

---

---

## LPC IO with 8042 KBC, Reset Generation, HWM and Multiple Serial Ports

---

---

### Product Features

- General Features
  - 3.3 Volt Operation (SIO Block is 5 Volt Tolerant)
  - Programmable Wake-up Event (PME) Interface
  - PC99, PC2001 Compliant
  - ACPI 2.0 Compliant
  - Serial IRQ Interface Compatible with Serialized IRQ Support for PCI Systems
  - ISA Plug-and-Play Compatible Register Set
  - Four Address Options for Power On Configuration Port
  - System Management Interrupt (SMI)
  - 40 General Purpose I/O pins
  - 6 GPIO with VID compatible inputs
  - Support for power button on PS/2 Keyboard
  - Security Key Register (32 byte) for Device Authentication
- Low Pin Count Bus (LPC) Interface
  - Supports LPC Bus frequencies of 19MHz to 33MHz
- Watchdog Timer
- Resume and Main Power Good Generator
- Programmable Clock Output to 16 HZ.
- 2.88MB Super I/O Floppy Disk Controller
  - Licensed CMOS 765B Floppy Disk Controller
  - Supports Two Floppy Drives
  - Configurable Open Drain/Push-Pull
  - Supports Vertical Recording Format
  - 16-Byte Data FIFO
  - 100% IBM® Compatibility
  - Detects All Overrun and Underrun Conditions
  - Sophisticated Power Control Circuitry (PCC) Including Multiple Powerdown Modes for Reduced Power Consumption
  - DMA Enable Logic
  - Data Rate and Drive Control Registers
  - 480 Address, Up to Eight IRQ and Four DMA Options
  - Support FDD Interface on Parallel Port Pins
- Enhanced Digital Data Separator
  - 2 Mbps, 1 Mbps, 500 Kbps, 300 Kbps, 250 Kbp Data Rates
  - Programmable Precompensation Modes
- Keyboard Controller
  - 8042 Software Compatible
  - 8 Bit Microcomputer
  - 2k Bytes of Program ROM
  - 256 Bytes of Data RAM
  - Four Open Drain Outputs Dedicated for Keyboard/Mouse Interface
  - Asynchronous Access to Two Data Registers and One Status Register
  - Supports Interrupt and Polling Access
  - 8 Bit Counter Timer
  - Port 92 Support
  - Fast Gate A20 and KRESET Outputs
  - Phoenix Keyboard BIOS ROM
- Multiple Serial Ports
  - SCH3112 - 2 Full Function Serial Ports
  - SCH3114 - 4 Full Function Serial Ports
  - SCH3116 - 4 Full Function and 2 Four-Pin Serial Ports
  - High Speed NS16C550A Compatible UARTs with
    - Send/Receive 16-Byte FIFOs
    - Supports 230k, 460k, 921k and 1.5M Baud
    - Programmable Baud Rate Generator
    - Modem Control Circuitry
    - 480 Address and 15 IRQ Options
    - Support IRQ Sharing among serial ports
    - RS485 Auto Direction Control Mode
- Infrared Port
  - Multiprotocol Infrared Interface
  - IrDA 1.0 Compliant
  - SHARP ASK IR
  - 480 Addresses, Up to 15 IRQ
- Multi-Mode™ Parallel Port with ChiProtect™
  - Standard Mode IBM PC/XT®, PC/AT®, and PS/2™ Compatible Bi-directional Parallel Port
  - Enhanced Parallel Port (EPP) Compatible - EPP 1.7 and EPP 1.9 (IEEE 1284 Compliant)

# SCH3112/SCH3114/SCH3116

- IEEE 1284 Compliant Enhanced Capabilities Port (ECP)
- ChiProtect Circuitry for Protection
- 960 Address, Up to 15 IRQ and Four DMA Options
- Hardware Monitor
  - Monitor Power supplies (+2.5V, +5V, +12V, Vccp (processor voltage), VCC, Vbat and Vtr.
  - Remote Thermal Diode Sensing for Two External Temperature Measurements accurate to 1.5°C
  - Internal Ambient Temperature Measurement
  - Limit Comparison of all Monitored Values
  - Programmable Automatic FAN control based on temperature
  - nHWM\_INT Pin for out-of-limit Temperature or Voltage Indication
  - Thermtrip signal for over temperature indication
- IDE Reset Output and 3 PCI Reset Buffers with Software Control Capability (SCH3112 and SCH3114 Only)
- Power Button Control and AC Power Failure Recovery (SCH3112 and SCH3114 Only)
- Temperature Range Available
  - Industrial (+85°C to -40°C)
  - Commercial (+70°C to 0°C)
- 128 Pin VTQFP RoHS Compliant Package

## 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](mailto: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](http://www.microchip.com) to receive the most current information on all of our products.

