LDG YT-1200 TUNER

For Yaesu
FT-450, FT-450D, FT-950,
FT-991, FT-991A
FTdx1200, FTdx3000,
HF Transceivers

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Table of Contents

Quickstart Guide 3
Introduction 4
Specifications 5
- Getting to know your YT-1200 5
- Front Panel 6
- Rear Panel 7

Installation 8
- Overview 8
- Radio Configurations 10

Operation 11
- Power-Up 11
- Basic Tuning Operation 11
- Toggle Bypass Mode: 12
- Memory Tuning Cycle 13
- Full Tuning Cycle 14
- Status LED 15
- Tune Button Press Summary 15

Application Notes 16
- Mobile Operation 16
- Tuning On The US 60 Meter Band 16
- MARS/CAP Coverage 16
- Operation with a PC / CAT 17
- Using Both Antenna Ports 17

A Word About Tuning Etiquette 19
Care and Maintenance 19
Technical Support 19
Two-Year Transferrable Warranty 19
Out of Warranty Service 20
Returning Your Product For Service 20
Product Feedback 20

Quickstart Guide

You should really read the whole manual, but this summary will get you started.

1. Turn off the radio, and the radio's power supply.
2. Connect the antenna jack on the transceiver to the **Tx** jack on the YT-1200, using a 50 ohm coax cable.
3. Connect a 50 ohm coax antenna feedline to the **Ant** jack on the YT-1200.
4. Connect the 8-pin mini-DIN plug on the supplied radio interface cable to the **TUNER** port on the back of your transceiver. The YT-1200 draws 12V power from the radio via this jack
5. Connect the DB-9 plug on that same end of the radio interface cable to the **CAT** port on the back of your radio.
6. Connect the DC coax plug on the other end of the radio interface cable to the **Power** jack on the rear of the YT-1200.
7. Connect the remaining DB-9 plug to the DB-9 jack marked **Radio** on the rear of the YT-1200.
8. Turn on the radio's power supply and then turn on the radio.
9. The tuner will automatically detect the radio's communications settings and may take up to 10 seconds. See the section on Radio Configurations.
10. Select the desired operating frequency.
11. Push and hold the **Tune** button on the front of the YT-1200 for one second (until the Tuning LED comes on), then release. The transceiver automatically switches modes, keys up with a minimal amount of power, and the YT-1200 begins a tuning cycle. At the end of the tuning cycle, the original mode and power level is restored.
12. Wait for the tuning cycle to end; you are now ready to operate!

Important Safety Warning

Keep antennas, supports and transmission lines well away from overhead power lines.

Never install antennas or transmission lines over or near power lines. You can be seriously injured or killed if any part of the antenna, support or transmission line touches a power line. Always follow this antenna safety rule: the distance to the nearest power line should be at least twice the length of the longest antenna, transmission line or support dimension.

Introduction

LDG pioneered the automatic, wide-range switched-L tuner in 1995. From its laboratories in St. Leonard, Maryland LDG continues to define the state of the art in this field with innovative automatic tuners and related products for every amateur need.

The YT-1200 is custom made for Yaesu transceivers, and exchanges data and control signals with the radio.

Congratulations on selecting the YT-1200 automatic tuner for Yaesu HF transceivers. The YT-1200 integrates seamlessly with your Yaesu transceiver, providing semi-automatic antenna tuning across the entire HF spectrum, at power levels up to 125 watts. It exchanges data with your transceiver, allowing you to control all tuning operations with the tuner's **Tune** button. The YT-1200 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 radios. The YT-1200 is similar to previous LDG tuners, but is specially engineered to integrate with these Yaesu HF radios:

- FT-450 and 450D
- FT-950
- FT-991 and 991A
- FTdx1200
- FTdx3000

The YT-1200 connects to the Cat port on the back of the radio. There is a pass-through data port to connect to your PC for computer control of the transceiver. Tuning is greatly simplified; use the **Tune** button on the tuner to start an automatic tuning cycle.

Specifications

Always operate within these limits.

