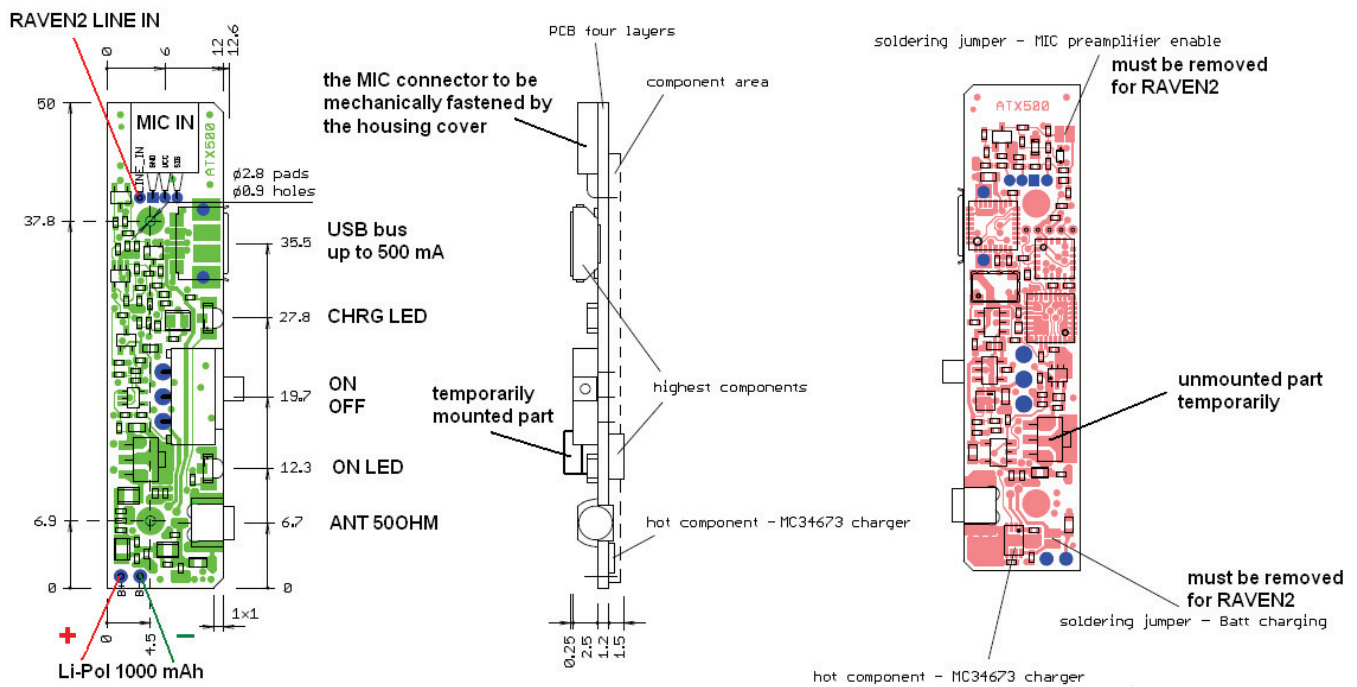


ATX502

Audio NFM transmitter module - PLL tunable

version 2



1. ATX500 Specification

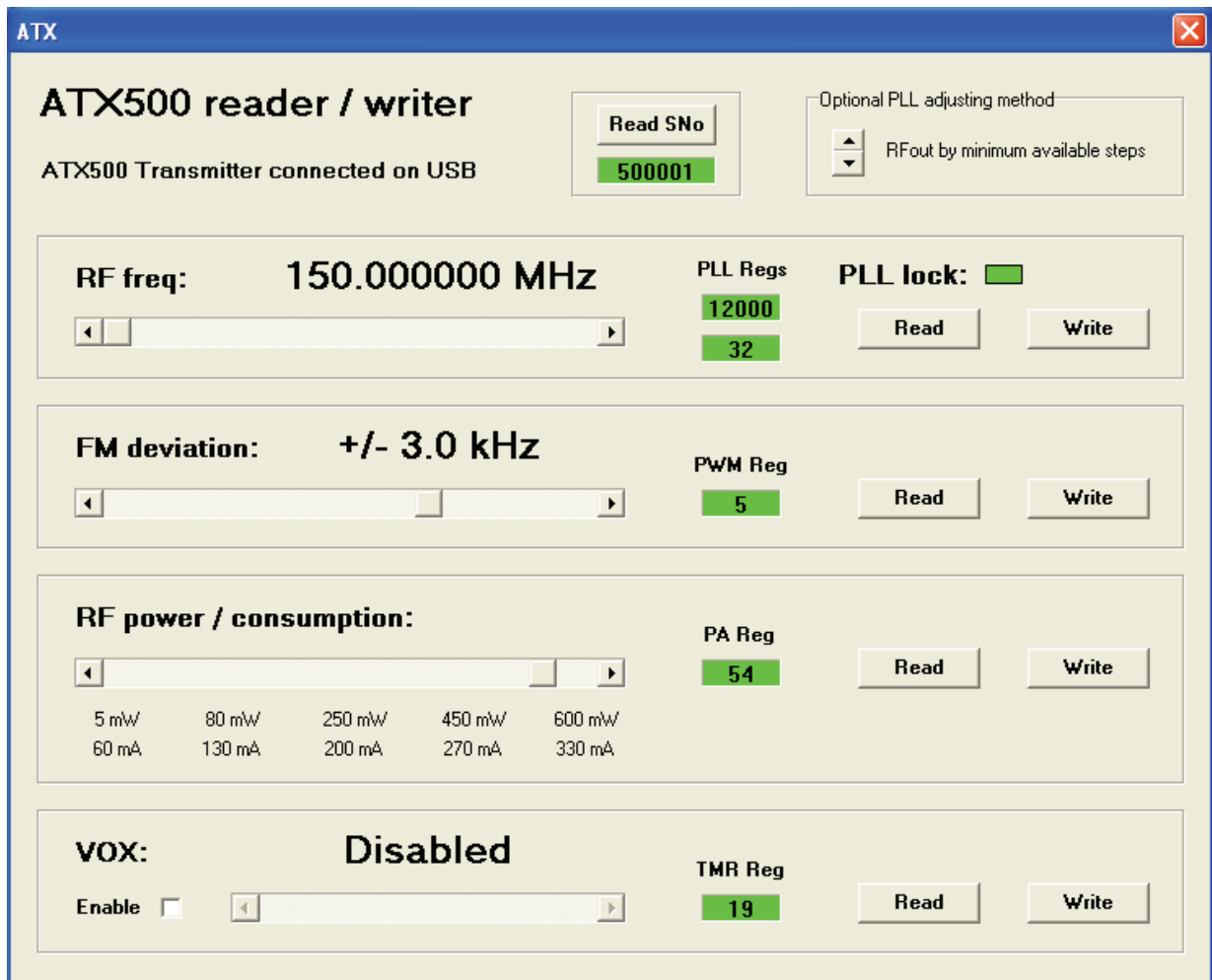
| | |
|---------------------|--|
| Supply Voltage | 3 to 4.2 VDC from Li-Pol battery, automatic undervoltage lock-off under 2.9 VDC saving a battery lifetime 5 VDC from USB |
| Supply Current | 310 mA from Li-Pol battery – during transmitting, independent on a supply voltage or antenna movement 0.3 mA from Li-Pol battery – in VOX mode during waiting 0.015 mA from Li-Pol battery during undervoltage lock-off up to 0.001 mA from Li-Pol battery during the switch is OFF up to 470 mA from USB during charging and transmitting 12 mA from USB if not charging or transmitting |
| PLL Freq Range | 150 – 175 MHz version (315 - 355 MHz on special request) |
| PLL Freq Step | 12.5 kHz in VHF band, 25 kHz in UHF band |
| Frequency Stability | +/- 1 ppm within case temperature range -10°C to +70°C, aging up to +/- 1 ppm per year |
| RF Power @ 50 Ω | 3.0 VDC: 400 mW 3.6 VDC: 500 mW 4.2 VDC: 600 mW |
| RF Spurious | - 65 dBc harmonics (max), - 55 dBc other products (max) |
| NFM Modulation | Selectable FM Deviation from +/- 1.5 kHz to +/- 5.4 kHz (peak value masured with 1 V p-p, 1 kHz burst, on LINE IN) |
| Audio response | 300 Hz - 3.5 kHz (-3dB) with 6 dB/octave Preemphasis Additional empirical preemphasis, optimized for best speech |
| Audio Input | MIC: 1.5 to 30 mV p-p (AGC range) LINE: 0.1 to 3 V p-p (AGC range) |
| AGC circuit | Fast automatic sound level control, optimized for speech, always operating |
| VOX function | Selectable Timeout from 0 to 10 minutes in 32 steps, or Disabled (continual transmitting) |
| USB Interface | FT232R circuit used, DLL Windows driver |
| Li-Pol charging | Linear constant voltage / constant current method, the green LED is shining during charging Via USB bus from PC, or from general wall mount AC adaptor equipped by USB 5 V / 500 mA output at least |
| Dimension | Transmitter: 50 x 12 x 5.5 mm (1.97" x 0.47" x 0.22") |
| Temp. range | -10°C to +80°C on the PCB protection above +100°C on the PA - RF power limitation |

