Stellaris® Brushed DC Motor Control RDK (RDK-BDC24)

Stellaris motor control reference design kits (RDKs) from Texas Instruments accelerate product development by providing ready-to-run hardware, a typical motor, and comprehensive documentation including hardware design files.

The RDK-BDC24 is designed for control of 12 V and 24 V brushed DC motors at up to 40 A continuous current. Features include high-performance CAN and RS232 networking as well as a rich set of control options and sensor interfaces, such as analog and quadrature encoder interfaces. After evaluating the RDK-BDC24, users may choose to either customize the hardware and software design or use the MDL-BDC24 module without modification.

Installing and Using the BDC24 Motor Control RDK

This section describes how to set up and use the RDK-BDC24.

Kit Contents

The RDK-BDC24 reference design kit includes the following items:

- MDL-BDC24 motor control module with 10-pin debug header
- Mabuchi RS-555PH-3255 brushed DC motor
- Universal input wall power supply
- DB9-to-RJ12 adapter
- 6P6C 7-ft cable
- CAN terminator
- Adapter cable for ARM JTAG/SWD fine pitch header
- Rubber pads (4)
- Reference Design Kit CD containing this documentation, software, and hardware design files

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Step 1: Set Up Hardware

Perform the following steps to run the motor:

1. Connect the rubber pads to the motor as shown in the next figure.

   WARNING: Without the rubber pads, the motor could potentially move and fall off the surface where you are working when subjected to sudden speed changes.

2. Connect the MDL-BDC24 module to a PC.
   – Connect the DB9-to-RJ12 adapter to the COM port on your PC.
   – Connect one end of the 6P6C cable to the adapter and the other end to the MDL-BDC24 module's CAN/RS232 connector (to the left of the LED – labeled IOIOI NET)

3. Connect the motor to the MDL-BDC24 module.
   – Connect the green lead of the motor to the green screw terminal of the MDL-BDC24 module.
   – Connect the white lead of the motor to the white screw terminal of the MDL-BDC24 module.

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4. Connect the power source to the MDL-BDC24 module.
   - Connect the black lead of the power supply output to the black screw terminal of the MDL-BDC24 module.
   - Connect the red lead of the power supply output to the red screw terminal of the MDL-BDC24 module.

5. Plug the power supply of the MDL-BDC24 module into an outlet. After the MDL-BDC24 module is powered up, the status LED flashes orange indicating that it is not receiving any CAN/RS232 traffic or a signal on the servo (PWM) input.

Step 2: Use BDC-COMM to Control the Motor

BDC-COMM is an application designed to help you control and monitor the MDL-BDC24 using your computer's COM port.

1. Insert the RDK Documentation and Software CD into the CD-ROM drive of your computer. If Autoplay is enabled on your PC, the index.htm file automatically opens in your default web browser. If not, use Windows Explorer or other browser to open the index.htm file manually.

2. From the CD menu, select the Software button. Click the 'Download' link for the BDC-COMM application.

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3. Save the BDC-COMM application to your preferred location.

4. Browse to the location where you saved the BDC-COMM application and double click the icon to run the application. The BDC-COMM application starts.

