GIE62+

2-CH PoE Gigabit Ethernet Vision (GigE Vision) Interface Card

User's Manual

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1 Introduction

The ADLINK GIE62+ is a PCI Express® x4 lane frame grabber that supports two Power over Ethernet cameras and delivers unprecedented image acquisition rates of up to 2 Gbps and long cable distances of up to 100 m. The GIE62+ supports Power over Ethernet (PoE) to simplify installation, lower maintenance costs, and reduce the total cost of ownership.

The ADLINK GIE62+ supports the Link aggregation control protocol, offering an inexpensive way to set up a double-speed backbone network that transfers much more data than any one single Gigabit Ethernet port or device.

The GIE62+ is also ideal for automation applications by providing two of each isolated TTL digital inputs, outputs, and programmable trigger output pulses to connect to external devices such as position sensors and strobe lighting.

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1.1 Features

- IEEE802.3af (48 V,15.4 W/channel) compliant
- Supports two independent GbE ports
- Supports Link aggregation
- Supports jumbo frames (9.5 KByte)
- PCI Express x4 compliant
- Provides Industrial screw lock connector
- 2 isolation digital inputs/outputs
- 2 isolation TTL level programmable trigger output pulses

1.2 Applications

- Machine Vision Inspection System
- Scientific Research Instrumentation
- Medical Research Instrumentation

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2 Hardware Reference

2.1 GIE62+

2.1.1 GIE62+ Specifications

Power over Ethernet Port

- Two full-integrated Gigabit Ethernet Media Access Control (MAC) and physical layer (PHY) ports.
- The Power over Gigabit Ethernet Controller complies with the IEEE 802.3.af standard for a minimum of 15.4 watts with power up to 48 V over the existing CAT-5 Ethernet infrastructure without the need to make any modifications.
- The Power over Gigabit Ethernet Controller provides a standard IEEE 802.3 Ethernet interface for 1000BASE-T, 100BASE-TX, and 10BASE-T applications (802.3, 802.3u, and 802.3ab).
- 9 kB jumbo frame support

IO Triggers

- 2 isolated digital inputs
- 2 isolated digital outputs
- 2 isolated trigger inputs
- 2 isolated trigger outputs

Isolated Voltage

- Rated Isolation Voltage 1000 V @ 60 seconds

Form Factor

- PCI Express interface, x4 lanes

Dimensions

- W x L: 129.5 x 111.15 mm

Operating Environment

- Temperature: 0 to 55°C
- Humidity: 5 to 90% RHNC

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Storage Environment

- Temperature: 0 to 85°C
- Humidity: 0 to 95% RHNC

Power Requirements

- Power from the PCIe slot:
  - +12 V max @ 0.2 A
  - +3.3 V max @ 1.5 A
- Power from power connector (CN3)
  - +12V max @ 3A (when the two Power over Ethernet ports are fully loaded, each port consumes 15.4 W)

2.1.2 GIE62+ Connectors & Pin Definitions

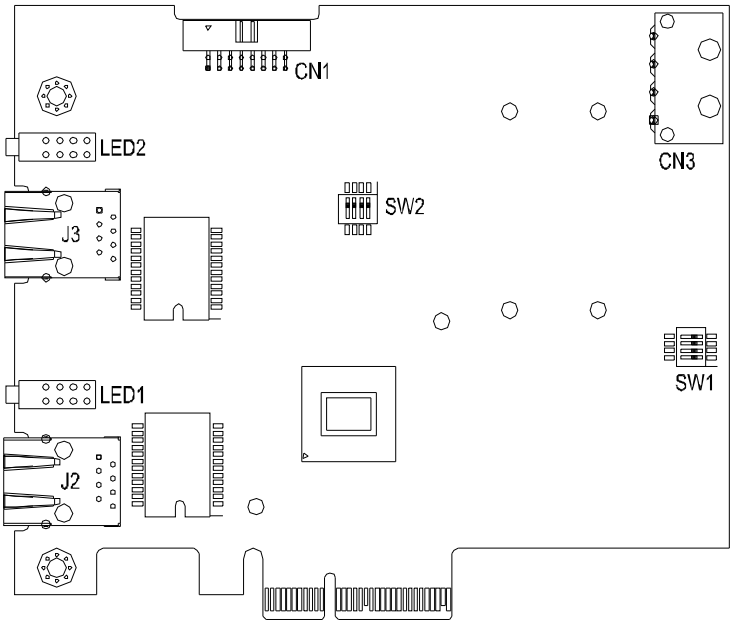
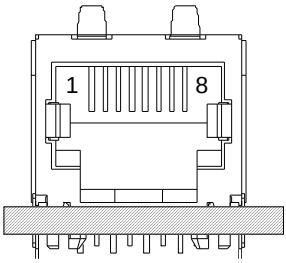


Figure 2-1: GIE62+ Layout

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J2, J3 RJ-45 Ethernet Port

- J2 RJ-45: LAN 1 Port
- J3 RJ-45: LAN 2 Port

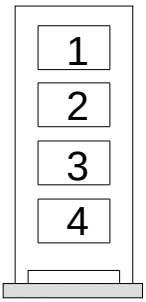


Pin	Signal	Pin	Signal
1	MDI0+ (PoE_DC48V)	5	MDI2- (PoE_DC48V)
2	MDI0- (PoE_DC48V)	6	MDI1- (PoE_DC0V)
3	MDI1+ (PoE_DC0V)	7	MDI3+ (PoE_DC0V)
4	MDI2+ (PoE_DC48V)	8	MDI3- (PoE_DC0V)

Table 2-1: J2 RJ-45: LAN 1 Port

LED1: LAN 1 status LED

LED2: LAN 2 status LED



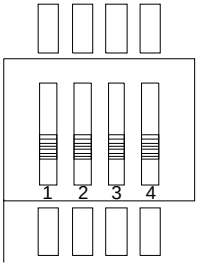
LED (Yellow)	Status	Function
1 Speed status	On	1000 Mbps
	Off	1000 Mbps link off
2 Speed status	On	100 Mbps
	Off	100 Mbps link off
3 Link status	ON	Data link
	OFF	Data link off
	Blinking	Data transfer in progress
4 PoE status	On	PoE link
	Off	PoE link off

Table 2-2: LAN status LED

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SW1: Card ID Select

The Card ID supports up to four cards



Pin	Signal Name	Default
1	Board ID Select 0	ON
2	Board ID Select 1	ON
3	Not used	ON
4	Not used	ON

