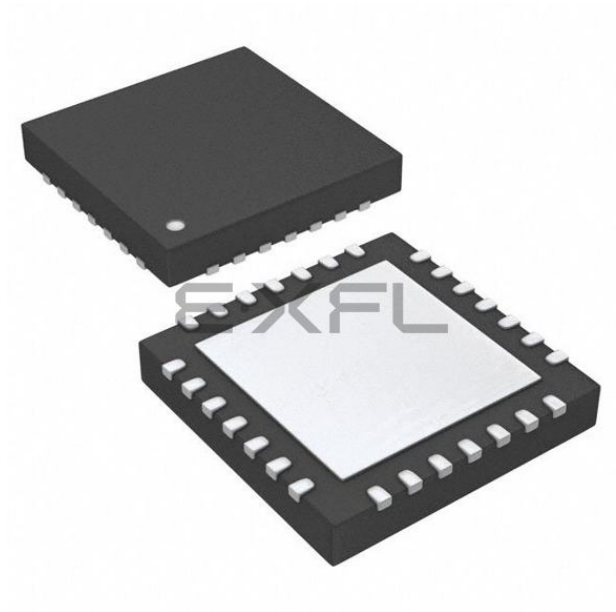

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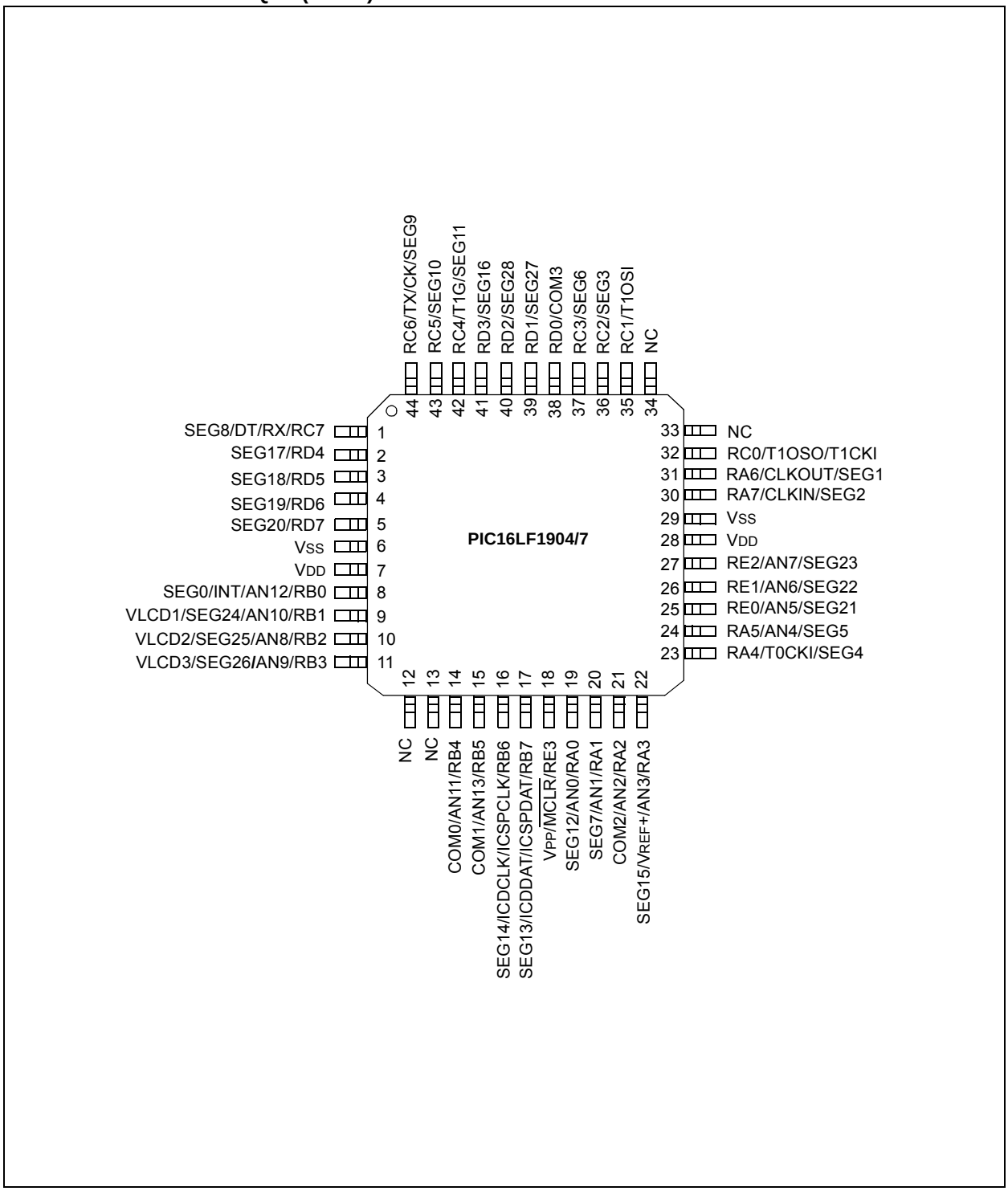
Applications of "Embedded - Microcontrollers"

Details	
Product Status	Active
Core Processor	PIC
Core Size	8-Bit
Speed	20MHz
Connectivity	LINbus, UART/USART
Peripherals	Brown-out Detect/Reset, LCD, POR, PWM, WDT
Number of I/O	25
Program Memory Size	14KB (8K x 14)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	512 x 8
Voltage - Supply (Vcc/Vdd)	1.8V ~ 3.6V
Data Converters	A/D 11x10b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 125°C (TA)
Mounting Type	Surface Mount
Package / Case	28-UFQFN Exposed Pad
Supplier Device Package	28-UQFN (4x4)
Purchase URL	https://www.e-xfl.com/product-detail/microchip-technology/pic16lf1906-e-mv

FIGURE 4: 44-PIN TQFP (10X10) PACKAGE DIAGRAM FOR PIC16LF1904/7



3.2.6 CORE FUNCTION REGISTERS SUMMARY

The Core Function registers listed in Table 3-4 can be addressed from any Bank.

