

PJLink Class2

Application Guideline

Version2.03

Revision history

Version.	Release date	Note
2.00	2016.12.13	Released Version 1.00
2.01	2017.4.1	Update contents table
2.02	2017.4.10	Update contents table, change the size of "Sent AVMT command flow chart"
2.03	2017.4.19	Error correction

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1- Cautions

1-1. Cautions for the development of PJLink application software

1	There are projectors and displays which are allowed only one connection to a TCP/IP port at the same time. (e.g. TCP/IP port No. 4352 of projector or display "A")
Answer	Disconnect the connection as soon as the transmission completes in case of using two or more controllers at the same time.

2	Slow responses may occur at some commands in stand-by mode.
Answer	Change the setting of timeout. Generally, response time is different from each other. Also stand-by mode may be delayed response time more than operating mode.

3	There are invalid commands in stand-by mode. (e.g. input change, AV mute and so on)
Answer	Refer to the recommendation of the control procedure on this manual and to the user's manual of the equipment.

4	There may be no connection time for several seconds right after turning on and turning off.
Answer	Retry a few times. [Note] There might be no connection at all after turning off due to the settings of projector and display.

5	Projectors or displays may NOT receive any commands during warming up or cooling down.
Answer	Refer to the recommendation of the control procedures. The status can be found by the command "POWR?"

6	The remote controller may be delayed during the transmission of PJLink command.
Answer	Adjust the transmission interval time when to send continuous commands.

7	ERR3, no receiving term of command, may be received as a command response.
Answer	Adjust the transmission interval time. ERR3 may occur due to the status of the projector or the display. Refer to the recommendation of the control procedure on this manual.

8	There is no definition of the password of projector or display.
Answer	Refer to the user's manual of the equipment.

9	There are both PJLink class 1 and class 2 equipment in the same network.
Answer	<p>Confirm all projectors and displays in the network by using command "CLSS?".</p> <p>The equipment of class 1 do NOT work with the command dedicated class 2.</p> <p>The commands dedicated class 2 can NOT be used for class 1 equipment. ERR1 should be received then. The commands of class 1 can be used for both class 2 and class 1 equipment.</p>

10	The parts of header and class are different from each other. The response of projector and display rely on the received class.
Answer	<p>The commands from class 1 add "1" to the response.</p> <p>Correct: %1POWR、%2SNUM Wrong: %2POWR、%1SNUM</p> <p>The commands from class 2 reply as a class 1 command when to send class 1 header.</p> <p>The commands from class 2 reply as a class 2 command when to send class 2 header.</p> <p>%1INPT ? → %1INPT=30 %2INPT ? → %2INPT=3Z</p>

1-2. Cautions for the test of PJLink application software

1	You may need to wait for some minutes to reboot a projector or display.
Answer	It is the characteristic of the equipment.

2	You may need to wait for a while to reboot a projector or display when to unplug the power cable and plug it again soon.
Answer	It is the characteristic of the equipment.

3	The life time of the lamp might be shorten if you unplug the power cable without cooling. The brightness might be decrease if you unplug the power cable without cooling.
Answer	Refer to the users manuals of the equipment.

4	AV mute may be cancelled when the input signal or resolution are changed or pull out the signal cable.
Answer	The AV mute status of PJLink application software may be changed due to the specification of the projector or display.

5	The power on-off repeating may have a impact on lamp life or brightness of the projector.
Answer	Generally, it is NOT good for the lamp. Refer to the user's manual of the equipment. Prepare an optional lamp accordingly.

6	Projectors or displays cannot be controlled for some minutes right after turning on or turning off.
Answer	Take care of this characteristic when to develop PJLink application software.

7	PJLink application software does NOT work.
Answer	Check the equipment whether PJLink are supported or not. Also some projectors and displays can disable PJLink or network function. Refer to the user's manual of the equipment.

8	There is no definition of the password and the name of projector or display for class 1.
Answer	Refer to the user's manual of the equipment. Other method from class1 should be used if PJLink application software can do that.

2- Purposes of commands

Command	Application
Power control POWR	To turn on and off the equipment.
Power on/off status POWR ?	<ol style="list-style-type: none"> 1 To confirm the status of power on or off. 2 Some commands are NOT set or got at the status of power on or off. <p>(Refer to the recommendation of the control procedure on this manual)</p>
Input change INPT	To change the signal input mode.
Check input mode INPT ?	To confirm the current signal input.
AV mute AVMT	<p>Audio and Video can be off temporary without power off.</p> <p>It can be used below situations.</p> <ol style="list-style-type: none"> 1. A presenter wants other audiences to look at him/her. 2. A presenter does NOT want other audiences to watch his/her documents temporary, such as a secret information. 3. Start up images of the PC. 4. When to reboot a projector soon. It is difficult for some projectors. 5. To avoid looking at projector light directly by a presenter.

