A revolutionary MLCD
Infinitely Expandable MLCD

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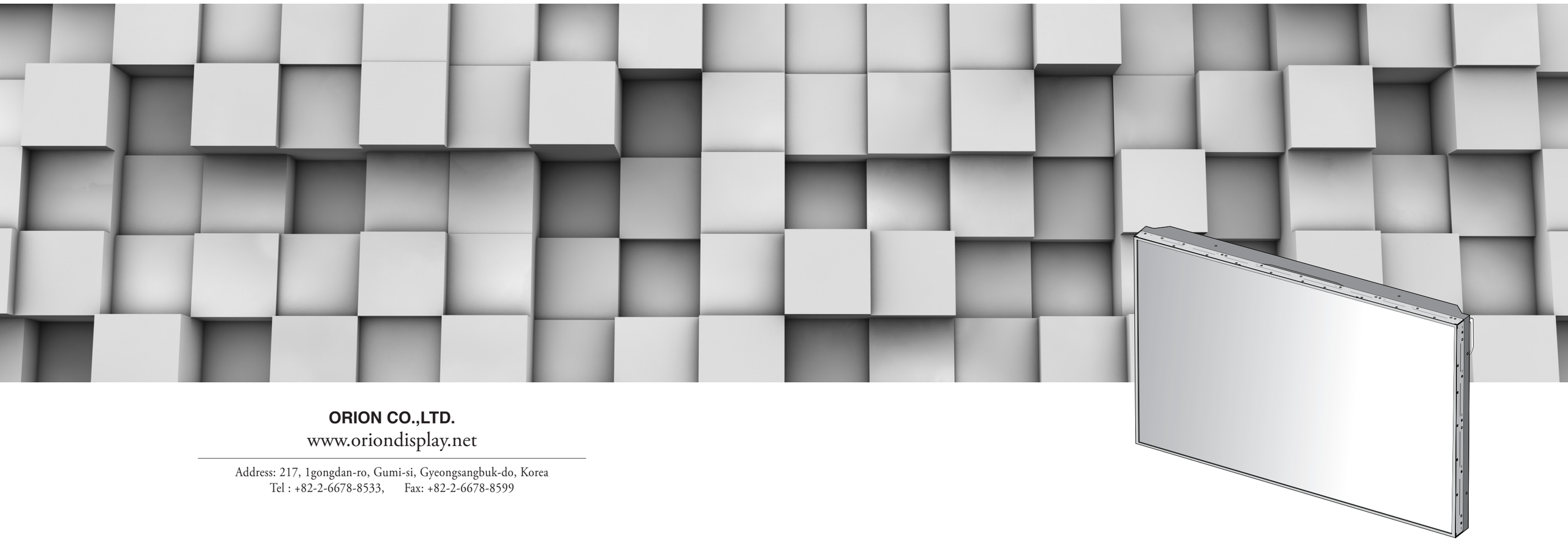

ORION CO.,LTD.
www.oriondisplay.net

Address: 217, 1gongdan-ro, Gumi-si, Gyeongsangbuk-do, Korea
Tel : +82-2-6678-8533, Fax: +82-2-6678-8599

User's Manual
White Balance Auto Control System

Thank you for purchasing our MLCD.
WBCS is the exclusive program for ORION MLCD.

• 2014.05.23

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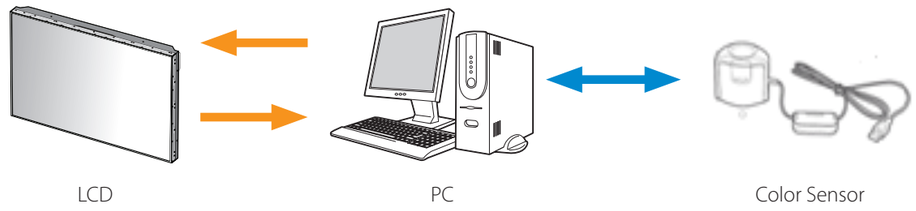
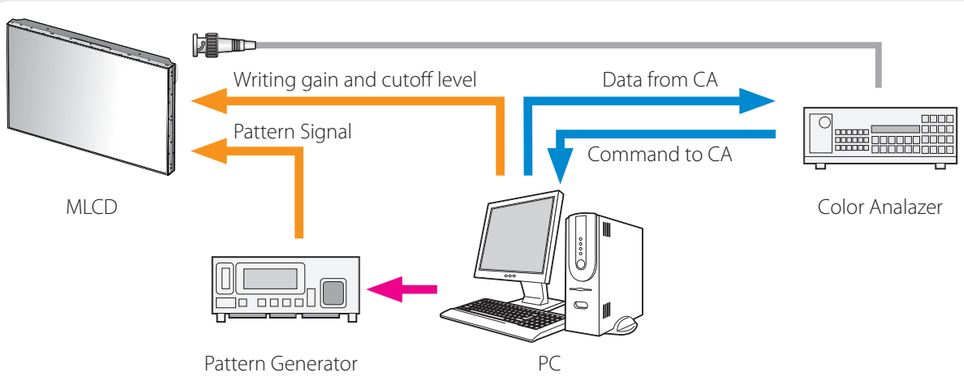


1.1.2. For the Pattern Generator and CA-210



If you use MLCD, Color Sensor (i1 Display), and PC (Desktop, Notebook), connect LCD and PC with Com port and use USB port for the connection between i1Display and PC.

If you use MLCD, Pattern Generator, Color Analyzer (CA-210) and PC (Desktop, Notebook), connect all the devices with Com port.

Before using Pattern Generator, Color Analyzer (CA-210), check the port speed and configurations.

16 grey, Low and High patterns should be prepared for Pattern Generator.

Request and initialize Zero Col for the Color Analyzer (CA-210).

1.2. ORION MLCD Connection

ORION MLCD

1.2.1. In case you use Pattern Generator

1) Connect Pattern Generator and cable based on input modes. (DVI, RGB, CVBS)
   - Connect the input that you want to adjust white balance only.

2) Connect serial cable to the Com port in PC or Laptop.
   - 115200Bps serial (RS-232C) communication.

3) Power on the MLCD.
   - The sequence of Cable connection and power on has no relation.

1.2.2. In case you don't use Pattern Generator (For PC use only)

1) Connect the cable to the Output port in the PC according to the input mode.(DVI, RGB)
   - Connect only the input that you want to adjust White Balance.

2) Connect Serial Cable to Com port in PC.
   - For 115200Bps Serial (RS-232C) communication.

3) Power on the LCD.
   - There is no specific order for Cable connection and Power on.

1.3. Color Analyzer Connection

Color Analyzer : CA-210

1) Connect Probe

2) Adjust the speed at 19200Bps with the terminals in the back of the device.
   - Refer to CA-210 manual

3) Connect serial cable to the Com port in PC or Laptop.
   - Refer to CA-210 manual for cable arrangement

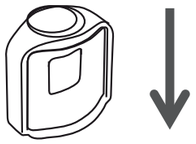
4) Power on, change the mode to Universal mode and execute Zero Col.

1.4. Color Sensor connection.

Color Sensor : i1 Display

1) Connect to the USB Port in PC.

2) Open the Ambient Diffuser Arm of i1 Display for measurement.



1.5. Connect Pattern Generator

Model: Baro BSG-360A, MIK-21 (B,C type) etc.

- Only the devices for serial communication can be used.
- Communication speed and Pin arrangement should be decided by each device.

1) Connect the serial cable to the Com port in PC or Laptop.

2) Power on the device.
   - The sequence of Cable connection and power on has no relation.

3) Check the pattern you want to use.
   - It is needed that Gain(high) pattern, Offset(low) pattern and 16 grey Pattern. Those patterns should be edited in the device.
   - Gain pattern and Offset pattern should have following output.

Gain pattern and Offset pattern should have following output.
Offset (low Pattern) : Video Level 15%
Gain (high Pattern) : Video Level 100%

1.6. Connection for Output port pattern of PC

1) Connect the output port of PC (DVI, PC) to the input port of MLCD.

2) Configure the graphic output monitor of PC after power on the MLCD.
   - e.g. If monitor No. 1 is connected to PC and monitor No. 2 and 3 are connected to MLCD via DVI and RGB, respectively, monitor No. 2 and 3 can be used as clone mode or expanded mode.

3) Check the necessary patterns.
   - Low and High Patterns can be configured by PCPattern.pcpt file in WBACS Data folder.
   - The Patterns are expressed by the combination of Red, Green and Blue and the range of each color is 0~255)

2. WBACS Installation

2.1. Installing WBACS

Supporting environment: Widows 2000, Windows XP, Windows Vista, Windows 7, Windows 8

• Execute the install program or copy and paste the WBACS execution file and Data folder.

