VIDEO SIGNAL GENERATOR

MSPG-6100L

USER MANUAL

Edition 1a

CONTENTS

Chapter 1. Introduction

1.1 Foreword

- Thank you for purchasing the MSPG-6100L video signal generator.
- This manual provides details on how to operate the MSPG-6100L and the precautions to be needed when doing so.
- Take the time to read through this manual before attempting to operate the MSPG-6100L.
- After reading this manual, keep it in a safe place for your future reference.

1.2 Product overview

- The generator enables you to test a board range of video displays including composite or component television video signals as well as computer video display terminals(MSPG-6100L, It can test the almost signal (HDMI, DVI, TV, Analog, Media Play etc.)).
- The generator enables you to quickly set signal generator formats appropriate for each display by twisting a Jog.
- The generator's functions can be customized to support video display testing in a variety of environments such as development, repair center, or production line.

1.3 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-6100L.
- These instructions to ensure that you will operate the MSPG-6100L 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. In installing time don't do any operations.
- Fuse replacement : The fuse is a F3.15AL 250V "F" type.

1.4 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.

1.4.1 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.
- Whenever the AC power line voltage dips below the minimum specified, this message is displayed and the generator's microprocessor is halted.
- If you see this message during normal operation, it probably indicates that a power sag or short duration dropout has occurred. To clear this condition, cycle the power going to the generator.
- If you still have a problem, you may also want to check to see that the line voltage selector(next to the power inlet) is set correctly for the power being fed into the generator.

1.4.2 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.

1.4.3 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.
- If there is a thunderstorm while the generator is being used outdoors, immediately turn off its power, disconnect the power cable from the main unit, and move the generator to a safe place.
- Do not place the signal generator long time in a car on hot 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.

1.4.4 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.

1.4.5 International Electrical Symbols

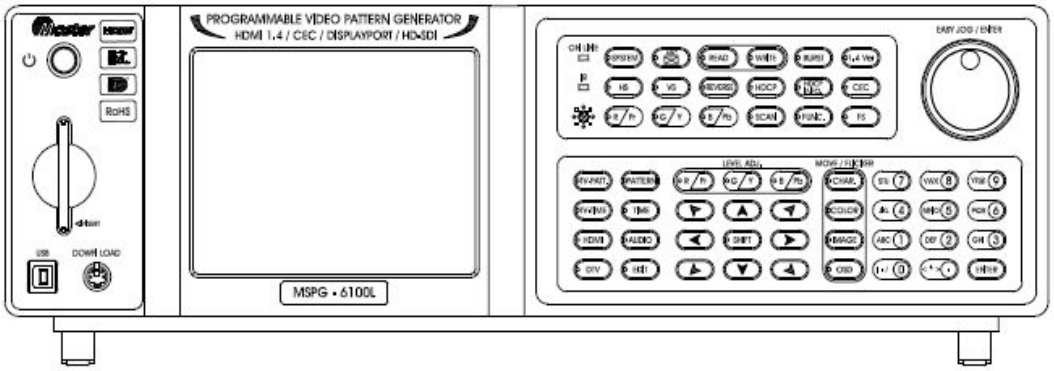
~	AC : Alternating Current
⏚	Earth Grounding
CE	Conforms to European Union directives
HDMI	High Definition Multimedia Interface
DVI	Digital Visual Interface
RoHS	Directive on Restriction of the use of certain Hazardous Substances in EEE

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.

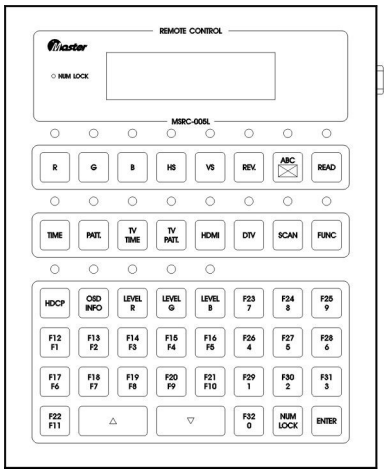
Tel : + 82-55-297-8880 / Fax : + 82-55-256-7388
E-mail : sales@Ltdmaster.com / webmaster@Ltdmaster.com

1.5 Accessories packed with the MSPG-6100L

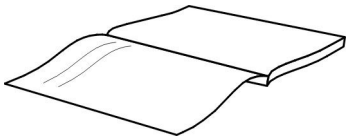
1) MSPG-6100L : Programmable Video Signal Generator



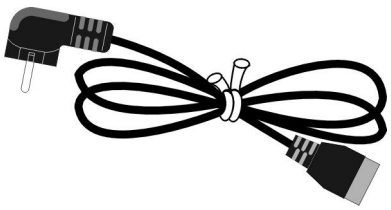
2) MSRC-005L : Remote Controller



3) User Manual



4) Cable



Chapter 2. Concerning the MSPG-6100L

2.1 Introduction

- HDMI Function Execution : HDMI 1.4a Version(Support 3D Video Formats)
- CEC Function Support, Support Deep Color & xvYCC
- Analog & Digital(Dual) Pixel rate up to 330MHz
- HDCP Execution, Teletext, V-Chip, Closed Caption
- Displayport 1.1a Version

〈MSPG-6100L Front〉

〈MSPG-6100L Real〉

〈 MSPG-6100L Output Port 〉

HDMI(Ver 1.4) & Optical 5 PORT

DVI 2 PORT (Single, Dual)

DISPLAYPORT 1 PORT

ANALOG 1 PORT

Component 1 PORT

CVBS & S-Video 1 PORT

Audio(R,L) & Optical(Input, Output) & S/PDIF

2.2 Features

1) Possible to adjust and inspect of high-resolution monitors
- Analog Monitor : 8~330MHz Pixel Frequency
- Digital single Monitor : 25~165MHz Pixel Frequency
- Digital dual Monitor : 25~330MHz Pixel Frequency
- Max Image : 2048X2048 bit map size Max 60 page possible to save

2) Analog/Digital signal simultaneous output
- BNC, 15P D-SUB ,DVI and HDMI simultaneous output

3) Certain abundant preset testing patterns and particular patterns
- MSPG-6100L has Initial patterns(Include Character, Color Bar, Cross Hatch, Grayscale, Combination so on, kinds of 500 pattern), and particular patterns(Include Image, Image Moving Pattern, so on) all of these patterns can be edited by user.

4) Convenience operation of the unit
- Possible to call patterns and timings by remote Controller & RS-232C.

5) Possible to make scan and function group with model and pattern
- Editing any model and pattern, using the function Group(1~99), and Scan Group(1~99).

6) Digital output
- It can output the Digital Single / Dual output using Sil170(Panel Link)chip, which includes HDCP(High-Bandwidth Digital Content Protection) function.
- It can output the HDMI 1.4Ver signal with HDCP using Sil9334 chip.

7) D-TV signal output
- 1080p, 1080i, 720p, 483p, 480i, 576p, 576i, etc. ATSC and DVB format.

8) NTSC, PAL, SECAM output
- NTSC-M, NTSC-J, NTSC-4.43
- PAL-B/D/G/H/I, PAL-M, PAL-60
- SECAM

9) SUPPORTS PC download

- Possible to download the main firmware program by PC.

10) Internal Audio output

- Mono & Fix & Swap & Sweep & Up & Down Mode

11) S/PDIF

- Input the Digital Audio signal, and then output it through HDMI port.

12) Optical Audio signal Input/output

- Input the Optical Audio signal, and then output it through HDMI port.

13) Displayport Output

- Displayport is a high-speed interface which is transmit Digital Video & Audio signal compliance with VESA standard.

2.3 Specifications

***** MSPG-6100L Specifications *****

Displayport	Display Size	2560 X 1600
	Pixel Clock	Max. 10.8Gbps (2.7GHz-1,2,4 Lanes / 1.6GHz-1,2,4 Lanes)
	Link Rate	25~300MHz
	Input Format	RGB444, YCbCr444, YCbCr422 (6,8,10,12 Bit)
	Compliant	Displayport 1.1a Version
	Audio	SPDIF, 192KHz, 2 Channels
H/V Frequency	Horizontal	10~300KHz / 1 Dot Resolution
	Vertical	10~300Hz / 1 Line Resolution
Analog Output	Display Size	4096 X 4096
	Pixel Clock	8~330MHz
	Video Level	R, G, B (Load 75 ohms, 0~1.0V Programmable)
	Output Connector	15P D-Sub, DVI-I
	EDID	Read
	Separate Sync	HS, VS (3.0V~5.5Vp-p Programmable / Inherited Sync Level is 5.0Vp-p)
DVI (TMDS) Output	Pixel Clock	* Single Link: 25~165MHz / * Dual Link: 25~330MHz
	Transfer Type	* Single TMDS 24 Bit Input Mode
		* Dual TMDS 12 Bit Input Mode
	EDID	Read
	HDCP	Support Single & Dual
	Compliant	DVI 1.0 Support
	Video Signal Type	RGB
	Output Connector	DVI-I (DVI 2 Ports, Single/Dual)
	Data Bit	8~16 Bit
CVBS Output	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)
	Closed Caption (NTSC)	C1, C2, C3, C4 / T1, T2, T3,T4
	V-Chip	* MPAA Rating: G, PG, PG-13, R, NC-17, X

		* XFCC Rating: TV-Y, TV-Y7, TV-G, TV-PG, TV-14, TV-MA
	Teletext (PAL)	Teletext System B Level 1, 1.5
D-TV Output	Signal	Y, Pb, Pr
	Connector	BNC
	Time	480i/p, 576i/p, 720p, 1080i/p for ATSC and DVB Format
	Note	Support D Terminal for Japanese D-TV (Adjustable to 16:9, 4:3 aspect ratio)
HDMI (TMDS) Video Output	Compliant	1.4a Version (CEC Support)
	Pixel Rate Range	25~165MHz (TMDS Clock : 25~225MHz)
	Standard Spec	EIA/CEA-861D
	Video Signal Type	RGB, YCbCr
	Pixel Encoding	RGB444, YCbCr444, YCbCr422
	Data bit of RGB & YCbCr	8, 10, 12
	Color Space	RGB, BT-601, BT-709, xvYCC-601, xvYCC-709
	HDCP	Support HDCP 1.1 Version
	EDID	Read
	Output Connector	Type A, HDMI 5 Port
	Note	Support Deep Color & xvYCC
	HDMI Ver 1.4	3D Video Formats(Stereoscopic)
HDMI Audio Output	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	0Hz to 24KHz / 5Hz step
	Level Range	0mV to 2.0V / 100mV step
	External Audio Input	S/PDIF, Optical
	Special Control Mode	Fix, Sweep, Swap, Optical, Mute
Audio (Analog) Output	Frequency Range	20Hz to 20KHz / 5Hz step
	Level Range	0mV to 2.0V / 100mV step
	Waveform	Sine Wave
	Number of Channel	2 Channels
	Connector	RCA
	Special Control Mode	Fix, Sweep, Swap, Mute
Scan & Function Group	Scan Storage	99 Group (1 Group; 24 Step)
	Function Storage	99 Group (1 Group; 32 Step)
Data Storage Device	Timing	999 Timing (User: 1~500, Default: 501~999)

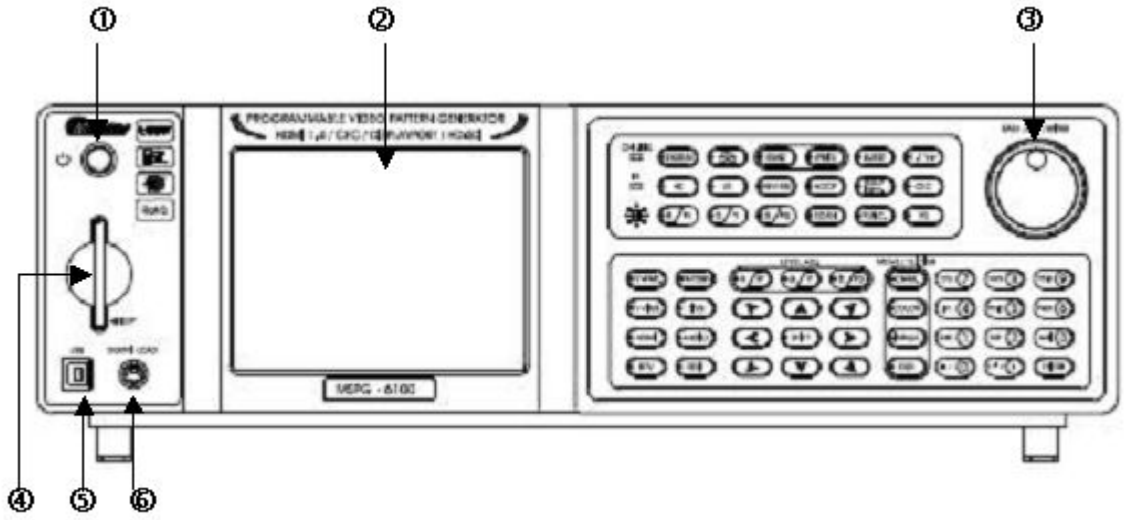
	Pattern	999 Pattern (User: 1~500, Default: 501~999)
	Compact Memory Card	2GB
General Specification	Power Consumption	AC 100~240VAC, 50/60Hz Auto Switch
	Operating Conditions	* Temperature : 0~40℃
		* 80% Humidity, Non-condensing
	Dimension (WXDXH)	440 X 355 X 145mm, Weight: 6Kg
Others	Max Image	2048 X 2048 Bit Map Image Size
	Moving	1 Dot, 1 Line Control
	User Interface	* Front Panel (6.4 inch / Graphic LCD) Key Pad
		* Possible to Timing Parameter Edit
		* USB, RS-232C, PC EDIT Tool

* Note: 1ppm = 1Mhz per 1Hz unit

* All specifications are subject to change without any notice.

2.4 Panel parts and their functions

2.4.1 Front Panel of MSPG-6100L



(1) Power Switch: AC Power ON/OFF Key.

(2) LCD: Display all of data information is at the screen.

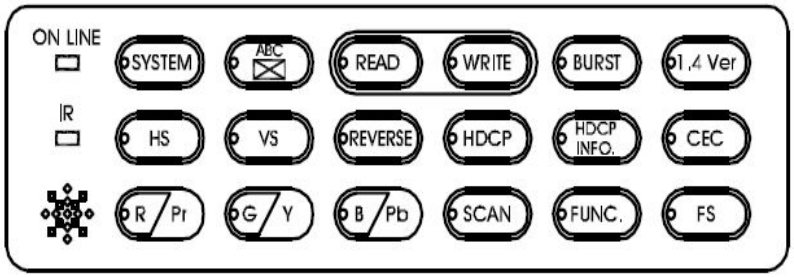
(3) Easy JOG/Enter: This turned clockwise or counter clockwise to select the setting items or parameters or levels etc.

(4) CF Card: Read/Write of system programs, Time Data, Pattern Data.

(5) Download Port: Firmware download port.

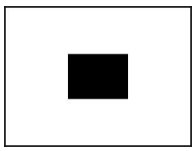
(6) USB: BMP File Write (Write to generator only).

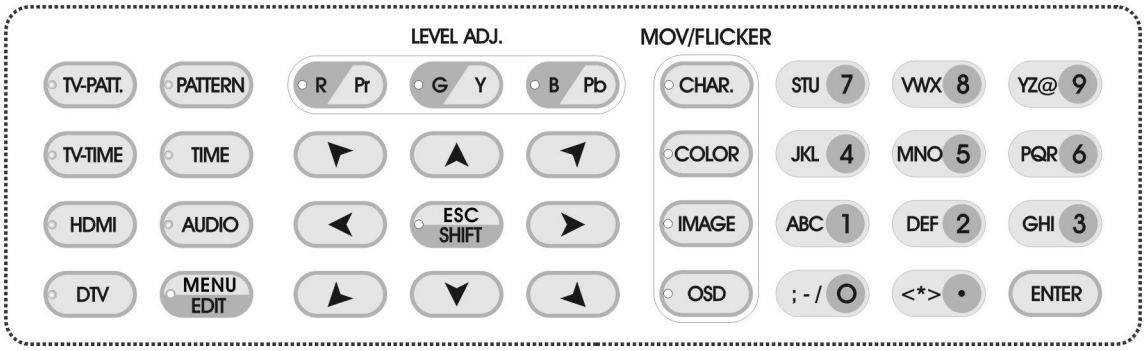
2.4.2 Description of front key



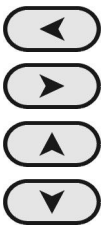
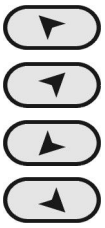
HS	Output the HS signal, upon LED On condition. If the Button is ON output. Transfer to display the screen, otherwise No Transfer. If Only HS Button On, No Display in the screen. HS, VS both Button on Screen Display Output.
VS	Output the VS signal, upon LED On condition. If the Button is ON Output. Transfer to display the screen, otherwise No Transfer. If Only VS Button On, No Display in the screen. HS, VS both Button on Screen Display Output.
R Pr	Output the Red signal, upon LED On condition. If the Button is ON Output Transfer to display the screen, otherwise No Transfer (In case of full white pattern). (1) Push R, G, B Button On that time Screen Display White, (2) Push R, G Button On that time Screen Display Yellow, (3) Push R, B Button On that time Screen Display Magenta, (4) Push G, B Button On that time Screen Display Cyan. Output the Green signal, upon LED On condition.
G Y	Output the Red signal, upon LED On condition. If the Button is ON Output Transfer to display the screen, otherwise No Transfer (In case of full white pattern). (1) Push R, G, B Button On that time Screen Display White, (2) Push R, G Button On that time Screen Display Yellow, (3) Push R, B Button On that time Screen Display Magenta, (4) Push G, B Button On that time Screen Display Cyan. Output the Green signal, upon LED On condition.

B Pb	Output the Red signal, upon LED On condition. If the Button is ON Output Transfer to display the screen, otherwise No Transfer(In case of full white pattern).
⊠	Use this key for Patterns of position check.(Inserting order is as like □, ×, OSD pattern) (1) Push 1st Time : Out Side Line Display(Check Top, Bottom, Left and Right(□)). (2) Push 2nd Time : Cross Line Display(Center Position Checking(×)). (3) Push 3rd Time : Character Checking. (4) Push 4th Time : OFF
READ	Copy the data from CF card to MSPG-6100L. (Reference page. 56)
WRITE	Copy the data from MSPG-6100L to CF card. (Reference page. 56)
REVERSE	Reverse the pattern: On/off key using reverse button.
HDCP	When LED on, running the HDCP function. When HDCP Button is on, you are not able to edit. If you need to edit, you should turn off the HDCP Button.
HDCP INFO.	This key is for checking the result, after inspecting HDCP certificate. You can see the info about AKSv, BKSv, Ti, Ri and HDCP pass on the display. (1) 1, 2, 3 4 for HDMI & HDCP information section (2) 5, 6 for DVI information section (3) 7 for information off.
SCAN	This key can call the set Scan data(Time, Pattern) to display auto-progression. Pattern and Timing will change automatically.
FUNC	Pattern and Timing will change automatically. This key can call Function Group (F1~F32) that is saved as edit the Function(Time, Pattern). (Reference page. 55)
BURST	Color Burst On/Off set up key(CVBS, S-Video Only). If the Burst is in On Condition the Color displayed in the screen. If the Burst is in Off Condition Color No Display Black & White Display in the screen.

1.4 Ver	This key for HDMI 1.4 Part of PCB Board. User can use HDMI1.4 function as push this key after then activity.
CEC	This is only HDMI Functionality (Output only). If you On this Button ready for HDMI, CEC connection, else Disconnect the HDMI, CEC.(Media player adapted auto CEC check.
RATIO	The key for setting up the Media display ratio.
SYSTEM	(1) Set the Buzzer On/Off (2) Setting Sync output level : from 3000 to 5500mV per 100mV (3) RS-232C Baud Rate : No.1 : 4800 / No.2 : 9600 / No.3 : 19200 / No.4 : 38400 / No.5 : 57600 / No.6 : 115200 / No.7 : 230400 / No.8 : 460800 (4) Data Bit : 8bit, 7bit (5) Stop Bit : 1bit, 2bit (6) Parity : Non, Even, Odd  (7) Data set up : This is option. When you use RS-232C Communication to use either select Y Level(0~100%) of pattern or 0~255. (8) Data Size set up : This is option to use either select pattern Size(0~100%) of window inner BOX or H/V. (9) EDID Block Read set up : Set up the part of EDID Block for read(0~4). (10) Old Edit Passwords : Input of established store password. (11) New Edit Password : Input of new password(Before input new password, you should store old password). (12) HDCP Display set up : HDCP OSD's set up to Pass or OK. (Normal -> HDCP Pass OSD.SAMSUNG -> HDCP OK OSD) (13) HDCP Retry On set up : Off -> HDCP fail case : HDCP authorization runs until 5times and then not try to authorization option. On -> HDCP fail case : HDCP authorization runs until success. (14) HDMI Lip Sync set up : HDMI Lip Sync On/Off set up. (15) AV MUTE set up : When HDCP Fail case's that Audio and Video Display /Clear. (16) Image set up : Set the output speed of output option images. Speeds up the rate set by FPGA.



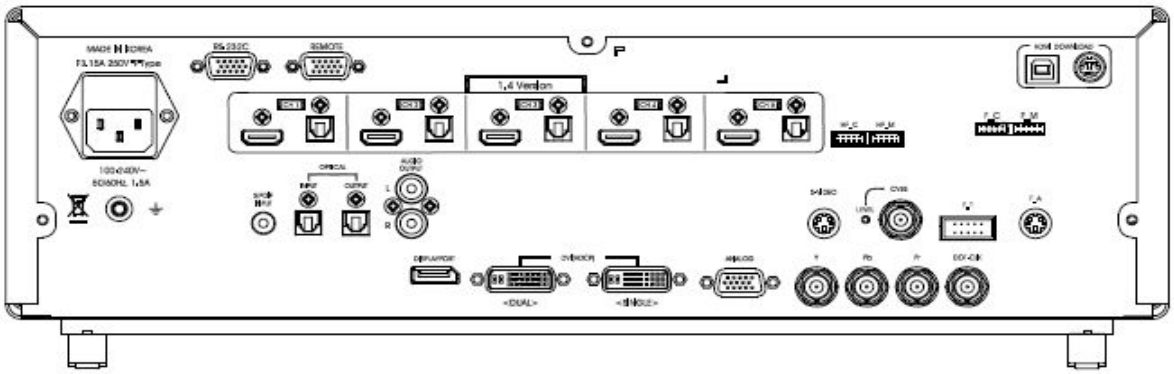
TV-PATT.	This key is for call the pattern from CVBS, S-VIDEO MODE.
TV-TIME	This key is for call the Timing from CVBS, S-VIDEO MODE
PATTERN	This key is for call the pattern which is output from Analog, DVI, HDMI, DTV, D5 calling. (Reference page. 37)
TIME	This key is to call all Times [1]. User Time, 2]. Default Time]) from user Time to Default Time. (Reference page. 38)
HDMI	This key is for call only HDMI Time Mode. If you call other calling mode except HDMI Time Mode, It will cry warning sound.
DTV	This key is for call only DTV Time Mode. If you call other calling mode except DTV Time Mode, It will cry warning sound.
AUDIO	This key is for calling Audio Pattern.
MENU EDIT	(1) Edit the pattern & time data when V/G function. (2) Move to edit menu when Media Function.
R Pr G Y B Pb	[LEVEL ADJUSTMENT] This key is for changing level value of brightness and contrast with only LED on condition. Especially, In case of contrast, the SHIFT key should be "On" condition to change level value.
ESC SHIFT	In case of V/G Mode, it can used by contrast & Brightness. In case of Media mode, it can used by EXIT key.

	The keys for moving the Pattern in all direction (Left, Right, Up, Down). (, Key) : Up Down key. To change Brightness/Contrast.
	These Key can set pattern as moving direction.
	Moving, Flicker function key. ▪ For Moving Pattern - All keys are 'On' condition, push the direction key, character, color, graphic and OSD will be moving or flicker. - The moving function are working, when you off it and 'On' the each key with push direction key. ▪ For Flicker Pattern - Shift key 'On' condition, if you push 'On' each key, Flicker function are operating. - Flick On Time : Top/Bottom key, inputting by jog shuttle. - Flick Off Time : Inputting by left/right key.
	The key for inputting number, Character, special Character. Shift key 'Off' condition, select the number key, you can choice only number. Shift key 'On' condition, select the key, you can choice Character, Special Character. Pattern and Name appointment.

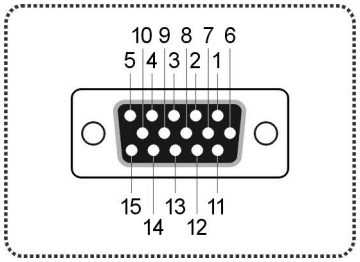
*** NOTICE ***

When you apply to Moving function for HDCP ON, this equipment outputs cryptographic TMDS signal as stopping that works in comparison with Ri, Ti Data. When you stop Moving function, this equipment works in comparison with Ri, Ti Data every 2 seconds to check again. So please take notice that is a super information.

2.4.3 Description of rear port



SPDIF INPUT	Audio input port for HDMI.
OPTICAL INPUT/OUTPUT	Optical audio signal input /output port.
AUDIO OUTPUT	Internal analog audio signal output port. - R Frequency : 20HZ ~ 20.000Hz - L Frequency : 20HZ ~ 20.000Hz
RS-232C, REMOTE (MSRC-005L)	RS-232 Communication interface port. Connecting port to remote controller(MSRC-005L).
CVBS, S-VIDEO	CVBS (Composite) / Y signal output port
FG ground	It can be connect with Frame Ground to Display's ground.
AC Input	AC input fuse and filter built in AC 100~240V 56/60Hz.
HDMI Ver. 1.4	3D Video Formats(Stereoscopic) support Audio Return Channel (ARC) support
DVI-I(HDCP)	Digital (Single & Dual) and Analog (R, G, B, Hs, Vs) output port through TMDS protocol. (MSPG-6100L has DVI Single Port and DVI Dual Port)

<table>
<tr><td>ANALOG</td><td>15P D-SUB Connector.
Output of Analog Video Signal R, G, B, Hs, Vs.
 

<table>
<tr><th>Pin No.</th><th>Pin Name</th><th>Pin No.</th><th>Pin Name</th></tr>
<tr><td>1</td><td>R</td><td>9</td><td>NC</td></tr>
<tr><td>2</td><td>G</td><td>10</td><td>GND</td></tr>
<tr><td>3</td><td>B</td><td>11</td><td>GND</td></tr>
<tr><td>4</td><td>NC</td><td>12</td><td>SDA</td></tr>
<tr><td>5</td><td>GND</td><td>13</td><td>H-SYNC</td></tr>
<tr><td>6</td><td>R GND</td><td>14</td><td>V-SYNC</td></tr>
<tr><td>7</td><td>G GND</td><td>15</td><td>SCL</td></tr>
<tr><td>8</td><td>B GND</td><td></td><td></td></tr>
</table></td></tr>
<tr><td>Y, Pb, Pr</td><td>Y, Pb, Pr signal output for DTV.</td></tr>
<tr><td>DOT-CLK</td><td>Dot frequency port.
Can be used for calibration and inspection.</td></tr>
<tr><td>Displayport</td><td>High-Speed interface signal, which is, transmit Digital Audio & Video signal compliance with VESA standard.</td></tr>
</table>

Chapter 3. Each signal parameter and output format

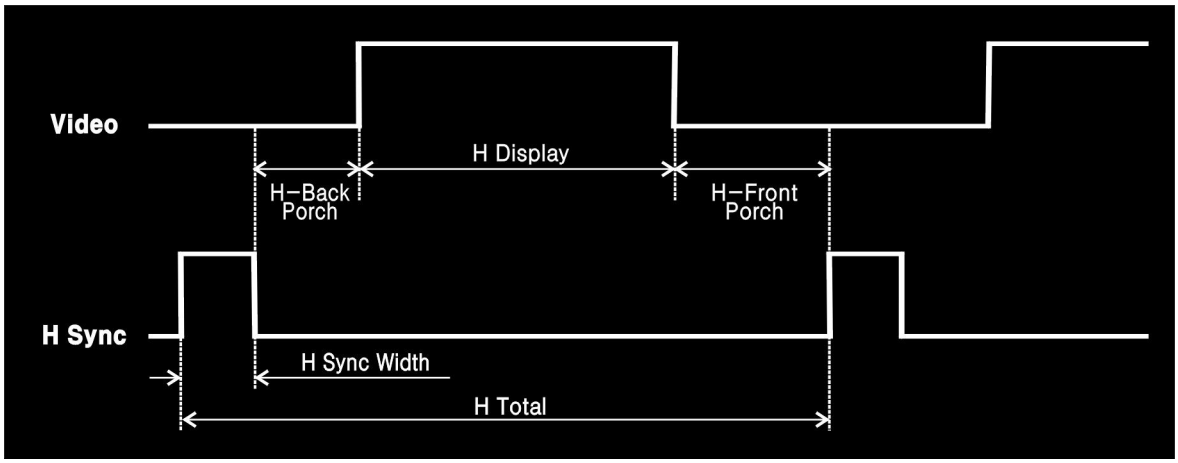
3.1 Timing parameters for each signal

3.1.1 Dot Frequency

The screen is composed of column and row of small spots, and these small spots is called by pixels. Dot frequency means the scanning speed of a pixel, and it's Measurement unit is MHz.

3.1.2 Horizontal Parameter

When making changes with the horizontal timing data, the parameters, which can be set and the names of the parameters are indicated below.



1) H-Freq (horizontal frequency)

The scanning speed of horizontal one line, and the unit is KHz.

2) Htd (horizontal total dot)

Total Number of horizontal dots of horizontal one line.

3) Hdisp (horizontal display period)

Total Number of horizontal dots in one horizontal line except horizontal front porch and back porch.

4) Hfp (horizontal front porch)

Begin from Video off section to HS Width (Right side except picture area of horizontal total dot).

5) Hbp (horizontal front porch)

Begin from HS Width to the end of Video on section (Left side except picture area of horizontal total dot).

6) Hsw (horizontal sync width)

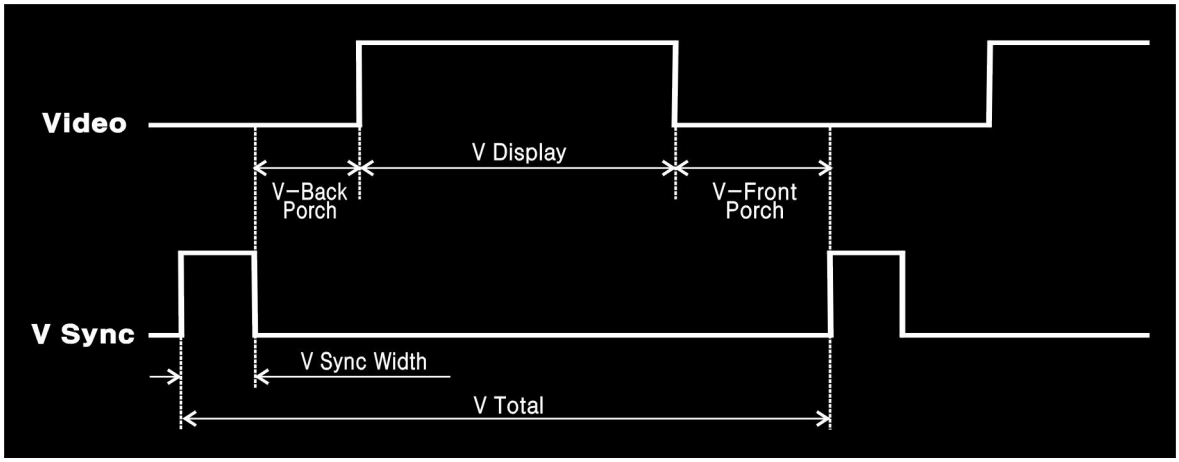
Horizontal recurrence Period.

*** NOTICE ***

- Hbp (horizontal back porch) is inputted automatically.
- Hbp (Horizontal Back Porch) = Htd - Hdisp - Hfp - Hsw

3.1.3 Vertical Parameter

When making changes with the Vertical timing data, the parameters, which can be set and the names of the parameters are indicated below.



1) V-Freq(vertical frequency)

The scanning speed of one frame, and the unit is hz.

2) Vtl (Vertical Total Line)

Total Number of vertical dots of vertical one line.

3) Vdisp (vertical display period)

Total Number of horizontal lines in one frame except vertical front porch and back porch.

4) Vfp (Vertical Front Porch)

Begin from Video off section to VS Width (Bottom except picture area of one frame).

5) Vbp : (Vertical Back Porch)
Begin from VS Width to the end of Video on section (Top except picture area of one frame).

6) Vsw (vertical sync width)
Vertical recurrence period.

*** NOTICE ***
- Vbp (vertical back porch) is inputted automatically.
- Vbp (Vertical Back Porch) = Vtl - Vdisp - Vfp - Vsw

3.1.4 Timing parameters

1) Dot F = Hdisp (Time, MHz) ÷ Hdisp (Dot, Mhz)
ex) 1024 ÷ 13.653 = 75.000

2) Dot F = Htd × Hfreq(KHz)
ex) 1328 × 56.476 = 1328

3) Htd = Dot F ÷ Hfreq
ex) 75MHz ÷ 56.476KHz = 1328

4) Vtl = Vfreq ÷ Hfreq
ex) 56.476KHz ÷ 70.069Hz = 806

*** NOTICE ***
- The parameter diagram depends on the value of dot frequency.
- The vertical parameter diagram is the same as horizontal parameter diagram.

3.1.5 Data chart

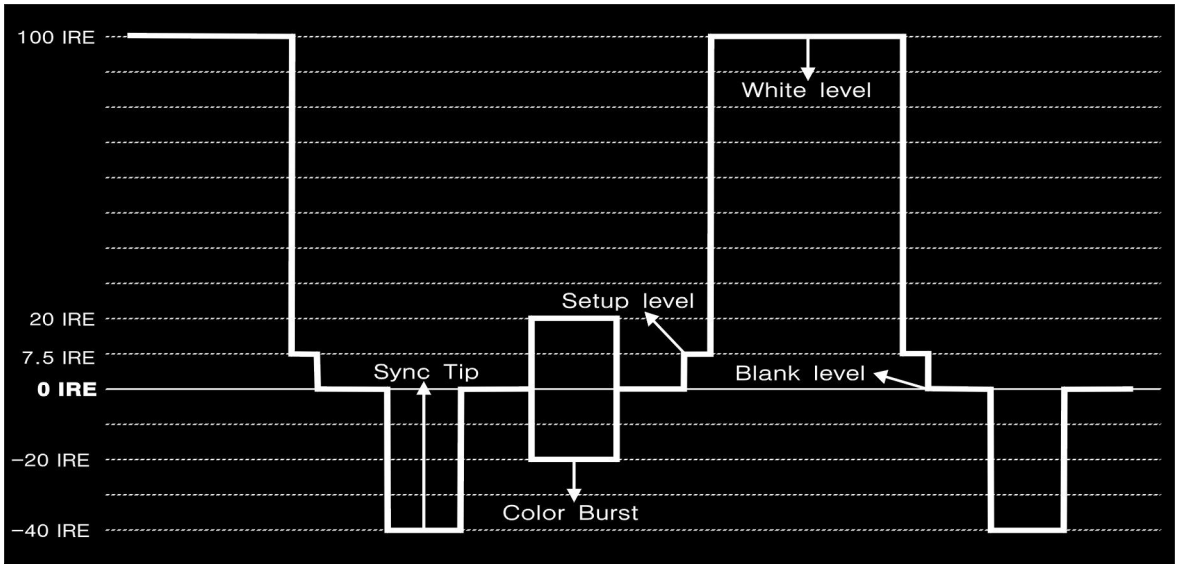
Timing List	Time	Dot & Line	Frequency
Dot - Frequency			75.000MHz
HS - Frequency			56.476KHz
VS - Frequency			70.069Hz
Htd		1328	
Hdisp	13.653	1024	
Hsw	1.813	136	
Hfp	0.32	24	
Vtl		806	
Vdisp	13.599	768	
Vsw	0.106	6	
Vfp	0.053	3	

3.2 A Summary concept of TV signal

1) CVBS (Composite) signal

- TV signal has such as CVBS, Y and C signal, but in this content below it explains about CVBS signal of NTSC.

