NuIPC â

cPCI-8210/8211/8212

3U CompactPCI
Ethernet & SCSI Controller
User's Guide



Recycled Paper

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Questions	
Product Model	
Environment to Use	OS: _____ Computer Brand: _____ M/B: CPU: Chipset: BIOS: Video Card: Network Interface Card: Other:
Challenge Description	
Suggestions for ADLINK	

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How to use this guide

This manual is to help you use cPCI-8210/8211 series modules. It describes how to install and arrange various settings. The briefs are as following:

- **Chapter 1,** “Introduction” gives an overview of the product’s pecifications. It also tells you what are included in the product package.
- **Chapter 2,** “Switches and Connectors” describes the definitions and positions of Switches and Connectors that you may easily configure and set up per requirement.

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1

Introduction

The cPCI-8210 Series products are the high performance Ethernet / SCSI controllers which comply with the CompactPCI standards. Two major functions are supported:

- **10 Base-T / 100 Base-TX Fast Ethernet and**
- **Wide Ultra-2 SCSI interface**

The cPCI-8211 integrates the high performance Ethernet controller , and the cPCI-8211R supports the rear connection ,which cooperates with the R8211 daughter board. The cPCI-8212 integrates the Wide Ultra-2 SCSI controller, and the cPCI-8212R supports the rear connection ,which cooperates with the R8212 daughter board.

cPCI-8211/8211R are supported:

- **10 Base-T / 100 Base-TX Fast Ethernet**

cPCI-8212/8212R are supported:

- **Wide Ultra-2 SCSI interface**

All the features create the high performance applications in the Compact PCI industry.

The cPCI-8210 integrates the Intel 82558 single chip Ethernet controller. The cPCI-8210 & cPCI8212/8212R integrate the SYMBIOS SYM53C895, the PCI Wide Ultra-2 SCSI controller. The Ultra-2 SCSI protocol supports the data transfer rate up to 80MB per second. The 53C895 is the first Ultra 2 SCSI controller in the world.

Accompanied with the Wide Ultra-2 SCSI is the Low Voltage Differential (LVD) link technology. The LVD is built on the 53C895 and make possible

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the higher rate, as well as much longer SCSI cable tolerance up to 12 meters. The 53C895 is backward compatible with all the SCSI standards. It could automatically detect the devices connected to the subsystem. If the devices are also Wide Ultra-2 SCSI compliant, the 53C895 runs in the highest mode that the LVD link is enabled, otherwise the 53C895 will fall back to the older mode automatically.

About SCSI (Small Computer System Interface)

The follow standard is defined by ANSI.

SCSI Item	Bus Speed, MBytes/Sec. Max.	Bus Width, bits	Max. Bus Lengths, Meters (1)			Max. Device Support
			Single-ended	LVD	HVD	
SCSC-1(2)	5	8	6	(3)	25	8
Fast SCSI(2)	10	8	3	(3)	25	8
Fast Wide SCSI	20	16	3	(3)	25	16
Ultra SCSI(2)	20	8	1.5	(3)	25	8
Ultra SCSI(2)	20	8	3	-	-	4
Wide Ultra SCSI	40	16	-	(3)	25	16
Wide Ultra SCSI	40	16	1.5	-	-	8
Wide Ultra SCSI	40	16	3	-	-	4
Ultra2 SCSI(2,4)	40	8	(4)	12	25	8
WideUltra2SCSI (4)	80	16	(4)	12	25	16

Note:

(1) The listed maximum bus lengths may be exceeded in Point-to-Point and engineered applications.

(2) Use of the word "Narrow", preceding SCSI, Ultra SCSI, or Ultra2 SCSI is optional.

(3) LVD was not defined in the original SCSI standards for this speed. If all devices on the bus support LVD, then 12-meters operation is possible at this speed. However, if any device on the bus is singled-ended only, then the entire bus switches to single-ended mode and the distances in the single-ended column apply.

(4) Single-ended is not defined for speeds beyond Ultra.

(5) HVD (Differential) is not defined for speeds beyond Ultra2.

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The date comes from STA (SCSI Trade Association)

The cPCI-8211 & cPCI-8211R use the Intel 82559 single chip Ethernet controller. The 82559 chip integrates the MAC (Media Access Controller) chip and the PHY chip (Physical layer interface).

The 82559 is a sophisticated PCI bus master with enhanced scatter-gather bus-mastering capability that could detect the speed and the duplex automatically. It is true 32-bit architecture enables it to perform high-speed data transfer on the PCI bus. The embedded macrocode-based engine enables the 82559 to process high level commands and perform multiple operations without CPU intervention. Its 3 K Bytes transmit and 3K Bytes receives FIFO provide large on-chip storage of multiple transmit and receive frames.

