

## 20-Pin 8-Bit CMOS Flash Microcontroller Product Brief

### High-Performance RISC CPU:

- Only 35 Instructions to Learn:
  - All single-cycle instructions except branches
- Operating Speed:
  - DC – 16 MHz oscillator/clock input
  - DC – 250 ns instruction cycle
- Up to 4K x 14 Words of Flash Program Memory
- Up to 256 bytes of Data Memory (RAM)
- Interrupt Capability
- 8-Level Deep Hardware Stack
- Direct, Indirect and Relative Addressing modes
- Processor Self-Write/Read access to Program Memory

### Special Microcontroller Features:

- Precision Internal Oscillator:
  - 16 MHz or 500 kHz operation
  - Factory calibrated to  $\pm 1\%$ , typical
  - Software tunable
  - Software selectable  $\div 1$ ,  $\div 2$ ,  $\div 4$  or  $\div 8$  divider
- Power-Saving Sleep mode
- Industrial and Extended Temperature Range
- Power-on Reset (POR)
- Power-up Timer (PWRT)
- Brown-out Reset (BOR)
- Multiplexed Master Clear with Pull-up/Input Pin
- Programmable Code Protection
- In-Circuit Serial Programming™ (ICSP™) via Two Pins
- High-Endurance Flash Cell:
  - 10,000 write Flash endurance (typical)
  - Flash retention: > 40 years
- Wide Operating Voltage Range:
  - 1.8V to 5.5V (PIC16F720/721)
  - 1.8V to 3.6V (PIC16LF720/721)

### Low-Power Features:

- Standby Current:
  - 50 nA @ 1.8V, typical
- Operating Current:
  - 100  $\mu$ A @ 1 MHz, 1.8V, typical
- Low-Power Watchdog Timer Current:
  - 500nA @ 1.8V, typical

### Peripheral Features:

- Up to 17 I/O Pins and 1 Input-only Pin:
  - High-current source/sink for direct LED drive
  - Interrupt-on-pin change
  - Individually programmable weak pull-ups
- A/D Converter:
  - 8-bit resolution
  - 12 channels
  - Selectable Voltage reference
- Timer0: 8-Bit Timer/Counter with 8-Bit Programmable Prescaler
- Enhanced Timer1
  - 16-bit timer/counter with prescaler
  - External Gate Input mode with toggle and single shot modes
  - Interrupt-on-gate completion
- Timer2: 8-Bit Timer/Counter with 8-Bit Period Register, Prescaler and Postscaler
- Capture, Compare, PWM module (CCP)
  - 16-bit Capture, max resolution 12.5 ns
  - 16-bit Compare, max resolution 250 ns
  - 10-bit PWM, max frequency 15 kHz
- Addressable Universal Synchronous Asynchronous Receiver Transmitter (AUSART)
- Synchronous Serial Port (SSP)
  - SPI (Master/Slave)
  - I<sup>2</sup>C™ (Slave) with Address Mask