TABLE 3-4: CORE FUNCTION REGISTERS SUMMARY

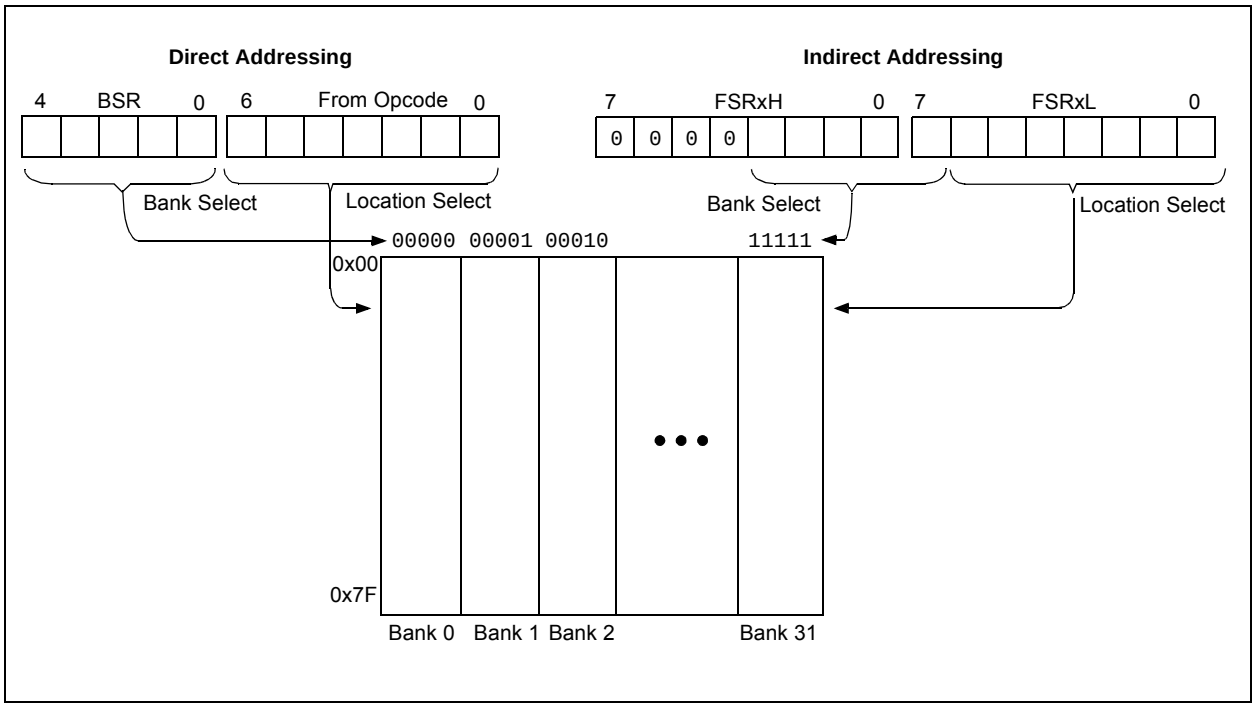
Addr	Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Value on POR, BOR	Value on all other Resets
Bank 0-31											
x00h or x80h	INDF0	Addressing this location uses contents of FSR0H/FSR0L to address data memory (not a physical register)								xxxx xxxx	uuuu uuuu
x01h or x81h	INDF1	Addressing this location uses contents of FSR1H/FSR1L to address data memory (not a physical register)								xxxx xxxx	uuuu uuuu
x02h or x82h	PCL	Program Counter (PC) Least Significant Byte								0000 0000	0000 0000
x03h or x83h	STATUS	—	—	—	$\overline{TO}$	$\overline{PD}$	Z	DC	C	---1 1000	---q quuu
x04h or x84h	FSR0L	Indirect Data Memory Address 0 Low Pointer								0000 0000	uuuu uuuu
x05h or x85h	FSR0H	Indirect Data Memory Address 0 High Pointer								0000 0000	0000 0000
x06h or x86h	FSR1L	Indirect Data Memory Address 1 Low Pointer								0000 0000	uuuu uuuu
x07h or x87h	FSR1H	Indirect Data Memory Address 1 High Pointer								0000 0000	0000 0000
x08h or x88h	BSR	—	—	—	BSR4	BSR3	BSR2	BSR1	BSR0	---0 0000	---0 0000
x09h or x89h	WREG	Working Register								0000 0000	uuuu uuuu
x0Ah or x8Ah	PCLATH	—	Write Buffer for the upper 7 bits of the Program Counter							-000 0000	-000 0000
x0Bh or x8Bh	INTCON	GIE	PEIE	TMR0IE	INTE	IOCIE	TMR0IF	INTF	IOCIF	0000 0000	0000 0000

Legend: x = unknown, u = unchanged, q = value depends on condition, - = unimplemented, read as '0', r = reserved. Shaded locations are unimplemented, read as '0'.

3.5.1 TRADITIONAL DATA MEMORY

The traditional data memory is a region from FSR address 0x000 to FSR address 0xFFF. The addresses correspond to the absolute addresses of all SFR, GPR and common registers.

FIGURE 3-10: TRADITIONAL DATA MEMORY MAP



REGISTER 4-2: CONFIGURATION WORD 2

R/P-1	R/P-1	R/P-1	R/P-1	R/P-1	U-1
LVP(1)	$\overline{\text{DEBUG}}$(3)	$\overline{\text{LPBOR}}$	BORV(2)	STVREN	—
bit 13					bit 8

U-1	U-1	U-1	U-1	U-1	U-1	R/P-1	R/P-1
—	—	—	—	—	—	WRT<1:0>	
bit 7							bit 0

Legend:		
R = Readable bit	P = Programmable bit	U = Unimplemented bit, read as '1'
'0' = Bit is cleared	'1' = Bit is set	-n = Value when blank or after Bulk Erase

bit 13 **LVP:** Low-Voltage Programming Enable bit(1)
1 = Low-voltage programming enabled
0 = High-voltage on $\overline{\text{MCLR}}$ must be used for programming

bit 12 **$\overline{\text{DEBUG}}$:** In-Circuit Debugger Mode bit(3)
1 = In-Circuit Debugger disabled, ICSPCLK and ICSPDAT are general purpose I/O pins
0 = In-Circuit Debugger enabled, ICSPCLK and ICSPDAT are dedicated to the debugger

bit 11 **$\overline{\text{LPBOR}}$:** Low-Power BOR bit
1 = Low-Power BOR is disabled
0 = Low-Power BOR is enabled

bit 10 **BORV:** Brown-out Reset Voltage Selection bit(2)
1 = Brown-out Reset voltage (V_{BOR}), low trip point selected
0 = Brown-out Reset voltage (V_{BOR}), high trip point selected

bit 9 **STVREN:** Stack Overflow/Underflow Reset Enable bit
1 = Stack Overflow or Underflow will cause a Reset
0 = Stack Overflow or Underflow will not cause a Reset

bit 8-2 **Unimplemented:** Read as '1'

bit 1-0 **WRT<1:0>:** Flash Memory Self-Write Protection bits
4 kW Flash memory (PIC16LF1904 only):
11 = Write protection off
10 = 000h to 1FFh write-protected, 200h to FFFh may be modified by PMCON control
01 = 000h to 7FFh write-protected, 800h to FFFh may be modified by PMCON control
00 = 000h to FFFh write-protected, no addresses may be modified by PMCON control
8 kW Flash memory (PIC16LF1906/7 only):
11 = Write protection off
10 = 0000h to 01FFh write-protected, 200h to 1FFFh may be modified by PMCON control
01 = 0000h to 0FFFh write-protected, 1000h to 1FFFh may be modified by PMCON control
00 = 0000h to 1FFFh write-protected, no addresses may be modified by PMCON control

Note 1: The LVP bit cannot be programmed to '0' when Programming mode is entered via LVP.
2: See V_{BOR} parameter for specific trip point voltages.
3: The $\overline{\text{DEBUG}}$ bit in Configuration Words is managed automatically by device development tools including debuggers and programmers. For normal device operation, this bit should be maintained as a '1'.

4.5 Device ID and Revision ID

The memory location 8006h is where the Device ID and Revision ID are stored. The upper nine bits hold the Device ID. The lower five bits hold the Revision ID. See **Section 10.4 "User ID, Device ID and Configuration Word Access"** for more information on accessing these memory locations.

Development tools, such as device programmers and debuggers, may be used to read the Device ID and Revision ID.

