

# **Napatech**

## **NT4E-4**

### **Hardware Installation Guide**

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**Abstract** This document explains how to install a Napatech NT4E-4 network adapter in a server.

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#### Modification history

This document has been updated as follows:

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|------|------------|---|
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| 2    | 2008-12-17 | A few minor changes have been made.   |
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# Contents

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|   |           |
|---|-----------|
| <b>Preface</b>                                    | <b>5</b>  |
| <b>1 Introduction</b>                             | <b>7</b>  |
| <b>2 Installation Requirements</b>                | <b>9</b>  |
| <b>3 Safety</b>                                   | <b>11</b> |
| 3.1 Safety Procedures                             | 11        |
| 3.1.1 General Safety Precautions                  | 11        |
| 3.1.2 Class 1 Laser Product                       | 12        |
| 3.1.3 ESD Precautions                             | 12        |
| 3.2 EMC Statements                                | 13        |
| 3.2.1 EMC Statement (Europe, Japan and Australia) | 13        |
| 3.2.2 EMC Statement (USA and Canada)              | 13        |
| 3.3 UL Statements                                 | 14        |
| <b>4 Installation Procedure</b>                   | <b>15</b> |
| <b>5 Technical Information</b>                    | <b>19</b> |
| 5.1 Port Numbering                                | 19        |
| 5.2 LEDs  | 20        |
| 5.3 DDR2 RAM Modules                              | 20        |
| 5.4 Battery Holder                                | 21        |
| 5.5 Optional Auxiliary Power Connector            | 22        |
| 5.6 Time Synchronization                          | 23        |
| 5.7 Technical Specification                       | 24        |
| <b>Index</b>                                      | <b>25</b> |



## Preface

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### Style conventions

**Bold typeface** is used for names of, for instance, LEDs (example: **Link/Activity**). Note that bold typeface is also used in other contexts.

### Abbreviations

This table explains the abbreviations used in this document.

| Abbreviation | Explanation                       |
|--------------|-----------------------------------|
| ATX          | Advanced Technology Extended      |
| Aux.         | AUXiliary                         |
| BSD          | Berkeley Software Distribution    |
| DC           | Direct Current                    |
| DDR          | Double Data Rate                  |
| DIMM         | Dual In-line Memory Module        |
| DN           | Document Number                   |
| EMC          | ElectroMagnetic Compatibility     |
| ESD          | ElectroStatic Discharge           |
| Exp.         | EXPansion                         |
| FCC          | Federal Communications Commission |
| GND          | GrouND                            |
| HW           | HardWare                          |
| I            | Input                             |
| LED          | Light Emitting Diode              |
| LX           | Long wave                         |
| Max.         | MAXimum                           |
| NT           | NapaTech                          |
| O            | Output                            |
| OEM          | Original Equipment Manufacturer   |
| PCB          | Printed Circuit Board             |
| PCI          | Peripheral Component Interconnect |
| RAM          | Random-Access Memory              |
| Ref.         | REference                         |
| Rev.         | REVision                          |

| Abbreviation | Explanation                              |
|--------------|--|
| RoHS         | Restriction of Hazardous Substances      |
| RX           | Reception/Receive                        |
| SDRAM        | Synchronous Dynamic Random-Access Memory |
| SELV         | Safety Extra-Low Voltage                 |
| SFP          | Small Form-factor Pluggable              |
| SO           | Small Outline                            |
| SX           | Short wave                               |
| LED          | Light Emitting Diode                     |
| T            | Twisted pair                             |
| TX           | Transmission/Transmit                    |
| UL           | Underwriters Laboratories                |
| USA          | United States of America                 |

## References

This table shows the documents that are referenced by this document.

| Ref. | Document Title  |
|------|---|
| 1    | Napatech, NT Adapters with Napatech Driver Software, Software Installation Guide for Linux, DN-0128   |
| 2    | Napatech, NT Adapters with Napatech Driver Software, Software Installation Guide for FreeBSD, DN-0164 |
| 3    | Napatech, NT Adapters with Napatech Driver Software, Software Installation Guide for Windows, DN-0184 |
| 4    | Napatech Time Synchronization Cables – Qualification, DN-0186   |
| 5    | Napatech Pluggable Modules 1 Gbit/s – Qualification, DN-0191  |
| 6    | Napatech SDRAM Modules – Qualification, DN-0250   |
| 7    | Napatech, NT Adapters with Napatech Software Suite, Software Installation Guide for Linux, DN-0379    |
| 8    | Napatech, NT Adapters with Napatech Software Suite, Software Installation Guide for FreeBSD, DN-0393  |
| 9    | Napatech, NT Adapters with Napatech Software Suite, Software Installation Guide for Windows, DN-0394  |