2) TV Signal



3) EIA RS-170A Standard timing

MODE	NTSC	PAL	SECAM
Scan lines (H)	525	625	625
Line frequency (KHz)	15.734	15.625	15.625
Field frequency (Hz)	59.94	50	50
Sync width (us)	4.7	44.7	44.7
VS Sync (H)	3	2.5	2.5
Blanking Time (us)	10.9	12.0	12.0
VS BI (H)	20	25	25
Equalizing pulse (us)	2.3	2.35	2.35
HS Front Porch (us)	1.5	1.5	1.5
VS Front Porch (H)	3	2.5	2.5
Color Burst (us)	2.5 (9 cycle)	2.25 (10 cycle)	
Color burst frequency (MHz)	3.579545	4.433618	For=4.40625 Fob=4.25

3.3 A Summary concept of HDMI signal

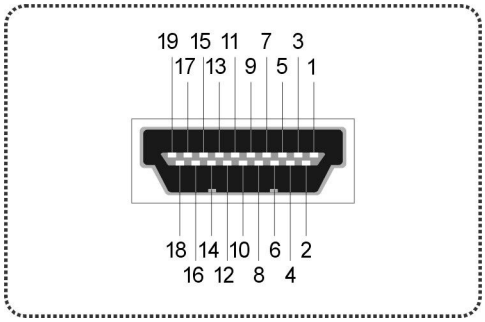
1) Definition

- HDMI(High Definition Multimedia Interface) is new upgrade interface to support a single cable, as well as signal information, too.
- It can operate as TMDS protocol.
- It supports audio and video(both).

2) Features

- Pixel Bandwidth : 25MHz~165MHz
- Connector Type : HDMI Type A
- Video Signal Type : RGB & YCbCr
- Video Sampling Mode : 4:4:4, 4:2:2
- Video Output Data Bit : 8,10,12 Bit (RGB & YCbCr & xvYCC)
- Audio Frequency Range : Sweep & Swap & Mute
- Audio Sampling Frequency : 32KHz, 44.1KHz, 48KHz, 88.2KHz, 96KHz, 176.4KHz, 192KHz
- HDMI 1.4 Version (3D Video Formats(Stereoscopic)),Audio Return Channel (ARC) support
- HDCP/CEC/xvYCC support and EDID Checking

3) HDMI Connector specification



Pin No.	Pin Name
1	TMDS Data 2+
2	TMDS Data Shield
3	TMDS Data 2-
4	TMDS Data 1+
5	TMDS Data 1 Shield
6	TMDS Data 1-
7	TMDS Data 0+
8	TMDS Data 0 Shield
9	TMDS Data 0-
10	TMDS Clock+
11	TMDS Clock Shield
12	TMDS Clock-
13	CEC
14	Reserved (in cable but N.C on device)
15	SCL
16	SDA
17	DDC/CEC ground
18	+5V Power
19	Hot Plug Detect

3.4 A Summary concept of DVI signal

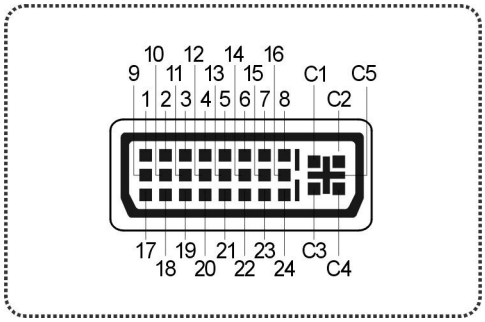
1) Definition

- DVI(Digital Video Interface) is a new video interface technology for flat panel of LCD monitor, high display device and high graphic card to make great display resolution, but it can just support video signal, no audio signal as HDMI.
- DVI output connectors are provided on the PC analog unit and DVI unit.

2) Features

- Pixel Bandwidth : 25MHz~165MHz(Single), 25MHz~330MHz(Dual)
- Connector Type : DVI-I
- Video Signal Type : RGB
- Support EDID, DDC, DMT
- Support HPD (Hot Plug Detect)
- Support HDCP

3) DVI Connector specification



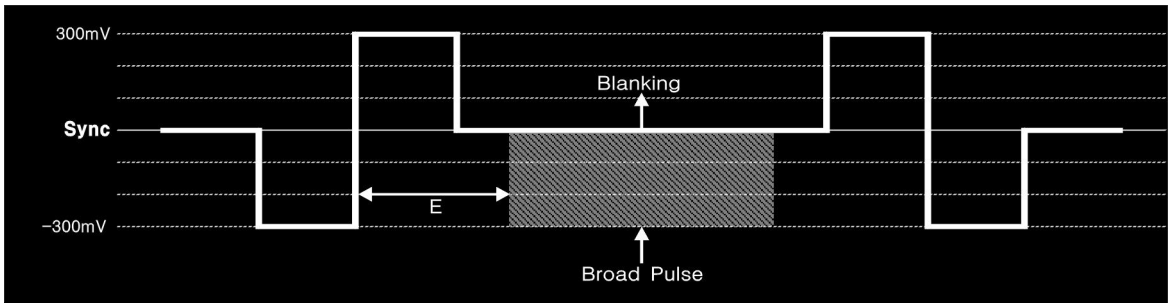
Pin No.	Pin Name	Pin No.	Pin Name
1	TMDS Data 2-	C1	Analog Red
2	TMDS Data 2+	C2	Analog Green
3	TMDS Data 2/4 Shield	C3	Analog Blue
4	TMDS Data 4-	C4	Analog H-Sync
5	TMDS Data 4+	C5	Analog Ground
6	DDC Clock		
7	DDC Data		
8	Analog V-Sync		
9	TMDS Data 1-		
10	TMDS Data 1+		
11	TMDS Data 1/3 Shield		
12	TMDS Data 3-		
13	TMDS Data 3+		
14	+5V Power		
15	Ground		
16	Hot Plug Detect		
17	TMDS Data 0-		
18	TMDS Data 0+		
19	TMDS Data 0/5 Shield		
20	TMDS Data 5-		
21	TMDS Data 5+		
22	TMDS Clock Shield		
23	TMDS Clock+		
24	TMDS Clock-		

3.5 A Summary concept of D-TV signal

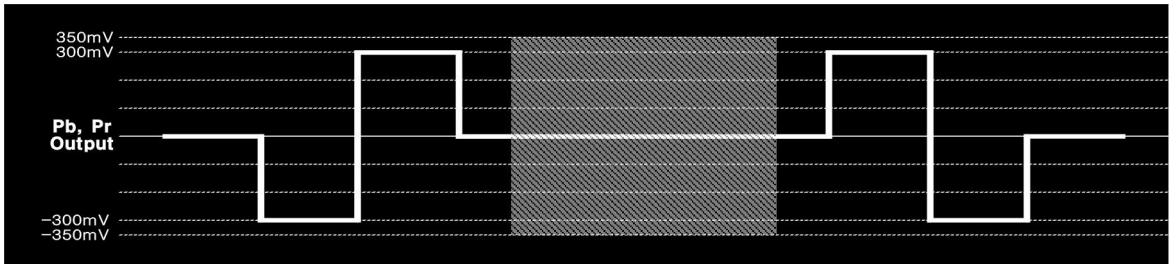
1) Definition

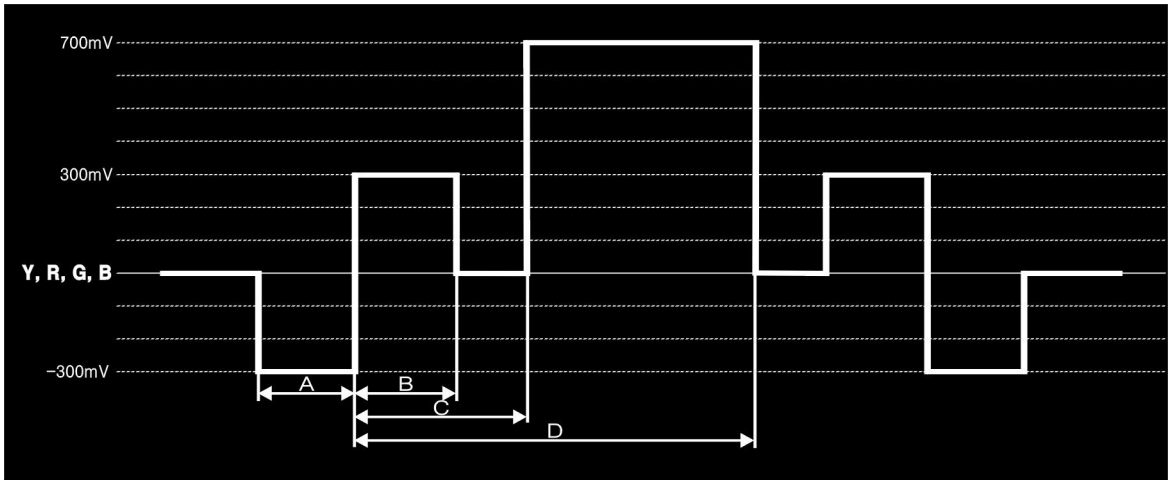
- It can make Y, Pb, Pr signal through each independent cable, which is more clear display than S-video. It can show you great scan display of progressive by DVD player.
- In Japan, some TV have D3/D4/D5 format, instead of D-TV format.

2) D-TV Signal



* E : Rising edge of sync to start of broad pulse.





* A : Low sync width
* B : High sync width
* C : Start of line to start active video
* D : Start of line to end active video

3.6 A Summary concept of Displayport

1) Definition

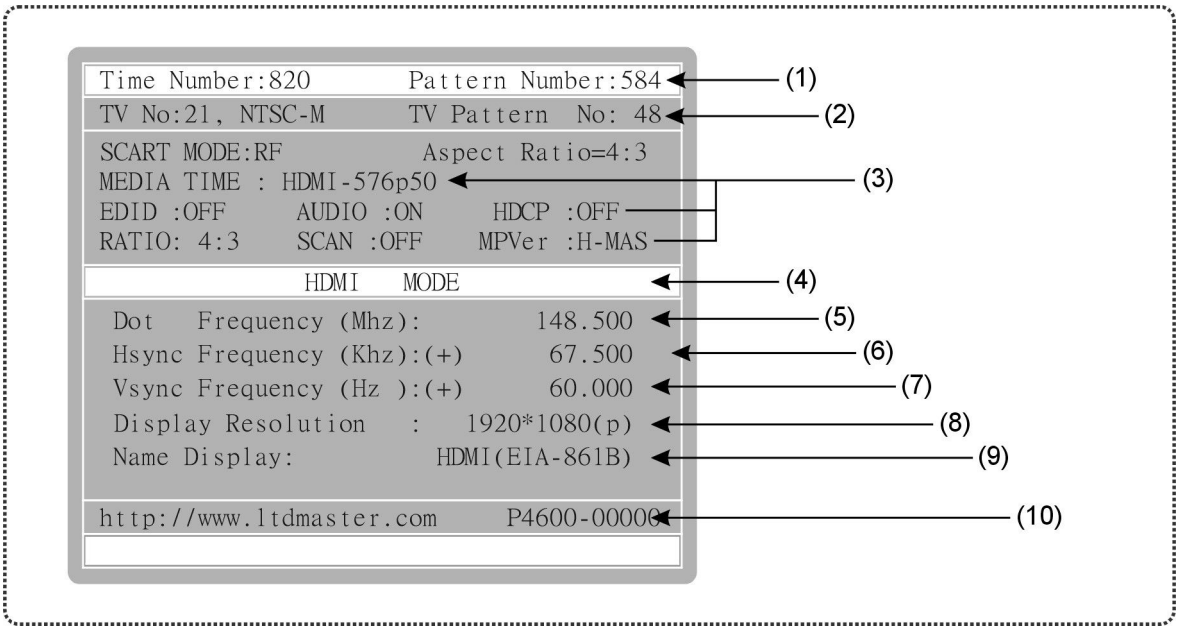
- Displayport(D/P) is a high-speed interface which is transmit Digital Video & Audio signal compliance with VESA standard.
- It is composed Main Link for Stream transmission and AUX CH to access DPCD(Display Port Configuration Data), EDID(Extended Display Identification Data) and support MCCS(Monitor Control Command Set).
- Main Link is composed 1, 2, 4(Lane), every Lane available 1.62Gbps or 2.7Gbps support maximum up to 10.8Gbps.

2) Features

- Pixel Bandwidth : 25MHz~300MHz
- Video Signal Type : RGB & YCbCr
- Video Sampling Mode : 4:4:4, 4:2:2
- Video Output Data Bit : 8,10,12(only 4:2:2) Bit
- Audio Sampling Frequency : 32, 44.1, 48, 88.2, 96, 176.4, 192KHz
- Max Lane Count Control (1,2,4 Lane select)
- Max Lane rate Control (1.62, 2.7Gbps select)
- EDID Checking

Chapter 4. MSPG-6100L main operation

4.1 Initial screen



(1) Time/Pattern Number

(2) TV Time / Pattern Number

(3) Media Function Information

(4) Mode Name

(5) Dot frequency

(6) Horizontal frequency

(7) Vertical frequency

(8) Resolution

(9) Resolution Name

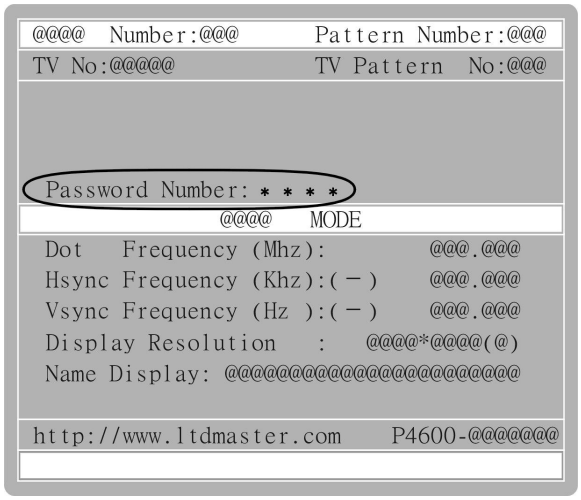
(10) MASTER website & Program version

*** REFERENCE ***

	User Section	Default Section
Time Number	No. 1~500	No. 501~999
Pattern Number	No. 1~500	No. 501~999
Edit	O	X

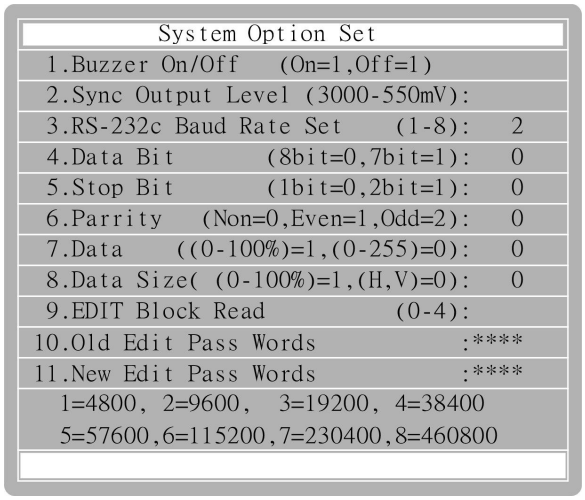
4.2 Password Functions

1) Passwords Functions



- These functions for prohibit someone who accesses another user.
- Password function are adapting by edit key and password input window is appear like next picture.
- Default Password is [8880]

2) How to setup the Passwords



① Push the SYSTEM key.
② Using direction key or jog, move '10.Old Edit Passwords'.
③ Press origin passwords and press ENTER.
④ Using direction key or jog, move '11.New Edit Passwords'.
⑤ Press new passwords and press ENTER.
⑥ Please, find message as below, "Save Ok !!!!!!".

3) Direction for Edit Pattern and Time option

① Pattern Edit : PATTERN Key → MENU EDIT Key → Password [8880]

② Time Edit : TIME Key → MENU EDIT Key → Password [8880]

4.3 Pattern Call and Edit Functions

1) How to call the pattern(In case of Analog, DVI, HDMI, DTV)

① Push the PATTERN key.
② Select number using numeral key or jog shuttle.
③ Push the ENTER key or jog.
④ Selected number is signed on the LCD window.

2) How to call the TV pattern(In case of CVBS, S-Video)

① Push the TV-PATT key.
② Select number using numeral key or jog shuttle.
③ Push the ENTER key or jog.
④ Selected number is signed on the LCD window.

3) How to edit pattern

① Push the PATTERN key.
② Select number using numeral key or jog shuttle(Please refer Time and pattern Sticker).
③ Push the ENTER key or jog.
④ Push the EDIT key.
⑤ The passwords input window is appear.
⑥ Input the password and Push the ENTER key or jog.
⑦ Find the list of 65 options on the LCD.(We will supply separately related pattern option.)
⑧ If you edit any option, you should push the ENTER key or jog shuttle to save pattern number, and then finally push the ENTER key or jog shuttle, again.
⑦ Please, find message as below, "Save Ok !!!!!!".

*** REFERENCE ***

	User Section	Default Section
Time Number	No. 1~500	No. 501~999
Pattern Number	No. 1~500	No. 501~999

4.4 Time Call and Edit Functions

1) How to call the time

① Push the TIME key.
② Select number using numeral key or jog shuttle.
③ Push the ENTER key or jog.
④ Selected Time number is signed on the LCD window.

2) How to edit time

① Push the TIME key.
② Select number using numeral key or jog shuttle (Please refer Time & Pattern Sticker).
③ Push the ENTER key or jog.
④ Push the EDIT key.
⑤ The passwords input window is appear.
⑥ Input the password and Push the ENTER key or jog.
⑦ Option for commonness & model are appear on the LCD.
⑧ If you edit any option, you should push the ENTER key or jog shuttle to save time number, and then finally push the ENTER key or jog shuttle, again.
⑨ Please, find message as below, "Save Ok !!!!!!".

*** NOTICE ***

- There are total 499(501~999) default times in the MSPG-6100L. Basically, also you can Save/Edit these default times to user time(In 500) Section.
- There are total 8(21~28) Default TV-TIME in the MSPG-6100L. Basically, also you can select Default TIME(1~20) through the saving & calling.

3) Time data example (VESA 800X600)

Originator	16	Originator	16
	VESA		VESA
Parameter (Unit)		Pixel Clock (MHz)	39.9244
H-Resolution (Pixels)	800	H Front Porch (Pixels)	40
V-Resolution (Lines)	600	H Sync (Pixels)	128
H-Frequency (KHz)	37.879	H Total (Pixels)	1054
V-Frequency (Hz)	60.317	V Front Porch (Lines)	1
Scan Type	P	V Sync (Lines)	4
H Sync Polarity	P	V Total (Lines)	628
V Sync Polarity	P		

4) Definition of the Option

********** **Common Option** **********

(1) Dot_Frequency (MHz)

Input the Dot Frequency as MHz.

(2) HS_Frequency (KHz)

Input the Horizontal Frequency as KHz.

(3) VS_Frequency (Hz)

Input the Vertical Frequency as Hz.

(4) H_Total (Dot/uS)

Input the data as Dot or Time for whole pixels of marking Horizontal 1 line.

(5) H_Display (Dot/uS)

Input the data as Dot or Time for available pixels of marking Horizontal 1 line.

(6) 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.

(7) HS_Width (Dot/uS)

Input the data as Dot or Time for Horizontal returning section.

(8) V_Total (Line/mS)

Input the data as line or time for whole line of one frame.

(9) V_Display (Line/mS)

All of Vertical display line frame except vertical front porch and back porch.

(10) Vfront_Porch (Line/mS)

No video section of one frame at the bottom.

(11) VS_Width (Line/mS)

Vertical recurrence period.

(12) HS_Polarity (P=0,N=1)

Select the Polarity of Horizontal sync. [Positive=0 or Negative=1]

(13) VS_Polarity (P=0,N=1)

Select the Polarity of Vertical sync. [Positive=0 or Negative=1]

(14) Serration On of(DTV&CS) (Y/N)

Select the nothing or being or serration pulse. [Y=Serration ON, N=Serration OFF]

(15) Serration Pulse (HS/2=0,HS=1)

Select the space of serration pulse.

(16) Interlace with video (Y/N)

When setup for interlace mode, existence about adapt to video signal.

[Y:Apply, N:Non Apply]

(17) H_V Resolution Display (Y/N)

Show the information of solution on the screen or not. [Y:Display, N:Non Display]

(18) Model Name Display (Y/N)

Show the Model name or not. [Y:Display, N:Non Display]

(19) Number of EQP Pulse (Front, EA)

Select the number of EQP pulse in Vertical front porch.

(20) Number of EQP Pulse (Back, EA)

Select the number of EQP pulse in Vertical back porch.

(21) Audio Pattern Number

Select audio pattern format.

(22) Video Pattern Number

Select video pattern format.

(23) Video Level (mV)

Set the default level of video output.

(24) Model Name

Set the model name.

********** **PC Mode** **********

(25) Sync On Green (Y/N)

Set up the G(Green) Video added horizontal, vertical sync frequency or not. [Y: send Sync, N : does not send Sync]

(26) HS Out Terminal <= CS (Y/N)

Set the Horizontal Sync port, with adding Vertical Sync or not. [Y:Send Vertical Sync, N:Does not send Vertical Sync]

(27) VS Out Terminal Off (Y/N)

Set the Vertical Sync port, with adding Vertical Sync or not. [Y:Send Vertical Sync, N:Does not send Vertical Sync]

(28) DPMS_Video (On=0, Off=1)

Selecting the video signal output or not, when the DPMS is operating. [On=0:Sending the Video Signal, Off=1: Does not send the Video Signal]

(29) DPMS_Hsync (On = 0, L_Off = 1, H_Off = 2)

DPMS is a mode for power saving at the monitor. [On = 0 : Sending the Horizontal sync normally, L_Off = 1 : Does not send the Horizontal sync by Low voltage = 0v, H_Off = 2 : Does not send the Horizontal sync by high voltage = 5v]

(30) DPMS_Vsync (On = 0, L_Off = 1, H_Off = 2)

DPMS is a mode for power saving at the monitor. [On = 0 : Sending the Vertical sync normally, L_Off = 1 : Does not send the Vertical sync by Low voltage = 0v, H_Off = 2 : Does not send the Vertical sync by high voltage= 5v]

(31) DVI Out (D&A=0, Digital=1, Analog=2)

Selecting the DVI output signal. [0=Digital & Analog, 1=Digital, 2=Analog]

(32) DVI Out (Full=0, Limit=1, RBLv240=2)

Setting of the Digital output signal to Full/Limit Range. [Full=0, Limit=1, RBLev240=2]

(33) LVDS Format Out Data Bit (8~16)

Setting of Digital Data bit. (8Bit~16Bit available)

(34) HDCP ON(D) (0=Off, 1=On, 2=Info On)

HDCP OSD On/Off while screen output.(D : Dual)

(35) HDCP ON(S) (0=Off, 1=On, 2=Info On)

HDCP OSD On/Off while screen output.(S : single)

********** **HDMI Mode** **********

(25) Aspect Ratio (4:3=0, 16:9=1)

Setting of info frame data, 4:3 or 16:9

(26) HDCP On (0=Off, 1=On, 2=Info On)

The function of HDCP On/Off, and set up the HDCP Info OSD.

(27) Color Space(RGB=0, 601=1, 709=2)

Set of color Matrix Format.

(28) RGB444=0, Ycbcr444=1, Ycbcr422=2

Set of output Data Format.

- RGB444=0 : This signal is incarnate by only RGB Data without Y.
- Ycbcr444=1: The express method as base on the Y, Cb, Cr
- Ycbcr422=1: The express method as base on the Y, Cb, Cr

(29) Out Data Bit (8=0, 10=1, 12=2)

Set of Data Bit of Data Format.

(30) DVI Out (Full=0, Limit=1, RBLv240=2)

Set of Full/Limit Range to the Digital signal.

(31) Audio (Int=0, Ext.Spdif=1, Opt.=2)

Set of HDMI Audio output signal(internal/external).

(32) Audio Format (Spdif=0, I2S=1)

Set of HDMI Audio output Format.

(33) Audio Sample Rate (0-7)

Set of HDMI Audio output Frequency.(Option 0~7)

0=Mute	1=32Kz	2=44.1Khz	3=48Khz
4=88.2Khz	5=96Khz	6=176.4khz	7=192khz

(34) RGB444=1, Ycbcr444=2, Ycbcr422=3

Set of Data Format Info-Frame information.

[0=32Khz, 1=44.1Khz, 2=48Khz, 3=88.2Khz, 4=96Khz, 5=176.4Khz, 6=192Khz]

(35) Audio Sample (0:1, 6:7) (1-7)

Set of HDMI Audio output Frequency Info-Frame.

(36) HDMI (Full = 0, Limit = 1, xvYCC = 2)

Set of HDMI output signal to Full/Limit/xvYCC Range.

(37) HDMI Repetition (0,2)

HDMI Repetition settings On/Off. (0=Non setting, 2=2Time Repetition setting)

*In less than 25MHz will be automatically setting, this option can be set in 1440timing.

********** HDMI 3D Video Format Edit **********

(1) HDMI Video Format (4Kx2K=1, 3D=2)

(2) 3D Structure (0-8)

0	0000	Frame packing
1	0001	Field alternative
2	0010	Line alternative
3	0011	Side-by-Side(Full)
4	0100	L+depth
5	0101	L+depth+Graphics+Graphics-depth)
6	0110~0111	Reserved for future use
8	1000	Side-by-Side(Half), (See Table H-3)

(3) 3D Ext Data (0-7)

Side-by-Side (Half)

	3D_Ext_Data	Meaning	
0	0000	Horizontal sub-sampling	Odd/Left picture, Odd/Right picture
1	0001		Odd/Left picture, Even/Right picture
2	0010		Even/Left picture, Odd/Right picture
3	0011		Even/Left picture, Even/Right picture
4	0100	Quincunx matrix	Odd/Left picture, Odd/Right picture
5	0101		Odd/Left picture, Even/Right picture
6	0110		Even/Left picture, Odd/Right picture
7	0111		Even/Left picture, Even/Right picture

(4) (i)HDMI Video Format (4K=1, 3D=2)

(5) (i)3D Structure (0-8)

(6) 3D Ext Data (0-7)

(7) Frame Packing Interlace (Y/N)

(8) 3D Vact_Space /V blank_3 (Line)

<3D Timing List>

No.	Name	881	1920*1080(p)/30.000Hz Top-and-Bottom
863	1280*720(p)/24.000Hz Frame packing	882	1920*1080(p)/59.940Hz Top-and-Bottom
864	1280*720(p)/30.000Hz Frame packing	883	1920*1080(p)/60.000Hz Top-and-Bottom
865	1280*720(p)/59.940Hz Frame packing	884	1920*1080(p)/50.000Hz Top-and-Bottom
866	1280*720(p)/60.000Hz Frame packing	885	1280*720(p)/59.940Hz Side-by-Side(Half)
867	1280*720(p)/50.000Hz Frame packing	886	1280*720(p)/60.000Hz Side-by-Side(Half)
868	1920*1080(i)/59.94Hz Frame packing	887	1280*720(p)/50.000Hz Side-by-Side(Half)
869	1920*1080(i)/60.000Hz Frame packing	888	1920*1080(p)/59.940Hz Side-by-Side(Half)
870	1920*1080(i)/50.000Hz Frame packing	889	1920*1080(p)/60.000Hz Side-by-Side(Half)
871	1920*1080(p)/23.976Hz Frame packing	890	1920*1080(p)/50.000Hz Side-by-Side(Half)
872	1920*1080(p)/24.000Hz Frame packing	891	1920*1080(p)/23.980Hz Side-by-Side(Half)
873	1920*1080(p)/29.970Hz Frame packing	892	1920*1080(p)/24.000Hz Side-by-Side(Half)
874	1920*1080(p)/30.000Hz Frame packing	893	1920*1080(i)/60.000Hz Field alternative
875	1280*720(p)/59.940Hz Top-and-Bottom	894	1920*1080(i)/50.000Hz Field alternative
876	1280*720(p)/60.000Hz Top-and-Bottom	895	1920*1080(p)/23.976Hz Line alternative
877	1280*720(p)/50.000Hz Top-and-Bottom	896	1920*1080(p)/24.000Hz Line alternative
878	1920*1080(p)/23.980Hz Top-and-Bottom	897	1280*720(p)/59.940Hz Side-by-Side(Full)
879	1920*1080(p)/24.000Hz Top-and-Bottom	898	1280*720(p)/60.000Hz Side-by-Side(Full)
880	1920*1080(p)/29.970Hz Top-and-Bottom	899	1280*720(p)/50.000Hz Side-by-Side(Full)

********** **DTV Mode** **********

(25) Sync On (Pb&Pr) with Y (Y/N)

Selecting the sync signal with Pb&Pr.

[Y: Pb&Pr with sync signal, N: No Pb&PR with sync signal]

(26) (Pb&Pr) Out Level (0-100%)

Set of Pb&Pr signal level.

(27) DTV Sync Level (50-400Mv)

Set the sync level (Default: 300Mv)

(28) Sync Set (Tri Level=0, Bi Level=1)

[0=Tri Level: Output with antagonism sync, 1=Bi Level: Output with general sync]

(29) DVI Out (Full=0, Limit=1, RBLv240=2)
Set of Digital output signal to Full/Limit Range.

(30) Data Format (RGB=0, 601=1, 709=2)
Set of color Matrix Format. [0=RGB, 1=601, 2=709]

(31) D5 Aspect Rat. (4:3=0, LT=1, 16:9=2)
Set of output data information through 11 pin voltage.

********** **TV Mode** **********

(26) Scart (0=RF,1=CVBS,2=RGB,3=Y/C)
Set of scart output mode.

(27) Scart Aspect Ratio (0=4:3,1=16:9)
Set of display rate when scart are displaying.

(28) S-V Ratio (0=4:3,1=4:3(L),2=16:9)
Set of display rate when S-Video are displaying.

(29) Video Filter (0-7)
Function of reduce the Video signal noise.

(30) Default = 0, 7.5IRE=1, 0IRE_S=2, 0IRE=3
Set of Video Black Level.

(31) Teletext (0-15)
Set of Teletext On/Off when PAL is displaying.

(32) Closed Caption (0-255)
Set of Closed Caption On/Off when NTSC is displaying.

(33) V-Chip (0-255)
Set of V-Chip On/Off when NTSC is displaying.

(34) Sync Amplitude (1-318Mv): Default: 300Mv

(35) Scart Monitoring (0=same, 1=return)

Same: Output the same signal except RF mode by TV & MONITORING port.

Return: TV port for normal signal and MONITORING port for returning signal output.

(36) Wss Aspect Ratio Control (0-7)

In television technology, **Wide Screen Signaling (WSS)** is a digital stream embedded in the TV signal describing qualities of the broadcast, in particular the intended aspect ratio of the image. This can be used by a wide screen TV to switch to the correct display mode.

*****How to set WSS*****

ⓐPush Pattern key and then input No.670 enter.

ⓑPush Time key and then input No.2 enter.(or default no.954).

ⓒPush Edit key and then input password 8880. Push enter key.

ⓓPush enter key again and then push ◄ key of LCD panel.

ⓔMove cursor to option no.36 “WSS ASPECT RATIO CONTROL”

ⓕPush Shift key and then WSS EDIT MODE will be shown as below.

<WSS EDID MODE>

BIT	0	1	2	3	4	5	6	7	8	9	A	B	C	D
VAL	1	0	0	0	0	0	0	0	0	0	0	0	0	0

<ASPECT RATIO BIT 0-3 SET>

0. B[0:3]0001 4:3 576 Line FULL FORMAT
1. B[0:3]0001 14:9 504 Line CENTER
2. B[0:3]0001 14:9 504 Line TOP
3. B[0:3]0001 16:9 430 Line CENTER
4. B[0:3]0001 16:9 430 Line TOP
5. B[0:3]0001 20:9 CENTER
6. B[0:3]0001 14:9 576 Line FULL FORMAT
7. B[0:3]0001 16:9 576 Line FULL FORMAT

ⓖThe desired options can be set using the front arrow key.

But No.8 bit must set up to 1.

ⓗAfter set pressing, push Shift key then you can get out of the WSS EDIT MODE.

ⓘPush Enter key and then set WSS option will be printed.

This time phrase appears “Save Time Number”, if you want save edited option value then you can save at 1~500 in an empty street.

********** **Displayport Mode** **********

(1) Link Rate (auto=0, 162G=1, 2.7G=2)

Auto : Signal generator connected with the DP display device has a unique value of the DPCD to check the entry of the “Link Rate” for the automatic output mode

1. 62G : This output mode that DP display unit has to ignore the value of DPCD and output by link rate fixed to 1.62GB.
2. 7G : This output mode that DP display unit has to ignore the value of DPCD and output by link rate fixed to 2.7GB.

(2) Lane Count (auto=0,1=1, 2=2, 4=3)

Auto : DP display device has a unique value of the DPCD to check the entry of the “Lane Count” for the automatic output mode.

1Lane : The mode, using the 1Lane of DP display to output data.

2Lane : The mode, using the 2Lane of DP display to output data.

4Lane : The mode, using the 4Lane of DP display to output data.

Link rate = 2.7 Gbps	Link rate = 1.62 Gbps
- 1 lane = 270 Mbytes per second	- 1 lane = 162 Mbytes per second
- 2 lane = 540 Mbytes per second	- 2 lane = 324 Mbytes per second
- 4 lane = 1080 Mbytes per second	- 4 lane = 648 Mbytes per second

(3) Down Spread (auto=0, 0%=1, 0.5%=2) : SSC Range Measurement

Auto : DP display device has a unique value of the DPCD to check the entry of the “Down Spread” for the automatic output mode

0% : “Down Spread Amplitude 0%” to output mode(SSC Disable Mode)

0.5% : “Down Spread Amplitude 0.5%” to output mode(SSC Disable Mode)

SSC(Spread Spectrum Clocking)

:A technique used to reduce electromagnetic interference (EMI) produced by synchronous digital systems (such as computer systems).

(4) p-to-p (0.4=0 ,0.6=1, 0.8=2, 1.2=3) : Variable test output level

0.4 : The signal from DP port output level 0.4Vp-p to the output by setting the mode.

0.6 : The signal from DP port output level 0.6Vp-p to the output by setting the mode.

0.8 : The signal from DP port output level 0.8Vp-p to the output by setting the mode.

1.2 : The signal from DP port output level 1.2Vp-p to the output by setting the mode.

(5) Emphasis (0.0=0, 3.5=1, 6.0=2, 9.0=3) : Complementary set for a particular noise.

