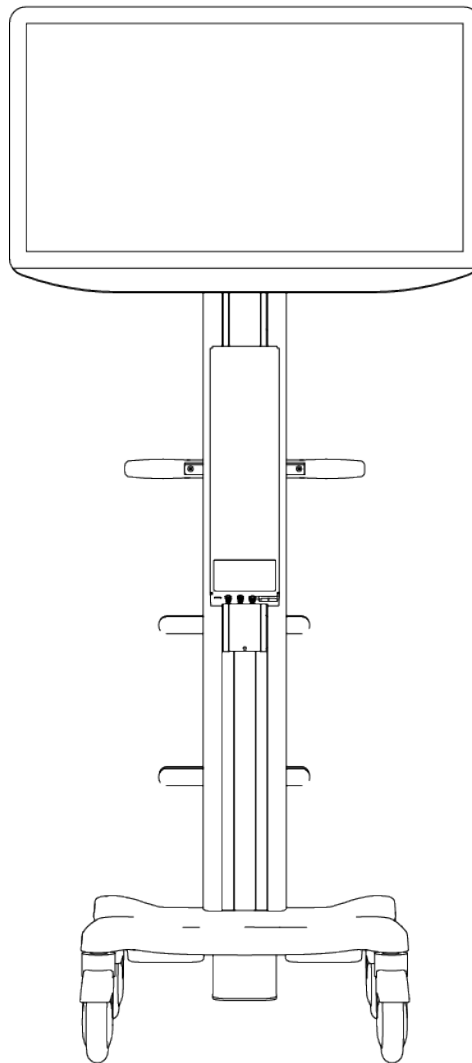


# Auxiliary Cart - 3D Monitor Cart 31"

## User Manual

MAN-0675 Revision B



# User Manual

Synaptive™ Auxiliary Cart - 3D Monitor Cart 31"

SYN-0794



MAN-0675 – Revision B issued on May 28, 2021.

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These instructions for use are also available in electronic form at [www.synaptivemedical.com/eIFU](http://www.synaptivemedical.com/eIFU). The electronic instructions for use may be viewed on any device that can access the internet and display PDF files. Access to the electronic instructions for use requires a password; to obtain the password, contact Synaptive Customer Service.

Auxiliary Cart - 3D Monitor Cart 31" fulfills all the relevant provisions in Regulation (EU) 2017/745 of the European Parliament and of the Council. Based on this regulation, the CE mark is hereby affixed:



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## 1.0 Product and Safety Symbols

**Table 1 ISO 7000 - Graphical symbols for use on equipment - Registered symbols and ISO 15223-1 - Medical devices - Symbols to be used with medical device labels, labeling and information to be supplied**











Symbol	Title	Reference	Description
	Caution	ISO 7000-0434A	To indicate that caution is necessary when operating the device or control close to where the symbol is placed, or to indicate that the current situation needs operator awareness or operator action in order to avoid undesirable consequences.
	Manufacturer	ISO 7000-3082	To identify the manufacturer of a product.
	Operator's manual	ISO 7000-1641	To identify the location where the operator's manual is stored or to identify information that relates to the operating instructions. To indicate that the operating instructions should be considered when operating the device or control close to where the symbol is placed.
	Catalog number	ISO 7000-2493	To identify the manufacturer's catalog number, for example on a medical device or the corresponding packaging.
	Serial number	ISO 7000-2498	To identify the manufacturer's serial number, for example on a medical device or its packaging.
	Mass; weight	ISO 7000-1321B	To indicate mass. To identify a function related to mass.
	Fragile; handle with care	ISO 7000-0621	To indicate that the contents of the transport package are fragile and the package shall be handled with care.
	Keep away from rain	ISO 7000-0626	To indicate that the transport package shall be kept away from rain and in dry conditions.
	Humidity limitation	ISO 7000-2620	To indicate the acceptable upper and lower limits of relative humidity for transport and storage.
	Temperature limit	ISO 7000-0632	To indicate the maximum and minimum temperature limits at which the item shall be stored, transported or used.

Table 2 ISO 7010 - Graphical symbols - Safety colors and safety signs - Registered safety signs




Symbol	Title	Reference	Description
	General warning sign	ISO 7010-W001	To signify a general warning.
	Refer to instruction manual/booklet	ISO 7010-M002	To signify that the instruction manual/booklet must be read.
	No pushing	ISO 7010-P017	To prohibit pushing against an object.

