

# Network Video Recorder

## Installation Manual

Before operating the unit, please read this manual and the Safety Regulations thoroughly and retain them for future reference.

## HAW-EIBU

Software Version 2017 R2 (11.2a) and Later



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# Usage Precautions

## Important Information About Safety

- Be sure to connect the unit to a power source that conforms fully to the electrical specifications of this unit.
- Do not coil the power cord or bundle it with other cords. Do not piggy back connections. If current ratings are exceeded, there is a risk of fire and other accidents.
- Make sure that all AC outlets and power cords are properly grounded.
- Do not use the unit with the panel opened or removed. Otherwise there is a risk of fire and electric shock. Do not attempt to open or remove the panel yourself. Always consult your supplier if opening is necessary.

## Important Information About Installation

### Locations for use/storage

To prolong the life of the product, avoid use or storage in the following locations.

- Locations that can become extremely hot or cold. (Be sure to use the unit that conforms fully to the specifications of this unit.)
- Locations exposed for an extended time to direct sunlight, and locations near heating appliances. (Note that the temperature in a closed car in summer can exceed +50 °C/+122 °F.)
- Locations with high levels of humidity or dust
- Locations subject to strong vibrations
- Locations subject to strong magnetic fields
- Locations in the vicinity of radio or TV transmitters creating a strong magnetic field

### Do not stack units or place the unit on other objects that generate heat

When one unit is stacked on top of another unit, the heat generated by both units can get extremely hot. Do not stack units on top of each other or place the unit on other objects that may generate heat.

### Do not block the ventilation openings

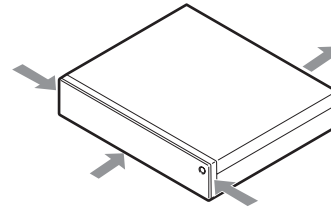
- The ventilation openings on the sides of the unit serve to prevent internal heat buildup. Always leave a clearance on both sides as well as behind and above the unit.
- Do not use the unit in a closed box or other enclosure.

### Precautions for rack installations

When installing the unit on a rack, take the following measures to ensure operation within the specified operating temperature.

- Place a fan to reduce the ambient temperature of the rack.

- Maintain a space of 1U rack-mount size (1.75 in. (approx. 44.5 mm)) or more above and below the unit.
- Do not obstruct the ventilation holes.



- Ventilation holes are located on the bottom of the front panel, so be sure to attach rubber feet when installing the unit on a shelf, for example.

### Use the unit in a horizontal position

- The unit is designed to be operated in a horizontal position.
- Do not install the unit on a slanted surface, and protect the unit from shocks.
- When the unit is dropped or otherwise subject to strong shocks, it can be seriously damaged.

### Maintenance

- Before cleaning the unit or performing any other kind of maintenance, be sure to disconnect the power cord from the AC outlet.
- For cleaning, lightly wipe the cabinet and panels with a dry cloth. To remove stubborn stains, lightly moisten the cloth with a mild, neutral detergent and wipe with a dry cloth afterwards.
- Do not use cleaning alcohol, solvents, benzene, insecticide, or any other volatile substances, because these may damage the finish and lead to discoloration.

### Transport

Use the original packing material or similar packing to protect the unit from shocks.

### Security

SONY WILL NOT BE LIABLE FOR DAMAGES OF ANY KIND RESULTING FROM A FAILURE TO IMPLEMENT PROPER SECURITY MEASURES ON TRANSMISSION DEVICES, UNAVOIDABLE DATA LEAKS RESULTING FROM TRANSMISSION SPECIFICATIONS, OR SECURITY PROBLEMS OF ANY KIND.

Depending on the operating environment, unauthorized third parties on the network may be able to access the unit. When connecting the unit to the network, be sure to confirm that the network is protected securely.

From a safety standpoint, when using the unit connected with the network, it is strongly recommended to access the Control window via a Web browser and change the access limitation settings from the factory preset values. Changing the password regularly is also recommended.

Do not browse any other website in the Web browser while making settings or after making settings. Since the login status remains in the Web browser, close the Web browser when you complete the settings to prevent unauthorized third parties from using the unit or harmful programs from running.

- Anti-virus software cannot be installed on the unit, so be sure to ensure anti-virus protection via firewalls and routers. In addition, be sure to check for the presence of viruses before connecting USB devices to the unit.
- Do not connect the unit directly to the Internet. When Internet connection is absolutely necessary, be sure to use a firewall.

## Condensation

If the unit is suddenly taken from a cold to a warm location, or if ambient temperature suddenly rises, moisture may form on the outer surface of the unit and/or inside of the unit. This is known as condensation. If condensation occurs, turn off the unit and wait until the condensation clears before operating the unit. Operating the unit while condensation is present may damage the unit.

## Consumable parts

The fan is a consumable part that will need periodic replacement.

When operating at room temperature, a normal replacement cycle will be about 5 years.

However, this replacement cycle represents only a general guideline and does not imply that the life expectancy of this part is guaranteed. For details on parts replacement, contact your dealer.

## Precautions for HDDs

The unit is not supplied with hard disk drives (HDDs) but will not operate without one installed.

HDDs are precision devices. If subject to shock, vibration, static electricity, high temperature or humidity, data loss can occur. When installing HDDs or operating the unit with HDDs installed, observe the following precautions.

### Protect from shocks and vibrations

When subject to shocks or vibrations, the HDD can be damaged and loss of data on the HDD can occur.

- When transporting the unit, use the specified packing material. When transporting on a dolly or similar, use a type which does not transmit excessive vibrations. Excessive shocks and vibrations can damage the HDD.
- Never move the unit while it is powered.
- Do not remove panels or outer parts of the unit.
- When placing the unit on a floor or other surface, make sure that the unit is equipped with the specified rubber

feet, and put the unit down carefully. If there are no feet, mount the rubber feet first.

- Do not place the unit near other devices that may become a source of vibrations.

### Wait for 30 seconds after turning power off

For a brief interval after the power is turned off, the platters inside the HDD will still keep spinning and the heads will be in an insecure position. During this interval, the unit is more susceptible to shocks and vibrations than during normal operation. For a period of at least 30 seconds after turning power off, avoid subjecting the unit even to very light shocks. After this period, the hard disk will be fully stopped and the unit can be manipulated.

### Temperature and humidity related precautions

Use and store the unit only in locations where the specified temperature and humidity ranges are not exceeded. (Be sure to use the unit that conforms fully to the specifications of this unit.)

In general, the performance of HDDs tends to diminish when operating in higher ambient temperatures, and this in turn shortens their replacement cycles.

Although normal operation is possible within the specified operating temperature, we recommend operation in an ambient temperature of +25 °C (+77 °F) to improve the HDD's replacement cycle.

### When the HDD seems to be faulty

Even if the HDD is showing signs of malfunction, be sure to observe all the above precautions. This will prevent further damage from occurring until the problem can be diagnosed and corrected.

### Replacement of the HDD and other consumable parts

The HDD and battery are consumable parts that will need periodic replacement. When operating at room temperature, a normal replacement cycle will be about two to three years. However, this replacement cycle represents only a general guideline and does not imply that the life expectancy of these parts is guaranteed. For details on parts replacement, contact your dealer.

### Precautions for using USB devices

- This unit supports USB 2.0, USB 3.0, Mass Storage class devices. However, it does not support USB 2.0, USB 3.0, Mass Storage class HDDs or CD/DVD drives. Do not connect mass storage class devices other than USB flash memory devices to the unit. Be aware that errors may still occur when writing data to a USB 2.0, USB 3.0, Mass Storage class memory device, depending on the type of device used. If errors occur when writing data, use a USB memory device of a different type.
- To ensure proper operation of USB devices, do not connect the devices via a USB hub. Connect the devices directly to the USB connectors on the unit. Operation is

not guaranteed when devices are connected via a USB hub, USB switch, or extension cable.

### **Protect data from power interruptions**

If the power supply is interrupted while the unit is in operation, data may be damaged. Be sure to take measures against power outages to protect data.

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## **Package Contents**

Check that the following items are included in this package:

- HAW-EIBU (1)
- Front panel (1)
- Operating Instructions - Download site Information (1)
- Front panel keys (2)
- Installation Manual (this document) (1)
- Safety Regulations (1)
- Warranty booklet (1)
- Rubber feet (4)
- HDD screws (40)

### **Notes**

- This package may contain additional hardware and/or documentation for those options.
- Save the boxes and packing materials for future use.

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# System Requirements

The hardware required in order to use this unit are as follows.

- Hard disk drives (HDDs)<sup>1)</sup>
- Monitor<sup>2)</sup>
- Sony network cameras<sup>3)</sup>
- USB keyboard<sup>4)</sup>
- USB mouse<sup>5)</sup>
- Network hub
- 1000Base-T/100Base-TX/10Base-T cable
- USB flash memory device<sup>6)</sup>

1) Contact your dealer for details about compatible HDDs.

2) HDMI-compatible devices, DisplayPort-compatible devices, and computer displays that accept RGB input are supported.

A resolution of at least 1024 × 768 and 16-bit color are the minimum suggested specifications.

3) Contact your dealer for details about compatible Sony network cameras.

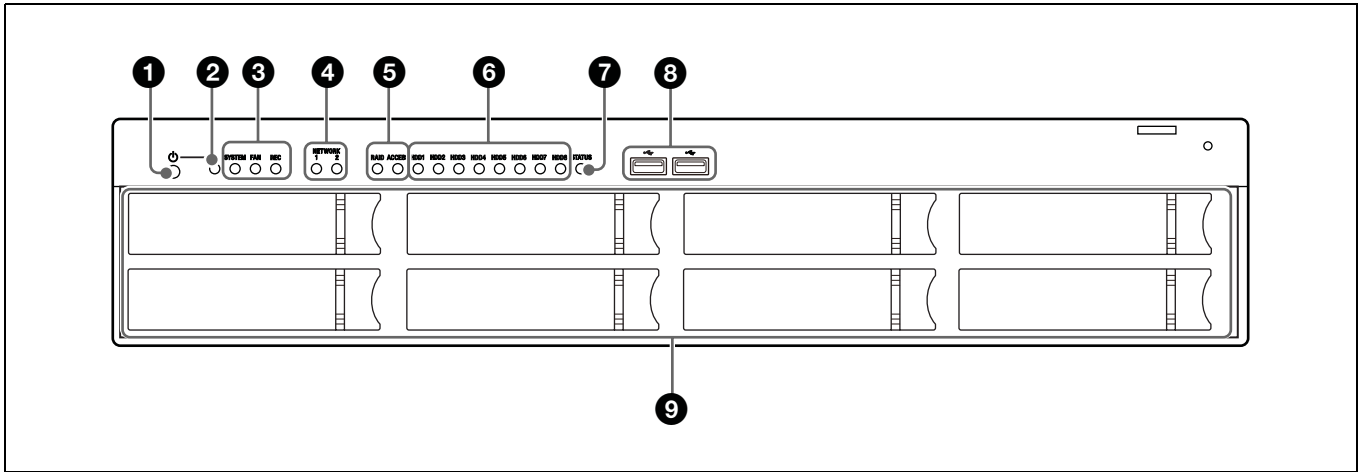
4) Use a USB keyboard with a cable. However, keys other than the standard may not function. Wireless or infrared USB keyboards may also not function properly.

5) Use a USB mouse with a cable. Wireless or infrared USB mice may not function properly. Functions such as three-button and wheel operations may also function improperly.

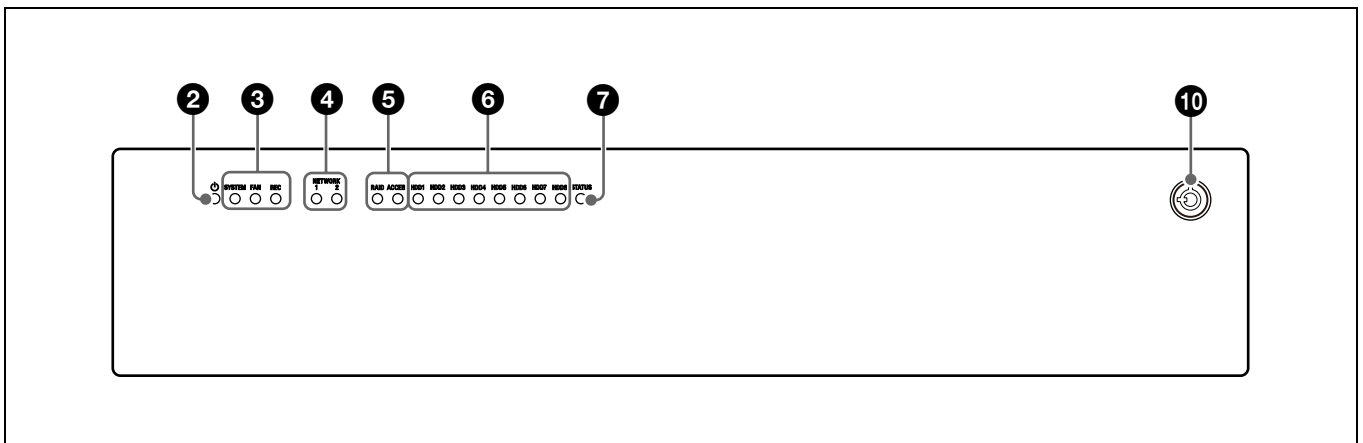
6) Required when backing up system information such as logs.  
– This unit supports USB 2.0, USB 3.0, and Mass Storage class devices. However, it does not support USB 2.0, USB 3.0, and Mass Storage class USB HDDs or CD/DVD drives. Do not connect mass storage class devices other than USB flash memory devices to the unit. Be aware that errors may still occur when writing data to a USB 2.0, USB 3.0, and Mass Storage class memory device, depending on the type of device used. If errors occur when writing data, use a USB flash memory device of a different type.

