

Control Room Site Requirements for Standard Control Station

A Ross Robotics system consists of control room equipment and studio equipment.

This document specifies site requirements for control room equipment. It applies only to Ross Robotics systems that use a Standalone SmartShell Control Station with Integrated Server (RRB-CTL-3 and RRB-CTL-6). In this type of control station, the SmartShell computer is a Dell OptiPlex XE5 Tower computer. The SmartShell robotics control application and the Robotics Server application both run on a single computer.

This document includes the following sections:

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For an overview of the system architecture, see “**Ross Robotics System Architecture**” on [page 11](#).

Ask Us Anything — Ross Video is pleased to provide guidance and answer any questions you might have about planning your installation. Our friendly, experienced Program Managers can help you achieve an efficient and trouble-free installation.

IMPORTANT: Ross Robotics always strives to provide excellent customer service. Installation of equipment provided by Ross Robotics must be performed by Ross-qualified personnel only. If any non-qualified persons unpack and/or attempt to install equipment provided by Ross Robotics, the warranty is voided, and any actions required to correct the installation and/or repair the equipment will be at the expense of the customer and/or systems integrator.

For More Information About...

- Studio site requirements for CamBot robots, see ***CamBot Studio Site Requirements (5100DR-022)***.
- Studio site requirements for Furio robots, see ***Furio Studio Site Requirements (5100DR-023)***.
- Control room site requirements for Ross Robotics systems that use a Standard SmartShell Control Station, which features separate computers for SmartShell and the Robotics Server, see ***Control Room Site Requirements for Standalone Control Station with Integrated Server (5100DR-032-xx)***.
- Additional site requirements for adding Vision[Ai]ry Facial and Body Tracking capabilities to your system, see ***Site Requirements for Vision[Ai]ry (5100DR-092-x.x)***.

About the Ross Robotics System

Robots in the studio are controlled from the control room through a computer application named SmartShell and the CX-3R joystick panel. The SmartShell computer communicates with robots and other components over a dedicated Ethernet network.

A single Ross Robotics system can include a variety of CamBot and Furio Robo robots, all controllable from a single operator position. Some systems include multiple operator positions, each with its own SmartShell computer and CX-3R joystick panel.

The system can also control certain third-party robots. For more information, contact Ross Video.

Control Desk Equipment

Your control desk must accommodate an operator position for the robotics operator. All equipment must be installed within comfortable reach of the operator. The operator position includes the following equipment:

- **SmartShell Computer** — The SmartShell robotics control application and the Robotics Server application are installed on this computer.
The SmartShell computer is a Dell OptiPlex XE5 Tower computer. When installed in a tower (upright) position, the approximate dimensions of the computer are as follows:
 - › **Height** — 13.8" (35cm)
 - › **Width** — 6.1" (15.4cm)
 - › **Depth** — 10.8" (27.4cm)**Note:** The computer can be installed in a tower (upright) position, or in a desktop (horizontal) position.
- **Video Monitor for SmartShell Computer** — The SmartShell video monitor is a touch-screen monitor (Dell model P2418HT). If the operator uses the touch-screen capability, the monitor must be installed within comfortable reaching distance. Alternatively, the operator can use a keyboard and mouse.
Approximate dimensions of the video monitor (with stand) are as follows:
 - › **Height** — 12.7" (32.3cm) to 16.5" (42cm), including the adjustable-height stand. Without the stand, the height is 12.7" (32.1cm)
 - › **Width** — 21.2" (53.8cm)
 - › **Depth** — 9.24" (23.5cm), including the stand. Without the stand, the depth is 2.2" (54cm).**Note:** The monitor has a standard VESA mount. It can be wall mounted with appropriate hardware (not included).
- **Keyboard and Mouse** — The keyboard and mouse are connected to the SmartShell computer.
- **CX-3R joystick panel** — The CX-3R joystick panel can be inset into the control desk, installed in a standard 19" component rack, or simply placed on the control desk. For detailed information about mounting the CX-3R joystick panel, see "**Mounting the CX-3R Joystick Panel**" on [page 5](#).
- **Operator's Video Monitor** — The Operator's Video Monitor displays a live feed from whichever camera is selected by the operator. Cameras can be selected using the SmartShell user interface, or the CX-3R joystick panel. The Operator's Video Monitor is optional, and is not provided by Ross Video.
- **Remote Emergency Stop Modules** — An optional accessory for Furio SE robotic dollies and BlackBird S-Series manual pedestals, the remote emergency stop module enables an operator to remotely stop the robot to which the module is connected. Each module comes with a 20m (65.6') cable that connects the module to a single dolly or pedestal. Other available cable lengths include 30m (98.4'), 40m (131.2'), and 50m (164').
Each module is 178mm (7") long, 172mm (6.76") wide, and 116mm (4.55") high. The top of each module must remain readily accessible so the operator can hit the **STOP** button quickly. Allow a minimum of 13cm (5") of space on one side (right or left) of each module for connecting the data cable.

