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**TSM-1012**

# NI TSM-101x

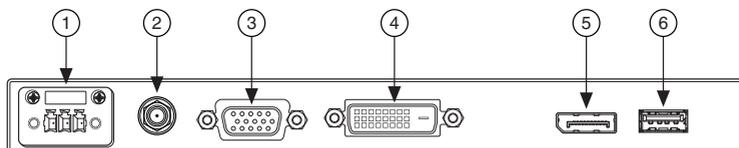
## NI TSM-1012, NI TSM-1015, NI TSM-1017 Touch Screen Monitors

This document describes the features of the National Instruments TSM-101x and contains information about installing and operating the device.

The NI TSM-101x series is a resistive touch screen, color LCD flat panel monitor for industrial applications. There are three models in the NI TSM-101x series: the NI TSM-1012, NI TSM-1015, and the NI TSM 1017.

The front of the NI TSM-101x monitor is a flat panel LCD screen surrounded by an aluminum frame. A small keypad on the rear of the monitor controls the onscreen display (OSD).

**Figure 1. NI TSM-101x Connector Panel**



- |                               |                          |
|-------------------------------|--------------------------|
| 1. 9 to 36 V terminal block   | 4. DVI-D port            |
| 2. 9 to 36 V lockable DC jack | 5. DisplayPort connector |
| 3. VGA port                   | 6. USB port              |

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## Safety Guidelines

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### General Safety Precautions



**Caution** Before installing and operating the NI TSM-101x monitor, read these safety instructions carefully.

- Disconnect all power from the monitor when installing or moving the monitor.
- Do not apply voltage levels that exceed the specified voltage range.
- Do not drop or insert any objects into the ventilation openings of the monitor.
- If considerable amounts of dust, water, or fluids enter the monitor, turn off the power supply immediately, disconnect the power cord, and contact National Instruments.
- Do not strike or exert excessive force on the LCD panel.
- Do not drop or the monitor.
- Do not touch the LCD panel with a sharp object.

### Installation Precautions

- The NI TSM-101x monitor may require at least two people to mount due to its weight.
- Disconnect all power to the monitor during installation.
- Position the power cord so that it cannot be stepped on. Do not place anything over the power cord.
- Ensure the monitor is located near an easily accessible power outlet.
- Only qualified personnel should install and operate the monitor.
- Leave at least 50 mm (0.04 in.) of clearance around the monitor to prevent overheating.
- Do not overload the voltage feeds. Provide external overcharge protection as per the label on the back of the monitor.

# Anti-Static Precautions



**Caution** Failure to follow these precautions may result in permanent damage to the monitor and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components. Dry climates are especially susceptible to ESD. It is critical that whenever qualified personnel open the NI TSM-101x monitor and handle the electrical components, they adhere to the following anti-static precautions.

- Wear an anti-static wristband to help prevent ESD from damaging any electrical component.
- Before handling any electrical component, touch any grounded conducting material. Touch grounded conducting materials frequently while handling an electrical component.
- When configuring or working with an electrical component, place it on an anti-static pad.
- Handle electrical components by the edges only.

## Maintenance and Cleaning



**Note** Take the following precautions prior to cleaning any part or component of the monitor.

- Turn the monitor off before cleaning.
- Never spray or squirt liquids directly onto any components except the LCD panel. To clean the LCD panel, gently wipe it with a piece of soft dry cloth or a slightly moistened cloth.
- Keep fluids away from the monitor interior. The interior of the monitor does not require cleaning.

## Cleaning Tools

Use the following tools to clean the monitor.

- Cloth
- Water or rubbing alcohol
- Vacuum cleaner
- Cotton swabs moistened with rubbing alcohol or water
- Foam swabs

## Verifying the Kit Contents

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Verify that the following components are included in the NI TSM-101x kit.



**Note** Do not remove the plastic cover over the LCD screen until the NI TSM-101x is properly installed.

- Touch Screen Stylus
- USB A-to-A Cable
- RS-232 Cable

If any of the items on the packing list are missing or damaged, contact National Instruments immediately.

## Optional Accessories

**Table 1.** Optional accessories for the NI TSM-101x monitor

Accessory	NI TSM-1012	NI TSM-1015	NI TSM-1017
Arm	783674-01		
Stand	783672-01	783673-01	
V-Mount Kit	783675-01	—	
Panel Mount Kit	783668-01		
Rack Mount Kit	783669-01	783670-01	783671-01

## Installing Software Drivers

The touch panel driver enables the NI TSM-101x monitor to communicate directly with the host machine. The driver emulates configurable left and right mouse button functions via the touch panel interface.