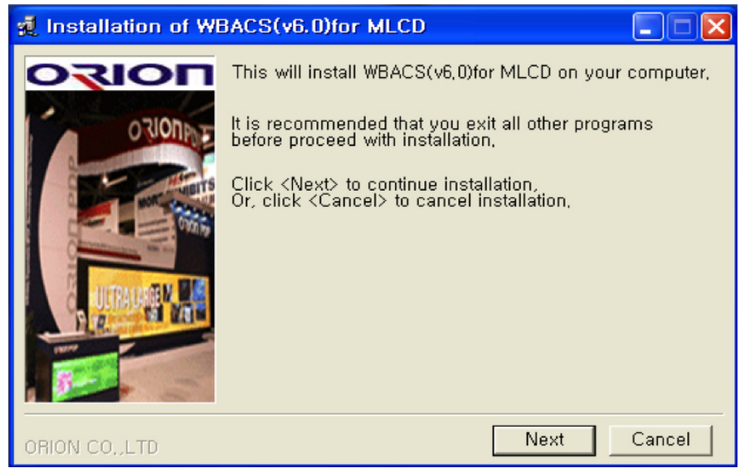
2.1.1. Installation with install program

1) Execute Install file .

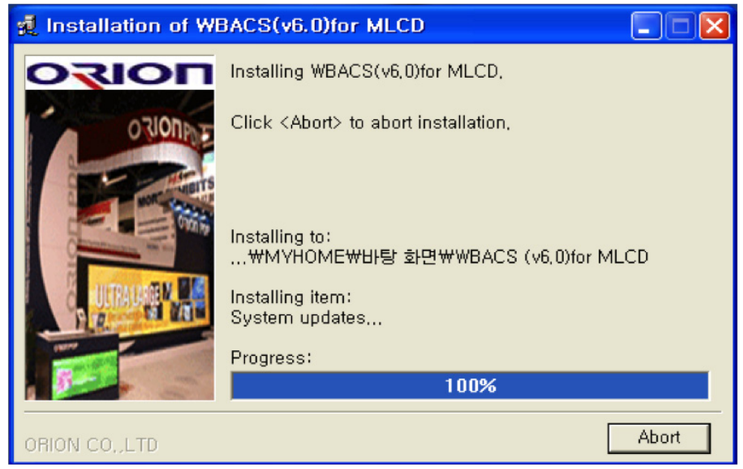
- WBACS(v6.0)for MLCD Install.exe

2) Click "Next" button.

3) Select the directory and click "Install".



4) The progressing bar indicates the installation process. If you want to cancel the installation click "Abort" before the Progress reaches 100%.



5) Click "OK" when the process is completed.

2.1.2. Copy and Paste

1) Copy the execution file WBACS(v 6.0) and the Data folder.

Caution

The necessary information and user information will be saved in the Data folder. It must be in the same folder with WBACS(v 6.0) for MLCD. exe.

2.2. WBACS Uninstall

1) Click the following steps.

2) Windows Start → Programs → ORION → WBACS(v 6.0) for MLCD → Uninstall_ WBACS (v6.0) for MLCD

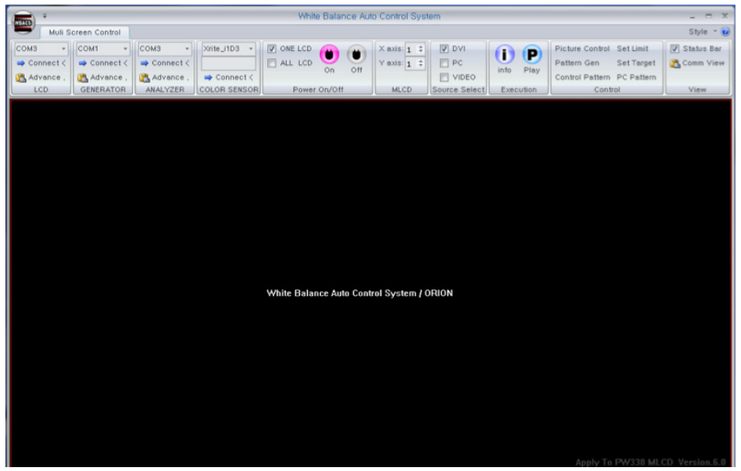
3) When you click "Yes", the uninstall procedure will be begun.

3. Configuration and Execution of WBACS

3.1. Executing WBACS

- WBACS is the application to control the white balance of MLCD automatically.
- The shortcut icon will be generated when the installation is completed.
- You can see the following initial screen of WBACS program by clicking the icon on User's PC.

1) Execute by double clicking.



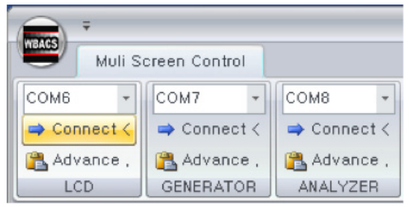
Main Image of WBACS(v6.0)for MLCD

3.2. Com port connection

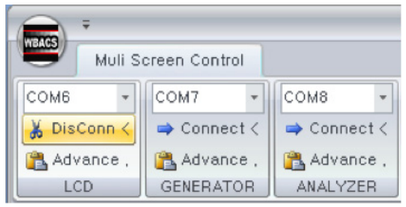
3.2.1. MLCD Connection

- Connect or disconnect the communication between PC and MLCD with this function.
- MLCD is connected to the Com port in a PC with RS-232C cable.

1) Select the port in LCD from the Menu bar, and click "Connect" to prepare the communication between PC and MLCD.
2) "Connect" button will be changed to "Disconnect" after the connection is established. To disconnect the communication, click "Disconnect"

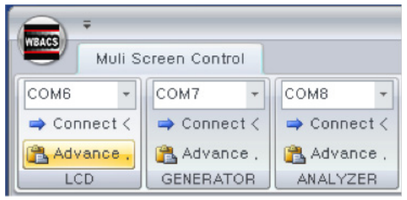


① LCD Connect Image

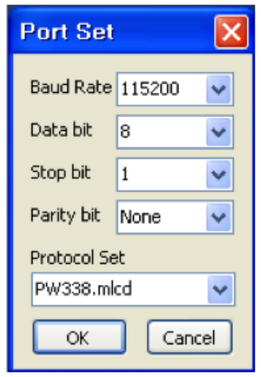


② LCD DisConnect Image

3) Click "Advance" for further configuration for Protocol and communication port.
4) The default set for Protocol set is PW338.mlcd.
Set as Baud Rate 115200, Data Bit 8, Stop bit 1 and Parity Bit None.



③ LCD Advance Image



④ LCD Port Set Image

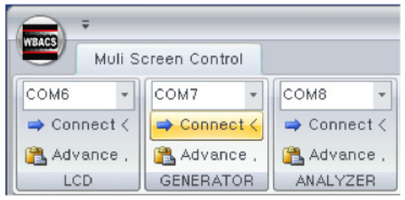
Caution Although Windows 2000 and Windows XP search and show all the Com port in a computer, Widows Vista only searches up to the 30th Com port. In case you need to use the Com port of 31st or higher, you need to change the port number at the Control board in the computer.

3.2.2. Connection for Pattern Generator

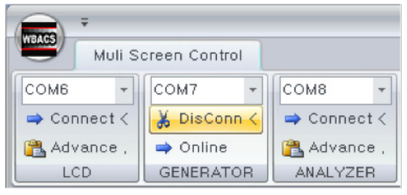
- Connect or disconnect the communication between PC and Pattern generator with this function.
- Pattern generator is connected to the Com port in a PC with RS-232C cable.

1) Select the port in Generator from the Menu bar, and click "Connect" to prepare the communication between PC and Pattern generator.

2) "Connect" button will be changed to "Disconnect" after the connection is established. To disconnect the communication, click "Disconnect".



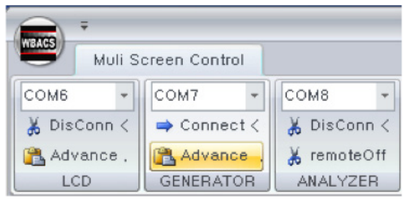
① Generator Connect Image



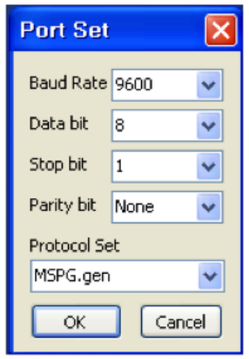
② Generator DisConnect Image

3) Click "Advance" for further configuration for Protocol and communication port.