Table 3 IEC 60417 — Graphical Symbols for Use on Equipment





Symbol	Title	Reference	Description
	Alternating current	IEC 60417-5032	To indicate on the rating plate that the equipment is suitable for alternating current only; to identify relevant terminals.
	Equipotentiality	IEC 60417-5021	To identify the terminals which, when connected together, bring the various parts of a system to the same potential, not necessarily being the earth (ground) potential (for example, for local bonding).
	Video input	IEC 60417-5525B	To identify video equipment input controls and connecting terminals.
	Video output	IEC 60417-5529B	To identify video equipment output controls and connecting terminals.

Table 4 Product Safety Certification Marks







Symbol	Title	Reference	Description
	CE mark	N/A	Conformity with the essential requirements set out in the European Directives.
	European Community Representative	N/A	Appears next to the European Community representative's name and address.
	cTUVus Certification Mark	N/A	Certified as meeting North American safety standards by TUV.

Table 5 Other Symbols

Symbol	Description
	U.S. Federal law restricts this device to sale by or on the order of a licensed healthcare provider.
	Medical Device
	To indicate that the device may not be disposed of in landfill but must be recycled according to the European Waste Electrical and Electronic Equipment (WEEE) directive.

## 2.0 Warnings and Precautions



### **WARNING: Risk of Operator Injury and Damage to Equipment**

The Auxiliary Cart - 3D Monitor Cart 31" system may be installed, maintained, repaired, and serviced only by qualified Synaptive Medical service representatives. There are no user-serviceable parts in the Auxiliary Cart - 3D Monitor Cart 31" system.

No modification of the Auxiliary Cart - 3D Monitor Cart 31" system is allowed.

The Auxiliary Cart - 3D Monitor Cart 31" contains non-permanent fasteners that may become loose over time, potentially causing mounted components to become loose and fall. Inspect the Auxiliary Cart before each use to ensure that there are no loose components. If any loose components are discovered, do not use the cart and report the problem to Synaptive Customer Service.

Use of the Auxiliary Cart adjacent to or stacked with other equipment should be avoided because it could result in improper operation. If such use is necessary, observe the Auxiliary Cart and the other equipment to verify that they are operating normally.

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

Unplugging the power cord is the means to isolate the cart from the supply mains. Do not position the cart such that it is difficult to unplug.

Use only the approved power cord supplied with the Auxiliary Cart - 3D Monitor Cart 31". The use of non-approved power cords can result in damage to the Auxiliary Cart - 3D Monitor Cart 31" system. The use of other accessories, transducers, and cables may result in increased electromagnetic emissions or decreased immunity of this equipment and may result in improper operation. If a cable becomes damaged, contact Synaptive customer service for assistance.

The cables connecting the Auxiliary Cart carts to each other and other equipment are a potential tripping hazard. When positioning the carts for a procedure, always ensure that there is sufficient cable length to allow the cables to reach the floor. Use caution when walking around the carts to avoid tripping over cables.



**WARNING: Risk of Operator Injury and Damage to Equipment**

Before moving a cart, always ensure that all cart casters are unlocked. Push the carts using the cart handles only. Never push on surfaces marked with the Do Not Push symbol. Applying excessive force to the cart or its components may present a tipping hazard.

Use caution when moving the Auxiliary Cart - 3D Monitor Cart 31" to prevent collisions with people or stationary objects such as equipment, doorways, or walls.

Do not roll the Auxiliary Cart - 3D Monitor Cart 31" over cabling. Doing so may damage the cables and cause the Auxiliary Cart to become unusable. If a cart rolls over cabling, inspect the cable for damage. If a cart rolls over any object, inspect the castors for damage.

Always use caution when adjusting the height of the cart using the lifting column. If the internal gas spring fails, the monitor will immediately drop to its lowest height, potentially causing injury or damage to nearby equipment.

The Auxiliary Cart - 3D Monitor Cart 31" contains a pressurized gas cylinder, which, although extremely unlikely, may suddenly rapidly decompress, potentially causing damage to equipment and injury to persons standing nearby.

After prolonged use, the monitor may overheat, becoming hot enough to burn a person who touches it. Overheating may also damage the monitor. To minimize the risk of overheating, always turn the monitor off when it is not in use.

---



**WARNING: Risk of Patient Injury Due to Incorrect Video Display**

The pre-defined Synaptive picture settings have been optimized for tissue differentiation in a surgical setting. Using other settings may result in poor tissue differentiation, potentially leading to suboptimal treatment.

Always ensure that the monitor is set to the correct mode (2D or 3D) for circumstances of the procedure. The monitor displays colors differently in 2D and 3D mode, which may result in poor tissue differentiation if not used correctly.