## Supported Operating Systems

The touch panel driver supports the following operating systems:

- Microsoft Windows
  - Microsoft Windows 2000
  - Microsoft Windows XP
  - Microsoft Windows 2003
  - Microsoft Windows 2008
  - Microsoft Windows Vista
  - Microsoft Windows 7
  - Microsoft Windows 8
  - Microsoft Windows 10
- NI Linux Real-Time

## Selecting Touch Screen Modality on Windows

The NI TSM-101x monitor supports touch screen modality through an RS-232 or a USB connection. Connect either the RS-232 or the USB to the appropriate connector on the host machine before installing the driver.



**Note** The default touch screen interface is USB. The RS-232 is optional for resistive touch ATO.



6. Follow the onscreen instructions. Touch the screen at the five specified points to calibrate.

## Enabling the Embedded UI on NI Linux Real-Time

The NI TSM-101x monitor requires a USB connection for touch-screen modality on NI Linux Real-Time targets.



**Note** NI Linux Real-Time does not support RS-232 touch screen modality.

Use a USB cable to connect the monitor to the target and complete the following steps to enable touch screen modality.

### Installing the Touch Panel Driver on NI Linux Real-Time

1. Install the recommended software set on the target.
  - a) In MAX, expand **Remote Systems** in the configuration tree, then expand the RT target by clicking the arrow beside it.
  - b) Select **Software**.
  - c) Click **Add/Remove Software** at the top of the Software tab to launch the LabVIEW Real-Time Software Wizard.
  - d) Select a recommended software set to install. Click **Next**. MAX displays installation progress, and restarts the target.
2. Select the **Enable Embedded UI** checkbox in MAX.
  - a) Expand **Remote Systems** in the configuration tree, then select the RT target.
  - b) Place a check in the **Enable Embedded UI** checkbox.
  - c) Click **Save**, then select **Yes** when prompted to restart the target.

### Calibrating the Touch Screen on NI Linux Real-Time

The touch screen may be out of calibration on first use. Visit [ni.com/info](http://ni.com/info) and enter the Info Code `CalibrateTouchScreenLinuxRT` for information about calibrating the NI TSM-101x touch screen on an RT target.

## Connecting the NI TSM-101x to Power

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**Caution** You must use a UL Listed ITE power supply marked LPS with the NI TSM-101x.

### Wiring the Terminal Block

Connect the leads of the 9 to 36 V DC power supply into the terminal block.

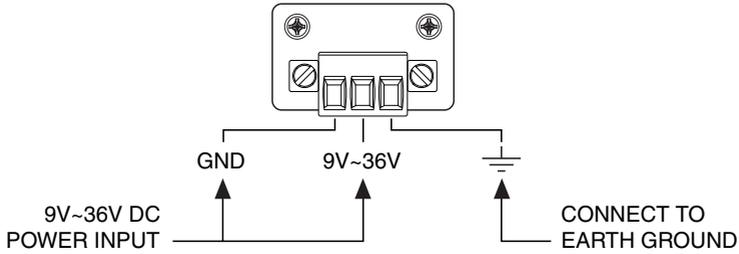


**Caution** To ensure the specified EMC performance, the length of all power wiring must not exceed 3 m (10 ft).

Use wire that meets the requirements in the device specifications. Attach the power and ground wires to the correct sockets of the connector as shown in the following figure.

Connect earth ground to the grounding electrode system of your facility using a method appropriate for the application.

**Figure 3. Wiring the Three-Pin Power Connector**



## Connecting an Adapter to the Power Jack

The monitor can be powered through the lockable 9-36 V DC jack. You must use an adapter with a locking connector that meets the requirements in the device specifications.

## Mounting the Monitor

The NI TSM-101x monitor can be mounted in a panel, cabinet, rack, wall, or on a monitor arm or stand.

Installation requires a Phillips screwdriver and may require additional accessories.



**Caution** When mounting, do not overtighten the retention screws.

## Dimensions

The following figures show the dimensions for the three models of NI TSM-101x.

