



Interfacing AT24CXX Serial EEPROMs with AT89CX051 Microcontrollers

Serial memory devices offer significant advantages over parallel devices in applications where lower data transfer rates are acceptable. In addition to requiring less board space, serial devices allow microcontroller I/O pins to be conserved. This is especially valuable when adding external memory to low pin count microcontrollers such as the Atmel AT89C1051 and AT89C2051.

This application note presents a suite of software routines which may be incorporated into a user's application to allow an AT89CX051 microcontroller to read and write AT24CXX serial EEPROMs. The software supports all members of the AT24CXX family, and may easily be modified for compatibility with any of the Atmel 8051-code compatible microcontrollers.

Hardware

A typical interconnection between an AT89CX051 microcontroller and an

AT24CXX serial EEPROM is shown in Figure 1. As indicated in the figure, up to eight members of the AT24CXX family may share the bus, utilizing the same two microcontroller I/O pins. Each device on the bus must have its address inputs (A0, A1, A2) hard-wired to a unique address. In the figure, the first device recognizes address zero (A0, A1, A2 tied low), while the eighth recognizes address seven (A0, A1, A2 tied high). Not all members of the AT24CXX family recognize all three address inputs, limiting the number of some devices which may be present to less than eight. The exact number of devices of each type which may share the bus is shown in Table 1.

Bidirectional Data Transfer Protocol

The Bidirectional Data Transfer Protocol utilized by the AT24CXX family allows a number of compatible devices to share a

(continued)

Table 1. Atmel's 2-Wire Serial EEPROM Family

Device	Size (Bytes)	Page Size (Bytes)	Max Per Bus	Addresses Used
AT24C01	1K	8	1	None
AT24C01A	1K	8	8	A0, A1, A2
AT24C02	2K	8	8	A0, A1, A2
AT24C04	4K	16	4	A1, A2
AT24C08	8K	16	2	A2
AT24C16	16K	16	1	None
AT24C164	16K	16	8	A0, A1, A2
AT24C32	32K	32	8	A0, A1, A2
AT24C64	64K	32	8	A0, A1, A2

Interfacing 24CXX Serial EEPROMs

Application Note

Rev. 0507C-10/98







Atmel Headquarters

Corporate Headquarters
2325 Orchard Parkway
San Jose, CA 95131
TEL (408) 441-0311
FAX (408) 487-2600

Europe

Atmel U.K., Ltd.
Coliseum Business Centre
Riverside Way
Camberley, Surrey GU15 3YL
England
TEL (44) 1276-686677
FAX (44) 1276-686697

Asia

Atmel Asia, Ltd.
Room 1219
Chinachem Golden Plaza
77 Mody Road
Tsimshatsui East
Kowloon, Hong Kong
TEL (852) 27219778
FAX (852) 27221369

Japan

Atmel Japan K.K.
Tonetsu Shinkawa Bldg., 9F
1-24-8 Shinkawa
Chuo-ku, Tokyo 104-0033
Japan
TEL (81) 3-3523-3551
FAX (81) 3-3523-7581

Atmel Operations

Atmel Colorado Springs
1150 E. Cheyenne Mtn. Blvd.
Colorado Springs, CO 80906
TEL (719) 576-3300
FAX (719) 540-1759

Atmel Rousset

Zone Industrielle
13106 Rousset Cedex, France
TEL (33) 4 42 53 60 00
FAX (33) 4 42 53 60 01

Fax-on-Demand

North America:
1-(800) 292-8635
International:
1-(408) 441-0732

e-mail

literature@atmel.com

Web Site

<http://www.atmel.com>

BBS

1-(408) 436-4309

© Atmel Corporation 1998.

Atmel Corporation makes no warranty for the use of its products, other than those expressly contained in the Company's standard warranty which is detailed in Atmel's Terms and Conditions located on the Company's website. The Company assumes no responsibility for any errors which may appear in this document, reserves the right to change devices or specifications detailed herein at any time without notice, and does not make any commitment to update the information contained herein. No licenses to patents or other intellectual property of Atmel are granted by the Company in connection with the sale of Atmel products, expressly or by implication. Atmel's products are not authorized for use as critical components in life support devices or systems.

Marks bearing ® and/or ™ are registered trademarks and trademarks of Atmel Corporation.

Terms and product names in this document may be trademarks of others.



Printed on recycled paper.

0507C-10/98/xM