This is the Revision F verion of the LED10 module. The status of this project is work in progress.

Led10 Module (Revision F)

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1. Introduction

The LED10 module provides the ability to output 10 bits of data to 10 LED's on board.

2. Programming

The Led4 Module supports the standard shared commands in addition to the following commands:

Command	Send/Receive	Byte Value								Discussion
		7	**6**	**5**	**4**	**3**	**2**	**1**	**0**	
Write Lower	Send	0	0	0	*f*	*g*	*h*	*i*	*j*	Write *fghij* out to the lower 5 LED's.
Write Upper	Send	0	0	1	*a*	*b*	*c*	*d*	*e*	Write *abcde* out to the upper 5 LED's.
Bit Clear	Send	0	1	0	0	*b*	*b*	*b*	*b*	Turn LED *bbbb* off. MSB (*bbbb*=1001) LSB (*bbbb*=0000)
Bit Set	Send	0	1	0	1	*b*	*b*	*b*	*b*	Turn LED *bbbb* on.
Bit Toggle	Send	0	1	1	0	*b*	*b*	*b*	*b*	Toggle LED *bbbb*.
Bit Read	Send	0	1	1	1	*b*	*b*	*b*	*b*	Read status of LED *bb*.
	Receive	*r*	*r*	*r*	0	0	0	0	*b*	LED state is *b*. Blink rate is *rrr*
Read All	Send	1	0	0	0	0	0	0	0	Read all ten LED's.
	Receive	0	0	0	*a*	*b*	*c*	*d*	*e*	Upper five LED state is *abcde*
	Receive	0	0	0	*f*	*g*	*h*	*i*	*j*	Lower five LED state is *fghij*
Read Lower	Send	1	0	0	0	0	0	0	1	Read lower five LED's.
	Receive	0	0	0	*f*	*g*	*h*	*i*	*j*	Lower five LED state is *fghij*
Read Upper	Send	1	0	0	0	0	0	1	0	Read upper five LED's.
	Receive	0	0	0	*a*	*b*	*c*	*d*	*e*	Upper five LED state is *abcde*
Blink Rate Set	Send	1	0	0	0	0	0	1	1	Set Blink Rate
	Send	r	r	r	0	b	b	b	b	Set LED *bbbb* blink rate to *rrr*. On (*rrr*=000) Slow (*rrr*=001)

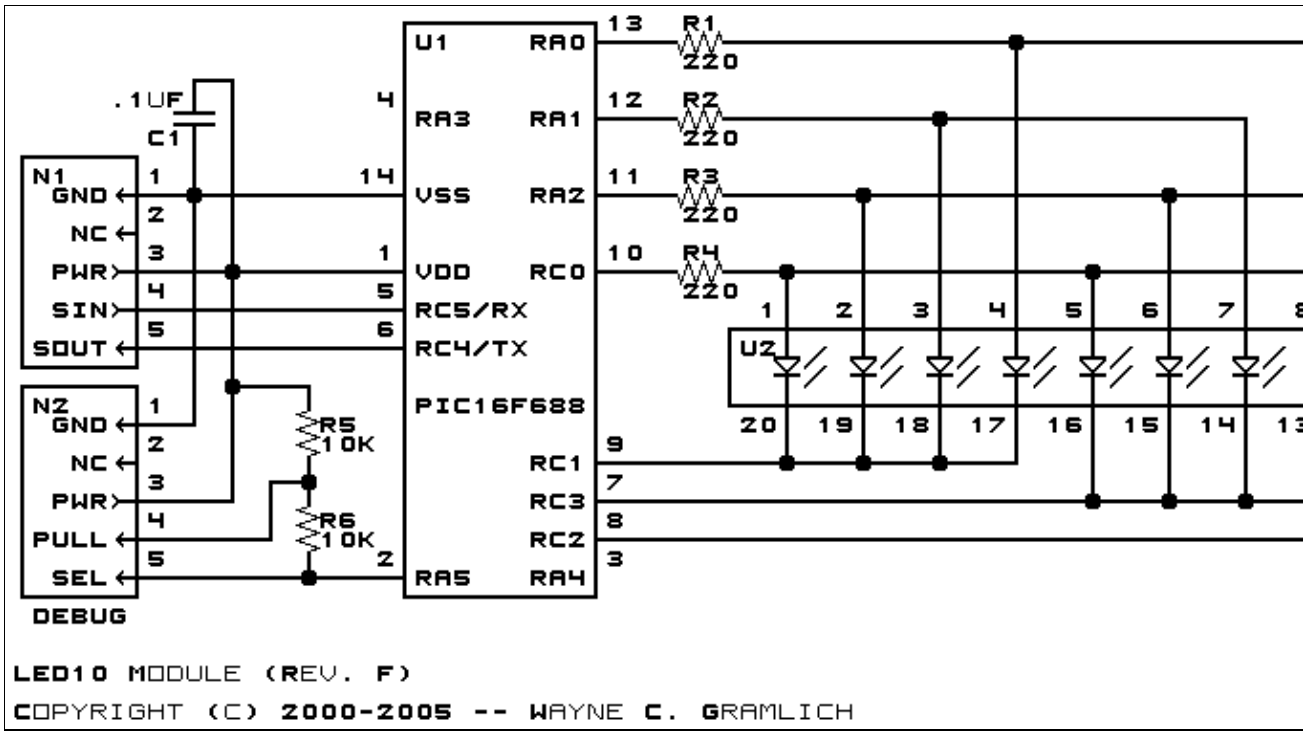
									Medium(*rrr*=100) Fast (*rrr*=111)
Increment LED's	Send	1	0	0	1	*b*	*b*	*b*	*b*	Increment LED's starting at bit *bbbb*
Decrement LED's	Send	1	0	1	0	*b*	*b*	*b*	*b*	Decrement LED's starting at bit *bbbb*
Power Level Mode	Send	1	0	1	1	*l*	*l*	*l*	*l*	Set LED's to power level *llll*; All off (*llll*=000), All on (*llll*>=1010)
Shared Commands	Send	1	1	1	1	1	*a*	*b*	*c*	Send shared command *abc* to Module.

3. Hardware

The hardware consists of a circuit schematic and a printed circuit board.

3.1 Circuit Schematic

The schematic for the Led10 Module is shown below:



The parts list kept in a separate file −− led10.ptl.

3.2 Printed Circuit Board

The printed circuit board files are listed below:

led10_back.png
: The solder side layer.

led10_front.png
: The component side layer.

led10_artwork.png
: The artwork layer.

led10.gbl
: The RS−274X "Gerber" back (solder side) layer.

led10.gtl
: The RS−274X "Gerber" top (component side) layer.

led10.gal
: The RS−274X "Gerber" artwork layer.

led10.drl
: The "Excellon" NC drill file.

led10.tol
: The "Excellon" tool rack file.

4. Software

The Led10 software is available as one of:

led10.ucl
: The µCL source file.

led10.asm
: The resulting human readable PIC assembly file.

led10.lst
: The resulting human readable PIC listing file.

led10.hex
: The resulting Intel® Hex file.

5. Issues

Any fabrication issues are listed here.