Command	Application
<p>Check the status of AV mute</p> <p>AVMT ?</p>	<p>To confirm the status of AV mute.</p> <p>[Note 1] There are some invalid commands while AV mute is on.</p> <p>(Refer to the recommendation of the control procedure on this manual.)</p> <p>[Note 2] AV mute may be cancelled when the input signal or resolution are changed or pull out the signal cable.</p>
<p>Check the error status</p> <p>ERST ?</p>	<p>To confirm whether projectors and displays are working normally or not.</p> <ol style="list-style-type: none"> 1. Internal error, such as fan or lamp failure. 2. Required filter maintenance 3. Temperature failure <p>[Note] There is no rule that projectors and displays have a failure sensor. No error or no warning responses are sent with the equipment.</p>
<p>Check lamp number and lamp time</p> <p>LAMP ?</p>	<p>To confirm the status of the lamps.</p> <ol style="list-style-type: none"> 1. Usage time of lamps. 2. The number of lamps (If it is multiple lamp equipment.) <p>[Note] In case of displays (or other “no lamp equipment”), ERR1 should be sent.</p>

Command	Application
Check signal input list INST ?	To confirm the list of available signal inputs. [Note] An external extension input box may NOT be found.
Check the name of the equipment NAME ?	To get the name of the equipment. This function can be used for below situation. To distinct the equipment one by one. [Note] PJLink class1 is NOT defined how to name the equipment. Refer to the uses manual of the equipment.
Check the brand name INF1 ?	To confirm the brand name of the equipment. To control the equipment for each brand.
Check the model name INF2 ?	To confirm the model name of the equipment. To control the equipment for each model.
Check other information INFO ?	To confirm other information [Note] It depends on each equipment.
Check PJLink class CLSS ?	To confirm PJLink class of the equipment.

Command	Application
Check the serial number SNUM ?	To confirm the serial number of the equipment. To distinct the specific equipment from same models. [Note] Each model has each expression method of the serial number.
Check the software version SVER ?	To confirm software version of the equipment. [Note] Each model has each expression method of the software version.
Check the name of input terminal INNM ?	To confirm the name of the signal input terminal [Note] This data gets UTF-8.
Check the input resolution IRES ?	To confirm the resolution of the signal input of the equipment. To confirm whether the signal input is correct or not.
Check the recommended resolution RRES ?	To confirm recommended resolution of the signal input. This data is NOT XGA or WXGA but the number of horizontal dots and vertical dots.

Command	Application
Check the filter usage time FILT ?	To confirm the filter usage time of the equipment To confirm maintenance timing based on the filter usage time.
Check the lamp part number RLMP ?	To confirm the option part number of the lamp. To exchange the lamp based on this part number.
Check the filter part number RFIL ?	To confirm the option part number of the filter. To exchange the filter based on this part number.
Volume control SVOL	To control audio volume (internal or external speakers) [Note] The command may NOT be valid at volume max or min. The volume can be changed step by step. It is NOT absolute value. The numbers of volume max and min have different from each other.
Microphone volume control MVOL	To control microphone volume. [Note] The command may NOT be valid at volume max or min. The volume can be changed step by step. It is NOT absolute value. The numbers of volume max and min have different from each other.

Command	Application
<p>Freeze control</p> <p>FREZ</p>	<p>To control freeze function of the equipment. This function can be used for below situation.</p> <ul style="list-style-type: none"> a. A presenter does NOT want other audiences to watch his/her documents temporary, such as a secret information. b. Start up images of the PC.
<p>Check the status of freeze</p> <p>FREZ?</p>	<p>To confirm the status of freeze.</p> <p>[Note 1] There are some invalid commands while freeze function is on.</p> <p>(Refer to the recommendation of the control procedure on this manual.)</p> <p>[Note 2] Freeze function may be cancelled when the input signal or resolution are changed or pull out the signal cable.</p>

3- Timing of getting information

Command	Timing of the status change	Timing of getting information
Power ON/OFF status POWR ?	The status may change when to use a remote controller.	Regularly
Check input mode INPT ?	The status may change when to use a remote controller.	Regularly
Check the status of AV mute AVMT ?	<ol style="list-style-type: none"> The status may change when to use a remote controller. AV mute may be cancelled when the input signal or resolution are changed or pull out the signal cable. 	Regularly
Check the error status ERST ?	The timing cannot be found.	Regularly
Check lamp number and lamp time LAMP ?	The lamp usage time is added during operating.	Regularly
Check signal input list INST ?	<p>The status cannot be changed.</p> <p>[Note] The status might be changed when an external extension input box is connected.</p> <p>[Note] The status might be changed when a removable media, such as USB memory is inserted or pulled out.</p>	One time (e.g. when to open the application software)
Check the name of the equipment NAME ?	<p>The status cannot be changed.</p> <p>[Note] The status may be changed when the name is changed.</p>	One time (e.g. when to open the application software)
Check the brand name INF1 ?	The status cannot be changed.	One time (e.g. when to open the application software)

