

A revolutionary MPDP

Infinitely Expandable MPDP

MPDP

A revolutionary MPDP
Infinitely Expandable MPDP

MPDP

User's Manual

OPM-4240 / OPM-4240R

ORION PDP CO.,LTD.
www.oriondisplay.net

Address: 257-6, Gongdan-dong, Gumi-si, Gyeongsangbuk-do, Korea
Tel : +82-2-6678-8533, Fax: +82-2-6678-8599



Thank you for purchasing our MPDP.
Please read through this user's manual for safety before installing this product.
This product is manufactured for Multi Plasma display model only.


Features of MPDP


- ▶ Enjoy a wide flat screen with high brightness and high quality.
- ▶ Easy to install and move due to its thin design
- ▶ Enjoy your favorite programs with various split-screen features simultaneously presenting several programs.

Thank you for purchasing our MPDP monitor.

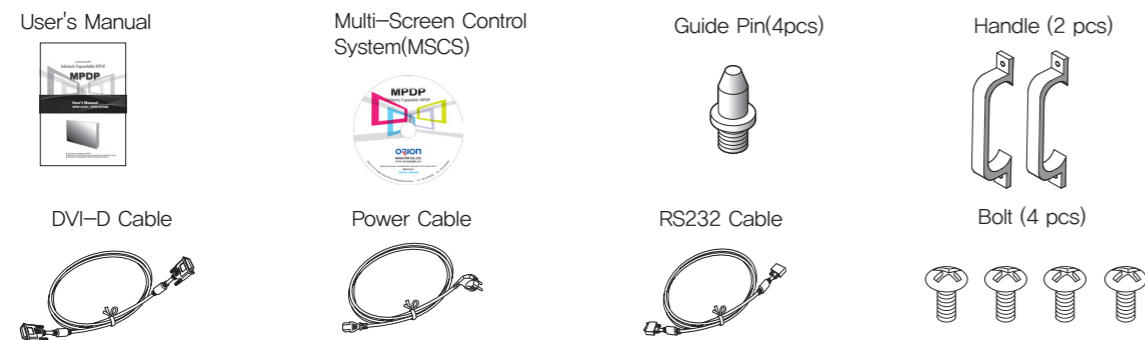
This manual describes how to use the product and notes in use.
 Please read the manual carefully before using it.
 After reading this manual, please retain for future reference.
 If you have any questions or a problem occurs, please contact either the company you purchased this product from or an authorized service center.

※ Displaying static picture for an extended period of time may cause an burn-in effect.

 **Warning** If you fail to comply with the regulations for safety and proper use, fire or injury may be caused.

 **Warning** To prevent electric shock, Do not remove cover.
 No user serviceable part inside
 Refer servicing to qualified service personal.

Supplied Accessories



Optional Accessories



Notice to users

Class A digital device

It is a device designed for business purpose with a safety certificate for electromagnetic interference, which user should be mindful of.

" Important Safety Instructions"

- 1) Read these instructions.
 - 2) Keep these instructions.
 - 3) Heed all warnings.
 - 4) Follow all instructions.
 - 5) Do not use this apparatus near water.
 - 6) Clean only with dry cloth.
 - 7) Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
 - 8) Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
 - 9) Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
 - 10) Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
 - 11) Only use attachments/accessories specified by the manufacturer.
 - 12) Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
 - 13) Unplug this apparatus during lightning storms or when unused for long periods of time.
 - 14) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- The symbol in figure 21 shall be shown adjacent to the text of item 12 above.

Contents

※ Please keep following instruction for panel protection without exception..... 4

1. Safety Precautions..... 8

2. How to Install..... 10

3. Guidance for Users..... 14

4. How to Connect Cables..... 16

 4.1. Connection of one set MPDP..... 16

 PC & DVI Connection..... 16

 VCR Connection..... 18

 DVD Player & DTV Set top box connection..... 20

 4.2. Connection of Multi-screen MPDP..... 22

 4.3. Connection of RS-232C Cable..... 24

 4.4. Connection of 3 x 3 MPDP..... 25

 4.5. ID setting of X x Y MPDP..... 26

5. Setting and operation of MSCS software..... 27

 5.1. Installation..... 27

 5.2. Start MSCS..... 28

 5.3. Setting 'Com Port'..... 29

 5.4. "New design/Last design" setting..... 29

 5.5. Multi-screen configuration..... 30

 5.6. MSCS Instruction..... 31

 5.7. ID Setting..... 31

 5.8. Configuration of various modes..... 32

 5.9. Setting multi screens at a time..... 33

 5.10. Slide Control..... 34

5.11. Screen Control..... 37

5.12. PC Tracking..... 38

5.13. Timer Control..... 39

5.14. BIC Control..... 40

 BIC status Indicator..... 42

 Burn-In-Compensation Control Method..... 43

 BIC Intervals and effect..... 43

 How to Control BIC..... 44

5.15. Orion PDP Home Page logon and Version information..... 49

6. MSCS Protocol..... 50

 ※ Attachment : ASCII to HEX Conversion Table..... 64

 ※ Hex code value according to Set ID..... 64

7. Other tips..... 65

 7.1. Before calling for service..... 65

 7.2. About Plasma display panel..... 66

8. Applicable signals..... 67

 8.1. DVD / DTV..... 67

 8.2. PC & DVI..... 67

9. Specifications..... 68

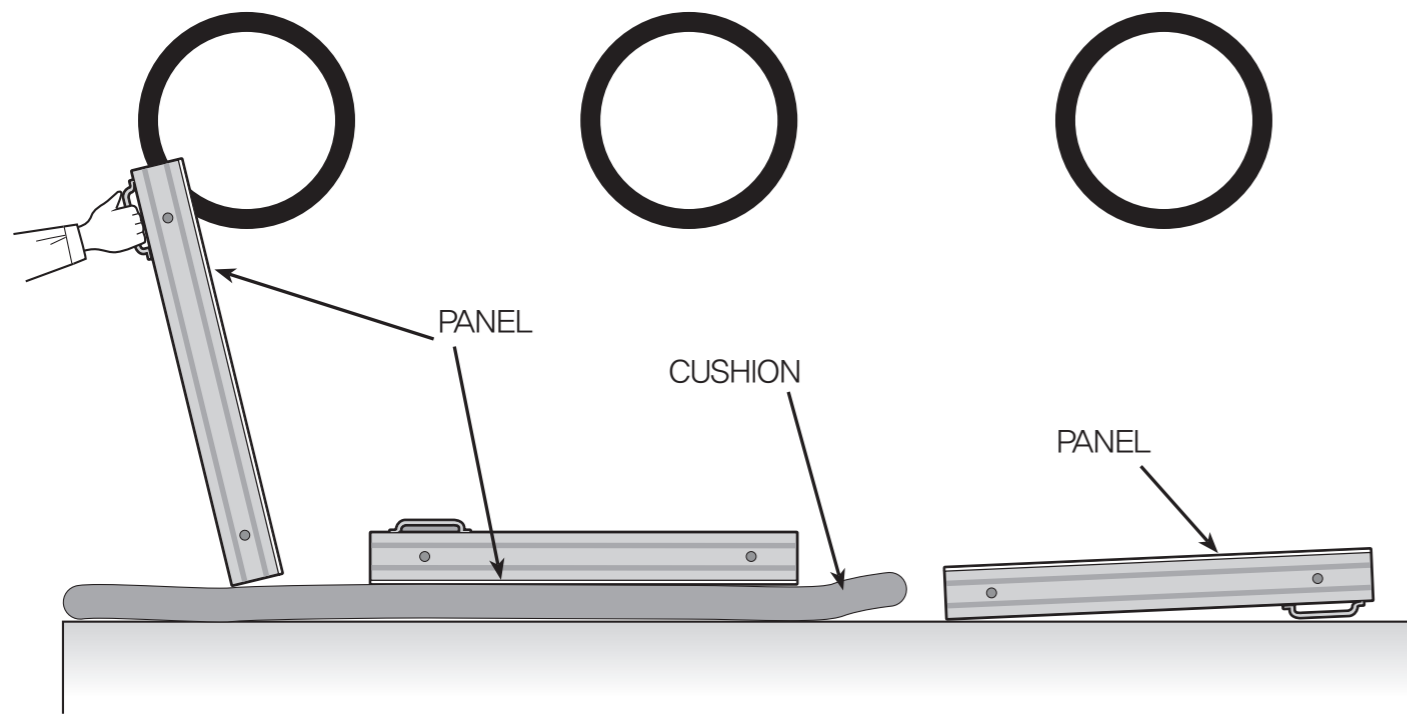
WARNING



Warning

※ Please keep following instruction for panel protection without exception.

- This product can be damaged even with minor impact for its nature. Please keep following instruction to carry or store the products.



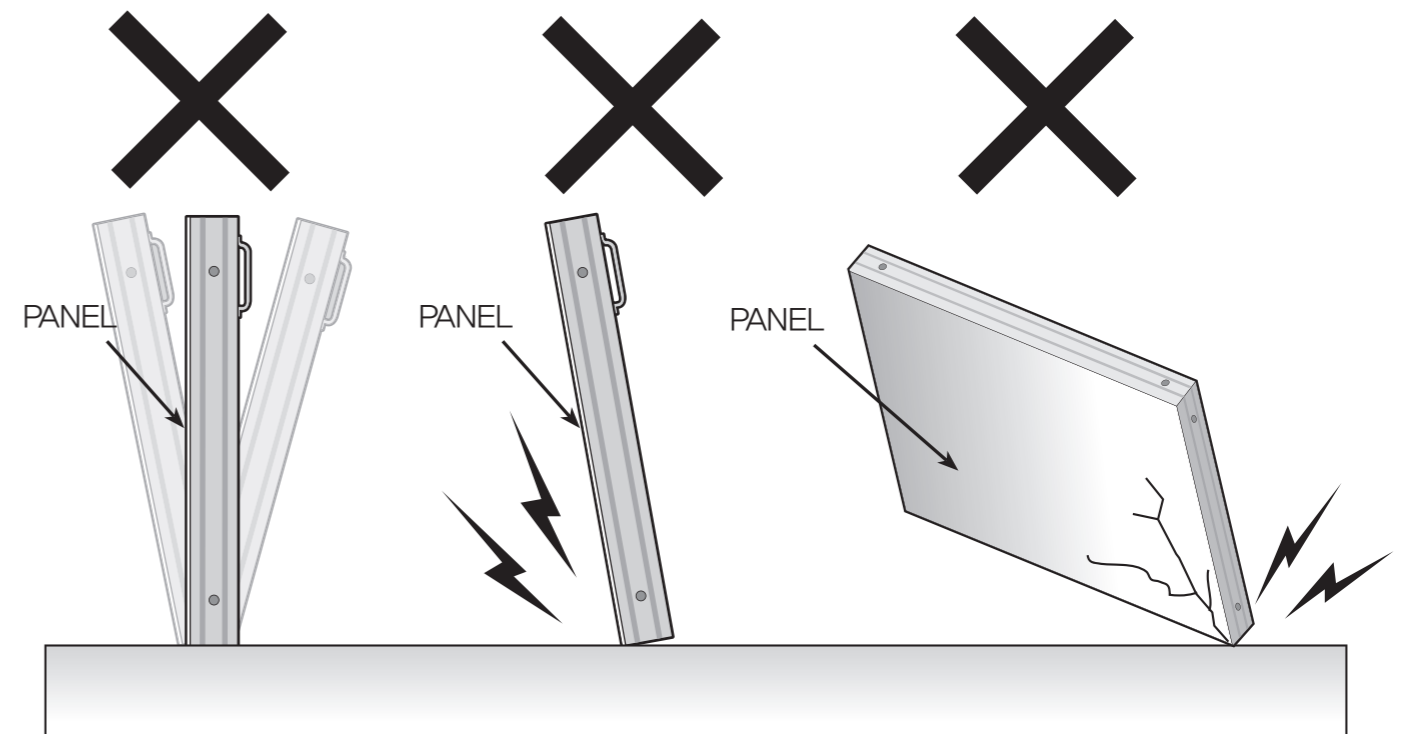
- If you need to stand PDP, you must use handles on the back and lean over the PDP to avoid panel touches ground or floor.
- If you need to lay down PDP as face down position, please use shock-absorbing pads under the PDP.
- If you need to lay down PDP as face up position, please be cautious for falling objects on the surface of the PDP.



Warning

※ Handle with Caution.

- Shock/Impact on the set's sides will result in internal circuit damages.
- The edge/bottom of the panel are fragile. Use shock-absorbing pads or rugs for laying down the product.

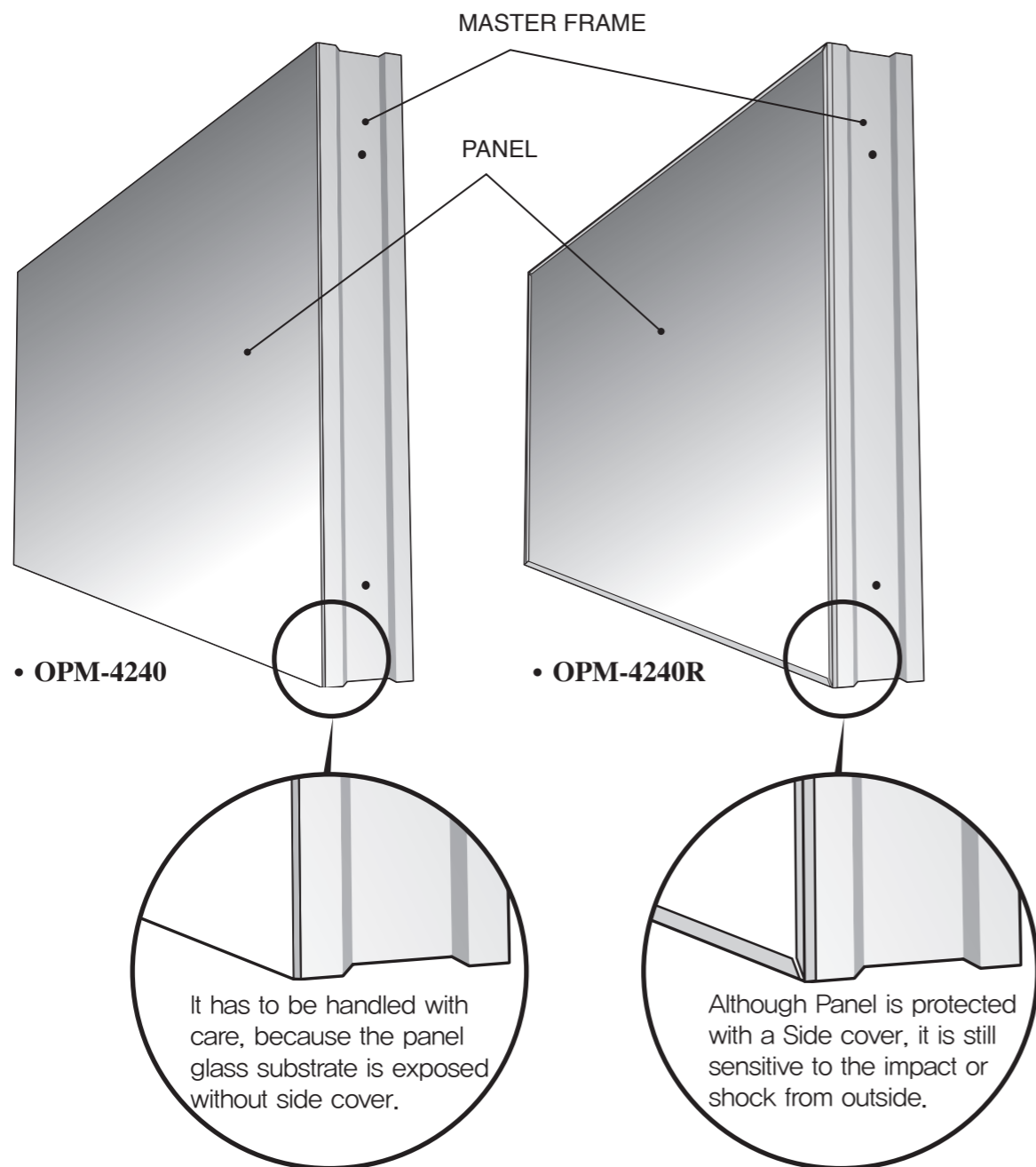


- Please do not stand PDP alone. It may fall or slip off and Panel can be broken or damaged.
- Please do not lean over the PDP. It may damage the bottom part of the PDP.
- Please do not lean over the PDP toward the edge part. It may damage the edge part of the PDP.

WARNING

Open Structure

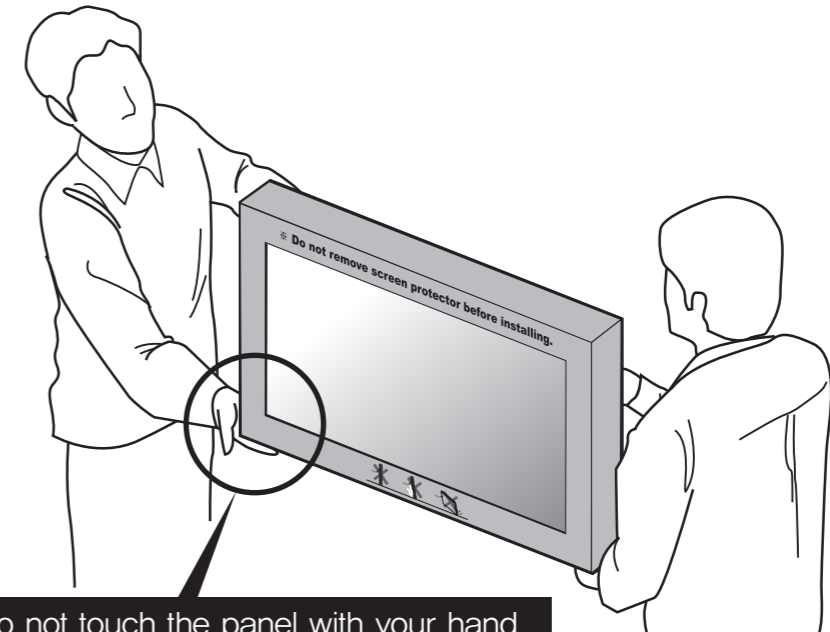
Unlike consumer PDP product, the panel of MPDP is exposed without any protective chassis.
It needs extra caution to carry or install to prevent any impact.



How to carry MPDP

Please see page 8 for unpack and handle assembly.

It always needs two persons to carry or install MPDP.
When you carry MPDP with up straight manner, please hold handles on the back and bottom part of the panel together.
Please be careful not to touch the bottom part of the panel when you put down the panel.

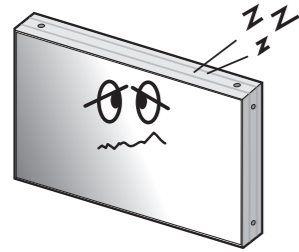


When you carry MPDP with flatbed manner, please hold handles on the back and lower part of the back.
Please be careful not to touch the bottom part of the panel when you put down the panel.

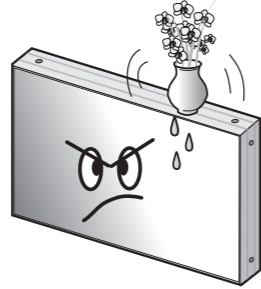


1. Safety Precautions

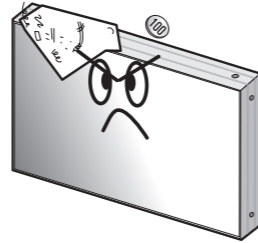
- If it operates abnormally, stop using it immediately.



- Do not place any liquid-containing container on it. If the inside is wet, it may cause electric shock or fire.



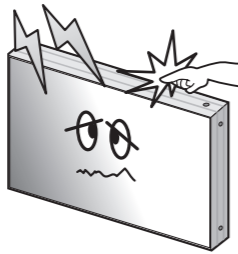
- Do not put any foreign material into the product. It may cause a failure or shorten the life span.



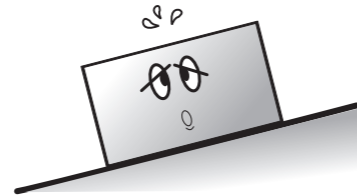
- Please refer to a specialized construction company for installing stand or wall mount unit. Otherwise, damage or injury may be caused.



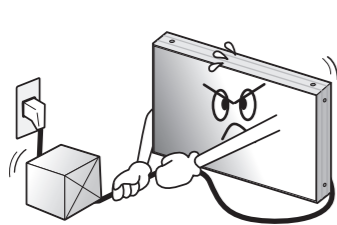
- Do not touch the device when lightning strikes.



- Do not install in an unstable location. It may cause injury.



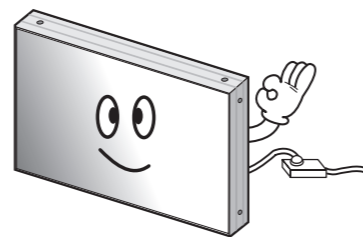
- Avoid any action to damage the power cord or power plug. It may cause fire or electric shock.



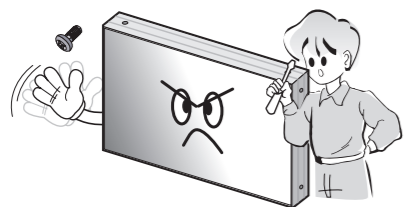
- Do not pull out the power plug with a wet hand. It may cause electric shock.



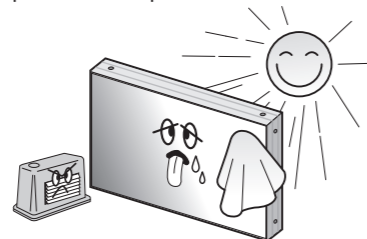
- Do not exceed ratings of AC outlet or extension cords. It may cause failure.



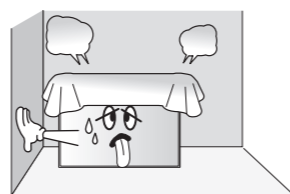
- Do not alter (or disassemble) the product. It may cause electric shock since high voltage is flowing inside.



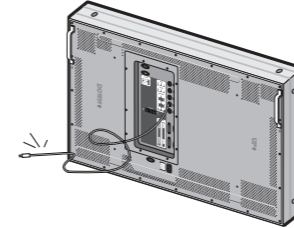
- Do not install the product where it may be exposed to direct sunlight or near any heating device. It may shorten the product's life span or cause failure.



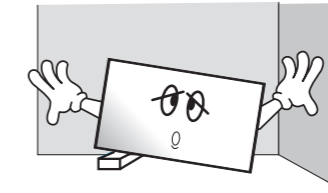
- Make sure the product is not covered with any object. If the ventilation hole is blocked, the inside temperature may rise to cause overheating resulting in fire.



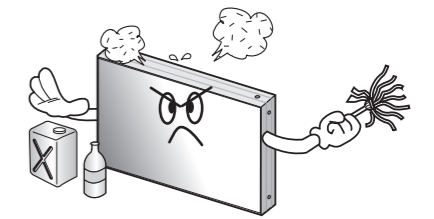
- Do not pull out or hang down the connection cable. It may damage the cord to cause fire or electric shock.



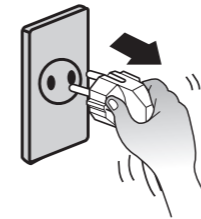
- Do not lean against the product or keep it leaned. It may cause injury or failure.



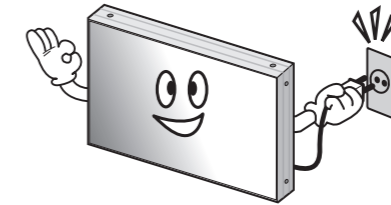
- Do not put it at any place with much humidity, dust, oil, smoke or steam. It may cause failure.