# Names and Functions of Parts

## Front (without the Front Panel)



## Front (with the Front Panel)



### 1 Power switch

Press this to turn on the unit.  
Pressing the power switch again during this time turns off the unit.

#### Caution

Pressing and holding down the power switch (approximately 4 seconds) turns off the unit forcefully.

### 2 POWER LED

Lights blue when the unit is turned on.

### 3 **SYSTEM LED**

During operation, this LED is lit green when the system is functioning normally. When a system error or other problem occurs, it lights or blinks red. If this LED lights or blinks red, contact your Sony dealer.

#### FAN LED

Lights green when the internal fan is functioning properly. Lights red or amber when a fan failure occurs.

#### REC LED (intended for future expansion)

Does not function currently.



**4 NETWORK LEDs (1 and 2)**

Light blue when there is a link to the network.  
Blink blue when the network is being accessed.

**5 RAID LED**

Lights green when the RAID configuration is functioning properly.  
Lights red if a fatal problem exists with the RAID due to an internal HDD failure, for example.  
Lights amber if the RAID is degraded or rebuilding.

**ACCESS LED**

Blinks blue when the HDDs are accessed.

**6 HDD LEDs (1 to 8)**

Light green when the internal HDDs are functioning properly.  
Light red when failures or other problem occurs.  
Also, light amber during the rebuilding of RAID.  
These remain unlit when HDDs are not recognized.

**7 STATUS LED**

Indicates the operation status when using a USB flash memory device to acquire logs.  
Lights green when a USB flash memory device formatted to acquire logs is recognized.  
Blinks green when log acquisition starts automatically and is in progress.  
Lights green again when log acquisition is successful.

Lights red if log acquisition fails.

**Caution**

Do not remove the USB flash memory device while the LED is blinking.

**8 USB 3.0 connectors (1 and 2)**

Use this connector to connect a USB mouse, keyboard, or USB flash memory to the unit.

**9 HDDs**

For details on maintenance, contact your Sony dealer.

**10 Lock**

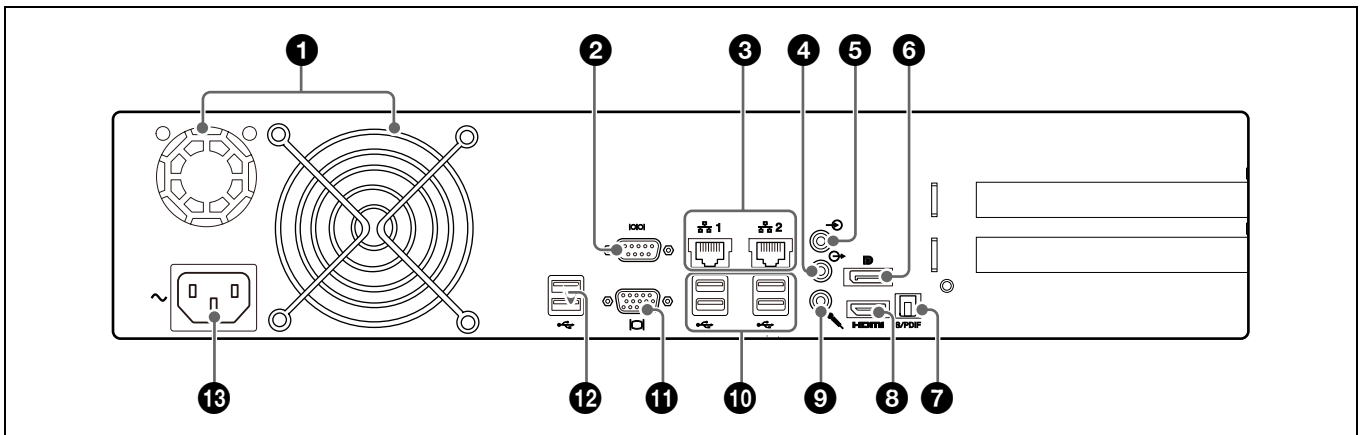
Use this in conjunction with the supplied front panel key to lock the front panel.  
When the front panel is locked, you cannot remove it.  
When attaching the front panel, make sure the lock is the unlocked state before you attach the front panel.  
You can distinguish the locked position from the unlocked position by looking at the lock, as illustrated below.

The front panel is locked

The front panel is unlocked



**Rear**



**1 Fans**

**Caution**

Take care not to obstruct the fan grille. If the grille is obstructed, heat may build up in the unit, leading to damage and/or fire.

**2 RS-232C connector (used for future expansion)**

**3 LAN connectors (1 and 2)**

Use these connectors to connect 10 Base-T, 100 Base-TX, or 1000 Base-T network cables.  
LAN1: Network cameras  
LAN2: Network cameras (LAN2 can only be used when using a different segment from LAN1.)

### Caution

- Do not configure LAN connectors 1 and 2 to the same network segment.
- For details on using iSCSI storage, contact your Sony dealer.

### CAUTION

- For safety, do not connect the connector for peripheral device wiring that might have excessive voltage to the following ports.
  - LAN1 connector
  - LAN2 connectorFollow the instructions for the above ports.
- When you connect the LAN cable of the unit to peripheral device, use a shielded-type cable to prevent malfunction due to radiation noise.

#### 4 **AUDIO OUT (line output) connector (stereo)**

Use this connector to output audio to a peripheral audio device.

#### 5 **AUDIO IN (line input) connector (stereo)**

Use this connector to input audio from a peripheral audio device.

#### 6 **DisplayPort connector**

Use this connector to connect a monitor that supports DisplayPort input.

#### 7 **S/PDIF connector**

Use this connector to connect a device that supports S/PDIF input.

#### 8 **HDMI monitor connector**

Use this connector to connect a monitor that supports HDMI input.

#### 9 **AUDIO IN (microphone input) connector**

Use this connector to input audio from a peripheral audio device, such as a microphone.  
Plug-In Power microphones are supported.

#### 10 **USB 3.0 connectors (1 to 4)**

Use these connectors to connect a USB mouse, keyboard, or USB flash memory to the unit.

#### 11 **Monitor connector**

Use this connector to connect a monitor that supports analog RGB input.

#### 12 **USB 2.0 connectors (1 and 2)**

Use these connectors to connect a USB mouse, keyboard, or USB flash memory to the unit.

#### 13 **Power supply connector**

Use this connector to connect the power cord.

## Acquiring Reference Manuals and Technical Documents

Reference manuals and technical documents for the unit are available online.

Access the following websites via the URLs, and download the necessary manuals and documents.

- NVMS Enterprise Edition Administrator Manual
  - NVMS License Guide
- <https://www.sony.net/CameraSystem/NVMS/Manuals>

- NVMS Enterprise Edition Maintenance Guide
  - NVMS Enterprise Edition System Design Requirements
- <https://www.sony.net/CameraSystem/NVMS/Technical-Documents>

# System Configuration

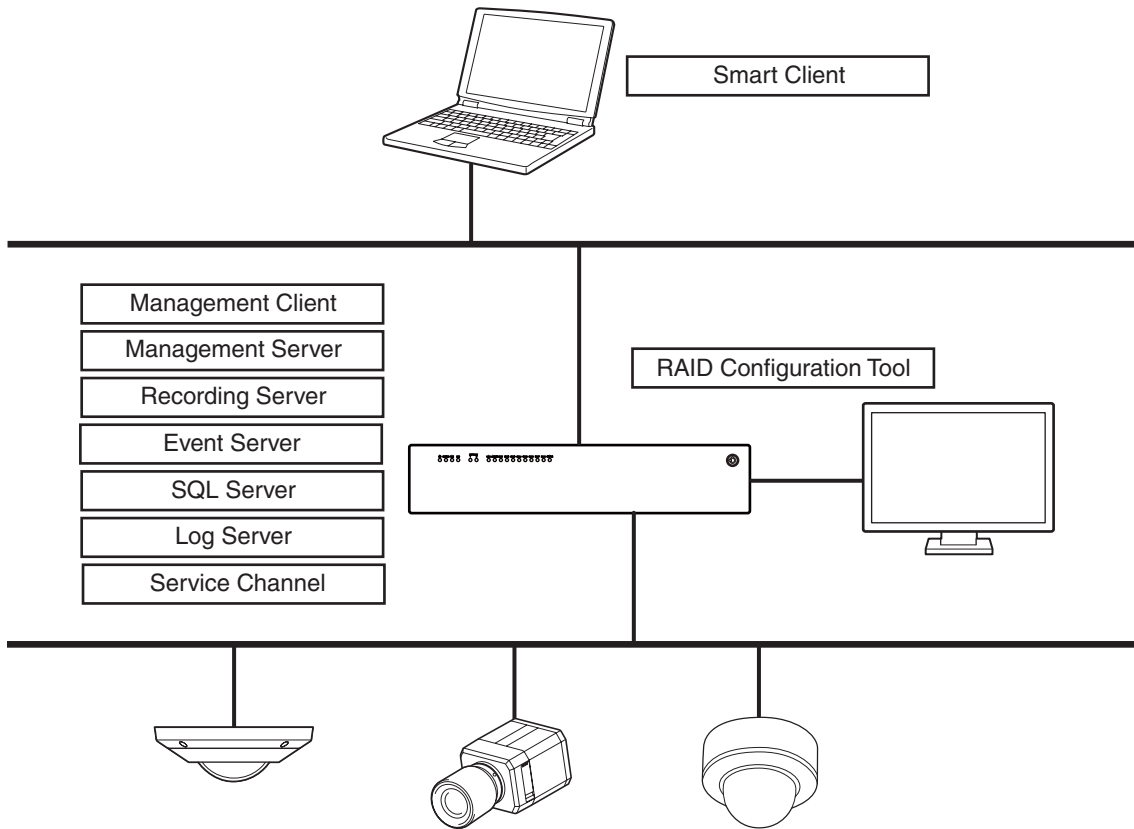
The location at which the management server should be installed differs depending on the number of Network Video Recorder units that exist in the system. The recording server should always be installed on the unit.

**Note**

The management server is the core component of the Network Video Management System Enterprise Edition. This server processes and distributes the system configuration to the recording server and other system components and handles user authentication. The recording server handles video recording, event processing, and all communication with cameras and other system devices. For details on other components, refer to the *NVMS Enterprise Edition Administrator Manual*.

## Single Network Video Recorder Systems

Install the management server and recording server on the single Network Video Recorder. Start RAID Configuration Tool and Management Client on the Network Video Recorder, and configure RAID settings and settings for each server. In addition, register and activate licenses using Management Client.



**Note**

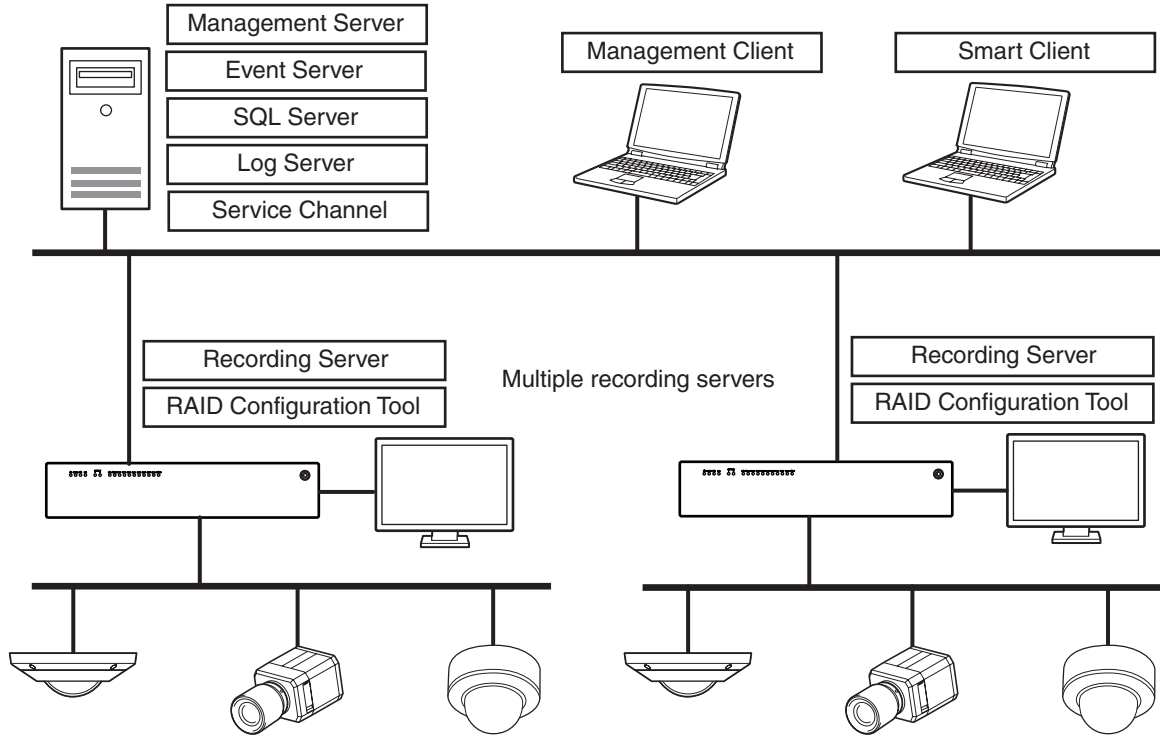
Management Client can be installed and used on a separate computer. For details on installation, refer to the *NVMS Enterprise Edition Administrator Manual*.