# 1 Introduction

---

|  |  |
|--|--|
| <b>In this document</b>                    | This document contains information about port numbering, LEDs and HW installation related to the Napatech 4 x 1 Gbit/s SFP PCI Express network adapter, NT4E-4.  |
| <b>Installation by qualified personnel</b> | <p>An NT4E-4 network adapter is an OEM product designed for integration with another product. The end user is not intended to install this product.</p> <p>Installation must be referred to qualified personnel who understand and are trained to work with server hardware. The installer must read this manual, especially <a href="#">“3 Safety” on page 11</a>, before attempting to install, test or use the network adapter.</p>   |
| <b>Reading instructions</b>                | <p>The document contains these chapters:</p> <ul style="list-style-type: none"><li>• <a href="#">“1 Introduction” on page 7</a>. This chapter introduces the document.</li><li>• <a href="#">“2 Installation Requirements” on page 9</a>. This chapter describes the requirements for installing an NT4E-4 network adapter in a server.</li><li>• <a href="#">“3 Safety” on page 11</a>. This chapter describes the safety issues involved when installing an NT4E-4 network adapter in a server.</li><li>• <a href="#">“4 Installation Procedure” on page 15</a>. This chapter describes the installation procedure.</li><li>• <a href="#">“5 Technical Information” on page 19</a>. This chapter contains information about LEDs and other technical specifications.</li></ul> |





## 2 Installation Requirements

---

|                                 |   |
|---------------------------------|---|
| <b>In this chapter</b>          | This chapter describes the system requirements for installing an NT4E-4 network adapter in a server.  |
| <b>Power considerations</b>     | <p>The NT4E-4 network adapter operates at 25 W without expansion adapter (NTPORT4E), which is equal to the 25 W specified for a PCI Express slot. Approximately 4.6 W is drawn from the 3.3 V supply rail, and approximately 20.4 W is drawn from the 12 V supply rail.</p> <p>Alternatively the optional auxiliary power connector (see <a href="#">“5.5 Optional Auxiliary Power Connector” on page 22</a>) can be used. In this case approximately 4.6 W is drawn from the 3.3 V supply rail, approximately 14.4 W is drawn from the 12 V supply rail and approximately 6.6 W is drawn from the auxiliary power connector.</p>   |
| <b>PCI considerations</b>       | The PCI Express connector in which the NT4E-4 network adapter is inserted must physically be an 8-lane or a 16-lane connector.  |
| <b>Cooling</b>                  | The network adapter must be installed only in a server having adequate cooling air flow to maintain the air temperature around the adapter at or below 45 °C during operation. Avoid installation in a slot adjacent to other high-temperature components.  |
| <b>Operating temperature</b>    | <p>The power consumption and thereby the heat dissipation depend on the network adapter activity. After a first installation in a new server, the ambient temperature should be verified by measurement while processing at full rate on all channels.</p> <p><b>Note:</b> Failure to observe these requirements might cause intermittent operation.</p>  |
| <b>Transport considerations</b> | <p>When installing the adapter in the server, you must ensure that the adapter is firmly secured in the PCI slot using the retention mechanism, for instance screw or clamp, provided in the server. In addition, you must ensure that the retention mechanism provides sufficient protection of the adapter against excessive vibration stress during transport. If the retention mechanism is not sufficient, you must consider adding extra retention or other means of preventing vibration stress.</p> <p><b>Caution:</b> If these precautions are not respected, there is a risk of the adapter being damaged due to vibration stress during transport of the server.</p> |



## 3 Safety

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### In this chapter

This chapter describes the safety issues involved when installing an NT4E-4 network adapter including accessories in a server.

The chapter contains these sections:

- [“3.1 Safety Procedures” on page 11](#)
- [“3.2 EMC Statements” on page 13](#)
- [“3.3 UL Statements” on page 14](#)

## 3.1 Safety Procedures

---

### In this section

Protection provided by the equipment might be impaired if it is used in a manner that is not in accordance with these instructions.

The section contains these subsections:

- [“3.1.1 General Safety Precautions” on page 11](#)
- [“3.1.2 Class 1 Laser Product” on page 12](#)
- [“3.1.3 ESD Precautions” on page 12](#)

### 3.1.1 General Safety Precautions

---



**Warning:** Before installing the network adapter, ensure that all power is disconnected from the server in which it is to be installed.

**Avertissement:** Avant d'installer l'adaptateur, assurez-vous que toute alimentation est déconnectée du serveur dans lequel il est installé.

**Warnung:** Bevor Sie den Adapter installieren, bitte achten Sie, dass Netzstrom vom Server getrennt wird, in dem es installiert werden soll.



**Caution:** Some components on the network adapter will get hot during normal use. The network adapter must be allowed to cool for 10 minutes prior to handling.