REGISTER 4-3: DEVICEID: DEVICE ID REGISTER

R	R	R	R	R	R
DEV<8:3>					
bit 13					bit 8

R	R	R	R	R	R	R	R
DEV<2:0>			REV<4:0>				
bit 7							bit 0

Legend:		
R = Readable bit	W = Writable bit	U = Unimplemented bit, read as '1'
u = Bit is unchanged	x = Bit is unknown	-n/n = Value at POR and BOR/Value at all other Resets
'1' = Bit is set	'0' = Bit is cleared	P = Programmable bit

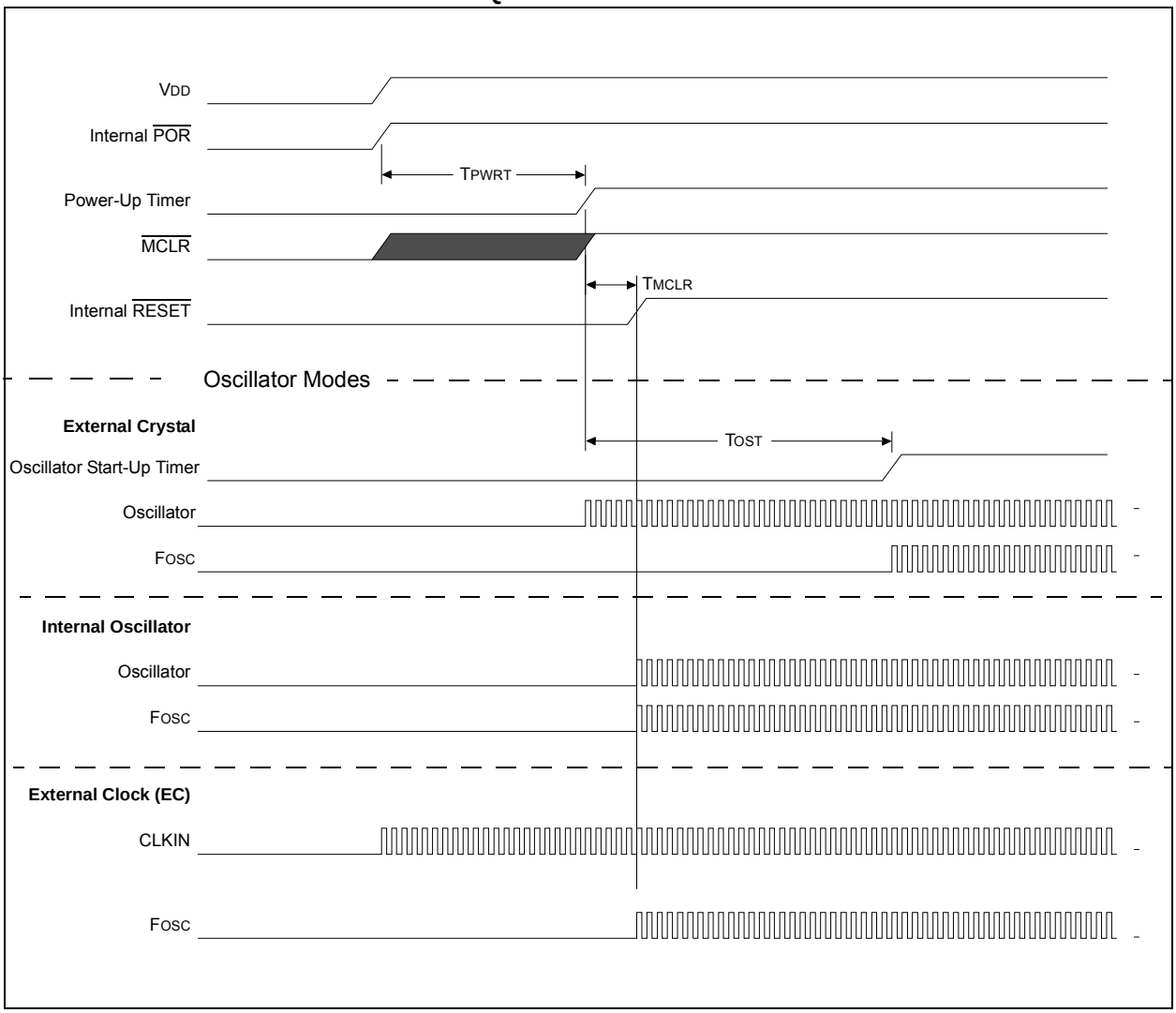
bit 13-5 **DEV<8:0>:** Device ID bits

Device	DEVICEID<13:0> Values	
	DEV<8:0>	REV<4:0>
PIC16LF1904	10 1100 100	x xxxx
PIC16LF1906	10 1100 011	x xxxx
PIC16LF1907	10 1100 010	x xxxx

bit 4-0 **REV<4:0>:** Revision ID bits

These bits are used to identify the revision (see Table under DEV<8:0> above).

FIGURE 5-3: RESET START-UP SEQUENCE



REGISTER 6-2: OSCSTAT: OSCILLATOR STATUS REGISTER

R-1/q	U-0	R-q/q	R-0/q	U-0	U-0	R-0/0	R-0/q
T1OSCR	—	OSTS	HFIOFR	—	—	LFIOFR	HFIOFS
bit 7							bit 0

Legend:		
R = Readable bit	W = Writable bit	U = Unimplemented bit, read as '0'
u = Bit is unchanged	x = Bit is unknown	-n/n = Value at POR and BOR/Value at all other Resets
'1' = Bit is set	'0' = Bit is cleared	q = Conditional

bit 7 **T1OSCR:** Timer1 Oscillator Ready bit
If T1OSCEN = 1:
1 = Timer1 oscillator is ready
0 = Timer1 oscillator is not ready
If T1OSCEN = 0:
1 = Timer1 clock source is always ready

bit 6 **Unimplemented:** Read as '0'

bit 5 **OSTS:** Oscillator Start-up Time-out Status bit
1 = Running from the external clock source (EC)
0 = Running from an internal oscillator (FOSC<1:0> = 00)

bit 4 **HFIOFR:** High-Frequency Internal Oscillator Ready bit
1 = HFINTOSC is ready
0 = HFINTOSC is not ready

bit 3-2 **Unimplemented:** Read as '0'

bit 1 **LFIOFR:** Low-Frequency Internal Oscillator Ready bit
1 = LFINTOSC is ready
0 = LFINTOSC is not ready

bit 0 **HFIOFS:** High-Frequency Internal Oscillator Stable bit
1 = HFINTOSC 16 MHz oscillator is stable and is driving the INTOSC
0 = HFINTOSC 16 MHz oscillator is not stable, the start-up oscillator is driving INTOSC

TABLE 6-2: SUMMARY OF REGISTERS ASSOCIATED WITH CLOCK SOURCES

Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Register on Page
OSCCON	—	IRCF<3:0>				—	SCS<1:0>		58
OSCSTAT	T1OSCR	—	OSTS	HFIOFR	—	—	LFIOFR	HFIOFS	59
T1CON	TMR1CS<1:0>		T1CKPS<1:0>		T1OSCEN	$\overline{\text{T1SYNC}}$	—	TMR1ON	139

Legend: — = unimplemented location, read as '0'. Shaded cells are not used by clock sources.

TABLE 6-3: SUMMARY OF CONFIGURATION WORD WITH CLOCK SOURCES

Name	Bits	Bit -/7	Bit -/6	Bit 13/5	Bit 12/4	Bit 11/3	Bit 10/2	Bit 9/1	Bit 8/0	Register on Page
CONFIG1	13:8	—	—	—	—	$\overline{\text{CLKOUTEN}}$	BOREN<1:0>		—	39
	7:0	$\overline{\text{CP}}$	MCLRE	$\overline{\text{PWRTE}}$	WDTE<1:0>		—	FOSC<1:0>		

Legend: — = unimplemented location, read as '0'. Shaded cells are not used by clock sources.

