

Reference Manual Software

(Ubuntu 20.04.4 LTS)

Industrial Edge AI Computer

DX-U1200 Series

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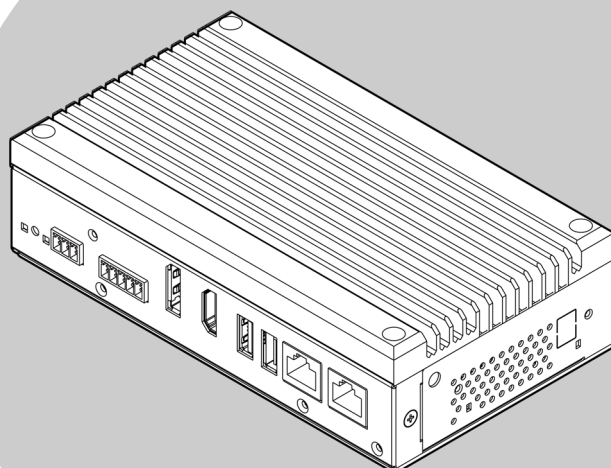


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Introduction

This will inform you of the information you need to know before using this product, such as an overview of the OS equipped with the preinstalled model, the overall configuration of this manual, the various manuals associated with this product, and so on.

1.About the Product

Ubuntu 20.04.4 LTS has been used as the firmware since R35.1 and is based on the Sample Root Filesystem for Jetson Xavier™ provided by NVIDIA®.

Contec firmware requires that the OS be customized using a predetermined configuration.



This document describes basic information, setup procedures, and recovery procedures for the OS after firmware installation.

2.Related Manuals

The manuals related to the product are listed below.

Read them as necessary along with this document.

◆ Must Read the Following Manuals.

| Name | Purpose | Contents | How to get |
|---|---|---|--|
| Product Guide | Must read this after opening the package. | This lists the product configuration and describes the precautions. | Included in the package (Printed matter) |
| Reference Manual | Read this when operating the product. | This describes the hardware aspects such as functions and settings. |  Download from the Contec website (PDF) |
| Pre-installed Model OS Manual (This manual) | Must read this after opening the package. | This explains basic OS information, setup procedures and recovery procedures. |  Download from the Contec website (PDF) |

◆ Download Manuals

Download the manuals accordingly from the following URL.

Download

<https://www.contec.com/download/>

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 - (2) The customer transfers to such third party all CONTEC hardware products onto which the Software has been downloaded; and
 - (3) The recipient of the transfer agrees to the terms and conditions herein.

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 - (1) The Republic of Cuba, The Islamic Republic of Iran, the Republic of Iraq, the Great Socialist People's Libyan Arab Jamahiriya or North Korea;
 - (2) Any individuals or entities on the "List of Foreign Users" based on the Import Trade Control Order or the U.S. Department of Commerce Denied Person's List or Entity List; or
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If for any reason any portion of the provisions set forth herein is found to be invalid or unenforceable, the remainder of the Agreement shall not be affected in any way and shall be valid and enforceable to the extent permitted by law.

Notes Regarding Use

This manual explains the precautions for using the product safely. Please make sure to read this before using this product.

1. Handling Precautions




CAUTION

- The specifications of the product are subject to change without notice for enhancement and quality improvement. Even when using the product continuously, be sure to read the manual in the CONTEC's website and understand the contents.
 - Do not modify the software. CONTEC will bear no responsibility for any problems, etc., resulting from modifying the software.
 - Regardless of the foregoing statement, CONTEC assumes no responsibility for any errors that may appear in this document or for results obtained by the user as a result of using the software.
-

2.Safety Information

This document provides safety information using the following symbols to prevent accidents resulting in injury or death and the destruction of equipment and resources.

Understand the meanings of these labels to operate the equipment safely.

| | |
|--|---|
|  DANGER | Signal word used to indicate an imminently hazardous situation which, if not avoided, will result in death or serious injury. |
|  WARNING | Signal word used to indicate a potentially hazardous situation which, if not avoided, could result in death or serious injury. |
|  CAUTION | Signal word used to indicate a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. |

3.Security Warning

When connecting to the network, be aware of security-related problems. See the examples of Security measures below and set up the product properly along with the network devices.

1. Information Security Risks

- Unauthorized access from the outside through a network could cause the system halt, data damage, or exposure to malware. *1
- Invaded and used as a stepping stone, a device might attack the others through networks. (a victim becomes an assailant)
- Information might leak without realizing due to the connection to the network.
- Secondary damages such as harmful rumors, liability in damages, social credibility fall, and opportunity loss are expected led by the troubles described above.

*1: Malware (Malicious Software) is software that brings harm to a computer system and performs unintended operations.

2. Security Measures – e.g.

- Do not keep using the default password. (Refer to the product manual for the password setting).
- Set a strong password.

Combined with upper and lowercase letters, and numbers so that it cannot be easily analogized by others.

- Change the password periodically.
- Disable unnecessary network services and functions.
- Restrict access to the network with network devices. *2
- Restrict ports to be released on the network with network devices. *2
- Create a closed network connection using such as dedicated network or VPN*3

*2: Inquire for setting procedure to manufacturers.

*3: VPN (Virtual Private Network) a secured network that wards off unauthorized access by protecting the communication path with authentication and encryption.

Unfortunately, there are no perfect ways to avert unauthorized access or close a security hole that are endlessly found day and night.

Please understand that risks are always involved with the Internet connection, and we strongly recommend a user should constantly update information security measures.

Setup procedures

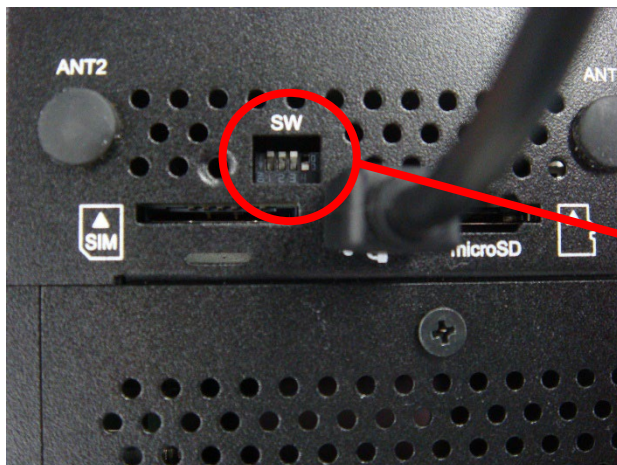
This manual describes the setup procedure that a user needs to perform after unpacking the product with a pre-installed operation system.
The setup of Ubuntu is performed interactively.

1. Ubuntu Setup

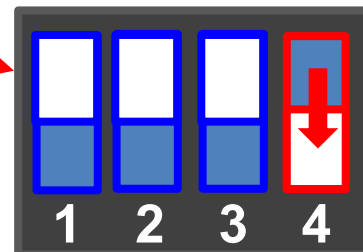
Check that the display, the keyboard and the mouse are connected with the PC. Do not connect other devices until a Ubuntu setup is completed. After confirming the connections, turn on the PC power.

⚠ CAUTION

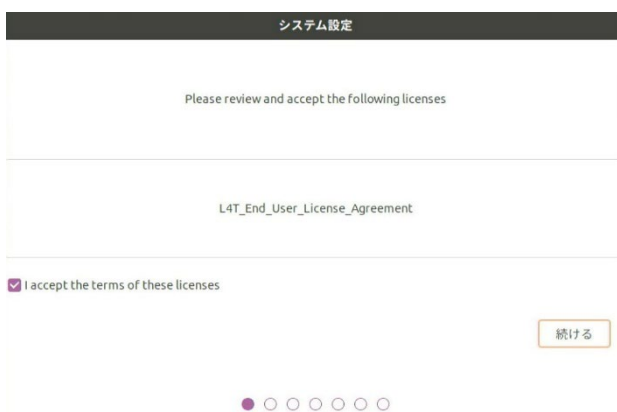
- The screen change during the setup operation may take time for a while.
- Do not turn off the power of the personal computer during the setup operation. Turning off the computer power before completing the setup will result in Ubuntu system damages.
- The eMMC built into the preinstalled model are GPT formatted. And, OS area is formatted by EXT4.
- The display driver, the LAN driver, etc. are already incorporated. However, since a network setup is needed separately, please consult with the system administrator of a connection place network.



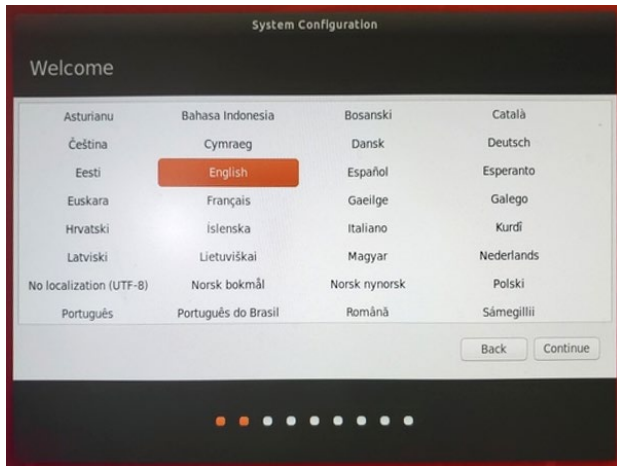
1. Set the DIPSW 4PIN on the side of the chassis to ON so that the system will watchdog-off when the power is turned on.



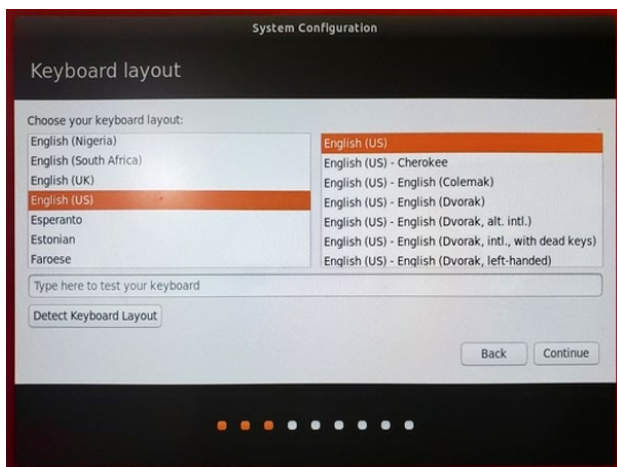
Turn on the power of the product. Please wait for the Ubuntu setup starts.
Follow the instructions on the display after start-up.



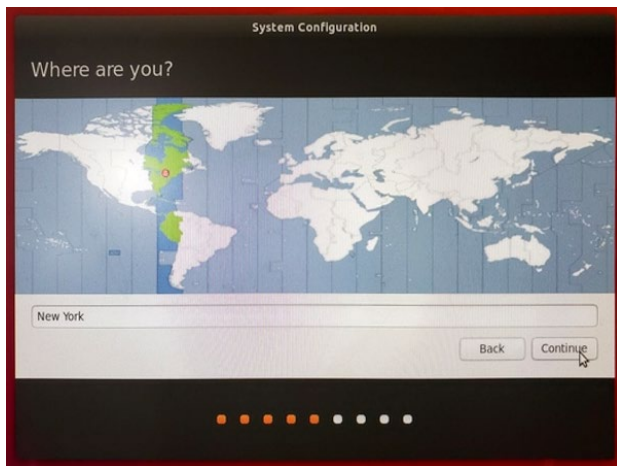
2. This is the documentation for the NVIDIA L4T licenses.
Please review and check off the box of ☐ I accept ~ to accept the licenses.
Click the .



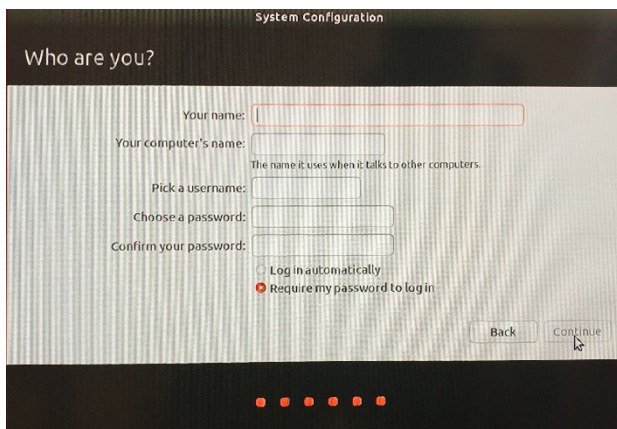
3. Select your preferred language.
Click the **Continue** button.
The following steps are explained using English as an example.



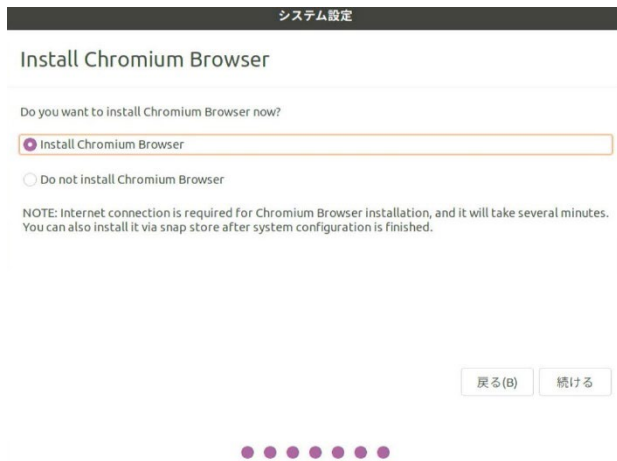
4. Select your preferred keyboard layout.
Click the **Continue** button.



