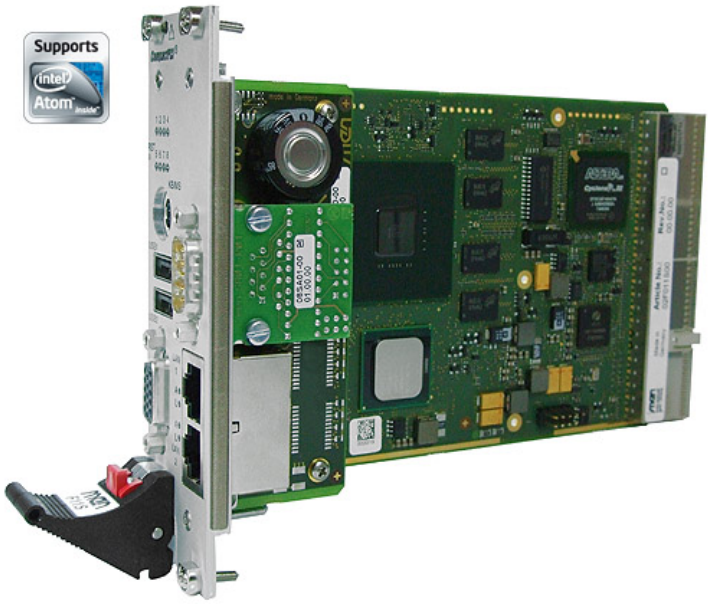
F11S – 3U CompactPCI® Intel® Atom™ CPU Board

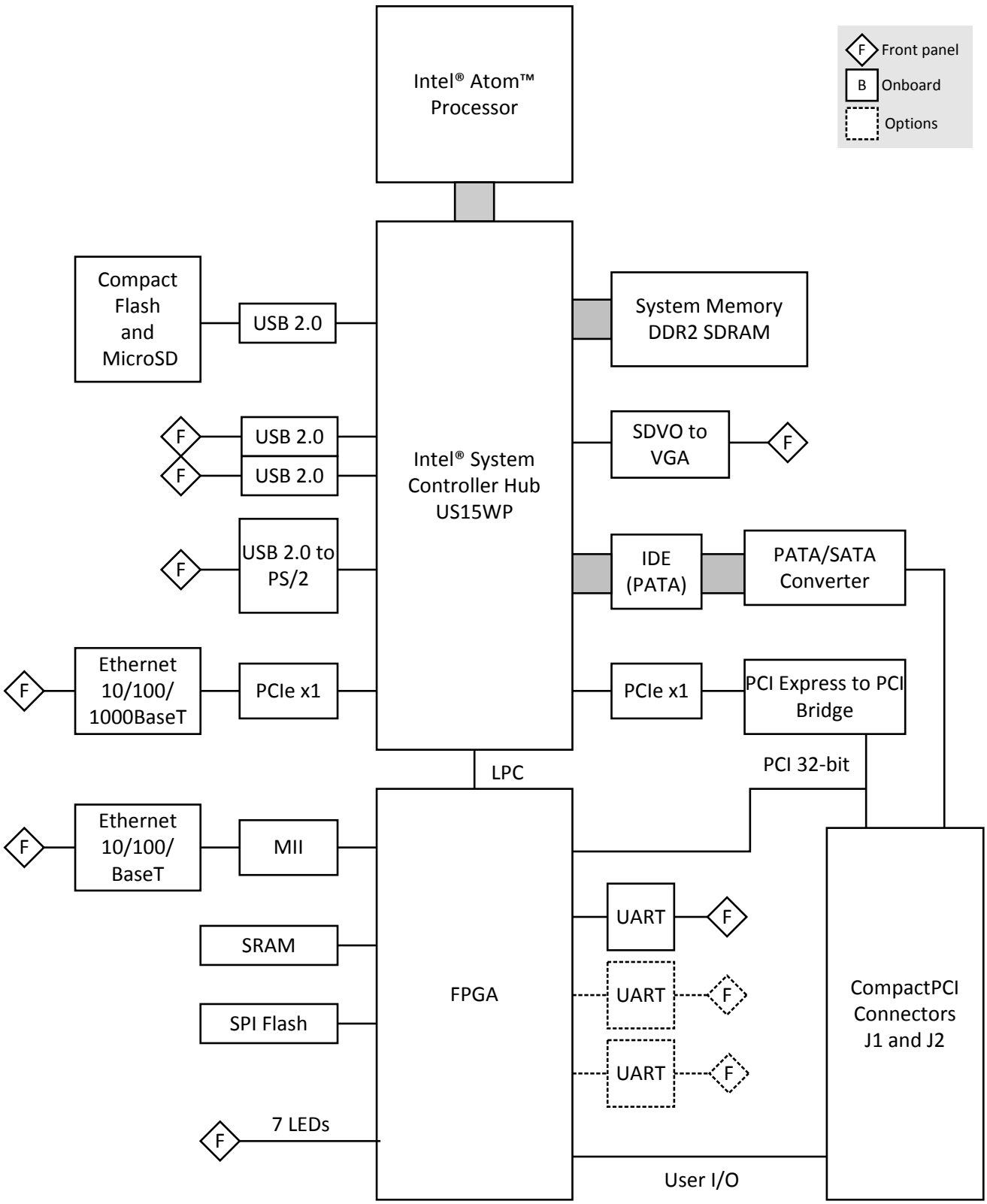
- **32-bit 8HP CompactPCI® system slot**
- **Intel® Atom™ Z510P, Z530P, Z510PT, Z520PT**
- **Up to 2 GB DDR2 SDRAM**
- **2 MB SRAM**
- **CompactFlash®**
- **microSD™ slot**
- **1 SATA interface via rear I/O**
- **VGA, 2 USB, PS/2, 1 UART**
- **1 Gigabit and 1 Fast Ethernet**
- **FPGA for individual user I/O at rear**
- **-40 to +85°C screened or with qualified components**



