DF9GR's ERC-1 Evaluation

(Note a copy of this can also be found in HRD WIKI.)

Type: Kit, single axis Azimuth (360 and 450 degrees) or Elev Interface (45, 90 and 180 Degrees).
Interface: RS232c, 4800bps, 8N1
Protocol supported: DCU-1, GS232B-Az and GS232B-Az/Elev
Rotor controllers supported: More then 72 different ones from 12 different manufacturers.
Firmware release tested: 5.5
Documentation: Specifications, Assembly and Installation
Software tested: HRD Rotator rel.: 2494, Logger32 rel 3.24.0, N1MM-Rotor rel.: 6.11.31, Wintest_Rotor rel.: 1.0, PST_Rotator-Lite and Nova 2.12B
Rotors Controllers tested: Alliance CD73, Yaesu G-500A, G-800SDX and G-5400B and Ham IV.
Softwares supplied with purchase: ERC Utility, ERC Control and PST-Rotator-Lite
Web Site: http://schmidt-alba.de/English/english.html or www.easy-rotor-control.de
Cost: 64.00 €

Rene's DF9GR ERC-1 is an impressive, incredibly flexible, low cost, small size, no frills, simple single axis unit that will support a surprising 72 different rotors in either Azimuth or elevation configuration!

Kit design, documentation and assembly (9/10):

The dense design makes it so that you need a good pair of glasses while soldering; this said the high quality PCB did not show ANY abuse after my FAR FROM BEING PROPER soldering practices done by this almost blind 49 year old Ham… The design does not use any SMD components making assembly fairly easy.

The kit came with ALL parts nothing was missing, all the way down to screws, nuts and even tie-wraps, parts were found to be of high quality and chip sets were properly protected. The documentation is very well made and complete, board density is so high that the well documented images with parts placement made assembly a lot easier. Assembly took a little over an hour or so, including hardware, cables and suggested pre-power testing and unit came up on first try… The unit is small enough to be directly integrated into most rotor controller enclosures.

The ERC-1 is design around a Atmel Mega168-20 CPU and a MAX232 serial interface, the feedback sensor circuitry is one of the best designs I have encountered yet! Based around a -15v to +15v bridge interface and the flexibility of the Atmel Mega168-20, well designed firmware and utility software, the ERC-1 uses an automatically selected multi range voltage scheme, that lets the unit select best voltages range up to 15 volts for the rotor you are "**calibrating**"…notice that I did not write "***trying to Calibrate***"… simply put that is because I have tested this unit with MULTIPLE rotors and did not find one yet that I was unable to calibrate on the FIRST try… even my old Alliance CD73... That's impressive…

The first things you notice when you look at the ERC-1 are these 2 large relays and one smaller one and then you start wondering why 3 relays! Well simply put for break support, the ERC-1 uses two large DPDT relays for Axis motion (UP/DOWN or CW/CCW) and one smaller SPST AUX relay for Break control. Break delays before and after motion request are configurable via the ERC utility, like just about everything else in this tiny interface having to do with rotor handling... The relay based design of the ERC-1 makes it the easiest to integrate to almost ANY rotor controller… In most cases simply install a N.O. side of the relay in parallel with existing controller control switch and same thing with the other relay for the opposite direction… if you want to get fancy use one of the N.C. portion of the relay to prevent manual operations of the rotor controller in the opposite direction during automatic operations or use the other N.O. contact for LEDs (BIG LEDS, I love BIG BRIGHT LEDS!)… Then hook up the sensor and calibrate and you are done!

If I were to look for something missing from the ERC-1, it would have to be the fact that it does not have an LCD display to show requested and real position status of the rotor and possibly break status. But the goal of this unit being to be fully integrated into the existing rotor enclosure, one could ask is this is really a requirement… Another minor issue is the fact that it is RS232c Based instead of USB…

Protocol compatibility and software supported (9/10):

The ERC-1 was originally designed around the DCU-1 protocol, The GS232B-Az were added to resolve some DCU-1 issues (aka AI1 position requested commands not being supported in HRD Rotator and other software (N1MM-Rotor not to name it!)) and this made it even better. Finally, the ERC-1 also supports GS232B-Az/Elev, this is used in Elevation mode to properly control the ERC-1 Elevation attached Rotor this feature was tested here with a G-500A and the elevation side of a G-5400B and both performed as expected, in this configuration HRD Rotator or Nova reported and controlled properly the Elevation and reported the Azimuth as 000 degrees (This is expected since the ERC-1 is not attached to a Azimuth Rotor) Being that HRD Rotator is able to support linking multiple Rotors to the same Satellite DDE link we were able to use mismatched rotors and interfaces and make them work together to track a target.

