EXPERIENCE THE ASPEN TOUCH

Aspen ATM-173R Series Touch Monitor Product Manual

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Contact Information
Aspen Touch Solutions
31207 Keats Way, Suite 104
Evergreen, Colorado 80439
tel: 303.468.4130
toll free: 877.427.7393 (North America)
fax: 303.468.4131
web: www.aspentouchsolutions.com
email: techsupport@aspentouchsolutions.com

Aspen ATM-173R Series Touch Monitor

Product Manual

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Usage Notice

Warning: To prevent the risk of fire or shock, do not expose this product to rain or moisture

Warning: To avoid electric shock, do not open or disassemble this product. There are no user serviceable parts in this product. Refer all service questions to Aspen Touch Solutions or a qualified servicer.

Introduction

Congratulations on your purchase of an Aspen Touch Solutions touchmonitor. This manual covers all models of the Aspen Touch Monitor 17" (ATM-173R) series of touchmonitor products. Aspen has brought together a team of experienced developers from the touch industry to create what we believe to be the finest touchmonitors available in the industry today. Your touchmonitor combines outstanding flat panel display design, the most needed features for typical touch, POS and medical applications, and the best touchscreen components to deliver a product of superior performance and value. We welcome your comments on our product and our company. For the latest contact information, see our web site at http://www.aspentouchsolutions.com. As you read this manual, you may encounter words or terms associated with display, touchscreen or touch applications that you are not familiar with. Many of the words unique to this industry have been italicized on first use in this manual. Definitions of these words have been included in the Glossary.

Product features of the Aspen ATM-173R series touchmonitor include:

- 17" *AMTFT LCD* panel
- 300 *nit* Brightness/450:1 *Contrast Ratio* LCD panel
- Auto-Sensing Brightness Adjustment for the best performance in changing light conditions
- High resolution resistive touchscreen with Dual Interface *Serial* (ATM-173R only) and *USB* connections
- 1280 x 1024 *native resolution*
- On Screen Display (OSD) for display setup, with vandal-resistant lockable controls
- One-click access to Brightness, Audio Mute, and Video Auto-Adjust functions
- Universal external power supply
- State-sensing, lockable power switch prevents display from being turned off by vandals, and restores operation after AC power is interrupted
- Power-on indicator built-in to power ON/OFF switch (OEM models only)
- Variety of *VESA*-compatible mounting options
- Top or bottom access stand lockdown for stable countertop mounting
- Kensington® lock connection on touchmonitor chassis for best public access security
- Cable management access through display base and bottom
- Touchscreen has high performance wedge seal for best contamination rejection in harsh environments
- Two high performance baffled loudspeakers with 5W+5W audio amplifiers and electronic volume controls
- 3.5mm Stereo Headphone Jack for private listening
- Optional *MSR* and Customer Display for the ultimate POS package

Connections and Installation

Begin your installation by selecting a data connection. With the ATM-173R monitors, you may use either a serial or USB data connection. All other ATM-173R series models use USB only. Choose the appropriate data cable from the accessory kit included with your monitor.

Please note that all Aspen displays that include an MSR or MSR/Customer Display also have an USB hub internal to the display to interface the peripheral devices. As a result, the display will have only one USB cable for touch data and the MSR/Customer Display data. Also, two additional User USB ports are externally available on the display, and these ports may be used to connect additional USB devices to your system such as a mouse, keyboard, bar code reader, etc.

Next select a mounting method for your monitor. If you wish to use your monitor in any other way than resting it on its stand on a flat surface, you will need to either:

- Attach the stand to a countertop or wall
- Dismount the display chassis from the stand and use the VESA mounting holes on the chassis to attach the display to an arm or other mount. The 100mm spaced holes are recommended for this purpose. Use the 75 mm holes only when 100mm hardware is not available or when recommended by your mounting hardware provider.

Connect the cables to the monitor before attaching the stand to a countertop or a wall, if access to cable connections will be restricted when the stand mounting is complete.

