

## mAT-1500Pro AUTOMATIC ANTENNA TUNER OPERATION MANUAL

Thank you for choosing our product.

Please **READ ALL INSTRUCTIONS** carefully and completely before using this tuner.

### ■ WARNING

- ◆ **WARNING! NEVER** touch the antenna or antenna connector with your hand when the transmitter is transmitting, it will cause burns!
- ◆ **WARNING! NEVER** use the antenna tuner during a lightning storm. It may result in an electric shock, cause a fire or damage the tuner. Always disconnect the power source and antenna before a storm.
- ◆ **WARNING! NEVER** operate the tuner with its cover removed. Touching the components inside the tuner while transmitting will result in painful RF burns.
- ◇ Always turn your transmitter off before plugging or unplugging anything, otherwise it would be damaged.
- ◇ The tuner is designed for indoor operation only, it is not waterproof. If you use it outdoors, you must protect it from rain, dew and steam.
- ◇ We cannot guarantee the tuner will work well with those YAESU transmitters which will be released after our tuner.

### ■ INTRODUCTION

The mAT-1500Pro is a multipurpose high-power automatic antenna tuner that can match almost all transmitters and linear amplifiers. The maximum RF power allowed is 1500 watts (SSB), the frequency range allowed is 1.8-30MHz, and two antennas can be connected at the same time. According to the different connected transmitters, the tuner has three modes, YAESU, ICOM and GENERAL. The tuner can automatically determine and match the type of the connected transmitters to minimize the manual operation.

When the mAT-1500Pro is working in GENERAL mode, in addition to manual operation on the front panel, it can also be remotely operated. There is an RS232 remote control interface on the rear panel of the tuner, which can be easily controlled by a computer or another terminal device. The remote operation function can only be used in GENERAL mode, and this function is not available in other modes.

The tuner adopts an all-aluminum casing and CNC panel, which looks beautiful and sturdy, and is relatively light in weight.

- **Operation Mode:** mAT-1500Pro has three operation modes: GENERAL, YAESU, and ICOM.

**GENERAL** mode: The tuner working in this mode can adapt to almost all transmitters, but the operation is more complicated. When the mAT-1500Pro is only connected to the DC power supply, without any control cable, the tuner automatically turn to the GENERAL mode after long pressing the [POWER] button to turn it on. The "GENERAL" indicator light on the left side of the front panel will be illuminated. Under this mode, the tuner needs to be manually started a tuning cycle and set ONLINE/BYPASS.

**YAESU** mode: When the tuner is connected to a YAESU transmitter via a mAT-CY control cable, the transmitter controls the operation of the tuner through the control cable and powers the tuner. The "YAESU" indicator light on the left side of the front panel will be illuminated. Therefore, the tuner no longer needs to be connected to an additional DC power supply.

If the transmitter's tuner-related function menu has been correctly set, the tuner will automatically be set to YAESU mode when it is turned on. Under this mode, the tuner is fully compatible with YAESU brand tuners, such as FC-30, FC-40 and FC-50, and the operation method is exactly the same.

For the settings of the transmitter's tuner-related menus and the operation of the antenna tuner, please read the manual of this transmitter. Different transmitters may require different settings.

Under this mode, the buttons on the front panel are still active except the [TUNE],and [POWER] button, these two buttons only serve as indicator lights. The tuner will turn on and off with the transmitter.

**ICOM** mode: When the tuner is connected to an ICOM or KENWOOD transmitter via a mAT-CI or mAT-CK control cable, the transmitter controls the tuner through the cable and provides power to the tuner.

When the transmitter is turned on, the tuner is also turned on and automatically set to this mode and the "ICOM" indicator light on the left side of the front panel will be illuminated. At this time, the tuner no longer needs to be connected to an additional power supply.

Most ICOM and KENWOOD can be operated directly with our tuner. A small number of transmitters may require additional settings related to external tuners. Please read the transmitter manual for details.