- 1 to 125 watts SSB and CW peak power, 100 watts on 6 meters, and 30 watts on PSK and digital modes.
- Latching relays for ultra-low power operation.
- 2,000 memories for near-instant frequency and band changing.
- Power: 12VDC, supplied by the transceiver. 500mA max. Power jack is 2.5x5.5mm center positive.
- Designed specifically for the Yaesu FT-450, FT-450D, FT-950, FT-991, FT-991A, FTdx1200, and FTdx3000 HF transceivers.
- Pass-thru CAT port allows the YT-1200 to control the transceiver over the CAT bus while still allowing a host PC to also control the radio. Use any baud rate.
- 1.8 to 54.0 MHz coverage. Frequency for memory storage is read from the radio via the CAT interface.
- Tunes 4 to 800 ohm loads (16 to 150 on 6M), 16 to 3200 ohms with optional 4:1 Balun.
- For Dipoles, Verticals, Vees, Beams or any Coax Fed Antenna.
- Optional external Balun allows tuning of random length, long wire or ladder line fed antennas.
- Radio interface cable included. LDG IC-450.
- Dimensions: 7.25”L x 7.75”W x 2.25”H.
- Weight: 1 pound 8 ounces

Getting to know your YT-1200

You’ll be using your YT-1200 for a long time; take a few minutes to get to know it.

Your YT-1200 is a quality, precision instrument that will give you many years of outstanding service; take a few minutes to get to know it.

The YT-1200 is designed for integrated use with Yaesu HF radios. Tuning is performed by pressing the **Tune** button on the front of the tuner. The tuner automatically communicates with your Yaesu transceiver, sets the proper mode and power level for tuning, and keys the transceiver. The tuner can be placed in bypass mode by pressing the **Tune** button on the tuner momentarily. Latching relays hold the tuned configuration indefinitely, even when DC power is completely removed. Tuning memories are stored indefinitely in flash memory. The transceiver provides DC power to the tuner; no separate power supply is needed.

The YT-1200 has 2,000 frequency memories. When tuning on or near a previously tuned frequency, the YT-1200 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 YT-1200 “learns” as you use it, adapting to your bands, frequencies and antenna characteristics as it goes.

Front Panel

The Tune button and Status LED have many functions.

On the front panel there is one pushbutton and one LED indicator light.

- **Tune** button: Initiates either a memory tune or a full tune, and also toggles the tuner between “active” and “bypass” modes.
- **Status LED**: Lights to give feedback on button presses, lights during tuning, and gives tune status at the end of a tuning cycle.

Rear Panel

The rear panel has standard SO-239 sockets for RF input and output, two data sockets for radio connection, a power socket, and a ground post.

The rear panel of the YT-1200 features six connectors:

- **Ant** connector: Connect the 50-ohm coax antenna feedline to this standard SO-239 connector.
- **GND** connector (wing nut): Connect to antenna system ground.
- **Tx** connector: Connect a 50-ohm coax jumper cable from this standard SO-239 connector to the **ANT** jack on the back of the transceiver.
- **PC** connector: This 9-pin DB-9 jack connects to a personal computer via a 9 pin female-to-female straight-thru cable. Use of this port is optional; it is provided to allow control of the radio by computer. This is a pass-thru port to the **RADIO** port, and is switched under software control by the YT-1200's microprocessor. The firmware of the YT-1200 makes it seem transparent to the computer user; if you use a computer to control your transceiver, plug the cable from the PC into this port instead of the **CAT** jack on the back of the transceiver.
- **Radio** connector: This 9-pin DB-9 jack connects to the radio's **CAT** jack. During tuning the YT-1200 controls the PTT, power level, and operating mode via CAT commands sent to the transceiver. The YT-1200 also reads the operating frequency directly from the transceiver for storing and retrieving tuning memory data.
- **Power** connector (DC coax jack): Connect to 12VDC supply capable of supplying at least 500 mA. Center pin is positive, 2.5 x 5.5 mm. The tuner is powered by the radio when used with the provided IC-450 interface cable.

Installation

Overview

Your YT-1200 is not water resistant; keep it dry.

The YT-1200 tuner is designed for indoor use only; it is not water resistant. If you use it outdoors (Field Day, for example) you must protect it from rain. The YT-1200 is designed for use with coax-fed antennas. You may need a balun to use your YT-1200 with longwires or antennas fed with ladder line. Either the LDG RBA-4:1 or RBA-1:1 is ideal, depending on the antenna and transmission line used.

Turn your radio off before you install the tuner.

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.

Your YT-1200 tuner is compatible with the following Yaesu HF transceivers:

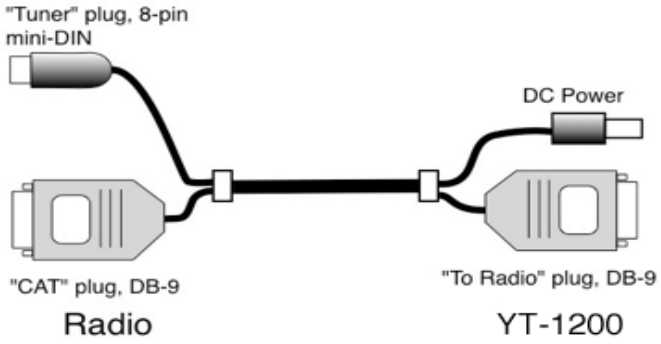
- FT-450 and 450D
- FT-950
- FT-991 and 991A
- FT DX 1200
- FT DX 3000

The YT-1200 radio interface cable will not work with any other radios.

