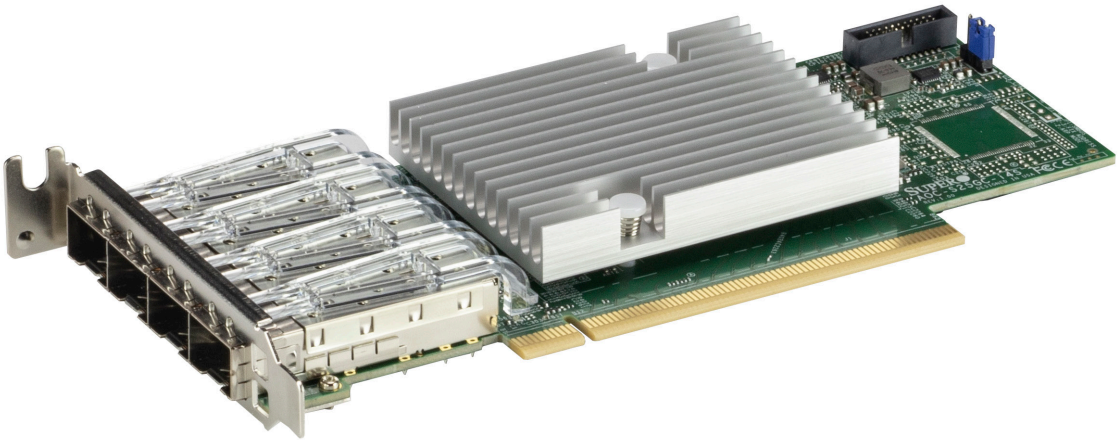
AOC-S25GC-i4S



USER'S MANUAL

Revision 1.0a

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Manual Revision 1.0a

Release Date: May 09, 2025

Preface

About This Manual

This user's guide is written for system integrators, PC technicians, and knowledgeable PC users. It provides information for the installation and use of the AOC-S25GC-i4S add-on card.

About This Add-On Card

The Supermicro® AOC-S25GC-i4S features Intel's state-of-the-art E810-CAM1 Ethernet solution, which delivers a high-performance, leading-edge 25 Gb per second transfer rate in a PCIe Gen 4 architecture with backward compatibility to PCIe Gen 3. It also supports RoCE v2, iWarp, DCDB, VXLAN, NVGRE, and Geneve. With support for Application Device Queue and Dynamic Device Personalization to deliver faster application response with lower latency, AOC-S25GC-i4S is an excellent network solution for cloud-scale networking, telecommunications, machine learning, and big data analytics.

An Important Note to the User

All graphic images and layout drawings shown in this user's guide are based upon the latest PCB revision available at the time of publishing this user's guide. The add-on card you have received may or may not look exactly the same as the graphics shown in this guide.

Returning Merchandise for Service

A receipt or copy of your invoice marked with the date of purchase is required before any warranty service will be rendered. You can obtain service by calling your vendor for a Returned Merchandise Authorization (RMA) number. When returning to the manufacturer, the RMA number should be prominently displayed on the outside of the shipping carton and mailed prepaid or hand-carried. Shipping and handling charges will be applied for all orders that must be mailed when service is complete. For faster service, RMA authorizations may be requested online (http://www.supermicro.com/support/rma/).

This warranty only covers normal consumer use and does not cover damages incurred in shipping or from failure due to the alteration, misuse, abuse, or improper maintenance of products.

During the warranty period, contact your distributor first for any product problems.

Conventions Used in the Manual

Special attention should be given to the following symbols for proper installation and to prevent damage done to the components or injury.

Warning! Indicates important information given to prevent equipment/property damage or personal injury.

Warning! Indicates high voltage may be encountered while performing a procedure.

Important: Important information given to ensure proper system installation or to relay safety precautions.

Note: Additional information given to differentiate various models or to provide information for proper system setup.

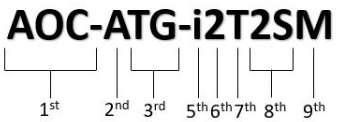
Important Links

For your system to work properly, follow the links to download all necessary drivers/utilities and the user's manual for your server.