The ERC-1 firmware automatically detects command sets sent to him by the application and switches automatically to the proper protocol, even better it detects during calibration if you are attaching an Elevation or Azimuth type rotor controler and reacts accordingly in GS232B-Az/Elev operations.... I made extensive tests using ERC-1 Release 5.5 firmware and with HRD Rotator (GS232b-Az, GS232B-Az/Elev and DCU-1), Logger32 (GS232b-Az and DCU-1). N1MM_Rotor (DCU-1), Wintest Rotor utility (GS232b-Az and DCU-1), ERC Control, PstRotator-Lite (GS232b-Az, GS232B-Az/Elev and DCU-1) and Nova (GS232B-Az/Elev) while monitoring the communication port for proper protocol responses or handling issues and no anomalies were detected. HRD Rotator DCU-1 start up issues found in earlier firmware release of ERC-1 were also fully tested and found to be resolved; this was also confirmed by Rene DF9GR. Both DCU-1 and GS232B protocols are both widely used and supported protocols that makes this unit easy to use with most rotor control software.

Installation, Calibration and operations (10/10):

Again, Rene's well prepared documentation featuring 72 rotor controllers from a dozen or so manufacturers was really helpful to understand and properly install the unit into most Rotor controllers. He uses a colour/numeric coded scheme that's simple enough to understand and almost foul proof… Well it worked with me didn't it! Proper warnings are clearly marked in the documentation when required, like when you're dealing with AC in the Ham IV Breaking circuitry…

Calibration is so easy with this unit it was just incredible, this is the easiest unit I have encountered yet as far as calibration is concerned… Simply start the ERC Utility Software that was sent with the unit, select the correct serial port, select calibration and follow the few simple steps (5 or so)! And you are done! What! Are you are concern your rotor sensor may not be linear (and I tough I was the only sucker with an Alliance CD73!), very good point! Not a problem when you get to the end of the calibration process, you can exit or select extra calibration steps every 30 degrees in Azimuth mode or 15 degrees in Elevation mode… No more miniature pots that change values when you release the screw driver or when they get oxydized…

Now that your unit is calibrated, operating is as simple as starting HRD Rotator selecting DCU-1 or GS232-AZ, proper speed (4800bps) and serial port and you're done… you should not even have to worry about setting up offsets... ERC-1 single axis interface is fully supported in all Ham Radio rotor control application that I have tested, if like with HRD Rotator the application does not support the DCU-1 AI1 position feedback request command sets, in these situation even tough the ERC-1 is fully operational, I suggest using GS232B-Az configurations since in this mode these same applications will get position feedback from the ERC-1 and makes for a better integration.

Support 10/10:

All emails sent to Rene DF9GR were responded to in a very short delay with very good information and when problems were found they were often resolved within a couple of days…I have tested this unit back and forth and found the ERC-1 Rel 5.5 firmware to be fully operational and stable.

ERC Also has a Yahoo support group which give a comunity oriented supported for exchange and more simple issues…

Conclusion 9.5/10:

I have tried and tested many different rotor controllers in the last 10 years, most always designed for the famous Yaesu G-5X00 series of rotor controllers that were designed to support external interfaces. Real life is that most rotors for Azimuth were always an issue, when available most being designed for very specific rotor controllers and we won't even get into calibration issues... Even worse would be mismatch non standard AZ/Elev setups making rotors like the G-500A series almost obsolete since they could not be integrated, well ALL of these issues are solved with the ERC-1. In my book it is a **9.5/10**, the ERC-1 is the simply the most flexible and easiest to calibrate unit that I have ever encountered and it was a fun simple kit to assemble. Rene DF9GR has done some incredible work with the ERC-1 and ERC-3D (that we will report on soon) product lines and all this within one year! I can't wait to see what he will come up with after one more year; keep an eye on this guy! I would recommend the ERC-1 anytime… It is simply that impressive…

