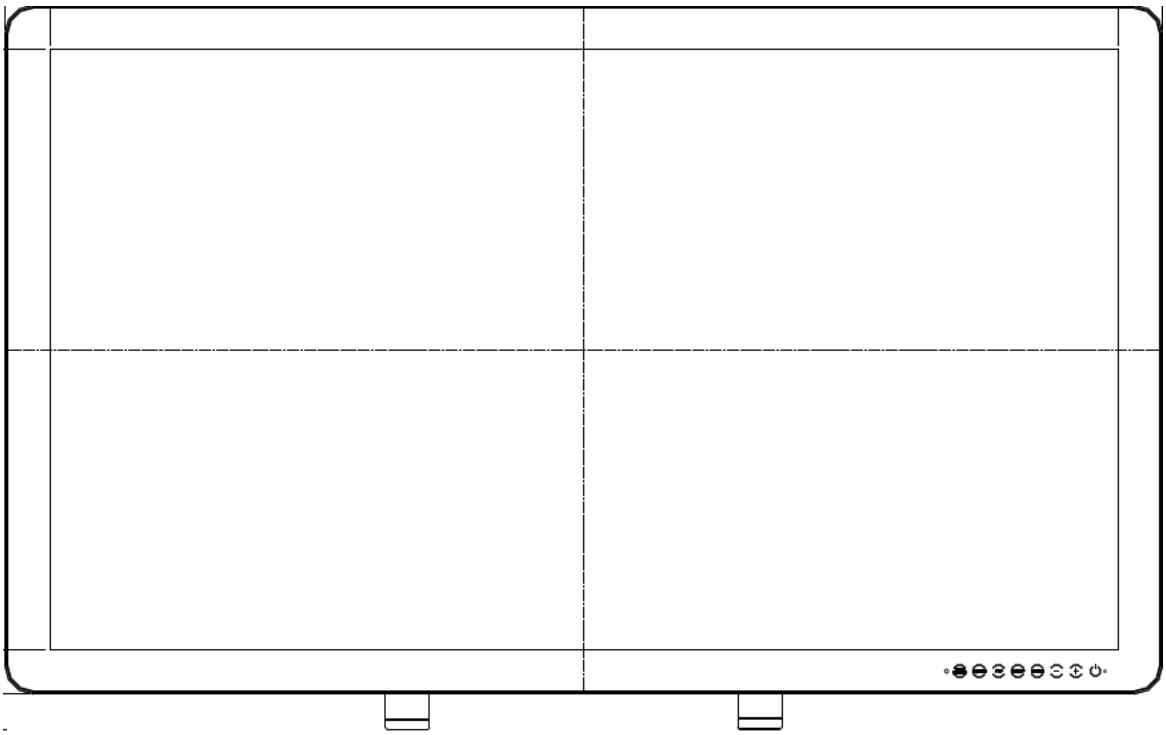
DisplayUser's Manual

MSAP

55’’ 4K2K Color LCD Display



Model:
MSAP5521AMA(Medical)
MSAP5521AA(IT)
MSAP5521AA-IRT(IT)

Revision History

The revision letter changes with related comments each time the document is updated.

Revision	Comment
001	Initial release of this document

TABLE OF CONTENTS

1 About product

1.1 Features

●55-inch LCD display with 8 million pixels

This color LCD display has a multi-scanning function corresponding to the resolution
From 640 x 480 (VGA) to 4K2K (3840x2160) by single input. This is also compliant with VESA standard display mode.
You can select 7 sources to display Full screen.
DP1&2-Pixel by pixel to display 3840*2160@60HZ
DVI1~4 input 3840*2160@30HZ,output 3840*2160@60HZ
VGA input FHD/WUXGA/UXGA, output 3840*2160@60HZ
Additional display parameters, such as brightness and contrast, can be adjusted via the on-screen menu.
The equipment supplied includes the signal cables, the power supply with power cordand this user manual.

●Power management

This unit has loaded the power management system. The power management mode functions when either horizontal or vertical signals or both disappears, and it reduces power consumption to less than 25W.

●55'' projected capacitive touch screen

Only for MSAP5521AMA (Medical) and MSAP5521AA (IT)
The monitor support 10 fingers touch.
Support HID USB and RS232 with driver.
Transparency≧82%
Gloss:AG80+/-20GU(gloss unit)

USB/RS232 Type Controller	
Circuit Board Dimension	55mm x 152mm
Channels of Panel	Max. Tx:72 Rx:126 channels (exclude shielding pin)
Input Voltage	3.5V~5.5V.Typical 5V.
Operating Temperature	-40 to 85 ℃
Storage Temperature	-40 to 90 ℃
Relative Humidity	95% at 60 ℃, RH Non-condensing
Linearity(Note 1)	Line drawing accuracy : 1pt +/- 1mm offset /10mm Touch (point) accuracy : 1pt +/- 1mm Refer to Windows 8 Logo regulation
Interface	USB: 1.1 Full Speed RS232: No parity,8 data bits,1 stop bit, baud rate 19200bps
Resolution	4096×4096 resolution
Power consumption(mA)	Active Mode: < 125 mA Idle Mode : < 60mA Sleep Mode :< 5mA (Operation Mode :Active Mode only)
Report rate(points/sec) (Note 2)	> 100 Hz
Response time	Average < 25 ms

IR touch for MSAP5521AA-IRT (IT)

The monitor support single touch with HID USB.

Report Resolution	32768 * 32768
Touch Accuracy	≤2mm, no drift
Touch Size	≥5mm
Output Form	Coordinate Value
Response Time	5-12ms
Calibration	“+”Calibration with 4 position.
Power Supply	USB
USB Port Version	2.0
Power Required	DC5V ，500mA
Power Consumption	< 2W

●Wall / Arm mountings

400*400mm, M8 threaded

●True Flat Display

Easy Clean

1.2 What’s in the box

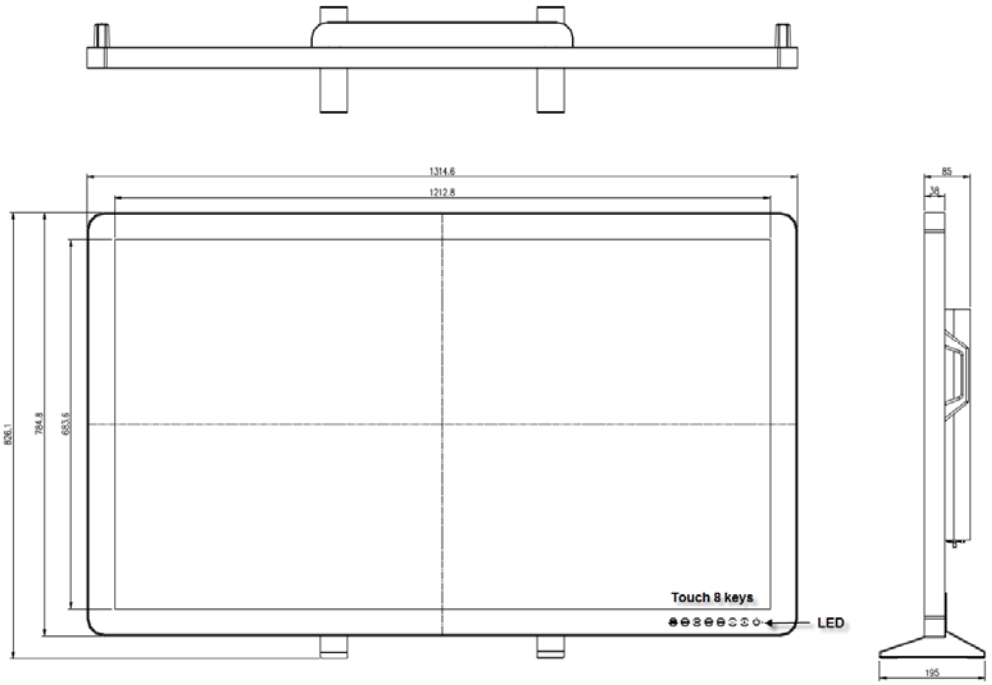
MSAP display monitor comes with:

•MSAP user guide
• VGA cable
• DVI cable
• DP cable
• USB cable
• AC power cord

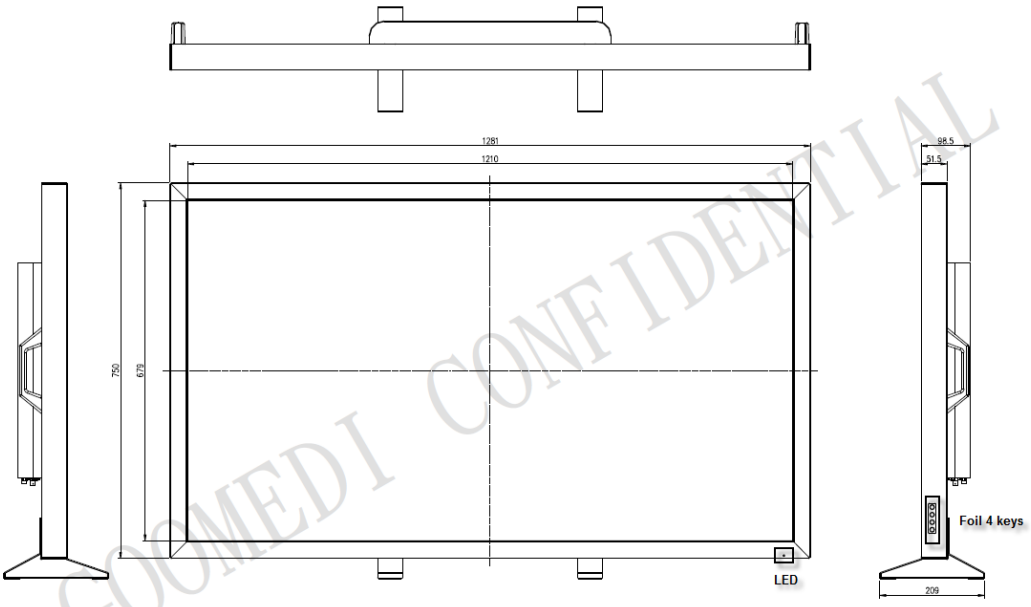
2 Outline

2.1 Front view

For MSAP5521AMA (Medical)&MSAP5521AA(IT)

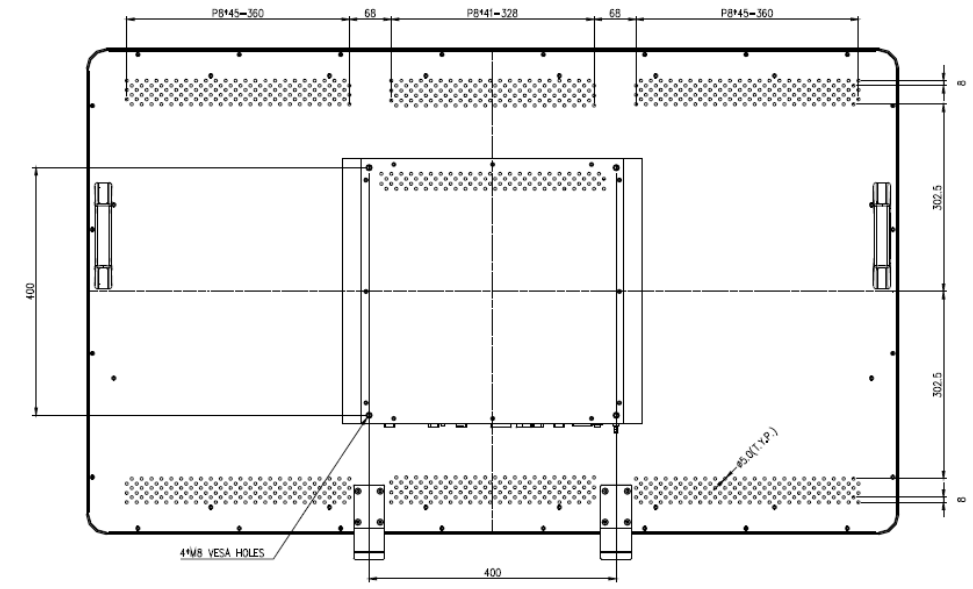


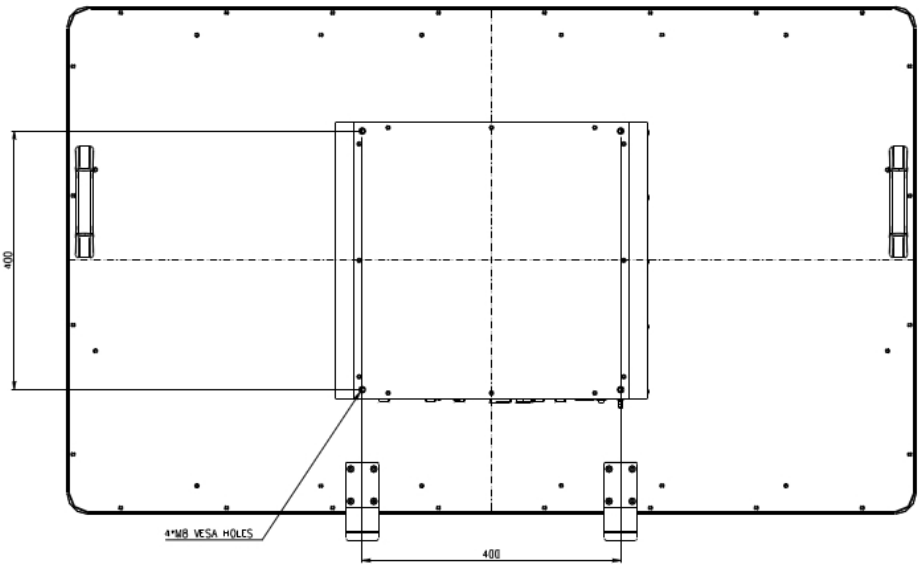
For MSAP5521AA-IRT(IT)



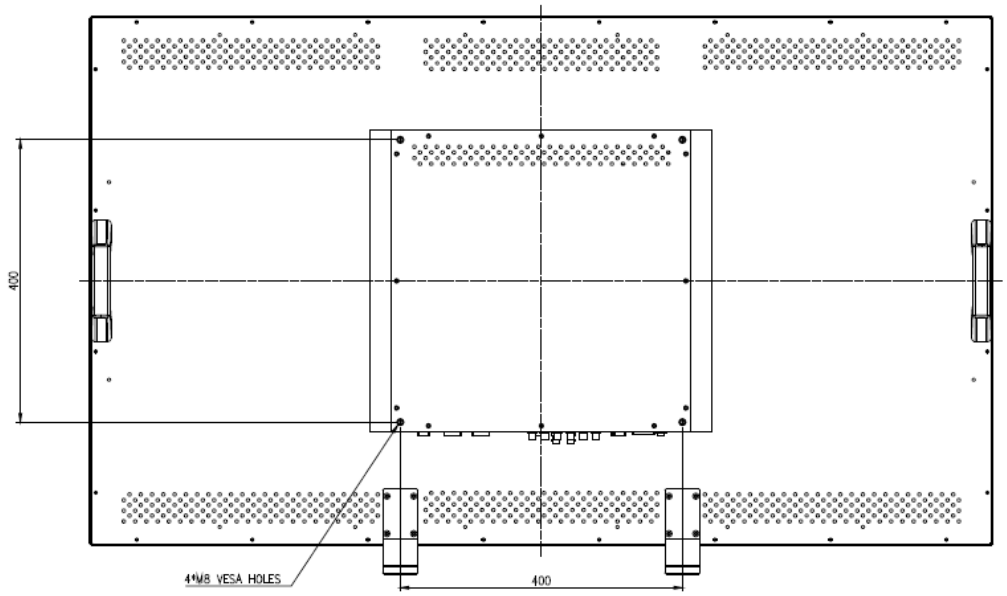
2.2 Real view

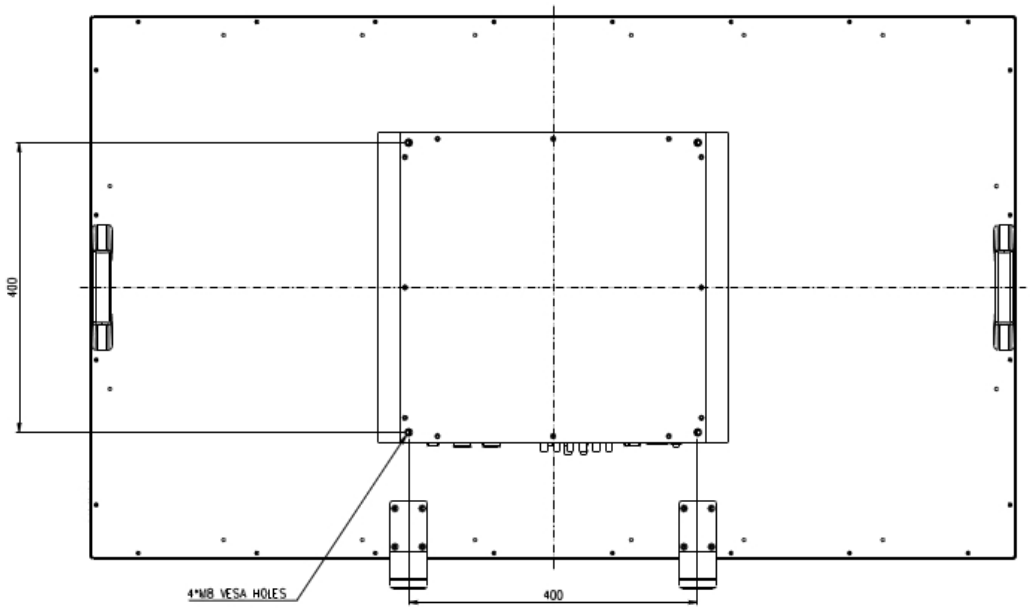
For MSAP5521AMA (Medical)&MSAP5521AA(IT)