**Attention:** Certains composants sur l'adaptateur deviennent chauds pendant l'utilisation normale. L'adaptateur doit être laissé à refroidir pendant 10 minutes avant toute manipulation.

**Vorsichtshinweis:** Einige Komponenten auf dem Adapter werden während des normalen Gebrauchs heiß. Der Adapter muss 10 Minuten vor Verwendung abkühlen.



**Warning:** There is a risk of explosion if an incorrect battery type is used.

**Avertissement:** Il y a un risque d'explosion si une batterie de type incorrect est utilisée.

**Warnung:** Es besteht die Gefahr der Explosion wenn einer Falscher Batterietyp verwendet wird.

### 3.1.2 Class 1 Laser Product

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**Warning:** This network adapter might be fitted with optical transmitter modules which are class 1 lasers. Use of controls, adjustments or performance of procedures other than those specified herein might result in hazardous light exposure.

**Avertissement:** Cette adaptateur peut être équipé de modules émetteurs optiques qui sont de classe 1 des lasers. L'utilisation de commandes, réglages ou procédures autres que celles spécifiées ici peut entraîner une exposition dangereuse à des rayons.

**Warnung:** Diese Adapter wird möglicherweise mit optischen Sendemodule Klasse 1 Laser ausgestattet. Verwendung von Steuerungen, Anpassungen oder Eingriffe andere als die hier angegeben kann zu gefährliche Belichtung führen.

### 3.1.3 ESD Precautions

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**Caution:** It is essential that you fit an anti-static wrist strap and observe all conventional ESD precautions when handling the network adapter. Avoid contact with backplane components and module connectors and so on.

**Attention:** Il est essentiel que vous vous situez un bracelet anti-statique et observer toutes les précautions ESD conventionnelles lors de la manipulation de l'adaptateur. Eviter le contact avec les composants et connecteurs de fond de panier du module, etc.

**Vorsichtshinweis:** Wichtig ist, dass Sie eine Anti-statische Handgelenk verwenden und alle konventionelle ESD-Vorsichtsmaßnahmen beim Umgang mit des Adapters beobachten. Vermeiden Sie den Kontakt mit Backplane-Komponenten und Modulschlüssen und so weiter.

## 3.2 EMC Statements

---

**In this section**

This section concerns EMC statements.

See [support.napatech.com](http://support.napatech.com) (Support Center) for product compliance and safety documentation.

The section contains these subsections:

- [“3.2.1 EMC Statement \(Europe, Japan and Australia\)” on page 13](#)
- [“3.2.2 EMC Statement \(USA and Canada\)” on page 13](#)

### 3.2.1 EMC Statement (Europe, Japan and Australia)

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**Class B note**

This equipment has been tested and found to comply with the limits for a Class B digital device for industrial use.

### 3.2.2 EMC Statement (USA and Canada)

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**FCC, Class B note**

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**Note:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**Unauthorized use or modifications**

The supplier is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment.

Unauthorized changes or modifications could void the user's authority to operate the equipment.

### 3.3 UL Statements

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|                        |   |
|------------------------|---|
| <b>In this section</b> | <p>This section concerns UL (Underwriters Laboratories) statements.</p> <p>See <a href="http://support.napatech.com">support.napatech.com</a> (Support Center) for product compliance and safety documentation.</p>                                   |
| <b>UL recognition</b>  | <p>The Napatech NT4E-4 network adapter is UL recognized: UL No. E314296.</p>  |
| <b>SFP modules</b>     | <p>See <a href="http://support.napatech.com">support.napatech.com</a> (Support Center) for a table that shows which SFP modules can be used with the NT4E-4 network adapter according to the UL qualification (<a href="#">Ref. 5 on page 6</a>).</p> |

## 4 Installation Procedure

### To install a network adapter in a server

To install an NT4E-4 network adapter in a server:

**Note:** An SDRAM module must be installed in the adapter to make it operational (see [“To install an SDRAM module” on page 16](#)).