1.1 What is Fast Ethernet

Fast Ethernet is a network technology specified by IEEE Standard 802.3u. It extends the traditional 10Mbps Ethernet technology to achieve 100Mbps transmission and reception, while retaining the same CSMA/CA Ethernet protocol. Thus while fast Ethernet provides a tenfold increase in network capacity, it is wholly compatible with traditional 10Mbps Ethernet network facilities. The compatibility is the key to easy and efficient upgrades to100Mbps in your network areas needing greater bandwidth. Upgrading selected areas to Fast Ethernet does not require hardware or software changes in network areas where traditional 10Mbps Ethernet is providing good service. For upgrading existing Ethernet installations to100Mbps, and especially for selectively upgrading areas needing upgrade, fast Ethernet is the clear choice in terms of cost-effectiveness, as well as convenience and smoothness in transition. Fast Ethernet comprises two subtypes: 100Base-T4 and 100Base-TX.100Base-T4 fast Ethernet can utilize existing Category 5 cabling, but does provide full duplex operation. Full duplex 100Base-TX operation allows simultaneous transmission and reception, both at 100Mbps, thus providing service potentially equal to 200Mbps half-duplex service.

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1.2 Specifications

- **System architecture:**
  - Standard 3U CompactPCI form factor
  - Advanced 10 Base-T/ 100 Base-TX Ethernet
  - Fully complied with PICMG 2.0 (CompactPCI) Rev2.0

- **cPCI-8210 Features:**

  Ethernet I/F

  - Intel 82558 Ethernet Controller
  - Complied with PCI V2.1, IEEE802.3, IEEE802.3u
  - True 32-bit PCI bus master
  - Full duplex support
  - 10 Base-T/ 100 Base-TX support
  - Nway, Auto-negotiation capability
  - Drivers support: DOS/ Windows-95/98, Windows NT

  Wide Ultra 2 SCSI I/F:

  - SYMBIOS SYM 53C895 advanced SCSI controller
  - Wide ULTRA-2 SCSI protocol up to 80 MB/s transfer rate (max.)
  - LVD link to extend cable length up-to 12 meters
  - On-chip SCSI clock quadrupler to achieve 160 MHz frequency with external 40 MHz oscillator
  - Backward compatible with Wide Ultra-2 SCSI, Wide Ultra SCSI, Ultra SCSI, and Fast SCSI
  - Auto Switch transmission modes for different kind of devices connected , suppose Signal-ended (SE) , Low Voltage Differential (LVD) , High Voltage Differential(HVD)
  - Drivers support: DOS/ Windows-95/98, Windows-NT, OS/2, SCO UNIX

Mode	SE	LVD	HVD
Voltage	-0.35 to +0.5	0.7 to 1.9	2.4 to 5.5

- **cPCI-8211/8211R**
  - Intel 82559 Ethernet Controller
  - Complied with PCI V2.1, IEEE802.3, IEEE802.3u

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- True 32-bit cPCI bus master
- Full duplex support
- 100Mbps Fast Ethernet or 10Mbps data transfer, selected via auto-negotiation
- Suppose INTEL PREBOOT EXECUTION ENVIRONMENT (PXE) for remote boot (82559 Only)
- 10 Base-T/ 100 Base-TX support
- Three LED indicators:10 Mbps / 100Mbps , Link , Activity
- Drivers support: DOS/ Windows-95/98, Windows NT, Linux

♦ **cPCI-8212/8212R**

- SYMBIOS SYM 53C895 advanced SCSI controller
- Wide Ultra-2 SCSI protocol up to 80 MB/s transfer rate (max.)
- LVD link to extend cable length up-to 12 meters
- On-chip SCSI clock quadrupler to achieve 160 MHz frequency with external 40 MHz oscillator
- Backward compatible with Wide Ultra-2 SCS, Wide Ultra SCSI, Ultra SCSI, and Fast SCSI
- Auto Switch transmission modes for different kind of devices connected, suppose Signal-ended (SE), Low Voltage Differential (LVD), High Voltage DifferentialHVD)

Mode	SE	LVD	HVD
oltage	-0.35 to +0.5	0.7 to 1.9	2.4 to 5.5

♦ **Drivers support: DOS/ Windows-95/98, Windows-NT, OS/2, SCO UNIX**

♦ **CE Test According to:**

EMI Test:	European Standard EN 55022 Class B
Harmonic Test:	European Standard EN 61 000-3-2
Voltage fluctuations Test:	European Standard EN 61 000-3-3
EMS Test:	European Standard EN 50 082-1:1997

♦ **FCC Test According to: Standard for Methods of Measurement**

ANSI C63.4 – 1992

Test in Compliance with CISPR PUB. 22 and FCC Part 15

- Dimension: 160 mm (D) x 100 mm (W)
- Power requirements:

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- cPCI-8210: 5V @ 2A (max.)
- cPCI-8211& cPCI-8211R: 5V @ 100 mA (max)
- cPCI-8212 & cPCI-8212R: 5V @ 1A (max)

♦ **Environment**

- Operating Temperature: 0 to 60^{o}C
- Storage Temperature: -20 to 80^{o}C
- Humidity: 10%~90% non condensing

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2

Installation & Configurations

2.1 What you have

- **cPCI-8210**

  3U Compact PCI board x 1

  ADLINK CD-ROM

  This manual

- **cPCI-8211**

  3U Compact PCI board x 1

  R8211 daughter board x1 **(only for cPCI-8211R)**

  ADLINK CD-ROM

  This manual

- **cPCI-8212**

  3U Compact PCI board x 1

  R8212 daughter board x1 ***(only for cPCI-8212R)***

  ADLINK CD-ROM

  This manual

If any of these items is missed or damages, please contact your vender.

