VTS-8510 Super-slim UHD LED Display

Model VTS-8510 Installation/Operation Manual

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Important Safety Instructions

- Before using this display, please read this user manual thoroughly to help protect against property damage and to ensure your personal safety and the safety of others.
- Be sure to observe the following instructions.
- For your safety, be sure to observe the warnings located in this manual.
- For installation or adjustment, please follow the instructions in this manual and refer all servicing to qualified service personnel.

Safety Precautions

- If smoke or a peculiar smell comes from the display, remove the power plug from the outlet immediately.
- Failure to do so may result in fire or electrical shock. Contact your dealer for inspection.
- If the display has been turned on but there isn't a picture, remove the power plug from the outlet immediately.
- Failure to do so may result in fire or electrical shock. Contact your dealer for inspection.
- If water is spilled or objects are dropped inside the display, remove the power plug from the outlet immediately.
- Failure to do so may result in fire or electrical shock. Contact your dealer for inspection.
- If the display is dropped or the cabinet is damaged, remove the power plug from the outlet immediately.
- Failure to do so may result in fire or electrical shock. Contact your dealer for inspection.
- To turn off the power of the display, press "O" on the main power switch at side of display.
- The power standby/on indicator will go off and the display cannot to be turned on/off by using the POWER button on the remote control. (To turn on/off the display by the remote control, press the main power switch again and light the power standby/on indicator.)
    - When turning off the display by pressing the POWER button on the remote control, the main power of the display is not turned off completely.
    - To disconnect power completely, remove the power plug from the outlet.
- If the power cord or plug is damaged or becomes hot, turn off the main power switch of the display, make sure the power plug has cooled down and remove the power plug from the outlet.
- If the display is still used in this condition, it may cause fire or electrical shock. Contact your dealer for replacement.

Installation

- Don't install in a high-temperature environment.
- If the display is used in high-temperature or in direct sunlight, it may cause the case or other parts to become distorted or damaged, resulting in overheating or electrical shock.
- Don't install in a high-humidity environment.
- This may cause overheating or electrical shock.
- Don't install near any heat sources such as radiators, heat registers, stoves, or other apparatus that produce heat.
- This may cause fire or electrical shock.
- Don't overload outlets or cables beyond electrical capacity.
- Don't use extension cords as it may cause fire or electrical shock.

- Don't insert the power plug into an outlet other than 100~240V AC.
- This may cause fire or electrical shock.
  - Don’t use a damaged power plug or worn outlet.
  - Don’t insert an improper power plug it may cause fire or electric shock.
- Don't place the display on an unstable shelf or surface.
- The display may fall, causing injury. Please install on a horizontal, stable, level surface.
- Don't place objects on the display.
  - If the display is covered or the vents are blocked, the display could overheat and cause a fire.
  - If metal or liquid gets into the display, it may cause fire or electrical shock.
  - Do not put heavy objects on the display as they may fall, causing injury.
  - Please keep a 10 cm minimum distance between the display and the wall for sufficient ventilation.
- Don't move the display when it is connected to the power cord and AV cables.
  - When moving the display, make sure to remove the power plug and cables from the outlet or source.
  - When unpacking or carrying the display, at least 2 people are needed. Make sure the display is carried upright.
  - Transport the display upright. Avoid placing the display face up or down.
  - Handle the display gently. Do not drop.

Use

- If you encounter a problem during installation, please contact your dealer for assistance. Don’t repair or open the display by yourself.
- Failure to do so may result in fire or electrical shock. Contact your dealer for inspection.
- Protect and correctly use the power cord/plug.
  - Don't pinch the power cord/plug between hard surfaces.
  - Don't step on the power cord/plug.
  - Before inserting the power plug into the wall outlet, connect the power cord to the display.
  - Don't operate the display with a damaged power cord or it may damage the display.
- Using extension cords (not recommended)
- If an extension cord must be used, ensure the voltage rating exceeds the max power consumption of the display. If the voltage rating is less than the display, it will cause the extension cord to overheat.
- If there is thunder or lightning, don’t touch the display or the power plug.
- This may cause an electric shock.
- Don’t use any kind of liquid on the display.
  - If liquid is spilled on the display, remove the power and ask qualified service personnel to check the display.
  - If the liquid gets on the display’s screen, please clean it with a dry and soft cloth immediately.
  - Don’t use any harsh chemical on the display.
  - If metal or liquid gets into the display, it may cause a fire or an electrical shock.

- Don’t install or remove the power plug with wet hands.
- This may cause an electrical shock.
- If the display will not be used for a long period of time, unplug the display.
- This may cause premature wear of electrical components or fire.
- Don’t press on the LCD panel.
- This may cause personal injury or panel damage.
- Don't push or shake the display.
- This may cause damage or injury.
  - If the glass of the display panel is broken, liquid may escape. Please don't touch the liquid.
  - If liquid get into your eyes or touches your skin, wash with the clean water and seek medical attention immediately.
  - Precautions with the remote control batteries
  - Please only use approved AAA type batteries.
  - Please be sure to insert batteries by matching the + and -.
  - Don’t recharge, heat, disassemble, short or throw batteries into a fire.
  - Don’t mix a new battery with a used one.
  - Don’t mix different types of batteries together (only use the specified type). it may cause burn and injury.

Cleaning

- If dust has collected on the power plug, removed the plug from the outlet and clean off the dust.
- Dust build-up may cause a fire.
- Take off the power plug before cleaning.
- Failure to do so may result in electrical shock or damage.
- Cleaning the surface of the display
  - When the surface of the display becomes dirty, please wipe the surface lightly with a soft clean cloth.
  - If the surface requires additional cleaning, lightly moisten the cloth.
  - Do not to let any kind of liquid enter the display as it may cause electrical shock or damage.
  - Do not clean the display with alcohol, solvents or ammonia, as this could damage the display.

Warnings

Use

- Do not use the display lying flat on its back.
- Transport the display upright with proper packaging. Avoid placing the display face up or down. Be careful not to bump to the display.
- Do not send a static (non-moving) image to the display, or it may cause image ‘burn-in’ or image retention.
- “Burn in” and/or image retention is not covered under warranty.
- Make sure to change the image on the display periodically. It is recommended to (1) turn off the display for at least 6 hours after 18 hours of usage in a 24 hour period to help avoid image retention and (2) to turn the “IRFM” function to “ON” in the OSD menu (under “Advanced Settings”).

Exemptions

- This product isn’t warranted for any damage caused by natural disaster (such as earthquake, thunder, etc.), fire, acts by third parties, accidents, owner’s intentional misuse and fault, or use in other improper conditions.
- This product isn’t warranted for incidental damages (such as profit loss or interruption in business, modification or erasure of record data, etc.) caused by use or inability to use of this product.
- This product isn’t warranted for any damage caused by inappropriate operation, or from not following the user manual.
- This product isn’t warranted for any damage caused by misuse or malfunction through simultaneous use of this product and the connected equipment or software.
- This product isn’t warranted for any damage caused by neglect of the instructions described about installation.
- This product isn’t warranted for any damage caused by improper installation.
- This product isn’t warranted for any damage caused by disassembly, modification or repair by non-authorised service center or people.

Compliance Information

DECLARATION OF CONFORMITY:

VIVIDtouch hereby declares that the Product's Model Number:

VTS-8510

Conforms with the provisions of:

- **FCC:**

  FCC CFR Title 47 Part 15 Subpart B Class A, CISPR 22

  ANSI C63.4

  ICES-003 Issue 5

- **CE:**

  EN 55022

  EN 55024

  EN 61000-3-2

  EN 61000-3-3

- **cTUVus:**

  UL 60950-1

  CAN/CSA-C22.2 No. 60950-1-07

- **CB:**

  IEC 60950-1

FCC PART 15:

This equipment has been tested and found to comply with the limits for a 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.

INDUSTRY CANADA (ICES-003):

CAN ICES-3 (A)/NMB-3(A)

PRODUCT DISPOSAL:

The Product contains small amounts of tin, lead and/or mercury. Disposal of these materials maybe regulated due to environmental considerations.

DISPOSAL OF OLD ELECTRICAL AND ELECTRONIC EQUIPMENT (Applicable throughout the European Union and other European countries with separate collection programs)

This symbol found on your product or on its packaging, indicates that this product should not be treated as household waste when you wish to dispose of it. Instead, it should be handed over to an applicable collection point for the recycling of electric al and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences to the environment and human health, which could otherwise be caused by inappropriate disposal of this product.

The recycling of materials will help to conserve natural resources. This symbol is only valid in the European Union. If you wish to discard this product, please contact your local authorities or dealer and ask for the correct method of disposal.

Notes

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1. Introduction

About This Manual

This Owner's Manual describes how to install, set up and operate the VIVIDtouch Series LED Display.

Throughout this manual, the VIVIDtouch Series LED Display is referred to as the "display"

Target Audience

The manufacturer has prepared this manual to help installers and end users get the most out of the display.

The manufacturer has made every effort to ensure that this manual is accurate as of the date it was printed. However, because of ongoing product improvements and customer feedback, it may require updating from time to time.

Textual and Graphic Conventions

Text Conventions: The following conventions are used in this manual, in order to clarify the information and instructions provided:

- Remote and built-in keypad button identifiers are set in upper-case bold type; for example, "Press EXIT to return to the previous menu."
- Computer input (commands you type) and output (responses that appear on-scree n) is shown in monospace (fixed-width) type; for example: "To change the aspect ratio to Letterbox, type 07 00 02 41 53 50 03 08 <Enter>."
- All keys with functional names are initial-capped, set in bold type and enclosed in angle brackets. These keys are the following: <Enter>, <Spacebar>, <Control>, <Esc> and <Tab>. <Enter> indicates that you may press either the RETURN or ENTER key on your keyboard if it has both keys.
- In addition to these conventions, underlining, bold face and / or italics are occasionally used to highlight important information, as in this example:

NOTE *A carriage return must be used after each command or string.*

Graphic Conventions: These symbols appear in numerous places throughout the manual, to emphasise points that you must keep in mind to avoid problems with your equipment or injury:

 *TIP*	TIPS highlight time saving short cuts and helpful guidelines for using certain features.
 *NOTE*	NOTES emphasise text with unusual importance or special significance. They also provide supplemental information.
 *CAUTION*	CAUTIONS alert users that a given action or omitted action can degrade performance or cause a malfunction.
 *WARNING*	WARNINGS appear when a given action or omitted action can result in damage to the equipment, or possible non-fatal injury to the user.
 *DANGER!*	DANGER appears when a given action can cause severe injury or death.

Using This Manual

Use the following table to locate the specific information you need in this manual.

If you need...	... Turn to page:
General information about the VIVIDtouch Series LED Display	16
Installation instructions	24
First-time configuration instructions	34
Advanced configuration instructions	46
Troubleshooting tips	50
Product specifications	61

Description, Features and Benefits

The **VTS-8510** is a ultra-high definition touch display that supports a full 3840x2160 @ 60 Hz resolution and can display 1.073 billion colours.

They combine ultra-high resolution and unparalleled image quality with configurable I/O in a large-format display for a wide range of digital signage and control-room applications.

Key Features and Benefits

The display offers these key features and benefits:

- Up to 3840x2160 @ 60 Hz resolution
- High-resolution, high-speed IR touch sensing for up to 6 simultaneous touches
- Can display up to 4 video sources simultaneously
- (4) HDMI v1.4 inputs and DisplayPort 1.2 input with High-bandwidth Digital Content Protection (HDCP), VGA, RS-232, USB 2.0/3.0, Touch USB and LAN connections
- An optional OPS (Open Pluggable Specification) slot
- Full-range internal speakers
- Signal source auto detection
- Selectable OSD keypad lock
- Landscape & Portrait support
- Flexible ON/OFF scheduler
- Low power consumption

Touch Capability:

- Precise, highly responsive touch technology
- High touch sensitivity – no pressure required
- Any touch: finger, gloved hand or pointer
- Calibrated easily by software tools as attached
- Windows 7/8, MAC OS and Linux compliant
- One USB cable for easy Plug-and-Play operation

Parts List

Your display is shipped with the following items. If any items are missing or damaged, please contact your dealer or Customer Service.

- VIVIDtouch UHD LED Display
- Remote Control Unit and Batteries
- AC Power Cord
- Touch Stylus
- Pen Tray
- IR Extender
- Quick Start Guide
- USB Key – Multi-Touch Drivers & User Manual
- USB Cable
- HDMI Cable
- VGA Cable

2. Controls and Functions

Display at a Glance

Figure 2-1 shows the key display components, and the paragraphs that follow describe them.

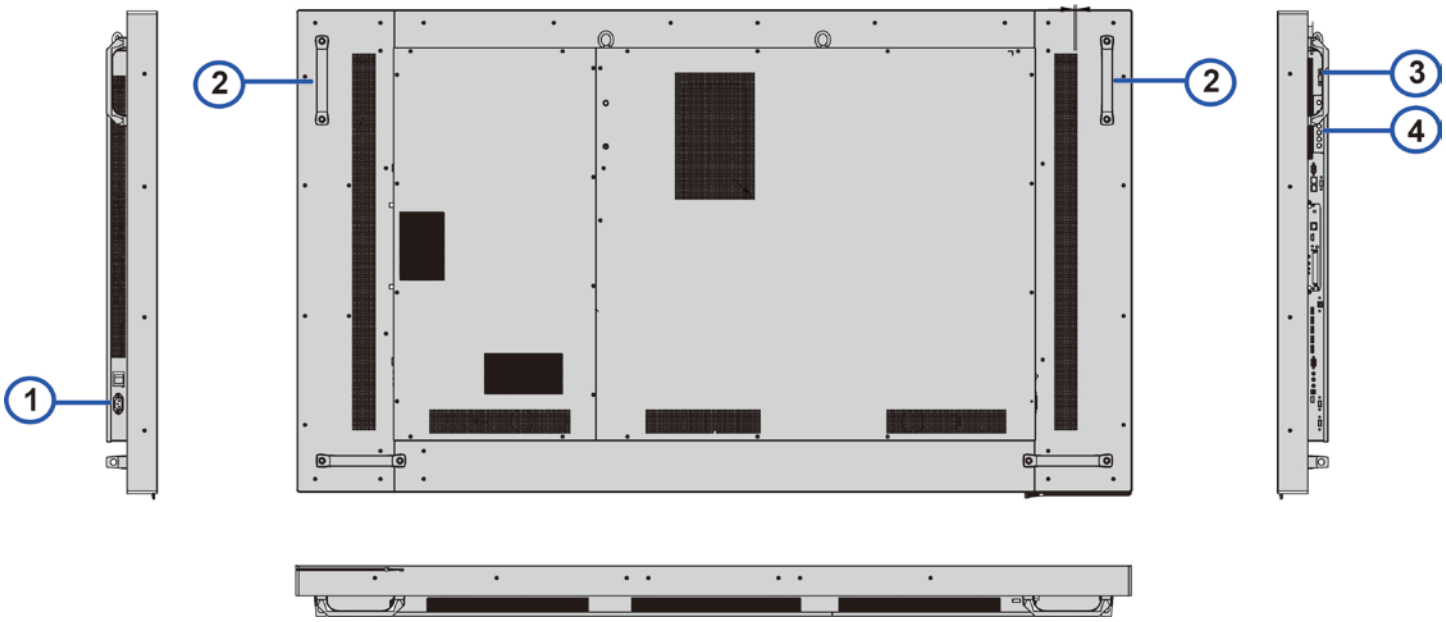


Figure 2-1. Display Rear/ Side View

1. **MAIN POWER SWITCH**

   Connects or disconnects the display panel from the AC power source.

2. **HANDLE**

   Always use the handles when carrying the display. DO NOT touch or hold the screen face.

3. **Status LED**

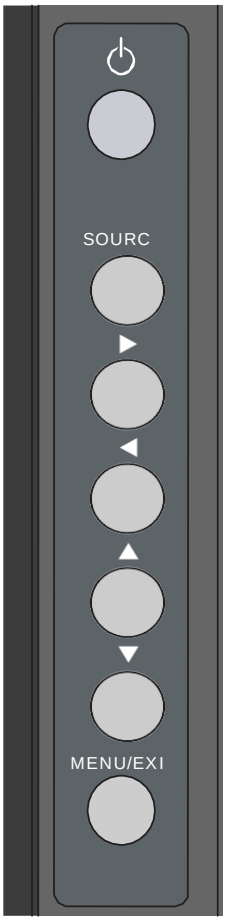
   Solid orange: display in standby mode

   Blinking orange: display on, no input detected

   Off: main power switch off

   Solid green: display on, input detected

4. KEYPAD



You can use the keypad instead of the remote control unit to operate the on-screen display (OSD) controls. The keypad operates as follows:

On/Standby ( )

Press once to toggle from standby mode to on mode. Press it again to return to standby mode.

