MICROCHIP

UNI/O™ Serial EEPROMs
Single I/O Bus Interface
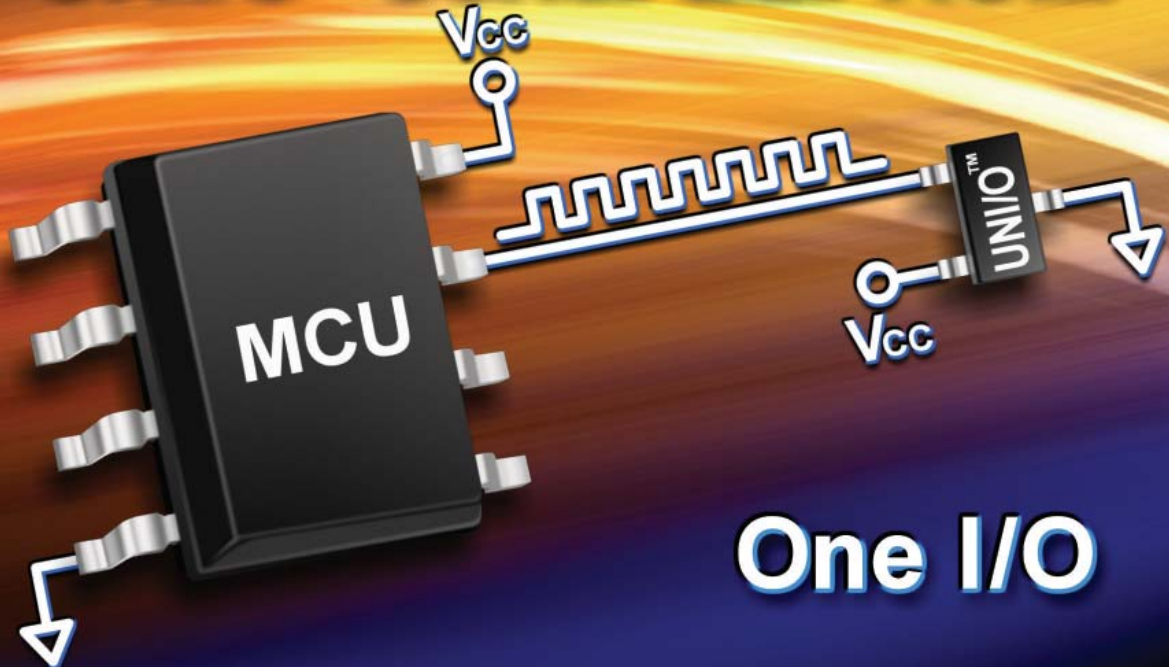
Introducing the UNI/O EEPROM Family

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)

