Don’t Forget to Register!

When you register, you’ll always know what’s new with BugBrains.
• Get notification of new features, parts, and accessories
• Get sample code you can use with your BugBrain
• Get pictures and tips about what other BugBrain owners are doing
• Find out about Contests
• Learn from FAQs and Q&A columns
• Send in your own questions
• Learn about special discounts and sales
• Tell us what you want to see next!

You can register by sending in the form in the front of your BugBrain Resource Manual. If you can’t find it, email us at robots@YostEngineering.com with the following information:
• Your name
• Your age (if under 18)
• Parent name (if under 18)
• Address
• City
• State
• Zip
• Country
• Phone
• Email
• Where you bought your BugBrain

RF Digital Transmitter
RF Digital Receiver
Parts:
RF Digital 28005
Parallax (http://www.parallax.com)
RF Digital Transmitter, Part #28005
RF Digital Receiver, Part #28004
Price:
Approximately $90 (USD) for both parts

Next Contest Deadline: December 31, 2003

For BugBrain™ Users

Expansions and Cool Stuff:
Adding Wireless Capability to Your BugBrain™

This month’s request comes from Joriel Robles in the Philippines, who wants to control his BugBrain using a remote control device. This project provides one option for adding this wireless capability.

There are many methods by which to get your BugBrain to respond to remote control messages. Various remote control methods include: infrared control (like a VCR or TV remote), manual radio frequency (RF) control (like a remote-control car), and computer RF control (like a wireless network connection).

This example will focus on creating a simple manual remote control system for your BugBrain robot kit. Later project notes will discuss adding infrared or computer RF remote control capabilities.

(continued on page 2...)

RF Digital 28005
Transmitter

Robotics Newsletter

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Active Robots Limited
Wells Road, Chilcompton
Radstock, Somerset BA3 4EY
+44(0)176.123.9267

www.Active-Robots.com
www.YostEngineering.com

RF Digital (http://www.rfdigital.com)
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Finished Building Your BugBrain?
Show it off!
"Never be afraid to try something new. Remember that amateurs built the ark. Professionals built the Titanic."
— Unknown

Picture-Perfect Contest: send us one or more pictures of your assembled BugBrain, showing off your personalized body parts or decorations. One winner gets a $50 Amazon.com gift certificate. One runner-up gets a $25 gift certificate.

Bug-Attack Contest: send us pictures of your BugBrain in action, along with the code that makes it happen (specify whether or not we can share the code with others). One winner gets a $75 Amazon.com gift certificate, and one runner-up gets a $50 gift certificate.
QUESTION: Why are circuit boards green?

ANSWER: Circuit boards are green for a couple of reasons. The green color is actually an enamel that is applied to the circuit boards to protect the copper traces. Underneath the green color, the circuit board is a beige color. The enamel protects the traces (the connections between components) from water and oxidation, and makes them less susceptible to damage. Although green is a traditional color, because it is easy to look at under many different lighting conditions, circuit boards can also be manufactured in other colors, such as red, blue and purple.

QUESTION: On the Basic X-24 chip, what is the blue tube-like thing on top of the chip?

ANSWER: This is the oscillator. The oscillator is basically a crystal that acts as the clock for the processor, so that it can synchronize its activities. For example, in the Centering Servos program, you can include the instruction: Call delay (0.02). This causes a pause of 0.02 seconds before the next instruction is carried out. The only way for the processor to know how long to wait, is if it has its own clock — which is the job of the oscillator, a very special crystal.

Adding Wireless Capability to Your BugBrain™ (continued from page 1)

For our RF control implementation we’re going to use a 418 MHz transmitter receiver pair from RF Digital (see order information in the box on page 4). The transmitter is a battery-operated key-fob transmitter that has five remote function buttons. The receiver is a 7-pin SIP module that can be interfaced with your BugBrain. This will allow you to send messages to your BugBrain at ranges up to 75 feet. The pair can be used to send and receive up to five single remote control commands, or commands & sequences can be combined to trigger any number of remote functions.

The transmitter has 5 buttons and the receiver has 5 outputs. When one of the 5 buttons on the transmitter is pressed, the corresponding output on the receiver goes high and remains high while the button is held. Because the BugBrain is completely programmable, it is possible to control virtually unlimited numbers of operations by using combinations of buttons or particular sequences of button presses. So let’s look at the 3 basic steps to adding remote-control capabilities to your BugBrain…

Step 1: Setting up the transmitter

Setting up the transmitter is easy because there is nothing to set up! The transmitter is ready to use as shipped. Simply remove it from the packaging and you're ready to go. The transmitter is shipped with a battery already installed. Should you need to replace the battery, be sure to use a single CR2032 battery cell.

Step 2: Interfacing the receiver

The receiver is a 7-pin SIP module that has the following connections: +5 volts, ground, and output 1 through output 5. The output pins correspond with each of the five buttons on the transmitter key fob. To connect the receiver module to the BugBrain you simply need to perform the following:

- Connect the +5VDC pin to BugBrain's Vdd line located on pin 1 of BugBrain's expansion connector.
- Connect the GND pin to BugBrain's Vss line located on pin 2 of BugBrain's expansion connector.
- Connect the Output1 through Output5 pins as desired to an available input port of BugBrain. As shipped, BugBrain has I/O port pins 11 and 12 unused and available. Also I/O port pins 16, 17, and 18 can be connected to the remote control modules, but in this case the inputs can also be driven by the three rear push buttons. It is not necessary to connect all of the outputs, only those that will be used.

The receiver module will work best when its antenna is facing as near to vertical as possible. Be sure that the antenna is not touching any of the metallic components because this will greatly affect the module's effective operating range.

Step 3: Programming the BugBrain to respond to commands

Programming the BugBrain to respond to remote control commands is now just as easy as programming it to respond to rear button presses or front feeler activation. When a button on the transmitter is pressed, the input pin on the receiver goes high. This means that a program can use the GetPin function to read the state of that pin as either a 0 when the remote button is not pressed or a 1 when the button is pressed. The sample program below illustrates this by getting the remote to make the LEDs flash from left to right or to left according to which button on the remote is pressed.

(When the sample code assumes that the receiver is connected to pin 11 and pin 12.)

```vba
*** Remote Control Example Program
*** Illustrates the use of the GetPin and IF/THEN Statements
*** The program reads pin 11 and pin 12 and then sends
*** a light pattern to the LEDs depending which remote button
*** is pressed.
******************************************************************************
Option Explicit
Public Sub Main()
    Dim i As Byte
    *Turn all LED lights off
    For i = 5 To 10
        Call putpin(i,0)
    Next
    *Set expansion pins 11 and 12 as inputs so remote control module
    *can be read.
    Call putpin(11,3)
    Call putpin(12,3)
    Do
        If GetPin(11) = 1 Then
            Call putpin(5,1)
            Call putpin(6,1)
            Call putpin(7,1)
        Else
            Call putpin(5,0)
            Call putpin(6,0)
            Call putpin(7,0)
        End If
        If GetPin(12) = 1 Then
            Call putpin(8,1)
            Call putpin(9,1)
        Else
            Call putpin(8,0)
            Call putpin(9,0)
            Call putpin(10,0)
        End If
        Call putpin(11,0)
        Call putpin(12,0)
    Loop
End Sub
```