15.1.5 INTERRUPTS

The ADC module allows for the ability to generate an interrupt upon completion of an Analog-to-Digital conversion. The ADC Interrupt Flag is the ADIF bit in the PIR1 register. The ADC Interrupt Enable is the ADIE bit in the PIE1 register. The ADIF bit must be cleared in software.

Note 1:	The ADIF bit is set at the completion of every conversion, regardless of whether or not the ADC interrupt is enabled.
2:	The ADC operates during Sleep only when the FRC oscillator is selected.

This interrupt can be generated while the device is operating or while in Sleep. If the device is in Sleep, the interrupt will wake-up the device. Upon waking from Sleep, the next instruction following the SLEEP instruction is always executed. If the user is attempting to wake-up from Sleep and resume in-line code execution, the GIE and PEIE bits of the INTCON register must be disabled. If the GIE and PEIE bits of the INTCON register are enabled, execution will switch to the Interrupt Service Routine.

15.1.6 RESULT FORMATTING

The 10-bit A/D conversion result can be supplied in two formats, left justified or right justified. The ADFM bit of the ADCON1 register controls the output format.

Figure 15-3 shows the two output formats.

FIGURE 15-3: 10-BIT A/D CONVERSION RESULT FORMAT

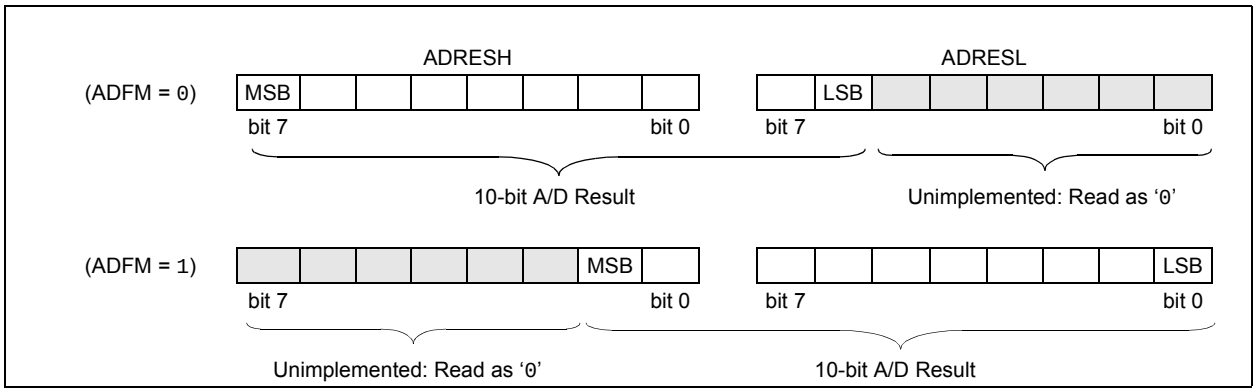


FIGURE 17-3: TIMER1 GATE ENABLE MODE

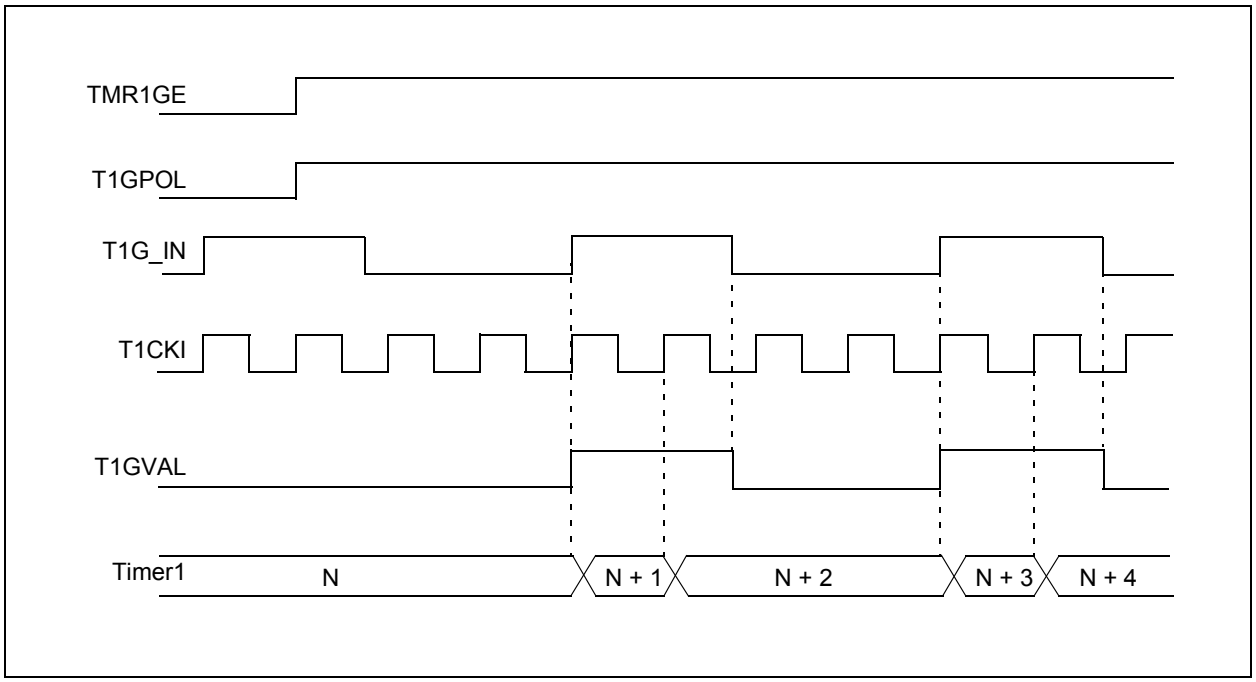


FIGURE 17-4: TIMER1 GATE TOGGLE MODE

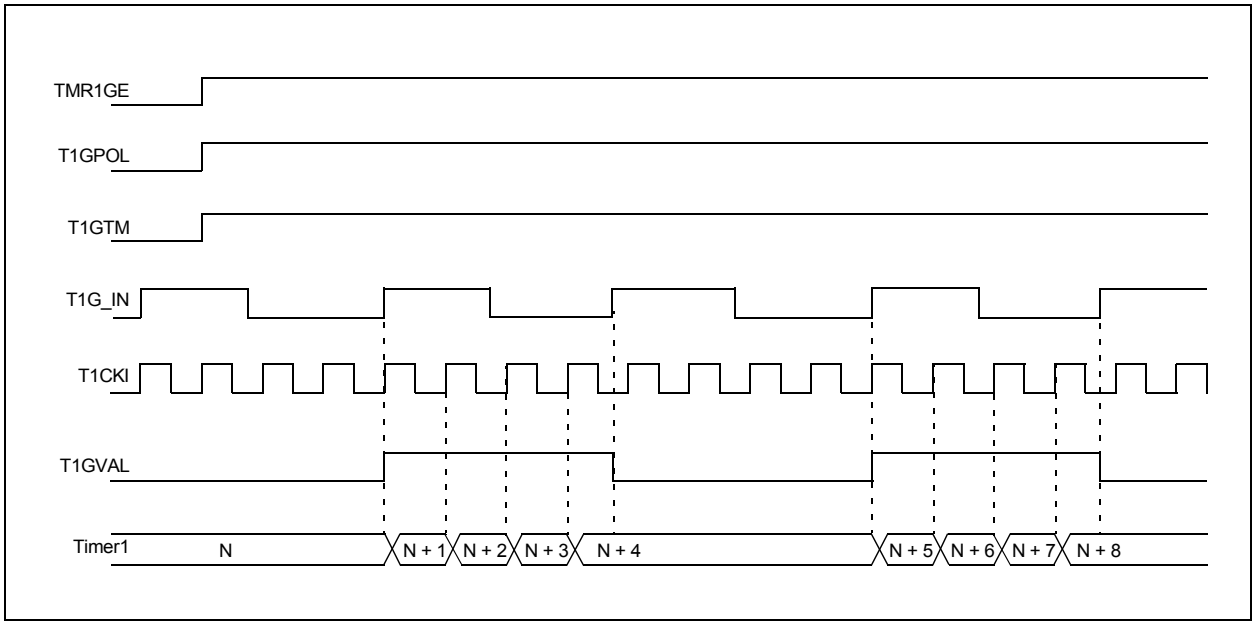
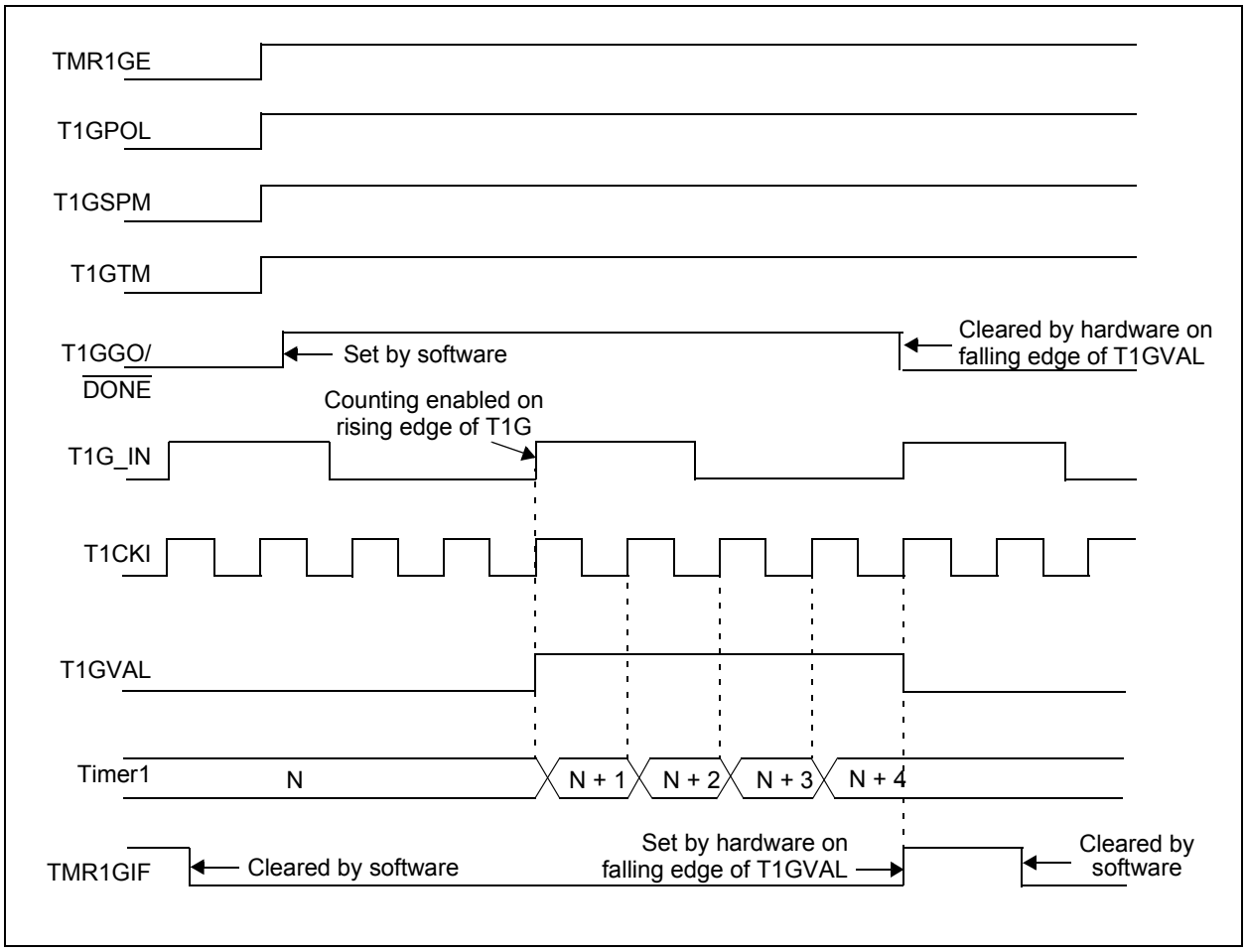


FIGURE 17-6: TIMER1 GATE SINGLE-PULSE AND TOGGLE COMBINED MODE



17.9 Timer1 Control Register

