



WebEngines
Blazer Platform
Version 1.0

HARDWARE REFERENCE GUIDE

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Network Engines WebEngines Blazer Platform Version 1.0 V Hardware Reference Guide

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Preface

Audience

This guide is written for Information Technology professionals who are responsible for installing, administering, and maintaining a Network Engines WebEngine cluster.

Scope

This guide is a hardware reference guide for the WebEngine products that are based on the Blazer v1.0 platform. It does not cover any software-related issues. This manual contains the following topics:

Chapter 1, *Product Overview*, describes WebEngines features, hardware components, and system specifications.

Chapter 2, *Connectors and Indicators*, lists WebEngine connectors and LEDs, and provides pinout definitions for each header and connector in the chassis.

Chapter 3, *BIOS Specifications*, provides the specifications for the WebEngine BIOS.

Appendix A, *Installing WebEngines*, describes how to install WebEngines in a rack and cable them in a cluster.

Appendix B, *Powering Up WebEngines*, provides an overview of the concepts and procedures for powering up WebEngines for the first time.

Appendix C, *Replacing WebEngines*, explains how to remove and replace a WebEngine mounted in a cluster.

Appendix D, *Installing Mezzanine Adapters*, explains how to install the Floppy Disk Drive and SCSI Mezzanine cards.

Conventions Used in this Manual

Network Engines uses the following conventions for notes, cautions, warnings, and danger notices:

A note presents information that is important, but not hazard-related.



CAUTION

A caution contains information essential to avoid damage to the system or equipment. The caution may apply to hardware or software.



WARNING

A warning contains information essential to avoid a hazard that can cause severe personal injury, death, or substantial property damage if you ignore the warning.



DANGER

A danger notice contains information essential to avoid a hazard that will cause severe personal injury, death, or substantial property damage if you ignore the warning.

Network Engines uses the following type style conventions in this guide:

Convention	Example
Angle brackets separate single keys that you press from surrounding text.	Press <Ctrl>
Boldface identifies numbers and characters that you type.	Type reset (dio) AC-OK-2
Courier indicates code lines and screen displays.	On IPport-1 = S
<i>Italics</i> emphasize file names and variable information.	See the <i>multitsk.cfg</i> file

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You can also contact us by using the following e-mail and internet addresses:

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 Information: Info@networkengines.com

Web Information: <http://www.networkengines.com>





Product Overview

This chapter describes the features, hardware components, and system specifications of the Network Engines WebEngine products that are based on the Blazer v1.0 platform. These products include:

- AdminEngine™ 1.x, 2.x
- WebEngine Viper NT™
- WebEngine Viper LX™

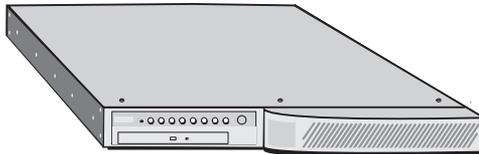


Figure 1. WebEngine Chassis

WebEngine Features

The WebEngine is an enterprise-class network appliance designed for a 1.75" rack-mounted chassis. It supports high-volume Web transaction processing in large Web hosting facilities, enterprise Web sites, and large electronic commerce sites. WebEngines are scalable and can be added to an existing cluster, combining seamless growth with remote manageability.

The WebEngine contains the following features:

- **Size**—Equipped with either a single or dual Intel Pentium III processors, the WebEngine is the most powerful server currently available on the market. Its compact package requires only 1.75 inches (1U) in a standard rack.
- **Manageability**—Network administrators can power a WebEngine up or down, take it on or off-line, and read the onboard instrumentation by using a web-based interface through an AdminEngine.
- **Scalability**—Each WebEngine within the cluster communicates with its neighbors via Network Engines' Cluster Maintenance Bus™ (CMBus) and by onboard network connections (a standard dual 10/100 Mb/s Ethernet, or an optional Gigabit Ethernet). When a new engine is added to a cluster, it is automatically recognized and easily configured.
- **Reliability**—WebEngine clusters provide an extremely high level of reliability. Network Engines provides several web-based management tools that identify problem events within a cluster, and allows corrections to be made before transactions are lost.
- **Remote Management**—An AdminEngine can manage all aspects of a WebEngine cluster, regardless of where it is located, through an easy-to-use administrative interface.

Major Hardware Components

This section describes the following major hardware components of the WebEngine:

- Processors
- System memory
- Battery-powered real-time clock
- System environmental monitor
- System busses
- IDE drive interface
- SCSI drive support
- Floppy drive interface
- 10/100 Base-T Ethernet
- USB
- Serial and parallel ports
- Keyboard, mouse, and VGA port
- Power supply

▼ Processors

The WebEngine supports one or two Pentium III processors with speeds up to 800MHz. The processors are mounted horizontally in the chassis in Slot 1 connectors. If a system is configured with one processor, the second slot is provided with a Bus Terminator. Each processor is fitted with a custom-designed heat sink/fan assembly.

Cache memory for each CPU is provided by the processor assembly, which provides 32KB primary cache.

The WebEngine monitors CPU temperatures for each processor using die sensors integrated into the Pentium processor assembly. CPU temperature data is reported to the System Environmental Monitor.

For information about specific Pentium processors, see the Intel web site at <http://developer.intel.com/sites/developer/>.

▼ System Memory

The WebEngine supports up to 2GB of SDRAM mounted in four 72-bit DIMM (168-pin) sockets. The types of DIMM modules that can be installed on the WebEngine are:

- 1Mx72
- 2Mx72
- 4Mx72
- 8Mx72
- 16Mx72
- 32Mx72
- 64Mx72

In addition to main system memory, the WebEngine contains onboard 2/4 Mb non-volatile CMOS Flash Device, with boot-block FLASH. The B69000 video accelerator provides 2MB of Video RAM.

▼ Battery-Powered Real-Time Clock

A CR2025 lithium battery provides power and backup for a real-time clock and memory that stores time, date, and system configuration data. The nominal projected life of the battery is 5-7 years.

▼ System Environmental Monitor

The System Environmental Monitor is a proprietary subsystem based on two 8-bit ST72251 chips. It monitors board voltages and ambient board temperatures, and provides control for remote reset, power on/off, diagnostic, and console switching.

When Network Engines management software is running, the nominal values for these measurements and the allowable tolerances are programmable by the user. Inputs which violate programmed tolerances cause an alarm interrupt to the system. The measurement values are available via the web-based interface on the AdminEngine.

The System Environmental Monitor provides a watchdog timer for the system. The watchdog timer can be configured to cause a system reset in case of a software malfunction.

For information about the ST72251 chip, see the ST Micro web site, <http://eu.st.com/stonline/index.htm>.

▼ System Busses

The PIIX4E component of Intel's 440GX Chipset provides IDE and PCI bus capability in the WebEngine chassis. The PCI bus is fully PICMG-compatible. An Intel (Digital Semiconductor) 21152 PCI-to-PCI Bridge Chip enables the bus to support up to two PCI slots. The bus clock runs at 30 or 33 MHz, depending on the Pentium processor speed. The WebEngine supports PCI transfer speeds up to 132 megabytes per second.

For information about the 440GX Chipset, see <http://developer.intel.com/design/chipsets440gx/>.

▼ IDE Drive Interface

The WebEngine has both a 40-pin primary and a 44-pin secondary IDE drive interface. Each interface is internal and supports a master and a slave IDE or EIDE device. Each channel supports bus mastering, PIO mode 4, and UDMA mode 2.

The secondary IDE interface supplies power through the connector; this connection is used by an optional CD-ROM drive. When installed, the CD-ROM drive is accessible through the front panel.

▼ SCSI Drive Support

Currently, the WebEngine provides support for SCSI drives by use of a PCI SCSI adapter in one of the PCI slots.

Currently under qualification, the Mezzanine SCSI Adapter card will also be available. The Mezzanine SCSI Adapter is a high performance, dual-channel Ultra-160 compliant unit that can be connected to internal SCSI drives with the supplied flat cable, or to external drive units using the optional external cable (or any Ultra-160 compliant commercial cable), or both. One channel, Channel A, can connect to both internal and external drives at the same time. The second channel, Channel B, can only be connected to external drives.

The SCSI drives mount in place of the IDE drives. It is possible to support a single IDE and a single SCSI drive at the same time, if required. It is possible to support internal IDE drives and external SCSI drives in the same unit.

▼ Floppy Drive Interface

Intended for maintenance purposes only, an internal 34-pin header provides support for 360K, 720K, 1.2M, 1.4M, or 2.8M floppy drives. Up to two drives may be attached to this interface when the chassis cover is removed.

▼ 10/100 Base-T Ethernet

Support for dual 10/100Mb/s Ethernet over twisted-pair is provided by two Intel 82559 32-bit PCI LAN controllers.

For information about Intel's 82559, see <http://developer.intel.com/design/network/82559.htm>

▼ USB

The WebEngine features two stacked USB connectors.

Neither Linux nor Windows NT 4.0 currently supports USB devices.

▼ Serial and Parallel Ports

Two external RS-232 serial ports are provided. An internal 26-pin header provides an interface for a standard parallel port. The interface is bi-directional and supports ECP/EPP high-speed parallel transport. It is disabled (default) in the BIOS. There is no external parallel port provided on the WebEngine.

▼ Keyboard, Mouse, and VGA Port

The WebEngine can operate without a keyboard, mouse, or monitor. Web-based software and a browser enable you to perform management and maintenance tasks. Local console operations, however, are fully supported.

Review the license agreement for your OS, as some do not allow local console operations.

For local control, the WebEngine provides an optional Console Cable Adapter to connect PS/2-compatible keyboard and mouse devices and a VGA-compatible monitor to the external CMBus port.

The WebEngine uses Chips and Technology's B69000 video chip to provide HiQVideo accelerated video/graphics capability. This chip has a 2MB integrated SDRAM graphics/video frame buffer, and supports 2D acceleration in all graphics modes up to 1280x1024, up to 32-bit color, raster speeds up to 83MHz, and real-time video acceleration.

