OCTAGON SYSTEMS
• Embedded rugged computers
• –40° to 85° C
• Embedded operating systems
• COTS—high reliability
• 7403 Church Ranch Blvd. • Westminster CO 80031 • USA •
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XE–900: Fastest EPIC™ board now available with Windows® XPe

The XE–900 SBC is a high–performance, low–power, x86 workhorse for embedded applications. It is an EPIC form factor SBC with a rich family of I/O functions. The XE–900 integrates video, serial ports, Ethernet, digital I/O, and USB networking into a single card. Support for three hard drives gives this card the versatility to adapt to any application. The XE–900 is ideal for applications in transportation, security, military, communications, distributed control, point–of–sale, ticketing machines, weighing equipment, and other similar environments. The XE–900 SBC is fully compatible with Windows XPe and Linux.

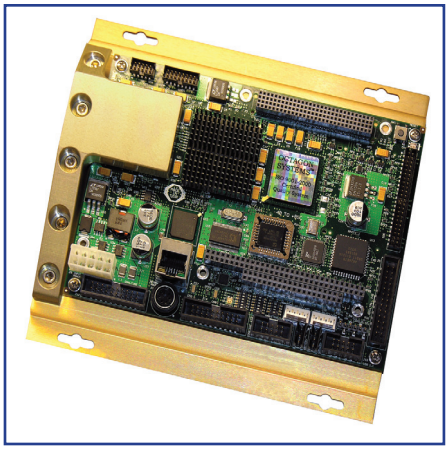
Integrated conductive cooling system available

For applications where a fan is unacceptable, the XE–900 conductive cooling system has passed the MIL–810F for wheeled and track vehicles. The rugged cooling structure comprises a massive heat channel that conducts the heat to a heat–spreader base plate. The base plate can be securely mounted to a bulkhead or other structure without fear of mechanical stress to the card. The cooling system is sold as one unit and can not be retrofitted to existing cards.

Rugged, reliable service at wide temperature range

Our products are designed and manufactured under a quality management system that is ISO 9001–2000 certified. The XE–900 will withstand high shock and vibration, and operates in temperature ranges from –40° to +85° C (400 & 733 MHz versions). In addition, the low–power requirements and built–in power management functions make it suitable for situations where either heat dissipation or battery life is a concern. The CPU provides enough computing power for virtually any embedded application. This rugged single board computer will provide years of reliable service in the most challenging environments.

OS Embedder kits available



Reduce the cost of development. Be first to market. Octagon has developed board support packages to get you up and running quickly with Windows XPe or Linux. Custom drivers provide easy access to enhanced features such as watchdog timer, read/writes to serial EEPROM, and digital I/O. We are your single hardware and software source.



Kits provide everything you need for fast, easy implementation of the operating system of your choice.

- XE–900 CPU
- Cables
- Drivers
- Sample programs
- Documentation
- Free technical support

Features

System :

- 32–bit VIA EDEN ESP low–power CPU
- Versions: 400 MHz; 733 MHz; 1 GHz
- VIA VT8606 "Twister T" North Bridge, VIAVT82C686B "Super South" South Bridge
- PC–compatible DMA controllers, interrupt controllers, and timers
- ACPI 2.0 and PCI power management
- Fully compatible with Windows XPe, Linux
- General Software BIOS with fast boot and industrial extensions
- Fully compatible with Windows XP, Linux
- 512 KB surface mount flash contains BIOS
- SO–DIMM socket for up to 512 MB SDRAM
- 1024 bytes user–available serial EEPROM
- CPU supervisor includes watchdog timer with 1, 10 and 60 seconds timeout periods, software controlled.

Drives:

- ATA–4 hard drive and CompactFlash interfaces support up to three drives (CD–ROM, hard drive, EIDE flash drives and other EIDE devices)
- CompactFlash on primary IDE controller, accepts Type I or Type II devices
- USB hard drive / floppy support (bootable from USB devices).

I/O:

- PS/2 mouse and keyboar
- On–board video controller: CRT or LVDS flat panels
- Dedicated digital I/O, 24 lines
- Six serial ports—16C550 compatible, 16–byte FIFO buffered, ESD protected: one eight–wire RS–232; three four–wire RS–232; one four–wire RS–232/ 422/485/TTL; one four–wire RS–422/485/TTL
- Two USB ports, 1.1 compliant
- PC/104–*Plus* 32–bit PCI Bus
- Ethernet 10/100 Base–T, supporting IEEE 802.3 standard.