SOURCE

To select a source, press the SOURCE button repeatedly (with no menus visible on-screen).

▶

When a menu is visible on-screen, this button operates identically to the right-arrow (or ENTER) button on the display remote control unit.

◀

When a menu is visible on-screen, this button operates identically to the left-arrow button on the display remote control unit.

▲ / ▼

When a menu is visible on-screen, these buttons operate identically to the up- and down-arrow buttons on the display remote control unit.

MENU/ EXIT

Press this button to access the on-screen display (OSD) controls, or to exit the current menu and return to the previous one.

Input Panel

Figure 2-2 shows the display input panel.

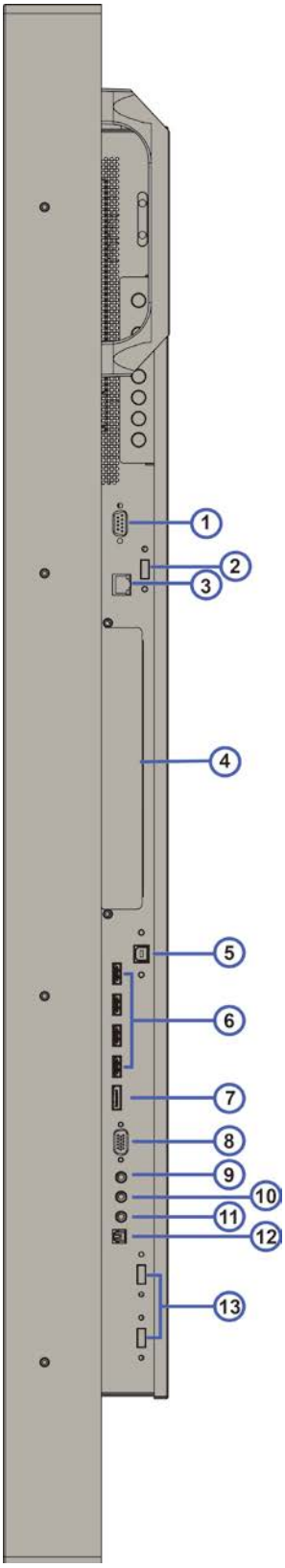


Figure 2-2. Display Input Panel Side View

1. **RS232C In**

   A female, 9-pin D-sub connector for interfacing with a PC or home theatre automation/control system.

2. **USB (2.0)**

   A standard USB 2.0 connector for connecting external multimedia player devices.

3. **LAN Port**

   An RJ-45 connector for interfacing with a PC or home theater automation/control system via a Cat 5 cable.

4. **OPS (Open Pluggable Specification) Slot**

   An optional OPS slot for connecting an internal PC to display 4K content.

5. **Touch USB**

   A standard, Type B USB port for connecting the DisplayPort input sources to the display.

6. **HDMI 1, 2, 3, 4**

   HDCP-compliant digital video input for connecting HDMI sources.

7. **DisplayPort**

   DisplayPort 1.1a and DisplayPort-HDCP 1.1 compliant, SD/HD input for connecting SDTV, EDTV or HDTV component video sources.

8. **VGA In (15-pin D-Sub)**

   Connects components that have RGB or component output jacks, such as a personal computer or external DTV decoder (a break-out c able is needed for BNC-type connection).

9. **PC Audio In**

   Connects the audio output from a personal computer here.

10. **IR Extender**

    Connects the IR Extender cable provided with the display to this input.

11. **Audio Out**

    Connects external, powered speakers or an external audio receiver/amplifier.

12. **SPDIF Out**

    Connects external and powered digital speakers or audio receiver/amplifier.

13. **USB (3.0)**

    Two standard USB 3.0 connectors for connecting external multimedia player devices.

Remote Control Unit

Figure 2-3 shows the display remote control, and Table 2-1 describes its functionality.

Figure 2-3. Display Remote Control Unit

Table 2-1. Remote Control Button Descriptions

	Label	Description
1	INFO	Provides source and resolution information
2	⏻	Turns the monitor on and off
3	VGA	Selects the PC RGB source
	DP1	Selects the DisplayPort source
	HDMI 1	Selects the HDMI source
	P-Source	Selects the secondary sub-source
	HDMI 2	Selects the HDMI source
4	PIP Position	Selects the PIP position
	OPS	Turn on OPS (open pluggable specification) feature
	HDMI 3	Selects the HDMI source
	PIP	Turns the PIP feature on and off
	SWAP	Swaps the main and PIP source
	HDMI 4	Selects the HDMI source
5	Blank	Blanks the screen. Press any key to restore.
6	Freeze	Freezes the screen. Press again to restore.
7	MENU ▶ ◀ ▲ ▼	Opens the monitor's on-screen menu system. When the menu system is already open, pressing this butt on will select the previous submenu. Navigates through submenus and settings
8	ENTER	Selects highlighted menu choices
9	EXIT	Closes the menu system
10	SCALING	Selects each aspect ratio, in sequence: Full Screen, Native, Letter Box and Pillar Box
	MUTE	Turns off the sound
	BRIGHT	Adjusts the brightness
	CONTRAST	Adjusts the contrast
	AUTO	Auto adjustment of VGA source
	SOURCE	Selects each source, in sequence
	VOLUME -	Decreases the sound volume
	VOLUME +	Increases the sound volume

3. Installation

NOTE *Installation must be performed by a qualified custom video installation specialist.*

Remote Control

To install batteries in the remote control:

1. Press down the tab on the cover and pull the cover up.
2. Insert the included batteries. Ensure that the polarities correctly match the ⊕ and ⊖ markings inside the battery component.
3. Insert the lower tab of the cover into the opening, and press down the cover until it clicks in place.

Notes on Batteries

Make sure that the battery polarities are correct when installing the batteries.

- Do not mix an old battery with a new one or different types of batteries.
- If you will not use the remote control for a long time, remove the batteries to avoid damage from battery leakage.
- Do not expose batteries to excessive heat such as from sunshine, fire or the like.

Notes on Remote Control Operation

- Make sure that there is nothing obstructing the infrared beam between the remote control and the IR receiver on the display.
- If the effective range of the remote control de creases, or it stops working, replace the batteries with new ones.
- The remote control may fail to operate if the infrared remote sensor is exposed to bright sunlight or fluorescent lighting.
- Ambient conditions may possibly impede the operation of the remote control. If this happens, point the remote control at the display, and repeat the operation.

Locking and Unlocking the Remote Control & Keypad on Display

You can lock the remote control buttons to prevent unauthorised persons from changing settings on the display. To do this, press ENTER, ENTER, EXIT, EXIT, ENTER and EXIT, in sequence. To unlock a locked remote control unit, use the same sequence of button presses.

Quick Setup

Table 3-1 gives a quick overview of the display installation process. The sections following this one provide detailed instructions.

Table 3-1. Installation Overview

Step	Procedure	For Details, Refer to page...
1	Mount the display(s) on a wall (optional)	27
2	Connect other external equipment to the display (optional): Automation/control system (RS-232, Ethernet) External IR extender	 28 30
3	Connect signal sources to the display	31
4	Apply power to the display	33
5	Change the OSD language (optional)	34
6	Perform touch screen-specific installation and configuration tasks (VIVIDtouch): Connect touch screen controller host computer to the display	 35
7	Display calibration: adjust the following *for each input*: • Aspect ratio • Brightness • Contrast • Colour temperature and white balance • Colour level • Tint • Input position	36

Installation Considerations

Proper installation of your display will ensure a satisfying viewing experience. Whether a display is installed temporarily or permanently, the following should be taken into account to ensure the best performance of the display.

Ambient Light

In general, minimise or eliminate light sources directed at the screen. Contrast ratio in your images will be noticeably reduced if light directly strikes the screen, such as when a shaft of light from a window or floodlight falls on the image. Images may then appear washed out and less vibrant. Direct sunlight may affect touch operation.

Ambient Heat

Keep the ambient temperature constant and below 35°C (95°F). Keep the display away from heating and / or air conditioning vents.

Ventilation

If you are mounting the display in an enclosure, leave sufficient space on all sides between it and surrounding objects, as shown in Figure 3-1. This allows heat to disperse, maintaining the proper operating temperature.

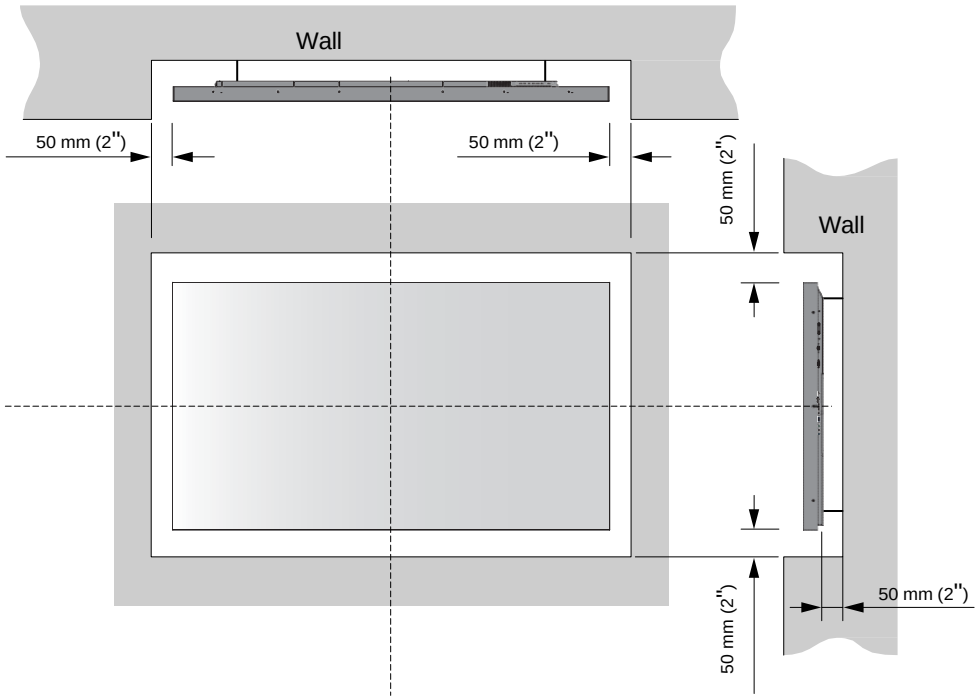


Figure 3-1. Ventilation Requirements for Enclosure Mounting

Mounting the Display

You can mount the display on a wall.

If you do decide to wall-mount the display, ensure that the wall-mount bracket is installed according to the instructions included with it. The wall must be capable of supporting a redundant weight factor three (3) times the weight of the display, or be reinforced.

We recommend that this be done by a custom installation specialist.

NOTE *Use only the approved wall-mount kit designed for your display.*

Connections to the Display

Proceed as follows to connect the display to your video sources, external controller(s) – if present – and AC power.

When connecting your equipment:

- Turn off all equipment before making any connections.
- Use the correct signal cables for each source.
- For best performance and to minimise cable clutter, use high-quality cables that are only as long as necessary to connect two devices. (Don't use a 7m cable when a 1.8m cable will suffice.)
- Ensure that the cables are securely connected. Tighten the thumbscrews on connectors that have them.

Connecting a Control System or PC:

RS232 Connection

Use a straight-through RS-232 cable with a 9-pin male connector to connect a PC or control/ automation system (if present) to the RS-232 port on the display; see **Figure 3-2**.

For more information about using this connection, refer to ***External Control*** on page 52.

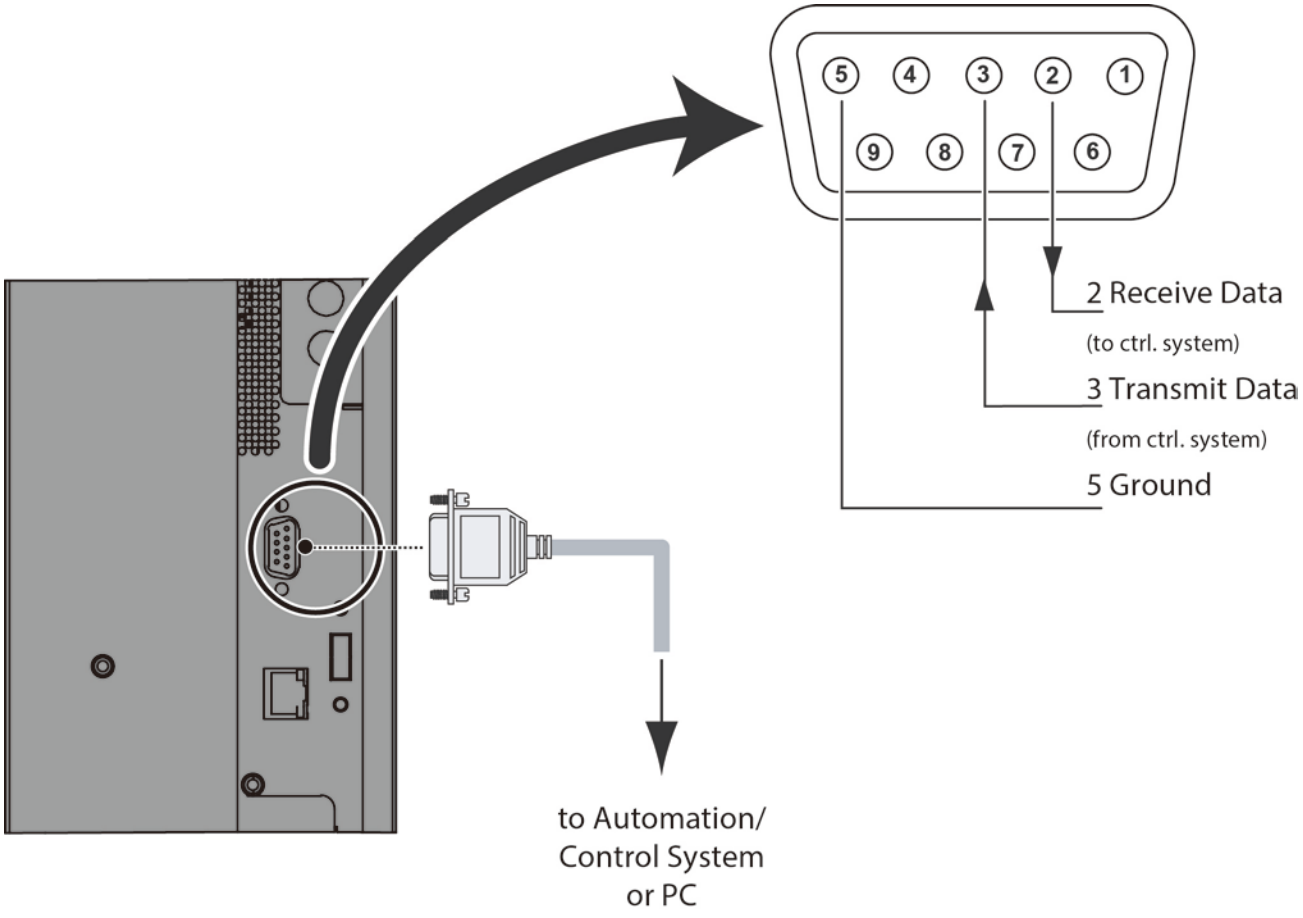


Figure 3-2. RS-232 Control System Connection

Ethernet Connection

Use a standard Ethernet cable with an RJ-45 male connector to connect a PC or control/automation system (if present) to the Ethernet port on the display.

For more information about using this connection, refer to ***External Control*** on page 52.