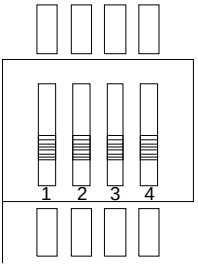
Table 2-3: SW1: Card ID Select

Card ID	Board ID Select 0	Board ID Select 1
0	ON	ON
1	OFF	ON
2	ON	OFF
3	OFF	OFF

Table 2-4: Card ID Select Table

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SW2: PoE Function Select



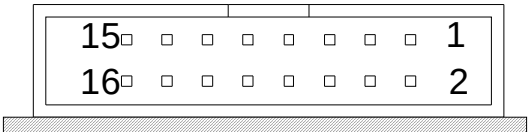
Pin	Signal Name	Default
1	Shut off +48 V supply	OFF
2	Not used	OFF
3	PoE 1 shutdown	OFF
4	PoE 2 shutdown	OFF

LAN Port	PoE Function	Shut Off +48V Supply	PoE 1 Shutdown	PoE 2 Shutdown
1	ON	OFF	OFF	
	OFF		ON	
2	ON	OFF		OFF
	OFF			ON

Table 2-5: SW2: PoE Function Select

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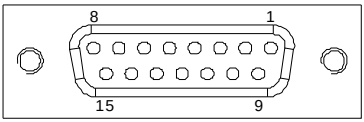
CN1: GPIO & Trigger



PIN	PIN NAME	TYPE	PIN	PIN NAME	TYPE
1	In01	IN	2	ComI01	IN
3	In02	IN	4	ComI02	IN
5	Out01	OUT	6	ComO01	OUT
7	Out02	OUT	8	ComO02	OUT
9	TrgIn1	IN	10	TrgComI01	IN
11	TrgIn2	IN	12	TrgComI02	IN
13	TrgOut1	OUT	14	TrgOut2	OUT
15	Frame Ground	OUT	16		

Table 2-6: CN3: GPIO & Trigger

The extension cable connector is a D-sub 15 pin female connector.

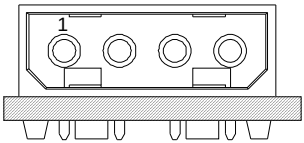


PIN	PIN NAME	TYPE	PIN	PIN NAME	TYPE
1	In01	IN	9	ComI01	IN
2	In02	IN	10	ComI02	IN
3	Out01	OUT	11	ComO01	OUT
4	Out02	OUT	12	ComO02	OUT
5	TrgIn1	IN	13	TrgComI01	IN
6	TrgIn2	IN	14	TrgComI02	IN
7	TrgOut1	OUT	15	TrgOut2	OUT
8	Frame Ground	OUT			

Table 2-7: CN3: GPIO & Trigger

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CN3: Power Connector



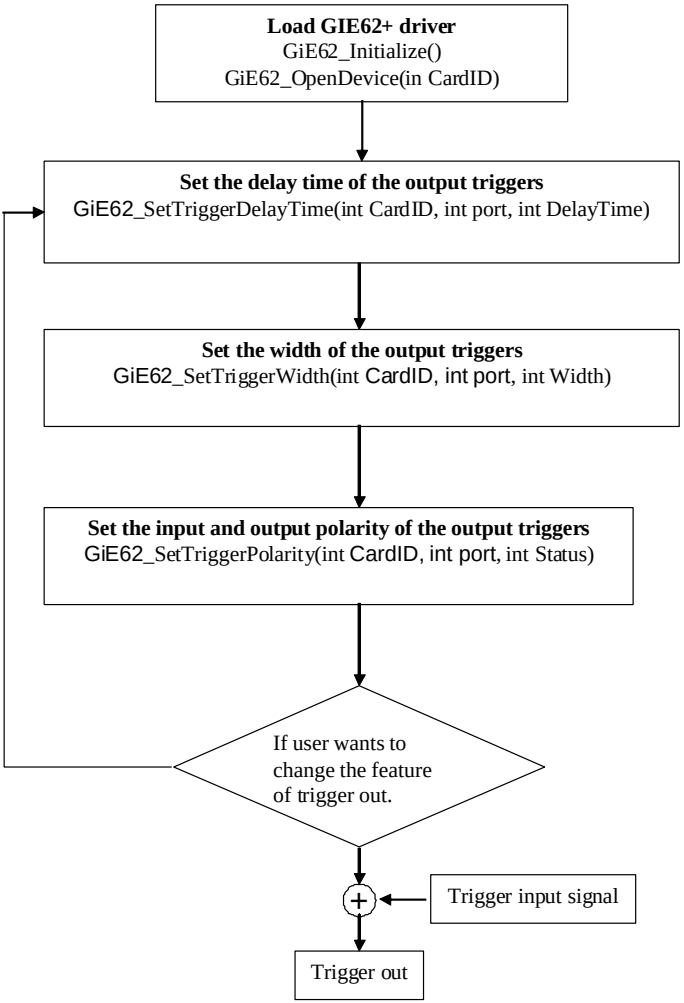
Pin	Singal
1	+12V
2	GND
3	GND
4	NC

Table 2-8: CN3: Power Connector

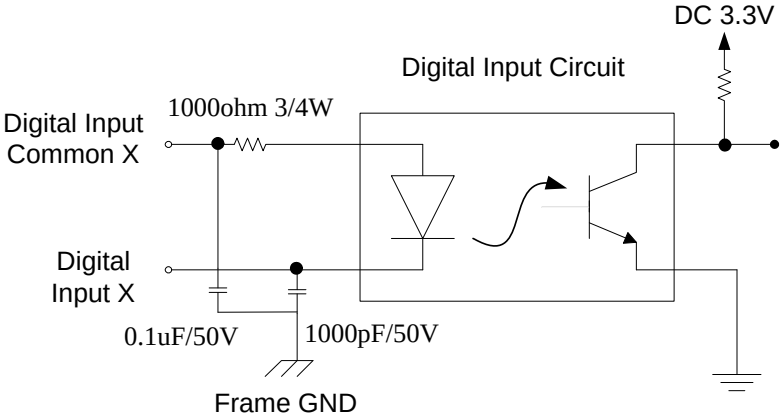
Note: When using the PoE feature, CN3 must be connected to the power supply.