4) Select the Protocol in the Pattern generator from Protocol Set.

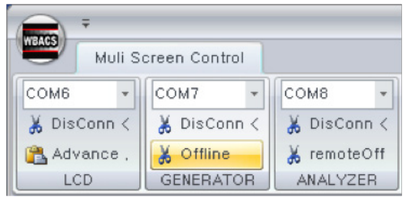


③ Generator Advance Image



④ Genetaror Port Set Image

5) "Advance" will be changed to "Online" after the connection is established. Depend on the makers, some Pattern generators can be controlled only at "Online" status.



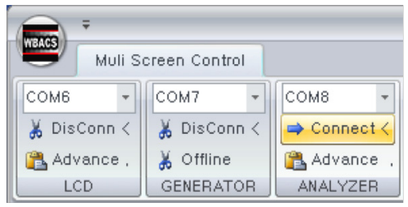
3.2.3. **Connect Color Analyzer** (CA-210)

- Connect or disconnect the communication between PC and Color Analyzer with this function.
- Color Analyzer is connected to the Com port in a PC with RS-232C cable.

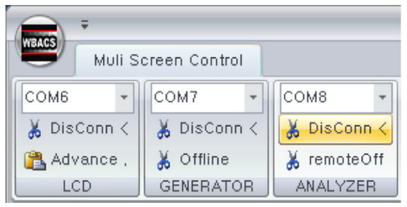
1) Select the port in Analyzer from the Menu bar, and click "Connect" to prepare the communication between PC and Analyzer.

2) "Connect" button will be changed to "Disconnect" after the connection is established. To disconnect the communication, click "Disconnect"

3) Click "Advance" for further configuration for Protocol and communication port.



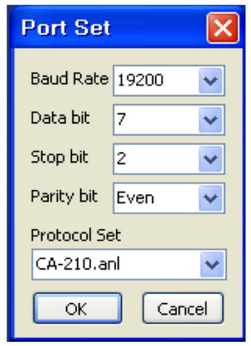
① Analyzer Connect Image



② Analyzer DisConnect Image

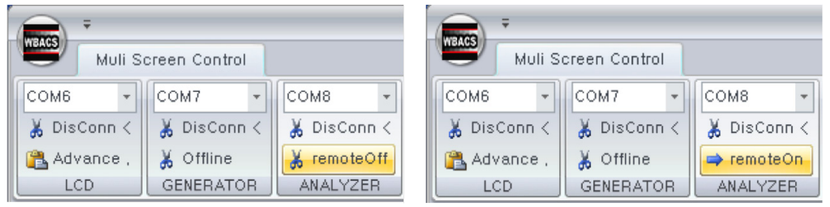
4) Select the Protocol in the Color Analyzer from Protocol Set.

③ Analyzer Advance Image



④ Analyzer Port Set Image

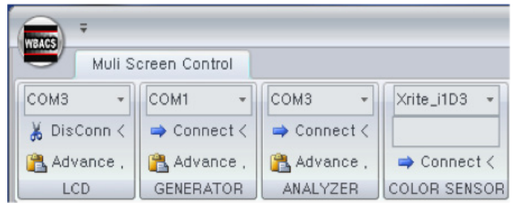
5) When the connection is established, it turns into "Remote on" status automatically and "Advance" button will be changed to "Remote off".



3.2.4. **Connection for Color Sensor** (i1 Display)

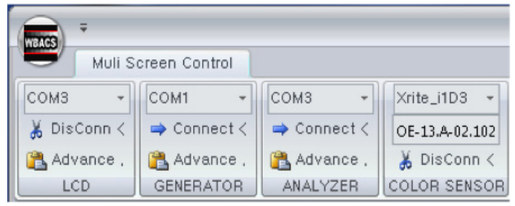
- Connect or disconnect the communication between PC and i1 Display(Color Sensor)
- Color Sensor (i1 Display) is connected to PC by USB port and cable.

1) Click "Connect" button of Color Sensor in the ribbon bar menu to prepare the communication between PC and Color Sensor.



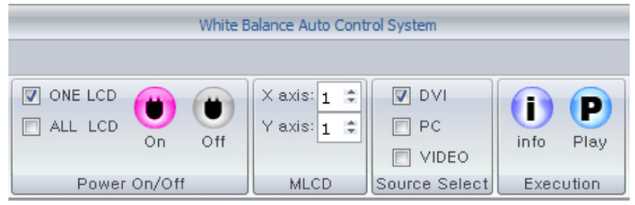
① Color Sensor Connect Image

2) Once the communication is connected, "Connect" button will be turned to "Disconnect"
Click "Disconnect" button to terminate the connection..



② Color Sensor DisConnect Image

3.3. Configuration for Multi-screen



Screen Configuration Setting

1) Input the exact number of X and Y of MLCD.
   - X is the number of MLCD set in horizontal side and Y is the number of MLCD in vertical side.
   - The numbers for X and Y can be selected from 1 to 15.
   - The arrangement of MLCD will be displayed at ①Main screen by clicking "Play" button.

Caution

It can be arranged up to the 99th MLCD set.
If you installed more than 100 sets, 100th and higher sets cannot be controlled.

2) Power On/Off
   - If you select "ONE LCD," you can transfer the command data to the MLCD of the currently selected ID.
   - If you select "ALL LCD," you can transfer the command data to the all MLCDs regardless of the ID.
   - You can turn on or off the selected single LCD or all LCDs according to the status of "ONE LCD" or "ALL LCD".

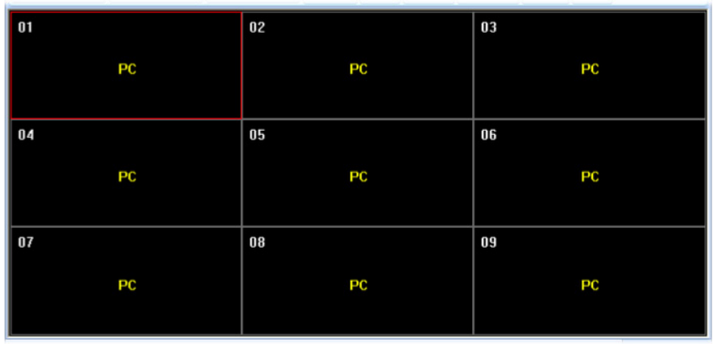
Caution

Under the Power off condition, all the commands to MLCD are ignored.
So, MLCD must be power on and ready before sending any command.

3) Input source can be selected among DVI, PC and VIDEO from "Source Slect..

4) Executing the Configuration

- Select the number of X and Y and click "Play" to display the selected configuration at the Main Screen.



① Main Screen (Input Source is PC, 3X3 setting)

Caution When you click "Play", all the configurations for multi-screen group will be removed. The colors for each input will be ignored and displayed as black.

5) To check the resolution, click "Info". It will be displayed at the lower right side of LCD.

6) ID setting

- To send data to MLCD, MLCD ID should be assigned at ① Main Screen.
- The ID can be selected at ① Main Screen by clicking the right button of the mouse. The selected ID will be indicated by the red border lines.

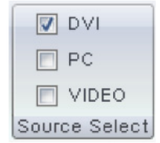
Caution If the program is freshly loaded or MLCD is connected for the first time, the input mode in the Main screen and the actual input mode may different.

3.4. Various Screen Formation

• Various screen formation are available with the variety of input configuration.

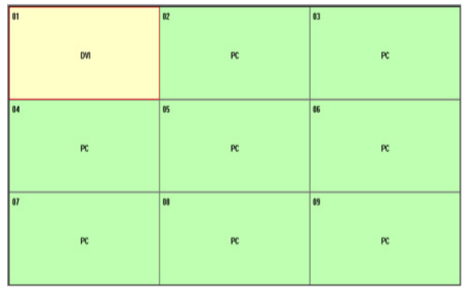
1) Select input source from "Source select" menu.

- e.g.) "DVI" input



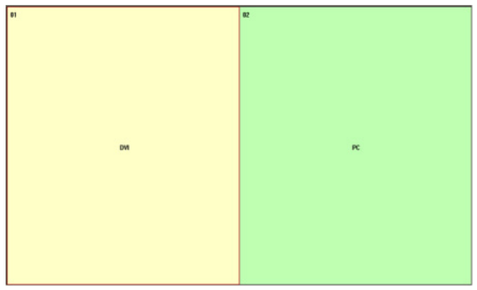
2) Click the MLCD that you want to change the input source at the Main Screen.

- Click the left button in your mouse on the screen you want to change.
- The screen is going to change as DVI input screen.



3) Various input screen can be obtained with the same manner.