The F11S single-board computer is a versatile 3U Eurocard CompactPCI® board, taking 8 HP or more front space depending on its configuration. It is equipped with the Intel® Atom™ XL processor, an IA-32 core based on 45nm process technology. Some processor versions are qualified for the extended temperature range. Due to the low power architecture of the Intel® Atom™ processor, the CPU card has a total power consumption of max. 5 to 7 Watts, while having a clock frequency of up to 1.6 GHz. A specially outlined heat sink efficiently takes away the heat from the board, even in extended temperature range.
The F11S is designed especially for systems which require low power consumption, e.g. as a computing platform for rugged industrial PCs in mobile applications or for infotainment applications, offering the whole world of Windows® and Linux based software.
The F11S accommodates up to 2 GB of directly soldered main memory, 2 MB SRAM and an SPI boot flash. A SATA interface is available at CompactPCI® connector J2. The storage capacity is completed by a CompactFlash® socket and a microSD™ card slot.

One Gigabit Ethernet via one PCI Express® x1 link from the Intel® System Controller Hub US15WP and one FPGA-controlled Fast Ethernet via RJ45 connectors are available at the front. Further standard front I/O interfaces are one COM via a D-Sub connector, two USB 2.0, graphics (VGA up to UXGA) and keyboard/mouse.
An on-board FPGA allows implementation of additional functionality such as serial interfaces, CAN bus controllers, binary I/O, protocol converters, touch controllers etc. to the needs of the individual application in a very flexible way. Before boot-up of the system, the FPGA is loaded from the boot Flash. Updates of the FPGA contents can be made inside the boot Flash during operation and are available after a power-off of the system. A maximum of 3 SA-Adapters™ can be realized on one F11S, with I/O accessible at the front panel.
The F11S is completed by a board management controller for temperature and power supervision. It comes with a Phoenix® Award BIOS configurable for the final application.
The F11S is screened or qualified for operation in a -40°C to +85°C conduction or convection cooled environment.

Diagram


Intel® Atom™ Processor
F Front panel
B Onboard
Options
Compact Flash and MicroSD
USB 2.0
System Memory DDR2 SDRAM
F
USB 2.0
F
USB 2.0
Intel® System Controller Hub US15WP
SDVO to VGA
F
F
USB 2.0 to PS/2
IDE (PATA)
PATA/SATA Converter
F
Ethernet 10/100/ 1000BaseT
PCIe x1
PCIe x1
PCI Express to PCI Bridge
LPC
PCI 32-bit
F
Ethernet 10/100/ BaseT
MII
UART
F
SRAM
FPGA
UART
F
CompactPCI Connectors J1 and J2
SPI Flash
UART
F
F
7 LEDs
User I/O

