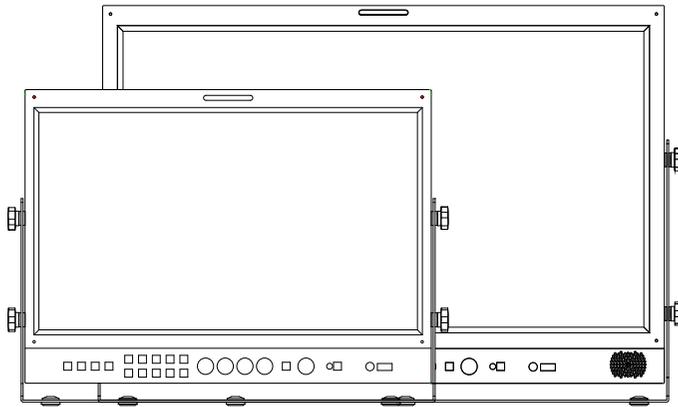


# 4K LCD Professional Monitor with 12G-SDI Single Link 4K



## Operational Instructions

OBM-U240

OBM-U170

## Table of Contents

1. Precaution .....	3
2. Main Features .....	5
3. Location and Function of Parts and Controls	
Front Panel .....	7
Rear Panel .....	8
4. Using the Menu .....	10
5. Adjustment Using the Menus .....	11
6. OSD Menu Operations	
Status Menu .....	12
Color Temp/Color Space/Gamma Menu .....	13
Zebra/Focus Menu .....	14
User Configuration Menu .....	15
Remote Menu .....	18
7. Scan Mode Image (OBM-U240) .....	19
8. Scan Mode Image (OBM-U170) .....	20
9. Connecting the SDI Signals .....	21
10. Available Signal Formats .....	22
11. Other Functions .....	24
12. Product Specification .....	25

## 1. Precaution

Always use set voltage.

AC 100 ~ 230V, 50/60Hz

DC 12V(OBM-U170) or DC 24V(OBM-U240)

All these instructions should be read and understood before operating the unit.

If liquid is spilled on or impacts this product, please disconnect the product immediately and seek professional help before continued use.

Unplug the unit from the wall outlet if it is not to be used for several days or more.

Keep unit in a well-ventilated place to prevent overheating.

Do not install the product near any heat-generating equipment. Also, keep the product out of direct sunlight or dusty areas.

Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

When using other DC 12V(OBM-U170) or DC 24V(OBM-U240) adapters instead of the standard adapter provided by the manufacturer, please check the proper load capacity or current capacity and use an adapter with stable voltage.

Do not overload AC outlets or extension cords. Overloading can cause fire or electric shock.

A very small proportion of pixels may be stuck, either always off (black), always on (red, green, or blue), or flashing. In addition, over a long period of use, because of the physical characteristics of the liquid crystal display, such stuck pixels may appear spontaneously. These problems are not a malfunction.

If a fixed picture such as a frame of a divided picture or time code, or a still picture is displayed for a long time, an image may remain on the screen and be superimposed as a ghosting image.

The permanent burn-in may occur for LCD panel if still images are displayed in the same position on the screen continuously, or repeatedly over extended periods.

To reduce the risk of burn-in,

- a. Turn off the character displays.
- b. Turn off the power when not in use.
- c. Turn off the power if the monitor is not to be used for a prolonged period of time.

## 1. Precaution

Do not attempt to service the product yourself. Removing covers can expose you to high voltage and other dangerous conditions. Request a qualified service person to perform servicing.

When the product needs replacement parts, make sure that the service person uses replacement parts specified by the manufacturer, or those with the same characteristics and performance as the original parts. Use of unauthorized parts may result in fire, electric shock and/or other danger.

Only clean the product with a noncommercial, mild and neutral detergent.

Do not throw away the carton and packing materials. When transporting the product, make use of its original packaging for safer carriage.

### FCC (Federal Communications Commission)

This equipment has been tested and found to comply with the limits for class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**⚠ Warning!!** : Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

### Disposal of Old Electrical & Electronic Equipment

(Applicable in the European Union and other European countries with separate collection systems)

This symbol on the product or on its packing indicates that this product shall not be treated as household waste. Instead it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequence for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. The recycling of materials will help to conserve natural resources.



## 2. Main Features

4K professional monitor OBM-U170/U240 Series unit has the following features:

- Versatile 4K/QFHD Input Capability

This monitor is equipped with standard 12G-SDI input interface(x2), 3G/HD-SDI input interface(x2) and support 4K 2-sample interleave signals and 4K square division signals.

This monitor accepts up to 3840x2160 23.98/24/25/29.97/30/50/59.94/60p and 4096x2160 23.98/24/25/29.97/30/50/59.94/60p

- Supporting 12G/6G-SDI(4K) 2 Channel, 3G/HD-SDI (Level A/B) 2 Channel

- Quad Link Square Division

- Quad Link 2 Sample Interleave (2SI)

- 3D-LUT for Accurate Color Reproduction (ITU-R BT.709, SMPTE-C, EBU, Native, D-CINEMA, ITU-R BT.2020)

- Gamma Selection (1.0 ~ 3.0)

- Color Temperature(3200K, 5500K, 6500K, 9300K, USER 1/2/3, D-CINEMA)

- Support 4096x2160 Aspect

- Compare Color Space & Gamma (Side by side, Wipe position)

- Monitor Update/Control via Ethernet, USB / RS-422

- Focus Assist

- Zebra

- Waveform, VectorScope (Wave + Vector, Waveform Wide)

- Exposure Range Check

- Camera Log Conversion

- Firmware Update via USB Flash Memory

- Various Markers (EBU, 4:3, 16:9, 1.85:1, 2.35:1, Variable etc.)

- Zero Scan / Over Scan /1:1 Scan

- H/V Delay

- Blue/Mono

- Time Code Display

- De-embedded 8~16ch Audio Level Meter

- Remote Control via GPI(RJ-45) Port

- White Internal Patterns Display for Color Test

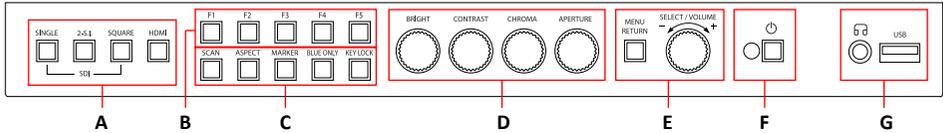
- 3 Color TALLY Lamp

- Rack & VESA Mount (Option)

- SFP optical connector

### 3. Location and Function of Parts and Controls

#### Front Panel



#### A : Input select Buttons/Lamp

Press to monitor the signal input to each connector.

##### [SINGLE] Button/Lamp

- Press the button to select SDI input or SFP input for one channel.
- Mode changes in the order of [12G SDI-1], [12G SDI-2], [3G SDI-3], [3G SDI-4], [SFP]\*.
- \*When a SFP module is inserted, [SFP] input can be selected.

