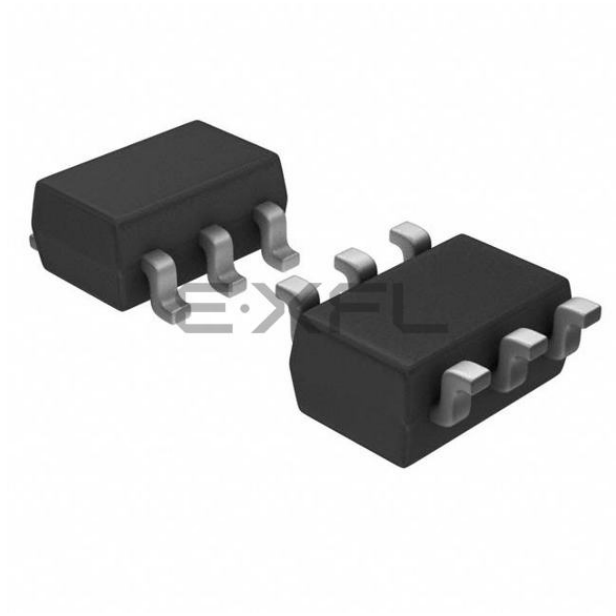

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Applications of "Embedded - Microcontrollers"

Details	
Product Status	Active
Core Processor	PIC
Core Size	8-Bit
Speed	8MHz
Connectivity	-
Peripherals	POR, WDT
Number of I/O	4
Program Memory Size	768B (512 x 12)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	23 x 8
Voltage - Supply (Vcc/Vdd)	2V ~ 5.5V
Data Converters	A/D 2x8b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	SOT-23-6
Supplier Device Package	SOT-23-6
Purchase URL	https://www.e-xfl.com/product-detail/microchip-technology/pic10f222t-i-ot

Table of Contents

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NOTES:

2.0 DEVICE VARIETIES

A variety of packaging options are available. Depending on application and production requirements, the proper device option can be selected using the information in this section. When placing orders, please use the PIC10F220/222 Product Identification System at the back of this data sheet to specify the correct part number.

2.1 Quick Turn Programming (QTP) Devices

Microchip offers a QTP programming service for factory production orders. This service is made available for users who choose not to program medium-to-high quantity units and whose code patterns have stabilized. The devices are identical to the Flash devices but with all Flash locations and fuse options already programmed by the factory. Certain code and prototype verification procedures do apply before production shipments are available. Please contact your local Microchip Technology sales office for more details.

2.2 Serialized Quick Turn Programming^{SM} (SQTP^{SM}) Devices

Microchip offers a unique programming service, where a few user-defined locations in each device are programmed with different serial numbers. The serial numbers may be random, pseudo-random or sequential.

Serial programming allows each device to have a unique number, which can serve as an entry-code, password or ID number.

NOTES:

4.6 OSCCAL Register

The Oscillator Calibration (OSCCAL) register is used to calibrate the internal precision 4/8 MHz oscillator. It contains seven bits for calibration.

Note:	Erasing the device will also erase the pre-programmed internal calibration value for the internal oscillator. The calibration value must be read prior to erasing the part so it can be reprogrammed correctly later.

After you move in the calibration constant, do not change the value. See **Section 8.2.2 "Internal 4/8 MHz Oscillator"**.

REGISTER 4-3: OSCCAL – OSCILLATOR CALIBRATION REGISTER (ADDRESS: 05h)

R/W-1	R/W-1	R/W-1	R/W-1	R/W-1	R/W-1	R/W-1	R/W-0
CAL6	CAL5	CAL4	CAL3	CAL2	CAL1	CAL0	FOSC4
bit 7							bit 0

Legend:			
R = Readable bit	W = Writable bit	U = Unimplemented bit, read as '0'	
-n = Value at POR	'1' = Bit is set	'0' = Bit is cleared	x = Bit is unknown

bit 7-1 **CAL<6:0>:** Oscillator Calibration bits

0111111 = Maximum frequency
•
•
•
0000001
0000000 = Center frequency
1111111
•
•
•
1000000 = Minimum frequency

bit 0 **FOSC4:** INTOSC/4 Output Enable bit(1)

1 = INTOSC/4 output onto GP2
0 = GP2/T0CKI applied to GP2

Note 1: Overrides GP2/T0CKI control registers when enabled.

4.9 Indirect Data Addressing; INDF and FSR Registers

The INDF register is not a physical register. Addressing INDF actually addresses the register whose address is contained in the FSR register (FSR is a *pointer*). This is indirect addressing.

4.9.1 INDIRECT ADDRESSING

- Register file 09 contains the value 10h
- Register file 0A contains the value 0Ah
- Load the value 09 into the FSR register
- A read of the INDF register will return the value of 10h
- Increment the value of the FSR register by one (FSR = 0A)
- A read of the INDR register now will return the value of 0Ah.

Reading INDF itself indirectly (FSR = 0) will produce 00h. Writing to the INDF register indirectly results in a no-operation (although Status bits may be affected).

