# MICROCHIP

## UNI/O™ Serial EEPROMs
## Single I/O Bus Interface
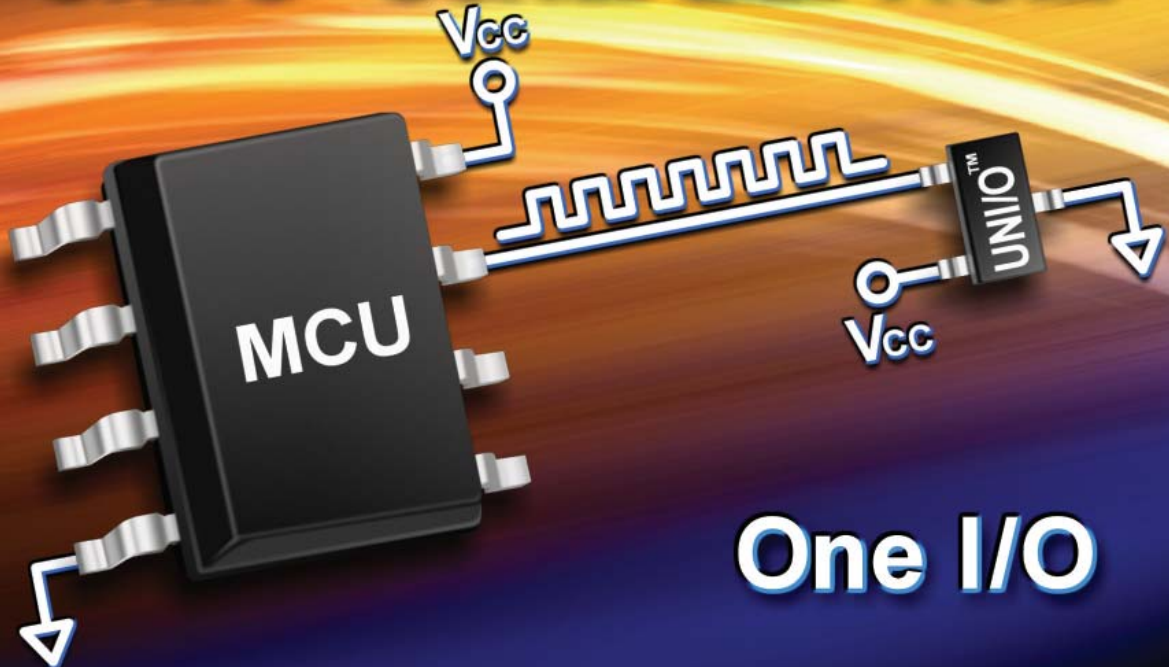
## Need more microcontroller pins for new features?
## Want to stay with a low pin-count microcontroller rather than switching to a more expensive one?

Microchip's new UNI/O serial EEPROM uses only ONE connection to the host microcontroller. This compares to two or three pins for I$^2$C™, and three to six pins for Microwire or SPI buses. This new, proprietary bus offers advanced features like a status register and write protection on demand, along with all I/O, memory array and command functions through a single pin.

### New Communications Standard

*UNI/O bus: First introduced on serial EEPROMs*
- Manchester Communications
  - Clock and data in a single serial bit stream
  - Signal transition in the middle of bit period
- MCU establishes data rate
- EEPROM tracks data rate – Frequency and Phase
- Software Addressable

### Benefits

*A single I/O EEPROM can simplify your design and reduce system cost*
- Free up pins on the MCU
  - Add a new feature to your application
  - Move to a smaller MCU
- Free up pins on your connector
  - Smaller connector = lower cost
- More compact design

### Advanced Features

- Single I/O Interface
- 1-16 Kbit Memory Densities
- 1.8-5.5V Operating Voltage
- 10-100 KHz Operating Frequency
- 1 Million Erase/Write Cycles
- Software Write Protect
  - ¼, ½ or Full Array
- Status Register
- Set/Erase entire memory with a single command
- ESD Protection > 4 KV
- Noise Filtration Circuitry
- Packaging: 3-pin SOT-23
  8-pin SOIC, MSOP & TDFN
- Temperature:  Industrial (-40°C to +85°C)
  Extended (-40°C to +125°C)