Due to the nature of LCD displays, image display characteristics (such as brightness, contrast, and the appearance of colors) may change over time. Turn the monitor off when it is not in use to prevent unnecessary wear. If the image display is inadequate when using the default Synaptive picture settings, contact Synaptive Customer Service.

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**WARNING: Risk of Electric Shock**

Use caution when handling the Auxiliary Cart - 3D Monitor Cart 31". If it develops a buildup of electric charge, anyone who touches the Auxiliary Cart may experience a mild shock.

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**WARNING: Risk of Patient Injury Due to Contamination of the Sterile Field**

Always follow the manufacturer's instructions for use when assembling and wearing the 3D eye shields. Assembling or wearing the 3D eye shields incorrectly may cause them become loose or fall during the procedure, potentially contaminating the sterile field.

---





**WARNING: Risk of Procedure Delay Due to Loss of Display**

Always verify that the cables connecting the monitor cart to other Synaptive equipment are securely connected. Applying excessive force to the cables may cause them to become disconnected, leading to a loss of system operation.

The displayed image quality is adversely affected if the monitor is subjected to an electrostatic discharge (such as by coming into contact with persons or equipment that have a buildup of electrostatic energy). This effect is temporary but may last up to several minutes.

After prolonged use, the monitor may overheat and shut down. To minimize the risk of overheating, always turn the monitor off when it is not in use.

---



**WARNING: Risk of Damage to Equipment**

Always verify that the cables connecting the Auxiliary Cart- 3D Monitor Cart 31" to other Synaptive equipment are securely connected. Applying excessive force to the cables may cause them to become disconnected, potentially damaging the system.

When setting up equipment, avoid bending the cables excessively. Extreme bends may damage the cables and lead to loss of function.

Always hold the monitor securely before pressing the height adjustment pedal. The monitor will rise when the pedal is pressed. Uncontrolled movement of the monitor may cause damage to the Auxiliary Cart or other nearby equipment.

Use only the cleaning agents described in this manual to clean the Auxiliary Cart - 3D Monitor Cart 31". Using other cleaning agents may damage the Auxiliary Cart.

---

## 3.0 Incident Reporting

Immediately report any serious incident that has occurred in relation to the use of this device to Synaptive Medical and, for EU customers, the competent authority of your Member State.

## 4.0 Intended Use Environment

The Auxiliary Cart - 3D Monitor Cart 31" is intended for use in hospitals, clinics, and other medical institutions.

## 5.0 Device Lifetime

The Auxiliary Cart - 3D Monitor Cart 31" has an expected lifespan of seven years. This lifespan assumes that regular maintenance and service is performed by qualified Synaptive Medical authorized service providers.

## 6.0 Synaptive Customer Service Information

For 24-hour access to clinical and technical support, contact Synaptive customer service.

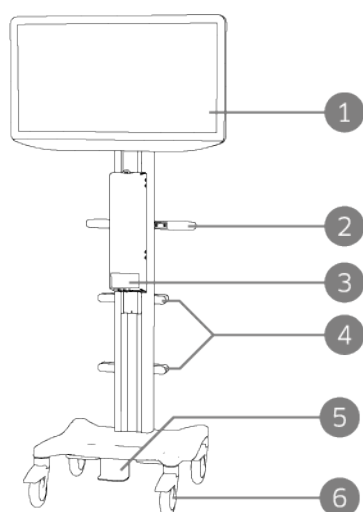
Phone: 1-844-462-7246 (North America)

1-647-925-3435 (International)

Email: [service@synaptivemedical.com](mailto:service@synaptivemedical.com)

## 7.0 About the Auxiliary Cart - 3D Monitor Cart 31"

The Auxiliary Cart - 3D Monitor Cart 31" provides an additional video display for Synaptive systems like BrightMatter Guide and Modus V.



- 1 31" 3D Monitor
- 2 Cart handle
- 3 I/O box
- 4 Cable cleats
- 5 Lifting column foot pedal
- 6 Locking casters

A monitor cover is provided with the Auxiliary Cart - 3D Monitor Cart 31" to protect the monitor during transportation and storage. Remove the monitor cover before using the Cart during a procedure and store it outside the sterile field.

Users of the Auxiliary Cart - 3D Monitor Cart 31" are surgeons and surgical staff members such as OR nurses.

