Contents

[1- Data variables 2](#_Toc293391479)

[2- Pin Configuration 3](#_Toc293391480)

[3- Available Pins: 5](#_Toc293391481)

[4- Reserved Pins: 5](#_Toc293391482)

[5- Analog Register: 7](#_Toc293391483)

1. Data variables

Typedef struct {int16\_t data[3]; } MOTOR\_DATA\_3EL\_16BI;

Typedef struct {int16\_t data[2]; } MOTOR\_DATA\_2EL\_16BI;

Typedef struct {int32\_t data[3]; } MOTOR\_DATA\_3EL\_32BI;

Typedef struct {int32\_t data[2]; } MOTOR\_DATA\_3EL\_32BI;

Typedef struct {int8\_t data[3];} MOTOR\_DATA\_3EL\_8BI;

Typedef struct{float data[4][3]; } MOTOR\_DATA\_CTRL;

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| # | Variable Name | Comments | Read/Write | Type | Range/Element Range |
|  | REG\_MOTOR\_VELOCITY | Motor 1 velocity  Motor 2 velocity  Motor 3 velocity | DEVICE\_WRITE | MOTOR\_DATA\_3EL\_16BI | -1023~+1023 |
|  | REG\_FAN\_VELOCITY | Fan 1 velocity  Fan 2 velocity | DEVICE\_WRITE | MOTOR\_DATA\_2EL\_16BI | 0~1023 |
|  | REG\_MOTOR\_FB\_RPM | Motor1 RPM  Motor2 RPM | DEVICE\_READ | MOTOR\_DATA\_2EL\_32BI |  |
|  | REG\_FLIPPER\_FB\_POSITION | Pot 1  Pot 2 | DEVICE\_READ | MOTOR\_DATA\_2EL\_16BI | 0~1023 |
|  | REG\_MOTOR\_FB\_CURRENT | Motor 1 current  Motor 2 current  Motor 3 current | DEVICE\_READ | MOTOR\_DATA\_3EL\_16BI | 0~1023 |
|  | REG\_MOTOR\_ENCODER\_COUNT | Motor 1 Encoder Count  Motor 2 Encoder Count | DEVICE\_READ | MOTOR\_DATA\_2EL\_32BI |  |
|  | REG\_MOTOR\_KP | REG\_MOTOR\_KP[i][j]  i: control mode  j: 0-Motor1, 1-Motor 2, 2-Motor 3 | DEVICE\_WRITE | MOTOR\_DATA\_CTRL |  |
|  | REG\_MOTOR\_KI | REG\_MOTOR\_KI[i][j]  i: control mode  j: 0-Motor1, 1-Motor 2, 2-  Motor 3 | DEVICE\_WRITE | MOTOR\_DATA\_CTRL |  |
|  | REG\_MOTOR\_KD | REG\_MOTOR\_KD[i][j]  i: control mode  j: 0-Motor1, 1-Motor 2, 2-  Motor 3 | DEVICE\_WRITE | MOTOR\_DATA\_CTRL |  |
|  | REG\_MOTOR\_CTRL\_MODE | Motor 1 ctrl mode  Motor 2 ctrl mode  Motor 3 ctrl mode | DEVICE\_WRITE | MOTOR\_DATA\_3EL\_16BI |  |
|  | REG\_MOTOR\_FAULT\_FLAG | Motor 1 driver fault  Motor 2 driver fault | DEVICE\_READ | MOTOR\_DATA\_2EL\_8BI |  |
|  | REG\_MOTOR\_TEMP | Thermistor 1  Thermistor 2  On board thermal chip | DEVICE\_READ | MOTOR\_DATA\_3EL\_16BI |  |
|  | REG\_PWR\_BAT\_VOLTAGE | CELL\_A voltage  CELL\_B voltage | DEVICE\_READ | MOTOR\_DATA\_2EL\_16BI |  |
|  | REG\_PWR\_TOTAL\_CURRENT |  | DEVICE\_READ | Uint16\_t | 0~1023 |

