

RT-21 SETUP UTILITY

Introduction

RT-21 SETUP Utility is an easy to use Windows program that can be used with the Green Heron RT-21 controller to allow computer access to all settings and features of the unit.

- Connecting to a controller via RS-232 or USB.
- Rotor control and display of current heading.
- Computer access to the front panel SETUP parameters.
- Access to parameters that are not available from the front panel.
 - MOTOR TIMEOUT in seconds.
 - Security to allow user lockout of SETUP, calibration and reset.
 - Vanity display changes for the LCD/VFD at start-up.
 - Direct setting of POT calibration values
 - Advanced feature settings
- Additional calibration features for easy and quick setup of new rotors
 - AUTO CAL for Orion (Cal and Center)
 - Quick CAL for many POT style rotors
- Ability to Save and Recall settings and calibration parameters for your specific rotor installations

NOTE: SETUP Utility is not intended as a general operator control program for rotator control. It is too easy to accidentally change settings with this program. Most logging programs and contesting programs already supply interfaces to rotators that support RT-21 (or DCU-1) that will operate your controller in a much more operator friendly way. There are also many standalone programs available, both free and for a small charge, that operate the controller in local and remote environments. GH Everywhere is available on our website free of charge. GHE is a complete Client-Server IP based application that can be used to include RT-21 rotators, and make them accessible from multiple users and in multiple locations using your network and the internet.

NOTE: Older RT-20 units are not supported in SETUP Utility.

RT-21 SETUP Utility supports all RT-21 versions, including Prop Pitch and Az/El controllers. In most cases, features are either not shown, or grayed out if they are not available with your specific controller as connected. SETUP Utility knows what to allow based on the firmware version read at the time you connect to the RT-21. Use your manual, and the RT-21 revision history document

Installation

SETUP Utility should be compatible with all Windows OS from XP on. Download and place the zip in a convenient location. Unzip the files and double click the Setup.exe to begin the installation. It should complete in just a few seconds. You may have to accept some of the warnings that come with the later Windows versions. SETUP Utility will not create extra task bar or desktop Icons. Access will be by your Start Menu and Programs menus. You can add additional start options on your own.

Connecting

Select your COM port from the drop down box. Once a COM port and baud rate match a connected controller, the LED will turn green and all of the various parameters will be read along with the current heading in the Rotor window. SETUP Utility will remember the last port used, if there's only one port on the system, it will use that one.

SETUP Utility will first read the firmware Name and Version number displaying this information on the screen. Features and settings that are not available to your controller Name (OEM) are not displayed. Features and settings that are not available for your firmware release version are grayed out.

The red Factory Reset button will attempt three times to reset a controller that may seem unresponsive. Even if it won't connect (and some errors make this difficult) as long as the Rotor Port COM and Baud are correct, it

should recover the controller to factory defaults. NOTE: a Pot Out-Of Range error cannot be cleared with a Reset. Use the Error Message section of the manual to troubleshoot this condition. The Refresh button can be used to re-read and re-populate the screen with current values from the RT-21. Normally, changes made in SETUP Utility automatically re-read and confirm the change. But, if you make a change from the front panel, or connect the COM cable to a different rotator, you will need to Refresh the display with this button.

Rotor Control

The “Rotor” top center panel of the program window mimics the front panel of the RT-21. The heading display is updated continuously. You may use the buttons to manually turn the rotator, select a new heading in Point 'n' shoot, and Go, or Cancel a rotation. The LED will remain green as long as an RT-21 is responding. It is OK for the LED to momentarily flash to red while RT-21 operations are being performed.

Computer Access to SETUP parameters

Rotor Type, Motor Control and Limits/Offset panels show and allow changes to settings that are mostly also available from the RT-21 front panel. Depending on what Rotor Type shown, either Analog (Pot) Cal panel, or the Digital (Pulse) Cal panels are enabled. Most settings changes will be immediately updated into the RT-21. Some have “Set” buttons next to them which allow further choices and/or make the setting change.

Limits/Offset

This panel shows and allows changes to the Offset values and Soft Limits. It shows a green and red bar that graphically represents the Soft Limit settings, making it easy to visualize. The green is the allowed rotation area as determined by the CCW and CW Limit settings, the red is the not allowed portion of the largest rotation range that is available by an RT-21. (720 degrees) The center of the graphic is the center of rotation as determined by the current value of Offset. Changing the Limits with the spin controls changes the graph, but no updates are actually made to the controller until you press the Change Lim/Offset button.

NOTE: Most rotators contain limit switches that determine the actual physical rotation range of the rotator. If the soft limits are larger (outside) the limit switch range, the controller will think that it can go there. This can result in ERROR, NO MOTION errors as well as affect the ramp down when approaching these stops.

Settings Only Accessible from SETUP Utility

Security

If set to User, this feature will disable front panel access to SETUP, RESET EE and Calibration functions of the RT-21.

Motor Timeout

This sets the “ERROR, NO MOTION” detection time. This value is the number of seconds the controller allows in order to traverse at least two degrees. If you have your rotator set for a very slow speed/long ramp times, you may need to set this value higher. Also, a Pro.Sis.Tel rotator may appear to be going too slow while you are calibrating it. It is OK to make this value a little larger if needed, but a good idea to keep it as short as needed actually needed.

Set Vanity

Use Set Vanity to change the boot-up message on the display. You can enter up to 14 characters and they will be centered on the 3rd line of the display at start up.

Alt #1 – Alt #2

Use these to set the two optional Alternate Offset values, and to enable their use in the RT-21. See the manual for the use of this feature.