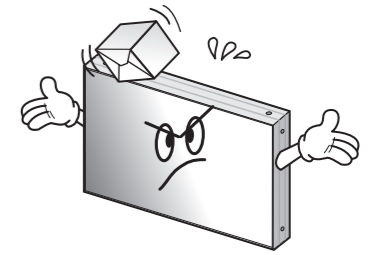
- Pull out the power plug by holding the plug. Otherwise, it may damage the power cord to cause fire or electric shock.



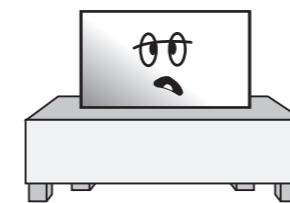
- If you do not want to use the product for a long time, keep the power plug unplugged to save electricity.
- The socket-outlet should be installed near the equipment and be easily accessible.



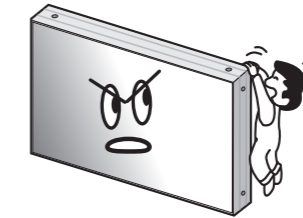
- Do not put any heavy object on it. It may cause failure.



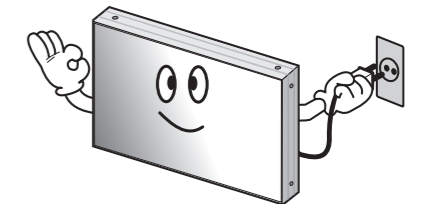
- Install the product on safe and flat surface.



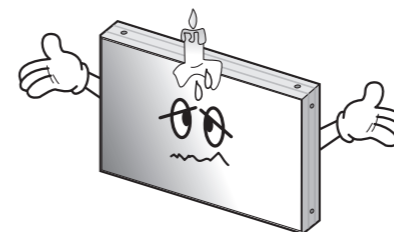
- Do not ride or step on the product. It may cause breakage when fallen down.



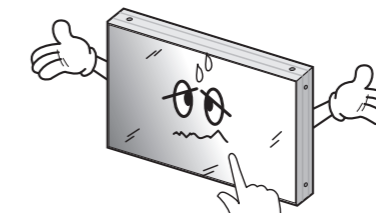
- When moving it, disconnect the connecting cable. Otherwise, it may damage the cable to cause fire or electric shock.



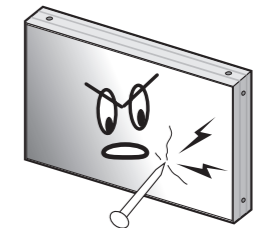
- Do not put candles on the product. If the liquid flows inside the product. It may cause electric shock or fire.



- Do not touch product's front surface with hand. Otherwise, the image quality can be lowered.



- Do not poke the front screen with sharp material. It may damage the screen and may cause malfunction of the product.

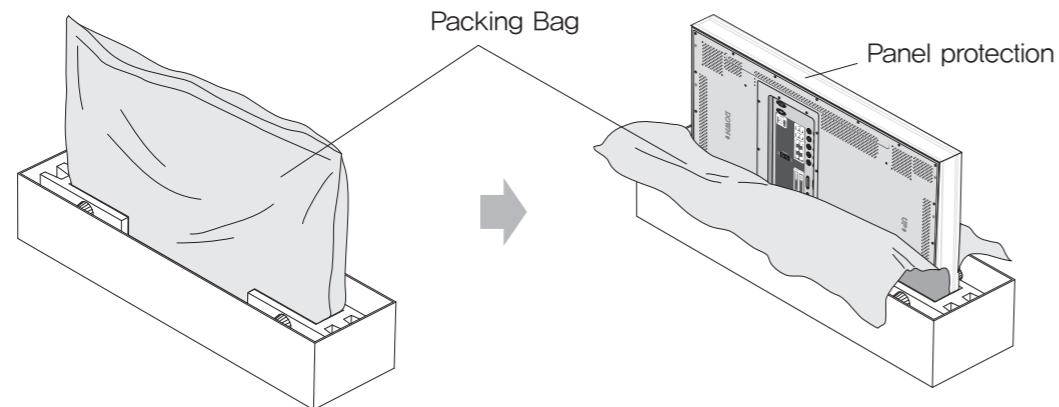


2. How to Install

- Install this set only at a location where adequate ventilation is available.

How to assemble handles

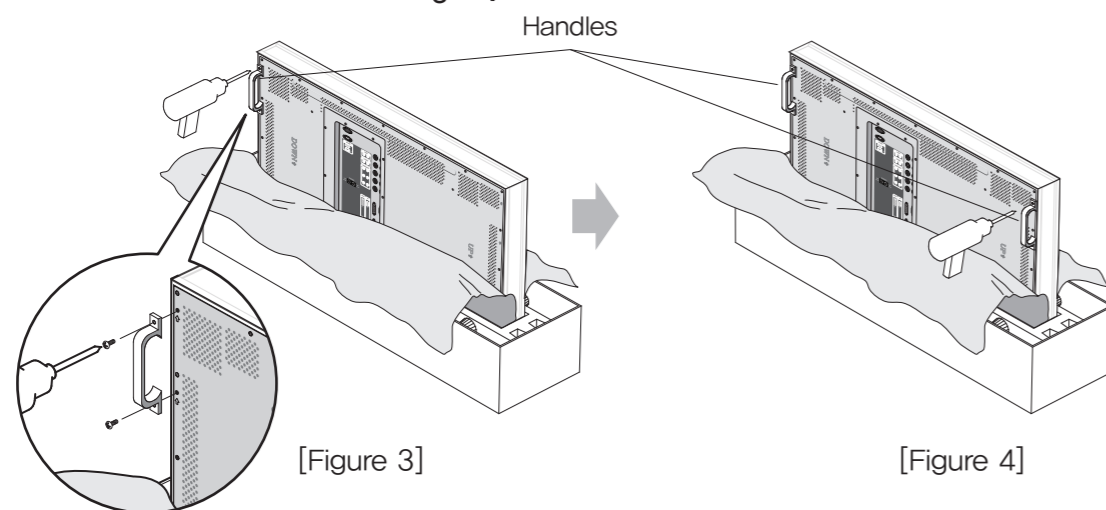
1. Product is packed in a box as shown in Figure 1.
2. Please carefully remove the Packing Bag with a knife or a pair of scissors.
 ※ Please check front and rear side before you cut the bag to prevent any damages on panel or set.



[Figure 1]

[Figure 2]

3. Please assemble handles with the bolts that are in the accessory box to the rear side as shown in the figure.

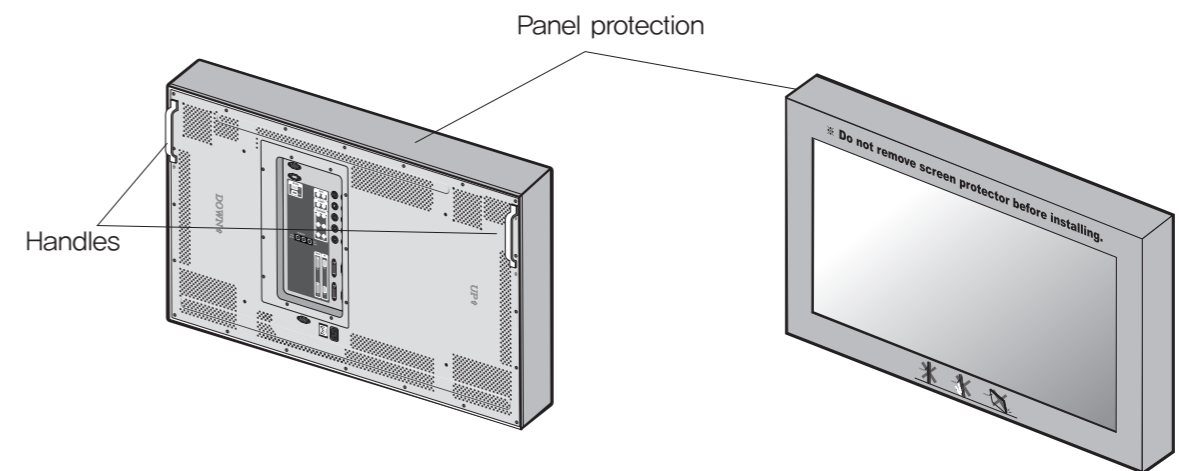


[Figure 3]

[Figure 4]

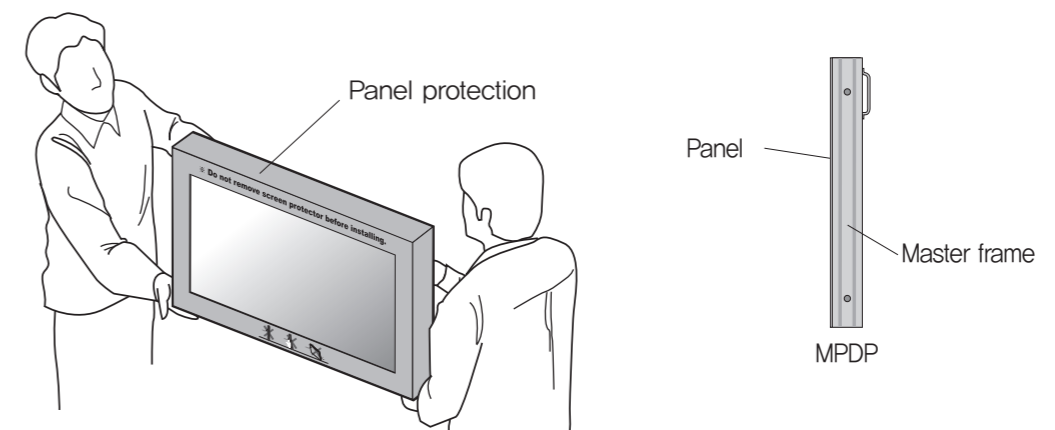
How to move MPDP

1. 2 people hold each handle on product's back side.



2. It needs two people to carry or install this product.

- Please hold the handles in the back and the front bottom part at the same time.
- Please do not grab the panel, but grab bottom of master frame when you carry or install the products.
 - Please use gloves when you carry or install the products.



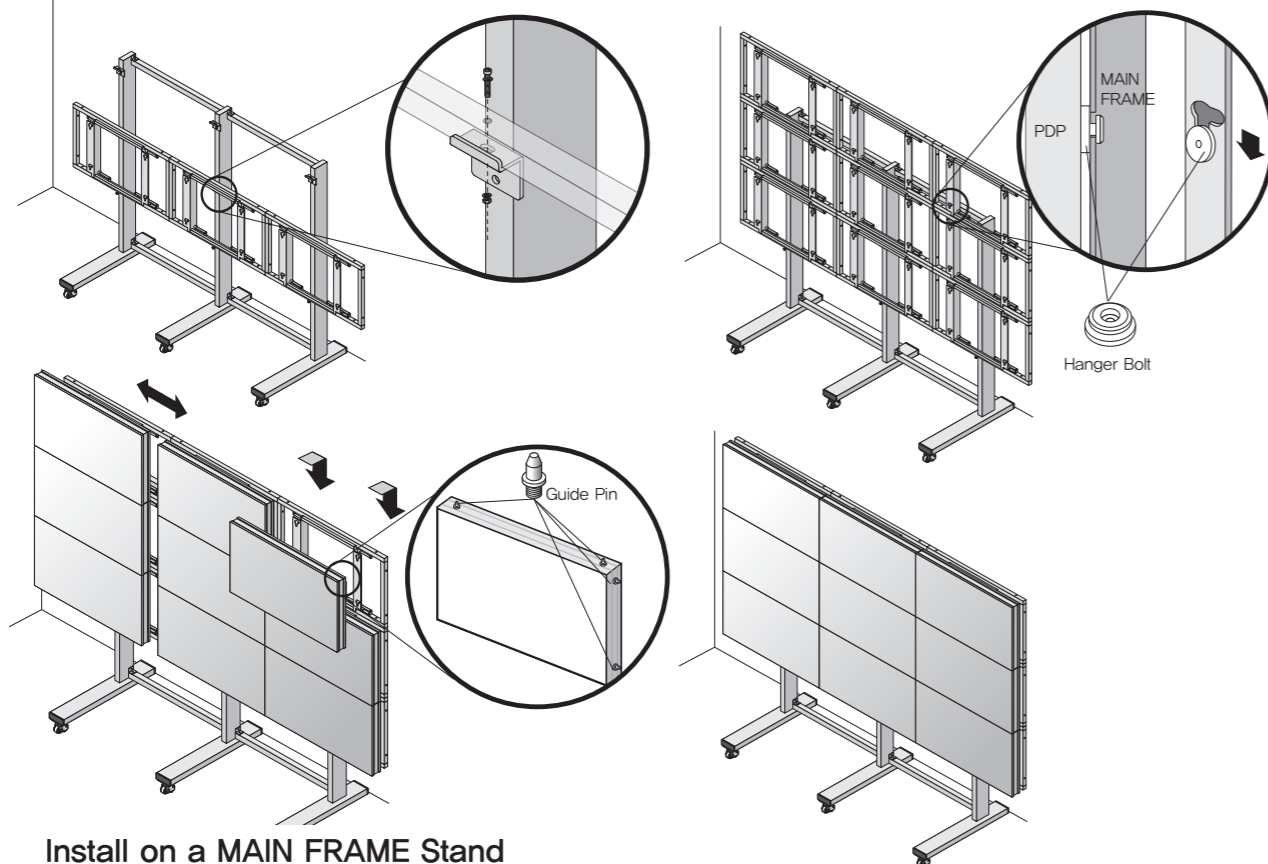
※ Attention :

- Do not remove the panel protection pad until a set is completely installed on a stand or a wall hanger. Please carefully remove Panel protection pad to prevent any damages on the product .
- Please make sure to use panel protection when you move, carry or rent MPDP.

MAIN FRAME Stand Unit (Option)

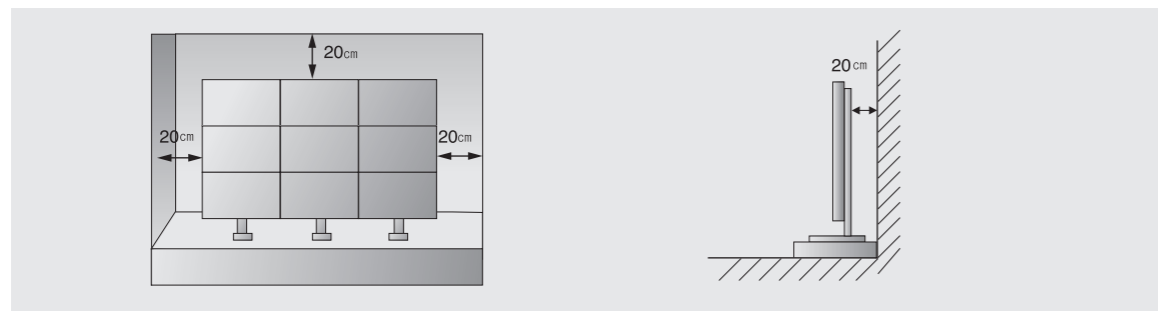
- Please do not install our product at following locations to protect the product and prevent possible malfunction.
 - Places of vibration or shock: PDP set may fall and damaged
 - Next or near to Sprinkler sensors: The sensors may detect heat from a set and sprinkler can be activated.
 - Around high voltage power lines: Noise from the power line may affect screen images
 - Around heating apparatus: PDP set may be overheated and damaged.

- The set can be installed as shown below.
(For further information, refer to the optional 'MAIN FRAME Installation and Setup Guide'.)



Install on a MAIN FRAME Stand

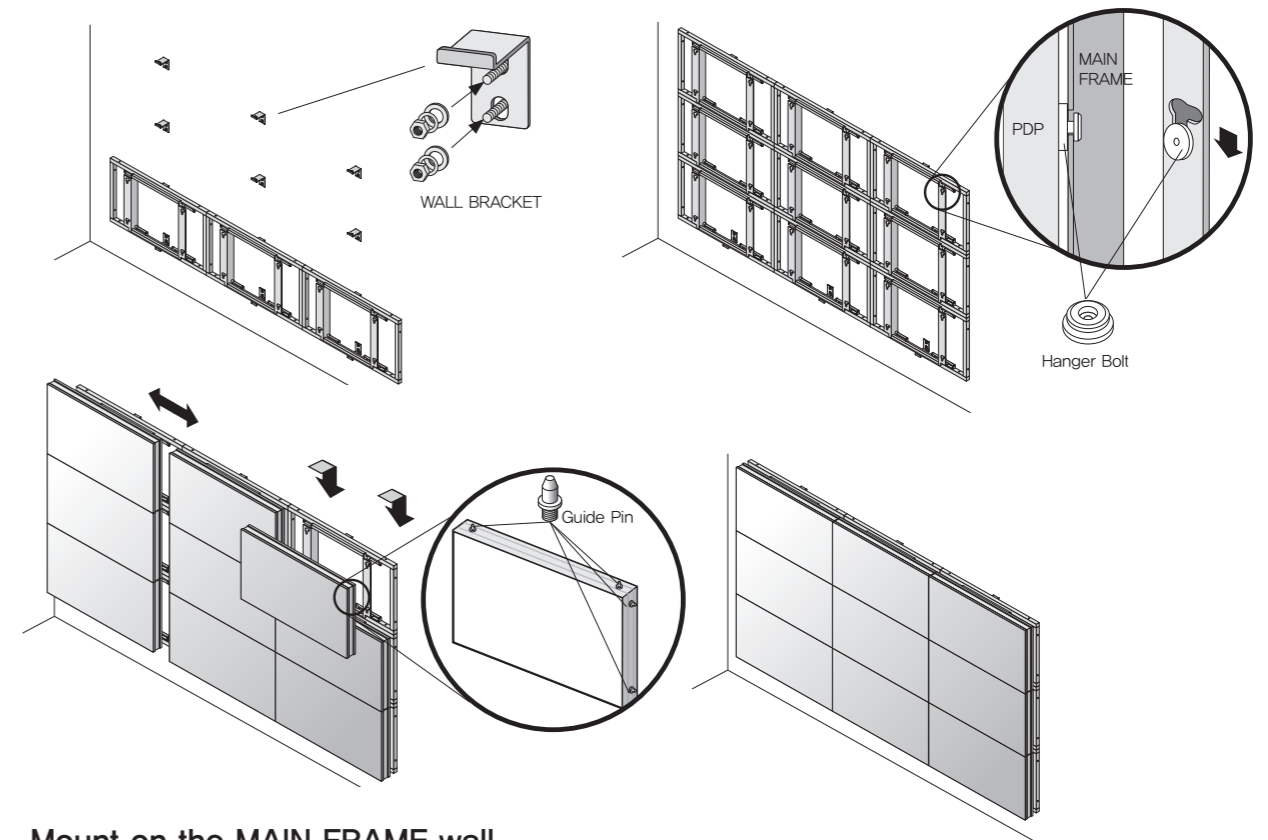
Please secure minimum clearance as shown in the picture for adequate ventilation and technical service.



MAIN FRAME Wall Mounting Unit (Option)

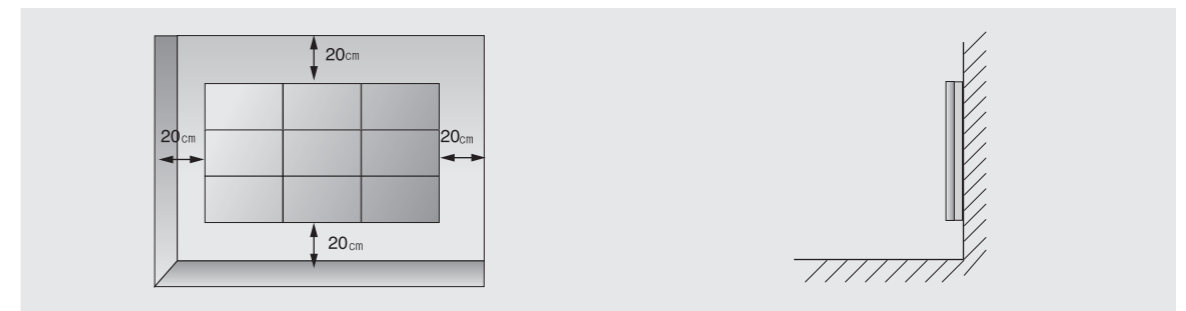
- Please check the stability of wall.
If the wall is not strong enough, reinforce the wall before installation.
- Please connect all the cables to proper ports in a set before installation.

- The set can be installed on the wall as shown below.
(For further information, refer to the optional 'MAIN FRAME Installation and Setup Guide'.)



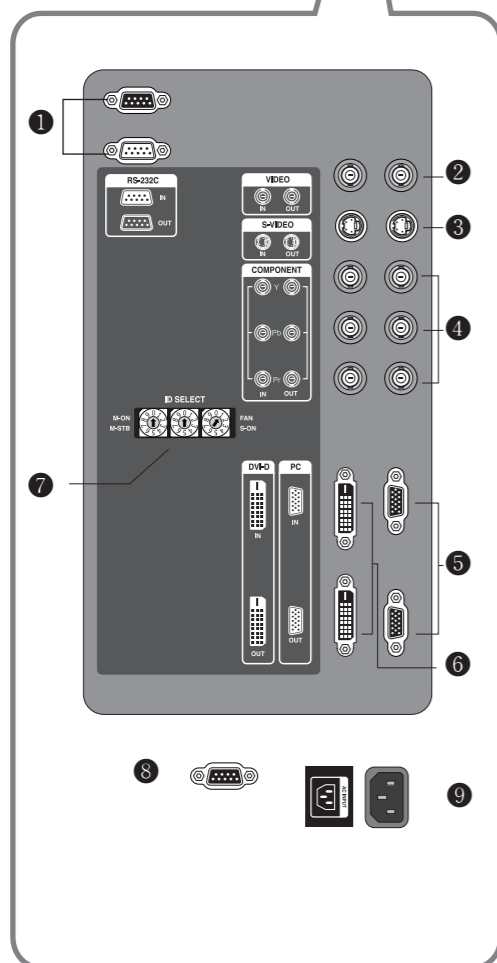
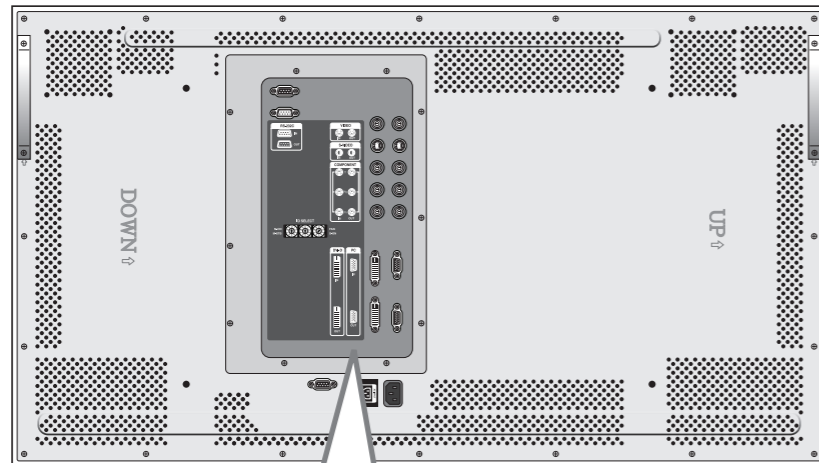
Mount on the MAIN FRAME wall

Please secure minimum clearance as shown in the picture for adequate ventilation and technical service.



