

CamBot Brick PC mSATA Upgrade

A CamBot pedestal contains an internal Brick PC with Solid State Drive compatibility.

This document outlines how to insert a new mSATA SSD into a CamBot Brick PC.

Depending on your current system, you may require the following:

- Replacing the Micro SD card in a CamBot Brick PC with the mSATA SSD. Firmware for CamBot pedestals is stored on the old Micro SD card. You're replacing it with an mSATA drive preloaded with firmware because it is a more reliable drive.
- Replacing your previous mSATA SSD with a new mSATA SSD preloaded with firmware.

The instructions below explain how to insert the new mSATA SSD for both Furio and CamBot devices.

Ask Us Anything — Ross Video is pleased to provide guidance and answer any questions you might have about planning your installation. Our friendly, experienced Technical Support 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 unqualified 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.

Required Tools

The following tools are required:

- Phillips screwdriver set
- Hexagonal key set
- mSATA SSD
- Non-magnetic tip Phillips screwdriver
- Electrostatic protection

Process Summary

This document provides detailed instructions to help you complete the following sections.

Depending on your system, complete the instructions relevant to your needs.

1. **"Downloading Backup Data" on page 3**
 - › **"Downloading Furio Backup Data" on page 3**
 - › **"Downloading CamBot Backup Data" on page 4**
2. **"Removing the CamBot Brick PC" on page 6**
3. **"Disassembling the CamBot Brick PC" on page 11**
4. **"Inserting the mSATA SSD" on page 11**
 - › **"Replacing the Micro SD card with the mSATA SSD" on page 12**
 - › **"Replacing the mSATA SSD" on page 13**
5. **"Reassembling the CamBot Brick PC" on page 13**
6. **"Reassembling the CamBot Pedestal" on page 14**
7. **"Restoring Backup Data" on page 16**
 - › **"Restoring Furio Backup Data" on page 16**
 - › **"Restoring CamBot Backup Data" on page 16**

Downloading Backup Data

This section provides an overview of how to back up data for either Furio or CamBot systems. Follow the instructions for your specific device.

Downloading Furio Backup Data

Download backup data for a Furio device

1. Obtain the IP address of the robot that requires its Micro SD card to be replaced with an mSATA SSD.
2. Enter the robot's IP address into a web browser. Refer to **Figure 1**.

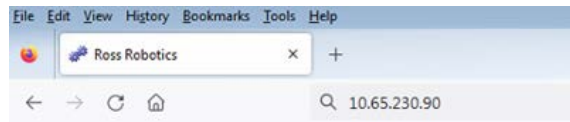


Figure 1 - Web UI of Robot When Entering the IP Address

Note: Ensure the robot is powered and connected to the network.

3. Select the Backup tab from the tab menu.
4. Select **Download Data Backup** to download and save a backup file. Refer to **Figure 2**.