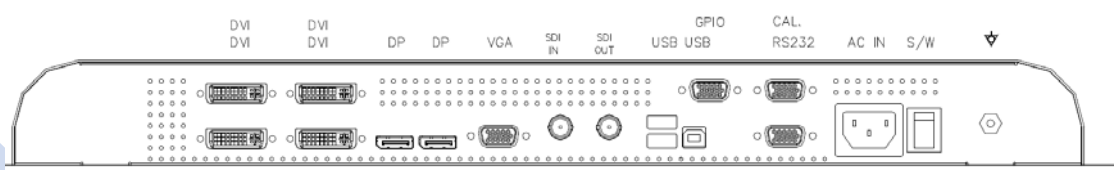


For MSAP5521AA-IRT(IT)

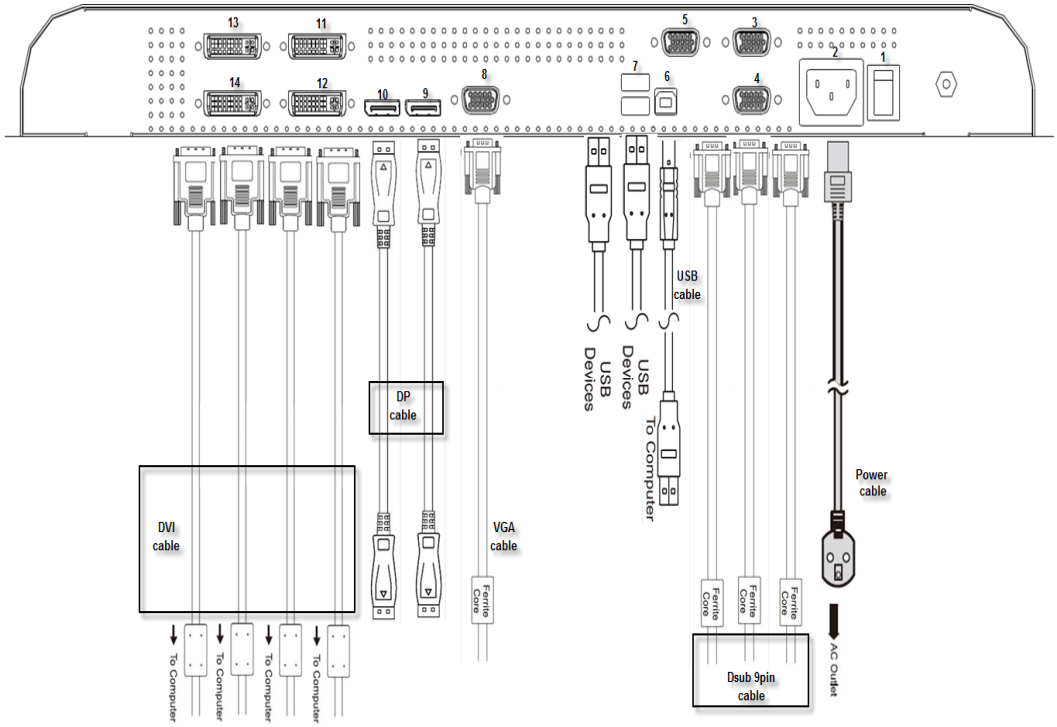




2.3 Connector view



2.4 Connection Method



1.AC power supply switch.

Confirm that your computer is off. Then, confirm that the main switch of the color LCD monitor on the back is off.

2.ACinlet

Connect the attach AC power cord to the AC inlet.

3.D-sub 9pin Female

Connect with PC to calibrate all setting for Monitor.(Like brightness/contrast/gamma….and so on)

4.D-sub 9pin Female

Connect with PC for Pcap touch screen active by RS232 (UART COM port)

5.D-sub 9pin Female

External GPIO key board control Monitor by RS232 cable

6. USB UP stream connector (B type)

Connect USB cable to computer's USB port and the monitor's USB connector.

It will be for USB HUB up stream or Pcap touch screen active.

7.USB down streams*2 connector(B type)

This product has equipped two USB DOWN stream ports to which USB device can be connected.

8.D-sub 15pin (VGA) connector

Analog RGB signal input. The analog VGA cable is plugged into this from PC's VGA out.

9.Display port 1(DP) connector

Connect the DP 1 connector of the monitor to PC's DP out with the attached DP cable.

It can support 3840x2160 60HZ by single cable

10.Display port 2(DP) connector

Connect the DP 1 connector of the monitor to PC's DP out with the attached DP cable.

It can support 3840x2160 60HZ by single cable (Graphic limited, see the support timing table)

11.DVI 1connector

Connect the DVI 1 connector of the monitor to PC's DVI out with the attached DVI cable.

It can support 3840x2160 30HZ by single cable (Graphic limited, see the support timing table)

12.DVI 2 connector

Connect the DVI 1 connector of the monitor to PC's DVI out with the attached DVI cable.

It can support 3840x2160 30HZ by single cable (Graphic limited, see the support timing table)

13.DVI 3 connector

Connect the DVI 1 connector of the monitor to PC's DVI out with the attached DVI cable.

It can support 3840x2160 30HZ by single cable (Graphic limited, see the support timing table)

14.DVI 4 connector

Connect the DVI 1 connector of the monitor to PC's DVI out with the attached DVI cable.

It can support 3840x2160 30HZ by single cable (Graphic limited, see the support timing table)

If you finish the video cable you want to connect from seven inputs, you can turn on PC and AC power switch to ''on'' for the monitor, you will see the image there.

2.5 Mounting

The Monitor can be mounted onto the wall or stand.
If you intend to mount the monitor on the wall, we strongly recommend that you use wall mountkits with attached M8*12mm screws and can load more than monitor weight, that you ensure itis securely and safely installed.

CAUTION:

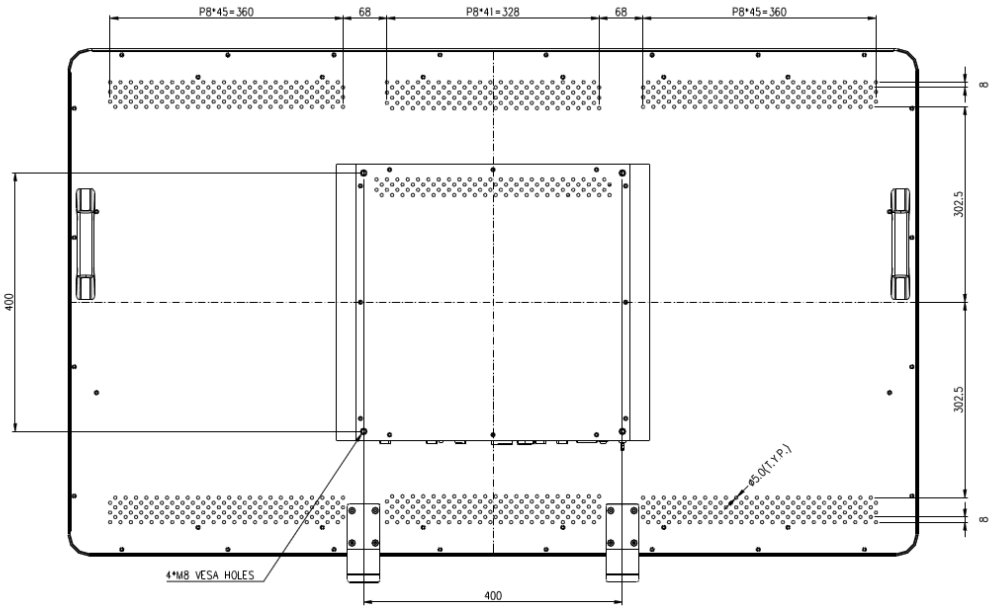
When mounting the monitor, take care to tighten the retention screws or bolts until fully secure, but do not over tighten. Over tightening the retention screws or bolts may cause them to become stripped, rendering them useless.

ATTENTION

Lors du montage du moniteur, prenezsoin de serrer les visou les boulons de fixation jusqu'àcomplètesécurisation, sans toutefois trop serrer. Unserrage trop important des vis ou des boulons de fixation risqued'endommager le filetage, les rendantinutiles. Utilisezunappareil de montage approprié pour éviter tout risque de blessure.

Wall Mounting Installation

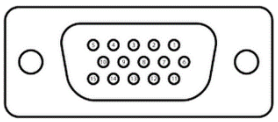
The Monitor has Video Electronics Standards Association (VESA) standard mounting
Hole stapped into the rear panel. The standard holes are M8 set at 400 mm x 400 mm



To mount the Monitor onto the wall or stand, please follow the steps below.
Step 1: Select the location on the wall for the wall-mounting bracket.(Listed VESA)
Step 2: Carefully mark the locations of the four screw holes in the bracket on the wall
Step 3: Drill four pilot holes at the marked locations on the wall for the bracket retention screws.
Step 4: Align the wall-mounting bracket screw holes with the pilot holes.
Step 5: Secure the mounting-bracket to the wall by inserting the retention screws into the fourpilot holes and tightening them.
Step 6: Insert the four monitor mounting screws provided in the wall mounting kit into the four screw holes on the real panel of the LCD Monitor and tighten until the screw shank is secured against the rear panel.
Step 7: Align the mounting screws on the monitor rear panel with the mounting holes on the bracket.
Step 8: Carefully insert the screws through the holes and gently pull the monitor downwards until the monitor rests securely in the slotted holes. Ensure that all four of the mounting screwsfit snuggly into their respective slotted holes.
Step 9: Secure the LCD Monitor by fastening the retention screw of the wall-mounting bracket.
Step 10: Secure the LCD Monitor by fastening the retention screw of the wall-mounting bracket

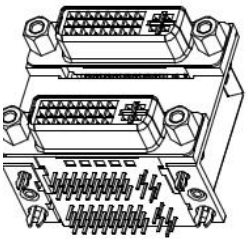
2.6 Connector pin assignments

Input signal connectors



VGA signal input	
Pin No.	**Signal Assignment**
1	RED SIGNAL
2	GREEN SIGNAL
3	BLUE SIGNAL
4	GND
5	DET
6	GND
7	GND
8	GND
9	DSUB_5V
10	GND
11	GND
12	DDC DATA
13	H.SYNC
14	V.SYNC
15	DDC CLOCK

(DVI, 2 layer,58pin)

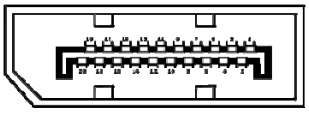


DVI signal input	
Pin No.	**Signal Assignment**
DVI 1/DVI3	
1	T.M.D.S. Data2-
2	T.M.D.S. Data2+
3	T.M.D.S. Data2 Shield
4	NC
5	NC
6	DDC Clock
7	DDC Data
8	NC
9	T.M.D.S. Data1-
10	T.M.D.S. Data1+
11	T.M.D.S. Data1 Shield

12	NC
13	NC
14	+5V Power
15	Ground
16	Hot Plug Detect
17	T.M.D.S. Data0-
18	T.M.D.S. Data0+
19	T.M.D.S. Data0 Shield
20	NC
21	NC
22	T.M.D.S. Clock Shield
23	T.M.D.S. Clock +
24	T.M.D.S. Clock -
C1	NC
C2	NC
C3	NC
C4	NC
C5A	GROUND
C5B	GROUND
DVI 2/DVI4	
25	T.M.D.S. Data2-
26	T.M.D.S. Data2+
27	T.M.D.S. Data2 Shield
28	NC
29	NC
30	DDC Clock
31	DDC Data
32	NC
33	T.M.D.S. Data1-
34	T.M.D.S. Data1+
35	T.M.D.S. Data1 Shield
36	NC
37	NC
38	+5V Power
39	GROUND
40	Hot Plug Detect
41	T.M.D.S. Data0-
42	T.M.D.S. Data0+

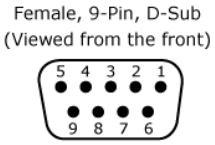
43	**T.M.D.S. Data0 Shield**
44	**NC**
45	**NC**
46	**T.M.D.S. Clock Shield**
47	**T.M.D.S. Clock +**
48	**T.M.D.S. Clock -**
C6	**NC**
C7	**NC**
C8	**NC**
C9	**NC**
C10A	**GROUND**
C10B	**GROUND**

DP signal input	
Pin No.	**Signal Assignment**
1	Lane 3 (negative)
2	Ground
3	Lane 3 (positive)
4	Lane 2 (negative)
5	Ground
6	Lane 2 (positive)
7	Lane 1 (negative)
8	Ground
9	Lane 1 (positive)
10	Lane 0 (negative)
11	Ground
12	Lane 0 (positive)
13	GND
14	GND
15	Aux Channel (positive)
16	Ground
17	Aux Channel (negative)
18	Hot Plug Detect
19	DP Power Return
20	+3.3V Power



Touch connectors

D-Sub 9 Pin	
PIN NO.	**Signal**
1	
2	TxD
3	RxD
4	
5	GND
6	
7	
8	
9	

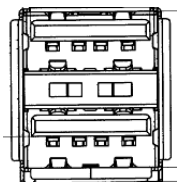


USB HUB/Touch connectors

USB UP, B-type 4 Pin	
PIN NO.	**Signal**
1	5V
2	D-
3	D+
4	GND

USB A type,2 layers

USB down signal	
Pin No.	**Signal Assignment**
1	5V
2	D-
3	D+
4	GROUND
5	5V
6	D-
7	D+
8	GROUND



3 OPERATION

3.1 keypad Introduction

For MSAP5521AMA (Medical) &MSAP5521AA(IT)

Touch Type 8keys :

The standard key is

Touch disabled/Source/PIP/SWAP/MENU/DOWN/UP/POWER

Press first time all LED will light but no action, it works with pressing second time.

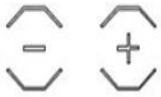
POWER Key with indicator LED

Press this button turn the monitor on.

When the monitor is on, press this button “HOLD UNTIL POWER OFF” will appear on the screen. Press for more than 4 seconds turn the monitor off. When the monitor is off, the LED goes off.

When the monitor is off, the green LED goes to off , but Power key blue LED will light as below.

You can slide 4 key (from left to right) or press power key to turn on Monitor.(DC on)



Down (-) and UP(+) key

Use these two key to control OSD go up or go down when Menu OSD appear..