- Supermicro product manuals: http://www.supermicro.com/support/manuals/
- Product drivers and utilities: https://www.supermicro.com/wdl/driver
- Product safety info: http://www.supermicro.com/about/policies/safety_information.cfm
- A secure data deletion tool designed to fully erase all data from storage devices can be found at our website: https://www.supermicro.com/about/policies/disclaimer.cfm?url=/wdl/utility/Lot9_Secure_Data_Deletion_Utility/
- If you have any questions, contact our support team at: support@supermicro.com
- Frequently Asked Questions: https://www.supermicro.com/FAQ/index.php
- If you have any feedback on Supermicro product manuals, contact our writing team at: Techwriterteam@supermicro.com

This manual may be periodically updated without notice. Check the Supermicro website for possible updates to the manual revision level.

Naming Convention



Character	Representation	Options
1st	Product Family	AOC: Add On Card
2nd	Form Factor	S: Standard, P: Proprietary, C: MicroLP, M: Super IO Module (SIOM), MH: SIOM Hybrid A: Advanced IO Module (AIOM), AH: AIOM Hybrid
3rd	Product Type/Speed	G: GbE (1Gb/s), TG: 10GbE (10Gb/s), 25G: 25GbE (25Gb/s), 40G: 40GbE (40Gb/s), 50G: 50GbE (50Gb/s), 100G: 100GbE (100Gb/s), IBE: EDR IB (100Gb/s), HFI: Host Fabric Interface
4th	Chipset Model (Optional)	N: Niantec (82599), P: Powerville (i350), S: Sageville (X550), F: Fortville (XL710/X710), L: Lewisburg (PCH)
5th	Chipset Manufacturer	i: Intel, m: Mellanox, b: Broadcom
6th	Number of Ports	1: 1 port, 2: 2 ports, 4: 4 ports, 8: 8 ports
7th	Connector Type (Optional)	S: SFP/SFP+/SFP28, T: 10GBase-T, Q: QSFP+, C: QSFP28
8th	2nd Controller/Connector Type (Optional)	G: 1x GbE RJ45, 2G: GbE 2x RJ45, S: 1x 10G SFP+, T: 10GBase-T, 2T: 2x 10GBase-T, 2S: 2x SFP+
9th	Bracket	For SIOM – Non-M: swappable bracket for Storage systems, M: Internal bracket for Twin systems. For AIOM – Non-M: 1U height bracket for Edge systems, M: 0.5U height bracket for all other systems.

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Website:	www.supermicro.com.tw

Table of Contents

Chapter 1

Introduction

1.1 Overview

Congratulations on purchasing your add-on card from an acknowledged leader in the industry. Supermicro products are designed with the utmost attention to detail to provide you with the highest standards of quality and performance. For product support and updates, refer to our website at https://www.supermicro.com/en/products/networking/adapters.

1.2 Key Features

The key features of this add-on card include the following:

- SFP28 Connectors
- Low-profile, short length standard form factor
- PCIe 4.0 x16 backward compatible to PCIe 3.0 x16
- Intel E810-CAM1 Ethernet Controller
- Asset Management Feature with thermal sensor
- Intel Ethernet Flow Director — Application Device Queues (ADQ)
- Data Plan Development Kit
- Low Latency RDMA over Converged Ethernet (iWARP and RoCE v2)
- VxLAN, NVGRE, and Geneve
- Jumbo Packet (9 K max.)
- NC-SI for IPMI support
- RoHS compliant 6/6 

- Dynamic Device Personalization (DDP)

1.3 Specifications

General

- Intel E810-CAM1 Ethernet Controller
- Compact size low-profile standard form factor
- PCIe 4.0
- SFP28 connectors
- Application Device Queues (ADQ)
- Dynamic Device Personalization (DDP)

Host Interface

- PCIe v4.0
- Backward compatible with PCIe v3.0
- Message Signal Interrupt (MSI-X)

Networking Interface

- Jumbo Packet (9 K max.)
- Teaming
- Virtual LANs 802.1q VLAN tagging

Stateless Offload Features

- TCP, UDP, IPv4, IPv6 checksum offload
- Large Send Offload (LSO)
- Receive Segment Coalescing (RSC)
- TCP Segmentation Offload (TSO)
- UDP Segment Offload (USO)

- Large Segment Offload (LSO)
- Receive Side Scaling (RSS)

Virtualization Features

- VXLAN
- NVGRE
- Geneve
- SR-IOV
- 768 Virtual Station Interface (VSI)
- Eight Physical Functions (PF)
- Microsoft VM Queue
- VMWare NetQueue
- DPDK Support
- QoS: Priority-based Flow Control (802.1Qbb)
- Enhanced Transmission Selection (802.1Qaz)

RDMA over Converged Ethernet (RoCE)

- iWARP
- RoCEv2
- Data Center Bridging

Manageability

- Network Controller Sideband Interface (NC-SI)

  Note: The card requires NC-SI cable and motherboard support.

