



# XTX 820 Brings ETX to the Future

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Ampro's XTX 820 Computer-On-Module (COM) allows OEM to access the latest processor chipset technology without a complete redesign of their ETX baseboard. We understand how much OEMs have invested in custom baseboards, consequently Ampro will help to make XTX an industry standard in order to provide the cleanest path forward for OEMs to adopt new processors and chipsets.

Although the ETX standard does not accommodate new high-speed serial technologies such as Serial ATA and PCI Express, the new XTX standard provides an extension to ETX by replacing the ISA bus signals with four PCI Express lanes, two Serial ATA ports, two additional USB ports, and the Low Pin Count (LPC) bus. The LPC bus has already replaced the ISA bus in desktop and notebook PCs and chipsets. Access to both the PCI bus and the LPC bus at the XTX baseboard interface gives OEMs two options for generating the ISA bus if it's needed: Through a PCI-to-ISA bridge or an LPC-to-ISA bridge on the baseboard. Unlike other COM architectures, XTX retains support for legacy peripherals such as serial ports, parallel port, floppy drive, Parallel ATA (IDE), and PS/2 keyboard and mouse.

XTX uses the same four baseboard connectors as ETX, in the same locations, and the module holes and dimensions are identical for seamless migration from a mechanical standpoint. Electrically, only the signals on one connector X2 are different (ISA bus). For OEMs not using ISA, the XTX 820 plugs directly into existing ETX baseboards, allowing easy access to the latest chipset technology, graphics, and processors plus a "bridge to the future" so that baseboards can take advantage of PCI Express and Serial ATA when it's convenient for each OEM. Other new module standards use completely different connectors, signals, locations, and board sizes, which causes a substantial baseboard design immediately, even when PCI Express is not needed in the short term.

Featuring performance up to 1.8 Gigahertz Pentium® M, the XTX 820 COM retains legacy peripherals while offering the latest high-speed interconnect and storage technologies. The XTX 820 COM offers the next generation Intel 915GM chipset along with a choice of 1.0GHz, 1.4GHz, or 1.8GHz Intel processors, DDR2 400 RAM to 1GB, (6) USB 2.0 ports, both EIDE and Serial ATA interfaces, 10/100 Ethernet, PCI expansion, and RoHS compliance. XTX modules plug into a baseboard to

allow customization of board size and shape, I/O circuitry, connector locations, and easy migration to higher performance modules in the future.

The XTX 820 QuickStart Kits include drivers and Board Support Packages (BSPs) for Windows® XP, Windows XP Embedded, Windows CE 5.0, VxWorks®, and QNX® operating systems, and a full Linux® 2.6 distribution (Fedora™ Core 3).

The XTX 820 is also designed with full ACPI 2.0 support, including S3 suspend-to-RAM. AMI BIOS provides full support for wake-up devices, including LAN, keyboard, mouse, power button, and PCI or SMBus activity. Below are the details for the ACPI functions supported by XTX 820.

## Power and Sleep States

The following information only applies if an ATX power supply is connected to the XTX baseboard where the XTX 820 is installed. If a non-ATX power supply is used, then the XTX 820 is only controlled by the Power-On/Off switch on the power supply and the various sleep states are not available. The ACPI sleep states are OS dependent and not available if your OS does not support power management based on the ACPI standard.

## Power-On Switch

The Power-On switch, on or connected to the XTX Baseboard, turns the XTX 820 and its attached power supply to a fully On condition, if you are using an ATX power supply and an OS that supports sleep states. If the operating system (OS) supports sleep states, the OS will turn off the XTX 820 and its power supply during the OS shut down process. Typically, the Power-On switch will also transition the XTX 820, the XTX baseboard, and its power supply between a fully powered on state and the various sleep states, including a fully powered off state. If the OS does not support sleep states, then the Power-On switch only turns power, On or Off, to the XTX 820 and its baseboard.

Typically, an OS that supports ACPI, also allows the Power-On switch to be configured through a user interface. The Power-On switch for the XTX 820 must be provided on, or connected to the baseboard.

## Sleep States (ACPI)

The XTX 820 supports the ACPI (Advanced Configuration and Power Interface) standard, which is a key component of certain Operating Systems' (OS's) power management. The supported features (sleep states) listed here are only available when an ACPI-compliant OS is used for the XTX 820, such as Windows 2000/XP. The term "sleep" state refers to a low wake latency (reduced power consumption) state, which can be re-started (awakened) restoring full operation to the XTX 820.

