Introducing the PIC24FJ64GA004 PIM

Overview

The PIC24FJ64GA004 PIM is designed to demonstrate the capabilities of the PIC24FJ64GA004 family using the Explorer 16 Demonstration Board kit and the PICtail™ Plus daughter boards. The PIC24FJ64GA004 is a 44-pin device with the new Peripheral Pin Select (PPS) feature. The PPS feature of this PIC24F family allows many of the digital peripherals on the part to be remapped to use any of a number of pins on the device. This allows for significant improvements in ease of design and helps to reduce cost by allowing for the smallest possible size devices to be used.

The following two tables detail the pin mapping of the 44-pin device to the 100-pin PIM header.

- The 44-pin to 100-pin table lists the device pins and shows what functions are mapped to each. This table is most useful for viewing multiplexing conflicts which prevent some functions from being used simultaneously.
- The 100-pin to 44-pin table shows a listing of the Explorer 16 functions and what device pin is mapped to that function.

PIC24FJ64GA004 PIM Features

Due to the flexibility allowed by the PPS feature, the 44-pin device is capable of performing all of the base functions on the 100-pin Explorer 16 board. In addition, the PIM is compatible with most of the PICtail Plus daughter boards for the Explorer 16.

PIC24FJ64GA004 PIM Limitations

The result of multiplexing the functions from a 44-pin part to the 100-pin PIM header is that many of the functions cannot be used simultaneously. All of the built-in functionality on the Explorer 16 board can be used simultaneously, with the exception of the LEDs. LEDs are multiplexed on switch and PMP lines, which means they will not always be usable if these functions are in use.

The PICtail Plus daughter boards have similar limitations. All daughter boards will work by themselves, however, most PICtail Plus daughter boards will not work if two are installed simultaneously. Additionally, a PICtail Plus daughter board may not work with all of the default Explorer 16 functionality. If a PICtail Plus daughter board is designed to work with a Microchip stack, the stack will need to be modified to function with the PIM pinout and PPS feature.

Please check the pinouts of the components you are using to ensure compatability before attempting to use multiple peripheral functions or PICtail Plus daughter boards at the same time.

Tips for Using the PIC24FJ64GA004 PIM

- The Explorer 16 LEDs are multiplexed with a number of functions and so may not be useful in some situations. Make sure to check the mapping tables for conflicts.
- The PIC24FJ64GA004 port pins are not mapped to the corresponding port I/O on the Explorer 16. Make sure to use the following pinout tables as a cross reference to ensure you use the correct device pin in your application.
- Many of the peripherals used by the Explorer 16 and PICtail Plus daughter boards are implemented on pins with analog functionality. These peripherals may not conflict with analog features on other PIC24F PIMs. Make sure to add any necessary code to override this analog functionality in your application or in the stack application you are using.
- Some Explorer 16 boards have a 5V LCD. If you are using a function which is multiplexed onto the PMP pins on one of these boards, it may be necessary to manually drive the pins initially. The pin must be driven in order to ensure the bus is driven to either V_{DD} or V_{SS}, instead of floating at 5V. Zero ohm resistors on pins 99 and 100 of the PIM allow the PMP functionality to be removed from these pins. This is done in order to prevent the I2C2 from having a bus collision with the PMP data lines when they are connected to the 5V LCD.
- UART1 and SPI1 are multiplexed onto the same device pins as the temperature sensor and potentiometer on the Explorer 16 board. Jumpers are provided to remove the analog temperature sensor and potentiometer functions from the PIM. Removing the jumpers will allow the SPI1 and UART1 to function correctly.
- Many PICtail Plus daughter boards use the EEPROM, SPI and UART2 (which has the RS-232 port functionality). These functions were mapped to ensure that they can be used together to allow support for these boards.