Press ‘’+’’ to increase brightness 0 →100

Press’’-‘’ to decrease brightness 100 →0

MENU

Press this button to open and close OSD menu.

For Goomedi 8 key, the ‘’Menu’’ key also will be ‘’Enter’’ function.

PIP

Press this button, the monitor will change mode to PiP->PbP2->PoP2->PoP3->PoP4->off

SWAP

Press this button, swap input1 and input2

Source key

Method 1: When Monitor have input display, press this button will show input 1 list

You can use ‘’up’’ &’’down’’ to select which input you want to change, then press ‘’Menu’’ to switch.

Method 2: Press source key to select input1 directly.

Toggle between all inputs (VGA, DVI 1, DVI 2, DVI3, DVI4, DP1, DP2,)

If you stop at the input of your choice after 4 sec., this source will be activated.

When Monitor have no input , It is going to power saving mode.

You can press this button to wake up the monitor and select source input1 between all inputs.

Touch Disabled (No function if with glass not Pcap touch)

Press this button to on/off touch screen function when someone clear the screen surface.

OSD will show ‘’touch enabled’’ or ‘’touch disabled’’.

Press this buttons over 3 seconds, the monitor will go into touch disabled mode.

Press again for this buttons over 3 seconds, the monitor will go into touch enabled mode.

If with Glass, we will remove this key function and printing icon.

Combination Key:

+ Key Lock

Press these 2 buttons over 3 seconds, the monitor will go into key lock mode.

Press again for 2 buttons for 3 seconds, the monitor will release keys.

Power LED indication

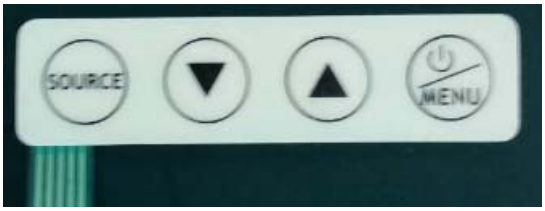
Green : Monitor on

Orange : Power saving or no signal

No lighting : Monitor off

For MSAP5521AA-IRT(IT)

Foil 4 keys(push button key)--- For traditional metal housing



Menu

Press this button to open and close OSD menu.

The ‘’Menu’’ key also will be ‘’Enter’’ function.

Down(-) and UP(+) key

Use these two key to control OSD go up or go down.

Source key

When Monitor have input display, press this button will show input 1 list

You can use ‘’up’’ &’’down’’ to select which input you want to change, then press ‘Menu’’ to switch.

3.2 OSD MENU

Charts of OSD Adjustment Functions

The charts display the function tree and brief explanations of the functions and other adjustments have sub-menus under each tree.

Main menu display

- **Exit/Info**
- **Input**
- **Picture**
- **PiP/PbP**
- **Color Mode**
- **Language**
- **OSD Settings**
- **Setup**

˙Exit/Info

Exit……Close the OSD screen

Info……Show four inputs with what source/resolution/H Freq/V Freq and which color mode exist.

˙Input

- VGA……..……..Select VGA analog input for display
- DVI1…….. ……Select DVI 1 digital input for display
- DVI2…….. ……Select DVI 2 digital input for display
- DVI3…….. ……Select DVI 3 digital input for display
- DVI4…….. ……Select DVI 4 digital input for display
- DisplayPort1……Select Display Port 1digital input for display
- DisplayPort2……..Select Display Port 2 digital input for display

Exit…….....Return to Input Page

˙Picture

- Picture Format (Only for Pip/Pbp=Off)
  - 16:9……Set display aspect rate to 16:9
  - 4:3……Set display aspect rate to 4:3
  - 1:1……..Set display aspect rate to 1:1
- Brightness……Adjust the backlight of the full screen by the range from 0 to 100
- Contrast……Adjust the contrast for the display image by the range from 0 to 100
- Sharpness……Adjust the contrast for the display image by the range from 0 to 100
- Black Level……..Adjust the contrast for the display image by the range from 0 to 100
- ALS……..On/off ‘’Auto Luminance Stabilize ’’ Function
  - On
  - Off
- Exit…… ……..Return to ‘’Picture’’ Page

˙PiP/PbP

- PiP/PbP Mode
  - Off……Set Main input1 to Full Screen
  - PiP……Set screen split to two screens (Picture in Picture)
  - PbP 2……Set screen split to two screens (Picture by Picture)
  - PoP 2……Set screen split to two same size screens (Picture outside picture Full)
  - PbP 3……..Set screen split to three screens (Picture by Picture)
  - PbP 4……Set screen split to four screens (Picture by Picture)
- Subinput2……It is active when set to PiP or PbP2 or PoP 2 mode
  - VGA……Select VGA analog for Sub Input2
  - DVI1……Select DVI 1 digitalfor Sub Input2
  - DVI2……Select DVI 2 digital for Sub Input2
  - DVI3……Select DVI 3 digital for Sub Input2
  - DVI4……Select DVI 4 digital for Sub Input2
  - DisplayPort1…… Select Display Port 1digital forSub Input2
  - DisplayPort2…… Select Display Port 2 digital for Sub Input2
- Subinput3……It is active when set to PbP 3 mode
  - VGA……..Select VGA analog for Sub Input3
  - DVI1……..Select DVI 1 digital for SubInput3
  - DVI2……..Select DVI 2 digital for Sub Input3
  - DVI3……Select DVI 3 digital for Sub Input3

- DVI4……..Select DVI 4 digital for Sub Input3
- DisplayPort1…….Select Display Port 1digital forSub Input3
- DisplayPort2……Select Display Port 2 digital for Sub Input3

Subinput4…….It is active when set to PbP 4 mode

- VGA…….Select VGA analog for Sub Input4
- DVI1…….Select DVI 1 digitalfor Sub Input4
- DVI2……..Select DVI 2 digital for Sub Input4
- DVI3……..Select DVI 3 digital for Sub Input4
- DVI4……..Select DVI 4 digital for Sub Input4
- DisplayPort1……Select Display Port 1digital forInput4
- DisplayPort2……...Select Display Port 2 digital for Input4

PiP Size……It is active when set to PiP mode

- Small……..Set Sub input2 size as small type
- Middle…….Set Sub input2 size as middle type
- Large……..Set Sub input2 size as large type

PiP Position……It is active when set to PiP mode

- Top-Right……..Set Sub input2 position as Top-Right
- Top-Left……..Set Sub input2 position as Top-Left
- Bottom-Right……..Set Sub input2 position as Bottom-Right
- Bottom-Left……..Set Sub input2 position as Bottom-Left

Swap……Swap input between Main input1 and Sub input2
It is active when set to PiP and PbP 2Win mode

Exit……Return to ‘’PiP/PbP’’Page

˙Color Mode

- Normal
  - Gamma
    - 1.8……...Set Gamma curve to curve 1.8
    - 2.0……...Set Gamma curve to curve 2.0
    - 2.2……...Set Gamma curve to curve 2.2
    - 2.4……...Set Gamma curve to curve 2.4
    - 2.6……...Set Gamma curve to curve 2.6
  - Color Temperature
    - Warm……Redish white suitable mainly for photo modifications
    - Neutral……White close to natural light mainly used for publishing trade
    - Cool……..Blueish white used for general use
    - User Define
      - Red ……..User adjusts the gain of Red by the range from 0 to 100
      - Green……User adjusts the gain of Green by the range from 0 to 100
      - Blue……..User adjusts the gain of Blue by the range from 0 to 100
      - Exit……Return to ‘’gamma’’ page
- DICOM……..Set Gamma curve to DICOM curve
- BT.709……..Set color gamut to ITU-REC.709
- BT.1886……Set color gamut to BT.1886
- BT.2020……Set color gamut to BT.2020
- Calibration……Calibrate monitor setting by using external device
  ALS always on, user can adjust below functions by Calibration software, like brightness/gamma/color temperature/ contrast/RGB gain……..etc
- Exit……Return to ‘’Color Mode’’ page

˙Language

- English…….....Display OSD in English
- Deutsch……..Display OSD in German
- Espanol……..... Display OSD in Spanish
- Francais……Display OSD in French
- Italiano…….. ……Display OSD in Italian
- 簡體中文……Display OSD in Simplified Chinese
- 繁體中文……Display OSD inTraditional Chinese
- 日本語……Display OSD in Japanese
- Exit……..Return to ‘’Language’’ page

˙OSD Setting

- Horizontal……Adjust the H position for OSD by the range from 0 to 100
- Vertical……Adjust the V position for OSD by the range from 0 to 100
- Transparency……Adjust the Transparency for OSD
  - off
  - 1
  - 2
  - 3
  - 4
- OSD Time Out
  - 5s……OSD will disappear after 5 seconds
  - 10s……OSD will disappear after 10 seconds
  - 20s……OSD will disappear after 20 seconds
  - 30s……OSD will disappear after 30 seconds
  - 60s……OSD will disappear after 60 seconds
  - Exit…… Return to‘’OSD Setting’’ page

˙Setup

- Auto ……Automatic screen size/position adjustment, only for VGA input
- H.Position ..... ….Adjust horizontal screen position for display image by the range from 0 to 100
- V.Position ……. Adjust vertical screen position for display image by the range from 0 to 100
- Phase……Adjust the phase for the video signals for display image from 0 to 100
- Clock…..Adjust the clock for the video signals for display image from 0 to 100
- Display Port……..Set the display port input version
  - 1.1…Set the display port input version to 1.1, support up to 1920*1080@60HZ
  - 1.2...Set the display port input version to 1.2, support up to 3840*2160@60HZ
- Reset …Clear all OSD user settings and back to the default settings
  - Yes
  - No
- Exit…… ……Return to‘’Setup’’page

XXXXXXXXXXX…….Only active for VGA input

3.3 OSD Selection

Photos Describe the OSD Adjustment Functions

The below photos will detail introduce every menu of OSD tree and brief explanations of the functions.

Detail of Adjustment Items

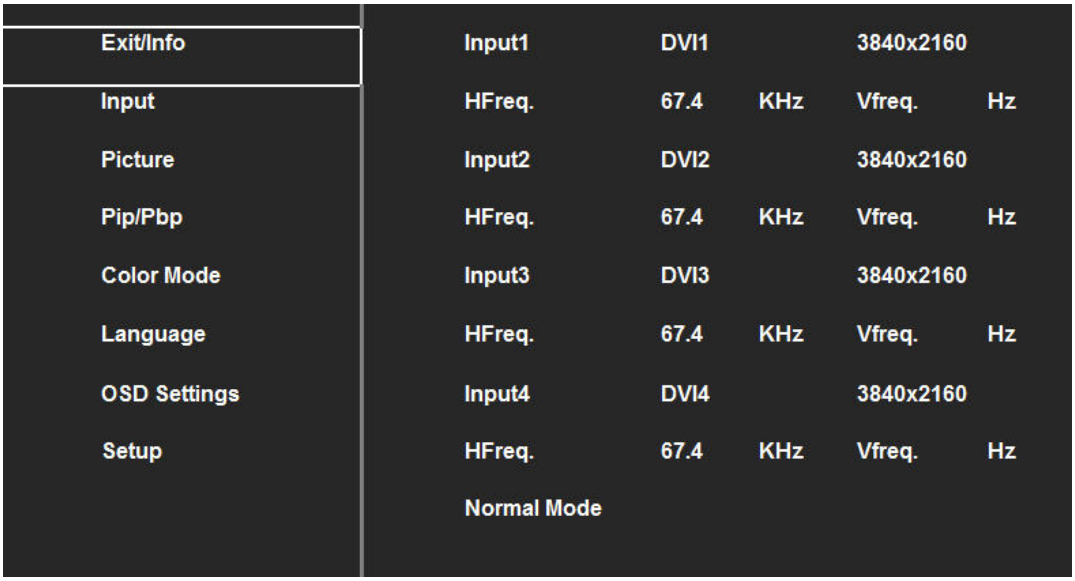
● Exit/Info

Close the Main menu

In addition, this page will show below messages:

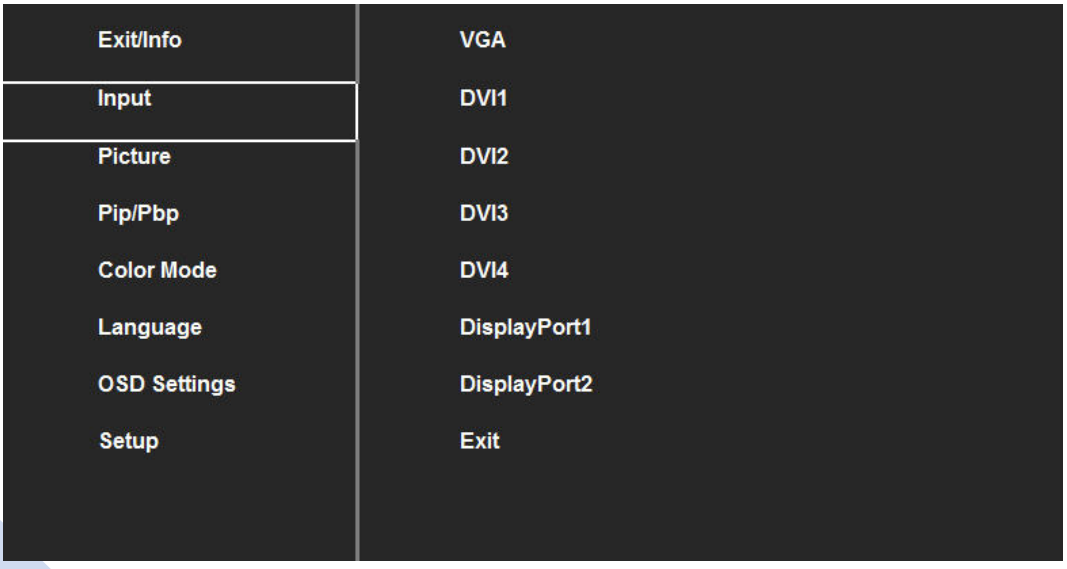
(1)Information for four input timing

(2)Indicate which mode display (color mode: Normal /DICOM/Calibration)



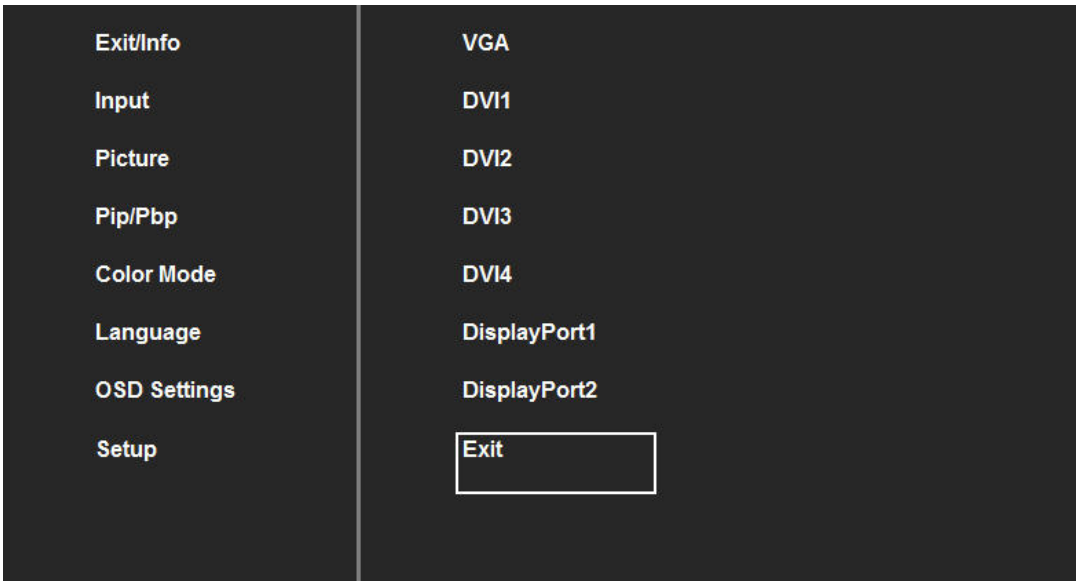
●Input

You can select source for image display from VGA,DVI 1~ DVI 4, and DP1, DP2…(Total 7 inputs)