Command	Timing of the status change	Timing of getting information
Check the model name INF2 ?	The status cannot be changed.	One time (e.g. when to open the application software)
Check other information INFO ?	The status cannot be changed. [Note] The status might be changed when the firmware of the equipment is upgraded.	One time (e.g. when to open the application software)
Check PJLink class CLSS ?	The status cannot be changed.	One time (e.g. when to open the application software)
Check the serial number SNUM ?	The status cannot be changed.	One time (e.g. when to open the application software)
Check the software version SVER ?	The status is changed when the software version is updated.	One time (e.g. when to open the application software)
Check the name of input terminal INNM ?	The status is changed when the name of the input terminal is changed.	Regularly

Command	Timing of the status change	Timing of getting information
Check the input resolution IRES ?	The status is changed when the signal input resolution is changed.	Regularly
Check the recommended resolution RRES ?	The status cannot be changed.	One time (e.g. when to open the application software)
Check the filter usage time FILT ?	The filter usage time is added during operating.	Regularly
Check the lamp part number RLMP ?	The status cannot be changed.	One time (e.g. when to open the application software)
Check the filter part number RFIL ?	The status cannot be changed.	One time (e.g. when to open the application software)
Check the status of freeze FREZ ?	The status may change when to use a remote controller.	Regularly

4- Recommendation of the control procedure

4-1. Preparation

You may need to change the settings of projectors or displays in order to use PJLink. Refer to uses manual of the equipment.

e.g. preparation

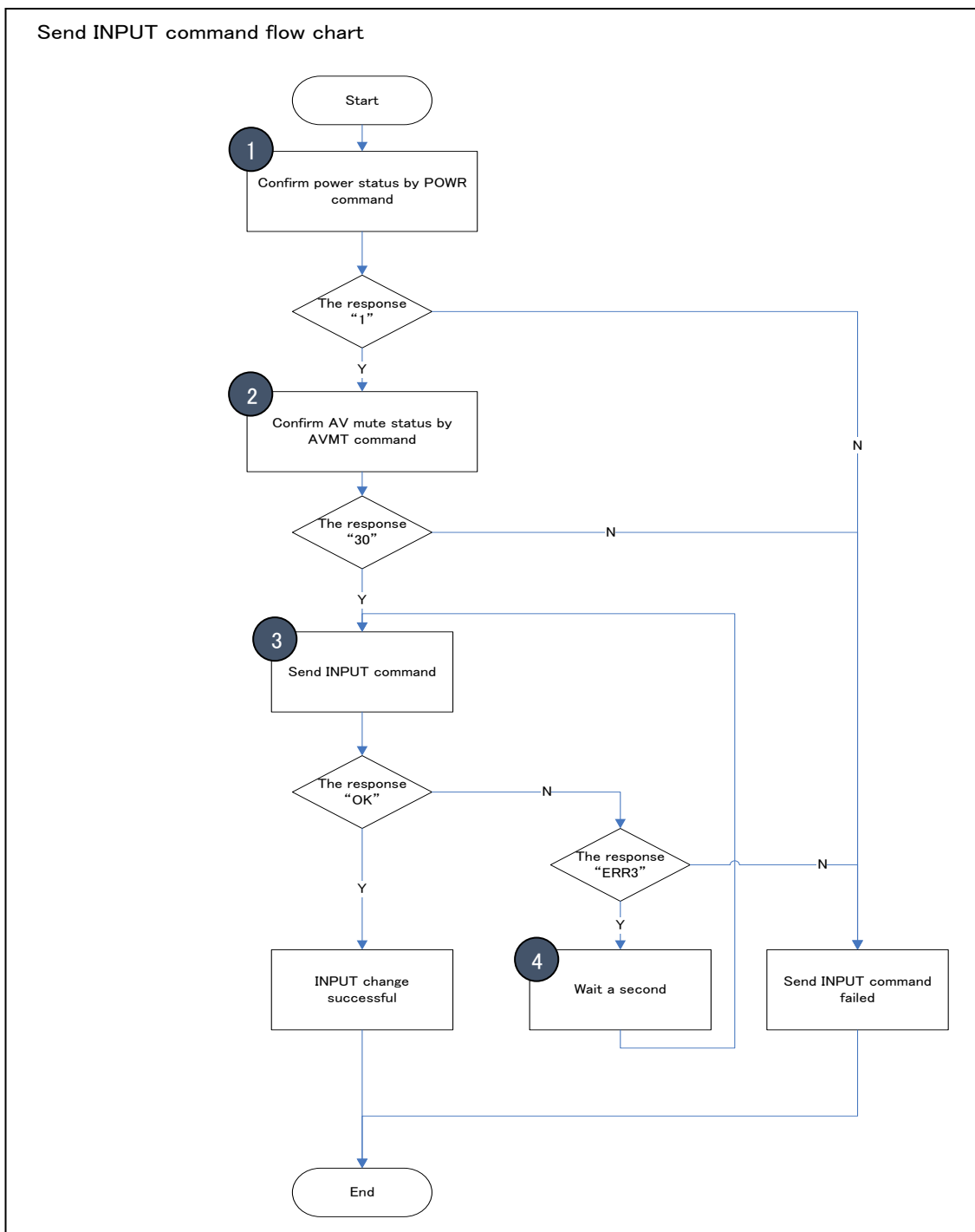
- Activate PJLink function.
- Deactivate the security functions of the equipment.
- Activate network function of the equipment.
- Deactivate “network off at stand-by mode” function.

