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 ±1%, typical
  - Software tunable
  - Software selectable ÷1, ÷2, ÷4 or ÷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 μA @ 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 postscale
- 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)
  - \(!\text{C}^\text{TM}\) (Slave) with address mask

<table>
<thead>
<tr>
<th>Device</th>
<th>Program Memory</th>
<th>SRAM</th>
<th>I/O</th>
<th>Timers 8/16-bit</th>
<th>8-bit A/D Channel</th>
<th>AUSART</th>
<th>CCP</th>
<th>SSP</th>
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<td>128</td>
<td>18</td>
<td>2/1</td>
<td>12</td>
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<td>1</td>
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<td>18</td>
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<td>18</td>
<td>2/1</td>
<td>12</td>
<td>Yes</td>
<td>1</td>
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</table>
FIGURE 1: 20-PIN DIAGRAM FOR PIC16F720/721 AND PIC16LF720/721

PDIP, SOIC, SSOP

VDD → [1] 20 → VSS
RA5/T1CKI/CLKIN → [2] 19 → RA0/AN0/ICSPDAT
RC5/CCP1 → [5] 16 → RC0/AN4
RC4 → [6] 15 → RC1/AN5

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

20-Pin QFN (4x4)

RA4/AN3/T2/CLKOUT → VDD → VSS → RA0/AN0/ICSPDAT
RA5/T1CKI/CLKIN → RA1/AN1/ICSPCLK
RA3/MCLR/VPP → RA2/AN2/T0CKI/INT
RC5/CCP1 → RC0/AN4
RC4 → RC1/AN5
RC3/AN7 → RC2/AN6
RC6/AN8/SS → RB5/AN11/RX/DT
RC7/AN9/SDO → RB6/SCK/SCL
RB7/TX/CK → RB4/AN10/SDI/SDA
## TABLE 2: 20-PIN ALLOCATION TABLE (PIC16F720/721 AND PIC16LF720/721)

<table>
<thead>
<tr>
<th>IO</th>
<th>20-Pin DIP/SOIC/SSOP</th>
<th>20-Pin QFN</th>
<th>A/D</th>
<th>Timers</th>
<th>CCP</th>
<th>AUSART</th>
<th>SSP</th>
<th>Interrupt</th>
<th>Pull-up</th>
<th>Basic</th>
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<tr>
<td>RA0</td>
<td>19 16</td>
<td>AN0</td>
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<td>—</td>
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<td>—</td>
<td>—</td>
<td>IOC</td>
<td>Y</td>
<td>ICSPDAT/ICDDAT</td>
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<tr>
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<td>18 15</td>
<td>AN1</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>IOC</td>
<td>Y</td>
<td>ICSPCLK/ICDCLK</td>
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<tr>
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<td>17 14</td>
<td>AN2 T0CKI</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>INT/IOC</td>
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<tr>
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<td>4 1</td>
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<td>—</td>
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<td>—</td>
<td>—</td>
<td>IOC</td>
<td>Y</td>
<td>MCLR/VPP</td>
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<tr>
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<td>AN3 T1G</td>
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<td>—</td>
<td>—</td>
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<td>—</td>
<td>IOC</td>
<td>Y</td>
<td>CLKOUT</td>
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<tr>
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<td>2 19</td>
<td>— T1CKI</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<td>—</td>
<td>IOC</td>
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<td>CLKIN</td>
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<td>—</td>
<td>SDI/SDA</td>
<td>IOC</td>
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<tr>
<td>RB5</td>
<td>12 9</td>
<td>AN11</td>
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<td>—</td>
<td>RX/DT</td>
<td>IOC</td>
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<tr>
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<td>SCK/SCL</td>
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<tr>
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<td>TX/CK</td>
<td>IOC</td>
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<tr>
<td>RC0</td>
<td>16 13</td>
<td>AN4</td>
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<tr>
<td>RC1</td>
<td>15 12</td>
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