Manual
Micro-Trak RTG FA (Ready-To-Go)

The Micro-Trak RTG is a frequency agile APRS transmitter capable of operating in the 2 meter amateur radio band. The transmitter was designed with the goal of producing a low cost, easy to implement APRS tracker with virtually no technical knowledge prerequisites for operation.

The Micro-Trak RTG FA is radically different than the single channel (~~144.390~~) version, the MT-RTG. A new PIC with significantly greater capabilities has been utilized in this design, and the firmware for the RTG is user-loadable, allowing new versions to be installed by the end user for special applications and as improvements become available.

The MT-RTG FA is designed to operate from automotive, unregulated power sources, and the device has built in power regulation and filtering. A special cable is included with your Micro-Trak that allows you to plug it into a cigarette lighter output in your vehicle, boat, aircraft, etc. A fuse is contained in the tip of the cigarette lighter plug, which is easily replaced by unscrewing the tip and removing the burnt out fuse. If your installation requires removing the cigarette lighter plug and directly wiring your unit into your vehicles' power, use great care to connect the device correctly, with the red wire as 12 Volt Positive, and the Black wire as vehicle ground. Do not use the device with the magnetically mounted antenna or any antenna connected to ground on vehicles with positive

ground. Reversing polarity, even briefly, is very likely to destroy the transmitter, and it will not be repaired under warranty.

The cable assembly also has a male, DB-9 serial plug, which allows the use of the Byonics GPS 2 magnetic mount "hockey puck" GPS module. Power for the GPS is provided through the DB-9 Cable. Virtually any GPS that can provide 4800 Baud, NMEA standard data is compatible with the MT-RTG.

Please note that the wiring of the DB-9 connector is set up for use with a GPS. The unit may be reprogrammed by downloading the free Byonics configuration software from the Byonics website. (www.byonics.com) In order to program the device, the transmitting and receiving serial lines must be reversed in respect to the GPS wiring scheme. Byonics offers a low cost null modem cable for user programming. Ordinarily, the device will be programmed to your specifications prior to shipping.

Operation

WARNING: Do not plug the cigarette lighter plug into your vehicle or apply power to the unit until the system is fully assembled. Operating the MT-RTG FA without an antenna or dummy load attached may destroy or damage the power amplifier in the unit, which will not be covered under warranty.

Assuming you ordered your Byonics MT-RTG FA pre-programmed; all that is required is simple "plug and play" operation. Connect the 6 pin mini din plug on the "dongle" cable into the mating receptacle on the MT-RTG, Note that the fit is quite snug, which should prevent unintentional removal. Note that the plug is keyed, and only fits in one way, so make sure you are properly aligning the plug and jack before applying any significant degree of pressure.

Connect the SMA antenna connector to the mating SMA connector on the MT-RTG. Place the magnetically mounted antenna as close to the center of the vehicle roof as possible. Non-metallic roofs may require metal foil or other improvised ground planes. In the event that you choose to utilize an antenna other that the one utilizing an SMA connector, use the appropriate

adapter and a 2 meter antenna capable of handling at least 10 Watts. The antenna should be a vehicular or ground plane antenna designed for two meter operation. Rubber duck or short whip antennas may cause the unit to become "swamped" with RF power, causing continuous resetting of the MT-RTG. This can be observed by watching the Bi-Color LED next to the 6 pin mini-DIN connector. Ordinarily, the red/green LED will flash briefly on startup, indicating normal operation. If the MT-RTG goes into continuous reset, the LED will flash continuously. Unplug the unit and trouble shoot the installation before attempting to re-power the device.

Plug the GPS 2 or other GPS device into the MT-RTG, and place it in a position to give it the best possible line of sight view of the sky.

After all connections are made, plug the cigarette lighter plug into the power jack, and switch the vehicle to whichever position allows the cigarette lighter jack to provide power. The MT-RTG LED will flash both colors indicating that it is starting properly. The green LED section should begin to flash at a rate of about once per second. This indicates that the unit is receiving serial data from the GPS, but the GPS is not "locked" onto the satellites. When the GPS is providing "good" data, the green LED will stay lit continuously.

The red section of the LED will flash briefly indicating a transmission is taking place. APRS transmissions are very short, and may last from about 1/3 of a second to a second, depending on the units' programming.

