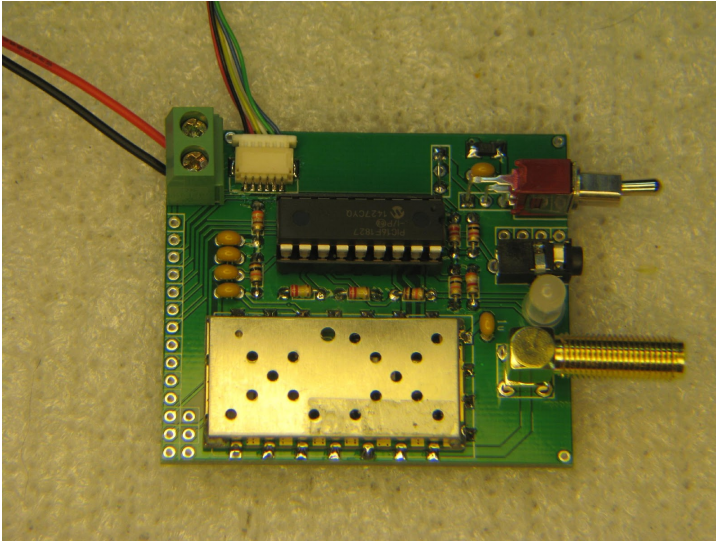


Byonics Micro-Trak 1000 High Altitude Balloon Tracker



The Micro-Trak 1000 (MT-1000) is a high altitude balloon (HAB) tracker. It is usually sold as a combination to provide a simple, turn-key tracking transmission solution designed primarily for high altitude balloons and other line-of-sight tracking applications. The transmitter produces nominally 1 Watt of RF output power, when powered with 3 AA batteries. This is a frequency agile transmitter capable of operating anywhere in the two meter ham band (144 - 148 MHz) and programmed in 5 KHZ steps. Deviation is factory set to 3.5 KHZ and is not adjustable. The MT-1000 HAB tracking combination kit includes the MT-1000 transmitter board (Not encased to minimize weight), The

Byonics GPS4OEM (not encased) high-altitude GPS receiver and mating cable, 3XAA battery enclosure with power switch, and the Byonics V6 center-fed half wave dipole antenna with one meter RF coaxial cable. The MT-1000 is designed to be a “bare bones” tracking transmitter. Typical operational times with Energizer “Ultimate Lithium” brand AA batteries and a two minute transmission interval, is not more than three days.