Exit

Return to ‘’Input”

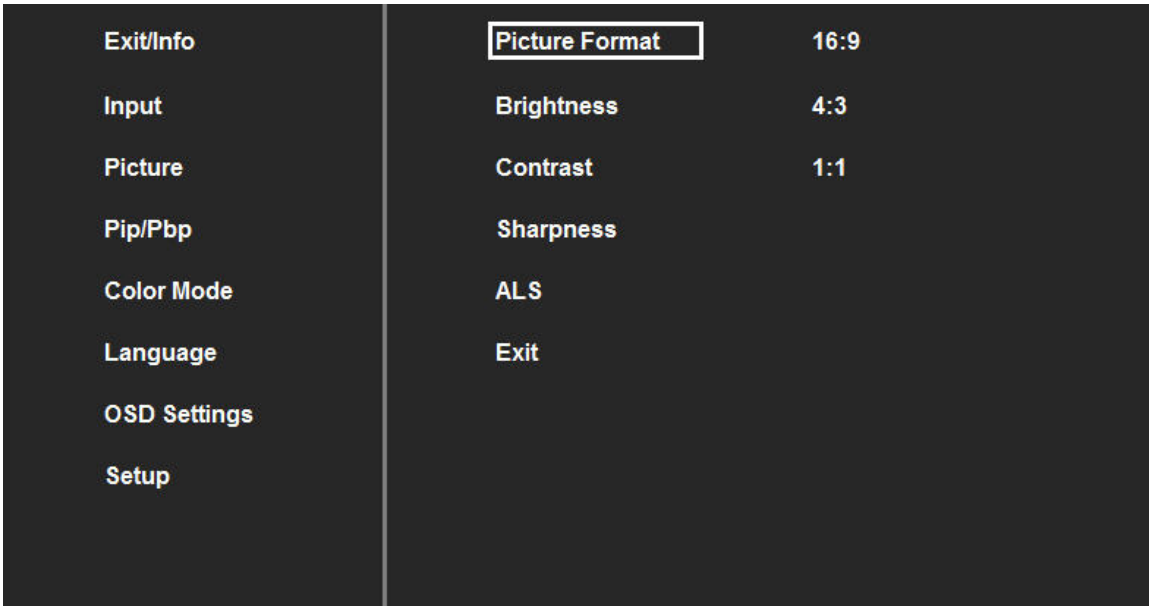


●Picture

Adjust values of below items for image display.

Picture Format

Adjust image size to 16:9 or 4:3 or 1:1



Brightness

Selecting this control allows you to make adjustment to the luminosity level of the display screen by the rangefrom 0 to 100

Contrast

Adjust the contrast for the display image by the range from 0 to 100

Sharpness

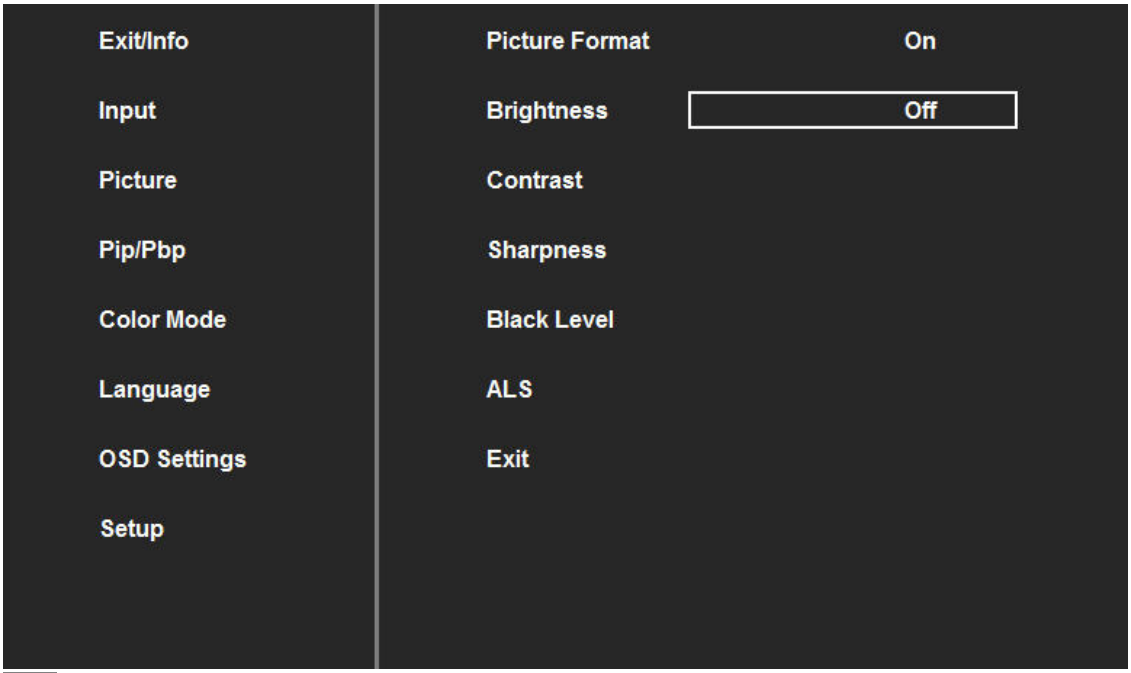
Adjust the sharpness for the display image by the range from 0 to 100

Black Level

Adjust the black level for the display image by the range from 0 to 100

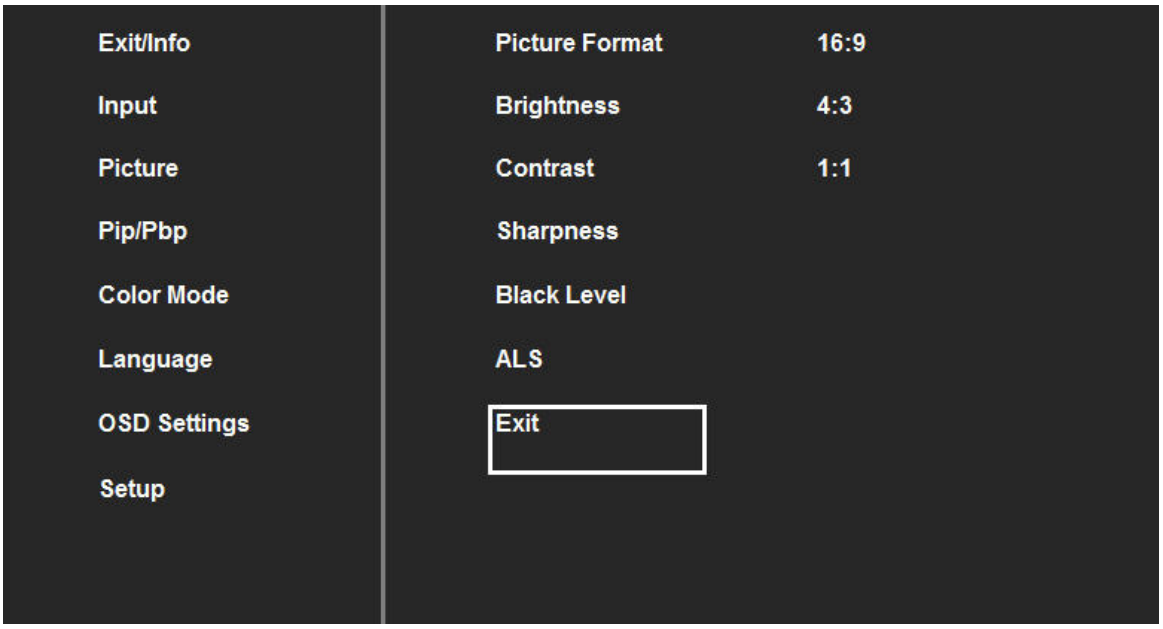
ALS

On/off ‘’Auto Luminance Stabilize ” Function



Exit

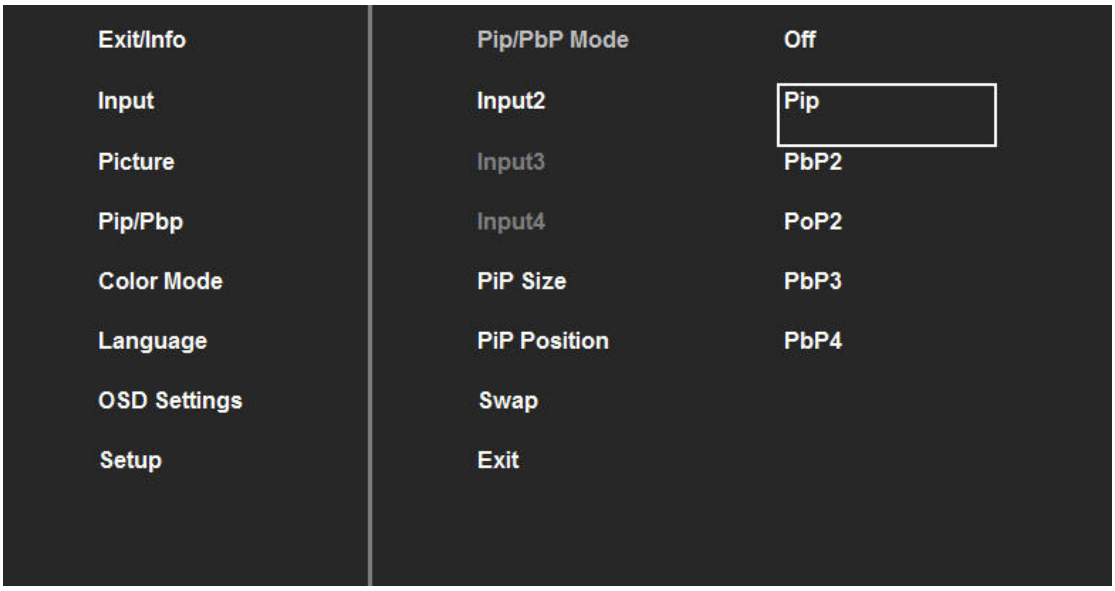
Return to ‘’Picture’’



●Pip/Pbp

There are six mode you can select, off(Full)/Pip/PbP2/PoP2/PbP3/PbP4

You also can select this control to adjust Pip/Pbp/Pop mode as below items settings for Sub channel



Off=(Full mode)

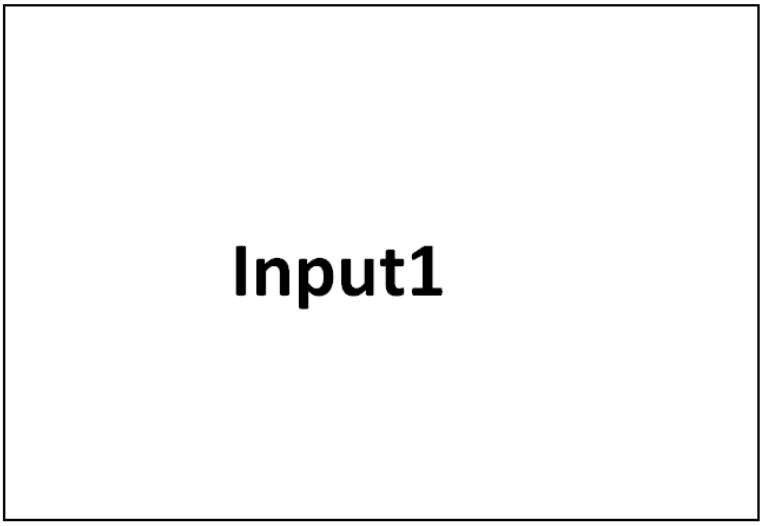
You can select 7 sources to display Full screen.

DP1&2-Pixel by pixel to display 3840*2160@60HZ

DVI1~4 input 3840*2160@30HZ, output 3840*2160@60HZ

VGA input FHD/WUXGA/UXGA, output 3840*2160@60HZ

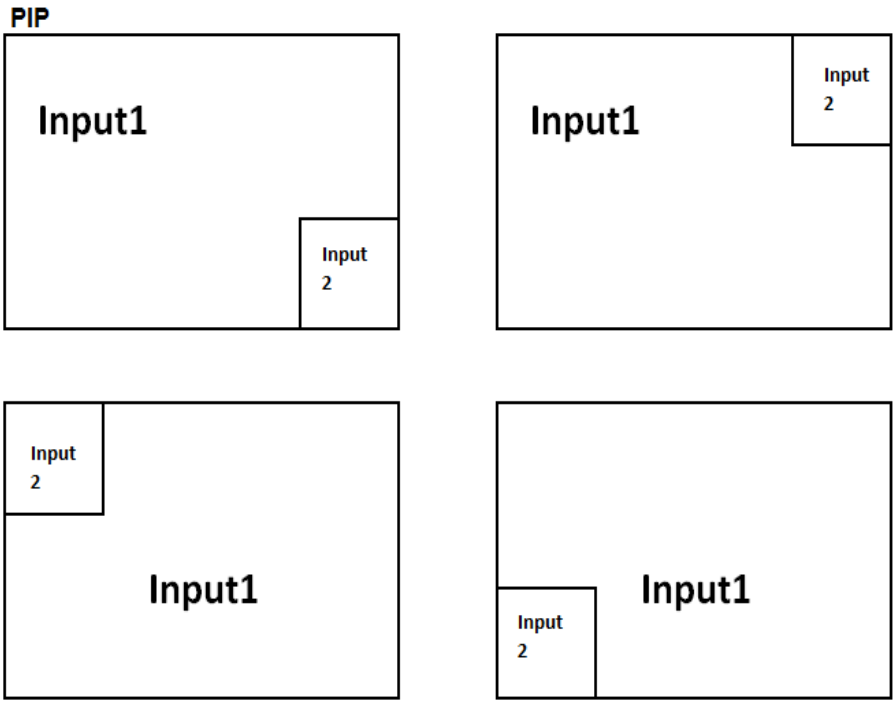
Full:3840*2160



PIP

Support two inputs for 7 sources for PIP

You can move sub channel to 4 positions as below and change three sizes.(Small,Middle,Large)

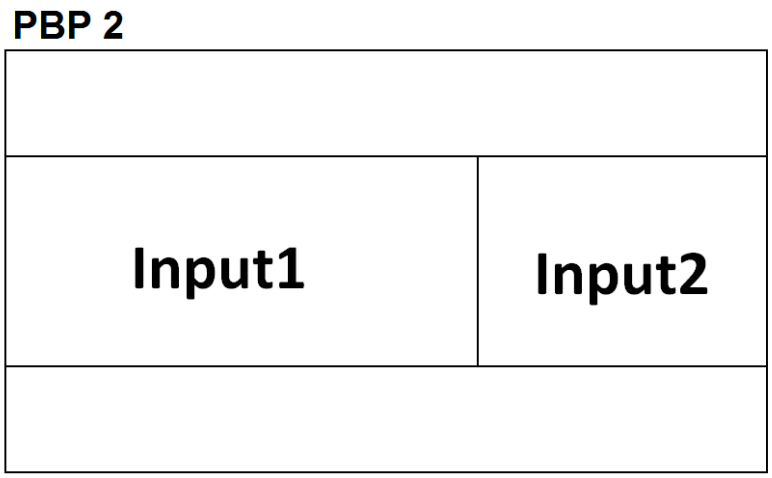


PBP2

You can select 7 sources for input1 and input2 at the same time.

