MVR-D2200V

User Manual

Notice to Reader

Canopus Co.,Ltd. makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Canopus shall not be liable for errors contained herein or for incidental consequential damages in connection with the furnishing, performance, or use of this material.

This document contains proprietary information which is protected by copyright. All rights are reserved. No part of this document may be photocopied, reproduced or translated into another language without the prior written consent of Canopus Co.,Ltd.

The information in this document is subject to change without notice.

FCC Notice

This equipment has been tested and found to comply with the limits for the class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

This equipment has been certified to comply with the limits for a class B computing device, pursuant to FCC Rules. In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with nonapproved equipment or unshielded cables is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the user's authority to operate this equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Warranty

Your MVR-D2200V hardware options are covered by a limited warranty when you register your Canopus product. This warranty is for a period of three years from the date of purchase from Canopus or an authorized Canopus agent. This warranty applies only to the original purchaser of the Canopus product and is not transferable.

Canopus Co.,Ltd. warrants that for this period the product will be in good working order. Should our product fail to be in good working order, Canopus will, at its option, repair or replace it at no additional charge, provided that the product has not been subjected to misuse, abuse or non-Canopus authorized alterations, modifications and/or repair. Proof of purchase is required to validate your warranty. Canopus Co.,Ltd. has gone to considerable effort to make the user manual as accurate as possible at the time of printing. Canopus cannot assume, however, any responsibility for any inaccuracies that may be contained in the manual. In no event will Canopus Co.,Ltd. be liable for direct, indirect, special, incidental, or consequential damages resulting from any defect or omission in the manual, even if advised of the possibility of such damages.

As part of their ongoing process of continued product development, Canopus Co.,Ltd. reserves the right to make improvements in the manual and the products it describes at any time, without notice or obligation.

CANOPUS CO.,LTD. IS NOT RESPONSIBLE FOR ANY LOST PROFITS, LOST SAVINGS OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF, OR INABILITY TO USE, THIS PRODUCT. THIS INCLUDES DAMAGE TO PROPERTY AND, TO THE EXTENT PERMITTED BY LAW, DAMAGES FOR PERSONAL INJURY. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Declaration of Conformity

According to FCC Part 15

Responsible Party Name: Canopus Co.,Ltd.

Address: 1-2-2 Murotani,Nishi-ku

    Kobe 651-2241 Japan

Declares that product: Model: MVR-D2200V

Complies with Part 15 of the FCC Rules.

MVR-D2200V

Table of Contents

Table of Contents

Chapter 3 35

Chapter 1

Before Installation

This chapter explains about things to know before installing the MVR series board.

- License Agreement

- Package Contents

- Customer Support

- Precautions

- System Requirements

License Agreement

This Product includes a Canopus Software License Agreement, which is a legal agreement between you and Canopus Co., Ltd., for the Canopus software product(s) included in this package. By installing, copying, or otherwise using the software (all within the limitations set in the agreement), you agree to be bound by the terms of this license agreement. If you do not agree to the terms of this license agreement, DO NOT install or use the software.

Package Contents

The below items are included in this package. Please check if all items are included, and if not, please contact Customer support.

MVR-D2200V product contents

- MVR-D2200V board

- S-Video / composite conversion cable

- CD-ROM

- Manual

- User Registration Card

Customer Support

For questions regarding application setup and usage, please contact your local Canopus office, distributor or the store that you have purchased this product.

For questions regarding the SDK, please contact the SDK support address printed in the SDK manual.

Precautions

It is illegal for anyone to violate any of the rights provided by the copyright laws to the owner of copyright, except for fair use (mainly private noncommercial use). Also, in certain cases copying is prohibited with no exceptions. In no event shall Canopus be liable for any direct or indirect damages whatsoever arising out of the use of captured materials.

System Requirements

Please confirm that your PC system meets the system requirements below for using the MVR-D2200V.

PC Unit

Intel® Pentium® III 866MHz or over

128MB of memory

1 open PCI bus slot (V2.1 or over)

CD-ROM drive

Operation system

Microsoft® Windows® Server 2003

  * For image overlay, the hardware acceleration on your display adapter needs to be set to highest, and the DirectDraw accelerator needs to be turned on.

Microsoft® Windows® XP Professional + Service Pack 1 or later

Microsoft® Windows® XP Home + Service Pack 1 or later

Microsoft® Windows® 2000 Professional + Service Pack 4 or later

Microsoft® Windows® 2000 Server + Service Pack 4 or later

Graphics

Support for resolutions larger than 640x480, in 16bit color or higher (Requires 800x600 or larger for x1 size overlay)

Sound System

Sound board which functions on WDM driver, and which has analog LINE IN terminal.

About IRQ

This hardware requires one free IRQ. While this hardware can share IRQs with other devices, many devices that report they can share IRQs may not share IRQs properly.

Chapter 2

System Setup

This chapter describes how to setup the hardware and software to your system.

- Hardware Descriptions

- Hardware Installation

- Connecting Peripheral Equipments

- Driver Installation

- Software Installation

- Uninstallation

- MVR-D2000 Properties

Hardware Descriptions

Below are the descriptions for the connectors on the MVR-D2200V board.
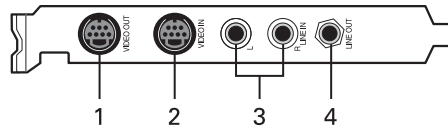
1 - Video output connectors

Outputs from the video playback application, and also loops through playback of video coming in from the input connectors. To connect Composite (RCA) cables, use the included conversion cable.

2 - Video input connectors

Inputs video from video devices. To connect Composite (RCA) cables, use the included conversion cable.

3 - Audio input connectors

Inputs stereo audio for capture.

4 - Audio output connector

Outputs audio through in capture mode.

 Warning
Please DO NOT connect headphones to this connector.

Hardware Installation

Precautions

Static electricity can damage electronic components. Take care not to touch connectors or cards directly. When installing or working on your PC, first touch a grounded metal surface. This will discharge any static electricity on your body.

The total power consumption of the board is below. Please be careful not to exceed the power limits of your computer.

- **MVR-D2200V**

  +5V   :   2.0A

  +12V :   200mA

  -12V   :   100mA

Inserting the board

Please follow the steps below to insert the board to your PC.

1. Shut down Windows, and turn off your PC.

2. Remove all power cables from your PC.

3. Remove the PC cover. Please refer to the instruction guide for your PC.

4. Remove the PCI slot cover.
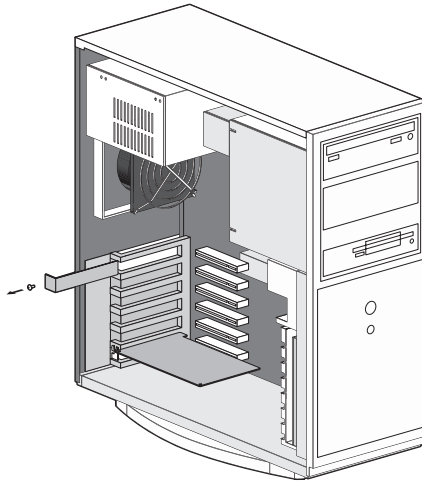
5. Insert the MVR series board to an open PCI slot.

6. Screw the bracket to your PC.

7. Close the PCI cover, and connect the power cables.
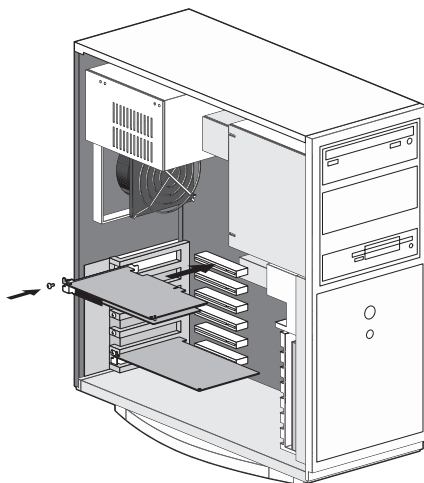
Connecting Peripheral Equipments

Connect Video Equipment to the MVR-D2200V boards as below:

Connecting systems with S-video

Connect equipment with S-Video connectors as below using S-Video cables (not included).

VIDEO IN   VIDEO OUT
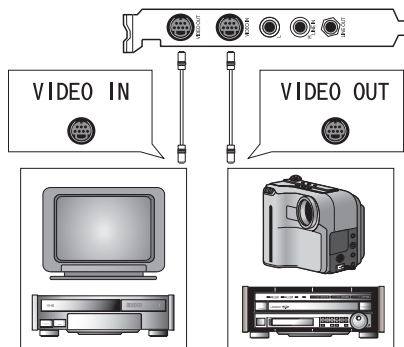
Connecting systems with component

Connect equipment with component (RCA) connectors as below using the S-Video component conversion cables (included) and composite video cables (not included).

VIDEO IN   VIDEO OUT
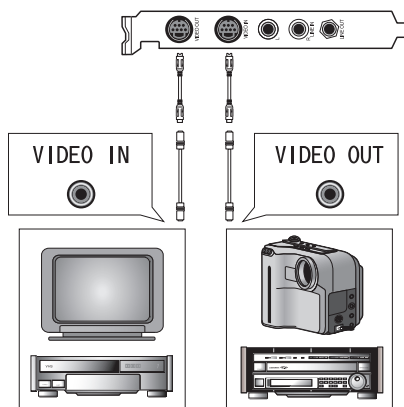
Connecting audio input connector

Connect equipment with audio connectors as below using audio cables (not included)

* For equipment that have stereo pin jack connectors, please use RCA to stereo pin jack conversion cables..

LINE OUT
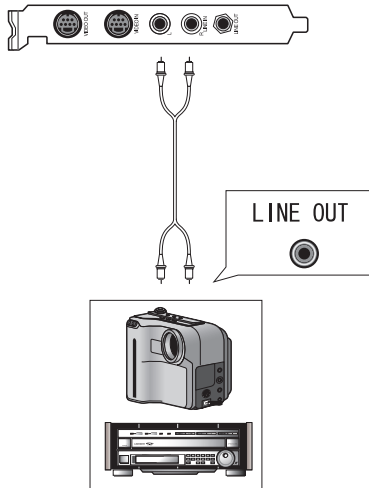
Connecting audio output connector

Connect equipment with audio connectors as below using audio cables (not included)

* For equipment that have RCA connectors, please use RCA to stereo pin jack conversion cables..

LINE IN
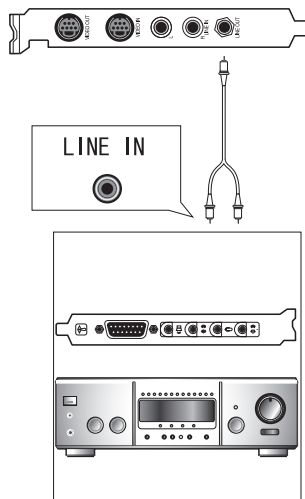
Driver Installation

Below shows how to install the drivers.

Windows 2000 / Windows 2000 Server Installation

To install the drivers, you will need to log on as a user with admin-istrator privilege.

1. When you start Windows after inserting the board, Plug and Play will detect the hardware and a driver installation window will open. Click **[Next]**.

2. Click **[Search for...]** and click **[Next]**.
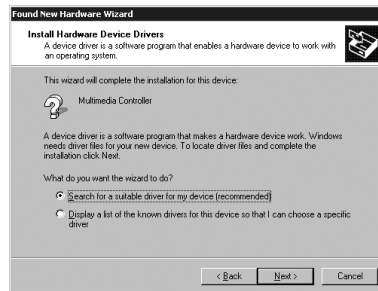
3. Check **[Specify a location]** and click **[Next]**.

4. Insert the CD-ROM, set **D:\MVR-D2000\driver** (D: is the location of your cd-rom drive), and click **[OK]**.

5. Confirm that the model name is **[MVR-D2000 Series Kernel Mode Driver]**, and click **[Next]**.

If "Digital Signature Not Found" dialog will appears during setup. Click **[Yes]**.

6. Click **[Finish]**.
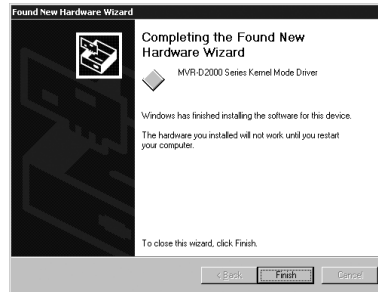
7. When they prompt you to reboot, click **[Yes]**.
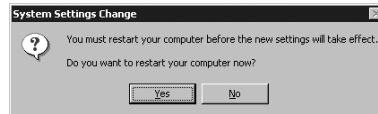
Windows XP / Windows Server 2003 Installation

To install the drivers, you will need to log on as a user with administrator privilege.

1. When you start Windows after inserting the board, Plug and Play will detect the hardware and a driver installation window will open. Choose **[Install from a list or specific location (Advanced)]** and click **[Next]**.

2. Click **[Don't search. I will choose the driver to install.]** and click **[Next]**.

3. Select **[Sound, video and game controllers]** from the **[Common hardware types]** field and then click **[Next]**.
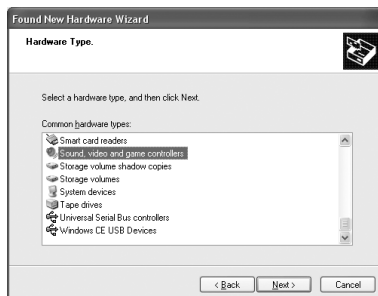
4. Click **[Have Disk]**.

5. Insert the CD-ROM and click **[Browse]**,
   set to *D:\MVR-D2000\driver* (D: is the location of your cd-rom
   drive), and click **[OK]**.
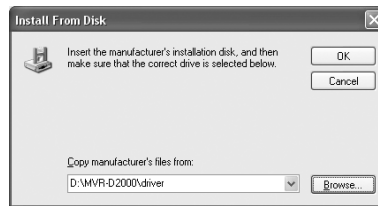
6. Confirm that the model name is **[MVR-D2000 Series Kernel
   Mode Driver]**, and click **[Next]**.