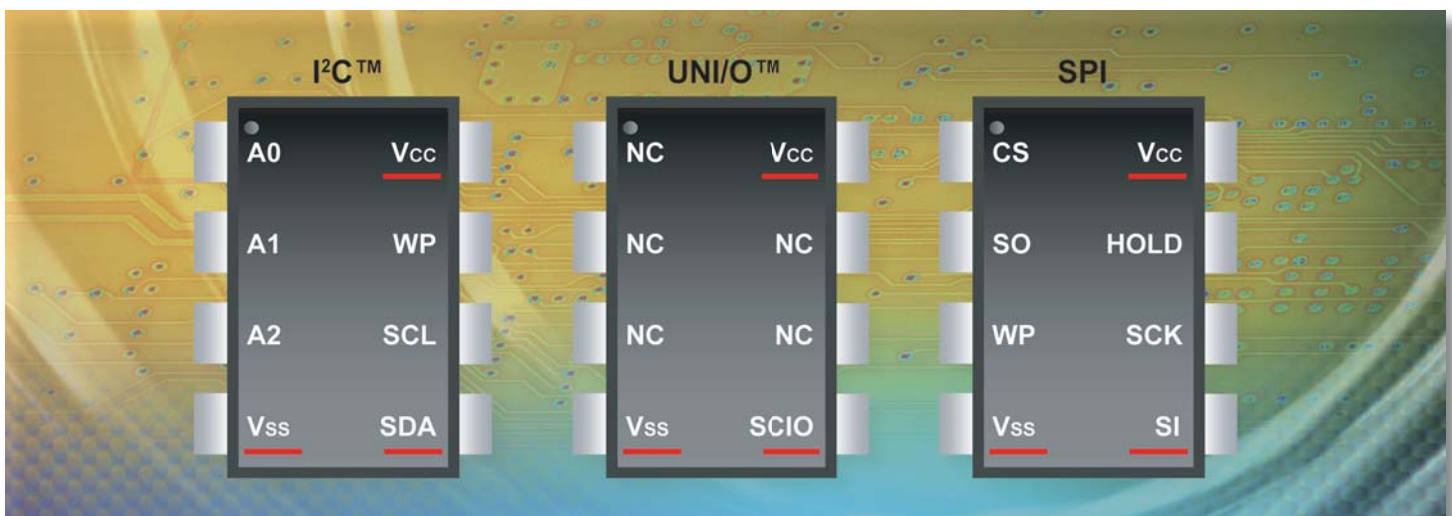### Get Started With a Simple Evaluation

*Use your existing hardware*
- UNI/O EEPROMs can fit in existing sockets
  - Pin-out similar to I$^2$C and SPI EEPROMs
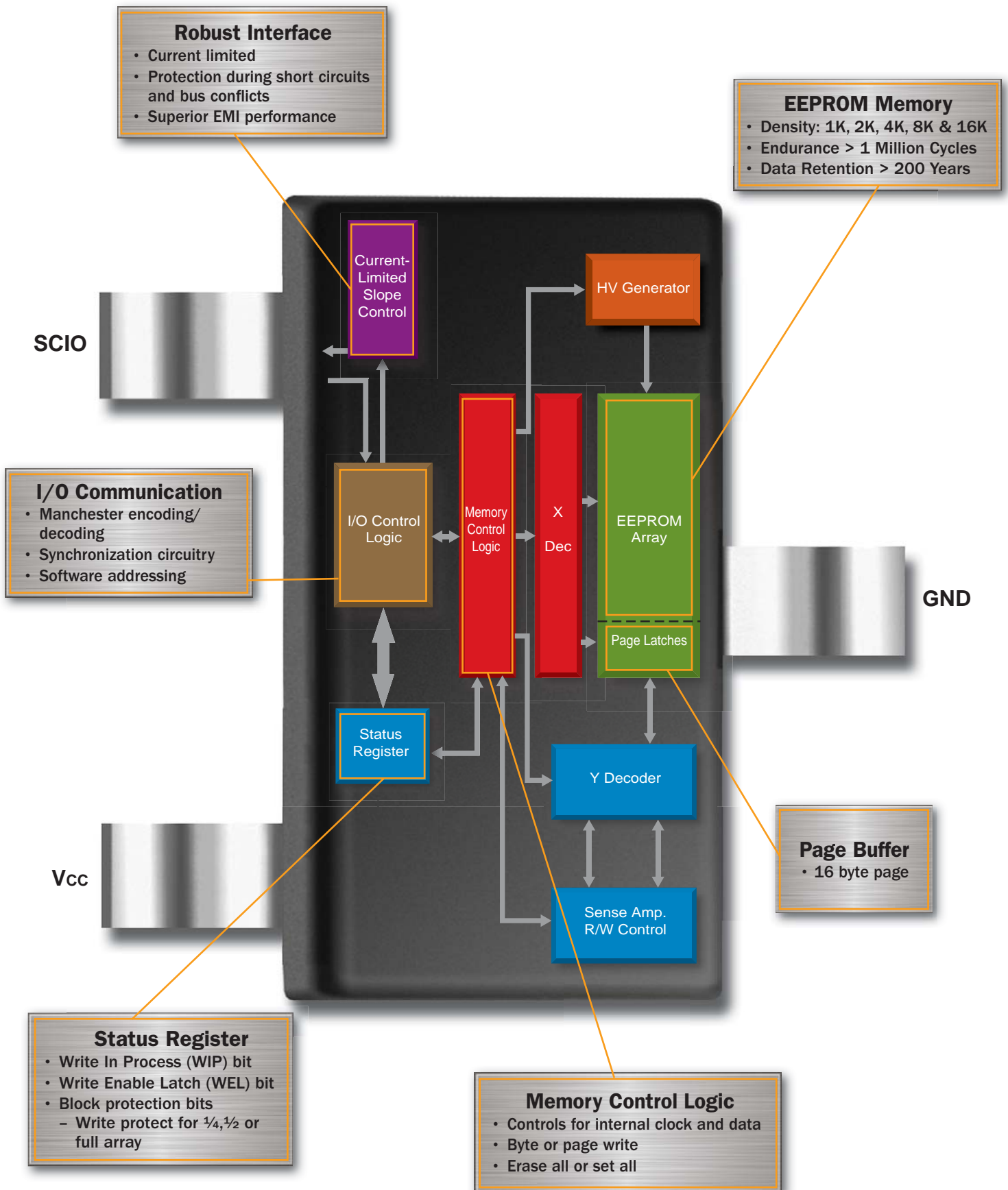  - 8-pin packages share Vcc, Vss and Data Line

*Use Microchip's software drivers*
- UNI/O software drivers available for many popular microcontrollers
- New drivers coming

### Current EEPROM 8-lead Pin Outs

# Inside the UNI/O EEPROM

**Robust Interface**
- Current limited
- Protection during short circuits and bus conflicts
- Superior EMI performance

**EEPROM Memory**
- Density: 1K, 2K, 4K, 8K & 16K
- Endurance > 1 Million Cycles
- Data Retention > 200 Years

**I/O Communication**
- Manchester encoding/decoding
- Synchronization circuitry
- Software addressing

**Page Buffer**
- 16 byte page

**Status Register**
- Write In Process (WIP) bit
- Write Enable Latch (WEL) bit
- Block protection bits
  – Write protect for ¼,½ or full array

**Memory Control Logic**
- Controls for internal clock and data
- Byte or page write
- Erase all or set all

Current-Limited Slope Control

HV Generator

SCIO

I/O Control Logic

Memory Control Logic

X Dec

EEPROM Array

GND

Page Latches

Status Register

Y Decoder

Vcc

Sense Amp. R/W Control

# Resources to help you get started quickly ...

## MPLAB® Starter Kit for Serial Memory Products
### (Part Number DV243003)

Increase productivity, reduce time to market and create a rock-solid design using this sophisticated development system. The MPLAB Starter Kit includes everything necessary to quickly program and develop a robust and reliable Serial EEPROM design, and reduce the time required for system integration and hardware/software debug.

