Quick Start Guide for X300 and X350 Pan & Tilt Heads

Start Here — Unpacking the Head

1 Unpack the Head

The package includes the following:

- X300 or X350 robotic pan & tilt head (X300: 5110AR-372-*xx*, X350: 5110AR-365-*xx*)
- Camera cradle attachment (5100AR-363-*xx*)
- Bag of four 1/4-20, 3/4" head mount screws (5110KR-041-*xx*)
- Bag of three 1/4-20, 5/8" camera screws and washers (5110KR-040-*xx*)
- Bag of four 6-32, 1/2" cradle mount screws and washers (5110KR-039-*xx*)
- One lens control cable suitable for your lens (as selected when ordered)
- Power supply unit and line cord suitable for your location (based on shipping address or special request).
- Printed copy of ***Site Requirements for X300 and X350*** (5100DR-080-*xx*)
- Printed copy of ***Quick Start Guide for X300 and X350*** (5100DR-081-*xx*)
- USB drive containing user manuals (5100USB-101-*xx*)

Retain all packaging materials in case you need to ship the head later.

Mounting the Head

2 Mount the Head

a) Find the orientation mark on the **Pan** axis hub and note whether it is aligned with a similar mark at the front of the head.

Gently and slowly turn the **Pan** axis hub by hand to align the marks. They do not need to be perfectly aligned.

b) Record the serial number from the underside of the head. You may need it later to configure the head.

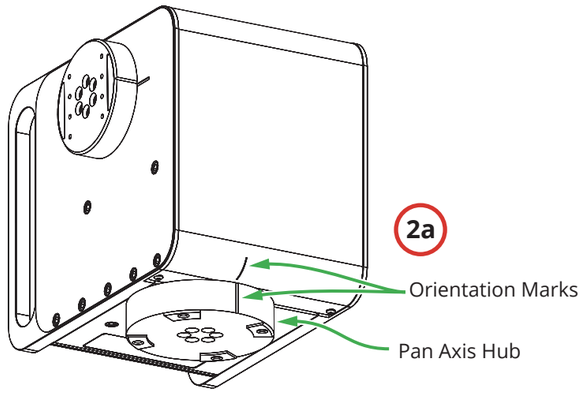
c) The bottom of the head has four mounting holes (1/4-20, 3/4" (19 mm) maximum penetration depth).

d) Fasten the head to the mount using four head mount screws (bag 5110KR-041-*xx*). Use a 3/16" hex key (Allen key).

e) X350 only — Ensure that the Ross logo badge on the side of the head is upright. Rotate it if necessary. The badge clicks into place. The position of the badge controls the orientation of the touch-screen display.

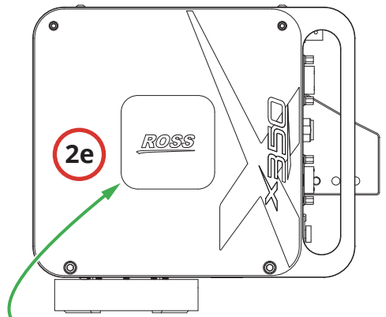
A variety of mount options are available from Ross Video:

- Model PM8 8" Pedestal Riser (RRB-UNI-PM8) mounts to horizontal surfaces such as a ceiling, half wall, or platform.
- Universal Ceiling Mount (RRB-UNI-CLM) for nominal 1.5" Schedule 40 pipe, OD 1.9" (48 mm). A PM8 Pedestal Riser is also required.
- Universal Wall Mount Bracket (RRB-UNI-WMB).
- Furio Dolly, SkyDolly, or BlackBird Pedestal (not shown).
- Mitchell Mount Adapter (RRB-UNI-MA) (not shown). A PM8 Pedestal Riser is also required as a mating adapter.
- Various other tripods and pedestals. Contact Ross Video for details.

