CP6012

6U CompactPCI Processor Board based on the Intel® Core™ Duo Processor and the Intel® Core™ 2 Duo Processor with the Intel® E7520 Chipset

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User Guide

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Imprint

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Caution, Electric Shock!

This symbol and title warn of hazards due to electrical shocks (> 60V) when touching products or parts of them. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material.

Please refer also to the section “High Voltage Safety Instructions” on the following page.



Warning, ESD Sensitive Device!

This symbol and title inform that electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.

Please read also the section “Special Handling and Unpacking Instructions” on the following page.



Warning!

This symbol and title emphasize points which, if not fully understood and taken into consideration by the reader, may endanger your health and/or result in damage to your material.



Note ...

This symbol and title emphasize aspects the reader should read through carefully for his or her own advantage.

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High Voltage Safety Instructions



Warning!

All operations on this device must be carried out by sufficiently skilled personnel only.



Caution, Electric Shock!

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Special Handling and Unpacking Instructions



ESD Sensitive Device!

Electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.

Do not handle this product out of its protective enclosure while it is not used for operational purposes unless it is otherwise protected.

Whenever possible, unpack or pack this product only at EOS/ESD safe work stations. Where a safe work station is not guaranteed, it is important for the user to be electrically discharged before touching the product with his/her hands or tools. This is most easily done by touching a metal part of your system housing.

It is particularly important to observe standard anti-static precautions when changing piggybacks, ROM devices, jumper settings etc. If the product contains batteries for RTC or memory backup, ensure that the board is not placed on conductive surfaces, including anti-static plastics or sponges. They can cause short circuits and damage the batteries or conductive circuits on the board.

General Instructions on Usage

In order to maintain Kontron's product warranty, this product must not be altered or modified in any way. Changes or modifications to the device, which are not explicitly approved by Kontron and described in this manual or received from Kontron's Technical Support as a special handling instruction, will void your warranty.

This device should only be installed in or connected to systems that fulfill all necessary technical and specific environmental requirements. This applies also to the operational temperature range of the specific board version, which must not be exceeded. If batteries are present, their temperature restrictions must be taken into account.

In performing all necessary installation and application operations, please follow only the instructions supplied by the present manual.

Keep all the original packaging material for future storage or warranty shipments. If it is necessary to store or ship the board, please re-pack it as nearly as possible in the manner in which it was delivered.

Special care is necessary when handling or unpacking the product. Please consult the special handling and unpacking instruction on the previous page of this manual.

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Kontron grants the original purchaser of Kontron's products a ***TWO YEAR LIMITED HARDWARE WARRANTY*** as described in the following. However, no other warranties that may be granted or implied by anyone on behalf of Kontron are valid unless the consumer has the express written consent of Kontron.

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If the customer's eligibility for warranty has not been voided, in the event of any claim, he may return the product at the earliest possible convenience to the original place of purchase, together with a copy of the original document of purchase, a full description of the application the product is used on and a description of the defect. Pack the product in such a way as to ensure safe transportation (see our safety instructions).

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Chapter 1

Introduction

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1. Introduction

1.1 Board Overview

The CP6012 is a highly integrated 6U CompactPCI system controller board based on the Intel® Core™ Duo and the Intel® Core™2 Duo microprocessors combined with the high-performance Intel® E7520 and Intel® 6300ESB server-class chipsets.

The board is capable of supporting the Intel® Core™ Duo and the Intel® Core™2 Duo processor versions in 65 nm technology with 64 kB L1 and up to 4 MB L2 cache in a 479 µFCBGA package with frequencies ranging from 1.5 GHz up to 2.16 GHz providing up to 667 MHz front side bus speed.

The Intel® Core™ Duo and the Intel® Core™2 Duo are low-power dual-core processors supporting Intel's Virtualization Technology (VT). The Intel® Core™ Duo consists of two cores and up to 2 MB L2 cache shared by both cores. The Intel® Core™2 Duo consists of two cores, up to 4 MB L2 cache shared by both cores, Intel® Extended Memory 64 Technology (Intel® EM64T), and enhanced address range for up to 64 GB memory. The Intel® Core™ Duo and the Intel® Core™ 2 Duo processors deliver optimized power-efficient computing and outstanding dual-core performance with low power consumption.

The board includes two SODIMM sockets to provide up to 4 GB dual-channel, registered, second-generation Double Data Rate (DDR2) memory with Error Checking and Correcting (ECC) running at 400 MHz (PC3200). Two Intel® 82571EB Dual Gigabit Ethernet controllers, each utilizing a x4 lane PCI Express interconnection to the E7520 chipset, ensure maximum data throughput between processor and memory.