The MT-RTG FA is a transmitter only. The unit will occasionally send position reports coincidentally with other transmitters. The APRS network is unlike the cellular network, in that the nationwide network of digipeaters may not cover every area of the Country. Since the system is entirely operated by volunteer hams, there is no guarantee that every (Or any) position report you send will make it to a digipeater or onto the APRS-IS (sites like openaprs.net or aprs.fi) Although the MT-RTG is much more powerful than handheld radios, it is still relatively low power in comparison to mobile users running potentially hundreds of Watts of power, and we occasionally have to struggle to get a word in edge wise. We have found 8-10 Watts of power to provide very good coverage in areas with working digipeaters.

The MT-RTG FA has internal adjustments for setting power and deviation levels. These should only be adjusted by qualified individuals with proper test equipment. The power and deviation levels are pre-set and fixed at optimal levels for the device. There is no on/off switch: The device is powered and drawing current whenever it is plugged into a "hot" cigarette lighter outlet. The MT-RTG FA uses a special version of the Byonics TT3 chip, and requires a version of TT3 Configuration program that is different than older versions. The default values included when your unit was shipped are generally optimal.

Because the TT3 chip is capable of storing two entirely separate configurations (containing your FCC call sign, Frequency, APRS Icon, tactical call sign, digipath, Smart Beaconing, and other modes) a pair of holes on the printed circuit board marked "SW" (Switch) has been provided for those hams with the skills to add an external switch. Most hams will generally only run one configuration, but as these units may be used in a car one day, and in a boat the next, the option to select multiple configurations creates a degree of flexibility.

The MT-RTG FA has two build in telemetry channels, one that reports the supply voltage to the RTG, another, which reports the temperature inside the RTG enclosure. If your application calls for a more accurate external temperature reading, you may remove the lid from the enclosure to allow better access to ambient air temperatures. If necessary, the temperature sensor may be removed and remotely-mounted.

Voltage and Temperature graphs from the MT-RTG will be available on aprs.fi. Further information regarding setting up all MT-RTG parameters can be found in the Micro-Trak Configuration Program manual.