4-2. INPT command

The command may NOT work at the specific status. e.g. AV mute, Freeze mode.

- ① Confirm that the response of POWR ? is "1".
- ② Confirm that the response of AVMT ? is "30" (AV mute OFF) in order to confirm AV mute status.
- ③ Send INPUT command.
- ④ Re-send the command with the increase of the length of the intervals when the response is ERR3.

Set the conditions of timeout and numbers of retrying of the application software properly against various statuses of the projectors and displays.



4-3. POWR 1 command

Check that the equipment is OFF.

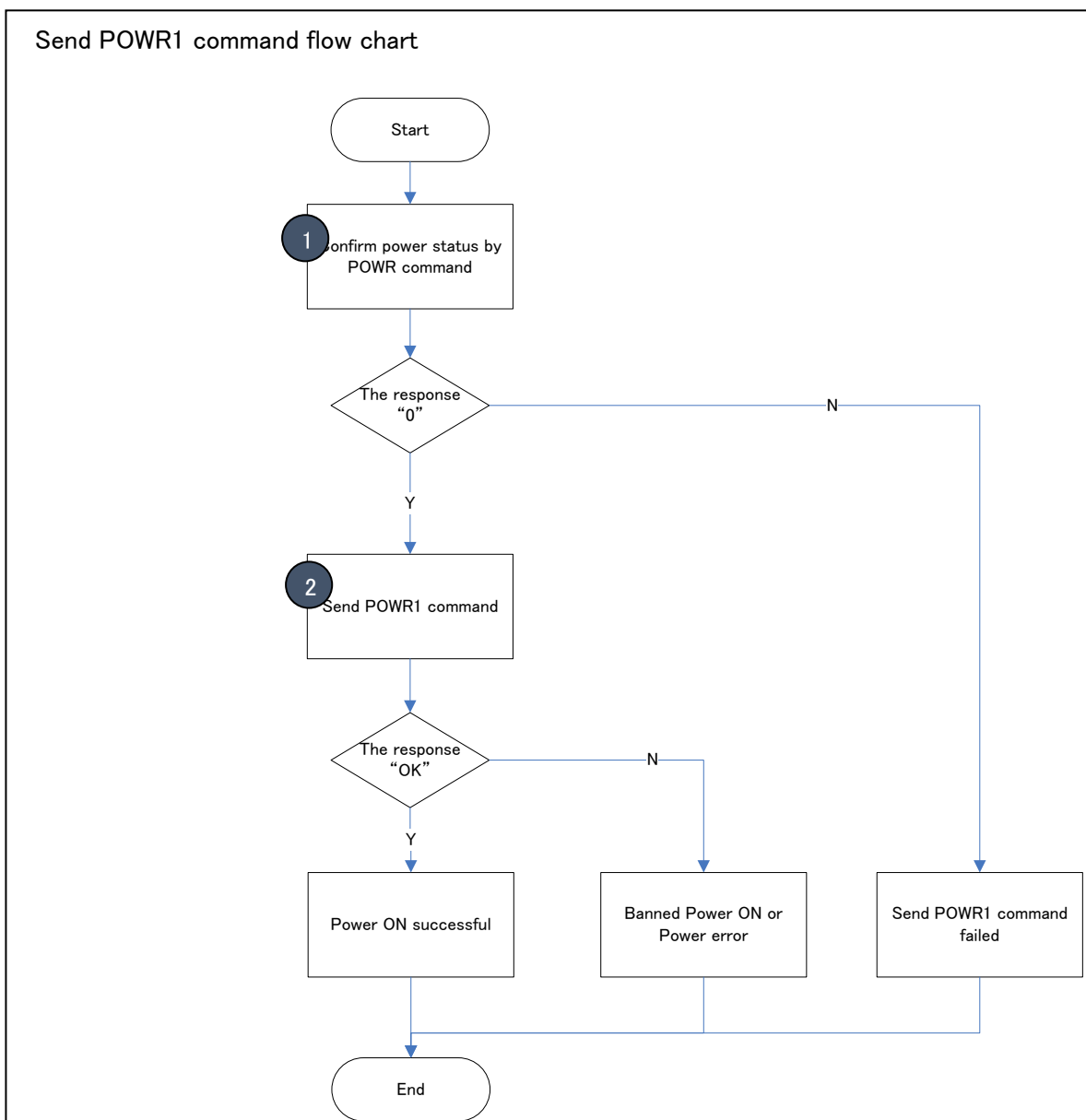
- ① Confirm that the response of POWR ? is "0"
- ② Send POWR 1 command.

(The status is NOT changed at power on when to send POWR1.)

