



**10 Gbps Network Based PCIe Computing Accelerator Card with
Two Intel® Core™ i5/i7 or Celeron® Processors,
32 GB / 8 GB RAM, SSD, QTS-Lite, SDK, RoHS**



Revision

Date	Version	Changes
January 8, 2018	1.01	Added software installation guide for Microsoft Windows 10 Added economic version (Mustang-200-C-8G) information
October 27, 2017	1.00	Initial release



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Manual Conventions

**WARNING**

Warnings appear where overlooked details may cause damage to the equipment or result in personal injury. Warnings should be taken seriously.

**CAUTION**

Cautionary messages should be heeded to help reduce the chance of losing data or damaging the product.

**NOTE**

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help avoid making mistakes.

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Chapter

1

Introduction



1.1 Introduction



Figure 1-1: Mustang-200

The Mustang-200 is a 10 Gbps network based computing accelerator for speeding up computations, calculations and applications in an affordable and scalable way. Equipped with two Intel® Core™ i5/i7 processors, 32 GB (four 8GB) / 8 GB (four 2 GB) RAM, and with/without 1TB (two 512GB) SSDs, the Mustang-200 PCIe card can be used with the existing system, enabling high-performance computing without costing a fortune. Multiple Mustang-200 can be installed into one system to further boost the computing capabilities.

The integrated QTS-Lite operating system supports various virtualization technologies such as containers and virtual machines, making it easy to convert the physical system into a virtual one (P2V) and assign it to one of the nodes on the Mustang-200.

SDK and a Web Application are also come with the Mustang-200. The Web Application is capable of VOD (file to live), Live (live to live) and File (file to file) transcoding scenarios. Each transcoding scenario can be created using simple wizard steps. It was developed based on the Host API, allowing developers to modify it to meet their requirements.

Mustang-200 Computing Accelerator

1.2 Model Variations

The model variations of the Mustang-200 series are listed below.

Model No.	Processor	Memory	SSD
Standard Version			
Mustang-200-i5-1T/32G	Intel® Core™ i5-7267U	32 GB DDR4	1 TB
Mustang-200-i7-1T/32G	Intel® Core™ i7-7567U	32 GB DDR4	1 TB
Economic Version			
Mustang-200-C-8G	Intel® Celeron® 3865U	8 GB DDR4	N/A

Table 1-1: Mustang-200 Model Variations

1.3 Features

Some of the Mustang-200 motherboard features are listed below:

- Two Intel® Core™ i7-7567U, i5-7267U or Celeron® 3865U processors, up to 4.00 GHz
- Support Intel® Iris™ Plus Graphics 650.
- Compatible with PCI Express x4, x8, and x16 slots
- Decentralized computing architecture for independent tasks based on 10Gbps network transmission
- Increasing computing power without changing or adding servers
- Achieve higher densities computing
- Lower capital expense and operation expense costs



1.4 Connectors

The connectors on the Mustang-200 are shown in the figures below.



Figure 1-2: Connectors (Front Side)

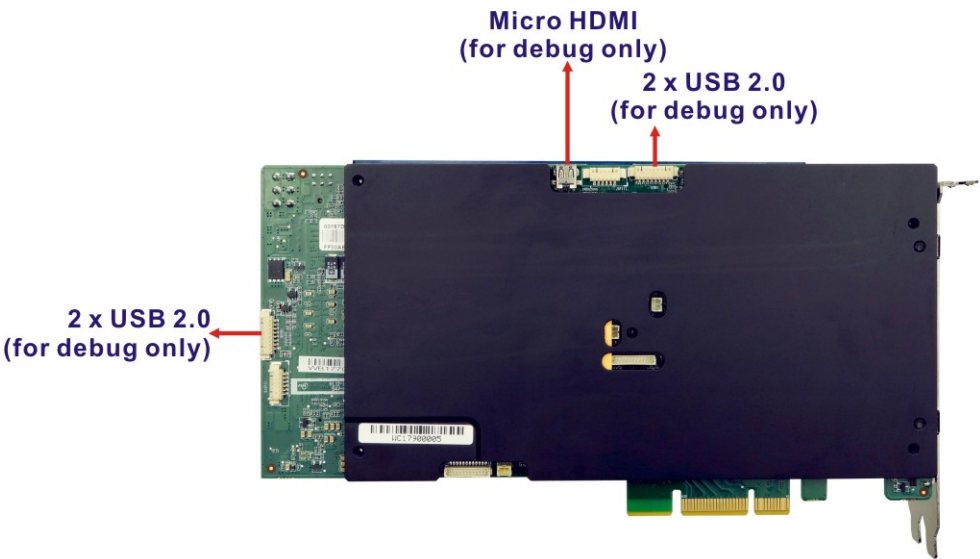


Figure 1-3: Connectors (Rear Side)



Mustang-200 Computing Accelerator

1.5 Dimensions

The dimensions of the board are listed below:

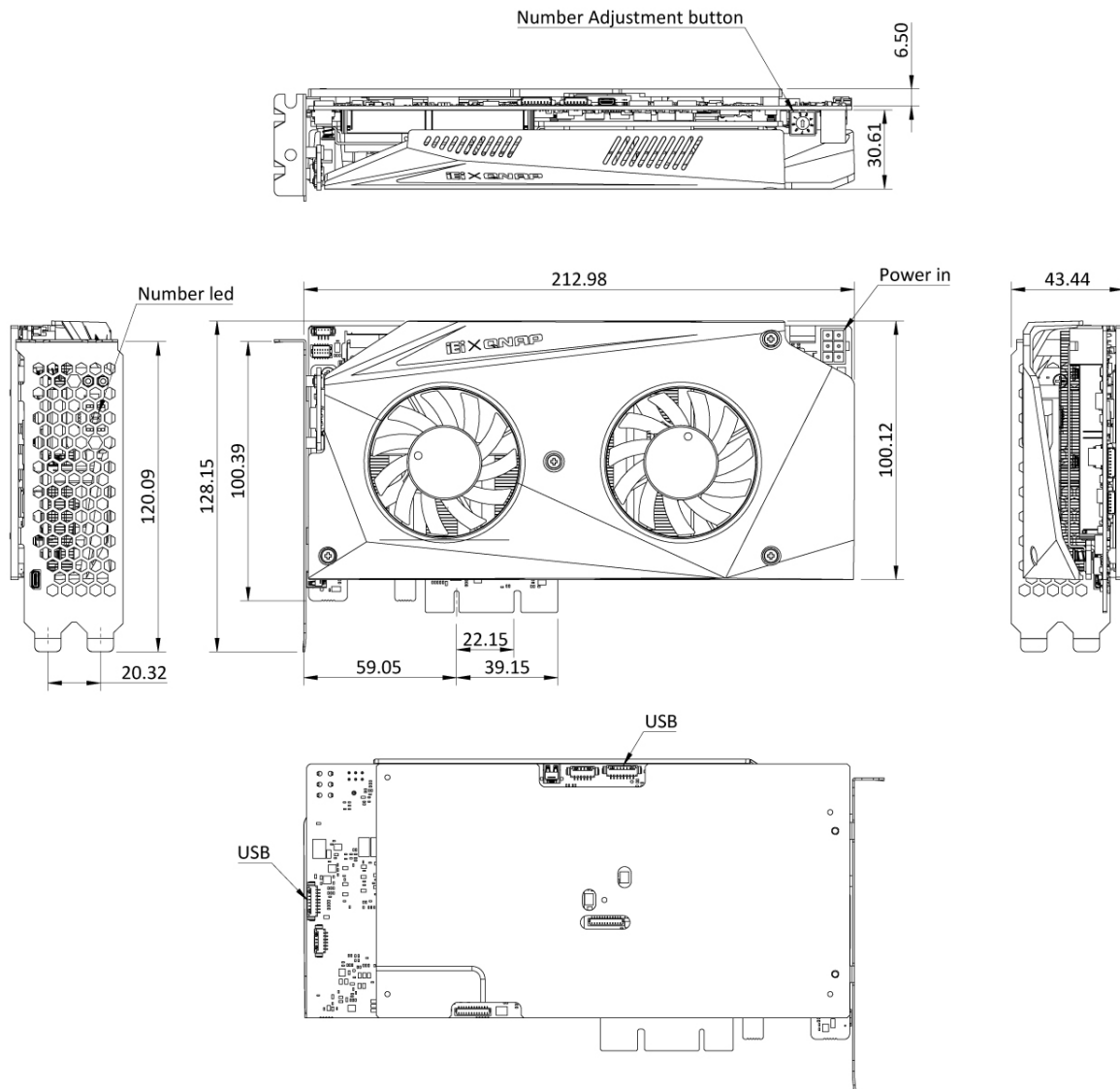


Figure 1-4: Dimensions (mm)

1.6 Data Flow

Figure 1-5 shows the data flow between the CPU and other components installed on the Mustang-200.

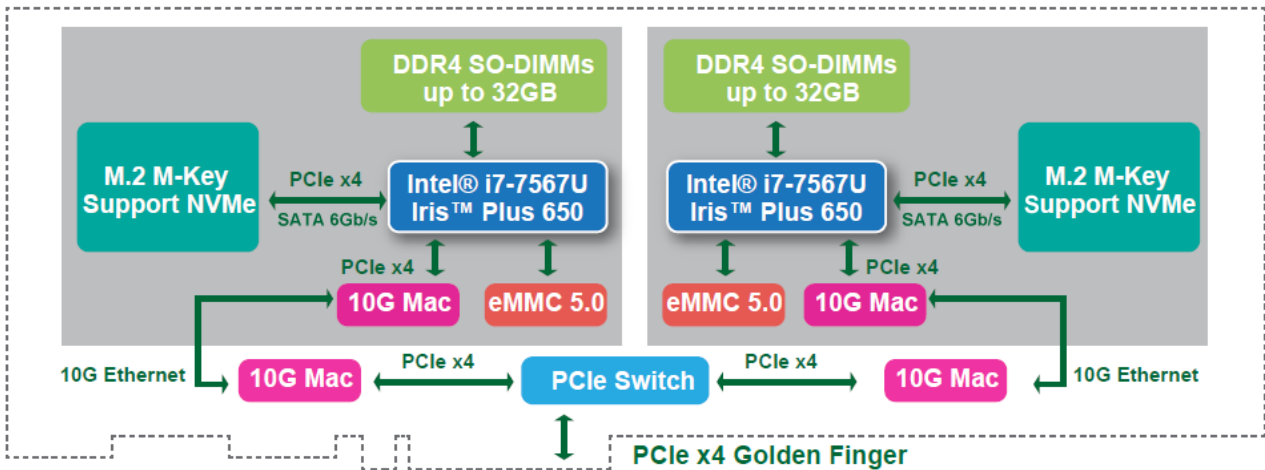


Figure 1-5: Data Flow Diagram

1.7 Technical Specifications

Mustang-200 technical specifications are listed below.

Specification	Mustang-200
Processor	<div>Intel® Core™ i5-7267U</div> <div>(up to 3.5 GHz, dual-core, 4 MB cache, TDP=28 W)</div> <div>Intel® Core™ i7-7567U</div> <div>(up to 4.0 GHz, dual-core, 4 MB cache, TDP=28 W)</div> <div>Intel® Celeron® 3865U</div> <div>(up to 1.8 GHz, dual-core, 2 MB cache, TDP=10 W)</div>

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Specification	Mustang-200
Memory	<p>Standard version:</p> <p>4 x 8 GB DDR4 SO-DIMM (two 8 GB DDR4 SO-DIMMs per CPU)</p> <p>Economic version:</p> <p>4 x 2 GB DDR4 SO-DIMM (two 2 GB DDR4 SO-DIMMs per CPU)</p>
Processor Graphics	<p>Intel® Iris™ Plus Graphics 650 (GT3e)</p> <p>Graphics base frequency: 300 MHz</p> <p>Graphics max dynamic frequency: 1.05 GHz</p> <p>Embedded graphics DRAM per GPU: 64 MB</p>
Hardware Video Decode	<p>H.264, H.265/HEVC</p> <p>MPEG2, M/JPEG</p> <p>VC-1 VP8 (8-bit) / VP9 (10-bit)</p>
Hardware Video Encode	<p>H.264, H.265/HEVC</p> <p>MPEG2, M/JPEG</p> <p>VC-1 VP8 (8-bit)</p>
Display Output	2 x Micro HDMI for debugging
USB Ports	4 x USB 2.0 (pin header) for debugging
Storage	<p>Standard version:</p> <p>2 x Intel® SSD 600P series (512 GB, M.2 80mm PCIe 3.0 x4, 3D1, TLC)</p> <p>Economic version:</p> <p>2 x M.2 Socket 3 (M key, type 2280, PCIe)</p> <p>Minimum capacity - 128 GB or above</p>
Physical PCIe Interface	PCI Express x8
Data Plane Interface	<p>PCI Express x4</p> <p>Compliant with PCI Express Specification V2.0</p> <p>Compatible with PCI Express x4, x8 and x16 slots</p>



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Specification	Mustang-200
External Interface	Reset button Power button
Indicator	7-segment LED display for card ID and debug code
Fan	Dual fan
Power Consumption	120 W, 12 V @ 10 A
Operating Temperature	0°C ~ 40°C
Operating Humidity	10% ~ 90%
Dimensions (WxHxD)	210 mm x 111 mm x 40 mm
Remark	There is no support for UPnP (Universal Plug and Play). This is because Mustang-200 is not connected to router directly, and its connection to external network can only be established via the host server.

Table 1-2: Technical Specifications



Chapter

2

Unpacking

2.1 Anti-static Precautions



WARNING!

Static electricity can destroy certain electronics. Make sure to follow the ESD precautions to prevent damage to the product, and injury to the user.

Make sure to adhere to the following guidelines:

- ***Wear an anti-static wristband:*** Wearing an anti-static wristband can prevent electrostatic discharge.
- ***Self-grounding:*** Touch a grounded conductor every few minutes to discharge any excess static buildup.
- ***Use an anti-static pad:*** When configuring any circuit board, place it on an anti-static mat.
- ***Only handle the edges of the PCB:*** Don't touch the surface of the motherboard. Hold the motherboard by the edges when handling.

2.2 Unpacking Precautions

When the Mustang-200 is unpacked, please do the following:

- Follow the antistatic guidelines above.
- Make sure the packing box is facing upwards when opening.
- Make sure all the packing list items are present.

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2.3 Packing List



NOTE:


If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the Mustang-200 was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The Mustang-200 is shipped with the following components:

Quantity	Item and Part Number	Image
1	Mustang-200 computing accelerator	
1	4-pin to 6-pin PCIe power adapter	
1	Quick Installation Guide	

2.4 Optional Item

The following is optional component which may be separately purchased:

Item	Image
Dual-port USB cable kit for debug (includes two cables) (P/N: 19B00-000396-00-RS)	

Chapter

3

Hardware Installation

3.1 Anti-static Precautions

**WARNING:**

Failure to take ESD precautions during the installation of the Mustang-200 may result in permanent damage to the Mustang-200 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the Mustang-200. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the Mustang-200 or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband:*** Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding*** Before handling the board, touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad:*** When configuring the Mustang-200, place it on an anti-static pad. This reduces the possibility of ESD damaging the Mustang-200.
- ***Only handle the edges of the PCB:*** When handling the PCB, hold the PCB by the edges.

3.2 Installation Considerations

**NOTE:**

The following installation notices and installation considerations should be read and understood before installation. All installation notices must be strictly adhered to. Failing to adhere to these precautions may lead to severe damage and injury to the person performing the installation.

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WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the Mustang-200, Mustang-200 components and injury to the user.

Before and during the installation please **DO** the following:

- Read the user manual:
The user manual provides a complete description of the Mustang-200 installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Turn all power to the system off:
When installing the Mustang-200, make sure that the system to be connected is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the Mustang-200 **DO NOT:**

- Remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- Use the product before verifying all the cables and power connectors are properly connected.
- Allow screws to come in contact with the PCB circuit, connector pins, or its components.

3.3 SSD Installation (Economic Version Only)

The Mustang-200-C-8G must be installed with two M.2 SSDs before hardware installation. The M.2 sockets located on the rear side of the Mustang-200 are keyed in the M position and provide mounting screw position for 2280-size SSD. To install a 2280-size SSD, please follow the steps below.

**WARNING:**

Please make sure the purchased SSD complies with the SSD specifications of the Mustang-200. SSD specifications compliant with the Mustang-200 are listed in Section 1.7.

Step 1: Locate the SSD socket.



Figure 3-1: SSD Socket Locations

Step 2: Remove the on-board retention screw as shown in **Figure 3-2**.