Technical Data

CPU	■ Intel® Atom™ Z510P, Z530P, Z510PT or Z520PT □ Up to 1.6GHz processor core frequency □ 400MHz or 533MHz system bus frequency ■ Chipset □ Intel® system controller hub US15WP
Memory	■ 512KB L2 cache integrated in Atom processor ■ Up to 2GB DDR2 SDRAM system memory □ Soldered □ 400/533MHz memory bus frequency locked to the FSB frequency ■ 2MB boot Flash ■ 2MB non-volatile SRAM, FPGA-controlled ■ CompactFlash® card interface □ Via USB □ Type I □ DMA support ■ One microSD™ card slot □ Via USB □ Compliant to SDIO Revision 1.1 and MMC Revision 4.0 (backward-compatible)
Mass Storage	■ SATA □ Transfer rates up to 100MB/s □ Via PATA-to-SATA converter □ Accessible on rear I/O connector J2
Graphics	■ Integrated in Intel® System Controller Hub US15WP ■ Maximum resolution: 1600x1200 pixels ■ VGA connector at front panel □ Via SDVO port from chipset
I/O	■ USB □ Two Series A connectors at front panel □ One USB for PS/2 interface □ One USB for connection of CompactFlash®/microSD™ □ UHCI and EHCI implementation □ Data rates up to 480Mbit/s ■ Ethernet □ One 10/100/1000Base-T Ethernet channel □ Via one PCI Express® x1 linkfrom the chipset □ One 10/100Base-T Ethernet channel □ FPGA-controlled □ RJ45 connectors at front panel □ Two status LEDs for each channel ■ One RS232 UART, FPGA-controlled □ D-Sub connector at front panel □ Via SA-Adapter™ □ Data rates up to 115.2kbit/s □ 60-byte transmit/receive buffer □ Handshake lines: CTS, RTS; DCD, DSR, DTR; RI ■ 66 user I/O lines, FPGA-controlled □ Depending on FPGA configuration □ Accessible via rear I/O connector ■ PS/2 keyboard/mouse □ PS/2 connector at front panel □ Via USB-PS/2 converter

Technical Data

Front Connections (Standard)	■ VGA ■ Two USB 2.0 (Series A) ■ Two Ethernet (RJ45) ■ One COM (D-Sub) ■ PS/2
FPGA	■ Standard factory FPGA configuration: □ Main bus interface □ 16Z024_SRAM - SRAM controller □ 16Z125_UART - UART controller □ 16Z087_ETH - Ethernet controller □ 16Z034_GPIO - GPIO controller ■ The FPGA offers the possibility to add customized I/O functionality. See FPGA.
PCI Express®	■ One x1 link to connect local 1000Base-T Ethernet controller ■ One x1 link for connection of PCI Express® to PCI bridge ■ Data rate 250MB/s (2.5 Gbit/s per lane)
Miscellaneous	■ Real-time clock buffered by a GoldCap or alternatively a battery (5 years life cycle) ■ Power supervision and watchdog ■ Temperature measurement ■ One status LED from board controller ■ One FPGA status LED ■ Six user LEDs (FPGA-controlled) ■ Reset button
CompactPCI® Bus	■ Compliance with CompactPCI® Core Specification PICMG 2.0 R3.0 ■ System slot ■ 32-bit/33-MHz PCI Express®-to-PCI bridge ■ V(I/O): +3.3V
Electrical Specifications	■ Supply voltage/power consumption: □ +5V (-3%/+5%), 0.9A typ. (with network connection) □ +3.3V (-3%/+5%), 0.9A typ. (with network connection) □ +12V (-5%/+5%), only provided for detection of 3.3V
Mechanical Specifications	■ Dimensions: conforming to CompactPCI® specification for 3U boards ■ Front panel: 8HP with ejector ■ Weight: 458g
Environmental Specifications	■ Temperature range (operation): □ -40..+85°C (screened) □ Airflow: min. 1.0m/s ■ Temperature range (storage): -40..+85°C ■ Relative humidity (operation): max. 95% non-condensing ■ Relative humidity (storage): max. 95% non-condensing ■ Altitude: -300m to + 3,000m ■ Shock: 15g/11ms ■ Bump: 10g/16ms ■ Vibration (sinusoidal): 1g/10..150Hz ■ Conformal coating on request
MTBF	■ 397,556h @ 40°C according to IEC/TR 62380 (RDF 2000)
Safety	■ PCB manufactured with a flammability rating of 94V-0 by UL recognized manufacturers
EMC	■ Conforming to EN 55022 (radio disturbance), IEC 61000-4-2 (ESD) and IEC 61000-4-4 (burst)
BIOS	■ Award BIOS

Technical Data

Software Support	■ Windows® ■ Linux ■ VxWorks® (on request) ■ QNX® (on request) ■ For more information on supported operating system versions and drivers see Downloads.

FPGA

This product offers the possibility to add customized I/O functionality in FPGA.

