

# Introducing the PIC24F32KA304 Plug-In Module

## Overview

The PIC24F32KA304 PIM is designed to demonstrate the capabilities of the PIC24F32KA304 family using the Explorer 16 Demonstration Board kit and the PICTail™ Plus Daughter Boards. [Table 1](#) and [Table 2](#) 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. These tables are most useful for viewing multiplexing conflicts which prevent some functions from being used simultaneously.

## PIM Features

The PIC24F32KA304 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.

## PIM Functionality

All of the built-in functionality on the Explorer 16 board can be used simultaneously, with the exception of switch, SW5, and LED10. This is because the Explorer 16 board has the LED and switch wired to the same microcontroller I/O pin. All PICTail Plus Daughter Boards work by themselves; however, most 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. Please check the pinouts of the components you are using to ensure compatibility before attempting to use multiple peripheral functions or PICTail Plus Daughter Boards at the same time.

## Tips for Using the PIC24F32KA

- The PIC24F32KA304 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 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 these 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.
- 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.

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**Table 1: PIC24F32KA304 44-Pin to 100-Pinout Mapping**

Pin #	Functionality	Explorer 16 Pin #	Explorer 16 Pin Functionality
1	SDA1/T1CK/U1RTS/CTED4/CN21/RB9	44	LCD4(RS)/AN15/CN12/RB15
2	U1RX/CN18/RC6	4	LCD4(D6)/RE6
3	U1TX/CN17/RC7	5	LCD4(D7)/RE7
4	OC2/CN20/RC8	59	LED(D6)/SDA2/RA3
5	IC2/CTED7/CN19/RC9	60	LED(D7)/TDI/RA4
6	IC1/CTED3/CN9/RA7	83	SWITCH(S3)RD6
7	C2OUT/OC1/CTED1/INT2/CN8/RA6	19	RE9/INT2
8	PGED2/SDI1/CTED11/CN16/RB10	11	EEPROM(MSDI)/RG7
9	PGEC2/SCK1/CTED9/CN15/RB11	10	EEPROM(SCK)/RG6
10	AN12+/LVDIN/CTED2/CN14/RB12	61	LED(D8)/TDO/RA5
11	AN11+/SDO1/CTPLS/CN13/RB13	12	EEPROM(MSDO)/RG8
12	OC3/CN35/RA10	38	LED(D4)/RA1/TCK
13	IC3/CTED8/CN36/RA11	58	LED(D5)/SCL2/RA2
14	CVREF/AN10+/C3INB/RTCC/C1OUT/OCFA/CTED5/INT1/CN12/RB14	84	SWITCH(S6)RD7
15	AN9+/C3INA/T3CK/T2CK/REFO/SS1/CTED6/CN11/RB15	79	EEPROM(CS)/RD12
16	Vss/AVss		GROUND
17	VDD/AVDD		3.3V
18	MCLR/VPP/RA5	13	MCLR
19	VREF+/CVREF+/AN0/C3INC/CTED1/CN2/RA0	20	POT/RB5/AN5
20	CVREF-/VREF-/AN1/CN3/RA1	21	TEMP/RB4/AN4
21	PGED1/AN2/CTCMP/C1IND/C2INB/C3IND/U2TX/CN4/RB0	50	U2TX/RF5
22	PGEC1/AN3/C1INC/C2INA/U2RX/CTED12/CN5/RB1	49	U2RX/RF4
23	AN4/C1INB/C2IND/SDA2/T5CK/T4CK/CTED13/CN6/RB2	91	LED(D9)/RA6
24	AN5/C1INA/C2INC/SCL2/CN7/RB3	92	LED(D10)/SWITCH(S5)/RA7
25	AN6/CN32/RC0	93	LCD4(D0)/RE0
26	AN7/CN31/RC1	94	LCD4(D1)/RE1
27	AN8+/CN10/RC2	98	LCD4(D2)/RE2
28	VDD		3.3V
29	Vss		GROUND
30	OSCI/AN13+/CLKI/CN30/RA2	63	OSCI/CLKI/RC12
31	OSCO/AN14+/CLKO/CN29/RA3	64	OSCO/CLKO/RC15
32	OCFB/CN33/RA8	80	SWITCH(S4)/RD13
33	SOSCI/AN15+/U2RTS/CN1/RB4		SOSCI
34	SOSCO/SCLKI/U2CTS/CN0/RA4		SOSCO
35	SS2/CN34/RA9	17	LED(D3)/RA0
36	SDI2/CN28/RC3	99	LCD4(D3)/RE3
37	SDO2/CN25/RC4	100	LCD4(D4)/RE4
38	SCK2/CN26/RC5	3	LCD4(D5)/RE5
39	Vss		GROUND
40	VDD		3.3V
41	PGED3/ASDA1(2)/CN27/RB5	27	PGED3
42	PGEC3/ASCL1(2)/CN24/RB6	26	PGEC3
43	INT0/CN23/RB7	81	LCD4(E)/RD4
44	SCL1/U1CTS/C3OUT/CTED10/CN22/RB8	82	LCD4(R/W)/RD5

