GE
Intelligent Platforms

Telum™ ASLP11 & ASLE11

High Performance Processor AMC Modules

Features

- Intel® Core™ 2 Duo L7400 processor, 1.5 GHz core clock, 4 MByte L2 cache
- Single width, full-size or mid-size AMC.0, R2.0 form factor
- AMC.0, R2.0 Hot Swap compliant
- Up to 4 GByte DDR2 SDRAM with ECC in main memory (2 banks of soldered components)
- 2 GByte Flash ROM array (higher capacity array available on request)
- Two Gigabit Ethernet SerDes ports at AMC connector ports 0 & 1 (AMC.2 Type E2)
- Two SATA 1.0 ports at AMC connector ports 2 & 3 (AMC.3)
- PCI Express x8 data port at AMC connector ports 4 – 11 (AMC.1 Type 8)
- PCI Express interface on ALSP11 may be configured as either the root complex or as an end point
- ASLE11 supports root complex (Master) functionality only
- MMC provides IPMI ver.2.0 functionality per AMC.0, R2.0
- Fabric clock (FCLKA) interface supports either clock receive or clock transmit configurations
- USB 2.0 ports available on front panel and at AMC connector port 18
- COM serial port available at either front panel or at AMC connector port 20
- Watchdog & temperature sensor provided
- Linux® OS support
- Operates under NEBS Level 3 Environment conditions at the host system
- Optional –40° C to +55° C operating temperature range

The Telum™ ASLP11 and ASLE11 are single width, full or mid size AMC processor boards with an integrated Intel® Core™ 2 Duo processor plus 3100 integrated controller. The assembly is fully compliant to the PICMG AMC.0, R2.0, AMC.1, R2.0 (Type 8 PCI Express), AMC.2 (Type E2 Gigabit Ethernet) and AMC.3 (Serial ATA) specifications.

The Telum™ ASLP11/ASLE11 hosts one Core 2 Duo processor with a 1.5 GHz or higher core clock. The assembly is ready to accept higher performance Core 2 Duo processor variants when introduced by Intel.

Two banks of DDR2-400 SDRAM components are provided on the ASLP11/ASLE11 for a maximum of 4 GBytes of main memory with ECC. These soldered memory banks offer higher levels of mechanical shock and vibration immunity as well as a higher MTBF metric for the overall assembly. The module also hosts a 2 GByte NAND Flash array through an internal USB port and may be provisioned with higher Flash ROM capacities when required for specific applications.

The PCI-Express port on the ASLP11 may be configured as either the root controller (Master) or as an end node (Slave) on a PCI-Express subnet. If the ASLP11 is configured as an end node, a non-transparent bridge function is enabled at the PCI-Express interface to protect the local processor's resources from the remote root controller. The PCI-Express fabric clock FCLKA interface provides a common reference clock in order to support a spread spectrum clock (SSC) signal, and may be configured as either an input or an output on the ASLP11 to support the PCI-Express port configuration.

The ASLE11 supports root complex (Master) functionality only when the PCI Express bridge is de-populated.

The Module Management Controller (MMC) on the ASLP11/ASLE11 supports the Intelligent Platform Management Interface (IPMI) v2.0 architecture as defined in the AMC.0 specification and is responsible for power sequencing, hot swap and overall module management. The MMC allows independent platform management between all AMC modules, carrier, power supplies, fans and other accessories in a system. This feature may be used for autonomous monitoring, logging and recovery control functions.

The AMC connector contains the following interfaces:

Ports 0 & 1: two Gigabit Ethernet ports
Ports 2 & 3: two S-ATA 1.0 ports
Ports 4 – 11: monolithic x8 PCI-Express port
Port 18 : USB 2.0 port (optional)
Port 20 : COM port (optional)

Supported operating system for the ASLP11/ ASLE11 is Linux.

The module is designed to operate under the NEBS Level 3 environment specifications at the host system. It is also available in an extended operating temperature version (-40° C to +55° C).

The Telum™ ASLP11 and ASLE11 are designed for use in a broad range of applications such as wireless base stations, voice over packet, enterprise devices, test and measurement systems, and server blade applications. This, combined with a custom specific assembly service, provides optimized price and performance for a vast number of telecom applications.

Please contact GE Intelligent Platforms for a current list of Core 2 Duo processors and OS versions supported on the ASLP11/ASLE11.