0.0 : pre-emphasis 0dB(x1) set to output mode (Default Setting)

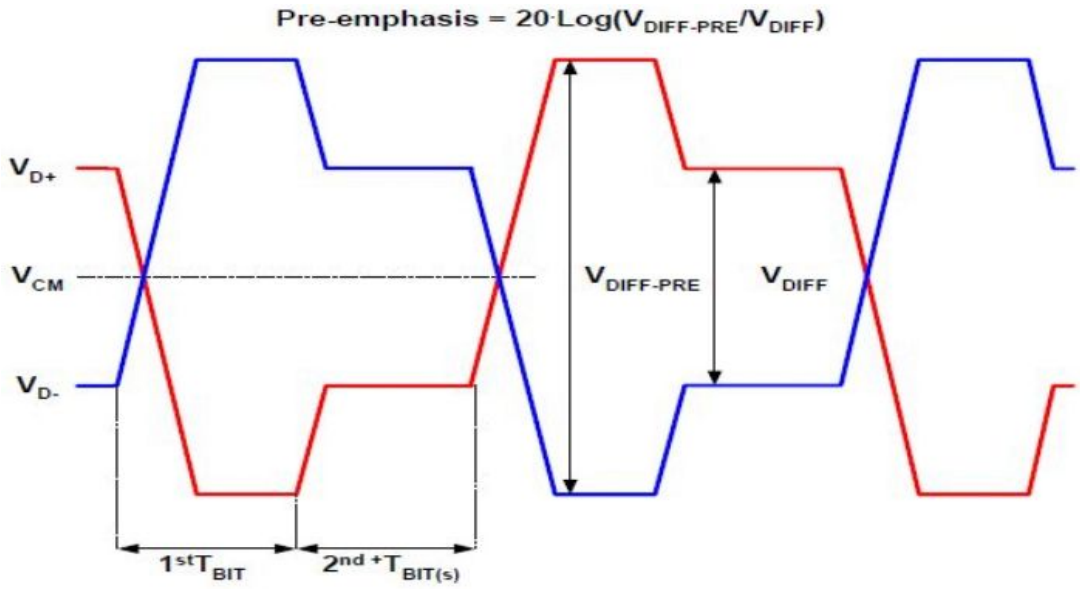
3.5 : pre-emphasis 3.5dB(x1) set to output mode.

6.0 : pre-emphasis 6.0dB(x1) set to output mode.

9.0 : pre-emphasis 9.0dB(x1) set to output mode.

[Definition of Pre-emphasis]

Pre-emphasis, as used in this document is defined as 20 multiplied by the $\log_{10}$ of the ratio of the peak-to-peak amplitude for the first T_{BIT} immediately following a transition divided by the peak-to-peak amplitude for the subsequent bits until the next transition (20.Log(V max/V min)).



[Allowed Vdiff_pp - Pre-emphasis Combinations]

	Pre-emphasis Level (dB)			
	Required			Optional
	0 dB (1x)	3.5 dB (1.5x)	6 dB (2x)	9.5 dB (3x)
V diff_pp	V diff_pre_pp	V diff_pre_pp	V diff_pre_pp	V diff_pre_pp
0.4	0.4	0.6	0.8	1.2
0.6	0.6	0.9	1.2	Not allowed
0.8	0.8	1.2	Not allowed	Not allowed
1.2	1.2	Not allowed	Not allowed	Not allowed

* Note : This table shows nominal values.

(6) Ext. DPCD auto TestLane Count (NO=0, YES=1)

No : During DPCP that output mode(Default Setting) for **without** check “Automated Testing Sub-Field (00218h to 0027Fh below) is optional” filed.

Yes : During DPCP that output mode(Default Setting) for **with** check “Automated Testing Sub-Field (00218h to 0027Fh below) is optional” filed.

(7) Scramble (Enable=0, Disable=1)

Enable : Data will be output **with** Scramble signal.

Disable : Data will be output **without** Scramble signal.

(8) AUX Line (0~8) x200us Delay

Through the AUX Line, EDID Data reading speed settings.

(9)Power Down Mode (On=0, Off=1)

On : Reading all EDID block Data while cut Sync Line out to DPMS mode.

Off : Reading all EDID block Data while cut Sync Line maintain to DPMS mode.

(10) HDCP ON (0=Off, 1=On, 2=Info On)

HDCP OSD on/off while screen output.

4.5 AUDIO Call and Edit Functions

1) How to call the Audio

① Push the AUDIO key.

② Select the number using numeral key or jog shuttle.

③ Push the ENTER key or jog shuttle.

④ Selected number is signed on the LCD window.

2) How to edit the Audio

① Push the AUDIO key.

② Select the number using numeral key or jog shuttle.

③ Push the EDIT key.

④ The passwords input window is appear.

⑤ Input the password and Push the ENTER key or jog.

⑥ 6 option are appeared on the LCD. Fix contents and then Push the ENTER key or jog.

⑦ After input the Audio number for store, Push the ENTER key or jog.

⑧ Please, find message as below, "Save Ok !!!!!!".

*** NOTICE ***

- There are total 12(21~32) Default Audio in the MSPG-6100L, basically, also you can select Default Audio(1~20) through the saving & calling.

3) Audio 8Ch Edit Option

Channel No.	Frequency	Volume
1CH (FL)	Hz	dB
2CH (FR)	Hz	dB
3CH (LFE)	Hz	dB
4CH (FC)	Hz	dB
5CH (RL/RC)	Hz	dB
6CH (RR)	Hz	dB
7CH (RLC/RC)	Hz	dB
8CH (RRC/TC)	Hz	dB

[Audio Option Disc.]

F : Front, L : Left, R : Right, C : Center, R : Rear, W : Wide, H : High, T : Top,

LFE : Low Frequency Effect

▪ Audio Format (0-9) : Audio output Format setup.

No.	Format
0	Speak Set
1	Freq & DB Set
2	Freq All Set
3	DB All Set
4	ON / OFF
5	SWAP RL
6	SWAP ALL
7	SWEEP UP
8	SWEEP DOWN
9	SWEEP UP / DOWN

▪ Channel Allocation No (0 - 49) :

[Channel Allocation Ex.]

2CH = 0, 2.1 CH = 1, 4 CH = 8, 5.1 CH = 11, 7.1 CH = 19 / 31 / 41 / 43 / 45 / 47 / 49

▪ Frequency Min (0-24000Hz) :

▪ Frequency Max (0-24000Hz):

▪ Frequency Step (0-999Hz) :

▪ Time Interval (0-999(10msec) : Audio output convert time setup

4) MSPG-6100L Audio Specification

① MSPG-6100L Provide the Analog Audio output and S/PDIF format of HDMI Digital Audio to converted by A/D.

② There are 2 Mode in Audio option

i) Programmable Mode (1~20) : User can set the Audio option.

ii) Default Mode (21~32) : User can operate audio mode without parameter setting.

▪ Programmable Mode is set up Default Pattern & Parameter related Audio output by user.

▪ It depends on Pattern type that is impossible Parameter setting.

▪ It is impossible setting Parameter to set, that is setting Default.

▪ Range of Voltage : 0~2V, 100mV

▪ Voltage range : 0~ 2V per 2mV unit.

▪ Frequency range :0 ~ 20Khz per 1Hz unit.

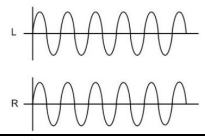
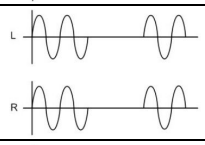
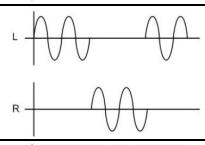
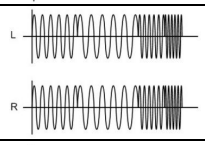
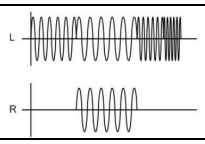
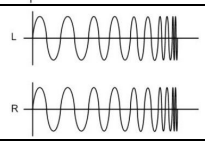
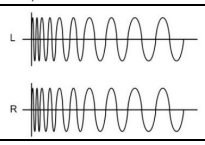
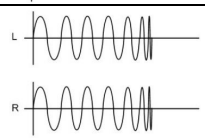
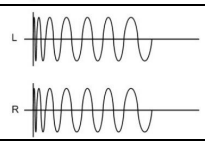
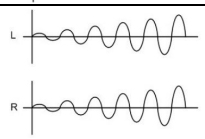
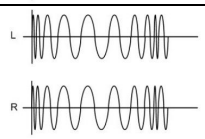
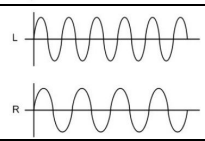
▪ Frequency maintenance Time : 1mS

▪ Output impedance : 600㏀

▪ Greatest output Voltage : 2.2Vp-p

▪ Output Bandwidth : 0 ~ 20KHz

5) Default Mode : (21~32)

Name	Waveform	Description	Voltage	Frequency	Duration Time
Pattern 1		Static (Plain Beep Sound)	500mV	L : 400Hz R : 1KHz	Continue
Pattern 2		Winker (Beep Sound On/Off)	500mV⇒0V	1KHz	1000msec
Pattern 3		Alternating Winker	500mV⇒0V	1KHz	1000msec
Pattern 4		Random	500mV	5K⇒61K⇒ 4K⇒2.5K⇒ 6.7KHz	500msec
Pattern 5		Alternating Winker and Random	500mV⇒0V	5K⇒61K⇒ 4K⇒2.5K⇒ 6.7KHz	500msec
Pattern 6		Discrete Sliding Up	500mV	1K⇒2K⇒3K ⇒4K⇒5K⇒ 6KHz	100mS
Pattern 7		Discrete Sliding Down	500mV	6K⇒5K⇒4K ⇒3K⇒2K⇒ 1KHz	100mS
Pattern 8		Continuity Sliding Up	500mV	0~1KHz (1Hz Step)	10mS
Pattern 9		Continuity Sliding Down	500mV	1~0KHz (1Hz Step)	10mS
Pattern 10		Rising Voltage	1mV~1.2V (1mV Step)	1KHz	10mS
Pattern 11		Rotational Sliding	500mV	0K⇒1K⇒ 0KHz (1Hz Step)	1uS
Pattern 12		Static	500mV	L : 400Hz R : 1KHz	Continue

* Programmable Mode : (1~20)

4.6 SCAN Call and Edit Functions

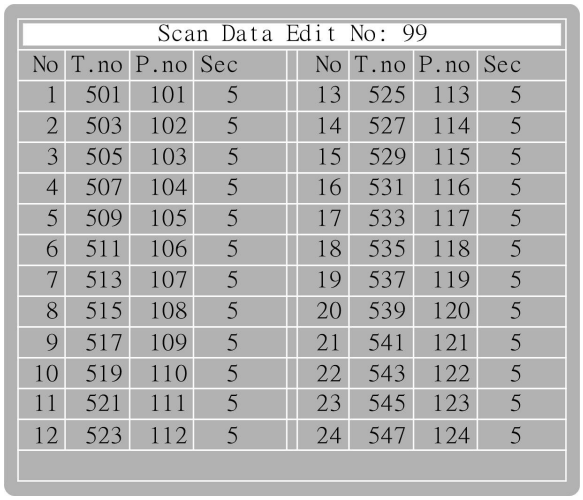
1) Definition

- Scan function has been displayed progressively by coupled arbitrary pattern and model during the fixed time.
- If you want to stop scan, push any key of front panel or remote controller.

2) How to call the scan (1~99)

① Push the SCAN key.
② Select the number using numeral key or jog shuttle.
③ Push the ENTER key or jog shuttle.
④ Time Number/Pattern Number are signed on the LCD and it will display.

3) How to edit the scan (1~99)



① Push the SCAN key.
② Select the number using numeral key or jog shuttle.
③ Push the EDIT key.
④ The passwords input window is appear.
⑤ Input the password and Push the ENTER key or jog.
⑥ Signs are appear like below on the LCD window.

⑦ Edit the each value of time number(1~999), pattern number(1~999) and second(0~999) using the direction key.
⑧ Push the ENTER key or jog shuttle.
⑨ Select the Scan number(1~99), and then push the ENTER key or jog shuttle, again.
⑩ Please, find message as below, "Save Ok !!!!!!".

4.7 FUNCTION Call and Edit Functions

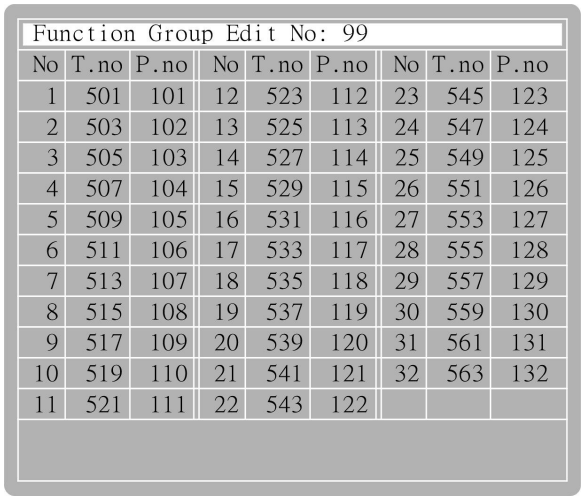
1) Definition

- Function(F1~F32) means that Arbitrary pattern and model have been coupled and then it can be called by pushing F1 to F32 key.
- Remote controller(MSRC-005L) has only special key(F1~F32) to call function group.

2) How to call the function (1~99)

① Push the FUNC key.
② Select the number using numeral key or jog shuttle.
③ Push the ENTER key or jog shuttle.
④ Time Number/Pattern Number/Function Group Name are signed on the LCD and it will display.
⑤ Control by using F1~F32 of remote(MSRC-005L) : F17~F32, controlled by NUM LOCK key.

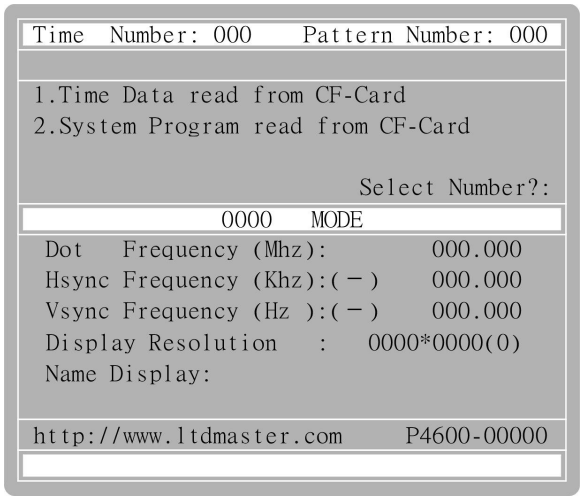
3) How to edit the function (1~99)



① Push the FUNC key.
② Select the number using numeral key or jog shuttle.
③ Push the ENTER key or jog shuttle.
④ Push the EDIT key.
⑤ The passwords input window is appear.
⑥ Input the password and Push the ENTER key or jog.
⑦ Signs are appear like below on the LCD window.
⑧ Edit the each value of time number(1~999), pattern number(1~999) using the direction key.
⑨ Push the ENTER key or jog shuttle.
⑩ Select the Function number(1~99), and then push the ENTER key or jog shuttle, again.
⑪ Please, find message as below, "Save Ok !!!!!!".

4.8 READ and WRITE Functions

1) Read the Data from CF card to Generator



① The Read function can copy the data from CF Card to MSPG-6100L.

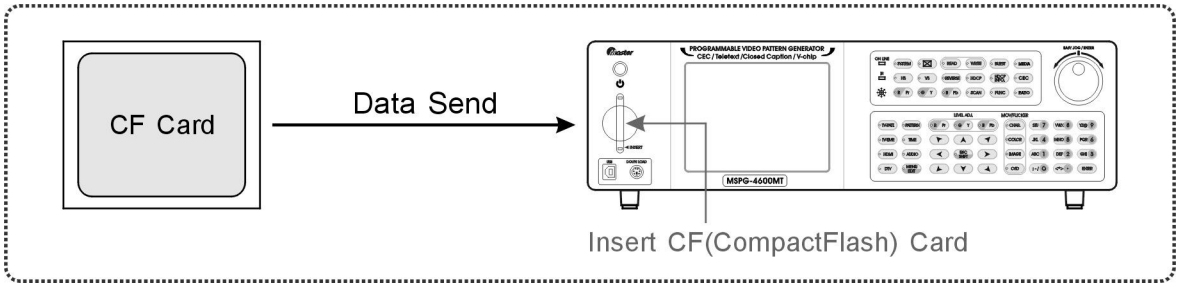
② If push the READ key, it will be displaying on the LCD as right picture.

③ Please, select which one will you read among below.

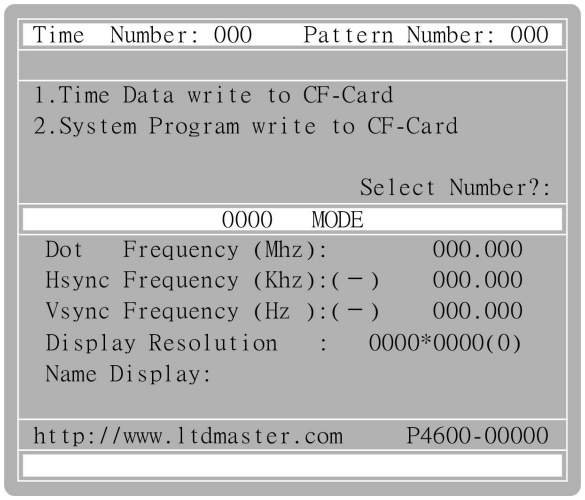
1. Time Data read from CF-Card
2. System Program read from CF-Card

④ It will operate when you select 1, 2.

⑤ In case of 3, it you push ENTER, [Start?(Y=1,N=0)] select contents are appear and then press '1' press ENTER, It will be operate.



2) Write the Data from Generator to CF card



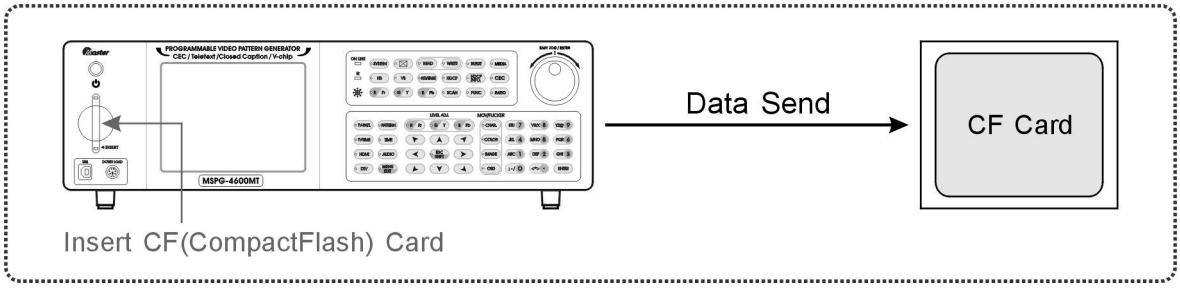
① The Write function can copy the data from MSPG-6100L to CF Card.

② If push the WRITE key, it will be displaying on the LCD as right picture.

③ Please, select which one will you write among below.

1. Time Data write from CF-Card
2. System Program write from CF-Card

④ When pushing the ENTER key, it will be running.



4.9 TELETEXT Functions

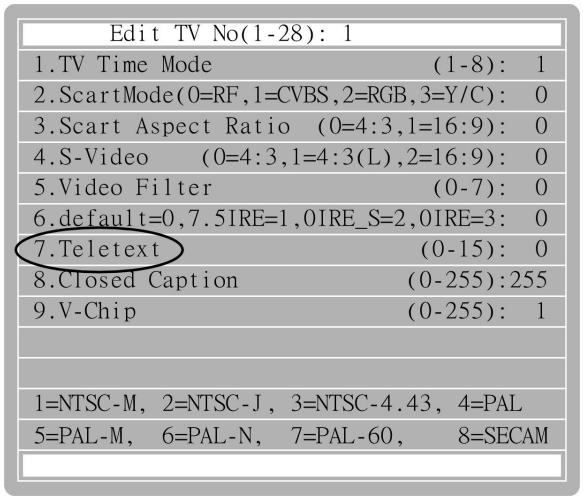
1) Teletext

- Teletext Function are incarnated by ETS 300 706 "Enhanced Teletext Specification" standard regulation.
- This function can operate only PAL Mode, and electrical specific is following the EIA standard.
- User can see the variety services from Teletext page.

*** NOTICE ***

- User can use this function by general Remote.

2) How to use Teletext (0~15)



① Push the TV-TIME key.
② Select the number using numeral key or jog shuttle.
③ Push the ENTER key or jog shuttle.
④ Push the EDIT key.
⑤ The passwords input window is appear.
⑥ Input the password and Push the ENTER key or jog.
⑦ Selected number is signed on the LCD window.
⑧ Using direction key or jog, it has to move 7.Teletext.
⑨ Fix contents and then Push the ENTER key or jog.
⑩ Select the Time number(0~15), and then push the ENTER key or jog shuttle, again.
⑪ Please, find message as below, "Save Ok !!!!!!".

3) How to use Teletext

▪ Teletext is transferred as below chart and it settled by 10 antilogarithm.

No.	Transfer method
1	FLOP
2	TOP
4	PDC
8	VPS

4) Consist of the Page

▪ Each page is consisted of the variety series.

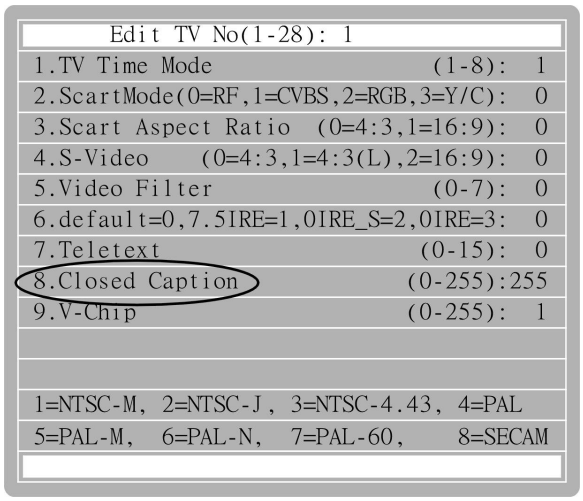
Page No.	Page Name	Page Description
100	Index	It is indicate the consist of Teletext page, and It is mode of "Prompt".
110	Introduction	Simply, Introduce the company.
120	Color Check	Color Bar for checking the support color.
130	Character Check	Checking the Display cell.
140	Bit Check	Checking the basic Text set for supporting the Teletext.

4.10 CLOSED CAPTION Functions

1) Closed Caption

- Closed Caption Function are incarnated by EIA-608-A regulations.
- This function can operate only NTSC mode and electrical specific is following the EIA standard.
- Closed Caption mode is support the several display style, And Text Mode can support the Roll-up display style.
- User can On/Off each channel or whole channel.

2) How to edit the Closed Caption (0~255)



① Push the TV-TIME key.
② Select the number using numeral key or jog shuttle.
③ Push the ENTER key or jog shuttle.
④ Push the EDIT key.
⑤ The passwords input window is appear.
⑥ Input the password and Push the ENTER key or jog.
⑦ Selected number is signed on the LCD window.
⑧ Using direction key or jog, it has to move "8.Closed Caption".
⑨ Fix contents and then Push the ENTER key or jog.
⑩ Select the Time number(0~255), and then push the ENTER key or jog shuttle, again.
⑪ Please, find message as below, "Save Ok !!!!!!".

3) Display Style of Channel

- Display style is different by the channel

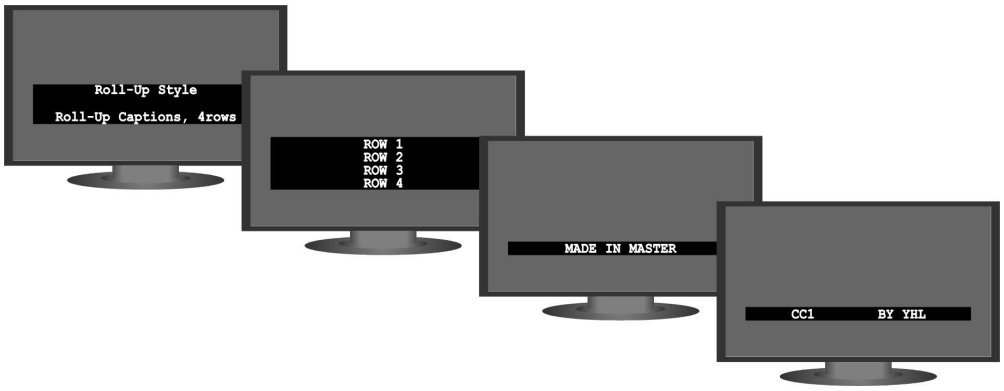
No.	Channel Name	Display Style	Description
1	CC1	Roll-Up	Characters are displayed by Roll-up style, from 4Rows to 2Rows.
2	CC2	Pop-On	Characters are displayed by Pop-On Style, Up, Middle, Down.
4	T1	Roll-Up (Default)	Characters are displayed complete sentences.
8	T2	Roll-Up (Default)	Displayed by one sentence's character
16	CC3	Paint-On	Font's background color changed and displaying by paint-on style.
32	CC4	Roll-Up	Simplify, Displaying by 2Row Roll-up style.
64	T3	Roll-Up (Default)	It does display character as T1, But The Character of each row is displayed as different color.
128	T4	Roll-Up (Default)	It does display character as T2. But The Character of each row is displayed as different color.
255		Full On	

4) Closed Caption Channel

- How to setup the closed caption channel.
- User can On/Off the each, also it can be set. by 8bit control (set or clear)

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Text 4	Text 4	CC4	CC3	Text 2	Text 1	CC2	CC1

ex) Number 1 = cc1



This function can operate only NTSC.

It user want to put together the style, just adding up the each channel.

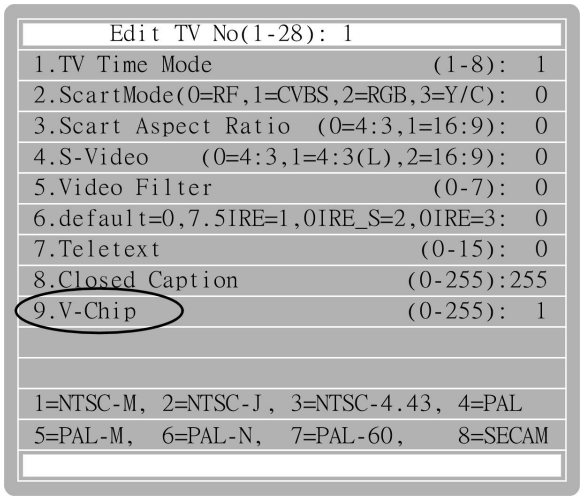
Ex) 1+2=3 (CC1, CC2 are displayed)

4.11 V-CHIP Functions

1) V-Chip Function

- V-chip Function is consisted of EIA-608 Program Rating Format, and it is transferring according to the Extended Data Service (XDS) User can set the Moving Rating and USA TV Rating.

2) How to use V-Chip (0~255)



① Push the TV-TIME key.
② Select the number using numeral key or jog shuttle.
③ Push the ENTER key or jog shuttle.
④ Push the EDIT key.
⑤ The passwords input window is appear.
⑥ Input the password and Push the ENTER key or jog.
⑦ Selected number is signed on the LCD window.
⑧ Using direction key or jog, it has to move "9.V-Chip".
⑨ Fix contents and then Push the ENTER key or jog.
⑩ Select the Time number(0~15), and then push the ENTER key or jog shuttle, again.
⑪ Please, find message as below, "Save Ok !!!!!!".

3) Rate Setting

No.	Movie Rating	No.	USA TV Rating
0	Not Rated	0	Not Rated
1	G	129	TV-Y
2	PG	130	TV-Y7
4	PG-13	132	TV-G
8	R	136	TV-PG
16	NC-17	144	TV-14
32	X	160	TV-MA

4) V-chip data bit

- Higher bit has priority.
- You can see the V-chip data by a bit at the below chart.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0=Movie Rating	Not Rated	X	NC-17	R	PG-13	PG	G
1=USA TV Rating	Not Rated	TV-MA	TV-14	TV-PG	TV-G	TV-Y7	TV-Y

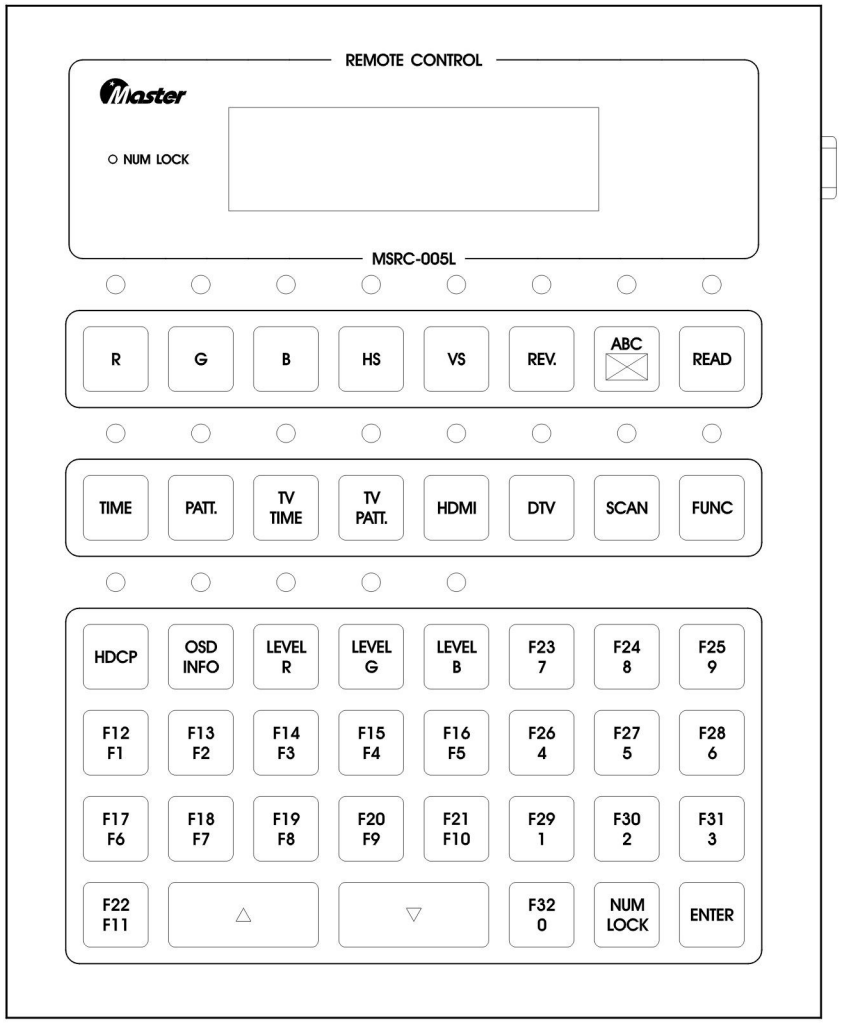
5) Rating detail

Movie Rating		TV Rating	
Rating	Contents	Rating	Contents
G	General Audiences (All Ages Admitted)	TV-Y	All Children
PG	Parental Guidance Suggested (Some Material May Not Be Suitable For Children)	TV-Y7	Directed to Older Children
PG-13	Parents Strongly Cautioned (Some Material May Be Inappropriate For Children Under 13)	TV-G	General Audience
R	Restricted (Under 17 Requires Accompanying Parent Or Adult Guardian)	TV-PG	Parental Guidance
NC-17	No One 17 And Under Admitted	TV-14	Parents Strongly Cautioned
X	No One Under 17 Admitted	TV-MA	Mature Audience only

4.12 REMOTE CONTROLLER

1) How to use MSRC-005L

- You can use remote box in order to promote work efficiency, Before operating remote box, first of all, check baud rate and protocol of communication.



Chapter 5. Customer Service

MASTER CO., LTD Warranty Statement

Completed information regarding MASTER's warranties is below

MASTER CO., LTD ("MASTER")

Warrants that its products are free from defects in material and workmanship. Subject to the conditions and limitations set forth below, Kingston will at its option, either repair or replace any part of its product(s) that prove defective by reason of improper workmanship or materials.

Repairing parts or replacement the products will be provided by MASTER on an exchange basis, and will be either new or refurbished to be functionally equivalent to new. This warranty does not cover any damage to this product those results from accident, abuse, misuse, natural or personal disaster, or any unauthorized disassembly, repair, or modification.

Duration of Warranty

One-Year Warranty :

The MASTER products are covered by this warranty for a period of one year from the date of original retail purchase.

This warranty covers only repair or replacement of defective MASTER products. MASTER is not liable for, and does not cover under warranty, any costs associated with servicing and/or the installation of MASTER products. MASTER will not discontinue support of its products as long as there are component materials available in the marketplace and reasonable customer demand for the products.

Customer must inform us of malfunction of products in warranty period in order to get after-sale service.