**Note:** The network adapter is not hot-pluggable.

| Step | Action   |
|------|--|
| 1    | Power off the server, and remove the server cover.<br><b>Caution:</b> Refer to the server documentation for correct procedure and for safety instructions.   |
| 2    | Remove the network adapter from the ESD bag.<br><b>Caution:</b> Observe the ESD precautions detailed in <a href="#">“3.1.3 ESD Precautions” on page 12</a> when handling or placing the network adapter on a surface.  |
| 3    | Insert the network adapter in a vacant PCI Express x8 or x16 connector, ensuring that it sits securely within the PCI Express connector.   |
| 4    | Optionally connect the optional auxiliary power connector to an external power supply (see <a href="#">“5.5 Optional Auxiliary Power Connector” on page 22</a> ).  |
| 5    | Secure the network adapter at the rear end of the server by fastening it at the top of the I/O bracket using the retention mechanism provided in the server, if applicable.  |
| 6    | Plug in the desired SFP modules (see <a href="#">“To plug in an SFP module” on page 15</a> ).  |
| 7    | Connect a network device via a fiber optic cable or via a copper-based cable to the network adapter depending on the SFP.  |
| 8    | Replace the server cover, and power on.  |
| 9    | Refer to <a href="#">Ref. 1 on page 6</a> , <a href="#">Ref. 2 on page 6</a> , <a href="#">Ref. 3 on page 6</a> , <a href="#">Ref. 7 on page 6</a> , <a href="#">Ref. 8 on page 6</a> or <a href="#">Ref. 9 on page 6</a> to install the driver for the network adapter.<br><br>The adapter is now ready to operate. |

### To plug in an SFP module

To plug in an SFP interface module in the network adapter:

| Step | Action  |
|------|---|
| 1    | If you want to avoid exposure to laser light, power off the server. |

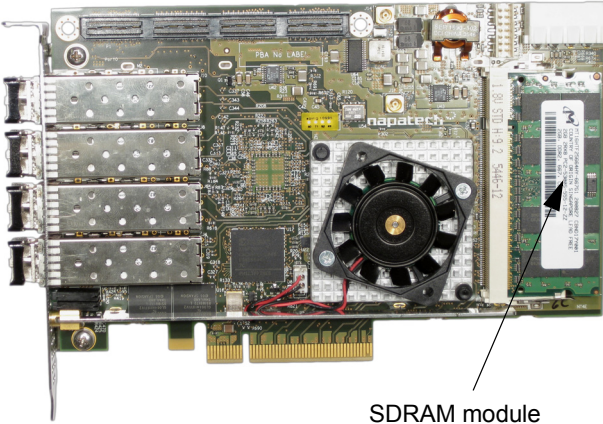
| Step | Action   |
|------|--|
| 2    | <p>Plug in the SFP interface module, make sure that the latch is firmly secured, and connect the fiber optic or copper-based cable, if applicable.</p> <p><b>Note:</b> See <a href="http://support.napatech.com">support.napatech.com</a> (Support Center) for a table of qualified SFP modules (<a href="#">Ref. 5 on page 6</a>).</p> <p><b>Caution:</b> To avoid exposure to laser light, do not remove the protective plugs on the SFP modules until the fiber optic cables are to be connected. Retain and replace the plugs if the cables are removed.</p> <p><b>Attention:</b> Pour éviter l'exposition à la lumière laser, ne pas enlever les bouchons de protection sur les modules SFP jusqu'à ce que les câbles à fibres optiques doivent être connectés. Retenir et remplacer les bouchons si les câbles sont enlevés.</p> <p><b>Vorsichtshinweis:</b> Zur Vermeidung der Exposition zum laser-Licht, entfernen Sie nicht die schützende Stecker auf die SFP-Module, bis die SFP-Kabel angeschlossen sind. Behalten Sie und ersetzen Sie die Stecker zu, wenn die Kabel entfernt werden.</p> |
| 3    | Power on the server.   |

#### To install an SDRAM module

To install an SDRAM module in the network adapter:

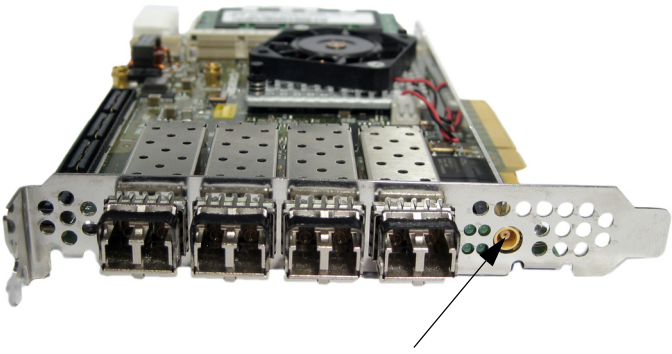
| Step | Action   |
|------|--|
| 1    | <p>If the network adapter is installed in a server, power off the server, and remove the server cover.</p> <p><b>Caution:</b> Refer to the server documentation for correct procedure and for safety instructions.</p>   |
| 2    | <p>If the network adapter is installed in a server, remove the network adapter from the PCI Express slot.</p> <p><b>Caution:</b> Observe the ESD precautions detailed in <a href="#">“3.1.3 ESD Precautions” on page 12</a> when handling or placing the network adapter on a surface.</p> |