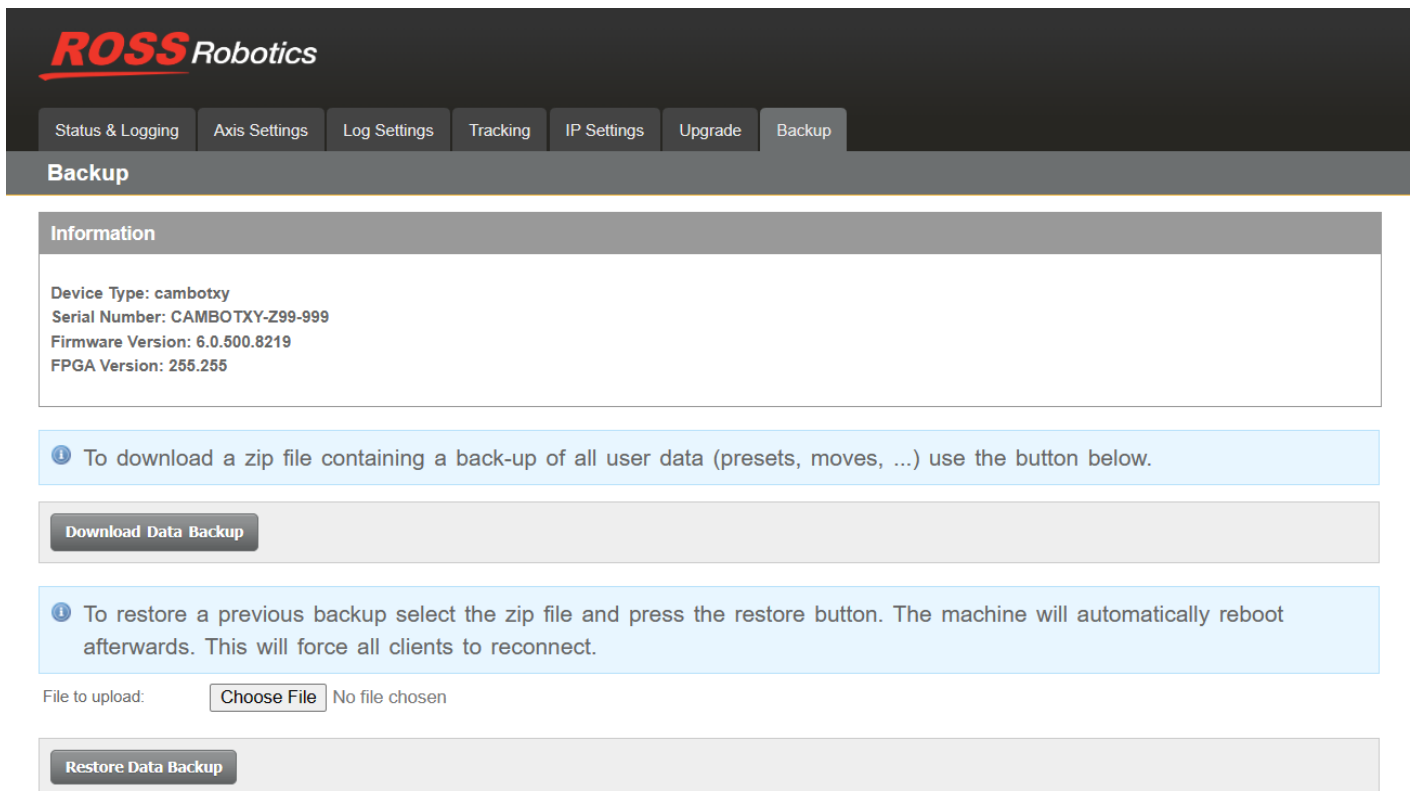


Figure 2 - Backup Tab Interface

Downloading CamBot Backup Data

Record CamBot pedestal settings

For each XY pedestal to upgrade, make note of the settings and details outlined below.

1. If a config.dat and config2.dat exist, check both, and complete the following:
 - a. If a parameter in config.dat is not in config2.dat, the value in config.dat remains valid and is not overwritten just because a config2.dat exists
 - b. Record all the values from config.dat and config2.dat.

Note: You can take information from one computer and put it in another using WinSCP or simply cut and paste into a notepad file for reference.
2. Record the **Network configuration** details, including: IP address, netmask, and gateway in /cf/startup.sh

```
# cat /cf/startup.sh
#This gets run at boottime
ifconfig eth0 192.168.4.124 netmask 255.255.255.0 up
route add default gw 192.168.4.1 eth0
```

↓ IP address
 ↓ gateway
 ↓ netmask

Figure 3 - Network Configuration Details

Note: It is possible that no gateway will be defined, however, Furio will require it.

3. Record the robot type. The options are as follows: 700XY, 600XY-S3, or 600XY-S2.

Note: If unsure, check /cf/config.dat:

- › oHT 5 = 700XY
- › oHT 24 or HT 13 = 600XY-S2
- › oHT 25 or HT 12 = 600XY-S3

4. Record the **Wheel Factor**.

```
# cat /cf/config.dat
[snip]
WF 0.997
```

Figure 4 - Network Configuration Details

A transfer function exists to convert CamBot firmware wheel calibration factor (WF) found in /cf/config.dat into the equivalent LeftWheelRadius and RightWheelRadius parameters found in cambotxy_conf.tmpl under Furio firmware.

Calculate the new wheel radii values by putting the WF value obtained above into the following equations:

- › **LeftWheelRadius** = 10.395 * WF + 78.443
- › **RightWheelRadius** = 177.60 - LeftWheelRadius

These values need to be applied to the configuration template as shown in Upgrade Procedure Step 6.

Note: This transfer function is based on statistical analysis, and it will work for most pedestals. For some outlier pedestals, this may cause drift after a few shot recalls, and manual recalibration is recommended.

5. Record the **FreeD** tracking destination address(es) and port(s) in /cf/config.dat.

Note: Ensure tracking output is enabled (VS 1).

6. Record the following:
 - › Tracking Destination 1 from VA & VP or VirtualSetAddress & VirtualSetPort
 - › Tracking Destination 2 from VirtualSetAddress2 & VirtualSetPort2
 - › Tracking Destination 3 from VirtualSetAddress3 & VirtualSetPort3

7. Record the **Iris control**.

In /cf/config.dat, if both parameters IR 1 and RI 1 are present, recall of Iris position is enabled for this CamBot XY pedestal.

8. Record the **serial number** of the pedestal assembly, located on a sticker in the pedestal's Connection Panel.

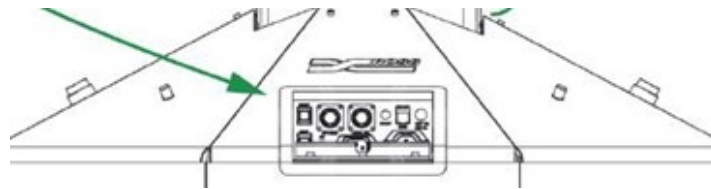


Figure 5 - Pedestal Assembly Serial Number

The serial number will be used for thumbnails in a later step.

9. Record the **persistent limits** for each axis, as seen in the Robotics Server web interface.

WallE axis limit settings

Axis	Status	Current Position	Low Temporary Limit	High Temporary Limit	Low Persistent Limit	High Persistent Limit
ZOOM	HOMED	32767.000	OPEN	OPEN	OPEN	OPEN
FOCUS	HOMED	32767.000	OPEN	OPEN	OPEN	OPEN
PAN	HOMED	81.436	-168.228	168.228	-168.228	168.228
TILT	HOMED	-22.318	-22.318	36.521	-22.318	36.521
IRIS	HOMED	32768.000	OPEN	OPEN	OPEN	OPEN

Figure 6 - High and Low Persistent Limits

Export preset data through the Robotics Server

This section assumes SmartShell and Robotics Server are already upgraded to the minimum required 5.2c version.

1. Enter `http://<robotics-server-ip>:3000/` into any browser.
2. Select **Robotics Server > Robots**.
3. Select **Stop** to halt the listener for the pedestal.

Note: All robotic control will be lost while the listener is stopped.

ID	Name	Protocol	IP Address	Command Port (TCP)	Status Port (TCP)	Listener State	Slave IP Address	Alter State
1	CAM1	Cambot	10.20.30.21	13002	13003	Connected	0.0.0.0:200.3026	Stop
2	CAM2	Cambot	10.20.30.22	13004	13005	Connected	0.0.0.0:4.200.3026	Stop
3	CAM3	Cambot	10.20.30.23	13006	13007	Connected	0.0.0.0:3.6.200.3068	Stop

Figure 7 - Robotics Server Preset Data

4. Export shots as follows:
 - a. Select the robot to export shots.
 - b. Select the **Robot Type**.

- c. Select **Export Iris** if **Iris Recall** is enabled for this robot.
- d. Select **Apply** to generate a zip file containing presets.