A simple program to clear RAM locations 10h-1Fh using Indirect addressing is shown in Example 4-1.

EXAMPLE 4-1: HOW TO CLEAR RAM USING INDIRECT ADDRESSING

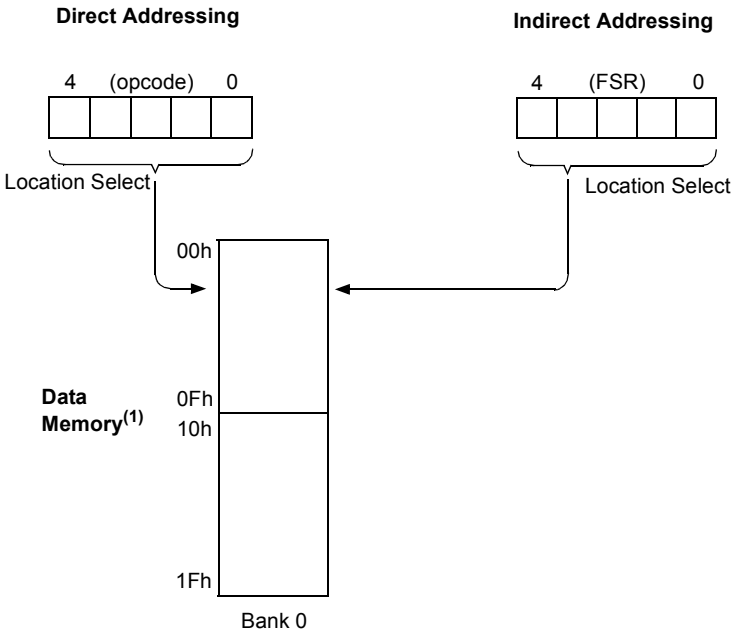
```
        MOVLW   0x10    ;initialize pointer
        MOVWF   FSR     ;to RAM
NEXT    CLRF    INDF    ;clear INDF
                        ;register
        INCF    FSR,F   ;inc pointer
        BTFSC   FSR,4   ;all done?
        GOTO    NEXT    ;NO, clear next
CONTINUE
            :           ;YES, continue
            :
```

The FSR is a 5-bit wide register. It is used in conjunction with the INDF register to indirectly address the data memory area.

The FSR<4:0> bits are used to select data memory addresses 00h to 1Fh.

Note:	Do not use banking. FSR <7:5> are unimplemented and read as '1's.

FIGURE 4-6: DIRECT/INDIRECT ADDRESSING



Note 1: For register map detail, see **Section 4.3 "Data Memory Organization"**.

FIGURE 6-3: TIMER0 TIMING: INTERNAL CLOCK/PRESCALE 1:2

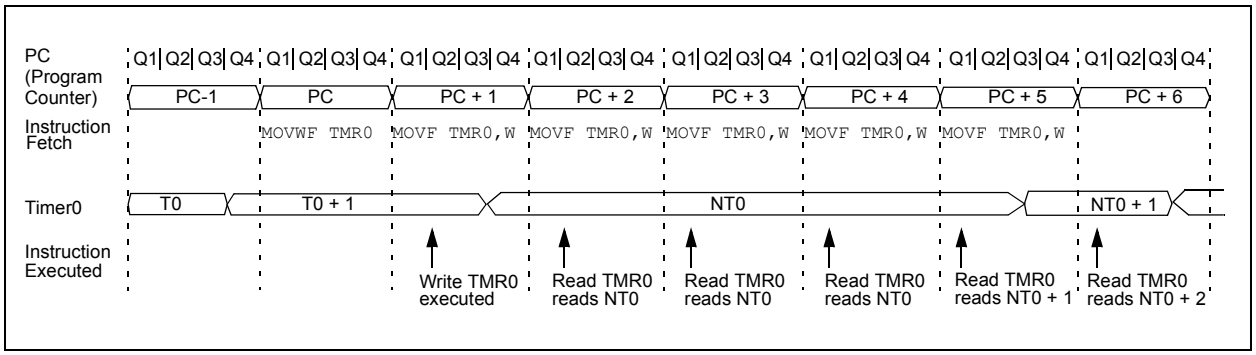


TABLE 6-1: REGISTERS ASSOCIATED WITH TIMER0

Address	Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Value on Power-On Reset	Value on All Other Resets
01h	TMR0	Timer0 – 8-Bit Real-Time Clock/Counter								xxxx xxxx	uuuu uuuu
N/A	OPTION	$\overline{GPWU}$	$\overline{GPPU}$	T0CS	T0SE	PSA	PS2	PS1	PS0	1111 1111	1111 1111
N/A	TRISGPIO(1)	—	—	—	—	I/O Control Register				---- 1111	---- 1111

Legend: Shaded cells not used by Timer0, – = unimplemented, x = unknown, u = unchanged.

