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Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



NCT5532D
Nuvoton LPC I/O

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1. GENERAL DESCRIPTION

The NCT5532D is a member of Nuvoton's Super I/O product line. The NCT5532D monitors several critical parameters in PC hardware, including power supply voltages, fan speeds and temperatures. In terms of temperature monitoring, the NCT5532D adopts the Current Mode (dual current source) and thermistor sensor approach. The NCT5532D also supports the Smart Fan control system, including "SMART FAN™ I and SMART FAN™ IV, which makes the system more stable and user-friendly.

The NCT5532D provides one high-speed serial communication port (UART), which includes a 16-byte send/receive FIFO, a programmable baud rate generator, complete modem-control capability and a processor interrupt system. The UART supports legacy speeds up to 115.2K bps as well as even higher baud rates of 230K, 460K, or 921K bps to support higher speed modems. The NCT5532D supports keyboard and mouse interface which is 8042-based keyboard controller.

The NCT5532D provides flexible I/O control functions through a set of general purpose I/O (GPIO) ports. These GPIO ports may serve as simple I/O ports or may be individually configured to provide alternative functions.

The NCT5532D supports the Intel® PECL (Platform Environment Control Interface), AMD® SB-TSI interface, AMD® CPU power on sequence, and also partial Intel® Deep Sleep Well glue logic to help customers to reduce the external circuits needed while using Deep Sleep Well function.

The NCT5532D supports two-color LED control to indicate system power states, Consumer IR function for remote control purpose, and also Advanced Power Saving function to further reduce the power consumption.

The configuration registers inside the NCT5532D support mode selection, function enable and disable, and power-down selection. Furthermore, the configurable PnP features are compatible with the plug-and-play feature in Windows, making the allocation of the system resources more efficient than ever.

2. FEATURES

General

- Meet LPC Specification 1.1
- SERIRQ (Serialized IRQ)
- Integrated hardware monitor functions
- Support DPM (Device Power Management), ACPI (Advanced Configuration and Power Interface)
- Programmable configuration settings
- Single 24-MHz or 48-MHz clock input
- Support selective pins of 5 V tolerance

UART

- One high-speed, 16550-compatible UART with 16-byte send / receive FIFO
- Support RS485
 - Supports auto flow control
- Fully programmable serial-interface characteristics:
 - 5, 6, 7 or 8-bit characters
 - Even, odd or no parity bit generation / detection
 - 1, 1.5 or 2 stop-bit generation
- Internal diagnostic capabilities:
 - Loop-back controls for communications link fault isolation
 - Break, parity, overrun, framing error simulation
- Programmable baud rate generator allows division of clock source by any value from 1 to $(2^{16}-1)$
- Maximum baud rate for clock source 14.769 MHz is up to 921K bps. The baud rate at 24 MHz is 1.5 M bps.

Keyboard Controller

- 8042-based keyboard controller
- Asynchronous access to two data registers and one status register
- Software-compatible with 8042
- Support PS/2 mouse
- Support Port 92
- Support both interrupt and polling modes
- Fast Gate A20 and Hardware Keyboard Reset
- 12MHz operating frequency

Hardware Monitor Functions

- Two remote temperature sensor inputs
- Programmable threshold temperature to speed fan fully while current temperature exceeds this threshold in the Thermal Cruise™ mode
- Support Current Mode (dual current source) temperature sensing method
- Up to eight voltage inputs (CPUVCORE, VIN2, VIN3, VIN4, 3VCC, AVCC, 3VSB and VBAT)
- Support Smart Fan I and Smart Fan IV
- Two fan-speed monitoring inputs

PRELIMINARY

Two fan-speed controls
Programmable hysteresis and setting points for all monitored items
Issue SMI# and OVT# (Over-temperature) to activate system protection via GPIO pins
Nuvoton Health Manager support
Provide I²C master / slave interface to read / write registers

CIR and IR (Infrared)

Support IrDA version 1.0 SIR protocol with maximum baud rate up to 115.2K bps
Support SHARP ASK-IR protocol with maximum baud rate up to 57,600 bps
Support Consumer IR, including CIRTx and CIRRx

General Purpose I/O Ports

Programmable general purpose I/O ports
Two access channels, indirect (via 2E/2F or 4E/4F) and direct (Base Address) access.