73, Richard VE2DX

Annexe 1

Table 1 : Software compatibility

	ERC Control Rel.: 5.3	HRD Rotator Rel.: 2494	Logger32 Rel.: 3.24.0	N1MM-Rotor Rel.: 6.11.31	Nova Rel.: 2.12b	Pst-Rotator_Lite Rel.: 1.50	Wintest_Rotor Rel.: 1.0
Yaesu G-800SDX	Yes, DCU-1 (Note 3)	Yes, DCU-1 (Note 1), GS232b-Az, GS232b-Az/Elev (Note 4)	Yes, DCU-1, GS232b-Az	Yes, DCU-1 (Note 1)	Yes, GS232b-Az/Elev (Note 4)	Yes, DCU-1 (Note 3)	Yes, DCU-1 GS232B-Az (Note 2)
Alliance CD73	Yes, DCU-1 (Note 3)	Yes, DCU-1, GS232b-Az, GS232b-Az/Elev (Note 1, 4)	Yes, DCU-1, GS232b-Az	Yes, DCU-1 (Note 1)	Yes, GS232b-Az/Elev (Note 4)	Yes, DCU-1 (Note 3)	Yes, DCU-1 GS232B-Az (Note 2)
Ham IV	Yes, DCU-1 (Note 3)	Yes, DCU-1, GS232b-Az, GS232b-Az/Elev (Note 1, 4)	Yes, DCU-1, GS232b-Az	Yes, DCU-1 (Note 1)	Yes, GS232b-Az/Elev (Note 4)	Yes, DCU-1 (Note 3)	Yes, DCU-1 GS232B-Az (Note 2)
Yaesu G-500A	Yes, DCU-1 (Note 3, 5)	Yes, DCU-1, GS232b-Az, GS232b-Az/Elev (Note 1, 4, 5)	Yes, DCU-1, GS232b-Az	Yes, DCU-1 (Note 1)	Yes, GS232b-Az/Elev (Note 4, 5)	Yes, DCU-1 (Note 3, 5)	Yes, DCU-1 GS232B-Az (Note 2)
Yaesu G-5400B	Yes, DCU-1 (Note 3, 5)	Yes, DCU-1, GS232b-Az, GS232b-Az/Elev (Note 1, 4, 5)	Yes, DCU-1, GS232b-Az	Yes, DCU-1 (Note 1)	Yes, GS232b-Az/Elev (Note 4, 5, 6)	Yes, DCU-1 (Note 3, 5)	Yes, DCU-1 GS232B-Az (Note 2)

Annexe 2

Table 2 : Rotor Compatibility

	Hook up Compatibility	Hook up Complexity	Calibration	450 Degree support	Elevation Support	KAT (Note 6)	CKAT (Note 7)
Yaesu G-800SDX	Yes	2	2 Had to do 2 extra steps for 450 Degree calibration	Yes	N/A	OK	OK
Alliance CD73	Yes	4	3 Very unstable rotor none linear rotor did fine calibration to validate.	N/A	N/A	OK	OK
Ham IV	Yes	4	1	N/A	N/A	OK	OK
Yaesu G-500A	Yes	3	1	N/A	Yes	OK	OK
Yaesu G-5400B	Yes Single Axis, but both worked.	1	1	N/A	Yes, tested both Azimuth and Elevation	OK	OK

1 = Easy … 10 = difficult

Annexe 3

Note 1: These softwares do not support AI1 command set in DCU-1 mode thus because of this there is no position feedback from the rotor to the application.

Note 2: Wintest-Rotators supports DCU-1 at 4800bps and GS232A at 4800bps, being that the ERC-1 is a GS232B protocol unit, the ERC-1 does accept the position request commands, but his position feedback commands are not understood by WinTest-Rotators, use DCU-1 with this application.

Note 3: ERC Control and PST_Rotator-Lite are driving the ERC-1 in DCU-1 mode only.

Note 4: GS232B-AZ/Elev react according to type of rotor calibrated on the ERC-1, if Azimuth rotor then commands respond to Azimuth request and send 000 to position request. If calibrated as Elevation rotor, then Elevation are respponded to and Azimuth commands respond with 000 to position request.

Note 5: In G-5400B test Azimuth and Elevation were tested as seperate entities, The ERC-1 not being a dual axis interface these could not be tested in duo.

Note 6: KAT = Kick Ass Test, where once the rotor is hooked up and tested, you send a series of 10 position request at very high speed to the controller alternating above and below the present position of the Controller, noting the reaction of both the application, communication protocol, Interface and rotor. Making certain that at end of test all position request were sent and accepted by the interface and controller and that the last position requested is the final position of the rotor.

Note 7: CKAT = Connection Kick Ass Test, where you connect and disconnect the interface to the application at very high speed, making certain the connection is always made and valid.

Note 8: Both KAT and CKAT were done with all applications and rotor and communications protocols