- **Address : 42-20, Palyong, Changwon, Gyeongnam, Korea, 641-847**
- **Tel : +82-55-297-8880**
- **Fax : +82-55-256-7388**
- **E-mail : sales@Ltdmaster.com / webmaster@Ltdmaster.com**

Chapter 6. APPENDIX

6.1 Timing Data (Default)

1) VESA Standard

No	H-freq (KHz)	V-freq (Hz)	Dot Clock (MHz)	Resolution (H x V)	Int/Prog	Sync polarity		Timing Data Name
						H	V	
501	37.861	85.081	31.500	640x350	Prog	+	--	VESA Standard
502	37.861	85.081	31.500	640x400	Prog	--	+	VESA Standard
503	37.927	85.038	35.500	720x400	Prog	--	+	VESA Standard
504	31.469	59.941	25.175	640x480	Prog	--	--	VESA Standard
505	37.861	72.810	31.500	640x480	Prog	--	--	VESA Standard
506	37.500	75.000	31.500	640x480	Prog	--	--	VESA Standard
507	43.269	85.008	36.000	640x480	Prog	--	--	VESA Standard
508	35.156	56.251	36.000	800x600	Prog	+	+	VESA Guidelines
509	37.879	60.317	40.000	800x600	Prog	+	+	VESA Guidelines
510	48.770	73.228	50.721	800x600	Prog	+	+	VESA Standard
511	46.875	75.000	49.500	800x600	Prog	+	+	VESA Standard
512	53.674	85.062	56.250	800x600	Prog	+	+	VESA Standard
513	31.016	59.992	33.748	848x480	Prog	+	+	VESA Guidelines
514	35.522	43.479	44.900	1024x768	Prog	--	--	VESA Standard
515	48.363	60.004	65.000	1024x768	Prog	--	--	VESA Standard
516	70.069	56.476	70.069	1024x768	Prog	--	--	VESA Standard
517	60.019	75.024	78.745	1024x768	Prog	+	+	VESA Standard
518	68.667	84.996	94.500	1024x768	Prog	+	+	VESA Standard
519	67.500	75.000	108.000	1152x864	Prog	+	+	VESA Standard
520	47.396	59.995	68.250	1280x768	Prog	+	--	VESA Standard
521	47.776	59.870	79.499	1280x768	Prog	--	+	VESA Standard
522	60.289	74.893	102.250	1280x768	Prog	--	+	VESA Standard
523	68.633	84.837	117.500	1280x768	Prog	--	+	VESA Standard
524	60.000	60.000	108.000	1280x960	Prog	+	+	VESA Standard
525	85.938	85.003	148.501	1280x960	Prog	+	+	VESA Standard
526	63.981	60.020	108.000	1280x1024	Prog	+	+	VESA Standard
527	79.976	75.024	134.999	1280x1024	Prog	+	+	VESA Standard
528	91.146	85.024	157.500	1280x1024	Prog	+	+	VESA Standard
529	47.712	60.015	85.500	1360x768	Prog	+	+	VESA Standard
530	64.744	59.948	101.001	1400x1050	Prog	+	--	VESA Standard
531	65.317	59.979	121.751	1400x1050	Prog	--	+	VESA Standard
532	82.278	74.866	155.999	1400x1050	Prog	--	+	VESA Standard
533	93.881	84.960	179.500	1400x1050	Prog	--	+	VESA Standard
534	55.469	59.902	88.750	1400x900	Prog	+	--	VESA Standard
535	55.935	59.888	106.500	1400x900	Prog	--	+	VESA Standard
536	70.635	74.984	136.749	1400x900	Prog	--	+	VESA Standard
537	80.430	84.842	156.999	1400x900	Prog	--	+	VESA Standard
538	75.000	60.000	162.000	1600x1200	Prog	+	+	VESA Standard
539	81.250	65.000	175.500	1600x1200	Prog	+	+	VESA Standard
540	87.500	70.000	189.000	1600x1200	Prog	+	+	VESA Standard
541	93.750	75.000	202.500	1600x1200	Prog	+	+	VESA Standard
542	106.250	85.000	229.500	1600x1200	Prog	+	+	VESA Standard
543	64.674	59.883	119.000	1680x1050	Prog	+	--	VESA Standard
544	65.290	59.954	146.250	1680x1050	Prog	--	+	VESA Standard
545	82.306	74.982	186.999	1680x1050	Prog	--	+	VESA Standard
546	93.859	84.940	214.749	1680x1050	Prog	--	+	VESA Standard
547	83.640	60.000	204.751	1792x1344	Prog	--	+	VESA Standard
548	106.270	74.996	260.999	1792x1344	Prog	--	+	VESA Standard
549	86.333	59.995	218.250	1856x1392	Prog	--	+	VESA Standard
550	112.500	75.000	288.000	1856x1392	Prog	--	+	VESA Standard

2) VESA Standard Proposed

No	H-freq (KHz)	V-freq (Hz)	Dot Clock (MHz)	Resolution (H x V)	Int/Prog	Sync polarity		Timing Data Name
						H	V	
551	74.038	59.950	153.999	1920x1200	Prog	+	--	VESA Standard
552	74.556	59.884	193.249	1920x1200	Prog	--	+	VESA Standard
553	94.038	74.038	245.251	1920x1200	Prog	--	+	VESA Standard
554	107.184	84.932	281.251	1920x1200	Prog	--	+	VESA Standard
555	90.000	60.000	234.000	1920x1440	Prog	--	+	VESA Standard
556	112.500	75.000	297.000	1920x1440	Prog	--	+	VESA Standard
557	106.250	59.994	330.013	2560x1600	Prog	--	+	VESA Standard
558								Blank
559	31.469	59.941	34.238	853x480	Prog	--	--	VESA Standard
560	47.396	59.995	68.250	1280x768	Prog	+	--	VESA Standard
561	37.531	74.763	30.625	640x480	Prog	--	+	VESA Standard
562	24.668	49.834	19.734	640x480	Prog	--	+	VESA Standard
563	29.844	60.048	23.875	640x480	Prog	--	+	VESA Standard
564	23.625	29.531	59.779	640x480	Prog	--	+	VESA Standard
565	42.819	84.790	35.625	640x480	Prog	--	+	VESA Standard
566	30.878	49.964	31.125	800x600	Prog	--	+	VESA Standard
567	37.231	59.857	38.125	800x600	Prog	--	+	VESA Standard
568	46.995	74.952	48.875	800x600	Prog	--	+	VESA Standard
569	53.504	84.927	56.500	800x600	Prog	--	+	VESA Standard
570	36.979	59.837	35.500	800x600	Prog	+	--	VESA Standard
571	39.444	49.866	51.751	1024x768	Prog	--	+	VESA Standard
572	47.712	60.015	64.125	1024x768	Prog	--	+	VESA Standard
573	60.110	74.950	81.750	1024x768	Prog	--	+	VESA Standard
574	68.496	84.877	94.250	1024x768	Prog	--	+	VESA Standard
575	47.297	59.870	56.000	1024x768	Prog	+	--	VESA Standard
576	49.405	50.005	83.000	1280x960	Prog	--	+	VESA Standard
577	59.579	59.939	101.999	1280x960	Prog	--	+	CVT
578	75.159	75.009	129.875	1280x960	Prog	--	+	CVT
579	85.651	84.971	149.375	1280x960	Prog	--	+	CVT
580	59.201	59.920	85.249	1280x960	Prog	+	--	CVT
581	53.977	49.932	99.749	1400x1050	Prog	--	+	CVT
582	65.160	59.945	122.501	1400x1050	Prog	--	+	CVT
583	82.213	75.012	155.876	1400x1050	Prog	--	+	CVT
584	93.685	84.937	179.126	1400x1050	Prog	--	+	CVT
585	64.744	59.948	101.001	1400x1050	Prog	+	--	CVT
586	61.742	49.994	132.375	1600x1200	Prog	--	+	CVT
587	74.479	59.967	160.875	1600x1200	Prog	--	+	CVT
588	93.921	74.957	205.875	1600x1200	Prog	--	+	CVT
589	107.031	84.945	234.612	1600x1200	Prog	--	+	CVT
590	74.007	59.915	130.252	1600x1200	Prog	+	--	CVT
591	74.060	49.973	191.964	1920x1440	Prog	--	+	CVT
592	89.367	59.978	233.499	1920x1440	Prog	--	+	CVT
593	112.689	74.976	297.499	1920x1440	Prog	--	+	CVT
594	128.483	84.976	341.251	1920x1440	Prog	--	+	CVT
595	88.822	59.974	184.750	1920x1440	Prog	+	--	CVT
596	78.983	49.989	218.615	2048x1536	Prog	--	+	CVT
597	95.357	60.011	267.000	2048x1536	Prog	--	+	CVT

No	H-freq (KHz)	V-freq (Hz)	Dot Clock (MHz)	Resolution (H x V)	Int/Prog	Sync polarity		Timing Data Name
						H	V	
598	120.233	75.005	340.500	2048x1536	Prog	--	+	CVT
599	137.040	85.012	388.097	2048x1536	Prog	--	+	CVT
600	209.250	132.437	462.024	2048x1536	Prog	+	--	CVT
601	24.621	49.739	29.000	848x480	Prog	--	+	CVT
602	29.830	60.020	31.500	848x480	Prog	--	+	CVT
603	37.569	74.839	40.875	848x480	Prog	--	+	CVT
604	42.799	84.750	47.250	848x480	Prog	--	+	CVT
605	29.638	59.996	29.875	848x480	Prog	+	--	CVT
606	30.876	49.961	41.250	1064x600	Prog	--	+	CVT
607	37.281	59.937	51.000	1964x600	Prog	--	+	CVT
608	46.964	74.903	65.750	1064x600	Prog	--	+	CVT
609	53.571	85.033	74.999	1064x600	Prog	--	+	CVT
610	37.057	59.963	45.358	1064x600	Prog	+	--	CVT
611	36.994	49.924	60.374	1280x720	Prog	--	+	CVT
612	44.697	59.916	74.376	1280x720	Prog	--	+	CVT
613	56.383	74.977	95.626	1280x720	Prog	--	+	CVT
614	64.252	84.989	109.999	1280x720	Prog	--	+	CVT
615	44.444	59.978	63.999	1280x720	Prog	+	--	CVT
616	39.489	49.923	65.501	1360x768	Prog	--	+	CVT
617	47.649	59.936	84.625	1360x768	Prog	--	+	CVT
618	60.149	74.999	108.749	1360x768	Prog	--	+	CVT
619	68.531	84.921	125.001	1360x768	Prog	--	+	CVT
620	72.000	91.139	109.440	1360x768	Prog	+	--	CVT
621	49.395	49.995	110.250	1704x960	Prog	--	+	CVT
622	59.574	59.934	134.876	1704x960	Prog	--	+	CVT
623	75.131	74.981	172.501	1704x960	Prog	--	+	CVT
624	85.640	84.960	198.000	1704x960	Prog	--	+	CVT
625	59.214	59.933	110.375	1704x960	Prog	+	--	CVT
626	54.005	49.958	133.500	1864x1050	Prog	--	+	CVT
627	65.196	59.978	163.251	1864x1050	Prog	--	+	CVT
628	82.216	75.015	208.500	1864x1050	Prog	--	+	CVT
629	93.701	84.951	239.125	1864x1050	Prog	--	+	CVT
630	64.785	59.986	131.125	1864x1050	Prog	+	--	CVT
631	55.572	49.975	141.375	1920x1080	Prog	--	+	CVT
632	67.049	59.972	172.718	1920x1080	Prog	--	+	CVT
633	84.548	74.954	220.501	1920x1080	Prog	--	+	CVT
634	96.370	84.982	252.875	1920x1080	Prog	--	+	CVT
635	66.647	59.988	138.626	1920x1080	Prog	+	--	CVT
636	61.710	49.968	175.750	2128x1200	Prog	--	+	CVT
637	74.479	59.967	214.499	2128x1200	Prog	--	+	CVT
638	93.922	74.958	273.501	2128x1200	Prog	--	+	CVT
639	107.070	84.976	313.501	2128x1200	Prog	--	+	CVT
640	74.082	59.985	169.500	2128x1200	Prog	+	--	CVT
641	74.060	49.973	255.951	2560x1440	Prog	--	+	CVT
642	89.378	59.985	311.750	2560x1440	Prog	--	+	CVT
643	88.833	59.982	241.626	2560x1440	Prog	+	--	CVT
644	79.002	50.001	292.623	2728x1536	Prog	--	+	CVT

No	H-freq (KHz)	V-freq (Hz)	Dot Clock (MHz)	Resolution (H x V)	Int/Prog	Sync polarity		Timing Data Name
						H	V	
645	24.609	49.715	23.626	768x480	Prog	--	+	VESA Standard
646	29.818	59.996	28.625	768x480	Prog	--	+	VESA Standard
647	37.550	74.801	37.250	768x480	Prog	--	+	VESA Standard
648	42.843	84.838	42.500	768x480	Prog	--	+	VESA Standard
649	29.634	59.988	27.500	768x480	Prog	+	--	CVT
650	30.833	49.892	37.000	960x600	Prog	--	+	CVT
651	37.236	59.865	45.875	960x600	Prog	--	+	CVT
652	46.974	74.919	59.375	960x600	Prog	--	+	CVT
653	53.501	84.922	67.625	960x600	Prog	--	+	VESA Standard
654	37.044	59.942	41.489	960x600	Prog	+	--	VESA Standard
655	37.020	49.960	54.493	1152x720	Prog	--	+	VESA Standard
656	44.714	59.938	67.250	1152x720	Prog	--	+	VESA Standard
657	56.396	74.995	86.624	1152x720	Prog	--	+	VESA Standard
658	64.290	85.040	98.749	1152x720	Prog	--	+	VESA Standard
659	44.398	59.916	58.250	1152x720	Prog	+	--	VESA Standard
660	39.499	49.936	62.250	1224x768	Prog	--	+	VESA Standard
661	47.652	59.940	76.624	1224x768	Prog	--	+	VESA Standard
662	60.137	74.984	98.625	1224x768	Prog	--	+	VESA Standard
663	68.521	84.908	112.374	1224x768	Prog	--	+	VESA Standard
664	47.327	59.908	65.501	1224x768	Prog	+	--	VESA Standard
665	49.355	49.954	99.500	1536x960	Prog	--	+	VESA Standard
666	59.570	59.930	121.999	1536x960	Prog	--	+	VESA Standard
667	75.120	74.970	156.250	1536x960	Prog	--	+	VESA Standard
668	85.639	84.959	179.499	1536x960	Prog	--	+	VESA Standard
669	59.257	59.977	100.500	1536x960	Prog	+	--	VESA Standard
670	54.011	49.964	120.120	1680x1050	Prog	--	+	VESA Standard
671	65.160	59.945	147.001	1680x1050	Prog	--	+	VESA Standard
672	82.168	74.971	188.000	1680x1050	Prog	--	+	VESA Standard
673	93.695	84.946	214.374	1680x1050	Prog	--	+	VESA Standard
674	64.742	59.946	119.125	1680x1050	Prog	+	--	VESA Standard
675	55.562	49.966	127.126	1728x1080	Prog	--	+	VESA Standard
676	67.022	59.948	155.491	1728x1080	Prog	--	+	VESA Standard
677	84.556	74.961	198.876	1728x1080	Prog	--	+	VESA Standard
678	96.389	84.999	228.249	1728x1080	Prog	--	+	VESA Standard
679	66.605	59.950	125.750	1728x1080	Prog	+	--	VESA Standard
680	61.719	49.975	158.001	1920x1200	Prog	--	+	VESA Standard
681	74.508	59.990	193.125	1920x1200	Prog	--	+	VESA Standard
682	93.941	74.973	246.501	1920x1200	Prog	--	+	VESA Standard
683	107.045	84.554	282.599	1920x1200	Prog	--	+	VESA Standard
684	74.099	59.999	154.126	1920x1200	Prog	+	--	VESA Standard
685	74.058	49.972	229.876	2304x1440	Prog	--	+	VESA Standard
686	89.405	60.003	280.374	2304x1440	Prog	--	+	VESA Standard
687	88.829	59.979	218.875	2304x1440	Prog	+	--	VESA Standard
688	78.987	49.992	263.501	2456x1536	Prog	--	+	VESA Standard
689	95.354	60.009	319.627	2456x1536	Prog	--	+	VESA Standard
690	94.753	59.970	247.874	2456x1536	Prog	+	--	VESA Standard
691	52.698	49.998	89.376	1280x1024	Prog	--	+	VESA Standard
692	63.595	59.995	108.875	1280x1024	Prog	--	+	VESA Standard
693	80.150	74.977	138.499	1280x1024	Prog	--	+	VESA Standard
694	91.385	85.009	159.375	1280x1024	Prog	--	+	VESA Standard
695	63.194	59.956	90.999	1280x1024	Prog	+	--	VESA Standard
696	39.518	49.960	65.126	1280x768	Prog	--	+	VESA Standard
697	47.693	59.991	80.124	1280x768	Prog	--	+	VESA Standard
698	60.091	74.926	102.876	1280x768	Prog	--	+	VESA Standard
699	68.504	84.887	118.375	1280x768	Prog	--	+	VESA Standard
700	98.713	59.971	268.499	2560x1600	Prog	--	--	DUAL

3) EIA-861B

No	H-freq (KHz)	V-freq (Hz)	Dot Clock (MHz)	Resolution (H x V)	Int/Prog	Sync polarity		Timing Data Name
						H	V	
701	31.469	59.941	25.175	640x480	Prog	--	--	EIA-861B
702	31.500	60.000	25.200	640x480	Prog	--	--	EIA-861B
703	31.469	59.941	27.000	720x480	Prog	--	--	EIA-861B
704	31.500	60.000	27.027	720x480	Prog	--	--	EIA-861B
705	44.955	59.940	74.176	1280x720	Prog	+	+	EIA-861B
706	45.000	60.000	74.250	1280x720	Prog	+	+	EIA-861B
707	37.500	50.000	74.250	1280x720	Prog	+	+	EIA-861B
708	33.716	59.940	74.175	1920x1080	Int	+	+	EIA-861B
709	33.750	60.000	74.250	1920x1080	Int	+	+	EIA-861B
710	28.125	50.000	74.250	1920x1080	Int	+	+	EIA-861B
711	15.734	59.939	13.500	720x480	Int	--	--	EIA-861B
712	15.750	60.000	13.514	720x480	Int	--	--	EIA-861B
713	15.734	59.825	13.500	720x240	Prog	--	--	EIA-861B
714	15.750	60.115	13.514	720x240	Prog	--	--	EIA-861B
715	15.734	59.825	27.629	1440x240	Prog	--	--	EIA-861B
716	15.750	60.115	27.657	1440x240	Prog	--	--	EIA-861B
717	31.469	59.940	54.000	1440x480	Prog	--	--	EIA-861B
718	31.500	60.000	54.054	1440x480	Prog	--	--	EIA-861B
719	67.432	59.940	148.350	1920x1080	Prog	+	+	EIA-861B
720	67.500	60.000	148.500	1920x1080	Prog	+	+	EIA-861B
721	31.250	50.000	27.000	720x576	Prog	--	--	EIA-861B
722	15.625	50.000	13.500	720x576	Int	--	--	EIA-861B
723	15.625	50.080	13.500	720x288	Prog	--	--	EIA-861B
724	15.625	49.920	13.500	720x288	Prog	--	--	EIA-861B
725	15.625	49.761	13.500	720x288	prog	--	--	EIA-861B
726	15.625	50.000	27.000	1440x576	Int	+	+	EIA-861B
727	56.250	50.000	148.500	1920x1080	Prog	+	+	EIA-861B
728	26.973	23.976	74.176	1920x1080	Prog	+	+	EIA-861B
729	27.000	24.000	74.250	1920x1080	Prog	+	+	EIA-861B
730	28.125	25.000	74.250	1920x1080	Prog	+	+	EIA-861B
731	33.716	29.970	74.175	1920x1080	Prog	+	+	EIA-861B
732	33.750	30.000	74.250	1920x1080	Prog	+	+	EIA-861B
733	15.625	50.000	54.000	2880x576	Int	--	--	EIA-861B
734	15.625	50.080	54.000	2880x288	Prog	--	--	EIA-861B
735	15.625	49.920	54.000	2880x288	Prog	--	--	EIA-861B
736	15.625	49.761	54.000	2880x288	Prog	--	--	EIA-861B
737	15.734	59.940	53.999	2880x480	Int	--	--	EIA-861B
738	15.750	60.000	54.054	2880x480	Int	--	--	EIA-861B
739	31.250	50.000	54.000	1440x576	Prog	--	+	EIA-861B
740	31.250	50.000	72.000	1920x1080	Int	+	--	EIA-861B
741	56.250	100.000	148.500	1920x1080	Int	+	+	EIA-861B
742	75.000	100.000	148.500	1280x720	Prog	+	+	EIA-861B
743	62.500	100.000	54.000	720x576	Prog	--	--	EIA-861B
744	31.250	100.000	27.000	1440x576	Int	--	--	EIA-861B
745	67.432	119.879	148.350	1920x1080	Int	+	+	EIA-861B
746	67.500	120.000	148.500	1920x1080	Int	+	+	EIA-861B
747	89.909	119.879	148.350	1280x720	Prog	+	+	EIA-861B
748	90.000	120.000	148.500	1280x720	Prog	+	+	EIA-861B
749	62.937	119.880	54.000	720x480	Prog	--	--	EIA-861B
750	63.000	120.000	54.054	720x480	Prog	--	--	EIA-861B
751	31.469	119.882	27.000	1440x480	Int	--	--	EIA-861B
752	31.500	120.000	27.027	1440x480	Int	--	--	EIA-861B
753	125.000	200.000	108.000	720x576	Prog	--	--	EIA-861B
754	62.500	200.000	54.000	1440x576	Int	--	--	EIA-861B
755	125.874	201.398	108.000	720x480	Prog	--	--	EIA-861B
756	126.000	201.600	108.108	720x480	Prog	--	--	EIA-861B
757	62.937	239.760	54.000	1440x480	Int	--	--	EIA-861B
758	63.000	240.000	54.054	1440x480	Int	--	--	EIA-861B

4) EIA-861B (HDMI)

No	H-freq (KHz)	V-freq (Hz)	Dot Clock (MHz)	Resolution (H x V)	Int/Prog	Sync polarity		Timing Data Name
						H	V	
801	31.469	59.941	25.175	640x480	Prog	--	--	HDMI(EIA-861B)
802	31.500	60.000	25.200	640x480	Prog	--	--	HDMI(EIA-861B)
803	31.469	59.941	27.000	720x480	Prog	--	--	HDMI(EIA-861B)
804	31.500	60.000	27.027	720x480	Prog	--	--	HDMI(EIA-861B)
805	44.955	59.940	74.176	1280x720	Prog	+	+	HDMI(EIA-861B)
806	45.000	60.000	74.250	1280x720	Prog	+	+	HDMI(EIA-861B)
807	37.500	50.000	74.250	1280x720	Prog	+	+	HDMI(EIA-861B)
808	33.716	59.940	74.175	1920x1080	Int	+	+	HDMI(EIA-861B)
809	33.750	60.000	74.250	1920X1080	Int	+	+	HDMI(EIA-861B)
810	28.125	50.000	74.250	1920x1080	Int	+	+	HDMI(EIA-861B)
811	15.734	59.939	13.500	720x480	Int	--	--	HDMI(EIA-861B)
812	15.750	60.000	13.514	720x480	Int	--	--	HDMI(EIA-861B)
813	15.734	59.825	13.500	720x240	Prog	--	--	HDMI(EIA-861B)
814	15.750	60.115	13.514	720x240	Prog	--	--	HDMI(EIA-861B)
815	15.734	59.825	27.629	1440x240	Prog	--	--	HDMI(EIA-861B)
816	15.750	60.115	27.657	1440x240	Prog	--	--	HDMI(EIA-861B)
817	31.469	59.941	54.000	1440x480	Prog	--	--	HDMI(EIA-861B)
818	31.500	60.000	54.054	1440x480	Prog	--	--	HDMI(EIA-861B)
819	67.432	59.94	148.35	1920x1080	Prog	+	+	HDMI(EIA-861B)
820	67.500	60.000	148.50	1920x1080	Prog	+	+	HDMI(EIA-861B)
821	31.250	50.000	27.000	720x576	Prog	--	--	HDMI(EIA-861B)
822	15.625	50.000	13.500	720x576	Int	--	--	HDMI(EIA-861B)
823	15.625	50.080	13.500	720x288	Prog	--	--	HDMI(EIA-861B)
824	15.625	49.920	13.500	720x288	Prog	--	--	HDMI(EIA-861B)
825	15.625	49.761	13.500	720x288	Prog	--	--	HDMI(EIA-861B)
826	15.625	50.000	27.000	1440x576	Prog	+	+	HDMI(EIA-861B)
827	56.250	50.000	148.50	1920x1080	Prog	+	+	HDMI(EIA-861B)
828	26.973	23.976	74.176	1920x1080	Prog	+	+	HDMI(EIA-861B)
829	27.000	24.000	74.250	1920x1080	Prog	+	+	HDMI(EIA-861B)
830	28.125	25.000	74.250	1920x1080	Prog	+	+	HDMI(EIA-861B)
831	33.716	29.970	74.175	1920x1080	Prog	+	+	HDMI(EIA-861B)
832	33.750	30.000	74.250	1920x1080	Prog	+	+	HDMI(EIA-861B)
833	15.625	50.000	54.000	2880x576	Int	--	--	HDMI(EIA-861B)
834	15.625	50.080	54.000	2880x288	Prog	--	--	HDMI(EIA-861B)
835	15.625	49.920	54.000	2880x288	Prog	--	--	HDMI(EIA-861B)
836	15.625	49.761	54.000	2880x288	Prog	--	--	HDMI(EIA-861B)
837	15.734	59.939	53.999	2880x480	Int	+	+	HDMI(EIA-861B)
838	15.750	60.000	54.054	2880x480	Int	+	+	HDMI(EIA-861B)
839	31.250	50.000	54.000	1440x576	Prog	+	+	HDMI(EIA-861B)

5) EIA-861D (HDMI)

No	H-freq (KHz)	V-freq (Hz)	Dot Clock (MHz)	Resolution (H x V)	Int/Prog	Sync polarity		Timing Data Name
						H	V	
840	31.250	50.000	72.000	1920x1080	Int	+	+	HDMI(EIA-861D)
841	56.250	100.00	148.500	1920x1080	Int	+	+	HDMI(EIA-861D)
842	75.000	100.00	148.500	1280x720	Prog	+	+	HDMI(EIA-861D)
843	62.500	100.00	54.000	720x576	Prog	--	--	HDMI(EIA-861D)
844	31.250	100.00	27.000	1440x576	Int	--	--	HDMI(EIA-861D)
845	67.432	119.88	148.352	1920x1080	Int	+	+	HDMI(EIA-861D)
846	67.500	120.00	148.500	1920x1080	Int	+	+	HDMI(EIA-861D)
847	89.909	119.88	148.352	1280x720	Prog	+	+	HDMI(EIA-861D)
848	89.909	120.00	148.500	1280X720	Prog	+	+	HDMI(EIA-861D)
849	62.937	119.88	54.000	720x480	Prog	--	--	HDMI(EIA-861D)
850	62.937	120.00	54.000	720x480	Prog	--	--	HDMI(EIA-861D)
851	31.500	119.88	27.027	1440x480	Int	--	--	HDMI(EIA-861D)
852	31.500	120.00	27.027	1440x480	Int	--	--	HDMI(EIA-861D)
853	125.00	200.00	108.00	720x576	Prog	--	--	HDMI(EIA-861D)
854	62.500	200.00	54.000	1440x576	Int	--	--	HDMI(EIA-861D)
855	125.874	201.398	108.000	720x480	Prog	--	--	HDMI(EIA-861D)
856	126.000	201.600	108.108	720x480	Prog	--	--	HDMI(EIA-861D)
857	62.937	239.76	54.00	1440x480	Int	--	--	HDMI(EIA-861D)
858	63.000	240.000	54.054	1440x480	Int	--	--	HDMI(EIA-861D)
859	18.000	24.000	59.400	1280x720	Prog	+	+	HDMI(EIA-861E)
860	18.750	25.000	74.250	1280x720	Prog	+	+	HDMI(EIA-861E)
861	22.500	30.000	74.250	1280x720	Prog	+	+	HDMI(EIA-861E)
862	-	-	-	-	-	-	-	-
863	36.000	24.000	118.800	1280x1470	Prog	+	+	Frame packing
864	45.000	30.000	148.500	1280x1470	Prog	+	+	Frame packing
865	89.910	59.940	148.351	1280x1470	Prog	+	+	Frame packing
866	90.000	60.000	148.500	1280x1470	Prog	+	+	Frame packing
867	75.000	50.000	148.500	1280x1470	Prog	+	+	Frame packing
868	67.716	30.096	148.975	1920x2228	Prog	+	+	Frame packing
869	67.500	30.000	148.500	1920x2228	Prog	+	+	Frame packing
870	56.250	25.000	148.500	1920x2228	Prog	+	+	Frame packing
871	53.946	23.976	148.351	1920x2205	Prog	+	+	Frame packing
872	54.000	24.000	148.500	1920x2205	Prog	+	+	Frame packing
873	67.432	29.970	148.350	1920x2205	Prog	+	+	Frame packing
874	67.500	30.000	148.500	1920x2205	Prog	+	+	Frame packing
875	44.955	59.940	74.176	1280x720	Prog	+	+	Top and Bottom
876	45.000	60.000	74.250	1280x720	Prog	+	+	Top and Bottom
877	37.500	50.000	74.250	1280x720	Prog	+	+	Top and Bottom
878	26.973	23.976	74.176	1920x1080	Prog	+	+	Top and Bottom
879	27.000	24.000	74.250	1920x1080	Prog	+	+	Top and Bottom
880	33.716	29.970	74.175	1920x1080	Prog	+	+	Top and Bottom
881	33.750	30.000	74.250	1920x1080	Prog	+	+	Top and Bottom
882	67.432	59.940	148.350	1920x1080	Prog	+	+	Top and Bottom
883	67.500	60.000	148.500	1920x1080	Prog	+	+	Top and Bottom
884	56.250	50.000	148.500	1920x1080	Prog	+	+	Top and Bottom
885	44.955	59.940	74.176	1280x720	Prog	+	+	Side by Side(Half)
886	45.000	60.000	74.250	1280x720	Prog	+	+	Side by Side(Half)
887	37.500	50.000	74.250	1280x720	Prog	+	+	Side by Side(Half)
888	67.432	59.940	148.350	1920x1080	Prog	+	+	Side by Side(Half)
889	67.500	60.000	148.500	1920x1080	Prog	+	+	Side by Side(Half)
890	56.250	50.000	148.500	1920x1080	Prog	+	+	Side by Side(Half)
891	26.973	23.976	74.176	1920x1080	Prog	+	+	Side by Side(Half)
892	27.000	24.000	74.250	1920x1080	Prog	+	+	Side by Side(Half)
893	67.500	60.000	148.500	1920x2206	Int	+	+	Field alternative
894	56.250	50.000	148.500	1920x2206	Int	+	+	Field alternative
895	53.946	23.976	148.351	1920x2160	Prog	+	+	Line alternative
896	54.000	24.000	148.500	1920x2160	Prog	+	+	Line alternative
897	44.955	59.940	148.351	2560x720	Prog	+	+	Side by Side(Full)
898	45.000	60.000	148.500	2560x720	Prog	+	+	Side by Side(Full)
899	37.500	50.000	148.500	2560x720	Prog	+	+	Side by Side(Full)

6) SMPTE

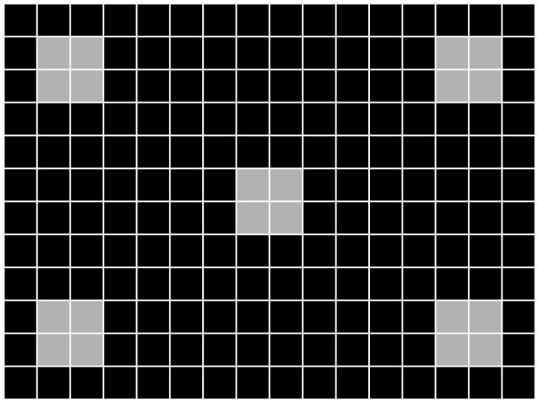
No	H-freq (KHz)	V-freq (Hz)	Dot Clock (MHz)	Resolution (H x V)	Int/Prog	Sync polarity		Timing Data Name
						H	V	
901	15.734	59.939	13.500	720x484	Int	--	--	ITU-R-BT601
902	15.625	50.000	13.500	720x576	Int	--	--	ITU-R-BT601
903	31.468	59.939	27.000	720x483	Prog	--	--	SMPTE-293M
904	31.469	59.941	27.000	720x483	Prog	--	--	SMPTE-293M
905	31.250	50.000	27.000	720x576	Prog	--	--	ITU-R-BT1358
906	45.000	60.000	74.250	1280x720	Prog	Tri	Tri	SMPTE-296M
907	44.955	59.940	74.176	1280x720	Prog	Tri	Tri	SMPTE-296M
908	37.500	50.000	74.250	1280x720	Prog	Tri	Tri	SMPTE-296M
909	22.500	30.000	74.250	1280x720	Prog	Tri	Tri	SMPTE-296M
910	22.477	29.969	74.174	1280x720	Prog	Tri	Tri	SMPTE-296M
911	18.750	25.000	74.250	1280x720	Prog	Tri	Tri	SMPTE-296M
912	18.000	24.000	74.250	1280x720	Prog	Tri	Tri	SMPTE-296M
913	17.982	23.976	74.176	1280x720	Prog	Tri	Tri	SMPTE-296M
914	33.750	60.000	74.250	1920x1080i	Int	Tri	Tri	SMPTE-274M
915	33.716	59.940	74.175	1920x1080	Int	Tri	Tri	SMPTE-274M
916	28.125	50.000	74.250	1920x1080	Int	Tri	Tri	SMPTE-274M
917	33.750	60.000	74.250	1920x1035	Int	Tri	Tri	SMPTE-240M
918	33.716	59.940	74.175	1920x1035	Int	Tri	Tri	SMPTE-240M
919	67.500	60.000	148.500	1920x1080	Prog	Tri	Tri	SMPTE-274M
920	67.432	59.940	148.350	1920x1080	Prog	Tri	Tri	SMPTE-274M
921	56.250	50.000	148.500	1920x1080	Prog	Tri	Tri	SMPTE-274M
922	33.750	30.000	74.250	1920x1080	Prog	Tri	Tri	SMPTE-274M
923	33.716	29.970	74.175	1920x1080	Prog	Tri	Tri	SMPTE-274M
924	28.125	25.000	74.250	1920x1080	Prog	Tri	Tri	SMPTE-274M
925	27.000	24.000	74.250	1920x1080	Prog	Tri	Tri	SMPTE-274M
926	26.973	23.976	74.176	1920x1080	Prog	Tri	Tri	SMPTE-274M
927	-							
928	-							
929	-							
930	-							
931	15.734	59.939	13.500	720x487	Int	--	--	SDI ITU-R-BT601
932	15.625	50.000	13.500	720x576	Int	--	--	SDI ITU-R-BT656
933	45.000	60.000	74.250	1280x720	Prog	+	+	HD-SDI CEA-861
934	37.500	50.000	74.250	1280x720	Prog	+	+	HD-SDI CEA-861
935	33.750	60.000	74.250	1920x1080	Int	+	+	HD-SDI CEA-861
936	28.125	50.000	74.250	1920x1080	Int	+	+	HD-SDI CEA-861
937	67.500	60.000	148.500	1920x1080	Prog	+	+	3G-SDI CEA-861
938	56.250	50.000	148.500	1920x1080	Prog	+	+	3G-SDI CEA-861
939	26.973	23.976	74.176	1920x1080	Prog	+	+	HD-SDI CEA-861
940	27.000	24.000	74.250	1920x1080	Prog	+	+	HD-SDI CEA-861
941	28.125	25.000	74.250	1920x1080	Prog	+	+	HD-SDI CEA-861
942	33.716	29.970	74.175	1920x1080	Prog	+	+	HD-SDI CEA-861
943	33.750	30.000	74.250	1920x1080	Prog	+	+	HD-SDI CEA-861

7) TV

No	H-freq (KHz)	V-freq (Hz)	Dot Clock (MHz)	Resolution (H x V)	Int/Prog	Sync polarity		Timing Data Name
						H	V	
951	15.734	59.939	13.500	710x484	Int	--	--	NTSC-M
952	15.734	59.939	13.500	710x484	Int	--	--	NTSC-J
953	15.734	59.939	13.500	710x484	Int	--	--	NTSC4.43
954	15.625	50.000	13.500	702x576	Int	--	--	PAL
955	15.734	59.939	13.500	710X484	Int	--	--	PAL-M
956	15.625	50.000	13.500	702X576	Int	--	--	PAL-N
957	15.734	59.939	13.500	710X484	Int	--	--	PAL-60
958	15.625	50.000	13.500	702x576	Int	--	--	SECAM