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2.2 Connect the Network Cable

Category 5 UTP cable qualifies for both, the Fast Ethernet And Ethernet, cabling rules. The maximum length of any single cable run between any station and its supporting Hub is 100 meter .The maximum length of a cable joining two hubs is 10m in general, but is 100m when both hubs qualify as Ethernet class 2 Repearters. However, these cable runs may need to be shorter than the given individual maximum lengths because their maximum aggregated cable run between any two stations is 205m.

Connecting for 100Mbps Ethernet

Category 5 UTP cable is required for fast Ethernet operation. The maximum cable run between the cPCI-8211 and the supporting hub is 100 meters. The cable must be straight (not a crossover cable) with an RJ-45 plug at each end. Make the network connection by plugging one end of the cable into the RJ-45 jack of the cPCI-8211, and the other end into a port of the supporting hub.

Connecting for 10Mbps Ethernet

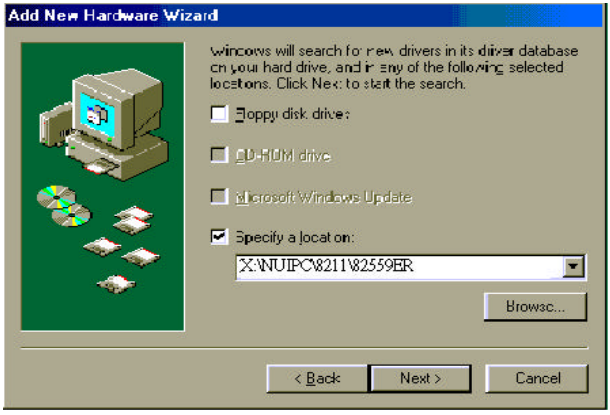
Category 3, Category 4, and Category 5 UTP cable, as well as EIA/TIA-568 100-0hm STP cable, all qualify under Ethernet cabling rules. The maximum cable run between the cPCI-8211 and the supporting hub is 100 meters. The cable must be straight (not a crossover cable) with RJ-45 connector at each end. Make the network connection by plugging one end of the cable into the RJ-45 jack of the cPCI-8211, and the other end into a port of the supporting Hub.

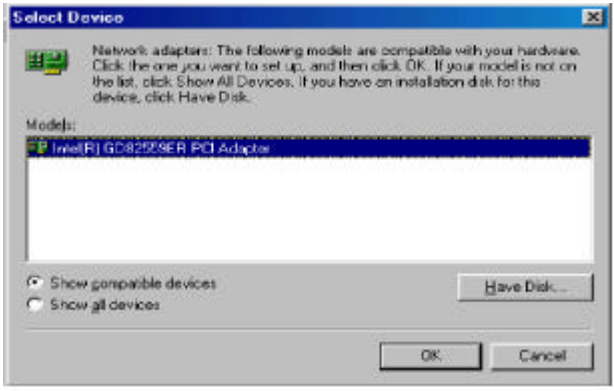
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2.3 Device Installation for Windows 98

cPCI-8211/8211R & cPCI-8210 (LAN)

While you first plug cPCI-8210 card and enter Windows 98, the system will detect this device automatically, and auto setup its driver. The cPCI-8211 must "Add New Hardware Wizard" to setup its device. When the user want to update device driver, user can choose the " Update Driver", and show the following dialog box that prompts you to select the driver information source.





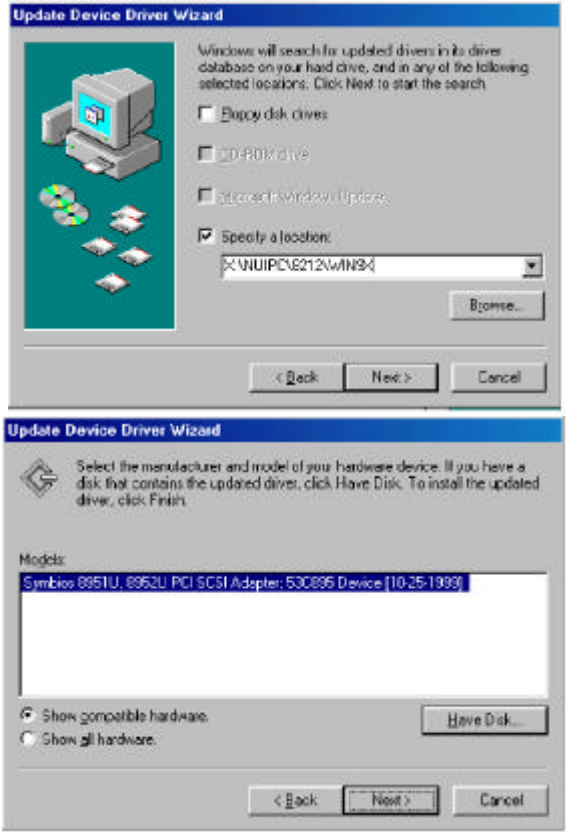
Place ADLINK's "Manual & Software Utility" CD into the appropriate CD driver. If cPCI-8211use INTEL 82559ER chip type "X:\NUIPC\8211\82559ER (these directory includes cPCI-8211 device information files "NET559ER.inf") in the input field and choose the model "Intel(R) GD82559ER PCI Adapter"(**X indicates the CD ROM driver**) and then click OK. The system will start the installation of cPCI-8211. If cPCI-