- Following example shows the different input source for each LCD.
- Each input source is displayed the different color.
  (At the initial step, LCD is displayed in black. Because the input source is not known.)



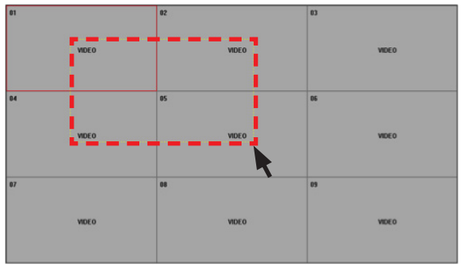
3.5. Multi-Screen configuration in One Step

• You can select multiple MLCD screen in one step.

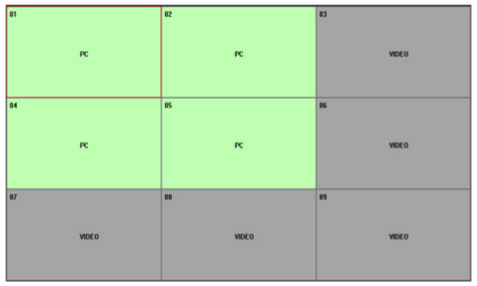
1) Select the input source in "Source Select" menu.

- e.g.) "PC" input

2) Click the first screen and drag to the screen of you want to select.



3) The selected screens turn into PC input.



Caution

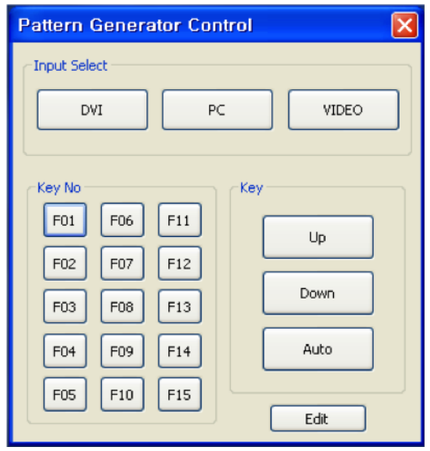
When you click "Play", all the configurations for multi-screen group will be removed. The colors for each input will be ignored and displayed as black.

3.6. Pattern Generator Control (For Pattern Generator)

• It is used to send the commands to Pattern generator o to execute the commands that edited in Key.

1) Click "Pattern Generator" in "Control" menu.

2) The widow for "Pattern Generator Control" is pop up.



- Click DVI, PC, or VIDEO buttons, the input source for all MLCD will be changed.
- Each of F01 to F15 button contains the designated commands, respectively. The command will be sent to Pattern Generator when you click the button.
- You can send the command in one step higher or lower button with "Up" and "Down" buttons.
- With "Auto" button, the commands in F01 to F15 can be repeated in circulation.

3) "Edit"

- You can edit the commands for F1 to F15 in each input mode.

- Click DVI, PC or VIDEO button to edit the command in each input mode.
- The commands will be assigned to F01 to F15 buttons from the top to the bottom of the left side and the top to the bottom of the right side sequentially.
- Timing No. and Pattern No. in Pattern Generator are coupled.
- "Delay Time" is the pause period between the commands for "Auto" mode.
- Click "save" to save the designated value in current input mode..

Caution

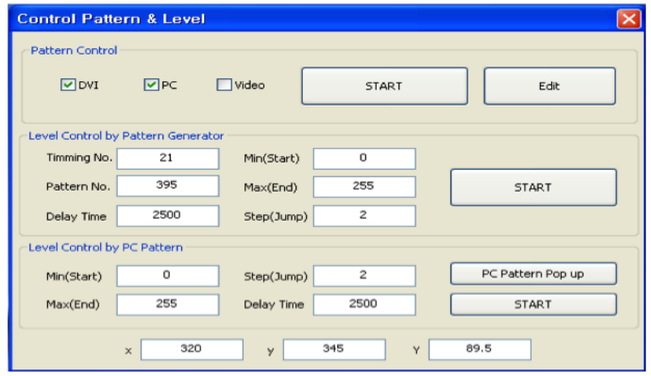
To save the data, you need to click "Save" prior to change input mode.
If not, all the new data will not be saved.

3.7. Control Pattern & Level

- This function is for saving data that is measured under the condition of changing input mode and pattern or increasing White level in predetermined interval.

1) Click "Control Pattern" in "Control" menu.

2) "Control Pattern & Level" window is pop up.

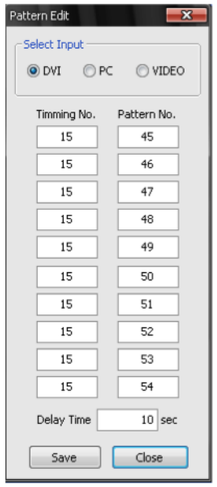


3) Pattern Control (For Pattern Generator) – Click "START" button.

- Sequentially execute the edited commands for the checked input modes in rotation.
- When you click "START" button, a window for the directory and the file name to save the measured data will be pop up.
- After type in the file name and click "Save" button, "START" button turns into "Stop" button.
- Click "Stop: button to stop the process. "Stop" button turns into "START" button.

4) Pattern Control – Click "Edit" button.

- Click DVI, PC, or VIDEO button to change the input mode.
- Each input mode has 10 combinations of Timing Call and Pattern Call.
- "Delay Time" is the stand-by time between each set of Timing Call and Pattern Call in sequence. It is decided for each input mode.
- Newly changed values will be saved by "Save" button. If there are any newly inserted or changed values, you must save the value before change the input mode.



5) Level Control

5-1) Using Pattern Generator

- It measures and saves the data of White level from Min. to Max. value. The value is increased step by step automatically.
- Send the command for Timing No. and Pattern No. only once at the beginning.
- When you click "START" button, a window for the directory and the file name to save the measured data will be pop up.
- After type in the file name and click "Save" button, "START" button turns into "Stop" button.
- Click "Stop: button to stop the process. "Stop" button turns into "START" button.

Caution Since this procedure needs the input signal from Pattern Generator, the measurement for x, y, Y of Color Analyzer and the mode change of MLCD, all 3 devices must be connected to Com port.

5-2) Using Patterns in PC

- Convert to the input source (DVI, PC) that you want to measure.
- Click "PC Pattern Pop UP" button to start a Pattern.
- Select the value of White Level (Min (0)~ Max(255)) and Delay time (msec).
- Click "Start" button in Level Control by PC Pattern Group Box.
- When you click "Start" button, a window will be popped up for the file saving path and file name.
- The process will be started by clicking "Save" button after assign a filename. "Start" button will be changed to "Stop" button.
- White Level value will be automatically increased between Minimum and Maximum values according to the step and measured. It stops and waits after a step increase for the delay time.
- The process will be halted by clicking "Stop" button and it will be change to "Start" button.

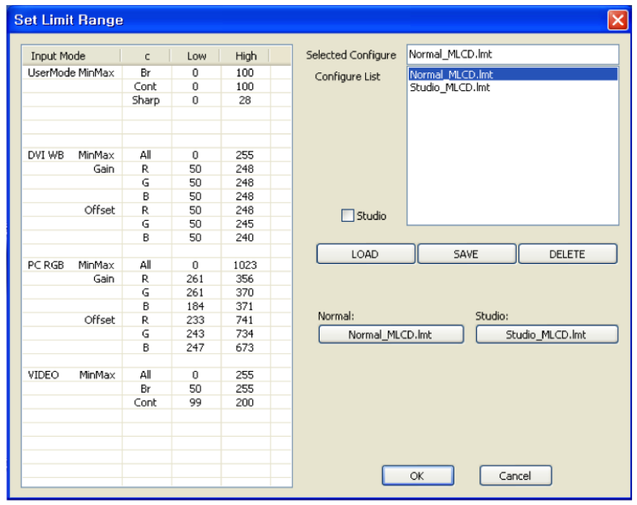
Caution Since this procedure needs the input signal from Pattern Generator, the measurement for x, y, Y of Color Analyzer and the mode change of MLCD, all 2 devices must be connected to Com port.

3.8. Set Limit

- It sets the upper and lower limitation for register value of MLCD.
- It is can be added, amended and deleted and handled as files.
- Each limitation is saved as a separate file and automatically applied when the program for the last loaded set is working.
- The configuration files of Normal and Studio mode are managed separately.

1) Click "Set Limit" in "Control" menu.

2) The window for "Set Limit Range" is pop up.

