SCH5636

Desktop Embedded Controller with Fan Control, Hardware Monitoring and PECI

Product Features

- High Performance 32-bit ARC-625D Embedded Controller (EC)
  - 96KB Closely Coupled Instruction ROM
  - 16 KB Single Cycle 32-bit Wide Dual-ported SRAM, Accessible as Closely Coupled Data Memory and Instruction Memory
  - 32 x 32 → 64 Multiply
  - Maskable Interrupt Aggregator Interface
  - Maskable Hardware Wake-Up Events
  - Idle and Sleep modes
  - JTAG Debug Port
  - MCU Serial Debug Port
  - 5-Channel DMA Interface
- ACPI 2.0 Compliant
- PC2001 Compliant
- LPC Interface
  - Supports LPC Bus frequencies of 19MHz to 33MHz
  - Multiplexed Command, Address and Data Bus
  - Serial IRQ Interface Compatible with Serialized IRQ Support for PCI Systems
  - PME Interface
- 3.3-Volt I/O
- 128-pin QFP RoHS Compliant Package
- Three Programmable 16-bit Timers
- 32-bit Performance Timer
- System Watch Dog Timer (WDT)
- Battery Backed Resources
  - Power-Fail Status Register
  - VBat backed 64 byte memory
- Two EC-based SMBus 2.0 Host Controllers
  - Allows Master or Dual Slave Operation
  - Controllers are Fully Operational on Standby Power
  - DMA-driven I^2C Network Layer
  - I^2C Datalink Compatibility Mode
  - Multi-Master Capable
  - Supports Clock Stretching
  - Programmable Bus Speeds
  - 400 KHz Capable
  - Hardware Bus Access “Fairness” Interface
  - Detects SMBus Time-outs
  - One controller can be multiplexed onto a low voltage SMBus
- PECI Interface 2.0
  - Supports PECI REQUEST# and PECI READY signaling
  - Supports up to 2 CPUs and 4 domains
- Temperature reading from PCH over SMBus
- Temperature reading from AMD-TSI over SMBus
- Temperature Monitor
  - Monitoring up to 2 Remote Thermal Diodes plus an Anti-Parallel Remote Thermal Diode
  - Built-in ADC supports temperature readings from -63 degrees Celsius to +192 degrees Celsius
    - Supports monitoring of discrete diodes (3904 type diodes)
    - Supports monitoring substrate diodes (45nm & 65nm processor diodes)
  - Temperature resolution is 0.125 degrees Celsius
  - Internal Ambient Temperature Measurement
  - Out-of-limit Temperature Event reporting
- Bi-directional PROCHOT# Pin
  - Interrupt generation for PROCHOT Assert events
  - May be used by AMTA and PTTA features to adjust fan control limits
  - May be configured to force fans on full
  - Supports PROCHOT Assertions to external CPU
  - Supports PROCHOT Throttle Events to external CPU
  - Supports Interrupt Event to Host
- Voltage Monitor
  - Monitoring VBAT, VTR,VCC and Vtt power supplies
  - Monitoring of one external voltage
  - Limit comparison on monitored values
- PWM (Pulse width Modulation) Outputs (4)
  - Multiple Clock Rates
  - 16-bit ON and 16-bit OFF Counters