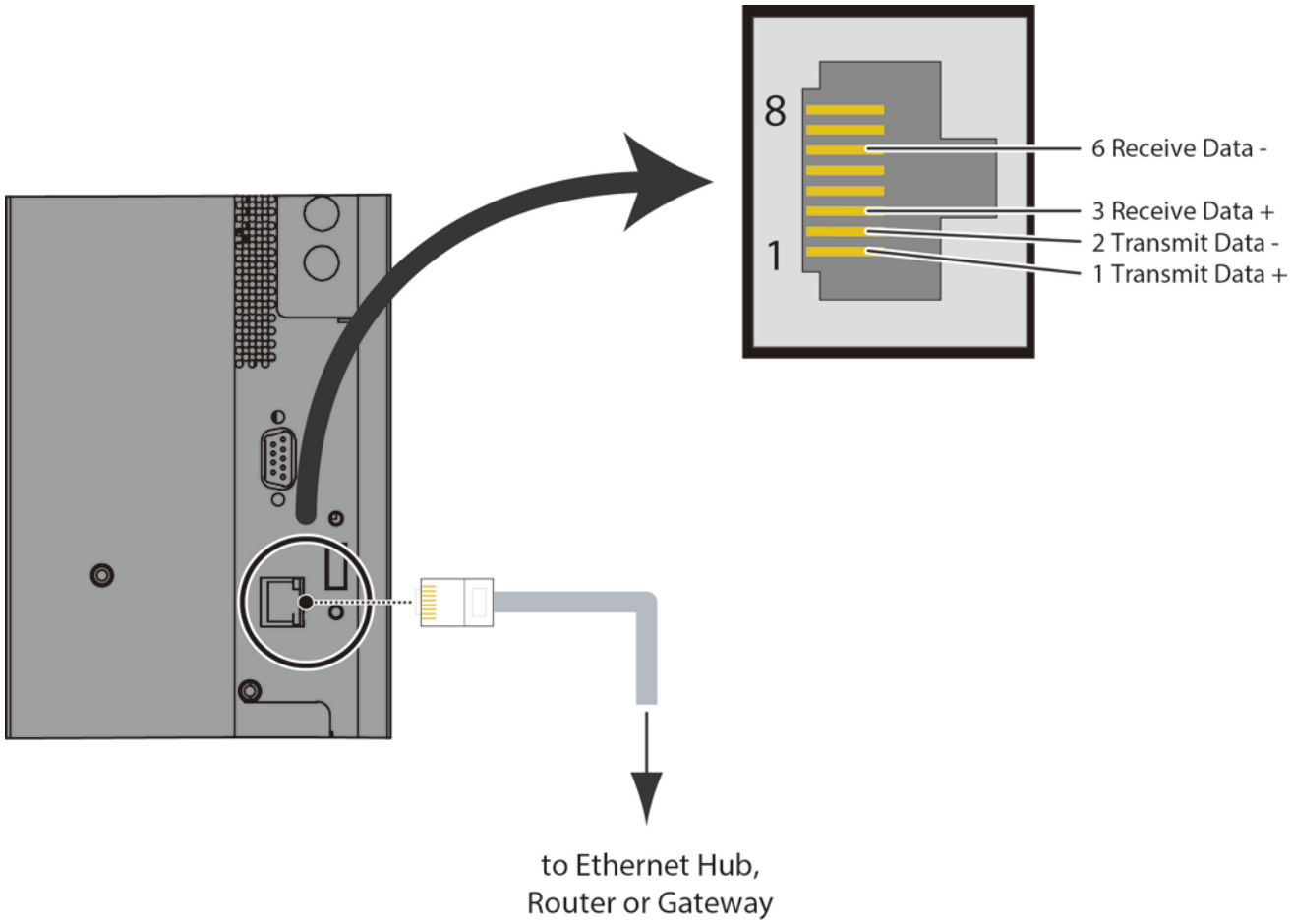


Figure 3-3. Ethernet Connection

IR Extender Connection:

Connect the provided IR extender cable to the IR Extender input as shown in Figure 3-4.

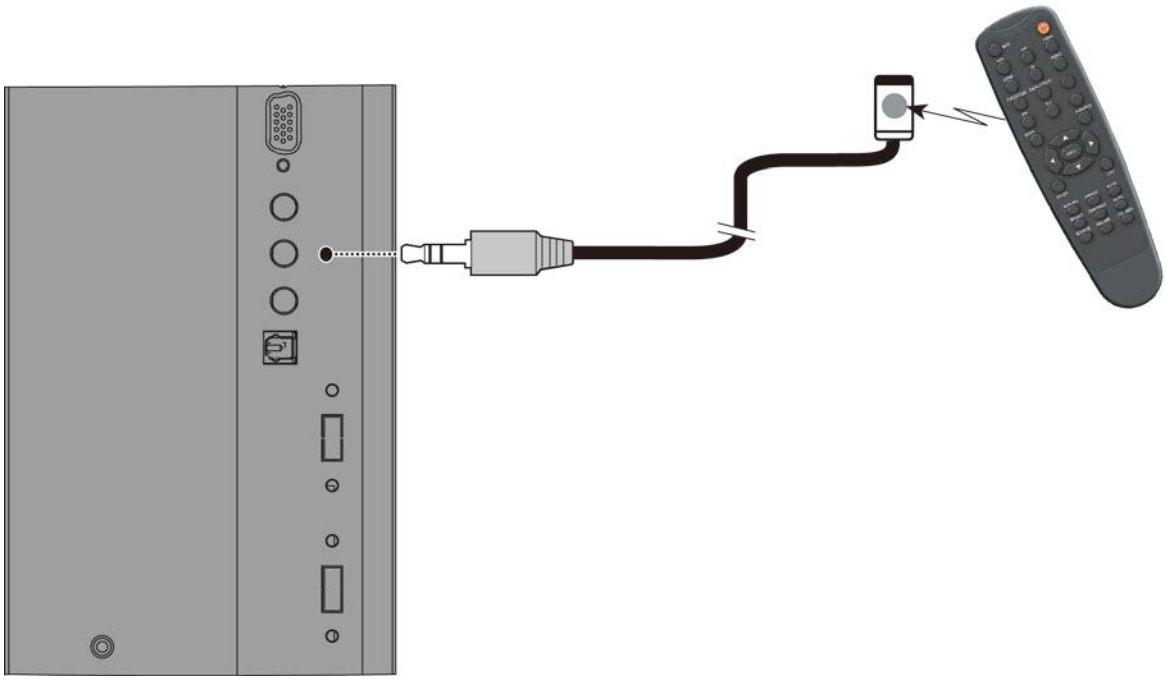


Figure 3-4. IR Extender Connection

Recommended IR Extender Positions for Cascading the 85” Display

In controlled testing, the IR range is approximately 1.5 metres directly on-axis, and about 1 metre at plus or minus 45 degrees off-axis using the IR extender.

Best performance is obtained in either position P1 or position P2.

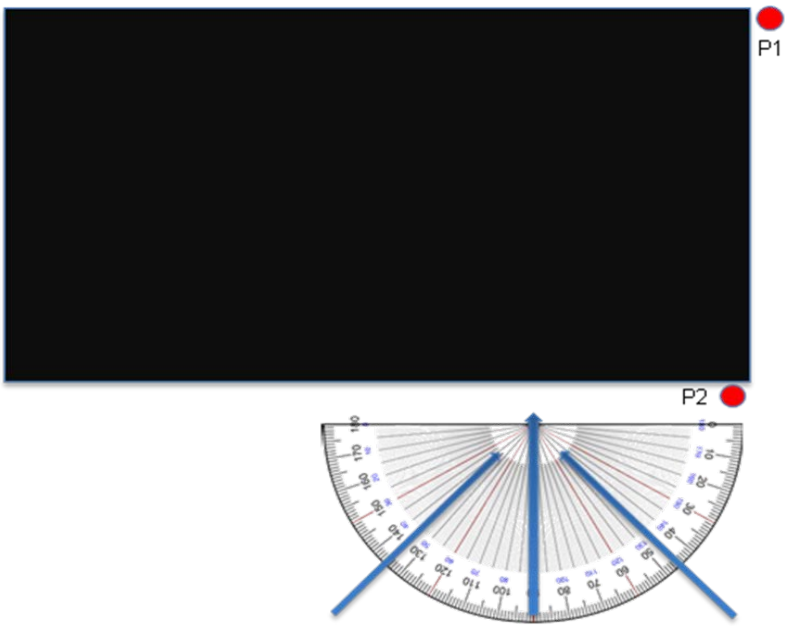


Figure 3-5. Recommended IR Extender Position

Connecting Source Components to the Display

Connect your video sources to the display as shown and described in the sections that follow.

DisplayPort Source Connection: See Figure 3-6.

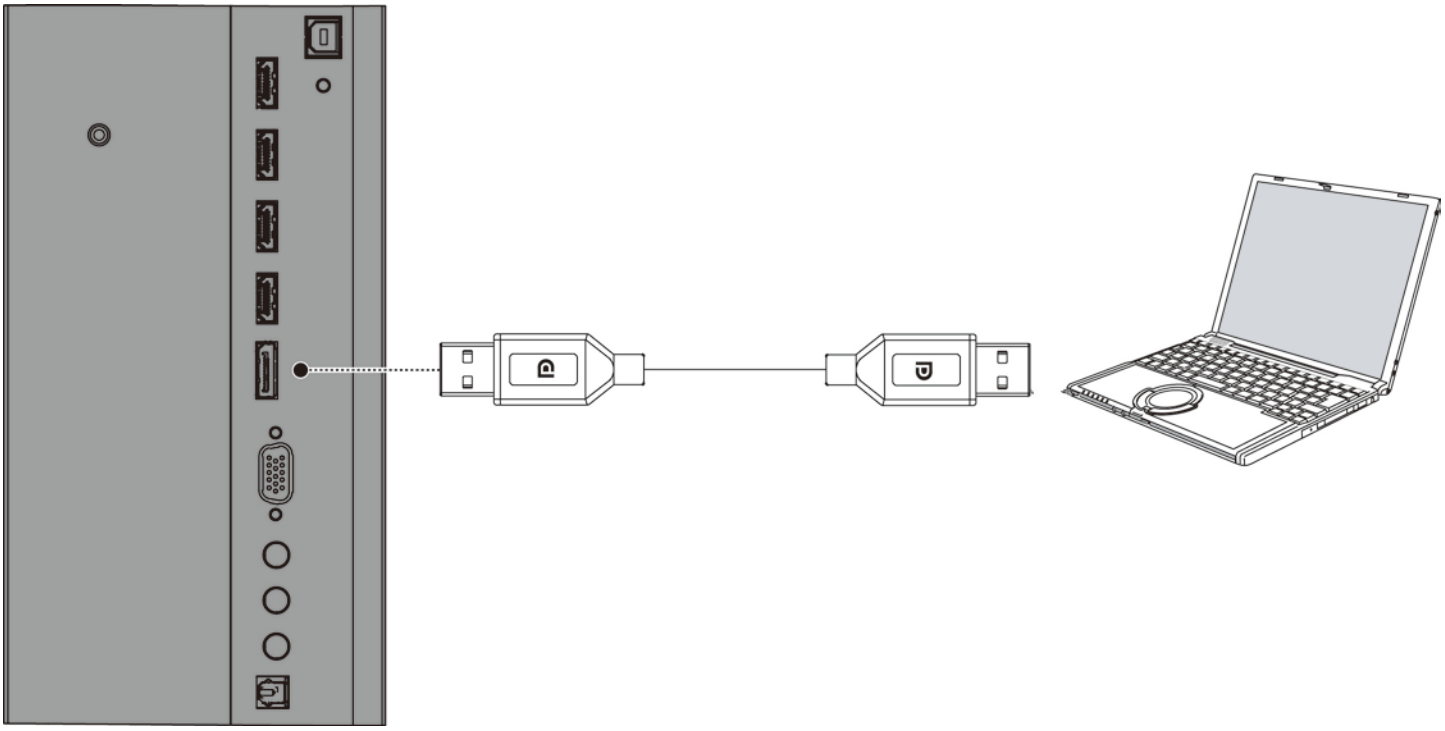


Figure 3-6. DisplayPort Source Connection

HDMI Source Connections: See Figure 3-7.

TIP *Use the HDMI inputs whenever possible. This ensures the highest video quality because the signal is carried in the digital domain throughout the entire signal path, from source component output into the display.*

NOTE *This display supports the VESA Display Data Channel (DDC) standard. This standard provides "Plug and Play" capability; the display and a VESA DDC-compatible computer communicate their setting requirements, allowing for quick and easy setup.*

In order for Plug and Play to work correctly, you must turn on the display before you turn on the connected computer.

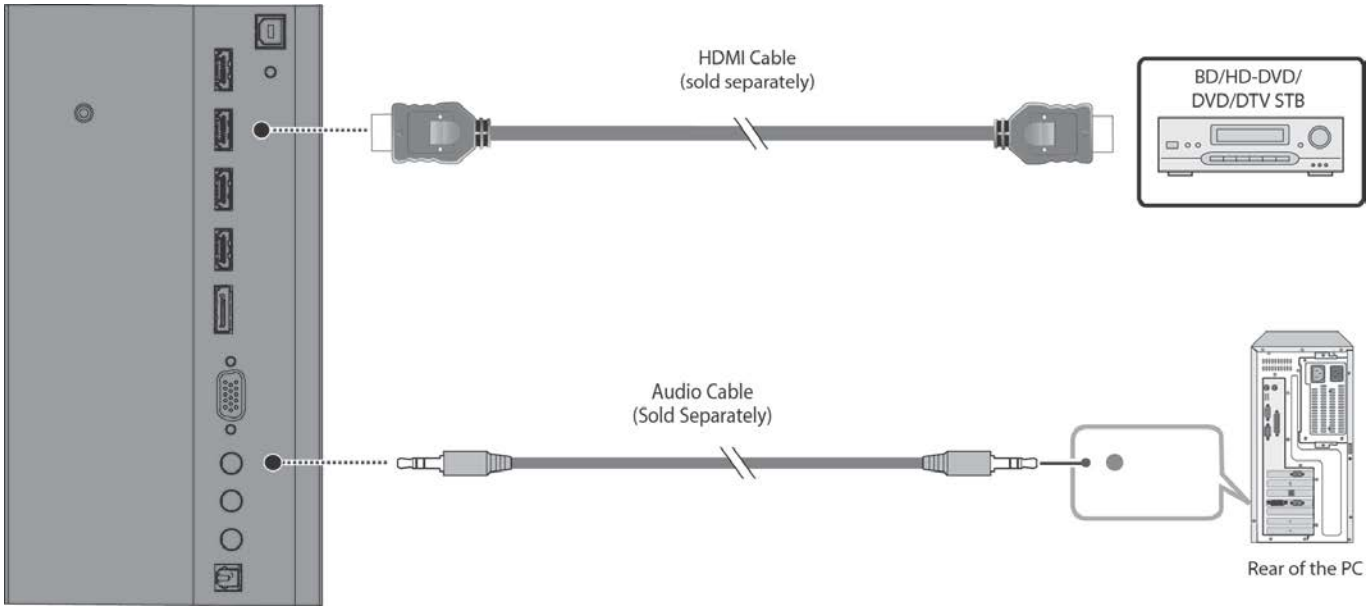


Figure 3-7. HDMI Source Connections

VGA Source Connection: Connect a personal computer or other RGB source to the VGA input as shown in Figure 3-8.

