



MICROCHIP

PIC18F6390/6490/8390/8490

PIC18F6390/6490/8390/8490 Data Sheet Errata

Clarifications/Corrections to the Data Sheet:

In the Device Data Sheet (DS39629B), the following clarifications and corrections should be noted. Any silicon issues related to the PIC18F6390/6490/8390/8490 devices will be reported in a separate silicon errata. Please check the Microchip web site for any existing issues.

1. Module: LCD Initialization Conditions

The initialization conditions for the LCDDATAx and LCDSEx registers have been revised from those shown in Table 4-4 of the Device Data Sheet.

The LCDDATAx registers are cleared upon all types of Resets, instead of unchanged for MCLR Reset, WDT Reset, the RESET instruction and Stack Overflow Resets.

The LCDSEx registers are cleared only on a POR and remain unchanged for a BOR. Note 6 was added to Table 4-4 in the Device Data Sheet to clarify this exception.

The revised conditions are shown in Table 1.

TABLE 1: INITIALIZATION CONDITIONS FOR ALL REGISTERS

Table with 5 columns: Register, Applicable Devices (6X90, 8X90), Power-on Reset, Brown-out Reset, MCLR Resets, WDT Reset, RESET Instruction, Stack Resets, and Wake-up via WDT or Interrupt. Rows list registers LCDDATA1 through LCDDATA23.

Legend: u = unchanged, x = unknown, - = unimplemented bit, read as '0', q = value depends on condition. Shaded cells indicate conditions do not apply for the designated device.

6: These registers are cleared on POR and unchanged on BOR.

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**TABLE 1: INITIALIZATION CONDITIONS FOR ALL REGISTERS (CONTINUED)**

Register	Applicable Devices		Power-on Reset, Brown-out Reset	MCLR Resets WDT Reset RESET Instruction Stack Resets	Wake-up via WDT or Interrupt
	6X90	8X90			
LCDDATA0	6X90	8X90	0000 0000	0000 0000	uuuu uuuu
LCDSE5	6X90	8X90	0000 0000 <sup>(6)</sup>	0000 0000	uuuu uuuu
LCDSE4	6X90	8X90	0000 0000 <sup>(6)</sup>	0000 0000	uuuu uuuu
LCDSE3	6X90	8X90	0000 0000 <sup>(6)</sup>	0000 0000	uuuu uuuu
LCDSE2	6X90	8X90	0000 0000 <sup>(6)</sup>	0000 0000	uuuu uuuu
LCDSE1	6X90	8X90	0000 0000 <sup>(6)</sup>	0000 0000	uuuu uuuu
LCDSE0	6X90	8X90	0000 0000 <sup>(6)</sup>	0000 0000	uuuu uuuu

**Legend:** u = unchanged, x = unknown, - = unimplemented bit, read as '0', q = value depends on condition.  
Shaded cells indicate conditions do not apply for the designated device.

**6:** These registers are cleared on POR and unchanged on BOR.

## 2. Module: OSCTUNE Register

In **Section 2.6.3 “OSCTUNE Register”**, references to INTRC have been removed from the second paragraph, which now reads as follows:

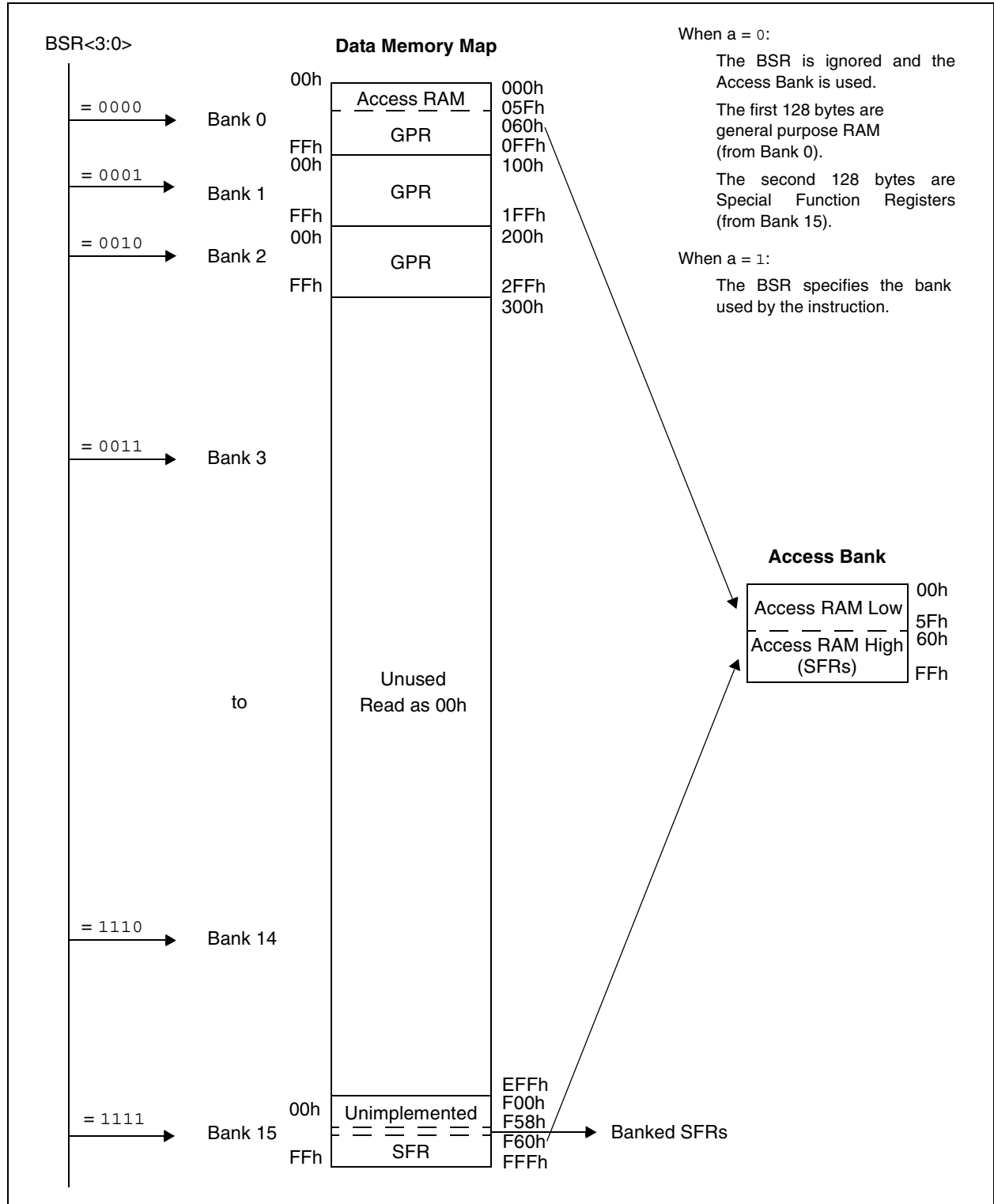
When the OSCTUNE register is modified, the INTOSC frequency will begin shifting to the new frequency. The INTOSC clock will stabilize within 1 ms. Code execution continues during this shift. There is no indication that the shift has occurred.

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## 3. Module: Data Memory Map

In Figure 5-5 of the Device Data Sheet, the address range, F00h to F58h, has been corrected to “Unimplemented” rather than “GPR”.

**FIGURE 5-5: DATA MEMORY MAP FOR PIC18F6390/6490/8390/8490 DEVICES**



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## 4. Module: PORTA, TRISA and LATA Registers

In Section 9.1 “PORTA, TRISA and LATA Registers”, the sixth paragraph and its associated note (see below) have been removed.

Pins RA0 through RA5 may also be used as comparator inputs or outputs by setting the appropriate bits in the CMCON register. To use RA3:RA0 as digital inputs, it is also necessary to turn off the comparators.

**Note:** On a Power-on Reset, RA5 and RA3:RA0 are configured as analog inputs and read as ‘0’. RA4 is configured as a digital input.

## 5. Module: LCD Bias Types

In Section 22.3 “LCD Bias Types”, the third paragraph has been modified (changes are shown in **bold text**) to read as follows.

The external resistor ladder should be connected to the Bias 1 pin, Bias 2 pin, Bias 3 pin and VSS. The Bias 3 pin should also be connected to **AVDD**.

## 6. Module: Electrical Characteristics

In Section 26.2 “DC Characteristics: Power-Down and Supply Current”, certain Max values for Power-Down Current (IPD) in Sleep mode have been updated.

The following relevant portion of the table indicates the corrections. (For clarity, the corrected items appear in **bold text** – all other text appears in plain text for purposes of this errata.)

