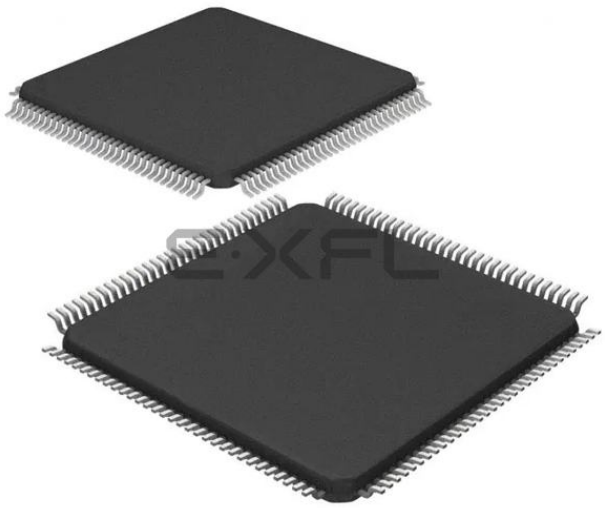


Welcome to E-XFL.COM

Embedded - Microcontrollers - Application Specific: Tailored Solutions for Precision and Performance

Embedded - Microcontrollers - Application Specific represents a category of microcontrollers designed with unique features and capabilities tailored to specific application needs. Unlike general-purpose microcontrollers, application-specific microcontrollers are optimized for particular tasks, offering enhanced performance, efficiency, and functionality to meet the demands of specialized applications.

What Are Embedded - Microcontrollers - Application Specific?

Application-specific microcontrollers are engineered to

Details	
Product Status	Active
Applications	I/O Controller
Core Processor	8051
Program Memory Type	-
Controller Series	-
RAM Size	64KB
Interface	ACPI, BC-Link, I²C/SMBus, LPC, PECI, PS/2, SPI
Number of I/O	56
Voltage - Supply	3.3V
Operating Temperature	0°C ~ 85°C
Mounting Type	Surface Mount
Package / Case	128-TQFP
Supplier Device Package	128-VTQFP (14x14)
Purchase URL	https://www.e-xfl.com/product-detail/microchip-technology/mec1310-nu-tr

MEC1310

Keyboard and Embedded Controller for Notebook PC

Product Features

- 3.3V Operation with 5V Tolerant Buffers on PS/2 pins
- ACPI 1.0/2.0 PC99/PC2001 Compliant
- LPC Interface with Clock Run Support
  - Supports LPC Bus frequencies of 19.2MHz to 33MHz
  - Serial IRQ Interface Compatible with Serialized IRQ Support for PCI Systems
  - 15 Direct IRQs
  - ACPI SCI Interface
  - nSMI output and supporting PM registers
  - Shadowed write only registers
- Internal 64K SRAM in MEC1310
  - Loaded at VCC1 power from the HOST/8051 SPI Memory Interface
  - Provides 64KB of 8051 program space
  - 32k-Byte region shared with 8051data space
- HOST/8051 SPI Memory Interface
  - 3-pin Full Duplex serial communication interface.
  - One Chip Select Pins
  - Fully 8051 Controlled
  - Hardware Support for two SPI Flash Configurations:
    - Switched SPI Flash Configuration
    - Parallel Shared SPI Flash Configuration
    - Debug Programming Interface
- Two Power Planes
  - Low Standby Current in Sleep Mode
- Three ACPI Embedded Controller Interface
- Configuration Register Set Compatible with ISA Plug-and-Play Standard (Version 1.0a)
- High-Performance Embedded 8051 Keyboard and System Controller
  - Provides System Power Management
  - System Watch Dog Timer (WDT)
  - 8042 Style Host Interface
  - Supports Interrupt and Polling Access
  - 1024 Boot /ROM
  - 256 Bytes Data RAM
  - On-Chip Memory-Mapped Control Registers
  - Access to VCC0 Backed Registers
  - Up to 18x8 Keyboard Scan Matrix
  - Two 16-Bit Timer/Counters
  - Integrated Full-Duplex Serial Port Interface
  - Seventy-Three 8051 Interrupt Sources
  - Thirty-Two 8-Bit, Host/8051 Mailbox Registers
  - Sixty-Four Maskable Hardware Wake-Up Events
  - Fast GATEA20
  - Fast CPU_RESET
  - Multiple Clock Sources and Operating Frequencies
  - IDLE and SLEEP Modes
  - Trace FIFO Debug Port
- Accurate Fail-Safe Ring Oscillator
  - Single Clock source for most 8051 and SIO functions
  - Provides 2% frequency accuracy
  - Lock Bit provides status
  - 32.768KHz-input clock
    - Single ended input
    - Compatible with south bridge SUSCLK/ RSMRST# gating rules
    - replacement 32K distribution available when RSMRST# is asserted
    - Very low power state with only external 32K clock distributed
- Integrated Standby Power Reset Generator
  - VCC1_RST# open drain output
  - Accepts External driven Reset
- VCC0 Backed Resources
  - 64 Byte VCC0 Backed Registers
  - VCC0 Backed Status Register
- Three 8584-Style I^2C/SMBus Controllers
  - 8051 Controlled Logic Allows I^2C/SMBus Master or Slave Operation
  - I^2C/SMBus Controllers are Fully Operational on Standby Power
  - Two Controllers with 2 Sets of Dedicated Pins per I^2C/SMBus Controller
  - One Controller with one Set of Dedicated Pins per I^2C/SMBus Controller
- Four independent Hardware Driven PS/2 Ports
  - GPIO signal function associated with each pin
- PECI Interface 2.0

