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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	Active
Core Processor	PIC
Core Size	8-Bit
Speed	20MHz
Connectivity	-
Peripherals	Brown-out Detect/Reset, POR, WDT
Number of I/O	17
Program Memory Size	1.5KB (1K x 12)
Program Memory Type	FLASH
EEPROM Size	64 x 8
RAM Size	68 x 8
Voltage - Supply (Vcc/Vdd)	2V ~ 5.5V
Data Converters	A/D 8x8b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	20-SSOP (0.209", 5.30mm Width)
Supplier Device Package	20-SSOP
Purchase URL	https://www.e-xfl.com/product-detail/microchip-technology/pic16f527t-i-ss

PIC16F527

20-Pin, 8-Bit ‘Enhanced Baseline’ Microcontroller Product Brief

Description:

This document describes the ‘Enhanced Baseline’ device with Flash program memory self-write capability, interrupts and op amps.

Processor Features:

- Interrupt Capability
- PIC16F527 Operating Speed:
  - DC – 20 MHz Crystal oscillator
  - DC – 200 ns Instruction cycle
- High Endurance Program and Flash Data Memory Cells:
  - 1024 x 12 user execution memory
  - 64 x 8 self-writable data memory
  - 100,000 write program memory endurance
  - 1,000,000 write Flash data memory endurance
  - Program and Flash data retention: >40 years
- General Purpose Registers (SRAM):
  - 68 x 8 for PIC16F527
- Only 36 Single-Word Instructions to Learn:
  - Added `RETURN` and `RETFIE` instructions
  - Added `MOVLB` instruction
- All Instructions are Single-Cycle except for Program Branches which are Two-Cycle
- Four-Level Deep Hardware Stack
- Direct, Indirect and Relative Addressing modes for Data and Instructions

Peripheral Features:

- Device Features:
  - 1 Input-only pin
  - 17 I/Os
  - Individual direction control
  - High-current source/sink
- 8-Bit Real-Time Clock/Counter (TMR0) with 8-Bit Programmable Prescaler
- In-Circuit Serial Programming™ (ICSP™) via Two External Pin Connections
- Analog Comparators (CMP):
  - Two analog comparators
  - Absolute and programmable references
- Analog-to-Digital Converter (ADC):
  - 8-bit resolution
  - 8 external input channels
  - 1 internal channel to convert comparator
  - 0.6V reference input
- Operational Amplifiers (op amps):
  - 2 operational amplifiers
  - Fully-accessible visibility

Microcontroller Features:

- Brown-out Reset (BOR)
- Power-on Reset (POR)
- Device Reset Timer (DRT)
- Watchdog Timer (WDT) with a Dedicated RC Oscillator
- Programmable Code Protection (CP)
- Power-Saving Sleep mode with Wake-up on Change Feature
- Selectable Oscillator Options:
  - INTOSC: Precision 4 or 8 MHz internal oscillator
  - EXTRC: Low-cost external RC oscillator
  - LP: Power-saving, low-frequency crystal
  - XT: Standard crystal/resonator
  - HS: High-speed crystal/resonator
  - EC: High-speed external clock
- Variety of Packaging Options:
  - 20-Lead PDIP, SOIC, SSOP, QFN

CMOS Technology:

- Low-Power, High-Speed CMOS Flash Technology
- Fully-Static Design
- Wide Operating Voltage and Temperature Range:
  - Industrial: 2.0V to 5.5V
  - Extended: 2.0V to 5.5V
- Operating Current:
  - 170 uA @ 2V, 4 MHz, typical
  - -15 uA @ 2V, 32 kHz, typical
- Standby Current:
  - 100 nA @ 2V, typical

PIC16F527 Family Types

Device	Pins	Flash	Data EE (B)*	RAM (B)	8-Bit ADC Channels	Op Amp	Comparator	8-Bit Timers	BOR	Stack Levels	Interrupts	8 MHz Int. Osc.
PIC16F527	20	1KW	64	68	8	2	2	1	Y	4	Y	Y

