cPCI-6636 Series

Value 6U CompactPCI®
Intel® Xeon® E3, Core™ i7/i3 Processor Blade

User's Manual



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Revision History

Revision	Release Date	Description of Change(s)
0.1	2018-08-20	Preliminary release

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Preface

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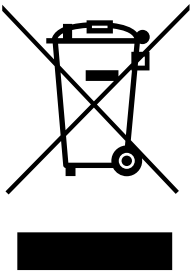
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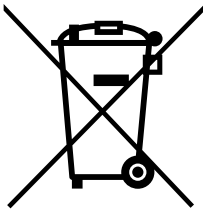
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Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.

NOTE: Additional information, aids, and tips that help users perform tasks.

CAUTION: Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.

WARNING: Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

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1 Introduction

1.1 Overview

The ADLINK cPCI-6636 Series is a 6U CompactPCI® processor blade based on the Intel® Xeon® E3 and 6th Generation Intel® Core™ i7/i3 Processors with Intel® HM170 or CM236 Chipsets. When paired with the Intel® CM236, the cPCI-6636 supports ECC memory. The cPCI-6636 supports up to 16GB onboard DDR4-2133 memory and 16GB DDR4-2133 via SODIMM. Total memory capacity is up to 32GB of DDR4-2133. The cPCI-6636 is a highly integrated processor blade fit for mission critical applications in industries ranging from automation to defence.

The cPCI-6636 Series supports flexible I/O interfaces with the cPCI-6636 in single-slot (4HP) and cPCI-6636D/DZ in dual slot (8HP) width form factors. Faceplate I/O for the cPCI-6636 (4HP) includes 2x GbE supported by an Intel® i219LM PHY controller and Intel® i210IT Ethernet controller, 3x USB 3.0, 1x RJ-45 serial port, and 1x DVI-I. Onboard I/O includes one 2.5" SATA drive space, one 7-pin SATA connector, and one CFast slot by adapter board. The cPCI-6636D (8HP) has identical I/O to the single-slot version, except that an XMC connector via PCIe x8 adapter board is supported in place of the CFast slot. A third configuration, the cPCI-6636DZ, supports 8x USB 3.0, 2x GbE, 6x serial TX/RX and 2x VGA on the faceplate, and the same onboard I/O as the two-slot "D" version. The cPCI-6636 Series supports with 66/64-bit PCI signaling. Additional signals including additional 3x SATA, up to 4x Ethernet ports, USB 2.0, PCIe x4, audio, display, and serial signals to rear J3 and J5 (DZ version supports no rear I/O). Graphics support is integrated on the Intel® processor with VGA and DVI-I options. Rear display output signal is reserved to J3 and J5 as option.

Rear I/O signals are available on cPCI-6636 and cPCI-6636D which are equipped with CompactPCI J3 and J5 connectors. Available to the RTM are up to 2x GbE to J3 by Intel® I210IT Ethernet controllers for PICMG 2.16, and an additional 2x GbE switchable to rear from the front panel for a total of up to 4x Ethernet to rear J3 and J5. Also available are 1x VGA to J3, 1x TMDS to J5, 2x SATA 1.5 Gb/s to J3, 1x SATA 1.5 Gb/s to J5, 6x USB 2.0 to

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J3, 10x GPIO to J3 and J5, HDA and KB/MS to J3, and serial ports to J5. For PCIe expansion, the cPCI-6636 offers one PCIe x4 or 4x PCIe x1 to J5.

The ADLINK 8HP cPCI-6636DZ only supports operation in host slots, whereas the cPCI-6636 and cPCI-6636D operate independently in both host and peripheral slots without CompactPCI bus communication (satellite mode), making it ideal for high density computing platforms. Moreover, the cPCI-6636 supports remote manageability by SEMA for system health monitoring over the Internet.

The cPCI-6636 Series offers outstanding computing power from the latest Intel® processors and is an ideal solution for military, automation and other robust computing applications that require the highest computing power in a rugged, reliable CompactPCI system.

1.2 Features

- 6U CompactPCI blade in 4/8HP width form factor
- 14nm uFC-BGA Intel® Processor
  - Intel ® Xeon® E3-1505M v5, 2.8/3.7GHz, 4C/8T, GT2, 8M, 45W (35W by cTDP)
  - Intel ® Core™ i7-6820EQ 2.8/3.5GHz, 4C/8T, GT2, 8M, 45W
  - Intel ® Core™ i3-6100E 2.7GHz, 2C/4T, GT2, 3M, 35W
- One channel DDR4-2133 soldered SDRAM with ECC up to 16GB; one channel with one socket SO-DIMM DDR4-2133 ECC memory up to 16GB (ECC is supported by default on cPCI-6636 and cPCI-6636D, Core™ i7 SKUs do not support ECC)
- Supports up to two independent displays
- cPCI-6636, cPCI-6636D support one DVI-I on front panel, additional 2x DVI routed to J3 and J5
- cPCI-6636DZ support 2x VGA on front panel, no rear I/O graphics
- 64-bit/66MHz CompactPCI interface based on PCI specifications, universal V(I/O)
- cPCI-6636DZ supports operation in host slot only

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- cPCI-6636, cPCI-6636D support satellite mode operation in host and peripheral slots
- One PCIe x8 Gen3 XMC site on cPCI-6636D and cPCI-6636DZ
- Supports SEMA for system health monitoring
- 2x Gigabit Ethernet egress ports on faceplate provided by an Intel® I219LM and I210IT GbE controller via PCIe x1 and two additional Gigabit Ethernet ports Intel® I210IT routed to J3 (PICMG 2.16 compliant); all four GbE can be routed to rear
- 1x 2.5" SATA drive space and one 7-pin SATA on all cPCI-6636 Series
- 1x CFast slot on cPCI-6636 single-slot version
- 1x XMC slot on cPCI-6636D and cPCI-6636DZ
- 2x SATA 1.5 Gb/s to J3, 1x SATA 1.5 Gb/s to J5
- 6x USB 2.0, HDA, KB/MS, RS-232 to J3
- RS-232 TX/RX to J5
- 10x GPIO to J3 and J5
- TPM 2.0 support (Infineon SLB 9665XT2.0), not supported by cPCI-6636DZ

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1.3 Model Number Decoder

cPCI-ET6636SLXX/6820E/MX–X/X
(A) (B) (C) (D)(E)(F)

(A) Operating Temperature Code

Blank = 0°C to +60°C

ET= -20°C to +70°C (for CPUs with TDP below 37W only)

(B) Configuration Code

Blank = cPCI-6636 single slot with I/O (DVI-I, COM, USB 3.0 x3, GbE x2), CFast slot, and J3/J5

D = cPCI-6636D dual slot with I/O (DVI-I, COM, USB 3.0 x3, GbE x2), XMC slot, and J3/J5

DZ = cPCI-6636DZ dual slot with I/O (VGA x2, COM x6, USB 3.0 x8, GbE x2) and XMC slot, without J3/J5

(C) CPU Code

1505Mv5= Xeon® E3-1505M v5

6820E = Core™ i7 6820EQ

6100E = Core™ i3 6100E

(D) Onboard Memory Capacity Code

M4 = 4GB onboard memory

M8 = 8GB onboard memory

M16 = 16GB onboard memory

(E) SODIMM Memory Capacity Code

4 = 4GB SODIMM

8 = 8GB SODIMM

16 = 16GB SODIMM

(F) Other information

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1.4 Package Contents

The cPCI-6636 is packaged with the following components. If any of the following items are missing or damaged, retain the shipping carton and packing material and contact the dealer for inspection. Please obtain authorization before returning any product to ADLINK. The packing contents of cPCI-6636 Series non-standard configurations will vary depending on customer requests.

cPCI-6636(D) Processor Blade

- Processor Blade
  - CPU and memory specifications will differ depending on options selected
  - Thermal module is assembled on the board
- RJ-45 to DB-9 COM adapter cable (PN: 30-01020-0200)
- 2.5" SATA drive accessory pack (PN: 58-99097-0010)
- 2.5” SATA adapter board (PN: 59-37571-0000)
- CFast accessory pack (PN: 58-99300-0000, cPCI-6636 only)
- DB-CFAST adapter board (PN: 59-37572-0000, cPCI-6636 only)

cPCI-6636DZ Processor Blade

- Processor Blade
  - CPU and memory specifications will differ depending on options selected
  - Thermal module is assembled on the board
- 2x RJ-45 to DB-9 COM adapter cable (PN: 30-25044-1020)
- 2.5" SATA drive accessory pack (PN: 58-99097-0010)
- 2.5” SATA adapter board (PN: 59-37571-0000)

Rear Transition Module

- Dependent on the module selected

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NOTE:

The contents of non-standard cPCI-6636 configurations may vary depending on the customer's requirements.


