

**Multi-format Video Server**

**MFPR-4000**

**INSTRUCTION MANUAL**

**REV. 1.1**

## **Safety Precautions**

To use this product safely, review the following safety precautions.

To avoid potential hazards, use this product only as specified.

## **Injury Precautions**

### **Use Proper Power Cord**

To avoid fire hazard, only use the power code specified for this product.

### **Avoid Electric Overload**

To avoid electric shock or fire hazard, do not apply a voltage to a terminal that is outside the range specified for the terminal.

### **Ground the Product**

This product is grounded through the grounding conductor of the power code. To avoid electric shock, the grounding conductor must be connected to earth ground. Before connecting the input or output cables, ensure that the product is properly grounded.

### **Do Not Operate Without Covers.**

To avoid electric shock or fire hazard, do not operate this product with covers or panels removed.

### **Do Not Operate in Wet Conditions.**

To avoid electric shock, do not operate this product in wet or damp conditions.

The apparatus shall not be exposed to dripping or splashing and that no objects filled with liquids, such as vases, shall be placed on the apparatus.

### **Do Not Operate in an Explosive Atmosphere.**

To avoid injury or fire hazard, do not operate this product in an explosive atmosphere.

## **Product Damage Precautions**

### **Use proper power source.**

Do not operate this product from a power source that applies more than the voltage specified. The specified voltage of this product is within 90-264 VAC, 50-60Hz.

### **Provide Power Ventilation.**

To prevent product overheating, provide proper ventilation.

### **Prevent Impact**

Prevent an impact during transportation. Do not move this product during operation.

### **Do Not Operate with Suspected Failures.**

If you suspect there is damage to this product, have it inspected by qualified service personnel.

### **Repair and Maintenance**

Only qualified service personnel should perform repairs and maintenances. Contact the sales office in those cases.

## **Recommended Replacement Period.**

The following parts of this product are recommended to replace within the specified term. Lifetime of parts is influenced by an environment, a frequency of use and a preservation condition.

- (1) Cooling fans: Three years.
- (2) SSD: Five years.
- (3) Power supply unit: Five years.

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## PREFACE

### Initial inspection.

Confirm the contents and damages of this product before initial use.

### Standard Accessories

19-inch Rack mount bracket	2
4 mm Screw for above bracket	4
Power cable	1

### Outline of the MFPR-4000

MFPR-4000 is 2-IN 2-OUT (2-Record 2-Playback) configuration. You can control two recording channels and two playback channels independently. It is possible that you can search to the desired position and make instant replay while keeping continuous recording (PLAY while REC feature). Also, you can playback some other files that are recorded previously or provided separately even in different file format.

This machine can be used as two playback machines of the linear editing system by connecting through the two RS-422 remote connectors (option). Also, you can control this machine through Ethernet connection with UDP protocol.

Almost all file formats can be played back, like MXF, MOV, and MPEG2-TS etc.

### Features

- ◆ Independent two record channels and two playback channels.
- ◆ Motion JPEG, MPEG2, MXF OP1a HD422, MOV DNxHD can be used as recording encoder.
- ◆ Multi-format playback of MXF, MOV, MPEG2-TS, etc.
- ◆ Multi standard like 1080i/59.94 and 720p/59.94 etc.
- ◆ Seamless playback of same or different file format clips.
- ◆ Simultaneous Record and Play.
- ◆ Endless LOOP recording mode
- ◆ Up to 8 TB optional SSD storage capacities.
- ◆ Up to eight channels Embedded AUDIO for each channel..
- ◆ RP-188 Embedded VITC/LTC time code.
- ◆ GEN LOCK to external BB or Tri-level sync
- ◆ Ethernet UDP remote control.
- ◆ RS-422 remote control (OPTION).
- ◆ PC Time can be used as Timecode.

## Control of the MFPR-4000

MFPR-4000 can be controlled as following control means.

- (1) GUI application associated with the MFPR-4000.
- (2) Short cut key from keyboard.
- (3) Windows Remote Desktop feature.
- (4) Ethernet UDP protocol.
- (5) RS-422 Remote control (OPTION)

## About recording time

A total recording time varies according to the SSD capacity, encoding scheme, TV standard and audio channels to be recorded. The following table shows typical examples that are the TV standard of 1080i/59.94, the encoding scheme of MPEG2 (LONG GOP 20Mbps), MJPEG (INTRA) and MXF HD422 50Mbps. The audio is uncompressed PCM 8 channels.

**<NOTE> MJPEG is VBR (variable bit rate), so the output data rate changes due to the input picture complexity. In a result, the recording time changes.**

TV standard	Encoding	Recording time VS Internal SSD capacity				
		500 GB	1TB	2TB	4TB	8TB
1080i/59.94	MPEG2	50 H	100 H	200 H	400 H	800 H
	Motion JPEG	22 H	44 H	88 H	176 H	352 H
	MXF HD422	18 H	36 H	72 H	144 H	288 H



## 1. Installations

Before installation of the MFPR-4000, please read the “**Safety Precautions**” of this manual.

### 1-1. Confirmation of Environment

This product operates properly within the temperature range of +0-35°C and the humidity range of 10-90% (Non-condensing). If the temperature of this product is out of this range due to a transportation or preservation, do not power on until the temperature reaches the specified range.

To prevent an over-heat, do not disturb the airflow of this product. Keep a certain space open, at least 5 cm on the front and the rear of this product.

### 1-2. Assurance of Mains Voltage

Assure that the mains AC voltage to this product is within the range of 90-264V 50/60 Hz.

### 1-3. Connection of Power Cable and Power ON

The power cable must be connected properly to the AC IN connector on the rear panel.

In default, the system automatically power-on by connecting the AC power.

Also, the system power is fed by pushing the front power button.

After power on, cooling fans start rotating, operating system is booted within about 30 seconds, then the system can be used.

### 1-4. Power OFF

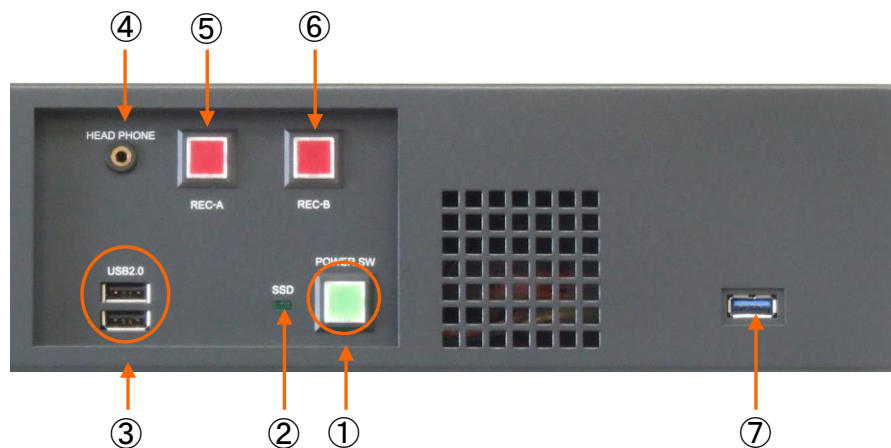
Push the POWER switch on the front panel for shutting down the power. Also, the power can be off from the operating system. Push the START button and click the “shut down” button.



## 2. OPERATION

### 2-1. Front Panel

Names and functions of the Front Panel switch and LED indicators are as follows:



① **POWER switch**

This switch turns on or turns off the system. Color of this switch is lit green when the power is ON. You should wait till the illumination off before you remove the power cable.

② **SSD indicator**

The green LED is lit or blinked when the system accesses the SSDs.

③ **USB 2.0 connector**

These connectors can be used to connect a MOUSE, a KEYBOARD or memory devices. It conforms to the USB2.0 specification and the maximum transfer rate is 480 Mbps.

④ **Head phone jack**

3.5 mm head phone can be connected.

⑤ **REC-A indicator**

Shows that the CH-A is currently recording.

⑥ **REC-B indicator**

Shows that the CH-B is currently recording.

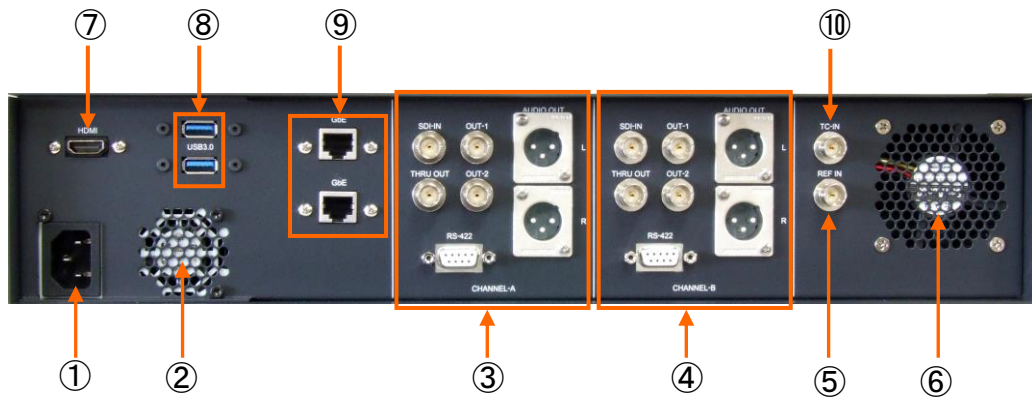
⑦ **USB3.0 connector**

This connector can be used to connect external drives etc.

It conforms to the USB3.0 specification and the maximum transfer rate is 5 Gbps.

## 2-2. Rear Panel

Names and functions of the Rear Panel fans and connectors are as follows:



① **AC-IN connector**

This connector is for connecting AC cable. Please use specified power cable to connect AC power. The voltage range is within 90-264V, 50/60Hz.

② **Cooling fan for power supply**

This fan starts to rotate when connecting the power code on the rear panel and the POWER SWITCH on the front panel is activated.

③ **Channel-A input and output connector part**

There are the SDI in/out, analog audio output and RS-422 remote connector. Details are explained in the next page.

④ **Channel-B input and output connector part**

There are the SDI in/out, analog audio output and RS-422 remote connector. Details are explained in the next page.

⑤ **REF IN connector**

This connector is for the EXTERNAL REFERENCE input (BB or tri-level sync.)

<CAUTION>

1. The reference signal of the same TV standard for the video signal must be connected.
2. The external reference signal is the common for both OUT-A and OUT-B. The output time can be adjusted separately for OUT-A and OUT-B in the [Playback settings] menu.

⑥ **Main cooling fan**

This fan starts to rotate when connecting the power code on the rear panel and the POWER SWITCH on the front panel is activated.

⑦ **HDMI connector**

HDMI female connector. The digital monitor out with the HDMI specification.

⑧ **USB3.0 connector x2**

USB3.0 female connector (Type-A). An external SSD Drive and the other USB3.0 equipment can be connected. The maximum transfer rate is 5 Gbps.

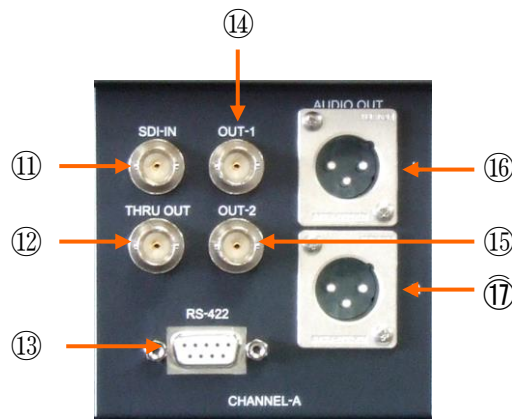
⑨ **Ethernet connector x2**

RJ-45 LAN connector for connecting Gigabit Ethernet cable. Used for transfer of the moving picture files and remote control.

⑩ **TC IN connector**

This connector is for the external time code. The timecode must be synchronized with the input video signal.

· **Channel-A/B input and output connector part details**



⑪ **SDI-IN connector**

**connects SDI input signal.**

⑫ **THRU OUT connector**

The input signal is output from this connector by actively through the internal circuit.

⑬ **RS-422 remote connector**

The D-SUB 9-pin female connector. This connector is used to connect external controllers with the RS-422 specifications.

⑭ **OUT-1 connector**

Outputs the SDI signal.

⑮ **OUT-2 connector**

The same SDI signal as OUT-1 is output.

⑯ **AUDIO OUT (L) connector**

The XLR-3 pin male connector to output Channel-L analog audio signal.

