Embedded Control

Machine-to-Machine (M2M) Application Kit
Getting Started

Application Kit Contents

- *Dynamic C*® and *Dynamic C* PPP module CDs, with complete product documentation on disk.

- Supplemental CD with sample programs and information related to M2M Application Kit.

- RCM3200 RabbitCore module.

- Prototyping Board, with a bag of accessory parts for use on the Prototyping Board.

- LCD/keypad module.

- AC adapters: 12 V DC, 1 A for RCM3200 and Prototyping Board; 12 V DC, 1 A for GSM/GPRS modem. AC adapters are included only with Application Kits sold for the North American market (provisions are included to facilitate other customers in connecting their own power supplies with an output of up to 1 A at 8–24 V DC).

- Programming cable with level-matching circuitry.

- GSM/GPRS modem: MultiTech or Wavecom 900/1900 MHz for North American customers; Wavecom 900/1800 MHz for customers outside North America.

- ½-wave antenna for modem

- DB15 to 10-pin adapter cable.

- Ethernet crossover cable.

- *RCM3200 Getting Started Manual*.

- *Getting Started* instructions and application instructions.

- *Rabbit 3000*® *Processor Easy Reference* poster.

- Registration card.

Hardware Connections

1. Set Up LCD/Keypad Module

If header J5 is installed, remove the jumper on header J5 on the back of the LCD/keypad module to configure the LCD/keypad module to operate at 5 V. If the LCD/keypad module has a potentiometer, the contrast may be adjusted once the LCD/keypad module is installed in Step 2.

2. Install Modules on Prototyping Board

Turn the RCM3200 module so that the Ethernet connector end of the module extends off the left side of the Prototyping Board as shown in Figure 2 below. Line up the pins on headers J1 and J2 on the bottom of the module with header sockets RCM2JA and RCM2JB on the Prototyping Board. Install the LCD/keypad module on header sockets J7, J8, and J10 of the Prototyping Board as shown in Figure 2. Press both module's pins firmly into the Prototyping Board header sockets.
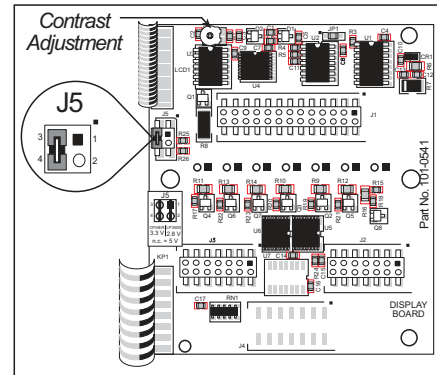
Figure 1. Remove Jumper from Header J5 on LCD/Keypad Module
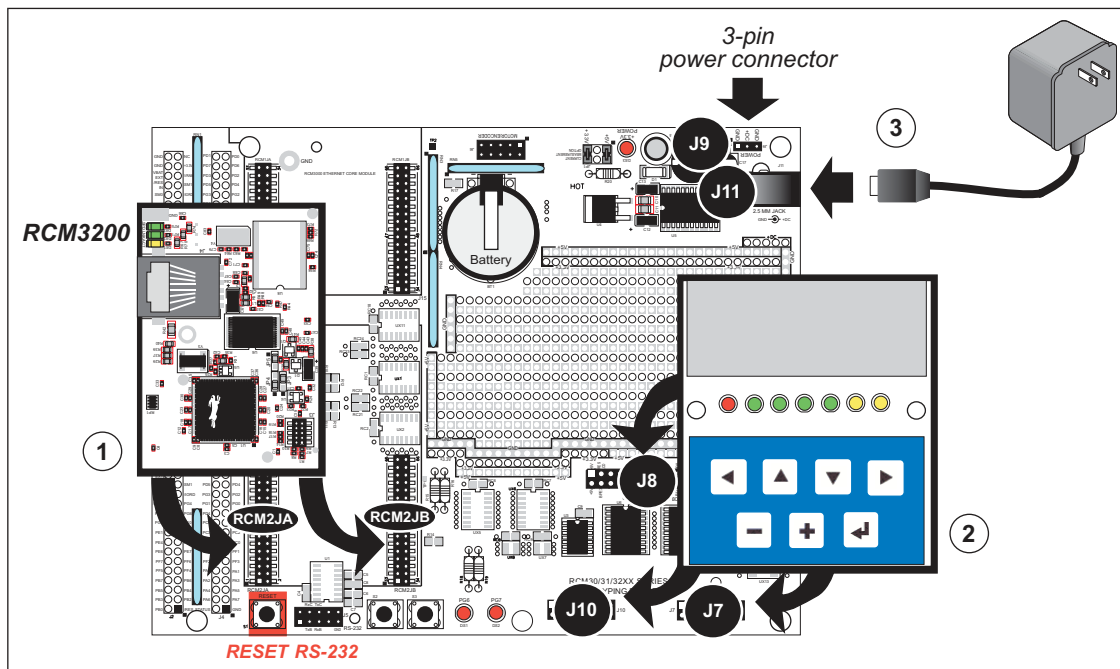
Figure 2. Install the Modules on the Prototyping Board