- 56 General Purpose I/O Pins
  - Maskable Hardware Wake-Event Capable
  - Programmable Open-Drain/Push-Pull Outputs
- 7 General-Purpose Outputs
- Four Programmable Pulse-Width Modulator Outputs
  - Independent Clock Rates
  - 6-Bit Duty Cycle Granularity
  - Operational in both Full on and Standby modes
- Dual Fan Tachometer Inputs
- RPM-Based Fan Speed Control Algorithm
  - Utilizes one TACH input and one PWM output
  - 3% accurate from 500 RPM to 16k RPM
  - Automatic Tachometer feedback
  - Aging Fan or Invalid Drive Detection
  - Spin Up Routine
  - Ramp Rate Control
    - RPM-based Fan Speed Control Algorithm
- Debug Port (UART)
  - High-Speed 16550A-Compatible UART with 16-Byte Send/Receive FIFOs
  - Programmable Baud Rate Generator
  - Relocatable to 480 Different Base I/O Addresses
  - 15 IRQ Options
- BC-Link Interconnection Bus
  - Combined High Speed/Low Speed Bus Master Controller
- General Purpose Analog to Digital Converter (GP-ADC)
  - 10-bit conversion precision
  - 10-bit conversion per channel is completed in 10.91us
  - 5 ADC channels
    - 10-bit Conversion with 25.78 mV resolution
    - 0 to 3.3 VDC Conversion Range
  - Channel 0 has a 5 volt tolerant input
  - Optional continuous sampling at a programmable rate
  - Selectable VREF source on a per Channel Basis
    - VREF pin or AVCC
- 128-Pin VTQFP RoHS Compliant Package

Description

The MEC1310 is a 128-pin 3.3V LPC-based ACPI 2.0 and PC99/PC2001 compliant Notebook I/O Controller. See FIGURE 1: MEC1310 Block Diagram on page 4.

The MEC1310 incorporates a high-performance 8051-based keyboard and system controller with internal embedded 64K SRAM; a 1K byte Boot ROM, and 64-bytes battery backed registers. The embedded 64K SRAM is loaded via HOST/8051 SPI Memory Interface. The HOST/8051 SPI Memory Interface can be configured in Switched SPI Flash Configuration or Parallel Shared SPI Flash Configuration.

The MEC1310 has four PS/2 ports; an 16C550A-compatible 2 pin UART for Debug Port; three 8584-style I^2C/SMBus controllers with two selectable ports per controller; a Serial IRQ peripheral agent interface; three ACPI Embedded Controller Interface; General Purpose I/O pins and seven General Purpose Outputs; four independently programmable pulse width modulators; dual fan control through the implementation of two fan tachometer input pins, RPM-PWM block with one tachometer input and one PWM output; hardware monitoring of a PWM input and maskable hardware wake-up events; one BC-Link Combined High Speed/Low Speed Bus Master Controller; 5 channel Analog to Digital Converter.

