PC1-GROOVE • CompactPCI® PlusIO
Core™ i7 Processor High Performance CPU Card

Equipped with New Technology for High Bandwidth Demand CompactPCI® Serial
Suitable for Classic CompactPCI© and PICMG 2.30 CompactPCI® PlusIO Systems

Document No. 5621 • 1 October 2015

The PC1-GROOVE is a powerful 4HP/3U CompactPCI® CPU board, equipped with an Intel® Core™ i7 processor (dual core, quad threads) scalable from 1.06GHz up to 2.66GHz clock (Turbo Boost up to 3.2GHz), and integrated graphics. The PC1-GROOVE front panel is provided with two Gigabit Ethernet jacks, two USB receptacles, and either the Vesa DisplayPort connector for attachment of a high resolution display (DVI adapter available), or alternatively the classic style VGA connector.

Conforming to the PICMG® 2.30 CompactPCI® PlusIO specification, the PC1-GROOVE in addition provides standardised high speed rear I/O across the backplane connector J2, such as PCI Express®, SATA, and Gigabit Ethernet. In a hybrid backplane system, the PC1-GROOVE acts as a bridge to PICMG® CPCIS.0 CompactPCI® Serial cards. In a classic CompactPCI® system, any 2.30 compliant rear I/O transition module such as the PR1-RIO may be used as an expansion option.
PC1-GROOVE • High Performance Dual Core CompactPCI® PlusIO CPU

Feature Summary

- CompactPCI® System Slot Controller
- CompactPCI® PlusIO Rear I/O According to PICMG® 2.30
- Hybrid Systems Option (Dual Backplane CompactPCI® & CompactPCI® Serial)
- Based on the Intel® Calpella-ECC Low Power Platform (Arrandale+ECC CPU, IbexPeak-M PCH)
- Intel® Core™ i7-600 Mobile Processor, Two Cores, 4 Threads, 3 Level Cache Hierarchy, Multi-Core CPU Turbo Boost Technology, Integrated Graphics Engine
- Standard Voltage Processor i7-610E 2.53GHz (3.2GHz Turbo Mode) TDP 35W, 500/766MHz Graphics
- Low Voltage Processor i7-620LE 2.0GHz (2.8GHz Turbo Mode) TDP 25W, 266/566MHz Graphics
- Ultra Low Voltage Processor i7-660UE 1.33GHz (2.4GHz Turbo Mode) TDP 18W, 166/500MHz Graphics
- Ultra Low Voltage Processor i7-620UE 1.06GHz (2.13GHz Turbo Mode) TDP 18W, 166/500MHz Graphics
- Other Processors on Request (i5-520E, i3-330E, P4505, U3405)
- Up to 8GB DDR3 Memory in Total (Dual Channel Mode Capable, up to 1066MHz PC3-8500)
- One Memory Bank Soldered (Low Memory) for Extreme Ruggedized Systems, up to 4GB
- One Socket for a DDR3 SODIMM Module, up to 4GB
- Intel® Mobile Series QM57 Express Chipset Platform Controller Hub (IbexPeak-M)
- Three Port Graphics Controller (Front Panel: DisplayPort or VGA Connector)
- SDVO (DVI) and Secondary DisplayPort Channel Via Mezzanine Connector
- Max Resolution 2560x1600 (DisplayPort), 1920x1200 (DVI), 2048x1536 (VGA)
- Quad Gigabit Ethernet Controllers
- Six Native SATA Channels 3Gbps
- Two Additional SATA Channels 3Gbps, RAID capable with JMicron Drivers
- Twelve USB 2.0 Channels
- CompactFlash with C40-SCFA Mezzanine Module Option (4HP Assembly Height Maintained)
- CFast™ Flash Card with C41-CFAST Mezzanine Module Option (4HP Maintained)
- SATA 1.8-Inch SSD with C42-SATA Mezzanine Module Option (4HP Maintained)
- Dual mSATA Mini Cards (RAID) with C47-MSATA Mezzanine Module Option (4HP Maintained)
- Dual M.2 SATA SSDs with C48-M2 Mezzanine Module Option (4HP Maintained)
- On-Board PCI Express® Packet Switch (4 Lanes available for Rear I/O and CPCI Serial Backplane Respectively, another 4 Lanes for Mezzanine Side Card)
- Variety of Mezzanine Expansion Boards (Side Cards) Available with and w/o PCIe
- Most Mezzanines Optionally Equipped with 2.5-Inch Single- or Dual-Drive
- Rear I/O Transition Module Option (e.g. PR1-RIO)
- UEFI Firmware Phoenix
- Long Term Availability
- Coating, Sealing, Underfilling on Request
- RoHS compliant
- MTBF 14years @ 50°C
- Designed & Manufactured in Germany
- ISO 9001 Certified Quality Management
- RT OS BSP & Driver Support - QNX 6.5.0 Available, VxWorks and Others on Request
## Related Information PC1-GROOVE

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<td>PC1-GROOVE Home</td>
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PC1-GROOVE
The PC1-GROOVE is equipped with a set of local expansion interface connectors, which can be optionally used to attach a mezzanine side board. A variety of expansion cards is available, e.g. providing legacy I/O and additional PCI Express based I/O circuitry such as SATA and Gigabit Ethernet, or a secondary video output. Most mezzanine cards can accommodate in addition a 2.5-inch drive.