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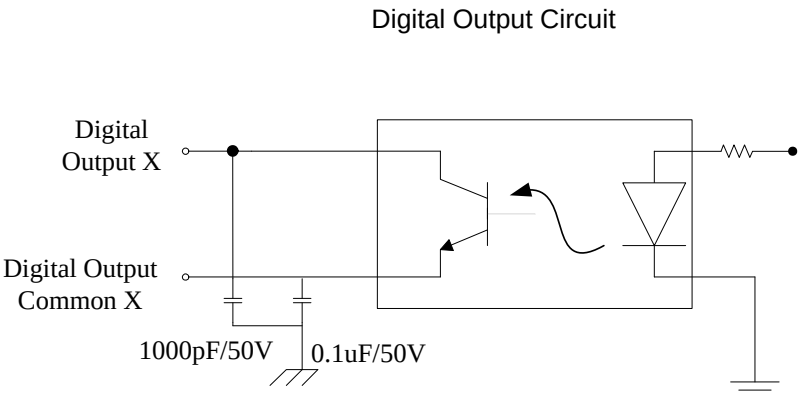
Trigger control setting flow chart



Digital Input Circuit

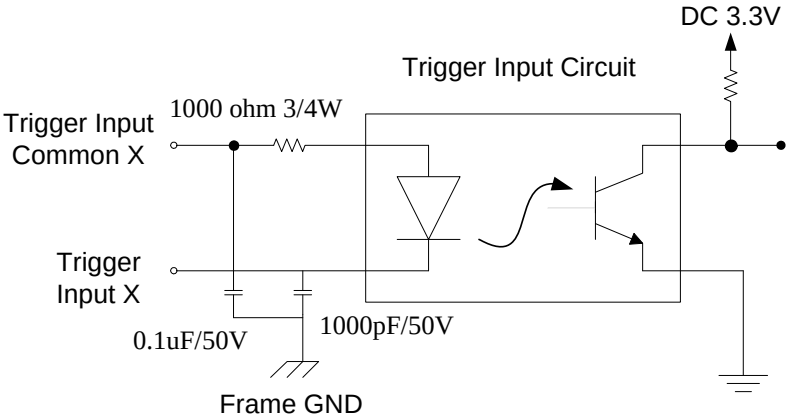


Digital Output Circuit

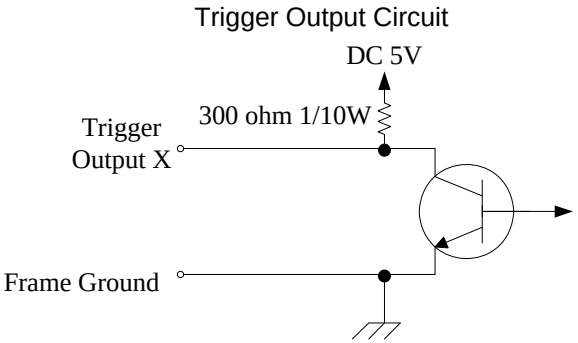


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Trigger Input Circuit

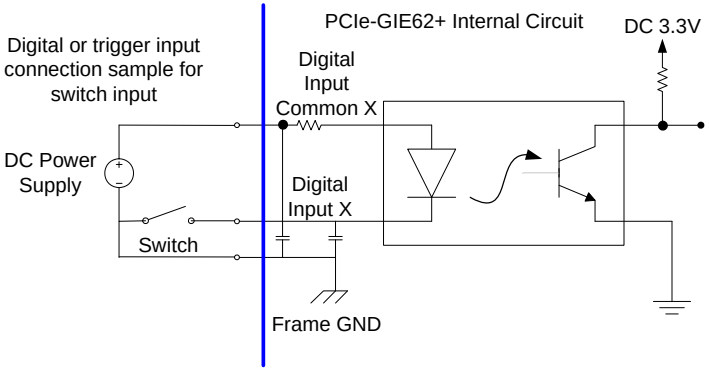


Trigger Output Circuit



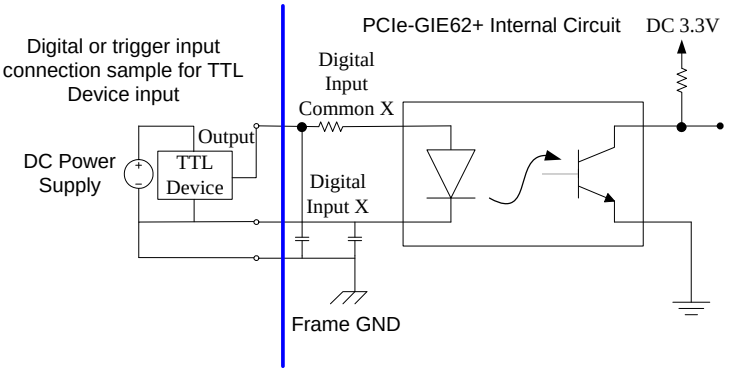
Connection Sample with External I/O Device

- Digital input or trigger input connection for switch input.



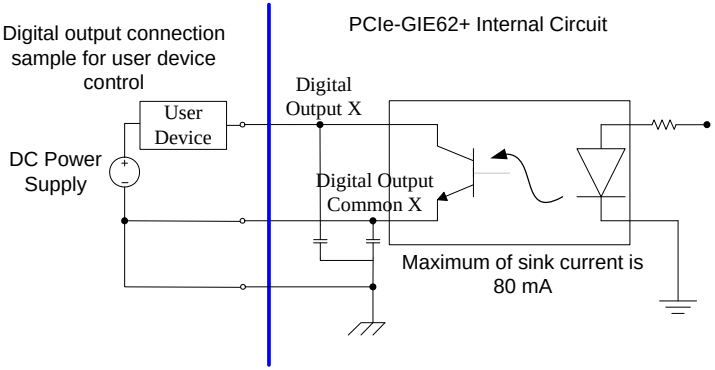
- Digital input or trigger input connection for TTL signal input.

Note: The response of the computer needs to be inversed in this connection condition mode.
If the external device output controls the digital input common contact, the response of the computer must be inversed.

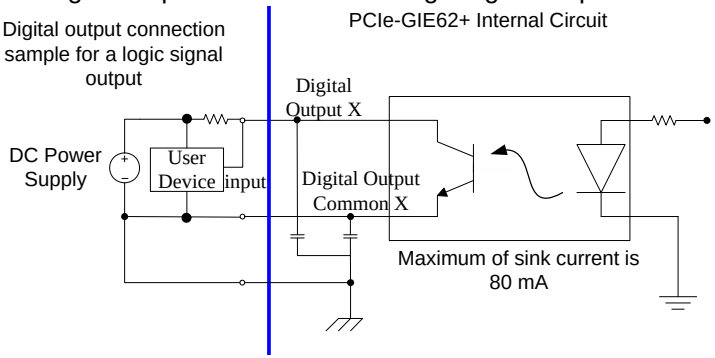


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▶ Digital output connection for user device control.

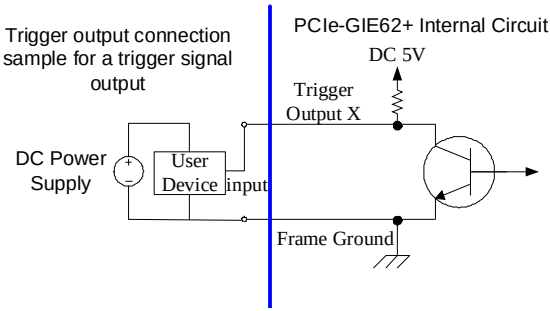


▶ Digital output connection for a logic signal output.