**Figure 4. NI TSM-1012 Dimensions**

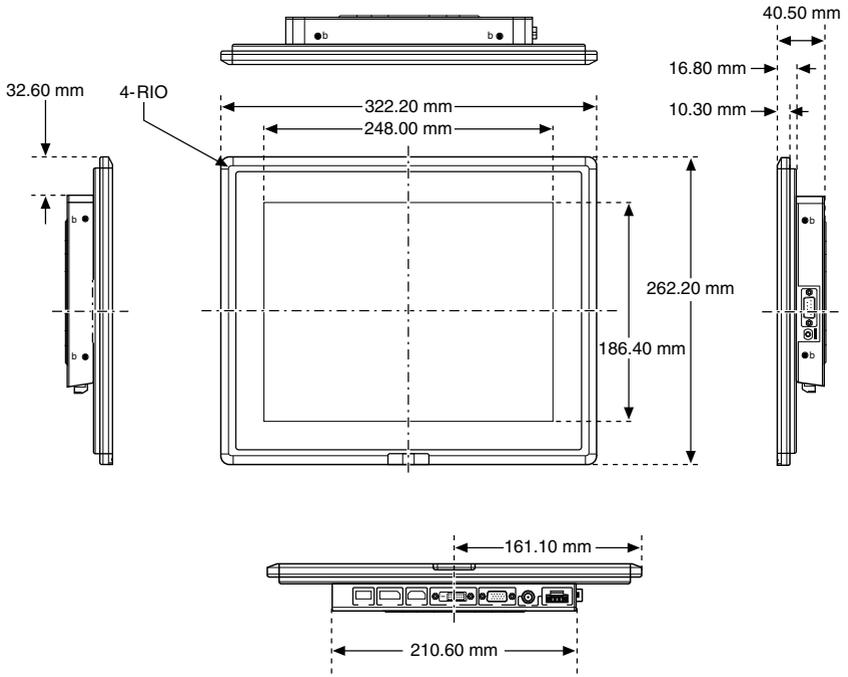
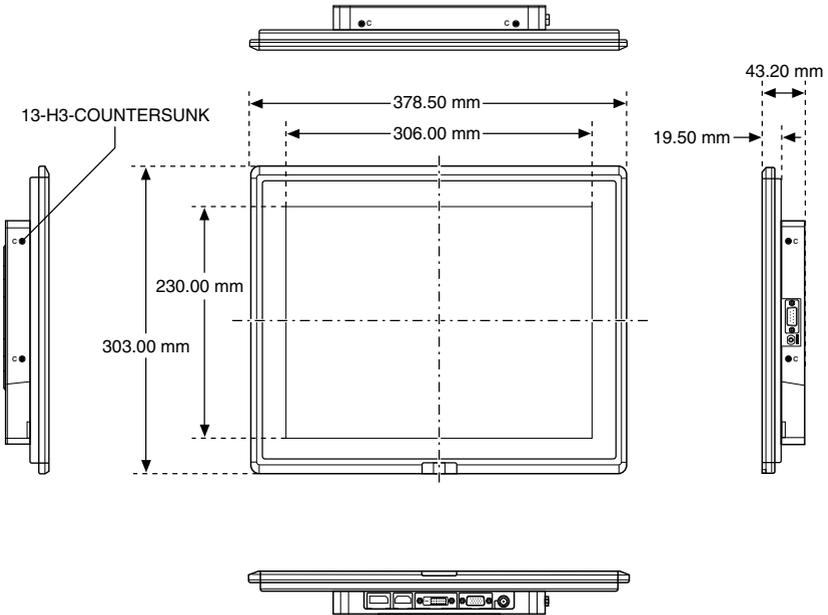
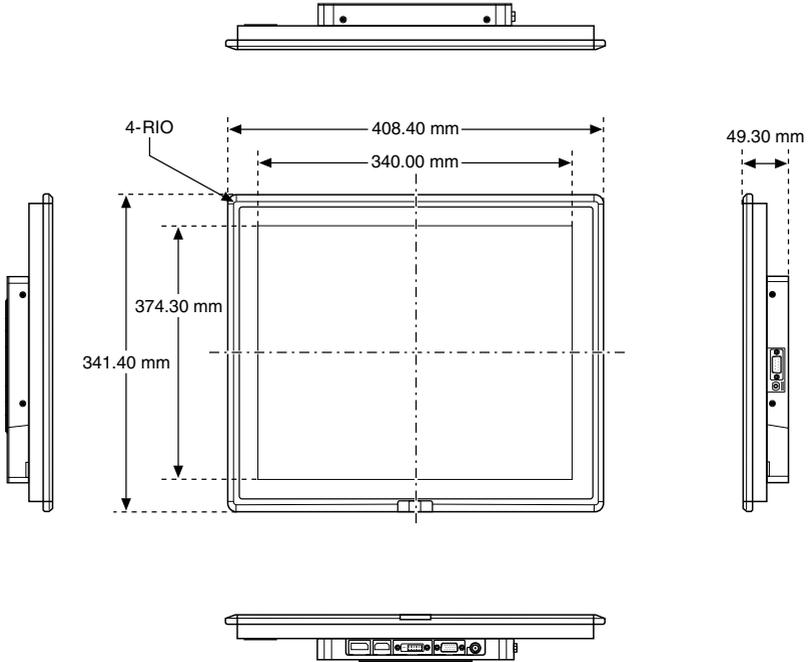


