Green Heron RT-20 Rotator Controller

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Hams and ham radio have changed drastically over the last half-century. No longer are we builders and tinkerers, cannibalizing discarded television sets for parts to make continuous wave transmitters. Today's radio amateur is an integrator of sophisticated software and hardware components, enabling the operator to customize systems capable of accomplishing a desired communications need.

Today, computers can be an integral part of amateur stations and are used for more than just basic logging. Much of our modern equipment is fully controllable with a computer. It's thus not surprising that automated operations are very popular among active hams.

Green Heron Engineering is on the cutting edge when it comes to meeting the needs of 21st century communicators with the introduction of their new microprocessor-based RT-20 Universal Digital Rotator Controller. At first one might ask: "Why would I need a digital controller for my antenna rotator when it already came with one from the manufacturer?" Well, the answer can be quickly found in the name of this unit.

First, it's *universal* — it works with any manufacturer's rotator. The RT-20's manual includes detailed information on using the controller with many popular rotators from Alfa-Spid, Alliance, Create, Hy-Gain, Orion, Rotor Doctor and Yaesu. The RT-20 is a great way to add modern features to an older but still reliable motor. And if you have rotators from more than one vendor up the tower, you can standardize on RT-20 controllers and bring some consistency to your shack.

Second, it's *digital* — microprocessor control makes many sophisticated features possible, even for old rotators that came with an ultra-simple control box. Digital also means that the RT-20 works under computer control if you have software that supports rotator control.

Features and Benefits

The rotator can be commanded to turn the antenna by turning the "point and shoot" preset knob on the RT-20's front panel, by issuing commands from compatible software (not supplied) running on an attached PC, or manually by pressing the CW/CCW (clockwise/counterclockwise) switches.

Several of the RT-20's features may help prolong the life of your rotator, particularly if you turn large antenna arrays. At the start and end of rotation, the controller allows gradual starts and stops by ramping the motor voltage up and down. Motor speed can be set in 11 steps (10% to 100%, plus a 100% setting with no ramp-up or down). Note that these features don't work equally well with all rotator motors. Check the downloadable instruction manual and other information on Green Heron's Web site for information on specific rotator models.

Another setting adjusts the delay before allowing rotation in the opposite direction. Adjustable in 100 ms increments up to 5.9 seconds, this setting allows the antenna to coast to a full stop before attempting to reverse direction. An adjustable brake delay for Hy-Gain HAM and TailTwister series rotators allows the antenna to stop turning before the mechanical wedge brake engages. There's even a special routine for TailTwisters that rocks the antenna slightly at startup to avoid a common problem with the brake sticking.

Because you can set the start/stop points for both CW and CCW rotation ("soft limits" on antenna travel as opposed to hardware limit switches), the RT-20 is an excellent controller for antennas that must be limited to less than 360° rotation. This includes antennas mounted on the side of the tower that need to stop before hitting a tower leg. No longer will you have to keep an eye on the visual markers written on your old rotator's display or risk crashing your side mounted beam into the tower. Once you have set the soft limits, the RT-20 remembers them and will only move within the specified arc of rotation. If your rotator supports more than 360° rotation ("over-travel"), the RT-20's soft limits allow up to 720° rotation (two full turns).

Some rotators are "north centered," meaning that the center of travel is 0° and the stops are at ±180°. Others are "south centered" with the center of travel at 180°. Using the RT-20's OFFSET option, you can change from north centered to south centered at will. The OFFSET is fully adjustable, so you can use this feature to compensate for an antenna or mast that has slipped in the wind. Another application mentioned in the manual is adjusting the OFFSET to keep antennas oriented properly for a mobile rover station that changes positions frequently.

Users can update the RT-20's software via the serial port as new versions are available. Green Heron indicates that they welcome requests for customization. Customized versions are available for KØXG Systems rotating towers and K7NV prop pitch rotators.

Table 2
Green Heron RT-20 Rotator Controller

Manufacturer's Specifications

Power requirement:	115/230 V ac.
Rotator motor voltage:	18-36 V ac; 24-48 V dc.
Position indicator:	Potentiometer, 150 Ω to 10 kΩ; variable resistor, 500 Ω; proximity/reed switch, 33 closures per deg.
Heading accuracy:	Up to ⅓ deg for potentiometer; up to ⅒ deg for proximity/reed switch.

Size (height, width, depth): 3.9 × 8.1 × 7.25 inches; weight, 7.5 pounds.