The Timer1 Control register (T1CON), shown in Register 17-1, is used to control Timer1 and select the various features of the Timer1 module.

REGISTER 17-1: T1CON: TIMER1 CONTROL REGISTER

R/W-0/u	R/W-0/u	R/W-0/u	R/W-0/u	R/W-0/u	R/W-0/u	U-0	R/W-0/u
TMR1CS<1:0>		T1CKPS<1:0>		T1OSCEN	$\overline{\text{T1SYNC}}$	—	TMR1ON
bit 7							bit 0

Legend:		
R = Readable bit	W = Writable bit	U = Unimplemented bit, read as ‘0’
u = Bit is unchanged	x = Bit is unknown	-n/n = Value at POR and BOR/Value at all other Resets
‘1’ = Bit is set	‘0’ = Bit is cleared	

bit 7-6 **TMR1CS<1:0>:** Timer1 Clock Source Select bits
- 11 = Reserved
- 10 = Timer1 clock source is pin or oscillator:
  - If T1OSCEN = 0:
  - External clock from T1CKI pin (on the rising edge)
  - If T1OSCEN = 1:
  - Crystal oscillator on T1OSI/T1OSO pins
- 01 = Timer1 clock source is system clock (FOSC)
- 00 = Timer1 clock source is instruction clock (FOSC/4)

bit 5-4 **T1CKPS<1:0>:** Timer1 Input Clock Prescale Select bits
- 11 = 1:8 Prescale value
- 10 = 1:4 Prescale value
- 01 = 1:2 Prescale value
- 00 = 1:1 Prescale value

bit 3 **T1OSCEN:** LP Oscillator Enable Control bit
- 1 = Dedicated Timer1 oscillator circuit enabled
- 0 = Dedicated Timer1 oscillator circuit disabled

bit 2 **$\overline{\text{T1SYNC}}$:** Timer1 External Clock Input Synchronization Control bit

TMR1CS<1:0> = 1X
- 1 = Do not synchronize external clock input
- 0 = Synchronize external clock input with system clock (FOSC)

TMR1CS<1:0> = 0X

This bit is ignored. Timer1 uses the internal clock when TMR1CS<1:0> = 1X.

bit 1 **Unimplemented:** Read as ‘0’

bit 0 **TMR1ON:** Timer1 On bit
- 1 = Enables Timer1
- 0 = Stops Timer1
  - Clears Timer1 gate flip-flop