* 64 bytes of Flash data memory

FIGURE 1: 20-PIN PDIP, SOIC, SSOP DIAGRAM FOR PIC16F527

20-pin PDIP, SSOP, SOIC

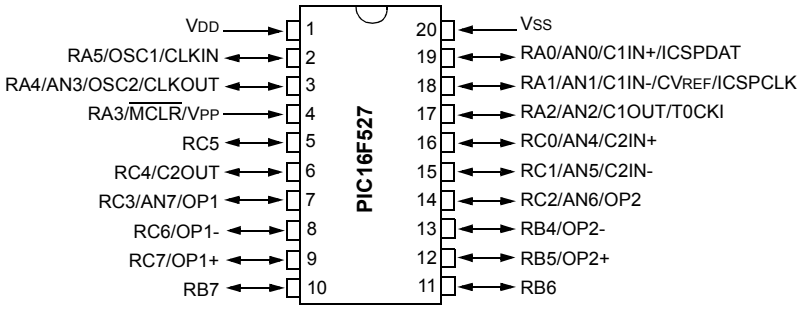

FIGURE 2: 20-PIN QFN DIAGRAM FOR PIC16F527

20-pin QFN

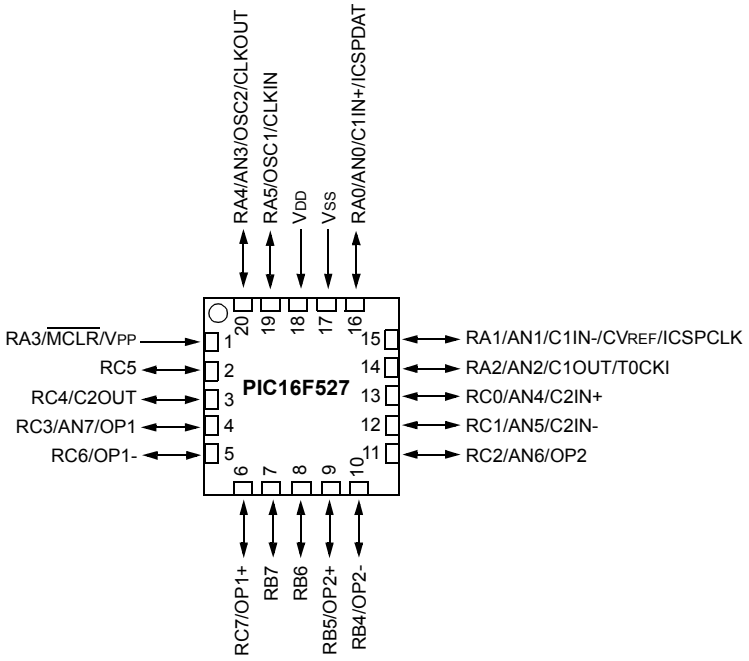

TABLE 1: PIC16F527 PIN SUMMARY

I/O	20-Pin PDIP/SOIC/SSOP	20-Pin QFN	Analog	Oscillator	Comparator	Reference	Timers	Op Amp	Clock Reference	ICSP™	Basic	Pull-up	Interrupt-on-Change
RA0	19	16	AN0	—	C1IN+	—	—	—	—	ICSPDAT	—	Y	Y
RA1	18	15	AN1	—	C1IN-	CV_{REF}	—	—	—	ICSPCLK	—	Y	Y
RA2	17	14	AN2	—	C1OUT	—	T0CKI	—	—	—	—	Y	Y
RA3	4	1	—	—	—	—	—	—	—	—	$\overline{MCLR}$ V_{PP}	Y	Y
RA4	3	20	AN3	OSC2	—	—	—	—	CLKOUT	—	—	Y	Y
RA5	2	19	—	OSC1	—	—	—	—	CLKIN	—	—	Y	Y
RB4	13	10	—	—	—	—	—	OP2-	—	—	—	—	—
RB5	12	9	—	—	—	—	—	OP2+	—	—	—	—	—
RB6	11	8	—	—	—	—	—	—	—	—	—	—	—
RB7	10	7	—	—	—	—	—	—	—	—	—	—	—
RC0	16	13	AN4	—	C2IN+	—	—	—	—	—	—	—	—
RC1	15	12	AN5	—	C2IN-	—	—	—	—	—	—	—	—
RC2	14	11	AN6	—	—	—	—	OP2	—	—	—	—	—
RC3	7	4	AN7	—	—	—	—	OP1	—	—	—	—	—
RC4	6	3	—	—	C2OUT	—	—	—	—	—	—	—	—
RC5	5	2	—	—	—	—	—	—	—	—	—	—	—
RC6	8	5	—	—	—	—	—	OP1-	—	—	—	—	—
RC7	9	6	—	—	—	—	—	OP1+	—	—	—	—	—
V_{DD}	1	18	—	—	—	—	—	—	—	—	—	—	—
V_{SS}	20	17	—	—	—	—	—	—	—	—	—	—	—

APPENDIX A: REVISION HISTORY

Revision A (06/2012)

Initial release of this document.

Revision B (11/2012)

Updated the Processor Features section; Added note to the Family Types table; Other minor corrections.

Note the following details of the code protection feature on Microchip devices:

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