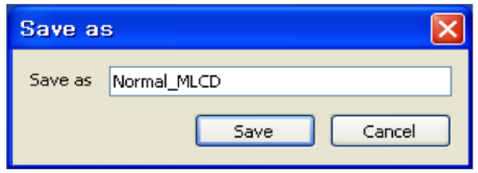


3) Click "Load" or double click the file to load

- Load each input limitation for User Mode, DVI, PC and VIDEO from the file.
- If the check box for Studio is checked, the loaded value is applied to Studio mode.

4) Click "Save" button to save the value

- It saves the input limitation value as a file.
- When you click "Save" button, a window for the file name will pop up.



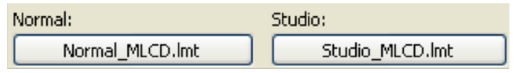
- Type-in only the file name without the extension.
- Click "Save" button. The check box status does not affect for saving data, checked or not checked.

5) Click "Delete" to delete the file

- The file in the list box will be deleted.

6) Data load with Quick button

- According to the check box status, you can open the file with the quick button. To use the quick button, it must be the last file of the previous program or loaded by clicking the "Load" button or the file name in the list box.



- The quick button indicates the currently applied file names and instantly loads the files to check and revise.

7) Edit Data

- This function is used to check and edit the currently selected files.
- "MinMax"-"All" part shows the maximum and minimum values that can be inputted manually for each input mode.
- "Low" and "high" parts show the changeable range of Gain and Offset of each input mode for R, G, and B during Auto White Balance.
- If you click the part that you want to edit, a input window with blue frame will pop up..

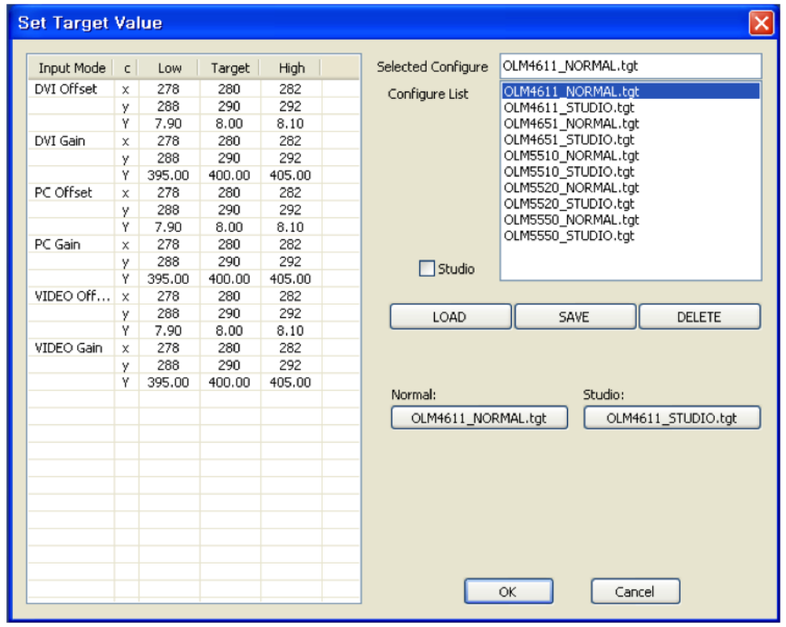
Input Mode		c	Low	High
UserMode MinMax		Br	0	100
		Cont	0	100
		Sharp	0	28
DVI WB	MinMax	All	0	255
	Gain	R	50	248
		G	50	248
		B	50	248
	Offset	R	50	248
		G	50	245
		B	50	240
PC RGB	MinMax	All	0	1023
	Gain	R	261	356
		G	261	370
		B	184	371
	Offset	R	233	741
		G	243	734
		B	247	673
VIDEO	MinMax	All	0	255
		Br	50	255
		Cont	99	200

3.9. Set Target

- Set the target value and the allowable error value for automatic White balance adjustment.
- It is managed as files and can be added, revised and deleted.
- They are saved as separate files and automatically applied when the program for the last loaded set is working.
- The configuration files of Normal and Studio mode are managed separately.

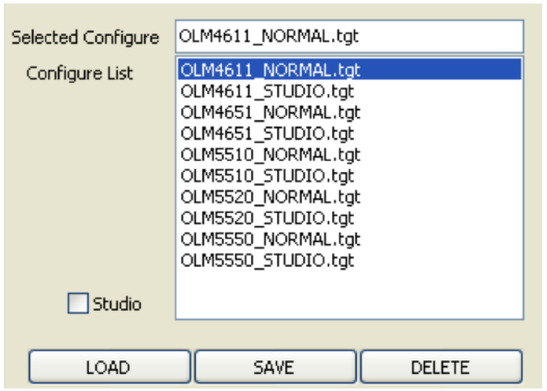
1) Click "Set Target" in "Control" menu.

2) The window for "Set Target Value" is pop up.



3) Click "Load" or double click the file to load.

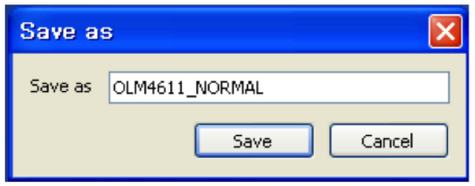
- Load the target value and the allowable error value for each item (x, y, Y) of DVI, PC and VIDEO from the file.
(Select the model and Color temperature and double click.)



- If the check box for Studio is checked, the loaded value is applied to Studio mode.

4) Click "Save" button to save the value

- It saves the target value and the allowable error value as a file.
- When you click "Save" button, a window for the file name will pop up.



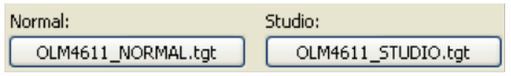
- Type-in only the file name without the extension.
- Click "Save" button. The check box status does not affect for saving data, checked or not checked.

5) Click "Delete" to delete the file

- The file in the list box will be deleted.

6) Data load with Quick button

- According to the check box status, you can open the file with the quick button. To use the quick button, it must be the last file of the previous program or loaded by clicking the "Load" button or the file name in the list box.



- The quick button indicates the currently applied file names and instantly loads the files to check and revise.

7) Edit Data

- This function is used to check and edit the currently selected files.
- Set the target value and the allowable error values of "High" and "Low" for Gain and Offset for each input mode.
- During Auto White Balance, "Low" and "high" parts are the coordination range. If they fall into the range, the corresponding parts get out of Auto control.
- If you click the part that you want to edit, an input window with blue frame will pop up.

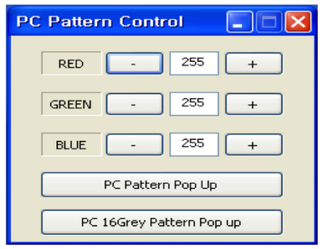
Input Mode	c	Low	Target	High
DVI Offset	x	278	280	282
	y	288	290	292
	Y	7.90	8.00	8.10
DVI Gain	x	278	280	282
	y	288	290	292
	Y	395.00	400.00	405.00
PC Offset	x	278	280	282
	y	288	290	292
	Y	7.90	8.00	8.10
PC Gain	x	278	280	282
	y	288	290	292
	Y	395.00	400.00	405.00
VIDEO Off...	x	278	280	282
	y	288	290	292
	Y	7.90	8.00	8.10
VIDEO Gain	x	278	280	282
	y	288	290	292
	Y	395.00	400.00	405.00

3.10. PC Pattern (for Patterns of PC output port)

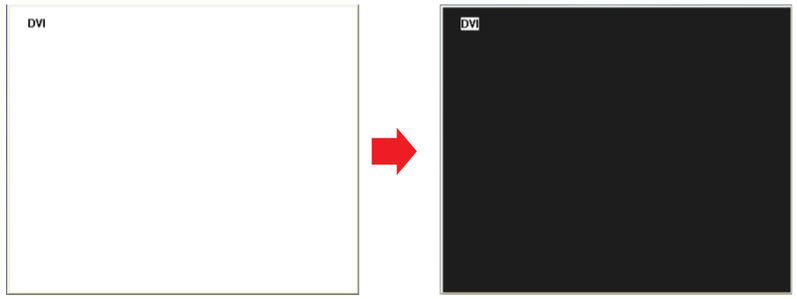
- This is the function to adjust White Balance using the Patterns of PC output port without the patterns from Pattern Generator.
- It can create patterns of Black (0) to White (255) with the combination of Red, Green and Blue. (The range of each color is 0 ~255)
- The output from PC is used for the input of LCD.

1) Click "PC Pattern" in "Control" menu bar.

