



**MICROCHIP**

## PIC16C63 → PIC16C63A Migration

### DEVICE MIGRATIONS

This document is intended to describe the functional differences and the electrical specification differences that are present when migrating from one device to the next.

**Note:** Even though compatible devices are specified to be tested to the same electrical specification, the characteristics of the devices may be different from each other (due to process difference). For systems that were designed to the device specifications, these process differences should not cause any issues in the application. For systems that did not tightly meet the electrical specifications, the process differences may cause the device to behave differently in the application.

**Note:** While there are no functional or electrical changes to the device oscillator specifications, the user should verify that the device oscillator starts and performs as expected. Adjusting the loading capacitor values and/or the oscillator mode may be required.

Table 1 shows the considerations that must be taken into account when migrating from the PIC16C63 to the PIC16C63A.

**TABLE 1: PIC16C63 → PIC16C63A DIFFERENCES**

| Functional Differences due to Errata or Module Update  |            |  |     |     |       |
|--|------------|--|-----|-----|-------|
| No.  | Module     | Difference   | H/W | S/W | Prog. |
| 1  | CCP        | CCP Special Event Trigger clears Timer1.   | —   | ✓   | —     |
| 2  |            | Compare mode drives pin correctly.   | —   | ✓   | —     |
| 3  | Timers     | Reading or writing TMR1H or TMR1L may affect TMR1H or TMR1L unexpectedly.  | —   | ✓   | —     |
| 4  |            | WDT/TMR0 prescaler assignment changes do not affect TMR0 count.  | —   | ✓   | —     |
| 5  | SSP        | TMR2 SPI™ clock synchronized to start of SPI Transmission.   | —   | ✓   | —     |
| 6  |            | Can now transmit multiple words in SPI mode.   | —   | ✓   | —     |
| 7  |            | Supports all four SPI modes. (Now uses SSP vs BSSP module.)<br>See SSP module in the PICmicro™ Mid-Range MCU Family Reference Manual (DS33023A). | —   | ✓   | —     |
| 8  |            | I <sup>2</sup> C™ no longer generates ACK pulses when module is enabled.   | —   | ✓   | —     |
| 9  | USART      | Async receive errors due to BRGH setting corrected.  | —   | ✓   | —     |
| 10   | Oscillator | TOST delay may be skipped when waking from SLEEP.  | —   | ✓   | —     |
| 11   | RESET      | Short MCLR pulses may cause improper operation on the PIC16C63A.   | ✓   | —   | —     |
| 12   |            | Operating voltage and frequency ranges have been redefined.  | ✓   | —   | —     |
| H/W - Issues may exist with regard to the application circuits.<br>S/W - Issues may exist with regard to the user program.<br>Prog. - Issues may exist when writing the program to the controller. |            |  |     |     |       |

**TABLE 2: ELECTRICAL SPECIFICATION DIFFERENCES**

| Param No.       | Symbol               | Characteristic  | PIC16C63   |        |      | PIC16C63A   |              |      | Unit |    |
|-----------------|----------------------|---|------------|--------|------|-------------|--------------|------|------|----|
|                 |                      |   | Min        | Typ†   | Max  | Min         | Typ†         | Max  |      |    |
| Core            |                      |   |            |        |      |             |              |      |      |    |
| D001            | VDD                  | Supply Voltage  | 4.0        | —      | 6.0  | 4.0         | —            | 5.5  | V    |    |
| D001A           |                      | XT, LP and RC mode                                      | 4.5        | —      | 5.5  | 4.0         | —            | 5.5  | V    |    |
|                 |                      | HS mode   | —          | —      | —    | VBOR        | —            | 5.5  | V    |    |
| D005            | VBOR                 | Brown-out Reset Voltage                                 | 3.7        | 4.0    | 4.3  | 3.65        | —            | 4.35 | V    |    |
| D150            | VOD                  | Open-Drain High Voltage on RA4                          | —          | —      | 14.0 | —           | —            | 8.5  | V    |    |
| SSP in SPI mode |                      |   |            |        |      |             |              |      |      |    |
| 71              | TscH                 | SCK input high  | Continuous | Tcy+20 | —    | —           | 1.25Tcy + 30 | —    | —    | ns |
| 71A             |                      | time (slave mode)                                       |            |        |      |             | Single Byte  | 40   | —    | —  |
| 72              | TscL                 | SCK input low   | Continuous | Tcy+20 | —    | —           | 1.25Tcy + 30 | —    | —    | ns |
| 72A             |                      | time (slave mode)                                       |            |        |      |             | Single Byte  | 40   | —    | —  |
| 73              | TdiV2scH<br>TdiV2scL | Setup time of SDI data input to SCK edge                | 50         | —      | —    | 100         | —            | —    | ns   |    |
| 73A<br>(Note 2) | Tb2B                 | Last clock edge of Byte1 to the 1st clock edge of Byte2 | —          | —      | —    | 1.5Tcy + 40 | —            | —    | ns   |    |
| 74              | Tsch2diL<br>TscL2diL | Hold time of SDI data input to SCK edge                 | 50         | —      | —    | 100         | —            | —    | ns   |    |
| 75              | TdoR                 | SDO data output rise time                               | PIC16CXX   | —      | 10   | 25          | —            | 10   | 25   | ns |
|                 |                      |   | PIC16LCXX  |        |      |             | —            | 20   | 45   | ns |
| 78              | TscR                 | SCK output rise time (master mode)                      | PIC16CXX   | —      | 10   | 25          | —            | 10   | 25   | ns |
|                 |                      |   | PIC16LCXX  |        |      |             | —            | 20   | 45   | ns |
| 80              | Tsch2doV<br>TscL2doV | SDO data output valid after SCK edge                    | PIC16CXX   | —      | —    | 50          | —            | —    | 50   | ns |
|                 |                      |   | PIC16LCXX  |        |      |             | —            | —    | 100  | ns |
| 83              | Tsch2ssH<br>TscL2ssH | SS ↑ after SCK edge                                     | —          | —      | —    | 1.5Tcy + 40 | —            | —    | ns   |    |