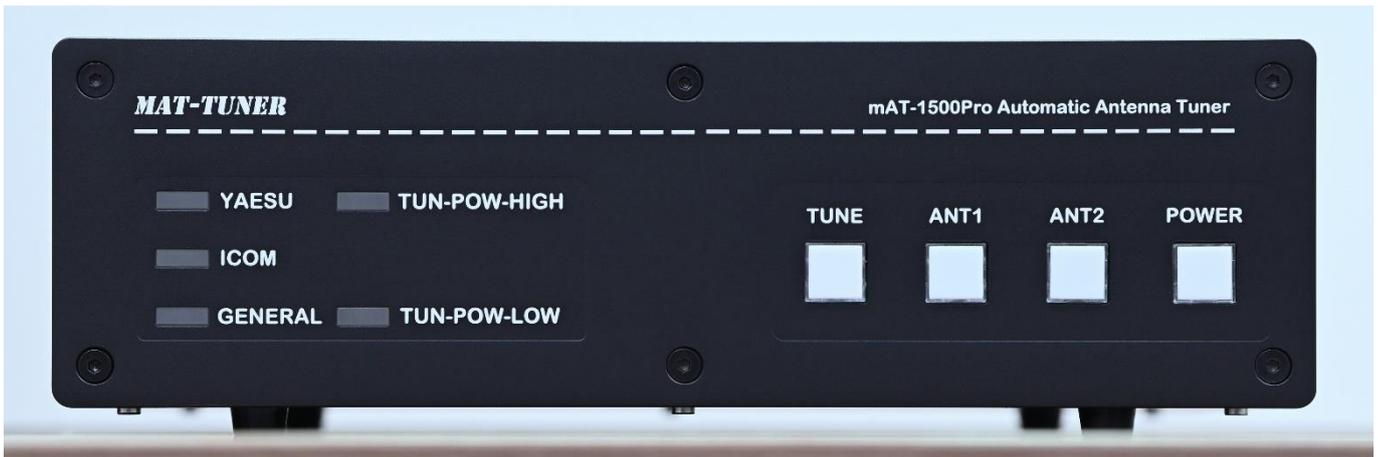
The tuner uses the standard tuner control sockets of YAESU, ICOM and KENWOOD to connect to the transmitter. If your transmitter is an old model of these brands and does not have a standard antenna control socket, the transmitter cannot set the tuner to YAESU or ICOM mode, and the tuner could only operates in GENERAL mode.

■ **Front:** The front panel has five indicator lights and four buttons, as shown in the figure. The four buttons on the right also serve as indicator lights.

Left indicator light:

1. "**GENERAL**", "**YAESU**" and "**ICOM**". Operation mode, tuner will automatically detect the type of transmitter being connected and enter the corresponding mode for operation.

2. “TUN-POW-HIGH”. High tuning power alarm. When the tuner starts a new tuning cycle, it



detects the input RF power. If too high RF power is input, this indicator light will light up and the tuning will be terminated. At the same time, the tuner will emit a beep sound to remind the user.

3. “TUN-POW-LOW”. Low tuning power alarm. When the tuner starts a tuning cycle and detects that the input RF signal is too low, this indicator light is lit.

Button:

**[TUNE]:** When in General mode, it is the tuning button. It can also switch between ONLINE/BYPASS states. Long press for more than 1 second to start tuning, short press to switch the status of the tuner. It is still an indicator light. When it goes off, it indicates that the tuner is deactivated. When it lights up green, it indicates that tuner is online, and when it lights up red, it indicates that tuner is tuning.

When in “YAESU” and “ICOM” modes, it is only an indicator light that shows the status of the tuner.

**[ANT1], [ANT2]:** Antenna selection button and indicator light.

**[POWER]:** When in general mode, it is the power switch and power indicator. In other modes, this is only the power indicator light.

■ Rear:



**"RF-IN"**: RF input. This socket needs to be connected to the antenna socket of the transmitter or linear amplifier, and the RF power signal will import the tuner from this socket.

**"ANT1", "ANT2"**: Antenna socket. The tuner can connect two antennas at the same time, you can switch between "ANT1" and "ANT2" socket by pressing [ANT1] and [ANT2] button on the front panel.

**"GND"**: Ground terminal. In order to improve the performance of the wireless system, it is recommended that you connect this terminal to a well-grounded ground wire.

**"ICOM & Kenwood"**: Control cable socket for connecting ICOM or KENWOOD transmitter. Use mAT-CI cable to connect ICOM transmitter, and use mAT-CK cable to connect KENWOOD transmitter. If this socket is used, the tuner will start up together with the transmitter and automatically set to ICOM mode.

**"YAESU"**: Control cable socket for connecting YAESU transmitter, the cable used here is mAT-CY. If this socket is used, the tuner will start up together with the transmitter and automatically set to YAESU mode.

