



## Product Change Notification - SYST-04FQTS945

---

**Date:**

05 Jul 2019

**Product Category:**

8-bit Microcontrollers

**Affected CPNs:****Notification subject:**

ERRATA - megaAVR 0-series Silicon Errata and Data Sheet Clarifications

**Notification text:**

SYST-04FQTS945

Microchip has released a new DeviceDoc for the megaAVR 0-series Silicon Errata and Data Sheet Clarifications of devices. If you are using one of these devices please read the document located at [megaAVR 0-series Silicon Errata and Data Sheet Clarifications](#).

**Notification Status:** Final

**Description of Change:**

## 1. Document:

- a. Adding variants with 16 KB and 8 KB Flash
- b. Adding 40-pin variant of ATmega4809
- c. Changing document title
- d. Adding section 3. Data Sheet Clarifications

## 2. New Errata:

- a. PORTMUX: 2.2.1 SPI SS Pin is Connected to Pin Even if SPI is Configured to Have No Port Connection
- b. TCB: 2.6.2 Minimum Event Duration Must Exceed Selected Clock Period
- c. USART: 2.7.1 TXD Pin Override Not Released When Disabling the Transmitter

3. Erratum for TCA removed: Issuing a restart will clear the direction bit - the data sheet is describing this correctly.

**Impacts to Data Sheet:** None

**Reason for Change:** To Improve Productivity

**Change Implementation Status:** Complete

**Date Document Changes Effective:** 05 Jul 2019

**NOTE:** Please be advised that this is a change to the document only the product has not been changed.

**Markings to Distinguish Revised from Unrevised Devices:** N/A

**Attachment(s):**

[megaAVR 0-series Silicon Errata and Data Sheet Clarifications](#)

Please contact your local [Microchip sales office](#) with questions or concerns regarding this notification.

**Terms and Conditions:**

If you wish to [receive Microchip PCNs via email](#) please register for our PCN email service at our



[PCN home page](#) select register then fill in the required fields. You will find instructions about registering for Microchips PCN email service in the [PCN FAQ](#) section.

If you wish to change your PCN profile, including opt out, please go to the [PCN home page](#) select login and sign into your myMicrochip account. Select a profile option from the left navigation bar and make the applicable selections.

Affected Catalog Part Numbers (CPN)

ATMEGA1608-AF  
ATMEGA1608-AFR  
ATMEGA1608-AU  
ATMEGA1608-AUR  
ATMEGA1608-MF  
ATMEGA1608-MFR  
ATMEGA1608-MU  
ATMEGA1608-MUR  
ATMEGA1608-XF  
ATMEGA1608-XFR  
ATMEGA1608-XU  
ATMEGA1608-XUR  
ATMEGA1609-AF  
ATMEGA1609-AFR  
ATMEGA1609-AU  
ATMEGA1609-AUR  
ATMEGA3208-AF  
ATMEGA3208-AFR  
ATMEGA3208-AU  
ATMEGA3208-AUR  
ATMEGA3208-MF  
ATMEGA3208-MFR  
ATMEGA3208-MU  
ATMEGA3208-MUR  
ATMEGA3208-XF  
ATMEGA3208-XFR  
ATMEGA3208-XU  
ATMEGA3208-XUR  
ATMEGA3209-AF  
ATMEGA3209-AFR  
ATMEGA3209-AU  
ATMEGA3209-AUR  
ATMEGA3209-MF  
ATMEGA3209-MFR  
ATMEGA3209-MU  
ATMEGA3209-MUR  
ATMEGA4808-AF  
ATMEGA4808-AFR  
ATMEGA4808-AU  
ATMEGA4808-AUR  
ATMEGA4808-MF  
ATMEGA4808-MFR  
ATMEGA4808-MU  
ATMEGA4808-MUR  
ATMEGA4808-XF  
ATMEGA4808-XFR