Printed Circuit Board

Schematic

|	VHS	
	MT-RTG FA VER 1.0	
A.R. Lord	Rev 1.0 03/05/11	1 of 1
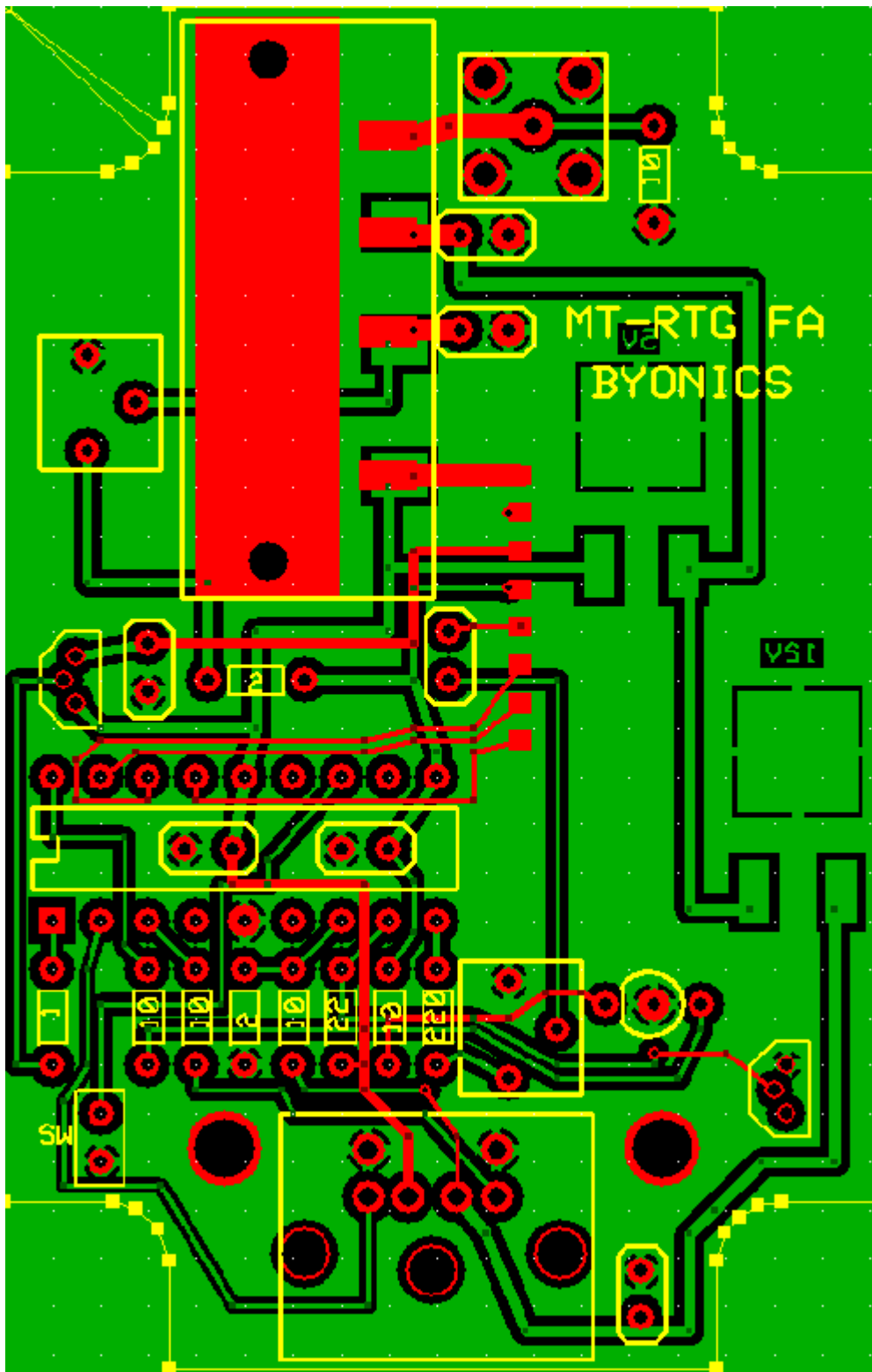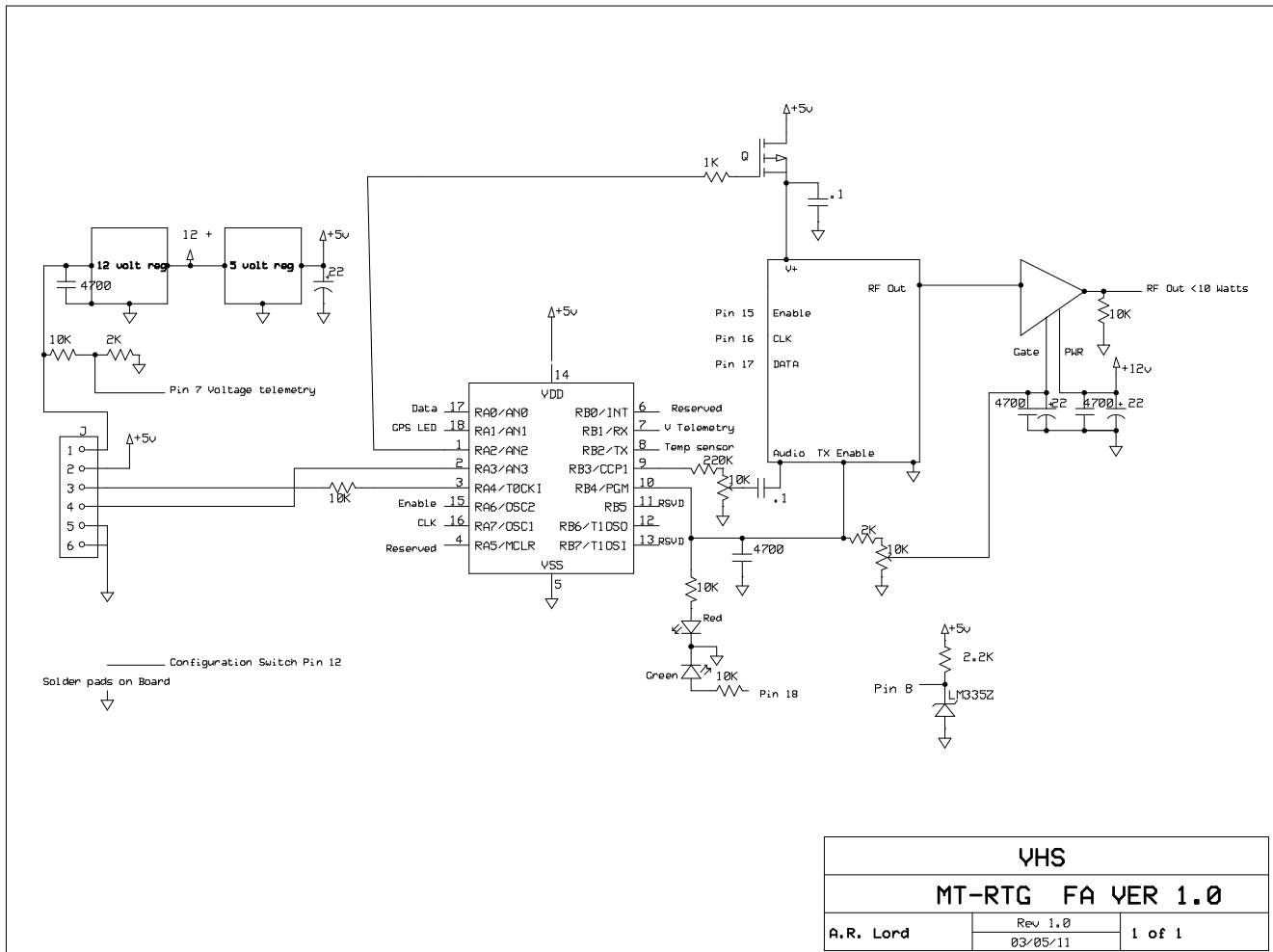
CONFIGURATION SOFTWARE