Figure 1 Monitor Cart 31" components

### 7.1 3D Eye Shields



#### **WARNING: Risk of Patient Injury Due to Contamination of the Sterile Field**

Always follow the manufacturer's instructions for use when assembling and wearing the 3D eye shields. Assembling or wearing the 3D eye shields incorrectly may cause them become loose or fall during the procedure, potentially contaminating the sterile field.

Stereoscopic visualization requires the use of a 3D eye shield composed of a frame and a disposable 3D lens.

Tips for wearing the 3D eye shield:

- Always verify that the lenses are securely attached to the frames. For information about attaching the lenses, consult their accompanying documentation.
- Wear the frames underneath your protective headwear.
- Secure the frames over the bridge of your nose.



Figure 2 3D eye shield showing lens assembled to frame

For more information about the eye shields, consult their accompanying documentation.

## 8.0 Using the Lifting Column



### **WARNING: Risk of Operator Injury and Damage to Equipment**

Always use caution when adjusting the height of the cart using the lifting column. If the internal gas spring fails, the monitor will immediately drop to its lowest height, potentially causing injury or damage to nearby equipment.



### **WARNING: Risk of Damage to Equipment**

Always hold the monitor securely before pressing the height adjustment pedal. The monitor will rise when the pedal is pressed. Uncontrolled movement of the monitor may cause damage to the Auxiliary Cart or other nearby equipment.

The Monitor Cart has a lifting column for adjusting the height of the monitor.

To adjust the height of the monitor:

1. Press down on the foot pedal at the base of the column.
2. While holding down the foot pedal, push on the bottom or top of the monitor to raise or lower the monitor height.
3. Release the foot pedal to lock the monitor at the desired height.

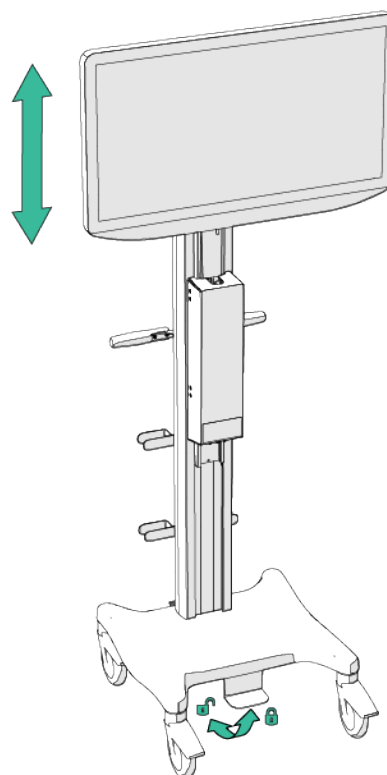


Figure 3 Using the lifting column

## 9.0 Cart Connections

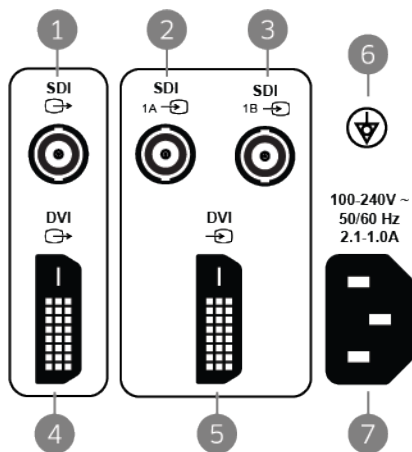


### **WARNING: Risk of Damage to Equipment**

Always verify that the cables connecting the Auxiliary Cart- 3D Monitor Cart 31" to other Synaptive equipment are securely connected. Applying excessive force to the cables may cause them to become disconnected, potentially damaging the system.

When setting up equipment, avoid bending the cables excessively. Extreme bends may damage the cables and lead to loss of function.

The Auxiliary Cart - 3D Monitor Cart 31" has an input/output box for connecting the carts to each other or to other Synaptive systems.



- 1 SDI out. Use this connector to send the SDI signal coming in to the cart to another monitor.
- 2 SDI 1A in. Connect the Modus V SDI 1A out to this connector
- 3 SDI 1B in. Connect the Modus V SDI 1B out to this connector.
- 4 DVI out. Use this connector to send the DVI signal coming in to the cart to another monitor.
- 5 DVI in. Connect the source of the DVI signal (for example, Modus V, or the BrightMatter Guide operator cart) to this connector.
- 6 Equipotential grounding pin (potential equilization point).
- 7 Power. Use the supplied power cable to connect the cart to a power outlet.

Figure 4 Input/output box connections

**NOTE:** If you want to use a video out connector, you must use the same video type as the signal coming in. For example, if you have an SDI signal coming in, you must use the SDI out connector.