- Windows® 2000, XP and Vista™ operating systems
- Total Endurance™ software model
- MPLAB Starter Kit board and user interface software
- Quick start guide
- Serial EEPROM sample pack

## FREE   Total Endurance™ Software

Microchip's Total Endurance Software provides you with unprecedented visibility into Serial EEPROM based applications. Describe your system to an advanced mathematical model (with a friendly human interface), and it will predict the performance and reliability of the Serial EEPROM within that environment. Design trade-off analysis that formerly consumed days or weeks can now be accomplished in minutes with a level of accuracy that delivers a truly robust design.

## Additional Resources

Microchip Advanced Part Selector (MAPS): **www.microchip.com/maps**

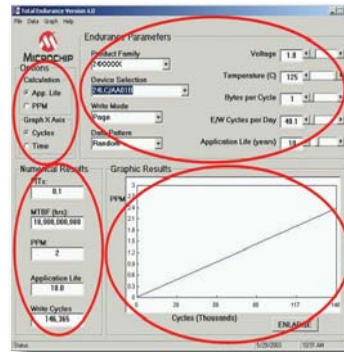Getting Started with UNI/O™ Webinar: **http://techtrain.microchip.com/webseminars**

Over 50 different application notes, many with source code options can be found at: **www.microchip.com/appnotes**

Get started with Microchip's Serial EEPROMs in four easy steps: **www.microchip.com/eeprom**

## UNI/O Bus Software Drivers

| MCU Family | Device | Architecture | | Language | Timer Resources |
|---|---|---|---|---|---|
| | | Data Bus | Instruction Word | | |
| PIC® MCU | PIC10F202 PIC12F508 PIC16F505 | 8-bit | 12-bit | Assembly | Firmware |
| PIC MCU | PIC12F609 PIC16F610 | 8-bit | 14-bit | Assembly | Firmware |
| PIC MCU | PIC12F683 PIC16F616 | 8-bit | 14-bit | Assembly | HW Peripheral |
| PIC MCU | PIC12F683 PIC16F616 | 8-bit | 14-bit | C | HW Peripheral |
| PIC MCU | PIC18F1220 | 8-bit | 16-bit | Assembly | Firmware |
| PIC MCU | PIC18F24J10 | 8-bit | 16-bit | Assembly | HW Peripheral |
| PIC MCU | PIC18F24J10 | 8-bit | 16-bit | C | HW Peripheral |
| PIC MCU | PIC24FJ128GA010 | 16-bit | 24-bit | C | HW Peripheral |
| dsPIC® DSC | dsPIC33F256GP710 | 16-bit | 24-bit | C | HW Peripheral |
| PIC MCU | PIC32XXX | 32-bit | 32-bit | C | HW Peripheral |
| ARM7 Core | AT91SAM7S256 | 32-bit | 32-bit | C | HW Peripheral |
| 8051 | 89LPC952 | 8-bit | 8-bit | Assembly | HW Peripheral |
| 8051 | 89LPC952 | 8-bit | 8-bit | C | HW Peripheral |
| MSP430 | MSP430F1232 | 16-bit | 16-bit | C | HW Peripheral |

**www.microchip.com/UNIO**

## UNI/O Product Family

| Device | Density (bits) | Organization | Page Size (bytes) | Operating Voltage | Temperature Range | Packages |
|--------|----------------|--------------|-------------------|-------------------|-------------------|----------|
| 11AA010 | 1K | 128 x 8 | 16 | 1.8-5.5V | I | TT, SN, MNY, MS, P |
| 11LC010 | 1K | 128 x 8 | 16 | 2.5-5.5V | I, E | TT, SN, MNY, MS, P |
| 11AA020 | 2K | 256 x 8 | 16 | 1.8-5.5V | I | TT, SN, MNY, MS, P |
| 11LC020 | 2K | 256 x 8 | 16 | 2.5-5.5V | I, E | TT, SN, MNY, MS, P |
| 11AA040 | 4K | 512 x 8 | 16 | 1.8-5.5V | I | TT, SN, MNY, MS, P |
| 11LC040 | 4K | 512 x 8 | 16 | 2.5-5.5V | I, E | TT, SN, MNY, MS, P |
| 11AA080 | 8K | 1024 x 8 | 16 | 1.8-5.5V | I | TT, SN, MNY, MS, P |
| 11LC080 | 8K | 1024 x 8 | 16 | 2.5-5.5V | I, E | TT, SN, MNY, MS, P |
| 11AA160 | 16K | 2048 x 8 | 16 | 1.8-5.5V | I | TT, SN, MNY, MS, P |
| 11LC160 | 16K | 2048 x 8 | 16 | 2.5-5.5V | I, E | TT, SN, MNY, MS, P |

Note: All devices are Pb-Free and RoHS compliant.

