ROTOR CONTROL DXA
de K4JRG

User's Manual

ROTOR CONTROL DXA, K4JRG

User's Manual

V1.05, Rev F4

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Welcome!

C ongratulations on your purchase of Rotor Control DXA de K4JRG. This device was designed with the goal of providing a functional but inexpensive means of controlling the Yaesu DXA rotors. Our philosophy is to 'keep it simple' where we can and above all, make it economical. There are no fancy circuitries here or even LED flashing. In fact, the idea is that you plug the device in, throw it behind your desk and forget about it's there.

The user interface is text based and uses a terminal program as display. You can use this interface to operate the device or, most likely, use it with a logging or spotting program. Rotor Control DXA uses a subset of the GS-232 controller protocol which makes it compatible with most software with Yaesu rotor support.

If you need assistance with operation or have a comment or suggestion, please don't hesitate to contact us. Contact information is located in the Warranty and Support section of this manual.

Features

- Fully automatic, software driven rotor azimuth control

- Easy, menu driven calibration - all done in firmware

- Full 'plug and play' without opening your rotor control box

- Manual rotor controls will operate concurrently

- User selected 'Start Delay' to reduce mechanical stress

- Auto ramp up/down speeds for smooth start/stop movements

- User selected maximum rotational speed

- Compatible with most rotor control software that support Yaesu rotors

- Menu driven operation using standard terminal program

- Self-contained, microcontroller driven

- Electrostatic Discharge (ESD) protection

- Firmware is field upgradeable via simple flash process

Specifications

Power requirements

8v to 25v DC @ 100ma

> **Note**
> Even though Rotor Control DXA has a built in voltage regulator, care should be taken when using a "wall-wart" type AC/DC adapter to ensure it's output is clean and stable.. A 12V input is the accepted standard.

Microcontroller

Atmel ATmega8 @ 8 MHz
8k bytes Flash memory
512 bytes EEPROM
1k byte SRAM
In-system programming with boot loader
Field programmable via serial port
Hardware ADC, Software DAC

Communications

9,600 and 19,200 baud rates
8 data bits
None parity
1 stop bit
Yaesu GS-232 protocol subset
Electrostatic Discharge (ESD) protected

Setup

Connections:

1. Connect Rotor Control DXA to your PC serial port with the provided DB9 RS-232 connector.

2. Connect the 6 pin mini DIN connector to your Yaesu DXA rotor controller. The flat end of the male connector faces up.

3. Connect to a stable DC power source between 8 and 25 volts. Your shack's 12v power supply is ideal. See "Specifications" elsewhere in this manual for power requirements details.

Calibration:

Rotor Control DXA comes preset with generic calibration values that might work for your antenna system setup. However, we strongly encourage you run through this calibration procedure to ensure maximum accuracy and function.

1. Launch your favorite terminal emulation program and set it to Baud rate = **19.200** Bits = **8** Parity = **None** Stop bits = **1**

2. Type the command **UI** and press Enter. You will be presented with the User Interface and calibration menu. See figure 1

Calibration (continued)

```
Terminal - HyperTerminal                                          _ □ ×
File  Edit  View  Call  Transfer  Help

Welcome to ROTOR CONTROL setup, v1.05
                 de k4jrg@k4jrg.org

1. Set N,S,E or W rotor heading (S)

2. Set LEFT (ccw) stop (10)

3. Set RIGHT (cw) stop (857)

4. Set rotor MAX speed (4)

5. Start Delay (1)

6. Move rotor to XYZ degrees (302)

7. Flash Microcontroller


9. Save and Exit


Please select:

Connected 0:00:13    ANSIW    9600 8-N-1   SCROLL  CAPS  NUM  Capture  Print echo
```

Figure 1. User Interface Main Menu. Activated with the **UI** command

3. Set your rotor heading by selecting **1** from the menu and pressing Enter. You will be prompted to chose your antenna system heading between N=North, S=South, E=East, W=West. Rotor heading refers to where your rotor points to when is resting half way the 360 degree range. For example, if your rotor starts at the left stop of 180 degrees (South), travels over 0 degrees (North) and finishes on 180 degrees (South again), your system is set with a North heading.