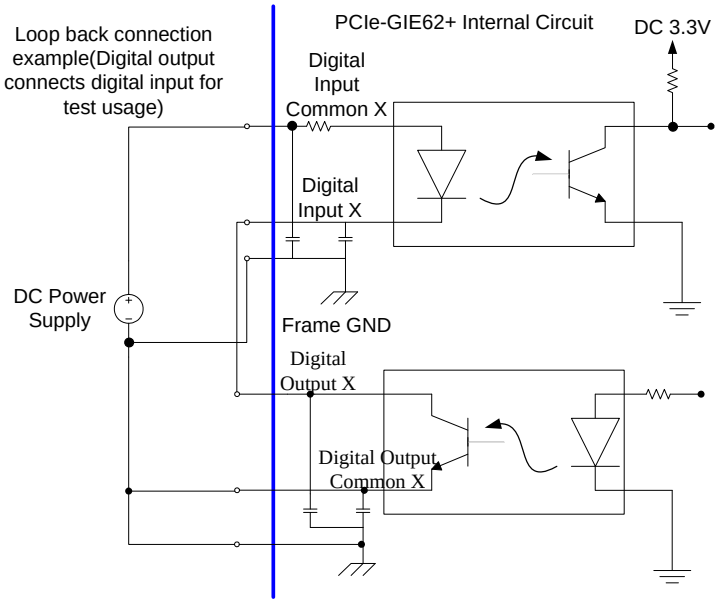


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▶ Trigger output connection for a trigger signal output.



▶ Loop back connection.



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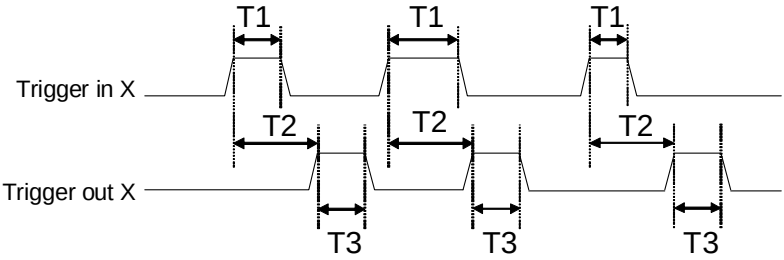
Hardware Features

Function	Electronic specification
Isolated Digital Input	Photo Coupled Input x 2 ch
Status	Normal is High, active is Low
Input voltage range (ComI to In)	0 to 25 V
High Level (active off)	ComI to In < 0.5 V
Low Level (active on)	ComI to In > 2.2 V
Isolated Digital Output	Photo Coupled Output x 2 ch
Status	Normal is Open, active is Low
Load voltage range	3 to 24V
Output sink current	80 mA (Max)
Output voltage drop	1.0 V (Max)
Leak current	0.1 mA (Max)
Reverse voltage	-6 V
Isolated Trigger Input	Photo Coupled Trigger input x2 ch
Status	Normal is High, active is Low
Input voltage range (TrgComI to TrgIn)	0 to 25 V
High Level (active off)	TrgComI to TrgIn < 0.5 V
Low Level (active on)	TrgComI to TrgIn > 2.4 V
Minimum pulse width	0.1 ms
Trigger In Control	
Polarity (Trigger edge)	Rising / Falling edge selectable
Isolated Trigger out	Photo Coupled Trigger output x2 ch
Status	Normal is High, active is Low
Load voltage range	0 to 5 V
Output current	16 mA (Max)
Output voltage drop	0.4 V Max(@16 mA)
Trigger Out Control	
Trigger delay	0 ms to 1000 ms selectable (1 ms/step.)
Trigger out pulse width	0 ms to 50 ms selectable (0.1 ms/step) Set at 0 ms to disable
Polarity	Positive / Negative Selectable

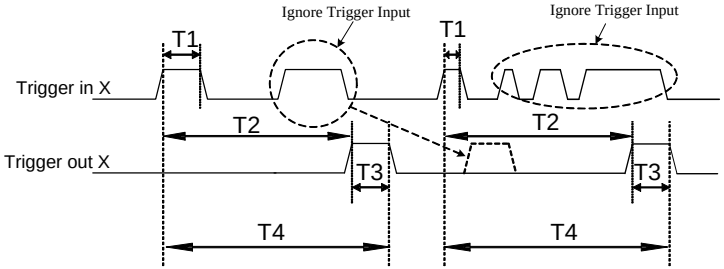
Table 2-9: Hardware Features

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Trigger Control Timing Chart



Symbol	Characteristic	Specification
T1	Trigger input pulse width	Minimum width is 0.1 msec
T2	Trigger delay	0-1000 msec selectable(1 msec/step)
T3	Output trigger pulse width	0.1-50 msec selectable(0.1 msec/step)



T4(Trigger counter busy time)=T2+T3;
If signal is on Trigger input channel during trigger counter busy time,it will be ignored.

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3 Installation Guide

3.1 Hardware Installation

Use the following steps to install the GIE62+ series board on the PCI express bus:

1. Remove the computer cover using the instructions from the computer manual.
2. Check that there is an empty PCI express slot. If there is not an empty slot, remove a PCI express board from the computer to make room for the GIE62+ board and take note of the chosen slot number.
3. Remove the blank metal plate located at the back of the selected slot (if any). Keep the removed screw to fasten the GIE62+ board after installation.
4. Carefully position the GIE62+ in the selected PCI express slot. If using a tower computer, align the board with the board slots.
5. Press the board firmly, but carefully into the connector.
6. Anchor the board by replacing the screw.
7. Plug in the cable to the PoE power connector (CN3).
8. Connect device via a Gigabit Ethernet connector.
9. Turn on the computer.

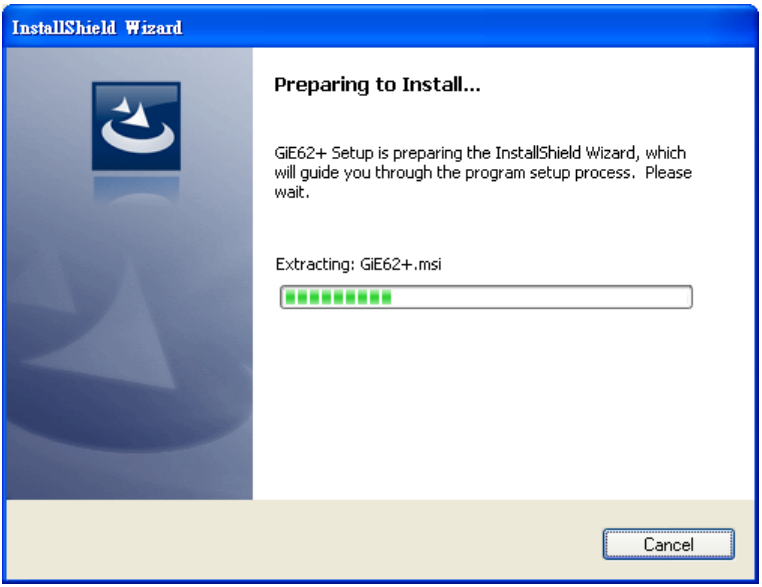
Note: The GIE62+ can be installed in a PCI Express x4, x8, and x16 slot.

