Introduction

The M1535D+ provides the best desktop system solution. The M1535D+ integrates AC-Link Host Controller, Hardware SoundBlaster Pro/16 compatibility, Host Signal Processing (HSP) software modem solution, ACPI support, green function, 2-channel dedicated UDMA/ATA-100 IDE Master controller, 2 USB controllers, SMBus controller, PS/2 Keyboard/Mouse controller, the Super I/O (Floppy Disk Controller, 2 serial port/1 parallel port) support and Fast IR into one chip.

The built-in I/O in M1535D+ is an advanced Super I/O controller containing all of the basic IBM PC, XT, AT peripherals. It incorporates three full function universal asynchronous receiver/ transmitters (UARTs), a flexible high performance internal data separator with send/receive 16 byte FIFOs. It is also suitable for notebook computers since it has Fast Infra Red for wireless communications with other devices. It can swap the floppy drives A & B. It supports SPP, PS/2, EPP and ECP parallel port. It also has a programmable baud rate generator. It has high performance power management for the FDC, UART and parallel port.

The built-in audio in M1535D+ is an advanced PCI audio accelerator providing wave table synthesis, DirectMusic, DirectSound, and DirectSound3D for the high performance, cost-sensitive consumer market. It also supports full Sound Blaster compatibility and is fully PC 98/PC 99 compliant. The M1535D+ Audio, combined with a standard AC'97/AC 98 Codec, provides better than CD quality audio with sound-to-noise ratio of > 90 db, up to 48 KHz sample rate, full duplex audio with independent playback and recording sample rate, 6-channel mixer and optional 3D surround sound enhanced output. In the legacy DOS game environment, the M1535D+ audio accelerator provides SoundBlaster Pro/16 compatibility, OPL2 and OPL3 emulation, and 1 to 8 MB of general MIDI music through the MPU 401 compatible interface. With built-in support of the legacy mode analog game port, the M1535D+ audio can replace all the functions of a wave table based legacy audio ISA card. In addition, the M1535D+ supports consumer audio digital interface (SPDIF) to connect external digital audio equipment.

The M1535D+ will provide the AC'97 2.1 compliant digital controller interface for third parties (such as the AMC Codec's vendor) to enable the software modem solution. The M1535D+ provides 4 separate telephony bus master channels. One for modem output, one for modem input, one for handset input, and one for handset output. The M1535D+ supports the modem on-demand variable sample rate transfer, power management, wake-up, and caller ID string transmission.

The M1535D+ will support the security feature such as the platform firmware protection. The M1535D+ also provides the ability to meet the Legacy-Free and Legacy Reduction specification of PC2001.
Features

- Provides a High Integration Bridge (with Audio, HSP Modem, Super I/O & Fast IR) between the PCI Bus and Peripheral Bus for both Desktop and Notebook Systems
- PCI 3.3V/5V Tolerance Interface
  - Supports PCI Master and Slave Interface
  - Supports PCI Master and Slave Initiated Termination
  - Concurrent PCI Architecture
  - PCI spec. 2.2 Compliant
  - PCI Power Management Interface spec. 1.1 Compliant

- Provides Steerable PCI Interrupts for PCI Device Plug-and-Play
  - Up to 8 PCI Interrupts Routing
  - Level to Edge Trigger Transfer

- Enhanced DMA Controller
  - Provides 7 Programmable Channels, 4 for 8-bit Data Size, 3 for 16-bit Data Size
  - 32-bit Addressability

- Interrupt Controller
  - Provides 14 Interrupt Channels
  - Independent Programmable Level/Edge Triggered Channels

- Counter/Timers
  - Provides 8254 Compatible Timers for System Timer, Refresh Request, Speaker Output Use

- Distributed DMA Supported
  - 7 DMA Channels can be Arbitrarily Programmed as Distributed Channels

- PC/PCI DMA Supported
  - 1 PC/PCI DMA Channel Interface Provided

- Serialized IRQ Supported
  - Quiet/Continuous Mode
  - Programmable (Default 21) IRQ/DATA Frames
  - Programmable START Frame Pulse Width

