



# AOC-C25G-m1S



## User's Guide

Revision 1.0

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**WARNING:** Handling of lead solder materials used in this product may expose you to lead, a chemical known to the State of California to cause birth defects and other reproductive harm.

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## Preface

### About this User's Guide

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-C25G-m1S add-on card.

### About this Add-on Card

The Supermicro AOC-C25G-m1S, based on Mellanox® ConnectX®-4 Lx EN controller, is the most advanced and compact 25GbE solutions for our high density MicroCloud and Twin series servers. With MicroLP form factor and lower power consumption, it can fit in small spaces while providing the highest networking bandwidth for data centers. It is backward compatible with 10GbE networks and represent the most cost effective upgrade from 10GbE to 25GbE. The AOC-C25G-m1S, designed to provide the best performance and optimized Cloud efficiency, is an excellent choice for customers who are looking to expand their networks with the highest bandwidth connectivity.

### An Important Note to the User

All images and layouts shown in this user's guide are based upon the latest PCB Revision available at the time of publishing. The card you have received may or may not look exactly the same as the graphics shown in this user's 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 the motherboard to the manufacturer, the RMA number should be prominently displayed on the outside of the shipping carton, and the shipping package is 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, You can also request a RMA authorization online (<http://www.supermicro.com>).

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

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

## Conventions Used in the User's Guide

Pay special attention to the following symbols for proper system installation and to prevent damage to the system or injury to yourself:



**Warning:** Important information given to ensure proper system installation or to prevent damage to the components or injury to yourself.



**Note:** Additional information given to differentiate between various models or provides information for correct system setup.

## Naming Convention

AOC-MHIBF-m2Q2G

1<sup>st</sup>
2<sup>nd</sup>
3<sup>rd</sup>
5<sup>th</sup>
6<sup>th</sup>
7<sup>th</sup>
8<sup>th</sup>

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
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), IBF: FDR IB (56Gb/s), IBQ: QDR IB (40Gb/s), HFI: Host Fabric Interface
4th	Chipset Model (Optional)	N: Niantec (82599), P: Powerville (i350), S: Sageville (X550)
5th	Chipset Manufacturer	i: Intel, m: Mellanox, b: Broadcom
6th	Number of Ports	1: 1 port, 2: 2 ports, 4: 4 ports
7th	Connector Type (Optional)	S: SFP+/SFP28, T: 10GBase-T, Q: QSFP+, C: QSFP28
8th	2 <sup>nd</sup> Controller/Connector Type (Optional)	G: 1x GbE RJ45, 2G: GbE 2x RJ45, S: 1x 10G SFP+, T: 10GBase-T, 2T: 2x 10GBase-T

## SMC Networking Add-on Cards

Model	Type	Form Factor	Controller	Connection	Dimension (w/o Brackets) (L x H)	Power (W)
AOC-MGP-I2	GbE	SIOM	Intel® i350 AM2	2 RJ45 (1Gb/port)	3.622" (92mm) x 3.428" (87.06mm)	3.7
AOC-MGP-I4	GbE	SIOM	Intel® i350 AM4	4 RJ45 (1Gb/port)	3.622" (92mm) x 3.428" (87.06mm)	4.4
AOC-MTGN-I2S	10GbE	SIOM	Intel® 82599ES	2 SFP+ (10Gb/port)	3.622" (92mm) x 3.428" (87.06mm)	7.2
AOC-MTG-I4S	10GbE	SIOM	Intel® XL710-BM1	4 SFP+ (10Gb/port)	3.622" (92mm) x 3.428" (87.06mm)	7
AOC-MTG-I2T	10GbE	SIOM	Intel® X550-AT2	2 RJ45 (10GBase-T)	3.622" (92mm) x 3.428" (87.06mm)	13
AOC-MTG-I4T	10GbE	SIOM	2x Intel® X550-AT2	4 RJ45 (10GBase-T)	3.622" (92mm) x 3.428" (87.06mm)	26
AOC-MHBF-m1Q2G	FRD IB GbE	SIOM	Mellanox® ConnectX-3 Pro Intel® i350	1 QSFP (56Gb/port) 2 RJ45 (1Gb/port)	3.622" (92mm) x 3.428" (87.06mm)	9
AOC-MHBF-m2Q2G	FRD IB GbE	SIOM	Mellanox® ConnectX-3 Pro Intel® i350	2 QSFP (56Gb/port) 2 RJ45 (1Gb/port)	3.622" (92mm) x 3.428" (87.06mm)	11
AOC-MH25G-b2S2G	25GbE GbE	SIOM	Broadcom® BCM57414 Intel® i350	2 SFP28 (25Gb/port) 2 RJ45 (1Gb/port)	3.622" (92mm) x 3.428" (87.06mm)	9
AOC-MH25G-m2S2T	25GbE	SIOM	Mellanox® ConnectX-4 Lx EN Intel® X550-AT2	2 SFP28 (25Gb/port) 2 RJ45 (10GBase-T)	3.622" (92mm) x 3.428" (87.06mm)	25
AOC-MHFI-I1C	Omni-Port	SIOM	Intel® OP HFI ASIC (Wolf River WFR-B)	1 QSFP28 (100Gb/port)	3.622" (92mm) x 3.428" (87.06mm)	15