The B69000 also features independent multimedia capture and display systems that can receive data from the frame AGP bus in either RGB or YUV (native video) format. Other multimedia support includes full frame-rate video capture and playback for MPEG1, MPEG2, V-CD, and DVD, and image mirroring and rotation for camera support. The WebEngine does not support digital output.

For information on the B69000, refer to the CHIPS 69000 Databook, available at <http://www.chips.com/design/graphics/>.

▼ Power Supply

The WebEngine uses a universal input, 90-264VAC power supply that is rated for up to 150W of continuous power or 180W peak power. The supply meets FCC class A EMI requirements, and is UL, CSA, and TUV compliant. WebEngines with 48VDC inputs are available as an option.

System Specifications

This section describes the following system specifications for the WebEngine:

- Processors
- BIOS
- Memory
- Chipsets
- System busses
- Disk drives
- Management functions
- Power
- Chassis
- Console Cable
- Adapter
- Environmental
- Physical

▼ Processors

Two Slot 1 connectors support one or two Intel Pentium III processors with maximum speeds up to 800MHz. A bus terminator is supplied for single processor configurations.

▼ BIOS

256KB AMI Server 98 flash BIOS, customized, Plug and Play, PC98- and Year 2000-compliant.

▼ Memory

Four DIMM sockets support up to 2GB of PC100-compliant SDRAM.

▼ Chipsets

- 29C020 Flash Memory with custom AMI BIOS
- Chips & Technology 69000 HiQVideo controller
- Intel 440GX AGPset PCI controllers
- Intel 82559 Ethernet controllers (2)
- ITE IT8671F Super I/O
- ITE IT8687R I/O buffer
- Maxim MAX1617 remote/local temperature sensor (4)
- ST Micro ST72251 8-bit Environmental Monitor (2)
- LM79 to provide remote/local voltage and fan tachometer instrumentation

▼ System Busses

- Dual IDE channels with PCI bus mastering mode, PIO mode 4 or UDMA mode 2; internal primary 40-pin and secondary 44-pin headers
- Two internal PCI slots, support one full and one half-length card in single-height models
- Dual onboard Ethernet ports, auto-sensing 10/100Mb/s with external RJ45 connectors
- Dual stacked 4-pin USB connectors
- Single high-speed, bi-directional and ECP/EPP parallel port interface; internal 26-pin header
- Two internal RS232 10-pin header serial ports, cabled to external DB-9 connectors
- External option (mezzanine) card connectors
- Two external CMBus console connectors

▼ Disk Drives

- Up to two internally mounted SCSI or EIDE drives
- Optional EIDE CD-ROM Drive: 24X or faster, mounted in chassis, front-panel accessible
- Internal connector for one floppy drive; supports 360KB, 720KB, 1.2MB, 1.4MB, or 2.88MB; disabled (default) in BIOS setup; no permanently mounted floppy

▼ Management

- Remote execution boot environment support (PXE)
- Universal Network Boot
- Embedded Environmental Monitor provides remote reset, power control, diagnostic, and console switching capability.
- Four dual-channel temperature sensors monitor air temperature at four points on the board and chip temperature on each CPU.
- Two LM79s monitor voltages at multiple ports and CPU fan speeds.

▼ Power

One 150W, 90-264VAC auto-ranging input standard, 48VDC input optional, remote reset and power on/off capability.

▼ Chassis

- Five cooling fans, each rated at 10 CFM; four in front, one located on the power supply; custom heat sink/fan assembly provided on each CPU
- Six-layer, continuous ground plane Main Logic Board (MLB) with split multiple power planes
- Ethernet Link and speed LEDs for both LAN1 and LAN2 on rear panel; activity LEDs for LAN1 and LAN2 on front panel
- Two 3.0V Lithium CR2025 batteries to power CMOS (with time-of-day clock) and chassis intrusion detection
- Internal piezo speaker

▼ Environmental Specifications

Operating temperature:	5–40 degrees Celsius
Non-operating temperature:	-20–80 degrees Celsius
Rate of change of temperature:	up to 5 degrees Celsius per minute
Operating humidity, non-condensing:	10–90%
Non-operating humidity, non-condensing:	5-95%
Operating shock:	5G half sine, 2mS
Non-operating shock:	50G half sine, 2 mS
Operating vibration:	1G, 5-500 Hz
Non-operating vibration:	2G, 5-500 Hz
Operating altitude:	10,000 feet ASL, 3,000 meters ASL
Non-operating altitude:	40,000 feet ASL, 12,000 meters ASL

▼ Physical Specifications

- Rackable/stackable 1U case
- 1.75" H x 24" L x 17" W (19" with mounting brackets)
- Weight approximately 22.5 lbs, depending on configuration



Connectors and Indicators

This chapter describes WebEngine connectors and LEDs, and provides pinout definitions for each header and connector in the chassis. It contains the following sections:

- Front and rear panels
- Chassis and main board layout
- Connectors and headers
- CMbus Console Cable Adapter
- Switches and jumpers

Front and Rear Panels

The following sections illustrate the LEDs on the WebEngine's front panel and the external connectors on the back panel.

▼ Control Panel

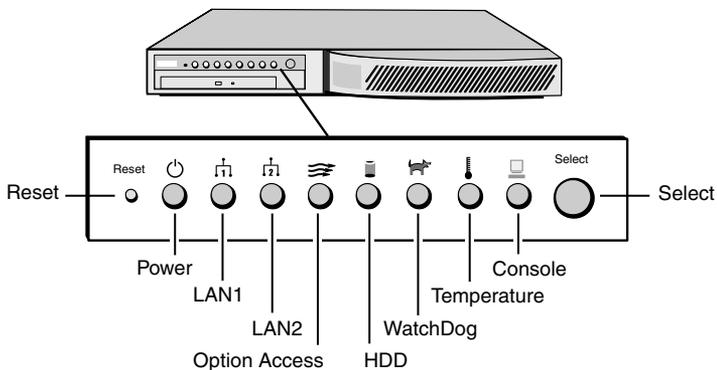


Figure 2. Front Control Panel

- **Reset** (amber)—Reboots the system through a standard PC reset.
- **Power** (green)—Indicates WebEngine power is ON.
- **LAN1** (amber)—Signals Ethernet activity on LAN1.
- **LAN2** (amber)—Signals Ethernet activity on LAN2.
- **Option Access** (amber)—Signals Option port activity (reserved for future releases).
- **HDD** (green)—Signals activity on hard drive(s) running on the NEI controller1—currently IDE on the main logic board, or SCSI on the mezzanine card (currently in qualification). It does not indicate activity of a drive that is running on a third-party SCSI card.
- **WatchDog** (green)—Reserved for future releases.
- **Temperature** (red)—Indicates an over-temperature (alarm) condition.
- **Console** (green)—Indicates WebEngine has focus (is connected to the CMBus and is accessible from the console).
- **Select Button**—Enables console connection and causes all of the WebEngines in the cluster to release console connections. In the default soft power mode (only maintenance section is powered on), switches board to full power mode (processors and all options powered on).

If you press Select for three seconds or longer, you can determine the CMBus ID through a sequence of blinking WatchDog, Temperature, and Console LEDs. Refer to *Determining CMBus IDs* on page 63.

▼ Rear Panel Connectors

Figure 3 shows the locations of connectors on the WebEngine's rear panel.

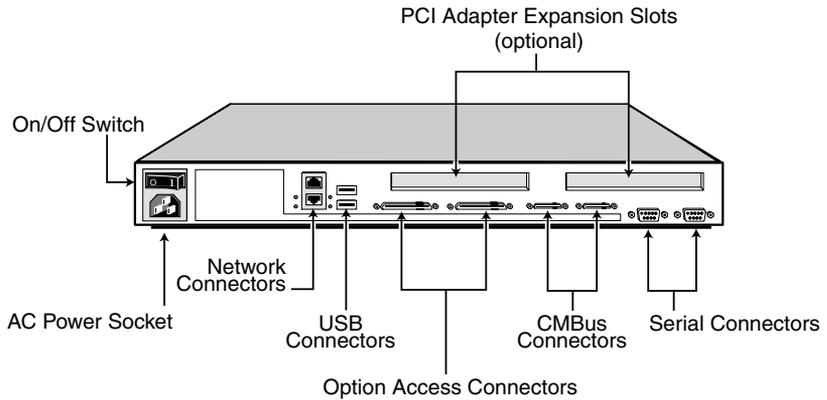


Figure 3. Rear Panel Connectors

Chassis and Main Logic Board Layout

Figure 4 on page 14 shows the organization of major components within the WebEngine chassis. Wiring and cabling positions are not shown. Some of the components shown may not be present in all models of WebEngines.

Figure 5 on page 15 shows chip and connector locations on the Main Logic Board.

