User Manual

PAX-324-C2

24" True-Flat Medical Monitor

ADVANTECH

Enabling an Intelligent Planet

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Disclaimer

Although every attempt has been made to achieve technical accuracy in this manual, we assume no responsibility for errors that may be found. Our goal is to provide you with the most accurate and usable documentation possible. To assist us with improving this manual, we welcome all comments and constructive criticism. Please send all feedback in writing to support@advantech.com.

Important

Please read this user manual carefully to familiarize yourself with the correct, safe, and effective usage procedures. Additionally, we recommend that you retain this manual for future reference.

Importante

Lea detenidamente este manual del usuario para familiarizarse con los procedimientos de uso eficaces y seguros. Conserve este manual para futuras consultas.

重要

ご使用前には必ず取扱説明書をよくお読みになり、正しくお使いください。この取扱説明書は大切に保管してください。

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Symbols

Symbol	Title
	This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions.
	This symbol is intended to alert the user to the presence of uninsulated “dangerous voltage” of sufficient magnitude to constitute a risk of electric shock.
	This symbol is intended to remind the user to follow the instructions for use, particularly with medical electrical equipment.
	This symbol denotes direct current.
	This symbol denotes the manufacturer.

FCC Compliance

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Class A

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 such cases, users are required to correct the interference at their own expense.

However, any modifications not expressly approved by the manufacturer may void the user’s authority to operate the equipment under the FCC Rules.

CE Marking

This marking is a declaration of conformity in accordance with Article 10(1) of the CE directive.
This product has passed the CE test for environmental specifications. Test conditions for passing include the equipment being operated within an industrial enclosure. To protect the product from damage due to electrostatic discharge (ESD) or electromagnetic interference (EMI) leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

VCCI (Voluntary Control Council for Interference)

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Disposal of Waste

- Products bearing this mark should not be disposed of with other household waste at the end of their working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, separate this product from other types of waste and recycle it responsibly to promote the sustainable reuse of material resources.
- Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take this item for environmentally safe recycling.
- Business users should contact their supplier and check the terms and conditions of the purchase contract. This product should not be mixed with other commercial waste for disposal.

Safety and Maintenance

Caution! *To ensure optimum performance, follow the safety instructions outlined below when setting up or using the equipment.*

- Do not open the monitor. There are no user-serviceable parts inside. Opening or removing the cover may expose you to dangerous shock hazards or other risks. Refer all servicing to qualified service personnel.
- Do not spill liquid onto the equipment and do not operate near water.
- Do not insert objects of any kind into the equipment as they may touch dangerous voltage points, which can be harmful or fatal or may cause electric shock, fire or equipment failure.
- Do not place any heavy objects on the power cord. Damage to the cord may cause shock or fire.
- Do not place the equipment on a sloping or unstable cart, stand, or table as it may fall and cause serious damage.
- To operate the equipment, use an AC power supply cord that complies with international safety standards.
- Do not place any objects on top of the equipment.
- Do not operate the equipment outdoors.
- The fluorescent tube inside the monitor contains mercury. Please follow local regulations when disposing of the tube.
- Do not use the equipment in very hot, humid, dusty, or oily environments.
- If the monitor screen is damaged or cracked, handle with care. Do not touch the liquid crystals.
- Ensure adequate ventilation around the equipment to allow heat dissipation. Do not block ventilated openings or place the equipment near a radiator or other heat sources.
- The power cable connector is the primary means of detaching the equipment from the power supply. The monitor should be installed close to a power outlet which is easily accessible.
- Handle with care when transporting. Save the original packaging for moving the equipment between locations.

Caution! *If any of the conditions listed below occur, immediately unplug the monitor from the power outlet and have it serviced by qualified service personnel.*

- The power supply cord or plug is damaged.
- Liquid or objects have penetrated the monitor.
- The monitor has been exposed to rain or water.
- The monitor has been dropped or damaged.
- The monitor does not operate normally according to the operating instructions.

Warning! ***High Voltage***

The AC/DC inverter is equipped with the caution label shown below to indicate the presence of high voltage current. Do not under any circumstances open the monitor to access the inverter. If servicing is required, contact a qualified service technician.

Radio Frequency

- This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to other devices in the vicinity. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to other devices, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
  - Reorient or relocate the receiving device.
  - Increase the separation between the equipment.
  - Connect the equipment into an outlet on a circuit different from that to which the other device(s) are connected.
  - Consult the manufacturer or field service technician for help.

Keep Away From Windows

- Exposure to rain, moisture, or sunlight can seriously damage the electrical components. To protect the monitor, do not place it near a window.

Storage Temperature

- Do not place the monitor in an environment with a storage temperature of below -20 °C (-4 °F) or above 60 °C (140 °F) as this can cause serious damage.

Image Persistence

- Image persistence is when a residual or ghost image of a previous image remains visible on the screen. Unlike CRT monitors, LCD monitors' image persistence is not permanent, but constant images being displayed for a long period of time should be avoided.
- To alleviate image persistence, turn off the monitor for as long as the previous image was displayed. For example, if an image was on the monitor for one hour and a residual image remains, the monitor should be turned off for one hour to erase the image.

Note! *As with all personal display devices, Advantech recommends using a moving screen saver whenever the screen is idle and turning off the monitor when not in use.*

Placement and Adjustment of the Monitor

- For optimum performance, a one hour warm-up time is recommended.
- Adjust the monitor height so that the top of the screen is at or slightly below eye level. Your eyes should look slightly downward when viewing the middle of the screen.
- Rest your eyes periodically by focusing on an object farther away and blinking often.
- Position the monitor at a 90 degree angle to windows and other light sources to minimize glare and reflections. Adjust the monitor tilt so that ceiling lights do not reflect on your screen.
- Use an anti-glare filter to improve viewing in the presence of reflected light.
- Use a lint-free, non-abrasive cloth for cleaning the surface of the LCD monitor. Do not use any cleaning solution or glass cleaner.
- Adjust the monitor's brightness and contrast setting to enhance readability.
- Avoid displaying fixed patterns on the monitor for long periods of time to avoid image persistence (residual image).

Note! *For optimal viewing, maintaining a 20-inch distance from the screen is recommended.*

Note! *This device generally does not require the user to install software. Any modification of the internal firmware must only be done following specific procedure provided by Advantech.*

Note! *The configuration of the device should mainly be done by the user using the provided hardware keypad.*

Note! *If software tools are provided by Advantech they should be operated using the specific instructions provided. Any software tools provided should only be installed on a computer with appropriate systems to prevent unauthorized access. It is recommended to install anti-virus software and not connect to unsafe external networks.*

Note! *In case of any serious incident that has occurred, please contact the manufacturer and the authorities immediately.*

Contents

Chapter 1

Introduction

1.1 Introduction

PAX-324 is a 24-inch TFT LCD monitor designed for medical imaging display applications. With the digital imaging and communication in medicine (DICOM) grayscale standard display function (GSDF) and 14-bit gamma correction for white balance, PAX-324 is optimized for displaying high-quality medical images and videos.

1.2 Features

- True-flat design with AR filter (optional)
- High brightness and high contrast ratio
- Integral LED backlight
- FHD resolution (1920x1200)
- HDMI 2.0 supports up to 1920x1200 @ 60 Hz resolution
- Display Port 1.2 supports up to 1920x1200 @ 60 Hz resolution
- SDI supports up to 1920x1080 @ 60 Hz resolution (optional)
- DVI supports up to 1920x1200 @ 60 Hz resolution (optional)
- Multi-Standard RGB(PC) Monitor supported up to 1920 x 1200 @60 Hz resolution (optional)
- Multiple video standards supported: NTSC, PAL, and SECAM (optional)
- Wide input connectivity for maximum flexibility
- Compatibility with standard VESA mode and support user-defined mode
- Dual Modality Connectivity
- Automatically detect plugged input source to change signal
- Video enhancement features include
  - 14-bit LUT processing
  - DICOM Part 14 GSDF compliance
  - DICOM Clear and Blue modes
- Variable Gamma and DICOM (color temperature) modes
- Variable picture control
- Variable image size
- Variable multi-picture display mode
- IP-based monitor with Advantech AVAS built in (optional)
- Integrated touchscreen (optional)
- Built in speaker (optional)