5. For Time Zone setting, select the local region where the system is used.
Click the **Continue** button.



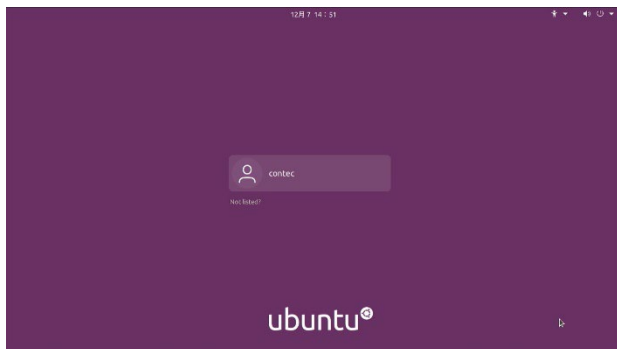
6. Type your name and your computer's name, pick a user name, and choose a password to be used for the Ubuntu desktop environment.
Click the **Continue** button.



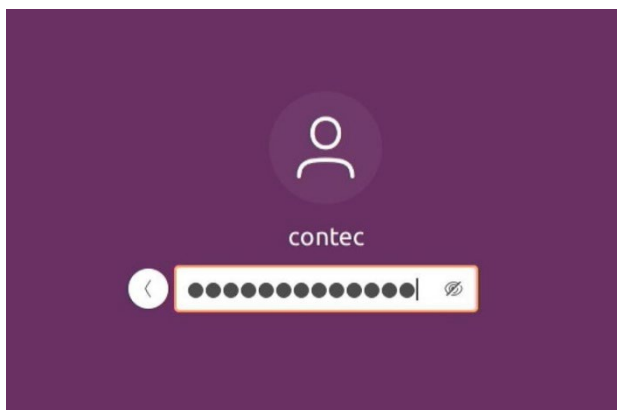
7. This setting confirms whether or not to install the Chromium browser. Make your selection and click Continue.



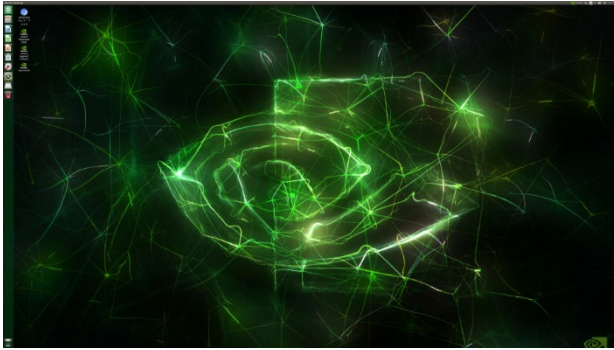
8. System Configuration will start. It takes about one minute to complete the configuration.



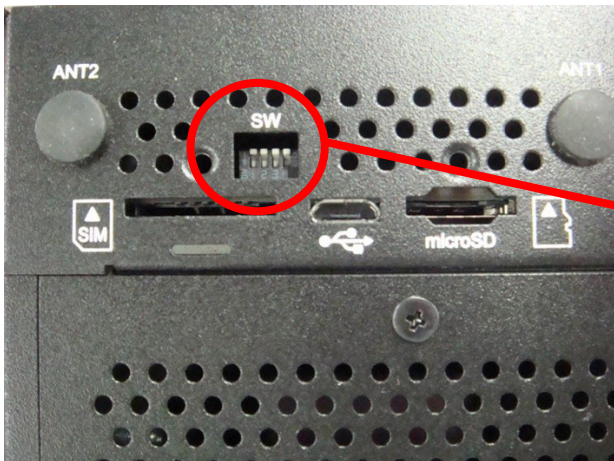
9. If you have checked off the box of [Require my password to log in], the login display will appear.



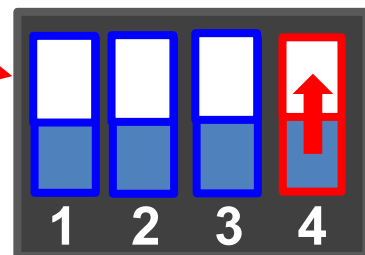
10. Enter your password and press Enter.



11. When the login process is completed, the desktop screen will appear.



12. After turning off the power, set back the DIPSW 4PIN on the side of the chassis to OFF and switch to normal booting (eMMC).



Recovery/Version Up Method

This section explains how to recover the OS in the event that it is unable to start in the preinstalled model. Please also refer here when updating the eMMC firmware of pre-installed models.

1.Preparations

This section describes how to recover/version up the OS of eMMC from the Host PC environment by connecting the host PC environment (Ubuntu 18.04 64bit) to the micro USB port of the DX-U1200.

Please obtain the following items in advance.

- Host PC Environment (Ubuntu 18.04 64bit)
- Display
- USB-HUB
- USB Keyboard
- USB Mouse
- The Product Itself
- Firmware File (mfi_jetson-nano-emmc_R35.x.x.tbz2) (Ubuntu 20.04 64bit)

Please check the following points and connect the device.

CAUTION

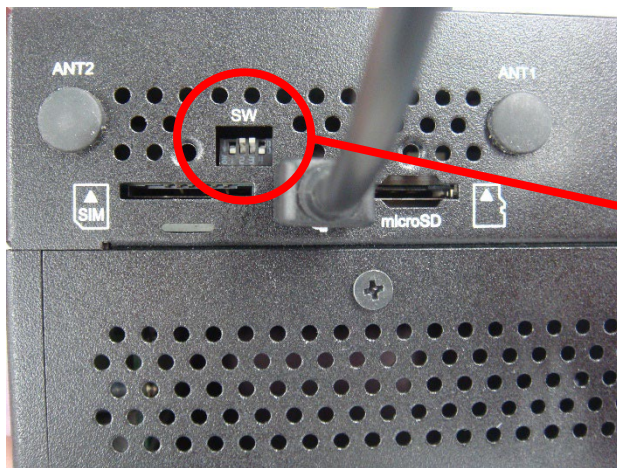
- Recovering with the firmware file will initialize the contents of the internal storage. Back up the data in the storage before performing OS recovery if it is important.
- Remove the connected disks if that are not composed in the pre-installed type from the body.
- Remove the USB storage device if it is connected to the body.

2.Procedure

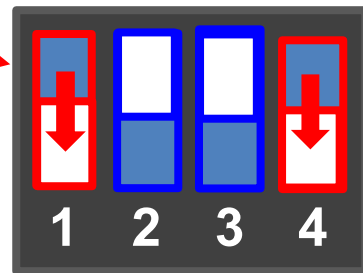
Before performing the operation, connect the display, USB keyboard, and USB mouse to the host PC environment (Ubuntu 18.04 64bit), then start up Ubuntu OS. (The installation and setup procedures of the host PC environment OS are omitted here.)

1. Setting the DIPSW and Turning On The Power Of The Product

Set the DIPSW located on the side of the product.



1. Set the DIPSW 1PIN on the side of the chassis to ON so that the system will boot in recovery mode when the power is turned on. Also set the DIPSW 4PIN to ON so that the system will boot with watchdog-off.



2. Connect the product and the host PC environment with the micro USB cable and turn on the power.

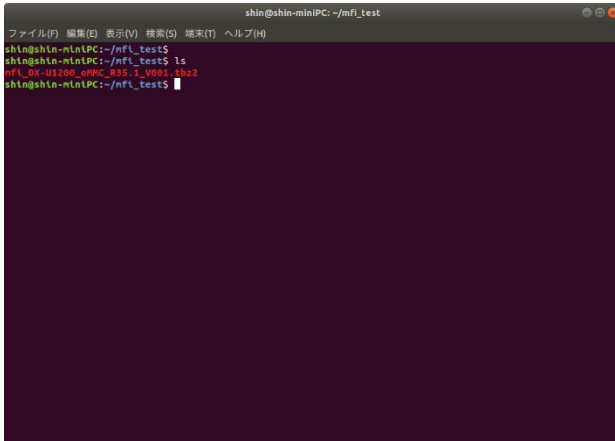


2. Extracting Firmware and Performing Write Operations

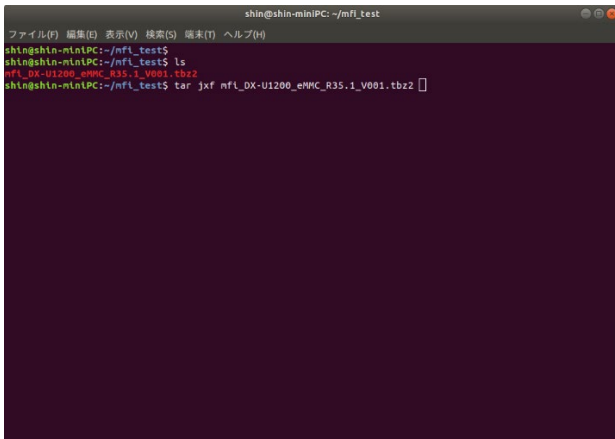
Write firmware via micro USB cable on the host PC environment (Ubuntu 18.04 64bit).



1. Start [Console] app on the Ubuntu environment.



2. Place the recovery image file on the specified directory and check whether it can be seen from the [Console] app.



3. Extract the recovery file with tar command [tar jxf archive name.tbz2].

```
shin@shin-miniPC: ~/mfi_test
shin@shin-miniPC:~/mfi_test$ ls
mfi_DX-U1200_eMMC_R35.1_V001  mfi_DX-U1200_eMMC_R35.1_V001.tbz2
shin@shin-miniPC:~/mfi_test$
```

4. After unzipping, the file will be extracted to mfi_DX-U1200_eMMC_.*.

```
shin@shin-miniPC:~/mfi_test$ sudo apt install libxml2-utils simg2img network-manager abootimg sshpass device-tree-compiler
[sudo] password for shin:
shin@shin-miniPC:~/mfi_test$
```

5. Using the apt command "sudo apt install libxml2-utils simg2img network-manager abootimg sshpass device-tree-compiler," install the application required for writing firmware in advance via an external network.

```
shin@shin-miniPC: ~/mfi_test/mfi_DX-U1200_eMMC_R35.1_V001
shin@shin-miniPC:~/mfi_test/mfi_DX-U1200_eMMC_R35.1_V001$ ls
mfi_DX-U1200_eMMC_R35.1_V001  mfi_DX-U1200_eMMC_R35.1_V001.tbz2
shin@shin-miniPC:~/mfi_test/mfi_DX-U1200_eMMC_R35.1_V001$ cd mfi_DX-U1200_eMMC_R35.1_V001/
shin@shin-miniPC:~/mfi_test/mfi_DX-U1200_eMMC_R35.1_V001$
```

6. The file goes under the mfi_DX-U1200_eMMC_.*.

```
shin@shin-miniPC: ~/mfi_test/mfi_DX-U1200_eMMC_R35.1_V001
shin@shin-miniPC:~/mfi_test/mfi_DX-U1200_eMMC_R35.1_V001$ lsusb
shin@shin-miniPC:~/mfi_test/mfi_DX-U1200_eMMC_R35.1_V001$ lsusb
Bus 002 Device 002: ID 8087:8080 Intel Corp.
Bus 002 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 001 Device 002: ID 8087:8080 Intel Corp.
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 004 Device 003: ID 152d:0570 Micron Technology Corp. / Micron USA Technology Corp.
Bus 004 Device 002: ID 174c:55aa ASMedia Technology Inc. ASM1051E SATA 6Gb/s bridge, ASM1053E SATA 6Gb/s
bridge controller
Bus 004 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 003 Device 006: ID 0955:7e19 Nvidia Corp.
Bus 003 Device 007: ID 093a:2510 Pixart Imaging, Inc. Optical Mouse
Bus 002 Device 000: ID 413c:2109 Dell Computer Corp. Model L100 Keyboard
Bus 003 Device 004: ID 1d40:0101 Terminus Technology Inc. Hub
Bus 003 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
shin@shin-miniPC:~/mfi_test/mfi_DX-U1200_eMMC_R35.1_V001$
```

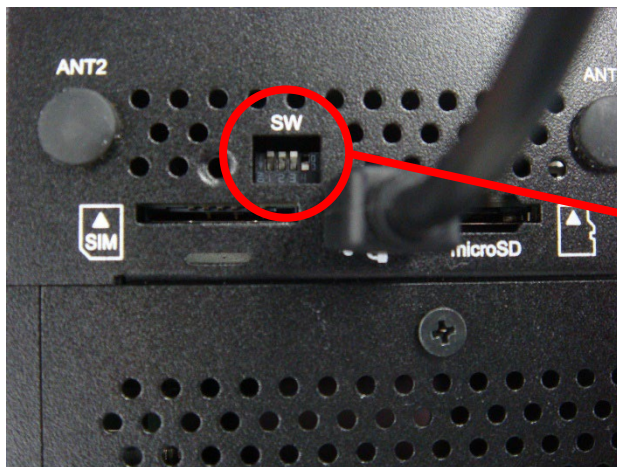
7. Use the lsusb command to confirm that the USB-IF of the CPU "Nvidia Corp" in the product is recognized.

```
shin@shin-miniPC: ~/nft_test/nft_DX-U1200_eMMC_R35.1_V001
shin@shin-miniPC:~/nft_test/nft_DX-U1200_eMMC_R35.1_V001$
shin@shin-miniPC:~/nft_test/nft_DX-U1200_eMMC_R35.1_V001$ lsusb
Bus 002 Device 005: ID 8087:8000 Intel Corp.
Bus 002 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 001 Device 001: ID 8087:8000 Intel Corp.
Bus 001 Device 002: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 004 Device 003: ID 152d:0578 JMicron Technology Corp. / JMicron USA Technology Corp.
Bus 004 Device 002: ID 174c:55aa ASMedia Technology Inc. ASM1051E SATA 6Gb/s bridge, ASM1053E SATA 6Gb/s bridge, ASM1153 SATA 3Gb/s bridge
Bus 004 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 003 Device 006: ID 0955:7e19 Nvidia Corp.
Bus 003 Device 007: ID 093a:2510 Pixart Imaging, Inc. Optical Mouse
Bus 003 Device 008: ID 413c:2105 Dell Computer Corp. Model L100 Keyboard
Bus 003 Device 004: ID 1a40:0101 Terminus Technology Inc. Hub
Bus 003 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
shin@shin-miniPC:~/nft_test/nft_DX-U1200_eMMC_R35.1_V001$ sudo ./massflash.sh
```