- Low Pin Count (LPC) Host Controller
  - Provides Low Pin Count Host Controller based on Low Pin Count Interface Spec. 1.0

- Plug-and-Play Supported
  - 2 Programmable Chip Select lines
  - 2 Steerable Interrupt Request lines

- Built-in Keyboard Controller
  - Built-in PS/2/AT Keyboard and PS/2 Mouse Controller

- Supports up to 512 KB ROM Size Decoding

PMU Features

1. G0 State
   -- On
   -- Standby Mode
2. G1 State (Suspend Mode 1)
   -- S1 State (Power On Suspend)
   -- S3 State (Suspend To RAM)
   -- S4 State (Suspend To DISK)
3. G2 State (Suspend Mode 2)
   -- S5 State (Soft-Off)
4. G3 State (Mechanical-Off)

APM State Detection and Control Logic Supported

Global and Local Device Power Control Logic

10 Monitor Timers : Standby/ APMA~D/ Global-Display/ HDD A~B/ SIO & Audio/ GPIO.

2 Low Battery timers supported.

Provides System Activity and Display Activity Monitoring, including
   -- Video
   -- Audio
   -- Hard Disk
   -- Floppy Disk
   -- Serial Ports
   -- Parallel Port
   -- Keyboard
   -- 4 Programmable I/O Groups
   -- 2 Programmable Memory Spaces

Provides Hot Plugging Event Detection
   -- Docking Insert
   Multiple External Wakeup Events of Standby Mode (G0)
   -- Power Button
   -- Sleep Button
   -- Modem Ring
   -- RTC Alarm
   -- DRQ2 Resume Events Detected Wake Up from Suspend Mode (G1, G2)
   -- 9 resume events supported.
   -- Power Button
   -- Sleep Button
   -- RTC Alarm
   -- PCI PMEJ Signal
   -- Modem Ring
   -- USB Events
   -- AC’97
   -- Hotkey KBD & MS
   -- IRQ1 & 12

CLKRUN# Function Supported for PCI Mobile Design Guide Ver. 1.1

Thermal Alarm Supported

Clock Generator Control Logic Supported
-- CPUCLK Stop Control
-- PCI CLK Stop Control
L2 Cache Power Down Control Logic Supported
Up to 25 Run Time Events Supported (included 8 Extended Run Time Events).
Up to 12 General Purpose Input Signals, up to 15 General Purpose Output Signals and up to 30 General Purpose Input/Output Signals.
16 Extended General Purpose Input Signals, 16 Extended General Purpose Output Signals, and 8 Extended Run Time Events supported.
All Registers Readable/Restorable for Proper Resume from Suspend State
Hotkey for Power on Button Function through Keyboard or Mouse
Supports Power Loss Recovery
Watch Dog Timer for
-- Setting a Bit in Register
-- Generating an SMII/SCI/NMI/INIT
-- Generating System Reset

Built-in PCI IDE Controller
Supports Ultra DMA Mode Transfers up to Mode 5 Timing (100 Mbytes/sec)
Supports PIO Modes up to Mode 4 Timings, and Multiword DMA Mode 0,1,2 with Independent Timing of up to 4 Drives
Integrated 48 x 16-bit Read Ahead & Posted Write Buffers for each channel (Total : 48 DWords)
• Dedicated ATA Interface signals for each channel
Supports Tri-state IDE Signals for Swap Bay
Supports Command Queue IDE enhancement

USB Interface
• Up to six (6) USB ports with two (2) USB host controllers based on the OpenHCI 1.0a Specification
• Supports FS (12Mbits/sec) and LS (1.5Mbits/sec) Serial Transfer
• Supports Legacy Keyboard and Mouse Software with USB-based Keyboard and Mouse

SMBus Interface
System Management Bus Interface meets the V1.0 Specification
SMBALERT# Support