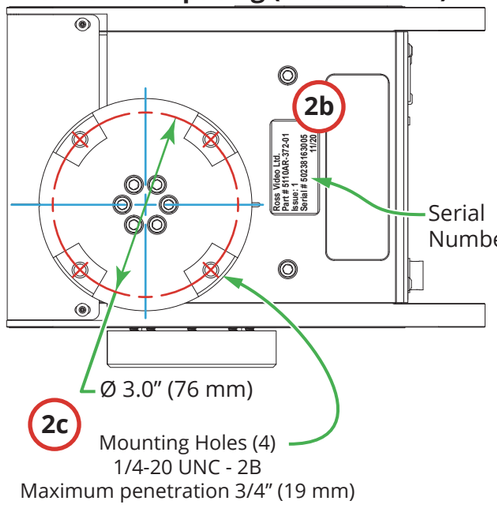


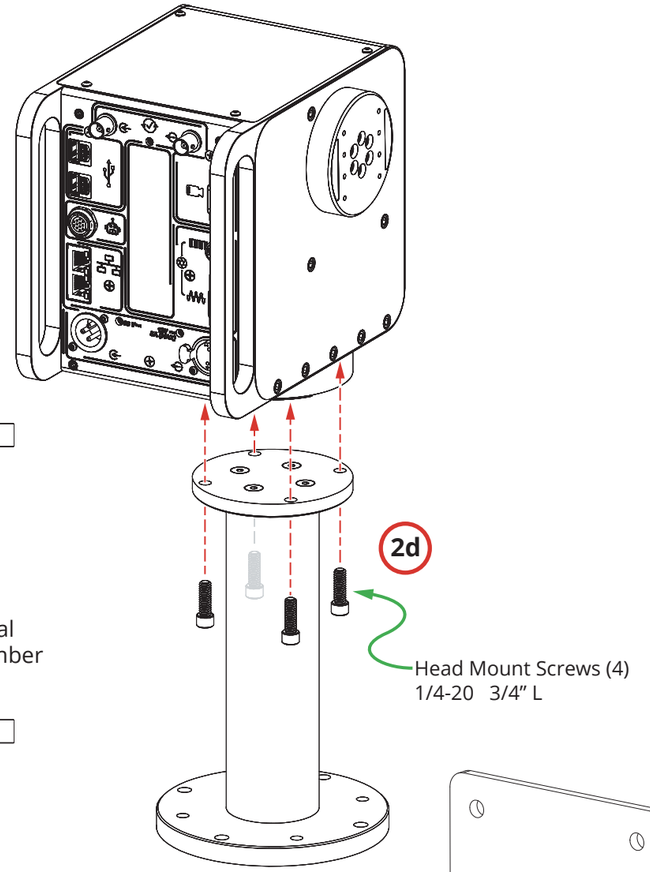
X300 (front angle view)

X350 (side view)

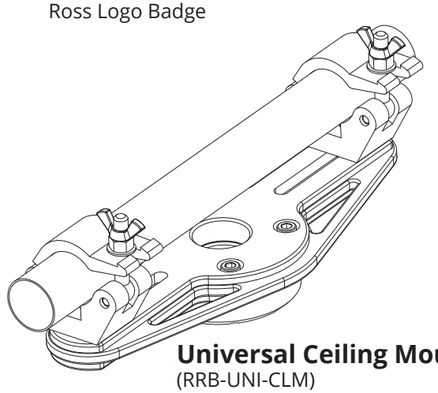


Mount Hole Spacing (bottom view)