If the following dialog appears, click **[Continue Anyway]**.

7. Click **[Finish]**.

8. When they prompt you to reboot, click **[Yes]**.
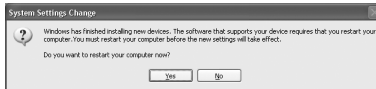
Software Installation

To install software in Windows 2000/XP/Server 2000/2003 Server, you will need to log on as a user with administrator privilege.

1. Insert the CD-ROM.

2. Setup application will run automatically. If the program does not run, please start the setup manually from the CD-ROM.

3. Click **[Next]**.
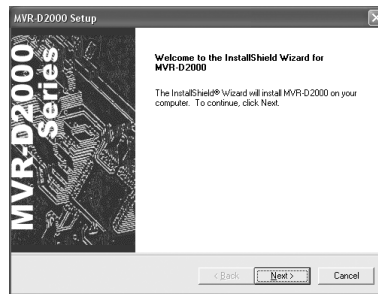
4. The License Agreement is shown. Read carefully and click **[Yes]** if you accept it.
   If you click **[No]**, the installation is aborted.
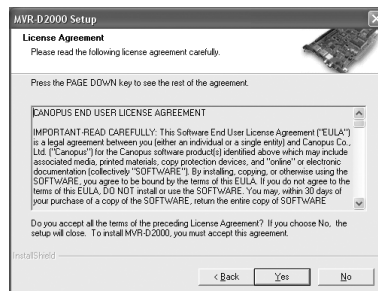
5. Set the destination folder and click **[Next]**.
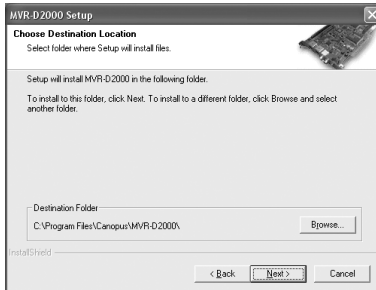
6. Select the components to install, and click **[Next]**.
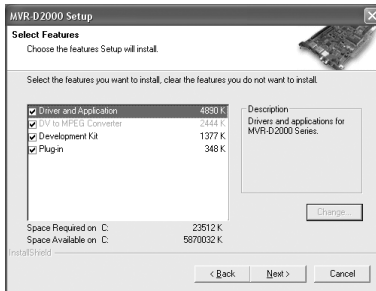
- Driver and Application (Required)

- DV to MPEG Converter

- Development Kit

- Premiere Plug-in (Available only when Premiere has already been installed.)

7. Click **[Next]**.
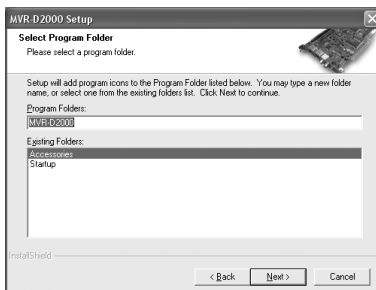
8. Choose **[Yes, I want to restart my computer now.]** and click **[Finish]**.
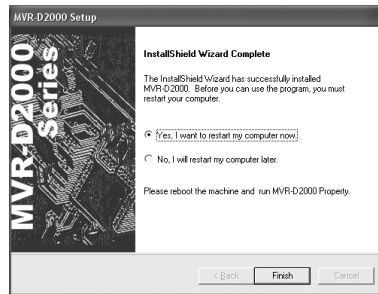
If you installed the development kit, you will need Adobe Reader to read the online manual. Please install Adobe Reader 6.0 as follows.

Adobe Reader 6.0 Installation

If you installed the development kit, you will need Adobe Reader to read the online manual.

1. Insert the CD-ROM

2. Open the CD-ROM with the Explorer, and go to **[AdbeRdr]**-**[English]** and click *AdbeRdr60_enu_full.exe*.
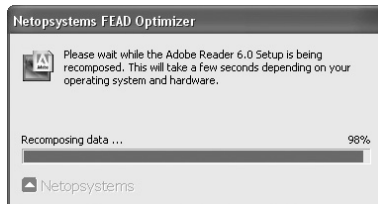
3 Click **[Next]**.
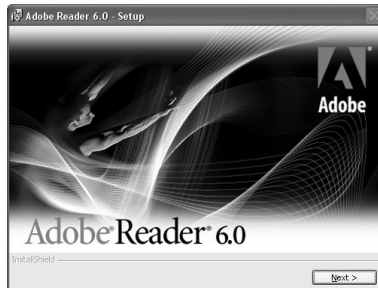
4. Click **[Next]**.
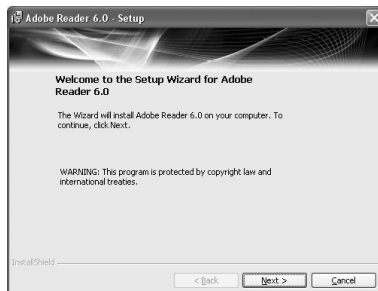
5. Set the destination folder and click **[Next]**.
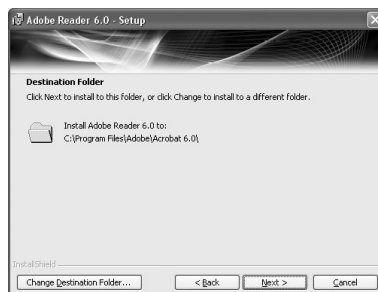
6. Click **[Install]**.
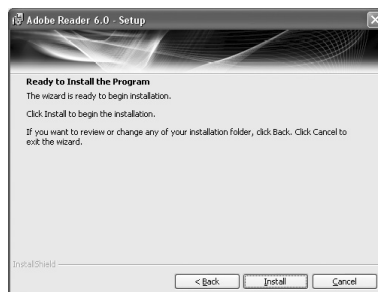
7. Click **[Finish]**.

Uninstallation

To uninstall software in Windows 2000/XP/server 2000/2003 Server, you will need to log on as a user with administrator privilege.

1. From Start menu, go to Control Panel, and select **[Add/Remove Programs]**.

2. Click **[MVR-D2000]** and click **[Change/Remove]**.
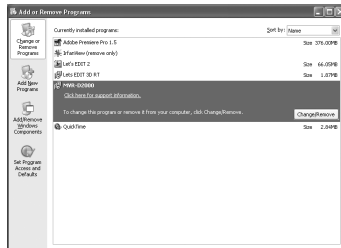
3. Choose **[Remove]** and click **[Next]**.

4. A confirmation message will appear. Click **[OK]**.
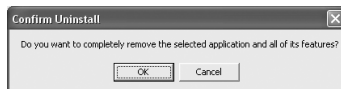
5. Click **[Finish]**.
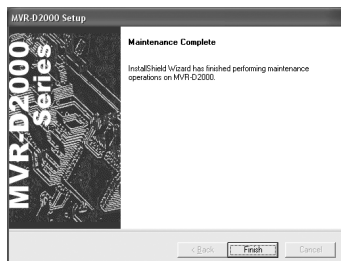
MVR-D2000 Properties

How to open the properties dialog

From Start Menu, go to [All Programs (Programs for windows 2000)] - [MVR-D2000] and select [MVR-D2000 Property].
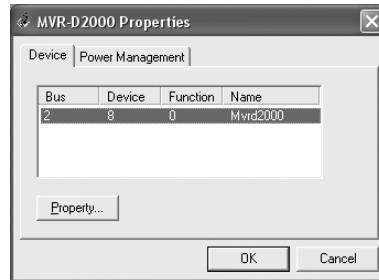

Property Settings

1. In the **[Device]** tab, click **[Property]**.
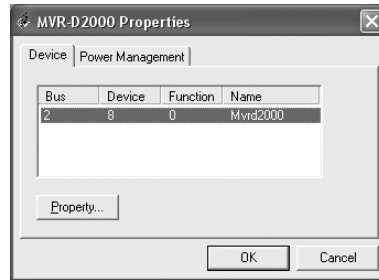
2. Set the necessary device settings.

   * If the [Convert AVI files to MPEG] box is checked, the driver requires extra memory space upon startup (approximately 3.7MB). If you wish to turn off this feature, uncheck this box.
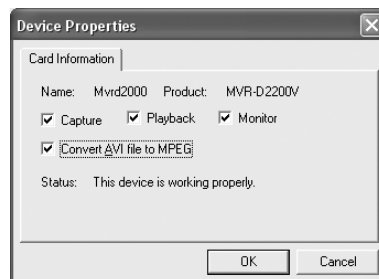
Device Properties for Card Information Tab

3. Set the Power Management settings.
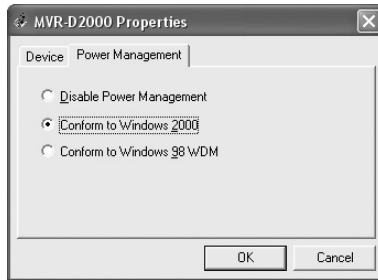
Immediately after the driver is installed, [Conform to Windows 2000] is selected. If the system is unstable, change the setting to [Conform to Windows 98 WDM], or to [Disable Power Management] if the system is still too unstable.

(1) Disable Power Management

* This disables power management. IRP processing requests from the Power Management is passed to the low-level driver.

(2) Conform toWindows 2000

* This operates as a power policy owner based on the Windows 2000 Device Driver Kit (build 2195).

(3) Conform to Windows 98 WDM

* This operates as a power policy owner based on the Windows 98 Device Driver Kit (or the Windows 2000 Release Candidate 2 Device Driver Kit).

4. Click **[OK]**.

Chapter 3

MPEG Station

This chapter explains about
MPEG Station.

- About MPEG Station

- Capturing Video

- Playback

- Details on Encoding Parameters

About MPEG Station

How to launch MPEG Station

From the Start Menu, go to **[All Programs (Programs for Windows 2000)]** - **[MVR-D2000]** and select **[MPEG Station]**.

Program Interface

Capture Mode
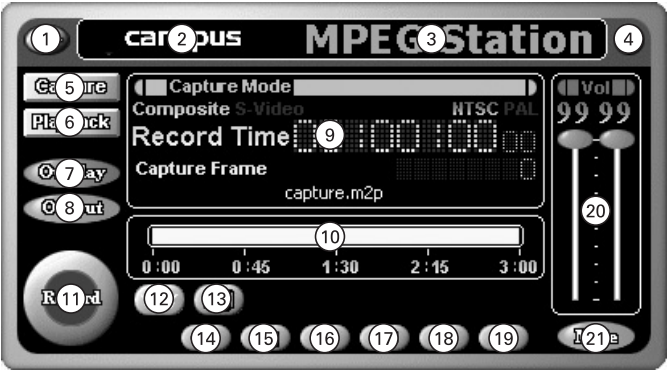
The following dialog box will appear when you right click on the interface.
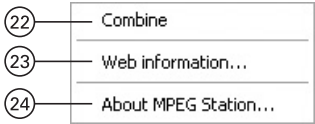
1 . Close ----------------------- Closes MPEG Station.

2 . Homepage ----------------- Click here to jump to the Canopus Homepage.

3 . Version info ------------- Click here to display the version info.

4 . Icon ------------------------ Click here to minimize this application.

5 . Capture mode ----------- Click here to switch to Capture mode.

6 . Playback mode --------- Click here to switch to Playback mode.

7 . Overlay button ---------- When the preview button is pressed, the overlay will turn on/off (toggle).

 8 . **Video output** ------------- When the preview button is pressed, this will pass through the input video to the output connector. Click again to turn off the output.

 9 . **Information display** --- Displays the file information.

10. **Status bar** ----------------- Displays captured length.

11. **Capture** -------------------- Click here to start capture.

12. **Preview** -------------------- Click here to turn the preview on/off (toggle).

13. **Still capture** ------------- Click here to capture a still image from the current video.

14. **Video input** -------------- Click here to select between S and composite video input.

15. **Capture file** -------------- Click here to set the capture file.

16. **Option settings** --------- Click here to set the capture / video parameter / still capture options.

17. **Image size** ---------------- Click here to set the preview image size.

18. **Image quality** ------------ Click here to set the capture and overlay quality.

19. **Capture time** ------------- Click here to set the capture time.

20. **Monitor level fader** --- Click here to adjust the input audio level for monitoring. You can use the wheel on your mouse to adjust this level also. You can not adjust this audio level while capturing.

21. **Mute** ----------------------- Click here to mute the monitor audio. This setting is not valid when capturing.

22. **Interface mode** --------- Click here to attach or separate the overlay display area from the main control area.

23. **Homepage** ---------------- Click here to jump to the Canopus Homepage.

24. **Version info** ------------- Click here to display the version info.

Playback mode
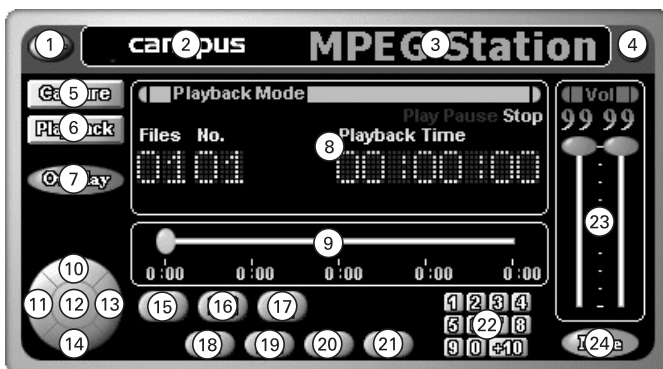
The following dialog box will appear when you right click on the interface.
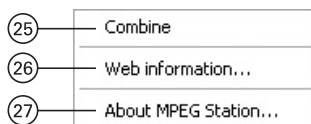
1 . **Close** ----------------------- Closes MPEG Station

2 . **Homepage** ---------------- Click here to jump to the Canopus Homepage.