Note: In addition to an optional remote emergency stop module, the Furio SE robotic dolly has two emergency stop buttons (one on each end). The BlackBird S-Series manual pedestal has one. The SmartShell control software includes on-screen buttons for immediately stopping all robots, or an individual robot.

Note: Some Ross Robotics systems include multiple operator positions. Each operator position includes one SmartShell computer and one CX-3R joystick panel.

Component Rack Equipment

The Ross Robotics system requires installation and mounting space in a standard 19" component rack for the following components:

- **Robotics Server** — The Robotics Server receives requests from control interfaces such as SmartShell and the CX-3R Joystick Panel, and sends commands to the robots. If your system includes thumbnail images, the Robotics Server captures and provides those images.
Note: The Robotics Server requires 1U of rack space.
- **Video Router** — The Video Router provides a live video feed of whichever camera is selected by the operator. Cameras can be selected using SmartShell or the CX-3R joystick panel. If your system includes thumbnail images, the images are captured as stills from the video feed. The video feed is also displayed by the Operator's Video Monitor (if present).

The amount of rack space required depends on the Video Router.

Note: A Video Router is not needed if one or both of the following points is completely true:

- › Your system does not include thumbnail images or an Operator's Video Monitor.
- › Your system includes only one camera, in which case you can use a distribution amplifier instead of a router.

The Video Router must support one of the following router control protocols:

- › Ross Video Ultrix router
- › Ross Video NK passthrough
- › Generic ASCII — Leitch Terminal Protocol and Jupiter Protocol (serial) supported, in addition to others.
- › Leitch passthrough
- › Matrix MASCOT / Extron
- › Nvision NV9000 (NP0017)
- › Nvision NVEP (NP0018)
- › Probel SW-P-02
- › Probel SW-P-08
- › SONY
- › Utah Scientific RCP-1
- › Utah Scientific RCP-3

The Video Router must communicate with the Robotics Server using one of the following communication protocols:

- › **Internet Protocol (IP)** — Communication over IP is the preferred method.
- › **RS422 serial** — Use RS422 if the Video Router is not capable of communication over IP. The Robotics Server has one RS232 port (male DB9 connector) and no RS422 port, so an RS232-RS422 converter is required (not supplied by Ross Video). The converter should be positioned close to the Robotics Server computer.

- › **RS232 serial** — Use RS232 only if the Video Router is not capable of communication over IP or RS422. The RS232 protocol has significant cable length limitations. If the Video Router and the Robotics Server are not co-located, we recommend the use of two RS422-RS232 converters to help span the distance.

Note: The serial port on the Robotics Server computer has a male DB9 connector.

- **Network Switch** — The Ethernet switch facilitates the Robotics Ethernet network. The switch is not supplied by Ross Video.

The amount of rack space required depends on the switch.

The switch must be capable of 100Mbps or faster.

If the Ross Robotics system is part of an Augmented Reality and/or Virtual Set (AR/VS) solution, network latency must be very low to prevent delay of position tracking data.

Power and Network Requirements

The following table specifies the power requirements for each component in the system. It also specifies data connectivity requirements.