3. Guidance for Users

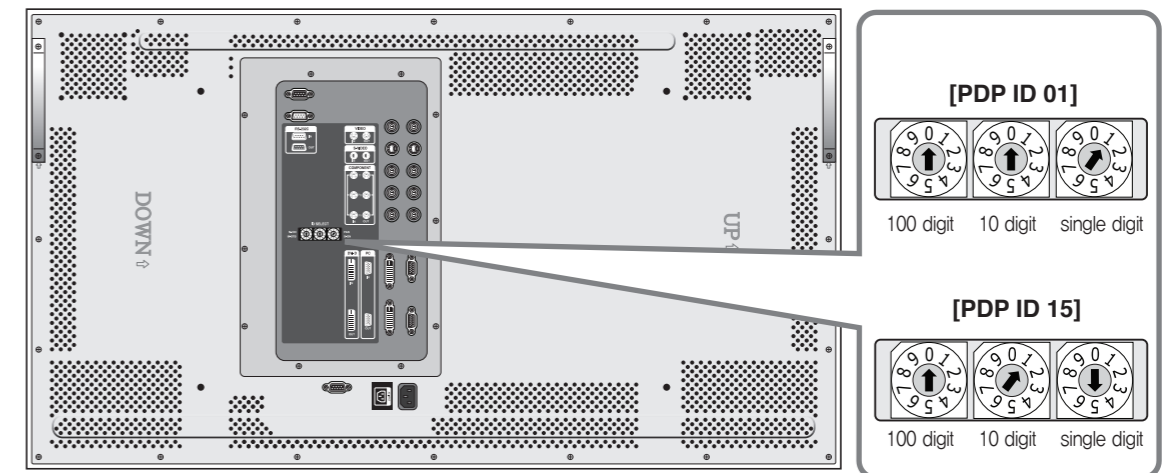
Input/Output Terminals



- 1. RS-232C**
MPDP Control, Firmware Upgrade, 9pin D-sub
- 2. Video**
Composite Signal
NTSC, PAL, SECAM
- 3. S-Video**
S-Video Signal
NTSC, PAL, SECAM, 4pin Mini Din
- 4. Component**
DVD Signal
DTV - YPbPr Signal
- 5. PC**
Computer RGB Analog Signal, D-sub 15pin
- 6. DVI-D**
TMDS Signal
- 7. ID Switch**
Set ID Switch
- 8. RS-232C(BIC)**
BIC Firmware Upgrade
- 9. AC Input**
AC 100V ~240V, 50/60Hz

Set ID Switch Setting

- Example of ID Switch setting
- You can set ID with 3 rotary switches as shown in the following figure.



- ※When you set ID of MPDP set, power cable must be disconnected. If power cable is not disconnected during ID setting, MPDP set may be operated with the previous ID and it may cause abnormal behavior.
- ※For stable operation, wait for at least 10 seconds prior to use MPDP control program after the first AC power connection.

• LED Indication

LED ON ○ OFF ● ON/OFF ◐

| LED Indication | | Description |
|----------------|---------|---|
| M-ON ● | M-STB ● | No Power. |
| M-ON ○ | M-STB ○ | Internal System Check after Power on. |
| M-ON ● | M-STB ● | System ready. |
| M-ON ◐ | M-STB ◐ | Power ON by MSCS Program. (M-ON and S-ON LEDs blink every other second. Power on status) |
| M-ON ○ | M-STB ○ | Power Off by MSCS Program. (System ready). |

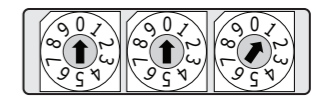
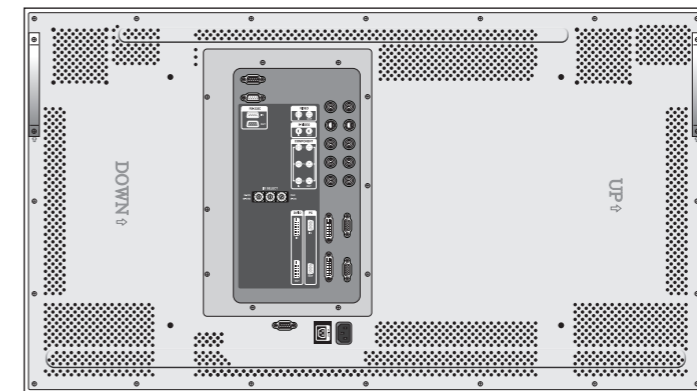
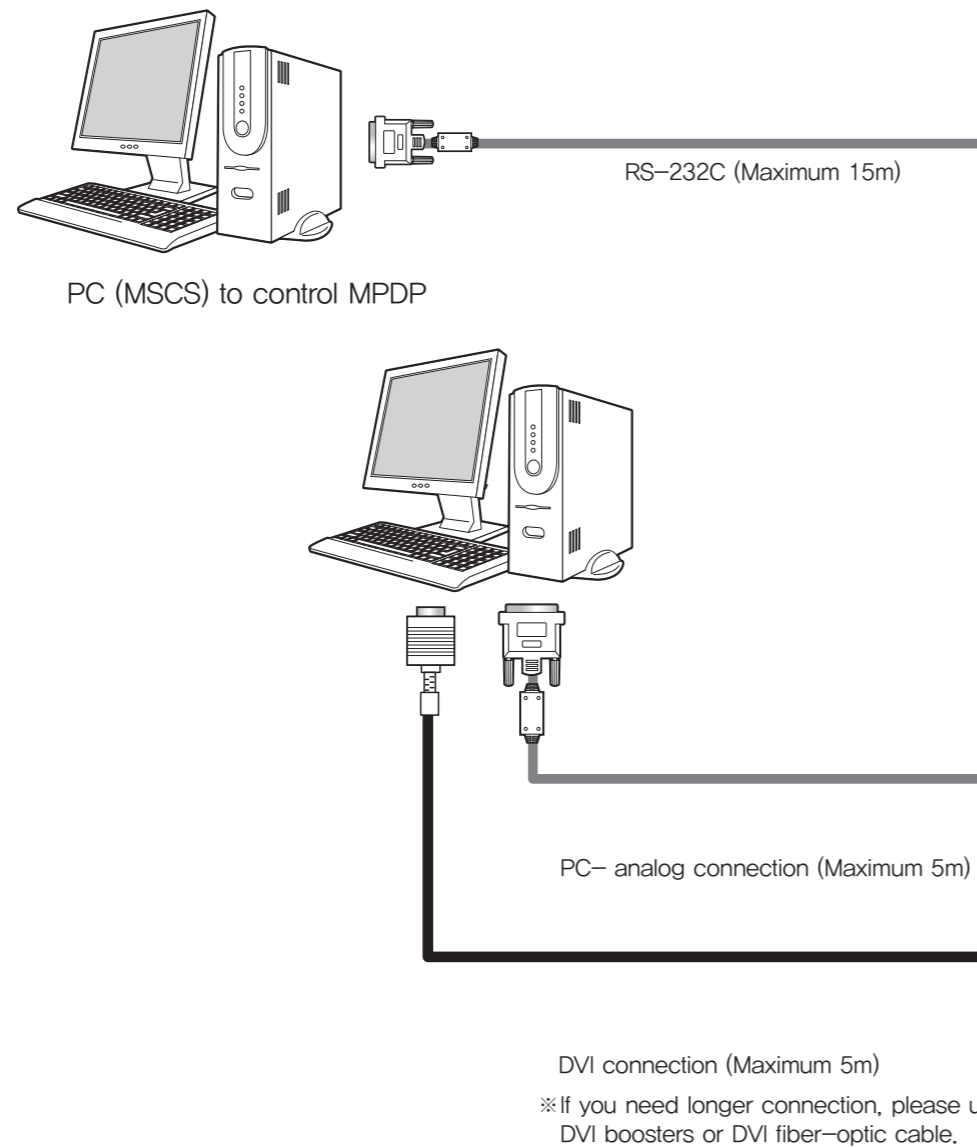
M-ON(Master-ON) : IP Board Master Power On.
 FAN : FAN POWER ON, IF Red LED on IP board is turned on, please check FANs.
 ※To protect the product, power can be disconnected automatically when the fan is stopped.
 M-STB(Master- Stand By) : IP Board Master Ready
 S-ON(Slave-ON) : IP Board Slave Ready

4. How to Connect Cables

4.1. Connection of one set MPDP

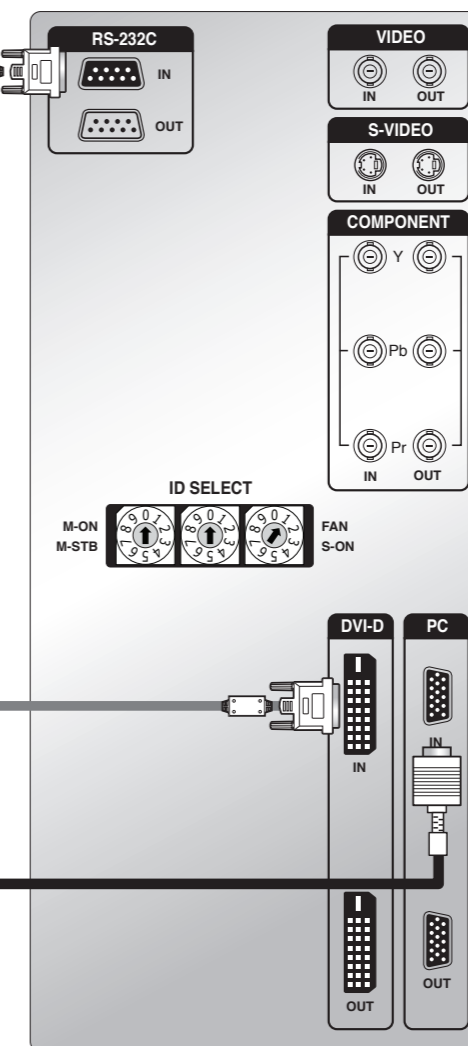
PC & DVI Connection

- MPDP and PC should be connected; a Com Port in a PC and RS-232C IN port in a MPDP is connected with supplied RS-232C cable.
- MPDP On/Off or Screen adjustment can be controlled by MSCS (Multi-Screen Control System).
- ID setting on the backside of MPDP must be identical with the ID setting in MSCS to control MPDP with a PC.
- If you do not have Com Port, you need to use an USB converter for RS-232. Depending on manufacturers or models, converters may cause malfunction.

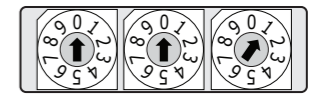
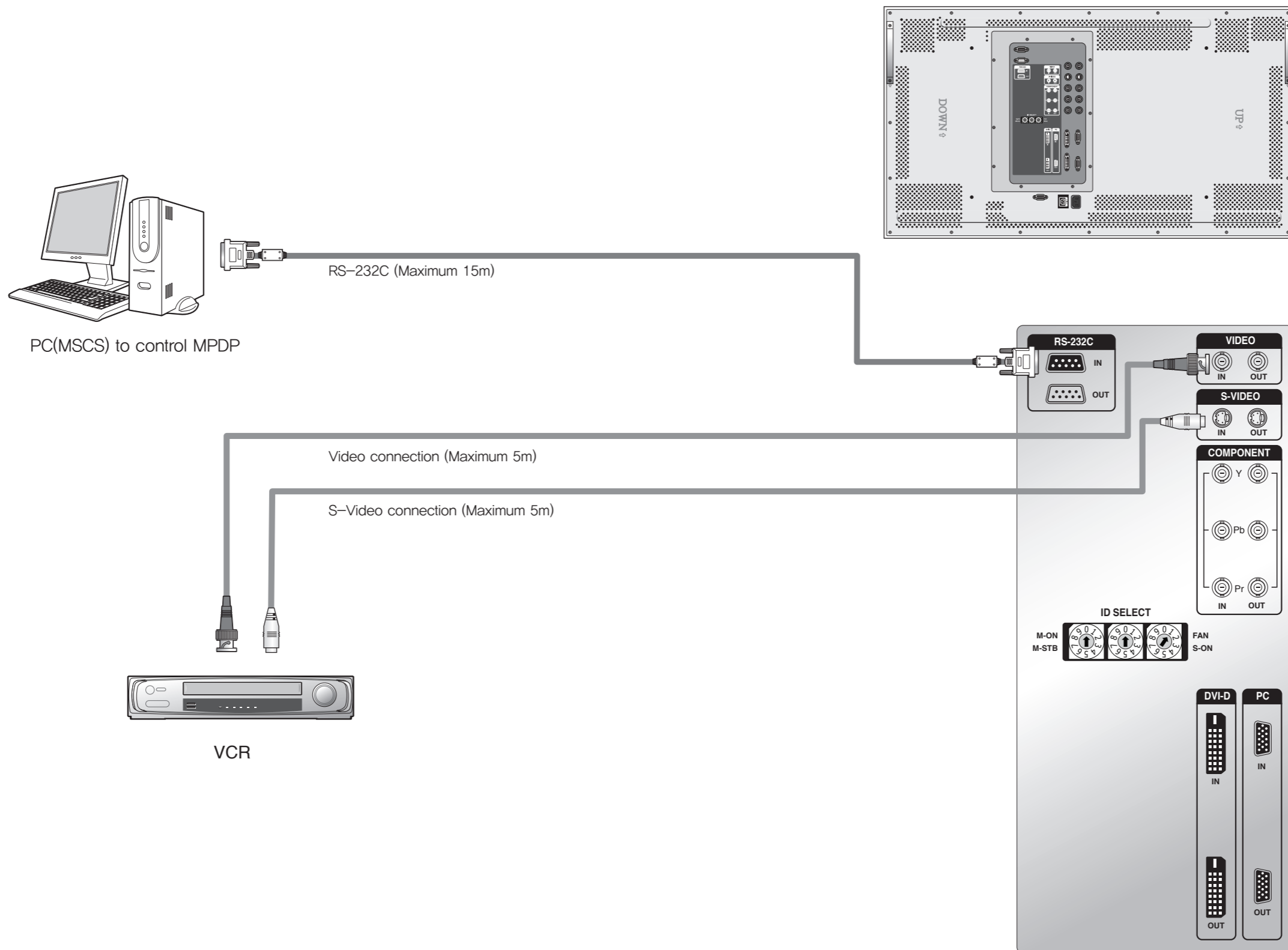


[PDP ID 1]

- ID switch must be set as ID 1 for one set use.



VCR Connection

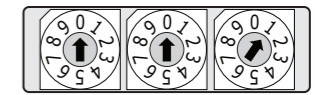
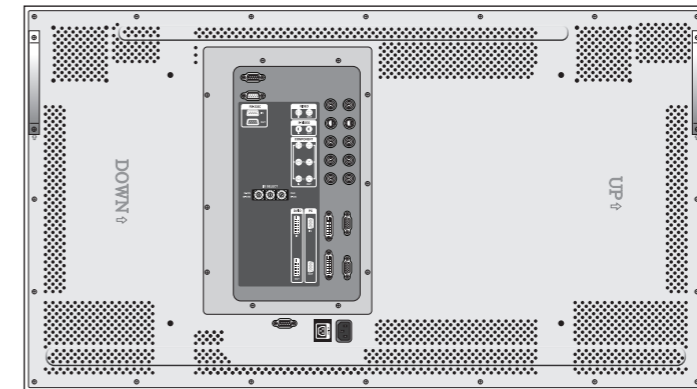
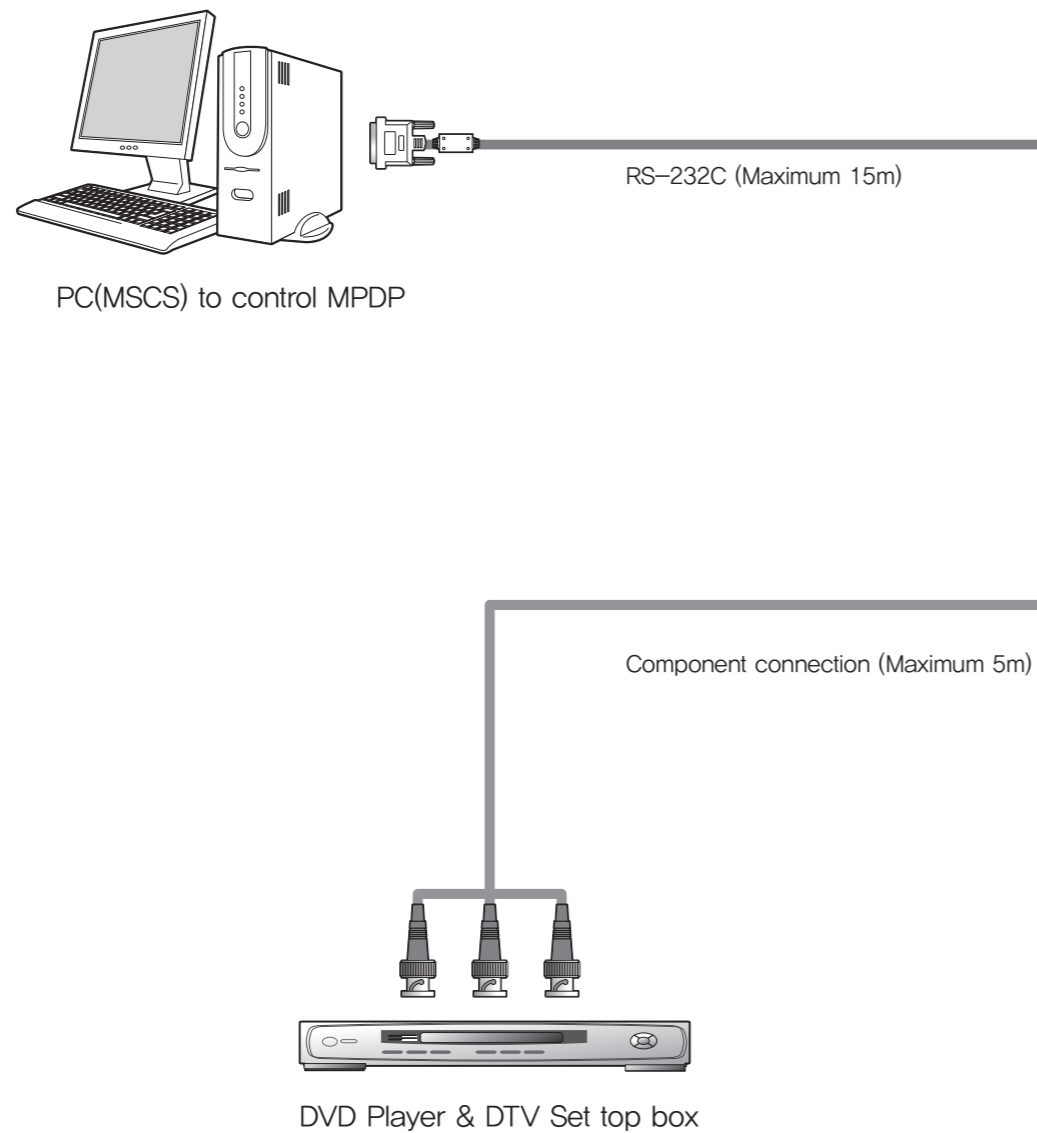


[PDP ID 1]

• ID switch must be set as ID 1 for one set use.

DVD Player & DTV Set top box connection

- In case input source is DVD(480p, 576p, 480i, 576i), select DVD in MSCS main screen.
- In case input source is DTV(720p, 1080i, 1080p), select DTV in MSCS main screen.



[PDP ID 1]

- ID switch must be set as ID 1 for one set use.

| | | | |
|----------------------------------|---|-----|-----|
| Component ports of the set | Y | Pb | Pr |
| Video output ports of DVD player | Y | Pb | Pr |
| | Y | B-Y | R-Y |
| | Y | Cb | Cr |

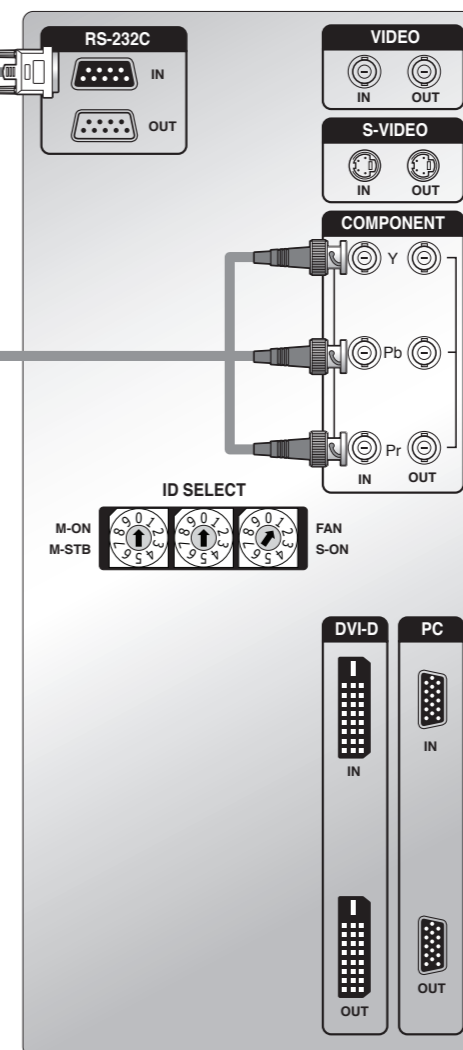
- According to manufacturers, the indication of DVD Component output port may vary; "Y, PB, PR", "Y, B-Y, R-Y" or "Y, CB, CR."

- **Component Input ports**
You can get better image quality by connecting DVD player to component input ports as below.