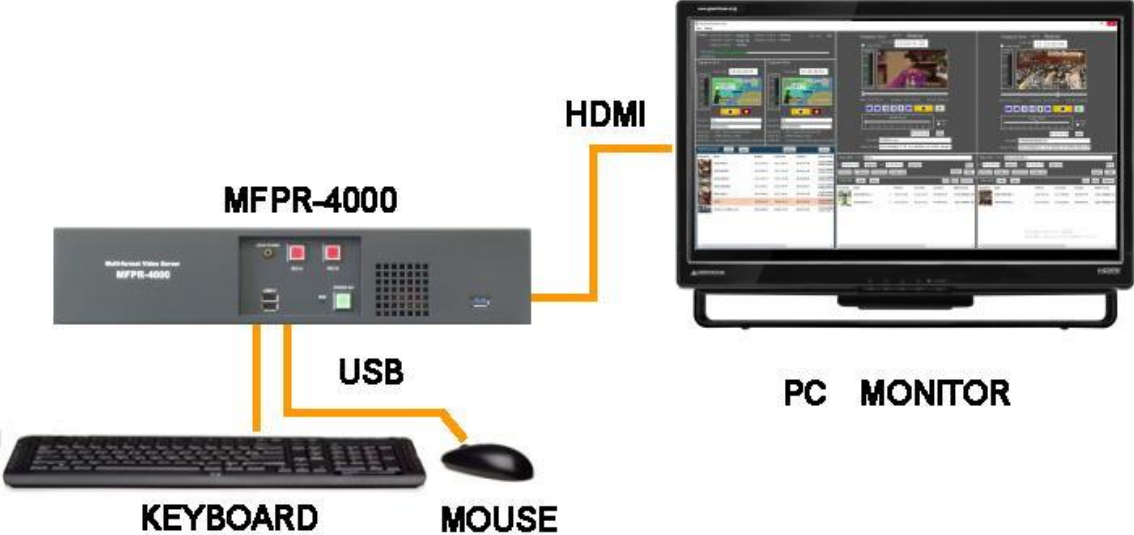
⑰ **AUDIO OUT(R) connector**

The XLR-3 pin male connector to output Channel-R analog audio signal.

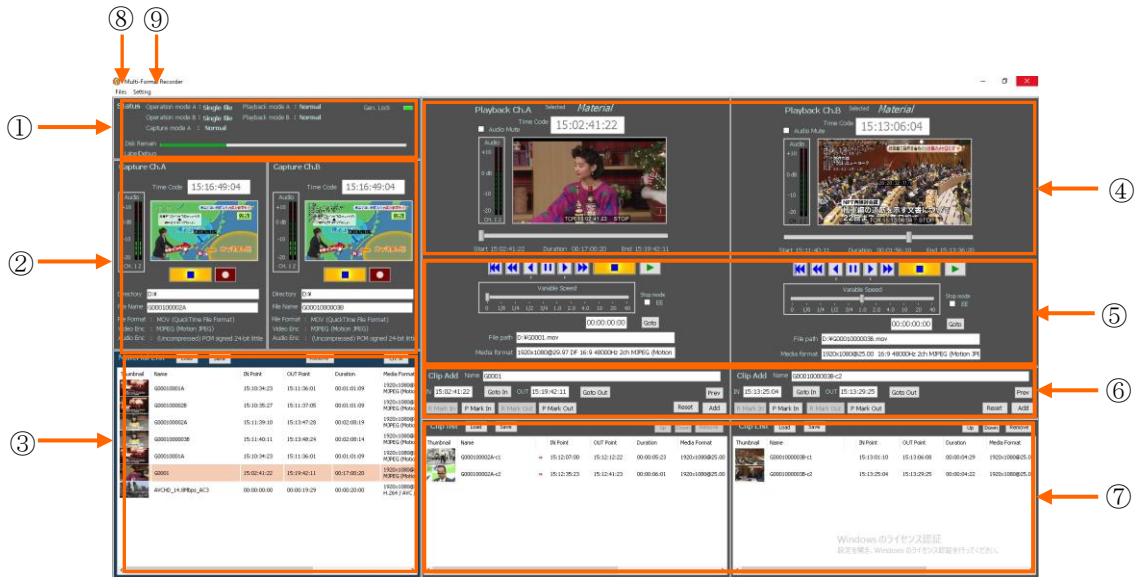
### 3. Control with GUI

The GUI application utility software is included in the MFPR-3100. This section explains the usage of this utility software.

Please connect the PC monitor, mouse and keyboard to the MFPR-4000 if necessary. Another choice is a remote control from external PC, using the Windows REMOTE DESKTOP feature via the LAN connection.

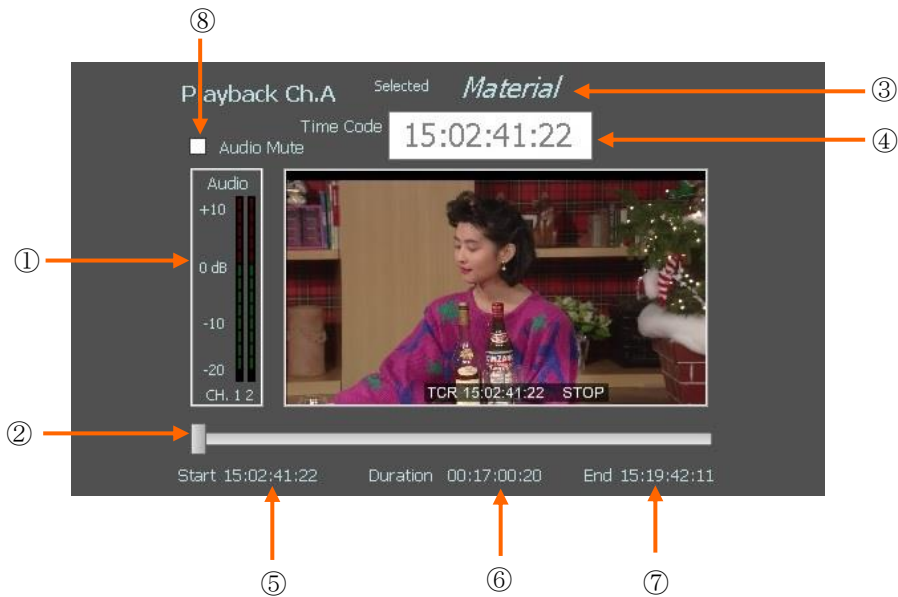


### 3-1. Multi-Format Recorder GUI names and functions



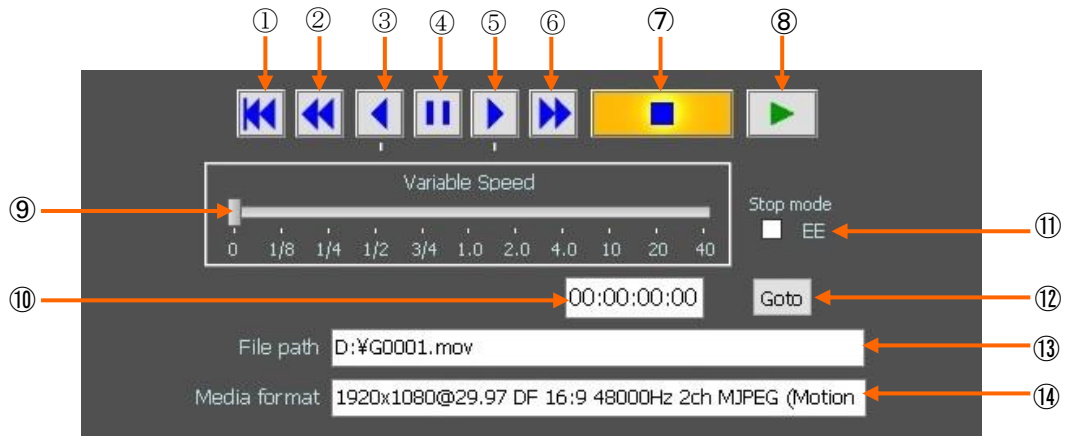
- ① **Status indication part:** shows the current settings and status.
- ② **Recorder control part:** Controls and previews for REC CH-A and REC CH-B.
- ③ **Material list part:** Shows list of the material files to be played back.
- ④ **Playback Preview part:** Monitors playback video, audio and time code of CH-A and CH-B.
- ⑤ **Deck control part:** Controls playback mode, playback direction and speed.
- ⑥ **Clip edit part:** Making clips by designating IN point, OUT point and clip name.
- ⑦ **Clip list or Play list part:** Shows list of the clips to be played back. When selecting the [Playlist] mode on the Settings menu, this list becomes the Play list.
- ⑧ **Files menu:** Menu for adding, deleting, or saving files.
- ⑨ **Setting menu:** Opens the setting menu dialog.

### 3-1-1. Playback Preview part details



- ① **VIDEO/AUDIO Monitor:** Displays playback video and audio meter. The audio meter channels can be changed in the [Playback settings] menu.
- ② **Slide-bar:** Browsing file contents quickly by dragging the button.
- ③ **Selected list:** Indicates which list is selected for playback, Material, Clip list or Playlist.
- ④ **Time Code:** Shows current time code value in the playback file.
- ⑤ **File Start:** Shows the start time code of the file or clip.
- ⑥ **Duration:** Shows duration (length) of the file or clip.
- ⑦ **File End:** Shows the end time code of the file or clip.
- ⑧ **Audio mute check box:** Muting audio output.

### 3-1-2. Deck control part details



- ① **GO TO START button:** Moves to the start point of the file or clip.
- ② **REWIND button:** Runs reverse direction with maximum speed.
- ③ **REVERSE button:** Runs reverse direction with the speed selected with ⑨ Variable Speed bar. If the selected speed is zero, moves one frame by each click.
- ④ **PAUSE button:** Stops movement and outputs the still frame.
- ⑤ **FORWARD button:** Runs forward direction with the speed selected with ⑨ Variable Speed bar. If the selected speed is zero, moves one frame by each click.
- ⑥ **FF button:** Runs forward direction with maximum speed.
- ⑦ **STOP button:** Releases the playback mode.
- ⑧ **PLAY button:** Starts normal playback (x1 speed).
- ⑨ **Variable Speed bar:** Selects variable speeds.
- ⑩ **TC input field for search:** Types time code value for GOTO function.
- ⑪ **Stop mode:** Selects the output video during the STOP mode.  
PB---Playback picture, sound and timecode are output.  
EE---INPUT picture, sound and timecode are output.
- ⑫ **GOTO button:** Goes to the position designated by ⑩.
- ⑬ **File path:** Shows file path of the selected file.
- ⑭ **Media format:** Shows encoding scheme for the video and audio of the selected file.

#### Use the mouse wheel

You can make the JOG movement by rotating the mouse wheel when the mode is STOP or PAUSE.

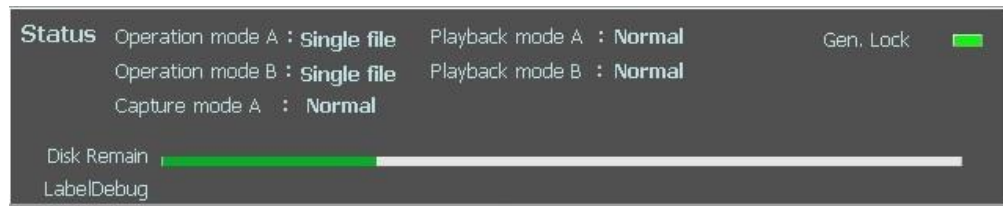


### 3-1-3. Material List part details



- ① **Material List:** Shows material files those are loaded for playback. It indicates from left, [Thumbnail picture], [File name], [IN point], [OUT point], [Duration], [format], [File path]. You can change the file orders by drag and drop.
- ② **Load button:** Recalls the Material list that is previously saved. The extension of the saved material list is [.glm].
- ③ **Save button:** Saves current material list for future use.
- ④ **Remove button:** Removes the selected file from the material list. The file itself on the storage device (SSD) is not deleted by this procedure.
- ⑤ **Channel selection button:** Decides which channels the selected file will be loaded. There are two selections, Ch-A and Ch-B. In the material list, the file with double click is loaded on the channel selected.

