



ATmega3208/3209 Silicon Errata and Data Sheet Clarification

ATmega3208/3209 Silicon Errata and Data Sheet Clarification

The ATmega3208/3209 devices of the megaAVR® 0-series you have received conform functionally to the current device data sheet (www.microchip.com/DS40002174), except for the anomalies described in this document. The errata described in this document will likely be addressed in future revisions of the ATmega3208/3209 devices.

Notes:

- This document summarizes all the silicon errata issues from all revisions of silicon, previous as well as current
- Refer to the Device/Revision ID section in the current device data sheet (www.microchip.com/DS40002174) for more detailed information on Device Identification and Revision IDs for your specific device, or contact your local Microchip sales office for assistance

Table of Contents

.....	1
1. Silicon Issue Summary.....	3
2. Silicon Errata.....	5
2.1. Errata Details.....	5
2.2. Device.....	5
2.3. PORTMUX.....	5
2.4. ADC.....	5
2.5. CCL.....	6
2.6. RTC.....	7
2.7. TCA.....	7
2.8. TCB.....	8
2.9. USART.....	8
3. Data Sheet Clarifications.....	10
3.1. Ordering Information - Automotive Ordering Codes Are Available on Request.....	10
4. Document Revision History.....	11
4.1. Revision History.....	11
4.2. Appendix - Obsolete Revision History.....	11
The Microchip Website.....	13
Product Change Notification Service.....	13
Customer Support.....	13
Microchip Devices Code Protection Feature.....	13
Legal Notice.....	14
Trademarks.....	14
Quality Management System.....	15
Worldwide Sales and Service.....	16

1. Silicon Issue Summary

Legend

- Erratum is not applicable.
- X Erratum is applicable.

Errata Overview

Peripheral	Short Description	Valid for Silicon Revision	
		Rev. B ⁽¹⁾	Rev. D
Device	2.2.1 Writing the OSCLOCK Fuse in FUSE.OSCCFG to '1' Prevents Automatic Loading of Calibration Values	X	X
PORTMUX	2.3.1 SPI SS Pin is Connected to Pin Even if SPI is Configured to Have No Port Connection	X	X
ADC	2.4.1 One Extra Measurement Performed After Disabling ADC Free-Running Mode	X	X
	2.4.2 ADC Functionality Cannot be Ensured with CLKADC Above 1.5 MHz and a Setting of 25% Duty Cycle	X	X
	2.4.3 Pending Event Stuck When Disabling the ADC	X	-
	2.4.4 ADC Performance Degrades with CLKADC Above 1.5 MHz and VDD < 2.7V	X	X
CCL	2.5.1 D-latch is Not Functional	X	-
	2.5.2 The CCL Must be Disabled to Change the Configuration of a Single LUT	X	X
RTC	2.6.1 Any Write to the RTC.CTRLA Register Resets the RTC and PIT Prescaler	X	-
TCA	2.7.1 Restart Will Reset Counter Direction in NORMAL and FRQ Mode	X	X
TCB	2.8.1 The TCA Restart Command Does Not Force a Restart of TCB	X	X
	2.8.2 Minimum Event Duration Must Exceed the Selected Clock Period	X	X
	2.8.3 CCMP and CNT Registers Operate as 16-Bit Registers in 8-Bit PWM Mode	X	X
USART	2.9.1 TXD Pin Override Not Released When Disabling the Transmitter	X	X
	2.9.2 Open-Drain Mode Does Not Work When TXD is Configured as Output	X	X
	2.9.3 Start-of-Frame Detection Can Unintentionally Be Triggered in Active Mode	X	X

ATmega3208/3209 Silicon Errata and ...

Silicon Issue Summary

Notes:

1. This revision is the initial release of the silicon.
2. The following silicon revision was never released to production: **Rev. B**

2. Silicon Errata

2.1 Errata Details

- Erratum is not applicable.
- X Erratum is applicable.

