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What is "Embedded - Microcontrollers"?

"Embedded - Microcontrollers" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

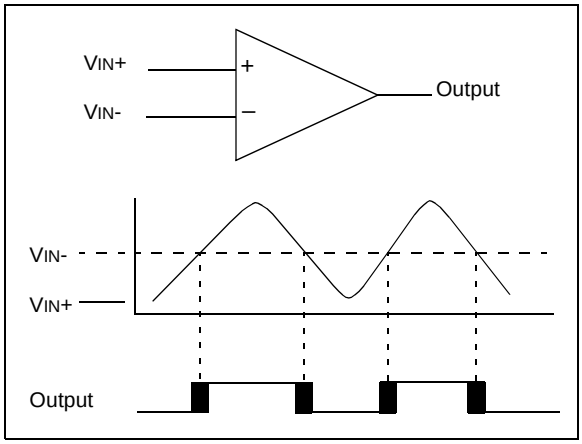
Applications of "Embedded - Microcontrollers"

Details	
Product Status	Obsolete
Core Processor	PIC
Core Size	8-Bit
Speed	48MHz
Connectivity	EBI/EMI, I²C, SPI, UART/USART, USB
Peripherals	Brown-out Detect/Reset, LVD, POR, PWM, WDT
Number of I/O	65
Program Memory Size	32KB (16K x 16)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	3.8K x 8
Voltage - Supply (Vcc/Vdd)	2V ~ 3.6V
Data Converters	A/D 12x10b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	80-TQFP
Supplier Device Package	80-TQFP (12x12)
Purchase URL	https://www.e-xfl.com/product-detail/microchip-technology/pic18f85j50t-i-pt

23.2 Comparator Operation

A single comparator is shown in Figure 23-2, along with the relationship between the analog input levels and the digital output. When the analog input at VIN+ is less than the analog input VIN-, the output of the comparator is a digital low level. When the analog input at VIN+ is greater than the analog input VIN-, the output of the comparator is a digital high level. The shaded areas of the output of the comparator in Figure 23-2 represent the uncertainty due to input offsets and response time.

FIGURE 23-2: SINGLE COMPARATOR



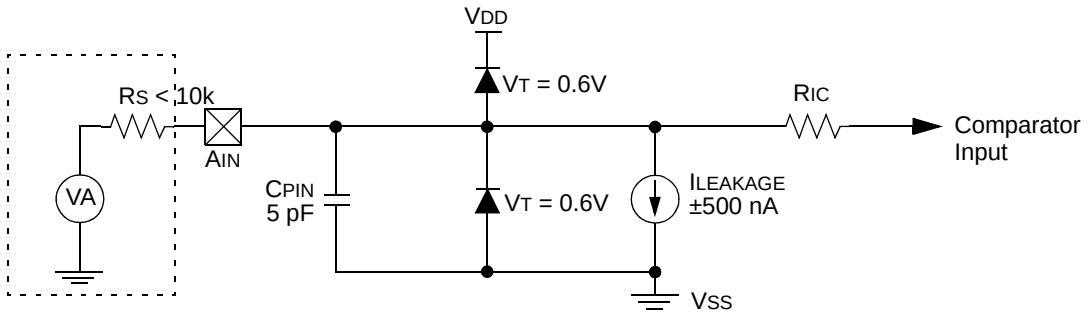
23.3 Comparator Response Time

Response time is the minimum time, after selecting a new reference voltage or input source, before the comparator output has a valid level. The response time of the comparator differs from the settling time of the voltage reference. Therefore, both of these times must be considered when determining the total response to a comparator input change. Otherwise, the maximum delay of the comparators should be used (see **Section 28.0 "Electrical Characteristics"**).

23.4 Analog Input Connection Considerations

A simplified circuit for an analog input is shown in Figure 23-3. Since the analog pins are connected to a digital output, they have reverse biased diodes to VDD and VSS. The analog input, therefore, must be between VSS and VDD. If the input voltage deviates from this range by more than 0.6V in either direction, one of the diodes is forward biased and a latch-up condition may occur. A maximum source impedance of 10 k : is recommended for the analog sources. Any external component connected to an analog input pin, such as a capacitor or a Zener diode, should have very little leakage current.