Figure 5. NI TSM-1015 Dimensions



**Figure 6. NI TSM-1017 Dimensions**



## Panel Mounting

The NI TSM-101x monitor has a series of mounting slots on the top and bottom panel, and requires nine mounting clamps to mount to a panel.

Take the following steps to mount the NI TSM-101x to a panel:

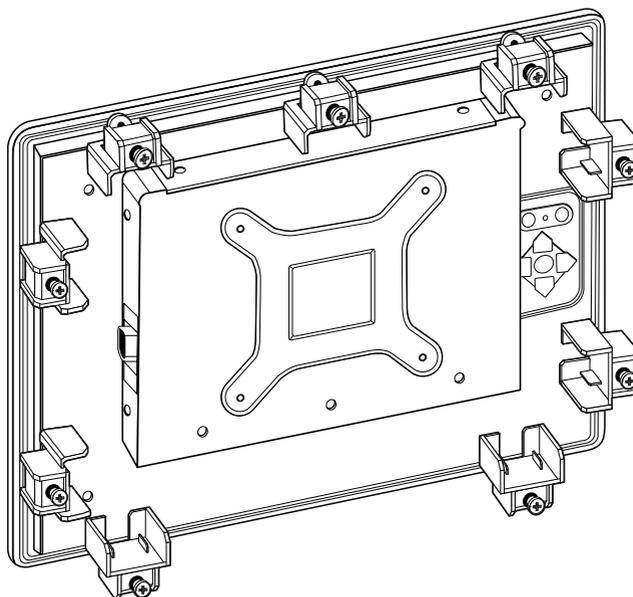
1. Cut out a section of the panel that corresponds to the dimensions of the rear panel of the monitor as shown in the following table.

**Table 2. Suggested Cutout Dimensions**

Model	Height	Width
NI TSM-1012	243.8 mm (9.60 in.)	303.8 mm (11.96 in.)
NI TSM-1015	284.6 mm (11.20 in.)	360.1 mm (14.18 in.)
NI TSM-1017	323.0 mm (12.72 in.)	390.0 mm (15.35 in.)

2. Slide the monitor through the cutout until the aluminum frame is flush against the panel.
3. Secure the panel mounting brackets to the rear of the monitor. Insert the panel mounting clamps into the holes along the two edges of the panel mounting brackets. The following figure shows the panel mounting clamp positions.

**Figure 7. Panel Mounting Clamp Positions**



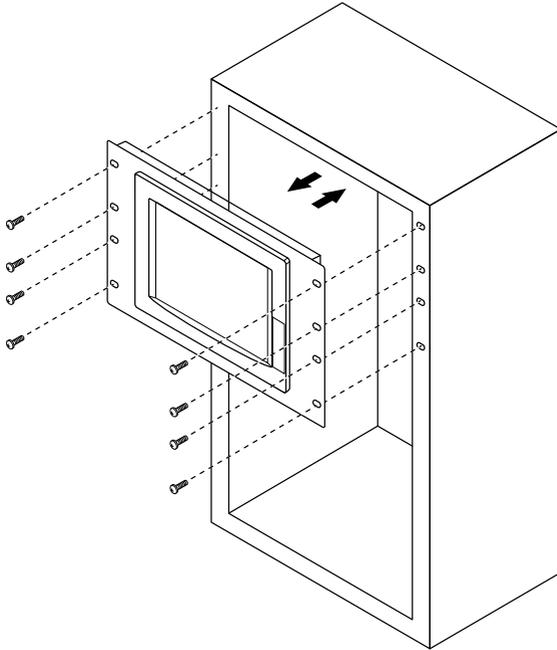
4. Use a Phillips screwdriver to tighten the screws that pass through the panel mounting clamps until the plastic caps at the front of the screws are firmly secured to the panel.