Component	Power Requirements	Data Connectivity Requirements
SmartShell computer (Dell OptiPlex XE5 Tower)	<p>The SmartShell computer must be plugged into either a 120VAC circuit with 15A circuit breaker protection, or a 240VAC circuit with 8A circuit breaker protection.</p> <p>The SmartShell computer includes an AC line cord with a plug suitable for the country where the system is to be installed.</p>	<ul style="list-style-type: none"> • Connected to the Robotics Ethernet network. • Connected to the CX-3R joystick panel via ethernet. • Sends display output to the touch-screen video monitor. • Connected to the touch-screen video monitor via USB to enable touch-screen capability
Touch-Screen Video Monitor for the SmartShell computer (Dell P2418HT)	<p>The touch-screen video monitor must be plugged into either a 120VAC circuit with 15A circuit breaker protection, or a 240VAC circuit with 8A circuit breaker protection.</p> <p>The SmartShell computer includes an AC line cord with a plug suitable for the country where the system is to be installed.</p>	<ul style="list-style-type: none"> • Connected to the SmartShell computer via USB to enable touch-screen capability. • Receives display video from the SmartShell computer.
CX-3R joystick panel	<p>The CX-3R joystick panel comes with an external power supply unit that is rated at 12V DC, 4.5A (54 Watts).</p> <p>The power supply unit must be plugged into either a 120VAC circuit with 15A circuit breaker protection, or a 240VAC circuit with 8A circuit breaker protection.</p> <p>The power supply unit includes an AC line cord with a plug suitable for the country where the system is to be installed.</p>	<ul style="list-style-type: none"> • Connected to the Robotics Ethernet network. • Connected to SmartShell computer via ethernet.

Component	Power Requirements	Data Connectivity Requirements
Video Router (optional)	Consult manufacturer's documentation.	<ul style="list-style-type: none"> Receives one video feed from each camera. Outputs one video feed to the SmartShell computer if thumbnails are enabled, and outputs the same feed to the Operator's Video Monitor (if equipped). Communicates with the SmartShell computer. For more information, see "Component Rack Equipment" on page 3.
Ethernet Switch	Consult manufacturer's documentation.	The Ethernet switch facilitates the Robotics Ethernet network.
Operator's Video Monitor (optional)	Consult manufacturer's documentation.	Receives a live video feed from the Video Router.
Sync reference source	N/A	Sync reference is required only for AR/VS applications. Note: CamBot 520PT and 600PT heads do not accept sync reference signals.

Note: Ross Video does not provide Ethernet cables, video cables, or serial control cables. Such cables are selected or custom-made to suit the facility, and are to be provided by the systems integrator or the customer.

Vision[Ai]ry Facial and Body Tracking Requirements

Vision[Ai]ry is an optional Ross Video software solution that enhances existing robotic systems by enabling robotic cameras to automatically correct and maintain video framing.

It reduces camera operator workload by eliminating the need for manual corrections of the camera position to compensate for talent movement and day-to-day variations in seating position, posture, and talent height.

If you plan to add Vision[Ai]ry capabilities to your Ross Robotics system, additional site requirements apply. For more information, see **Site Requirements for Vision[Ai]ry (5100DR-092-x.x)**.

For more information about Vision[Ai]ry, see the Ross Video website or contact your Ross Video sales representative.

Mounting the CX-3R Joystick Panel

The CX-3R joystick panel must be mounted within comfortable reach of the robotics operator.

Although the CX-3R joystick panel can be used as a table-top device, it is typically inset into a control desk or installed in a standard 19" component rack.

It is important to decide the mounting method in advance, to allow time to modify the control desk or to reserve rack space.

This section describes the following mounting options:

- "Inset Mounting" on [page 6](#)
- "Rack-Mounting" on [page 9](#)

Note: Drawings in this section are not to scale.

Korean Class A Notice for the CX-3R joystick panel

The following is the Korean Class A Broadcasting and Telecommunication Products for Business Purpose Statement.