##### [2-S.I.] Button/Lamp

- Press the button to select 2-SAMPLE Interleave SDI input signal through two or four SDI inputconnectors.
- Mode changes in the order of [Dual-Link 2-S.I.], [Quad-Link 2-S.I.].

[SQUARE] Button/Lamp - Press the button to select [Quad-Link Square Division] mode.

[HDMI] Button/Lamp - Press the button to select HDMI input.

#### B : F1 ~ F5 Button/Lamp

Press to adjust or turn on/off the assigned function.

The following functions are assigned at the factory.

[F1]: Color Space Compare

[F2]: H/V Delay

[F3]: Color Temp

[F4]: Audio Level Meter

[F5]: Time Code

#### C : Function Button/Lamp

Press to adjust or turn/off each function.

[SCAN] Button - Press the button to adjust the scan mode. (Zero Scan, 1:1 Scan).

[ASPECT] Button

- Press the button to select the Aspect Ratio of the signal.

- Mode changes in the order of [16:9] [4:3] [2.35:1] [1.85:1] [15:9] [16:10] [AUTO].

[MARKER] Button- Press the button to activate and deactivate the Marker.

[BLUE ONLY] Button

- Press the button to activate and deactivate the Blue Only function.

- You may remove R(red) and G(green) from the input signal and play the screen only with B(blue) signal.

This function is convenient to adjust Chroma and Phase and to observe the signal noise.

- The button may be pressed twice to change the screen to MONO mode.

(This mode uses only Luminance value)

[KEY LOCK] Button- Press the button to lock all buttons except Power.

#### D : Rotary encoder

[BRIGHT] knob

Press this knob to display the adjustment screen and adjust the picture brightness. Press again to hide the adjustment screen. Turn the knob right to increase the brightness and turn left to decrease it.

[CONTRAST] knob

Press this knob to display the adjustment screen and adjust the picture contrast. Press again to hide the adjustment screen. Turn the knob right to increase the contrast and turn left to decrease it.

**[CHROMA] knob**

Press this knob to display the adjustment screen and adjust the color intensity. Press again to hide the adjustment screen. Turn the knob right to increase the color intensity and turn left to decrease it.

**[APERTURE] knob**

Press this knob to display the adjustment screen and adjust the picture sharpness. Press again to hide the adjustment screen. Turn the knob right to make the picture sharper and turn it left to make the picture softer.

**E : Menu Operation Buttons**

Displays or sets the on-screen menu.

**[MENU/RETURN]**

- Activates and deactivates the display of the Main Menu.
- When the on-screen menu is not displayed, if this button is pressed the main menu is display. When the menu is displayed, press the button to return to the previous menu.

**[SELECT/VOLUME] knob (Menu selection control)**

- When the menu is displayed, turn the knob to select a menu item or setting value, and then press the knob to confirm the setting.
- If the menu is not displayed and this knob is pressed, the adjustment screen of [VOLUME] is displayed to adjust the audio volume.
- Press this knob to change the modes in the order of [Focus Frequency] [Zebra Level] [Line Position] [Variable Marker] and adjust each mode's value.

[Focus Frequency]: When Focus Assist function is activated, this mode is displayed.

[Zebra Level]: When Zebra function is activated, this mode is displayed.

[Line Position]: When WFM/Vector function and Line Select function is activated, this mode is displayed.

[Variable Marker]: When Marker function is activated and Aspect Marker is set Variable, this mode is displayed.

**F :  (Standby) switch and indicator**

- Press to turn the power on when this monitor is in standby mode. After being turned on, the monitor performs Initialization and the indicator flashes in green.
- Press the switch again for a second to set the monitor in standby mode. Then, the indicator flashes in orange and then turns red. The indicator in orange means that the monitor goes into the standby mode. When the indicator flashes in orange, this button doesn't work.

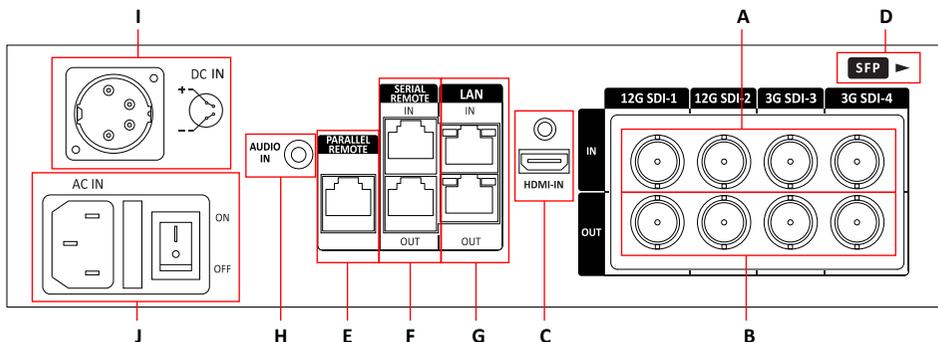
**G :  (headphone) jack & Speaker and USB connector****Headphone jack & Speaker**

- The audio signal which is selected using the input select button is output in stereo sound.
- When SDI signals are input, the audio signals of the channels selected with SDI Audio Setting in the User Configuration menu are output.
- When the headphones are connected to the  jack, audio signals will not be output.

**[USB] Connector**

- To update CPU, GPU, FPGA program.
- To connect the monitor with the Color Calibration program provided by the manufacturer and perform the color calibration.
- To connect the monitor with the control program provided by the manufacturer and control functions remotely.

## Rear Panel



### A : SDI IN (SDI Input) connectors (BNC)

Input connectors for SDI signals. For details, see “Connecting the SDI Signals” (page 21).

### B : SDI OUT (SDI Output) connectors (BNC)

Output connectors for SDI signals.

Each connector outputs the signal which is input to the corresponding SDI IN connector.

**\*\*Note** - Output is activated only when the power is on. Output is not activated in standby mode.

### C : HDMI input connectors

Input connectors for HDMI signals.

- For an HDMI cable, High Speed HDMI Cable with the cable type logo or HDMI 2.0 Cable is recommended.
- When inputting 4K resolution(3840 x 2160 or 4096 x 2160) signal, use a cable of 3m or less.

### D : SFP Input connector

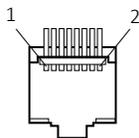
Input connector for SFP optical signal.

### E : PARALLEL REMOTE connector(RJ-45, 8-pin)

Forms a parallel switch and controls the monitor externally.

**\*\*Note** - For safety, do not connect the connector for peripheral device wiring that might have excessive voltage to this port. Follow the instructions about this port.

[Pin Assignment]



Functions can be changed in [Remote] section of the menu.

Pin Number	Function
1	Single SDI
2	2-S.I. SDI
3	Square SDI
4	HDMI
5	1:1 Scan
6	Aspect
7	Power
8	GND

**F : SERIAL REMOTE IN/OUT connector (RJ-45)**

Used for the future function expansion.