The MEC1310 has two separate power planes to provide “instant on” and system power management functions. Additionally, the MEC1310 incorporates sophisticated power control circuitry (PCC). The PCC supports multiple low power down modes. Wake-up events and ACPI-related functions are supported through the SCI Interface.

The MEC1310 supports the ISA Plug-and-Play Standard (Version 1.0a) and provides all the functionality for current Windows O/S’s. The I/O Address and Hardware IRQ of each logical device in the MEC1310 may be reprogrammed through the internal configuration registers. There are 480 I/O address location options and 15 IRQs for each logical device.

TO OUR VALUED CUSTOMERS

It is our intention to provide our valued customers with the best documentation possible to ensure successful use of your Microchip products. To this end, we will continue to improve our publications to better suit your needs. Our publications will be refined and enhanced as new volumes and updates are introduced.

If you have any questions or comments regarding this publication, please contact the Marketing Communications Department via E-mail at **docerrors@microchip.com**. We welcome your feedback.

Most Current Data Sheet

To obtain the most up-to-date version of this data sheet, please register at our Worldwide Web site at:

http://www.microchip.com

You can determine the version of a data sheet by examining its literature number found on the bottom outside corner of any page. The last character of the literature number is the version number, (e.g., DS30000000A is version A of document DS30000000).

Errata

An errata sheet, describing minor operational differences from the data sheet and recommended workarounds, may exist for current devices. As device/documentation issues become known to us, we will publish an errata sheet. The errata will specify the revision of silicon and revision of document to which it applies.

To determine if an errata sheet exists for a particular device, please check with one of the following:

- Microchip's Worldwide Web site; http://www.microchip.com
- Your local Microchip sales office (see last page)

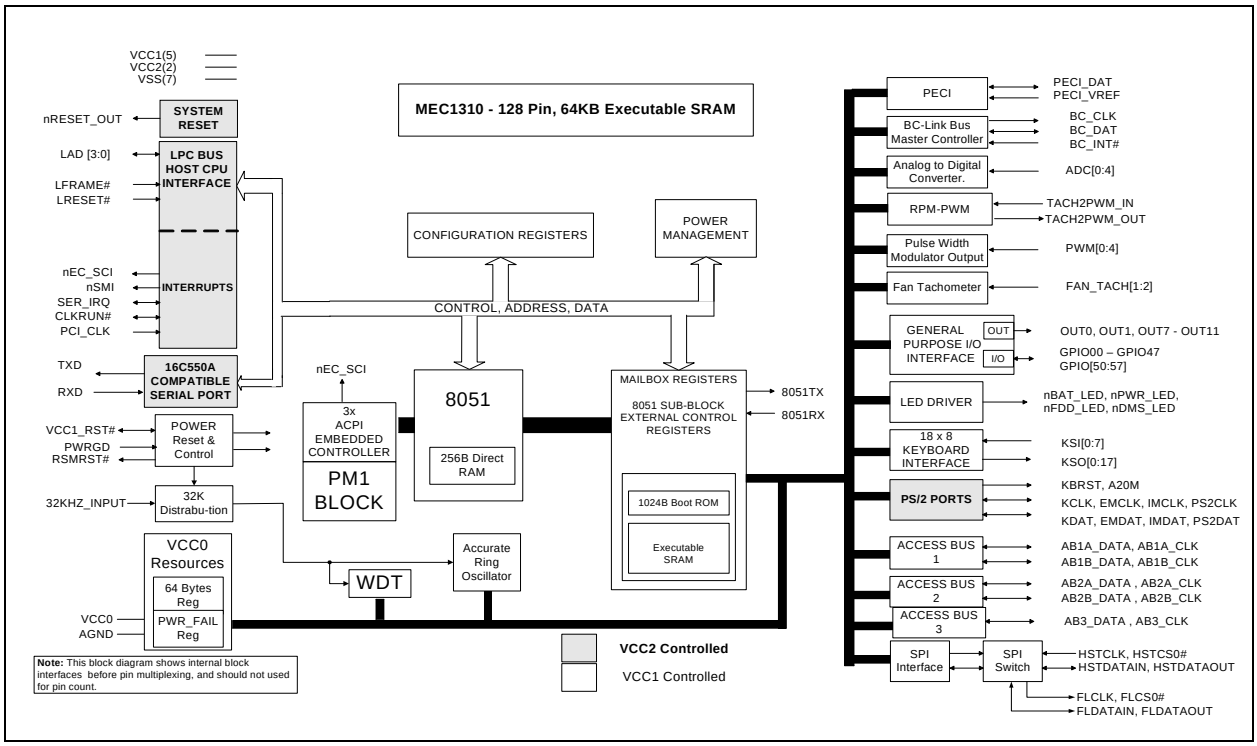
When contacting a sales office, please specify which device, revision of silicon and data sheet (include -literature number) you are using.