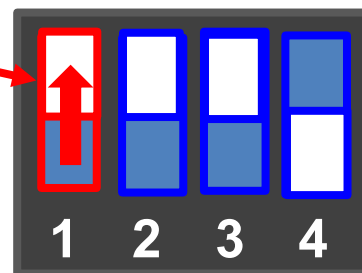
- Use the "sudo ./massflash.sh " command to start recovery of the product via USB.

```
shin@shin-miniPC: ~/nft_test/nft_jetson-xavier-emmc
shin@shin-miniPC:~/nft_test/nft_jetson-xavier-emmc$
shin@shin-miniPC:~/nft_test/nft_jetson-xavier-emmc$ lsusb
Bus 002 Device 001: ID 8087:8000 Intel Corp.
Bus 002 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 001 Device 002: ID 8087:8000 Intel Corp.
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 004 Device 002: ID 152d:0578 JMicron Technology Corp. / JMicron USA Technology Corp.
Bus 004 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 003 Device 051: ID 0b05:1790 ASIX Electronics Corp. AX88179 Gigabit Ethernet
Bus 003 Device 036: ID 0403:6001 Future Technology Devices International, Ltd FT232 USB-SerI
al (UART) IC
Bus 003 Device 034: ID 093a:2510 Pixart Imaging, Inc. Optical Mouse
Bus 003 Device 033: ID 413c:2105 Dell Computer Corp. Model L100 Keyboard
Bus 003 Device 032: ID 1a40:0101 Terminus Technology Inc. Hub
Bus 003 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
shin@shin-miniPC:~/nft_test/nft_jetson-xavier-emmc$ sudo ./nvnflash.sh --showlogs
[sudo] password for shin:
Start flashing device: 3-2, PID: 28019
Flash complete (SUCCESS)
shin@shin-miniPC:~/nft_test/nft_jetson-xavier-emmc$
```

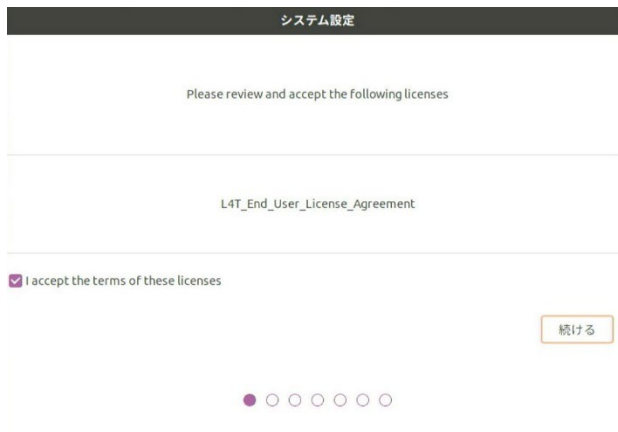
- Writing to the product will be completed in about 5 minutes. After completion, turn off the power of the product.



- After turning off the power, set back the DIP SW 1PIN on the side of the chassis to OFF and switch to normal booting.



3. Starting up OS



Turn on the power of the product again. The initial System Configuration screen of the Ubuntu OS will appear on the HDMI display. Continue to follow "Ubuntu Setup" to complete the Ubuntu setup.

Boot SD Write Procedure

This section explains how to write an SD image for SD Boot.

1.Preparations

This section describes how to insert an SD card into the host PC environment (Ubuntu 20.04 64bit) and write an SD image to the SD card. Please obtain the following items in advance.

- Host PC Environment (Ubuntu 18.04 64bit)
- balenaEtcher ApplImage File ("balenaEtcher-1.5.115-x64.ApplImage")
Download from the following website:
<https://github.com/balena-io/etcher/releases/tag/v1.5.115>
- USB SD Card Reader
- microSD Card (SDHC, Class 10, 32 GB or more)
- The Product Itself
- SD Image File (XavierNX_R35.x.x_xxx_sd_blob.img.tbz2) (Ubuntu 20.04 64bit)
Download from the CONTEC website.
 - * Use the same version as for the eMMC firmware.
 - * If the eMMC firmware and SD Image File versions do not match,
please refer to "Recovery/VersionUp Method" to upgrade the eMMC firmware.
 - * The file is about 18 GB.
 - * The image file version may be updated at a later date.
- Checking the eMMC Firmware Version

Use the following command to check the firmware version after starting eMMC.

```
$ cat /etc/contec/CONTEC-L4T.version  
XAVIERNX-35.1-V001
```

2.Procedure

Before performing any operations, connect the display, USB keyboard, and USB mouse to the host PC environment (Ubuntu 18.04 64bit) and start the Ubuntu OS. ((The installation and setup procedures of the host PC environment OS are omitted here.)

1. Preparing the SD Image

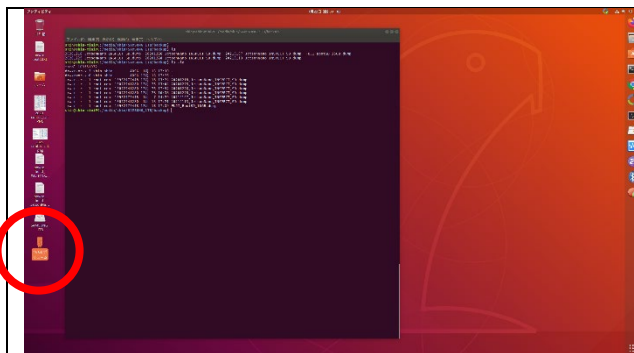
After downloading the SD image file, use the following command to extract the compressed .tbz2 file into a .img file.

```
$ tar jxf XavierNX_R35.x_Vxxx_sd_blob.img.tbz2
```

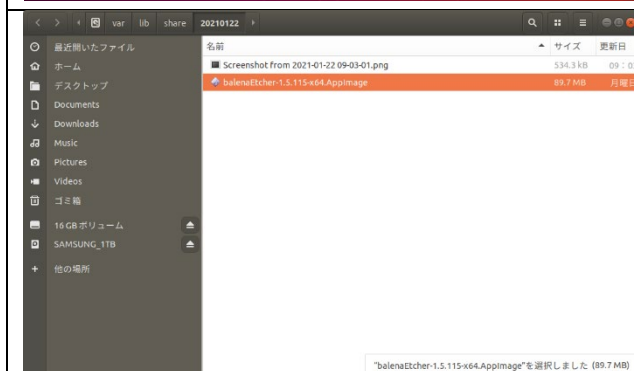
The file (XavierNX_R35.x_Vxxx_sd_blob.img) extracted using the command above will be used as the SD image being written.

2. Writing the SD Image

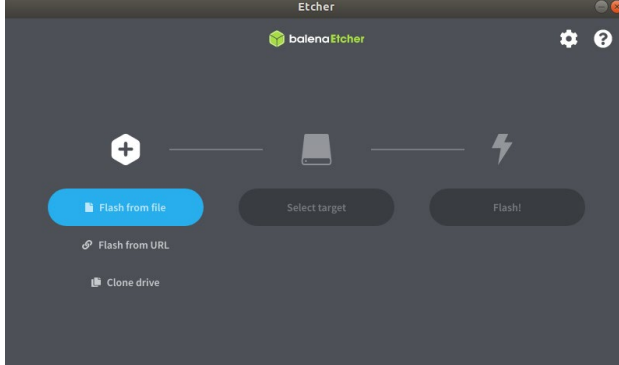
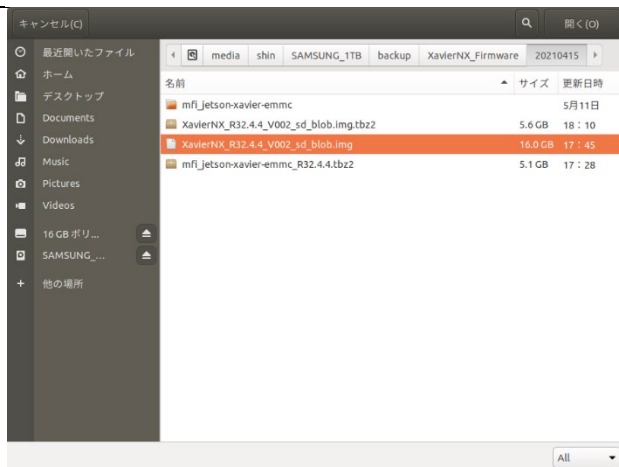
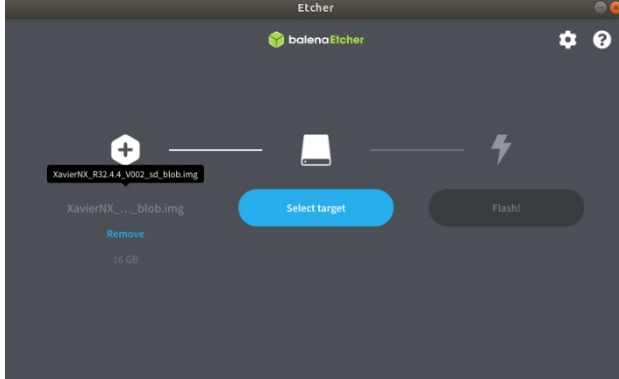
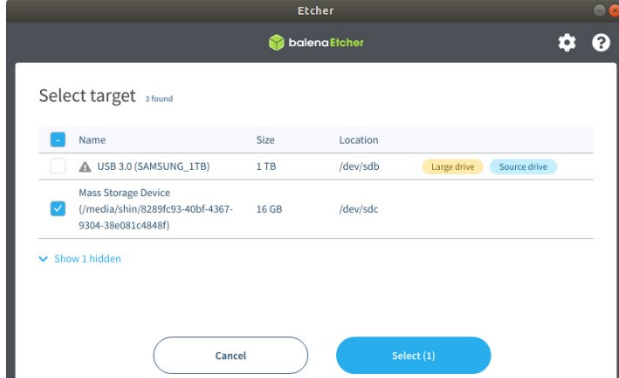
Use the SD card reader in the host PC environment (Ubuntu 18.04 64bit) to write the firmware file.

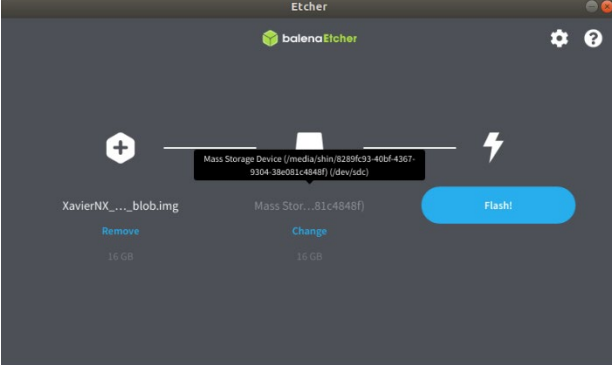
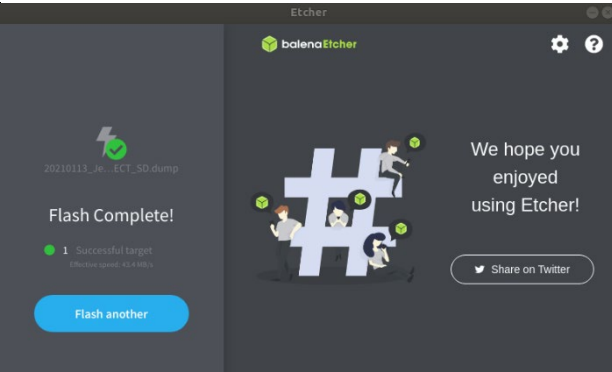


1. Insert the USB SD card reader into the Ubuntu PC and verify the SD card is recognized.

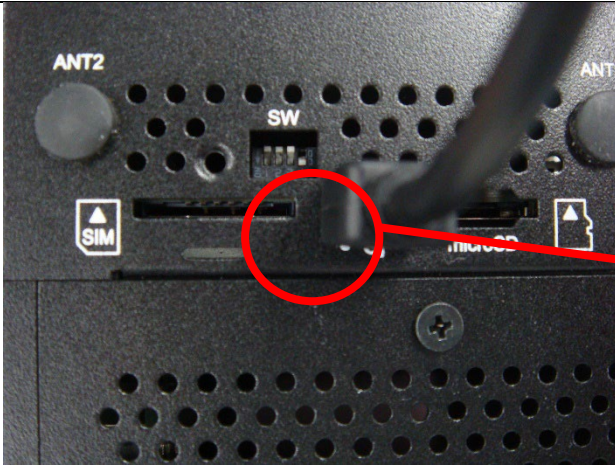
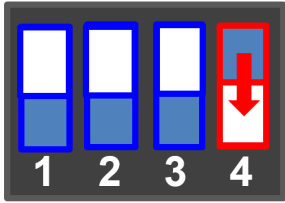
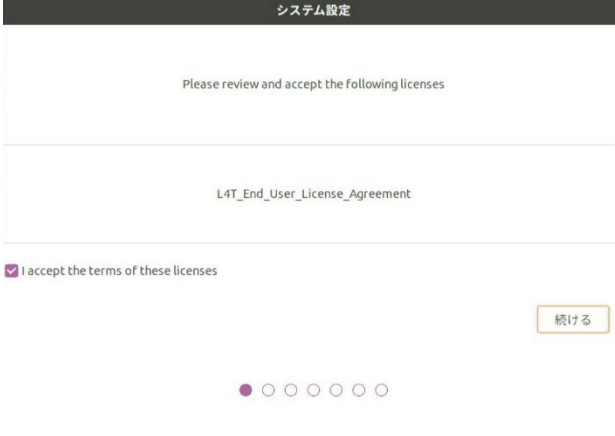


