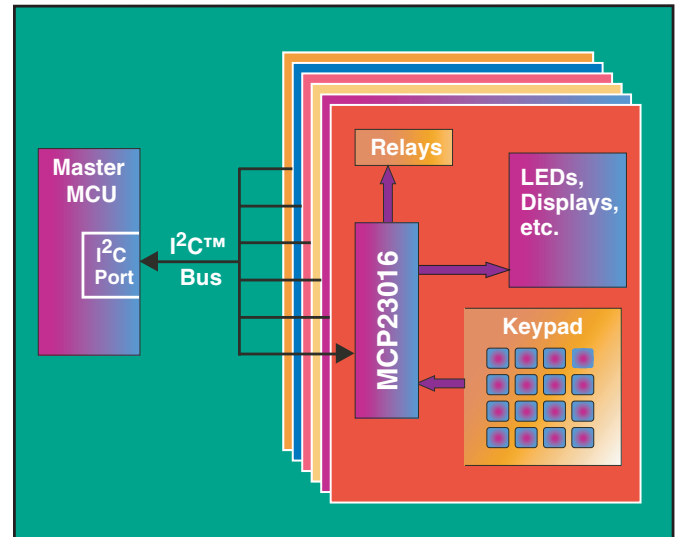# MCP23016, Serial Peripherals - 16-bit I/O Expander

The Microchip **MCP23016** is a 16-bit input/output expander designed to provide embedded systems with general purpose remote I/O expansion through an I^2C™ serial port. The fully bi-directional 16 I/Os default to inputs and can be configured as inputs or outputs. Additionally, there are four sets of registers that are programmable and provide for configuration (input or output control), output value, and polarity (active low or high). The MCP23016 open drain interrupt ($\overline{INT}$) output is activated when any input state differs from its corresponding input port register state. By sending an interrupt signal on the interrupt logic of the master, this remote slave device informs the master that there is incoming data on the port without having to communicate via the I^2C bus. Three external hardware pins (A0, A1 and A2) vary the fixed I^2C address and allow up to eight devices to share the same bus.

The MCP23016 has low current consumption and includes latched outputs with high current drive capability for directly driving LEDs.

Applications:

- General purpose I/O expansion for systems utilizing I^2C and SMBus™ ports, such as, driving ACPI power switches, sensors, push-buttons, keypads, LEDs and fans
- Servers, workstations, backplanes and PC applications supporting microprocessors for examining input lines from peripherals, such as, keyboards and temperature sensors
- Power supply applications (driving LEDs and sensor type applications)
- PCs, cell phones, washers, dryers and industrial applications
- Board version tracking and configuration
- Board monitoring and status reporting (AC/DC good or bad conditions)
- Multiple card systems in telecom, networking and base station infrastructure equipment
- Field recall and troubleshooting functions for installed boards

Features:

- I^2C and SMBus compatible clock frequency (0 to 400 kbits/s)
- 2.0 – 5.5V operating supply voltage range
- 16 programmable bi-directional I/Os compatible with most processors
- Outputs can directly drive LEDs (source and sink current 25 mA)
- Polarity inversion register to configure the polarity of the input port data
- Internal Power-on Reset (POR)
- Open-drain interrupt output activated when input changes state
- Three external address pins allow user to connect up to eight of these devices on the same bus
- Low supply current
- Specified over industrial temperature range (-40°C to +85°C)
- Available in 28-pin PDIP, SSOP, SOIC and QFN packages

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Interface Devices

Additional Information:

- Microchip's web site: www.microchip.com
- Microchip's *Technical Library CD-ROM*, Order No. DS00161
- *Product Line Card*, Order No. DS00148
- *Analog & Interface Families Data Book 2002*, Order No. DS00207
- *2002 Technical Documentation Analog & Interface Product Families* CD-ROM, Order No. DS51205
- *MCP23016 Data Sheet,* DS20090

MCP23016, Serial Peripherals - 16-bit I/O Expander						
Product	Operating Voltage (V)	Bus Type	Maximum Bus Frequency (kbits/s)	Output Current (mA)	Features	# of Pins/Package
MCP23016	2.0V – 5.5V	I^{2}C™	400 kbits/s	25 mA	16-bit I/O port expander with interrupt and 3 hardware address pins	28P, 28SO, 28SS, 28ML

Package Key: **P** = PDIP   **SO** = SOIC   **SS** = TSSOP   **ML** = QFN

Microchip's first I/O expander offers industry comparable performance, packages and pin-outs. With the introduction of this new serial peripheral device, Microchip has expanded its presence in the interface and interconnect industry.