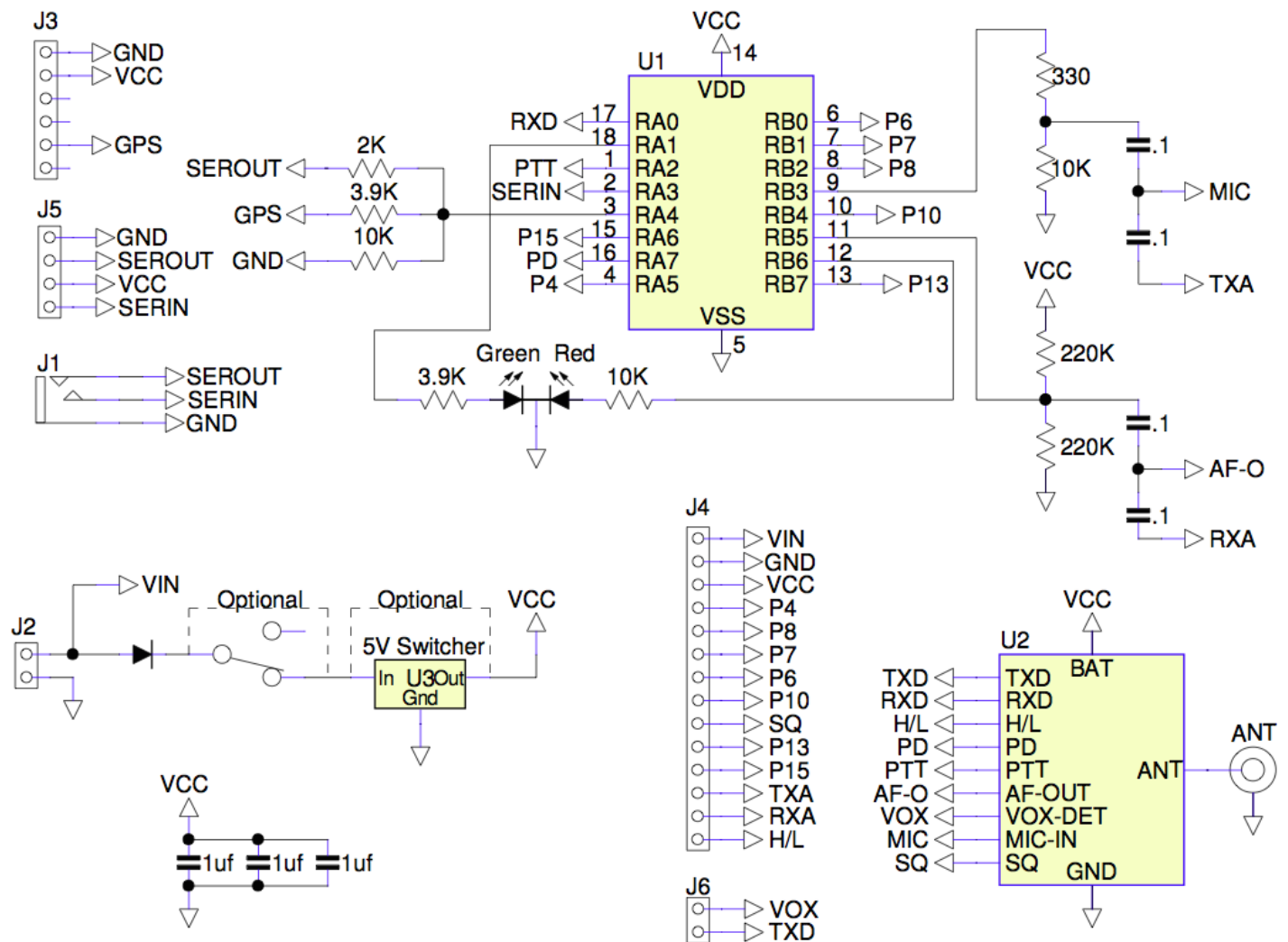
Features

Dimensions	2.2 X 1.9 inches, not including the SMA RF connector which overhangs the end of the board by .54 inches.
Weight	Transmitter: Less than .9 ounce 3 AA battery enclosure: 1 ounce, empty GPS4 OEM receiver and cable: .8 ounce V6 antenna: .4 ounce 1 meter RG-174u SMA patch cable: .6 ounce
Programming Input	Kenwood compatible 2.5mm 3 conductor cable (Not included) Byonics offers these cables optionally as both standard serial and USB types. See www.byonics.com
GPS Input	6 pin, 1mm connector for Byonics GPS4OEM receiver. The GPS receiver is continually powered as long as power is applied to the MT-1000, but inserting a programming cable will over-ride GPS for programming without having to remove the GPS. The GPS4OEM receiver is rated to function at altitudes up to 84KM.
Power input	Two pin screw terminal. 4.5 to 5 Volts DC. DO NOT EXCEED 5 VOLTS INPUT!
Current	At 4.5 Volts, the MT-1000 draws nominally 30 mA in standby mode, most of which is assigned to GPS functions. During transmissions, typically lasting 300 to 1000 ms, the total consumption is approximately 620 mA. Power output and current draw will increase with a supply voltage of not more than 5 Volts, and will decrease as batteries decay.

Firmware	<p>The MT-1000 is loaded as provided with a special version of the Byonics TT3 Firmware. The firmware may be re-written by the end user as updates or special functions become available. These may include versions of other Byonics firmware (I.e, Fox, Wx-Trak, etc)</p> <p>The MT-1000 will not function with firmware versions from other Byonics products, which could potentially damage the device. Software and Firmware for the MT-1000 will be designated as “Omega” line products to distinguish them from other Byonics and Micro-Trak Products.</p>
Configuration	<p>Configuration software for all Byonics firmware is available free for download from the Byonics website. The Configuration program for the MT-1000 is proprietary to the MT-1000 and is not compatible with other Byonics products. The MT-1000 HAB combination will ordinarily be shipped pre-programmed to the customer’s specifications. Note that the transmitter must have power supplied during configuration programming or loading new firmware. Also note that not every feature available in the configuration software menu is available in the MT-1000.</p>
Antenna	<p>The V6 antenna is a center fed, half-wave dipole measuring approximately one meter in length. The elements are spring steel wire. Note that this type of antenna will exhibit approximately 5 dB of gain over a standard ¼ wave whip, nearly quadrupling the effective radiated power of the transmitter. This antenna is a “free-space” antenna, and will not work inside of a car or metal enclosure. For optimal performance, the element connected to ground (Closest to the word “Byonics on the antenna PCB) should be oriented towards ground with the antenna polarized vertically. The antenna should be mounted to the payload with a short boom, using the supplied threaded SMA connector. Excess coaxial cable should be rolled into a 2 inch (nominally) roll as close to the antenna as possible to act as a balun. This will help prevent the coaxial cable as acting as part of the radiation element, lower SWR, and help prevent RF from interfering with other electronic applications on your payload. For Ground-testing, the antenna should be held at arm’s length or set away from humans and other objects. Do not touch the antenna elements during transmission. Do not short the antenna elements together: Even though it may be shipped to you rolled into a loop to fit into the mailer, operating the transmitter this way may potentially destroy your transmitter. NEVER operate the transmitter unless it is connected to an antenna or 50 Ohm Dummy Load! (Really, don’t do that. It’s bad...)</p>
Batteries	<p>For airborne or more mission critical applications, we recommend using three Energizer “Ultimate Lithium” batteries, which are cold weather tolerant, have significantly higher energy density than batteries of other chemistry, and are roughly 1/3 the weight of Alkaline batteries. Other batteries are fine for ground testing or low altitude, temperate weather operation.</p>
External Power	<p>The unit may be powered externally from your well regulated supply source of not more than 5 Volts. Note that the PC board contains a location in which a Murata switching regulated power supply may be installed. This is for applications in which your only available power bus is greater than 5 Volts. These regulators are available as special order parts. Power may be supplied via the two terminal screw block, or optionally, through the auxiliary connection pin holes at the bottom of the board. Note that external power should not be applied through the external holes while the unit is connected to the AA battery pack.</p>

