**Dated:** December 4th, 2014

Following block diagram shows how modules are used and shared in a controller. As in this diagram Uart1 module (resource) is shared by three independent processes.

Motors

Software Multiplexed Devices

U1

LCD

UART

**DsPIC33FJ64MCX02/X04**

M

Transceiver

U2

Compass

Status LEDS

ADC

Conditioning

DC Battery

PWM

Servo

**Figure 1:** Block Diagram showing Main System

U1

Compass

UART

**dsPIC33FJ64MCX02/X04**

M

U2

Transceiver

Status LEDS

ADC

Conditioning

DC Battery

Input I/Os

**Figure 2**: Block Diagram showing Binocular Side

**PIN DISTRIBUTION TABLE:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Pin Number | RPX | Port Pin | Purpose | Module No |
| 1 | RP9 | RB9 | Power LED | GP I/O |
| 2 | RP22 | RC6 | Servo2 | GP I/O |
| 3 | RP23 | RC7 | Servo1 | GP I/O |
| 4 | RP24 | RC8 | LIMIT Switch up | GP I/O |
| 5 | RP25 | RC9 | LIMIT Switch down | GP I/O |
| 6 |  |  |  |  |
| 7 |  |  |  |  |
| 8 | RP10 | RB10 | Line LED | GP I/O |
| 9 | RP11 | RB11 | Error LED | GP I/O |
| 10 |  |  |  |  |
| 11 | RP13 | RB13 | To transistor Base for Buzzer Switch | GP I/O |
| 12 |  |  |  |  |
| 13 |  |  |  |  |
| 14 |  |  |  |  |
| 15 |  |  |  |  |
| 16 |  |  |  |  |
| 17 |  |  |  |  |
| 18 |  |  |  |  |
| 19 |  |  |  |  |
| 20 |  |  |  |  |
| 21 |  |  |  |  |
| 22 |  |  |  |  |
| 23 | RP2 | RB2 | Encoder 1A |  |
| 24 | RP3 | RB3 | Encoder 1B |  |
| 25 | RP16 | RC0 | Encoder 2A |  |
| 26 | Rp17 | RC1 | Encoder 2B |  |
| 27 | RP18 | RC2 | UART for magnetometer (transmit) | UART2 |
| 28 |  |  |  |  |
| 29 |  |  |  |  |
| 30 |  |  |  |  |
| 31 |  |  |  |  |
| 32 |  |  |  |  |
| 33 | RP4 | RB4 | UART for magnetometer (receive) | UART2 |
| 34 |  |  |  |  |
| 35 |  |  |  |  |
| 36 | RP19 | RC3 | UART for transceiver (transmit) | UART1 |
| 37 | RP20 | RC4 | UART for transceiver (receive) | UART1 |
| 38 | RP21 | RC5 | GP UART(transmit) | UART1 |
| 39 |  |  |  |  |
| 40 |  |  |  |  |
| 41 | RP5 | RB5 | UART for Sabertooth (transmit) | UART1 |
| 42 |  |  |  |  |
| 43 | RP7 | RB7 | UART for OLED (receive) | UART1 |
| 44 | RP8 | RB8 | UART for OLED (transmit) | UART1 |

**IRSAM Board of Material PCB Design:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S.No** | **Component Name** | **Quantity** | **Unit Cost** | **Total Cost** |
| **1** | 2pin Power Crimp | 20 |  |  |
| **2** | 4pin Power Crimp | 15 |  |  |
| **3** | Db9 right angle female | 10 |  |  |
| **4** | Max232 IC | 6 |  |  |
| **5** | 7805 regulator IC | 10 |  |  |
| **6** | 7803 regulator IC | 10 |  |  |
| **7** | 1uF 50v | 24 |  |  |
| **8** | 3pin Crimp | 12 |  |  |
| **9** | 10uF 50v | 24 |  |  |
| **10** | Buzzer | 5 |  |  |
| **11** | Dspic33fjmc204 | 6 |  |  |

**IRSAM Stand Side Compass Connector:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Big Connector pin #** | **Compass** | **Small connector**  **Pin#** | **Box Big Connector Signal Side** |
| **1** | **Vcc** |  |  |
| **2** |  | **5** | **Crim blk wire** |
| **3** |  | **7** | **Crim yellow** |
| **4** |  | **1** | **Crim2 yelow** |
| **5** |  | **4** | **Crim brwn** |
| **6** | **gnd** |  |  |
| **7** | **tx** |  |  |
| **8** | **rx** |  |  |
| **9** |  | **2** | **Crim3 brwn** |
| **10** |  | **3** | **Crim3 blk** |

**IRSAM Binocular Compass Connector:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Connector pin** | **Connection on compass side** | **Connection on Circuit side** | **In Board** |
| A | Tx | Rx |  |
| B | Button A - T1 | Gray free |  |
| C | Button A – T2 | Green free |  |
| D | Button B - T1 | Crim1 white |  |
| E | LED3 – S1 | free yellow | Servo 2 |
| F | LED2 – S1 | Crim2 red | E |
| G | LED1 – S1 | Crim 2 white | L |
| H | Button D – T2 | Crim3 black |  |
| J | Button D - T1 | Crim3 white |  |
| K | Button C - T1 | Crim3 purple |  |
| L | Vcc | Fuse red |  |
| M | Gnd | Fuse gnd |  |
| N | Rx | Tx |  |
| P | Button B – T2 | Crim1 blue |  |
| R | LED3– S2 | Crim2 gray | G |
| S | LED2 – S2 | Crim2 orange | P |
| T | LED1 – S2 | free1 white | Servo1 |
| U | Button C – T2 | Crim3 pink |  |
| **V** |  | **Free white** |  |

**Stand side servo connector**

|  |  |  |  |
| --- | --- | --- | --- |
| **Connector** | **Pin** |  |  |
| **Servo1** | **1** |  |  |
| **Servo2** | **7** |  |  |
| **Gnd** | **3** |  |  |
| **Gnd** | **5** |  |  |
|  |  |  |  |