

T.Moore

Last Modified: 3.31.11

= NEW TO DESIGN

For use with ICC Board Module, Version 3.3

I/O PORT A --> PORT G REGISTERS

- TRISx -- DATA DIRECTION CONFIGURATION REGISTER, 0 = OUTPUT PIN, 1 = INPUT PIN
- PORTx -- DATA VALUE REGISTER. CAN BE INPUT AND OUTPUT
- LATx -- PORT LATCH REGISTER
- ODCx -- OPEN-DRAIN CONTROL REGISTER, 0= DIGITAL OUTPUT, 1 = OPEN-DRAIN OUTPUT

I/O PORT A REGISTER (RA)

MSB														LSB	
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
+48VA OV FAULT	-15VA OV FAULT	NO PIN	NO PIN	NO PIN	PMA6	PMA7	NO PIN	FAN2 RPM OK	CLR FAN4 FAULT	+15VA OV FAULT	-5VA OV FAULT	+5VA OV FAULT	+3.3VD OV FAULT	NO FAULTS	+5VD OV FAULT
IN	IN				I/O	I/O		IN	OUT	IN	IN	IN	IN	OUT	IN

TRISA Register Data

0xC0BD

ODCA Register Data

0x0000

PORTA Register Data

- 0xFFFF -- +5VD HAS OV FAULT
 - 0xFFFF -- NO FAULTS ARE NOTICED FROM UCONTROLLER
 - 0xFFFF -- +3.3VD HAS OV FAULT
 - 0xFFFF -- +5VA HAS OV FAULT
 - 0xFFFF -- -5VA HAS OV FAULT
 - 0xFFFF -- +15VA HAS OV FAULT
 - 0xFFFF -- CLEAR FAULT CONDITION ON FAN4 FAN CONTROLLER
 - 0xFFFF -- FAN #2 RPM IS OK
 - 0xFFFF -- -15VA HAS OV FAULT
 - 0xFFFF -- +48VA HAS OV FAULT
- * NOTE: 0=OK, 1=NOT OK

I/O PORT B REGISTER (RB)

MSB														LSB	
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
PMA0	PMA1	PMA10	PMA11	PMA12	PMA13	AN9	AN8	AN7	AN6	AN5	AN4	AN3	AN2	PGC1	PGD1
I/O	I/O	I/O	I/O	I/O	I/O	IN	IN	IN	IN	IN	IN	IN	IN	I/O	I/O

Register Data

- 0x0004 -- COMMON A/D INPUT: EITHER TEMPERATURE (L_TEMP/MUX ADDR 0x0), HUMIDITY (HUMID_VOUT/MUX ADDR 0x1), OR +5VD (P_5VD_PWR_SCLD/MUX ADDR 0x2)
- 0x0008 -- -5VA A/D INPUT
- 0x0010 -- +3.3VD A/D INPUT
- 0x0020 -- +5VA A/D INPUT
- 0x0040 -- +15VA A/D INPUT
- 0x0080 -- +48VA A/D INPUT
- 0x0100 -- -28VA A/D INPUT
- 0x0200 -- -15VA A/D INPUT

I/O PORT C REGISTER (RC)

MSB														LSB	
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
OSC2	FAN5 RPM OK	CLR VCR FAN FAULT	OSC1	NO PIN	NO PIN	NO PIN	NO PIN	NO PIN	NO PIN	NO PIN	NO PIN	NO PIN	NO PIN	FAN_CNTRL_OFF	NO PIN
I/O	IN	OUT	I/O											OUT	

TRISC Register Data

0x4000

ODCC Register Data

0x0000

PORTC Register Data

- 0x2XXX -- CLEAR FAULT CONDITION ON VICOR FAN FAN CONTROLLER
- 0x4XXX -- FAN #5 RPM IS OK
- 0xXXX2 -- FAN ROTATION CONTROLS OFF (TURN OFF FANS)

I/O PORT D REGISTER (RD)

MSB														LSB	
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
		FAN7 RPM OK	FAN6 RPM OK	PMA14	PMCS-		-28VA OV FAULT	CLR FAN8 FAULT	CLR FAN7 FAULT	PMRD	PMWR-		CLR FAN6 FAULT	CLR FAN5 FAULT	VCR FAN RPM NOT OK
		IN	IN	I/O	OUT		*IN	OUT	OUT	OUT	OUT		OUT	OUT	*IN