2.2 Device

2.2.1 Writing the OSCLOCK Fuse in FUSE.OSCCFG to '1' Prevents Automatic Loading of Calibration Values

Writing the OSCLOCK fuse in FUSE.OSCCFG to '1' prevents the automatic loading of calibration values from the signature row. The device will run with an uncalibrated OSC20M oscillator.

Work Around

Do not use OSCLOCK for locking the oscillator calibration value. The oscillator calibration value can be locked by writing LOCK in CLKCTRL.OSC20MCALIBB to '1'.

Affected Silicon Revisions

Rev. B	Rev. D
X	X

2.3 PORTMUX

2.3.1 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 Host mode and the $\overline{SS}$ pin goes low, or input is disabled, the SPIn will exit Host mode.

Work around

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

Affected Silicon Revisions

Rev. B	Rev. D
X	X

2.4 ADC

2.4.1 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.

ATmega3208/3209 Silicon Errata and ...

Silicon Errata

Affected Silicon Revisions

Rev. B	Rev. D
X	X

2.4.2 ADC Functionality Cannot be Ensured with CLK_{ADC} Above 1.5 MHz and a Setting of 25% Duty Cycle

The ADC functionality cannot be ensured if $CLK_{ADC} > 1.5$ MHz with ADCn.CALIB.DUTYCYC set to '1'.

Work Around

If ADC is operated with $CLK_{ADC} > 1.5$ MHz, ADCn.CALIB.DUTYCYC must be set to '0' (50% duty cycle).

Affected Silicon Revisions

Rev. B	Rev. D
X	X

2.4.3 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 the conversion to complete before disabling the ADC.

Affected Silicon Revisions

Rev. B	Rev. D
X	-

2.4.4 ADC Performance Degrades with CLK_{ADC} Above 1.5 MHz and $V_{DD} < 2.7V$

The ADC INL performance degrades if $CLK_{ADC} > 1.5$ MHz and ADCn.CALIB.DUTYCYC set to '0' for $V_{DD} < 2.7V$.

Work Around

None.

Affected Silicon Revisions

Rev. B	Rev. D
X	X

2.5 CCL

2.5.1 D-latch is Not Functional

The CCL D-latch is not functional.

Work Around

None.

Affected Silicon Revisions

Rev. B	Rev. D
X	-

2.5.2 The CCL Must be Disabled to Change the Configuration of a Single LUT

To reconfigure a LUT, the CCL peripheral must be disabled (write ENABLE in CCL.CTRLA to '0'). Writing ENABLE to '0' will disable all the LUTs, and affects the LUTs not under reconfiguration.

Work Around

None

Affected Silicon Revisions

Rev. B	Rev. D
X	-

2.6 RTC

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

Any write to the RTC.CTRLA register resets the 15-bit prescaler resulting in a longer period on the current count or period.

Work Around

None.

Affected Silicon Revisions

Rev. B	Rev. D
X	-

2.7 TCA

2.7.1 Restart Will Reset Counter Direction in NORMAL and FRQ Mode

When the TCA is configured to the NORMAL or FRQ mode (WGMode in TCAn.CTRLB is '0x0' or '0x1'), a RESTART command or Restart event will reset direction to default. The default is counting upwards.

Work Around

None.

Affected Silicon Revisions

Rev. B	Rev. D
X	X

2.8 TCB

2.8.1 The TCA Restart Command Does Not Force a Restart of TCB

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

Work Around

None.

Affected Silicon Revisions

Rev. B	Rev. D
X	X

2.8.2 Minimum Event Duration Must Exceed the 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 input events is equal to or longer than the selected clock source (CLKSEL in TCBn.CTRLA) period.

Affected Silicon Revisions

Rev. B	Rev. D
X	X

2.8.3 CCMP and CNT Registers Operate as 16-Bit Registers in 8-Bit PWM Mode

When the TCB operates in 8-bit PWM mode (CNTMODE in TCBn.CTRLB is '0x7'), the low and high bytes for the CNT and CCMP registers operate as 16-bit registers for read and write. They cannot be read or written independently.