## 26.2 DC Characteristics: Power-Down and Supply Current PIC18F6390/6490/8390/8490 (Industrial) PIC18LF6390/6490/8390/8490 (Industrial)

PIC18LF6390/6490/8390/8490 (Industrial)		Standard Operating Conditions (unless otherwise stated)			
		Operating temperature -40°C ≤ TA ≤ +85°C for industrial			
PIC18F6390/6490/8390/8490 (Industrial)		Standard Operating Conditions (unless otherwise stated)			
		Operating temperature -40°C ≤ TA ≤ +85°C for industrial			
Param No.	Device	Typ	Max	Units	Conditions
<b>Power-Down Current (IPD)<sup>(1)</sup></b>					
	PIC18LFX390/X490	0.1	<b>1.0</b>	μA	-40°C
		0.1	<b>1.0</b>	μA	+25°C
		0.2	<b>5.0</b>	μA	+85°C
	PIC18LFX390/X490	0.1	<b>2.0</b>	μA	-40°C
		0.1	<b>2.0</b>	μA	+25°C
		0.3	<b>8.0</b>	μA	+85°C
	All devices	0.1	2.0	μA	-40°C
		0.1	2.0	μA	+25°C
		0.4	<b>15</b>	μA	+85°C
					V <sub>DD</sub> = 2.0V (Sleep mode)
					V <sub>DD</sub> = 3.0V (Sleep mode)
					V <sub>DD</sub> = 5.0V (Sleep mode)

**Note 1:** The power-down current in Sleep mode does not depend on the oscillator type. Power-down current is measured with the part in Sleep mode, with all I/O pins in high-impedance state and tied to VDD or VSS and all features that add delta current disabled (such as WDT, Timer1 Oscillator, BOR, etc.).

# PIC18F6390/6490/8390/8490

## 7. Module: Electrical Characteristics

In Section 26.2 “DC Characteristics: Power-Down and Supply Current”, the Units value for Supply Current (IDD) in RC\_RUN mode (FOSC = 4 MHz and VDD = 2.0V), have been updated to “mA” rather than “μA”.

The following relevant portion of the table indicates the corrections. (For clarity, the corrected items appear in **bold** text – all other text appears in plain text for purposes of this errata.)

### 26.2 DC Characteristics: Power-Down and Supply Current PIC18F6390/6490/8390/8490 (Industrial) PIC18LF6390/6490/8390/8490 (Industrial)

<b>PIC18LF6390/6490/8390/8490</b> (Industrial)		<b>Standard Operating Conditions (unless otherwise stated)</b> Operating temperature -40°C ≤ TA ≤ +85°C for industrial				
<b>PIC18F6390/6490/8390/8490</b> (Industrial)		<b>Standard Operating Conditions (unless otherwise stated)</b> Operating temperature -40°C ≤ TA ≤ +85°C for industrial				
Param No.	Device	Typ	Max	Units	Conditions	
	<b>Supply Current (IDD)<sup>(1)</sup></b>					
	PIC18LFX390/X490	0.6	1.7	<b>mA</b>	-40°C	VDD = 2.0V
		0.6	1.6	<b>mA</b>	+25°C	
		0.6	1.5	<b>mA</b>	+85°C	
	PIC18LFX390/X490	1.0	2.4	mA	-40°C	VDD = 3.0V
		1.0	2.4	mA	+25°C	
		1.0	2.4	mA	+85°C	
	All devices	2.0	4.2	mA	-40°C	VDD = 5.0V
		2.0	4	mA	+25°C	
		2.0	3.8	mA	+85°C	
	FOSC = 4 MHz <b>(RC_RUN mode,</b> INTOSC source)					

**Note 1:** The supply current is mainly a function of operating voltage, frequency and mode. Other factors, such as I/O pin loading and switching rate, oscillator type and circuit, internal code execution pattern and temperature, also have an impact on the current consumption.

The test conditions for all IDD measurements in active operation mode are:

OSC1 = external square wave, from rail-to-rail; all I/O pins tri-stated, pulled to VDD or VSS;  
MCLR = VDD; WDT enabled/disabled as specified.

# PIC18F6390/6490/8390/8490

## 8. Module: Electrical Characteristics

In Section 26.2 “DC Characteristics: Power-Down and Supply Current”, certain Max values and operating temperatures for Supply Current (IDD) in SEC\_RUN and SEC\_IDLE modes have been updated.