Super I/O Interface
Supports Windows Plug-and-Play
Supports 2 Serial/ 1 Parallel/ FDC Functions
Supports 16-bit Address Decoder
• Automatic media sense support
2.88 MB (Formatted) Floppy Disk Controller
-- Software Compatible with 82077 and Supports 16-byte Data FIFOs
-- High Performance Internal Data Separator
-- Supports Standard 1 Mbps/ 500 Kbps/ 300 Kbps/ 250 Kbps Data Transfer Rate
-- Supports 3 modes of 3.5" FDD (720KB/ 1.2MB/ 1.44MB)
-- Swappable Drives A and B
-- Programmable 7-bit I/O Base Address
Various Mode Parallel Port

-- Standard Mode
-- Programmable 8-bit I/O Base Address
-- Multiplexing of FDC Signals through Parallel Port Pins
-- 12 IRQ Channel Options
-- 4 8-bit DMA Channel Options
-- IBM PC/XT, PC/AT and PS/2 Compatible
  Bi-directional Parallel Port
-- Enhanced Mode
  - Enhanced Parallel Port (EPP) Compatible
  - EPP is compatible with EPP1.9 (IEEE 1284 Compliant), also supports EPP1.7 of Xircom Specification
-- High Speed Mode
  - Microsoft and Hewlett Packard Extended Capabilities Port (ECP) Compatible
  - IEEE 1284 Compatible ECP
  - Includes Protection Circuit against damage caused when printer is powered up, or operated at higher voltages
Serial Ports
-- Three High Performance 16450/16550 Compatible UARTs with Send/Receive 16-byte FIFOs
-- Programmable Baud Rate Generator
-- Wireless Communications
-- Dedicated signals and COM Port for Infrared Transmission
-- Supports IrDA 1.0 (SIR) and IrDA 1.1 (MIR and FIR)
-- Supports Sharp-IR
-- MIDI (Musical Instrument Digital Interface) Compatible
-- High Performance Power Management for FDC, UART and Parallel Port
-- Option between Programmable 7-bit I/O Base Addresses, 12 IRQs, and 4 DMA Channels for each device
Audio System

- Fully Plug-and-Play PCI controller and software
- PCI 2.2 compliant bus master optimized for multiple stream operation.
- On-chip per voice cache to minimize PCI bandwidth use
- Hardware multi-channel digital mixer
- 32 voices polyphony wavetable synthesizer supports all combinations of stereo/mono, 8-/16-bit, and signed/unsigned samples.
- Per channel for wave table synthesis with envelop, pitch shift, tremolo and vibrato
- DLS1-compliant Downloadable Sample support
- DirectMusic with unlimited downloadable samples in system memory
- Legacy game audio with SoundBlaster Pro/16 compatibility
- Legacy game FM and wave table synthesis supported
- MPU-401 compatible MIDI I/O with FIFO
- AC97 2.1 support with full duplex, independent sample rate converter for recording and playback
- High precision internal 26-bit digital mixer with 20-bit digital audio output
- Microsoft WDM streaming architecture compliant and "Re-routable endpoint" support
- 32-voice DirectSound channels
- 16-voice DirectSound3D accelerator with IID, ITD and Doppler effect on 3D positional audio buffer
- DirectSound accelerator with volume, pan and pitch shift control on streaming or static buffers
- DirectInput support with digital enhanced game port enables an analog joystick to emulate digital joystick performance using DirectInput driver. This eliminates up to 12% CPU overhead wasted on joystick polling.
- DirectX timer for video/audio synchronization
- Hardware digital volume control
- Supports Consumer SPDIF Output
- Supports Consumer SPDIF Input

Software Modem Interface

- The M1535+ provides the AC’97 2.1 compliant digital controller interface for third parties (such as the AMC Codec’s vendor) to enable the software modem solution.
- 4 separate telephony bus master channels. One for modem output, one for modem input, one for handset input, and one for handset output.
- AC’97 2.1 Modem variable sample rate support for “On Demand” sample transport scheme.
- AC’97 2.1 GPIO signal status and control support.
- Power Management and wake-up event support
- Caller ID string transmission via AC-link support

352-pin (27mmx27mm) BGA Package