Model	Type	Form Factor	Interface	Controller	Connection	Dimension (w/o Brackets) (L x H)	Power (W)
AOC-SGP-i2	GbE	Standard LP	PCI-E x4	Intel® I350 AM2	2 RJ45 (1Gb/port)	3.9" (99mm) x 2.73" (69mm)	3.5
AOC-SGP-i4	GbE	Standard LP	PCI-E x4	Intel® I350 AM4	4 RJ45 (1Gb/port)	3.9" (99mm) x 2.73" (69mm)	5
AOC-STG-i2T	10GbE	Standard LP	PCI-E x8	Intel® X540-AT2	2 RJ45 (10GbBase-T)	5.9" (150mm) x 2.73" (69mm)	13
AOC-STGS-i1T	10GbE	Standard LP	PCI-E x4	Intel® X550-AT	1 RJ45 (10GbBase-T)	5.9" (150mm) x 2.73" (69mm)	9
AOC-STGS-i2T	10GbE	Standard LP	PCI-E x4	Intel® X550-AT2	2 RJ45 (10GbBase-T)	5.9" (150mm) x 2.73" (69mm)	11
AOC-STG-i4T	10GbE	Standard LP	PCI-E x8	Intel® XL710-BM1	4 RJ45 (10GbBase-T)	5.9" (14.99cm) x 2.73" (6.9cm)	15.5
AOC-STGN-i1S	10GbE	Standard LP	PCI-E x8	Intel® 82598EN	1 SFP+ (10Gb/port)	4.0" (102mm) x 2.73" (69mm)	10
AOC-STGN-i2S	10GbE	Standard LP	PCI-E x8	Intel® 82598ES	2 SFP+ (10Gb/port)	4.0" (102mm) x 2.73" (69mm)	11.2
AOC-STGF-i2S	10GbE	Standard LP	PCI-E x8	Intel® X710-BM2	2 SFP+ (10Gb/port)	TBD	TBD
AOC-STG-b4S	10GbE	Standard LP	PCI-E x8	Broadcom® BCM57840S	4 SFP+ (10Gb/port)	5.4" (137mm) x 2.73" (69mm)	14
AOC-STG-i4S	10GbE	Standard LP	PCI-E x8	Intel® XL710-BM1	4 SFP+ (10Gb/port)	5.9" (150mm) x 2.73" (69mm)	8
AOC-S40G-44S	10GbE	Standard LP	PCI-E x8	Intel® XL710-BM1	1 QSFP+ w/ breakout cable to 4 x 10GbE	5.9" (150mm) x 2.73" (69mm)	TBD
AOC-S25G-b2S	25GbE	Standard LP	PCI-E x8	Broadcom® BCM57414	2 SFP28 (25Gb/port)	5.6" (142mm) x 2.713" (69mm)	7