2. USB driver installation

- A driver must be installed firstly. The USB device **ATX500** please do not connect into the computer port meanwhile !!!
- Installation in the WindowsXP, WindowsVista and Windows7 systems seems nearly the same. Therefore the following installation manual is mentioned just for the XP version.
- The driver can be installed from delivered CD or there is also possible to download a latest DLL driver from the <http://www.ftdichip.com/Drivers/D2XX.htm> website. We recommend to prefer the **Setup Executable** option on the right side of the page, because installation is easier by this way.
- Please Run the **CDM20814_Setup.exe** file on the delivered CD or choice a latest downloaded version from website. The driver will install itself within few seconds and a DOS system window can be shown momentarily. This window automatically disappears after install termination.
- Now, please connect the **ATX500** device into the PC. It can be switched-off. Further action continues automatically. The Plug And Play message shows up, that the new hardware was found – **ATX500 Transmitter**. Please wait until some final message is shown, e.g. – “New hardware is installed and ready to use”.

3. Controlling Window

- Firstly, we recommend **remove the antenna** from the transmitter, to avoid of any potential interference to the USB interface, mouse, computer, monitor, etc... Otherwise, some of mentioned devices can be **unstable or totally dead during programming !!!** A dummy 50 Ohm load instead of the antenna is not required.
- It is assumed that the USB driver has been installed correctly and the **ATX500** transmitter is connected to the computer and **switched-on** by the **ON-OFF switch**.
- Now, Run the **ATX500_150-175.exe** file placed on any computer drive or folder. The software is compatible and tested on Windows XP, Vista or 7 systems. The **ATX500** device USB Interface can be disconnected from PC and connected again. No any application restart is required in such case.
- You can click on **Reads** step by step - **it is equal to download from the device**. Registers on the screen will be updated from the real ATX500 transmitter. Values filled by green color are shown after that.
- You can click on any **Write** - **it is equal to upload to the device**. The value actually shown is uploaded to the device and is stored in the nonvolatile EEPROM inside. Values filled by green color are shown after that.