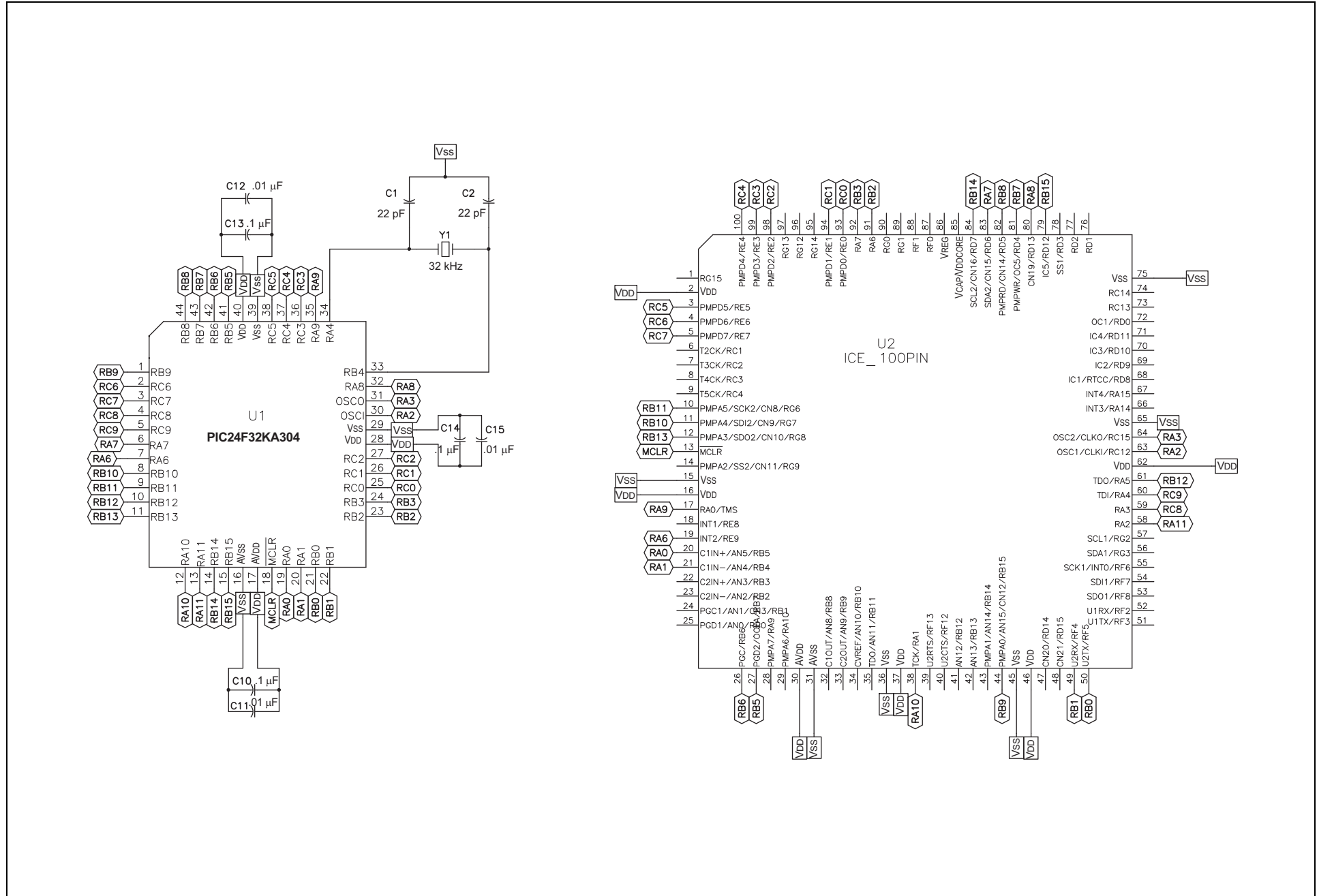
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**Table 2: PIC24F32KA304 100-Pin to 44-Pin Pinout Mapping**