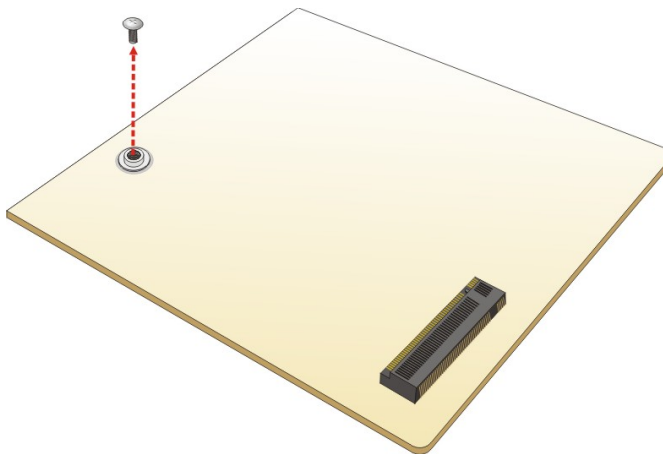


Figure 3-2: Removing the SSD Retention Screw

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Step 3: Line up the notch on the SSD with the notch on the socket. Slide the SSD into the socket at an angle of about 20° (**Figure 3-3**).

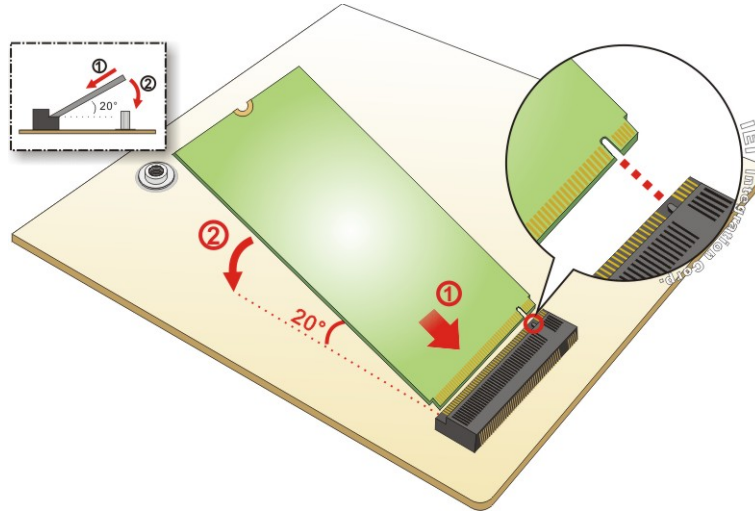


Figure 3-3: Inserting SSD into the Socket at an Angle

Step 4: Push the SSD down and secure it with the previously removed retention screw (**Figure 3-4**).

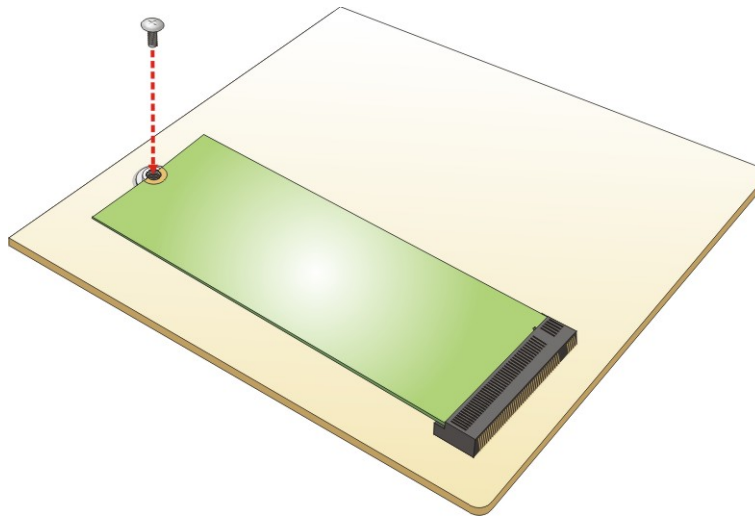


Figure 3-4: Securing the SSD

3.4 Hardware Installation

To install the Mustang-200, please follow the steps below.

Step 1: Prepare the computer. Turn off the computer, and remove the power cord from the rear of the power supply.



WARNING:

Disconnect the computer from the power supply and from any networks to which you will install the Mustang-200, or you risk damaging the system or experiencing electrical shock.

Step 2: Remove the cover from the chassis.

Step 3: Locate available PCIe slots and remove the blank brackets. The Mustang-200 is compatible with PCIe x4, x8 and x16 slots, and needs two side-by-side PCIe slots for installation. Remove two blank bracket panels on the back of the computer that align with the PCIe slot (right side in **Figure 3-5**) for installing the Mustang-200. Save the bracket screws.

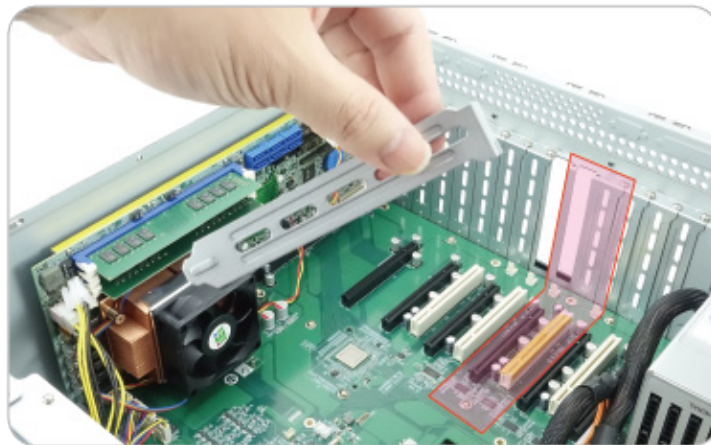


Figure 3-5: Remove Two Blank Brackets

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Step 4: Install and secure the Mustang-200 to the system. Align the Mustang-200 to the PCIe slot. Press down gently, but firmly, to seat the Mustang-200 correctly in the slot. Install two bracket screws to secure the Mustang-200 to the system's chassis.



Figure 3-6: Install and Secure Mustang-200

Step 5: Connect a power cable to the Mustang-200. The Mustang-200 requires 12V 10A DC power. Use a power cable with 6-pin connector from the system, if applicable, or add the 4-pin to 6-pin PCIe power adapter to connect to the power connector of the Mustang-200.



Figure 3-7: Power Cable Connection

Step 6: Assign a card ID to the Mustang-200 by adjusting the rotary switch. The card ID number assigned here will be shown on the LED display of the card after power-up.

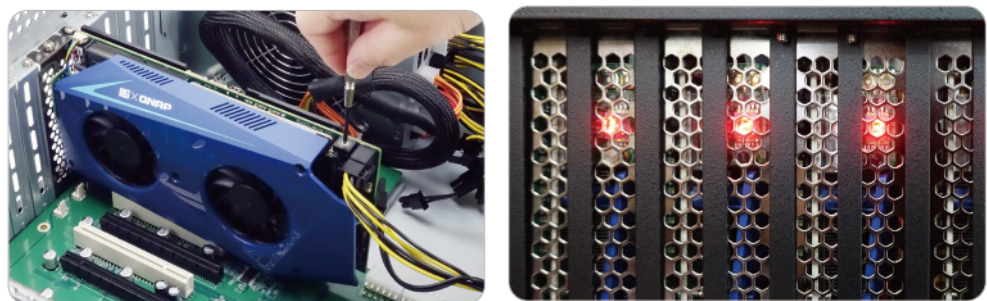


Figure 3-8: Assign a Card ID

Step 7: Repeat **Step 3 ~ Step 6** to install multiple Mustang-200 into the system if available.

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Figure 3-9: Multiple Mustang-200 Installed

Step 8: Replace the cover of the chassis.

Step 9: Reconnect any power cords and any network cables to the system. Power up the system.

Chapter

4

Software Installation (Linux)

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4.1 System Requirements

- Linux Ubuntu 16.04

4.2 Prerequisites

- Make sure the system installed with the Mustang-200 is connected to the network
- Please run all the following installation steps as the root user.
- Go to <https://download.ieiworld.com>. Search for Mustang-200, and download **MVT_Host_Linux_V1.xx.zip**. Unzip and save the **MVT_Host_Linux** folder inside a path in the system. The folder can be renamed.

WARNING: DO NOT change the file path of the project or delete any project files after installation.

4.3 Host SDK Installation

To install the Mustang-200 host SDK in Linux, follow the steps below.



NOTE:

For the economic version users, please follow the instruction described in **Section 4.4** to perform software installation.

Step 1: Install NodeJS in the system with the following commands:

```
sudo apt-get update
```

```
curl -sL https://deb.nodesource.com/setup_7.x | bash - && apt-get install -y nodejs
```

Step 2: cd to the MVT Host root directory:

```
cd MVT_Host_Linux
```

If the original root folder (MVT_Host_Linux) is renamed, be sure to change the directory name in the command.

Step 3: Inside the MVT Host root directory, run the following command to install npm:

```
sudo npm install
```

Step 4: Inside the MVT Host root directory, run the following command to execute the MVT Host:

```
sudo node mvt_host.js
```

**NOTE:**

If, by any chance, the Linux kernel has been re-installed, the Mustang-200 driver must be installed again.

4.4 Software Installation for Economic Version

The Mustang-200 economic version requires more setup procedures before the Host SDK installation. Please follow the following steps to install driver, setup network bridge connection and initialize the Mustang-200 in Linux environment.

Step 1: Install the Mustang-200 driver:

cd to the driver directory

```
cd MVT_Host_Linux/driver
```

If the original root folder (MVT_Host_Linux) is renamed, be sure to change the directory name in the command.

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Inside the driver directory, run the following command to install driver:

`make; make install`

Step 2: Setup network bridge connection:

Run the following command to list the network interfaces:

`ifconfig`

```
test@test-sad7: ~
File Edit View Search Terminal Help
test@test-sad7:~$ ifconfig
enp14s0  Link encap:Ethernet  HWaddr 00:18:7d:af:1b:7d
UP BROADCAST MULTICAST  MTU:1500  Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
Memory:fb300000-fb3fffff

enp15s0  Link encap:Ethernet  HWaddr 00:18:7d:af:1b:7e
inet addr:10.10.40.100  Bcast:10.10.41.255  Mask:255.255.254.0
inet6 addr: fe80::dbdb:20cb:f256:7482/64  Scope:Link
UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
RX packets:486 errors:0 dropped:0 overruns:0 frame:0
TX packets:98 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:54689 (54.6 KB)  TX bytes:12768 (12.7 KB)
Memory:fb100000-fb1fffff

enp3s0   Link encap:Ethernet  HWaddr 00:18:7d:ff:00:f7
UP BROADCAST MULTICAST  MTU:1500  Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:3000
RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
Interrupt:62 Memory:f9f00000-f9f10000

enp4s0   Link encap:Ethernet  HWaddr 00:18:7d:ff:00:f8
UP BROADCAST MULTICAST  MTU:1500  Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:3000
RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
Interrupt:63 Memory:f9e00000-f9e10000

lo       Link encap:Local Loopback
inet addr:127.0.0.1  Mask:255.0.0.0
inet6 addr: ::1/128  Scope:Host
UP LOOPBACK RUNNING  MTU:65536  Metric:1
RX packets:334 errors:0 dropped:0 overruns:0 frame:0
TX packets:334 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1
RX bytes:25762 (25.7 KB)  TX bytes:25762 (25.7 KB)

test@test-sad7:~$
```



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Run the following command to setup bridge connection:

```
brctl addbr temp
```

Run the following command to bridge the two network interfaces listed above (e.g. enp3s0 and enp4s0):

```
brctl addif temp enp3s0
brctl addif temp enp4s0
```

Run the following command to give bridge IP:

```
ifconfig temp 169.254.100.1 netmask 255.255.0.0
```

Step 3: Initialize Mustang-200 economic version. Go to <https://www.qnap.com/en/utilities>. Download and install **Qfinder Pro**.



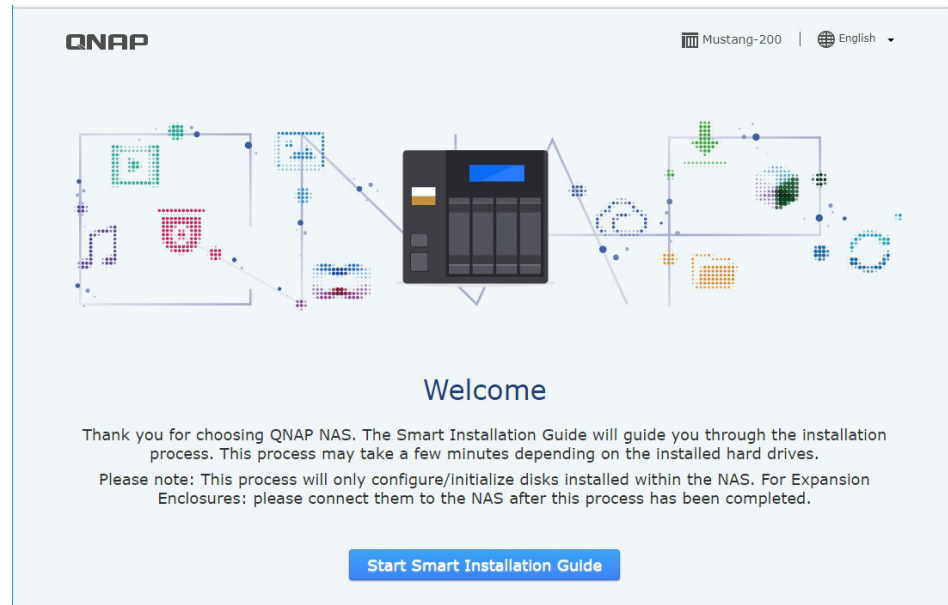
Step 4: Run the Qfinder Pro to search for Mustang-200. Two Mustang-200 will be found for each physical Mustang-200 card. If there are two Mustang-200 installed in the system, the Qfinder Pro will find four Mustang-200. Double click on one of the Mustang-200 in the Qfinder Pro to start initializing.

QNAP									
Qfinder PRO									
Login Network Drives Media Upload Configuration Details Resource Monitor Bookmark the device									
Bookmark	Name	IP Address	Type	myQNAPcloud	Device Name	Device Type	Version	MAC Address	Status
	NASBDB3F0	10.10.41.250	--		TS-439		4.1.0 (20140612)	00-08-9B-BD-B3-F0	🟢
	NASFF00F9	169.254.100.100	--		Mustang-200		4.3.3.0366	00-18-7D-FF-00-F9	?
	NASFF00FA	169.254.100.101	--		Mustang-200		4.3.3.0366	00-18-7D-FF-00-FA	?
Online: 7									

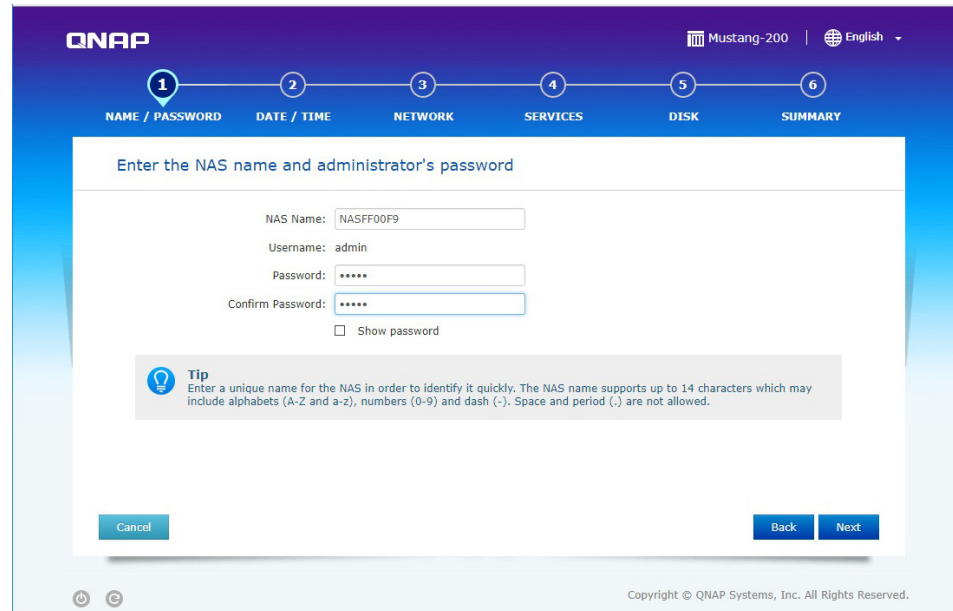


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Step 5: The Qfinder Pro setup wizard welcome page appears in a web browser. Click **Start Smart Installation Guide**.



Step 6: The following page appears. Name the NAS and enter the password. The default password is **admin**. Click **Next** to continue.