Customer Notification System

Register on our web site at **www.microchip.com** to receive the most current information on all of our products.

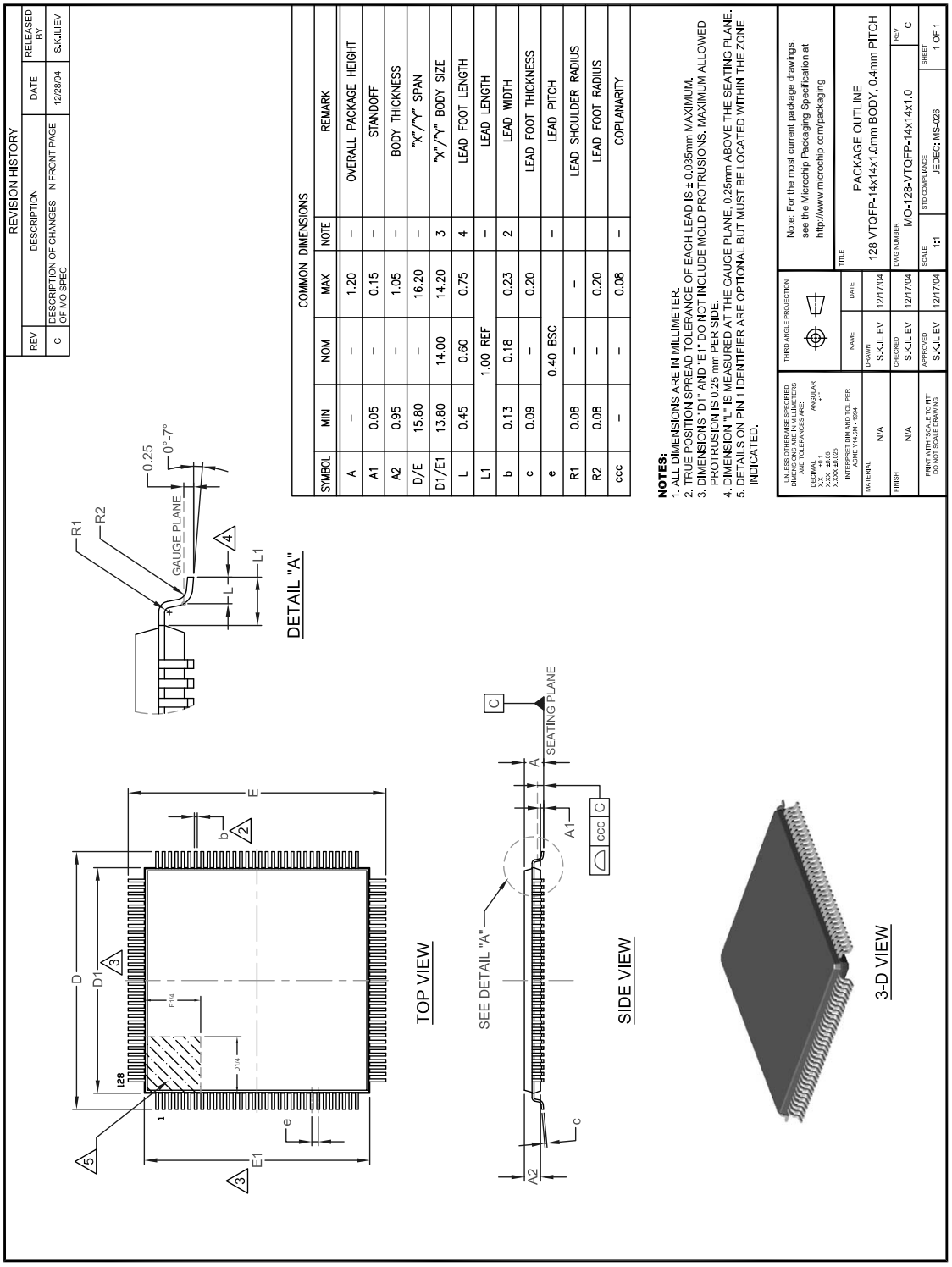
BLOCK DIAGRAM

FIGURE 1: MEC1310 BLOCK DIAGRAM



PACKAGE OUTLINE

FIGURE 2: MEC1310 128-PIN VTQFP PACKAGE OUTLINE 14X14X1.0



APPENDIX A: PRODUCT BRIEF REVISION HISTORY

TABLE A-1: REVISION HISTORY

Revision	Section/Figure/Entry	Correction
DS00001768A (06-02-14)	Document Release	

THE MICROCHIP WEB SITE

Microchip provides online support via our WWW site at www.microchip.com. This web site is used as a means to make files and information easily available to customers. Accessible by using your favorite Internet browser, the web site contains the following information:

- **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 (FAQ), technical support requests, online discussion groups, Microchip consultant 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

CUSTOMER CHANGE NOTIFICATION SERVICE

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

To register, access the Microchip web site at www.microchip.com. Under "Support", click on "Customer Change Notification" and follow the registration instructions.

CUSTOMER SUPPORT

Users of Microchip products can receive assistance through several channels:

- Distributor or Representative
- Local Sales Office
- Field Application Engineer (FAE)
- Technical Support

Customers should contact their distributor, representative or field application engineer (FAE) for support. Local sales offices are also available to help customers. A listing of sales offices and locations is included in the back of this document.

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

PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, refer to the factory or the listed sales office.

PART NO.	[X]	-	XXX	-	[X](1)
Device	Temperature Range		Package		Tape and Reel Option

Device:	MEC1310	
Temperature Range:	Blank = 0°C to +85°C i = -40°C to +85°C	(Extended Commercial) (Industrial)