Re-send the command with the increase the length of the intervals in case of getting other than "OK".

ERR4 may indicate the error of the equipment.

Set the conditions of timeout and numbers of retrying of the application software properly against various statuses of the projectors and displays.



4-4. POWR 0 command

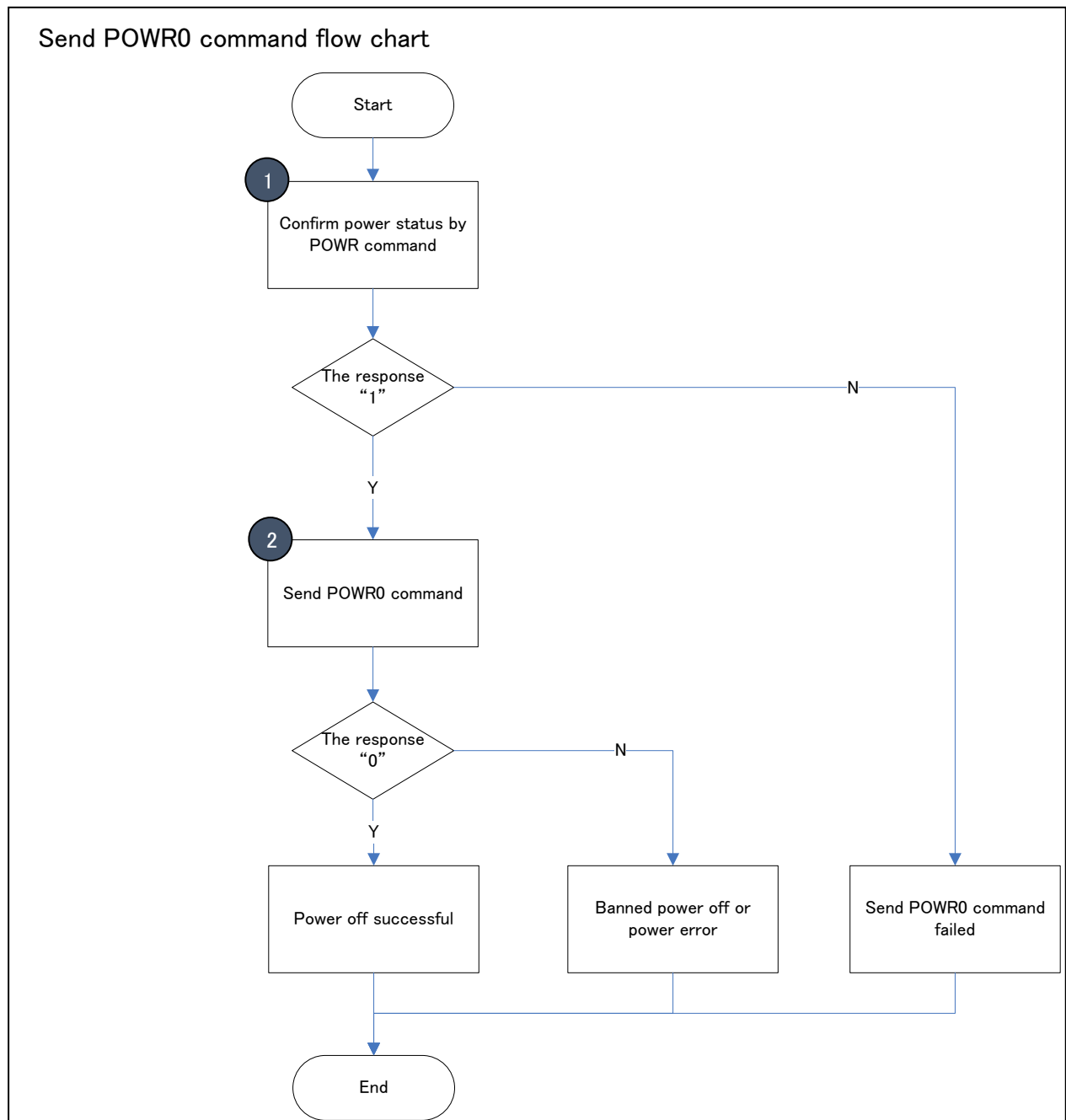
Check that the equipment is ON.

- ① Confirm that the response of POWR ? is "1"
- ② Send POWR 0 command.

(The status is NOT changed at power off when to send POWR 0.)

Re-send the command with the increase the length of the intervals in case of getting other than "OK".

Set the conditions of timeout and numbers of retrying of the application software properly against various statuses of the projectors and displays.