AOC-S25G-m2S	25GbE	Standard LP	PCI-E x8	Mellanox® CX-4 LX	2 SFP28 (25Gb/port)	TBD	TBD
AOC-S40G-i1Q	40GbE	Standard LP	PCI-E x8	Intel® XL710-BM1	1 QSFP+ (40Gb/port)	5.9" (150mm) x 2.73" (69mm)	6.5
AOC-S40G-i2Q	40GbE	Standard LP	PCI-E x8	Intel® XL710-BM2	2 QSFP+ (40Gb/port)	5.9" (150mm) x 2.73" (69mm)	7
AOC-S100G-m2C	100GbE	Standard LP	PCI-E x16	Mellanox® CX-4 EN	2 QSFP28 (100Gb/port)	TBD	TBD
AOC-PTG-i1S	10GbE	Proprietary	PCI-E x8	Intel® 82598EN	1 SFP+ (10Gb/port)	10.04" (255mm) x .78" (20mm)	7.5
AOC-UG-i4	GbE	UIO FH	PCI-E x8	Intel® 82571EB	4 RJ45 (1Gb/port)	6.6" (167mm) x 3.9" (98mm)	10
AOC-CGP-i2	GbE	MicroLP	PCI-E x4	Intel® I350 AM2	2 RJ45 (1Gb/port)	4.45" (113mm) x 1.54" (39mm)	4
AOC-CG-i2	GbE	MicroLP	PCI-E x4	Intel® 82580	2 RJ45 (1Gb/port)	4.45" (113mm) x 1.3" (34mm)	4
AOC-CIBF-m1	FDR IB	MicroLP	PCI-E x8	Mellanox® ConnectX-3	1 QSFP (56Gb/port)	4.85" (123mm) x 1.54" (39mm)	7
AOC-CTG-i1S	10GbE	MicroLP	PCI-E x8	Intel® 82598EN	1 SFP+ (10Gb/port)	4.85" (123mm) x 1.54" (39mm)	10
AOC-CTG-i2S	10GbE	MicroLP	PCI-E x8	Intel® 82598ES	2 SFP+ (10Gb/port)	4.85" (123mm) x 1.54" (39mm)	11
AOC-CTG-i2T	10GbE	MicroLP	PCI-E x8	Intel® X540-AT2	2 RJ45 (10GbBase-T)	4.8" (123mm) x 2.75" (71mm)	13
AOC-CTGS-i2T	10GbE	MicroLP	PCI-E x4	Intel® X550-AT2	2 RJ45 (10GbBase-T)	4.45" (113mm) x 1.54" (39mm)	12
AOC-C25G-m1S	25GbE	MicroLP	PCI-E x8	Mellanox® CX-4 Lx EN	1 SFP28 (25Gb/port)	4.45" (113mm) x 1.54" (39mm)	8.5

