Introducing the PIC24FJ64GA104 PIM

Overview

The PIC24FJ64GA104 PIM is designed to demonstrate the capabilities of the PIC24FJ64GA104 family using the Explorer 16 Demonstration Board kit and the PICtail™ Plus daughter boards. The PIC24FJ64GA104 is a 44-pin device with nanoWatt XLP™ Technology and Peripheral Pin Select (PPS) features. 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.

PIC24FJ64GA104 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.

PIC24FJ64GA104 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 PIC24FJ64GA104 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 PIC24FJ64GA104 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 VDD or VSS, instead of floating at 5V.
- Jumper settings: Jumper J1 pins (1-2) select PT+; pins (2-3) select the Explorer 16 potentiometer function. Jumper J2 pins (1-2) select PT+; pins (2-3) select the Explorer 16 analog temperature sensor. Jumper J3 pins (1-2) select the Explorer 16 Serial EEPROM CS; pins (2-3) select PT+. **Note:** PT+ refers to a PICtail Plus connection on the Explorer 16.
- Many PICtail Plus daughter boards use the EEPROM, SPI and UART2 (which has the RS-232 port functionality). These functions are mapped to ensure that they can be used together to allow support for these boards.

Table 1: 44-Pin to 100-Pin Pinout

Device Pin #	PIC24FJ64GA104 Pinout	Jumper	PIM Pin #	PIM Func #1	Jumper	PIM Pin #	PIM Func #2	Jumper	PIM Pin #	PIM Func #3
1	SDA1/RP9/PMPD3/CN21/RB9		56	RG3/SDA1(1)		99	RE3/PMD3			
2	RP22/PMPA1/CN18/RC6		43	PMA1/U1MUX1		23	RB2/SS1/AN2(1)		92	RA7
3	RP23/PMPA0/CN17/RC7		44	RB15/PMA0		77	RD2			
4	RP24/PMPA5/CN20/RC8		10	RG6/PMA5/SCK2		48	RD15/U1RTS(1)			
5	RP25/PMPA6/CN19/RC9		29	RA10/PMA6		50	RF5/PMA8/U2TX		66	RA14/INT3
6	DISVREG		15	VSS						
7	VCAP/VDDCORE		85	VDDCORE						
8	PGD2/RP10/PMD2/CN16/RB10		98	RE2/PMD2		90	RG0(1)			
9	PGC2/RP11PMD1/CN15/RB11		94	RE1/PMD1		89	RG1(1)			
10	AN12/RP12/CN14/PMD0/RB12		93	RE0/PMD0		88	RF1(1)			
11	AN11/C1INC/REFO/RP13/PMPRD/ CN13/RB13		82	RD5/PMRD		51	RF3/U1TX			
12	TMS/PMPA10/RA10		17	RA0/TMS		69	RD6			
13	TCK/PMPA7/RA7		28	RA9/PMA7		38	RA1/TCK		70	RD10/PMCS2
14	AN10/C3INB/CVREF/RTCC/RP14PMWR/ CN12/RB14		81	RD4/PMWR					87	RF0(1)
15	AN9/C3INA/RP15/PMCS1/CN11/RB15		7	RC2(1)		55	RF6/SCK1		71	RD11/PMCS1
16	AVSS		31	AVSS						
17	AVDD		30	AVDD						
18	MCLR		13	MCLR						
19	AN0/C3INC/VREF+/CN2/CTED1/RA0		25	RB0/AN0(1)		33	RB9/AN9(1)		83	RD8
20	AN1/C3IND/VREF-/CN3/CTED2/RA1		24	RB1/AN1(1)		32	RB8/AN8(1)		80	RD13
21	PGD1/AN2/C2INB/RP0/CN4/RB0		27	RB7/AN7/PGD						
22	PGC1/AN3/C2INA/RP1/CN5/RB1		26	RB6/AN6/PGC						
23	AN4/C1INB/SDA2/RP2/CN6/RB2		19	RE9/INT2(1)		59	RA3/SDA2		68	RA4/INT3(1)
24	AN5/C1INA/SCL2/RP3/CN7/RB3		47	RD14/U1CTS(1)		58	RA2/SCL2		72	RD0(1)
25	AN6/RP16/CN8/RC0	J2-2	53	RF8/SDO1	J2-3 (Temp)	21	RB4/AN4	J2-1 (PT+)	34	RB10/PMA13
26	AN7/RP17/CN9/RC1	J1-2	54	RF7/SDI1	J1-3 (POT)	20	RB5/AN5	J1-1 (PT+)	35	RB11/PMA12
27	AN8/RP18/PMPA2/CN10/RC2		14	RB14/PMA1		18	RE8/INT1(1)		6	RC1(1)
28	VDD		46	VDD						
29	VSS		45	VSS						
30	OSCI/CLKI/C1IND/CN30/RA2		63	OSC1						
31	OSCO/CLKO/CN29/RA3		64	OSC2						
32	TDO/PMPA8/RA8		61	RA5/TDO		79	RG12		76	RD1
33	SOSCI/SCLKI/C2IND/RP4/CN1/RB4		73	RC13/SOSCO						
34	SOSCO/T1CK/C2INC/CN0/RA4		74	RC13/SOSCO						
35	TDI/PMPA9/RA9		60	RA4/TDI		84	RD7		22	RB3/AN3(1)
36	RP19/PMPBE/CN28/RC3/ (NOT 5V)		78	RD3/PMBE		49	RF4/PMA9/ U2RX		67	RA15/INT4(1)
37	RP20/PMPA4/CN25/RC4		11	PMA4/SDI2						
38	RP21/PMPA3/CN26/RC5		12	PMA3/SDO2		91	RA6			
39	VSS		75	VSS						
40	VDD		62	VDD						
41	PGD3/ASDA1/RP5/PMD7/CN27/RB5		5	RE7/PMD7		40	RF12/U2CTS(1)			
42	PGC3/ASCL1/RP6/PMD6/CN24/RB6		4	RE6/PMD6		39	RF13/U2RTS(1)			
43	RP7/PMPD5/INT0/CN23/RB7		3	RE5/PMD5		52	RF2/U1RX			
44	SCL1/RP8/PMPD4/CN22/RB8		57	RG2/SCL1(1)		100	PMD4/LED4			