Telum™ ASLP11 & ASLE11 High Performance Processor AMC Modules

Specifications

Processor – µFCBGA, Low Power Design
- Scalable embedded processing power
- Intel® Core™ 2 Duo processor: L7400 (1.5 GHz core clock / 667 MHz FSB)
- Cache: Level 1-32 KB / Level 2 4096 KB, full speed
- High efficiency on-board switching regulator (DC/DC)
- Contact GE Intelligent Platforms for current Core 2 Duo versions

Integrated Controller – Intel® 3100
- 667 MHz system bus to processor
- DDR2-400 / DDR2-533 memory controller with ECC
- Two PCI-Express root controllers
- S-ATA port controller with HW RAID support
- UART port controller
- USB 2.0 port controller
- GPIO interfaces
- PCI Local Bus controller
- SMBus and LPC port controllers
- Internal processor peripherals including DMA engines, timers, and interrupt controllers

PCI Express on ASLP11
- One PCI Express x8 link with bridge to AMC connector ports 4 – 11 (AMC.1 Type 8)
- Standard configuration: acts as root complex (Master) or end point (Slave) for external PCI Express devices (non-transparent bridging)

PCI Express on ASLE11
- One PCI Express x8 link direct connected to AMC connector ports 4 – 11 (AMC.1 Type 8)
- Acts as root complex (Master) for external PCI Express devices only (transparent bridging)

Main Memory Array
- DDR2-400 SDRAM array: 2 banks soldered memory components
- 72-bit wide bus with error correction (ECC)
- Configurable capacity: 512 MByte to 4 GByte

Flash ROM Memory Module
- Standard configuration: 2 GByte NAND Flash ROM module
- Accessed by core processor through internal USB 2.0 port
- Other Flash ROM capacities available on request

Dual Gigabit Ethernet – Intel® 82571
- Highly integrated Dual Channel Ethernet MAC / PHY Controller
- Serdes type 1000Base-BX connection on AMC connector ports 0 & 1 (AMC.2 Type E2)

S-ATA Ports
- Ultra SATA/150 sync. DMA mode up to 150 Mbytes/sec
- SATA interfaces on AMC connector ports 2 & 3 (AMC.3)

Keyboard/Mouse
- Support via USB port

Real-time clock, CMOS RAM
- RTC 146818 compatible, no battery backup

USB 2.0 Ports
- One external USB 2.0 connector at front panel
- Optional external interface at AMC connector port 18
- Internal USB interface to on-board Flash ROM array

EEPROM
- 512 kbit serial EEPROMs for non-volatile user data

Watchdog Timer
- Integrated in 3100 controller
- Two stage watchdog with independent count values
- First stage drives NMI or SMI, second stage drives reset
- Configurable granularity from 1µs to 10 minutes

COM Serial Port
- RS-232 TxD/RxD/RTS/CTS interface wired to mini USB type connector at front panel
- Optional redirect of RS-232 signals to AMC connector port 20

General Purpose Timers
- Contained in 3100 integrated controller
- Includes three timers comparators
- One-shot and periodic interrupts supported

Reference Fabric Clock FCLKA
- Common reference clock for PCI Express port
- Supports spread spectrum clock (SSC) operation as defined in the PCI Express specification
- Standard configuration: ASLP11 receives from external master
- Optional configuration: ASLP11 generates its own reference clock and drives external FCLKA bus

On-board Temperature Sensors
- CPU die and board temperature software readable from –65° C to +127° C via I2C or via IPMI
- Individual CPU internal digital die temperature sensor for each core on Core 2 Duo processor

LEDs
- Front panel LED system control
- Hot swap (blue), LED 1 (red, failure, out of service status; red/amber/green during boot for BIOS status display) and LED 2 (green, healthy) available for applications under IPMI control
- LED positions / colors per AMC.0 R2.0 Specification

MMC
- Module Management Controller as defined in AMC.0 R2.0
- Supports the Intelligent Platform Management Interface (IPMI) v2.0 architecture
- Implements full Hot Swap functionality to permit module to be inserted or removed in a powered system

Front and Rear I/O (Interconnect)

Port	Front	AMC connector
FCLKA	—	FCLKA
Eth 1	—	Port 0
Eth 2	—	Port 1
USB0	•	—
USB1	—	Port 18 (optional)
PCIe x8	—	Port 4 to 11
LEDs	•	—
SATA 1	—	Port 2
SATA 2	—	Port 3
COM	•	Port 20 (optional)

BIOS Features
- New AMI BIOS Core 8, in-system programmable Flash ROM
- CPU, memory and SATA auto-detection/ selection
- Integrated Ethernet BIOS ROM
- USB Mass Storage support and booting capability (floppy, HDD, CDROM, and on-board Flash ROM array)
- Password protection, BIOS post, system BIOS shadowing
- Operation without disk, keyboard and video

Software
- Linux (2.6.2x tree)
- Contact GE Intelligent Platforms for current release levels of standard Linux

Module Power Requirements
- +12V Module power
- +3.3V Advanced Management power, 0.1A max.