## 10.0 Using the Monitor

### 10.1 Monitor Controls

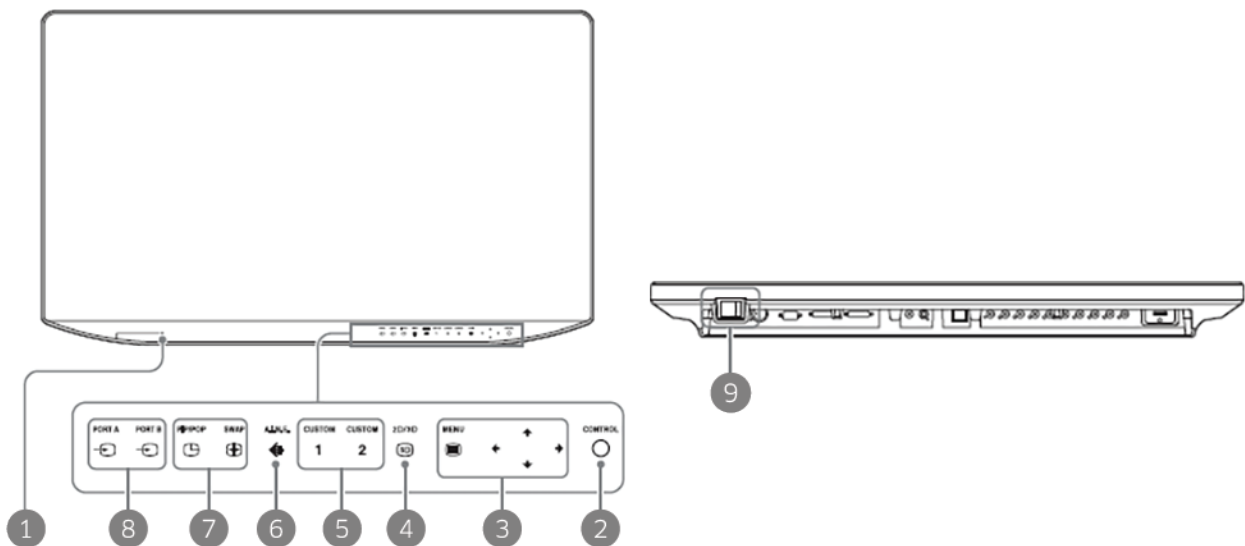


Figure 5 Monitor controls

- 1 Power indicator. This light is green when the power is on. The monitor has a safety function that reduces the display brightness if the monitor becomes too hot. This light flashes amber when the display brightness is reduced.
- 2 CONTROL button. Press to activate the other controls on the monitor and to select certain menu items.
- 3 MENU and arrow buttons. Press the MENU button to show or hide the on-screen menu. Press the arrow buttons to navigate through the menu items.
- 4 2D/3D select button. Press to switch between 2D and 3D displays.
- 5 CUSTOM buttons. Press to access the functions associated with the buttons. By default, the CUSTOM buttons are mapped to the following functions:
  - CUSTOM 1: Brightness
  - CUSTOM 2: Contrast
- 6 A.I.M.E. button. This function is not supported.
- 7 Multi-screen display setting buttons. Press the PIP/POP button to toggle between multi-screen (picture in picture and picture out of picture) modes. Press the SWAP button to swap the primary and secondary displays when in a multi-screen mode. For more information, see 10.5 Displaying Multiple Inputs on page 14.
- 8 Input selection buttons. Press once to display the input associated with the button on the monitor. Press again to specify the input associated with the button.
- 9 Power switch.

## 10.2 Picture Settings



### **WARNING: Risk of Patient Injury Due to Incorrect Video Display**

The pre-defined Synaptive picture settings have been optimized for tissue differentiation in a surgical setting. Using other settings may result in poor tissue differentiation, potentially leading to suboptimal treatment.

Due to the nature of LCD displays, image display characteristics (such as brightness, contrast, and the appearance of colors) may change over time. Turn the monitor off when it is not in use to prevent unnecessary wear. If the image display is inadequate when using the default Synaptive picture settings, contact Synaptive Customer Service.

The monitor is shipped with the optimal picture settings already configured, but users may change them. If necessary, you can restore the optimal picture settings.

1. Press the **MENU** button then press the down arrow button to move to the **Preset** option then press the right arrow button to select it.
2. If the **Load User Setting** tab is not already selected, use the left or right arrow button to move to that tab.
3. Press the down arrow button to move to the **SYNAPTIVE** option then press the right arrow button to select it.
4. Press the right arrow button to move to the **Yes** option then press the **CONTROL** button to load the Synaptive default settings.