Typically, the PC1-GROOVE and the related side card would come as a readily assembled 8HP unit. As an alternate, Flash based mezzanine storage modules are available that fit on the PC1-GROOVE while maintaining the 4HP profile. The C42-SATA module e.g. is equipped with a very fast 1.8-inch SATA Solid State Drive (SSD), which is suitable for installation of any popular operating system.
CPU Carrier to Mezzanine Side Card Connector Suite
PC1-GROOVE • High Performance Dual Core CompactPCI® PlusIO CPU

Low Profile Storage Module Area

PC1-GROOVE with C47-MSATA RAID Mezzanine Module
C41-CFAST Mezzanine Module

C42-SATA Mezzanine Module
PC1-GROOVE • High Performance Dual Core CompactPCI® PlusIO CPU

C48-M2 • Low Profile Storage Module 2 x M.2 SATA SSD

8HP Assembly PC1 - PCS - C48
CompactPCI® PlusIO (PICMG 2.30) is a new standard for rear I/O across J2, specified by the PICMG®. High speed signal lines (PCI Express®, SATA, Gigabit Ethernet and USB) are passed from the PC1-GROOVE through the special UHM connector to the backplane, for usage either on a PlusIO rear I/O transition module, or CompactPCI® Serial card slots.

CompactPCI® Serial (PICMG CPCIS.0) defines a completely new card slot, based on PCI Express®, SATA, Gigabit Ethernet and USB serial data lines. On a hybrid backplane, both card styles, CompactPCI® and CompactPCI® Serial, can coexist, with the PC1-GROOVE in the middle as system slot controller for both backplane segments.

Related Documents CompactPCI® PlusIO & CompactPCI® Serial

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<td>CompactPCI® Serial - The Smart Solution</td>
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PC1-GROOVE  •  High Performance Dual Core CompactPCI® PlusIO CPU

PC1-GROOVE  •  Backplane Connectors

PC1-GROOVE  •  Top View (UHM Connector Upper Right Corner)
PC1-GROOVE • High Performance Dual Core CompactPCI® PlusIO CPU

PR1-RIO • Rear I/O Transition Module

PR1-RIO w. on-Board USB Stick
PC1-GROOVE • High Performance Dual Core CompactPCI® PlusIO CPU

PR1-RIO w. on-Board PE Cable Connectors

PC1-GROOVE & PR1-RIO

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CompactPCI® PlusIO & CompactPCI® Serial
Hybrid Backplane

Removable Power Supply

CompactPCI® 32 Bit
Peripheral Slots

PICMG® 2.30 PlusIO

GbE

PCIE
SATa
USB

J6

CPOS.0
Peripheral Slots

J1

Small Systems Hybrid Backplane

PC1-GROOVE as System Controller in a Hybrid System
Sample Hybrid CompactPCI® & CompactPCI® Serial Backplanes

Sample Hybrid System Rack
Sample Hybrid System Rack

State of the Art Alternate: CompactPCI® Serial Native Systems
Block Diagram

Intel® Low Power Platform Calpella + ECC

Simplified Block Diagram
PC1-GROOVE
Sheet 1 - CPU & RAM
Simplified Block Diagram

PC1-GROOVE
Sheet 2 - PCH

PCH (QM57)

Front Panel Stuffing Alternates - either DisplayPort or VGA.

- USB
- USB
- VGA
- DP
- GbE 1
- GbE 2

Sheet 3 J-SDVO2
Sheet 3 J-EXP J-HSE
Sheet 3 J-DDP
Sheet 3 J-EXP
Sheet 3 J-HSE
Sheet 4 2 x 82574

Sheet 1
Sheet 2
Sheet 3
Sheet 4

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Simplified Block Diagram
PC1-GROOVE
Sheet 3 - Mezzanine Connectors

Sheet 2
PCH

PCle 1.5
PCle SATA
SATA
USB

Sheet 2
PCH
SDVO

Sheet 2
PCH
DDPC

Sheet 2
PCH

Sheet 2
PCH

USB
GPIO
LPC
HD Audio
SMBUS

Sheet 1
CPU

PCle 0.1 - 0.4
PCle Gen2 Switch
PCle 2.1 - 2.4

Sheet 4
J2

PCle 3.1 - 3.4

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Simplified Block Diagram

PC1-GROOVE
Sheet 4 - Backplane Connectors
PC1-GROOVE • High Performance Dual Core CompactPCI® PlusIO CPU

PC1-GROOVE • DisplayPort • C41-CFAST Module

PC1-GROOVE • VGA • C42-SATA Module
Front Panel Options

PC1-GROOVE DisplayPort

PC1-GROOVE VGA
Custom Specific Front Panel Solutions Available

PC1-GROOVE • PCS-BALLET Side Card (8HP Assembly)
PC1-GROOVE • PCS-BALLET Side Card (12HP Assembly)

PC1-GROOVE & PR1-RIO
C40-SCFA CompactFlash Module

C41-CFAST CFast Module
C42-SATA 1.8-Inch Micro SATA Module

C43-SATA Internal SATA Connector Module
C47-MSATA Dual mSATA SSD Module

Custom Specific Mezzanine Module Design
PC1-GROOVE with C47-MSATA RAID Storage Mezzanine Module
PC1-GROOVE 12HP Assembly w. PCS-BALLET & C32-FIO
PC1-GROOVE w. PCS-BALLET Side Card & C42-SATA Mezzanine
PC1-GROOVE w. PCS-BALLET Side Card & C47-MSATA Mezzanine
DisplayPort to DVI Adapters Available

DisplayPort to VGA Adapters Available

Ordering Information

For popular PC1-GROOVE SKUs please refer to www.ekf.com/liste/liste_21.html#PC1

For popular Mezzanine Side Cards please refer to www.ekf.com/liste/liste_20.html#C23
Industrial Computers Made in Germany
boards. systems. solutions.