   Note: You can also run the BDC-COMM application directly from the CD. The BDC-COMM utility is located in the /Software/BDC-COMM directory on the CD.
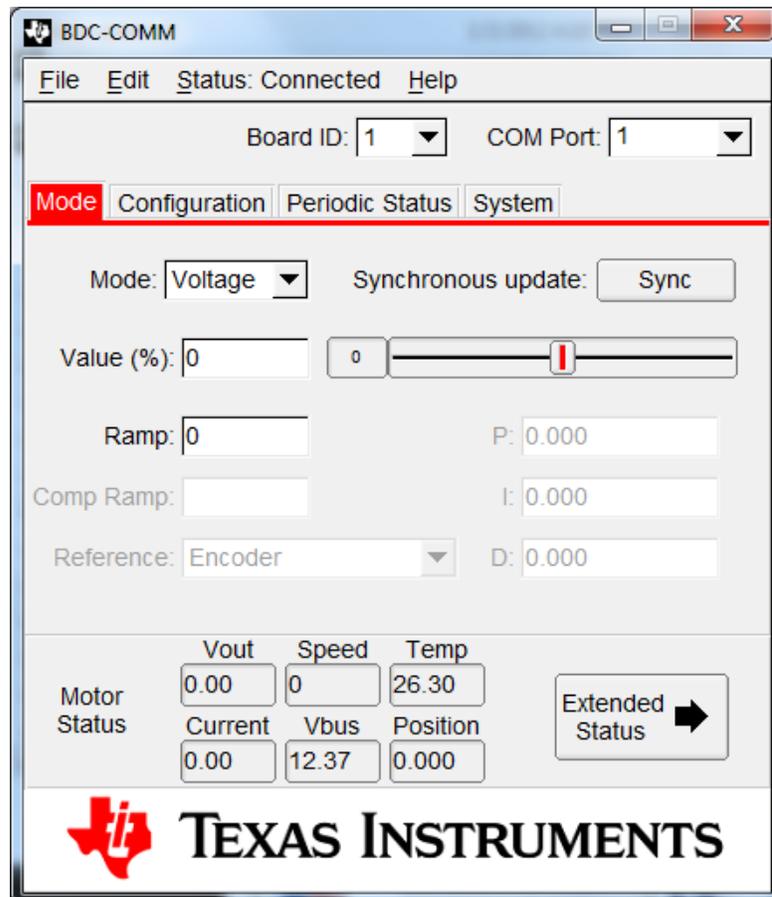
5. With the hardware already setup, the BDC-COMM application should automatically connect to the board. If it does not connect automatically to the board, select the COM port number associated with your PC's COM port (typically number 1). Then select the proper board ID (defaults to number 1).

6. Set the ramp rate to 10 by typing '10' into the "Ramp" field or by clicking the up arrow next to the "Ramp" field.

7. Set the output voltage value to 25% by typing '25' into the "Value (%)" field. Press Enter.

8. Adjust the output voltage to the motor by using the slider bar.

Additional Information

For details on using the BDC-COMM application, see the *BDC-COMM Application User's Guide.* As the output voltage is changed, the status LED changes as follows:

LED State	Module Status
flashing green	The output voltage is above 0 %, but below 100%.
solid green	The output voltage is at maximum (100%V).
flashing red	The output voltage is below 0%, but above -100%.
solid red	The output voltage is at negative maximum (-100%).
solid orange	The output voltage is neutral (0%).

The neutral output is provided for a small range of voltage inputs. This is done for joystick-based robotics applications and is an adjustable parameter in the MDL-BDC24 module (although the BDC-COMM application does not support this parameter).

Large instantaneous changes in output voltage result in a corresponding instantaneous current draw. Using the ramp parameter allows you to specify the rate at which the applied voltage is changed to the motor. The ramp parameter can be used to reduce the instantaneous current demand. The ramp parameter has a default value of '0' which corresponds to being disabled.

Conclusion

You have now successfully operated the brushed DC motor using the MDL-BDC24 module. For more information on using the RDK-BDC24 reference design kit, see the *RDK-BDC24 Brushed DC Motor Control RDK User's Manual*, which also contains information that can assist you with adapting the software and hardware for a specific application.

References

The following references are included on the BDC24 Motor Control RDK documentation CD and are also available for download at www.ti.com/stellaris:

- *Stellaris Brushed DC (RDK-BDC24) Motor Control Reference Design Kit User's Manual*, publication number RDK-BDC24-UM

- *Stellaris Brushed DC (MDL-BDC24) Motor Control data sheet,* publication number RDK-BDC24-DS

- *BDC-COMM Application User's Guide,* publication number BDC-COMM-UG

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