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8211 uses INTEL 82559 chip type “X:\NUIPC\8211\82559 (these directory includes cPCI-8211 device information files “oemsetup.inf”) in the input field and choose the model “Intel(R) 8255X-based PCI Adapter”(**X indicates the CD ROM driver**) and then click OK. If install cPCI-8210 Type “X:\NUIPC\8210\LAN in the input field and choose the model “Intel Ether Express PRO Adapter ”.

cPCI-8212/8212R & cPCI-8210 (SCSI)

While you first plug cPCI-8212 or cPCI-8210 card and enter Windows 98, the system will detect this device automatically, and auto setup its driver. When the user want to update device driver, user can choose the “ Update Driver”, and show the following dialog box that prompts you to select the driver information source.



Place ADLINK’s “Manual & Software Utility” CD into the appropriate CD driver. Type“X:\NUIPC\8212\Win9X”(thesedirectoryincludescPCI-8212

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device information files“SYMC8XX.inf”) in the input field and choose the model “Symbios 8951U 8952U PCI SCSI Adapter 53C895 Driver”(**X indicates the CDROM driver**)and then click OK. The system will start the installation of cPCI-8212. If install cPCI-8210 Type X:\NUIPC\8210\SCSI\WIN95 in the input field.

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2.4 Device Installation for WindowsNT

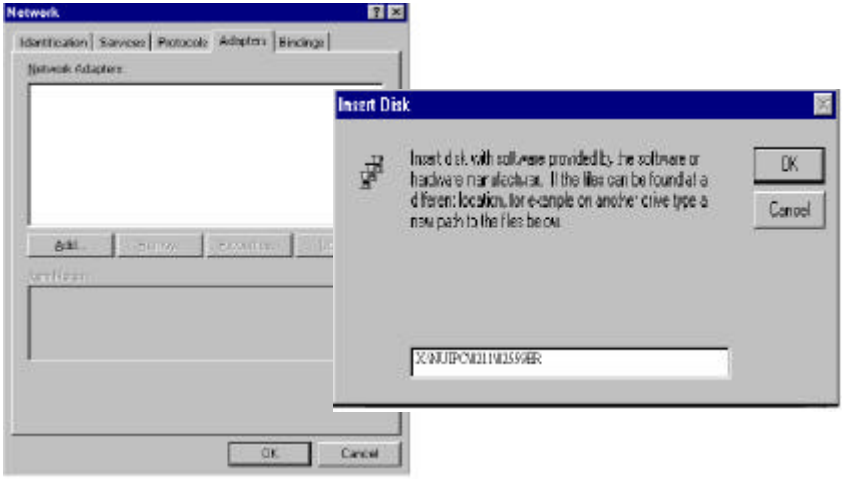
cPCI-8211/8211R&cPCI-8210(LAN)

While you first plug cPCI-8211 card and enter WindowsNT.

Step1: Select Control Panel.

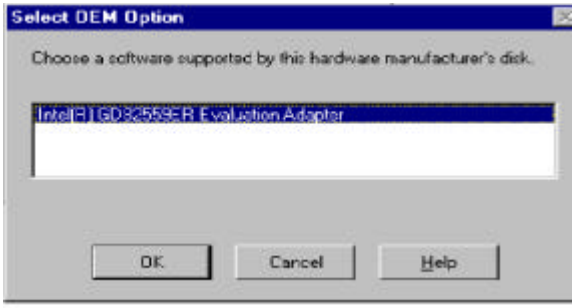
Step2: Select Network.

Step3: Select Adapters then select Add.



Step4: Place ADLINK's "Manual & Software Utility" CD into the appropriate CD driver. If cPCI-8211 uses the 82559ER chip type "X:\NUIPC\ 8211\ 82559ER in the input field and choose the model "Intel(R) GD82559ER Evaluation Adapter"(**X indicates the CDROM driver**) and then click OK. If cPCI-8211 uses the 82559 chip type "X:\NUIPC\8211\82559 in the input field and choose the model "Intel(R)"(**X indicates the CD ROM driver**) and then click OK. The system will start the installation of cPCI-8211. If install cPCI-8210 Type "X:\NUIPC\8210\LAN in the input field and choose the model "Intel Ether Express PRO Adapter".

