

# RT-21 Version 4

rev 2

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## Overview:

Beginning with serial number 4000, the RT-21 version 4 is being supplied for all RT-21, RT-21r, RT-21dc, RT-21D and RT-21pp units. This new version contains a few functional differences and new features. Included is a new, larger main CPU that has twice the program memory space so that we may add more features in the future. Released along with RT-21 v4, is a new SETUP Utility version that adds support for the new features. Please download and install SETUP Utility 4.n should you desire to take advantage of them.

## Supports Internal WiFi and embedded webserver (Option)

This optional feature consists of an add-in card, ribbon cable and external antenna that implement an internal WiFi interface for the RT-21 that includes an embedded webserver for graphic rotator control. Once configured, this allows you to connect your RT-21 to any in-range WiFi network, and then operate your RT-21 from any fixed or mobile device through a web browser. For external (to your network) use, you will need to configure your home router to allow remote access.

## New, easier firmware update process

Firmware updates no longer require an additional program. SETUP Utility 4.0 now provides a direct firmware update for v4 units over RS232 or USB. The process is simple:

- Connect SETUP Utility to your RT-21, the on-screen LED should be green to indicate communications is working on the selected COM port.
- Click on the orange “Update Firmware” button at the lower left.
- Browse for the new firmware file on your computer (RT-21 4.xx.hex) and select it.
- Click on the “Load Firmware” button to load the new firmware. The RT-21 will momentarily flash “BOOT” on the display, and then go blank. The SETUP Utility will show the load process. The RT-21 will restart itself automatically at the end of the firmware load.

## New rotators added to the OPTIONS menu

Two new OPTIONS are available in the SETUP->Options menu (and SETUP Utility) to preconfigure the RT-21 for other Yaesu models.

- YAESU AC450 – for G450/G650 and other of the smaller AC motor units that allow 450 degrees of rotation
- YAESU AC360 – for the older Yaesu and Kenpro (G400/G600) units that use AC motors, but allow only 360 degrees of rotation

## Other changes and improvements

- Factory Resets, and Rotator OPTION changes now automatically re calibrate counter type rotators to the center of their rotation for a North Center setup.
- Factory Reset (RESET EE) resets ALL settings to the defaults for the specific rotator that is already selected with OPTION. (note: The OPTION setting is the only setting that does not get changed upon a RESET EE.)
- The wording on the RT-21 display in SETUP mode is changed. Instead of “New Value = “ to indicate what the setting will be changed to, the display reads “Change To:”.
- Recovery from severe power glitches/brownouts is improved. Along with a change to the firmware in the display module, instances of blank displays, or “Counter Range Errors” when the RT-21 is subjected to such instances, should be reduced.
- SETUP Utility will now display various status messages from the RT-21 including “In-Motion” and various Error Status, including Pot out-of-range, and Error, No-Motions as they occur. Communications will no longer be disabled with these errors. (CAUTION: For remote operations, it is now possible to see what is happening to your rotator system and these errors may indicate that there is a problem with your rotator that should be addressed on-site. Attempts to calibrate or use DEBUG remotely can allow you to over-rotate your system and cause cable/rotator damage on those rotators that do NOT contain protective limit switches. This includes Pro.Sis.Tel, Alfa Spid, and TIC ring systems.)
- The vanity boot message will now be reset to factory defaults when a front Panel EE RESET occurs. (Requires new 1.2 display for this)

## New Protocol commands.

R2n; - New Poll command that returns current heading along with a status byte. Returns “SOH,'0',Status,'>',nnn.n,;” nnn.n is the current heading.

Status: 0 = idle, 1 = In Motion, 2 = Error, no Motion, 4 = Pot out-of-range, 5 = Counter Range

ATn; - all following serial commands are sent to and processed by the add-in wireless module. <esc> escapes from ATn; and returns communications to RT-21 main CPU.

R3n; - forces CPU and Display Resets. This is the same as a power restart.

R4m; - Reads (and then clears) the last abnormal controller CPU RESET.