User interface:

- 18–bit LVDS flat panel, with resolutions to 1600 x 1200
- CRT resolution up to 1920 x 1440 x 24
- PS/2 keyboard and mouse
- Serial console through COM1 to host computer
- "Legacy USB" keyboard and mouse supported.

Mounting:

- Panel mounted with standoffs
- Accepts PC/104 and PC/104–*Plus* cards.

Other:

- AT battery port for real time clock (no battery necessary for operation)
- Size 115 mm x 165 mm x 20 mm (4.53" x 6.50" x 0.80"); EPIC* form factor
- Power 5V ±0.25V, 3.3A @ 400 & 733 MHz; 3.4A @ 1 GHz, 10A inrush current
- 400 MHz: –40° to +85° C, operating range
- 733 MHz: –40° to +80° C, operating range
- 1 GHz: –40° to +70° C, operating range with forced air flow
- Conductive cooling systems available.

epic™

*Embedded Platform for Industiral COmputers™

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Technical description

Busses

Front side bus: 133 MHz
PCI Bus: 33 MHz, 32–bit, rev. 2.1 specification
PC/104 Bus: 8.33 MHz

System

CPU: A 32–bit VIA EDEN ESP, in 733 MHz and 1 GHz versions. The CPU contains the complete x86 core. The north bridge and south bridge support the PC peripherals (see diagram on page 5). The VIA EDEN ESP is 100 percent object code compatible with the Intel x86 microprocessors. Built–in ACPI 2.0 and PCI power management.

Operating System: Fully compatible with Windows XPe, Linux. Octagon Systems has developed OS Embedder kits with all the drivers to get you quickly up and running with your required operating system.

BIOS: General Software BIOS. The BIOS is fully PC–AT compatible. It supports all the on–board PC peripherals. At power–on the BIOS performs a Power–On–Self–Test (POST) and outputs the results via an LED. Refer to the XE–900 Reference Manual for an interpretation of the codes.

SDRAM: Supports up to 256 MB SDRAM using PC100 or PC133 memory sticks.

Watchdog timer: A fail–safe against program crashes or processor lockups. It has a programmable timeout period of 1, 10 or 60 seconds. The watchdog is enabled in BIOS SETUP and then automatically initiated on power–up. OS drivers are used to set the timeout period, strobe, and disable the watchdog timer from your application. If the timer expires, it performs a hardware reset.

Drives

EIDE: Supports a CompactFlash on the primary IDE channel. For the secondary channel there is an industry–standard 44–pin, 2 mm connector for EIDE devices such as hard drives, EIDE flash drives or CR–ROMs. For those hard drives that use a 40–pin connector Octagon has a 44–pin to 40–pin adapter cable. An EIDE cable connects to the XE–900 connector and provides two connectors for the devices. The individual devices have a jumper to designate them as a master or a slave device. The IDE channels are ATA–4 compliant.

CompactFlash: Accepts type I or type II devices. CompactFlash is connected to the primary IDE channel and appears as an IDE device.

USB: Supports USB hard drives, flash drives and floppy drives. The drives may be used as boot devices, and are supported in DOS, with automatic hand–off to other OS drivers.

I/O

Keyboard/mouse: Supports a PS/2 keyboard and mouse. Neither a keyboard nor a mouse is required for operation.

USB: Two 1.1 compliant USB ports are supported. USB 1.1 provides transmission up to 12 Mbps. Legacy support is provided for mouse and keyboard at boot.

Ethernet: An Intel 82551ER (82559 compatible) chip provides one 10/100Base–T Ethernet port and supports the IEEE 802.3 Ethernet standard. The Ethernet controller IC chip provides an 8k x 16 SRAM buffer, and powers two LEDs for link and traffic status. The interface terminates at the standard 8–position, RJ–45 jack.

CONTINUED, PAGE 4

PC/104 and PC/104–*Plus* interfaces: PC/104 is a 16–bit interface on the 8.33 MHz ISA Bus. Up to four cards can be stacked on this connector. PC/104–Plus is a 32–bit interface on the 33 MHz PCI Bus. Up to four cards can be stacked on this connector.