3 . **Version info** ------------- Click here to display the version info.

4 . **Icon** ------------------------- Click here to minimize this application.

5 . **Capture mode** --------- Click here to switch to Capture mode.

6 . **Playback mode** ------- Click here to switch to Playback mode.

7 . **Overlay button** -------- When the preview button is pressed, the overlay will turn on/off (toggle).

8 . **Information display** - Displays the file information.

9 . **Playback slider** -------- Drag the marker to change the play-back location.

10. **Pause** ----------------------- Pause playback.

11. **Previous file** ------------- Jump to the previous file in program playback mode.

12. **Playback** ------------------ Start playback.

13. Next file ------------------ Jump to the next file in program playback mode.

14. Stop ----------------------- Stops playback and return to start.

15. Repeat --------------------- Repeats the current playback.

16. Still capture ------------ Click here to capture a still image from the current video.

17. Program playback ---- Click here to switch to program playback mode.

18. Playlist -------------------- Click here to set the playback list for program playback mode.

19. File select ---------------- Select the MPEG file to playback.

20. Option --------------------- Sets the options for file playback. You can also see the settings for the current file.

21. Overlay size ------------ Sets the overlay image size.

22. File number key ------- In program playback mode, click here to select the file to playback.

23. Monitor level fader -- Click here to adjust the input audio level for monitoring. You can use the wheel on your mouse to adjust this level also. You can not adjust this audio level when playing WAVE files.

24. Mute ------------------------ Click here to mute the monitor audio.

25. Interface mode -------- Click here to attach or separate the overlay display area from the main control area.

26. Homepage --------------- Click here to jump to the Canopus Homepage.

27. Version info ------------ Click here to display the version info.

Capturing Video

Basic operation
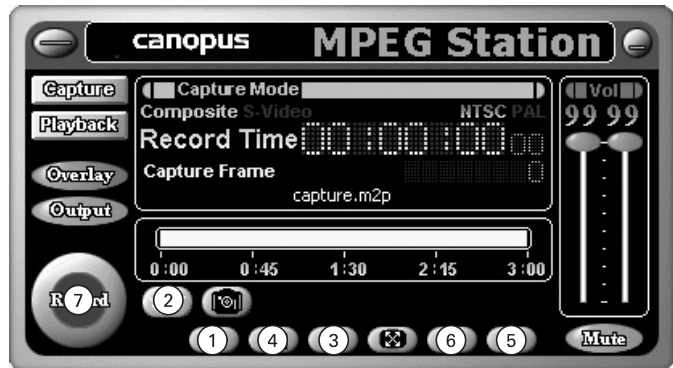
1 . Click the Video input select button to select the video source.

2 . Click the Preview button to display the input video.

3 . Click the Options button to open the capture parameters.

4 . Click the File options button to set the capture file name and location.

5 . Click the Capture time button to set the capture time.

6 . Click the Image quality button to set the input video quality.

7 . Click the Record button to start capturing. Click the Record button again to stop capture.

Monitoring Video and Audio

You can monitor the input video and audio on the computer screen and on an external monitor as below:

1. Viewing on the computer screen

   Click the preview button, then click the overlay display button.

2. Viewing on an external monitor

   Click the preview button, then click the video output button.

Tip
You can click the overlay size button to change the overlay screen size. You need to separate the screen area and the control area to change the screen size.

WARNING
The audio LINE OUT terminal of MVR-D2200V is exclusive for LINE OUT. Please DO NOT connect headphones to this connector.

Overlay quality adjustments

Click the overlay quality adjustment button to adjust the overlay image quality. (This setting will not change the capture quality)
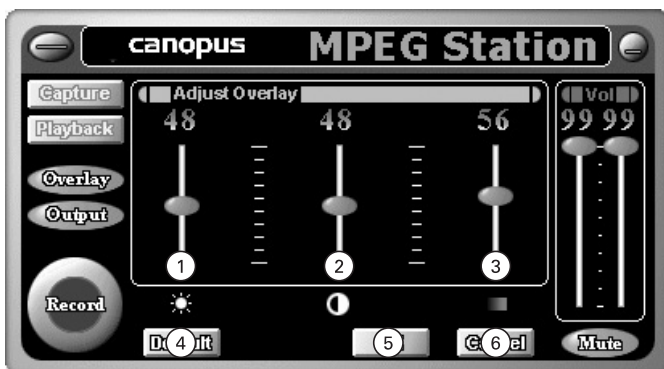
1 . Brightness ---------------- Adjust the brightness of the input picture. Zero (0) is the darkest state and 99 is the brightest state. The higher the value, the higher the luminosity, the lower the value, the lower the luminosity.

2 . Contrast ------------------ Adjust the input picture's contrast. The higher the value, the higher the contrast. When the value is 0, there is no luminosity component to determined contrast.

3 . Saturation ---------------- Adjust the density of color in the input picture. The higher the value, the greater the density of the color. When the color is 0, there is no color component (black and white state).

4 . Default -------------------- Return to the default setting.

5 . OK --------------------------- Apply the settings and return to the main screen.

6 . Cancel --------------------- Returns to the main screen without applying changes.

Audio monitoring

You can monitor the input audio as below:

1. Monitoring on speaker

   Connect the audio output to a speaker with amplifier.

   * DO NOT connect a headphone to the audio output connector.

2. Monitoring through soundcard

   Connect the audio output to the line in connector of your sound card.

Tip
You can click on top of the fader controls to show a checkbox to control both faders at the same time.

Tip
You can also use your mouse wheel to control the faders.

Video encode parameter settings

You can set the capture parameters as below.

[Default] - Return to the factory default settings.

[Restore] - Restore the previous sttings.
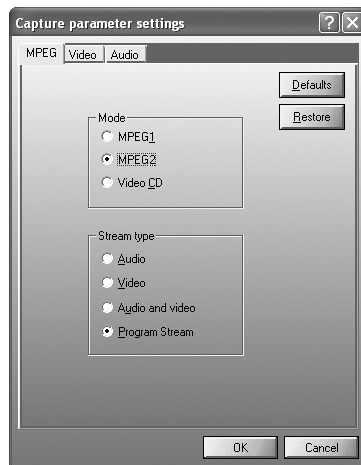
MPEG Tab

•**Mode**

Select your file type. VideoCD will create a MPEG1 file in VideoCD compliant format.

•**Stream type**

Select the stream mode.

Video tab
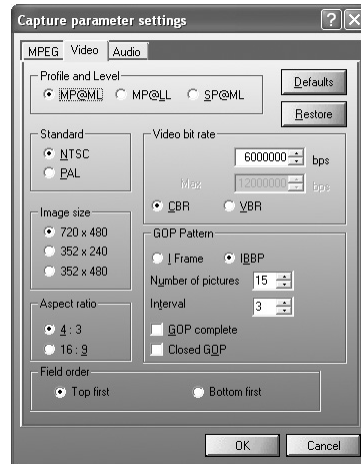
●**Profile and level**

Assign profile and level. Specifiable only when MPEG2 is selected for the file format.

●**Standard**

Assign the video signal format.

●**Image size**

Assign the size of images in capture files. If MPEG1 or Video CD is selected for the file format, then [352 x 240] is the only size that can be selected.

●**Aspect ratio**

Assign the aspect ratio.

●**Video bit rate**

Assign the video data bit rate and coding format. Assign video bit rate in 400bps units. If bit rate is not set in 400bps units, conversion to bit rates in 400bps unit will be done automatically. Increasing bit rate improves picture quality but also increases file size. Set the video data coding format to either CBR or VBR. Maximum bit rate (in 400bps units) can be simultaneously assigned only when VBR is selected.

●**GOP Pattern**

Set the GOP pattern to either I Frame (GOP configured from I pictures only) or IBBP (GOP configured from three picture types, I, B and P), which allows the following parameters to be assigned.

・Number of pictures

Assigns the number of pictures that can be contained in one GOP in a range of 1 to 30. When I Frame is selected, the number of pictures is fixed at 1.

・Interval

Assign in a range from 1 to 3, the cycles in which I or P pictures will appear. When I Frame is selected the cycle will be fixed at 1.

・GOP complete

This setting takes each pack group that stores one GOP of video data and its accompanying audio data as one unit, and completes one GOP within it. GOP complete cannot be assigned if the mode of the file to be created is MPEG1 or Video CD.

・Closed GOP

Makes the images in a GOP independent from other GOPs and assigns a Closed GOP flag indicating that it is playable.

●**Field order**

For specifying field order during MPEG capture.

Audio tab

•**Sampling rate**

Specify the audio signal sampling rate.

•**Audio bit rate**

Specify the bit rate for audio data. The higher the bit rate, the better the audio quality, but the greater the size of the audio file.

•**Audio format**

Specify the audio data format. If the created stream mode is other than [Audio] or [Audio + Video] or if the file mode is [Video CD], then no format other than [Layer 2] can be selected.

•**Channel**

Specify the audio channel mode.

•**Emphasis**

Specify to perform emphasis encoding.

•**Protection**

Place a check in this box to create files on which CRC error detection can be performed.

•**Original**

Place a check in this box to create files that have original bits.

•**Copyright**

Place a check in this box to create files that are copyrighted.

Video processing parameter settings

- **Video processing**

  Select the YC separation of composite signals and the creation of noise filters.

- **RAPCON**

  Some video equipment may make the color at the top of the image different from the actual image.

  If that happens, turning on RAPCON (check the box) will improve the color.

- **IRE Setting**

  Specify the Black level. Usually set the black level to 7.5IRE in North America. 0IRE is the setting for video system for Japanese teritory.

  IRE setting is only available for NTSC.

Adjusting picture quality

Adjust the parameters below to adjust the quality of the input picture.

* Before adjusting picture quality, set the options so that the input video is displayed on-screen.
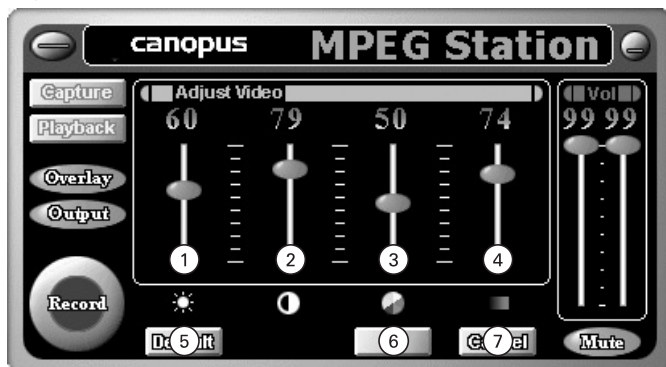
1 . Brightness ---------------- Adjust the brightness of the input picture. Zero (0) is the darkest state and 99 is the brightest state. The higher the value, the higher the luminosity, the lower the value, the lower the luminosity.

2 . Contrast ------------------ Adjust the input picture's contrast. A value higher than 50 raises the contrast and a value lower than 50 increase the contrast in a state in which the luminosity component of the input signal is inverted. When the value is 50, there is no luminosity component to determined contrast.

3 . Hue -------------------------- Adjust the color hue of the input picture. The higher the value goes above 50, the more the color goes from red to bluish red, and the more the value goes below 50, the more the color goes from green to bluish green. If the value is at 50, then the sate is such that the color component of the input signal cannot be adjusted.

4 . Saturation --------------- Adjust the density of color in the input picture. The higher the value, the greater the density of the color. When the color is 0, there is no color component (black and white state).

5 . Default -------------------- Restore the default settings.

6 . OK --------------------------- After reflecting the results of adjustment and recording the adjusted values, returns to the capture mode window.

7 . Cancel --------------------- Returns to the capture mode window without applying changes.

Playback

Standard playback
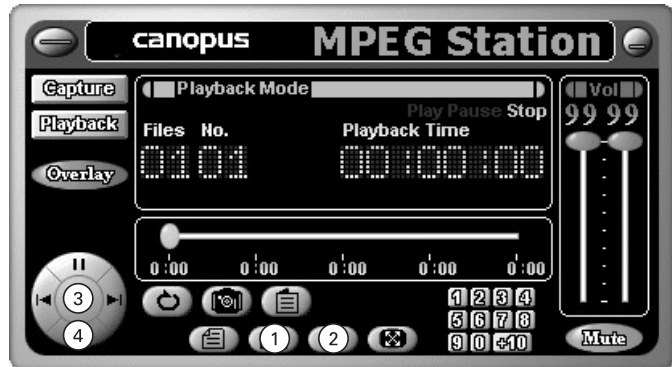
Start the MPEG Station, click on the playback mode selector button and then do the following:

1 . Click on the file selector button to select the file to be played back.

2 . Click on the option button, assign the playback parameters and adjust the quality of picture in the overlay display.

   * See "Assigning playback options" on p. 55.

3 . Click on the playback button. The file plays and the playback images are output to both the personal computer display and the video output terminal.

   * If only outputting video, click on the overlay display button to end the overlay display.

4 . To stop, click the stop button.

   * Clicking on the stop button returns the playback position to the head of the file. Click the pause button to pause.

Playback Sound

MPEG/WAVE file playback requires a sound card that can run on the OS on which the MVR-D2200V operates. Because playback sound outputs from the line output terminal on the sound card, connect the line output terminal on the card to a speaker equipped with an amplifier or to a stereo amplifier.

