MSPG-8000

SLOT TYPE MULTI VIDEO SIGNAL GENERATOR

User Guide

2023.12.04

Edition 14(Eng)

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Chapter 1. Safety Notice

1.1 Foreword

- Thank you for purchasing the MSPG-8000 video signal generator.
- This manual provides details on how to operate the MSPG-8000 and the precautions to be needed when doing so.
- Take the time to read through this manual before attempting to operate the MSPG-8000.
- After reading this manual, keep it in a safe place for your future reference.

1.2 Safety precautions

- Improper handling may lead to accidents.
- We recommended you to read through following warning, precaution and information's without fail before attempting to operate the MSPG-8000.
- These instructions to ensure that you will operate the MSPG-8000 properly.
- Don't install signal generator in dusty environment.
- Attention before connect between video signal generator and display instrument.
  - ✓ Make sure to connect ground line to FG video signal generator.
  - ✓ Ground connection plays an important role in protecting internal IC's and elements of video signal generator.
  - ✓ Take special care when connecting the generator to display unit.
  - ✓ If these are not connect together, the generator may fail.
- Setup time for stable system
  - ✓ System needs about 5 minutes setup time for measuring precise data.
- Fuse re-placement: The fuse is a F3.15AL 250V "F" type.

1.3 Notice for safe usage

- If the equipment is used in a manner not specified by the manufacture, the protection provided by the equipment may be impaired.

1.3.1 AC Power

- ✓ Turn off power of signal generator when inserting a power plug in a socket.
- ✓ Don't use harmed power cable and loose socket.
- ✓ Separate power cable from a heating apparatus.
- ✓ Please, use power switch if you want to turn off signal generator.
- ✓ Use the three-wire power supply code.
- ✓ If you use unlicensed Cable, the video signal generator can cause electric shock.

1.3.2 The Power Cord

- ✓ Always take hold of the molded part of the plug when disconnecting the power cord.
- ✓ Use permissible AC Power and Connection Cable. If you use unlicensed Cable, the video signal generator can cause electric shock.
- ✓ Do not use force to bend the power cord or bunch it up for use. Doing so may cause fire.
- ✓ Do not place heavy objects on top of the power cord. Doing so may damage the cord causing a fire or electrical shock.

1.3.2 The Generator

- ✓ Do not place the video signal generator at the ferromagnetic body area. The generator can cause electric shock as irregular working.
- ✓ Do not subject the generator to impact or throw it. Doing so may cause the generator to malfunction, explode or generate abnormally high levels of heat, possibly resulting in a fire.
- ✓ Do not use outdoors.
- ✓ Do not place the signal generator long time in a car on hot day or cold day. It is able to cause characteristic decrease, function inferiority and shape variation of outside parts. If you place the condition continuously, it can case electric shock and fire as short circuit or insulation.
- ✓ When you not using the video signal generator for a long time, disconnect AC Power plug from AC line outlet for safe consideration.
- ✓ Do clean the FAN regularly.
- ✓ Wipe the cabinet with a dry cloth to eliminate dust.
- ✓ Be clean with the cleaner. Do not use benzene. If you use the benzene, the video signal generator is changed shape variation of outside parts and the works is erased.
- ✓ This generator contains some high-voltage parts. If you touch them, you may receive an electric shock and burn yourself so do not attempt to disassemble, repair or remodel the generator.
- ✓ When occurring the malfunction or breakdown, don't disassemble the video signal generator by yourself. Contact our company promptly.
- ✓ Set the video signal generator more 10cm from wall. It can obstruct the flowing of air. And it causes fire because high temperature.

1.3.3 Installation

- ✓ Install the generator in a stable location. Do not stand it on either of its side panels. Doing so may cause the generator's temperature to rise due to heat generation, possibly resulting in malfunctioning.
- ✓ Don't install signal generator vertically.
- ✓ Install signal generator at flat place.
- ✓ Do not spill liquids inside the generator or drop inflammable objects into it. Operating the generator under these conditions may cause a fire, electrical shock or malfunctioning.

1.3.4 International Electrical Symbols


AC : Alternating Current


Earth Grounding


Conforms to European Union directives


High Definition Multimedia Interface


Digital Visual Interface


Directive on Restriction of the use of certain Hazardous Substances in EEE

In the unlikely event that trouble or malfunctioning should occur, first disconnect the power cable, and then contact your dealer or Master technical sales department.

Tel : + 82-55-297-8880 / Fax : + 82-55-256-7388

E-mail: webmaster@Ltdmaster.com

www.Ltdmaster.com

2. Chapter Two

Appearance and specification of the MSPG-8000

2.1 Accessories packed with the MSPG-8000

2.2 Introduction to slots

2.3 Specification of the MSPG-8000

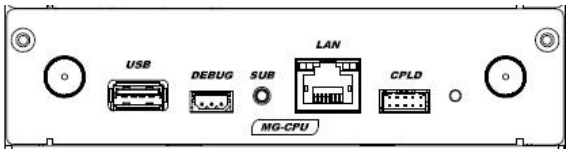
2.4 Panel parts and their functions

Chapter 2. Appearance and specification of the MSPG-8000

2.1 Accessories packed with the MSPG-8000

1) MSPG-8000 main body x 1ea

2) MSPG-8000 main CPU slot x 1ea



3) User Manual x 1ea

4) Pattern & Timing sticker x 1ea

5) Power Cable 220V x 1ea

6) Optional slots and remote(Option)

① MSRC-009L remote controller

② MG-HDMI2.0/ARC: HDMI 2.0Ver slot and cable

③ MG-DISPLAYPORT1.3: DISPLAYPORT 1.3Ver slot and cable

④ MG-ANALOG/DVI: ANALOG/DVI slot and cable

⑤ MG-COMPONENT: Component slot and cable

⑥ MG-S-VIDEO/CVBS: S-VIDEO/CVBS slot and cable

⑦ MG-S-VIDEO/CVBS/SCART: S-VIDEO/CVBS/SCART slot and cable

⑧ MG-HDMI2.1/ARC-1: HDMI 2.0Ver slot and cable

2.2 Introduction to slots

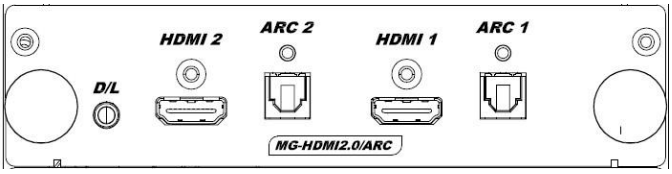
1) "MG-HDMI2.0/ARC" : HDMI 2.0 4K/60Hz outputs & ARC outputs

① Output signal: HDMI 2.0Ver x 2port & Optic ARC

② Output Spec.: 25MHz~600MHz / 4Kx2K@60Hz (600MHz)

③ Supports to HDCP 2.2, ARC 2Ch, HDR(HDR-10/HLG), EDID and CEC

④ D/L: slot upgrade port



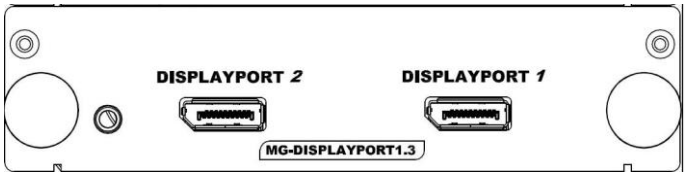
2) "MG-DISPLAYPORT1.3" : DISPLAYPORT 1.3Ver 4K/60Hz outputs

① Output signal: DISPLAYPORT 1.3Ver x 2port

② Output Spec.: 8Kx4K@30Hz (HBR3)

③ Supports to HDCP 2.2 and EDID read

④ D/L: slot upgrade port



3) "MG-ANALOG/DVI" : ANALOG, DVI DUAL, AUDIO outputs

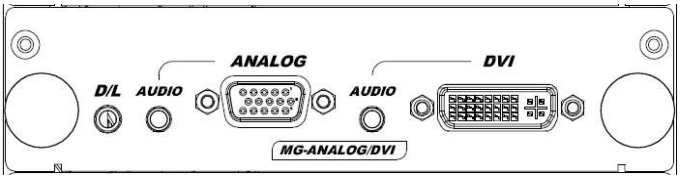
① Output signal: ANALOG x 1port & DVI DUAL x 1port & AUDIO 2Ch

② Output Spec.

- ✓ ANALOG(8~250MHz)
- ✓ DVI DUAL(25~330MHz)

③ Supports to DVI HDCP 1.3 and ANALOG/DVI EDID read

④ D/L: slot upgrade port

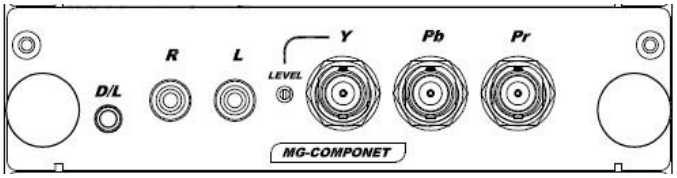


4) “MG-COMPONENT” : COMPONENT. AUDIO R/L outputs

① Output signal: COMPONENT x 1port & AUDIO R/L

② Output Spec.: COMPONENT: Y, Pb, Pr (480i/p, 576i/p, 720p, 1080i/p for ATSC and DVB Format)

③ D/L: slot upgrade port



5) “MG-S-VIDEO/CVBS”: S-VIDEO & CVBS & AUDIO R/L outputs

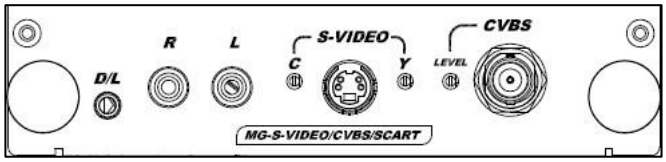
① Output signal: S-VIDEO x 1port & CVBS x 1port & AUDIO R/L

② Output Spec.

✓ S-VIDEO & CVBS: NTSC M/J(3.58MHz), NTSC 443(4.4MHz),

PAL B/D/G/H/I(4.434MHz), SECAM (For=4.406Mhz/For=4.25MHz)

③ D/L: slot upgrade port



6) “MG-S-VIDEO/CVBS/SCART”: S-VIDEO&CVBS&SCART & AUDIO R/L outputs

① Output signal: S-VIDEO x 1port & CVBS x 1port & SCART x 2port & AUDIO R/L

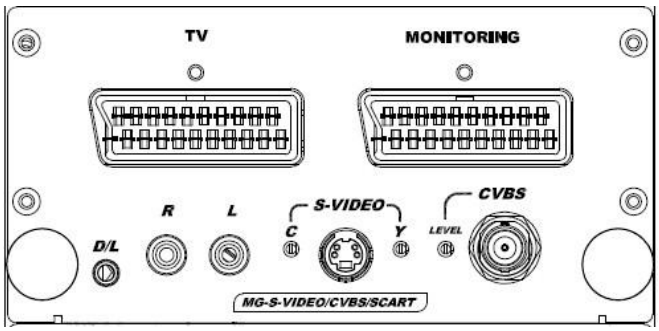
② Output Spec. (2slot size)

✓ S-VIDEO & CVBS: NTSC M/J(3.58MHz), NTSC 443(4.4MHz),

PAL B/D/G/H/I(4.434MHz), SECAM (For=4.406Mhz/For=4.25MHz)

✓ SCART: PAL only

③ D/L: slot upgrade port



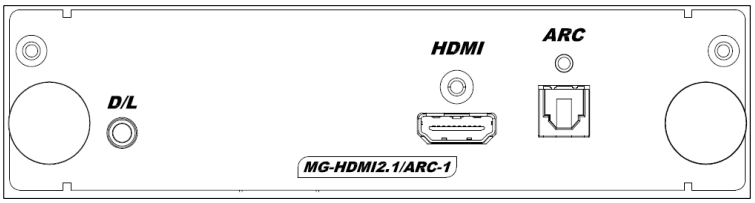
7) “MG-HDMI2.1/ARC-1” : HDMI 2.1 8K/60Hz outputs

① Output signal: HDMI 2.1Ver x 1port

② Output Spec.: 100MHz~1.2GHz / 8Kx4K@60Hz

③ Supports to HDCP 1.4 and 2.3

④ D/L : Slot upgrade port



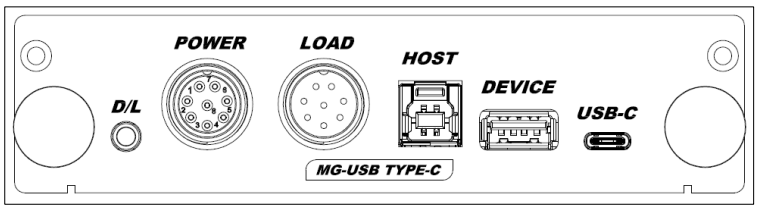
8) “MG-USB TYPE-C” : DISPLAYPORT 1.2

① Output signal: DISPLAYPORT 1.2Ver

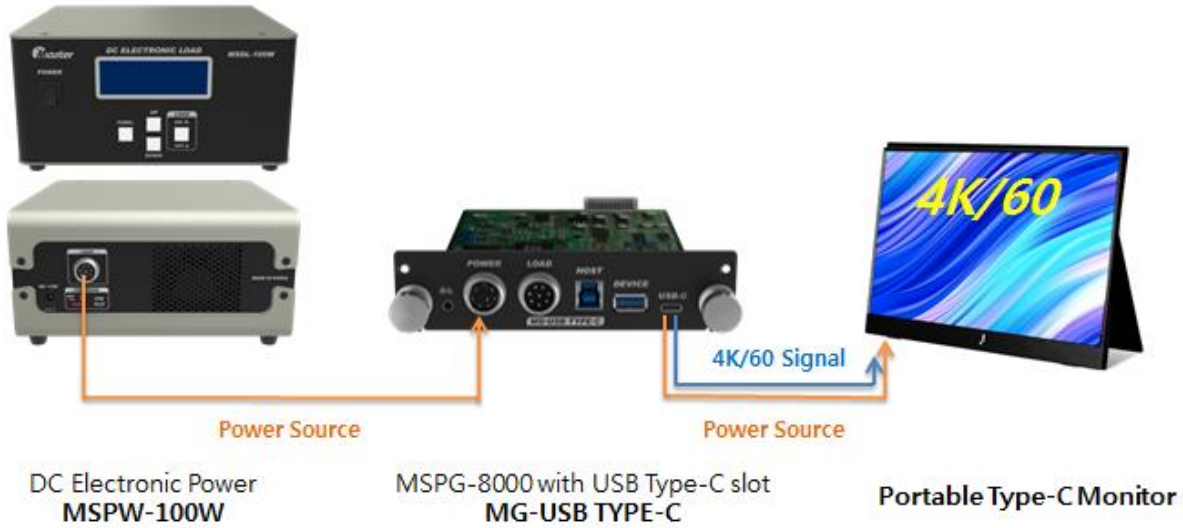
② Max resolution: 4Kx2K@60Hz

③ Supports to HDCP 1.2 and 2.2

④ D/L: slot upgrade port



⑤ POWER: The POWER port that can be connected to a separate MSPW-100W to power the display equipment.



⑥ LOADER: The LOAD port that can be connected to a separate MSDL-100W to electric load the display equipment.

2.3 Specification of MSPG-8000

MG-HDMI2.0/ARC		
HDMI 2.0 x 2port	Compliant	HDMI 2.0 Version
	Pixel Rate Range	25MHz~600MHZ/4Kx2K/60Hz(600MHz)
	Video Signal Type	RGB, YCbCr
	Pixel Encoding & Data bit of RGB & YCbCr	4K@30Hz_RGB444(8, 10, 12 bit), YCbCr444(8, 10, 12 bit), YCbCr422(8, 10, 12 bit)
	Data bit of RGB &YCbCr	4K@60Hz_RGB444(8bit only), YCbCr444(8bit only), YCbCr422(8bit ,10,12bit)
	Color Space	RGB, BT-601, BT-709, BT-2020, xvYCC-601, xvYCC-709
	HDCP	Support HDCP 1.4 and 2.2 Version
	Output Connector	Type A, HDMI 2 Port (4K x 2K @60Hz 2Port, ARC 2Port)
	Note	Audio Return Channel (ARC) 2Port, CEC Support
		3D Video Formats (Frame Packing, Side by Side, Top & Bottom, Field Alternative)
	D/L port	Firmware & Data up-load port
	Digital Audio	2Ch Audio
Optic ARC x 2port	Digital Audio	SPDIF (Audio Return Channel)
MG-DISPLAYPORT1.3		
Displayport 1.3 x 2port	Compliant	Displayport 1.3 Version
	Pixel Rate Range	8K x 4K@30Hz(7680x4320@30Hz), HBR3
	Video Signal Type	RGB, YCbCr
	Color Space	RGB, BT-601, BT-709
	HDCP	Support HDCP 1.3 and 2.2 Version
	Output Format	RGB444, YCbCr444(8, 10, 12 bit)
		YCbCr422(8, 10, 12 bit)
	Digital Audio	I2S, 48KHz, 2 Channels
MG-ANALOG/DVI		
Analog x 1port	Pixel Rate Range	8~250MHz
	Video Signal Type	R, G, B (Load 75 ohms, 0~1.0V Programmable)
	Output Connector	15P D-Sub
	Separate Sync	HS, VS(3.0V~5.5Vp-p Programmable)
Analog Audio x 1port	Analog audio	Stereo L, R
DVI Dual x 1port	Compliant	DVI 1.0 Support
	Pixel Rate Range	* Dual Link: 25~330MHz
	Transfer Type	* Single TMDS 24 Bit Input Mode
		* Dual TMDS 12 Bit Input Mode
	HDCP	Support HDCP 1.3

	Video Signal Type	RGB
	Output Connector	DVI-D (DVI 1Ports, Single/Dual)
DVI Audio x 1port	Analog audio	Stereo L, R
MG-S-VIDEO/CVBS		
S-VIDEO/CVBS x 1Port	Output Mode	* NTSC M,J (3.58MHz)
		* NTSC443 (4.4MHz)
		* PAL B, D, G, H, I (4.434MHz)
		* SECAM (For=4.406MHz / For=4.25MHz)
	Subcarrier Stability	25ppm (±25Hz / 1MHz)
	Video Output	Composite (BNC), S-Video
		* Signal: CVBS (Connector: BNC)
		* Signal: Y/C (Connector: 4Pin-Mini Din)
S-VIDEO/CVBS Audio L/R	Analog audio	RCA L, R
MG-S-VIDEO/CVBS/SCART		
Same as MG-S-VIDEO / CVBS slot		
SCART X 1Port (Monitoring x 1port)	Output Mode	PAL only
	Output Connector	SCART 21pin
MG-COMPONENT		
COMPONENT(YPbPr) x 1port	output mode	Y, Pb, Pr(480i/p, 576i/p, 720p, 1080i/p for ATSC and DVB Format)
	Output Connector	BNC
COMPONENT Audio L/R	Analog audio	RCA L, R
MG-HDMI2.1/ARC-1		
HDMI 2.1 X 1Port	Compliant	HDMI2.1 Version
	Pixel Rate Range	25MHz~1.2GHz / 8Kx4K@60Hz
	Signal Type	TMDS, Fixed Rate Link (FRL – Maximum link : 10Gbps x4Lane
	Pixel Encoding & Date Bit of RGB & YCbCr	8K@30Hz_RGB444(8/10bit), YCbCr444(8/10bit), YCbCr422(8/10/12bit) 8K@60Hz_YCbCR420(8/10bit)
	Color Space	RGB, BT-601, BT-709, BT-2020, xvYCC-601, xvYCC-709
	HDCP	Support HDCP 1.4 and 2.3 Version
	Output Connector	Type A, HDMI 1 Port (8K x 4K @60Hz 1Port)
	Note	3D Video Formats (Frame Packing, Side by Side, Top & Bottom, Field Alternative)
	D/L port	Firmware & Data up-load port
	Digital Audio	8ch audio
Optic ARC X 1Port	Digital Audio	SPDIF (Audio Return Channel)
MG-USB TYPE-C		

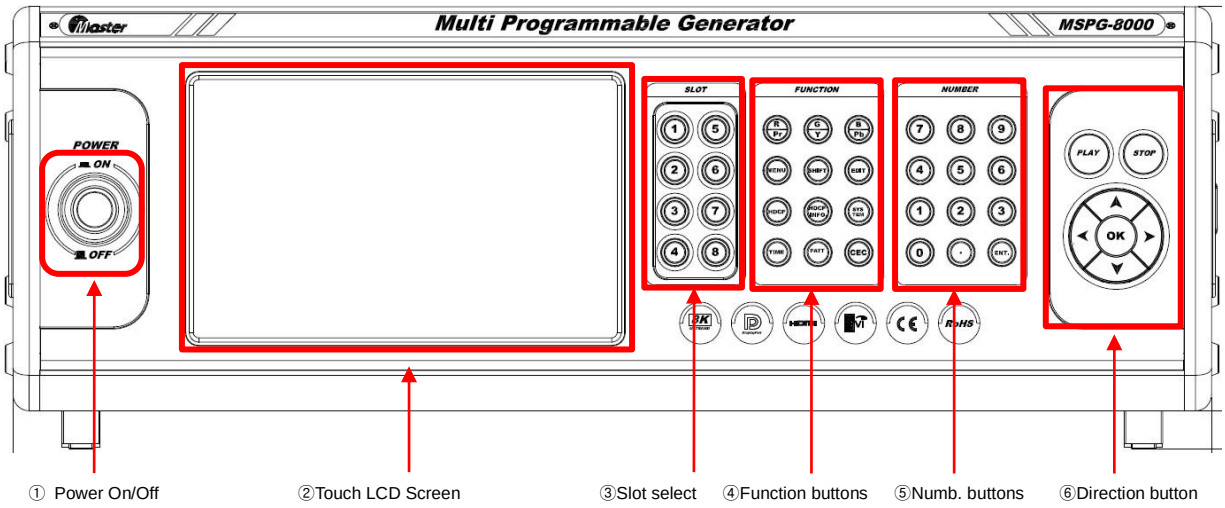
USB TYPE-C X 1Port	Compliant	Displayport 1.2Ver
	Pixel Rate Range	Max 4K x 2K@60Hz Resolution
	Pixel Encoding & Date bit of RGB & YCbCr	HBR2(4Lanes) RGB444(8/10bit), YCbCr444(8/10bit), YCbCr422(8/10bit), 4K x 2K@60Hz RGB 444 8bit only
	HDCP	HDCP 1.4 and 2.2
	Color Space	RGB, BT-601, BT-709
	Output Connector	USB TYEP-A (Device) USB TYEP-B (Host) USB TYEP-C (Dual role port) POWER : External power source connector to MSPS-100W LOAD : External electric load connector to MSDL-100W
	USB Pass-thru	USB3.1(5Gbps) and USB 2.0 pass--thru
	Power Delivery(Source)	Up to 20V/5A(100W) with external power test unit MSPS-100W (Optional)
	Power Delivery(Sink)	Up to 20V/5A(100W) with external load test unit MSDS-100W (Optional)
	D/L Port	Firmware & Data up-load port
	Digital Audio	I2S, 48KHz, 2Channels
COMMON Spec.		
Digital Audio Common Spec.	Sample Rate	32 / 44.1 / 48 / 88.2 / 96 / 176.4 / 192KHz
	Number of Channel	8 Channels
	Bit per Sample	24
	Waveform	Sine Wave
	Frequency Range	20Hz to 24KHz / 5Hz step
	Level Range	0dB to -110dB/ 0.5dB step
	External Audio Input	Optical, Coaxial
	Special Control Mode	Fix, Sweep, Swap, Optical, Mute
Analog Audio Common Spec.	Frequency Range	20Hz to 24KHz / 5Hz step
	Level Range	0mVrms to 900mVrms / 5mVrms, 0~18dB
	Waveform	Sine Wave
	Number of Channel	2 Channels
	Connector	RCA
	Special Control Mode	Fix, Sweep, Swap, Mute
Scan Storage	Scan Storage	99 Group (1 Group; 40 Step)
Function Storage	Function Storage	99 Group (1 Group; 30 Step)
Data Storage	Timing	999 Timing (User: 1~500, Default: 501~999)
	Pattern	999 Pattern (User: 1~500, Default: 501~999)
MSPG-8000 main body	Reset	MSPG-8000 main firmware download reset button

	D/L Mode	MSPG-8000 main firmware download mode switch
	REMOTE	MSRC-009L remote port
	RS-232C	RS-232C communication port & MSPG-8000 main firmware download port
General Spec.	Power Consumption	AC 100~240VAC, 50/60Hz Auto Switch
	Operating Conditions	* Temperature: 0~40℃
		* 80% Humidity, Non-condensing
	Dimension & weight	319x350x150(162)Cm / 4.0Kg (Slot 0.3Kg)

All specifications are subject to change without any notice

2.4 Panel parts and their functions

1) Front panel of MSPG-8000



① Power On/Off switch

② Touch Screen LCD

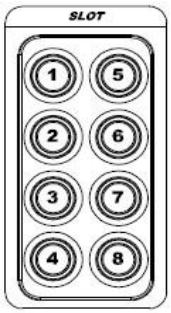
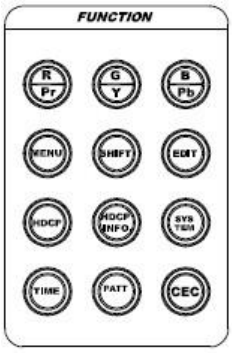
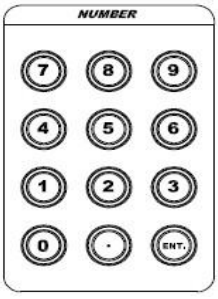
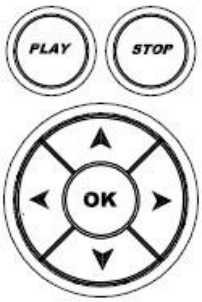
③ Slot select buttons 1~8

④ Function buttons

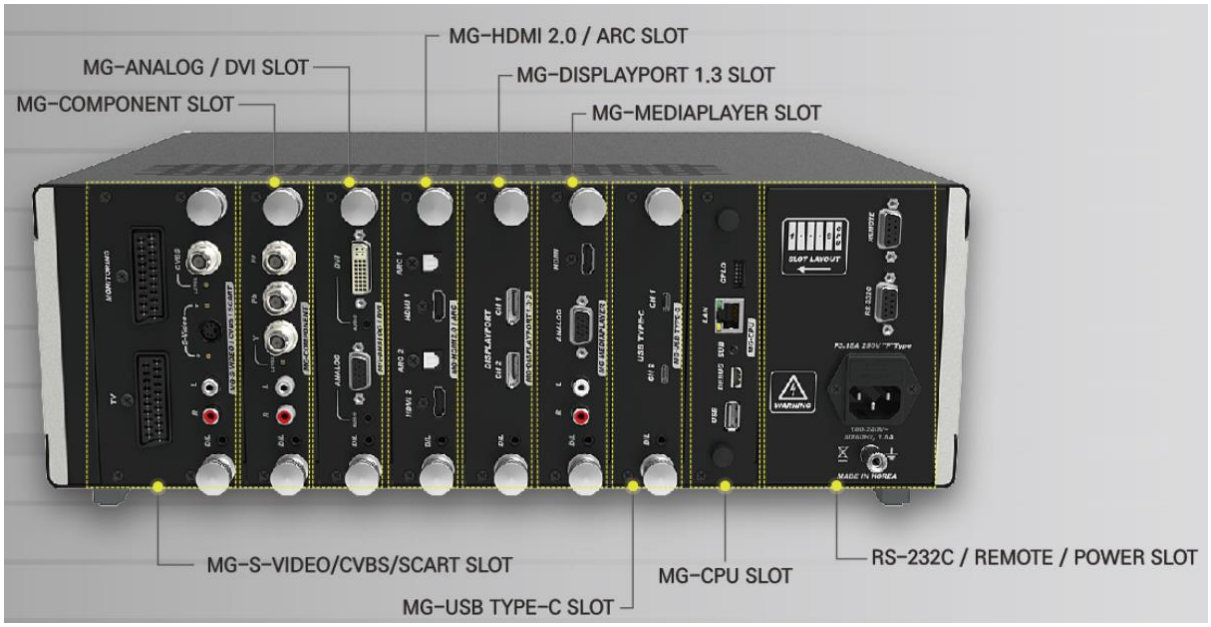
⑤ Number buttons

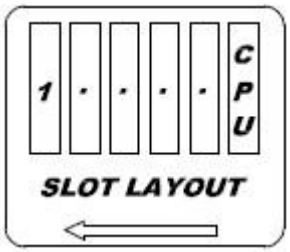
⑥ Cursor and ok(enter) buttons

2) Front buttons

<table>
<tr><td> 
</td><td>Slot select buttons 1 to 8 slots
✓ LED OFF: No slots are installed
✓ LED BLUE ON: Slots are installed
✓ LED RED ON: Slots are installed and selected</td></tr>
<tr><td rowspan="8"> 
</td><td>Red(Pr), Green(y), Blue(Pb) on/off button on the display.</td></tr>
<tr><td>MENU: Reverse pattern</td></tr>
<tr><td>SHIFT: SCAN rolling pause, download mode setting</td></tr>
<tr><td>HDCP(High-bandwidth Digital Content Protection) on/off button</td></tr>
<tr><td>HDCP INFO.: HDCP and EDID information display on the screen</td></tr>
<tr><td>SYSTEM: MSPG-8000 set up button</td></tr>
<tr><td>TIME: Resolution(Timing) select button</td></tr>
<tr><td>PATT: Pattern select button</td></tr>
<tr><td>CEC: CEC on/off button</td></tr>
<tr><td> 
</td><td>Number and Enter button</td></tr>
<tr><td> 
</td><td>PLAY: Play button with media player slot(will update)
STOP: Stop button with media player slot(will update)
Direction and enter button</td></tr>
</table>

3) Real panel



SLOT number	From left No.1~8 
REMOTE	Optional: remote MSRC-009L port
RS-232C	RS-232C PC communication port
MG-CPU SLOT	USB: Firmware & Time/Pattern data update port DEBUG: Master Co., Ltd debug port SUB: safety mode button LAN: Master Co., Ltd update port CPLD: Master Co., Ltd update port
Power	F3.15A 250V “F” TYPE 100~240V 50/60Hz, 1.5A

3. Chapter Three

Mounting slots and starting the MSPG-8000

3.1 Mounting slots to MSPG-8000

Chapter 3. Mounting slots and starting the MSPG-8000

1.1 Mounting slots to MSPG-8000

① Turn off the MSPG-8000 and disconnect power cord from MSPG-8000.

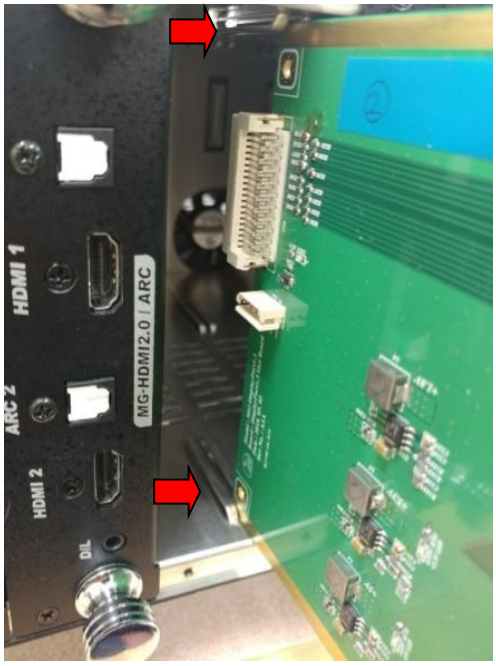
② Use a cross screwdriver to loosen the empty slot cover or old slot.

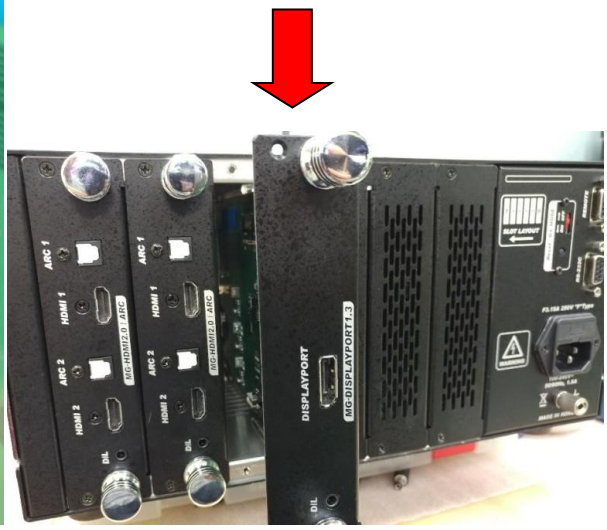
(empty slot cover)

(old slot)

③ Take out the empty slot cover or old slots from MSPG-8000.

④ Insert the prepared new slot gently into the desired empty slot, as shown in the below picture.(*Caution: Please check the orientation as it may be inserted upside down.)





⑤ Tighten the bolts to original position.

⑥ Turn on the MSPG-8000

⑦ The MSPG-8000 will automatically recognize to all installed slots.

4. Chapter Four

How to use

4.1 Touch screen

4.2 Time(resolution)

4.3 Pattern

4.4 Scan

4.5 Function

4.6 Audio

4.7 Program copy(firmware update)

4.8 Data copy(Pattern, Timing, Audio, Function, Scan and System update)

4.9 System option

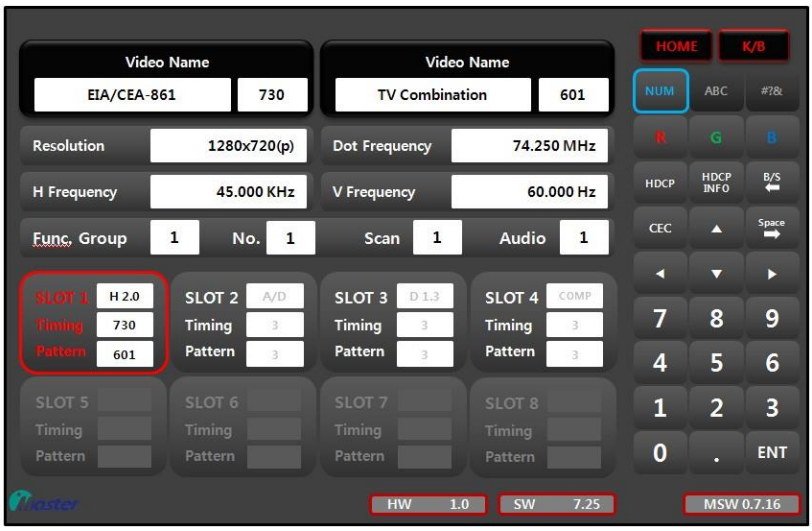
4.10 User setting

4.11 Moving control

Chapter 4. Mounting slots and starting the MSPG-8000

4.1 Touch screen

The MSPG-8000 can be controlled by using the front touch screen.



① Video Name: Current displayed timing name and timing number.

② Pattern Name: Current displayed pattern name and pattern number.

③ Resolution: Current displayed timing's resolution.

④ Dot Frequency: Current displayed timing's Dot Frequency.

⑤ H-Frequency: Current displayed timing's Horizontal Frequency.

⑥ V-Frequency: Current displayed timing's Vertical Frequency.

⑦ Func. Group: Current setting Function Group and Function Number.

⑧ Scan: Current setting Scan Number.

⑨ Audio: Current setting Audio Number.

⑩ Slot 1 ~ 8: Each slot type, timing number and pattern number display.

a. Slot 1. HDMI 2.0 slot installed and selected

b. Slot 2. Analog/DVI slot installed.

c. Slot 3.Displayport 1.3 slot installed.

d. Slot 4.Component slot installed.

e. Slot 5~8 Slot has not installed.