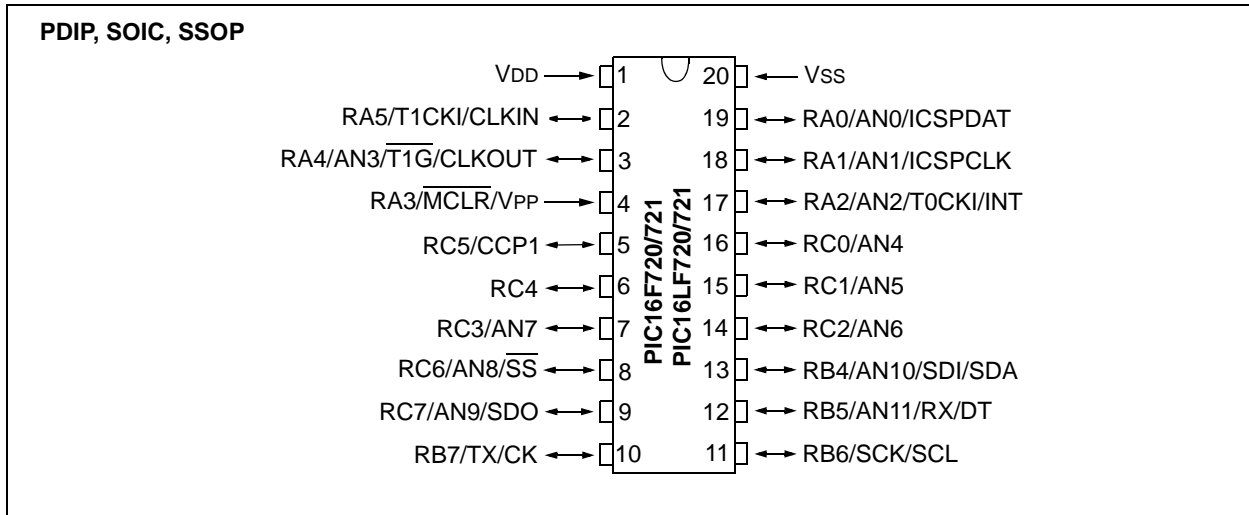
**TABLE 1: PIC16F720/721 AND PIC16LF720/721 FAMILY TYPES**

Device	Program Memory Flash (words)	SRAM (bytes)	I/O	Timers 8/16-bit	8-bit A/D (ch)	AUSART	CCP	SSP
PIC16F720	2048	128	18	2/1	12	Yes	1	1
PIC16F721	4096	256	18	2/1	12	Yes	1	1
PIC16LF720	2048	128	18	2/1	12	Yes	1	1
PIC16LF721	4096	256	18	2/1	12	Yes	1	1

