National Semiconductor

November 2002
Revision 1.4

PC87431M/S/C
mini-Baseboard Management Controller (mBMC)

General Description

The National Semiconductor® PC87431x family of mini-Baseboard Management Controllers (mBMC) is a light version of the IPMI v1.5 BMC. It is targeted for a wide range of remote-controlled platforms such as servers, workstations, hubs and printers.

The PC87431x incorporates an embedded microcontroller, three System Management Bus (SMBus®) interfaces, a Chassis Management interface, Bi-color LED control, an integrated flash, Fan control, 12 ADC channels, and Digital Input Event and General-Purpose Output pins.

The PC87431x interfaces with the host via a slave SMBus interface; it interfaces with the LAN On Motherboard (LOM) and with peripherals via two independent master SMBus interfaces.

The PC87431x also supports distributed management architecture via the Intelligent Platform Management Bus (IPMB).

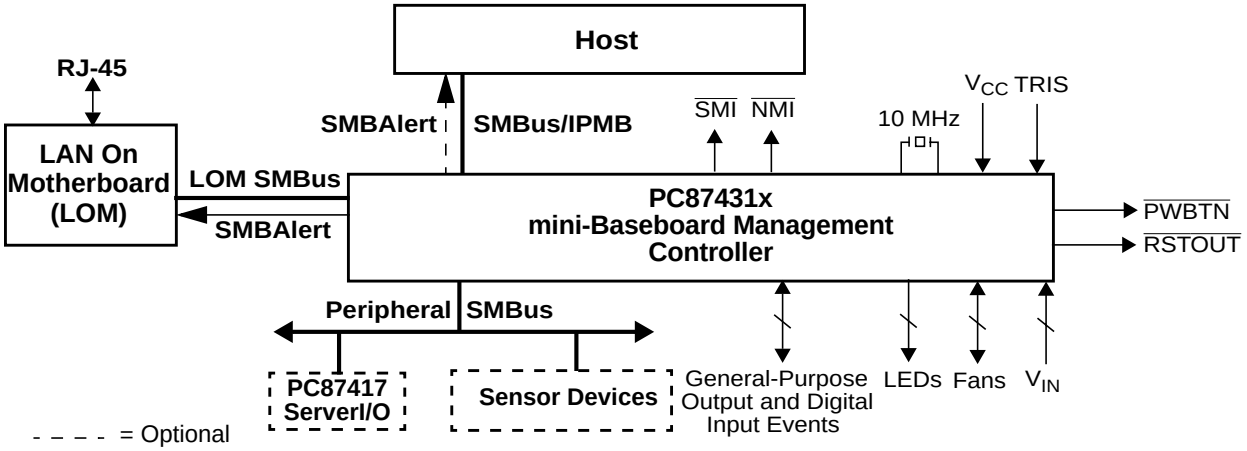
In addition, the PC87431x includes an inhibit strap to enable the system to work with the daughter board of an advanced BMC.

The PC87431x, like other members of National's Advanced I/O family, is PC01 and ACPI compliant

Outstanding Features

- Canned solution
- LAN commands follow IPMI v1.5
- MD5 secure authentication
- Support for a variety of popular LOMs
- Field Replaceable Unit (FRU) Inventory
- System Event Log (SEL)
- Sensor Data Record (SDR) Repository
- Platform Event Filtering (PEF)
- Remote secure reset, Power On/Off
- Remote settable BIOS boot options
- BIOS Alerting interface
- System health monitoring using SMBus-based sensors
- LAN Alerting in PET format
- Watchdog Timer
- Host, LOM and Peripheral interfaces, via SMBus
- Intelligent Platform Management Bus (PC87431C)
- Digital Input Event pins and General-Purpose Output pins
- Integrated Fan control and ADC (PC87431S/C)
- Integrated flash, to reduce system cost
- Two LEDs, with Bi-color LED control
- Inhibit strap, to enable the system to work with the daughter board of an advanced BMC

PC87431x System Connection Diagram



Notes: IPMB interface is supported by PC87431C only.
Integrated ADC and Fan are supported by PC87431S/C only.

