



# USB Digital I/O Module

*A low cost solution for controlling 12 digital lines*

This project can be used to control 12 digital lines. The module consists of only one chip and 12 I/O lines. The module can be implemented to your design and is cost effective. It can control your design by using the USB bus. The module is supplied with the USB\_OCX component, which allows you to control these lines from your own application. Your application can be written in Visual C, Basic or other language which can use ActiveX controls.

## Application

The card can be used for a variety of purposes. For instance, it can help you speed up your software development time, and it can assist you in controlling your own projects by using the latest USB technology.

The USB I/O Module may also be used to control modules such as:

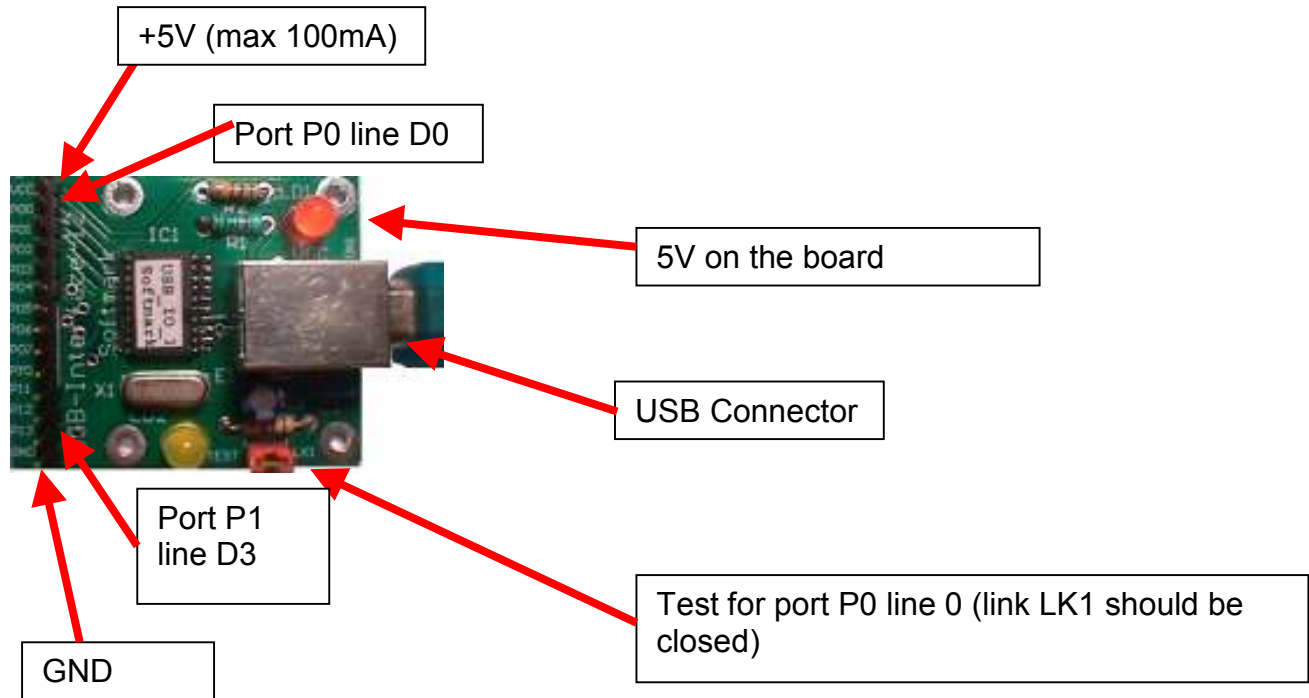
- ADC converters
- DAC converters
- DTMF transceivers
- PLL generators
- DDS synthesizers
- Relay Cards
- Stepper Motor Cards
- Switch Cards
- LED Indicator Cards
- And much more...

Softmark supplies the USB\_OCX component that allows you to easily control all these modules.

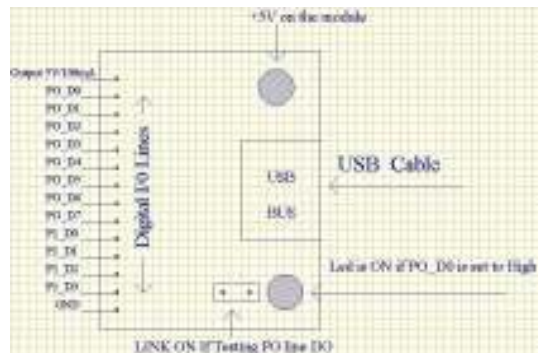
The project features two ports: P0 (8 bit) and P1 (4 bit). These ports can be set as either inputs or outputs. The USB\_OCX component will be used to write to and read from the ports. With this component you can fully control the USB Digital I/O Module from your application. Information on how to use the USB\_OCX can be downloaded from our web site.

## Features:

- 12 digital input/output lines
- bi-directional P0 port (8 bit) and P1 port (4 bit) programmable by software
- maximum current taken from 1 line is 10mA. A driver (transistor) will be required to drive the relay
- a maximum of 100mA/5V can be taken from the module to power your application
- free data acquisition examples



**Figure 1.** 12 line input/output interface controlled via the USB bus



**Figure 2.** 8 digital line ports. These lines can be easily set (for high or low level) from your application using Softmark’s USB\_OCX component.