TABLE 18-2: REGISTERS ASSOCIATED WITH ASYNCHRONOUS RECEPTION

Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Register on Page
BAUD1CON	ABDOVF	RCIDL	—	SCKP	BRG16	—	WUE	ABDEN	153
BAUD2CON	ABDOVF	RCIDL	—	SCKP	BRG16	—	WUE	ABDEN	153
INTCON	GIE	PEIE	TMR0IE	INTE	IOCIE	TMR0IF	INTF	IOCIF	65
PIE1	TMR1GIE	ADIE	RCIE(1)	TXIE(1)	—	—	—	TMR1IE	66
PIR1	TMR1GIF	ADIF	RCIF(1)	TXIF(1)	—	—	—	TMR1IF	68
RCREG	EUSART Receive Register								147*
RCSTA	SPEN	RX9	SREN	CREN	ADDEN	FERR	OERR	RX9D	152
SPBRGL	EUSART Baud Rate Generator, Low Byte								154*
SPBRGH	EUSART Baud Rate Generator, High Byte								154*
TRISC	TRISC7	TRISC6	TRISC5	TRISC4	TRISC3	TRISC2	TRISC1	TRISC0	101
TXSTA	CSRC	TX9	TXEN	SYNC	SENDB	BRGH	TRMT	TX9D	151

Legend: — = unimplemented locations, read as '0'. Shaded bits are not used for asynchronous reception.

* Page provides register information.

Note 1: PIC16LF1904/7 only.

REGISTER 18-2: RCSTA: RECEIVE STATUS AND CONTROL REGISTER

R/W-0	R/W-0	R/W-0	R/W-0	R/W-0	R-0	R-0	R-x
SPEN	RX9	SREN	CREN	ADDEN	FERR	OERR	RX9D
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 **SPEN:** Serial Port Enable bit
1 = Serial port enabled (configures RX/DT and TX/CK pins as serial port pins)
0 = Serial port disabled (held in Reset)

bit 6 **RX9:** 9-bit Receive Enable bit
1 = Selects 9-bit reception
0 = Selects 8-bit reception

bit 5 **SREN:** Single Receive Enable bit
Asynchronous mode:
Don't care
Synchronous mode – Master:
1 = Enables single receive
0 = Disables single receive
This bit is cleared after reception is complete.
Synchronous mode – Slave
Don't care

bit 4 **CREN:** Continuous Receive Enable bit
Asynchronous mode:
1 = Enables receiver
0 = Disables receiver
Synchronous mode:
1 = Enables continuous receive until enable bit CREN is cleared (CREN overrides SREN)
0 = Disables continuous receive

bit 3 **ADDEN:** Address Detect Enable bit
Asynchronous mode 9-bit (RX9 = 1):
1 = Enables address detection, enable interrupt and load the receive buffer when RSR<8> is set
0 = Disables address detection, all bytes are received and ninth bit can be used as parity bit
Asynchronous mode 8-bit (RX9 = 0):
Don't care

bit 2 **FERR:** Framing Error bit
1 = Framing error (can be updated by reading RCREG register and receive next valid byte)
0 = No framing error

bit 1 **OERR:** Overrun Error bit
1 = Overrun error (can be cleared by clearing bit CREN)
0 = No overrun error

bit 0 **RX9D:** Ninth bit of Received Data
This can be address/data bit or a parity bit and must be calculated by user firmware.

18.4 EUSART Baud Rate Generator (BRG)

The Baud Rate Generator (BRG) is an 8-bit or 16-bit timer that is dedicated to the support of both the asynchronous and synchronous EUSART operation. By default, the BRG operates in 8-bit mode. Setting the BRG16 bit of the BAUDCON register selects 16-bit mode.

The SPBRGH:SPBRGL register pair determines the period of the free running baud rate timer. In Asynchronous mode the multiplier of the baud rate period is determined by both the BRGH bit of the TXSTA register and the BRG16 bit of the BAUDCON register. In Synchronous mode, the BRGH bit is ignored.

Example 18-1 provides a sample calculation for determining the desired baud rate, actual baud rate, and baud rate % error.

Typical baud rates and error values for various Asynchronous modes have been computed for your convenience and are shown in Table 18-5. It may be advantageous to use the high baud rate (BRGH = 1), or the 16-bit BRG (BRG16 = 1) to reduce the baud rate error. The 16-bit BRG mode is used to achieve slow baud rates for fast oscillator frequencies.

Writing a new value to the SPBRGH, SPBRGL register pair causes the BRG timer to be reset (or cleared). This ensures that the BRG does not wait for a timer overflow before outputting the new baud rate.

If the system clock is changed during an active receive operation, a receive error or data loss may result. To avoid this problem, check the status of the RCIDL bit to make sure that the receive operation is Idle before changing the system clock.

EXAMPLE 18-1: CALCULATING BAUD RATE ERROR

For a device with FOSC of 16 MHz, desired baud rate of 9600, Asynchronous mode, 8-bit BRG:

$$Desired\ Baud\ Rate = \frac{FOSC}{64([SPBRGH:SPBRG] + 1)}$$

Solving for SPBRGH:SPBRGL:

$$SPBRGH: SPBRGL = \frac{\frac{FOSC}{Desired\ Baud\ Rate}}{64} - 1$$

$$= \frac{\frac{16000000}{9600}}{64} - 1$$

$$= [25.042] = 25$$

$$ActualBaudRate = \frac{16000000}{64(25 + 1)}$$

$$= 9615$$

$$Baud\ Rate\ \%\ Error = \frac{Calc.\ Baud\ Rate - Desired\ Baud\ Rate}{Desired\ Baud\ Rate}$$

$$= \frac{(9615 - 9600)}{9600} = 0.16\%$$

TABLE 18-3: BAUD RATE FORMULAS

Configuration Bits			BRG/EUSART Mode	Baud Rate Formula
SYNC	BRG16	BRGH		
0	0	0	8-bit/Asynchronous	FOSC/[64 (n+1)]
0	0	1	8-bit/Asynchronous	FOSC/[16 (n+1)]
0	1	0	16-bit/Asynchronous	
0	1	1	16-bit/Asynchronous	FOSC/[4 (n+1)]
1	0	x	8-bit/Synchronous	
1	1	x	16-bit/Synchronous	

Legend: x = Don't care, n = value of SPBRGH, SPBRGL register pair

18.4.4 BREAK CHARACTER SEQUENCE

The EUSART module has the capability of sending the special Break character sequences that are required by the LIN bus standard. A Break character consists of a Start bit, followed by 12 '0' bits and a Stop bit.

To send a Break character, set the SENDB and TXEN bits of the TXSTA register. The Break character transmission is then initiated by a write to the TXREG. The value of data written to TXREG will be ignored and all '0's will be transmitted.

The SENDB bit is automatically reset by hardware after the corresponding Stop bit is sent. This allows the user to preload the transmit FIFO with the next transmit byte following the Break character (typically, the Sync character in the LIN specification).

The TRMT bit of the TXSTA register indicates when the transmit operation is active or Idle, just as it does during normal transmission. See Figure 18-9 for the timing of the Break character sequence.

18.4.4.1 Break and Sync Transmit Sequence

The following sequence will start a message frame header made up of a Break, followed by an auto-baud Sync byte. This sequence is typical of a LIN bus master.

1. Configure the EUSART for the desired mode.
2. Set the TXEN and SENDB bits to enable the Break sequence.
3. Load the TXREG with a dummy character to initiate transmission (the value is ignored).
4. Write '55h' to TXREG to load the Sync character into the transmit FIFO buffer.
5. After the Break has been sent, the SENDB bit is reset by hardware and the Sync character is then transmitted.