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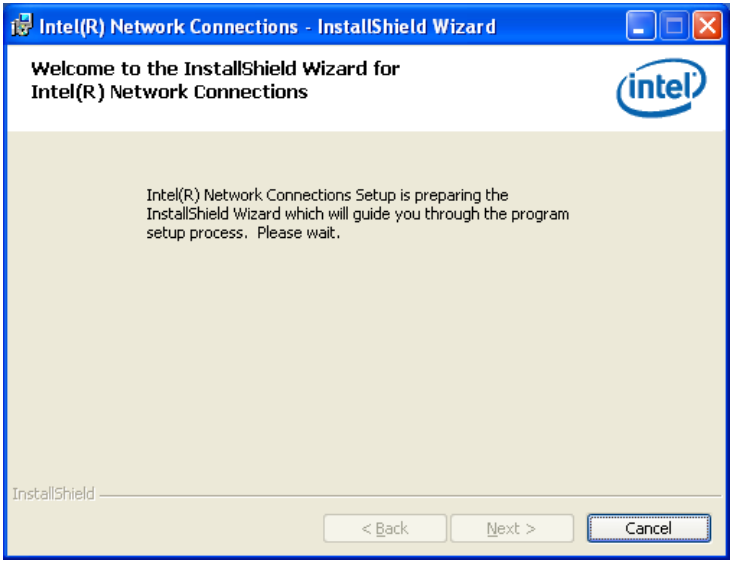
3.2 Driver Installation

This is a two-part driver installation which includes installation of the Intel network connections driver and installation of the GIE62+ driver. The former is used for network connections between GIE62+ cards and PoE or Non-PoE GigE Vision cameras; the later is used for GIE62+ DIO and trigger functions.

1. Double Click GIE62+_XP32.exe (for 2K/XP) or GIE62+_Vista32.exe (for Vista) to start driver installation of the Intel network chipsets according to your operating system, and the Intel network connections driver installation will begin first.

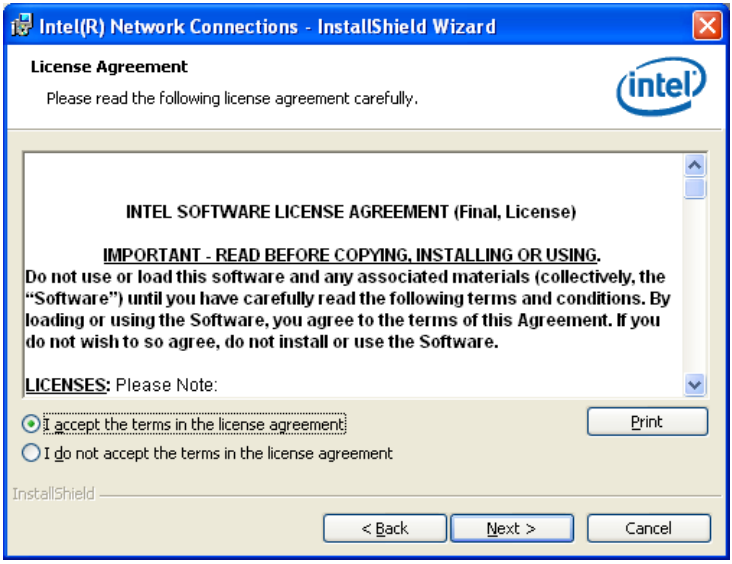


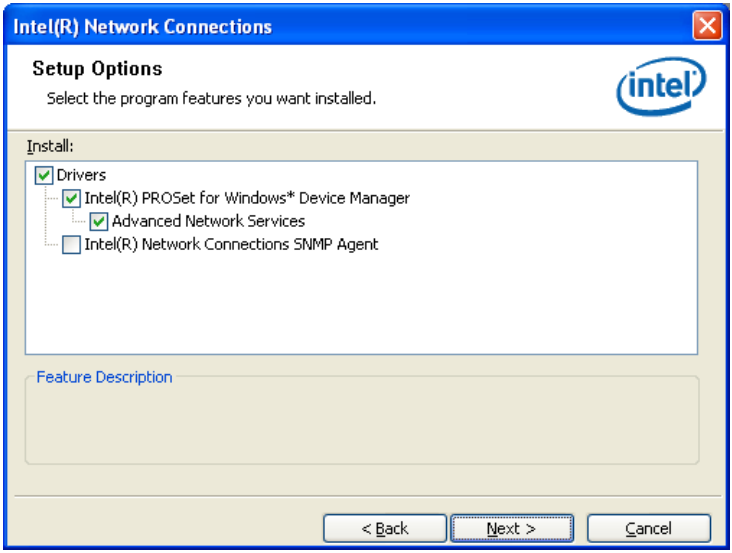
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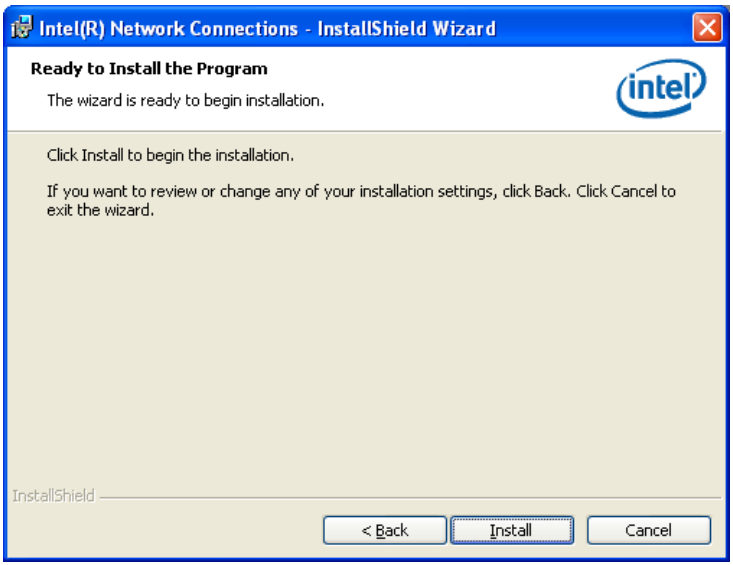
2. Select "I accept the terms in the license agreement" and click “Next” to continue driver installation.