Power Consumption
- L7400 Core 2 Duo plus 2 GB RAM: 45W typical
- See User's Manual or contact GE Intelligent Platforms for additional power consumption information

Mechanical – PICMG AMC.0, R2.0
- Single module PCB (180.6 x 73.5 mm without front bezel)
- Mid-size module (19mm front panel) or full-size module (29mm front panel) assembly options
- Passive Heatsink provided over processor and other high thermal load components (no fans on the module)

Operating Systems
- Linux
- For detailed information and additional options, contact GE Intelligent Platforms

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Environment Specifications

Temperature

- Operating Range
  - Standard: 0° C to +55° C
  - Extended: -40° C to +55° C
- Storage Range
  - Standard: -40° C to +75° C
  - Extended: -40° C to +75° C

Note: Consult the User's Manual or GE Intelligent Platforms for additional detailed information on the operating temperature behavior of the modules. The ASLP11/ASLE11 operating temperature range is influenced by processor type and speed, operating altitude, and the type of cooling used in the host system.

Relative Humidity

- Operating: 5 – 95% @ 40° C, non-condensing
- Storage: 5 – 95% @ 40° C, non-condensing

Altitude

- Operating: Sea level to 15,000 ft. (4.5 km)
- Storage: Sea level to 40,000 ft. (12 km)

Mechanical Shock - Operating

- 12g / 6 ms, 3 axis, up & down, 5 hits / direction

Random Vibration - Operating

- 2 g rms @ 5–100 Hz, 1 hour each axis

MTBF / FIT Prediction

- Prediction calculations are available in accordance with either SR-332 or MILHDBK-217 models. Please contact GE Intelligence Platforms for further information.

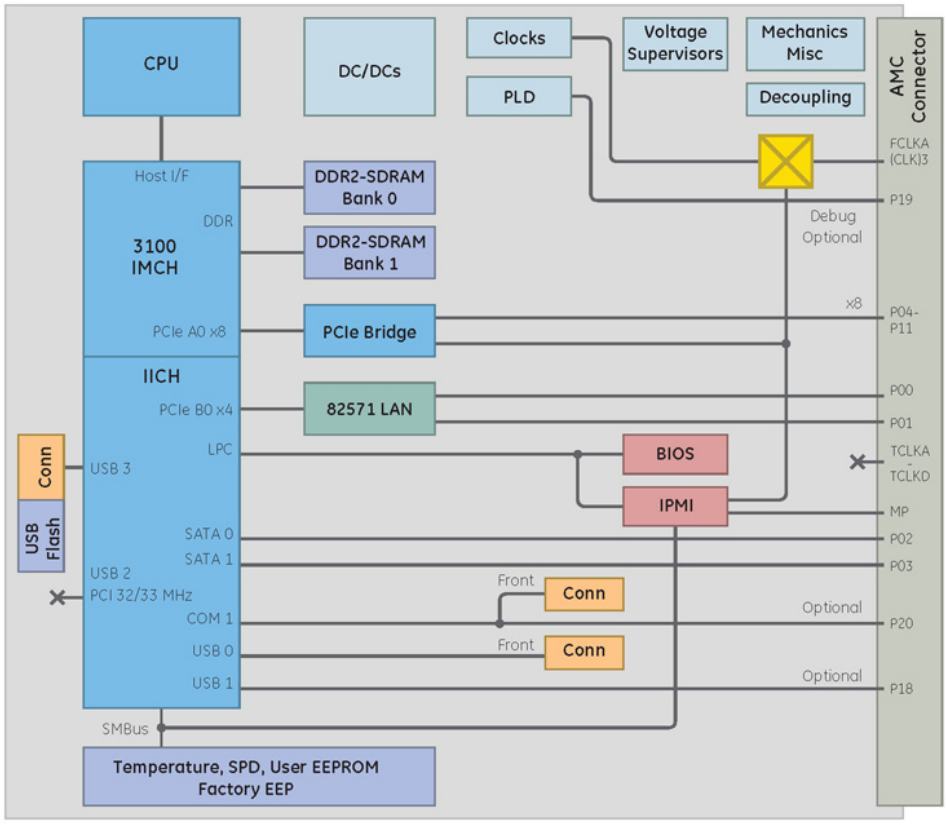
Regulatory / Statutory Certifications

- CE Mark certificate obtained
- Designed to meet:
  - FCC 47 CFR Part 15 Class A (USA)
  - EN 55022:1998/A1:2000/A2:2003 Class A ITE (EU)
  - ICES-003 Issue 3 Class A (Canada)
  - VCCI Class A ITE
  - AS/NZ CISPR 22:2002 Class A (Aus. New Zealand)
  - EN 55024:1998/A1:2001/A2:2003 (EU)
  - UL60950-1 (USA)
  - CSA 22.1 No. 60950-1-03 (Canada)
  - EN 60950-1 (EU)
- Designed to operate in a host system subjected to NEBS Level 3 environment specifications.