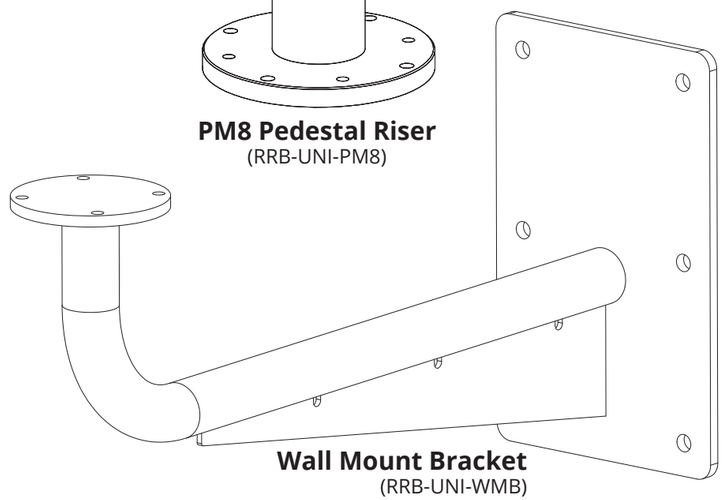




PM8 Pedestal Riser
(RRB-UNI-PM8)



Universal Ceiling Mount
(RRB-UNI-CLM)



Wall Mount Bracket
(RRB-UNI-WMB)

5100DR-081-01

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Attaching the Camera Cradle

3 Attach the Camera Cradle

a) Find the orientation mark on the **Tilt** axis hub and note whether it is aligned with a similar mark pointing towards the front of the head.

Gently and slowly turn the **Tilt** axis hub by hand to align the marks. They do not need to be perfectly aligned.

b) Fasten the camera cradle to the head using four cradle mount screws and washers (bag 5110KR-039-*xx*).

Use a 1/4" flat wrench to drive the screws.

Tip: The exact camera cradle position is not critical at this stage. You may need to adjust it later to balance the payload.

Mounting the Payload

4 Assemble the Payload

Attach the lens and other payload components to the camera, and then check the total payload weight.

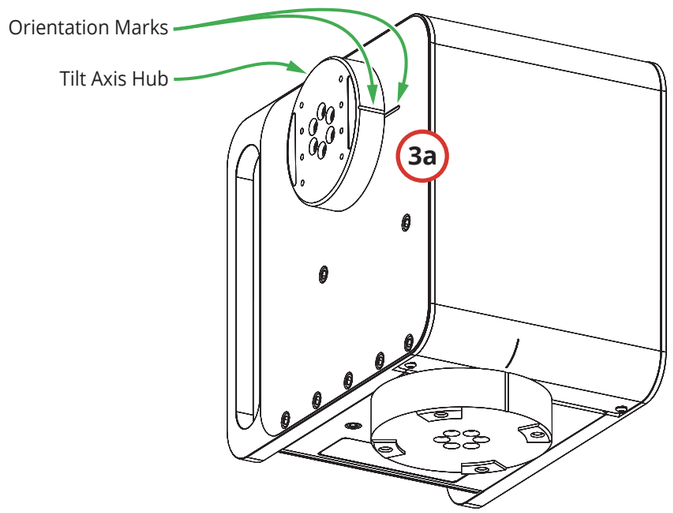
IMPORTANT: Maximum payload is 15 lbs (6.8 kg).

