CL11

High Performance – 3U Compact PCI® Single Slot Dual Core Processor Board

Features

- Intel® Core 2 Duo® processor, 1.5 GHz
- Intel® Core Duo® processor 1.2, 1.66 and 2.16 GHz
- Up to 4 MByte L2 cache
- Ultra compact all-in-one PC
- Single slot
- System or non-system (peripheral mode)
- System slot for 32-bit CompactPCI backplane
- Up to 2 GByte DDR2 SDRAM
- Optional Flash drive
- VGA interface
- Dual Gigabit Ethernet
- Enhanced IDE UDMA-100
- 2x Serial ATA
- 1x serial I/O with FIFOs, RS-232 interface
- 6x USB 2.0
- Watchdog, temperature sensor
- 5 V / 3.3 V supply
- Optional -40° C to +85° C
- Custom specific versions
- RoHS compliant

CL11 is a high-performance, single slot, 3U CompactPCI CPU board using the Intel Core Duo or the Intel Core 2 Duo Processor. It incorporates sophisticated power management technology, eliminating the need for an onboard fan. The CL11 can be ordered as a system or non-system slot single board computer.

CompactFlash is available as an option.

The CL11 supports two Gigabit Ethernets, up to 2 GByte of DDR2 SDRAM and VGA. At the core of the CL11 design is a high-bandwidth bus between the processor, and the chipset is running with a FSB of up to 667 MHz. The chipset-to-memory bus supports 667 MHz (PC2-5300) DDR2 SDRAMs. In addition there are six USB 2.0 ports, one serial channel, and two serial ATA channels. Interfaces are available as front- and/or rear-I/O. The CL11 standard temperature range is from 0° C to +50° C. The optional extended

temperature range starts at -40° C. The upper temperature depends on the selected processor type and available air flow in the system. For example, the 1.06GHz ULV Celeron M 423 processor is able to achieve a maximum temperature of 85° C with 3m/s airflow. Custom specific versions are available on request.

The CL11 is a powerful processor platform for a wide range of applications and markets such as multimedia, automation, transportation, as well as imaging, medical, robotics, and many others. The CL11 is very suited to low-power embedded computer applications in a small form factor where optimal performance and functionality is required.

The CL11 is RoHS compliant.

For additional functionality, refer to the CL11's sister product, CC11. The CC11 is a 3U CompactPCI dual slot dual core processor board.

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Specifications

Processor - µFCBGA, Low Power Design
- Scaleable processing power with flexible processor design
- Intel Core Duo processor U2500: 1.20 GHz
- Intel Core Duo processor L2400: 1.66 GHz
- Intel Core Duo processor T7400: 2.16 GHz
- Intel Core 2 Duo processor L7400: 1.5 GHz
- High efficiency on-board switching regulator (DC/DC)
- Fanless cooling with heat sink
- * Contact factory for latest CPU versions

Cache	level 1	level 2e
Core Duo	32 KByte	2 MByte, full speed
Core 2 Duo	32 KByte	4 MByte, full speed

Chipset – Intel 945GM with Intel ICH7R
- 533/667 MHz system bus to processor
- One PCI Express x4 interface
- Two PCI Express x1 interfaces
- Data throughput between 945GM and ICH7R is theoretically 2 GByte/s (1 GByte/s each direction)

Memory – DDR2 667
- Single-/dual-channel DDR2 SDRAM
- High-speed 667 MHz (PC2 5300) DDR2 SDRAM
- 64-bits wide/128-bits wide
- 512 MByte to 2 GByte with soldered chips

CompactPCI
- PICMG 2.0 R3.0 compliant CPCI 32 bit/66 MHz local bus standard
- Backplane with rear I/O
- System or non-system (peripheral) PCI Bridge Pericom PI7C9X110 for up to 7 slots
- J1+2, 2 mm pin and socket connectors (IEC-1076-4-101)

Gigabit – Two Realtek RTL8111B
- Highly integrated single Gigabit Ethernet controller with PCI Express x1 interface
- 64 KB transmit and receive FIFO
- 10/100/1000BaseT auto-negotiation
- Port 1 and Port 2 for front or rear I/O. Solder option.