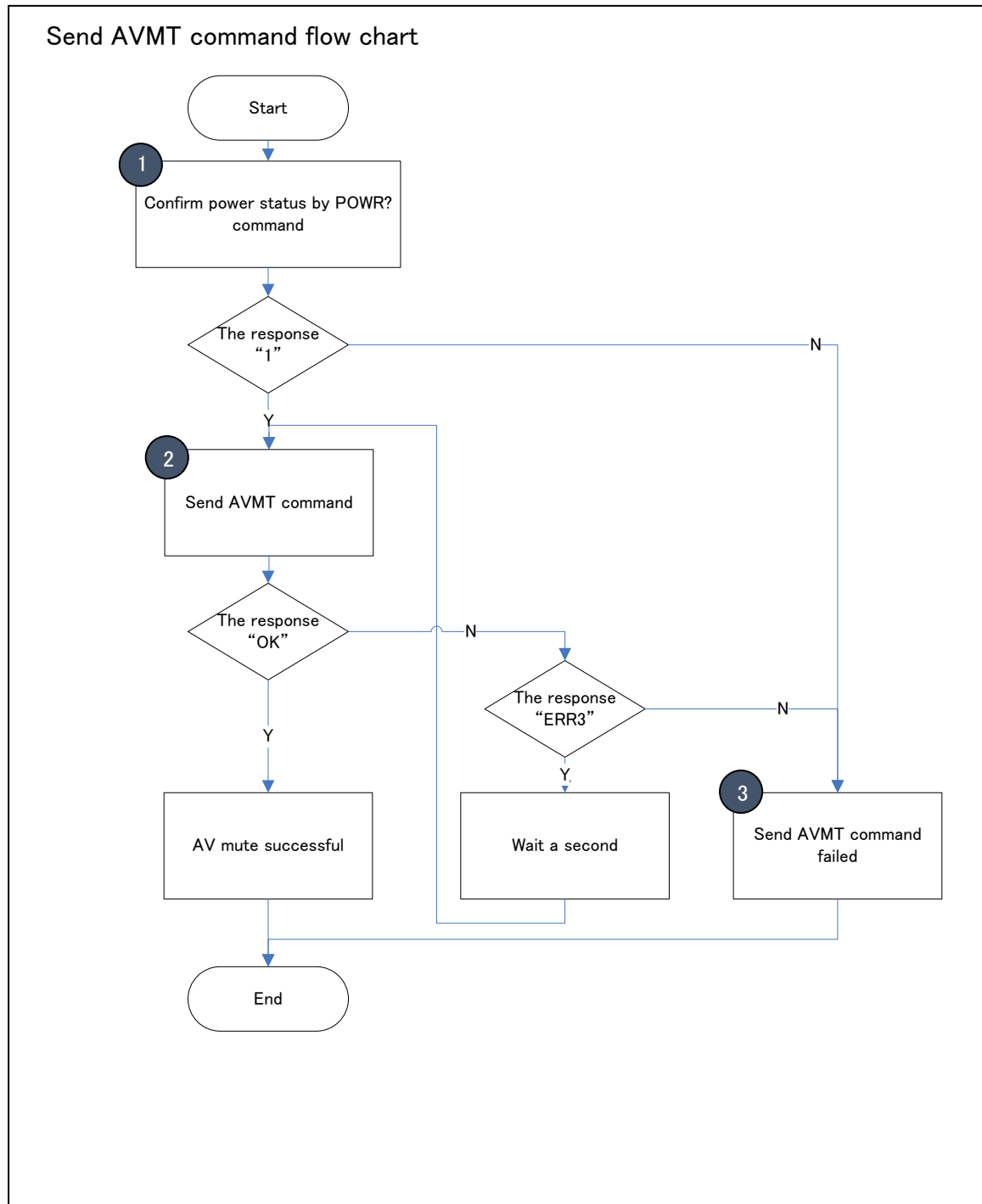


4-5. AVMT command

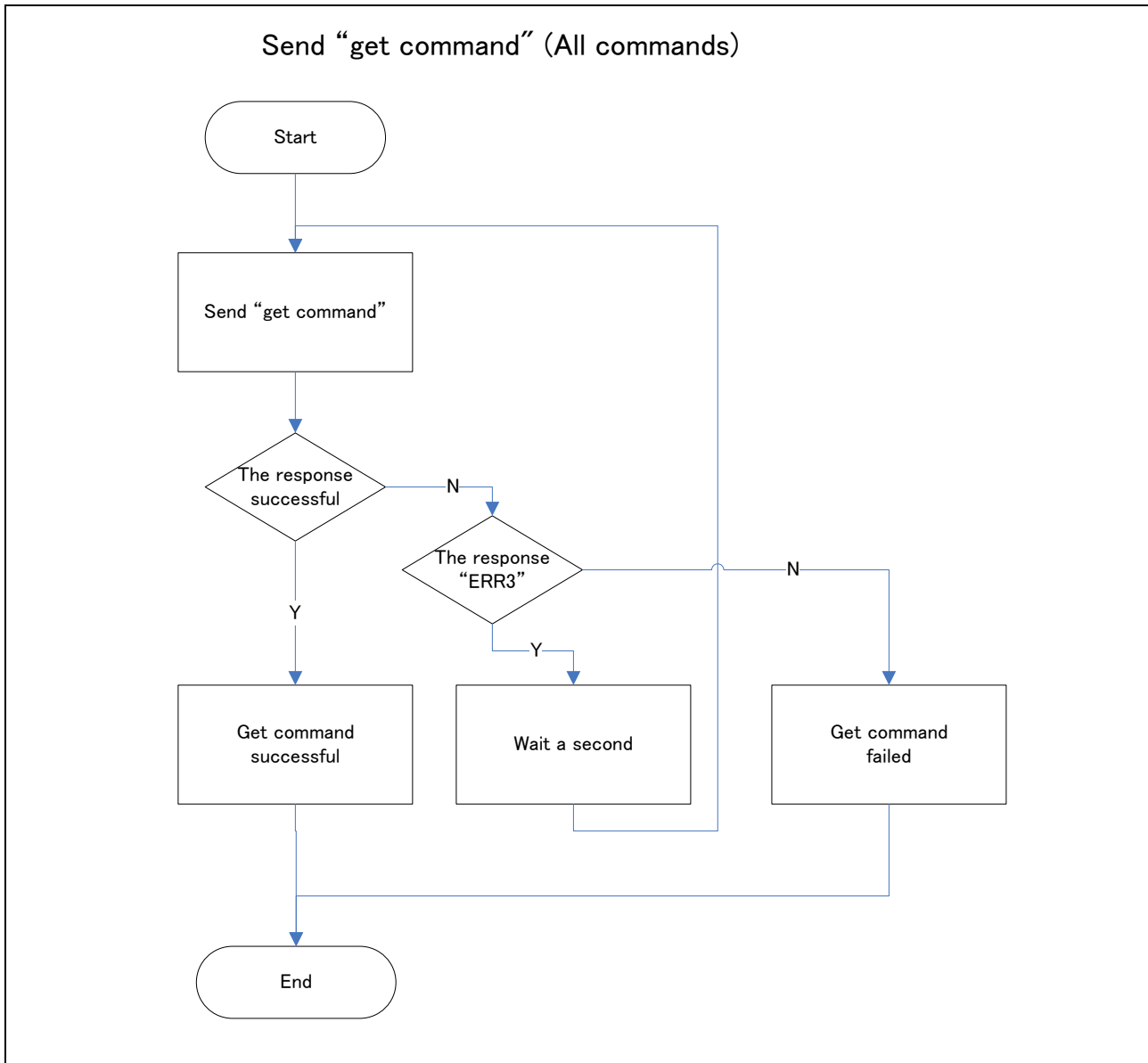
Check that the equipment is ON.

- ① Confirm that the response of POWR ? is "1"
- ② Send AVMT command.
- ③ Re-send the command with the increase the length of the intervals in case of getting other than "OK"