The screenshot shows the QNAP Mustang-200 Setup Wizard at Step 1: NAME / PASSWORD. The progress bar at the top indicates the current step. The main area contains the following fields:

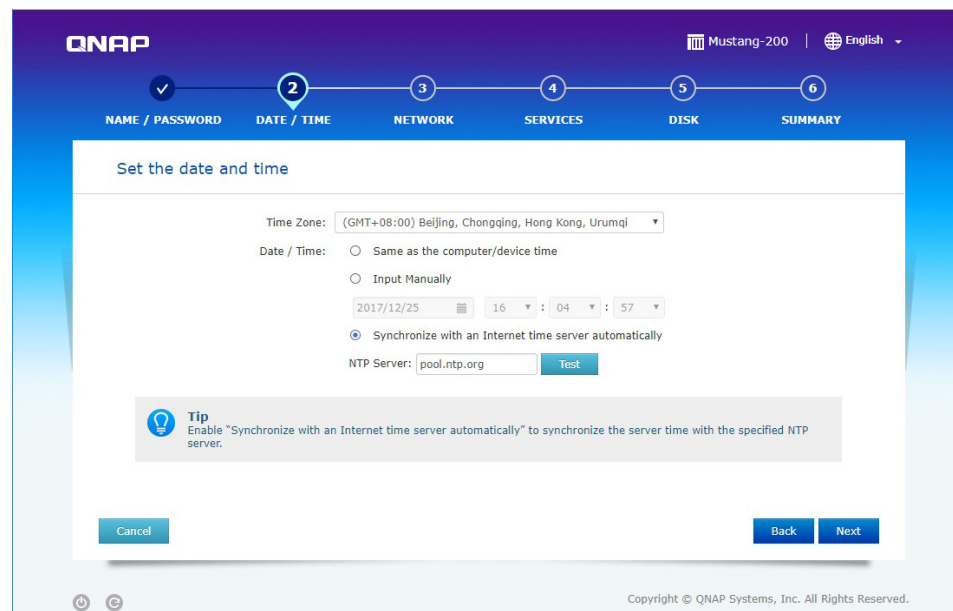
- NAS Name:
- Username:
- Password:
- Confirm Password:
- ☐ Show password

A tip box states: "Enter a unique name for the NAS in order to identify it quickly. The NAS name supports up to 14 characters which may include alphabets (A-Z and a-z), numbers (0-9) and dash (-). Space and period (.) are not allowed."

Buttons at the bottom: Cancel, Back, Next.

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Step 7: Set the date and time. Click **Next** to continue.



The screenshot shows the QNAP Mustang-200 Setup Wizard at Step 2: DATE / TIME. The progress bar at the top indicates the current step. The main area contains the following fields:

- Time Zone:
- Date / Time:
 - ☐ Same as the computer/device time
 - ☐ Input Manually
 - ☒ Synchronize with an Internet time server automatically
- NTP Server:

A tip box states: "Enable 'Synchronize with an Internet time server automatically' to synchronize the server time with the specified NTP server."

Buttons at the bottom: Cancel, Back, Next.

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Step 8: Configure the network settings. It is recommended to select **Obtain an IP address automatically (DHCP)**. Click **Next** to continue.

The screenshot shows the QNAP Mustang-200 web interface during the network configuration step. The progress bar at the top indicates steps 1 through 6, with step 3 (NETWORK) currently active. The main heading is "Configure the network settings".

Under the heading, there are two radio button options:

- ☒ Obtain an IP address automatically (DHCP)
- ☐ Use static IP address

Below these options, the "Interface" is set to "Ethernet 1 (Connected)". The static IP configuration fields are visible but not active:

- IP Address: 169 . 254 . 100 . 100
- Subnet Mask: 255 . 255 . 0 . 0
- Default Gateway: 0 . 0 . 0 . 0
- Primary DNS Server: 8 . 8 . 8 . 8
- Secondary DNS Server: 8 . 8 . 8 . 8

A "Tip" box contains the following text:

1. The default gateway IP is "0.0.0.0". Enter a correct DNS server IP if the NAS is configured with a static IP. Otherwise, the NAS may fail to synchronize with the NTP server or send alert emails.
2. If you want set static IP, you can use scroll bar to choose correct interface you want to set. After installation you can go to "Control Panel" > "Network & File Services" > "Network & Virtual Switch" to set all interface.

At the bottom of the configuration area are three buttons: "Cancel", "Back", and "Next". The footer includes the copyright notice: "Copyright © QNAP Systems, Inc. All Rights Reserved."

Step 9: Select cross-platform file transfer services if needed. Click **Next** to continue.

The screenshot shows the QNAP Mustang-200 web interface during the services configuration step. The progress bar at the top indicates steps 1 through 6, with step 4 (SERVICES) currently active. The main heading is "Cross-platform file transfer service".

Below the heading, there is a text instruction: "Enable the following OS features to assist you in doing cross-platform file management, sharing, and transfer (multiple choices are allowed):".

There are three checkboxes with corresponding OS icons:

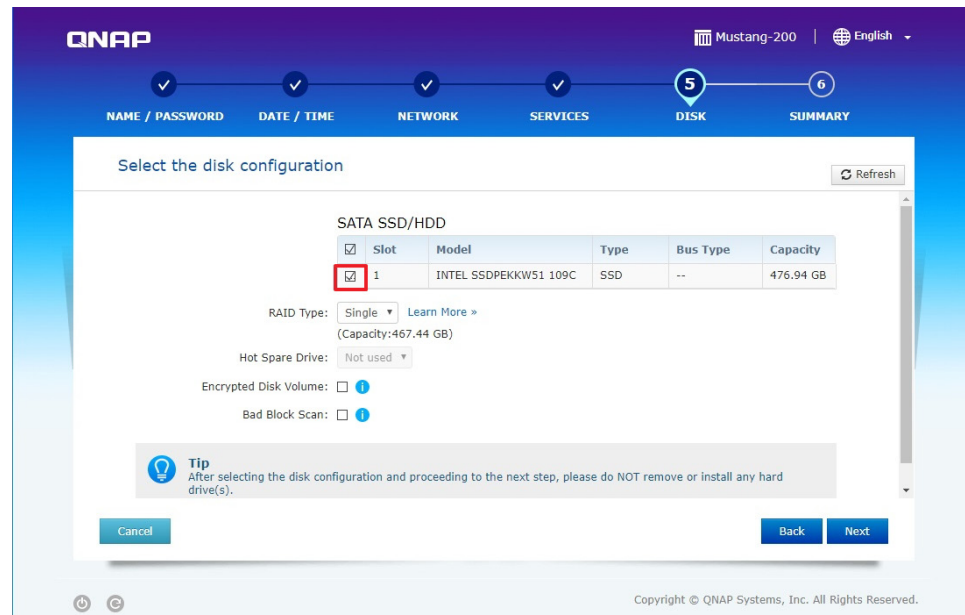
- ☒ Windows (SMB/CIFS, File Station, FTP)
- ☐ Mac (AFP, SMB/CIFS, File Station, FTP)
- ☐ Linux/UNIX (NFS, SMB/CIFS, File Station, FTP)

A "Tip" box contains the following text:

Select the above services to enable immediately after the system installation is complete. To configure the detailed settings, please log into the administration page to modify after finishing the installation.

At the bottom of the configuration area are three buttons: "Cancel", "Back", and "Next". The footer includes the copyright notice: "Copyright © QNAP Systems, Inc. All Rights Reserved."

Step 10: Select the disk configuration. Check to select the installed SSD. Click **Next** to continue.

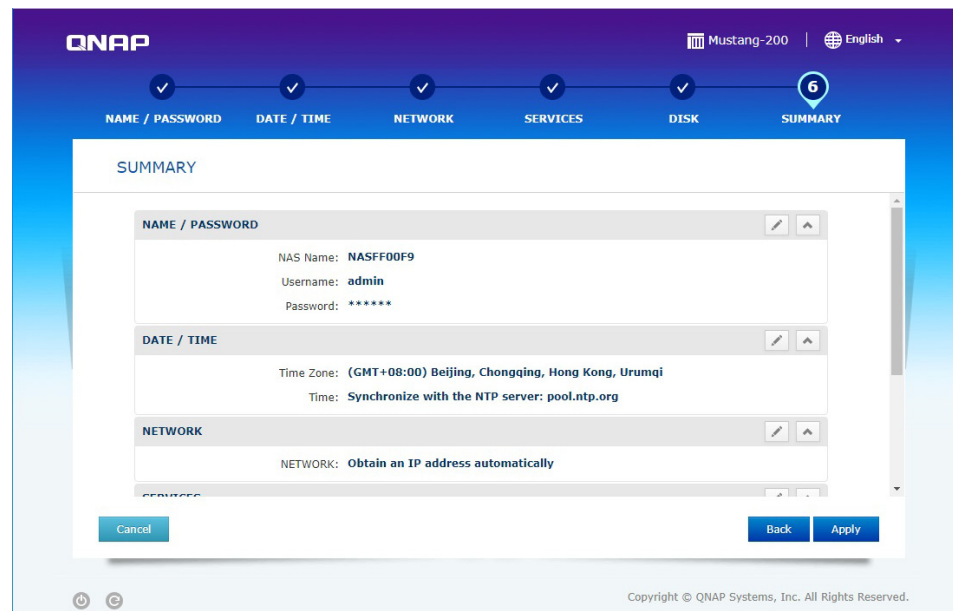


The screenshot shows the QNAP web interface for the Mustang-200. The top navigation bar includes steps: NAME / PASSWORD, DATE / TIME, NETWORK, SERVICES, **DISK** (Step 5), and SUMMARY (Step 6). The main area is titled "Select the disk configuration" with a "Refresh" button. Below this, there's a section for "SATA SSD/HDD" with a table:

<input checked="" type="checkbox"/>	Slot	Model	Type	Bus Type	Capacity
<input checked="" type="checkbox"/>	1	INTEL SSDPEKKW51 109C	SSD	--	476.94 GB

Below the table, there are settings for RAID Type (Single), Hot Spare Drive (Not used), Encrypted Disk Volume (unchecked), and Bad Block Scan (unchecked). A tip box states: "Tip: After selecting the disk configuration and proceeding to the next step, please do NOT remove or install any hard drive(s)." At the bottom are "Cancel", "Back", and "Next" buttons.

Step 11: The summary page appears with configuration information set in the previous steps. Click **Apply** to continue.



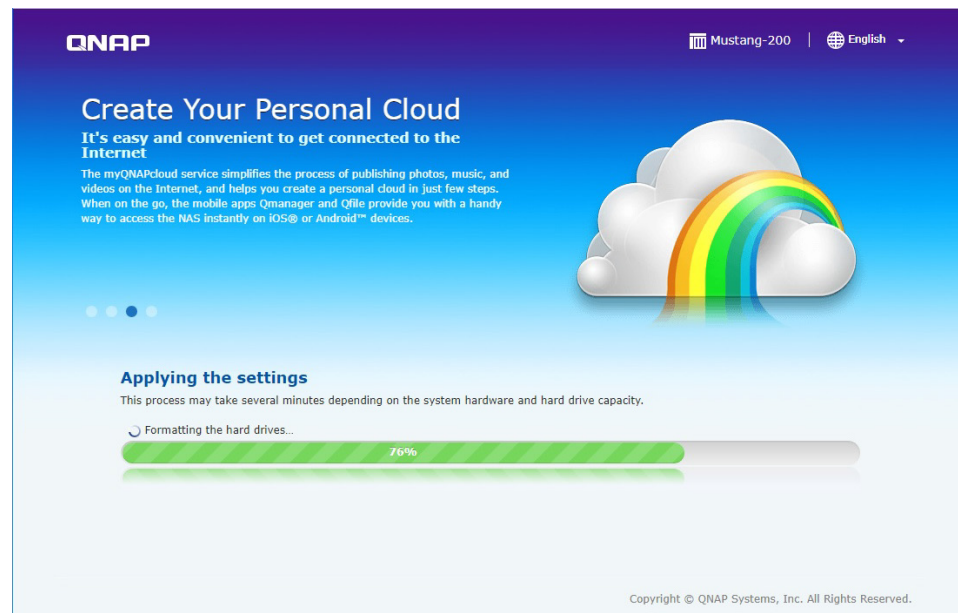
The screenshot shows the QNAP web interface for the Mustang-200. The top navigation bar includes steps: NAME / PASSWORD, DATE / TIME, NETWORK, SERVICES, DISK, and **SUMMARY** (Step 6). The main area is titled "SUMMARY" and displays the configuration for the previous steps:

- NAME / PASSWORD:** NAS Name: NASFF00F9, Username: admin, Password: *****
- DATE / TIME:** Time Zone: (GMT+08:00) Beijing, Chongqing, Hong Kong, Urumqi, Time: Synchronize with the NTP server: pool.ntp.org
- NETWORK:** NETWORK: Obtain an IP address automatically

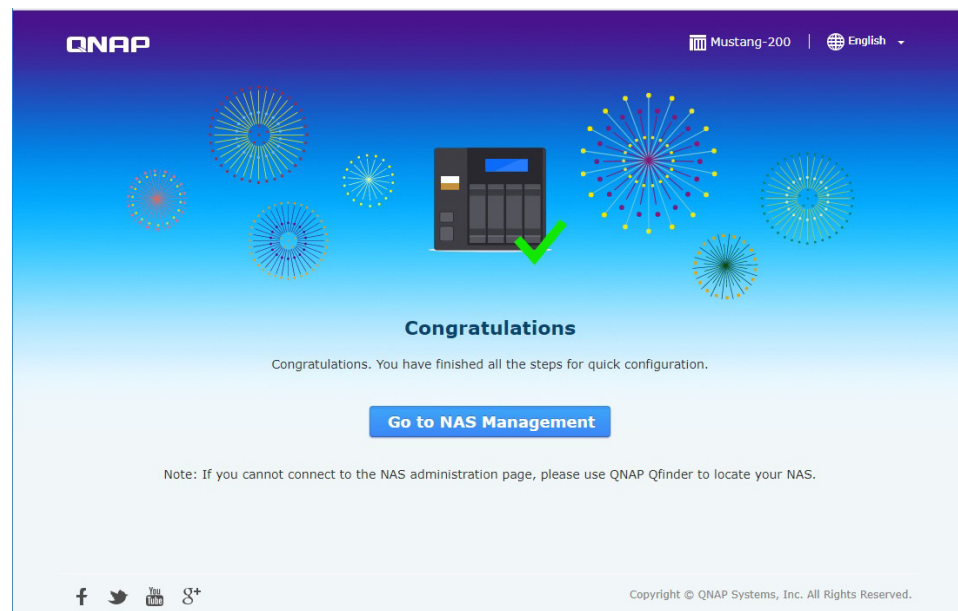
At the bottom are "Cancel", "Back", and "Apply" buttons.

Mustang-200 Computing Accelerator

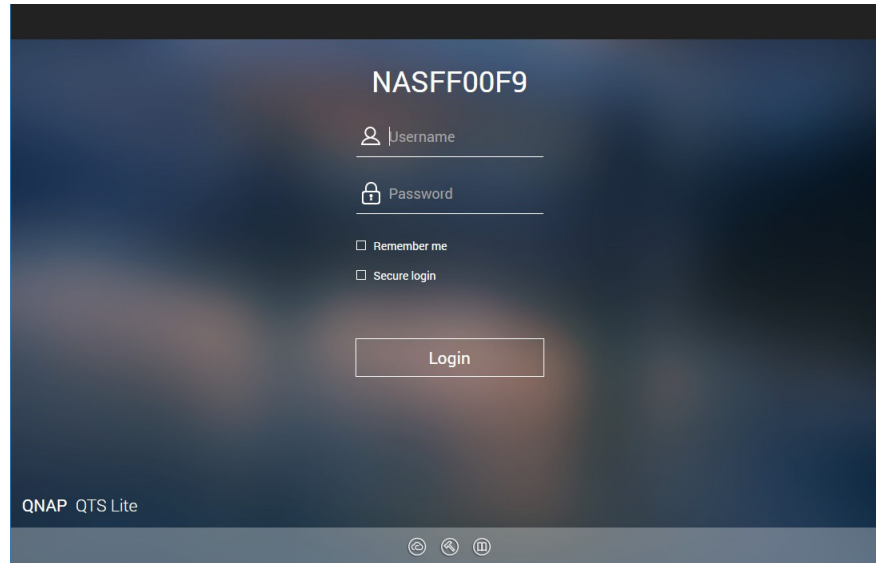
Step 12: The Qfinder Pro setup wizard starts initializing and applying the settings. This process may take several minutes.



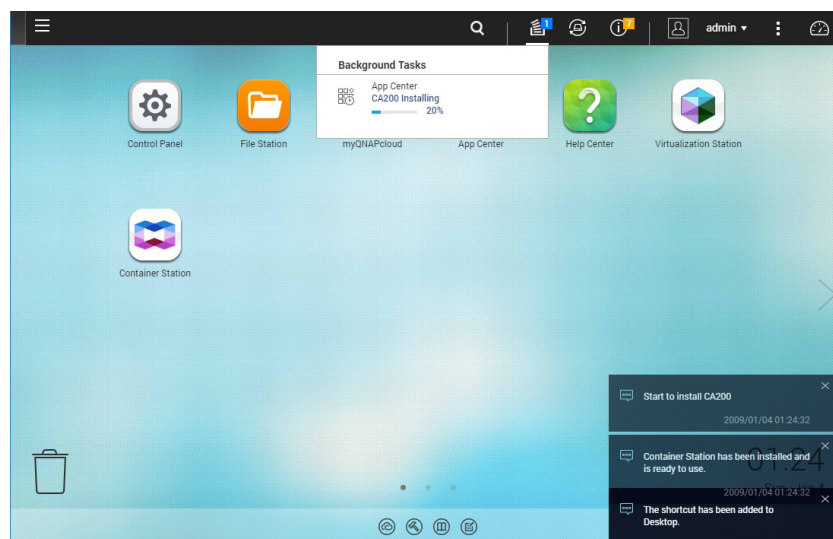
Step 13: The following page appears when the process is complete. Click **Go to NAS Management** to continue.