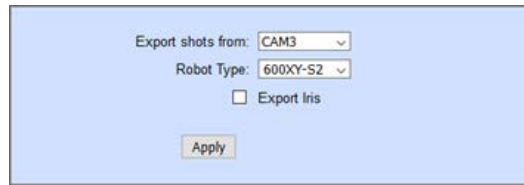


Figure 8 - Sample Export Shots

- 5. Download the zip file from <http://<robotics-server-ip>/Export/>.

Note: By default, the exported files are stored on the server in D:\thumbnails\Export, making them accessible via the Thumbnail Server's HTTP server.

The exported file name records the settings selected during export:

"Export_ " Name " _HT" HeadType " _ID" RobotId ["_WithIris"] TimestampUTC ".zip"

- 6. Select **Start** to restart the listener.

Removing the CamBot Brick PC

Before you begin

Power off and disconnect the CamBot's power source before starting.

To expose the wheels, you must lift the pedestal skirt.

Note: This procedure requires two people.

Lift the skirt:

- 1. Along the top edge of the skirt, use a 3/32" hex key to remove the four screws (or eight, depending on the CamBot model) that secure the skirt to the lift column (if present). Refer to **Figure 9**.

Note: Some CamBot XY pedestals do not have screws along the top edge of the skirt.

IMPORTANT: Use caution around the rubber bumper encircling the skirt bottom.

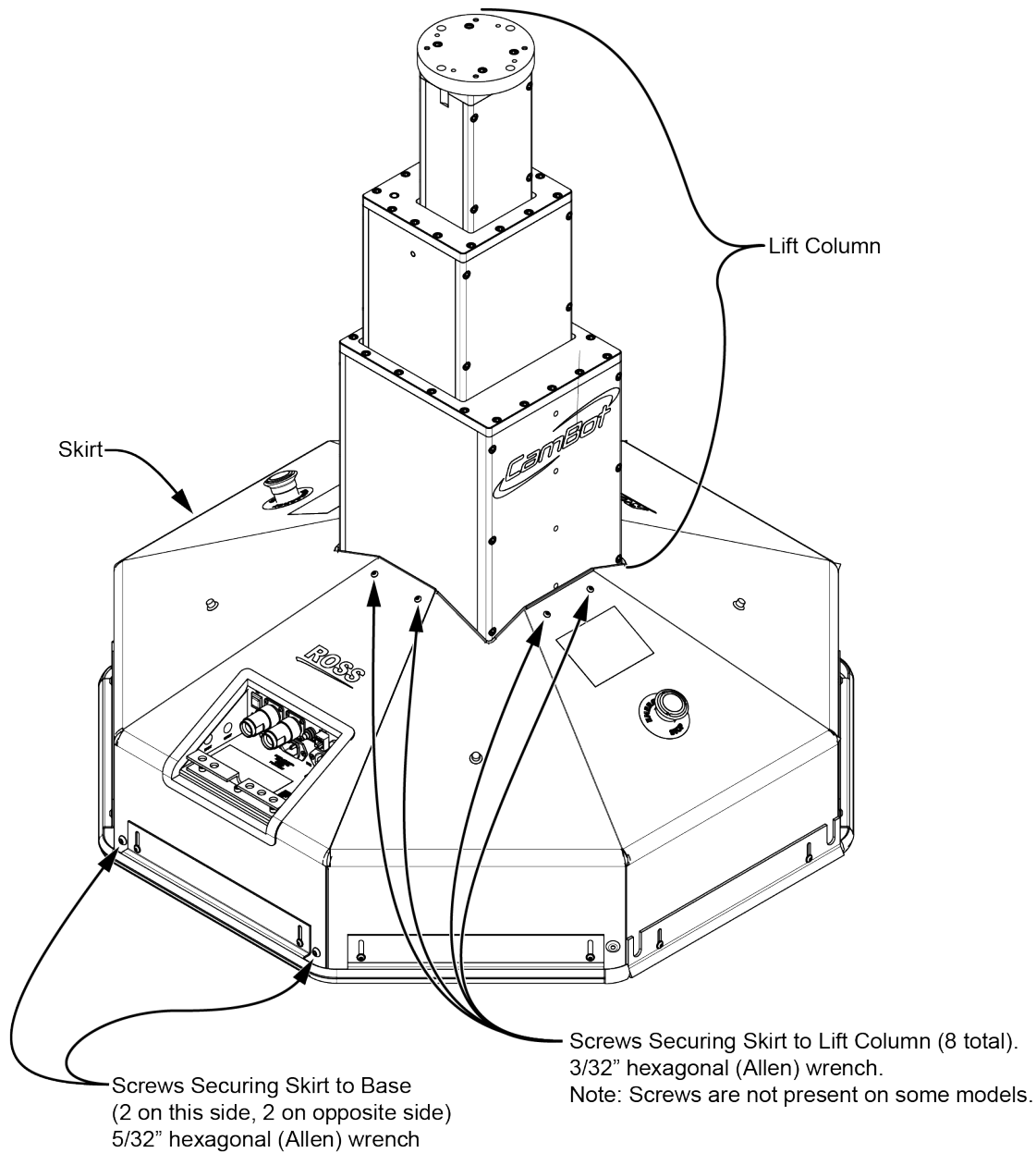


Figure 9 - CamBot 700XY Pedestal, showing Screws that Secure the skirt

2. At the bottom of the skirt, use a 5/32" hex key to remove the four screws that secure the skirt to the pedestal base plate (see **Figure 9**).
3. Bring the two 36" (90cm) wooden support pieces to within easy reach of the pedestal for the next step.
4. With one person on each side of the pedestal, slowly lift the skirt approximately 10 inches (25cm) and then slide the support pieces under the skirt so they rest on the rectangular blocks beside the large drive wheels. Lower the skirt onto the support pieces, as shown in **Figure 10**.