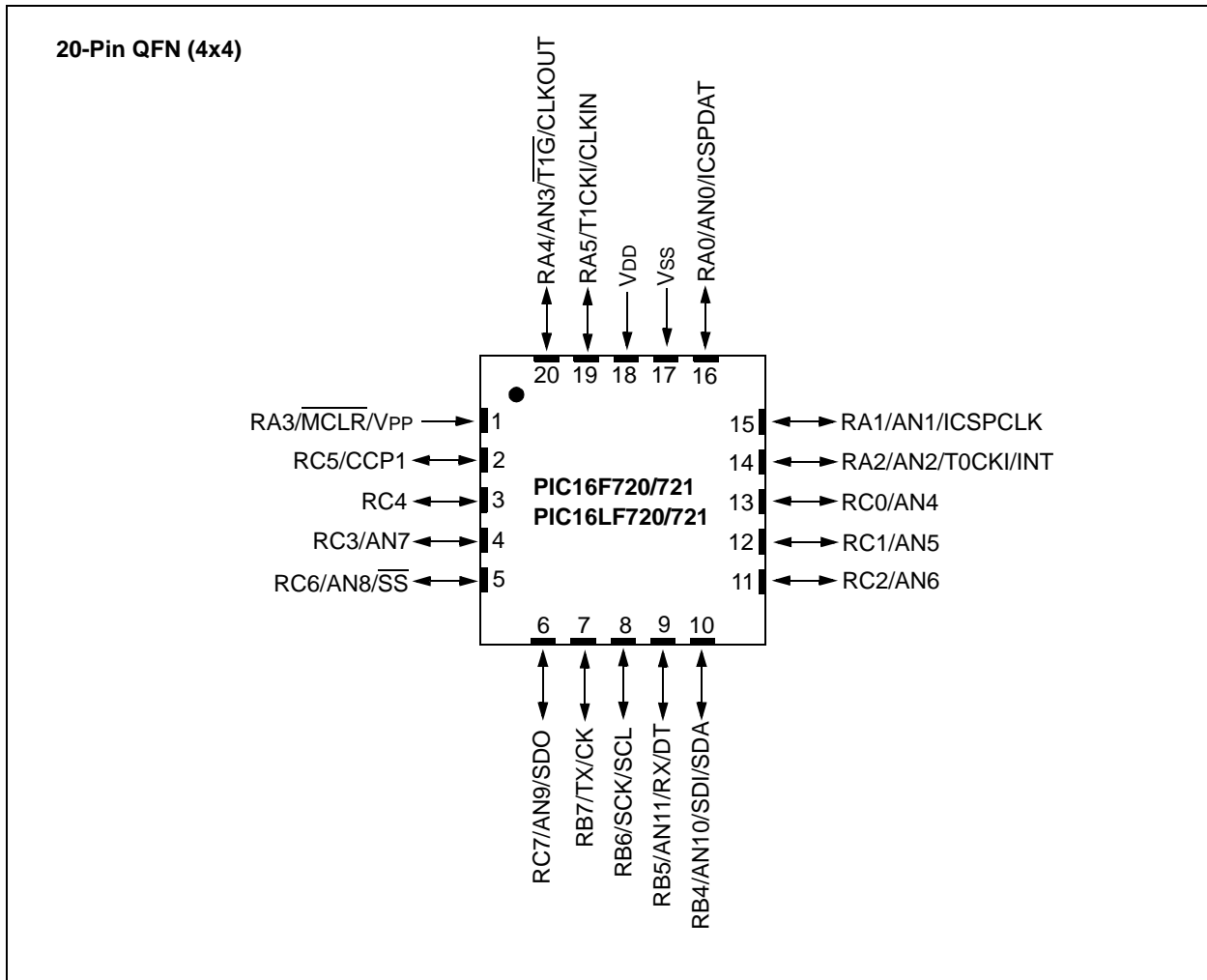
# PIC16F720/721

**Note:** Pin details are subject to change.

**FIGURE 1: 20-PIN DIAGRAM FOR PIC16F720/721 AND PIC16LF720/721**



**FIGURE 2: 20-PIN DIAGRAM FOR PIC16F720/721 AND PIC16LF720/721**



**TABLE 2: 20-PIN ALLOCATION TABLE (PIC16F720/721 AND PIC16LF720/721)**

I/O	20-Pin DIP/SOIC/ SSOP	20-Pin QFN	A/D	Timers	CCP	AUSART	SSP	Interrupt	Pull-up	Basic
RA0	19	16	AN0	—	—	—	—	IOC	Y	ICSPDAT/ ICDDAT
RA1	18	15	AN1	—	—	—	—	IOC	Y	ICSPCLK/ ICDCLK
RA2	17	14	AN2	T0CKI	—	—	—	INT/IOC	—	—
RA3	4	1	—	—	—	—	—	IOC	Y	MCLR/VPP
RA4	3	20	AN3	T1G	—	—	—	IOC	Y	CLKOUT
RA5	2	19	—	T1CKI	—	—	—	IOC	Y	CLKIN
RB4	13	10	AN10	—	—	—	SDI/SDA	IOC	Y	—
RB5	12	9	AN11	—	—	RX/DT	—	IOC	Y	—
RB6	11	8	—	—	—	—	SCK/SCL	IOC	Y	—
RB7	10	7	—	—	—	TX/CK	—	IOC	Y	—
RC0	16	13	AN4	—	—	—	—	—	—	—
RC1	15	12	AN5	—	—	—	—	—	—	—
RC2	14	11	AN6	—	—	—	—	—	—	—
RC3	7	4	AN7	—	—	—	—	—	—	—
RC4	6	3	—	—	—	—	—	—	—	—
RC5	5	2	—	—	CCP1	—	—	—	—	—
RC6	8	5	AN8	—	—	—	SS	—	—	—
RC7	9	6	AN9	—	—	—	SDO	—	—	—
VDD	1	18	—	—	—	—	—	—	—	VDD
VSS	20	17	—	—	—	—	—	—	—	VSS

# PIC16F720/721

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NOTES:

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