

## Advanced I/O with X-Bus Interface

### FEATURES

- 3.3 Volt Operation (5V tolerant)
- Floppy Disk Controller (Supports 2 FDCs)
- Multi-Mode Parallel Port
- Two UARTs
- 8042 Keyboard Controller
- SMBus Controller
  - SMBus access to LCD Interface
  - SMBus Serial Port 2 Interface Disable
  - SMBus access to Power On Elapsed Time Counters
  - Programmable Slave Address
- X-Bus Interface
  - Supports up to four external I/O components
  - Offers two modes of operation
  - Support for Driving LCD Panel Interface Controller
  - Supports Port 80h “Snooping”
- Programmable Wakeup Event Interface (IO\_PME# Pin)
- SMI Support (IO\_SMI# Pin)
- GPIOs (55)
- Fan Controller
  - One Fan Speed Control Output
  - One Fan Tachometer Input
- ISA IRQ to Serial IRQ Conversion
- XNOR Chain for Board Test Mode
- PC2001 and ACPI 2.0 Compliant
- 128-pin QFP Package
- ISA Plug-and-Play Compatible Register Set
- Intelligent Auto Power Management
- Power On Elapsed Time Counters
  - Counter for Main Power
  - Counter for Standby Power
- Real Time Clock
  - MC146818 and DS1287 Compatible
  - 256 Bytes of Battery Backed CMOS in Two 128-Byte Banks
  - 128 Bytes of CMOS RAM Lockable in 4x32 Byte Blocks
  - 12 and 24 Hour Time Format
  - 24-hour daily alarm
  - 30-day alarm
  - Binary and BCD Format
  - <1 $\mu$ A Standby Current (typ)
- 2.88MB Super I/O Floppy Disk Controller
  - Licensed CMOS 765B Floppy Disk Controller
  - Software and Register Compatible with SMSC'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 15 IRQ and Four DMA Options
- Enhanced Digital Data Separator
  - 2 Mbps, 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
  - Supports 230k and 460k Baud
  - Programmable Baud Rate Generator
  - Modem Control Circuitry
  - 480 Address and 15 IRQ Options
  - IrDA 1.0, HP-SIR, ASK IR Support

- 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 Against Damage Due to Printer Power-On
  - 960 Address, up to 15 IRQ and Four DMA Options
- Pin Reduced ISA Host Interface (LPC Bus)
  - Multiplexed Command, Address and Data Bus
  - 8-Bit I/O Transfers
  - 8-Bit DMA Transfers
  - 16-Bit Address Qualification
  - Serial IRQ Interface Compatible with *Serialized IRQ Support for PCI Systems*
  - Power Management Event (PME) Interface Pin
- Power Management
- ACPI Registers

## ORDERING INFORMATION

LPC47S457-NS

for 128 pin QFP package with Phoenix 42i Keyboard BIOS Lead-Free RoHS Compliant

LPC47S457-NC

for 128 pin QFP package with Phoenix 42i Keyboard BIOS



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## GENERAL DESCRIPTION

The LPC47S45x is a 3.3V PC2001 compliant Super I/O controller designed for server applications. The LPC47S45x implements the LPC interface, a pin reduced ISA interface which provides the same or better performance as the ISA/X-bus with a substantial savings in pins used. The part provides 55 GPIO pins, ACPI support, an X-Bus interface, two SMBus controllers, a fan speed control output, a fan tachometer input and four ISA IRQs that can be routed to any of the serial IRQs. The LPC47S45x also provides Power on Elapsed Time counters for Main Power and Standby Power, power supply on/off control, and a Real Time Clock.