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cPCI-8212/8212R&cPCI-8210(SCSI)

Use cPCI-8212/8212R&cPCI-8210(SCSI)driver to setup Windows NT4.0

Step1: Copy ADLINK's "Manual & Software Utility CD"X:\NUIPC\8212\WINNT\WINNTHI\I386\WIN Nt all files to floppy disk.

Step2: Use Windows NT boot disk to boot your computer.

Step3: When install Windows NT disk 2 to setup Windows NT system.

Step4: Please press "S" key to skip NT Setup's auto detect SCSI controller.

Step5: Please press "S" key again to specify add a new device.

Step6: Select "Others", and plug the floppy disk which copy files from The ADLINK's "Manual & Software Utility CD".

Step7: Select "Symbios Logic PCI<53C8XX>", press "Enter" key.

Step8: Then you have finished setup of the cPCI-8212, and you can continue to setup Windows NT4.0.

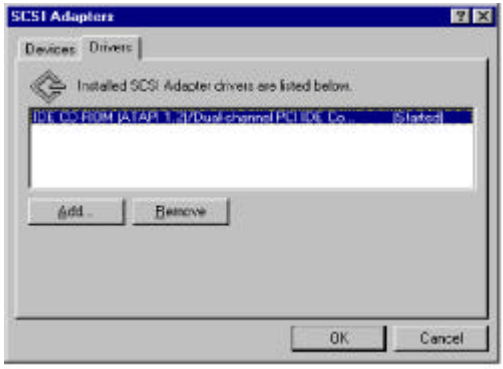
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Add cPCI-8212/8212R & cPCI-8210 (SCSI) driver to Windows NT4.0

While you first plug cPCI-8211 card and enter Windows NT.

Step1: Select Control Panel.

Step2: Select SCSI Adapter.

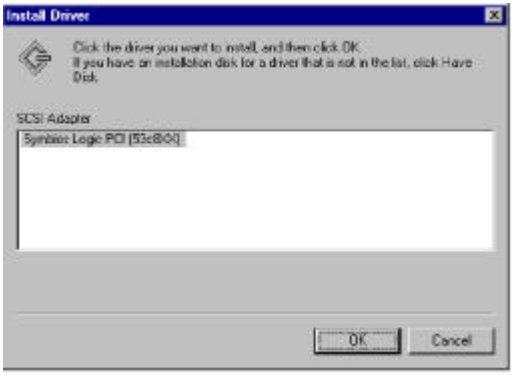


Step3: Select **Drivers** then select **Add.**



Step4: Place ADLINK's "Manual & Software Utility "CD into the appropriate CD driver. Type X:\NUPRO\8212\WINNTWINNTH\I386\WINNT\MINPORT in the input field and choose the model "Symbios Logic PCI(53c8XX) "(**X indicates the CD ROM driver**) and then click OK. The system will start the installation of cPCI-8212. If install cPCI-8210 Type "X:\NUIPC\8210\SCSI\WINNT\MINPORT in the input field

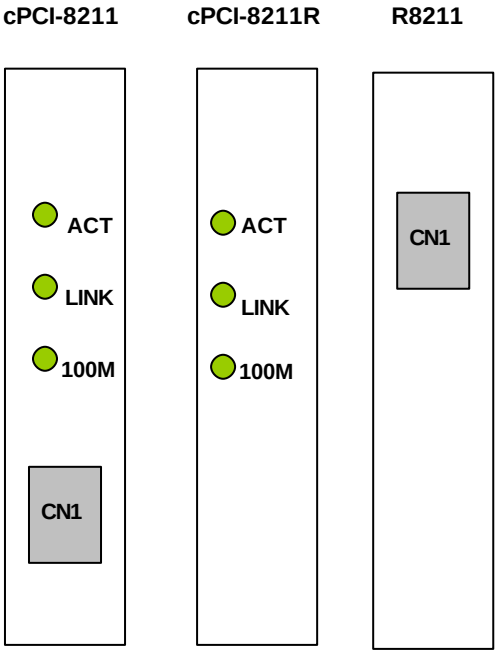
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2.5 PCB Panel & Layout