이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

The preceding statement applies to the following Ross Video component, and may also apply to others:

- **5100AR-252-01** — 6-Axis Unified Robotics Control Panel

Inset Mounting

This option involves cutting a hole in the control desk and mounting the CX-3R joystick panel in the hole.

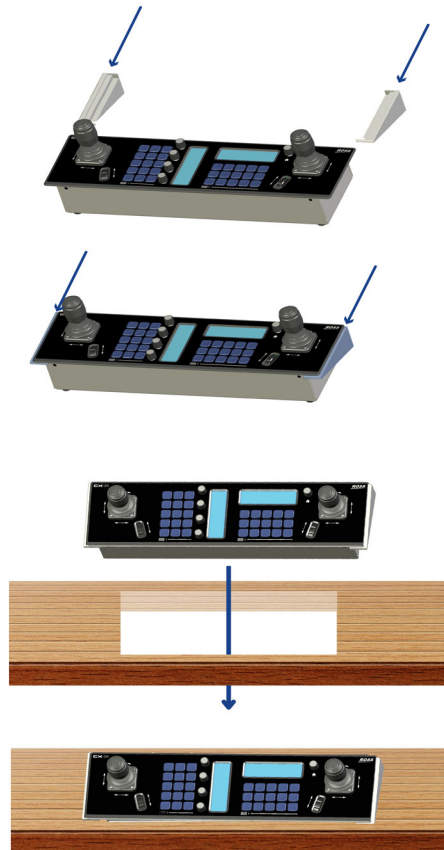
Depending on the thickness of the desk, you may have to remove additional material from the underside of the desk to allow space for cabling the CX-3R joystick panel.

To mount the CX-3R joystick panel inset into the control desk:

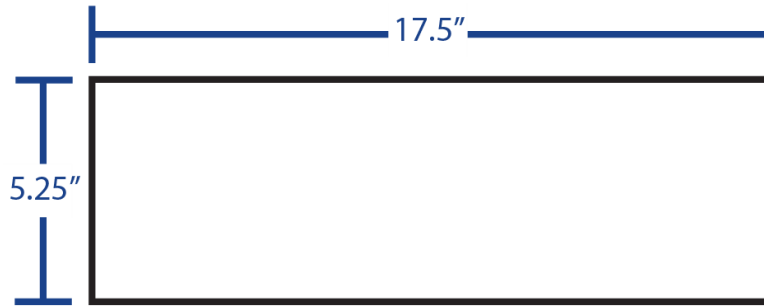
Note: The Desk Mounting option available for all panels and is required to properly secure the panel to a desk.

Note: You may have to remove the legs from the control panel to mount it in a desk.

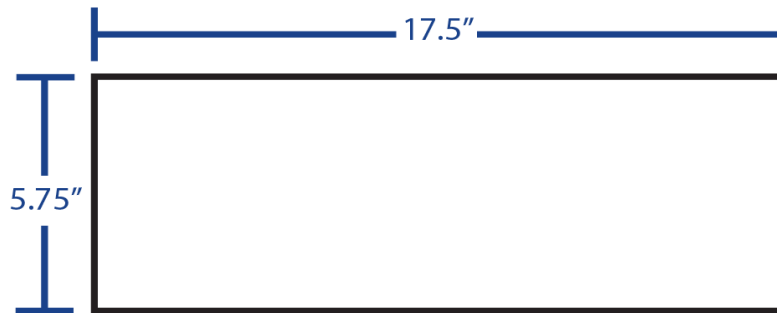
IMPORTANT: Mounting wedges (5110FR-487-01) are available for users who wish to mount the CX-3R joystick panel at an 18° viewing angle when inset into a control desk. The required cutout dimensions differ depending on whether mounting wedges are used. Refer to Step 1 below.