Note 1: The TRIS of the T0CKI pin is overridden when T0CS = 1

6.1 Using Timer0 With An External Clock

When an external clock input is used for Timer0, it must meet certain requirements. The external clock requirement is due to internal phase clock (TOSC) synchronization. Also, there is a delay in the actual incrementing of Timer0 after synchronization.

6.1.1 EXTERNAL CLOCK SYNCHRONIZATION

When no prescaler is used, the external clock input is the same as the prescaler output. The synchronization of T0CKI with the internal phase clocks is accomplished by sampling the prescaler output on the Q2 and Q4 cycles of the internal phase clocks (Figure 6-4). Therefore, it is necessary for T0CKI to be high for at least 2TOSC (and a small RC delay of 2Tt0H) and low for at least 2TOSC (and a small RC delay of 2Tt0H). Refer to the electrical specification of the desired device.

When a prescaler is used, the external clock input is divided by the asynchronous ripple counter-type prescaler, so that the prescaler output is symmetrical. For the external clock to meet the sampling requirement, the ripple counter must be taken into account. Therefore, it is necessary for T0CKI to have a period of at least 4TOSC (and a small RC delay of 4Tt0H) divided by the prescaler value. The only requirement on T0CKI high and low time is that they do not violate the minimum pulse width requirement of Tt0H. Refer to parameters 40, 41 and 42 in the electrical specification of the desired device.

7.0 ANALOG-TO-DIGITAL (A/D) CONVERTER

The A/D converter allows conversion of an analog signal into an 8-bit digital signal.

7.1 Clock Divisors

The A/D Converter has a single clock source setting, INTOSC/4. The A/D Converter requires 13 TAD periods to complete a conversion. The divisor values do not affect the number of TAD periods required to perform a conversion. The divisor values determine the length of the TAD period.

Note:	Due to the fixed clock divisor, a conversion will complete in 13 CPU instruction cycles.

7.2 Voltage Reference

Due to the nature of the design, there is no external voltage reference allowed for the A/D Converter. The A/D Converter reference voltage will always be VDD.

7.3 Analog Mode Selection

The ANS<1:0> bits are used to configure pins for analog input. Upon any Reset ANS<1:0> defaults to 11. This configures pins AN0 and AN1 as analog inputs. Pins configured as analog inputs are not available for digital output. Users should not change the ANS bits while a conversion is in process. ANS bits are active regardless of the condition of ADON.

7.4 A/D Converter Channel Selection

The CHS bits are used to select the analog channel to be sampled by the A/D Converter. The CHS bits should not be changed during a conversion. To acquire an analog signal, the CHS selection must match one of the pin(s) selected by the ANS bits. The Internal Absolute Voltage Reference can be selected regardless of the condition of the ANS bits. All channel selection information will be lost when the device enters Sleep.

Note:	The A/D Converter module consumes power when the ADON bit is set even when no channels are selected as analog inputs. For low-power applications, it is recommended that the ADON bit be cleared when the A/D Converter is not in use.

7.5 The GO/$\overline{\text{DONE}}$ bit

The GO/$\overline{\text{DONE}}$ bit is used to determine the status of a conversion, to start a conversion and to manually halt a conversion in process. Setting the GO/$\overline{\text{DONE}}$ bit starts a conversion. When the conversion is complete, the A/D Converter module clears the GO/$\overline{\text{DONE}}$ bit. A conversion can be terminated by manually clearing the GO/$\overline{\text{DONE}}$ bit while a conversion is in process. Manual termination of a conversion may result in a partially converted result in ADRES.

The GO/$\overline{\text{DONE}}$ bit is cleared when the device enters Sleep, stopping the current conversion. The A/D Converter does not have a dedicated oscillator, it runs off of the system clock.

The GO/$\overline{\text{DONE}}$ bit cannot be set when ADON is clear.

7.6 Sleep

This A/D Converter does not have a dedicated A/D Converter clock and therefore no conversion in Sleep is possible. If a conversion is underway and a Sleep command is executed, the GO/$\overline{\text{DONE}}$ and ADON bit will be cleared. This will stop any conversion in process and power-down the A/D Converter module to conserve power. Due to the nature of the conversion process, the ADRES may contain a partial conversion. At least 1 bit must have been converted prior to Sleep to have partial conversion data in ADRES. The CHS bits are reset to their default condition and CHS<1:0> = 11.

For accurate conversions, TAD must meet the following:

- 500 ns < TAD < 50 μs
- TAD = 1/(FOSC/divisor)

TABLE 7-1: EFFECTS OF SLEEP AND WAKE ON ADCON0

	ANS1	ANS0	CHS1	CHS0	GO/$\overline{\text{DONE}}$	ADON
Prior to Sleep	x	x	x	x	0	0
Prior to Sleep	x	x	x	x	1	1
Entering Sleep	Unchanged	Unchanged	1	1	0	0
Wake	1	1	1	1	0	0

7.9 A/D Acquisition Requirements

For the ADC to meet its specified accuracy, the charge holding capacitor (CHOLD) must be allowed to fully charge to the input channel voltage level. The Analog Input model is shown in Figure 7-1. The source impedance (RS) and the internal sampling switch (RSS) impedance directly affect the time required to charge the capacitor CHOLD. The sampling switch (RSS) impedance varies over the device voltage (VDD), see Figure 7-1. **The maximum recommended impedance for analog sources is 10 kΩ.** As the source impedance is decreased, the acquisition time may be decreased. After the analog input channel is selected (or changed), an A/D acquisition must be done before the conversion can be started. To calculate the minimum acquisition time, Equation 7-1 may be used. This equation assumes that 1/2 LSb error is used (256 steps for the ADC). The 1/2 LSb error is the maximum error allowed for the ADC to meet its specified resolution.