**"DC"**: Power socket. Use the DC cable that comes with the tuner to connect to a 12-14V DC power supply that can provide a stable current of at least 2.0A. If the power supply voltage is less than 11V, the tuner may not operate properly.

***Tips:***

*We do not recommend connecting the transmitter and power supply to the above three sockets at the same time. If they are connected at the same time, the priority of the tuner's operating mode will be: YAESU > ICOM > GENERAL.*

*mAT-CY, mAT-CI and mAT-CK control cables are not standard accessories, and are not provided with the tuner by default. You can purchase the cable according to your needs. The DC power cable is provided with the tuner by default.*

**REMOTE**: Remote control interface, RS232 level. When the tuner is in GENERAL mode, you can use this interface to operate it remotely. For specific operation methods and instructions, please refer to the "mAT Tuner Remote Operation Instructions".

**PTT IN**: Transmitter PTT signal input. You can use the RCA cable which comes together with the tuner to connect this socket to the transmitter's PTT output interface. The transmitter's PTT signal enters the tuner through this interface.

*Tips: Some YAESU, ICOM and KENWOOD transmitters do not have an independent PTT signal output interfaces. For these ICOM and KENWOOD transmitters, please obtain the transmitter's PTT signal in a correct and appropriate manner and connect it to the tuner's PTT IN socket. For YAESU transmitters, the PTT signal is already included in the mAT-CY cable, so there is no need to connect an additional RCA cable to the transmitter. The tuner's PTT IN socket can be left idle.*

**PTT OUT**: Transmitter PTT signal output. You can use the RCA cable which comes together with the tuner to connect this socket to the PTT input interface of the linear amplifier, and the transmitter's PTT signal is transmitted to the amplifier through this interface.

*Tips: The tuner comes with two RCA cables by default. You do not need to purchase them separately.*

**Important 1:** In order to ensure safe operation, it is strongly recommended that you use the PTT IN and PTT OUT sockets of the tuner to control the PTT signal transmission between the transmitter and the linear amplifier. When the tuner is in a tuning cycle, the amplifier is absolutely prohibited from amplifying the low-power RF signal output by the transmitter, otherwise it may cause permanent damage to the tuner! During the tuning cycle, the tuner will automatically disconnect the PTT IN and PTT OUT connections, preventing the transmitter's PTT signal from being transmitted to the linear amplifier, leaving the amplifier in the STBY state. After the tuning cycle is completed, the tuner will automatically restore the connection between PTT IN and PTT OUT so that the amplifier can amplify the radio signal normally.

**Important 2:** For the YAESU transmitter, two things need to pay particular attention to.

1. The PTT signal is already included in the mAT-CY cable. The PTT signal of the transmitter can still be transmitted to the tuner without using the PTT IN socket of the tuner.
2. If there are other cables connecting the transmitter and the amplifier, such as ACC, please be sure to check carefully whether these cables contain PTT signals. If they do, please be sure to disconnect them to avoid the amplifier mistakenly starting amplification during the tuning cycle of the tuner, causing damage to the tuner.

#### ■ **Connection of RF cable and RCA cable:**

Before connecting any cables, please make sure your transmitter, tuner, and linear amplifier are turned off. The tuner does not come with any RF cables, please prepare the RF cables you need by yourself.

1. Use an RF cable to connect the RF output (ANT) of the transmitter to the RF input of the linear amplifier. If you are not using a linear amplifier, connect the RF output (ANT) of the transmitter to the "RF-IN" socket of the tuner and ignore step 2 below.
2. Use another RF cable to connect the RF output (ANT) of the linear amplifier to the "RF-IN" socket of the tuner.
3. Connect the RF cable that connected to the antenna to "ANT1" or "ANT2" of the tuner, and select the corresponding antenna socket through the [ANT-SEL] button on the front panel of the tuner before subsequent operations.

**Important:** Please connect it in the above order. Never connect the tuner between transmitter and linear amplifier, but between the amplifier and the antenna!

4. Use an RCA cable that comes with the tuner to connect the PTT IN of the linear amplifier to the "PTT OUT" of the tuner.
5. Use another RCA data cable to connect the "PTT IN" of the tuner to the "PTT OUT" socket of the transmitter. If you are using a Yaesu transmitter, please ignore this step.

#### ■ **Tuner power on, power off, and tuning cycle:**

When the mAT-1500Pro is in YAESU and ICOM mode, you do not need to manually turn it on and off. It will be on and off together with the transmitter. You only need to operate the transmitter.