Table 1: 44-Pin to 100-Pin Pinout

Pin #	PIC24FJ64GA004 Pinout	Pin #	PIM Func #1	Pin #	PIM Func #2	Pin #	PIM Func #3
1	RP9/SDA1/CN21/PMPD3/RB9	59	RA3/SDA2	99	PMD3		
2	RP22/CN18/PMPA1/RC6	92	RA7	23	RB2/SS1[1]	43	PMA1
3	RP23/CN17/PMPA0/RC7	44	PMA0				
4	RP24/CN20/PMPA5/RC8	67	RA15/INT4[1]	48	RD15/U1RTS[1]	10	PMA5/SCK2
5	RP25/CN19/PMPA6/RC9	50	U2TX	66	RA14/INT3[1]	29	PMA6
6	DISVREG	75	GND				
7	V$_{CAP}$/V$_{DDCORE}$	85	V$_{CAP}$/V$_{DDCORE}$				
8	RP10/CN16/PMPD2/RB10	98	PMD2				
9	RP11/CN15/PMPD1/RB11	94	PMD1				
10	RP12/CN14/PMPD0/RB12	91	RA6	93	PMD0		
11	RP13/CN13/PMPRD/RB13	82	PMRD				
12	PMPA10/RA10/TMS	17	RA0/TMS	83	RD6		
13	PMPA7/RA7/TCK	38	RA1/TCK	80	RD13	28	PMA7
14	AN10/CV$_{REF}$/RTCC/RP14/CN12/ PMPWR/RB14	68	RTCC/RD8[1]	81	PMWR		
15	AN9/RP15/C11/PMPCS1/RB15	55	SCK1	7	RC2/T3CK[1]	71	PMCS1
16	AV$_{SS}$	31	AV$_{SS}$				
17	AV$_{DD}$	30	AV$_{DD}$				
18	NMCLR	13	NMCLR				
19	AN0/CV$_{REF}$+/CN2/RA0	25	RB0/AN0[1]	72	RD0[1]	33	RB9/AN9[1]
20	AN1/CV$_{REF}$-/CN3/RA1	24	RB1/AN1[1]	32	RB8/AN8[1]	9	RC4[1]
21	AN2/C2IN-/RP0/CN4/RB0/PGD1	27	PGD				
22	AN3/C2IN+/RP1/CN5/RB1/PGC1	26	PGC				
23	AN4/C1IN-/RP2/SDA2/CN6/RB2	56	SDA1/RG2[1]	87	RF0[1]	19	RE9/INT2[1]
24	AN5/C1IN+/RP3/SCL2/CN7/RB3	57	SCL1/RG3[1]	88	RF1[1]	47	RD14/U1CTS[1]
25	AN6/RP16/CN8/RC0	21	RB4/AN4	53	SDO1	51	U1TX
26	AN7/RP17/CN9/RC1	20	RB5/AN5	54	SDI1	52	U1RX
27	AN8/RP18/CN10/PMPA2/RC2	22	RB3/AN3[1]	18	RE8/INT1[1]	14	PMA2/SS2
28	V$_{DD}$	16	V$_{DD}$				
29	V$_{SS}$	15	V$_{SS}$				
30	OSCI/CLKI/CN30/RA2	63	OSC1				
31	OSCO/CLKO/CN29/RA3	64	OSC2				
32	PMPA8/RA8/TDO	61	RA5/TDO	79	RD12		
33	SOSCI/RP4/CN1/RB4	73	SOSCI				
34	SOSCO/T1CK/CN0/RA4	74	SOSCO				
35	PMPA9/RA9/TDI	60	RA4/TDI	84	RD7		
36	RP19/CN28/PMPBE/RC3	49	U2RX	6	RC1/T2CK[1]	78	PMBE
37	RP20/CN25/PMPA4/RC4	40	RF12/U2CTS[1]	90	RG0[1]	11	PMA4/SDI2
38	RP21/CN26/PMPA3/RC5	39	RF13/U2RTS[1]	89	RG1[1]	12	PMA3/SDO2
39	V$_{SS}$	36	V$_{SS}$				
40	V$_{DD}$	37	V$_{DD}$				
41	RP5/ASDA1/CN27/PMPD7/RB5	5	PMD7				
42	RP6/ASCL1/CN24/PMPD6/RB6	4	PMD6				
43	RP7/INT0/CN23/PMPD5/RB7	3	PMD5				
44	RP8/SCL1/CN22/PMPD4/RB8	58	RA2/SCL2	100	PMD4		

Note 1: This pin is a common or required signal for PICtail™ Plus daughter boards.