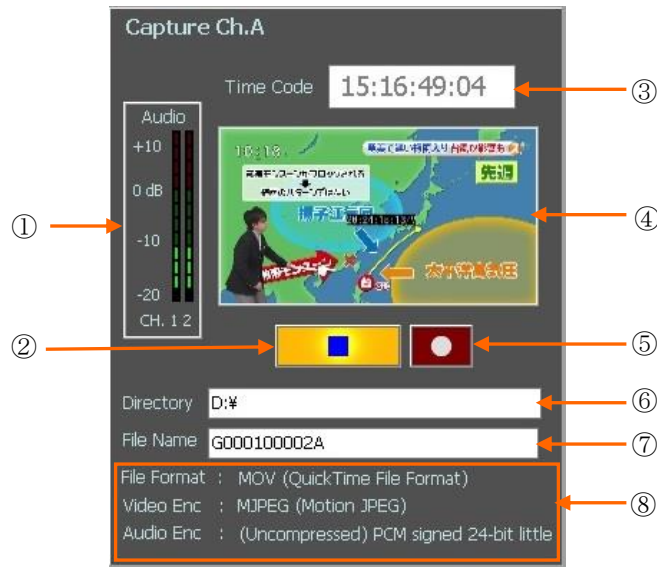
### 3-1-4. Status indication part details



**Status indication:** Indicates current settings mode.

- **Operation mode A**---Indicates selected operation mode of Ch-A, Single file or Playlist.
- **Operation mode B**---Indicates selected operation mode of Ch-B, Single file or Playlist.
- **Playback mode A**---Indicates playback mode of CH-A, Normal or Repeat. If the “Pause” is selected in the Playlist mode, the indication changes to [Pause-END] or [Pause-NEXT].
- **Playback mode B**---Indicates playback mode of CH-B, Normal or Repeat. If the “Pause” is selected in the Playlist mode, the indication changes to [Pause-END] or [Pause-NEXT].
- **Capture mode**—Indicates the capture mode, LOOP or Normal.
- **Disk Remain**---Indicates the consumed disk space (Green bar) and the remaining disk space (Blank). The full length is equivalent to 100 %. If the remaining time closes to zero, warning of [Almost End of Disk] is displayed. If the remaining time reaches to zero, the warning of [End of Disk] is displayed and the recording is terminated.
- **Gen.Lock**--- Indicates the Gen-lock condition. If locked, indication is stable green color. The blinking of orange color shows unlock state.
-

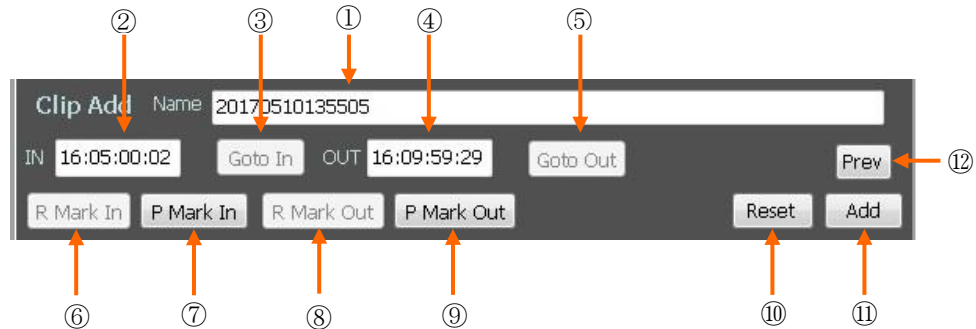
### 3-1-5. Recorder control part details



- ① **VIDEO and AUDIO Monitor:** Displays input video and audio level. The audio meter channels can be changed in the [Capture settings] menu.
- ② **REC STOP button:** Stops recording.
- ③ **Time Code:** Indicates the current Timecode value. The time code to be used can be selected in the Capture Settings menu. One of the Input TC, PC Time or Preset can be selected.
- ④ **Video preview screen:** Shows input video.
- ⑤ **REC button:** Starts recording.
- ⑥ **Directory:** Indicates directory path that the recording file is stored. This directory can be changed in the [Capture Settings] menu.
- ⑦ **File Name:** Indicates the name of the file to be recorded. The file name can be selected by the “File name preset” item of the [Capture Settings menu]. If “Disable” is selected, you can type the name in this box.
- ⑧ **Encoder description:** Shows the currently used video and audio encoder and the container format.

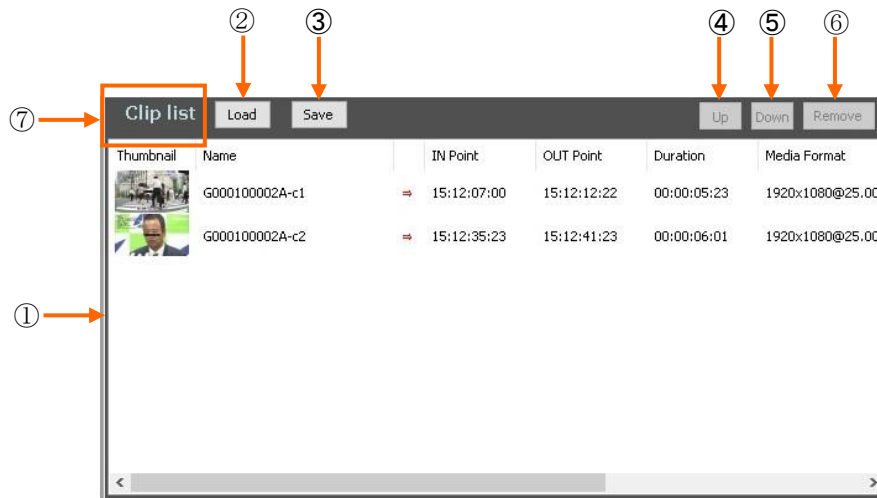
### 3-1-6. Clip Edit part details

You can make edited clips with desired IN point and OUT point on the selected file. The original material file is not modified, so you can remake the clip many times.



- ① **Name:** Types optional name for the clip. When the clip is made from the material file on the material list, the original file name appears initially.
- ② **IN Point TC:** Indicates the IN point for the clip. You can insert TC values also.
- ③ **Goto In:** Cues up to the IN point.
- ④ **OUT Point TC:** Indicates the OUT point for the clip. You can insert TC values also.
- ⑤ **Goto Out:** Cues up to the OUT point.
- ⑥ **R Mark In:** Injects the current time code on the recording side to the IN point.
- ⑦ **P Mark In:** Injects the current time code on the playback side to the IN point.
- ⑧ **R Mark Out:** Injects the current time code on the recording side to the OUT point.
- ⑨ **P Mark Out:** Injects the current time code on the playback side to the OUT point.
- ⑩ **Reset:** Resets the IN point and the OUT point of the clip. (The TC values of the IN point and OUT point changes to the original TC values of the material file.) This Reset function is used for redesignation of the IN and the OUT point.
- ⑪ **Add:** Adds the newly specified clip on the Clip list. This button name changes to [Set] if you select the clip in the Clip list.
- ⑫ **Prev:** Preview button. Playbacks from the IN point to the OUT when you click this button just after the IN point and the OUT point are designated.

### 3-1-7. Clip list part details

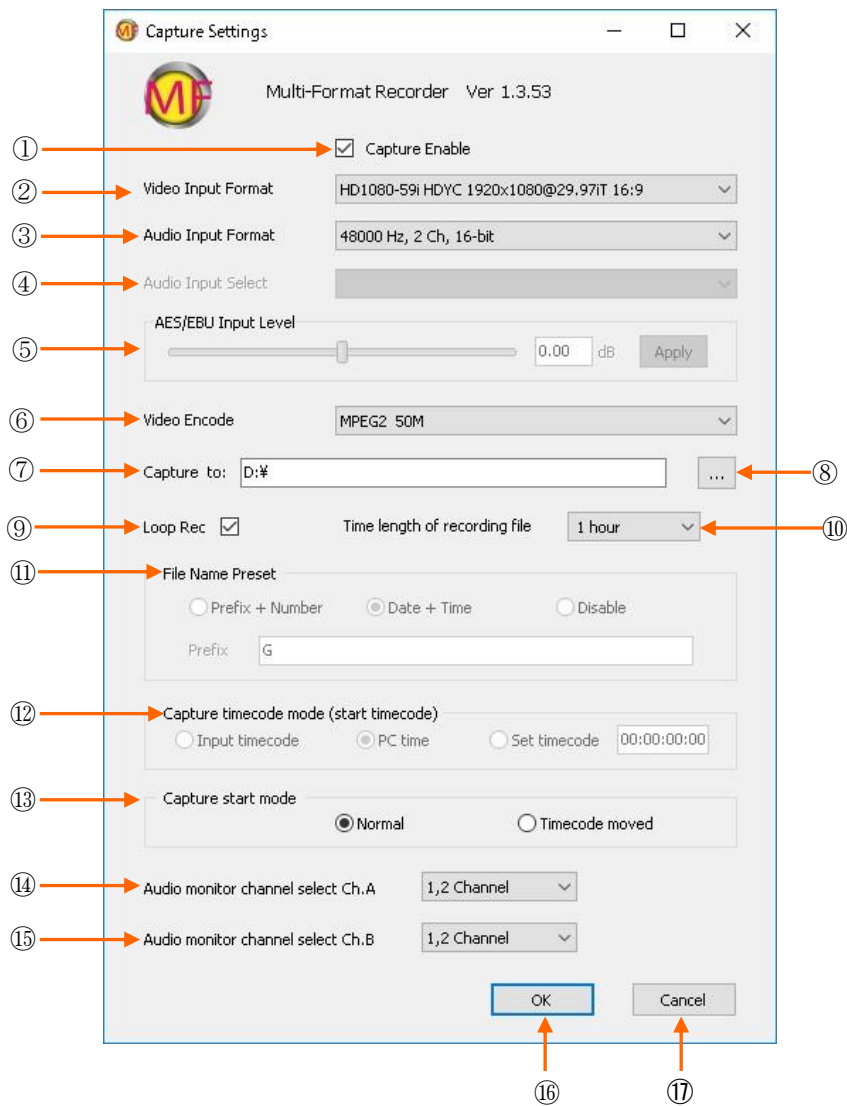


- ① **Clip List:** Lists clips made by the Clip Edit part or retrieved from saved clip list. The list indicates [Thumbnail picture]-[Clip name]-[IN point]-[OUT point]-[Duration]-[Format]-[File path].
- The mark before IN point shows as follows:
- ⇒ --- Single File Mode
  - ↔ --- Repeat playback in the Single File Mode.
  - ↓ --- Continuous playback in the Playlist Mode.
  - ---Pause mode in the Playlist Mode.
- ② **Load button:** Reads the saved Clip list (or Play list). After clicking, dialog like Explorer opens. Selects the file (The file extension is [.gls].and click OPEN.
- ③ **Save button:** Saves contents of the current Clip list (or the Playlist). After clicking, dialog like Explorer opens. Selects the folder and put the file name then click the SAVE button.
- ④ **Up button:** Moves the selected clip upward. You can use drag and drop also.
- ⑤ **Down button:** Moves the selected clip downward. You can use drag and drop also.
- ⑥ **Remove button:** Removes the selected clip from the Clip list.
- ⑦ **Name of list:** This name changes to the [Playlist] when selecting the Playlist mode.

## 3-1-8. Settings Menu

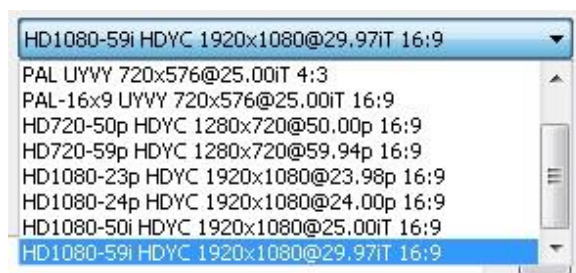
### 3-1-8-1 Capture Settings menu

You cannot open this menu during record mode. You should stop recording to open this menu.



① **Capture Enable:** Puts check mark when you use Capture control part. If you remove the check, only playback part can be displayed and used.

② **Video Input Format:** Selects a video input format.



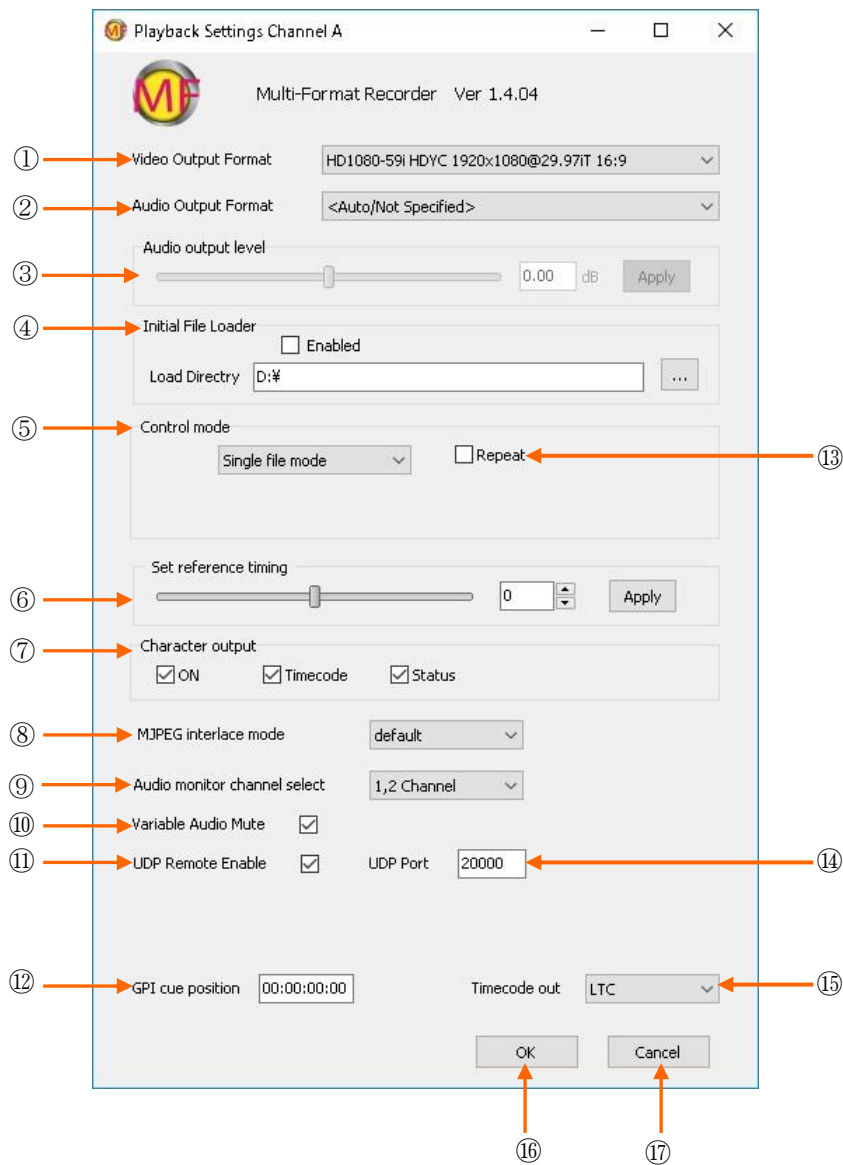
- ③ **Audio Input Format:** Selects an audio input format.
- ④ **Audio input select:** This menu is not available. (Embedded audio only.)
- ⑤ **AES/EBU Input level:** This menu is not available.
- ⑥ **Video Encode:** Selects encoding mode

<<CAUTION>> Do not select the ProRes422 when you use simultaneous REC/PLAY.