2.5.1 cPCI-8211 Panel



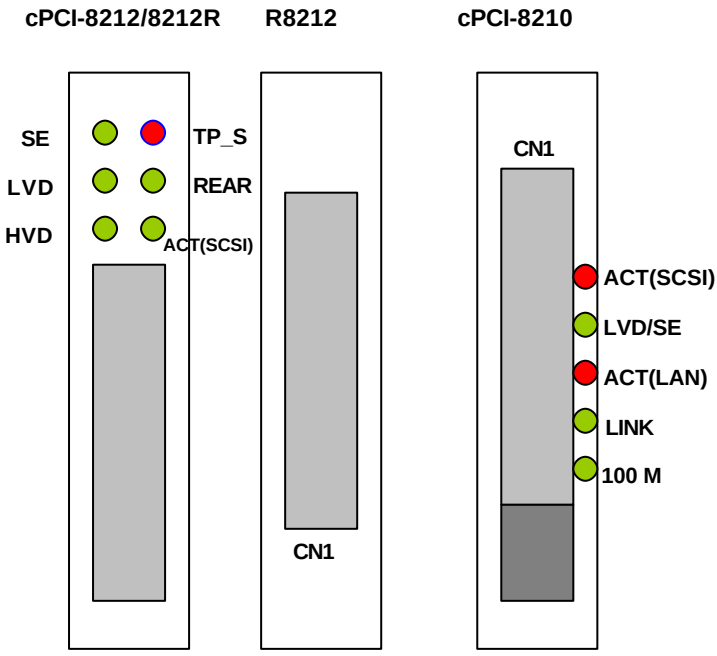
Front LED-definition of LED 1,2,3

ACT:	**LAN active**
LINK:	**LAN Link**
100M:	**10/100 Mbps**
CN1:	**RJ45 Connector**

Figure 2.5.1 Panel of cPCI-8211/8211R

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2.5.2 cPCI-8212/8210 Panel

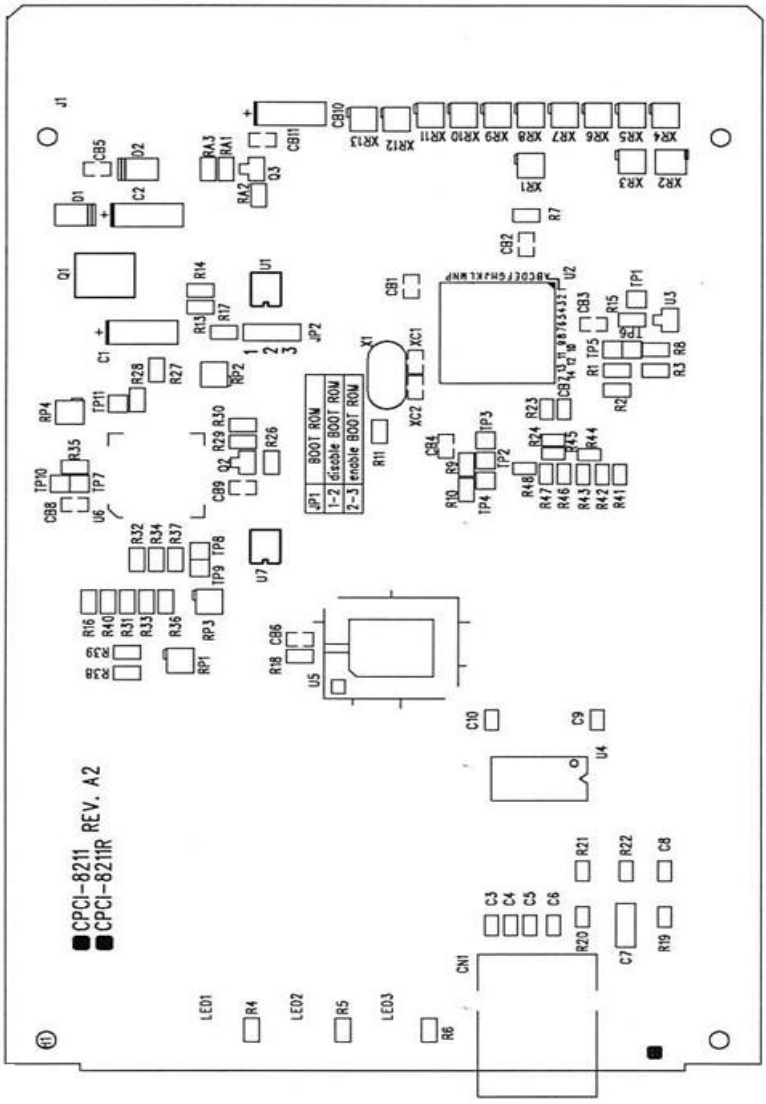


SE:	**Transmission mode (Single–Ended)**
LVD:	**Transmission mode(Low Voltage Differential)**
HVD:	**Transmission mode(High Voltage Differential)**
TP_S:	**Terminal Power Shorted (RED)**
REAR:	**Rear SCSI connection display (Only for cPCI-8212R)**
LVD/SE:	**Transmission mode (Low Voltage Differential & Single–Ended)**
ACT(SCSI):	**SCSI active**
LINK:	**LAN Link**
100M:	**10/100 Mbps**
ACT(LAN):	**LAN active**
CN1:	**68-pin Wide Ultra-2 SCSI Connector**
CN2:	**RJ45 Connector**