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- Fan tachometer Inputs (4)
  - Programmable to monitor standard tachometer outputs or locked rotor alarm outputs
  - Generate tachometer event when speed of fan drops below programmed limit
- Internal clock sources
  - A Ring Oscillator generates 64 MHz clock
  - SIO clocks derived from a 96MHz PLL synchronized to a 14.318MHz clock input
  - Main ring generates 32kHz standby clock when external 32.768KHz clock source is off
- Low Battery Warning
- LED Control
  - Two LEDs to indicate system state
- Programmable Wake-up Event Interface
- General Purpose Input/Output Pins (60 total)
- System Management Interrupt (SMI)
- GLUE Logic
  - 4 Buffered PCI Reset Outputs
  - Power OK Signal Generation
  - Power Sequencing
  - Power Supply Turn On Circuitry
  - Resume Reset Signal Generation
  - Speaker output
  - Intrusion Detection
- 2.88MB Super I/O Floppy Disk Controller
  - Licensed CMOS 765B Floppy Disk Controller
  - Software and Register Compatible with Microchip's Proprietary 82077AA Compatible Core
  - Configurable Open Drain/Push-Pull Output Drivers
  - 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
- Enhanced Digital Data Separator
  - 1 Mbps, 500 Kbps, 300 Kbps, 250 Kbps 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
- Serial Ports
  - Two Full Function Serial Ports
  - High Speed NS16C550A Compatible UARTs with Send/Receive 16-Byte FIFOs
  - Programmable Baud Rate Generator
  - Modem Control Circuitry
  - Any LPC Address Configurable. 15 IRQ Options
- 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)
  - IEEE 1284 Compliant Enhanced Capabilities Port (ECP)
  - ChiProtect Circuitry for Protection
  - 960 Addresses, Up to 15 IRQ and Four DMA Options

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General Description

The SCH5636 is a 3.3V PC 2001 compliant Super I/O controller with an LPC interface. All legacy drivers used for Super I/O components are supported making this interface transparent to the supporting software. The LPC bus also supports power management, such as wake-up and sleep modes.

The SCH5636 provides temperature monitoring with auto fan control. The temperature monitor is capable of monitoring up to three external diodes, one internal ambient temperature sensor or retrieving temperatures from external processors that implement the PECI Interface. This device offers programmable automatic fan control support based on one or more of these measured temperatures. There are four pulse width modulation (PWM) outputs with high frequency support as well as four fan tachometer inputs. In addition, there is support for a bi-directional PROCHOT# pin that may be used to generate an interrupt, adjust the programmed temperature limits in the auto fan control logic, or force the PWM outputs on full. The RRCC feature provides a linear relationship of temperature to fan speed.

The Glue Logic includes various power management logic; including generation of RSMRST# and Power OK signal generation. There are also two LEDs to indicate power status. The part also provides a low battery warning circuit.

The SCH5636 provides 60 General Purpose I/O control pins, which offer flexibility to the system designer.

The SCH5636 incorporates the following Super I/O components: a parallel port that is compatible with IBM PC/AT architecture, as well as the IEEE 1284 EPP and ECP; two serial ports that are 16C550A UART compatible; a keyboard/mouse controller that uses an 8042 micro controller; and a floppy disk controller.

The SCH5636 is ACPI 1.0b/2.0 compatible and supports multiple low power-down modes. It incorporates sophisticated power control circuitry (PCC), which includes keyboard and mouse wake-up events.

The SCH5636 incorporates a high-performance embedded microcontroller. The SCH5636 communicates with the system host using the Intel® Low Pin Count bus.

The SCH5636 is directly powered by two separate suspend supply planes (VBAT and VTR) and senses a third runtime power plane (VCC) to provide “instant on” and system power management functions. The SCH5636 also contains an integrated VTR Reset Generator and a system power management interface that supports low-power states and can drive state changes as a result of hardware wake events as defined by the SCH5636 wake interface.