Package:	NU = 128-pin VTQFP	
Tape and Reel Option:	Blank = Standard packaging (tray) TR = Tape and Reel(1)	

Example:

MEC1310-NU for 128-pin VTQFP

RoHS Compliant packaage

Note 1: Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. Check with your Microchip Sales Office for package availability with the Tape and Reel option. Reel size is 4,000.

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.

ISBN: 9781632762511

QUALITY MANAGEMENT SYSTEM
CERTIFIED BY DNV
ISO/TS 16949

Microchip received ISO/TS-16949:2009 certification for its worldwide headquarters, design and wafer fabrication facilities in Chandler and Tempe, Arizona; Gresham, Oregon and design centers in California and India. The Company's quality system processes and procedures are for its PIC® MCUs and dsPIC® DSCs, KEELOQ® code hopping devices, Serial EEPROMs, microperipherals, nonvolatile memory and analog products. In addition, Microchip's quality system for the design and manufacture of development systems is ISO 9001:2000 certified.

Worldwide Sales and Service

AMERICAS

Corporate Office
2355 West Chandler Blvd.
Chandler, AZ 85224-6199
Tel: 480-792-7200
Fax: 480-792-7277
Technical Support:
http://www.microchip.com/support
Web Address:
www.microchip.com

Atlanta
Duluth, GA
Tel: 678-957-9614
Fax: 678-957-1455

Austin, TX
Tel: 512-257-3370

Boston
Westborough, MA
Tel: 774-760-0087
Fax: 774-760-0088

Chicago
Itasca, IL
Tel: 630-285-0071
Fax: 630-285-0075

Cleveland
Independence, OH
Tel: 216-447-0464
Fax: 216-447-0643

Dallas
Addison, TX
Tel: 972-818-7423
Fax: 972-818-2924

Detroit
Novi, MI
Tel: 248-848-4000

Houston, TX
Tel: 281-894-5983

Indianapolis
Noblesville, IN
Tel: 317-773-8323
Fax: 317-773-5453

Los Angeles
Mission Viejo, CA
Tel: 949-462-9523
Fax: 949-462-9608

New York, NY
Tel: 631-435-6000

San Jose, CA
Tel: 408-735-9110

Canada - Toronto
Tel: 905-673-0699
Fax: 905-673-6509

ASIA/PACIFIC

Asia Pacific Office
Suites 3707-14, 37th Floor
Tower 6, The Gateway
Harbour City, Kowloon
Hong Kong
Tel: 852-2943-5100
Fax: 852-2401-3431