When the TXREG becomes empty, as indicated by the TXIF, the next data byte can be written to TXREG.

18.4.5 RECEIVING A BREAK CHARACTER

The Enhanced EUSART module can receive a Break character in two ways.

The first method to detect a Break character uses the FERR bit of the RCSTA register and the Received data as indicated by RCREG. The Baud Rate Generator is assumed to have been initialized to the expected baud rate.

A Break character has been received when;

- RCIF bit is set
- FERR bit is set
- RCREG = 00h

The second method uses the Auto-Wake-up feature described in **Section 18.4.3 "Auto-Wake-up on Break"**. By enabling this feature, the EUSART will sample the next two transitions on RX/DT, cause an RCIF interrupt, and receive the next data byte followed by another interrupt.

Note that following a Break character, the user will typically want to enable the Auto-Baud Detect feature. For both methods, the user can set the ABDEN bit of the BAUDCON register before placing the EUSART in Sleep mode.

FIGURE 18-9: SEND BREAK CHARACTER SEQUENCE

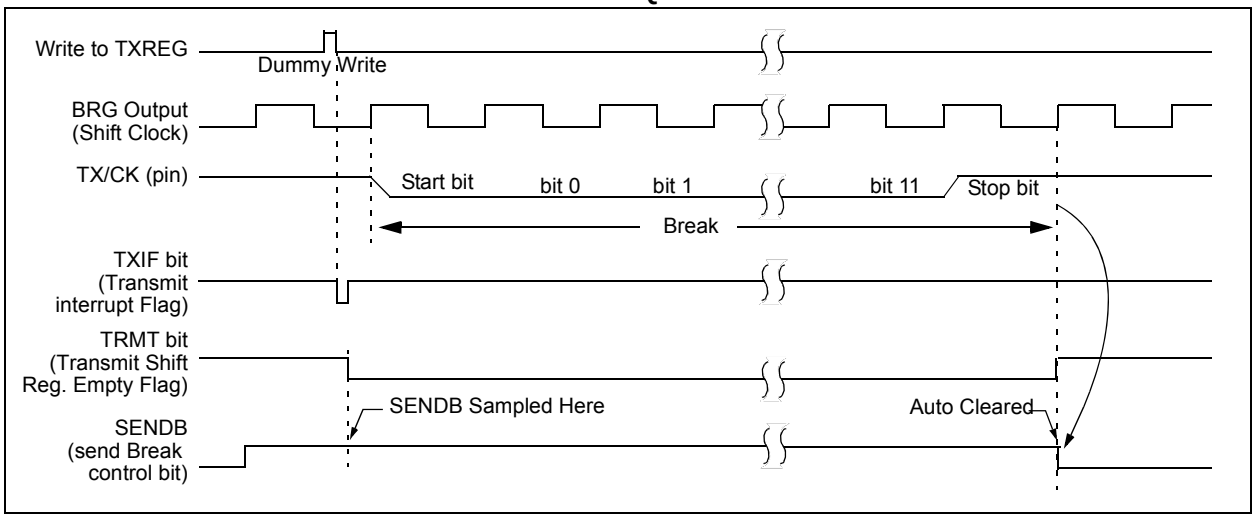


FIGURE 19-6: LCD INTERNAL REFERENCE LADDER POWER MODE SWITCHING DIAGRAM – TYPE B WAVEFORM (1/2 MUX, 1/2 BIAS DRIVE)

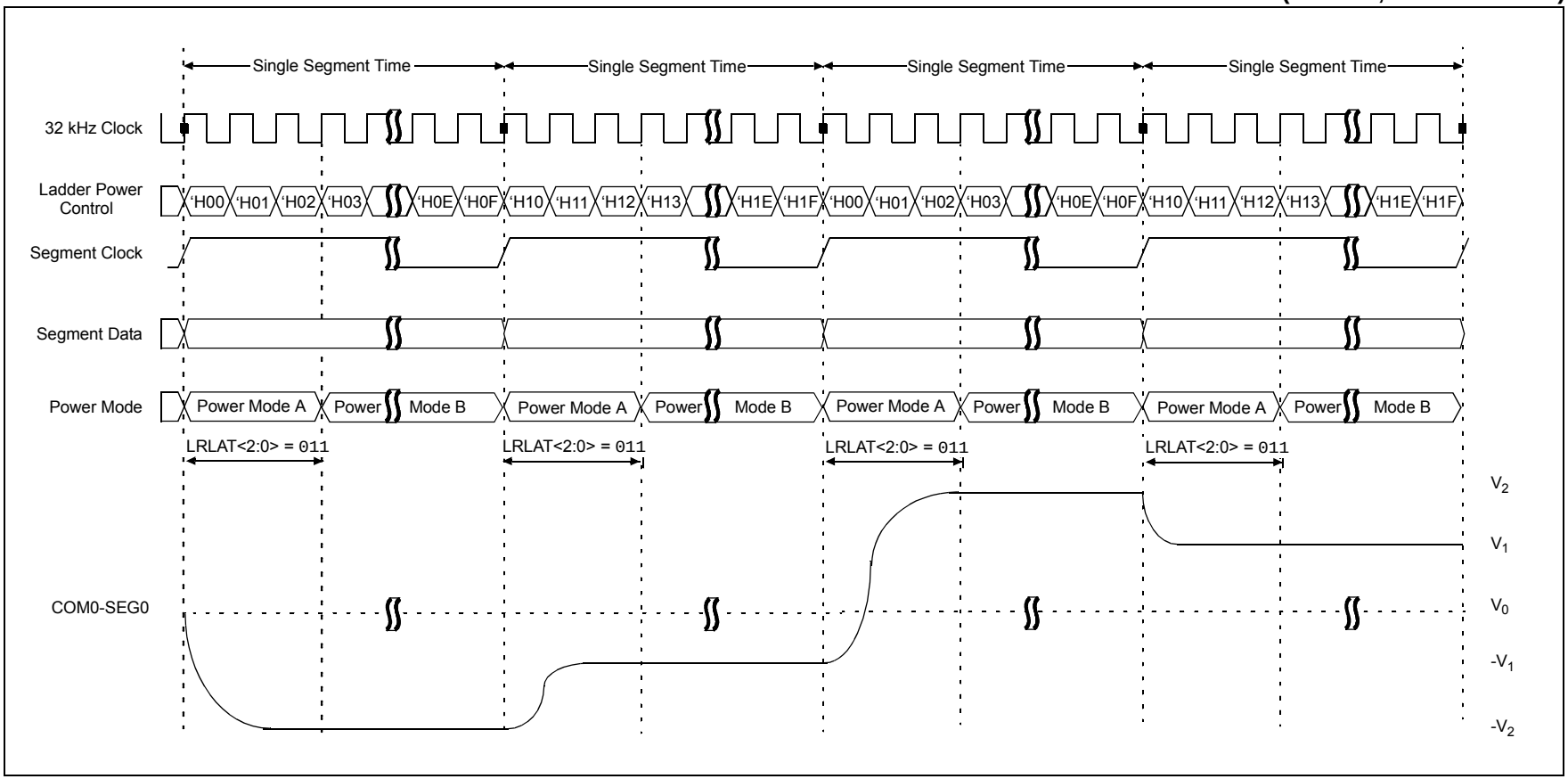


TABLE 22-3: POWER-DOWN CURRENTS (I_{PD})