The following relevant portion of the table indicates the corrections. (For clarity, the corrected items appear in **bold** text – all other text appears in plain text for purposes of this errata.)

### 26.2 DC Characteristics: Power-Down and Supply Current PIC18F6390/6490/8390/8490 (Industrial) PIC18LF6390/6490/8390/8490 (Industrial)

PIC18LF6390/6490/8390/8490 (Industrial)		Standard Operating Conditions (unless otherwise stated)					
		Operating temperature -40°C ≤ TA ≤ +85°C for industrial					
PIC18F6390/6490/8390/8490 (Industrial)		Standard Operating Conditions (unless otherwise stated)					
		Operating temperature -40°C ≤ TA ≤ +85°C for industrial					
Param No.	Device	Typ	Max	Units	Conditions		
<b>Supply Current (IDD)</b> <sup>(1)</sup>							
PIC18LFX390/X490		13	<b>40</b>	μA	<b>-40°C</b>	VDD = 2.0V	Fosc = 32 kHz <sup>(2)</sup> ( <b>SEC_RUN</b> mode, Timer1 as clock)
		14	<b>40</b>	μA	+25°C		
		16	<b>40</b>	μA	<b>+85°C</b>		
PIC18LFX390/X490		34	<b>74</b>	μA	<b>-40°C</b>	VDD = 3.0V	
		31	<b>70</b>	μA	+25°C		
		28	<b>67</b>	μA	<b>+85°C</b>		
All devices		72	<b>150</b>	μA	<b>-40°C</b>	VDD = 5.0V	
		65	<b>150</b>	μA	+25°C		
		59	<b>150</b>	μA	<b>+85°C</b>		
PIC18LFX390/X490		5.5	15	μA	<b>-40°C</b>	VDD = 2.0V	
		5.8	15	μA	+25°C		
		6.1	18	μA	<b>+85°C</b>		
PIC18LFX390/X490		8.2	30	μA	<b>-40°C</b>	VDD = 3.0V	
		8.6	30	μA	+25°C		
		8.8	35	μA	<b>+85°C</b>		
All devices		13	80	μA	<b>-40°C</b>	VDD = 5.0V	
		13	80	μA	+25°C		
		13	85	μA	<b>+85°C</b>		

**Note 1:** The supply current is mainly a function of operating voltage, frequency and mode. Other factors, such as I/O pin loading and switching rate, oscillator type and circuit, internal code execution pattern and temperature, also have an impact on the current consumption.

The test conditions for all IDD measurements in active operation mode are:

OSC1 = external square wave, from rail-to-rail; all I/O pins tri-stated, pulled to VDD or VSS;

MCLR = VDD; WDT enabled/disabled as specified.

**2:** BOR and HLVD enable internal band gap reference. With both modules enabled, current consumption will be less than the sum of both specifications.

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## 9. Module: Electrical Characteristics

In Section 26.2 “DC Characteristics: Power-Down and Supply Current”, the Max values of parameters D022A (Brown-out Reset) and D022B (High/Low-Voltage Detect) have been updated.

The following relevant portion of the table indicates the corrections. (For clarity, the corrected items appear in **bold** text – all other text appears in plain text for purposes of this errata.)

### 26.2 DC Characteristics: Power-Down and Supply Current PIC18F6390/6490/8390/8490 (Industrial) PIC18LF6390/6490/8390/8490 (Industrial)

PIC18LF6390/6490/8390/8490 (Industrial)		Standard Operating Conditions (unless otherwise stated) Operating temperature $-40^{\circ}\text{C} \leq T_A \leq +85^{\circ}\text{C}$ for industrial				
PIC18F6390/6490/8390/8490 (Industrial)		Standard Operating Conditions (unless otherwise stated) Operating temperature $-40^{\circ}\text{C} \leq T_A \leq +85^{\circ}\text{C}$ for industrial				
Param No.	Device	Typ	Max	Units	Conditions	
<b>Module Differential Currents (<math>\Delta I_{WDT}</math>, <math>\Delta I_{BOR}</math>, <math>\Delta I_{LVD}</math>, <math>\Delta I_{LCD}</math>, <math>\Delta I_{OSCB}</math>, <math>\Delta I_{AD}</math>)</b>						
D022A ( $\Delta I_{BOR}$ )	<b>Brown-out Reset</b>	17	<b>50.0</b>	$\mu\text{A}$	$-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	$V_{DD} = 3.0\text{V}$
		47	<b>60.0</b>	$\mu\text{A}$	$-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	$V_{DD} = 5.0\text{V}$
D022B ( $\Delta I_{LVD}$ )	<b>High/Low-Voltage Detect</b>	14	<b>38.0</b>	$\mu\text{A}$	$-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	$V_{DD} = 2.0\text{V}$
		18	<b>40.0</b>	$\mu\text{A}$	$-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	$V_{DD} = 3.0\text{V}$
		21	<b>45.0</b>	$\mu\text{A}$	$-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	$V_{DD} = 5.0\text{V}$