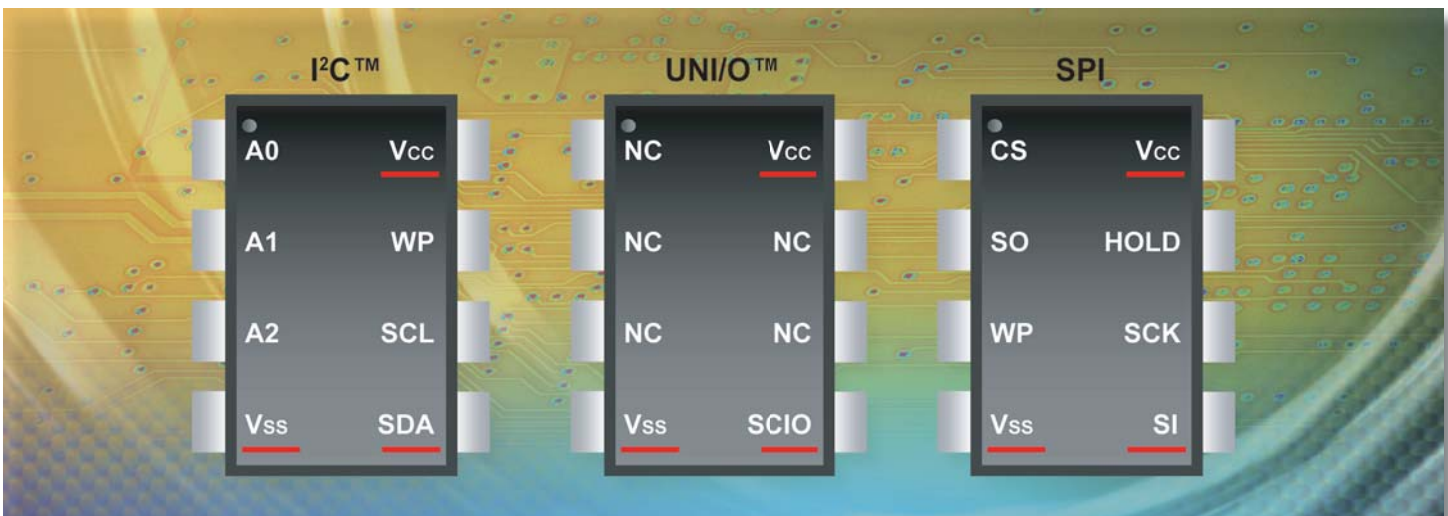## Get Started With a Simple Evaluation

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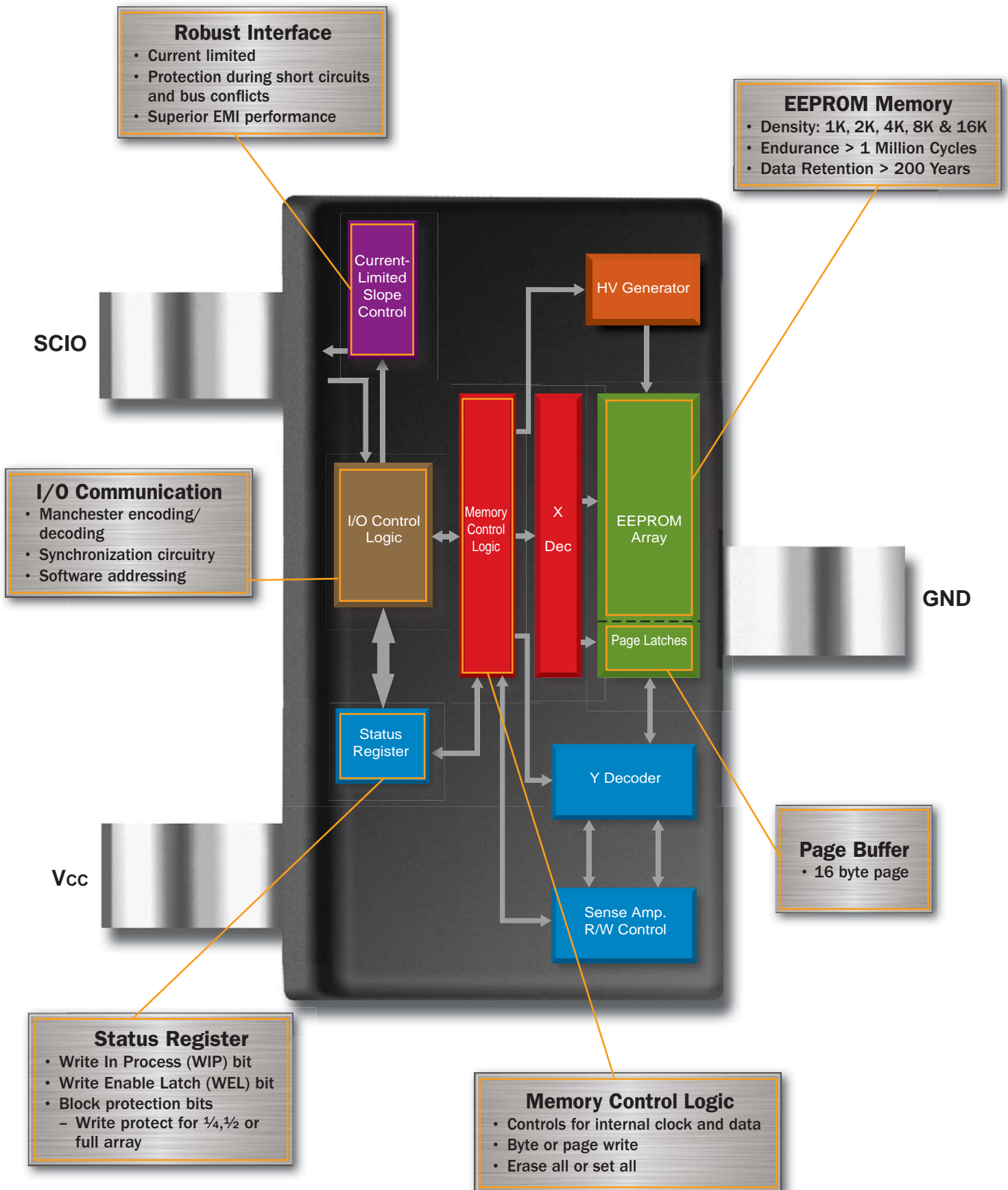 - 8-pin packages share Vcc, Vss and Data Line

