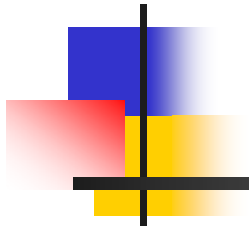


PIC I/O Ports

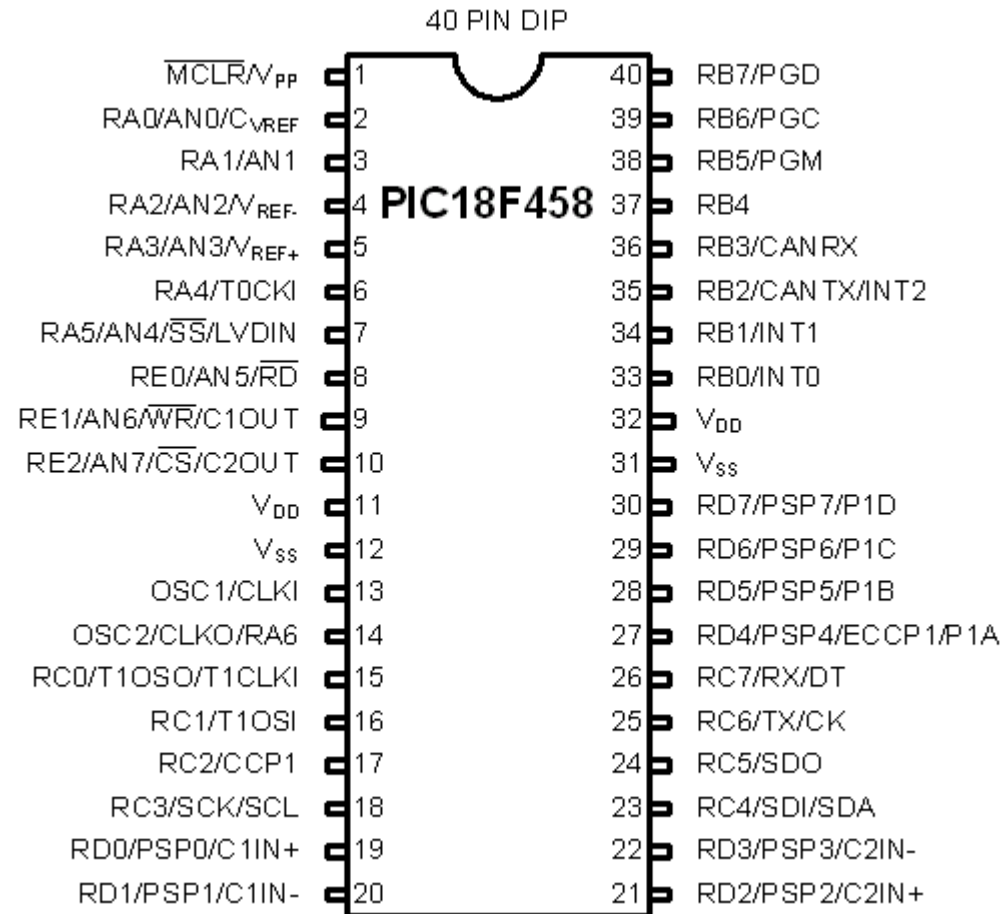


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Objectives

- Operation of I/O ports
- Generation of square waves from I/O bits
- Read voltage levels via I/O bits