Connects the monitor to the control program provided by the manufacturer by using RS-422/485 communication or the external UMD(IMD) equipment and controls the monitor.

**G : LAN(10/100) IN/OUT connector**

Used for the future function expansion.

Connects to the LAN (10/100) connector of the network by using 10BASE-T/100BASE-TX LAN cable.

A daisy chain connection using the LAN input/output connectors enables the control of multiple monitors in sequence.

**H : AUDIO IN connector (Stereo mini jack)**

Connector for analog audio input.

Analog input can be selected with SDI Audio Setting in User Configuration menu.

**I : DC IN terminal**

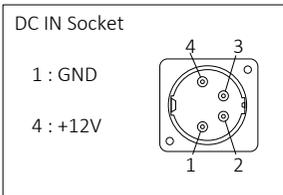
Connects the DC power supply to the monitor.

- OBM-U170: 12V

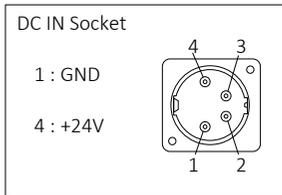
- OBM-U240: 24V

Make sure to use DC 12V power supply for OBM-U170 and DC 24V power supply for OBM-U240.

OBM-U170



OBM-U240



**J : AC IN terminal**

AC power input connector.

Connects the provided AC power cord.

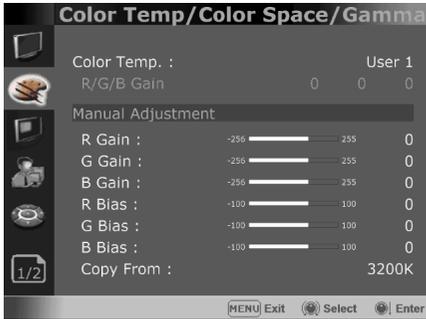
## 4. Using the Menu

This monitor is equipped with an OSD menu to make various adjustments and settings such as picture control, input setting, set setting change, etc.

### 1. Press the MENU button.

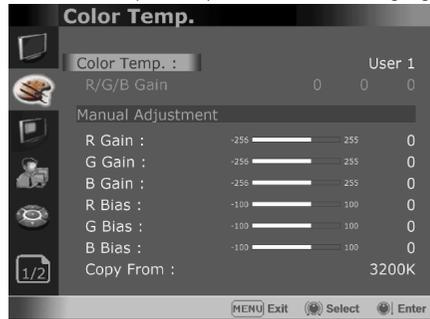
The menu appears.

The menu presently selected is shown in gray.



### 2. Turn SELECT/VOLUME knob to select a menu, then press the knob.

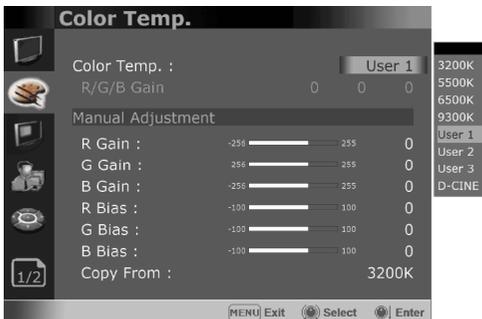
The menu icon presently selected is shown highlighted.



### 3. Select an item.

Turn SELECT/VOLUME knob to select the item, then press the knob.

The item to be changed is shown highlighted, and the sub menu is displayed on the right.



### 4. Make the setting or adjustment on an item.

#### How to change the adjustment level:

To increase the level, turn the SELECT/VOLUME knob right.

To decrease the level, turn the SELECT/VOLUME knob left.

#### How to change the setting:

Turn the SELECT/VOLUME knob to change the setting, then press the knob to confirm the setting.

**\*\*Note** - An item displayed in gray cannot be accessed. The item is accessible if it is displayed in white.

#### To return the display to the previous screen

Press the MENU button.

#### To clear the menu

Press the MENU button.

## 5. Adjustment Using the Menu

The OSD menu of this monitor consists of the following items.



### Status menu (To indicate the current settings)

- Format
- Color Temp
- Brightness
- Contrast
- Chroma
- Aperture
- Color Space
- Gamma
- User Preset
- RGB Range
- WFM/Vector
- Audio Level Meter
- Focus Assist
- Time Code
- Volume
- SDI Payload ID
  - Identifier
  - Sampling
  - Picture Rate
  - Scanning Method
  - Bit Depth
  - Link Assignment
- Model Name
- Serial Number
- Board Version
- Operation Time
- Last Calibration Time



### Color Temp./Color Space/Gamma menu

- Color Temp. ——— R/G/B Gain
- Manual Adjustment
  - R Gain
  - G Gain
  - B Gain
  - R Bias
  - G Bias
  - B Bias
  - Copy From
- Color Space
- Gamma
- OBM-HDR
- Color Space Compare
  - Left Color Space
  - Right Color Space
  - Right Gamma
  - Wipe Position
- Back Light



### Zebra/Focus menu

- Zebra ——— Level Adjustment
- Focus Assist
  - Color
  - Frequency



### User Configuration menu

- User Preset
- Function Button Setting
  - F1 Button
  - F2 Button
  - F3 Button
  - F4 Button
  - F5 Button
- Input Setting
  - 3G Signal Format
  - RGB Range
  - Mode Detect Setting
  - SFP Enable
- Camera Log ——— Log Select
- Speaker Out / Audio Level Meter Setting
  - SDI Left Speaker Out
  - SDI Right Speaker Out
  - HDMI L/R Speaker Out
  - Audio Level Meter
    - Display
    - Reference
    - Size/Transparency
    - Peak Hold Time
- Marker
  - Aspect Marker ——— Variable Aspect
  - Center Marker
  - Area Marker
  - Color
  - Aspect Mat
  - Fit
  - Thickness
- WFM/Vector
  - Intensity
  - Transparency
  - Color
  - Line Select — Line Position
- System Setting
  - Factory Reset
  - Internal Pattern
  - Key LED
  - OSD Time
- TimeCode



### Remote menu

- Parallel Remote
  - 1 Pin
  - 2 Pin
  - 3 Pin
  - 4 Pin
  - 5 Pin
  - 6 Pin
  - 7 Pin
  - 8 Pin

## 6. OSD Menu Operations



### Status Menu

The Status menu displays the current status of the monitor. The following items are displayed.