NOTE *Refer to **Supported Timings** on page 62 for a list of compatible input signals.*

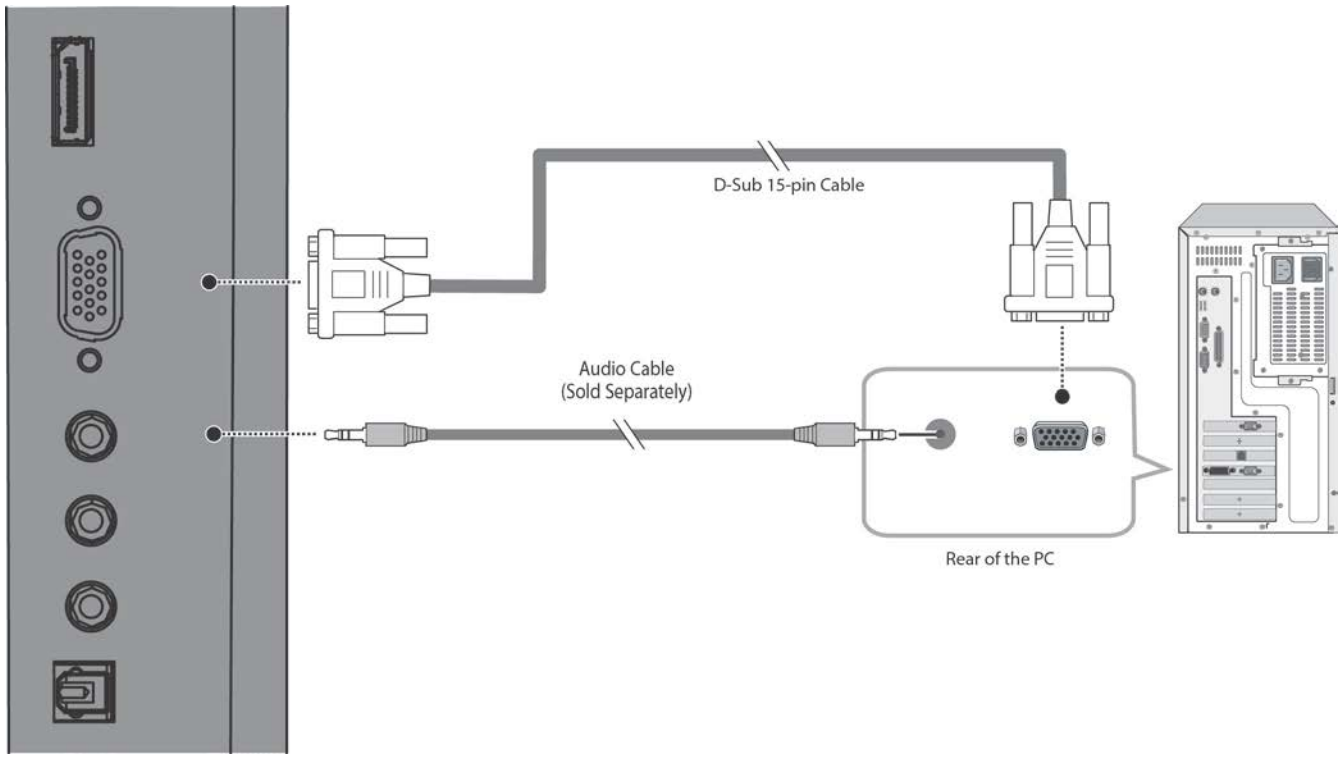


Figure 3-8. VGA Source Connections

Turning on the Power

1. Turn on your source components.
2. Plug the female end of the supplied power cord into the AC receptacle on the side of the display (AC 100V ~ 240V). See Figure 2-2.
3. Connect the other end to your AC power source.
4. Turn on the main power switch at the side of the display (see Figure 2-1). The power indicator lights orange to indicate that the display is in “standby” mode.
5. Press the power button ( ) on the remote control to turn on the display or press the power button ( ) on the keypad.
6. After a brief warm-up period, the display will display an image.

NOTE *If there's no input signal for a period of time, the display will automatically go into power saving (sleep) mode.*

Changing the OSD Language

The display OSD language is initially set to English, but can also display the menus in different languages.

To change the OSD language:

1. Press MENU.
2. Select Basic Settings from the Main Menu.
3. Select OSD Language from the Basic Settings Menu.
4. Press ◀ or ▶ to select the desired language and press ENTER. The change takes effect immediately.

Enabling the Touch Screen

Before setting up your display to support touch screen capability, ensure that:

- The touch screen controller host computer is turned off.
- The display is turned on.
- The video output from the computer is connected to a video input on the display. See Figure 3-6, Figure 3-7 or Figure 3-8.

Connecting the Touch Screen Controller Host Computer to the Display

Connect the signal cable witch display, and then turn on the display.

Connect the USB cable with display and the computer; connect one side of USB cable (Type-B USB connector) on the display side.

Connect the other side of USB cable (Type-A USB) to the USB port on computer. See picture below.

Then turn on the computer.

When USB cable connected, then wait for 5 seconds and the touch function is ready to go. It can be activated by pen, finger, or any other pointer

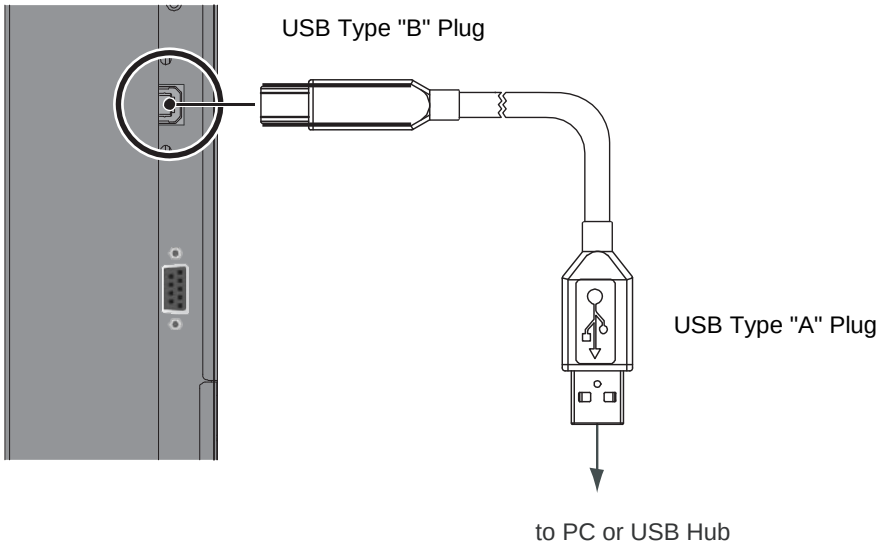
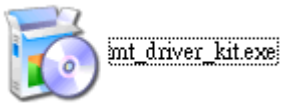


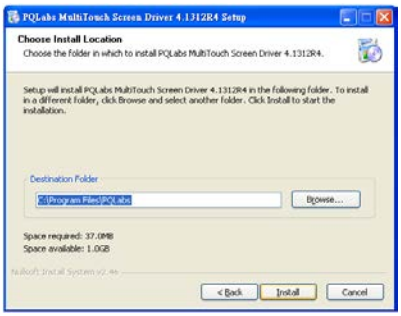
Figure 3-9. Touch Screen Controller (USB) Connection

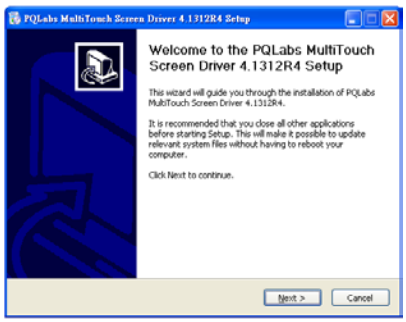
Software Installation

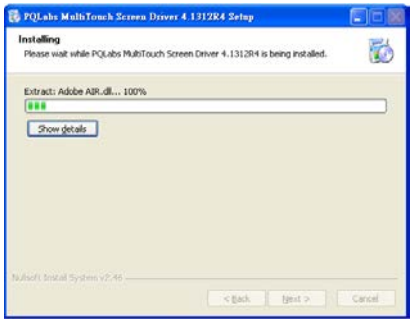
1. Double-click the installation file mt_driver_kit [xxxxxx].exe, located on the USB-Key provided with the display.



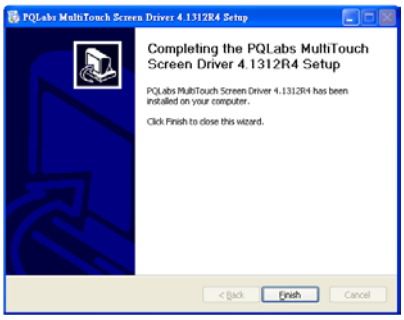
2. The Touch Screen Driver Setup Wizard appears. Click Next, then click Install to start the process.



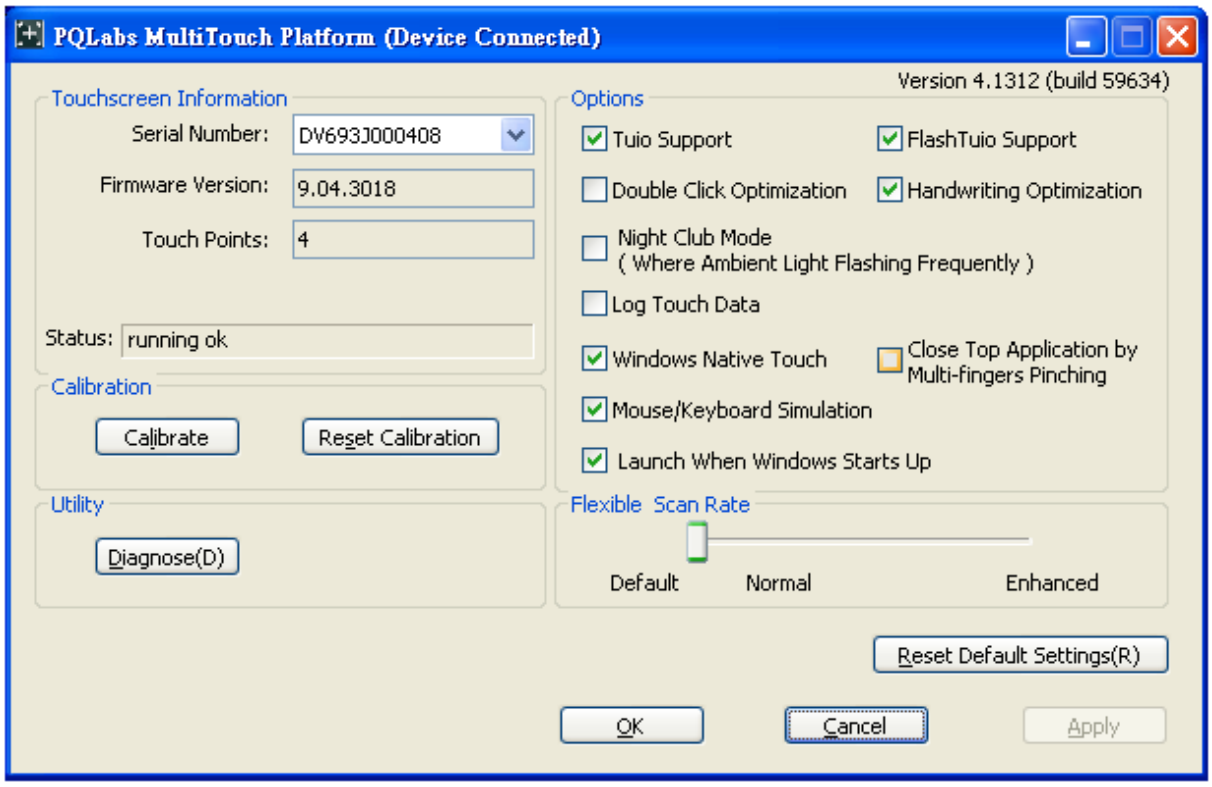




3. Click Finish to complete the installation.



Touch Screen Configuration Instructions



Touchscreen Information: This area of the mt_touch_driver configuration window contains a variety of information about the touch module: the product type, firmware version and operating status.

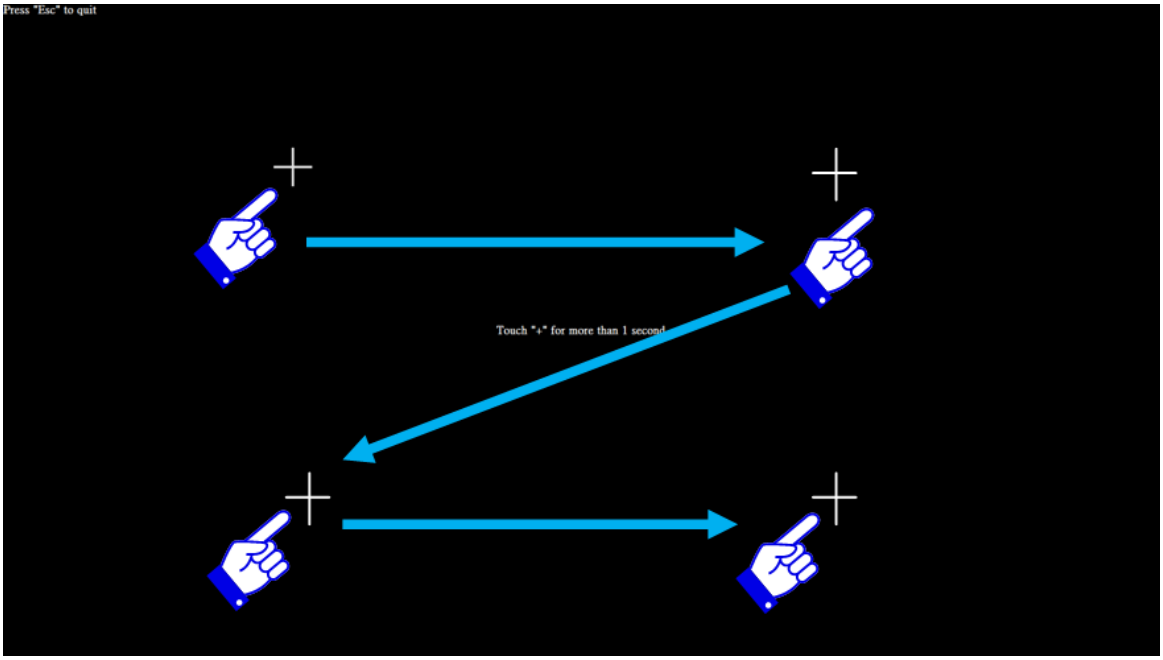
- Serial Number: Unique ID of a touchscreen.
- Firmware Version: Internal firmware version of a touchscreen.
- Touch Points: Maximum touch points that a physical touch screen supports.
- Status: Show current status of a touch screen.

  It may be:

  - Working normal
  - Open bulk device failed
  - Open virtual digitizer failed
  - Open physic digitizer failed

Calibration: If touching the screen does not place the cursor in the desired position, you may be able to correct this by performing a touch screen engine calibration. To do this:

- Click Calibration. A white cross at a black background appears on the screen.
- Click the white cross by hand more than 1 second and follow the cross moving to finish the four-point touch calibration.



Utility: Please do not execute this function, for it is for service engineer to diagnose the touch function.

CAUTION *This action is not reversible.*

4. Operation

Using the On-Screen Menus

To display the on-screen menus, press **MENU** on the remote control (Figure 2-3) or built-in keypad (Figure 2-1).

To select a sub-menu, use the ▲ and ▼ buttons to highlight it. Then, press ▶ to enter that sub-menu.

To select a menu item, use the ▲ and ▼ buttons to highlight it. Then, press ◀ or ▶ to adjust that setting and press **ENTER**.

The OSD menus are arranged hierarchically, as shown in Figure 4-1. Depending on the selected input source and signal characteristics, some menu options may not be available.