**Caution**

We recommend using separate LAN connectors for connections to the client network and the camera network. However, when using a network storage device, for example, the network configuration may differ depending on the system environment.

## Multi Network Video Recorder Systems

When configuring a system with two or more Network Video Recorders, install the management server on a computer separate from the Network Video Recorders. Use Management Client to configure settings for the recording servers on each Network Video Recorder, and use RAID Configuration Tool on each Network Video Recorder to configure RAID settings. In addition, register and activate licenses using Management Client.



### Caution

We recommend using separate LAN connectors for connections to the client network and the camera network. However, when using a network storage device, for example, the network configuration may differ depending on the system environment.

# Preparation

Step 1: Installation (page 13)



Step 2: Installing the HDDs (page 14)



Step 3: Connections (page 16)



Step 4: System Settings (page 17)



Step 5: Verifying Operation (page 29)



Step 6: Activation (page 29)



Step 7: Data Backup (page 31)



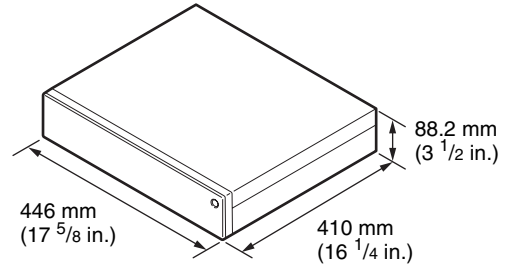
For details on advanced settings, refer to the *NVMS Enterprise Edition Administrator Manual*.

## Note

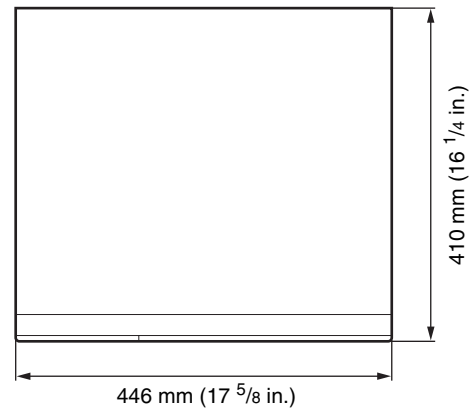
For systems with multiple Network Video Recorders, install the management server on a computer. For details, see “*Installing the Management Server on a Computer*” (page 18).

# Step 1: Installation

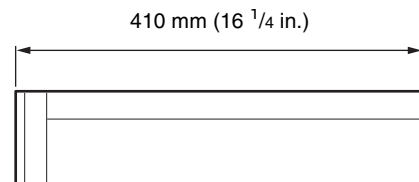
Before setting up, be sure that the location for installation provides sufficient space and strength to support the unit. For the unit weight, see “*Specifications*” (page 62). The dimensions for the unit are as follows.



## Top



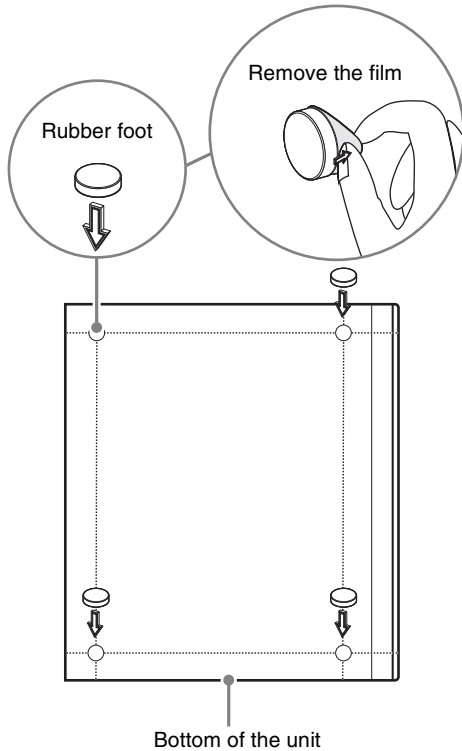
## Side



When installing the unit on a rack, use the rack mount kit designed specifically for this unit. For details on the rack mount kit, contact your Sony dealer.

## Installing without a Rack

Attach the provided rubber feet to the unit.  
Place the unit upright so that the bottom surface is visible.  
Then affix the adhesive surfaces of the rubber feet on the bottom of the unit as illustrated below.



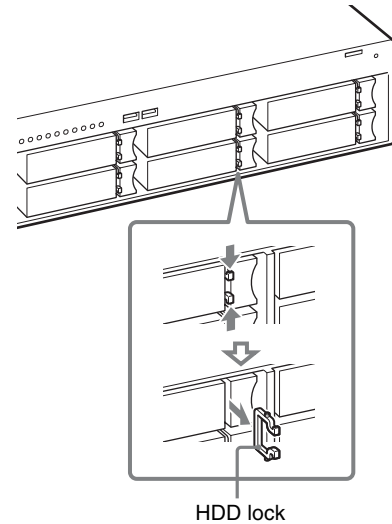
## Step 2: Installing the HDDs

### Note

The unit will not operate without an HDD installed.

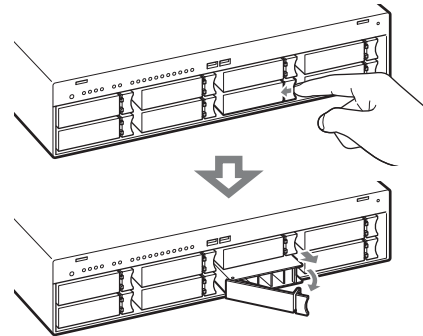
- 1 Remove the HDD lock for the slot in which the HDD will be installed.

To remove the HDD lock, push the tabs inward.

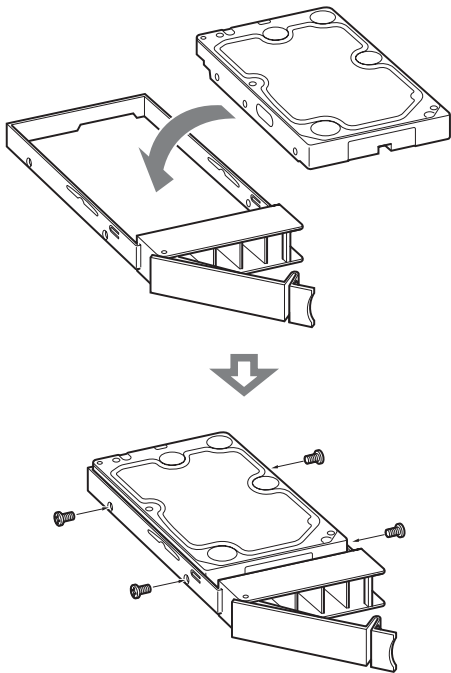
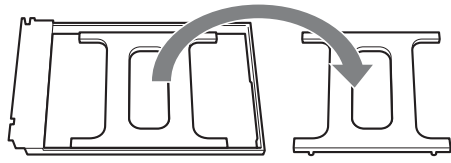


- 2 Remove the tray.

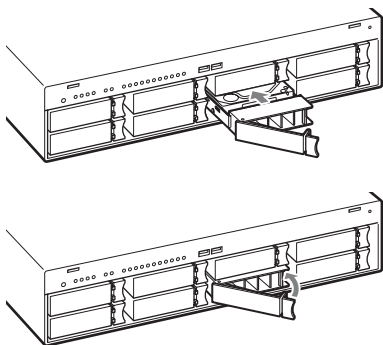
To unlatch the tray cover, insert your finger in the indentation on the right and push inward.



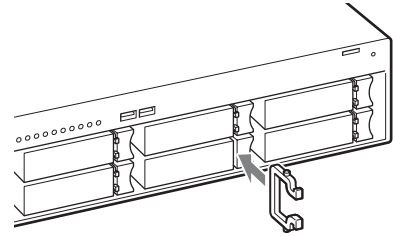
- 3** Remove the dummy HDD from the tray, set the actual HDD into the tray in the direction illustrated, and secure it using the four HDD screws (+K, UNC x 5).



- 4** Fully insert the tray in which the HDD is installed into the slot, and lock it into place.

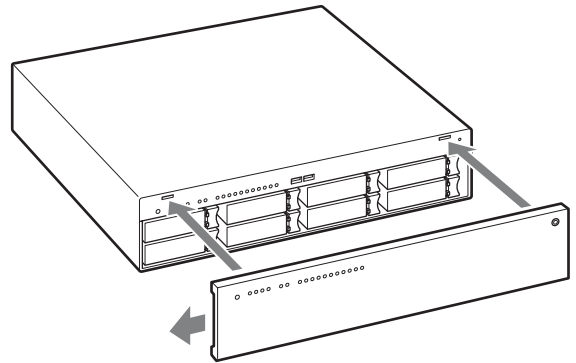


- 5** Reinsert the HDD lock removed in step 1.



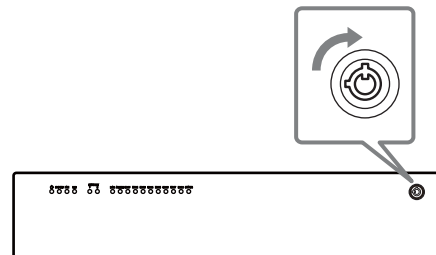
- 6** Attach the front panel.

Insert the four tabs on the front panel into the corresponding holes on the unit, and slide the panel to the left.



- 7** Use the supplied front panel key to lock the front panel.

Turn the front panel key 90 degrees clockwise.



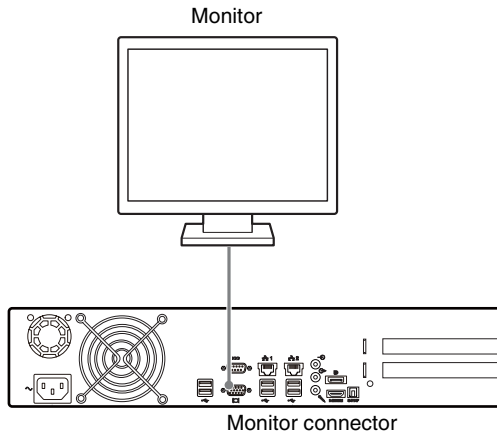
## Step 3: Connections

Connect each device to the unit.

### Connecting the Monitors

Connect the monitor to the monitor connector.

Example)



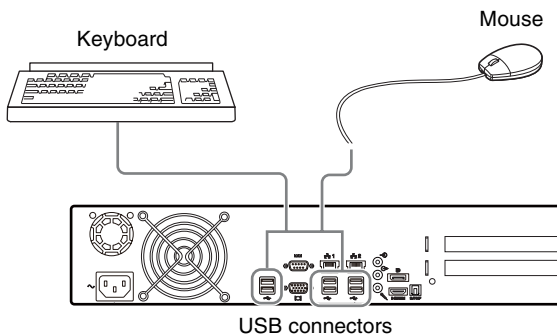
#### Caution

When monitors are connected via a monitor switch, images may not always display. We recommend connecting monitors directly to the unit.

### Connecting the Keyboard and Mouse

Connect the devices to the USB connectors on the unit.

Example)



#### Note

When using USB devices, be sure to read “Precautions for using USB devices” (page 5) in the “Usage Precautions” section beforehand.

### Connecting the Power Cord

Connect the power cord to the power supply connector.

#### Caution

Before installing, carefully read the Safety Regulations (leaflet). When using the unit in combination with multiple HAW units, make sure that the power supply is sufficient.

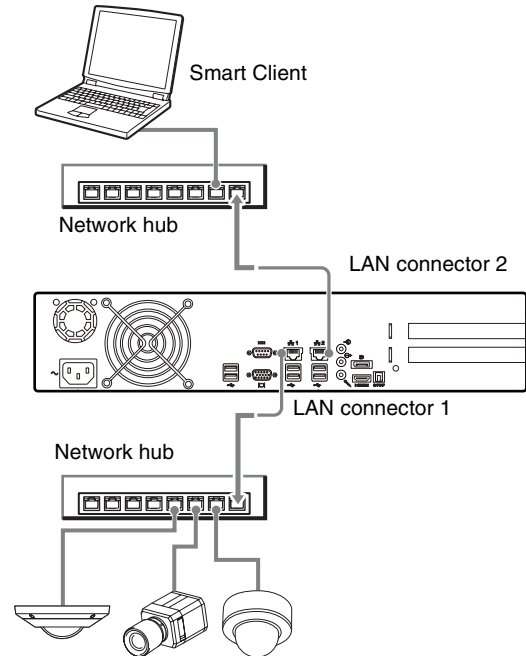
### Connecting to a Network

Connect to the network as follows.

Example)

#### Remote client

Connect LAN connector 2 to the same network as the Windows PC being used as the remote client.



#### Network cameras

Connect LAN connector 1 to the same network as the network cameras.