> **NOTE:** It is important that you line up the pins on the modules exactly with the corresponding pins of the sockets on the Prototyping Board. The header pins may become bent or damaged if the pin alignment is offset, and the modules will not work. Permanent electrical damage to the modules may also result if a misaligned module is powered up.

Connect the wall transformer to jack J11 on the Prototyping Board as shown in Figure 2 above. The power LED to the left of the power-supply connection on the Prototyping Board should light up.

> **NOTE:** The **RESET** button is provided on the Prototyping Board to allow a hardware reset of the RCM3200 module without disconnecting power.

> **TIP:** If you need to reset the GSM/GPRS modem, disconnect, then reconnect its power supply. The GSM/GPRS modem has its own power supply.
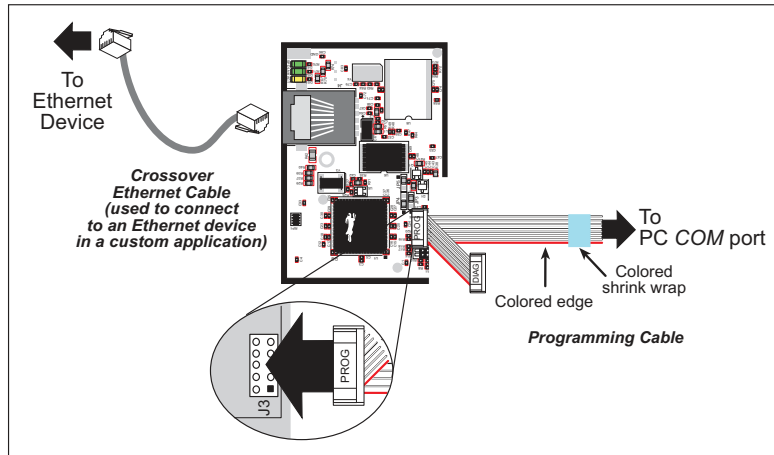
Application Kits Outside North America

Application kits sold outside North America include a header connector that may be connected to 3-pin header J9 on the Prototyping Board. The connector may be attached either way as long as it is not offset to one side.The red and black wires from the connector can then be connected to the positive and negative connections on your power supply. The power supply should deliver 8 V–24 V DC at 1 A.

3. Attach Cables

Connect the 10-pin connector of the programming cable labeled **PROG** to header J3 on the RCM3200 as shown in Figure 3. Be sure to orient the marked (usually red) edge of the cable towards pin 1 of the connector. (Do not use the **DIAG** connector, which is used for a normal serial connection.)

> NOTE: Be sure to use the programming cable supplied with this Application Kit— the programming cable has blue shrink wrap around the

Figure 3. Connect Programming and Ethernet Cables to PC

RS-232 converter section located in the middle of the cable. Programming cables from other Z-World or Rabbit Semiconductor kits were not designed to work with RCM3200 modules.
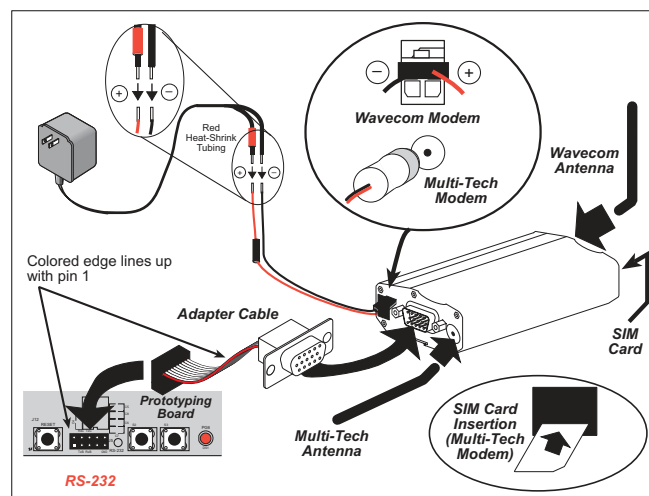
4. Set Up GSM/GPRS Modem

The modem requires a SIM card, and supports both 3 V and 5 V SIM cards. Before using your SIM card, contact your service provider to activate your card as detailed in the instructions included with your card. North American customers may call AIRDESK at 1-800-AIR-DESK to get a SIM card, and make arrangements for wireless service and activation. You may have to wait 8–24 hours for the activation to come into effect. You may also be asked for the 15-digit IMEI number of the modem, which appears with the bar code label on the modem.

