Chapter 9

I²C BUS FOR PERIPHERAL CHIP ACCESS

9.1 OVERVIEW

The I²C (Inter-IC) bus, developed by Philips Semiconductors, provides a two-wire bidirectional interface to a variety of chips that can serve as powerful adjuncts to a PIC. It can also serve as the means for connecting a master PIC to one or more slave PICs using only two wires for the connection.

The PIC parts discussed in this book provide a full implementation of the slave function but only minor hardware support of the master function required for the access of the peripheral chips to be discussed in this chapter. Nevertheless, the value of the I²C bus will be seen through its connection to three small (eight-pin), low-cost parts:

- A dual 8-bit digital-to-analog converter
- A 9-bit temperature sensor
- A 128-byte serial EEPROM

To write data to one of these parts, the PIC will bit-bang the two I²C pins on PORTC, transferring out

- A peripheral chip address and a read/write bit designating that the peripheral chip is to read successive bytes
- A peripheral internal register or address byte
- Data to write into one or more consecutive internal addresses

To read data from one of these parts, the PIC

- Sends out a peripheral chip address and a read/write bit designating that the peripheral chip is to send one or more successive bytes beginning at a previously selected internal register or address
- Reads back one or more bytes of data

9.2 I²C BUS OPERATION

The I²C bus standard was in that at that time required notion of a fast mode, which this faster rate, the updating 500 μs with OSC = 4 MHz slower than a transfer takes two orders of magnitude slower.

In spite of its relatively where its speed is still much transducer having a thermal subroutines have been written same two I²C lines going through routines used with the other.

This chapter begins with peripheral chips. Bit-bang junction with the three chip

RC3/S0

and

RC4/S1

respectively.

The open-drain output PIC’s I/O pins, as shown ance output, instead of w bit, thereby obtaining the Whereas any of the two good reasons to use

- The I²C circuitry specifications.
- If an application PC slave mode

The I²C bus protocol inc (multimaster control). T

Transfers on the I²C is driven by the PIC chipp er can be used by the rec