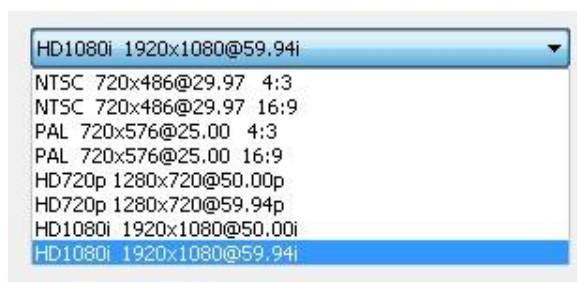
- ⑦ **Capture to:** Indicates a directory that the recording file is stored.
- ⑧ **Brows button:** Opens for changing the directory. As the default, the internal D: drive is selected. You can also select external drives or network drives.
- ⑨ **Loop Rec:** Put a check mark when you want to do the LOOP recording.
- ⑩ **The length of recording file:** In the LOOP recording mode, the recorded file is automatically split into plural files with certain time period. You can select the file length from 5 min, 10 min, 30 min or 1 hour.
- ⑪ **File Name Preset:** Selects file name for recording.
  - Prefix+Number**--- The word which is typed in the window plus numbering becomes the file name.
  - Date+Time**--- The current date and time becomes the file name.
  - Disable**--- You can type a file name on the Capture part of GUI.
- ⑫ **Capture Timecode Mode :** Selects time code source to be used for the recording file. ます。
  - Input Timecode**--- Use the input time code embedded in the SDI signal.
  - <<Caution>> Do not select the "Input TC" if the LTC or the VITC on the SDI signal does not exist.
  - PC time**--- Use current time of the PC.
  - Set Timecode**--- Use preset time code value. You should type the time code values in the right window. The default value is [00:00:00:00].
- ⑬ **Capture Start mode:** Selects the record start timing.
  - Normal**--- Actual recording starts Immediately.
  - Timecode moved**--- Actual recording starts after detecting change of the time code value.
- ⑭ **Audio monitor channel select CH-A:** Selects channel pair (1/2, 3/4, 5/6, 7/8) for the input audio meter.
- ⑮ **Audio monitor channel select CH-B:** Selects channel pair (1/2, 3/4, 5/6, 7/8) for the input audio meter.
- ⑯ **OK button:** Sets the new settings.
- ⑰ **Cancel button:** Cancels the new settings.

### 3-1-8-2 Playback 用 Settings メニュー (Single file mode)



① **Video Output Format:** Selects video format to be output from SDI connector.

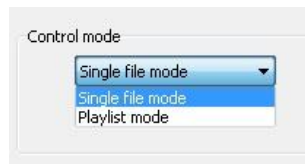
<<CAUTION>> You should stop the playback for changing the output format.



② **Audio Output Format:** This menu is not available. The audio output format is fixed to the default of [AUTO/Not Specified].



- ③ **Audio output level:** This menu is not available. (This menu is for the model with AES/EBU audio output.)
- ④ **Input File Loader :** If put a check mark on [Enabled] box, all the files in the directory that is designated on the Load Directory window are automatically loaded in the material list when the application is booted.
- ⑤ **Control Mode:** Selects Clip list mode or Playlist mode. The following selection menu opens by clicking the right tab.

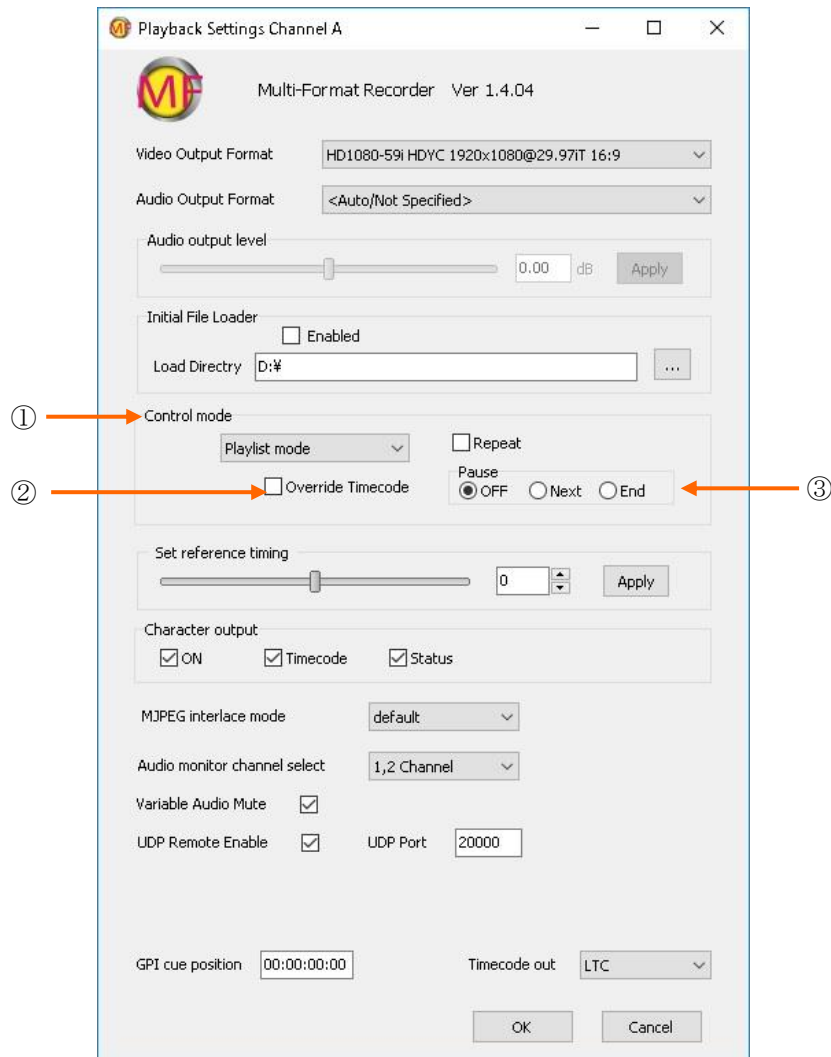


**Single file mode**--- The mode that only one selected clip can be played back.

**Playlist mode**--- You can playback plural clips continuously in this mode.

- ⑥ **Set reference timing:** Adjusts Gen-lock phase. For adjustment, move the slide bar or put digits -511 to +511 in the window then click the [Apply] button.
- ⑦ **Character Output:** Determines whether the characters are inserted or not.
  - ON**--- Enables the character insertion.
  - Timecode**--- Timecode can be displayed.
  - Status**--- Deck status (REC, PLAY, STOP etc) can be displayed.
- ⑧ **MJPEG interlace mode:** Selects interlace mode when playback the Motion JPEG file. The default mode is the [TOP], but there is a case that the ODD/EVEN relationship becomes abnormal for some MJPEG files. In this case, you can select the other mode.
- ⑨ **Audio monitor channel select :** Selects channel pair (1/2, 3/4, 5/6, 7/8) for the playback audio meter.
- ⑩ **Variable audio mute:** Enables audio mute in variable play back mode. Without check mark, audio can be output even in the variable playback (JOG, Slow or Shuttle).
- ⑪ **UDP Remote Enable:** Put a check mark in the box if you use the Ethernet UDP remote control.
- ⑫ **GPI Cue Point:** Designate the CUE-UP offset of the GPI interface (OPTION). The default value is [00:00:00:00].
- ⑬ **Repeat:** Enables repeat (LOOP) playback.
- ⑭ **UDP Port:** Designates the port number for the UDP control. You need rebooting the application for activating.
- ⑮ **Timecode out:** Selects time code output on the HD-SDI (RP-188 specification). The VITC, VITC2, LTC or Disable can be selected.
- ⑯ **OK button:** Sets the new settings.
- ⑰ **Cancel button:** Cancels the new settings.

### 3-1-8-3 Playback Settings menu (Playlist mode)

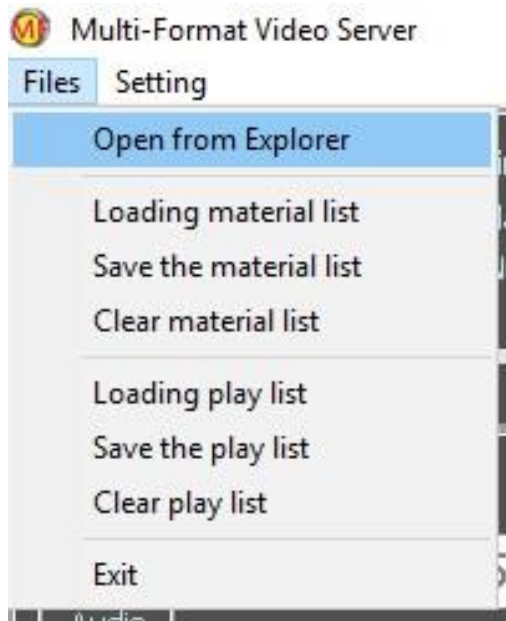


On the Control mode ①, If you select the Playlist mode, The ② and the ③ is newly displayed.

- ② **Override Timecode:** Selects the timecode count when playback plural clips continuously,. The original Timecode value is used when the check box is empty. The continuous time code from [00:00:00:00] is applied for plural clips when the box is checked.
- ② **Pause:** Selects the playback mode of the Playlist.
  - OFF**--- Playbacks all clips seamlessly.
  - Next**--- Stops at the beginning of the next clip after playing back the previous clip.
  - End**--- Stops at the end of the clip.

### 3-1-9. Files menu

This section explains handlings of files. By clicking the Files menu, the dialog below is displayed.



#### 3-1-9-1. Open from Explorer

By clicking this item, the dialog like the Explorer opens. Selects the needed file and clicks OPEN button. The selected file (or files) can be loaded on the Material list. The loading file is also done by Drag and Drop from the Explorer.

#### 3-1-9-2. Loading material list

This menu readouts the saved Material list. After clicking, dialog like Explorer opens. Selects the file (The file extension is [.glm]).and click OPEN button.

This menu is equivalent to the [Load] button of the Material list.

#### 3-1-9-3. Save the material list

This menu saves contents of the current Material list. After clicking, dialog like Explorer opens. Selects the folder and put the file name then click the SAVE button.

This menu is equivalent to the [Save] button of the Material list.

#### 3-1-9-4. Clear material list

Clicking this menu clears all files from the Material list.

#### **3-1-9-5. Loading play list**

This menu reads out the saved Clip list (or Play list). After clicking, dialog like Explorer opens. Selects the file (The file extension is [.gip]).and click OPEN button.  
This menu is equivalent to the [Load] button of the Clip list (or Playlist).

#### **3-1-9-6. Save the play list**

This menu saves contents of the current Clip list (or Playlist). After clicking, dialog like Explorer opens. Selects the folder and put the file name then click the SAVE button.  
This menu is equivalent to the [Save] button of the Clip list.