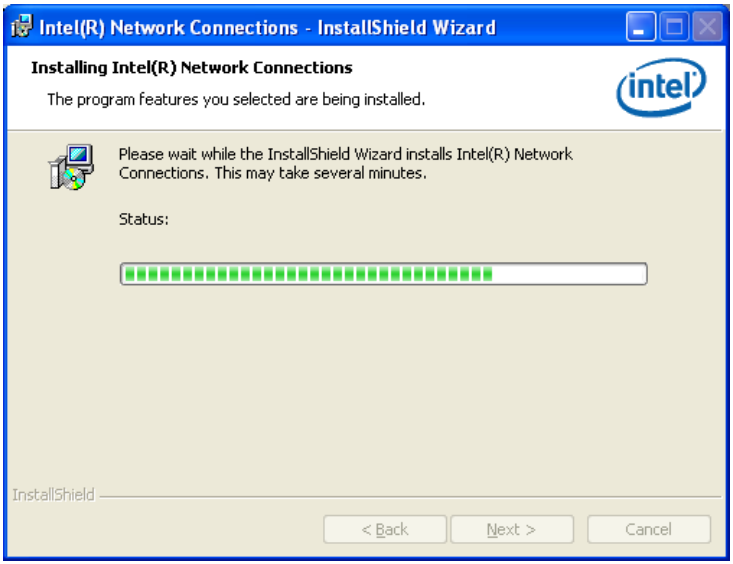




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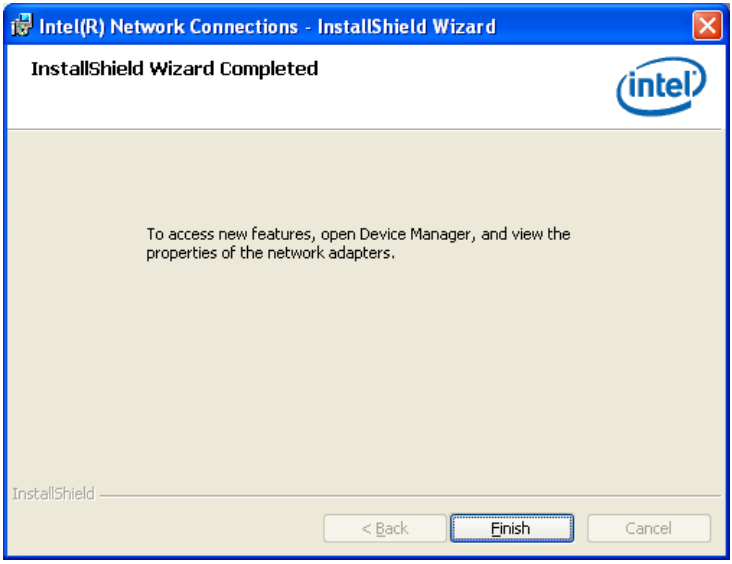
3. Click “Install” to start installing.





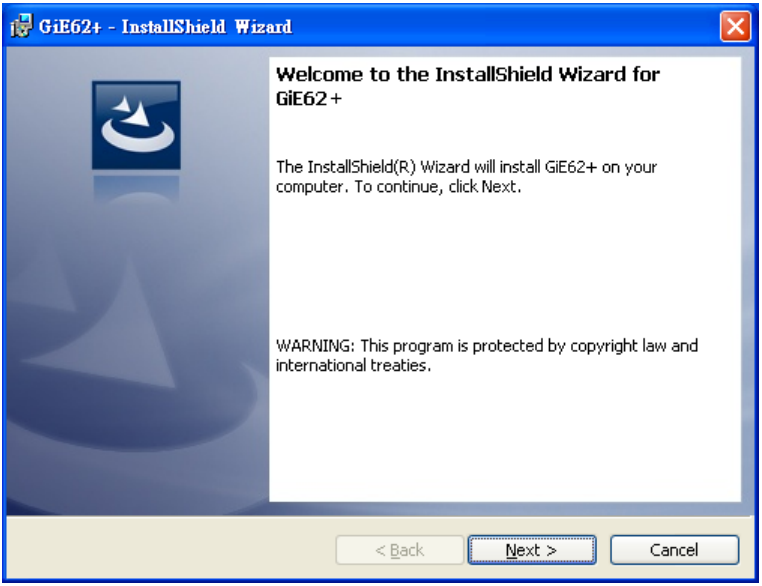
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4. Click “Finish” to complete Intel network connections driver installation.



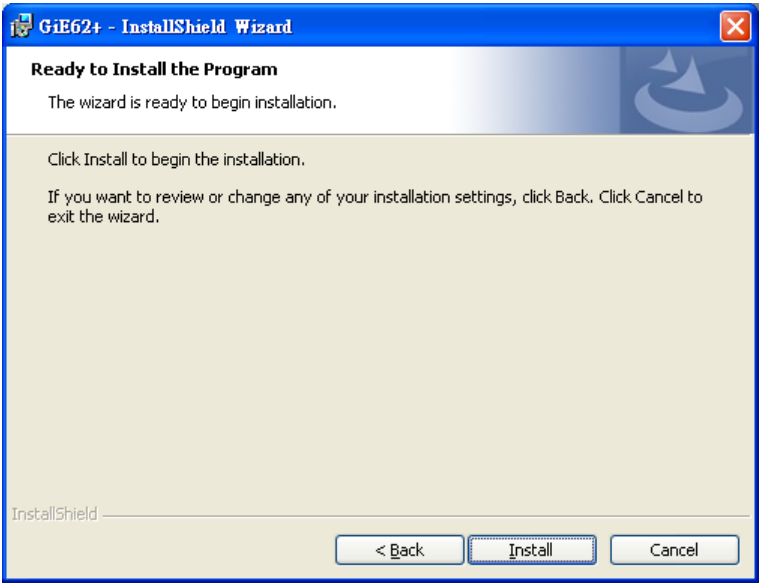
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5. After completing the Intel network connections driver installation, the GIE62+ driver installation phase will begin.