Program playback

Start up the MPEG Station, click on the playback mode selector button, and follow the steps below.
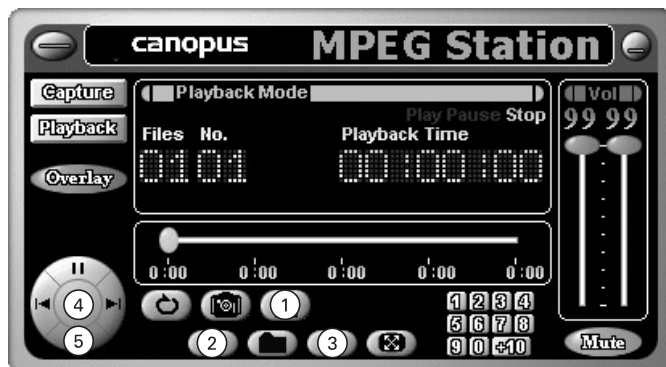
1 . Click on the program playback button to switch to the program playback mode.

  * If the play list has not been edited, the play list editing menu will be displayed.

2 . Click on the program editing button and edit the play list.

  * For information on how to edit the play list, see p. 52, "Editing the play list".

3 . Click on the option button, assign the playback parameters and adjust the quality of picture on the overlay display.

  *For more information, see p.55, "Assigning playback options".

4 . Click on the playback button. The file will play back as determined by the play list contents, with the playback video being output to the personal computer's monitor and to the video output terminal.

  * To stop the overlay display, click on the overlay display button again.

5 . To stop, click on the stop button

  * Clicking on the stop button returns the playback position to the head of the file. Click the pause button to pause.

MPEG Station

Editing the play list

Click on the play list edit button or on the program playback button (only if the play list has not been edited) to display the following window, allowing you to edit the play list. After editing is complete, click on [OK] to close the play list and return to the MPEG Station. To cancel the changes, click on [Cancel].

* The MPEG Station cannot be operated, while the play list is open.
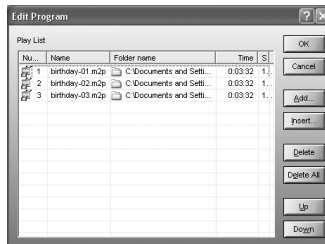
Registering files

Click on [Add]. The following window will appear so select the files to be registered in the list and click on [Open]. The registered files will be given numbers in order starting with 1 at the top.

* Multiple files can be selected using the [Ctrl] key.
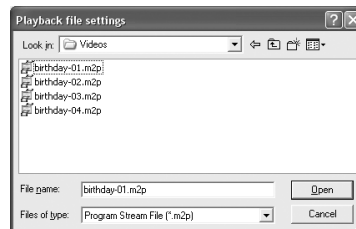
Deleting registered files

With the mouse, select the file to be deleted, and then click on [Delete]. To delete all files, click on [Delete All].

Inserting files

Files can be inserted at any position in the play list.

* In this example, a file is inserted between the files numbered 1 and 2.

1. Use the mouse to select file number 2.
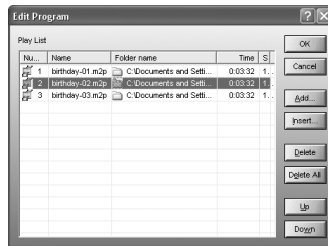
2. Click on [Insert]. The following window will appear, so select the
   files to be registered in the list and click on [Open].

   * Multiple files can be selected using the [Ctrl] key.
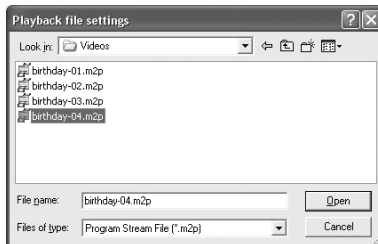
3. The selected file will be inserted at the cursor position specified
   in Step 1.
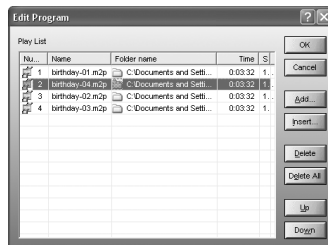
Changing the list order

The sequence in which files are played back can be changed using the move buttons [Up] and [Down].

1. With the mouse, select the file you want to change the order.
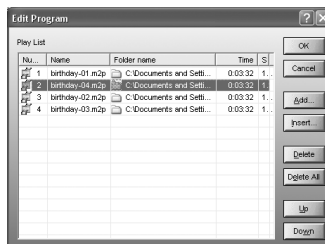
2. Use the move buttons to move the file to the desired position.
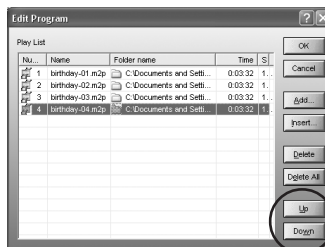
Assigning playback options

The following settings can be made during playback as necessary.

Playback parameter settings

Click on the options button and select [Playback parameter settings]. The box shown below will appear to allow the setting of playback parameters.
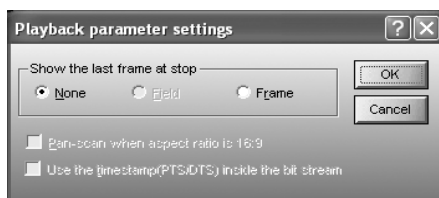
- ●**Show the last frame at stop**

  The methods for displaying windows when the playback of a moving picture files ends, can be assigned in any of the following ways.

  ・None

  Renders the screen totally black. This option is selected at default.

  ・Field (* Not available in MVR-D2200V)

  Displays the last image in field still state.

  ・Frame

  Displays last image in frame still state.

- ●**Pan-scan when aspect ratio is 16:9**

  Play back files in pan & scan (picture has right and left edges cut off) when the image has an aspect ratio of 16:9. This option is turned off at default. When this option is turned off, the entire picture will be displayed in full screen. The 16:9 image cannot be displayed in so-called letterbox style.

  * This setting is not available in MVR-D2200V.

- ●**Use the timestamp (PTS/DTS) inside the bit stream**

  Check the box to use a time stamp (PTS/DTS) in the bit stream during playback of an MPEG1 system stream or MPEG2 program stream. This option is turned on at default. If the time stamp is not used, the video and audio may be out of sync.

  * This setting is not available in MVR-D2200V.

MPEG Station

Overlay parameter settings

Click on the option button and select [Overlay parameter settings] which displays the window below for setting the picture quality of the overlay display.
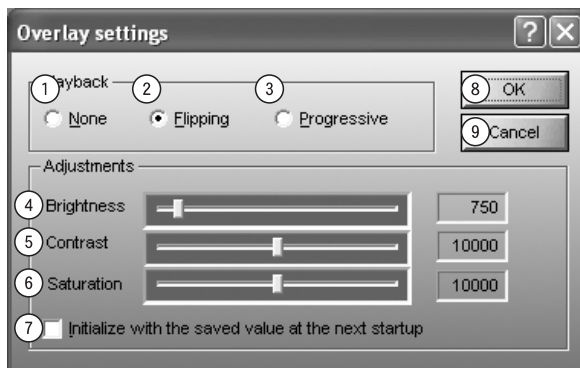
1 . None ------------------------- The video will be displayed in interlace mode. A frame is divided into two fields, and each field will be drawn one after the other, making the frame change by two scan processes.

2 . Flipping -------------------- Check this option to prevent tearing. You can prevent the part of the image from being redrawn before the completion of the previous drawing process.

3 . Progressive -------------- Redraws Odd and Even fields of the screen every 1/60 second, interpolates the field image before displaying. This option does not work for non-interlaced video (MPEG1 and MPEG2 of SIF size).

4 . Brightness --------------- Adjust the brightness of the input picture. The higher the value, the brighter the picture.
  * Minimum and maximum values differs according to the enviroment.

5 . Contrast ------------------- Adjust the contrast of input video. The higher the value, the higher the contrast. If the value is at the minimum, that is a state in which there is no luminosity component for determining contrast.
  * Minimum and maximum values differs according to the enviroment.

6 . Saturation --------------- Adjust the color density of the input video. The higher value, the denser the color. If the value is at the minimum, that is a state in which there is no color component (white and black state).
  * Minimum and maximum values differs according to the enviroment.

7 . Initialize with the saved value at the next startup

----------------------Initializes with the saved value at the time of the next starting.
Saves the current settings and use it as the default settings at the time of rebooting.

8 . OK ---------------------------After reflecting the results of adjustment and recording the adjusted value, makes a return to the playback mode window.

9 . Cancel ---------------------Deletes the adjustment results and makes a return to the playback mode window.

Still Capture parameter settings

Click on the option button to select [Still Capture parameter settings]. The windows below will appear to allow the settings for still picture capture.
The size of sources that can be acquired are:

"Capture mode"

NTSC: 720x480

PAL: 720x576

"Playback mode"

NTSC: 720x480/352x240/352x480

PAL: 720x576/352x288/352x576

If vertical lines of the source are 480 or less, the still image capture is performed by [FRAME] in any setting.

●**Still image capture setup**

・FRAME

Captures still pictures in frames.

・Odd field

Acquires the odd-numbered lines and expands them to double size.

・Even field

Acquires the even-numbered lines and expands them to double size.

Displaying file information

Click on the option button. Select [File information]. The window shown here will appear. Information on the selected file will be displayed.
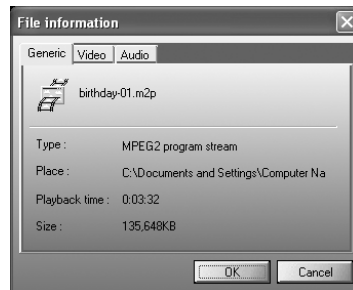
●**General tab**

Displays the file format or the saved drive, folder name, playback time, and file size.

●**Video tab**

Displays the format of the video track. If the selected file contains only audio data, this tab will not appear.

●**Audio tab**

Displays the audio track format. If the selected file contains only video data, this tab will not appear.

Adjusting the overlay display size

Click on the overlay size setup button. That displays the assignable overlay display sizes that allow any size desired to be played back.

Adjusting volume

Adjust the playback volume using the volume adjustment fader. Right-clicking on the volume adjustment fader will display the [Adjust both L/R sound level] menu. If a check is placed in the box, the audio volume on the left and right channels can be adjusted simultaneously. To adjust the left and right volume separately, right-click on the fader again and remove the check from the box in [Adjust both L/R sound level]. If you are using a mouse equipped with wheel functions, move the wheel on top of the fader and adjust volume.

* Volume for WAVE files cannot be adjusted on the MPEG Station. Adjust with the Windows mixer.

File search

In the program playback mode, you can search for the file to play
by the seach buttons or the keypad.

Search using search button
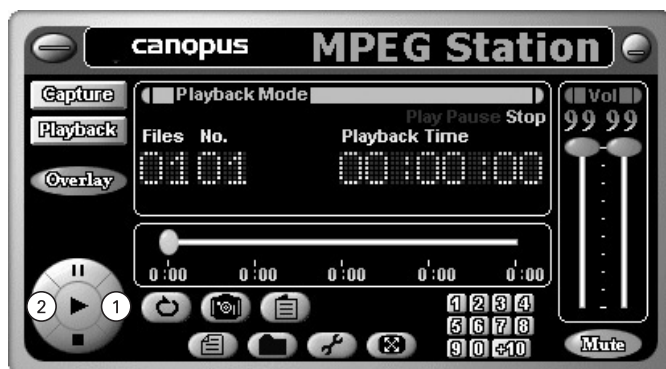
1 . Search for the next file.

2 . Search for the previous file.

Search using the keypad
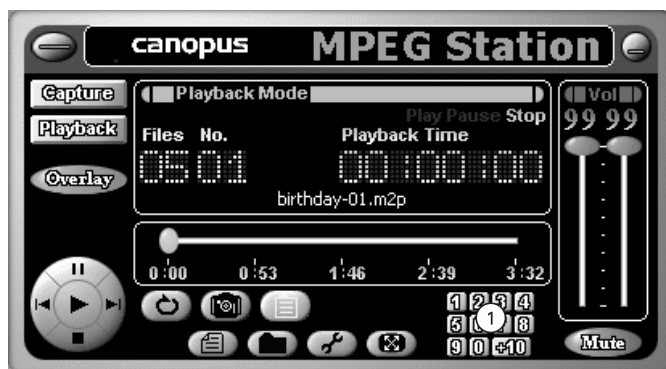
1 . Specify the number of the file to play (numbers are shown in
the program list).

Repeat playback
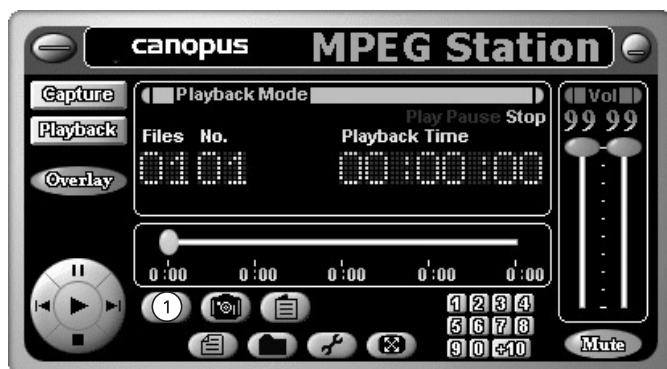
Repeat-playback can be enabled in standard playback and program playback modes.

1 . Click on the repeat button for repeat playback. All files registered in the play list can be repeated played in program playback mode. To clear repeat play, click on the repeat button one more time.

Details on Encoding Parameters

Overview

When encoding with an MPEG Station of MVR-D2200V, use the detailed encoding parameter assignment file that allows you to assign detailed parameters that cannot be assigned in the standard application setup menus. It should be noted that assigning these parameters requires specialized knowledge. We recommend that those who do not have that specialized knowledge use the general parameter default settings.

How to use

Add the following startup options and start the MPEG Station.

Mstation.exe [/VEP:file name] [/ID[:board number]]

/VEP: file name	The switch and file name that will enable the detailed encoding parameters.
/ID[:board number]	Multiple startup switches [:board number] is the number of the board that will be started. (If this number is not specified, a search will be made for usable boards, and one of those boards will be started.)