IMPORTANT: When you insert the support pieces, avoid snagging or pinching any cables under the skirt. Slide the support pieces from the side, not lengthwise (see **Figure 10**).

IMPORTANT: Depending on the pedestal model, there may be a green ground wire that spans between the base (near the connection panel) and the edge of the skirt. This wire may become tight or it may disconnect entirely. If it becomes disconnected, reconnect it.

Tip: To prevent binding, avoid tilting the skirt as you lift it.

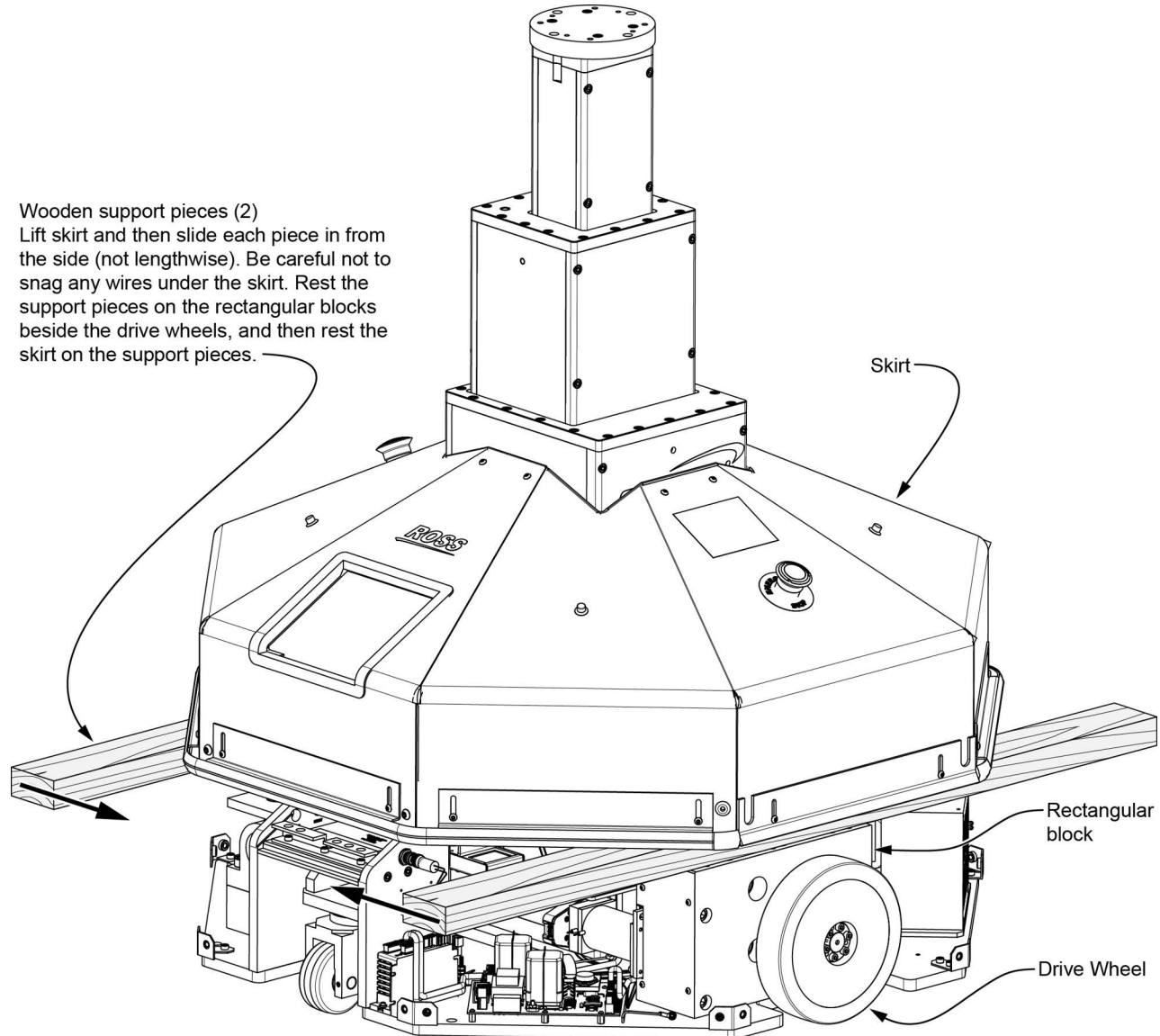


Figure 10 - Lifting and Supporting the Pedestal Skirt (CamBot 700XY pedestal shown)

Remove the CamBot Brick PC connections

To locate the Brick PC, you will need to lift the skirt to access the pedestal's electronic components (**Figure 11**).