The CP6012 offers more features and expandability than other CompactPCI boards in its class. The board comes with four Gigabit Ethernet ports, up to four USB 2.0 ports, two Ultra ATA/100 interfaces with one of them connected to a CompactFlash type II socket, two onboard Serial ATA interfaces, one PMC interface with 64-bit/66 MHz on the PCI bus, one XMC interface utilizing a x8 lane PCI Express interconnection, rear I/O with several interfaces, and an ATI ES1000 2D Graphics accelerator with 64 MB of DDR2 memory for enhanced graphics performance with a VGA CRT-display interface. Several onboard connectors provide additional expansion capability.

The board supports a configurable 64-bit/66 MHz, hot swap CompactPCI interface. In the System Master slot the interface is enabled, and if installed in a peripheral slot, the CP6012 is isolated from the CompactPCI bus.

A further feature of the CP6012 is its support of the PICMG CompactPCI Packet Switching Backplane Specification 2.16. When installed in a backplane which supports packet switching, the CP6012 can communicate via two Gigabit Ethernet interfaces with other peripherals.

Designed for stability, the board fits into all applications situated in industrial environments, including I/O intensive applications where only one slot is available for the CPU, making it a perfect core technology for long-life applications. Components with high temperature tolerance have been selected from embedded technology programs, and therefore offer long-term availability.

The board is offered with Linux®, Microsoft® Windows® XP, Windows® XP Embedded and Microsoft® Windows® Server 2003, and VxWorks® operating systems. Please contact Kontron for further information concerning the operation of the CP6012 with other operating systems.

1.2 Board-Specific Information

The CP6012 is a CompactPCI single-board computer based on the Intel® Core™ Duo and the Intel® Core™2 Duo processors and specifically designed for use in highly integrated platforms with solid mechanical interfacing for a wide range of industrial environment applications.

Some of the CP6012's outstanding features are:

- Supports all Intel® Core™ Duo and Intel® Core™2 Duo microprocessors with up to 667 MHz FSB
- 479-pin µFCBGA package
- 64 kB L1 and up to 4 MB L2 cache on-die, running at CPU speed
- Intel® E7520 and Intel® 6300ESB chipset
- Up to 4GB registered DDR2 SDRAM registered memory with ECC
- 2D high performance VGA controller, 32-bit/33 MHz PCI
- Analog display support up to 1600 x 1200 pixels at 16-bit and 75 Hz
- 64-bit / 66 MHz CompactPCI interface in accordance with the CompactPCI Spec. Rev 3.0
- PMC interface with rear I/O support and bezel cutout on front panel and PCI functionality, 64-bit/66 MHz PCI, 3.3V only
- XMC interface utilizing a x8 lane PCI Express
- Four Gigabit Ethernet interfaces utilizing a x4 lane PCI Express per Gigabit Ethernet controller
  - Two Gigabit Ethernet interfaces on the front panel
  - Two Gigabit Ethernet interfaces on rear I/O (PICMG 2.16)
- Two EIDE Ultra ATA/100 interfaces
- Two Serial ATA interfaces
- Socket for Serial ATA 2.5" hard disk for boards equipped with a narrow heat sink
- Onboard CompactFlash type II socket (True IDE)
- Up to four USB ports
  - Two USB 2.0 ports on the front panel
  - Two USB 2.0 ports on rear I/O
- AMI BIOS
- Two 1 MB onboard FWH for redundant BIOS
- Floppy disk interface on rear I/O
- Watchdog Timer
- Real-time clock
- Two COM ports (RS-232):
  - One COM port either on the front panel or on the rear I/O
  - One COM port on the rear I/O
- I/O extension connector (LPC)
- 4HP, 6U CompactPCI
- Jumperless board configuration
- Passive heat sink solution for forced-airflow cooling
- Hot swap capability: as system controller or as peripheral device
- Supports PICMG Packet Switching Backplane Specification 2.16
- Several rear I/O configurations
- Rear I/O on J3 and J5; optionally on J4
- IPMI compliant Baseboard Management Controller

1.3 System Expansion Capabilities

1.3.1 PMC Modules

The CP6012 has one PCI, 64-bit/66 MHz, 3.3V, rear I/O capable, PMC mezzanine interface. This interface supports a wide range of available PMC modules with PCI interface including all of Kontron's PMC modules and provides an easy and flexible way to configure the CP6012 for various application requirements.

For information on the PMC interface, refer to chapter 2.3.13, "PMC Interface".

1.3.2 XMC Modules

The CP6012 has one XMC mezzanine interface for support of x1, x2, x4 and x8 PCI Express XMC modules providing an easy and flexible way to configure the CP6012 for various application requirements.