PICF458 pin diagram



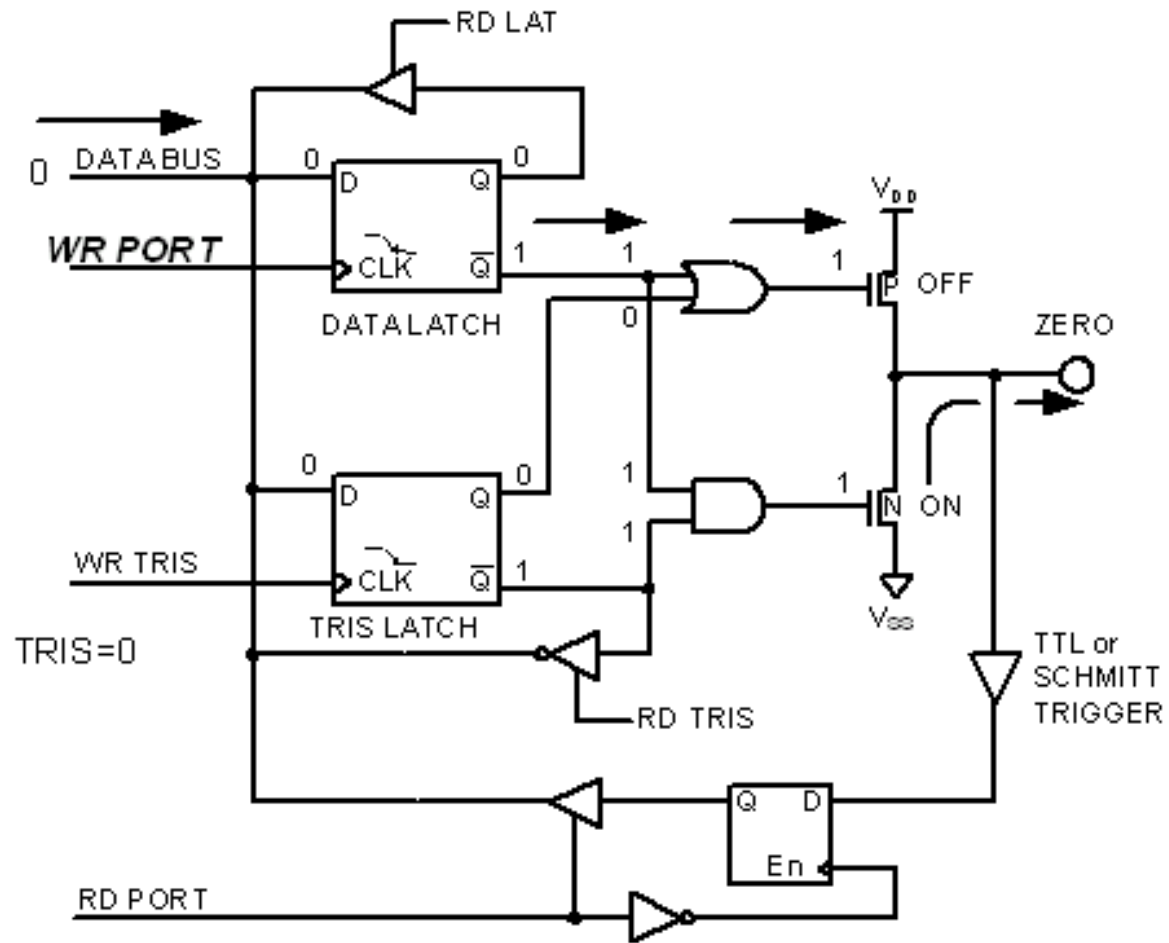
Toggle all 8 bits of Port with a time delay

```
L1    MOVLW    0x0
      MOVWF   TRISB
      MOVLW   0x55
      MOVWF   PORTB
      CALL    DELAY
      MOVLW   0xAA
      MOVWF   PORTB
      CALL    DELAY
      GOTO   L1
```