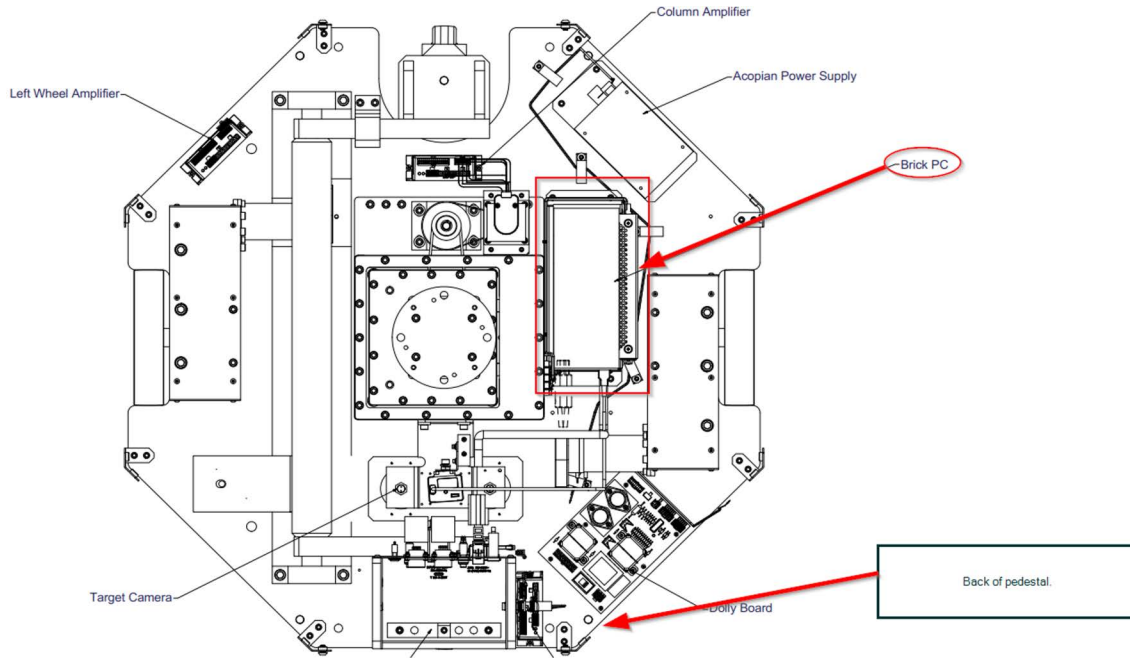


Figure 11 - Locating the CamBot Brick PC

- Before the Brick PC is removed, note the location of the connections going to the CamBot Brick PC (**Figure 12**).

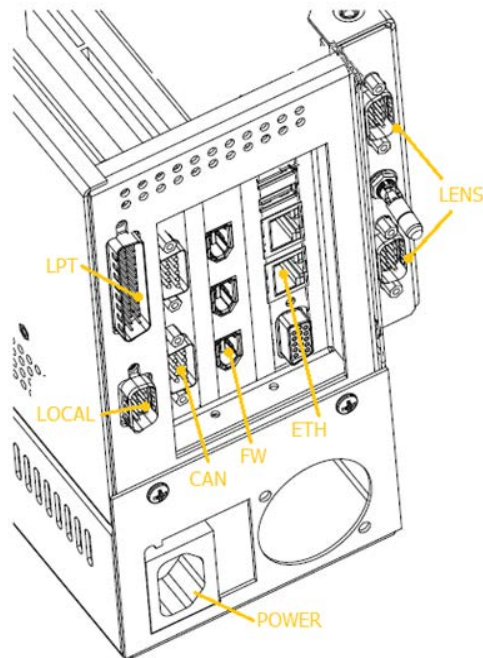


Figure 12 - CamBot Brick Cable Connections

Connection Abbreviation	Description
LP	Parallel port

Connection Abbreviation	Description
LOCAL	White and yellow two-wire cable, connects to DB9 port below the parallel port
CAN	Green, white, orange three-wire cable, connects to the bottom DB9 port on the CAN board
FW	Firewire cable with red connector, connects to bottom port
ETH	Ethernet cable, connects to bottom port
LENS	Connect to top port for Fuji lenses, to bottom port for Canon lenses
POWER	Reconnect the IEC mains cable
AUX POWER	Reconnect the matching connector to the aux power connector on the front of the computer (not shown)

- After removing the 5 electronic connections shown in the above diagram, you must also remove the input AC (located on the front) and the DC output power (located on the back of the CamBot Brick PC).

Note: You can also take a picture of the connections to reference later.

Remove the CamBot Brick PC

- Locate the four mounting bolts on the corners of the Brick PC's mounting plate (**Figure 13**). These bolts hold the Brick PC to the base plate of the pedestal.
- Remove the four mounting bolts and carefully remove the Brick PC.

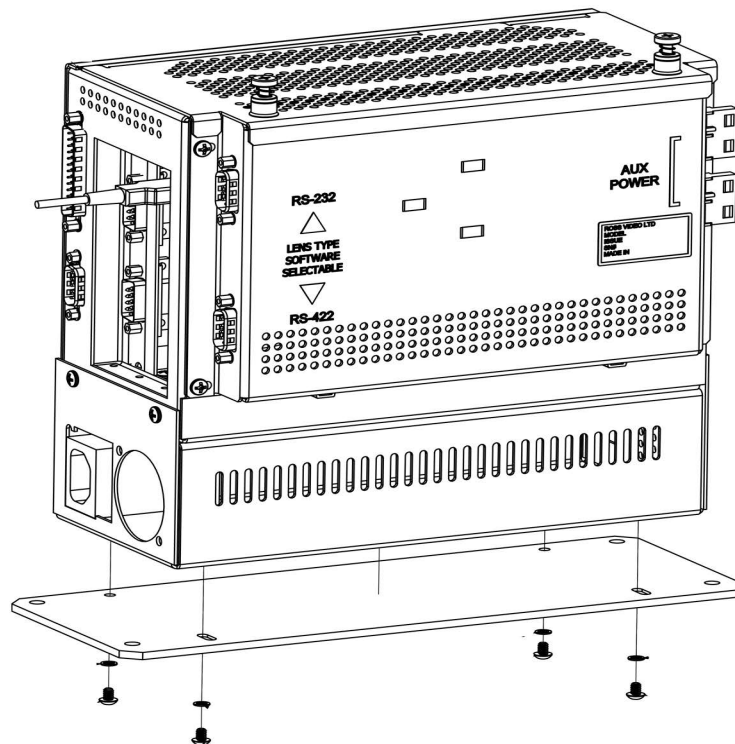


Figure 13 - Mounting Plate, Showing Round Holes and Slotted Holes

Disassembling the CamBot Brick PC

Before you begin

Ensure you have a flat surface to work on that is free of clutter. Make sure you're working in a static-safe environment. Placing the Brick PC onto this surface allows you to work quickly and access all required components.