Applicable PICMG AMC Specifications

- AMC.0, R2.0 Base Specification
- AMC.1, R2.0 PCI Express on AMC Specification
- AMC.2, R1.0 Ethernet AMC Specification
- AMC.3, R1.0 AMC Storage Specification

ASLP11 Block Diagram



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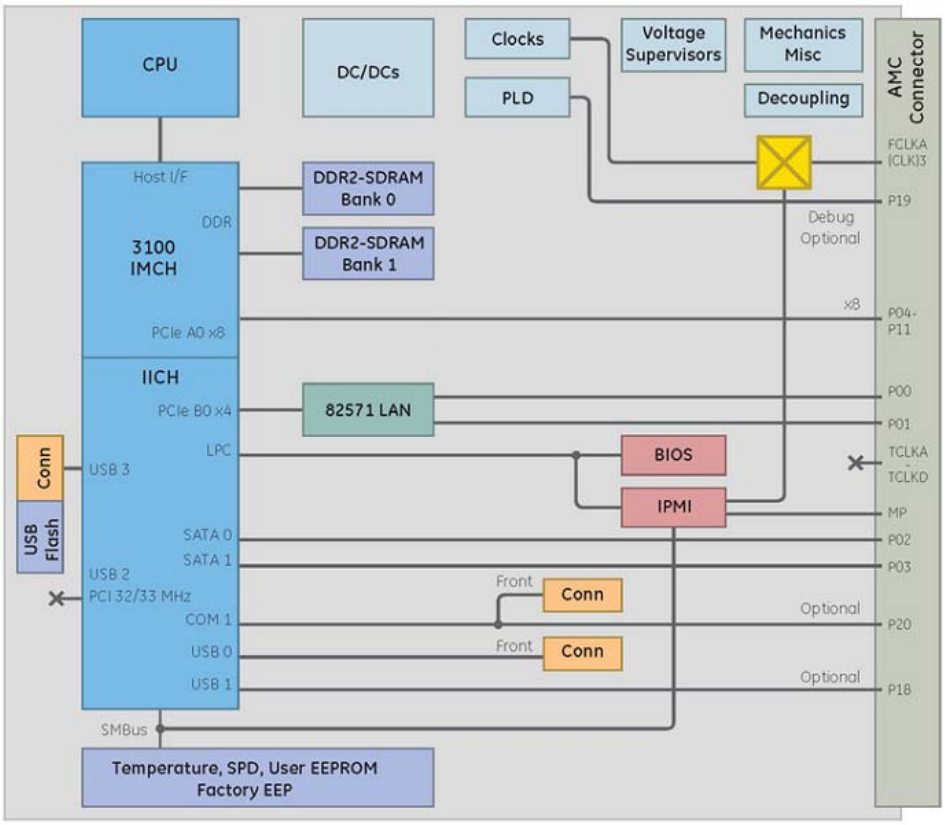
ASLE11 Block Diagram



Ordering Information

ASLP11RFCI01	Processor AMC, single-width, full-size, Intel LV Core 2 Duo L7400 1.5GHz, 2GB ECC DDR2, 2GB Flash, 2x rear GigE, 2x rear SATA, IPMI, front panel USB and serial port, supports root complex (Master) and end point (Slave)
ASLP11RFCIM1	As above but with mid-size front plate
ASLE11RFCI01	Processor AMC, single-width, full-size, Intel LV Core 2 Duo L7400 1.5GHz, 2GB ECC DDR2, 2GB Flash, 2x rear GigE, 2x rear SATA, IPMI, front panel USB and serial port, supports root complex (Master)
ASLE11RFCIM1	As above but with mid-size front plate
YLU015MB	Cable USB to USB, Type B, length 150 mm
YLU050MD	Cable USB to Serial, Type B, length 500 mm
ASLP11-SDK-LNX	ASLP11 and ASLE11 Software Development Kit for Linux

GE Intelligent Platforms Contact Information

Americas: 1 800 322 3616 or 1 256 880 0444
Global regional phone numbers are listed by location on our web site at www.ge-ip.com/contact

www.ge-ip.com