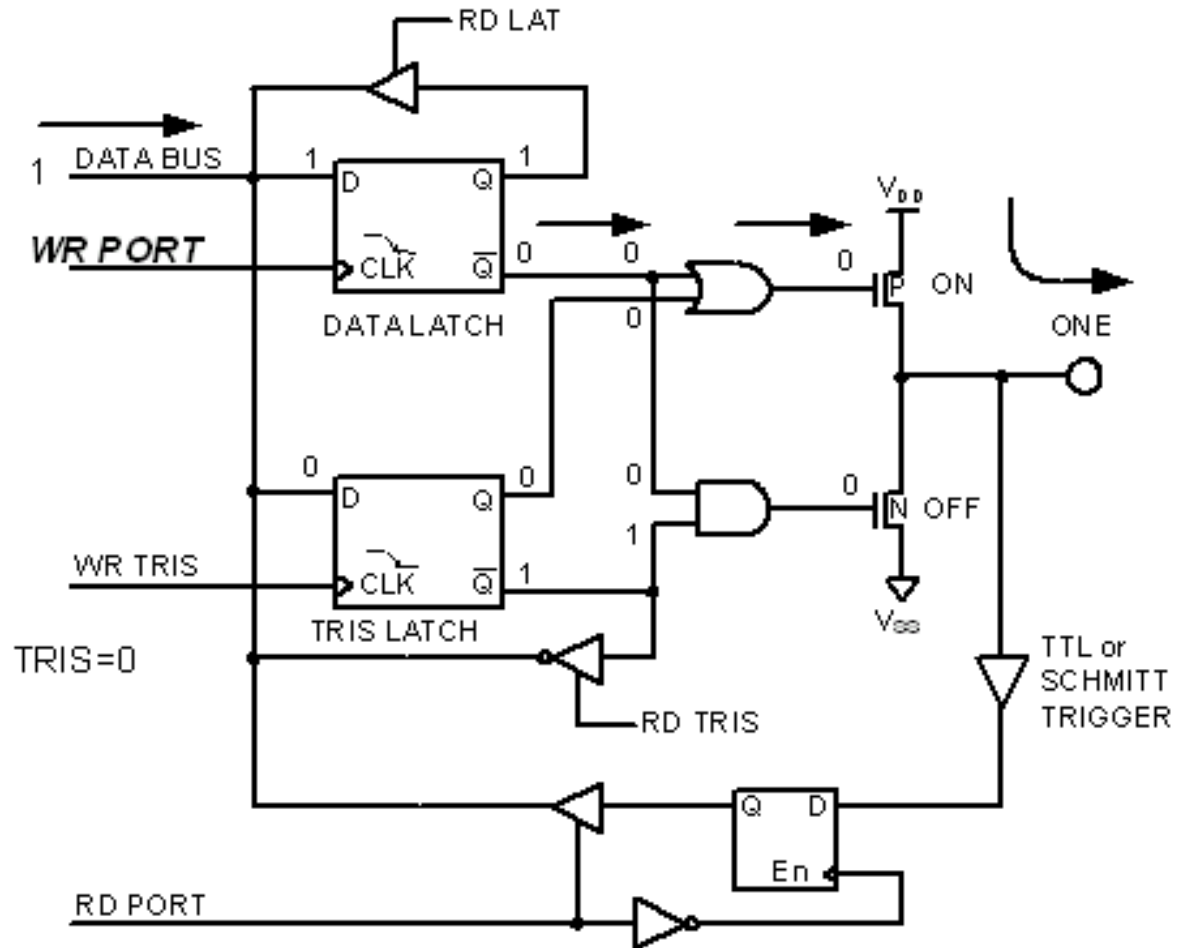
Operation of I/O port

- Three registers for each I/O port
 - TRIS register
 - PORT register
 - LAT register
- Data direction (TRIS) register needs to be set before the I/O operation
 - 1 for input
 - 0 for output

