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1. GENERAL DESCRIPTION

The NCT5577D is a member of Nuvoton's Super I/O product line. The NCT5577D monitors several critical parameters in PC hardware, including power supply voltages, fan speeds and temperatures. In terms of temperature monitoring, the NCT5577D adopts the Current Mode (dual current source) and thermistor sensor approach. The NCT5577D 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 NCT5577D 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 NCT5577D 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 NCT5577D supports the Intel® PECI (Platform Environment Control Interface) and AMD® SB-TSI interface. It also supports AMD® CPU power on sequence and Intel® Deep Sleep Well glue logic to help customers to reduce the external circuits needed while using Deep Sleep Well function.

NCT5577D supports two-color LED control via GPIO ouptputs to indicate system power states. The NCT5577D supports Consumer IR function for remote control purpose. It also supports Advanced Power Saving function to further reduce the power consumption while the system is at S5 state.

The configuration registers inside the NCT5577D 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.

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2. FEATURES

General

Meet LPC Spec. 1.1
Support AMD power on sequence
Support 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

Smart Fan control system
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
Eight voltage inputs (CPUVCORE, VIN0, VIN1, VIN3, 3VCC, AVCC, 3VSB and VBAT)
Two fan-speed monitoring inputs

Two fan-speed controls
Dual mode for fan control (PWM and DC) for SYSFANOUT
Programmable hysteresis and setting points for all monitored items
Issue SMI# to activate system protection
Nuvoton Health Manager support
Provide I^2C 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, 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

Power Measurement

Support Power Consumption measurement

Fading LED driver control for power status and diagnostic indications

AMD® CPU Power on Srquence

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

Characteristic

- Operation Temperature: 0℃ ~ 70℃
- Operation Voltage: 3.0V ~ 3.6V
- Voltage Detection Accuracy: +/-16mV
- Temperature Detection Accuracy: +/- 1℃
- Fan Speed Detection Accuracy: +/- 1 Fan Count
- Fan Speed DC Mode Output
    - Range: 0~2.048V
    - Resolution: 8mV / LSB
    - Accuracy: +/- 4mV