#### Page 1/4



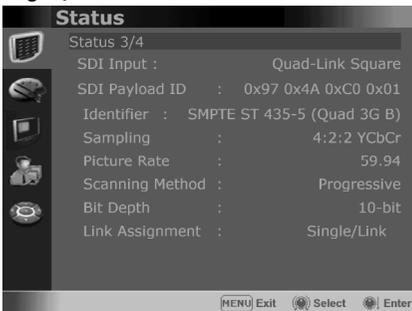
- Format
- Color Temp
- Brightness
- Contrast
- Chroma
- Aperture
- Color Space
- Gamma

#### Page 2/4



- User Preset
- RGB Range
- Back Light
- WFM/Vector
- Audio Level Meter
- Focus Assist
- Time Code
- Volume

#### Page 3/4



- SDI Input
- SDI Payload ID
- Identifier
- Sampling
- Picture Rate
- Scanning Method
- Bit Depth
- Link Assignment

\*\*\* When the SDI signal is connected, these items are displayed.

#### Page 4/4



- Model Name
- Serial Number
- Board Version
- Operation Time
- Last Calibration Time

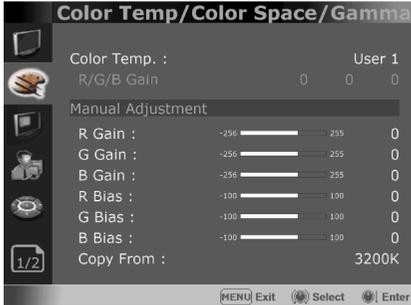
## 6. OSD Menu Operations



### Color Temp/Color Space/Gamma Menu

These menus are used for adjusting or setting the color temperature, color space or gamma of the picture.

#### Page 1/2



#### Color Temp

- Selects the color temperature from among [3200K] [5500K] [6500K] [9300K] [User1] [User2] [User3] [D-CINE].

**\*\*Note** - If Color Space is set to [D-CINE], Color Temp. is fixed to [D-CINE].

#### R/G/B Gain

- Displays the R/G/B Gain of the current Color Temperature.

#### Manual Adjustment

- If you set the Color Temp. to User 1/2/3, the item is changed from black to white, which means you can adjust the color temperature.

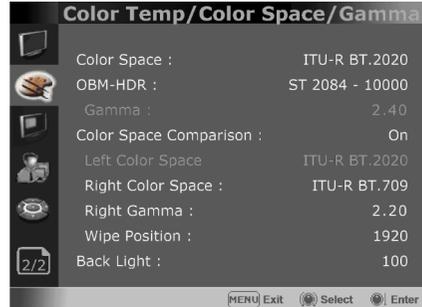
#### R/G/B Gain/Bias

- Adjusts the color balance(Gain, Bias).

#### Copy From

- The Gain and Bias data of each Color Temp. are restored to User adjustment.

#### Page 2/2



#### Color Space

- Selects the color space from among [ITU-R BT.709] [SMPTE-C] [D-CINE] [ITU-R BT.2020] [Native].

#### OBM-HDR

- Selects 4 modes of HDR gamma.
- ST-2084 10000 : The characteristics of LCD panel doesn't allow to produce the ideal brightness required by this standard, so the gamma is displayed in the relative brightness.
- ST-2084 300: This mode displays the absolute brightness up to 300cd/m<sup>2</sup>. So, the highlights over 300cd/m<sup>2</sup> are clipped.
- HLG 1000 (Hybrid Log Gamma): This mode can be selected when the White is 1000 cd/m<sup>2</sup> in HLG gamma.
- HLG 300 (Hybrid Log Gamma) : This mode can be selected when the White is 300 cd/m<sup>2</sup> in HLG gamma.

#### Gamma

- Selects the appropriate gamma mode from 1.00 to 3.00.

**\*\*Note** - When the OBM-HDR is set Off, this menu becomes activated.  
-When the color space is set to Native, this menu becomes deactivated.

## 6. OSD Menu Operations



### Zebra/Focus Menu

#### Color Space Comparison

- Allows you to divide the picture side by side, adjust the color space and gamma on the right half of the picture, and compare the color space and gamma between right half and left half.

#### Left Color Space

- Displays the color space which is set in Color Space menu.

#### Right Color Space

- Selects the color space of the right half which will be compared with the left half of the picture.

#### Right Gamma

- Adjust the gamma of the right half which will be compared with the left half of the picture.

#### Wipe Position

- Adjust the boundary line of the left and right area. Allowed to adjust the boundary line by using the SELECT/VOLUME knob

#### Back Light

- Adjusts the level of the back light level.  
If the back light value is increased, the screen becomes brighter.

- \*\* If the setting in Color Temp. menu and Color Space menu is changed, the value of Back Light returns to the default value of the color calibration in the factory.

#### Zebra

- Evaluates the Luma(Y') level of the input image. If the certain Y' level is set, the pixels with the designated Luma(Y') level are displayed in zebra pattern.

- \*\* Pixels with Y' level over 100% turn to red zebra pattern, and pixels with Y' level under 0% turn to green zebra pattern.

#### Level Adjustment

- Adjusts the Y' level as the user wants.

#### Focus Assist

- Controls the aperture level of a video signal and displays images on screen with sharpened edges to help camera focus operation.

Available types are [Color On] and [Mono On].

- [Color On]: The background image is the original color type.
- [Mono On]: The background image is the mono type.

#### Color

- Selects a color for Focus Assist among [RED], [Green], [Blue], [White], [Yellow], [Cyan].

#### Frequency

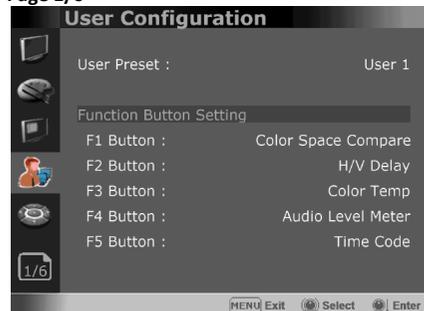
- Adjusts the edge difference level between the edges in an image.
- Available values are from 0% to 100%.



## User Configuration Menu

User Configuration consists of the adjustment menus such as [User Preset], [Function Button Setting], [Input Setting], [Camera Log], [SDI Audio Setting], [Audio Level Meter Setting], [Marker], [WFM/Vector], [System Setting].

### Page 1/6



#### User Preset

- Allows to check the adjustment status which each user presets.
- All the adjustments the user sets are automatically save.

#### Function Button Setting

- Assigns the function for F1 to F5 buttons on the front panel.

The following functions can be assigned.  
: [Color Space Compare], [H/V Delay], [Color Temp.], [Audio Level Meter], [Time Code], [Zebra], [Focus Assist], [WFM/Vector], [Camera Log].

The following functions are assigned in the factory.