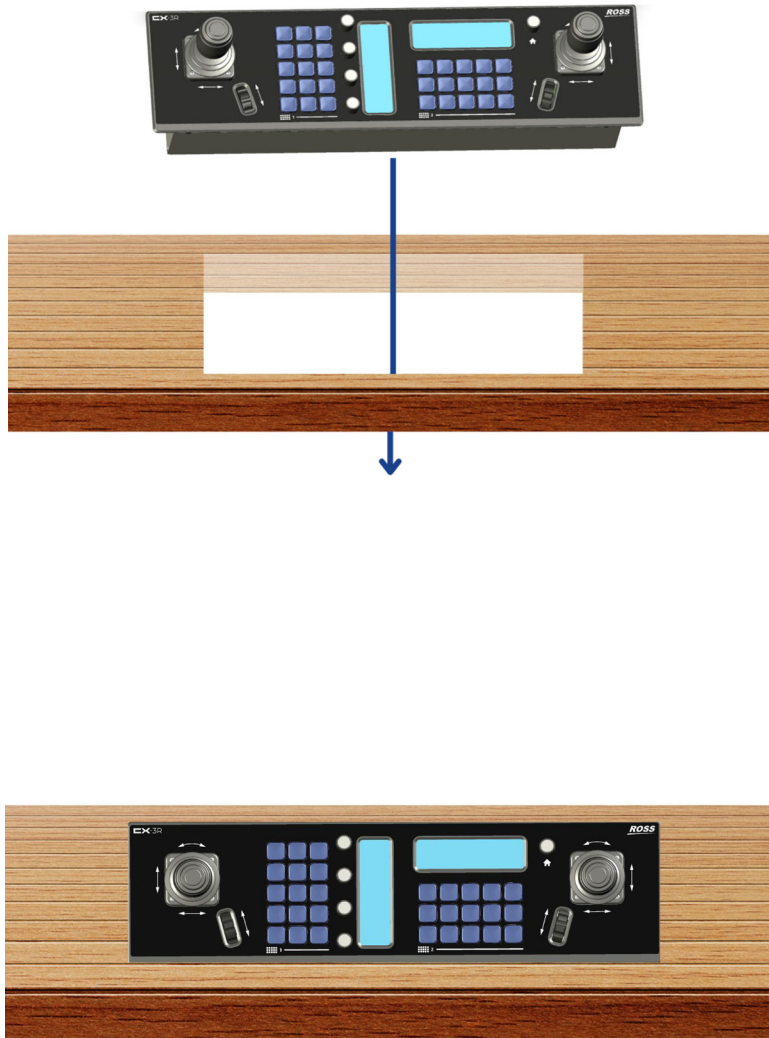
1. For CX-3R joystick panels **without** mounting wedges, cut a **17.5" x 5.25"** rectangular hole into the desk.
Important: Always use proper safety gear and exercise best practice when operating sharp tools to avoid injury.



- For CX-3R joystick panels **with** mounting wedges, cut a **17.5" x 5.75"** rectangular hole into the desk.
Important: Always use proper safety gear and exercise best practice when operating sharp tools to avoid injury.



- Lower the CX Panel into the **17.5" x 5.25"** hole cut into the desk for CX-3R joystick panels **without** mounting wedges.
Lower the CX Panel into the **17.5" x 5.75"** hole cut into the desk for CX-3R joystick panels **with** mounting wedges.
Note: The panel should rest flush with the rest of the desk. Ensure that no dirt or debris are underneath the bezel.





Rack-Mounting

This option is for control desks that feature standard rack space within comfortable reach of the robotics operator position.

Note: The CX-3R joystick panel must be co-located with the SmartShell computer. The CX-3R joystick panel must not be installed in a remote rack room. The robotics operator uses the SmartShell computer and the CX-3R joystick panel together.

The CX-3R joystick panel requires a total of 4U of rack space. The CX-3R joystick panel occupies slightly more than 3U. The remaining space is required above the CX-3R joystick panel for cabling.