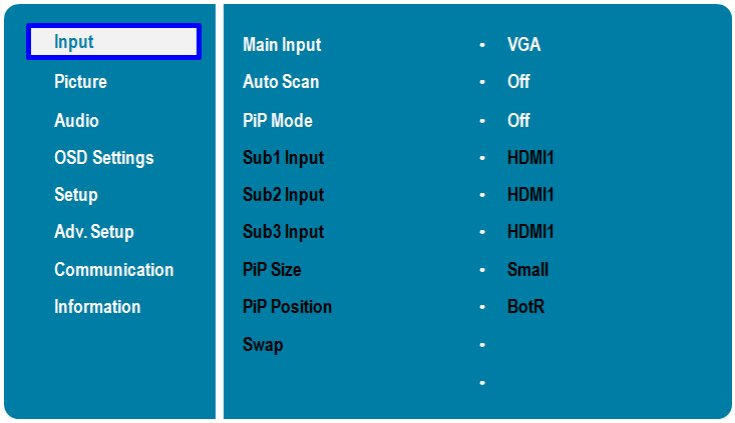
Main Menu	SubMenu	Value
Input	Main Input	VGA; DisplayPort; HDMI1; HDMI2; HDMI3; HDMI4; OPS
	AutoScan	**Off**; Main; PxP; All
	PiP Mode	Off; PiP; PbP; 3Window; 4Window
	Sub1 Input	VGA; DisplayPort; HDMI1; HDMI2; HDMI3; HDMI4; OPS
	Sub2 Input	(same as above)
	Sub3 Input	(same as above)
	PiP Size	Small; Mid; Large
	PiP Position	TopR; TopL; BotR; BotL
	Swap	
Picture	Picture Format	**Main**: Full Screen/Letterbox/ 4:3/1:1; **PxP**: Full Screen/Letterbox/ 4:3
	Scheme	**User**, Vivid, Cinema, Game, Sport
	Contrast	0, 1, 2, ..., **50**, ...100
	Brightness	0, 1, 2, ..., **50**, ...100
	Sharpness	0, 1, 2, ..., **50**, ...100
	Hue	0, 1, 2, ..., **50**, ...100
	Saturation	0, 1, 2, ..., **50**, ...100
	Backlight	0, 1, 2, ..., 50, ..., **80**, ...100
	Color Temp & Gamma	5000K; 6500K; 7500K; **9300K**; User; off; 2.2
	HDMI RGB Range	Auto; Full; Limited
Audio	Volume	0~100
	Treble	-6~6
	Bass	-6~6
	Balance	-6~6
	Internal Speaker	On; Off
	Audio Source	Line-In ; DisplayPort ; HDMI1 ; HDMI2 ; HDMI3 ; HDMI4 ; OPS

Main Menu	SubMenu	Value
OSD Settings	Horizontal	0~100
	Vertical	0~100
	Transparency	Off; 1~4
	OSD Timeout	5s; 10s; 20s; 30s; 60s
	OSD Rotation	Landscape, Portrait
	Language	**English**, French, German, Dutch, Hungarian, Slovenian, Serbian, Croatian, Danish
	Splash Screen	On; Off
Setup	Auto Adjustment	
	H.Position	0~100
	V.Position	0~100
	Phase	0~100
	Clock	0~100
	Zoom	10 steps
	Power LED	On; Off
	Real Time Clock	User Mode; Workday Mode; Everyday Mode
Adv. Setup	Smart Light Control	Off; DCR; Light Sensor
	IRFM	On; **Off**
	Noise Reduction	**Off**; Low; Medium; High
	Wake Up From Sleep	VGA Only; Digital, RS232. Ethernet; Never Sleep
	DP Ver.	1.1; 1.2
	EDID Setup	HDMI: 4K2K/1080P; DP: 4K2K/1080P
	Touch Control	Auto; OPS; External
	Factory Reset	
Communication	RS232 Baud Rate	**115200**; 38400; 19200; 9600
	Enable Network	Yes; No
	IP Address Settings	Please refer to Section 5.1 detail settings.
	Power Status Alert	Yes; No
	Source Status Alert	Yes; No
	Signal Lost Alert	Yes; No
	Load Default	Yes; No
	Device MAC	Shows the MAC address of the device
Information	(Timing info)	Shows the name of input source
	Firmware Version	Shows the firmware version of the monitor
	SubMCU Version	Shows the firmware version of the monitor
	Serial Number	Shows the Serial Number of the monitor

NOTE *Default settings appear in bold type.*

Figure 4-1. OSD Menu Structure

Input Menu

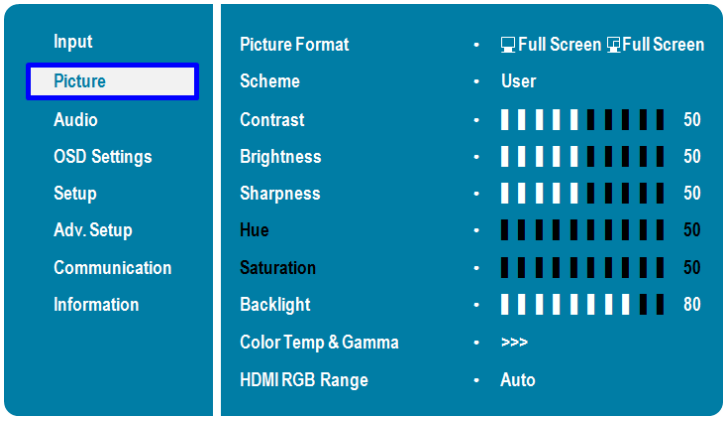


This menu is used for selecting the main input source (Main) and up to three Picture-in-Picture input sources (Sub1, Sub2 and Sub3). Up to four sources can be displayed at the same time.

Main Input	
	Select the main input source **Options:** DisplayPort, HDMI1, HDMI2, HDMI3, HDMI4, VGA, OPS
Auto Scan	
	Select whether the display will automatically scan for a main input source **Options:** Off, Main, PxP, All
PiP Mode	
	Select the PiP (Picture-in-Picture) mode **Options:** Off, PiP, PbP, 3Window, 4Window
Sub1 Input	
	Select the source for the primary PiP window **Options:** DisplayPort, HDMI1, HDMI2, HDMI3, HDMI4, VGA, OPS Note: This function is only available when PiP Mode is set to PiP, PbP, 3Window or 4Window
Sub2 Input	
	Select the source for the secondary PiP window **Options:** DisplayPort, HDMI1, HDMI2, HDMI3, HDMI4, VGA, OPS Note: This function is only available when PiP Mode is set to 3Window or 4Window
Sub3 Input	
	Select the source for the tertiary PiP window **Options:** DisplayPort, HDMI1, HDMI2, HDMI3, HDMI4, VGA, OPS Note: This function is only available when PiP Mode is set to 4Window
PIP Size	
	Select the size of the primary PiP window **Options:** Small, Mid, Large Note: This function is only available when PiP Mode is set to PiP
PIP Position	
	Set the position of the primary PiP window **Options:** TopR, TopL, BotR, BotL Note: This function is only available when PiP Mode is set to PiP
Swap	
	Swap the main input source with the primary PiP source Note: This function is only available when PiP Mode is set to PiP, PbP, 3Window or 4Window

Picture Menu

This menu is used for making common image adjustments.



Picture Format	
	Adjust the picture format of the screen **Options:** Full Screen, Letterbox, 4:3, 1:1; **Default:** Full Screen
Scheme	
	Press ◄or► to select one of the following: **Options:** User, Vivid, Cinema, Game, Sport; **Default:** User
Contrast	
	Increase or decrease the contrast of picture. Press ◄ **or** ► to select the desired level, and then press **ENTER**. Range: 0~100; **Default:** 50
Brightness	
	Increase or decrease the brightness of picture. Press ◄or► to select the desired level, and then press **ENTER**. Range: 0~100; **Default:** 50
Sharpness	
	Adjust the definition of picture. Press ◄ **or** ► to select the desired level, and then press **ENTER**. Range: 0~100; **Default:** 50
Hue	
	Increase or decrease the green hue. Press ◄ **or**► to select the desired level, and then press **ENTER.** Range: 0~100; **Default:** 50 Note: This function is not available when displaying PC or graphics sources
Saturation	
	Adjust the brilliance and brightness. Press ◄or► to select the desired level, and then press **ENTER**. Range: 0~100; **Default:** 50 Note: This function is not available when displaying PC or graphics sources
Backlight	
	Increase or decrease the intensity of the LCD backlight. Press ◄or► to select the desired level, and then press **ENTER**. Range: 0~100; **Default:** 80
Gamma	
	Select gamma curve **Options:** Off, 2.2; **Default:** 2.2
Color Temp	
	Select a color temperature, or select User to make RGB adjustments. **Options:** User, 5000K, 6500K, 7500K and 9300K; **Default:** 9300K

HDMI RGB Range

Select an RGB range for the HDMI input.
Options: Auto, Full, Limited; **Default:** Auto

Color Temperature Settings

Red Gain

Set Color Temperature to “User Mode” in order to adjust this setting.
Range: 0~100
Default: 100

Green Gain

Set Color Temperature to “User Mode” in order to adjust this setting.
Range: 0~100
Default: 100

Blue Gain

Set Color Temperature to “User Mode” in order to adjust this setting.
Range: 0~100
Default: 100

Red Offset

Set Color Temperature to “User Mode” in order to adjust this setting.
Range: 0~100
Default: 50

Green Offset

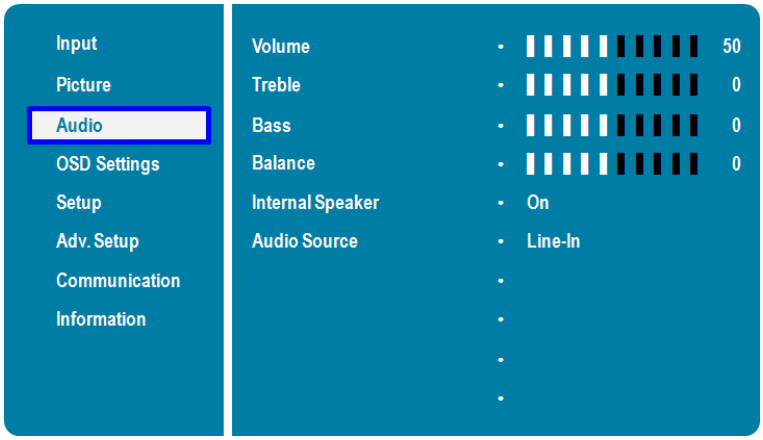
Set Color Temperature to “User Mode” in order to adjust this setting.
Range: 0~100
Default: 50

Blue Offset

Set Color Temperature to “User Mode” in order to adjust this setting.
Range: 0~100
Default: 50

Audio Menu

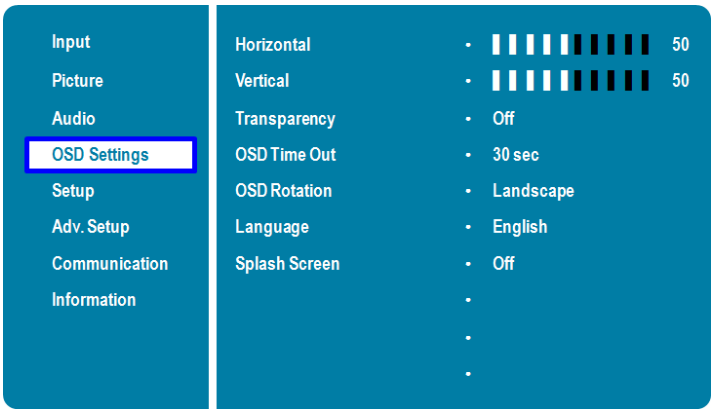
This menu is used for adjusting volume settings.



Volume	
	Adjust the sound. Press ◄ or ► to select the desired level, and then press **ENTER**. Range: 0~100 **Default:** 50
Treble	
	Adjust the sound in high tones (treble). Press ◄ or ► to select the desired level, and then press **ENTER**. Range: -6~6 **Default:** 0
Bass	
	Adjust the sound in low tones (bass). Press ◄ or ► to select the desired level, and then press **ENTER**. Range: -6~6 **Default:** 0
Balance	
	Adjust the balance of the left and right speakers. Press ◄ or ► to select the desired level, and then press **ENTER**. Range: -6~6 **Default:** 0
Internal Speaker	
	Turn the internal speaker on or off **Default:** On
Audio Source	
	Select the audio source for the Main input Options: DisplayPort, HDMI1, HDMI2, HDMI3, HDMI4, OPS, Line-In **Default:** Line-in

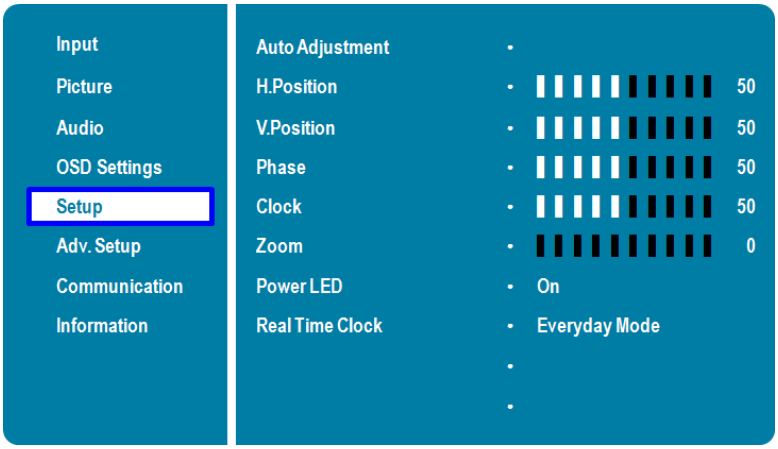
OSD Settings Menu

This menu is used to make initial set-up adjustments to the OSD (On-Screen Display) menu and other on-screen messages.



Horizontal	
	Adjust the horizontal position of the OSD menu. Press ◄ or ► to select the desired level, and then press **ENTER**. Range: 0~100 **Default:** 50
Vertical	
	Adjust the vertical position of the OSD menu. Press ◄ or ► to select the desired level, and then press **ENTER**. Range: 0~100 **Default:** 50
Transparency	
	Adjust the transparency of the OSD menu. Press ◄ or ► to select the desired level, and then press **ENTER**. Range: Off, 1~4; **Default:** Off
OSD Timeout	
	Adjust the time in seconds before the OSD menu disappears. Press ◄ or ► to select the desired level, and then press **ENTER**. Options: 5s, 10s, 20s, 30s, 60s **Default:** 30s
OSD Rotation	
	Select the OSD Rotation. Press ◄or ► to select the rotation. Options: Landscape, Portrait **Default**: Landscape
Language	
	Select the OSD language Options: English, French; German; Dutch; Hungarian; Slovene Serbian; Croatian; Danish **Default:** English
Splash Screen	
	Select whether a splash screen appears when the monitor is powered up Options: On, Off **Default:** On

Setup Menu



Auto Adjustment

Force the display to reacquire and lock to the input signal (VGA source only). This is useful when the signal quality is marginal. Note: This feature does not continually reacquire the signal.

Options: No, Yes

Default: No

H. Position

Adjust the horizontal position of the image (VGA source only). Press ◄ or ► to select the desired level, and then press **ENTER**.

Range: 0~100

Default: 50

V. Position

Adjust the vertical position of the image (VGA source only). Press ◄ or ► to select the desired level, and then press **ENTER**.

Range: 0~100

Default: 50

Phase

Adjust the phase of the displayed signal (VGA source only). Press ◄ or ► to select the desired level, and then press **ENTER**.

Range: 0~100

Clock

Adjust the clock of the displayed signal (VGA source only). Press ◄ or ► to select the desired level, and then press **ENTER**.

Range: 0~100

Zoom

Adjust the zoom (overscan) of the image. Press ◄ or ► to select the desired level, and then press ENTER.

Range: 10 steps

Power LED

Enable or disable the status LED

Options: On, Off

Default: On

Real Time Clock

Set the internal clock of the display, and to power on and off the display at preset times if desired.

Options: User mode, Workday mode, Everyday mode

Default: Everyday mode

Advanced Setup Menu

Smart Light Control

Enable dynamic contrast (DCR) or ambient light sensor
Options: Off, DCR, Light Sensor
Default: Off

IRFM

Create slight frame motion to help avoid image retention
Options: On, Off
Default: Off

Noise Reduction

Reduce random noise in the video content
Options: Off, Low, Medium, High
Default: Off

Wake Up From Sleep

Options: VGA Only, Digital, RS232, Ethernet; Never Sleep
Default: VGA Only

DP Ver.

Select DisplayPort version of the DisplayPort inputs
Options: 1.1, 1.2
Note: DisplayPort 1.2 is the more modern standard and supports 3840x2160 @ 60 Hz resolution. However, sometimes DisplayPort 1.1 is needed for compatibility with older graphics cards.

EDID Setup

Select EDID (Extended Display Identification Data) of the HDMI and DisplayPort inputs
Options: 1080p, 4K2K
Note: Use the 1080p setting for the broadest support of lower resolution sources. Use 4K2K setting to support high resolution sources such as 3840x2160.

Touch Control

Select one of the touch connections, or choose auto detection.
Options: Auto, OPS, External
Default: Auto

Factory Reset

Restore all settings to their default.
Options: No, Yes
Default: No

Wake Up from Sleep

By default, the display will enter power saving (Sleep Mode) if no signal is received for 5 minutes. Normally, the RS-232, DisplayPort, and HDMI inputs are inactive in Sleep Mode, to save power.

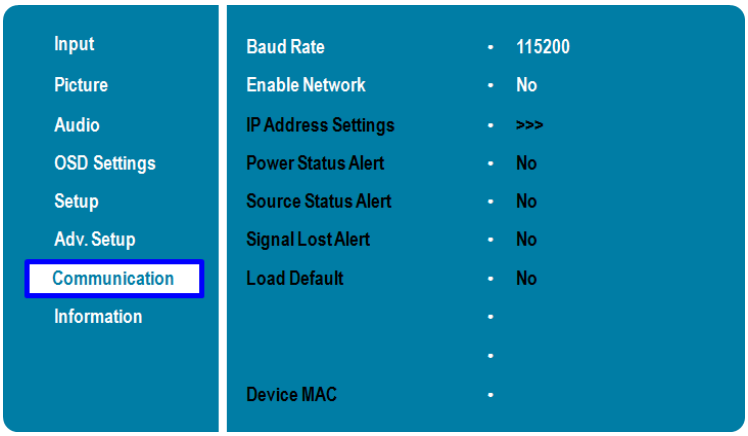
To change the behavior of Sleep Mode, change the "**Wake up from Sleep**" setting in the "**Adv. Setup**" menu.

