H3C XG310 GPU Module

User Guide

New H3C Technologies Co., Ltd.
http://www.h3c.com

Document version: 6W101-20210610

1 About the GPU module

Overview

IMPORTANT:

The model name of a hardware option in this document might differ slightly from its model name label. A model name label might add a prefix or suffix to the hardware-coded model name for purposes such as identifying the matching server brand or applicable region. For example, the GPU-XG310-32GB-FHFL GPU module model represents GPU module labels including UN-GPU-XG310-32GB-FHFL and UN-GPU-XG310-32GB-FHFL-F, which have different prefixes and suffixes.

H3C GPU-XG310-32GB-FHFL GPU module (hereinafter referred to as GPU module) uses Intel SG1 GPUs on the Gen12 graphics architecture, delivering increased performance and high energy efficiency. The XG310 has four independent GPUs, allowing the server to call different number of GPUs as needed for image processing and data operations. Each GPU supports a maximum of 96 execution units (EUs). The XG310 is applicable to cloud gaming, virtual desktop, image and video processing, and other scenarios.

In this document, "GPU module" refers to the GPU-XG310-32GB-FHFL module and "GPU" refers to a GPU chip on the GPU-XG310-32GB-FHFL module.

Figure1-1 GPU module

Connectors

Figure1-2 Connectors

(1) Power connector	(2) PCIe3.0 ×16 connector

Specifications

Table1-1 Hardware specifications

Item	Specifications
GPU package type	FCBGA
Number of GPUs	4
EUs	96 EUs per GPU
Video memory type	LPDDR4x
Video memory size	• GPU: 8 GB • GPU module: 32 GB
GPU video memory bitwidth	128 bits
GPU video memory bandwidth	68.25 GB/s
Video memory operating rate	4267 MT/s
GPU module operating frequency	• Boost: 1.1 GHz • Base: 0.9 GHz
Power consumption	• GPU: 23 W • GPU module: 150 W
Bus type	PCIe3.0 ×16

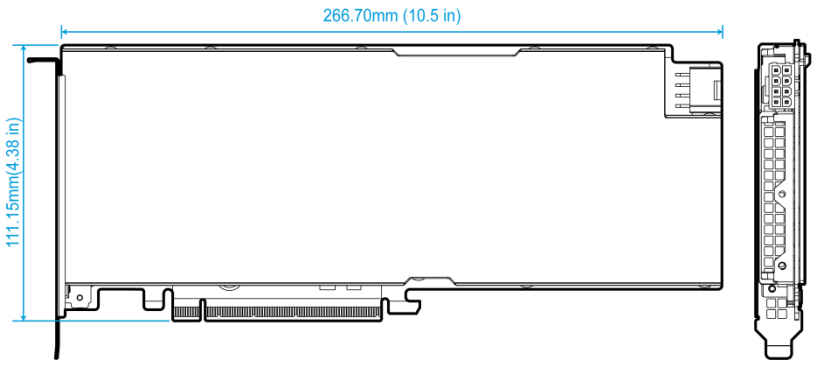
Item	Specifications
Power connector type	PCIe 8-pin
Thermal solution	Passive
Maximum operating temperature	95°C (203°F) The GPU module operates at reduced frequency if the temperature exceeds 95°C (203°F).
Forced power-off temperature	130°C (266°F)

Table1-2 Software specifications

Item	Specifications
Fixed function decode	Supported (AVC/HEVC/VP9/MPEG-2/JPEG)
Fixed function encode	Supported (AVC/HEVC/VP9/JPEG)
Programmable encode	Supported (AVC/HEVC/MPEG-2)
AV1 decode	Supported
GFX/APIs	Supported (OpenGL/OpenGL ES)
Virtualization mode	Only pass-through mode supported
ECC	Not supported
Compatible operating system	• Linux: CentOS and Debian. • VMware: Not supported. • Windows: Not supported.
Hypervisor	KVM
Host OS	CentOS
Guest OS	CentOS

Dimensions

Figure1-3 Dimensions



Environment requirements

Table1-3 Environment requirements

Item	requirements
Temperature	• Operating temperature: 0°C to 55°C (32°F to 131°F) • Storage temperature: –40°C to +70°C (–40°F to +158°F)
Humidity	• Operating humidity: 8%RH to 90%RH, noncondensing • Storage humidity: 5%RH to 95%RH, noncondensing

Cooling requirements

Figure1-4 Airflow through the GPU module

Table1-4 Required air volumes for different inlet temperatures

GPU module inlet temperature	Required air volume
55°C (131°F)	12 CFM
50°C (122°F)	10 CFM
45°C (113°F)	8 CFM
40°C (104°F)	6 CFM