Aux connections	There are a number of holes set on .1 inch (2.54mm) header-format holes. The primary header holes are along the bottom edge of the board, and not all of them will have functions with the APRS tracking transmitter version of the firmware.
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MT-1000 Schematic (OMEGA Board)



Configuration Program

Shown below is a typical configuration used in high altitude balloon launches in North America. You will note that the unit is capable of being programmed with two separate and unique channels. By default, the unit will operate on the primary channel. A pin on the header row can be brought to ground to effect changing the transmitters operating parameters to those set in the secondary configuration. The configuration shown below will transmit the programmed call sign, represented here by "NOCALL" using the Digipath represented in the field marked "PATH" every 120 seconds. The APRS Icon is designated as a balloon by the selection of the symbol and table settings shown below. For a complete explanation of all the functions within the Configuration Program, download the TT3 Configuration Programming Manual from the Byonics website.

The screenshot displays the 'TinyTrak3Config v1.4' window with the 'Primary' tab selected. The interface is organized into several sections: 'Primary/Secondary' tabs at the top; 'Callsign' and 'Path' text fields; 'Symbol' and 'Table' dropdowns; 'Frequency' and 'MHz' fields; a 'Timing' section with 'Auto TXD', 'Auto TX Rate', 'Manual TXD', 'Manual TX Rate', 'Quiet Time', and 'Calibration' settings; a 'Status' section with 'Text', 'Send Every', and 'Send Separate' options; a 'Mic-E' section with 'Enable', 'Message', and 'Path' settings; a 'Time Slotting' section with 'Enable' and 'Offset' settings; a 'SmartBeaconing' section with 'Enable', 'Min Turn Angle', 'Turn Slope', 'Min Turn Time', 'Slow Speed', 'Slow Rate', 'Fast Speed', and 'Fast Rate' settings; a 'Power Switch' section with 'Enable' and a time setting; and a bottom section with 'Configure' (COM3, Read Config, Write Config, Read Version) and 'Test Tones' (Send 1200Hz, Send 2200Hz, Send Both, Stop Test) buttons, along with 'Save', 'Load', and 'Quit' buttons.

TinyTrak3Config v1.4

Primary | Secondary

Callsign:

Path:

Symbol: Table:

Frequency: MHz

Timing

Auto TXD: ms

Auto TX Rate: sec

Manual TXD: ms

Manual TX Rate: sec

Quiet Time: msec

Calibration:

Status

Text:

Send Every: ☐ Send Separate ☐ Don't Send '>'

☒ Transmit Altitude ☐ Allow TTL Serial ☐ No TX Out on PTT In ☐ Serial Out High ☐ Alternate Digi Paths ☐ Invert CD In ☐ Send NMEA

☒ Only Send Valid ☐ Send 300 Baud ☐ Serial 9600 Baud ☒ TX Twist ☒ Send DAO ☐ No Startup Packet

Timestamp:

Mic-E

☒ Enable Message: ☐ Force Printable Path:

Time Slotting

☐ Enable Offset: sec

SmartBeaconing

☐ Enable

Min Turn Angle: deg Slow Speed: MPH

Turn Slope: Slow Rate: sec

Min Turn Time: sec Fast Speed: MPH

Fast Rate: sec

Power Switch

☐ Enable sec

Configure

COM3

Test Tones