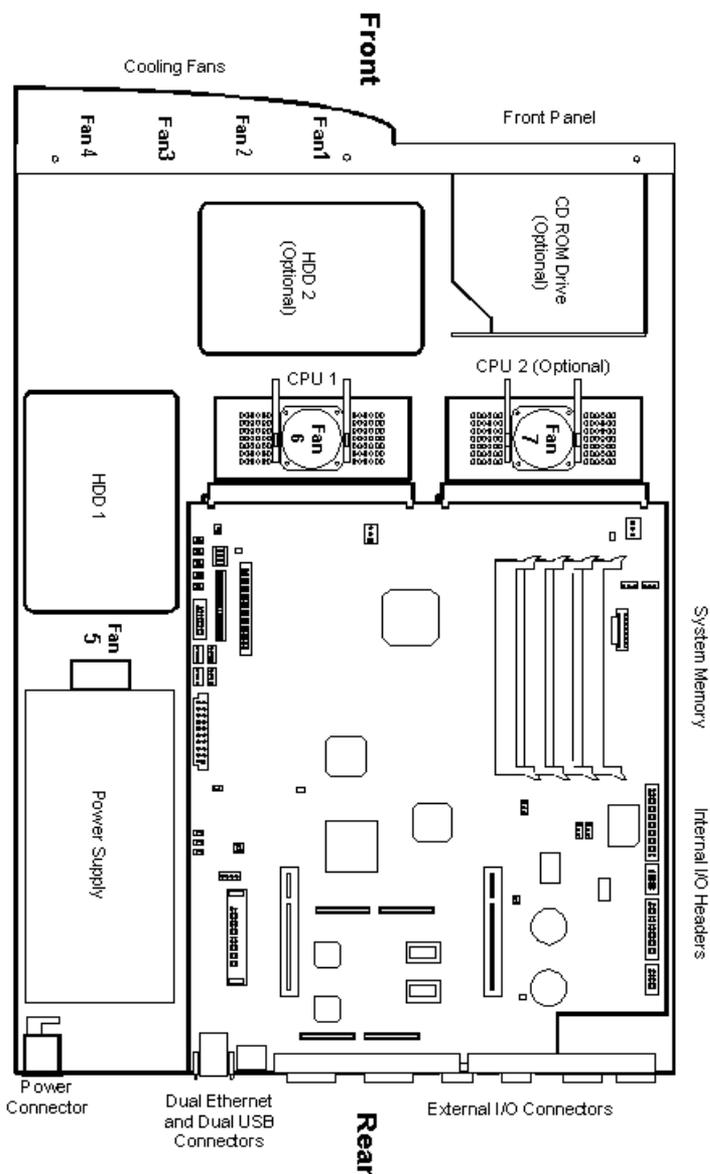


Figure 4. Major Components in the WebEngine Chassis

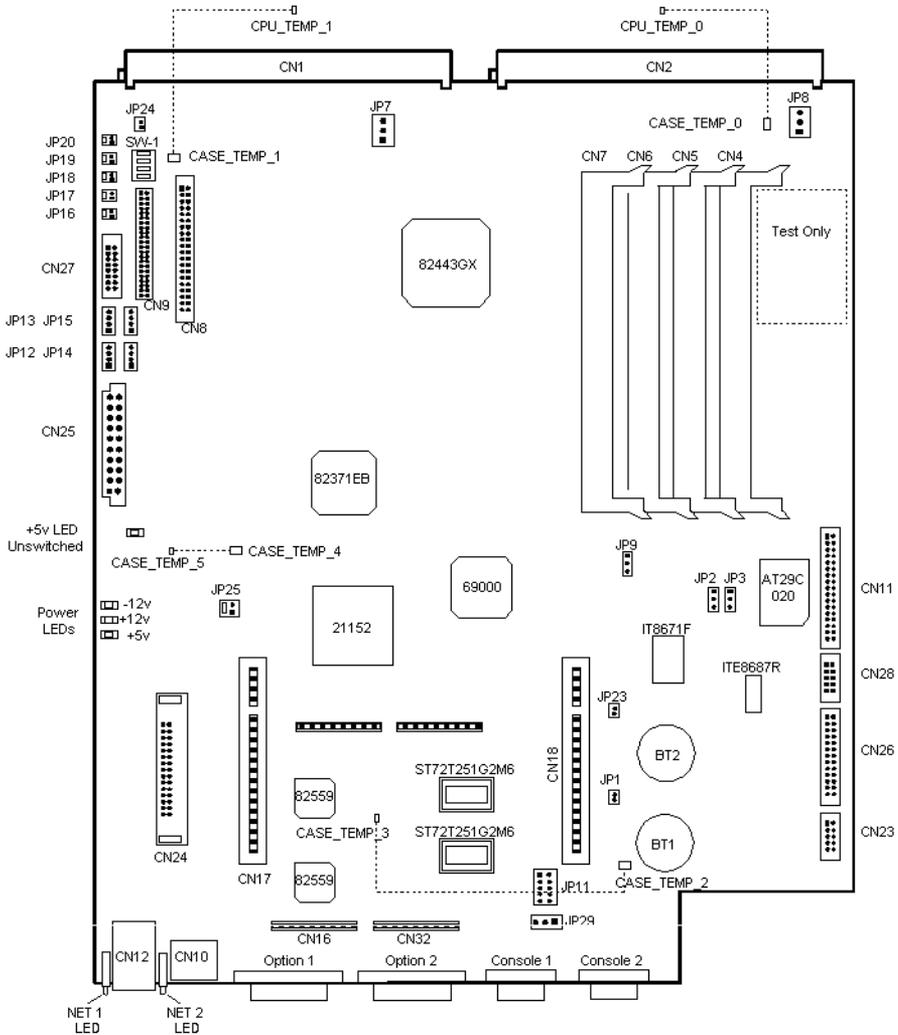


Figure 5. Main Logic Board Chip and Connector Locations

The Main Logic Board connectors and components are identified in Table 1. The chips and chipset descriptions are listed in Table 2.

Table 1. Main Logic Board Connectors and Components

Connector	Function
BT1	Intrusion Detection Battery Holder
BT2	CMOS Battery Holder
CN1, CN2	CPU Connector
CN4 - CN7	DIMM Sockets
CN8	Primary IDE Connector
CN9S	Secondary IDE Connector
CN10	USB Connectors
CN11	Floppy Disk Controller
CN12	Ethernet Connectors
CN13, CN14	CMBus Console Connectors
CN15	Option 1 (Mezzanine Output) ^a
CN16, CN32	External Option 1 and 2 Connectors ^a
CN17, CN18	32-bit PCI Connector
CN21	Option 2 (Mezzanine Output) ^a
CN23, CN28	Serial Port 1 and 2
CN24	VRM Module Connector
CN25	Power Supply Connector
CN26	Parallel Port Connector
CN27	Display Panel Connector
J1, J2	Mezzanine Input Connectors ^a
JP1	Select Video (test only)

Table 1. Main Logic Board Connectors and Components (continued)

Connector	Function
JP2, JP3	Flash Update Selection Jumpers
JP7, JP8	CPU Cooling Fan Connectors
JP9	SMI Selection Jumper
JP11	Programming Header Connector
JP12 - JP15	HDD Power Connectors
JP16 - JP20	Chassis Cooling Fan Connectors
JP23, JP24	Temperature Sensor Connectors
JP25	RESET Connector
JP26	SCSI Termination

- a. Mezzanine (Option Board) connectors are defined by the specific option board installed.

Table 2. Chip and Chipset Descriptions

Chip	Function/Description
AT29C020	ATMEL Flash Memory with custom AMI Server 98 BIOS
69000	Chips and Technology 69000 HiQVideo Accelerator
21152	Digital PCI-to-PCI Bridge Chip
82443GX	Intel 440GX AGPset Host Bridge/Controller
82371EB	Intel 440GX AGPset PCI Controller
82559	Intel 82559 32-bit PCI bus 10/100Mbps Fast Ethernet Controller
MAX1617	Maxim MAX1617 remote/local temperature sensor (4)
ST72251	ST Micro ST72251 8-bit Environmental Monitor (2)

Connectors and Headers

The following sections list pinout definitions for each connector on the WebEngine chassis.

▼ CMOS Battery Holders—BT1 and BT2

The WebEngine main board mounts two CR2025 Lithium batteries that have a nominal shelf life of 5-7 years. If the cover is on and the machine is powered on, the life expectancy of the two batteries equals the shelf life.

When the machine is powered off, the CMOS battery drains slowly. When the cover is removed, the intrusion detector is activated and its battery drains at a rate that varies with the brightness of the environment. Under extreme conditions, the life expectancy of the CMOS battery is three to five years; the intrusion detector battery—one and one half to two years.

Connector	Function	Device
BT1	Intrusion Detection Battery	CR2025
BT2	CMOS Battery	CR2025

▼ CPU Connectors—CN1 and CN2

The WebEngine has two standard Pentium Slot 1 type connectors. If a system is equipped with one processor, Network Engines provides a bus terminator for the second slot. The connectors are identified below.

Connector	Processor
CN1	CPU 0
CN2	CPU 1

▼ DIMM Sockets—CN4 to CN7

The chassis has four DIMM sockets, Molex 72-bit, 168-pin connectors, mounted at a 25° angle. These connectors accept standard JEDEC modules, types:

- 1Mx72
- 2Mx72
- 4Mx72
- 8Mx72
- 16Mx72
- 32Mx72
- 64Mx72

The sockets use ejector latches to align the modules during insertion and removal. Modules are inserted by sliding them straight in, using the latches to seat the edge-connector pins and lock the module. When fully locked, the latches reduce the potential for micro-motion.

▼ IDE 40-Pin Primary Port—CN8

The WebEngine provides high speed primary and secondary IDE interfaces. A master and a slave IDE or EIDE device may be connected to each connector. Devices are configured as either master or slave using the BIOS setup utilities.

Pin	Function	Pin	Function
1	IDE RESET	21	IDE DREQ
2	GND	22	GND
3	DATA(7)	23	I/O WRITE
4	DATA(8)	24	GND
5	DATA(6)	25	I/O READ
6	DATA(9)	26	GND
7	DATA(5)	27	I/O READY
8	DATA(10)	28	GND
9	DATA(4)	29	IDE DACK
10	DATA(11)	30	GND
11	DATA(3)	31	IRQ(14)
12	DATA(12)	32	IOCS16
13	DATA(2)	33	A1
14	DATA(13)	34	N/C
15	DATA(1)	35	A0
16	DATA(14)	36	A2
17	DATA(0)	37	IDE CHIP SELECT 0
18	DATA(15)	38	IDE CHIP SELECT 1
19	GND	39	IDE ACTIVE
20	N/C	40	GND

▼ IDE 44-Pin Secondary Port—CN9

The secondary IDE port is a 44-pin (ATA) internal connector. This connector adds the following four pins to the standard 40-pin IDE connector defined above. This connector is commonly used with CD ROM drives.

Pin	Function
41	+5 VDC (Logic)
42	+5 VDC (Motor)
43	Ground
44	Type (0=ATA)

▼ USB Stacked Connectors—CN10

Two USB Series A connectors in a double-stacked mount are located at the rear of the chassis. All power is fused and filtered. The terminations for each connector are described below.