2 Compatibility

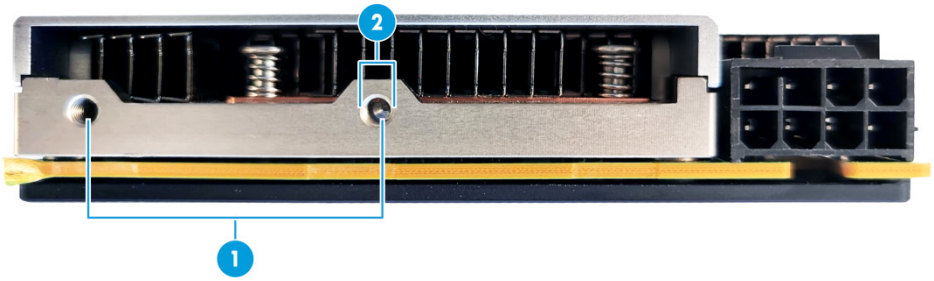
The XG310 GPU module is developed based on the Intel SG1 chip and can only be used on servers that use Intel CPUs.

3 Installing a GPU module

Attaching a support bracket to the GPU module

To install the GPU module securely on a server, attach a support bracket to the GPU module as required. See Figure3-1 for the support bracket securing hole specifications.

Figure3-1 Support bracket securing hole specifications



(1) Hole distance = 28.5 mm (1.12 in)	(2) Hole diameter = M3

Installing the GPU module on a server

For information about installing the GPU module on a server, see the user guide for the server.

4 Installing drivers and the firmware

Downloading the firmware and drivers

Access https://www.h3c.com/en/Support/Resource_Center/Software_Download/Servers/ to obtain the firmware and drivers for the GPU module and the related installation guides.

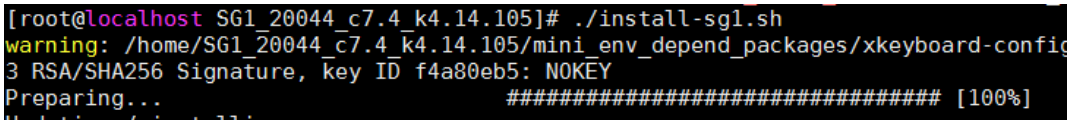
Installing drivers

A GPU module can be identified and used only after drivers are installed correctly on it. The following procedure installs drivers for the GPU module on a CentOS 7.4 operating system.

Installing drivers

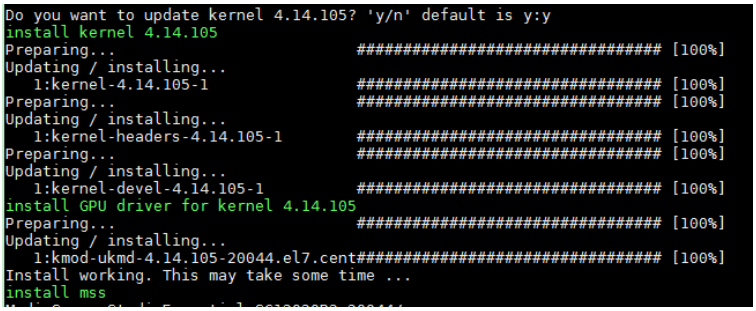
1. Copy the downloaded driver program to the server and decompress it.
2. Install the kernel and drivers:
   a. Execute the **`./install-sg1.sh`** command to start the driver installation.

      Figure4-1 Starting the driver installation



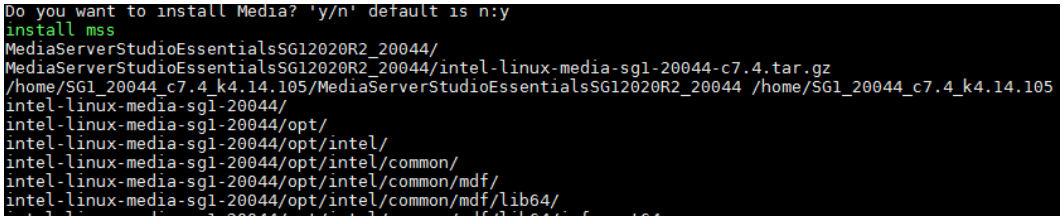
   b. Enter **y** to install the kernel.

      Figure4-2 Installing the kernel



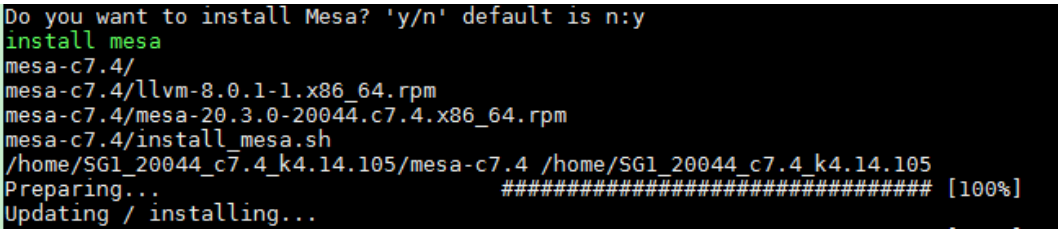
   c. Enter **y** to install the media driver.