† Data in "Typ" column is at 5V, 25°C unless otherwise stated. These parameters are for design guidance only and are not tested.

**Note 1:** When BOR is enabled, the device will operate until VDD drops below VBOR.

**2:** Specification 73A is only required if specifications 71A and 72A are used.

---

---

**NOTES:**



## WORLDWIDE SALES AND SERVICE

### AMERICAS

#### Corporate Office

Microchip Technology Inc.  
2355 West Chandler Blvd.  
Chandler, AZ 85224-6199  
Tel: 480-786-7200 Fax: 480-786-7277  
Technical Support: 480-786-7627  
Web Address: <http://www.microchip.com>

#### Atlanta

Microchip Technology Inc.  
500 Sugar Mill Road, Suite 200B  
Atlanta, GA 30350  
Tel: 770-640-0034 Fax: 770-640-0307

#### Boston

Microchip Technology Inc.  
2 LAN Drive, Suite 120  
Westford, MA 01886  
Tel: 508-480-9990 Fax: 508-480-8575

#### Chicago

Microchip Technology Inc.  
333 Pierce Road, Suite 180  
Itasca, IL 60143  
Tel: 630-285-0071 Fax: 630-285-0075

#### Dallas

Microchip Technology Inc.  
4570 Westgrove Drive, Suite 160  
Addison, TX 75001  
Tel: 972-818-7423 Fax: 972-818-2924

#### Dayton

Microchip Technology Inc.  
Two Prestige Place, Suite 150  
Miamisburg, OH 45342  
Tel: 937-291-1654 Fax: 937-291-9175

#### Detroit

Microchip Technology Inc.  
Tri-Atria Office Building  
32255 Northwestern Highway, Suite 190  
Farmington Hills, MI 48334  
Tel: 248-538-2250 Fax: 248-538-2260

#### Los Angeles

Microchip Technology Inc.  
18201 Von Karman, Suite 1090  
Irvine, CA 92612  
Tel: 949-263-1888 Fax: 949-263-1338

#### New York

Microchip Technology Inc.  
150 Motor Parkway, Suite 202  
Hauppauge, NY 11788  
Tel: 631-273-5305 Fax: 631-273-5335

#### San Jose

Microchip Technology Inc.  
2107 North First Street, Suite 590  
San Jose, CA 95131  
Tel: 408-436-7950 Fax: 408-436-7955

### AMERICAS (continued)

#### Toronto

Microchip Technology Inc.  
5925 Airport Road, Suite 200  
Mississauga, Ontario L4V 1W1, Canada  
Tel: 905-405-6279 Fax: 905-405-6253

### ASIA/PACIFIC

#### China - Beijing

Microchip Technology, Beijing  
Unit 915, 6 Chaoyangmen Bei Dajie  
Dong Erhuan Road, Dongcheng District  
New China Hong Kong Manhattan Building  
Beijing, 100027, P.R.C.  
Tel: 86-10-85282100 Fax: 86-10-85282104

#### China - Shanghai

Microchip Technology  
Unit B701, Far East International Plaza,  
No. 317, Xianxia Road  
Shanghai, 200051, P.R.C.  
Tel: 86-21-6275-5700 Fax: 86-21-6275-5060

