TERMINAL COMMANDS for COMPUTER INTERFACING

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1) Introduction

Figure 1 shows the pin out of PIC18F14K50 microcontroller. There are up to three ports available PORT A, PORT B and Port C. Some pins of the I/O ports are multiplexed with an alternate function from the peripheral features on the device. In general, when a peripheral is enabled, that pin may not be used as a general purpose I/O pin. For each I/O pin, there are special function and special instruction to activate them.

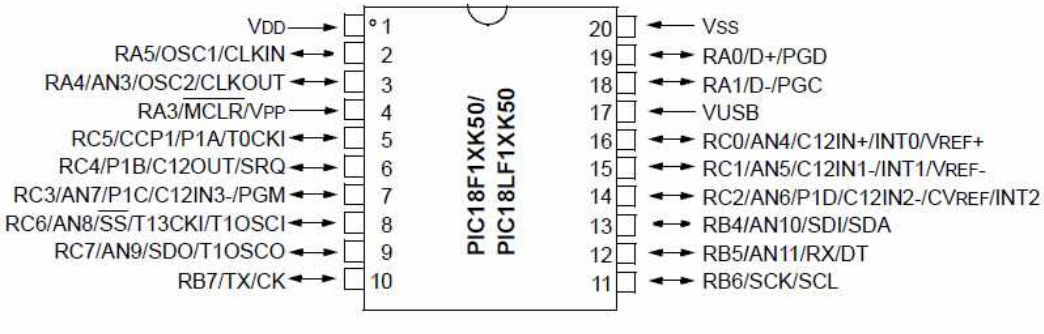

Figure 1: The pin configuration of PIC18F14K50 microcontroller

In this article we will use Terminal v1.9 b in order to communicate to our devices and this terminal program is free. Figure 2 shows the Terminal v.19b program.

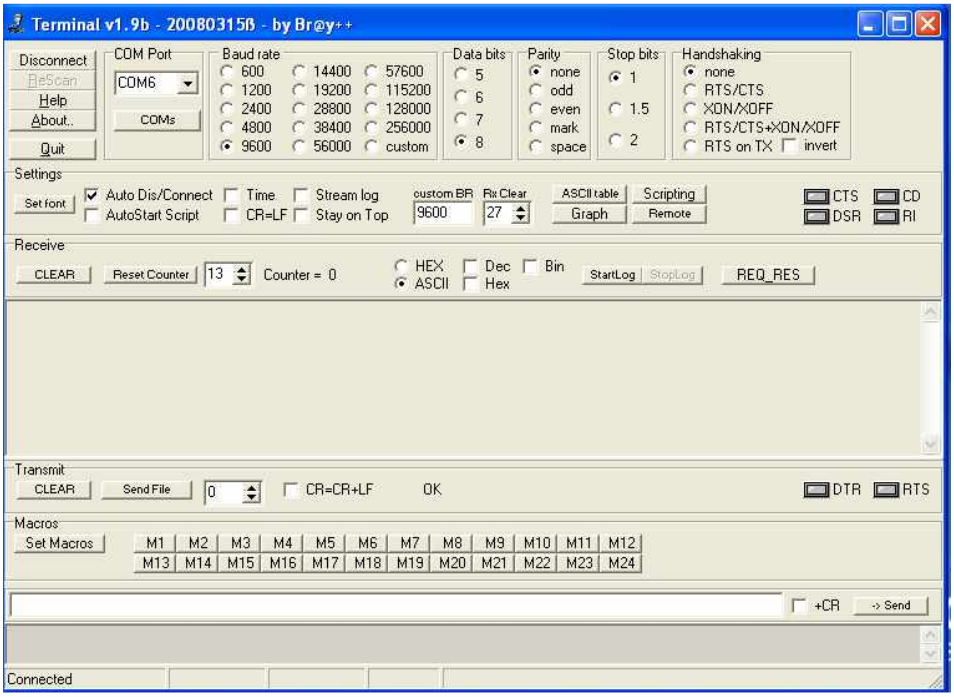

Figure 2: The Terminal v.19b program

This article will cover topic of; (i) Digital Port Commands, (ii) Analog Input Commands, and (iii) Analog Output Commands.

2) DIGITAL PORT COMMANDS

There are three digital ports on the PIC18F14K50 labeled PORT A, B and C. The individual I/O lines from PORT A are labeled RA3 (Input only), RA4 and RA5 are used as crystal oscillator input. The RA0 and RA1 are used as USB data line D- and D+. Three pin, RB4 - RB7 from PORT B and eight pin RC0-RC7 from PORT C.

By using this terminal commands, the user are allows to;

i) Configure individual bits an input or output

ii) SET or RESET individual bits

iii) read individual bits

iv) read entire port in binary or decimal format

v) write to entire port in binary or decimal format.