## Cabinet or Rack Mounting

The back of the metal frame around the monitor has retention screw holes for a cabinet or rack installation bracket. Take the following steps to mount the NI TSM-101x monitor into a cabinet or rack.

1. Slide the monitor through the cabinet or rack bracket until the rear side of the monitor frame is flush against the front of the bracket.
2. Secure the panel mounting bracket to the rear of the monitor. Insert the panel mounting clamps into the holes along the edges of the monitor, as shown in the following figure.
3. Use a Phillips screwdriver to tighten the screws that pass through the panel mounting clamps. Secure the plastic caps at the front of the screws to the panel.
4. Slide the monitor with the attached bracket into a rack or cabinet.
5. Insert and tighten the retention screws to secure the system into a cabinet or rack as shown in the following figure.

**Figure 8.** Securing the Cabinet or Rack Bracket



## Mounting to a Monitor Stand

The NI TSM-101x monitor has standard Video Electronics Standards Association (VESA) mounting holes in the rear panel. The holes are designed for M4 screws and set at 100.0 mm × 100.0 mm (3.94 in. × 3.94 in.) apart.

The monitor stand mounting plate has a matching VESA hole pattern. Take the following steps to mount the NI TSM-101x monitor onto a stand.

1. Align the threaded holes on the monitor rear panel with the screw holes on the monitor stand mounting plate.
2. Secure the monitor to the stand with the supplied retention screws.

## Mounting to a Monitor Arm

The NI TSM-101x monitor has standard Video Electronics Standards Association (VESA) mounting holes in the rear panel. The holes are designed for M4 screws and set at 100.0 mm × 100.0 mm (3.94 in. × 3.94 in.) apart.

The monitor arm mounting plate has a matching VESA hole pattern. Take the following steps to mount the monitor to a monitor arm:

1. Align the threaded holes on the monitor rear panel with the screw holes on the monitor arm mounting plate.
2. Secure the monitor to the arm with the supplied retention screws.

# Mounting with the V-Mount Kit

You can use the V-Mount Kit to mount the NI TSM-1012 to a wall, ceiling, desk, or other surface. The V-Mount has a 0 to 90 degree adjustable hinge to optimize the viewing angle of the monitor.



**Note** The V-Mount is compatible only with the NI TSM-1012.

Take the following steps to mount the NI TSM-1012 with the V-Mount Kit.

1. Mark the locations of the four V-Mount retention screw holes on the mounting surface.
2. Align the VESA mounting holes in the V-Mount with the mounting holes in the rear of the monitor.
3. Insert retention screws through the VESA mounting holes to secure the V-Mount to the monitor.



**Note** The VESA holes on the monitor are designed for M4 screws and set at 100.0 mm × 100.0 mm (3.94 in. × 3.94 in.) apart.

4. Secure the V-Mount and monitor to the surface with retention screws in the locations you marked in step 1.

## NI TSM-101x Features

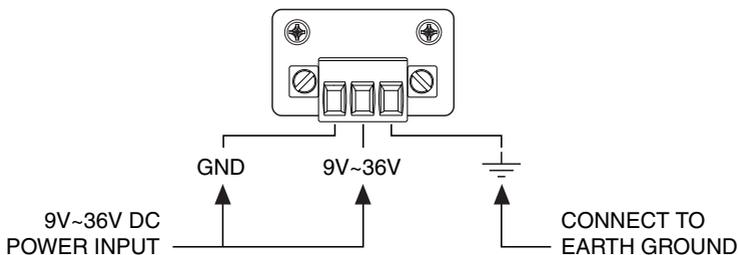
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### 9 to 36 V Terminal Block

The 9 to 36 V DC terminal block has an earth ground socket, a ground socket, and three terminals for 9 to 36 V inputs.

**Figure 9.** 3-pin Terminal Block

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### VGA Connector

The VGA connector connects VGA video output from the host machine into the monitor. The pins on the connector have the standard pin numbering configuration for a VGA connector.