⑪ HOME: Return to main screen button

⑫ K/B: Keyboard button

⑬ NUM, ABC, #?&

a. Num: RGB, HDCP, HDCP Info, Back Space, CEC, direction button and number button

b. ABC: Upper case or lower case

c. #?&: Special character

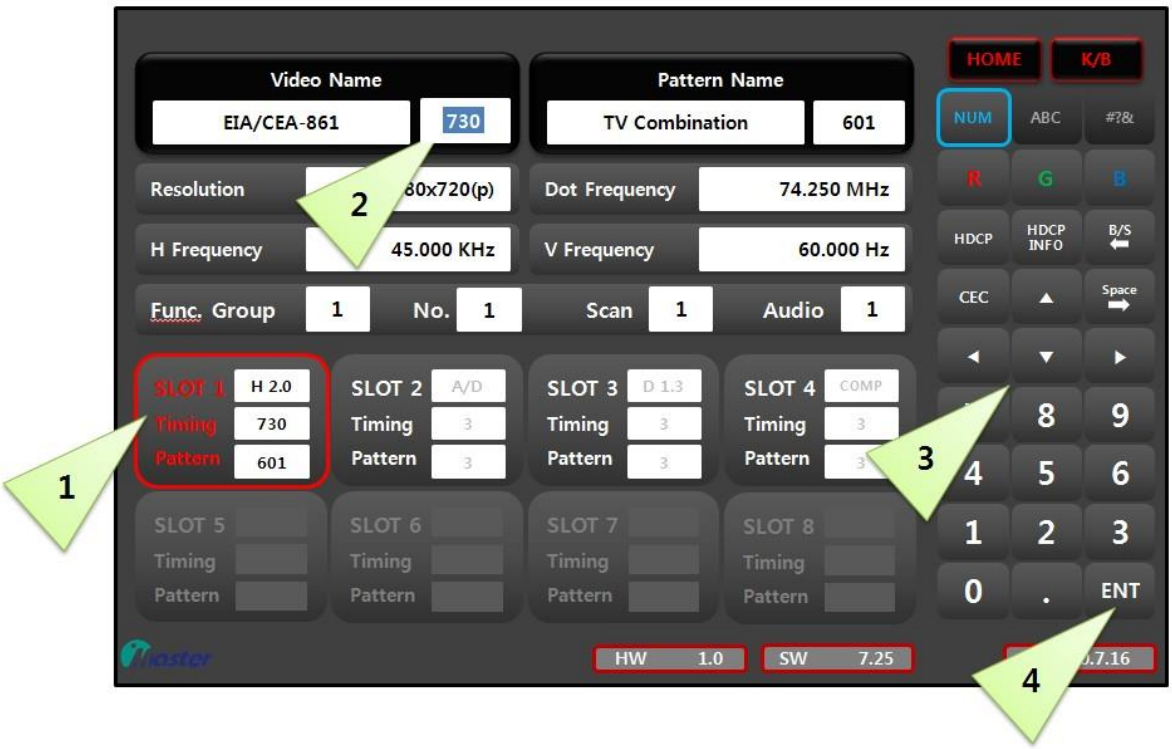
⑭ HW, SW: Hardware and software version

4.2 Time(resolution)

You can use various type timings and edit them yourself.

4.2.1 How to call timing

1) Timing call using the touch screen



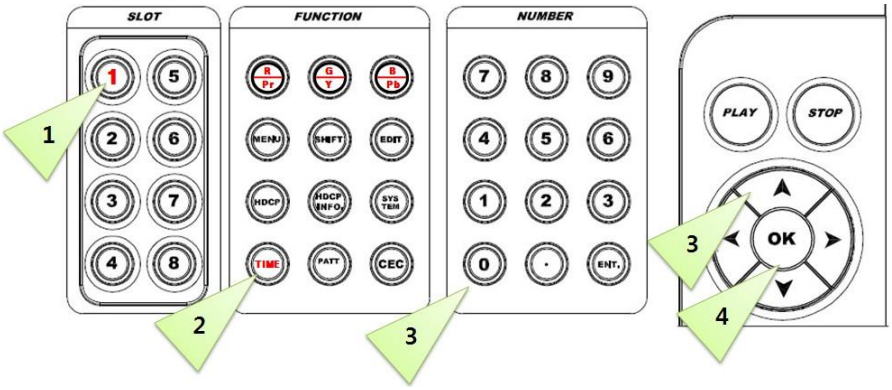
① Select slot number which you want to change timing ➔ Selected slot will change red and activate.

② Select Video Name box ➔ Cursor will activate.

③ Check the timing sticker and select timing number.

④ Press “ENT” button to run ➔ Selected timing will output to display equipment.

2) Timing call using keypad



① Select slot number which you want to change timing ➔ Selected slot will change red and activate.

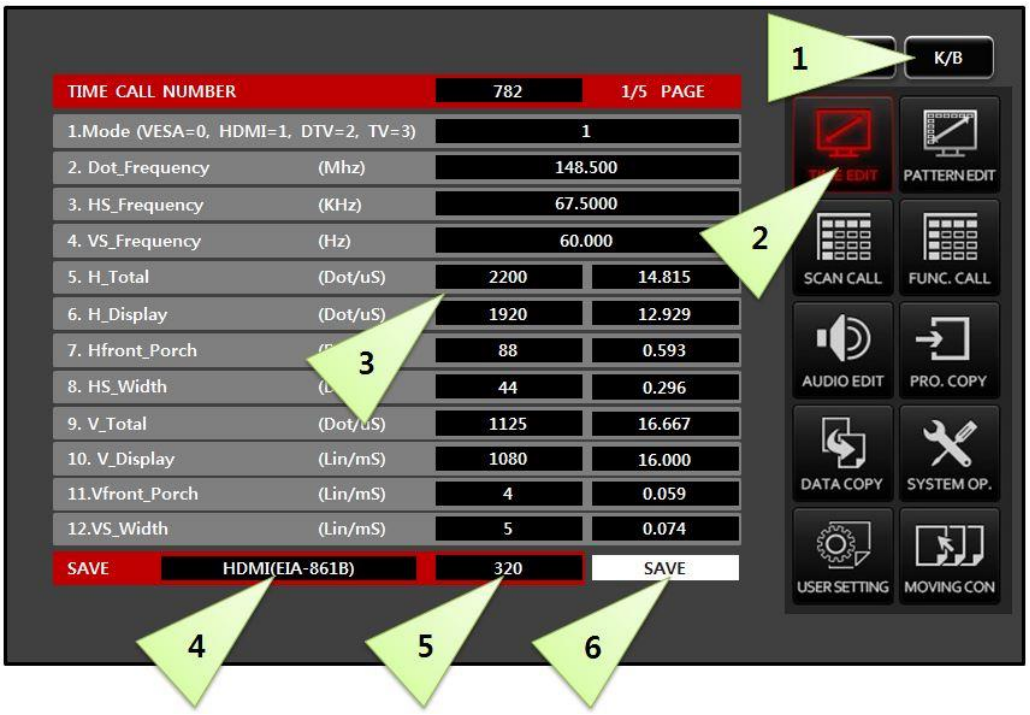
② Select TIME button ➔ TIME button will change to red.

③ Check the timing sticker and select timing number.

④ Press “OK” button to run ➔ Selected timing will output to display equipment.

4.2.2 How to edit timing

1) Timing edit using touch screen



① Press “K/B” button to activate edit list.

② Press “TIME EDIT” button to activate timing edit list.

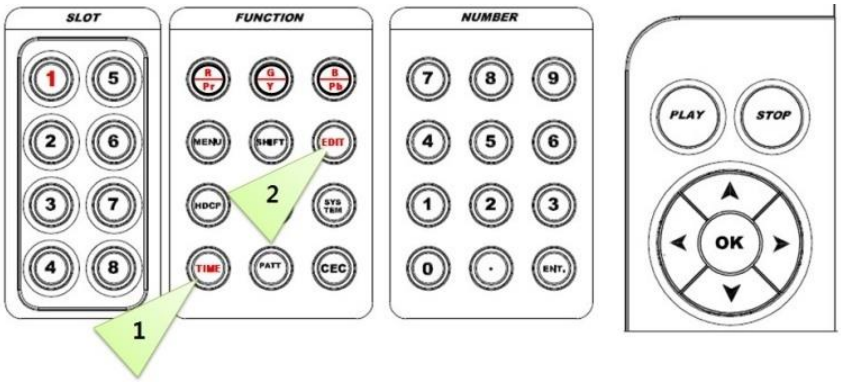
③ Use direction button for change timing value as you wanted ➔ Refer to manual page at 23~30

④ Change timing name as you wanted. Drag number 4. and press “K/B” button for character.

⑤ Change timing number as you wanted empty timing number at 1~700.

⑥ Password is “8880”.

2) Timing edit using keypad



4.2.3 Timing edit list

Common Option				
MODE	NO.	LIST	DESCRIPTION	SETTING
COMMON OPTION	1	Mode	***Video mode setting***	***0~3***
			ANALOG mode setting	ANALOG=0
			DIGITAL mode setting	DIGITAL=1
			COMPONENT mode setting	COMP=2
			CVBS mode setting	CVBS=3
	2	Dot_Frequency(MHz)	Input the Dot Frequency as MHz.	Number
	3	HS_Frequency(KHz)	Input the Horizontal Frequency as KHz.	Number
	4	VS_Frequency (Hz)	Input the Vertical Frequency as Hz.	Number
	5	H_Total (Dot/uS)	Input the data as Dot or Time for whole pixels of marking Horizontal 1 line.	Number
	6	H_Display (Dot/uS)	Input the data as Dot or Time for available pixels of marking Horizontal 1 line.	Number
	7	Hfront_Porch (Dot/uS)	Input the data as Dot or Time for one of the line that is not display from the right side of screen.	Number
	8	HS_Width (Dot/uS)	Input the data as Dot or Time for Horizontal returning section.	Number
	9	V_Total (Lim/mS)	Input the data as line or time for whole line of one frame.	Number
	10	V_Display (Lim/mS)	All of Vertical display line frame except vertical front porch and back porch.	Number
	11	Vfront_Porch(Lim/mS)	No video section of one frame at the bottom.	Number
	12	VS_Width (Lim/mS)	Vertical recurrence period.	Number
	13	HS_Polarity	***Select the Polarity of Horizontal sync***	***0 or 1***
			Horizontal sync setting to negative “-“	Negative(-)=0
			Horizontal sync setting to positive “+“	Positive(+)=1
	14	VS_Polarity	***Select the Polarity of Vertical sync***	***0 or 1***
			Vertical sync setting to negative “-“	Negative(-)=0
			Vertical sync setting to positive “+“	Positive(+)=1
	15	Interlace	***Interlace setting***	***0~2***
			Default / Interlace None setting(No=0)	No=0
			Interlace setting with Video Signal(S&V=1)	S&V=1
			Interlace setting without Video Signal(S=2)	S=2
	16	Resolution Display	***Current resolution display on the monitor or not.***	***0 or 1***
			Default / Current resolution none display.	No = 0
			Current resolution display on the monitor at the center below.	Yes = 1

COMMON OPTION	17	Model Name Display	***Current model name display on the monitor or not.***	***0 or 1***
			Default / Current model name none display.	No = 0
			Current model name display on the monitor at the center upper.	Yes = 1
	18	Aspect Ratio	***Set screen ratio.***	***0~2***
			Setting screen ratio to 4:3	4:3=0
			Default / Setting screen ratio to 16:9	16:9=1
			Setting screen ratio to 64:27	64:27=2
	19	Color Space	***Set color matrix format.***	***0~3***
			Default / Setting color matrix format to RGB	RGB=0
			Setting color matrix format to BT.601	BT.601=1
			Setting color matrix format to BT.709	BT.709=2
			Setting color matrix format to BT.2020	BT.2020=3
	20	Color Format	***Set of output Data Format.***	***0~3***
			Default / This signal is incarnate by only RGB Data without Y	RGB444=0
			The express method as base on the Y, Cb, Cr	YCbCr444=1
			The express method as base on the Y, Cb, Cr	YCbCr422=2
			The express method as base on the Y, Cb, Cr	YCbCr420=3
	21	Out Data Bit	***Set of Data Bit Format.***	***0~3***
			Setting to 6bit	6bit=0
			Default / Setting to 8bit	8bit=1
			Setting to 10bit	10bit=2
			Setting to 12bit	12bit=3
	22	Out Range	***Set of out range to full, limit or xvYCC***	***0~2***
			Setting to full range	Full=0
			Default / Setting to limit range	Limit=1
			Setting to xvYCC range	xvYCC=2
	23	Audio Pattern Number	Change audio format at selected timing	1~32
	24	Video Pattern Number	Change pattern at selected timing(will update)	Number

ANALOG MODE				
MODE	NO	LIST	DESCRIPTION	SETTING
ANALOG MODE	25	Sync On Green	Set up the G(Green) Video added horizontal, vertical sync frequency or not	No=0 Yes=1
	26	HS Out Terminal <= CS	Set the Horizontal Sync port, with adding Vertical Sync or not	No=0 Yes=1
	27	VS Out Terminal Off	Set the Vertical Sync port, with adding Vertical Sync or not.	No=0 Yes=1
	28	DPMS Video	Selecting the video signal output or not, when the DPMS is operating	On=0 Off=1
	29	DPMS_Hsync	DPMS is a mode for power saving at the monitor	On=0 L_Off=1 H_Off=2
	30	DPMS_Vsync	DPMS is a mode for power saving at the monitor	On=0 L_Off=1 H_Off=2
	31	DVI Out	Selecting the DVI output signal	D&A=0 Digital=1 Analog=2
	32	DVI Range	Setting of the Digital output signal to Full/Limit Range	Full=0 Limit=1 RBLv.240=2
	33	Video Level	Set video level mV	0~999mV (default 700mV)
	34	Sync Off	H/V/Sync & Data enable Off setting	Sync On=0 H-Sync off=1 V-Sync off=2 Data enable off=4 H/V-Sync off=3 Data enable & H/V-Sync off=7
	35	Link Rate(DP)	Setting to DISPLAYPORT link rate	**Default** Auto=0 1.63G=1 / 2.7G=2 / 5.4G=3 6.75G=4 / 8.1G=5
	36	Link Count(DP)	Setting to DISPLAYPORT link count	**Default** Auto=0 1Lane=1 / 2Lane=2 / 4Lane=3

DIGITAL MODE					
MODE	NO.	LIST	DESCRIPTION		SETTING
DIGITAL MODE	25	HDCP ON	***Setting to HDCP on/off setting on timing.***		***0~2***
			HDCP off when call timing		Off=0
			HDCP on when call timing		On=1
			HDCP on and HDCP information display when call timing		Info On=2
	26	HDCP Version	***Setting to HDCP version 1.4 or 2.x.***		***0 or 1***
			Default / Setting to HDCP 1.4 version		1.4=0
			Setting to HDCP 2.x Version		2.x=1
	27	Audio Format	***Setting to audio format***		***0 or 1***
			Default / Setting to SPDIF audio(2Ch only/ Audio left & right)		SPDIF=0
			Setting to I2S audio(8Ch)		I2S=1
	28	Audio Sample Rate	***Setting to audio sample rate***		***0~7***
			Setting audio sample rate to mute		Mute=0
			Setting audio sample rate to 32Khz		32Khz=1
			Setting audio sample rate to 44.1Khz		44.1Khz=2
			Default / Setting audio sample rate to 48Khz		48Khz=3
			Setting audio sample rate to 88.2Khz		88.2Khz=4
			Setting audio sample rate to 96Khz		96Khz=5
			Setting audio sample rate to 176.4Khz		176.4Khz=6
			Setting audio sample rate to 192khz		192Khz=7
	29	ARC Setting (MG-HDMI2.0) eARC Setting (MG-HDMI2.1-12G)	**Setting to ARC(HDMI2.0)/eARC(HDMI2.1 12G slot)**		
			MG-HDMI2.0 only	**Default /** Setting to ARC off	Off=0
				Setting to ARC Ch1 on	Ch1=1
				Setting to ARC Ch2 on	Ch2=2
				Setting to ARC Ch1&2 on	Ch1&2=3
			MG-HDMI2.1-12G only *All=5 Check the eARC first, and if equipment does not support eARC and then check the ARC	**Default /** Setting to ARC off	Off=0
				Setting to ARC Ch1 on	ARC=1
				Setting to eARC Ch1 on	eARC=4
				Setting to eARC & ARC on	All=5
	30	Reserved	(HDR option-> change option at 42~44)		
	31	FRL Rate	Setting to FRL Rate		0=Off 3G=3 6G=6 10G=10

DIGITAL MODE				12G=12
	32	FRL Lane	Setting to FRL Lane	3Lane=3 4Lane=4
	33	FRL Mode	EDID Check ➔ Read EDID on TV(Monitor) and if TV(monitor) not support to SCDC then no screen output EDID Pass ➔ Screen output regardless of SCDC	SCDC Chk=0 SCDC non Chk.=1
	34	Displayport Link Rate	***Setting to Displayport link rate***	***0~5***
			Default / Displayport link rate to auto setting	Auto=0
			Setting Displayport link rate to 1.62Gbps	1.62Gbps=1
			Setting Displayport link rate to 2.70Gbps	2.70Gbps=2
			Setting Displayport link rate to 5.40Gbps	5.40Gbps=3
			Setting Displayport link rate to 6.75Gbps	6.75Gbps=4
			Setting Displayport link rate to 8.10Gbps	8.10Gbps=5
	35	Displayport Lane Count	***Setting to Displayport lane count***	***0~4***
			Default / Auto Displayport lane setting	Auto=0
			Setting Displayport to 1(one) lane	1lane=1
			Setting Displayport to 2(two) lane	2lane=2
			Setting Displayport to 4(four) lane	4lane=4
	36	Sync off	***Setting to Sync Off***	
			Default / Setting to Horizontal & Vertical & DE sync on	On=0
			Setting to Horizontal sync off	H-sync off=1
			Setting to Vertical sync off	V-Sync off=2
			Setting to Data Enable off	DE off=4
			Setting to Horizontal & Vertical sync & DE off	H&V&DE off=7
	37	Video Format	**2D or 3D setting**	***0 or 2***
			Default / 3D setting off	Off=0
			3D display setting	3D=2
	38	3D Structure	**3D Type setting**	***0~8***
			Frame Packing(3D data: 0000)	0
			Field Alternative(3D data: 0001)	1
			Line Alternative(3D data: 0010)	2
			Side-By-Side Full(3D data: 0011)	3
			Reserved	4
			Reserved	5
			Top and Bottom(3D data: 0110)	6
			Side-By-Side Half(3D data: 1000)	8
	39	3D Ext Data	**3D Ext Data setting**	***0~7***

DIGITAL MODE			Horizontal sub-sampling odd/left picture, odd/right picture	0
			Horizontal sub-sampling odd/left picture, even/right picture	1
			Horizontal sub-sampling even/left picture, odd/right picture	2
			Horizontal sub-sampling even/left picture, even/right picture	3
			Quincunx matrix odd/left picture, odd/right picture	4
			Quincunx matrix odd/left picture, even/right picture	5
			Quincunx matrix even/left picture, odd/right picture	6
			Quincunx matrix even/left picture, even/right picture	7
	40	3D Vact_space/Vblank3	**3D V Active Space setting**	Line
	41	Frame packing interlace	**Frame packing interlace setting**	***0 or 1***
			Default / Frame packing interlace off	Off=0
			Frame packing interlace on	On=1
	42	HDR EOTF	**Setting to HDR**	***0/2/3***
			Setting to HDR off	Off=0
			Setting to HDR10 on Setting to HDR10 on [HDR 10 default setting value] a. On/Off HDR Metadata infoframe:1_On/Enable b. Type of HDR Metadata infoframe: 7_Fixed, un editable c. Version of HDR Metadata infoframe: 1_Version 1, Fixed, un editable d. Select EOTF: 2_SMPTE ST 2048 e. Type of static Metadata Descriptor ID:0_Metadata type1 f. Set Display_Primaries_X[0]: 35000 g. Set Display_Primaries_Y[0]: 15000 h. Set Display_Primaries_X[1]: 7500 i. Set Display_Primaries_Y[1]: 40000 j. Set Display_Primaries_X[2]: 7000 k. Set Display_Primaries_Y[2]: 2500 l. Set White_point_X: 13550 m. Set White_point_Y: 13500 n. Set max_display_mastering_luminance: 10000 o. Set min_display_metering_luminance: 70 p. Set Maximum Content Light Level: 1000 Set Maximum Frame-average Light Level: 400	HDR10=2
			Setting to HLG on	HGL=3
	43	HDR Max CLL	Setting to HDR Max CLL	1~65535
	44	HDR Max FALL	Setting to HDR Max FALL	1~65535

COMPONENT MODE				
MODE	NO	LIST	DESCRIPTION	SETTING
COMPONENT MODE	25	Serration On of DTV	***DTV serration on/off setting***	***0 or 1***
			DTV serration off	No=0
			DTV serration on	Yes=1
	26	Serration Pulse	***Serration pulse setting***	***0 or 1***
			DTV serration setting to HS/2	HS/2=0
			DTV serration setting to HS	HS=1
	27	Number of EQP Pulse (Front EA)	**Select the number of EQP pulse in vertical front porch**	***0~99***
	28	Number of EQP Pulse (Back EA)	**Select the number of EQP pulse in vertical back porch**	***0~99***
	29	Sync On(Pb&Pr) with Y	**Select the sync signal with Pb & Pr**	***0 or 1***
			Sync signal with Pb & Pr	0
			Sync signal without Pb & Pr	1
	30	(Pb & PR) Out Level	**Set of Pb & Pr signal level**	***0~100%***
	31	Sync Set	0=Tri Level: Output with antagonism sync	Tri Lev=0
			1=Bi Level: Output with general sync	Bi Lev=1

CVBS MODE				
MODE	No	LIST	DESCRIPTION	SETTING
CVBS MODE	25	TV Time Mode	***TV(CVBS) Time Mode Setting***	***1~8***
			Setting to NTSC-M	1
			Setting to NTSC-J	2
			Setting to NTSC-0.43	3
			Setting to PAL-BDFH	4
			Setting to PAL-M	5
			Setting to PAL-60	7
			Setting to SECAM	8
	26	SCART	***Set of SCART output mode.***	***0~3***
			Setting to RF	RF=0
			Setting to CVBS	CVBS=1
			Setting to RGB	RGB=2
			Setting to Y/C	Y/C=3
	27	SCART Aspect Ratio	***Set of display rate when SCART are displaying***	***0 or 1***
			Setting to 4:3 SCART rate	4:3=0
			Setting to 16:9 rate	16:9=1
	28	S-V Ratio	***Set of display rate when S-Video are displaying.***	***0~2***
			Setting to 4:3 S-VIDEO rate	4:3=0
			Setting to 4:3(L) S-VIDEO rate	4:3(L)=1
			Setting to 16:9 S-VIDEO rate	16:9=2
	29	Video Filter	Function of reduce the Video signal noise.	0~7
	30	Video Black Level	**Set of Video Black level.**	***0~3***
			Setting to default	Default=0
			Setting to 7.52 IRE	7.5IRE=1
			Setting to 0 IRE_S	0 IRE_S=2
			Setting to 0 IRE	0 IRE=3
	31	Teletext	Set of Teletext on/off when PAL is displaying.	0~15
	32	Closed Caption	***Set of Closed Caption on/off when NTSC is displaying.***	***1~255***
		▶CC1=Roll-UP	Characters are displayed by Roll-up style, from 4Rows to 2Rows.	CC1=1
		▶CC2=Pop-On	Characters are displayed by Pop-On Style, Up, Middle, Down.	CC2=2
		▶T1=Roll-Up(Default)	Characters are displayed complete sentences.	T1=4
		▶T2=Roll-Up(Default)	Displayed by one sentence's character	T2=8
		▶CC3=Paint-On	Font's background color changed and displaying by paint-on style.	CC3=16

		▶CC4=Roll-Up	Simplify, Displaying by 2Row Roll-up style.	CC4=32
		▶T3=Roll-Up(Default)	It does display character as T1, But The Character of each row is displayed as different color.	T3=64
		▶T4=Roll=Up(default)	It does display character as T2. But The Character of each row is displayed as different color.	T4=128
		▶Full On	All Closed Caption functions are on.	FULL=255

C V B S M O D E	33	***V-Chip***	***Set of V-Chip on/off when NTSC is displaying.***					
		Canadian Ratings(**English**)				Canadian Rating(**French**)		
		1.Exempt	20			1.E	30	
		2.C	21			2.G	31	
		3.C	22			3.8+	32	
		4.G	23			4.13+	33	
		5.PG	24			5.16+	34	
		6.14+	25			6.18+	35	
		7.18+	26					

USA(Movie)		**USA Rating**		**USA(TV) Sub Rating**		
1.G	1	1.A	10X	1.TV-Y	USA Rating+1	
2.PG	2	2.D(Suggestive Dialogue)	11X	2.TV-Y7	USA Rating+2	
3.PG-13	3	3.L(Coarse Language)	12X	3.TV-G	USA Rating+3	
4.R	4	4.S(Sexual Content)	13X	4.TV-PG	USA Rating+4	
5.NC-17	5	5.V(Violence)	14X	5.TV-14	USA Rating+5	
6.X	6			6.TV-MA	USA Rating+6	
7.NR	7	Ex.)"Coarse Language" + "TV-G" = 123 // "Violence" + "TV-Y" = 141				

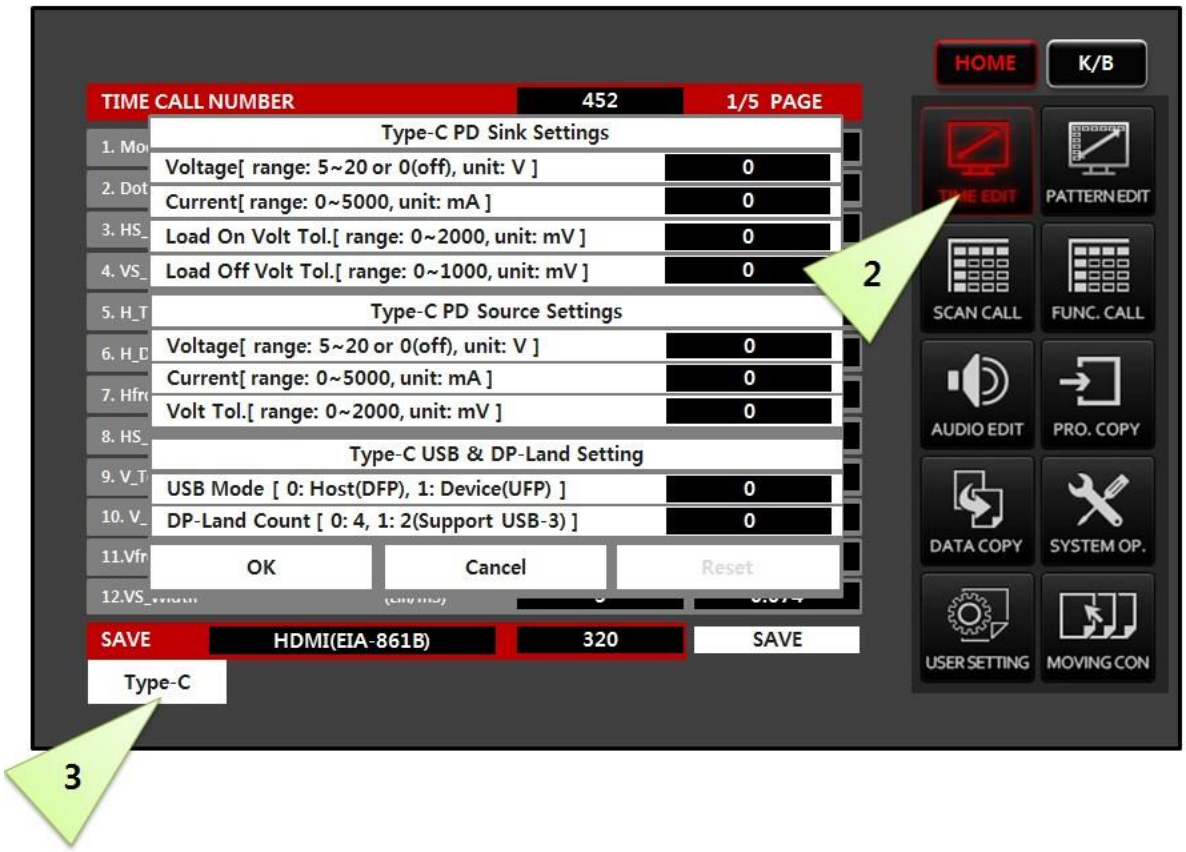
34	SCART Monitoring	***SCART TV/MORNITORING setting***	***0 or 1***
		Output the same signal except RF mode by TV & Monitoring port.	Same=0
		TV port for normal signal and Monitoring port for returning signal output	Return=1
35	WSS ASPECT RATIO Control	Setting WIDE SCREEN SIGNALING	***0 ~ 7***

USB TYPE-C MODE + MSDL-100W + MSPW-100W				
MODE	NO	LIST	DESCRIPTION	SETTING
USB TYPE-C MODE	For testing Monitor's Type-C output port electric load(MSDL-100W_optional)			
	1	Voltage	Type-C monitor's voltage set from 5V to 20V, 0.05V/unit.	0 or 5~20 (0=off)
	2	Current	Type-C monitor's current set from 0~5000mV, 10mA/unit.	0~5000
	3	Load On Voltage Tol.	Voltage error tolerance under the electric load. 0~2000mV, 1mV/unit	0~2000 (0=off)
	4	Load Off Voltage Tol.	Voltage error tolerance without the electric load. 0~1000mV, 1mV/unit	0~1000
	For sending Monitor's Type-C port to electric power(MSPW-100W_optional)			
	1	Voltage	The voltage sent to the Type-C monitor can be set to 0V, 5~20V. 0.05V/unit	0 or 5~20 (0=off)
	2	Current	The current sent to the Type-C monitor can be set to 0~5000mV. 10mA/unit	0~5000
	3	Volt Tol.	Voltage tolerance to monitor can be set to 0 to 2000mV (500mV~1000mV recommended)	0~2000
	USB Mode and DP LANE setting			
	1	USB Mode	USB Mode: Type-C USB mode setting	
			0=Host(DFP) Connect a PC(Host) to a USB Type-B port to check USB working.	
			1= Device(UFP) Confirm connecting memory device to USB Type-A port.	
	2	DP-Lane	DP-Lane Count: Displayport lane count setting	
			0=4 Displayport 4data lane use(USB3.0 does not work)	
			1=2 Displayport 2data lane use(USB3.0 does work, DP 4 lane mode does not work)	

1)How to use the MG-USB-TYPE C and ELECTRIC LOAD MSDL-100W

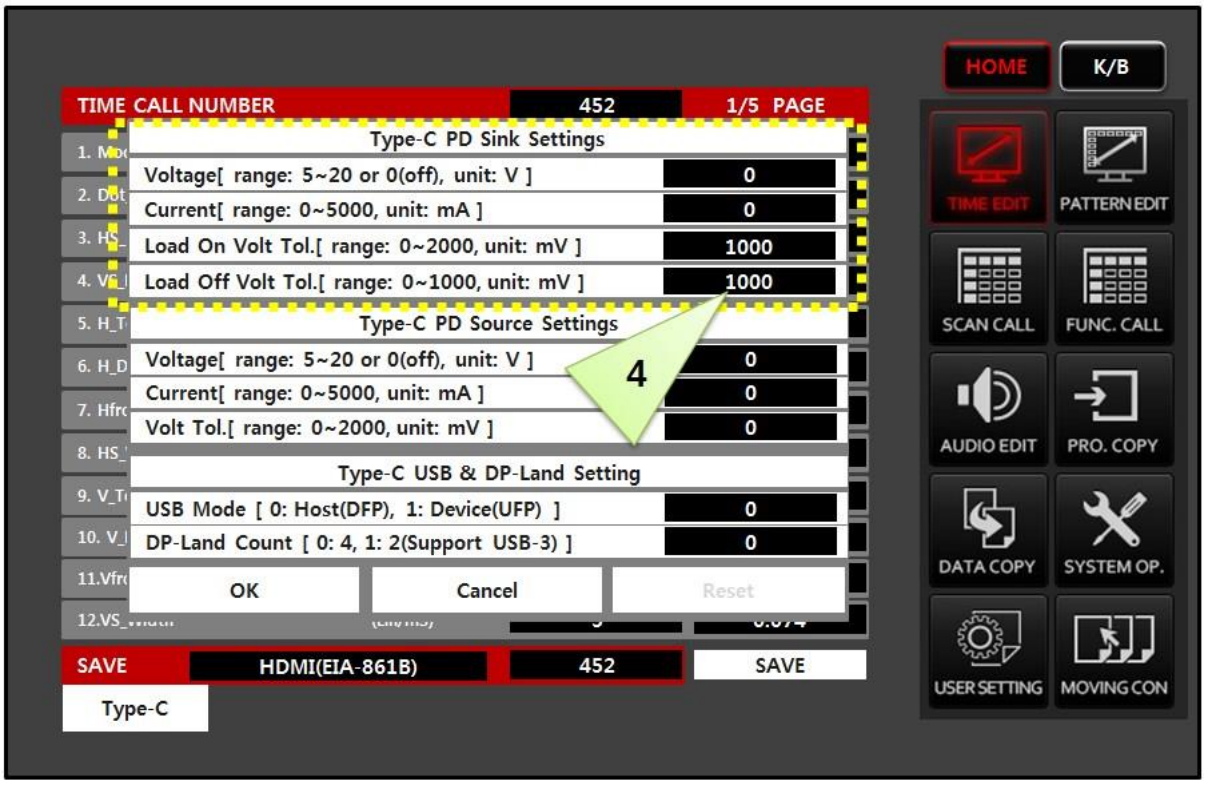
① Please connect MG-USB-TYPE C and MSDL-100W.

② Select MG-USB-TYPE C slot and press TIME EDIT button. Only time number 1~500 can be setup the electric load.

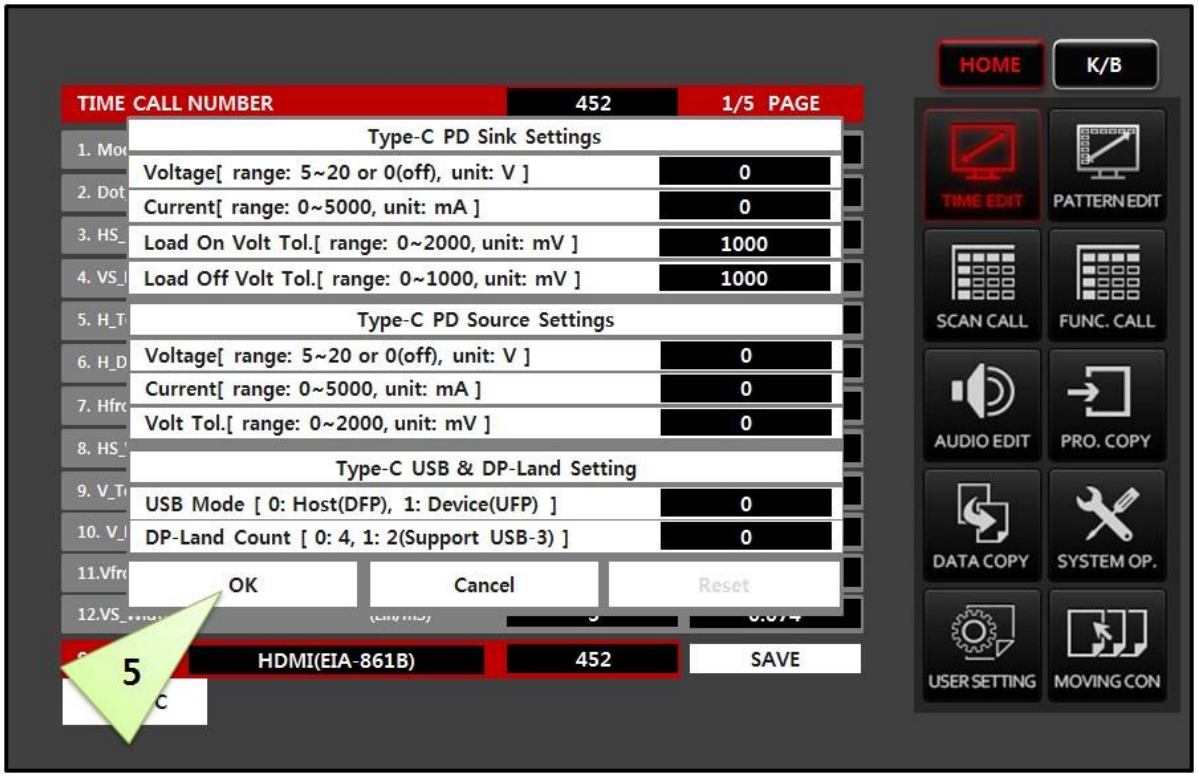


③ Press Type-C button to activate the Type-C setup window.