## 10. Module: Electrical Characteristics

In Table 26-1 of the Device Data Sheet, the Min values of parameters D132 and D132A have been updated.

The following relevant portion of Table 26-1 indicates the corrections. (For clarity, the corrected items appear in **bold** text – all other text appears in plain text for purposes of this errata.)

**TABLE 26-1: MEMORY PROGRAMMING REQUIREMENTS**

DC Characteristics			Standard Operating Conditions (unless otherwise stated) Operating temperature $-40^{\circ}\text{C} \leq T_A \leq +85^{\circ}\text{C}$ for industrial				
Param No.	Sym	Characteristic	Min	Typ†	Max	Units	Conditions
D132 D132A	$V_{IE}$	<b>Program Flash Memory</b> VDD for Block Erase	<b>2.75</b>	—	5.5	V	Using ICSP™ port
	$V_{IW}$	VDD for Externally Timed Erase or Write	<b>2.75</b>	—	5.5	V	Using ICSP port

† Data in “Typ” column is at 5.0V, 25°C unless otherwise stated. These parameters are for design guidance only and are not tested.

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## 11. Module: Electrical Characteristics

In Table 26-4 of the Device Data Sheet, the parameter D423 has been added.

The following relevant portion of Table 26-4 indicates the addition. (For clarity, the new item appears in **bold** text – all other text appears in plain text for purposes of this errata.)

**TABLE 26-4: LOW-VOLTAGE DETECT CHARACTERISTICS**

				<b>Standard Operating Conditions (unless otherwise stated)</b> Operating temperature $-40^{\circ}\text{C} \leq T_A \leq +85^{\circ}\text{C}$ for industrial				
Param No.	Symbol	Characteristic		Min	Typ†	Max	Units	Conditions
D423	V <sub>BG</sub>	<b>Band Gap Reference Voltage Value</b>	<b>L<sub>VV</sub> = 1111</b>	—	<b>1.20</b>	—	<b>V</b>	<b>HLVDIN input external</b>

† Production tested at T<sub>AMB</sub> = 25°C. Specifications over temperature limits ensured by characterization.

## 12. Module: Electrical Characteristics

In Table 26-10 of the Device Data Sheet, the Max value for parameter 33 has been updated.

The following relevant portion of Table 26-10 indicates the correction. (For clarity, the corrected item appears in **bold** text – all other text appears in plain text for purposes of this errata.)

**TABLE 26-10: RESET, WATCHDOG TIMER, OSCILLATOR START-UP TIMER, POWER-UP TIMER AND BROWN-OUT RESET REQUIREMENTS**

Param. No.	Symbol	Characteristic	Min	Typ	Max	Units	Conditions
33	TPWRT	Power-up Timer Period	55.5	65.5	<b>75</b>	ms	

## 13. Module: Electrical Characteristics

In Table 26-23 of the Device Data Sheet, the part numbers listed in the heading incorrectly reference the PIC18F4520 and PIC18LF4520 families of devices and have been corrected.

The following relevant portion of Table 26-23 indicates the correction.

**TABLE 26-23: A/D CONVERTER CHARACTERISTICS: PIC18F6390/6490/8390/8490 (INDUSTRIAL)  
PIC18LF6390/6490/8390/8490 (INDUSTRIAL)**



## REVISION HISTORY

### Rev A Document (3/2005)

First revision of this document. Includes issues 1 (HLVD Internal Reference Voltage Parameter) and 2 (LCD Initialization Conditions).

### Rev B Document (11/2006)

Removed issue 1, renumbered issue 2 (LCD Initialization Conditions) to issue 1. Added new issues 2 (OSCTUNE Register), 3 (Data Memory Map), 4 (PORTA, TRISA and LATA Registers), 5 (LCD Bias Types) and 6 through 13 (Electrical Characteristics).

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NOTES:

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