6.2 Pattern Edit List Sample

Default Pattern 501



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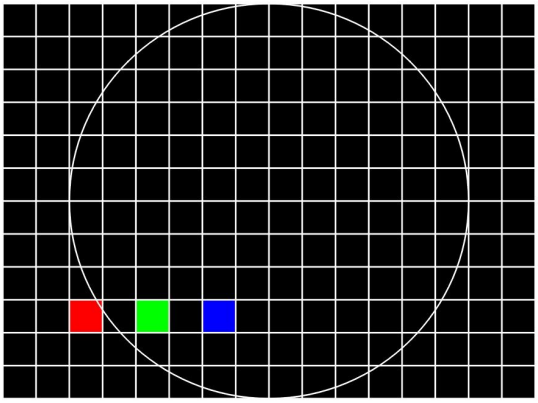
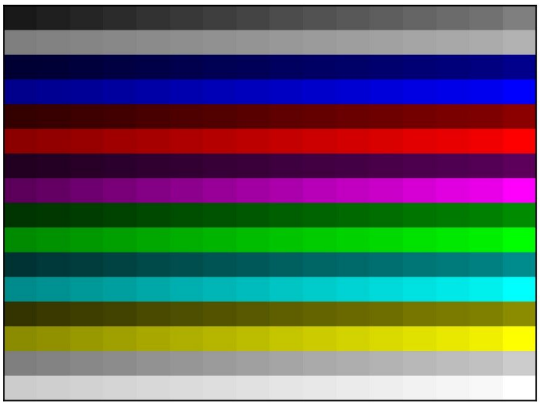
 1. H_Line Divide/Space        (0-64): 16
 2. V_Line Divide/Space        (0-64): 12
 3. Cross_Hatch/Dot/Line       (0-18):  2
 4. H_Width                    (0-64):  0
 5. V_Width                    (0-64):  0
 6. Dot Pattern          (On=1,Off=0):  0
 7. Gray step/Line(ea),EDID  (0-255):  0
 8. Side Line Box=1/Char. On=2(0-2):  1
 9. Circle Ratio       (4:3=0,16:9=1):  0
10. Circle Width       (0 - V_Line/2):  0
11. Circle                     (0-14):  0
12. Circle_1    (r=0-100% of V_Line):  0
13. Circle_2    (r=0-100% of V_Line):  0
14. Center Marker/Slash/Box    (0-15):  0
15. Character Pattern Style    (0-18):  0
16. Character Font Size         (0-7):  0
17. Character Font           (28-127):  0
18. Character Font H_Space    (0-100):  0
19. Character Font V_Space    (0-100):  0
20. Color Box H_Start         (0-100%):  0
21. Color Box V_Start         (0-100%):  0
22. Color Box R/Low_P         (0-100%):  0
23. Color Box G(Y)_Level      (0-100%):  0
24. Color Box B/Dir           (0-100%):  0
25. Color_Box_H_Size          (0-100%):  0
26. Color_Box_V_Size          (0-100%):  0
27. Color Pattern               (0-33):  0
28. Diamond V_Size            (0-100%):  0
29. H_Line_2                  (0-100%):  0
30. V_Line_2                  (0-100%):  0
31. Box                 (Full=1,Non=0):  0
32. Character Box H_Start     (0-100%):  0
33. Character Box V_Start     (0-100%):  0
34. Character Box H_Size      (0-100%):  0
35. Character Box V_Size      (0-100%):  0
36. White_Gray High Level     (0-100%):  0
37. White_Gray Low Level      (0-100%):  0
38. Divide(H&HL)               (0-255):  0
39. Divide(V&HR)               (0-255):  0
40. Base_R__Level           (0%-100%):  0
41. Base_G__Level           (0%-100%):  0
42. Base_B__Level           (0%-100%):  0
43. Character_R_Level       (0%-100%):100
44. Character_G_Level       (0%-100%):100
45. Character_B_Level       (0%-100%):100
46. OSD_R_Level             (0%-100%):100
47. OSD_G_Level             (0%-100%):100
48. OSD_B_Level             (0%-100%):100
49. Reverse On Time        (0-999)/Vf:  0
50. Reverse Off Time       (0-999)/Vf:  0
51. Auto Bright Up&Down        (0-12):  0
52. OSD Display                 (0-6):  0
53. Character Moving            (0-8):  0
54. OSD Moving                  (0-8):  0
55. Color Moving               (0-12):  0
56. Graphic Moving              (0-8):  0
57. Moving Speed Fast          (0-20):  1
58. Moving Speed Slow          (0-99):  0
59. Flicker On(CH,OSD,CL,GP)   (0-15):  0
60. Flicker On Time        (0-999)/Vf:  0
61. Flicker Off Time       (0-999)/Vf:  0
62. Gamma Correction        (0-30)/10: 10
63. Video Level             (0-999mV):  0
64. Add Pattern Number        (1-999):  0
65. Add Pattern Number        (1-999):  0
```

Default Pattern 502



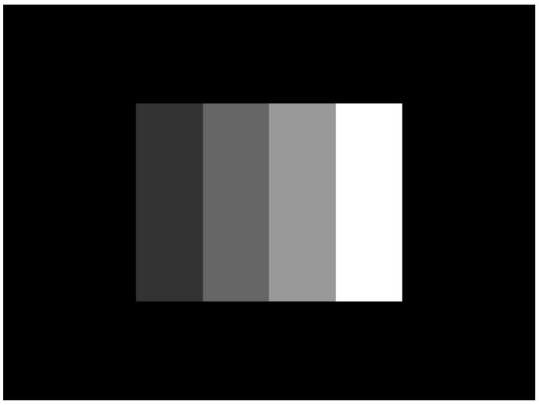
1. H_Line Divide/Space (0-64): 16
2. V_Line Divide/Space (0-64): 12
3. Cross_Hatch/Dot/Line (0-18): 1
4. H_Width (0-64): 0
5. V_Width (0-64): 0
6. Dot Pattern (On=1,Off=0): 0
7. Gray step/Line(ea),EDID (0-255): 0
8. Side Line Box=1/Char. On=2(0-2): 1
9. Circle Ratio (4:3=0,16:9=1): 0
10. Circle Width (0 - V_Line/2): 1
11. Circle (0-14): 1
12. Circle_1 (r=0-100% of V_Line): 0
13. Circle_2 (r=0-100% of V_Line): 0
14. Center Marker/Slash/Box (0-15): 0
15. Character Pattern Style (0-18): 0
16. Character Font Size (0-7): 0
17. Character Font (28-127): 0
18. Character Font H_Space (0-100): 0
19. Character Font V_Space (0-100): 0
20. Color Box H_Start (0-100%): 0
21. Color Box V_Start (0-100%): 0
22. Color Box R/Low_P (0-100%): 0
23. Color Box G(Y)_Level (0-100%): 0
24. Color Box B/Dir (0-100%): 0
25. Color_Box_H_Size (0-100%): 0
26. Color_Box_V_Size (0-100%): 0
27. Color Pattern (0-33): 21
28. Diamond V_Size (0-100%): 0
29. H_Line_2 (0-100%): 0
30. V_Line_2 (0-100%): 0
31. Box (Full=1,Non=0): 0
32. Character Box H_Start (0-100%): 0
33. Character Box V_Start (0-100%): 0
34. Character Box H_Size (0-100%): 0
35. Character Box V_Size (0-100%): 0
36. White_Gray High Level (0-100%): 0
37. White_Gray Low Level (0-100%): 0
38. Divide(H&HL) (0-255): 0
39. Divide(V&HR) (0-255): 0
40. Base_R__Level (0%-100%): 0
41. Base_G__Level (0%-100%): 0
42. Base_B__Level (0%-100%): 0
43. Character_R_Level (0%-100%):100
44. Character_G_Level (0%-100%):100
45. Character_B_Level (0%-100%):100
46. OSD_R_Level (0%-100%):100
47. OSD_G_Level (0%-100%):100
48. OSD_B_Level (0%-100%):100
49. Reverse On Time (0-999)/Vf: 0
50. Reverse Off Time (0-999)/Vf: 0
51. Auto Bright Up&Down (0-12): 0
52. OSD Display (0-6): 0
53. Character Moving (0-8): 0
54. OSD Moving (0-8): 0
55. Color Moving (0-12): 0
56. Graphic Moving (0-8): 0
57. Moving Speed Fast (0-20): 1
58. Moving Speed Slow (0-99): 0
59. Flicker On(CH,OSD,CL,GP) (0-15): 0
60. Flicker On Time (0-999)/Vf: 0
61. Flicker Off Time (0-999)/Vf: 0
62. Gamma Correction (0-30)/10: 10
63. Video Level (0-999mV): 0
64. Add Pattern Number (1-999): 0
65. Add Pattern Number (1-999): 0

Default Pattern 554



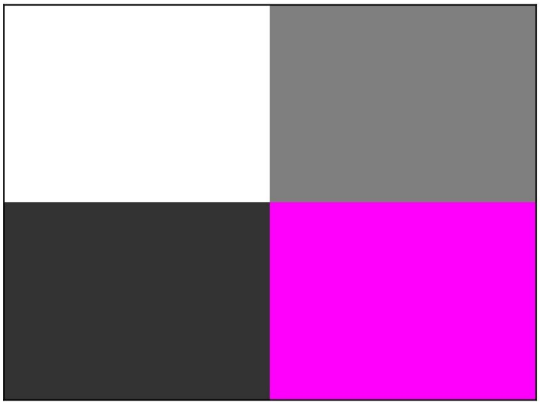
1. H_Line Divide/Space (0-64): 0
2. V_Line Divide/Space (0-64): 0
3. Cross_Hatch/Dot/Line (0-18): 0
4. H_Width (0-64): 0
5. V_Width (0-64): 0
6. Dot Pattern (On=1,Off=0): 0
7. Gray step/Line(ea),EDID (0-255): 0
8. Side Line Box=1/Char. On=2(0-2): 0
9. Circle Ratio (4:3=0,16:9=1): 0
10. Circle Width (0 - V_Line/2): 0
11. Circle (0-14): 0
12. Circle_1 (r=0-100% of V_Line): 0
13. Circle_2 (r=0-100% of V_Line): 0
14. Center Marker/Slash/Box (0-15): 0
15. Character Pattern Style (0-18): 0
16. Character Font Size (0-7): 0
17. Character Font (28-127): 0
18. Character Font H_Space (0-100): 0
19. Character Font V_Space (0-100): 0
20. Color Box H_Start (0-100%): 0
21. Color Box V_Start (0-100%): 0
22. Color Box R/Low_P (0-100%): 0
23. Color Box G(Y)_Level (0-100%): 0
24. Color Box B/Dir (0-100%): 0
25. Color_Box_H_Size (0-100%): 0
26. Color_Box_V_Size (0-100%): 0
27. Color Pattern (0-33): 18
28. Diamond V_Size (0-100%): 0
29. H_Line_2 (0-100%): 0
30. V_Line_2 (0-100%): 0
31. Box (Full=1,Non=0): 0
32. Character Box H_Start (0-100%): 0
33. Character Box V_Start (0-100%): 0
34. Character Box H_Size (0-100%): 0
35. Character Box V_Size (0-100%): 0
36. White_Gray High Level (0-100%): 0
37. White_Gray Low Level (0-100%): 0
38. Divide(H&HL) (0-255):128
39. Divide(V&HR) (0-255): 16
40. Base_R__Level (0%-100%): 0
41. Base_G__Level (0%-100%): 0
42. Base_B__Level (0%-100%): 0
43. Character_R_Level (0%-100%):100
44. Character_G_Level (0%-100%):100
45. Character_B_Level (0%-100%):100
46. OSD_R_Level (0%-100%):100
47. OSD_G_Level (0%-100%):100
48. OSD_B_Level (0%-100%):100
49. Reverse On Time (0-999)/Vf: 0
50. Reverse Off Time (0-999)/Vf: 0
51. Auto Bright Up&Down (0-12): 0
52. OSD Display (0-6): 0
53. Character Moving (0-8): 0
54. OSD Moving (0-8): 0
55. Color Moving (0-12): 0
56. Graphic Moving (0-8): 0
57. Moving Speed Fast (0-20): 1
58. Moving Speed Slow (0-99): 0
59. Flicker On(CH,OSD,CL,GP) (0-15): 0
60. Flicker On Time (0-999)/Vf: 0
61. Flicker Off Time (0-999)/Vf: 0
62. Gamma Correction (0-30)/10: 10
63. Video Level (0-999mV): 0
64. Add Pattern Number (1-999): 0
65. Add Pattern Number (1-999): 0

Default Pattern 604



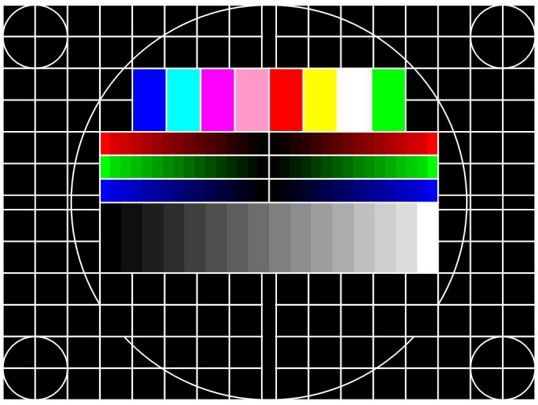
1. Color Pattern (0-22): 3
2. Color_Box_H_Size (0-100%): 50
3. Color_Box_V_Size (0-100%): 50
4. Color_H_Divide/V_Color (0-20): 4
5. Color_V_Divide/H_Color (0-20): 0
6. Color Size/Gray Lev_1 (0-100%): 40
7. Color Size/Gray Lev_2 (0-100%): 60
8. Color Size/Gray Lev_3 (0-100%): 80
9. Color Size/Gray Lev_4 (0-100%):100
10. Color Size/Gray Lev_5 (0-100%): 0
11. Color Size/Gray Lev_6 (0-100%): 0
12. Color Size/Gray Lev_7 (0-100%): 0
13. Color Size/Gray Lev_8 (0-100%): 0
14. 8 Color Gray Step/Dir (0-32)*8: 0
15. Color Level_1/R_1 (0-100%): 0
16. Color Level_2/G_1 (0-100%): 0
17. Color Level_3/B_1 (0-100%): 0
18. Color Level_4/R_2 (0-100%): 0
19. Color Level_5/G_2 (0-100%): 0
20. Color Level_6/B_2 (0-100%): 0
21. Color Level_7/R_3 (0-100%): 0
22. Color Level_8/G_3 (0-100%): 0
23. Color Level_9/B_3 (0-100%): 0
24. Color R_4 (0-100%): 0
25. Color G_4 (0-100%): 0
26. Color B_4 (0-100%): 0
27. Color1/ R_5 (0-100%): 0
28. Color2/ G_5 (0-100%): 0
29. Color3/ B_5 (0-100%): 0
30. Color1/ R_6 (0-100%): 0
31. Color2/ G_6 (0-100%): 0
32. Color3/ B_6 (0-100%): 0
33. Color1/ R_7 (0-100%): 0
34. Color2/ G_7 (0-100%): 0
35. Color3/ B_7 (0-100%): 0
36. Color R_8(R) (0-100%): 0
37. Color G_8(G) (0-100%): 0
38. Color B_8(B) (0-100%): 0
39. COLOR(R,G,B)/Step (0-255): 0
40. Base_R__Level (0%-100%): 0
41. Base_G__Level (0%-100%): 0
42. Base_B__Level (0%-100%): 0
43. Character_R_Level (0%-100%):100
44. Character_G_Level (0%-100%):100
45. Character_B_Level (0%-100%):100
46. OSD_R_Level (0%-100%):100
47. OSD_G_Level (0%-100%):100
48. OSD_B_Level (0%-100%):100
49. Reverse On Time (0-999)/Vf: 0
50. Reverse Off Time (0-999)/Vf: 0
51. Auto Bright Up&Down (0-12): 0
52. OSD Display (0-6): 0
53. Character Moving (0-8): 0
54. OSD Moving (0-8): 0
55. Color Moving (0-12): 0
56. Graphic Moving (0-8): 0