Disassemble the CamBot Brick PC

1. Use a Phillips head screwdriver to loosen the two screws on the L-shaped vent.
Note: The screws will be screwed in completely, and the springs underneath apply tension so the screw doesn't come loose on its own.
2. Remove the four screws on the side plate with a Phillips head screwdriver, as shown in **Figure 14**.

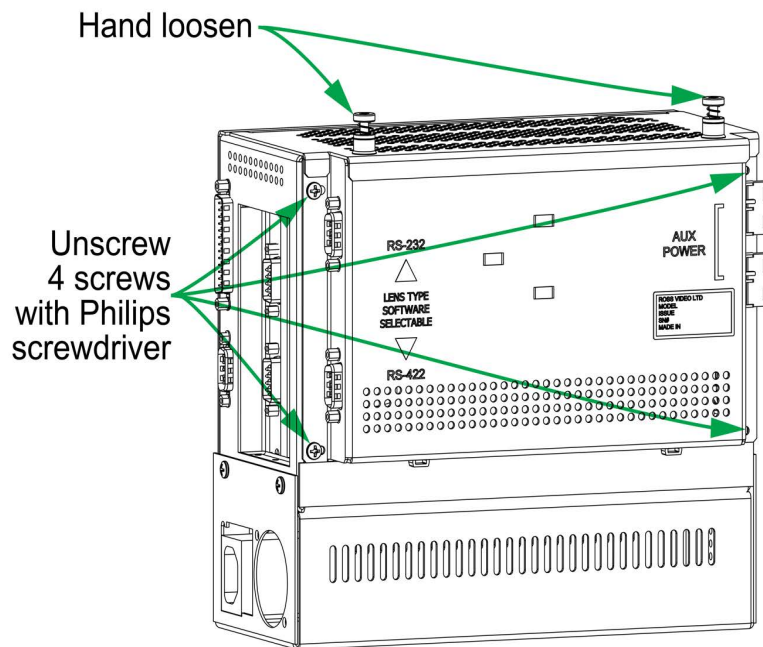


Figure 14 - Vent and side plate removal

Inserting the mSATA SSD

These instructions outline how to replace the Micro SD card with an mSATA SSD, or how to replace one mSATA SSD with another. Follow the instructions that suit your device.

Replacing the Micro SD card with the mSATA SSD

Removing the Micro SD card

1. Press down on the Micro SD to eject it from the SD slot shown in **Figure 15**.

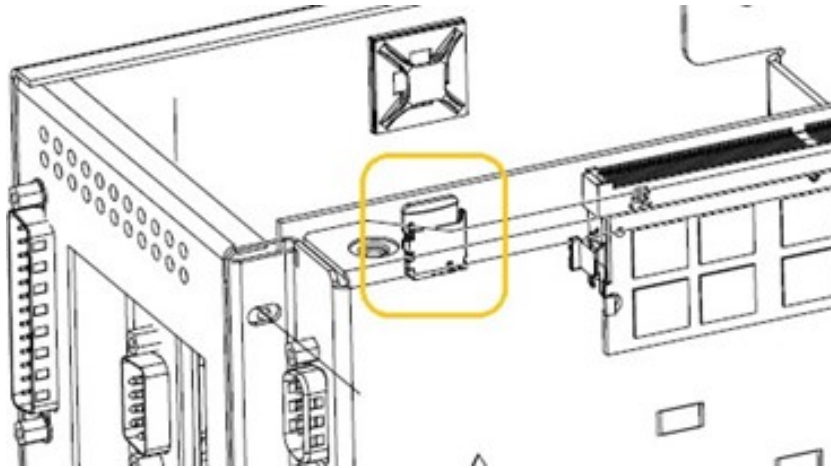


Figure 15 - SD Slot Location in CamBot Brick PC

2. Discard or store the Micro SD card, as it is no longer required.

Inserting the mSATA

1. Hold the mSATA SSD along the edges, avoiding the connectors shown in **Figure 16**.



Figure 16 - mSATA SSD

2. Locate the Brick PC's mSATA slot shown in **Figure 17**.

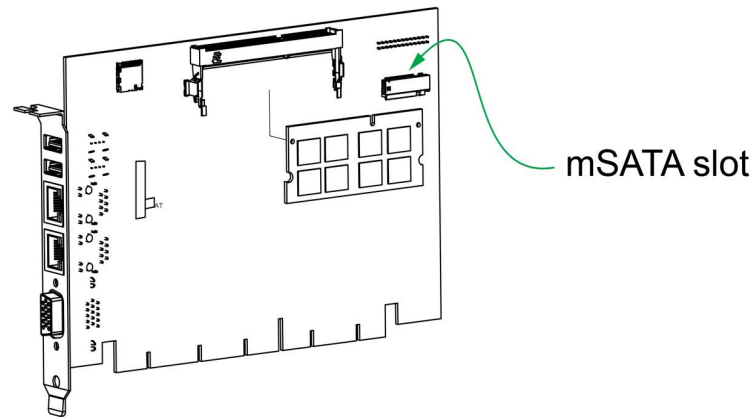


Figure 17 - mSATA Slot Location in CamBot Brick PC

3. Remove the two screws located at each corner of the slot with the non-magnetic Philip's screwdriver.
Note: These screws are very small and easy to lose.
4. Insert the mSATA SSD into the mSATA slot.
5. Align the notches on the mSATA SSD with the ridges in the mSATA slot.
Note: When inserting the mSATA SSD, press down on it lightly before screwing it in place.
6. Tighten the two screws on the bottom corners of the slot with the non-magnetic Philip's screwdriver.