**[F1 Button]:** Color Space Compare

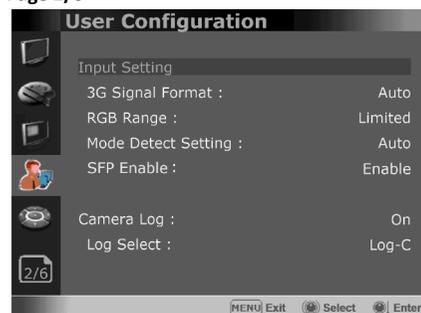
**[F2 Button]:** H/V Delay

**[F3 Button]:** Color Temp

**[F4 Button]:** Audio Level Meter

**[F5 Button]:** Time Code

### Page 2/6



#### Input Setting

##### 3G Signal Format

- Selects the format of 3G SDI input signal.  
: [Auto], [A 4:4:4 YUV 10b], [A 4:4:4 GBR 10b], [A 4:4:4 YUV 12b], [A 4:4:4 GBR 12b], [A 4:2:2 YUV 12b], [B DL 4:4:4 YUV 10/12b], [B DL 4:4:4 GBR 10/12b], [B DL 4:2:2 YUV 12b], [B DL 4:2:2 YUV 10b 60p]

##### RGB Range

- Selects Black Level and White Level of RGB format.  
\*Limited : 64(10bit)/256(12bit) ~ 1023(10bit)/4095(12bit)  
\*Full: 0(Black Level) ~ 1023(10bit)/4095(12bit)

##### SFP Enable

- Allows for SFP input to be selected by pushing [SINGLE] button on the front.

#### Camera Log

- Selects a camera LUT.

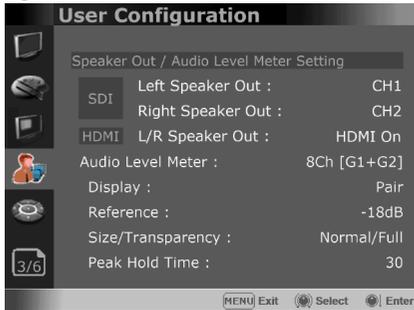
##### Log Select

The following camera LUT can be selected.  
: [Log-C], [C-Log], [S-Log2], [S-Log3]



User Configuration Menu

Page 3/6



**Speaker Out / Audio Level Meter Setting**

- Selects the audio channel of the SDI & HDMI input signal.

**SDI : Left Speaker Out / Right Speaker Out**

- Selects the embedded audio channel for the left and right audio out of the Headphone jack on the front panel of the monitor.

Audio channel can be selected among Ch1 ~ Ch16, Analog.

**HDMI : L/R Speaker Out**

- Selects the embedded audio channel of the HDMI signal. The available models are [Off], [HDMI On], [Analog On].

**Audio Level Meter**

Selects the embedded audio mode.

: [Off], [8Ch [G1+G2]], [8Ch [G2+G3]], [8Ch [G3+G4]], [8Ch [G1+G3]], [8Ch [G1+G4]], [8Ch [G2+G4]], [16Ch [G1~G4]]

\*\* In HDMI input, either [Off] or [HDMI 2Ch] can be selected.

**Display**

Selects the display method for Audio Level Meter.

Available modes are [Group] and [Pair].

\*\* In HDMI input, the mode is fixed to [Pair].

**Reference**

Selects the default value of Audio Level Meter.

Available options are [-18dB] and [-20dB].

**Size/Transparency**

Selects the size and transparency of Audio Level Meter.

Available options are [Normal/Full], [Normal/Half], [Large/Full], [Large/Half].

**Peak Hold Time**

Controls the speed rate of Peak Hold Decay Time occurring when the audio volume decreases.

Page 4/6



**Marker**

- Selects On to display the marker, and Off to deactivate it.

**Aspect Marker**

Selects the aspect ratio of the marker.

You can select from among [Off], [16:9], [4:3], [4:3 ON AIR], [15:9], [14:9], [13:9], [1.85:1], [2.35:1], [2.39:1], [1.85:1 & 4:3], [1.66:1], [1.896:1], [Variable].

**\*Variable Aspect**

Allows the user to select the aspect ratio from the range between 1.00:1 and 3.00:1.

**Center Marker**

Selects On to display the center marker and Off not to display it.

**Area Marker**

Selects the size of the area marker.

You can select from among [Off], [80%], [85%], [88%], [90%], [93%], [100%], [EBU Action 16:9], [EBU Graphic 16:9], [EBU Action 14:9], [EBU Graphic 14:9], [EBU Action 4:3], [EBU Graphic 4:3].

**Color**

Selects the color of the marker.

You can select from among [White], [Gray], [Red], [Green], [Blue], [Yellow], [Cyan], [Magenta].

**Aspect Mat**

Darkens the outside of the area of the Aspect Marker. You can select from 0 to 7.

**Fit**

With Fit On, the Area Marker is displayed relative to the Aspect Marker in use.

With Fit Off, the Area Marker is displayed relative to the incoming video source.

**Thickness**

Adjusts the thickness of the marker lines.

You can select it from 1 to 7.

\*\* This menu is activated in OBM-U170 model only.



User Configuration Menu

Page 5/6



**WFM/Vector**

- Sets to activate and deactivate Waveform monitor and Vectorscope.  
You can select from among [WFM], [VectorScope], [WFM+Vector], [WFM Wide].  
\*This function doesn't work when RGB format signal is input.

**Intensity**

Adjusts the brightness of Waveform and Vectorscope display.  
You can select from 1 to 64.

**Transparency**

Adjusts the transparency level of Waveform and Vectorscope.  
[Black]: The background is black. Displayed image is hidden behind the background.  
[Half]: The background is transparent. Displayed image can be seen indistinctly behind the Waveform and Vectorscope display.

**Color**

Selects the color of Waveform monitor.  
Available colors are [Green] and [White].

**Line Select**

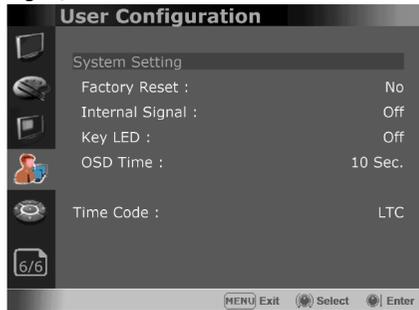
Selects [On] to display the Waveform of the line assigned in [Line Position] below.

**\*Line Position**

Selects the specific horizontal line for Waveform and Vectorscope.  
Increases the value to move the line upwards and decreases the value to move the line downwards.

\*\* [WFM Wide] feature is disable on U240 model

Page 6/6



**System Setting**

**Factory Reset**

Initializes OSD values to the factory default.

**Internal Signal**

Generates the White Pattern internally.  
The selectable range is from 100%(White) to 0%(Black).

**Key LED**

Sets On to turn on the LED of the keys, and sets Off to turn off the LED of the keys.