Caution

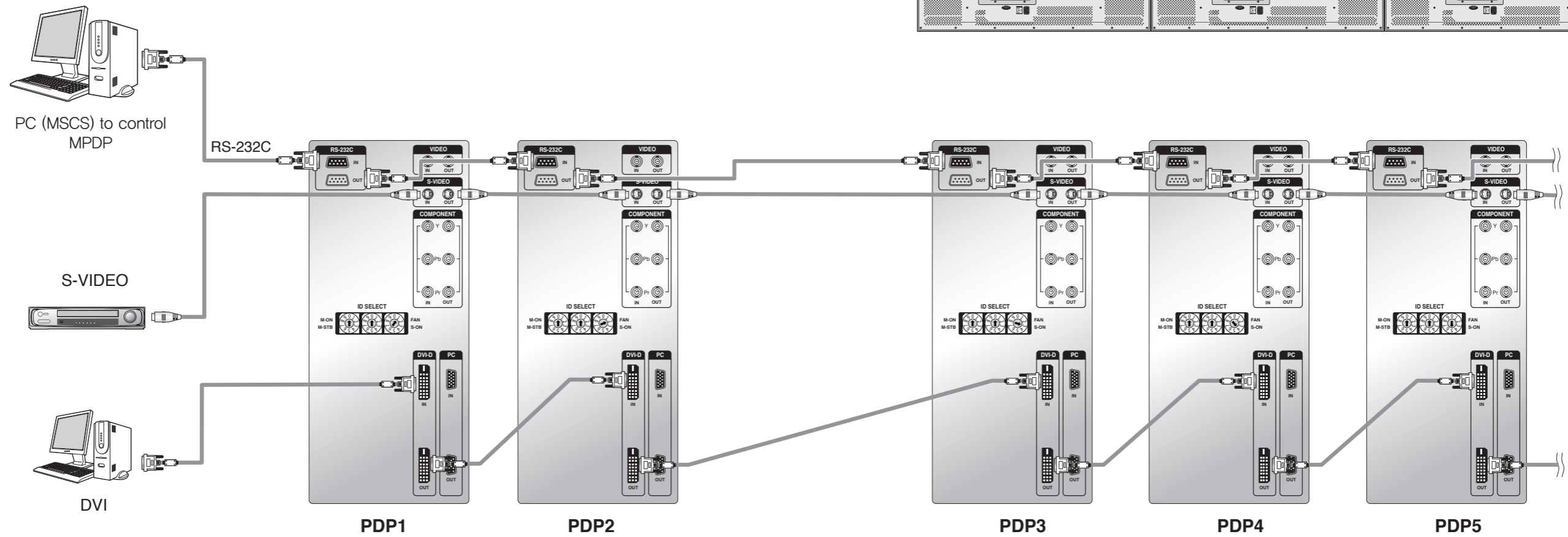
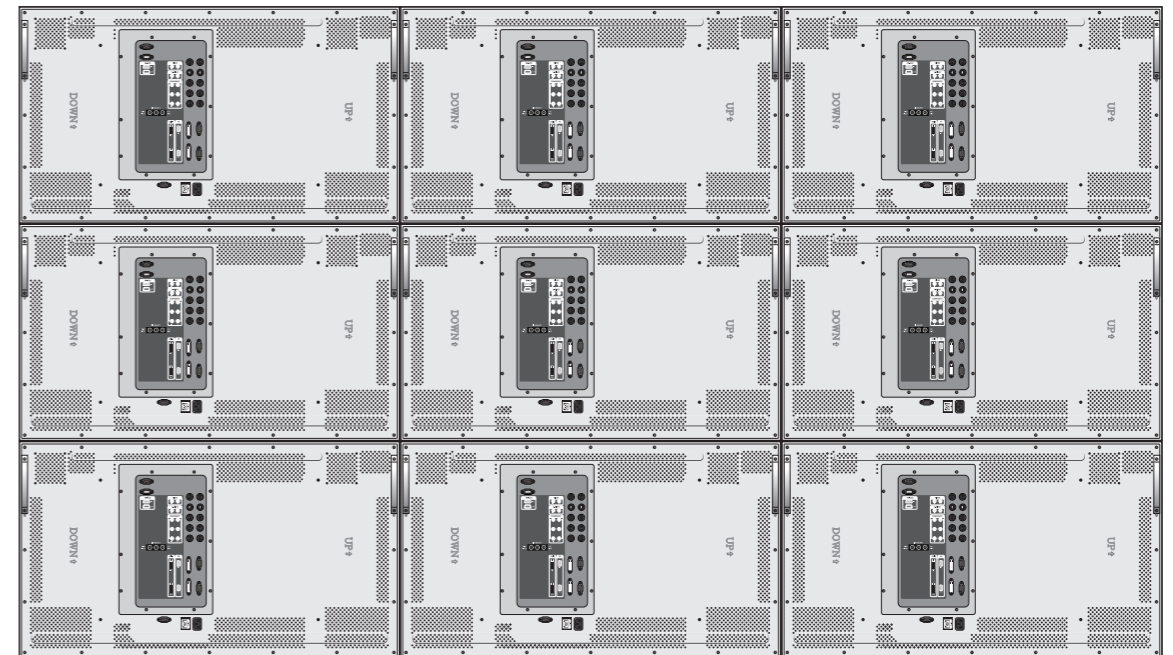
- **Caution for Component connection**
In case component cables are not properly connected, you may have bluish or redish screen or even no screen images.



4.2. Connection of Multi-screen MPDP

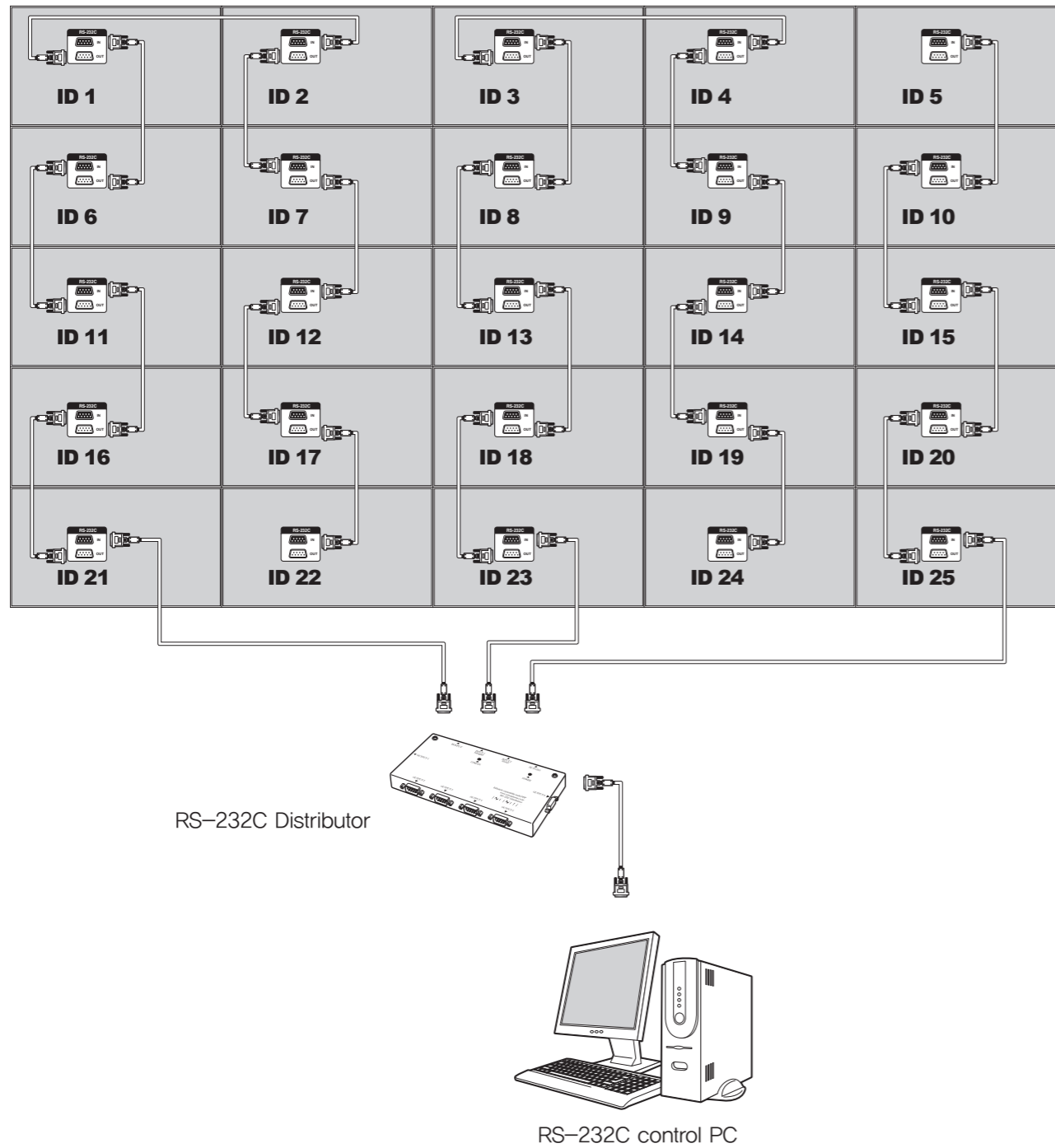
- Recommended maximum set connection for Multi setting is shown in table below. If you need to connect more than described in the table, you have to use distributors.
- Image quality can be affected by cable or signal quality.

| INPUT SOURCE | Resolution | Connection | Remark |
|---------------|------------------------------------|------------|------------------|
| DVI | 1600 x 1200 x 60HZ | 9 sets | |
| PC | 8.2. PC & DVI Resolution Reference | 1 sets | 67 page |
| DTV | 720p, 1080i, 1080P | 4 sets | |
| DVD | 480i, 480p, 576i, 576p | 6 sets | |
| VIDEO/S-VIDEO | NTST, PAL, SECAM | 6 sets | |
| RS-232C | | 30 sets | ORION Cable Only |

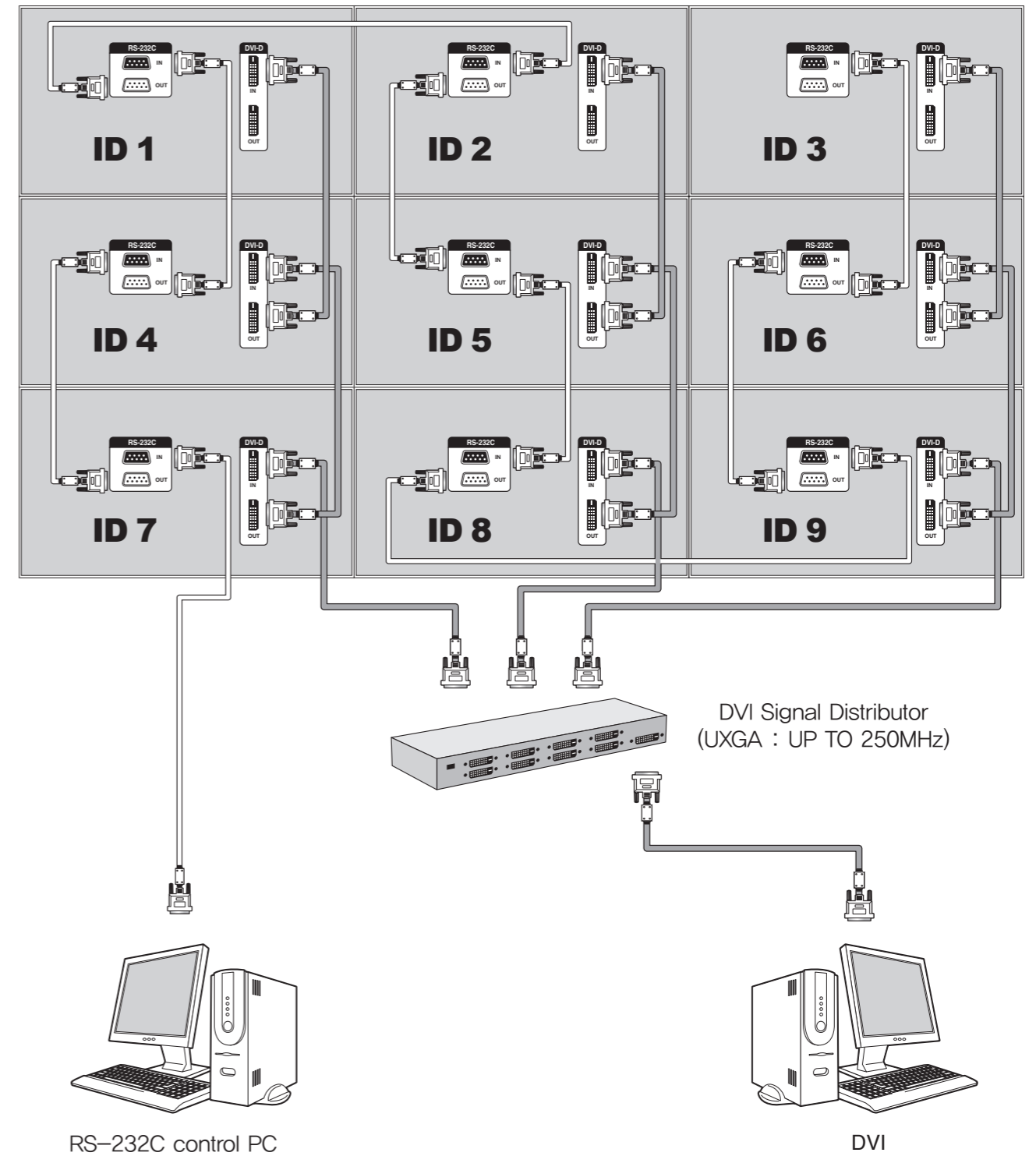


4.3. Connection of RS-232C Cable

- Maximum use of RS-232 with Daisy Chain connection is **30** or less.
If you need additional connection, use RS-232 distributor.

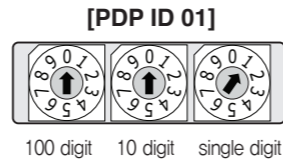


4.4. Connection of 3 x 3 MPDP



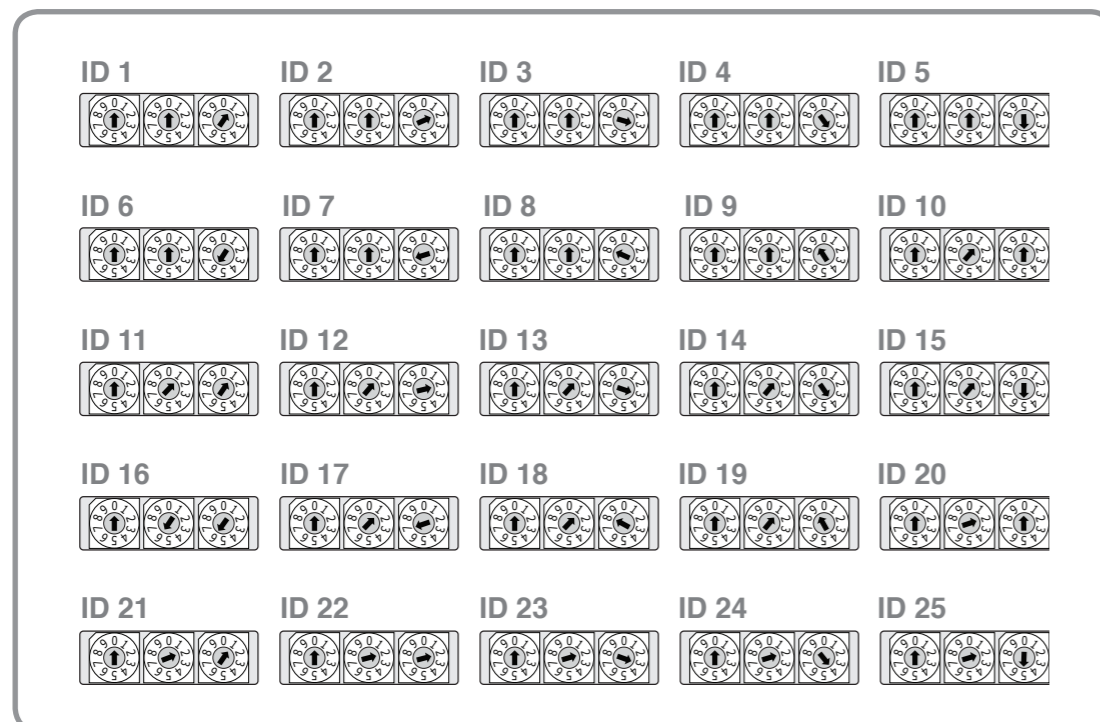
4.5. ID setting of X x Y MPDP

- Identity number (ID) indicates the location of each MPDP.
- When you look at the MPDP screens in front of MPDP.



| | | | | |
|--------------|--------------|--------------|--------------|--------------|
| PDP ID 1 | PDP ID 2 | PDP ID 3 | PDP ID 4 | PDP ID 5 |
| PDP ID 6 | PDP ID 7 | PDP ID 8 | PDP ID 9 | PDP ID 10 |
| PDP ID 11 | PDP ID 12 | PDP ID 13 | PDP ID 14 | PDP ID 15 |
| PDP ID 16 | PDP ID 17 | PDP ID 18 | PDP ID 19 | PDP ID 20 |
| PDP ID 21 | PDP ID 22 | PDP ID 23 | PDP ID 24 | PDP ID 25 |

Recommended ID of X x Y screens



5. Setting and operation of MSCS software

5.1. Installation

- Insert the Installation CD.
- You can see following installation start screen.
- Select proper version for your product and star installation

• MSCS supports Windows® 2000, Windows® XP and Windows Vista™ only



MSCS Installation start screen.



Caution

Caution for using MSCS

1. Data for Picture control, Manual Tracking and so forth can be read by clicking the right button of your mouse on the desired MPDP set from MSCS. Please do not use above function together with the other functions.
2. When you off AC power, execute power off by MSCS first and disconnect AC power to save your configuration.

5.2. Start MSCS

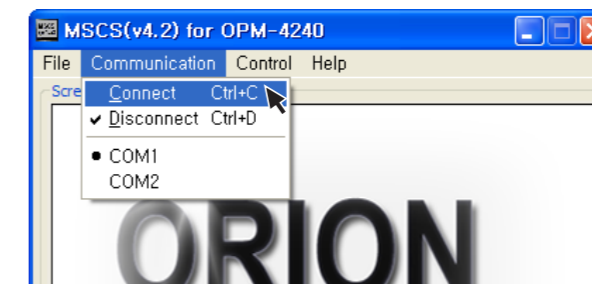
- MSCS is an application program needed to control MPDP.
- When you execute MSCS (v 4.2) for your product at the installation screen, it will create a new folder at *C:\Program File\MSCS (v4.2)* and an icon on your computer screen.
- By double clicking the MSCS (v 4.2) icon, the initial screen image of MSCS (v 4.2) will be displayed as shown in the picture.



※ Input source is not displayed on the MSCS screen, but it is indicated by colors.
 ※ DVI: Yellow, PC: Green, DTV: Pink, DVD: Purple, S-VIDEO: Brown, VIDEO: Gray

5.3. Setting 'Com Port'

- Com Port connects or disconnects the communication between PC and MPDP.
- Connect MPDP to PC Com Port via RS-232C cable.



Communication Setting

- Go to MSCS Menu → Communication and set Com Port. Click 'Connect' using mouse or press 'Ctrl+C' using keyboard.
- In order to disconnect communication, click 'Disconnect' using mouse or press 'Ctrl+D' using keyboard.
- When you use USB-to-RS232C converters, you need to set Com Port again, because MSCS uses one of Com Port no. 1 to 30.

5.4. "New design/Last design" setting

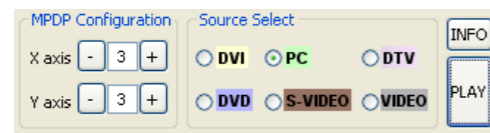
When Com Port is successfully connected, pop-up window for "New design/Last design" appears.



New/Last Design Set

- Click "Open New Design" to prepare new configuration.
- Click "Open Last Design" to go to last design before closing.

5.5. Multi-screen configuration

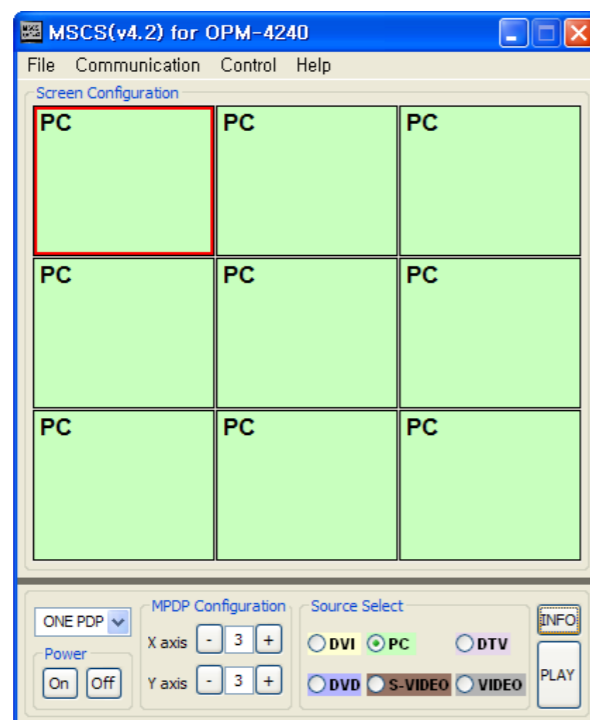


Screen Configuration Setting

- 1** Input the numbers of X and Y
 - X is for the number of row and Y is for column.
 - X and Y can be selected within the range from 1 to 15. The maximum MPDP quantity of MSCS control is 100 sets.
 - MPDP image of selected numbers of X and Y is displayed in the Screen configuration in one second after setting the number.

- 2** Select one of input sources from DVI, PC, DTV, DVD, S-VIDEO, or VIDEO.

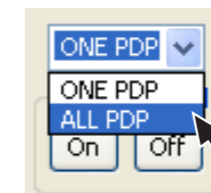
- 3** Execution of the configuration.
 - When you click "PLAY" button after selecting input source from Source select and the numbers of X and Yin MPDP Configuration, the configuration of MPDP is generated as shown in the figure below.



- ※ **INFO :**
- Check the resolution of the input source. It is displayed at the upper right corner of the screen.
 - Check the signal. If there is no input signal, "No signal" is displayed.

5.6. MSCS Instruction

- Check "ALL PDP" to send data to all connected MPDP regardless of ID.



MPDP Control – Power On/Off

- In order to control power of specific MPDP, use "Power On/Off" button after selecting the specific MPDP.

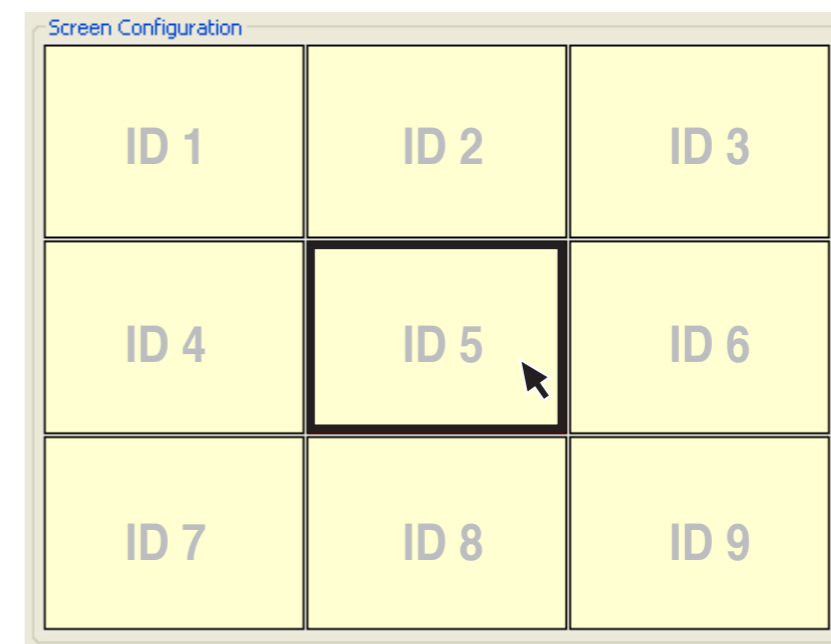


Caution

Please wait for at least 10 seconds before executing "Power On" command after the first AC power connection. If not, it may cause abnormal behavior. Please disconnect AC power and reconnect in case of abnormal behavior.

5.7. ID Setting

- ID of MSCS(Multi Screen Control System) is set automatically.



Example of MPDP ID Setting
(Input signal is DVI, Configuration is 3 by 3)

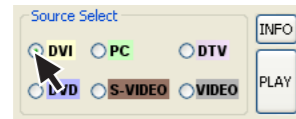
- To send a command to the desired MPDP set, select ID of the MPDP from Screen Configuration.
- Select ID using right button of mouse. Selected ID is displayed with red square box.

5.8. Configuration of various modes

- You can configure various input sources as you want.

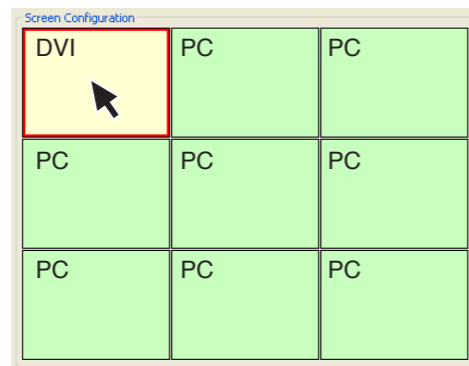
1 Select a desirable input Source in "Source Select"

– Ex) Select "DVI" in "Source Select"



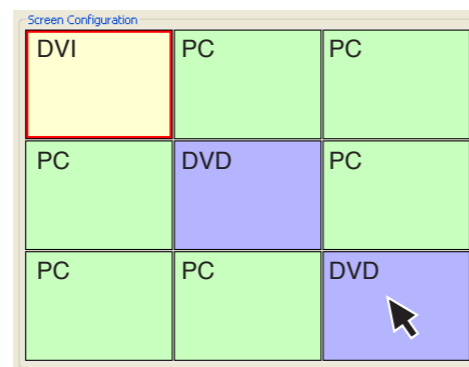
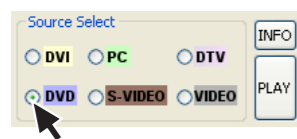
2 Click desirable screen with left button of mouse then the screen would be converted into DVI.