4. Select number **2** from the menu and manually move your rotator to its far LEFT stop. Once the rotor has reached its LEFT stop, press Enter to set left.

5. Repeat the above procedure for the RIGHT stop by selecting **3** from the menu

> **Note**
>
> As of this writing, only 360 degree movements are supported so your right stop should be 360 degrees from the left stop in the previous step.

Calibration (continued)

6. Set the maximum rotor speed by selecting **4** from the menu. The rotor speed has an arbitrary range of 1 through 4. Increasing the number will increase the rotor movement top speed.

7. Select number **5** from the menu to set the start delay in seconds. The start delay refers to the time Rotor Control DXA will wait before starting to move the rotator. This feature is helpful in reducing stress to the rotator when reversing direction movement.

8. Menu option **6** allows you to manually enter the antenna azimuth in degrees so you can confirm its accuracy.

9. Option **7** is discussed in the "Flashing Microcontroller" section of this manual. This option should only be selected when directly by the manufacturer. A new device already comes with the latest firmware loaded.

10. After completing the calibration procedure, select option 9 to save your settings and return to normal operation.

Changing Baud Rate:

Rotor Control DXA supports 9,600 and 19,200 baud rates. The default factory set speed is 19,200. To change the baud rate:

1. Open Hyperterminal at the current baud rate. You may have to experiment with Hyperterminal between the two speeds if you have changed the default setting at some point.

2. Type **B96** for 9,600 or **B19** for 19,200 and then press enter. Note that you will not see what you type on the screen.

3. Disconnect Hyperterminal, change it's baud rate to match your new setting and reconnect. You should see the menu if you enter the UI command.

4. The new setting will be saved to memory so it stays at the new baud rate even if power is removed from the device.

Chapter

2

Flashing Microcontroller

WARNING: Complete this procedure when instructed to do so by the manufacturer. Failure to strictly follow this procedure while flashing the microcontroller can render the device unusable.

This procedure uses the Windows HyperTerminal application included with these platforms. Make equivalent changes for other terminal applications.

Windows HyperTerminal Setup:

1. Launch the HyperTerminal application, usually found in the Accessories folder

2. You will be prompted with a dialog box to enter the terminal setup name. Type "Terminal".
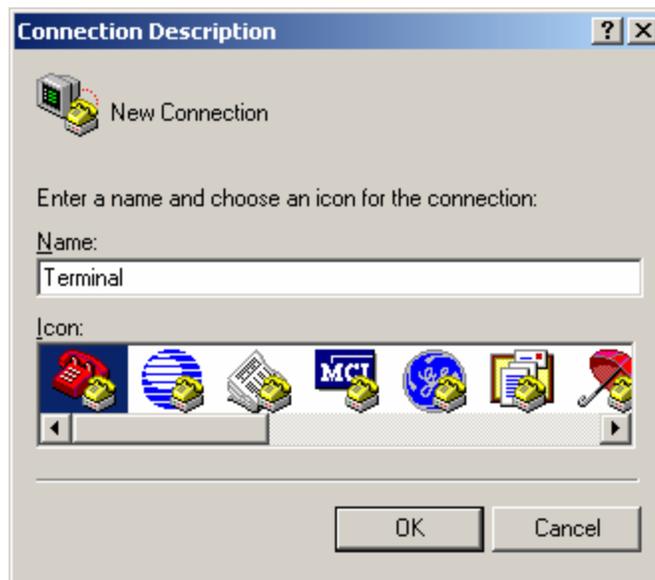
Figure 2. HyperTerminal Setup Name during first time setup.