Figure 4. Hook Up GSM/GPRS Modem

Use a small screwdriver to pry off the SIM cover on Multi-Tech modems; for Wavecom modems, use a pointed object to press the yellow button near the antenna connector to eject the SIM card holder. Place the SIM card, and return the card holder into the modem.

Use the DB15 to 10-pin adapter cable to connect the modem to the RS-232 header on the Prototyping Board. Be sure to orient the marked (usually red) edge of the adapter cable towards pin 1 of the connector. Install the antenna and connect the 12 V, 1 A power adapter as shown in Figure 4.

Running the Software

1. Install the DC 8.51 software from the Dynamic C CD. Use the license key supplied on the card inside the CD sleeve.

2. Install the PPP module from the Dynamic C PPP module CD. Using the license key supplied on the card inside the CD sleeve.

3. Copy the contents from the supplemental CD to a directory on your hard disk. We recommend that you assign a readily identifiable directory name such as `M2M_KIT`.

4. Copy the library components from the `C:\M2M_KIT\LIB` folder into the library directory of your Dynamic C installation (e.g., `C:\DCRABBIT_8.51\LIB`).

5. Open Dynamic C (for example, by double-clicking on the Dynamic C icon on your PC desktop), and open the library directory file `LIB.DIR`. Add the following lines, and save the file.

   ```
   ...
   lib\gsmkit\gsm_gprs.lib              lib\op7200_app\glmenu.lib
   lib\gsmkit\kdu_menu.lib              lib\op7200_app\gprs_app.lib
   lib\gsmkit\kdu_menu_sms.lib          lib\op7200_app\gprs_bmp.lib
   lib\gsmkit\mdm_wavecom.lib           lib\op7200_app\tscustkeyboard.lib
   lib\gsmkit\modemcntrl.lib
   ```

6. With the programming cable and modem adapter cable attached as described in the preceding pages, and power applied to both the Prototyping Board and the modem, open the sample program `M2M_KIT\SAMPLES\GSM\BASIC_SMS.C`. Press **F9** to compile and download the sample program.

The program should print out some diagnostic information in the Dynamic C **STDIO** window. The phone number for the modem is included in this diagnostic information. Use the phone number to send an SMS message from a GSM phone to the modem. The sample application will read the message, display the contents on the screen, and then respond to the SMS message with a preprogrammed message.

Where Do I Go From Here?

Be sure to check the `readme_1st.txt` file on the supplemental CD and the M2M FAQs on the M2M product page from the Z-World® Web site for additional information. The *RabbitCore RCM3200 Getting Started Manual* included with this kit provides more detailed hookup and Dynamic C debugging information. The *RabbitCore RCM3200 User's Manual* on the Dynamic C CD provides complete information on using and developing applications for the RCM3200, and includes further information on the Prototyping Board and the LCD/keypad module.

The supplemental CD included with this Application Kit contains sample programs to illustrate:

- using a GSM device (e.g., cell phone) to initiate SMS commands/messages to the RCM3200
- using the RCM3200 to initiate an SMS message to a cell phone via the LCD/keypad module
- using the RCM3200 to establish a PPP connection via GPRS network (opens socket for a GPRS session)
- using the RCM3200 to log on to FTP/SMTP/POP3 servers
- a data-entry menu system for the LCD/keypad module
- interfacing Z-World's OP7200 operator interface with a GSM device
- using TCP/IP libraries for Machine2ME communication

If there are any problems:

- Use the Dynamic C **Help** menu to get further assistance with Dynamic C.
- Check the Z-World/Rabbit Semiconductor Technical Bulletin Board at www.zworld.com/support/bb/.
- Use the Technical Support e-mail form at www.zworld.com/support/questionSubmit.shtml.

> **NOTE:** If you purchased your M2M Application Kit through a distributor or through a Z-World or Rabbit Semiconductor partner, contact the distributor or partner first for technical support.