VGA Only (default) – The RS-232, DisplayPort, and HDMI inputs are inactive when the display is in sleep mode. The display will wake up when it receives a signal at the VGA input.

Digital, RS232, Ethernet – The RS-232, DisplayPort and HDMI inputs stay active when the display is in sleep mode. The display will wake up when it receives a signal at either of the DisplayPort, HDMI, or RS-232 inputs, or via LAN connection.

Communication Menu

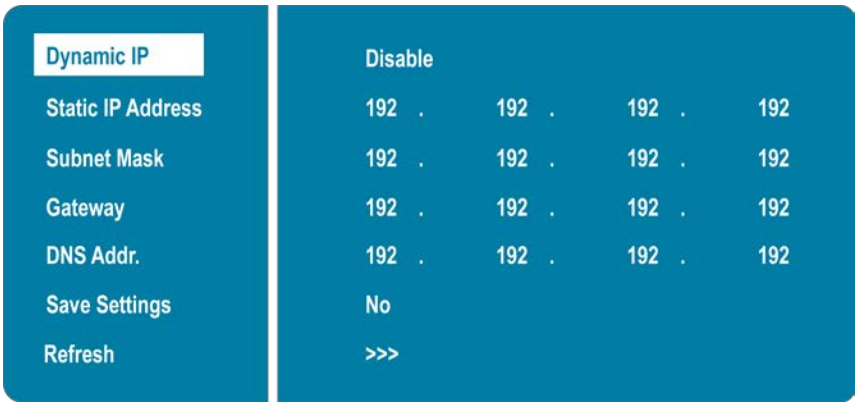
This menu configures the display's RS232 and Ethernet communication ports.



Baud Rate	
	Select the baud rate of the display's RS232 port Options: 115200, 38400, 19200, 9600 **Default:** 115200
Enable Network	
	Enable the display's built-in Ethernet port Options: No, Yes **Default:** No
IP Address Settings	
	Enable Dynamic IP mode or set the static IP address of the display's Ethernet port
Power Status Alert	
	Enable an automatic alert when the display is powered down Options: No, Yes **Default:** No
Source Status Alert	
	Enable an automatic alert when the source is changed Options: No, Yes **Default:** No
Signal Lost Alert	
	Enable an automatic alert when the video signal is lost Options: No, Yes **Default:** No
Load Default	
	Load default communication settings Options: No, Yes **Default:** No
Device MAC	
	Display the MAC address of the device

Network Settings

To assign an IP address to your display, access the IP Address Settings Menu in the **Communication Menu**. Consult your system administrator if you do not know how to configure the parameters shown in the menu.

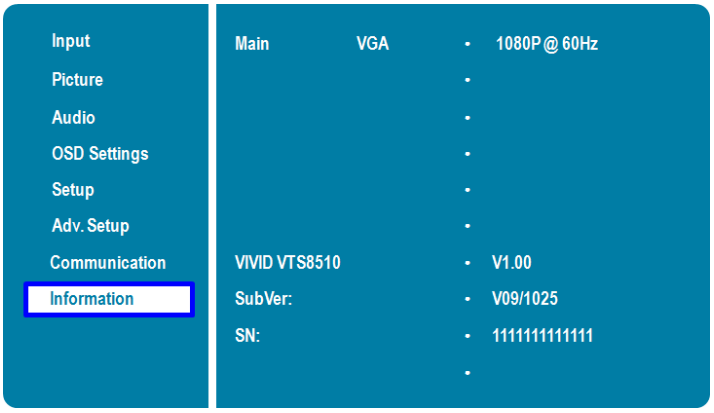


The default settings are shown below.

Item	Setting
DHCP	Disable
IP ADDRESS	192.168.2.1
SUBNET MASK	255.255.255.0
DEFAULT GATEWAY	192.168.2.1
DNS Addr.	192.168.2.1

Information

This read-only menu provides information on the active sources and the latest firmware version



5. Maintenance and Troubleshooting

Maintenance

The VIVIDtouch Series LED Displays does not require any routine maintenance other than occasional cleaning with a non-abrasive cloth. There are no user-serviceable or replaceable parts. Unless you are a qualified, factory-trained technician, do not attempt to repair or replace any system component yourself. You will void the product warranty if you do so.

Troubleshooting

Table 5-1 provides some general guidelines for troubleshooting problems you may encounter with the VIVIDtouch Series LED Display. If the suggested solutions fail to resolve the problem or if you encounter an issue not described here, please contact your dealer.

Table 5-1. Troubleshooting Chart

Symptom	Possible Cause(s)	Solution
The display does not turn on.	· The display is not plugged in or the AC outlet is not active. · The main power switch is off. · The remote control batteries have run out.	· Ensure that the display is **plugged in and that the AC outlet is active.** · Set the main power switch (see Figure 2-1) to the on position. · Replace the batteries.
The display is on and menus appear, but there is no picture.	· Incorrect source selection. · Source component is not turned on. · Source component is connected incorrectly or not at all.	· Select the correct source. · Turn on the source component. · Check connections from the source component to the display.
The remote control does not work.	· The remote control batteries have run out. · The buttons are locked. · IR extender is not connected.	· Replace the batteries. · Unlock the buttons by pressing **ENTER, ENTER, EXIT, EXIT, ENTER and EXIT**, in sequence. · Verify that the IR extender cable is correctly connected (see Figure 3-4).
Image geometry is incorrect.	· Incorrect aspect ratio selection.	· Select a different aspect ratio.
The display is jittery or unstable.	· Poor-quality or improperly connected source. · The horizontal or vertical scan frequency of the input signal may be out of range for the display.	· Ensure that the source is properly connected and of adequate quality for detection. · Correct at the source.
Image is too bright and/or lacks definition in the bright areas of the image.	· Contrast is set too high.	· Decrease the contrast setting.

Table 5-1. Troubleshooting Chart (continued)

Symptom	Possible Cause(s)	Solution
Image appears "washed out" and / or dark areas appear too bright.	· Brightness is set too high.	· Decrease the brightness setting.
Image is too dark.	· Brightness and / or Backlight are set too low.	· Increase the brightness and / or backlight settings.
Images from an HDMI source do not display.	· The resolution and frequency of the video card in the computer are not compatible with the display. · HDMI cable from source to display is either defective or too long.	· Select a compatible resolution and vertical frequency (refer to ***Supported Timings*** on page 62). · Try a known-good and / or shorter HDMI cable.
Computer images do not display correctly.	· The resolution and frequency of the video card in the computer are not compatible with the display · Clock and Phase settings need adjustment.	· Select a compatible resolution and vertical frequency (refer to ***Supported Timings*** on page 62). · Adjust Clocks and Phase settings (refer to ***Setup Settings*** page 45).
Touch screen doesn't work.	· Multi-touch controller host computer is not connected correctly. · Host computer hardware or OS incompatibility.	· See Figure 3-9. · Refer to ***Enabling the Touch Screen*** on page 34.

Should you require assistance with a suspected hardware fault, please contact the support line below. You will require your unit serial number. The operator will attempt to diagnose any fault and will take action as appropriate.

UK Warranty Support

Tel. 08450 724 999

Email. services@steljes.co.uk

6. External Control

In addition to using the display keypad or remote control unit, you can control the display using a serial (RS-232) link to send ASCII commands and receive responses to those commands.

You also use discrete infrared (IR) control codes to program a third-party remote control unit. For more information, refer to Using Discrete IR Codes on page 58.

Serial Communications

The display uses a simple text-based control protocol to take requests from control devices and to provide responses to such devices. This section describes how to send control messages over a serial link between the display and an automation/control system or a PC running a terminal emulation program such as Windows® HyperTerminal or Tera Term.

RS-232 Connection and Port Configuration

Connect your control system or PC to the RS-232 input of the display as shown in Figure 3-2.

Configure the RS-232 controller or PC serial port as follows: no parity, 8 data bits, 1 stop bit and no flow control. Set the baud rate to 115200, to match that of the display RS-232 port.

Command and Response Format

Commands sent from an automation/control system or PC to the display must have the following format:

[STX] [IDT] [TYPE] [CMD] ([VALUE] or [REPLY]) [ETX] [CR]

Where:

- [STX] indicates the start of the command data (always 07).
- [IDT] is the display ID (always 01).
- [TYPE] is the command type:
  - 00 = return to host (response from the LCD panel)
  - = read / action
  - = write
- [VALUE] is the parameter setting for the command.
- [REPLY] is the parameter setting for the command, acknowledged by the display in its response to a command.
- [ETX] indicates the end of the command data (always 08).
- [CR] is the ASCII carriage return key (0x0D).

Command and Response Examples

Here are some examples of serial commands and their responses:

Table 6-1. Serial Command/ Response Examples

Description	Command Sent to LCD Panel	Response Received from LCD Panel
Turn LCD panel power off.	07 01 02 50 4F 57 00 08	07 01 00 50 4F 57 00 08
Turn LCD panel power on.	07 01 02 50 4F 57 01 08	07 01 00 50 4F 57 01 08
Request LCD panel power status.	07 01 01 50 4F 57 08	07 01 00 50 4F 57 XX 08 (XX = 0 when off or 1 when on)
Set the LCD panel contrast to 30 (1E hex).	07 01 02 43 4F 4E 1E 08	07 01 00 43 4F 4E 1E 08
Reset the LCD panel display settings.	07 01 02 41 4C 4C 00 08	07 01 00 41 4C 4C 00 08
Request LCD panel serial number.	07 01 01 53 45 52 08	07 01 00 53 45 52 S(0)…S(12) 08 S(0) …S(12) = the serial number in ASCII
Request LCD panel firmware version.	07 01 01 47 56 45 08	07 01 00 47 56 45 S(0)…S(5) 08 S(0) …S(5) = the firmware version in ASCII

Serial Command List

Table 6-2 lists all supported commands.

Table 6-2. Serial Commands

Main Item	Control Item	CMD	Type	Value (DEC)	Reply (DEC)	Content	CMD (HEX)	Remark
Power Control and Input Source	Power Control	POW	W/R	00	00	Off (soft power)	**50 4F 57**	▲
				01	01	On (soft power)		▲
	Input Source	MIN	W/R	00	00	VGA	**4D 49 4E**	
				13	13	DisplayPort1		
				9	9	HDMI1		
				10	10	HDMI2		
				11	11	HDMI3		
				12	12	HDMI4		
				14	14	OPS		
Display Adjustment	Color	BRI	W/R	0~100	Current value	Back Light Brightness	**42 52 49**	
		BRL	W/R	0~100	Current value	Digital Brightness Level	**42 52 4C**	
		BLC	W/R	00	00	Off (Back Light)	**42 4C 43**	
				01	01	On (Back Light)		

Main Item	Control Item	CMD	Type	Value (DEC)	Reply (DEC)	Content	CMD (HEX)	Remark
Display Adjustment	Color	CON	W/R	0~100	Current value	Contrast	**43 4F 4E**	
		SHA	W/R	0~100	Current value	Sharpness	**53 48 41**	
		HUE	W/R	0~100	Current value	Hue	**48 55 45**	
		SAT	W/R	0~100	Current value	Saturation	**53 41 54**	
	Noise Reduction	NOR	W/R	00	00	Off	**4E 4F 52**	
				01	01	Low		
				02	02	Medium		
				03	03	High		
	Scheme	SCM	W/R	00	00	User	**53 43 4D**	
				01	01	Sport		
				02	02	Game		
				03	03	Cinema		
				04	04	Vivid		
	Color Temperature	COT	W/R	00	00	User	**43 4F 54**	
				01	01	6500K		
				02	02	9300K		
				06	06	5000K		
				07	07	7500K		
	Gamma	GAC	W/R	00	00	Off (Gamma)	**47 41 43**	
				01	01	2.2 (Gamma)		
	Gain &Offset	USR	W/R	0~100	Current value	Red Gain (0~100)	**55 53 52**	
		USG	W/R	0~100	Current value	Green Gain (0~100)	**55 53 47**	
		USB	W/R	0~100	Current value	Blue Gain (0~100)	**55 53 42**	
		UOR	W/R	0~100	Current value	Red Offset (0~100)	**55 4F 52**	
		UOG	W/R	0~100	Current value	Green Offset (0~100)	**55 4F 47**	
		UOB	W/R	0~100	Current value	Blue Offset (0~100)	**55 4F 42**	
	VGA Adjustment	PHA	W/R	0~100	Current value	Phase	**50 48 41**	
		CLO	W/R	0~100	Current value	Clock	43 4C 4F	

Main Item	Control Item	CMD	Type	Value (DEC)	Reply (DEC)	Content	CMD (HEX)	Remark
		HOR	W/R	0~100	Current value	Horizontal Position	48 4F 52	
		VER	W/R	0~100	Current value	Vertical Position	56 45 52	
		ADJ	W	00	00	Auto Adjust	41 44 4A	
RTC	Current Time Adjustment	RTY	W/R	0~99	0~99	Year	52 54 59	
		RTM	W/R	1~12	1~12	Month	52 54 4D	
		RTD	W/R	1~31	1~31	Day	52 54 44	
		RTH	W/R	0~23	0~23	Hour	52 54 48	
		RTN	W/R	0~59	0~59	Minute	52 54 4E	
Audio	Volume	VOL	W/R	0~100	Current value	volume	56 4F 4C	
	Bass	BAS	W/R	0~100	Current value	Bass (-6 ~ 6)	42 41 53	
	Treble	TRE	W/R	0~100	Current value	Treble (-6 ~ 6)	54 52 45	
	Balance	BAL	W/R	0~100	Current value	Balance (-6 ~ 6)	42 41 4C	
	Internal Speaker	INS	W/R	00	00	Internal Speaker Off	49 4E 53	
				01	01	Internal Speaker On		
	Mute	MUT	W/R	00	00	Mute Off	4D 55 54	
				01	01	Mute On		
EDID	DisplayPort	EDP	W/R	00	00	4Kx2K	45 44 50	
				01	01	1080P		
Other Control	PIP Adjust	PSC	W/R	00	00	PIP OFF	50 53 43	
				01	01	PIP Small		
				02	02	PIP medium		
				03	03	PIP large		
				04	04	PbP (Side By Side)		
				06	06	3 Windows		
				07	07	4 Windows		
	PIP source selection	PIN	W/R	00	00	VGA	50 49 4E	
				09	09	HDMI 1		

Main Item	Control Item	CMD	Type	Value (DEC)	Reply (DEC)	Content	CMD (HEX)	Remark
				10	10	HDMI 2		
				11	11	HDMI 3		
				12	12	HDMI 4		
				13	13	Disaplyport 1		
				14	14	OPS		
	PIP position	PPO	W/R	00	00	PIP Position Bottom-left	**50 50 4F**	
				01	01	PIP Position Bottom-Right		
				02	02	PIP Position Top-left		
				03	03	PIP Position Top-right		
	PIP/Main Swap	SWA	W	00	00	Swap main and PIP	**53 57 41**	
	Scaling	ASP	W/R	00	00	Native	**41 53 50**	
				01	01	Full Screen		
				02	02	4:3		
				03	03	Letterbox		
		ZOM	W/R	00	00	Zoom in	**41 53 50**	
				01	01	Zoom out		
	Baud Rate Adjustment	BRA	W/R	00	00	115200	**42 52 41**	
				01	01	38400		
				02	02	19200		
				03	03	9600		
	Wakeup from Sleep	WFS	W/R	0	0	VGA Only	**57 46 53**	
				1	1	VGA, Digital, RS232		
				2	2	Never Sleep		
	Other Control	RCU	W	00	00	MENU Key	**52 43 55**	
				01	01	INFO Key		
				02	02	UP Key		
				03	03	DOWN Key		
				04	04	LEFT Key		

Main Item	Control Item	CMD	Type	Value (DEC)	Reply (DEC)	Content	CMD (HEX)	Remark
				05	05	RIGHT Key		
				06	06	ENTER Key		
				07	07	EXIT Key		
		ALL	W	00	00	Reset all	**41 4C 4C**	
		KLC	W/R	00	00	Un-lock keys	**4B 4C 43**	
				01	01	Lock keys		
		SER	R		13 bytes	Read Serial Number	**53 45 52**	
		MNA	R		13 bytes	Read Model Name	**4D 4E 41**	
		GVE	R		6 bytes	Read Firmware Version	**47 56 45**	
		RTV	R		Current value	Read RS232 table Version	**52 54 56**	

Using Discrete IR Codes

The display accepts commands in the form of infrared (IR) signals that conform to the NEC protocol. Each display remote control button has an IR control code associated with it.