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 #	PIM Function	Jumper	Device Pin #	PIC24FJ64GA104 Pinout
1	RG15			
2	VDD			
3	RE5/PMD5		43	RP7/PMPD5/INT0/CN23/RB7
4	RE6/PMD6		42	PGC3/ASCL1/RP6/PMD6/CN24/RB6
5	RE7/PMD7		41	PGD3/ASDA1/RP5/PMD7/CN27/RB5
6	RC1(1)		27	AN8/RP18/PMPA2/CN10/RC2
7	RC2(1)		15	AN9/C3INA/RP15/PMCS1/CN11/RB15
8	RC3			
9	RC4			
10	RG5/PMA5/SCK2		4	RP24/PMPA5/CN20/RC8
11	PMA4/SDI2		37	RP20/PMPA4/CN25/RC4
12	PMA3/SDO2		38	RP21/PMPA3/CN26/RC5
13	$\overline{\text{MCLR}}$		18	$\overline{\text{MCLR}}$
14	RB14/PMA1		27	AN8/RP18/PMPA2/CN10/RC2
15	VSS		6	DISVREG
16	VDD			
17	RA0/TMS		12	TMS/PMPA10/RA10
18	RE8/INT1(1)		27	AN8/RP18/PMPA2/CN10/RC2
19	RE9/INT2(1)		23	AN4/C1INB/SDA2/RP2/CN6/RB2
20	RB5/AN5	J1-3 (POT)		
21	RB4/AN4	J2-3 (TEMP)		
22	RB3/AN3(1)		35	TDI/PMPA9/RA9
23	RB2/$\overline{\text{SS1}}$/AN2(1)		2	RP22/PMPA1/CN18/RC6
24	RB1/AN1(1)		20	AN1/C3IND/VREF-/CN3/CTED2/RA1
25	RB0/AN0(1)		19	AN0/C3INC/VREF+/CN2/CTED1/RA0
26	RB6/AN6/PGC		22	PGC1/AN3/C2INA/RP1/CN5/RB1
27	RB7/AN7/PGD		21	PRD/AN2/C2INB/RP0/CN4/RB0
28	RA9/PMA7		13	TCK/PMPA7/RA7
29	RA10/PMA6		5	RP25/PMPA6/CN19/RC9
30	AVDD		17	AVDD
31	AVSS		16	AVSS
32	RB8/AN8(1)		20	AN1/C3IND/VREF-/CN3/CTED2/RA1
33	RB9/AN9(1)		19	AN0/C3INC/VREF+/SN2/CTED1/RA0
34	RB10/PMA13	J2-1 (PT+)		
35	RB11/PMA12	J1-1 (PT+)		
36	VSS			
37	VDD			
38	RA1/TCK		13	TCK/PMPA7/RA7
39	RF13/U2RTS(1)		42	PGC3/ASCL1/RP6/PMD6/CN24/RB6
40	RF12/U2CTS		41	PGD3/ASDA1/RP5/PMD7/CN27/RB5
41	RB12/PMA11			
42	RB13/PMA10			
43	RB14/PMA1		2	RP22/PMPA1/CN18/RB6
44	RB15/PMA0		3	RP23/PMPA0/CN27/RB5
45	VSS		29	VSS
46	VDD		28	VDD
47	RD14/U1CTS(1)		24	AN5/C1INA/SCL2/RP3/CN7/RB3
48	RD15/U1RTS(1)		4	RP24/PMPA5/CN20/RC8
49	RF4/PMA9/U2RX		36	RP19/PMPBE/CN28/RC3 (NOT 5V)
50	RF5/PMA8/U2TX		5	RP25/PMPA6/CN19/RC9