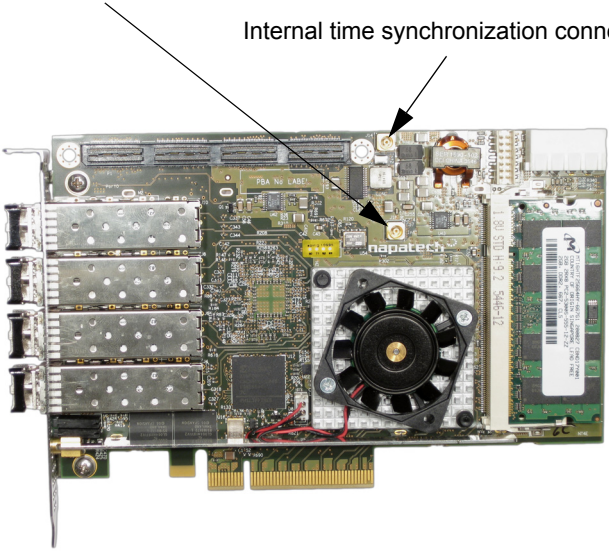


| Step | Action   |
|------|--|
| 3    | <p>Mount the SDRAM module on the network adapter, ensuring that it clicks into a locked position.</p>  <p>SDRAM module</p> |
| 4    | Install the network adapter in the server.   |
| 5    | Replace the server cover, and power on.  |

#### To connect cables for time synchronization

To connect cables for time synchronization:

| Step                    | Action   |
|-------------------------|--|
| <b>External cables:</b> |  |
| 1                       | <p>Connect the relevant time synchronization cable to the external time synchronization connector on the front plate of the network adapter.</p>  <p>External time synchronization connector</p> |
| <b>Internal cables:</b> |  |
| 1                       | <p>Power off the server, and remove the server cover.</p> <p><b>Caution:</b> Refer to the server documentation for correct procedure and for safety instructions.</p>  |

| Step | Action  |
|------|---|
| 2    | <p>Connect the relevant time synchronization cable to one of the internal time synchronization connectors.</p> <p><b>Caution:</b> Observe the ESD precautions detailed in <a href="#">“3.1.3 ESD Precautions”</a> on <a href="#">page 12</a> when handling the network adapter.</p> <p>Internal time synchronization connector 1</p> <p>Internal time synchronization connector 2</p>  |
| 3    | <p>Replace the server cover, and power on.</p>  |

## 5 Technical Information

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**In this chapter**

This chapter contains information about LEDs and other technical specifications.

The chapter contains these sections:

- [“5.1 Port Numbering” on page 19](#)
- [“5.2 LEDs” on page 20](#)
- [“5.3 DDR2 RAM Modules” on page 20](#)
- [“5.4 Battery Holder” on page 21](#)
- [“5.5 Optional Auxiliary Power Connector” on page 22](#)
- [“5.6 Time Synchronization” on page 23](#)
- [“5.7 Technical Specification” on page 24](#)

### 5.1 Port Numbering

---

**In this section**

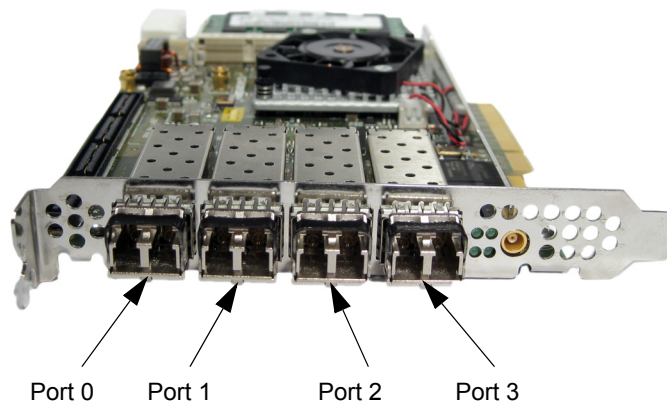
This section explains the numbering of the ports on the NT4E-4 adapters.

**Port numbering**

On an NT4E-4 adapter, port 3 is the one closest to the PCI Express connector, and port 0 is the one furthest away.

**Illustration**

This figure shows the port numbering for an NT4E-4 adapter.