Input 1,will scaling input1 up to 2560*1440(16:9)

Input 2, will scaling down input2 down to 960*540(16:9)



The big one scaling up input from 1920*1080 to 2560*1440(16:9)

The small one scaling down input from 1920*1080 to 960*540(16:9)

POP2(Input1+Input2-4K2K)

1920*2160+1920*2160=3840*2160@60HZ

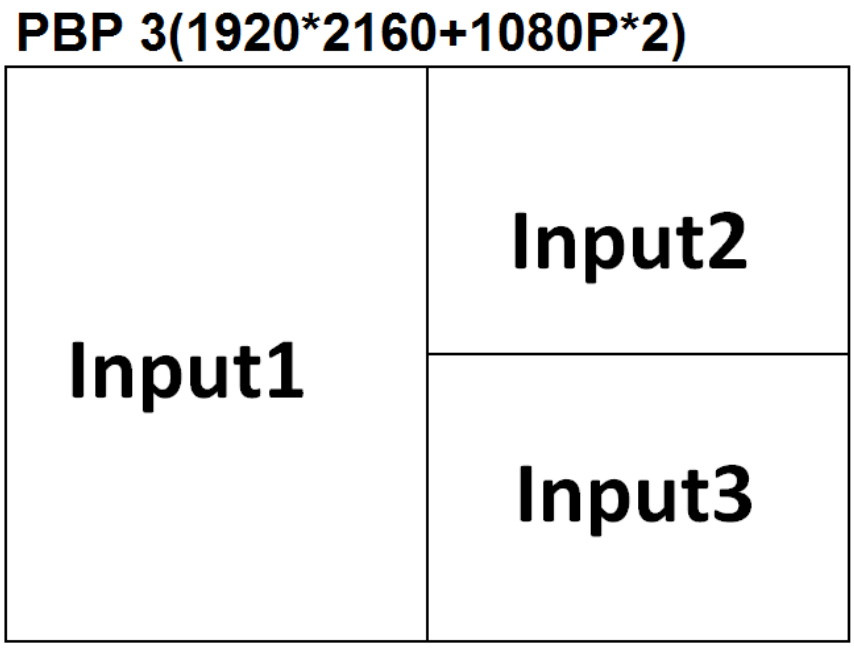
Support two input for left and right side screen

DP1.1 or HDMI 1.4 ready

You can use this function with Specific old graphic card(DP1.1 or HDMI1.4) to use two DP/DVI cable to work up 3840*2160@60HZ, 1920*2160 input1 for left and 1920*2160 1nput2 for right.

PBP 3

One input1 for 1920*2160, and other two input2&3 for 1920*1080



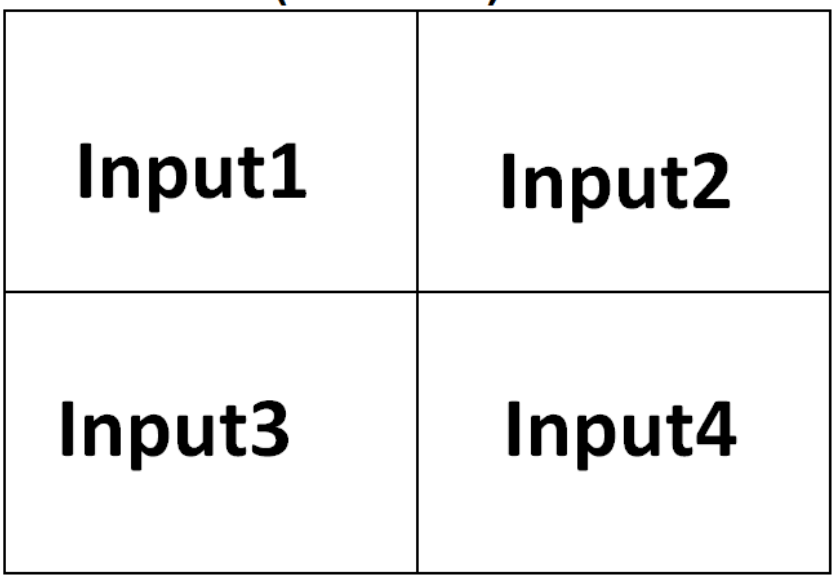
PBP 4

Support four inputs for 7 sources for demoIn addition,

You can use this function with Specific old graphic card(DP1.1 or SLDVI) to use four DP/DVI cable to work up 3840*2160@60HZ, four DVI is in charge of Quarter for 3840*2160@60HZ

1920*1080*4=3840*2160@60HZ

PBP Win 4(1080P*4)



Input2/Input3/Input4

Provide 7 input selections for input 2 and input 3 and input 4

input2……It is active when set to PiP or PbP2 or PoP2 mode

input3……It is active when set to PbP 3 mode

input4……It is active when set to PbP 4 mode

Select VGA analog for Sub Input2&Input3&Input4

Select DVI1for Sub Input2&Input3&Input4

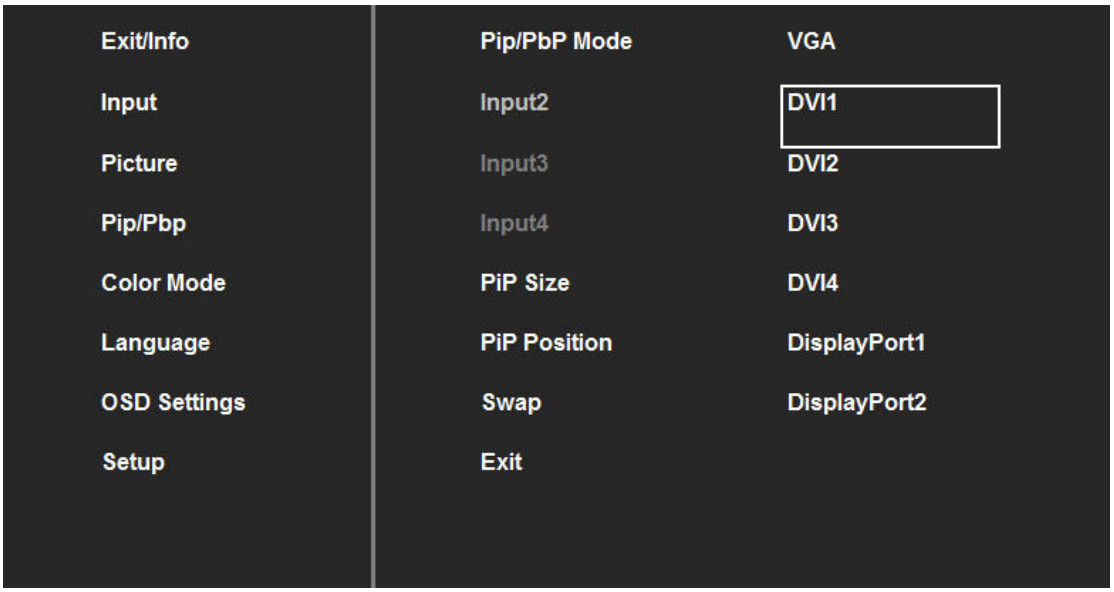
Select DVI2for Sub Input2&Input3&Input4

Select DVI3for Sub Input2&Input3&Input4

Select DVI4for Sub Input2&Input3&Input4

Select DisplayPort1for Sub Input2&Input3&Input4

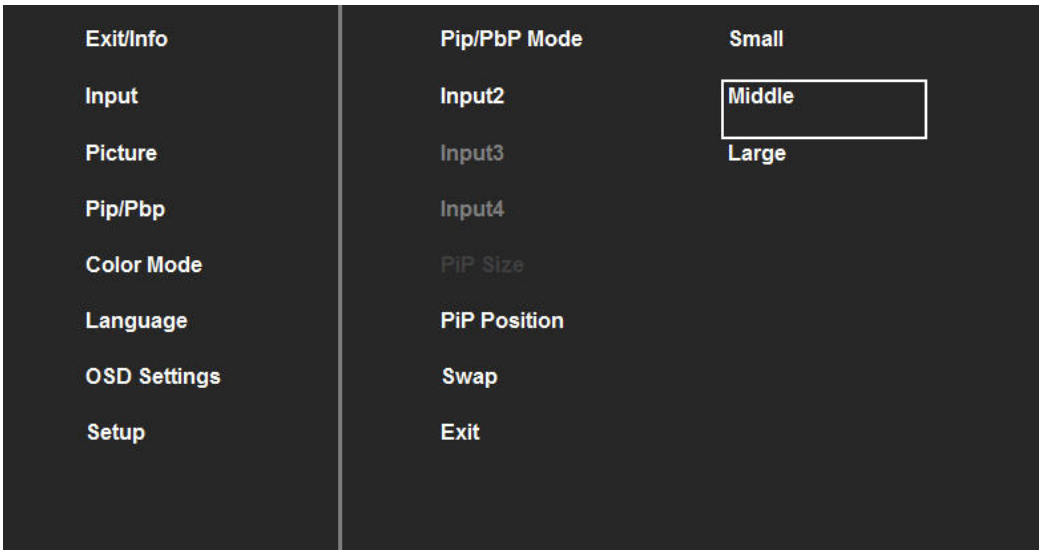
Select DisplayPort2 Input2&Input3&Input4



PiP size

*Notice :PIP size only active when Mode set to PiP.

Provide three size for Sub input2 selections: Small/Middle/Large..



PiP Position

*Notice :PIP Position only active when Mode set to PiP.

Provide four position for Sub input2 selections as below.

Top-Right

Set Sub input2 position as Top-Right.

Top-Left

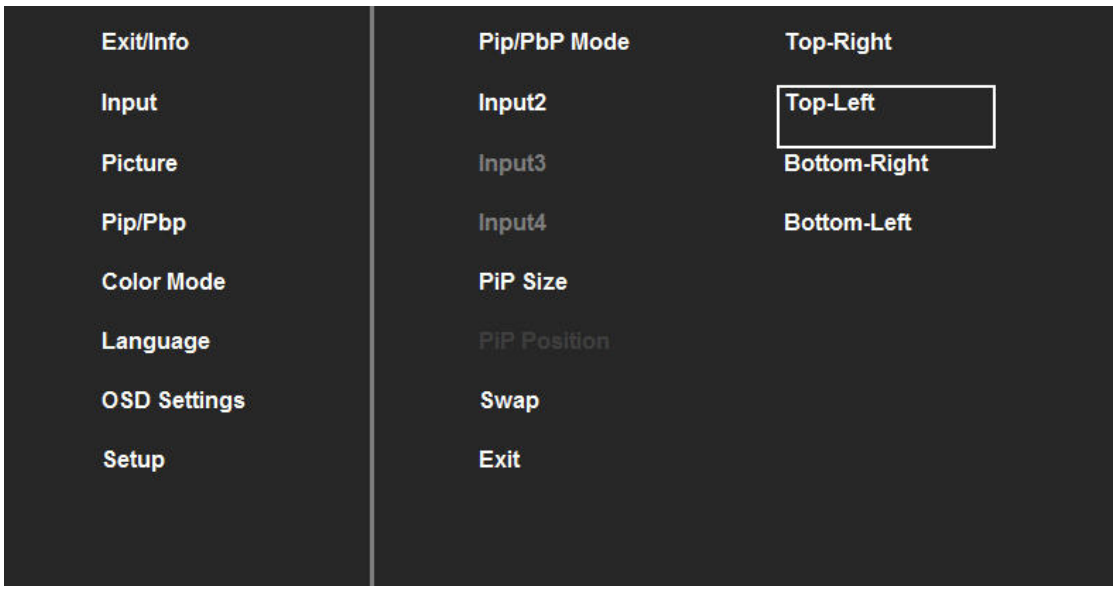
Set Sub input2 position as Top-Left.

Bottom-Right

Set Sub input2 position as Bottom-Right.

Bottom-Left

Set Sub input2 position as Bottom-Left.



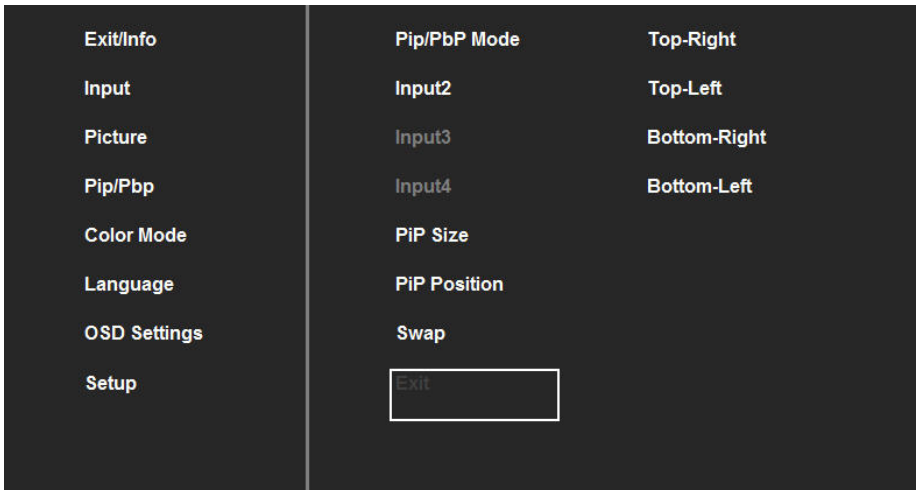
Swap

Swap input between Main input1 and Sub input2.

It is active when set to PiP or PbP2 or PoP2 mode.

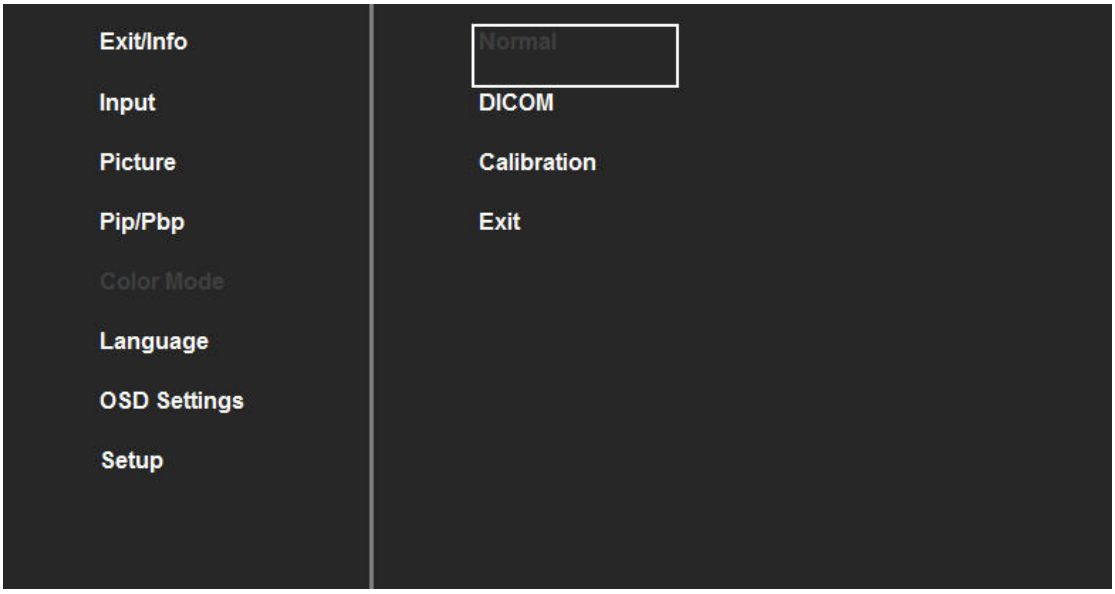
Exit

Return to ‘’PiP/PbP’’Page



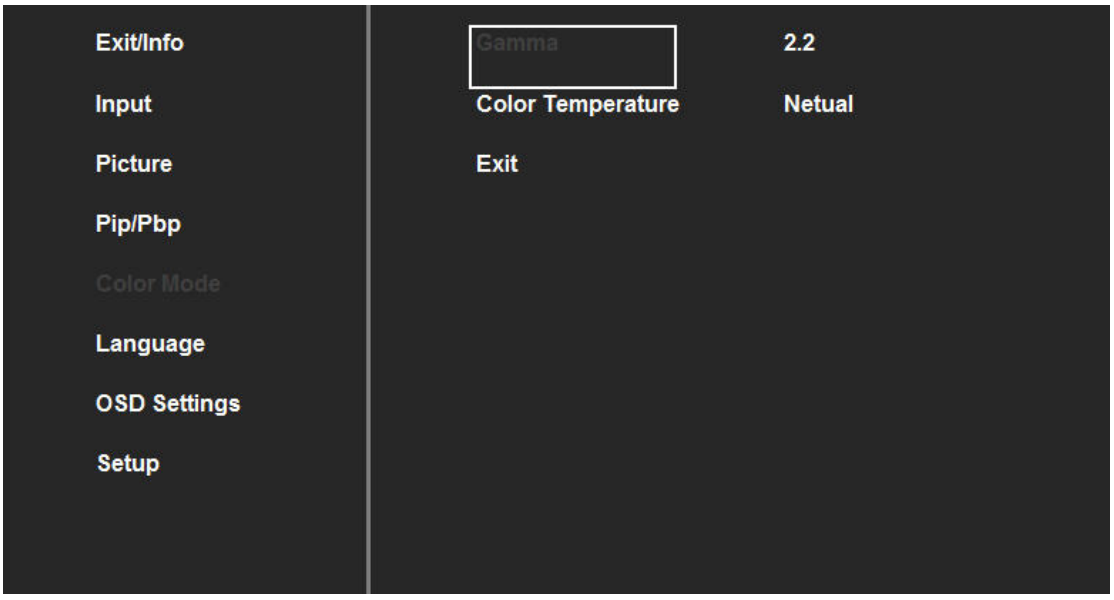
●Color Mode

Select color mode to Normal or DICOM or Calibration mode.