4. Parameters Description

- **RF frequency** can be simply changed in **12.5 kHz steps** by the Scroll Bar. An optional adjusting method is presented on the window top right. This method changes not only the main N divider of the PLL, but it changes N and R dividers both together. A finer frequency step can be achieved by this method.
- **FM deviation** can be adjusted in **7 steps** within a range from **+/-1.5 to +/-5.4 kHz**. The **3 kHz** value is always recommended, except of audio listening on some special receivers with very narrow IF-band or vice versa.
- **RF power** and corresponding **DC current consumption** can be adjusted in **59 steps**. Best transmitter efficiency (RF power per DC power consumption) is achieved around **500 mW** of RF power, which is the optimal value according to design. If you need lower output power, a worsened efficiency must be taken into account, of course.
- **The VOX function** can be **Enabled** or **Disabled**. If the function is Disable, the transmitter is passing into continual transmitting mode, irrespective of the sound level. In case of Enable the device will be awoken from sleep only on acoustic stimulus. User can optionally change the **VOX-Timeout from 0 to 10 minutes** in 32 steps. The Timeout means the remaining time after an acoustic stimulus away, during which the device is still transmitting. A shorter Timeouts are good for body worn applications. A long Timeout in minutes is predestined for covert mounting in case of a room monitoring with rare or silence talk activity.

5. Notes

The ATX500 transmitter can be programmed or operate from USB supply without presence on a Li-Pol battery on the pins. But just only a VOX mode can falls into the improper operation due to charger pulsation on a supply bus.

The USB cable from the ATX500 Transmitter can be disconnected and connected again whenever, except of the short term data transfer during Read or Write sequence. There is no any self-running data transfer meanwhile.

Do not insert any USB-hub between PC and ATX500 device !!! Please keep in mind up to 500 mA current passing through the 5 V USB bus.

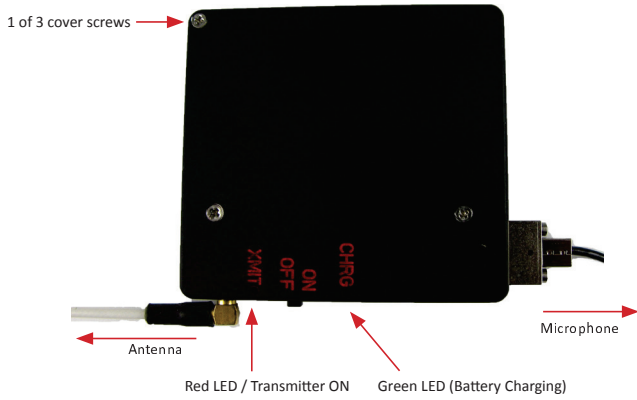
If the ATX500 transmitter is switched-off, the USB interface is still functional, because it is supplied from the USB bus. But, the register field stays in white color after click on a button, due to missing data response from the ATX500 controller.

If you see a red color value after click on any button, something is wrong. The USB interface is not operating properly in such case.

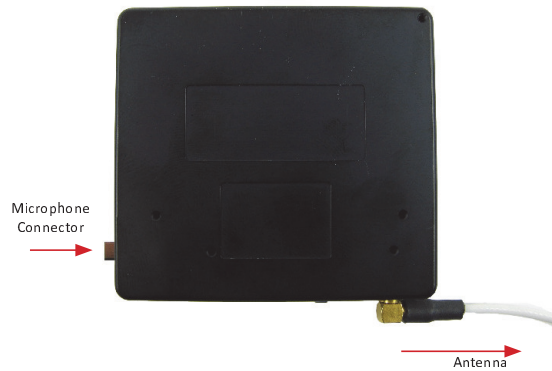
First production series will be equipped by two PA transistors in parallel connection soldered together by a hand made mounting. Such solution has been chosen additionally to avoid of parasitic RF oscillations during antenna movement. This problem will be investigated in a future. For now, a sufficient mechanical space has to be stipulated or milled to the housing cover.