1.3 Specifications

Specifications of PAX-324-C2B-HAS, PAX-324-C2B-HAR, PAX-324-C2B-HAR-SP, PAX-324-C2F-HAS, PAX-324-C2B-NAS, PAX-324-C2B-NAS-S, PAX-324-C2B-NAR, PAX-324-C2B-NAS-SK, PAX-324-C2B-NAR-SK, PAX-324-C2F-NAS, PAX-324-C2A-NBS, PAX-324-C2A-NBR, PAX-324-C2A-NAR, PAX-324-C2B-NAS-SP, PAX-324-C2B-NAR-SP

Note! *The specifications are subject to change without notice.*

1.3.1 Display

Item	Model Name		
	PAX-324-C2B-HAS PAX-324-C2B-HAR	PAX-324-C2B-HAR-SP	PAX-324-C2F-HAS
Screen Size (Active Area)	24.07" (518.40 (H) x 324.0 (V) [mm])		
Aspect Ratio	16:10		
Number of Pixels	1920 (H) x 1200 (V)		
Pixel Pitch	0.270 (H) x 0.270 (V) [mm]		
Display Colors	1.07 Billion (10-bit)		
Brightness (Typical)	900 cd/m^2		
Contrast Ratio (Typical)	1,000:1		
Display Mode	AHVA		
Response Time (Typical)	14ms (Tr + Tf)		
Viewing Angle (H/V)	178/178		
Touch Screen (Option)	Projected Capacitive		

Item	Model Name		
	PAX-324-C2B-NAS **PAX-324-C2B-NAS-S** **PAX-324-C2B-NAR**	**PAX-324-C2B-NAS-SK** **PAX-324-C2B-NAR-SK**	**PAX-324-C2F-NAS**
Screen Size (Active Area)	24.07" (518.40(H) x 324.0(V) [mm])		
Aspect Ratio	16:10		
Number of Pixels	1920 (H) x 1200 (V)		
Pixel Pitch	0.270(H) x 0.270(V) [mm]		
Display Colors	16.7 Million (8-bit)		
Brightness (Typical)	350 cd/m^2		
Contrast Ratio (Typical)	1,000:1		
Display Mode	AH-IPS		
Response Time (Typical)	14ms (Gray To Gray)		
Viewing Angle (H/V)	178/178		
Touch Screen (Option)	Projected Capacitive		

Item	Model Name		
	PAX-324-C2A-NBS PAX-324-C2A-NBR	PAX-324-C2A-NAR	PAX-324-C2B-NAS-SP PAX-324-C2B-NAR-SP
Screen Size (Active Area)	24.07" (518.40(H) x 324.0(V) [mm])		
Aspect Ratio	16:10		
Number of Pixels	1920 (H) x 1200 (V)		
Pixel Pitch	0.270(H) x 0.270(V) [mm]		
Display Colors	16.7 Million (8-bit)		
Brightness (Typical)	350 cd/m^2		
Contrast Ratio (Typical)	1,000:1		
Display Mode	AH-IPS		
Response Time (Typical)	14ms (Gray To Gray)		
Viewing Angle (H/V)	178/178		
Touch Screen (Option)	Projected Capacitive		

1.3.2 Input / Output Terminals

Item		Specifications		
		PAX-324-C2B-HAS PAX-324-C2B-HAR	PAX-324-C2B-HAR-SP	PAX-324-C2F-HAS
DC Power Input	DC Jack x 1	DC24V, 4.16A(MAX) or 5A(MAX) or 3.75A(MAX)		
DC Power Output	DC Jack x 1	DC5V or DC12V		
RS-232C	Mini DIN Jack x 1 (8 pin)	Service Port		
SDI Input	BNC Jack x 1	Serial Input Common Mode: 2.2V[p-p](75Ω) MAX: 1920 x 1080@60 Hz		
SDI Output	BNC Jack x 1	Serial Input Common Mode: 2.2V[p-p](75Ω) MAX: 1920 x 1080@60 Hz		
S-Video Input	Mini DIN Jack x 1 (4 pin)	Y: 1V[p-p] (75 Ω), C: 0.286V[p-p] (75 Ω) [NTSC] Y: 1V[p-p] (75 Ω), C: 0.300V[p-p] (75 Ω) [PAL / SECAM]		
S-Video Output	Mini DIN Jack x 1 (4 pin)	Y: 1V[p-p] (75 Ω), C: 0.286V[p-p] (75 Ω) [NTSC] Y: 1V[p-p] (75 Ω), C: 0.300V[p-p] (75 Ω) [PAL / SECAM]		
Video Input	BNC Jack x 1	1V[p-p] (75 Ω) [NTSC / PAL / SECAM]		
Video Output	BNC Jack x 1	1V[p-p] (75 Ω) [NTSC / PAL / SECAM]		
DVI Input	DVI Jack x 2 (Type D)	Digital RGB: TMDS MAX: 1920 x 1200@60 Hz		
DVI Output	DVI Jack x 2 (Type D)	Digital RGB: TMDS MAX: 1920 x 1200@60 Hz		
HDMI 2.0 Input	HDMI Jack x 1 (Type A)	Digital RGB: TMDS MAX: 1920 x 1200@60 Hz		
HDMI 1.4 Input (For Ndcoder)	HDMI Jack x 1 (Type A) (Internal Connection)	Digital RGB: TMDS MAX: 1920 x 1200@60 Hz		
DP 1.2 Input	DP Jack x 1	DisplayPort 1.2 MAX: 1920 x 1200@60 Hz		
USB Up	USB-B Jack x 1	USB 2.0 (For Touch Screen)		

RGB Input	D-Sub Jack x 1	Analog RGB: 0.7V[p-p](75Ω), H/CS/V: TTL (2.2 kΩ), SOG: 1V[p-p](75Ω) MAX: 1920 x 1200@60Hz		-
Audio Input	Ear Jack x 1	Audio: 0.5V[rms](Normal), 2 Channel (L+R)		-
Audio Output	Ear Jack x 1	Audio: 0.5V[rms](Normal), 2 Channel (L+R)		-
Speaker Output	Built in Speaker	-	3W(L) + 3W(R) [RMS] / 4 Ω 2 Channel (L+R)	-
DVI Output (For Display)	DVI Jack x 1 (Type D) (Internal Connection)	-		Digital RGB: TMDS MAX: 1920 x 1080@60Hz
LAN	RJ45 Jack x 1	-		1GbE
SFP+	Module			SFP+ 10Gbps

Item		**Specifications**		
		PAX-324-C2B-NAS **PAX-324-C2B-NAS-S** **PAX-324-C2B-NAR**	**PAX-324-C2B-NAS-SK** **PAX-324-C2B-NAR-SK**	**PAX-324-C2F-NAS**
DC Power Input	DC Jack x 1	DC24V, 4.16A(MAX) or 5A(MAX) or 3.75A(MAX)		
DC Power Output	DC Jack x 1	DC5V or DC12V		
RS-232C	Mini DIN Jack x 1 (8 pin)	Service Port		
SDI Input	BNC Jack x 1	Serial Input Common Mode: 2.2V[p-p](75Ω) MAX: 1920 x 1080@60 Hz		
SDI Output	BNC Jack x 1	Serial Input Common Mode: 2.2V[p-p](75Ω) MAX: 1920 x 1080@60 Hz		
S-Video Input	Mini DIN Jack x 1 (4 pin)	Y: 1V[p-p] (75 Ω), C: 0.286V[p-p] (75 Ω) [NTSC] Y: 1V[p-p] (75 Ω), C: 0.300V[p-p] (75 Ω) [PAL / SECAM]		
S-Video Output	Mini DIN Jack x 1 (4 pin)	Y: 1V[p-p] (75 Ω), C: 0.286V[p-p] (75 Ω) [NTSC] Y: 1V[p-p] (75 Ω), C: 0.300V[p-p] (75 Ω) [PAL / SECAM]		
Video Input	BNC Jack x 1	1V[p-p] (75 Ω) [NTSC / PAL / SECAM]		
Video Output	BNC Jack x 1	1V[p-p] (75 Ω) [NTSC / PAL / SECAM]		
DVI Input	DVI Jack x 2 (Type D)	Digital RGB: TMDS MAX: 1920 x 1200@60 Hz		
DVI Output	DVI Jack x 2 (Type D)	Digital RGB: TMDS MAX: 1920 x 1200@60 Hz		
HDMI 2.0 Input	HDMI Jack x 1 (Type A)	Digital RGB: TMDS MAX: 1920 x 1200@60 Hz		
HDMI 1.4 Input (For Ndcoder)	HDMI Jack x 1 (Type A) (Internal Connection)	Digital RGB: TMDS MAX: 1920 x 1200@60 Hz		
DP 1.2 Input	DP Jack x 1	DisplayPort 1.2 MAX: 1920 x 1200@60 Hz		
USB Up	USB-B Jack x 1	USB 2.0 (for touch screen)		
RGB Input	D-Sub Jack x 1	Analog RGB: 0.7V[p-p](75Ω), H/CS/V: TTL (2.2 kΩ), SOG: 1V[p-p](75Ω) MAX: 1920 x 1200@60Hz		-
Audio Input	Ear Jack x 1	Audio: 0.5V[rms](normal), 2 Channel (L+R)		-
Audio Output	Ear Jack x 1	Audio: 0.5V[rms](normal), 2 Channel (L+R)		-

