PhidgetEncoder HighSpeed

Phidgets are the most user-friendly system available for controlling and sensing the environment from your computer. People with absolutely no hardware knowledge or experience can include encoders into their projects. It is just a matter of plugging your PhidgetEncoder HighSpeed into the USB port on your computer and connecting an optical encoder. After that, you can use the simple to program Phidgets software libraries to access these devices.

The PhidgetEncoder HighSpeed connects to any typical two-bit otptical encoder. It can return upto 500,000 counts per second. With It you can:

- Detect changes in incremental position.
- Easily track these changes with respect to time.

The PhidgetEncoder HighSpeed can be controlled from Windows, Linux, and Mac OS X. High-level programming interfaces are available for Visual Basic, C, C++, Flash, .NET, Java, LabVIEW, etc.

What Can the PhidgetEncoder HighSpeed Do?

The PhidgetEncoder HighSpeed can be connected to almost any optical encoder to measure shaft speed or accurate human input device. Use it to keep track of wheel velocity on a Robot.

Getting Started on Windows 2000 / XP

The PhidgetEncoder HighSpeed board can be controlled from a variety of Software Development Environments. The PhidgetEncoder software component provides a high-level programmer interface to the Phidget libraries, details can be found in the API Manual for your chosen development environment (Documentation section of our website). Here is how to get started under Windows 2000 or Windows XP. For users of MAC OS X or Linux please go to the Downloads section of our website and review the readme files in the associated downloads.

Step 1. What you need to have ready

- Your PhidgetEncoder HighSpeed.
- An Incremental Encoder with Quadrature output (and known pinout)
- A USB cable.
- A computer running Windows 2000 or Windows XP.
- An Internet connection and a Web browser.

Step 2. Assemble your hardware

- Plug the flat end of the USB cable into the input connector on the PhidgetEncoder HighSpeed.
- Plug the rectangular end of the USB cable into the USB connector on your computer (you can do this at any time).
- Connect your Encoder following the pin out specified in the picture on page 3.

Step 3. Install the software

Phidgets use a library installed on your computer. This only has to be installed once no matter how many different types of Phidgets you have.

- Have you previously installed the Phidget library? If so, you can skip this step.
- To install the library go to www.phidgets.com >> Downloads >> Release.
- Select the PHIDGET.msi file.
- A dialog box will appear asking if you would like to open the file or save it to your computer. You can do either, but if you are unsure just select "Open" and follow the instructions.
- Do you want to update a previously installed Phidget library? If so, you must remove the old library when prompted to do so.

Step 4. Download the sample programs

- Go to www.phidgets.com >> Downloads >> Release.
- Select the Examples.zip file.
- Save the zip file to a place of your choosing, and then uncompress it.
- You will find many executables in the Visual Basic folder, and their source in the sub-folders.
- PhidgetMonitor.exe will show you what Phidgets are plugged in. If you have followed Step 2 and Step 3, a PhidgetEncoder should be displayed in the list, along with its serial number. The source for this .exe is in the PhidgetManagerExamples folder.
- All PhidgetEncoder samples have an "encoder" prefix. Try them! All source code can be found in the PhidgetEncoderExamples folder.

Step 5. Try Programming a Phidget

- Go to www.phidgets.com >> Documentation.
- Read the API manual for the Programming language of your choice and read the documentation under the PhidgetEncoder heading.
- Based on this documentation, we recommend you examine the source of the sample programs mentioned in Step 4.
- Now try modifying the samples. Or code your own from scratch.

Step 6. Learning more ...

- Explore www.phidgets.com. We recommend you visit Projects and Examples to see what other people have done. For new applications or other programming languages visit the Forums.

## Step 7. Read the license agreement

Go to www.phidgets.com >> Documentation and select the License link. Note that the term Phidget™ is trademarked, and that the name PhidgetEncoder is synonymous with Phidget™.
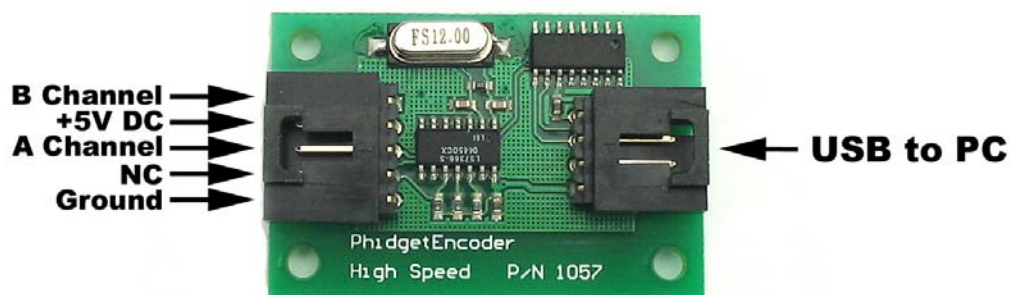
Hardware Description

The PhidgetEncoder HighSpeed can be used with a wide assortment of mechanical and optical encoders. The output from the encoder should be quadrature, which means there should be two channels usually labeled A, and B. The maximum rate is listed at 500,000 counts per second, this relates to your revolutions per second and the counts per revolution on your disk. If your disk has 1000 counts per revolution then the limit on revolutions per second is 500. With the PhidgetEncoder HighSpeed you can:

- Detect changes in incremental position.

- Easily track these changes with respect to time.
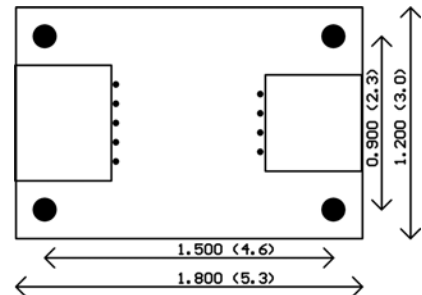
Quadrature Encoder Fundamentals

The most common type of incremental encoder uses two output channels (A and B) to sense position. Using two sensors on a standard optical grating positioned 90 degrees out of phase, the two output channels of the quadrature encoder indicate both incremental position and direction of rotation. If A leads B, for example, the disk is rotating in a clockwise direction. If B leads A, then the disk is rotating in a counter-clockwise direction. By monitoring both the number of pulses and the relative phase of signals A and B, you can track both the position and direction of rotation.

Choosing Encoders

Review the data sheet for the encoder that your are selecting carefully before purchasing it or connect it to the PhidgetEncoder HighSpeed. Almost any incremental quadrature encoder should work but it is always important to verify this before connecting to the Phidget. Absolute encoders will not work with this device. We have reviewed the following encoders, and found that they can be used with the PhidgetEncoder HighSpeed, this is not a complete list but should be used as a comparison with other Encoders.

Manufacturer	Web Page	Part number
Grayhill	**www.Grayhill.com**	Series 63R, Series 61R Series 63Q TTL Output Series 64T TTL Output
US Digital	**www.USDigital.com**	S5S,E2,E3, etc.
Avago Technologies (Formerly Agilent)	**www.avagotech.com**	HEDS 5500
CUI Inc.	**www.cui.com**	AMT103-V

Device Specification

Position Update Rate	Approx. 500,000 Hz
USB Current Consumption	100 mA