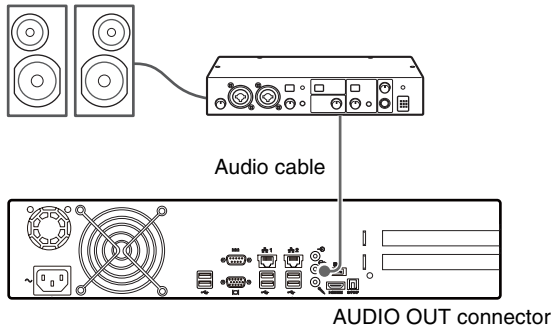
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## Connecting Other Devices

### Connecting an audio output device

Connect the audio output device to the line output connector.

Example)



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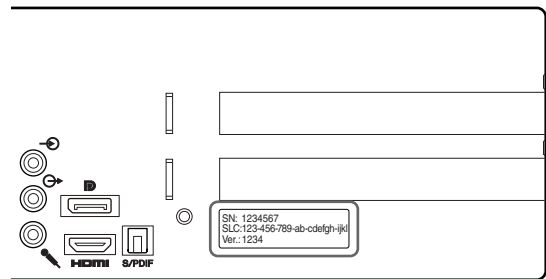
## Step 4: System Settings

This section describes how to turn on the power and the basic procedure for registering cameras and other devices.

---

### Registering the Software License Code (SLC) and Acquiring the License File

Acquire a software license file using the SLC found on the rear panel of the unit. For details, refer to the *NVMS License Guide*.



#### Note

When configuring a system with multiple Network Video Recorders, the device licenses associated with each SLC must be transferred to a single SLC to form a single software license. For details on transferring device licenses, refer to the *NVMS License Guide*.

---

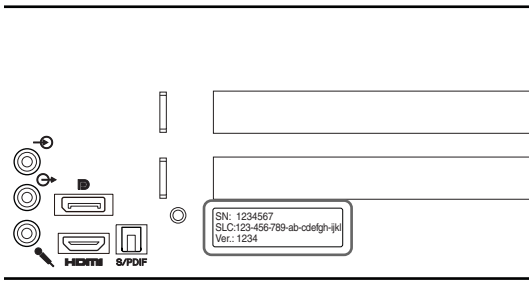
### Verifying the Software Version

Verify that the latest software is installed on the unit, and update the software if it is older.

#### Note

For systems with multiple Network Video Recorders, the same version of the software must be running on all the Network Video Recorders.

- 1 Verify the version indicated on the rear panel of the unit.



- 2 Verify the latest version.

Download the “NVMS Enterprise Edition Installation Image Release Note” from the following URL, and verify the software version.

<https://www.sony.net/CameraSystem/NVMS/Software>

- 3 If the version of the software installed on the unit is older, perform a clean installation of the software and acquire the license file for the latest version.

For details on clean installation, refer to the *NVMS Enterprise Edition Maintenance Guide*. For details on acquiring the license file for the latest version, refer to the *NVMS License Guide*.

## Adding Device Licenses

Purchase and add licenses to increase the maximum number of devices that can be registered. The additional purchased licenses must also be applied to the unit’s license. For details on applying the additional licenses, refer to the *NVMS License Guide*.

### Note

For details on purchasing additional licenses, contact your Sony dealer.

## Installing the Management Server on a Computer

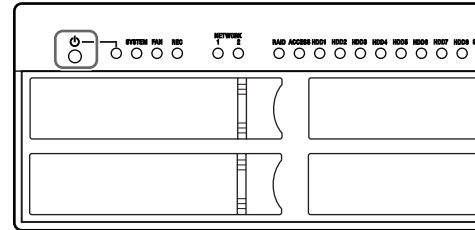
When configuring a system with two or more Network Video Recorders, the management server must be installed on a computer separate from the Network Video Recorders. Download the latest version of NVMS Enterprise Edition for NVR from the following URL, and install it on your computer.

<https://www.sony.net/CameraSystem/NVMS/Software>

For details on installation, refer to the *NVMS Enterprise Edition Administrator Manual*.

## Turning On the Unit

When you remove the unit’s front panel and press the power switch, the unit turns on and the POWER LED lights blue.



When the unit is turned on for the first time, initial setup for Windows will start. Proceed to the next section, “Initial Setup for Windows.”

## Turning off the unit

Click the Start button (🌐) on the left side of the taskbar, and click [Shutdown] in the menu that appears. Alternatively, if you press the power switch, the unit will start the shutdown procedure and turn off after a few minutes.

## Initial Setup for Windows

When the following setup wizard appears after turning on the unit, perform the following.

- 1 Select the system language, and click [Next].
- 2 Select your country or region, time and currency, keyboard layout, and click [Next].
- 3 Enter the user name and computer name that will be used for login, and click [Next].
- 4 Enter the user password and password hint, and click [Next].

Enter the password twice for confirmation. Enter a word or phrase that will remind you of your password for the password hint.

### Note

You can proceed without entering the password here. In such cases, be sure to configure the password after initial setup for Windows is complete. For details, see “Configuring the Login Password” (page 19).

### Caution

Do not forget your password. If you forget the password you configured, you will not be able to log in or change or disable the password.

- 5 Read the software license agreement, select the [I accept...] checkboxes, and click [Next].
- 6 Configure the time zone, date, and time, and click [Next].
- 7 Specify the network you want to use.  
The desktop screen will be displayed.

### Note

This screen appears only when a network is connected to LAN connector 1 or 2.

### Caution

The [Windows could not complete the installation. To install Windows on this computer, restart the installation.] dialog may be displayed while restarting. In this case, turn off the power to the unit and then perform a clean install of the system image. For details about clean install, refer to the *NVMS Enterprise Edition Maintenance Guide*.

## Changing the Keyboard Layout


If you selected Japanese in step 1 of “Initial Setup for Windows” (page 18) and want to use a 106/109 keyboard, perform the following to change the keyboard layout. If this is not necessary, proceed to the next procedure.

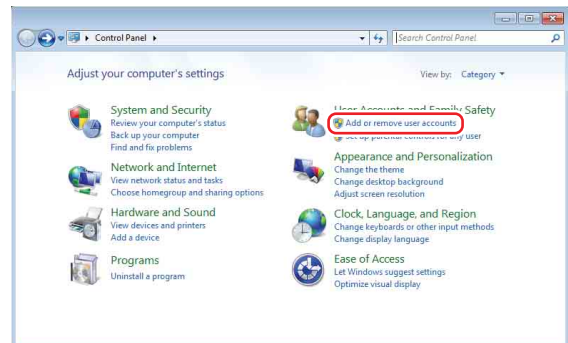
- 1 Double-click the computer icon on the desktop.  
Explorer appears.
- 2 Double-click [OS(C:)] - [PromiseApp] - [keyboard].
- 3 Double-click “keyboard\_106-109.bat” to start the file.
- 4 Press the Enter key.

The Network Video Recorder will restart automatically.

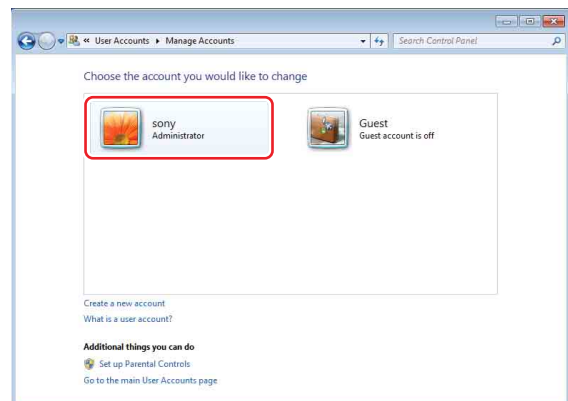
## Configuring the Login Password

The login password can be configured during initial setup for Windows. However, if you skipped password configuration for whatever reason, configure it as follows.

- 1 Click the Start button (  ) on the left side of the taskbar.  
The Start menu appears.
- 2 Click [Control Panel] in the Start menu.  
The control panel appears.
- 3 Click [Add or remove user accounts].



- 4 Click [Administrator].



- 5 Click [Create a password].
- 6 Enter a password, and click [Create password].  
Enter the password twice for confirmation.  
The password is created.

## Caution

Do not forget your password. If you forget the password you configured, you will not be able to log in or change or disable the password.

## Configuring the IP Address

- 1 Click the Start button (  ) on the left side of the taskbar.

The Start menu appears.

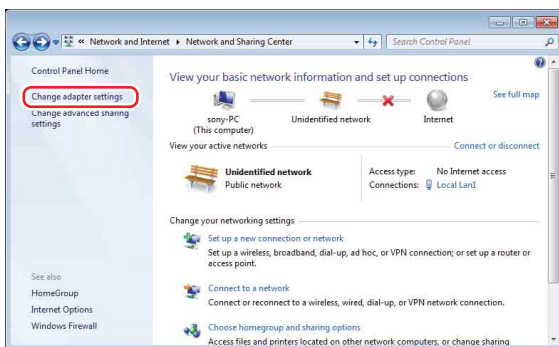
- 2 Click [Control Panel] in the Start menu.

The control panel appears.

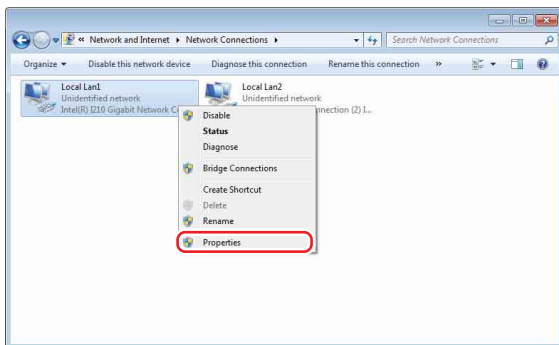
- 3 Click [Network and Internet].

- 4 Click [Network and Sharing Center].

- 5 Click [Change adapter settings].



- 6 Right-click the adapter you want to configure, and click [Properties].



The properties dialog box appears.

- 7 Select [Internet Protocol Version 4 (TCP/IPv4)], and click [Properties].

The [Internet Protocol Version 4 (TCP/IPv4) Properties] dialog box appears.

- 8 Enter the [IP address], [Subnet mask], and [Default gateway] settings, and click [OK].

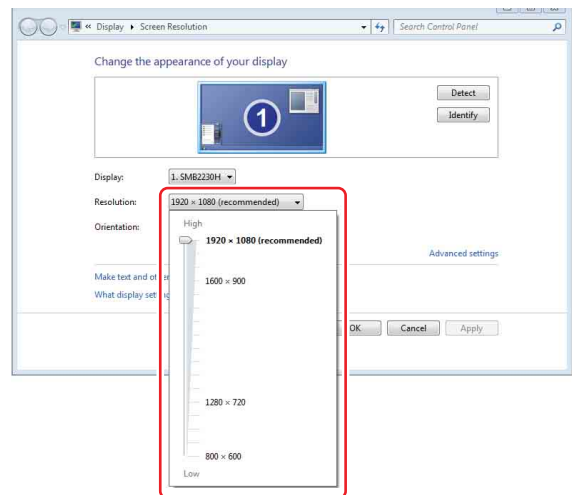
The network is configured.

## Configuring Monitor Settings

### Changing the monitor resolution

- 1 Right-click a blank area of the desktop, and click [Screen resolution].

- 2 Click the [Resolution] setting, and drag the slider that appears to select the resolution.



- 3 Click [OK].

The settings are applied.

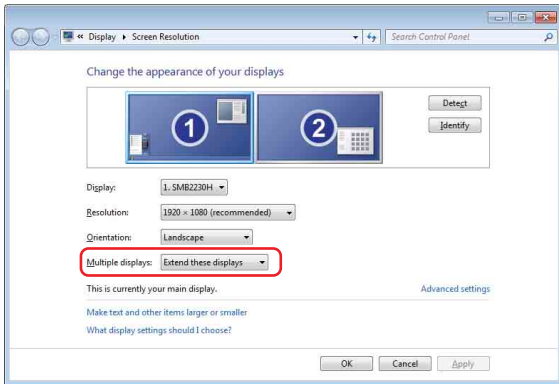
### Configuring dual display settings

You can connect multiple monitors to the unit and use them as a single display.

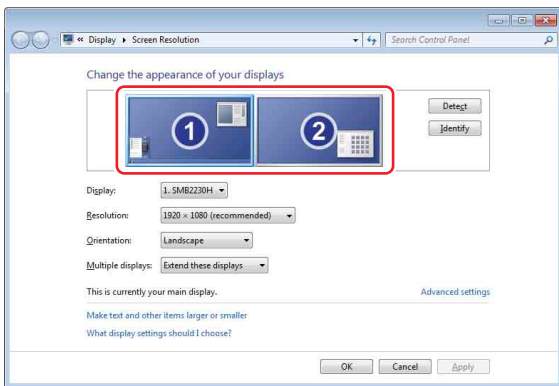
Be sure to connect the monitors beforehand.

- 1 Right-click a blank area of the desktop, and click [Screen resolution].

- 2 Click the [Multiple displays] setting, and select [Extend these displays].



- 3 Drag the displays under [Change the appearance of your displays], and match the positions of displays 1 and 2 with the actual positions of the monitors.



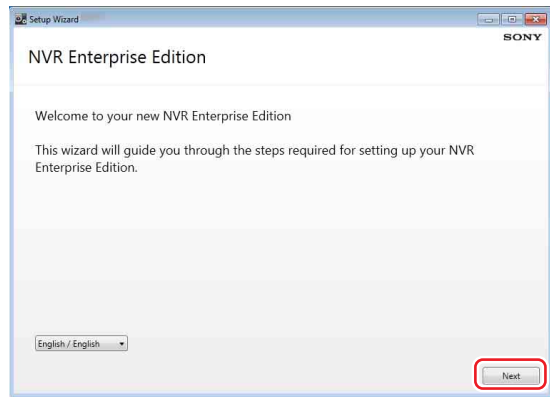
- 4 Click [OK].