Figure 2.5.2 Panel of cPCI-8212 / cPCI-8210

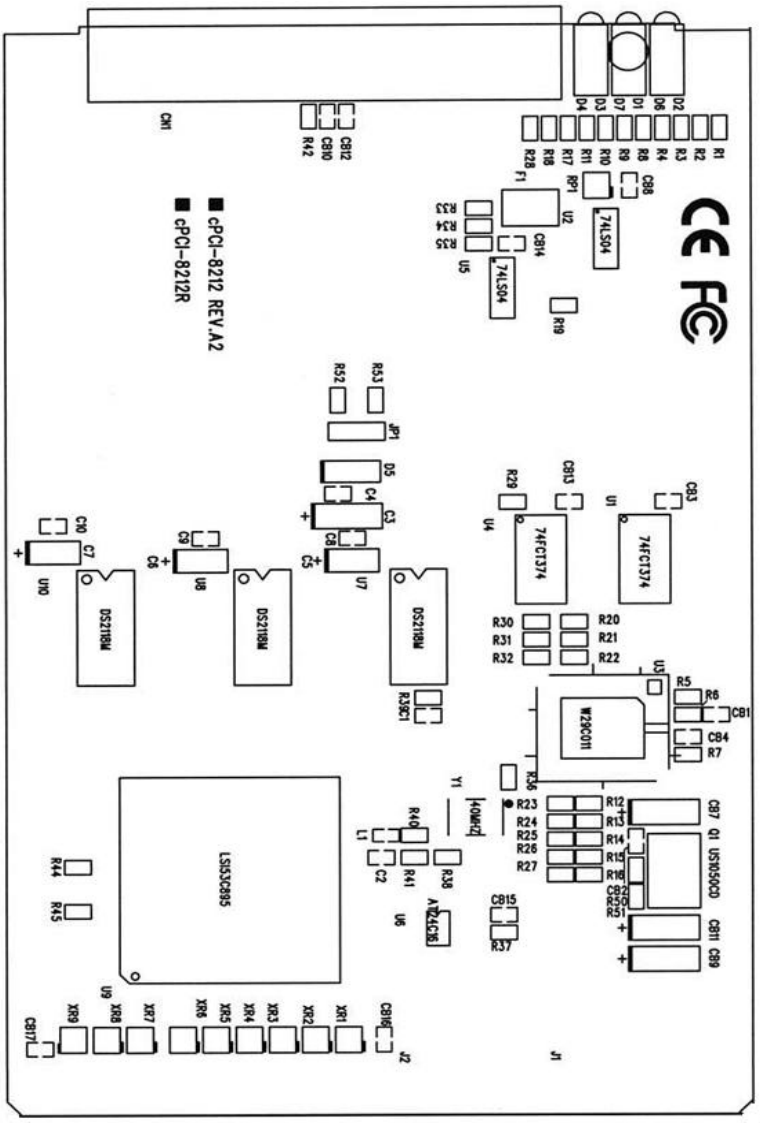
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2.5.3 cPCI-8211 Layout



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2.5.4 cPCI-8212 Layout



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2.6 Jumper & Switches Setting

2.6.1 cPCI-8210 Switched Setting

Switches on the I/O card are used to select options for different components used. The switch-on /off is to accommodate the variations of the flash Boot ROM. The flash ROM is optional. When the flash ROM is installed, the switch setting is as following table:

For + 12V flash ROM type

	Switch1	Switch2	Switch3	Switch4
SCSI	ON	OFF	OFF	OFF
LAN	OFF	ON	OFF	OFF

For + 5V flash ROM type

	Switch1	Switch2	Switch3	Switch4
SCSI	OFF	OFF	OFF	OFF
LAN	OFF	OFF	OFF	OFF

2.6.2 cPCI-8211/8211R Jumper Setting

ThecPCI-8211 supposes remote boot by PREBOOT EXECUTION ENVIRONMENT (PXE) function. The user should be enable the system BIOS's "Boot From Lan First " item. When post finished, press Ctrl+S Into INTEL Boot Agent Setup Program. There are seven item as follow.

Boot Protocol: **PXE (RPL)**
PnP/BEVBoot: **Disable (Enable)**
Default Boot: **Network (Local)**
Local Boot: **Enable (Disable)**
Prompt time: **5 (2,3,8)**
Setup Message: **Disable (Enable)**
Power Mgmt: **ACPI (APM)**
JP1: **Boo tRom enable & disable setting**

ault Setting

JP1	Disable BOOT ROM	Enable BOOT ROM
Jumper Pin No.	1 - 2	2 - 3

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2.6.3 cPCI-8212R Jumper Setting

The cPCI-8212R supposes front and rear connection. When the front and rear are both connected device, like fig 2.6.1,the terminate of the cPCI-8212R should be disabled.

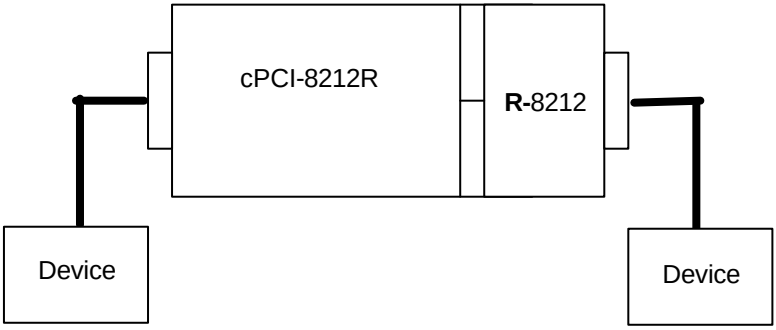
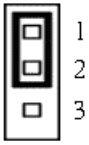
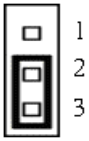


Figure 2.6.1

JP1: Terminate enable & disable setting

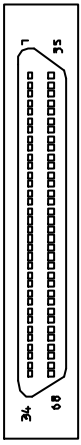
JP1	Enable terminate (Default Setting)	Disable terminate
Jumper Setting		

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2.7 Pin-definition of 68-pin Wide Ultra2 SCSI Connector

68-pin Wide Ultra2 SCSI Connector

The table below shows the pin-out assignments of this 68-pin connector.