EQUATION 7-1: ACQUISITION TIME EXAMPLE

Assumptions:

Temperature = 50°C and external impedance of 10 kΩ 5.0V VDD

Tacq = Amplifier Settling Time + Hold Capacitor Charging Time + Temperature Coefficient

= TAMP + TC + TCOFF

= 2 μs + TC + [(Temperature - 25°C)(0.05 μs/°C)]

Solving for Tc:

Tc = CHOLD (RIC + RSS + RS) In(1/512)

= -25pF (l kΩ + 7 kΩ + 10 kΩ) In(0.00196)

= 2.81 μs

Therefore:

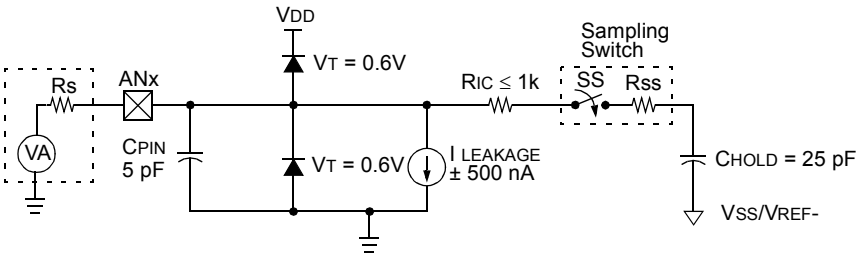
Tacq = 2 μs + 2.81 μs + [(50°C-25°C)(0.0 5μs/°C)]

= 6.06 μs

Note 1: The charge holding capacitor (CHOLD) is not discharged after each conversion.

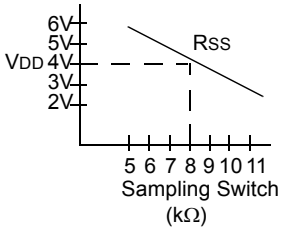
2: The maximum recommended impedance for analog sources is 10 kΩ. This is required to meet the pin leakage specification.

FIGURE 7-1: ANALOG INPUT MODULE



Legend:

CPIN	=	Input Capacitance
VT	=	Threshold Voltage
ILEAKAGE	=	Leakage current at the pin due to various junctions
RIC	=	Interconnect Resistance
SS	=	Sampling Switch
CHOLD	=	Sample/Hold Capacitance



8.9.2 WAKE-UP FROM SLEEP

The device can wake-up from Sleep through one of the following events:

1. An external Reset input on GP3/MCLR/VPP pin, when configured as MCLR.
2. A Watchdog Timer Time-out Reset (if WDT was enabled).
3. A change on input pin GP0, GP1 or GP3 when wake-up on change is enabled.

These events cause a device Reset. The TO, PD GPWUF bits can be used to determine the cause of a device Reset. The TO bit is cleared if a WDT time-out occurred (and caused wake-up). The PD bit, which is set on power-up, is cleared when SLEEP is invoked. The GPWUF bit indicates a change in state while in Sleep at pins GP0, GP1 or GP3 (since the last file or bit operation on GP port).

Caution:	Right before entering Sleep, read the input pins. When in Sleep, wake up occurs when the values at the pins change from the state they were in at the last reading. If a wake-up on change occurs and the pins are not read before re-entering Sleep, a wake-up will occur immediately even if no pins change while in Sleep mode.

Note:	The WDT is cleared when the device wakes from Sleep, regardless of the wake-up source.

8.10 Program Verification/Code Protection

If the Code Protection bit has not been programmed, the on-chip program memory can be read out for verification purposes.

The first 64 locations and the last location (Reset Vector) can be read, regardless of the code protection bit setting.

8.11 ID Locations

Four memory locations are designated as ID locations where the user can store checksum or other code identification numbers. These locations are not accessible during normal execution, but are readable and writable during program/verify.

Use only the lower 4 bits of the ID locations and always program the upper 8 bits as '1's.