## 10.3 Using the 3D Monitor Without 3D Eye Shields

By default, when the monitor is in 3D mode a color temperature correction is automatically applied to compensate for a user wearing 3D eye shields. If the monitor is in 3D mode (that is, if one or more SDI

video inputs is connected to the monitor) but the user is **not** wearing 3D eye shields, this color correction should be removed.

1. Press the **CONTROL** button on the monitor to access the other monitor buttons.
2. Press the **MENU** button and use the down arrow to navigate to the **System Configuration** item, then press the right arrow button to access the system configuration options.
3. Navigate to the **Panel Display > 3D Color Temp Offset** option and set it to **Off**.

Set the **3D Color Temp Offset** value back to **Auto** for 3D visualization.

## 10.4 Assigning Inputs to the PORT Buttons

If you have two video inputs connected to the monitor, assign the inputs to the PORT A and PORT B buttons to switch between displaying the two inputs, or to view both inputs simultaneously (see 10.5 Displaying Multiple Inputs below).

**NOTE:** If only one video input is connected to the monitor, the monitor automatically displays that input. It is not necessary to assign that input to a PORT button.

To assign the inputs to the PORT buttons:

1. Press the **CONTROL** button on the monitor to access the other monitor buttons.
2. Press the **PORT A** button. (If the monitor is currently displaying PORT B, press the **PORT A** button twice to access the menu).
3. Use the arrow buttons to select either **SDI 2** or **DVI-D** as the primary display.
4. Wait for the screen to refresh (it will flash once) then press the **PORT A** button again to accept the selection and close the menu.
5. Repeat the steps above to set PORT B to the input for the secondary display.

To display the input associated with a PORT button, press that button.

## 10.5 Displaying Multiple Inputs

If you have more than one video source coming in to the monitor, you can display two inputs at once using the picture in picture (PIP) or picture out of picture (POP) display options.

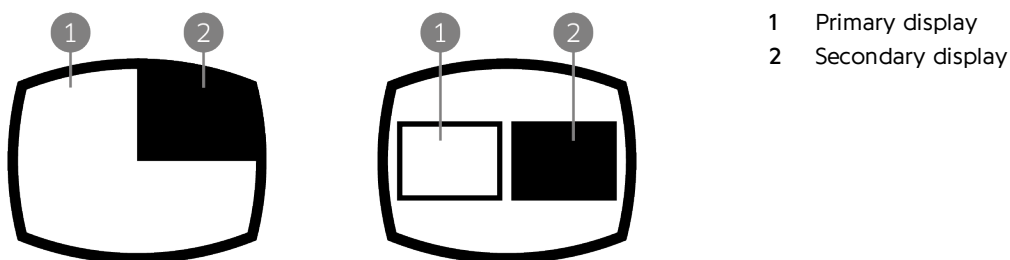


Figure 6 Picture in picture (left) and picture out of picture (right)

To use the PIP/POP feature:

1. Press the **CONTROL** button on the monitor to access the other monitor buttons.
2. Set **PORT A** and **PORT B** to the inputs you want to be the primary and secondary displays, respectively. For more information, see 10.4 Assigning Inputs to the PORT Buttons on page 14.
3. Press the **MENU** button then use the down arrow button to move to the **PIP / POP** option in the menu then press the right arrow button access the PIP/POP options.
4. Use the right arrow button to move to the **Sub Screen Position** tab, then use the down arrow button to move to the **PIP** option to configure picture in picture settings or the **POP** option to configure picture out of picture settings.
5. Use the left and right arrow buttons to toggle through the secondary display location options.
6. When the menu displays your preferred secondary display location, press the **MENU** button to accept your selection and close the menu.
7. Press the **PIP/POP** button on the monitor. This button acts as a toggle so you may need to keep pressing it until your desired PIP or POP configuration is displayed on the monitor.

## 11.0 Cleaning



### **WARNING: Risk of Damage to Equipment**

Use only the cleaning agents described in this manual to clean the Auxiliary Cart - 3D Monitor Cart 31". Using other cleaning agents may damage the Auxiliary Cart.

The Auxiliary Cart components can be cleaned as described below.