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Device-Specific Information

The following table shows the main features for the devices in the PC87431x family.

Function	PC87431M	PC87431S	PC87431C
Remote Chassis Control	✔	✔	✔
Remote Boot Options	✔	✔	✔
LAN Configuration and Alerting	✔	✔	✔
System Health Monitoring	✔	✔	✔
System Event Log (SEL)	✔	✔	✔
Field Replaceable Unit (FRU) Inventory	✔	✔	✔
Platform Event Filtering	✔	✔	✔
Watchdog and FRB	✔	✔	✔
External Sensors Interface	✔	✔	✔
Internal Sensors: ADC Channels and Fan	–	✔	✔
Authentication	MD5	MD5	MD5
IPMB support on host interface	–	–	✔

The package type is specified by two letters (L or T) that follow the part number:

- LLP package - PC87431xxx/L
- TSSOP package - PC87431xxx/T

Features

- Three SMBus 2.0 compatible Interfaces
- System Chassis Control
- Digital Input Events and General-Purpose Outputs

IPMI and DMTF/ASF Support

- Supports *Intelligent Platform Management Interface (IPMI) Specification v1.5 (revision 1.1)*, February 20, 2002
- Supports LAN Alert sending as SNMP Trap in *IPMI Platform Event Trap Format v1.0*, December 7, 1998
- Secure Authentication, based on *RFC 1321, The MD5 Message-Digest Algorithm*, R. Rivest, MIT Laboratory for Computer Science and RSA Data Security, Inc., April 1992

Host Interface

- Fault Resilient Booting (FRB) support with autonomous system reset, power cycling and CPU or BIOS switch.
- Critical event alerting from system monitoring device on peripheral SMBus interface

Peripheral Interface

- LMxx-like Sensors devices for system health monitoring
- Supports PC874xx LPC SuperI/O for Servers and Workstations.

Integrated ADC Channels and Fan Control (PC87431S/C)

- 10-bit successive approximation Analog to Digital converter (up to 12 channels)
- Fan Speed Control for three fans
- Fan Speed Monitor for two fans

Internal E^2PROM

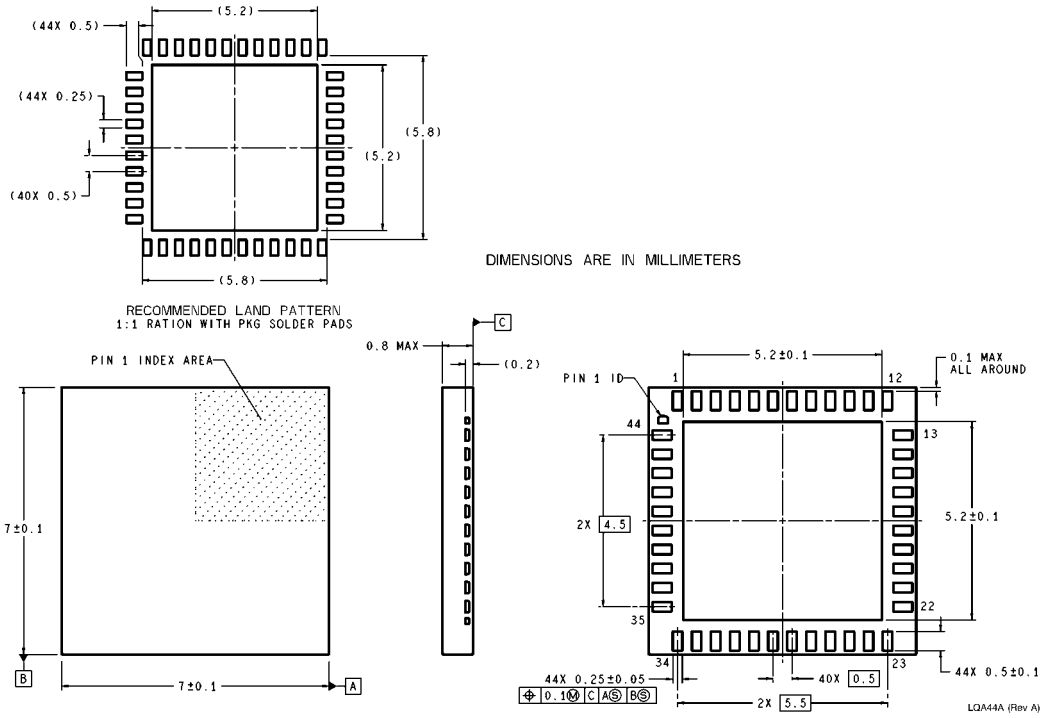
- Stores the following:
  - Sensor access table
  - Sensor configuration table
  - Customizing table
  - 512 bytes for FRU Inventory or OEM data