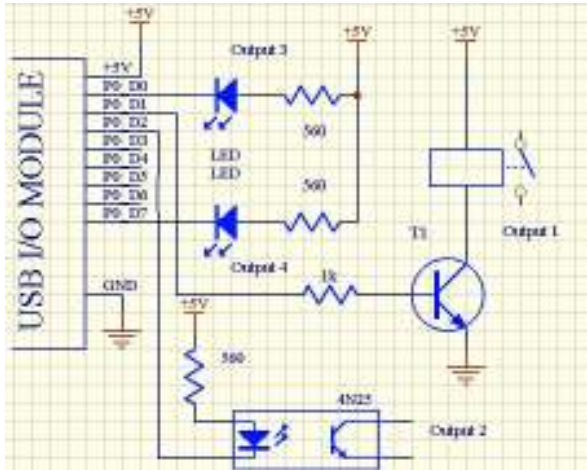
### How to write to a particular port

The simplest way to write to a port is to connect a LED to a particular port line to test the port. On the board, there is a test circuit to test just port P0 and line D0. To activate testing, the LK1 link should be closed.

Figure 3 below shows how you can use output lines.

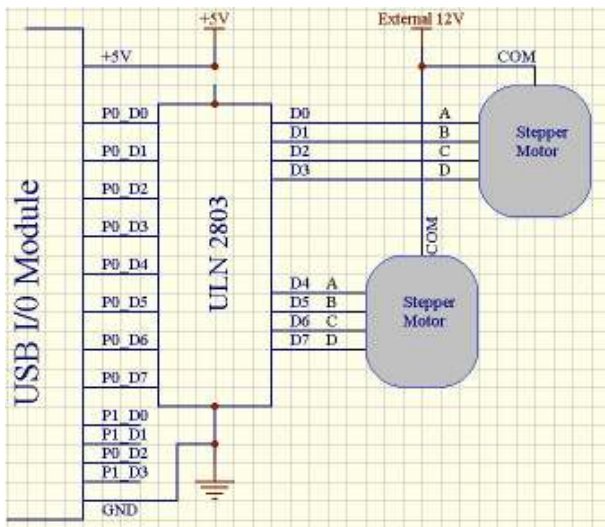
Note: Data can be transferred from your application via the USB\_OCX to the hardware by executing just a few lines of code:

'Set all data on port A to high level  
**Wr\_PortP0(255)**  
 'Set all data on port A to low level  
**Wr\_PortP0(0)**  
 'Set line D0 to high, the rest to zero  
**Wr\_PortP0(1)**



**Figure 3.** An example of an output indicator during writing to port P0.

The output from a particular port will drive the current driver based on ULN 2803. Open collector drivers can be used to directly drive relays or stepper motor coils.

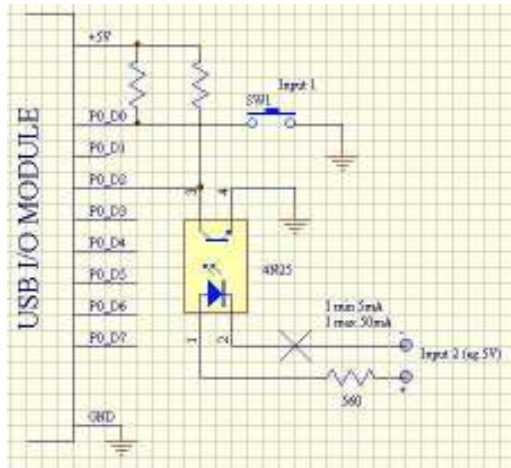


**Figure 4.** Connecting the module and controlling stepper motors. You can control 3 stepper motors from this module.

## How to read data from a particular port

You can set the module to acquire data and transfer it to your application. This can be used to inform your application that this line was, for example, set to high. Either P0 or P1 can be used for that.

Figure 5 below shows how lines of the port can be set to high or low.

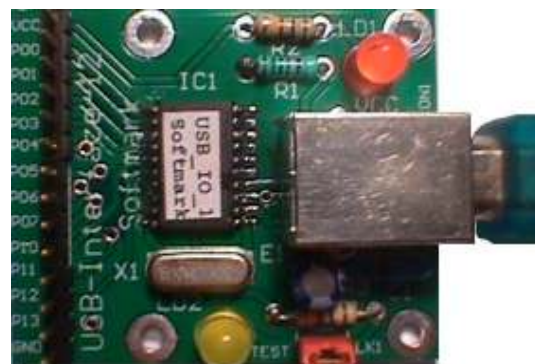
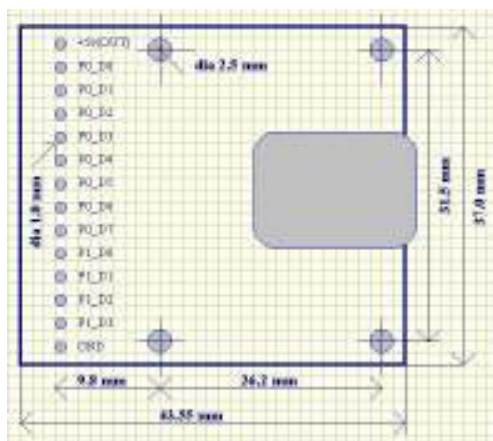


**Figure 5.** Here, port P0 is used to control external devices.

If you use the command `a= RD_PO()` a port value will be returned.

More information about reading and writing data is supplied with the kit. The USB\_OCX component is attached to this module. A comprehensive schematic for this module is also included.

## Module layout



Note: This module can supply +5V and a maximum of 100mA which can be used in your application.

Information about installing drivers can be found on the CD ROM/disks supplied with the kit.

After the driver module is installed, the next time you use the card the Windows operating system will automatically find the module. No other setup will be required.

## **Important**

The USB I/O Module does not need a power supply as voltage is supplied from the USB bus in your PC.

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