Speaker Output	Built in Speaker	-	3W(L) + 3W(R) [RMS] / 4 Ω 2 Channel (L+R)	-
DVI Output (For Display)	DVI Jack x 1 (Type D) (Internal Connection)	-		Digital RGB: TMDS MAX: 1920 x 1080@60Hz
LAN	RJ45 Jack x 1	-		1GbE
SFP+	Module			SFP+ 10Gbps

Item		**Specifications**		
		PAX-324-C2A-NBS PAX-324-C2A-NBR	**PAX-324-C2A-NAR**	**PAX-324-C2B-NAS-SP PAX-324-C2B-NAR-SP**
DC Power Input	DC Jack x 1	DC24V, 4.16A(MAX) or 5A(MAX) or 3.75A(MAX)		
DC Power Output	DC Jack x 1	-		
RS-232C	Mini DIN Jack x 1 (8 pin)	-		
SDI Input	BNC Jack x 1	Serial Input Common Mode: 2.2V[p-p](75Ω) MAX: 1920 x 1080@60 Hz	-	
SDI Output	BNC Jack x 1	Serial Input Common Mode: 2.2V[p-p](75Ω) MAX: 1920 x 1080@60 Hz	-	
S-Video Input	Mini DIN Jack x 1 (4 pin)	-		
S-Video Output	Mini DIN Jack x 1 (4 pin)	-		
Video Input	BNC Jack x 1	-		
Video Output	BNC Jack x 1	-		
DVI1 Input	DVI Jack x 1 (Type D)	Digital RGB: TMDS MAX: 1920 x 1200@60 Hz		
DVI1 Output	DVI Jack x 1 (Type D)	Digital RGB: TMDS MAX: 1920 x 1200@60 Hz		
HDMI 2.0 Input	HDMI Jack x 1 (Type A)	Digital RGB: TMDS MAX: 1920 x 1200@60 Hz		
HDMI 1.4 Input (For Ndcoder)	HDMI Jack x 1 (Type A) (Internal Connection)	-		
DP 1.2 Input	DP Jack x 1	DisplayPort 1.2 MAX: 1920 x 1200@60 Hz		
USB Up	USB-B Jack x 1	USB 2.0 (For Touch Screen)		
RGB Input	D-Sub Jack x 1	-		Analog RGB: 0.7V[p-p](75Ω), H/CS/V: TTL (2.2 kΩ), SOG: 1V[p-p](75Ω) MAX: 1920 x 1200@60Hz
Audio Input	Ear Jack x 1	-		Audio: 0.5V[rms](Normal), 2 Channel (L+R)
Audio Output	Ear Jack x 1	-		Audio: 0.5V[rms](Normal), 2 Channel (L+R)

Speaker Output	Built in Speaker	-	3W(L) + 3W(R) [RMS] / 4 Ω 2 Channel (L+R)
DVI Output (For Display)	DVI Jack x 1 (Type D) (Inter-nal Connection)	-	
LAN	RJ45 Jack x 1	-	
SFP+	Module	-	

Caution!

- *External equipment intended for connection to signal input, signal output or other connectors, shall comply with relevant IEC Standard (e.g., IEC60950 for IT equipment and IEC60601-1 series for medical electrical equipment). In addition, all such combination-system-shall comply with the standard IEC60601-1 and /for IEC60601-1-1 harmonized standard or the combination.*
- *If in doubt contact qualified technician or your local representative.*

Warning! *Do not touch signal input, signal output or other connectors, and the patient simultaneously.*

1.3.3 General

Item	Model Name		
	PAX-324-C2B-HAS PAX-324-C2B-HAR	**PAX-324-C2B-HAR-SP**	**PAX-324-C2F-HAS**
Power Supply	DC24V, 4.16A(MAX) or 5A(MAX) or 3.75A(MAX)		
Power Consumption	55.1 W	48.3 W	67.2 W
Dimensions (W x H x D)	578.13 x 402.78 x 68.0 [mm]		
Weight (Without Stand)	7.50 Kg	7.58 Kg	7.85 Kg

Item	Model Name		
	PAX-324-C2B-NAS PAX-324-C2B-NAS-S PAX-324-C2B-NAR	**PAX-324-C2B-NAS-SK PAX-324-C2B-NAR-SK**	**PAX-324-C2F-NAS**
Power Supply	DC24V, 4.16A(MAX) or 5A(MAX) or 3.75A(MAX)		
Power Consumption	26.7 W	27.0 W	36.0 W
Dimensions (W x H x D)	578.13 x 402.78 x 68.0 [mm]		
Weight (Without Stand)	7.20 Kg	7.28 Kg	7.55 Kg

Item	Model Name		
	PAX-324-C2A-NBS PAX-324-C2A-NBR	**PAX-324-C2A-NAR**	**PAX-324-C2B-NAS-SP PAX-324-C2B-NAR-SP**
Power Supply	DC24V, 4.16A(MAX) or 5A(MAX) or 3.75A(MAX)		
Power Consumption	20.0 W	19.0 W	19.3 W
Dimensions (W x H x D)	578.13 x 402.78 x 68.0 [mm]		
Weight (Without Stand)	7.25 Kg	7.20 Kg	7.28 Kg

1. Type of protection against electric shock: Class I equipment.

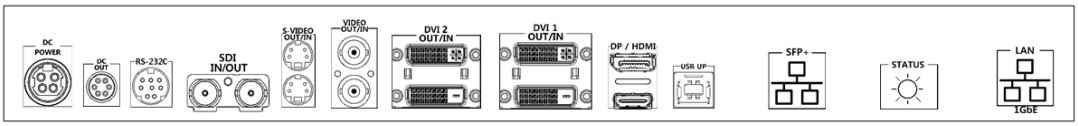
2. Degree of protection against electric shock: Not classified – no applied parts.
3. Classification according to the degree of protection against ingress of water: IPX0, ordinary equipment.
4. This equipment is not suitable for use in the presence of flammable anesthetics or oxygen.
5. Mode of operation: continuous operation.

1.3.4 Environmental Condition

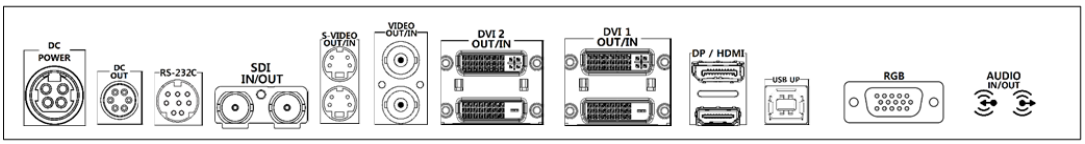
Temperature	**Operating**	0 ~ 40 °C
	Storage	-20 ~ 60 °C
Humidity	**Operating**	Ta = 40°C, 90% RH (non-condensing)
	Storage	5 ~ 90%
Pressure	**Operating**	500 hPa to 1013 hPa
	Storage	500 hPa to 1013 hPa

1.4 Input/Output Signal Connectors

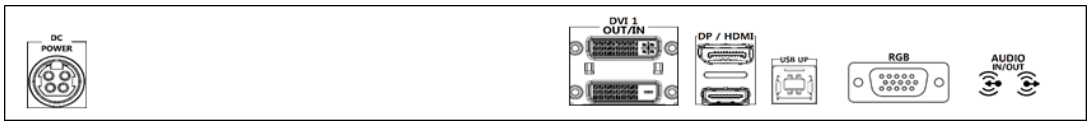
- PAX-324-C2F-HAS, PAX-324-C2F-NAS (AVAS option)