TRISD Register Data

0x3101

ODCD Register Data

0x0000

PORTD Register Data

- 0xFFFF -- VICOR FAN RPM IS NOT OK
- 0xFFFF -- CLEAR FAULT CONDITION ON FAN #5 FAN CONTROLLER
- 0xFFFF -- CLEAR FAULT CONDITION ON FAN #6 FAN CONTROLLER
- 0xFFFF -- CLEAR FAULT CONDITION ON FAN #7 FAN CONTROLLER
- 0xFFFF -- CLEAR FAULT CONDITION ON FAN #8 FAN CONTROLLER
- 0x1XXX -- FAN #6 RPM OK
- 0x2XXX -- FAN #7 RPM OK
- 0x1XXX -- -28VA HAS OV FAULT **MOVED FROM RD15 TO RD8-11.17.10**

PORTD Combination Register Data

- 0x3000 -- VICOR FAN, FAN #6, & FAN #7 RPM IS OK
- * NOTE: 0=OK, 1=NOT OK

I/O PORT E REGISTER (RE)

MSB														LSB	
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
NO PIN	NO PIN	NO PIN	NO PIN	NO PIN	NO PIN	MUX ADDR2	MUX ADDR1	PMD7	PMD6	PMD5	PMD4	PMD3	PMD2	PMD1	PMD0
						OUT	OUT	I/O	I/O	I/O	I/O	I/O	I/O	I/O	I/O

TRISE Register Data

0x0000

ODCE Register Data

0x0000

PORTE Register Data

0x0000 -- MUX ADDR 0: TEMP
 0x0100 -- MUX ADDR 1: HUMIDITY
 0x0200 -- MUX ADDR 2: +5VD VOLTS

I/O PORT F REGISTER (RF)

MSB														LSB	
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
NO PIN	NO PIN	VOLTS GOOD	GEN SHTDWN	NO PIN	NO PIN	NO PIN	SPI ICC SDO	SPI ICC SDI		PMA8	PMA9	NOT OK PWR UP	DHE SYS NOT OK	FAN3 RPM OK	FAN8 RPM OK
		IN	IN				OUT	IN		OUT	OUT	*IN	*OUT	IN	IN

TRISF Register Data

0x308B

ODCF Register Data

0x0000

PORTF Register Data

0xXXX1 -- FAN #8 RPM OK
 0xXXX2 -- FAN #3 RPM OK
 0xXXX4 -- DHE SYSTEM NOT OK
 0xXXX8 -- NOT OK TO POWER UP
 0x1XXX -- GEN SHUTDOWN: SYSTEM IS FUNCTIONING PROPERLY
 0x2XXX -- VOLTS GOOD: NO OVERVOLTAGE CONDITION IS PRESENT

* NOTE: 0=OK, 1=NOT OK

** NOTE: INVERTED HERE SO LABVIEW WON'T NEED CHANGED

I/O PORT G REGISTER (RG)

MSB														LSB	
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
VOLTS WAIT	CLR FAN2 FAULT	CLR FAN1 FAULT	FAN1 RPM OK	NO PIN	NO PIN	PMA2	PMA3	PMA4	PMA5	NO PIN	NO PIN	SPI_CS	*SPI SCLK	CLR FAN3 FAULT	FAN4 RPM OK
OUT	OUT	OUT	IN			OUT	OUT	OUT	OUT			IN	IN	OUT	IN

TRISG Register Data

0x100D

ODCG Register Data

0x0000

PORTG Register Data

0xXXX1 -- FAN #4 RPM OK
 0xXXX2 -- CLEAR FAULT CONDITION ON FAN #3 FAN CONTROLLER
 0x1XXX -- FAN #1 RPM OK
 0x2XXX -- CLEAR FAULT CONDITION ON FAN #1 FAN CONTROLLER
 0x4XXX -- CLEAR FAULT CONDITION ON FAN #2 FAN CONTROLLER
 0x8XXX -- WAIT UNTIL VICOR VOLTAGE HAS STABILIZED

* NOTE: SPI SCLK WAS MOVED FROM RF6 TO RG2

Fault_Condition-- A VARIABLE USED TO DETERMINE WHICH FAULTS HAVE OCCURRED

MSB														LSB	
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	MEAS. VOLTAGE FAULT	MEAS. TEMP. FAULT	MEAS. HUMIDITY FAULT	VOLTS GOOD FAULT	GEN SHTDWN FAULT	OK PWR UP FAULT	VCR FAN FAULT	FAN8 FAULT	FAN7 FAULT	FAN6 FAULT	FAN5 FAULT	FAN4 FAULT	FAN3 FAULT	FAN2 FAULT	FAN1 FAULT