Step 14: Use QTS Lite account username and password to log in (QTS Lite is the operating system for the Mustang-200). The default username and password are both **admin**.



Step 15: After login, the system automatically starts to install container station and CA200 (MVT) apps. Both container station and MVT program must be installed to complete the initializing process. The following figure shows the Container Station app has been installed and a shortcut has been added to Desktop, and CA200 is being installing.

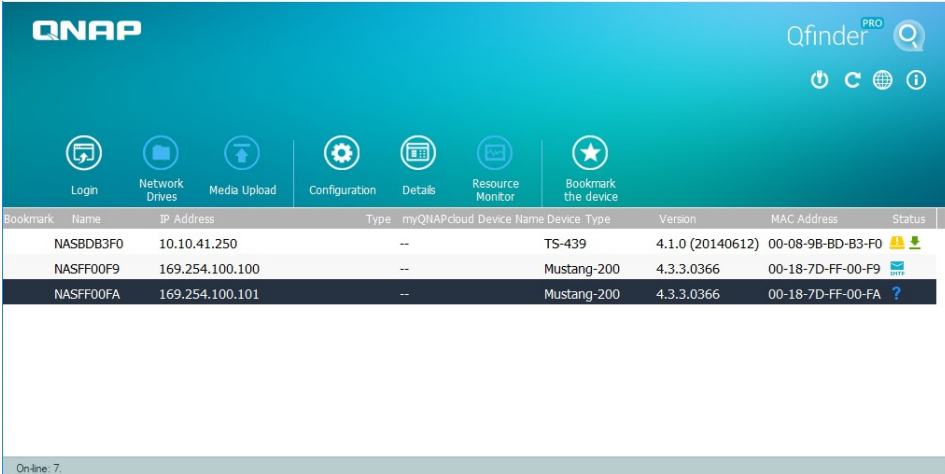


Mustang-200 Computing Accelerator

Step 16: Go back to Qfinder Pro. Double click on another Mustang-200 and follow **Step 5**

~ **Step 15** to complete the initializing process. All Mustang-200 listed in Qfinder

Pro have to be initialized to finish the entire initializing process.



Bookmark	Name	IP Address	Type	myQNAPcloud Device Name	Device Type	Version	MAC Address	Status
	NASBDB3F0	10.10.41.250	--	TS-439		4.1.0 (20140612)	00-08-9B-BD-B3-F0	
	NASFF00F9	169.254.100.100	--	Mustang-200		4.3.3.0366	00-18-7D-FF-00-F9	
	NASFF00FA	169.254.100.101	--	Mustang-200		4.3.3.0366	00-18-7D-FF-00-FA	

Online: 7.

Step 17: Install Mustang-200 Host SDK. See Section 4.3.

Chapter

5

Software Installation (Windows)

Mustang-200 Computing Accelerator

5.1 System Requirements

- Microsoft Windows 10

5.2 Prerequisites

- Make sure the system installed with the Mustang-200 is connected to the network
- Go to <https://download.ieiworld.com>. Search for Mustang-200, and download the MVT_Host_Windows_V1.xx.zip file. Unzip and save the files in the system.

5.3 Installation and Configuration Steps

The following installation steps must be followed.

Step 1: Install the driver and MVT software. See **Section 5.3.1**.

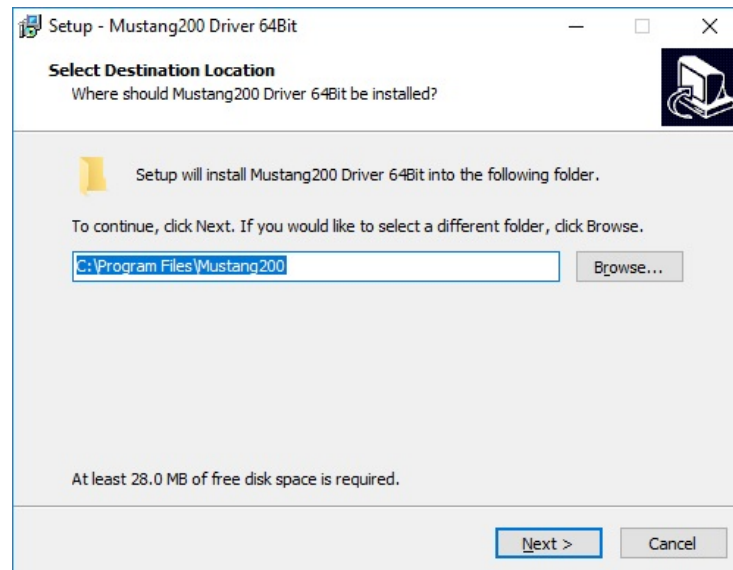
Step 2: Initialize Mustang-200 economic version (skip this procedure for standard version). See **Section 5.3.2**.

Step 3: Install Mustang-200 utility and setup network. See **Section 5.3.3**.

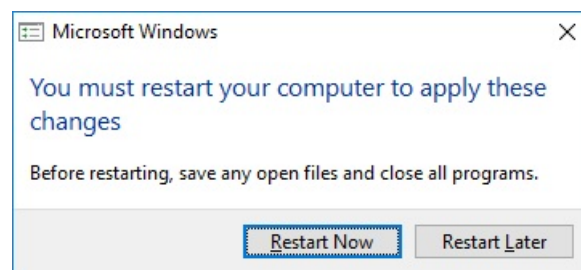
5.3.1 Driver and MVT Software Installation

Step 1: Run the Mustang-200 driver file (Mustang200_Driver_64Bit_v1xx.exe). The driver installation wizard will guide you along the way to complete driver

installation.

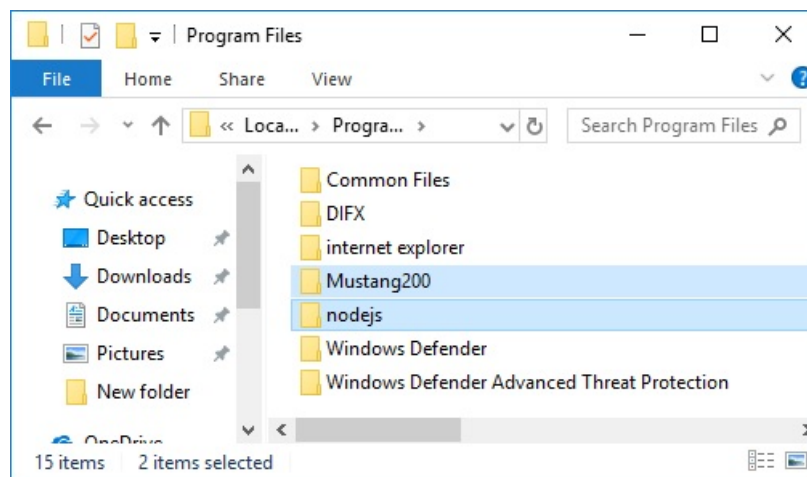
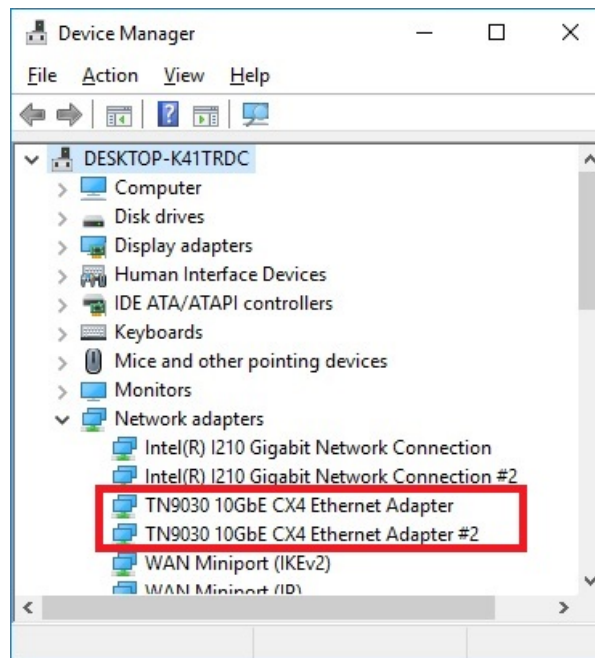


Step 2: Restart the computer to complete the installation.



Step 3: After the installation, two TN9030 Ethernet Adapters will appear in the device manager, and two folders, Mustang200 and nodejs, will be created.

Mustang-200 Computing Accelerator



5.3.2 Initializing (only needed for economic version)

Step 1: Go to <https://www.qnap.com/en/utilities>. Download and install **Qfinder Pro**.

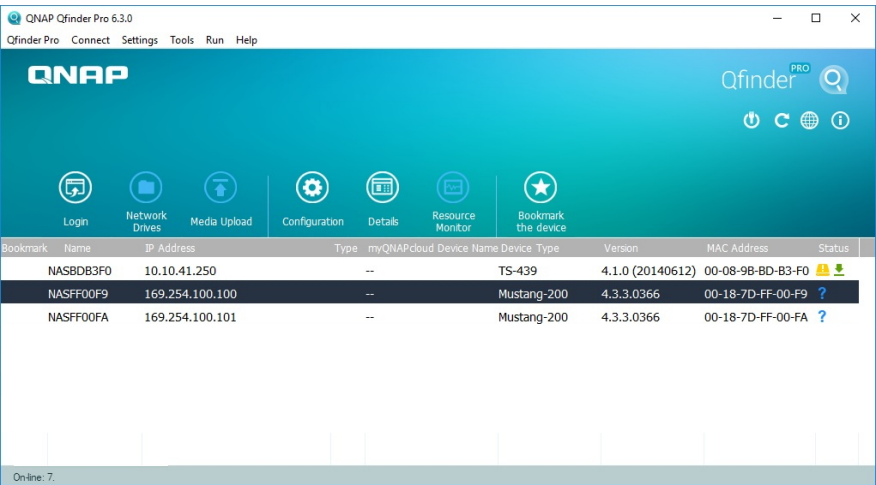


Step 2: Run the Qfinder Pro to search for Mustang-200. Two Mustang-200 will be found for each physical Mustang-200 card. If there are two Mustang-200 installed in the system, the Qfinder Pro will find four Mustang-200. Double click on one of

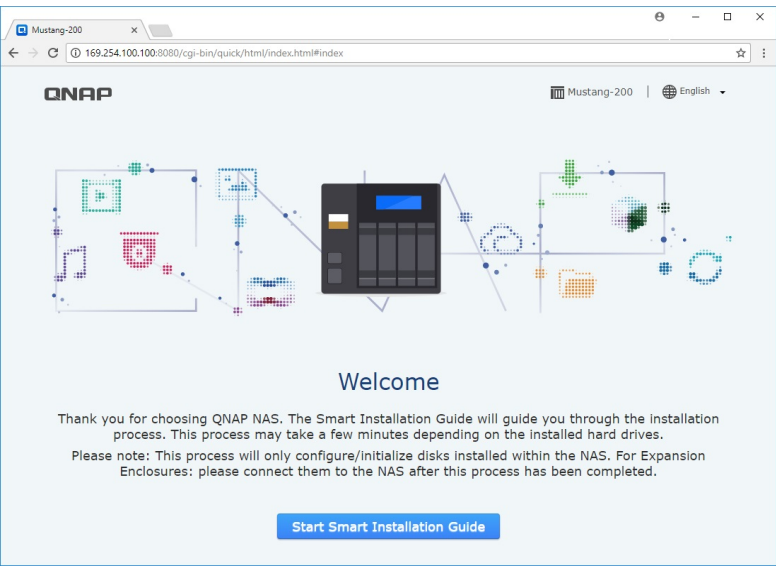


Mustang-200 Computing Accelerator

the Mustang-200 in the Qfinder Pro to start initializing.



Step 3: The Qfinder Pro setup wizard welcome page appears in a web browser. Click **Start Smart Installation Guide**.



Mustang-200 Computing Accelerator

Step 4: The following page appears. Name the NAS and enter the password. The default password is **admin**. Click **Next** to continue.

The screenshot shows the QNAP Mustang-200 setup interface in a web browser. The browser address bar shows the URL: 169.254.100.100:8080/cgi-bin/quick/html/index.html#advanced. The page has a blue header with the QNAP logo and navigation tabs: NAME / PASSWORD, DATE / TIME, NETWORK, SERVICES, DISK, and SUMMARY. A progress bar at the top indicates the current step is 1 (NAME / PASSWORD). The main content area is titled "Enter the NAS name and administrator's password". It contains four input fields: "NAS Name" (with the value "NASFF00F9"), "Username" (with the value "admin"), "Password" (masked with dots), and "Confirm Password" (masked with dots). There is a checkbox labeled "Show password". Below the input fields is a "Tip" box with a lightbulb icon, stating: "Enter a unique name for the NAS in order to identify it quickly. The NAS name supports up to 14 characters which may include alphabets (A-Z and a-z), numbers (0-9) and dash (-). Space and period (.) are not allowed." At the bottom of the form are three buttons: "Cancel", "Back", and "Next". The footer of the page says "Copyright © QNAP Systems, Inc. All Rights Reserved."

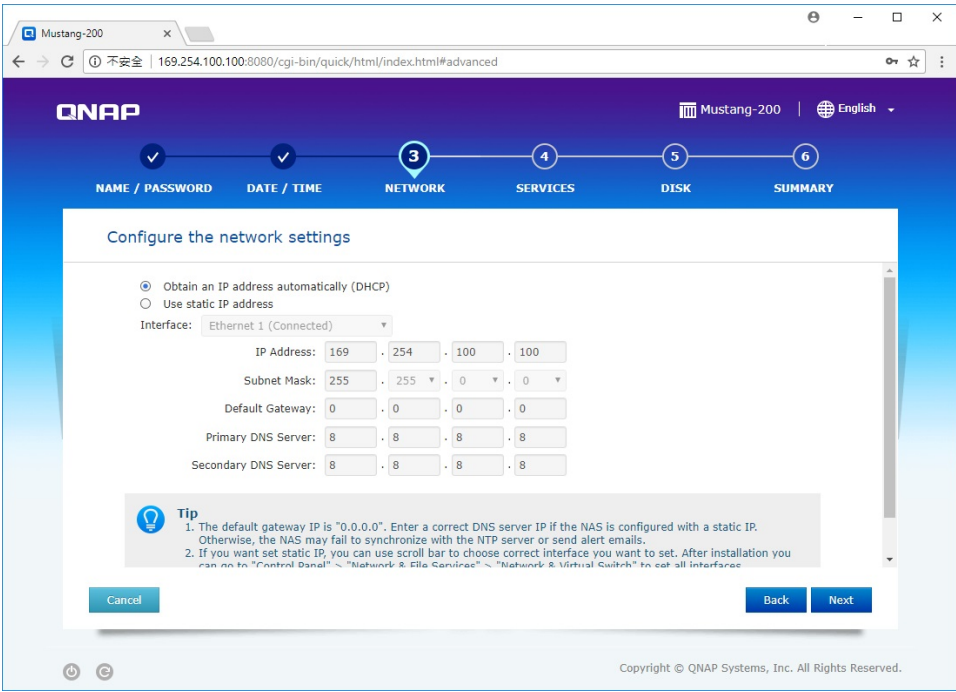
Step 5: Set the date and time. Click **Next** to continue.

The screenshot shows the QNAP Mustang-200 setup interface in a web browser. The browser address bar shows the URL: 169.254.100.100:8080/cgi-bin/quick/html/index.html#advanced. The page has a blue header with the QNAP logo and navigation tabs: NAME / PASSWORD, DATE / TIME, NETWORK, SERVICES, DISK, and SUMMARY. A progress bar at the top indicates the current step is 2 (DATE / TIME). The main content area is titled "Set the date and time". It contains a "Time Zone" dropdown menu (set to "(GMT+08:00) Beijing, Chongqing, Hong Kong, Urumqi"), a "Date / Time" section with three radio buttons: "Same as the computer/device time", "Input Manually", and "Synchronize with an Internet time server automatically" (which is selected). Below the radio buttons are input fields for date (2017/12/25), hour (16), minute (04), and second (57). There is an "NTP Server" input field (set to "pool.ntp.org") and a "Test" button. Below the input fields is a "Tip" box with a lightbulb icon, stating: "Enable 'Synchronize with an Internet time server automatically' to synchronize the server time with the specified NTP server." At the bottom of the form are three buttons: "Cancel", "Back", and "Next". The footer of the page says "Copyright © QNAP Systems, Inc. All Rights Reserved."