In these various sleep states, the computer appears to be off, indicated by such things as no display on the attached monitor and no activity for the connected CD-ROM or hard drives. Normally, when a computer detects certain activity (i.e. power switch, mouse, keyboard, serial port, or certain types of LAN activity), it returns to a fully operational state.

The XTX 820 supports at least five ACPI power states, depending on the operating system used and its ability to manage sleep states. Typically, the Power-On switch is used to wake up from a sleep state, or transition from one state to another, but this is dependent on the operating system.

- 1st state is normal Power On (S0).
  - To go to a fully powered on state, the XTX 820 must either be powered Off (S5), or in a sleep state (S1 or S4), and then the Power-On switch is pressed for less than 4 seconds (default).
  - The XTX 820 can transition from this state (S0) to the various states described below, depending on the power management capability of the OS and how it is programmed.
- 2nd state is a standby state (S1).
  - In this state there are no internal operations taking place, except for the internal RTC (real time clock) and the contents of RAM. This includes no activity for the CPU, CD-ROM, or hard disk drives. The XTX 820 appears to be off including the Power-On LED.
  - Normally, to enter this sleep state, the XTX 820 must be fully powered on (S0) and the OS transitions the XTX 820 into this standby state (S1) under user control.
- To exit this sleep state a wake up event, such as the Power-On switch, is used to wake up the XTX 820 and restore full operation, including the Power-On LED. Typically, pressing the
  - Power-On switch for less than 4 seconds (default) will restore full operation.
  - 3rd state is a suspend-to-RAM state (S3).
    - In this state there are no internal operations taking place, except for the internal RTC (real time clock) and the contents of RAM. This includes no activity for the CPU, CD-ROM, or hard disk drives. The XTX 820 appears to be off including the Power-On LED.
    - Normally, to enter this sleep state, the XTX 820 must be fully powered on (S0) and the OS transitions the XTX 820 into this suspend-to-RAM (S3) state under user control.
    - To exit this sleep state a wake up event, such as the Power-On switch, is used to wake up the XTX 820 and restore full operation, including the Power-On LED. Typically, pressing the Power-On switch for less than 4 seconds (default) will restore full operation.
  - 4th state is a hibernate or suspend-to-disk state (S4).
    - In this state there are no internal operations taking place, except for the internal RTC. This includes no activity for the RAM, CPU, CD-ROM, or hard disk drives. The XTX 820 appears to be off, including the Power-On LED. Your system will take longer to wake-up in this sleep state, however, since your data is saved to the disk, it is more secure and should not be lost in the event of a power failure.
    - To enter a hibernate or suspend-to-disk state, the XTX 820 must be fully powered on and the OS transitions the XTX 820 into this sleep state (S4) under user control.
    - To exit this sleep state a wake up even, such as the Power-On switch, is used to wake up the XTX 820 and restore full operation, including the Power-On LED. Typically, pressing the Power-On switch for less than 4 seconds (default) will restore full operation.
  - 5th state is the normal power Off or shutdown (S5).
    - All activity stops except the internal clock, unless the power cord is removed from the power source.
    - To go to a fully powered down state, the XTX 820 must either be powered On, or in a sleep state, and then the Power-On switch is pressed for more than 4-to-6 seconds.

- To go to a fully powered up state, press the Power-On switch for less than 4 seconds (default) and full operation is restored.

The OS may provide additional programming features to change the activation time for each state, and to shutdown or transition the XTX 820 at certain times, depending on the way the OS interface is programmed. Refer to the OS vendor's documentation for power management under the ACPI standard.

Below is the complete list of XTX 820 supported features.