- PAX-324-C2B-HAS, PAX-324-C2B-HAR, PAX-324-C2B-NAS, PAX-324-C2B-NAS-S, PAX-324-C2B-NAR (RGB option)
  PAX-324-C2B-NAS-SK, PAX-324-C2B-NAR-SK,
  PAX-324-C2B-HAR-SP (built in speaker, RGB option)



- PAX-324-C2B-NAS-SP, PAX-324-C2B-NAR-SP (built in speaker, RGB option)



- PAX-324-C2A-NAR

■ PAX-324-C2A-NBS, PAX-324-C2A-NBR

Symbol	Signal	Connector	Specification
RS-232C	RS-232C	1 x Mini DIN jack (8 pin)	Service port
USB Up	USB up	1 x USB-B jack	Touch control (optional)
Video	Video input	2 x BNC jack	1V[p-p] (75 Ω) [NTSC/PAL/ SECAM]
	Video output		
S-Video	S-video input	2 x Mini DIN jack (4 pin)	Y: 1V [p-p] (75 Ω), C: 0.286V [p-p] (75 Ω) [NTSC] Y: 1V [p-p] (75 Ω), C: 0.300V [p-p] (75 Ω) [PAL/SECAM]
	S-video output		
SDI 1	SDI input	2 x BNC jack	Serial input common mode: 2.2V [p-p](75 Ω) 1920x1080 @ 60 Hz max.
	SDI output		
DVI 1~2	DVI Input	2 x DVI jack (Type D)	Digital RGB: TMDS 1920x1200 @ 60 Hz max.
	DVI Output		
HDMI	HDMI 1.4 input (for AVAS)	1 x HDMI jack (Type A) (internal connection)	Digital RGB: TMDS 1920x1200 @ 60 Hz max.
	HDMI 2.0 input	1 x HDMI jack (Type A)	
DP	DP 1.2 input	1 x DP jack	DisplayPort 1.2 1920x1200 @ 60 Hz max.
RGB	RGB input	1 x D-Sub jack	Analog RGB: 0.7V [p-p] (75 Ω), H/CS/V: TTL (2.2 kΩ), 1920x1200 @ 60 Hz max.
Audio	Audio input	1 x Ear jack	0.5V [rms] (Normal) 2 Channel (L+R)
	Audio output	1 x Ear jack	

Caution! *External equipment intended for connecting to the signal input, signal output, or other connectors must comply with the relevant IEC standard (e.g., IEC 60950 for IT equipment and IEC 60601-1 series for medical electrical equipment). In addition, all such combination systems must comply with the IEC 60601-1 and IEC 60601-1-1 standard specifications.*

If in doubt, contact a qualified technician or your local representative.

Warning! *Do not touch the signal inputs, signal outputs, or other connectors while touching the patient.*

Note! *The specifications of Advantech products are subject to change without notice.*

1. *Type of protection against electric shock: Class I equipment.*
2. *Degree of protection against electric shock: Not classified - no applied parts.*
3. *Classification according to the degree of protection against water ingress: IPX0, ordinary equipment.*
4. *This equipment is not suitable for use in the presence of flammable anesthetics or oxygen.*
5. *Mode of operation: continuous operation.*

Chapter 2

Installation

2.1 Unpacking

Before unpacking the LCD monitor, prepare a suitable level and clean workspace near a power outlet. Set up the LCD monitor in a location with sufficient airflow and away from direct sunlight. After unpacking the LCD monitor, check to ensure that the following items have been included in the shipment:

- 1 x PAX-324 LCD monitor
- 1 x PAX-324 user manual

If any of the above items are missing or damaged, contact your dealer or sales representative immediately. Retain the shipping carton and packing material for storing or transporting the monitor in the future.

2.2 System Controls

The LCD monitor is designed to provide easy and convenient access to all the control keys and the peripheral ports. Before installation, take the time to familiarize yourself with the system controls and I/O ports.

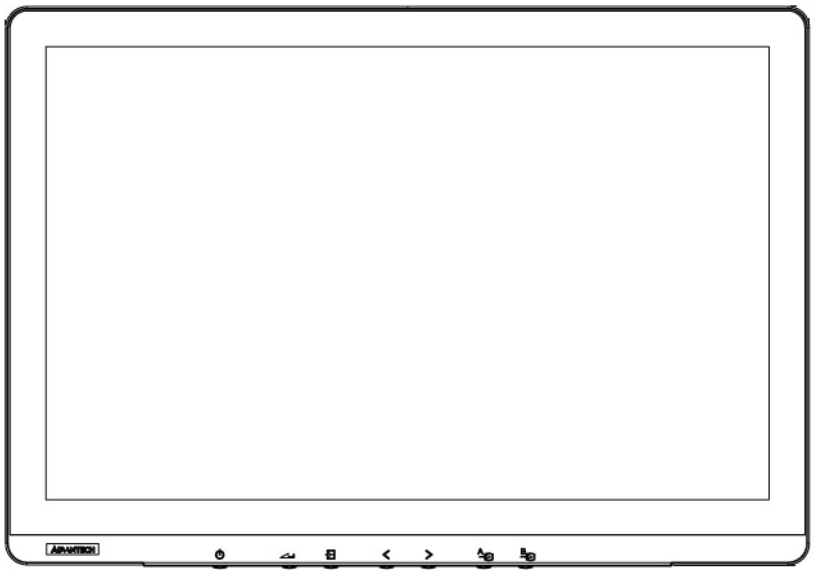
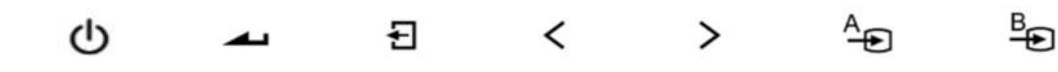
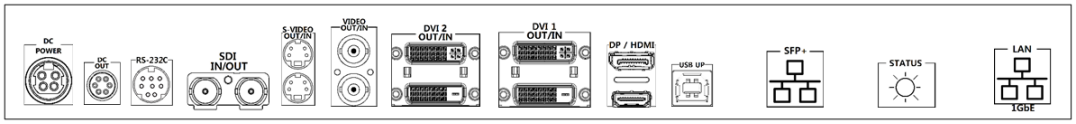


Figure 2.1 PAX-324 Monitor Front View



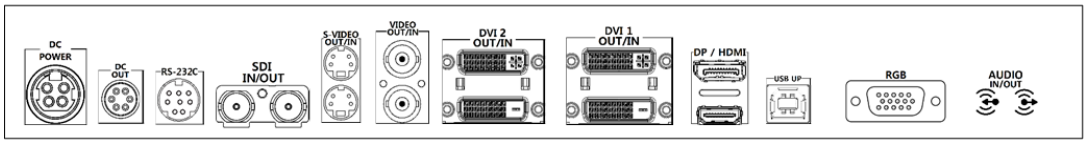
2.2.1 I/O Ports

- PAX-324-C2F-HAS, PAX-324-C2F-NAS (AVAS option)



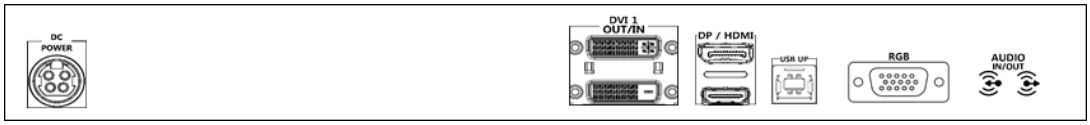
(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13)

- PAX-324-C2B-HAS, PAX-324-C2B-HAR, PAX-324-C2B-NAS, PAX-324-C2B-NAS-S, PAX-324-C2B-NAR (RGB option)
  PAX-324-C2B-NAS-SK, PAX-324-C2B-NAR-SK,
  PAX-324-C2B-HAR-SP (built in speaker, RGB Option)



(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12)

- PAX-324-C2B-NAS-SP, PAX-324-C2B-NAR-SP (built in speaker, RGB option)



(1) (2) (3) (4) (5) (6)

- PAX-324-C2A-NAR

(1) (2) (3) (4)

- PAX-324-C2A-NBS, PAX-324-C2A-NBR

(1) (2) (3) (4) (5)

2.2.2 Display

The PAX-324 features a 24-inch TFT LCD display. The screen supports the maximum resolution of 1920x1200 @ 60Hz.