For information on the XMC interface, refer to chapter 2.3.14, "XMC Interface".

1.3.3 CTM80-3 Rear I/O Module

The CTM80-3 rear I/O module has been designed for use with the CP6012 6U CompactPCI board from Kontron. This module provides comprehensive rear I/O functionality and may also be configured for use in other applications.

For further information concerning the CTM80-3 module, please refer to Appendix A.

1.3.4 CP6012-EXT-SATA Module

The CP6012-EXT-SATA module has been designed for use with the CP6012 6U CompactPCI board from Kontron and enables the user to connect an onboard 2.5" Serial ATA hard disk to the CP6012.

For further information concerning the CP6012-EXT-SATA module, please refer to Appendix B.

1.4 System Relevant Information

The following system relevant information is general in nature but should still be considered when developing applications using the CP6012.

Table 1-1: System Relevant Information

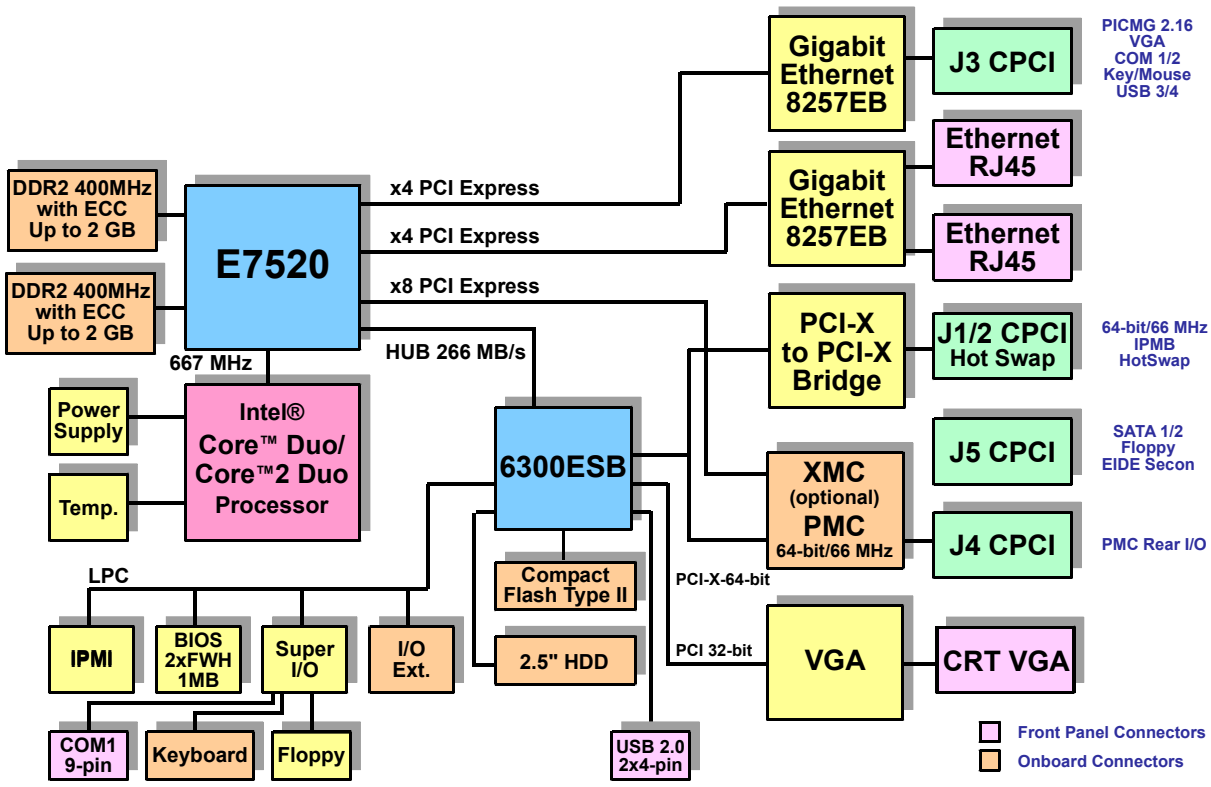
SUBJECT	INFORMATION
System Slot / System Master Functionality	The CP6012 is designed for use as a System Master board whereby it can support up to 7 peripheral boards with up to 64-bit / 66 MHz. It may, however, be operated in a peripheral slot in which case it does not support the CompactPCI bus interface.
Peripheral Slot Functionality	When installed in a peripheral slot, the CP6012 is electrically isolated from the CompactPCI bus. It receives power from the backplane and supports rear I/O and, if the system supports it, packet switching (in this case up to two channels of Gigabit Ethernet).
Hot Swap Compatibility	When operated as a System Master, the CP6012 supports individual clocks for each slot and ENUM signal handling is in compliance with the PICMG 2.1 Hot Swap Specification. When operated in a peripheral slot the CP6012 supports basic hot swap.
Operating Systems	The CP6012 can be operated under the following operating systems: • Microsoft® Windows® XP with Service Pack 1 or higher • Microsoft® Windows® XP Embedded • Microsoft® Windows® Server 2003 • Linux® • VxWorks® Please contact Kontron for further information concerning the operation of the CP6012 with other operating systems.