Australia - Sydney
Tel: 61-2-9868-6733
Fax: 61-2-9868-6755

China - Beijing
Tel: 86-10-8569-7000
Fax: 86-10-8528-2104

China - Chengdu
Tel: 86-28-8665-5511
Fax: 86-28-8665-7889

China - Chongqing
Tel: 86-23-8980-9588
Fax: 86-23-8980-9500

China - Hangzhou
Tel: 86-571-8792-8115
Fax: 86-571-8792-8116

China - Hong Kong SAR
Tel: 852-2943-5100
Fax: 852-2401-3431

China - Nanjing
Tel: 86-25-8473-2460
Fax: 86-25-8473-2470

China - Qingdao
Tel: 86-532-8502-7355
Fax: 86-532-8502-7205

China - Shanghai
Tel: 86-21-5407-5533
Fax: 86-21-5407-5066

China - Shenyang
Tel: 86-24-2334-2829
Fax: 86-24-2334-2393

China - Shenzhen
Tel: 86-755-8864-2200
Fax: 86-755-8203-1760

China - Wuhan
Tel: 86-27-5980-5300
Fax: 86-27-5980-5118

China - Xian
Tel: 86-29-8833-7252
Fax: 86-29-8833-7256

China - Xiamen
Tel: 86-592-2388138
Fax: 86-592-2388130

China - Zhuhai
Tel: 86-756-3210040
Fax: 86-756-3210049

ASIA/PACIFIC

India - Bangalore
Tel: 91-80-3090-4444
Fax: 91-80-3090-4123

India - New Delhi
Tel: 91-11-4160-8631
Fax: 91-11-4160-8632

India - Pune
Tel: 91-20-3019-1500

Japan - Osaka
Tel: 81-6-6152-7160
Fax: 81-6-6152-9310

Japan - Tokyo
Tel: 81-3-6880- 3770
Fax: 81-3-6880-3771

Korea - Daegu
Tel: 82-53-744-4301
Fax: 82-53-744-4302

Korea - Seoul
Tel: 82-2-554-7200
Fax: 82-2-558-5932 or
82-2-558-5934

Malaysia - Kuala Lumpur
Tel: 60-3-6201-9857
Fax: 60-3-6201-9859

Malaysia - Penang
Tel: 60-4-227-8870
Fax: 60-4-227-4068

Philippines - Manila
Tel: 63-2-634-9065
Fax: 63-2-634-9069

Singapore
Tel: 65-6334-8870
Fax: 65-6334-8850

Taiwan - Hsin Chu
Tel: 886-3-5778-366
Fax: 886-3-5770-955

Taiwan - Kaohsiung
Tel: 886-7-213-7830

Taiwan - Taipei
Tel: 886-2-2508-8600
Fax: 886-2-2508-0102

Thailand - Bangkok
Tel: 66-2-694-1351
Fax: 66-2-694-1350

EUROPE

Austria - Wels
Tel: 43-7242-2244-39
Fax: 43-7242-2244-393

Denmark - Copenhagen
Tel: 45-4450-2828
Fax: 45-4485-2829

France - Paris
Tel: 33-1-69-53-63-20
Fax: 33-1-69-30-90-79

Germany - Dusseldorf
Tel: 49-2129-3766400

Germany - Munich
Tel: 49-89-627-144-0
Fax: 49-89-627-144-44

Germany - Pforzheim
Tel: 49-7231-424750

Italy - Milan
Tel: 39-0331-742611
Fax: 39-0331-466781

Italy - Venice
Tel: 39-049-7625286

Netherlands - Drunen
Tel: 31-416-690399
Fax: 31-416-690340

Poland - Warsaw
Tel: 48-22-3325737

Spain - Madrid
Tel: 34-91-708-08-90
Fax: 34-91-708-08-91

Sweden - Stockholm
Tel: 46-8-5090-4654

UK - Wokingham
Tel: 44-118-921-5800
Fax: 44-118-921-5820

03/25/14