WARNING: Do not attempt to use the YT-1200's radio interface cable with any other transceivers, even if the plugs fit. At best the YT-1200 simply won't work with other radios. At worst it could damage the tuner, the radio or both.

The YT-1200 is supplied with the IC-450 radio interface cable. Each end has two connectors. On the radio side, the round 8-pin mini-DIN connector goes to the radio's **TUNER** jack, and the DB-9 connector goes to the radio's **CAT** jack. On the tuner side, the round coaxial power connector goes to the tuner's **Power** jack, providing 12 volts dc to the tuner, and the DB-9 plug goes to the tuners' **Radio** jack. Connect the **ANT** jack on the radio to the **Tx** jack on the back of the YT-1200.

The radio powers the tuner (except for the FT-2000, which requires an external power supply).

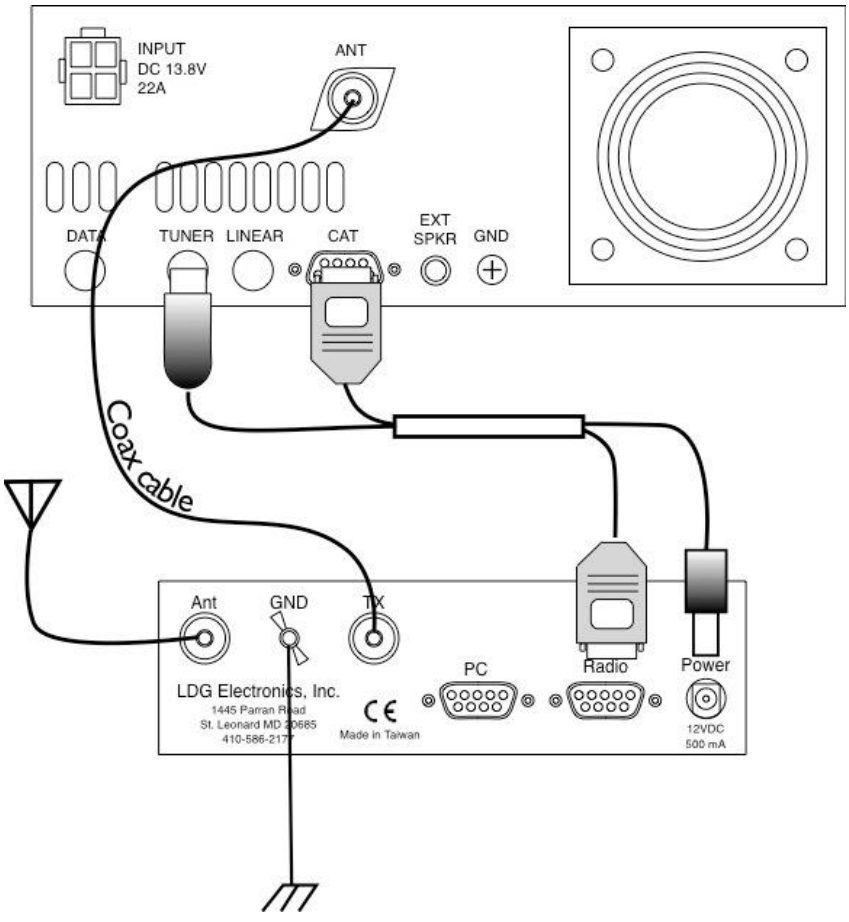


You may optionally connect an RS-232 cable between the **PC** jack on the tuner and your PC for computer control of the radio; this cable is not included.

Connect your YT-1200 to your antenna and transceiver using the shortest practical coax runs.

Grounding the YT-1200 tuner may enhance its performance and safety. LDG recommends 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 a cold water pipe can provide a serviceable ground. LDG strongly recommends the use of a properly installed, high quality lightning arrestor on all antenna cables.

The following illustration shows installation for typical Yaesu radios.



Radio Configurations

Set your radio according to these instructions.