2. Start the [balenaEtcher] app on the host PC (Ubuntu).

| | |
|---|--|
|  | <p>3. Select [Flash from file].</p> |
|  | <p>4. Select the SD image file saved to Ubuntu.</p> |
|  | <p>5. Select the target write drive under [Select target].</p> |
|  | <p>6. Select the inserted microSD card. (* Selecting the boot drive by mistake will cause a host environment failure.)</p> |

| | |
|--|--|
|  The screenshot shows the Etcher application window. At the top, it says 'balenaEtcher'. Below that, there are three main sections: a source image 'XavierNX_..._blob.img' (16 GB) with a 'Remove' button, a target device 'Mass Storage Device (/media/lskln/8239f631-40bf-436f-9304-38a081c4848f) (dev/sdc)' (16 GB) with a 'Change' button, and a large blue 'Flash!' button on the right. | <p>7. Press the [Flash] button to begin writing.</p> |
|  The screenshot shows the Etcher application window after the flashing process is complete. On the left, it says 'Flash Complete!' with a green checkmark icon and a 'Flash another' button. On the right, there is a large '#1' graphic with people icons, the text 'We hope you enjoyed using Etcher!', and a 'Share on Twitter' button. | <p>8. [Flash Complete] will be displayed when writing is complete.</p> |

3. OS Startup

| | |
|--|--|
|  | <p>1. Insert the microSD card created in the previous section into the side of the chassis and turn off the watchdog timer by switching PIN4 to ON.</p>  |
|  | <p>2. Turn on the power supply and verify that the initial System Configuration screen of the Ubuntu OS appears on the HDMI display. Continue to follow "Ubuntu Setup" to complete the Ubuntu setup.</p> |

Operational Checks

This section describes Linux OS environment in which operational checks have been conducted and the results of operational checks.

1. Operating Environment

◆ Distribution

The distributions used and their version information are as follows.

Ubuntu 20.04.4 LTS

```
root@contec-desktop:~# cat /proc/version
Linux version 5.10.104-tegra (ubuntu1@ubuntu1-B560M) (aarch64-buildroot-linux-gnu-gcc.br_real
(Buildroot 2020.08) 9.3.0, GNU ld (GNU Binutils) 2.33.1) #1 SMP PREEMPT Wed Nov 30 10:38:09 JST
2022

root@contec-desktop:~# uname -a
Linux testsd-desktop 5.10.104-tegra #1 SMP PREEMPT Wed Nov 30 10:38:09 JST 2022 aarch64 GNU/Linux
```

◆ Configuration

| No. | Equipment name | Maker | Model | Remarks |
|-----|---|-----------|------------|---|
| 1 | Industrial Edge AI Computer | CONTEC | DX-U1200P1 | The product model with a Low Profile PCI Express(x1) slot |
| 2 | USB Keyboard/USB Mouse | - | - | |
| 3 | Display | ViewSonic | VX2882-4KP | HDMI/DisplayPort/ HDMI Audio (Speaker) |
| 4 | Device used to confirm network communication status | - | Generic PC | Wired LAN |

* - : Not specified

2. List of Operational Checks

1. Operational Checks and Results

Only basic operations such as the installation and startup are verified as part of the operational checks. The operational checks were not conducted assuming all possible applications.

This manual covers operational checks that were conducted for the items below.

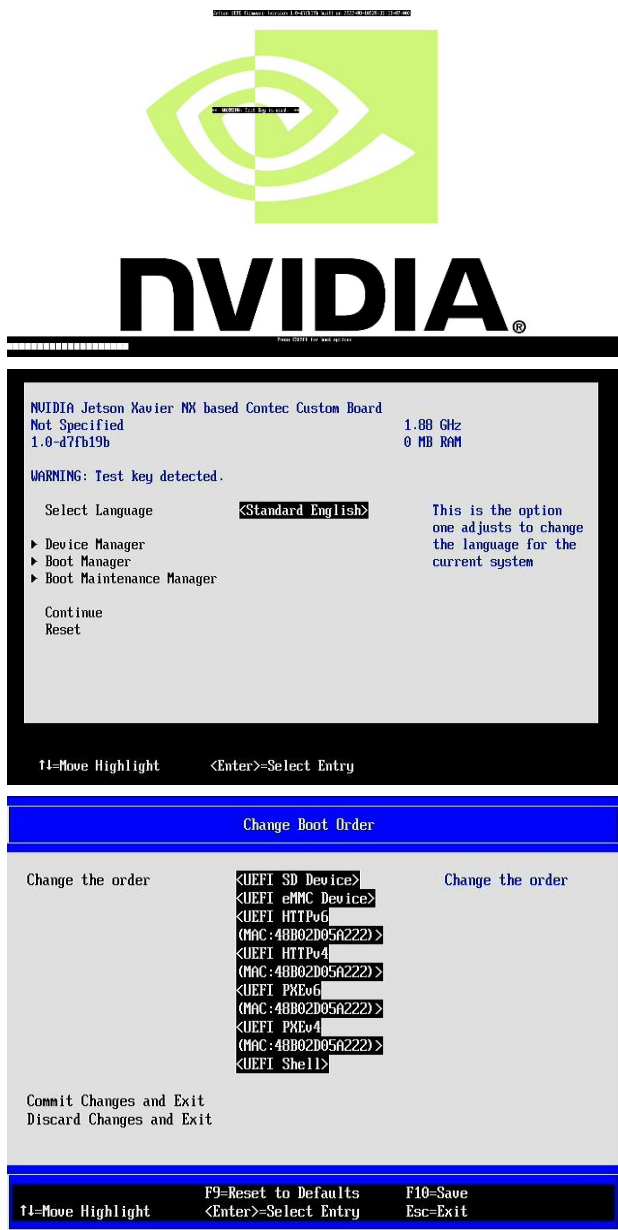
| Item | | Details | Result | Remarks |
|---------------|----------------------------|--|--------|-------------|
| OS | | Installation from USB-connected media is possible | ○ | |
| | | Typical installation completes successfully | ○ | |
| Display | HDMI | Recommended display resolution is displayed | ○ | See Page 38 |
| | DisplayPort | Recommended display resolution is displayed | ○ | See Page 39 |
| | Dual display | Dual display is supported | ○ | See Page 40 |
| Audio | HDMI Port Output | Confirmed that sound can be output from the display's speakers when connected to the HDMI Port | ○ | See Page 41 |
| UEFI | | eMMC or SD Boot can be selected with DIPSW | ○ | See Page 34 |
| Storage | eMMC | eMMC Boot is possible | ○ | See Page 42 |
| | SD | SD Boot is possible | | See Page 43 |
| LAN | | Package installation is possible using "apt" commands | ○ | |
| | | Login is possible using SSH | ○ | See Page 48 |
| USB | USB 2.0 Port | USB memory can be recognized | ○ | See Page 49 |
| | USB 3.2 Gen1 (USB3.0) Port | USB memory can be recognized | ○ | See Page 50 |
| RAS | General-purpose I/O | Input/output operations are possible (DIO) | ○ | See Page 51 |
| | LED | Alarm LED turns on/off | ○ | See Page 52 |
| | WDT | Reset is possible after configuring timeout | ○ | See Page 53 |
| | HW monitor | System temperature can be obtained | | See Page 53 |
| | HW monitor | Power voltage can be obtained | | See Page 53 |
| RTC | | Time can be configured | ○ | See Page 54 |
| CAMERA-IF | | Input images can be HDMI output. | ○ | See Page 55 |
| 40-PIN HEADER | GPIO | Input/output operations are possible (GPIO) | ○ | See Page 58 |
| | UART | Communication through loopback is possible | ○ | See Page 59 |
| | SPI | Reading and writing for Serial Flash is possible | ○ | See Page 60 |
| | I2C | I2C-EEPROM can be recognized | ○ | See Page 61 |

3.Operational Check Details

1. BootMode Setting

BootMode settings are configured in Bootloader: UEFI, which starts immediately after the product is turned on.

If firmware is written to both the eMMC and SD card, the SD card will be prioritized for booting by default.

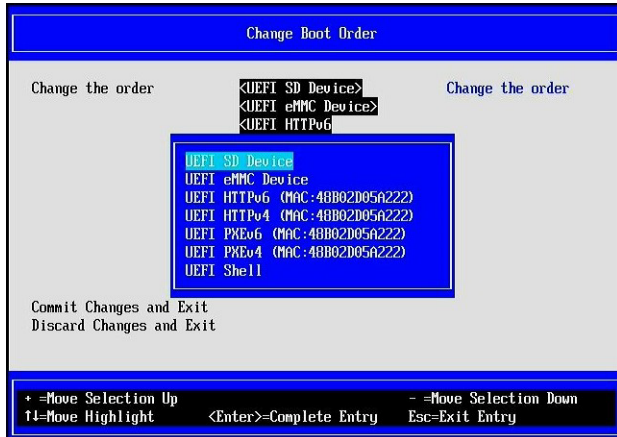


Once the product is turned on, press the Esc key to enter UEFI mode when the NVIDIA logo and "Press ESCAPE for boot options" are displayed.

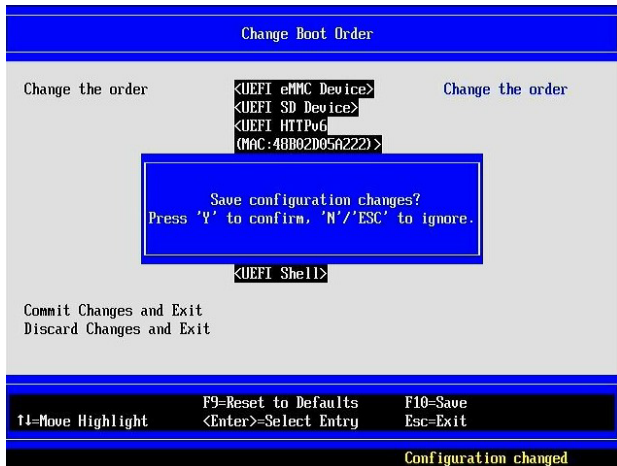
*Do not press the Esc key multiple times.

Once the UEFI screen is displayed, select Boot Maintenance Manager
-> Boot Option
-> Change Boot Order
in that order.

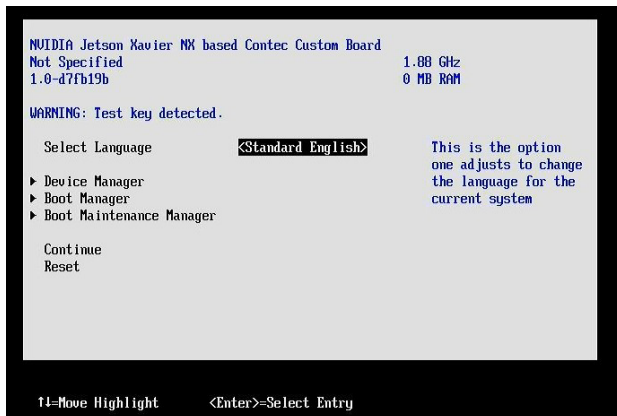
Select the Boot Order list and press Enter.



Select the device whose boot order you want to change and change the boot order by pressing the + and - keys. After changing the order, confirm the change by pressing Enter.



Once confirmed, press the F10 key. A dialog will then appear asking to save the settings. Press the Y key to save.



Press Esc to return to the initial screen and select [Continue] to exit UEFI mode.

Once you have exited UEFI mode, the boot sequence will restart with booting taking place from the configured device.

◆ eMMC Boot

In the UEFI BootMode settings, set the OS to boot from the eMMC and confirm that the OS boots from the eMMC built into the CPU Module.

```
contec@contec-desktop:~$ mount
/dev/mmcblk0p1 on / type ext4 (rw,relatime,data=ordered)
proc on /proc type proc (rw,relatime)
sysfs on /sys type sysfs (rw,relatime)
none on /dev type devtmpfs (rw,relatime,size=1785364k,nr_inodes=446341,mode=755)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,nodev,mode=755)
tmpfs on /run/lock type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120k)
tmpfs on /sys/fs/cgroup type tmpfs (ro,nosuid,nodev,noexec,mode=755)
cgroup on /sys/fs/cgroup/unified type cgroup2 (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,xattr,name=systemd)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpuset)
cgroup on /sys/fs/cgroup/hugetlb type cgroup (rw,nosuid,nodev,noexec,relatime,hugetlb)
cgroup on /sys/fs/cgroup/pids type cgroup (rw,nosuid,nodev,noexec,relatime,pids)
cgroup on /sys/fs/cgroup/net_cls,net_prio type cgroup (rw,nosuid,nodev,noexec,relatime,net_cls,net_prio)
cgroup on /sys/fs/cgroup/cpu,cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,cpu,cpuacct)
cgroup on /sys/fs/cgroup/debug type cgroup (rw,nosuid,nodev,noexec,relatime,debug)
cgroup on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,memory)
cgroup on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime,perf_event)
cgroup on /sys/fs/cgroup/blkio type cgroup (rw,nosuid,nodev,noexec,relatime,blkio)
cgroup on /sys/fs/cgroup/freezer type cgroup (rw,nosuid,nodev,noexec,relatime,freezer)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=30,prgrp=1,timeout=0,minproto=5,maxproto=5,direct)
mqueue on /dev/mqueue type mqueue (rw,relatime)
hugetlbfs on /dev/hugetlb type hugetlbfs (rw,relatime)
sunrpc on /run/rpc_pipefs type rpc_pipefs (rw,relatime)
debugfs on /sys/kernel/debug type debugfs (rw,relatime)
configfs on /sys/kernel/config type configfs (rw,relatime)
tmpfs on /run/user/120 type tmpfs (rw,nosuid,nodev,relatime,size=405964k,mode=700,uid=120,gid=124)
gvfsd-fuse on /run/user/120/gvfs type fuse.gvfsd-fuse (rw,nosuid,nodev,relatime,user_id=120,group_id=124)
fusectl on /sys/fs/fuse/connections type fusectl (rw,relatime)
tmpfs on /run/user/1000 type tmpfs (rw,nosuid,nodev,relatime,size=405964k,mode=700,uid=1000,gid=1001)
gvfsd-fuse on /run/user/1000/gvfs type fuse.gvfsd-fuse (rw,nosuid,nodev,relatime,user_id=1000,group_id=1000)
```

On the console App of the DX-U1200, execute the mount command and confirm that /dev/mmcblk0p1(eMMC) is mounted as /(root).