1.5 Board Diagrams

The following diagrams provide additional information concerning board functionality and component layout.

1.5.1 Functional Block Diagram

Figure 1-1: CP6012 Functional Block Diagram



1.5.2 Front Panel

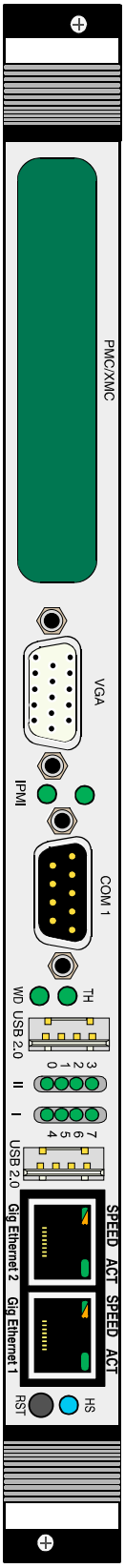


Figure 1-2: CP6012 Front Panel

Legend:

IPMI LEDs

IPMI (green): Indicate the software status of the IPMI controller

General Purpose LEDs

WD (green): Watchdog Status

TH (green): Overtemperature Status

HS (blue): Hot Swap Control

Front-I: General Purpose/POST code or board-specific

Front-II: General Purpose/POST code or board-specific

Integral Ethernet LEDs

ACT (green): Ethernet Link/Activity

SPEED (green/orange): Ethernet Speed

SPEED ON (orange): 1000 Mbit

SPEED ON (green): 100 Mbit

SPEED OFF: 10 Mbit



Note ...

If the TH LED and the WD LED are flashing during boot-up, a failure is indicated before the BIOS has started.

For further information, contact Kontron's Technical Support.

1.5.3 Board Layout

Figure 1-3: CP6012 Board Layout (Front View)