Pin	Name	Signal	Cable Color
1	Vcc	+5V DC	Red
2	D-	USBP0-	White
3	D+	USBP0+	Green
4	Gnd	Ground	Black

▼ Floppy Disk Connector—CN11

This 34-pin header is an industry standard floppy port capable of supporting two floppy drives. 360k, 1.2M, 720k, 1.4M, and 2.8M drives are all supported. This connector is provided for maintenance purposes only. The WebEngine does not have a permanently mounted floppy diskette drive.

Pin	Function	Pin	Function
1	GND	18	DIRECTION
2	RPM	19	GND
3	GND	20	STEP
4	N/C	21	GND
5	GND	22	WRITE DATA
6	DRATE0	23	GND
7	GND	24	WRITE ENABLE
8	INDEX	25	GND
9	GND	26	TRACK0
10	MOTOR1	27	GND
11	GND	28	WRITE PROTECT
12	DRIVE2	29	GND
13	GND	30	READ DATA
14	DRIVE1	31	GND
15	GND	32	HEAD SELECT
16	MOTOR2	33	GND
17	GND	34	DISK CHANGE

▼ Ethernet Connectors—CN12

The WebEngine supports two auto-switching 10 BASE-T/100 BASE-TX Ethernet connectors. These are provided by two Intel 82558 Ethernet controllers. The connector accepts standard RJ45 connectors using data grade cables.

Pin	Signal
1	TDH
2	TDL
3	RDH
4	N/C
5	N/C
6	RDL
7	N/C
8	N/C

▼ CMBus Console Connectors—CN13 and CN14

WebEngines in a cluster are linked together by the CMBus and several other interconnects. The CMBus carries maintenance-related data, in addition to signals available at the console, through the Console Cable Adapter interface.

Pin	Signal	Pin	Signal
1	RED	19	RED_GND
2	GRN	20	GRN_GND
3	BLU	21	BLU_GND
4	H_SYNC	22	GND
5	V_SYNC	23	GND
6	CON_DCC_DAT	24	GND
7	CON_DCC_CLK	25	GND
8	N/C	26	GND
9	N/C	27	GND
10	N/C	28	GND
11	KBDVCC	29	GND
12	KCLK	30	GND
13	KDATA	31	GND
14	MSEVCC	32	GND
15	MCLK	33	GND
16	MDAT	34	GND
17	XLCL	35	GND
18	XLDA	36	GND

▼ PCI Connectors—CN17 and CN18

The PCI Local Bus connectors are keyed for 5-volt operation. If cards require 3.3 VDC, the voltage is provided by using either a jumper block or a voltage regulator module (VRM) in header CN24, depending on the current drain expected.

Pin	Signal	Pin	Signal
B1	-12V	A1	TRST#
B2	TCK	A2	+12V
B3	Gnd	A3	TMS
B4	TDO	A4	TDI
B5	+5V	A5	+5V
B6	+5V	A6	INTA#
B7	INTB#	A7	INTC#
B8	INTD#	A8	+5V
B9	PRSNT1#	A9	Reserved
B10	Reserved	A10	+5V
B11	PRSNT2#	A11	Reserved
B12	Gnd	A12	Gnd
B13	Gnd	A13	Gnd
B14	Reserved	A14	Reserved
B15	Gnd	A15	RST#
B16	CLK	A16	+5V
B17	Gnd	A17	GNT#
B18	REQ#	A18	Gnd
B19	+5V	A19	Reserved
B20	AD31	A20	AD30

Pin	Signal	Pin	Signal
B21	AD29	A21	+3.3V
B22	Gnd	A22	AD28
B23	AD27	A23	AD26
B24	AD25	A24	Gnd
B25	+3.3V	A25	AD24
B26	C/BE3#	A26	IDSEL
B27	AD23	A27	+3.3V
B28	Gnd	A28	AD22
B29	AD21	A29	AD20
B30	AD19	A30	Gnd
B31	+3.3V	A31	AD18
B32	AD17	A32	AD16
B33	C/BE2#	A33	+3.3V
B34	Gnd	A34	FRAME#
B35	IRDY#	A35	Gnd
B36	+3.3V	A36	TRDY#
B37	DEVSEL#	A37	Gnd
B38	Gnd	A38	STOP#
B39	LOCK#	A39	+3.3V
B40	PERR#	A40	SDONE
B41	+3.3V	A41	SBO#
B42	SERR#	A42	Gnd
B43	+3.3V	A43	PAR
B44	C/BE1#	A44	AD15

Pin	Signal	Pin	Signal
B45	AD14	A45	+3.3V
B46	Gnd	A46	AD13
B47	AD12	A47	AD11
B48	AD10	A48	Gnd
B49	Gnd	A49	AD9
B50	Connector Key	A50	Connector Key
B51	Connector Key	A51	Connector Key
B52	AD8	A52	C/BE0#
B53	AD7	A53	+3.3V
B54	+3.3V	A54	AD6
B55	AD5	A55	AD4
B56	AD3	A56	Gnd
B57	Gnd	A57	AD2
B58	AD1	A58	AD0
B59	+5V	A59	+5V
B60	ACK64#	A5160	REQ64#
B61	+5V	A61	+5V
B62	+5V	A62	+5V

▼ Serial Port Connectors—CN23 and CN28

Two standard 10-pin RS-232 headers are provided at CN23 and CN28. These ports support transfers up to 115k baud. Two DB9 connectors are mounted at the rear of the chassis and connected to CN23 by ribbon cable connectors. The table below gives conversions between common connectors.

10-Pin Hdr	Signal Name	DB9	DB25
1	DCD: Data Carrier Detect (input)	1	8
2	RXD: Receive Data (input)	2	3
3	TXD: Transmit Data (output)	3	2
4	DTR: Data Terminal Ready (output)	4	20
5	GND	5	7
6	DSR: Data Set Ready (input)	6	6
7	RTS: Request To Send (output)	7	4
8	CTS: Clear To Send (input)	8	5
9	RI: Ring Indicator (input)	9	22
10	GND		

▼ Unsupported—CN24

The 30-position, vertical-mount header; currently unsupported.

▼ Power Connector—CN25

The 150W power module connects to the main board at CN25. The spare pins are wired in the circuit board and are available if needed.

Pin	Function	Pin	Function
1	Red +5VDC	2	+5 Spare
3	Red +5VDC	4	+5 Spare
5	Red +5VDC	6	GND Spare
7	Red +5VDC	8	GND Spare
9	Blk GND	10	GND Spare
11	Blk GND	12	Not Used
13	Blk GND	14	B -12VDC
15	Blk GND	16	Y +12VDC
17	Blk GND	18	Y +12VDC
19	Blk GND	20	Y +12VDC

Header pins are numbered according to the board schematic values. Some manufacturers number their connectors differently.

▼ Parallel Port Header—CN26

The 26-pin header on the main board provides a bi-directional parallel port interface. There is no external connector on the WebEngine.

Pin	Function	Pin	Function
1	STROBE/	2	AUTOFEED/
3	DATA(0)	4	ERROR/
5	DATA(1)	6	INIT/
7	DATA(2)	8	SELECT IN/
9	DATA(3)	10	GND
11	DATA(4)	12	GND
13	DATA(5)	14	GND
15	DATA(6)	16	GND
17	DATA(7)	18	GND
19	ACK/	20	GND
21	BUSY	22	GND
23	PAPER EMPTY	24	GND
25	SELECT	26	GND

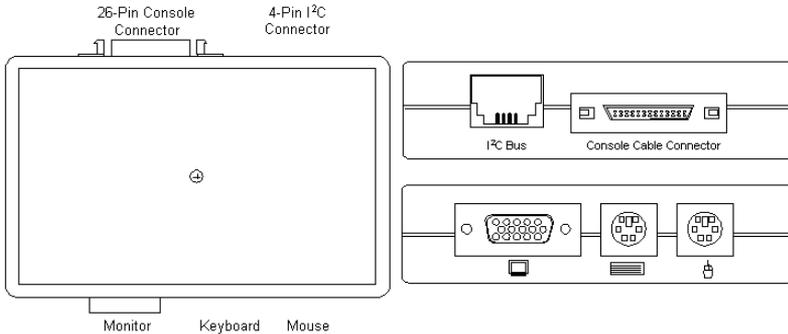
▼ Display Panel Connector—CN27

The LEDs and switches mounted on the front panel are routed to this header.

Pin	Signal	Pin	Signal
1	VCC	2	+5VUSW
3	N/C	4	SELECT_SW#
5	N/C	6	RESET_SW#
7	N/C	8	SELECT_LED#
9	CS_ACTIVITY#	10	TEMP_LED#
11	LAN2_ACTIVE#	12	WATCHDOG_LED#
13	LAN1_ACTIVE#	14	IDE_ACTIVE#
15	GND	16	GND

CMBus Console Cable Adapter

The Console Cable Adapter provides an interface between the CMBus and the console peripheral devices. Typically, the adapter is connected to the bottom WebEngine in the cluster.



CONSOLE CABLE ADAPTER

Figure 6. Console Cable Adapter

▼ PS/2 Keyboard/Mouse Connector Ports

The WebEngine supports most keyboards. PS/2 style keyboards are supported directly by connection to a port on the CMBus Console Adapter. Non-PS/2 keyboards require an adapter.

Pin	Signal
1	DATA
2	N/C
3	GND

Pin	Signal
4	VCC +5 VOLTS
5	CLOCK
6	GND

▼ CMBus Access Connector

The I²C connector provides access to the CMBus.

Pin	Signal
1	GND
2	CMB DATA
3	+5VDC
4	CMB CLK

▼ VGA Port

The Console Adapter provides a standard 15-pin connector which connects to most monitors supporting VGA.

Pin	Function
1	RED
2	GREEN
3	BLUE
4	ID2
5	GND
6	RGND
7	GGND
8	BGND
9	KEY (no pin)

Pin	Function
10	SGND
11	ID0
12	ID1 or SDA
13	H SYNC
14	V SYNC
15	ID3 or SCL

▼ CMBus Access Connector

The I²C connector provides access to the CMBus.