* For an explanation of detailed commands and parameters, see VideoEncoderParams.TXT, which is in the installation folder for the MVR-D2200V Module. (The default directory for the file is "Program Files\Canopus\MVR-D2000".)

Chapter 4

DV-MPEG File Converter

This chapter explains how to use the DV-MPEG file converter.

- Startup and Functions of each section

- File Conversion

* Using these functions requires that there be a check on [Convert AVI file to MPEG] which is shown in the paragraph "MVR D2000 Properties" on p. 32 of this manual.

Startup and Functions of each section

Startup procedures

Move from the start menu to [All Programs] (programs when in the Windows 2000 environment) and to [MVR-D2000] and then select [DV-MPEG File Converter] to start the DV-MPEG file converter.

· If the MVR-D2000 properties are assigned (see p. 32 in this manual) and the item [Convert AVI file to MPEG] is not checked, the following message appears when the DV-MPEG file converter starts. Please change the settings in the "MVR-D2000 Proper-ties" dialog box, restart your PC, and then start the DV-MPEG file converter again.
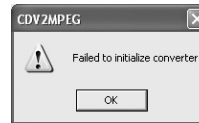
Functions in each section

The following window appears at "DV-MPEG file converter" startup.
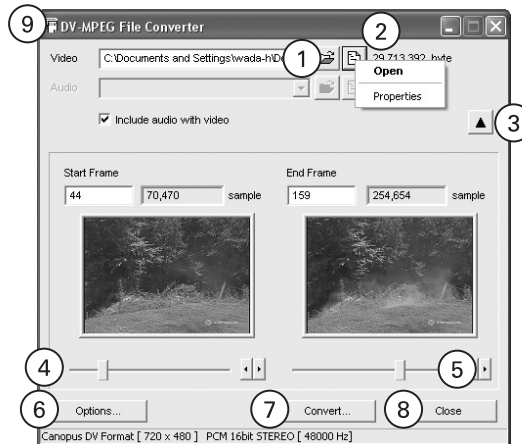
* This is what the window looks like when the [▼] button is clicked. This window is for explanation purposes and is different from the window that will actually be displayed.

· Double clicking on the start frame and end frame's preview window displays the frame list. Clicking on either the ◄ or the ► button moves the display frame either backward or forward. Left-clicking on the window in the list allows frames to be specified.
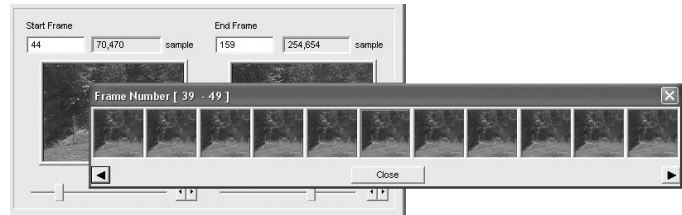
· Right-clicking on the start frame's and end frame's preview window captures the frame. Selecting [Copy bitmap] transfers the frame screen capture to the clipboard. Selecting [Save bitmap] allows the frame's screen capture to be saved as a file. Left-dragging on the preview window and dropping it on the desktop is another way to save the frame screen capture as a file. (In this case, however, the file name will be allocated automatically.) Selecting [Display bitmap] displays a still picture in BitmapView.

File Conversion

Procedures in file conversion

1. To specify a file name either enter the name of the source file for conversion into the **[Video]** or **[Audio]** field, or specify the name by clicking on the ![button] button, or specifying the file name by dragging and dropping the file directly from Explorer.
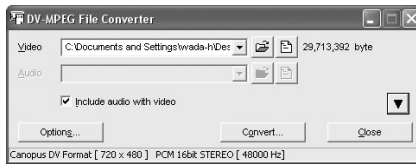
* When converting a DV format AVI file for which sound has been captured in advance, place a check on [Include audio with video].

2. To convert just part of a file, click on the **[▼]** button. Use the slider to specify start frame and end frame and then click on **[Convert]**. To convert an entire file, select the file, click on **[Convert]** and then go to step 5.
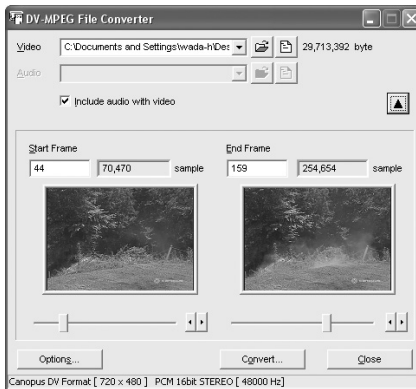
Tip
To go back to the window in step 1, click on the **[▲]** button.

3. To assign options at the time of conversion, click on **[Options]**. After specifying the option, click on **[OK]**.
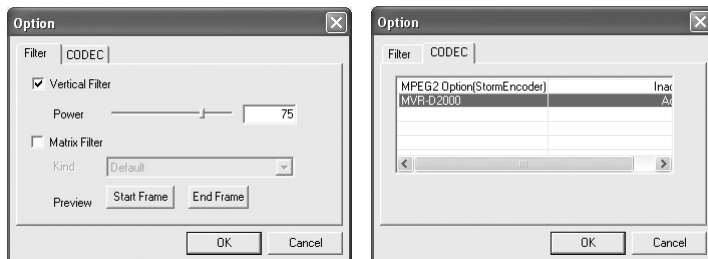
Filter tab

Vertical Filter

This filter suppresses flicker in images with little movements. If the value set is "100", its state is the same as that of the progressive display.

To use the vertical filter, place a check on it. Placing a check on vertical filter activates [Power] to specify its level.

Power

Use the slider to adjust the level of filtration.

Matrix Filter

This filter suppresses blur in images that have sharp and sudden movements.

To use the matrix filter, place a check on it. Once matrix filter is checked, [Kind] is activated allowing you to select the preset settings from the pulldown menu.

Kind

Click on the [▾] button to select and assign preset from the pulldown menu.

Preview (Start Frame/End Frame)

Previews the assigned filter. Click either the [Start Frame] or the [End Frame], the [BitmapView] window appears. Check the filter effect (the still picture that is shown is not the actual converted data, it is the result of arithmetic/logic operations on the programmed values).

Codec tab

Select the codec to use in conversion. This tab is shown only when more than one Codec are available for DV-MPEG file converter.

4. To convert multiple files, Select the **[Use FileList]** from the File menu and open the File List window.

To register the file in the **[File List]** first specify the file and then click on **[Add]**.

① Click this button ② Specify a file

③ Click [Add]   ④ The file is added to the File List.
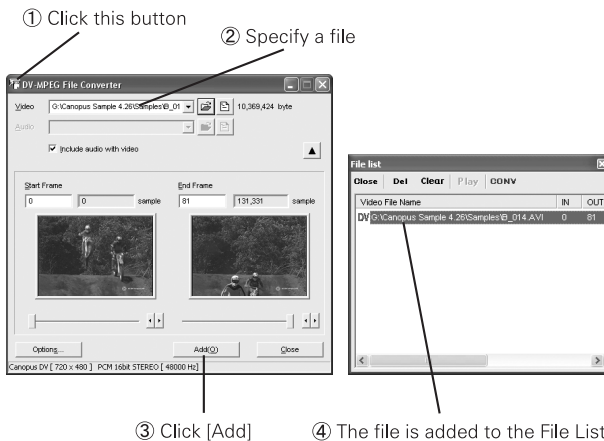
· When the [File List] starts up, the [Convert] button changes to the [Add] button.

· The display widths of the IN and OUT points are adjusted by clicking with the mouse.

Close ------------------------------- Closes the file list. IF you close the file list, registered data are deleted.

Del ----------------------------------- Deletes selected file from the file list.

Clear ------------------------------- Deletes all file from the file list.

Play --------------------------------- Previews converted files.

CONV ------------------------------- Sequentially converts items in the file list. If the conversion ends normally, the OK icon will appear. If the conversion fails, the icon will say NG.

Right click on an item ------ Converts only the selected file.

Double click on an item --- Displays the selected item in the main window. If a change is made in the start frame or the end frame in the main window, they must be re-registered using the [Add] button.

Info

system menu: click on (9) in the DV-MPEG file converter window shown on p. 64 of this manual.

Tip

Drag and drop from Internet Explorer can be used to add multiple files into the list. Drag and drop file(2) onto the main window automatically starts up the [File List].

5. Specify MPEG file formats created in converted files.

MPEG1 System Stream

Multiplexes audio and video and records them in one file.

MPEG1 Elementary Stream

Encodes audio and video and records each simultaneously as separate files. Specifying either [Video] or [Audio] allows independent encoding of video and audio. If the box [Wave Format] is checked, video is encoded and audio, as non-compressed PCM data, is recorded, simultaneously in separate files.

MPEG2 Program Stream

Multiplexes audio and video and records them in one file.

MPEG2 Elementary Stream

Encodes audio and video and records each simultaneously as separate files. Specifying either [Video] or [Audio] allows independent encoding of video and audio. If the box [Wave Format] is checked, video is encoded and audio, as non-compressed PCM data, is recorded, simultaneously in separate files.

Video CD

Creates MPEG1 files based on the Video CD format.
This parameter cannot be selected if data is recorded at other than the 44100 Hz audio sampling rate.

After completing the settings, click on **[Next]**.

6. Specify the video data settings.
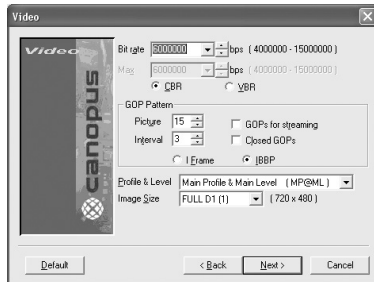
When video CD is selected.
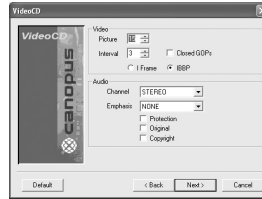
* Display windows will differ according to the file format for conversion.

· If the Video CD format is selected, If the Video CD format is se-
lected, audio settings described on the following pages, can be
done in step 5.

Bit rate

Assign the video data bit rate and coding format. The video
bit rate is set in units of 400bps. If the video bit rate is not
set in units of 400bps, the setting will be automatically
converted to units of 400bps. The higher the bit rate the
better the picture quality but that will also make the file size
bigger. The coding format for video data will be either CBR
or VBR. The maximum bit rate (in 400 bit units) can be set
only when VBR is selected.

GOP Pattern

GOP pattern can be assigned as either [I Flame] (GOP
configured from only one picture) or [IBBP] (GOP configured
from three pictures, I, B and P) and the following parameters
can also be assigned.

• **Picture**

The number of pictures contained in a GOP can be set in
a range from 1 to 30. If I Flame is selected, then the
number of pictures is fixed at 1.

• **Interval**

The cycle in which I or P pictures will appear is assigned
in a range from 1 to 3. If I Flame is selected, then the
number of cycles is fixed at 1.

- **GOPs for streaming (can be assigned if the audio sampling rate is 48000Hz)**

  If this is set, the collection of packs that store one GOP of video data and the audio data that accompanies are regarded as one unit. A GOP completes with in the unit. Unavailable MPEG1 conversion.

- **Closed GOPs**

  Assigns the Closed GOP flag that shows that the video in a GOP is independent from other GOPs.

Profile & Level

Specifies the profile and the level. Unavailable for MPEG1 conversion.

Image Size

Specifies the size of image in the capture file. Unavailable for MPEG1 conversion.

After completing the settings, click on **[Next]**.

7. Specify the audio data settings.
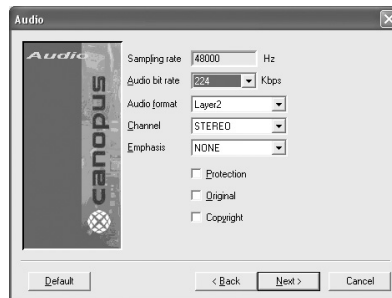
* The display window will differ according to the file format for conversion.

- If Video CD format is selected, If the Video CD format is selected, assign these audio settings in step 5 on p.70.

Sampling rate

The audio signal's sampling rate is displayed.

Audio bit rate

Specifies the audio data bit rate. The higher the bit rate the better the audio quality, but the higher the bit rate the greater the size of the file.

Audio format

Specifies the audio data format. Formats other than [Layer 2] cannot be selected.

Channel

Specifies the type of audio channel.

Emphasis

Set for emphasis encoding.

Protection

Check this option to create a file for CRc erroe detection.

Original

Check this option to create a file that has an original bit attached.

Copyright

Check this option to create a file that has copyrighted data attached.

After completing the settings, click on **[Next]**.

8. Specify the data output settings.
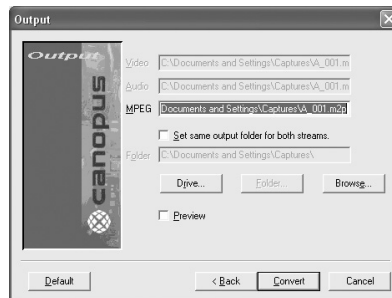
* The display window will differ according to the format of the file to be converted.

Video

When you convert file(s) either to MPEG1 elementary stream or MPEG2 elementary stream, you can type the name for the output file (including the path name) in this field.
The [Drive] and [Browse] buttons will be available.

Audio

When you convert file(s) either to MPEG1 elementary stream or MPEG2 elementary stream, you can type the name for the output file (including the path name) in this field.
The [Drive] and [Browse] buttons will be available.

MPEG

When you convert file(s) either to MPEG1 system stream, MPEG2 program stream, or Video CD, you can type the name for the output file (including the path name) in this field.
The [Drive] and [Folder] buttons will be available.

Folder

If [Set same output folder for both streams.] is checked, you can specify the folder to store the generated files.
The [Drive] and [Folder] buttons will be available.

Preview

Check this option to enable the preview windor during conversion operation.