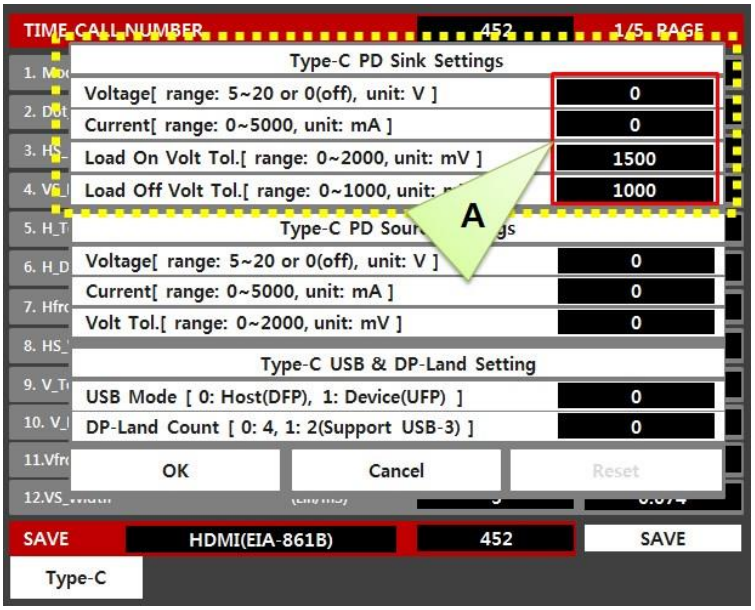
④ Change the power delivery electric load value as below.



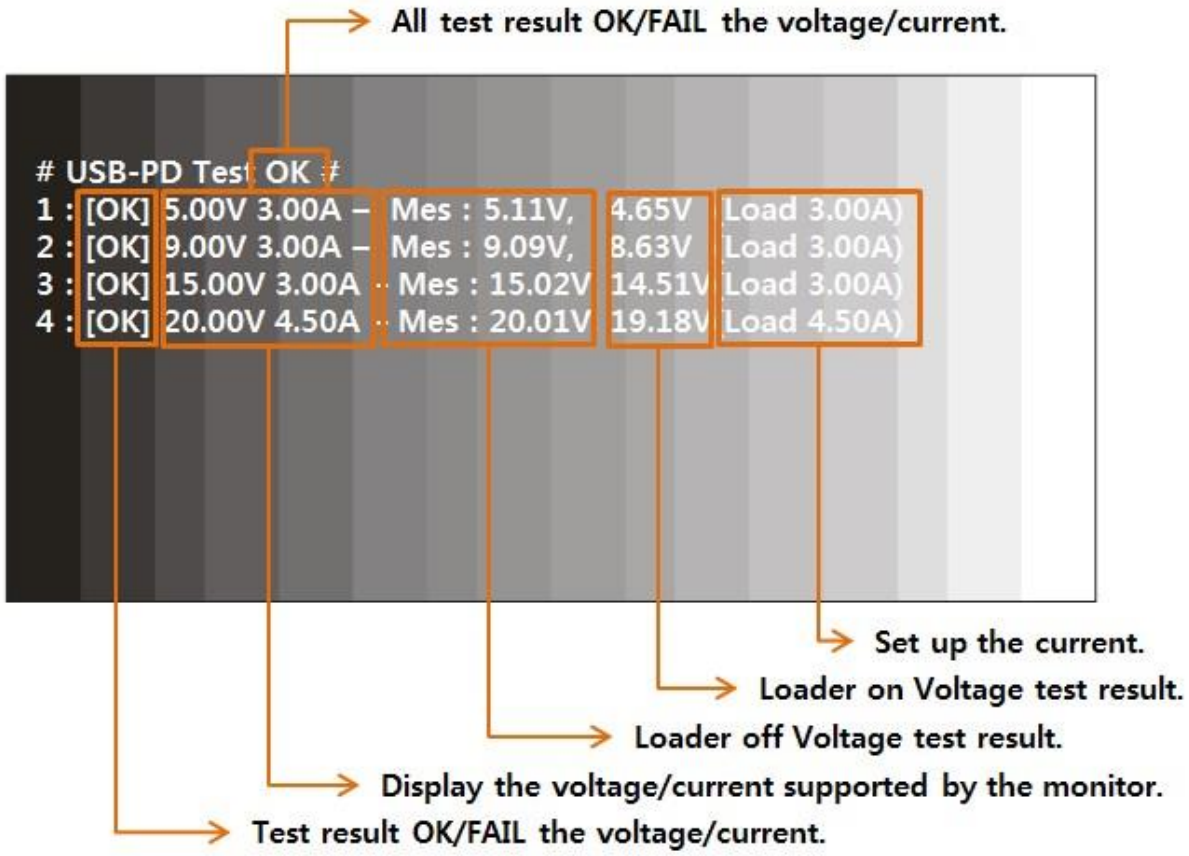
⑤ Press OK to save.(Overwrite the changed value at the called timing number.)



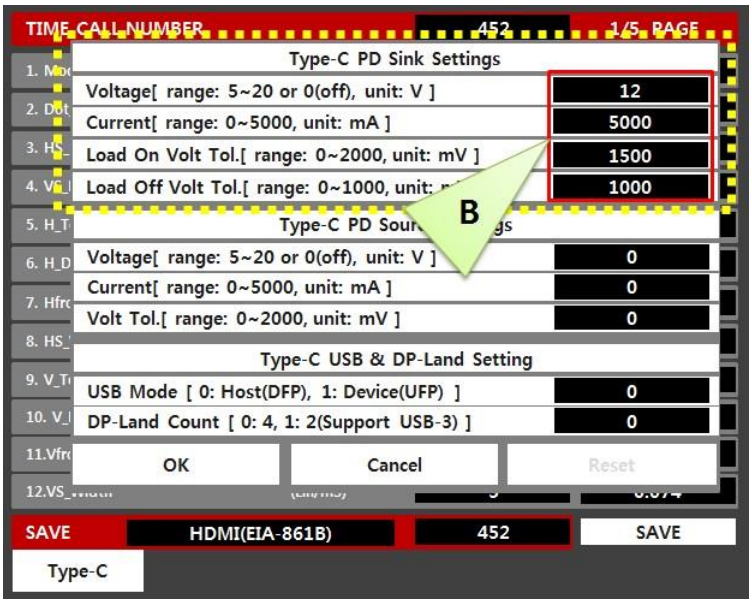
A. Ex.)Type-C electric load FULL AUTO Test.(recommend to production line)



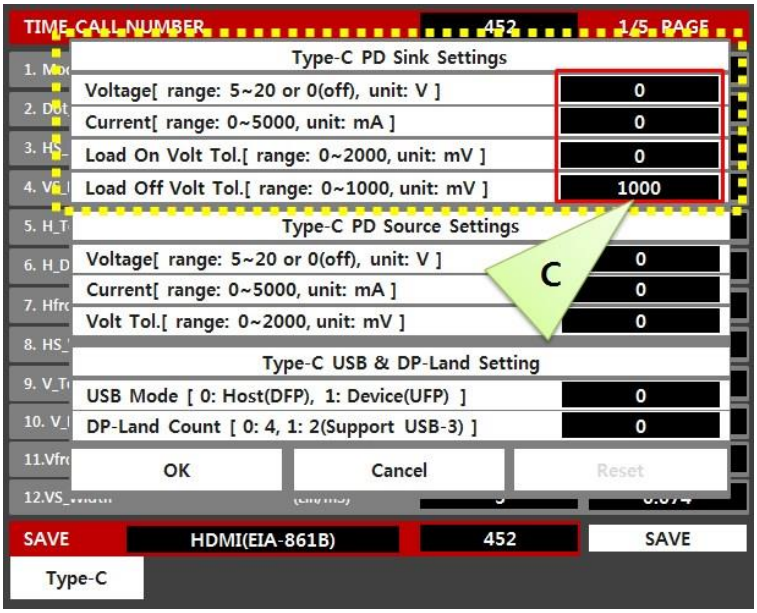
The MSPG-8000 checks the voltage/current supported by monitor with PD communication, automatically tests those values, and shows the result along with the pattern as below.



B. Ex.)Type-C electric load 12V/5A(60W) only MANUAL Test.

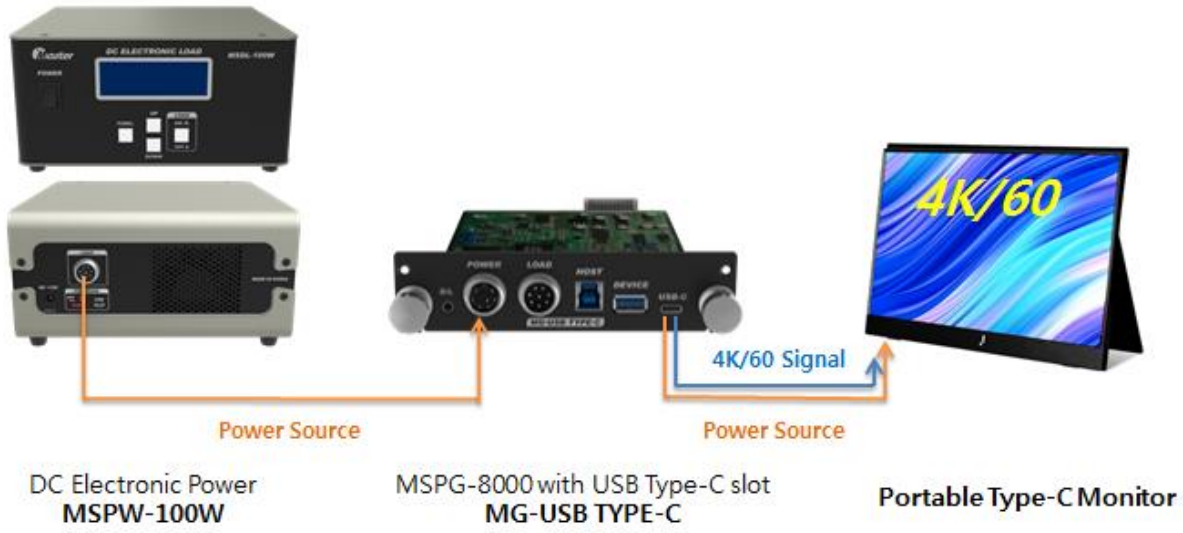


C. Ex.)Type-C voltage without electric load(MSDL-100W) AUTO Test.

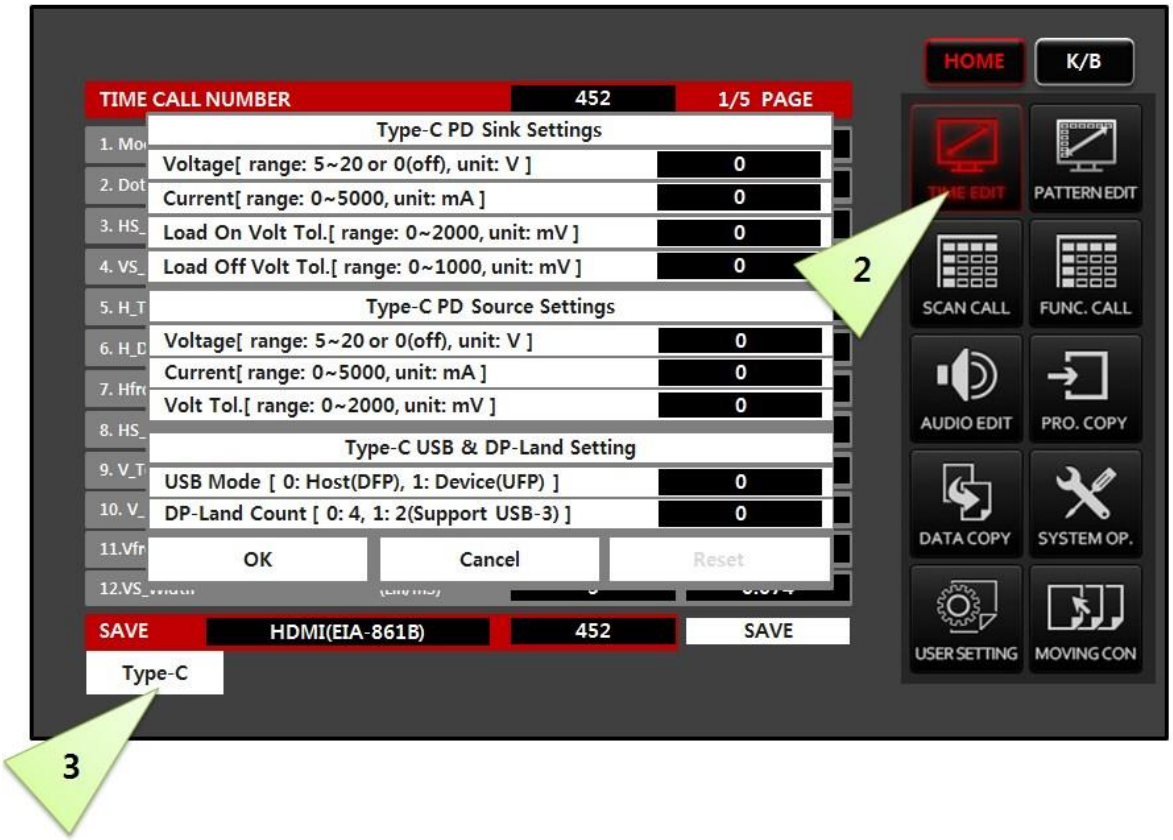


2)How to use the MG-USB-TYPE C and TYPE-C POWER MSPW-100W.

① Please connect MG-USB-TYPE C and MSPW-100W.

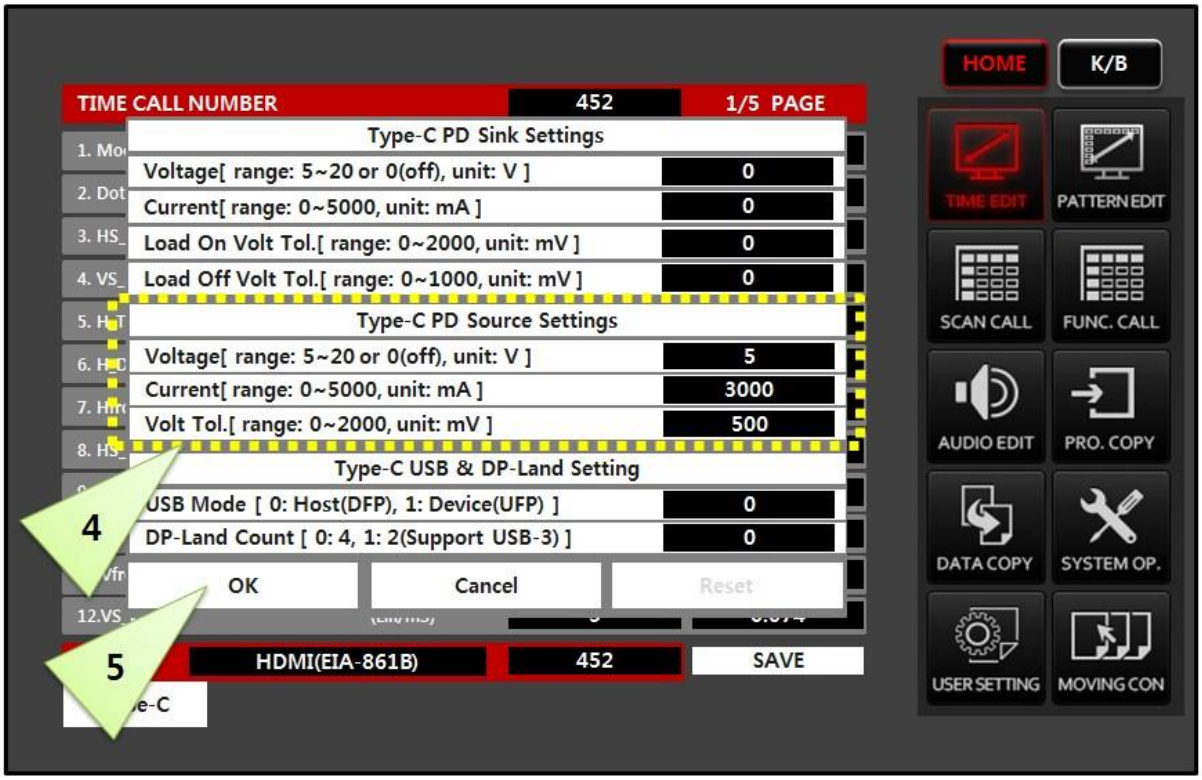


② Select MG-USB-TYPE C slot and press TIME EDIT button. Only time number 1~500 can be setup the power supply.



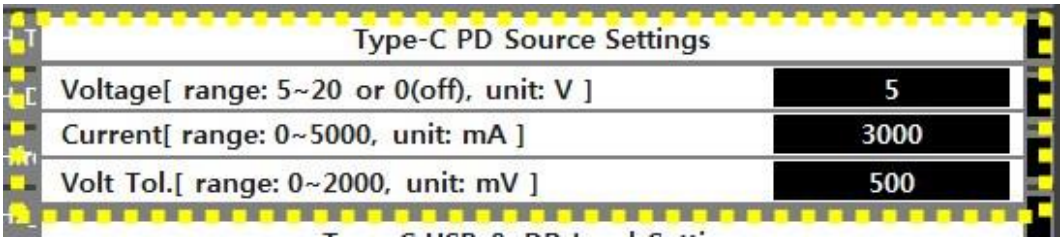
③ Press Type-C button to activate the Type-C setup window.

④ Set up the power delivery power as below.



⑤ Press OK to complete saving the settings.

⑥ Ex.)5V/3A(15W) Type-C power sending.

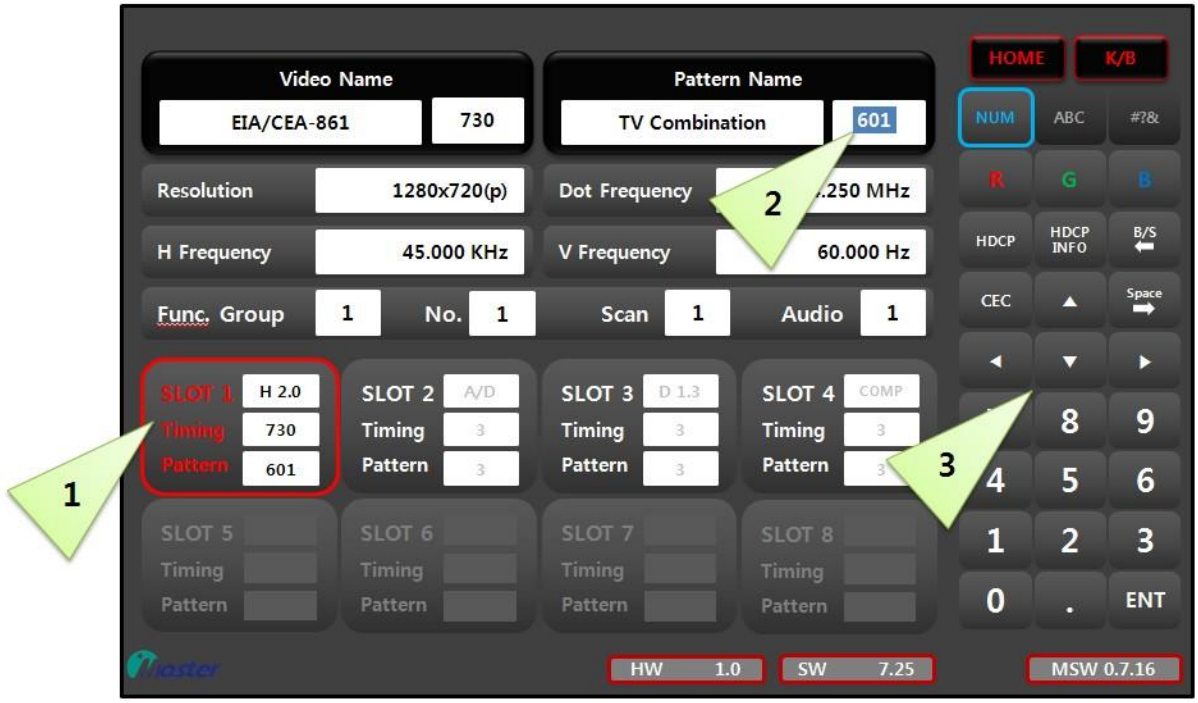


4.3 Pattern

You can use various type patterns and edit them yourself.

4.3.1 How to call pattern

1) Pattern call using the touch screen

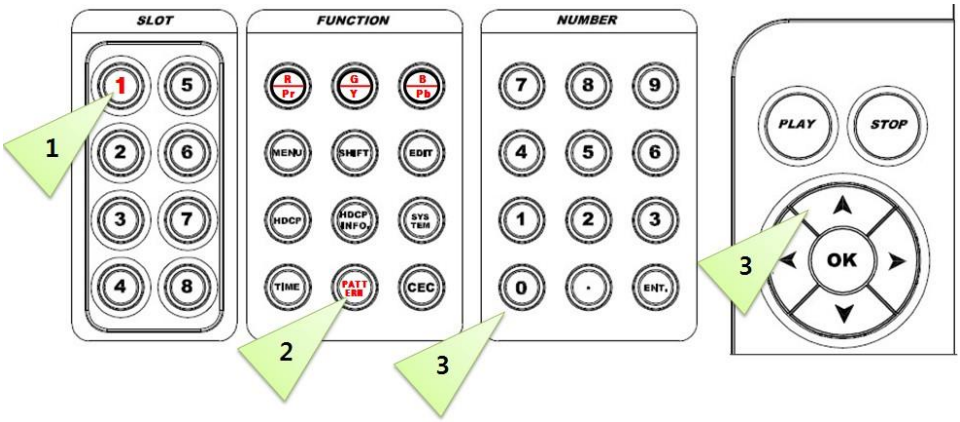


① Select slot number which you want to call pattern ➔ Selected slot will change red and activate.

② Select Pattern Name box ➔ Cursor will activate.

③ Check the pattern sticker and select pattern number. ➔ Selected pattern will output to display equipment.

2) Pattern call using the keypad



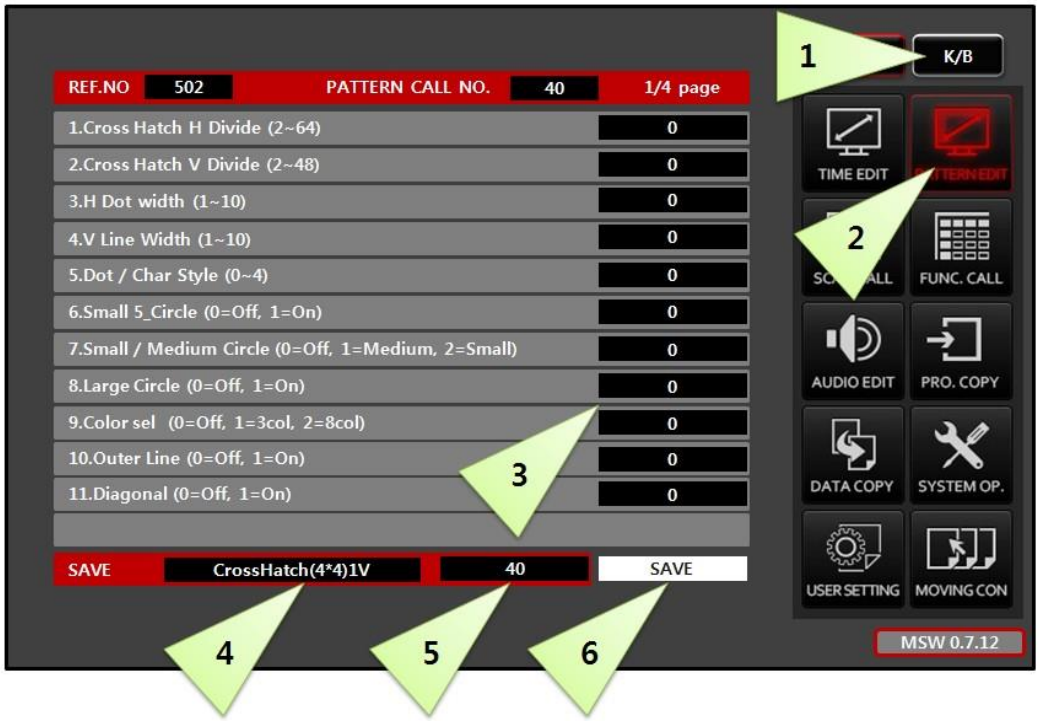
① Select slot number which you want to change pattern ➔ Selected slot will change red and activate.

② Select PATTERN button ➔ PATTERN button will change to red.

③ Check the pattern sticker and select pattern number. ➔ Selected pattern will output to display equipment.

4.3.2 How to edit pattern

1) Pattern edit using touch screen



⑦ Press “K/B” button to activate edit list.

⑧ Press “PATTERN EDIT” button to activate pattern edit list.

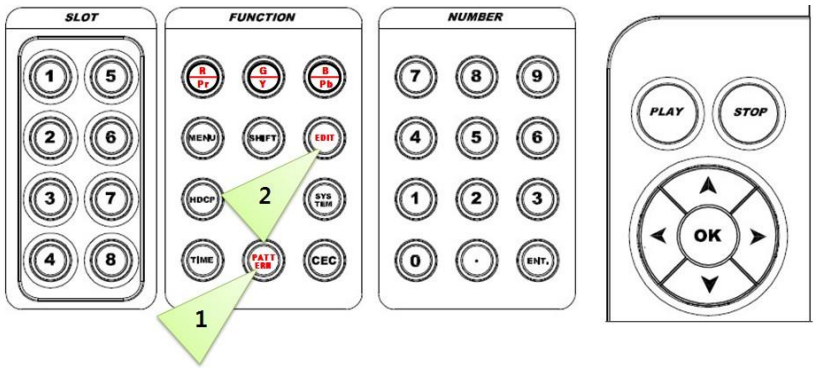
⑨ Use direction button for change pattern value as you wanted..

⑩ Change pattern name as you wanted. Drag number 4. and press “K/B” button for character.

⑪ Change pattern number as you wanted empty pattern number at 1~500.

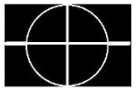
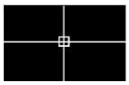
⑫ Password is “8880”.

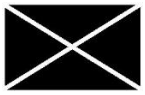
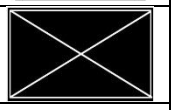
2) Pattern edit using keypad



3) Pattern edit common list

All of pattern edit list are different, some patterns can have set value from 1 to 1, while others can have set value from 1 to 48. However all of patterns have same default options(35) from “Center Maker/Slash/box (0-11)” to “Add pattern number”.

Common Option				
MODE	NO.	LIST	DESCRIPTION	SETTING
COMMON OPTION	1	Center Marker/Slash/Box(0-11)	0: None	Based on Black pattern
			1: 9point center/border/edge	
			2: One line Cross line	
			3:Center Cross point	
			4:X line	
			5:Inverted triangle with white	
			6:Cross line with Circle	
			7:Black cross bar with white bar	
			8: Two line Cross line	
			9: Two vertical line	
			10: Cross line with center square box	
			11: Border line	
	2	Base_R/G/B_Level(0-100%)	If there is base color on the pattern, it can change base color Red/Green/Blue level 0% to 100%.	0~100
	3			
	4			
	5	Character R/G/B Level(0-100%)	If there is character on the pattern, it can character color change Red/Green/Blue level 0% to 100%.	0~100
	6			
	7			

COMMON OPTION	8	OSD Display(0-6)	0: None	Based on Black pattern
			1:美 Character at the bottom	
			2 :美 Character at the top	
			3 :美 Character at the top and bottom	
			4: Boarder line character	
			5: X line character	
			6: Boarder and X line character	
	9	OSD_R/G/B_Level(0-100%)	If there are OSD on the pattern, it cans OSD color change Red/Green/Blue level 0% to 100%.	0-100
	10			
	11			
	12	Auto Bright Up & Down(0-12)	0: None	0
			1: Automatically brightens and darkens repeatedly.	1
			2: Automatically red brightens and darkens repeatedly.	2
			3: Automatically brightens and darkens repeatedly with red.	3
			4: Automatically brightens and darkens repeatedly with blue.	4
			5: Automatically brightens and darkens repeatedly.	5
			6: Automatically brightens and darkens repeatedly with red and cyan..	6
			7: Automatically brightens and darkens repeatedly with green and magenta.	7
			8: Automatically brightens and darkens repeatedly with blue and yellow.	8
			9: Automatically brightens and darkens repeatedly.	9
			10: Automatically brightens and darkens repeatedly with red cyan.	10
			11: Automatically brightens and darkens repeatedly with green and magenta.	11
			11: Automatically brightens and darkens repeatedly with blue and yellow.	12

	13	Reverse On Time (0~999)/Vf	Set up the reverse on/off time to 0~900/Vertical Frequency. If you want to check reverse on/off pattern, you have to set up on time and off time together	0~900
	14	Reverse Off Time (0~900)/Vf		
	15	Character Moving (0~8)	If there is character on the pattern, you can move only character pattern to any direction. *If you want to check moving pattern, you have to set up "Moving Pixel Step (0~99)" to minimum "1".	
			0:none	0
			1: Moving only character right to left ←	1
			2: Moving only character left to right →	2
			3: Moving only character down to up ↑	3
			4: Moving only character up to down ↓	4
			5: Moving only character left/up to right/down ↘	5
			6: Moving only character right/up to left/down ↙	6
			7: Moving only character left/down to right/up ↗	7
			8: Moving only character right/down to left/up ↖	8
	16	Reserved		0
	17	Color Moving (0~8)	If there are color base on the pattern, you can move only color base pattern to any direction. *If you want to check moving pattern, you have to set up "Moving Pixel Step (0~99)" to minimum "1".	
			0:none	0
			1: Moving only color right to left ←	1
			2: Moving only color left to right →	2
			3: Moving only color down to up ↑	3
			4: Moving only color up to down ↓	4
			5: Moving only color left/up to right/down ↘	5
			6: Moving only color right/up to left/down ↙	6
			7: Moving only color left/down to right/up ↗	7
			8: Moving only color right/down to left/up ↖	8
	18	Reserved		0
	19	Moving Pixel Step (0~99)	Moving pixel step set up 0 to 99	0~99
	20	Moving Frame Interval (0~99)	Moving frame interval set up 0 to 99	0~99
	21	Flicker On(CH, OSD, CL) (0~7)	Flicker on select to CH(Character), OSD(On screen display) and GL(Color) (bit combination)	0~7
			0	none
			1: Flicker character only	1

			2: Flicker OSD only	2
			3: Flicker character and OSD	3
			4: Flicker color only	4
			5: Flicker character and color	5
			6: Flicker OSD and color	6
			7: Flicker character, OSD and color	7
	22	Flicker on time (0~999)/Vf	Flicker on/off time set up to 0~999/Vertical frequency *If you want to check flicker pattern, you have to set up flicker on and off time together.	0~999
	23	Flicker off time (0~999)/Vf		0~999
	24	Gamma Correction (0~30)/10	Analog gamma correction (0~30)/10	0~30
	25	Video R (On=0, Off=1)	Video red on/off option	0=on 1=off
	26	Video G (On=0, Off=1)	Video green on/off option	0=on 1=off
	27	Video B (On=0, Off=1)	Video blue on/off option	0=on 1=off
	28	Video Level (0~999mV)	Video level set up	0~999
	29	Scart	Scart set up	1=RF 2=CVBS 3=RGB 4=Y/C,+1
	30	Reserved		
	31	Reserved		
	32	Reserved		
	33	Reserved		
	34	Reserved		

4) How to modify the pattern ➔ Call pattern No. xxx and press EDIT button.

① Full white pattern No.503 edit value and result.

Ref.no 503 **Full White pattern**				
1.Color box H start	100	100	100	50
2.Color box V start	100	100	100	0
3.Color box H size	100	100	50	100
4.Color box V size	100	100	50	100
5.Color Box R Level	255	255	0	255
6.Color Box G Level	255	0	255	0
7.Color Box B Level	255	0	0	0
8.Uniformity Position No.	0	0	0	0
9.Uniformity Position size	0	0	0	0
10.Lip_Sync on	0	0	0	0
11.Lip_Sync off	0	0	0	0
12.Cross Hatch H Divide	0	0	0	0

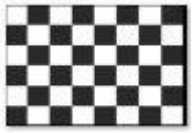
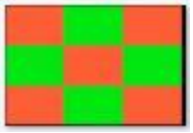
② Full white pattern No.505 edit value and result.

Ref.no 504 **Gray Step pattern**				
1.Color Step	256	8	8	8
2.Color Step Case	3	3	3	1
3.Red Color Level	255	255	0	0
4.Green Color Level	255	255	0	0
5.Blue Color Level	255	255	255	255

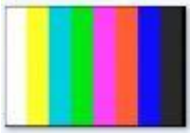
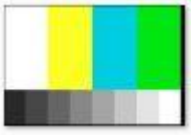
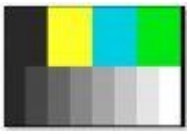
③ Line on/off pattern No.505 edit value and result.

Ref.no 505 **Line On/Off pattern**				
1.On Size	1	5	5	5
2.Off Size	1	5	5	5
3.H/V Line, Dot Select	0	1	2	2
4.Color On R Level	255	255	255	255
5.Color On G Level	255	255	0	0
6.Color On B Level	255	255	0	0
7.Color Off R Level	0	0	0	255
8.Color Off G Level	0	0	0	255
9.Color Off B Level	0	0	0	0

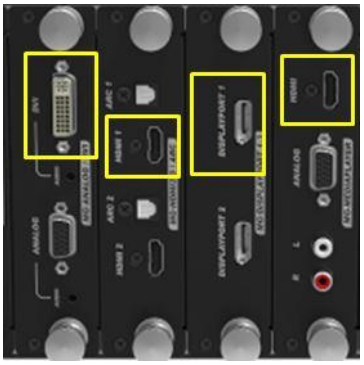
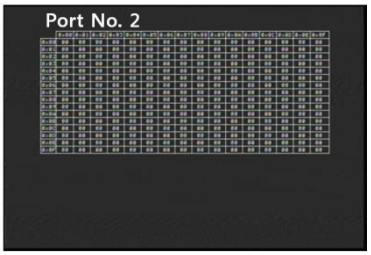
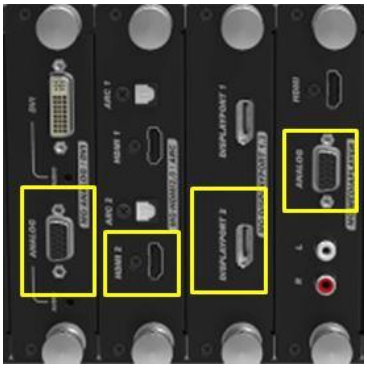
④ Chess pattern No.507 edit value and result.

Ref.no 507 **Chess pattern**				
1.H Divide	8	3	3	1
2.V Divide	6	3	3	1
3.Divide / Pixel select	0	0	0	1
4.Color On R Level	255	255	255	255
5.Color On G Level	255	255	0	255
6.Color On B Level	255	255	0	255
7.Color Off R Level	0	0	0	0
8.Color Off G Level	0	0	255	0
9.Color Off B Level	0	0	255	0

⑤ Color Bar pattern No.508 edit value and result.

Ref.no 508 **Color bar pattern**				
1.Color Bar H/V divide	8	4	4	8
2.Gray Size	0	30	50	50
3.Gray Step by one color	2	2	2	2
4.Gray 1 level	255	255	255	255
5.Color 1 R Level	255	255	0	0
6.Color 1 G Level	255	255	0	0
7.Color 1 B Level	255	255	0	0
8.Color 2 R Level	255	255	255	0
9.Color 2 G Level	255	255	255	0
10.Color 2 B Level	0	0	0	0
11.Color 3 R Level	0	0	0	0
12.Color 3 G Level	255	255	255	0
13.Color 3 B Level	255	255	255	0
14.Color 4 R Level	0	0	0	0
15.Color 4 G Level	255	255	255	0
16.Color 4 B Level	0	0	0	0
17.Color 5 R Level	255	255	255	255
18.Color 5 G Level	0	0	0	255
19.Color 5 B Level	255	255	255	255
20.Color 6 R Level	255	255	255	255
21.Color 6 G Level	0	0	0	255
22.Color 6 B Level	0	0	0	255
23.Color 7 R Level	255	255	255	255
24.Color 7 G Level	0	0	0	255
25.Color 7 B Level	0	0	0	255
26.Color 8 R Level	0	0	0	255
27.Color 8 G Level	0	0	0	255
28.Color 8 B Level	0	0	0	255

⑥ EDID pattern No.521/522/523 edit value and result.