◆ SD Boot

In the UEFI BootMode settings, set the OS to boot from the SD card and confirm that the OS boots from the OS installed in the microSD card.

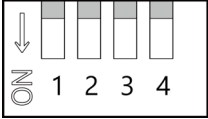
* For details on how to create an OS image to install on the microSD card, refer to **“Boot SD Write Procedure (Page 25).”**

```
contec@contec-desktop:~$ mount
/dev/mmcblk1p1 on / type ext4 (rw,relatime,data=ordered)
proc on /proc type proc (rw,relatime)
sysfs on /sys type sysfs (rw,relatime)
none on /dev type devtmpfs (rw,relatime,size=1781332k,nr_inodes=445333,mode=755)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,nodev,mode=755)
tmpfs on /run/lock type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120k)
tmpfs on /sys/fs/cgroup type tmpfs (ro,nosuid,nodev,noexec,mode=755)
cgroup on /sys/fs/cgroup/unified type cgroup2 (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,xattr,name=systemd)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/cpu,cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,cpu,cpuacct)
cgroup on /sys/fs/cgroup/net_cls,net_prio type cgroup (rw,nosuid,nodev,noexec,relatime,net_cls,net_prio)
cgroup on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime,perf_event)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices)
cgroup on /sys/fs/cgroup/debug type cgroup (rw,nosuid,nodev,noexec,relatime,debug)
cgroup on /sys/fs/cgroup/blkio type cgroup (rw,nosuid,nodev,noexec,relatime,blkio)
cgroup on /sys/fs/cgroup/pids type cgroup (rw,nosuid,nodev,noexec,relatime,pids)
cgroup on /sys/fs/cgroup/freezer type cgroup (rw,nosuid,nodev,noexec,relatime,freezer)
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpuset)
cgroup on /sys/fs/cgroup/hugetlb type cgroup (rw,nosuid,nodev,noexec,relatime,hugetlb)
cgroup on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,memory)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=34,prgrp=1,timeout=0,minproto=5,maxproto=5,direct)
```

On the console App of the DX-U1200, execute the mount command and confirm that /dev/mmcblk1p1(SD) is mounted as /(root).

◆ DIP SW

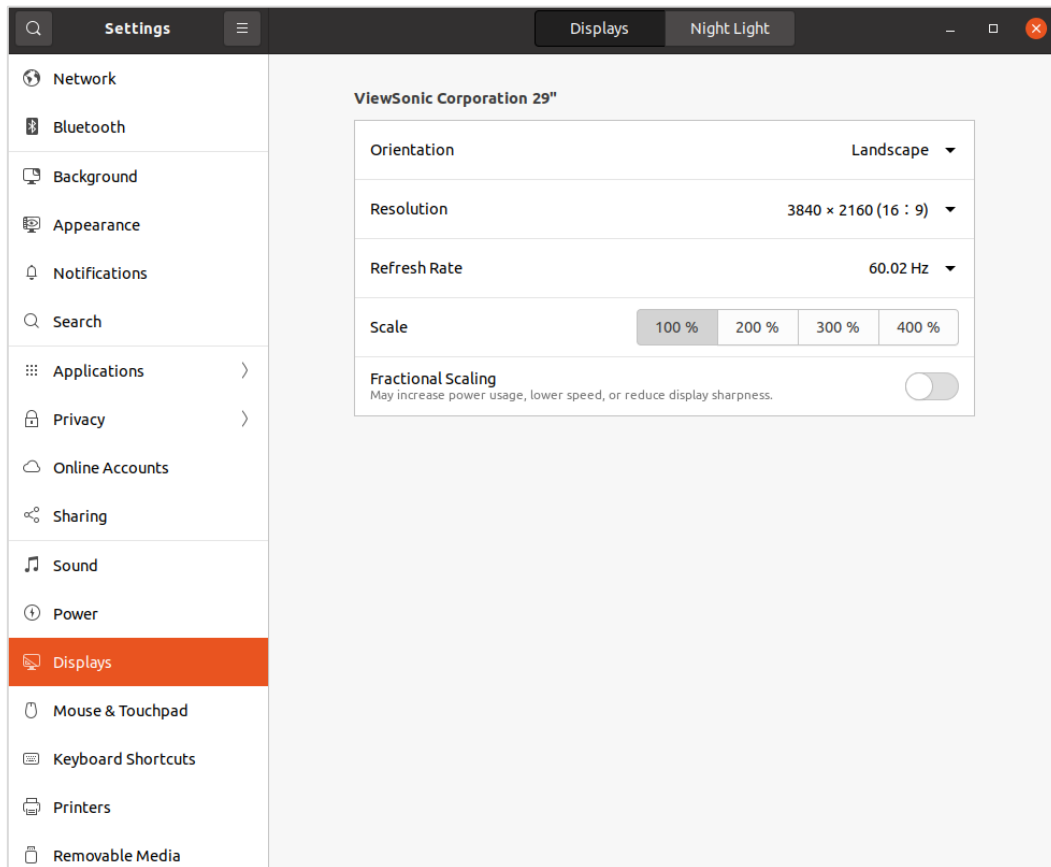
Confirm that switching of the recovery mode is possible using DIPSW PIN1 and that switching of watchdog timer operation is possible using DIPSW PIN4.

|  | Bit No. | ON/OFF | Description |
|---|---------|---------------------------------|-------------------------------------|
| | 1 | ON | Turn this on for OS writing. |
| | | OFF | Turn this off for a normal booting. |
| | 2 | System Reservation : Always OFF | |
| | 3 | System Reservation : Always OFF | |
| | 4 | ON | Turn this on for OS Setup. |
| | | OFF | Turn this off for a normal booting. |

2. Check the display

◆ HDMI Port

Select [System Settings]-[Displays]. Check the manufacturer information of the connected display and the recommended resolution of the display can be displayed. Also, check the resolution and rotation can be decided according to user's choice.

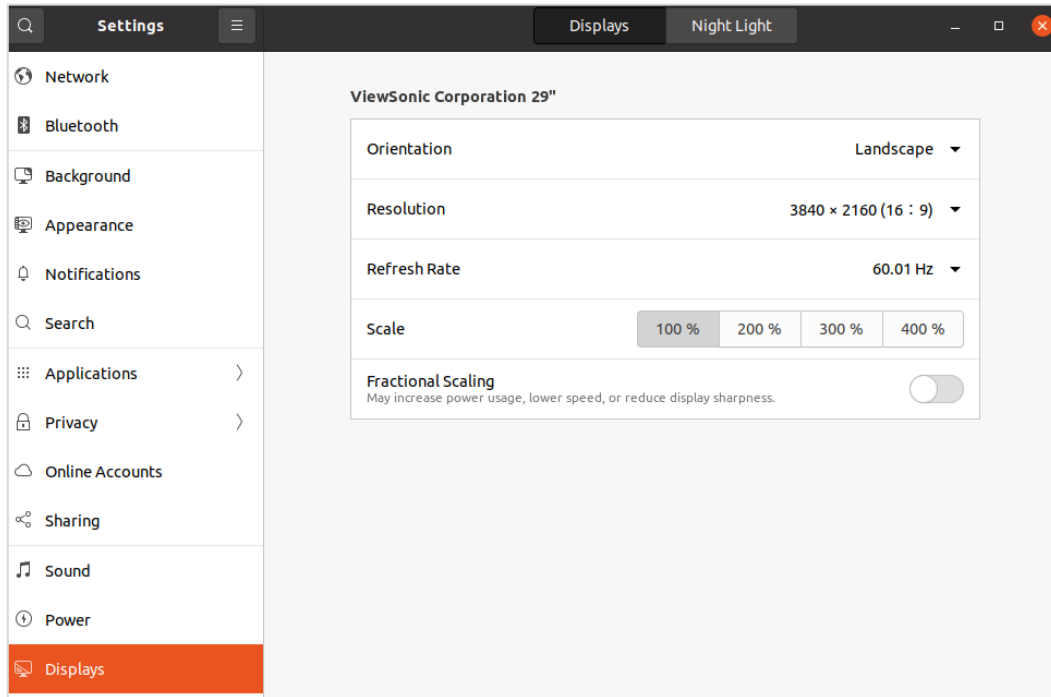


Special note:

The recommended resolution or the currently selected resolution may not be displayed if the HDMI cable is connected while the OS is running. In that case, use the display configuration tool again to choose the appropriate resolution.

◆ DisplayPort

Select [System Settings]-[Displays]. Check the manufacturer information of the connected display and the recommended resolution of the display can be displayed. Also, check the resolution and rotation can be decided according to user's choice.

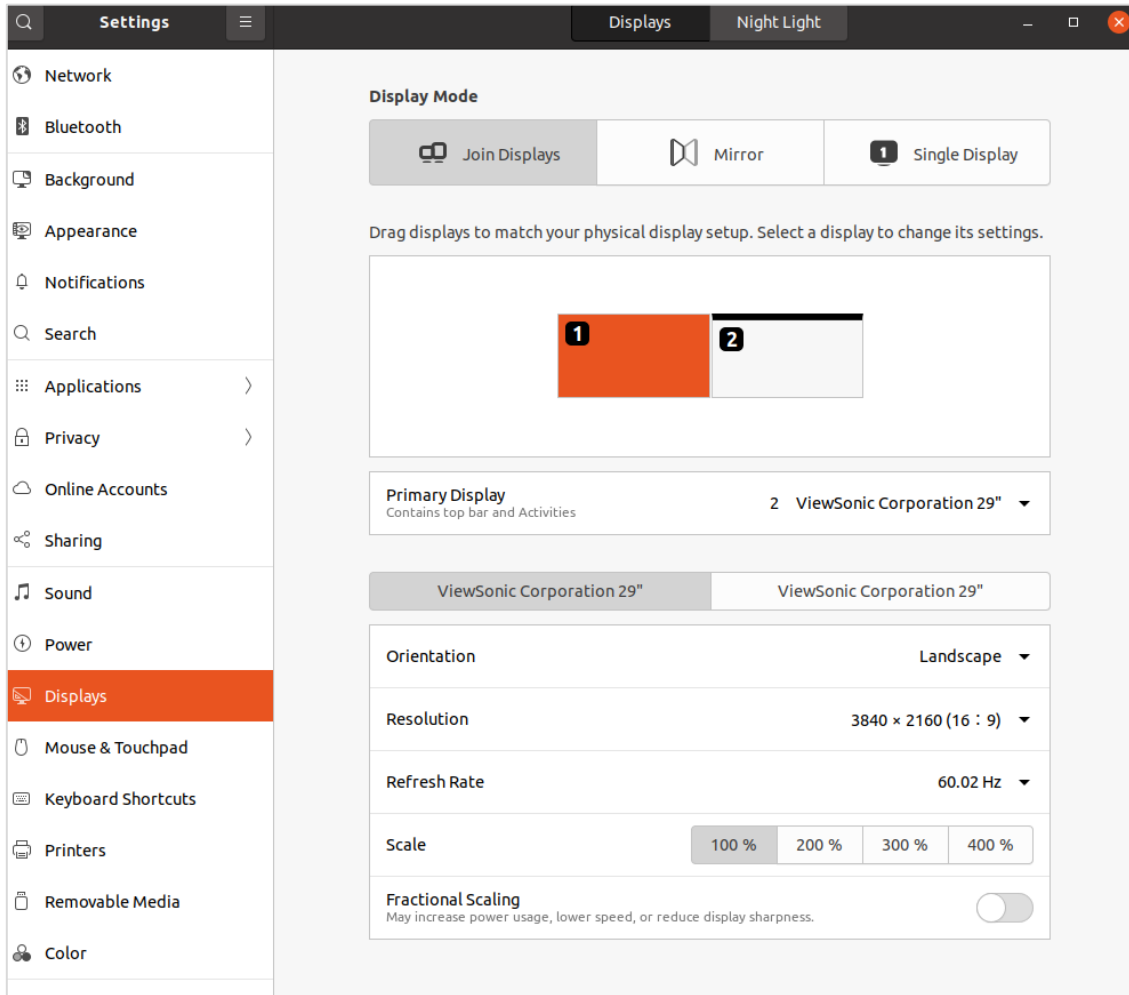


Special note:

The recommended resolution or the currently selected resolution may not be displayed if the DisplayPort cable is connected while the OS is running. In that case, use the display configuration tool again to choose the appropriate resolution.

◆ HDMI + DisplayPort

Select [System Settings]-[Displays]. Check the manufacturer information of the connected display and the recommended resolution of the display can be displayed. Also, check the resolution and rotation can be decided according to user's choice.