**OSD Time**

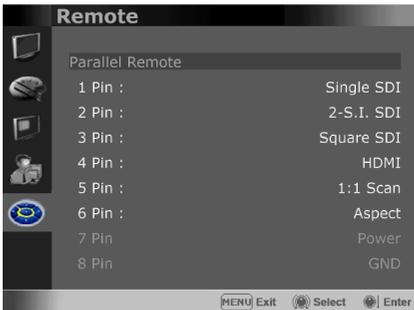
Adjusts the display time of the OSD menu.  
[10 Sec.]: The OSD menu will be disappeared after 10 seconds.  
[20 Sec.]: The OSD menu will be disappeared about 20 seconds.  
[30 Sec.]: The OSD menu will be disappeared about 30 seconds.  
[On]: The OSD menu will not be disappeared.

**Time Code**

- Selects the type of the time code to be displayed.  
[VITC]: To display the VITC time code  
[LTC]: To display the LTC time code



## Remote Menu

**Parallel Remote**

Selects the Parallel Remote connector pins for which you want to change the function. Various functions can be assigned to pin 1 to 6. The following lists the functions which can be assigned to the pins.

[--]  
 [Single SDI]  
 [2-S.I. SDI]  
 [Square SDI]  
 [HDMI]  
 [Scan]  
 [1:1 Scan]  
 [Aspect]  
 [H/V Delay]  
 [Blue Only]  
 [Mono]  
 [A 16:9]  
 [A 4:3]  
 [A 4:3OnAir]  
 [A 15:9]  
 [A 14:9]  
 [A 13:9]  
 [A 1.85:1]  
 [A 2.35:1]  
 [A 1.85:1&4:3]  
 [Center M.]  
 [Area 80%]  
 [Area 85%]  
 [Area 88%]  
 [Area 90%]  
 [Area 93%]  
 [Area 100%]  
 [TALLY R]  
 [TALLY G]

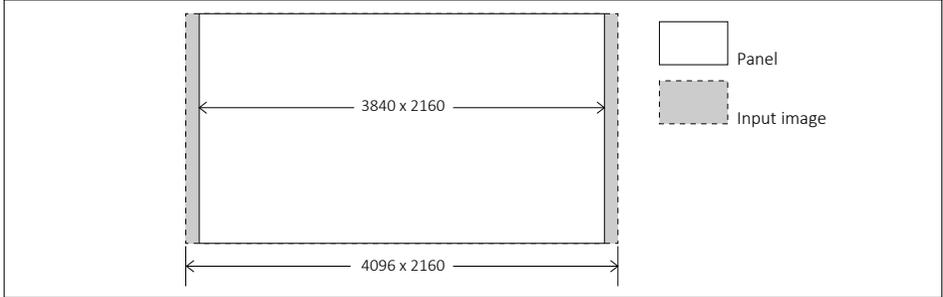
\*\* [--]: No function is assigned.

\*7 Pin: For Power On and Off only  
 \*8 Pin: For Ground only

## 7. Scan Mode Image (OBM-U240)

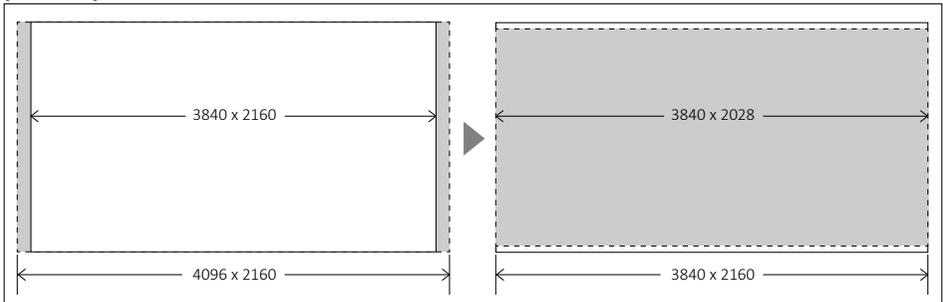
### OBM-U240

4K/QFHD Mode



The LCD panel resolution of OBM-U240 is QFHD(16:9) 3840x2160, so if the input signal is 3840x2160, 1:1 mapping is supported. If the input signal is DCI 4K(1.89:1) 4096x2160, 1:1 mapping is not supported.

[Zero Scan]

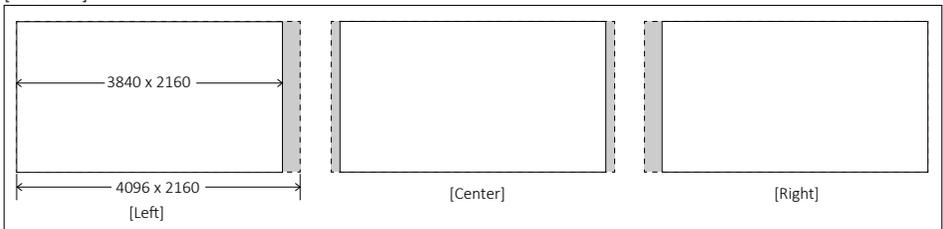


When the 4096x2160 signal is fed, if you select Zero Scan using [Scan] button on the front panel, the picture is scaled to be displayed on the panel of 3840x2048 resolution with maintaining 1.89:1 ratio.

If you press [Scan] button once more, [1:1 Scan] mode is selected.

To see the image on the right-end and the left-end area, the location of the image can be moved by rotating the [SELECT/VOLUME] knob.

[1:1 Scan]