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

SCIO

GND

Vcc

Current-Limited Slope Control

HV Generator

I/O Control Logic

Memory Control Logic

X Dec

EEPROM Array

Page Latches

Status Register

Y Decoder

Sense Amp. R/W Control

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

www.microchip.com/UNIO

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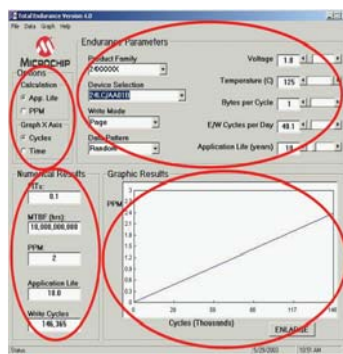
Over 50 different application notes, many with source code options can be found at: **www.microchip.com/appnotes**

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 Serial EEPROM Product Specifications

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
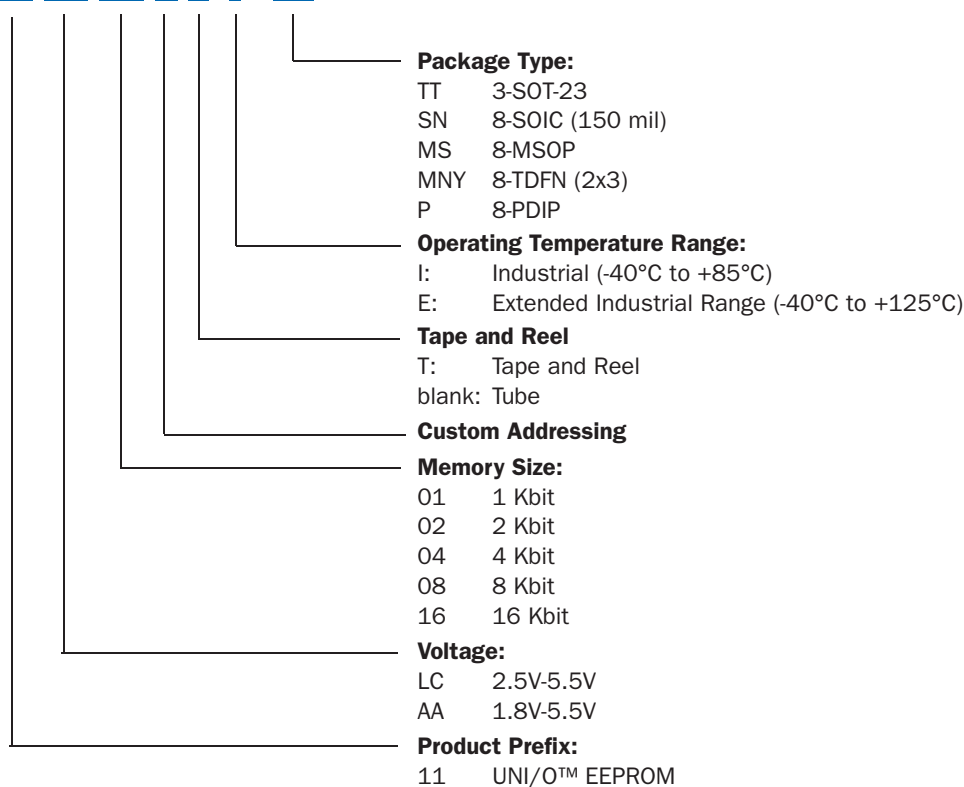
Packages Available for UNI/O EEPROM Memory

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

Microchip is committed to supporting its customers in developing products faster and more efficiently. We maintain a worldwide network of field applications engineers and technical support ready to provide product and system assistance. In addition, the following service areas are available at www.microchip.com:

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If additional training interests you, then Microchip can help. We continue to expand our technical training options, offering a growing list of courses and in-depth curriculum locally, as well as significant online resources – whenever you want to use them.

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