Replacing the mSATA SSD

Remove the old mSATA SSD

1. Locate the Brick PC's mSATA slot.
2. Remove the two screws located at each corner of the old mSATA with the non-magnetic Philip's screwdriver.
Note: These screws are very small and easy to lose; keep them in a safe place, as they'll be used to secure the new mSATA SSD.
3. Remove the old mSATA SSD.

Insert the new mSATA

1. Insert the new mSATA SSD into the mSATA slot.
2. Align the notches on the mSATA SSD with the ridges in the mSATA slot.
3. Tighten the two screws on each corner of the slot with the non-magnetic Philip's screwdriver.

Reassembling the CamBot Brick PC

1. Tighten the four screws on the side plate with a Phillips head screwdriver, as shown in **Figure 14**.
2. Tighten the two screws on the L-shaped vent with a Phillips head screwdriver.

Reassembling the CamBot Pedestal

Insert the CamBot Brick PC

1. Locate the four mounting bolts on the corners of the Brick PC's mounting plate (**Figure 13**).
These bolts are holding the Brick PC to the pedestal's base plate.
2. Tighten the four mounting bolts and carefully secure the Brick PC in place.

Restore Electronic Connections

1. Refer to the connections noted in "**Remove the CamBot Brick PC connections**" on **page 8**.
IMPORTANT: Use caution when reconnecting the 4-pin Molex connector. If the pins push out and misalign, they won't have power for the DC.
2. Reestablish all connections as per your reference and those outlined in **Figure 12**.
3. After reconnecting the 5 electronic connections shown in the above diagram, you must also reconnect the input AC (located on the front) and the DC output power (located on the back of the Brick PC).

Install the Skirt

1. To the right side of the connection panel, check whether there is a loose green ground wire hanging from the inside edge of the skirt. If such a wire is present, reconnect it. The wire connects to a similar green ground wire attached to a threaded post beside the connection panel. Refer to **Figure 18**.

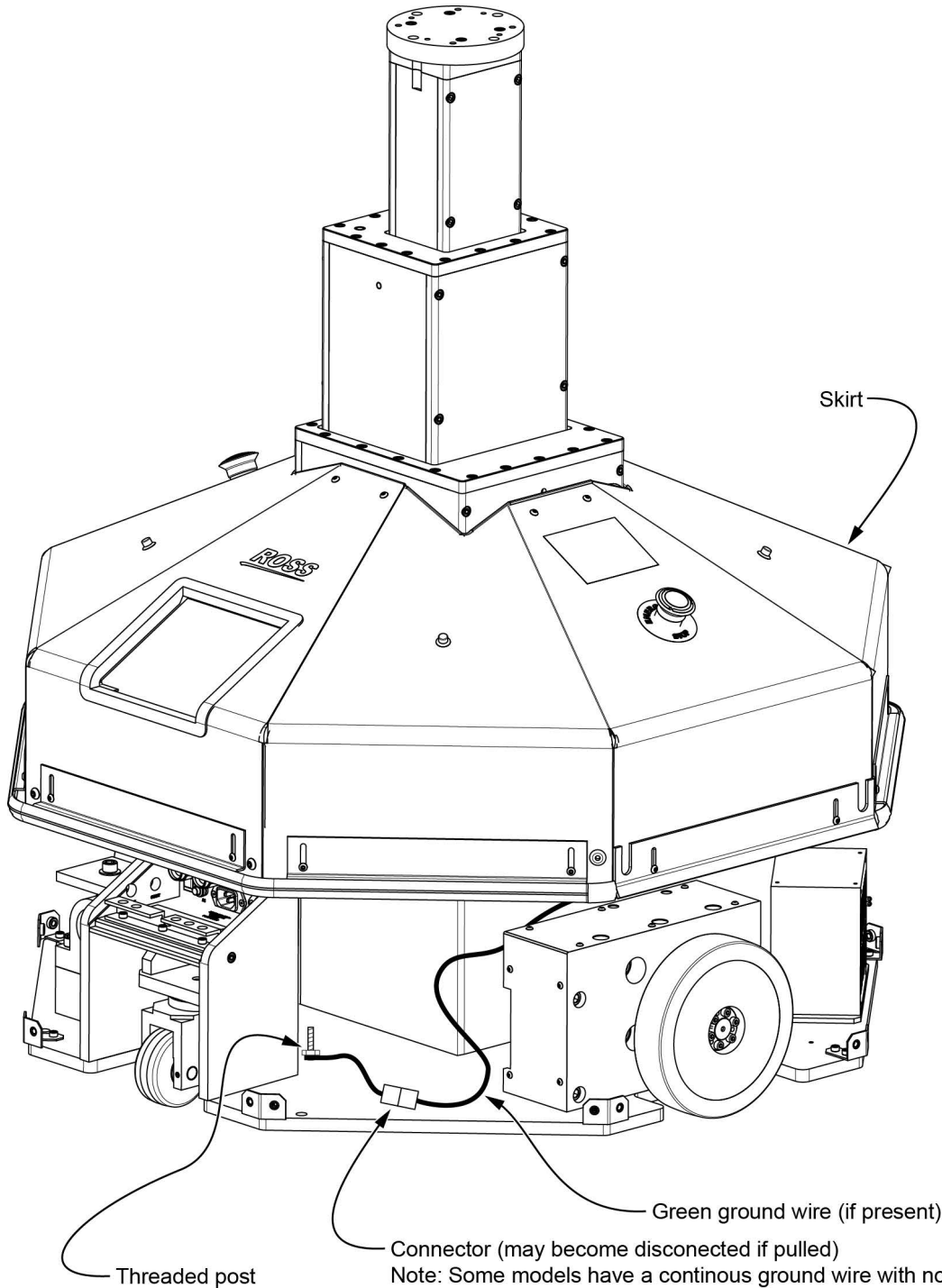


Figure 18 - Reconnecting the Ground Wire (if present) - View of the CamBot 700XY Pedestal (some parts omitted for clarity)