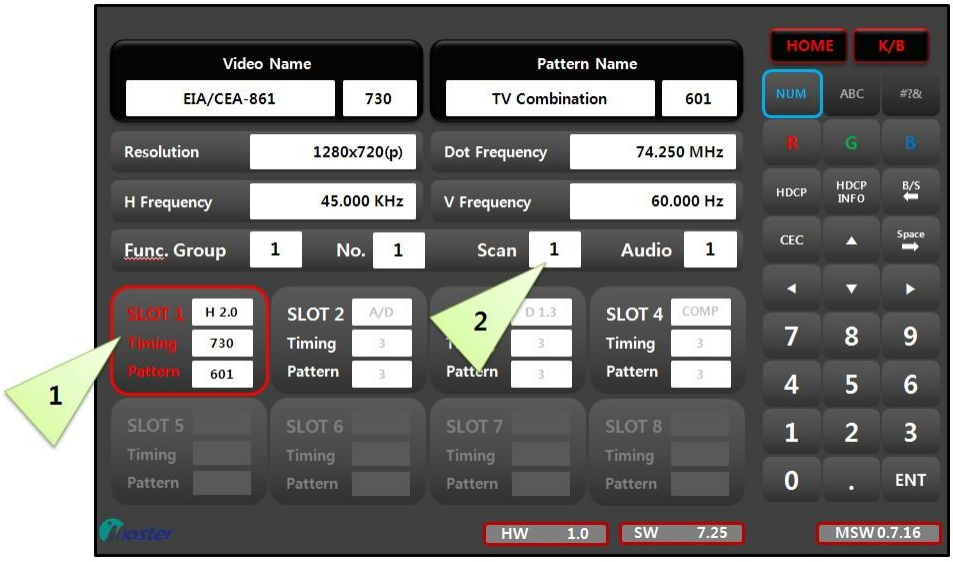
Ref.no 521/522/523 **EDID pattern**	 	 
1.EDID Port No.	Port 1 = 0	Port 2=1

4.4 SCAN

SCAN is designed for repeated output of timing and patterns. It can be applied to aging test or automation test.

4.4.1 SCAN function.

1) How to call saved Scan list.



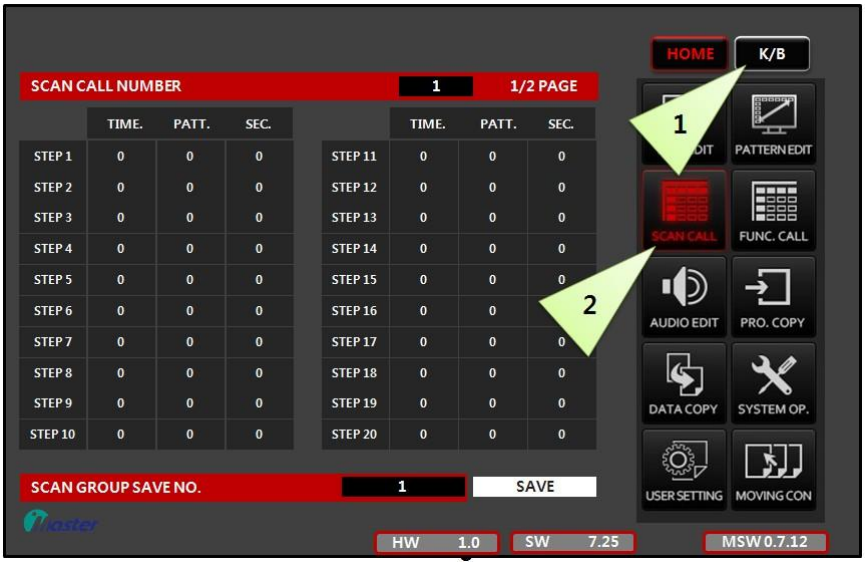
① Select slot number which you want to change scan ➔ Selected slot will change red and activate.

② Select Scan ➔ Cursor will activate

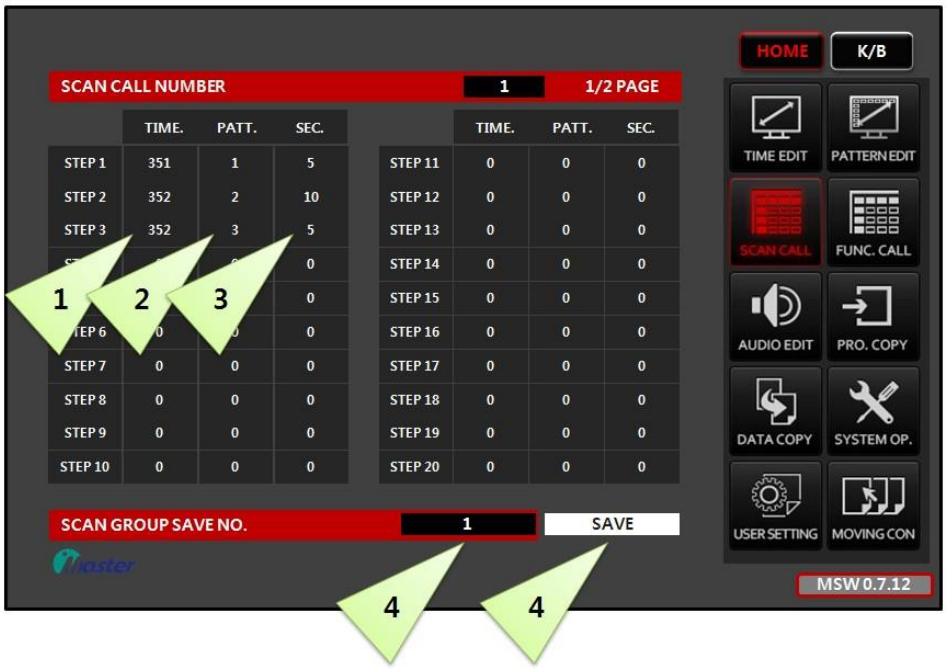
③ Press “ENT” button to run ➔ Set up the timing & pattern will repeat.

2) How to edit Scan

① Select slot number which you want to change scan ➔ Selected slot will change red and activate.



② Press “K/B” and “SCAN CALL” for scan edit.



③ Set up the “TIME”, “PATT” and “SEC.”

i. “TIME”: Resolution number.

*If you want to change only pattern, please set up the same timing number.

ii. “PATT”: Pattern number.

iii. “SEC.” Time & Pattern display time/Sec.

*Please set up over 4~5 second, so our generator & display equipment can response the signal.

**Above image example:*

- ✓ *Time 351 & Pattern 1 together display while 5 second.*
- ✓ *Time 352 & Pattern 2 together display while 10 second.*
  - ➔ *Timing changed 351 to 352, so it will be flash to once.*
- ✓ *Time 352 & Pattern 3 together display while 5 second.*
  - ➔ *Timing is same 352 to 352, so it just change pattern without flash.*

④ Select save number 1~99 and press “SAVE” button.(password is ”8880”)

⑤ If you want to stop the SCAN, press time button and call new timing.

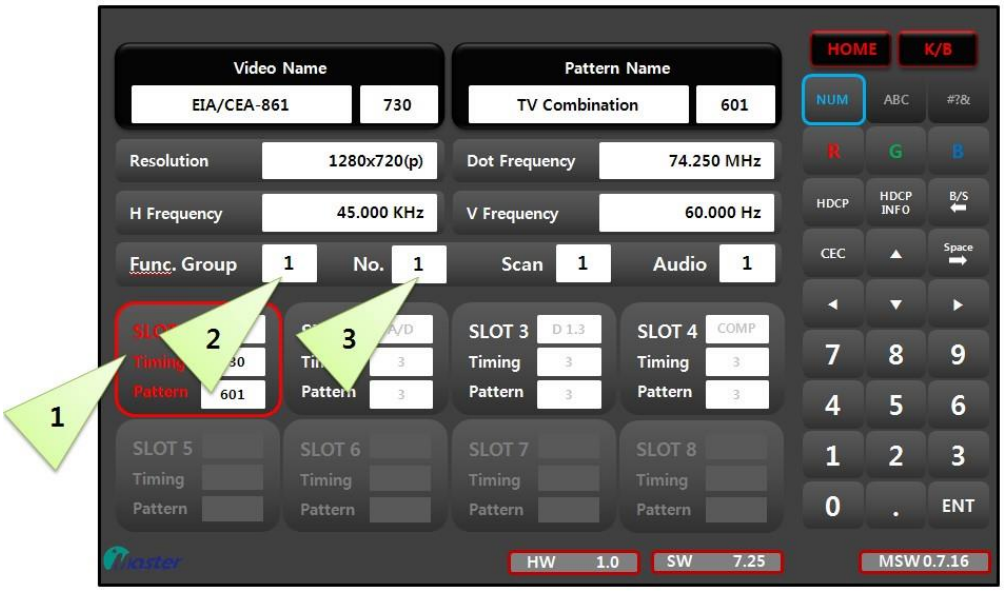
*Press “SHIFT” button for pause scan rolling.

4.5 Function

FUNCTION is designed for calling timing and patterns at once. This feature provides simple commands for frequently used inspection patterns and timings. It is more useful with MSRC-009L.

4.5.1 Function

1) How to call saved Function list.



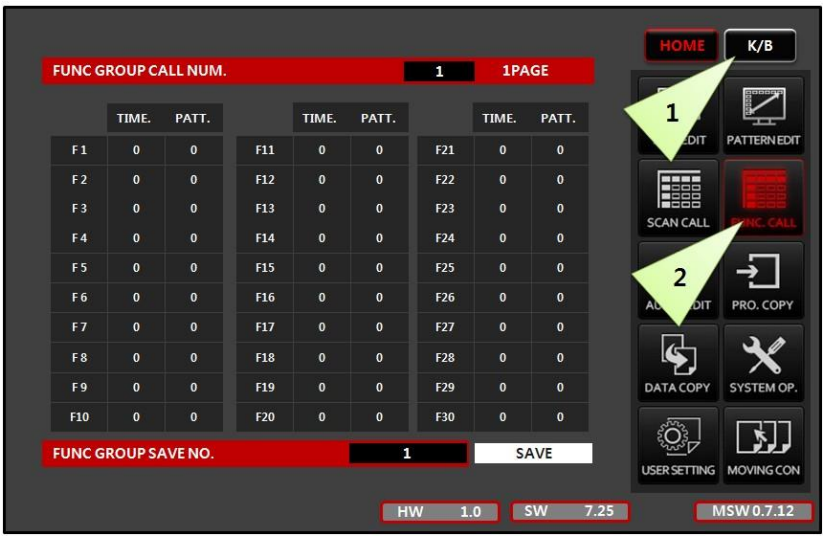
④ Select slot number which you want to change function ➔ Selected slot will change red and activate.

⑤ Select Func. Group number ➔ Cursor will activate

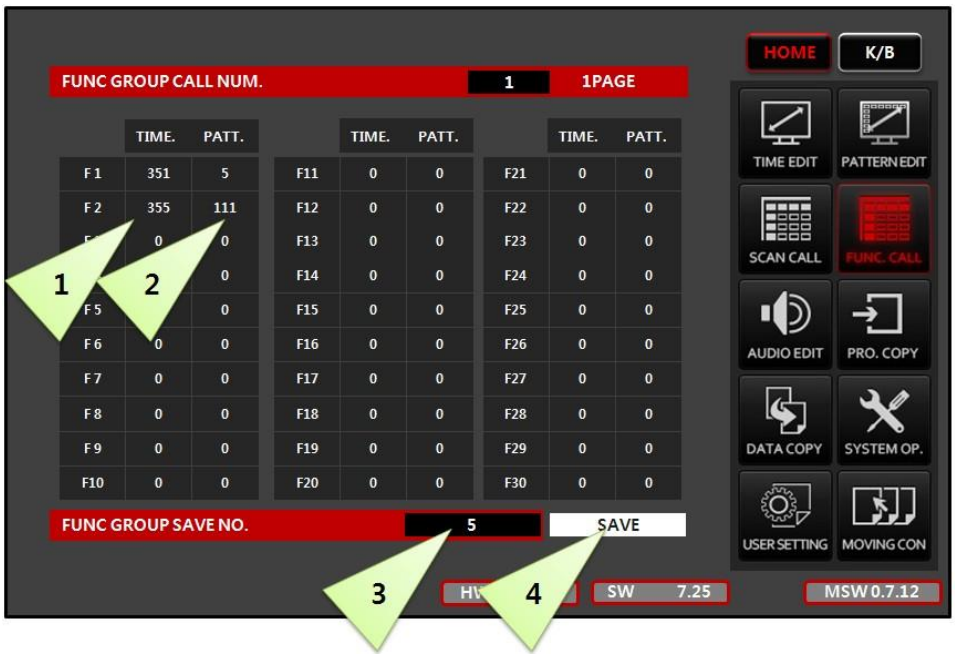
⑥ Select No. number ➔ Set up the timing & pattern will calling.

2) How to edit Function

① Select slot number which you want to change function ➔ Selected slot will change red and activate.



② Press “K/B” and “FUNC. CALL” for function edit.



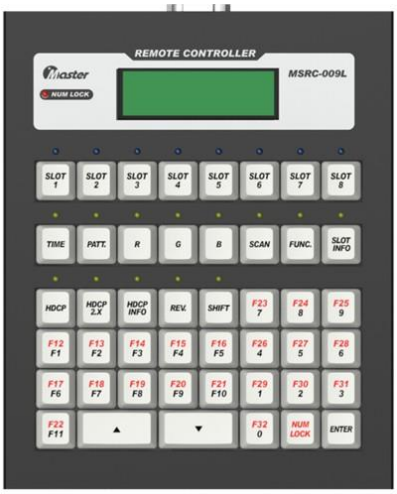
③ Set up the “TIME” and “PATT”.

i. “TIME”: Resolution number.

ii. “PATT”: Pattern number.

④ Select save number 1~99 and press “SAVE” button.(password is ”8880”)

**If you have optional remote controller MSRC-009L, it is better easy to use.*



i. Press FUNC. Button

ii. Press F1~F11(NUM LOCK on F12~F30) ➔ Calling saved timing and patter at once.

4.6 Audio

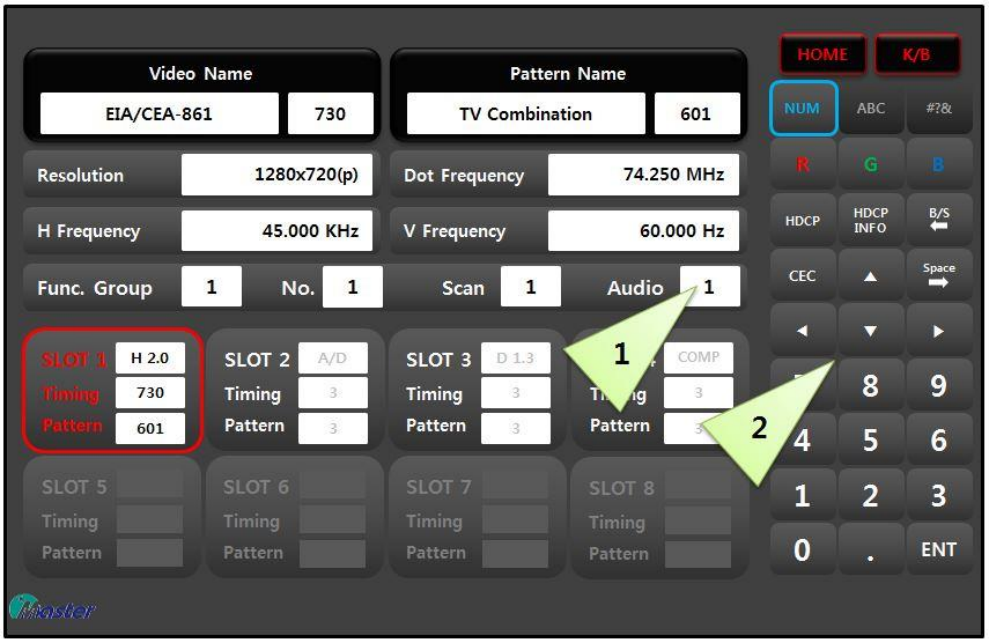
You can use various type audio and edit them yourself.

4.6.1 Audio

1) How to call saved Audio list.

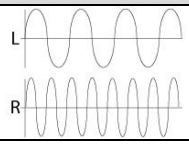
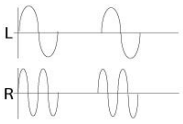
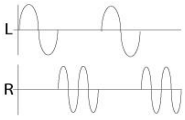
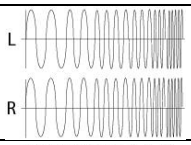
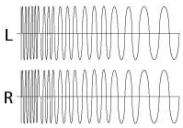
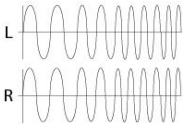
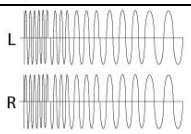
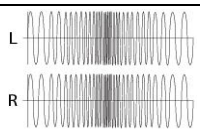
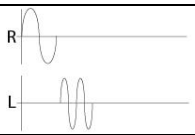
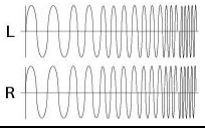
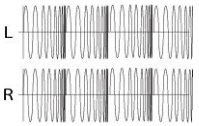
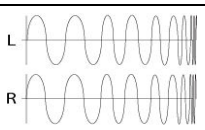
① Press audio button to activate audio.

② Press up/down or number button for change audio ➔The changed audio will applied equally to all slots.



2) Saved Audio list.

User can edit audio number 1 to 20 and audio number 21 to 32 is default audio.

Name	Waveform	Setting Value	
Audio Pattern 21		Audio Type (~9) Audio CA(~49) Min Freq.(Hz) Max Freq.(Hz) Freq. Step(Hz) Interval (10ms)	1 0 0 0 0 0
Audio Pattern 22		Audio Type (~9) Audio CA(~49) Min Freq.(Hz) Max Freq.(Hz) Freq. Step(Hz) Interval (10ms)	4 0 0 0 0 100
Audio Pattern 23		Audio Type (~9) Audio CA(~49) Min Freq.(Hz) Max Freq.(Hz) Freq. Step(Hz) Interval (10ms)	5 0 0 0 0 100
Audio Pattern 24		Audio Type (~9) Audio CA(~49) Min Freq.(Hz) Max Freq.(Hz) Freq. Step(Hz) Interval (10ms)	7 0 200 3000 400 10
Audio Pattern 25		Audio Type (~9) Audio CA(~49) Min Freq.(Hz) Max Freq.(Hz) Freq. Step(Hz) Interval (10ms)	8 0 200 3000 400 10
Audio Pattern 26		Audio Type (~9) Audio CA(~49) Min Freq.(Hz) Max Freq.(Hz) Freq. Step(Hz) Interval (10ms)	7 0 200 3000 40 10
Audio Pattern 27		Audio Type (~9) Audio CA(~49) Min Freq.(Hz) Max Freq.(Hz) Freq. Step(Hz) Interval (10ms)	8 0 200 3000 40 10
Audio Pattern 28		Audio Type (~9) Audio CA(~49) Min Freq.(Hz) Max Freq.(Hz) Freq. Step(Hz) Interval (10ms)	9 0 200 3000 40 10
Audio Pattern 29		Audio Type (~9) Audio CA(~49) Min Freq.(Hz) Max Freq.(Hz) Freq. Step(Hz) Interval (10ms)	6 19 200 3000 40 20
Audio Pattern 30		Audio Type (~9) Audio CA(~49) Min Freq.(Hz) Max Freq.(Hz) Freq. Step(Hz) Interval (10ms)	7 0 300 750 1 1
Audio Pattern 31		Audio Type (~9) Audio CA(~49) Min Freq.(Hz) Max Freq.(Hz) Freq. Step(Hz) Interval (10ms)	7 0 610 690 1 3
Audio Pattern 32		Audio Type (~9) Audio CA(~49) Min Freq.(Hz) Max Freq.(Hz) Freq. Step(Hz) Interval (10ms)	10 0 0 0 0 50

3) How to edit audio.

① Press “K/B” button and press “AUDIO EDIT” button for activate audio edit list.

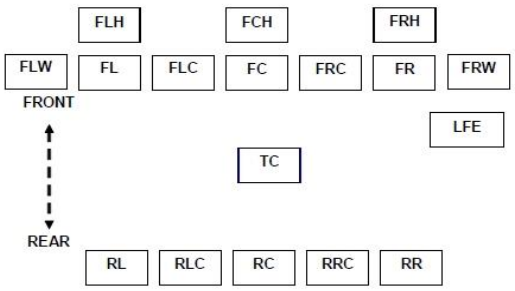
*-dB is –dBfs(full scale)

*The -0dBfs setting is the maximum that digital audio can produce.

*.180(-dB) is actually same as -18dBfs.

② Press “K/B” button and press “AUDIO EDIT” button for activate audio edit list.

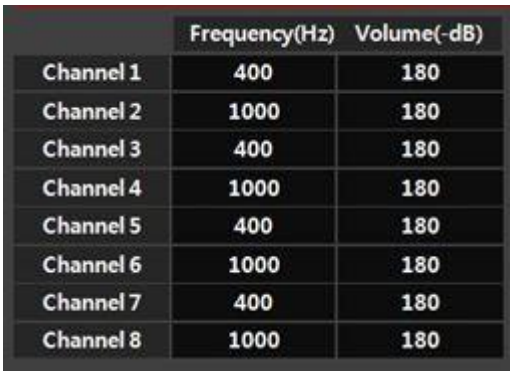
Understanding about speaker placement.



Label	Location
FL	Front Left
FC	Front Center
FR	Front Right
FLC	Front Left Center
FRC	Front Right Center
RL	Rear Left
RC	Rear Center
RR	Rear Right
RLC	Rear Left Center
RRC	Rear Right Center
LFE	Low Frequency Effect
FLW	Front Left Wide
FRW	Front Right Wide
FLH	Front Left High
FCH	Front Center High
FRH	Front Right High
TC	Top Center

③ Change setting value.

a. Change to audio frequency(Hz) and volume (-dBfs) from audio Ch1 to Ch8. All default setting is 2Ch, such as Left & Right audio.



	Frequency(Hz)	Volume(-dB)
Channel 1	400	180
Channel 2	1000	180
Channel 3	400	180
Channel 4	1000	180
Channel 5	400	180
Channel 6	1000	180
Channel 7	400	180
Channel 8	1000	180

Edit Audio No		
Channel No.	Frequency	Volume
1CH (FL)	400Hz	(-) 18.0dBfs
2CH (FR)	1000Hz	(-) 18.0dBfs
3CH (LFE)	400Hz	(-) 18.0dBfs
4CH (FC)	1000Hz	(-) 18.0dBfs
5CH (RL/RC)	400Hz	(-) 18.0dBfs
6CH (RR)	1000Hz	(-) 18.0dBfs
7CH (RLC/RC)	400Hz	(-) 18.0dBfs
8CH (RRC/TC)	1000Hz	(-) 18.0dBfs
F : Front L : Left R : Right C : Center R : Rear W : Wide H : High T : Top LFE : Low Frequency Effect		

b. Setting the audio type (1~9)

Audio	Format	Description
1	Static	L,R Fix mode
2	Winker	L,R same time On/Off mode
3	Alternate Winker	L,R individual On/Off mode
4	Random	5Khz ⇒6Khz ⇒4Khz ⇒2.5Khz ⇒6.5Khz Rotation
5	L/R Different Random	L,R individual (1Khz ⇒2Khz ⇒3Khz ⇒4Khz ⇒5Khz Rotation)
6	Frequency Up	300Hz to 20Khz / step to100Hz
7	Frequency Down	20Khz to 300Hz / step to 100Hz
8	Continue Up	20Hz to 1Khz / step to 1Hz
9	Continue Down	1Khz to 20Hz / step to 1Hz

c. Setting the audio Channel(0~49)

CA (binary)								CA (hex)	Channel Number								MSPG-xxxx CA(0~49)
7	6	5	4	3	2	1	0		8Ch	7Ch	6Ch	5Ch	4Ch	1Ch	2Ch	1Ch	
0	0	0	0	0	0	0	0	0x00	-	-	-	-	-	-	FR	FL	**0**
0	0	0	0	0	0	0	1	0x01	-	-	-	-	-	LFE1	FR	FL	**1**
0	0	0	0	0	0	1	0	0x02	-	-	-	-	FC	-	FR	FL	**2**
0	0	0	0	0	0	1	1	0x03	-	-	-	-	FC	LFE1	FR	FL	**3**
0	0	0	0	0	1	0	0	0x04	-	-	-	BC	-	-	FR	FL	**4**
0	0	0	0	0	1	0	1	0x05	-	-	-	BC	-	LFE1	FR	FL	**5**
0	0	0	0	0	1	1	0	0x06	-	-	-	BC	FC	-	FR	FL	**6**
0	0	0	0	0	1	1	1	0x07	-	-	-	BC	FC	LFE1	FR	FL	**7**
0	0	0	0	1	0	0	0	0x08	-	-	RS	LS	-	-	FR	FL	**8**
0	0	0	0	1	0	0	1	0x09	-	-	RS	LS	-	LFE1	FR	FL	**9**
0	0	0	0	1	0	1	0	0x0A	-	-	RS	LS	FC	-	FR	FL	**10**
0	0	0	0	1	0	1	1	0x0B	-	-	RS	LS	FC	LFE1	FR	FL	**11**
0	0	0	0	1	1	0	0	0x0C	-	BC	RS	LS	-	-	FR	FL	**12**
0	0	0	0	1	1	0	1	0x0D	-	BC	RS	LS	-	LFE1	FR	FL	**13**
0	0	0	0	1	1	1	0	0x0E	-	BC	RS	LS	FC	-	FR	FL	**14**
0	0	0	0	1	1	1	1	0x0F	-	BC	RS	LS	FC	LFE1	FR	FL	**15**
0	0	0	1	0	0	0	0	0x10	RRC	RLC	RS	LS	-	-	FR	FL	**16**
0	0	0	1	0	0	0	1	0x11	RRC	RLC	RS	LS	-	LFE1	FR	FL	**17**
0	0	0	1	0	0	1	0	0x12	RRC	RLC	RS	LS	FC	-	FR	FL	**18**
0	0	0	1	0	0	1	1	0x13	RRC	RLC	RS	LS	FC	LFE1	FR	FL	**19**
0	0	0	1	0	1	0	0	0x14	FRC	FLC	-	-	-	-	FR	FL	**20**
0	0	0	1	0	1	0	1	0x15	FRC	FLC	-	-	-	LFE1	FR	FL	**21**
0	0	0	1	0	1	1	0	0x16	FRC	FLC	-	-	FC	-	FR	FL	**22**
0	0	0	1	0	1	1	1	0x17	FRC	FLC	-	-	FC	LFE1	FR	FL	**23**
0	0	0	1	1	0	0	0	0x18	FRC	FLC	-	BC	-	-	FR	FL	**24**
0	0	0	1	1	0	0	1	0x19	FRC	FLC	-	BC	-	LFE1	FR	FL	**25**
0	0	0	1	1	0	1	0	0x1A	FRC	FLC	-	BC	FC	-	FR	FL	**26**
0	0	0	1	1	0	1	1	0x1B	FRC	FLC	-	BC	FC	LFE1	FR	FL	**27**
0	0	0	1	1	1	0	0	0x1C	FRC	FLC	RS	LS	-	-	FR	FL	**28**
0	0	0	1	1	1	0	1	0x1D	FRC	FLC	RS	LS	-	LFE1	FR	FL	**29**
0	0	0	1	1	1	1	0	0x1E	FRC	FLC	RS	LS	FC	-	FR	FL	**30**
0	0	0	1	1	1	1	1	0x1F	FRC	FLC	RS	LS	FC	LFE1	FR	FL	**31**
0	0	1	0	0	0	0	0	0x20	-	TpFC	RS	LS	FC	-	FR	FL	**32**

0	0	1	0	0	0	0	1	0x21	-	TpFC	RS	LS	FC	LFE1	FR	FL	**33**
0	0	1	0	0	0	1	0	0x22	TpC	-	RS	LS	FC	-	FR	FL	**34**
0	0	1	0	0	0	1	1	0x23	TpC	-	RS	LS	FC	LFE1	FR	FL	**35**
0	0	1	0	0	1	0	0	0x24	TpFR	TpFL	RS	LS	-	-	FR	FL	**36**
0	0	1	0	0	1	0	1	0x25	TpFR	TpFL	RS	LS	-	LFE1	FR	FL	**37**
0	0	1	0	0	1	1	0	0x26	FRW	FLW	RS	LS	-	-	FR	FL	**38**
0	0	1	0	0	1	1	1	0x27	FRW	FLW	RS	LS	-	LFE1	FR	FL	**39**
0	0	1	0	1	0	0	0	0x28	TpC	BC	RS	LS	FC	-	FR	FL	**40**
0	0	1	0	1	0	0	1	0x29	TpC	BC	RS	LS	FC	LFE1	FR	FL	**41**
0	0	1	0	1	0	1	0	0x2A	TpFC	BC	RS	LS	FC	-	FR	FL	**42**
0	0	1	0	1	0	1	1	0x2B	TpFC	BC	RS	LS	FC	LFE1	FR	FL	**43**
0	0	1	0	1	1	0	0	0x2C	TpC	TpFC	RS	LS	FC	-	FR	FL	**44**
0	0	1	0	1	1	0	1	0x2D	TpC	TpFC	RS	LS	FC	LFE1	FR	FL	**45**
0	0	1	0	1	1	1	0	0x2E	TpFR	TpFL	RS	LS	FC	-	FR	FL	**46**
0	0	1	0	1	1	1	1	0x2F	TpFR	TpFL	RS	LS	FC	LFE1	FR	FL	**47**
0	0	1	1	0	0	0	0	0x30	FRW	FLW	RS	LS	FC	-	FR	FL	**48**
0	0	1	1	0	0	0	1	0x31	FRW	FLW	RS	LS	FC	LFE1	FR	FL	**49**
0	0	1	1	0	0	1	0	0x32									Reserved

d. Setting minimum frequency (Hz): Sweep mode minimum frequency setting.

e. Setting maximum frequency(Hz): Sweep mode maximum frequency setting.

f. Setting frequency step (Hz): Sweep mode step setting.

g. Setting the audio output interval(10ms)

**Except static mode*

④ When you changed setting value completed, than save to empty audio number at 1~20.(password is "8880")

⑤ Turn to main LCD screen and call to changed audio call number again, than you can test new audio.

4) Audio setting with current value

Reference Audio Value Settings in the 180dB 400mVrms.

400mVrms = $\sqrt[3]{2}X400$ = 1130mV

Left Audio : Digital Audio Output Convers to Analog Audio data.

dB(decibel)	Output(mv)400Hz	1000Hz	2000Hz	4000	8000	10000	Reference Value(mV)	
480	37	36	36	36	37	37	36	
420	71	71	71	71	71	72	71	
360	141	141	141	141	141	141	142	
300	285	285	285	285	285	285	285	
240	566	569	566	566	566	566	570	
180(standard)	**1136**	**1133**	**1133**	**1133**	**1133**	**1132**	**1140**	**400mVrms**
120	2278	2278	2278	2277	2275	2270	2280	
60	4452	4454	4454	4453	4450	4444	4560	

Right Audio : Digital Audio Output Convers to Analog Audio data.

dB(decibel)	Output(mv)400Hz	1000Hz	2000Hz	4000	8000	10000	Reference Value(mV)	
480	36	36	36	36	36	36	36	
420	70	71	70	71	70	70	71	
360	141	141	141	141	141	141	142	
300	283	284	284	285	283	28283	285	
240	565	566	566	566	564	562	570	
180(standard)	**1128**	**1132**	**1132**	**1134**	**1132**	**1129**	**1140**	**400mVrms**
120	2258	2268	2269	2270	2270	2268	2280	
60	4445	4450	4450	4450	4447	4440	4560	

※ If you set at a low level then 60dB, Audio output come out distortion.

4.7 Program copy (firmware update), slot firmware/FPGA update guide

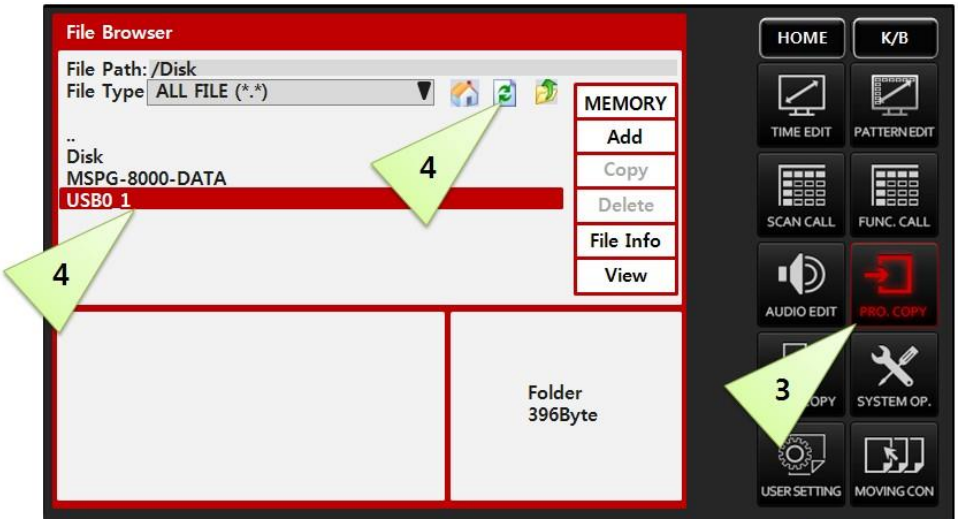
You can use USB memory stick to update main program.

1) How to firmware update

① Please receive firmware file from Master Co., Ltd and save to USB memory stick.

② Connect USB stick to MSPG-8000's rear USB port and wait 5second for recognize USB.

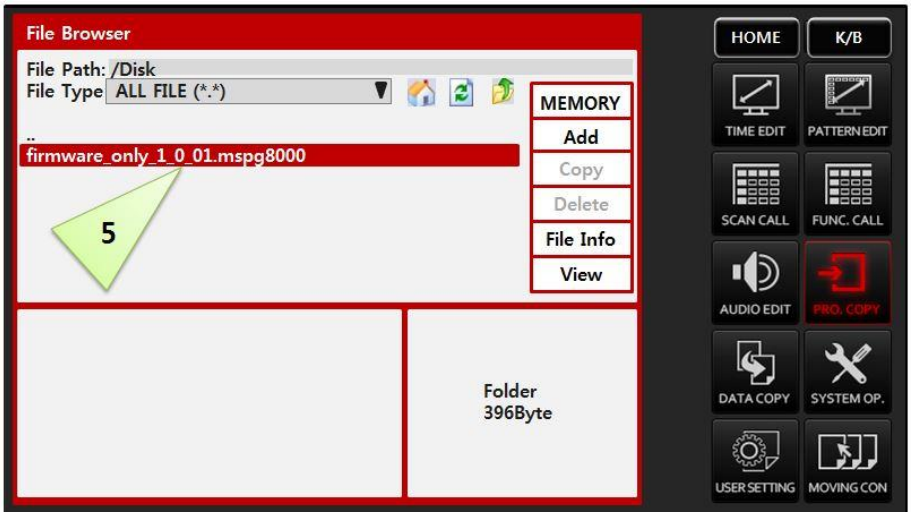
③ Press the K/B button and press the PRO.COPY button.



④ Press the K/B button, PRO.COPY and USB0_1 buttons sequentially.

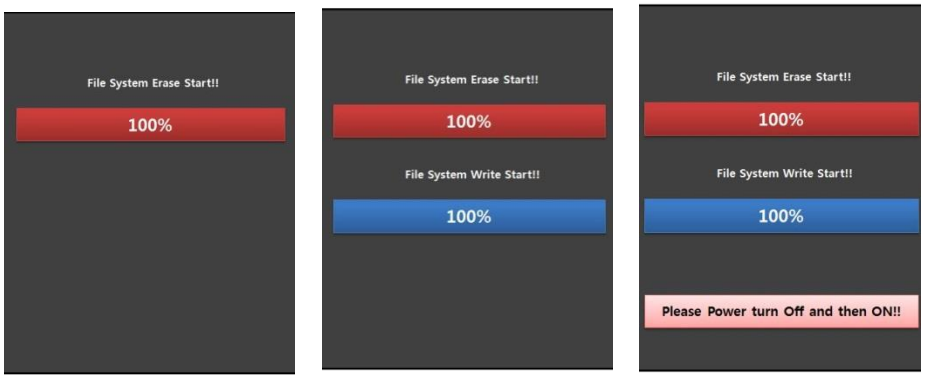
(Press  button if you can't find "USB0_1" on the list after connection)

⑤ Select update file and press enter button to update.(pass word is "8880")



⑥ Select update file and press enter button to update.(pass word is “8880”)

⑦ Update will begin as below.