2.2.3 OSD Key Functions

Key Name	Function
Power Key 	Power On/Off
Menu/Enter Key 	Select main OSD menu. Select sub menu. Apply adjustments (save). Wake up in DPMS mode.
Exit / Input Key 	Exit/Return to previous menu in main OSD menu. Can be used to activate the Input hot menu when main OSD menu is not displayed. Can be used to Lock/Unlock settings for key activation by holding the key for longer than 30 sec. when the main OSD menu is not displayed.
Left Key 	Move between options and adjust values in the main OSD menu. Can be used to activate the Backup Source MSG On/Off hot menu by holding the key for longer than 3 seconds when the main OSD menu is not displayed. Wake up in DPMS mode.
Right Key 	Move between options and adjust values in the main OSD menu. Can be used to activate the Display Mode hot menu by holding the key for longer than 3 seconds when the main OSD menu is not displayed. Wake up in DPMS mode.
Port A Key 	PIP main input selection. Only available when using the PIP function. Used to change directly to the backup source input specified in A. Used to display the selectable OSD menu for backup source input A by holding the key for more than 5 sec. It isn't available when using the pip function
Port B Key 	PIP sub input selection. Only available when using the PIP function. Used to change directly to the backup source input specified in B. Used to display the selectable OSD menu for backup source input B by holding the key for more than 5 sec. It isn't available when using the pip function

2.2.4 Input/Output Signal Ports

PAX-324-C2F-HAS, PAX-324-C2F-NAS (AVAS option)

(1) DC POWER Input: +24V Power Connector
(2) DC POWER Output: +5V/+12V Power Connector
(3) RS-232C
(4) SDI 1 Input / Output
(5) S-VIDEO Input / Output
(6) VIDEO Input / Output
(7) DVI 2 Input / Output
(8) DVI 1 Input / Output
(9) DP/HDMI Input
(10) USB UP
(11) SFP+ Option
(12) STATUS Option
(13) LAN Option

PAX-324-C2B-HAS, PAX-324-C2B-HAR, PAX-324-C2B-NAS, PAX-324-C2B-NAS-S, PAX-324-C2B-NAR (RGB option)
PAX-324-C2B-NAS-SK, PAX-324-C2B-NAR-SK,
PAX-324-C2B-HAR-SP (Built in Speaker, RGB option)

(1) DC POWER Input: +24V Power Connector
(2) DC POWER Output: +5V/+12V Power Connector
(3) RS-232C
(4) SDI 1 Input / Output
(5) S-VIDEO Input / Output
(6) VIDEO Input / Output
(7) DVI 2 Input / Output
(8) DVI 1 Input / Output
(9) DP/HDMI Input
(10) USB UP
(11) RGB Input
(12) AUDIO Input / Output

PAX-324-C2B-NAS-SP, PAX-324-C2B-NAR-SP

(Built in Speaker, RGB option)
(1) DC POWER Input: +24V Power Connector
(2) DVI 1 Input / Output
(3) DP/HDMI Input
(4) USB UP
(5) RGB Input
(6) AUDIO Input / Output

PAX-324-C2A-NAR

(1) DC POWER Input: +24V Power Connector
(2) DVI 1 Input / Output
(3) DP/HDMI Input
(4) USB UP

PAX-324-C2A-NBS, PAX-324-C2A-NBR

(1) DC POWER Input: +24V Power Connector
(2) SDI 1 Input / Output
(3) DVI 1 Output / Input
(4) DP/HDMI Input
(5) USB UP

2.2.5 Interface on AVAS Back Panel

Name	Function
SFP+	SFP+ port for SFP+ modules only.
Status LED	Status LED, will indicate the AVAS operational status: a. Blinking green: operating as normal. b. Blinking orange: warning notification. c. Continuous orange: FPGA is starting-up. d. Blinking red: error notification. e. Off: no power supplied to the AVAS.
1GbE	1GbE (RJ45) has no function yet.

Note! *If the power supply cord is unplugged from the power outlet, the AVAS will be disconnected. The power outlet socket should be located near the equipment and easily accessible.*

2.3 Viewing Angle

The PAX-324 LCD monitor can be vertically adjusted to the preferred viewing angle for maximum comfort.

Caution! *Do not force the monitor past its maximum extension in any direction as this may damage the monitor and the monitor stand.*

2.4 Positioning

Before setting up your workstation, prepare a suitable installation space. This should be a stable, flat, dust-free surface with good surrounding ventilation. Position the monitor screen away from direct sunlight. The glare caused by reflected sunlight may render the onscreen difficult to read.

Caution!

- When positioning the equipment, ensure that the main ports and sockets are easily accessible.
- Do not place the monitor close to a heat source.
- Do not place the monitor in direct sunlight or near a window. Exposed to direct sunlight or moisture can damage the monitor.

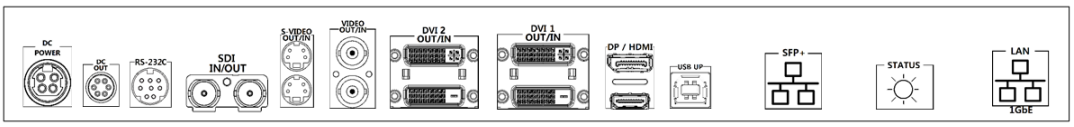
2.5 Connecting AC/DC Power

- Plug the female end of the AC/DC power adapter into the DC power connector.
- Plug the female end of the power cord into the AC power connector on the adapter.
- Plug the male end of the power cord into a power outlet socket.
- The power cable plug may differ according to the standards of each country.

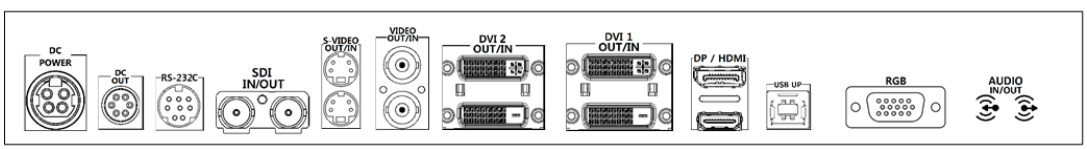
2.6 Connecting Video

- Before connecting the monitor to a PC or other device, ensure all equipment is powered off.
- Connect one end of an HDMI 2.0 cable to the monitor's HDMI port and the other end to the HDMI port of the PC or other device. A DP 1.2 cable can be connected to the monitor's DP port and to the DP port of the PC or other device if equipped with a DP input port.
- Ensure that the cable is securely connected to both the monitor and the PC/ other device. Tighten the connector screws to ensure a secure connection.
- The signal input source can be selected via the OSD menu. Refer to Section 3.1.9 for further details.

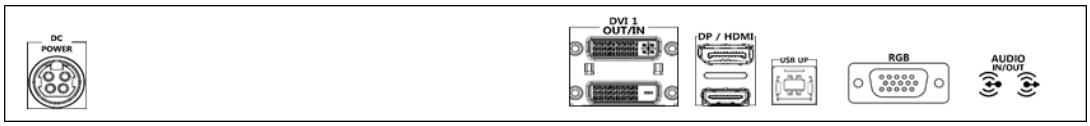
- PAX-324-C2F-HAS, PAX-324-C2F-NAS (AVAS option)



- PAX-324-C2B-HAS, PAX-324-C2B-HAR, PAX-324-C2B-NAS, PAX-324-C2B-NAS-S, PAX-324-C2B-NAR (RGB option)
  PAX-324-C2B-NAS-SK, PAX-324-C2B-NAR-SK,
  PAX-324-C2B-HAR-SP (Built in Speaker, RGB Option)



- PAX-324-C2B-NAS-SP, PAX-324-C2B-NAR-SP (Built in Speaker, RGB option)