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# Notes

# Chapter 1

## Overview

### 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 in quality and performance. For product support and updates, please refer to our website at <http://www.supermicro.com/products/nfo/networking.cfm#adapter>.

### 1-2 Key Features

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

- Single SFP28 (Small Form Factor Pluggable) Connector
- MicroLP Form Factor
- PCI Express 3.0 x8 (8GT/s)
- Hardware offloads for NVGRE, VXLAN and GENEVE encapsulated traffic
- SR-IOV for virtualization
- Low latency RDMA over Converged Ethernet (RoCE)
- Jumbo Frames support
- NC-SI for remote management
- Support Direct Attach Copper and Fiber Cables
- RoHS compliant 6/6

### 1-3 Specifications

#### General

- Mellanox® ConnectX®-4 Lx EN controller
- MicroLP form factor

- Single SFP28 connector with speed up to 25Gb/s per port
- PCI-E 3.0 x8 (8GT/s) interface

### **Ethernet**

- 25GbE/10GbE/1GbE
- IEEE 802.3ad, 802.1AX Link Aggregation
- IEEE 802.1Q, 802.1P VLAN tags and priority
- IEEE 1588v2
- Jumbo frame support (9.6KB)

### **Enhanced Features**

- Hardware-based reliable transport
- Collective operations offloads
- Vector collective operations offloads
- 64/66 encoding
- Dynamically Connected Transport (DCT)
- Enhanced Atomic operations
- Support for MSI/MSI-X mechanisms

### **Storage Offloads**

- RAID offload – erasure coding (Reed-Solomon) offload

### **Overlay Networks**

- Stateless offloads for overlay networks and tunneling protocols
- Hardware offload of encapsulation of NVGRE and VXLAN overlay networks

## Hardware-based I/O Virtualization

- Single Root IOV
- Multi-function per port
- Multiple queues per virtual machine
- VMware NetQueue support

## Virtualization

- SR-IOV: Up to 256 Virtual Functions
- SR-IOV: Up to 16 Physical Functions per port

## CPU Offloads

- RDMA over Converged Ethernet (RoCE)
- TCP/UDP/IP stateless offload
- LSO, LRO, checksum offload
- RSS (can be done on encapsulated packet), TSS, HDS, VLAN insertion/striping, Receive flow steering
- Intelligent interrupt coalescence

## Management Features

- Remote boot over iSCSI
- PXE and UEFI
- NC-SI for remote management

## OS Support

- RHEL/CentOS (7.2, 7.1, 7.0, 6.8, 6.7, 6.6, 6.5, 6.2)
- Windows (2012 R2, 2012)

- FreeBSD (11)
- VMware (6.5, 5.5)

## **Cables Support**

- Direct attach twinaxial copper cables
- Fiber-optic cables (with required optional transceivers)

## **Power Consumption**

- AOC-C25G-m1S: Maximum 8.5W

## **Operating 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

## **Physical Dimensions**

- Card PCB dimensions: 11.3cm (4.45in) x 3.9cm (1.54in) (L x H)

## **Compliance/Environmental**

- RoHS Compliant 6/6, Pb Free



## **Supported Platforms**

- Supermicro Twin Servers and MicroCloud Systems with MicroLP expansion slot (see MicroLP Compatibility Matrix online at [http://www.supermicro.com/support/resources/aoc/microLP\\_compatibility.cfm](http://www.supermicro.com/support/resources/aoc/microLP_compatibility.cfm))

## 1-4 Available SKUs

Product Part Number	Part Number	Description
AOC-C25G-m1S	AOC-C25G-m1S	1-port 25 Gigabit Ethernet Adapter
	BKT-0051L	MicroLP PCB bracket (pre-installed)
	BKT-0115L	IO bracket for 1U system (pre-installed)

## 1-5 Related Supermicro Products

Product Part Number	Form Factor	Speed	Interface	Connector Type	Total Ports	Controller
AOC-CGP-i2	MicroLP	GbE	PCI-E 2.1 x4	RJ45	2	Intel® i350-AM2
AOM-CGP-i2M	MicroLP	GbE	PCI-E 2.1 x4	RJ45	2	Intel® i350-AM2
AOC-CTG-i1S	MicroLP	10GbE	PCI-E 2.0 x8	SFP+	1	Intel® 82599EN
AOM-CTG-i1SM	MicroLP	10GbE	PCI-E 2.0 x8	SFP+	1	Intel® 82599EN
AOC-CTG-i2S	MicroLP	10GbE	PCI-E 2.0 x8	SFP+	2	Intel® 82599ES
AOC-CTG-i2T	MicroLP	10GbE	PCI-E 2.1 x8	RJ45	2	Intel® X540
AOC-CTGS-i2T	MicroLP	10GbE	PCI-E 3.0 x4	RJ45	2	Intel® X550-AT2
AOM-CTGS-i2TM	MicroLP	10GbE	PCI-E 3.0 x4	RJ45	2	Intel® X550-AT2