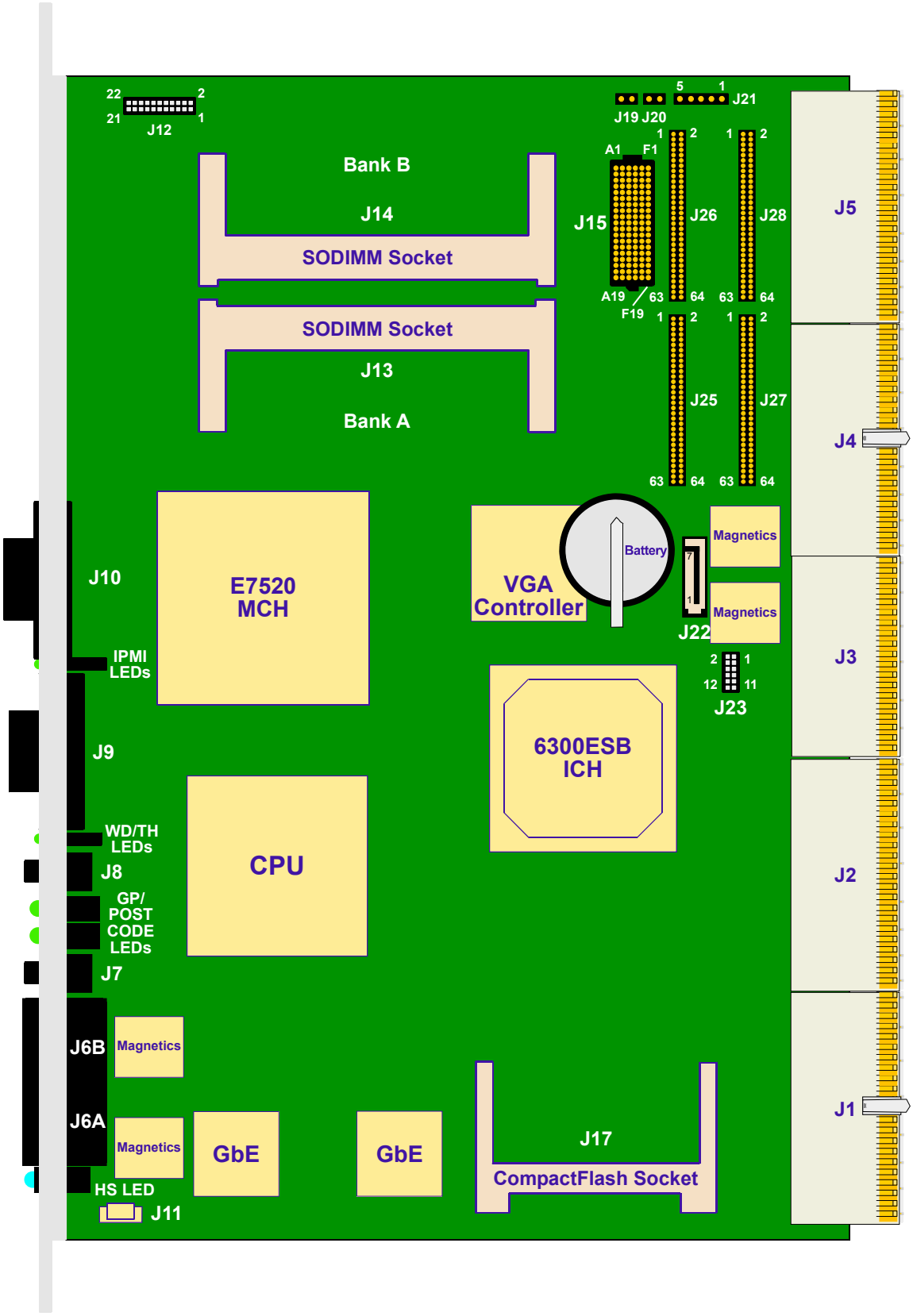
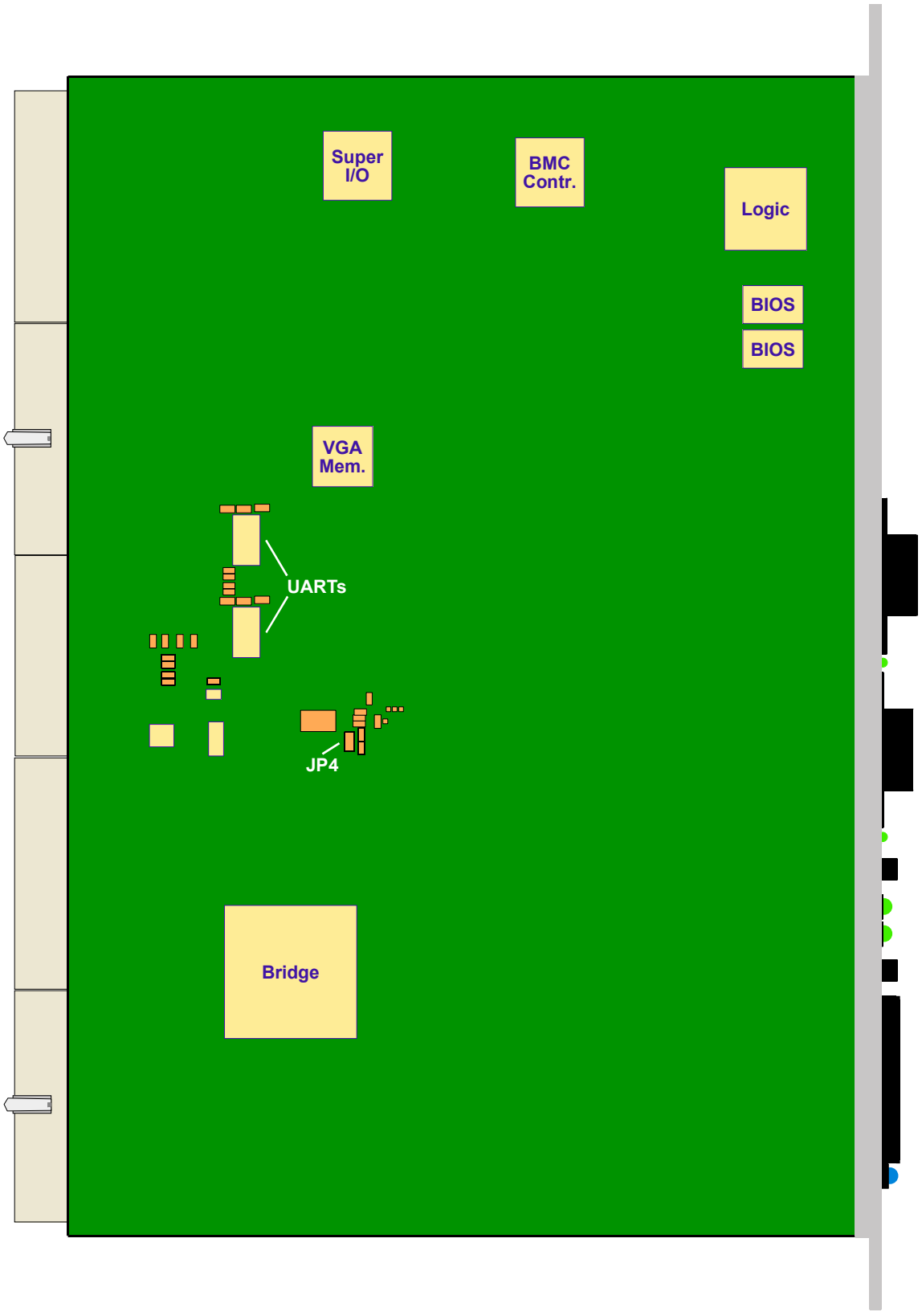