Radio configuration varies slightly from model to model. These recommended settings are referenced from a full reset of the radio with all settings at default. See your radio's operating manual for reset information. You can use any standard Yaesu baud rate (4800, 9600, 19,200, 38,400), any TOT setting (10, 100, 1000, 3000) and any RTS setting. Note: setting the TOT to 3000 may cause longer power up configuration time for the tuner/radio combination.

FT-450 and 450D

There are no menu settings.

FT-950

There are no menu settings.

FT-991 and 991A

Quick info: Set Menu 28 – GPS/232C to RS-232C.

Details: Press Menu/Setup button momentarily to engage the menu display on the bottom half of the display. Scroll using the MULTI knob and scroll to menu 028 labeled GPS/232C SELECT. Press the Select button on the touch screen. Turn the MULTI knob clockwise until the selection is RS-232C, then press the Enter button on the touchscreen.

Press the back button on the touch screen to exit menu mode. Turn the radio off and back on to begin using the tuner.

FTdx1200

There are no menu settings.

FTdx3000

There are no menu settings.

Operation

Power-Up

Your YT-1200 is powered by your radio.

The YT-1200 is powered by the transceiver. When the YT-1200 is first powered on with your radio, the **Status** LED will come on as it checks the communication to the radio. This may take a few seconds the first time, but will store the settings for that radio. If the setting for the CAT port are changed, the tuner will automatically re-read the settings and then store the new setting.

If the tuner fails to detect the radio, check for the following problems: an improperly seated CAT cable, a damaged CAT cable, a blown CAT fuse, or plugging the CAT cable into a radio other than those supported by the YT-1200. If none of these correct the problem, try turning the radio and tuner off and back on again. If none of those work, try a full reset of the radio.

Basic Tuning Operation

You can start a tuning cycle using the front panel TUNE button.

The YT-1200 is operated from the front panel **Tune** button on the YT-1200. Two types of tuning cycles are available; a memory tuning cycle and a full tuning cycle.

The **memory tuning cycle** restores parameters stored after a previous successful tune on the currently selected frequency. The tuner then checks to see that an acceptable SWR match is found. If no memory match is found, the tuner will then perform a full tune.

Your YT-1200 saves tuning parameters so it can tune instantly when you return to that frequency.

A **full tuning cycle** "starts from scratch" and begins a tuning sequence in which the YT-1200 rapidly tries varying combinations of inductance and capacitance values, and then zeroes-in on the best match possible. If an acceptable match is found, the inductance and capacitance settings are saved in a memory associated with the frequency so that they may be recalled quickly in the future via a memory tuning cycle.

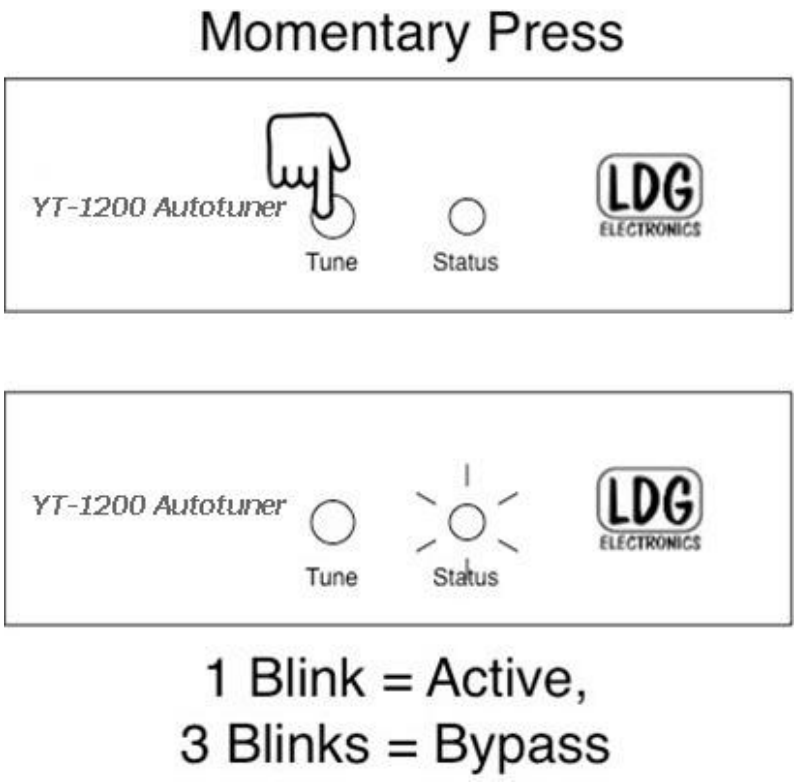
In this manner the YT-1200 "learns"; the longer you use it, the better it adapts itself to the bands and frequencies used, and the characteristics of your antenna. Most users will probably use memory tuning most of the time; it takes advantage of any saved tuning settings, but automatically defaults to a full tuning cycle if no stored data is available.