Pin	Signal
1	GND
2	CMB DATA
3	+5VDC
4	CMB CLK

Switches and Jumpers

▼ Flash Update Selection—JP2 and JP3

JP2	JP3	Selection
NC	NC	Write protect (Default)
1-2	1-2	Write protect
2-3	1-2	Program device
1-2	2-3	Write protect
2-3	2-3	Program PLCC device, write protect TSOP device

▼ CPU Fan Power—JP7 and JP8

JP7, JP8	Signal
1	GND
2	+12VDC
3	Tachometer Out

▼ SMI Selection—JP9

JP9	Selection
NC	APIC SMI (Default)
2-3	PIIX4 SMI

▼ External Flash Programmer—JP11

JP11	Signal	JP11	Signal
1	GND	6	RESET CMB
2	ITE8671	7	+5UNSW
3	GND	8	ITE8671
4	ITE8671	9	N/C
5	GND	10	N/C

▼ HDD Power—JP12 through JP15

JP12 - JP15	Signal
1	+5VDC
2	GND
3	GND
4	+12VDC

▼ Chassis Fan Power—JP16 through JP20

JP16 - JP20	Signal
1	GND
2	+12VDC

▼ Temperature Sensors—JP23 and JP24

JP23, JP24	Signal
1	SensorN
2	SensorP

▼ System Reset Connector—JP25

JP25	Selection
1-2	System Reset
OPEN	No Reset (Default)

▼ Maintenance Processor Reset Connector—JP29

JP29	Signal
1	SMB
2	GND
3	CMB

▼ Bus Frequency Ratio Switch—SW1

The following table lists the settings for switch SW1, which sets the frequency ratio of the Front-Side CPU Bus.

Both the Katmai and Coppermine Pentium IIIs ignore these switch settings.

The switch settings labeled in the table may be labeled as "SA, SB, SC, SD", or "S1, S2, S3, S4", depending on the board revision. These correspond to switches 1, 2, 3, and 4 in SW1 (Figure 7).

SA / S1	SB / S2	SC / S3	SD / S 4	CPUxBus Ratio
ON	ON	ON	ON	2.0X
ON	OFF	ON	ON	2.5X
ON	ON	OFF	ON	3.0X
ON	OFF	OFF	ON	3.5X
ON	ON	ON	OFF	4.0X
ON	OFF	ON	OFF	4.5X
ON	ON	OFF	OFF	5.0X
ON	OFF	OFF	OFF	5.5X
OFF	ON	ON	ON	6.0X
OFF	OFF	ON	ON	6.5X
OFF	ON	OFF	ON	7.0X
OFF	OFF	OFF	ON	7.5X
OFF	ON	ON	OFF	8.0X

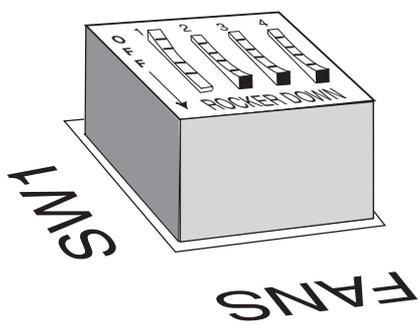


Figure 7. SW1 Bus Frequency Switch



BIOS Specifications

This chapter provides a list of the following BIOS default parameters:

- General BIOS options
- Standard CMOS setup options
- Advanced CMOS setup options
- Advanced chipset support options
- Power management setup options
- PCI Plug and Play setup options
- Peripheral setup options
- Auto-configuration with Fail-Safe settings

General BIOS Options

Table 3. General BIOS Options

Option	Default Parameter
Processor Speeds Supported	up to 800 MHz
Boot Logo Graphic	Not present

Standard CMOS Setup Options

Table 4. Standard CMOS Setup Options

Option	Default Parameter
Floppy Drive A	1.44 MB 3 1/2"
Floppy Drive B	Not Installed
Pri Master	Auto 32-Bit Mode ON
Pri Slave	Auto 32-Bit Mode ON
Sec Master	Auto 32-Bit Mode ON
Sec Slave	Auto 32-Bit Mode ON
Boot Sector Virus Protection	Disabled

Advanced CMOS Setup Options

Table 5. Advanced CMOS Setup Options

Option	Default Parameter
Quick Boot	Enabled
Pri Master ARMD Emulated as	Auto
Pri Slave ARMD Emulated as	Auto
Sec Master ARMD Emulated as	Auto
Sec Master ARMD Emulated as	Auto
1st Boot Device	ATAPI CD-ROM
2nd Boot Device	Disabled
3rd Boot Device	Disabled
Try other Boot Devices	Yes
Initial Display Mode	Silent
Floppy Access Control	Read-Write

Table 5. Advanced CMOS Setup Options (continued)

Option	Default Parameter
Hard Disk Access Control	Read-Write
SMART for Hard Disks	Enabled
BootUp Num-Lock	On
PS/2 Mouse Support	Enabled
Primary Display	VGA/EGA
Password Check	Setup
Parity Check	Not present in NEI
Boot to OS/2	No
Wait for 'F1' if Error	Disabled
Internal Cache	WriteBack
External Cache (v.96 and higher)	WriteBack
System BIOS Cacheable	Enabled
Default Primary Video	AGP
C000, 16K Shadow	Cached
C400, 16K Shadow	Cached
C800, 16K Shadow	Disabled
CC00, 16K Shadow	Disabled
D000, 16K Shadow	Disabled
D400, 16K Shadow	Disabled
D800, 16K Shadow	Disabled
DC00, 16K Shadow	Disabled
Event Logged	Not present in NEI
Clear Event Log	Not present in NEI

Advanced Chipset Support Options

Table 6. Advanced Chipset Support Options

Option	Default Parameter
USB Function	Disabled
USB KB/Mouse Legacy	Disabled
Port 64/60 Emulation	Disabled
SERR#	Enabled
PERR#	Enabled
WSC# Handshake	Enabled
USWC Write Post	Enabled
Master Latency Timer (Clks)	64
Multi-Trans Timer (Clks)	32
PCI1 to PCI0 Access	Disabled
DRAM Integrity Mode	ECC Hardware
DRAM Refresh Rate	15.6 μ s
Memory Hole	Disabled
SDRAM RAS# to CAS# delay	Auto
SDRAM RAS# Precharge	Auto
Power Down SDRAM	Enabled
ACPI Control Register	Disabled
Gated Clock	Disabled
Graphics Aperture Size	64MB
Search for MDA Resources	Yes
AGP Multi-Trans Timer (AGP Clks)	32
AGP Low-Priority Timer (AGP Clks)	16

Table 6. Advanced Chipset Support Options (continued)

Option	Default Parameter
AGP SERR	Disabled
AGP Parity Error Response	Disabled
8-bit I/O Recovery Time	Disabled
16-bit I/O Recovery Time	Disabled
PIIX4 SERR#	Disabled
USB Passive Release	Enabled
PIIX4 Passive Release	Enabled
PIIX4 Delayed Transaction	Enabled
TypeF DMA Buffer Control1	Disabled
TypeF DMA Buffer Control2	Disabled
DMA-0 Type	PC/PCI
DMA-1 Type	PC/PCI
DMA-2 Type	Normal ISA
DMA-3 Type	PC/PCI
DMA-5 Type	PC/PCI
DMA-6 Type	PC/PCI
DMA-7 Type	PC/PCI

Power Management Setup Options

The Advanced Configuration Power Management Interface (ACPMI) options are currently supported by Windows 2000 only, and will be available in a future release of the WebEngines Blazer.

Table 7. Power Management Setup Options

Option	Default Parameter
ACPI Aware O/S	No
Power Management/APM	Disabled
Power Button Function	On/Off
Green PC Monitor Power State	Suspend
Video Power Down Mode	Suspend
Hard Disk Power Down Mode	Suspend
Hard Disk Timeout (Minute)	Disabled
Power Saving Type	Sleep
Standby/Suspend Timer Unit	4 min
Standby Timeout	Disabled
Suspend Timeout	Disabled
Slow Clock Ratio	50% - 62.5%
Display Activity	Ignore
Device 6	Monitor
Device 7	Monitor
Device 8	Monitor
Device 5	Monitor
Device 0	Monitor
Device 1	Monitor

Table 7. Power Management Setup Options (continued)

Option	Default Parameter
Device 2	Monitor
Device 3	Monitor
RTC Wake-up	Disabled

PCI Plug and Play Setup Options

Table 8. PCI Plug and Play Setup Options

Option	Default Parameter
PNP Aware OS	No
PCI Latency Timer (PCI Clks)	64
PCI VGA Palette Snoop	Disabled
Allocate IRQ to PCI VGA	No
PCI IDE Bus Master	Enabled
Off-Board PCI IDE Card	Auto
Off-Board PCI IDE Primary IRQ	Disabled
Off-Board PCI IDE Secondary	Disabled
PCI Slot 1 IRQ Priority	Auto
PCI Slot 2 IRQ Priority	Auto
PCI Slot 3 IRQ Priority	Auto
PCI Slot 4 IRQ Priority	Auto
DMA Channel 0	PnP
DMA Channel 1	PnP
DMA Channel 3	PnP
DMA Channel 5	PnP
DMA Channel 6	PnP
DMA Channel 7	PnP
IRQ3	PCI/PnP
IRQ4	PCI/PnP
IRQ5	PCI/PnP
IRQ7	PCI/PnP

Table 8. PCI Plug and Play Setup Options (continued)

Option	Default Parameter
IRQ9	PCI/PnP
IRQ10	PCI/PnP
IRQ11	PCI/PnP
IRQ12	PCI/PnP
IRQ14	PCI/PnP
IRQ15	PCI/PnP
Reserved Memory Size	Disabled
Reserved Memory Address	C8000
BIOS Devnode for Shadow RAM	Disabled