B2n; - Places RT-21 into bootloader mode using RS-232

BUn; - Places RT-21 into bootloader mode using USB

## Upgrades and Compatibility.

- The v4 CPU can only be installed in a main board rev 4.0 or higher. Any earlier RT-21 may be upgraded with v4 by replacing the main board, and upgrading the display. We can re-program displays at the factory for this purpose.
- The new rev 1.2 FW display module may be installed in any RT-21. With the new module, the display will blank after a rotator turn for 3 seconds unless firmware 3.08.2 or later is also installed.

## WiFi Operation:

The internal Wifi option implements a standard network interface that can connect to any 2.4 GHz wifi router or access point. You configure the Web-Server from the RT-21 SETUP Utility software connected to RS232 or USB port on the RT-21. Once connected (Green LED) click on "Web-Server Configure" to display the IP Configuration window. You will set:

### Rotator Name ID

This is the name you wish assign to this RT-21 for display when your browser connects.

### DHCP or Static IP

If you want to use a Static IP in the RT-21, select this and provide the required IP, Subnet and Gateway

### WiFi Security

Select the security type and the SSID of the network you want to join. If using security, also provide the network key phrase. The security Type MUST match the wifi network security exactly.

### Ports (Advanced and Optional)

Selects ports used for access other than the defaults. HTTP port is the port that your browser needs to connect. If you use 80, then no port need be specified in your browser.

UDP and Serial are for future use. The Web Login is not implemented in the first release either.

Close and restart your RT-21. The first time your RT-21 connects to your network, it may take up to 30 seconds depending on your security type. After that, it will connect in less than 5 seconds. There are two LEDs on the Wifi Board, the large green one next to the DIP switch is power, then smaller one on the radio module will blink when it connects. Once it connects, you can restart SETUP Utility and open the Web Server Window again to see what IP address was assigned (if you did not set a static IP)

Now, enter the IP address into your browser URL window to bring your control web-page.

In order to access remotely, you must use a port that can be forwarded by your router to the IP of the RT-21 you have selected. See your router's documentation for specific info for your router. We recommend that Static IP in the RT-21 be used whenever you access remotely.

If your ISP does not supply you with a static IP for your network, then a Dynamic DNS provider would make things simple. Setup for remote access is straightforward if you have any experience with your router. If not, we would be happy to assist, or point you in the right direction.

## Using the WiFi Browser interface: - EXAMPLE.

Your IP is 192.169.1.4, your HTTP port is 8080

Connect to your RT-21 entering <http://192.168.1.4:8080> in your URL field. (inside your network)

Use the Setup tab to set Presets and beamwidth for your rotator display. You may also create and utilize your own images ([www.dxatlas.com](http://www.dxatlas.com) works well) for your location and specific needs. We will set you up with an account on our image server so that you can upload and manage your images.

From the MAP tab, you can drag the beam display, enter a heading, “press the CW or CCW buttons”, or click on the presets.

From Console tab you may enter “R21;<cr>” to see the response to the poll command.

Green Heron Engineering maintains a test unit that is normally available at <http://webster.no-ip.net:8080>

The default image is a compass rose. The RT-21 defaults to a B/W banner and image only if the cloud server cannot be reached.

The screenshot shows a web browser window displaying the Green Heron Engineering LLC interface. The browser's address bar shows the URL <http://192.168.2.63:8080/>. The page header features a green heron logo and the company name "GREEN HERON ENGINEERING LLC" with contact information: "1107 Salt Road, Webster, NY 14580" and "(585) 217-9093".

The interface is divided into three tabs: "Console", "Map", and "Setup". The "Map" tab is currently active, showing a circular map of the world with a green beam of light pointing towards North America. The beam is labeled "W2FU" and "Jeff Ach".

On the left side of the interface, there is a "Status" section with the following information:

- Rotator Name: My Wifi Rotator
- Rotator Status: Idle
- Current Heading: 333.6
- Point'n'Shoot: 334 (with a "Go" button)
- Buttons: CCW, CW, Stop

Below the status section is a "Presets" table:

Presets	Heading
Europe	42°
North Africa	89°
South Africa	105°
South America/VK/ZL	190°
VK/ZL	255°
KH6	285°