- Asset Management with thermal sensors

Remote Boot

- iSCSI Boot
- Legacy PXE Boot
- UEFI PXE Boot

Data Center Bridging

- Enhanced transmission — IEEE 802.1Qaz
- Priority-based flow control — IEEE 802.1Qbbb
- Edge Virtual Bridging — IEEE 802.Qbg

Power Saving

- ACPI-compliant power management
- Pass through Energy Efficient Ethernet (IEEE802.3az-2010)

Operation Conditions

- Operating temperature: 0°C to 55°C (32°F to 131°F)
- Storage temperature: -40°C to 70°C (-40°F to 158°F)
- Storage humidity: 90% non-condensing relative humidity at 35°C (95°F)

Chapter 2

Hardware Components

2.1 Add-On Card Image and Layout

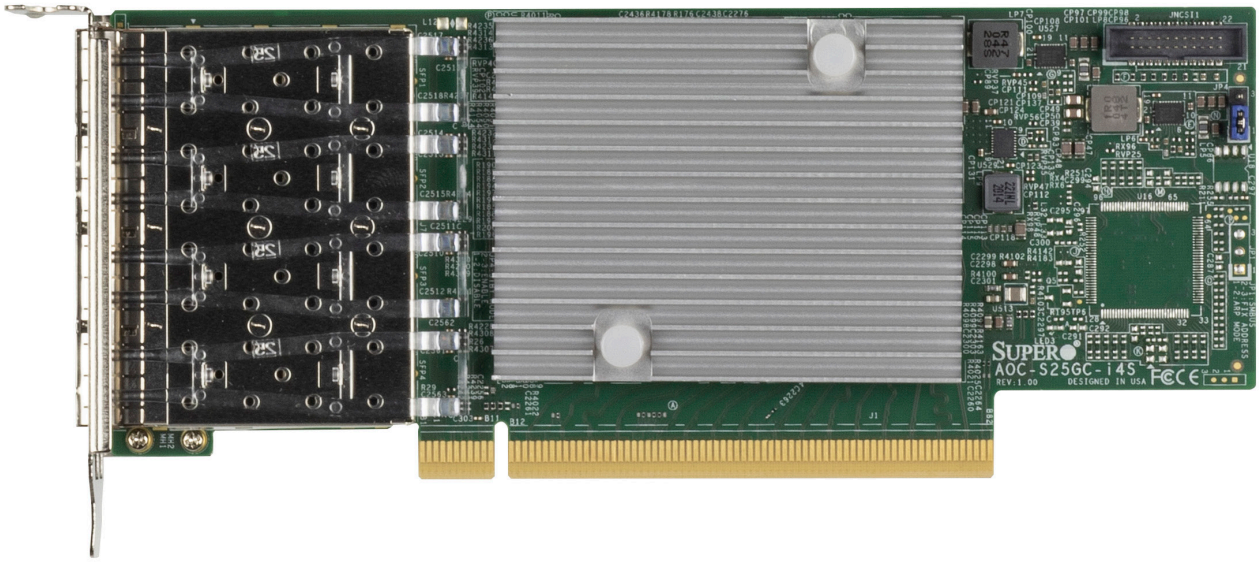


Figure 2-1: AOC-S25GC-i4S View

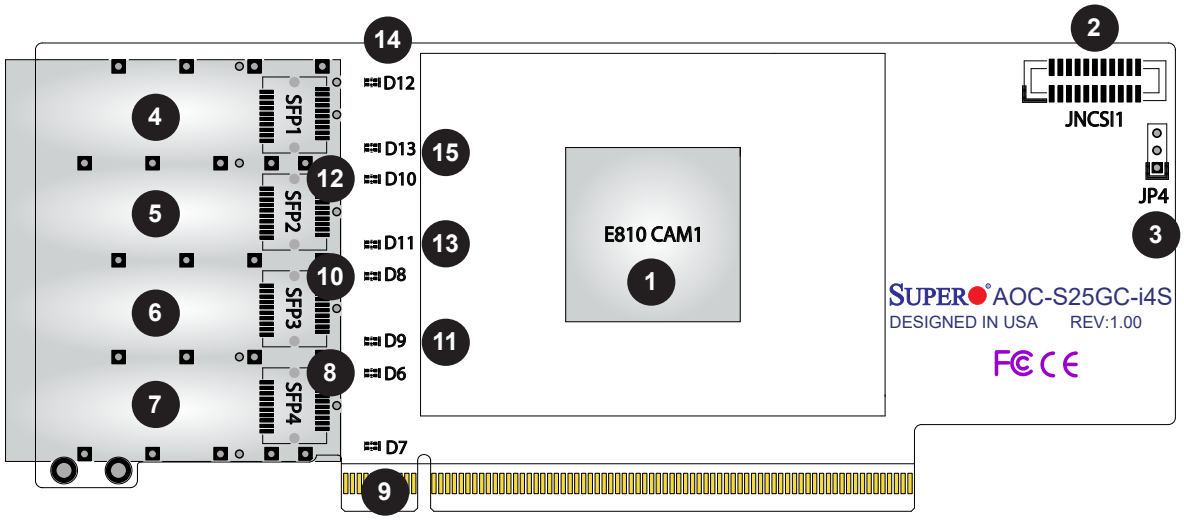


Figure 2-2: AOC-S25GC-i4S Layout

2.2 Major Components