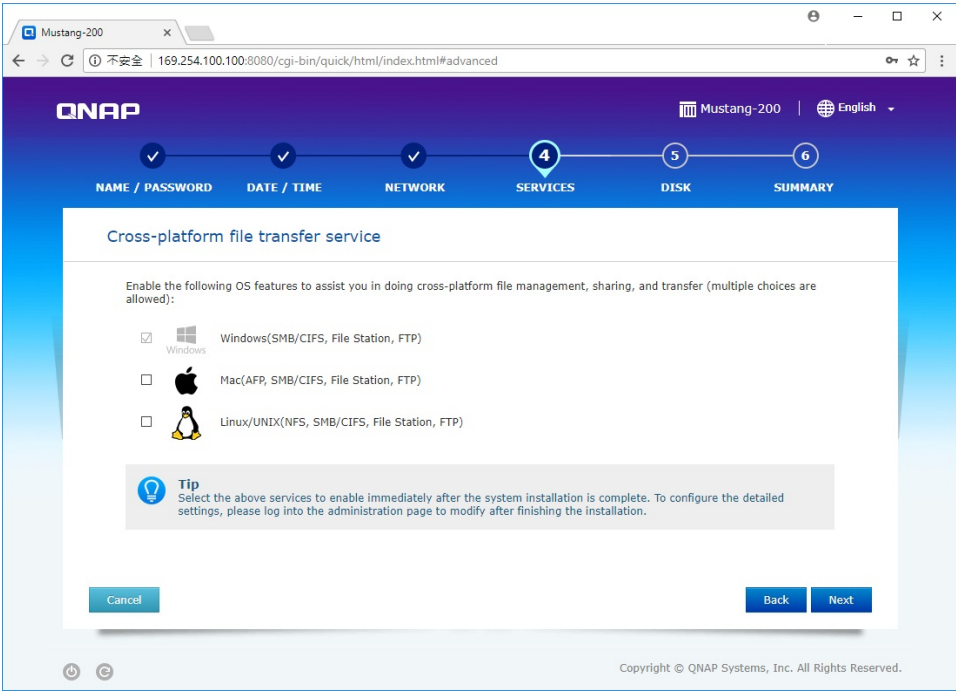


Mustang-200 Computing Accelerator

Step 6: Configure the network settings. It is recommended to select **Obtain an IP address automatically (DHCP)**. Click **Next** to continue.



Step 7: Select cross-platform file transfer services if needed. Click **Next** to continue.



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Step 8: Select the disk configuration. Check to select the installed SSD. Click **Next** to continue.

Mustang-200

NAME / PASSWORD DATE / TIME NETWORK SERVICES DISK SUMMARY

Select the disk configuration

SATA SSD/HDD

<input checked="" type="checkbox"/>	Slot	Model	Type	Bus Type	Capacity
<input checked="" type="checkbox"/>	1	INTEL SSDPEKKW51 109C	SSD	--	476.94 GB

RAID Type: Single (Capacity: 467.44 GB) [Learn More >](#)

Hot Spare Drive: Not used

Encrypted Disk Volume: ☐

Bad Block Scan: ☐

Tip
After selecting the disk configuration and proceeding to the next step, please do NOT remove or install any hard drive(s).

Cancel Back Next

Copyright © QNAP Systems, Inc. All Rights Reserved.

Step 9: The summary page appears with configuration information set in the previous steps. Click **Apply** to continue.

Mustang-200

NAME / PASSWORD DATE / TIME NETWORK SERVICES DISK SUMMARY

SUMMARY

NAME / PASSWORD

NAS Name: NASFF00F9
Username: admin
Password: *****

DATE / TIME

Time Zone: (GMT+08:00) Beijing, Chongqing, Hong Kong, Urumqi
Time: Synchronize with the NTP server: pool.ntp.org

NETWORK

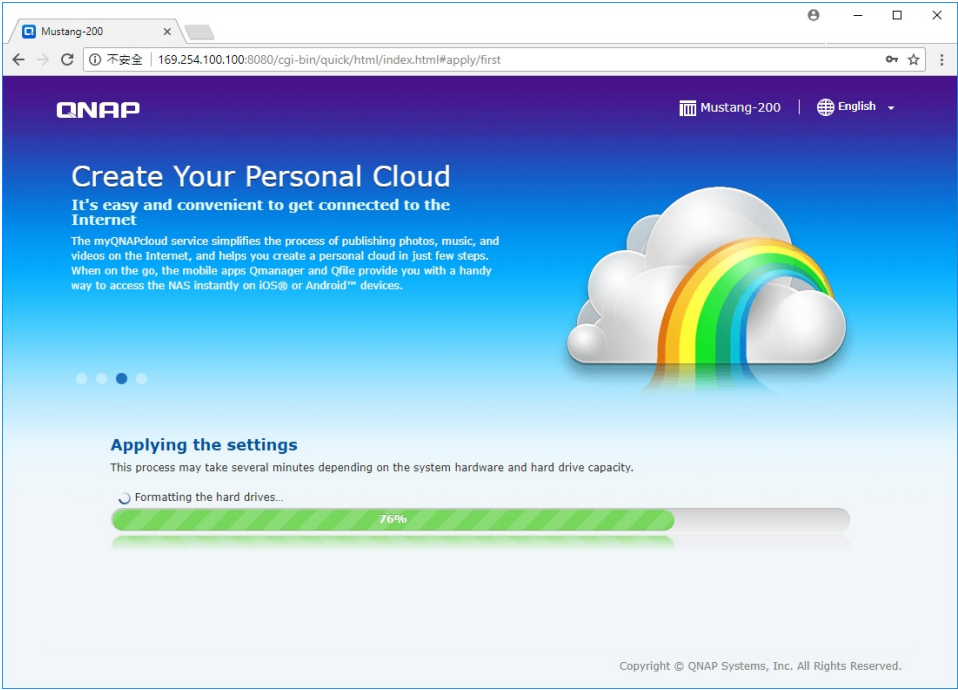
NETWORK: Obtain an IP address automatically

SERVICES

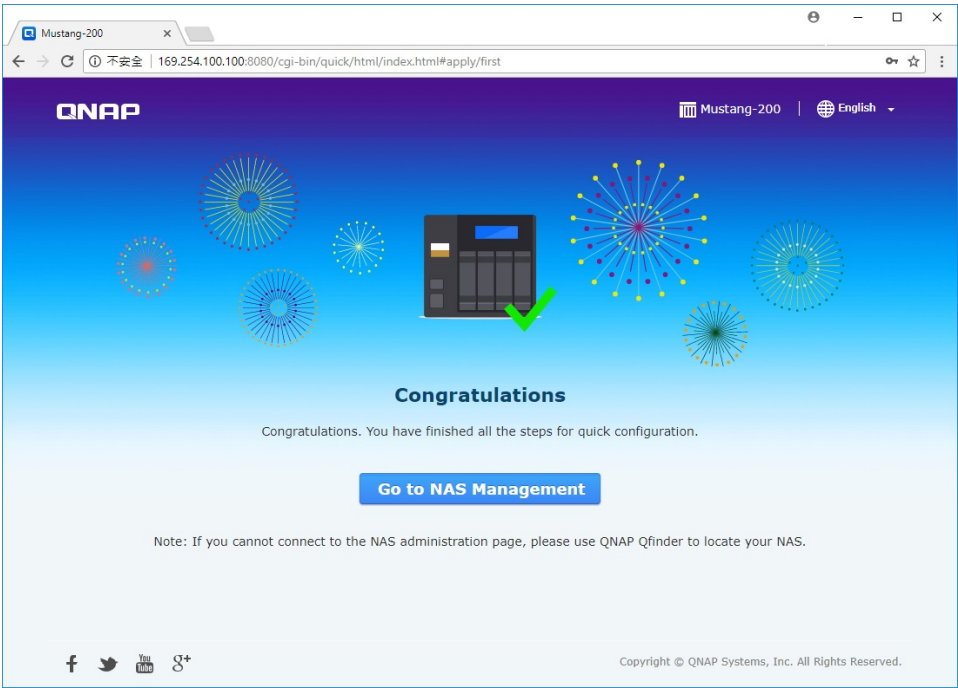
Cancel Back Apply

Copyright © QNAP Systems, Inc. All Rights Reserved.

Step 10: The Qfinder Pro setup wizard starts initializing and applying the settings. This process may take several minutes.

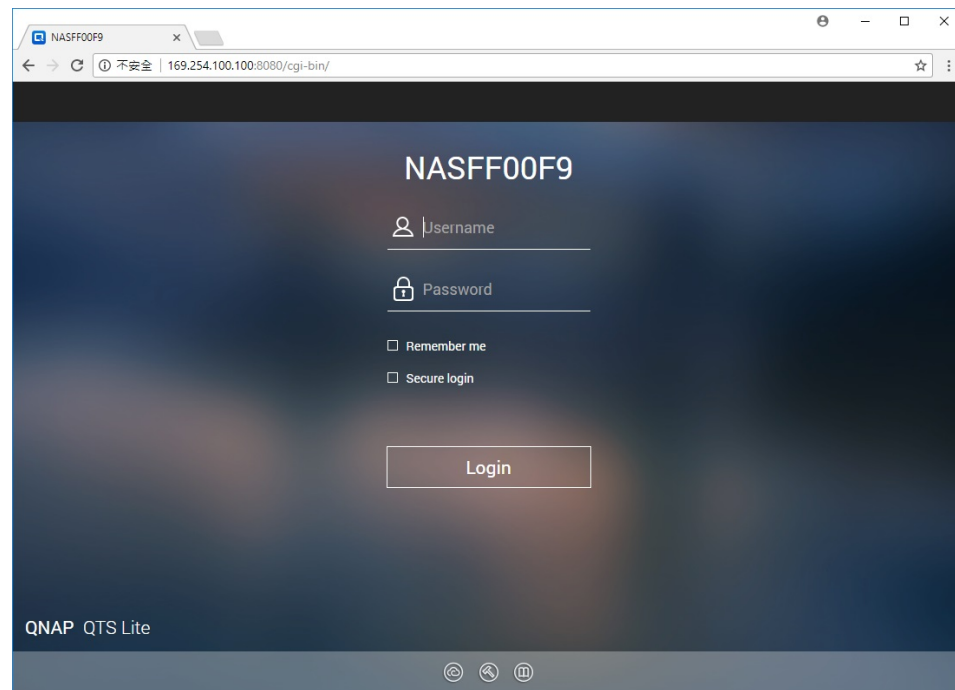


Step 11: The following page appears when the process is complete. Click **Go to NAS Management** to continue.



Mustang-200 Computing Accelerator

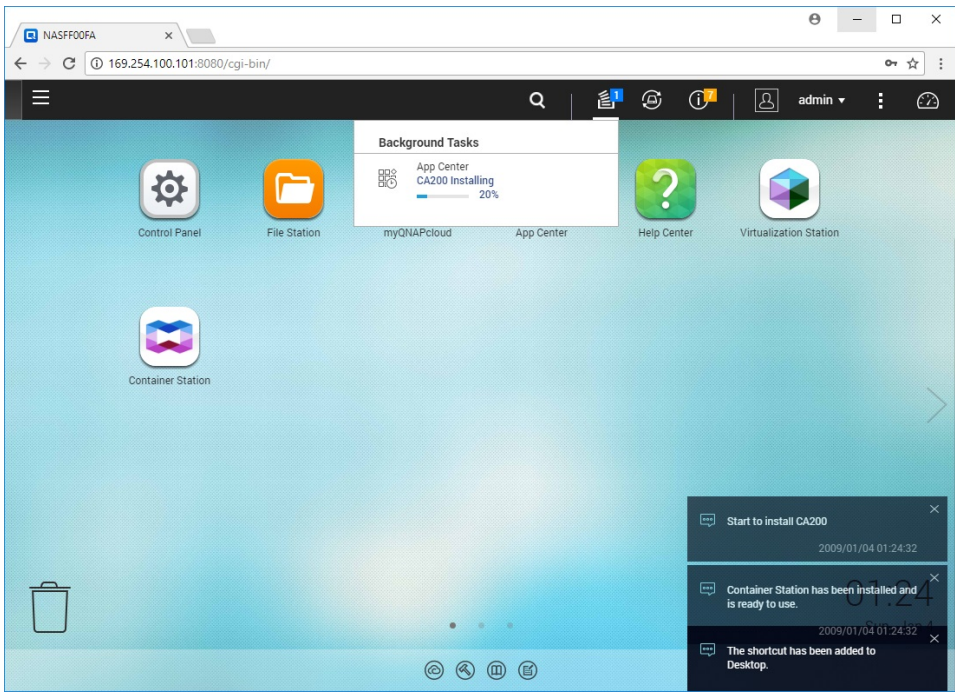
Step 12: Use QTS Lite account username and password to log in (QTS Lite is the operating system for the Mustang-200). The default username and password are both **admin**.



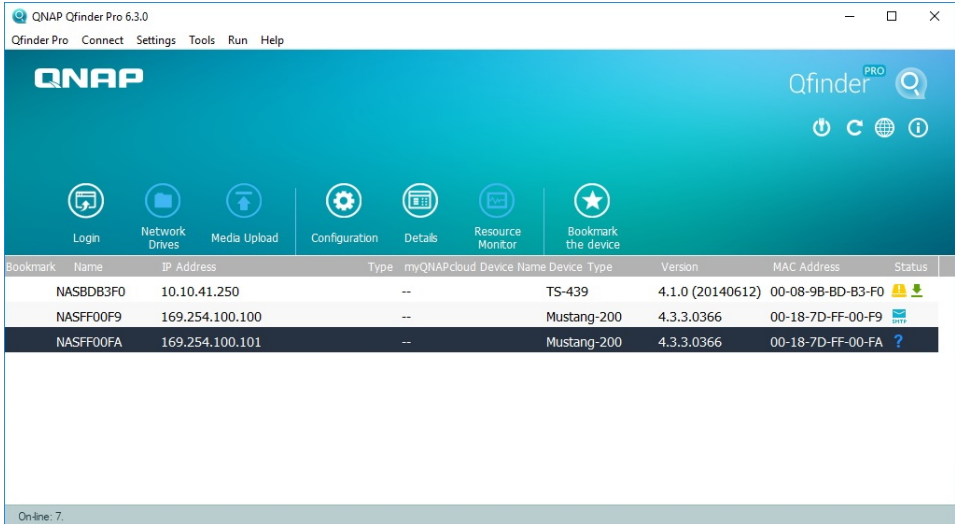
Step 13: After login, the system automatically starts to install container station and CA200 (MVT) apps. Both container station and MVT program must be installed to complete the initializing process. The following figure shows the Container Station app has been installed and a shortcut has been added to Desktop, and CA200 is being installing.



Mustang-200 Computing Accelerator



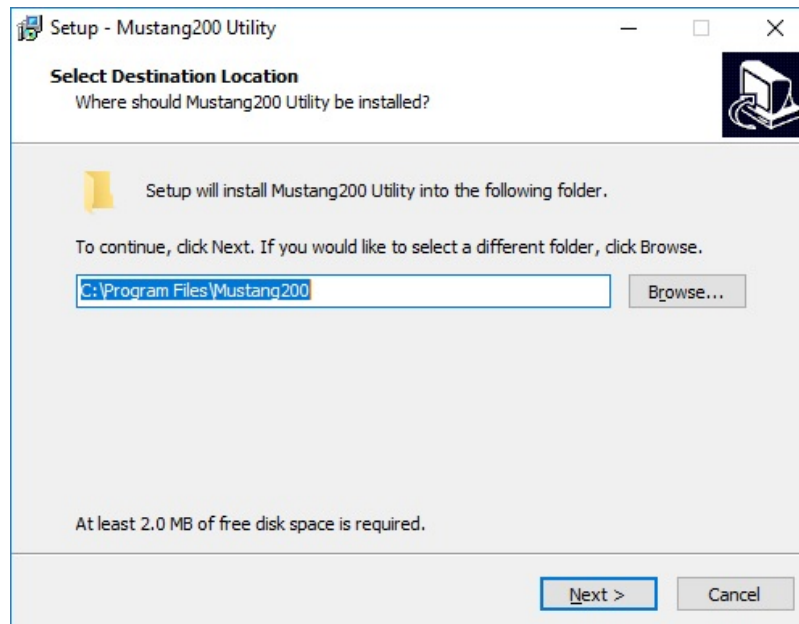
Step 14: Go back to Qfinder Pro. Double click on another Mustang-200 and follow **Step 3 ~ Step 13** to complete the initializing process. All Mustang-200 listed in Qfinder Pro have to be initialized to finish the entire initializing process.



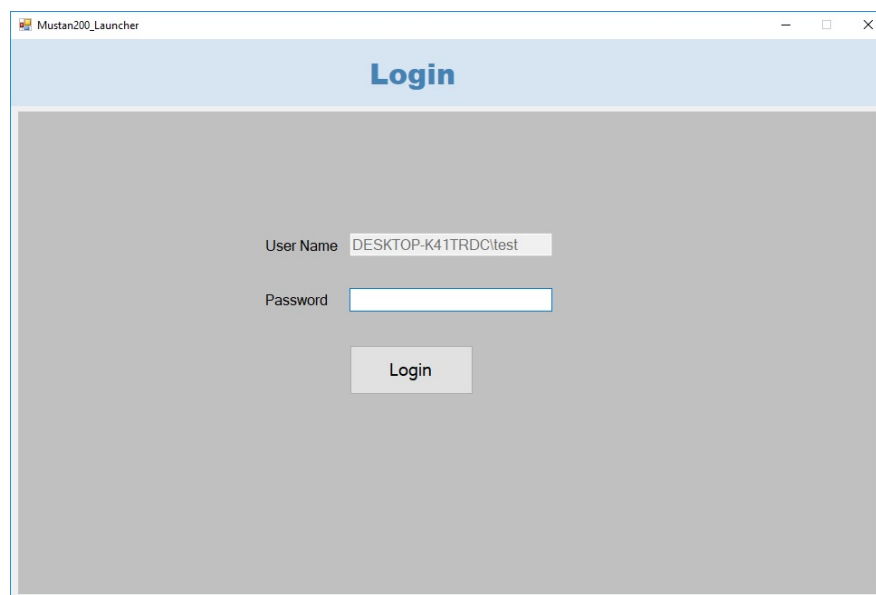
Mustang-200 Computing Accelerator

5.3.3 Mustang-200 Utility Installation and Network Setup

Step 1: Run the Mustang-200 utility file (Mustang200_Utility_v1xx.exe). The utility installation wizard will guide you along the way to complete the installation.