9. Click **[Convert]**.

> Starts file conversion.
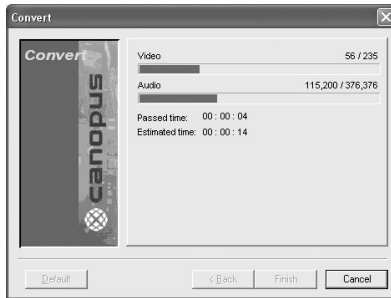
10. File conversion ends, when the following dialog appears.

>> To play converted files, click on the [Play] button.

>> To quit the DV-MPEG file converter, click on the [Finish] button.
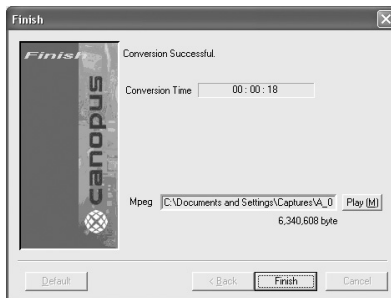
· When multiple files are converted, the names and sizes of the output files will not be displayed. Output files cannot be played from this window. To play an output file, select [play] from [File List].

This completes file conversion operations.

Chapter 5

Premiere Plug-in

This section explains how to use the Premiere Plug-in.

- Overview

- How to Operate

* To use the Premiere Plug-in function, "DV to MPEG Converter" module along with the "Premiere Plug-in" module must be installed at the MVR-D2200V installation. You must also place a check on [Convert AVI file to MPEG] which is shown in the paragraph "MVR D2000 Property" on p. 32 of this manual.

Overview

About the Premiere Plug-in

The MVR-D2200V comes equipped with a plug-in for use with Adobe Premiere Pro 1.5. The Premiere Plug-in provided has the functions shown below.

Movie Compiler Module

Parameter settings are equivalent to those of the DV-MPEG file converter.

・If you use the Premiere Plug-in, install the Premiere before setting up the MVR-D2200V.

・For the explanation of the assignment window for MPEG parameters, see the paragraphs on DV-MPEG File Converter and MPEG Station.

How to Operate

Movie Compiler Module

1. After editing, select the location you want to output and then select
   [File]-**[Export]**-**[Canopus MPEG Encoder]**.
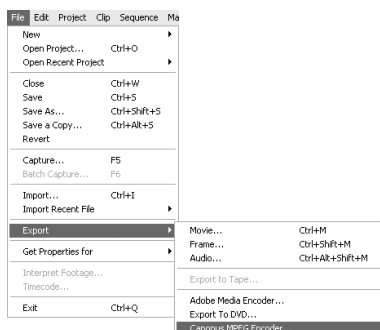
2. Set the parameters in the same manner as the DV-MPEG Converter
   (See page 70).
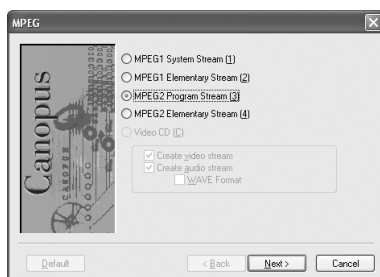
Select [File]-[Export]-[Canopus MPEG Encoder], and in the encoder setting sequence, specify the field order according to the one used in the source.
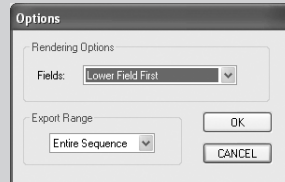
Field order indicates that the topmost line when viewing video in frame units is either an odd-numbered line divided into fields, or a line within even-numbered fields. If field order is not set correctly, the horizontally moving sections of an output MPEG2 file's video image will wobble during play (quite marked when viewed on a television set).

· If the topmost line is an odd-numbered field (Top Field First)

   Specify [Upper Field First].

· If the topmost line is an even-numbered field (Bottom Field First)

   Specify [Lower Field First]

· If the original video file is in Canopus DV format or Canopus Motion JPEG format, the topmost line will be an even-numbered field, so specify [Lower Field First].

· If the original video field does not have a field structure (such as when it has MPEG1 files or AVI field with a vertical resolution of 240 or less), specify [Upper Field First].

Chapter 6

Online Manual

This section explains how to use the online manual, which was written to show you how to use the MVR Series Development Kit.

- How to Use the Online Manual

How to Use the Online Manual

The online manual explains how to use the MVR Series Development Kit. Don't use the MVR Series Development Kit until you have read and thoroughly understood the online manual.

Before starting the online manual

The online manual is a pdf format file and you will need Adobe Reader 6.0 to read it. If you don't have Adobe Reader 6.0 installed, read the instructions "Adobe Reader 6.0 Installation" on p. 29 of this manual before starting the online manual.

Starting the online manual

Insert the "MVR-2200V Installation CD" into the CD-ROM drive, open the CD-ROM drive from the computer, open "MVR-D2000" folder, "Manual" folder, and then double-click on "Sdk_manual_e.pdf".

Install onto the hard drive

The online manual can also be used by copying it onto the hard disk drive. Follow these steps to make such a copy:

 1. Use the Windows Explorer to create a new folder on the hard-disk drive. (Specify any drive or folder name desired for the folder to be created.)

 2. Insert the "MVR-D2200V Installation CD" into the CD-ROM drive, open "MVR-D2000" folder, "Manual" folder, and copy the "Sdk_manual_e.pdf" into the file created in Step 1.

    To start the online manual after installation, open the relevant folder from the Windows Explorer and then double-click on "Sdk_manual_e.pdf".

How to operate Adobe Reader 6.0

Select the [Adobe Reader Help] from Adobe Reader 6.0's [Help] to start up the Adobe Reader 6.0's online guide. To understand how to operate the Adobe Reader 6.0 please read this online guide.

MVR-D2200V

Appendix

Explanation and Analysis of MVR-D2200V Programming Parameters.

- Explanation and Analysis of MVR-D2200V Programming Parameters

- Troubleshooting

- Hardware Specifications

Explanation and Analysis of MVR-D2200V Programming Parameters

Assigning the capture parameters

MPEG tab

Mode
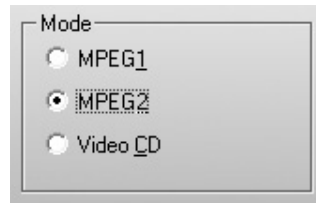
- MPEG1 - Select to encode video in MPEG1 format.
- MPEG2 - Select to encode video in MPEG2 format.
- Video CD - Select to create MPEG1 files in video CD format.

Stream type
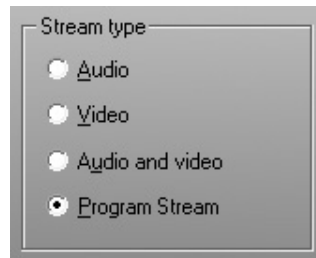
- Audio - Encodes only audio signals and records the resulting elementary stream into a file.
- Video - Encodes only video signals and records the resulting elementary stream into a file.
- Audio and video - Encodes both audio and video signals and simultaneously records the resulting elementary streams into two separate files.
- System stream (when MPEG1 is selected)
- Program stream (when MPEG2 is selected) - Encodes audio and video signals, multiplexes those results and records them in one file.

Video tab

Profile and Level

```
┌─ Profile and Level ──────────────────┐
│  ⦿ MP@ML    ○ MP@LL    ○ SP@ML       │
└──────────────────────────────────────┘
```

MPEG2 specifications permit an extremely broad range of parameters and with the vastly different ranges that are supported by different products a great deal of confusion can be anticipated. That is why we have set up guides, which are profile and level, that are divided into several hierarchies.

Three types of profiles and levels are usable in the MVR-D2200V: MP@ML, MP@LL and SP@ML. The highest level is the MP@ML. MP2ML is the standard for standard TV (Not HDTV). Almost all MPEG2 decoders, the most widely used at the present time, are for handling MP@ML, and as long as there is no special reason for not doing so, use the MP@ML with MPEG2. Profile and level have no specifications for MPEG1 so they cannot be selected.

Standard

```
┌─ Standard ──────┐
│  ⦿ NTSC          │
│  ○ PAL           │
└──────────────────┘
```
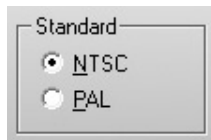
NTSC is the video standard used for television in Japan, North America and a number of other countries.

PAL is the video standard used in many European countries, China and other areas.

Select NTSC for use in North America.

Image size
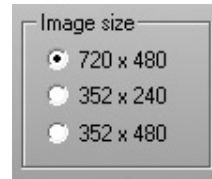
This is the number of pixels that make up one frame when video is encoded. The larger the image size, the better the resolution, but data volume increases enormously.

Generally the image size to be used is 720 x 480 (for PAL it would be 720 x 576).

If there is a special need to decrease data size (at or less than 4MB per second), use a resolution of 352 x 480 (352 x 576 for PAL). This pixel size is generally called Half-D1.

If you want to decrease data volume further, (to around 2MB per second) use the 352 x 240 resolution (352 x 288 for PAL). This pixel size is generally called SIF. If MPEG1 is selected, no sizes other than these can be selected.

Aspect ratio (16:9 and 4:3)
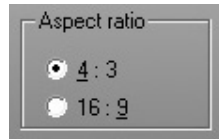
The aspect ratios of video images now used are 4:3 or 16:9. Click on the radio button to assign either aspect ratio.

When shown on TV, a 16:9 ratio video indicates the video signal as shown below. (A picture has been taken of a true circle and the diagram shows what happens to them).

Shown on a 16:9 TV   Shown on a 4:3 TV
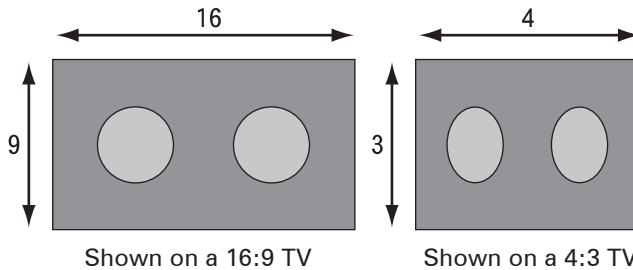
The video shown below is on a 4:3 TV, and because the 16:9 image is converted for 4:3 TV use, the entire video becomes 4:3.
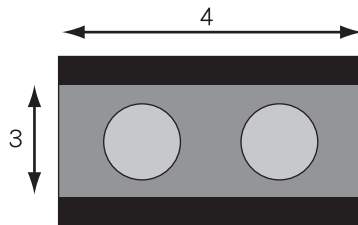
For 4:3 TV use with black bands placed at the top and bottom of the 16:9 image.

No matter which radio button for aspect ratio is checked, the number of encoded pixels per line will remain always at 720 dots. The only difference in the encoding operation is that either data indicating 16:9 or data indicating 4:3 will be input into the header of the created MPEG stream.

The header data determines switching of playback image output method during decoding.

Video bit rate
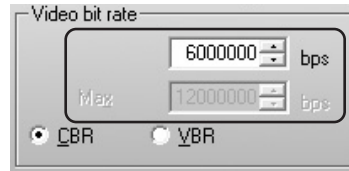
For specifying the video data bit volume. Increasing the bit rate improves picture quality but it also greatly increases file consumption volume. The numbers are the necessary data size per second of recording time. Since the specification is made in bit size, to convert it into bytes, divide by 8. If for example, you want to specify 8,000,000bps (8Mbps), i.e., 8M bits per second, or 1M bytes, then in one minute of recording, 1M bytes x 60 seconds means that you will need at least 60M bytes of available disk space (if audio is being recorded simultaneously, the volume of data for the audio must be added).

The general targets for an optimum balance between data volume and picture quality are given here.

• **Picture size of 720 x 480 (720 x 576 for PAL)**

  6-12Mbps is optimum. At 4Mbps there will be a slight deterioration in picture quality. Increasing to more than 8M will not yield that great an improvement in picture quality. 15Mbps is the upper limit for MPEG2 (MP@ML) specs.

• **Picture size of 352 x 240 (352 x 288 for PAL)**

  1.5 to 1.8 Mbps is optimum for MPEG1. 1.8Mbps is the upper limit for MPEG1 specifications. In Video CD specs, 1.152Mbps is the upper limit so that if Video CD is selected, that value will be fixed.

  If this picture size is used for MPEG2, 2 to 3 Mbps is optimum.

  To raise the bit rate further (for improved picture quality), use 352 x 480 (352 x 576 for PAL).

• **Picture size of 352 x 480 (352 x 576 for PAL)**

  3 to 4 Mbps is optimum.

  To raise the bit rate further (for improved picture quality) use 720 x 480 (720 x 576 for PAL).

Appendix

CBR and VBR
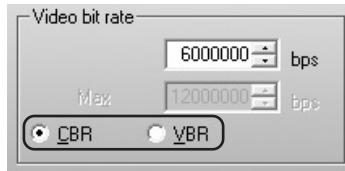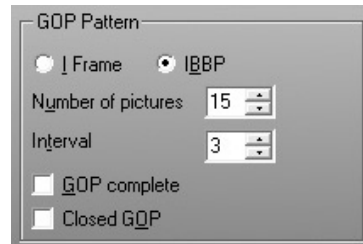
CBR is the abbreviation for constant bit rate, which holds video data quantities at almost a fixed level.

VBR is the abbreviation for variable bit rate and it allows the quantity of video data to change.

MPEG has the property of being difficult to compress when a scene changes quickly or the picture contains a large amount of finely detailed patterns. In those situations, CBR will attempt to compress the data to a certain fixed level, and the picture quality will deteriorate to a certain extent compared to other scenes. To ameliorate that, VBR allows the data volume resulting from compression to be larger than average in scenes like the one described, while in other scenes it decreases the amount of data from the average. This format is based on the idea of maintaining picture quality in all scenes to as uniform a level as possible without increasing total data quantity.

This means that VBR allows two settings: the bit rate (mean target bit rate) and the maximum bit rate (does not exceed upper limit even when data quantity increases).