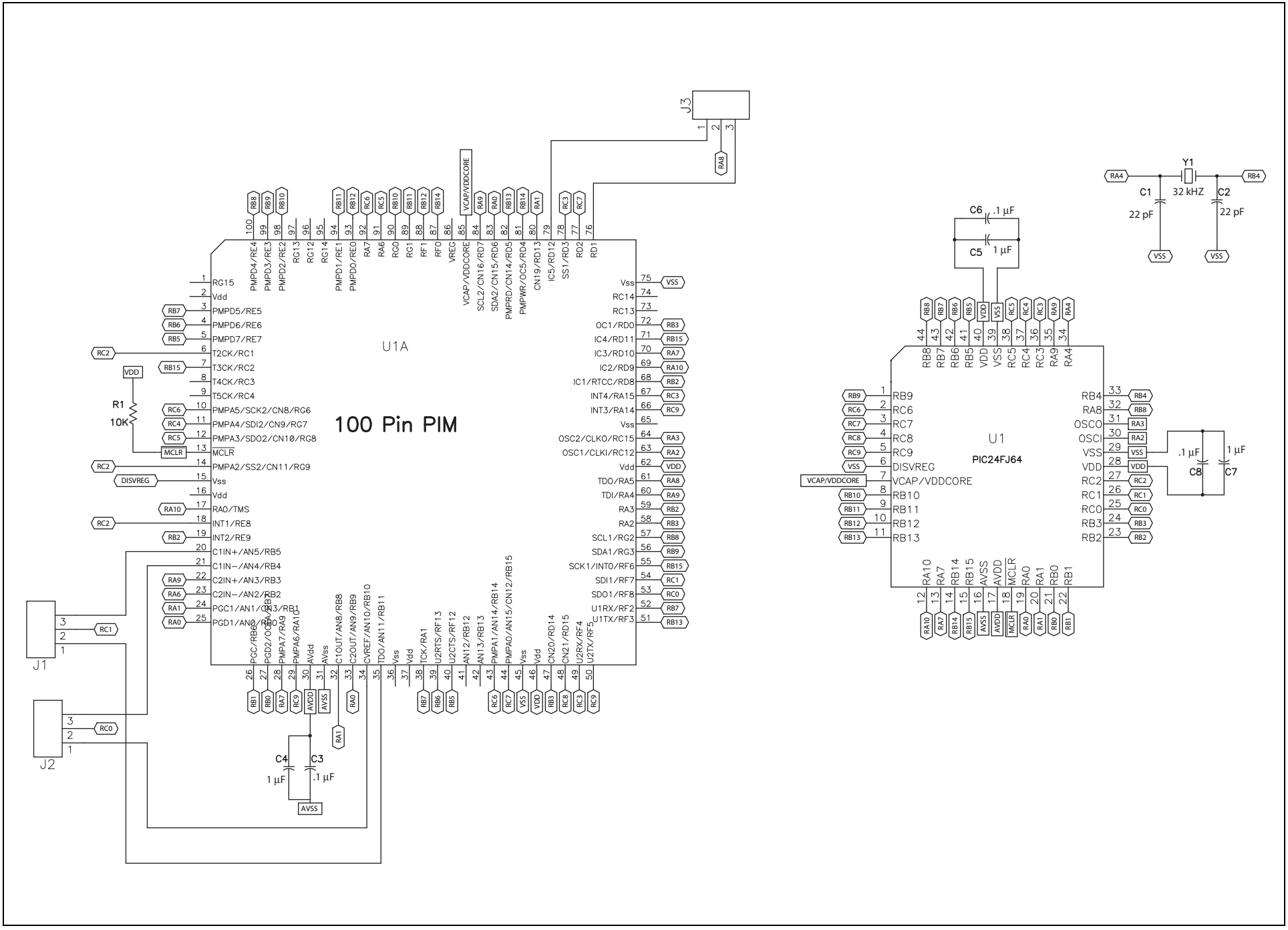
Note 1: This pin is a common or required signal for PICtail™ Plus daughter boards.