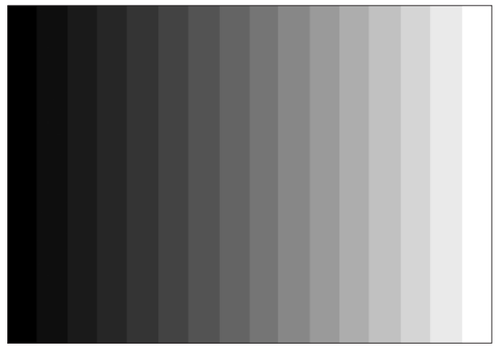
2) "PC Pattern Control" window will be popped up.
- The control range of Red, Green and Blue is 0 ~255, respectively.



3) Click "PC Pattern Pop Up" button to display Pattern.
- The pattern can be adjusted by "+" or "-" buttons.
- Or simply type in a certain number into Editbox and press "Enter"
- The adjusted value will be applied to the pattern instantly.



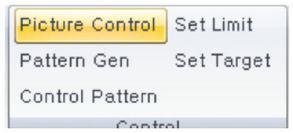
4) Click "PC 16 Grey Pattern Pop Up" button to display 16 Grey Pattern.
The PC 16 Grey pattern will be used for Auto Calibration at PC input mode.



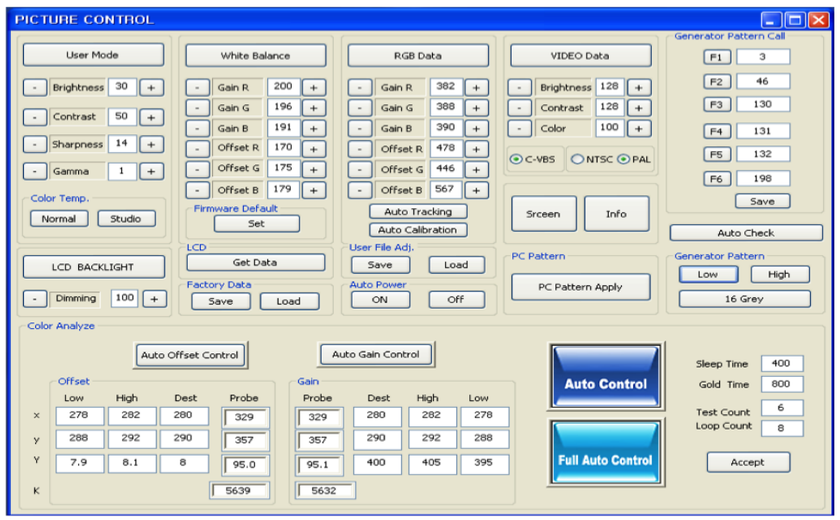
3.11. Picture Control

- It provides the interface for automatic White Balance.
- It controls the MLCD of the selected ID at the Main Screen.

1) Click "Picture Control" in "Control" menu.



2) The window for "Picture Control" is pop up.

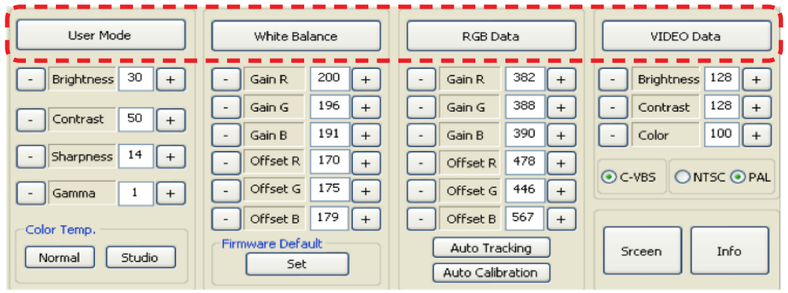


Caution

If MLCD port is not connected or it fails to load the registry value from MLCD, all the control become inactive. When it happens, close all the windows and check the cable connection and the power connection to MLCD.

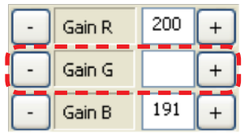
3) Converting input mode and Data input

- To convert the input mode, click DVI(White Balance), PC(RGB) or VIDEO.



4) Manual Data input

- Click the "+" or "-" button of the item that you want to change or type-in the value and press "Enter".

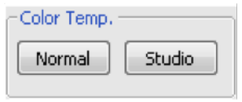


Caution

When you press "+" or "-" button, the changed value applied to the MLCD immediately. If you type-in a value, it will be applied only after you hit "Enter." So, if you do not hit "Enter" and convert to the other input method, the changed value will not be applied to MLCD unlike the screen display

5) Converting Normal and Studio

- When you click "Normal" or "Studio" button, the mode turns to the selected one. It loads the assigned files for the modes such as Target Limit Value file or Initial Value and changes the configuration automatically.



6) RGB Auto Tracking

6-1) Patterns from Pattern Generator

- When you click "Auto Tracking" button at RGB (PC) input mode, the pattern will be changed to a pattern which is suitable for Auto Tracking and do the process.

6-2) Pattern from PC

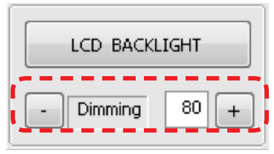
- When you click "Auto Tracking" button at RGB (PC) input mode, Auto Tracking will be done.

WARNING

Prior to Auto White Balance, Auto Tracking must be done manually.
Click "RGB Data" first -> "Auto Tracking"

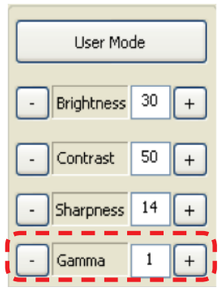
7) LCD BACKLIGHT

- To control the LCD backlight, adjust the dimming value.
- The dimming value affects only on the brightness value.



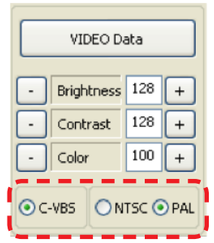
8) LCD Gamma

- This function adjusts Gamma of LCD.
- If the value is 1, it means no Gamma and 2 for 1.5 Gamma, 3 for 1.9 Gamma, 4 for 2.0 Gamma, 5for 2.2 Gamma, and 6 for 2.5 Gamma.

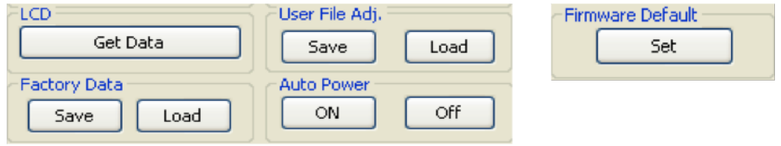


9) Additional Input mode options

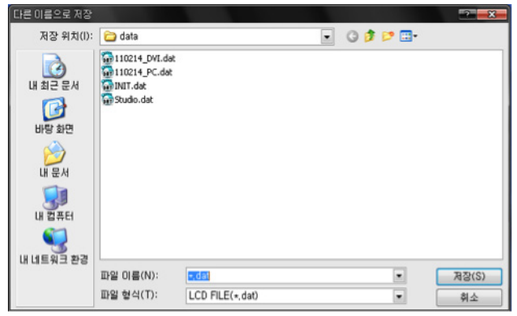
- VIDEO input supports C-VBS, NTSC and PAL methods. You can convert to the method of your choice by clicking "Video Data" button.



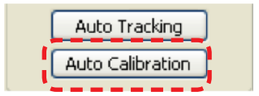
10) Functional Buttons



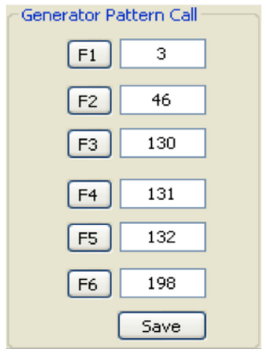
- LCD "Get Data" shows the assigned registry value of MLCD.
  (You can use this function to check the value. Basically, the values are automatically displayed, when you open the "Picture Control" window.)
- Firmware Default "Set" loads the initial values of MLCD Register.
- Factory Data "Save" saves the initial factory values. "Load" initializes the values as the factory values.
- Use file Adj. "Save" saves the current values. "Load" reads the values from a file and changes the register values of MLCD.
- In case of "Save" or "Load", the file names to save or load will be designated as shown below.



The folder that WBACS is installed will be designated as the default data folder.

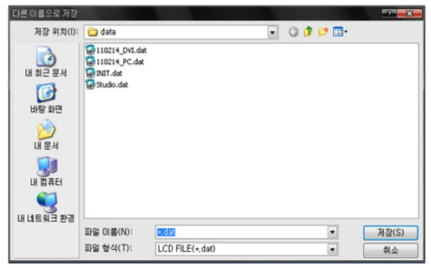


- Auto Calibration "Set" is the function that adjusts the White Balance automatically for RGB (PC) input mode. It adjusts the value based on the White level adjusted at DVI input mode.
- The patterns in Generator Pattern Group Box will be used for Pattern Generator. "Low" patterns are dark patterns for adjusting Offset value and "High" patterns are bright patterns to control Gain value.
- "16 Grey" is the pattern for Auto Calibration.