Flash Drive
- EIDE interface on header connector
- Extension board with one CompactFlash connector

VGA and LCD - Chipset Integrated
- 2D & 3D graphics engine
- DirectX 9.1 support
- Up to 64 MB of dynamic video memory allocation
- Integrated 360 MHz 24-bit RAMDAC for analog VGA monitors up to 1600 x 1200, 75 Hz
- Display image rotation
- Graphics power management
- VGA at front or rear I/O

EIDE
- Ultra ATA/100 sync. DMA mode up to 90 MByte/s
- PIO mode 4 and bus master IDE up to 16 MByte/s
- Onboard devices supported via local header

SATA
- Two serial ATA at rear I/O
- DMA mode up to 150 MByte/s

Serial I/O - RS232
- Integrated in SMSC SCH3112 Super I/O
- One asynchronous 16550 compatible full duplex serial channel
- High-speed transfer up to 115.2 Kbaud with 16 byte FIFOs
- COM1 available at rear I/O

General Purpose Input/Outputs
- Integrated in SMSC SCH3112 Super I/O
- 8 bits programmable general purpose inputs/outputs

USB 2.0
- Six USB 2.0 connectors. Two on front, three on rear I/O and one onboard

Keyboard
- Via USB (supports legacy keyboard/mouse SW)

Mouse
- Via USB (supports legacy keyboard/mouse SW)

Real-time Clock
- Integrated in chipset
- RTC 146818 compatible, on-board Li-battery

CMOS RAM
- 114 bytes non-volatile CMOS RAM for BIOS data

EEPROM
- 512 Kbit (64 KByte) serial EEPROM for non-volatile user data

Floppy
- Via USB port

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

Timer
- Integrated in chipset based on 82C59
- Includes three timer comparators
- One-shot and periodic interrupts supported

Temperature Sensor
- CPU die and heat sink temperature software readable from –65° C to +127° C

LED
- Two LEDs at front panel

BIOS Features
- New AMI BIOS Core 8, in-system programmable Flash ROM
- Automatic system configuration
- Integrated VGA, SATA RAID and Ethernet PXE ROM
- USB mass storage support
- Password protection
- Headless support
- Remote console through serial port

Software
- The following software is supported to the extent listed below.

OS	On Request	Available
WIN XP	-	√
QNX 6	√	-
VxWorks	-	√
Lynx OS	√	-
Linux	√-	√

Front and Onboard I/O with Standard Front Panel

Function	Single Board Computer CC11		
	Front I/O	Onboard I/O	Rear I/O
Gb Ethernet 0	RJ-45 [*2]		Yes [*2]
Gb Ethernet 1	RJ-45 [*2]		Yes [*2]
USB 0	USB		
USB 1	USB		
USB 2 to 4			Yes
USB 5		Misc. Header 2	
VGA	D-15		Yes
EIDE		Misc. Header 1 [*1]	

SATA 1 / 2			Yes
COM 1			Yes
GPIO (8 pins)			Yes
Power button	Button		Reset
	Yes		
Speaker			Yes
LED	Yes		
Keyboard, Mouse, Floppy	Via USB		Via USB

[*1] CompactFlash adapter with special extension card possible
[*2] Front- or Rear-IO as a solder option

Power Requirements
- +5 V, +3.3 V Required

Power Consumption - typical operating current (est)
- TBD

Mechanical – PICMG 2.0
- 3U, 1 slot wide (100 x 160 x 20.32 mm) with front panel

Temperature
- Note: For detailed information about the operating temperature behavior of the board it is absolutely necessary to consult the manual. The highest achievable operating temperature depends on processor type, speed, ambient conditions (air flow) and front plate width.
- All values under typical conditions.

	Operating	Storage
Standard	0° C to +50° C*	–40° C to +85° C
Extended	–40° C to +85° C**	–40° C to +85° C

* Consult the manual for the required airflow and other basic conditions.

** The maximum achievable temperature is a function of the selected CPU version, air flow, altitude, etc. Not every processor is able to achieve this maximum temperature. Please consult the manual for detailed information.