CAUTION:

This product must be protected from static discharge and physical shock. Never remove any of the components except at a static-free workstation. Use the anti-static bag shipped with the product when putting the board on a surface. Wear an anti-static wrist strap properly grounded on one of the system's ESD ground jacks when installing or servicing system components.

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2 Specifications

2.1 cPCI-6636(D) Processor Blade Specifications

CompactPCI® Standards	• PICMG® 2.0 CompactPCI® Rev. 3.0 • PICMG® 2.1 Hot Swap Specification Rev. 2.0 • PICMG® 2.16 Packet Switching Backplane Rev. 1.0
Mechanical	• Standard 6U CompactPCI® • Board size: 233mm x 160mm • Single/dual-slot (4/8HP, 20.32/40.64mm) • CompactPCI® connectors: J1, J2, J3, J5 (cPCI-6636, cPCI-6636D) • CompactPCI® connectors with J1, J2 connectors (cPCI-6636DZ)
Processor	• Intel® Xeon® E3-1505M v5 Processor, dual core, dual thread, 2.7 GHz, 3MB Smart Cache, TDP 35W • Intel® Core™ i7-6820EQ Processor, quad core, eight thread, 2.8 GHz (3.5 GHz Turbo), 8MB Smart Cache, TDP 45W (**Note:** does not support ECC) • Intel® Core™ i3-6100E Processor, dual core, four thread, 2.7 GHz, 3MB Smart Cache, TDP 35W • Passive heatsink
Chipset	• cPCI-6636(D): Mobile Intel® CM236 Chipset (w/ ECC) • cPCI-6636DZ: Mobile Intel® HM170 Chipset (w/o ECC)
Memory	• Dual channel DDR4-2133 SDRAM, up to 32GB non-ECC memory via 2x SODIMMs • One channel soldered onboard up to 16GB; one channel ion SO-DIMM socket, up to 16GB • ECC supported by CM236 PCH on cPCI-6636(D) only (**Note:** Core™ i7 SKUs do not support ECC)
Graphics	• Intel® HD Graphics 530 integrated on Intel® Core™ i7-6820EQ and Core™ i3-6100E processors • Intel® HD Graphics P530 integrated on Intel® Xeon® processor E3-1505M v5 • 1-slot versions: one DVI-I port • 2-slot version: two VGA ports on front panel

Table 2-1: cPCI-6636 Processor Blade Specifications

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Gigabit Ethernet	• One PCIe x1 Intel® I2199LM GbE PHY and two three PCIe x1 Intel® I210IT Gigabit Ethernet controllers • Three Two egress 10/100/1000BASE-T ports on front panel, one supporting Intel® AMT 9.0 by I219LM PHY controller • Two 10/100/1000BASE-T ports to rear by default • and tTheTwo front two 10/100/1000BASE-T ports switchable to rear for PICMG 2.16. (Total up to four GbE ports to rear total)
CompactPCI Bus	• PCI 64-bit/66MHz; 3.3V, 5V universal V I/O • All models support Host mode operation as a master in host slots and cPCI-6636(D) support Satellite mode operation as a standalone computer without connection to the PCI bus
Serial Ports	• cPCI-6636DZ: three RJ-45 on faceplate (converts to 6x RS-232 TX/RX by adapter) • cPCI-6636(D): one RJ-45 RS-232/422/485, one RS-232 TX/RX to J3, one RS-232 TX/RX to J5
USB 3.0	• cPCI-6636(D): three USB 3.0 ports on faceplate • cPCI-6636DZ: eight USB 3.0 ports on faceplate
XMC	• cPCI-6636D and cPCI-6636DZ: one XMC site
Audio	• High definition audio routed to J3
Storage Interfaces[1]	• One onboard 2.5" SATA connector supporting SATA 6Gb/s drive on all models • 1-slot cPCI-6636 supports onboard CFast slot • One SATA 3Gb/s 7-pin connector onboard on all models • cPCI-6636(D): two SATA 3Gb/s channels routed to J3
BIOS	• AMI UEFI BIOS, 128Mbit SPI flash memory
OS Compatibility	• Microsoft Windows 7 64-bit • Microsoft Windows 10 64-bit • Ubuntu 16.10.64-bit • Fedora 22, 64-bit • Other OS support upon request

Table 2-1: cPCI-6636 Processor Blade Specifications

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Faceplate I/O	**cPCI-6636 (4HP)** • 3x 10/100/1000BASE-T Ethernet ports • 1x DVI-I port & 1x DVI-D port • 3x USB 3.0 ports • 1x USB 2.0 port • 1x RJ-45 serial port supporting RS-232/422/485 **cPCI-6636D (8HP)** • 2x 10/100/1000BASE-T Ethernet ports • 1x DVI-I port • 3x USB 3.0 ports • 1x RJ-45 serial port supporting RS-232/422/485 • 1x XMC slot **cPCI-6636DZ (8HP)** • 2x 10/100/1000BASE-T Ethernet ports • 2x VGA ports • 8x USB 3.0 ports • 3x RJ-45 serial port supporting 6x RS-232 TX/RX • 1x XMC slot
Environmental	• Operating Temperature (with forced air flow)[2]: Standard: -20°C to +60°C Extended: -20°C to +70°C with forced air flow • Storage Temperature: -50°C to 100°C • Humidity: 95% @60°C non-condensing • Shock: 20G peak-to-peak, 11ms duration, non-operating • Vibration[1]: 2Grms, 5-500Hz, each axis, operating (w/o hard drive)
EMI	• FCC Class A • CE EN55032

Table 2-1: cPCI-6636 Processor Blade Specifications

1. The storage device limits the operational vibration tolerance. When the application requires higher specification for anti-vibration, it is recommended to use a flash storage device.
2. ADLINK-certified thermal design. The thermal performance is dependent on the chassis cooling design. Sufficient forced air-flow is required. Temperature limits of optional mass storage devices may also affect the thermal specification.

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2.2 Block Diagrams

cPCI-6636(D/DZ) Blade

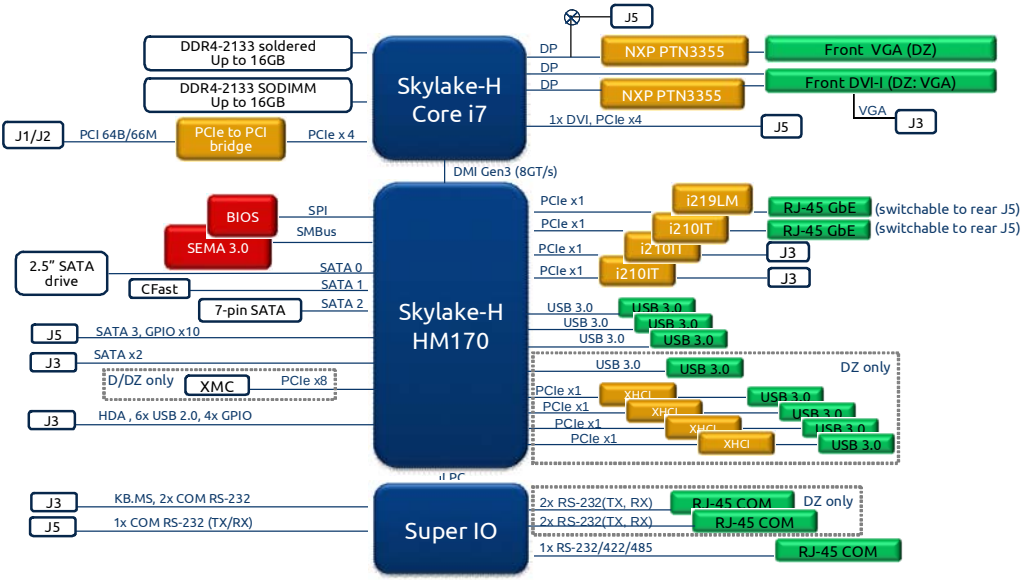


Figure 2-1: cPCI-6636(D/DZ) Blade Functional Block Diagram

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2.3 I/O Connectivity Table

Function	cPCI-6636 (4HP)		cPCI-6636D (8HP)		cPCI-6636DZ (8HP)	
	Faceplate	Onboard	Faceplate	Onboard	Faceplate	Onboard
GbE	Y x2		Y x2		Y x2	
COM	Y x1 (RJ-45)		Y x1 (RJ-45)		Y x3 (RJ-45)	
USB 3.0	Y x3		Y x3		Y x8	
DVI-I	Y x1		Y x1			
VGA					Y x2	
SATA		Y x2 (one for 2.5” drive, one 7-pin SATA connector)		Y x2 (one for 2.5” drive, one 7-pin SATA connector)		Y x2 (one for 2.5” drive, one 7-pin SATA connector)
CFast		CFast				
XMC				Y x1		Y x1
LEDs	Y x3		Y x3		Y x3	
Reset Button	Y		Y		Y	