- PAX-324-C2A-NAR

- PAX-324-C2A-NBS, PAX-324-C2A-NBR

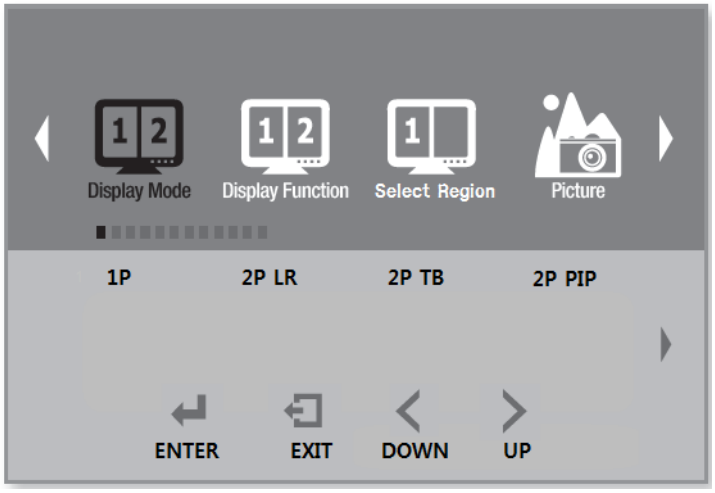
Chapter 3

OSD Menu

3.1 OSD Menu Controls

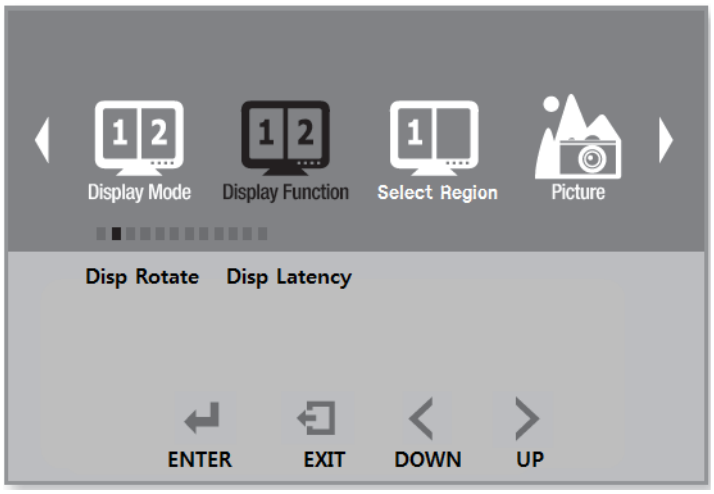
This chapter refers to the On Screen Display (OSD) controls. Using the OSD controls the user can adjust contrast, brightness, display clarity, color temperature etc. Please read this chapter carefully to get the most out of this monitor.

3.1.1 Display Mode



Menu	Description	Default	Remarks
Display Mode	Used to select one of the various display modes.	1P	

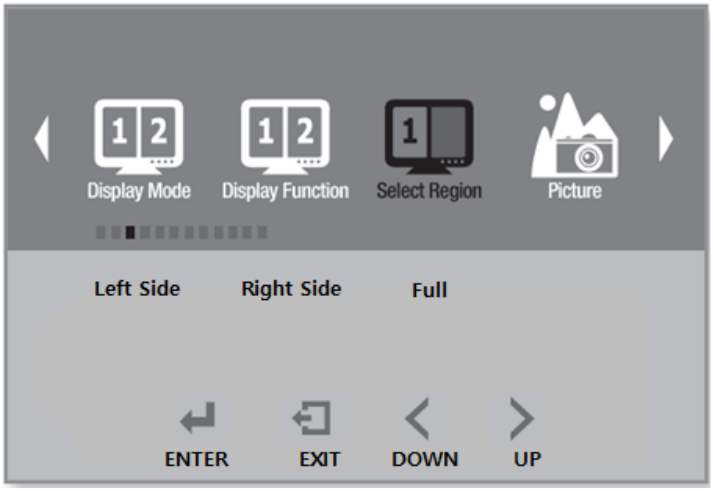
3.1.2 Display Function



Menu	Description	Default	Remarks
Disp Rotate	Used to rotate the screen.	0°	Apply in 1P mode
Disp Latency	Not applicable.		
LR Ratio	Used to adjust the ratio for the left and right displays.		Apply in 2P LR mode
Input Swap	Used to swap input sources for the left and right displays.		

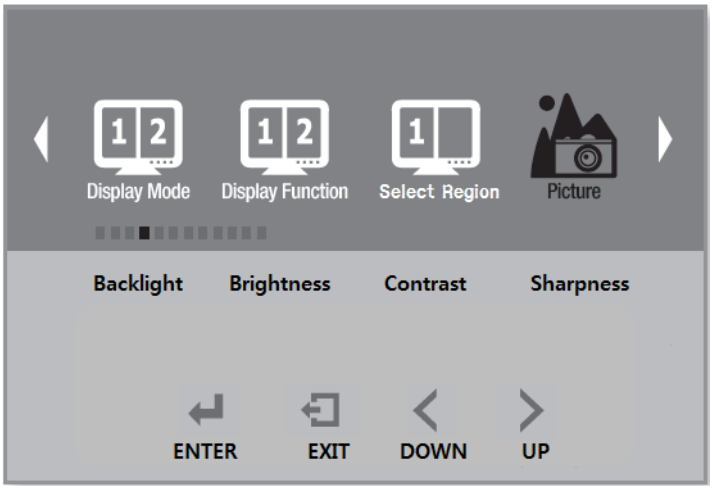
Input Swap	Used to swap input sources for the top and bottom displays.		Apply in 2P TB mode
PIP Position	Used to select one of the various positions on the sub-screen.	Bottom right	Apply in 2P PIP mode
PIP Transparency	Used to adjust the transparency of the sub-screen.	0	
PIP Size	Used to adjust the size of the subscreen.	10	
Input Swap	Used to swap input sources for main and sub-display.		

3.1.3 Select Region



Menu	Description	Default	Remarks
Left Side Right Side Full	Select one region to control: Left side, Right side or Full.	Left side	Apply in 2P LR mode
Top Side Bottom Side Full	Select one region to control: Top Side, Bottom Side or Full.	Top Side	Apply in 2P TB mode
Main Sub Full	Select one region to control: Main, Sub or Full.	Main	Apply in 2P PIP mode
1P 2P 3P 4P Full	Select one region to control :1P, 2P, 3P, 4P or 4P Full.	1P In	Apply in 4P mode

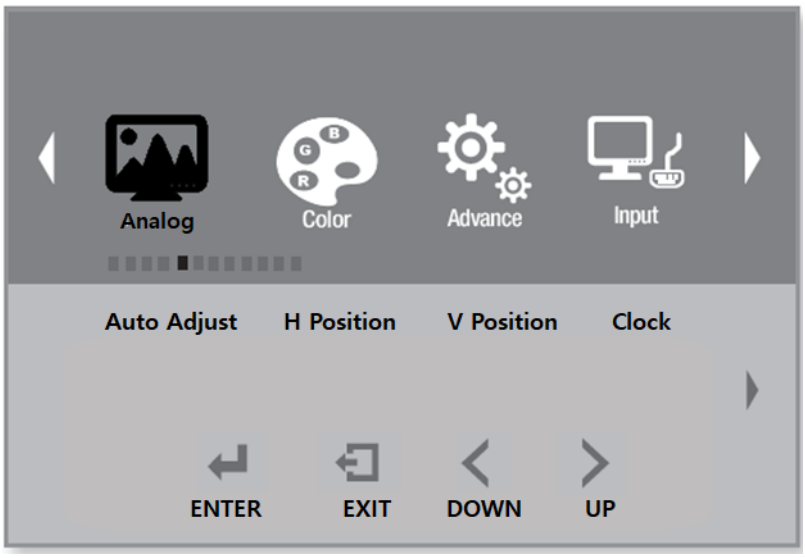
3.1.4 Picture



Menu	Description	Default	Remarks
Backlight	Used to adjust the backlight luminance.		
Brightness	Used to adjust the screen brightness. Press the < or > button to adjust.	50	Independent of each input
Contrast	Used to adjust the screen contrast. Press the < or > button to adjust.	50	Independent of each input
Sharpness	Used to adjust the screen sharpness. Press the < or > button to adjust.	5	Independent of each input