#### **3-1-9-7. Clear play list**

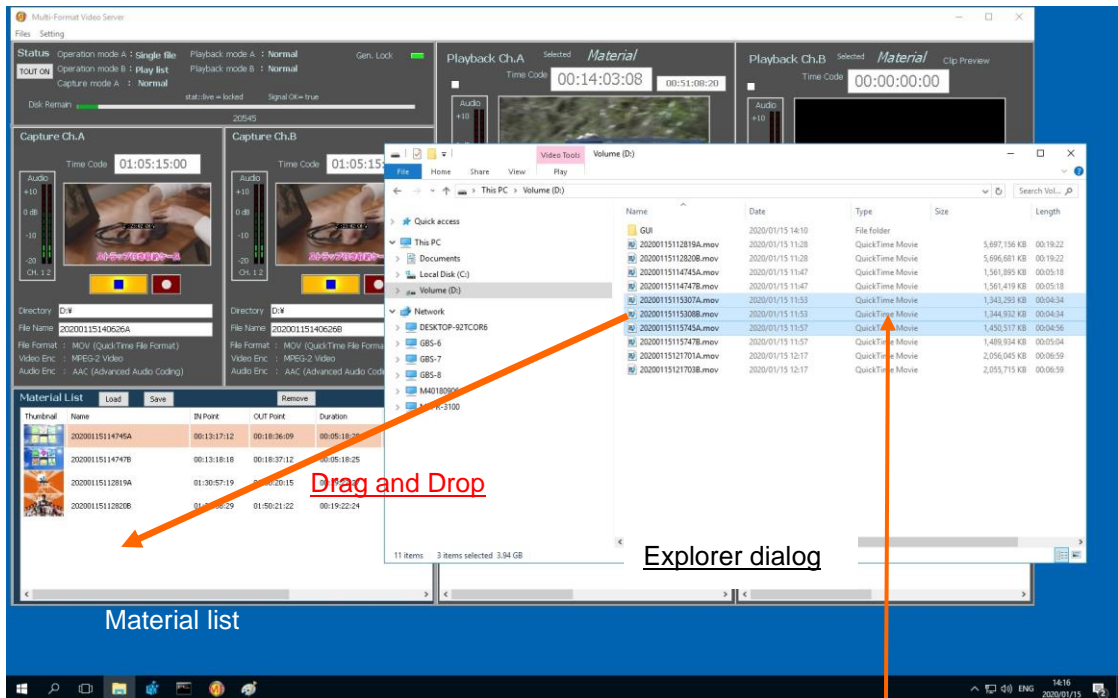
Clicking this menu clears all clips on the Clip list (or Playlist).

#### **3-1-9-8. Exit**

Clicking this menu closes the GUI application.

### 3-1-10. Loading Material files from the Explorer

When you move the mouse cursor to the bottom of the screen, the taskbar is displayed. By clicking the Explorer icon, the Explorer dialog opens. Open the folder that includes recorded files (the default is D: drive). Select the file you want to load, then Drag and Drop the file to the material list part. You can select plural files by using the [Shift] key or the [Ctrl] key.



## 3-2. Operating the Simultaneous RECORD/PLAY

Recording and Playback is controlled independently in this mode. Normally, the playback side plays the file being recorded. If you need, you can select different file for playback that was recorded previously. Even in this case, the recording continues till clicking the Stop Recording button.

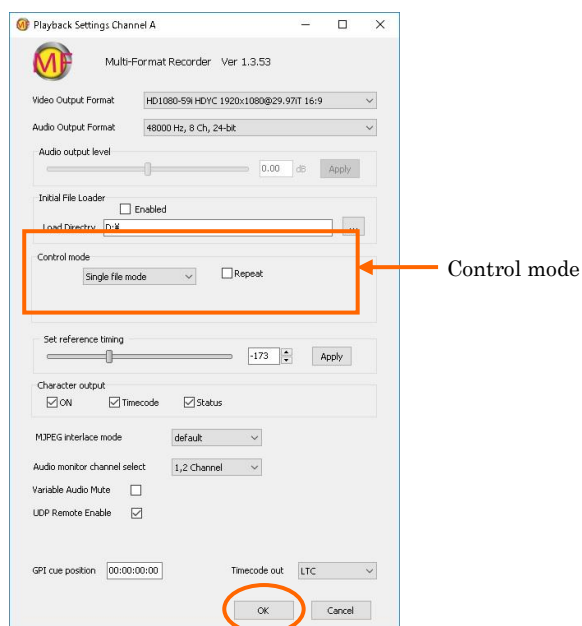
(NOTE) Maximum recording time in an independent file is 19 hours. If the recording reaches this limit, the recording automatically stops.

### 3-2-1. Preparations

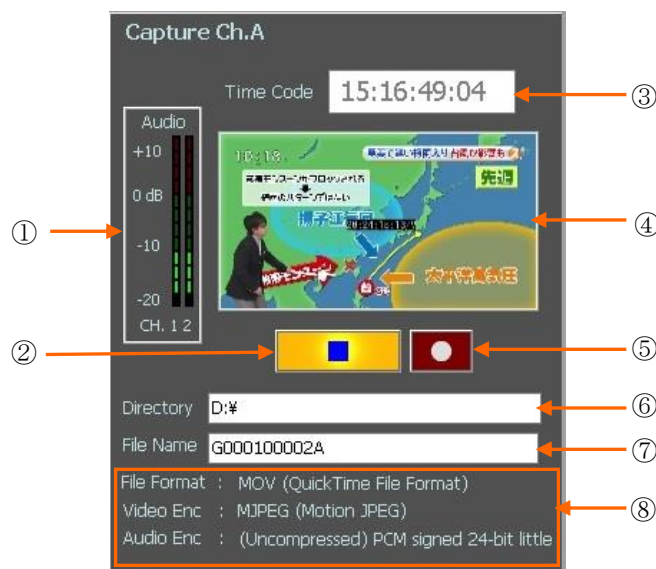
- (1) Connect the signal source from HD camera etc to the SDI INPUT on the rear panel.
- (2) Connect the SDI OUT on the rear panel to the external equipment like HD monitor.
- (3) Connect HDMI OUT on the rear panel to the PC monitor.
- (4) Connect MOUSE and KEYBOARD to the USB connector on the front panel or rear panel.
- (5) Open settings menu and select [Capture settings]. Set desirable settings. Refer to the 3-1-8-1 paragraph for details.

<CAUTION> Do not select the encoding mode of **「ProRes422」** for the Simultaneous RECORD/PLAY. If you want to record with this mode, you should keep stop on the playback side.

- (6) Open settings menu and select [Playback settings]. Set desirable setting and choose the [Single file mode] on the Control mode.



### 3-2-2. Start Recording



- (1) Observe the Recorder control part and check if the video and audio ① and the time code ④ are correctly displayed.
- (2) Select [Directory] ⑥ for recording and type the [File Name] ⑦ if necessary.
- (3) Click the [RECORD] button ⑤ at your desirable timing. The recording can be started from remote controllers like the UDP or the RS-422.
- (4) The new file is added on the Material list and loaded to the CH-A Playback part automatically.

Now, you can start playback of the CH-A (Simultaneous RECORD/PLAY).

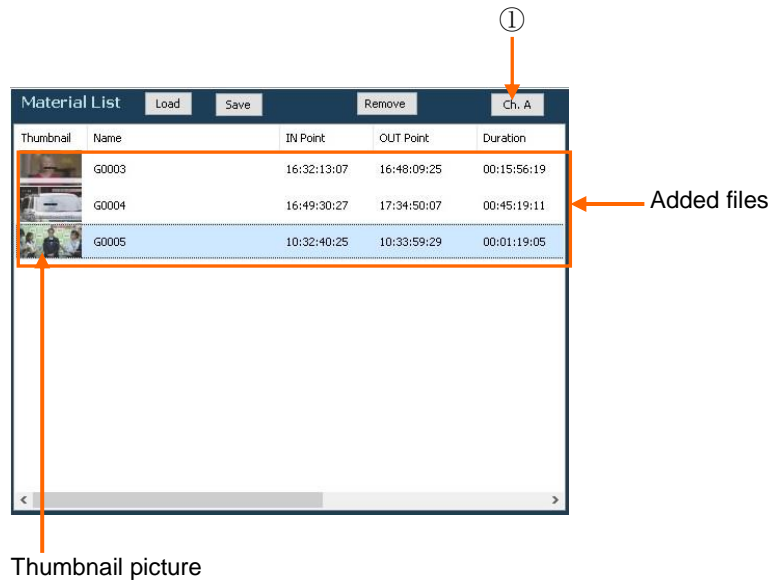
#### <CAUTION>

1. If there is no input signal on the SDI input, the [No video input] message is displayed on the preview monitor and this signal is recorded during the recording.
2. The possible maximum recording time is 19 hours. If the duration reaches to this time the recording is automatically stopped.

### 3-2-3. Stop Recording

Click the [REC-STOP] button ③ to stop the recording.

### 3-2-4. Playback the other files



- (1) Newly add material files to the Material list referring to the paragraph 3-1-9 or 3-1-10.
- (2) Select the [channel selector] ① to choose the playback channel A or B.
- (3) On the Material list, double click the desirable file to be playback.
- (4) Click [PLAY] button or push the [SPACE] key for starting playback.
- (5) For stopping, click the [STOP] button or push the [SPACE] key again.

You can change the playback mode to FF, REW, VARIABLE by manipulating the Deck control buttons. Please refer to the paragraph 3-1-2 for more information.



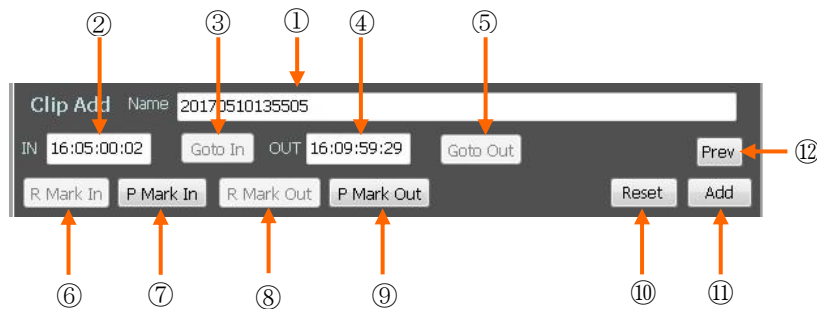
### 3-3. Clip Edit

#### 3-3-1. Making clips from playback file

You can edit and make clips by designating the IN point and OUT point from the playback material file on the Material list. Also, you can change the IN point and OUT point of already determined clips.\_

##### How to set clips

- (1) Select the [Single file mode] on the [Playback Settings] menu (or push the [F1] key).
- (2) Select the file on the Material list by double click. If you want to change the pre-determined clip, select that clip on the Clip list.
- (3) By using the slide bar or other Deck control buttons, pause at the scene that you want to set as the IN point.
- (4) Click the [**P Mark In**] button ⑦ to take the timecode value for the IN point. You can also directly type the timecode value in the IN point timecode box ②.
- (5) As the same manner, pause at the scene that you want to set as the OUT point.
- (6) Click the [**P Mark Out**] button ⑨ to take the timecode value for the OUT point. You can also directly type the timecode value in the OUT point timecode box ④. If the Time code value of the OUT point is smaller than the IN point value, the character color becomes red and the clip edit is prohibited.
- (7) By clicking the [**Goto In**] button ③, or the [**Goto Out**] button ⑤, you can cue-up to the IN point or the OUT point respectively.
- (8) By clicking the [**Prev**] button, you can preview the clip (playback from the IN point to the OUT point). When the [**Repeat**] is set on the [Playback settings] menu, the playback repeats from IN point and OUT point.
- (9) When you want to change the IN or the OUT point, retry (3) to (6) above.
- (10) If the IN point and the OUT point is OK, put the clip name in the [**Name**] box then click the [**Add**] or the [**Set**] button. The clip is registered on the Clip list.

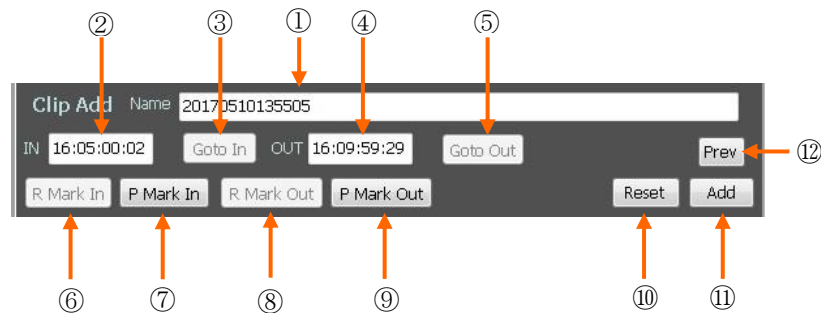


### 3-3-2. Designating IN and OUT point from the recording timecode

You can set the IN point and OUT point from the current time at the recording side.\_

#### How to set clips

- (1) Select the [Single file mode] on the [Playback Settings] menu (or push the [F1] key).
- (2) At the timing that you want to mark as IN point, click the [R Mark In] button ⑥ to take the timecode value for the IN point. You can also directly type the timecode value in the IN point timecode box ②.
- (3) Then at the timing that you want to mark as OUT point, Click the [R Mark Out] button ⑧ to take the timecode value for the OUT point. You can also directly type the timecode value in the OUT point timecode box ④.
- (4) By clicking the [Goto In] button ③, or the [Goto Out] button ⑤, you can cue-up to the IN point or the OUT point respectively.
- (5) By clicking the [Prev] button, you can preview the clip (playback from the IN point to the OUT point). When the [Repeat] is set on the [Playback settings] menu, the playback repeats from IN point and OUT point.
- (6) When you want to change the IN or the OUT point, retry (2) to (5) above.
- (7) If the IN point and the OUT point is OK, put the clip name in the [Name] box then click the [Add] button. The clip is registered on the Clip list.