**Table 3.** VGA Connector Pinouts

Pin	Description
1	RED
2	GREEN
3	BLUE
4	NC
5	GROUND
6	GROUND
7	GROUND
8	GROUND
9	NC
10	GROUND
11	NC
12	DDCDAT
13	HSYNC
14	VSYNC
15	DDCCLK

## DVI-D Connector

The DVI connector connects to a display device with DVI interface. The pins on the connector have the standard pin numbering configuration for a DVI-D connector.

**Table 4.** DVI-D Connector Pinouts

Pin	Description
1	RX2-
2	RX2+
3	GND
4	NC
5	NC
6	DVI-SCL
7	DVI-SDA

**Table 4. DVI-D Connector Pinouts (Continued)**

<b>Pin</b>	<b>Description</b>
8	NC
9	RX1-
10	RX1+
11	GND
12	NC
13	NC
14	DVI-5V
15	GND
16	HOT-PLUG
17	RX0-
18	RX0+
19	GND
20	NC
21	NC
22	GND
23	RXC-
24	RXC-

## DisplayPort Connector

The DisplayPort connector transmits a digital signal to compatible DisplayPort devices. The pins on the connector have the standard pin numbering configuration for a DisplayPort connector.

**Table 5. DisplayPort Connector Pinouts**

<b>Pin</b>	<b>Description</b>
1	ML_L3N
2	GND
3	ML_L3P
4	ML_L2N

**Table 5.** DisplayPort Connector Pinouts (Continued)

<b>Pin</b>	<b>Description</b>
5	GND
6	ML_L2P
7	ML_L1N
8	GND
9	ML_L1P
10	ML_L0N
11	GND
12	ML_L0P
13	GND
14	GND
15	C_DDI0_DP_AUXP
16	GND
17	C_DDI0_DP_AUXN
18	C_DDI0_DP_HPD
19	GND
20	VCC
21	GND
22	GND
23	GND
24	GND

## USB for Touch Panel Connector

The USB touch panel connector enables touch screen modality from the monitor to the host machine. The pins on the connector have the standard pin numbering configuration for a USB-A connector.

**Table 6.** USB Connector Pinouts

Pin	Description
1	VCC
2	USB20_N11
3	USB20_P11
4	GND

## Display Panel Keypad

The NI TSM-101x monitor has a small keypad on the rear panel. Use this keypad to navigate the onscreen menus, turn the screen on and off, and auto-adjust the image and display settings.

## Software Configuration

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### Image Menu

The following image menu options are listed in the order they appear onscreen. Grayed out options do not appear in the list.

- **Brightness**—Adjusts the brightness of the screen.
- **Contrast**—Adjusts the contrast of the screen. Adjusting this value too high or too low worsens the image quality.
- **Sharpness**—Softens the edges around objects on the screen.
- **Color**—Provides the following options for color settings:
  - **Auto**—Automatically adjusts the color settings
  - **Color Temp**—Adjusts the following settings:
    - **5000k**—National Television System Committee (NTSC) standard Kelvin
    - **6500k**—NTSC standard Kelvin
    - **9300k**—NTSC standard Kelvin
    - **User**—Adjusts the balance between red, green, and blue color hues.

### Display Menu

The following display menu options are listed in the order they appear onscreen.

- **Auto Adjust**—Automatically adjusts the LCD screen position.
- **Phase**—Adjusts the input signal (analog only).
- **Clock**—Adjusts the dot clock position.
- **Display Position**—Adjusts the Gamma.

# System Menu

The following system menu options are listed in the order they appear onscreen.

- **Input**—Selects which input device to use.
- **OSD Settings**—Provides the following options for onscreen display (OSD) configuration:
  - **Timer**—Specifies how many seconds the screen stays on after it is unattended.
  - **Rotation**—Adjusts the angle at which the image is rotated on the screen.
  - **Position**—Adjusts the image position on the screen
  - **Transparency**—Adjusts the transparency of the menu background.

# Input Menu

The following input menu options are listed in the order they appear onscreen.

- **Display Port**—Selects the DisplayPort connector as the input.
- **VGA**—Selects the VGA connector as the input.
- **DVI/HDMI**—Selects the DVI/HDMI as the input.
- **autoscan**—Automatically selects the input device to use.

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