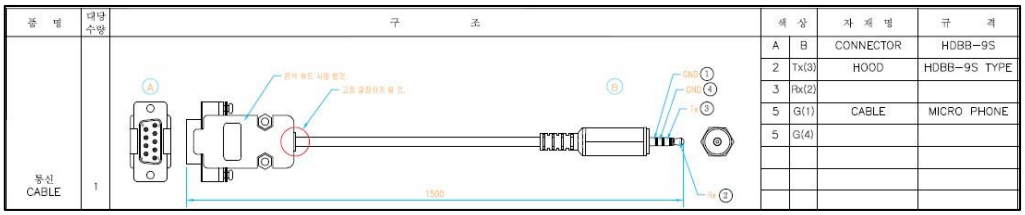
⑧ After update please power off and then power on for finish update and checked update version.

2) How to update each slots(you tube guide: https://www.youtube.com/watch?v=7jfydawgWZE&t=21s)

① Download and install the update program to PC at below download site.

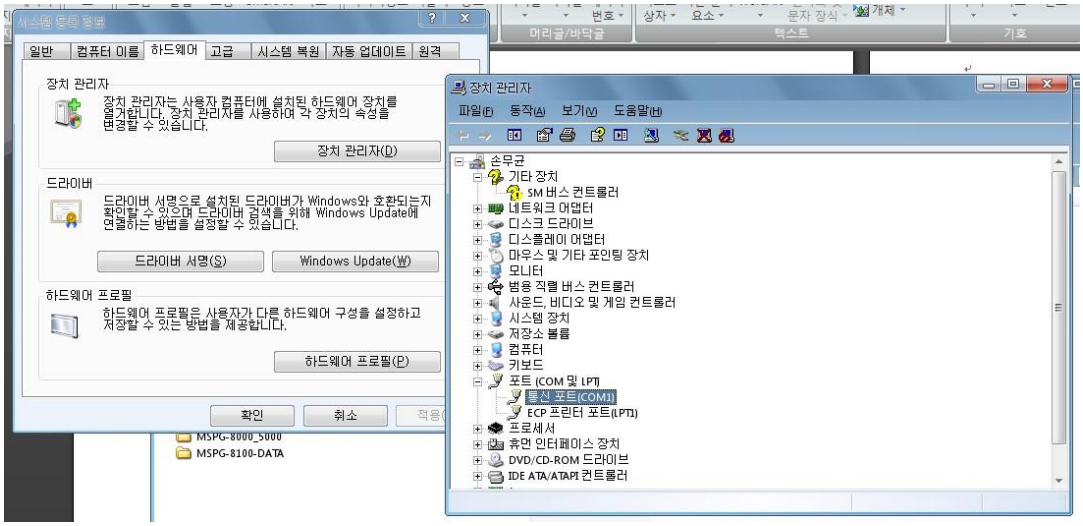
http://www.ltdmaster.com/son/MSPG-5000_8000/flash_loader_demo_v2.8.0.exe

② Must completed MSPG-8000 power on first and then connect MSPG-8000's slot D/L port to PC's RS-232C port via RS-232C cable(Stereo to 9S cable)



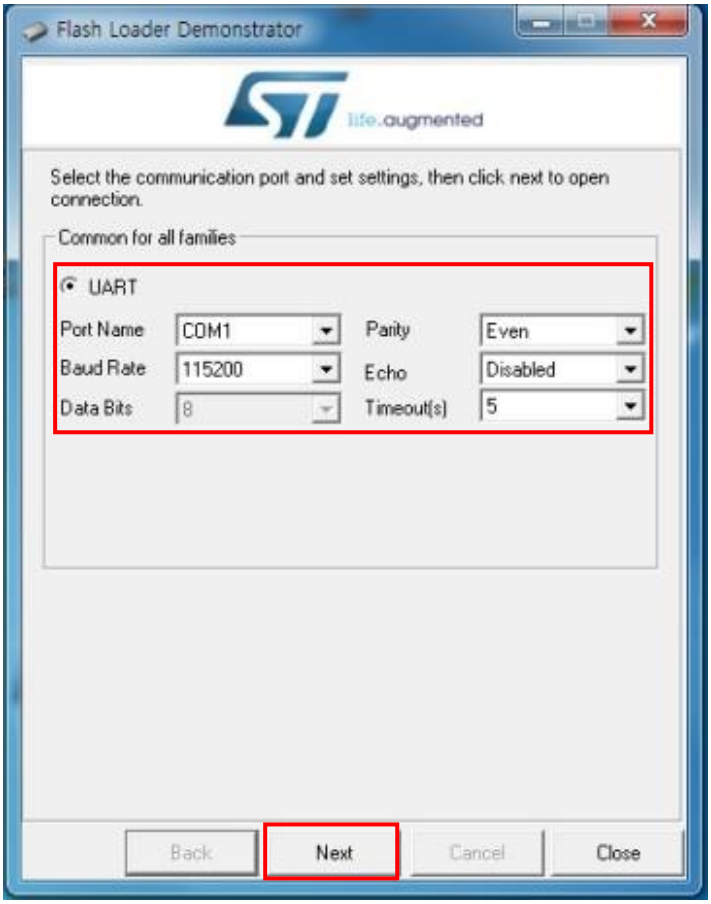
품 명	대당 수량	구 조	색 상		자 재 명	규 격
통신 CABLE	1		A	B	CONNECTOR	HDBB-9S
			2	Tx(3)	HOOD	HDBB-9S TYPE
			3	Rx(2)		
			5	G(1)	CABLE	MICRO PHONE
			5	G(4)		

③ Check the PC's com port number as below.



④ Run installed "flash_loader_demo_v2.8.0.exe".

⑤ Set up the UART value as below.

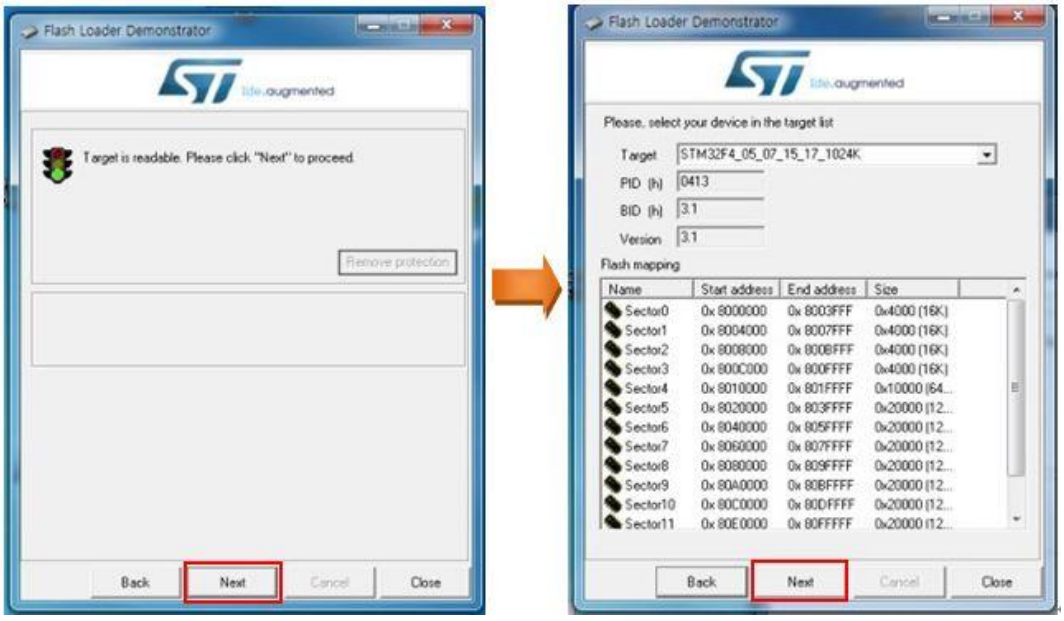


⑥ Press “SHIFT” button at keypad, it is set up to download mode to all slots.

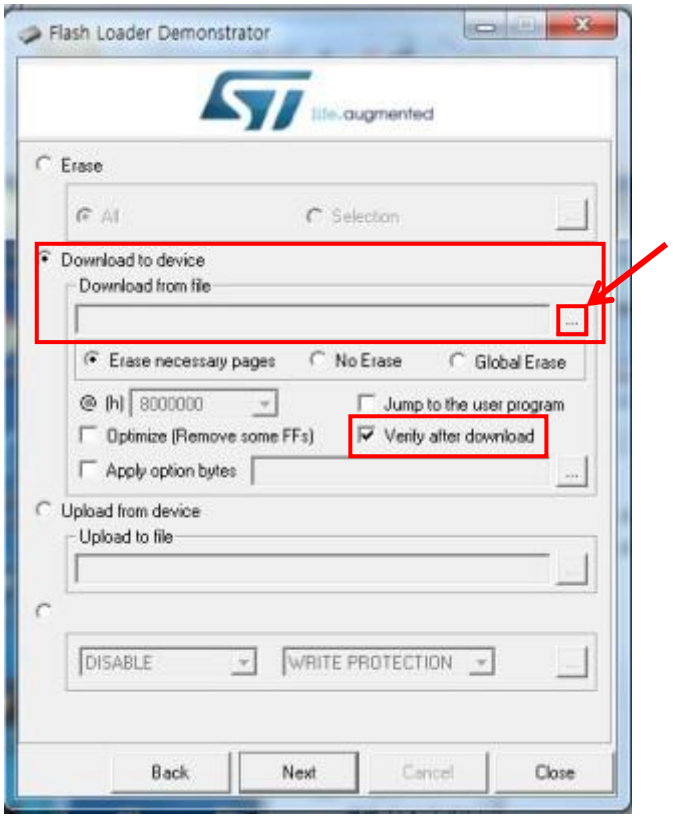
⑦ And press “MENU” button for ready to update.

⑧ Click the next button.

⑨ When below screen showing, press “Next” button.(If not, try again from number 2.)

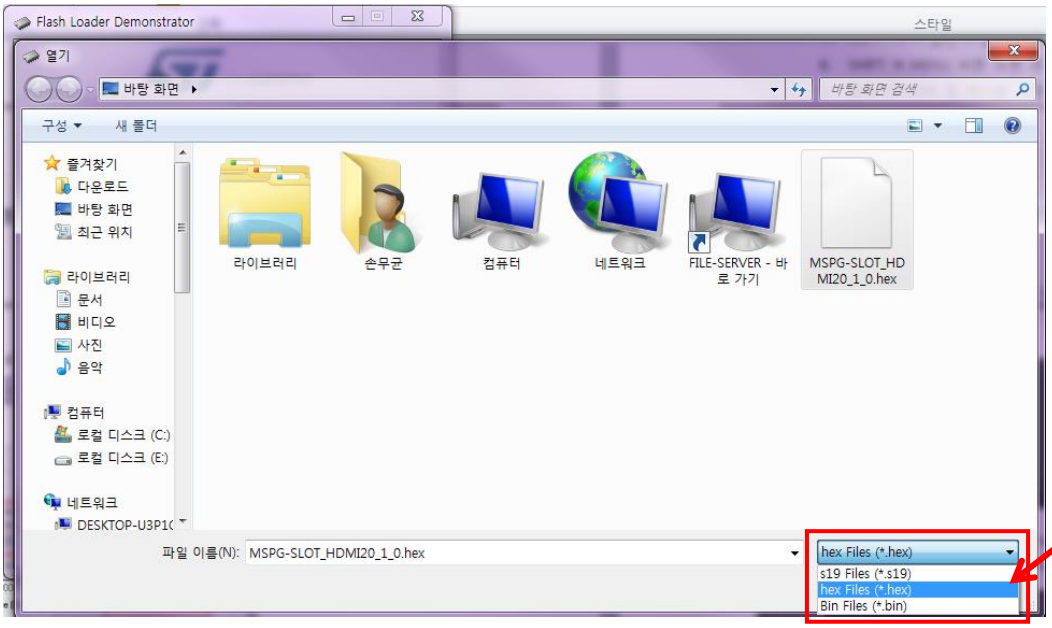


⑩ Check “Verify after download” and select file upload button.

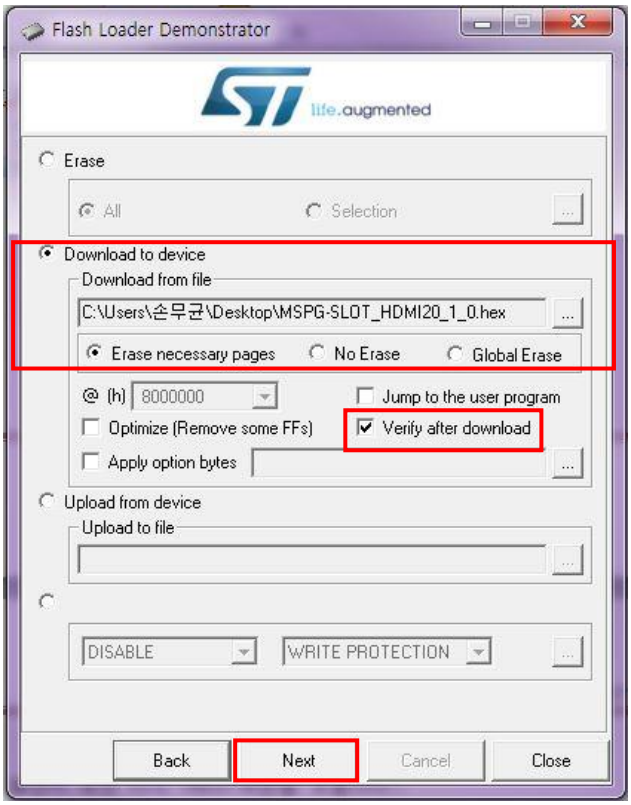


⑪ Change file type to hex.Files(*.hex) and select “MSPG-8000_HDMI_1_0.hex”

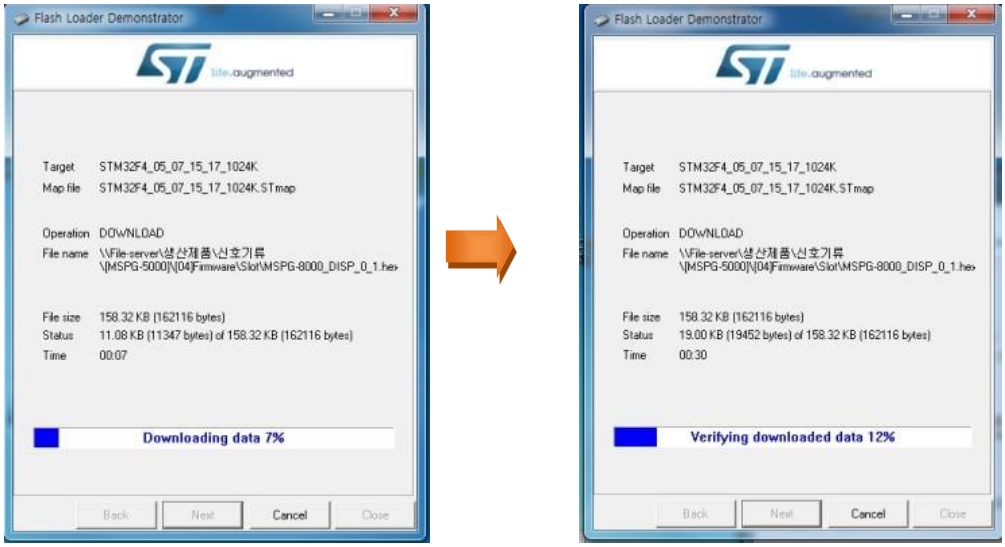
*Please check the correct slot type with slot update program name. Below is HDMI slot and HDMI slot update program sample picture



⑫ Click “Next” button to update start.



⑬ Click “Next” button to update start.

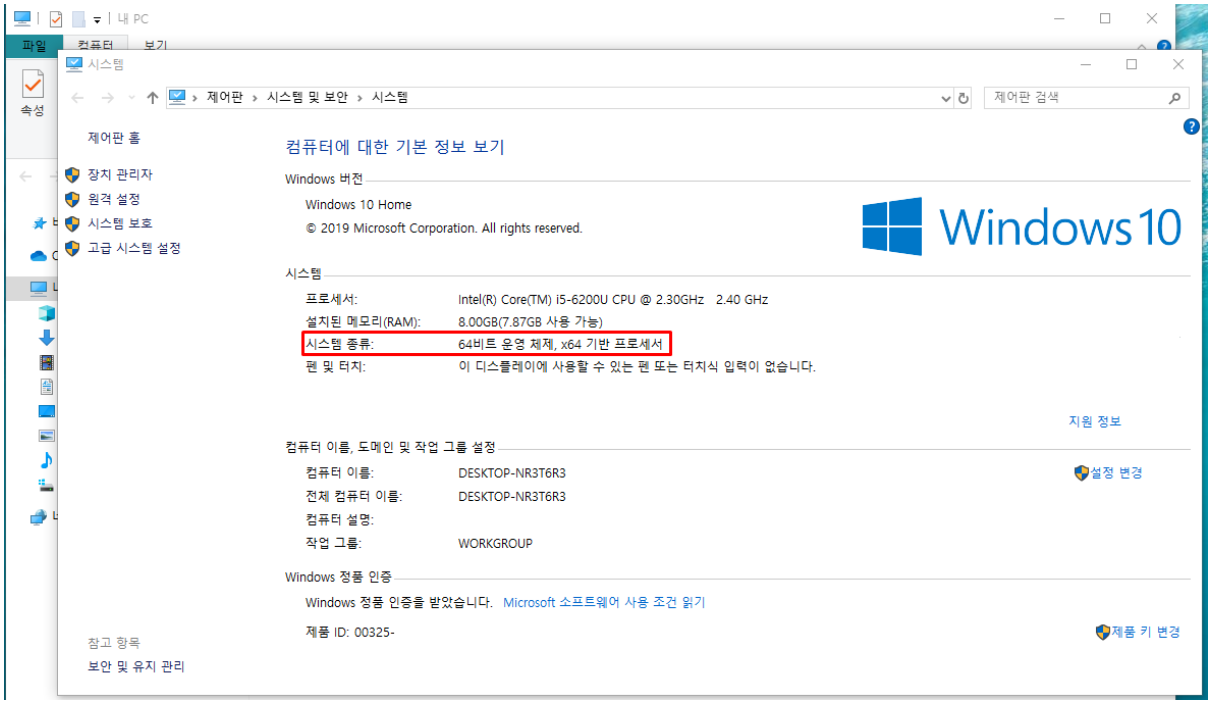


⑭ When you finished update than please power off the MSPG-8000.

⑮ Disconnect the download cable from the MSPG-8000. The slot firmware update complete.

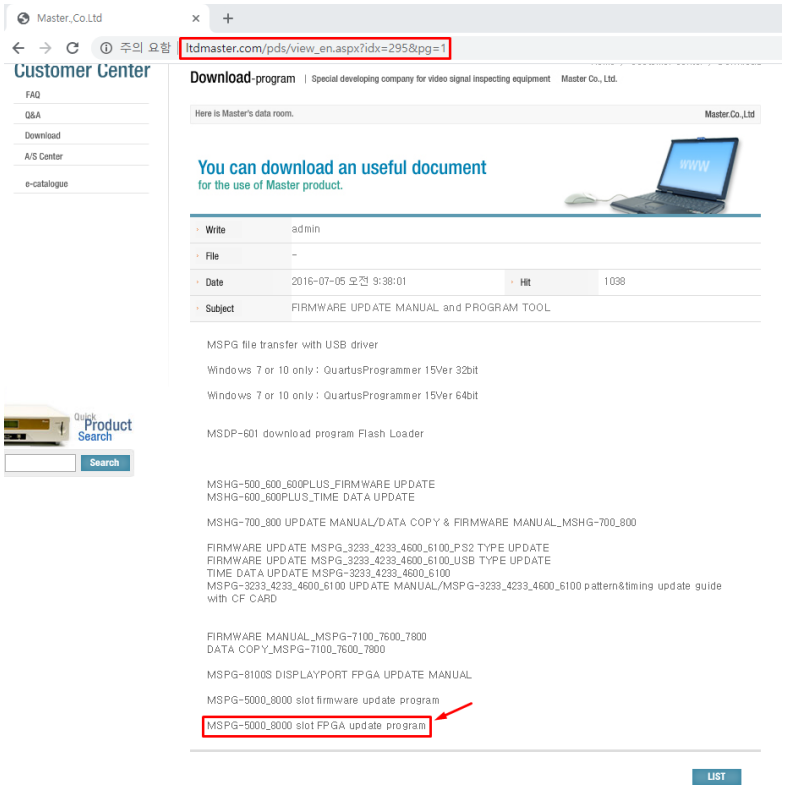
3) How to slot FGPA update (you tube guide:https://www.youtube.com/watch?v=ZOi0Gaay71M&t=93s)

① Prepare to 64bit system windows OS PC.



② Please download program as below site and install to 64bit PC.

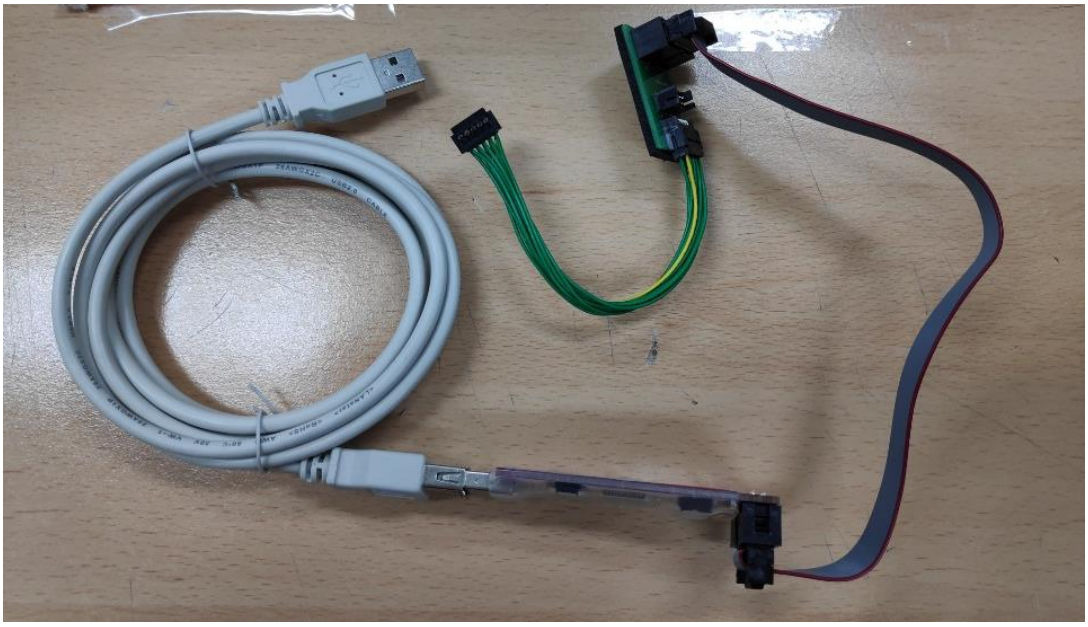
http://www.ltdmaster.com/son/UPDATE%20PROGRAM%20TOOL/QuartusProProgrammerSetup-19.3.0.222-windows.exe



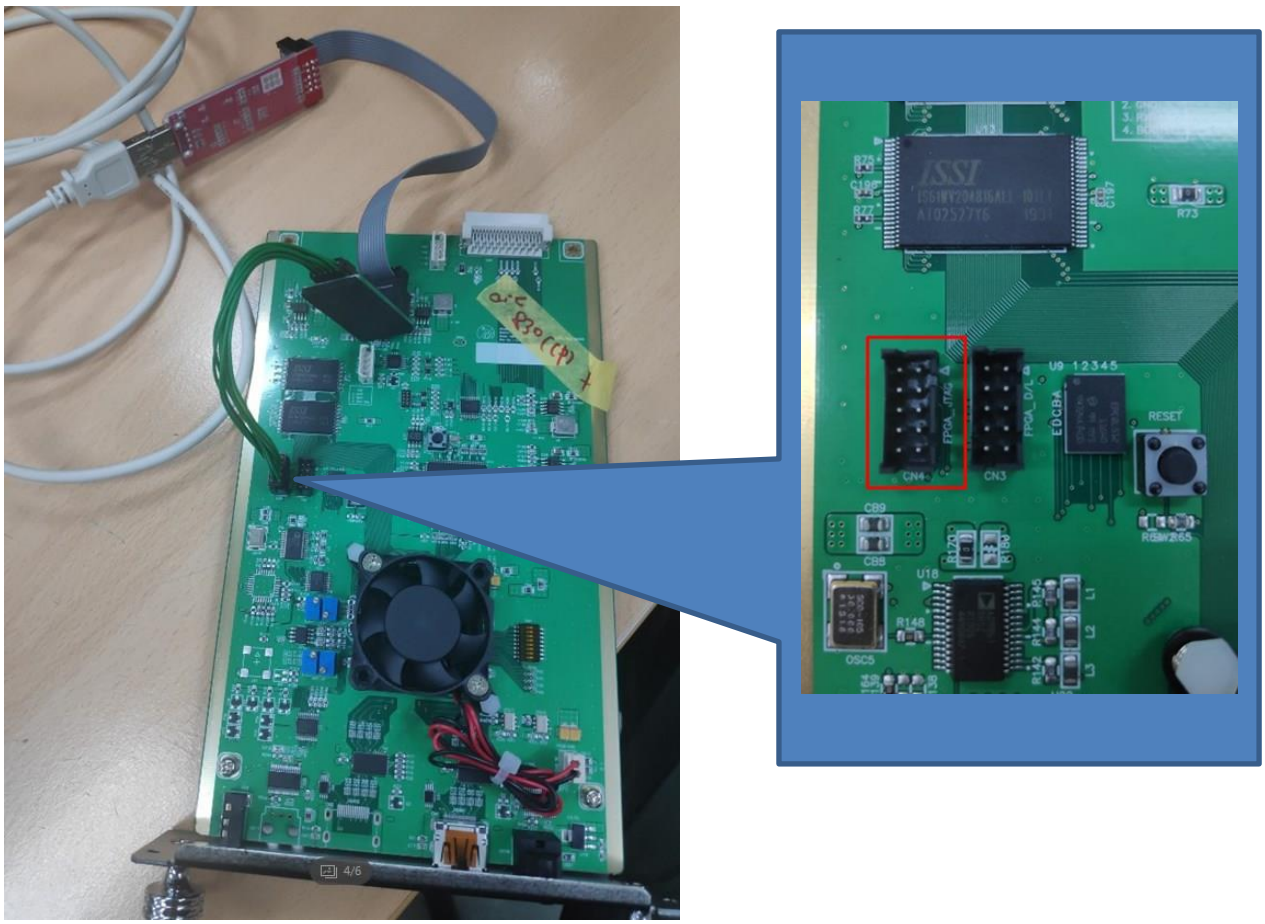
③ Turn off the MSPG-8100S and loosen the bolts as shown below.

④ Pull the slot slightly as shown below to separate it from the main body.

⑤ Prepare the FPGA download tool provided by the Master Co.

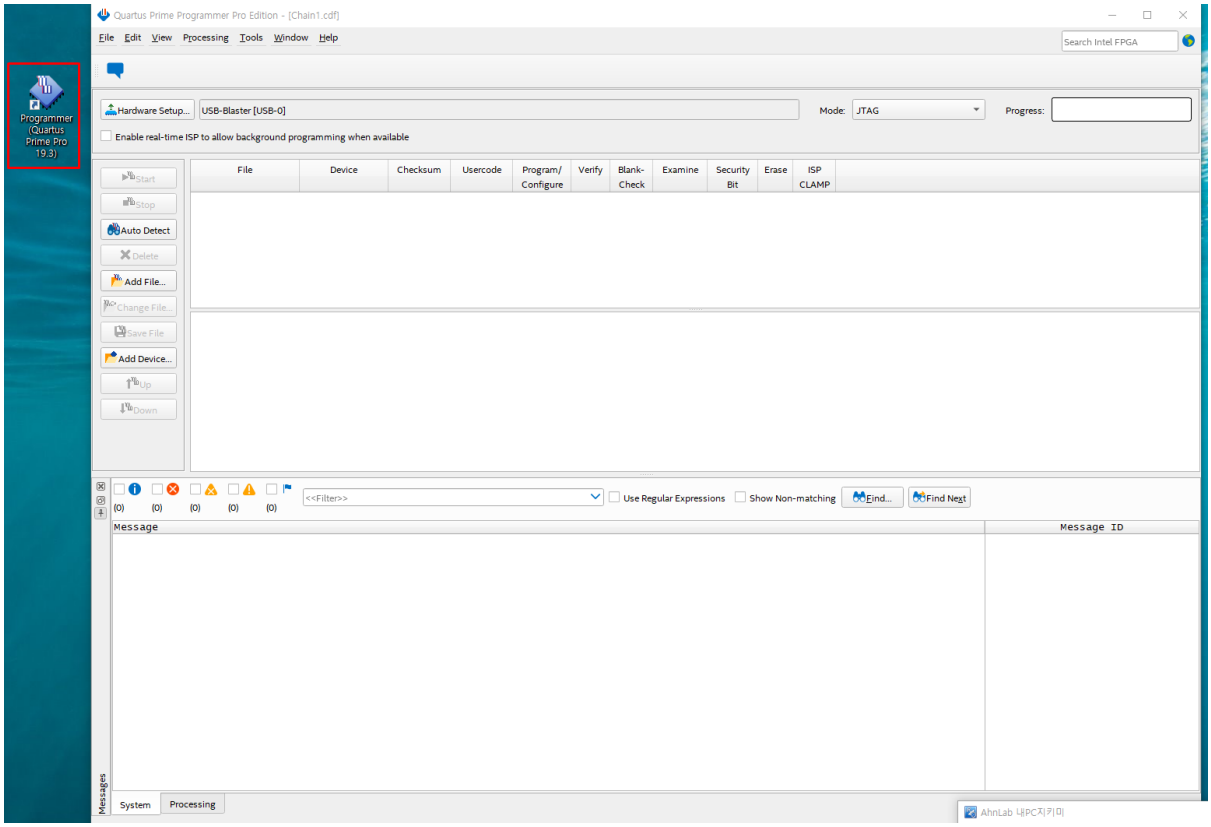


⑥ Connect FPGA download cable as below and USB cable connect to 64bit PC.

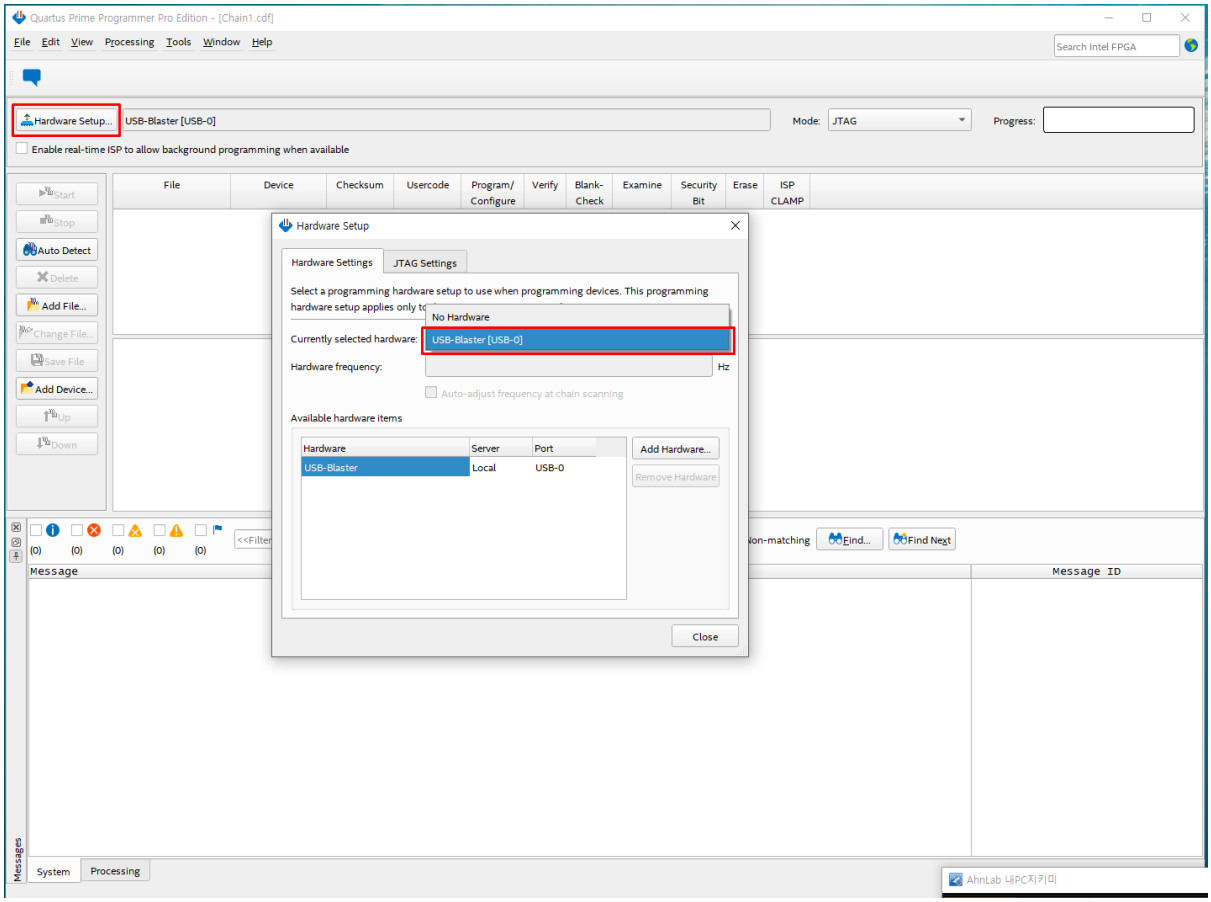


⑦ Insert it back into the MSPG-8000 main body while connected and then turn on the MSPG-8000.

⑧ Run the Quartus Programmer that you installed.

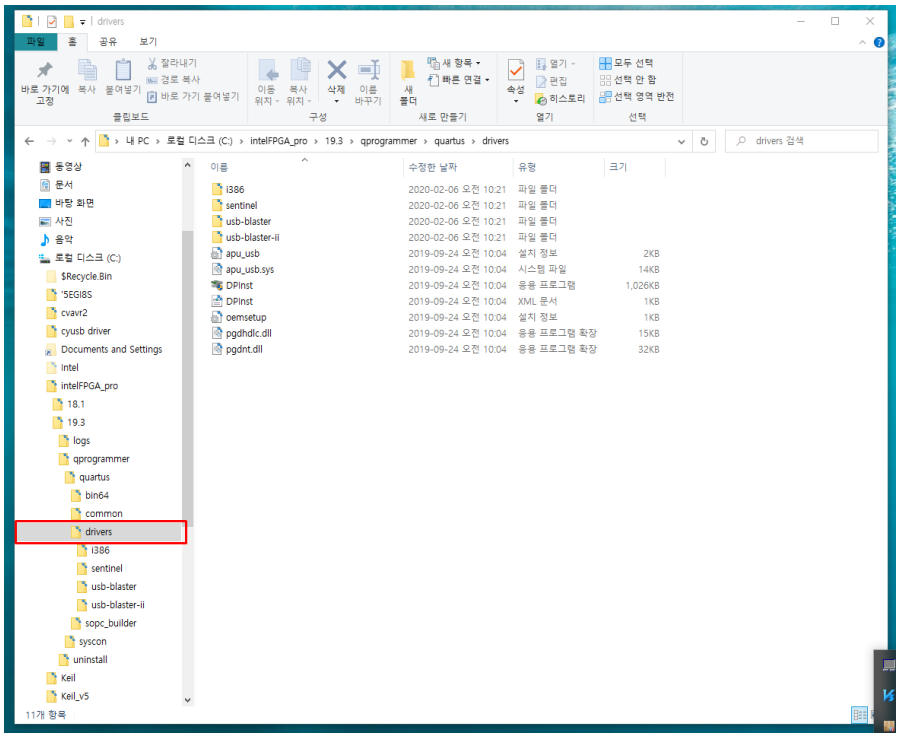


⑨ Press ‘Hardware Setup’, select ‘USB-Blaster[USB-0] and then press the ‘Close’ button.