### 3-4. Playback Clips

#### 3-4-1. Instantaneous Direct Playback (Pong Playback)

The clips that registered on the Clip list can be directly played back as the following procedure.

- (1) Double click one of the clips on the Clip list to enable the play back from the Clip list.  
(For example, the clip marked ① shows the clip selected by double click.)
- (2) Select the clip that you want to playback by the **[Page Up]** key or the **[Page Down]** key. The starting picture is displayed on the preview screen by this action. (Double click the Clip is equivalent.)
- (3) Push the **[SPACE]** key for playback or stop. It works alternately.



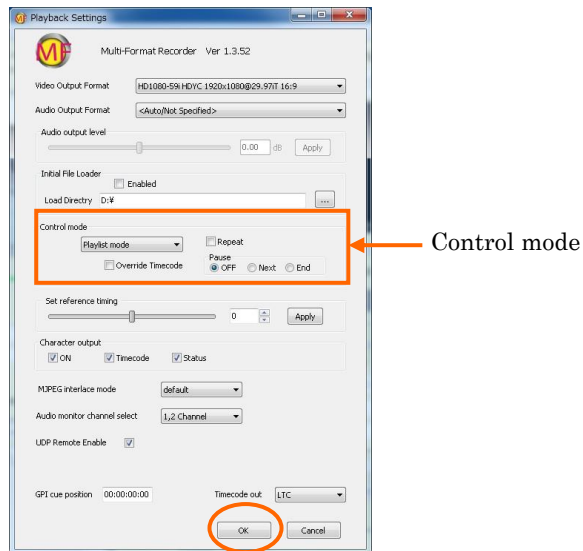
Thumbnail	Name	IN Point	OUT Point	Duration	Media
	20170511141100-c	⇒ 14:11:08:07	14:19:59:29	00:08:51:23	1920x48000
	20170511141100-2	⇒ 14:11:57:09	14:19:59:29	00:08:02:21	1920x48000
	20170511141100-3	⇒ 14:12:35:18	14:19:59:29	00:07:24:12	1920x48000

### 3-4-2. Sequence Playback of Plural Clips

- (1) Open the [Setting] menu then click the [Playback settings].
- (2) Select [Playlist] at the Control mode.
- (3) Select the [Off] in the [Pause] check box for continuous sequence playback.

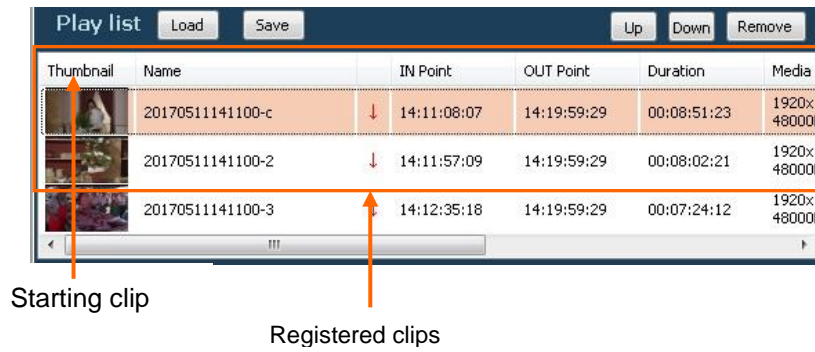
If you want to stop playback at each clip, select [Pause Next] (waiting the next play command at the beginning of the next clip) or [Pause End] (Waiting the next play command at the end of the current clip).

- (4) Check the [Override timecode] box for continuous time code count from 00:00:00:00. (If you prefer to use original time code value, Uncheck the box. (Please note that the time code value changes clip by clip in this case).



- (5) When just after registering clips in the paragraph 3-3, you can make playback at once. If Playlists are saved, recall the playlist referring to the paragraph 3-1-9-5 [Loading play list].
- (6) For changing the order of the list, select the clip then click [Up] or [Down] button. You can also use Drag and Drop scheme.

- (7) Double click on the clip that you want to start.
- (8) Click the **[PLAY]** button or push the **[Space]** key to start the sequence playback.



**<CAUTION>** The sequence playback will not be smooth when you use the clips from low speed external devices.

### 3-4-3. Clip Export

You can export the selected clip to internal or external drives.

- (1) Select the clip by clicking the Clip on the clip list.
- (2) Click the [**Clip Export**] button.
- (3) A dialog like Explorer opens. Choose the directory and put the file name, then click the [Save] button. The clip export starts and an orange color indicator on the [**Status Indicator**] part blinks during export. You should keep waiting until the orange blinking stops.

Clip Export button



Clip list part

### 3-5. LOOP Recording

You can make an endless recording by using the LOOP Recording mode.

- (1) Open the [**Settings**] menu and select the [**Capture settings**]
- (2) Check the [**Loop**] check box. The [**File name**] mode changes to the [**Date+Time**] and the [**Capture timecode**] mode changes to the [**PC Time**] automatically.
- (3) Select the [**Time length of recording file**] from 5 min, 10 min, 30 min, or 1 hour. The recording file is automatically switched and divided with this duration time value.

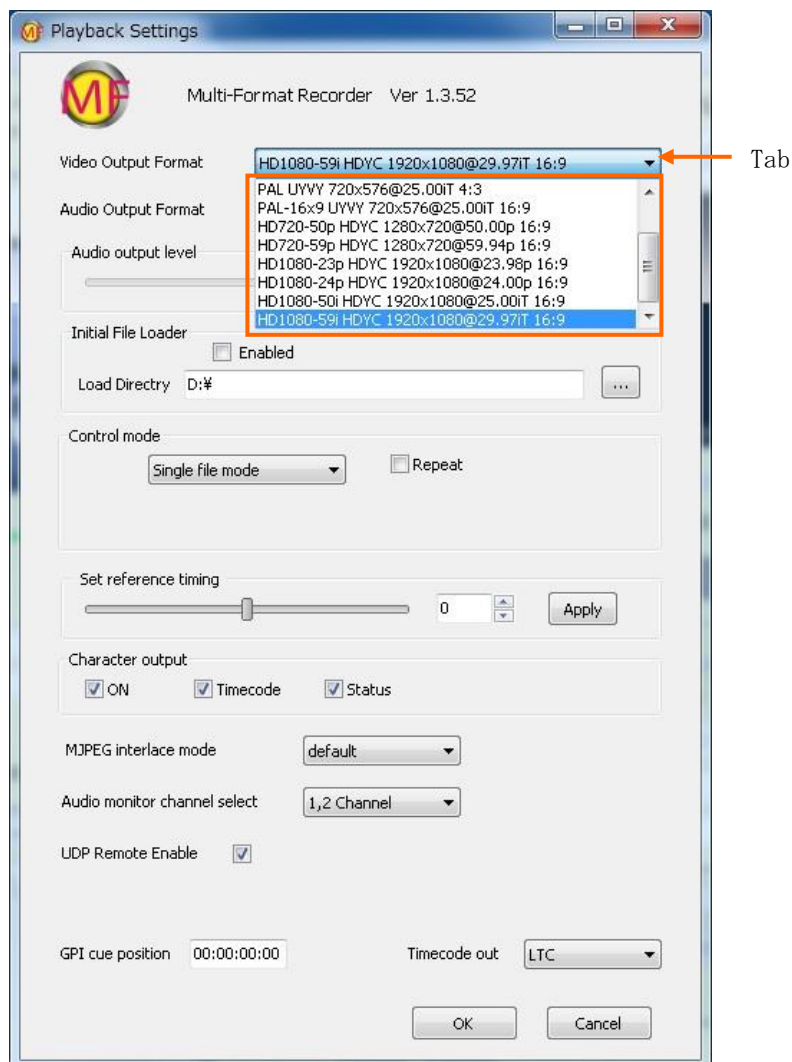
**<CAUTION>** In case that you are using the small capacity recording media less than 1TB, don't select 30 min or 1 hour. The loop recording accidentally stops at the end of disk.

### 3-6. UP/DOWN Convert of the Output Video

You can change the video format on the video output.

- (1) Confirms that the Deck mode is in stop. Open the **[Settings]** mode and select the **[Playback settings]**.
- (2) Click the Tab at the **[Video Output Format]** to observe the output TV standards.
- (3) Select the TV standard that you want to output.
- (4) Click the **[OK]** button to close the settings dialog.

<CAUTION> If converting to the TV standard with different field frequency, it will be lost smooth picture movement.



### 3-7. Deleting Files

Use Explorer for deleting files. This application does not have the delete function.



## 4. Remote Control

### 4-1. Using Remote Desktop Connection

You can use the Windows **[Remote Desktop Connection]** utility for fully controlling the MFPR-3100.

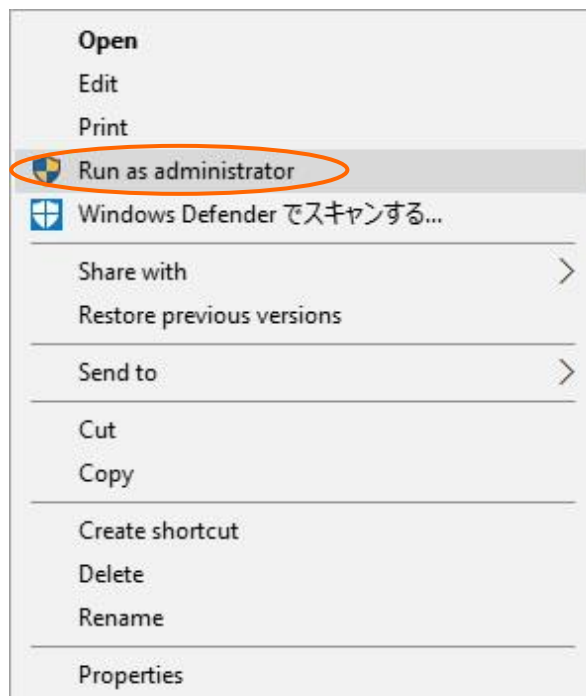
<CAUTION> To terminate the **[Remote Desktop Connection]**, You must execute the following procedure.

- (1) Change the size of GUI on the Host (MFPR-3100) to smaller size and observe the Desktop.
- (2) Click the **[rdtexit]** icon on the top left of the Desktop, then right-click this icon.



rdtexit icon

- (3) On the context menu, click the **[Run as administrator]**. The Remote Desktop connection will end.



## 4-2. UDP Remote Control

### 4-2-1. Outline

MFPR-4000 can be remotely controlled by the Ethernet UDP protocol.

The MFPR-4000 UDP protocol uses the SONY RS-422 compatible [**VTR control protocol**] and dedicated [**Disk control protocol**] that is extended to control our Disk Recorders.

### 4-2-2. Structure of communication data

The data format is that the commands and the status are described on the payload in the Ethernet UDP packets. ㄱ

### 4-2-3. UDP Port

The UDP port number is as follows:

Channel A = 20000

Channel B = 20001

### 4-2-4. 9-pin Compatible VTR control command format

Communication between control systems and this product uses the following command telegram format: CMD 1/Data count, CMD 2, and data checksum (CHECKSUM). If Data count is zero, no data is transmitted. If it is not zero, the data corresponding to the existing values are inserted between CMD2 and CHECKSUM.

Bit	Bit
4-7	0-3

CMD 1	Data length	CMD 2	DATA 1	-----	DATA N N=15max	CHECKSUM
-------	----------------	-------	--------	-------	-------------------	----------

- **CMD 1:** CMD 1 assigns the command to the following main function groups that serve to define the function, and the transfer direction of the data words that follows.

CMD 1	Function	Transfer direction Controller---Recorder
0	System control	→
1	System control-Return message	←
2	Recorder control	→
4	Setup and selection control	←
8	Data request	→
7	Data request-Return message	←

- **Data length:** Defines the number of data words that are inserted after CMD2 (0x0-0xF).
- **CMD 2:** Is the specific command to the recorder or the command return message from the recorder, respectively.
- **DATA:** The number of data words and their contents are defined by the CMD2 command.
- **CHECKSUM:** The sum of the data (D0-D7) contained in each data word, from CDM 1/DATA COUNT to the last data word before the checksum.

#### 4-2-5. Disk Control Protocol Command Format

MFPR-3100 provides dedicated protocol for the disk recorder control. The extended disc control command format is described as follows. It consists of the Extend code (0x3E), Data length, CMD 1, CMD 2, DATA and CHECKSUM. If Data count is zero, no data is transmitted. If it is not zero, the data corresponding to the existing values are inserted between CMD2 and CHECKSUM.