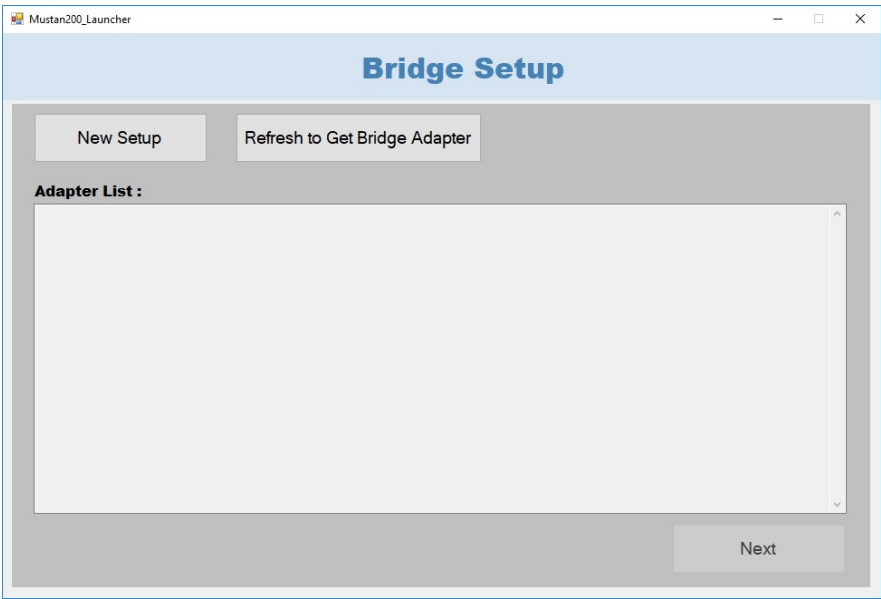


Step 2: Run the utility and log in using the password of the computer installed with Mustang-200. The password field should not be left blank. If there is no password for the computer, create one for it.

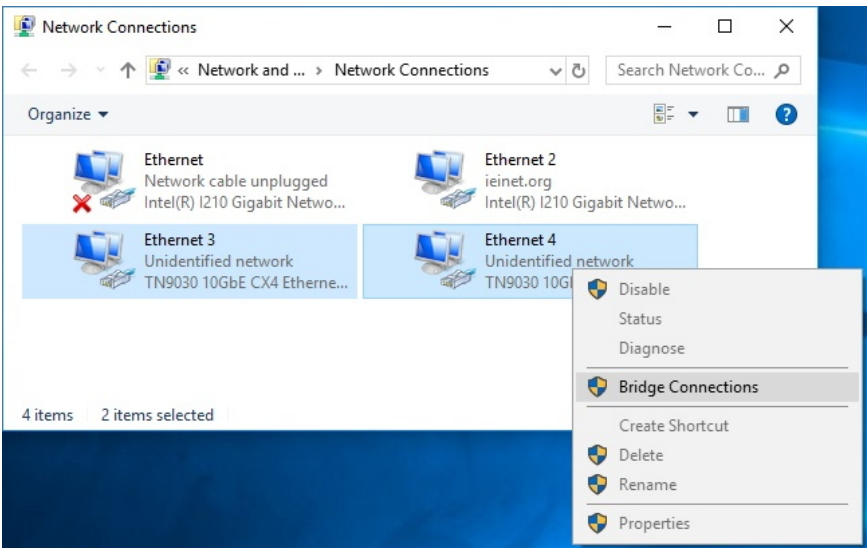




Step 3: The following window appears.

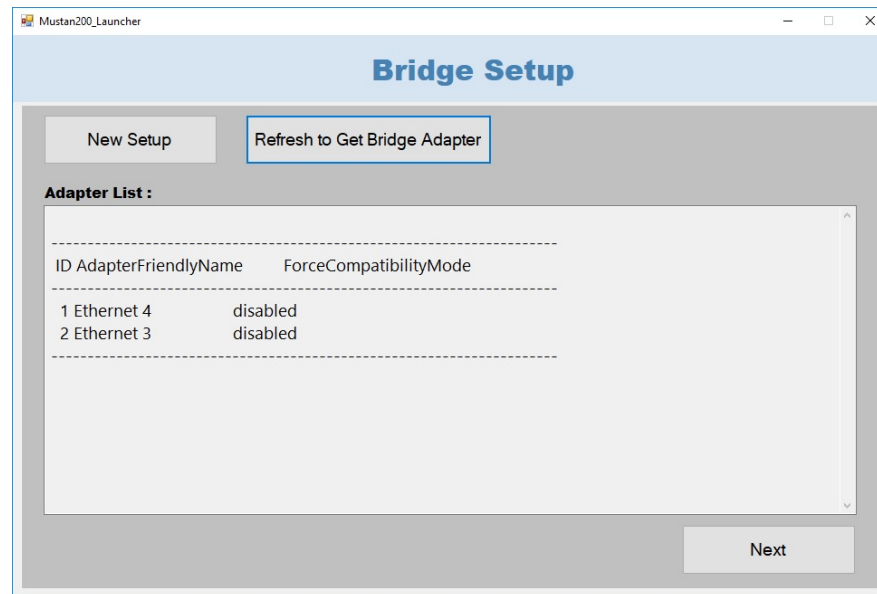


Step 4: For the first time user, please setup network bridge by following the procedures below. Use the **Windows key + X** to open the Power User menu and select Network Connections. Select both TN9030 Ethernet adapters. Right click the selection and click **Bridge Connections**.

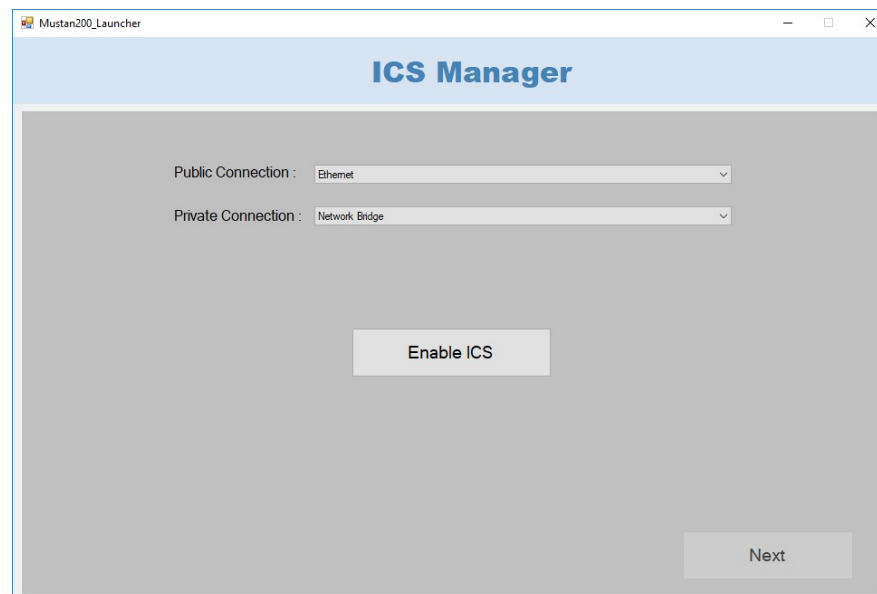


Mustang-200 Computing Accelerator

Step 5: Click **Refresh to Get Bridge Adapter**. The two Ethernet adapters are added in the list. Click **Next** to continue.



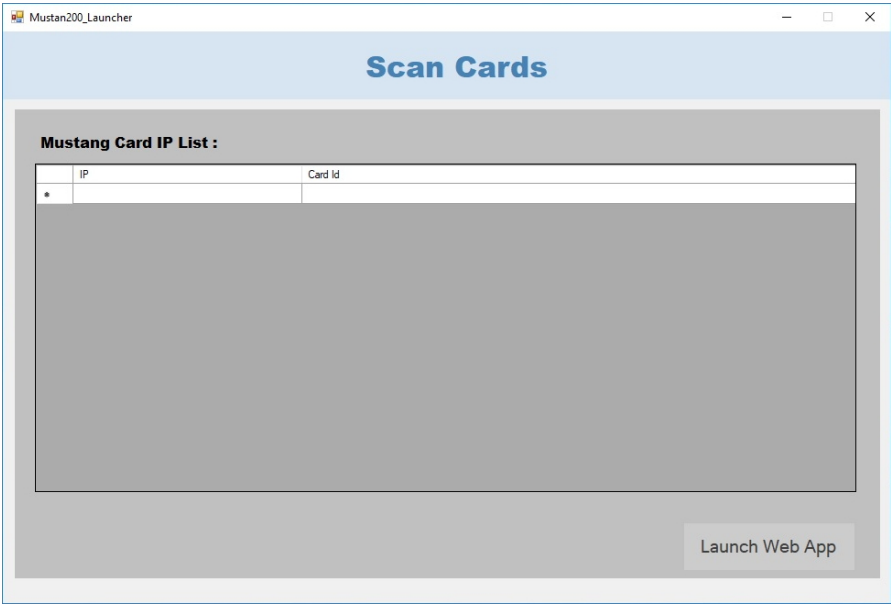
Step 6: Select a interface (Ethernet) for public connection; select the bridge (Network Bridge) setup in the previous steps for private connection. Click the **Enable ICS** button. Then, click **Next** to continue.



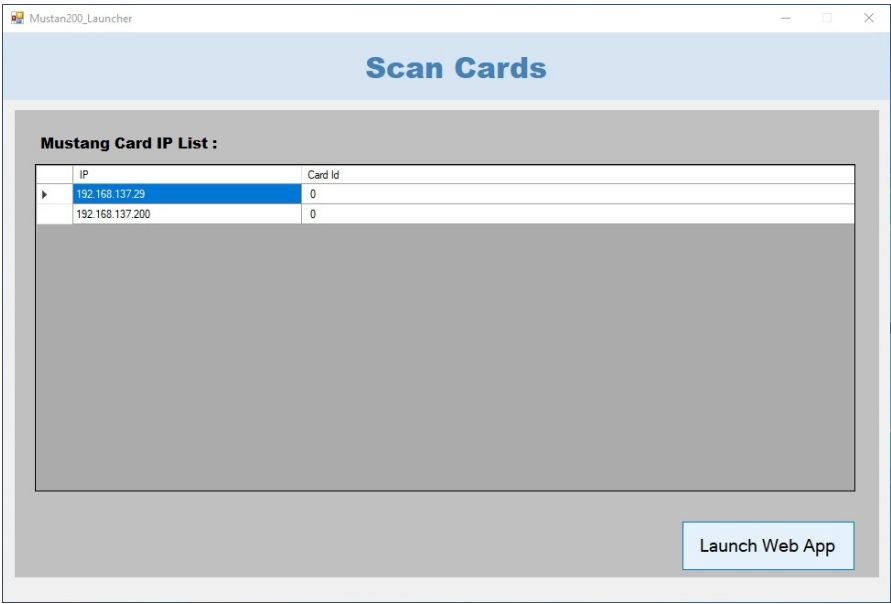


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Step 7: The following screen appears. The program automatically starts getting the IP address of the Mustang-200.



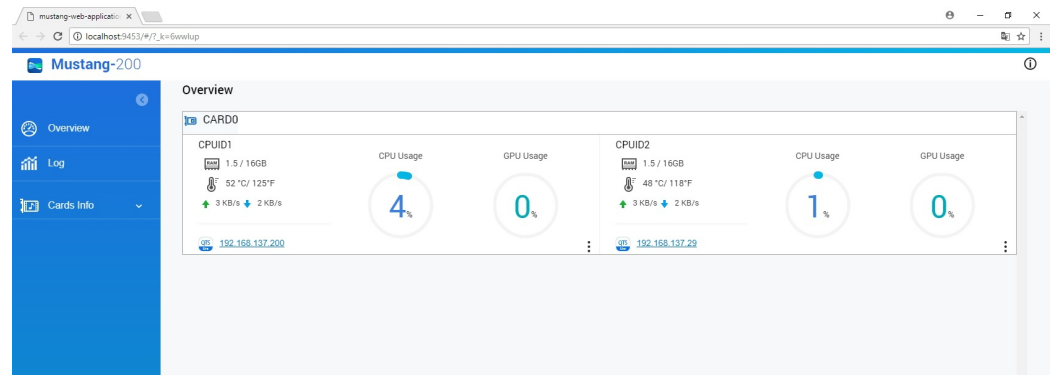
Step 8: The IP addresses of all Mustang-200 cards installed in the computer will be listed (two IP addresses per card). Click the **Launch Web App** button.



Mustang-200 Computing Accelerator

Step 9: The Mustang-200 web application will be opened automatically in a web page.

Refer to **Chapter 6** for more detail about the web application.



Chapter

6

Web Application

Mustang-200 Computing Accelerator

6.1 Web Application Introduction

The Mustang-200 Web Application handles all the features of Mustang-200. It was developed based on the Host API. So developers can refer to this application to call APIs in their application. It is released under open source license, allowing users to modify it to meet their requirements.

The Web Application is capable of handling multiple Mustang-200 cards. The user can manage and monitor all of the cards using this application. Also you can navigate to the Mustang-200 operating system named QTS Lite by clicking the QTS icon in the application. QTS Lite is a lightweight custom operation system developed by QNAP.

The Web Application is capable of VOD (file to live), Live (live to live) and File (file to file) scenarios. Each transcoding scenario can be created using simple wizard steps. The Web Application also builds with Media Player to view the video when VOD or Live job that is running.

6.2 Developer Installation Guide

The IEI Web Application is developed based on React JS and Node JS Frameworks. It allows developers to modify it to meet their requirements. To modify the application, follow the guide below.

Step 1: Install Mustang-200 Host SDK as described in **Chapter 4**.

Step 2: Go to <https://download.ieiworld.com>. Search for Mustang-200, and download **MVT_Web application_V1.xx.zip**. Unzip and save the **MVT_Web application_V1.xx** folder inside a path in the system.

Step 3: Run with debug mode (developer's PC).

- 1) Set file: `"/src/js/config/appConfig.js"` parameter → `"const DebugUse=true;"`
`appConfigHead.HOST_API.host = host Ip appConfigHead.HOST_API.port = host port`
- 2) `npm run dev`
- 3) Open local web page: url is localhost:8080

```
appConfig.js — C:\Project\Mustang-Video-Transcode-Web-Application-master\Mustang-Video-Transcode-Web-Application-master — Atom
File Edit View Selection Find Packages Help

Project
└─ Mustang-Video-Transcode-Web-Application-ma
  └─ node_modules
  └─ public
  └─ src
    └─ js
      └─ api
      └─ components
      └─ config
        └─ appConfig.js
        └─ cardInfo.js
        └─ index.js
        └─ taskConfig.js
      └─ css
      └─ pages
      └─ client.js
      └─ readme_img
      └─ package-lock.json
      └─ package.json
      └─ README.md

appConfig.js
1
2
3 const DebugUse=true;//false;
4 // More Special ----- 2017-07-10
5 const appConfigHead = {
6   // connection status text references
7   HOST_API: {
8     host:"10.10.70.145",//"127.0.0.1"
9     port:9453,
10    mainPath:"/mvt/api/v1"
11  }
12 };
13 export const routeResp = {
14   Result:"result",//success/fail
15   Data:"msg",//return data
16   SuccessResult:"Success",
17   FailResult:"Fail",
18 }
19 const HOST_API_URL_HEAD= DebugUse?("http://" +appConfigHead.HOST_API.host+
20
21 export const appConfig = {
22
```

Step 4: Run in host sever

- 1) Set file: "/src/js/config/appConfig.js" parameter → "const DebugUse=false;"
- 2) Modify DebugUse and host IP
- 3) `npm run build_dev`
- 4) Copy the application's "/mustang-web-application-master/public" folder to replace the "/mvt_host/public" folder of Host SDK.
- 5) Open web page: url is hostIP:hostPort

```
Project — C:\Project\Mustang-Video-Transcode-Web-Application-master\Mustang-Video-Transcode-Web-A
File Edit View Selection Find Packages Help

Project
└─ Mustang-Video-Transcode-Web-Application-ma
  └─ node_modules
  └─ public
  └─ src
    └─ js
      └─ api
      └─ components
      └─ config
        └─ appConfig.js

appConfig.js
1
2
3 const DebugUse=false;//false;
4 // More Special ----- 2017-07-10
5 const appConfigHead = {
6   // connection status text references
7   HOST_API: {
8     host:"127.0.0.1",//"127.0.0.1"
9     port:9453,
10    mainPath:"/mvt/api/v1"
11  }

```


Mustang-200 Computing Accelerator

6.3 How to Access

To access IEI web application without changing its function, follow the guide below.