The following major components are installed on AOC-S25GC-i4S:

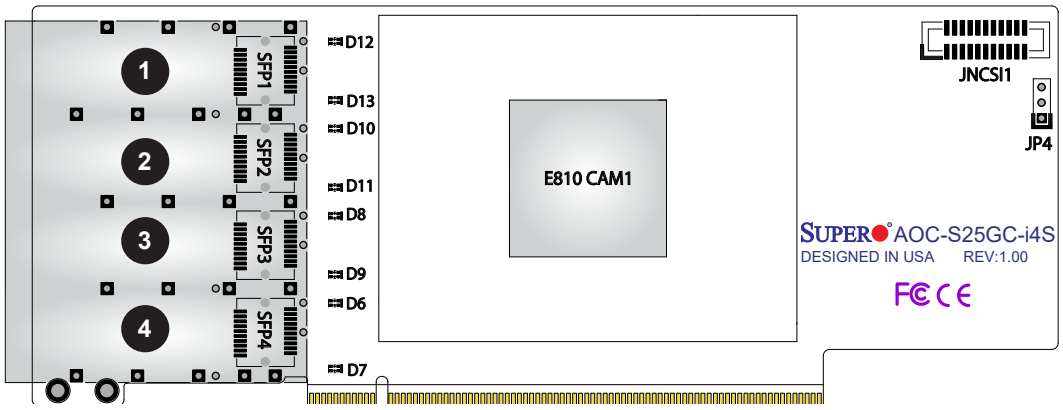
AOC-S25GC-i4S Major Components		
No	**Component Name**	**Definition**
1	Intel E810-CAM1	Ethernet 25 GbE controller
2	JNC-SI1	NC-SI Header
3	JP4	1–2: Standby Mode Disable (default)
		2–3: Standby Mode Enable
4	SFP1	SFP28 Port 1
5	SFP2	SFP28 Port 2
6	SFP3	SFP28 Port 3
7	SFP4	SFP28 Port 4
8	D6	SFP28 LAN4 LED
9	D7	SFP28 LAN4 LED
10	D8	SFP28 LAN3 LED
11	D9	SFP28 LAN3 LED
12	D10	SFP28 LAN2 LED
13	D11	SFP28 LAN2 LED
14	D12	SFP28 LAN1 LED
15	D13	SFP28 LAN1 LED

2.3 SFP28 Ethernet Connections

SFP28 (LAN1/LAN2/LAN3/LAN4) Connectors

Four small form-factor pluggable (SFP28) optical transceiver connectors are located at SFP1, SFP2, SFP3, and SFP4 on the add-on card. These SFP28 ports provide Ethernet 25 GbE/10 GbE network connections.