Special note:

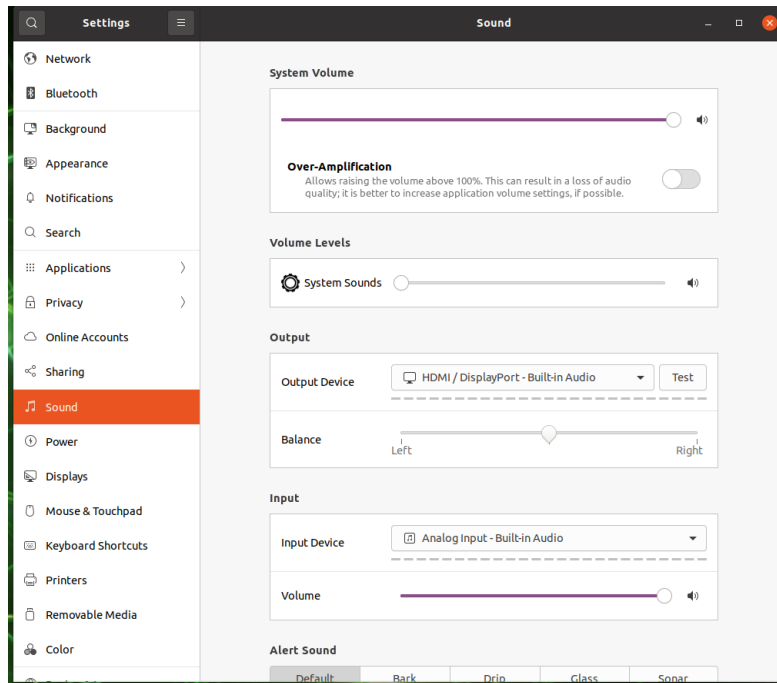
The recommended resolution or the currently selected resolution may not be displayed if the HDMI cable and the DisplayPort cable are connected while the OS is running. In that case, use the display configuration tool again to choose the appropriate resolution.

3. HDMI Audio Operational Check

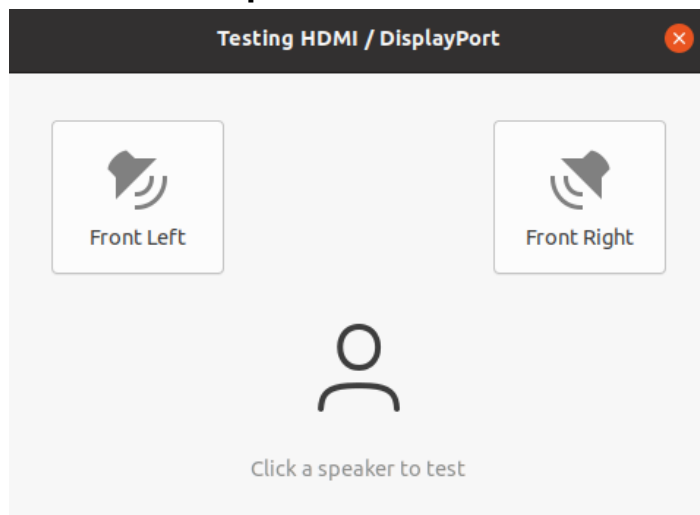
HDMI Output

Select [System Settings]-[Sound].

When using HDMI Port, select “HDMI/DisplayPort Built-in Audio” as the output destination, and press the [Test] button. The following test screen is displayed. Confirm that sound is output from the display by pressing the [speaker] button.



HDMI Port output test screen



Special note:

As for DisplayPort cable, audio output cannot be supported since the specification of the product port is eDP (embedded DisplayPort).

4. Storage Operational Check

◆ eMMC

eMMC is recognized as /dev/mmcblk0.

Confirm that eMMC is mounted as Rootfs when booting from eMMC Boot.

```
root@contec-desktop:~# mount
/dev/mmcblk0p1 on / type ext4 (rw,relatime)
proc on /proc type proc (rw,relatime)
sysfs on /sys type sysfs (rw,relatime)
none on /dev type devtmpfs (rw,relatime,size=3466568k,nr_inodes=866642,mode=755)
selinuxfs on /sys/fs/selinux type selinuxfs (rw,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,nodev,size=701084k,mode=755)
tmpfs on /run/lock type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120k)
tmpfs on /sys/fs/cgroup type tmpfs (ro,nosuid,nodev,noexec,mode=755)
cgroup2 on /sys/fs/cgroup/unified type cgroup2
(rw,nosuid,nodev,noexec,relatime,nsdelegate)
cgroup on /sys/fs/cgroup/systemd type cgroup
(rw,nosuid,nodev,noexec,relatime,xattr,name=systemd)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime)
efivarfs on /sys/firmware/efi/efivars type efivarfs (rw,nosuid,nodev,noexec,relatime)
none on /sys/fs/bpf type bpf (rw,nosuid,nodev,noexec,relatime,mode=700)
cgroup on /sys/fs/cgroup/cpu,cpuacct type cgroup
(rw,nosuid,nodev,noexec,relatime,cpu,cpuacct)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices)
cgroup on /sys/fs/cgroup/blkio type cgroup (rw,nosuid,nodev,noexec,relatime,blkio)
cgroup on /sys/fs/cgroup/hugetlb type cgroup (rw,nosuid,nodev,noexec,relatime,hugetlb)
cgroup on /sys/fs/cgroup/freezer type cgroup (rw,nosuid,nodev,noexec,relatime,freezer)
cgroup on /sys/fs/cgroup/pids type cgroup (rw,nosuid,nodev,noexec,relatime,pids)
cgroup on /sys/fs/cgroup/net_cls,net_prio type cgroup
(rw,nosuid,nodev,noexec,relatime,net_cls,net_prio)
cgroup on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,memory)
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpuset)
cgroup on /sys/fs/cgroup/perf_event type cgroup
(rw,nosuid,nodev,noexec,relatime,perf_event)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs
(rw,relatime,fd=28,pgrp=1,timeout=0,minproto=5,maxproto=5,direct)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime,pagesize=2M)
mqueue on /dev/mqueue type mqueue (rw,nosuid,nodev,noexec,relatime)
sunrpc on /run/rpc_pipefs type rpc_pipefs (rw,relatime)
debugfs on /sys/kernel/debug type debugfs (rw,nosuid,nodev,noexec,relatime)
tracefs on /sys/kernel/tracing type tracefs (rw,nosuid,nodev,noexec,relatime)
configfs on /sys/kernel/config type configfs (rw,nosuid,nodev,noexec,relatime)
binfmt_misc on /proc/sys/fs/binfmt_misc type binfmt_misc
(rw,nosuid,nodev,noexec,relatime)
tmpfs on /run/user/124 type tmpfs
(rw,nosuid,nodev,relatime,size=701080k,mode=700,uid=124,gid=130)
gvfsd-fuse on /run/user/124/gvfs type fuse.gvfsd-fuse
(rw,nosuid,nodev,relatime,user_id=124,group_id=130)
```

```
fusectl on /sys/fs/fuse/connections type fusectl (rw,nosuid,nodev,noexec,relatime)
tmpfs on /run/user/1000 type tmpfs
(rw,nosuid,nodev,relatime,size=701080k,mode=700,uid=1000,gid=1001)
gvfsd-fuse on /run/user/1000/gvfs type fuse.gvfsd-fuse
(rw,nosuid,nodev,relatime,user_id=1000,group_id=1001)
```

◆ SD Card

SD card is recognized as /dev/mmcblk1.

Confirm that SD is mounted as Rootfs when booting from SD card.

```
root@contec-desktop:~# mount
/dev/mmcblk1p1 on / type ext4 (rw,relatime)
proc on /proc type proc (rw,relatime)
sysfs on /sys type sysfs (rw,relatime)
none on /dev type devtmpfs (rw,relatime,size=3466564k,nr_inodes=866641,mode=755)
selinuxfs on /sys/fs/selinux type selinuxfs (rw,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,nodev,size=701084k,mode=755)
tmpfs on /run/lock type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120k)
tmpfs on /sys/fs/cgroup type tmpfs (ro,nosuid,nodev,noexec,mode=755)
cgroup2 on /sys/fs/cgroup/unified type cgroup2
(rw,nosuid,nodev,noexec,relatime,nsdelegate)
cgroup on /sys/fs/cgroup/systemd type cgroup
(rw,nosuid,nodev,noexec,relatime,xattr,name=systemd)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime)
efivarfs on /sys/firmware/efi/efivars type efivarfs (rw,nosuid,nodev,noexec,relatime)
none on /sys/fs/bpf type bpf (rw,nosuid,nodev,noexec,relatime,mode=700)
cgroup on /sys/fs/cgroup/perf_event type cgroup
(rw,nosuid,nodev,noexec,relatime,perf_event)
cgroup on /sys/fs/cgroup/hugetlb type cgroup (rw,nosuid,nodev,noexec,relatime,hugetlb)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices)
cgroup on /sys/fs/cgroup/cpu,cpuacct type cgroup
(rw,nosuid,nodev,noexec,relatime,cpu,cpuacct)
cgroup on /sys/fs/cgroup/net_cls,net_prio type cgroup
(rw,nosuid,nodev,noexec,relatime,net_cls,net_prio)
cgroup on /sys/fs/cgroup/freezer type cgroup (rw,nosuid,nodev,noexec,relatime,freezer)
cgroup on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,memory)
cgroup on /sys/fs/cgroup/pids type cgroup (rw,nosuid,nodev,noexec,relatime,pids)
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpuset)
cgroup on /sys/fs/cgroup/blkio type cgroup (rw,nosuid,nodev,noexec,relatime,blkio)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs
(rw,relatime,fd=26,pgrp=1,timeout=0,minproto=5,maxproto=5,direct)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime,pagesize=2M)
debugfs on /sys/kernel/debug type debugfs (rw,nosuid,nodev,noexec,relatime)
tracefs on /sys/kernel/tracing type tracefs (rw,nosuid,nodev,noexec,relatime)
mqueue on /dev/mqueue type mqueue (rw,nosuid,nodev,noexec,relatime)
configfs on /sys/kernel/config type configfs (rw,nosuid,nodev,noexec,relatime)
fusectl on /sys/fs/fuse/connections type fusectl (rw,nosuid,nodev,noexec,relatime)
sunrpc on /run/rpc_pipefs type rpc_pipefs (rw,relatime)
```

```
binfmt_misc on /proc/sys/fs/binfmt_misc type binfmt_misc
(rw,nosuid,nodev,noexec,relatime)
tmpfs on /run/user/1000 type tmpfs
(rw,nosuid,nodev,relatime,size=701080k,mode=700,uid=1000,gid=1001)
gvfsd-fuse on /run/user/1000/gvfs type fuse.gvfsd-fuse
(rw,nosuid,nodev,relatime,user_id=1000,group_id=1001)
```

◆ Using a SD Card as External Storage When Booting From eMMC

SD card is recognized as `/dev/mmcblk1`.

After the card is inserted, it will be mounted under the `/media/[user name]/directory`.

```
contec@contec-desktop: ~$ mount
/dev/mmcblk0p1 on / type ext4 (rw,relatime,data=ordered)
proc on /proc type proc (rw,relatime)
sysfs on /sys type sysfs (rw,relatime)
none on /dev type devtmpfs (rw,relatime,size=1781268k,nr_inodes=445317,mode=755)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,nodev,mode=755)
tmpfs on /run/lock type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120k)
tmpfs on /sys/fs/cgroup type tmpfs (ro,nosuid,nodev,noexec,mode=755)
cgroup on /sys/fs/cgroup/unified type cgroup2 (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,xattr,name=systemd)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime,perf_event)
cgroup on /sys/fs/cgroup/net_cls,net_prio type cgroup (rw,nosuid,nodev,noexec,relatime,net_cls,net_prio)
cgroup on /sys/fs/cgroup/pids type cgroup (rw,nosuid,nodev,noexec,relatime,pids)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices)
cgroup on /sys/fs/cgroup/blkio type cgroup (rw,nosuid,nodev,noexec,relatime,blkio)
cgroup on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,memory)
cgroup on /sys/fs/cgroup/hugetlb type cgroup (rw,nosuid,nodev,noexec,relatime,hugetlb)
cgroup on /sys/fs/cgroup/freezer type cgroup (rw,nosuid,nodev,noexec,relatime,freezer)
cgroup on /sys/fs/cgroup/cpu,cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,cpu,cpuacct)
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpuset)
cgroup on /sys/fs/cgroup/debug type cgroup (rw,nosuid,nodev,noexec,relatime,debug)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=26,pgrp=1,timeout=0,maxproto=5,maxproto=5,direct)
debugfs on /sys/kernel/debug type debugfs (rw,relatime)
sunrpc on /run/rpc_pipefs type rpc_pipefs (rw,relatime)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime)
mqueue on /dev/mqueue type mqueue (rw,relatime)
configfs on /sys/kernel/config type configfs (rw,relatime)
tmpfs on /run/user/120 type tmpfs (rw,nosuid,nodev,relatime,size=405144k,mode=700,uid=120,gid=124)
fusectl on /sys/fs/fuse/connections type fusectl (rw,relatime)
gvfsd-fuse on /run/user/120/gvfs type fuse.gvfsd-fuse (rw,nosuid,nodev,relatime,user_id=120,group_id=124)
tmpfs on /run/user/1000 type tmpfs (rw,nosuid,nodev,relatime,size=405144k,mode=700,uid=1000,gid=1001)
gvfsd-fuse on /run/user/1000/gvfs type fuse.gvfsd-fuse (rw,nosuid,nodev,relatime,user_id=1000,group_id=1001)
/dev/mmcblk1p1 on /media/contec/41c0d5e6-82d9-46b6-94d9-eed867943334 type ext4 (rw,nosuid,nodev,relatime,data=ordered,uhelper=udisks2)
contec@contec-desktop: ~$
```

By adding an entry to `/etc/fstab`, the card can always be mounted to a specific directory after booting.