In both cases, at the end of the tuning cycle the carrier is held for about two seconds after tuning is complete so that the final SWR may be read on the transceiver's internal SWR meter or another inline SWR meter, and the front panel LED will indicate the status of the tuning cycle.

Toggle Bypass Mode:

Press the Tune button momentarily to toggle between active and bypass modes.

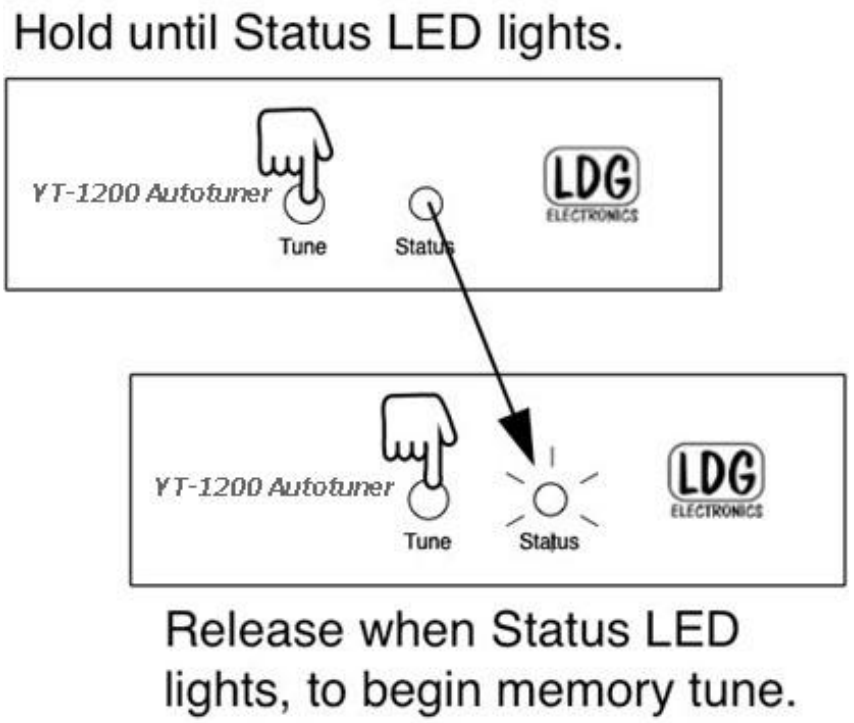
To toggle between active and bypassed mode, press the front panel **Tune** button on the YT-1200 momentarily. The **Status** LED will flash three times to indicate that the tuner is in bypass mode. Press the front panel **Tune** button momentarily again to place the tuner in active mode and recall the previous tuner settings. The **Status** LED will flash once to indicate that the tuner is no longer bypassed. This function may be useful if you wish to compare antenna performance with and without the benefit of the tuner's matching network.



Memory Tuning Cycle

Memory tuning is the default mode; you'll probably use it most of the time.

To initiate a memory tuning cycle, press and hold the **Tune** button on the front of the YT-1200 until the **Status** LED lights, then release; a memory tuning cycle will begin. The YT-1200 will set the mode, change the power level to one that is appropriate for tuning, and key the radio. When tuning is complete, the transceiver will return to the operating mode and power level previously set. You will notice that the radio toggles between VFO A and VFO B before and after a tuning cycle. This is normal; the YT-1200 is determining if the radio is operating in split mode, and acting accordingly. The YT-1200 will tune under most split conditions, storing the tuning memory information associated with the transmit frequency.