ATMEGA4808-XU  
ATMEGA4808-XUR  
ATMEGA4809-AF  
ATMEGA4809-AFR  
ATMEGA4809-AU  
ATMEGA4809-AUR  
ATMEGA4809-MF  
ATMEGA4809-MFR  
ATMEGA4809-MU  
ATMEGA4809-MUR  
ATMEGA4809-PF  
ATMEGA808-AF  
ATMEGA808-AFR  
ATMEGA808-AU  
ATMEGA808-AUR  
ATMEGA808-MF  
ATMEGA808-MFR  
ATMEGA808-MU  
ATMEGA808-MUR  
ATMEGA808-XF  
ATMEGA808-XFR  
ATMEGA808-XU  
ATMEGA808-XUR  
ATMEGA809-AF  
ATMEGA809-AFR  
ATMEGA809-AU  
ATMEGA809-AUR



# megaAVR® 0-series

---

---

## megaAVR® 0-series Silicon Errata and Data Sheet Clarifications

---

---

### General Notes

---

The megaAVR® 0-series devices you have received conform functionally to the current Device Data Sheets that are available online at <https://www.microchip.com/8-bit/microchip-avr-mcus>, except for the anomalies described in this document.

The errata described in this document may be addressed in future revisions of the silicon.

**Note:** This document summarizes all silicon errata issues from all revisions of silicon, previous as well as current.

**Note:** If you are unable to extract the silicon revision, contact your local Microchip sales office for assistance.

---

## Table of Contents

---

General Notes.....	1
1. Errata Summary.....	3
2. Silicon Errata.....	4
2.1. Errata Details.....	4
2.2. PORTMUX.....	4
2.3. ADC.....	4
2.4. CCL.....	6
2.5. RTC.....	6
2.6. TCB.....	7
2.7. USART.....	8
3. Data Sheet Clarifications.....	9
4. Revision History.....	10
4.1. Document Rev.B - 07/2019.....	10
4.2. Document Rev.A - 02/2018.....	10
The Microchip Website.....	11
Product Change Notification Service.....	11
Customer Support.....	11
Microchip Devices Code Protection Feature.....	11
Legal Notice.....	12
Trademarks.....	12
Quality Management System.....	13
Worldwide Sales and Service.....	14

## 1. Errata Summary

### Legend

- A, B,..** Erratum is valid for silicon revisions A, B,... of the device in that column.
- Erratum is not applicable for any silicon revision of this device.

### Errata Overview

Peripheral	Short Description	Valid for Silicon Revision							
		48 Pins		40 Pins		32 Pins		28 Pins	
		ATmega4809, ATmega3209	ATmega1609, ATmega809	ATmega4809	ATmega4808, ATmega3208	ATmega1608, ATmega808	ATmega4808, ATmega3208	ATmega1608, ATmega808	
PORTMUX	2.2.1 SPI SS Pin is Connected to Pin Even if SPI is Configured to Have No Port Connection	A, B	A	A, B	A, B	A	A, B	A	
ADC	2.3.1 One Extra Measurement Performed After Disabling ADC Free Running Mode	A, B	A	A, B	A, B	A	A, B	A	
	2.3.2 Pending Event Stuck When Disabling the ADC	A, B	-	A, B	A, B	-	A, B	-	
	2.3.3 ADC - Functionality Cannot be Guaranteed With ADCCLK Above 1.5 MHz for All Conditions	A, B	A	A, B	A, B	A	A, B	A	
CCL	2.4.1 D-Latch is Not Functional	A, B	-	A, B	A, B	-	A, B	-	
RTC	2.5.1 Any Write to the RTC.CTRLA Register Resets the RTC and PIT Prescaler	A, B	-	A, B	A, B	-	A, B	-	
TCB	2.6.1 TCA Restart Command Does Not Force a Restart of TCB	A, B	A	A, B	A, B	A	A, B	A	
	2.6.2 Minimum Event Duration Must Exceed Selected Clock Period	A, B	A	A, B	A, B	A	A, B	A	
USART	2.7.1 TXD Pin Override Not Released When Disabling the Transmitter	A, B	A	A, B	A, B	A	A, B	A	

## 2. Silicon Errata

### 2.1 Errata Details

- Erratum is not applicable.
- X** Erratum is applicable.
- \* This silicon revision was never released to production.