To attach the stand to a countertop or wall, print out the full size template file that accompanies this manual, and use it to determine the proper locations for screw or bolt holes, and if necessary, to select a location for a larger hole to route cables through the mounting surface. Cables can generally be hidden under the stand baseplate and the rear cover. The baseplate of the stand can be attached to a flat surface in several ways:

- The four holes near the middle of the baseplate are at a VESA-compatible spacing of 75mm and 100mm. Use these holes to bolt the stand from the back side.
- The three large “keyhole” slots may be used to secure bolts, inserted from the front side, by nuts threaded on from the back side of the mounting surface. Insert bolts in mounting holes, loosely thread nuts on from back side, slip stand keyholes over bolt heads and position bolt shaft in the narrow portion of keyhole slot. Tighten nuts from back side to finish the installation.
- To attach the stand to the mounting surface from the front, use the two round holes adjacent cable access cutout, and the hole in the center of the smaller keyhole slot near the front of the baseplate. The back holes are accessible through the stand when the rear cover is removed, and the front hole is accessed through the small cover in the top surface of the plastic base. Rotate the cover 1/4 turn counter-clockwise to remove by inserting a flat blade screwdriver in the cover slot.

Display Setup and On Screen Display

Connect and secure cables to the display and the computer, except for the USB cable. The AC cordset provided with your display should be appropriate for your region. If the proper cordset has not been provided, you may use any cordset with an IEC320 connector at the appliance end to connect to the external power supply of your touch display.

Notice: Unless your Aspen touch display has a serial data interface, or you are connecting this touch display to a computer that already has Aspen touchscreen MSR and Customer Display drivers installed, please leave the USB cable disconnected until the appropriate drivers for your computer's operating system have been installed.

You can now set up the display for operation with your computer. Display setup requires use of some of the main features of the OSD, listed below. Detailed use of the OSD is described later in this section.

OSD Controls

The following table shows the OSD and Power control buttons, located on the right side of the display, and both the normal and direct access functions of these buttons:

Button	Symbol	Button Name	Normal Function	Direct Access
❶		Menu	Displays/Exits OSD Menu	
❷		Up	Increases selected item value	Display brightness
❸		Down	Decreases selected item value	Audio ON/OFF
❹		Enter	Selects highlighted menu item	Video auto adjust
❺		Power	Turns all display power ON/OFF	

Use the OSD buttons as described above to set up the display:

- Turn on the display with the power switch
- The display will initially be set to properly display the native resolution for the LCD panel, which is 1280 X 1024 pixels. If your computer outputs a video signal at another resolution, further adjustment than described in this section may be required. Contact Aspen Technical Support if assistance is required.
- Press the Enter key on the OSD controls. A pop-up window on the display should appear with the message "Auto Adjusting Please Wait."
- Inspect the edges of a typical application to see if you can see the all edges of the image. If so, you are finished with the basic setup of the display.

If your application requires use of the display at another resolution than 1280 X 1024, such as 1024 X 768 or 800 x 600, you may achieve satisfactory operation by using the Auto Adjust procedure described above, or you may need to use the individual controls in the OSD to properly adjust the display. If so, access the OSD main menu and use the picture size adjustment (see table below) to resize, move, or adjust the quality of the displayed image.

Notice: The OSD will not function if the monitor is operated at a resolution above 1280 X 1024. While the monitor may actually display a video image at some higher resolution, it will be briefly accompanied by an "Out of Range" message when the image is initially displayed. Reduce the video resolution from your computer to 1280 X 1024 or less to restore the function of the OSD.

The complete menu of the OSD is shown in the table below. The Main Menu icon for each menu is shaded, and the individual functions within the group follow:

OSD Menu and Function

Contrast and Brightness	
Contrast	Controls the display contrast
Brightness	Controls the display brightness
Video Adjustment	
Auto Adjust	Automatically sets display image size, position, and fine adjustment. Contrast and brightness are not adjusted.
Left/Right	Controls horizontal position
Up/Down	Controls vertical position
Horizontal Size	Increases or decreases the horizontal size of the image
Fine	Controls the vertical fine adjustment. May improve picture detail in *emulation* modes.
OSD Tool	
OSD Left/Right	Adjusts the default horizontal position of the OSD on the display
OSD Up/Down	Adjusts the default vertical position of the OSD on the display
OSD Timeout	Determines time (in seconds) that OSD waits before closing automatically after no action has been performed
Factory Reset	Recalls original factory settings of image parameters
OSD Language	Selects the OSD menu language—English, French, German, Italian, Spanish, Japanese, Traditional Chinese, Simplified Chinese
OSD Color	Selects one of ten OSD color schemes
Color Adjustment	Adjusts preset *color temperature* of the image. Available choices are 9300, 7500, 6500, and 5500° *Kelvin* (K). A User mode allows custom setup of each color component of the image—Red, Green and Blue. Default setup for this parameter is 6500°K. Do not adjust color temperature unless you have a specific need to do so.
Audio Adjustment	
Volume	Adjusts the loudspeaker volume
Mute ON/OFF	Mute ON turns off the audio function. Mute OFF restores the audio function
Auto DIM	
Auto Dim	Turns the Auto-Sensing Brightness Adjustment circuit ON or OFF
Dimming Range	Menu shows sensed light level, and brightness setting as a percentage of full scale (same setting as Brightness in **Contrast and Brightness** menu when Auto DIM is OFF). With Auto DIM ON, brightness is now controlled by the light sensor located at top center of the front bezel. See additional discussion of this feature further in this section.