– Click the left mouse button on the screen that you want to change. Screen will be turned into DVI input screen.



3 You can configure other screens in the same way.

– Selected screen would be converted into DVD.

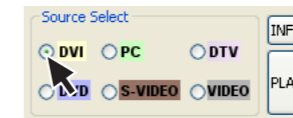


5.9. Setting multi screens at a time

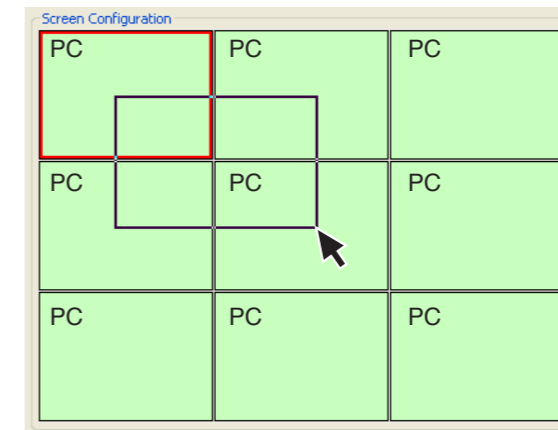
- You can select multi screens at a time as you want.

1 Select a desirable input source in "Source Select"

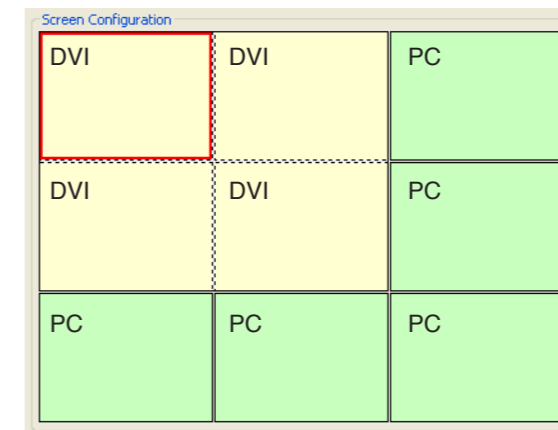
– Select "DVI" in "Source Select".



2 Select screens with left button of mouse and drag from the first screen.

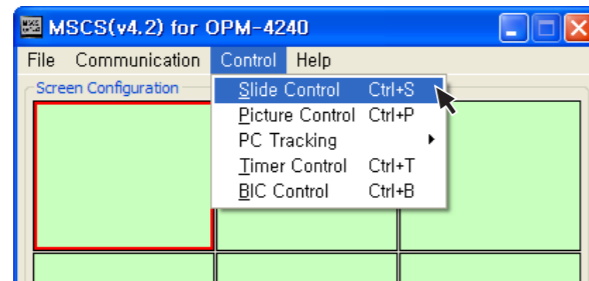


3 Selected screens would be converted into DVI.

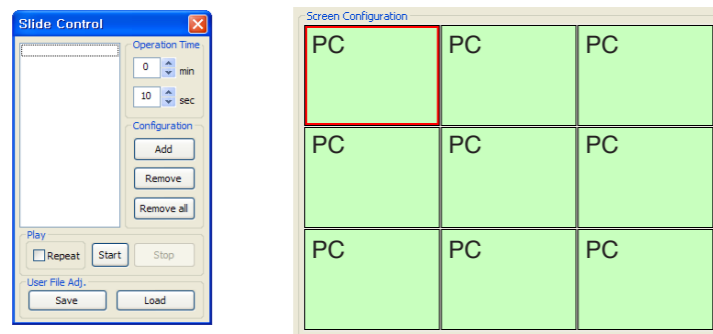


5.10. Slide Control

- MPDP configuration that users set is displaying repeatedly.
- To use Slide Control, go to MSCS Menu → Control → Slide Control or press "Ctrl+S" using Keyboard.

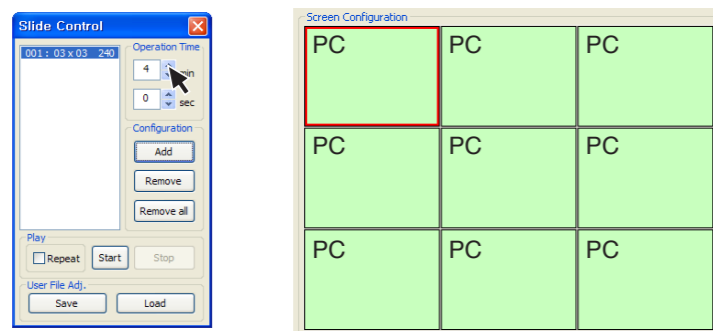


1 Make a desirable configuration in "Screen Configurations"

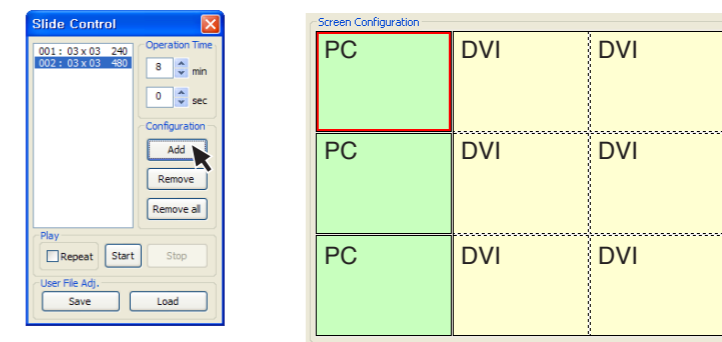


2 Set "Operation Time" in "Slide Control"

- Click "Add" button to save configuration.
- The range of "Operation Time" is from 10 seconds to 1 hour.

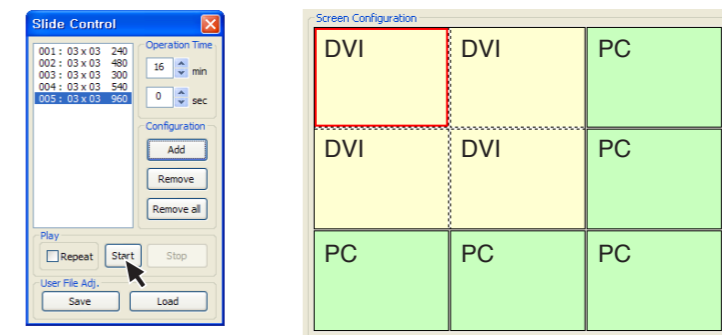


3 Save various screen configurations in the same way.

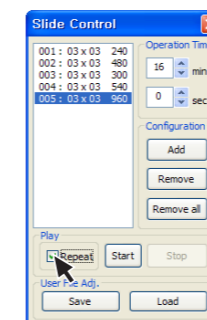


4 Click "Slide Start" to display saved screen configurations.

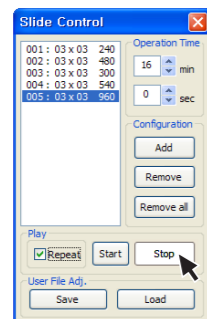
- Saved screen configurations are displaying for preset time.



5 Check "Repeat" to display saved configuration repeatedly.

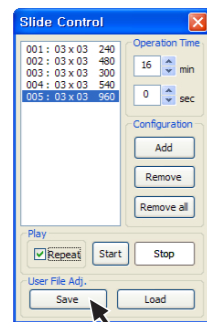


6 Click "Stop" button to end "Slide Control"



7 Save or Load the slide configuration

- Click "SAVE" button to save user added Slide configuration as "*.ssd" file.
- Click "LOAD" button to open saved "*.ssd" file.

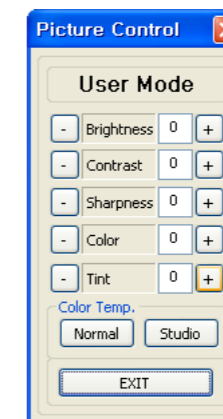
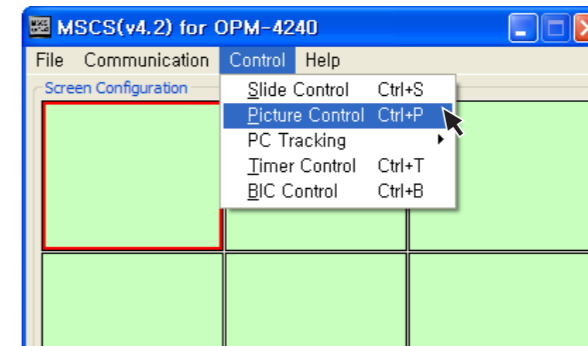


Caution When you load "Slide File", previous slide configuration and new slide configuration must be identical. If they are different, the file cannot be loaded. So, revise the new slide file configuration as previous configuration or save as new file.

- ※ To view the saved screen configuration, select the list from "List Box."
- ※ Saved screen protocol is transmitted to MPDP by double clicking the list.

5.11. Screen Control

- Register values related to display of MPDP can be changed.
- Click "Picture Control" of "Control" menu bar or enter "Ctrl+P" in order to run "Picture Control" window.

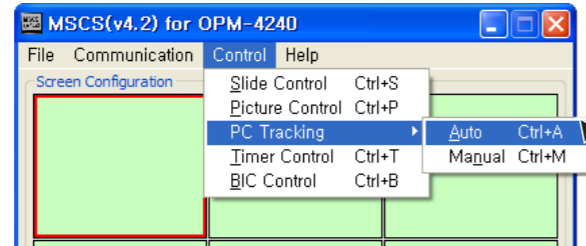


Picture Control

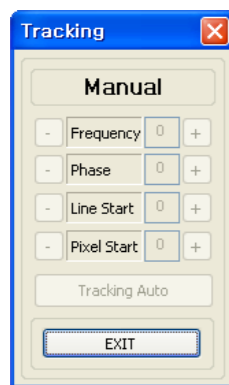
- In order to control display values, input values directly in "Edit Box" and press Enter key. Or click -/+ button using mouse.
- Click "Exit" button or press "Ctrl+X" using keyboard to close "Picture Control" window.
- Color Temp.
 - Normal : Initial setting. Proper for normal video image view.
 - Studio : Low Color temperature. Proper for broadcasting purpose.

5.12. PC Tracking

- Alignment adjustment is available when input source is PC.



- Go to "Control" in menu bar → PC Tracking → Auto in order to run "Tracking Auto" window.



Tracking Manual Window

- In case alignment doesn't work through "Tracking Auto" command, users can tune finely through "Tracking Manual". Go to "Control" of menu bar → PC Tracking → Manual or press "Ctrl+M" using keyboard.
- "Tracking Manual" window enables users to set Frequency, Phase, LineStart and PixelStart.
- When "Tracking Manual" window is on display, users cannot display "Picture Control" window.
- Even when "Tracking Manual" window is on display, selecting 'ID' is available by clicking right button of mouse. (Refer to "5.5 PDP ID Setting".)

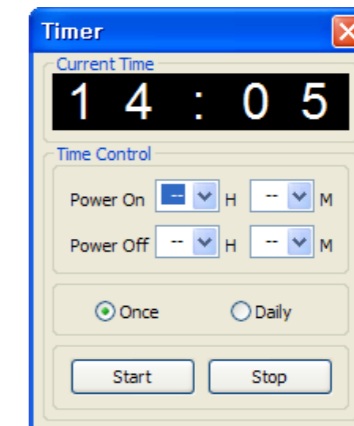
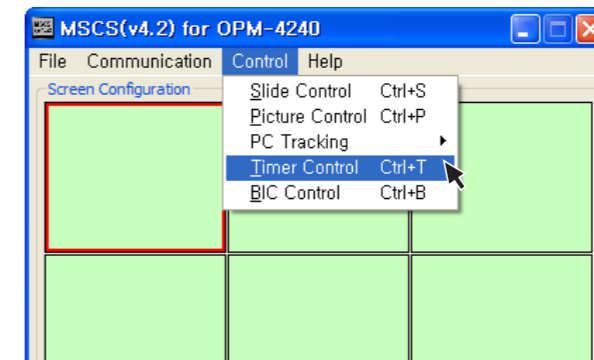
- Detail adjustment steps are as follows.

- 1) Tune "Phase" until the vertical lines are clearly adjusted..
- 2) Tune "LineStart" to adjust vertical alignment. "PixelStart" for horizontal alignment.
- 3) Adjust "Frequency" if alignment is still wrong.
If you adjust "Frequency", repeat step 1) and 2) to fit alignment.
Adjustable range is as follows
 - The range of "Frequency" you can adjust is -50 to 50
 - The range of "Phase" you can adjust is 0 to 31
 - The range of "Linestart" you can adjust is -23 to 10
 - The range of "Pixelstart" you can adjust is -50 to 40

- Click "Exit" button or press "Ctrl+X" using keyboard to close "Tracking Manual" window.

5.13. Timer Control

- Users can decide the time of turning on or off MPDP set by timer control.
- To use this function, click Menu → Control → Timer Control or use 'Ctrl +T' keys from the keyboard.

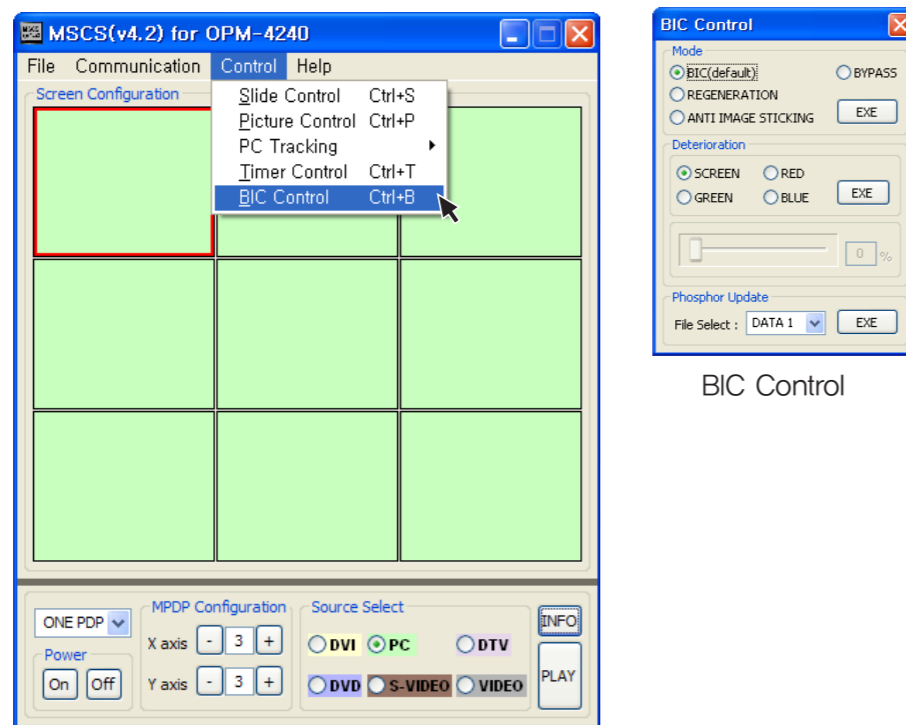


Timer Control Dialog

- How to set the time of power on or off.
 - I. Select Hour and Minutes of turn on or off
 - II. Select once for one time use and Daily for daily use, then click 'Start'
 - III. Power on or off signal will be transmitted to MPDP at the time of user set.
- Time Dialog must be activated to use Timer function

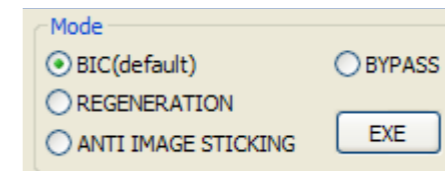
5.14. BIC Control

- You can control BIC functions related with burn-in compensation.
- Please select "Menu → Control → BIC Control" or "Ctrl+B" to start BIC control.



BIC Control

- Select one of BIC mode, BYPASS mode, REGENERATION mode and ANTI IMAGE STICKING mode and click "EXE" to control Burn-in compensation function.



1. BIC On/Off

- 1) **BIC Mode:**
Activate BIC function to reduce burn-in effect. (BIC function On)
- 2) **BYPASS Mode:**
Deactivate BIC function, but BIC board keeps recording burn-in history.(BIC function Off)

2. Additional compensation

- 1) **REGENERATION Mode:**
Compensate burn-in effect by displaying a reversal image of the current burn-in image.
- 2) **ANTI IMAGE STICKING Mode :**
In case you find serious Burn-in effect in a certain area, select "Anti Image Sticking Mode," White Stripe pattern scans whole screen to make uniform screen condition to eliminate unequally burned pixels.



White bar pattern in the screen moves horizontally.

Precaution for MVP device

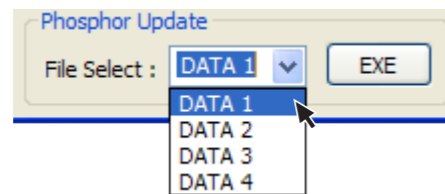
* MVP devices can be used with APL off mode and it can be selected by MSCS control.
When APL is turned off, brightness is slightly decreased.

MVP (Multi Video Processor) device?

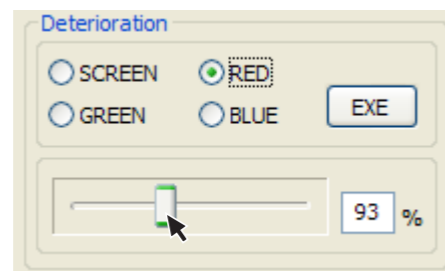
It is a multi channel image processing system using digital signal processing methods. It converts analog composite videos to digital format, save in a memory and process the saved image data without any frame loss and image deterioration to communicate with a computer.

※ For more information for APL, please contact with the dealers or agent where you purchased the MPDP.

- Phosphor Update function changes phosphor value.
If you cannot have satisfactory compensation result by adjusting Deterioration function, you can change phosphor value.



- Deterioration function adjusts deterioration range for Red, Green and Blue respectively.
 - Set up Test pattern—Red, Green, Blue and "SCREEN" external image source, to control Deterioration.
 - Adjust Deterioration range for Red, Green and Blue respectively.
Adjustable range is 70% to 130% and initial value is 100%.
In case surrounding pixels are brighter than burn-in image, increase the present value and surrounding pixels are darker, decrease the value.



← Lower luminescence. Higher luminescence. →
Activation status between 70% ~ 130%

BIC status Indicator

Red: Malfunction, a small red square continuously blinks at the lower right corner of the screen.
Green: Normal, a small green square blinks several times and disappears at the same position.
Yellow: BIC related events such as Update, a small yellow square continuously blinks at the same position.

※ Caution

- Screen may fade in and out when power on. It is a process of BIC initial update.
It is not a malfunction of MPDP.
- Do not use BIC function during moving images. (BYPASS MODE)
- Brightness can be decreased for burn-in compensation.

Burn-In-Compensation Control Method

- User can select a color (Red, Green or Blue) for compensation from Deterioration Menu in the BIC Control menu.
- When you find disturbing Burn-in effect on your screen, please select a proper value from Data 1, Data 2, Data 3 and Data 4 in the phosphor change option and execute. (It takes 1 ~2 seconds)
Please select Data 1 when Burn-in pattern is brighter than surrounding screen area and select Data 4 for darker Burn-in pattern than surrounding screen area
- If the selected value does not cause enough compensation result, repeat above process up to 4 times, and select the most satisfactory value and fix the value.
- If the compensation result is still not good enough, you can fine tune Red, Green and Blue colors one by one in Deterioration Menu
- Please control Green, Blue and Red sequentially.
Initial value is set as 100% and it can be controlled within the range of 70% ~ 130%.
- In case of Burn-in pattern is brighter than surrounding area, select lower value (under 100%) and higher value (over 100%) for darker Burn-in pattern.
(Please find optimal value through changing the value by 10 %)
- Sequentially control Red, Green, and Blue, examine the result with white pattern and repeat the process.
- If you do not have satisfactory result after repeating above process, please change the value of Green, Red and Blue by 1% until you can find the best result.
- In case, the compensation result is still unsatisfactory, REGENERATION Mode and ANTI IMAGE STICKING Mode may be applied for better result.
- Adjusting White Balance after BIC control process may improve compensation result.

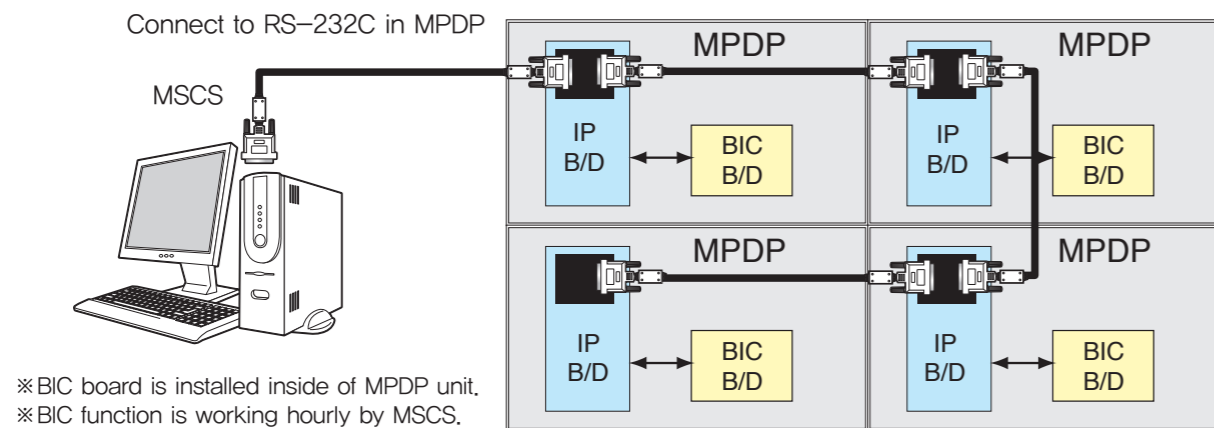
BIC Intervals and effect

Burn-In-Compensation function is executed automatically. However, the level of burn-in effect may vary due to input sources and display period.
In case, you can notice disturbing level of visual burn-in effect, we recommend to execute additional compensation functions.
It is very effective to execute such compensation after 3months of daily 24hour use.
If you do compensation prior to 3 months, the compensation result may be less effective.
If you have any questions or need further information, please contact us or the dealers where you purchased the product.

How to Control BIC

1.MSCS

- 1) MSCS and MPDP must be always connected.
- 2) If MSCS command is executed prior to the BIC command, the BIC command will be executed again one hour later.
- 3) Turn off the energy save mode of the computer.
- 4) The compensation for undesirable burn-in effect is made automatically when BIC function is executed. If the compensation result is not satisfactory, use additional Burn-in compensation function in MSCS. (Please see page 39 for further information.)