### 2.2 PORTMUX

#### 2.2.1 SPI $\overline{SS}$ Pin is Connected to Pin Even if SPI is Configured to Have No Port Connection

The SPIn  $\overline{SS}$  pin is connected even if NONE is selected in the SPIn field in PORTMUX.TWISPIROUTE. If SPIn is operating in Master mode and the  $\overline{SS}$  pin goes low, or input is disabled, the SPIn will exit master mode.

#### Work around

Write the SSD bit in SPIn.CTRLB to '1' to ignore the  $\overline{SS}$  signal.

#### Affected Silicon Revisions

Device	Rev. A	Rev. B						
48 pins	ATmega3209/4809	*	X					
	ATmega809/1609	X						
40 pins	ATmega4809	*	X					
32 pins	ATmega3208/4808	*	X					
	ATmega808/1608	X						
28 pins	ATmega3208/4808	*	X					
	ATmega808/1608	X						

### 2.3 ADC

#### 2.3.1 One Extra Measurement Performed After Disabling ADC Free Running Mode

The ADC may perform one additional measurement after clearing ADCn.CTRLA.FREERUN.

#### Work around

Write ADCn.CTRLA.ENABLE to '0' to stop the free running mode immediately.



### Affected Silicon Revisions

Device		Rev. A	Rev. B				
48 pins	ATmega3209/4809	*	X				
	ATmega809/1609	X					
40 pins	ATmega4809	*	X				
32 pins	ATmega3208/4808	*	X				
	ATmega808/1608	X					
28 pins	ATmega3208/4808	*	X				
	ATmega808/1608	X					

### 2.3.2 Pending Event Stuck When Disabling the ADC

If the ADC is disabled during an event-triggered conversion, the event will not be cleared.

#### Work around

Clear ADC.EVCTRL.STARTEI and wait for conversion to complete before disabling the ADC.

### Affected Silicon Revisions

Device		Rev. A	Rev. B				
48 pins	ATmega3209/4809	*	X				
	ATmega809/1609	-					
40 pins	ATmega4809	*	X				
32 pins	ATmega3208/4808	*	X				
	ATmega808/1608	-					
28 pins	ATmega3208/4808	*	X				
	ATmega808/1608	-					

### 2.3.3 ADC - Functionality Cannot be Guaranteed With ADCCLK Above 1.5 MHz for All Conditions

The ADC functionality cannot be guaranteed if  $ADCCLK > 1.5$  MHz with ADCn.CALIB.DUTYCYC set to 1. The ADC functionality cannot be guaranteed if  $ADCCLK > 1.5$  MHz and  $VDD < 2.7$ V.

#### Work around

If ADC is operated with  $ADCCLK > 1.5$  MHz and  $VDD > 2.7$ V, ADCn.CALIB.DUTYCYC must be set to zero (50% duty cycle). Do not use ADC at  $ADCCLK > 1.5$  MHz and  $VDD < 2.7$ V

### Affected Silicon Revisions

Device		Rev. A	Rev. B				
48 pins	ATmega3209/4809	*	X				
	ATmega809/1609	X					

.....continued								
Device		Rev. A	Rev. B					
40 pins	ATmega4809	*	X					
32 pins	ATmega3208/4808	*	X					
	ATmega808/1608	X						
28 pins	ATmega3208/4808	*	X					
	ATmega808/1608	X						

## 2.4 CCL

### 2.4.1 D-Latch is Not Functional

The CCL D-latch is not functional.

#### Work around

None.