Power/OSD Lock/Unlock There is no menu graphic for this feature.

The Power/OSD lockout menu is separate from the main OSD. Access this feature by first pressing the MENU button to access the main OSD. While the main OSD is displayed, press and hold the MENU button. The main OSD will disappear. While continuing to hold the MENU button down, momentarily press the POWER button. The POWER/OSD lockout menu will appear. Press the ENTER button to alternately select OSD or POWER, and use the UP and DOWN buttons to toggle your selection between UNLOCK (the default) and LOCK.

OSD LOCK defeats all normal access to the OSD, including the Direct Access shortcuts to Brightness, Audio, and Video Auto Adjust. *The only access to the OSD, when in OSD LOCK, is to again press and hold MENU and while holding MENU down, then momentarily press POWER.*

POWER LOCK defeats the operation of the POWER button. This feature, in addition to preventing casual vandalism of the system, allows the touch monitor to power up properly when the system or touch monitor is powered from an outlet strip or remote master switch, or when the monitor is installed in a kiosk or other location where the power button is inaccessible.

OSD buttons UP, DOWN and ENTER will scroll through available choices when held down continuously.

The Auto-Sensing Brightness Adjustment feature is intended to be used in situations where the ambient lighting can change significantly over time. The brightness of the image tracks ambient brightness and dims the display as the ambient light decreases, making the image less obtrusive under reduced lighting conditions where high image brightness is not necessary for good viewability. In general, it is expected that the brightness is adjusted to its nominal setting under the brightest ambient light available. Assuming that this is true, and the ambient light is 150 or above as reported by the Auto DIM OSD menu (units are approximately in *Lux*, a common measure of *illuminance*, or lighting of surfaces by light sources), the brightness will not change when the Auto Dim feature is turned ON.

However, when the ambient lighting is less than 150, the display will immediately dim in response to the setting of the Auto Dim range and the ambient light:

- Dimming Range is a measure of how much the display will dim when ambient light is reduced
- Dimming only occurs in the ambient light range of 0-150 (Lux) as measured by the automatic light sensor. If the ambient light is brighter than 150, no dimming will occur until the light level drops below 150, and then will drop proportionally to the measured light level
- A 100 Dimming Range setting means that the image brightness will be reduced to its minimum in total darkness conditions
- A 0 Dimming Range setting means that the image brightness will not be reduced at all under total darkness conditions

Touchscreen and Touchscreen Drivers

Touchscreen: Your Aspen ATM-173R series touch display is equipped with a *resistive* touchscreen. Features of a resistive touchscreen that are important for your use are:

- The touchscreen is made of a thin (about 1/8") sheet of glass overlaid with a layer of plastic. The resulting composite is placed in front of the LCD panel in your touchmonitor.
- The touchscreen can be activated by anything that applies a force of about 1 ounce over a normal fingertip-sized area. Objects with smaller contact areas such as a credit card, pen or pencil tips and pencil erasers will activate the touchscreen with even less force. So, in normal circumstances, a very light touch is all that is required to navigate your application with the touchscreen.
- The touchscreen plastic layer has a hard front surface coating on it, and will withstand years of use with finger, fingernail and other relatively large radius styli. However, hard objects with sharp edges can easily damage the touchscreen. Avoid the use of ball-point pen barrels with the tip retracted, microball pens, keys, rings, coins and metal tableware.
- The touchscreen may be cleaned with common glass cleaners, but do not use cleaners with abrasives—Comet, BonAmi, etc. The best procedure for cleaning the screen is to apply your cleaner to a soft cloth or paper towel, and wipe the touchscreen until contamination is removed. Applying cleaner to the cloth rather than spraying it directly on the screen will minimize the amount of overspray that may collect at the bottom of the screen.
- One characteristic of the resistive touchscreen technology is that it averages multiple touches. So, if you touch the screen with two fingers at the same time, on opposite sides of the display, the reported location to the application will be in the middle of the screen! Consider this in navigation of your application.