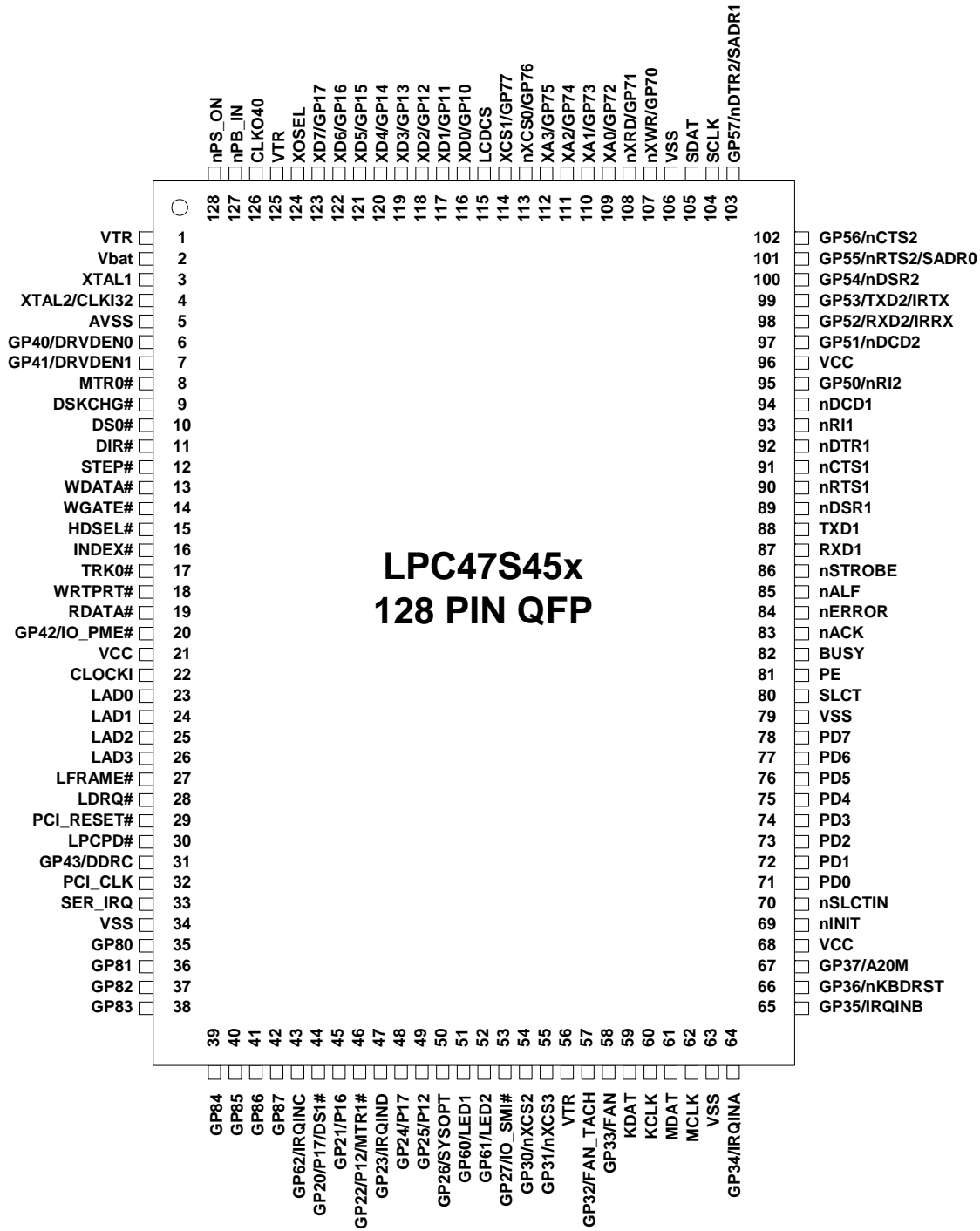
The X-Bus interface allows the LPC47S45x to interface to as many as four external components that have an eight bit data bus and occupy up to 4 contiguous I/O address ports. It is accessible by either the SMBus or the LPC interface. It is capable of interfacing to an LCD Panel Interface Controller without any external logic and it can be used for Port 80h "snooping".

The LPC47S45x offers two SMBus controllers that share the same pin interface. The SMBus slave only device provides external access to an LCD controller that can be attached to the X-Bus. It is capable of disabling the floppy port, the serial ports, and the parallel port. The SMBus slave only device can also tristate the Serial Port 2 interface so that it may be muxed with an external UART controller. The LPC47S45x is equipped with two counters that may be monitored either by the SMBus slave only device or by the LPC interface, which monitor the length of time VCC and VTR are active.