Humidity
- Operating: 5% – 95% @ 40° C
- Storage: 5% – 95% @ 40° C

Altitude
- Operating: 15.000 ft. (4.5 km)
- Storage: 40.000 ft. (12 km)

Shock (3 axis, up & down, 5 hits/direction)
- Styles 1, 3:   12 g /6 ms

Vibration (60 minutes each axis)
- Styles 1, 3:   2 g rms @ 5 to 100 Hz

VITA 47
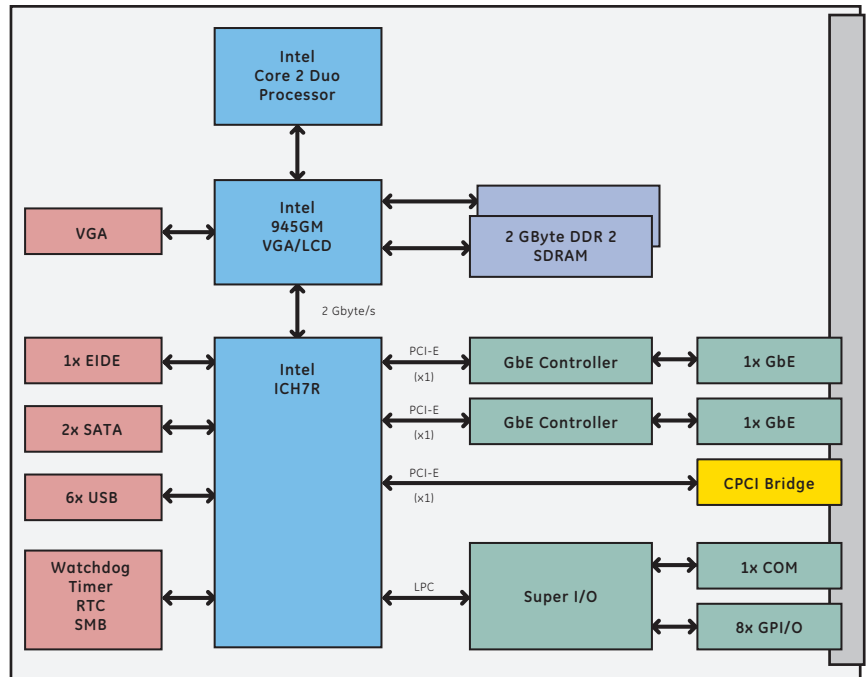- Designed to meet VITA47 class EAC1 and EAC3

MTBF
- Calculations are available in accordance with MIL-HDBK-217. Please contact GE Intelligent Platforms.

Safety
- Designed to meet standard UL1590, CE Class A, FCC-A

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Block Diagram

Ordering Information

Hardware Accessories

CTM18A01	I/O transition module for 3U backplane
SCC484TB05CL11R	Starter cage 19" 4U, 5 slots, with fans, power supply, DVD, hard disk, transition module, 0° C to +40° C

Operating Systems

Extensive operating systems support is available, (see page 3 of this document).
Chassis with power supplies, backplanes and drives on request.
For detailed information and further options, contact GE Intelligent Platforms.

Software

CL11-SDK-Linux	System Development Kit for CC11/CL11 Linux
CC11-BSP-VXW	VxWorks 6.6 Board Support Package for CC11/CL11
CL11-SDK-XP	System development Kit for CC11/CL11 for Windows XP and XP Embedded

About GE Intelligent Platforms

GE Intelligent Platforms, a General Electric Company (NYSE: GE), is an experienced high-performance technology company and a global provider of hardware, software, services, and expertise in automation and embedded computing. We offer a unique foundation of agile, advanced and ultra-reliable technology that provides customers a sustainable advantage in the industries they serve, including energy, water, consumer packaged goods, government and defense, and telecommunications. GE Intelligent Platforms is a worldwide company headquartered in Charlottesville, VA and is part of GE Home and Business Solutions. For more information, visit www.ge-ip.com.

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05.11 GFA-997A