8.12 In-Circuit Serial Programming™

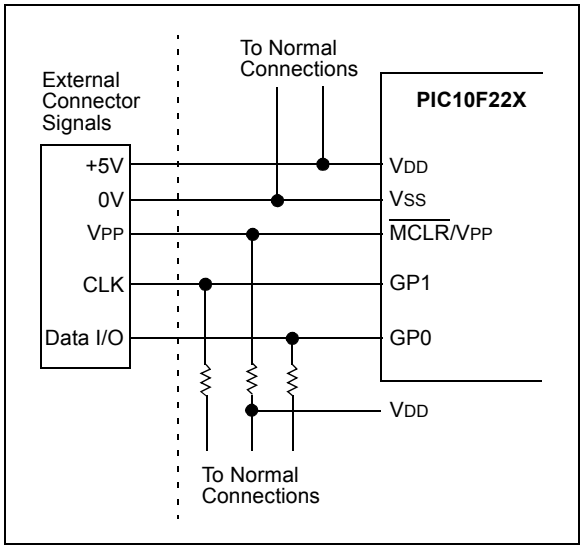
The PIC10F220/222 microcontrollers can be serially programmed while in the end application circuit. This is simply done with two lines for clock and data, and three other lines for power, ground and the programming voltage. This allows customers to manufacture boards with unprogrammed devices and then program the microcontroller just before shipping the product. This also allows the most recent firmware, or a custom firmware, to be programmed.

The devices are placed into a Program/Verify mode by holding the GP1 and GP0 pins low while raising the MCLR (VPP) pin from VIL to VIHH (see programming specification). GP1 becomes the programming clock and GP0 becomes the programming data. Both GP1 and GP0 are Schmitt Trigger inputs in this mode.

After Reset, a 6-bit command is then supplied to the device. Depending on the command, 16 bits of program data are then supplied to or from the device, depending if the command was a Load or a Read. For complete details of serial programming, please refer to the PIC10F220/222 Programming Specifications.

A typical In-Circuit Serial Programming connection is shown in Figure 8-10.

FIGURE 8-10: TYPICAL IN-CIRCUIT SERIAL PROGRAMMING™ CONNECTION



IORWF	Inclusive OR W with f
Syntax:	[*label*] IORWF f,d
Operands:	$0 \le f \le 31$ $d \in [0,1]$
Operation:	(W).OR. (f) → (dest)
Status Affected:	Z
Description:	Inclusive OR the W register with register 'f'. If 'd' is '0', the result is placed in the W register. If 'd' is '1', the result is placed back in register 'f'.

MOVF	Move f
Syntax:	[*label*] MOVF f,d
Operands:	$0 \le f \le 31$ $d \in [0,1]$
Operation:	(f) → (dest)
Status Affected:	Z
Description:	The contents of register 'f' are moved to destination 'd'. If 'd' is '0', destination is the W register. If 'd' is '1', the destination is file register 'f'. 'd' = 1 is useful as a test of a file register, since status flag Z is affected.

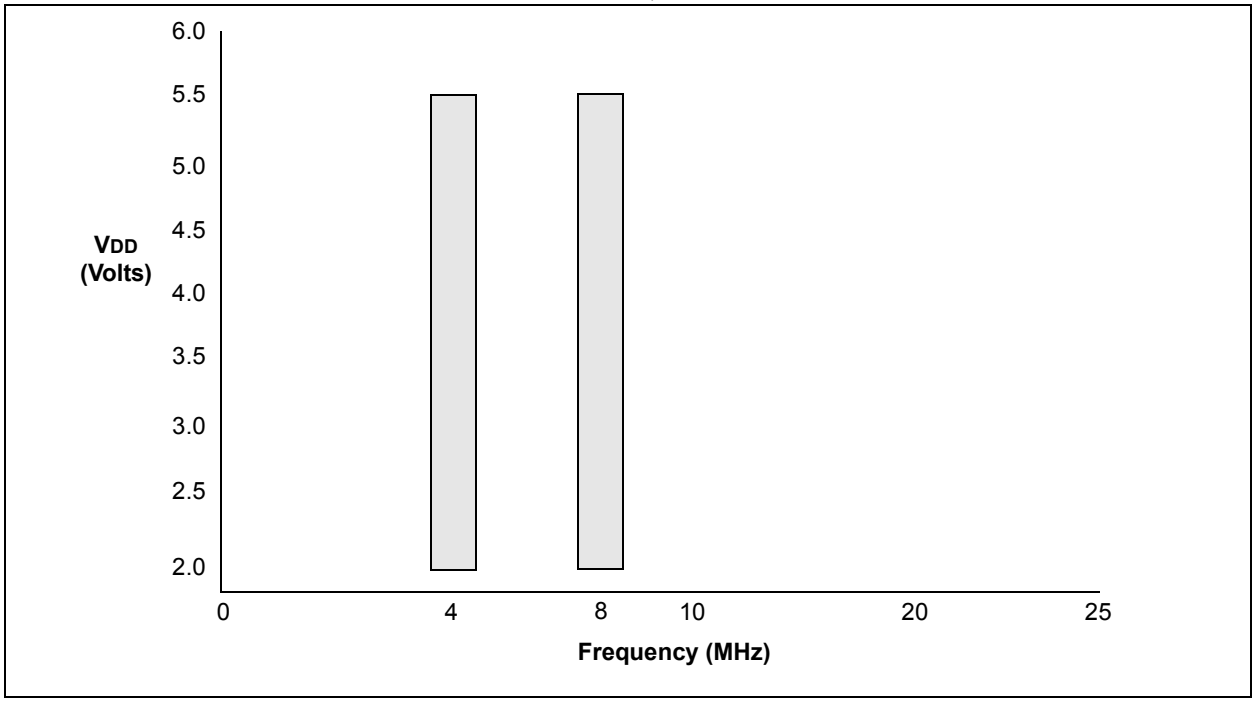
MOVLW	Move Literal to W
Syntax:	[*label*] MOVLW k
Operands:	$0 \le k \le 255$
Operation:	k → (W)
Status Affected:	None
Description:	The eight-bit literal 'k' is loaded into the W register. The "don't cares" will assembled as '0's.