Table 2-2: cPCI-6636(D/DZ) I/O Connectivity

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2.4 Power Requirements

In order to guarantee a stable functionality of the system, it is recommended to provide more power than the system requires. **An industrial power supply unit should be able to provide at least twice as much power as the entire system requires of each voltage**. An ATX power supply unit should be able to provide at least three times as much power as the entire system requires of each voltage.

The cPCI-6636 is designed with 5V input only to ensure product stability. The tolerance of the voltage lines described in the CompactPCI specification (PICMG 2.0 R3.0) is +5%/-3% for 5V, 3.3 V and ±5% for ±12V. This specification is for power delivered to each slot and it includes both the power supply and the backplane tolerance.

Voltage	Nominal Value	Tolerance	Max. Ripple (P - P)
5V	+5.0 VDC	+5% / -3%	50 mV
V I/O (PCI I/O Buffer Voltage)	+5 VDC	+5% / -3%	50 mV
GND			

Power Consumption

Intel® Core i7™-6820EQ: BIOS EIST Enabled, cTDP Normal

OS/Mode	Current @ 3.3V	Current @ 5V	Total Power
Windows 10/Idle mode	1.66 A	1.1 A	10.97 W
Windows typical mode	1.74 A	11.94 A	65.44 W
Windows max mode	1.70 A	11.8 A	61.51W

Intel® Xeon® CPU E3-1505M v5: BIOS EIST Enabled, cTDP Normal

OS/Mode	Current @ 3.3V	Current @ 5V	Total Power
Windows 10/Idle mode	1.80 A	0.70 A	9.44 W
Windows typical mode	1.85 A	12.48 A	68.51 W
Windows max mode	1.85 A	10.83 A	60.26 W

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3 Functional Description

The following sections describe the cPCI-6636 Series features and functions.

3.1 Processors

The 6th Generation Intel® Core™ processor family is the state of art 64-bit, multi-core mobile processor built on 14 nanometer process technology. Based on the advanced microarchitecture, the processor is designed for a two-chip platform. The two-chip platform consists of a processor and platform controller hub (PCH). The platform enables higher performance, lower cost, easier validation, and improved x-y footprint. The processor includes an integrated display engine, processor graphics and integrated memory controller.

Features	Xeon® E3-1505M v5	Core™ i7-6820EQ	Core™ i3-6100E
Clock Speed	2.8 GHz	2.8GHz	2.7 GHz
Max. Single Core Turbo Freq.	3.7 GHz	3.5GHz	NA
Last Level Cache	8MB Smart Cache	8MB Smart Cache	3MB Smart Cache
No. of Core/Thread	4/8	4/8	2/4
Maximum Power (TDP(1))	45W/35W by cTDP	45W	35W
DMI	8 GT/s DMI3	8 GT/s DMI3	8 GT/s DMI3
$T_{junction,MAX}$(2)	100°C	100°C	100°C
Socket Supported	FCBGA1440	FCBGA1440	FCBGA1440
Processor Graphics	Intel® HD Graphics P530	Intel® HD Graphics 530	Intel® HD Graphics 530
Graphics Base/Max Freq.	350 MHz / 1.05 GHz	350 MHz /1 GHz	350 MHz /950 MHz
Graphics Video Max Memory	1.7 GB	64 GB	64 GB
DirectX	12	12	12
OpenGL	4.4	4.5	4.5

(see notes on next page)

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1. The highest expected sustainable power while running known power intensive applications. TDP is not the maximum power that the processor can dissipate.
2. The maximum supported operating temperature.

Supported Technologies

Feature	Xeon® E3-1505M v5	Core™ i7-6820EQ	Core™ i3-6100E
Intel® Turbo Boost Technology	2.0	2.0	No
Intel® vPro Technology	Yes	Yes	No
Intel® Hyper-Threading Technology	Yes	Yes	Yes
Intel® Virtualization Technology (Intel® VT-x)	Yes	Yes	Yes
Intel® Virtualization Technology for Directed I/O (Intel® VT-d)	Yes	Yes	Yes
Intel® VT-x with Extended Page Tables (EPT)	Yes	Yes	Yes
Intel® TSX-NI	Yes	Yes	Yes
Intel® 64 Architecture	Yes	Yes	Yes
Instruction Set	64-bit	64-bit	64-bit
Instruction Set Extensions	Intel® SSE4.1, Intel® SSE4.2, Intel® AVX2	Intel® SSE4.1, Intel® SSE4.2, Intel® AVX2	Intel® SSE4.1, Intel® SSE4.2, Intel® AVX2
Enhanced Intel SpeedStep® Technology	Yes	Yes	Yes
Thermal Monitoring Technologies	Yes	Yes	Yes
Intel Flex Memory Technologies	Yes	Yes	Yes
Intel® Identity Protection Technology	Yes	Yes	Yes

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Feature	Xeon® E3-1505M v5	Core™ i7-6820EQ	Core™ i3-6100E
Intel® Stable Image Platform Program (SIPP)	Yes		
Intel® Smart Response Technology	Yes		

Interfaces

- Two channels of DDR4-2133 ECC memory(cPCI-6636(D) only, Core™ i7 SKUs do not support ECC)
- Memory DDR4 data transfer rates of 2133 MT/s
- 64-bit wide channels
- DDR4 I/O Voltage of 1.2V
- 4Gb, and 8Gb DDR4 DRAM technologies are supported for x8 devices. Using 8Gb device technologies, the largest memory capacity possible is 16 GB
- The PCI Express port(s) are fully-compliant with the PCI Express Base Specification, Revision 2.0.
- 8 GT/s point-to-point DMI interface to PCH is supported

Graphics

The Intel® HD Graphics 530 for Core™ i7 and Core™ i3 and Intel® HD Graphics P530 for Xeon® E3-1505M v5 is integrated in the processor enabling substantial gains in performance and lower power consumption.

- DX12 support
- OpenGL 4.4/4.5, OpenCL 1.2 support
- Graphics Base Frequency: 3500 MHz
- Graphics Max Dynamic Frequency: 1.05 GHz for Xeon® E3-1505M v5, Core™ i7 and 950MHz 1GHz for Core™ i37 and 950MHz for Core™ i3Celeron®
- Graphics Video Max Memory: Uup to 64GB
- Supports Intel® InTru™ 3D Technology, Intel® Quick Sync Video, Intel® Clear Video HD Technology, Intel® Clear Video Technology

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3.2 Chipset

The cPCI-6636(D) are equipped with Mobile Intel® CM236 Chipset and cPCI-6636DZ is equipped with Mobile Intel® HM170 Chipset. Functions and capabilities include:

Feature	Mobile Intel® CM236 Chipset	Mobile Intel® HM170 Chipset
Bus Speed	8 GT/s DMI3	8 GT/s DMI3
TDP	3.67 W	2.6 W
# of DIMMs per channel	2	2
Intel® Clear Video Technology	Yes	Yes
PCI Support	No	No
PCI Express Revision	3.0	3.0
PCI Express Configurations ‡	x1, x2, x4	x1, x2, x4
Max # of PCI Express Lanes	20	16
RAID Configuration	0/1/5/10	0/1/5/10
Intel® Virtualization Technology for Directed I/O (VT-d) ‡	Yes	Yes
Intel® vPro™ Technology ‡	Yes	No
Intel® ME Firmware Version	11.0	11.0
Intel® HD Audio Technology	Yes	Yes
Intel® Rapid Storage Technology	Yes	Yes
Intel® Rapid Storage Technology enterprise	Yes	No
Intel® Smart Response Technology	Yes	Yes

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Feature	Mobile Intel® CM236 Chipset	Mobile Intel® HM170 Chipset
Intel® Stable Image Platform Program (SIPP)	Yes	Yes
Intel® Smart Sound Technology	Yes	Yes
Intel® Trusted Execution Technology ‡	Yes	No

3.3 XMC

The cPCI-6636D/DZ supports one PCIe x8 XMC site for front panel I/O expansion.

