PIC16F87X → PIC16F87XA Migration

DEVICE MIGRATIONS

This document is intended to describe the functional differences and the electrical specification differences present when migrating from one device to the next.

Except for items listed in Table 1, PIC16F87XA is designed to be pin-to-pin, and functionally compatible with the PIC16F87X product family. Table 1 shows the considerations that must be taken into account when migrating from the PIC16F87X to the PIC16F87XA. Table 2 shows the electrical and timing differences.

Note:	This device has been designed to perform to the parameters of its data sheet. It has been tested to an electrical specification designed to determine its conformance with these parameters. Due to process differences in the manufacture of this device, this device may have different performance characteristics than its earlier version. These differences may cause this device to perform differently in your application than the earlier version of this device.

Note:	The user should verify that the device oscillator starts and performs as expected. Adjusting the loading capacitor values and/or the oscillator mode may be required.

TABLE 1: PIC16F87X → PIC16F87XA FUNCTIONAL DIFFERENCES

No.	Feature	Differences from PIC16F87x	H/W	S/W	Prog
Functional Differences Due to Errata or Module Update:					
1	Analog Comparator	Two analog comparators with input multiplexing have been added	**(Note 1)**	**(Note 1)**	
2		Programmable reference voltage for comparators is provided			
3	ICSP™	Programming specifications are different**(2)**			Yes
4	User Writes to FLASH	Write to FLASH program memory in 4-word blocks, instead of 1-word blocks**(2)**		Yes	
Legend: H/W – Issues may exist with regard to the application circuit. S/W – Issues may exist with regard to the user program. Prog – Issues may exist when writing the program to the controller.					

Note 1: Although the comparator is a new peripheral on the 16F87XA, the 16F87XA is defined to maintain 100% pinout compatibility with the PIC16F87X. This is achieved by mapping the comparator inputs with the existing ADC channels on PORTA. The comparator is disabled on power-up so that existing PIC16F87X code requires no modification.

2: Please refer to device data sheet, errata, and the Microchip website for more information on programming specifications and writing to FLASH program memory.

TABLE 2: PIC16F87X → PIC16F87XA ELECTRICAL SPECIFICATION DIFFERENCES

Param No.	Symbol	Characteristic	PIC16F877			PIC16F877A			Unit
			Min	Typ	Max	Min	Typ	Max	
Core									
D005	VBOR	Brown-out Reset Voltage	3.7			3.65			V
D042A	VIH	OSC1 (XT, LP)	0.7 VDD			1.6V			
EEPROM Data Memory									
D120	ED	Endurance	100K	—		100K	1M		E/W(2)
Program FLASH Memory									
D130	EP	Endurance	1000			10K	100K	—	E/W(2)
Comparator Specifications (new for 16F87XA)									
D300	VIOFF	Input Offset Voltage	N/A	N/A	N/A	—	+/-5.0	+/-10	mV
D301	VICM	Input Common Mode Voltage	N/A	N/A	N/A	0	—	VDD-1.5	V
D302	CMRR	Common Mode Rejection Ratio	N/A	N/A	N/A	55	—	—	dB
300 300A	TRESP	Response Time	N/A	N/A	N/A	—	150	400 (F) 600 (LF)	ns
301	TMC2OV	Comparator Mode Change to Output Valid	N/A	N/A	N/A	—	—	10	µs
Voltage Reference Specifications (new for 16F87XA)									
D310	VRES	Resolution	N/A	N/A	N/A	VDD/24	—	VDD/32	LSb
D311	VRAA	Absolute Accuracy	N/A	N/A	N/A	—	—	¼ VRR = 1 ½ VRR = 0	LSb
D312	VRUR	Unit Resistor Value	N/A	N/A	N/A	—	2k	—	Ohm
310	TSET	Settling Time	N/A	N/A	N/A	—	—	10	µs
External Clock Timing Requirements(1)									
	FOSC	External CLKIN Freq (HS osc mode –10 parts)	DC	—	10	N/A	N/A	N/A(1)	MHz
		External CLKIN Freq (HS osc mode –4 parts)	DC	—	4	N/A	N/A	N/A(1)	MHz
1	TOSC	External CLKIN Period (HS osc mode –10 parts)	100	—	—	N/A(1)	N/A	N/A	ns
		External CLKIN Period (HS osc mode –4 parts)	250	—	—	N/A(1)	N/A	N/A	ns
Parallel Slave Port Requirements (PIC16F874/PIC16F877 ONLY)									
62(3)	TdtV2wrH	Setup time	25	—	—	20	—	—	ns
64(3)	TrdL2dtV	Data-out valid	—	—	90	—	—	80	ns

Note 1: The -4 and -10 parts are not produced for PIC16F877A. Use PIC16F877A up to 20 MHz, or PIC16LF877A up to 10 MHz.

2: Erase/Write cycles (E/W)

3: There is no separate specification for PIC16F877A extended range parts.

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If you have any further questions about this matter, please contact the local sales office nearest to you.

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