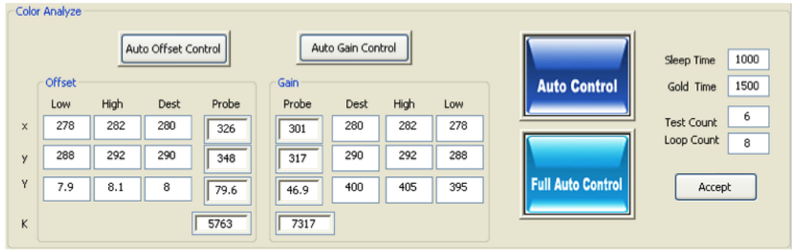
- "Screen," "Auto Power On, Off," and "Info" buttons do as the name indicate. (They are the commands for MLCD control.)
- For the functions of "F1"~"F6," input the decimal numbers for the patterns that will be sent to the pattern generator. Click "Save" after editing the values.

- "Auto Check" increases Offset R,G,B value and Gain R,G,B value within the allowed range by 1 at a time. The measured values of x, y, Y will be saved as a file.
- When you click the button, following window will pop up.

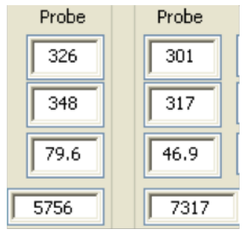


- Select the Gain, Offset R, G and B to check from Pattern Control.
- Click "Start" and assign the file name as shown in the picture.
- "Start" button will be changed to "Stop."
- Click "Stop" to halt the measurement. (The saved file is a text file with separators. It can be processed with Excel program.)

11) General functions of White Balance Auto Control

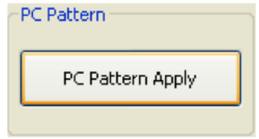


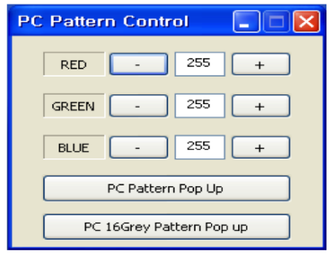
- When you use CA-210, Probe shows the values of x, y and Y which are measured from Color Analyzer in real time.
- When you use i1 Display, Probe shows the values of x, y, Y and K which are measured from Color Analyzer in real time. (Color Temperature: Kelvin).



- If you change the input mode while using Pattern Generator, it will be initiated with High pattern and will be displayed at the Probe window for Gain.
- If you click "Low" pattern in Pattern menu, the pattern will be changed to Low. It is displayed at the Probe in Offset side.

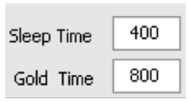
- If you adjust through the output port (DVI, PC) of PC, White Pattern will be popped up by clicking "PC Pattern Apply Button" for PC Pattern Control Dialog and White Balance.
- Pattern will be expressed by the combination of Red, Green, and Blue. The range of each color is 0 to 255.
- While the output of PC (DVI, PC) is connected to LCD, Pattern has to be displayed on the LCD screen with clone mode or expanded mode by the graphic card in a PC to use PC Pattern to adjust White Balance.
- Pattern will be changed to Low (dark) pattern or High (bright) pattern automatically for adjusting White Balance. Low and High patterns can be configured by PCPattern.pcpt file in the data folder.
- In case of Auto Control or Full Auto Control, it will be automatically changed to Low or High patterns which are configured in PCPattern.pcpt file.



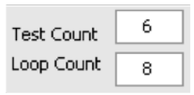


- Sleep Time is the stand-by time between the steps of Auto Control. It can be controlled as ms (1/1000 second). But, if you apply too short period, it may bring the un-renewed value.

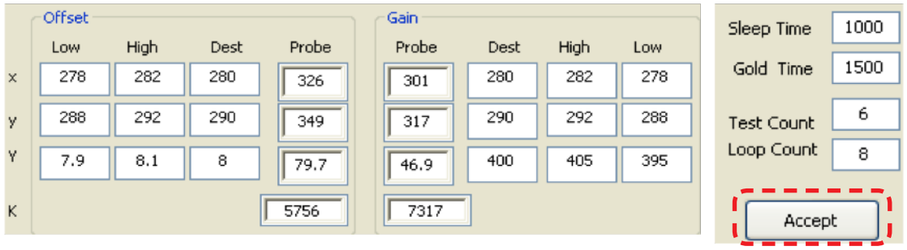
- **Gold Time:** It is the time to stabilize the measured data for X and Y, and brightness Y.



- **Test Count** : It is the repeat count to adjust the value for Offset or Gain RGB.



- Loop Count is the number of repetition of Offset and Gain.
  If the values of Gain and Offset do not reach to the target value, the operation will be halted.
  The operation is completed, when the x, y, and z values reach to the target value. So, it repeats "High" and "Low" patterns. Since it needs to check the coordination of the values, it has to repeat one more time than the number of actual adjustment.
  In addition, there can be a lot of wobbling during the repetition of "High" and "Low" patterns. It may cause inaccurate data measure and test error for coordination. Although it may take longer time, enough numbers of repeated test are required.



- Accept is used to apply the changed values for Sleep Time, Gold Time, Test Count, and Loop Count, if High, Low or Dest values of Gain or Offset are changed.
  Since these values are applied to one of input modes. Click Accept" button before changing input mode. The values will be saved automatically.

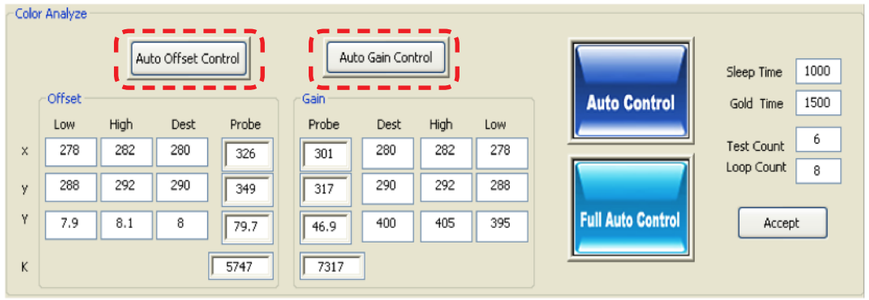
WARNING

When you click "Accept" after changing High, Low or Dest values, the values in the file that was assigned by "Set Target Value" will be changed. So, it is recommended to copy and save the file separately. If you click "Accept" to revise the data while "Set Target Value" window is still opened, the result does not show up immediately. You need to reload the data file.

12) Starting White Balance Auto Control – Manual conversion for Offset and Gain

12-1) Pattern Generator

A. Click Low Pattern=> Click "Auto Offset Control"



- Click "Auto Offset Control" to adjust Offset first after converting to Low Pattern.
  ("Complete!" message will be showed up for a moment when it is completed.)

B. Click High Pattern=> Click "Auto Gain Control"

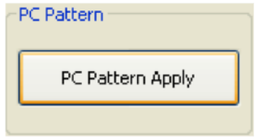
- Click "Auto Gain Control" to adjust Gain first after converting to High Pattern.
  ("Complete!" message will be showed up for a moment when it is completed.)

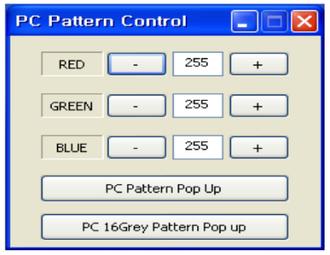
C. Repeat Step A) and B) to adjust Offset and Gain.

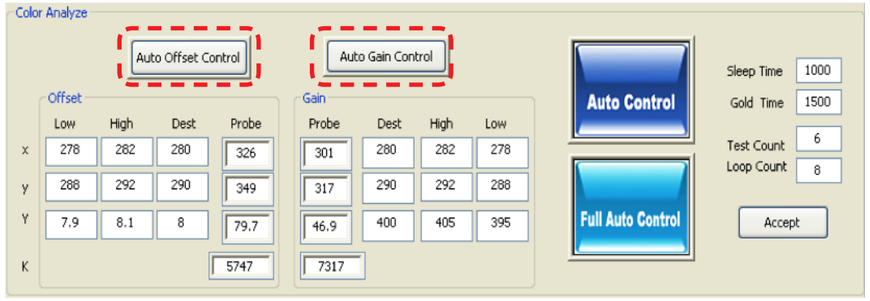
WARNING

In case "Auto Control" button is inactive at "Picture Control" window, MLCD, Pattern Generator or Color Analyzer is not connected properly. Check the connection again.