FAN1 FAULT 0xXXX1
 FAN2 FAULT 0xXXX2
 FAN3 FAULT 0xXXX4
 FAN4 FAULT 0xXXX8
 FAN5 FAULT 0xXX1X
 FAN6 FAULT 0xXX2X
 FAN7 FAULT 0xXX4X
 FAN8 FAULT 0xXX8X
 VICOR FAN FAULT 0xX1XX
 OK PWR UP FAULT 0xX2XX
 GEN SHTDWN FAULT 0xX4XX
 VOLTS GOOD FAULT 0xX8XX
 MEASURED HUMIDITY FAULT 0x1XXX
 MEASURED TEMP FAULT 0x2XXX
 MEASURED VOLTAGE FAULT 0x4XXX

OV Fault Condition-- A VARIABLE USED TO DETERMINE WHICH OVER-VOLTAGE FAULTS HAVE OCCURRED

MSB											LSB				
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
								+48VA OV FAULT	-28VA OV FAULT	-15VA OV FAULT	+15VA OV FAULT	-5VA OV FAULT	+5VA OV FAULT	+3.3VD OV FAULT	+5VD OV FAULT
+5VD OV FAULT			0xXXX1												
+3.3VD OV FAULT			0xXXX2												
+5VA OV FAULT			0xXXX4												
-5VA OV FAULT			0xXXX8												
+15VA OV FAULT			0xXX1X												
-15VA OV FAULT			0xXX2X												
-28VA OV FAULT			0xXX4X												
+48VA OV FAULT			0xXX8X												

ADCValueArray-- AN ARRAY USED TO HOLD THE MEASURED VALUES FROM THE A/D AND HOLDS THE FAULT CONDITION VALUE

INDEX #											11
0	1	2	3	4	5	6	7	8	9	10	11
MEASURED TEMP	MEASURED -5VA	MEASURED +3.3VD	MEASURED +5VA	MEASURED +15VA	MEASURED +48VA	MEASURED -28VA	MEASURED -15VA	MEASURED HUMIDITY	MEASURED +5VD	FAULT COND. VALUE	OV FAULT COND. VALUE

SPIValueArray-- AN ARRAY USED TO HOLD ADCValueArray VALUES FROM NVRAM TO BE SENT TO ICS

INDEX #											11
0	1	2	3	4	5	6	7	8	9	10	11
MEASURED TEMP	MEASURED -5VA	MEASURED +3.3VD	MEASURED +5VA	MEASURED +15VA	MEASURED +48VA	MEASURED -28VA	MEASURED -15VA	MEASURED HUMIDITY	MEASURED +5VD	FAULT COND. VALUE	OV FAULT COND. VALUE

NVRAM MEMORY MAP

1 ADCValueArray[0] Stored in NVRAM

0x0000	LSByte of Temp value
0x0001	MSByte of Temp value
0x0002	LSByte of -5VA value
0x0003	MSByte of -5VA value
0x0004	LSByte of +3.3VD value
0x0005	MSByte of +3.3VD value
0x0006	LSByte of +5VA value
0x0007	MSByte of +5VA value
0x0008	LSByte of +15VA value
0x0009	MSByte of +15VA value
0x000A	LSByte of +48VA value
0x000B	MSByte of +48VA value
0x000C	LSByte of -28VA value
0x000D	MSByte of -28VA value
0x000E	LSByte of -15VA value
0x000F	MSByte of -15VA value
0x0010	LSByte of Humidity value
0x0011	MSByte of Humidity value
0x0012	LSByte of +5VD value
0x0013	MSByte of +5VD value
0x0014	LSByte of Fault Condition Register
0x0015	MSByte of Fault Condition Register
0x0016	LSByte of OV Fault Condition Register
0x0017	MSByte of OV Fault Condition Register

****ALL ADCValueArray[0-10] Stored in NVRAM**

0x8000-0x8017	ADCValueArray[0-10] #1	PRE-FAULT
0x8018-0x802F	ADCValueArray[0-10] #2	CURRENT FAULT
0x8030-0x8047	ADCValueArray[0-10] #3	POST-FAULT

- ADCValuesArray has 12 elements which take up 2 addresses each
12 elements * 2 addresses/element = 24 addresses
 - I'll save 1 Pre-fault ADCValues, 1 Current fault ADCValues,
& 1 Post-fault ADCValues to NVRAM.
 - (3*24) = 72 Total Addr.
or 0x0000 - 0x0047 Total Addr.
 - In Conclusion: NVRam address map is: 0x0000 -> 0x0047
This address map will store 3 groups of 12 elements,
or 36 Values from ADCValueArray
- ** NVRAM memory goes from 0x0000 - 0x7FF5, but NVRAM chip select comes from top addr (0x8000), so uProcessor address range is 0x8000-0xFFFF5.