Touchscreen and Peripherals Drivers: Drivers for different operating systems have been supplied on a CDROM that accompanied your touch display. If you cannot find the disk or need additional copies of the software, contact Aspen at http://www.aspentouchsolutions.com.

Touchscreen and Peripherals Driver Installation: Drivers for all supported operating systems are contained on the Aspen Touch Solutions Install Disk. To install drivers, follow the procedures below as appropriate. Touchscreen support is provided for Windows 98/Me/NT/2000/XP, DOS and Linux (kernels 4.2.18 and above). The MSR and Customer Display peripherals are USB devices. Currently support is provided for Windows platforms only, though Linux will be supported in the future. Contact Aspen TechSupport for further information.

Windows 98/Me/NT/2000/XP Installation:

- If you are using a USB data interface, disconnect it from the computer before proceeding. Connect the touch-screen cable if using a serial interface (ATM-173R only). Insert the disk in your drive. If AutoRun does not start the installation, double click the “Setup” program in the CDROM folder.
- Follow the instructions pertaining to your particular product configuration, and check the appropriate boxes in the “Select Features” page to install drivers for the peripherals you have. The POS demo program may be installed now or at any time in the future.
- If the installation program does not restart your computer, shut down, connect the USB cable, if used, and restart.
- After restart, the touchscreen controller and other USB devices, if present (the MSR and Customer Display), will be found by Windows and the drivers automatically installed for them.

- Find the Aspen Touchscreen Settings icon in Control Panel, and use the features under the appropriate tabs to configure the operation of the touchscreen for your application, and if necessary, to *calibrate* the touchscreen to the display image.
- The MSR, if present, is configured for *keyboard emulation* by default. It should work identically to *keyboard wedge* readers in all applications. Contact Aspen TechSupport if this format is not suitable for your application.
- The Customer Display, while hardware interfaced as a USB device, is equivalent to a serial display for programming purposes. Contact Aspen Technical Support for programming information on this device.

DOS Installation:

- See specific procedures in DOS section of disk

Linux Installation:

- See specific procedures in Linux section of disk
- Kernels 2.4.18 and above (corresponding to RedHat Linux versions 8 and 9) are supported
- Source code is available on request

Specifications

Monitor Part Number	Standard OEM	ATM-173R, ATM-17RM, ATMM-173R ATM-173RO, ATM-173RMO, ATMM-173R
Display		17" Color AMTFT LCD
Color	Standard, OEM	Dark Gray (ATMM: Beige)
Touchscreen Technology		5-wire resistive
Active Screen Dimensions		Horizontal 13.3" (338 mm) Vertical 10.6" (270 mm)
Monitor Dimensions	With Stand	Horizontal 16.5" (418mm) Vertical 15.8" (400mm) Depth 10.5" (267mm)
	Without Stand	Horizontal 16.5" (418mm) Vertical 14.2" (361mm) Depth 3.3" (84mm)
Weight	ATM-173R/RM	Actual 19.8lb/9.0kg Shipping 23 lb/10.5kg
Brightness	LCD With touchscreen	300 nit (typical) 240 nit
Colors		16.2 million (6-Bit +FRC)
Resolution	Native Supported (Preset Timing)	1280 X 1024 at 60, 75 Hz 1024 X 768 at 60, 70, 75 Hz 1024 X 768 at 65 Hz (Sun) 832 X 624 at 75 Hz (Mac) 800 X 600 at 56, 60, 72, 75 Hz; 720 X 400 at 70 Hz 720 X 350 at 70 Hz; 640 X 480 at 60, 72, 75 Hz
	Supported (User Timing)	Nine Settings Available
Viewing Angle	Horizontal Vertical	140° Total (70° left/right), CR≥10 130° Total (60° up/down), CR≥10
Contrast Ratio		450:1 (typical)
Scanning Frequency	Horizontal Vertical	31.5 - 80 KHz 56.3 - 75 Hz
Video Input		Analog RGB (VGA) Analog RGB with sync on green DVI-D
Video Bandwidth		70 MHz
Input Video Format		VGA/SVGA/XGA analog DVI-D
Plug and Play		VESA DDC1/2B