# SCH3112/SCH3114/SCH3116

---

## General Description

The SCH3112/SCH3114/SCH3116 Product Family is a 3.3V (Super I/O Block is 5V tolerant) PC99/PC2001 compliant Super I/O controller with an LPC interface. The SCH3112/SCH3114/SCH3116 Product Family also includes Hardware Monitoring capabilities, enhanced Security features, Power Control logic and Motherboard Glue logic.

The SCH3112/SCH3114/SCH3116 Product Family's hardware monitoring capability includes temperature, voltage and fan speed monitoring. It has the ability to alert the system of out-of-limit conditions and automatically control the speeds of multiple fans. There are four analog inputs for monitoring external voltages of +5V, +2.5V, +12V and V<sub>ccp</sub> (core processor voltage), as well as internal monitoring of the SIO's VCC, VTR, and Vbat power supplies. The SCH3112/SCH3114/SCH3116 Product Family includes support for monitoring two external temperatures via thermal diode inputs and an internal sensor for measuring ambient temperature. The nHWM\_INT pin is implemented to indicate out-of-limit temperature, voltage, and FANTACH conditions. The hardware monitoring block of the SCH3112/SCH3114/SCH3116 Product Family is accessible via the LPC bus. The same interrupt event reported on the nHWM\_INT pin also creates PME wakeup events. A separate THERMTRIP output is available, which generates a pulse output on a programmed over temperature condition. This can be used to generate an reset or shutdown indicator to the system.

The hardware monitoring capability also has programmable automatic FAN control. Three fan tachometer inputs and three pulse width modulator (PWM) outputs are available.

The Motherboard Glue logic includes various power management and system logic including generation of nRSMRST, a programmable Clock output, and reset generation. The reset generation includes a watchdog timer which can be used to generate a reset pulse. The width of this pulse is selectable via an external strapping option.

The SCH3112/SCH3114/SCH3116 Product Family incorporates complete legacy Super I/O functionality including an 8042 based keyboard and mouse controller, an IEEE 1284, EPP, and ECP compatible parallel port, multiple serial ports, one IrDA 1.0 infrared ports, and a floppy disk controller with Microchip's true CMOS 765B core and enhanced digital data separator. The true CMOS 765B core provides 100% compatibility with IBM PC/XT and PC/AT architectures and is software and register compatible with Microchip's proprietary 82077AA core. System related functionality, which offers flexibility to the system designer, General Purpose I/O control functions, and control of two LED's.

The serial ports are fully functional NS16550 compatible UARTs that support data rates up to 1.5 Mbps. There are four, 8 pin Serial Ports and two, 4pin Serial Ports. The reduced pin serial ports have selectable input and output controls. The Serial Ports contain programmable direction control, which will automatically Drive nRTS when the Output Buffer is loaded, then Drive nRTS when the Output Buffer is Empty.

The SCH3112/SCH3114/SCH3116 Product Family is ACPI 1.0/2.0 compatible and therefore supports multiple low power-down modes. It incorporates sophisticated power control circuitry (PCC), which includes support for keyboard.

The SCH3112/SCH3114/SCH3116 Product Family supports the ISA Plug-and-Play Standard register set (Version 1.0a). The I/O Address, DMA Channel and hardware IRQ of each logical device in the SCH3112/SCH3114/SCH3116 Product Family may be reprogrammed through the internal configuration registers. There are up to 480 (960 - Parallel Port) I/O address location options, a Serialized IRQ interface, and Three DMA channels.

