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

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- 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.

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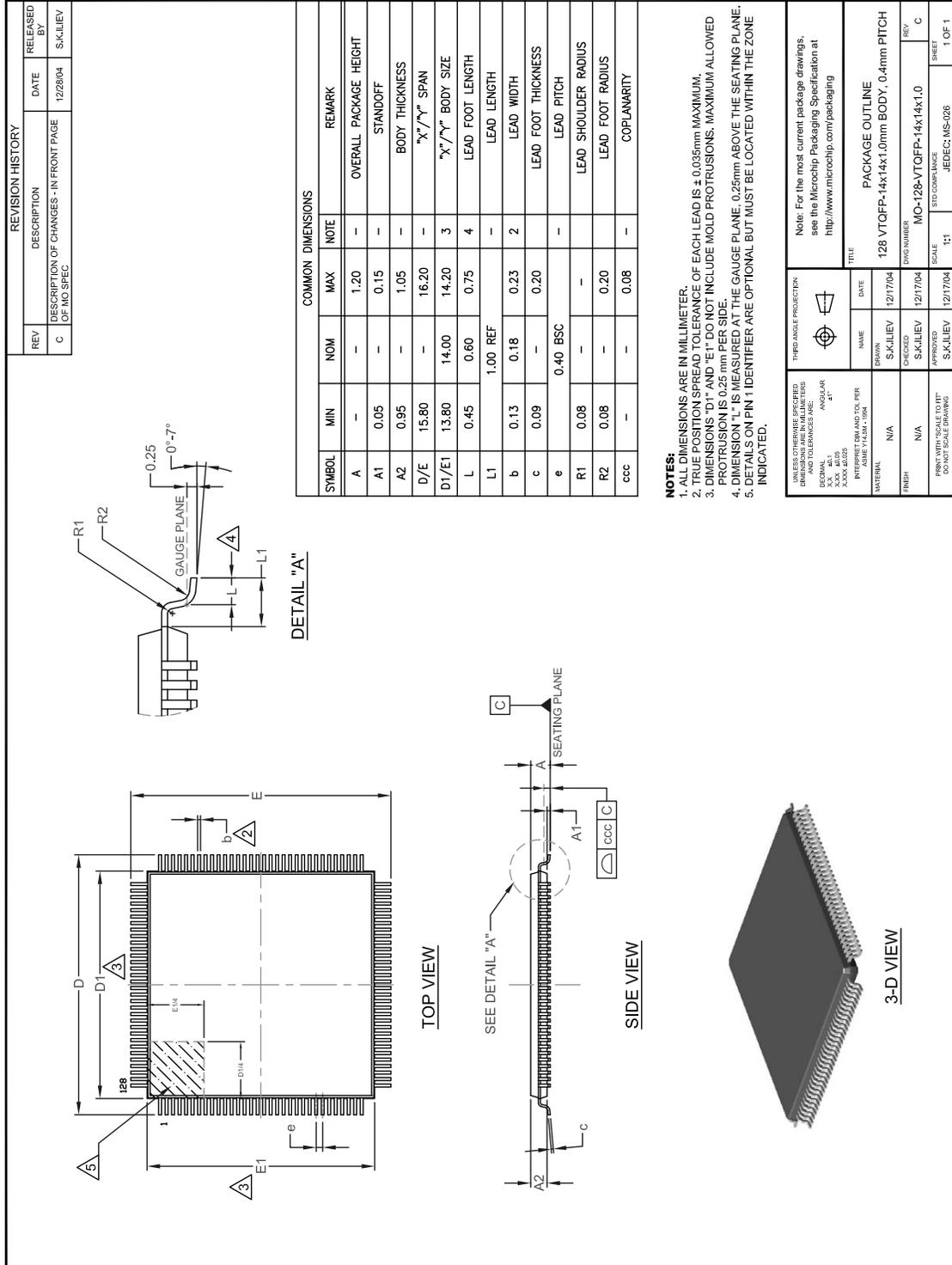
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MEC1310

BLOCK DIAGRAM

FIGURE 1:   MEC1310 BLOCK DIAGRAM

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PACKAGE OUTLINE

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

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
C	DESCRIPTION OF CHANGES - IN FRONT PAGE OF MO SPEC	12/28/04	S.KJLIEV

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	–	–	1.20	–	OVERALL PACKAGE HEIGHT
A1	0.05	–	0.15	–	STANDOFF
A2	0.95	–	1.05	–	BODY THICKNESS
D/E	15.80	–	16.20	–	"X"/"Y" SPAN
D1/E1	13.80	14.00	14.20	3	"X"/"Y" BODY SIZE
L	0.45	0.60	0.75	4	LEAD FOOT LENGTH
L1		1.00 REF		–	LEAD LENGTH
b	0.13	0.18	0.23	2	LEAD WIDTH
c	0.09	–	0.20		LEAD FOOT THICKNESS
e		0.40 BSC		–	LEAD PITCH
R1	0.08	–	–		LEAD SHOULDER RADIUS
R2	0.08	–	0.20		LEAD FOOT RADIUS
ccc	–	–	0.08	–	COPLANARITY

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.035mm MAXIMUM.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

DETAIL "A"

TOP VIEW

SIDE VIEW

3-D VIEW

SEE DETAIL "A"

SEATING PLANE

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	THIRD ANGLE PROJECTION		
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:		NAME	DATE
DECIMAL ANGULAR X.X ±0.1 ±1° X.XX ±0.05 X.XXX ±0.025		DRAWN S.KJLIEV	12/17/04
		CHECKED S.KJLIEV	12/17/04
MATERIAL N/A		APPROVED S.KJLIEV	12/17/04
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994			

TITLE PACKAGE OUTLINE
128 VTQFP-14x14x1.0mm BODY, 0.4mm PITCH

DWG NUMBER MO-128-VTQFP-14x14x1.0	REV C
STD COMPLIANCE JEDEC: MS-026	
SCALE 1:1	SHEET 1 OF 1

FINISH N/A

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

APPENDIX A: PRODUCT BRIEF REVISION HISTORY

TABLE A-1:   REVISION HISTORY

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

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MEC1310

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PART NO.   [X] - XXX - [X]$^{(1)}$

Device   **Temperature Range**   **Package**   **Tape and Reel Option**

Device:	MEC1310
Temperature Range:	Blank = 0°C to +85°C (Extended Commercial) i = -40°C to +85°C (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.

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