## Part Number Suffix Designations

Ordering information for Microchip UNI/O Memory products.

**11 LC 01 0 T -I /TT**

**Package Type:**
TT      3-SOT-23
SN      8-SOIC (150 mil)
MS      8-MSOP
MNY   8-TDFN (2x3)
P        8-PDIP

**Operating Temperature Range:**
I:        Industrial (-40°C to +85°C)
E:       Extended Industrial Range (-40°C to +125°C)

**Tape and Reel**
T:        Tape and Reel
blank:  Tube

**Custom Addressing**

**Memory Size:**
01      1 Kbit
02      2 Kbit
04      4 Kbit
08      8 Kbit
16      16 Kbit

**Voltage:**
LC      2.5V-5.5V
AA      1.8V-5.5V

**Product Prefix:**
11       UNI/O™ EEPROM
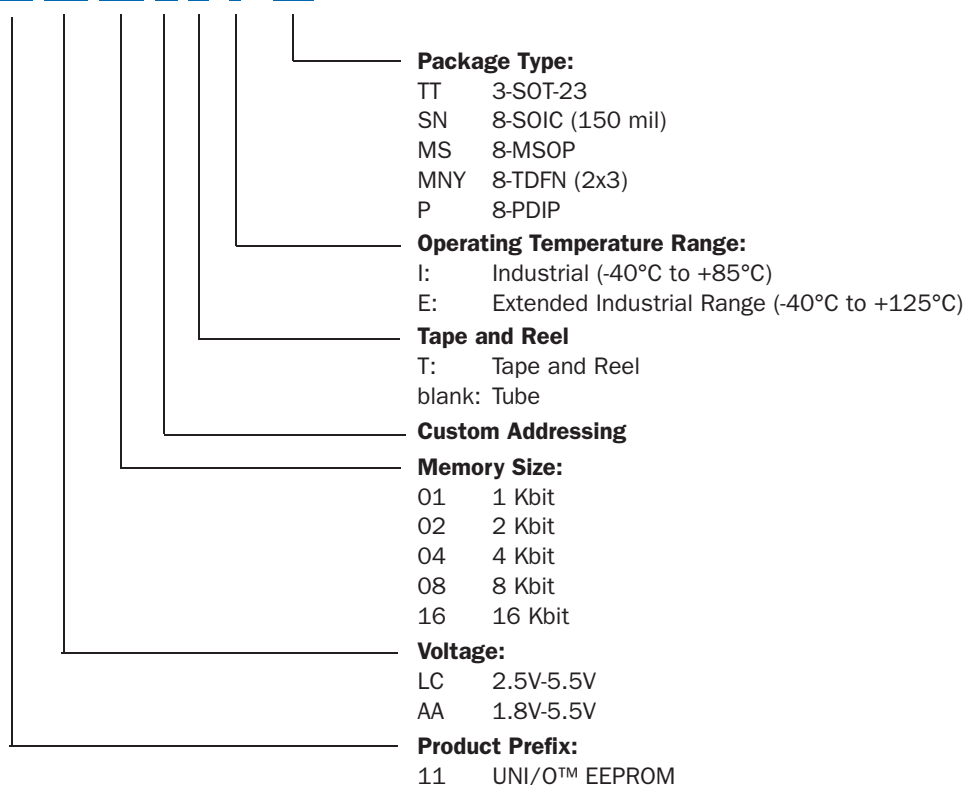
## Packages Available for UNI/O EEPROM Memory

3-SOT23 (TT)
3 x 3 mm

8-TDFN (MNY)
2 x 3 mm

8-MSOP (MS)
3 x 5 mm

8-SOIC (SN)
5 x 6 mm

8-PDIP (P)
8 x 9.5 mm

Shown approximate size.

For the most up-to-date information visit: **www.microchip.com/UNIO**

## Support

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