PIC16LF1904/6/7		Standard Operating Conditions (unless otherwise stated)						
Param No.	Device Characteristics	Min.	Typ†	Max. +85°C	Max. +125°C	Units	Conditions	
							V_{DD}	Note
	Power-down Base Current (I_{PD})(2)							
D023		—	0.15	1.0	3.0	µA	1.8	WDT, BOR, FVR, and T1OSC disabled, all Peripherals Inactive
		—	0.16	2.0	4.0	µA	3.0	
		—	0.65	3.0	5.0	µA	3.6	
D024		—	0.27	2.0	4.0	µA	1.8	WDT Current **(Note 1)**
		—	0.56	3.0	5.0	µA	3.0	
		—	0.75	4.0	6.0	µA	3.6	
D025		—	17.5	31	35	µA	1.8	FVR current
		—	17.7	33	38	µA	3.0	
		—	17.8	35	41	µA	3.6	
D026		—	0.15	2.30	3.56	µA	3.0	LPBOR current
		—	0.21	3.40	4.70	µA	3.6	
D027		—	7.0	10	12	µA	3.0	BOR Current
		—	7.5	12	14	µA	3.6	
D028		—	0.50	2.0	4.0	µA	1.8	T1OSC Current
		—	0.60	3.0	5.0	µA	3.0	
		—	0.70	4.0	6.0	µA	3.6	
D029		—	0.40	2.0	4.0	µA	1.8	ADC Current **(Note 1, Note 3)**, no conversion in progress
		—	0.70	3.0	5.0	µA	3.0	
		—	0.90	4.0	6.0	µA	3.6	
D030		—	—	250	—	µA	1.8	ADC Current **(Note 1, Note 3)**, conversion in progress
		—	—	250	—	µA	3.0	
		—	—	250	—	µA	3.6	
D031	LCD Bias Ladder							
	Low power	—	1	2	6	µA	1.8	
	Medium Power	—	10	13	21	µA	3.0	
	High Power	—	100	111	120	µA	3.6	

* These parameters are characterized but not tested.

† Data in "Typ" column is at 3.0V, 25°C unless otherwise stated. These parameters are for design guidance only and are not tested.

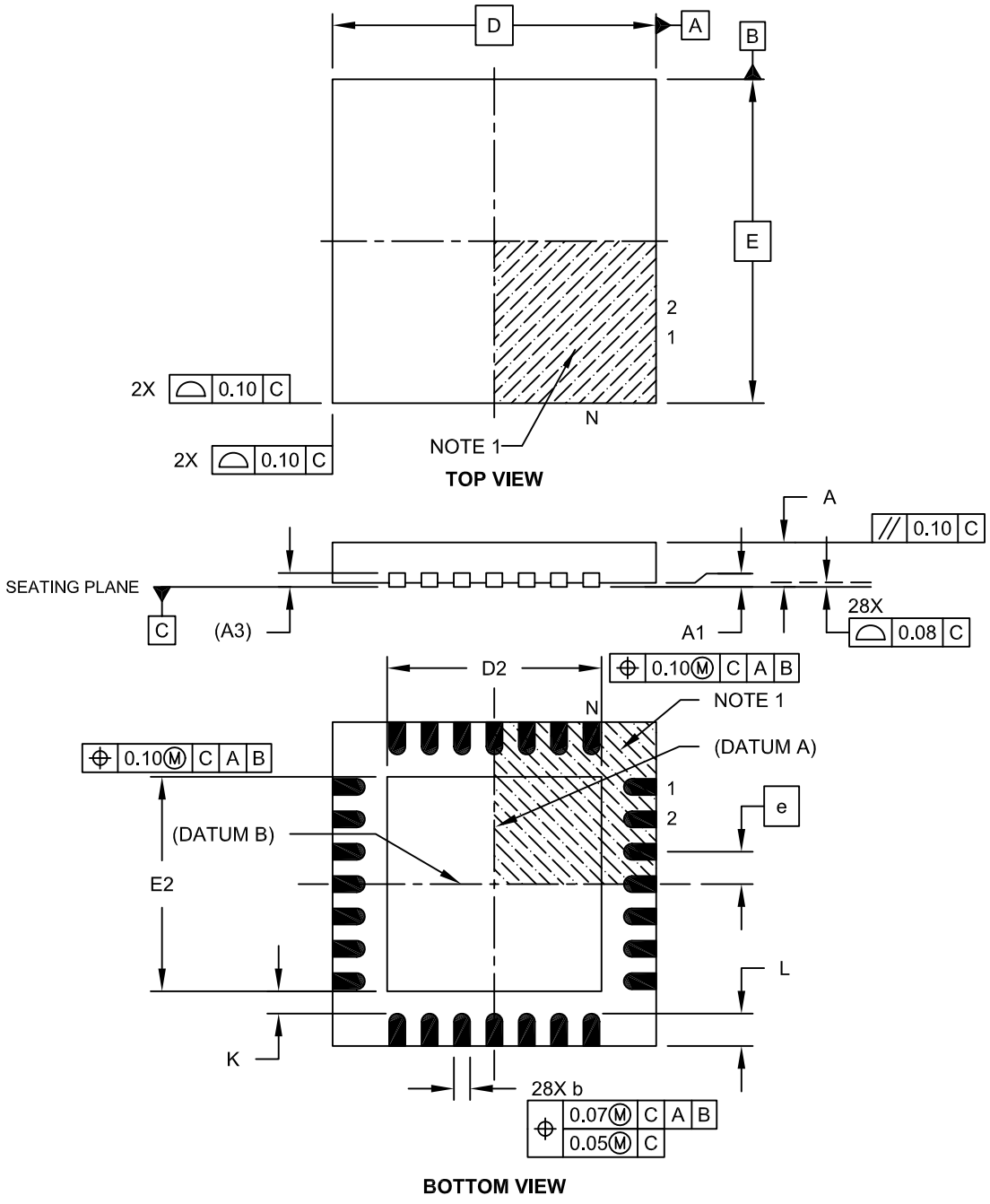
Note 1: The peripheral current is the sum of the base I_{DD} or I_{PD} and the additional current consumed when this peripheral is enabled. The peripheral Δ current can be determined by subtracting the base I_{DD} or I_{PD} current from this limit. Max values should be used when calculating total current consumption.

2: 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 V_{DD}.

3: A/D oscillator source is FRC.

28-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) – 4x4x0.5 mm Body [UQFN]

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



Microchip Technology Drawing C04-152A Sheet 1 of 2

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](1)	-	X	/XX	XXX
Device	Tape and Reel Option		Temperature Range	Package	Pattern

Device:	PIC16LF1904, PIC16LF1906, PIC16LF1907	
Tape and Reel Option:	Blank T	= Standard packaging (tube or tray) = Tape and Reel(1)
Temperature Range:	I E	= -40°C to +85°C (Industrial) = -40°C to +125°C (Extended)
Package:	MV P PT SO SS	= UQFN (4x4x0.5) = PDIP = TQFP (44-pin) = SOIC = SSOP
Pattern:	QTP, SQTP, Code or Special Requirements (blank otherwise)	

Examples:

a) PIC16LF1904T - I/MV 301
Tape and Reel,
Industrial temperature,
UQFN package,
QTP pattern #301

b) PIC16LF1906 - I/P
Industrial temperature
PDIP package

c) PIC16LF1906 - E/SS
Extended temperature,
SSOP package

Note 1: Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. Check with your Microchip Sales Office for package availability with the Tape and Reel option.

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