In order to do that task, special commands are required. The digital port commands are listed as below.

i) **Configure Port as input or output**.

CPBxxxxxxxx Configures each bit of PORT B.
CPCxxxxxxxx Configures each bit of PORT C.
All eight bits must be specified. Order is MSB-LSB (x=1 for input, x=0 for output)

Example: CPC00001111<CR>
(RC7 ,RC6, RC5, RC4 are configured as outputs and RC3, RC2, RC1, RC0 are configured as inputs).

ii) **Set Port, send data to output port**

SPBxxxxxxxx Outputs binary data to PORT B
SPCxxxxxxxx Outputs binary data to PORT C.
All eight bits must be specified.

Order is MSB-LSB. Individual bits configured as input are not effected by this command. (x=1 or 0)

Example: SPC10101000<CR>
(RC7, RC5, RC3 are set, RC6, RC4, RC2, RC1, RC0 are reset)

iii) **Return port status, read data from I/O port**. Individual lines configured as output will return last data set on the port.

i) **RPA** Returns status RA3 line in PORT A in binary format.

ii) **RPB** Returns status of RB4-RB7 lines in PORT B in binary format.

iii) **RPC** Returns status of all I/O lines in PORT C in binary format.

Order is MSB-LSB.

Example:RPC<CR>

0 1 1 1 0 0 1 0

(RC7, RC3, RC2, RC0 are low, RC6, RC5 ,RC4, RC1 are high)

iv) **Returns status of single I/O line**. Read single bit of I/O port. Individual lines configured as output will return last data set on the port.

RPA3 Returns status of RA3 in PORT A.

RPBn Returns status of single I/O line in PORT B specified by n.

(n=4 to 7)

RPCn Returns status of single I/O line in PORT C specified by n.

(n=0 to 7)

Example: RPC4<CR>

1

(RC4 is high)

v) **Output decimal data to output port**. Individual lines configured as input are not affected by this command.

MBddd Outputs decimal data (ddd) to PORT B (PB4-PB7 only). (ddd= 000 to 255).

MCddd Outputs decimal data (ddd) to PORT C.

Example: MC255<CR>

(All lines of PORT C are set)

vi) **Returns status of PORT in decimal format**. Individual lines configured as output will return last data set.

PA Returns status of PORT A in decimal format. (RA3 only)

PB Returns status of PORT B in decimal format. (RB4-RB7 only)

PC Returns status of PORT C in decimal format.

Example: PC<CR>

128

(RC7 is high, RC6 thru RC0 are low)

vii) **Resets (clear) I/O line specified by bit number.** This

i) RESPBn Resets I/O line specified by n in PORT B. (n=4 to 7)

ii) RESPCn Resets I/O line specified by n in PORT C.(n=0 to 7)

Example: RESPC4<CR>

(RC4 is reset)

viii) **Set I/O line specified by bit number**. This command has no effect on I/O lines configured as input.

SETPBn Sets I/O line specified by n in PORT B.(n=4 to 7)

SETPCn Sets I/O line specified by n in PORT C. (n=0 to 7)

Example: SETPC3<CR>
(RC3 is set)

B) ANALOG INPUT COMMANDS

There are 8 analog inputs, with a resolution of 10-bits, on the PIC18F14K50 labeled AN4 to AN11, AN4 is not usable. The analog input range is 0 to 5 VDC. The commands used to read analog inputs allow data to be retrieved is

RDn Returns status of analog port specified by n in decimal format. (n = 4 to 11)

Returns integer value from 0000 to 1023. (Input voltage range used for conversion is 0 to 5VDC)

Example: RD10<CR>
202

(To convert to voltage; voltage = $Voltage = \frac{reading\ in\ decimal}{1023} \times 5\ Volt$

(Input AN10 is (202/1023) X 5 =0.987V.

C) ANALOG OUTPUT COMMANDS on RC2/CCP1.

The Enhanced PWM Mode can generate a PWM signal on up to four different output pins with up to 10-bits of resolution. The PWM outputs are multiplexed with I/O pins and are designated P1A, P1B, P1C and P1D.

FH	Sets PWM frequency to 46.8Khz
FM	Sets PWM frequency to 11.7Khz
FL	Sets PWM frequency to 2.9KHz
EA	Enables 10-bit PWM **PIA**

DA Disables 10-bit PWM **PIA**

Tdddd Sets period of PWM (dddd = 0000 to 1023)

Vdddd Outputs decimal data (dddd) as analog voltage (dddd = 0 to 1023)

D) EVENT COUNTER COMMAND (RC6/AN8/SS/T13CKI/T1OSCI as input)

CE Clear Event Counter

RE Returns present count of counter

REC Returns present count of counter and clears event counter