



# Using GPIO on the Vortex86

## Summary

Application Note  
AP0100 (v1)

How to configure and drive the GPIO pins on the Vortex86SX and Vortex86DX processors.

These DOS code examples were written and compile using Borland Turbo C++. There is a download link for this compiler at <http://cc.embarcadero.com/item/26014>

All the GPIO pins on the Vortex86 are independent and can be configured as inputs or outputs.

Not all Vortex86 modules provide access to all of the GPIO ports. Table 1 includes addresses for all ports for completeness.

The ports are all controlled by reading and writing from register pairs in the I/O space of the Vortex86. The register locations are shown in Table 1.

	Port 0	Port 1	Port 2	Port 3	Port4
Data Register Address	78h	79h	7Ah	7Bh	7Ch
Direction Register Address	98h	99h	9Ah	9Bh	9Ch

Table 1

For each of the registers, the 8 bits are mapped to the respective GPIO pins. The direction register determines the direction of each GPIO pin:

- 0 = input mode
- 1=output mode

Example values to write into register for port 0:

- Writing 00h to register 98h makes all pins input
- Writing FFh makes all pins output
- Writing F0h makes pins [7-4] Outputs and pins [3-0] inputs

The data register is a read/write register; again the 8 GPIO pins are mapped to the 8 bits of the register. A logic 1 denotes the pin is high and a logic 0 denotes the pin low.

Only pins set to output are affected by a write operation, the status of all the pins can be read from the register, regardless of direction.

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### Example DOS program

```
#include <dos.h>

#define PORT_0_DATA 0x78
#define PORT_0_DIR 0x98

void main (void)
{
    unsigned char ReadValue;

    // set all port 0 pins to input
    outportb(PORT_0_DIR,0x00);
    // read in the value
    ReadValue = inportb(PORT_0_DATA);

    // Now drive pins on port 0

    // First set all port 0 pins to output
    outportb(PORT_0_DIR,0xff);

    // drive all pins high
    outportb(PORT_0_DATA,0xff);

    // drive all pins low
    outportb(PORT_0_DATA,0x00);

    // put the pattern 01010101 out to GPIO 0
    outportb(PORT_0_DATA,0x55);

    // example of reading the port first to enable just a single pin to be changed
    ReadValue=inportb(PORT_0_DATA); //read in current status of all pins
    ReadValue = (ReadValue | 0x02); // set bit we wish to change
    outportb(PORT_0_DATA,ReadValue);
    // bit pattern will now be 01010111

} // end of main
```

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