TX-502 TRANSMITTER

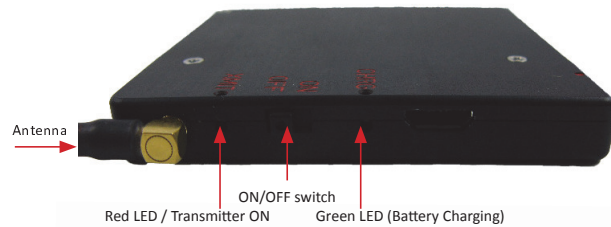
Top View



Bottom View



Side Views



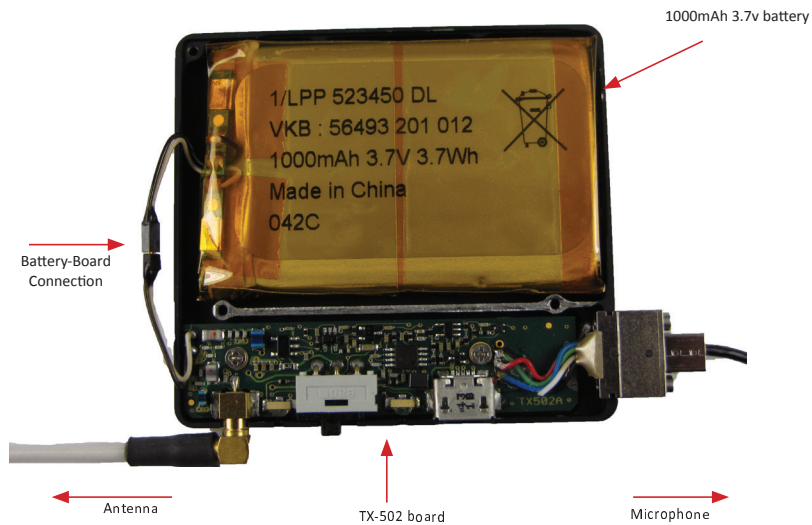
Adaptive Digital Systems, Inc.

20322 S.W. Acacia St., Newport Beach, CA 92660

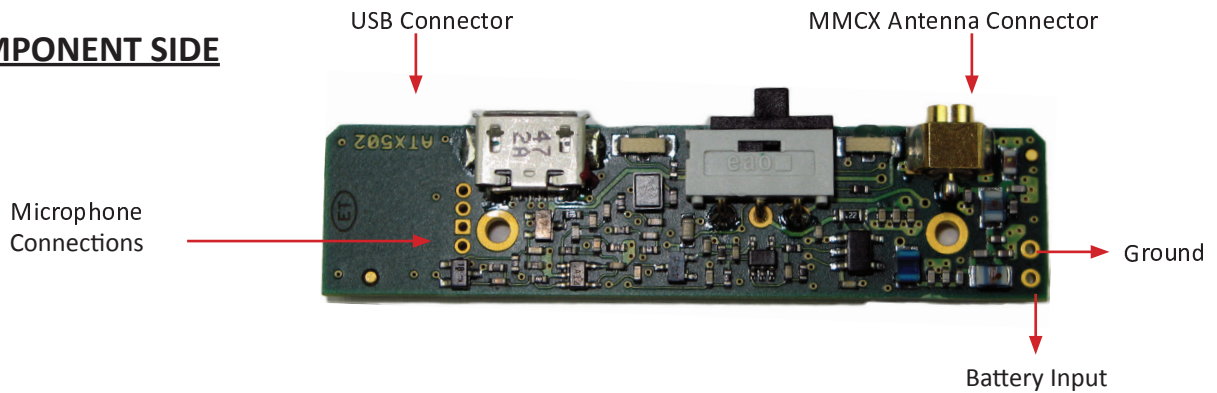
(p) 949-955-3116 (f) 949-955-3108 www.AdaptiveDigitalSystems.com

TX-502 TRANSMITTER

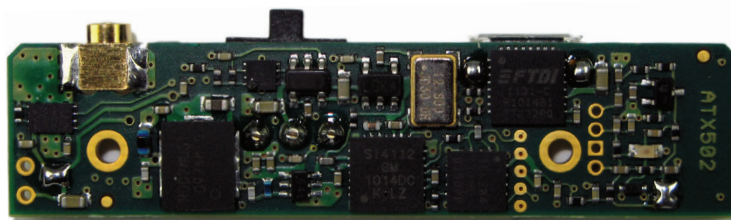
INSIDE CHASSIS VIEW



COMPONENT SIDE



SOLDER SIDE



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TX-502 TRANSMITTER

MODEL NUMBER -ADS-TX502
FCC ID : PYK-ADS-TX502
(see page 9 for Rf exposure training info.)
This device is for occupational use only.
Refer to owner's manual for specific operating requirements



Shown actual size



Adaptive Digital Systems, Inc.
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TX-502 TRANSMITTER

CHARGING THE TX-502

THE TX-502 MUST BE CHARGED BY CONNECTING THE DEVICE TO A LAPTOP'S USB PORT USING THE SUPPLIED CABLE .