Figure 1-4: CP6012 Board Layout (Reverse View)



1.6 Technical Specification

Table 1-2: CP6012 Main Specifications

CP6012		SPECIFICATIONS
Processor and Memory	CPU	The CP6012 supports the following microprocessors: • Intel® Core™ Duo, T2500 (SV), 2.0 GHz, 667 MHz FSB, 2 MB L2 cache • Intel® Core™ Duo, L2400 (LV), 1.66 GHz, 667 MHz FSB, 2 MB L2 cache • Intel® Core™2 Duo, T7400 (SV), 2.16 GHz, 667 MHz FSB, 4 MB L2 cache • Intel® Core™2 Duo, L7400 (LV), 1.5 GHz, 667 MHz FSB, 4 MB L2 cache All microprocessors are provided in a 479 µFCBGA packaging.

	Memory	Main Memory:
		• Up to 4 GB dual-channel, registered DDR2 memory with Error Checking and Correcting (ECC) running at 400 MHz (PC3200)
		Cache structure:
		• 64 kB L1 on-die full speed processor cache
		  • 32 kB for instruction cache
		  • 32 kB for data cache
		• Up to 4 MB L2 on-die full speed processor cache
		FLASH Memory:
		• Two 1 MB FLASH for redundant BIOS
		Memory Extension:
		• CompactFlash socket type II (true IDE mode)
		Serial EEPROM:
		• 24LC64 (64 kbit)

Table 1-2: CP6012 Main Specifications (Continued)

CP6012		SPECIFICATIONS

Chipset	Intel® E7520	Intel® E7520 Memory Controller Hub:
		• Support for a single Intel® Core™ Duo or Intel® Core™2 Duo microprocessor
		• 64-bit AGTL/AGTL+ based System Bus interface up to 667 MHz
		• System Memory interface with optimized support for dual-channel, registered DDR2 SDRAM memory at 400 MHz with ECC
		• Two x4 PCI Express ports for Gigabit Ethernet interface
		• One x8 PCI Express port for XMC interface
		• RASUM (Reliability, Availability, Serviceability, Usability, and Manageability) features:
		  • Memory error detection and reporting of 1- and 2-bit errors including correction of 1-bit failures
		  • Integrated Memory Scrub Engine, which logs any uncorrectable memory errors
		  • Support for automatic read retry on uncorrectable errors

	Intel® 6300ESB	Intel® 6300ESB I/O Controller Hub: • Dual channel SATA 150 interface • Integrated IDE controller Ultra ATA/100/66/33 • USB host interface with up to four USB 1.1 or USB 2.0 ports • Firmware Hub interface support • Low pin count interface • PCI Rev. 2.2 compliant with support for 64-bit/66 MHz PCI operations • PCI Rev. 2.2 compliant with support for 32-bit/33 MHz PCI operations • Power management logic support • Enhanced DMA controller, interrupt controller, and timer functions • System Management Bus (SMBus) compatible with most I²C™ devices • Hub interface for the E7520 MCH • RTC controller

Table 1-2: CP6012 Main Specifications (Continued)