Work Around

Use 16-bit register access. Refer to the data sheet for further information.

Affected Silicon Revisions

Rev. B	Rev. D
X	X

2.9 USART

2.9.1 TXD Pin Override Not Released When Disabling the Transmitter

The USART will not release the TXD pin override if:

- 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')
- 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 work arounds:

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

Affected Silicon Revisions

Rev. B	Rev. D
X	X

2.9.2 Open-Drain Mode Does Not Work When TXD is Configured as Output

When the USART TXD pin is configured as an output, it can drive the pin high regardless of whether the Open-Drain mode is enabled or not.

Work Around

Configure the TXD pin as an input by writing the corresponding bit in PORTx.DIR to '0' when using Open-Drain mode.

Affected Silicon Revisions

Rev. B	Rev. D
X	X

2.9.3 Start-of-Frame Detection Can Unintentionally Be Triggered in Active Mode

The Start-of-Frame Detection feature enables the USART to wake up from Standby sleep mode upon data reception.

The Start-of-Frame Detector can unintentionally be triggered when the Start-of-Frame Detection Enable (SFDEN) bit in the USART Control B (USARTn.CTRLB) register is set, and the device is in Active mode. If the Receive Data (RXDATA) registers are read while receiving new data, the Receive Complete Interrupt Flag (RXCIF) in the USARTn.STATUS register is cleared. This results in the Start-of-Frame Detector being triggered and falsely detecting the following falling edge as a start bit. When the Start-of-Frame Detector detects a start condition, the frame reception is restarted, resulting in corrupt received data.

Note that the USART Receive Start Interrupt Flag (RXSIF) always is '0' when in Active mode. No interrupt will be triggered.

Work Around

Disable Start-of-Frame Detection by writing '0' to the Start-of-Frame Detection Enable (SFDEN) bit in the USART Control B (USARTn.CTRLB) register when the device is in Active mode. Enable it again by writing the bit to '1' before transitioning to Standby sleep mode. This work around depends on a protocol preventing a new incoming frame when re-enabling Start-of-Frame Detection. Re-enabling Start-of-Frame Detection, while a new frame is already incoming, will result in corrupted received data.

Affected Silicon Revisions

Rev. B	Rev. D
X	X

3. Data Sheet Clarifications

The following typographic corrections and clarifications are to be noted for the latest version of the device data sheet (www.microchip.com/DS40002174).

Note: Corrections are shown in **bold**. Where possible, the original bold text formatting has been removed for clarity.

3.1 Ordering Information - Automotive Ordering Codes Are Available on Request

Note: Automotive-grade ordering codes (VAO suffix) are set up on request and may not be listed in “Table 34-1. Available Product Numbers” of the data sheet.

4. Document Revision History

Note: The data sheet clarification document revision is independent of the die revision and the device variant (last letter of the ordering number).

4.1 Revision History

Doc Rev.	Date	Comments
C	07/2021	- Added errata: 2.5.2 The CCL Must be Disabled to Change the Configuration of a Single LUT - Added data sheet clarifications: 3.1 Ordering Information - Automotive Ordering Codes Are Available on Request
B	02/2021	- Added new errata: - Device: 2.2.1 Writing the OSCLOCK Fuse in FUSE.OSCCFG to '1' Prevents Automatic Loading of Calibration Values - TCA: 2.7.1 Restart Will Reset Counter Direction in NORMAL and FRQ Mode - TCB: 2.8.3 CCMP and CNT Registers Operate as 16-Bit Registers in 8-Bit PWM Mode - USART: 2.9.2 Open-Drain Mode Does Not Work When TXD is Configured as Output 2.9.3 Start-of-Frame Detection Can Unintentionally Be Triggered in Active Mode
A	01/2020	- Document - Change document structure from one document for the entire megaAVR 0-series to one document per data sheet: - from: megaAVR-0-series-Errata-and-Clarification-80000777C.pdf - to: ATmega3208_3209-Errata-and-Clarification-DS80000869A.pdf - Updated document template - Errata - Update tables with device Rev. D - The ADC errata, ADC Functionality Cannot be Ensured with ADCCLK Above 1.5 MHz for All Conditions, has been split into two separate erratas and rewritten

4.2 Appendix - Obsolete Revision History

Note: Due to document structure change from a single megaAVR 0-series to one document per data sheet, the following history from www.microchip.com/DS80000777 is provided as reference.