1. Pin Configuration

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Pin Name | Pin # | Description | Function | Input/Output | Digital/Analog | Comment |
| 1 | **RP20**/PMRD/CN14/RD5 | 53 | M1\_TACHO | IC | Input | Digital | IC1 |
| 2 | **RP25**/PMWR/CN13/RD4 | 52 | M1\_DIRO | IO | Input | Digital |  |
| 3 | AN14/CTPLS/**RP14**/PMA1/CN32/RB14 | 29 | M1\_PWM | PWM | Output | Digital | OC1 |
| 4 | **RP16**/USBID/CN71/RF3 | 33 | M1\_DIR | IO | Output | Digital |  |
| 5 | RTCC/DMLN/**RP2**/CN53/RD8 | 42 | M1\_BRAKE | IO | Output | Digital |  |
| 6 | AN15/**RP29**/REFO/PMA0/CN12/RB15 | 30 | M1\_MODE | IO | Output | Digital |  |
| 7 | VCPCON/**RP24**/CN50/RD1 | 49 | M1\_COAST | IO | Output | Digital |  |
| 8 | TMS/CVREF/AN10/PMA13/CN28/RB10 | 23 | M1\_Current | A/D | Input | Analog |  |
| 9 | TDO/AN11/PMA12/CN29/RB11 | 24 | M1\_Temperature | A/D | Input | Analog |  |
| 10 | TCK/AN12/PMA11/CTED2/CN30/RB12 | 27 | M1\_FF1 | IO | Input | Digital |  |
| 11 | **RP22**/PMBE/CN52/RD3 | 51 | M2\_TACHO | IC | Input | Digital | IC2 |
| 12 | DPH/**RP23**/CN51/RD2 | 50 | M2\_DIRO | IO | Input | Digital |  |
| 13 | C1IND/**RP21**/PMA5/CN8/RG6 | 4 | M2\_PWM | PWM | Output | Digital | OC2 |
| 14 | C1INC/**RP26**/PMA4/CN9/RG7 | 5 | M2\_DIR | IO | Output | Digital |  |
| 15 | C2IND/**RP19**/PMA3/CN10/RG8 | 6 | M2\_BRAKE | IO | Output | Digital |  |
| 16 | **RP27**/PMA2/C2INC/CN11/RG9 | 8 | M2\_MODE | IO | Output | Digital |  |
| 17 | PMD5/CN63/RE5 | 1 | M2\_COAST | IO | Output | Digital |  |
| 18 | PGEC3/AN5/C1INA/VBUSON/**RP18**/CN7/RB5 | 11 | M2\_Current | A/D | Input | Analog |  |
| 19 | PGED3/AN4**/**C1INB/USBOEN/**RP28**/CN6/RB4 | 12 | M2\_Temperature | A/D | Input | Analog |  |
| 20 | AN3/C2INA/VPIO/CN5/RB3 | 13 | M2\_FF1 | IO | Input | Digital |  |
| 21 | SOSCI/C3IND/CN1/RC13 | 47 | M3\_PWM | PWM | Output | Digital | OC3 |
| 22 | DMH/**RP11**/INT0/CN49/RD0 | 46 | M3\_DIR | IO | Output | Digital |  |
| 23 | SOSCO/T1CK/C3INC/**RPI37**/CN0/RC14 | 48 | M3\_BRAKE | IO | Output | Digital |  |
| 24 | **RP12**/PMCS1/CN56/RD11 | 45 | M3\_MODE | PWM | Output | Digital |  |
| 25 | AN8/**RP8**/CN26/RB8 | 21 | M3\_Current | A/D | Input | Analog |  |
| 26 | AN9/**RP9**/PMA7/CN27/RB9 | 22 | M3\_Temperature | A/D | Input | Analog |  |
| 27 | TDI/AN13/PMA10/CTED1/CN31/RB13 | 28 | M3\_Fault | IO | Input | Digital |  |
| 28 | C3INA/CN16/RD7 | 55 | M1\_FF2 | IO | Input | Digital |  |
| 29 | C3INB/CN15/RD6 | 54 | M2\_FF2 | IO | Input | Digital |  |
| 30 | SCL3/PMD6/CN64/RE6 | 2 | DE1 |  |  |  |  |
| 31 | SDA3/PMD7/CN65/RE7 | 3 | DE2 |  |  |  |  |
| 32 | VCMPST2/CN69/RF1 | 59 | DE3 |  |  |  |  |
| 33 | VBUSST/VCMPST1/CN68/RF0 | 58 | DE4 |  |  |  |  |
| 34 | AN2/C2INB/VMIO**/RP13**/CN4/RB2 | 14 | DE5 |  |  |  |  |
| 35 | PGEC1/AN1/VREF-/**RP1**/CN3/RB1 | 15 | DE6 |  |  |  |  |
| 36 | PGED1/AN0/VREF+/**RP0**/PMA6/CN2/RB0 | 16 | DE7 |  |  |  |  |
| 37 | SDA2/**RP10**/PMA9/CN17/RF4 | 31 | DE8 |  |  |  |  |
| 38 | SCL2/**RP17**/PMA8/CN18/RF5 | 32 | DE9 |  |  |  |  |
| 39 | DPLN/SDA1/**RP4**/CN54/RD9 | 43 | UART1\_TX | UART | Output | Digital |  |
| 40 | SCL1/**RP3**/PMCS2/CN55/RD10 | 44 | UART1\_RX | UART | Input | Digital |  |
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1. Available Pins:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| 1 |  |  |  |
| 2 |  |  |  |