GOP Pattern (I Frame and IBBP)

Video images often undergo slight changes with the passage of time. MPEG makes use of that fact and if there is a part within forward or backward frames that resembles that image, it uses that information so that all data will not be recorded as is. Thus an image cannot be structured if there are no previous images.

However, even if there is no information from forward or backward images, images are contained that can be independently reproduced at the proportion of one frame to any other frame. This is called I picture.

In contrast to this, there is what is called P picture that uses information from the forward image in time to record images so that they can be reproduced from a small amount of data.

There is also B picture that uses the information from both the forward images in time and the backward images in time to record images by reproducing them from a small amount of data.

If IBBP is selected, all the methods described above are used to maintain picture quality with a small amount of data. Standard MPEG is recorded with this format. Please select and use this in most instances.

However, using information from forward and backward images in this format does not allow uncoupling during data compression and connection to data in another section. In other words, it is difficult to edit recorded images.

If you select I frame, all frames will be recorded as I picture (I frame only) so that editing will be easy. You have software that can edit I frame MPEG files and if you want to use it, try I frame.

However, this format requires a much larger volume of data that IBBP does in order to maintain the same level of picture quality. Maximum bit rate is limited to 15Mbps, the MP@ML regulation and that limits any attempt to use large amounts of data to obtain high picture quality.

Number of pictures
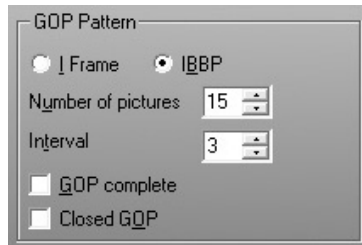
As stated above, MPEG video data contains I picture at a ratio of one to several frame at a ratio of one frame to several frames and that number of frames is specified. Following the one I picture are the B and P pictures all organized into one group, which is called a GOP. In other words, the number of pictures is the number of frames in an image that makes up one GOP. The parameter called N has that value.

The general setting is about 15. The maximum is 30.

Interval

Assign the cycle in which pictures other than the B picture (I or P) appear. The values that can be assigned are 1 to 3. If 3 is specified, for example, the image row will be IBBPBBPBBP. If 1 is specified that will eliminate the B picture and the row will be IPPPP. This is the value of the parameter called M.

Generally, 3 is specified.

Closed GOP
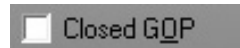
As shown in section "GOP Pattern", each picture other than the I picture compresses the content of pictures forward and backward in time. That is why one cannot uncouple while data is being compressed and switch to connect to data in another section in order to edit. This is the same as for the GOP boundary section. The GOP header is an I picture but after that there are B pictures among P pictures, and ordinarily reference is made to the final P picture in the previous GOP. If [Closed GOP] is checked, the B picture will not refer to the forward picture. In other words, the data within the GOP is completed, and, in principal, the image can be reproduced even if data on the GOP boundary is uncoupled. However, that reduces compression efficiency.

In ordinary operations, do not check the check box.

If the software used can edit closed-GOP structure MPEG files in GOP units, check the check box.

Field Order

Specify which field of the frame is prioritized. Refer to p.101 of this manual for the technical information.

GOP complete

GOP complete
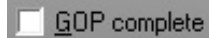
This is a term not set down in MPEG specifications, but it is a word that Canopus has adopted based on the concept that it resembles the structure called DVD VOBU.

The program stream creates groups of video and audio data packets that are called packs (A pack is generally a group of two or more packets with a header attached but MVR-D2200V output data places only one packet in one pack). In the MVR-D2200V the length of one pack is fixed at 2048 bytes unless Video CD is specified. However, video data quantity changes with each frame. Therefore, if video data is randomly divided into packets, GOP boundaries and pack boundaries will not always coincide. Thus the GOP completion mode deliberately makes GOP boundaries and pack boundaries coincide so it is the mode that makes it easy to process data. However, the non-completion mode has a higher, but only slightly higher, efficiency than does the completion mode.

In standard operation, do not check the [GOP Complete] check box. If the customer application is used to read encoded MPEG files and do some sort of processing, check the completion mode to simplify processing.

This selection changes the program stream data structure as shown below.

1. GOP completion mode (check box checked)

- The group of packs that store one GOP of video data and the audio data that belongs to it is called one completion unit.

- One GOP is complete in one completion unit and no other GOP data is in it. If data that should be entered into those units is completed in the pack, padding data (data that contains no information but is entered in order to adjust data size) is entered into the remainder of the pack.

- A system header is attached to the first pack of all completion units.

2. Non-completion mode (no check mark)

- Does not recognize delimiters such as completion units and if a GOP ends while the pack is still underway, data from the next GOP is entered into the remainder of the pack.

- A system header is attached only to the first of all packs.

Audio tab

Sampling rate

Specify the audio signal's sampling frequency. The selections are either 32kHz (32000Hz), 44.1kHz (44100Hz) or 48kHz (48000Hz). 44.1kHz is the frequency used for audio CDs and Video CDs, and 48kHz is the frequency used for DVDs.

There is little difference in which one is selected, but from what we have seen so far, the optimum combination with MPEG1 video would be audio of 44.1kHz and the optimum combination for MPEG2 video would be audio of 48kHz. For particular reductions in data size select 32kHz.

Audio bit rate

To compress audio under MPEG audio specifications (see next paragraph) specify the post-compression data quantity in bits per second. The unit is kilobits per second.

Because of the overlap between sound quality and data volume, normally, 192, 224 or 256 should be selected.

Audio format

· Layer 2 - Audio signals are compressed based on MPEG audio layer 2 specifications. For channel configuration, refer to section "Channel" on the next page.

· PCM Stereo - Records non-compressed linear PCM data on two channels. Video can be selected only when it is recorded as elementary stream. Creates a WAVE file separate from video data.

· PCM Mono - Records non-compressed linear PCM data on one channel. Video can be selected only when it is recorded as elementary stream. Creates a WAVE file separate from video data. Records only signal input to the left channel input terminal.

Channel

Channel

○ Stereo ○ Joint ○ Dual ○ Mono

- Stereo - Audio can be encoded efficiently if there is a certain correlation between the signals on the left and right channel. Use this setting to encode music and other stereo signals. The signals on the right and left channels, such as standard music and other signals, closely resemble each other. Thus, the two channels don't have to be independently encoded; the properties of the parts closely resembling each other can be used when encoding, thus providing a higher quality compression. These settings give compression like that.

- Joint - Use when there is a strong correlation between the signals on the right and left channels.

- Dual - Use when there is almost no correlation between the signals on the right and left channels. Use this setting to record completely different sound on each channel

- Mono - Records audio signals on only one channel. Only signals input to the left channel input pin will be recorded.

Emphasis

Emphasis

○ None ○ 50/15us ○ CCITT J.17
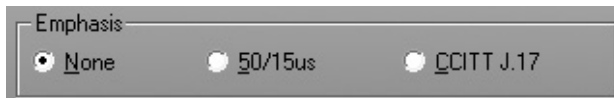
Emphasis enlarges the high level of audio during recording and returns it to the source during playback to reduce the effect of noise during recording and transmission. Analog recording on magnetic tape will include noise from the high frequency component that produces a harsh sound. Emphasis gives a relative reduction in the effects of high frequency noise.

However, since all recording by the MVR-D2200V is digital, emphasis has almost no practical effect. It is supplied for compatibility with systems used for playback. Usually, you don't have to select emphasis.

Protection

Click on the check box to add a check mark and that will add an error check code to the audio data.

Original and Copyright

Click on these check boxes to add a check mark and that information will be recorded in the header of the audio data created.

· Original - This indicates that the data has not been copied, that it is original data.

· Copyright - Indicates that the data is copyrighted.
This information does not affect the data when it is played and converted to analog signals. Use when you want to include the information described above in the data. However, do not check original unless the customer encodes created audio signals.

Assigning playback parameters

Show the last frame at stop
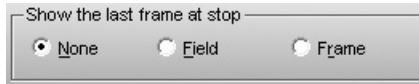
For specifying how the menu is to be displayed after the MPEG file has finished playing.

· None - Makes the menu display black. The video signals continue to be output but the menu content is blacked out.

· Field - Continues displaying only one side of the field in the final menu. There will be no blur even in the moving parts of the picture, but the resolution in the vertical direction will be cut in half.
(* Not available in MVR-D2200V)

· Frame - Continues displaying both fields of the final menu. Resolution in the vertical direction will not drop because of that but the moving sections will be blurred.

Pan-scan display when aspect ratio is 16:9
(* Not available in MVR-D2200V)
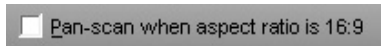
· **When not checked**

The entire screen will be made video output without the decoder making conversions to video output no matter whether the MPEG data aspect ratio is 16:9 or 4:3.

If video output is connected to a wide TV, check this check box. Then, use the TV's programming functions to switch to the optimum display as determined by playback data aspect ratio.

· **When checked**

If MPEG data is 4:3, the entire window will become video output without the encoder switching to video output. If MPEG data is 16:9, part of the screen (540 dot section in the horizontal direction) will be cut off and the screen will be full in the horizontal direction.

Information on the cut off sections' positions may be entered into the header in the MPEG stream, and if it is, the sections specified will be cut off. Otherwise, the central sections of encoded streams are always cut off.

Appendix

720dot

480 dot

Pan & Scan display
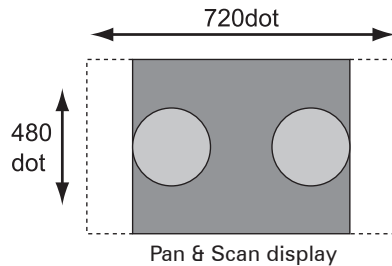
Specify this setting when video output is connected to a 4:3 size TV. If the playback data aspect ratio is 16:9, a horizontal part of the screen will not be displayed, but no matter what the aspect ratio is, the display will be at a correct aspect ratio.

Use the timestamp (PTS/DTS) inside the bit stream
(* Not available in MVR-D2200V)

☑ Use the timestamp(PTS/DTS) inside the bit stream

The time in which the respective audio and video data should play is entered as a time stamp in multiplexed video and audio MPEG data (system stream in MPEG1 and program stream in MPEG2). That controls video and audio play time and provides a resulting synchronization of audio and video. Normally this is operated with the box checked.

Glossary

MPEG1 and MPEG2 streams

The MVR-D2200V has functions for encoding both video and audio signals. For video signal encoding, either MPEG1 (ISO/IEC 11172-2) or MPEG2 (ISO/IEC 13818-2) specifications can be selected.

Audio signal encoding is based on MPEG audio (ISO/IEC 11172-3) specifications. Audio is recorded in uncompressed PCM data.

Encoded video or audio data is called an elementary stream. The MVR-D2200V creates files in which either or both video and audio are encoded and the elementary stream recorded.

Organizing video and audio signals into one data set is convenient when they are simultaneously recorded. To do that, the video elementary stream and the audio elementary stream can be multiplexed into one stream. The multiplexing format for video MPEG1 is system stream (ISO/IEC 11172-1) and for video MPEG2 it is program stream and transport stream (both are ISO/IEC 13818-1) and each one has its specifications. Either system stream or program stream can be created.

Video CD

Since the purpose of Video CD is to record both audio and video, it records in the system stream format (Video CD uses MPEG1 video). Thus, when MVR-D2200V encoded data is used as a video element to create Video CDs, it encodes as system stream. However, Video CD specifications limit conditions to a narrower range than the general MPEG1 system stream, and because of the slight differences in those specifications, a [Video CD] selection button has been set up separately in the MVR-D2200V to allow output of a system stream fitting those conditions. Thus, reading file output into a Video CD creation software available on the open market allows you to create Video CDs.

Selecting Video CD, MVR-D2200V creates files in the following formats.

Item	Value
MPEG type	MPEG1
Video input size	NTSC 352x240, PAL 352x288
Video bit rate	1150000 bps
CBR/VBR	CBR
Audio bit rate	224000 bps
Sampling rate	44100Hz
Audio layer	Layer II
Multiplexing	System stream
Pack size	2324 Bytes
SCR initial value	0

Video CDs can be created by obtaining Video CD creation software (not provided) that is available on the market and that can read these data formats.

DVD-Video

DVD-Video records in program stream format (DVD-Video uses MPEG2 video). The kind of MPEG data format required by DVD authoring software will differ according to software type but generally it reads the elementary stream and then multiplexes it with the program stream inside the authoring software. Audio data will be read as MPEG audio elementary stream or uncompressed PCM data and as a separate file.

The MVR-D2200V supports recording in video and audio elementary stream or audio PCM format so that the encoded data can be used as described above for video elements that create DVD-Video.

Field order

Frame and field makeup

NTSC video has 525 scanning lines per frame with 486 of those lines structured to carry signals for video. However, two of those lines carry signals on only half and cannot be used for digital video. Line no. 21 is used for closed caption signals in the United States so that line is usually excluded. Removing those three lines gives us 483 lines that remain as effective video signal carriers.

Interlacing every other line gives 241 lines with a forward image time shift and a remaining 242 lines are carrying images with a 1/60 second time shift. Put those together and you have a configuration with 30 frames per second, but with that image every other line has a 1/60th of a second time shift forward and backward, and each of those comprises a field.

Field order for two types of MPEG files

Because full D1 and half D1 size MPEG2 record 480 pixel video vertical they extract just 480 scanning lines from 483 scanning lines and record. Because of that, strictly speaking, MPEG2 cannot effectively record all video signals and only part of them will be recorded. When that happens, MPEG2 has no rules as to which scanning lines will be abandoned and which 480 will be recorded, so that allows room to make a selection.

There are two ways in which the scanning lines are selected, either the topmost line when rowed in frames is the line that belongs to the field that was taken first or the topmost line is the line that belongs to the field that was taken afterwards. The two are distinguished by calling the former "top field first" and the latter "bottom field first." This distinction is known as field order. MPEG2 has information recorded in it to tell whether or not the field order is top field first.