3.4 Intel® Turbo Boost Technology

Intel® Turbo Boost Technology is a feature that allows the processor to opportunistically and automatically run faster than its rated operating core and/or render clock frequency when there is sufficient power headroom, and the product is within specified temperature and current limits. The Intel Turbo Boost Technology feature is designed to increase performance of both multi-threaded and single-threaded workloads. The processor supports a Turbo mode where the processor can use the thermal capacity associated with package and **run at power levels higher than TDP power for short durations**. This improves the system responsiveness for short, bursty usage conditions.

Turbo Mode availability is independent of the number of active cores; however, the Turbo Mode frequency is dynamic and dependent on the instantaneous application power load, the number of active cores, user configurable settings, operating environment, and system design. If the power, current, or thermal limit is reached, the processor will automatically reduce the frequency to stay with its TDP limit.

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3.5 Intel® Hyper-Threading Technology

Intel® Hyper-Threading Technology allows an execution core to function as two logical processors. While some execution resources (such as caches, execution units, and buses) are shared, each logical processor has its own architectural state with its own set of general-purpose registers and control registers. This feature must be enabled using the BIOS and requires operating system support. Intel recommends enabling Hyper-Threading Technology with Microsoft Windows 7, and disabling Hyper-Threading Technology using the BIOS for all previous versions of Windows operating systems.

3.6 Battery

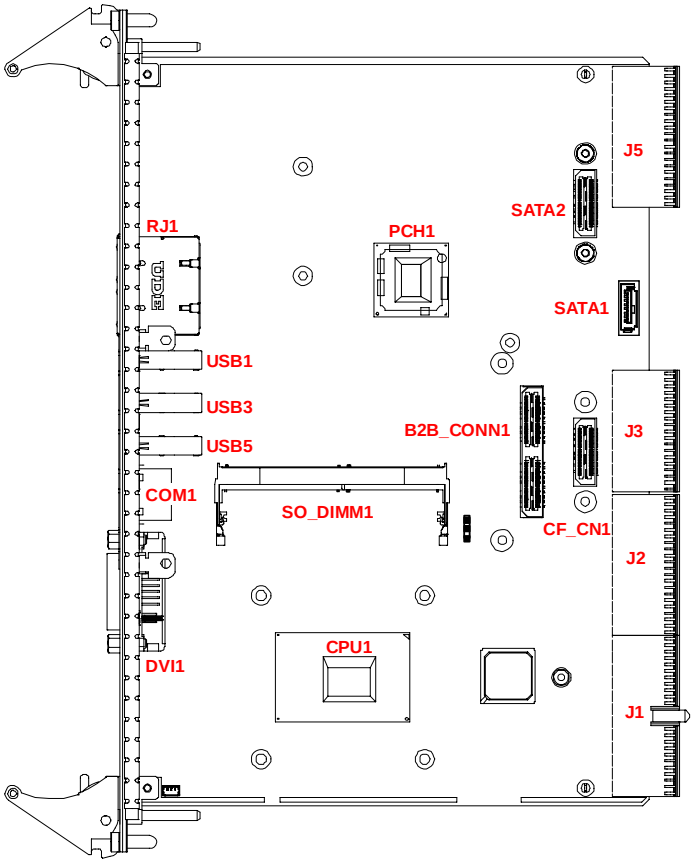
The cPCI-6636(D/DZ) is equipped with a 3.0V "coin cell" lithium battery for the real time clock (RTC). The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer. A Rayovac BR2032 is equipped on board by default.

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4 Board Interfaces

This chapter illustrates the board layout, connector pin assignments, and jumper settings to familiarize users with the cPCI-6636 Series.

4.1 cPCI-6636(D) Component Side Layout



CPU1	Intel® processor	**PCH1**	Intel® PCH
SO_DIMM1	Memory socket	**J1/J2/J3/5**	CompactPCI connectors
CF_CN1 (CPCI-6636)	CFast board-to-board connector	**B2B_CONN1 (cPCI-6636D/DZ)**	XMC board-to-board connector
SATA1	7-pin SATA connector	**SATA2**	SATA board-to-board connector

Figure 4-1: cPCI-6636(D) Component Side Layout

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4.2 cPCI-6636D/DZ Assembly Layoutt

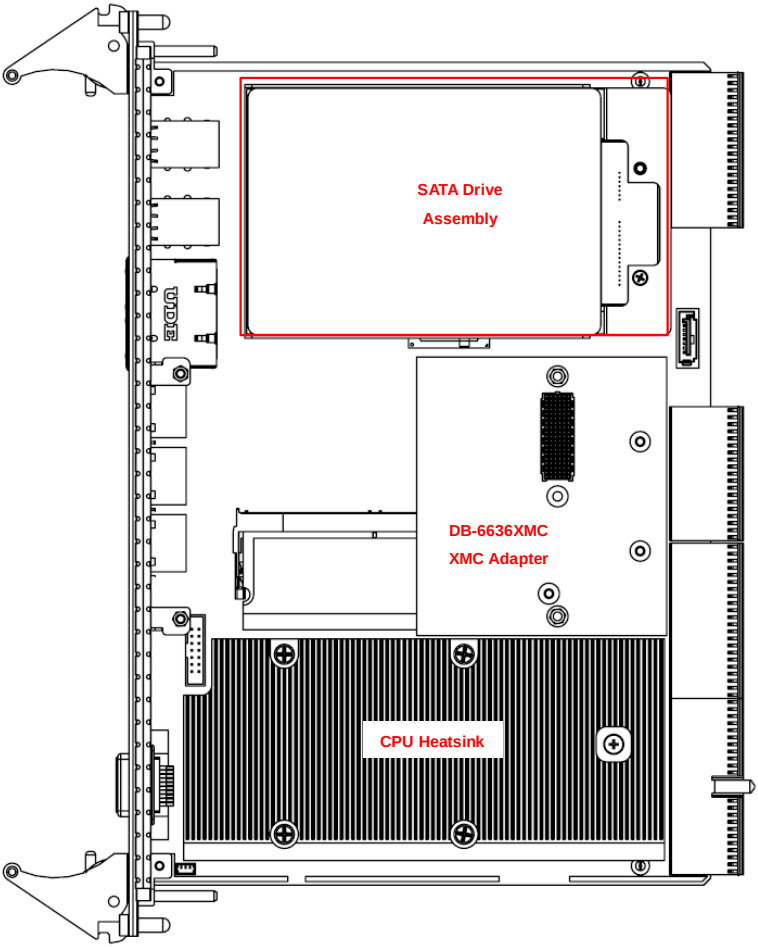
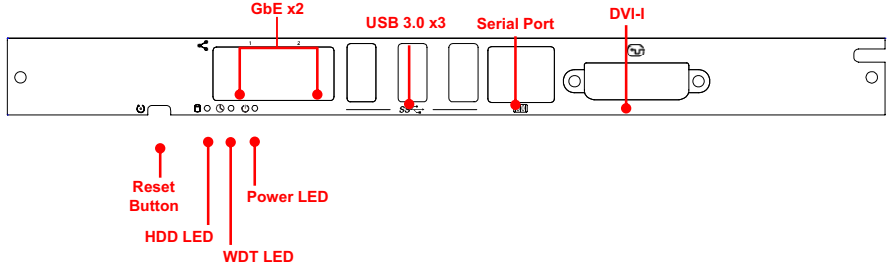