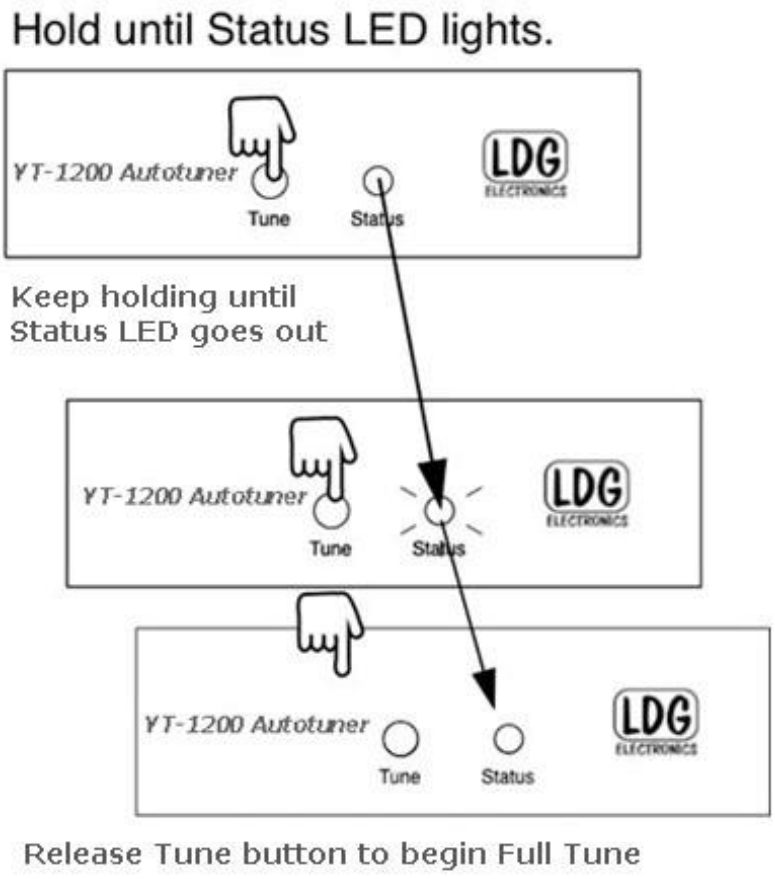


Full Tuning Cycle

You can force a full tuning cycle if needed by pressing and holding the Tune button.

You may need to run a full tuning cycle even when stored parameters are available. For example, you or the elements may have changed some aspect of your antenna, or reoriented it. In that case the stored parameters may not be optimal. Forcing a full tune will cause the YT-1200 to seek a new match regardless of what is already stored in memory for the current frequency.

To force a full tuning cycle, press and hold the **Tune** button on the front panel of the YT-1200 until the **Status** LED lights up, and keep holding until the **Status** LED goes out again. Release the **Tune** button once the **Status** LED goes out. A full tuning cycle will begin. When tuning is complete, the transceiver will be restored to its previous operating mode and power level. You will notice that the radio toggles between VFO A and VFO B before and after a tuning cycle. This is normal.



Status LED

The Status LED has multiple functions.

The **Status** LED indicates various operating modes, tuning statuses, and error conditions. The followings table lists the LED status codes and their meaning.

LED Indication	Meaning
Status LED on while tuning.	Tuner is tuning.
Status LED goes out after a tune, then blinks 1 time.	Tuner has completed a tuning cycle; a good SWR match was found.
Status LED goes out after a tune, then blinks 2 times.	Tuning cycle is complete, tuning match is between 1.5:1 and 3.0:1 SWR.
Status LED goes out after a tune, then blinks 3 times.	Tuning cycle is complete, tuning match is greater than 3.0:1 SWR.
Status LED blinks 4 times.	Tuning cycle failed, RF was lost in the middle of the tune.
Status LED blinks 5 times.	Tuning cycle failed, no RF was detected.
Status LED blinks 3 times and repeats.	Communication with radio failed *****.

Tune Button Press Summary

The Tune button has three functions, depending on how long you hold it down.

The tuner's **Tune** button has three functions, depending on length of press:

- Bypass toggle: Short press (0 - 1 second)
- Memory tune: Medium press (1 - 3 seconds)
- Full tune: Long press (more than 3 seconds)

***** If the tuner fails to communicate with the radio, check the interface cable connections and cycle DC power on the radio and tuner.

Application Notes

Mobile Operation

Here are some helpful notes on using your YT-1200.

The YT-1200 is suited for mobile operation. It can be installed under the dashboard along with the transceiver. The only requirement is that the tuner remain dry and is properly grounded.

The supplied radio interface cable is 36 inches long. If you need to position the YT-1200 farther from the transceiver than this cable length allows, you will need to construct a custom cable. This can be accomplished in two ways: cut the supplied cable and solder jumper wires between all the connections, or purchase new connectors and cable to construct a custom-length interface cable from scratch.

The 9-pin CAT interface connector is Kobiconn part number 156-1309T-E, available from http://www.mouser.com/ as Mouser part number 156-1309T-E. Pinout for this cable is one-to-one, straight through; all nine signals are used. Be sure to use a DB-9 hood for the connector as well; this protects against shorts and other damage to the connector.

Tuning On the US 6o Meter Band

FCC regulations require a different tuning procedure in the US 60 meter band.