      Figure4-3 Installing the media driver



   d. Enter **y** to install the Mesa driver.

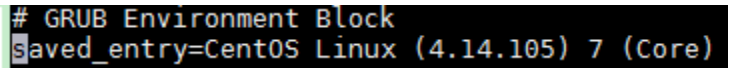
Figure4-4 Installing the Mesa driver



3. Modify the system configuration file.

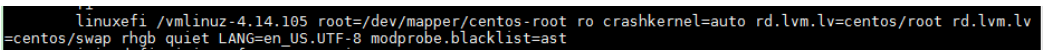
   a. Modify the GRUB setting. As shown in Figure4-5, open the **/boot/efi/EFI/centos/grubenv** file and replace the **saved_entry** line with **saved_entry=CentOS Linux (4.14.105) 7 (Core)**..

   Figure4-5 Modifying the GRUB setting



   b. Add the kernel option. Open the **/boot/efi/EFI/centos/grub.cfg** file, add space and **modprobe.blacklist=ast** to the end of **en_US.UTF-8**, as shown in Figure4-6.

   Figure4-6 Adding the kernel option



4. Execute the **`systemctl disable gdm`** command to disable the GDM service.
5. Execute the **`reboot`** command to restart the server.
6. Configure the following settings on the server:

```
export
LD_LIBRARY_PATH=/usr/local/lib:/usr/local/lib64:/usr/local/lib64/dri/:/usr/l
ib64/:/usr/lib64/dri:${LD_LIBRARY_PATH}
export DISPLAY=:0.0
export MESA_LOADER_DRIVER_OVERRIDE=iris
export LD_LIBRARY_PATH=.:/opt/intel/mediasdk/lib64/:${LD_LIBRARY_PATH}
export LIBVA_DRIVER_NAME=iHD
export LIBVA_DRIVERS_PATH=/opt/intel/mediasdk/lib64
```

7. Execute the **`/usr/bin/X –sharevts &`** command to connect the GPUs to the X service.

Verifying the installation

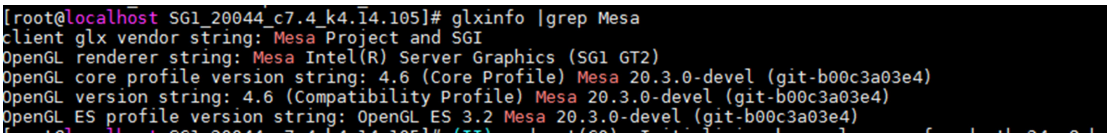
1. In the root directory of the driver, execute the **`./gpu_sanity_test_sh`** command to run a sanity test on the four GPUs.

   As shown in Figure4-7, all GPUs pass the sanity test.

Figure4-7 Sanity test on GPUs

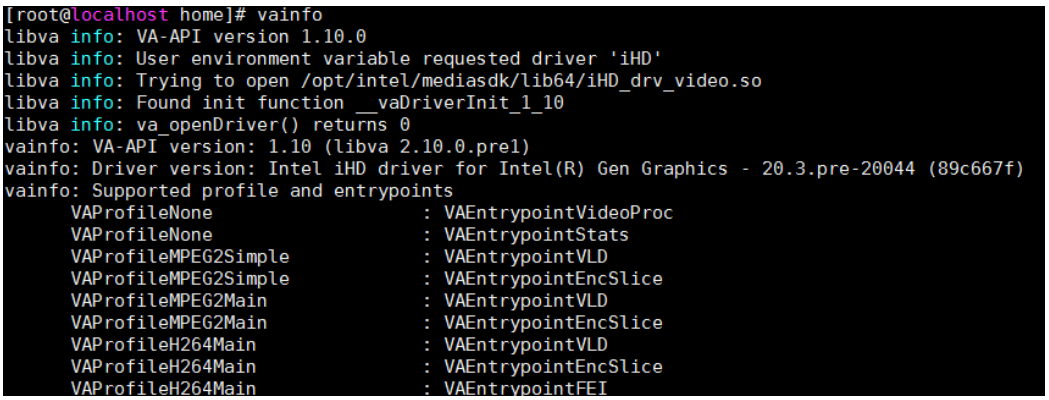
2. Execute the **`glxinfo |grep Mesa`** command to view Mesa driver version information.