Normal

Adjust Gamma and color temperature.



Gamma

Select gamma curve for gamma 1.8/2.0/2.2/2.4/Linear

Gamma 1.8

Set Gamma curve to curve 1.8

Gamma 2.0

Set Gamma curve to curve 2.0

Gamma 2.2

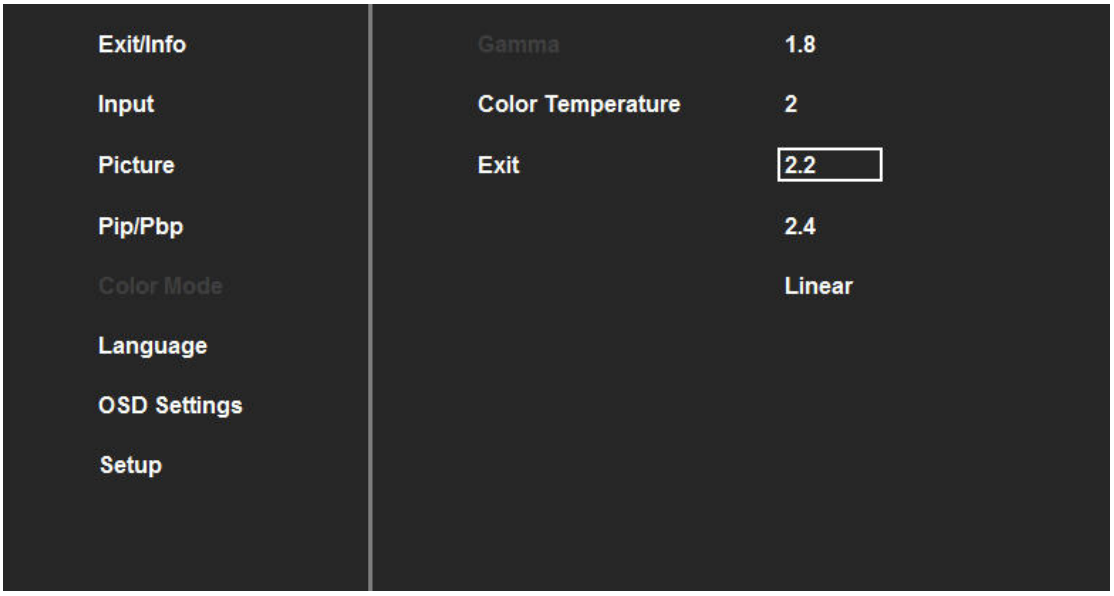
Set Gamma curve to curve 2.2

Gamma 2.4

Set Gamma curve to curve 2.4

Linear

Set Gamma curve to curve 1(bypass LUT)



Color Temperature

Select color temperature to Warm or Neutral or Cool or User Define

Warm

Redish white suitable mainly for photo modification

Neutral

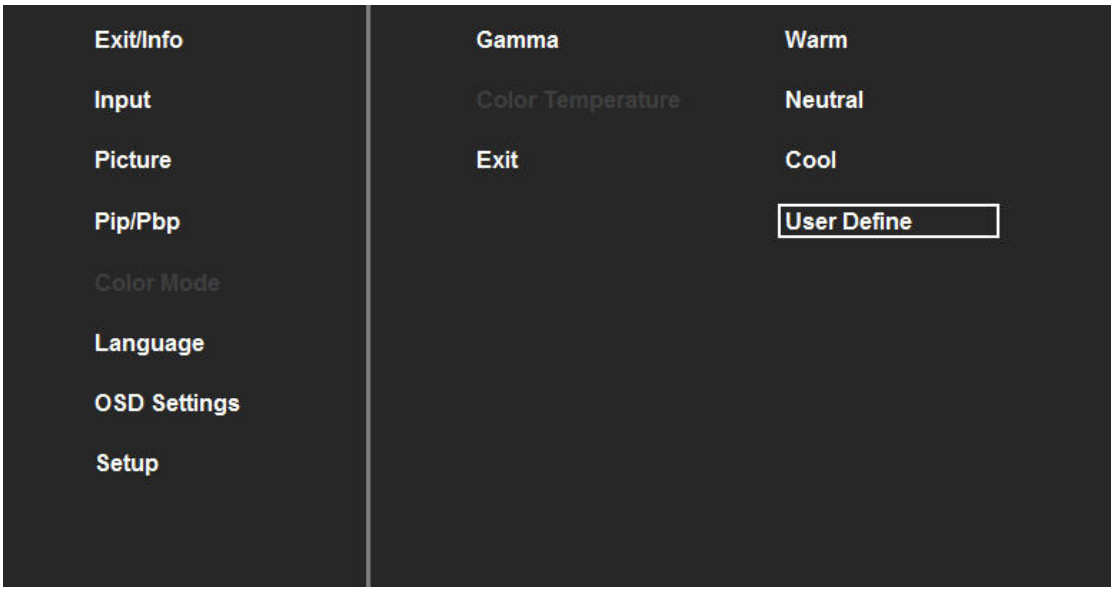
White close to natural light mainly used for publishing trade

Cool

Blueish white used for general uses

User Define

Select this control allows you to adjust the Red gain , Green gain and Blue gain individually to match personal preference.



Red Gain

You can adjusts the gain of Red by the range from 0 to 100

Green Gain

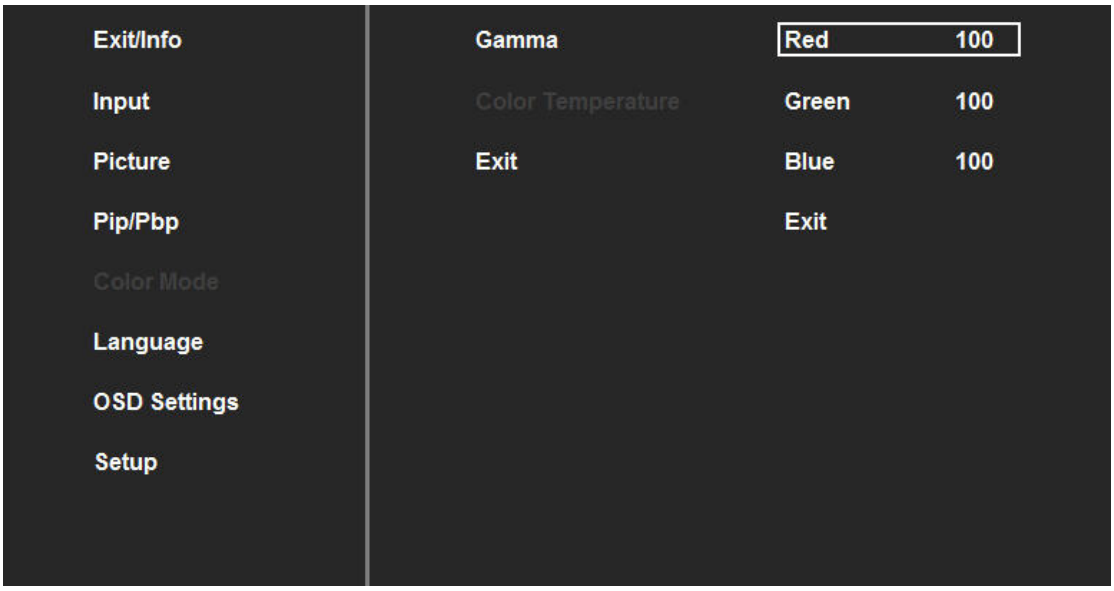
You can adjusts the gain of Green by the range from 0 to 100

Blue Gain

You can adjusts the gain of Blue by the range from 0 to 100

Exit

Return to ‘’Gamma’’



DICOM

Set Gamma curve for medical standards

Calibration

Calibrate monitor setting by using external device , user can adjust below functions by Calibration software, like brightness/gamma/color temperature/contrast/RGB Gain ……..etc

Exit

Return to ‘’Color mode’’

● Language

Select this control allows you to choose below languages that you want to display for OSD

English

Display OSD in English

Deutsch

Display OSD in German

Espanol

Display OSD in Spanish

Francais

Display OSD in French

Italiano

Display OSD in Italian

簡體中文

Display OSD in Simplified Chinese

繁體中文

Display OSD in Traditional Chinese

日本語

Display OSD in Japanese

Exit

Return to ‘’Language’’

● OSD Settings

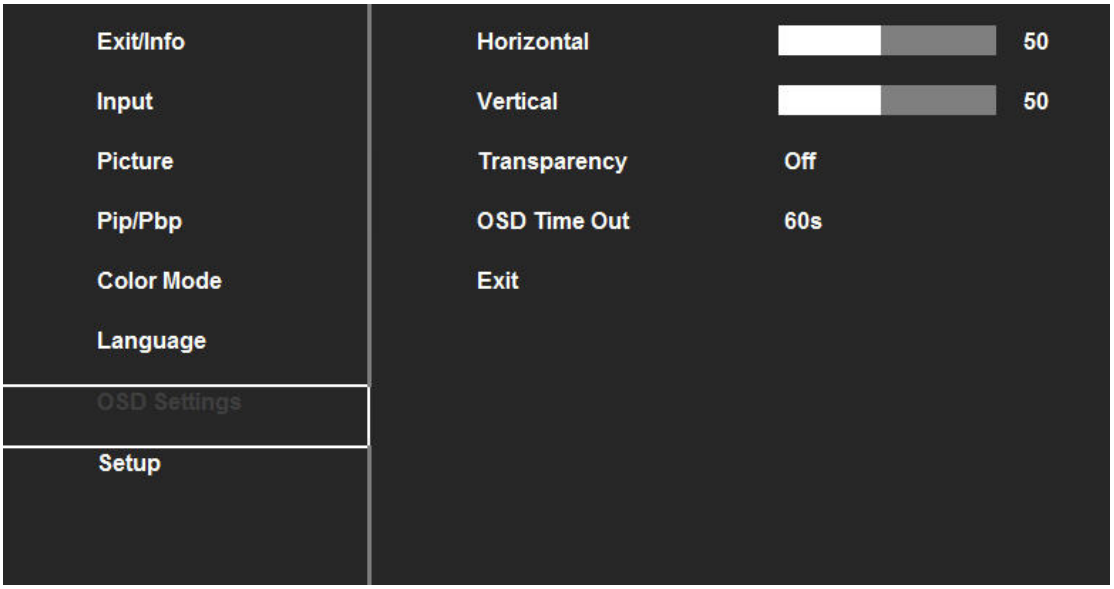
Select this control allows you to adjust below setting for OSD

Horizontal

Adjust the H position for OSD by the range from 0 to 100

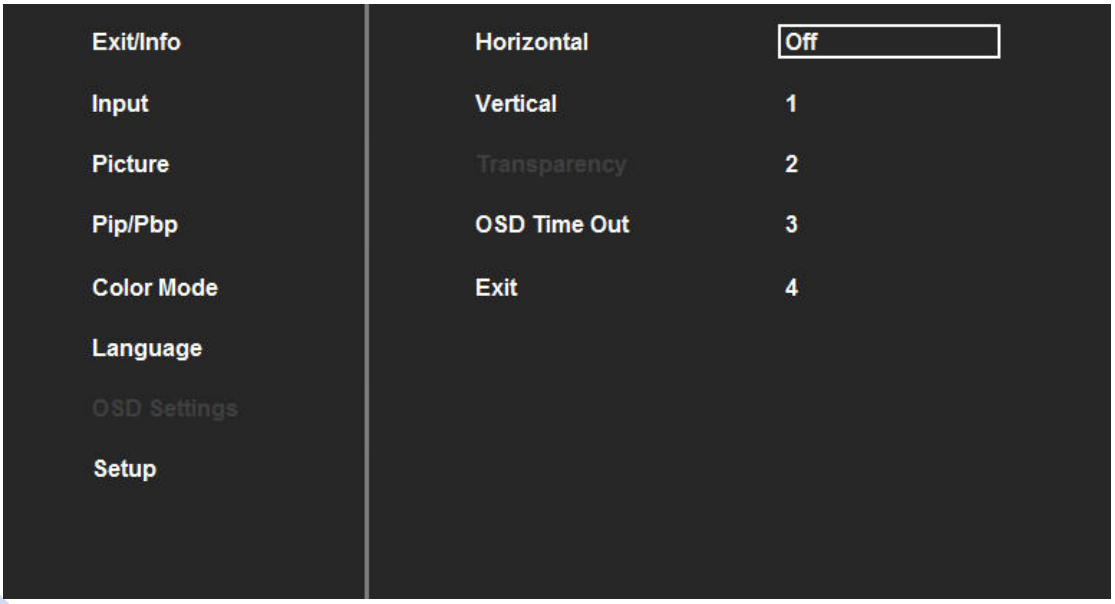
Vertical

Adjust the V position for OSD by the range from 0 to 100



Transparency

Adjust the Transparency for OSD, there are off/1/2/3/4 modes.