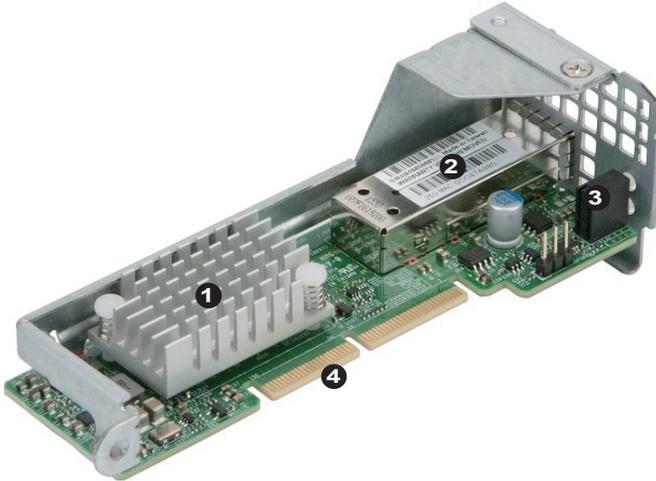
**Note:** AOM products come pre-assembled with a riser card and bracket, and are designed in a small MicroLP form factor to fit Supermicro 12 node MicroCloud server systems.

## Notes

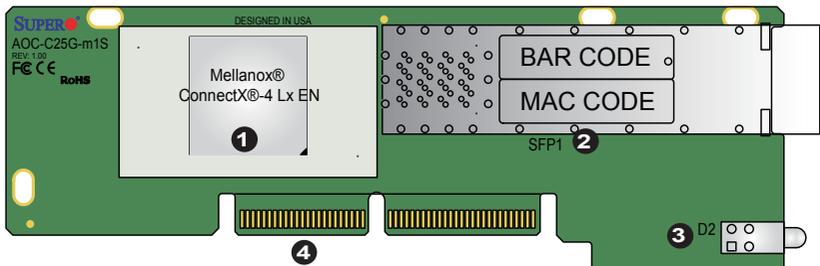
## Chapter 2

### Hardware Components

#### 2-1 Add-On Card Image and Layout



The AOC-C25G-m1S Image



The AOC-C25G-m1S Layout

1. Mellanox® ConnectX®-4 Lx EN	4. PCI-E 3.0 x8 interface
2. SFP1: SFP28 Port	
3. D2: SFP28 Port Link/Activity LED	

## 2-2 Major Components

The following major components are installed on the AOC-C25G-m1S:

1. Mellanox® ConnectX®-4 Lx EN Controller
2. Single SFP28 (Small Form Factor Pluggable) Ports
3. One (1) SFP28 Link/Activity LED Indicator

## 2-3 SFP28 Ethernet Connections

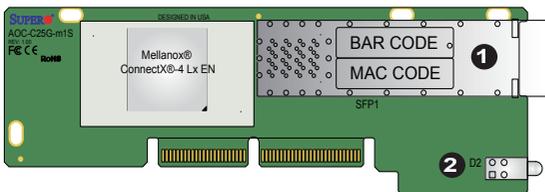
### SFP28 (SFP1) Connector

One small form-factor pluggable (SFP28) optical transceiver connector (SFP1) is on the add-on card. The SFP28 port provides Ethernet up to 25GbE network connections. See the layout below for the location.

### SFP28 (SFP1) Link/Activity LED Indicator

One LAN Link/Activity LED indicator is located at D2 on the add-on card. See the table and layout below for the LED states and location.

LAN Port Link/Activity LED LED State		
LED	Color	Definition
LNK	Green	25 Gbps Link Speed
	Yellow	10 Gbps or 1 Gbps
	Off	No Connection
ACT	Blinking Green	25/10/1 Gbps Active



1. [Single SFP28 Connector](#)
2. [SFP28 Link/Activity LED Indicator](#)