Peripheral Setup Options

Table 9. Peripheral Setup Options

Option	Default Parameter
OnBoard Mezzanine	Enabled
OnBoard LAN #1	Enabled
Load OnBoard Lan #1 Option ROM	Enabled
OnBoard LAN #2	Enabled
Load OnBoard LAN #2 Option ROM	Enabled
OnBoard FDC	Auto
OnBoard Serial Port 1	3F8H
OnBoard Serial Port 2	2F8H
Serial Port 2 Mode	Normal
Duplex Mode	Full
OnBoard Parallel Port	Auto
Parallel Port Mode	ECP
Parallel Port IRQ	Auto
Parallel Port DMA Channel	Auto
Remote Setup Always On	No
Remote Setup COMx Base	Auto
Remote Setup COMx Baud Rate	19.2k bps
OnBoard IDE	Both

Auto-Configuration with Fail-Safe Settings

When you select Auto Configuration with Fail-Safe Settings from the BIOS setup utility, the following settings are automatically changed:

Table 10. Auto-Configuration with Fail-Safe Settings

Options/Settings	Default	Fail-Safe Default
Advanced CMOS Setup Option: <ul style="list-style-type: none"> System BIOS Cacheable 	Enabled	Disabled
Advanced Chipset Support Options: <ul style="list-style-type: none"> Power Down SDRAM AGP Multit-Trans Timer AGP Low-Priority Timer 	Enabled 32 16	Disabled Disabled Disabled
Power Management Setup Options: <ul style="list-style-type: none"> Green PC Monitor Power State Video Power Down Mode Hard Disk Power Down Mode 	Suspend Suspend Suspend	Stand By Disabled Disabled



Installing WebEngines

This appendix explains how to complete the initial installation of WebEngines on the desktop and in a Telco or standard 19" rack.

Pre-Installation Checklist

WebEngines are shipped fully assembled, with all components installed and configured, and all internal cables connected. A power cable is included with each WebEngine. A Console Cable Adapter and cable may be included with your shipment.

▼ Tools Required

To mount the chassis rails, you will need a #2 Phillips screwdriver. You may also need a small flathead screwdriver to secure the monitor connector.

▼ Site Preparation

Before you begin, consider the following safety precautions:

- Do not block the cooling vents or restrict the airflow through the WebEngine chassis.
- Make sure that each rack you intend to use is securely mounted in place. For Telco racks that are not bolted to the ground, you must center-mount the WebEngines to distribute their weight evenly within the rack.
- When installing multiple units in a rack, make sure the overall loading for each branch circuit does not exceed the rated capacity.

- ❑ Each rack system and each WebEngine requires a reliable ground. WebEngines should be connected to an Earth ground through the AC line cord.

In addition, WebEngines should be located in or near the following:

- ❑ Controlled environments that meet NEI specifications for ambient temperature, humidity, and electrical noise
- ❑ Areas with adequate support or floor loading capacity to support the current installation and possible future growth
- ❑ AC outlets for each engine and one for a monitor
- ❑ Appropriate earth-ground connections for each rack and each engine
- ❑ Ethernet hubs or individual jacks (10/100 Base-T cables cannot be longer than 100 meters)

▼ **Unpacking**

- ❑ Check the packing list provided with the WebEngine to verify that you received all the equipment, software, and manuals.

If any item is missing, contact Network Engines Customer Support:

(781) 986-8324

email: support@networkengines.com

web: <http://support.networkengines.com>

- ❑ Remove all the protective coverings and uncoil any cables.
- ❑ Inspect the chassis for scratches, dents, or other signs of physical damage.
- ❑ Make copies of the packing slips and file the originals with your records. Keep the copies in a binder with this manual for future reference.

Installing WebEngines on a Desktop

To avoid damage to the units, do not install more than six (6) WebEngines in a single stack on the desktop.

Installing the WebEngine in a Telco Rack

IMPORTANT: *If the Telco rack is not securely bolted to the floor, the WebEngine must be center-mounted to evenly distribute its weight.*

To install the WebEngine:

1. Unpack the WebEngine and locate the chassis mounting hardware.
2. Mount the two Telco brackets to the center of the WebEngine chassis (Figure 8).
3. Align the bracket and WebEngine chassis with the Telco rack and secure with the four screws.

CAUTION

To prevent equipment damage, support the WebEngine until all four fasteners are securely fastened to the Telco rack.

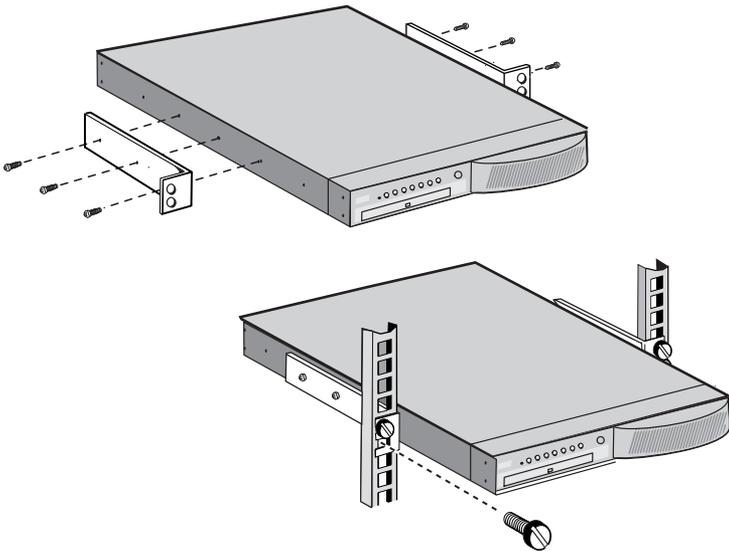


Figure 8. Telco Rack Installation

Installing WebEngines in a Standard 19-inch Rack

1. Unpack the WebEngine and locate the chassis mounting hardware.
2. Mount the two side rails to the WebEngine chassis (Figure 9).

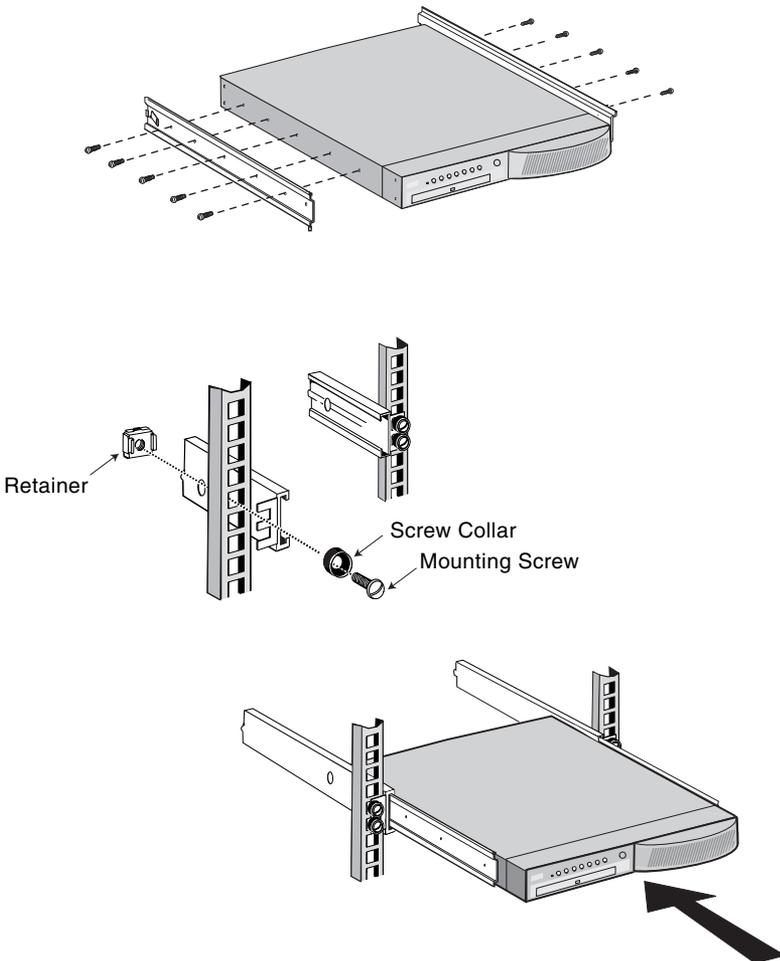


Figure 9. Standard 19-inch Rack Installation

3. Attach the cabinet rails to the rack with the mounting screws, screw collars, and retainers as shown. The smaller side of the retainer should face the outside of the rack.
4. Align the WebEngine chassis rails with the cabinet rails and slide the engine into the cabinet until the rails lock.
5. Press the interlock button on each side and slide the WebEngine completely into the cabinet.

Connecting the Cables

Cabling requirements will vary, depending on the specific installation. An example of a WebEngine cluster with Ethernet, CMBus, and Console Cable Adapter cables is shown in Figure 10 on page 58.

▼ CMBus Cables

For a cluster of WebEngines:

1. Connect a CMBus cable to the left CMBus connector on the first engine.
2. Connect the other end of the cable to the right CMBus connector on the next engine.
3. Continue cabling the remaining engines in a similar cross-over manner.
4. To maintain clear video in a cluster of more than six WebEngines, you must terminate the VGA signals on the last (open) CMBus connector using a Console Cable Adapter and a VGA terminator.

▼ Ethernet Cables

Optional—for external network access.

1. Connect the Ethernet cable(s) from the private switch/hub port to the top port (Adapter 2).

The adapter must be connected to the same network as the machine that is used to configure the WebEngine.

2. Connect the Ethernet cable(s) for external access from the appropriate switch/hub port to the bottom port (Adapter 1).

The two network interfaces are assigned default IP addresses. The IP addresses are dependent on the specific WebEngine model. Refer to the corresponding WebEngine *User Guide* for more information.