OSD Time Out

5s

OSD will disappear after 5 seconds

10s

OSD will disappear after 10 seconds

20s

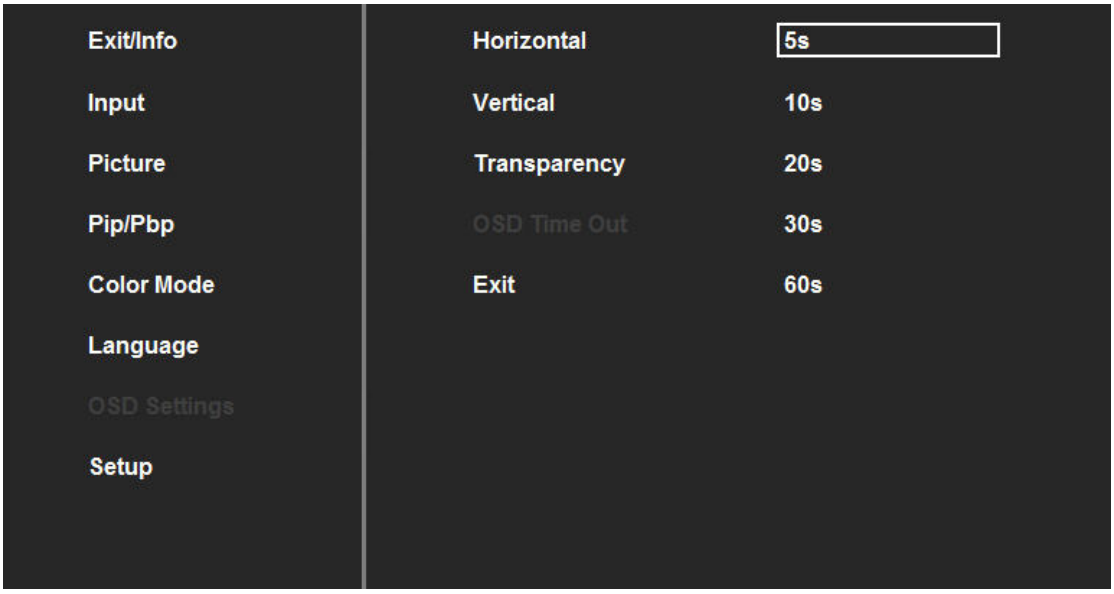
OSD will disappear after 20 seconds

30s

OSD will disappear after 30 seconds

60s

OSD will disappear after 60 seconds

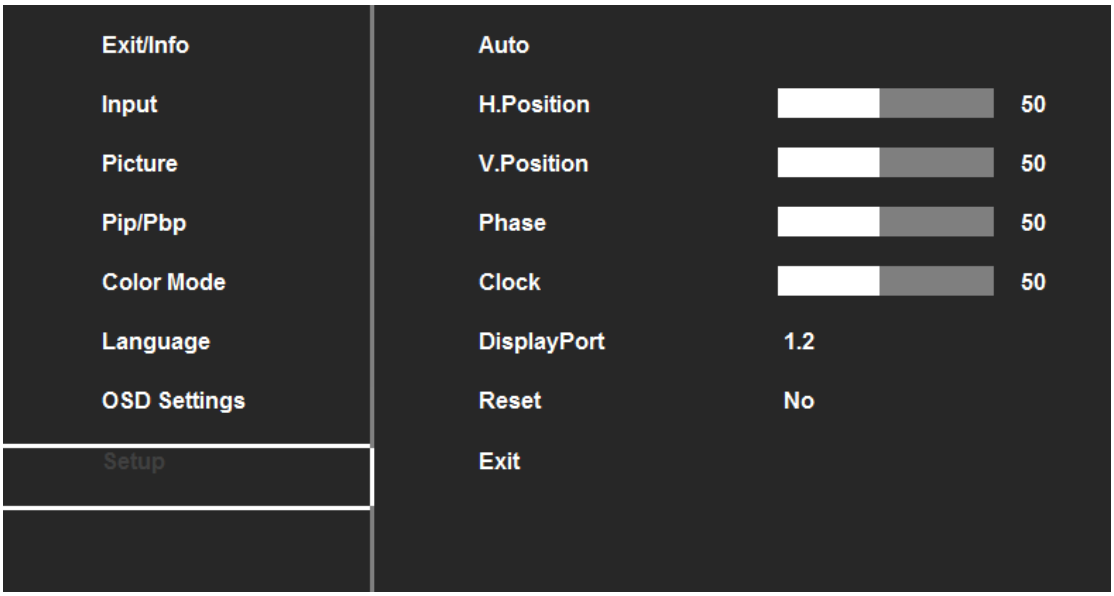


Exit

Return to ‘’OSD Settings’’.

● Setup

1. Automatic screen size/position/phase/clock adjustment, only for VGA input. Others input will disable these functions (gray mark).
2. Select Display port version between 1.1 or 1.2
3. Reset all OSD setting to default.



Auto

Automatic screen size/position adjustment, only for VGA input

H.Position

Adjust horizontal screen position for display image by the range from 0 to 100

V.Position

Adjust vertical screen position for display image by the range from 0 to 100

Phase

Adjust the phase for the video signals for display image from 0 to 100

Clock

Adjust the clock for the video signals for display image from 0 to 100

XXXXXXXXXXX.....Only active for VGA input

DisplayPort

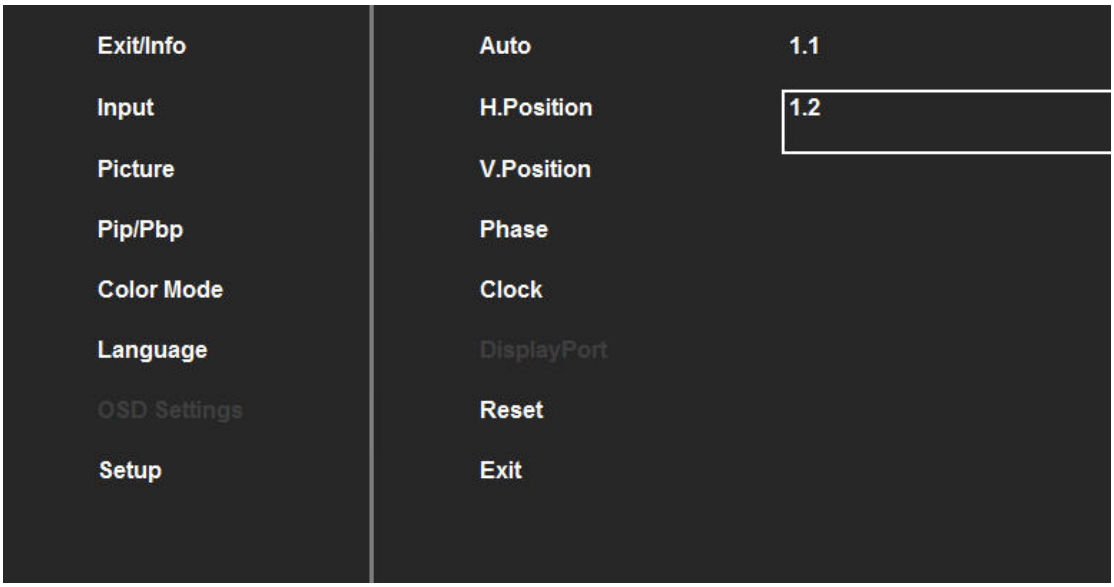
Set the display port input version

1.1

Set the display port input version to 1.1, support up to 1920*1080@60HZ

1.2

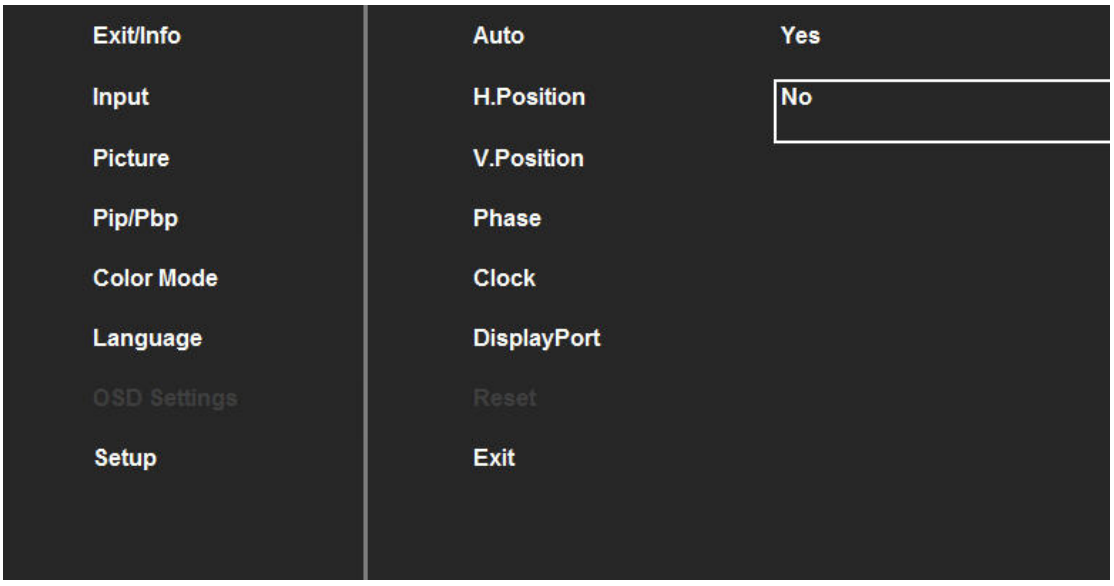
Set the display port input version to 1.2, support up to 3840*2160@60HZ



Reset

Yes Clear all OSD user settings and back to the default settings

No Return to ‘’Reset’’ page.



Exit

Return to ‘’Setup’’ page.

4 Display Timing Modes

NO	Pixel Format	Pixel Frequency	Frequency		Standard	Input Signal	Input Signal	Input Signal	Input Signal
		CLK(MHZ)	H(Hz)	V(Hz)	Type	DVI 1~4	DP 1~2	VGA	Input 1+ Input 2
1	640*480	25.175	31.5K	60	VESA				
	640*480	36	43.3K	80	VESA				
2	800*600	40	37.9K	60	VESA	V	V	V	
	800*600	49.5	46.9K	75	VESA	V	V	V	
3	1024*768	65	48.4K	60	VESA	V	V	V	
	1024*768	78.75	60K	75	VESA	V	V	V	
4	1280*1024	108	64K	60.	VESA	V	V	V	
	1280*1024	135	80K	75	VESA	V	V	V	
5	1600*1200	162	75K	60	VESA	V	V	V	
6	1920*1080	148.5	67.5K	60	VESA	V	V	V	
7	1920*1200(R.B.)	154	74K	60	VESA	V	V	V	
8	1920*2160	297	67.5K	60	See note 1	V	V		
9	1920*2160+1920*2160=3840*2160	297	67.5K	60	See note 1				V
10	3840*2160	297	67.5	30	See note 1	V			
11	3840*2160	594	135K	60	See note 1		V		

Remark:

1. **No8~No11 have graphic card limited.**
2. **NvidiaQuadro K2200 have been test and approved for this model.**
3. **One DVI can support 3840*2160@30HZ,work with PC output HDMI 1.4 via DVI connector)**
4. **One DP can support 3840*2160@60GZ**
5. **Two input can support 3840*2160 60HZ, use POP2,1920*2160+1920*2160**

5. Information

Safety Precautions

CAUTION

Symbol Description

Caution!-This symbol alerts you to important operating considerations or a potential operating condition that could damage equipment. Refer to user's manual or operation's manual for precautionary instructions.

Consignes de sécurité

ATTENTION

Description des symboles

Attention ! - Ce symbolevousavertit sur les considérationsd'utilisationimportantesoud'une condition de fonctionnementpotentiellementdangereuse pour l'équipement. Reportez-vous au manuel de l'utilisateurou au manueld'utilisation pour les consignes de sécurité.

CLASSIFICATION

Class I : No applied parts Protection against harmful ingress of water is IPX0 Not suitable for use in the presence of flammable anesthetic's or oxygen. Mode of operation: Continuous.

External Equipment

External equipment intended for connection to signal input / output or other connectors, shall comply with UL/EN 60601-1 for medical electrical equipment. In addition, all such combination system shall comply with the standard IEC 60601-1-1, Safety requirements for medical electrical systems. Equipment not complying with UL/EN/IEC 60601-1 shall be kept outside the patient environment, as defined on the systems standard.

Intended Use

The equipment is designed for general purpose medical image in the hospital environment,
for displaying information. It should not be used as a life-support system.

FCC

FCC Information

FCC(U. S. Federal Communications Commission)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of

the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause unacceptable interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

● Reorient or relocate the receiving antenna.

● Increase the separation between the equipment and receiver.

● Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

● Consult your dealer or an experienced radio/TV technician for help.

FCC Warning:

To assure continued FCC compliance, the user must use a grounded power supply cord and the provided shielded video interface cable with bonded ferrite cores. Also, any unauthorized changes or modifications to this monitor would void the user's authority to operate this device.

General recommendations

●Read the safety and operating instructions before operating the device.

● Note that, excluding those cases where a responsibility for legal compensation is recognized, the manufacturer shall bear absolutely no responsibility for damage to this product by a customer or a third party that results from the ignoring of contents entered in this Operating Manual and mistaken use.

● Follow the instructions below for safety use of the LCD Monitor.

●To avoid electric shock, do not attempt to remove any cover or touch the inside of the monitor. Only a qualified service technician should open the monitor case.

●Do not insert metal objects or spill liquid into the LCD monitor through cabinet slots. They may cause accident fire, electric shock or failure. If a foreign object inserted or water penetrated, unplug the AC cable and have the monitor serviced.

● Do not cover or block the vent holes in the case.

● Disconnect the power plug from the AC outlet if you will not use it for an indefinite period of time.

●Do not touch the screen directly with your fingers. You may damage the screen, and oil from your skin is difficult to move.

●Do not apply pressure to the screen. The LCD is very delicate.

● If your LCD monitor does not operate normally-in particular, if there are any unusual sounds or smells coming from it-unplug the AC cable immediately and contact the manufacturer, authorized or service center.

● Please do not touch other patient and this medical device at the same time.

● Users must not allow SIP/SOPs and the patient to come into contact at the same time.

● Warning – Do not modify this equipment without authorization of the manufacturer.

Recommandationsgénérales

- Lisez les consignes de sécuritéet de fonctionnementavantd'utiliserl'appareil.
- Notez que, saufdans les casoù la responsabilité de la compensation légaleestreconnue, le fabricant n'endosseraabsolumentaucuneresponsabilité pour les dommagesoccasionnés à ceproduit par un client ou un tiers, résultant de l'ignorance du contenu de cemanueld'utilisation et d'uneerreurd'utilisation.
- Suivez les instructions ci-dessous pour utiliserl'écran LCD entoutesécurité.
- Pour éviterun choc électrique, ne tentez pas de retirer un couvercleou de toucher l'intérieur du moniteur. Seuluntechnicienqualifiépeutouvrir le boîtier du moniteur.
- N'insérez pas d'objetsmétalliquesou ne renversez pas de liquidedans le moniteur LCD par les fentes du boîtier. Celapourraitprovoquerunincendie, un choc électriqueouunepanne. Si un corps étrangerestinséréousi de l'eau a pénétré, débranchez le câblesecteur et faitesréparer le moniteur.
- Ne couvreznin'obstruez les trous de ventilation du boîtier.
- Débranchez le cordon d'alimentation de la prisesecteursivous ne l'utilisez pas pendant unepériodeindéfinie.
- Ne touchez pas l'écrandirectement avec vosdoigts. Vousrisquezd'endommagerl'écran, etl'huile de votrepeauest difficile à retirer.
- N'appliquez pas de pression sur l'écran. L'écran LCD esttrèsdélicat.
- Si votremoniteur LCD ne fonctionne pas normalementenparticulier, s'ilproduit des bruits inhabituelsou des odeurs, débranchez le câblesecteurimmédiatementetcontacter le fabricant, ou un centre de réparationagréé.
- Ne touchez pas d'autre patient etcetappareilmédicalenmême temps.
- Les utilisateurs ne doivent pas laisser les SIP/SOP et le patient entreren contact enmême temps.
- Avertissement - Ne modifiez pas cetéquipement sans l'autorisation du fabricant.

General warnings

●All devices and complete setup must be tested and validated before taking into operation.

●The installer needs to foresee a backup system in case the video falls away.

●This equipment shall not be serviced or maintained while in use with the patient.

●WARNING: To avoid the risk of electric shock, this equipment must only be connected to a supply mains with protective earth.

●The plug is used as disconnect to the mains supply, do not to position the ME EQUIPMENT so that it is difficult to operate the disconnection device.

●When replacing parts or check refer servicing to qualified service personnel.

●”Additional equipment connected to medical electrical equipment must comply with the respective IEC or ISO standards (e.g. IEC 60950 for data processing equipment). Furthermore all configurations shall comply with the requirements for medical electrical systems (see IEC 60601-1-1 or clause 16 of the 3Ed. of IEC 60601-1, respectively).

Anybody connecting additional equipment to medical electricalequipmentconfigurations a medical system and is therefore responsible that the system complies with the requirements for medical electrical systems. Attention is drawn to the fact that local laws take priority over the above mentioned requirements. If in doubt, consult your local representative or the technical service department."

Avertissementsgénéraux

- Tous les appareilsetl'installationcomplètedoiventêtretestés et validésavant la miseen service.
- L'installateurdoitprévoirunsystème de sauvegardeencas de chute de la vidéo.
- Cetéquipement ne doit pas êtreréparéouentretenu pendant son utilisation avec le patient.
- ATTENTION : Pour éviter le risque de choc électrique, cetéquipementdoitêtreraccordé à un réseauélectrique protégé par unemise à la terre.
- La fiche estutilisée pour la déconnexion du réseauélectrique, ne placez pas l'ÉQUIPEMENT ME de tellesortequ'ilsoit difficile d'utiliser le dispositif de déconnexion.
- Faitesappel à un personnel qualifié pour le remplacement de piècesou la vérification de l'appareil.
- Tout « équipementsupplémentaireconnecté à un équipementmédicalélectriquedoitêtreconforme aux normes CEI ou ISO respectives (par exemple CEI 60950 pour les équipements de traitement de données). Enoutre, toutes les configurations doiventêtreconformes aux exigences pour les systèmesélectriquesmédicaux (voir la norme CEI 60601-1-1 ou à la clause 16 de la 3Ed. de la norme CEI 60601-1, respectivement).
- Toutepersonne qui relieunéquipementsupplémentaire à un équipementmédicalélectrique configure un systèmemédical et estdoncresponsable de ce que le systèmesoitconforme aux exigences pour les systèmesélectriquesmédicaux. Nous attironsvotre attention sur le fait que les lois locales sontprioritaires par rapport aux exigencesmentionnées ci-dessus. Encas de doute, consultezvotrereprésentant local ou le service technique ».