0x3E	Data length	CMD 1	CMD 2	DATA 1	DATA N N= Max255	CHECKSUM
------	-------------	-------	-------	--------	------------------------	----------

- **CMD 1:** CMD 1 assigns the command to the following main function groups that serve to define the function, and the transfer direction of the data words that follows.

CMD 1	Function	Transfer Direction Controller---Recorder
0x32	System control	→
0x33	System control-Return message	←
0x34	Recorder control	→
0x35	Setup and selection control	←
0x36	Data request	→
0x37	Data request-Return message	←

- **Data length:** Defines the number of data words that are inserted after CMD2 (0x0-0xF).
- **CMD 2:** Is the specific command to the recorder or the command return message from the recorder, respectively.
- **DATA:** The number of data words and their contents are defined by the CMD2 command.
- **CHECKSUM:** The sum of the data (D0-D7) contained in each data word, from CDM 1/DATA COUNT to the last data word before the checksum.

#### 4-2-6. Communication Protocol

When the recorder receives a command from the control system, it sends back the following return telegram.

- If the recorder receives a command without data request:  
ACK (10h, 01h) = Acknowledgement of receipt.
- If the Recorder receives a command with data request:  
Answer code + data
- If transmission error is detected or undefined command is received:  
NAK (11h, 12h) + error code.

Error Code:

Bit 0 (01h) = Command not defined.

Bit 2 (04h) = Checksum error.

Bit 4 (10h) = Parity error.

Bit 5 (20h) = Overrun error.

Bit 6 (40h) = Start/Stop bit error.

Bit 7 (80h) = Time out.

The control system must not send any additional command before having received a corresponding response to the previous command.

The control system must not interrupt the transmission of a command for more than 10 ms. As soon as the recorder detected such a break longer than 10 ms, it proceeds with a time out error sequence. The recorder ignores the command received and transmits a NAK (time out).

As soon as the recorder receives a command from the control system, it sends a return message within 9 ms. Therefore, unless having received a return message from the recorder within 10 ms after execution of a command transmission, the control system must proceed as if the communication had not taken place under normal circumstances.

When an error is detected, the recorder immediately sends a NAK to the control system. Upon receipt of a NAK, the control system in turn must immediately abort the data block transmission.

#### 4-2-7. Command List

The typical command and status of the UDP control is as follows. Please refer to the separate UDP Protocol Manual for more detailed protocol description.

- VTR control protocol commands

CODE	Command	Data	Response
10 01	ACK		
11 12	NACK		

- 拡張ディスク制御プロトコルコマンド

CODE	Command	Data	Response
3E 01 34 00	STOP	Parameter	10 01
3E 00 34 01	PLAY		10 01
3E 00 34 02	REC		10 01
3E 00 34 04	STANDBY OFF		10 01
3E 00 34 05	STANDBY ON		10 01
3E 00 34 10	FAST FWD		10 01
3E 01 34 11	JOG FWD	Speed	10 01
3E 01 34 12	VAR FWD	Speed	10 01
3E 01 34 13	SHUTTLE FWD	Speed	10 01
3E 00 34 14	STEP FWD		10 01
3E 00 34 20	REWIND		10 01
3E 01 34 21	JOG REV	Speed	10 01
3E 01 34 22	VAR RVS	Speed	10 01
3E 01 34 23	SHUTTLE REV	Speed	10 01
3E 00 34 24	STEP REV		10 01
3E 04 34 31	CUE UP WITH DATA	Time	10 01
3E 00 36 60	EXTEND STATUS SENSE		3E 1D 37 60
3E 01 36 62	CURRENT TIME SENSE	Parameter	37 04, 37 05, 37 06

### 4-3. RS-422 Remote Controller (OPTION)

#### 4-3-1. Outline

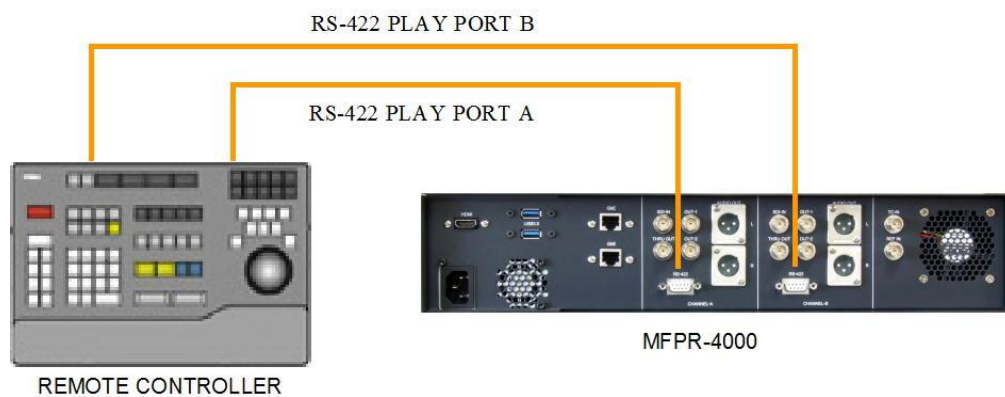
MFPR-4000 has two D-SUB 9-pin female connectors (for controlling CH-A and CH-B) on the rear panel that conforms to EIA RS-422 Serial Remote Control Protocol. Most of controllers with the same control protocol can remotely control this product.

The VTR control protocol conforms to the SONY protocol. The dedicated disk control protocol can be used additionally. (Please refer to the separate RS-422 control protocol manual for more information.)

##### 4-3-1-1. Connection of the RS-422 Cables

There are two RS-422 ports on the rear panel of the MFPR-4000. Those are the PLAY-A port and the PLAY-B port.

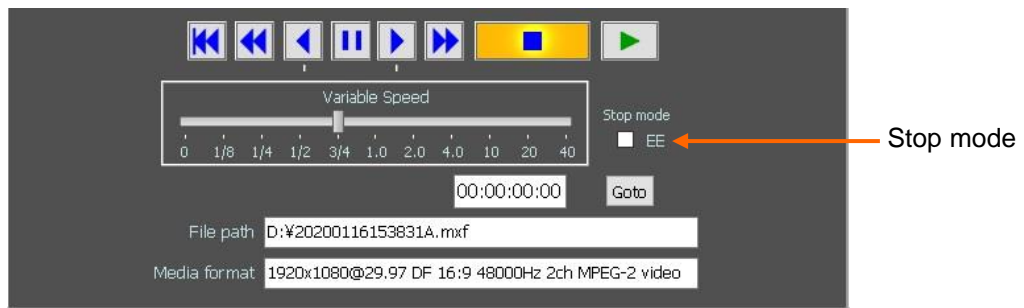
If you want to use the remote control during recording (Simultaneous REC/PLAY function), you must initiate the recording manually (directly on the GUI, or on the Remote Desktop GUI) before using.



**RS-422 REMOTE CONNECTION**

#### 4-3-1-2. Important note for the [Instant Replay] operation

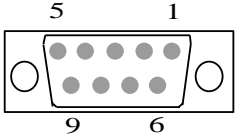
1. Select the [EE] on the [Stop mode] (refer to the paragraph 3-1-2.) when using for the “Instant Replay” operation. In this EE mode,
  - (1) Output picture and sound becomes the INPUT picture and sound in STOP mode.
  - (2) The timecode value on the RS-422 remote connection becomes the INPUT timecode in STOP mode.
  - (3) Other than the STOP mode (PLAY, SLOW, PAUSE and SHUTTLE), the video, sound and timecode are from the playback side.



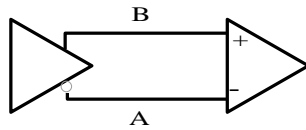
2. Mark/Search function
  - (1) In STOP mode, the recording side timecode is stored as the Mark point.
  - (2) Other than the STOP mode (PLAY, SLOW, PAUSE and SHUTTLE) the playback side timecode is stored as the Mark point.
  - (3) The Search is always done in the playback side.

#### 4-3-2. Pin assignment of the connectors

The pin assignment of the D-SUB 9-pin female connector is shown below:

	Pin number	Signal
 <p>D-SUB 9-pin Female</p>	1	GND
	2	TX-A
	3	RX-B
	4	GND
	5	NC
	6	GND
	7	TX-B
	8	RX-A
	9	GND

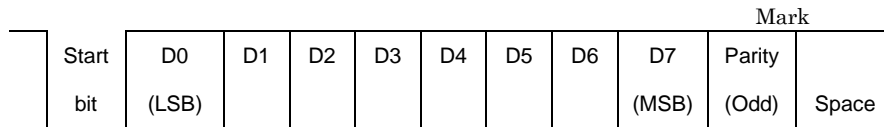
The A and B is defined as follows:





### 4-3-3. Architecture of the serial transmission data

- 4-wire-transmission system.
- Asynchronous bit-serial word-serial data transmission.
- Data structure: 1 Start bit+8 Data bits+1 Parity bit+1 Stop bit



(Note 1) Odd Parity: The sum of the D0+D1+...+D7 and Parity bit is an odd number.

(Note 2) Mark B>A; (Voltage on line B is higher than that on Line A)

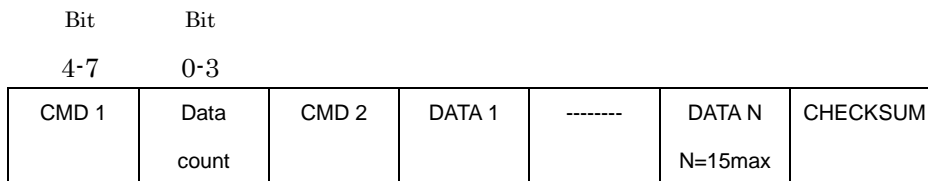
Space A>B: (Voltage on line A is higher than that on Line B)

### 4-3-4. Command Format

Communication between control systems and this product uses the following command telegram format:

CMD 1/Data count, CMD 2, and data checksum (CHECKSUM).

If Data count is zero, no data is transmitted. If it is not zero, the data corresponding to the existing values are inserted between CMD2 and CHECKSUM.



- **CMD 1:** CMD 1 assigns the command to the following main function groups that serve to define the function, and the transfer direction of the data words that follows.

CMD 1	Function	Transfer Direction Controller---Recorder
0	System control	→
1	System control-Return message	←
2	Recorder control	→
4	Setup and selection control	←
8	Data request	→
7	Data request-Return message	←

- **Data count:** Defines the number of data words that are inserted after CMD2 (0x0-0xF).
- **CMD 2:** Is the specific command to the recorder or the command return message from the recorder, respectively.
- **DATA:** The number of data words and their contents are defined by the CMD2 command.
- **CHECKSUM:** The sum of the data (D0-D7) contained in each data word, from CDM 1/DATA COUNT to the last data word before the checksum.

#### 4-3-5. Communication Protocol

When the recorder receives a command from the control system, it sends back the following return telegram.

- If the recorder receives a command without data request:  
ACK (10h, 01h) = Acknowledgement of receipt.
- If the Recorder receives a command with data request:  
Answer code + data
- If transmission error is detected or undefined command is received:  
NAK (11h, 12h) + error code.

Error Code:

Bit 0 (01h) = Command not defined.

Bit 2 (04h) = Checksum error.

Bit 4 (10h) = Parity error.

Bit 5 (20h) = Overrun error.

Bit 6 (40h) = Start/Stop bit error.

Bit 7 (80h) = Time out.

The control system must not send any additional command before having received a corresponding response to the previous command.

The control system must not interrupt the transmission of a command for more than 10 ms. As soon as the recorder detected such a break longer than 10 ms, it proceeds with a time out error sequence. The recorder ignores the command received and transmits a NAK (time out).

As soon as the recorder receives a command from the control system, it sends a return message within 9 ms. Therefore, unless having a received a return message from the recorder within 10 ms after execution of a command transmission, the control system must proceed as if the communication had not taken place under normal circumstances.

When an error is detected, the recorder immediately sends a NAK to the control system. Upon receipt of a NAK, the control system in turn must immediately abort the data block transmission.