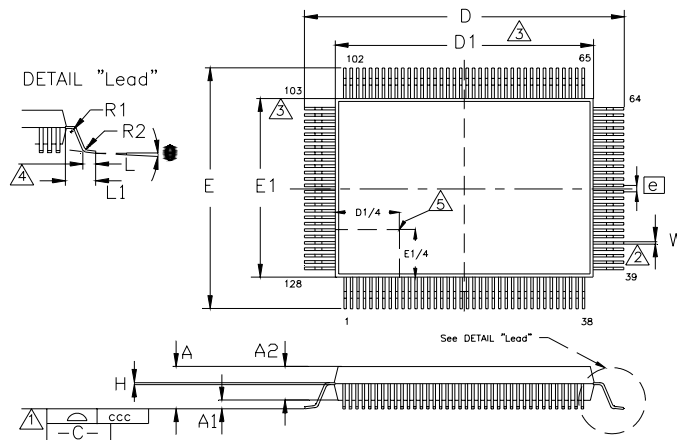
The LPC47S45x incorporates a keyboard interface, SMSC's true CMOS 765B floppy disk controller, advanced digital data separator, two 16C550 compatible UARTs, one Multi-Mode parallel port which includes ChiProtect circuitry plus EPP and ECP, and Intelligent Power Management. The true CMOS 765B core provides 100% compatibility with IBM PC/XT and PC/AT architectures in addition to providing data overflow and underflow protection. The SMSC advanced digital data separator incorporates SMSC's patented data separator technology, allowing for ease of testing and use. The on-chip UARTs are compatible with the NS16C550. The parallel port is compatible with IBM PC/AT architecture, as well as IEEE 1284 EPP and ECP. The LPC47S45x incorporates sophisticated power control circuitry (PCC). The PCC supports multiple low power down modes.

The LPC47S45x supports the ISA Plug-and-Play Standard (Version 1.0a) and provides the recommended functionality to support Windows 2000, Windows Me, and PC2001. The I/O Address, DMA Channel and Hardware IRQ of each logical device in the LPC47S45x may be reprogrammed through the internal configuration registers. There are 480 I/O address location options, a Serialized IRQ interface, and three DMA channels.

# PIN CONFIGURATION



# 128 PIN QFP PACKAGE OUTLINE, 3.9 MM FOOTPRINT.



	MIN	NOMINAL	MAX	REMARKS
<b>A</b>	~	~	3.4	Overall Package Height
<b>A1</b>	0.05	~	0.5	Standoff
<b>A2</b>	2.55	~	3.05	Body Thickness
<b>D</b>	23.70	~	24.10	X Span
<b>D1</b>	19.90	~	20.10	X body Size
<b>E</b>	17.70	~	18.10	Y Span
<b>E1</b>	13.90	~	14.10	Y body Size
<b>H</b>	0.09	~	0.20	Lead Frame Thickness
<b>L</b>	0.73	0.88	1.03	Lead Foot Length
<b>L1</b>	~	1.95	~	Lead Length
<b>e</b>	0.50 Basic			Lead Pitch
<b>θ</b>	0°	~	7°	Lead Foot Angle
<b>W</b>	0.10	~	0.30	Lead Width
<b>R1</b>	0.13	~	~	Lead Shoulder Radius
<b>R2</b>	0.13	~	0.30	Lead Foot Radius
<b>ccc</b>	~	~	0.08	Coplanarity

**Notes:**

- <sup>1</sup> Controlling Unit: millimeter.
- <sup>2</sup> Tolerance on the position of the leads is ± 0.04 mm maximum.
- <sup>3</sup> Package body dimensions D1 and E1 do not include the mold protrusion.  
Maximum mold protrusion is 0.25 mm.
- <sup>4</sup> Dimension for foot length L measured at the gauge plane 0.25 mm above the seating plane.
- <sup>5</sup> Details of pin 1 identifier are optional but must be located within the zone indicated.