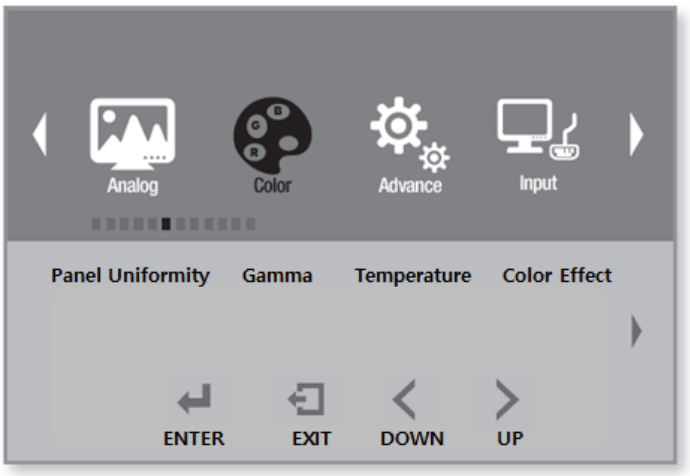
Note! *For the PAX-324-C2B-HAR-SP model, you can only adjust the sub-menu by pressing the menu key on the 'Picture' icon for at least three seconds.*

3.1.5 Analog (Option)



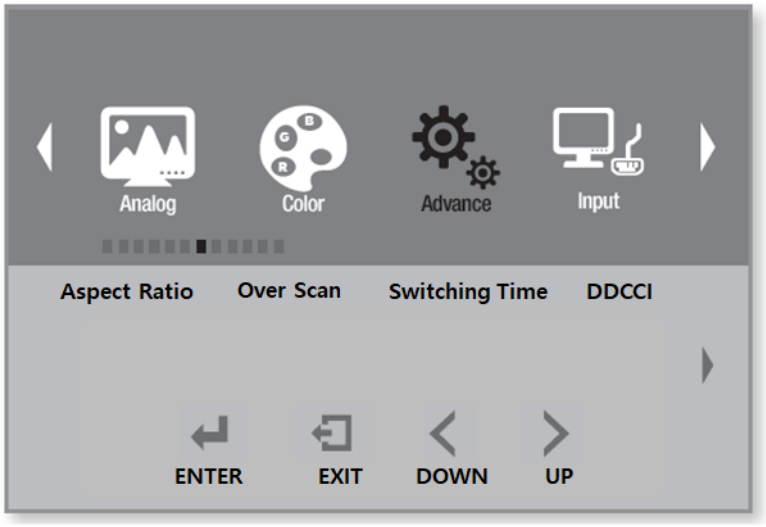
Menu	Description	Default	Remarks
Auto Adjust	Automatically adjust the Horizontal position, Vertical position, Horizontal size, and Phase Window's background or characters should be displayed on your Full screen prior to proceed this function		
H Position	Used to adjust the horizontal position of the screen.	50	
V Position	Used to adjust the vertical position of the screen.	50	
Clock	Used to adjust the screen resolution frequency.		
Phase	Used to adjust the focus of the screen.		

3.1.6 Color



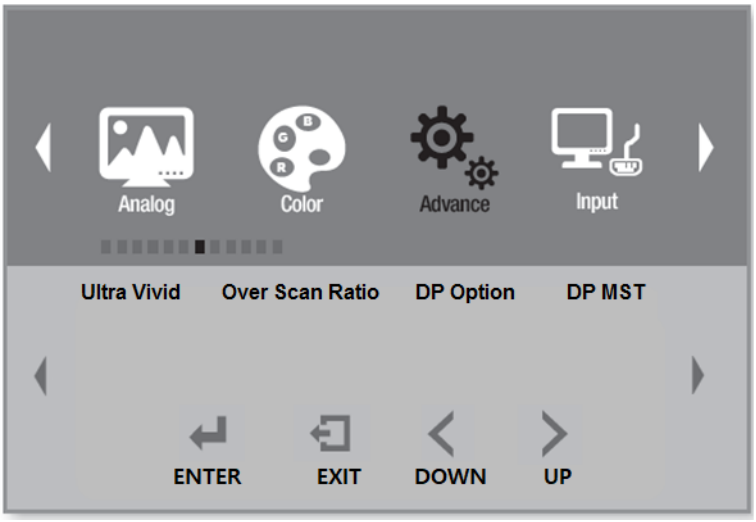
Menu	Description	Default	Remarks
Panel Uniformity	Not applicable.		
Gamma	Used to select one of the various gammas.	2.2	Independent of each input
Temperature	Used to select one of the various color temperatures. * Set Gamma to OFF to adjust the red, green, and blue values in the user mode.	Clear	Independent of each input
Color Effect	Used to select one of the various color effects.	Standard	Independent of each input
Profiles	Used to select one of the various profiles. Select the profile and select the Apply icon to load predefined parameters such as Backlight, Input, Brightness, Contrast, Sharpness, Saturation, Hue, Gamma, Temperature, etc. Users can edit each parameter by selecting the Edit icon, and select the Apply icon to load the edited parameter.	OFF	Apply in 1P mode
Color Format	Used to view the color format of the current input. [RGB, YUV]		
PCM	Not applicable.		
Hue	Used to adjust the screen color hue.	50	Independent of each input
Saturation	Used to adjust the screen color saturation.	50	Independent of each input

3.1.7 Advance



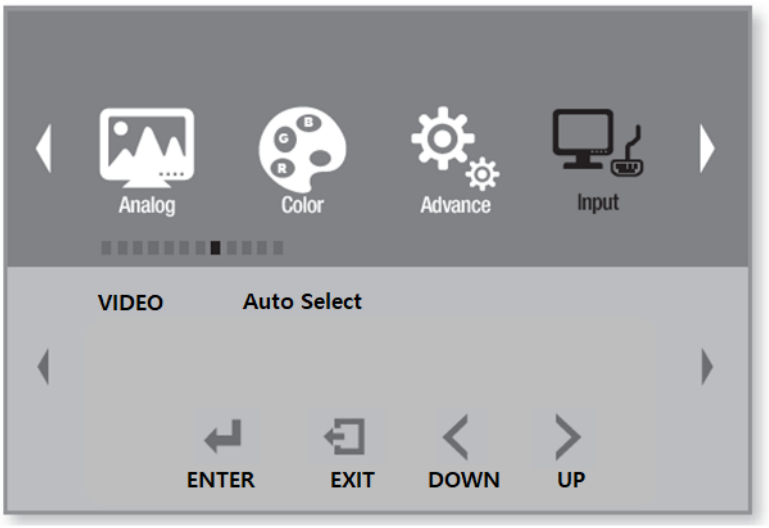
Menu	Description	Default	Remarks
Aspect Ratio	Used to select one of the various screen aspect ratios.	Full	RGB (Option) DP HDMI DVI 1 DVI 2 (Option) SDI 1 (Option) AVAS (Option)
		Auto Mode	VIDEO (Option) S-VIDEO (Option)
Over Scan	Used to activate/deactivate the over scan function. [ON,OFF]	OFF	RGB (Option) DP HDMI DVI 1 DVI 2 (Option) SDI 1 (Option) AVAS (Option)
		ON	VIDEO (Option) S-VIDEO (Option)
Switching Time	Used to set the screen switching time.	2	
Over Drive	Not applicable.		
DDCCI	Used to activate/deactivate the DDCCI function. [ON,OFF]	ON	Display Data Channel Command Interface

3.1.8 Advance



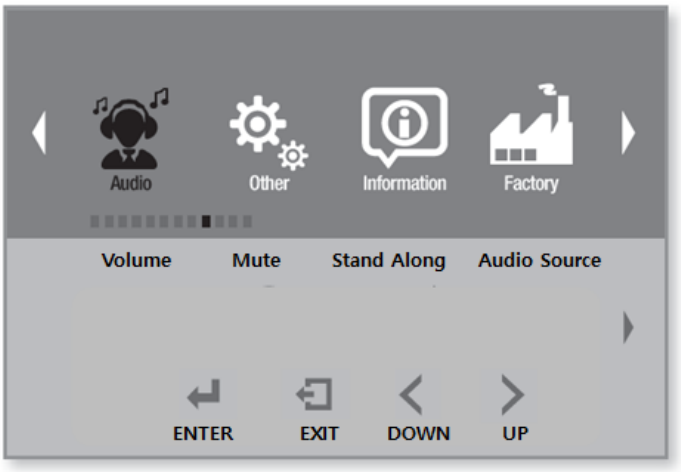
Menu	Description	Default	Remarks
Ultra Vivid	Used to configure the ultra vivid screen. [OFF, L, M, H]	OFF	
Over Scan Ratio	Used to adjust screen over-scan ratio. * After adjusting the over-scan ratio, set the Over Scan menu from Off to On.	10	RGB (Option) DP HDMI DVI 1 DVI 2 (Option) SDI 1 (Option) AVAS (Option)
		25	VIDEO (Option) S-VIDEO (Option)
DP Option	Used to select a DP Version. [D0, D1, D6]	D0	
DP MST	Not applicable		
DP EDID	Not applicable		
Clone mode	Not applicable		
Free Sync	Not applicable		
Freeze	Used to activate/deactivate the screen freeze function. [ON,OFF]	OFF	

