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Embedded Control

Camera Interface Application Kit Getting Started

Application Kit Contents

- 3 CDs — *Dynamic C*[®], *Dynamic C* FAT File System module, and supplemental CD with sample programs and information related to Camera Control Application Kit — with complete product documentation on disk.
- RCM3365 RabbitCore module.
- Camera Interposer Board to interface camera and micro-servo motors with RCM3365 and Prototyping Board.
- RCM3365 Prototyping Board, with a bag of accessory parts for use on the Prototyping Board.
- Miniature C328-7640 serial camera, plastic bracket, and 4-wire cable with friction-lock connectors.
- 10-pin header to DB9 programming cable with integrated level-matching circuitry.
- 2 power-supply harnesses (3-pin connector to red/black wires with bare leads).
- AC adapter, 12 V DC, 1 A.
- Ethernet cables.
- 2 Blue Arrow micro-servo motors.
- Infrared motion sensor.
- 4 foam doubled-sided mounting strips.
- *Getting Started* instructions.
- 32 MB *xD-Picture Card*[™] (NAND flash)
- *Rabbit 3000 Processor Easy Reference* poster.
- Registration card.

Installing *Dynamic C*[®]

Insert the CD from the Development Kit in your PC's CD-ROM drive. If the installation does not auto-start, run the **setup.exe** program in the root directory of the *Dynamic C* CD. Install any *Dynamic C* modules and the software from the supplemental CD after you install *Dynamic C*.

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Hardware Connections

1. Install Camera Interposer Board and RCM3365

Orient the Camera Interposer Board as shown in Figure 1 and line up the pins on the bottom of the Interposer Board with sockets JA and JB on the Prototyping Board. Press the Interposer Board's pins firmly into the Prototyping Board sockets.

Use a power-supply harness to connect the PWR pins (header J3, middle terminal is +5 V) on the Interposer Board to the +5 V and GND terminals on screw-terminal header J6 on the Prototyping Board.

Install the RCM3365 on the Interposer Board as shown in Figure 1. Line up the pins on the bottom of the RCM3365 module with sockets JA and JB on the Interposer Board. Press the RCM3365 module's pins firmly into the Interposer Board sockets. The *xD-Picture Card* may be inserted into header J6 on the RCM3365 at this time.

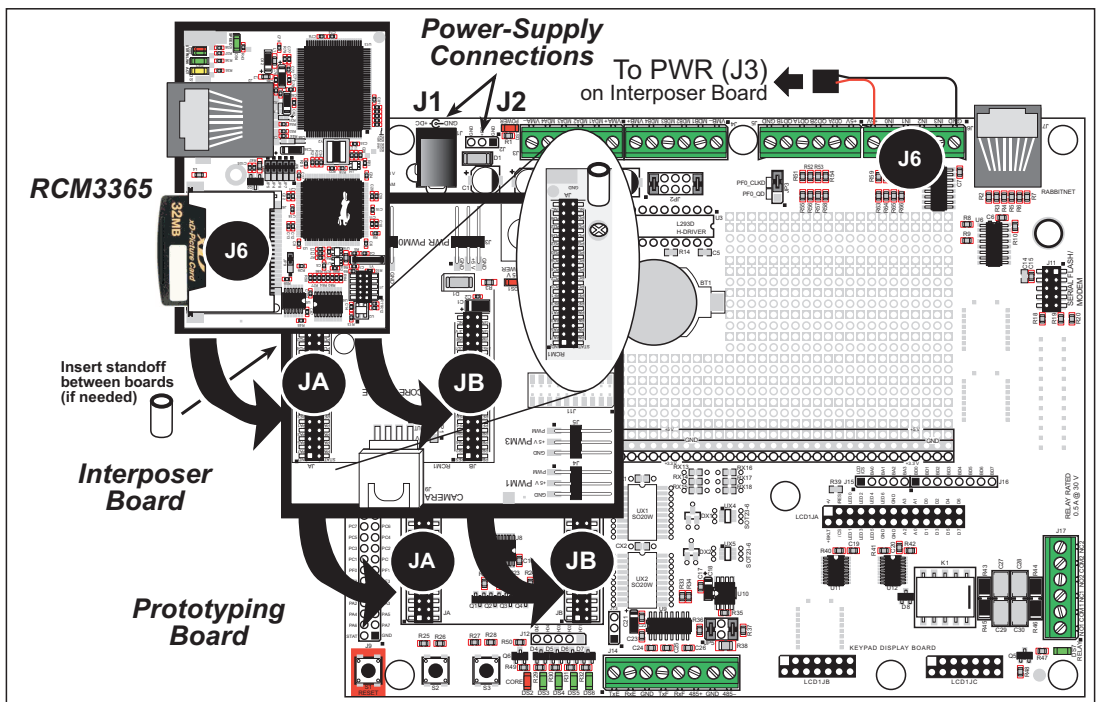


Figure 1. Install the RCM3365 and Interposer Board on the Prototyping Board

NOTE: It is important that you line up the pins on the RCM3365 module and the Interposer Board exactly with the corresponding pins of the sockets. The header pins may become bent or damaged if the pin alignment is offset, and the boards will not work. Permanent electrical damage to the modules may also result if a misaligned module is powered up.