Flashing Microcontroller (continued)

3. Next, choose the serial COM port where Rotor Control DXA is connected.

Figure 3. Choose the serial COM port

4. When prompted for COM port parameters, enter 19,200, 8,1,N
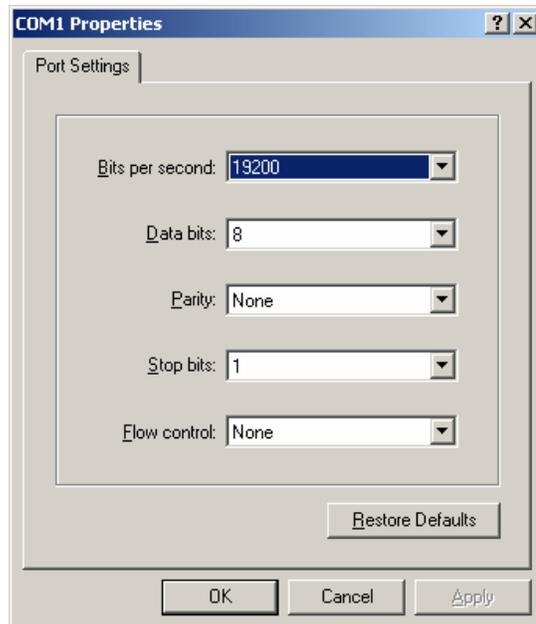
Figure 4. Set COM port parameter

Flashing Microcontroller (continued)

5. Enter the ASCII Setup:

  ▪ Disconnect from serial port with Call, Disconnect
  ▪ File, Properties, Settings, ASCII setup
 ▪ Set Line delay = 20 ms
  ▪ Set Character delay = 2 ms
  ▪ Click OK and close the windows
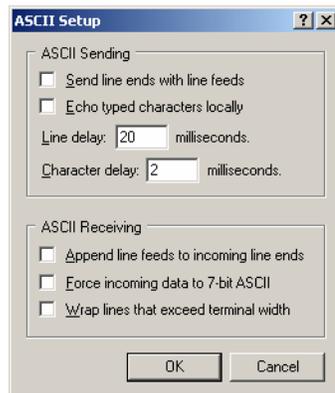
Figure 5. ASCII setup window. It's critical that these
Parameters are set exactly like shown

6. Press Enter and then type command **UI** and press the Enter key again.

7. From the main menu shown, choose **7** Flash Microcontroller.

8. Select Transfer, Send Text File and open the new .HEX file
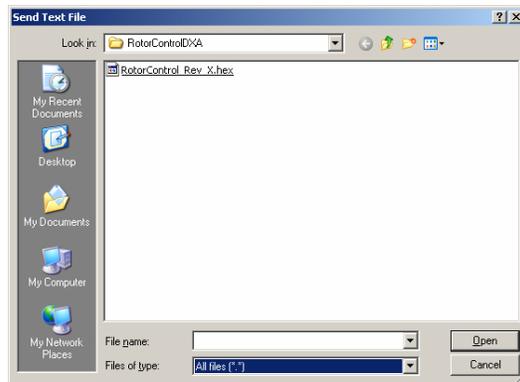
Figure 6. Transfer, Send Text File dialog.

Flashing Microcontroller (continued)

9. Microcontroller flashing will commence.

DO NOT INTERRUPT FLASH PROCESS

10. The microcontroller will echo a ? symbol while it's receiving the new code.

11. The process will be complete when the microcontroller sends an "X" character.

12. After completion, power cycle Rotor Control DXA by interrupting power for >2 seconds.

Chapter

3

Warranty and Support

If you're not completely satisfied with this product, neither are we. We will do our best to make things right for you or we'll refund your money. For a full purchase price refund, minus shipping and handling, contact us at the address below.

Rotor Control DXA is warranted on parts and labor for a period of up to one (1) year after purchase. This warranty is transferable. All parts are covered against defect for one full year except if misused.

We have taken steps to ensure this documentation, product interface and use is as simple and clear as possible. Please read this manual thoroughly before requesting support. However, if you have any questions, issue or simply want to make a suggestion or comment, please don't hesitate to contact us as per below

To claim warranty or request support, contact us at:

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