Advanced Features

Advanced Features are primarily for special circumstances or settings for unusual requirements. Please do NOT change any of these without fully understanding the purpose of the setting. If used improperly, some of them could allow over-rotation of rotators that do not have limit switches or other unpredictable results. Detail descriptions of these features are in the manual under the Advanced Features section.

Save/Restore

You may save and recall/restore complete sets of settings and calibration values that are stored in your controllers. This may be useful if you have multiple rotors and controllers and want backup settings in case you need to replace a controller, or accidentally erase settings. After connecting to a controller that you wish to save, verify the settings and then press **Save**. In order to recall, do a **Restore**. The currently connected controller will be restored automatically.

Analog (Pot) Cal Panel

This panel is enabled for rotators that use analog style feedback and calibration techniques. These rotators contain a potentiometer or other sensor that sends the rotator position to the controller via a DC voltage that is read on Terminal #4. The panel continuously displays both the A/D (analog to digital conversion) as 0 to 1023 and the VDC that creates this value. These values are very useful in troubleshooting cable and rotator problems.

The Analog Panel is also very useful for calibrating your rotator. It provides for multiple methods of calibrating the system, including Quick Calibrating to our experience for many rotor types. Because this panel shows the actual A/D values of the current position and the A/D values that are stored into the two Cal Values, it is easy to see exactly what is happening.

The CCW and CW Cal Values are the A/D readings at both ends of a 360 degree rotation. The values are used by the RT-21 to calibrate the A/D converter into accurate headings. The factory defaults are 0 and 960, and the correct values for your rotator can be set a number of ways:

1. If you select a Rotor Type of HAM, T2X or Yaesu (Yaesu in version 3.08, others in 1.06/3.06), the RT-21 will automatically set these values to numbers that will work in most installations without further calibration.
2. Performing the CCW and CW calibration from the front panel.
3. Using the CCW or CW 'Set Cal at Current Position' buttons.
4. Entering the values directly and pressing the 'Set' buttons
5. Pressing the 'Quick Cal' button and selecting your rotator type.

Note: #3 is the SETUP Utility equivalent of #2

Note: The difference between #1 and #5 is that #1 is firmware dependent and the values come from that firmware in the RT-21. The values that are selected in #5 come from this version of SETUP Utility.

Reset Cal Values returns the Calibration back to factory default of 0 and 960.

Digital (Pulse) Cal Panel

WARNING: Never use the Orion Cal and Center, or the CCW Limit Switch Cal unless you are actually connected to a rotator that has working limit switches. In order to provide as much safeguard as possible, the Orion Cal will NOT function unless the Rotor Type is set to Orion. The CCW Limit Cal will NOT function unless you have enabled the Advanced Option of 'Allow CCW Limit Cal'. Do not defeat these safeguards unless you are absolutely sure of the potential dangers.

The Digital (Pulse) Cal panel is enabled for rotators that use a reed switch, encoder or other device that generate pulses that the RT-21 can count in order to determine heading. Although not as easy to understand and visualize how it works, the actual calibration is usually very simple.

In order to calibrate using the Cal Panel, simply press the Set Calibrate button and set the heading value to be equal to wherever the rotator and antenna are currently pointed. This is equivalent to front panel SETUP->CALIBRATE setting. This assumes two important things:

1. The Divide Ratio is correct for your rotator type, (see manual for your rotator) this value is the number of pulses that are generated by your rotator for a 360 degree rotation. You can change this value in the Digital Cal panel too.
2. If your rotator has limit switches, the rotator MUST have been previously centered and then the antenna and mast bolted to match that centered direction.

Alfa Spid and Prop Pitch (usually) do not have limit switches, so the #2 doesn't apply. You must be aware of your coax rotor loop though and so therefore it's a good idea to tighten your mast into the rotator at a known (centered) direction anyway.

Orion rotators have limit switches, so we provide an easy way to automatically find the CCW limit, then center and calibrate the rotator to center. Pressing the Orion Cal and Center button accomplishes this by turning the rotator at a slow speed until an ERROR, NO MOTION is detected. This is the position of the CCW limit switch. Then the Utility will turn the rotator back CW until it is at the center of rotation, then set the Calibrate value to that center. Re-calibrating your system can then be accomplished by:

1. Looking at the antenna, then Set Calibrate to match that heading
2. Orion Cal and Center will accomplish the same thing in cases where it's inconvenient to see the antenna.

NOTE: Orion Cal and Center' differs from the RT-21 Front Panel Orion auto-cal in that it ends with the rotator centered and it is software driven from SETUP Utility, and therefore is available on any version of RT-21 firmware. The front panel Orion auto-cal is in version 3.08 and later.

CAL to CCW limit is similar to the 'Orion Cal and Center' except is designed for custom systems where a custom Limit Switch position is known and entered. It is used in conjunction with the Advanced Options 'Limit Switch Position' and the 'Allow Cal to CCW Limit' Setting. See the WARNING above before using this one.

NEW in Version 4 for Version 4 RT-21s

Version 4 RT-21s provide new firmware updates now using SETUP Utility instead of the previous 3rd part program "tinybldwin.exe". This creates an easier update process using either RS-232 or USB.

Also included in the Version 4 is the optional WiFi embedded WebServer features. SETUP Utility includes the configuration tools to allow you to adjust your WiFi module as needed.

Version 4 controllers have the ability to present error and operational status to programs that are designed to use these features. SETUP Utility utilizes this to add the status at the top of the screen for these controllers.

See the V4 manual for details on how to use the V4 features using SETUP Utility.