#### Affected Silicon Revisions

Device		Rev. A	Rev. B					
48 pins	ATmega3209/4809	*	X					
	ATmega809/1609	-						
40 pins	ATmega4809	*	X					
32 pins	ATmega3208/4808	*	X					
	ATmega808/1608	-						
28 pins	ATmega3208/4808	*	X					
	ATmega808/1608	-						

## 2.5 RTC

### 2.5.1 Any Write to the RTC.CTRLA Register Resets the RTC and PIT Prescaler

Any write to the RTC.CTRLA register resets the RTC and PIT prescaler.

#### Work around

None.

**Affected Silicon Revisions**

Device		Rev. A	Rev. B				
48 pins	ATmega3209/4809	*	X				
	ATmega809/1609	-					
40 pins	ATmega4809	*	X				
32 pins	ATmega3208/4808	*	X				
	ATmega808/1608	-					
28 pins	ATmega3208/4808	*	X				
	ATmega808/1608	-					

**2.6 TCB**

**2.6.1 TCA Restart Command Does Not Force a Restart of TCB**

The TCA restart command does not force a restart of the TCB when TCB is running in SYNCUPD mode. TCB is only restarted after a TCA OVF.

**Work around**

None.

**Affected Silicon Revisions**

Device		Rev. A	Rev. B				
48 pins	ATmega3209/4809	*	X				
	ATmega809/1609	X					
40 pins	ATmega4809	*	X				
32 pins	ATmega3208/4808	*	X				
	ATmega808/1608	X					
28 pins	ATmega3208/4808	*	X				
	ATmega808/1608	X					

**2.6.2 Minimum Event Duration Must Exceed Selected Clock Period**

Event detection will fail if TCBn receives an input event with a high/low period shorter than the period of the selected clock source (CLKSEL in TCBn.CTRLA).

This applies to the TCB modes (CNTMODE in TCBn.CTRLB) *Time-out check* and *Input Capture Frequency and Pulse-Width Measurement* mode.

**Work around**

Ensure that the high/low period of the input events is equal to or longer than the period of the selected clock source (CLKSEL in TCBn.CTRLA).

**Affected Silicon Revisions**

Device		Rev. A	Rev. B				
48 pins	ATmega3209/4809	*	X				
	ATmega809/1609	X					
40 pins	ATmega4809	*	X				
32 pins	ATmega3208/4808	*	X				
	ATmega808/1608	X					
28 pins	ATmega3208/4808	*	X				
	ATmega808/1608	X					

**2.7 USART**

**2.7.1 TXD Pin Override Not Released When Disabling the Transmitter**

Event detection will fail if TCBn receives an input event with a high/low period shorter than the period of the selected clock source (CLKSEL in TCBn.CTRLA).

The USART will not release the TXD pin override if:

1. The USART transmitter is disabled by writing the TXEN bit in USART.CTRLB to '0' while the USART receiver is disabled (RXEN in USART.CTRLB is '0').
2. Both the USART transmitter and receiver are disabled at the same time by writing the TXEN and RXEN bits in USART.CTRLB to '0'.

**Work around**

There are two possible workarounds:

- Make sure the receiver is enabled (RXEN in USART.CTRLB is '1') while disabling the transmitter (writing TXEN in USART.CTRLB to '0').
- Write to any register in the USART after disabling the transmitter. This will start the USART for long enough to release the pin override of TXD pin.

**Affected Silicon Revisions**

Device		Rev. A	Rev. B				
48 pins	ATmega3209/4809	*	X				
	ATmega809/1609	X					
40 pins	ATmega4809	*	X				
32 pins	ATmega3208/4808	*	X				
	ATmega808/1608	X					
28 pins	ATmega3208/4808	*	X				
	ATmega808/1608	X					

**3. Data Sheet Clarifications**

None.

