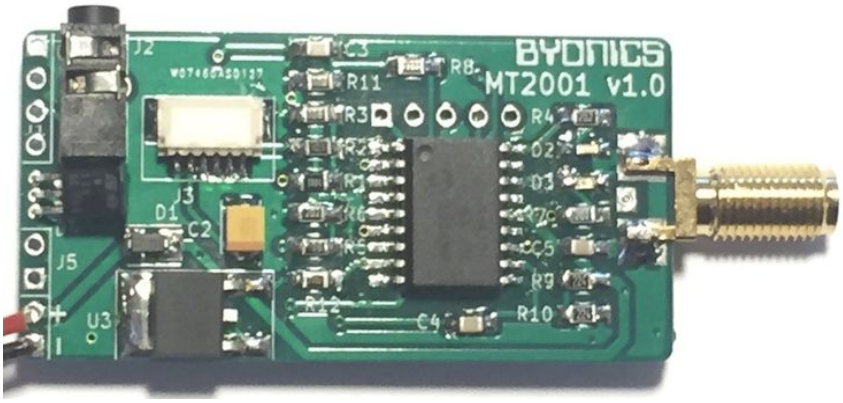
MicroTrak-2001 Manual

Version 0.3 – November 19, 2018

Overview



The Micro-Trak 2001 (MT-2001) is a 2-meter, frequency agile, 2-watt miniature APRS (Automatic Position Reporting System) transmitter designed primarily for high altitude balloons and other applications requiring mid-power transmitters with minimal size and weight. The MT-2001 replaces the somewhat larger and heavier MT-2000, measures only 1” X 2” (excluding SMA) and weighs less than one ounce.

The MT-2001 is based on the Byonics TinyTrak3 controller. It may be ordered pre-configured, however programming cables are available for the end user to change the configuration at any time. The Windows TinyTrak3 Configuration program version 1.4.6 may be downloaded for free from the Byonics website. SMA Antenna and GPS are not included. The MT-2001 is capable of power output in excess of 2 watts which should allow extremely long air-to-ground ranges, but may not be optimal for all terrestrial applications.

Power Supply

The MT-2001 requires external power of between 7.2 and 12 volts DC and 800 mA to the J4 pads. It includes wire power leads in the form of a 9 volt battery wire clip lead, however a typical 9 volt battery is not adequate for this transmitter. A 2 or 3 cell LiPo battery, or a 6 alkaline AA battery pack (9 volts) should work well for ground and low altitude operations. For high altitude operations, we recommend ONLY Energizer “Ultimate Lithium” AA batteries in either the 6 or 8 pack cartridges (9 or 12 volts).

GPS

Connector J3 allows uses of a Byonics GPS receiver module, but any 4800 or 9600 baud, NMEA-0183 compatible serial GPS may be used. If the MT-2001 will be used with a high altitude balloon, be sure to get a high altitude capable GPS, such as the Byonics GPS5HA Module, as many GPS receiver are capped at 60,000 feet. J1 and J2 can also be used to connect a GPS. Both TTL and RS-232 GPS are supported.

Configurations

Like most TT3-based products, the MT-2001 is capable of storing two independent operation profiles, which are entered during the computer configuration process. A optional SPST switch can be connected to J5 to manually select the desired the configuration.

