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

The I²C bus standard was in
that at that time required no
tion 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 sl

In spite of its relativel
where its speed is still muc
transducer having a therma
subroutines have been writ
same two I²C lines going t
routines used with the othe

This chapter begins wi
peripheral chips. Bit-bangi
junction with the three chi

9.2 I²C BUS OPERAT

The I²C bus specification,
downloaded from **http://**
These two pins, called *SC*
the two multipurpose pins

RC3/S

and

RC4/S

respectively.

The open-drain outp
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
  ifications.
- If an application
  I²C slave mode u

The I²C bus protocol inc
multimaster control). Th

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