Table 2: 100-Pin to 44-Pin Pinout

| Exp 16 Pin #	Explorer 16 Func	Device Pin #	PIC24FJ64GA004 Pinout
1	RG15		
2	3.3V		
3	PMD5	43	RP7/INT0/CN23/PMPD5/RB7
4	PMD6	42	RP6/ASCL1/CN24/PMPD6/RB6
5	PMD7	41	RP5/ASDA1/CN27/PMPD7/RB5
6	RC1/T2CK[1]	36	RP19/CN28/PMPBE/RC3
7	RC2/T3CK[1]	15	AN9/RP15/C11/PMPCS1/RB15
8	RC3		
9	RC4[1]	20	AN1/CVREF-/CN3/RA1
10	PMA5/SCK2	4	RP24/CN20/PMPA5/RC8
11	PMA4/SDI2	37	RP20/CN25/PMPA4/RC4
12	PMA3/SDO2	38	RP21/CN26/PMPA3/RC5
13	NMCLR	18	NMCLR
14	PMA2/SS2	27	AN8/RP18/CN10/PMPA2/RC2
15	VSS	29	VSS
16	VDD	28	VDD
17	RA0/TMS	12	PMPA10/RA10/TMS
18	RE8/INT1[1]	27	AN8/RP18/CN10/PMPA2/RC2
19	RE9/INT2[1]	23	AN4/C1IN-/RP2/SDA2/CN6/RB2
20	RB5/AN5	26	AN7/RP17/CN9/RC1
21	RB4/AN4	25	AN6/RP16/CN8/RC0
22	RB3/AN3[1]	27	AN8/RP18/CN10/PMPA2/RC2
23	RB2/SS1[1]	2	RP22/CN18/PMPA1/RC6
24	RB1/AN1[1]	20	AN1/CVREF-/CN3/RA1
25	RB0/AN0[1]	19	AN0/CVREF+/CN2/RA0
26	PGC	22	AN3/C2IN+/RP1/CN5/RB1/PGC1
27	PGD	21	AN2/C2IN-/RP0/CN4/RB0/PGD1
28	PMA7	13	PMPA7/RA7/TCK
29	PMA6	5	RP25/CN19/PMPA6/RC9
30	AVDD	17	AVDD
31	AVSS	16	AVSS
32	RB8/AN8[1]	20	AN1/CVREF-/CN3/RA1
33	RB9/AN9[1]	19	AN0/CVREF+/CN2/RA0
34	RB10/PMA13		
35	RB11/PMA12		
36	VSS	39	VSS
37	VDD	40	VDD
38	RA1/TCK	13	PMPA7/RA7/TCK
39	RF13/U2RTS[1]	38	RP21/CN26/PMPA3/RC5
40	RF12/U2CTS[1]	37	RP20/CN25/PMPA4/RC4
41	RB12/PMA11		
42	RB13/PMA10		
43	PMA1	2	RP22/CN18/PMPA1/RC6
44	PMA0	3	RP23/CN17/PMPA0/RC4
45	GND		
46	3.3V		
47	RD14/U1CTS[1]	24	AN5/C1IN+/RP3/SCL2/CN7/RB3
48	RD15/U1RTS[1]	4	RP24/CN20/PMPA5/RC8
49	U2RX	36	RP19/CN28/PMPBE/RC3
50	U2TX	5	RP25/CN19/PMPA6/RC9

Note 1: This pin is a common or required signal for PICtail™ Plus daughter boards.

Table 2: 100-Pin to 44-Pin Pinout (Continued)