Figure4-8 Viewing Mesa driver version information



3. Execute the **`vainfo`** command to view media driver version information.

Figure4-9 Viewing media driver version information



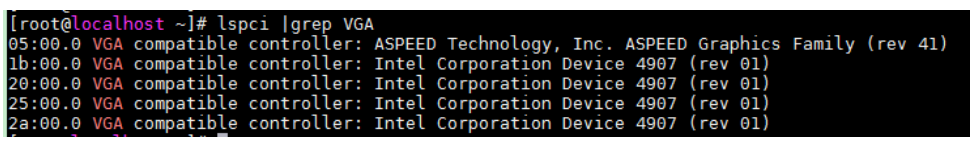
Viewing GPU module information in the operating system

1. Execute the **`lspci | grep VGA`** command to view GPU information.

   A GPU module typically has four GPUs. As shown in Figure4-10, four PCI devices, each represented by Device 4907, are identified for a GPU module.

   The first PCIe device with bus number 05:00.0 in Figure4-10 is the VGA device provided on the system board.

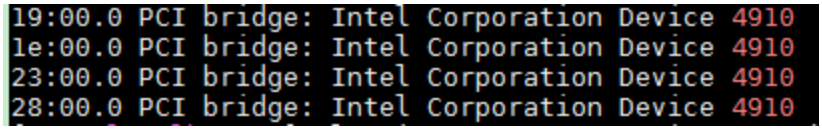
Figure4-10 Viewing GPUs



2. Execute the **`lspci | grep 4910`** command to view PCI bridges of the GPU module.

   Typically, four PCI bridges (Device 4910) are displayed for a GPU module as shown in Figure4-11.

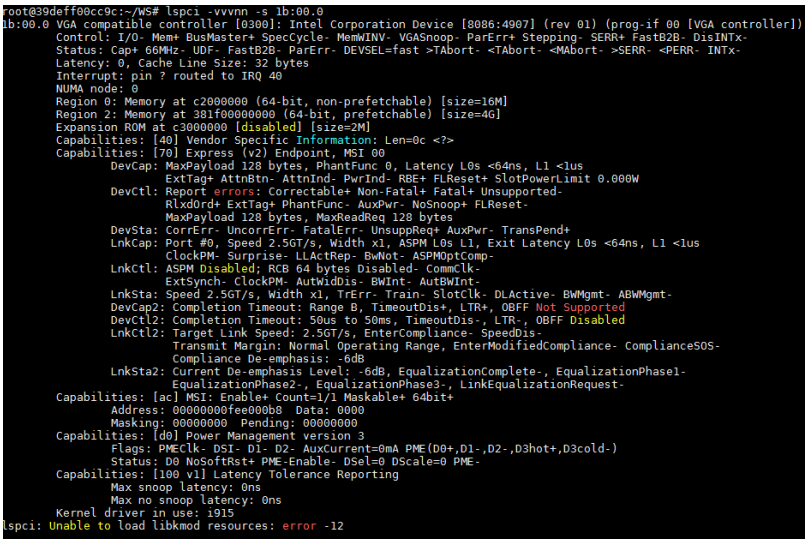
   Figure4-11 Viewing PCI bridges



3. Execute the **`lspci -vvvnn -s`** *bus* command to view the detailed PCI information of a GPU.

   To obtain the bus number of a GPU, see 1.

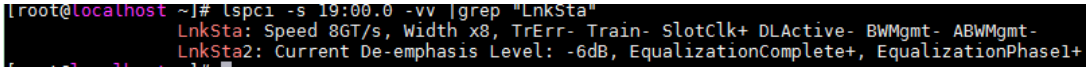
   Figure4-12 Viewing detailed PCI information about a GPU



4. Execute the **`lspci -s`** *bus* **`-vv | grep "LnkSta"`** command to view the link status of a PCI bridge.

   To obtain the bus number of a PCI bridge, see 2.

   Figure4-13 Viewing the link status of a PCI bridge



Upgrading the firmware

For better use of the GPU module, upgrade the firmware to the latest version as a best practice. For more information, see the firmware installation guide. To obtain the guide, see "Downloading the firmware and driver."

5 Safety standards and EMC standards

Safety standards

UL 60950-1

UL 62368-1

IEC 60950-1

IEC 62368-1

EN 60950-1

EN 62368-1

GB 4943.1

EMC standards

EN 55024

EN 55032

EN 55035

CISPR 24

CISPR 32

CISPR 35

AS/NZS CISPR 32

FCC Part 15 Subpart B

ICES-003 Issue 7

ANSI C63.4

VCCI-CISPR 32

6 Acronyms

Acronym	Full name
A	
AVC	Advanced Video Coding
AV1	AOMedia Video 1
C	
CFM	Cubic Feet per Minute
E	
ECC	Error Correcting Code
EU	Execution Unit in the Graphics Processor
G	
GPU	Graphics Processing Unit
H	
HEVC	High Efficiency Video Coding
M	
MPEG2	Moving Picture Experts Group
S	
SoC	System-on-chip
SDK	Software Development Kit
T	
TDP	Thermal Design Power