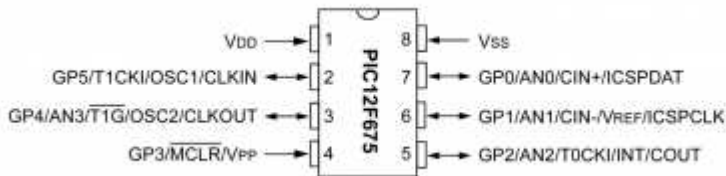# PIC12: General purpose I/O (GPIO)

GPIO on PIC12F675

- 6 inputs/outputs (GP0 – GP5)
- 1 pin input only(GP3)
- note the precedence of analog functions
- Depending on which peripherals are enabled, some or all of the pins may not be available as general purpose I/O
- optional weak pull-ups

Associated registry

REGISTER 3-2:   TRISIO — GPIO TRISTATE REGISTER (ADDRESS: 85h)

U-0	U-0	R/W-x	R/W-x	R-1	R/W-x	R/W-x	R/W-x
—	—	TRISIO5	TRISIO4	TRISIO3	TRISIO2	TRISIO1	TRISIO0

bit 7   bit 0

bit 7-6:   **Unimplemented**: Read as '0'

bit 5-0:   **TRISIO<5:0>**: General Purpose I/O Tri-State Control bit

1 = GPIO pin configured as an input (tri-stated)
0 = GPIO pin configured as an output.

Note: TRISIO<3> always reads 1.

TRISIO – configuring the data direction: 1 = GPIO pin configured as an input (tri-stated), 0 = GPIO pin configured as an output.

REGISTER 3-1:   GPIO — GPIO REGISTER (ADDRESS: 05h)

U-0	U-0	R/W-x	R/W-x	R/W-x	R/W-x	R/W-x	R/W-x
—	—	GPIO5	GPIO4	GPIO3	GPIO2	GPIO1	GPIO0

bit 7   bit 0

bit 7-6:   **Unimplemented**: Read as '0'

bit 5-0:   **GPIO<5:0>**: General Purpose I/O pin.

1 = Port pin is >V_{IH}
0 = Port pin is <V_{IL}

GPIO – read / write the digital values from/to the particular pin

REGISTER 3-3: **WPU — WEAK PULL-UP REGISTER (ADDRESS: 95h)**

U-0	U-0	R/W-1	R/W-1	U-0	R/W-1	R/W-1	R/W-1
—	—	WPU5	WPU4	—	WPU2	WPU1	WPU0
bit 7							bit 0

bit 7-6   **Unimplemented:** Read as '0'

bit 5-4   **WPU<5:4>:** Weak Pull-up Register bit
1 = Pull-up enabled
0 = Pull-up disabled

bit 3   **Unimplemented:** Read as '0'

bit 2-0   **WPU<2:0>:** Weak Pull-up Register bit
1 = Pull-up enabled
0 = Pull-up disabled

Note 1: Global $\overline{GPPU}$ must be enabled for individual pull-ups to be enabled.
2: The weak pull-up device is automatically disabled if the pin is in Output mode (TRISIO = 0).

`WPU` – enable/disable weak pull-ups

REGISTER 7-2: **ANSEL — ANALOG SELECT REGISTER (ADDRESS: 9Fh)**

U-0	R/W-0	R/W-0	R/W-0	R/W-1	R/W-1	R/W-1	R/W-1
—	ADCS2	ADCS1	ADCS0	ANS3	ANS2	ANS1	ANS0
bit 7							bit 0

bit 7   **Unimplemented:** Read as '0'.

bit 6-4   **ADCS<2:0>:** A/D Conversion Clock Select bits
000 = Fosc/2
001 = Fosc/8
010 = Fosc/32
x11 = FRC (clock derived from a dedicated internal oscillator = 500 kHz max)
100 = Fosc/4
101 = Fosc/16
110 = Fosc/64

bit 3-0   **ANS3:ANS0:** Analog Select bits
(Between analog or digital function on pins AN<3:0>, respectively.)
1 = Analog input; pin is assigned as analog input[1]
0 = Digital I/O; pin is assigned to port or special function

Note 1: Setting a pin to an analog input automatically disables the digital input circuitry, weak pull-ups, and interrupt-on-change. The corresponding TRISIO bit must be set to Input mode in order to allow external control of the voltage on the pin.

`ANSEL` – configure the analog/digital function

Others: IOC, CMCON

Using GPIO in C

```
    char c;

    /* init */
    CMCON = 7;      // disable comparator
    ANSEL = 0;      // disble analog functions
    TRISIO = 0;     // set all pins as output
    TRIS2 = 1;      // set GP2 as input

    /* main program */
    c = 0b01010101; // define pattern
    GPIO = c;       // assign pattern to GPIO
    GPIO4 = 0;      // assign value to a single LED

    c = GPIO2;      // either 0 or 1 will be assigned
```