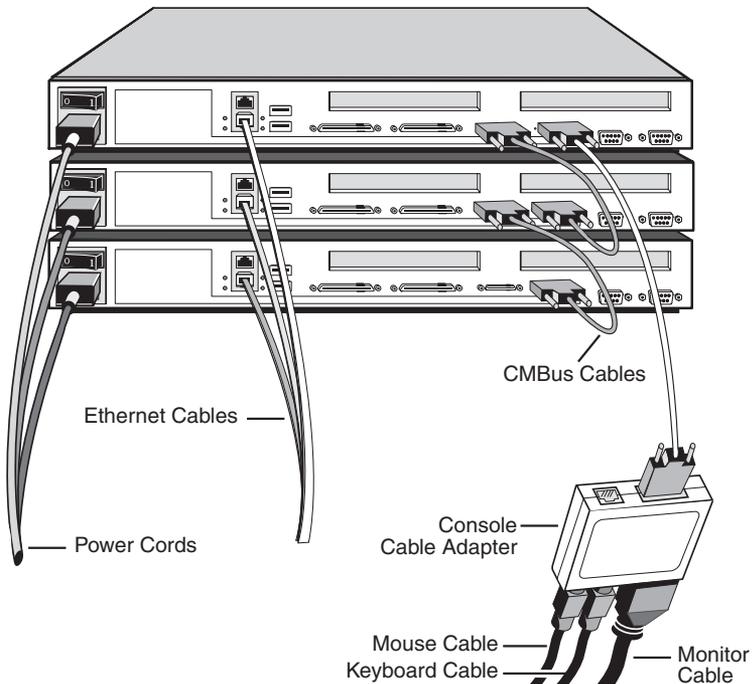


Figure 10. Cabling WebEngines

▼ Console Cable Adapter

The Console Cable Adapter allows you to access a WebEngine through a directly connected monitor. See *Providing Focus to a WebEngine* on page 62 for more information.

1. Connect a CMBus cable to the right CMBus connector.

2. Attach the Console Cable Adapter to the other end of the cable.
3. Connect the keyboard, mouse, and monitor cables to the Console Cable Adapter.

The BIOS immediately tries to detect the mouse, therefore, the mouse must be connected to the Console Cable Adapter before you power up the first engine. If the mouse is not detected during the POST period, it will not be available to the operating system. If this occurs, refer to *Troubleshooting* on page 66.

▼ Power Cables

1. Plug the monitor power cord into a grounded AC power outlet.
2. Connect the WebEngine power cable(s) to individual, grounded AC power outlets. For WebEngines with the 48V DC power option, plug the power cables into the DC power supply, provided by the customer.

CAUTION

Do not apply power until you are familiar with the startup procedures, explained in Appendix B, *Powering Up WebEngines*.



Powering Up WebEngines

This appendix provides an overview of the concepts and the procedures for powering up WebEngines. It includes the following topics:

- Startup modes (soft start/hard start)
- Providing focus to a WebEngine
- Power up sequence
- CMBus addresses
- Determining CMBus IDs
- Powering up new WebEngines
- Troubleshooting

Startup Modes

There are two startup modes, *soft start* and *hard start*.

▼ Soft Start Mode

(default—programmed in manufacturing)

When you turn the power switch on, the green Console LED starts blinking as power is applied to the maintenance processors. You should wait at least ten seconds until the initial power cycle stabilizes, then immediately press the Select button to apply power to the CPU(s) and start the booting sequence. The Console LED stops blinking and the Power LED is steady green.

▼ Hard Start Mode

(provided at customer's request)

A hard start combines the power up sequence of the soft start—when you turn the power switch on, power is applied to the board and the boot

sequence automatically begins. You do not need to press the Select button when an engine is shipped in hard start mode.

Providing Focus to a WebEngine

A WebEngine is said to have *focus* when the video monitor, mouse, and keyboard connections are enabled through its CMBus. You can give a machine focus anytime it is up and running, or you can focus at the beginning of a soft start:

- **To provide focus while an engine is running:**
Press the Select button at anytime to give the machine focus. A steady green Console LED indicates the machine is focused.
- **To focus during a normal soft start:**
 - a. Turn the power switch on.
 - b. Wait at least ten seconds for the power to stabilize, then press Select twice. The bootup sequence completes and the machine has focus.
- **To focus after a soft start has begun:**
If the WebEngine is in the process of booting up, you *must* wait until the entire POST period has completed before you press Select to focus., otherwise, the WebEngine may experience unpredictable performance.

In a cluster, only one WebEngine can have focus at the same time. Each time you focus a different WebEngine, the Console LED on the machine that previously had focus goes out (indicating it no longer has focus), and the Console LED on the new machine is steady green.

A single WebEngine remains focused once you give it focus.

Power Up Sequence

In a new cluster installation, each engine must be powered on and complete its booting sequence *before* you power on the next engine. This avoids potential CMBus address conflicts.

CMBus Addresses

In a new cluster installation, the first engine that is powered on acquires a CMBus address of 2 by default. As each additional engine in the cluster is powered up, it seeks its own unique CMBus address by polling the other engines connected to the CMBus. For this reason, it is important that WebEngines are powered up and complete their booting sequence one at a time to avoid potential address conflicts.

Once an engine initially determines its CMBus address, its identification number (CMBus ID) is stored in the EEPROM of its maintenance processor. WebEngines can then be safely powered on or off in any sequence without the possibility of address conflicts.

Determining CMBus IDs

The *CMBus ID* is a one- to three-digit number (e.g., 4, 23, 126) that corresponds to the CMBus address acquired by the WebEngine during its initial startup. While a WebEngine is running, you can determine its CMBus ID through a sequence of blinking LEDs on the right side of the control panel—the WatchDog, Temperature, and Console. Starting with the WatchDog, each LED blinks a specific number of times to represent each of the corresponding digits of the CMBus ID—the WatchDog LED represents 100s, the Temperature LED represents 10s, and the Console LED represents 1s. This counting scheme is shown in Figure 11.

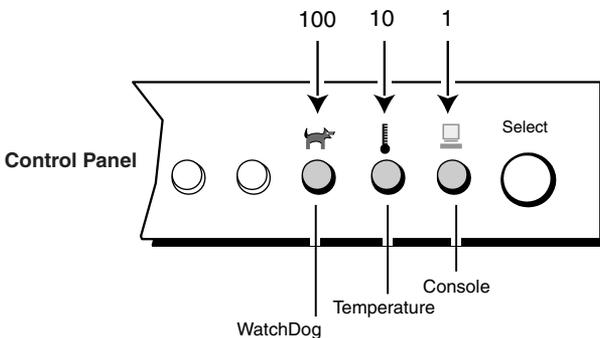


Figure 11. Counting Scheme for Determining CMBus IDs

Sequence of events when determining CMBus IDs:

WebEngines must be up and running in order to obtain the CMBus ID.

1. Press and hold the Select button for three seconds or longer.

To signal the beginning of the count, all three LEDs blink at the same time.

2. Starting with the WatchDog LED, count how many times each LED blinks, using the counting scheme shown in Figure 11. Refer to the examples in Figure 12.

To signal the end of the count, all three LEDs blink again.

The following two examples show how to use the counting scheme to determine CMBus IDs of 126 and 4, respectively:

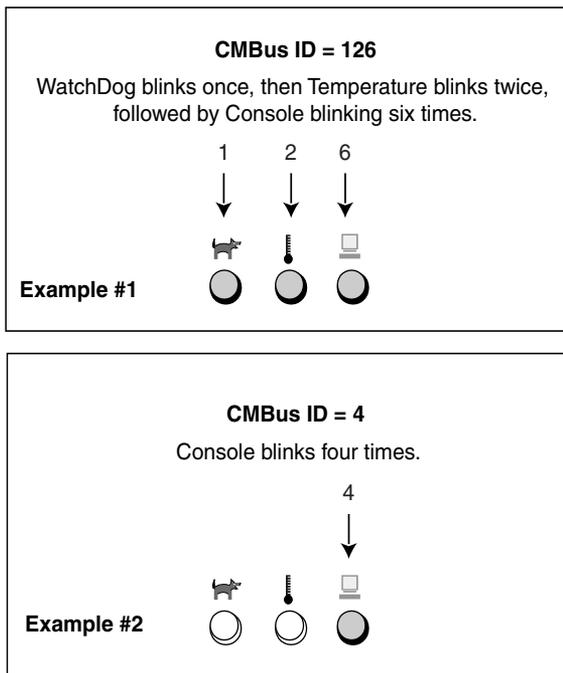


Figure 12. Examples—Determining CMBus IDs

Powering Up New WebEngines

This procedure explains how to power up one or more WebEngines for the first time. Before you begin, make note of the following conditions:

- The mouse must be connected to the Console Cable Adapter before you power up the first engine because the machine's BIOS immediately tries to detect it. If the mouse is not detected at this time, it will not be available to the operating system. See *Troubleshooting* on page 66 for more information.
- For a cluster of engines, you must wait for each engine to complete its boot sequence before you power up the next engine.

To power up in soft start mode:

1. Set the power switch to ON. As power is applied, the green Console LED starts to blink.
2. Wait at least ten seconds for the initial power cycle to stabilize, then immediately do one of the following:
 - **For WebEngine without focus:** Press the Select button once to start the boot sequence. The Console LED stops blinking and the Power LED is steady green.
 - **For WebEngine with focus:** Press the Select button twice to start the boot sequence and give the machine focus. The steady green Console LED indicates the machine has focus.

If you do not press Select twice within a 3-second period, you *must* wait for the WebEngine to complete its boot sequence, then press Select to provide focus.

3. For a cluster of WebEngines, repeat Steps 1 and 2 for each new engine.

After each new WebEngine is powered on, you must wait until it completes its boot sequence before powering up the next unit.

To power up in hard start mode:

1. Set the power switch to ON. Power is applied to the board and the machine completes its boot sequence.
2. To give the WebEngine focus, press Select.

After each WebEngine is powered on, you must wait until it completes its boot sequence before starting the next unit.