The YT-1200 tunes in a carrier mode, but in the United States the FCC permits only SSB transmissions in the 60 meter band. Therefore, Yaesu radios may not switch modes but will remain in SSB mode. You can talk or whistle into the mic while in SSB mode and then press the tune button on the tuner. If no audio is present during SSB transmission then no RF will be generated, and the YT-1200 LED may blink a "No RF Was Detected" error.

To tune on the 60 meter band you must key and speak into the microphone while tuning. It will suffice to say "Ahh" for a few seconds while tuning. Be sure to identify your station as required by regulations.

MARS/CAP Coverage

The YT-1200 provides continuous tuning coverage over its specified range, not just in the ham bands. This makes it useful for MARS or CAP operation, or any other legal HF operation.

Operation with a PC / CAT

You can still use PC/CAT control with the YT-1200.

Although the YT-1200 uses the transceiver's CAT port for tuning control, it is designed to also allow the user to continue to use the CAT interface with the transceiver for PC control.

If PC control of the radio is desired, simply connect a 9 pin straight thru female-to-female cable to the **PC** jack on the rear of the YT-1200, and connect to the PC's serial port. The rig control software on the computer and the radio can be set to any baud rate.

The YT-1200 monitors the **PC** port for activity and waits until there is a pause in the PC data before beginning any tuning cycle. When the tuning cycle is complete, it returns control of the CAT interface to the PC.

This procedure is completely automatic and transparent to the user. Simply hook up a PC, and use the rig control software as normal. Press the **Tune** button on the YT-1200 when you want to tune. Some rig control software will detect that the radio is no longer communicating with the PC during tuning. This is normal, and communications with the PC will resume once the tuning cycle is complete.

Note: The YT-1200 must be powered-on to use its pass-through CAT port.

Using Two Antenna Ports

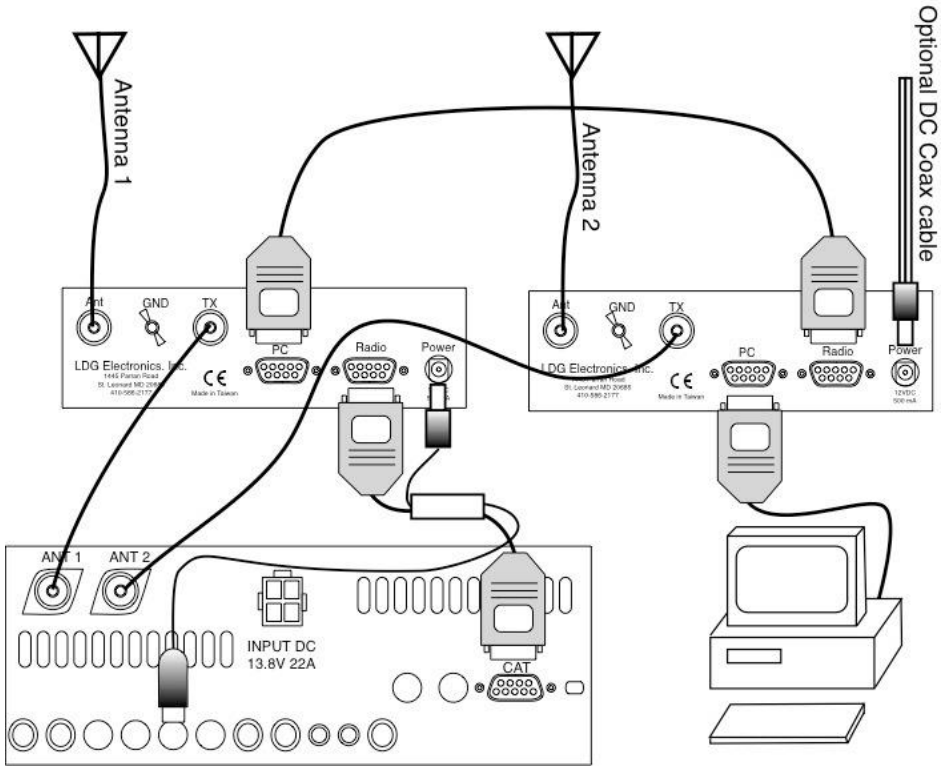
You can use both antenna ports on the radio if you wish by "daisy chaining" two YT-1200 tuners.

Some supported Yaesu transceivers have two antenna ports, selectable via a control on the front panel. It is also possible to set up an "odd split" on the radio where transmission is done on one antenna, and reception on the other. Simply choose different antennas for VFO-A and VFO-B, and then enable split mode.