Set the conditions of timeout and numbers of retrying of the application software properly against various statuses of the projectors and displays.



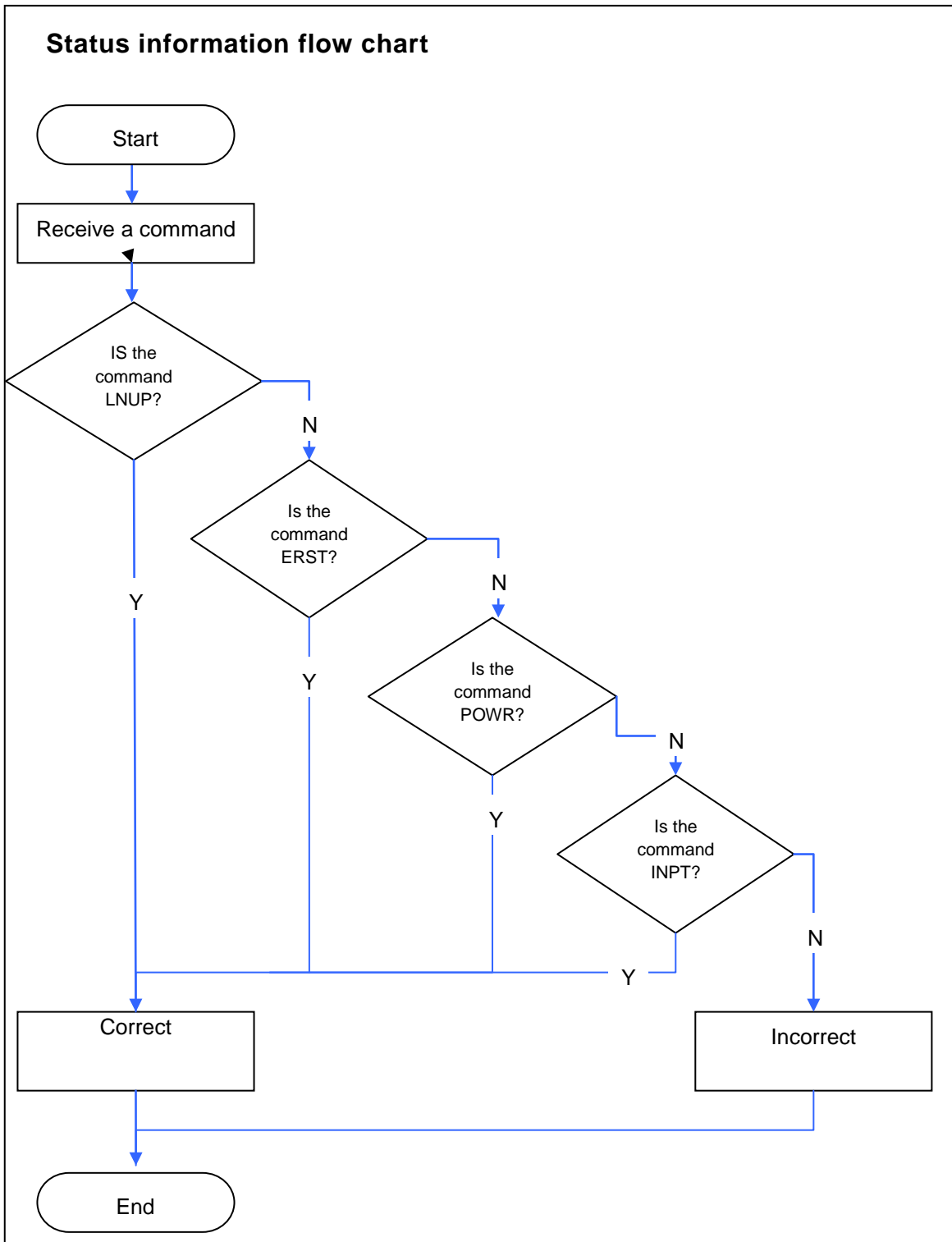
4-7. All Commands (All commands working during power off)