Flexible Configuration	■ Customized I/O functions can be added to the FPGA. ■ It depends on the board type, pin counts and number of logic elements which IP cores make sense and/or can be implemented. Please contact MEN for information on feasibility. ■ You can find more information on our web page "User I/O in FPGA"
FPGA Capabilities	■ FPGA Altera® Cyclone® III EP3C16 □ 119,088 logic elements □ 516,096 total RAM bits ■ Connection □ Total available pin count: 66 pins □ Functions available via rear I/O connector J2 □ SA-Adapters™ can be used to realize the physical lines.

Configuration & Options

Standard Configurations

Article No.	CPU Type	Clock	DDR2	SRAM	Front I/O	Operating Temperature	Mechanical
02F011S00	Atom Z530P	1.6 GHz	1 GB	2 MB	2 USB, 2 Ethernet on RJ45, 1 VGA, 1 PS/2, 1 UART	-40..+85°C screened	8 HP

Options

CPU	■ Intel® Atom™ Z530P, 1.6GHz, 533MHz FSB ■ Intel® Atom™ Z510P, 1.1GHz, 400MHz FSB ■ Intel® Atom™ Z520PT, 1.33GHz, 533MHz FSB ■ Intel® Atom™ Z510PT, 1.1GHz, 400MHz FSB
Memory	■ CompactFlash® □ 0 MB up to maximum available ■ MicroSD card □ 0 MB up to maximum available ■ NAND Flash instead of CompactFlash®, microSD™ card and battery □ 0 MB up to maximum available ■ mSATA slot instead of CompactFlash® and microSD™ card □ 0 MB up to maximum available
I/O	■ USB □ One additional interface on M12 connector ■ Ethernet □ Two interfaces on two 9-pin D-Sub connectors instead of two RJ45 connectors and COM interface □ Two interfaces on two M12 connectors instead of two RJ45 connectors and COM interface ■ UART □ Two additional UARTS on two SA-Adapters™ (12HP front)
Mechanical	■ 4HP (without 2 Ethernet and UART) ■ 8HP (standard) ■ 12HP (with 2 additional UARTs)
Operating Temperature	■ -40..+85°C qualified
Cooling Concept	■ Also available with conduction cooling in MEN CCA frame

Please note that some of these options may only be available for large volumes. Please ask our sales staff for more information.

Ordering Information

Standard F11S Models	**02F011S00**	Intel® Atom™ Z530P 1.6GHz, 1GB DDR2 RAM, 2MB SRAM, CompactFlash® and microSD™, 2 Ethernet via RJ45 (1Gbit, 100Mbit), 1 COM, 2 USB 2.0, keyboard/mouse, VGA, 8TE, -40..+85°C screened
Related Hardware	**08CT12-00**	CompactPCI® PlusIO rear transition module 3U/80mm, 2 Ethernet, 4 USB, 4 SATA, 4 PCIe® x1, -40°C..+85°C qualified
	Please note that only one SATA port can be used on the CT12 in combination with the F11S.	
Memory	**0751-0046**	MicroSD card, 2 GB, -40..+85°C
	0751-0051	SSD mSATA, 8 GB, -40..+85°C
	0751-0052	MicroSD card, 4 GB, -40..+85°C
	0754-0007	SSD SATA 256 GB, 2.5" MLC, 0..+70°C
SA-Adapters™	You can find a more detailed overview of possible carrier board/SA-Adapter™ combinations along with software support in our option matrix (PDF).	
	08SA01-00	RS232, not optically isolated, 0..+60°C
	08SA02-00	RS422/485, half duplex, optically isolated, 0..+60°C
	08SA02-01	RS422/485, full duplex, optically isolated, 0..+60°C
	08SA02-07	RS422/485, full duplex, optically isolated, -40..+85°C screened
	08SA03-00	1 RS232, optically isolated, 0..+60°C
	08SA03-01	1 RS232, optically isolated, -40..+85°C screened
	08SA08-00	CAN ISO high-speed, optically isolated, 0..+60°C
	08SA08-01	CAN ISO high-speed, optically isolated, -40..+85°C screened
	08SA15-00	8 digital I/O channels, -40..+85°C with qualified components, no RoHS
	08SA22-00	IBIS master SA-Adapter™, -40..+85°C screened
	08SA22-01	IBIS slave SA-Adapter™, -40..+85°C screened
	08SA25-00	GPS receiver, isolated, -40..+85°C screened
Systems & Card Cages	MEN delivers turn-key systems completely installed (hardware, operating system, accessories), wired and tested. Different rack sizes, power supplies and backplanes on request. For details please contact your local sales representative.	
	0701-0046	CompactPCI® 19" 4U/24HP desktop system for 3U cards, 3-slot 3U CompactPCI® backplane, system slot right, 1U fan tray with 1 fan, 8 HP space for 1 pluggable PSU
	0701-0056	CompactPCI® 19" 4U/84HP rack-mount enclosure for 3U cards (vertical), 4+4-slot 3U CompactPCI® / CompactPCI® Serial hybrid backplane, prepared for rear I/O, 250W power supply wide range 90..264VAC on rear, 1U fan tray with 2 fans included, 0..+60°C

Ordering Information

Software: Linux

This product is designed to work under Linux. See below for potentially available separate software packages from MEN.