Pin #	Functionality	Device Pin #	Functionality	Pin #	Functionality	Device Pin #	Functionality
1	RG15			51	U1TX/RF3		
2	3.3V			52	U1RX/RF2		
3	LCD4(D5)/RE5	38	SCK2/CN26/RC5	53	4550(MSDO)/RF8		
4	LCD4(D6)/RE6	2	U1RX/CN18/RC6	54	4550(MSDI)/RF7		
5	LCD4(D7)/RE7	3	U1TX/CN17/RC7	55	4550(SCK)/RF6		
6	RC1/T2CK			56	SDA1/RG3		
7	RC2/T3CK			57	SCL1/RG2		
8	RC3			58	LED(D5)/SCL2/RA2	13	IC3/CTED8/CN36/RA11
9	RC4			59	LED(D6)/SDA2/RA3	4	OC2/CN20/RC8
10	EEPROM(SCK)/RG6	9	PGEC2/SCK1/CTED9/CN15/RB11	60	LED(D7)/TDI/RA4	5	IC2/CTED7/CN19/RC9
11	EEPROM(MSDI)/RG7	8	PGED2/SDI1/CTED11/CN16/RB10	61	LED(D8)/TDO/RA5	10	AN12+/LVDIN/CTED2/CN14/RB12
12	EEPROM(MSDO)/RG8	11	AN11+/SDO1/CTPLS/CN13/RB13	62	Vdd		
13	MCLR	18	MCLR	63	OSCI/CLKI/RC12	30	OSCI/AN13+/CLKI/CN30/RA2
14	EEPROM (SS)/RG9			64	OSCO/CLKO/RC15	31	OSCO/AN14+/CLKO/CN29/RA3
15	Vss			65	Vss		
16	Vdd			66	INT3/RA14		
17	LED(D3)/RA0	35	SS2/CN34/RA9	67	INT4/RA15		
18	RE8/INT1			68	RTCC/RD8		
19	RE9/INT2	7	C2OUT/OC1/CTED1/INT2/CN8/RA6	69	RD9		
20	POT/RB5/AN5	19	VREF+/CVREF+/AN0/C3INC/CTED1/CN2/RA0	70	RD10		
21	TEMP/RB4/AN4	20	CVREF-/VREF-/AN1/CN3/RA1	71	RD11		
22	AN3/RB3			72	RD0		
23	4550(SS)/RB2			73	SOSCI		
24	AN1/RB1			74	SOSCO		
25	AN0/RB0			75	Vss		
26	PGC	42	PGEC3/ASCL1/CN24/RB6	76	RD1		
27	PGD	41	PGED3/ASDA1/CN27/RB5	77	RD2		
28	RA9			78	RD3		
29	RA10			79	EEPROM(CS)/RD12	15	AN9+/C3INA/T3CK/T2CK/REFO/SS1/CTED6/CN11/RB15
30	AvDD			80	SWITCH(S4)/RD13	32	OCFB/CN33/RA8
31	Avss			81	LCD4(E)/RD4	43	INT0/CN23/RB7
32	AN8/RB8			82	LCD4(R/W)/RD5	44	SCL1/U1CTS/C3OUT/CTED10/CN22/RB8
33	AN9/RB9			83	SWITCH(S3)/RD6	6	IC1/CTED3/CN9/RA7
34	RB10/PMA13			84	SWITCH(S6)/RD7	14	CVREF/AN10+/C3INB/RTCC/C1OUT/OCFA/CTED5/INT1/CN12/RB14
35	RB11/PMA12			85	VDDCORE/VCAP		
36	Vss			86	ENVREG		
37	Vdd			87	RF0		
38	LED(D4)/RA1/TCK	12	OC3/CN35/RA10	88	RF1		
39	UART(RTS)/RF13			89	RG1		
40	UART(CTS)/RF12			90	RG0		
41	AN12/RB12			91	LED(D9)/RA6	23	AN4/C1INB/C2IND/SDA2/T5CK/T4CK/CTED13/CN6/RB2
42	AN13/RB13			92	LED(D10)/SWITCH(S5)/RA7	24	AN5/C1INA/C2INC/SCL2/CN7/RB3
43	AN14/RB14			93	LCD4(D0)/RE0	25	AN6/CN32/RC0
44	LCD4(RS)/AN15/CN12/RB15	1	SDA1/T1CK/U1RTS/CTED4/CN21/RB9	94	LCD4(D1)/RE1	26	AN7/CN31/RC1
45	Vss			95	RG14		
46	Vdd			96	RG12		
47	U1CTS/CN20/RD14			97	RG13		
48	U1RTS/CN21/RD15			98	LCD4(D2)/RE2	27	AN8+/CN10/RC2
49	U2RX/RF4	22	PGEC1/AN3/C1INC/C2INA/U2RX/CTED12/CN5/RB1	99	LCD4(D3)/RE3	36	SDI2/CN28/RC3
50	U2TX/RF5	21	PGED1/AN2/CTCMP/C1IND/C2INB/C3IND/U2TX/CN4/RB0	100	LCD4(D4)/RE4	37	SDO2/CN25/RC4

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## Board Schematic



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