1. SFP28 LAN1
2. SFP28 LAN2
3. SFP28 LAN3
4. SFP28 LAN4



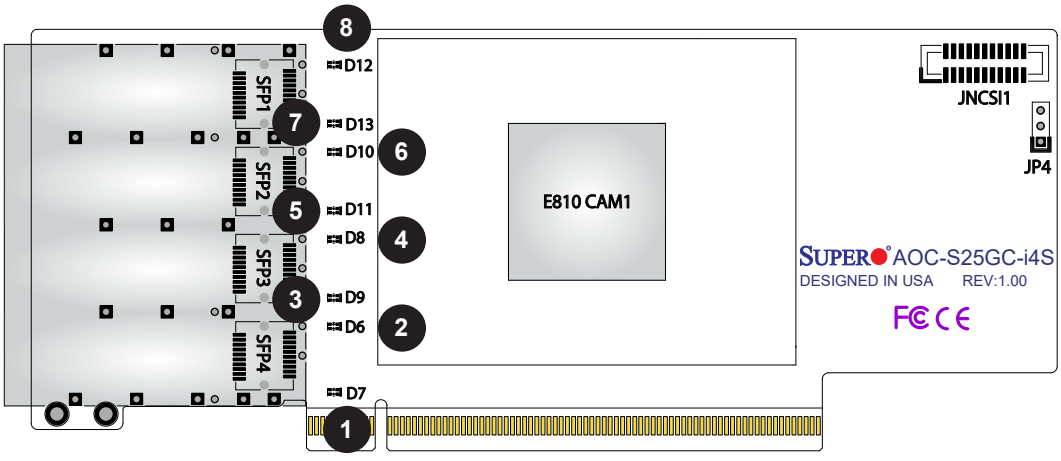
SFP28 (LAN1/LAN2/LAN3/LAN4) Link/Activity LED Indicators

Eight LAN Link/Activity LED indicators are located at D6, D7, D8, D9, D10, D11, D12, and D13 on the add-on card. D12 and D13 are used for the SFP28 LAN1 connector while D10 and D11 are for the SFP28 LAN2 connector. D8 and D9 are used for the SFP28 LAN3 connector, and D6 and D7 are for the SFP28 LAN4 connector.

LAN Port Activity LED Indicators D6 to D13 Assignment/State	
LED	**LAN Port Assigned**
D6	SFP28 LAN4
D7	SFP28 LAN4
D8	SFP28 LAN3
D9	SFP28 LAN3
D10	SFP28 LAN2
D11	SFP28 LAN2
D12	SFP28 LAN1
D13	SFP28 LAN1

LAN Port Link LEDs (D6 to D13) LED State	
LED Color	**Definition**
Amber	10 Gbps
Green	25 Gbps

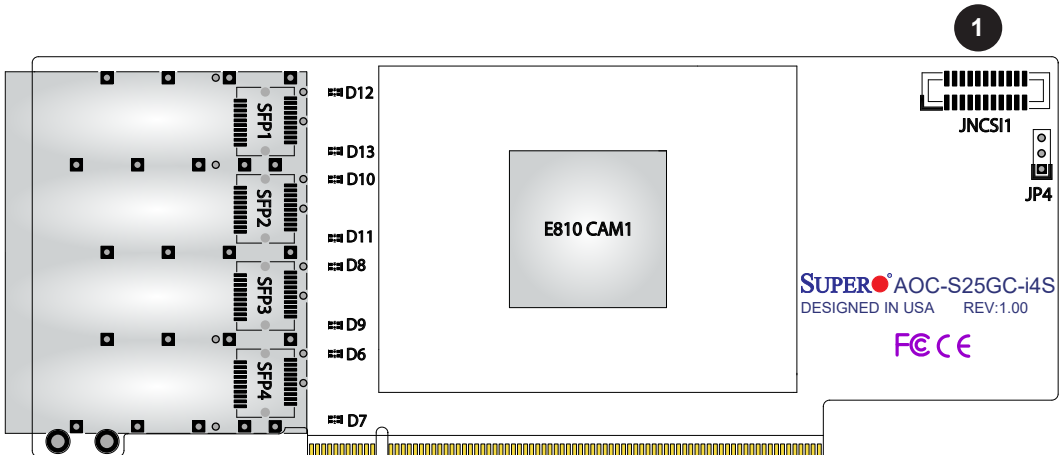
1. D7: SFP28 LAN4 LED
2. D6: SFP28 LAN4 LED
3. D9: SFP28 LAN3 LED
4. D8: SFP28 LAN3 LED
5. D11: SFP28 LAN2 LED
6. D10: SFP28 LAN2 LED
7. D13: SFP28 LAN1 LED
8. D12: SFP28 LAN1 LED