The settings are applied.

## Configuring Initial Settings with Setup Wizard

Setup Wizard starts automatically when the desktop screen is displayed for the first time.

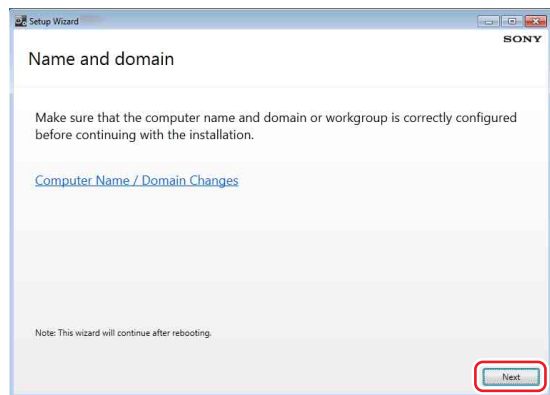
- 1 Click [Next].



### Note

You can change the display language for Setup Wizard. To change the language, select a language in the language selector at the bottom left, and click [OK] in the dialog box that appears to restart Setup Wizard automatically.

- 2 Verify the computer name and configure the domain settings, and click [Next].



### Notes

- The computer name was configured in the “Configuring Initial Windows Settings” procedure. You can change the name here if necessary.
- Configuration of the domain settings is not required.
- Network Video Recorder must be restarted after changing the computer name and domain settings. After Network Video Recorder restarts and you log in, Setup Wizard will appear automatically.

- 3 Select [All-In-One] or [Recording], and click [Next].

- [All-In-One]: Install all components onto the unit. Select this when configuring a system with a single Network Video Recorder.

- [Recording]: Install only the recording server onto the unit. Select this when configuring a system with multiple Network Video Recorders.

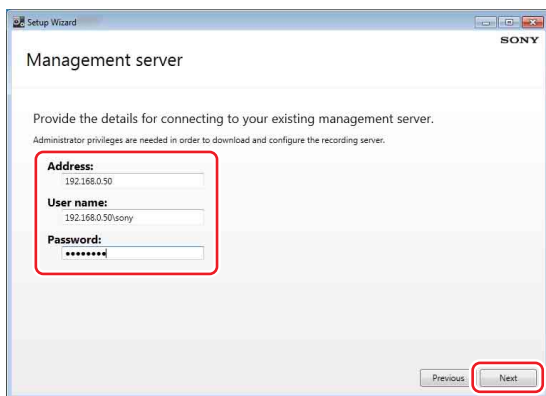
If you selected [All-In-One], proceed to the “Installation in all-in-one mode” section. If you selected [Recording], proceed to the “Installation in recording mode” section.

### Installation in all-in-one mode

- 1 Copy the license file acquired in the “Registering the Software License Code (SLC) and Acquiring the License File” procedure to a USB flash memory device.
- 2 Connect the USB flash memory device to the unit.
- 3 Click [Browse...].
- 4 Select the software license file stored on the USB flash memory device, and click [Open].
- 5 Click [Next].
- 6 Click [Setup].
- 7 Click [Run].
- 8 Click [Finish].

### Installation in recording mode

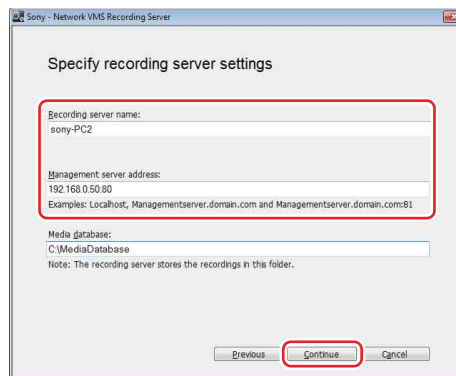
- 1 Enter the IP address, user name, and password for the management server, and click [Next].



#### Notes

- Configure the user name as follows.  
<IP address of the computer on which the management server is installed>\<user name>
- If an error message appears, check that the time settings on the management server and the unit are the same.

- 2 Click [Setup].  
The recording server installation dialog box appears.
- 3 Click [Run].
- 4 Select the language to use for the installer, and click [Continue].
- 5 Click [Typical].
- 6 Enter the recording server name and management server’s IP address, and click [Continue].



#### Note

The path specified in [Media database] will be changed to the path for the RAID drive after the RAID settings are configured, so leave the default path unchanged for now.

- 7 Select the language to use for the Network Video Recorders under [Product language], and click [Install].

#### Caution

Do not change the file location. Changing this setting may result in unstable operation.

- 8 Click [Close].  
Installation of the recording server will complete.
- 9 Click [Finish].  
Setup Wizard closes.

## Configuring the Recording Disk Settings

Configure a recording disk for the internal HDDs to be used as the storage destination for recorded video, archives, and exported data. To configure the recording

disk, start by creating a disk array using RAID Configuration Tool. After creating the RAID array, create a simple volume.

**Caution**

- This document describes settings for RAID5+ hot spare. Be sure to install at least five HDDs on the unit beforehand.
- The procedure described in this section must be performed regardless of the number of HDDs installed on the unit.
- This document describes creation of a single simple volume. The number of simple volumes will vary depending on your operating environment. For details, refer to *NVMS Enterprise Edition System Design Requirements*.

**Logging into RAID Configuration Tool**

- 1 Double-click the RAID Configuration Tool icon on the desktop.



- 2 Click [Ask me later].

The login screen for RAID Configuration Tool appears.

- 3 Enter the user name and password, and click [Login].

**Note**

The default user name and password are as follows.

- User Name: administrator
- Password: password

**Caution**

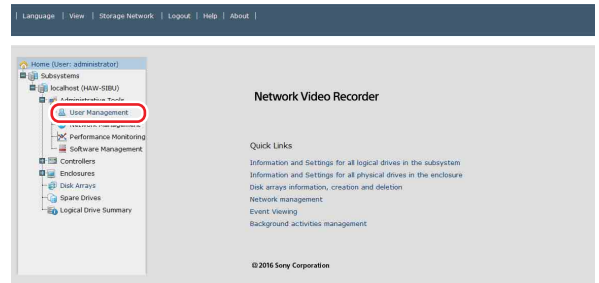
Be sure to change the default user name and password.

- 4 Click [Continue to this website (not recommended)].

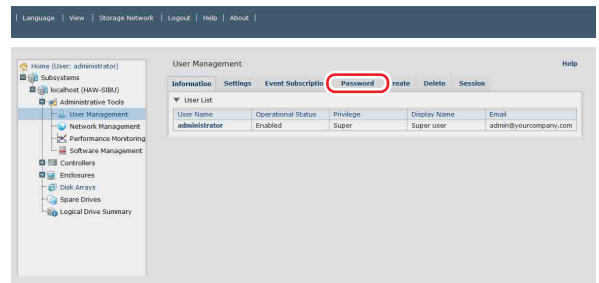
If a RAID array has not been created, the array configuration screen will appear, regardless of whether HDDs have been installed. The home screen will appear in all other cases.

**Changing the password**

- 1 Open [Home] - [Subsystems] - [localhost] - [Administrative Tools] in the RAID Configuration Tool screen's tree list, and click [User Management].

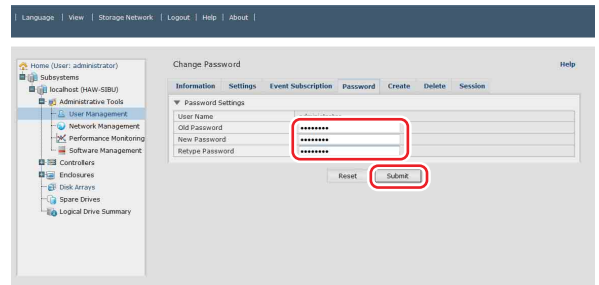


- 2 Click the [Password] tab.



- 3 Enter a password, and click [Submit].

Enter the current password in [Old Password], and enter the new password twice.



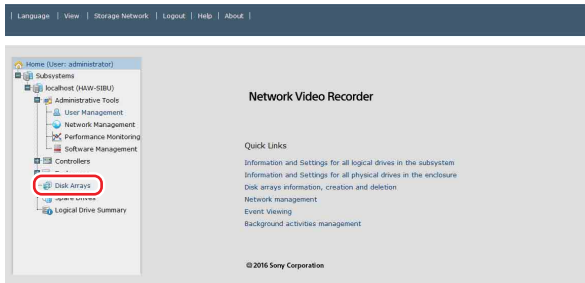
**Caution**

Do not forget your password. If you forget the password you configured, you will not be able to log in or change the password.

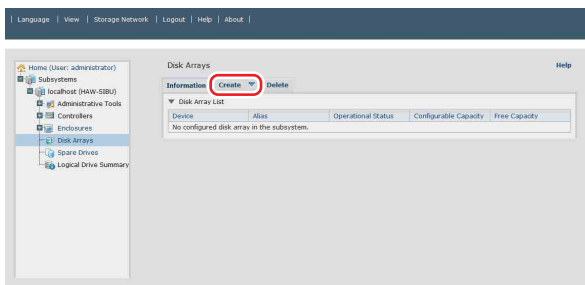


## Creating disk arrays

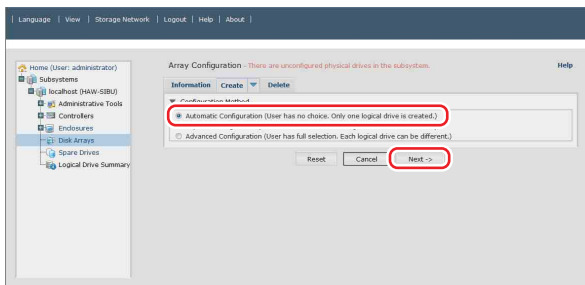
- 1 Open [Home] - [Subsystems] - [localhost] in the RAID Configuration Tool screen's tree list, and click [Disk Arrays].



- 2 Click the [Create] tab.



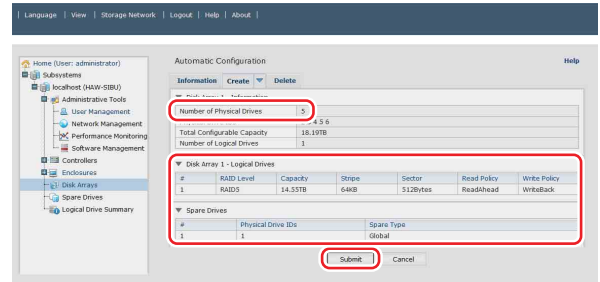
- 3 Click [Automatic Configuration], and click [Next ->].



- 4 Verify that the [Number of Physical Drives] value under [Disk Array 1 - Information] is one less than the number of drives installed on the unit and that both [Disk Array 1 - Logical Drives] and [Spare Drives] include one entry (#1), and click [Submit].

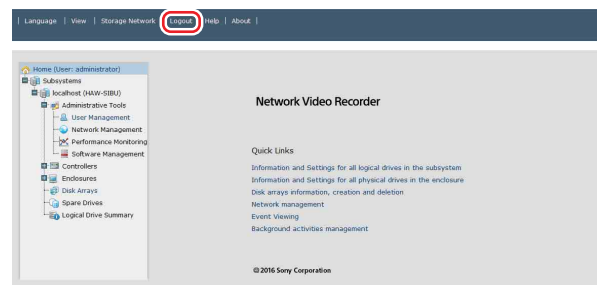
If the correct information is not displayed, the HDDs may not be installed properly. Turn off the unit, and check the HDD installations.

For details, see “Step 2: Installing the HDDs” (page 14).



## Logging out of RAID Configuration Tool

- 1 Click [Logout] in the RAID Configuration Tool screen's menu bar.

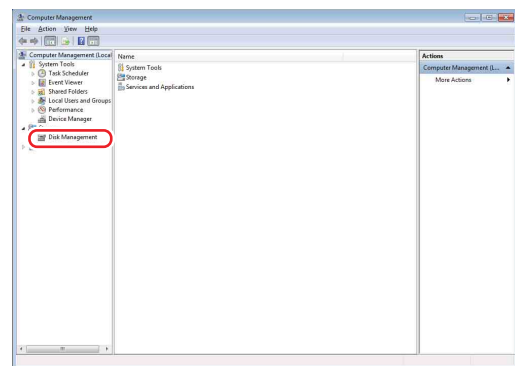


## Creating simple volumes

- 1 Right-click the [Computer] icon on the desktop, and click [Manage] in the menu that appears.

The [Computer Management] screen appears.

- 2 Click [Disk Management].

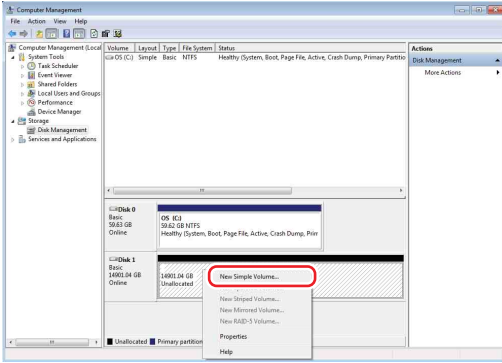


The [Initialize Disk] dialog box appears.