**Table 6 Hardware Cleaning**

Component	Cleaning Instructions
Cart surfaces	<p>Cart surfaces may be cleaned with the following solutions:</p> <ul style="list-style-type: none"> <li>• Water</li> <li>• Mild Soap Solutions</li> <li>• Hydrogen Peroxide Solution, 3%</li> <li>• Iodine Solutions</li> <li>• Bleach Solutions, 10%</li> <li>• Isopropyl Alcohol Solutions, 70%, 91%</li> <li>• Cavicide®</li> </ul> <p>The cart surface finish will be permanently damaged by strong chemicals and solvents such as acetone and trichloroethylene. Steel wool or other abrasive material should never be used.</p> <p>Never submerge or allow liquids to enter a cart or components on the cart. Doing so may irreparably damage the system. Wipe cleaning agents off surfaces immediately using a water-dampened cloth. Dry surfaces thoroughly after cleaning.</p>



Table 6 Hardware Cleaning (continued)

Component	Cleaning Instructions
Monitor	<p>Prior to cleaning and surface disinfection, turn off the monitor and disconnect it from its power source.</p> <p>Cleaning: Thoroughly wipe all exterior surfaces with a lint-free cloth that has been dampened with vinegar (distilled white vinegar, 5% acidity) or an Ammonia-based glass cleaner. Remove residual detergent by wiping all exterior surfaces with a lint-free cloth dampened with distilled water.</p> <p>Disinfecting: Wipe all exterior surfaces with a lint-free cloth dampened with 80% Ethyl Alcohol. Allow the monitor to air dry.</p> <p>Do not allow liquids to penetrate the monitor housing, and do not permit exterior surfaces to come into contact with unacceptable solvents such as MEK (Methyl Ethyl Ketone), Toluene, and Acetone as these may damage the monitor.</p>
Monitor cover	<p>The monitor cover may be cleaned with most mild, non-abrasive solutions commonly used in hospital environment (e.g., diluted bleach, ammonia, or alcohol solutions). The surface finish will be permanently damaged by strong chemicals and solvents such as acetone and trichloroethylene. Steel wool or other abrasive material should never be used. Wipe cleaning agents off surfaces immediately using a water-dampened cloth. Dry surfaces thoroughly after cleaning.</p>

**CAUTION**

Synaptive Medical makes no claims regarding the efficacy of the listed chemicals or processes as a means for controlling infection. Consult your hospitals' infection control officer or epidemiologist.

## 12.0 Troubleshooting Problems

Table 7 Auxiliary Cart Problems and Possible Solutions

Problem	Possible Solutions
No power on monitor.	<ul style="list-style-type: none"> <li>• Check monitor power connection.</li> <li>• Check power switch on back of monitor.</li> </ul>
No video signal to monitor (when monitor is powered on).	<ul style="list-style-type: none"> <li>• Verify that the cable connecting the monitor to the video source is securely connected at both ends.</li> </ul>

## 13.0 Recommended Environmental Conditions

Operate, store, and transport the Auxiliary Cart system components only under the following conditions.

**Table 8 Permissible Environmental Conditions**

	Operating	Storage/Transport
Ambient temperature	16 °C–30 °C	-20 °C- 60 °C
Relative humidity (non-condensing)	10 %–70 %	0 %-90%
Atmospheric Pressure	70 kPa–106 kPa	70 kPa–106 kPa

## 14.0 Disposal

No part of the Auxiliary Cart - 3D Monitor Cart 31" system may be disposed of in landfill.

Before disposing of any Synaptive product, contact Synaptive customer service or your supplier for further information.

## 15.0 System Classification and Specifications

**Classification:** Class I Equipment

**Mode of Operation:** Continuous Operation

**Degree of Protection Against Ingress of Water:** IPX0

**Mains Supply:** 100-240 V, 50/60 Hz, 2.1-1.0 A

### 15.1 Essential Performance

The monitor shall maintain its selected video orientation.

## 15.2 Cable Specifications

Table 9 Cable Specifications

Cable	Specifications
Power cord*	<ul style="list-style-type: none"> <li>• 6 m with C13 and NEMA 5-15P hospital grade connector</li> <li>• 6 m with C13 and Medical DK-2-8A connector</li> <li>• 6 m with C13 and CEE7/7 connector</li> <li>• 6 m with C13 and BS1363/A connector</li> <li>• 6 m with C13 and AS/NZS 3112:2000 hospital grade connector</li> <li>• 6 m with C13 and SEV 1011 Type 12 connector</li> </ul>
Equipotential grounding cable	<ul style="list-style-type: none"> <li>• 3 m with right-angled, spring-loaded sockets</li> </ul>

\* The specific power cord supplied with your Auxiliary Cart system is dependent on regional power specifications.