#### 4-3-6. RS-422A Command List

CODE	Recorder command	Meaning	Response	Footnote
00 11	DEVICE TYPE REQUEST	Machine ID	12 11 XX YY	*0)
20 00	STOP		10 01 (ACK)	
20 01	PLAY		10 01	
20 02	RECORD	Crash-Record	10 01	
20 04	STANDBY OFF		10 01	
20 05	STANDBY ON		10 01	
20 10	FAST FWD	Max speed forward	10 01	
21 11	JOG FWD	Slow motion	10 01	*1) *2)
22 11	JOG FWD high-reso.	Slow motion	10 01	*1) *4)
21 12	VAR FWD	Variable	10 01	*1) *2)
22 12	VAR FWD high-reso.	Variable	10 01	*3) *4)
21 13	SHUTTLE FWD		10 01	*2)
22 13	SHUTTLE FWD high-reso		10 01	*4)
20 14	STEP FWD	Field step	10 01	
20 20	REWIND	Max speed reverse	10 01	
21 21	JOG REV	Slow motion	10 01	*1) *2)
22 21	JOG REV high-reso.	Slow motion	10 01	*1) *4)
21 22	VAR RVS	Variable	10 01	*1) *2)
22 22	VAR REV high-reso.	Variable	10 01	*1) *4)
21 23	SHUTTLE REV		10 01	*2)
22 23	SHUTTLE REV high-reso.		10 01	*4)
20 24	STEP REV	Field step	10 01	
20 30	PREROLL	Cue up	10 01	*5)
24 31	CUE UP WITH DATA	TC search	10 01	*5) *6)
20 40	PREVIEW	Edit simulation	10 01	*8) *9) *10)
20 41	REVIEW	Edit review	10 01	*8) *9) *10)
204-1	AUTO EDIT		10 01	*8) *9) *10)
20 60	FULL EE OFF	All PB	10 01	
20 06	FULL EE ON	All EE	10 01	
20 63	SELECT EE ON	EE on select channel	10 01	*9) *11)
20 64	EDIT OFF	Play from record	10 01	
20 65	EDIT ON	Record from play	10 01	*9)
20 6A	FREEZE OFF		10 01	
20 6B	FREEZE ON		10 01	
44 04	TIME CODE PRESET		10 01	*6)

44 05	USER BIT PRESET		10 01	*12)
40 10	IN ENTRY	Mark as IN point	10 01	*8)
40 11	OUT ENTRY	Mark as OUT point	10 01	*9)
44 14	IN DATA PRESET	Set IN point	10 01	*6) *9)
44 15	OUT DATA PRESET	Set OUT point	10 01	*6) *9)
40 18	IN SHIFT+	IN=IN+1	10 01	
40 19	IN SHIFT-	IN=IN-1	10 01	
44 1A	OUT SHIFT+	OUT=OUT+1	10 01	
44 1B	OUT SHIFT-	OUT=OUT-1	10 01	
40 20	IN FLAG RESET	Clear IN point	10 01	
40 21	OUT FLAG RESET	Clear OUT point	10 01	
40 24	IN RECALL	Recall IN point	10 01	
40 25	OUT RECALL	Recall OUT point	10 01	
41 30	EDIT PRESET		10 01	*13)
42 30	EDIT PRESET high-r.		10 01	*13)
44 31	PREROLL TIME PRESET	Set pre-roll time	10 01	*6)
41 32	TAPE/AUTO SELECT	Select automatic EE	10 01	*14)
41 33	REF SELECT	Select reference signal	10 01	*15)
41 3A	EDIT FIELD SELECT	Select field as edit point	10 01	*16)
41 3B	FREEZE MODE SELECT		10 01	*17)
40 40	AUTO MODE OFF		10 01	
40 41	AUTO MODE ON		10 01	
61 0A	TC GEN DATA SENSE		TC data	*18)
61 0C	CURRENT TIME SENSE		TC data	*19) *20) *21)
61 10	IN DATA SENSE		74 10 TC	
61 11	OUT DATA SENSE		74 11 TC	
61 20	STATUS SENSE		Status data	*22)
60 30	EDIT PRESET SENSE		Edit preset	*14)
60 31	PREROLL TIME SENSE		Preroll time	

## Footnote

**\*0)** xx=data-1, yy=data-2. Default: data-1=00, data-2=E0

**\*1)** The slow-motion speed range is  $0\pm 3$  times PLAY speed.

**\*2)** The low-resolution speed data consists of one byte (Value=0-255).

The real speed in multiplies of play is defined as:

$$\text{Real speed} = 10^{(\text{Value}/32-2)}$$

This means the speed data is the logarithmic of the Real speed. (e.g. Value=32:

0.1xplay, Value=64: 1xplay, Value=96: 10xplay)

**\*3)**  $0\pm 3$  times PLAY speed is executed as VARIABLE. More than this speed is executed as SHUTTLE to allow synchronization of the machine with this command. ( $0\pm 40$  times PLAY)

**\*4)** The high-resolution speed data consists of two bytes, but only the first data byte is used to calculate the tape speed (refer to the foot note \*2).

**\*5)** The parking accuracy is 0 frame.

**\*6)** The time code data consists of four bytes coded BCD (Binary coded decimal).

- Data 1=Frames
- Data 2=Seconds
- Data 3=Minutes
- Data 4=Hours

**\* 8 )** The time base for this operation can be set with the TAPE CODE SELECT command.

**\*9)** This operation is done with the selected tracks and the record mode of the EDIT PRESET command.

**\*10)** The IN point and the OUT point must be set before, with IN/OUT ENTRY command or IN/OUT DATA PRESET command.

**\*11)** If the servo is not locked, this command is executed as a FULL EE ON to allow to do BVB (Black-VIDEO-Black) simulation.

**\*12)** The user bit data consists of four bytes (high nibble, low nibble)

- data-1: binary group 2 / binary group 1
- data-2: binary group 4 / binary group 3
- data-3: binary group 6 / binary group 5
- data-4: binary group 8 / binary group 7

**\*13)** The high-resolution EDIT PRESET is the bit transparent representation of record mode and the track selection

Data 1:

Bit0	Not used	Bit4	Video track
Bit1	Not used	Bit5	Assemble mode
Bit2	Time-code track	Bit6	Insert mode
Bit3	Not used	Bit7	Not used

Data 2:

Bit0	A1/A2 track	Bit4	Not used
Bit1	A3/A4 track	Bit5	Not used
Bit2	A5/A6 track	Bit6	Not used
Bit3	A7/A8 track	Bit7	Not used

**\*14)** The TAPE/AUTO SELECT data is defined as:

00h: Automatic (tape or EE)

01h: tape

FF h : as locally selected

**\*15)** The REFERENCE SELECT data is defined as:

01h: PB EXT REF

02h: INPUT VIDEO

FFh: as locally selected.

**\*16)** The EDIT FIELD SELECT data is defined as:

00h: edit starts every field depending on a receipt of edit command.

01h: edit starts in field 1.

02h: edit starts in field 2.

FFh: as selected locally.

**\*17)** The FREEZE MODE SELECT data is defined as:

00h: Field freeze

11h: Frame freeze

**\*18)** The TC GENE DATA SENSE data is defined as:

Data	Definition	Response
01h	Request Time code	74h, 08h, 4 bytes BCD Time code
10h	Request User bit	74h, 09h, 4 bytes User bit
11h	Request Time code + User bit	78h, 08h, 8 bytes BCD Time code + User bit

**\*19)** The CURRENT TIME SENSE data is defined as:

Data	Definition	Response
01h	Request Time code	74h, 04h, 4 bytes BCD Time code
10h	Request User bit	74h, 15h, 4 bytes User bit
11h,	Request Time code + User bit	78h, 04h, 8 bytes BCD Time code + User bit

**\*20)** There is a field-ID in the time code data:

60Hz/DATA2	50Hz/DATA4	Field
MSB	MSB	Selection
0	0	Field 1
1	1	Field 2

**\*21)** There is a DROP-FRAME-ID in the time code data:

DATA 1	Drop Frame
Bit 6	
0	OFF
1	ON



**\*22)** The STATUS SENSE data is defined as:

- High nibble (Bit4-7): the first data byte number of status field.
- Low nibble (Bit0-3): number of data bytes out of status field.
- Response: 7xh, 20h, and x data bytes of status field is:

Data byte Number	Bit Number	Status	Bit Number	Status
Byte 0	Bit 0	LOCAL		
Byte 1	Bit 0	PLAY	Bit 1	RECORD
	Bit 2	FAST FWD	Bit 3	REWIND
	Bit 5	STOP	Bit 7	STANDBY
Byte 2	Bit 0	CUE UP	Bit 1	STILL
	Bit 2	DIRECTION	Bit 3	VAR
	Bit 4	JOG	Bit 5	SHUTTLE
	Bit 7	SERVO LOCK		
Byte 3	Bit 0	IN DATA SET	Bit 1	OUT DATA SET
	Bit 6	FREEZE	Bit 7	AUTO MODE
Byte 4	Bit 0	PREROLL	Bit 1	PREVIEW
	Bit 2	AUTO EDIT	Bit 3	REVIEW
	Bit 4	EDIT	Bit 6	FULL EE ON
	Bit 7	SELECT EE ON		
Byte 5	Bit 0	A1	Bit 1	A2
	Bit 2	A3	Bit 3	A4
	Bit 4	VIDEO	Bit 5	ASSEMBLE
	Bit 6	INSERT		
Byte 6	Not used			
Byte 7	Not used			
Byte 8	Bit 0	REC INHIBIT	Bit 4	EOT
Byte 9	Bit 7	FUNCTION ABORT		

## 5. Maintenance

### 5-1 Cleaning of the Air Intake and vent

If the air intake on the front panel and exhaust port on the rear panel gather dust, internal temperature increases resulting malfunctions and failure. Please make a cleaning.

- (1) Clean with a vacuum cleaner at the air intake below.



- (2) Clean with a vacuum cleaner at the air exhaust port below.



### 5-2 In case of failure

When there is something wrong with the operation of the unit, please ask for the service window.

## Appendix Shortcut Key Assignment

By pressing the following keyboard key, you can control the GUI quickly. In case of entering the names and comments, the keys work as normal character keys.

<b>Tab key</b>	Moves selection of buttons and windows.
<b>Enter key</b>	Fixes the selected items. When handling the File or the CLIP, the selection determines and moves to the starting point of that file or clip. When using the [Goto] function, moves to the cue point.
<b>Space key</b>	Each time you press, changes the mode to [Play] or [Stop]. When entering names and comments, uses to insert the [Space].
<b>J key</b>	Scrub mode in reverse direction. Each time you press, the shuttle speed changes like -1, -2, -4, -10, -20, -40. When moving forward direction by the [L] key, decelerates gradually to zero speed then accelerate to reverse. (To use this [Scrub] mode, you must press the [K] key to enter the variable mode.)
<b>K key</b>	Enters the [Scrub] mode. Goes to Pause mode.
<b>L key</b>	Scrub mode in forward direction. Each time you press, the shuttle speed changes like +1, +2, +4, +10, +20, +40. When moving rev direction by the [L] key, decelerates gradually to zero speed then accelerate to forward. (To use this [Scrub] mode, you must press the [K] key to enter the variable mode.)
<b>→ key</b>	Frame advance. Each time you press, advances one frame.
<b>← key</b>	Frame rewind. Each time you press, rewinds one frame.
<b>↑ key</b>	Moves to the start point of the file or the clip.
<b>↓ key</b>	Moves to the end point of the file or the clip.
<b>Page Up key</b>	Moves to the previous file or clip.
<b>Page Down key</b>	Moves to the next file or clip.
<b>Ctrl+O key</b>	Jumps to the [Open from Explorer] menu,
<b>Ctrl+T key</b>	Moves the cursor to the time code window of the [Goto] function.
<b>F1 key</b>	Selects the Clip list mode of CH-A.
<b>F2 key</b>	Selects the Playlist mode of CH-A.
<b>Shift+F1 key</b>	Selects the Clip list mode of CH-B.
<b>Shift+F2 key</b>	Selects the Playlist mode of CH-B.
<b>Key assignment used for the SHUTTLE PRO2</b>	
<b>Shift+1 key</b>	Forward x 1/4 speed
<b>Shift+2 key</b>	Forward x 1/2 speed
<b>Shift+3 key</b>	Forward x 3/4 speed
<b>Shift+4 key</b>	Forward x 1 speed
<b>Shift+5 key</b>	Forward x 2 speed
<b>Shift+6 key</b>	Forward x 4 speed
<b>Shift+7 key</b>	Forward x 10 speed
<b>Shift+8 key</b>	Forward x 20 speed
<b>Shift+9 key</b>	Forward x 40 speed
<b>Ctrl+1 key</b>	Reverse x 1/4 speed
<b>Ctrl+2 key</b>	Reverse x 1/2 speed
<b>Ctrl+3 key</b>	Reverse x 3/4 speed
<b>Ctrl+4 key</b>	Reverse x 1 speed
<b>Ctrl+5 key</b>	Reverse x 2 speed

<b>Ctrl+6 key</b>	Reverse x 4 speed
<b>Ctrl+7 key</b>	Reverse x 10 speed
<b>Ctrl+8 key</b>	Reverse x 20 speed
<b>Ctrl+9 key</b>	Reverse x 40 speed
<b>F3</b>	Clip Reset
<b>F4</b>	Clip Add/Set
<b>F5</b>	Rewind
<b>S</b>	Stop
<b>P</b>	Play
<b>F7</b>	Pause
<b>F9</b>	FF
<b>F10</b>	GOTO IN
<b>F11</b>	GOTO OUT
<b>Shift+F10</b>	MARK IN
<b>Shift+F11</b>	MARK OUT