PhidgetInterfaceKit 8/8/8

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 things like switches, sensors, and low-powered output devices such as LEDs into their projects. It is just a matter of plugging our off the shelf devices into the Interface Kit, which in turn is plugged into the USB port on your computer. After that, you can use the simple to program Phidgets software libraries to access these devices.

The PhidgetInterfaceKit 8/8/8 board is our most versatile Phidget, designed to be the core of a wide variety of projects. It is a USB based controller with:

- **8 Analog Inputs**
- **8 Digital Inputs**
- **8 Digital Outputs**
- **1 USB input port**
- **2 USB output ports**

An external power supply is required only to operate the USB output ports. The PhidgetInterfaceKit 8/8/8 board 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 PhidgetInterfaceKit 8/8/8 Do?

Analog inputs can be used to measure continuous quantities, such as temperature, humidity, position, pressure, etc. There are many plug and play sensors in the Phidgets product line that require no assembly. In addition, any sensor that returns a signal between 0 and 5 volts can be easily interfaced.

Digital inputs can be used to convey the state of push buttons, limit switches, relays.

Digital outputs can be used to drive LEDs, solid state relays, transistors; in fact, anything that will accept a CMOS signal.

The two USB output ports can be used to add more Phidgets to your project without using more USB ports on your PC. Phidgets are modular devices; if there is something that the PhidgetInterfaceKit 8/8/8 cannot do – for example motor control or LED dimming – add another Phidget designed for that purpose.

Getting Started on Windows 2000 / XP

The PhidgetInterfaceKit 8/8/8 board can be controlled from a variety of Software Development Environments. The PhidgetInterfaceKit 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 link on our website). Here is how to get started under Windows 2000 or Windows XP. For users of Windows CE, MAC OSX 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 Phidget Interface Kit.
- A piece of wire to test the digital input.
- An LED to test the digital output.
- A USB cable.
- A computer running Windows 2000 or Windows XP.
- An Internet connection and a Web browser.

Step 2. Assemble your hardware

- Connect any Phidget sensors by simply plugging the 3-pin plug at one end of the sensor cable fully into the socket of an analog input and the 3-pin plug at the other end into the sensor. Attaching to the analog input after the Interface Kit has connected to the USB bus may cause errors.
- If you have any other USB devices connected to the USB output ports, attach the power supply.
- Plug the square end of the USB cable into the USB input connector on the Interface Kit.

- Plug the rectangular end of the USB cable into the USB connector on your computer (you can do this at any time).

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 PhidgetInterfaceKit should be displayed in the list, along with its serial number. The source for this .exe is in the PhidgetManagerExamples folder.
- All PhidgetInterfaceKit samples have an "interfacekit" prefix. Try them! All source code can be found in the PhidgetInterfaceKitExamples 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 PhidgetInterfaceKit 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 PhidgetInterfaceKit is synonymous with Phidget™.

Creating Custom Analog and Digital Devices

While the Interface Kit and its off the shelf devices will satisfy almost all needs, the occasional developer may want to include a sensor, switch or output type that is not available through Phidgets. Fortunately, this is still very easy to do, and only a rudimentary knowledge of electronics is needed. Read on!
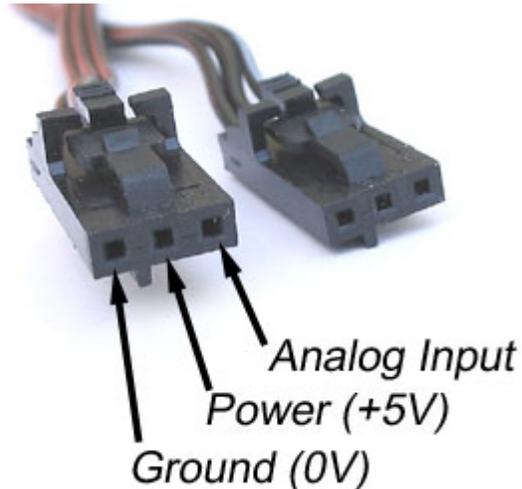
Using the Analog Inputs

The Analog Input can measure a voltage between 0V and 5V. The analog measurement is represented in the software as a value between 0 and 1024, so a sensor value of 1 unit represents a voltage of approximately 5 millivolts.

Each analog input uses a 3-pin, 0.100 inch pitch locking connector. Pictured here is a plug with the connections labeled. If this is wired backwards, damage to your sensor may result. The Interface Kit provides + 5 VDC, ground, and an analog input with a range of 0 to 5V.

We offer an expanding line of packaged sensors that can be plugged directly into the analog inputs. Experienced users are encouraged to interface their own sensors.

The connector is manufactured by Molex, part number 50-57-9403 and 16-02-0102 for the wire crimp insert, and is available from many sources including www.DigiKey.com (Digi-Key part numbers WM2901-ND and WM2510-ND). If you want to create your own sensor boards than you can use one of the following Molex connectors on the circuit board: 70543-0002, 70553-0002, 70553-0037, 15-91-2035 (Digi-Key part numbers: WM4801-ND, WM4901-ND, WM4925-ND, WM1341-ND).