Clocking, Supply and Package Information

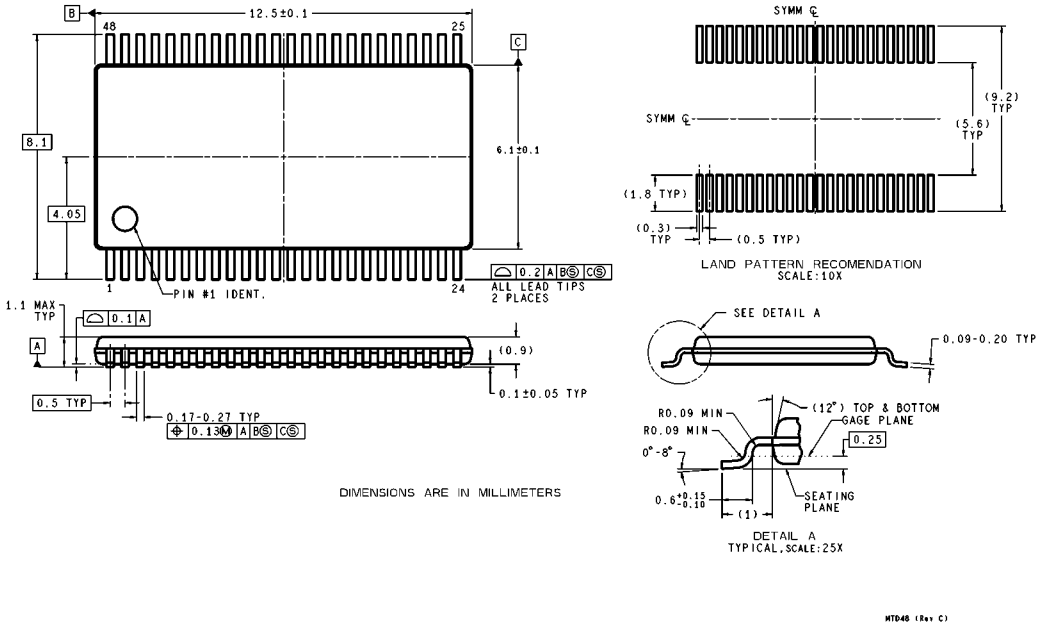
- Strap Input Controlled Operating Modes:
  - Inhibit mode
- Clocks:
  - Single 10 MHz crystal oscillator
- Power Supply:
  - Single supply operation: 4.7V - 5.5V
- Package Options:
  - 48-pin TSSOP
  - 44-pin LLP

Physical Dimensions

All dimensions are in millimeters



44-Pin Leadless Leadframe (LLP) Package
Order Numbers PC87431Mxx/L, PC87431Sxx/L, PC87431Cxx/L
NS Package Number LQA44A



48-Pin Plastic Thin Shrink Small Outline (TSSOP) Package
Order Numbers PC87431Mxx/T, PC87431Sxx/T, PC87431Cxx/T
NS Package Number MTD48

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