12-2) Patterns from PC Output (Without Generator Pattern)







A. Configure the values for RED, GREEN, and BLUE after PC Pattern Pop Up
⇒ Click "Auto Offset Control"

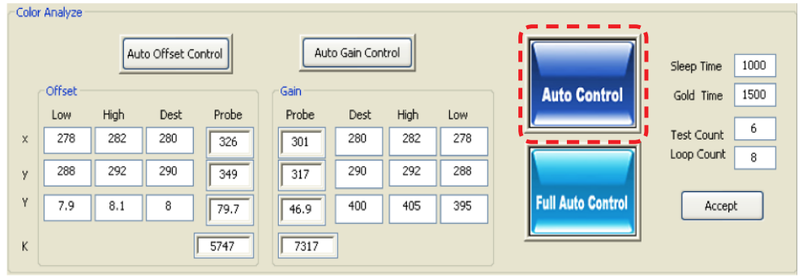
- Click "Auto Offset Control" button to adjust Offset after pattern change to Low pattern in which each of Red, Green, and Blue is set as 127 or lower.
- The Low value can be set with PCPattern.pcpt file in Data folder.
(When it is completed, "Complete!" window will be displayed for a moment.)

B. Configure the values for RED, GREEN, and BLUE after PC Pattern Pop Up
⇒ Click "Auto Gain Control"

- Click "Auto Gain Control" button to adjust Gain after pattern change to High pattern in which each of Red, Green, and Blue is set as 128 or higher.
- The High value can be set with PCPattern.pcpt file in Data folder.
(When it is completed, "Complete!" window will be displayed for a moment.)

C. Repeat A and B procedures to adjust Offset and Gain

13) White Balance Auto Control – Click "Auto Control"



A. Click "Auto Control" after converting to the input mode of your choice.

B. Wait until "Complete!" window pops up.

- Repeat High and Low patterns automatically to adjust the values to target value..

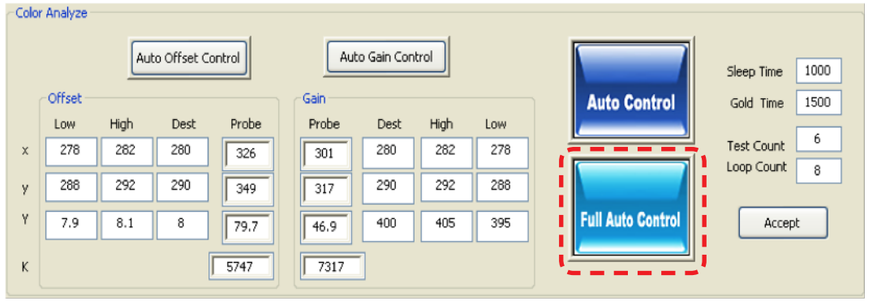
If it is successful, "Good" is displayed. If not, "NG" is displayed.

- The number of repetition and stand-by time are decided based on Sleep Time, Gold Time, Test Count and Loop Count..

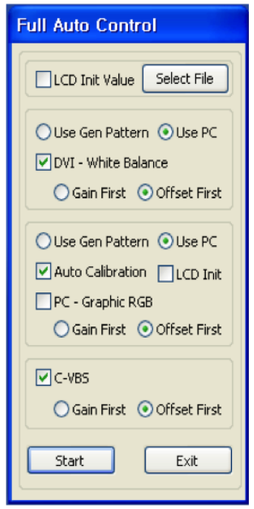
※ If you want to stop the procedure, click "STOP" button that was converted from "Auto Control" button

14) White Balance Auto Control – Click "Full Auto Control"

• It controls whole process from DVI to VIDEO all at once.



A. Click "Full Auto Control"



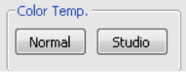
- "Full Auto Control" window pops up.

① LCD Init Value is the initial values for each input mode that you can assign. Using the assigned values as starting values that is close to the target value, the process can be completed in short time.

- Click "Select File" to select the files of initial files.

WARNING

If you select a file during Normal mode, the file will be regarded as the initial file of Normal mode. It is also same for Studio mode. Since the last selected files will be loaded for each mode automatically, it is not necessary to select files. But, in case of Color Temperature change, click "Get Data" button in LCD Group Box.



② Select the input mode among DVI, PC, or C-VBS for Auto White Balance.
However, it does not support CVBS during the adjustment with the pattern from PC.

WARNING

White Balance for DVI must be the first one to be adjusted. If it is not adjusted separately, the check box of DVI must be checked. If the adjustment for DVI is not successful when DVI is checked, all the other procedures will be ignored.

③ Check Auto Calibration for PC mode.

WARNING

If PC is checked during Auto White Balance, Auto White Balance is executed after Auto Calibration.

If Auto White Balance for PC mode (PC-Graphic RGB) is not checked, the other procedures of check mark will be done after Auto Calibration.

If you want to display a pattern in the White Balance Program through the outport in your PC for for Auto Tracking, select 16 grey pattern.

④ If you want to apply the initial value for PC mode after Auto Calibration, it is necessary to mark for LCD Init of the responding input mode.

WARNING

①The status of LCD Init Value does not affect the result; Checked or not.

In case of ①, it is the case that Auto Calibration is not marked. But, the file of the initial value follows as ①.

⑤ Select a pattern for each input mode.
If you want to Gain first, it starts with High pattern. In case of Offset first, Low pattern..

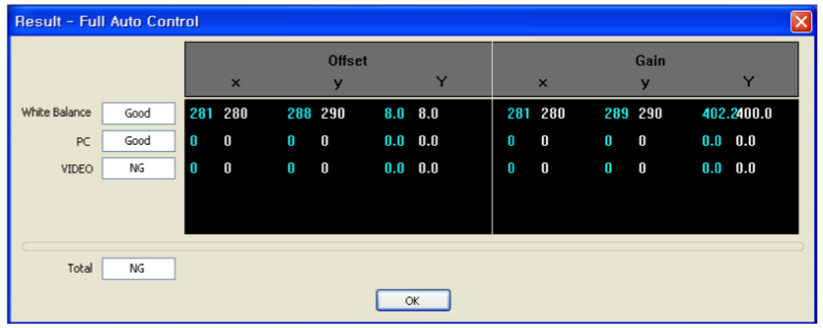
WARNING

It is recommended to start with Gain to increase the whole brightness, if the brightness of full white is lower than you want.

⑥ Click "Start"
Execute procedures of the selected input mode sequentially.

※ If you want to stop the procedure, click "STOP" button that was converted from " Full Auto Control" button

⑦ The window for result will pop up when all the procedures completed.
(It also appears when the procedures are manually halted.)

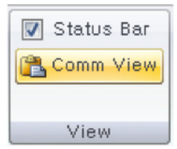


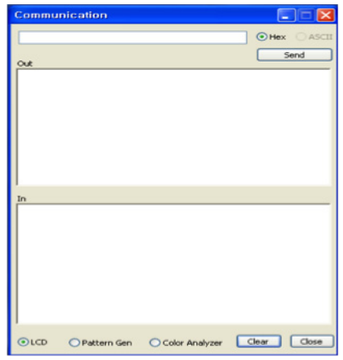
- If White Balance adjustment is successful, it displays "Good." If not, "NG"
- If any procedures are unsuccessful, 'NG" is displayed for "Total."
- As explained above, in case DVI procedure is NG, all the other procedures will be ignored. But the above picture shows the Auto Calibration of PC mode and DVI was marked.
- If it is successful, it is indicated with blue color. If it fails, it is indicated with red color.

3.12. Comm View

• You can monitor the input and output for each Com port.

- It is useful to test communication protocol for each device.

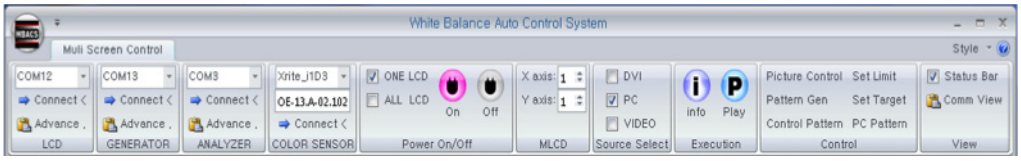




3.13. How to use Ribbon Bar

• All the control functions are managed by Ribbon Bar menu.

- If the window width is enough, all the sub menus of Ribbon Bar are displayed.



- If the window width is not enough, some of the sub menus of Ribbon Bar are not displayed.
- To view the sub menu, click Top menu.