## 4. Revision History

### 4.1 Document Rev.B - 07/2019

- Document
  - Adding variants with 16 KB and 8 KB Flash
  - Adding 40-pin variant of ATmega4809
  - Changing document title
  - Adding section [3. Data Sheet Clarifications](#)
- New Errata:
  - PORTMUX: [2.2.1 SPI SS Pin is Connected to Pin Even if SPI is Configured to Have No Port Connection](#)
  - TCB: [2.6.2 Minimum Event Duration Must Exceed Selected Clock Period](#)
  - USART: [2.7.1 TXD Pin Override Not Released When Disabling the Transmitter](#)
- Erratum for TCA removed: Issuing a restart will clear the direction bit - the data sheet is describing this correctly.

### 4.2 Document Rev.A - 02/2018

Initial version.

## The Microchip Website

---

Microchip provides online support via our website at <http://www.microchip.com/>. This website is used to make files and information easily available to customers. Some of the content available includes:

- **Product Support** – Data sheets and errata, application notes and sample programs, design resources, user's guides and hardware support documents, latest software releases and archived software
- **General Technical Support** – Frequently Asked Questions (FAQs), technical support requests, online discussion groups, Microchip design partner program member listing
- **Business of Microchip** – Product selector and ordering guides, latest Microchip press releases, listing of seminars and events, listings of Microchip sales offices, distributors and factory representatives

## Product Change Notification Service

---

Microchip's product change notification service helps keep customers current on Microchip products. Subscribers will receive email notification whenever there are changes, updates, revisions or errata related to a specified product family or development tool of interest.

To register, go to <http://www.microchip.com/pcn> and follow the registration instructions.

## Customer Support

---

Users of Microchip products can receive assistance through several channels:

- Distributor or Representative
- Local Sales Office
- Embedded Solutions Engineer (ESE)
- Technical Support

Customers should contact their distributor, representative or ESE for support. Local sales offices are also available to help customers. A listing of sales offices and locations is included in this document.

Technical support is available through the web site at: <http://www.microchip.com/support>

## Microchip Devices Code Protection Feature

---

Note the following details of the code protection feature on Microchip devices:

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as "unbreakable."

Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

## Legal Notice

---

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION, INCLUDING BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE. Microchip disclaims all liability arising from this information and its use. Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights unless otherwise stated.

## Trademarks

---

The Microchip name and logo, the Microchip logo, Adaptec, AnyRate, AVR, AVR logo, AVR Freaks, BesTime, BitCloud, chipKIT, chipKIT logo, CryptoMemory, CryptoRF, dsPIC, FlashFlex, flexPWR, HELDO, IGLOO, JukeBlox, KeeLoq, Kleer, LANCheck, LinkMD, maXStylus, maXTouch, MediaLB, megaAVR, Microsemi, Microsemi logo, MOST, MOST logo, MPLAB, OptoLyzer, PackeTime, PIC, picoPower, PICSTART, PIC32 logo, PolarFire, Prochip Designer, QTouch, SAM-BA, SenGenuity, SpyNIC, SST, SST Logo, SuperFlash, Symmetricom, SyncServer, Tachyon, TempTrackr, TimeSource, tinyAVR, UNI/O, Vectron, and XMEGA are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

APT, ClockWorks, The Embedded Control Solutions Company, EtherSynch, FlashTec, Hyper Speed Control, HyperLight Load, IntelliMOS, Libero, motorBench, mTouch, Powermite 3, Precision Edge, ProASIC, ProASIC Plus, ProASIC Plus logo, Quiet-Wire, SmartFusion, SyncWorld, Temux, TimeCesium, TimeHub, TimePictra, TimeProvider, Vite, WinPath, and ZL are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Adjacent Key Suppression, AKS, Analog-for-the-Digital Age, Any Capacitor, AnyIn, AnyOut, BlueSky, BodyCom, CodeGuard, CryptoAuthentication, CryptoAutomotive, CryptoCompanion, CryptoController, dsPICDEM, dsPICDEM.net, Dynamic Average Matching, DAM, ECAN, EtherGREEN, In-Circuit Serial Programming, ICSP, INICnet, Inter-Chip Connectivity, JitterBlocker, KleerNet, KleerNet logo, memBrain, Mindi, MiWi, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, MultiTRAK, NetDetach, Omniscient Code Generation, PICDEM, PICDEM.net, PICkit, PICtail, PowerSmart, PureSilicon, QMatrix, REAL ICE, Ripple Blocker, SAM-ICE, Serial Quad I/O, SMART-I.S., SQI, SuperSwitcher, SuperSwitcher II, Total Endurance, TSHARC, USBCheck, VariSense, ViewSpan, WiperLock, Wireless DNA, and ZENA are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