Power Supply Voltages		External DC supply, +12VDC AC input 100-240VAC/50-60 Hz
Power Dissipation	Operating	45 W max AC 30 W max DC
	Sleep Mode	<4 W
	Off	<2 W
Power Saving		VESA DPMS compliant
Temperature	Operating	+0°C to +50°C
	Storage	- 30°C to +60°C
Humidity	Operating	20% to 80% non-condensing
	Storage	5% to 95% non-condensing
Altitude	Operating	0 - +12000 ft (3658m)
	Non-operating	0 - +40000 ft (12192m)
External Connections	Power	IEC320 Standard AC inlet
	Audio	Standard 3.5mm Stereo Jack
	Video	HD15(VGA) DVI-D 24pin
	Touch Interface	Standard USB series "B" receptacle (detachable USB cable) Standard DB9 F Serial (ATM-173R only) (detachable serial cable)
POS Options	Magstripe Reader	3 Track Reader with Power and Error Indicator Light
	Customer Display	2 x 20 VFD Display with Dual Axis (tilt & swivel) Movement
Additional features	Power indicator for display, built in to power switch; Power switch state memory	
	Digital on-screen display (OSD); Hidden, software lockable controls	
	Direct access to contrast, audio mute, and video auto adjust functions (bypass OSD)	
	Auto-Sensing Brightness Adjustment	
	Rubber Wedge Sealed touchscreen	
	Removable base	
	Two 75 mm VESA mounts (On base and display chassis)	
	Top or bottom access to countertop mounting holes	
	Kensington lock connection on chassis	
	Broad range of vertical tilt (-5° to +90°)	
	Two built-in 4W baffled speakers; 3.5mm Headphone Jack for private listening; 5W+5W Audio Amplifier	
	Two Port USB Hub (ATM-17RM/RMD/RMO and RMDO models only)	

Product Agency Approvals	Safety	UL, cUL, CSA 22.2 No.950 3rd Ed. EN60950 Low Voltage Directive 93/68/EEC
	Ergonomics	EK 1-1TB 2000
	EMI	FCC/B EN 55022: Class B 1998
	EMS	EN 55024: 1998
	Low Emission	MPR II 1990: 8/MPR 1990:10
Warranty		3 Year, 24 Hour Advance Replacement

Glossary

AMTFT—Active Matrix Thin Film Transistor. This is the type of liquid crystal display panel used in essentially all computer flat panel displays today.

Calibrate—For touchscreens, "calibrate" is the common term for the process that is really "video alignment." A touchscreen and its controller have a coordinate system that are usually not identical to the coordinate system of the video display of the host computer. By displaying reference points on the touch monitor (through the calibration program) and touching those reference points, the touch monitor coordinate system is scaled to that of the computer.

Color temperature—Color temperature is a simplified way to characterize the spectral properties of a light source, and is the temperature you would heat a theoretical "black body" source to radiate light of the same visual color. For example, "low" color temperature, like 3200°K, implies warmer (more yellow/red) light, while "high" color temperature, like 9300°K, implies a cooler (more blue) light. Daylight has the 3200°K temperature mentioned near dawn and evening, and a higher one during the day. The standard unit for color temperature is the Kelvin (k).

Contrast Ratio—The ratio of the luminance of the display of a full white image to a full black image. This parameter is useful in determining the relative sharpness of two displays—a higher contrast ratio usually implies a sharper image, especially when test is displayed.

Controller—Touchscreen controller. The electronics that actually process the touch on the touchscreen and sends out a digital representation of that touch to the host computer.

Emulation—As used in display technology, emulation mode means an image displayed at a non-native resolution. For your Aspen touch monitor and other 17" monitors, the common emulation modes are 800x600 and 640x480. In emulation modes, a monitor cannot perfectly display the image sent from the computer when the monitor pixel to image pixel ratio is not an integral multiple.

FRC—Frame Rate Control. A method of dithering the video image to produce additional color depth. In this monitor, as with most 17" monitors, it effectively extends the color depth from 6-bit resolution to 8-bit resolution.

Hub or USB hub—An electronic circuit that combines several USB signals into one.

Illuminance—The measure of how much luminous flux per unit area that impinges on a particular surface, or how bright a point source of light appears to the eye. It is measured in foot-candles or in lux.