Figure 4-2: cPCI-6636D/DZ Assembly Layout

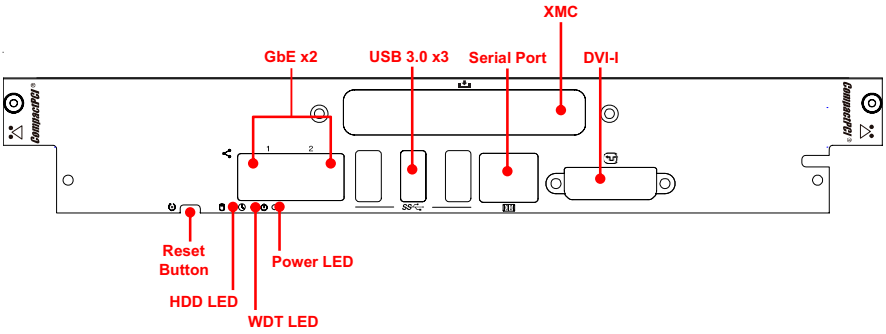
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4.3 cPCI-6636(D/DZ) Faceplate I/O

cPCI-6636



cPCI-6636D



cPCI-6636DZ

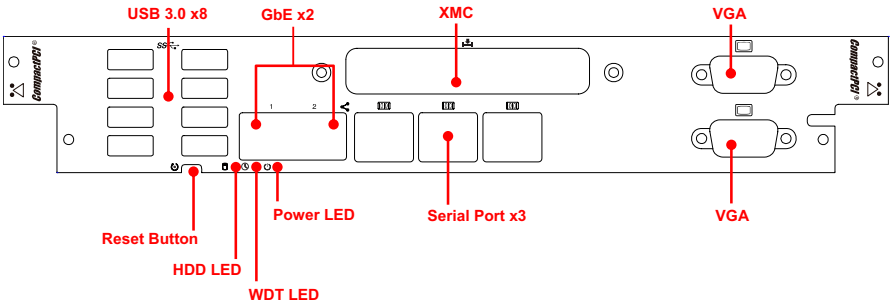


Figure 4-3: cPCI-6636(D/DZ) Faceplate I/O

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System LEDs

LED	Color	Condition	Indication
Power 	Green/ Red	Off	System is off
		Red	System Power ready (PWGD)
		Green	Post OK
WDT 	Orange	Off	No Watchdog event
		Blinking	Watchdog event alert
HDD 	Yellow	Off	No CF/CFast/SATA HDD activity
		Blinking	Data read/write in process for CFast/ SATA drive

Table 4-1: cPCI-6636(D) Front Panel System LED Descriptions

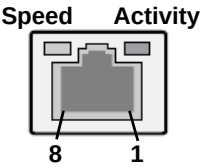
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4.4 Connector Pin Assignments

LAN1/2 RJ-45 GbE Connectors

Pin #	10BASE-T/ 100BASE-TX	1000BASE-T
1	TX+	LAN_TX0+
2	TX-	LAN_TX0-
3	RX+	LAN_TX1+
4	—	LAN_TX2+
5	—	LAN_TX2-
6	RX-	LAN_TX1-
7	—	LAN_TX3+
8	—	LAN_TX3-

Table 4-2: LAN1/2 RJ-45 GbE Pin Definitions



Status		Speed LED (Green/Amber)	Activity LED (Yellow)
Network link is not established or system powered off		OFF	OFF
10 Mbps	Link	OFF	ON
	Active	OFF	Blinking
100 Mbps	Link	Green	ON
	Active	Green	Blinking
1000 Mbps	Link	Amber	ON
	Active	Amber	Blinking

Table 4-3: LAN LED Status Definitions

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USB 3.0 Connectors

Pin #	Signal Name
1	VCC
2	Data-
3	Data+
4	GND
5	RX_N
6	RX_P
7	GND
8	TX_N
9	TX_P

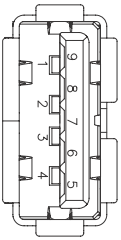


Table 4-4: USB 3.0 Pin Definitions

cPCI-6636(D) COM1 (RJ-45)

Pin #	RS-232	RS-422	RS-485
1	DCD#	TX-	Data-
2	RTS#	—	—
3	DSR#	—	—
4	TXD	RX+	—
5	RXD	TX+	Data+
6	GND	—	—
7	CTS#	—	—
8	DTR#L	RX-	—

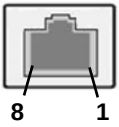


Table 4-5: cPCI-6636(D) COM Pin Definitions

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cPCI-6636(D) COM RJ-45 to DB-9 Cable

(PN: 30-01020-0200)

Pin #	RS-232	RS-422	RS-485
1	DCD#	TX-	Data-
2	RXD	TX+	Data+
3	TXD	RX+	—
4	DTR#L	RX-	—
5	GND	—	—
6	DSR#	—	—
7	RTS#	—	—
8	CTS#	—	—
9	—	—	—

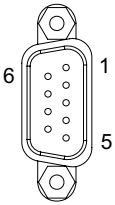


Table 4-6: cPCI-6636(D) COM RJ-45 to DB-9 Cable Pin Definitions

cPCI-6636DZ COM1-6 (RJ-45)

The three RJ-45 ports on the cPCI-6636DZ carry two sets of RX/TX signals each. From right to left: COM1/2, COM3/4 and COM5/6.

COM1/2

Pin #	RS-232
1	P5V
2	COM1_RX
3	COM1_TX
4	GND
5	P5V
6	COM2_RX
7	COM2_TX
8	GND

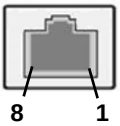


Table 4-7: cPCI-6636DZ COM1/2 Pin Definitions

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COM3/4

Pin #	RS-232
1	P5V
2	COM3_RX
3	COM3_TX
4	GND
5	P5V
6	COM4_RX
7	COM4_TX
8	GND

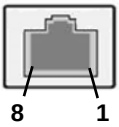


Table 4-8: cPCI-6636DZ COM3/4 Pin Definitions

COM5/6

Pin #	RS-232
1	P5V
2	COM3_RX
3	COM3_TX
4	GND
5	P5V
6	COM4_RX
7	COM4_TX
8	GND

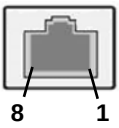
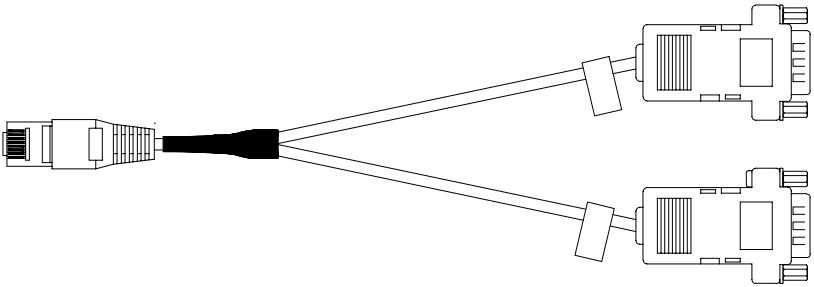


Table 4-9: cPCI-6636DZ COM5/6 Pin Definitions

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cPCI-6636DZ COM RJ-45 to 2x DB-9 Cable

(PN: 30-25044-1020)



The DB-9 connectors are labeled “01” and “02”. Connector “01” corresponds to the odd numbered COM signal on the RJ-45 connector, and connector “02” corresponds to the even numbered COM signal (i.e. “a” = “odd”, “b” = “even”).