The Adaptec logo, Frequency on Demand, Silicon Storage Technology, and Symmcom are registered trademarks of Microchip Technology Inc. in other countries.



GestIC is a registered trademark of Microchip Technology Germany II GmbH & Co. KG, a subsidiary of Microchip Technology Inc., in other countries.

All other trademarks mentioned herein are property of their respective companies.

© 2019, Microchip Technology Incorporated, Printed in the U.S.A., All Rights Reserved.

ISBN: 978-1-5224-4737-5

## Quality Management System

---

For information regarding Microchip's Quality Management Systems, please visit <http://www.microchip.com/quality>.

## Worldwide Sales and Service

AMERICAS	ASIA/PACIFIC	ASIA/PACIFIC	EUROPE
<p><b>Corporate Office</b> 2355 West Chandler Blvd. Chandler, AZ 85224-6199 Tel: 480-792-7200 Tel: 480-792-7277 Technical Support: <a href="http://www.microchip.com/support">http://www.microchip.com/support</a> Web Address: <a href="http://www.microchip.com">http://www.microchip.com</a></p> <p><b>Atlanta</b> Duluth, GA Tel: 678-957-9614 Fax: 678-957-1455</p> <p><b>Austin, TX</b> Tel: 512-257-3370</p> <p><b>Boston</b> Westborough, MA Tel: 774-760-0087 Fax: 774-760-0088</p> <p><b>Chicago</b> Itasca, IL Tel: 630-285-0071 Fax: 630-285-0075</p> <p><b>Dallas</b> Addison, TX Tel: 972-818-7423 Fax: 972-818-2924</p> <p><b>Detroit</b> Novi, MI Tel: 248-848-4000</p> <p><b>Houston, TX</b> Tel: 281-894-5983</p> <p><b>Indianapolis</b> Noblesville, IN Tel: 317-773-8323 Fax: 317-773-5453 Tel: 317-536-2380</p> <p><b>Los Angeles</b> Mission Viejo, CA Tel: 949-462-9523 Fax: 949-462-9608 Tel: 951-273-7800</p> <p><b>Raleigh, NC</b> Tel: 919-844-7510</p> <p><b>New York, NY</b> Tel: 631-435-6000</p> <p><b>San Jose, CA</b> Tel: 408-735-9110 Tel: 408-436-4270</p> <p><b>Canada - Toronto</b> Tel: 905-695-1980 Fax: 905-695-2078</p>	<p><b>Australia - Sydney</b> Tel: 61-2-9868-6733</p> <p><b>China - Beijing</b> Tel: 86-10-8569-7000</p> <p><b>China - Chengdu</b> Tel: 86-28-8665-5511</p> <p><b>China - Chongqing</b> Tel: 86-23-8980-9588</p> <p><b>China - Dongguan</b> Tel: 86-769-8702-9880</p> <p><b>China - Guangzhou</b> Tel: 86-20-8755-8029</p> <p><b>China - Hangzhou</b> Tel: 86-571-8792-8115</p> <p><b>China - Hong Kong SAR</b> Tel: 852-2943-5100</p> <p><b>China - Nanjing</b> Tel: 86-25-8473-2460</p> <p><b>China - Qingdao</b> Tel: 86-532-8502-7355</p> <p><b>China - Shanghai</b> Tel: 