2. With one person on each side of the pedestal, slowly lift the skirt approximately 10 inches (25cm) and then remove the rectangular blocks beside the large drive wheels.
3. Place the skirt back in place over the base of the pedestal and lower it to rest on the support pieces underneath, as shown in **Figure 9**.

IMPORTANT: When you remove the support pieces, avoid snagging or pinching any cables under the skirt. Slide the support pieces out from the side, not lengthwise (see **Figure 10**).

Tip: To prevent binding, avoid tilting the skirt as you lift it.

4. At the bottom of the skirt, use a 5/32" hex key to tighten the four (or eight) screws that secure the skirt to the pedestal base plate (refer to **Figure 9**).
5. Along the top edge of the skirt, use a 3/32" hex key to tighten the four screws (or eight, depending on the CamBot model) that secure the skirt to the lift column (if present). Refer to **Figure 9**.

Note: Some CamBot XY pedestals do not have screws along the top edge of the skirt.

Test CamBot Functionality

1. With the skirt secured, power up the pedestal and observe the normal boot sequence.
2. In SmartShell, test the operation of the pedestal.
3. Secure the skirt and return the pedestal to service.

Restoring Backup Data

This section provides an overview of how to back up data for either Furio or CamBot systems. Follow the instructions for your specific device.

Restoring Furio Backup Data

Restore Furio Backup Data

Follow this procedure to restore a CamBot system.

1. Obtain the IP address of the robot that required a new mSATA SSD.
2. Enter the robot's IP address into a web browser.
Note: Ensure the robot is powered and connected to the network.
3. Select the **Backup** tab from the tab menu.
4. Select **Choose File**.
5. Locate the file that you would like to restore from "Downloading Backup Data" above.
6. Select **Restore Data Backup**.

Restoring CamBot Backup Data

Restore Pedestal Settings

Follow this procedure to restore presets on an upgrade to Motion Director.

1. Obtain the IP address of the robot that required a new mSATA SSD.
2. Enter the robot's IP address into a web browser.
Note: Ensure the robot is powered and connected to the network.
3. Extract the appropriate XY config template from the firmware zip file.

For example, extract cambotxy_conf_600XYS3.tpl for a 600XY- S3, as shown in **Figure 19**.

Name	Type
web	File folder
cambotxy_conf.tpl	TMPL File
cambotxy_conf_600XYS2.tpl	TMPL File
cambotxy_conf_600XYS3.tpl	TMPL File
cambotxy_conf_700XY.tpl	TMPL File
Furio	File
Furio.properties	PROPERTIES File

Figure 19 - Config Templates

4. Edit the template and set the values for LeftWheelRadius and RightWheelRadius, using the values calculated in “Record CamBot pedestal settings” on page 4.

```
# Pedestal/XY Axis parameters
Axis XY {
    ...
    PedControl {
        ...
        Param LeftWheelRadius { Value 88.8; }; # mm ~7 inch diameter
        Param RightWheelRadius { Value 88.8; }; # mm
    }
}
```

Figure 20 - Pedestal Axis Parameter Settings

5. Upload the extracted config template in the same manner the zip file was uploaded.
6. Reconfigure persistent limits through the device web interface.
7. Open the **Axis Settings** tab and select **Enable Edit > Yes**.
8. Enter new high and low tilt, lift, zoom, and focus limits.
IMPORTANT: Do not re-apply persistent PAN limits as they are relative to the pedestal base in 5.2c, unlike under CamBot firmware, where they were relative to the floor (or target).
9. Open the **Tracking** tab.
10. Set **Protocol** to **FreeD**.
11. Enter the **Send over UDP** section for each **Tracking Destination** found in the **Recording Pedestal Settings** section, as shown in **Figure 21**.

```
# cat /cf/config.dat
[snip]
VS 1 Tracking Enabled
VA 10.20.50.51
VP 1100
VirtualSetAddress2 10.20.30.10
VirtualSetPort2 1100
VirtualSetAddress3 172.16.16.5
VirtualSetPort3 1234
```

➔

Protocol: FreeD

Send via UART:

Send over UDP:

Send IP	Port
<input checked="" type="checkbox"/> 10.20.50.51	1100
<input checked="" type="checkbox"/> 10.20.30.10	1100
<input checked="" type="checkbox"/> 172.16.16.5	1234

Figure 21 - Send Over UDP Data

Note: If Ross Lucid Studio (formerly Ross UX / VCC) is part of the Virtual Set solution, be sure to change the Pedestal Mount option from “Cambotics Ped” to “Furio Curved” for CamBot XY Pedestals running Furio Firmware.

Restore CamBot Backup Data

Follow this procedure to restore a CamBot system.

1. Open the browser with the robot's IP address entered in the address bar.
2. Select the **Backup** tab from the tab menu, as shown in **Figure 22**.
3. Select **Browser**.
4. Locate the file that you would like to restore from "Downloading Backup Data" above.
5. Select **Restore Data Backup**.



Figure 22 - Restore CamBot Backup Data