5 Mount the Payload

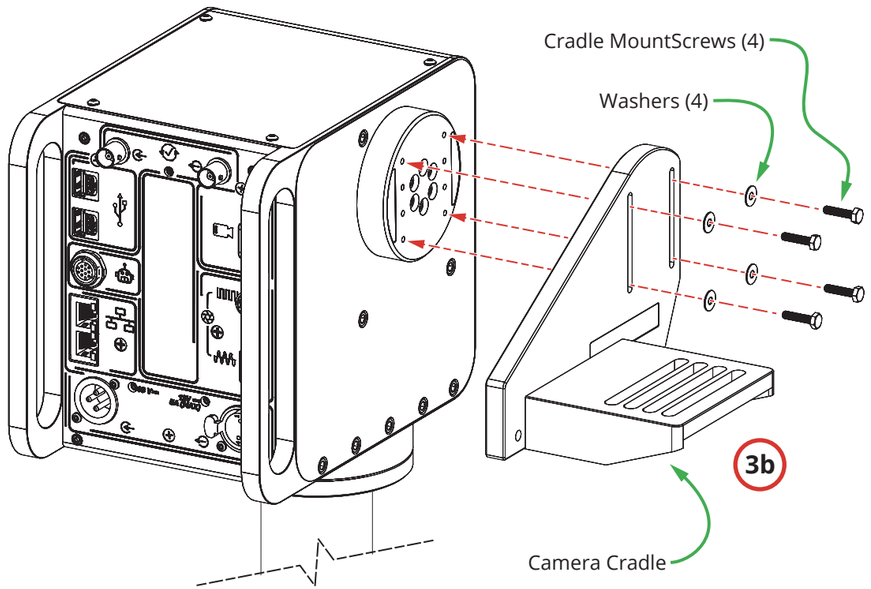
Fasten the camera to the camera cradle using two camera screws and washers (bag 5110KR-040-*xx*).

Use a 3/16" hex key (Allen key) to drive the screws.

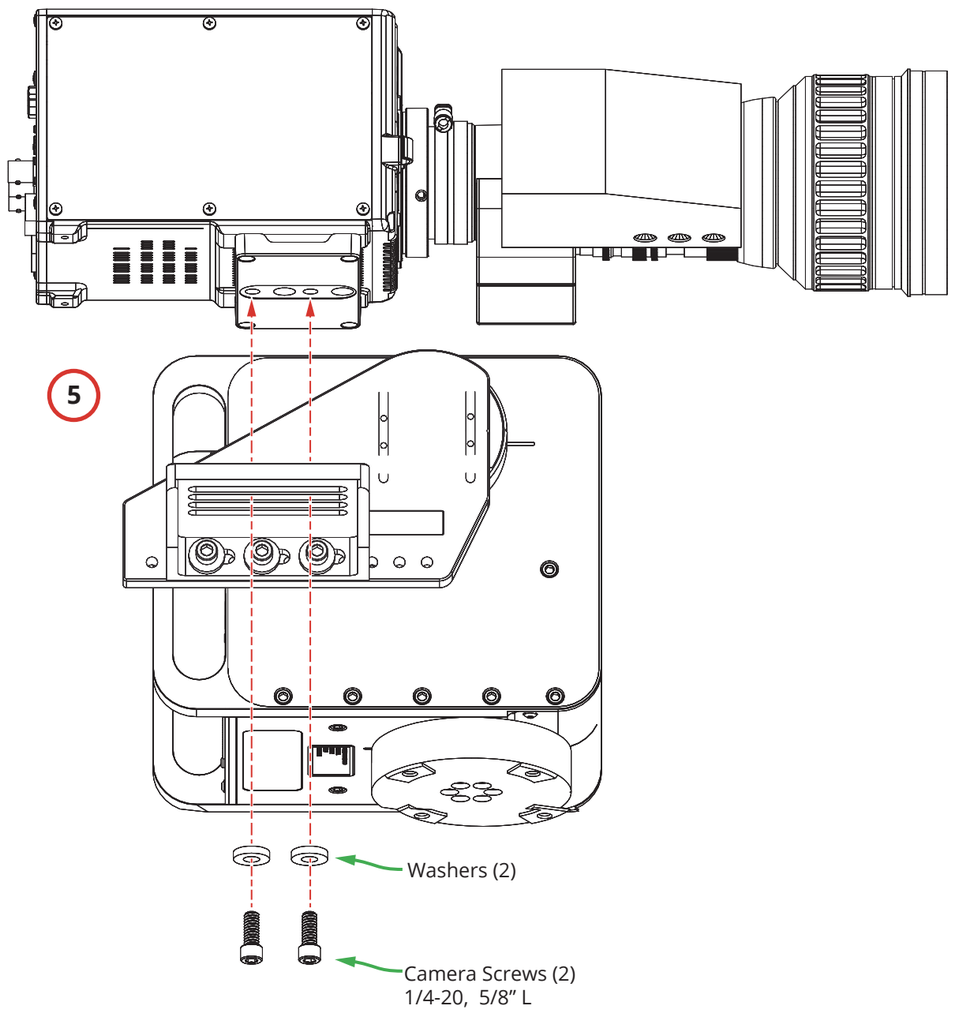
X300 (front angle view)