6.3.1 Linux System

Prerequisites:

Install Mustang-200 Host SDK as described in **Chapter 4**.

How to:

Open a web page in Google Chrome browser and type the URL which is **hostIP:hostPort** (e.g. 10.10.70.42:9453)

6.3.2 Windows System

Prerequisites:

Install Mustang-200 driver and utility as described in **Chapter 5**.

How to:

Open a web page in Google Chrome browser and type the URL which is **hostIP:hostPort** (e.g. 10.10.70.42:9453)

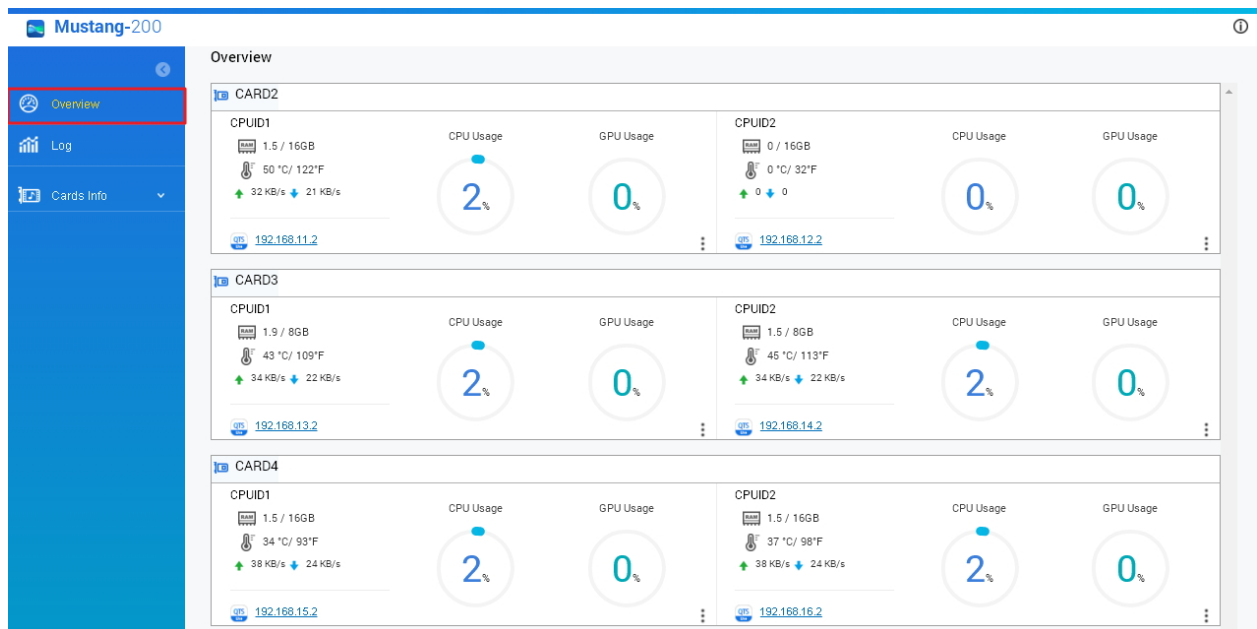
6.4 Interface Overview

The Web Application has four main pages that provide users entire streaming application needs.

6.4.1 Overview

The Overview page provides a whole picture of system status which include

- Number of cards installed in the system.
- Individual CPU and GPU usage.
- System information (including RAM, temperature, speed and IP addresses).
- Navigating to individual CPU




NOTE:



Users can login to QTS Lite OS by clicking the IP address link. The default username and password for QTS login are:

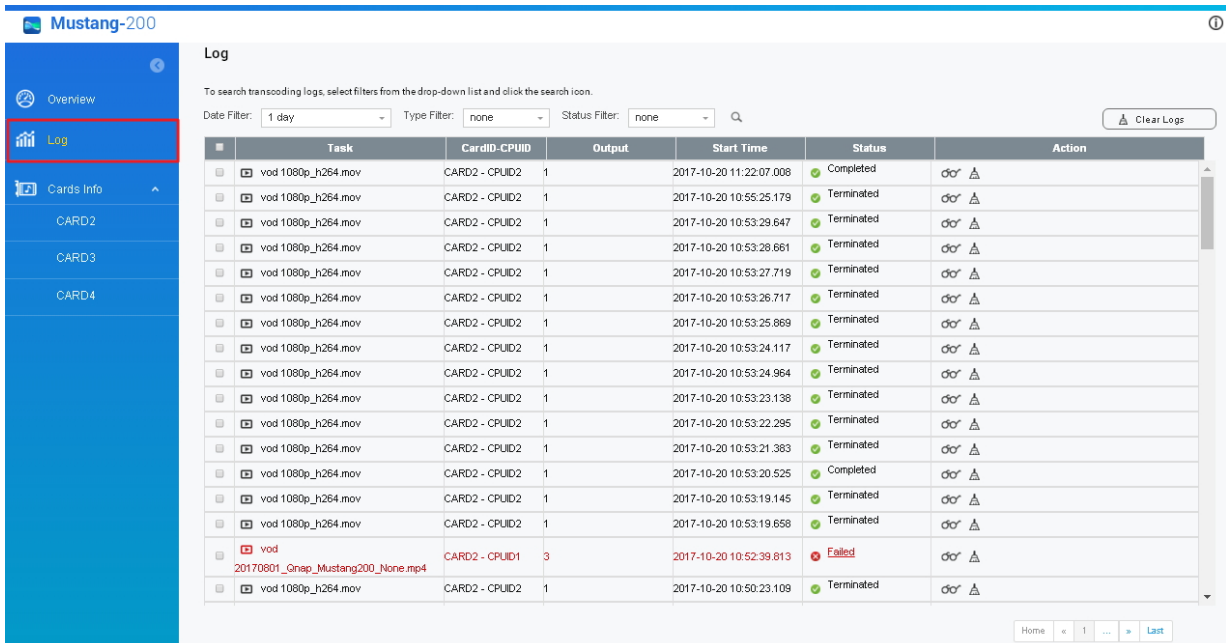
- **Username:** admin
- **Password:** admin

Mustang-200 Computing Accelerator

6.4.2 Log

The Log page shows the log of the tasks. The user can search a log by using the filter and clicking  on the page. The History page gives the following task information:


- Task name
- Card ID
- Output
- Start time
- Status
- Action (click  to view the transcoding summary; click  icon to clear the log)






















































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Log

To search transcoding logs, select filters from the drop-down list and click the search icon.


Date Filter: 1 day Type Filter: none Status Filter: none  [Clear Logs](#)

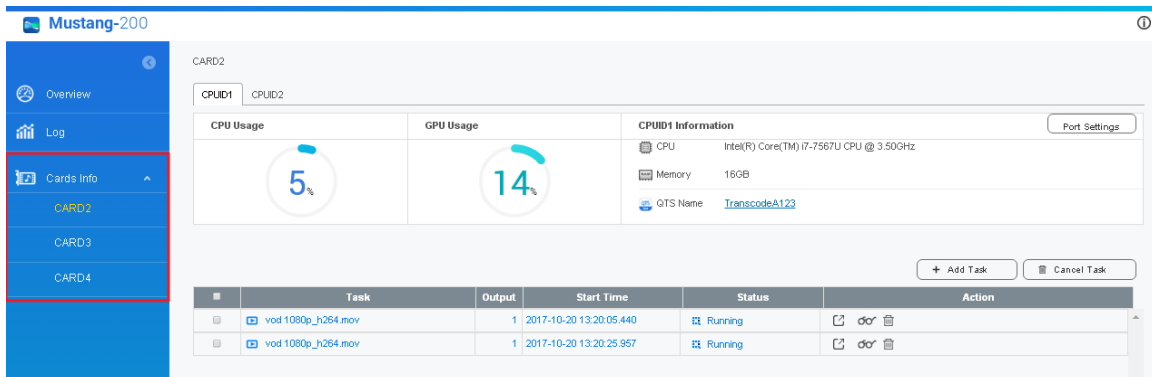
Task	CardID-CPUID	Output	Start Time	Status	Action
 vod 1080p_h264.mov	CARD2 - CPUID2	1	2017-10-20 11:22:07.008	Completed	 
 vod 1080p_h264.mov	CARD2 - CPUID2	1	2017-10-20 10:55:25.179	Terminated	 
 vod 1080p_h264.mov	CARD2 - CPUID2	1	2017-10-20 10:53:29.647	Terminated	 
 vod 1080p_h264.mov	CARD2 - CPUID2	1	2017-10-20 10:53:28.661	Terminated	 
 vod 1080p_h264.mov	CARD2 - CPUID2	1	2017-10-20 10:53:27.719	Terminated	 
 vod 1080p_h264.mov	CARD2 - CPUID2	1	2017-10-20 10:53:26.717	Terminated	 
 vod 1080p_h264.mov	CARD2 - CPUID2	1	2017-10-20 10:53:25.869	Terminated	 
 vod 1080p_h264.mov	CARD2 - CPUID2	1	2017-10-20 10:53:24.117	Terminated	 
 vod 1080p_h264.mov	CARD2 - CPUID2	1	2017-10-20 10:53:24.964	Terminated	 
 vod 1080p_h264.mov	CARD2 - CPUID2	1	2017-10-20 10:53:23.138	Terminated	 
 vod 1080p_h264.mov	CARD2 - CPUID2	1	2017-10-20 10:53:22.295	Terminated	 
 vod 1080p_h264.mov	CARD2 - CPUID2	1	2017-10-20 10:53:21.383	Terminated	 
 vod 1080p_h264.mov	CARD2 - CPUID2	1	2017-10-20 10:53:20.525	Completed	 
 vod 1080p_h264.mov	CARD2 - CPUID2	1	2017-10-20 10:53:19.145	Terminated	 
 vod 1080p_h264.mov	CARD2 - CPUID2	1	2017-10-20 10:53:19.658	Terminated	 
 vod 20170801_Onap_Mustang200_None.mp4	CARD2 - CPUID1	3	2017-10-20 10:52:39.813	Failed	 
 vod 1080p_h264.mov	CARD2 - CPUID2	1	2017-10-20 10:50:23.109	Terminated	 

Home < 1 > Last









6.4.3 Cards Info

The Cards Info pages show information about individual cards. The user can also assign task in this page. It card page gives the following information:

- Card ID
- CPU and GPU usage
- CPU information:
 - CPU
 - Memory
 - QTS Name: Login to QTS OS by clicking the link. Name can be edited by rolling over the original name and clicking  icon.
- Port settings (see **Section 6.4.3.1**)
- Tasks and task status
- Add/Cancel tasks (see **Section 6.4.3.2**) and clear logs



The screenshot displays the Mustang-200 interface for CARD2. The left sidebar shows navigation options: Overview, Log, Cards Info (selected), and sub-items for CARD2, CARD3, and CARD4. The main content area for CARD2 includes tabs for CPUID1 and CPUID2. Below these are two circular gauges for CPU Usage (5%) and GPU Usage (14%). To the right is a 'CPUID1 Information' section with a 'Port Settings' button, showing details for CPU (Intel(R) Core(TM) i7-7567U CPU @ 3.50GHz), Memory (16GB), and QTS Name (TranscodeA123). At the bottom is a table of tasks with columns for Task, Output, Start Time, Status, and Action. Two tasks are listed, both running.

	Task	Output	Start Time	Status	Action
<input type="checkbox"/>	 vod 1080p_h264.mov	1	2017-10-20 13:20:05.440	 Running	 
<input type="checkbox"/>	 vod 1080p_h264.mov	1	2017-10-20 13:20:25.957	 Running	 



NOTE:

The task logs displayed on this page will be eliminated automatically after few minutes. To check the log history, please go to the Log page.

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6.4.3.1 Port Settings

This is a sub page from the card page. After clicking the **Port Settings** button, the Port Settings page will appear with the network information regarding how this card is connected to host system. The Port Settings page contains the following information:

- Card ID and CPU ID
- QTS name
- IP addresses
- Port information for QTS and protocols (Icecast, RTMP, HTTP)

Port Settings

Setup a unique port for each service of Mustang-200.

To check the ports that are assigned to other cards, see the Port Information below.

ID:	CARD2	QTS-Lite Port:	8310
CPU ID:	CPUID1	Ice Cast Port:	8100
QTS Name:	TranscodeA123	RTMP Port:	1936
IP Address:	192.168.11.2	HTTP Port:	8020


Port Information

Card ID	CPUID (QTS Name)	QTS-Lite Port	Ice Cast Port	RTMP Port	HTTP Port
CARD2	CPUID1(TranscodeA123)	8310	8100	1936	8020
CARD3	CPUID1(TranscodeDDD)	8312	8102	1938	8022
CARD4	CPUID1(Transcode)	8314	8104	1940	8024

CLOSE



NOTE:

The Icecast, RTMP, HTTP and QTS ports can be changed by rolling over the blue port numbers on the page and clicking  icon. Please be noted that setup a unique port for each service of the card. To check the ports that are assigned to other cards, see the Port Information table.



6.4.3.2 Add Task

This is a sub page from the card page. After clicking the Add Task button to add new task, this wizard page will appear. A sequence of wizard steps will guide the user to setup transcoding tasks.

- Select the task type and the file path
- Output Format Setting (including protocols, file type, video & audio codec information)
- Output Quality Settings (including resolution, frame rate and bitrate / QP value)
- Summary

Detailed description of adding a transcoding task can be found in **Section 6.6**.

Add Task on CPUID1

1 Select a Task

2 Output Format Setting

3 Output Quality Setting

4 Summary

VOD, Live and File transcoding types are available. Quick transcode function is only for "File" transcoding.

Task Type:

VOD

Quick Transcode:

☐

Select File:

Path

Video Codec/ Bitrate(KB/S):

Audio Codec/ Bitrate(KHz):

Resolution:

FPS:

File Size:

Duration:

Cancel

Next



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6.5 Transcoding Specifications

The table below lists the transcoding specifications supported by the web application of the Mustang-200.

Video File Format	H.264/MPEG-4/AVC H.265/HEVC /UHD/4K VP8 VP9 MPEC2
Audio File Format	AAC MP3 Vorbis Copy Disable
Streaming Format	RTMP HLS MPEG-DASH ICECAST
Resolutions	3840 x 2160 2560 x 1440 1920 x 1080 1280 x 720 858 x 480 640 x 360 426 x 249
Video Bit Rate	1 Mbps ~25 Mbps
Frame Rate	24 fps ~ 60 fps
QP Value	1 ~ 50

Table 6-1: Transcoding Specifications

6.6 Examples

The following sections give step-by-step examples to help users learn to use the web application to assign transcoding tasks.

6.6.1 VOD Transcoding

The following example will teach you how to transcoding 4K HEVC to 4K H.264 codec for VOD RTMP streaming.

Step 1: Click **Add Task** on Card Page.

The screenshot shows the Mustang-200 web interface. On the left is a blue sidebar with navigation links: Overview, Log, Cards Info, and a sub-menu for CARD2, CARD3, and CARD4. The main content area is titled 'CARD2' and contains several sections: CPUID1 and CPUID2 tabs, CPU Usage (5%), GPU Usage (14%), and CPUID1 Information (CPU: Intel(R) Core(TM) i7-7567U CPU @ 3.50GHz, Memory: 16GB, QTS Name: TranscodeA123). Below these is a table of tasks with columns: Task, Output, Start Time, Status, and Action. Two tasks are listed, both with status 'Running'. A red box highlights the '+ Add Task' button in the top right corner of the task table area.

Task	Output	Start Time	Status	Action
vod 1080p_h264.mov	1	2017-10-20 13:20:05.440	Running	
vod 1080p_h264.mov	1	2017-10-20 13:20:25.957	Running	

Step 2: Select a Task

- 1) Select Task Type as VOD
- 2) Browse and choose 4K input file (To select a folder, double-click on it). Once a file is selected it will display the file information.
- 3) Click **Next** to continue.

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Add Task on CPUID1

1 Select a Task 2 Output Format Setting 3 Output Quality Setting 4 Summary

VOD, Live and File transcoding types are available. Quick transcode function is only for "File" transcoding.

Task Type: VOD Quick Transcode: ☐

Select File: FILEPATHFORFLOWSHOW/


Video Codec/ Bitrate(KB/S): AVC / 38.4 Mb/s
Audio Codec/ Bitrate(KHz): AAC / 44.1 kHz
Resolution: 7,680x4,320
FPS: 23.844 FPS
File Size: 588 MiB
Duration: 2 min 8 s

Cancel Next

Step 3: Output Format Setting:

- 1) Choose output streaming RTMP
- 2) Video Codec: H.264
- 3) Profile: Main
- 4) Level: 4
- 5) Audio Codec: AAC
- 6) Audio Bitrate: 128 Kbps

Click **Next** to continue.