2.4 NC-SI Header

A Network-Controller Sideband Interface (NC-SI) header is located at JNCSI1 on the add-on card. Connect an appropriate cable from this header to a motherboard to provide the out-of-band (sideband) connection between the onboard Baseboard Management Controller (BMC) and a Network Interface Controller (NIC) for remote management. For the network sideband interface to work properly, you will need to use a motherboard that supports NC-SI and also needs to have a special cable. Contact Supermicro at www.supermicro.com to purchase the cable for this header.

1. NC-SI Header



2.5 Jumper Settings

Explanation of Jumpers

To modify the operation of the motherboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board.

Note: On two pin jumpers, "Closed" means the jumper is on, and "Open" means the jumper is off the pins.

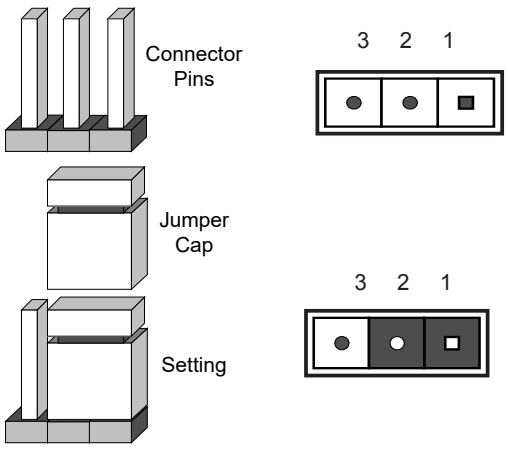
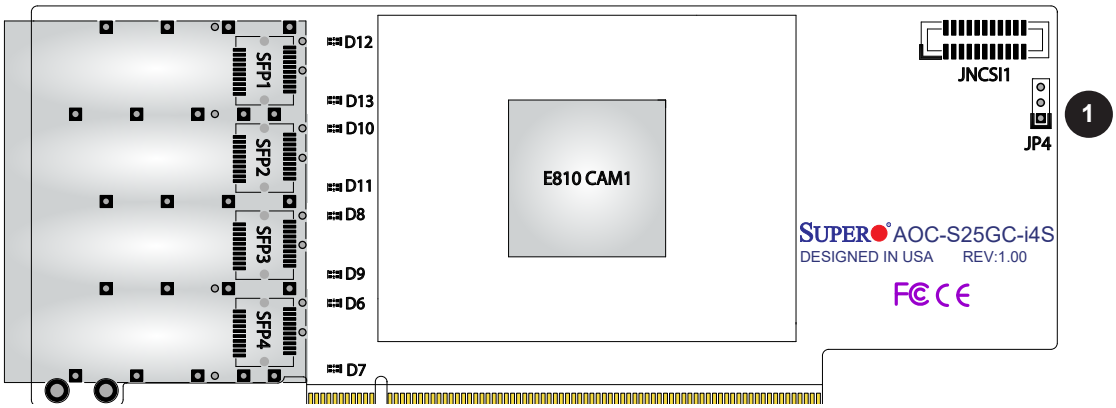


Figure 2-4: Three Pin Setting

1. Standby Power



3.3 V Standby Power Enable

The 3.3 V Standby Power Enable jumper is located at JP4 on the add-on card. Close Pins 1 and 2 to enable 3.3 V Standby Power support. Consult Supermicro before enabling it. The default setting is Disable.

JP4 for NC-SI Standby by Power	BMC Support	FailOver Support	WoL Support	Function	Notes
Disable = No standby Power to AOC NIC	Yes	Yes	No	Disable jumper to disconnect the standby power	Default
Enable = Standby Power to AOC NIC	Yes	Yes	Yes	Enable jumper to connect standby power to AOC NIC	Wake-on-LAN (WoL) is supported but limited to platforms with sufficient airflow when it is in standby mode (S5 state). Consult Supermicro before enabling it.

Chapter 3

Installation

Your system came with the AOC-S25GC-i4S add-on card, which is designed as a part of an integrated solution. We do not recommend that any part of your system components be removed and reinstalled. However, if you do need to remove or reinstall a system component, including this add-on card, follow the instructions to ensure proper system setup. Also, be sure to remove the power cord first before adding, removing, or changing any hardware components to avoid damaging the system or components.