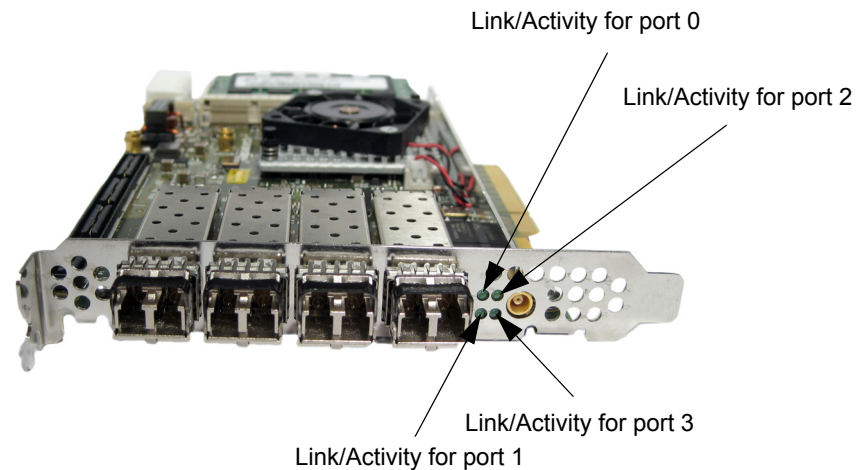
## 5.2 LEDs

### In this section

This section describes the function of the LEDs on the NT4E-4 adapter.

### Illustration

This figure shows the LEDs on an NT4E-4 adapter.



### The function of the LEDs

This table describes the function of the LEDs. There is a **Link/Activity** LED for each port as shown in the figure in [“Illustration” on page 20](#).

| Name          | Color | State    | Condition  |
|---------------|-------|----------|--|
| Link/Activity | Green | Off      | The driver is not loaded, or the Ethernet link in question is down.                              |
|               |       | On       | The driver is loaded, and the Ethernet link in question is up, but there is no RX or TX traffic. |
|               |       | Flashing | The driver is loaded, and there is RX or TX traffic on the Ethernet link in question.            |

## 5.3 DDR2 RAM Modules

### In this section

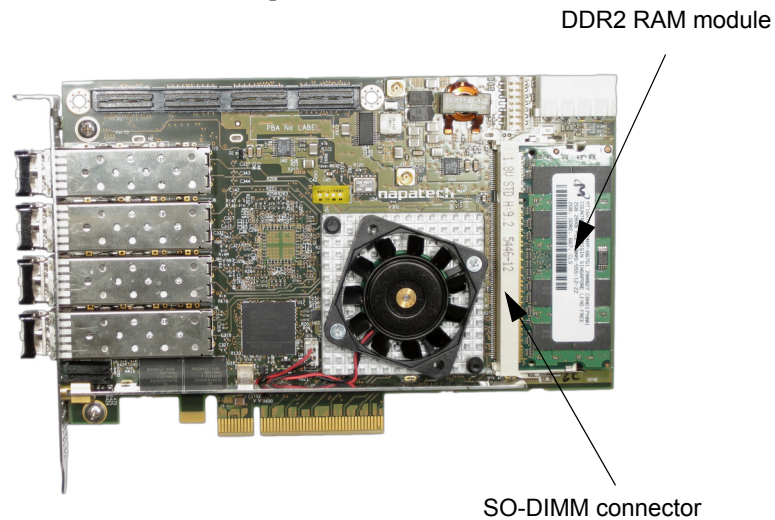
This section describes the DDR2 RAM modules for the NT4E-4 adapter.

### Installation

A DDR2 RAM module must be installed in the standard SO-DIMM connector on the NT4E-4 adapter to make the adapter operational.

**Illustration**

This figure shows a DDR2 RAM module installed in the standard SO-DIMM connector on an NT4E-4 adapter.

**Qualified DDR2 RAM modules**

See [support.napatech.com](http://support.napatech.com) (Support Center) for a table of qualified DDR2 RAM modules ([Ref. 6 on page 6](#)).

## 5.4 Battery Holder

---

**In this section**

This section describes the use of the battery holder.

**Battery holder**

The battery holder is situated at the back of the adapter under the RAM modules. As the battery holder is reserved for future use there are currently no qualified batteries available. Therefore, the battery holder must not be used.

**Caution:** There is a risk of explosion if an incorrect battery type is used. Dispose of used batteries according to the manufacturer's instructions or your local authority procedures.

**Attention:** Il y a un risque d'explosion si une batterie de type incorrect est utilisée. Jetez les batteries usagées conformément aux instructions du fabricant ou aux procédures de vos autorités locales.

**Vorsichtshinweis:** Es besteht die Gefahr der Explosion wenn einer Falscher Batterietyp verwendet wird. Entsorgen Sie gebrauchte Batterien gemäß den Anweisungen des Herstellers oder Ihre lokale Behörde-Prozeduren.

## 5.5 Optional Auxiliary Power Connector

### In this section

This section describes the optional auxiliary power connector.