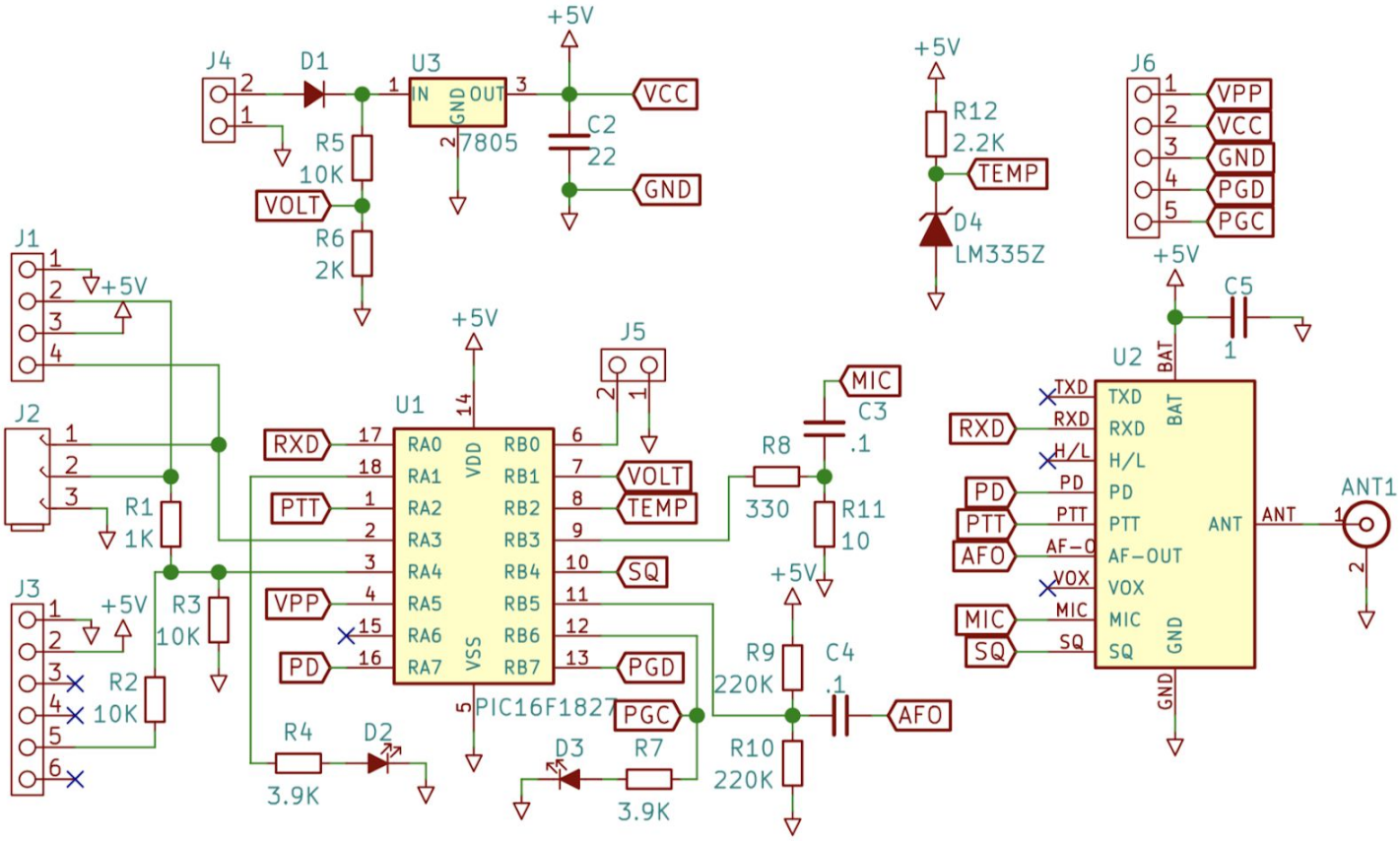
RF Output Connector

The MT-2001 uses a female, edge-mounted SMA connector for the RF output, and is very flexible in the type of antennae it will accept. The need for antenna gain typically increases with proximity to the ground. For high altitude balloon applications, we recommend the Byonics V6, a center-fed, half-wave dipole antenna. Use care when inserting mating connectors into the SMA connector, as off-axis insertion can easily cause bent pins and damage the MT-2001. Avoid regularly connecting and disconnect an antenna, as SMA connectors have a connection life cycle. Do not place any significant strain on the SMA connector.

LED Indicator

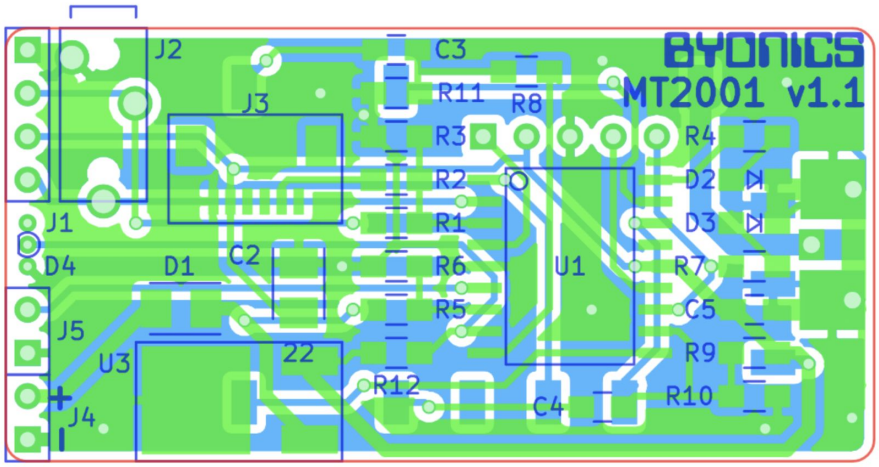
The MT-2001 has two LED's to report on the unit's status: a green LED for GPS status, and a red LED for transmit. There is no "power on" indicator per se. Both LEDs will flash on powerup. If they flash continuously, the unit is resetting, typically due to low battery voltage level or poor antenna with high SWR. Shortly after applying power, the MT-2001 will send an initial ID packet and the red LED will light during this transmission. When the MT-2001 recognizes a GPS signal, the green LED will begin to flash. Once the GPS acquires valid position data, the green LED will light solidly, and the MT-2001 will transmit a position packet.

Schematic



PCB

J1 - Ground, serial in, VCC, serial out
J2 - 2.5mm serial programming jack
J3 - GPS module connection (tip=serial out, ring=serial in, sleeve=ground)
J4 - 7-12V DC power input
J5 - Config bank selection switch



Specifications

Size	2.6”x1”x0.25” including RF connector
Supply voltage	7 - 12VDC
Current, standby	20 mA
Current, transmit	780 mA
RF Output	2 Watts @ 9 VDC
Weight	0.4 Ounces