Exp 16 Pin #	Explorer 16 Func	Device Pin #	PIC24FJ64GA004 Pinout
51	U1TX	25	AN6/RP16/CN8/RC0
52	U1RX	26	AN7/RP17/CN9/RC1
53	SDO1	25	AN6/RP16/CN8/RC0
54	SDI1	26	AN7/RP17/CN9/RC1
55	SCK1	15	AN9/RP15/C11/PMPCS1/RB15
56	SDA1/RG2[1]	23	AN4/C1IN-/RP2/SDA2/CN6/RB2
57	SCL1/RG3[1]	24	AN5/C1IN+/RP3/SCL2/CN7/RB3
58	RA2/SCL2	44	RP8/SCL1/CN22/PMPD4/RB8
59	RA3/SDA2	1	RP9/SDA1/CN21/PMPD3/RB9
60	RA4/TDI	35	PMPA9/RA9/TDI
61	RA5/TDO	32	PMPA8/RA8/TDO
62	3.3V		
63	OSC1	30	OSCI/CLKI/CN30/RA2
64	OSC2	31	OSCO/CLKO/CN29/RA3
65	GND		
66	RA14/INT3[1]	5	RP25/CN19/PMPA6/RC9
67	RA15/INT4[1]	4	RP24/CN20/PMPA5/RC8
68	RTCC/RD8[1]	14	AN10/CVREF/RTCC/RP14/CN12/PMPWR/RB14
69	RD9		
70	RD10/PMCS2		
71	PMCS1	15	AN9/RP15/C11/PMPCS1/RB15
72	RDO[1]	19	AN0/CVREF+/CN2/RA0
73	SOSCI	33	SOSCI/RP4/CN1/RB4
74	SOSCO	34	SOSCO/T1CK/CN0/RA4
75	GND	6	DISVREG
76	RD1		
77	RD2		
78	PMBE	36	RP19/CN28/PMPBE/RC3
79	RD12	32	PMPA8/RA8/TDO
80	RD13	13	PMPA7/RA7/TCK
81	PMWR	14	AN10/CVREF/RTCC/RP14/CN12/PMPWR/RB14
82	PMRD	11	RP13/CN13/PMPRD/RB13
83	RD6	12	PMPA10/RA10/TMS
84	RD7	35	PMPA9/RA9/TDI
85	VDDCORE/VCAP	7	VCAP/VDDCORE
86	ENVREG		
87	RF0[1]	23	AN4/C1IN-/RP2/SDA2/CN6/RB2
88	RF1[1]	24	AN5/C1IN+/RP3/SCL2/CN7/RB3
89	RG1[1]	38	RP21/CN26/PMPA3/RC5
90	RG0[1]	37	RP20/CN25/PMPA4/RC4
91	RA6	10	RP12/CN14/PMPD0/RB12
92	RA7	2	RP22/CN18/PMPA1/RC6
93	PMD0	10	RP12/CN14/PMPD0/RB12
94	PMD1	9	RP11/CN15/PMPD1/RB11
95	RG14		
96	RG12		
97	RG13		
98	PMD2	8	RP10/CN16/PMPD2/RB10
99	PMD3	1	RP9/SDA1/CN21/PMPD3/RB9
100	PMD4	44	RP8/SCL1/CN22/PMPD4/RB8

Note 1: This pin is a common or required signal for PICtail™ Plus daughter boards.