A ¼" (6.3 mm) standoff is recommended to secure the RCM3365 module and the Interposer Board to the Prototyping Board in high-vibration environments. Attach one standoff to the top side of the Interposer Board as shown in Figure 1. Then secure the Interposer Board to the Prototyping Board using the standoff already on the Prototyping Board, and secure the RCM3365 into the other standoff on the Interposer Board.

2. Connect Programming Cable and Power Supply

Connect the 10-pin connector of the programming cable labeled **PROG** to header J1 on the RCM3365 as shown in Figure 2. Be sure to orient the marked (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.) Connect the other end of the programming cable to a COM port on your PC.

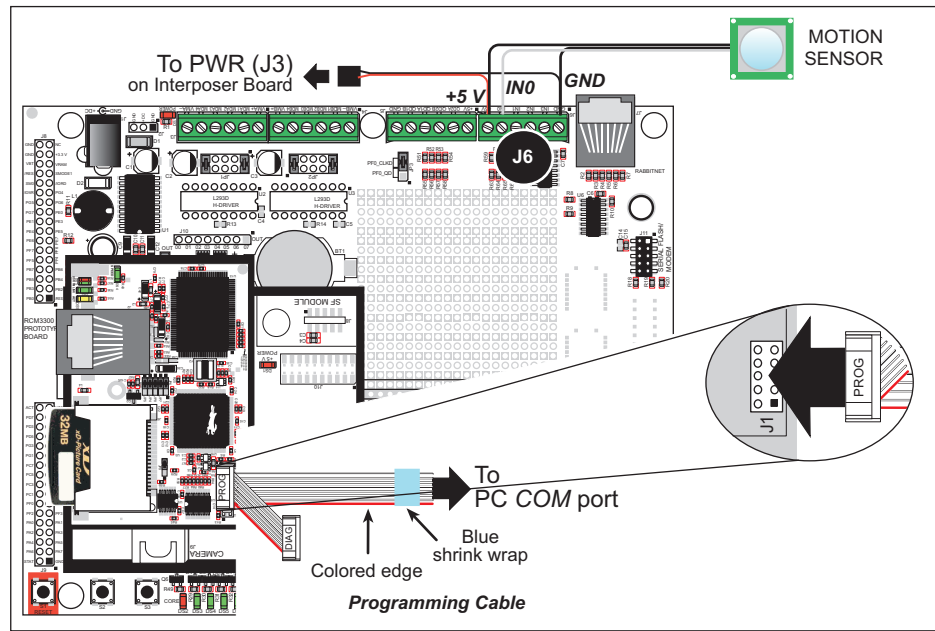


Figure 2. Connect Programming Cable, Interposer Board Power, and Motion Sensor

NOTE: Be sure to use the programming cable (part number 101-0542) supplied with this Application Kit—the programming cable has blue shrink wrap around the RS-232 converter section located in the middle of the cable. Programming cables with red or clear shrink wrap from other Z-World or Rabbit Semiconductor kits are not designed to work with RCM3365 modules.

NOTE: Some PCs now come equipped only with a USB port. It may be possible to use an RS-232/USB converter (Rabbit Semiconductor Part No. 540-0070) with the programming cable supplied with this Application Kit. Note that not all RS-232/USB converters work with Dynamic C.

If you are using the motion sensor, connect its +5 V and GND terminals to screw-terminal header J6 on the Prototyping Board—the middle black wire is +5 V—and connect its gray wire to IN0.

Once all the other connections have been made, you can connect power to the Prototyping Board. Connect the AC adapter to jack J1 on the Prototyping Board. The **POWER** LED on the Prototyping Board should light up. The RCM3365 and the Prototyping Board are now ready to be used.

NOTE: A **RESET** button is provided on the Prototyping Board to allow a hardware reset without disconnecting power.

Alternate Power-Supply Connections

All Development Kits include a harness that may be used to connect your power supply to 3-pin header J2 on the Prototyping Board. The connector may be attached either way as long as it is not offset to one side—the center pin of J2 is always connected to the positive supply, and either edge pin is negative. The power supply should deliver 8 V–30 V DC at 1 A.

3. Set Up and Connect Servo Motors and Camera

Complete the assembly of each servo motor by attaching the cross-shaped plastic blade to the motor shaft using the smallest screw from the parts bag in the motor box.

Cut a piece of a foam mounting strip and use it to secure the end opposite the turning axis of one of the micro-servo motors in an unused area of the Prototyping Board close to the edge. This will be the *pan* servo motor. You may also use another surface located close to the Prototyping Board. This *pan* servo motor can be secured more firmly if it is next to something else such as a screw-terminal header, and its side is also secured with the foam mounting strip.

