

Programmable Peripherals

The PIC16C74 can provide programmable I/O pins, Analog inputs, a timer, and a USART. This device has a Parallel Slave Port (PSP), which is an 8 bit input and an 8 bit output latch that is asynchronously writeable or readable by the host processor.

Address decoding is required on the host. Two addresses must be decoded. One asserts the chip select for the PSP on the PIC16C74. The other latches the data bus to define the peripheral or register to select. Reading data from the PSP is done by first writing the register select, then reading the result. Writing data to the PSP is done by first writing the register select, then writing the data.

Registers:	Read	Write
B2 B1 B0		
0 0 0	STATUS	
0 0 1		ADDRESS (for PEEK/POKE)
0 1 0	PEEK	POKE
0 1 1	ADC value	ADC channel select
1 0 0		DATA DIRECTION (PORTB)
1 0 1	PORTB IN BITS	PORTB OUT BITS
1 1 0	SERIAL RX DATA	SERIAL TX DATA
1 1 1		

The PSP is interrupt serviced by the PIC16C74. The only peripheral that it provides that is time critical is the USART. Serial configuration: 8 data bits, 1 start bit, 1 stop bit, no parity = 10 bits/character. 9600 baud is 104 uSec per bit. A 20 MHz PIC does one instruction in 200 nSec (16 MHz in 250 nSec). The only operation that matters is serial receive.

The PEEK and POKE registers can directly access all of the PIC16C74 memory and special function registers. No bank selection is needed because the most significant bit in the indirect address register specifies the bank (for the PIC16C74).

Read values are continuously updated with the exception of SERIAL RX DATA, which is updated every time new data is available. Reading serial data is done by setting the register to STATUS and polling for IBF=1, then setting the register to SERIAL RX DATA and reading the data. Writing serial data is done by setting the register to STATUS and polling for OBF=0, then setting the register to SERIAL TX DATA and writing the data.

PORTA is configured for 3 analog inputs (AN0, AN1, AN3). They are selected by writing (00, 01, 11) to the PSP ADC channel selection register. The ADC must then be turned on by setting bit0 of the ADCON0 SFR (ADDRESS=0x??). Do this by PEEKing the current setting, then logical OR 0x01 to set bit0, then POKE the result. The ADC conversion must finally be started (after waiting the required sampling time...see the data sheet) by setting bit2 of the ADCON0 SFR.

Be careful with the PORTB I/O pins. Avoid output contention caused by setting a pin to be an output when it should be an input! When PORTB is used as an input, you may want to use the soft pull up option.

The PIC16C74 software will have to be modified to support counter/timer interrupts or USART interrupts for buffered operation.