57. Moving Speed Fast (0-20): 1
58. Moving Speed Slow (0-99): 0
59. Flicker On(CH,OSD,CL,GP) (0-15): 0
60. Flicker On Time (0-999)/Vf: 0
61. Flicker Off Time (0-999)/Vf: 0
62. Gamma Correction (0-30)/10: 10
63. Video Level (0-999mV): 0
64. Add Pattern Number (1-999): 0
65. Add Pattern Number (1-999): 0

Default Pattern 606



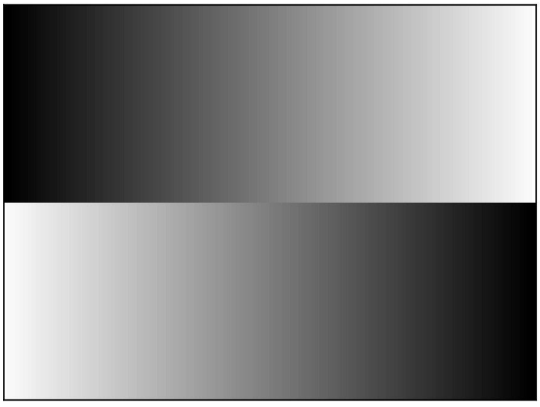
1. Color Pattern	(0-22):	6
2. Color_Box_H_Size	(0-100%):	0
3. Color_Box_V_Size	(0-100%):	0
4. Color_H_Divide/V_Color	(0-20):	2
5. Color_V_Divide/H_Color	(0-20):	2
6. Color Size/Gray Lev_1	(0-100%)	0
7. Color Size/Gray Lev_2	(0-100%)	0
8. Color Size/Gray Lev_3	(0-100%)	0
9. Color Size/Gray Lev_4	(0-100%)	0
10. Color Size/Gray Lev_5	(0-100%)	0
11. Color Size/Gray Lev_6	(0-100%)	0
12. Color Size/Gray Lev_7	(0-100%)	0
13. Color Size/Gray Lev_8	(0-100%)	0
14. 8 Color Gray Step/Dir	(0-32)*8:	0
15. Color Level_1/R_1	(0-100%):	93
16. Color Level_2/G_1	(0-100%):	93
17. Color Level_3/B_1	(0-100%):	93
18. Color Level_4/R_2	(0-100%):	50
19. Color Level_5/G_2	(0-100%):	50
20. Color Level_6/B_2	(0-100%):	50
21. Color Level_7/R_3	(0-100%):	29
22. Color Level_8/G_3	(0-100%):	29
23. Color Level_9/B_3	(0-100%):	29
24. Color R_4	(0-100%):	100
25. Color G_4	(0-100%):	0
26. Color B_4	(0-100%):	100
27. Color1/ R_5	(0-100%):	0
28. Color2/ G_5	(0-100%):	0
29. Color3/ B_5	(0-100%):	0
30. Color1/ R_6	(0-100%):	0
31. Color2/ G_6	(0-100%):	0
32. Color3/ B_6	(0-100%):	0
33. Color1/ R_7	(0-100%):	0
34. Color2/ G_7	(0-100%):	0
35. Color3/ B_7	(0-100%):	0
36. Color R_8(R)	(0-100%):	0
37. Color G_8(G)	(0-100%):	0
38. Color B_8(B)	(0-100%):	0
39. COLOR(R,G,B)/Step	(0-255):	0
40. Base_R__Level	(0%-100%):	0
41. Base_G__Level	(0%-100%):	0
42. Base_B__Level	(0%-100%):	0
43. Character_R_Level	(0%-100%):	100
44. Character_G_Level	(0%-100%):	100
45. Character_B_Level	(0%-100%):	100
46. OSD_R_Level	(0%-100%):	100
47. OSD_G_Level	(0%-100%):	100
48. OSD_B_Level	(0%-100%):	100
49. Reverse On Time	(0-999)/Vf:	0
50. Reverse Off Time	(0-999)/Vf:	0
51. Auto Bright Up&Down	(0-12):	0
52. OSD Display	(0-6):	0
53. Character Moving	(0-8):	0
54. OSD Moving	(0-8):	0
55. Color Moving	(0-12):	0
56. Graphic Moving	(0-8):	0
57. Moving Speed Fast	(0-20):	1
58. Moving Speed Slow	(0-99):	0
59. Flicker On(CH,OSD,CL,GP)	(0-15):	0
60. Flicker On Time	(0-999)/Vf:	0
61. Flicker Off Time	(0-999)/Vf:	0
62. Gamma Correction	(0-30)/10:	10
63. Video Level	(0-999mV):	0
64. Add Pattern Number	(1-999):	0
65. Add Pattern Number	(1-999):	0

Default Pattern 622



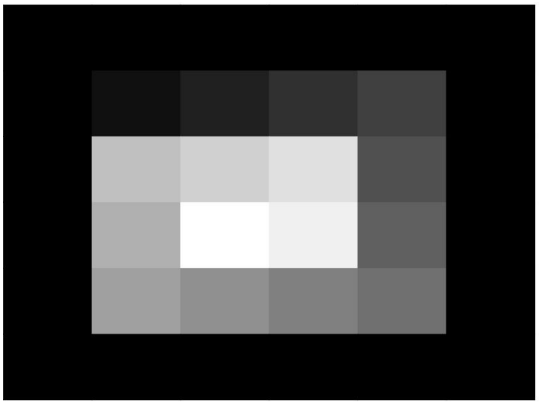
1. Color Pattern (0-22): 17
2. Color_Box_H_Size (0-100%): 0
3. Color_Box_V_Size (0-100%): 0
4. Color_H_Divide/V_Color (0-20): 0
5. Color_V_Divide/H_Color (0-20): 0
6. Color Size/Gray Lev_1 (0-100%) 0
7. Color Size/Gray Lev_2 (0-100%) 0
8. Color Size/Gray Lev_3 (0-100%) 0
9. Color Size/Gray Lev_4 (0-100%) 0
10. Color Size/Gray Lev_5 (0-100%) 0
11. Color Size/Gray Lev_6 (0-100%) 0
12. Color Size/Gray Lev_7 (0-100%) 0
13. Color Size/Gray Lev_8 (0-100%) 0
14. 8 Color Gray Step/Dir (0-32)*8: 0
15. Color Level_1/R_1 (0-100%): 0
16. Color Level_2/G_1 (0-100%): 0
17. Color Level_3/B_1 (0-100%):100
18. Color Level_4/R_2 (0-100%): 0
19. Color Level_5/G_2 (0-100%):100
20. Color Level_6/B_2 (0-100%):100
21. Color Level_7/R_3 (0-100%): 50
22. Color Level_8/G_3 (0-100%): 0
23. Color Level_9/B_3 (0-100%): 50
24. Color R_4 (0-100%):100
25. Color G_4 (0-100%): 0
26. Color B_4 (0-100%):100
27. Color1/ R_5 (0-100%):100
28. Color2/ G_5 (0-100%): 0
29. Color3/ B_5 (0-100%): 0
30. Color1/ R_6 (0-100%): 50
31. Color2/ G_6 (0-100%): 50
32. Color3/ B_6 (0-100%): 0
33. Color1/ R_7 (0-100%):100
34. Color2/ G_7 (0-100%):100
35. Color3/ B_7 (0-100%): 0
36. Color R_8(R) (0-100%): 0
37. Color G_8(G) (0-100%):100
38. Color B_8(B) (0-100%): 0
39. COLOR(R,G,B)/Step (0-255): 16
40. Base_R__Level (0%-100%): 0
41. Base_G__Level (0%-100%): 0
42. Base_B__Level (0%-100%): 0
43. Character_R_Level (0%-100%):100
44. Character_G_Level (0%-100%):100
45. Character_B_Level (0%-100%):100
46. OSD_R_Level (0%-100%):100
47. OSD_G_Level (0%-100%):100
48. OSD_B_Level (0%-100%):100
49. Reverse On Time (0-999)/Vf: 0
50. Reverse Off Time (0-999)/Vf: 0
51. Auto Bright Up&Down (0-12): 0
52. OSD Display (0-6): 0
53. Character Moving (0-8): 0
54. OSD Moving (0-8): 0
55. Color Moving (0-12): 0
56. Graphic Moving (0-8): 0
57. Moving Speed Fast (0-20): 1
58. Moving Speed Slow (0-99): 0
59. Flicker On(CH,OSD,CL,GP) (0-15): 0
60. Flicker On Time (0-999)/Vf: 0
61. Flicker Off Time (0-999)/Vf: 0
62. Gamma Correction (0-30)/10: 10
63. Video Level (0-999mV): 0
64. Add Pattern Number (1-999): 0
65. Add Pattern Number (1-999): 0

Default Pattern 625



1. Color Pattern (0-22): 15
2. Color_Box_H_Size (0-100%): 0
3. Color_Box_V_Size (0-100%): 0
4. Color_H_Divide/V_Color (0-20): 7
5. Color_V_Divide/H_Color (0-20): 1
6. Color Size/Gray Lev_1 (0-100%) 0
7. Color Size/Gray Lev_2 (0-100%) 0
8. Color Size/Gray Lev_3 (0-100%) 0
9. Color Size/Gray Lev_4 (0-100%) 0
10. Color Size/Gray Lev_5 (0-100%) 0
11. Color Size/Gray Lev_6 (0-100%) 0
12. Color Size/Gray Lev_7 (0-100%) 0
13. Color Size/Gray Lev_8 (0-100%) 0
14. 8 Color Gray Step/Dir (0-32)*8: 0
15. Color Level_1/R_1 (0-100%): 0
16. Color Level_2/G_1 (0-100%): 0
17. Color Level_3/B_1 (0-100%): 0
18. Color Level_4/R_2 (0-100%): 0
19. Color Level_5/G_2 (0-100%): 0
20. Color Level_6/B_2 (0-100%): 0
21. Color Level_7/R_3 (0-100%): 0
22. Color Level_8/G_3 (0-100%): 0
23. Color Level_9/B_3 (0-100%): 0
24. Color R_4 (0-100%): 0
25. Color G_4 (0-100%): 0
26. Color B_4 (0-100%): 0
27. Color1/ R_5 (0-100%): 0
28. Color2/ G_5 (0-100%): 0
29. Color3/ B_5 (0-100%): 0
30. Color1/ R_6 (0-100%): 0
31. Color2/ G_6 (0-100%): 0
32. Color3/ B_6 (0-100%): 0
33. Color1/ R_7 (0-100%): 0
34. Color2/ G_7 (0-100%): 0
35. Color3/ B_7 (0-100%): 0
36. Color R_8(R) (0-100%): 0
37. Color G_8(G) (0-100%): 0
38. Color B_8(B) (0-100%): 0
39. COLOR(R,G,B)/Step (0-255): 0
40. Base_R__Level (0%-100%): 0
41. Base_G__Level (0%-100%): 0
42. Base_B__Level (0%-100%): 0
43. Character_R_Level (0%-100%):100
44. Character_G_Level (0%-100%):100
45. Character_B_Level (0%-100%):100
46. OSD_R_Level (0%-100%):100
47. OSD_G_Level (0%-100%):100
48. OSD_B_Level (0%-100%):100
49. Reverse On Time (0-999)/Vf: 0
50. Reverse Off Time (0-999)/Vf: 0
51. Auto Bright Up&Down (0-12): 0
52. OSD Display (0-6): 0
53. Character Moving (0-8): 0
54. OSD Moving (0-8): 0
55. Color Moving (0-12): 0
56. Graphic Moving (0-8): 0
57. Moving Speed Fast (0-20): 1
58. Moving Speed Slow (0-99): 0
59. Flicker On(CH,OSD,CL,GP) (0-15): 0
60. Flicker On Time (0-999)/Vf: 0
61. Flicker Off Time (0-999)/Vf: 0
62. Gamma Correction (0-30)/10: 10
63. Video Level (0-999mV): 0
64. Add Pattern Number (1-999): 0
65. Add Pattern Number (1-999): 0

Default Pattern 626

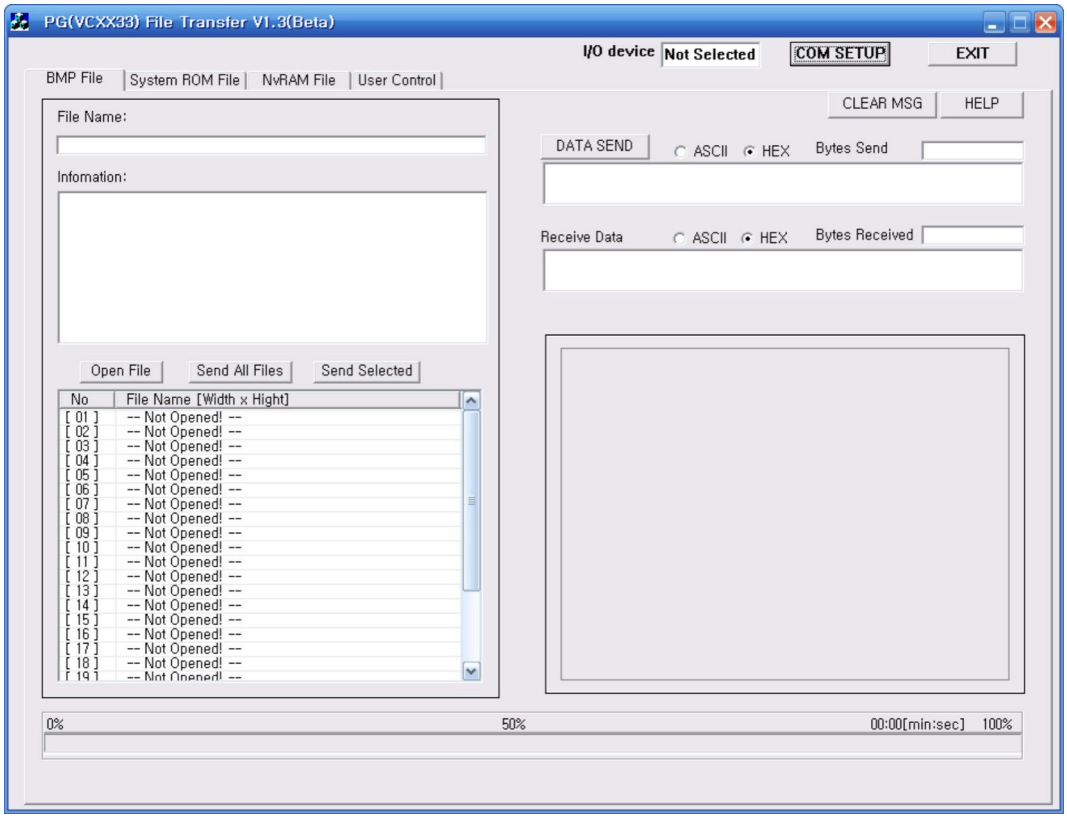


1. Color Pattern (0-22): 0
2. Color_Box_H_Size (0-100%): 0
3. Color_Box_V_Size (0-100%): 0
4. Color_H_Divide/V_Color (0-20): 0
5. Color_V_Divide/H_Color (0-20): 0
6. Color Size/Gray Lev_1 (0-100%) 0
7. Color Size/Gray Lev_2 (0-100%) 0
8. Color Size/Gray Lev_3 (0-100%) 0
9. Color Size/Gray Lev_4 (0-100%) 0
10. Color Size/Gray Lev_5 (0-100%) 0
11. Color Size/Gray Lev_6 (0-100%) 0
12. Color Size/Gray Lev_7 (0-100%) 0
13. Color Size/Gray Lev_8 (0-100%) 0
14. 8 Color Gray Step/Dir (0-32)*8: 0
15. Color Level_1/R_1 (0-100%): 0
16. Color Level_2/G_1 (0-100%): 0
17. Color Level_3/B_1 (0-100%): 0
18. Color Level_4/R_2 (0-100%): 0
19. Color Level_5/G_2 (0-100%): 0
20. Color Level_6/B_2 (0-100%): 0
21. Color Level_7/R_3 (0-100%): 0
22. Color Level_8/G_3 (0-100%): 0
23. Color Level_9/B_3 (0-100%): 0
24. Color R_4 (0-100%): 0
25. Color G_4 (0-100%): 0
26. Color B_4 (0-100%): 0
27. Color1/ R_5 (0-100%): 0
28. Color2/ G_5 (0-100%): 0
29. Color3/ B_5 (0-100%): 0
30. Color1/ R_6 (0-100%): 0
31. Color2/ G_6 (0-100%): 0
32. Color3/ B_6 (0-100%): 0
33. Color1/ R_7 (0-100%): 0
34. Color2/ G_7 (0-100%): 0
35. Color3/ B_7 (0-100%): 0
36. Color R_8(R) (0-100%): 0
37. Color G_8(G) (0-100%): 0
38. Color B_8(B) (0-100%): 0
39. COLOR(R,G,B)/Step (0-255): 0
40. Base_R__Level (0%-100%): 0
41. Base_G__Level (0%-100%): 0
42. Base_B__Level (0%-100%): 0
43. Character_R_Level (0%-100%):100
44. Character_G_Level (0%-100%):100
45. Character_B_Level (0%-100%):100
46. OSD_R_Level (0%-100%):100
47. OSD_G_Level (0%-100%):100
48. OSD_B_Level (0%-100%):100
49. Reverse On Time (0-999)/Vf: 0
50. Reverse Off Time (0-999)/Vf: 0
51. Auto Bright Up&Down (0-12): 0
52. OSD Display (0-6): 0
53. Character Moving (0-8): 0
54. OSD Moving (0-8): 0
55. Color Moving (0-12): 0
56. Graphic Moving (0-8): 0
57. Moving Speed Fast (0-20): 1
58. Moving Speed Slow (0-99): 0
59. Flicker On(CH,OSD,CL,GP) (0-15): 0
60. Flicker On Time (0-999)/Vf: 0
61. Flicker Off Time (0-999)/Vf: 0
62. Gamma Correction (0-30)/10: 10
63. Video Level (0-999mV): 0
64. Add Pattern Number (1-999): 0
65. Add Pattern Number (1-999): 0

6.3 PROGRAM, BMP Download and PC Edit

6.3.1 Initial Display

File Transfer initial display is given below.

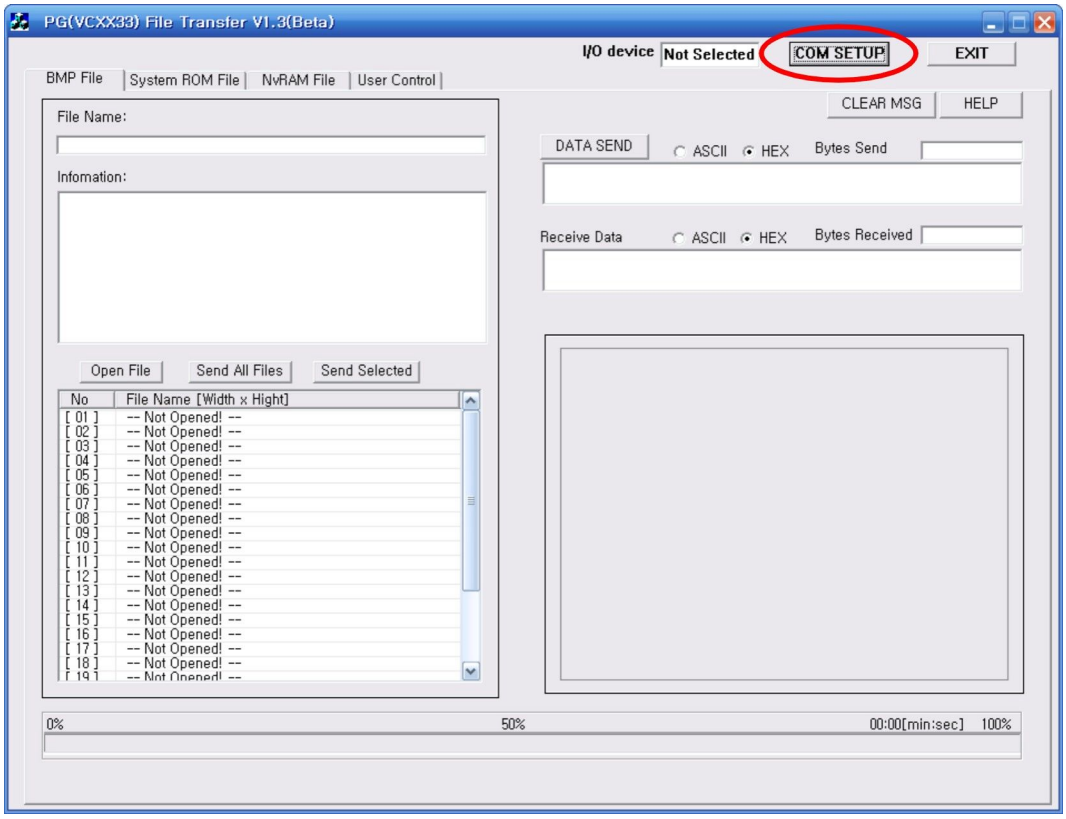


6.3.2 USB Connect

Push the “COM SETUP” button.

"COM SETUP" button located on right side top.

Which is shown red circle as shown below.