## Notes

## Chapter 3

### Installation

#### 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

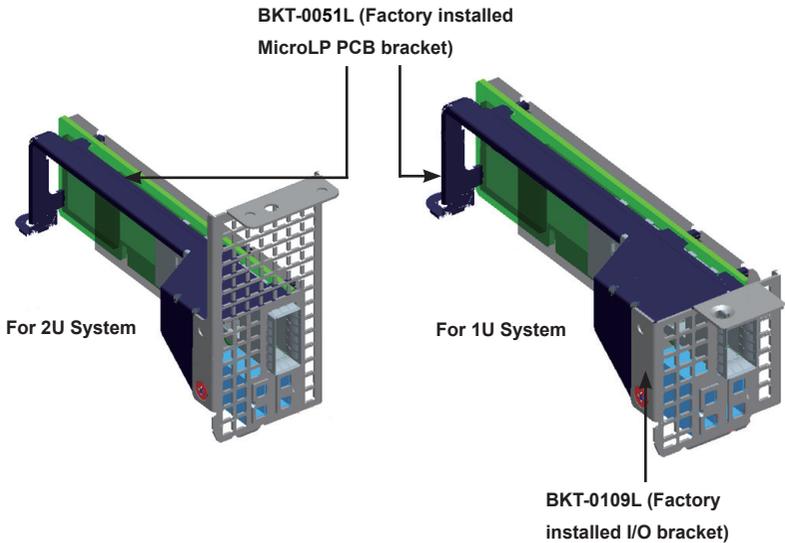
The add-on card is shipped in antistatic packaging to avoid static damage. When unpacking your component or your system, make sure that the person handling it is static protected.



**Warning:** To avoid damaging your components and to ensure proper installation, be sure to always connect the power cord last, and always remove it before adding, removing or changing any hardware components.

### 3-2 Add-On Card Brackets

The add-on card ships with a PCB bracket that is pre-installed at the factory. For 1U systems, an I/O bracket is also pre-installed on the card. For 2U systems, the I/O bracket is bundled with the card and must be installed by the customer. See the drawings below for bracket details.



### 3-3 Before Installation

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

1. Power down the system.
2. Remove the power cord from the wall socket.
3. Use industry standard anti-static equipment (such as gloves or wrist strap) and follow the instructions listed on Page 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 hotfixes.

### 3-4 Installing the Add-on Card

Follow the steps below to install the add-on card into your system.

1. Remove the server cover and, 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, and gently push down on both sides of the card until it slides into the PCI connector.
4. Secure the add-on card to the chassis. If required, use the screw that you previously removed.
5. Attach any necessary external cables to the add-on card.
6. Replace the chassis cover.
7. Plug the power cord into the wall socket, and power up the system.

### 3-5 Installing Drivers from the CD-ROM CDR-NIC

Follow the steps below to install the drivers needed for your Windows OS support. The controller comes with a driver on the CD-ROM CDR-NIC.

1. Run the CDR-NIC. (If you do not have a product CD-ROM, download drivers from the Supermicro Support Website and then transfer them to your system.)
2. When the SUPERMICRO window appears, click on the computer icon next to the product model.



 **Note:** If the *FOUND NEW HARDWARE WIZARD* screen displays on your system, click **CANCEL**.

3. Click on **INSTALL DRIVERS AND SOFTWARE**.
4. Follow the prompts to complete the installation.

## **3-6 Installing Drivers**

Use the procedures below to install drivers for the AOC-C25G-m1S add-on card for both Linux and Windows.

### **Linux Drivers**

Use the following procedures to install drivers on the Linux operating system.

#### ***Installing 25G Drivers for the Linux Operating System***

1. From the CDR-NIC LAN driver CD or FTP site, go to the following directory:  
Mellanox > Linux.
2. Download the Linux driver package file.
3. Install the driver by entering the following commands:

```
tar xzvf mlnx-en-<ver>.tgz  
cd mlnx-en-<ver>  
./install.sh
```

This installs the Linux drivers to your system.

### **Windows Drivers**

Use the following procedures to install drivers on the Windows operating system.

#### ***Installing 25G Drivers for the Windows Operating System***

1. From the CDR-NIC LAN driver CD or FTP site, go to the following directory:  
Mellanox > Windows.
2. Choose the desired Windows driver package file.
3. Double-click to run and install the driver package file.

(Disclaimer Continued)

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