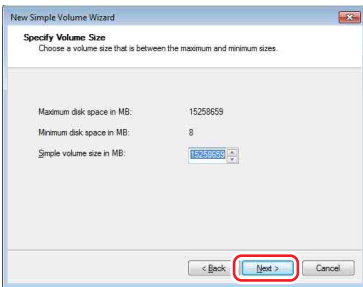
- 3 Select [GPT (GUID Partition Table)], and click [OK].



- Right-click the “Unallocated” area of [Disk 1], and click [New Simple Volume...].

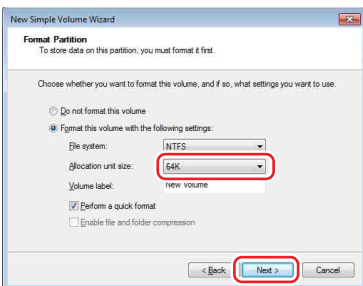



- Click [Next].
- Click [Next] again.



### Notes

- The [Maximum disk space in MB] value depends on the size and number of HDDs installed and the RAID settings.
  - Verify that the [Simple volume size in MB] value matches the [Maximum disk space in MB] value.
- Click [Next].
  - Change the [Allocation unit size] value to [64K], and click [Next].



- Click [Finish].
- Click  to close the screen.

## Updating the Device Pack Version

Communication between network cameras and video encoders is performed via device drivers developed especially for each device and device drivers for multiple similar devices from the same manufacturer. Device drivers are installed by default during installation of the recording server. However, you can update to the latest device drivers by downloading and installing new versions of the Device Pack.

### Verifying the version of the installed Device Pack

- Verify the latest version of Device Pack at the following URL.

<https://www.sony.net/CameraSystem/NVMS/Software>

- Click the Start button () on the left side of the taskbar.

The Start menu appears.

- Click [Control Panel] in the Start menu.

The control panel appears.

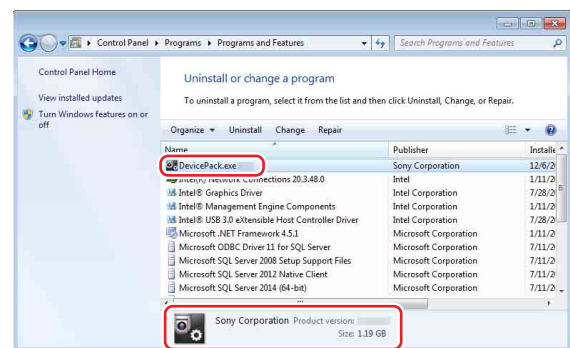
- Click [Programs].

The programs screen appears.

- Click [Programs and Features].

The programs and features screen appears.

- Select the Device Pack, and verify the Device Pack product version.



If the installed Device Pack is not the latest version, proceed to the next section, “Updating the Device Pack.”

## Updating the Device Pack

- 1 Download the latest version of Device Pack from the following URL.  
<https://www.sony.net/CameraSystem/NVMS/Software>
- 2 Copy the downloaded Device Pack to a USB flash memory device.
- 3 Connect the USB flash memory device to the unit.
- 4 Double-click the Device Pack installer, and follow the instructions on the screen to perform installation.

## Starting Management Client

- 1 Double-click the Management Client shortcut icon on the desktop.  
The login screen appears.
- 2 Click [Connect].  
When login is successful, the Management Client screen appears.

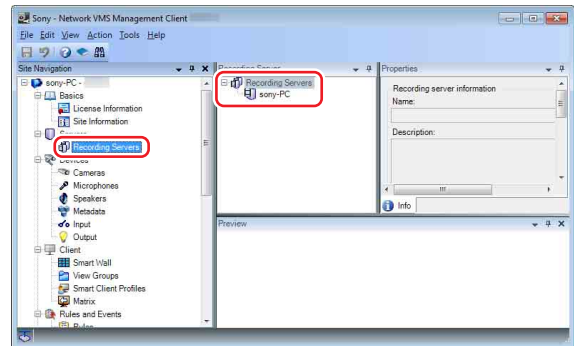
### Note

You can change the display language of Management Client under [Tools] - [Options] in the menu bar. For details, refer to the *NVMS Enterprise Edition Administrator Manual*.

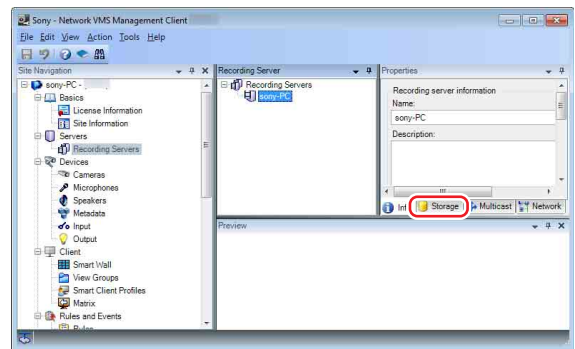
## Configuring the Recording Destinations

Configure two recording destinations, “recording” and “archiving.” The archiving destination is not configured by default, so be sure to create it.

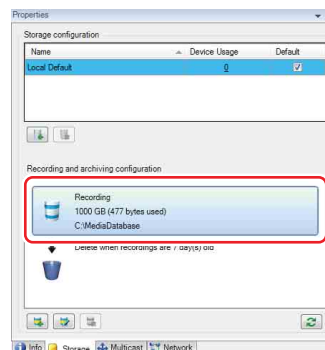
- 1 Click [Servers] - [Recording Servers] in the Management Client screen, and click the registered recording server.



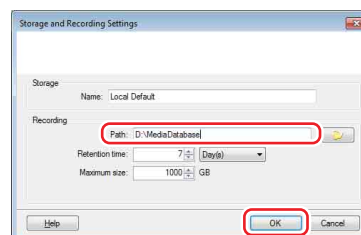
- 2 Click the [Storage] tab in the properties screen.



- 3 Double-click [Recording].



- 4 Change the [Path] setting to “D:\MediaDatabase,” and click [OK].



The storage recording destination is changed.

## Note

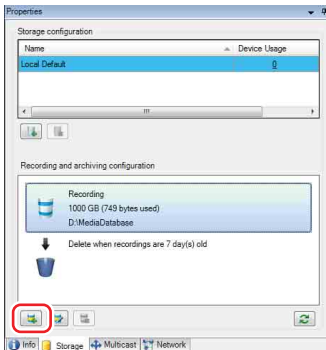
You can set the retention time and maximum size for recording in this dialog.

## Caution

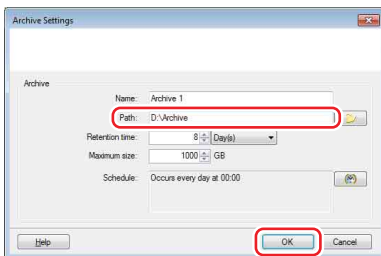
Be sure to specify the RAID area as the path. Setting the path to the C drive may result in unstable operation.

5 Click [Yes].

6 Click .



7 Change the [Path] setting to “D:\Archive,” and click [OK].



The archive destination is added.

## Note

You can set the retention time and maximum size for archiving, and the schedule for moving recorded images to an archive after recording in this dialog. For details about the schedule for moving recorded images to an archive after recording, refer to *NVMS Enterprise Edition System Design Requirements*.

## Caution

- Be sure to specify the RAID area as the path. Setting the path to the C drive may result in unstable operation.
- The archive storage location will vary depending on your operating environment. For details, refer to

## NVMS Enterprise Edition System Design Requirements for HAW-E.

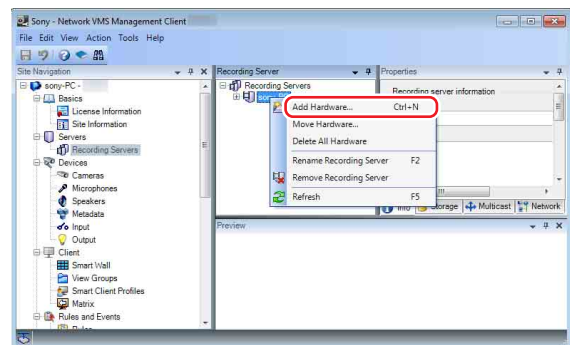
## Registering Cameras

Register the cameras within the network to the recording server, and enable operation of the cameras from the Network Video Recorder.

## Caution

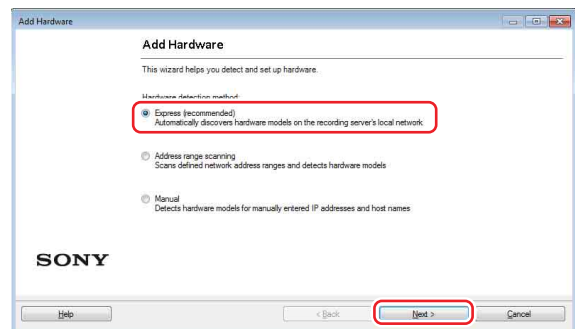
- IP addresses must be configured for the network cameras beforehand.
- Do not assign the same IP address to multiple devices, as this will prevent proper configuration.

1 Click [Servers] - [Recording Servers] in the Management Client screen, right-click the registered recording server, and click [Add Hardware...].



The [Add Hardware] dialog box appears.

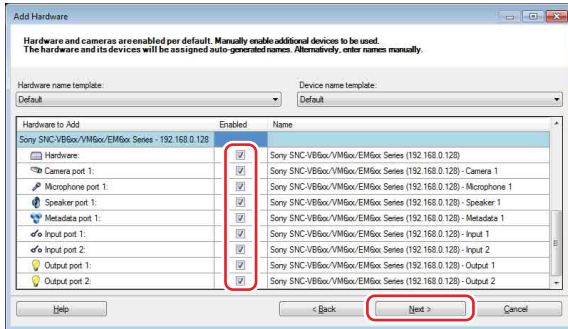
2 Select [Express (recommended)], and click [Next].



## Note


This section describes the express procedure only. Therefore, the IP addresses for the network cameras must be configured using the same segment as LAN connectors 1 and 2 of the unit. For details on “Address range scanning” and “Manual” procedures, refer to the *NVMS Enterprise Edition Administrator Manual*.

- 3 Click [Next] in the subsequent screens.
- 4 Select the checkboxes of the devices to use for each camera, and click [Next].



- 7 Use the same procedure to add other groups other than camera groups.
- 8 Click [Finish].

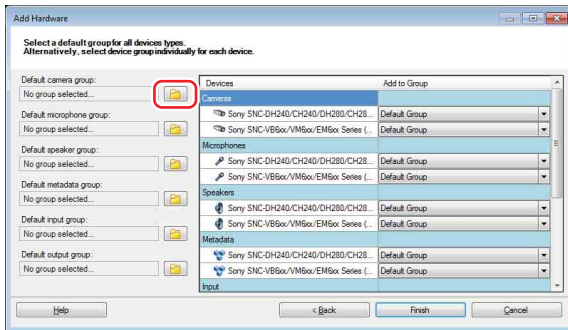
## Quitting Management Client

Click  at the top right of the Management Client screen to close the screen.

### Notes


- The following device types exist. For details, refer to the *NVMS Enterprise Edition Administrator Manual*.
  - Cameras
  - Microphones
  - Speakers
  - Metadata
  - Inputs
  - Outputs
- The available devices and their number vary depending on the specifications of the cameras.

- 5 Click  for [Default camera group].



### Note

Each device must belong to at least one group.

- 6 Click  to add a new camera group, and click [OK].



## Step 5: Verifying Operation

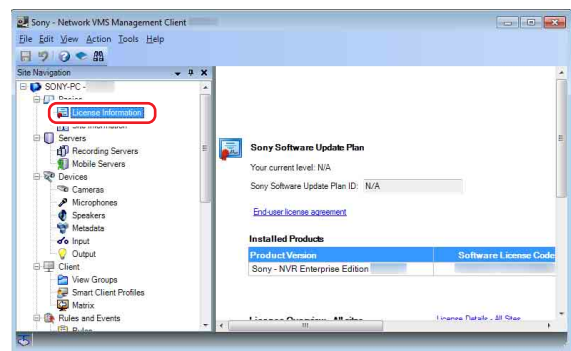
Install Smart Client on the computer connected to the unit to verify operation. For details on installation, refer to the *NVMS Smart Client User Manual*.

## Step 6: Activation

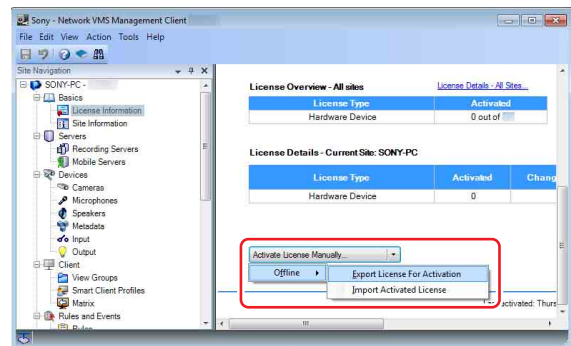
After registering cameras and configuring settings with the application, licenses must be activated.

### Exporting License Request Files (.lrc)

- 1 Connect a USB flash memory device to the unit.
- 2 Click [Basics] - [License Information] in the Management Client screen's tree list.



- 3 Click [Activate License Manually...] - [Offline] - [Export License For Activation].



- 4 Select the USB flash memory device in the file saving screen, and click [Save].

The license request file is exported.

#### Caution

Before removing USB flash memory devices from the unit, be sure to right-click the target removable disk in Explorer and perform [Eject].