When the USB are connected, the message are shown like below picture.

If using USB connection, push the (Y) key.

When you use USB as Serial connection, push the "N" Button.

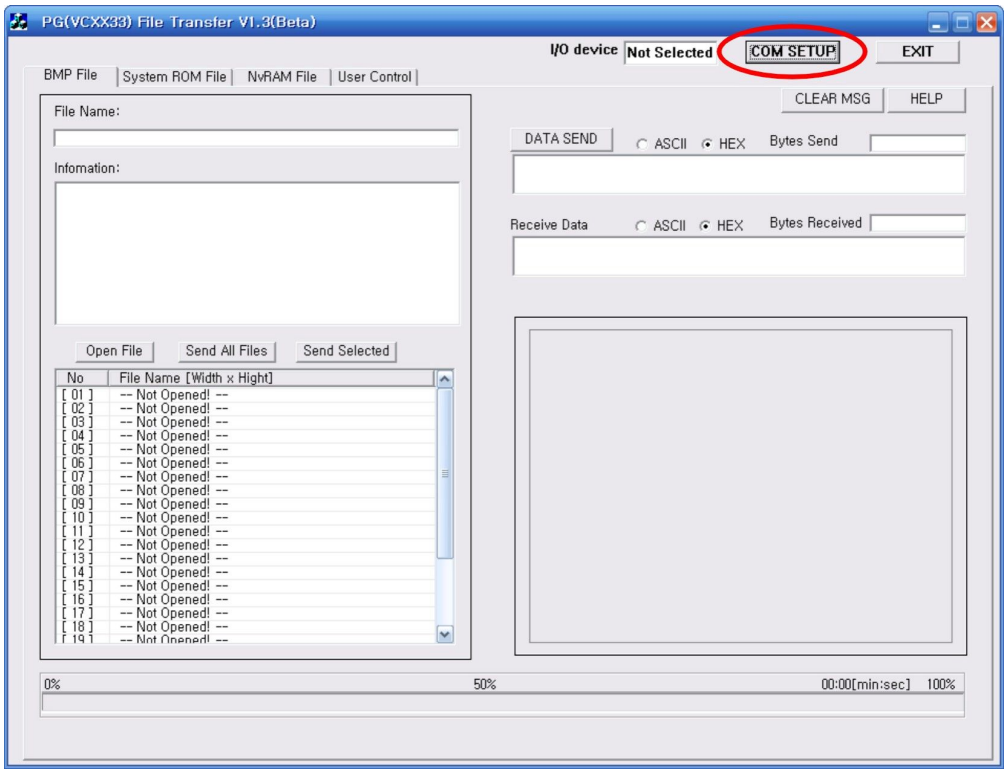
Then communication option and connection window will be open.

6.3.3 RS232 Connect

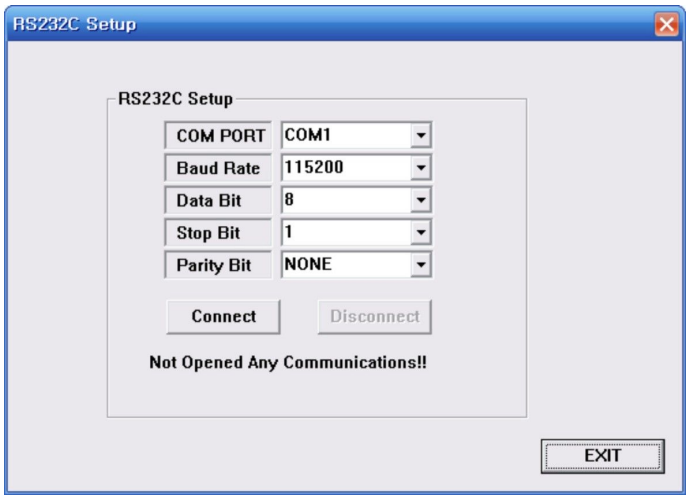
Push the “COM SETUP” button.

"COM SETUP" button located on right side top.

Which is shown red circle as shown below.



Select the communication option of RS232C Setup and than confirm.



Set up communication like above window, except COM PORT and Baud Rate, which are depended on USER.

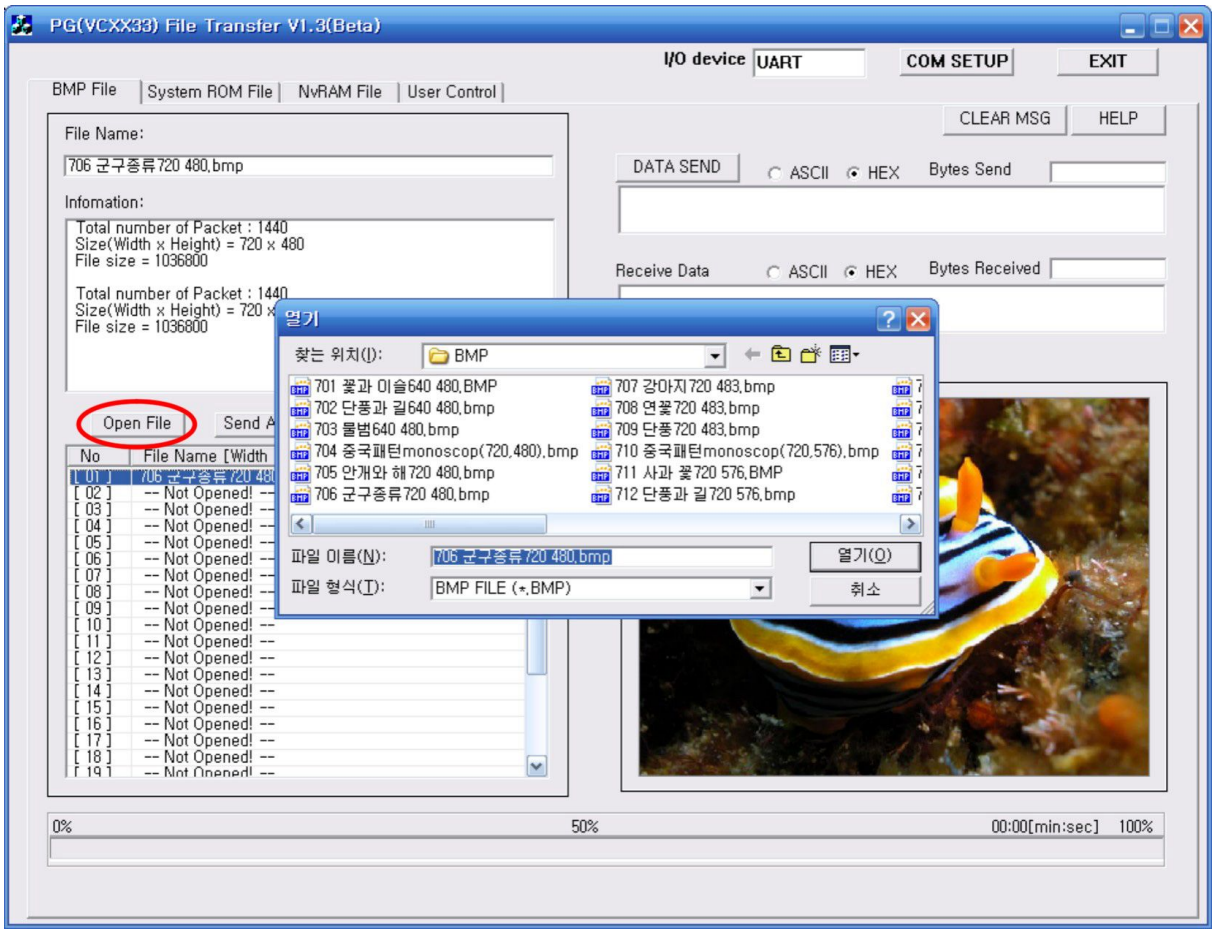
Start the communication, after pushing “Connect” key.

6.3.4 BMP File Download

Main Display is in BMP File Section.

In this section Push "Open File" Button.

Open Dialog box is displayed given below. select the BMP File from open dialog.



When opening the file, it will be added in the list, as well as show it's image and information. (It can be also open the file with double click of the Mouse.)

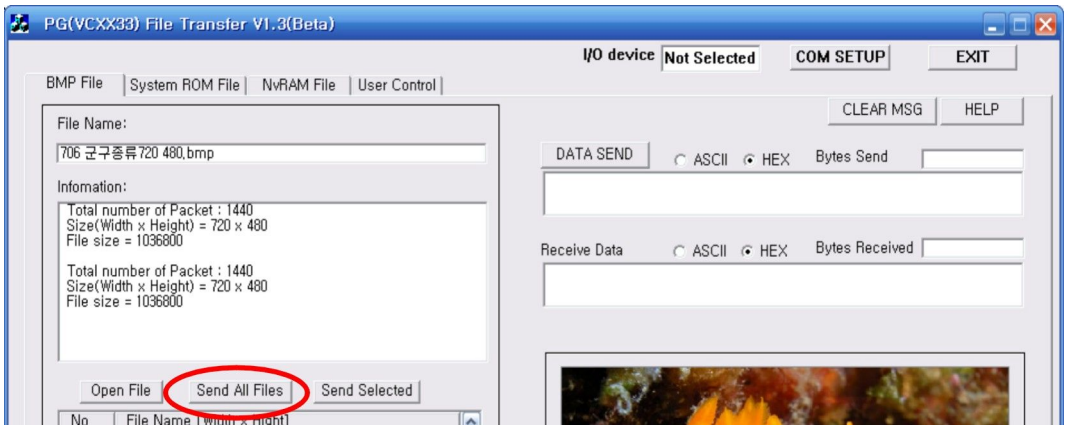
User can save files up to 2048*2048The Information below box displayed the picture size and Data information.

Number 1~60 number can save to BMP of **2048*2048** size (Pattern Number 701 ~760).

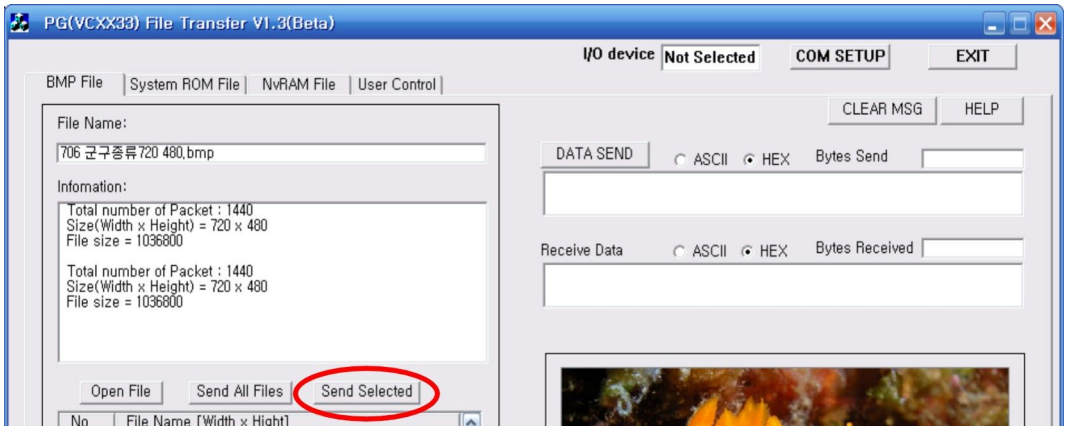
When you save the image pattern, you should check the number that corrects image size.

There are 2 kinds of methods for BMP file download. (Send All Files, Send Selected)

i) If clicking Send All Files, it will send all data from combo box.



ii) If clicking Send Selected, it will send selected data from list.



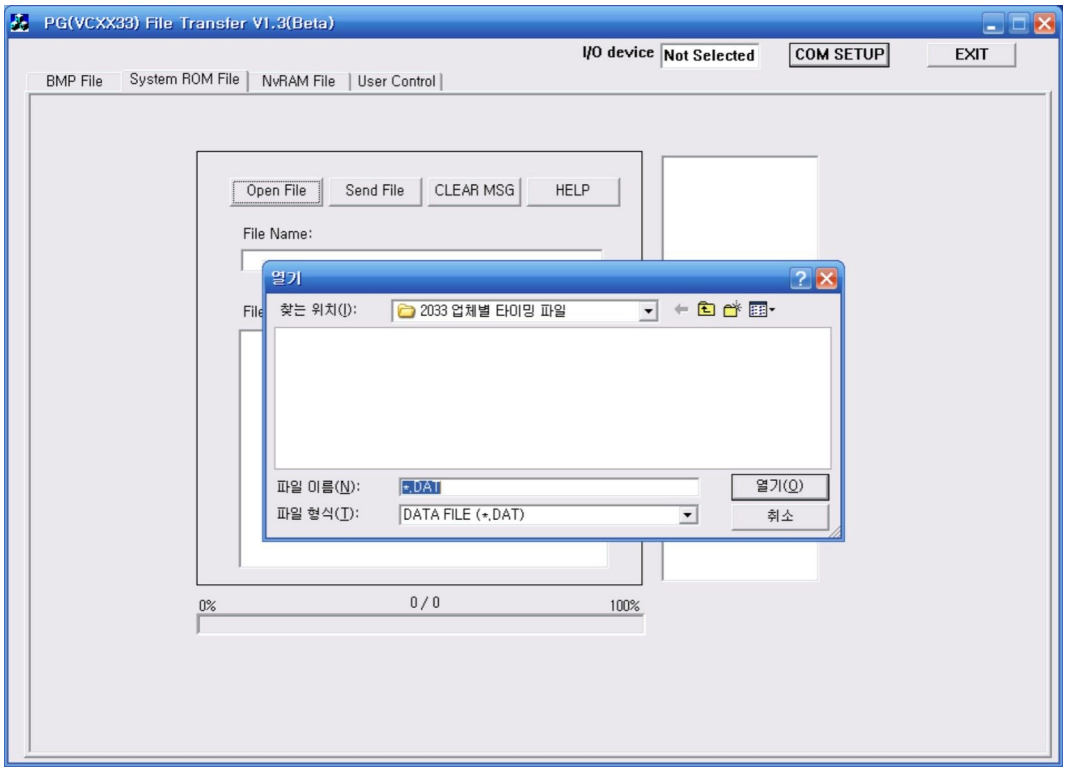
How to select the files :

Select first file, then push shift key(Category selecting) or Ctrl Key (personal selecting)on the keyboard continue until making the range of final file.

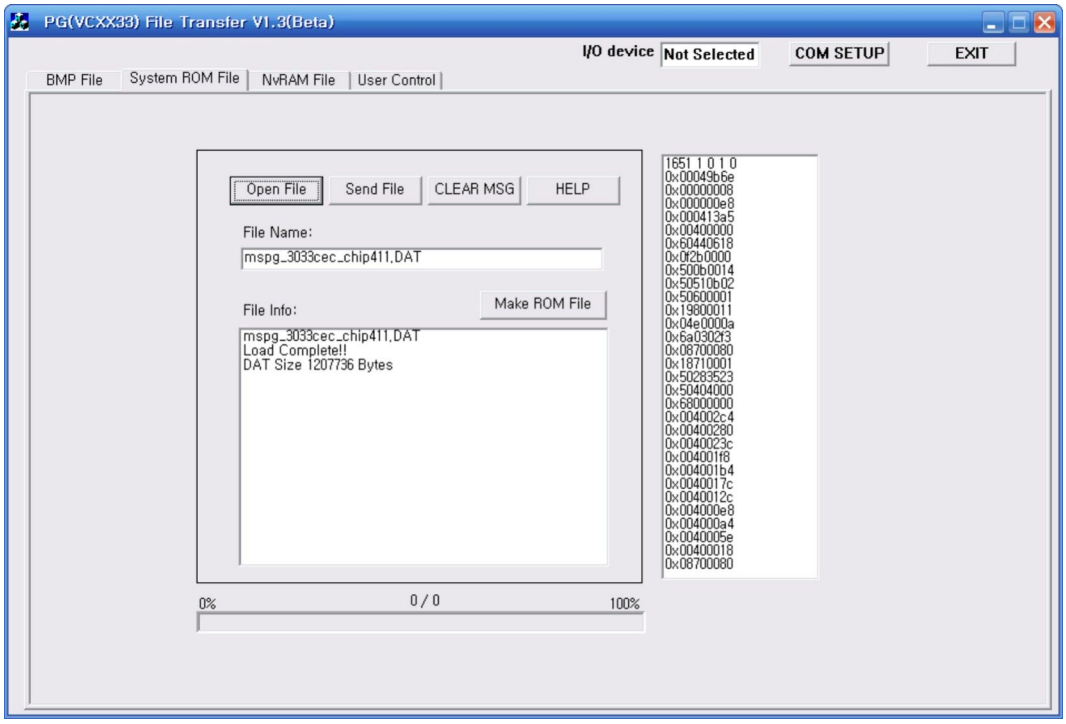
List No. 1 ~ 60(Default Pattern No.701~760) :
BMP MAX Size 2048(W) X 2048(H) {w=h size, h=v size}.

6.3.5 System ROM DAT File Download

When push the Open File key on the System ROM DAT file display, it can show as below to select a file. (file type : *.DAT)

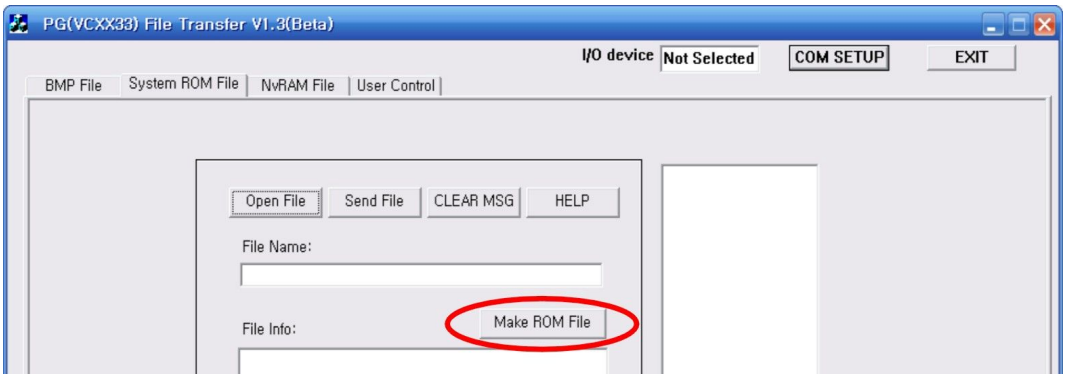


When open the file, it will show the file list and information on the File Information box.



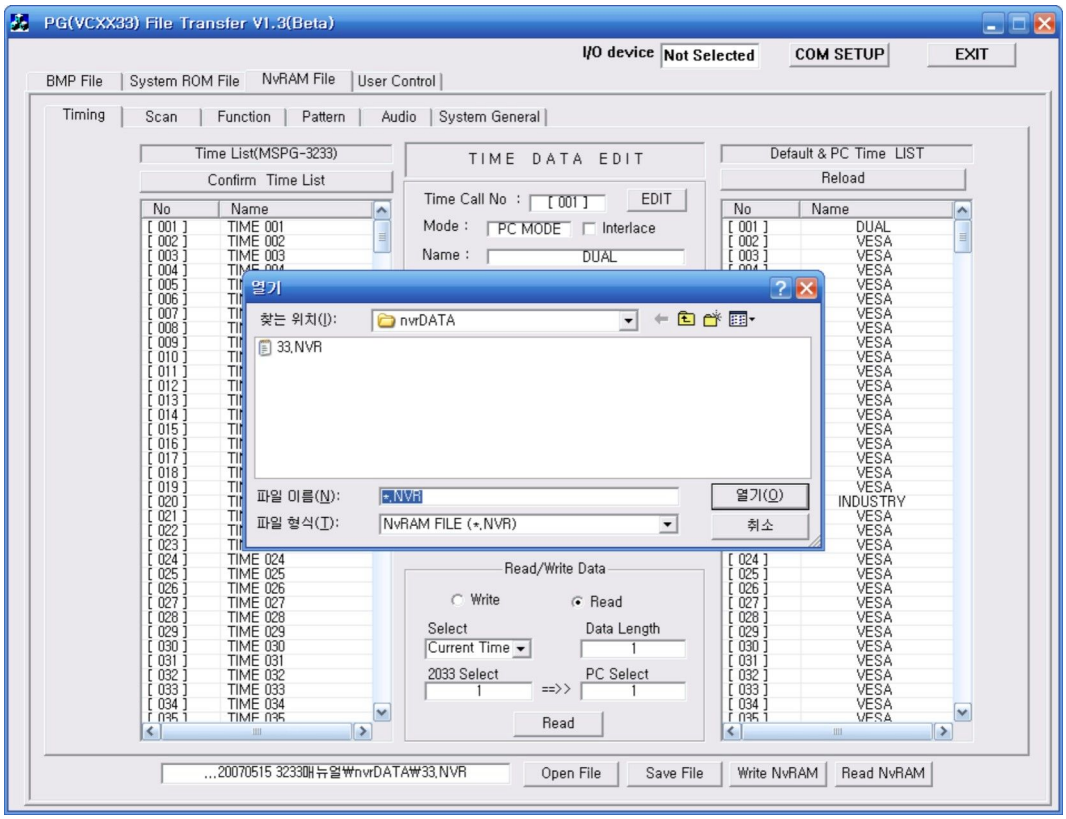
When push the Send File, it will be lunch the File download.

When clicking Make Rom File, it will make a ROM file from DAT file in order to use it for system through copying CF-card.

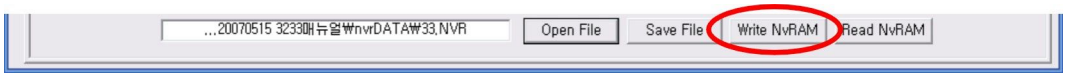


6.3.6 NvRAM File Download

It can send or receive the NvRAM files from PC to MSPG-6100L or MSPG-6100L to PC.
NvRAM File has the information of Timing, Scan, Function, Pattern, Audio, System General.

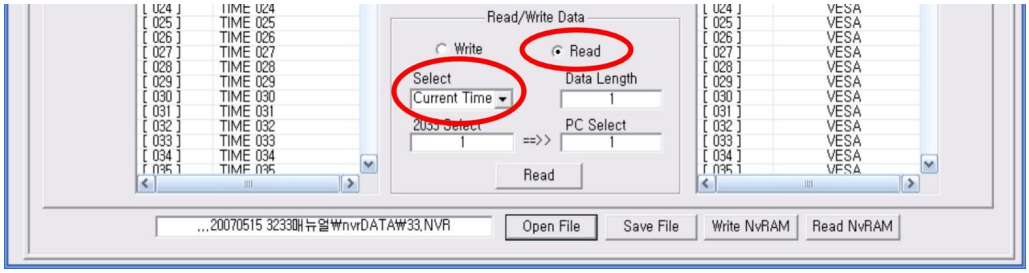


WRITE Button send editing data to MSPG-6100L and rewrite memory. This time, all of editing data in the PC will be erased, so it should be backup, if you need to save important files.



READ Button can show receiving data from MSPG-6100L on the Edit Box. This time, all of editing data in the PC will be erased, so it should be backup, if you need to save important files.

READ Button can send the whole of the calling data from MSPG-6100L to EDIT box to control data selected, also selecting data range as below list.



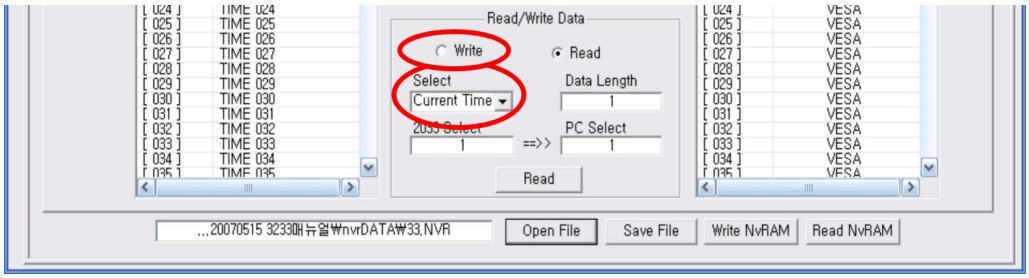
-Select-

▷ Current Time : It will sending a selected data current from the list.

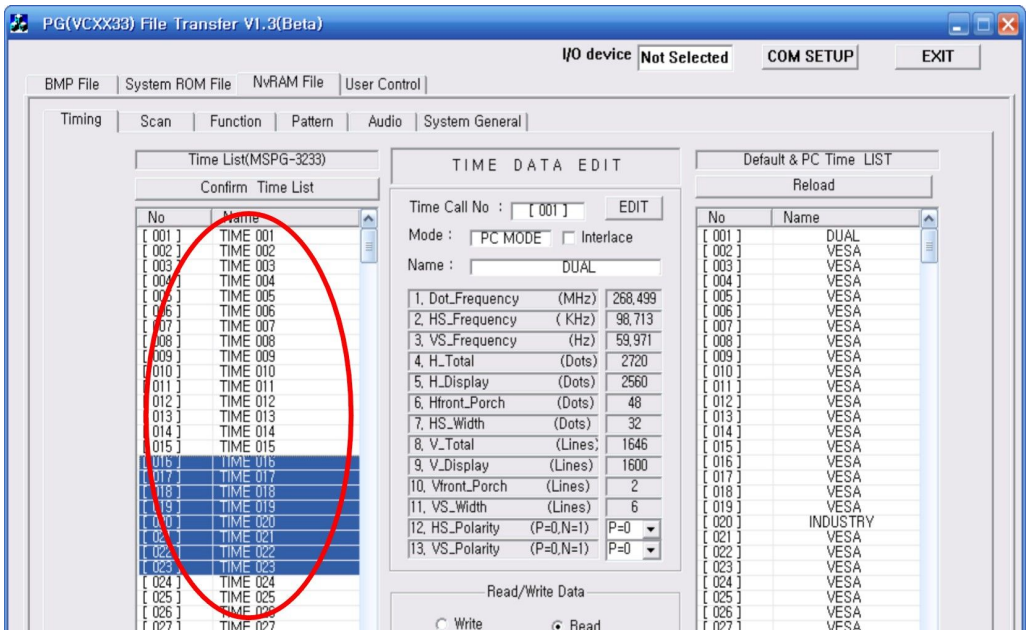
▷ All Time Data : It will sending all data from the list.

▷ Select Range : It will sending selected data by user from list.

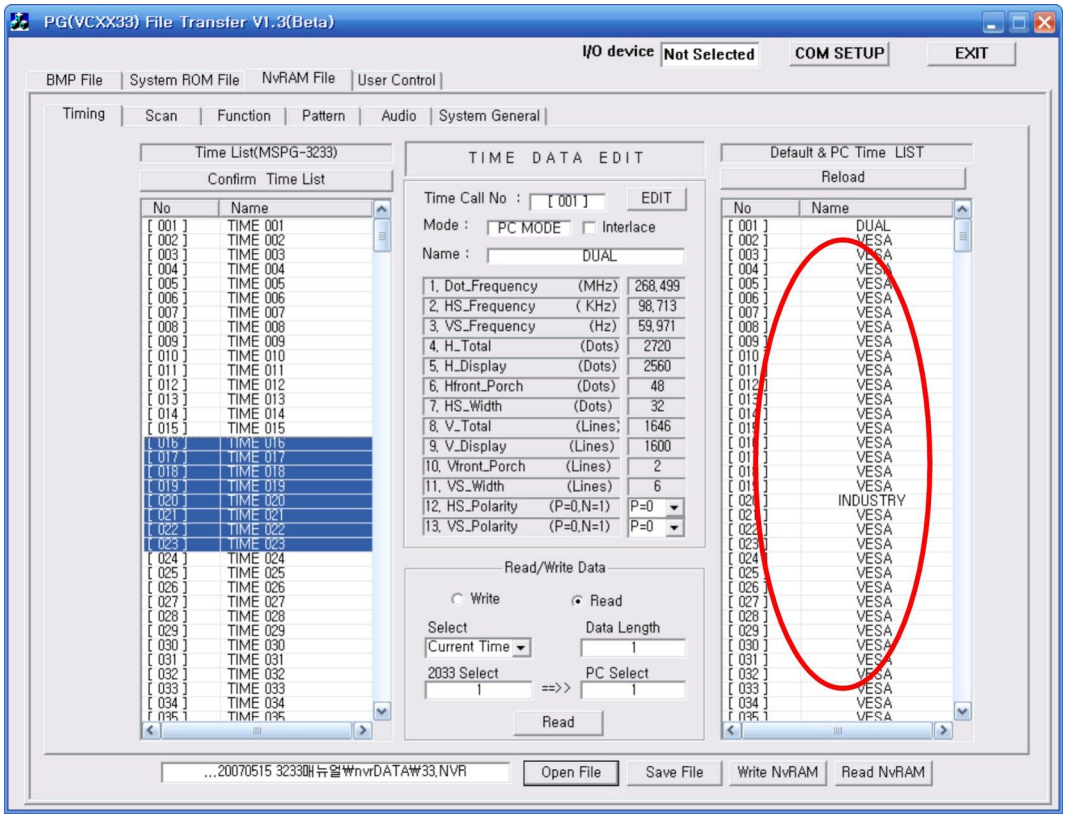
WRITE Button can returning all edited data from EDIT box to MSPG-6100L for EDIT, also select data range as below list like “Select” item



Display the Time Data information of MSPG-6100L. (Impossible to edit)



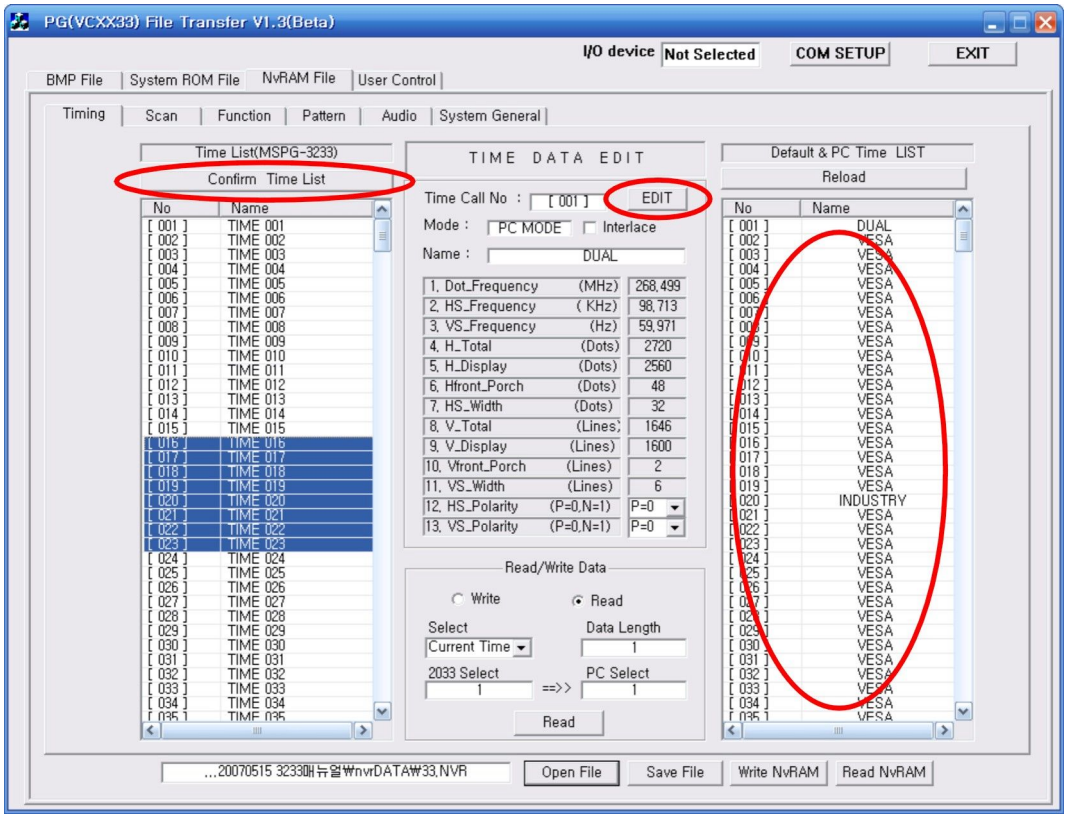
It is the Edit Box to control Time Data information from MSPG-6100L.



6.3.7 Time Data File Edit (sending/receiving)

1) Confirm Time data

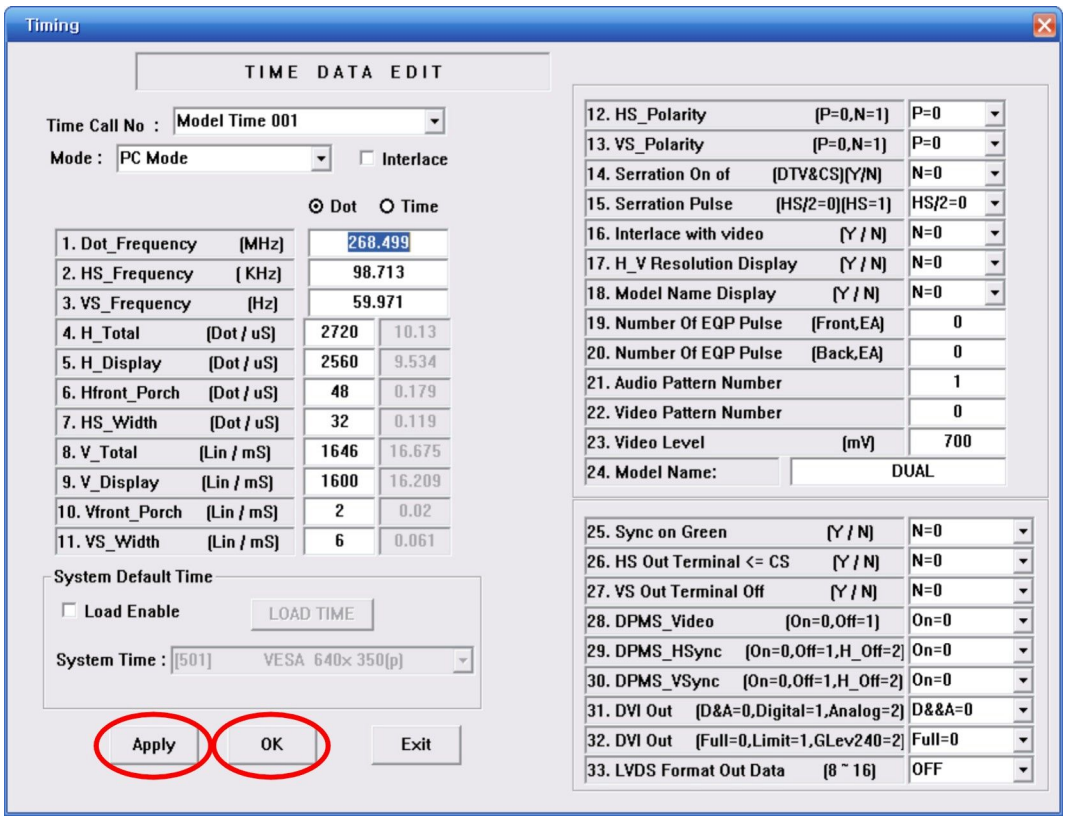
To find saved Time List in MSPG-6100L, just push the Confirm Time List button, also it can update every sending/ receiving the Time Data, moreover whole NvRAM data, too.



2) Time Data Edit

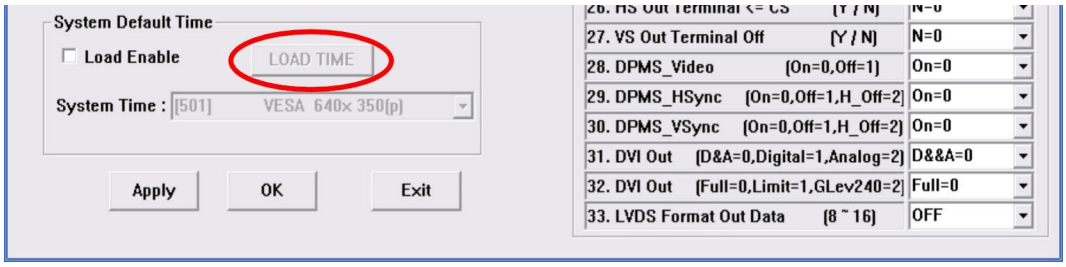
To edit Time Data or to create new Time Data, just click the “EDIT” button or double-click Time Data of List.

Then the Time Data Edit Box is opened. After editing Time Data, if click the Apply button, it will be just save, on the other hand, if click the OK button, it will be save and then close Edit Box.



3) Call Default Time Data

Calling No.501~958 as fixed Time Data to edit/copy among 1 ~ 500, it needs to check the menu of Load Enable as below.



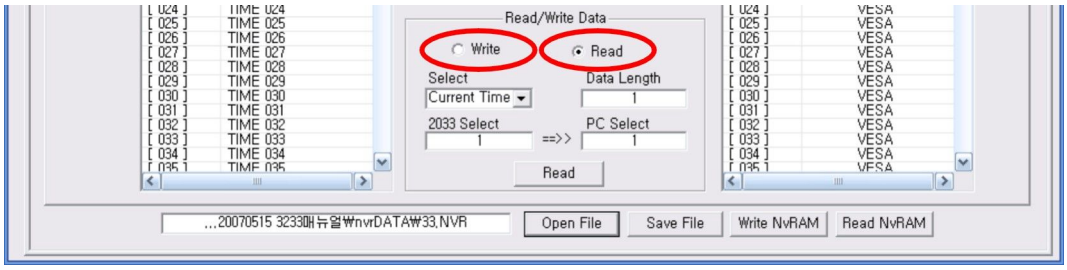
Selecting Time Data, and click LOAD TIME Button, which will show Time Data information, after that click Apply button or OK Button to save.

4) Time Data sending/receiving

i) Sending/Receiving through Menu Button

When sending Time Data, just click the Write Button to change to sending Mode.

When receiving Time Data, just click the Read Button to change to receiving Mode.



The quantity of sending/receiving Data send/received as “Current Time” as a data or “All Time Data” as 500 data or “Select Range” as pointed data up to the quantity of Data Length.

ii) Sending/Receiving through the List Selection

It can sending/ receiving the Time Data simply using Mouse controlling.

First, select a list or more from Source side, and click right button of the Mouse on the selected list, the cursor will be changed as like , .

Click a left button of the Mouse on the recommended list of the Destination, and pointed data will send/receive each side.

If you select data more than one, just use the Shift key.

5) Time Data Copy

It can copy the data in the same list from only PC.

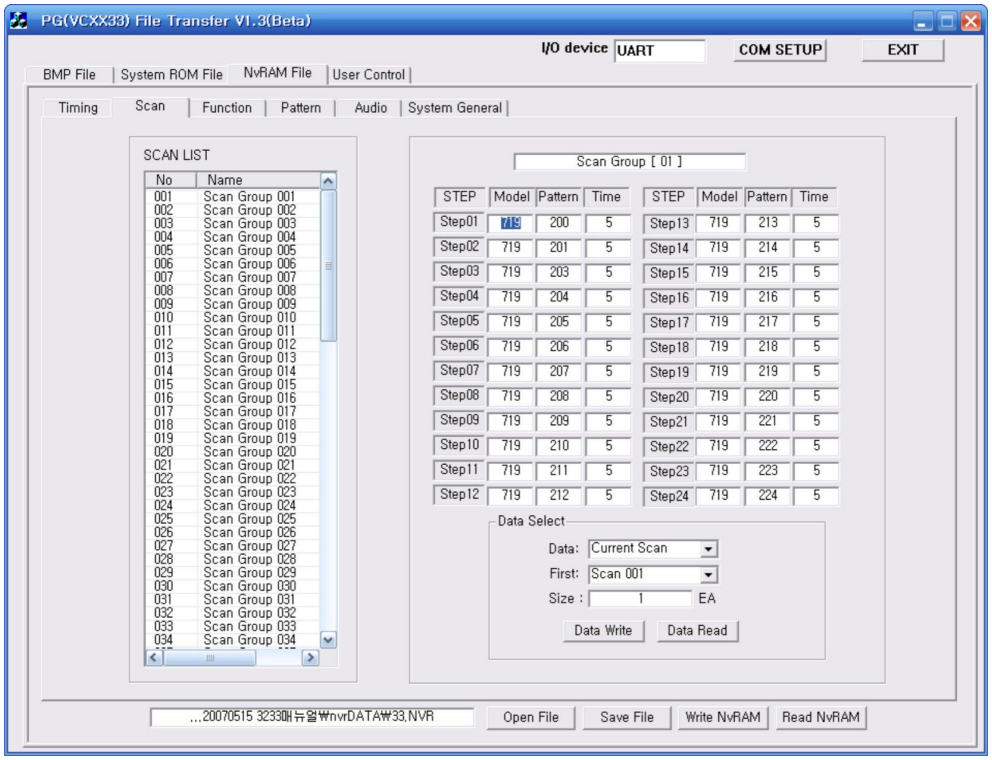
Select the Time Data, and click right button of the Mouse to make cursor like , after that click left button of the Mouse to copy on the pointed list.

6.3.8 Scan Data File Edit sending/receiving

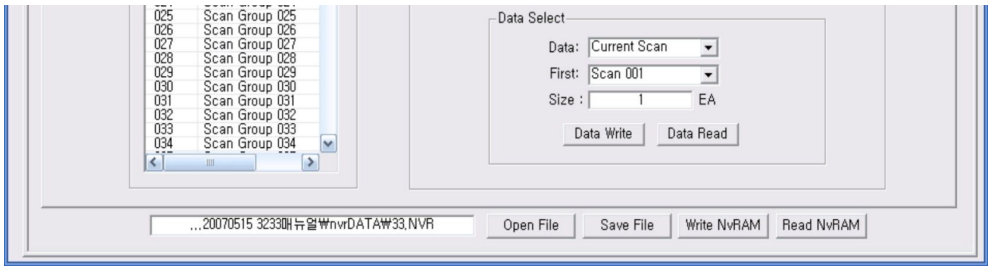
1) Scan Data Edit

After clicking left button of the Mouse on the selected list, it will be show the present data.

It is able to modify data from present group to edit data of display window.



2) Scan Data sending/receiving



The Scan Data could be send/receive “Current Scan” as one data or “All Scan Data” as all 99 data or “Select Range” as selected quantity. “Data Write” is for sending data. “Data Read” is for the receiving data.

3) Scan Data Copy

The Scan Data can copy each other in the list.

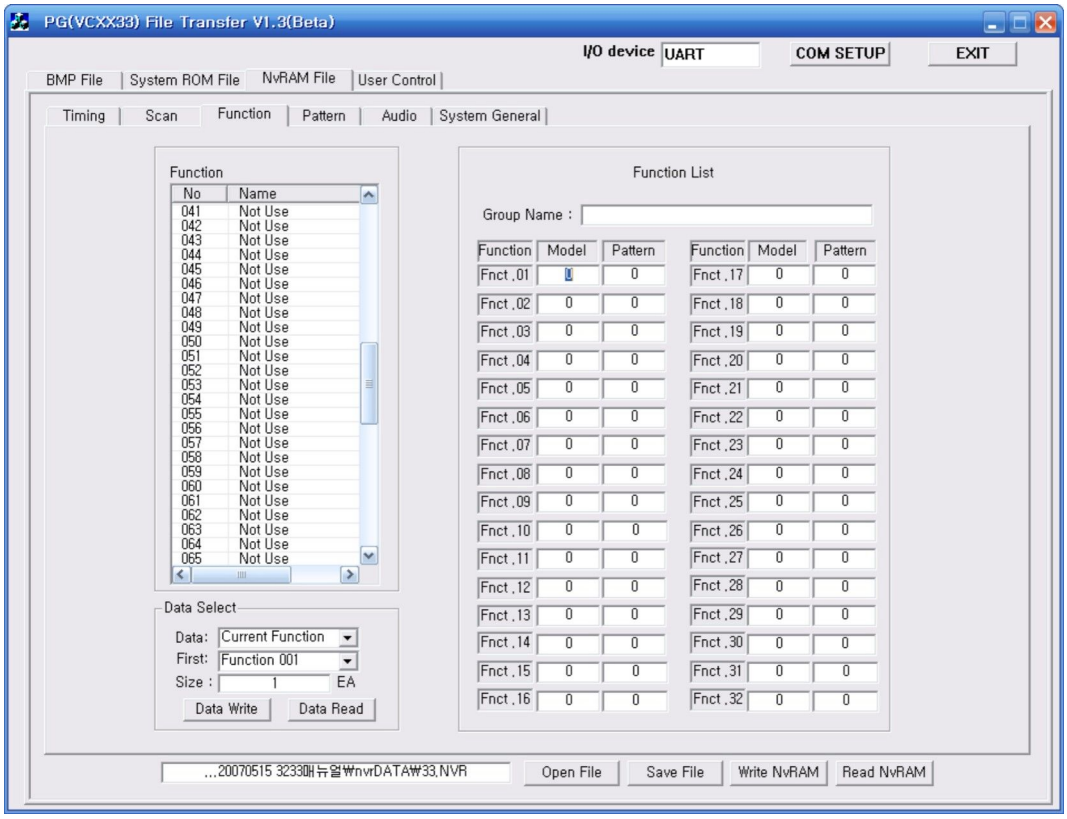
Select one or more Scan Data and then click right button of the Mouse to make cursor like 

, after that click left button of the Mouse to copy on the pointed list.

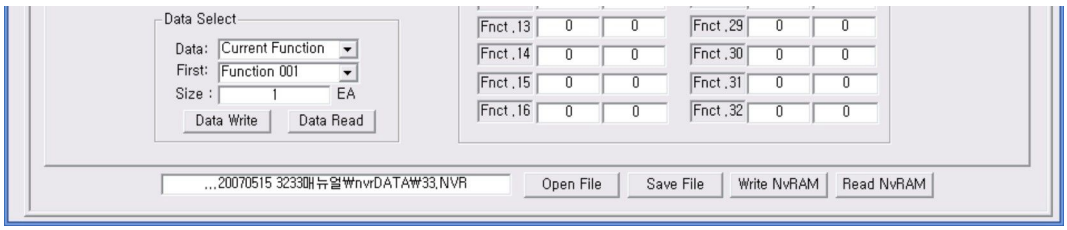
6.3.9 Function Data File Edit Sending/Receiving

1) Function Data Edit

After clicking left button of the Mouse on the selected list, it will be show the present data. It is able to modify data from present group to edit data of display window.



2) Function Data Sending/Receiving



The Scan Data could be send/receive “Current Scan” as one data or “All Scan Data” as all 99 data or “Select Range” as selected quantity. “Data Write” is for sending data. “Data Read” is for the receiving data.

3) Function Data Copy

The Function Data Copy can copy each other in the list.

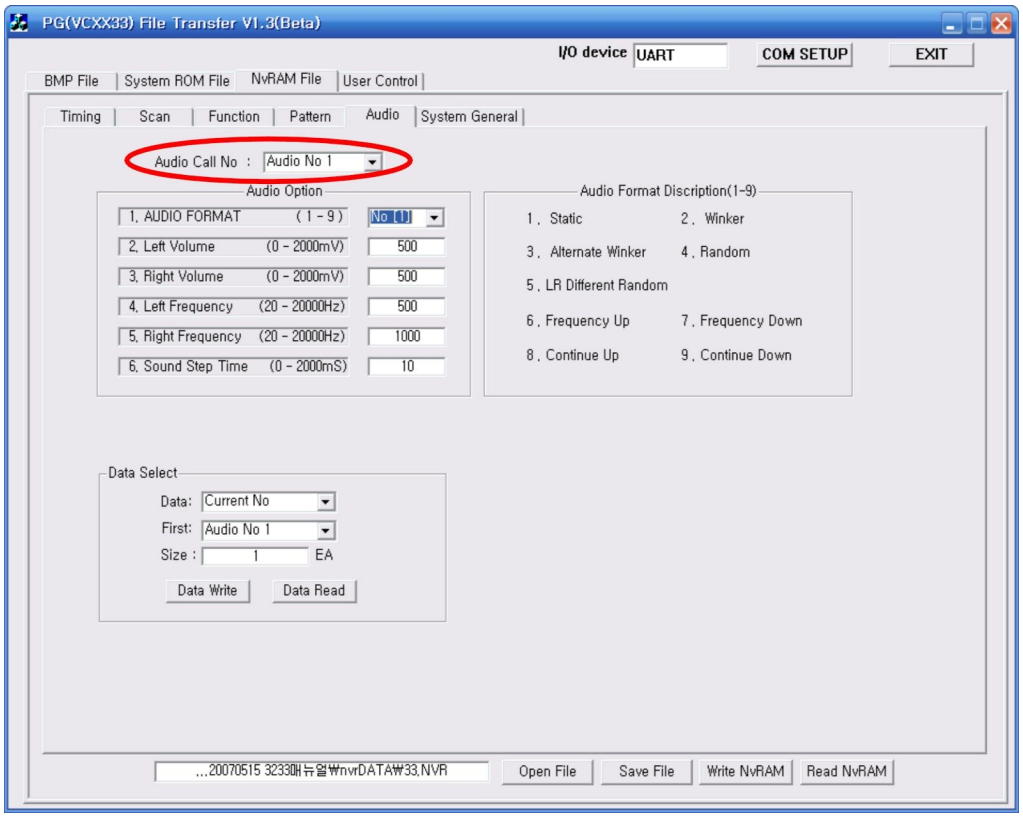
Select one or more Scan Data and then click right button of the Mouse to make cursor like  , after that click left button of the Mouse to copy on the pointed list.

6.3.10 Audio Data File Edit Sending/Receiving

1) Audio Data Edit

After selecting Audio Number in the “Audio Call No” Combo Box, it will be show each data and be possible to edit.

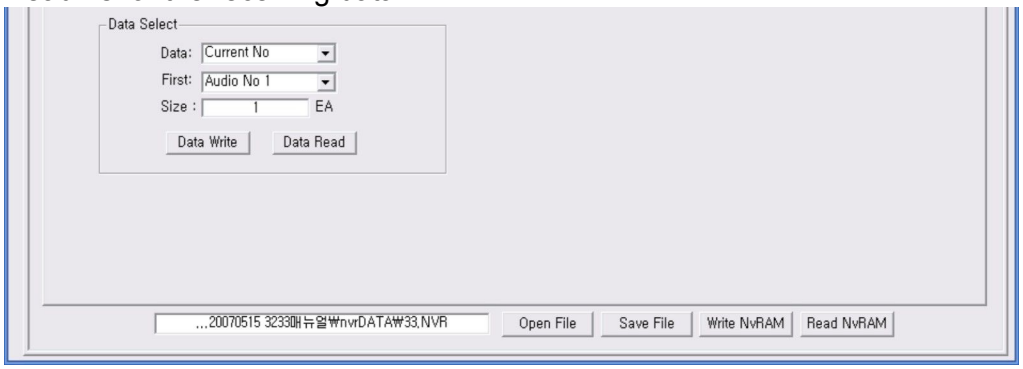
After Editing, if you want to modify Audio Number selection, the editing data is saved first and next data is opened.



2) Audio Data Sending/Receiving

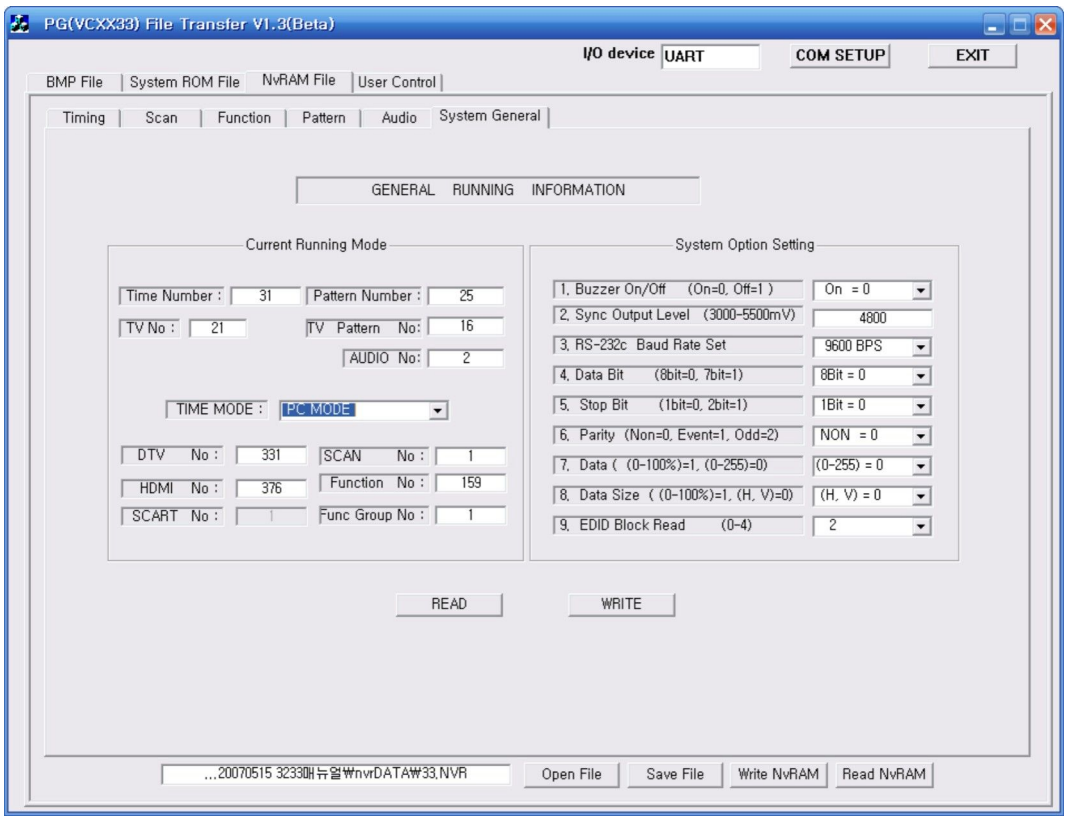
If change the Audio Number after editing, editing data will be preferentially saved, and then next data will be opened.

The Scan Data could be send/receive “Current Scan” as one data or “All Scan Data” as all 20 data or “Select Range” as selected quantity. “Data Write” is for sending data. “Data Read” is for the receiving data.



6.3.11 System General

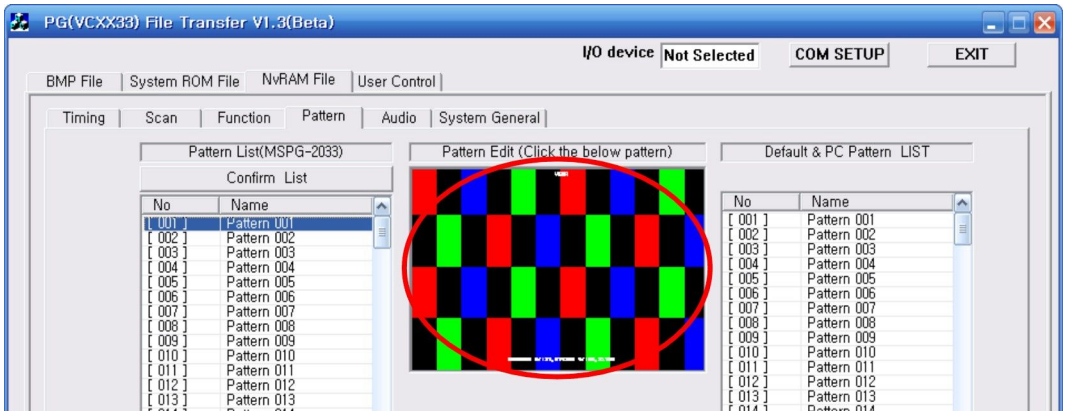
It is possible to call the System setting values using READ Button from MSPG-6100L to PC, as well as edit each setting value, and then finally resend edited data to MSPG-6100L using WRITE Button.



6.3.12 Pattern File Edit Sending/Receiving

1) Pattern Edit Method

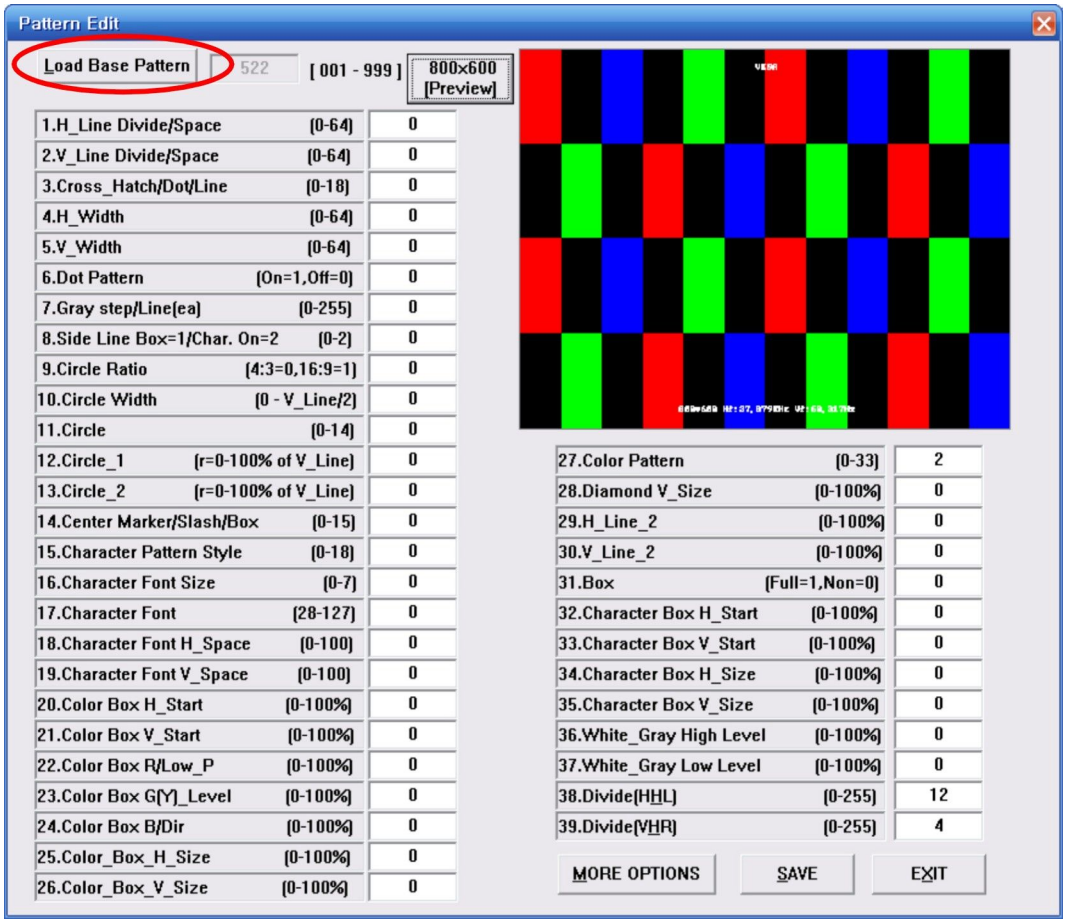
Click the picture part of below to edit Pattern. You can go Edit Mode.



2) Pattern Call Method

You push Load Pattern Button.

You can call User Pattern(No.1~500) and Default Pattern(No.501~999)



3) Pattern Option Edit

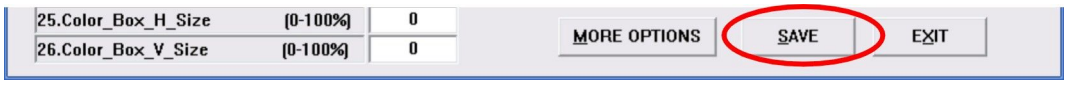
