Port Chart for PIC 18F46K22 Light Project Interface Unit

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
PortA	Xtal 16 Mhz CPU Pin 13	Xtal 16 Mhz CPU Pin 14	Display Reset Digital Display Pin 17 CPU Pin 07	Display E Digital Display Pin 8 CPU Pin 06	Display R/W Digital Display Pin 7 CPU Pin 05	Display RS Digital Display 6 CPU Pin 04	Display CS 2 Digital Display 2 CPU Pin 03	Display CS 1 Digital Display 1 CPU Pin 02
PortB	Display Data D7 Display Pin 17 CPU Pin 40	Display Data D6 Display Pin 15 CPU Pin 39	Display Data D5 Display Pin 14 CPU Pin 38	Display Data D4 Display Pin 13 CPU Pin 37	Display Data D3 Display Pin 12 CPU Pin 36	Display Data D2 Display Pin 11 CPU Pin 35	Display Data D1 Display Pin 10 CPU Pin 34	Display Data D0 Display Pin 09 CPU Pin 33
PortC	Blue Tooth Master RX Module TX CPU Pin 26	Blue Tooth Master TX Module RX CPU Pin 25	Smart MP3 SPI-1 MISO Digital CPU Pin 24	Smart MP3 SPI-1 MOSI Digital CPU Pin 23	Smart MP3 SPI-1 Clock Digital CPU Pin 18	Smart-MP3 Reset Rst CPU Pin 17	Smart-MP3 MP3 CS CPU Pin 16	Smart-MP3 SD Card CS CPU Pin 15
PortD	Speak-UP UART RX Module TX CPU Pin 30	Speak-UP UART TX Module RX CPU Pin 29	Manual TP Calibrate Switch CPU Pin 28	Smart-MP3 Data Request Digital CPU Pin 27	Smart-MP3 Byte Sync Digital CPU Pin 22	Blue Tooth Connected Module Pin 1 CPU Pin 21	TP Digital Drive B Module Pin 4 CPU Pin 20	TP Digital Drive A Module Pin 3 CPU Pin 19
PortE					MCLR CPU Pin 01	Not Used CPU Pin 10	TP Analog Left Input CPU Pin 09	TP Analog Bottom Input CPU Pin 08

Port Chart for PIC 16LF1825 Light Project Receiver Unit

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
PortA	Not Implemented On this Processor	Not Implemented On this Processor	Blue Tooth Connected Digital Input CPU Pin 02	Porch Light Analog Current-Sensor CPU Pin 03	MCLR CPU Pin 04	Hall Light Analog Current-Sensor CPU Pin 11	Sink Light Analog Current-Sensor CPU Pin 12	Table Light Analog Current-Sensor CPU Pin 13
PortC	Not Implemented On this Processor	Not Implemented On this Processor	Blue Tooth UART RX Module TX CPU Pin 05	Blue Tooth UART TX Module RX CPU Pin 06	Hall Light Digital Light Control CPU Pin 07	Hall Light Digital Light Control CPU Pin 08	Sink Light Digital Light Control CPU Pin 09	Table Light Digital Light Control CPU Pin 10

Communications Protocol For Light Project Receiver Unit

The Communication between the Master and the Receiver is Serial 38400 Baud, 1 Start Bit, 8 Data Bits, 1 Stop Bit no parity, over a Blue Tooth Connection. Blue Tooth Modules are model HC-05 with a TTL ASYNC Serial Interface to the PIC Microcontrollers. They Pair automatically with only themselves after a documented setup procedure. All the Commands are Two Bytes. Two of the commands return Receiver Data after the two byte commands and are for test purposes. The host processor must take this into account and deal with the additional data.

Command	Response	Action
"A"... ("1" --> "4")	Fill_Char ... ACK/NAK	Turn On a Light
"B"... ("1" --> "4")	Fill_Char ... ACK/NAK	Turn Off a Light
"C"... Fill_Char	Fill_Char ... ACK/NAK	Turn On all Lights
"D"... Fill_Char	Fill_Char ... ACK/NAK	Turn Off all Lights
"E"... Mask of Light I/O Port	Fill_Char ... ACK/NAK	Turn on Lights that have a 1 in their bits and off those that have a 0 in their bits
"F"... Fill_Char	Port Data ... ACK/NAK	Returns the Light Port Bits
"G"... ("1" --> "4")	"G" ... ACK/NAK	Toggles selected Light
"I"... Fill_Char	Fill_Char ... ACK/NAK	Resets Receiver
"J"... Fill_Char	High Nibble is the ATD Data Low Nibble is the Port Data ... ACK/NAK	Nop Light State Report
"S"... Fill_Char	"S" ... ACK/NAK	Response followed by 4 Words of Current Data, 4 Words of Calibration Data, 1 byte of ADC Data, 1 Byte of Port Data
"T"... Fill_Char	"T" ... ACK/NAK	Same as "S" Command except the data is in ASCII format with CR/LF after each light data. This is useful for checking function with the Mikro USART terminal tool.

Fill_Char = 0x0D

ACK = 0x06

Nak = 0x15

All alpha characters can be Upper or Lower Case

The Current sensing data is a sampling of 32 from the ATD module to insure a large enough difference between Current data and calibration data so that data is in words which is transmitted Most significant byte first over the UART. My Light status screen then displays the difference on line four of the report on the GLCD. I had to use a PIC 18F46K22 on the master module to have enough memory for the overhead used by the Visual GLCD software from MikroTec. This small expense was well outweighed by the time the Visual Software saved. The Visual software is a bit touchy when deleting buttons and does sometimes change the Handler routines but I soon became accustomed to its quirks and after a few days use it and I settled down to a workable process.