---

## Acquiring Activated Software License Files (.lic)

Register license request files at the Sony license site, and acquire activated software license files. For details, refer to the *NVMS License Guide*.

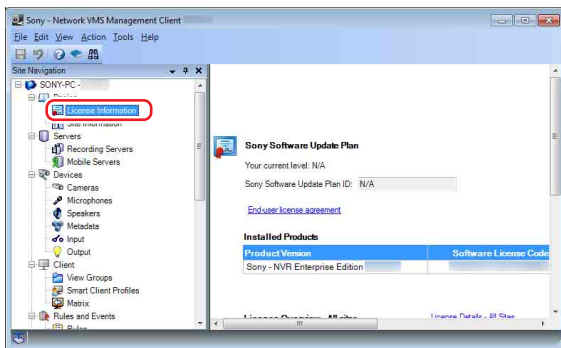
### Caution

Before removing USB flash memory devices from the unit, be sure to right-click the target removable disk in Explorer and perform [Eject].

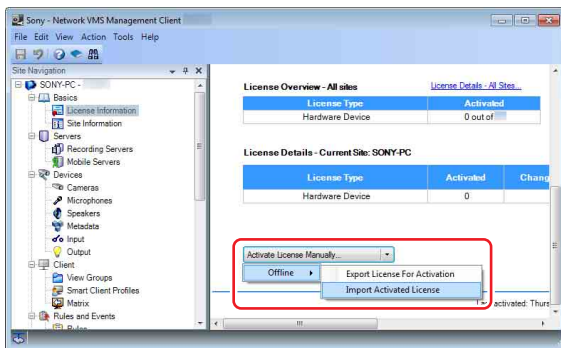
---

## Importing Activated Software License Files (.lic)

- 1 Copy the activated license file to a USB flash memory device.
- 2 Connect the USB flash memory device to the unit.
- 3 Click [Basics] - [License Information] in the Management Client screen's tree list.



- 4 Click [Activate License Manually...] - [Offline] - [Import Activated License].



- 5 Select the activated software license file stored on the USB flash memory device in the file opening screen, and click [Open].

This completes activation.

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## Step 7: Data Backup

We recommend backing up your data so it can be restored if a hardware failure occurs, for example.

For details on backing up data, refer to the *NVMS Enterprise Edition Maintenance Guide*.

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```
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 * -----
 */
```

For the modules/mappers/mod\_imagemap.c component:

"macmartinized" polygon code copyright 1992 by Eric Haines, erich@eye.com

For the server/util\_md5.c component:

```
/*
 * NCSA HTTPd Server
 * Software Development Group
 * National Center for Supercomputing Applications
 * University of Illinois at Urbana-Champaign
 * 605 E. Springfield, Champaign, IL 61820
 * httpd@ncsa.uiuc.edu
 *
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 *
 * -----
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 *
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 *
 */
```

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```
*/
/*
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* -----
*/
```

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```

For the `src/libapr-util/xml/external/conftools/install-sh` component:

```
#
# install - install a program, script, or datafile
# This comes from X11R5 (mit/util/scripts/install.sh).
#
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#
```

For the `test/vb.c` component:

```
/*
=====
ZeusBench V1.01
=====
*/
```

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Written by Adam Twiss (adam@zeus.co.uk). March 1996

Thanks to the following people for their input:  
Mike Belshe (mbelshe@netscape.com)  
Michael Campanella (campanella@stevms.enet.dec.com)

\*/

For the expat xml parser component:

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=====  
standard crypt

FreeSec: libcrypt for NetBSD

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=====  
standard crypt's blowfish implementation

The crypt\_blowfish homepage is:

<http://www.openwall.com/crypt/>

This code comes from John the Ripper password cracker, with reentrant and crypt(3) interfaces added, but optimizations specific to password cracking removed.

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This implementation is mostly compatible with OpenBSD's bcrypt.c (prefix "\$2a\$") by Niels Provos <[provos@cit.umich.edu](mailto:provos@cit.umich.edu)>, and uses some of his ideas. The password hashing algorithm was designed by David Mazieres <[dm@lcs.mit.edu](mailto:dm@lcs.mit.edu)>. For more information on the level of compatibility, please refer to the comments in BF\_set\_key() and to the crypt(3) man page included in the crypt\_blowfish tarball.

There's a paper on the algorithm that explains its design decisions:

<http://www.usenix.org/events/usenix99/provos.html>

Some of the tricks in BF\_ROUND might be inspired by Eric Young's Blowfish library (I can't be sure if I would think of something if I hadn't seen his code).

=====  
json\_parser

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rand

The following php\_mt\_...() functions are based on a C++ class MTRand by Richard J. Wagner. For more information see the web page at <http://www-personal.engin.umich.edu/~wagner/MersenneTwister.html>

Mersenne Twister random number generator -- a C++ class MTRand  
Based on code by Makoto Matsumoto, Takuji Nishimura, and Shawn Cokus  
Richard J. Wagner v1.0 15 May 2003 [rjwagner@writeeme.com](mailto:rjwagner@writeeme.com)

The Mersenne Twister is an algorithm for generating random numbers. It was designed with consideration of the flaws in various other generators. The period,  $2^{19937}-1$ , and the order of equidistribution, 623 dimensions, are far greater. The generator is also fast; it avoids multiplication and division, and it benefits from caches and pipelines. For more information see the inventors' web page at <http://www.math.keio.ac.jp/~matumoto/emt.html>

#### Reference

M. Matsumoto and T. Nishimura, "Mersenne Twister: A 623-Dimensionally Equidistributed Uniform Pseudo-Random Number Generator", ACM Transactions on Modeling and Computer Simulation, Vol. 8, No. 1, January 1998, pp 3-30.

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strnatcmp.c

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uencode

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xm1pc

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=====  
zip

zip.h -- exported declarations.  
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snprintf.c

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main/snprintf  
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=====  
strcat, strlcpy

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6. ext/standard crypt's blowfish implementation  
7. Sqlite/Sqlite3 ext/sqlite3 ext/sqlite  
8. ext/json/json\_parser  
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10. ext/standard/scanf  
11. ext/standard/strnatcmp.c  
12. ext/standard/unicode  
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5. ext/standard crypt

FreeSec: libcrypt for NetBSD

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#### 6. ext/standard/crypt's blowfish implementation

The crypt\_blowfish homepage is:

<http://www.openwall.com/crypt/>

This code comes from John the Ripper password cracker, with reentrant and crypt(3) interfaces added, but optimizations specific to password cracking removed.

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This implementation is mostly compatible with OpenBSD's bcrypt.c (prefix "\$2a\$") by Niels Provos <provos at citi.umich.edu>, and uses some of his ideas. The password hashing algorithm was designed by David Mazieres <dm at lcs.mit.edu>. For more information on the level of compatibility, please refer to the comments in BF\_set\_key() and to the crypt(3) man page included in the crypt\_blowfish tarball.

There's a paper on the algorithm that explains its design decisions:

<http://www.usenix.org/events/usenix99/provos.html>

Some of the tricks in BF\_ROUND might be inspired by Eric Young's Blowfish library (I can't be sure if I would think of something if I hadn't seen his code).

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#### 9. ext/standard/rand

The following php\_mt\_\*() functions are based on a C++ class MTRand by Richard J. Wagner. For more information see the web page at <http://www-personal.engin.umich.edu/~wagner/MersenneTwister.html>

Mersenne Twister random number generator -- a C++ class MTRand Based on code by Makoto Matsumoto, Takuji Nishimura, and Shawn Cokus Richard J. Wagner v1.0 15 May 2003 [rjwagner@write.com](mailto:rjwagner@write.com)

The Mersenne Twister is an algorithm for generating random numbers. It was designed with consideration of the flaws in various other generators. The period,  $2^{19937}-1$ , and the order of equidistribution, 623 dimensions, are far greater. The generator is also fast; it avoids multiplication and division, and it benefits from caches and pipelines. For more information see the inventors' web page at <http://www.math.keio.ac.jp/~matumoto/emt.html>

#### Reference

M. Matsumoto and T. Nishimura, "Mersenne Twister: A 623-Dimensional Equidistributed Uniform Pseudo-Random Number Generator", ACM Transactions on Modeling and Computer Simulation, Vol. 8, No. 1, January 1998, pp 3-30.

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#### 10. ext/standard/scanf scanf.c --

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11. ext/standard/stratcmp.c

stratcmp.c -- Perform 'natural order' comparisons of strings in C.  
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12. ext/standard/uencode

Portions of this code are based on Berkeley's uencode/uudecode implementation.

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15. main/snprintf.c

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main/sprintf

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16. `main/strcat`  
17. `main/strlcpy`  
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- Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

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Although their code does not appear in gd, the authors wish to thank David Koblas, David Rowley, and Hutchison Avenue Software Corporation for their prior contributions.

#### The Independent JPEG Group's JPEG software

README for release 6b of 27-Mar-1998

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This software is the work of Tom Lane, Philip Gladstone, Jim Boucher, Lee Crocker, Julian Minguillon, Luis Ortiz, George Phillips, Davide Rossi, Guido Vollbeding, Ge' Weijers, and other members of the Independent JPEG Group.

IJG is not affiliated with the official ISO JPEG standards committee.

#### DOCUMENTATION ROADMAP

This file contains the following sections:

- OVERVIEW General description of JPEG and the IJG software.
- LEGAL ISSUES Copyright, lack of warranty, terms of distribution.
- REFERENCES Where to learn more about JPEG.
- ARCHIVE LOCATIONS Where to find newer versions of this software.
- RELATED SOFTWARE Other stuff you should get.
- FILE FORMAT WARS Software \*not\* to get.
- TO DO Plans for future IJG releases.

Other documentation files in the distribution are:

#### User documentation:

install.doc How to configure and install the IJG software.  
usage.doc Usage instructions for cjpeg, djpeg, jpegtran,  
rdjpgcom, and wrjpgcom.  
\*.1 Unix-style man pages for programs (same info as usage.doc).  
wizard.doc Advanced usage instructions for JPEG wizards only.  
change.log Version-to-version change highlights.  
Programmer and internal documentation:  
libjpeg.doc How to use the JPEG library in your own programs.  
example.c Sample code for calling the JPEG library.  
structure.doc Overview of the JPEG library's internal structure.  
filelist.doc Road map of IJG files.  
coderules.doc Coding style rules --- please read if you contribute code.

Please read at least the files install.doc and usage.doc. Useful information can also be found in the JPEG FAQ (Frequently Asked Questions) article. See ARCHIVE LOCATIONS below to find out where to obtain the FAQ article.

If you want to understand how the JPEG code works, we suggest reading one or more of the REFERENCES, then looking at the documentation files (in roughly the order listed) before diving into the code.

#### OVERVIEW

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This package contains C software to implement JPEG image compression and decompression. JPEG (pronounced "jay-peg") is a standardized compression method for full-color and gray-scale images. JPEG is intended for compressing "real-world" scenes; line drawings, cartoons and other non-realistic images are not its strong suit. JPEG is lossy, meaning that the output image is not exactly identical to the input image. Hence you must not use JPEG if you have to have identical output bits. However, on typical photographic images, very good compression levels can be obtained with no visible change, and remarkably high compression levels are possible if you can tolerate a low-quality image. For more details, see the references, or just experiment with various compression settings.

This software implements JPEG baseline, extended-sequential, and progressive compression processes. Provision is made for supporting all variants of these processes, although some uncommon parameter settings aren't implemented yet. For legal reasons, we are not distributing code for the arithmetic-coding variants of JPEG; see LEGAL ISSUES. We have made no provision for supporting the hierarchical or lossless processes defined in the standard.

We provide a set of library routines for reading and writing JPEG image files, plus two sample applications "cjpeg" and "djpeg", which use the library to perform conversion between JPEG and some other popular image file formats. The library is intended to be reused in other applications.

In order to support file conversion and viewing software, we have included considerable functionality beyond the bare JPEG coding/decoding capability; for example, the color quantization modules are not strictly part of JPEG decoding, but they are essential for output to colormapped file formats or colormapped displays. These extra functions can be compiled out of the library if not required for a particular application. We have also included "jpegtran", a utility for lossless transcoding between different JPEG processes, and "rdjpgcom" and "wrjpgcom", two simple applications for inserting and extracting textual comments in JFIF files.

The emphasis in designing this software has been on achieving portability and flexibility, while also making it fast enough to be useful. In particular, the software is not intended to be read as a tutorial on JPEG. (See the REFERENCES section for introductory material.) Rather, it is intended to be reliable, portable, industrial-strength code. We do not claim to have achieved that goal in every aspect of the software, but we strive for it.

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The Unix configuration script "configure" was produced with GNU Autoconf. It is copyright by the Free Software Foundation but is freely distributable. The same holds for its supporting scripts (config.guess, config.sub, ltconfig, ltmain.sh). Another support script, install-sh, is copyright by M.I.T. but is also freely distributable.

It appears that the arithmetic coding option of the JPEG spec is covered by patents owned by IBM, AT&T, and Mitsubishi. Hence arithmetic coding cannot legally be used without obtaining one or more licenses. For this reason, support for arithmetic coding has been removed from the free JPEG software. (Since arithmetic coding provides only a marginal gain over the unpatented Huffman mode, it is unlikely that very many implementations will support it.) So far as we are aware, there are no patent restrictions on the remaining code.