CP6012		SPECIFICATIONS
Interfaces	CompactPCI	Compliant with CompactPCI Specification PICMG® 2.0 R 3.0 • System Master operation • 64-bit / 66 MHz master interface • 3.3V or 5V compliant When the CP6012 is operated in a peripheral slot, the CompactPCI bus is electrically isolated (passive mode).
	Rear I/O	The following interfaces are routed to the rear I/O connector J3, J4 and J5: • COM1 and COM2 (RS-232 signaling); no buffer on the rear I/O module is necessary • 2 x USB 2.0 • CRT VGA • PS/2 (Mouse / Keyboard) • 2 x Gigabit Ethernet (compliant with PICMG 2.16, R 1.0) • Secondary EIDE (ATA 100) • 2 x SATA 150 • PMC rear I/O • Floppy disk interface
	Hot Swap Compatible	The CP6012 supports System Master hot swap functionality and application dependent hot swap functionality when used in a peripheral slot. When used as a System Master the CP6012 supports individual clocks for each slot and ENUM signal handling is in compliance with the PICMG 2.1 Hot Swap Specification.
	VGA	ATI ES1000 2D Graphics accelerator for enhanced graphics performance. • Supports resolutions of up to 1600 x 1200 by 16-bit color resolution at a 75 Hz refresh rate or up to 1280 x 1024 by 32-bit color resolution at an 75 Hz refresh rate. • The graphics controller provides 64 MB video memory. • One CRT controller capable of supporting two identical simultaneous display paths.
	Gigabit Ethernet	Up to four 10 Base-T/100 Base-TX/1000 Base-T Gigabit Ethernet interfaces based on two Intel® 82571EB Ethernet PCI Express bus controllers. • Two channels on rear I/O • Two RJ45 connectors on the front panel • Automatic mode recognition (Auto-Negotiation) • Automatic cabling configuration recognition (Auto-MDI/X) Cabling requirement: Category 5, UTP, four-pair cabling
	USB	Four USB ports supporting UHCI and EHCI: • Two USB 2.0 connectors on the front panel • Two USB 2.0 on the rear I/O interface

Table 1-2: CP6012 Main Specifications (Continued)

CP6012		SPECIFICATIONS
Interfaces	Serial	Two 16C550-compatible UARTs on the rear I/O interface (RS-232 signaling), one thereof can be routed to the front panel
	PMC	CMC / PMC P1386 / Draft 2.4a compliant mezzanine interface • Jn1, Jn2, Jn3 and Jn4 PCI mezzanine connectors for standard PMC modules • 64-bit / 66 MHz PCI interface • Only 3.3V PCI signalling voltage • Rear I/O supported through the CompactPCI connector J4 • Supported voltages: 3.3 V, 5 V, +12 V, and -12 V
	XMC	XMC interface • Onboard XMC connector J15 • Up to x8 lanes PCI Express • Rear I/O supported through the PMC connector Jn4 (J27) to the CompactPCI connector J4
	Keyboard and Mouse	Keyboard and mouse are supported • USB Support on 4HP • PS/2 (keyboard and mouse) with rear I/O module (e.g. CTM80-3) • Onboard keyboard pinrow connector for debug purposes requiring an adapter in order to be connected to a regular keyboard

	Mass Storage	EIDE Ultra ATA/100/66/33:
		• Two onboard Ultra ATA/100 interfaces, one on CompactFlash and one on Rear I/O
		• Up to three devices (one CompactFlash and up to two hard disks or CD-ROMs
		Onboard 2.5" hard disk:
		• Onboard 2.5" hard disk is supported on J23, a 12-pin Serial ATA interface (only for boards equipped with a narrow heat sink)
		• For this Serial ATA interface, the CP6012-EXT-SATA module is used
		CompactFlash:
		• CompactFlash type II socket (true IDE mode and DMA support)
		• Supports type I and II CompactFlash cards and Microdrive™
		SATA: Integrated Serial ATA Host Controllers
		• Provide independent DMA operation on 2 channels:
		  • One SATA channel switchable to rear I/O via BIOS (for standard HDDs)
		  • One SATA channel routed either to the SATA connector J22 or to rear I/O (for 2.5" HDDs)
		• Data transfer rates up to 150 MB/s
		Floppy Disk (only with rear I/O module):
		• Supports 5.25" or 3.5" floppy drives
		• 1.44 or 2.88 MB, 3.5" floppy disks

	I/O Extension Interface	I/O extension interface: • LPC devices

Table 1-2: CP6012 Main Specifications (Continued)

CP6012		SPECIFICATIONS
Sockets	Front Panel Connectors	• VGA: 15-pin, D-Sub connector • USB: two 4-pin connectors • Ethernet: two RJ-45 connectors • COM: 9-pin, D-Sub connector • PMC/XMC front panel

	Onboard Connectors	• CompactFlash socket for type I, II and Microdrive™ devices (primary EIDE interface)
		• I/O extension connector
		• PMC connectors J25 - J28 (Jn1 - Jn4)
		• XMC connector, J15
		• Two SATA connectors
		  • one 7-pin, standard SATA connector
		  • one 12-pin, SATA extension connector
		• CompactPCI Connector J1 and J2 (J3 - J5 optional)
		• Two 200-pin SODIMM sockets