3.1 Static-Sensitive Devices

Electrostatic Discharge (ESD) can damage electronic components. To avoid damaging your add-on card, it is important to handle it very carefully. The following measures are generally sufficient to protect your equipment from ESD.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing the add-on card from the antistatic bag.
- Handle the add-on card by its edges only; do not touch its components or peripheral chips.
- Put the add-on card back into the antistatic bags when not in use.
- For grounding purposes, make sure that your system chassis provides excellent conductivity between the power supply, the case, the mounting fasteners, and the add-on card.

Unpacking

The add-on card is shipped in antistatic packaging to avoid static damage. When unpacking your component or system, make sure you are static protected.

Note: To avoid damaging your components and to ensure proper installation, always connect the power cord last, and always unplug it before adding, removing, or changing any hardware components.

3.2 Before Installation

To install the add-on card properly, be sure to follow the instructions:

1. Power down the system.
2. Remove the power cord from the wall socket.
3. Use industry-standard antistatic equipment (such as gloves or a wrist strap) and follow the instructions listed in Section 3.1 to avoid damage caused by ESD.
4. Familiarize yourself with the server, motherboard, and/or chassis documentation.
5. Confirm that your operating system includes the latest updates and hot fixes.

3.3 Installing the Add-on Card

Follow the steps to install an add-on card into your system. (If the system is fixed onto a rack, the removal of the server top cover is not required. If the system is not anchored to a fixed structure, it is recommended to remove the system top cover for ease of installation.)

1. Remove the server cover. If necessary, set aside any screws for later use.
2. Remove the add-on card slot cover. If the case requires a screw, place the screw aside for later use.
3. Position the add-on card in the slot directly over the connector on the motherboard.
4. Gently push down on both sides of the card until it slides into the PCI connector.
5. Secure the add-on card/motherboard to the chassis. If required, use the screw that you had previously removed.
6. Attach any necessary external cables to the add-on card.
7. Replace the chassis cover.
8. Plug the power cord into the wall socket.
9. Power up the system.

3.4 Installing the Drivers (for Intel E810-CAM1)

To install drivers for the AOC-S25GC-i4S add-on card for either Linux or Windows, follow the instructions:

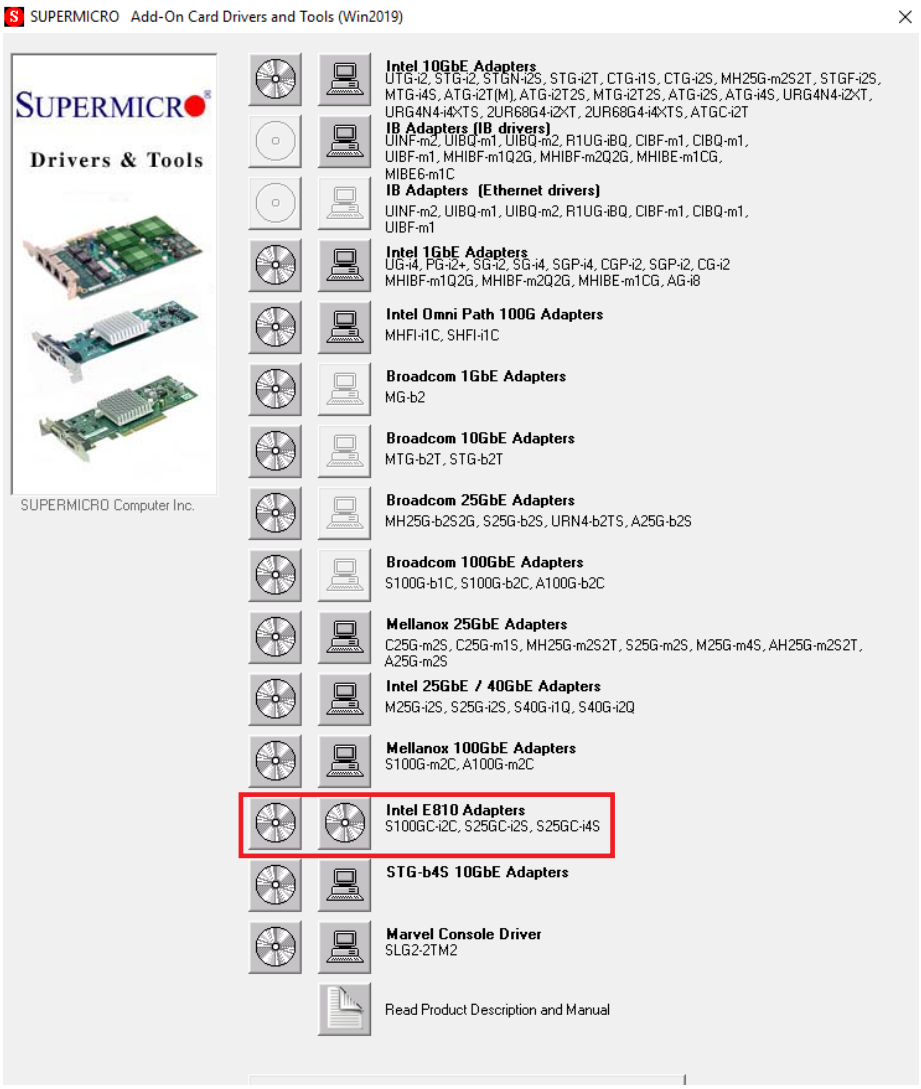


Figure 3-1: Add-On Card Drives and Tools

Building the Driver RPM Package

Follow the steps to build a binary RPM package for this driver:

Note: RPM functionality has only been tested in Red Hat distributions.

1. Run the following command, where <x.x.x> is the version number for the driver tar file:

```
# rpmbuild -tb ice-<x.x.x>.tar.gz
```

Note: For the build to work properly, the kernel currently running MUST match the version and configuration of the installed kernel sources. If you have just recompiled the kernel, reboot the system before building.

2. After building the RPM, the last few lines of the tool output contain the location of the RPM file that was built. Install the RPM with one of the following commands where <RPM> is the location of the RPM file:

```
# rpm -Uvh <RPM>
```

or

```
# dnf/yum localinstall <RPM>
```

Note 1: To compile the driver on some kernel/arch combinations, you may need to install a package with the development version of libelf (e.g., libelf-dev, libelf-devel, elfutils-libelf-devel).

Note 2: When compiling an out-of-tree driver, users will find that details may vary by distribution. However, you will usually need a kernel-devel RPM or some RPM that provides the kernel headers at a minimum. The RPM kernel-devel will usually fill in the link at /lib/modules/'uname -r'/build.

Manually Building the Driver

Follow the steps to manually build the driver:

1. Move the base driver tar file to the directory of your choice. For example, use '/home/username/ice' or '/usr/local/src/ice'.

2. Untar/unzip the archive where <x.x.x> is the version number for the driver tar file.

```
# tar zxf ice-<x.x.x>.tar.gz
```

3. Change to the driver src directory where <x.x.x> is the version number for the driver tar.

```
# cd ice-<x.x.x>/src
```

4. Compile the driver module.

   ```
   # make install
   ```

   The binary will be installed as:

   ```
   /lib/modules/<KERNEL VER>/updates/drivers/net/ethernet/intelice/
   ice.ko
   ```

   The installation location listed above is the default location. This may differ for various Linux distributions.

   Note: To compile the driver with Application Device Queues (ADQ) flags set, use the following command where <nproc> is the number of logical cores:

   ```
   # make -j<nproc> CFLAGS_EXTRA='-DADQ_PERF -DADQ_PERF_COUNTERS'
   install
   ```

   This will also apply the above 'make install' command.

5. Load the module using the modprobe command. To check the version of the driver and then load it, enter the following commands:

   ```
   # modinfo ice
   ```

   ```
   # modprobe ice
   ```

Alternately, make sure that any older ice drivers are removed from the kernel before loading the new module.

```
# rmmod ice; modprobe ice
```

Note: To enable verbose debug messages in the kernel log, use the dynamic debug feature (dyndbg). See "Dynamic Debug" later in this README for more information.

6. Assign an IP address to the interface by entering the following, where <ethX> is the interface name that was shown in dmesg after modprobe.

   ```
   # ip address add <IP_address>/<netmask bits> dev <ethX>
   ```

7. After verifying that the interface works, enter the following commands where the IP_ address is for another machine on the same subnet. Do so when the interface is being tested.

   ```
   # ping <IP_address>
   ```

(Disclaimer Continued)

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