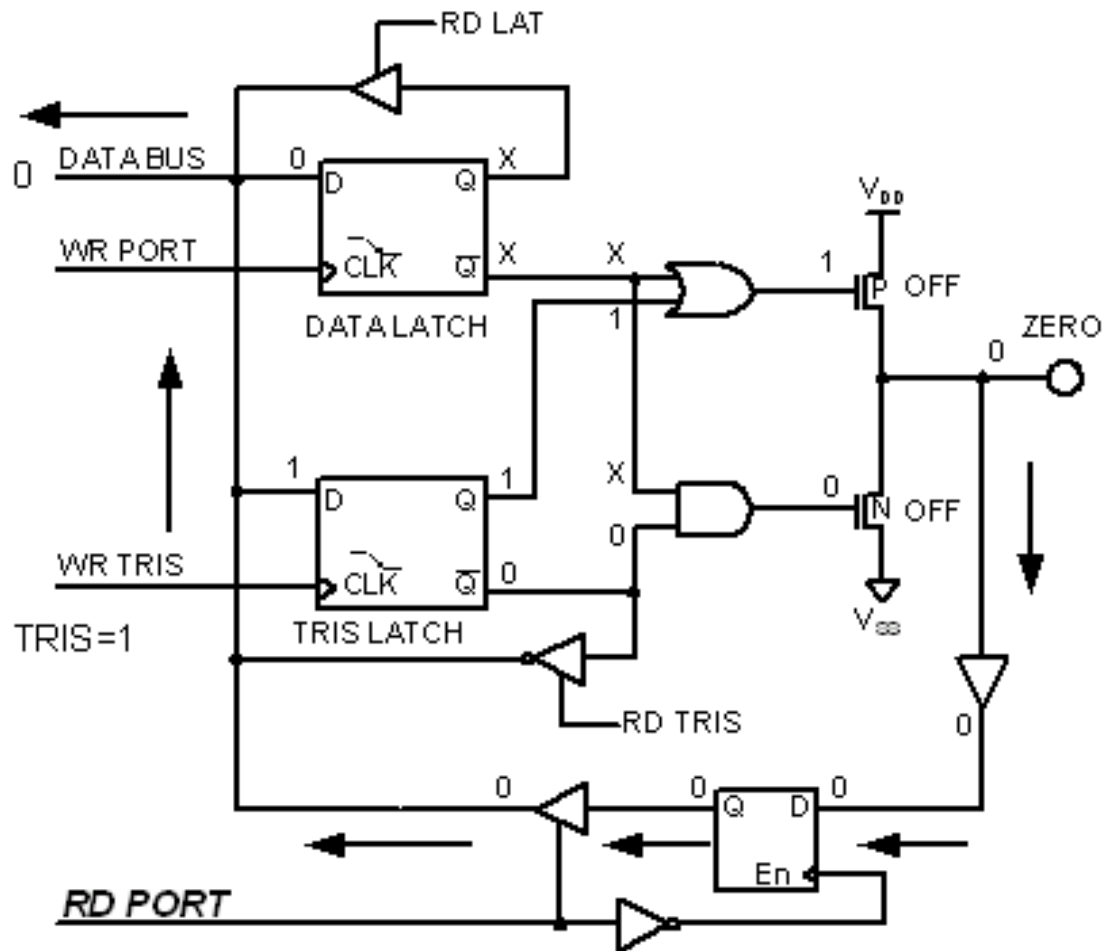
Outputting 0 to a Pin in PIC18



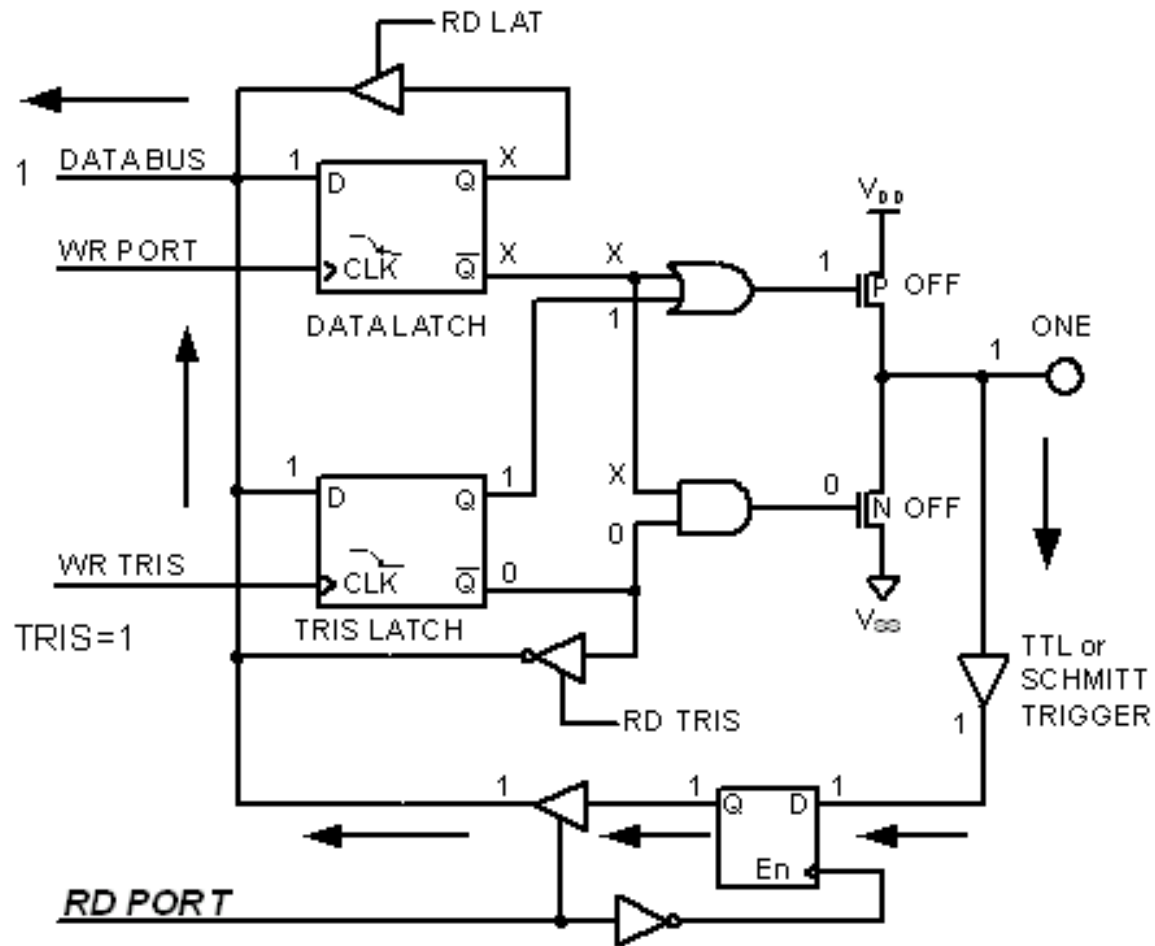
Outputting 1 to a Pin in PIC18



Inputting 0 from a Pin in PIC18



Inputting 1 from a Pin in PIC18



Get data from Port C and send it to PortB

	MOVLW	B'00000000'		CLRF	TRISB
	MOVWF	TRISB		SETF	TRISC
	MOVLW	B'11111111'	L2	MOVF	PORTC, W
	MOVWF	TRISC		ADDLW	5
L2	MOVF	PORTC, W		MOVWF	PORTB
	ADDLW	5		GOTO	L2
	MOVWF	PORTB			
	GOTO	L2			

Configure the upper four pins of port D for input and the lower four pins for output

```
MOVLW    0xF0  
MOVWF    TRISD,A
```

Dual role of Ports A and B

Table 4-3: Port A Alternate Functions

Bit	Function
RA0	AN0/CVREF
RA1	AN1
RA2	AN2/VREF-
RA3	AN3/VREF+
RA4	T0CKI
RA5	AN4/SS/LVDIN
RA6	OSC2/CLKO

Table 4-4: Port B Alternate Functions

Bit	Function
RB0	INT0
RB1	INT1
RB2	INT2/CANTX
RB3	CANRX
RB4	