13XM01-06	MDIS5™ low-level driver sources (MEN) for XM1, XM1L, MM1, MM2, XM2, F11S, F19P, F21P, F22P, G20, G22, SC21, SC27 and DC2 board controller
13Z001-90	Linux host driver (MEN) for 16Z001_SMB (I2C)
13Z024-06	MDIS4™/2004 / MDIS5™ low-level driver sources (MEN) for 16Z024_SRAM
13Z077-90	Linux native driver (MEN) for 16Z077_ETH and 16Z087_ETH

Software: Windows®

This product is designed to work under Windows®. See below for potentially available separate software packages from MEN.

10F014-78	Windows® XP Embedded BSP (MEN) for F11S, F14, F15, F17, F18, F19P, F21P, G20, XM1, XM1L, XM2, MM1, MM2, SC21, SC24, DC1, DC2, RC1, BC50I, BC50M and BL50W
10Y000-78	Windows® Embedded Standard 7 BSP for F11S, F19P, F21P, F22P, G20, G22, XM1L, XM2, MM1, MM2, SC21, SC24, SC27, BC50M, BC50I, BL50W, BL50S, F206, F210, F215, F216, G215, P506, P507 and P511
13T010-70	Windows® 32-bit network driver (Intel®) for XM1, XM1L, XM2, MM2, F11S, F18, F18E, F19P, F21P, F22P, G20, G22, GM1, GM2, G211, G211F, SC24, BC50I, BC50M and BL50W
13T011-70	Windows® graphics driver (Intel®) for XM1, XM1L, MM1 and F11S
13T012-70	Windows® XP/Vista chipset driver (Intel®) for XM1, XM1L, MM1 and F11S
13T015-70	Windows® Vista™ network driver (Intel®) for XM1, XM1L and F11S
13T016-70	Windows® Vista™ chipset graphics driver (Intel®) for XM1, XM1L, MM1 and F11S
13Z024-70	MDIS4™/2004 / MDIS5™ Windows® driver (MEN) for 16Z024_SRAM
13Z087-70	Windows® native driver (MEN) for 16Z087_ETH (Ethernet controller)

Software: VxWorks®

This product is designed to work under VxWorks®. For details regarding supported/unsupported board functions please refer to the corresponding software data sheets.

13XM01-06	MDIS5™ low-level driver sources (MEN) for XM1, XM1L, MM1, MM2, XM2, F11S, F19P, F21P, F22P, G20, G22, SC21, SC27 and DC2 board controller
13Z024-06	MDIS4™/2004 / MDIS5™ low-level driver sources (MEN) for 16Z024_SRAM

Software: QNX®

This product is designed to work under QNX®. For details regarding supported/unsupported board functions please refer to the corresponding software data sheets.

13XM01-06	MDIS5™ low-level driver sources (MEN) for XM1, XM1L, MM1, MM2, XM2, F11S, F19P, F21P, F22P, G20, G22, SC21, SC27 and DC2 board controller
13Z024-06	MDIS4™/2004 / MDIS5™ low-level driver sources (MEN) for 16Z024_SRAM
13Z087-40	QNX® native driver (MEN) for 16Z087_ETH

Software: Miscellaneous

Intel® software development products such as analyzers, compilers, threading tools etc. can be downloaded under www.intel.com/cd/software/products/asmo-na/eng/index.htm. IA-32 Intel® Architecture Software Developer's Manuals are available under www.intel.com/products/processor/manuals/index.htm.

For operating systems not mentioned here contact MEN sales.

Ordering Information

Documentation	Compare Chart 3U CompactPCI® / PlusIO CPU cards » Download	
	Compare Chart 3U CompactPCI® / PlusIO peripheral cards » Download	
	Compare Chart 3U CompactPCI® / PlusIO extension cards » Download	
	20F011SER	F11S Errata
	20F011S00	F11S User Manual
	21APPN016	Application Note: Accessing SMBus under Linux Kernel 3.2 on MEN Intel® Boards
	22Z087-ER	16Z087_ETH Errata

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