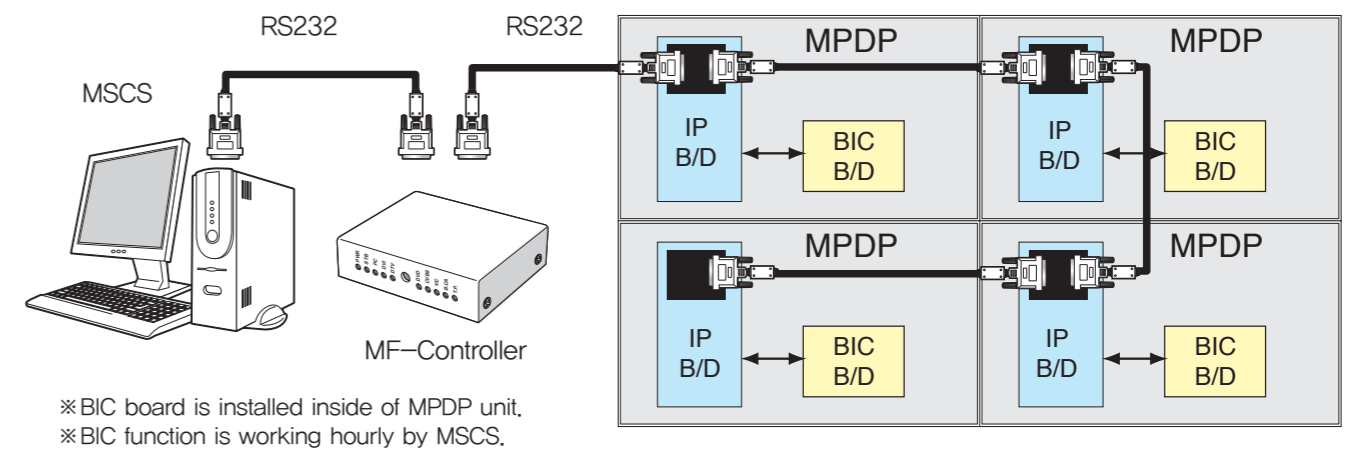


2.The other control program (beside MSCS)

Refer to BIC protocol and program guide to insert BIC control program into the MPDP control program.

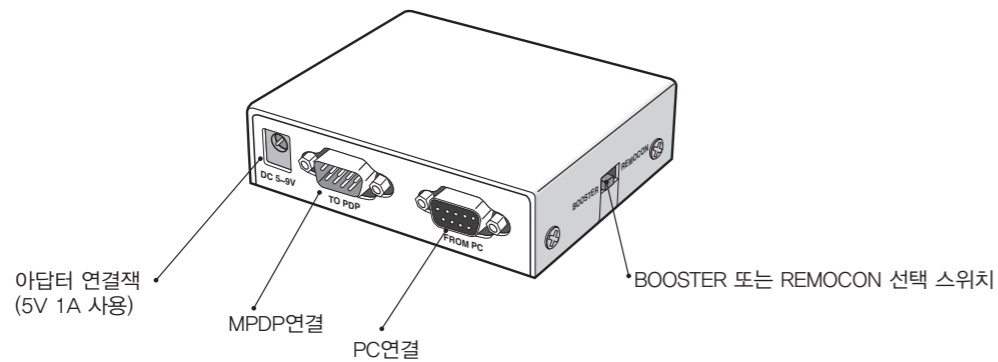
3. MF-Controller

- 1) If you want to use the other MPDP control program beside MSCS and you cannot integrate BIC control program into the MPDP control program, you can use MF-Controller.
- 2) The numbers of MPDP units should be set by MF-Controller.
- 3) The MF-Controller connected to MPDP must be always turned on.
- 4) During BIC function is being executed, all the commands are ignored. Even the remote controller is not responding. If BIC command is given during the command from MF-Controller is being executed, the BIC command will be executed one hour later.
- 5) Please refer to the next page for MF Controller configuration.

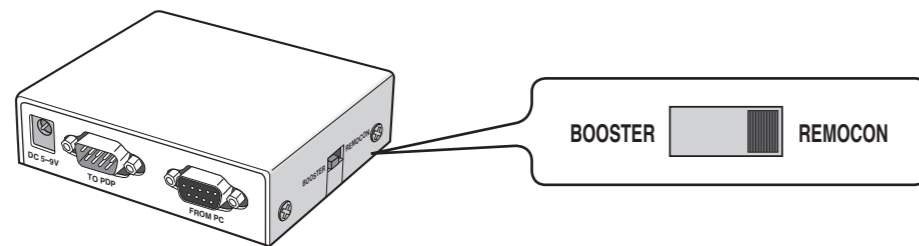


MF-Controller configuration method

1. Connect power.
2. Connect female D-sub to the Com port in a computer.
3. Connect male D-sub to the RS-232C port in MPDP.



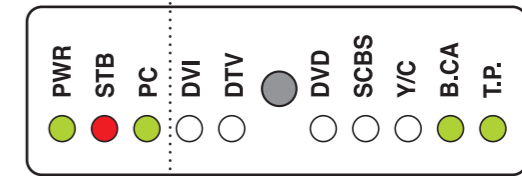
4. Set the number of the connected MPDP units in advance. The number can be set only by the Remote controller.
5. Set the switch at REMOCON side



※ Note

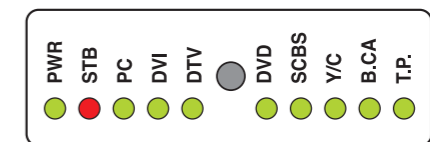
Select BOOSTER for a booster and BIC functions.
 Select REMOCON for a remote controller and BIC functions.

6. Start with press "GO" button.
7. Configure the number of horizontally installed MPDP units at first.
 Press "LEFT" and "RIGHT" buttons to begin horizontal configuration. (◀ ▶)

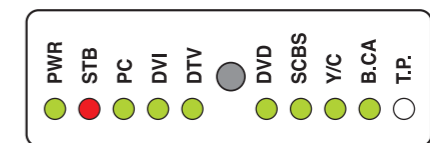


Horizontal & Vertical configuration

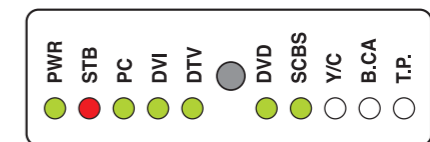
The LEDs are turned on one by one from the rightmost as the number increases from 1 to 7 and turned off from the rightmost for the number 8 or higher.



Horizontal configuration 7sets

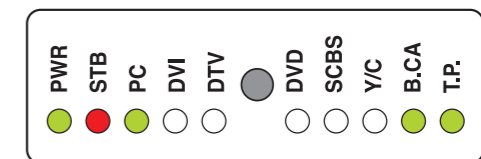
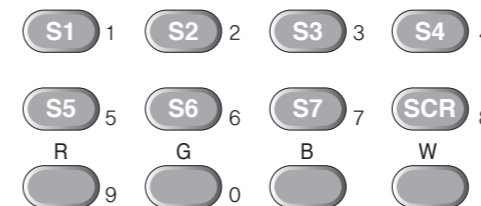


Horizontal configuration 8sets



Horizontal configuration 10sets

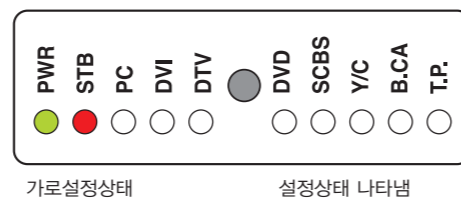
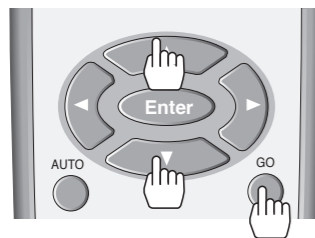
Press the button for the number of the MPDP units and the same number of LEDs are turned on from the right side. (In case of 2X2, press **S2** button.)



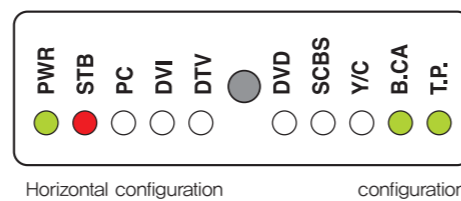
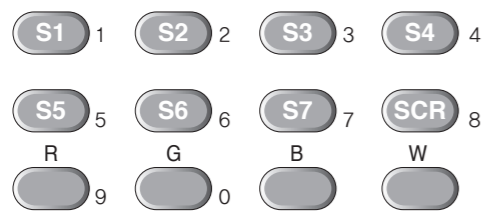
가로설정상태 설정상태 나타냄

2sets are selected.

8. Press "UP" and "DOWN" buttons to begin vertical configuration.(▲▼)

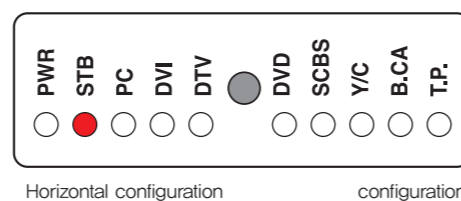
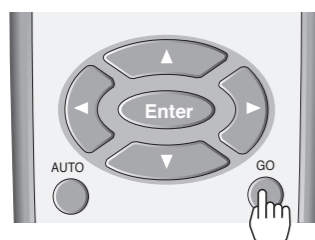


Press the button for the number of the MPDP units and the same number of LEDs are turned on from the right side. (In case of 2X2, press **S2** button.)

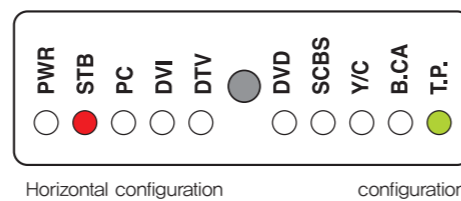


2sets are selected.

9. Press "GO" button to finish configuration mode. (Configuration finish & save)

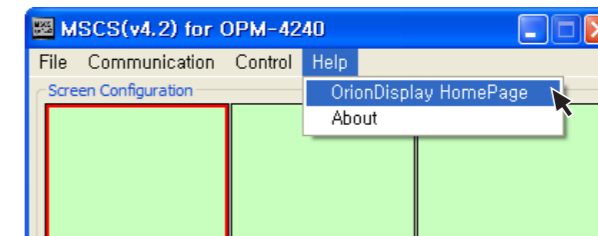


10. The rightmost LED (T.P.) is turned on when MF Controller starts BIC communication. If this LED blinks, there are some communication errors. The LED is turned off after the communication.



5.15. Orion PDP Home Page logon and Version information

• In order to move to Orion PDP's website, go to "Help" of menu bar → "OrionDisplay HomePage".



Orion PDP Home Page Logon

• Go to "Help" of menu bar → "About" to check MSCS.

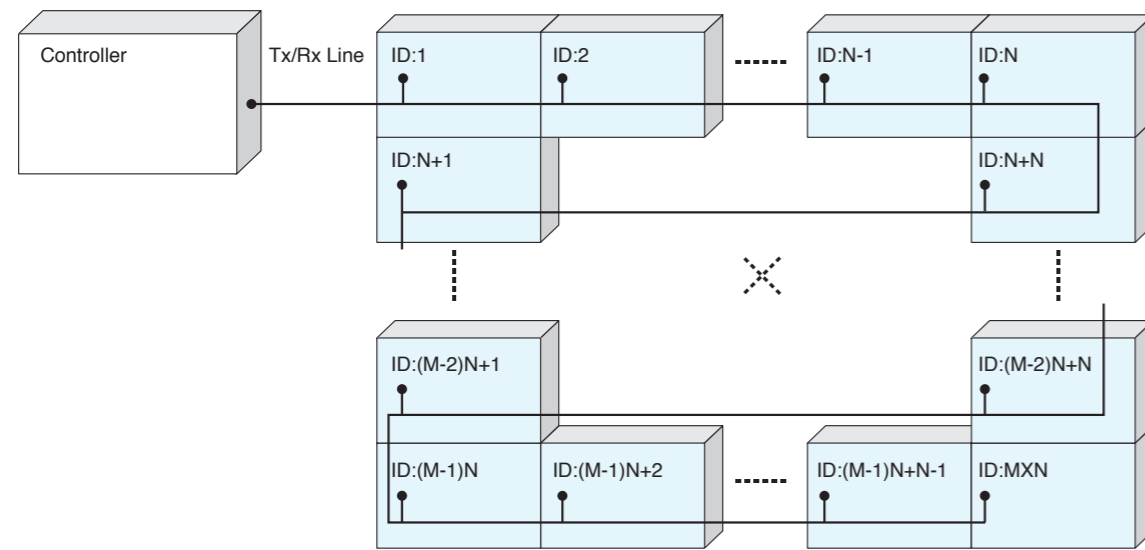


Checking MSCS Version

6. MSCS Protocol

1. Introduction

This document contains the communication protocol between PDP and its control devices such as computer for better use of the product. However, it does not include detailed technical matters. It rather focuses on the brief functional explanation and communication protocol.



* Connection formation can be vary based on the configuration or user setting.
<Communication connection diagram>

1.1. Communication Setting

- Transmission & Reception type: Asynchronous Serial Communication
- Connection type: Daisy Chain
- Baudrate : 115200
- Data Bits : 8
- Parity : None
- Stop Bits : 1
- Flow Control : None

2. Protocol Format

2.1. Send To PDP

| STX | Command | Length | Data | ETX |
|--------|---------|--------|----------|--------|
| 1 byte | 1 byte | 1 byte | Variable | 1 byte |

| ID | Other Data |
|--------|------------|
| 1 byte | N byte |

- This is how to send commands to PDP. Only the set of the designated ID is working according to the "Command." But, if the "ID" value is "0", all MPDP sets are working according to command as "Broad Cast".
- STX(0x02): The initial code. It means the beginning of Protocol. (Fixed value)
- Command: Code for actual operation. (Variable)
- Length: the length of "Data" area. (Variable: 0~255)
- Data: the areas for "ID" and the other Data (Variable)
- ID: Set identification (0~255) (Variable)
- ETX(0x03): The end of the code. (Fixed value)

2.2. Receive From PDP

| STX | CMD | Length | Data | Check Sum | ETX |
|--------|--------|--------|----------|-----------|--------|
| 1 byte | 1 byte | 1 byte | Variable | 1 byte | 1 byte |

| ID | Other Data |
|--------|------------|
| 1 byte | N byte |

- Response by a certain command from the designated set among MPDP sets. The difference from "Send to PDP" is "Check sum".
- STX(0x02): The initial code. It means the beginning of Protocol. (Fixed value)
- Command: Code for actual operation. (Variable)
- Length: the length of "Data" area. (Variable: 0~255)
- Data: the areas for "ID" and the other Data (Variable)
- ID: Set identification (0~255) (Variable)
- Check Sum: Add all the values in "Data" area. Then perform "NOT" operation. (Variables)
- ETX(0x03): The end of the code. (Fixed value)

3. Command

3.1. Power On

- Power On command for MPDP
- Command Code: 0x40
- One way communication (Send to PDP)
- Data: ID(1 byte)
- E.g.) Power On Condition for MPDP ID No.1 set

| | STX | CMD | Length | ID | ETX |
|-------|------|------|--------|------|------|
| Value | 0x02 | 0x40 | 0x01 | 0x01 | 0x03 |

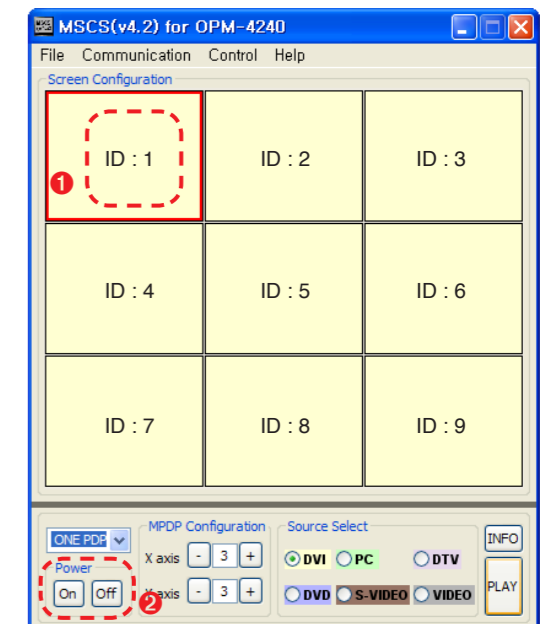
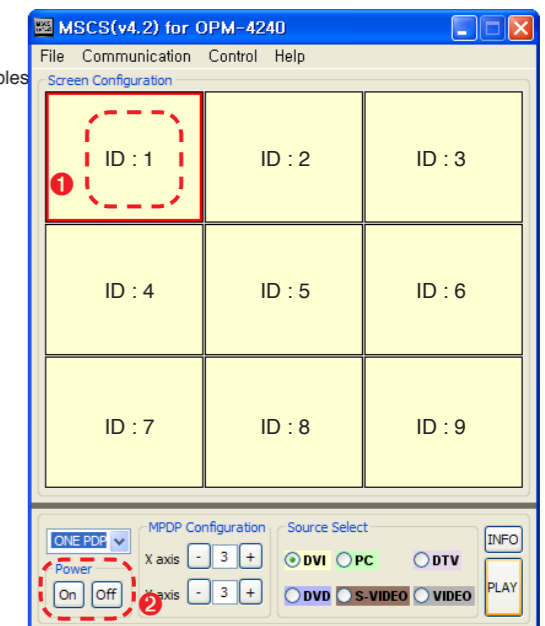
1. Click the right button of the mouse to select desired set
2. Select ONE PDP and click "On"

3.2. Power Off

- Power off command for MPDP
- PDP will be turn into "Stand-by" mode after execute this command
- Command Code: 0x41
- One way communication (Send to PDP)
- Data: ID(1 byte)
- E.g.) Power Off Condition for MPDP ID No.1 set

| | STX | CMD | Length | ID | ETX |
|-------|------|------|--------|------|------|
| Value | 0x02 | 0x41 | 0x01 | 0x01 | 0x03 |

1. Click the right button of the mouse to select desired set
2. Select ONE PDP and click "Off"

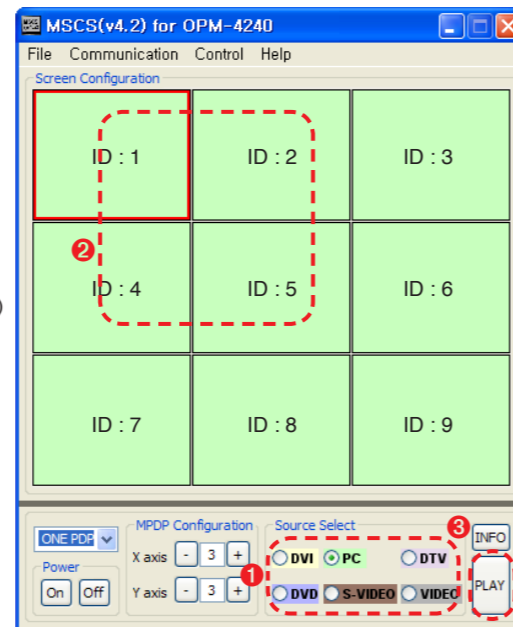


3.3. Multi-Scale

- Screen expansion command for MPDP
- Command Code
0xDD (DVI), 0xDE (PC), 0xDF (DTV), 0xE0 (DVD), 0xE1 (S-Video), 0xE2 (Video)
- One way communication (Send to PDP)
- Data: ID (1 byte) + X/Y (1 byte) + P (1 byte)
- X: the number of horizontally installed MPDP
- Y: the number of vertically installed MPDP
- P: the location of expanded scale
X/Y: upper position 4bits - X (Max: 15), lower position 4bits - Y (Max: 15)
e.g.) 0x44 for 4 x 4 screens, 0xFF for 15 x 15 screens
- e.g.) Screen expansion condition of 2x2 among 3x3 MPDP 3 sets. (Input-Source - DVI)

| | STX | CMD | Length | ID | X/Y | P | ETX |
|-------|------|------|--------|------|------|------|------|
| Value | 0x02 | 0xDD | 0x03 | 0x01 | 0x22 | 0x01 | 0x03 |
| Value | 0x02 | 0xDD | 0x03 | 0x02 | 0x22 | 0x02 | 0x03 |
| Value | 0x02 | 0xDD | 0x03 | 0x04 | 0x22 | 0x03 | 0x03 |
| Value | 0x02 | 0xDD | 0x03 | 0x05 | 0x22 | 0x04 | 0x03 |

1. Select "DVI" from "Source Select"
2. Drag 2x2 by mouse
※ In case execute "①" → "②" or
Play "①" → "③", all MPDP sets are turned into 1:1 screen.
- "X/Y" value is 0x22, "P" value is "0x01"

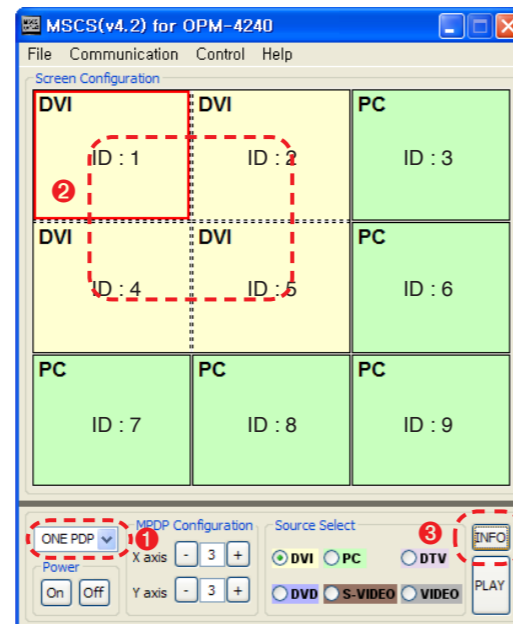


3.4. Information

- Information display command for set (Input source and Resolution)
- The information will be displayed on the selected PDP after this command. (OSD display)
- Command Code: 0x42
- One way communication (Send to PDP)
- Data: ID (1 byte)
- e.g.) Set information check for MPDP ID No.1

| | STX | CMD | Length | ID | ETX |
|-------|------|------|--------|------|------|
| Value | 0x02 | 0x42 | 0x01 | 0x01 | 0x03 |

1. Select desired set by clicking the right button of the mouse.
 2. Select ONE PDP and Click "INFO" on the right side
※ If you need to check the all MPDP sets, select ALL PDP at the step "①" and execute step "②"
- Execute Broad Cast with the "ID" area value of "0x00"



3.5. Auto-Power Mode

- The command for set or cancel automatic power on when AC power is connected
- Command Code: 0x62 (Set), 0x63 (Cancel)
- One way communication (Send to PDP)
- Data: ID (1 byte)
- e.g.) Set or Cancel Auto Power mode for the ID No. 1 MPDP

| | STX | CMD | Length | ID | ETX | STX | CMD | Length | ID | ETX |
|-------|------|------|--------|------|------|------|------|--------|------|------|
| Value | 0x02 | 0x62 | 0x01 | 0x01 | 0x03 | 0x02 | 0x63 | 0x01 | 0x01 | 0x03 |

※ If you need to set or cancel Auto Power Mode for all MPDP, set the value of ID area as "0x00".

3.6. Global Offset

- Command for removing the image data of the seam area (set) for better continuous image or displaying the image data of the seam area (cancel).
- Command Code: 0x74 (Set), 0x73 (Cancel)
- One way communication (Send to PDP)
- Data: ID (1 byte)
- e.g.) Set or cancel Global Offset command for MPDP ID No.

| | STX | CMD | Length | ID | ETX | STX | CMD | Length | ID | ETX |
|-------|------|------|--------|------|------|------|------|--------|------|------|
| Value | 0x02 | 0x74 | 0x01 | 0x01 | 0x03 | 0x02 | 0x73 | 0x01 | 0x01 | 0x03 |

※ If you need to set or cancel Global Offset Mode for all MPDP, set the value of ID area as "0x00".

3.7. Test Pattern

- Command for check the set condition with the internal test pattern.
- Command Code: 0x57 (Red), 0x58 (Green), 0x59 (Blue), 0x5A (White), 0x5B (Screen)
- To return to main screen: 0x5B
- One way communication (Send to PDP)
- Data: ID (1 byte)
- e.g.) Set or cancel White Test Pattern for MPDP ID No. 1

| | STX | CMD | Length | ID | ETX | STX | CMD | Length | ID | ETX |
|-------|------|------|--------|------|------|------|------|--------|------|------|
| Value | 0x02 | 0x5A | 0x01 | 0x01 | 0x03 | 0x02 | 0x5B | 0x01 | 0x01 | 0x03 |

※ If you need to set or cancel Test Pattern for all MPDP, set the value of ID area as "0x00".