- CPU features
  - Intel Celeron M 373 1.0 GHz with 512 kbytes L2 cache
  - Intel Pentium M 738 1.4 GHz with 2 Mbytes L2 cache
  - Intel Pentium M 745 1.8 GHz with 2 Mbytes L2 cache
  - All three CPUs use 400 MHz front side bus (FSB)
- Memory
  - Single standard 200-pin DDR2 SODIMM socket
  - Supports +1.8V RAM up to 1 GB
  - Supports PC2 3200 DDR2 400 (400 Mbps)
- Power Management
  - Supports ACPI 2.0 with S3 (Suspend to RAM)
- PCI Bus
  - PCI 2.2 compliant
  - PCI Bus speed at 33 MHz
- PCI Express
  - Supports 4 x 1 PCI Express Lanes
  - Supports PCI Express edge card or ExpressCards on custom baseboard
  - Supports PCI Express specification v1.0a
- LPC Bus
  - Provides the equivalent ISA signals with a lower pin count (LPC)
- IDE/ATA Interfaces
  - Supports two Serial ATA interfaces
  - Supports one EIDE channel (UDMA 66/100)
  - Supports ATAPI and DVD peripherals
- Supports IDE native and ATA compatibility modes
- Floppy Disk Interface
  - Shares output connector with Parallel port
  - Supports one standard (34-pin) floppy drive
  - Supports all standard PC/AT formats: 360KB, 1.2MB, 720KB, 1.44MB
- Serial Ports
  - Provides two buffered TTL serial ports with full handshaking (transceiver on baseboard)
  - Provides 16550-equivalent controllers, each with a built-in 16-byte FIFO buffer
  - Supports full modem capability
  - Supports programmable word length, stop bits, and parity
  - Supports 16-bit programmable baud-rate generator and an interrupt generator.
- Infrared Interface
  - Supports a single IrDA 1.1 port
  - Supports HPSIR and ASKIR infrared modes
- Parallel Port
  - Shares output connector with Floppy controller
  - Supports standard printer port
  - Supports IEEE standard 1284 protocols of EPP and ECP outputs
  - Bi-directional data lines
  - Supports 16 byte FIFO for ECP mode.
- USB Ports
  - Supports three root USB hubs
  - Supports six USB ports
  - Supports USB v2.0 (EHCI) and legacy v1.1
  - Supports over-current fuses on board
- Keyboard/Mouse Interface
  - Supports PS/2 keyboard
  - Supports PS/2 mouse
- Audio interface
  - Supports AC'97 standard
  - AC'97 HDA (High Definition Audio) CODEC on board
  - Supports audio amplifier on baseboard

- Ethernet Interface
  - Supports one Ethernet port
  - I/O Hub (Southbridge) provides MAC Ethernet Controller
  - Intel 82562GZ provides the PHY Ethernet interface
  - Requires magnetics and RJ45 connector on baseboard
  - Supports IEEE 802.3 10BaseT/100BaseTX compatible physical layer
  - Supports Auto-negotiation for speed, duplex mode, and flow control
  - Supports full duplex or half-duplex mode
- Full-duplex mode supports transmit and receive frames simultaneously
- Supports IEEE 802.3x Flow control in full duplex mode
- Half-duplex mode supports enhance proprietary collision reduction mode
- Video Interfaces (CRT/LVDS/TV Out)
  - Support CRT resolutions up to 2048x1536 @ 70Hz (QXGA)
  - Supports Intel Graphics Media Accelerator 900
  - Supports max 224 MB DVMT 3.0 (Dynamic Video Memory Technology)
  - Supports Dual independent display
  - Supports 2x 112 MHz LVDS transmitter
  - Supports TV Out to the baseboard
- Miscellaneous
  - Provides Real-time clock (RTC) supported by external battery on baseboard
  - Supports Remote Access (Serial Console or Console Redirection)
  - Supports Watchdog timer
  - Supports Customizable splash screen

## About Ampro Computers, Inc.

Ampro Computers, Inc. is the leading global provider of modular embedded computing solutions for OEM applications. Ampro's mission is to provide time saving solutions for embedded systems designers that accelerate the product deployment process. Ampro pioneered the embedded PC industry creating the popular pC/104 and EBX standards, and recently co-invented the new EPIC standard. The EnCore and ETX families are rugged Computers-ON-Modules (COMs) products which enable designers to obtain all the benefits of an off-the-shelf CPU solution while maintaining the flexibility of a full custom design. In addition to EnCore and ETX, Ampro offers PC/104-compatible CoreModule CPUs and MiniModule expansion products, EBX form factor LittleBoard single-board computers (SBCs), EPIC form factor ReadyBoard SBCs, and Mini-ITX form factor MightyBoard SBCs. For more information about Ampro visit [www.Ampro.com](http://www.Ampro.com).

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