Figure 1: 100-Pin Header and 44-Pin Device Schematic
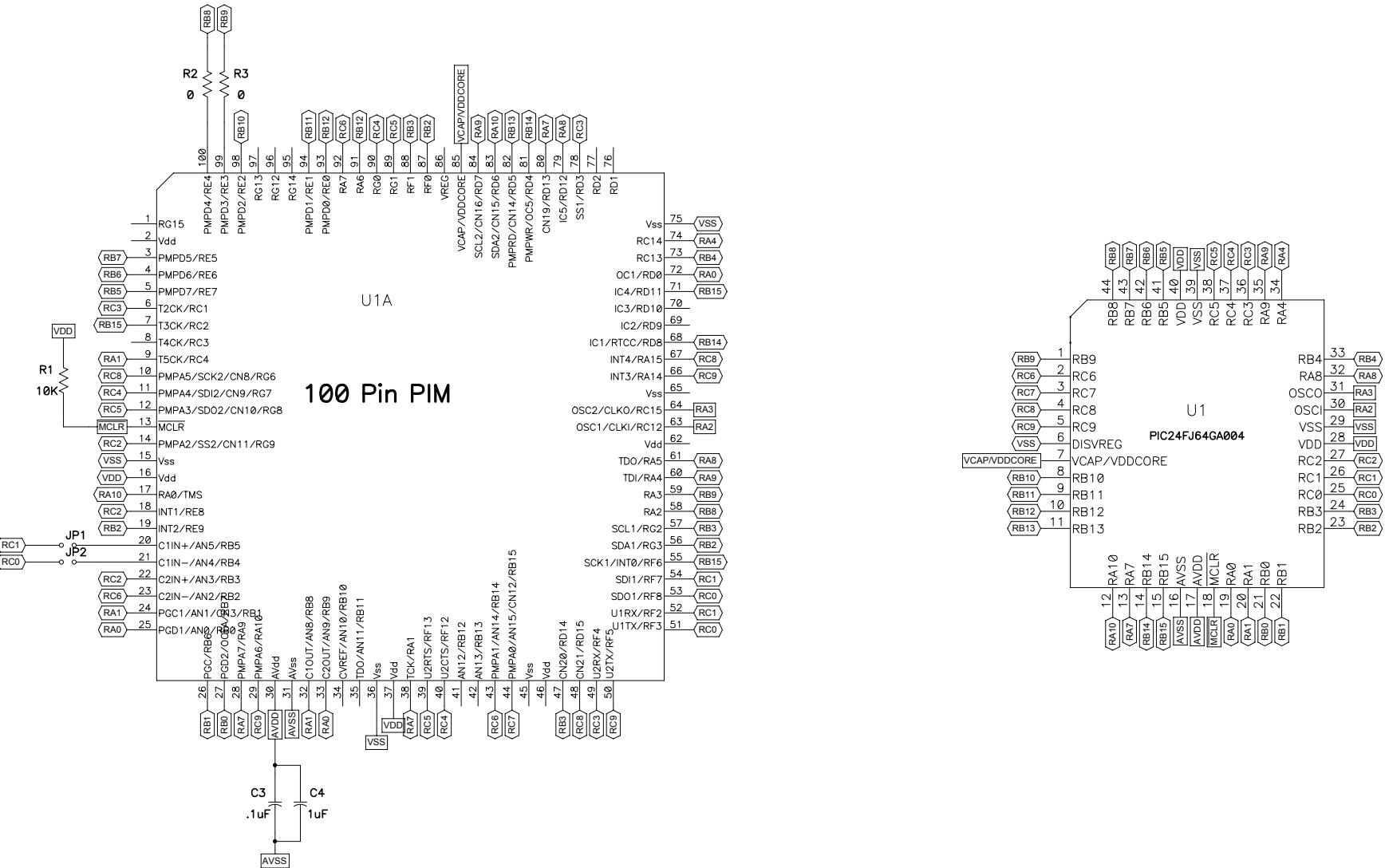
Americas

Atlanta - 678-957-9614
Boston - 774-760-0087
Chicago - 630-285-0071
Dallas - 972-818-7423
Detroit - 248-538-2250
Kokomo - 765-864-8360
Los Angeles - 949-462-9523
Phoenix - 480-792-7200
Santa Clara - 408-961-6444
Toronto - 905-673-0699

Asia/Pacific

Australia - Sydney - 61-2-9868-6733
China - Beijing - 86-10-8528-2100
China - Chengdu - 86-28-8665-5511
China - Fuzhou - 86-591-8750-3506
China - Hong Kong - 852-2401-1200
China - Qingdao - 86-532-8502-7355
China - Shanghai - 86-21-5407-5533
China - Shenyang - 86-24-2334-2829
China - Shenzhen - 86-755-8203-2660
China - Shunde - 86-757-2839-5507
China - Wuhan - 86-27-5980-5300
China - Xian - 86-29-8833-7250
India - Bangalore - 91-80-4182-8400
India - New Delhi - 91-11-4160-8631
India - Pune - 91-20-2566-1512
Japan - Yokohama - 81-45-471-6166
Korea - Gumi - 82-54-473-4301
Korea - Seoul - 82-2-554-7200
Malaysia - Penang - 60-4-646-8870
Philippines - Manila - 63-2-634-9065
Singapore - 65-6334-8870
Taiwan - Hsin Chu - 886-3-572-9526
Taiwan - Kaohsiung - 886-7-536-4818
Taiwan - Taipei - 886-2-2500-6610
Thailand - Bangkok - 66-2-694-1351

Europe

Austria - Weis - 43-7242-2244-39
Denmark - Copenhagen - 45-4450-2828
France - Paris - 33-1-69-53-63-20
Germany - Munich - 49-89-627-144-0
Italy - Milan - 39-0331-742611
Netherlands - Drunen - 31-416-690399
Spain - Madrid - 34-91-708-08-90
UK - Wokingham - 44-118-921-5869

4/03/07

MICROCHIP

www.microchip.com

2355 West Chandler Boulevard • Chandler, Arizona 85224-6199 • (480) 792-7200 • Fax (480) 792-7277