Package

64-pin LQFP
Green

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3. BLOCK DIAGRAM

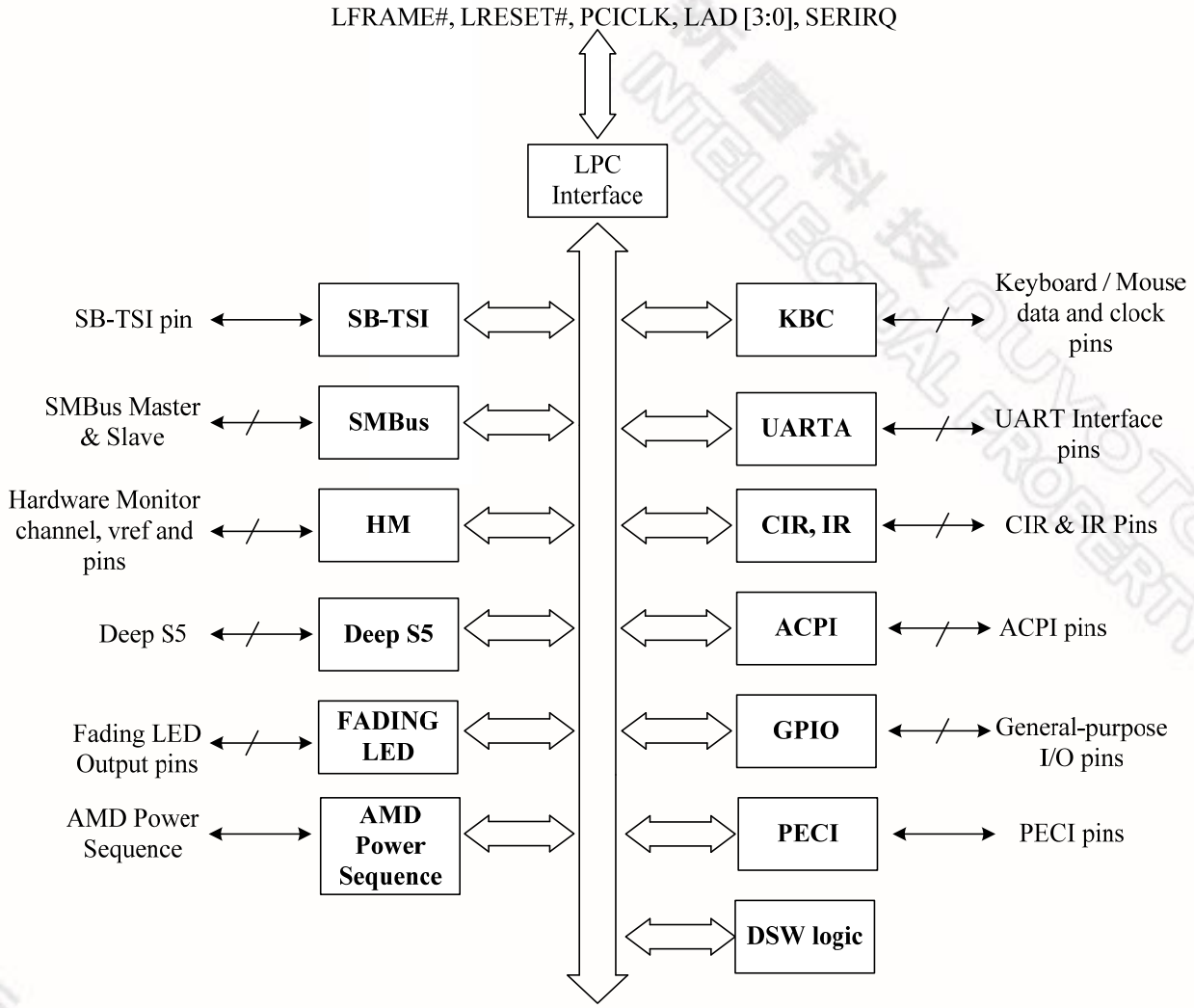

Figure 3-1 NCT5577D Block Diagram

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4. PIN LAYOUT

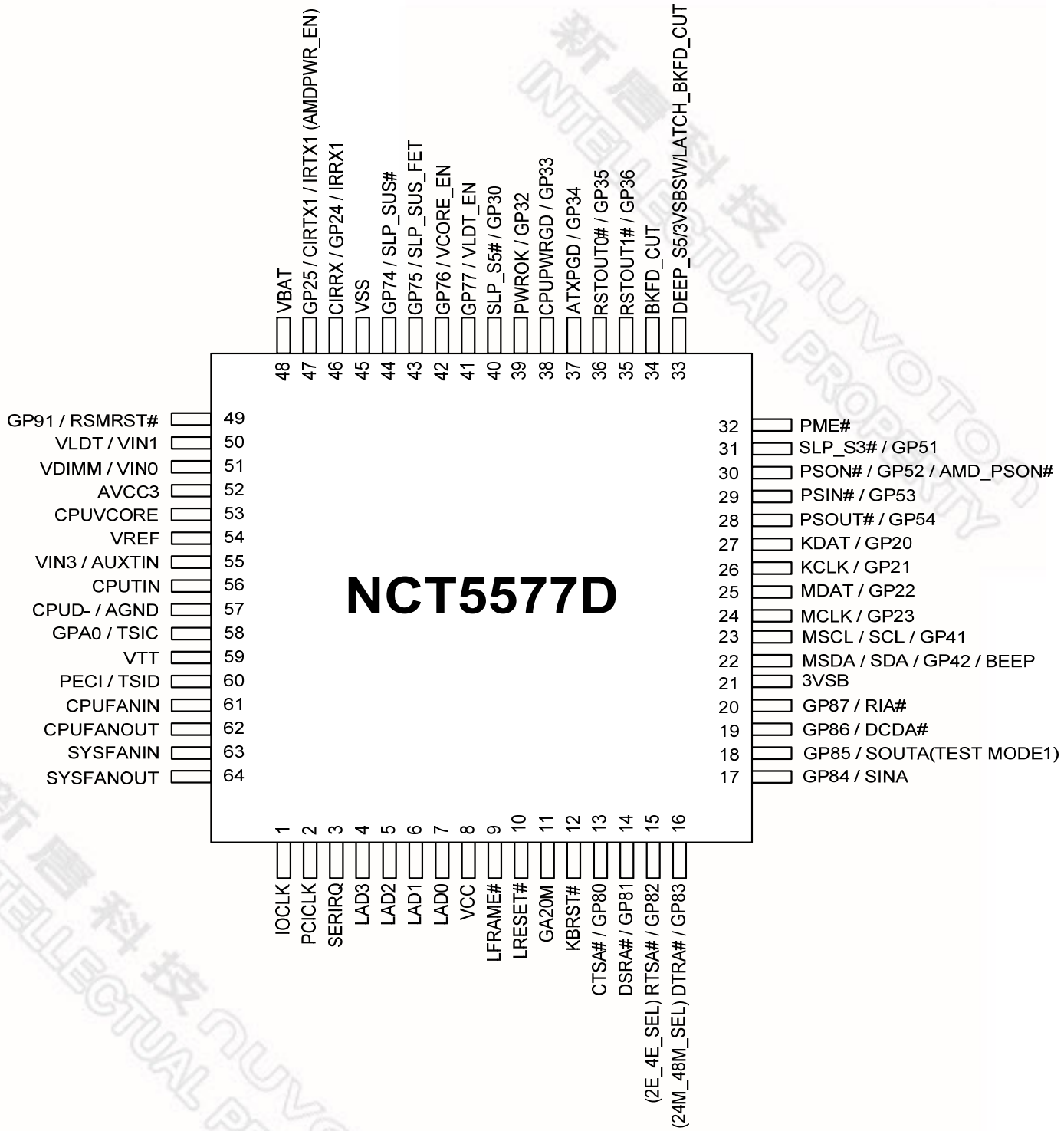

Figure 4-1 NCT5577D Pin Layout

5. PIN DESCRIPTION

Note: Please refer to 20.2 DC CHARACTERISTICS for details.

AOUT - Analog output pin
AIN - Analog input pin
IN_{tp3} - 3.3V TTL-level input pin
IN_{tsp3} - 3.3V TTL-level, Schmitt-trigger input pin
IN_{gp5} - 5V GTL-level input pin
IN_{tp5} - 5V TTL-level input pin
IN_{tscup5} - 5V TTL-level, Schmitt-trigger, input buffer with controllable pull-up
IN_{tsp5} - 5V TTL-level, Schmitt-trigger input pin
IN_{tdp5} - 5V TTL-level input pin with internal pull-down resistor
O_8 - output pin with 8-mA source-sink capability
OD_8 - open-drain output pin with 8-mA sink capability
O_{12} - output pin with 12-mA source-sink capability
OD_{12} - open-drain output pin with 12-mA sink capability
O_{24} - output pin with 24-mA source-sink capability
OD_{24} - open-drain output pin with 24-mA sink capability
O_{48} - output pin with 48-mA source-sink capability
OD_{48} - open-drain output pin with 48-mA sink capability
I/O_{v3} - Bi-direction pin with source capability of 6 mA and sink capability of 1 mA
I/O_{v4} - Bi-direction pin with source capability of 6 mA
O_{12cu} - output pin 12-mA source-sink capability with controllable pull-up
OD_{12cu} - open-drain 12-mA sink capability output pin with controllable pull-up

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