# SCH3112/SCH3114/SCH3116

---

**TABLE 1: DEVICE SPECIFIC SUMMARY**

Function	SCH3112	SCH3114	SCH3116
LPC Bus Interface	YES	YES	YES
Legacy functional Blocks <sup>(1)</sup>	YES	YES	YES
Floppy on Parallel Port Option	YES	YES	YES
Reset Generator	YES	YES	YES
Serial Ports	2	4	6 <sup>(2)</sup>
Programmable Clock Output	YES	YES	YES
IDE / PCI Reset Outputs	YES	YES	NO
Power Button / AC Fail Support	YES	YES	NO
GPIOs	40	40	40
GPIO with VID Compatible Inputs	6	6	6
Dedicated GPIOs	16	0	0
Hardware Monitor	YES	YES	YES

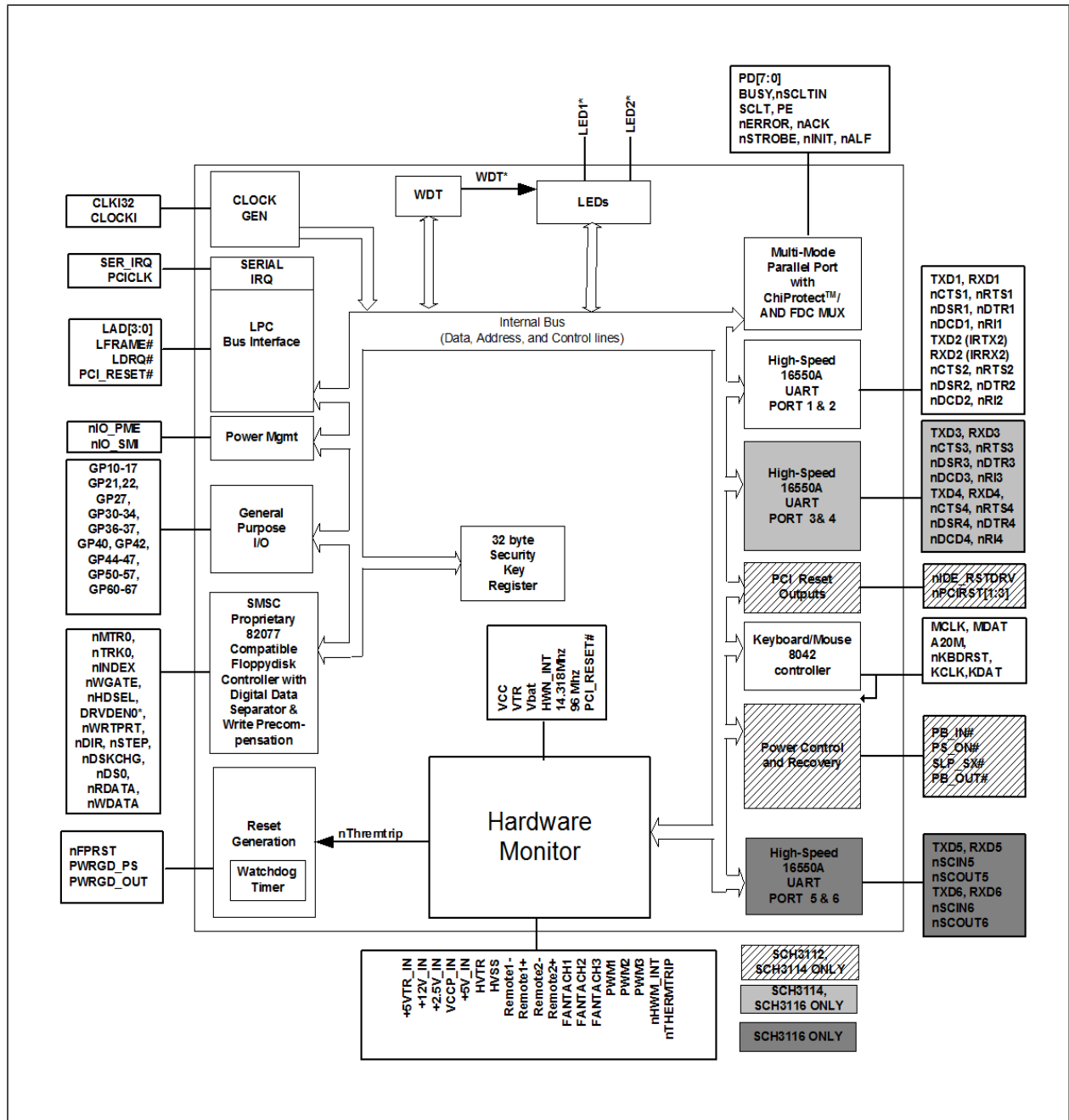
**Note 1:** Legacy Blocks include floppy disk, parallel port, watchdog timer and keyboard controller