4-8. Status information commands

Use UDP protocol for the status information

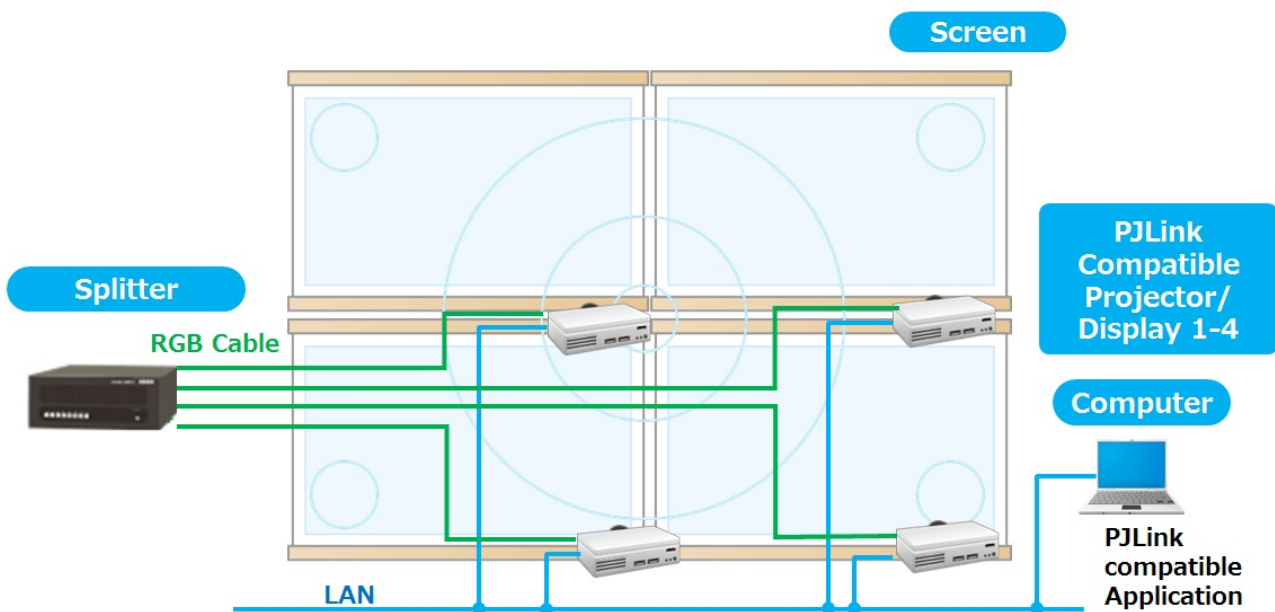
Projectors and displays send status information command to registered IP addresses when to detect the change of the status. These commands are LKUP, ERST, POWR and INPT.



5- System example

5-1. Multi screen system

- The condition of the system example
 - 2 x 2 multi screen system by using four projectors and/or displays.
 - Signal source of all equipment are RGB 1.
 - Each equipment receives the signal of a quarter of full screen size.
- The example of the control
 - Power on and display images at all of the equipment.
 - Power off at all of the equipment.
 - Set AV mute at all of the equipment.
 - Display images at all of the equipment.
 - Set same input source at all of the equipment.
- [Note]
 - To power ON at the same time at all of the equipment is NOT recommended to avoid rush current.
 - To turn ON of AV mute or input change at the same time at all of the equipment is recommended.



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