Attaching the Camera Cradle (X350 shown)



Mounting the Payload



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Balancing the Payload

6 About Balancing the Payload

For best performance, and to reduce wear on the drive train, ensure that the payload's center of gravity is aligned with the tilt axis.

IMPORTANT: An overweight or improperly balanced payload can cause permanent damage to the head.

The head and camera cradle are designed to make balancing easy (see diagram):

- Three screws along the bottom edge of the camera cradle fasten the cradle pieces together, and allow for horizontal adjustment (forwards / backwards):
  - A series of threaded holes allow the screws to be repositioned for major horizontal adjustments.
    Tip: When repositioning the screws, be careful to avoid losing washers.
  - Slots allow for horizontal fine-tuning.

  IMPORTANT: Be sure to tighten the three screws that fasten together the camera cradle pieces. These screws are shipped partially-loose.
- Four screws that join the camera cradle to the head allow for vertical adjustment (up / down):
  - A series of threaded holes allow the screws to be repositioned for major vertical adjustments.
    Tip: When repositioning the screws, be careful to avoid losing washers.
  - Vertical slots on the camera cradle allow for vertical fine-tuning.

  IMPORTANT: Always use four screws to fasten the camera cradle to the head (two per slot).

7 Balance the Payload Horizontally

Tilt the payload so that it is horizontal, and then release it.

If the payload tilts, it is not horizontally balanced.

Use the horizontal adjustment features (see diagram) to move the payload away from the direction it tilted, and then test again.

Tip: After you balance the payload horizontally, use a grease pencil or marker to mark the position of the payload on the camera cradle.

8 Balance the Payload Vertically

Tilt the payload approximately 40° (but not as far as it can go), and then release it.

If the payload moves, it is not vertically balanced:

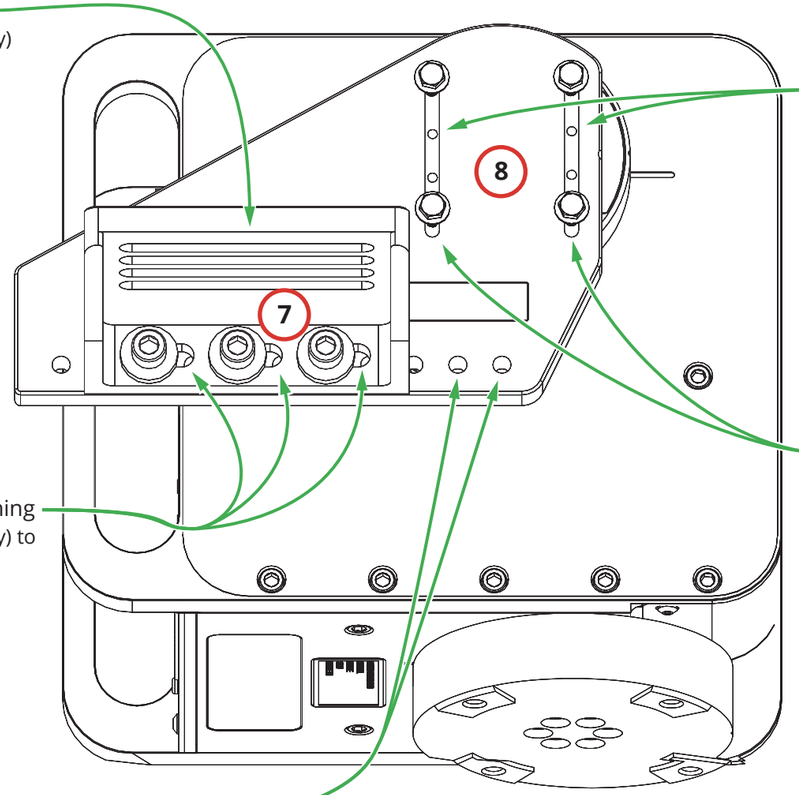
- If the payload tilts back towards horizontal, it is mounted too low, and must be raised.
- If the payload continues tilting away from horizontal, it is mounted too high, and must be lowered.