Power cords:

● Utilize a UL-listed detachable power cord, 3-wire, type SJ or equivalent, 18 AWG min., rated 250 Vmin., provided with a hospital-grade type plug 5-15P configuration for 120V application, or 6-15P for 240V application.

● Do not overload wall outlets and extension cords as this may result in fire or electric shock.

● Mains lead protection (U.S.: Power cord): Power cords should be routed so that they are not likely to be walked upon

or pinched by items placed upon or against them, paying particular attention to cords at plugs and receptacles.

● The power supply cord should be replaced by the designated operator only at all time.

● Use a power cord that matches the voltage of the power outlet, which has been approved and complies with the safety standard of your particular country.

Installation

● Place the equipment on a flat, solid and stable surface. Do not used on the floor.
If you use an unstable cart or stand, the equipment may fall, causing serious injury to a child
or adult, and serious damage to the equipment.

● Do not allow to climb, rest, sitting or stepping on the equipment.

● When adjusting the angle of the equipment, move it slowly so as to prevent the equipment from moving or slipping off from its stand or arm.

● When the equipment is attached to an arm, do not use the equipment as a handle or grip in order to move the equipment. Please refer to the instruction manual of the arm for instructions on how to move the arm with the equipment.

● Provide full attention to safety during installation, periodic maintenance and examination of this equipment.

● Sufficient expertise is required for installing this equipment, especially to determine the strength of the wall for withstanding the display's weight.

●Do not cover or block any ventilation openings in the cover of the set. When installing the device in a cupboard or another closed location, heed the necessary space between the set and the sides of the cupboard.

Technical data

●The monitor is intended for indoor use

● Operating Temperature : 0~40°C

● Operating Humidity : 10%~90% RH (non-condensing)

● Operating Pressure : 70 kPa-106 kPa

● Storage/Transport Temperature : -20 ~ +60°C

● Storage/Transport Humidity : 10% ~ 90% RH (non-condensing)

● Storage/Transport Pressure : 50 kPa-106 kPa

● Rating 100-240Vac, 50-60Hz, 1.75-0.78A (Medical) / 1.84-0.84A (IT)

Intended User Profile

Users to be considered

A.Installation personnel – only by manufacturer trained and authorized technician

B.Cleaning personnel – by manufacturer trained and authorize technician

C.Maintenance/repair personnel – only by manufacturer trained and authorize technician

D. Operating personnel – not in consideration for the graphical images at this stage as there are none to consider, however user interfaces such as OSD and conttol buttons shall be considered. Installation and OSD adjusting should only be carried by manufacturer trained and authorized personnel.

Operating Principle

The scaler is configured with a high-speed integrated triple-ADC(VGA,YPbPr,CVBS…) , an integrated DVI/HDMI/DP receiver, a high quality
display processing engine, an integrated micro-controller and output LVDS panel
interface format.
The user can select the signal ports by front key of monitor then the scalerprocessing these signals as zoom in or out action to fit the panel resolution.Then through the cable line transmission LVDS signals to one of the LCD module.
The last by the clock controller (Timing Controller, TCON), the clock signal is
transmitted to the drive IC on the panel and turn on Backlight for LCD module
light source by Scaler control.

Cleaning

● Be sure to unplug the power cord from the mains when cleaning your LCD monitor.

● Take care not to scratch the front surface with any hard or abrasive material.

● Dust,finger marks, grease etc. can be removed with a soft damp cloth (a small amount of mild detergentcan be used on the damp cloth).

● Wipe off water drop immediately.

● Using a spray applicator, apply any of the approved liquids from the list below and use a soft lint free cloth to clean the screen.

● Water the unit with a clean cloth that has been mistened in the pure water

Electrical and Electronic Equipment Symbols

In addition to the equipment symbols described in your user's manual, the following symbols may be appear on the monitor.

Alternating current.

Equipotentiality. Connect device to a potential equalization conductor.

European Union Declaration of Conformity.

FCC. USA only. Complies with applicable US government (Federal Communications Commission) radio-frequency interference regulations.

Caution: Consult accompanying documents.

Dangerous voltage. To reduce the risk of electric shock, do not remove cover. Refer servicing to qualified service personnel.

Indicates front.

Consult the operating instructions

Standby or power indicator.

This symbol indicates that the waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment

Indicates the manufacturing date

Manufacturer & After – sale Service

Goomedi Laboratories, Ltd

16F.-2, No.872, Zhongzheng Rd. Zhonghe Dist. 23551 New Taipei City TAIWAN

6 Technical specifications

Display(MSAP5521AMA)

Items	Specifications
LCD display device	139.7cm (55 inch)Color TFT Normally Black
Pixel pitch	Horizontal 0.315 mm x Vertical 0.315mm
Display area	Horizontal 1209.6mm x Vertical 680.4mm
Pixel	Pixel 3840 x 2160 pixels
Display colors	10 bit(8bit +FRC)
Standard viewing angle	Horizontal : 178 deg. Vertical : 178 deg.
Response Time	Response Time 6.5ms (Typ.) (Gray to Gray)
Contrast Ratio	Contrast Ratio 4000 : 1 (Typ.) 3200:1(Min.)
Brightness	Brightness 450 cd/m2 (Typ.) ; 360 cd/m2 (Min.)
Input signal	(1) VGA (15-pin D-SUB) Analog video RGB : 0.7Vp-p 75 ohms. Horizontal sync and composite sync signal: TTL level 2.5~5.5V (2) Display port (20-pin DP) connector *2 Differential peak to peak output voltage : Max=1.38V / Min=0.34V) Input Impedance: 100 ohm DisplayPort 1.2a compliant Supports 5.4Gbps, 2.7Gbps and 1.62Gbps per lane, receiver offering 21.6Gbps bandwidth over 4lanes Bi-directional auxiliary channel to flexibly deliver control and status information (3)DVI 2 layer:DVI 58 pin connector(2 layer) *2 ,(4 DVI support) Differential Signal Level Range: TMDS (Max=1560mVp-p / Min=150mVp-p) Input Impedance: 100 ohm HDMI 1.4 compliant HDMI supports up to 300MHz(Via DVI to HDMI adapter) (4) USB HUB interface 1* USB Up stream connector ,link to PC , be a USB HUB and touch screen 2*USB down stream for external USB device using. (5)D-Sub 9pin *2 RS232 interface 1* Dub-9pin Female connector for RS232 command control 1* Dub-9pin Female connector for RS232 command control for touch screen 1* Dub-9pin Female connector for external GPIO key
Temperature	Operating: Temperature : 10~40°C; Humidity(non-condensation) : 30~75%; Air pressure : 700~1060hPa Storage and Transport: -20~60°C; 10~90%; 500~1060hPa
Power Supply	100-240V~,50/60Hz,1.75-0.78A
Power Consumption	Approx.165W Max. Less than 20W when entry power saving mode.
External dimensions	Width 1314.6mm x Height 826.4mm x Depth 195mm
Weight	Approx. 47 kg(with Base)

Display(MSAP5521AA)

Items	Specifications
LCD display device	139.7cm (55 inch)Color TFT Normally Black
Pixel pitch	Horizontal 0.315 mm x Vertical 0.315mm
Display area	Horizontal 1209.6mm x Vertical 680.4mm
Pixel	Pixel 3840 x 2160 pixels
Display colors	10 bit(8bit +FRC)
Standard viewing angle	Horizontal : 178 deg. Vertical : 178 deg.
Response Time	Response Time 6.5ms (Typ.) (Gray to Gray)
Contrast Ratio	Contrast Ratio 4000 : 1 (Typ.) 3200:1(Min.)
Brightness	Brightness 450 cd/m2 (Typ.) ; 360 cd/m2 (Min.)
Input signal	(1) VGA (15-pin D-SUB) Analog video RGB : 0.7Vp-p 75 ohms. Horizontal sync and composite sync signal: TTL level 2.5~5.5V (2) Display port (20-pin DP) connector *2 Differential peak to peak output voltage : Max=1.38V / Min=0.34V) Input Impedance: 100 ohm DisplayPort 1.2a compliant Supports 5.4Gbps, 2.7Gbps and 1.62Gbps per lane, receiver offering 21.6Gbps bandwidth over 4lanes Bi-directional auxiliary channel to flexibly deliver control and status information (3)DVI 2 layer:DVI 58 pin connector(2 layer) *2 ,(4 DVI support) Differential Signal Level Range: TMDS (Max=1560mVp-p / Min=150mVp-p) Input Impedance: 100 ohm HDMI 1.4 compliant HDMI supports up to 300MHz(Via DVI to HDMI adapter) (4) USB HUB interface 1* USB Up stream connector ,link to PC , be a USB HUB and touch screen 2*USB down stream for external USB device using. (5)D-Sub 9pin *2 RS232 interface 1* Dub-9pin Female connector for RS232 command control 1* Dub-9pin Female connector for RS232 command control for touch screen 1* Dub-9pin Female connector for external GPIO key
Temperature	Operating / Storage and Transport Temperature : 10~40°C / -20~60°C Humidity(non-condensation) : 30~75% / 10~90% Air pressure : 700~1060hPa / 500~1060hPa
Power Supply	100-240V~,50/60Hz,1.84-0.84A
Power Consumption	Approx.165W Max. Less than 25W when entry power saving mode.
External dimensions	Width 1314.6mm x Height 826.4mm x Depth 195mm
Weight	Approx. 47 kg(with Base)

Display(MSAP5521AA-IRT)

Items	Specifications
LCD display device	139.7cm (55 inch)Color TFT Normally Black
Pixel pitch	Horizontal 0.315 mm x Vertical 0.315mm
Display area	Horizontal 1209.6mm x Vertical 680.4mm
Pixel	Pixel 3840 x 2160 pixels
Display colors	10 bit(8bit +FRC)
Standard viewing angle	Horizontal : 178 deg. Vertical : 178 deg.
Response Time	Response Time 6.5ms (Typ.) (Gray to Gray)
Contrast Ratio	Contrast Ratio 4000 : 1 (Typ.) 3200:1(Min.)
Brightness	Brightness 450 cd/m2 (Typ.) ; 360 cd/m2 (Min.)
Input signal	(1) VGA (15-pin D-SUB) Analog video RGB : 0.7Vp-p 75 ohms. Horizontal sync and composite sync signal: TTL level 2.5~5.5V (2) Display port (20-pin DP) connector *2 Differential peak to peak output voltage : Max=1.38V / Min=0.34V) Input Impedance: 100 ohm DisplayPort 1.2a compliant Supports 5.4Gbps, 2.7Gbps and 1.62Gbps per lane, receiver offering 21.6Gbps bandwidth over 4lanes Bi-directional auxiliary channel to flexibly deliver control and status information (3)DVI 2 layer:DVI 58 pin connector(2 layer) *2 ,(4 DVI support) Differential Signal Level Range: TMDS (Max=1560mVp-p / Min=150mVp-p) Input Impedance: 100 ohm HDMI 1.4 compliant HDMI supports up to 300MHz(Via DVI to HDMI adapter) (4) USB HUB interface 1* USB Up stream connector ,link to PC , be a USB HUB and touch screen 2*USB down stream for external USB device using. (5)D-Sub 9pin *2 RS232 interface 1* Dub-9pin Female connector for RS232 command control 1* Dub-9pin Female connector for RS232 command control for touch screen 1* Dub-9pin Female connector for external GPIO key
Temperature	Operating: Temperature : 10~40°C; Humidity(non-condensation) : 30~75%; Air pressure : 700~1060hPa Storage and Transport: -20~60°C; 10~90%; 500~1060hPa
Power Supply	100-240V~,50/60Hz,1.84-0.84A
Power Consumption	Approx.165W Max. Less than 25W when entry power saving mode.
External dimensions	Width 1281mm x Height 750mm x Depth 98.5mm
Weight	Approx. 35 kg(with Base)

7 EMC table

(MSAP5521AMA)

Guidance and manufacturer's declaration – electromagnetic emissions		
The model MSAP5521AMA is intended for use in the electromagnetic environment specified below. The customer or the user of the model MSAP5521AMA should assure that it is used in such an environment.		
Emissions test	**Compliance**	**Electromagnetic environment – guidance**
RF emissions CISPR 11	Group 1	The model MSAP5521AMA uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The model MSAP5521AMA is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Not applicable	

Recommended separation distances between portable and mobile RF communications equipment and the model MSAP5521AMA			
The model MSAP5521AMA is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the model MSAP5521AMA can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the model MSAP5521AMA as recommended below, according to the maximum output power of the communications equipment.			
Rated maximum output power of transmitter W	**Separation distance according to frequency of transmitter** m		
	150 kHz to 80 MHz $d = 1{,}2\sqrt{P}$	**80 MHz to 800 MHz** $d = 1{,}2\sqrt{P}$	**800 MHz to 2,5 GHz** $d = 2{,}3\sqrt{P}$
0,01	0,12	0,12	0,23
0,1	0,38	0,38	0,73

1	1,2	1,2	2,3
10	3,8	3,8	7,3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance *d* in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

Guidance and manufacturer's declaration – electromagnetic immunity

The model MSAP5521AMA is intended for use in the electromagnetic environment specified below. The customer or the user of the model MSAP5521AMA should assure that it is used in such an environment.

Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment guidance**
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV line(s) to line(s) ±2 kV line(s) to earth	±1 kV line(s) to line(s) ±2 kV line(s) to earth	Mains power quality should be that of a typical commercial or hospital environment.
interruptions and	<5 % *U*T	<5 % *U*T	Mains power quality should

voltage variations on power supply input lines IEC 61000-4-11	(>95 % dip in *U*T) for 0,5 cycle 40 % *U*T (60 % dip in *U*T) for 5 cycles 70 % *U*T (30 % dip in *U*T) for 25 cycles <5 % *U*T (>95 % dip in *U*T) for 5 sec	(>95 % dip in *U*T) for 0,5 cycle 40 % *U*T (60 % dip in *U*T) for 5 cycles 70 % *U*T (30 % dip in *U*T) for 25 cycles <5 % *U*T (>95 % dip in *U*T) for 5 sec	be that of a typical commercial or hospital environment. If the user of the model MSAP5521AMA requires continued operation during power mains interruptions, it is recommended that the model MSAP5521AMA be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE *U*T is the a.c. mains voltage prior to application of the test level.			

Guidance and manufacturer's declaration – electromagnetic immunity			
The model MSAP5521AMA is intended for use in the electromagnetic environment specified below. The customer or the user of the model MSAP5521AMA should assure that it is used in such an environment.			
Immunity	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment – guidance**
			Portable and mobile RF communications equipment should be used no closer to any part of the model MSAP5521AMA, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.

Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	Vrms	**Recommended separation distance** $d = 1,2\sqrt{P}$ $d = 1,2\sqrt{P}$ 80 MHz to 800 MHz $d = 2,3\sqrt{P}$ 800 MHz to 2,5 GHz
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2,5 GHz	V/m	where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and *d* is the recommended separation distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, [a] should be less than the compliance level in each frequency range. [b] Interference may occur in the vicinity of equipment marked with the following symbol: 

NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption
and reflection from structures, objects and people.

[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the model MSAP5521AMA is used exceeds the applicable RF compliance level above, the model MSAP5521AMA should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the model MSAP5521AMA.

[b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than V/m.