3.1.9 Input



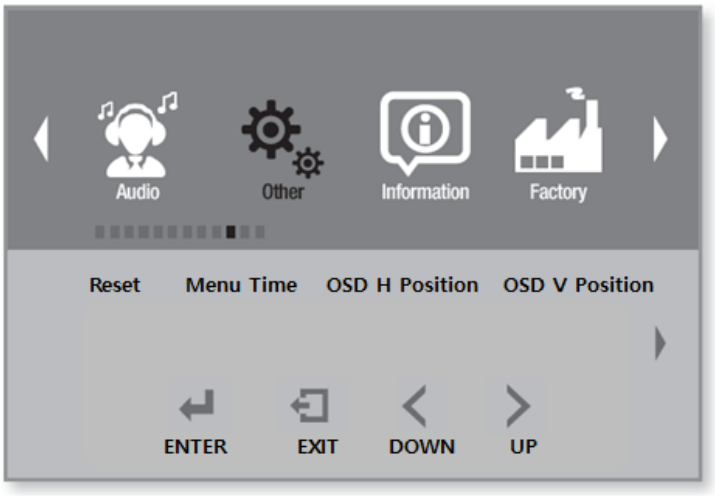
Menu	Description	Default	Remarks
RGB (Option), DP, HDMI, DVI 1, DVI 2(Option), SDI 1(Option), AVAS (Option), S-VIDEO (Option), VIDEO (Option), Auto Select	Used to select the monitor's display input sources.	Auto Select	Apply in 1P mode
Left Side	Used to select the input sources for the left and right screens. * See Section 3.1.14 for selectable inputs.		Apply in 2P LR mode
Right Side			
Top Side	Used to select the input sources for the top and bottom screens. * See Section 3.1.14 for selectable inputs.		Apply in 2P TB mode
Bottom Side			
Main	Used to select the input sources for the main and sub screens. *See Section 3.1.14 for selectable inputs.		Apply in 2P PIP mode
Sub			
1P In	Used to select the input sources for 1P, 2P, 3P, and 4P screens. * See Section 3.1.14 for selectable inputs.		Apply in 4P mode
2P In			
3P In			
4P In			

3.1.10 Audio (Option)



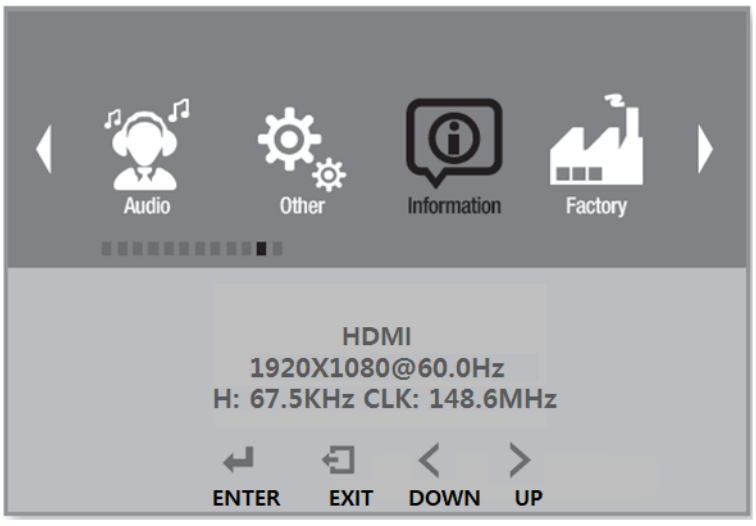
Menu	Description	Default	Remarks
Volume	Used to adjust the speaker volume on the monitor.	50	
Mute	Used to activate/deactivate the mute function. [ON, OFF]	OFF	
Stand Alone	Don't Switch Audio Source if Line In is Currently Playing unless a Digital Source is found. (Optional - ready for future use)	OFF	
Audio Source	Used to select the audio source. [Analog, Digital region1]	Analog	

3.1.11 Other



Menu	Description	Default	Remarks
Reset	Used to activate/deactivate the monitor reset function. [YES, NO]	NO	
Menu Time	Used to set the duration of the OSD menu display.	20	
OSD H Position	Used to adjust the horizontal position of the OSD menu.	50	
OSD V Position	Used to adjust the vertical position of the OSD menu.	50	
Language	Used to select OSD language.	English	

3.1.12 Information



Menu	Description	Default	Remarks
Information	Used to access the monitor information.		

3.1.13 OSD Input Source

RGB (optional) DP HDMI DVI 1 DVI 2 (optional) SDI 1 (optional) AVAS (optional) S-VIDEO (optional) VIDEO (optional) Auto Select	Used to select the Input source. * Auto Select cannot be selected in Multi-Display Mode.

3.1.14 PIP Table

Sub Source \ Main Source	RGB (optional)	DP	HDMI	DVI 1	DVI 2 (optional)	SDI 1 (optional)	AVAS (optional)	S-Video (optional)	Video (optional)
RGB (optional)	O	O	O	O	O	O	O	O	O
DP	O	O	O	O	O	O	O	O	O
HDMI	O	O	O	O	O	O	O	O	O
DVI 1	O	O	O	O	O	O	O	O	O
DVI 2 (optional)	O	O	O	O	O	O	O	O	O
SDI 1 (optional)	O	O	O	O	O	X	O	X	X
AVAS (optional)	O	O	O	O	O	O	O	O	O
S-Video (optional)	O	O	O	O	O	X	O	X	X
Video (optional)	O	O	O	O	O	X	O	X	X

Appendix A

Cleaning

A.1 Cleaning the LCD Panel

- When the liquid crystal panel becomes dusty or dirty, wipe gently with a soft cloth.
- Do not rub the LCD panel with cloth of a hard or coarse material.
- Do not apply pressure to the LCD surface.
- Do not use an OA cleaner for cleaning as it may damage or discolor the LCD surface.

A.2 Cleaning the Cabinet

- Firstly, unplug the power supply.
- Gently wipe the cabinet with a soft cloth.
- Dampen a cloth with water and neutral detergent and wipe the cabinet.
- Dry the cabinet using a soft cloth.

Note! *Many plastics are used on the surface of the cabinet. Do not clean with benzene, thinner, alkaline detergent, alcohol-based system detergent, glass cleaner, wax, polish cleaner, soap powder, or insecticide. Do not place rubber or vinyl against the cabinet for long periods. These types of fluids and materials can cause the paint to deteriorate, crack, or peel.*

Appendix B

Troubleshooting

B.1 Non-Responsive Power Button

- Unplug the power cord from the AC outlet to power off and reset the monitor.

B.2 No Picture

- Check that the signal cable is securely connected to the monitor and to the display source device.
- Check that the monitor and the display source device are powered on.
- Check that the monitor and display source device are configured to the correct display mode.
- Check that the monitor is compatible with the display card and the settings are all configured correctly.
- Check that the signal cable connector pins are not bent or pushed in.
- Check that the monitor's signal input settings are correctly configured.

B.3 No Video

- If no video is displayed on screen, turn the monitor power off and on again.
- Ensure that the monitor and display source device are not in power-saving mode.

B.4 Image Persistence

- Image persistence refers to when a residual or "ghost" image of a previous image remains visible on screen. Unlike CRT monitors, with LCD monitors image persistence is not permanent. However, displaying constant images for long periods of time should be avoided.
- To alleviate image persistence, power off the monitor for the same length of time as the image was displayed. For example, if an image was displayed on the monitor for one hour and a residual image remains, the monitor should be powered off for one hour to erase the image.

Note! *As with all personal display devices, Advantech recommends using a moving screen saver whenever the screen is idle and turning off the monitor when not in use.*

B.5 Unstable, or Unfocused Image

- Check that the signal cable is securely connected to the monitor and to the display source device.
- Check that the monitor is compatible with the display card and the settings are all configured correctly.
- If text is presented on screen in a garbled manner, change the display mode and set the refresh rate to 60Hz.

B.6 Incorrect Display Image Size

- Check that the monitor and display source device are configured to the correct display mode (refer to the display card or monitor user manual when changing graphics mode).

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