Kelvin—The scale of temperature measurement that begins at absolute zero. The increment of temperature that one Kelvin represents is the same as that of the Celsius scale, but the scale starts at -273.16°C. Thus 293°K is about 20°C or 68°F.

Keyboard emulation—Produces the same output as a keyboard, or a "keyboard wedge" magnetic stripe reader.

Keyboard wedge—An MSR unit that connects to a computer keyboard port with a cable that also connects the standard keyboard, thus a keyboard wedge.

LCD—Liquid Crystal Display. The most common technology used in flat computer displays today. "Liquid crystal" molecules (a very complex chemical engineered for this function) sandwiched between a combination of flat glass color filters and polarizers, pass or block light in response to electrical signals applied by the display electronics. The result is a very sharp, bright display that is very thin, and uses little power, compared with a CRT, or tube-type monitor.

Lux—The standard unit for illuminance is lux (lx) which is lumens per square meter (lm/m2). 1 lux = 10.764 foot-candle. Common room lighting is 100-1000 lux.

MSR—Magnetic Stripe Reader. A device that reads information encoded in the magnetic stripes on the back of a credit card, etc. The process is essentially identical to the operation of a cassette tape player.

Native resolution—The resolution of a digital flat panel display that actually describes how many pixels are in each row and column of the display, and which is the resolution that the display is optimized for. Your 17" Aspen touch monitor has a native resolution of 1280 x 1024, which means that the LCD panel has 1280 pixels on each row, and has 1024 rows. Each element of video information received from the computer/display electronics is assigned to and displayed by a specific location on the display panel—a pixel. At resolutions other than native (see emulation) there is not a one to one correspondence between the video information elements and the available pixels on the display. The display electronics must compensate for this and cannot do a perfect conversion, thus emulation modes never look as good as images displayed at the native resolution.

Nit—The standard unit of luminance is the candela per square meter (cd/m^2), or Nit.

Pixel—Abbreviation for "picture element." In an electronic display, the smallest complete element of the picture that contains all possible colors and proper brightness. In your Aspen touchmonitor, one pixel of the LCD panel is a square "window," with an area of about 0.3x0.3mm, containing three smaller windows that pass red, green or blue light at the appropriate brightness in response to the video signal from the computer.

Polarizer—A thin glass or plastic sheet that filters out light rays of all but a specific orientation. Light passing through such a sheet is thus *polarized*.

POS—Point Of Sale.

Serial—A data transmission method where each bit (a "1" or "0") of data is passed sequentially (or serially) over a single data path (a wire…). The most common standard for this method is called RS232. This is a very common method of interfacing peripheral equipment to older computers. Today this method is increasingly replaced by another method called USB (see below).

USB—Universal Serial Bus. A common method for interfacing peripheral equipment to computers. It has the advantages over other serial data transmission standards of higher speeds and the ability to connect many devices to the same port on a computer.