Pin #	DB-9 “01”	DB-9 “02”
1	-	-
2	COMa_RX	COMb_RX
3	COMa_TX	COMb_TX
4	-	-
5	GNDa	GNDb
6	-	-
7	-	-
8	-	-
9	-	-

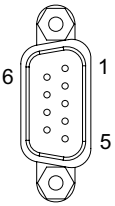
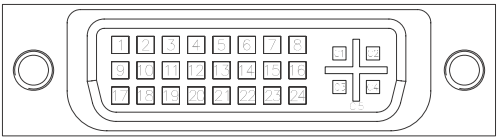


Table 4-10: cPCI-6636DZ COM RJ-45 to 2x DB-9 Cable Pin Definitions

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DVI-I Connector



Pin #	Signal	Pin #	Signal
1	TMDS Data2-	16	Hot Plug Detect
2	TMDS Data2+	17	TMDS Data0-
3	GND	18	TMDSData0+
4	NC	19	GND
5	NC	20	NC
6	DDC Clock [SCL]	21	NC
7	DDC Data [SDA]	22	GND
8	Analog vertical sync	23	TMDS Clock +
9	TMDS Data1-	24	TMDS Clock -
10	TMDS Data1+	C1	Analog Red
11	GND	C2	Analog Green
12	NC	C3	Analog Blue
13	NC	C4	Analog Horizontal Sync
14	+5 V Power	C5	Analog GND Return
15	GND		

Table 4-11: DVI-I Connector Pin Definition

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Serial ATA 7-pin Connector (SATA1)

Pin #	Signal
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND



Table 4-12: Serial ATA 7-pin Connector Pin Definition

Serial ATA Connector with Power

2.5” SATA adapter board (PN: 59-37571-0000)

Pin #	Signal
S1	GND
S2	TX+
S3	TX-
S4	GND
S5	RX-
S6	RX+
S7	GND
P1	NC
P2	NC
P3	NC
P4	GND
P5	GND
P6	GND
P7	5V
P8	5V
P9	5V
P10	GND
P11	NC
P12	GND
P13~P15	NC

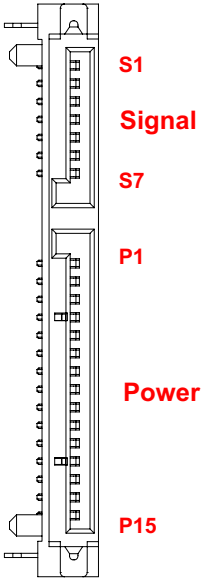


Table 4-13: Serial ATA Connector with power Pin Definition

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CFast Socket

DB-CFAST adapter board (PN: 59-37572-0000)

Pin #	Signal Name
Ground	S1
SATA_TX-P	S2
SATA_TX-N	S3
Ground	S4
SATA_RX-N	S5
SATA_RX-P	S6
Ground	S7
CFast_CDI	P1
Ground	P2
NC	P3
NC	P4
NC	P5
NC	P6
Ground	P7
CFast_LED1	P8
CFast_LED2	P9
NC	P10
NC	P11
NC	P12
+3.3V	P13
+3.3V	P14
Ground	P15
Ground	P16
CFast_CDO	P17

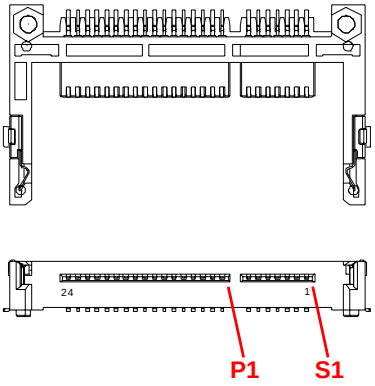


Table 4-14: CFast Socket Pin Definition

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CompactPCI J1 Connector

Pin	Z	A	B	C	D	E	F
25	GND	P5V	CPCI_REQ64-L	CPCI_ENUM-L	P3V3	P5V	GND
24	GND	CPCI_AD1	P5V	CPCI_VIO_STB	AD0	CPCI_ACK64-L	GND
23	GND	P3V3	CPCI_AD4	CPCI_AD3	P5V	CPCI_AD2	GND
22	GND	CPCI_AD7	GND	P3V3	CPCI_AD6	CPCI_AD5	GND
21	GND	P3V3	CPCI_AD9	CPCI_AD8	CPCI_M66EN	CPCI_CBE-L0	GND
20	GND	CPCI_AD12	GND	CPCI_VIO_STB	CPCI_AD11	CPCI_AD10	GND
19	GND	P3V3	CPCI_AD15	CPCI_AD14	GND	CPCI_AD13	GND
18	GND	CPCI_SERR-L	GND	P3V3	CPCI_PAR	CPCI_CBE-L1	GND
17	GND	P3V3	IPMB_CLK	IPMB_DAT	GND	CPCI_PERR-L	GND
16	GND	CPCI_DEVSEL-L	GND	CPCI_VIO_STB	CPCI_STOP-L	CPCI_LOCK-L	GND
15	GND	P3V3	CPCI_FRAME-L	CPCI_IRDY-L	CPCI_BDSEL-L	CPCI_TRDY-L	GND
12-14	Key Area						
11	GND	CPCI_AD18	CPCI_AD17	CPCI_AD16	GND	CPCI_CBE-L2	GND
10	GND	CPCI_AD21	GND	P3V3	CPCI_AD20	CPCI_AD19	GND
9	GND	CPCI_CBE-L3	CPCI_IDSEL	CPCI_AD23	GND	CPCI_AD22	GND
8	GND	CPCI_AD26	GND	CPCI_VIO_STB	CPCI_AD25	CPCI_AD24	GND
7	GND	CPCI_AD30	CPCI_AD29	CPCI_AD28	GND	CPCI_AD27	GND
6	GND	CPCI_REQ-L0	CPCI_PRESENT-L	P3V3	CPCI_CLK0	CPCI_AD31	GND
5	GND	NC	NC	CPCI_RET-L	GND	CPCI_GNT-L0	GND
4	GND	P5V_IPMB	CPCI_HEALTHY-L	CPCI_VIO_STB	CPCI_INTP	CPCI_INTS	GND
3	GND	CPCI_INTA-L	CPCI_INTB-L	CPCI_INTC-L	P5V	CPCI_INTD-L	GND
2	GND	GND	P5V	NC	NC	NC	GND
1	GND	P5V	N12V	NC	P12V	P5V	GND

Table 4-15: CompactPCI J1 Connector Pin Definition

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CompactPCI J2 Connector

Pin	Z	A	B	C	D	E	F
22	GND	GA4	GA3	GA2	GA1	GA0	GND
21	GND	CPCI_CLK6	GND	NC	NC	NC	GND
20	GND	CPCI_CLK5	GND	NC	GND	NC	GND
19	GND	GND	GND	IPMB_DAT	IPMB_CLK	IPMB_PWR	GND
18	GND	NC	NC	NC	GND	NC	GND
17	GND	NC	GND	J2_RST-L	CPCI_REQ-L6	CPCI_GNT-L6	GND
16	GND	NC	NC	CPCI_DEG-L	GND	NC	GND
15	GND	NC	GND	CPCI_FAL-L	CPCI_REQ-L5	CPCI_GNT-L5	GND
14	GND	CPCI_AD35	CPCI_AD34	CPCI_AD33	GND	CPCI_AD32	GND
13	GND	CPCI_AD38	GND	CPCI_VIO	CPCI_AD37	CPCI_AD36	GND
12	GND	CPCI_AD42	CPCI_AD41	CPCI_AD40	GND	CPCI_AD39	GND
11	GND	CPCI_AD45	GND	CPCI_VIO	CPCI_AD44	CPCI_AD43	GND
10	GND	CPCI_AD49	CPCI_AD48	CPCI_AD47	GND	CPCI_AD46	GND
9	GND	CPCI_AD52	GND	CPCI_VIO	CPCI_AD51	CPCI_AD50	GND
8	GND	CPCI_AD56	CPCI_AD55	CPCI_AD54	GND	CPCI_AD53	GND
7	GND	CPCI_AD59	GND	CPCI_VIO	CPCI_AD58	CPCI_AD57	GND
6	GND	CPCI_AD63	CPCI_AD62	CPCI_AD61	GND	CPCI_AD60	GND
5	GND	CPCI_CBE-L5	CPCI_DEV64-L	CPCI_VIO	CPCI_CBE-L4	CPCI_PAR64	GND
4	GND	CPCI_VIO	NC	CPCI_CBE-L7	GND	CPCI_CBE-L6	GND
3	GND	CPCI_CLK4	GND	CPCI_GNT-L3	CPCI_REQ-L4	CPCI_GNT-L4	GND
2	GND	CPCI_CLK2	CPCI_CLK3	SYSEN-L	CPCI_GNT-L2	CPCI_REQ-L3	GND
1	GND	CPCI_CLK1	GND	CPCI_REQ-L1	CPCI_GNT-L1	CPCI_REQ-L2	GND