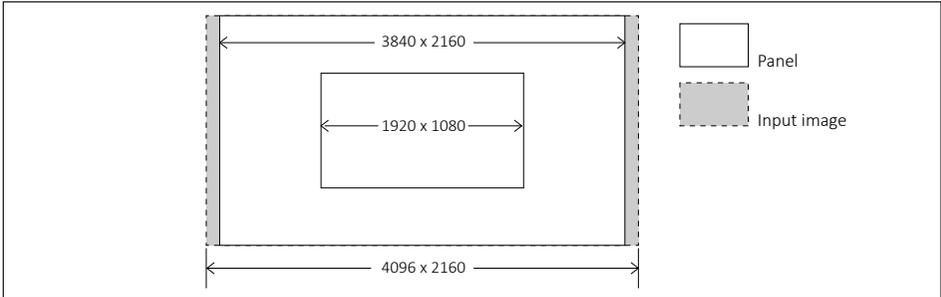


**\*\*Note** -When QFHD/DCI 4K signal is fed, [Aspect] button is not activated.

## 8. Scan Mode Image (OBM-U170)

### OBM-U170

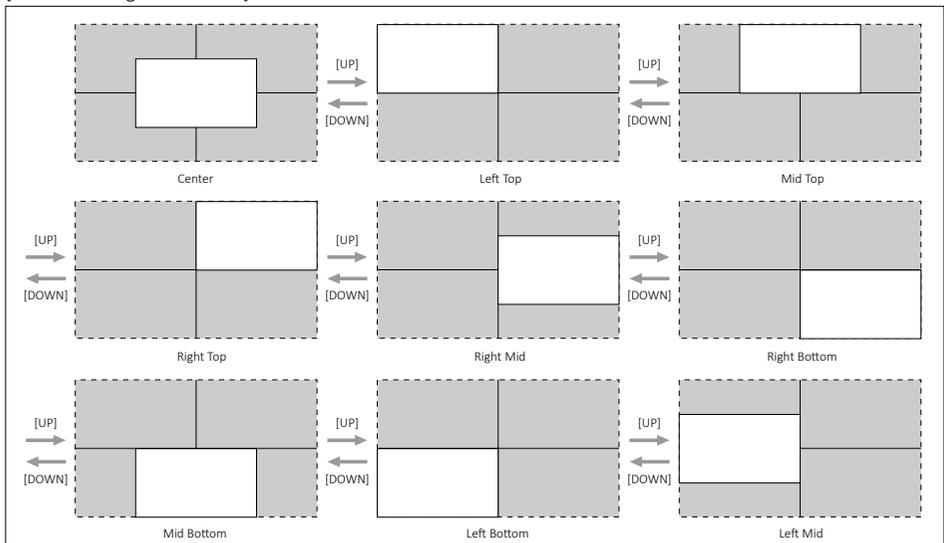
4K/QFHD Mode



The LCD panel resolution of OBM-U170 is FHD(16:9) 1920x1080. So, when Zero Scan is selected, if the input signal is QHD(3840x2160) it is scaled to 1920x1080(16:9), and if the input signal is DCI 4K(1.89:1) 4096x2160 it is scaled to 1920x1012(1.89:1).

If you press [Scan] button and select [1:1 Scan] mode, 1:1 pixel mapping of the original image is displayed. The location of the image can be changed by rotating the [SELECT/VOLUME] knob.

[Position change in 1:1 Scan]



**\*\*Note** -When QFHD/DCI 4K signal is fed, [Aspect] button is not activated.

## 9. Connecting the SDI Signals

Single Link 12G/6G/3G/HD-SDI, Dual-Link 3G-SDI, and Quad-Link 3G-SDI signals can be input to the SDI IN connectors of this monitor.

Up to 2-channel Single Link 12-SDI signals, up to 4-channel 3G/HD-SDI signals, 1-channel Dual-Link 3G-SDI or 1-channel Quad-Link 3G-SDI signals can be input. Use the appropriate input connectors depending on the input signal, referring to the tables below.

### Single-Link 12G –SDI Signal

Connector	Input signal
12G SDI-1	12G SDI
12G SDI-2	12G SDI

### Dual-Link 3G –SDI Signal

\* 2-sample interleave division signals

Connector	Input signal
12G SDI-1	3G SDI Link1
12G SDI-2	3G SDI Link2

### Quad-Link 3G/HD –SDI Signal

\* 2-sample interleave division signals

Connector	Input signal
12G SDI-1	3G SDI Link1
12G SDI-2	3G SDI Link2
3G SDI-3	3G SDI Link3
3G SDI-4	3G SDI Link4

\* Square division signals

Connector	Input signal
12G SDI-1	Sub-Image 1 (upper-left screen)
12G SDI-2	Sub-Image 2 (upper-right screen)
3G SDI-3	Sub-Image 3 (upper-left screen)
3G SDI-4	Sub-Image 4 (upper-right screen)

### Image of Square division signals

Sub-Image1 (upper-left screen)	Sub-Image2 (upper-right screen)
Sub-Image1 (lower-left screen)	Sub-Image1 (lower-right screen)

## 10. Available Signal Formats

This monitor is applicable to the following signal formats

### HD-SDI

Signal System	Signal Format
1920x1080 / 23.98, 24, 25, 29.97, 30p/Psf, 50, 59.94, 60i	4:2:2 YCbCr 10bit
2048 x 1080 / 23.98, 24, 25, 29.97, 30p/Psf	4:2:2 YCbCr 10bit
1280x 720 / 23.98, 24, 25, 29.97, 30, 50, 59.94, 60p	4:2:2 YCbCr 10bit

### 3G-SDI

Signal System	Signal Format	
1920 x1080 / 50, 59.94, 60p	4:2:2 YCbCr 10bit	Level A / Level B-DL
1920 x1080 / 23.98, 24, 25, 29.97, 30p/Psf, 50, 59.94, 60i	4:4:4 RGB 10bit 4:4:4 YCbCr 10bit 4:4:4 RGB 12bit 4:4:4 YCbCr 12bit	Level A / Level B-DL
1280x 720 / 23.98, 24, 25, 29.97, 30, 50, 59.94, 60p	4:4:4 RGB 10bit 4:4:4 YCbCr 10bit	Level A
2048 x1080 / 48, 50, 60p	4:2:2 YCbCr 10bit	Level A / Level B-DL
2048 x 1080 / 23.98, 24, 25, 29.97, 30p/Psf	4:4:4 RGB 10bit 4:4:4 YCbCr 10bit 4:4:4 RGB 12bit 4:4:4 YCbCr 12bit	Level A / Level B-DL

### 12G-SDI (4K) 3G-SDI

Signal System	Signal Format
3840 x2160 / 50, 59.94, 60p	4:2:2 YCbCr 10bit
4096 x2160 / 47.95, 48, 50, 59.94, 60p	4:2:2 YCbCr 10bit

### Dual-Link (4K) 3G-SDI

Signal System	Signal Format	
3840 x2160 / 23.98, 24, 25, 29.97, 30p	4:2:2 YCbCr 10bit	Level B-DS 2-sample interleave division
4096 x2160 / 23.98, 24, 25, 29.97, 30p	4:2:2 YCbCr 10bit	Level B-DS 2-sample interleave division

## 10. Available Signal Formats

### Dual-Link (4K) 3G-SDI

Signal System	Signal Format		
3840 x2160 / 50, 59.94, 60p	4:2:2 YCbCr 10bit	Level A / Level B-DL	2-sample interleave division/ Square division
3840 x2160 / 23.98, 24, 25, 29.97, 30p	4:4:4 RGB 10bit 4:4:4 YCbCr 10bit 4:4:4 RGB 12bit 4:4:4 YCbCr 12bit	Level A / Level B-DL	
3840 x2160 / 23.98, 24, 25, 29.97, 30Psf	4:4:4 RGB 10bit 4:4:4 YCbCr 10bit 4:4:4 RGB 12bit 4:4:4 YCbCr 12bit	Level A / Level B-DL	Square division
4096 x 2160 / 47.95, 48, 50, 59.94, 60p	4:2:2 YCbCr 10bit	Level A / Level B-DL	2-sample interleave division/ Square division
4096 x 2160 / 23.98, 24, 25, 29.97, 30p	4:4:4 RGB 10bit 4:4:4 YCbCr 10bit 4:4:4 RGB 12bit 4:4:4 YCbCr 12bit	Level A / Level B-DL	
4096 x 2160 / 23.98, 24, 25, 29.97, 30Psf	4:4:4 RGB 10bit 4:4:4 YCbCr 10bit 4:4:4 RGB 12bit 4:4:4 YCbCr 12bit	Level A / Level B-DL	Square division