86-21-3326-8000</p> <p><b>China - Shenyang</b> Tel: 86-24-2334-2829</p> <p><b>China - Shenzhen</b> Tel: 86-755-8864-2200</p> <p><b>China - Suzhou</b> Tel: 86-186-6233-1526</p> <p><b>China - Wuhan</b> Tel: 86-27-5980-5300</p> <p><b>China - Xian</b> Tel: 86-29-8833-7252</p> <p><b>China - Xiamen</b> Tel: 86-592-2388138</p> <p><b>China - Zhuhai</b> Tel: 86-756-3210040</p>	<p><b>India - Bangalore</b> Tel: 91-80-3090-4444</p> <p><b>India - New Delhi</b> Tel: 91-11-4160-8631</p> <p><b>India - Pune</b> Tel: 91-20-4121-0141</p> <p><b>Japan - Osaka</b> Tel: 81-6-6152-7160</p> <p><b>Japan - Tokyo</b> Tel: 81-3-6880-3770</p> <p><b>Korea - Daegu</b> Tel: 82-53-744-4301</p> <p><b>Korea - Seoul</b> Tel: 82-2-554-7200</p> <p><b>Malaysia - Kuala Lumpur</b> Tel: 60-3-7651-7906</p> <p><b>Malaysia - Penang</b> Tel: 60-4-227-8870</p> <p><b>Philippines - Manila</b> Tel: 63-2-634-9065</p> <p><b>Singapore</b> Tel: 65-6334-8870</p> <p><b>Taiwan - Hsin Chu</b> Tel: 886-3-577-8366</p> <p><b>Taiwan - Kaohsiung</b> Tel: 886-7-213-7830</p> <p><b>Taiwan - Taipei</b> Tel: 886-2-2508-8600</p> <p><b>Thailand - Bangkok</b> Tel: 66-2-694-1351</p> <p><b>Vietnam - Ho Chi Minh</b> Tel: 84-28-5448-2100</p>	<p><b>Austria - Wels</b> Tel: 43-7242-2244-39 Fax: 43-7242-2244-393</p> <p><b>Denmark - Copenhagen</b> Tel: 45-4450-2828 Fax: 45-4485-2829</p> <p><b>Finland - Espoo</b> Tel: 358-9-4520-820</p> <p><b>France - Paris</b> Tel: 33-1-69-53-63-20 Fax: 33-1-69-30-90-79</p> <p><b>Germany - Garching</b> Tel: 49-8931-9700</p> <p><b>Germany - Haan</b> Tel: 49-2129-3766400</p> <p><b>Germany - Heilbronn</b> Tel: 49-7131-72400</p> <p><b>Germany - Karlsruhe</b> Tel: 49-721-625370</p> <p><b>Germany - Munich</b> Tel: 49-89-627-144-0 Fax: 49-89-627-144-44</p> <p><b>Germany - Rosenheim</b> Tel: 49-8031-354-560</p> <p><b>Israel - Ra'anana</b> Tel: 972-9-744-7705</p> <p><b>Italy - Milan</b> Tel: 39-0331-742611 Fax: 39-0331-466781</p> <p><b>Italy - Padova</b> Tel: 39-049-7625286</p> <p><b>Netherlands - Drunen</b> Tel: 31-416-690399 Fax: 31-416-690340</p> <p><b>Norway - Trondheim</b> Tel: 47-72884388</p> <p><b>Poland - Warsaw</b> Tel: 48-22-3325737</p> <p><b>Romania - Bucharest</b> Tel: 40-21-407-87-50</p> <p><b>Spain - Madrid</b> Tel: 34-91-708-08-90 Fax: 34-91-708-08-91</p> <p><b>Sweden - Gothenberg</b> Tel: 46-31-704-60-40</p> <p><b>Sweden - Stockholm</b> Tel: 46-8-5090-4654</p> <p><b>UK - Wokingham</b> Tel: 44-118-921-5800 Fax: 44-118-921-5820</p>