

Robotics Newsletter

*“If you think
education
is
expensive, try
ignorance.”*

— Derek Bok

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www.YostEngineering.com

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ServoCenter FAQ

Q: Does ServoCenter support RC servos that have been modified to allow continuous rotation?

A: While ServoCenter can provide a basic switch function for modified servos (on/off and direction), most features will not work.

ServoCenter scaled & timed motion commands are dependent upon rotational limits built into RC servos. When removed, ServoCenter is no longer able to accurately issue these movement commands (location, speed, etc.).

ADVANCED! Adding a Range Finder

This example uses the Parallax Ping)))™ Range Finder (\$24.95 from Parallax.com) to allow your BugBrain to sense how far away an obstacle is, and to plan its path according to how and when you want it to respond. The Ping)))™ requires the use of only one I/O pin, so it is pretty easy to interface to the BugBrain.

The picture shows the range finder, which you will connect to the BugBrain's expansion connector. Be very careful when hooking up the wires, or you could damage your range finder, the BugBrain, or both!

On your BugBrain expansion connection:

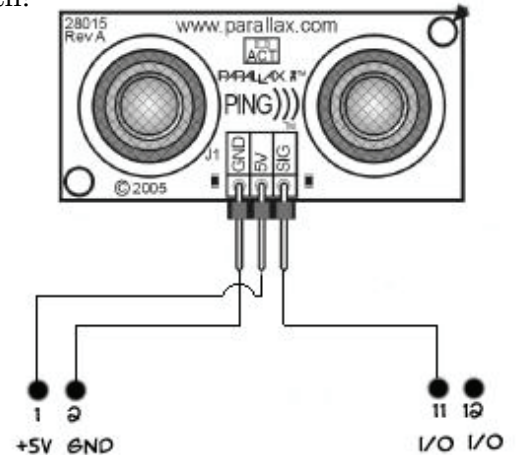
- Pin 1 = +5V
- Pin 2 = Ground
- Pins 11 / 12 = Free I/O pins

(In the example code, we are using Pin 11).

So, as shown at right:

1. The GND pin on the range finder should be connected to BugBrain Pin 2.

(continued inside)



BugBrain: 101 – What is EEPROM?

EEPROM stands for **E**lectrically-**E**rasable **P**rogrammable **R**ead-**O**nly **M**emory. EEPROM is a type of non-volatile memory. This means that whatever is written to it, will be stored when it is powered off. The EEPROM on your BugBrain's microprocessor is where your program and data are stored.

If you have a BasicX-24 processor, you have 32k (32,768) bytes of EEPROM available. If you have a BASICStamp2, you only have 2k (2,048) bytes of EEPROM.

The BugBrain: 101 CoursePak is available for classroom, home school, or self-study. The coursepak is designed to teach robotics and programming basics, making use of the BugBrain robotic kit. Each month we will feature some quick tips or definitions, taken from the CoursePak.

(continued from front page)

ADVANCED! Adding a Range Finder

2. The 5V pin should be connected to BugBrain Pin 1.
3. The SIG pin should be connected to BugBrain Pin 11 (or 12).

Now that the hardware is connected, let's look at some sample code that will make use of the range finder:

```
Option Explicit

Public Sub Main()
    dim IOPin as byte
    dim time as single, inches as single, feet as single
    IOPin=11 ' Or 12 if you're using the alternate pin
    do while(1=1) ' begins infinite loop
        call putpin(IOPin,0) 'sets pin low to start the range finder
        call pulsein(IOPin,1,time) 'saves the time into our variable
        time=time/2.0 'gives us the distance one-way
        feet=time*1115.0 'multiplies seconds by feet/second
        inches=feet*12.0 'converts to inches instead of feet
        debug.print Cstr(inches) 'prints result to the screen
    Loop
End Sub
```

Let's look at how this code works...

The PutPin() call puts a zero on the signal pin of the range finder. The range finder then sends out an ultrasonic wave. When this sound wave is sent, a high pulse (1) is placed on the signal pin. This causes the PulseIn() function to start a timer.

When the sound wave bounces back to the range finder, a low pulse (0) is placed on the signal pin. This causes the PulseIn() function to return. The PulseIn() call therefore measures the time, in seconds, that a sound wave took to travel to and bounce back from an object.