#### Hong Kong

Microchip Asia Pacific  
Unit 2101, Tower 2  
Metroplaza  
223 Hing Fong Road  
Kwai Fong, N.T., Hong Kong  
Tel: 852-2-401-1200 Fax: 852-2-401-3431

#### India

Microchip Technology Inc.  
India Liaison Office  
Divyasree Chambers  
I Floor, Wing A (A3/A4)  
No. 11, O'Shaugnessey Road  
Bangalore, 560 027, India  
Tel: 91-80-207-2165 Fax: 91-80-207-2171

#### Japan

Microchip Technology Intl. Inc.  
Benex S-1 6F  
3-18-20, Shinyokohama  
Kohoku-Ku, Yokohama-shi  
Kanagawa, 222-0033, Japan  
Tel: 81-45-471-6166 Fax: 81-45-471-6122

#### Korea

Microchip Technology Korea  
168-1, Youngbo Bldg. 3 Floor  
Samsung-Dong, Kangnam-Ku  
Seoul, Korea  
Tel: 82-2-554-7200 Fax: 82-2-558-5934

### ASIA/PACIFIC (continued)

#### Singapore

Microchip Technology Singapore Pte Ltd.  
200 Middle Road  
#07-02 Prime Centre  
Singapore, 188980  
Tel: 65-334-8870 Fax: 65-334-8850

#### Taiwan

Microchip Technology Taiwan  
11F-3, No. 207  
Tung Hua North Road  
Taipei, 105, Taiwan  
Tel: 886-2-2717-7175 Fax: 886-2-2545-0139

### EUROPE

#### Denmark

Microchip Technology Denmark ApS  
Regus Business Centre  
Lautrup høj 1-3  
Ballerup DK-2750 Denmark  
Tel: 45 4420 9895 Fax: 45 4420 9910

#### France

Arizona Microchip Technology SARL  
Parc d'Activite du Moulin de Massy  
43 Rue du Saule Trapu  
Batiment A - 1er Etage  
91300 Massy, France  
Tel: 33-1-69-53-63-20 Fax: 33-1-69-30-90-79

#### Germany

Arizona Microchip Technology GmbH  
Gustav-Heinemann-Ring 125  
D-81739 München, Germany  
Tel: 49-89-627-144 0 Fax: 49-89-627-144-44

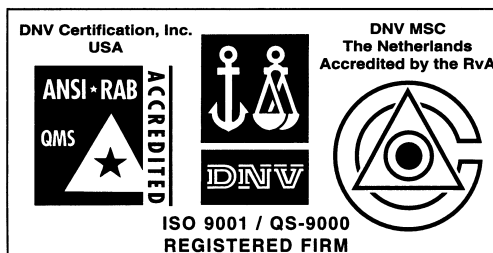
#### Italy

Arizona Microchip Technology SRL  
Centro Direzionale Colleoni  
Palazzo Taurus 1 V. Le Colleoni 1  
20041 Agrate Brianza  
Milan, Italy  
Tel: 39-039-65791-1 Fax: 39-039-6899883

#### United Kingdom

Arizona Microchip Technology Ltd.  
505 Eskdale Road  
Winnersh Triangle  
Wokingham  
Berkshire, England RG41 5TU  
Tel: 44 118 921 5858 Fax: 44-118 921-5835

8/01/00



Microchip received QS-9000 quality system certification for its worldwide headquarters, design and wafer fabrication facilities in Chandler and Tempe, Arizona in July 1999. The Company's quality system processes and procedures are QS-9000 compliant for its PICmicro® 8-bit MCUs, KEELoc® code hopping devices, Serial EEPROMs and microperipheral products. In addition, Microchip's quality system for the design and manufacture of development systems is ISO 9001 certified.

All rights reserved. © 2000 Microchip Technology Incorporated. Printed in the USA. 8/00 Printed on recycled paper.

Information contained in this publication regarding device applications and the like is intended through suggestion only and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. No representation or warranty is given and no liability is assumed by Microchip Technology Incorporated with respect to the accuracy or use of such information, or infringement of patents or other intellectual property rights arising from such use or otherwise. Use of Microchip's products as critical components in life support systems is not authorized except with express written approval by Microchip. No licenses are conveyed, implicitly or otherwise, except as maybe explicitly expressed herein, under any intellectual property rights. The Microchip logo and name are registered trademarks of Microchip Technology Inc. in the U.S.A. and other countries. All rights reserved. All other trademarks mentioned herein are the property of their respective companies.