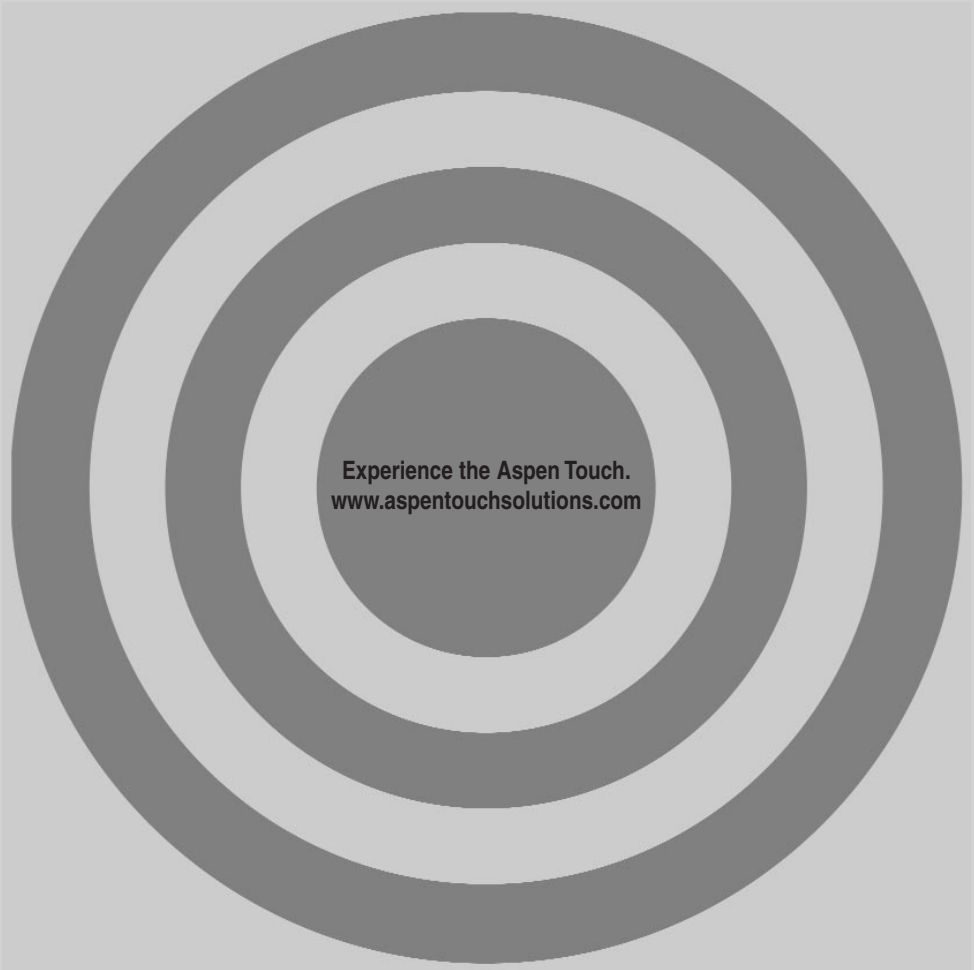
VESA—Video Electronics Standards Association. An industry trade group that promotes interoperability standards within the video and computer industry. The VESA mounting pattern (100 mm) for displays is used by your Aspen touch monitor on the base and chassis, allowing the monitor to be quickly attached to standard swing arms and mounting plates.

Mounting Template

A full-sized image of the metal base plate for the touch monitor is included with this manual, and may be used as a template for creating mounting holes in a countertop, etc. Electronic versions of this manual include a file that may be printed to create the same template. Ensure that your printed version is scaled correctly. You may check the printing by verifying that the center-to-center distances of the VESA mount pattern are exactly 100mm.

Aspen Touch Solutions, Inc. Product Warranty

Aspen warrants that the Products will conform to the Specifications and be free from defects in material and workmanship for three (3) years from date of shipment. Customer shall report any claimed defect in writing to Aspen immediately upon discovery, and in any event, within the warranty period. Products must be returned to Aspen within thirty (30) days of Aspen's receipt of warranty claim notice and only after receiving Aspen's authorization to return products in accordance with Aspen's Product Return Policy. In the case Customer needs fast turnaround for product replacement, Aspen will issue advance replacements with 24 hours after an Aspen Return Material Authorization (RMA) number has been issued for Product to be returned. Warranty repairs shall be warranted for the remainder of the original warranty period for the Product. This warranty is void if the Products have been repaired, altered or modified in any manner by persons other than Aspen, without Aspen's prior written approval. This warranty excludes prototypes and conditions in Products resulting from normal wear and tear. Defects caused in whole or in part by failure to properly store, install, operate or maintain Products in accordance with good industry practices and Aspen's recommendations are excluded from warranty coverage. Damage caused by use of the Product other than that which it is intended is excluded from warranty coverage. Repair or replacement is Customer's exclusive remedy under this warranty, except if such remedy is adjudicated inadequate, Aspen shall refund the paid price of the Products. Aspen will pay to return the Products to Customer. The turnaround time on repairs will usually be thirty (30) working days or less. Aspen accepts no added liability for additional days required for repair. This warranty shall not be enlarged or modified, and no obligation or liability of Aspen shall be created, by Aspen offering technical advice, assistance, or services relating to the Products. Before returning Products to Aspen on warranty claim, Customer shall remove from the Products any hardware, data, software or programs or keep backups. Aspen disclaims any liability for loss of such data in returned Products. ASPEN MAKES NO OTHER WARRANTY OF ANY KIND WITH RESPECT TO THE PRODUCTS, except as specified herein. ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE DISCLAIMED.



Aspen
TOUCH SOLUTIONS

31207 Keats Way, Suite 104
Evergreen, Colorado 80439
tel: 303.468.4130 fax: 303.468.4131
toll free: 877.427.7393
web: www.aspentouchsolutions.com
email: info@aspentouchsolutions.com

Template will print on one sheet of 11" x 17" paper.