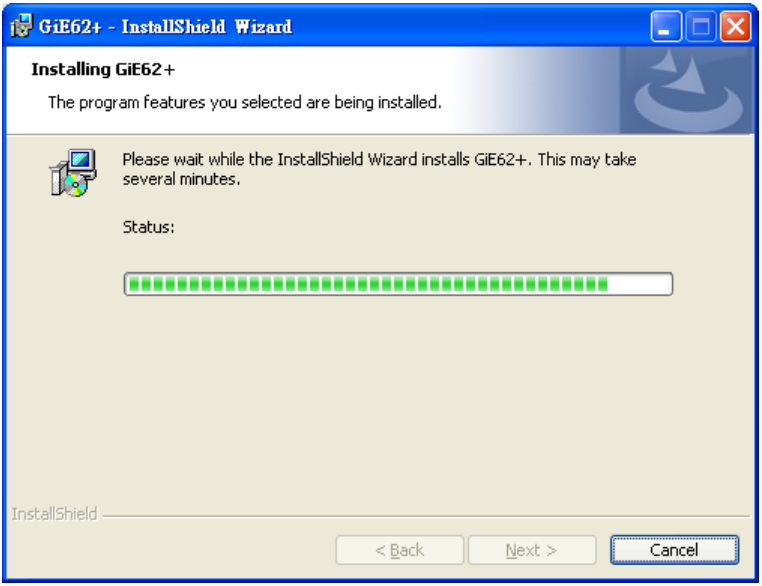


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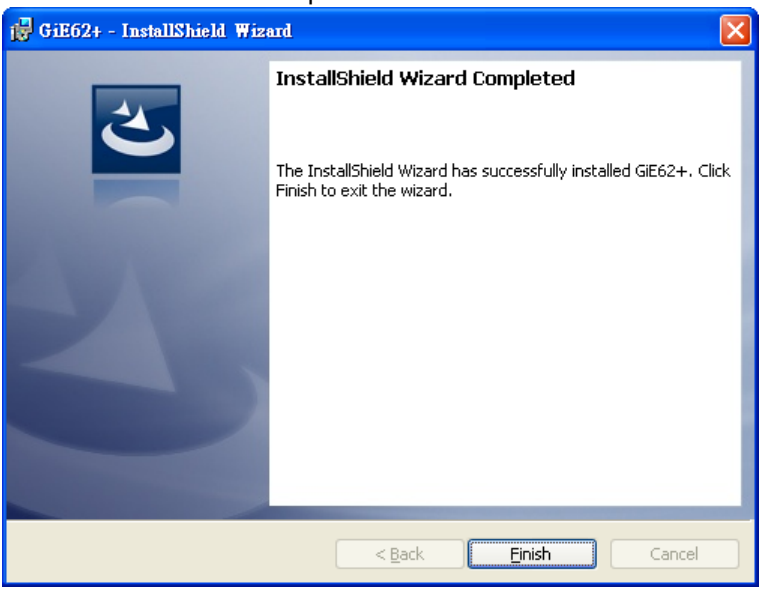
6. Click “Next” to continue driver installation.



7. Click “Install” to start installing.



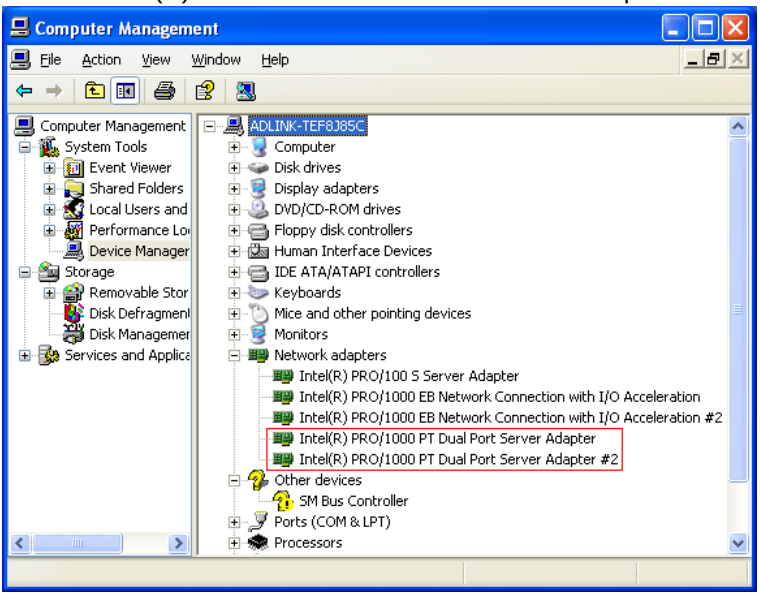
8. Click “Finish” to complete GIE62+ driver installation.



9. To ensure the Intel network connections driver has been installed successfully, go to the “Device Manager” and check “Network adapters”. You should see the following two items:

   ▷ Intel(R) PRO/1000 PT Dual Port Server Adapter

   ▷ Intel(R) PRO/1000 PT Dual Port Server Adapter #2



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4 Function Library

This chapter describes the API for GIE62+ cards. Please refer to the sample programs in the installation folder, and then use these functions to develop application programs in C#, Visual Basic.NET, Visual Basic, Visual C++, or C++ Builder.

Note: C# and Visual Basic.NET sample programs were developed with Visual Studio 2005.

4.1 Function List

Function name	Description
System Functions	
GiE62_Initialize	Load the driver of GIE62+ card. You must call this function before any other functions
GiE62_GetTotalDeviceNum	Get the number of GIE62+ cards in your system
GiE62_GetTotalDeviceID	Get the CardID(s) of all GIE62+ cards in your system
GiE62_OpenDevice	Open GIE62+ card and set it to the default status
GiE62_ResetDevice	Reset GIE62+ card to the default status
GiE62_GetFirmwareVersion	Get the firmware version of GIE62+ card
DIO Functions	
GiE62_SetDOStatus	Set general purpose digital output status
GiE62_GetDIStatus	Get general purpose digital input status
Trigger Functions	
GiE62_SetTriggerDelayTime	Set the delay time of output triggers
GiE62_SetTriggerOutWidth	Set the width of output triggers
GiE62_SetTriggerOutPolarity	Set the output polarity of output triggers
GiE62_SetTriggerInPolarity	Set the input polarity of output triggers
GiE62_GetTriggerDelayTime	Get the delay time of output triggers
GiE62_GetTriggerOutWidth	Get the width of output triggers
GiE62_GetTriggerOutPolarity	Get the output polarity of output triggers
GiE62_GetTriggerInPolarity	Get the input polarity of output triggers

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4.2 Functions

4.2.1 GiE62_Initialize

Description

Load the driver of GIE62+ card. You must call this function before any other functions.

Syntax

```
int GiE62_Initialize();
```

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4.2.2 GiE62_GetTotalDeviceNum

Description

Get the number of GIE62+ cards from the value returned by this function.

Syntax

```
int GiE62_GetTotalDeviceNum();
```

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4.2.3 GiE62_GetTotalDeviceID

Description

Get the CardID(s) of each GIE62+ cards in your system.

Syntax

```
int GiE62_GetTotalDeviceID(int *DeviceID);
```

Parameters

`DeviceID`

[out] Pointer to a 32-bit integer array with four elements which stores the read out CardID(s). Please note that the array size cannot be less than 4, and each GIE62+ card must be assigned a different CardID by through the DIP switch on board. If the array size is more than 4, only the first 4 elements contain CardID(s) since GIE62+ supports 4 cards at most in a system.

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4.2.4 GiE62_OpenDevice

Description

Open the GIE62+ card and set it to the default status.

Syntax

```
int GiE62_OpenDevice(int CardID);
```

Parameters

`CardID`

[in] Card ID of GIE62+. The card ID could be 0, 1, 2 and 3. It is defined by the DIP switch on the board.

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4.2.5 GiE62_ResetDevice

Description

Reset the GIE62+ card and set it to the default status.

Syntax

```
int GiE62_ResetDevice(int CardID);
```

Parameters

`CardID`

[in] Card ID of GIE62+. The card ID could be 0, 1, 2 and 3. It is defined by the DIP switch on the board.