Table 4-16: CompactPCI J2 Connector Pin Definition

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CompactPCI J3 Connector

Pin	Z	A	B	C	D	E	F
19	GND	P5V	P5V	P12V	P5V	P5V	GND
18	GND	LAN4_MDI0_P	LAN4_MDI0_N	GND	LAN4_MDI2_P	LAN4_MDI2_N	GND
17	GND	LAN4_MDI1_P	LAN4_MDI1_N	GND	LAN4_MDI3_P	LAN4_MDI3_N	GND
16	GND	LAN3_MDI0_P	LAN3_MDI0_N	GND	LAN3_MDI2_P	LAN3_MDI2_N	GND
15	GND	LAN3_MDI1_P	LAN3_MDI1_N	GND	LAN3_MDI3_P	LAN3_MDI3_N	GND
14	GND	USB_OC5-L	USB_OC6-L	USB_OC7-L	USB_OC8-L	USB_OC9-L	GND
13	GND	USB8-P	USB8-N	GND	USB9-P	USB9-N	GND
12	GND	USB6-P	USB6-N	GND	USB7-P	USB7-N	GND
11	GND	USB4-P	USB4-N	GND	USB5-P	USB5-N	GND
10	GND	USB_OC4-L	CRT_CLK	CRT_DAT	CRT_HSYNC	CRT_VSYNC	GND
9	GND	COM3_CTS-L	COM3_RI-L	CRT_BLUE	CRT_RED	CRT_GREEN	GND
8	GND	COM3_RXD	COM3_TXD	COM3_DTR-L	COM3_DSR-L	COM3_RTS-L	GND
7	GND	COM4_TX	COM4_RX	COM3_DCD-L	GPIO	GPIO	GND
6	GND	SATA1_RXPC	SATA1_RXNC	GND	SATA0_RXPC	SATA0_RXNC	GND
5	GND	GND	GND	NC	GND	GND	GND
4	GND	SATA1_TXPC	SATA1_TXNC	GND	SATA0_TXPC	SATA0_TXNC	GND
3	GND	KBDATA	KBCLK	GPIO2	MSDATA	MSCLK	GND
2	GND	A_HDA_SDIN1	AUD_SDIN2	NC	AUD_DOCK_EN-L	AUD_DOCK_RST-L	GND
1	GND	A_HDA_RST-L	A_HDA_SYNC	A_HDA_BIT_CLK	A_HDA_SDOUT	A_HDA_SDIN0	GND
	Z	A	B	C	D	E	F

Table 4-17: CompactPCI J3 Connector Pin Definition

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CompactPCI J5 Connector

Pin	Z	A	B	C	D	E	F
22	GND	LAN2_MDI_P0	LAN2_MDI_N0	GND	LAN2_MDI_P2	LAN2_MDI_N2	GND
21	GND	LAN2_MDI_P1	LAN2_MDI_N1	GND	LAN2_MDI_P3	LAN2_MDI_N3	GND
20	GND	LAN1_MDI_P0	LAN1_MDI_N0	GND	LAN1_MDI_P2	LAN1_MDI_N2	GND
19	GND	LAN1_MDI_P1	LAN1_MDI_N1	GND	LAN1_MDI_P3	LAN1_MDI_N3	GND
18	GND	DVID_CLKP	DVID_CLKN	GND	GND	GND	GND
17	GND	DVID_TXP1	DVID_TXN1	GND	COM2_TX	COM2_RX	GND
16	GND	DVID_SDA	DVID_SCL	DVID_HPD	GND	GND	GND
15	GND	DVID_TXP2	DVID_TXN2	GND	SATA_RX3_P_C	SATA_RX3_N_C	GND
14	GND	DVID_TXP0	DVID_TXN0	GND	SATA-TX3_P_C	SATA-TX3_N_C	GND
13	GND	LAN3_LED_ 100-L	LAN4_LED_ 100-L	REAR_GPIO6	LAN4_LED_ 1000-L	LAN3_LED_1 000-L	GND
12	GND	DVI_SDA_RTM	DVI_SCL_RTM	DVI_HPD_RTM	RTM_HDD_LED	RTM_WDT_LED	GND
11	GND	DVIB_TX2_P_ C	DVIB_TX2_N_ C	GND	DVIB_CLK_P_C	DVIB_CLK_N_C	GND
10	GND	DVIB_TX0_P_ C	DVIB_TX0_N_ C	GND	DVIB_TX1_P_C	DVIB_TX1_N_C	GND
9	GND	REAR_GPIO1	REAR_GPIO2	REAR_GPIO3	REAR_GPIO4	REAR_GPIO5	GND
8	GND	LAN3_ACT-L	REAR_GPIO7	LAN4_ACT-L	REAR_GPIO8	REAR_GPIO9	GND
7	GND	GND	GND	BAT_RTM	GND	GND	GND
6	GND	CLK_REAR-P	CLK_REAR-N	GND	PLTRST_REAR- L	GPIO	GND
5	GND	GND	GND	GND	GND	GND	GND
4	GND	PCIE_TX8-P	PCIE_TX8-N	GND	PCIE_RX8-P	PCIE_RX8-N	GND
3	GND	PCIE_TX7-P	PCIE_TX7-N	GND	PCIE_RX7-P	PCIE_RX7-N	GND
2	GND	PCIE_TX6-P	PCIE_TX6-N	GND	PCIE_RX6-P	PCIE_RX6-N	GND
1	GND	PCIE_TX5-P	PCIE_TX5-N	GND	PCIE_RX5-P	PCIE_RX5-N	GND
	Z	A	B	C	D	E	F

Table 4-18: CompactPCI J5 Connector Pin Definition


NOTE:

GPIO signals to J5 are from the PCH. Contact ADLINK for information on how to control these GPIO.