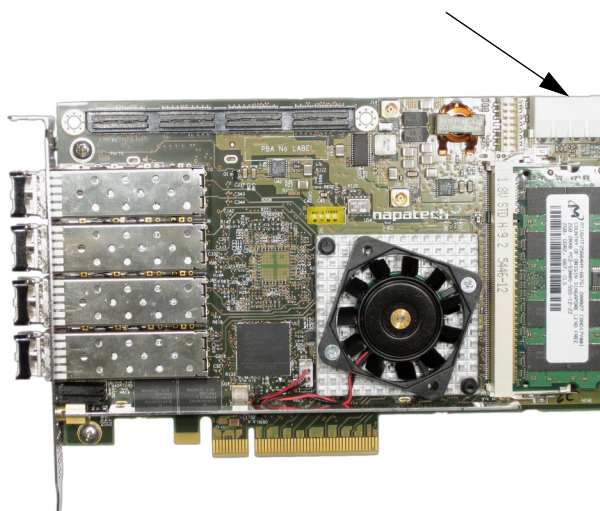
### Purpose

The optional auxiliary power connector can be used for providing additional power to the adapter, if the motherboard cannot provide the 25 W required.

### Illustration

This figure shows the optional auxiliary power connector.

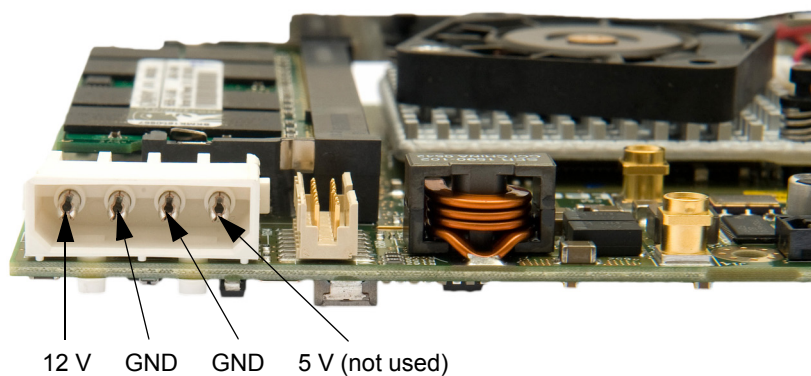
Optional auxiliary power connector



### Description

The optional auxiliary power connector is an ATX hard disk power connector (Tyco Electronics 1-641737-1). This figure shows a section of the NT4E-4 adapter with an explanation of the pins on the optional auxiliary power connector.

**Note:** All four pins must be connected.





## 5.6 Time Synchronization

---

**In this section**

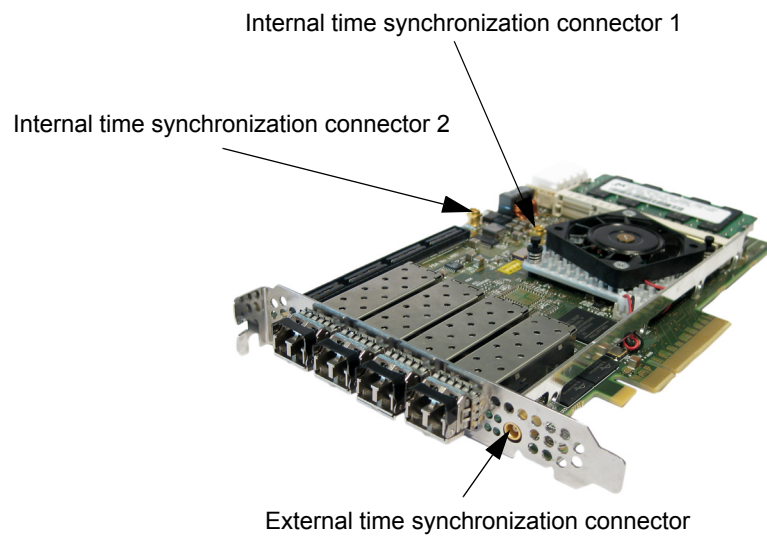
This section describes connection of two NT4E-4 adapters for time synchronization.

**Connecting two network adapters**

To time-synchronize two NT4E-4 adapters, they must be connected via a time synchronization cable. The connection between the adapters can be made internally if they are mounted in the same server by using the connectors on the PCBs or externally by using the connectors on the front plates.

**Illustration**

This figure indicates the time synchronization connectors on an NT4E-4 adapter.

**Description**

The time synchronization connectors are MCX female coax connectors.

**Available time synchronization cables**

See [support.napatech.com](http://support.napatech.com) (Support Center) for a table of available time synchronization cables ([Ref. 4 on page 6](#)).