### HDMI

Signal System	Signal Format
640 x 480p@59.94 / 60	4:4:4 RGB 8 / 10 / 12bit 4:4:4 YCbCr 8 / 10 / 12bit 4:2:2 RGB 12bit
720 x 480p@59.94 / 60	
720 x 576p@50	
1280 x 720p@50 / 59.94 / 60	
1920 x 1080i@50 / 59.94 / 60	
1920 x 1080p@23.98 / 24 / 25 / 29.97 / 30 / 50 / 59.94 / 60	
2048 x 1080p@23.98 / 24 / 25 / 29.97 / 30 / 47.95 / 48 / 50 / 59.94 / 60	
3840 x 2160p@23.98 / 24 / 25 / 29.97 / 30 / 50 / 59.94 / 60	4:4:4 RGB 8bit 4:4:4 YCbCr 8bit 4:2:2 RGB 12bit
4096 x 2160p@23.98 / 24 / 25 / 29.97 / 30	4:4:4 RGB 8 / 10 / 12bit 4:4:4 YCbCr 8 / 10 / 12bit 4:2:2 RGB 12bit
800 x 600p@60	
1024 x 768p@60	

## 11. Other Functions

### Versatile 4K/QFHD Input Capability

The OBM-U170 and OBM-U240 are equipped with standard 12G-SDI input interface(x2) , 3G/HD-SDI input interface(x2) and support 4K Quad Link 2-Sample Interleave signals and 4K Quad Link Square Division signals.

The OBM-U170 and OBM-U240 can accept up to 3840x2160/24,25,30,50,60p and 4096x2160/24.25,30,50,60p signals.

### Various 4K/12G Display Modes

#### **Mode 1 : Single Link 12G**

#### **Mode 2 : Quad Link Square Division**

Each link contains one square of the original image.

#### **Mode 3 : Quad Link 2 Sample Interleave (2SI)**

Each link contains a full image at 1/4 resolution. 2SI mode uses four Sub-image and alternates the samples every two pixels and every line instead of slitting the image into four quadrants.

### 4K Waveform Monitor and Vector Scope Display

These features enable users to monitor sources using the internal Waveform and Vector Scope. Waveform Wide mode is supported, and both Waveform and Vector Scope can be displayed simultaneously.

### SFP optical connector

The OBM-U240 and OBM-U170 have the SFP interface, which allows to use the various SFP modules which can fit any possible broadcast applications.

### Adjustable Gamma

Gamma value is adjustable from 1.0 to 3.0 as user's preference to monitor in the dark area of the picture. Any pictures taken in either light or dark environment can be easily watched or analyzed.

### Focus Assist

This function controls the aperture level of a video signal, and displays images on screen with sharpened edges to help camera focus operation.

### Supports DCI P3 and ITU-R BT.2020 Wide Color Spaces

The wide color gamut and the advanced 3D LUT function enable OBM-U240 and OBM-U170 to reproduce various color spaces accurately and the excellent grayscale.

You can select from color gamuts such as DCI-P3, ITU-R BT.2020, ITU-R BT.709, SMPTE-C, EBU, Native.

### Color Space & Gamma Comparison

(Side by Side, Wipe position)

This unique function allows users to compare the two difference color spaces and gammas side by side simultaneously.

The area of the two pictures to be displayed can be selected using a vertical WIPE pattern.

### Zebra

This function displays the Luma(Y') level of the input image in zebra pattern.

### Various Markers

The OBM-U240 and OBM-U170 can display various markers, including aspect marker, area marker, and center marker. In addition, the detailed display settings of each marker are allowed. For example, the color, brightness, horizontal/vertical position, and thickness of aspect markers can all be adjusted.

## 12. Product Specifications

ITEM		OBM-U170	OBM-U240
Input	4 x BNC	12G-SDI-1/2, 3G/HD-SDI-3/4	
	1 x HDMI	HDMI 2.0	
	1 x SFP	Optical	
Output	4 x BNC	12G-SDI-1/2, 3G/HD-SDI-3/4 Active Loop Output	
Input Signal Format	SMPTE ST 2082M	2160p(60/59.94/50/30/29.97/25/24)	
	SMPTE ST 2081M	2160p(30/29.97/25/24)	
	SMPTE 425M AB	1080p(60/59.94/50/30/29.97/25/24/23.98/30sF 29.97sF/25sF/24sF/23.98sF) / 1080i (60/59.94/50)	
	SMPTE 274M/292M	1080i (60/59.94/50)	
		1080p(30/29.97/25/24/24sF/23.98/23.98sF)	
	SMPTE 296M	720p(60/59.94/50)	
	SMPTE 260M	1035i(60/59.94)	
	SMPTE 125M/259M	480i(60/59.94), 576i(50)	
	2K, SMPTE 428M	2048 x 1080p(24/24sF/23.98/23.98sF)	
	ITU R-BT.656	576i(50)	
HDMI 2.0	~ 2160p(60)		
SFP	2.970Gbps, 1.485Gbps, 270Mbps		
Audio In/Out	1 x Phone Jack In	Line In(Stereo)	
	1 x Phone Jack Out	H/P Out(Front, Stereo)	
	2 x Speaker Out	Stereo	
LCD	Size	17.3"	23.8"
	Resolution	1920 x 1080 (16:9)	3840 x 2160 (16:9)
	Pixel Pitch	0.199mm	0.137mm
	Color	10 bit, 1.073G colors	10 bit, 1.073G colors
	Viewing Angle	178(H), 178(V)	178(H), 178(V)
	Luminance of White	350d/m <sup>2</sup>	350d/m <sup>2</sup>
	Contrast	1000 : 1	1000 : 1
Display Area (H x V)	381.9 x 214.8 (mm)	527 x 296 (mm)	
General	1 x Ethernet	Control/Update In/Out, GPI-7 Port, RJ-45P Jack	
	1 x GPIO	GPI-7 Port, RJ-45P Jack	
	2 x Serial	RS-422 In/Out, RJ-11P Jack	
	1 x USB	For firmware update, Color Calibration	
	Power Requirements	AC(100-230V, 50/60Hz) / DC 12V	AC(100-230V, 50/60Hz) / DC 24V
	Power Consumption	40W	100W
	Operating Temperature	0°C ~ 40°C(32°F~104°F)	
	Operating Humidity	20% ~ 80% RH	
	Weight	6.5kg / 14.33lbs	10.5kg / 23.14lbs
	Dimension(WxHxD)	412 x 325 x 84.5mm (with stand)	570 x 402 x 85mm (with stand)
	Accessories	Power Cable	
	Option	Rack Mount Kit / Carrying Case / V-Mount / Acrylic Protector / Sun Hood(17" only)	

\* Specifications are subject to change without prior notice for the product quality improvement.

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