FIGURE 23-3: COMPARATOR ANALOG INPUT MODEL



Legend:
CPIN = Input Capacitance
VT = Threshold Voltage
ILEAKAGE = Leakage Current at the pin due to various junctions
RIC = Interconnect Resistance
RS = Source Impedance
VA = Analog Voltage

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TABLE 28-29: A/D CONVERSION REQUIREMENTS

Param No.	Symbol	Characteristic	Min	Max	Units	Conditions
130	TAD	A/D Clock Period	0.7	25.0(1)	Ps	TOSC based, VREF t 3.0V
			—	1	Ps	A/D RC mode
131	TCNV	Conversion Time (not including acquisition time)(2)	11	12	TAD	
132	TACQ	Acquisition Time(3)	1.4	—	Ps	-40 qC to +85 qC
135	TSWC	Switching Time from Convert o Sample	—	**(Note 4)**		
137	TDIS	Discharge Time	0.2	—	Ps	

Note 1: The time of the A/D clock period is dependent on the device frequency and the TAD clock divider.

2: ADRES registers may be read on the following TCY cycle.

3: The time for the holding capacitor to acquire the “New” input voltage when the voltage changes full scale after the conversion (VDD to VSS or VSS to VDD). The source impedance (RS) on the input channels is 50 :.

4: On the following cycle of the device clock.

RETLW 396
RETURN 397
RLCF 397
RLNCF 398
RRCF 398
RRNCF 399
SETF 399
SETF (Indexed Literal Offset Mode) 413
SLEEP 400
Standard Instructions 365
SUBFWB 400
SUBLW 401
SUBWF 401
SUBWFB 402
SWAPF 402
TBLRD 403
TBLWT 404
TSTFSZ 405
XORLW 405
XORWF 406
INTCON Register
RBIF Bit 143
INTCON Registers 123
Inter-Integrated Circuit. *See* I^2C.
Internal Oscillator Block 38
Adjustment 39
OSCTUNE Register 39
Internal RC Oscillator
Use with WDT 358
Internal Voltage Reference Specifications 433
Internet Address 477
Interrupt Sources 349
A/D Conversion Complete 305
Capture Complete (CCP) 211
Compare Complete (CCP) 212
Interrupt-on-Change (RB7:RB4) 143
TMR0 Overflow 193
TMR1 Overflow 195
TMR2 to PR2 Match (PWM) 221
TMR3 Overflow 203, 205
TMR4 to PR4 Match 208
TMR4 to PR4 Match (PWM) 207
Interrupts 121
During, Context Saving 136
INTx Pin 136
PORTB, Interrupt-on-Change 136
TMR0 136
Interrupts, Flag Bits
Interrupt-on-Change (RB7:RB4) Flag (RBIF Bit) 143
INTOSC Frequency Drift 39
INTOSC, INTRC. *See* Internal Oscillator Block.
IORLW 388
IORWF 388
IPR Registers 132

L

LFSR 389

M

Master Clear ($\overline{MCLR}$) 57
Master Synchronous Serial Port (MSSP). *See* MSSP.
Memory Organization 69
Data Memory 78
Program Memory 69
Memory Programming Requirements 432
Microchip Internet Web Site 477
MOVF 389
MOVFF 390
MOVLB 390
MOVLW 391
MOVSF 409
MOVSS 410
MOVWF 391
MPLAB ASM30 Assembler, Linker, Librarian 416
MPLAB ICD 2 In-Circuit Debugger 417
MPLAB ICE 2000 High-Performance Universal In-Circuit Emulator 417
MPLAB Integrated Development Environment Software . 415
MPLAB PM3 Device Programmer 417
MPLAB REAL ICE In-Circuit Emulator System 417
MPLINK Object Linker/MPLIB Object Librarian 416
MSSP
$\overline{ACK}$ Pulse 248, 251
I^2C Mode. *See* I^2C Mode.
Module Overview 233
SPI Master/Slave Connection 237
TMR4 Output for Clock Shift 208
MULLW 392
MULWF 392

N

NEGF 393
NOP 393

O

Oscillator Configuration 35
Internal Oscillator Block 38
Oscillator Control 35
Oscillator Modes and USB Operation 36
Oscillator Selection 349
Oscillator Settings for USB 40
Oscillator Start-up Timer (OST) 46
Oscillator Switching 42
Oscillator Transitions 43
Oscillator, Timer1 ..... 195, 205
Oscillator, Timer3 203

P

Packaging 459
Details 460
Marking 459
Parallel Master Port (PMP) 167
Application Examples 188
Associated Registers 190
Master Port Modes 180
Module Registers 168
Slave Port Modes 175
PICSTART Plus Development Programmer 418
PIE Registers 129
Pin Functions
AV_{DD} 21
AV_{DD} 34
AV_{SS} 21
AV_{SS} 34
$\underline{ENVREG}$ 21, 34
$\overline{MCLR}$ 14, 22
OSC1/CLKI/RA7 ..... 14, 22
OSC2/CLKO/RA6 ..... 14, 22
RA0/AN0 ..... 15, 23
RA1/AN1 ..... 15, 23
RA2/AN2/V_{REF-} 15, 23
RA3/AN3/V_{REF+} 15, 23