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4.2.6 GiE62_GetFirmwareVersion

Description

Get the firmware version of the GIE62+ card.

Syntax

```
int GiE62_GetFirmwareVersion(int CardID, char
*FirmwareVersion, int StringSize);
```

Parameters

`CardID`

[in] Card ID of GIE62+. The card ID could be 0, 1, 2 and 3. It is defined by the DIP switch on the board.

`FirmwareVersion`

[out] Pointer to a character array which stores the read out firmware version.

`StringSize`

[in] Size of the character array that will be returned.

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4.2.7 GiE62_SetDOStatus

Description

Set the general purpose digital output status.

Syntax

```
int GiE62_SetDOStatus(int CardID, int port, int
status);
```

Parameters

`CardID`

[in] Card ID of GIE62+. The card ID could be 0, 1, 2 and 3. It is defined by the DIP switch on the board.

`port`

[in] Port number of GIE62+. The port number could be 1 and 2.

`status`

[in] A 32-bit integer variable which represents the status of digital output.

- ▷ 0: Low
- ▷ 1: High

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4.2.8 GiE62_GetDIStatus

Description

Get the general purpose digital input status.

Syntax

```
int GiE62_GetDIStatus(int CardID, int port, int
*status);
```

Parameters

`CardID`

[in] Card ID of GIE62+. The card ID could be 0, 1, 2 and 3. It is defined by the DIP switch on the board.

`port`

[in] Port number of GIE62+. The port number could be 1 and 2.

`status`

[out] Pointer to a 32-bit integer variable which stores the read out digital input status.

- 0: Low
- 1: High

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4.2.9 GiE62_SetTriggerDelayTime

Description

Set the delay time of output triggers.

Syntax

```
int GiE62_SetTriggerDelayTime(int CardID, int port,
int DelayTime);
```

Parameters

`CardID`

[in] Card ID of GIE62+. The card ID could be 0, 1, 2 and 3. It is defined by the DIP switch on the board.

`port`

[in] Port number of GIE62+. The port number could be 1 and 2.

`DelayTime`

[in] A 32-bit integer variable which specifies the delay time of output triggers. The unit of delay time is in milliseconds (ms).

The value should be 0 - 1000.

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4.2.10 GiE62_SetTriggerOutWidth

Description

Set the width of output triggers.

Syntax

```
int GiE62_SetTriggerOutWidth(int CardID, int port,
int width);
```

Parameters

`CardID`

[in] Card ID of GIE62+. The card ID could be 0, 1, 2 and 3. It is defined by the DIP switch on the board.

`port`

[in] Port number of GIE62+. The port number could be 1 and 2.

`width`

[in] A 32-bit integer variable which specifies the width of output triggers. The unit of width is in 0.1 milliseconds (ms).

The value should be 0 - 500.

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4.2.11 GiE62_SetTriggerOutPolarity

Description

Set the output polarity of output triggers.

Syntax

```
int GiE62_SetTriggerOutPolarity(int CardID, int
port, int OutPolarity);
```

Parameters

`CardID`

[in] Card ID of GIE62+. The card ID could be 0, 1, 2 and 3. It is defined by the DIP switch on the board.

`port`

[in] Port number of GIE62+. The port number could be 1 and 2.

`OutPolarity`

[in] A 32-bit integer variable which specifies the output polarity of output triggers.

The value should be 0 or 1.

- ▷ 0: Negative
- ▷ 1: Positive

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4.2.12 GiE62_SetTriggerInPolarity

Description

Set the input polarity of output triggers.

Syntax

```
int GiE62_SetTriggerInPolarity(int CardID, int
port, int InPolarity);
```

Parameters

`CardID`

[in] Card ID of GIE62+. The card ID could be 0, 1, 2 and 3. It is defined by the DIP switch on the board.

`port`

[in] Port number of GIE62+. The port number could be 1 and 2.

`InPolarity`

[in] A 32-bit integer variable which specifies the input polarity of output triggers.

The value should be 0 or 1.

- ▷ 0: Falling
- ▷ 1: Rising

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4.2.13 GiE62_GetTriggerDelayTime

Description

Get the delay time of output triggers.

Syntax

```
int GiE62_GetTriggerDelayTime(int CardID, int port,
int *DelayTime);
```

Parameters

`CardID`

[in] Card ID of GIE62+. The card ID could be 0, 1, 2 and 3. It is defined by the DIP switch on the board.

`port`

[in] Port number of GIE62+. The port number could be 1 and 2.

`DelayTime`

[out] Pointer to a 32-bit integer variable which stores the read out delay time of output triggers. The unit of delay time is in milliseconds (ms).

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4.2.14 GiE62_GetTriggerOutWidth

Description

Obtain the width of output triggers.

Syntax

```
int GiE62_GetTriggerOutWidth(int CardID, int port,
int *width);
```

Parameters

`CardID`

[in] Card ID of GIE62+. The card ID could be 0, 1, 2 and 3. It is defined by the DIP switch on the board.

`port`

[in] Port number of GIE62+. The port number could be 1 and 2.

`width`

[out] Pointer to a 32-bit integer variable which stores the read out width of output triggers. The unit of width is in 0.1 milliseconds (ms).

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4.2.15 GiE62_GetTriggerOutPolarity

Description

Get the output polarity of output triggers.

Syntax

```
int GiE62_GetTriggerOutPolarity(int CardID, int
port, int *OutPolarity);
```

Parameters

`CardID`

[in] Card ID of GIE62+. The card ID could be 0, 1, 2 and 3. It is defined by the DIP switch on the board.

`port`

[in] Port number of GIE62+. The port number could be 1 and 2.

`polarity`

[out] Pointer to a 32-bit integer variable which stores the read out output polarity of output triggers.

- ▷ 0: Negative
- ▷ 1: Positive

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4.2.16 GiE62_GetTriggerInPolarity

Description

Get the input polarity of output triggers.

Syntax

```
int GiE62_GetTriggerInPolarity(int CardID, int
port, int *InPolarity);
```

Parameters

`CardID`

[in] Card ID of GIE62+. The card ID could be 0, 1, 2 and 3. It is defined by the DIP switch on the board.

`port`

[in] Port number of GIE62+. The port number could be 1 and 2.

`InPolarity`

[out] Pointer to a 32-bit integer variable which stores the read out input polarity of output triggers.

- ▷ 0: Falling
- ▷ 1: Rising

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4.3 Error Codes

Error Code	Meaning
0	ERROR_NoError
-1	ERROR_Invalid_CardID
-2	ERROR_Invalid_PortNo
-3	ERROR_DeviceNotOpened
-4	ERROR_DeviceAlreadyOpened
-5	ERROR_ParameterExceedLimit
-6	ERROR_DeviceCannotAccess

Table 4-1: Error Codes

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