3.8. Position

- Command for moving screen position of Component (DTV, DVD), Composite (Video), and S-Video image input.
- Command Code: 0x6E (Up), 0x6F (Down), 0x70 (Left), 0x71 (Right), 0x72 (Center)
- Data: ID (1 byte)
- e.g.) Move to the left side or cancel for MPDP ID No.1

| | STX | CMD | Length | ID | ETX | STX | CMD | Length | ID | ETX |
|-------|------|------|--------|------|------|------|------|--------|------|------|
| Value | 0x02 | 0x70 | 0x01 | 0x01 | 0x03 | 0x02 | 0x72 | 0x01 | 0x01 | 0x03 |

※ If you want to set the position of all MPDP, set the value of ID area as "0x00".

3.9. Tracking Mode

- Automatic or Manual screen alignment or open previous configuration at PC RGB Mode.
- Command Code: 0x4A (Auto-tracking), 0x4B (Get Tracking Values), 0x4C (Frequency-tracking), 0x4D (Phase-tracking), 0x4E (Line-Start tracking), 0x4F (Pixel-Start tracking)
- Protocol format for each command
:Get Tracking Values - Two way communication (Send to PDP, Receive from PDP)

① Send to PDP

| STX | CMD | Length | ID | ETX |
|--------|--------|--------|--------|--------|
| 1 byte | 1 byte | 1 byte | 1 byte | 1 byte |

- Data: ID(1 byte)

② Receive From PDP

| STX | CMD | Length | Data | Check Sum | ETX |
|--------|--------|--------|--------|-----------|--------|
| 1 byte | 1 byte | 1 byte | 5 byte | 1 byte | 1 byte |

- Data: ID(1 byte) + Frequency(1 byte) + Phase(1 byte) + LineStart(1 byte) + PixelStart(1 byte)
- Check Sum: Add all the values in "Data" area. Then perform "NOT" operation.
- : Auto-tracking - One way communication (Send to PDP)

| STX | CMD | Length | Data | ETX |
|--------|--------|--------|--------|--------|
| 1 byte | 1 byte | 1 byte | 1 byte | 1 byte |

- Data: ID (1 byte)

- If you want to execute Auto-tracking for all MPDP, set the value of ID area as "0x00".
- : Frequency-tracking - One way communication (Send to PDP)

| STX | CMD | Length | Data | ETX |
|--------|--------|--------|--------|--------|
| 1 byte | 1 byte | 1 byte | 2 byte | 1 byte |

- Data: ID(1 byte) + Frequency(1 byte)

- If you want to execute Frequency-tracking for all MPDP, set the value of ID area as "0x00".
- : Phase-tracking - One way communication (Send to PDP)

| STX | CMD | Length | Data | ETX |
|--------|--------|--------|--------|--------|
| 1 byte | 1 byte | 1 byte | 2 byte | 1 byte |

- Data: ID(1 byte) + Phase (1 byte)

- If you want to execute Phase-tracking for all MPDP, set the value of ID area as "0x00".
- : LineStart - tracking - One way communication (Send to PDP)

| STX | CMD | Length | Data | ETX |
|--------|--------|--------|--------|--------|
| 1 byte | 1 byte | 1 byte | 2 byte | 1 byte |

- Data: ID(1 byte) + LineStart (1 byte)

- If you want to execute LineStart-tracking for all MPDP, set the value of ID area as "0x00".
- : PixelStart-tracking - One way communication (Send to PDP)

| STX | CMD | Length | Data | ETX |
|--------|--------|--------|--------|--------|
| 1 byte | 1 byte | 1 byte | 2 byte | 1 byte |

- Data: ID(1 byte) + PixelStart (1 byte)

- If you want to execute PixelStart-tracking for all MPDP, set the value of ID area as "0x00".

3.10. Input Mode Change

- This can be used for additional input mode change.
- Command Code: 0x44 (DVI), 0x45 (PC), 0x46 (DTV), 0x47 (DVD), 0x48 (S-Video), 0x49 (Video)
- One way communication (Send to PDP)
- Data: ID (1 byte)
- e.g.) ID No.1: Mode change for DVI, ID No. 2: Video

| | STX | CMD | Length | ID | ETX | STX | CMD | Length | ID | ETX |
|-------|------|------|--------|------|------|------|------|--------|------|------|
| Value | 0x02 | 0x44 | 0x01 | 0x01 | 0x03 | 0x02 | 0x49 | 0x01 | 0x02 | 0x03 |

※ If you want to set the same input mode for all MPDP, set the value of ID area as "0x00".

3.11. APL Control

- APL On/Soft/Off
- Command Code: 0x54 (APL On), 0x55 (APL Soft), 0x56 (APL Off)
- One way communication (Send to PDP)
- Data: ID (1byte)
- e.g.) APL On after APL off of MPDP ID No.1

| | STX | CMD | Length | ID | ETX | STX | CMD | Length | ID | ETX |
|-------|------|------|--------|------|------|------|------|--------|------|------|
| Value | 0x02 | 0x56 | 0x01 | 0x01 | 0x03 | 0x02 | 0x54 | 0x01 | 0x02 | 0x03 |

※ If you want to set the same APL status for all MPDP, set the value of ID area as "0x00".

3.12. Video Zoom Control

- Default level of Video Zoom is "5", and can be set for "1" to "9".
- Command Code: 0x6D
- One way communication (Send to PDP)
- Data: ID (1byte) + Zoom (1 byte)
- e.g.) 9 times Zoom for MPDP ID No. 1

| | STX | CMD | Length | Data | ETX |
|-------|------|------|--------|-----------|------|
| Value | 0x02 | 0x6D | 0x02 | 0x01 0x09 | 0x03 |

※ If you want to apply the same Video zoom level for all MPDP, set the value of ID area as "0x00".

3.13. Color Temperature

- Normal mode 9300k, Studio mode 3600k
- Generally, Normal mode is recommended. Studio mode is suitable for broadcasting. (Default: Normal mode)
- Command Code: 0xB3 (Normal), 0xB4 (Studio: broadcasting)
- One way communication (Send to PDP)
- Data: ID (1 byte)
- e.g.) Mode change from Studio mode to Normal mode for MPDP ID No.1

| | STX | CMD | Length | ID | ETX | STX | CMD | Length | ID | ETX |
|-------|------|------|--------|------|------|------|------|--------|------|------|
| Value | 0x02 | 0xB4 | 0x01 | 0x01 | 0x03 | 0x02 | 0xB3 | 0x01 | 0x01 | 0x03 |

※ If you want to have the same color temperature for all MPDP, set the value of ID area as "0x00".

3.14. Elapsed Time

- Command for finding out how long the set was actually used.
- Command code: 0x78
- Protocol Format: - two way communication (Send to PDP, Receive from PDP)
- * Send to PDP

| STX | CMD | Length | ID | ETX |
|--------|--------|--------|--------|--------|
| 1 byte | 1 byte | 1 byte | 1 byte | 1 byte |

- Data: ID(1 byte)
- * Receive From PDP

| STX | CMD | Length | Data | Check Sum | ETX |
|--------|--------|--------|--------|-----------|--------|
| 1 byte | 1 byte | 1 byte | 7 byte | 1 byte | 1 byte |

- Data: ID(1 byte) + Elapsed Time Data(5 byte)
- Elapsed Time Data
Data 0: position for hundred thousand, Data 1: position for ten thousand
Data 2: position for thousand, Data 3: position for hundred
Data4: position for ten, Data5: position for one
- Check sum: Add all the values in "Data" area. Then perform "NOT" operation.

3.15. IP Serial Number

- Apply serial number of IP board to each set and identify the number again.
- Command Code: 0x75 (Get S/N), 0x76 (Set S/N)
- Protocol Format for each command
- ① Get Serial Number – Two way communication (Send to PDP, Receive From PDP)
- * Send to PDP

| STX | CMD | Length | ID | ETX |
|--------|--------|--------|--------|--------|
| 1 byte | 1 byte | 1 byte | 1 byte | 1 byte |

- Data: ID(1 byte)
- * Receive From PDP

| STX | CMD | Length | Data | Check Sum | ETX |
|--------|--------|--------|--------|-----------|------|
| 1 byte | 1 byte | 1 byte | 9 byte | 1 byte | byte |

- Data: ID(1 byte) + S/N(8 byte)
- Check Sum: Add all the values in "Data" area. Then perform "NOT" operation.

- ② Set Serial Number – One way communication (Send to PDP)

| STX | CMD | Length | Data | ETX |
|--------|--------|--------|--------|--------|
| 1 byte | 1 byte | 1 byte | 1 byte | 1 byte |

- Data: ID(1 byte) + S/N(8 byte)

3.16. Auto-Calibration

- Adjust ADC Gain and Offset at 100% 8 -Color input. It is available only with PC, DTV and DVD input modes.
- Caution: This command is available only with PC, DTV and DVD input modes at 100% 8 -Color input signal.
- Command Code: 0x80
- One way communication (Send to PDP)
- Data: ID (1 byte)
- e.g.) Auto-Calibration for MPDP ID No. 1

| | STX | CMD | Length | ID | ETX |
|-------|------|------|--------|------|------|
| Value | 0x02 | 0x80 | 0x01 | 0x01 | 0x03 |

※ If you want to execute Auto-Calibration for all MPDP, set the value of ID area as "0x00".

3.17. Default Data Load (Picture Control Data)

- Return every adjusted value to default values. All the built-in values are applied.
- Caution: Existing Picture Control Data will be lost with this command.
- Command Code: 0x81
- One way communication (Send to PDP)
- Data: ID (1 byte)
- e.g.) Execute Default Data Load for MPDP ID No. 1

| | STX | CMD | Length | ID | ETX |
|-------|------|------|--------|------|------|
| Value | 0x02 | 0x81 | 0x01 | 0x01 | 0x03 |

※ If you want to execute Default Data Load for all MPDP, set the value of ID area as "0x00".

3.18. BIC (Burn-In Compensation)

- The purpose of BIC function is reducing Burn-in effect. Please refer to detailed explanation and register for BIC document.
- Command Code: 0x6A
- Protocol Format

- 1. Set Data – One way communication (Send to PDP)

| STX | CMD | Length | Data | ETX |
|--------|--------|--------|--------|--------|
| 1 byte | 1 byte | 1 byte | n byte | 1 byte |

- Data

| Index | ID | Set Data Bit | Read/Write | Address | BIC Data |
|-------|----------|--------------|------------|----------|----------|
| Size | 1 byte | 1 byte | 1 byte | 1 byte | 4 byte |
| Value | Variable | 0x04 | 0x00 | Variable | Variable |

※ Set Data Bits: 8, 16, 32 bit setting area, Currently 32bit configuration is used.
(8 bit: 0x01, 16 bit: 0x02, 32bit: 0x04)

※ BIC data: According to "Set Data Bit" area configuration, Data length is vary.
(8 bit: 1byte, 16 bit: 2byte, 32bit: 4byte)

※ If you want to execute BIC command for all MPDP, set the value of ID area as "0x00".

- Length
: Length value is 0x08 for 32bit configuration.

※ Length value for "Set Data Bit" area configuration

| Length | 8bit | 16bit | 32bit |
|--------|------|-------|-------|
| | 0x05 | 0x06 | 0x08 |

- 2. Get Data – Two way communication (Send to PDP, Receive From PDP)

- * Send to PDP

| STX | CMD | Length | Data | ETX |
|--------|--------|--------|--------|--------|
| 1 byte | 1 byte | 1 byte | n byte | 1 byte |

- Data

| Index | ID | Set Data Bit | Read/Write | Address |
|-------|----------|--------------|------------|----------|
| Size | 1 byte | 1 byte | 1 byte | 1 byte |
| Value | Variable | 0x04 | 0x01 | Variable |

- Length
: Length value is 0x04, because currently only 32bit configuration is applied.

- * Receive From PDP

| STX | CMD | Length | Data | Check Sum | ETX |
|--------|--------|--------|--------|-----------|--------|
| 1 byte | 1 byte | 1 byte | n byte | 1 byte | 1 byte |

- Data

| Index | ID | Set Data Bit | Read/Write | Address | BIC Data |
|-------|----------|--------------|------------|----------|----------|
| Size | 1 byte | 1 byte | 1 byte | 1 byte | 4 byte |
| Value | Variable | 0x04 | 0x00 | Variable | Variable |

- Length

: Length value is 0x08, because currently only 32bit configuration is applied.

- Check Sum

: Add all the values in "Data" area. Then perform "NOT" operation.

3.19. Graphic User Mode Control

- Command for controlling Brightness, Contrast, Sharpness, Color and Tint by User

- Command Code

: 0x8A (Brightness), 0x8B (Contrast), 0x8C (Sharpness), 0x8D (Color), 0x8E (Tint)

- One way communication (Send to PDP)

- Data: ID(1 byte) + Control Data(1 byte)

- The range of Control Data value and Applicable Input Mode

* All Input Mode: Brightness ("0" ~ "100"), Contrast ("0" ~ "100"), and Sharpness ("0" ~ "28")

* DTV, DVD, S-Video, Vide Input Mode: Color ("0" ~ "100"), Tint ("0" ~ "90")

Caution: Adjusted value cannot be applied during "Stand-by" or "No signal" status. There must be input signal for each input mode to apply adjusted value, while MPDP is operated.

- e.g.) Adjust Brightness "47(0x2F)" for MPDP ID No.1

| | STX | CMD | Length | ID | Control Data | ETX |
|-------|------|------|--------|------|--------------|------|
| Value | 0x02 | 0x8A | 0x02 | 0x01 | 0x2F | 0x03 |

- If you want to apply the adjusted value for all MPDP, set the value of ID area as "0x00".

3.20. White Balance Control

- Command for controlling Gain R/G/B and Offset R/G/B of White Balance by user

- Command Code

: 0xAC (Gain R), 0xAD (Gain G), 0xAE (Gain B), 0xB0 (Offset R), 0xB1 (Offset G), 0xB2 (Offset B)

- One way communication (Send to PDP)

- Data: ID (1 byte) + Control Data (1 byte)

- The range of Control Data: "0 (0x00)" ~ "255 (0xFF)"

Caution 1: Although ID area value is set as "0x00" to apply the same value to all MPDP, White balance may not be adjusted due to the deviation between sets. So, individual White Balance adjustment is recommended.

Caution 2: Adjusted value cannot be applied during "Stand-by" or "No signal" status. There must be input signal for each input mode to apply adjusted value, while MPDP is operated.

- e.g.) Adjust Gain R "240(0xF0)" for MPDP ID No. 1

| | STX | CMD | Length | ID | Control Data | ETX |
|-------|------|------|--------|------|--------------|------|
| Value | 0x02 | 0xAC | 0x02 | 0x01 | 0xF0 | 0x03 |

3.21. RGB/DTV/DVD Data Control

- Command for adjust RGB value of PC input and Gain R/G/B and Offset R/G/B of Component input

- Command Code (PC RGB, DTV, DVD Identity)

: 0xB5 (Gain R), 0xB6 (Gain G), 0xB7 (Gain B), 0xB8 (Offset R), 0xB9 (Offset G), 0xBA (Offset B)

- One way communication (Send to PDP)

- Data: ID (1 byte) + Control Data (2 byte)

- Control Data

: Data Range : "0 (0x00)" ~ "1023 (0x3FF)"

: Control Data 0 (Upper Byte), Control Data 1 (Lower Byte)

Ex) 511(0x1FF) → Control Data0: 0x01, Control Data1: 0xFF

10(0x0A) → Control Data0: 0x00, Control Data1: 0x0A

Caution 1: Although ID area value is set as "0x00" to apply the same value to all MPDP, White balance may not be adjusted due to the deviation between sets. So, individual White Balance adjustment is recommended.

Caution 2: Adjusted value cannot be applied during "Stand-by" or "No signal" status. There must be input signal for each input mode to apply adjusted value, while MPDP is operated.

Caution 3: Input mode should be decided before execute this command. Since Command Code is used for PC, DTV and DVD commonly, execute Multi-Scale command or Input Mode Change Command to adjust value for the exact input mode.

- e.g.) Adjust Gain R "360(0x168)" of DTV Mode for MPDP ID No.1

| | STX | CMD | Length | ID | Control Data | ETX |
|-------|------|------|--------|------|--------------|------|
| Value | 0x02 | 0xB5 | 0x03 | 0x01 | 0x01 0x68 | 0x03 |

- e.g.) Adjust Offset R "500(0x1F4)" of PC Mode for MPDP ID No.2

| | STX | CMD | Length | ID | Control Data | ETX |
|-------|------|------|--------|------|--------------|------|
| Value | 0x02 | 0xB8 | 0x03 | 0x02 | 0x01 0xF4 | 0x03 |

3.22. VIDEO Data Control

- Command for controlling Brightness, Contrast and Color of Video input

- Command Code: 0xBE (Brightness), 0xBF (Contrast), 0xC0 (Color),

- One way communication (Send to PDP)

- Data: ID (1 byte) + Control Data (1 byte)

- Control Data Range: "0 (0x00)" ~ "255 (0xFF)"

Caution 1: Although ID area value is set as "0x00" to apply the same value to all MPDP, White balance may not be adjusted due to the deviation between sets. So, individual White Balance adjustment is recommended.

Caution 2: Adjusted value cannot be applied during "Stand-by" or "No signal" status. There must be input signal for each input mode to apply adjusted value, while MPDP is operated.

- e.g.) Adjust Brightness "128 (0x80)" for MPDP ID No.1

| | STX | CMD | Length | ID | Control Data | ETX |
|-------|------|------|--------|------|--------------|------|
| Value | 0x02 | 0xBE | 0x02 | 0x01 | 0x80 | 0x03 |

3.23. Get Current Status

- Command for finding out current PDP status

- Command Code: 0x87

- Protocol Format - Two way Communication (Send to PDP, Receive From PDP)

Caution: It will not respond during Stand-by. It should be executed only during operating status.

* Send to PDP

| STX | CMD | Length | ID | ETX |
|--------|--------|--------|--------|--------|
| 1 byte | 1 byte | 1 byte | 1 byte | 1 byte |

- Data: ID(1 byte)

* Receive From PDP

| STX | CMD | Length | Data | Check Sum | ETX |
|--------|--------|--------|---------|-----------|--------|
| 1 byte | 1 byte | 1 byte | 31 byte | 1 byte | 1 byte |

- Data: ID(1 byte) + Status(30 byte)

| No. | Data | Length | Explanation |
|-------|------------------|--------|---|
| 0 | ID | 1 byte | Range: 1 ~ 225(for Full MPDP: 15 x 15) |
| 1 | Input Source | 1 byte | 0x0C: PC, 0x0E: DVI, 0x0D: DTV, 0x07: DVD, 0x05: S-Video, 0x02: Video |
| 2 | Resolution | 1 byte | Value for the detected Resolution |
| 3 | PWR Status | 1 byte | 0: Power Off, 1: Power On |
| 4 | BIC Mode | 1 byte | 0: BIC Off, 1: BIC On |
| 5 | Global Offset | 1 byte | 0: Global Offset Off, 1: Global Offset On |
| 6 | Color Temp. | 1 byte | 0: Normal mode, 1: Studio mode |
| 7 | Auto-Power Mode | 1 byte | 0: Auto-Power Off, 1: Auto-Power On |
| 8~13 | F/W Version | 6 byte | Year: 2 byte, Month: 2byte, Day: 2byte 2012Year 12Month 29Day → 0x01 0x02 0x01 0x02 0x02 0x09 |
| 14 | Video Zoom Level | 1 byte | Default: 5, Allowable range: 1 ~ 9 |
| 15~22 | S/N | 8 byte | 123456 → 0x00 0x00 0x01 0x02 0x03 0x04 0x05 0x06 1 → 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x01 |
| 23~28 | Elapsed Time | 6 byte | 54321 → 0x00 0x05 0x04 0x03 0x02 0x01 10 → 0x00 0x00 0x00 0x00 0x01 0x00 |
| 29 | Temperature | 1 byte | 0(0x00): 0°C ~ 127(0x7F): 127°C / 128(0x80): -1°C ~ 254(0xFE): -127°C 0xFF: Temp. Sensor Error |
| 30 | FAN Status | 1 byte | 0x30: Good, 0x31: Error |

- Check Sum

:Add all the values in "Data" area. Then perform "NOT" operation.

< Detected Resolution (Different from supporting Resolution)>

| Resolution | Value | Resolution | Value | Resolution | Value |
|--------------|----------|---------------|----------|---------------|----------|
| 640x480x60 | 0(0x00) | 720Px60 | 20(0x14) | 1600x1200x50 | 43(0x2B) |
| 640x480x85 | 1(0x01) | 720Px50 | 21(0x15) | 800x600x50 | 44(0x2C) |
| 800x600x56 | 2(0x02) | 576Px50 | 22(0x16) | 1360x768x60 | 45(0x2D) |
| 800x600x60 | 3(0x03) | 480Px60 | 23(0x17) | 640x350x85 | 46(0x2E) |
| 800x600x75 | 4(0x04) | 1920x1080ix60 | 24(0x18) | 640x480x75 | 47(0x2F) |
| 800x600x85 | 5(0x05) | 1920x1080ix50 | 25(0x19) | 640x480x72 | 48(0x30) |
| 853x480x60 | 6(0x06) | 1280x720Px60 | 26(0x1A) | 1152x864x75 | 49(0x31) |
| 1024x768x60 | 7(0x07) | 1280x720Px50 | 27(0x1B) | 1280x720x60 | 50(0x32) |
| 1024x768x70 | 8(0x08) | PAL | 28(0x1C) | 1280x768x75 | 51(0x33) |
| 1024x768x75 | 9(0x09) | SECAM | 29(0x1D) | 1280x1024x75 | 52(0x34) |
| 1024x768x85 | 10(0x0A) | PALP | 30(0x1E) | 1366x768x50 | 53(0x35) |
| 1280x768x60 | 11(0x0B) | NTSC | 31(0x1F) | 1400x1050x50 | 54(0x36) |
| 1280x960x60 | 12(0x0C) | NTSCP | 32(0x20) | 1440x900x60 | 55(0x37) |
| 1280x1024x60 | 13(0x0D) | Unknown | 34(0x22) | 576ix50 | 56(0x38) |
| 1366x768x60 | 14(0x0E) | No-Signal | 35(0x23) | 480ix60 | 57(0x39) |
| 1600x1200x60 | 15(0x0F) | 853x480x50 | 38(0x26) | 1080px60 | 58(0x3A) |
| 1400x1050x60 | 16(0x10) | 1280x1024x50 | 39(0x27) | 1080px50 | 59(0x3B) |
| 1706x960x60 | 17(0x11) | 1360x768x50 | 40(0x28) | 1920x1080px60 | 60(0x3C) |
| 1080ix60 | 18(0x12) | 1600x900x50 | 41(0x29) | 1920x1080px50 | 61(0x3D) |
| 1080ix50 | 19(0x13) | 1600x900x60 | 42(0x2A) | | |

※ The resolutions in red and italic can be detected, but they are not supporting resolution.

3.24. Get Picture Control Data

- Command for finding out the value for current Picture Control Data such as User mode, White Balance, Graphic, and Video.
- Command Code: 0x88
- Protocol Format - Two way communication (Send to PDP, Receive from PDP)

Caution 1: It will not respond during Stand-by. It should be executed only during operating status.

Caution 2: Values by Color temperature (Normal mode/ Studio mode) will be displayed.