Digital I/O: 24 lines of digital I/O. These lines will interface with logic devices, switch inputs, LEDs, and industry–standard opto module racks. All lines can be individually programmed as inputs or outputs. Octagon has a variety of opto modules and termination boards for easy access for field wiring.

COM1 through COM6: Six 16C550–compatible serial channels are provided. One channel is an 8–wire RS–232C interface, three channels are dedicated 4–wire RS–232C interfaces. All channels are full duplex, asynchronous interfaces with a double 16–bit FIFO buffer. The baud rate is programmable with rates from 9600 bps to 115.2 Kbps. The ports provide backdrive protection as well as ESD protection according to IEC 1000, level 3; contact discharge of ±6 KV, and air–gap discharge of ±8 KV.

COM5 can be configured in BIOS Setup as a 4–wire RS–232/422/485/TTL interface. COM6 can be configured as a 4–wire RS–422/485/TTL interface. RS–422 and RS–485 use differential signaling to communicate between devices. Differential signaling reduces the effects of environmental noise, allowing communication over distances up to 1200 meters.

The RS–232C COM ports terminate in 10– and 20–pin connectors; RS–422/485 terminate in separate 5–pin connectors for each port, and TTL terminates in a 6–pin connector. Octagon has cables to route these connectors to industry–standard interfaces.

User Interface

Monitors: The north bridge supports CRTs with resolutions to 1920 x 1440, and 18–bit LVDS flat panels with resolutions up to 1600 x 1200.

Serial console: You can establish communication with the XE–900 using a host computer as a serial console. COM1 is connected to a COM port on the host PC. A program such as SmartLINK or Hyperterminal on the host PC directly communicates to the XE–900. This allows you to download programs or configure the XE–900.

Custom cables

To conserve board real estate, a few high–density connectors provide industry–standard interfaces:

COM VTC–20F cable: Connects to the 20–pin COM1/2 or COM3/4 ports and provides two DB–9 female connectors. A VTC–20M provides two DB–9 male connectors.

COM2 VTC–9F cable: Connects to the 10–pin COM5 port and provides a DB–9 female connector. A VTC–9M provides a DB–9 male connector.

RS–422/485 cable, 0.100–in.: Connects to the 5–pin header for RS–422/485 on COM5 and COM6 and provides a standard DB–9 interface.

CMA–26 ribbon cable: Connects the 26–pin digital I/O port to an STB–26 termination board to provide access for field wiring.

VGA cable, 2 mm: Provides a standard 15–pin, VGA interface.

LVDS–18 video cable: Connects to the LVDS connector and provides 18–inch flying leads.

IDE cable, 44–pin to 40–pin: Converts the 44–pin IDE header to a 40–pin IDE header.

Keyboard/mouse "Y" cable: Connects to the PS/2 keyboard/mouse port to provide keyboard and mouse interfaces. A keyboard will plug directly into the XE–900 port. Available at most computer supply stores.

ATX power cable: Connects to the 10–pin ATX power connector and provides a standard 20–pin ATX connector.

Two–port USB cable: Converts the 10–pin header for USB 1,2 into two standard 1.1 USB interfaces.

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Mounting

You can panel mount the XE–900 using eight #4–40 standoff and screws (not provided). The XE–900 User's Manual shows the center–to–center mounting hole dimensions.

HW Ordering information

#6880 XE–900 CPU card, 0 MB, 400 MHz
#6533 XE–900 CPU card, 0 MB, 733 MHz, w/fan
#6755 XE–900 CPU card, 0 MB, 1 GHz, w/fan
#6580 XE–900 cable kit for all models

Conductive cooling system

#7023 XE–900 with conductive cooling system, 733 MHz, 256 MB DRAM
#7024 XE–900 with conductive cooling system, 733 MHz, 512 MB DRAM
#6902 XE–900 with conductive cooling system, 1 GHz, 256 MB DRAM
#7022 XE–900 with conductive cooling system, 1 GHz, 512 MB DRAM

OS Embedder ordering information

#6842 XE–900 Windows XP OS Embedder, 1 GHz
#6843 XE–900 Windows XP OS Embedder, 733 MHz
#6848 XE–900 Linux OS Embedder, 1 GHz
#6849 XE–900 Linux OS Embedder, 733 MHz

FUNCTIONAL DIAGRAM

