycle, If an acceptable SWR match is found in the memory tuning cycle, the tuning cycle ends. Otherwise, the mAT-K100 automatically begins a full tuning cycle in an attempt to find a good match.
3. At the end of the tuning cycle, if the SWR is less than 2:1, the match data is stored in a memory associated with the selected frequency. If SWR is greater than 2:1, the current matching data will not be stored.
4. The transceiver restores the current mode and power level to the previous settings, and the tuning ends.
5. After tuning is completed, when the tuner is working normally, the four indicator lights on the front panel are used to display the current SWR.

## ONLINE / BYPASS

For some transceivers, the ONLINE/BYPASS state of the tuner can be switched by pressing the [TUNER] button. If the tuner is online, the "TUNER" tag is displayed on the display screen of the transceiver.

## LED INDICATORS

There are four indicator LEDs on the front panel of mAT-K100. The PWR LED is the power light. When lit, tuner power is on.

The 1.5, 2.0, 3.0 LED's show the current SWR. The 1.5 light means that the current SWR is less than or equal to 1.5. The 2.0 light means that the current SWR is from 1.5 to 3.0. ;The 3.0 light means the SWR is higher than 3.0

**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.

Welcome to <http://www.mat-tuner.com/> for more information

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BG3MZU 2019.03.02