REQUIRED FCC STATEMENTS: PART 15.19, 15.21, 15.105.

The details as:

15.19:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

15.21:

Caution: Any changes or modification to the equipment not expressly approved by Adaptive Digital Systems, Inc. could void your authority to operate this equipment.

15.105:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

RF EXPOSURE TRAINING INSTRUCTIONS FOR OCCUPATIONAL / CONTROLLED ENVIROMENT (KDB 4447498):

Compliance with RF Energy Exposure Standards:

NOTICE: This transmitter is intended for use in occupational/controlled applications where users have been made aware of the potential for exposure and can exercise control over their exposure. This transmitting device is NOT authorized for general population, consumer.

Federal Communication Commission (FCC) Regulations:

The FCC has established limits for safe exposure to radio frequency (RF) emissions from portable transmitters. The FCC requires manufacturers to demonstrate compliance with RF exposure limits before portable two-way radios can be marketed in the U.S. When transmitters are approved for occupational/controlled environment exposure limits, the FCC requires users to be fully aware of, and exercise control over, their exposure. Awareness and control of RF exposure can be accomplished by the use of labels, or by education and training through appropriate means, such as information and instructions in user manual. Your ADS transmitter has an RF exposure information label on the outer case. This user safety page includes useful information about RF exposure and helpful instructions on how to control your RF exposure.



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TX-502 TRANSMITTER

Your ADS transmitter is designed and tested to comply with the national standards and guidelines (listed below) regarding human exposure to RF electromagnetic energy. This transmitter complies with the IEEE (FCC) and ICNIRP exposure limits for occupational/controlled RF exposure environments at usage factors of up to 100% talk. In terms of measuring RF energy for compliance with FCC exposure guidelines, your transmitter radiates measurable RF energy only while it is transmitting.

Your ADS transmitter complies with the following RF energy exposure standards and guidelines:

- United States Federal Communications Commission, Code of Federal Regulations.

Compliance and Control Guidelines and Operating Instructions for Portable transmitter:

To control your exposure and ensure compliance with the occupational/controlled environment exposure limits, always adhere to the following procedures:

- Transmit no more than 4 hours at a time. To transmit (talk), turn on the transmitter using the on/off switch.

Transmitting 4 hours at a time or less is important since the transmitter generates measurable RF energy exposure only when transmitting (in terms of measuring standards compliance).

For body-worn operation, always place the radio in a body harness or a pouch.

Specific Absorption Rate (SAR) : What It Means For You

There is considerable confusion and misunderstanding about the meaning of the maximum reported Specific Absorption Rate (SAR) values for transmitters (and other wireless devices). SAR is a measure of the rate of RF (radiofrequency) energy absorption by the body from the source being measured – in this case, a transmitter. SAR provides a straightforward means for measuring the RF exposure characteristics of transmitters to ensure that they are within the safety guidelines set by the FCC.

Many people mistakenly assume that using a cell phone with a lower reported SAR value necessarily decreases a user's exposure to RF emissions, or is somehow "safer" than using a transmitter with a high SAR value. While SAR values are an important tool in judging the maximum possible exposure to RF energy from a particular transmitter, a single SAR value does not provide sufficient information about the amount of RF exposure under typical usage conditions to reliably compare individual transmitters. Rather, the SAR values collected by the FCC are intended only to ensure that the transmitter does not exceed the FCC's maximum permissible exposure levels even when operating in conditions which result in the device's highest possible – but not its typical - RF energy absorption for a user.

ADS transmitter tx-502 meets the Specific Absorption Rate required by the FCC



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