**2:** 2 of the 6 serial ports have 4 pin interfaces

# SCH3112/SCH3114/SCH3116

## Block Diagram

FIGURE 1: SCH3112/SCH3114/SCH3116 BLOCK DIAGRAM





## APPENDIX A: PRODUCT BRIEF REVISION HISTORY

TABLE A-1: REVISION HISTORY

Revision	Section/Figure/Entry	Correction
DS00001730A (04-24-14)	REV A replaces previous SMSC version Rev. 1.1 (06-05-07)	

# SCH3112/SCH3114/SCH3116

---

## THE MICROCHIP WEB SITE

Microchip provides online support via our WWW site at [www.microchip.com](http://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](http://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>**

# SCH3112/SCH3114/SCH3116

## 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. <sup>(1)</sup>	[X]	-	XXX <sup>(2)</sup>	-	[X] <sup>(3)</sup>
Device	Temperature Range		Package		Tape and Reel Option
Device: SCH3112 <sup>(1)</sup> SCH3114 <sup>(1)</sup> SCH3116 <sup>(1)</sup>					
Temperature Range:	Blank = Commercial 0°C to 70°C I = Industrial -40°C to 85°C				
Package:	NU = 128 pin VTQFP <sup>(2)</sup>				
Tape and Reel Option:	Blank = Tray packaging TR = Tape and Reel <sup>(3)</sup>				
<b>Examples:</b> a) SCH3112-NU = 128-pin VTQFP, Commercial b) SCH3116I-NU = 128-pin VTQFP, Industrial					
<b>Note 1:</b> These products meet the halogen maximum concentration values per IEC61249-2-21.					
<b>Note 2:</b> All package options are RoHS compliant. For RoHS compliance and environmental information, please visit <a href="http://www.microchip.com/pagehandler/en-us/aboutus/ehs.html">http://www.microchip.com/pagehandler/en-us/aboutus/ehs.html</a> .					
<b>Note 3:</b> 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.					

# SCH3112/SCH3114/SCH3116

---

## 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.

---

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.

## Trademarks

The Microchip name and logo, the Microchip logo, dsPIC, FlashFlex, KEELOQ, KEELOQ logo, MPLAB, PIC, PICmicro, PICSTART, PIC<sup>32</sup> logo, rPIC, SST, SST Logo, SuperFlash and UNI/O are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

FilterLab, Hampshire, HI-TECH C, Linear Active Thermistor, MTP, SEEVAL and The Embedded Control Solutions Company are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Silicon Storage Technology is a registered trademark of Microchip Technology Inc. in other countries.

Analog-for-the-Digital Age, Application Maestro, BodyCom, chipKIT, chipKIT logo, CodeGuard, dsPICDEM, dsPICDEM.net, dsPICworks, dsSPEAK, ECAN, ECONOMONITOR, FanSense, HI-TIDE, In-Circuit Serial Programming, ICSP, Mindi, MiWi, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, mTouch, Omniscent Code Generation, PICC, PICC-18, PICDEM, PICDEM.net, PICKit, PICtail, REAL ICE, rLAB, Select Mode, SQL, Serial Quad I/O, Total Endurance, TSHARC, UniWinDriver, WiperLock, ZENA and Z-Scale 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.

GestIC and ULPP are registered trademarks of Microchip Technology Germany II GmbH & Co. KG, a subsidiary of Microchip Technology Inc., in other countries.

flexPWR, JukeBlox, Klear, KlearNet, MediaLB, and MOST

The preceding is a non-exhaustive list of trademarks in use in the US and other countries. For a complete list of trademarks, email a request to [legal.department@microchip.com](mailto:legal.department@microchip.com). The absence of a trademark (name, logo, etc.) from the list does not constitute a waiver of any intellectual property rights that SMSC has established in any of its trademarks.

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

© 2014, Microchip Technology Incorporated, Printed in the U.S.A., All Rights Reserved.

ISBN: 9781632761668

**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<sup>®</sup> MCUs and dsPIC<sup>®</sup> DSCs, KEELOQ<sup>®</sup> 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](http://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

## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

- ⊖ [View SCH3114I-NU on WIN SOURCE](#)
- ⊖ [Microchip Technology](#) Information

## Optimize Your Supply Chain with WIN SOURCE Solutions

- ✓ Global Sourcing Solution
- ✓ Obsolete Management
- ✓ Cost Control Management
- ✓ Shortage Management
- ✓ Alternative Solution
- ✓ Excess Inventory Management