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

Exp 16 Pin #	PIM Function	Jumper	Device Pin #	PIC24FJ64GA104 Pinout
51	RF3/U1TX		11	AN11/C1INC/REFO/RP13/PMPRD/CN13/RB13
52	RF2/U1RX		43	RP7/PMPD5/INTO/CN23/RB7
53	RF8/SDO1		25	AN6/RP16/CN8/RC0
54	RF7/SDI1		26	AN7/RP17/CN9/RC1
55	RF6/SCK1		15	AN9/C3INA/RP15/PMCS1/CN11/RB15
56	RG3/SDA1(1)		1	SDA1/RP9/PMPD3/CN21/RB9
57	RG2/SCL1(1)		44	SCL1/RP8/PMPD4/CN22/RB8
58	RA2/SCL2		24	AN5/C1INA/SCL2/RP3/CN7/RB3
59	RA3/SDA2		23	AN4/C1INB/SDA2/RP2/CN6/RB2
60	RA4/TDI		35	TDI/PMPA9/RA8
61	RA5/TDO		32	TDO/PMPA8/RA8
62	VDD		40	VDD
63	OSC1		30	OSCI/CLKI/C1IND/PMCS1/CN30/RA2
64	OSC2		31	OSCO/CLKO/CN29/RA3
65	VSS			
66	RA14/INT3		5	RP25/PMPA6/CN19/RC9
67	RA15/INT4		36	RP19/PMPBE/CN28/RC3 (NOT 5V)
68	RA14/INT3		23	AN4/C1INB/SDA2/RP2/CN6/RB2
69	RD9		12	TMS/PMPA10/RA10
70	RD10/PMCS2		13	TCK/PMPA7/RA7
71	RD11/PMCS1		15	AN9/C3INA/RP15/PMCS1/CN11/RB15
72	RD0		24	AN5/C1INA/SCL2/RP3/CN7/RB3
73	RC14/SOSCI			
74	RC13/SOSCO			
75	VSS		39	VSS
76	RD1		32	TDO/PMPA8/RA8
77	RD2		3	RP23/PMPA0/CN17/RC7
78	RD3/PMBE		36	RP19/PMPBE/CN28/RC3 (NOT 5V)
79	RD12		32	TDO/PMPA8/RA8
80	RD13		20	AN1/C3IND/VREF-/CN3/CTED2/RA1
81	RD4/PMWR		14	AN10/C3INB/CVREF/RTCC/RP14/PMWR/SN12/RB14
82	RD4/PMRD		11	AN11/C1INC/REFO/RP13/PMPRD/CN13/RB13
83	RD6		19	AN0/C3INC/VREF+/CN2/CTED1/RA0
84	RD7		35	TDI/PMPA9/RA9
85	VDDCORE		7	VCAP/VDDCORE
86	ENVREG			
87	RF0		14	AN10/C3INB/CVref/RTCC/RP14/PMWR/CN12/RB14
88	RF1		10	AN12/RP12/CN14/PMD0/RB12
89	RG1		9	PGC2/RP11PMD1/CN15/RB11
90	RG0		8	PGD2/RP10/PMP2/CN16/RB10
91	RA6		38	RP21/PMPA3/CN26/RC5
92	RA7		2	RP22/PMPA1/CN18/RC6
93	RE0/PMD0		10	AN12/RP12/CN14/PMD0/RB12
94	RE1/PMD1		9	PGC2/RP11/PMD1/CN15/RB11
95	RG14			
96	RG12			
97	RG13			
98	RE2/PMD2		8	PGD2/RP10/PMD2/CN16/RB10
99	RE3/PMD3		1	SDA1/RP9/PMPD3/CN21/RB9
100	PMD4/LED4		44	SCL1/RP8/PMPD4/CN22/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



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