With a pair of YT-1200 tuners it is possible to use both antenna ports, and have one-button pushbutton tuning for each antenna by "daisy-chaining" the **PC** ports on the two YT-1200 tuners. Just be sure to have the correct antenna selected on the radio when pushing the **Tune** button on the YT-1200 connected to that antenna port.

The advantage of this configuration is that two separate antennas can be used without requiring retuning when switching between them. This is especially useful if a TX/RX split is set up, where TX is on one antenna and RX is on the other. Just be sure to tune both antennas prior to working the split, and the transceiver will automatically switch between TX and RX antennas when you key the radio!

Note that when daisy-chaining a second YT-1200 there is only one TUNER port on the rear of the radio, so there is no place to plug in the second YT-1200's 8-pin mini-DIN connector to provide power to the tuner. The second YT-1200 requires a separate power supply. An LDG power cable or wall plug power supply are available from several dealers, including www.cheapham.com. The DC plug is 2.5X 5.5mm with center positive.



A Word About Tuning Etiquette

Be careful not to interfere with other stations when you tune.

Be sure to use a vacant frequency when tuning. With today's crowded ham bands this is often difficult. However, causing interference to other hams should be avoided whenever possible. The YT-1200's very short tuning cycle minimizes the impact of tuning transmissions.

Care and Maintenance

The YT-1200 tuner is essentially maintenance-free. You should always strictly observe the power limits specified in this manual. The outer case may be cleaned as needed with a soft cloth slightly dampened with household cleaning solution. As with any modern electronic device, the YT-1200 can be damaged by temperature extremes, water, impact, or static discharge. LDG strongly recommends using a good quality, properly installed lightning arrestor in the antenna lead.

Technical Support

Email if you have questions or need help.

Technical support is always available by e-mail (support@ldgelectronics.com). We've placed answers to common questions in the FAQ section of our web page. LDG also keeps up to date product information on our web site, including product manuals if you need a replacement. When you consider buying another LDG product, our website has complete specifications and photographs you can use to help make your purchase decision. There are also links to all of the quality LDG Dealers who are ready to help you make your purchase decision.

Two-Year Transferrable Warranty

Your two-year warranty is transferable if you sell or give your tuner to someone else.

Your LDG product is warranted against manufacturer defects in parts and labor for two full years from the date of purchase. This two-year warranty is transferable; when you sell or give away your LDG product include the original sales receipt, and the two-year warranty goes with the product to the new owner. There is no need to complete a warranty card or to register an LDG product; your receipt establishes eligibility for warranty service, so be sure to save it. Include a copy of your receipt whenever you send your product to LDG for warranty repair. Products sent to LDG without a receipt are considered requests for out-of-warranty repair. The warranty does not cover damage or abuse; a failure caused by the customer or by an act of nature (e.g. lightning), as determined by LDG, is not covered under the two-year warranty. Damage can be caused by failure to observe the product's published limitations and specifications, or by not following good Amateur practice.

Out of Warranty Service

We'll be happy to fix your tuner even if it's out of warranty.

LDG will repair your product even after the warranty has expired; a reasonable fee will apply. We will troubleshoot the problem, and based on your instructions either contact you with an estimate, or fix it and bill you for any repair charges. Check our web site for the latest information on obtaining out of warranty service.

Returning Your Product For Service

Pack it carefully, include your receipt for warranty service, and ship it to us; no RMA is required.

LDG does not require a return merchandise authorization, and there is no need to contact LDG before returning your product. Download the LDG Product Repair Form from our web site. On the Repair Form, describe the problems you're experiencing. Our technician will attempt to duplicate the problems that are describe, so please be accurate and complete. LDG recommends using a shipper that provides a tracking number. Include your email address so our return shipper can alert you when your product is en-route back to you. Repairs can take six to eight weeks, but are often faster. The most current information on returning products for service is found on the LDG website under the Support menu item, then under the Tech Support sub-menu.

Send your carefully packaged unit with the Repair Form and a copy of your receipt to:

LDG Electronics, Inc.
Attn: Repair Department
1445 Parran Rd
St. Leonard, MD 20685

Product Feedback

We love to hear from our customers.

We encourage product feedback; tell us what you think of your LDG product. In a card, letter, or email (preferred) tell us how you used the product, how well it worked in your application, and any suggestions you have for enhancements or new products. Send along a photo or even a schematic or drawing to illustrate your narrative. We like to share your comments with our staff, our dealers, and even other customers on the LDG website:

http://www.ldgelectronics.com/

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