MOVWF	Move W to f
Syntax:	[*label*] MOVWF f
Operands:	$0 \le f \le 31$
Operation:	(W) → (f)
Status Affected:	None
Description:	Move data from the W register to register 'f'.

NOP	No Operation
Syntax:	[*label*] NOP
Operands:	None
Operation:	No operation
Status Affected:	None
Description:	No operation.

OPTION	Load OPTION Register
Syntax:	[*label*] OPTION
Operands:	None
Operation:	(W) → OPTION
Status Affected:	None
Description:	The content of the W register is loaded into the OPTION register.

FIGURE 10-1: VOLTAGE-FREQUENCY GRAPH, -40°C ≤ TA ≤ +125°C



10.1 DC Characteristics: PIC10F220/222 (Industrial)

DC CHARACTERISTICS			Standard Operating Conditions (unless otherwise specified) Operating Temperature -40×C ≤ TA ≤ +85°C (industrial)				
Param No.	**Sym**	**Characteristic**	**Min**	**Typ(1)**	**Max**	**Units**	**Conditions**
D001	VDD	**Supply Voltage**	2.0		5.5	V	See **Figure 10-1**
D002	VDR	**RAM Data Retention Voltage(2)**	1.5*	—	—	V	Device in Sleep mode
D003	VPOR	**VDD Start Voltage** to ensure Power-on Reset	—	Vss	—	V	
D004	SVDD	**VDD Rise Rate** to ensure Power-on Reset	0.05*	—	—	V/ms	
D010	IDD	**Supply Current(3)**					
			— — — —	175 0.625 250 0.800	275 1.1 400 1.5	μA mA μA mA	VDD = 2.0V, Fosc = 4 MHz VDD = 5.0V, Fosc = 4 MHz VDD = 2.0V, Fosc = 8 MHz VDD = 5.0V, Fosc = 8 MHz
D020	IPD	**Power-down Current(4)**					
			— —	0.1 1	1.2 2.4	μA μA	VDD = 2.0V VDD = 5.0V
D022	IWDT	**WDT Current(4)**					
			— —	1.0 7	3 16	μA μA	VDD = 2.0V VDD = 5.0V

* These parameters are characterized but not tested.

Note 1: Data in the Typical ("Typ") column is based on characterization results at 25°C. This data is for design guidance only and is not tested.

2: This is the limit to which VDD can be lowered in Sleep mode without losing RAM data.

3: The supply current is mainly a function of the operating voltage and frequency. Other factors such as bus loading, bus rate, internal code execution pattern and temperature also have an impact on the current consumption.

a) The test conditions for all IDD measurements in active operation mode are:
All I/O pins tri-stated, pulled to VSS, T0CKI = VDD, $\overline{MCLR}$ = VDD; WDT enabled/disabled as specified.

b) For standby current measurements, the conditions are the same, except that the device is in Sleep mode.

4: 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. The peripheral current is the sum of the base IPD and the additional current consumed when the peripheral is enabled.

10.2 DC Characteristics: PIC10F220/222 (Extended)

DC CHARACTERISTICS			Standard Operating Conditions (unless otherwise specified) Operating Temperature -40×C £ TA £ +125×C (extended)				
Param No.	**Sym**	**Characteristic**	**Min**	**Typ(1)**	**Max**	**Units**	**Conditions**
D001	VDD	**Supply Voltage**	2.0		5.5	V	See **Figure 10-1**
D002	VDR	**RAM Data Retention Voltage(2)**	1.5*		—	V	Device in Sleep mode
D003	VPOR	**VDD Start Voltage** to ensure Power-on Reset	—	Vss	—	V	
D010	IDD	**Supply Current(3)**					
			—	175	275	µA	VDD = 2.0V, Fosc = 4 MHz
			—	0.625	1.1	mA	VDD = 5.0V, Fosc = 4 MHz
			—	250	400	µA	VDD = 2.0V, Fosc = 8 MHz
			—	0.800	1.5	mA	VDD = 5.0V, Fosc = 8 MHz
D020	IPD	**Power-down Current(4)**					
			—	0.1	9	µA	VDD = 2.0V
			—	1	15	µA	VDD = 5.0V
D022	IWDT	**WDT Current(4)**					
			—	1.0	18	µA	VDD = 2.0V
			—	7	22	µA	VDD = 5.0V

* These parameters are characterized but not tested.