### WARNING

Use only the approved power cord supplied with the Auxiliary Cart - 3D Monitor Cart 31". The use of non-approved power cords can result in damage to the Auxiliary Cart - 3D Monitor Cart 31" system. The use of other accessories, transducers, and cables may result in increased electromagnetic emissions or decreased immunity of this equipment and may result in improper operation. If a cable becomes damaged, contact Synaptive customer service for assistance.

## 16.0 Certifications

The Auxiliary Cart - 3D Monitor Cart 31" is certified to the following standards:

- IEC 60601-1-2: 2014
- CAN/CSA C22.2 No. 60601-1: 2014-03
- ANSI/AAMI ES60601-1:2005/A1:2012-08
- CB SCHEME CERTIFICATION

All Auxiliary Cart Systems are designed and manufactured in an ISO:13485 registered facility that is routinely audited by medical device regulators under the Medical Device Single Audit Program (MDSAP).

## 17.0 Electromagnetic Environment Information

The Auxiliary Cart system requires special precautions regarding electromagnetic compatibility and must be installed and used according to the electromagnetic compatibility information described in the tables below.

Portable and mobile RF (radio frequency) communications equipment can affect the performance of the Auxiliary Cart system.

**Table 10 Electromagnetic Environment (Emissions)**

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

Emissions Test	Compliance	Electromagnetic Environment Guidance
RF emissions CISPR 11	Group 1	The Auxiliary Cart system uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The Auxiliary Cart system is suitable for use in all establishments other than domestic, and may be used in domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes, provided the following warning is heeded:  <b>Warning:</b> This equipment may cause radio interference or may disrupt the operation of nearby equipment. It may be necessary to take mitigation measures, such as re-orienting or relocating the equipment or shielding the location.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/flicker emissions IEC 61000-3-3	Complies	

NOTE: The EMISSIONS characteristics of this equipment make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required) this equipment might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or re-orienting the equipment.

**Table 11 Electromagnetic Environment (Immunity)**

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

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment Guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±8 kV contact ±15 kV air	±8 kV contact ±15 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±0.5 kV, ±1 kV line to line ±0.5 kV, ±1 kV, ±2 kV line to ground	±0.5 kV, ±1 kV line to line ±0.5 kV, ±1 kV, ±2 kV line to ground	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11 $U_T = 120 \text{ Vac}$	0% $U_T$ (100% dip in $U_T$ ) for 0.5 cycle 0% $U_T$ (100% dip in $U_T$ ) for 1 cycle 70% $U_T$ (30% dip in $U_T$ ) for 25/30 cycles	0% $U_T$ (100% dip in $U_T$ ) for 0.5 cycle 0% $U_T$ (100% dip in $U_T$ ) for 1 cycle 70% $U_T$ (30% dip in $U_T$ ) for 25/30 cycles 0% $U_T$ (100% dip in $U_T$ ) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. It is recommended that the Auxiliary Cart system be powered from an uninterruptible power supply or a battery.
Power frequency (50 Hz/60 Hz) magnetic field IEC 61000-4-8	30 A/m	30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

NOTE  $U_T$  is the a.c. mains voltage prior to application of the test level.

Table 12 Electromagnetic Environment (Conducted/Radiated)

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

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment Guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz  6 Vrms ISM/Amateur Radio bands inside 150 kHz to 80 MHz	3 Vrms 150 kHz to 80 MHz  6 Vrms ISM/Amateur Radio bands inside 150 kHz to 80 MHz	Portable and mobile RF communications equipment should be used no closer to any part of the Auxiliary Cart system, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.  Recommended separation distance: $d = 1.2\sqrt{P}$
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2,7 GHz	3 V/m 80 MHz to 2,7 GHz	$d = 1.2\sqrt{P}$ 80 MHz to 800 MHz $d = 2.3\sqrt{P}$ 800 MHz to 2.7 GHz  Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).  Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey <sup>a</sup> should be less than the compliance level in each frequency range <sup>b</sup> .

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

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

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

b) Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

**Table 13 Recommended Separation Distances Between Portable and Mobile RF Communications Equipment and the System**

The Auxiliary Cart system is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. Auxiliary Cart users can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Auxiliary Cart system as recommended below, according to the maximum output power of the communications equipment.

Rated Maximum Output Power of Transmitter (W)	Separation Distance According to Frequency of Transmitter (m)		
	150 kHz - 80 MHz $d = 1.2\sqrt{P}$	80 MHz - 800 MHz $d = 1.2\sqrt{P}$	800 MHz - 2.7 GHz $d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.24
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

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

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

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

WARNING: Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the Auxiliary Cart system, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.