Add Task on CPUID1

1 Select a Task

2 Output Format Setting

3 Output Quality Setting

4 Summary

1. Select an output protocol: RTMP, HLS, DASH, ICECAST (Live or VOD)
 Select an output file format: MKV, MP4, FLV, F4V, AVI, WEBM, MPEG, MOV, MPG (File)

2. Select a video codec: H.264, H.265, VP8, VP9

3. Select an audio codec: AAC, MP3, Vorbis, Disable

Streaming

RTMP

1

Video Options

Video Codec:

H.264

2

Video Profile:

Main

High

3

Level:

4

4

Audio Options

Audio Codec:

AAC

5

Audio Bitrate:

128 kbps

6

Cancel

Back

Next

Step 4: Output Quality Settings:

1) Select quality as **QP**

Select the number of outputs by adding the following settings:

2) Resolution: 3840x2160 (4K)

3) Frame Rate: 30

4) QP Value: 23

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Add Task on CPUID1

1 Select a Task 2 Output Format Setting 3 Output Quality Setting 4 Summary

1. Choose an output video quality index (QP or Bitrate).
2. Add resolution settings (Maximum 4).

Quality Settings: ☐ BitRate ☒ QP 1

Output Options + Add Remove

	Resolution 2	FrameRate 3	QP Value 4	Remove
<input type="checkbox"/>	3840x2160	30	23	<input type="checkbox"/>

Cancel Back Next

Step 5: The Summary page displays all the selected information. Transcoding will begin after clicking the **Start** button.

Add Task on CPUID1

1 Select a Task 2 Output Format Setting 3 Output Quality Setting 4 Summary

Task Overview.

Task: ☐ VOD-8k.mp4 Video Settings: H.264/ Profile-Main/level:4
Streaming: RTMP Audio Settings: AAC/ 128 kbps

Output

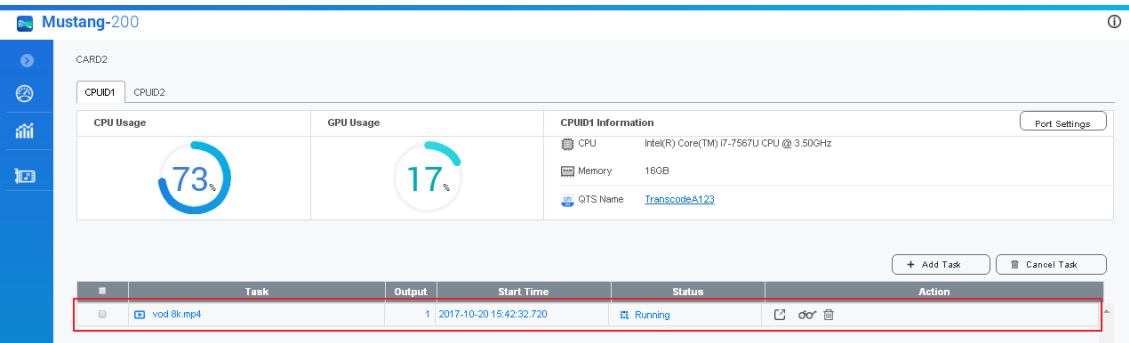
Resolution (px)	FrameRate (fps)	QP Value
3840x2160	30	23


Cancel Back Start




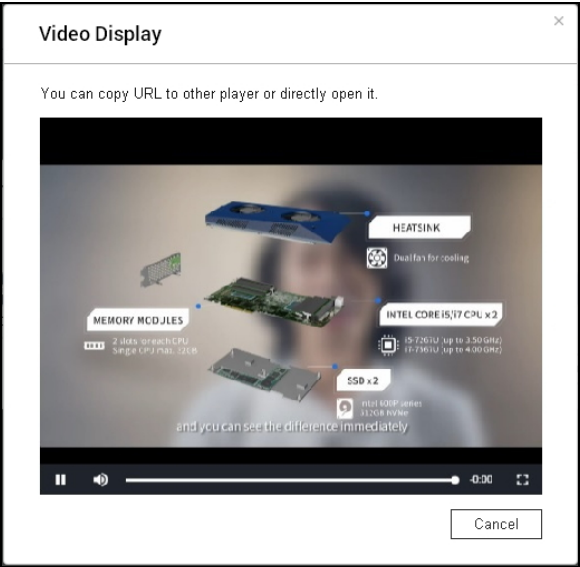
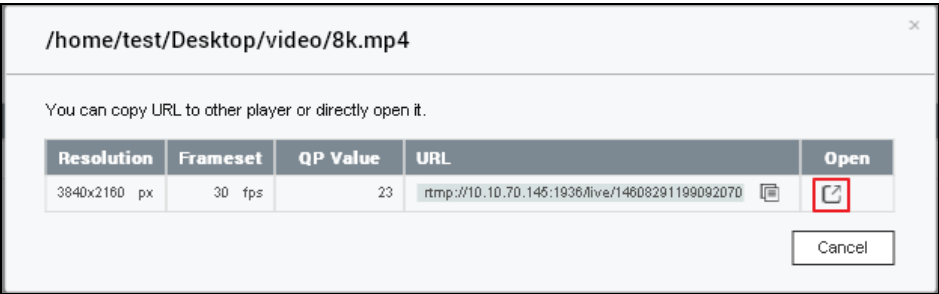
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Step 6: The transcoding task is added to the list.



Step 7: Click  on the card page. The following page with task information appears.

Click the  icon to preview the video in media player.



Step 8: Click  on the card page to view the transcoding summary.



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Transcoding Summary

Task : vod 8k.mp4

Job ID: CARD2 CPUID1 Output folder: N/A

Start Time: 2017-10-20 15:42:32.720 Video Settings: H.264 / Profile-Main / level:4

Duration: 2 min 8 s Audio Settings: AAC / 128 kbps

Output			
Resolution (px)	FramesRate	QP Value	Output
3840x2160	30 fps	23	File path : ...rtmp://10.10.70.145:1936/live/146082911990

CLOSE

6.6.2 File Transcoding

The following example will teach you how to transcode H.264 4K to 4K H.265 (HEVC) codec.

Step 1: Click **Add Task** on Card Page.

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- Overview
- Log
- Cards Info
 - CARD2
 - CARD3
 - CARD4

CARD2

CPUID1

CPUID2

CPU Usage: 5%

GPU Usage: 14%

CPUID1 Information

CPU: Intel(R) Core(TM) i7-7567U CPU @ 3.50GHz

Memory: 16GB

GTS Name: TranscodeA123

+ Add Task

Cancel Task

	Task	Output	Start Time	Status	Action
	vod 1080p_h264.mov	1	2017-10-20 13:20:05.440	Running	
	vod 1080p_h264.mov	1	2017-10-20 13:20:25.957	Running	

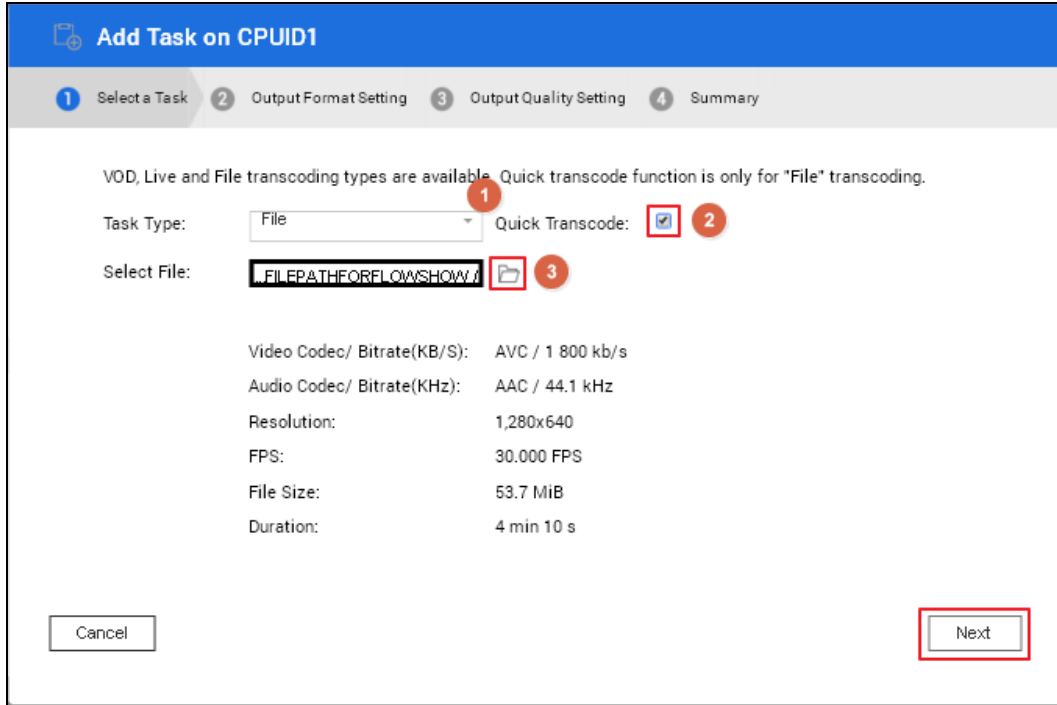
Step 2: 1) Select **"File"** as the Task Type.

2) Enable **"Quick Transcode"** to complete transcoding process quicker. Quick Transcode uses maximum GPU resources to transcode faster.

3) Browse and choose a 4K input file. Once a file is selected, its information will

be displayed.

Click **Next** to continue.




Add Task on CPUID1

1 Select a Task 2 Output Format Setting 3 Output Quality Setting 4 Summary

VOD, Live and File transcoding types are available. Quick transcode function is only for "File" transcoding.

Task Type: File Quick Transcode: ☒

Select File: FILEPATHFORFLOWSHOW? 

Video Codec/ Bitrate(KB/S):	AVC / 1 800 kb/s
Audio Codec/ Bitrate(KHz):	AAC / 44.1 kHz
Resolution:	1,280x640
FPS:	30.000 FPS
File Size:	53.7 MiB
Duration:	4 min 10 s

Cancel Next

Step 3: Output Format Setting:

- 1) Choose output file format: MKV
- 2) Video Codec: H.265
- 3) Profile: Main
- 4) Level: 6.2
- 5) Audio Codec: AAC
- 6) Audio Bitrate: 128 Kbps

Click **Next** to continue.

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Add Task on CPUID1

1 Select a Task 2 Output Format Setting 3 Output Quality Setting 4 Summary

1. Select an output protocol: RTMP, HLS, DASH, ICECAST (Live or VOD)
Select an output file format: MKV, MP4, FLV, F4V, AVI, WEBM, MPEG, MOV, MPG (File)
2. Select a video codec: H.264, H.265, VP8, VP9
3. Select an audio codec: AAC, MP3, Vorbis, Disable

File Type: MKV 1

☒ Video Options

Video Codec: H.265 2

Video Profile: Main 3 High 4

Level: 6.2 4

☐ Audio Options

Audio Codec: AAC 5

Audio Bitrate: 128 kbps 6

Cancel Back Next

Step 4: Output Quality Setting:

1) Select quality as **QP**

Select the number of outputs by adding the following settings:

2) Resolution: 3840x2160 (4K)

3) Frame Rate: 30

4) QP Value: 23



Mustang-200 Computing Accelerator

Add Task on CPUID1

1

Select a Task

2

Output Format Setting

3

Output Quality Setting

4

Summary

1. Choose an output video quality index (QP or Bitrate).

2. Add resolution settings (Maximum 4).

Quality Settings: ☐ BitRate ☒ QP 1

Output Options

+ Add

Remove

	Resolution 2	FrameRate 3	QP Value 4	Remove
<input type="checkbox"/>	3840x2160	30	23	<input type="checkbox"/>

Cancel

Back

Next

Step 5: The Summary page displays all the selected information. Transcoding will begin after clicking the **Start** button.

Add Task on CPUID1

1

Select a Task

2

Output Format Setting

3

Output Quality Setting

4

Summary

Task Overview.

Task:

☐ File-360_shark.mp4

Video Settings:

H.265/ Profile-Main/level:6.2

File Type:

MKV

Audio Settings:

AAC/ 128 kbps

Output

Resolution (px)	FrameRate (fps)	QP Value
3840x2160	30	23

Cancel

Back

Start



Mustang-200 Computing Accelerator

Step 6: The transcoding task is added to the list.

The screenshot shows the Mustang-200 web interface. On the left is a blue sidebar with navigation icons. The main area is titled 'Mustang-200' and shows system status for 'CARD2'. It includes two circular progress indicators: 'CPU Usage' at 5% and 'GPU Usage' at 71%. To the right, 'CPUID1 Information' is displayed, showing CPU: Intel(R) Core(TM) i7-7567U CPU @ 3.50GHz, Memory: 16GB, and QTS Name: TranscodeA123. Below this is a table of tasks. One task is listed: 'file 360_shark.mp4' with output '1', start time '2017-10-20 16:12:26.043', and status 'Running'. The task is highlighted with a red box. At the bottom right of the task list are buttons for '+ Add Task' and 'Cancel Task'.

Task	Output	Start Time	Status	Action
file 360_shark.mp4	1	2017-10-20 16:12:26.043	Running	[Icon] [Icon] [Icon]

Step 7: Click  on the card page to view the transcoding summary.

The screenshot shows a 'Transcoding Summary' dialog box. It contains the following information:

- Task : file 360_shark.mp4
- Job ID: CARD2 CPUID1
- Start Time: 2017-10-20 16:12:26.043
- Duration: 4 min 10 s
- Output folder: /home/test/Desktop/video/output
- Video Settings: H.265 / Profile-Main / level:6.2
- Audio Settings: AAC / 128 kbps

Below this information is a table titled 'Output' with the following data:

Resolution (px)	FramesRate	QP Value	Output
3840x2160	30 fps	23	File path : ...home/test/Desktop/video/output/360_shark_/ [Icon]

A 'CLOSE' button is located at the bottom right of the dialog box.

Appendix

A

Regulatory Compliance

Mustang-200 Computing Accelerator

DECLARATION OF CONFORMITY



This equipment has been tested and found to comply with specifications for CE marking. If the user modifies and/or installs other devices in the equipment, the CE conformity declaration may no longer apply.

FCC WARNING



This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Appendix

B

Product Disposal

Mustang-200 Computing Accelerator

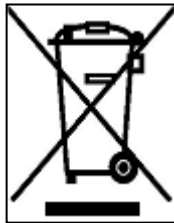


CAUTION:

Risk of explosion if battery is replaced by an incorrect type. Only certified engineers should replace the on-board battery.

Dispose of used batteries according to instructions and local regulations.

- Outside the European Union – If you wish to dispose of used electrical and electronic products outside the European Union, please contact your local authority so as to comply with the correct disposal method.
- Within the European Union – The device that produces less waste and is easier to recycle is classified as electronic device in terms of the European Directive 2012/19/EU (WEEE), and must not be disposed of as domestic garbage.



EU-wide legislation, as implemented in each Member State, requires that waste electrical and electronic products carrying the mark (left) must be disposed of separately from normal household waste. This includes monitors and electrical accessories, such as signal cables or power cords. When you need to dispose of your device, please follow the guidance of your local authority, or ask the shop where you purchased the product. The mark on electrical and electronic products only applies to the current European Union Member States.

Please follow the national guidelines for electrical and electronic product disposal.

Appendix

C

Hazardous Materials Disclosure

Mustang-200 Computing Accelerator

The details provided in this appendix are to ensure that the product is compliant with the Peoples Republic of China (China) RoHS standards. The table below acknowledges the presences of small quantities of certain materials in the product, and is applicable to China RoHS only.

A label will be placed on each product to indicate the estimated “Environmentally Friendly Use Period” (EFUP). This is an estimate of the number of years that these substances would “not leak out or undergo abrupt change.” This product may contain replaceable sub-assemblies/components which have a shorter EFUP such as batteries and lamps. These components will be separately marked.

Please refer to the following table.

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	O	O	O	O	O	O
Display	O	O	O	O	O	O
Printed Circuit Board	O	O	O	O	O	O
Metal Fasteners	O	O	O	O	O	O
Cable Assembly	O	O	O	O	O	O
Fan Assembly	O	O	O	O	O	O
Power Supply Assemblies	O	O	O	O	O	O
Battery	O	O	O	O	O	O
<p>O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006 (now replaced by GB/T 26572-2011).</p> <p>X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006 (now replaced by GB/T 26572-2011).</p>						



Mustang-200 Computing Accelerator

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有“环境友好使用期限”的标签，此期限是估算这些物质“不会有泄漏或突变”的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯 醚 (PBDE)
壳体	O	O	O	O	O	O
显示	O	O	O	O	O	O
印刷电路板	O	O	O	O	O	O
金属螺帽	O	O	O	O	O	O
电缆组装	O	O	O	O	O	O
风扇组装	O	O	O	O	O	O
电力供应组装	O	O	O	O	O	O
电池	O	O	O	O	O	O
O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T 11363-2006 (现由 GB/T 26572-2011 取代) 标准规定的限量要求以下。 X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11363-2006 (现由 GB/T 26572-2011 取代) 标准规定的限量要求。						