Note 1: Data in the Typical (“Typ”) column is based on characterization results at 25°C. This data is for design guidance only and is not tested.

2: This is the limit to which VDD can be lowered in Sleep mode without losing RAM data.

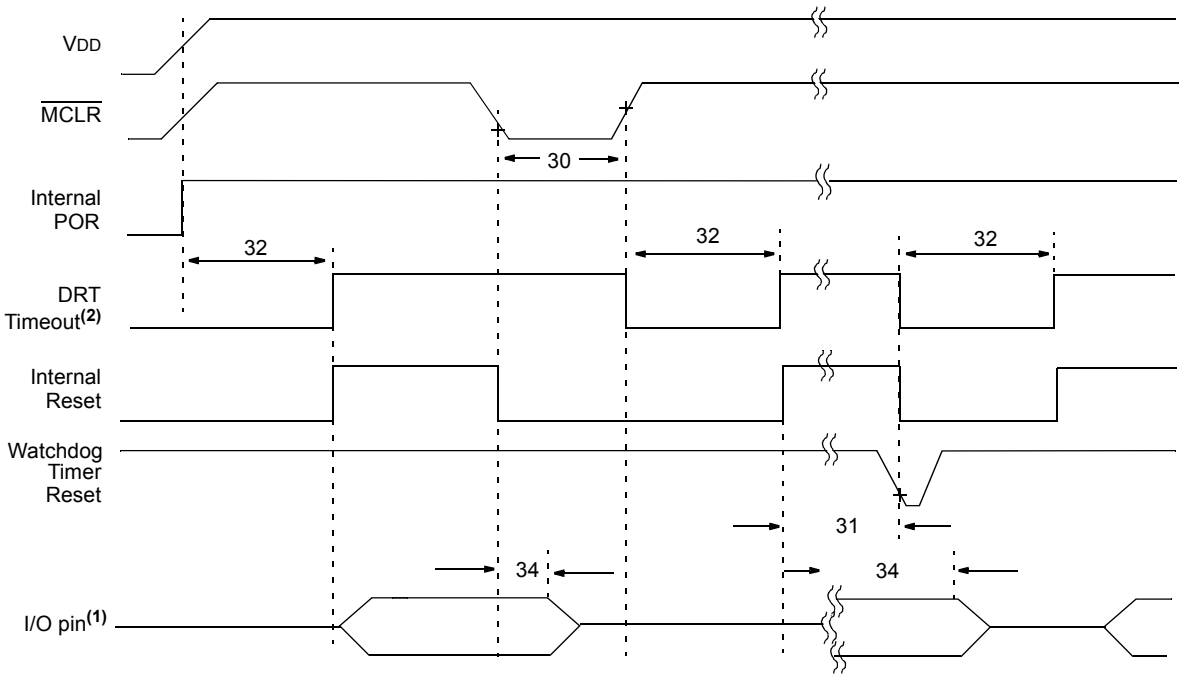
3: The supply current is mainly a function of the operating voltage and frequency. Other factors such as bus loading, bus rate, internal code execution pattern and temperature also have an impact on the current consumption.

a) The test conditions for all IDD measurements in active operation mode are:
All I/O pins tri-stated, pulled to VSS, T0CKI = VDD, $\overline{MCLR}$ = VDD; WDT enabled/disabled as specified.

b) For standby current measurements, the conditions are the same, except that the device is in Sleep mode.

4: 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. The peripheral current is the sum of the base IPD and the additional current consumed when the peripheral is enabled.

FIGURE 10-3: RESET, WATCHDOG TIMER AND DEVICE RESET TIMER TIMING



Note 1: I/O pins must be taken out of High-impedance mode by enabling the output drivers in software.
2: Runs on POR Reset only.

TABLE 10-3: RESET, WATCHDOG TIMER AND DEVICE RESET TIMER – PIC10F220/222

AC CHARACTERISTICS			Standard Operating Conditions (unless otherwise specified) Operating Temperature -40°C ≤ TA ≤ +85°C (industrial) -40°C ≤ TA ≤ +125°C (extended) Operating Voltage VDD range is described in **Section 10.1 "DC Characteristics: PIC10F220/222 (Industrial)"**				
Param No.	**Sym**	**Characteristic**	**Min**	**Typ(1)**	**Max**	**Units**	**Conditions**
30	T_{MCL}	$\overline{MCLR}$ Pulse Width (low)	2* 5*	— —	— —	µs µs	VDD = 5V, -40°C to +85°C VDD = 5.0V
31	TWDT	Watchdog Timer Time-out Period (no prescaler)	10 10	18 18	29 31	ms ms	VDD = 5.0V (Industrial) VDD = 5.0V (Extended)
32	TDRT*	Device Reset Timer Period (standard)	0.600 0.600	1.125 1.125	1.85 1.95	ms ms	VDD = 5.0V (Industrial) VDD = 5.0V (Extended)
34	TIOZ	I/O High-impedance from $\overline{MCLR}$ low	—	—	2*	µs	

* These parameters are characterized but not tested.