1. Reserved Pins:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| 1 | MCLR | 7 |  |
| 2 | VSS | 9 |  |
| 3 | VDD | 10 |  |
| 4 | PGEC2/AN6/**RP6**/CN24/RB6 | 17 |  |
| 5 | PGED2/AN7/**RP7**/RCV/CN25/RB7 | 18 |  |
| 6 | AVDD | 19 |  |
| 7 | AVSS | 20 |  |
| 8 | VSS | 25 |  |
| 9 | VDD | 26 |  |
| 10 | VBUS | 34 |  |
| 11 | VUSB | 35 |  |
| 12 | D-/RG3 | 36 |  |
| 13 | D+/RG2 | 37 |  |
| 14 | VDD | 38 |  |
| 15 | OSCI/CLKI/CN23/RC12 | 39 |  |
| 16 | OSCO/CLKO/CN22/RC15 | 40 |  |
| 17 | VSS | 41 |  |
| 18 | VCAP/VDDCORE | 56 |  |
| 19 | ENVREG | 57 |  |
| 20 | PMD0/CN58/RE0 | 60 |  |
| 21 | PMD1/CN59/RE1 | 61 |  |
| 22 | PMD2/CN60/RE2 | 62 |  |
| 23 | PMD3/CN61/RE3 | 63 |  |
| 24 | PMD4/CN62/RE4 | 64 |  |

1. Analog Register:

0—Analog 1--Digital

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| AN15 | AN14 | AN13 | AN12 | AN11 | AN10 | AN9 | AN8 | AN7 | AN6 | AN5 | AN4 | AN3 | AN2 | AN1 | AN0 |
| 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | / | / | 0 | 0 | 1 | / | / | / |

I/O pin mapping: 0-Output 1-Input

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| \_TRISB15 | \_TRISB14 | \_TRISB13 | \_TRISB12 | \_TRISB11 | \_TRISB10 | \_TRISB9 | \_TRISB8 | \_TRISB7 | \_TRISB6 | \_TRISB5 | \_TRISB4 | \_TRISB3 | \_TRISB2 | \_TRISB1 | \_TRISB0 |
| 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |  |  | 1 | 1 | 1 | / | / | / |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| \_TRISC15 | \_TRISC14 | \_TRISC13 | \_TRISC12 | \_TRISC11 | \_TRISC10 | \_TRISC9 | \_TRISC8 | \_TRISC7 | \_TRISC6 | \_TRISC5 | \_TRISC4 | \_TRISC3 | \_TRISC2 | \_TRISC1 | \_TRISC0 |
|  | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| \_TRISD15 | \_TRISD14 | \_TRISD13 | \_TRISD12 | \_TRISD11 | \_TRISD10 | \_TRISD9 | \_TRISD8 | \_TRISD7 | \_TRISD6 | \_TRISD5 | \_TRISD4 | \_TRISD3 | \_TRISD2 | \_TRISD1 | \_TRISD0 |
|  |  |  |  | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| \_TRISE15 | \_TRISE14 | \_TRISE13 | \_TRISE12 | \_TRISE11 | \_TRISE10 | \_TRISE9 | \_TRISE8 | \_TRISE7 | \_TRISE6 | \_TRISE5 | \_TRISE4 | \_TRISE3 | \_TRISE2 | \_TRISE1 | \_TRISE0 |
|  |  |  |  |  |  |  |  | / | / | 0 |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| \_TRISF15 | \_TRISF14 | \_TRISF13 | \_TRISF12 | \_TRISF11 | \_TRISF10 | \_TRISF9 | \_TRISF8 | \_TRISF7 | \_TRISF6 | \_TRISF5 | \_TRISF4 | \_TRISF3 | \_TRISF2 | \_TRISF1 | \_TRISF0 |
|  |  |  |  |  |  |  |  |  |  | / | / | 0 |  | / | / |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| \_TRISG15 | \_TRISG14 | \_TRISG13 | \_TRISG12 | \_TRISG11 | \_TRISG10 | \_TRISG9 | \_TRISG8 | \_TRISG7 | \_TRISG6 | \_TRISG5 | \_TRISG4 | \_TRISG3 | \_TRISG2 | \_TRISG1 | \_TRISG0 |
|  |  |  |  |  |  | 0 | 0 | 0 | 0 |  |  |  |  |  |  |