5. LAN Operational Check

◆ Network Settings

The two Gigabit Ethernet ports are recognized by Linux as the following interface names, respectively.

LAN-A : eth1

```
eth1: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
      ether 00:04:4b:ea:58:53 txqueuelen 1000 (Ethernet)
      RX packets 0 bytes 0 (0.0 B)
      RX errors 0 dropped 0 overruns 0 frame 0
      TX packets 0 bytes 0 (0.0 B)
      TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
      device interrupt 156 base 0xe000
```

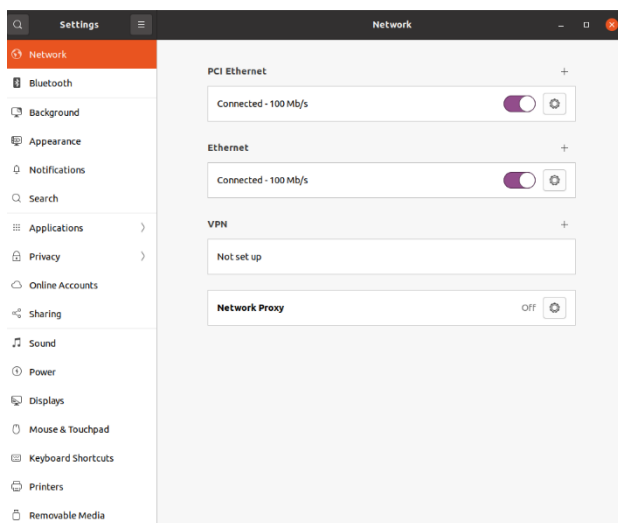
LAN-B : eth0

```
eth0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
      ether 00:80:4c:6b:9d:11 txqueuelen 1000 (Ethernet)
      RX packets 0 bytes 0 (0.0 B)
      RX errors 0 dropped 0 overruns 0 frame 0
      TX packets 0 bytes 0 (0.0 B)
      TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

GUI or nmcli command can be used for settings.

Setting with GUI

Select [System Settings] - [Network].



Select the settings icon located to the right of the LAN port to be configured.

Cancel Wired Apply

Details Identity IPv4 IPv6 Security

Link speed 100 Mb/s

IPv4 Address 192.168.11.90

IPv6 Address fe80::87ce:6923:4a1e:ecdf

Hardware Address 00:80:4C:6B:9D:0B

Default Route 192.168.11.1

DNS 192.168.11.1

☒ Connect automatically

☒ Make available to other users

☐ Metered connection: has data limits or can incur charges
Software updates and other large downloads will not be started automatically.

Remove Connection Profile

Select the IPv4 Settings tab.

Cancel Wired Apply

Details Identity IPv4 IPv6 Security

IPv4 Method

☐ Automatic (DHCP) ☐ Link-Local Only

☒ Manual ☐ Disable

☐ Shared to other computers

Addresses

| Address | Netmask | Gateway | |
|----------|---------|------------|--|
| 10.0.0.1 | 8 | 10.0.0.254 | |
| | | | |

DNS Automatic ☒

Separate IP addresses with commas

On the IPv4 Settings tab, configure the method, IP address, netmask, and gateway before pressing [Apply] to apply your settings.

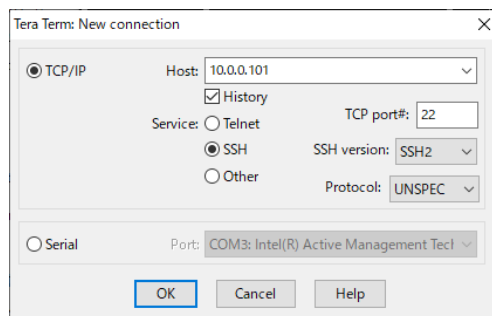
◆ SSH Operations

Access the SSH server of the DX-U1200 Ubuntu and confirm that remote login can be performed.

For Linux, start a terminal and use the SSH command to make the connection.

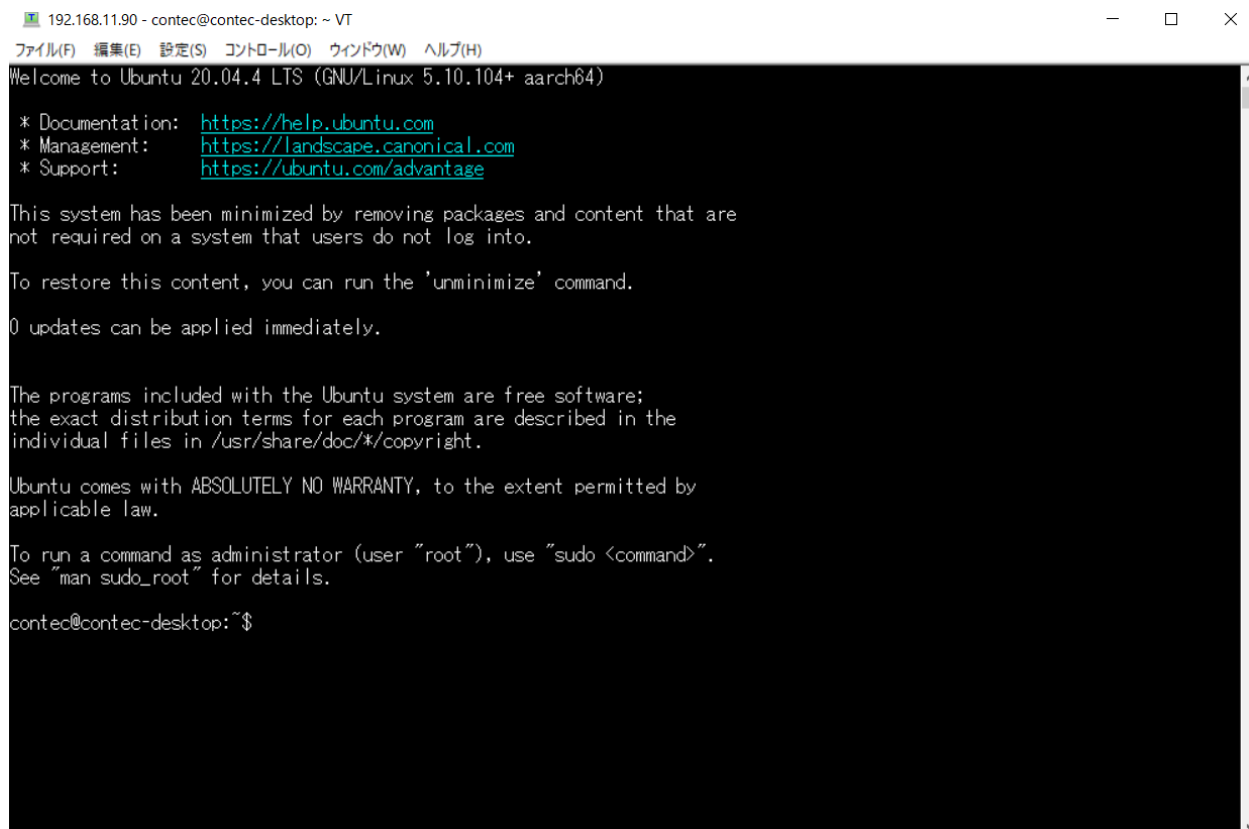
```
$ ssh user_name@ip_address
```

Use Tera Term on the Windows PC, enter the IP of the DX-U1200 to see whether connecting via SSH succeeds.



Enter the username and password used in the Ubuntu configuration.

If everything is in order, connection will be completed as below.



6. USB2.0 Port Operation Check

When a USB memory device is inserted into the USB2.0 Port, it will be recognized as shown below.

Before USB memory device is inserted

```
root@contec-desktop:~# lsusb -t
/: Bus 02.Port 1: Dev 1, Class=root_hub, Driver=tegra-xusb/4p, 10000M
/: Bus 01.Port 1: Dev 1, Class=root_hub, Driver=tegra-xusb/4p, 480M
   |__ Port 3: Dev 2, If 0, Class=Hub, Driver=hub/3p, 480M
```

After USB memory device is inserted

```
root@contec-desktop:~# lsusb
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 003: ID 054c:0243 Sony Corp. MicroVault Flash Drive
Bus 001 Device 002: ID 0424:2514 Standard Microsystems Corp. USB 2.0 Hub
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub

root@contec-desktop:~# lsusb -t
/: Bus 02.Port 1: Dev 1, Class=root_hub, Driver=tegra-xusb/4p, 10000M
/: Bus 01.Port 1: Dev 1, Class=root_hub, Driver=tegra-xusb/5p, 480M
   |__ Port 3: Dev 2, If 0, Class=Hub, Driver=hub/3p, 480M
       |__ Port 1: Dev 3, If 0, Class=Mass Storage, Driver=usb-storage, 480M

root@contec-desktop:~# mount
/dev/mmcblk0p1 on / type ext4 (rw,relatime)
proc on /proc type proc (rw,relatime)
sysfs on /sys type sysfs (rw,relatime)
...
/dev/sda1 on /media/ea2de978-4dd0-42fe-b4a7-850476b72b47 type ext4
(rw,relatime,data=ordered)
```

7. USB3.2 Gen1 (USB3.0) Port Operational Check

When a USB memory device is inserted into the USB3.2 Gen1 (USB3.0) Port, it will be recognized as shown below.

Before USB memory device is inserted

```
root@contec-desktop:~# lsusb -t
/: Bus 02.Port 1: Dev 1, Class=root_hub, Driver=tegra-xusb/4p, 10000M
/: Bus 01.Port 1: Dev 1, Class=root_hub, Driver=tegra-xusb/4p, 480M
   |__ Port 3: Dev 2, If 0, Class=Hub, Driver=hub/3p, 480M
```

After USB memory device is inserted

```
root@contec-desktop:~# lsusb
Bus 002 Device 002: ID 0930:6545 Toshiba Corp. Kingston DataTraveler 102/2.0 / HEMA
Flash Drive 2 GB / PNY Attache 4GB Stick
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 002: ID 0424:2514 Standard Microsystems Corp. USB 2.0 Hub
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub

root@contec-desktop:~# lsusb -t
/: Bus 02.Port 1: Dev 1, Class=root_hub, Driver=tegra-xusb/4p, 5000M
   |__ Port 1: Dev 2, If 0, Class=Mass Storage, Driver=usb-storage, 10000M
/: Bus 01.Port 1: Dev 1, Class=root_hub, Driver=tegra-xusb/5p, 480M
   |__ Port 3: Dev 2, If 0, Class=Hub, Driver=hub/3p, 480M

root@contec-desktop:~# mount
/dev/mmcblk0p1 on / type ext4 (rw,relatime,data=ordered)
proc on /proc type proc (rw,relatime)
sysfs on /sys type sysfs (rw,relatime)
...
/dev/sda1 on /media/202FC8E73FF115F8 type fuseblk
(rw,relatime,user_id=0,group_id=0,allow_other,blksize=4096)
```

8. RAS Operational Check

The following section describes how to check the operations of the pre-installed RAS sample application.

◆ General-purpose I/O Operations

Launch a console window. Execute the DIO sample (ras_dio) as follows. The result is displayed.

```
root@contec-desktop:~# ras_dio
BUILD_DATE=Jan 15 2021:09:02:41
./ras_dio [-i|-o] [portnum] [value]
-i [portnum] : get port state
-o [portnum] [value] : set port state to [value]
+-----+-----+-----+
|          | DI  | DIO |          |
+-----+-----+-----+
|          | 1 0 | 1 0 | COM  |
+-----+-----+-----+
| portnum | 0 1 | 2 3 |      |
+-----+-----+-----+

Read the status of DI1 Port
root@contec-desktop:~# ras_dio -i 0
1

Write the DIO1 Port
root@contec-desktop:~# ras_dio -o 2 1
```

Special notes:

Run the DIO sample to see that you can get the input state and change the output state.

◆ POWER LED Operations

Launch a console window. Run the `ras_misc` sample as follows, and see that the POWER LED turns off all lights, turns solid red, flashes red, and turns solid green.

Refer to the RAS-API document for details about the API.

```
#all lights off
root@contec-desktop:~# ras_misc -s 0
Set LED Status mode
MT_SetLEDStatus End

#solid red
root@contec-desktop:~# ras_misc -s 1
Set LED Status mode
MT_SetLEDStatus End

#flash red
root@contec-desktop:~# ras_misc -s 2
Set LED Status mode
MT_SetLEDStatus End

#solid green
root@contec-desktop:~# ras_misc -s 4
Set LED Status mode
MT_SetLEDStatus End
```

Special notes:

Confirm that the POWER LED turns on, turns off, and flashes.

◆ Watchdog Timer Operations

Launch a console window. Execute the WDT sample as follows, and confirm that the system is reset after WDT timeout. Refer to the help document for details about the API.

```
root@contec-desktop:~# ras_wdt -s 30  
enter start WDT mode  
MT_SetWDT End  
MT_StartWDT End
```

Special notes:

In the execution example, the system will be reset about 30 seconds after executing the WDT sample.
(*If ras_wdt is already running, the WDT may not work properly.

Please make sure that there are no other ras_wdt processes running when you check the WDT operations.)

◆ Hardware Monitor Operational Check

Launch a console window. Execute the ras_misc sample as follows, and confirm that system temperature and the system's power-supply voltage can be retrieved. Refer to the help document for details about the API.

```
# retrieve system temperature  
root@contec-desktop:~# ras_misc -t  
enter stop ftemp mode  
ftemp = 61.210762  
  
# retrieve power-supply voltage  
root@contec-desktop:~# ras_misc -l  
enter fvol mode Setting  
fvol = 23.626904
```

9. RTC Operational Check

Confirm that the date and time can be manually changed by entering the `timedatectl` command on the console screen.