Note 1: Data in the Typical ("Typ") column is at 5V, 25°C unless otherwise stated. These parameters are for design guidance only and are not tested.

12.11 Demonstration/Development Boards, Evaluation Kits, and Starter Kits

A wide variety of demonstration, development and evaluation boards for various PIC MCUs and dsPIC DSCs allows quick application development on fully functional systems. Most boards include prototyping areas for adding custom circuitry and provide application firmware and source code for examination and modification.

The boards support a variety of features, including LEDs, temperature sensors, switches, speakers, RS-232 interfaces, LCD displays, potentiometers and additional EEPROM memory.

The demonstration and development boards can be used in teaching environments, for prototyping custom circuits and for learning about various microcontroller applications.

In addition to the PICDEM™ and dsPICDEM™ demonstration/development board series of circuits, Microchip has a line of evaluation kits and demonstration software for analog filter design, KEELOQ® security ICs, CAN, IrDA®, PowerSmart battery management, SEEVAL® evaluation system, Sigma-Delta ADC, flow rate sensing, plus many more.

Also available are starter kits that contain everything needed to experience the specified device. This usually includes a single application and debug capability, all on one board.

Check the Microchip web page (www.microchip.com) for the complete list of demonstration, development and evaluation kits.

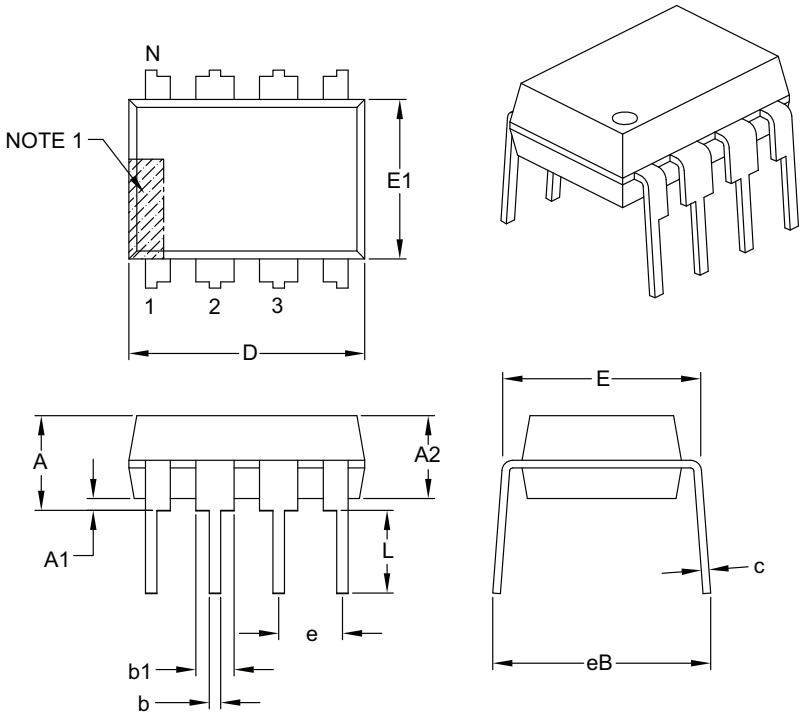
12.12 Third-Party Development Tools

Microchip also offers a great collection of tools from third-party vendors. These tools are carefully selected to offer good value and unique functionality.

- Device Programmers and Gang Programmers from companies, such as SoftLog and CCS
- Software Tools from companies, such as Gimpel and Trace Systems
- Protocol Analyzers from companies, such as Saleae and Total Phase
- Demonstration Boards from companies, such as MikroElektronika, Digilent® and Olimex
- Embedded Ethernet Solutions from companies, such as EZ Web Lynx, WIZnet and IPLogika®

8-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		.100 BSC	
Top to Seating Plane	A	–	–	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.290	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.348	.365	.400
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.040	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.430

Notes:

1. Pin 1 visual index feature may vary, but must be located with the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-018B

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NOTES:

PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, refer to the factory or the listed sales office.

PART NO.	X	/XX	XXX
Device	Temperature Range	Package	Pattern

Device:	PIC10F220 PIC10F222 PIC10F220T (Tape & Reel) PIC10F222T (Tape & Reel)	
Temperature Range:	I = -40°C to +85°C E = -40°C to +125°C	(Industrial) (Extended)
Package:	P = 300 mil PDIP (Pb-free) OT = SOT-23, 6-LD (Pb-free) MC = DFN, 8-LD 2x3 (Pb-free)	
Pattern:	Special Requirements	

Examples:

a) PIC10F220-I/P = Industrial temp., PDIP package (Pb-free)

b) PIC10F222T-E/OT = Extended temp., SOT-23 package (Pb-free), Tape and Reel

c) PIC10F222-E/MC = Extended temp., DFN package (Pb-free)