#### **Power on and off operation in General mode:**

You only need to connect the DC power cable, and then press and hold **[POWER]** for more than 1 second to turn on the tuner. When the tuner is turned on, press and hold **[POWER]** for more than 1 second, and release the button to turn off the tuner.

### **Tuning:**

1. Connect the tuner to the DC power supply, press and hold the **[POWER]** button to turn on the tuner.
2. Select the correct antenna socket through the **[ANT1]** or **[ANT2]** button.
3. Set the transmitter to the required frequency, set the power to 10W, and set the mode to one of FM, FSK, and RTTY.
4. If you do not use the RCA cable to let the tuner control the PTT signal between the transmitter and the amplifier, please set the amplifier to "STBY" and turn off the amplification function. If you use the tuner to automatically control this PTT signal, please ignore this step.
5. Press and hold the PTT button on the transmitter microphone to let the transmitter send a stable carrier.
6. Press the **[TUNE]** button of the tuner to start tuning. The tuner will make a loud noise during the tuning process, which is normal. The **[TUNE]** button will be illuminated in red.
7. When the **[TUNE]** button goes off or lights up green, and the tuner no longer makes a sound, it means that the tuner tuning is completed. If this button lights up in green, it means that the tuning is successful, and If this button goes off, it means that the tuning fails.
8. If the tuning is successful, please restore the power and mode of the transmitter to the settings you need, and you can transmit normally. If you do not use the RCA cable to let the tuner control the transmitter and the amplifier's PTT signal, you need to set the amplifier to "OPR" status to allow it to amplify.
9. If you change the operating frequency of the transmitter, repeat step 3-8 before the first transmission.

### **Operation in YAESU and ICOM mode:**

1. Before the first use, please check whether the transmitter needs to set the function menu that related to the external tuner, and whether it is correct. Please read the manual of the transmitter to set the menu. You can set the mAT-1500Pro as their own brand tuner, which is fully compatible.
2. If you do not use the RCA cable to control the PTT signal between the transmitter and the amplifier, please set the amplifier to the "STBY" state, which will temporarily deactivate the amplification function. If you use the RCA cable to control the PTT signal, please ignore this step.
3. Press and hold the **[TUNE]** button on the front panel of the transmitter (for ICOM or KENWOOD transmitters, this button may be **[AT]** ) for more than 1 second to start tuning. During the tuning process, the tuner will make a loud sound, and **[TUNE]** is lit up in red.
4. When the **[TUNE]** button goes off or lights up green, and the tuner no longer makes a sound, it means that the tuner tuning is completed. If this button lights up in green, it means that the tuning is successful, and If this button goes off, it means that the tuning fails.

## ■ Error and warning messages

1. "TUN-POW-HIGH". High tuning power alarm. When the tuner starts a new tuning cycle, it detects the input RF power. If too high RF power is input, this indicator light will light up and the tuning will be terminated. At the same time, the tuner will emit a beep sound to remind the user.
2. "TUN-POW-LOW". Low tuning power alarm. When the tuner starts a tuning cycle and detects that the input RF signal is too low, this indicator light is lit.

## ■ ACCESSORY

|   |          |
|---|----------|
| 5.5mm DC power line (intermediate contact diameter 2mm) | Standard |
| RCA control cable, 2pcs                                 | Standard |
| mAT-CY control cable for YAESU                          | Optional |
| mAT-CI control cable for ICOM                           | Optional |
| mAT-CK control cable for Kenwood                        | Optional |

## ■ ELECTRICAL

- Frequency Range: 1.8 ~ 30 MHz
- Input Power Capability: 1500W(SSB), 800W(DATA mode)
- Tuning Power: 5-15W
- Tuning time: ≤ 8 S(Programmed), 0.1S (From pre-saved frequencies in memory)
- Operating Temperature: -10°C ~ +60°C, 14°F ~ 140°F
- Channel: 16000
- Power Requirements: DC 12-14V, 2.0A
- Dimensions (H x W x L): 290 x 243 x 78mm, Package dimensions: 337 x 312 x 144mm
- Weight:3.5Kg, Gross weight: 4.1Kg

## ■ TECHNICAL SUPPORT

Visit the web: <http://www.mat-tuner.com/> for more information and operation manual. In order for you to get better service, we recommend you to buy our products from your local distributor.

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