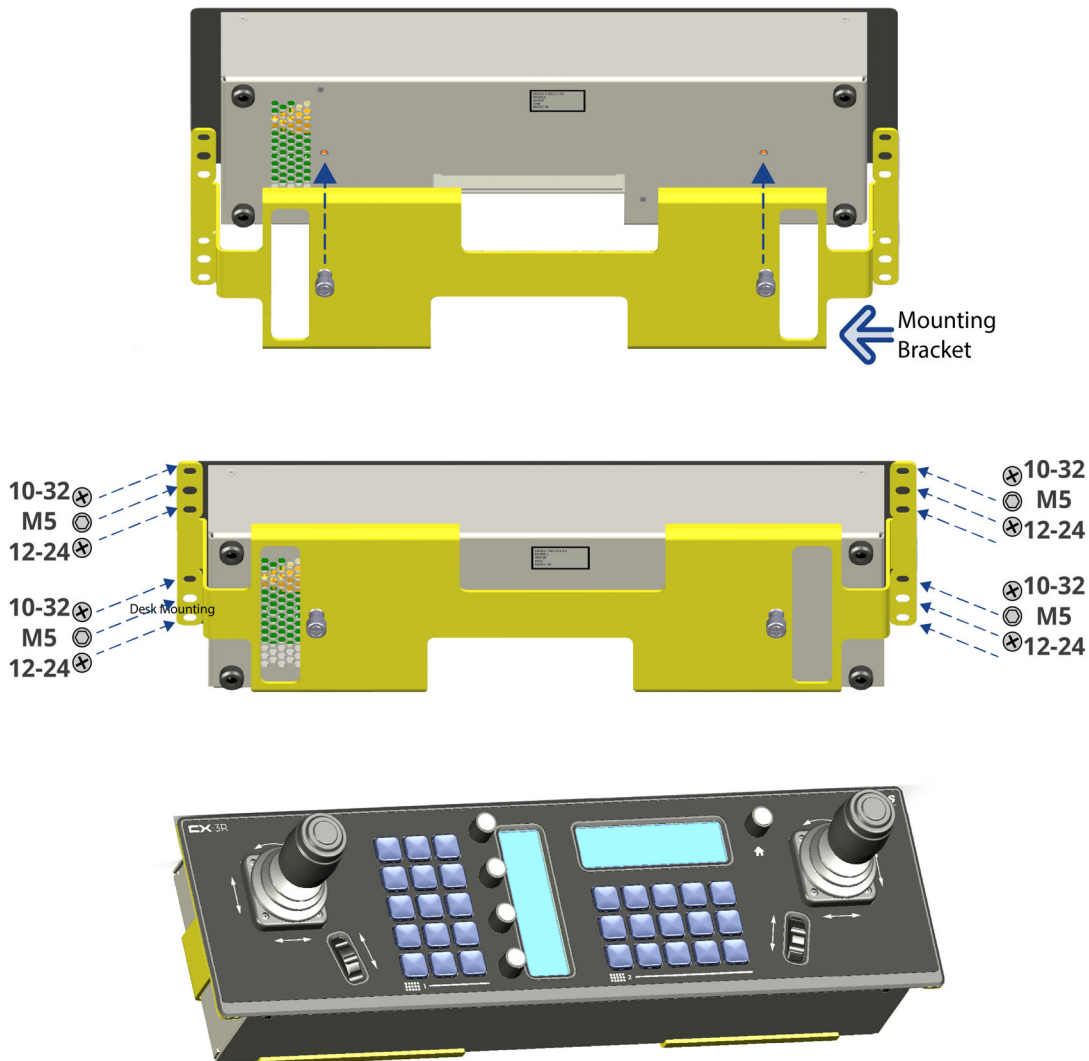


To rack-mount the CX-3R joystick panel:

Note: The Rack Mounting option is available for the CX Panel and is required to properly secure the panel to an equipment rack.

Note: Although a rack is not shown, the mounting bracket gets installed into the rack first.

1. Attach the mounting brackets to both sides of the CX Panel and secure the thumb screws shown in the image below.
2. Insert the panel into the rack and align the brackets with the rack's mounting holes, then insert the 10-32, M5, and 12-25 screws as shown in the image below.



Ross Robotics System Architecture

Ross Robotics systems can be operated through an easy-to-use software application named SmartShell, and the CX-3R joystick panel. The SmartShell computer communicates with robots and other components over a dedicated Ethernet network. The following illustration shows the typical communication architecture of the system.