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4.5 Switches and Buttons

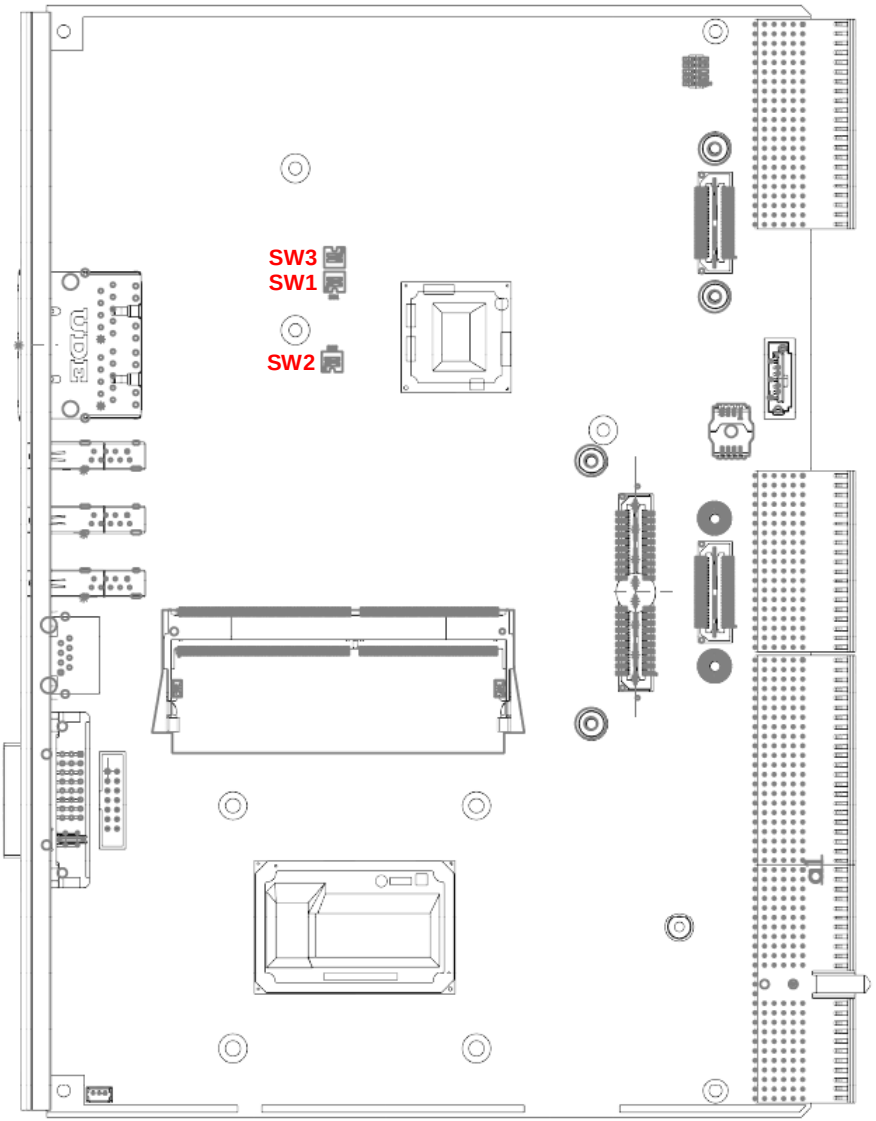


Figure 4-4: cPCI-6636 Series Switch Locations - Component Side

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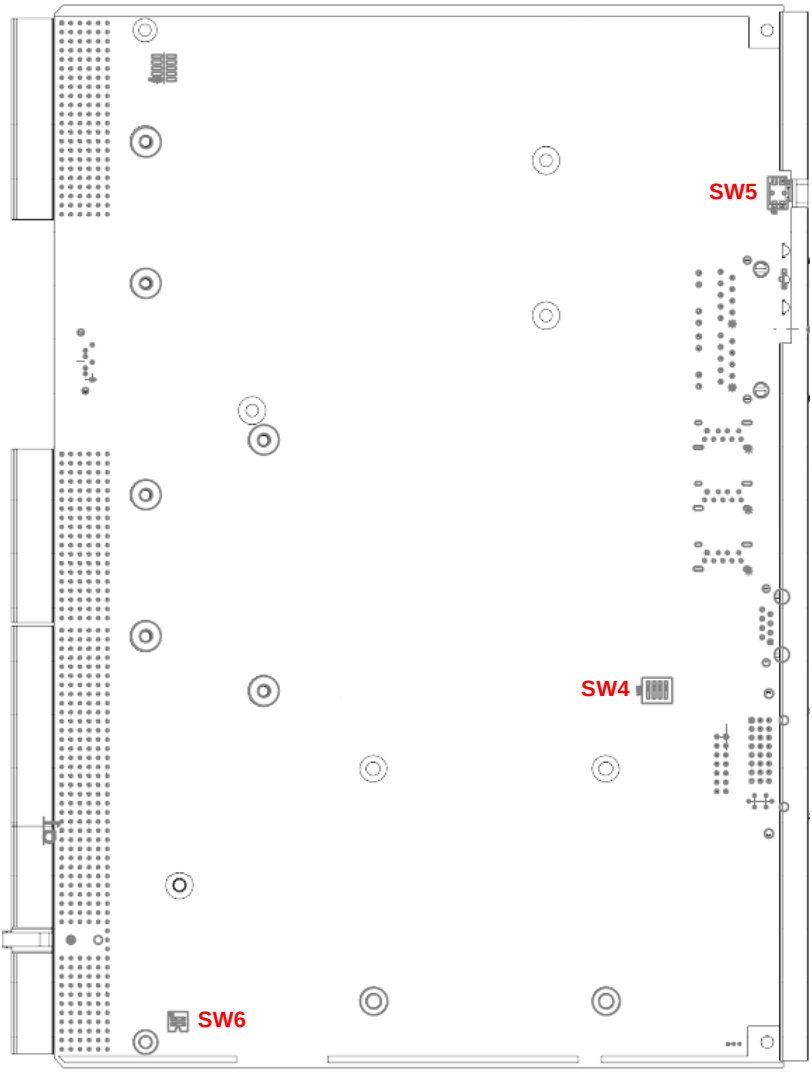


Figure 4-5: cPCI-6636 Series Switch Locations - Solder Side

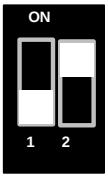
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VGA Signal Front/Rear Switch (SW1 Pin 1, Reserved)

VGA functionality is controlled by BIOS.

BIOS Protection Switch (SW1 Pin 2)

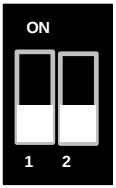
Enabling BIOS protection prevents changes to be made to the BIOS settings (enabled by default).



SW1 Pin	ON	OFF
1	Reserved	Reserved (default)
2	BIOS Protection Enabled (default)	BIOS Protection Disabled

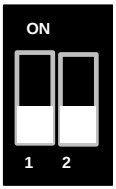
Debug Switch (SW2, Reserved)

The default setting for SW2 is 1 OFF, 2 OFF. Do not change the settings unless instructed by ADLINK.



LAN (RJ1) Front/Rear Switch (SW3, Reserved)

Default all OFF.

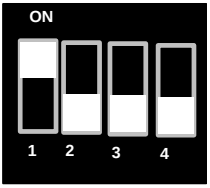


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COM1 Mode Switch (SW4)

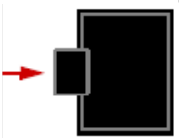
cPCI-6636(D) only.

Pin	Function
1 OFF, 2 ON (default)	RS-232
1 ON, 2 OFF	RS-485
1 ON, 2 ON	RS-422
3	OFF (Reserved)
4	OFF (Reserved)



System Reset Button (SW5)

Press switch SW5 to reset the system.

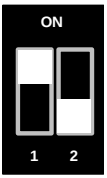


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Force Ejector Handle Closed Switch (SW6)

Switch SW6 allows the ejector handle state to be forced "closed" so that blades without ejector handles (e.g. conduction cooled) will power on when inserted into the chassis.

Pin	ON	OFF
1	Force the ejector handle state to "closed" (default)	On/Off state is controlled by the ejector handle
2	NC	NC (default)



NOTE:

When the On/Off state is controlled by the ejector handle (Pin 1 OFF), make sure to properly shut down the OS before opening the handle. If the ejector handle is opened while the OS is operating, power will be cut immediately, resulting in possible system corruption and data loss.

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Important Safety Instructions

For user safety, please read and follow all **instructions**, **WARNINGS**, **CAUTIONS,** and **NOTES** marked in this manual and on the associated equipment before handling/operating the equipment.

- Read these safety instructions carefully.
- Keep this user's manual for future reference.
- Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- When installing/mounting or uninstalling/removing equipment:
  - Turn off power and unplug any power cords/cables.
- To avoid electrical shock and/or damage to equipment:
  - Keep equipment away from water or liquid sources;
  - Keep equipment away from high heat or high humidity;
  - Keep equipment properly ventilated (do not block or cover ventilation openings);
  - Make sure to use recommended voltage and power source settings;
  - Always install and operate equipment near an easily accessible electrical socket-outlet;
  - Secure the power cord (do not place any object on/over the power cord);
  - Only install/attach and operate equipment on stable surfaces and/or recommended mountings; and,
  - If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.

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- Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.

A Lithium-type battery may be provided for uninterrupted, backup or emergency power.



Risk of explosion if battery is replaced with one of an incorrect type. Dispose of used batteries appropriately.

- Equipment must be serviced by authorized technicians when:
  - The power cord or plug is damaged;
  - Liquid has penetrated the equipment;
  - It has been exposed to high humidity/moisture;
  - It is not functioning or does not function according to the user's manual;
  - It has been dropped and/or damaged; and/or,
  - It has an obvious sign of breakage.

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Getting Service

Ask an Expert: http://askanexpert.adlinktech.com

ADLINK Technology, Inc.
9F, No.166 Jian Yi Road, Zhonghe District
New Taipei City 235, Taiwan
Tel: +886-2-8226-5877
Fax: +886-2-8226-5717
Email: service@adlinktech.com

Ampro ADLINK Technology, Inc.
5215 Hellyer Avenue, #110
San Jose, CA 95138, USA
Tel: +1-408-360-0200
Toll Free: +1-800-966-5200 (USA only)
Fax: +1-408-360-0222
Email: info@adlinktech.com

ADLINK Technology (China) Co., Ltd.
300 Fang Chun Rd., Zhangjiang Hi-Tech Park
Pudong New Area, Shanghai, 201203 China
Tel: +86-21-5132-8988
Fax: +86-21-5132-3588
Email: market@adlinktech.com

ADLINK Technology GmbH
Hans-Thoma-Strasse 11
D-68163 Mannheim, Germany
Tel: +49-621-43214-0
Fax: +49-621 43214-30
Email: emea@adlinktech.com

Please visit the Contact page at **www.adlinktech.com** for information on how to contact the ADLINK regional office nearest you.

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