Bottom Line

Green Heron's RT-20 Digital Rotator Controller offers an easy way to add the latest features to an existing rotator. It really shines in a more complicated setting with multiple antennas and rotators.

More than One Antenna?

The more complicated your antenna system, the more the RT-20 shines. The product has the capability of connecting several "slave" RT-20 controllers to a "master" RT-20 unit. This is done simply using the DB-9 serial connection on the rear of the units and accessing the menus on the individual controllers to set one as master and the others as slaves.

Setting several RT-20s in a master/slave configuration allows the units to work together as a system. This capability allows complex control of antenna arrays on single or multiple towers all from a single control point, either at the station or remotely. One common application is turning all antennas in a stacked array to the same heading simultaneously.

Another common configuration is a rotating tower with a separate rotator for the antenna or antennas at the top. With one RT-20 controlling the tower movement and another controlling the tower-top rotator, you can program the top rotator to maintain its heading regardless of tower movement.

Setting it Up

Setup for the RT-20 is simple and straightforward. Because it works with any manufacturer's rotator, you simply locate your model in the manual and set the internal jumpers. Pay close attention when doing this, as some jumpers are numbered left to right and others right to left. The manual provides a worksheet to help you configure the unit for a rotator that is not listed in the manual. You will need to have the rotator's manual or specifications handy to do this.

Once the internal setup is complete, it's time to connect the rotator to the unit via a multiconductor control cable. I found the terminal strip on the rear of the RT-20 clearly labeled, so connecting the control cable is simple and straightforward. Again, refer to the manual for proper terminal connection for your specific rotator.

After connecting the rotator to the RT-20, the final step is setting the software parameters and calibrating the clockwise and counterclockwise start/stop points. The manual cautions you to be careful during setup. If your rotator doesn't have mechanical stops, it's easy to turn the antenna too far and stress the feed line.

Pressing and holding the SETUP/ITEM button for a few seconds accesses the menu. Pressing this button momentarily allows you to page through the various menus. Keep the manual handy during setup because some parameters must be set in a certain order. Some of the settings are rotator-specific. Others are for soft rotation limits and position calibration.

Setup took less than an hour. Please take the time to read the manual and familiarize yourself with the layout of the board. I found the manual to be clear and complete and didn't have to make any calls to tech support. Other RT-20 users have told me that the folks at Green Heron are quick to answer and are extremely helpful.

After the initial setup was complete, the RT-20 was turning a Yaesu GS-800 that I had mounted on the bench for this review. The bright green LCD shows antenna heading in large characters, as well as direction of travel, position of the point-and-shoot control and operating state (manual, preset, remote, master/slave and so on). Other indicators show when the rotator is in over-travel, when a soft limit is reached, and when a brake is engaged.

Software Control

As I mentioned, the RT-20 interfaces with most logging software via a computer serial port. According to the manual, if your software is compatible with the Hy-Gain DCU-1 protocol, it will probably work with the RT-20.

In about three minutes I had the controller working with *LOGic 8* logging software. When you enter a call sign in the log, the software calculates both short path and long path headings to the station from your location. You can select one of the paths with a simple keystroke, and *LOGic* will tell the RT-20 to point the antenna right toward the station you want to work. The RT-20 moved the antenna to the exact position each time.

LOGic software also has a feature that allows you to drag your mouse cursor over a compass rose and click on a heading. With a single mouse click your antenna is moving toward a selected heading and the position is verified on the RT-20's large display. Pressing CANCEL on the RT-20 or using the software's stop feature will stop the motor's movement at any point during the rotation.

The RT-20 also performed flawlessly with *WriteLog* contest logging software, which has similar provision for moving the antenna toward the station you are working. *WriteLog* allows the user to specify a keystroke to start the rotator.

Final Thoughts

Green Heron did a nice job with the packaging. Fit and finish are excellent, and the controls have a nice feel. The 46 page instruction manual is quite detailed, and I found it to be clear and helpful. Once setup is complete, operation is straightforward. Perhaps the hardest part, after years of pressing manual buttons, is remembering to use all the features the RT-20 offers.

If you have an older rotator that you would like to modernize with some new operating features without climbing the tower, or if your contest station requires flexible control of multiple rotating arrays, or if you simply appreciate the ease of operation in a modern automated station, then the Green Heron RT-20 is an accessory that belongs in your station.

Manufacturer: Green Heron Engineering, 1107 Salt Rd, Webster, NY 14580; tel 585-217-9093; **www.greenheronengineering.com**. Price $549. QST