You can use these codes to program a third-party, “universal” remote control unit to work with the display. These third-party products usually come with a computer software application for this purpose. For more information, consult the documentation provided with the remote control unit.

IR Command Protocol

The IR control codes have the following characteristics:

- Each code consists of the following:
  - A leader pulse (a modulated pulse of 9 ms followed by a non-modulated pulse of 4.5 ms);
  - 16 address bits (also called a “custom code”): eight (8) bits for the address followed by the logical inverse of the address. The custom code for the display is 16559 decimal (0x40AF, binary 01000000 10101111).
  - 16 da ta bits: eight (8) bits for the command followed by the logic al inverse of the command; and
  - An end pulse (a modulated pulse of 0.56 ms, similar to the modulated pulse in the ‘0’ and ‘1’ bits). The end of the modulated pulse constitutes the end of the data transmission.
- The carrier frequency is 38 kHz, with the modulated pulses having a 33% duty cycle.
- Commands are sent at a maximum rate of 9 Hz.

For example, here is the NEC control code for the POWER button on the display remote control unit:

Hex	40	AF	1C	E3
Binary	01000000	10101111	00011100	11100011
Function	Cust. Code Byte 1	Cust. Code Byte 2	Command	Command (Logical Inverse)

IR Control Code List

Table 6-3 lists the IR control codes for the display.

Table 6-3. Infrared (IR) Control Codes

Customer Code	Data Code	Function
40AF	04FB	INFO
40AF	1CE3	POWER
40AF	07F8	VGA
40AF	08F7	DISPLAYPORT
40AF	09F6	HDMI1
40AF	0AF5	P-SOURCE
40AF	0CF3	HDMI2
40AF	1AE5	PIP POSITION
40AF	15EA	OPS
40AF	10EF	HDMI3
40AF	11EE	PIP
40AF	0DF2	SWAP
40AF	16E9	HDMI4
40AF	06F9	BLANK
40AF	13EC	FREEZE
40AF	0EF1	MENU
40AF	12ED	ENTER
40AF	05FA	EXIT
40AF	14EB	SCALING
40AF	00FF	MUTE
40AF	17E8	BRIGHTNESS
40AF	18E7	CONTRAST
40AF	1EE1	AUTO
40AF	0FF0	SOURCE
40AF	1BE4	VOLUME -
40AF	1DE2	VOLUME +

Notes:

7. Specifications

	VTS-8510
PANEL	
Diagonal Size (Inch)	85"
Backlight	Direct LED
Aspect Ratio	16:9
Input Resolution	3840 x 2160 @ 60 Hz
Response Time	6.5 ms
Display Frame Rate	120 Hz
Brightness	500 cd/m^2
Contrast Ratio	3000:1
Viewing Angle	178º (H) / 178º (V)
Supported Colours	1.07 G colours
Display Orientation	Lanscape / Portrait compatible
TOUCH SYSTEM	
Interface	1 x Touch USB
Touch	ZeroParallax™ High-resolution infrared touch; Up to 6 points
Glass	Anti-glare, 2.0 mm Corning Gorilla® Glass®;
Supported Operating System	Windows XP / Vista / 7 / 8 / Mac OSX / Linux
AUDIO	
Built-in Speakers	4 Ω / 2 x 10W
CONNECTIVITY	
Connections	4 x HDMI / 1 x DisplayPort / 1 x VGA
Audio	Audio Out / SPDIF Out / PC Audio In
Control	IR Extender / RS232 / Ethernet / Touch USB
PHYSICAL SPECIFICATIONS	
Dimensions	1925.6 (mm) x 1108.2 (mm) x 116.8 (mm)
Weight	Net: 108.8 kg / Gross: 118.8 kg
Wall Mount	500mm x 400mm / 500mm x 600mm VESA,
Fanless Design	Yes
OSD FUNCTIONS	
OSD Languages	English, French, German, Dutch, Hungarian, Slovenian, Serbian, Croatian, Danish
Source Auto Detect Function	Yes
OSD Key Lock Function	Yes
POWER	
Power Supply	AC100-240V (Worldwide), 50/60Hz
Maximum Power Consumption	≤ 575 W
Standby	≦0.5 W
ENVIRONMENTAL	
Operating Temperature	5 °C ~ 40 °C
Storage Temperature	-20 °C ~ 60 °C
Humidity	35% ~ 85% RH

Supported Timings

Table 7-2 lists the signal types supported by each input on the display.

Table 7-2. Supported Timings By Input

Timing			fH (kHz)	fV (Hz)	Dot clock (MHz)	HDMI	VGA	DisplayPort
VESA	VGA 640x480		31.469	59.94	25.175	O	O	O
			37.861	72.809	31.5	O	O	O
			37.5	75	31.5	O	O	O
			43.269	85.008	36	O	O	O
	SVGA 800x600		35.156	56.25	36	O	O	O
			37.879	60.317	40	O	O	O
			48.077	72.188	50	O	O	O
			46.875	75	49.5	O	O	O
			53.674	85.06	56.25	O	O	O
	XGA 1024x768		48.363	60.004	65	O	O	O
			56.476	70.069	75	O	O	O
			60.023	75.029	78.75	O	O	O
			68.677	84.997	94.5	O	O	O
	WXGA1360x768		47.712	60.015	85.5	O	O	O
	1280 x 720		44.444	59.98	64	O	O	O
			44.772	59.86	74.5	O	O	O
			56.456	74.78	95.75	O	O	O
	1280 x 768		47.776	59.87	79.5	O	O	O
			47.396	59.995	68.25	O	O	O
			68.633	84.837	117.5	O	O	O
	1280 x 800		49.306	59.91	71	O	O	O
			49.702	59.81	83	O	O	O
	SXGA	1152x864	67.5	75	108	O	O	O
		1280x1024	63.981	60.02	108	O	O	O
			79.976	75.025	135	O	O	O
			91.146	85.024	157.5	O	O	O
	1440 x 900		55.469	59.901	88.75	O	O	O
			55.935	59.88	106.5	O	O	O
	WSXGA+ 1680 x1050		64.674	59.883	119	O	O	O
			65.29	59.954	146.25	O	O	O
	UXGA 1600 x 1200		75	60	162	O	O	O
	1920 x 1080		66.587	59.93	138.5	O	O	O
	WUXA 1920 x 1200		74.038	59.95	154	O	O	O
	QHD 2560x1440		88.787	59.951	241.5	O	-	O
			89.521	59.961	312.25	-	-	O
	QSXGA 2560x1600		98.713	59.972	268.5	O	-	O
			99.458	59.987	348.5	-	-	O
EDTV	480p		31.5	60	27.03	O	-	O
	576p		31.25	50	27	O	-	O

Timing		fH (kHz)	fV (Hz)	Dot clock (MHz)	HDMI	VGA	DisplayPort
HDTV	720p	37.5	50	74.25	O	-	O
	1280x720	44.995	59.94	74.176	O	-	O
		45	60	74.25	O	-	O
	1080i	28.13	50	74.25	O	-	O
	1920x1080	33.716	59.94	74.176	O	-	O
		33.75	60	74.25	O	-	O
	1080p 1920x1080	27	24	74.25	O	-	O
		28.125	25	74.25	O	-	O
		33.75	30	74.25	O	-	O
		56.25	50	148.5	O	-	O
		67.433	59.94	148.352	O	-	O
		67.5	60	148.5	O	O	O
4K2K	3840x2160	54	24	297	O	-	O
		56.25	25	297	O	-	O
		67.5	30	297	O	-	O
		110.5	49.977	442	-	-	O
		112.5	50	594	-	-	O
		133.313	59.997	533.25	-	-	O
		135	60	594	-	-	O

Overall Dimensions

Figure 7-1 shows the display dimensions of VTS-8510 (all dimensions are in millimetres).

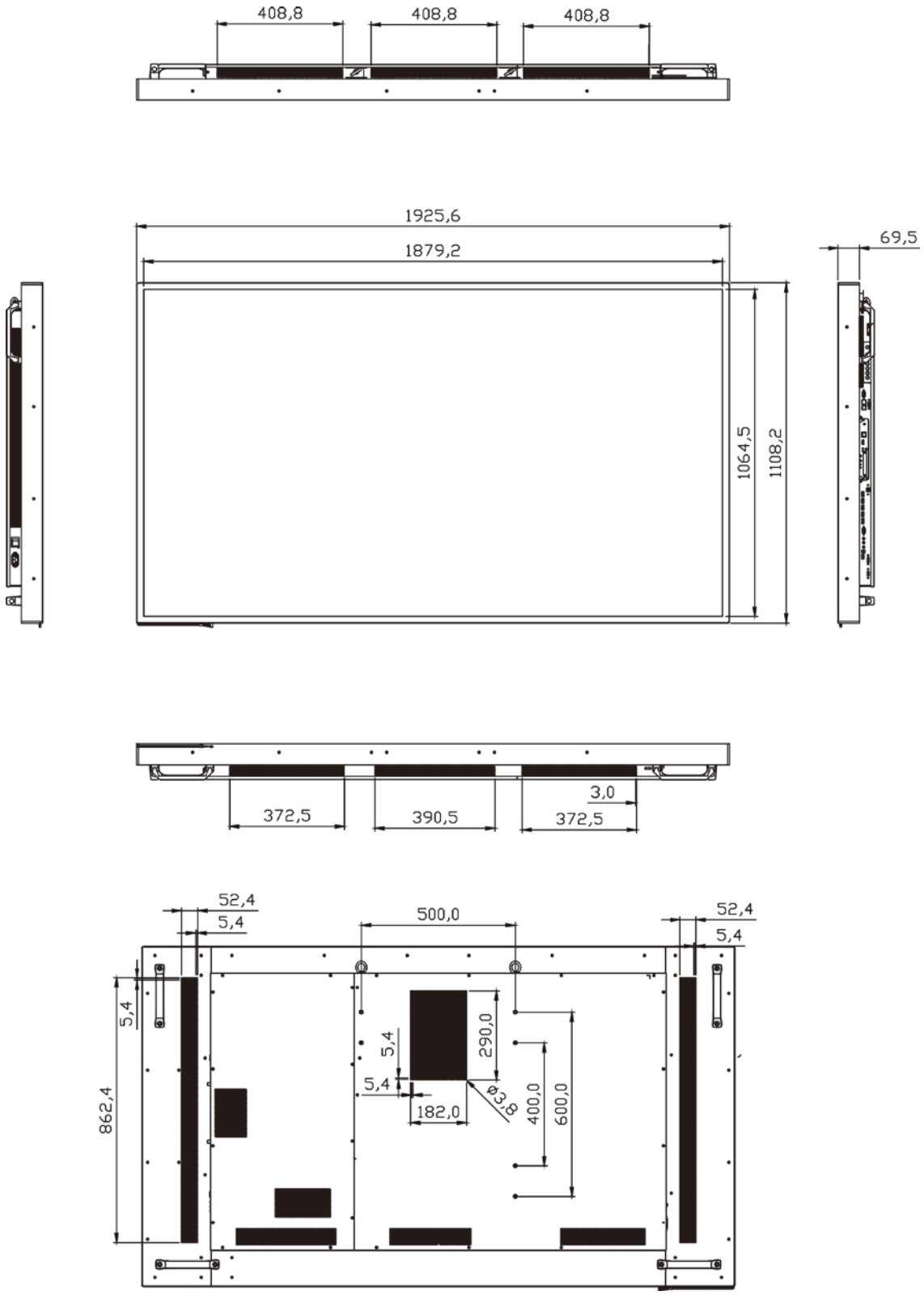


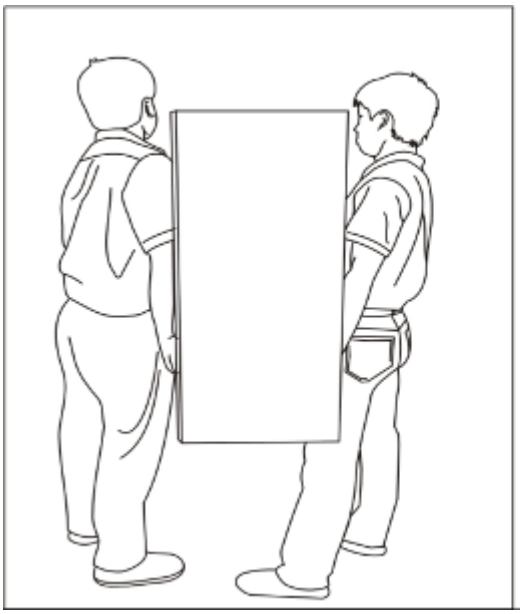
Figure 7-1. VTS-8510 Display Dimensions

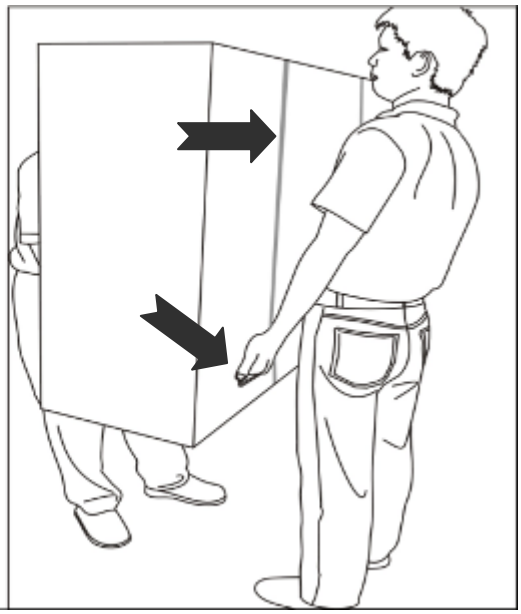
Notes:

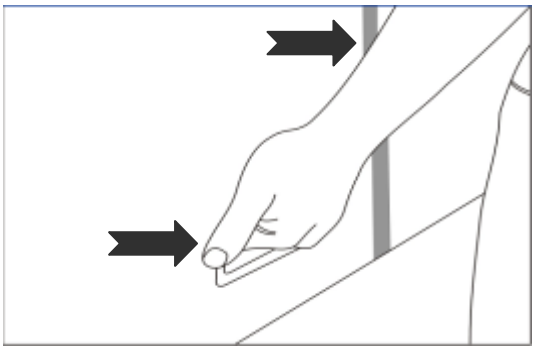
Appendix I: Moving and Carrying Notice

Moving the Display:

Moving the display requires at least two people. Attempting to move the display with one person may result in dropping the display and/or serious injury. When moving a display in its shipping carton, lift the carton using the white handles.







Carrying the display:

This display is heavy; please follow proper lifting technique, as pictured below. Failure to do so may cause injury.

Appendix II: Installing a Wall Mount

Follow the manual instructions for the type of mount you have selected. Refer all servicing to qualified service personnel.

Moving the display requires at least two people.