After PulseIn() returns our time, we divide this value by 2. This is because the value in the time variable is the round-trip time, and dividing by 2 yields the time taken just to reach the object. We can then determine the distance in feet to the object, by multiplying our time value by the speed of sound (we'll use an approximate value of 1115 feet per second, which will be close enough for our purposes here).

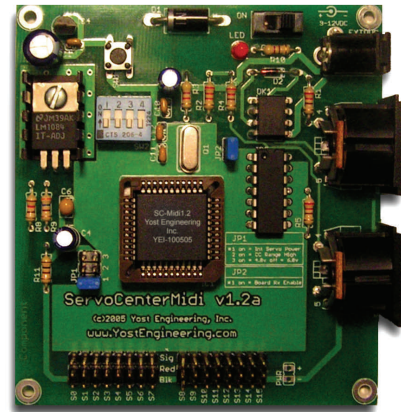
Finally, a simple multiplication by 12 will yield the distance in inches to the object (1 foot = 12 inches), which is then output to the screen via a debug.print() call.

Now you can figure out the distance to an obstacle or wall in front of BugBrain, and program it for evasive action before it actually hits something!

ServoCenter™ MIDI added to Servo Controller Product Family

The latest addition to the YEI ServoCenter family is the ServoCenter™ MIDI (Musical Instrument Digital Interface). ServoCenter MIDI is an embedded servo controller system that allows MIDI continuous controller messages to directly control up to 16 standard RC servos per board, and up to 512 total servos through a single MIDI-OUT port — each with independent and simultaneous control over both position and speed. Features include:

- Standard MIDI control via Continuous Controller messages.
- Control position of all 16 servos simultaneously.
- On-board voltage regulator supports both 4.8 volt and 6.0 volt servo supply voltages.
- Simple MIDI protocol makes motor control simple for non-programmers.
- Full 14-bit resolution allows for 16384 servo positions.
- Using ServoCenterMidi 1.2 with MIDI sequencer software allows for an instant motion control solution that allows accurate and repeatable recording and playback of servo motions.

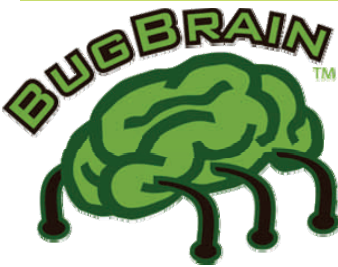


ServoCenter MIDI is designed to be easily configured by anyone familiar with MIDI. By allowing MIDI Continuous Controller messages to control servos, the ServoCenter MIDI opens up countless performance and sequencing options for musicians and special effects/animation technicians.

The ServoCenter controller family, especially suited to applications in robotics, animatronics, motion control, and automation, includes ServoCenter™ 3.1 RS232, ServoCenter™ 3.1 USB, ServoCenter™ Chip (DIP, PLCC, TQFP Integrated Circuits), and ServoCenter™ MIDI.

Find out more at: <http://www.Servo-Center.com>

BugBrain Contest Deadline: June 30, 2006



Does your BugBrain look amazing? Did you program it to do something new and different? Tell us about it, and you could win a prize! All participants get their name and BugBrain picture on our webpage, so go ahead and show off your creation!

Enter by sending your name, address, age, and email address, along with pictures and programming code (for Bug-Attack contest) to: robots@YostEngineering.com. Be sure to specify which contest(s) you are entering (you may enter both):

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

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Support Services

All BugBrain and ServoCenter products include free, unlimited, phone and email technical and programming support.

We're here to help!

(888) 395-9029

or

[support@
YostEngineering.com](mailto:support@YostEngineering.com)

ROBOTICS NEWSLETTER

COMING UP IN THE NEXT ISSUE...

BugBrain

What modifications would you like to make to your BugBrain? Let us know what you would like to do, and we'll try to help you out with instructions and tips in the next newsletter.

Did you already do something cool? Want to share? Send us your own design tips and expansions, and we will share them with other users (and don't forget to enter them in our contest too!).

Coming up in the next couple of issues, you will see:

- Advanced: How to Play .wav Files

- Troubleshooting Tips
- Soldering Do's and Don'ts

ServoCenter

And for those of you working with ServoCenter, please send us your questions, tips, suggestions, and project pictures or descriptions.

In upcoming issues, we will be featuring:

- Troubleshooting Tips
- Projects using ServoCenter