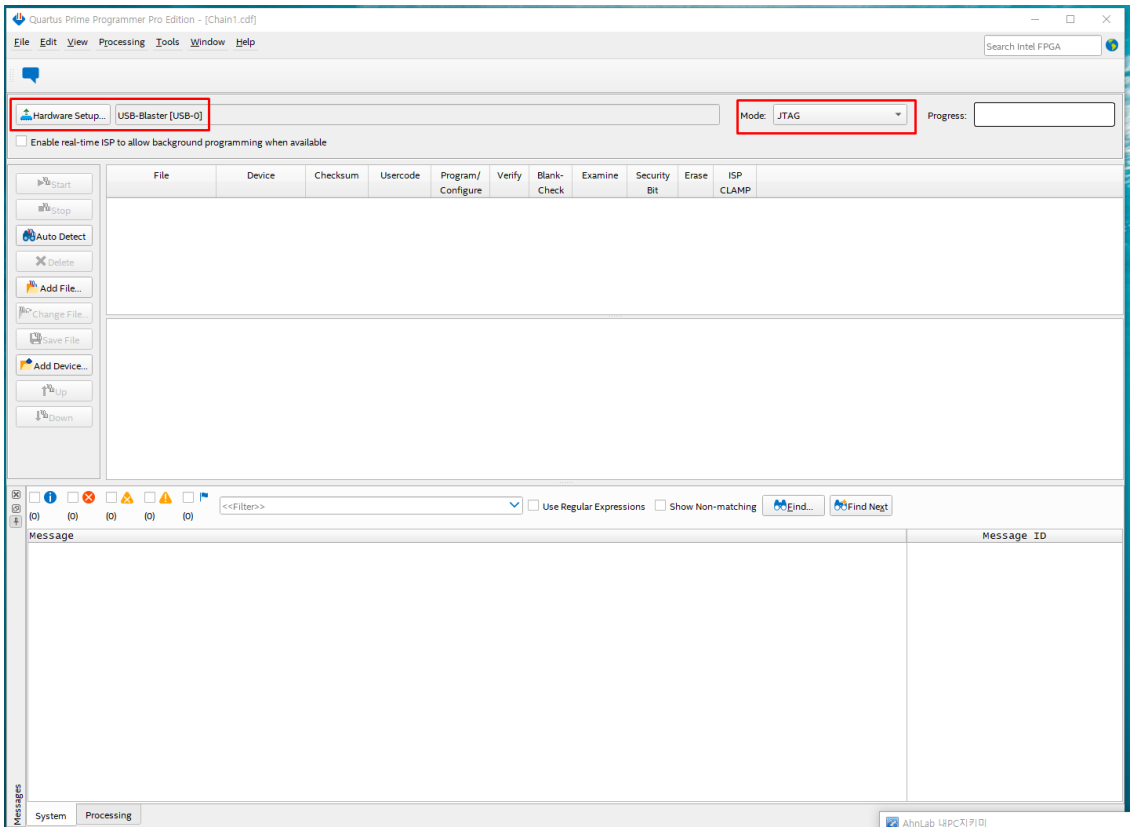


*The installation of USB DRIVER is possible at the following path;

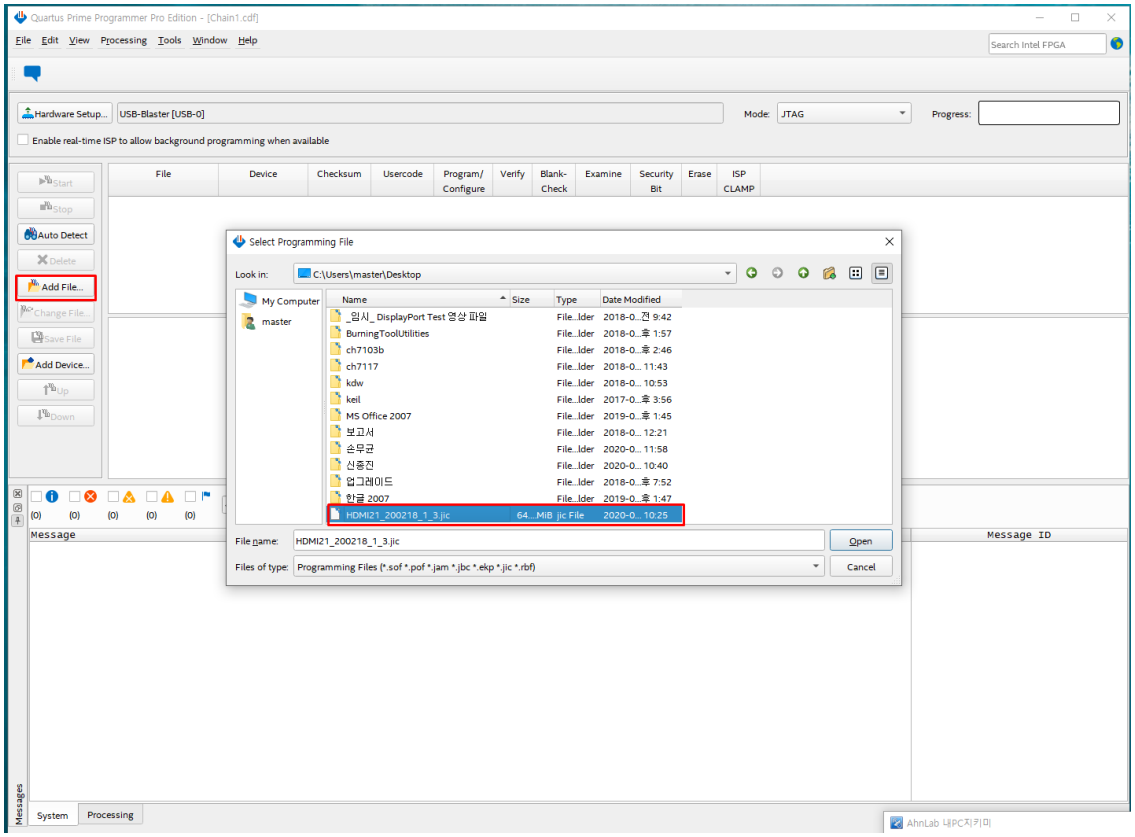
C:intelFPGA_pro/19.3/qprogrammer/quartus/drivers



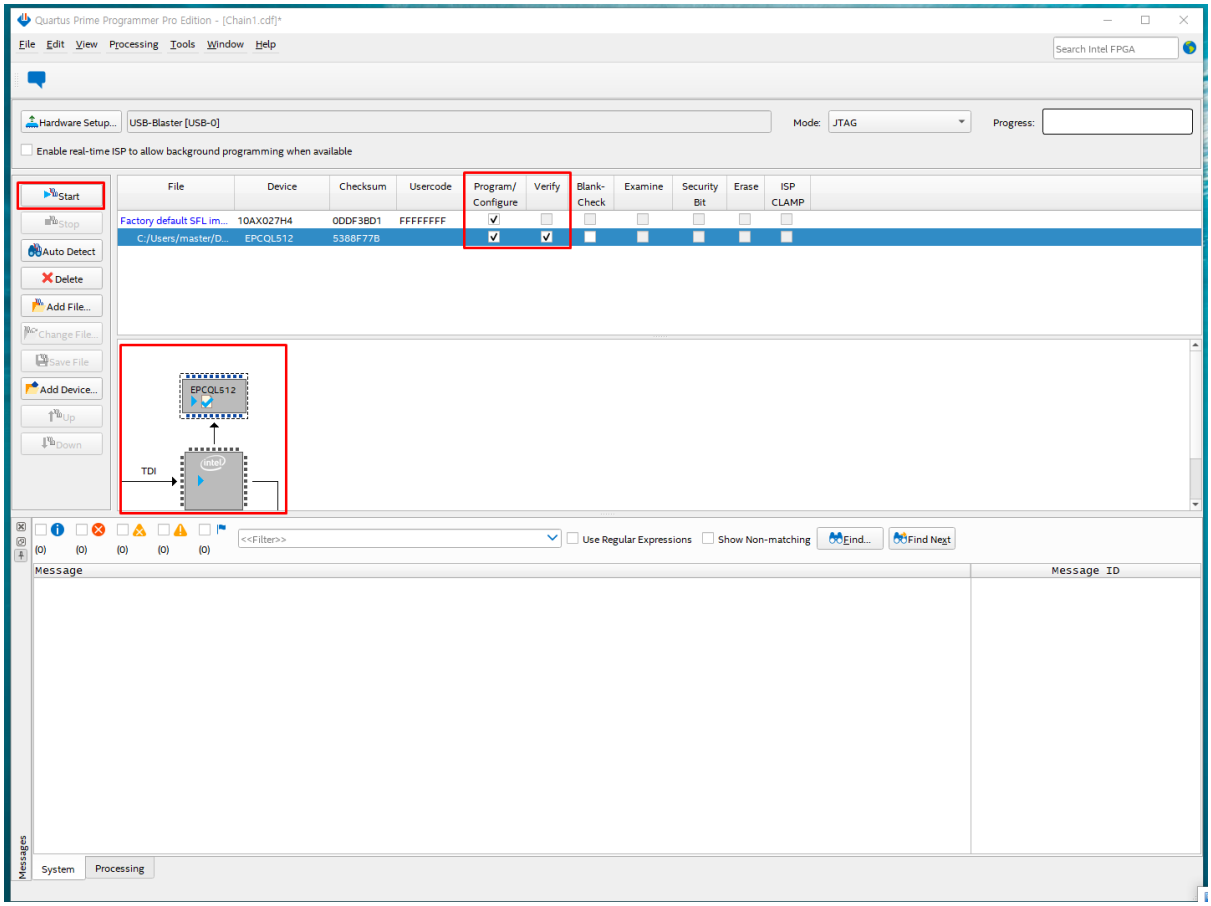
⑩ Setting as below.



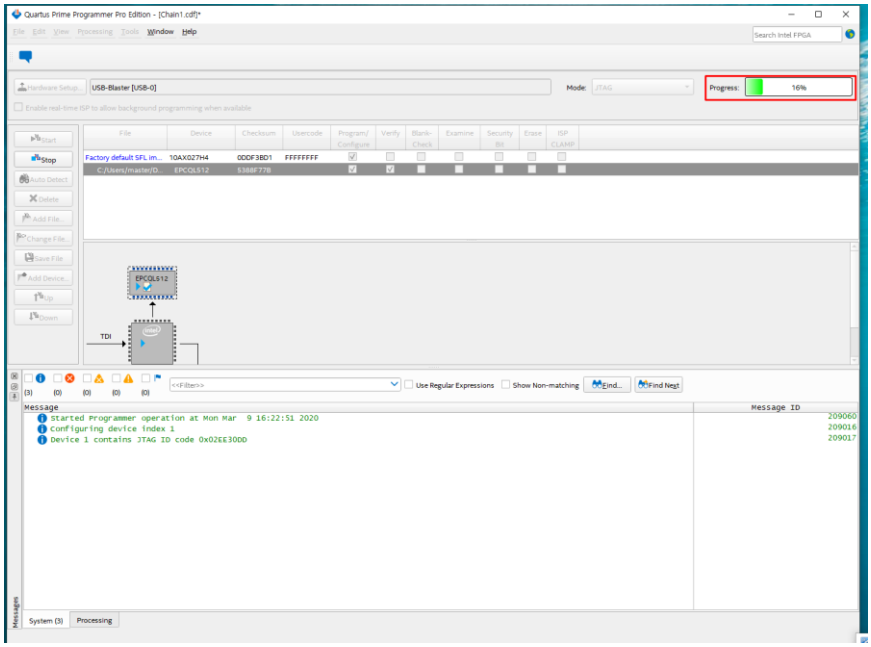
⑪ Press ‘Add File’ button and select Master given FPGA file.



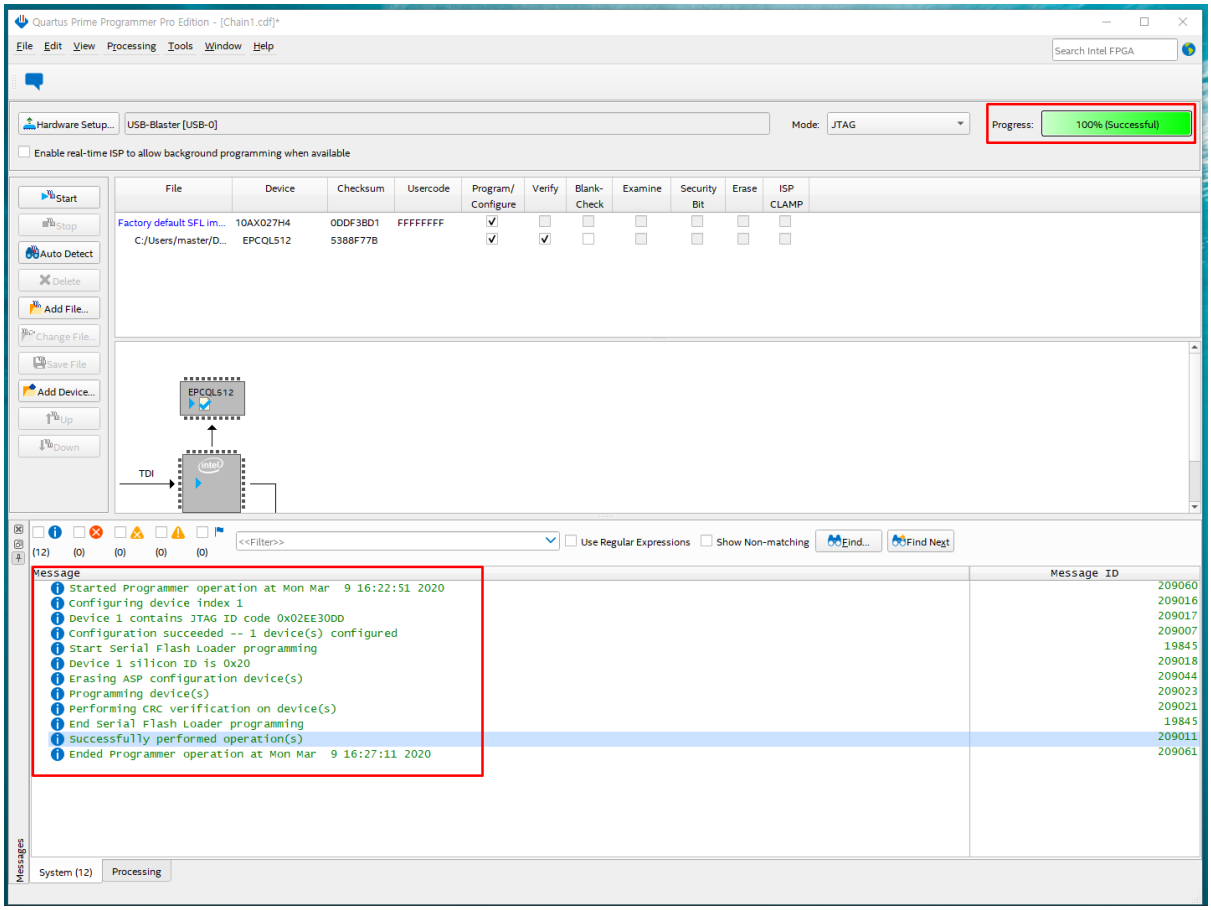
⑫ Press ‘Program/Configure’ and ‘Verify’. And then press ‘Start’ to start FPGA update.



⑬ The update will take about 4minutes and 30 seconds.



⑭ When update finished, the display will be change as below.



⑮ Turn off the MSPG-8000 and disconnect all cables.

16 Insert FPGA updated slots again and turn on the MSPG-8000.

17 If you update FPGA with ‘HDMI21_200218_1_3.jic’, then HW version will showing HW1.3.

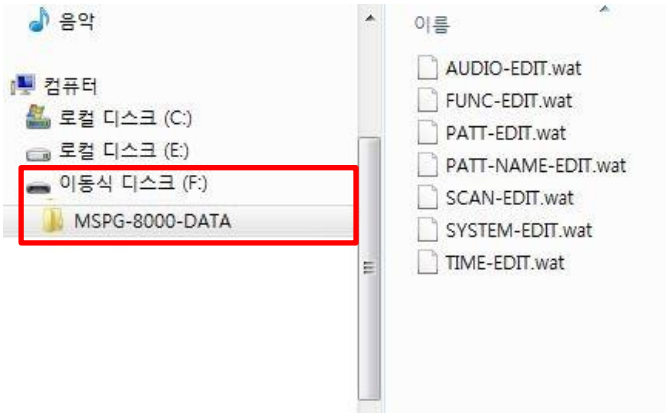
4.8 Data copy (Pattern, Timing, Audio, Function, Scan and System update)

You can use USB memory stick to update/back up all data, such as pattern, timing, audio, function, scan and system set up data.

1) All data update from USB memory stick to MSPG-8000

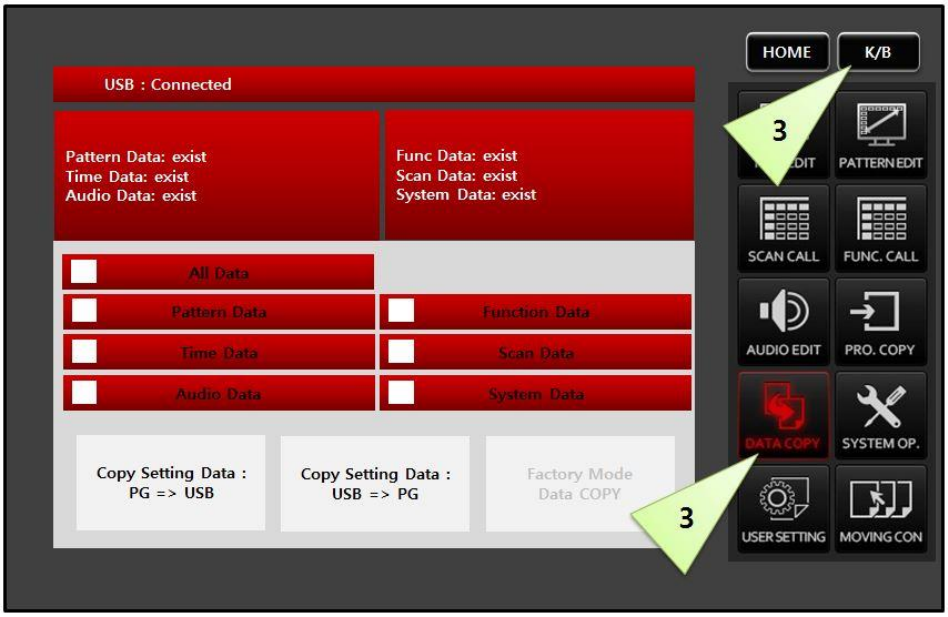
① Please receive firmware file from Master Co., Ltd and un-zip save to USB memory stick on root folder.

Must save to ROOT folder, so MSPG-8000 can recognize.



② Connect USB stick to MSPG-8000's rear USB port and wait 5second for recognize USB.

③ Press the K/B button and press the DATA COPY button.



④ Select the ALL Data for update all data.

a. All data: pattern, time, audio, function, scan and system data

b. Pattern data: Only pattern data

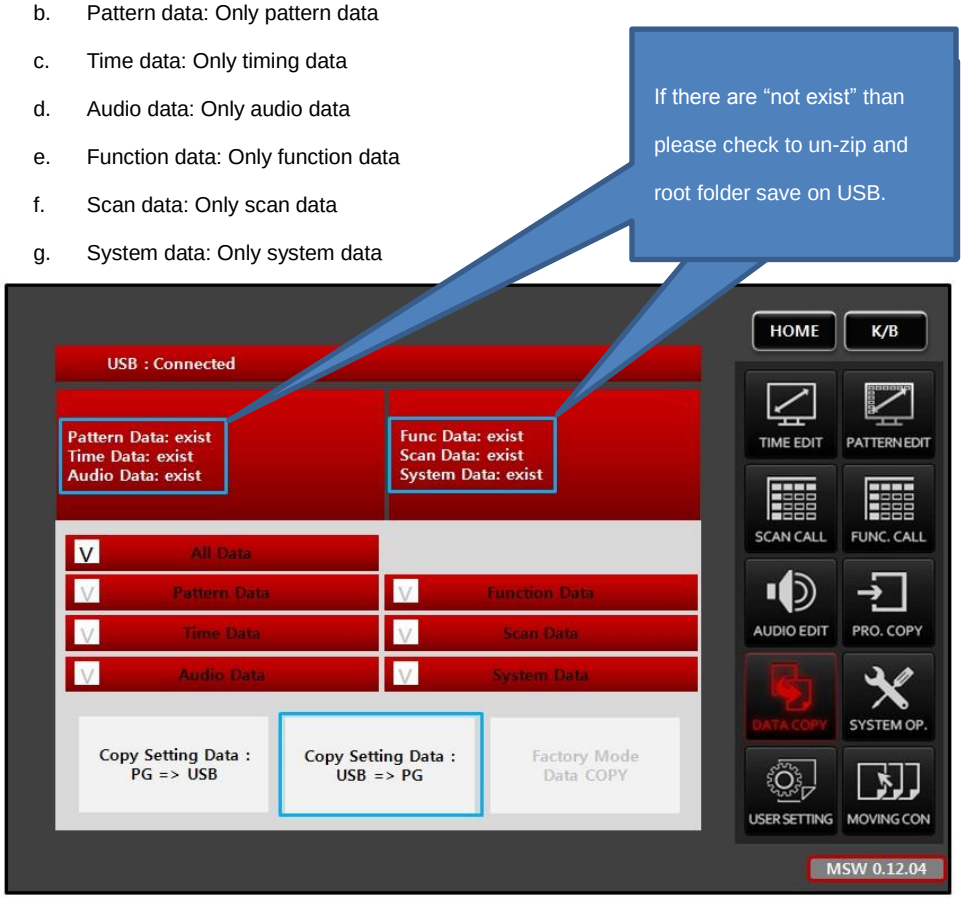
c. Time data: Only timing data

d. Audio data: Only audio data

e. Function data: Only function data

f. Scan data: Only scan data

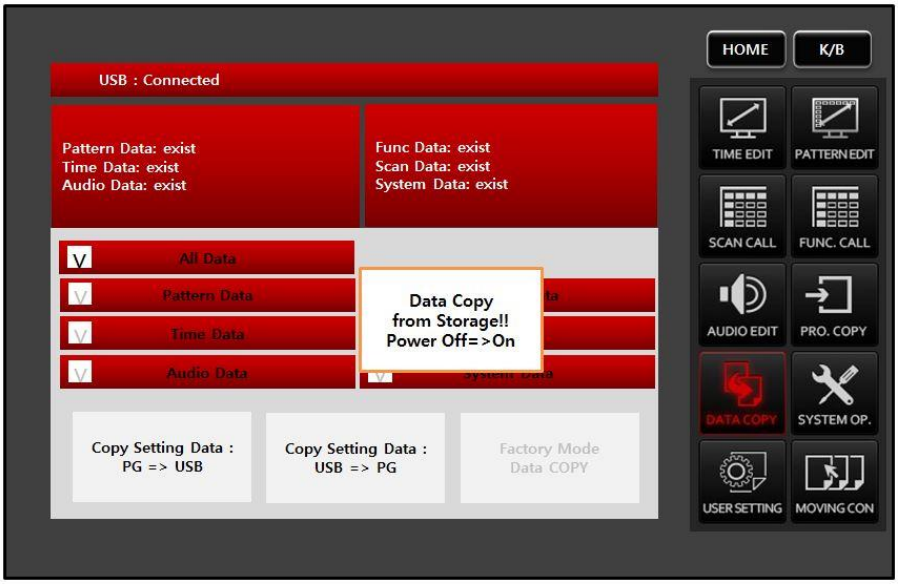
g. System data: Only system data



⑤ Select the “Copy Setting Data: USB => PG”, it means all USB data copy to MSPG-8000. Existing data will be overwritten.(Password is “8880”)

⑥ MSPG-8000 will confirm to copy, press ok button.

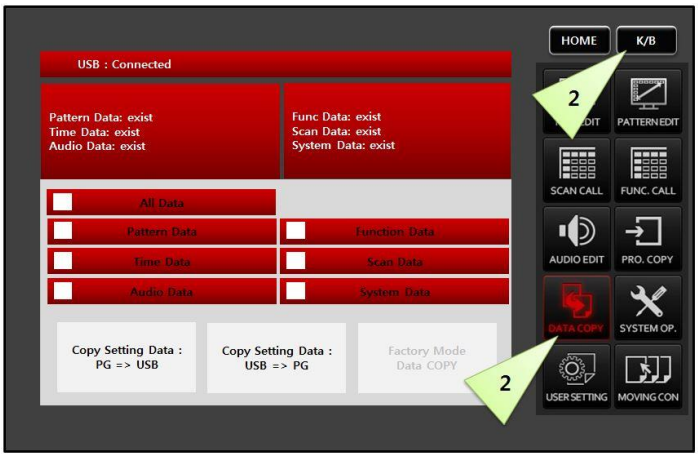
⑦ After 5 second update will finish as below, please turn off and turn on the MSPG-8000 for finish update.



2) All data back up from MSPG-8000 to USB memory stick.

① Connect USB stick to MSPG-8000's rear USB port and wait 5second for recognize USB.

② Press the K/B button and press the "DATA COPY" button.



③ Select the ALL Data for update all data.

a. All data: pattern, time, audio, function, scan and system data

b. Pattern data: Only pattern data

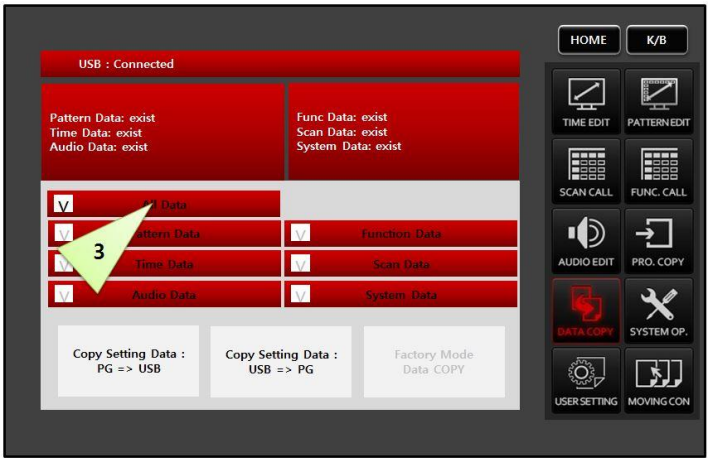
c. Time data: Only timing data

d. Audio data: Only audio data

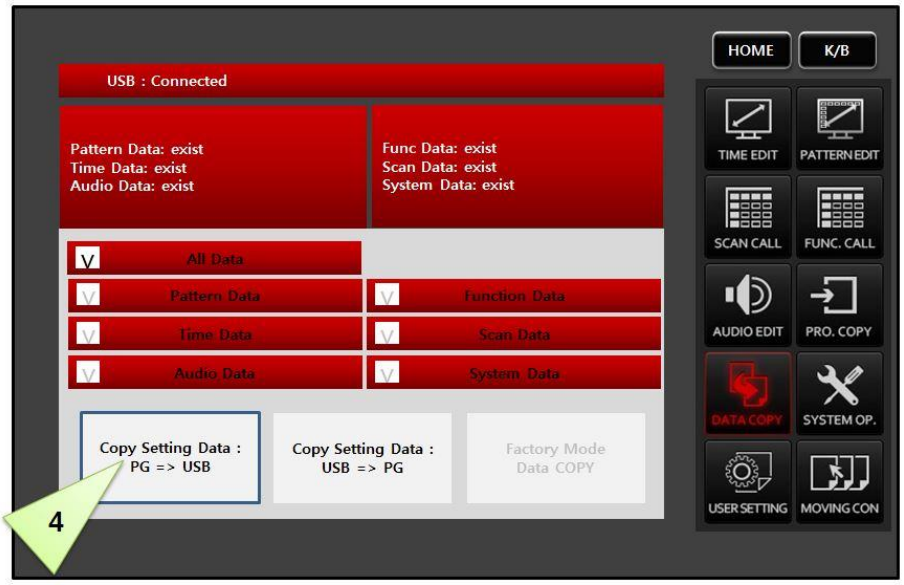
e. Function data: Only function data

f. Scan data: Only scan data

g. System data: Only system data

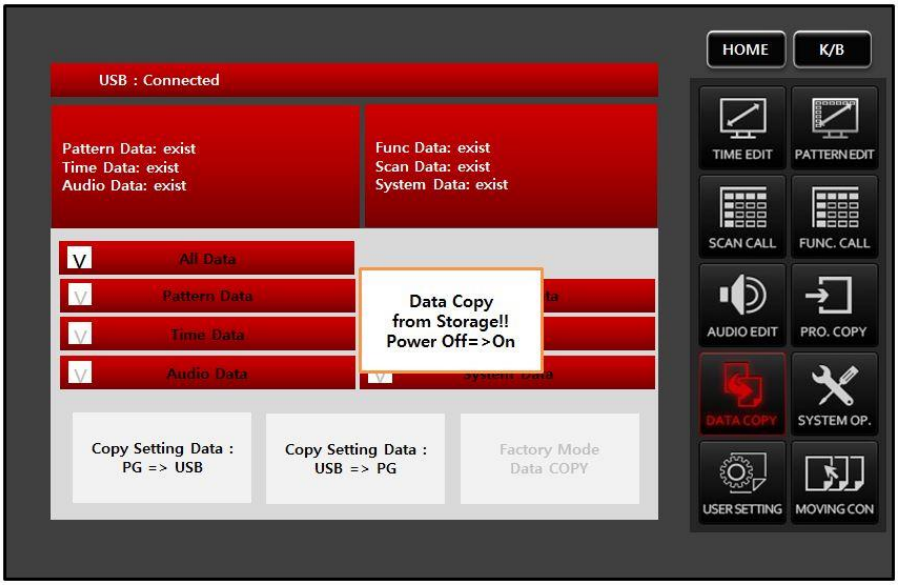


④ Select the “Copy Setting Data: PG => USB”, it means all MSPG-8000’s set up data will back up to USB memory stick. Existing data will be overwritten to USB memory stick.(Password is “8880”)



⑤ MSPG-8000 will confirm to copy, press “ok” button.

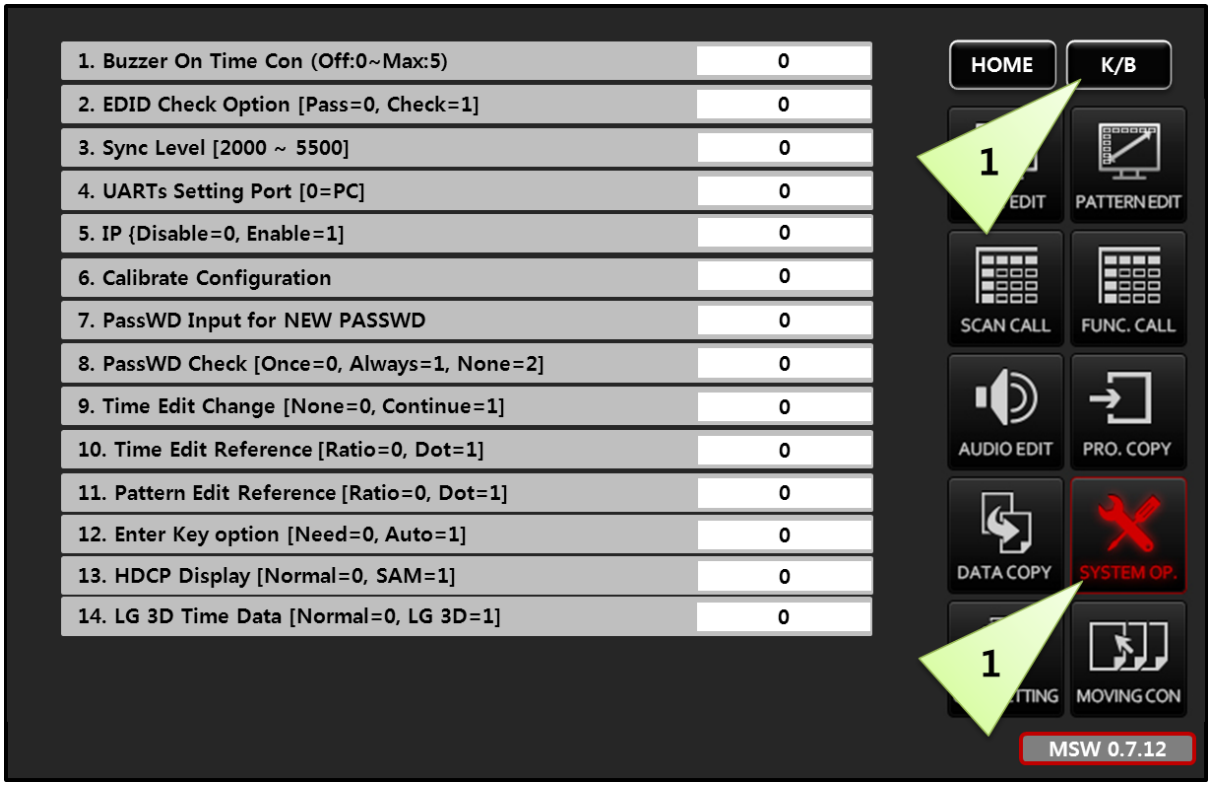
⑥ After 5 second update will finish as below, this back up data can use to another MSPG-8000 for make same set up.



4.9 System option

You can set up the default setting on MSPG-8000.

Press the K/B button and press the SYSTEM OP. button.



① Buzzer On: Button touch/press buzzer on/off setting

a. Buzzer off: 0

b. Buzzer on: 1

② EDID Check Option: EDID check function

a. EDID Pass[0]: Do not check EDID

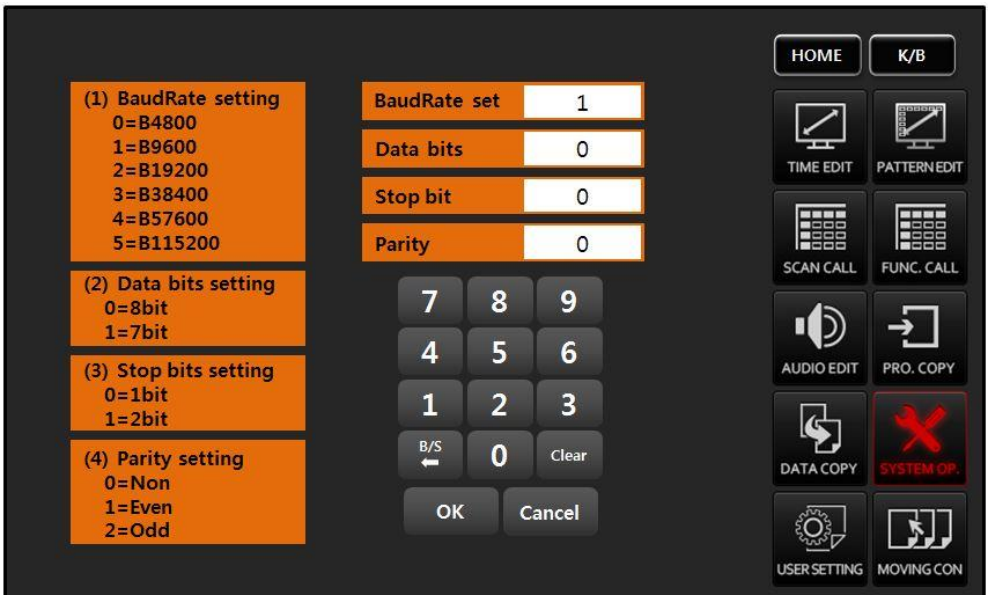
b. EDID Check[1]: EDID check

- ✓ EDID normal: Normal display with sound
- ✓ EDID abnormal: No display or no sound

③ Sync Level [2000~5500]: Analog Horizontal and Vertical sync level setting, default is 4800

④ UART setting Port[0]: Press OK/ENTER button for into set up

Connect PC to MSPG-8000's RS-232 port via RS-232(cross type) cable. Set up baud rate, data bit, stop bits and parity same as PC and UART setting.(password is "8880")



⑤ IP [Disable=0, Enable=1]: Reserved

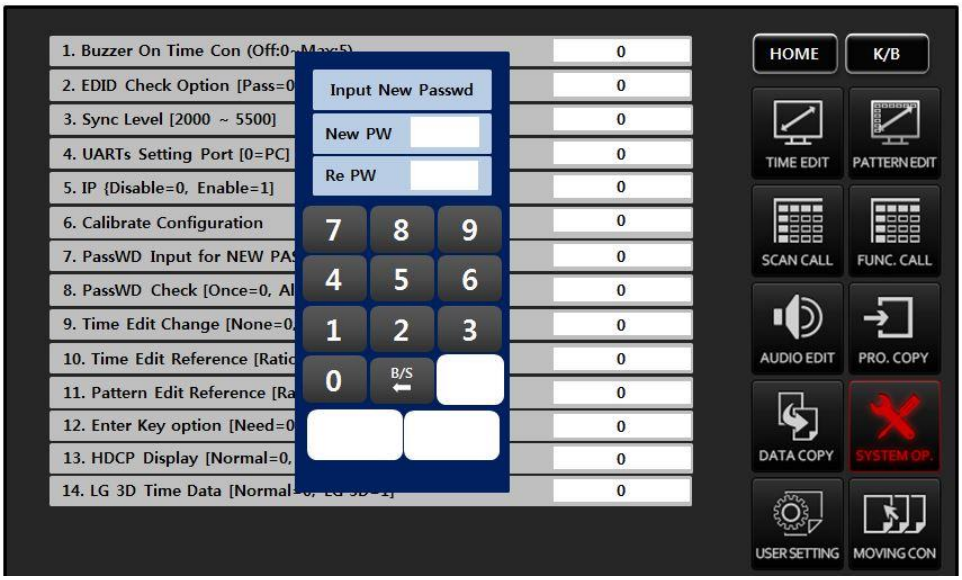
⑥ Calibrate Configuration: It can control proper location of touch screen in LCD screen.