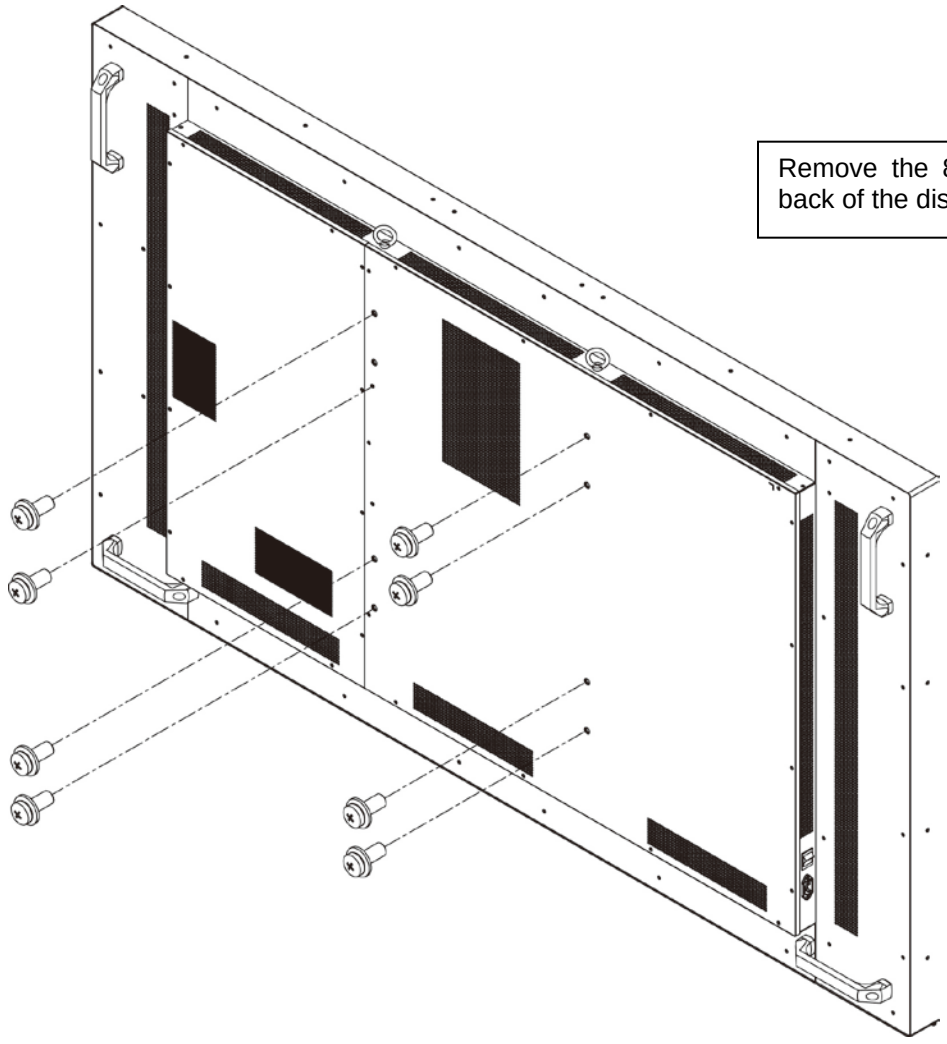
Before installing, please make sure the wall is strong enough to hold the necessary weight of the display and the mount.

Step1. Keep the display facing the ground and place it on a flat object.

Step2. Remove the 8 screws (M8*15) from the back of the display.

Step3. Align the wall brackets with the mounting holes and attach the brackets to the display using the screws removed in Step 2.

Caution: Longer screws will damage the display.



Use maximum 15mm/0.59” long screws.

8mm Metric

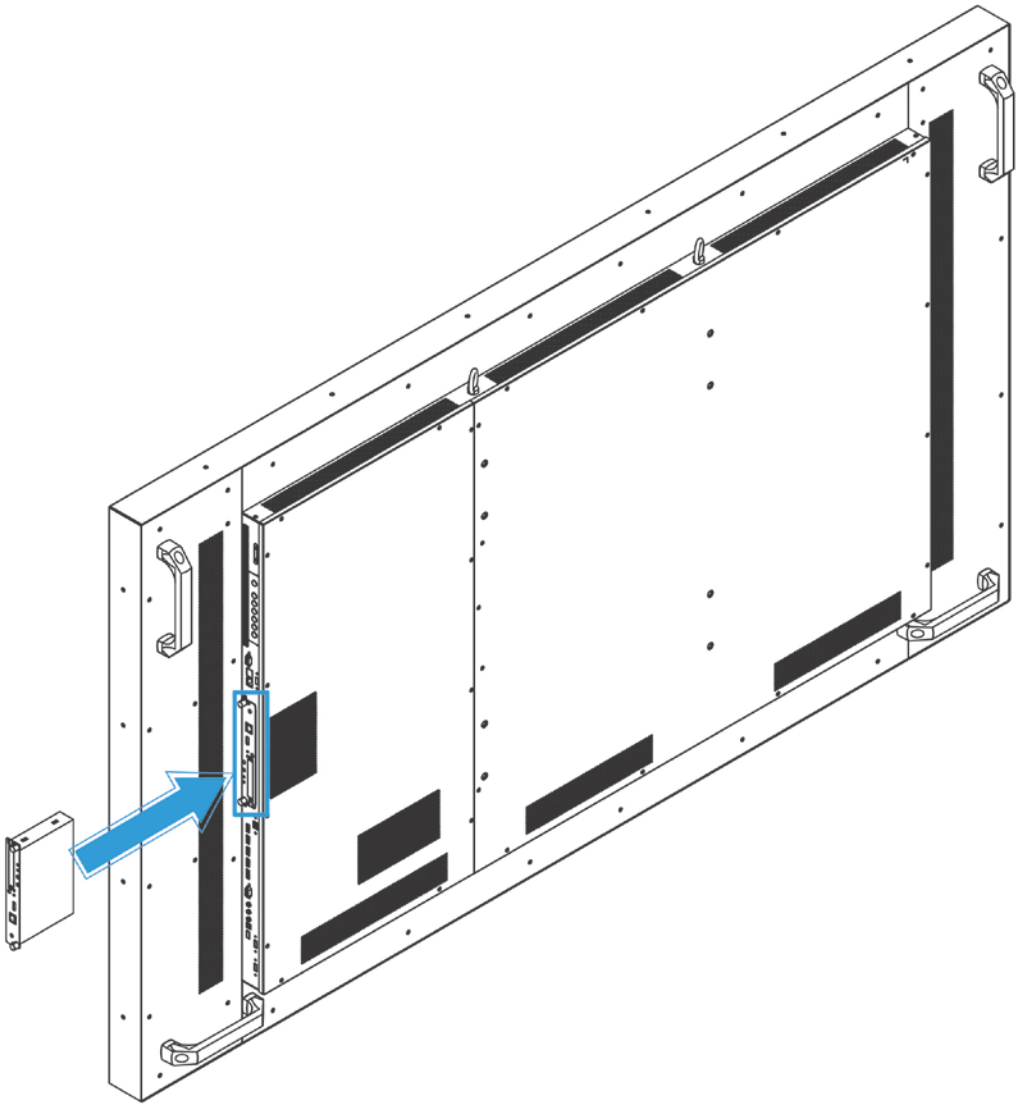
Appendix III: Installing an OPS Module

Follow the steps below to install an OPS module.

Step1. Use a screw driver to unscrew the OPS slot cover on the display input panel.
Do not lose the screws that are removed.

Step2. Install the OPS module by sliding it into the .OPS slot until you hear a click, indicating the module is securely inserted.

Step3. Secure the OPS module in position by screwing it onto the display input panel using the screws that are removed earlier.



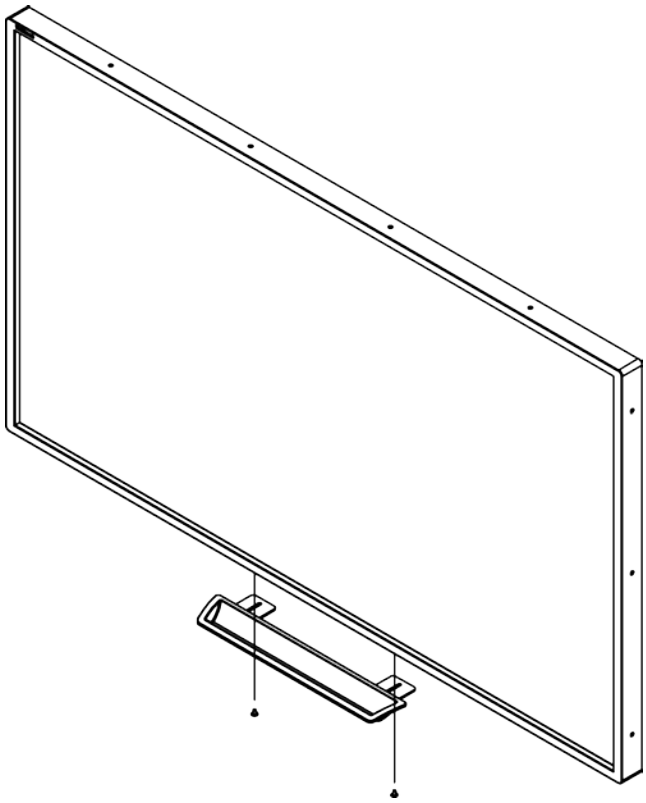
Appendix IV: Installing a Pen Tray

Follow the steps below to install a pen tray.

Step1. Use a screwdriver to unscrew the two screws under the display.

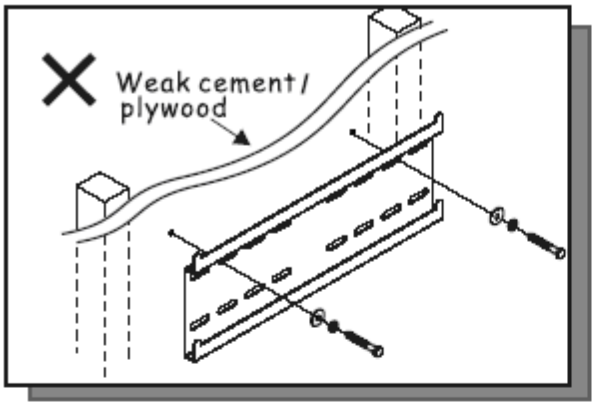
Step2. Align the pen tray with the holes that hold the screws under the display.

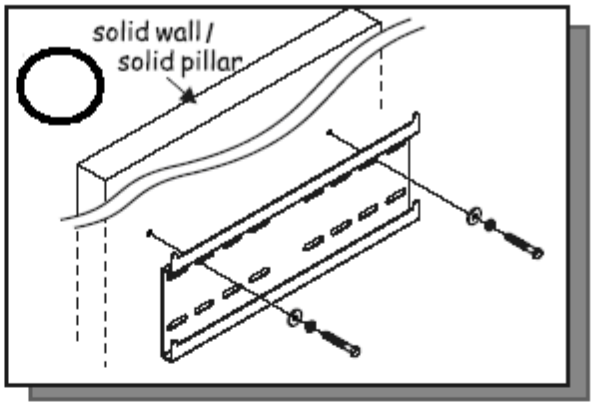
Step3. Screw the pen tray onto the bottom of the display using the screws that were removed earlier.



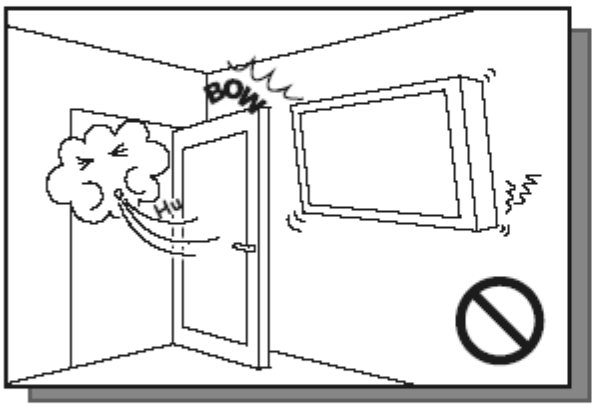
Appendix V: Wall Mount Safety Notes

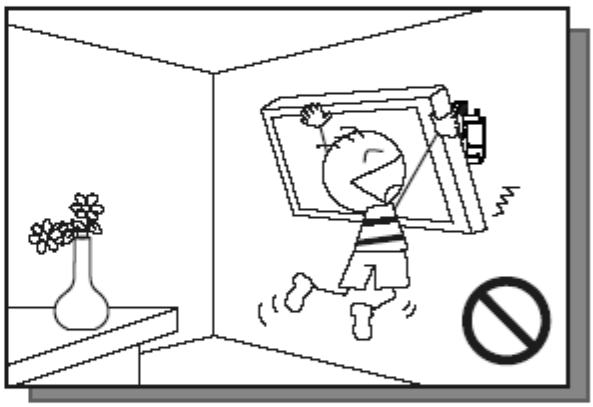
1. Please make sure if the bracket is fixed to the solid wall / solid pillar for fear of falling due to heavy weight.



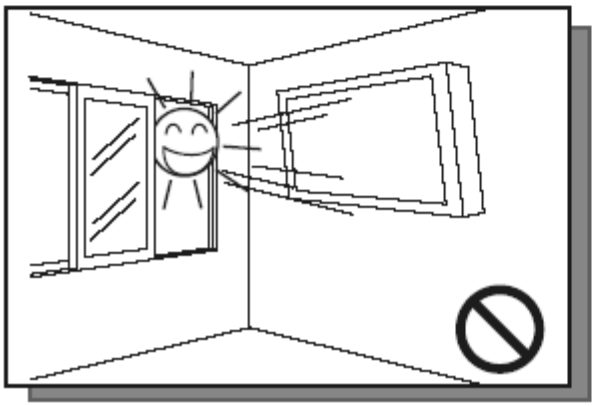


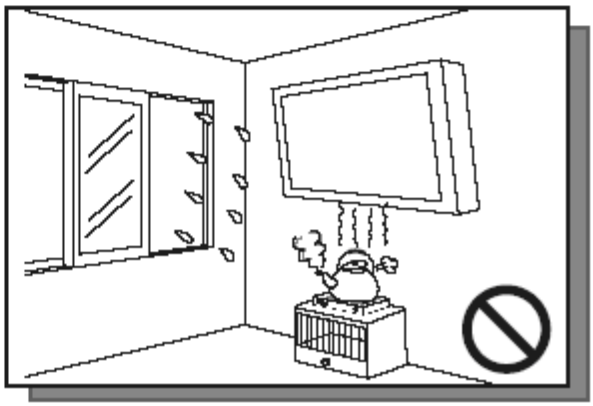
2. After assembling, please don't pull or shake violently.





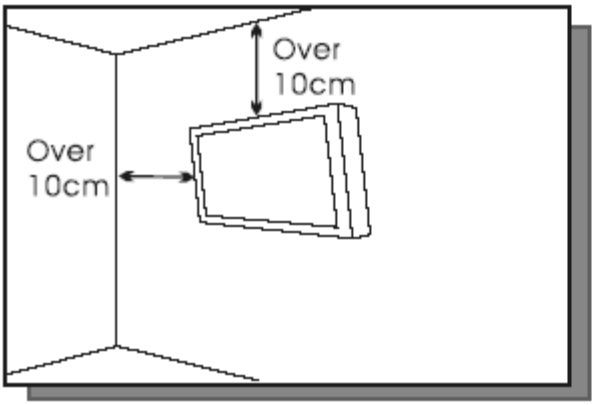
3. Please don't install the bracket directly under the sunshine or humidity / high temperature places for fear that the quality is effected.

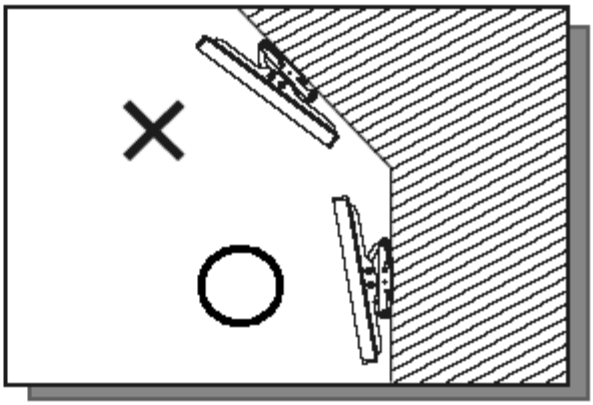




4.

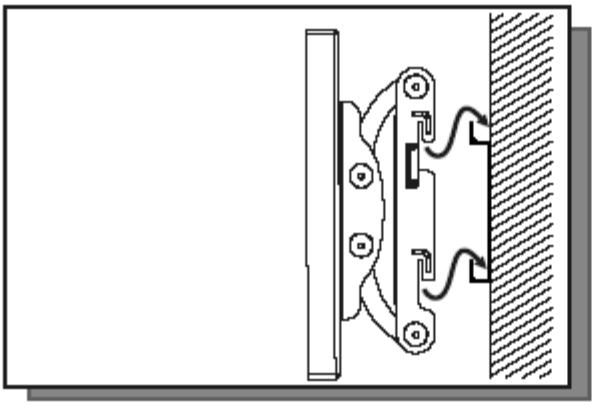
Installing the brakcet over 10 cm from each wall side and being vertical to the ground is the suggested installing position.





5.

Please make sure to hang on the mounting hooks firmly.



6.

The flat screen must be put in the mid of the bracket for fear of slope.