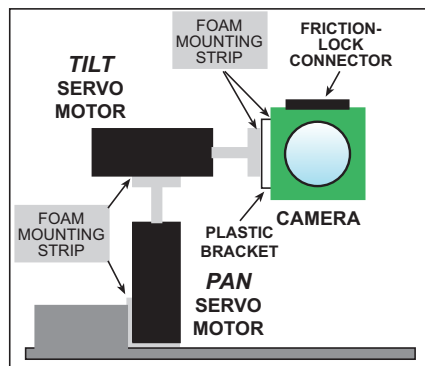
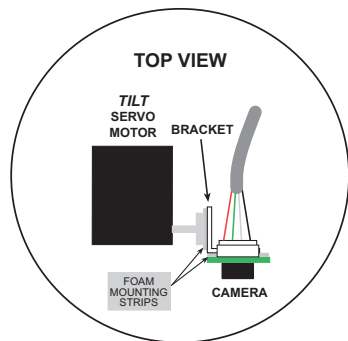
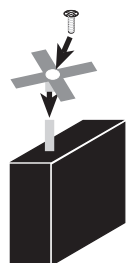


Figure 3. Servo Motor and Camera Setup

Starting Dynamic C

Once the RCM3365 is connected as described in the preceding pages, start Dynamic C by double-clicking on the Dynamic C icon or by double-clicking on `dcrab_XXXX.exe` in the Dynamic C root directory, where `XXXX` are version-specific characters. Dynamic C uses the serial port specified during installation.

If you are using a USB port to connect your computer to the RCM3365, choose **Options > Project Options** and select “Use USB to Serial Converter.”

Set the compiler to run the application in the fast program execution SRAM by selecting “Code and BIOS in Flash, Run in RAM” from the Dynamic C **Options > Project Options > Compiler** menu.

Pan Motor Connections Connect the servo motor wires to the Interposer Board — connect the *pan* servo motor to PWM3 (header J5). The black wire is GND and the white wire is the PWM signal.

Calibrate Pan Motor Calibrate the *pan* servo motor now by running the `SERVO_CALIB.C` sample program from the Dynamic C `SAMPLES\CAMERAINTERFACE` folder. Use the **File** menu to open the sample program, and press function key **F9** to compile and run the program. The **STDIO** window will open on your PC and will display a calibration dialog box. Use a felt pen to mark a dot on the servo motor’s rotating blade, and watch the blade rotate as you repeatedly press the “l” key on your keyboard with the **STDIO** window active. A **PAN** value will also display in the **STDIO** window. The blade will not rotate any further when it reaches its limit, and you may hear the motor humming. Go back at least two “steps” by pressing the “r” key on your keyboard, and press the “s” key on your keyboard to save the **PAN** value. (Write down the value.) Answer the prompts in the **STDIO** window and. Now repeatedly press the “r” key on your keyboard until the blade reaches its other limit, and go back at least two “steps” by pressing the “l” key on your keyboard. Press the “s” key on your keyboard to save the **PAN** value and answer the prompts. (Write down the value.) Finish by continuing to press the “l” key on your keyboard until the **PAN** value is midway between the two limits.

Tilt Motor Setup Cut a second piece of a foam mounting strip and use it to secure a side of the other micro-servo motor to the blade on the turning axis of the *pan* servo motor. This other servo motor is the *tilt* servo motor.

Connect the *tilt* servo motor to PWM1 (header J4), and calibrate it using the “u” and “d” keys on your keyboard to rotate the blade to its limits as you did for the *pan* servo motor. Go back at least two “steps,” and press the “s” key on your keyboard to save the **TILT** values (write down the values), answering the prompts in the **STDIO** window. Since the `SERVO_CALIB.C` sample program will terminate once all four limit values have been saved, run the `SERVO.C` sample program to be able to press the “u” and “d” keys on your keyboard as prompted in the **STDIO** window until the **TILT** value is midway between the two limits.

Install Camera Use a third piece of foam mounting strip to secure the plastic camera bracket to the blade of the *tilt* servo motor, and finally use the remaining foam mounting strip to attach the camera to the plastic bracket — remove any labels from the back of the camera board before attaching it with the foam mounting strip.

Connect Camera Use the 4-wire cable with polarized friction-lock plugs to connect the camera to header J9 on the Interposer Board — connect the white plug to the camera, and connect the black plug to header J9.

Where Do I Go From Here?

If the sample servo calibration program ran fine, you are now ready to go on to other sample programs on the supplemental Dynamic C CD, which are discussed in Application Note AN412, *Camera Interface Application Kit*. The source code for the sample programs is provided to allow you to modify them for your own use. The *RCM3365/RCM3375 User's Manual* on the Dynamic C CD also provides complete hardware reference information and describes the software function calls for the RCM3365 RabbitCore modules and the Prototyping Board. If there are any problems:

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

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