## 5.7 Technical Specification

**In this section** This section contains some technical specifications for the NT4E-4 adapter.

**Electrical rating** This table shows the power consumption for an NT4E-4 adapter including 4 x 1000BASE-SX SFP modules.

| Connections |          | Supply Voltage |             |             | Supply Current |             |             | Supply Power |             |             |            |
|-------------|----------|----------------|-------------|-------------|----------------|-------------|-------------|--------------|-------------|-------------|------------|
| Aux. Power  | Exp. bus | PCI Express    |             | Aux. Power  | PCI Express    |             | Aux. Power  | PCI Express  |             | Aux. Power  | Total Max. |
|             |          | 3.3 V [in V]   | 12 V [in V] | 12 V [in V] | 3.3 V [in A]   | 12 V [in A] | 12 V [in A] | 3.3 V [in W] | 12 V [in W] | 12 V [in W] | [in W]     |
| No          | No       | 3.30           | 12.00       | –           | 1.4            | 1.7         | –           | 4.6          | 20.4        | –           | 25.0       |
| No          | Yes      | 3.30           | 12.00       | –           | 1.7            | 2.0         | –           | 5.6          | 24.0        | –           | 29.6       |
| Yes         | No       | 3.30           | 12.00       | 12.00       | 1.4            | 1.2         | 0.6         | 4.6          | 14.4        | 6.6         | 25.6       |
| Yes         | Yes      | 3.30           | 12.00       | 12.00       | 1.7            | 1.3         | 0.9         | 5.6          | 15.6        | 10.2        | 31.4       |

The adapter is Class III equipment for supply by SELV circuits only.

**Environmental condition**

Environmental conditions:

- Operating temperature: 0 °C to 45 °C (32 °F to 113 °F) measured around the network adapter
- Operating relative humidity: 20% to 80%
- RoHS-compliant (see [support.napatech.com](http://support.napatech.com) (Support Center) for product compliance and safety documentation)

**Network interface ports**

The network adapter has 4 ports for connection of SFP modules (see [support.napatech.com](http://support.napatech.com) (Support Center) for a table of qualified SFP modules (Ref. 5 on page 6)).



## Index

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### A

- Abbreviations 5
- Adapters
  - NT4E-4 19
- Australia
  - EMC statement 13
- Auxiliary power connector
  - description 22
  - illustration 22
  - optional 22
  - purpose 22
- Available time synchronization cables 23

### B

- Battery holder 21
- Bold typeface
  - use of 5

### C

- Cables
  - for time synchronization 17
- Canada
  - EMC statement 13
- Class 1 laser product 12
- Class B note 13
- Connecting cables for time synchronization 17
- Cooling 9

### D

- DDR2 RAM modules 20
  - illustration 21
  - installation 20
  - qualified 21

### E

- Electrical rating 24
- Electrostatic discharge 12
- EMC statement
  - Australia 13
  - Canada 13
  - Europe 13
  - Japan 13
  - USA 13
- EMC statements 13
- Environmental condition 24
- ESD precautions 12

- Europe
  - EMC statement 13

### F

- FCC
  - Class B note 13

### H

- Humidity
  - operating 24
  - relative 24

### I

- Installation 15
  - of DDR2 RAM modules 20
- Installation procedure 15
- Installation requirements 7, 9
- Installing an SDRAM module in a network adapter 16
- Interface ports 24

### J

- Japan
  - EMC statement 13

### L

- LEDs 20
  - function 20
  - illustration 20
  - Link/Activity 20
  - on NT4E-4 20
- Link/Activity LED 20

### M

- Modifications
  - unauthorized 13

### N

- Network adapters
  - NT4E-4 19
- Network interface ports 24
- NT4E-4 19
  - LEDs 20
  - port numbering 19

**O**

- Operating relative humidity 24
- Operating temperature 9, 24
- Optional auxiliary power connector 22
  - description 22
  - illustration 22
  - purpose 22

**P**

- PCI considerations 9
- Plugging in an SFP module in a network adapter 15
- Port numbering 19
  - illustration 19
  - on NT4E-4 19
- Ports 24
- Power connector
  - description 22
  - illustration 22
  - optional auxiliary 22
  - purpose 22
- Power considerations 9

**Q**

- Qualified DDR2 RAM modules 21

**R**

- RAM modules
  - DDR2 20
  - illustration 21
  - installation 20
- Reading instructions 7
- Referenced documents 6
- References 6
- Requirements 7, 9

**S**

- Safety 11
  - general precautions 11
- Safety procedures 11
- SDRAM modules
  - installing in a network adapter 16
- SFP modules 14, 24
  - plugging into a network adapter 15
- Style conventions 5

**T**

- Technical information 19

- Temperature
  - operating 9, 24
- Time synchronization 23
- Time synchronization cables 17
  - availability 23
- Time synchronization connectors 23
  - description 23
  - illustration 23
- Transport considerations 9

**U**

- UL recognition 14
- UL statements 14
- Unauthorized use or modifications 13
- USA
  - EMC statement 13
- Use
  - unauthorized 13