⑦ PassWD Input for NEW PASSWD: Change new password.

a. Enter default password "8880" and press enter

b. Input new password 1~8 digit number.

c. Input same new password 1~8 digit number once more.



⑧ PassWD Check: Set password checking frequency

a. Once[0]: MSPG-8000 power on and ask the password only once

b. Always[1]: Ask the password always

c. None[2]: Do not ask the password

⑨ Reserved 1

⑩ Reserved 2

⑪ Pattern Edit Reference

a. Ratio[0]: Set pattern to ratio

b. Dot[1]: Set pattern to dot

⑫ Enter key option

a. Need[0]: Timing change with Enter button

b. Auto[1]: Timing change without Enter button(apply more than three digits)

⑬ HDCP Display

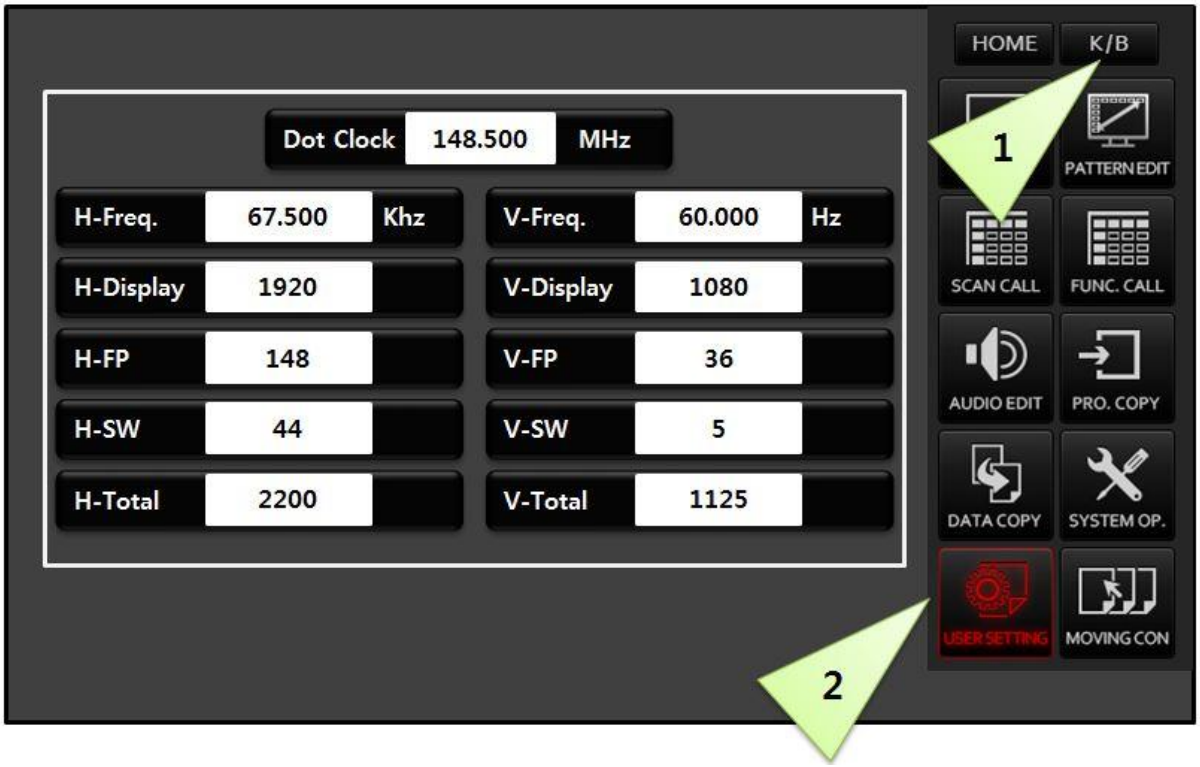
a. Normal[0]: HDCP/EDID information display type A

b. SAM[1]: HDCP/EDID information display type B

4.10 User setting

You can change the timing settings you called in real time. H-Freq & V-Freq are auto calculate.

1) Press the K/B button and press the USER SETTING button.



2) You can change setting value of Dot Clock, Horizontal Display, Vertical Display, Horizontal front porch, Vertical Front porch, Horizontal Sync Width, Vertical Sync width, Horizontal Total and Vertical Total. Use the arrow up and down buttons or digit number.

3) The changed timing setting will showing the monitor, the changed timing will not be saved.

4.11 Moving control

Level adjuster: Each Red, Green and Blue level can be adjustment from -255 to +255.

Moving control: Each pattern of character, color, image and OSD can be moving to all of direction.

1) Press the K/B button and press the MOVING CON button.

2) Level Adjuster

① Inc/Dec: Level step setting

② RED: Only red level can be adjustment -255 to +255.

③ GREEN: Only green level can be adjustment -255 to +255.

④ BLUE: Only blue level can be adjustment -255 to +255.

⑤ Set each (or together) RED, GREEN and BLUE then use arrow up/down buttons for change value.

3) Moving Control

① Char.: Pattern designed from character.

② Color: Pattern designed from color.

③ Image: Pattern designed from image.(will update)

④ OSD: Pattern designed from OSD.

⑤ Set each (or together) Char, Color, Image and OSD then use arrow buttons for moving selected option.

⑥ Use the arrow up/down buttons can increase moving speed.

MSPG-8100S

5. Chapter Five

How to control RS-232C communication

5.1 Prepare RS-232C communication

5.2 HEX code and ASCII code

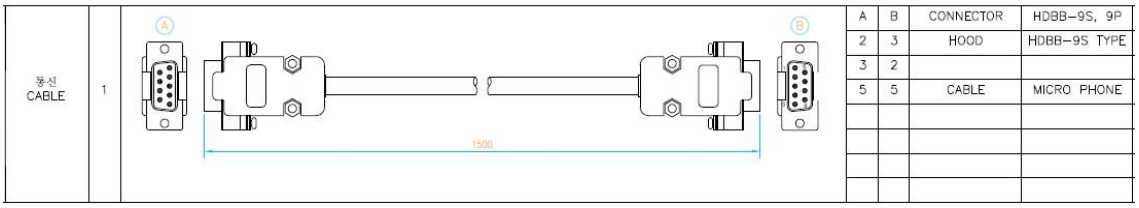
5.3 HEX code RS-232C control example

5.4 ASCII code RS-232C control example

Chapter 5. How to control RS-232C communication

5.1 Prepare RS-232C communication

1) Prepare to 9p to 9s.(Use the cable provided from Master Co., Ltd)



A	B	CONNECTOR	HDBB-9S, 9P
2	3	HOOD	HDBB-9S TYPE
3	2		
5	5	CABLE	MICRO PHONE

2) Connect MSPG-8000's RS-232C port to PC via 9p to 9s cable.

3) MSPG-8000 communication setting value

① Baud rate: 9600 or 19200 (Check the manual page at 80)

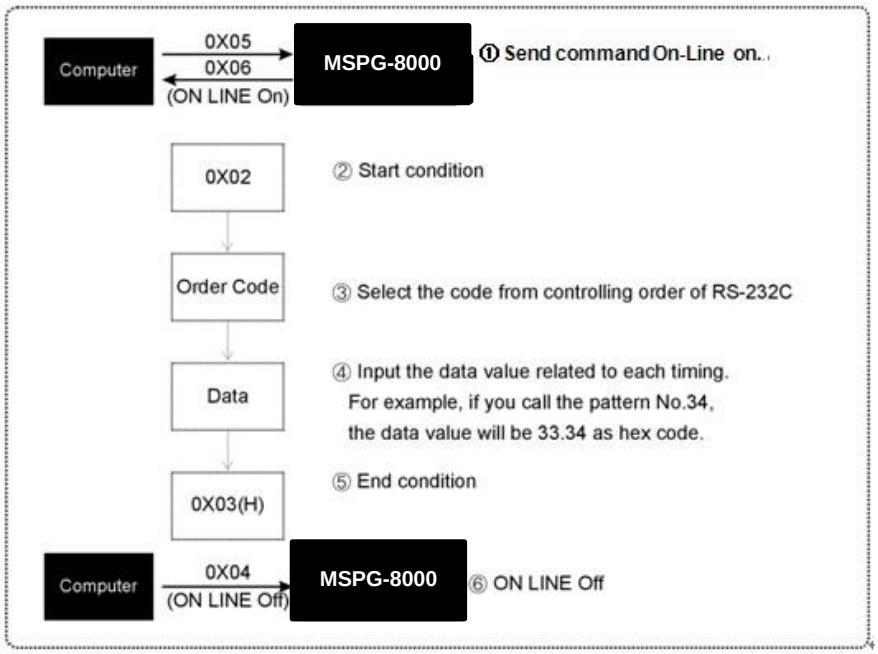
② Data Bits: 8

③ Stop Bits: 1

④ Parity: None

⑤ Device: User computer's comport number

4) RS-232C flow chart



5.2 HEX code and ASCII code

COMMAND	HEX CODE	ASCII CODE
On-Line	0x05	No need
Off-Line	0x04	No need
Start	0x02	No need
End	0x03	No need
Slot select	0x1F	run slot 1~8;
Time select	0x07	run time 1~999;
Pattern select	0x08	run pattern 1~999;
Time & Pattern select	0x09	In the future
Audio select	0x13	run audio 1~39;
HDCP ON/OFF select	0x12	run hdcp on; OR run hdcp off;
HDCP 1.4/2.2 on/off	0x15	run hdcp ver 1.4; OR run hdcp ver 2.2;
HDR select	0x16	In the future

5.3 Hex code RS-232C control example

1) On line: 0x05 (★Be sure to send an on-line command(0x05) first to order communications)

Off line: 0x04 (Send it to end the communications)

Command	
On line	05
Of line	04

2) Slot select: 0x1F + Slot No. 0x31~0x38

Command	Start 02	Slot select 1F	Slot No. 31~38	End 03
Slot No.1	02	1F	31	03
Slot No.7			37	

3) Time change: 0x07 + Time No. 0x30~0x39 3code

Command	Start 02	Time select 07	Time No. 3x 3x 3x			End 03
Time No.98	02	07	30	39	38	03
Time No.152			31	35	32	

4) Pattern change: 0x08 + Pattern No. 0x30~0x39 3code

Command	Start 02	Pattern select 08	Pattern No. 3x 3x 3x			End 03
Pattern No.52	02	08	30	35	32	03
Pattern No.1			30	30	31	

5) Time & Pattern change: 0x09 + Time No. 0x30~0x39 3code + Pattern No. 0x30~0x39 3code

Command	Start 02	T&P select 09	Time No. 3x 3x 3x			Pattern No. 3x 3x 3x			End 03
T.371&P.52	02	09	33	37	31	30	35	32	03
T.463&P.1			34	36	33	30	30	31	

6) Audio On/Off: 0x13 + audio on/off command 0x32 + audio off 0x30/audio on 0x31

Audio number select: 0x13 + Audio Type 0x30~0x31 / 0x31~0x39

Command	Start 02	Audio 13	Off/On 32	Audio off 30 Audio on 31		End 03
Audio Off	02	13	32	30		03
Audio On				31		
Command	Start 02	Audio 13	Type 31	Audio Number 3x 3x		End 03
Audio No.2	02	13	31	30	32	03
Audio No.25				32	35	

7) HDCP On/Off setting: 0x12 + HDCP OFF 0x30/HDCP ON 0X31

Command	Start 02	HDCP ON/OFF 12	HDCP ON/OFF 30/31	End 03
HDCP OFF	02	12	30	03
HDCP ON			31	

8) HDCP On/Off & Version setting: 0x15 + 0x30(off) / 0x31(on) + 0x30(HDCP1.4)/0x31(HDCP2.2)

Command	Start 02	HDCP select 15	HDCP ON/OFF 30(OFF)/31(ON)	HDCP 1.4/2.2 30(1.4)/31(2.2)	End 03
HDCP 1.4 off	02	15	30	30	03
HDCP 1.4 on			31	30	
HDCP 2.2 off			30	31	
HDCP 2.2 on			31	31	

9) HDR setting: 0x16 + 0x04(EOTF) + 0x32/33

Command	Start 02	HDR 16	EOTF 04	EOTF select 32~33	End 03
Reserved	02	16	04	Reserved	03
Reserved				Reserved	
HDR10				32	
HLG				33	

5.4 ASCII code RS-232C control example

1) Slot select: run slot 1~8;

   ① Ex: Slot 5 select: **run slot 5;**

2) TIME change: run time 1~999;

   ① Ex: Time 47 change: **run time 47;**

3) PATTERN change: run pattern 1~999;

   ① Ex: Pattern 999 change: **run pattern 999;**

4) AUDIO change: run audio 1~40;

   ① Ex: Audio 39 change: **run audio 39;**

5) HDCP on/off select: run hdcp on/off;

   ① Ex: HDCP on: **run hdcp on;**

   ② Ex: HDCP off: **run hdcp off;**

6) HDCP 1.4/2.2 on: run hdcp ver 1.4/2.2

   ① Ex: HDCP 1.4 on: **run hdcp ver 1.4;**

   ② Ex: HDCP 2.2 on: **run hdcp ver 2.2;**

6. Chapter Six

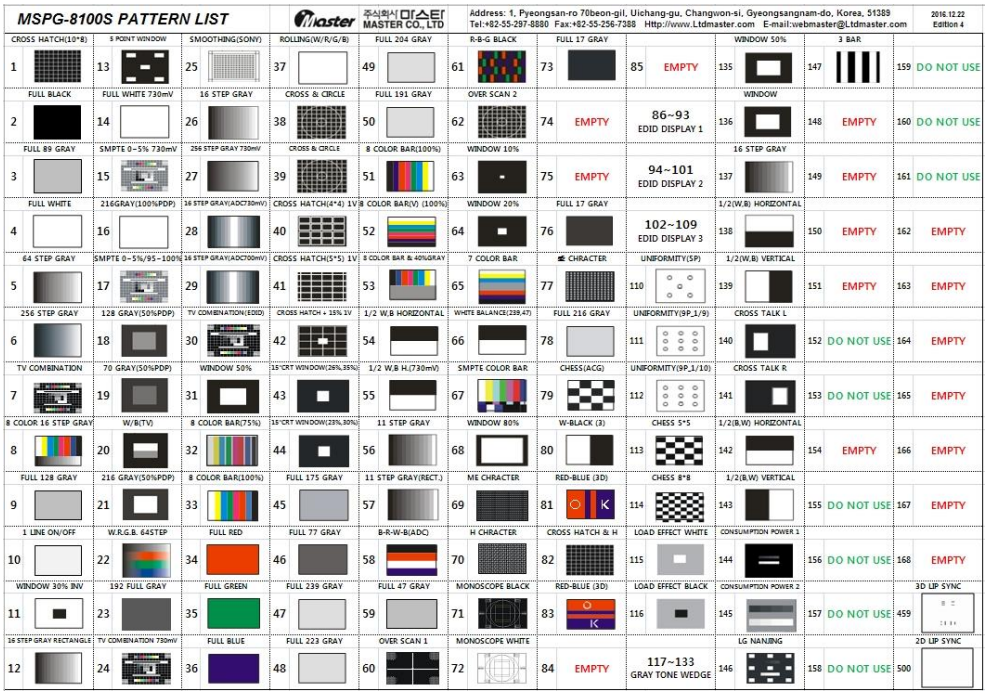
Default pattern and timing list

Chapter 6. Default pattern and timing list

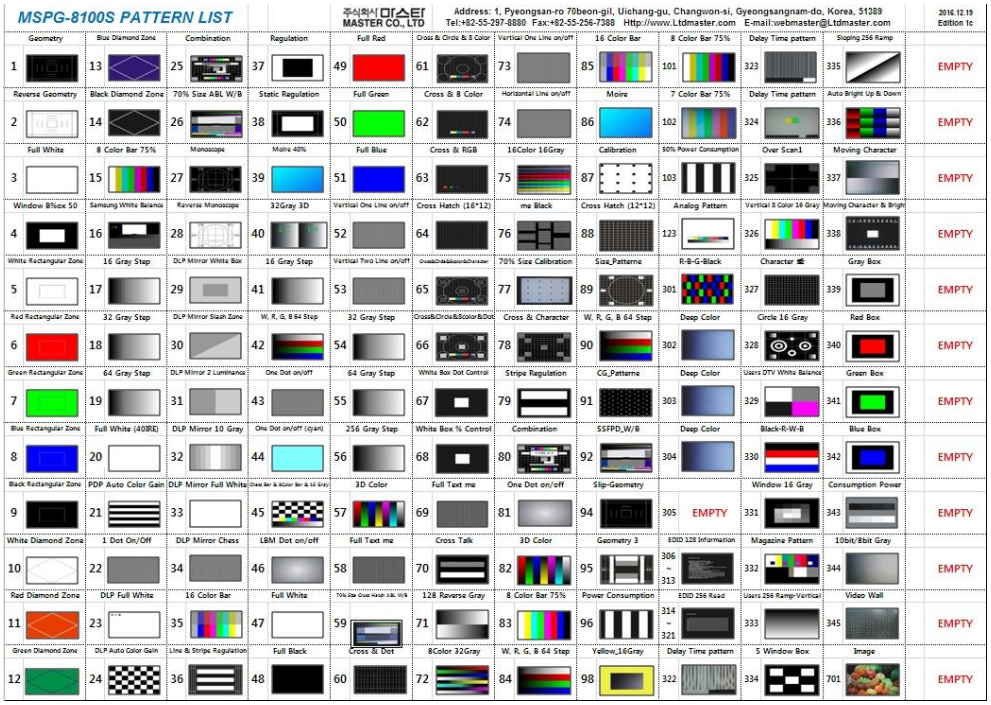
6.1 Two Types pattern

MSPG series has two kinds patterns as below

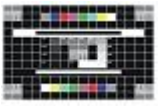
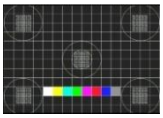
[A Type]

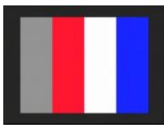
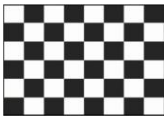
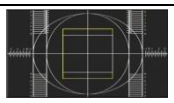


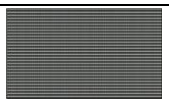
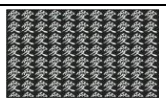
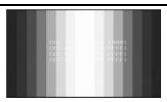
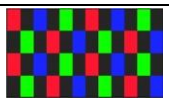
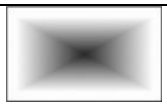
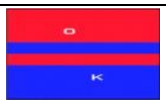
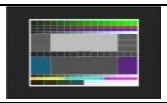
[B type]

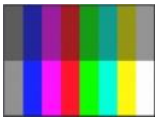


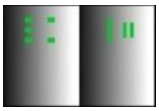
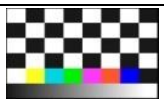
6.2 Default pattern and option list

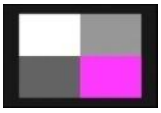
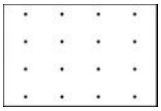
Pattern name	Default No. A type time No. B type time No.	Pattern Image	Option List
Linearity check pattern	Default 501 7,15,17,24,30 25,80		1.Position Box (0=Off, 1=On): Position Box setting On/off 2.Final Char (0=Off, 1=On):Character pattern setting on/off 3.Final Color (0=Off, 1=On):Color pattern setting on/off 4.EDID Check (0=Off, 1=On) ▶HDMI/DVI EDID check pattern, if Display's EDID header and check sum value are correct → Video On(Display) if Display's EDID header and check sum value are wrong → Video Off(No Signal) 4 ~38 Common option
Geometry check pattern Deflection linearity check pattern	Default 502 38,39,40,41, 62,82 60,61,62,63,64,65,66,78,88, 89		1.Cross Hatch H Divide (2~64): Horizontal line divide 2 to 64 2.Cross Hatch V Divide (2~48): Horizontal line divide 2 to 48 3.H Dot width (1~10): Horizontal line width setting 1 to 10 4.V Dot width (1~10): Vertical line width setting 1 to 10 5.Dot / Char Style (0~6): Dot or Character pattern style change 0 to 6 6.Small 5 Circle (0=off, 1=On): Small 5 circle line on/off 7.Small / Medium Circle (0=Off, 1=Medium, 2=Small): Center circle on/off 8.Large Circle (0=Off, 1=On): Large circle on/off 9.Large Circle size (0~100%): Large circle size setting 0 to 100% 10.Color Sel (0=Off, 1=3Col, 2=8Col) ▶0: Color Off ▶1: Red, Green and Blue On ▶2: White, Yellow, Cyan, Green, Magenta, Red, Blue and Gray On 11.Outer Line (0=Off, 1=On): Outer Line on/off 12~46 Common option
Color Pattern	Default 503 2,3,4,9,14,16, 23,34,35,36,37,45,46,47,48, 49,50,59,73,76,78,110,111,112,115,116 3,20,33,39,47, 48,49,50,51,86,338		1.Color Box H Start (0~100): Color Box Horizontal start setting 0 to 100 2.Color Box V Start (0~100): Color Box Vertical start setting 0 to 100 3.Color Box H Size (0~100): Color Box Horizontal size setting 0 to 100 4.Color Box V Size (0~100): Color Box Vertical size setting 0 to 100 5.Color Box R Level (0~255): Color Box Red level setting 0 to 255 6.Color Box G Level (0~255): Color Box Green level setting 0 to 255 7.Color Box B Level (0~255): Color Box Blue level setting 0 to 255 8.Background R Level (0~255): Background Red Level setting 0to 255 9.Background G Level (0~255): Background Green Level setting 0to 255 10.Background B Level (0~255): Background Blue Level setting 0to 255 11.Uniformity Position No. (5,9,10): Uniformity circle position setting ▶5: 5 uniformity point ▶9: 6 uniformity point ▶10: bigger 6 uniformity point 12.Uniformity Position Size (H Size/x) (0~100): Uniformity size setting 0 to100 13.Lip_Sync (on*100ms) (0 ~999): Video and audio On time setting 0 to 999 14.Lip_Sync (off*100ms) (0 ~999): Video and audio Off time setting 0 to 999 15~49 Common option
Gray/Color Scale Pattern	Default 504 12 32,71,335,336,337		1.Color/Gray Step (1~255): Gray Step setting 1 to 255 2.H Divide (1~16): Horizontal divide 1 to 16 3.V Divide (1~16): Vertical divide 1 to 16 4.Gray Direction (0~11): Gray Direction setting 0 to 11 5.Color Selector (0~1) ▶0: Gray Step ▶1: Color Step

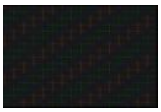
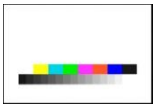
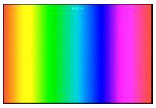
			6.Color 1 (0~15): Change color 1 0 to 15 7.Color 2 (0~15): Change color 1 0 to 15 8.Color 3 (0~15): Change color 1 0 to 15 9.Color 4 (0~15): Change color 1 0 to 15 10~44 Common option
Line On/Off Pattern	Default 505 10 22,43,44,46,52,53,73,74,81		1.On Size (0~100): H/V line on size setting 1 to 100 2.Off Size (0~100): H/V line of size setting 1 to 100 3.Color/Character select (0=color, 1=Char): Color or Character select 4.H/V Line, Dot Select (0=H, 1=V, 2=Dot) ▶0: Horizontal line type ▶1: Vertical line type ▶2: Dot type 5~7 Color On R,G,B Level (0~255): Color On R,G,B Level setting 0 to 255 8~10 Color Off R,G,B Level (0~255): Color Off R,G,B Level setting 0 to 255 11~45 Common option
Purity check pattern Color matrix check pattern	Default 506 11,18,19,20,21,31,42,43,44,54,55,58,63,64,66,68,80 4,29,37,67,68,79,96,103,330		1.Color Window H Start (0~100%): Color window horizontal setting 0 to 100% 2.Color Window V Start (0~100%): Color window vertical setting 0 to 100% 3.Color Window H Size (0~100%): Color window horizontal size setting 0 to 100% 4.Color Window V Size (0~100%): Color window vertical size setting 0 to 100% 5.Color window divide (0~14): Color window divide 0 to 14 6.Color window H/V select (0~1): Color window select horizontal or vertical 7.Color 1 R level (0~255): Color 1 Red level setting 0 to 255 …. 48.Color 14 B level (0~255): Color 14 Blue level setting 0 to 255 49~83 Common option
Auto color gain adjustment check pattern	Default 507 79,113,114 24,34		1.H Divide (0~255): Horizontal divide 0 to 255 2.V Divide (0~255): Vertical divide 0 to 255 3.Divide / Pixel Select (0=Divide, 1=Pixel) ▶0: Divide by H and V ▶1: Pixel: Divide unit is pixel 4.Color On R Level (0~255): Color on Red level setting 0 to 255 …. 9.Color On B Level (0~255): Color off Blue level setting 0 to 255 10~44 Common option
Color matrix check pattern	Default 508 8,32,33,51,52,53,65 15,21,31,83,101,102,326		1.Color Bar H/V Divide (1~8): Color Bar H or V divide 1 to 8 2.H / V select (0=H, 1=V): Horizontal or Vertical select 3.Gray Size (0~90%): Gray step size select 0 to 90% 4.Gray Step by one color (0~16): Gray step select 0 to 16 depend on Color bar 5.Gray 1 Level: Reserved 6.Reserved 7.Color 1 R level (0~255); Color 1 Red level setting 0 to 255 … 30. Color 8 B level (0~255); Color 8 Blue level setting 0 to 255 31~65 Common option
Geometry check pattern Aspect ratio format check pattern Over scan check pattern	Default 509 71,72 27,28		1~35 Common option

Character check pattern	Default 510 none none		1.Font Ascii Value (32~127): Font Ascii select 32 to 127 2.Font H Space (0~99): Font horizontal space setting 0 to 99 3.Font V Space (0~99): Font vertical space setting 0 to 99 4.Font Size or Code (1~7): Font size or code select 1 to 7 5~39 Common option
Character check pattern	Default 511 69 58,69,76		1.Me Style Select(0~4): “ME” Character style select 0 to 4 2.Pattern Select(0~1): Pattern type select 3~37 Common option
Character size check pattern	Default 512 none none		1.Character font size (1~8): Character font size setting 1 to 8 2~36 Common option
Chinese font check pattern	Default 513 77 327		1.Chinese Font select (0=Love, 1=Beautiful): Chinese Font select 愛 or 美 2~36 Common option
Color scale tracking check pattern	Default 514 22 42,84,90		1.Color Step (2~256): Color Step setting 2 to 256 2.H Divide (1~4): Horizontal divide 1 to 4 3~37 Common option
Gray scale tracking check pattern	Default 515 28,29 none		1.Color Windows H Divide (0~20): Horizontal color windows divide 0 to 20 2.Color Windows V Divide (0~20): Vertical color windows divide 0 to 20 3.Color Windows H Size (0~100%): Horizontal color windows divide 0 to 100% 4.Color Windows V Size (0~100%): Vertical color windows divide 0 to 100% 5.Gray Level 1 (0~255): Gray level 1 setting 0 to 255 … 24.Gray Level 20 (0~255): Gray level 20 setting 0to 255 25~59 Common option
Convergence adjustment check pattern	Default 516 61 301		1.H Divide (0~255): Horizontal divide 0 to 255 2.V Divide (0~255): Vertical divide 0 to 255 3~37 Common option
White balance check pattern	Default 517 13 334		1.Box H Start (0~100%): Box horizontal start position setting 0 to 100% 2.Box V Start (0~100%): Box vertical start position setting 0 to 100% 3.Box H Size (0~100%): Box horizontal size setting 0 to 100% 4.Box V Size (0~100%): Box vertical size setting 0 to 100% 5.Center Box On/Off (0=Off, 1=On): Center box on/off setting 6.Box Full On/Off (0=Off, 1=On): full or empty box select 7~41.
Gray scale tracking pattern with square type	Default 518 None None		1.Divide (1~64): Square box divide 1 to 64 2.Gray Type (0~1): Black or white type select 3.Shape Type (0=Fill, 1=2by2): Shape type select 4~38 Common option
3D check pattern (Side by side / Top and bottom type)	Default 519 81,83 None		1.3D Struct Select (0=SSH, 1=TB): 3D pattern setting, 0=Side by side type / 1=Top and bottom type 2~36 Common option
AVL W/B (70%) pattern	Default 520 none		1.H Size (1~100%): Horizontal size setting 1 to 100% 2.V Size (1~100%): Vertical size setting 1 to 100% 3.Cross Hatch Width (0~30Pixels): Cross hatch width setting 0 to 30 pixels

	26,59,92		4.Side width (0~30Pixes): Side width setting 0 to 30 pixels 5.Dot On/Off Color Level (0~255): Dot on/off color level setting 0 to 255 6~40 Common option
EDID check pattern 256 Byte with diagram	Default 521 94,95 314,315		1.EDID Port No. ▶0: Ch 1 EDID 255 DATA ▶1: Ch 2 EDID 255 DATA 2~36 Common option
EDID check pattern Simple EDID data	Default 522 86,87 306,307		1.EDID Port No. ▶0: Ch 1 EDID DATA ▶1: Ch 2 EDID DATA 2~36 Common option
EDID check pattern Detail EDID data	Default 523 102,103 none		1.EDID Port No. ▶0: Ch 1 EDID detail DATA ▶1: Ch 2 EDID detail DATA 2~36 Common option
3.Geometry check pattern with Circle	Default 524 None none		1.Large 1 Circle (0=Off, 1=On): Large circle on/off 2.Large Circle width (0~10): Large circle width setting 0 to 10 3.Middle 5 Circle (0=Off, 1=On): Middle circle on/off 4.Middle Circle width (0~10): Middle circle width setting 0 to 10 5.Cross 4 Circle (0=Off, 1=On): Cross circle on/off 6.Cross Circle width (0~10): Cross circle width setting 0 to 10 7.Small 5 Circle (0=Off, 1=On): Small circle on/off 8.Small Circle width (0~10): Small circle width setting 0 to 10 9~41 Common option
1.Purity check pattern with square box	Default 525 none 5,6,7,8,9,10,1 1,12,13,14		1.Color Box H Start(0~100):Color box horizontal start position setting 0 to 100 2.Color Box V Start(0~100):Color box vertical start position setting 0 to 100 3.Color Box H Size(0~100): Color Box horizontal size setting 0 to 100 4.Color Box V Size(0~100): Color Box vertical size setting 0 to 100 5~7.Color Box R,G,B level (0~255): Color Box level red, green and blue setting 0 to 255 8.Color Rectangular H Start(0~100):Color Rectangular horizontal start position setting 0 to 100 9.Color Rectangular V Start(0~100):Color Rectangular vertical start position setting 0 to 100 10.Color Rectangular H Size(0~100): Color Rectangular horizontal size setting 0 to 100 11.Color Rectangular V Size(0~100): Color Rectangular vertical size setting 0 to 100 12.Rectangular/Diamond/Box Select (0=Rectangular/1=Diamond/2=Box) 13~47 Common option
Color matrix check pattern with level adjustment	Default 526 None 35,85		1.Color H Divide (1~8): Color horizontal divide 1 to 8 2.Color V Divide (1~64): Color vertical divide 1 to 64 3.H Size (1~100%): Horizontal size setting 1 to 100% 4.V Size (1~100%): Vertical size setting 1 to 100% 5.Reserved 6.Reserved 7.Color 1 R level (0~255): Color 1 red level setting 0 to 255 … 30.Color 30 B level (0~255): Color 8 blue level setting 0 to 255 31~65 Common option

Regulation check pattern	Default 527 None 36		1.H Line space value (0~50%): Horizontal line space value setting 0~50% 2.H Box space value (0~50%): Horizontal box space value setting 0~50% 3.V Line space value (0~50%) Vertical line space value setting 0~50% 4.V Box space value (0~50%) Vertical box space value setting 0~50% 5~39 Common option
Regulation check pattern	Default 528 none 38		1.H Line Count (0~64%): Horizontal line count setting 0 to 64% 2.V Line Count (0~64%): Vertical line count setting 0 to 64% 3.H Line Position (0~100%): Horizontal line position setting 0 to 100% 4.V Line Position (0~100%): Vertical line position setting 0 to 100% 5.H Box Position (0~100%): Horizontal box position setting 0 to 100% 6.V Box Position (0~100%): Vertical box position setting 0 to 100% 7.Color Box R level (0~255) 8.Color Box G level (0~255) 9.Color Box B level (0~255) 10~44 Common option
3D check pattern All of 3D type can be display with “3D” character	Default 529 None 40		1.3D Structure Type (0=SBS(Half), 1=T&B) ▶0: Side by side half type 3D ▶1: Top and bottom type 3D 2~36 Common option
Auto color gain adjustment check pattern Color matrix check pattern	Default 530 None 45		1.H Divide (1~8) 2.V Divide (1~20) 3.8 Color Level (0~255) 4.Gray level (0~255) 5.Gray Step by one color (0~32) 6~40 Common option
Color scale tracking pattern with vertical type	Default 531 none 57,82		1.V Divide (1~255) 6~40 Common option
Cross talk check pattern	Default 532 None 70		1.Color Box H Start (0~100): Color Box Horizontal start setting 0 to 100 2.Color Box V Start (0~100): Color Box Vertical start setting 0 to 100 3.Color Box H Size (0~100): Color Box Horizontal size setting 0 to 100 4.Color Box V Size (0~100): Color Box Vertical size setting 0 to 100 5.Color Box R Level (0~255): Color Box Red level setting 0 to 255 6.Color Box G Level (0~255): Color Box Green level setting 0 to 255 7.Color Box B Level (0~255): Color Box Blue level setting 0 to 255 8.Characte Line On(0~255) 9.Characte Line Off(0~255) 10.Character Box H Start (0~100%) 11.Character Box V Start (0~100%) 12. Character Box H End (0~100%) 13. Character Box V End (0~100%)
13.Color scale tracking pattern with horizontal type	Default 533 None 533		1.H Divide (1~256): Horizontal step divide 1 to 256 2~36 Common option
13.Color scale tracking pattern with horizontal type	Default 534 None 75		1.H Divide (0~255): Horizontal divide 0 to 255 2.V Divide (0~16): Vertical divide 0 to 16 3~37 Common option