ACPI Configuration

Support Glue Logic functions
Support general purpose Watch Dog Timer functions via GPIO pins

OnNow Functions

Keyboard Wake-Up by programmable keys
Mouse Wake-Up by programmable buttons
OnNow Wake-Up from all of the ACPI sleeping states (S1-S5)

PECI Interface

Support PECI 1.1, 2.0 and 3.0 specification
Support 2 CPU addresses and 2 domains per CPU address

AMD SB-TSI Interface

Support AMD[®] SB-TSI specification

SMBus Interface

Support SMBus Slave interface to report Hardware Monitor device data
Support SMBus Master interface to get thermal data from PCH
Support SMBus Master interface to get thermal data from MXM module

AMD[®] CPU Power on Sequence

Support AMD[®] CPU power on sequence

Advanced Power Saving

Advanced Sleep State Control to save motherboard Stand-by power consumption

Operation voltage

3.3 voltage

Package

64-pin LQFP

Green

3. BLOCK DIAGRAM

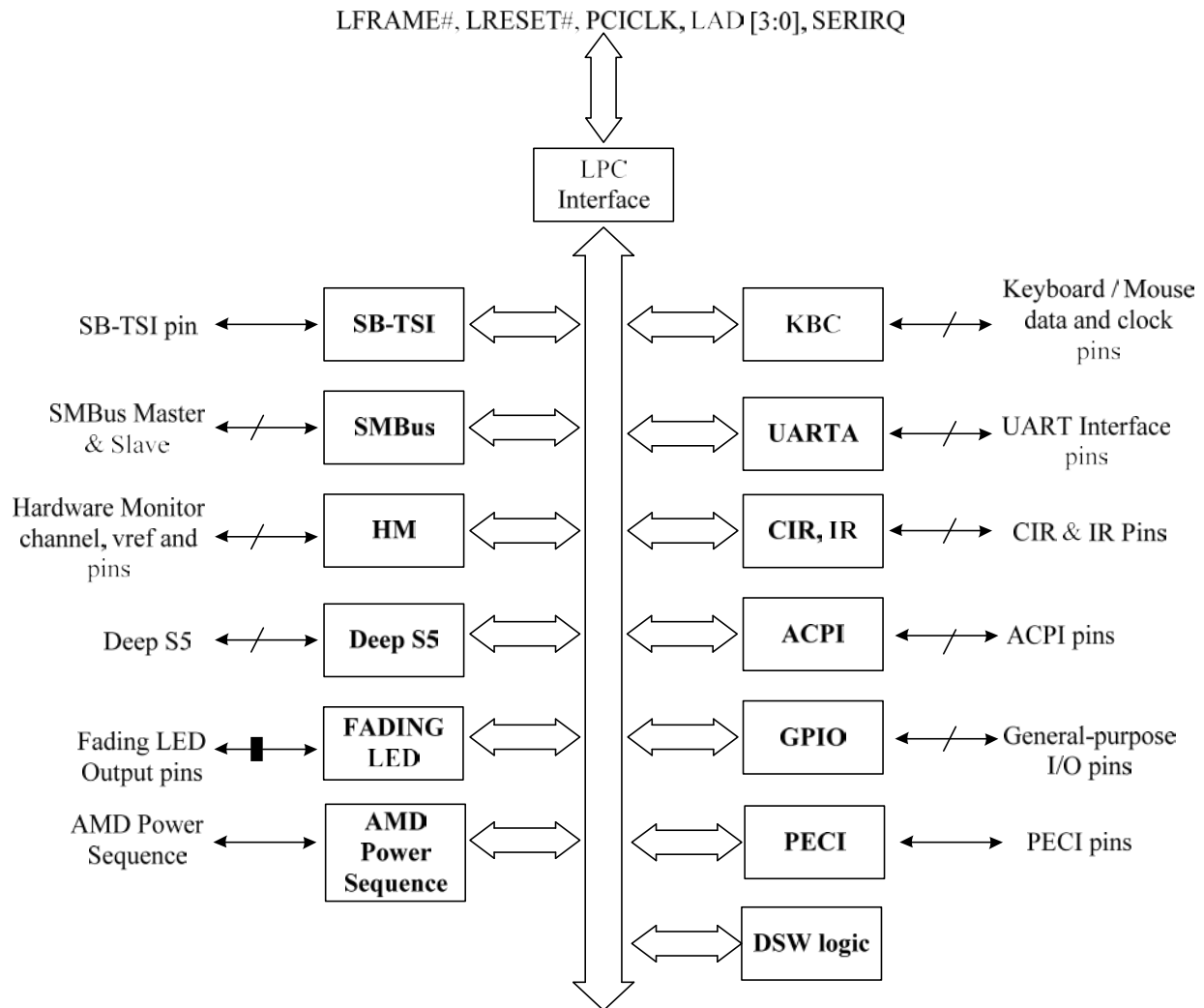


Figure 3-1 NCT5532D Block Diagram

4. PIN LAYOUT

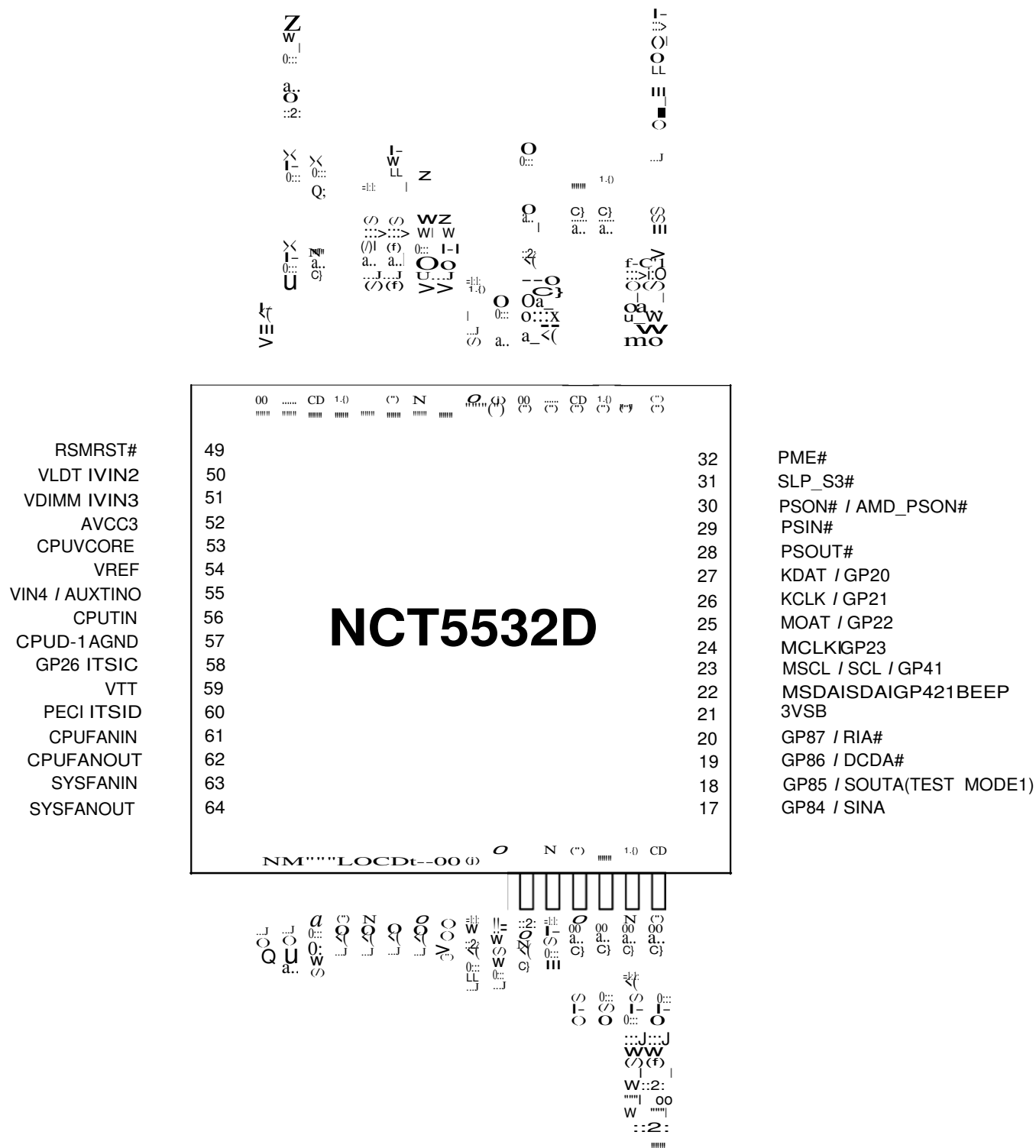


Figure 4-1 NCT5532D Pin Layout