HW Monitoring	LEDs	System status: • TH (green): Overtemperature Status • WD (green): Watchdog Status • IPMI: Control information Gigabit Ethernet status: • ACT (green): network activity • SPEED (green / orange): network speed General Purpose LEDs: • I (green): General Purpose/POST code or board-specific • II (green): General Purpose/POST code or board-specific
	Watchdog	Software configurable Watchdog generates IRQ, NMI, or hardware reset.
	Thermal Management	CPU overtemperature protection is provided by: • Internal processor temperature control unit • CPU shut down via hardware monitor
	System Monitor	In SCH3112 integrated hardware monitor for supervision of: • Several system power voltages • Two fan speed inputs • Board temperature
	IPMI	Baseboard Management Controller (BMC) that supports two keyboard controller-style interfaces (KCS) compliant with: • IPMI specification 1.5, revision 1.5 • PICMG 2.9 specification IPMI supports two IPMB busses via the J1 and J2 connectors.

Table 1-2: CP6012 Main Specifications (Continued)

CP6012		SPECIFICATIONS
Software	Software BIOS	AMI BIOS with 1 MB Flash memory with the following features: • QuickBoot • QuietBoot • BootBlock • LAN boot capability for diskless systems (standard PXE) • Boot from USB floppy disk drive • BIOS boot support for USB keyboards • Plug and Play capability • BIOS parameters are saved in the EEPROM • Board serial number is saved within the EEPROM • PC Health Monitoring
	Operating Systems	Operating systems supported: • Microsoft® Windows® XP • Microsoft® Windows® XP Embedded • Microsoft® Windows® Server 2003 • Linux • VxWorks
General	Mechanical	6U, 4HP, CompactPCI compliant form factor
	Power Consumption	See Chapter 5 for details
	Temperature Ranges	Operational: 0°C to +60°C Standard Storage: -55°C to +85°C Without hard disk and without battery -40°C to +65°C With hard disk and without battery  ***Note ...*** When a battery is installed, refer to the operational specifications of the battery as this determines the storage temperature of the CP6012 (See "Battery" below).
	Battery	3.0V lithium battery for RTC with battery socket. Recommended types: • VARTA CR2025 • PANASONIC BR2020 Temperature ranges: Operational: -20°C to +70°C typical (refer to the battery manufacturer's specifications for exact range) Storage: -55°C to +70°C typical (no discharge)
	Heat Sink	The following heat sink types are used on the CP6012: • Narrow heat sink • Wide heat sink (obsolete)
	Climatic Humidity	93% RH at 40 °C, non-condensing (acc. to IEC 60068-2-78)
	Dimensions	233.35 mm x 160 mm
	Board Weight	560 g (boards with low voltage processor and without mezzanine cards) 680 g (boards with standard voltage processor and without mezzanine cards) 690 g (boards with standard voltage processor and wide heat sink and without mezzanine cards)

1.7 Kontron Software Support

Kontron is one of the few CompactPCI and VME manufacturers providing inhouse support for most of the industry-proven real-time operating systems that are currently available. Due to its close relationship with the software manufacturers, *Kontron* is able to produce and support BSPs and drivers for the latest operating system revisions thereby taking advantage of the changes in technology.

Finally, customers possessing a maintenance agreement with *Kontron* can be guaranteed hotline software support and are supplied with regular software updates. A dedicated web site is also provided for online updates and release downloads.

1.8 Standards

This product complies with the requirements of the following standards:

Table 1-3: Standards

TYPE	ASPECT	STANDARD
CE	Emission	EN55022 EN61000-6-3
	Immission	EN55024 EN61000-6-2
	Electrical Safety	EN60950-1
Mechanical	Mechanical Dimensions	IEEE 1101.10
Environmental	Climatic Humidity	IEC60068-2-78
	WEEE	Directive 2002/96/EC Waste electrical and electronic equipment
	RoHS	Directive 2002/95/EC Restriction of the use of certain hazardous substances in electrical and electronic equipment

1.9 Related Publications

The following publications contain information relating to this product.

Table 1-4: Related Publications

PRODUCT	PUBLICATION
CompactPCI Systems and Boards	CompactPCI Specification 2.0, Rev. 3.0 CompactPCI Packet Switching Backplane Specification PICMG 2.16 Rev. 2.0 CompactPCI System Management Specification PICMG 2.9 Rev. 1.0 CompactPCI Hot Swap Specification PICMG 2.1 Rev. 2.0
	Kontron CompactPCI Backplane Manual, ID 24229
CompactFlash Cards	CF+ and CompactFlash Specification Revision 2.1
PMC Modules	IEEE 1386-2001, IEEE Standard for a Common Mezzanine Card (CMC) Family IEEE 1386.1-2001, IEEE Standard Physical and Environmental Layers for PCI Mezzanine Cards (PMC)