* Send to PDP

| STX | CMD | Length | ID | ETX |
|--------|--------|--------|--------|--------|
| 1 byte | 1 byte | 1 byte | 1 byte | 1 byte |

- Data: ID(1 byte)

* Receive From PDP

| STX | CMD | Length | Data | Check Sum | ETX |
|--------|--------|--------|---------|-----------|--------|
| 1 byte | 1 byte | 1 byte | 51 byte | 1 byte | 1 byte |

- Data: ID(1 byte) + Status(30 byte)

| No. | Data | Length | Explanation |
|-------|--------------------------|--------|--|
| 0 | ID | 1 byte | Range: 1 ~ 225(for Full MPDP: 15 x 15) |
| 1 | User Mode - Brightness | 1 byte | Range: 0(0x00) ~ 100(0x64) |
| 2 | User Mode - Contrast | 1 byte | Range: 0(0x00) ~ 100(0x64) |
| 3 | User Mode - Sharpness | 1 byte | Range: 0(0x00) ~ 28(0x1C) |
| 4 | User Mode - Color | 1 byte | Range: 0(0x00) ~ 100(0x64) |
| 5 | User Mode - Tint | 1 byte | Range: 0(0x00) ~ 90(0x5A) |
| 6 | White Balance - Gain R | 1 byte | Range: 0(0x00) ~ 255(0xFF) |
| 7 | White Balance - Gain G | 1 byte | Range: 0(0x00) ~ 255(0xFF) |
| 8 | White Balance - Gain B | 1 byte | Range: 0(0x00) ~ 255(0xFF) |
| 9 | White Balance - Offset R | 1 byte | Range: 0(0x00) ~ 255(0xFF) |
| 10 | White Balance - Offset G | 1 byte | Range: 0(0x00) ~ 255(0xFF) |
| 11 | White Balance - Offset B | 1 byte | Range: 0(0x00) ~ 255(0xFF) |
| 12~13 | Graphic(PC) - Gain R | 2 byte | Range: 0(0x00) ~ 1023(0x3FF) |
| 14~15 | Graphic(PC) - Gain G | 2 byte | Range: 0(0x00) ~ 1023(0x3FF) |
| 16~17 | Graphic(PC) - Gain B | 2 byte | Range: 0(0x00) ~ 1023(0x3FF) |
| 18~19 | Graphic(PC) - Offset R | 2 byte | Range: 0(0x00) ~ 1023(0x3FF) |
| 20~21 | Graphic(PC) - Offset G | 2 byte | Range: 0(0x00) ~ 1023(0x3FF) |
| 22~23 | Graphic(PC) - Offset B | 2 byte | Range: 0(0x00) ~ 1023(0x3FF) |
| 24~25 | Graphic(DTV) - Gain R | 2 byte | Range: 0(0x00) ~ 1023(0x3FF) |
| 26~27 | Graphic(DTV) - Gain G | 2 byte | Range: 0(0x00) ~ 1023(0x3FF) |
| 28~29 | Graphic(DTV) - Gain B | 2 byte | Range: 0(0x00) ~ 1023(0x3FF) |
| 30~31 | Graphic(DTV) - Offset R | 2 byte | Range: 0(0x00) ~ 1023(0x3FF) |
| 32~33 | Graphic(DTV) - Offset G | 2 byte | Range: 0(0x00) ~ 1023(0x3FF) |
| 34~35 | Graphic(DTV) - Offset B | 2 byte | Range: 0(0x00) ~ 1023(0x3FF) |
| 36~37 | Graphic(DVD) - Gain R | 2 byte | Range: 0(0x00) ~ 1023(0x3FF) |
| 38~39 | Graphic(DVD) - Gain G | 2 byte | Range: 0(0x00) ~ 1023(0x3FF) |
| 40~41 | Graphic(DVD) - Gain B | 2 byte | Range: 0(0x00) ~ 1023(0x3FF) |
| 42~43 | Graphic(DVD) - Offset R | 2 byte | Range: 0(0x00) ~ 1023(0x3FF) |
| 44~45 | Graphic(DVD) - Offset G | 2 byte | Range: 0(0x00) ~ 1023(0x3FF) |
| 46~47 | Graphic(DVD) - Offset B | 2 byte | Range: 0(0x00) ~ 1023(0x3FF) |
| 48 | Video - Brightness | 1 byte | Range: 0(0x00) ~ 255(0xFF) |
| 49 | Video - Contrast | 1 byte | Range: 0(0x00) ~ 255(0xFF) |
| 50 | Video - Color | 1 byte | Range: 0(0x00) ~ 255(0xFF) |

- Check Sum

: Add all the values in "Data" area. Then perform "NOT" operation.

3.25. Factory Data Load (Picture Control Data)

- Picture Control value such as User Mode, White Balance, RGB Data, DTV Data, DVD Data and VIDEO Data that are adjusted at the factory will be applied. (It is different from Default Data Load)
- Command Code: 0x83
- One way Communication (Send to PDP)
- Data: ID (1 byte)
- e.g.) Load the factory value for MPDP ID No.1 and Read Picture Control Data

| | STX | CMD | Length | ID | ETX |
|-------|------|------|--------|------|------|
| Value | 0x02 | 0x83 | 0x01 | 0x01 | 0x03 |

※ If you need Factory data value for all MPDP, set the value of ID area as "0x00"

| | STX | CMD | Length | ID | ETX |
|-------|------|------|--------|------|------|
| Value | 0x02 | 0x88 | 0x01 | 0x01 | 0x03 |

※ Please refer to "Get Picture Control Data"

3.26. DVI Over-Scan On/Off

- User can select Over-scan when DTV resolution is detected from DVI input.
- Command Code: 0xE4(On), 0xE5(Off)
- One way communication (Send to PDP)
- Data: ID (1 byte)
- e.g.) DVI Over-scan On and Off for MPDP ID No.1

| | STX | CMD | Length | ID | ETX | | STX | CMD | Length | ID | ETX |
|-------|------|------|--------|------|------|--|------|------|--------|------|------|
| Value | 0x02 | 0xE4 | 0x01 | 0x01 | 0x03 | | 0x02 | 0xE5 | 0x01 | 0x01 | 0x03 |

※ If you want to execute DVI Over-Scan (On/Off) for all MPDP, set the value of ID area as "0x00".

3.27. Get Temperature Status (for IP Board)

- Command for collecting temperature information of IP board
- Command Code: 0x7F
- Protocol Format - Two way communication (Send to PDP, Receive from PDP)
- **Caution: It will not respond during Stand-by. It should be executed only during operating status.**

* Send to PDP

| STX | CMD | Length | ID | ETX |
|--------|--------|--------|--------|--------|
| 1 byte | 1 byte | 1 byte | 1 byte | 1 byte |

- Data: ID(1 byte)

* Receive From PDP

| STX | CMD | Length | Data | Check Sum | ETX |
|--------|--------|--------|--------|-----------|--------|
| 1 byte | 1 byte | 1 byte | 1 byte | 1 byte | 1 byte |

- Data: ID(1 byte) + Temp. Data(1 byte)

- Temp. Data: 0(0x00): 0°C ~ 127(0x7F): 127°C
 128(0x80): -1°C ~ 254(0xFE): -127°C
 0xFF: Temp. Sensor Error

- Check Sum

: Add all the values in "Data" area. Then perform "NOT" operation.

3.28. Adjust H-Align(for DTV, DVD mode)

- If H align is not correct at the expanded image of 2x2 or wider with DTV/DVD input, it can be adjusted. Also the adjusted data can be read with this function.
- Command Code: 0xED(Set), 0xEE(Get)
- Set command is one-way communication (Send to PDP), Get command is two-way communication (Send to PDP, Receive from PDP)

Caution: it does not respond at Stand-by status. It should be used at operative status.

- Set Command (one-way communication)

* Send to PDP

| STX | CMD | Length | Data | ETX |
|--------|--------|--------|--------|--------|
| 1 byte | 1 byte | 1 byte | n byte | 1 byte |

- Data: ID(1 byte) + Data(1 byte)

| Index | ID | Adjust Data |
|-------|----------|---------------|
| Size | 1 byte | 1 byte |
| Value | Variable | Variable(1~5) |

- Length : The value of "Length" is "0x02".

- Get Command (two-way communication)

* Send to PDP

| STX | CMD | Length | ID | ETX |
|--------|--------|--------|--------|--------|
| 1 byte | 1 byte | 1 byte | 1 byte | 1 byte |

- Data: ID(1 byte)

* Receive From PDP

| STX | CMD | Length | Data | Check Sum | ETX |
|--------|--------|--------|--------|-----------|--------|
| 1 byte | 1 byte | 1 byte | 1 byte | 1 byte | 1 byte |

-Data: ID(1 byte) + Data(1 byte)

-Check Sum

: Add all the values in "Data" area and execute "Not" operation.

4. The difference between OPM-4240 Protocol and MIS-4230 Protocol

4.1. Revised or Deleted items

- Protocol Format Change (Total Data length reduced): Refer to Page 50~51
- Additional SHDN Control command will not be sent, when Data read command is sent.
- Multi-Scale Data Format change (within 8 byte): Refer to Page 52 (3.3. Multi-Scale)
- Picture Control Variable change
 1. "Color" and "Tint" in "User Mode" can be adjusted only in DTV, DVD and VIDEO: Refer to page 58 (3.19. Graphic User Mode Control)
 2. "Cr", "Cb" and "Tint" adjustment in "Video Data" are deleted (Video and S-Video control are combined): Refer to page 59 (3.22. VIDEO Data Control)

4.2. Newly added items

- Temperature measurement (for IP): Refer to Page 62 (3.27. Get Temperature Status (for IP Board))
- Elapsed time: Refer to Page 56 (3.14. Elapsed Time)
- APL Soft: Refer to Page 55 (3.11. APL Control)
- DVI Over-Scan; Refer to Page 62 (3.27. Get Temperature Status (for IP Board))
- Auto-Calibration: Refer to Page 56 (3.16. Auto-Calibration)

※Attachment : ASCII to HEX Conversion Table

| ASCII | HEX | ASCII | HEX | ASCII | HEX | ASCII | HEX | ASCII | HEX | ASCII | HEX | ASCII | HEX |
|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|
| STX | 02 | * | 2A | 9 | 39 | H | 48 | W | 57 | f | 66 | u | 75 |
| ETX | 03 | + | 2B | : | 3A | I | 49 | X | 58 | g | 67 | v | 76 |
| Esc | 1B | , | 2C | ; | 3B | J | 4A | Y | 59 | h | 68 | w | 77 |
| CR | 0D | - | 2D | < | 3C | K | 4B | Z | 5A | i | 69 | x | 78 |
| LF | 0A | . | 2E | = | 3D | L | 4C | [| 5B | j | 6A | y | 79 |
| Space | 20 | / | 2F | > | 3E | M | 4D | \ | 5C | k | 6B | z | 7A |
| ! | 21 | 0 | 30 | ? | 3F | N | 4E |] | 5D | l | 6C | { | 7B |
| " | 22 | 1 | 31 | @ | 40 | O | 4F | ^ | 5E | m | 6D | | 7C |
| # | 23 | 2 | 32 | A | 41 | P | 50 | - | 5F | n | 6E | } | 7D |
| \$ | 24 | 3 | 33 | B | 42 | Q | 51 | ` | 60 | o | 6F | ~ | 7E |
| % | 25 | 4 | 34 | C | 43 | R | 52 | a | 61 | p | 70 | DEL | 7F |
| & | 26 | 5 | 35 | D | 44 | S | 53 | b | 62 | q | 71 | | |
| ' | 27 | 6 | 36 | E | 45 | T | 54 | c | 63 | r | 72 | | |
| (| 28 | 7 | 37 | F | 46 | U | 55 | d | 64 | s | 73 | | |
|) | 29 | 8 | 38 | G | 47 | V | 56 | e | 65 | t | 74 | | |

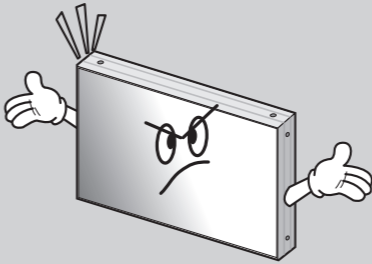
※Hex code value according to Set ID (MPDPD 5X5)

| | | | | |
|--|--|--|--|--|
| ID 1 id[0] = 0x30 id[1] = 0x31 | ID 2 id[0] = 0x30 id[1] = 0x32 | ID 3 id[0] = 0x30 id[1] = 0x33 | ID 4 id[0] = 0x30 id[1] = 0x34 | ID 5 id[0] = 0x30 id[1] = 0x35 |
| ID 6 id[0] = 0x30 id[1] = 0x36 | ID 7 id[0] = 0x30 id[1] = 0x37 | ID 8 id[0] = 0x30 id[1] = 0x38 | ID 9 id[0] = 0x30 id[1] = 0x39 | ID 10 id[0] = 0x30 id[1] = 0x3A |
| ID 11 id[0] = 0x30 id[1] = 0x3B | ID 12 id[0] = 0x30 id[1] = 0x3C | ID 13 id[0] = 0x30 id[1] = 0x3D | ID 14 id[0] = 0x30 id[1] = 0x3E | ID 15 id[0] = 0x30 id[1] = 0x3F |
| ID 16 id[0] = 0x31 id[1] = 0x30 | ID 17 id[0] = 0x31 id[1] = 0x31 | ID 18 id[0] = 0x31 id[1] = 0x32 | ID 19 id[0] = 0x31 id[1] = 0x33 | ID 20 id[0] = 0x31 id[1] = 0x34 |
| ID 21 id[0] = 0x31 id[1] = 0x35 | ID 22 id[0] = 0x31 id[1] = 0x36 | ID 23 id[0] = 0x31 id[1] = 0x37 | ID 24 id[0] = 0x31 id[1] = 0x38 | ID 25 id[0] = 0x31 id[1] = 0x39 |

7. Other tips

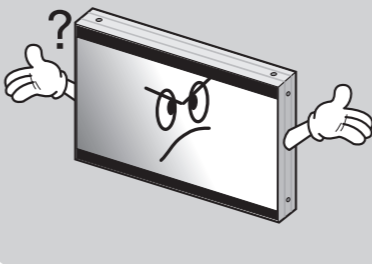
7.1. Before calling for service

Before calling for any repair, check the following and then refer to a near A/S center.



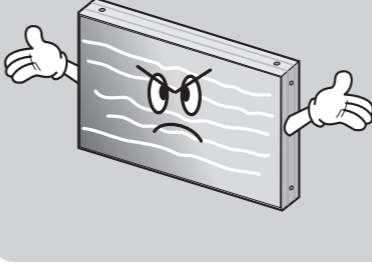
► **"Tick" sound from the main body.**

- If there is no problem with the screen or sound, the "tick" sound is likely to result from the cabinet lightly shrinking with the change of room temperature. The sound does not affect product's performance.



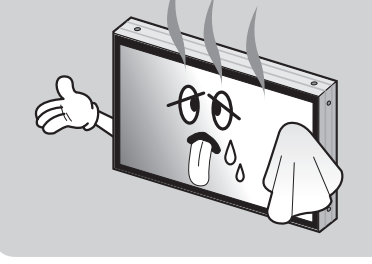
► **No image at upper and lower part of the screen.**

- As for a screen which is over 16:9 in width (such as cinema-sized one), no image may be displayed at upper and bottom part of the screen.



► **Speckles or white lines on the screen**

- Check whether the problem is caused by vehicle, streetcar, high-voltage cable or neon sign, which emitting interference wave or electromagnetic induction. Avoid any interfering object.

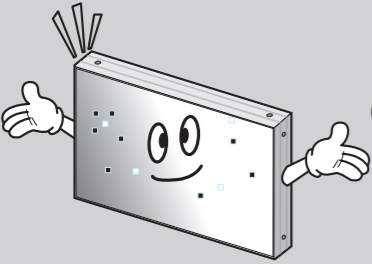


► **Screen or a PDP Set is hot**

- PDP sets or screen can be hot, because basic principle of PDP driving is Plasma discharge between electrodes.
- It is not a defect or a malfunction of the product, you may continue to use the product.

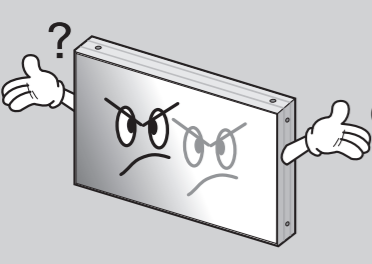
7.2. About Plasma display panel

The followings are phenomena caused by characteristics of the plasma display panel. Since it is not a fault, you may continue to use the product.



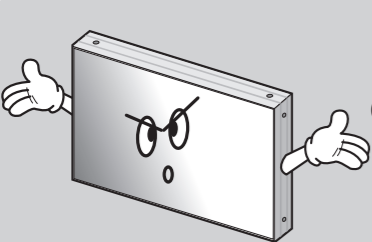
Caution ▶ **Black or twinkling spots on the screen**

- Although the plasma display panel is manufactured with high-precision technology, there may exist black or twinkling spots on the screen. Since it is not a fault, you may continue to use the product.



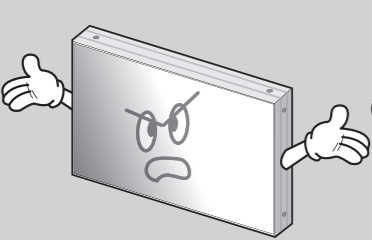
Caution ▶ **Burn-In effect**

- Displaying static images such as still video frames or computer screen images for an extended period of time may cause burn-in effect. The burn-in effect may be gradually reduced by displaying full white pattern.
- However, please always be careful in using static images on this product, because such burn-in effect may cause permanent damages in some cases.



Caution ▶ **Noise from the inside**

- When you turn on the product slight buzzing sound may be heard from the rear of display panel. Since it is not a fault, you may continue to use the product.



Caution ▶ **Screen decolorization**

- Optical film that is attached on the panel can be slightly decolorized after long time of use. The degree of decolorization may vary depending on display contents and conditions. It is due to the characteristics of the film, but it is not a defect. (It is caused by chemical characteristics of the film.)

8. Applicable signals

8.1. DVD / DTV

| Input Signal | | Resolution | Remarks |
|--------------|-------|-------------|---------|
| DVD | 480i | 720 x 480 | |
| | 480p | 720 x 480 | |
| | 576i | 720 x 576 | |
| | 576p | 720 x 576 | |
| DTV | 720p | 1280 x 720 | |
| | 1080i | 1920 x 1080 | |
| | 1080p | 1920 x 1080 | |

8.2. PC & DVI

• When you select PC for input source, it does not support DTV signal.

| Resolution | V-Freq. (Hz) | H-Freq. (KHz) | Remarks |
|-------------|--------------|---------------|----------|
| 640 x 480 | 60 | 31.46 | VESA DMT |
| 800 x 600 | 50 | 30.99 | VESA CVT |
| 800 x 600 | 60 | 37.88 | VESA DMT |
| 853 x 480 | 50 | 31.50 | - |
| 853 x 480 | 60 | 31.50 | VESA DMT |
| 1024 x 768 | 60 | 48.36 | |
| 1280 x 768 | 60 | 47.69 | VESA CVT |
| 1280 x 960 | 60 | 60.00 | VESA DMT |
| 1280 x 1024 | 50 | 52.67 | VESA CVT |
| 1280 x 1024 | 60 | 63.97 | VESA DMT |
| 1360 x 768 | 50 | 39.56 | VESA CVT |
| 1360 x 768 | 60 | 47.71 | VESA DMT |
| 1366 x 768 | 50 | 48.79 | - |
| 1366 x 768 | 60 | 48.77 | - |
| 1400 x 1050 | 60 | 65.317 | VESA CVT |
| 1600 x 900 | 50 | 46.39 | VESA CVT |
| 1600 x 900 | 60 | 55.99 | VESA CVT |
| 1600 x 1200 | 50 | 61.79 | VESA CVT |
| 1600 x 1200 | 60 | 75.00 | VESA DMT |
| 1706 x 960 | 60 | 59.57 | |

9. Specifications

| | | |
|--|---|---------------------------|
| Model Name | OPM-4240 | |
| Power supply | 100 ~ 240V AC, 50/60Hz | |
| Power consumption | | |
| Average (Typical) | 300W | |
| Max | 360W | |
| Plasma display panel | 42 inch, 16:9 Aspect Ratio | |
| Contrast ratio | 10,000 :1 (Dark Room) | |
| Brightness | 1,000 cd/m ² (Without film & BIC) | |
| Burn-in effect | Burn-In Compensation (BIC) | |
| Front filter | AGAR (Anti Glare Anti Reflection) | |
| Number of pixels | 853(H) X 480(V) | |
| Seam gap (In case of multi formation) | 3.5mm | |
| Environmental condition | | |
| Temperature | 0° C ~ 35° C | |
| Humidity | 20% ~ 70% | |
| Signal | | |
| Video signal | NTSC, PAL, SECAM | |
| PC signal | SVGA, WVGA, XGA, SXGA, WXGA, UXGA | |
| Frequency | Horizontal Frequency 15.5 ~ 75kHz Vertical Frequency 50/60Hz | |
| Connectors | Input | Output |
| Video | CVBS : BNC 1pin | CVBS : BNC 1pin |
| | S-Video : DIN 4pin | S-Video : DIN 4pin |
| Component | Y, Pb, Pr : BNC 3pin | Y, Pb, Pr : BNC 3pin |
| PC | PC RGB : D-Sub 15pin | PC RGB : D-Sub 15pin |
| DVI | TMDS : DVI-D 24pin | TMDS : DVI-D 24pin |
| Serial | RS-232C D-Sub 9pin(female) | RS-232C D-Sub 9pin (male) |
| External dimension | 924.6mm[W] X 521.8mm[H] X 75.4mm[D] | |
| | | |
| Weight | 25kg (±1kg) | |

※Product design and specification can be changed for quality improvement without prior notice.

| | | |
|--|---|---------------------------|
| Model Name | OPM-4240R | |
| Power supply | 100 ~ 240V AC, 50/60Hz | |
| Power consumption | | |
| Average (Typical) | 300W | |
| Max | 360W | |
| Plasma display panel | 42 inch, 16:9 Aspect Ratio | |
| Contrast ratio | 10,000 :1 (Dark Room) | |
| Brightness | 1,000 cd/m ² (Without film & BIC) | |
| Burn-in effect | Burn-In Compensation (BIC) | |
| Front filter | AGAR (Anti Glare Anti Reflection) | |
| Number of pixels | 853(H) X 480(V) | |
| Seam gap (In case of multi formation) | 5mm | |
| Environmental condition | | |
| Temperature | 0° C ~ 35° C | |
| Humidity | 20% ~ 70% | |
| Signal | | |
| Video signal | NTSC, PAL, SECAM | |
| PC signal | SVGA, WVGA, XGA, SXGA, WXGA, UXGA | |
| Frequency | Horizontal Frequency 15.5 ~ 75kHz Vertical Frequency 50/60Hz | |
| Connectors | Input | Output |
| Video | CVBS : BNC 1pin | CVBS : BNC 1pin |
| | S-Video : DIN 4pin | S-Video : DIN 4pin |
| Component | Y, Pb, Pr : BNC 3pin | Y, Pb, Pr : BNC 3pin |
| PC | PC RGB : D-Sub 15pin | PC RGB : D-Sub 15pin |
| DVI | TMDS : DVI-D 24pin | TMDS : DVI-D 24pin |
| Serial | RS-232C D-Sub 9pin(female) | RS-232C D-Sub 9pin (male) |
| External dimension | 926.2mm[W] X 523.6mm[H] X 76.5mm[D] | |
| | | |
| Weight | 25kg (±1kg) | |

※Product design and specification can be changed for quality improvement without prior notice.