Packaging the MPEG2 file with the encoder that created it gives the frame configuration of an interlaced MPEG2 file those two types of field order. Encoding in SIF size causes all fields to be erased on one side so there is no interlacing. That means that there is no such distinction of field order with SIF MPEG2 files. Each frame is processed progressively.

When do we need to be aware of differences in field order?

In normal MPEG file playback, the MPEG decoder automatically discriminates between differences in field order and, based on that, changes the video signal configuration sequence. So the user does not have to pay any attention to field order.

However, when reading and editing the created MPEG file with video-editing software, the video-editing software may require that different settings be made because of the file's field order.

With systems that continuously play multiple MPEG files with no break it may be necessary to make the field order the same for all files. If that is necessary, the user must already know the created file's field order, or must specify and create a field order when creating the MPEG file.

Field order of MPEG2 files created in the MVR-D2200V

The field order of MPEG2 files created in the MVR-D2200V differs with captured video and with conversion from AVI files using the DV-MPEG file converter.

・ When capturing video signals and creating MPEG2 files, select either capture by top field first or capture by bottom field first.

・ MPEG2 files created by conversion from DV AVI files will always be bottom field first (DV format video is set at bottom field first).

Positions in video signals captured in the MVR-D2200V

The parts of video signals shown below are recorded when video is captured in Full-D1 size.

・ **Vertical direction**

　・ When captured by top field first

　　Lines 22 to 261 from odd-numbered fields.
　　Lines 285 to 524 from even-numbered fields.

　・ When captured by bottom field first

　　Lines 23 to 262 from odd-numbered fields.
　　Lines 285 to 524 from even-numbered fields.

・ **Horizontal direction**

　Start from a point about 9.0μ from the leading edge of the horizontal sync signal, the luminosity signals for 720 pixels are sampled at a 13.5MHz sampling frequency and the color differential signals for 360 pixels are sampled at a 6.75MHz sampling frequency.

Data conversion when saving still pictures

Range of pixel values when saving still pictures

The standard specifications for digital treatment of video signals is, that when the three primary colors (R, G, B) are each represented by 8 bits numbers, they are determined to be adjusted so that each R, G and B signal will be 235 at the brightest and 16 at the darkest. Values of 236 and above and 15 and below are regarded as margins.

There are two concepts for handling these video signals on the computer as bit map data and saving them as still pictures.

One is expansion processing of each R, G and B so that the 16-235 range will become 0-255. This expansion is theoretically correct processing because, on the computer, each R, G and B has a value of 255 at its brightest and 0 at its darkest.

However, an actual video picture contains values of 236 and above and 15 and below. The expansion processing described above, must clip the values because of the maximum 255 and the minimum 0. The result often is that the bright sections and the dark sections appear flat as if they were saturated.

Another method is not to expand the range but keep it as is and handle it as bitmap data. When that is done and the video images are adjusted correctly, as called for in the specifications, there appears to be a slight reduction in contrast when viewed as a bit map.

The decision was made to create bit map data using the latter method when saving still images on the MVR-D2200V software MPEG station. The reasons for doing so are as follows.

· The reduction in contrast caused by not using expansion processing is relatively small.

· Data that is clipped through the use of the first method above cannot be restored to what it originally was but the range of data saved in the second method can be expanded by reprocessing later.

When using SDK to save still pictures, the parameters assigned by API can be used to specify which processing will be performed.

Gamma conversion when saving still pictures

The values of R, G and B video signals are gamma corrected when the pictures are taken. The TV cathode ray tube input voltage and display luminosity are not proportional, so to maintain the curved line relationship, inverse characteristics are given throughout picture-taking and that corrects the luminosity of the cathode ray tube display. Thus, RGB signal values obtained from video signals are not proportional to the brightness. To make these values express brightness accurately, the conversion must be made with the same characteristics as the characteristics of the cathode ray tube. These characteristics are determined by the numeric values known as gamma values, and the gamma value for cathode ray tube characteristics is 2.2. Thus, by performing a gamma-value 2.2 conversion of RGB, values will be obtained that are proportional to the brightness of the picture subject.

However, because computers and their printers do not have linear display characteristics, the picture viewed on them will not appear natural when the RGB values obtained are displayed on a PC screen or printed out on a printer.

Specifically, if no gamma conversion is made during the saving of still pictures, because the gamma correction for TV will remain without modification, the bit map data obtained will have sections of intermediate brightness appearing too bright, or appearing whitish.

However, when converted at the 2.2 gamma value, the intermediate brightness sections appear too dark, or even black.

In other words, we must gamma convert, but, conversion was made at 2.2 gamma as theory states causing too great a reversion to source. We thus need a conversion of intermediate levels. With the MVR-D2200V, we have made the gamma value 1.5 for using the software MPEG station to save still pictures.

When SDK is used to save still pictures, the parameters assigned by API allow any gamma value desired to be specified. When the gamma is 1, the relationship is linear with no conversion, but when gamma is higher than 1, the relationship becomes curved, and the larger the gamma value the greater the curve.

Digital three-dimensional YC separation

With composite signal video, the brightness (Y) and color (C) signals in one signal are in a mixed state.

To convert a composite signal into RGB data that can be handled by a personal computer, the Y and C data must first be separated. There are three methods of separation.

One-dimensional YC separation

This method separates Y and C using the relationship between dots in the left and right directions (= frequency characteristics).

This was the method of separation used in almost all old-style TVs because of the simplicity of reproduction by analog circuits. (There are, however, recent digitalized versions of this method.)

The method does have disadvantages in somewhat lower resolution, but it does not produce any color noise.

Two-dimensional YC separation

This method separates Y and C signals by making use of the vertical relationship between dots. It is generally called a comb filter. It requires one line of memory. At one time, a glass delay device was used in analog TV sets but now digital one-line memory is used. Color noise (such as white diagonal lines on a black background) is generated when the vertical association between dots is low but because of its high resolution this is a format that is widely used today.

Three-dimensional YC separation

This method separates Y and C signals from the time relationship of dots displayed in the same position and of all the processing procedures conceived of today, this is the one that gives the highest resolution. Still sections with a strong correlation on the time axis use the time axis, and moving sections that have low correlation on the time axis use the vertical relationship (two-dimensional) to process. A digital frame buffer and motion detecting device are mandatory.

* Either two-dimensional or three-dimensional YC separation can be used in the MVR-D2200V.

Digital three-dimensional digital noise reduction

Conventional noise reduction is in either the one-dimensional or two-dimensional direction and removes noise in that direction by dropping the entire image's frequency characteristics, thus creating the problem of affecting sections that have no noise. The three-dimensional digital noise reduction used in the MVR-D2200V detects noise from noise characteristics (low association on the time axis) so that effects on the picture are held down to the very minimum. Reducing noise, which is the big enemy in MPEG compression, contributes to the improvement of compression rate.

* Structural limitations prevent the elimination of all noise.

Digital 3D frame synchronizer

The characteristics of the MPEG encoder chip create problems in that it may be unable to continue processing if the input sync signal is distorted due to noise or other factors.

To solve this problem, a one-screen memory is used as a buffer so that even if a sync signal in the input signal is distorted, the MPEG encoder chip will always be supplied with stable sync signals and the possibilities of processing interruption are greatly suppressed.

* There is no synchronization function for external signals (external sync input).
* The digital 3D frame synchronizer is always in ON state.

Digital line time base corrector

This detects images that have strong jitter in the horizontal direction and forcibly corrects it. It is also very powerful in capturing old video libraries.

* There may be times when the quality of the signal will prevent correction.
* The digital line time base corrector is always in ON state.

Troubleshooting

The MVR-D2200V may not operate correctly at times. There are many different causes for incorrect operation. Before calling Technical Support, check to see if a similar case may have occurred and is reported in Troubleshooting.

Q: Input image does not appear

Cause 1   Preview display is disabled.

Remedy 1   Click on the preview button to enable the preview display.

Cause 2   Wrong settings for video input terminals.

Remedy 2   Use the MPEG Station source switching button to switch input terminals.

Cause 3   Video device not outputting images.

Remedy 3   Change the settings on the video device so that it will output images from the video device that is the input source.

Q: Input image is not overlay-displayed

Cause 1   Preview display and overlay display are not enabled. Preview display is not enabled.

Remedy 1   Click on the preview button and the overlay button to enable the preview display and the overlay display.

Cause 2   Using Windows at a resolution or frequency that cannot handle overlay display.

Remedy 2   Refer to the operational manual for the graphics board you are using and change the frequency and resolution to ones that can handle overly display.

Cause 3   The capture parameter's MPEG tab stream is on audio.

Remedy 3   The overlay will not display if audio is selected. Select something other than [Audio] from [Stream] which is in the [Assign capture parameters] dialog box.

Q: Input image is not video output

Cause 1   The preview display and video output are not enabled.

Remedy 1   Click on the preview button and the video output button to enable the preview display and video output.

Cause 2   Input assignment for video equipment is wrong.

Remedy 2   Change the settings on the video equipment so that the MVR-D2200V video output terminal and the connected video equipment's input terminal can be used.

Q: Audio not being input or volume is extremely low

Cause 1   Using an audio cable with resistance.

Remedy 1   Use a cable with no resistance. Use of a cable with resistance will greatly reduce volume.

Cause 2   Inappropriate MPEG Station audio volume control.

Remedy 2   Use the monitor volume control fader on the MPEG Station to adjust the volume.

Cause 3   MPEG Station's mute button is enabled.

Remedy 3   Click on the MPEG Station's mute button to release the mute.

Q: No sound at file playback or volume is extremely low

Cause 1   Using an audio cable having resistance.

Remedy 1   Use a cable with no resistance. Use of a cable with resistance will greatly reduce volume.

Cause 2   Inappropriate MPEG Station audio volume control.

Remedy 2   Use the monitor volume control fader on the MPEG Station to adjust the volume.

Cause 3   MPEG Station's mute button is enabled.

Remedy 3   Click on the MPEG Station's mute button to release the mute.

Cause 4   Low recording level during capture.

Remedy 4   Either adjust the volume on the source or change the source. Recording level during capture cannot be adjusted in the MVR-D2200V.

Cause 5   Input settings on audio equipment are wrong (only when audio equipment is connected).

Remedy 5   Change the settings on the audio equipment so that the audio equipment's input terminals that are connected with the MVR-D2200V audio output terminals can be used.

Cause 6   Inappropriate settings on Windows mixer (only when connected to sound card).

Remedy 6   Check to make sure that the mute is not enabled or adjust the line input level on the Windows mixer.

Cause 7   Sound card not set up or not operating.

Remedy 7   A sound card is required for MPEG/WAVE file playback. Check to make sure that the sound card operating on your OS is set up and operating correctly.

Q: Cannot check results of adjusting picture quality

Cause   Preview display is not enabled.

Remedy   Click on the preview button to enable the preview display. Then click on the overlay button or the video output button. Use the personal computer monitor or an externally attached television monitor to check the results of picture quality adjustment.

Hardware Specifications

Video	Input/Output format	NTSC, PAL
	Input terminal	7-pin mini-DIN connectors, 1 set (Use an S video cable or the pin jack converter cable provided and connect the composite video cable)
	Output terminal	7-pin mini-DIN connectors, 1 set (Use an S video cable or the pin jack converter cable provided and connect the composite video cable)
	Input Video quality	Input Video quality (Brightness, Contract, Hue and Saturation) can be adjusted. * The adjustment will be applied to the output video.
	Overlay preview	Input video (while capturing) and Output video (while playback) can be displayed with overlay. * Display hardware and software which support the overlay function by the Windows DirectX, are required.
	Overlay video quality	The video quality (Brightness, Contrast and Saturation) for Input video (while capturing) and Output video (while playback) can be adjusted. * The adjustment does not affect the encoded result.
Audio	Input terminal	RCA pin jack (stereo), 1 set Input impedance 22kΩ (typ) Full scale input level 2Vrms
	Output terminal	LINE OUT ϕ 3.5mm Stereo mini-jack, 1 set Matched load impedance 10kΩ or over MAX output level 2Vrms
	Sampling frequency	32kHz, 44.1kHz, 48kHz,
	Bandwidth	16 bit

MPEG encode/decode	Video Compression	ISO/IEC 13818-2(MPEG-2) ISO/IEC 11172-2(MPEG-1)	
	Profile level	MP@ML(MPEG-2), MP@LL, SP@ML	
	Resolution	NTSC 720 x 480(Full-D1) 352 x 480(Half-D1) 352 x 240(SIF)	PAL 720 x 576(Full-D1) 352 x 576(Half-D1) 352 x 288(SIF)
	Video bit rate	MPEG2 Full-D1 MPEG2 Half-D1/SIF MPEG1 SIF	4M to 15M bps 2M to 8M bps 1M to 1.8M bps
	GOP configuration	IBBP(M=1 to 3, N=1 to 30) I-only (M=1, N=1) Closed GOP is available.	
	Audio compression	ISO/IEC 11172-3 Layer 2 (Real-time processing as determined by software) No compression (WAVE file can be created by Linear PCM)	
	Audio bit rate	128, 160, 192, 224, 256, 320, 384 Kbps	
	Multiplex format	ISO/IEC 13818-1 MPEG-2 program stream ISO/IEC 11172-1 MPEG-1 system stream Non-multiplex (Elementary streams for video and audio)	
Resources used	Interrupt	Use 1 channel of IRQ allocated during PCI configuration on personal computer	
	Memory space	Use 512 bytes allocated during PCI configuration on personal computer	
Current consumption (Maximum)		+5V 2.0A, +12V 200mA, -12V 100mA	
Outside dimentions		175mm x 107mm (without including projecting parts)	
Weight		200g (without including the provided parts)	

Appendix

Memo