RB5	PGM
RB6	PGC
RB7	PGD

Dual role of Ports C and D

Table 4-5: Port C Alternate Functions

Bit	Function
RC0	T1OSO/T1CKI
RC1	T1OSI
RC2	CCP1
RC3	SCK/SCL
RC4	SDI/SDA
RC5	SDO
RC6	TX/CK
RC7	RX/DT

Table 4-6: Port D Alternate Functions

Bit	Function
RD0	PSP0/C1IN+
RD1	PSP1/C1IN-
RD2	PSP2/C2IN+
RD3	PSP3/C2IN-
RD4	PSP4/ECCP1/P1A
RD5	PSP5/P1B
RD6	PSP6/P1C
RD7	PSP7/P1D

Examples of I/O operations

- Toggle bits periodically (Example 4-1)
- Turn on LEDs sequentially (Example 4-2)
- Generate square wave with a duty cycle (Example 4-3)
- Read status of a switch (Examples 4-5 & 4-6)

Reference

- M.A. Mazidi, R.D. Mckinlay, D Causey, PIC Microcontroller and Embedded Systems Using Assembly and C for PIC18, Pearson Education Inc., 2008.
- Han-Way Huang, PIC Microcontroller: An Introduction to Software and Hardware Interfacing, Thomson Delmar Learning, 2005.