Wide Ultra2

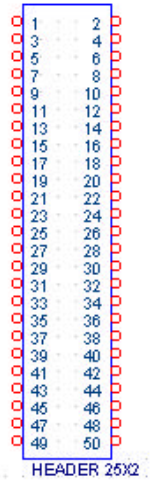
Signal Name	Pin #	Pin #	Signal Name
LVDP12	1	35	LVDM12
LVDP13	2	36	LVDM13
LVDP14	3	37	LVDM14
LVDP15	4	38	LVDM15
LVDPHP	5	39	LVDPHM
LVDP0	6	40	LVDM0
LVDP1	7	41	LVDM1
LVDP2	8	42	LVDM2
LVDP3	9	43	LVDM3
LVDP4	10	44	LVDM4
LVDP5	11	45	LVDM5
LVDP6	12	46	LVDM6
LVDP7	13	47	LVDM7
LVDPLP	14	48	LVDPLM
GROUND	15	49	GROUND
DFFSENSE	16	50	LVEXT68
LVTRMPWR	17	51	LVTRMPWR
LVTRMPWR	18	52	LVTRMPWR
N.C.	19	53	N.C.
GROUND	20	54	GROUND
LVATNP	21	55	LVATNM
GROUND	22	56	GROUND
LVBSYP	23	57	LVBSYM
LVACKP	24	58	LVACKM
LVRSTP	25	59	LVRSTM
LVMSGP	26	60	LVMSGM
LVSELP	27	61	LVSELM
LVCDP	28	62	LVCDM
LVREQP	29	63	LVREQM
LVIOP	30	64	LVIOM
LVDP8	31	65	LVDM8
LVDP9	32	66	LVDM9
LVDP10	33	67	LVDM10
LVDP11	34	68	LVDM11

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2.8 Pin-definition of 50-pin Ultra SCSI Connector

50-pin Ultra SCSI Connector

The table below shows the pin-out assignments of this 50-pin connector.



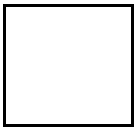
Signal Name	Pin #	Pin #	Signal Name
LVDP0	1	2	LVDM0
LVDP1	3	4	LVDM1
LVDP2	5	6	LVDM2
LVDP3	7	8	LVDM3
LVDP4	9	10	LVDM4
LVDP5	11	12	LVDM5
LVDP6	13	14	LVDM6
LVDP7	15	16	LVDM7
LVDPLP	17	18	LVDPLM
GROUND	19	20	GROUND
DIFFSENSE	21	22	DIFFSENSE
N.C.	23	24	N.C.
LVTRMPWR	25	26	LVTRMPWR
N.C.	27	28	N.C.
GROUND	29	30	GROUND
LVATNP	31	32	LVATNM
GROUND	33	34	GROUND
LVBSYP	35	36	LVBSYM
LVACKP	37	38	LVACKM
LVRSTP	39	40	LVRSTM
LVMSGP	41	42	LVMSGM
LVSELP	43	44	LVSELM
LVCDP	45	46	LVCDM
LVREQP	47	48	LVREQM
LVIOP	49	50	LVIOM

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2.9 Pin-definition of RJ45 Connector

RJ45 Connector

This connector is for the 10/100Mbps Ethernet capability of the CPU card. The figure below shows the pin out assignments of this connector and its corresponding input jack.



RJ45

Pin#1: TD+ Pin#5: NC
Pin#2: TD- Pin#6: RD-
Pin#3: RD+ Pin#7: NC
Pin#4: NC Pin#8: NC

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Product Warranty/Service

ADLINK warrants that equipment furnished will be free from defects in material and workmanship for a period of one year from the date of shipment. During the warranty period, we shall, at our option, either repair or replace any product that proves to be defective under normal operation.

This warranty shall not apply to equipment that has been previously repaired or altered outside our plant in any way as to, in the judgment of the manufacturer, affect its reliability. Nor will it apply if the equipment has been used in a manner exceeding its specifications or if the serial number has been removed.

ADLINK does not assume any liability for consequential damages as a result from our product uses, and in any event our liability shall not exceed the original selling price of the equipment. The remedies provided herein are the customer's sole and exclusive remedies. In no event shall ADLINK be liable for direct, indirect, special or consequential damages whether based on contract of any other legal theory.

The equipment must be returned postage-prepaid. Package it securely and insure it. You will be charged for parts and labor if the warranty period is expired or the product is proves to be misuse, abuse or unauthorized repair or modification.

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