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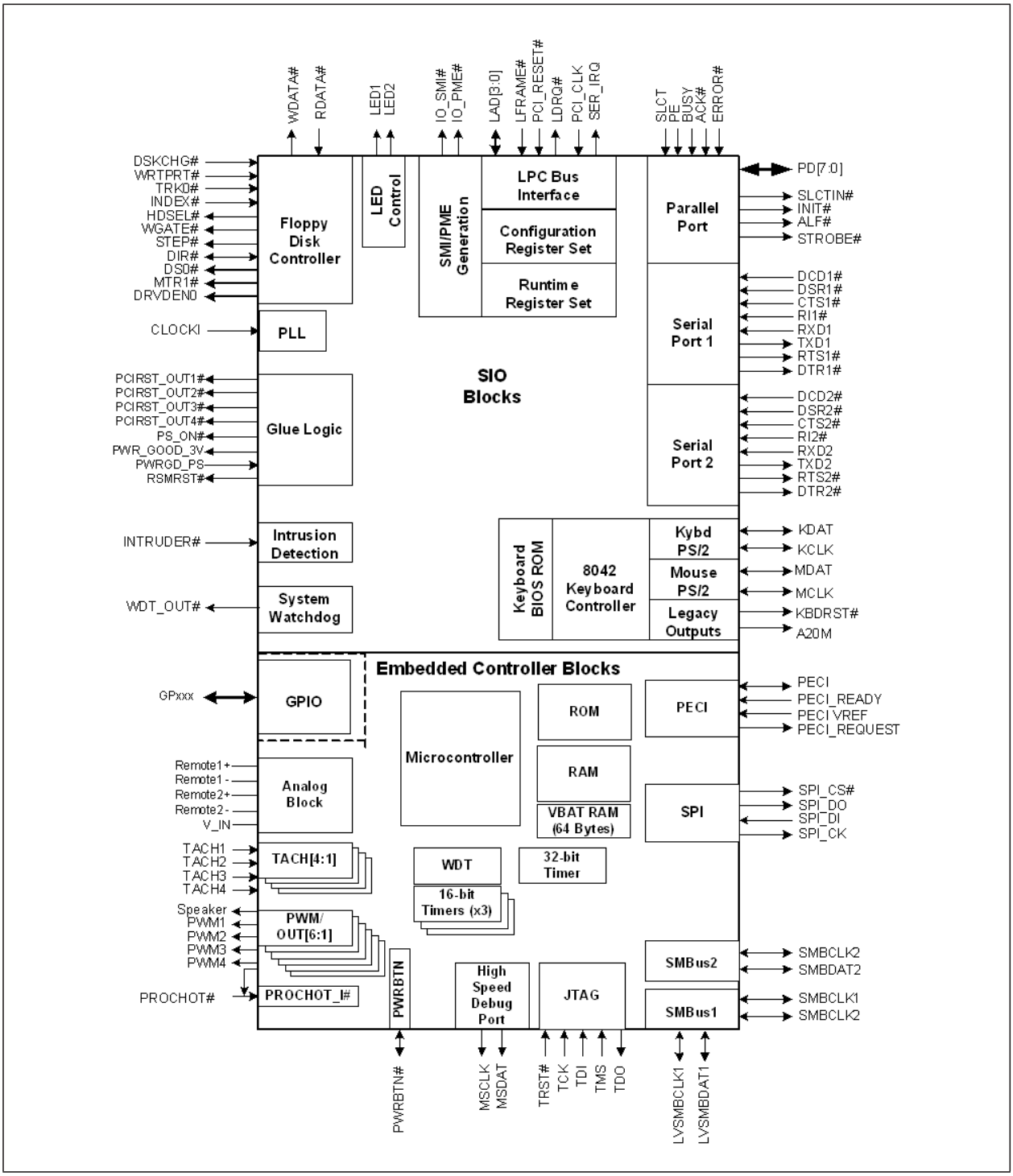
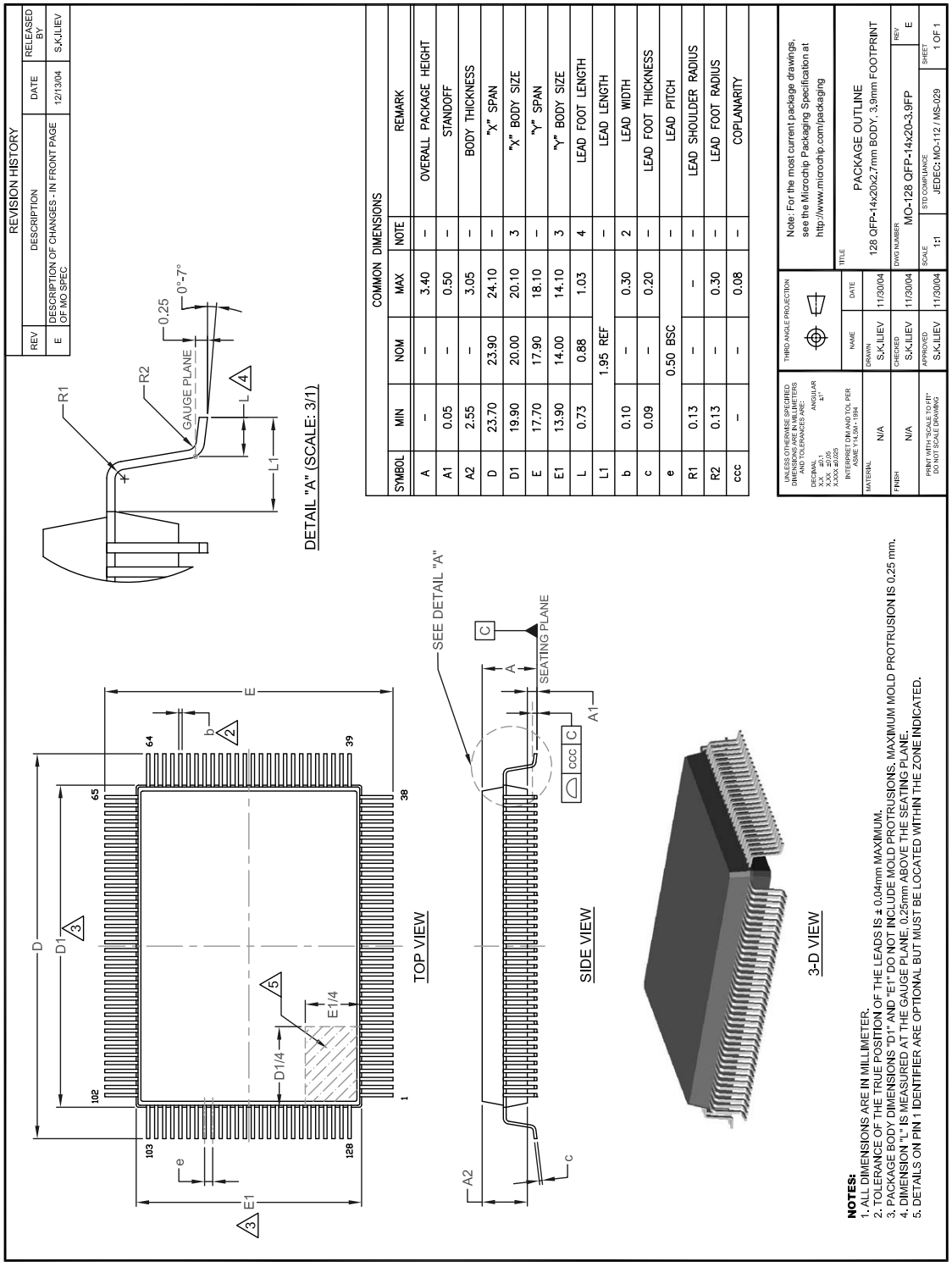
Block Diagram



Package Outline

FIGURE 1: 128 PIN QFP PACKAGE OUTLINE (3.9MM FOOTPRINT)



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APPENDIX A: PRODUCT BRIEF REVISION HISTORY

TABLE A-1: REVISION HISTORY

Revision	Section/Figure/Entry	Correction
DS00001732A (05-01-14)	REV A replaces previous SMSC version Rev. 0.30 (01-25-1)	

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PART NO. (1) - XXX (2) - [X] (3)	Example:
Device: SCH5636 (1)	SCH5636-NS = 128-pin QFP
Package: NS = 128 pin QFP (2)	
Tape and Reel Option: Blank = Tray packaging TR = Tape and Reel (3)	

Device | **Package** | **Tape and Reel Option**

Note 1: These products meet the halogen maximum concentration values per IEC61249-2-21.

Note 2: All package options are RoHS compliant. For RoHS compliance and environmental information, please visit http://www.microchip.com/pagehandler/en-us/aboutus/ehs.html .

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