```
root@contec-desktop:~# timedatectl set-ntp false    #Stop the systemd-timesyncd.service
root@contec-desktop:~# timedatectl set-time "2021-02-28 10:30:00"    #Set the time manually
root@contec-desktop:~# timedatectl status    #Check the status
                Local time: Sun 2021-02-28 10:30:11 JST
                Universal time: Sun 2021-02-28 01:30:11 UTC
                RTC time: Sun 2021-02-28 01:30:11
                Time zone: Asia/Tokyo (JST, +0900)
    System clock synchronized: no
systemd-timesyncd.service active: no
                RTC in local TZ: no
```

In addition, confirm that the RTC keeps the time even after the power is turned OFF->ON.

```
root@contec-desktop:~# timedatectl status
                Local time: Sun 2021-02-28 10:35:51 JST
                Universal time: Sun 2021-02-28 01:35:51 UTC
                RTC time: Sun 2021-02-28 01:35:51
                Time zone: Asia/Tokyo (JST, +0900)
    System clock synchronized: no
systemd-timesyncd.service active: no
                RTC in local TZ: no
```

This is the procedure for synchronizing the time using the `systemd-timesyncd` service.
Set the server settings for time synchronization according to your environment.

```
root@contec-desktop:~# timedatectl set-ntp true    #Start the systemd-timesyncd.service
root@contec-desktop:~# timedatectl status    #Check the status
                Local time: Thu 2021-01-28 09:11:18 JST
                Universal time: Thu 2021-01-28 00:11:18 UTC
                RTC time: Thu 2021-01-28 00:11:19
                Time zone: Asia/Tokyo (JST, +0900)
    System clock synchronized: yes
systemd-timesyncd.service active: yes
                RTC in local TZ: no
root@contec-desktop:~# vi /etc/systemd/timesyncd.conf    #Edit the setting file
root@contec-desktop:~# systemctl restart systemd-timesyncd    #Restart the service (Reflect the settings)
root@contec-desktop:~# timedatectl status    #Check the status
                Local time: Thu 2021-01-28 09:14:05 JST
                Universal time: Thu 2021-01-28 00:14:05 UTC
                RTC time: Thu 2021-01-28 00:14:06
                Time zone: Asia/Tokyo (JST, +0900)
    System clock synchronized: yes
systemd-timesyncd.service active: yes
                RTC in local TZ: no
```

10. CAMERA-IF Operational Check

Connect the camera to the MIPI CSI-2 camera connector and confirm that the camera is recognized on the console screen.

```
root@contec-desktop:~# dmesg #Verify that the probe has been completed on the driver.
---
[ 1.517479] vi 54080000.vi: vi_probe: ++
[ 1.520292] vi 54080000.vi: initialized
[ 1.522328] vi 54080000.vi: subdev nvcsi--2 bound
[ 1.522342] vi 54080000.vi: subdev imx219 7-0010 bound

root@contec-desktop:~# ls -la /dev/video0 #Confirm recognition as video0.
crw-rw----+ 1 root video 81, 0 January 28 09:27 /dev/video0
```

Execute the Gstreamer. Confirm that camera input images can be HDMI output and displayed.

```
root@contec-desktop:~# systemctl stop gdm
root@contec-desktop:~# gst-launch-1.0 nvarguscamerasrc ! 'video/x-raw(memory:NVMM), ¥
> width=(int)1920, height=(int)1080, format=(string)NV12, ¥
> framerate=(fraction)30/1' ! nvdrmvideosink -e
Setting pipeline to PAUSED ...
Pipeline is live and does not need PREROLL ...
Setting pipeline to PLAYING ...
New clock: GstSystemClock
GST_ARGUS: Creating output stream
CONSUMER: Waiting until producer is connected...
GST_ARGUS: Available Sensor modes :
GST_ARGUS: 3280 x 2464 FR = 21.000000 fps Duration = 47619048 ; Analog Gain range min 1.000000, max
10.625000; Exposure Range min 13000, max 683709000;

GST_ARGUS: 3280 x 1848 FR = 28.000001 fps Duration = 35714284 ; Analog Gain range min 1.000000, max
10.625000; Exposure Range min 13000, max 683709000;

GST_ARGUS: 1920 x 1080 FR = 29.999999 fps Duration = 33333334 ; Analog Gain range min 1.000000, max
10.625000; Exposure Range min 13000, max 683709000;

GST_ARGUS: 1640 x 1232 FR = 29.999999 fps Duration = 33333334 ; Analog Gain range min 1.000000, max
10.625000; Exposure Range min 13000, max 683709000;

GST_ARGUS: 1280 x 720 FR = 59.999999 fps Duration = 16666667 ; Analog Gain range min 1.000000, max 10.625000;
Exposure Range min 13000, max 683709000;

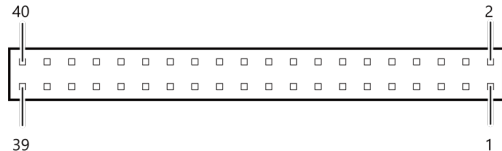
GST_ARGUS: Running with following settings:
  Camera index = 0
  Camera mode  = 2
  Output Stream W = 1920 H = 1080
  seconds to Run   = 0
  Frame Rate = 29.999999
GST_ARGUS: Setup Complete, Starting captures for 0 seconds
```

```
GST_ARGUS: Starting repeat capture requests.
CONSUMER: Producer has connected; continuing.
WARNING: from element /GstPipeline:pipeline0/GstNvDrmVideoSink:nvdrmvideosink0: Pipeline construction is invalid,
please add queues.
Additional debug info:
gstbasesink.c(1209): gst_base_sink_query_latency (): /GstPipeline:pipeline0/GstNvDrmVideoSink:nvdrmvideosink0:
Not enough buffering available for the processing deadline of 0:00:00.015000000, add enough queues to buffer
0:00:00.015000000 additional data. Shortening processing latency to 0:00:00.000000000.
^Chandling interrupt.
Interrupt: Stopping pipeline ...
EOS on shutdown enabled -- Forcing EOS on the pipeline
Waiting for EOS...
Got EOS from element "pipeline0".
EOS received - stopping pipeline...
Execution ended after 0:00:32.722647463
Setting pipeline to PAUSED ...
Setting pipeline to READY ...
GST_ARGUS: Cleaning up
CONSUMER: Done Success
GST_ARGUS: Done Success
Setting pipeline to NULL ...
Freeing pipeline ...
```


11. 40-PIN HEADER Operational Check

The 40-pin GPIO pin header is located on the back of the product model with an expansion slot.
(* Not compatible with XavierNX EVK 40-pin GPIO pin header.)

GPIO Pin Header

| Connector used on the product | | 2.54mm Pitch Pin Header | |
|--|-------------|-------------------------|-------------|
|  | | | |
| Pin No. | Signal name | Pin No. | Signal name |
| 2 | 3.3V | 1 | 5.0V |
| 4 | I2C_SDA | 3 | 5.0V |
| 6 | I2C_SCL | 5 | GND |
| 8 | GPA00 | 7 | UART_TXD |
| 10 | GND | 9 | UART_RXD |
| 12 | UART_RTS | 11 | GPB00 |
| 14 | GPA01 | 13 | GND |
| 16 | GPA02 | 15 | GPB01 |
| 18 | 3.3V | 17 | GPB02 |
| 20 | SPI_MOSI | 19 | GND |
| 22 | SPI_MISO | 21 | GPB03 |
| 24 | SPI_SCK | 23 | SPI_CS0 |
| 26 | GND | 25 | SPI_CS1 |
| 28 | I2C_SDA | 27 | I2C_SCL |
| 30 | GPA03 | 29 | GND |
| 32 | GPA04 | 31 | GPB04 |
| 34 | GPA05 | 33 | GND |
| 36 | GPA06 | 35 | UART_CTS |
| 38 | GPA07 | 37 | GPB05 |
| 40 | GND | 39 | GPB06 |

*1 GPIOs are indicated with the signal names GPA0x and GPB0x.

*2 The two channels of I2C pins are on the same bus.

◆ GPIO

GPA00 - GPB06 are assigned to gpio-289 – gpio303.

```
root@contec-desktop:~# cat /sys/kernel/debug/gpio
gpiochip3: GPIOs 289-304, parent: i2c/1-0020, 1-0020, can sleep:
gpio-289 (GPA00          )
gpio-290 (GPA01          )
gpio-291 (GPA02          )
gpio-292 (GPA03          )
gpio-293 (GPA04          )
gpio-294 (GPA05          )
gpio-295 (GPA06          )
gpio-296 (GPA07          )
gpio-297 (GPB00          )
gpio-298 (GPB01          )
gpio-299 (GPB02          )
gpio-300 (GPB03          )
gpio-301 (GPB04          )
gpio-302 (GPB05          )
gpio-303 (GPB06          )
gpio-304 (               )
...
```

By exporting each GPIO number to /sys/class/gpio, input values can be input and output values can be output.

```
#When setting GPA00 to Output 1
root@contec-desktop:~# echo 289 > /sys/class/gpio/export
root@contec-desktop:~# echo out > /sys/class/gpio/gpio289/direction
root@contec-desktop:~# cat /sys/class/gpio/gpio289/direction
out
root@contec-desktop:~# echo 1 > /sys/class/gpio/gpio289/value

#When setting GPB00 to Input and read
root@contec-desktop:~# echo 297 > /sys/class/gpio/export
root@contec-desktop:~# echo in > /sys/class/gpio/gpio297/direction
root@contec-desktop:~# cat /sys/class/gpio/gpio297/direction
in
root@contec-desktop:~# cat /sys/class/gpio/gpio297/value
0
```

◆ UART

UART_TXD and UART_RXD are assigned to /dev/ttyTHS1.

We looped back UART_TXD/UART_RXD and confirmed with the linux-serial-test that sending/receiving communication can be performed.

```
root@contec-desktop:~# linux-serial-test -s -e -p /dev/ttyTHS1 -b 115200 -o 5 -i 7
Stopped transmitting.
/dev/ttyTHS1: count for this session: rx=57135, tx=57135, rx err=0
/dev/ttyTHS1: TIOCGICOUNT: ret=0, rx=57135, tx=415, frame = 0, overrun = 0, parity = 0,
brk = 0, buf_overrun = 0
Stopped receiving.
/dev/ttyTHS1: count for this session: rx=57135, tx=57135, rx err=0
/dev/ttyTHS1: TIOCGICOUNT: ret=0, rx=57135, tx=415, frame = 0, overrun = 0, parity = 0,
brk = 0, buf_overrun = 0
```

◆ SPI

SPI-BUS (SPI_MOSI/SPI_MISO/SPI_SCK/SPI_CS0/SPI_CS1) is assigned as

/dev/spidev0.0 (CS PIN: SPI_CS0)

/dev/spidev0.1 (CS PIN: SPI_CS1).

In the environment of the CONTEC, we connected serial EEPROM (25LC128) and confirmed that reading /writing communication can be performed as follows.

```
# Write values of 0-255 bytes incremented by 1 byte
root@contec-desktop:~# 25lc128 -d /dev/spidev0.0 -c

# Display 0-255 bytes
root@contec-desktop:~# 25lc128 -d /dev/spidev0.0 -s
00 01 02 03 04 05 06 07 08 09 0a 0b 0c 0d 0e 0f
10 11 12 13 14 15 16 17 18 19 1a 1b 1c 1d 1e 1f
20 21 22 23 24 25 26 27 28 29 2a 2b 2c 2d 2e 2f
30 31 32 33 34 35 36 37 38 39 3a 3b 3c 3d 3e 3f
40 41 42 43 44 45 46 47 48 49 4a 4b 4c 4d 4e 4f
50 51 52 53 54 55 56 57 58 59 5a 5b 5c 5d 5e 5f
60 61 62 63 64 65 66 67 68 69 6a 6b 6c 6d 6e 6f
70 71 72 73 74 75 76 77 78 79 7a 7b 7c 7d 7e 7f
80 81 82 83 84 85 86 87 88 89 8a 8b 8c 8d 8e 8f
90 91 92 93 94 95 96 97 98 99 9a 9b 9c 9d 9e 9f
a0 a1 a2 a3 a4 a5 a6 a7 a8 a9 aa ab ac ad ae af
b0 b1 b2 b3 b4 b5 b6 b7 b8 b9 ba bb bc bd be bf
c0 c1 c2 c3 c4 c5 c6 c7 c8 c9 ca cb cc cd ce cf
d0 d1 d2 d3 d4 d5 d6 d7 d8 d9 da db dc dd de df
e0 e1 e2 e3 e4 e5 e6 e7 e8 e9 ea eb ec ed ee ef
f0 f1 f2 f3 f4 f5 f6 f7 f8 f9 fa fb fc fd fe ff

# Erase 0-255byte
root@contec-desktop:~# 25lc128 -d /dev/spidev0.0 -e
```

◆ I2C

I2C-BUS (I2C_SCL, I2C_SDA) is assigned to /dev/i2c-8.

In the environment of the CONTEC, we connected I2C-EEPROM (24LC256) and confirmed that CHIP Addr can be recognized.

```
root@contec-desktop:~# i2cdetect -y -a -r 8
    0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
20: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
40: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
50: 50 51 -- -- -- -- -- -- -- -- -- -- -- -- --
60: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
```

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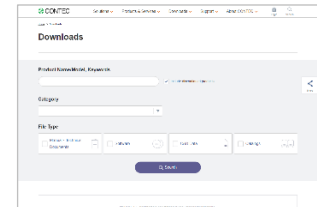
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Revision History

| MONTH YEAR | Summary of Changes |
|---------------|--------------------|
| December 2022 | The First Edition |
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DX-U1200 Reference Manual Software (Ubuntu20.04)

NA09300 (LXCA981) [12232022]

December 2022 Edition