Doc Rev.	Date	Comments
C	08/2019	- New Errata: - CPUINT: Interrupt Level 1 Does Not Work Note: Only applicable to ATmega4808/4809 for specific date codes.

ATmega3208/3209 Silicon Errata and ...

Document Revision History

.....continued		
Doc Rev.	Date	Comments
B	07/2019	• Document – Adding variants with 16 KB and 8 KB Flash – Adding 40-pin variant of ATmega4809 – Changing document title – Adding section "Data Sheet Clarifications" • New Errata: – PORTMUX: SPI SS is Connected to Pin Even if SPI is Configured to Have No Port Connection – TCB: Minimum Event Duration Must Exceed Selected Clock Period – USART: 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.
A	02/2018	• Initial document release.

The Microchip Website

Microchip provides online support via our website at 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 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 website at: 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 specifications contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is secure when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods being used in attempts to breach the code protection features of the Microchip devices. We believe that these methods require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Attempts to breach these code protection features, most likely, cannot be accomplished without violating Microchip's intellectual property rights.
- Microchip is willing to work with any customer who is concerned about the integrity of its code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of its code. Code protection does not mean that we are guaranteeing the product is "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 is provided for the sole purpose of designing with and using Microchip products. Information 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.

THIS INFORMATION IS PROVIDED BY MICROCHIP "AS IS". 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 ANY IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE OR WARRANTIES RELATED TO ITS CONDITION, QUALITY, OR PERFORMANCE.

IN NO EVENT WILL MICROCHIP BE LIABLE FOR ANY INDIRECT, SPECIAL, PUNITIVE, INCIDENTAL OR CONSEQUENTIAL LOSS, DAMAGE, COST OR EXPENSE OF ANY KIND WHATSOEVER RELATED TO THE INFORMATION OR ITS USE, HOWEVER CAUSED, EVEN IF MICROCHIP HAS BEEN ADVISED OF THE POSSIBILITY OR THE DAMAGES ARE FORESEEABLE. TO THE FULLEST EXTENT ALLOWED BY LAW, MICROCHIP'S TOTAL LIABILITY ON ALL CLAIMS IN ANY WAY RELATED TO THE INFORMATION OR ITS USE WILL NOT EXCEED THE AMOUNT OF FEES, IF ANY, THAT YOU HAVE PAID DIRECTLY TO MICROCHIP FOR THE INFORMATION. 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, Klear, 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, TimeSource, tinyAVR, UNI/O, Vectron, and XMEGA are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

AgileSwitch, 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, 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, Augmented Switching, BlueSky, BodyCom, CodeGuard, CryptoAuthentication, CryptoAutomotive, CryptoCompanion, CryptoController, dsPICDEM, dsPICDEM.net, Dynamic Average Matching, DAM, ECAN, Espresso T1S, EtherGREEN, IdealBridge, In-Circuit Serial Programming, ICSP, INICnet, Intelligent Paralleling, Inter-Chip Connectivity, JitterBlocker, maxCrypto, maxView, 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, RTAX, RTG4, SAM-ICE, Serial Quad I/O, simpleMAP, SimpliPHY, SmartBuffer, SMART-I.S., storClad, SQL, SuperSwitcher, SuperSwitcher II, Switchtec, SynchroPHY, Total Endurance, TSHARC, USBCheck, VariSense, VectorBlox, VeriPHY, ViewSpan, WiperLock, XpressConnect, 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.