This is a screen shot of the programming software

This configuration program is designed for use with multiple variations of the Micro-Trak product line, and not all settings will be used with the MT-RTG FA. The MT-RTG FA will ordinarily be shipped with information you provide at the time of your order. If you need to reprogram the MT-RTG FA or other new-gen Micro-Trak products, you may download a free copy of this new configuration from the Byonics website. Please not that this Configuration software is currently only for use with the MT-RTG FA.

Connect your MT-RTG FA to the wiring harness provided with your RTG, through a null modem, gender changer adapter or cable (also available from Byonics) Your RTG must be powered during programming, and an antenna or dummy load (preferable) must be connected to the antenna output to prevent damage to the unit. You must have a serial port or USB to Serial adapter to program the RTG FA.
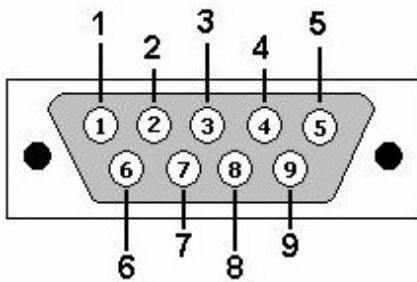
DB9: View looking into male connector

Pin No.	Dir	Notes/Description
1	-	No Connection
2	IN	Serial Input - From GPS RS-232 TX or PC
3	OUT	Serial Output - (Only used during programming)
4	OUT	+5 volts output to power GPS
5	OUT	Ground
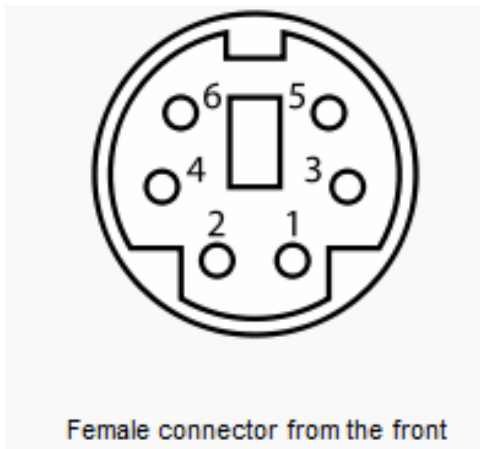
Female connector from the front

Pin assignment for Mini-DIN 6 Connector

5-6   Ground
4   Serial out (From Transmitter)
3   Serial in (To Transmitter)
2   +5 regulated output (to GPS)
1   Unregulated 12 VDC input (Power Supply)

Power adjustment

External Switch

Deviation Control   Bi-color LED   Temperature Sensor