Troubleshooting**Mouse connection:**

If the WebEngine(s) cannot detect the mouse connection, check for the following conditions:

- The BIOS tries to detect the mouse immediately, therefore, the mouse must be connected to the Console Cable Adapter before you power up the first engine. If the mouse is not detected, it will not be available to the operating system.
- Each engine's BIOS attempts to detect a mouse when it performs its power-on self-test (POST). Because a single mouse is used for all of the engines in a cluster, it is important that each engine is selected during the POST. Thus, WebEngines must be booted one at a time.
- If the BIOS discovers the external devices (mouse, keyboard, etc.) before you press the Select button, the mouse may not function with that unit. Some operating systems may not load a driver because the device has not been discovered. In this case, press and hold the Reset button on the front panel and *at the same time* press Select to power down the CPU(s). Reboot the engine, wait at least ten seconds for the power to stabilize, then immediately press the Select button.



Replacing WebEngines

This chapter explains how to shut down, remove, and replace WebEngines.

Replacing Standalone WebEngines

To remove a standalone WebEngine, power down the engine and disconnect all power and network cables. The power-up procedure is explained in *Powering Up New WebEngines* on page 65.

Replacing a WebEngine in a Cluster

To remove and replace a WebEngine in a cluster, follow these steps:

▼ Powering Down a WebEngine in a Cluster

1. If you are powering down an AdminEngine, stop all NEI services:
 - a. Go into services via the control panel.
 - b. Select the service, then select Stop. The NEI services are all services with the prefix "NEI".
2. If the WebEngine does not have focus, press the Select button. The Console LED should be steady green.
3. Execute a normal shutdown for your operating system.
4. Press the Select button on a different WebEngine.
5. On the WebEngine being shut down, press and hold the Reset button on the front panel, *and at the same time*, press Select to power off the CPU(s).

6. Set the power switch to OFF.

To ensure proper operation, leave the WebEngine powered off for 30 seconds before restarting it.

▼ Removing a WebEngine from a Cluster

1. Verify that the WebEngine's power switch is set to OFF.
2. Disconnect the power cord and the Ethernet cables from the engine.



CAUTION

Disconnect both CMBus cables from the engine. Do not attempt to use the mouse or change focus while the CMBus is disconnected.

3. Remove one CMBus cable from the WebEngine you are removing and connect the other cable, as shown in Figure 13.

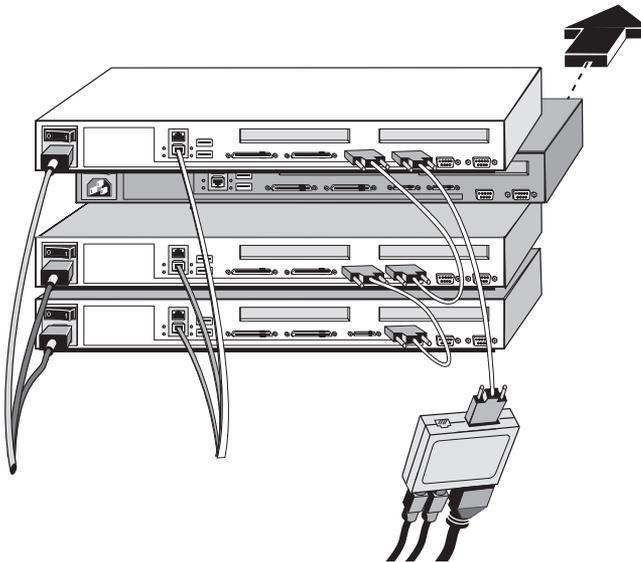


Figure 13. Removing a WebEngine from the Cluster

It is now safe to use the mouse and select other WebEngines.

4. Remove the engine you disconnected from the cluster.

▼ Replacing a WebEngine

1. Mount the new WebEngine in the cluster.
2. Verify that the power switch of all other engines in the cluster is set to ON.
3. Connect the power cord and Ethernet cables.
4. Reconnect the CMBus cables in the original configuration.
5. Set the power switch of the new engine to ON.
6. If the replacement WebEngine was shipped in the default soft start mode, wait at least ten seconds for the power cycle to stabilize, then press Select twice to start the boot sequence and give the machine focus.
7. For an AdminEngine, restart all NEI services.
8. Refer to the corresponding WebEngine *User Guide* to configure the operating system for your specific WebEngine.



Installing Mezzanine Adapters

This chapter discusses the floppy disk drive and SCSI mezzanine adapters.

Floppy Disk Drive Mezzanine Adapter

The Floppy Disk Drive Mezzanine Adapter is designed as an extension of the standard floppy port **CN11**. The 34-pin floppy port is connected to a 34-pin header on the Floppy Mezzanine Adapter with floppy drive power obtained from the PCI mezzanine connectors. The floppy signals are ported to the outside through the Option 1 port.

The Floppy Disk Drive Mezzanine Adapter is installed directly onto the main logic board directly under Slot 2 (attached to the plastic PCI risers). Your WebEngine may already have a PCI card installed in Slot 2. In this case, you must remove the PCI card before installing the mezzanine card.

Required Tools

You will need a #2 Phillips screwdriver. You may also need a flathead screwdriver to secure the external cable(s).

Procedure

IMPORTANT: *Use proper electrostatic discharge precautions while performing this procedure.*

1. Power down, disconnect, and remove the WebEngine from the cluster. Refer to *Replacing a WebEngine in a Cluster* on page 67 for details.
2. Remove the WebEngine cover:

- a. At the front of the machine, remove the three screws from the top of the chassis cover.
 - b. On the rear panel, remove the center screw.
 - c. For each side rail, remove the two screws on either end. It is not necessary to remove the three middle screws on the side rails.
 - d. Carefully lift the cover from the WebEngine and set it aside.
3. Locate the plastic PCI risers toward the back of the engine. If there is a PCI card installed here, remove it before continuing.
 4. Install the mezzanine card:
 - a. Remove the card from its protective sleeve.
 - b. Carefully position the card over the connectors, and align the white plastic PC lock-in support over the mounting hole on the board.
 - c. Gently press the card into the connectors until it is securely seated and the lock-in support snaps into place.
 5. Connect the cables:
 - a. Install the internal ribbon cable from card's **J1** connector to the **CN11 (FLOPPY)** connector on the main logic board.
 - b. Connect the external cable to the **Option 1** connector.
 - c. Connect the other end of the cable to the floppy drive enclosure box.
 6. If you removed a PCI card, reinstall it into the risers.
 7. Replace the cover and secure with the screws.
 8. Reinstall the WebEngine in the cluster and reconnect its cables (Appendix C, page 67).

Refer to Appendix B to power up the WebEngine.

SCSI Mezzanine Adapter

The SCSI Mezzanine Adapter is a high-performance, dual-channel Ultra160-compliant card that you can connect to both internal SCSI drives with the supplied flat cable, and to external drive units using the optional external cable (or any Ultra 160-compliant commercial cable).

The Option 2 connector is dedicated to Channel A, which is shared with any internal SCSI devices. Termination for Channel B is enabled by default in the Adaptec SCSI BIOS. If you are running both internal and external drives on Channel A, you must disable termination to comply with standard SCSI termination rules.

The SCSI Mezzanine Adapter requires NEI .99 BIOS or higher.

Required Tools

You need a #2 Phillips screwdriver. You may also need a flathead screwdriver to secure the external cables.

Procedure

IMPORTANT: *Use proper electrostatic discharge precautions while performing this procedure.*

1. Power down, disconnect, and remove the WebEngine from the cluster.
2. Remove the WebEngine cover:
 - a. At the front of the machine, remove the three screws from the top of the chassis cover.
 - b. On the rear panel, remove the center screw.
 - c. For each side rail, remove the two screws at either end. It is not necessary to remove the middle three screws on the rails.
 - d. Carefully lift the cover from the WebEngine and set it aside.
3. Locate the plastic PCI risers towards the back of the engine. If there is a PCI card installed here, remove it before you continue.

4. Install the SCSI mezzanine card:
 - a. Remove the card from its protective sleeve.
 - b. Carefully position the card over the connectors and align the white plastic PC lock-in support over the mounting hole on the board.
 - c. Gently press the card into the connectors until it is securely seated and the lock-in support snaps into place.
5. Connect the cables:
 - a. Connect the ribbon cable from connector **J6** on the card to the internal SCSI drive.
 - b. If you are attaching an external SCSI device, attach the external cable to the Option 1 (Channel B) connector. The cable must be Ultra 160 LVD-compliant.
 - c. Attach the other end of the cable to the external SCSI device.

The external SCSI device must be terminated.

 - d. Attach a second external SCSI device to the Option 2 (Channel A connector).

Termination for Channel A must be disabled when attaching an external device to Option 2 connector. This is done later in Step 10.

6. If you removed a PCI card, reinstall it into the risers.
7. Replace the cover and secure with the screws.
8. Reinstall the WebEngine in the cluster and reconnect its cables.

9. Enable the card in the NEI BIOS:
 - a. Turn the power to ON.
 - b. As the boot sequence begins, press <Delete> to enter the NEI BIOS Setup Utility.
 - c. Select **Peripheral Setup**, then change the **OnBoard Mezzanine** setting to **Enabled**.
 - d. Press <ESC> to exit, then press <F1> to save the settings and exit the utility. The engine will automatically reboot.
10. If you are running both internal and external drives on Channel A, disable termination in the Adaptec SCSI BIOS:
 - a. As the WebEngine reboots, wait for the NEI BIOS to detect the SCSI card.

```
Adaptec AHA-2940U2W SCSI BIOS...
©Adaptec 2000. All Right Reserved
```
 - b. Press <Ctrl-A> to invoke the Adaptec SCSI Select™ Utility.
 - c. Select **Channel A** (00:13:A) and press <Enter>.
 - d. Under the **Options** menu, select **Configure/View Host Adapter Settings**.
 - e. Set the Host Adapter SCSI Termination to **Disable**.
 - f. Press <ESC> to exit the SCSI Utility. The system reboots.

Termination Guidelines for Removing an External SCSI Device

When you remove an external SCSI device from the Option 2 connector, enable termination on Channel A through the Adaptec SCSI Select Utility (refer to Step 10). If you do not enable termination, you are violating standard SCSI termination rules—the WebEngine may not boot or its performance may become unstable.

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