© 2021, Microchip Technology Incorporated, Printed in the U.S.A., All Rights Reserved.

ISBN: 978-1-5224-8430-1

Quality Management System

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

Worldwide Sales and Service

AMERICAS	ASIA/PACIFIC	ASIA/PACIFIC	EUROPE
Corporate Office 2355 West Chandler Blvd. Chandler, AZ 85224-6199 Tel: 480-792-7200 Fax: 480-792-7277 Technical Support: www.microchip.com/support Web Address: www.microchip.com	Australia - Sydney Tel: 61-2-9868-6733 China - Beijing Tel: 86-10-8569-7000 China - Chengdu Tel: 86-28-8665-5511 China - Chongqing Tel: 86-23-8980-9588 China - Dongguan Tel: 86-769-8702-9880 China - Guangzhou Tel: 86-20-8755-8029 China - Hangzhou Tel: 86-571-8792-8115 China - Hong Kong SAR Tel: 852-2943-5100 China - Nanjing Tel: 86-25-8473-2460 China - Qingdao Tel: 86-532-8502-7355 China - Shanghai Tel: 86-21-3326-8000 China - Shenyang Tel: 86-24-2334-2829 China - Shenzhen Tel: 86-755-8864-2200 China - Suzhou Tel: 86-186-6233-1526 China - Wuhan Tel: 86-27-5980-5300 China - Xian Tel: 86-29-8833-7252 China - Xiamen Tel: 86-592-2388138 China - Zhuhai Tel: 86-756-3210040	India - Bangalore Tel: 91-80-3090-4444 India - New Delhi Tel: 91-11-4160-8631 India - Pune Tel: 91-20-4121-0141 Japan - Osaka Tel: 81-6-6152-7160 Japan - Tokyo Tel: 81-3-6880-3770 Korea - Daegu Tel: 82-53-744-4301 Korea - Seoul Tel: 82-2-554-7200 Malaysia - Kuala Lumpur Tel: 60-3-7651-7906 Malaysia - Penang Tel: 60-4-227-8870 Philippines - Manila Tel: 63-2-634-9065 Singapore Tel: 65-6334-8870 Taiwan - Hsin Chu Tel: 886-3-577-8366 Taiwan - Kaohsiung Tel: 886-7-213-7830 Taiwan - Taipei Tel: 886-2-2508-8600 Thailand - Bangkok Tel: 66-2-694-1351 Vietnam - Ho Chi Minh Tel: 84-28-5448-2100	Austria - Wels Tel: 43-7242-2244-39 Fax: 43-7242-2244-393 Denmark - Copenhagen Tel: 45-4485-5910 Fax: 45-4485-2829 Finland - Espoo Tel: 358-9-4520-820 France - Paris Tel: 33-1-69-53-63-20 Fax: 33-1-69-30-90-79 Germany - Garching Tel: 49-8931-9700 Germany - Haan Tel: 49-2129-3766400 Germany - Heilbronn Tel: 49-7131-72400 Germany - Karlsruhe Tel: 49-721-625370 Germany - Munich Tel: 49-89-627-144-0 Fax: 49-89-627-144-44 Germany - Rosenheim Tel: 49-8031-354-560 Israel - Ra'anana Tel: 972-9-744-7705 Italy - Milan Tel: 39-0331-742611 Fax: 39-0331-466781 Italy - Padova Tel: 39-049-7625286 Netherlands - Drunen Tel: 31-416-690399 Fax: 31-416-690340 Norway - Trondheim Tel: 47-72884388 Poland - Warsaw Tel: 48-22-3325737 Romania - Bucharest Tel: 40-21-407-87-50 Spain - Madrid Tel: 34-91-708-08-90 Fax: 34-91-708-08-91 Sweden - Gothenberg Tel: 46-31-704-60-40 Sweden - Stockholm Tel: 46-8-5090-4654 UK - Wokingham Tel: 44-118-921-5800 Fax: 44-118-921-5820