You can edit option(No.1~39) through option Box, when pattern is calling.

After modify you go next step then the pattern will be shown as changed option value.

If you want to set addition option, click More Option then you can edit addition option(No.40~65).

4) Save Method of Editing Pattern

If you want to save editing Pattern, push the Save Button.



5) Pattern Edit End

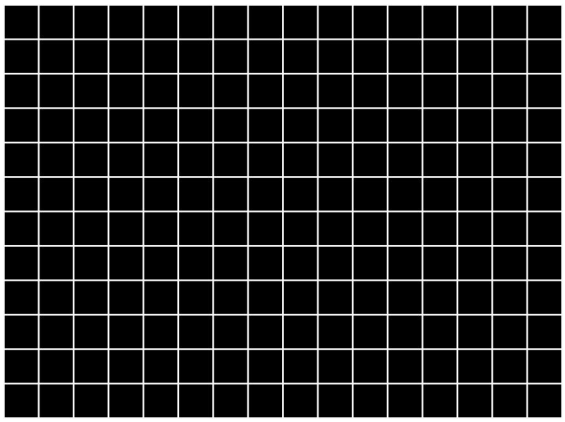
If you click EXIT Button of right lower, you can go former step. Then you should push Save Button.

If you push Preview Button, you can preview about edited Pattern by user. (Size : 800*600)

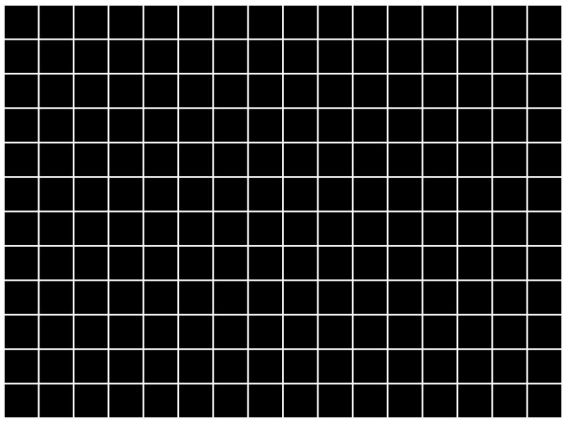
6) Pattern Compilation Parameter

********** Cross Hatch Pattern **********

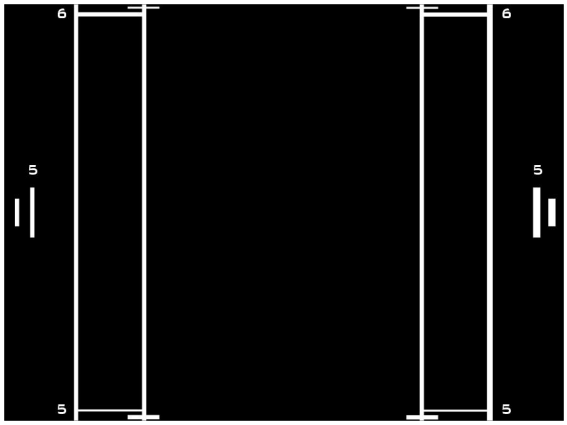
3. Cross_Hatch/Dot/Line(0-24) : 1



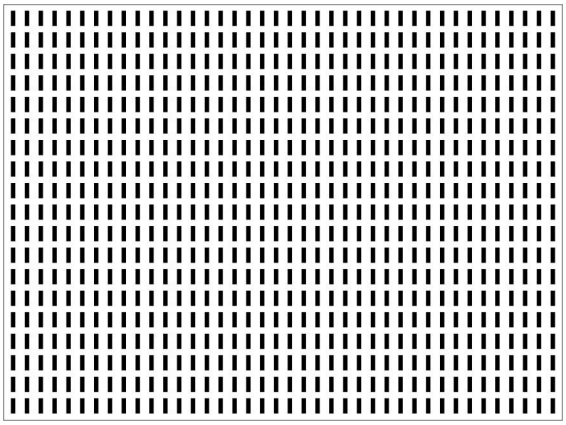
3. Cross_Hatch/Dot/Line(0-24) : 2



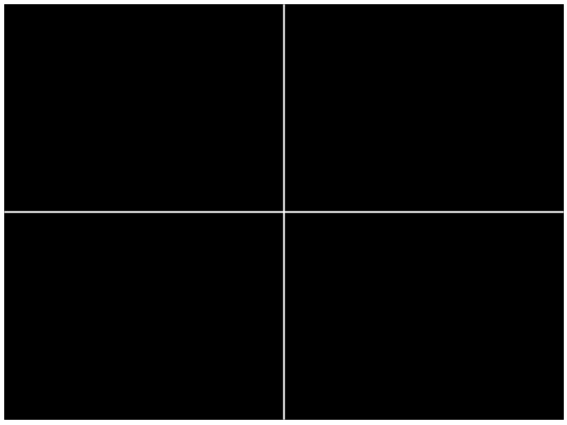
3. Cross_Hatch/Dot/Line(0-24) : 3



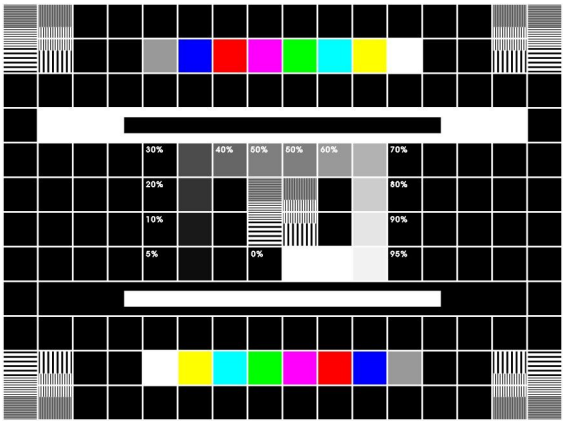
3. Cross_Hatch/Dot/Line(0-24) : 4



3. Cross_Hatch/Dot/Line(0-24) : 6



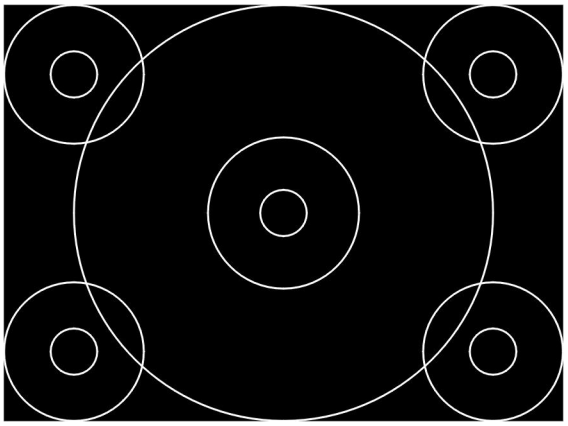
3. Cross_Hatch/Dot/Line(0-24) : 7



3. Cross_Hatch/Dot/Line(0-24) : 8

3. Cross_Hatch/Dot/Line(0-24) : 10

3. Cross_Hatch/Dot/Line(0-24) : 11



3. Cross_Hatch/Dot/Line(0-24) : 15

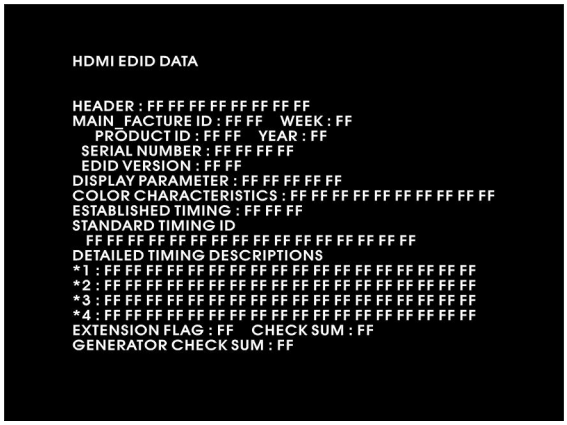
3. Cross_Hatch/Dot/Line(0-24) : 16

3. Cross_Hatch/Dot/Line(0-24) : 17

3. Cross_Hatch/Dot/Line(0-24) : 18

3. Cross_Hatch/Dot/Line(0-24) : 19

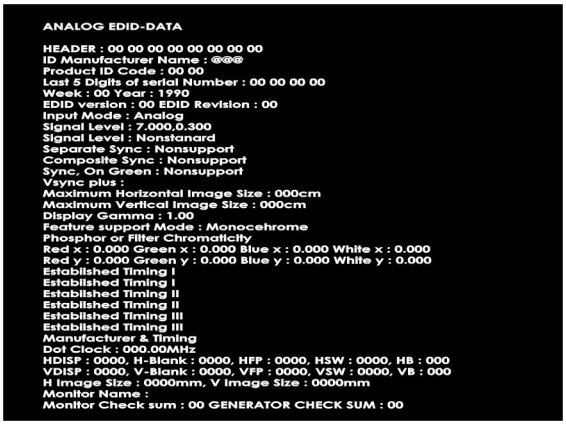
3. Cross_Hatch/Dot/Line(0-24) : 20



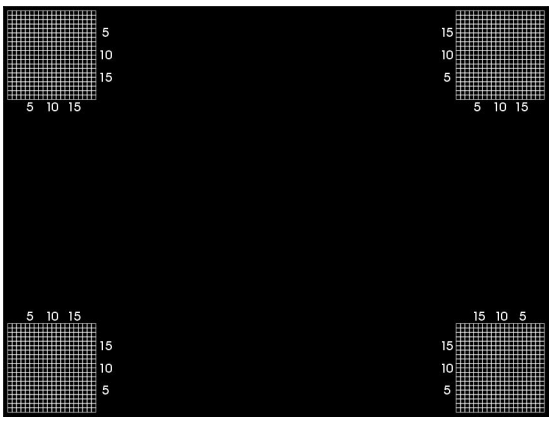
3. Cross_Hatch/Dot/Line(0-24) : 21

3. Cross_Hatch/Dot/Line(0-24) : 22

3. Cross_Hatch/Dot/Line(0-24) : 23

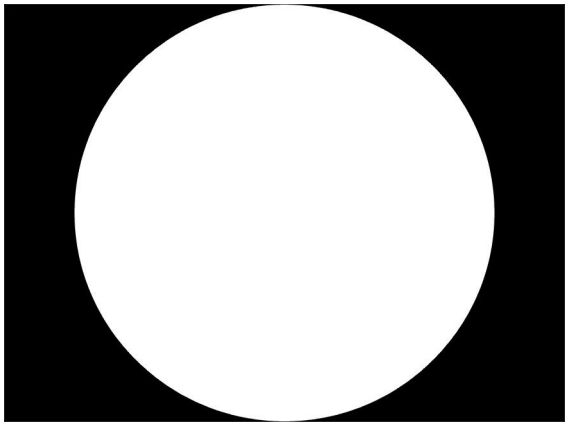


3. Cross_Hatch/Dot/Line(0-24) : 24

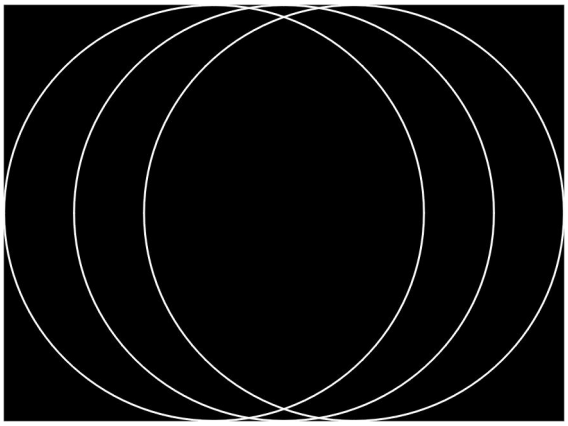


********** Circle **********

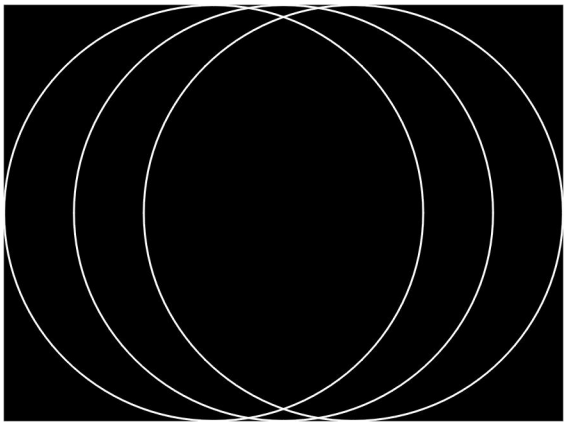
11. Circle(0-13) : 1



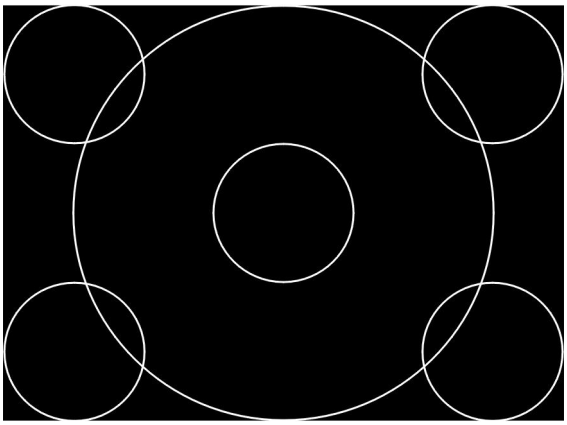
11. Circle(0-13) : 2



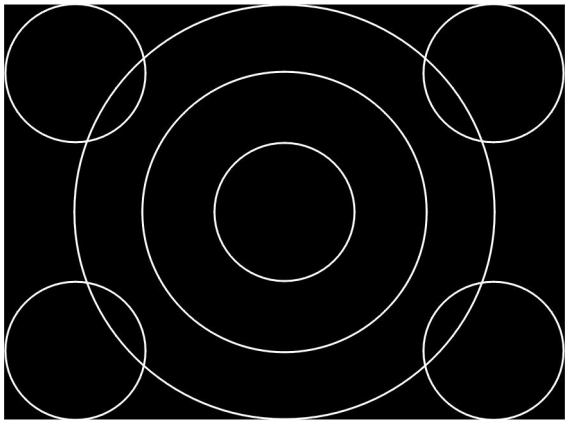
11. Circle(0-13) : 3



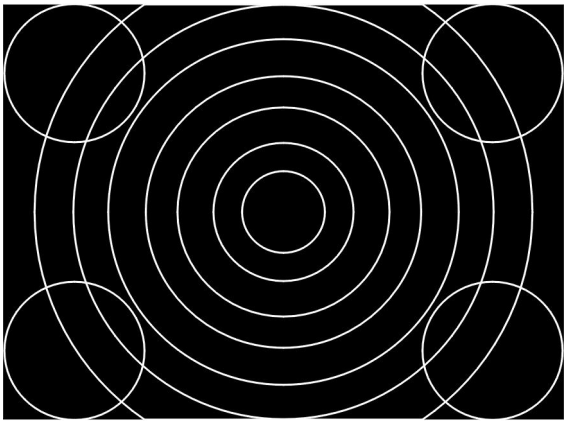
11. Circle(0-13) : 4



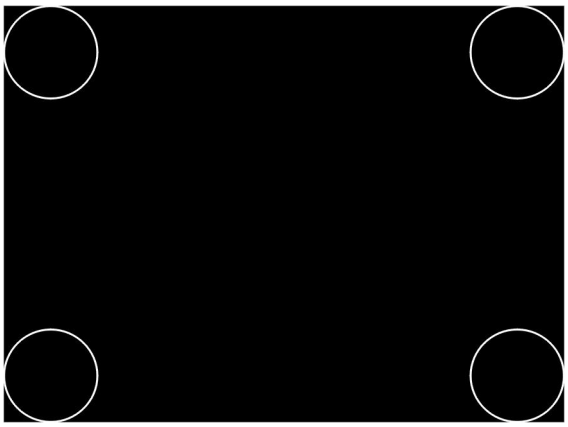
11. Circle(0-13) : 5



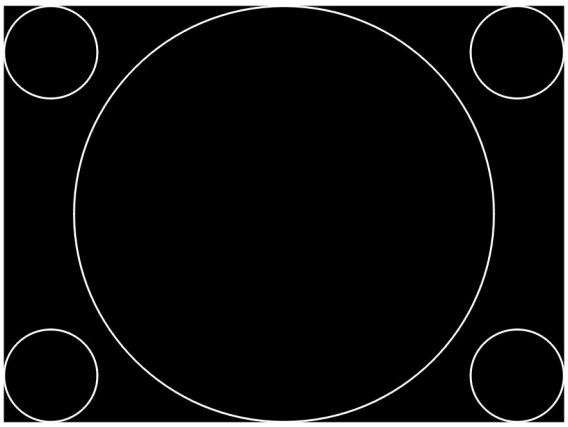
11. Circle(0-13) : 6



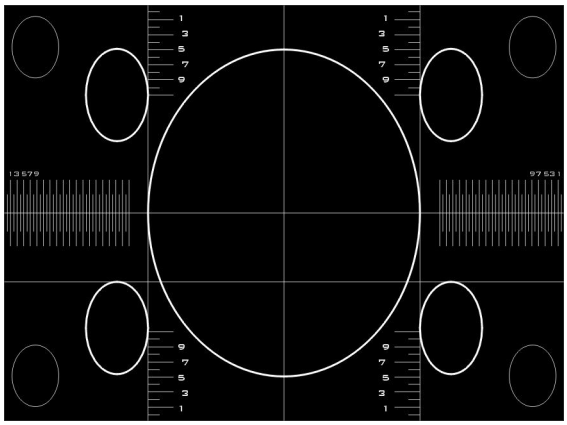
11. Circle(0-13) : 7



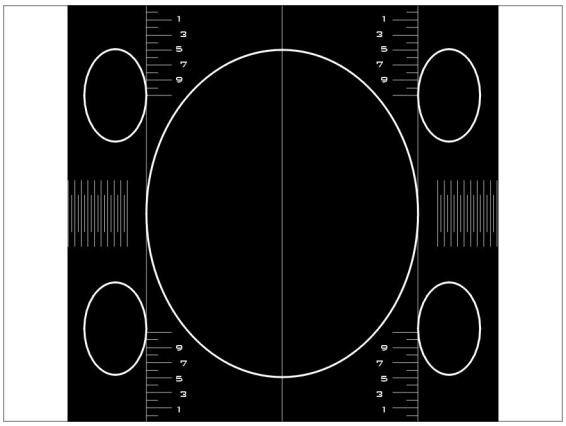
11. Circle(0-13) : 8



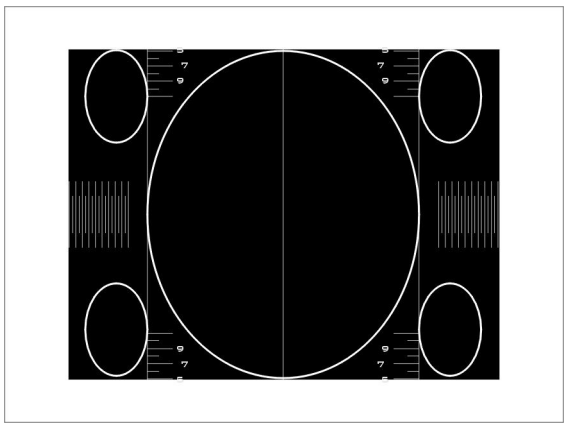
11. Circle(0-13) : 9



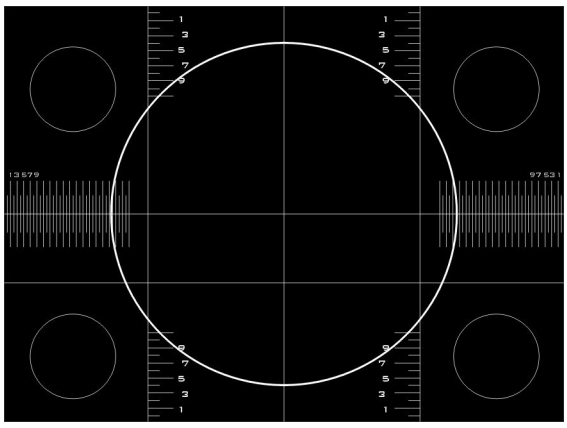
11. Circle(0-13) : 10



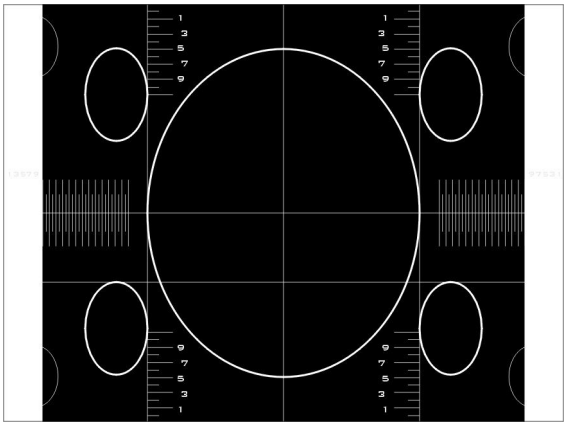
11. Circle(0-13) : 11



11. Circle(0-13) : 12

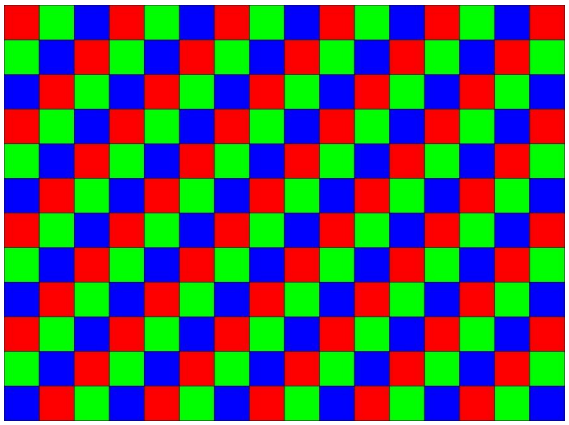


11. Circle(0-13) : 13

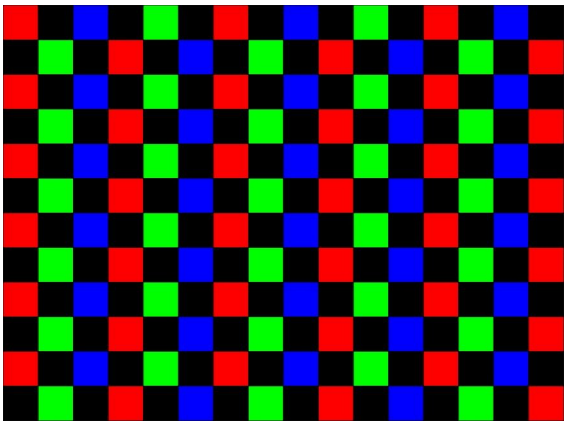


********** Color Pattern **********

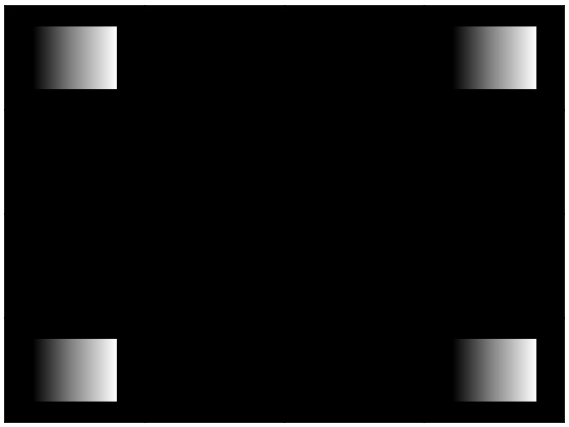
27. Color Pattern (0-33) : 1



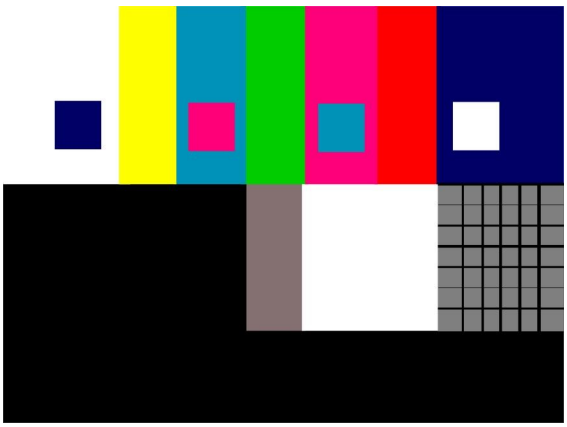
27. Color Pattern (0-33) : 2



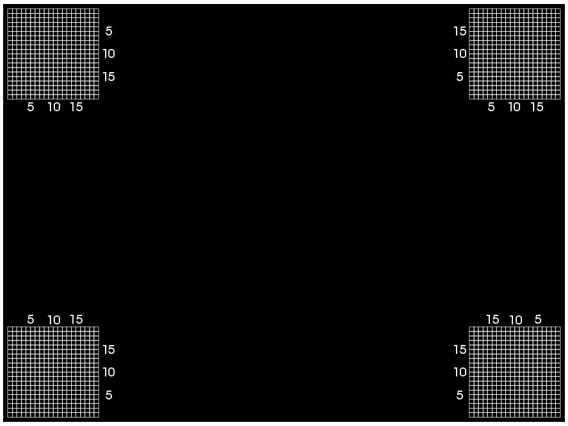
27. Color Pattern (0-33) : 24



27. Color Pattern (0-33) : 25

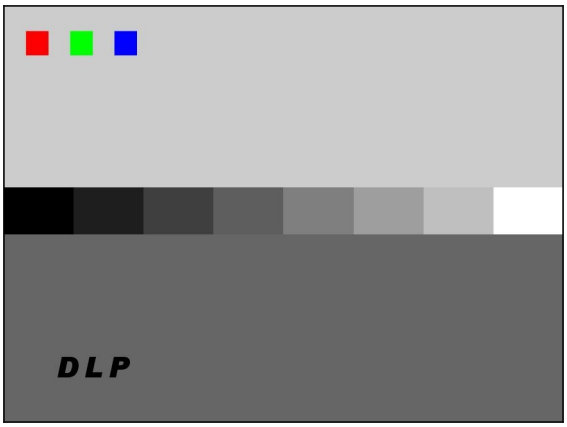


27. Color Pattern (0-33) : 26



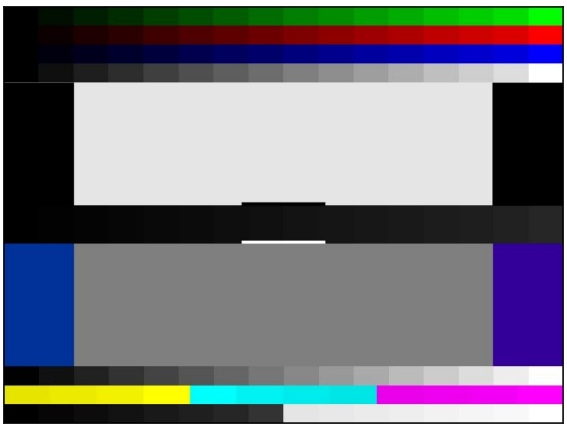
27. Color Pattern (0-33) : 30

27. Color Pattern (0-33) : 31



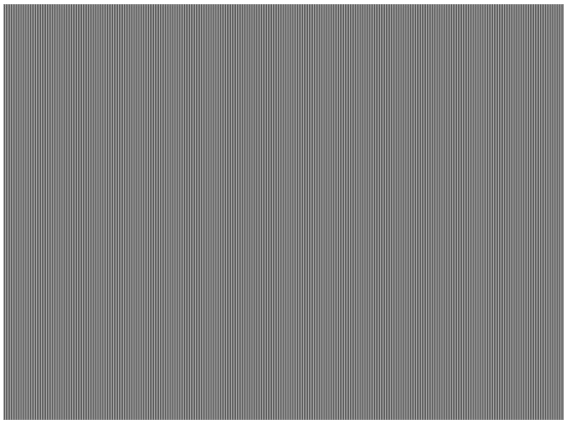
27. Color Pattern (0-33) : 32

27. Color Pattern (0-33) : 33



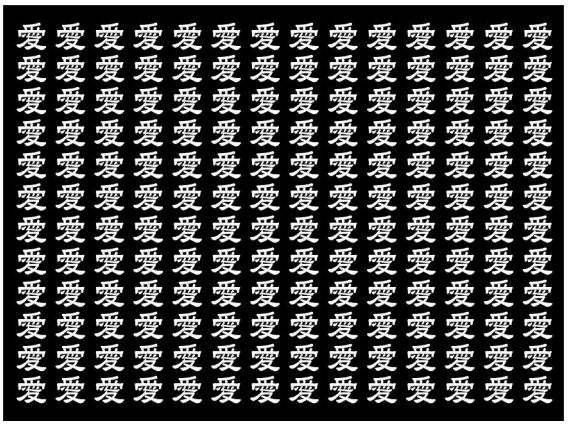
********** Character Pattern Style **********

15. Character Pattern Style (0-14) : 1

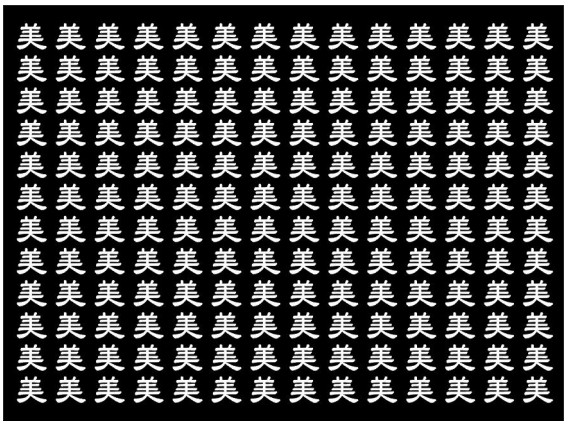


15. Character Pattern Style (0-14) : 2

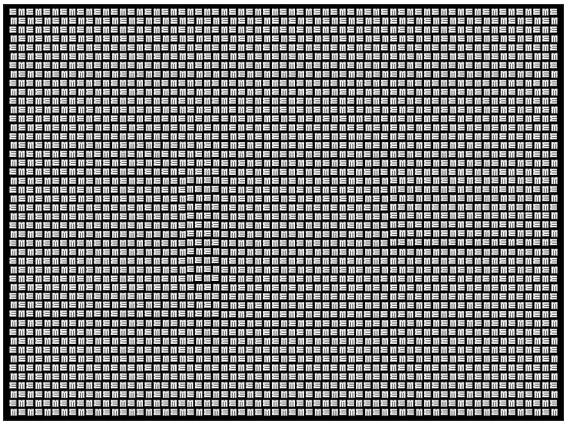
15. Character Pattern Style (0-14) : 3



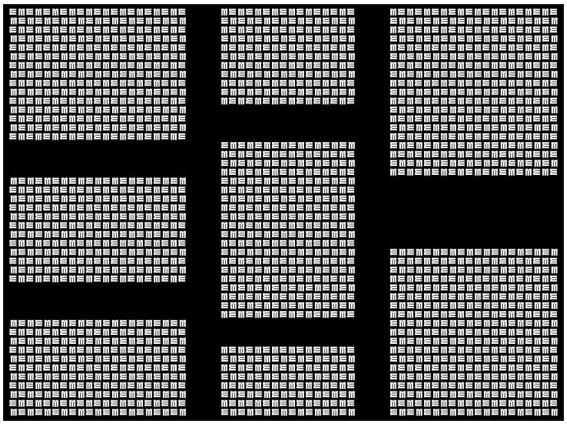
15. Character Pattern Style (0-14) : 4



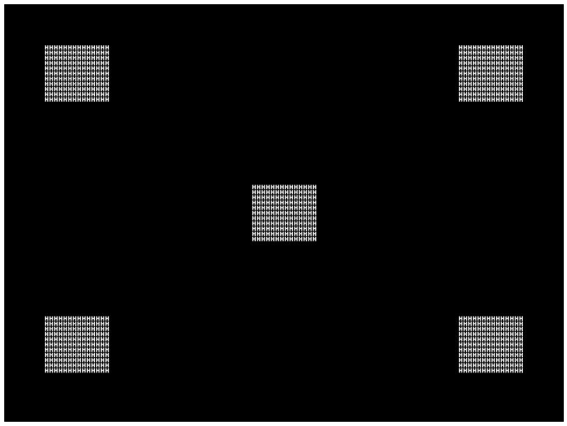
15. Character Pattern Style (0-14) : 5



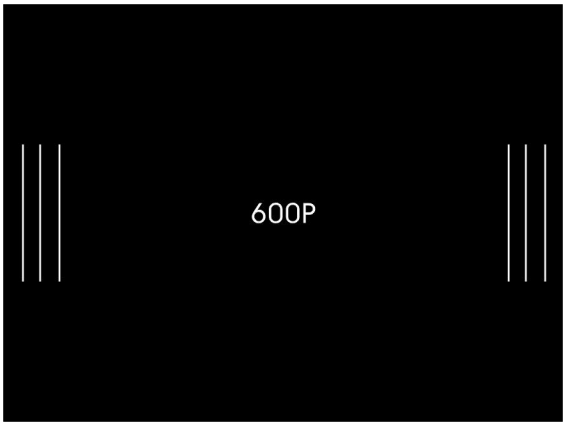
15. Character Pattern Style (0-14) : 6



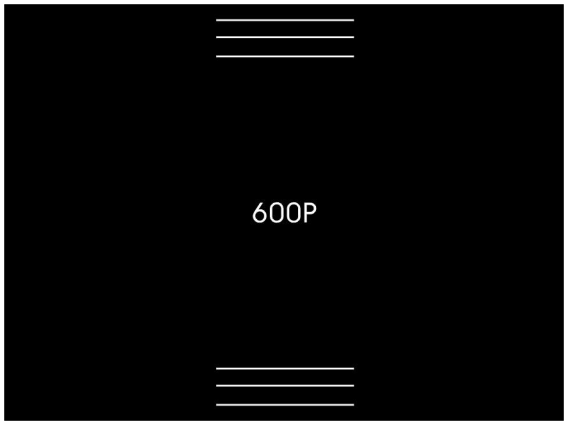
15. Character Pattern Style (0-14) : 7



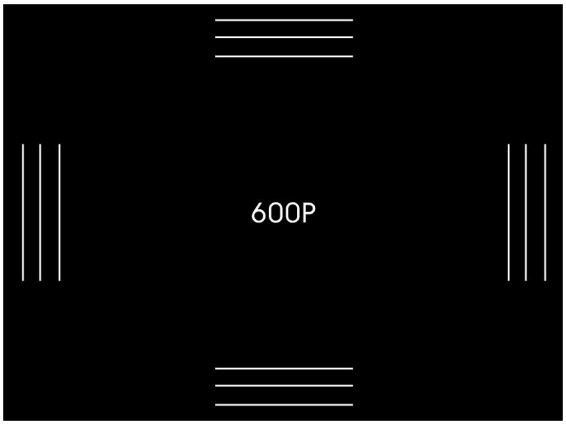
15. Character Pattern Style (0-14) : 9



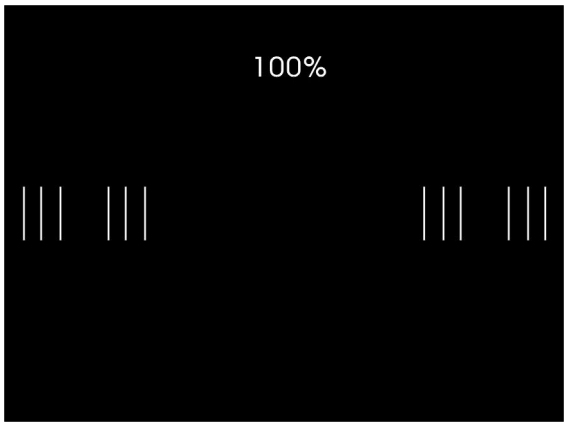
15. Character Pattern Style (0-14) : 10



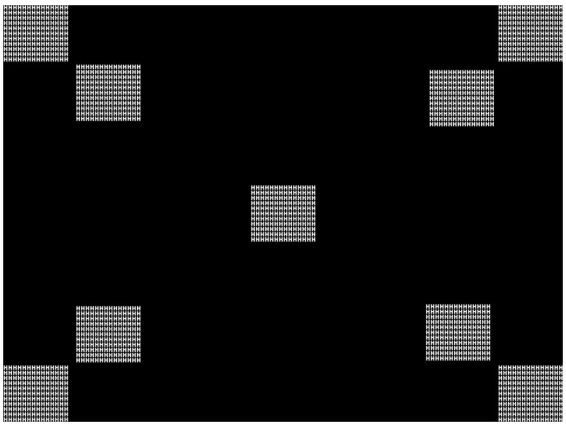
15. Character Pattern Style (0-14) : 11



15. Character Pattern Style (0-14) : 12



15. Character Pattern Style (0-14) : 13



6.4 RS-232C Communication interface

1) Definition of RS-232C interface

RS-232C port can be connected to remote controller, PC and that accomplished controlling device.

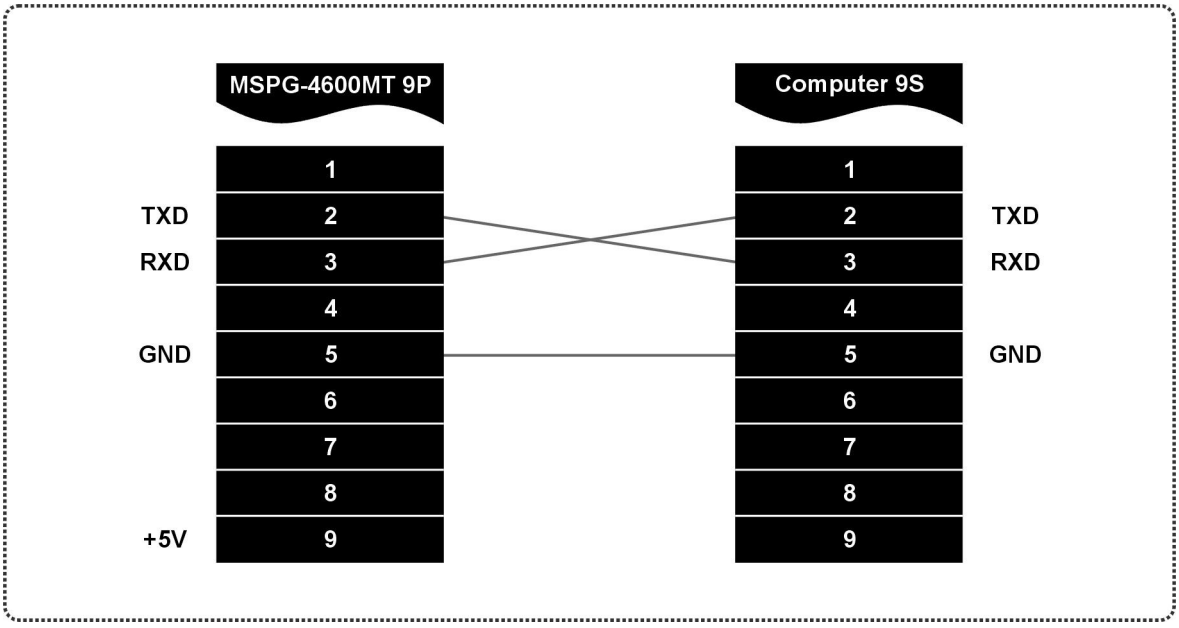
It should be the same setting both band rate protocol during the RS-232 communication.

Please find setting method from page 18, SYSTEM button.

RS-232C can improve the productivity of labor from automatic line and equipment (White balance, Pattern controlling equipment) by Calling/Editing function of MSPG-6100L through PC and other devices.

RS-232C cable is no problem as communicating cable, but be ware, because 9th pin of MSPG-6100L is connected to +5V.

2) RS-232C Cable Connection



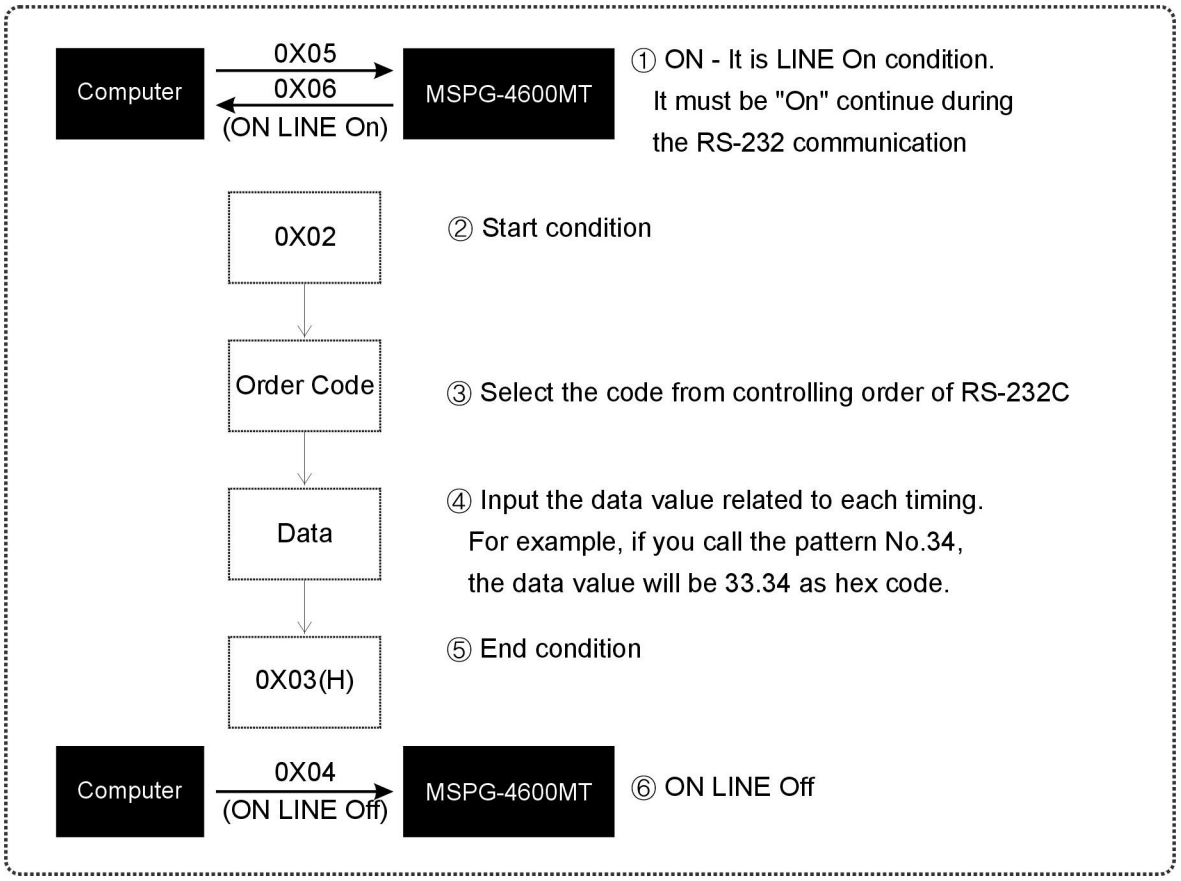
3) The controlling order of RS-232C

It could be changed by user's request.

No.	Hex Code	Dec Code	Function
1	0X02	02	Start Transmitting
2	0X03	03	End Transmitting
3	0X04	04	On-Line Off (Interface Off)
4	0X05	05	On-Line On (Interface On)
5	0X06	06	Positive Response
6	0X07	07	Time Data (Model)
7	0X08	08	Pattern
8	0X09	09	Time Data and Pattern
9	0X0B	11	H-Sync On/Off
10	0X0C	12	V-Sync On/Off

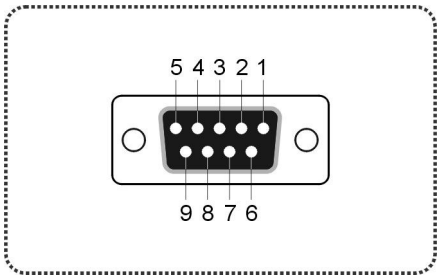
4) The operating method of RS-232C

Please, follow the flow chart as below.



5) RS-232C Connector specification

It is used, when communicating with remote controller, PC or other devices.



Pin No.	Pin Name
1	N.C
2	RXD
3	TXD
4	N.C
5	GND
6	N.C
7	N.C
8	
9	+5V (For Remote)

6) RS-232C Communication Command and Method

No.	Function	Hex Code	Key Board	Note
1	Start transmitting command data	02H	Ctrl + B	Start Code
2	End transmitting command data	03H	Ctrl + C	End Code
3	Request to end the terminal mode	04H	Ctrl + D	On-Line Off
4	Request to start the terminal mode	05H	Ctrl + E	On-Line On
5	Call Model	07H	Ctrl + G	Model Change
6	Call Pattern	08H	Ctrl + H	Pattern Change
7	Call Model and Pattern	09H	Ctrl + I	Model, Pattern Change
8	Video color change	0AH	Ctrl + J	Video Color Pattern Change
9	H-sync on/off	0BH	Ctrl + K	Horizontal Frequency on/off
10	V-sync on/off	0CH	Ctrl + L	Vertical Frequency on/off
11	RGB Video Level	0FH	Ctrl + O	RGB Video Level Change

[Reference]RS-232C Interface

1. ON LINE CODE : Ctrl + E(0X05) 2. OFF LINE CODE : Ctrl + D(0X04)

NO.5 Model Change

Start Code	Model Change	Three figure(Model 120)	End Code
Ctrl + B(0X02)	Ctrl + G(0X07)	1(0X31) 2(0X32) 0(0X30)	Ctrl + C(0X03)

NO.6 Pattern Change

Start Code	Pattern Change	Three figure(Pattern 345)	End Code
Ctrl + B(0X02)	Ctrl + H(0X08)	3(0X33) 4(0X34) 5(0X35)	Ctrl + C(0X03)

NO.7 Model, Pattern Change, Contemporary

Start Code	Model and Pattern Change	Three figure (Pattern 345)	Double figure (Pattern 34)	End Code
Ctrl + B (0X02)	Ctrl + I (0X09)	1(0X31) 4(0X34) 5(0X35)	3(0X33) 4(0X34)	Ctrl + C (0X03)

NO.8 Video Color Pattern Change

Start Code	Color Change	One figure(Input "5")	End Code
Ctrl + B(0X02)	Ctrl + J(0X0A)	5(0X35)	Ctrl + C(0X03)

"0"(0X30) : White

"1"(0X31) : Cyan

"2"(0X32) : Magenta

"3"(0X33) : Blue

"4"(0X34) : Yellow

"5"(0X35) : Green

"6"(0X36) : Red

"7"(0X37) : Black

NO.9 Horizontal Frequency on/off

Start Code	Horizontal on/off Change	One figure(Input "0")	End Code
Ctrl + B(0X02)	Ctrl + K(0X0B)	0(0X30)	Ctrl + C(0X03)

"0"(0X30) : ON

"1"(0X31) : OFF

NO.10 Vertical Frequency on/off

Start Code	Vertical on/off Change	One figure(Input "1")	End Code
Ctrl + B(0X02)	Ctrl + L(0X0C)	1(0X31)	Ctrl + C(0X03)

"0"(0X30) : ON

"1"(0X31) : OFF

NO.11 RGB Level Change

Start Code	Level Change	Three figure(R Level 239)	Three figure(G Level 239)
Ctrl + B(0X02)	Ctrl + O(0X0C)	2(0X32) 3(0X33) 9(0X39)	2(0X32) 3(0X33) 9(0X39)

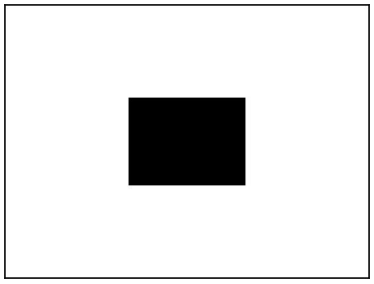
Three figure(B Level 239)	End Code
2(0X32) 3(0X33) 9(0X39)	Ctrl + C(0X03)

RGB Level change is able to change each RGB Level from 0 to 255.

7) RS232C Interface (Commands)

1. On Line Code	0X05	2. Off Line Code	
3. Model Select	Command Step	4. Pattern select	Command Step
	Code Start : 0X02 Model : 0X07 Model No. : X=3 digits End : 0X03 EXAMPLE : Model 3 select 02 - 07 - X(003) - 03		Code Start : 0X02 Model : 0X08 Model No. : X=2 digits End : 0X03 EXAMPLE : Model 20 select 02 - 08 - X(20) - 03

Pattern (Default 516)



Background RGB Level adjustment	Start	0X02(Ctrl + B)
	22	0X0f(Ctrl + O)
	R	R = 3 digits (0~255)
	G	G = 3 digits (0~255)
	B	B = 3 digits (0~255)
	End	0X03(Ctrl + C)
	0X02 - 0X0f - R - G - B - 0X03	
When R,G,B Level 0,0,0 is setting, it will going to Default.		
Inner Box RGB Level adjustment	Start	0X02(Ctrl + B)
	22	0X10(Ctrl + P)
	R	A = 3 digits (0~255)
	G	B = 3 digits (0~255)
	B	C = 3 digits (0~255)
	End	0X03(Ctrl + C)
	0X02 - 0X10 - R - G - B - 0X03	
When R,G,B Level 0,0,0 is setting, it will going to Default.		
Inner Box Size adjustment	Start	0X02(Ctrl + B)
	22	0X11(Ctrl + Q)
	H Size	H Size=3 digits(0~255)
	V Size	V Size=3 digits(0~255)
	End	0X03(Ctrl + C)

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