Using the Digital Inputs

To wire a switch to a digital input, connect the switch between an input, labeled 0 to 7, and a provided ground, labeled G. When the switch is closed, or electrical contact is made, software will report this as a DigitalInputChanged event, reporting True for this input.

0-7
Input Pin

G
Ground

Output Pin
0-7

300 Ohm

+5V

1

0
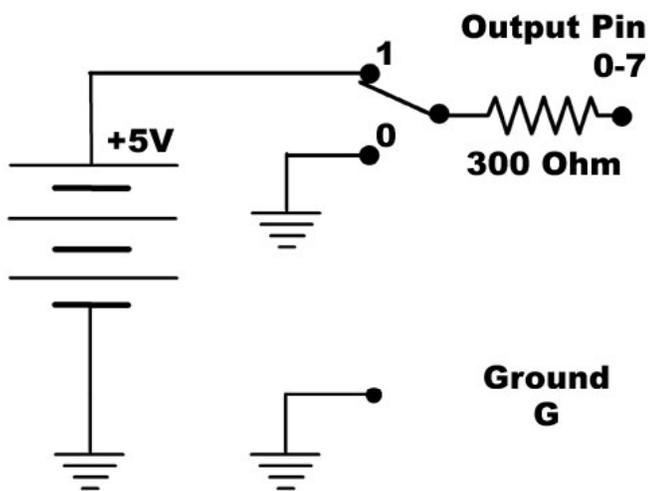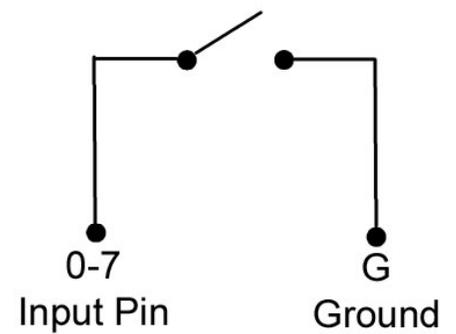
Ground
G

Using the Digital Outputs

Connecting a LED or other circuit to a digital output is simple. In the case of an LED, wire the anode to a digital output labeled 0 to 7 on the Interface Kit, and the cathode to a supplied ground, labeled G.

The 300 ohm resistance is internal to the PhidgetIntefaceKit 8/8/8, and limits the current that can flow through the output. This is intended to protect the device from being damaged if there is a short to ground or if an LED is used. The output is intended to drive TTL or CMOS inputs; it is not designed to provide power to an external circuit.

The digital outputs can be used to switch larger electrical currents and voltages using devices such as power transistors, or logic level MOSFETS.

Hardware Description

The PhidgetInterfaceKits are the most versatile of the Phidgets currently available. This versatility comes at the price of some complexity.   In addition to the USB input port, the PhidgetInterfaceKit 8/8/8 has:

- 8 Analog Inputs,
- 8 Digital Inputs,
- 8 Digital Outputs,
- 2 USB output ports.

An external power supply is required only to operate the USB output ports.
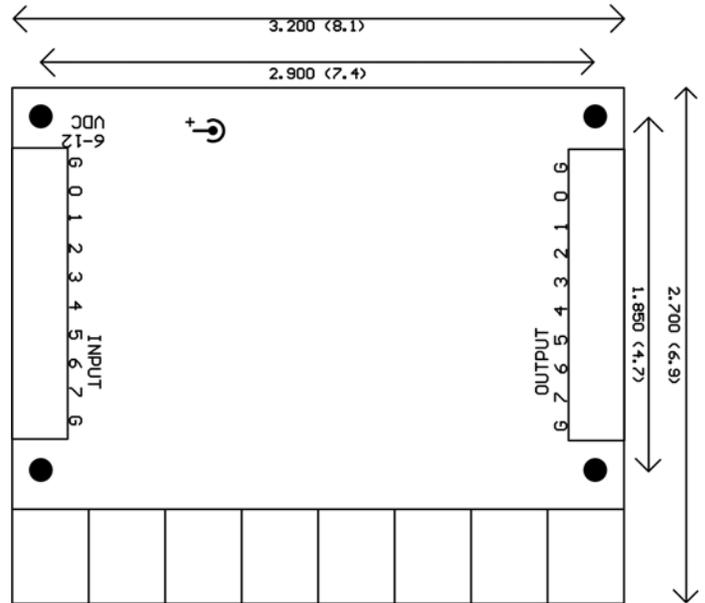
Device Specification

Digital Output Resistance	300 ohm
Digital Output Update Rate	Approx. 125 Updates / sec.
Digital Input Update Rate	125 / sec.
Analog Input Update Rate	65 / sec.
USB Current Consumption	Max. 500 mA
External Power Supply Voltage	6 to 12 V DC
External Power Supply Current	Max. 1000 mA
External Power Supply Rating	Max. 6 to 12 VA