The IJG distribution formerly included code to read and write GIF files. To avoid entanglement with the Unisys LZW patent, GIF reading support has been removed altogether, and the GIF writer has been simplified to produce "uncompressed GIFs". This technique does not use the LZW algorithm; the resulting GIF files are larger than usual, but are readable by all standard GIF decoders.

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#### REFERENCES

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We highly recommend reading one or more of these references before trying to understand the innards of the JPEG software.

The best short technical introduction to the JPEG compression algorithm is Wallace, Gregory K. "The JPEG Still Picture Compression Standard", Communications of the ACM, April 1991 (vol. 34 no. 4), pp. 30-44. (Adjacent articles in that issue discuss MPEG motion picture compression, applications of JPEG, and related topics.) If you don't have the CACM issue handy, a PostScript file containing a revised version of Wallace's article is available at <http://ftp.uu.net/graphics/jpeg/wallace.ps.gz>. The file (actually a preprint for an article that appeared in IEEE Trans. Consumer Electronics) omits the sample images that appeared in CACM, but it includes corrections and some added material. Note: the Wallace article is copyright ACM and IEEE, and it may not be used for commercial purposes.

A somewhat less technical, more leisurely introduction to JPEG can be found in "The Data Compression Book" by Mark Nelson and Jean-loup Gailly, published by M&T Books (New York), 2nd ed. 1996, ISBN 1-55851-434-1. This book provides good explanations and example C code for a multitude of compression methods including JPEG. It is an excellent source if you are comfortable reading C code but don't know much about data compression in general. The book's JPEG sample code is far from industrial-strength, but when you are ready to look at a full implementation, you've got one here...

The best full description of JPEG is the textbook "JPEG Still Image Data Compression Standard" by William B. Pennebaker and Joan L. Mitchell, published by Van Nostrand Reinhold, 1993, ISBN 0-442-01272-1. Price US\$59.95, 638 pp. The book includes the complete text of the ISO JPEG standards (DIS 10918-1 and draft DIS 10918-2). This is by far the most complete exposition of JPEG in existence, and we highly recommend it.

The JPEG standard itself is not available electronically; you must order a paper copy through ISO or ITU. (Unless you feel a need to own a certified official copy, we recommend buying the Pennebaker and Mitchell book instead; it's much cheaper and includes a great deal of useful explanatory material.) In the USA, copies of the standard may be ordered from ANSI Sales at (212)

642-4900, or from Global Engineering Documents at (800) 854-7179. (ANSI doesn't take credit card orders, but Global does.) It's not cheap: as of 1992, ANSI was charging \$95 for Part 1 and \$47 for Part 2, plus 7% shipping/handling. The standard is divided into two parts, Part 1 being the actual specification, while Part 2 covers compliance testing methods. Part 1 is titled "Digital Compression and Coding of Continuous-tone Still Images, Part 1: Requirements and guidelines" and has document numbers ISO/IEC IS 10918-1, ITU-T T.81. Part 2 is titled "Digital Compression and Coding of Continuous-tone Still Images, Part 2: Compliance testing" and has document numbers ISO/IEC IS 10918-2, ITU-T T.83.

Some extensions to the original JPEG standard are defined in JPEG Part 3, a newer ISO standard numbered ISO/IEC IS 10918-3 and ITU-T T.84. IJG currently does not support any Part 3 extensions.

The JPEG standard does not specify all details of an interchangeable file format. For the omitted details we follow the "JFIF" conventions, revision 1.02. A copy of the JFIF spec is available from:

Literature Department  
C-Cube Microsystems, Inc.  
1778 McCarthy Blvd.  
Milpitas, CA 95035  
phone (408) 944-6300, fax (408) 944-6314  
A PostScript version of this document is available by FTP at  
ftp://ftp.uu.net/graphics/jpeg/jfif.ps.gz. There is also a plain text  
version at ftp://ftp.uu.net/graphics/jpeg/jfif.txt.gz, but it is missing  
the figures.

The TIFF 6.0 file format specification can be obtained by FTP from  
ftp://ftp.sgi.com/graphics/tiff/TIFF6.ps.gz. The JPEG incorporation scheme  
found in the TIFF 6.0 spec of 3-June-92 has a number of serious problems.  
IJG does not recommend use of the TIFF 6.0 design (TIFF Compression tag 6).  
Instead, we recommend the JPEG design proposed by TIFF Technical Note #2  
(Compression tag 7). Copies of this Note can be obtained from ftp.sgi.com or  
from ftp://ftp.uu.net/graphics/jpeg/. It is expected that the next revision  
of the TIFF spec will replace the 6.0 JPEG design with the Note's design.  
Although IJG's own code does not support TIFF/JPEG, the free libtiff library  
uses our library to implement TIFF/JPEG per the Note. libtiff is available  
from ftp://ftp.sgi.com/graphics/tiff/.

#### ARCHIVE LOCATIONS

The "official" archive site for this software is ftp.uu.net (Internet  
address 192.48.96.9). The most recent released version can always be found  
there in directory graphics/jpeg. This particular version will be archived  
as ftp://ftp.uu.net/graphics/jpeg/jpegsrc.v6b.tar.gz. If you don't have  
direct Internet access, UUNET's archives are also available via UUCP; contact  
help@uunet.uu.net for information on retrieving files that way.

Numerous Internet sites maintain copies of the UUNET files. However, only  
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You can also obtain this software in DOS-compatible "zip" archive format from  
the SimTel archives (ftp://ftp.simtel.net/pub/simtelnet/msdos/graphics/), or  
on CompuServe in the Graphics Support forum (GO CIS:GRAPHSUP), library 12  
"JPEG Tools". Again, these versions may sometimes lag behind the ftp.uu.net  
release.

The JPEG FAQ (Frequently Asked Questions) article is a useful source of  
general information about JPEG. It is updated constantly and therefore is  
not included in this distribution. The FAQ is posted every two weeks to  
Usenet newsgroups comp.graphics.misc, news.answers, and other groups.  
It is available on the World Wide Web at http://www.faqs.org/faqs/jpeg-faq/  
and other news.answers archive sites, including the official news.answers  
archive at rtfm.mit.edu: ftp://rtfm.mit.edu/pub/usenet/news.answers/jpeg-faq/.  
If you don't have Web or FTP access, send e-mail to mail-server@rtfm.mit.edu  
with body  
send usenet/news.answers/jpeg-faq/part1  
send usenet/news.answers/jpeg-faq/part2

#### RELATED SOFTWARE

Numerous viewing and image manipulation programs now support JPEG. (Quite a  
few of them use this library to do so.) The JPEG FAQ described above lists  
some of the more popular free and shareware viewers, and tells where to  
obtain them on Internet.

If you are on a Unix machine, we highly recommend Jef Poskanzer's free  
PBPLUS software, which provides many useful operations on PPM-format image  
files. In particular, it can convert PPM images to and from a wide range of  
other formats, thus making cjpeg/djpeg considerably more useful. The latest  
version is distributed by the NetPBM group, and is available from numerous  
sites, notably ftp://wuarhive.wustl.edu/graphics/packages/NetPBM/.  
Unfortunately PBPLUS/NETPBM is not nearly as portable as the IJG software is;  
you are likely to have difficulty making it work on any non-Unix machine.

A different free JPEG implementation, written by the PVRG group at Stanford,  
is available from ftp://havefun.stanford.edu/pub/jpeg/. This program  
is designed for research and experimentation rather than production use;  
it is slower, harder to use, and less portable than the IJG code, but it  
is easier to read and modify. Also, the PVRG code supports lossless JPEG,  
which we do not. (On the other hand, it doesn't do progressive JPEG.)

#### FILE FORMAT WARS

=====

Some JPEG programs produce files that are not compatible with our library.  
The root of the problem is that the ISO JPEG committee failed to specify a  
concrete file format. Some vendors "filled in the blanks" on their own,  
creating proprietary formats that no one else could read. (For example, none  
of the early commercial JPEG implementations for the Macintosh were able to  
exchange compressed files.)

The file format we have adopted is called JFIF (see REFERENCES). This format  
has been agreed to by a number of major commercial JPEG vendors, and it has  
become the de facto standard. JFIF is a minimal or "low end" representation.  
We recommend the use of TIFF/JPEG (TIFF revision 6.0 as modified by TIFF  
Technical Note #2) for "high end" applications that need to record a lot of  
additional data about an image. TIFF/JPEG is fairly new and not yet widely  
supported, unfortunately.

The upcoming JPEG Part 3 standard defines a file format called SPIFF.  
SPIFF is interoperable with JFIF, in the sense that most JFIF decoders should  
be able to read the most common variant of SPIFF. SPIFF has some technical  
advantages over JFIF, but its major claim to fame is simply that it is an  
official standard rather than an informal one. At this point it is unclear  
whether SPIFF will supersede JFIF or whether JFIF will remain the de-facto  
standard. IJG intends to support SPIFF once the standard is frozen, but we  
have not decided whether it should become our default output format or not.  
(In any case, our decoder will remain capable of reading JFIF indefinitely.)

Various proprietary file formats incorporating JPEG compression also exist.  
We have little or no sympathy for the existence of these formats. Indeed,  
one of the original reasons for developing this free software was to help  
force convergence on common, open format standards for JPEG files. Don't  
use a proprietary file format!

#### TO DO

=====

The major thrust for v7 will probably be improvement of visual quality.  
The current method for scaling the quantization tables is known not to be  
very good at low Q values. We also intend to investigate block boundary  
smoothing, "poor man's variable quantization", and other means of improving  
quality-vs-file-size performance without sacrificing compatibility.

In future versions, we are considering supporting some of the upcoming JPEG  
Part 3 extensions --- principally, variable quantization and the SPIFF file  
format.

As always, speeding things up is of great interest.

Please send bug reports, offers of help, etc. to jpeg-info@uunet.uu.net.

#### libmagic

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Download: ftp://ftp.astron.com/pub/file/

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PCRE is a library of functions to support regular expressions whose syntax and semantics are as close as possible to those of the Perl 5 language.

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The basic library functions are written in C and are freestanding. Also included in the distribution is a set of C++ wrapper functions, and a just-in-time compiler that can be used to optimize pattern matching. These are both optional features that can be omitted when the library is built.

## THE BASIC LIBRARY FUNCTIONS

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## PCRE JUST-IN-TIME COMPILATION SUPPORT

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Structures\_Graph

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webalizer - a web server log analysis program

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# Troubleshooting

Check the following items before contacting your Sony dealer, and contact them if the problem persists.

## The unit does not operate.

- Check whether the power switch is turned on.
- Check whether the power cord is properly connected.
- Check whether the wall outlet has power. Test it by plugging another device.
- Check that the HDDs are not being accessed (the ACCESS LED on the front panel of the unit is not blinking), turn the unit off forcibly by pressing and holding the power switch at the front panel of the unit for approximately 4 seconds, and then restart the unit.
- During the startup procedure, the unit checks the file system. The length of this check varies depending on the amount of data on the unit. During the file system check, the ACCESS LED on the front panel of the unit blinks.

## The monitor remains blank.

- Check whether the unit is turned on.
- Check whether the power cord is properly connected.
- Check whether the monitor cable is properly connected.
- Check whether the monitor is connected to the appropriate connector.

## External devices connected to the USB connectors do not operate.

- The unit supports standard USB 2.0 and USB 3.0 mass storage class devices. However, depending on the type of USB device, errors may occur when writing data to the device. If errors occur when writing data, try using a USB flash memory device of a different type.
- To ensure proper operation of USB devices, do not connect the devices via a USB hub. Connect the devices directly to the USB connectors on the unit. Operation is not guaranteed when devices are connected via a USB hub, USB switch, or extension cable.
- Refer to the documentation supplied with the USB device.

## The HDDs cannot be accessed.

- Check that the HDD is properly installed.
- Check the HDD LEDs on the front panel of the unit. Identify the defective HDD via the drive LEDs. A defective HDD LED lights red.

## The system shuts down automatically.

When the internal temperature of the unit rises to an abnormal level, the system shuts down automatically. Make sure that nothing is blocking the ventilation openings on the front, sides, and rear of the unit, and that dust has not accumulated in them.

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# Specifications

## External connectors

Front	USB: USB 3.0 (2)
Rear	Monitor output: Analog RGB (mini D-SUB 15 pin) (1) HDMI (1) DisplayPort (1) Line output (1) Microphone input (1) Line input (1) LAN (1000 Base-T/100 Base-TX/ 10 Base-T) (RJ-45) (2) USB: USB 2.0 (2) USB 3.0 (4) S/PDIF output (1) Serial connector: RS-232C (1)

## Operating environment

Operating temperature	5 °C to 40 °C (41 °F to 104 °F)
Operating humidity	20% to 80% (no condensation)
Temperature range for storage	-20 °C to +60 °C (-4 °F to +140 °F)
Humidity range for storage	20% to 90% (no condensation)

## Power and miscellaneous

Power	100 V to 240 V AC (50/60 Hz)
Rated current	7 A
Dimensions	447 × 88.5 × 410 mm (17 <sup>5</sup> / <sub>8</sub> × 3 <sup>1</sup> / <sub>2</sub> × 16 <sup>1</sup> / <sub>4</sub> in.) (W/H/D, excluding protrusions)
Mass	Approx. 8.6 kg (18 lb. 15 oz.) (excluding the HDD units)

Design and specifications are subject to change without notice.

## Notes

- Always make a test recording, and verify that it was recorded successfully.  
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