3.Geometry check pattern	Default 535 None 1,2,94		1.H Line Divide (0~64): Horizontal line add 0 to 64 2.V Line Divide (0~64): Vertical line add 0 to 64 3.H Width (0~64): Horizontal line width setting 0 to 64 4.V Width (0~64): Vertical line width setting 0 to 64 5.H Line Position (0~100) 6.V Line Position (0~100) 7.Rectangular Full (0=Off, 1=On): Rectangular fill up or empty 8.Rectangular H Size (0~100) 9.Rectangular V Size (0~100) 10~44Common option
Windows square check pattern	Default 537 None 339,340,341,342		1.Base R Color Level (1~100%) 2.Base G Color Level (1~100%) 3.Base B Color Level (1~100%) 4.Center Box Size (1~100%) 5.Center Box R Level (1~100%) 6.Center Box G Level (1~100%) 7.Center Box B Level (1~100%) 8.Small Box Size (1~100%) 9.Small Box R Level (1~100%) 10.Small Box G Level (1~100%) 11.Small Box B Level (1~100%) 12~46 Common option
Windows square check pattern with color	Default 538 none 329		1.Color Windows H Start (1~100%) 2.Color Windows V Start (1~100%) 3.Color Windows H Size (1~100%) 4.Color Windows V Size (1~100%) 5.Color Windows H Divide (0~4) 6.Color Windows V Divide (0~3) 7.Color 1 R Level (0~255) … 45.Color 13 B Level (0~255) 46~80 Common option
Uniformity check pattern	Default 539 None 77,87,91		1.Pattern Size (0~100%) 2.Horizontal Divide (2~16) 3.Vertical Divide (2~12) 4.Circle Size (1~32): Circle size setting 1 to 32 5.Circle ratio (0=4:3, 1=16:9, 2=21:9): Circle ratio setting 6.Color Box R Level (0~255) 7.Color Box G Level (0~255) 8.Color Box B Level (0~255) 9.Triangle On/Off (0=Off, 1=On) 10~44 Common option
Gray rotate pattern	Default 542 None 331		1.Gray Rotate Step (0=16,1=256) 4~38 Common option
Consumption Power check pattern	Default 543 None 343		1.Box H Size (0~100%) 2.Box V Size (0~100%) 3.Box 1_1 Level (0~100%) 4.Box 1_2 Level (0~100%)

			5.Box 1_3 Level (0~100%) 6.Box 1_4 Level (0~100%) 7.Box 2_1 Level (0~100%) 8.Box 2_2 Level (0~100%) 9.Box 2_3 Level (0~100%) 10.Box 2_4 Level (0~100%) 11~45 Common option
Color box Line check pattern	Default 545 None None		1.Color Box 1 R Level (0~100%) … 9.Color Box 3 B Level (0~100%) 10~44Common option
Consumption Power check pattern	Default 546 None None		1.Low Level Gray Box 1 (0~255) 2.Low Level Gray Box 2 (0~255) 3.Low Level Gray Box 3 (0~255) 4.Low Level Gray Box 4 (0~255) 5.High Level Gray Box 1 (0~255) 6.High Level Gray Box 2 (0~255) 7.High Level Gray Box 3 (0~255) 8.High Level Gray Box 4 (0~255) 9.Side Box Level (0~255) 10~44 Common option
DLP full white check pattern	Default 615 None 23		1~35 Common option
Samsung W/B pattern	Default 616 None 16		1~35 Common option
8.White balance check pattern Slash zone pattern	Default 617 None None		1~35 Common option
Analog pattern 14.Color matrix check pattern	Default 620 None None		1~35 Common option
14.Color matrix check pattern	Default 621 None None		1~35 Common option
13.Color scale tracking pattern	Default 630 None None		1~35 Common option

<Common option>

1.Center Marker/Slash/Box(0~11)

▶0: None

▶1: 9point center/border/edge

▶2: Cross line

▶3:Center Cross point

▶4:X line

▶5:Inverted triangle with white

▶6:Cross line with Circle

▶7:Black cross bar with white bar

▶8: Cross line

▶9: Two vertical line

▶10: Cross line with center square box

▶11: Border line

2 ~ 4. Base R, G, B Level (0~100%)

▶ N/A(These pattern haven't base)

5 ~ 7. Character R, G, B Level (0~100%)

▶ N/A(These pattern haven't Character)

8. OSD Display (0~6): On Screen Display

▶ 1:美 Character at the bottom

▶2 :美 Character at the top

▶3 :美 Character at the top and bottom

▶4:Boarder line character

▶5:X line character

▶6:Boarder and X line character

9 ~ 11 OSD R, G, B Level (0~100%)

▶On Screen Display Red, Green and Blue level setting 0 to 100%

12. Auto Bright up & down (0~12)

▶0:None

▶1: Auto Contrast up & down with Red, Green and Blue

▶2: Auto Contrast up & down Red only

▶3: Auto Contrast up & down Green only

▶4: Auto Contrast up & down Blue only

▶5: Auto Contrast up & down with Red, Green and Blue

▶6: Auto Contrast up & down Red only

▶7: Auto Contrast up & down Green only

▶8: Auto Contrast up & down Blue only

▶9: Auto Bright up & down with Red, Green and Blue

▶10: Auto Bright up & down Red only

▶11: Auto Bright up & down Green only

▶12: Auto Bright up & down Blue

13. Reverse On Time (0~999)/Vf

▶ Reverse pattern on time setting 0 to 999/Vertical Frequency

14. Reverse Off Time (0~999)/Vf

▶ Reverse pattern off time setting 0 to 999/Vertical Frequency

15. Character Moving (0~8)

▶0:None

▶1:Character moving right to left

▶2:Character moving left to right

▶3:Character moving down to up

▶4:Character moving up to down

▶5:Character moving left up to right down

▶6:Character moving right up to left down

▶7:Character moving left down to right up

▶8:Character moving right down to left up

▶9:Character moving right up to left down

16. Color Moving (0~12)
- ▶0:None
- ▶1:Color moving right to left
- ▶2:Color moving left to right
- ▶3:Color moving down to up
- ▶4:Color moving up to down
- ▶5:Color moving left up to right down
- ▶6:Color moving right up to left down
- ▶7:Color moving left down to right up
- ▶8:Color moving right down to left up
- ▶9:Color moving right up to left down

17. Graphic Moving (0~8)
- ▶0:None
- ▶1:Graphic moving right to left
- ▶2:Graphic moving left to right
- ▶3:Graphic moving down to up
- ▶4:Graphic moving up to down
- ▶5:Graphic moving left up to right down
- ▶6:Graphic moving right up to left down
- ▶7:Graphic moving left down to right up
- ▶8:Graphic moving right down to left up
- ▶9:Graphic moving right up to left down

18. Moving Pixel Step (0~99)
- ▶ Moving step setting 0 to 99 by pixel step

19. Moving Frame Interval (0~99)
- ▶ Moving frame interval setting 0 to 99, it is relate with 49.Moving Pixel step setting

20. Flicker On (CH, OSD, CL, GP) (0~15)
- ▶ Flicker on item to

CH(1)=Character, OSD(2)=On Screen Display, CL(4)=Color, GP(8)=Graphic
- ▶0=None
- ▶1=CH
- ▶2=OSD
- ▶3=CH+OSD
- ▶4=CL
- ▶5=CH+CL
- ▶6=OSD+CL
- ▶7=CH+OSD+CL
- ▶8=GP
- ▶9=CH+GP
- ▶10=OSD+GP
- ▶11=CH+OSD+GP
- ▶12=CL+GP
- ▶13=CH+CL+GP
- ▶14=OSD+CL+GP
- ▶15=CH+OSD+CL+GP

21. Flicker On Time (0~999)/Vf
- ▶ Flicker on time setting to 0~999/Vertical Frequency

22. Flicker Off Time (0~999)/Vf
- ▶ Flicker off time setting to 0~999/Vertical Frequency

23. Gamma Correction (0~30)/10
- ▶ Gamma correction setting 0 to 30, default value is 10

24 ~ 26. Video R, G, B (On=1, Off=0)
- ▶ Each video off to Red, Green and Blue

27. Video Level (0~999mV)
- ▶ Analog(VGA) Video level setting to 0~999mv

28. RGB444=1, YCbCr444=2, YCbCr422=3

▶ Pattern RGB444, YCbCr444 or YCbCr422 setting

29.Scart 1=RF, 2=CVBS, 3=RGB, Y/C+1=4

▶SCART setting

30~35. Reserved

6.3 Default timing list

MSPG-8000 has 1~700 user timings and 701~999 default timings.

(from MSW version 2.0.01, the slot also needs to be update)

Below has 701~999 default timing list and please contact to Master co., ltd for 1~700 timing list

***This table is a standard timings and may not be supported depending on the slot.**

Time No.	Mode	Resolution (Progressive / Interlace)	Dot Clock (MHz)	H. Freq. (KHz)	V. Freq. (Hz)	H. Total	H. Front Porch	H. Back Porch	H. Sync Width	V. Total	V. Front Porch	V. Back Porch	V. Sync Width	H.	V.	Remark
701	CTA861	640x480p	25.175	31.469	59.94	800	16	48	96	525	10	33	2	-	-	HDMI/R444/8bit/Limit
702	CTA861	640x480p	25.200	31.500	60.00	800	16	48	96	525	10	33	2	-	-	HDMI/R444/8bit/Limit
703	CTA861	720x480i	13.500	15.734	59.94	858	19	57	62	525	9	30	6	-	-	HDMI/R444/8bit/Limit
704	CTA861	720x480i	13.514	15.751	60.00	858	19	57	62	525	9	30	6	-	-	HDMI/R444/8bit/Limit
705	CTA861	720x480i	27.000	31.469	119.88	858	19	57	62	525	9	30	6	-	-	HDMI/R444/8bit/Limit
706	CTA861	720x480i	27.027	31.500	120.00	858	19	57	62	525	9	30	6	-	-	HDMI/R444/8bit/Limit
707	CTA861	720x480i	54.000	62.937	239.76	858	19	57	62	525	9	30	6	-	-	HDMI/R444/8bit/Limit
708	CTA861	720x480i	54.054	63.000	2400.00	858	19	57	62	525	9	30	6	-	-	HDMI/R444/8bit/Limit
709	CTA861	720x480p	27.000	31.469	59.94	858	16	60	62	525	9	30	6	-	-	HDMI/R444/8bit/Limit
710	CTA861	720x480p	27.027	31.500	60.00	858	16	60	62	525	9	30	6	-	-	HDMI/R444/8bit/Limit
711	CTA861	720x480p	54.000	62.937	119.88	858	16	60	62	525	9	30	6	-	-	HDMI/R444/8bit/Limit
712	CTA861	720x480p	54.054	63.000	120.00	858	16	60	62	525	9	30	6	-	-	HDMI/R444/8bit/Limit
713	CTA861	720x480p	108.000	125.874	239.76	858	16	60	62	525	9	30	6	-	-	HDMI/R444/8bit/Limit
714	CTA861	720x480p	108.108	126.000	240.00	858	16	60	62	525	9	30	6	-	-	HDMI/R444/8bit/Limit
715	CTA861	720x576i	13.500	15.625	50.00	864	12	69	63	625	5	38	6	-	-	HDMI/R444/8bit/Limit
716	CTA861	720x576i	27.000	31.250	100.00	864	12	69	63	625	5	38	6	-	-	HDMI/R444/8bit/Limit
717	CTA861	720x576i	54.000	62.500	200.00	864	12	69	63	625	5	38	6	-	-	HDMI/R444/8bit/Limit
718	CTA861	720x576p	27.000	31.250	50.00	864	12	68	64	625	5	39	5	-	-	HDMI/R444/8bit/Limit
719	CTA861	720x576p	54.000	62.500	100.00	864	12	68	64	625	5	39	5	-	-	HDMI/R444/8bit/Limit
720	CTA861	720x576p	108.000	125.000	200.00	864	12	68	64	625	5	39	5	-	-	HDMI/R444/8bit/Limit
721	CTA861	1280x720p	59.341	17.982	23.98	3300	1760	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
722	CTA861	1280x720p	59.400	18.000	24.00	3300	1760	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
723	CTA861	1280x720p	74.250	18.750	25.00	3960	2420	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
724	CTA861	1280x720p	74.176	22.478	29.97	3300	1760	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
725	CTA861	1280x720p	74.250	22.500	30.00	3300	1760	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
726	CTA861	1280x720p	89.910	35.964	47.95	2500	960	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
727	CTA861	1280x720p	90.000	36.000	48.00	2500	960	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
728	CTA861	1280x720p	74.250	37.500	50.00	1980	440	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
729	CTA861	1280x720p	74.176	44.955	59.94	1650	110	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
730	CTA861	1280x720p	74.250	45.000	60.00	1650	110	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
731	CTA861	1280x720p	148.500	75.000	100.00	1980	440	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
732	CTA861	1280x720p	148.352	89.910	119.88	1650	110	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
733	CTA861	1280x720p	148.500	90.000	120.00	1650	110	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
734	CTA861	1680x720p	59.341	17.982	23.98	3300	1360	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
735	CTA861	1680x720p	59.400	18.000	24.00	3300	1360	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
736	CTA861	1680x720p	59.400	18.750	25.00	3168	1228	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
737	CTA861	1680x720p	59.341	22.478	29.97	2640	700	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
738	CTA861	1680x720p	59.400	22.500	30.00	2640	700	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
739	CTA861	1680x720p	98.901	35.964	47.95	2750	810	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
740	CTA861	1680x720p	99.000	36.000	48.00	2750	810	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
741	CTA861	1680x720p	82.500	37.500	50.00	2200	260	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
742	CTA861	1680x720p	98.901	44.955	59.94	2200	260	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
743	CTA861	1680x720p	99.000	45.000	60.00	2200	260	220	40	750	5	20	5	+	+	HDMI/R444/8bit/Limit
744	CTA861	1680x720p	165.000	82.500	100.00	2000	60	220	40	825	5	95	5	+	+	HDMI/R444/8bit/Limit
745	CTA861	1680x720p	197.802	98.901	119.88	2000	60	220	40	825	5	95	5	+	+	HDMI/R444/8bit/Limit
746	CTA861	1680x720p	198.000	99.000	120.00	2000	60	220	40	825	5	95	5	+	+	HDMI/R444/8bit/Limit
747	CTA861	1920x1080i	74.250	28.125	50.00	2640	528	148	44	1125	5	30	10	+	+	HDMI/R444/8bit/Limit
748	CTA861	1920x1080i	74.176	33.716	59.94	2200	88	148	44	1125	5	30	10	+	+	HDMI/R444/8bit/Limit
749	CTA861	1920x1080i	74.250	33.750	60.00	2200	88	148	44	1125	5	30	10	+	+	HDMI/R444/8bit/Limit
750	CTA861	1920x1080i	148.500	56.250	100.00	2640	528	148	44	1125	5	30	10	+	+	HDMI/R444/8bit/Limit
751	CTA861	1920x1080i	148.352	67.433	119.88	2200	88	148	44	1125	5	30	10	+	+	HDMI/R444/8bit/Limit
752	CTA861	1920x1080i	148.500	67.500	120.00	2200	88	148	44	1125	5	30	10	+	+	HDMI/R444/8bit/Limit
753	CTA861	1920x1080p	74.176	26.973	23.98	2750	638	148	44	1125	4	36	5	+	+	HDMI/R444/8bit/Limit
754	CTA861	1920x1080p	74.250	27.000	24.00	2750	638	148	44	1125	4	36	5	+	+	HDMI/R444/8bit/Limit
755	CTA861	1920x1080p	74.250	28.125	25.00	2640	528	148	44	1125	4	36	5	+	+	HDMI/R444/8bit/Limit
756	CTA861	1920x1080p	74.176	33.716	29.97	2200	88	148	44	1125	4	36	5	+	+	HDMI/R444/8bit/Limit
757	CTA861	1920x1080p	74.250	33.750	30.00	2200	88	148	44	1125	4	36	5	+	+	HDMI/R444/8bit/Limit
758	CTA861	1920x1080p	148.352	53.946	47.95	2750	638	148	44	1125	4	36	5	+	+	HDMI/R444/8bit/Limit

759	CTA861	1920x1080p	148.500	54.000	48.00	2750	638	148	44	1125	4	36	5	+	+	HDMI/R444/8bit/Limit
760	CTA861	1920x1080p	148.500	56.250	50.00	2640	528	148	44	1125	4	36	5	+	+	HDMI/R444/8bit/Limit
761	CTA861	1920x1080p	148.352	67.433	59.94	2200	88	148	44	1125	4	36	5	+	+	HDMI/R444/8bit/Limit
762	CTA861	1920x1080p	148.500	67.500	60.00	2200	88	148	44	1125	4	36	5	+	+	HDMI/R444/8bit/Limit
763	CTA861	1920x1080p	297.000	112.500	100.00	2640	528	148	44	1125	4	36	5	+	+	HDMI/R444/8bit/Limit
764	CTA861	1920x1080p	296.703	134.865	119.88	2200	88	148	44	1125	4	36	5	+	+	HDMI/R444/8bit/Limit
765	CTA861	1920x1080p	297.000	135.000	120.00	2200	88	148	44	1125	4	36	5	+	+	HDMI/R444/8bit/Limit
766	CTA861	2560x1080p	98.901	26.374	23.98	3750	998	148	44	1100	4	11	5	+	+	HDMI/R444/8bit/Limit
767	CTA861	2560x1080p	99.000	26.400	24.00	3750	998	148	44	1100	4	11	5	+	+	HDMI/R444/8bit/Limit
768	CTA861	2560x1080p	90.000	28.125	25.00	3200	448	148	44	1125	4	36	5	+	+	HDMI/R444/8bit/Limit
769	CTA861	2560x1080p	118.681	33.716	29.97	3520	768	148	44	1125	4	36	5	+	+	HDMI/R444/8bit/Limit
770	CTA861	2560x1080p	118.800	33.750	30.00	3520	768	148	44	1125	4	36	5	+	+	HDMI/R444/8bit/Limit
771	CTA861	2560x1080p	197.802	52.747	47.95	3750	998	148	44	1100	4	11	5	+	+	HDMI/R444/8bit/Limit
772	CTA861	2560x1080p	198.000	52.800	48.00	3750	998	148	44	1100	4	11	5	+	+	HDMI/R444/8bit/Limit
773	CTA861	2560x1080p	185.625	56.250	50.00	3300	548	148	44	1125	4	36	5	+	+	HDMI/R444/8bit/Limit
774	CTA861	2560x1080p	197.802	65.934	59.94	3000	248	148	44	1100	4	11	5	+	+	HDMI/R444/8bit/Limit
775	CTA861	2560x1080p	198.000	66.000	60.00	3000	248	148	44	1100	4	11	5	+	+	HDMI/R444/8bit/Limit
776	CTA861	2560x1080p	371.250	125.000	100.00	2970	218	148	44	1250	4	161	5	+	+	HDMI/R444/8bit/Limit
777	CTA861	2560x1080p	494.505	149.850	119.88	3300	548	148	44	1250	4	161	5	+	+	HDMI/R444/8bit/Limit
778	CTA861	2560x1080p	495.000	150.000	120.00	3300	548	148	44	1250	4	161	5	+	+	HDMI/R444/8bit/Limit
779	CTA861	3840x2160p	296.703	53.946	23.98	5500	1276	296	88	2250	8	72	10	+	+	HDMI/R444/8bit/Limit
780	CTA861	3840x2160p	297.000	54.000	24.00	5500	1276	296	88	2250	8	72	10	+	+	HDMI/R444/8bit/Limit
781	CTA861	3840x2160p	297.000	56.250	25.00	5280	1056	296	88	2250	8	72	10	+	+	HDMI/R444/8bit/Limit
782	CTA861	3840x2160p	296.703	67.433	29.97	4400	176	296	88	2250	8	72	10	+	+	HDMI/R444/8bit/Limit
783	CTA861	3840x2160p	297.000	67.500	30.00	4400	176	296	88	2250	8	72	10	+	+	HDMI/R444/8bit/Limit
784	CTA861	3840x2160p	593.407	107.892	47.95	5500	1276	296	88	2250	8	72	10	+	+	HDMI/R444/8bit/Limit
785	CTA861	3840x2160p	594.000	108.000	48.00	5500	1276	296	88	2250	8	72	10	+	+	HDMI/R444/8bit/Limit
786	CTA861	3840x2160p	594.000	112.500	50.00	5280	1056	296	88	2250	8	72	10	+	+	HDMI/R444/8bit/Limit
787	CTA861	3840x2160p	593.407	134.865	59.94	4400	176	296	88	2250	8	72	10	+	+	HDMI/R444/8bit/Limit
788	CTA861	3840x2160p	594.000	135.000	60.00	4400	176	296	88	2250	8	72	10	+	+	HDMI/R444/8bit/Limit
789	CTA861	4096x2160p	297.000	54.000	24.00	5500	1020	296	88	2250	8	72	10	+	+	HDMI/R444/8bit/Limit
790	CTA861	4096x2160p	297.000	56.250	25.00	5280	968	128	88	2250	8	72	10	+	+	HDMI/R444/8bit/Limit
791	CTA861	4096x2160p	297.000	67.500	30.00	4400	88	128	88	2250	8	72	10	+	+	HDMI/R444/8bit/Limit
792	CTA861	4096x2160p	594.000	108.000	48.00	5500	1020	296	88	2250	8	72	10	+	+	HDMI/R444/8bit/Limit
793	CTA861	4096x2160p	594.000	112.500	50.00	5280	968	128	88	2250	8	72	10	+	+	HDMI/R444/8bit/Limit
794	CTA861	4096x2160p	594.000	135.000	60.00	4400	88	128	88	2250	8	72	10	+	+	HDMI/R444/8bit/Limit
795	CTA861	5120x2160p	396.000	52.800	24.00	7500	1996	296	88	2200	8	22	10	+	+	HDMI/R444/8bit/Limit
796	CTA861	5120x2160p	396.000	55.000	25.00	7200	1696	296	88	2200	8	22	10	+	+	HDMI/R444/8bit/Limit
797	CTA861	5120x2160p	396.000	66.000	30.00	6000	664	128	88	2200	8	22	10	+	+	HDMI/R444/8bit/Limit
798	CTA861	3840x2160p	594.000	135.000	60.00	4400	176	296	88	2250	8	72	10	+	+	HDMI/Y444/8bit/Limit
799	CTA861	3840x2160p	594.000	135.000	60.00	4400	176	296	88	2250	8	72	10	+	+	HDMI/Y420/8bit/Limit
800	CTA861	3840x2160p	1188.000	270.000	120.00	4400	176	296	88	2250	8	72	10	+	+	HDMI/Y420/8bit/Limit
801	CTA861	1920x1080p	297.000	112.500	100.00	2640	528	148	44	1125	4	36	5	+	+	FRL/R444/8bit/Limit
802	CTA861	1920x1080p	297.000	135.000	120.00	2200	88	148	44	1125	4	36	5	+	+	FRL/R444/8bit/Limit
803	CTA861	3840x2160p	297.000	54.000	24.00	5500	1276	296	88	2250	8	72	10	+	+	FRL/R444/8bit/Limit
804	CTA861	3840x2160p	297.000	56.250	25.00	5280	1056	296	88	2250	8	72	10	+	+	FRL/R444/8bit/Limit
805	CTA861	3840x2160p	297.000	67.500	30.00	4400	176	296	88	2250	8	72	10	+	+	FRL/R444/8bit/Limit
806	CTA861	3840x2160p	594.000	108.000	48.00	5500	1276	296	88	2250	8	72	10	+	+	FRL/R444/8bit/Limit
807	CTA861	3840x2160p	594.000	112.500	50.00	5280	1056	296	88	2250	8	72	10	+	+	FRL/R444/8bit/Limit
808	CTA861	3840x2160p	594.000	135.000	60.00	4400	176	296	88	2250	8	72	10	+	+	FRL/R444/8bit/Limit
809	CTA861	3840x2160p	1188.000	225.000	100.00	5280	1056	296	88	2250	8	72	10	+	+	FRL/R444/8bit/Limit
810	CTA861	3840x2160p	1188.000	270.000	120.00	4400	176	296	88	2250	8	72	10	+	+	FRL/R444/8bit/Limit
811	CTA861	4096x2160p	297.000	54.000	24.00	5500	1020	296	88	2250	8	72	10	+	+	FRL/R444/8bit/Limit
812	CTA861	4096x2160p	297.000	56.250	25.00	5280	968	128	88	2250	8	72	10	+	+	FRL/R444/8bit/Limit
813	CTA861	4096x2160p	297.000	67.500	30.00	4400	88	128	88	2250	8	72	10	+	+	FRL/R444/8bit/Limit
814	CTA861	4096x2160p	594.000	108.000	48.00	5500	1020	296	88	2250	8	72	10	+	+	FRL/R444/8bit/Limit
815	CTA861	4096x2160p	594.000	112.500	50.00	5280	968	128	88	2250	8	72	10	+	+	FRL/R444/8bit/Limit
816	CTA861	4096x2160p	594.000	135.000	60.00	4400	88	128	88	2250	8	72	10	+	+	FRL/R444/8bit/Limit
817	CTA861	4096x2160p	1188.000	225.000	100.00	5280	800	296	88	2250	8	72	10	+	+	FRL/R444/8bit/Limit
818																
819	CTA861	5120x2160p	396.000	52.800	24.00	7500	1996	296	88	2200	8	22	10	+	+	FRL/R444/8bit/Limit
820	CTA861	5120x2160p	396.000	55.000	25.00	7200	1696	296	88	2200	8	22	10	+	+	FRL/R444/8bit/Limit
821	CTA861	5120x2160p	396.000	66.000	30.00	6000	664	128	88	2200	8	22	10	+	+	FRL/R444/8bit/Limit
822	CTA861	5120x2160p	742.500	118.800	48.00	6250	746	296	88	2475	8	297	10	+	+	FRL/R444/8bit/Limit
823	CTA861	5120x2160p	742.500	112.500	50.00	6600	1096	296	88	2250	8	72	10	+	+	FRL/R444/8bit/Limit
824	CTA861	5120x2160p	742.500	135.000	60.00	5500	164	128	88	2250	8	72	10	+	+	FRL/R444/8bit/Limit
825																
826																
827	CTA861	7680x4320p	1188.000	108.000	24.00	11000	2552	592	176	4500	16	144	20	+	+	FRL/R444/8bit/Limit
828	CTA861	7680x4320p	1188.000	110.000	25.00	10800	2352	592	176	4400	16	44	20	+	+	FRL/R444/8bit/Limit
829	CTA861	7680x4320p	1188.000	132.000	30.00	9000	552	592	176	4400	16	44	20	+	+	FRL/R444/8bit/Limit
830	CTA861	7680x4320p	2376.000	264.000	60.00	9000	552	592	176	4400	16	44	20	+	+	FRL/Y420/8bit/Limit

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901	SMPTE	710x484i	13.500	15.734	59.94	858	20	65	63	525	7	28	6	-	-	DTV COMPONENT
902	SMPTE	702x576i	13.500	15.625	50.00	864	20	79	63	625	4	40	5	-	-	

903	SMPTE	720x483p	27.000	31.469	59.94	858	16	59	63	525	6	30	6	+	+	
904	SMPTE	720x483p	27.000	31.469	59.94	858	16	59	63	525	6	30	6	+	+	
905	SMPTE	720x576p	27.000	31.250	50.00	864	12	68	64	625	5	39	5	+	+	
906	SMPTE	1280x720p	74.250	45.000	60.00	1650	70	220	80	750	5	20	5	+	+	
907	SMPTE	1280x720p	74.176	44.955	59.94	1650	70	220	80	750	5	20	5	+	+	
908	SMPTE	1280x720p	74.250	37.500	50.00	1980	400	220	80	750	5	20	5	+	+	
909	SMPTE	1280x720p	74.250	22.500	30.00	3300	1720	220	80	750	5	20	5	+	+	
910	SMPTE	1280x720p	74.174	22.477	29.97	3300	1720	220	80	750	5	20	5	+	+	
911	SMPTE	1280x720p	74.250	18.750	25.00	3960	2380	220	80	750	5	20	5	+	+	
912	SMPTE	1280x720p	74.250	18.000	24.00	4125	2545	220	80	750	5	20	5	+	+	
913	SMPTE	1280x720p	74.176	17.982	23.98	4125	2545	220	80	750	5	20	5	+	+	DTV
914	SMPTE	1920x1080i	74.250	33.750	60.00	2200	44	148	88	1125	5	30	10	-	-	COMPONENT
915	SMPTE	1920x1080i	74.175	33.716	59.94	2200	44	148	88	1125	5	30	10	-	-	
916	SMPTE	1920x1080i	74.250	28.125	50.00	2640	484	148	88	1125	5	30	10	-	-	
917	SMPTE	1920x1035i	74.250	33.750	60.00	2200	44	148	88	1125	11	69	10	-	-	
918	SMPTE	1920x1035i	74.175	33.716	59.94	2200	44	148	88	1125	11	69	10	-	-	
919	SMPTE	1920x1080p	148.500	67.500	60.00	2200	44	148	88	1125	4	36	5	-	-	
920	SMPTE	1920x1080p	148.350	67.432	59.94	2200	44	148	88	1125	4	36	5	-	-	
921	SMPTE	1920x1080p	148.500	56.250	50.00	2640	484	148	88	1125	4	36	5	-	-	
922	SMPTE	1920x1080p	74.250	33.750	30.00	2200	44	148	88	1125	4	36	5	+	+	
923	SMPTE	1920x1080p	74.175	33.716	29.97	2200	44	148	88	1125	4	36	5	+	+	
924	SMPTE	1920x1080p	74.250	28.125	25.00	2640	484	148	88	1125	4	36	5	+	+	
925	SMPTE	1920x1080p	74.250	27.000	24.00	2750	594	148	88	1125	4	36	5	+	+	
926	SMPTE	1920x1080p	74.176	26.973	23.98	2750	594	148	88	1125	4	36	5	+	+	
927																
928																
929																
930																
931	TV	710x484i	13.500	15.734	59.94	858	21	64	63	525	7	28	6	-	-	NTSC-M
932	TV	710x484i	13.500	15.734	59.94	858	21	64	63	525	7	28	6	-	-	NTSC-J
933	TV	710x484i	13.500	15.734	59.94	858	21	64	63	525	7	28	6	-	-	NTSC-4.43
934	TV	702x576i	13.500	15.625	50.00	864	20	79	63	625	4	40	5	-	-	PAL
935	TV	710x484i	13.500	15.734	59.94	858	20	65	63	525	7	28	6	-	-	PAL-M
936	TV	702x576i	13.500	15.625	50.00	864	20	79	63	625	4	40	5	-	-	PAL-N
937	TV	710x484i	13.500	15.734	59.94	858	20	65	63	525	7	28	6	-	-	PAL-60
938	TV	702x576i	13.500	15.625	50.00	864	21	78	63	625	4	40	5	-	-	SECAM
939																
940																
941	VESA	640x350p	31.500	37.861	85.08	832	32	96	64	445	32	3	60	+	-	
942	VESA	640x400p	31.500	37.861	85.08	832	32	96	64	445	1	41	3	-	+	
943	VESA	720x400p	35.500	37.927	85.04	936	36	108	72	446	1	42	3	-	+	
944	VESA	640x480p	25.175	31.469	59.94	800	16	48	96	525	2	41	2	-	-	
945	VESA	640x480p	31.500	37.861	72.81	832	24	128	40	520	1	36	3	-	-	
946	VESA	640x480p	31.500	37.500	75.00	840	16	120	64	500	1	16	3	-	-	
947	VESA	640x480p	36.000	43.269	85.01	832	56	80	56	509	1	25	3	-	-	
948	VESA	800x600p	36.000	35.156	56.25	1024	24	128	72	625	1	22	2	+	+	
949	VESA	800x600p	40.000	37.879	60.32	1056	40	88	128	628	1	23	4	+	+	
950	VESA	800x600p	50.000	48.077	72.17	1040	56	64	120	666	37	23	6	+	+	
951	VESA	800x600p	49.500	46.875	75.00	1056	16	160	80	625	1	21	3	+	+	
952	VESA	800x600p	56.250	53.674	85.06	1048	32	152	64	631	1	27	3	+	+	
953	VESA	848x480p	33.750	31.020	59.99	1088	16	112	112	517	6	23	8	+	+	
954	VESA	1024x768p	44.900	35.522	43.48	1264	8	56	176	817	0	45	4	-	-	
955	VESA	1024x768p	65.000	48.363	60.00	1344	24	160	136	806	3	29	6	-	-	
956	VESA	1024x768p	75.000	56.476	70.07	1328	24	144	136	806	3	29	6	-	-	
957	VESA	1024x768p	78.750	60.023	75.02	1312	16	176	96	800	1	28	3	+	+	VESA
958	VESA	1024x768p	94.500	68.677	85.00	1376	48	208	96	808	1	36	3	+	+	RGB444
959	VESA	1152x864p	108.000	67.500	75.00	1600	64	256	128	900	1	32	3	+	+	8BIT
960	VESA	1280x768p	68.250	47.396	59.99	1440	48	80	32	790	3	12	7	+	-	
961	VESA	1280x768p	79.500	47.776	59.87	1664	64	192	128	798	3	20	7	-	+	
962	VESA	1280x768p	102.250	60.289	74.89	1696	80	208	128	805	3	27	7	-	+	
963	VESA	1280x768p	117.500	68.633	84.84	1712	80	216	136	809	3	31	7	-	+	
964	VESA	1280x960p	108.000	60.000	60.00	1800	96	312	112	1000	1	36	3	+	+	
965	VESA	1280x960p	148.500	85.938	85.00	1728	64	224	160	1011	1	47	3	+	+	
966	VESA	1280x1024p	108.000	63.981	60.02	1688	48	248	112	1066	1	38	3	+	+	
967	VESA	1280x1024p	135.000	79.976	75.02	1688	16	248	144	1066	1	38	3	+	+	
968	VESA	1280x1024p	157.500	91.146	85.02	1728	64	224	160	1072	1	44	3	+	+	
969	VESA	1360x768p	85.500	47.712	60.01	1792	64	256	112	795	3	18	6	+	+	
970	VESA	1400x1050p	101.000	64.744	59.95	1560	48	80	32	1080	3	23	4	+	-	
971	VESA	1400x1050p	121.750	65.317	59.98	1864	88	232	144	1089	3	32	4	-	+	
972	VESA	1400x1050p	156.000	82.278	74.87	1896	104	248	144	1099	3	42	4	-	+	
973	VESA	1400x1050p	179.500	93.881	84.96	1912	104	256	152	1105	3	48	4	-	+	
974	VESA	1440x900p	88.750	55.469	59.90	1600	48	80	32	926	3	17	6	+	-	

975	VESA	1440x900p	106.500	55.935	59.89	1904	80	232	152	934	3	25	6	-	+
976	VESA	1440x900p	136.750	70.635	74.98	1936	96	248	152	942	3	33	6	-	+
977	VESA	1440x900p	157.000	80.430	84.84	1952	104	256	152	948	3	39	6	-	+
978	VESA	1600x1200p	162.000	75.000	60.00	2160	64	304	192	1250	1	46	3	+	+
979	VESA	1600x1200p	175.500	81.250	65.00	2160	64	304	192	1250	1	46	3	+	+
980	VESA	1600x1200p	189.000	87.500	70.00	2160	64	304	192	1250	1	46	3	+	+
981	VESA	1600x1200p	202.500	93.750	75.00	2160	64	304	192	1250	1	46	3	+	+
982	VESA	1600x1200p	229.500	106.250	85.00	2160	64	304	192	1250	1	46	3	+	+
983	VESA	1680x1050p	119.000	64.674	59.88	1840	48	80	32	1080	3	21	6	+	-
984	VESA	1680x1050p	146.250	65.290	59.95	2240	104	280	176	1089	3	30	6	-	+
985	VESA	1680x1050p	187.000	82.306	74.89	2272	120	296	176	1099	3	40	6	-	+
986	VESA	1680x1050p	214.750	93.859	84.94	2288	128	304	176	1105	3	46	6	-	+
987	VESA	1792x1344p	204.750	83.640	60.00	2448	128	328	200	1394	1	46	3	-	+
988	VESA	1792x1344p	261.000	106.270	75.00	2456	96	352	216	1417	1	69	3	-	+
989	VESA	1856x1392p	218.250	86.333	59.99	2528	96	352	224	1439	1	43	3	-	+
990	VESA	1856x1392p	288.000	112.500	75.00	2560	128	352	224	1500	1	104	3	-	+
991	VESA	1920x1200p	154.000	74.038	59.95	2080	48	80	32	1235	3	26	6	+	-
992	VESA	1920x1200p	193.250	74.556	59.88	2592	136	336	200	1245	3	36	6	-	+
993	VESA	1920x1200p	245.250	94.038	74.93	2608	136	344	208	1255	3	46	6	-	+
994	VESA	1920x1200p	281.250	107.184	84.93	2624	144	352	208	1262	3	53	6	-	+
995	VESA	1920x1440p	234.000	90.000	60.00	2600	128	344	208	1500	1	56	3	-	+
996	VESA	1920x1440p	297.000	112.500	75.00	2640	144	352	224	1500	1	56	3	-	+
997	VESA	2560x1600p	330.013	106.250	59.99	3106	168	146	232	1771	2	159	10	-	+
998	VESA	2560x1600p	348.500	99.458	59.99	3504	192	472	280	1658	3	49	6	-	+
999	VESA	2560x1600p	268.499	98.713	59.97	2720	48	80	32	1646	3	37	6	-	+

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