Use the vertical adjustment features (see diagram) to raise or lower the payload as required, and then test again.

Tip: If you cannot easily access the vertical adjustment screws, you may need to temporarily remove the payload from the camera cradle. Be sure to return it to its original position.

Tip: After you balance the payload vertically, use a grease pencil or marker to mark the position of the cradle mount screws on the cradle.

6 Balancing the Payload



Slots for Sliding Camera
- Use a 3/16" hex key (Allen key) to drive screws joining the camera to the camera cradle.

Holes for Vertical Adjustment
- Use a 1/4" flat wrench to drive cradle mount screws.
- Always use four screws to fasten the cradle to the head (two per slot). By selecting which holes to use, you can mount the cradle higher or lower.

Slots for Vertical Fine-Tuning
- Use a 1/4" flat wrench to drive cradle mount screws.

Slots for Horizontal Fine-Tuning
- Use a 9/64" hex key (Allen key) to drive screws joining the two pieces of the camera cradle.

Holes for Horizontal Adjustment
- Use a 9/64" hex key (Allen key) to drive screws.

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- online through our website: www.rossvideo.com

Cabling the Head

9 Connect Ethernet Cables for Head Control and Camera Control Over IP

a) Connect a CAT5E cable from the Ethernet network to one of the two **Ethernet Ports** on the head.

b) If camera control over IP is required, connect a CAT5E cable from an **Ethernet Port** to the camera.

Tip: If the camera can be controlled both over IP and through a serial digital connection, and you want to cascade the network connection from head-to-head, use the serial DB-9 socket for camera control. This leaves both Ethernet ports available for daisy-chaining the network connection.

c) If there is a vacant **Ethernet Port** and you want to cascade the network connection from head to head, connect a CAT5E cable between the **Ethernet Port** and an **Ethernet Port** on the next head.

10 Connect CAN Bus Data Cable (X350 only, firmware v6.0.200 or higher required)

This step applies only if the head is model X350 and is to be connected to a Controller Area Network (CAN). This applies to X350 heads mounted on a Furio dolly, Furio SkyDolly, or Furio BlackBird pedestal.

Connect a CAN data cable from the control network (typically via the connection panel of a Furio Dolly, SkyDolly, or BlackBird pedestal) to the **CAN Control Port** on the X350 head.

11 Connect Cables for Lens Control, Serial Camera Control, Sync, and Power Out

a) If lens control is analog, connect a suitable lens control cable from the **Analog Lens Control Port** to the lens.

b) If lens control is digital, connect a suitable lens control cable from the **Digital Lens Control Port** to the lens.

c) X350 only — If serial camera control is required, connect a suitable serial cable from the **Serial Camera Control Port** to the camera.

d) X350 only — If a sync signal is available, connect the sync cable to the **SYNC IN** port (standard BNC).

Tip: You can also provide the sync signal to another device, such as a camera or robotic head, via the **SYNC OUT** port (standard BNC).

e) X350 only — If you want to provide 12 VDC power from the head to the camera, connect the camera's power cable to the **POWER OUT** port on the head. Maximum current 5 Amps. Maximum power 60 Watts.

12 Connect Power Cable, Dress Cables, Install Tether(s), and Connect Power

a) Connect the power adapter cable to the **POWER IN** port on the head.

b) Dress all cables carefully to

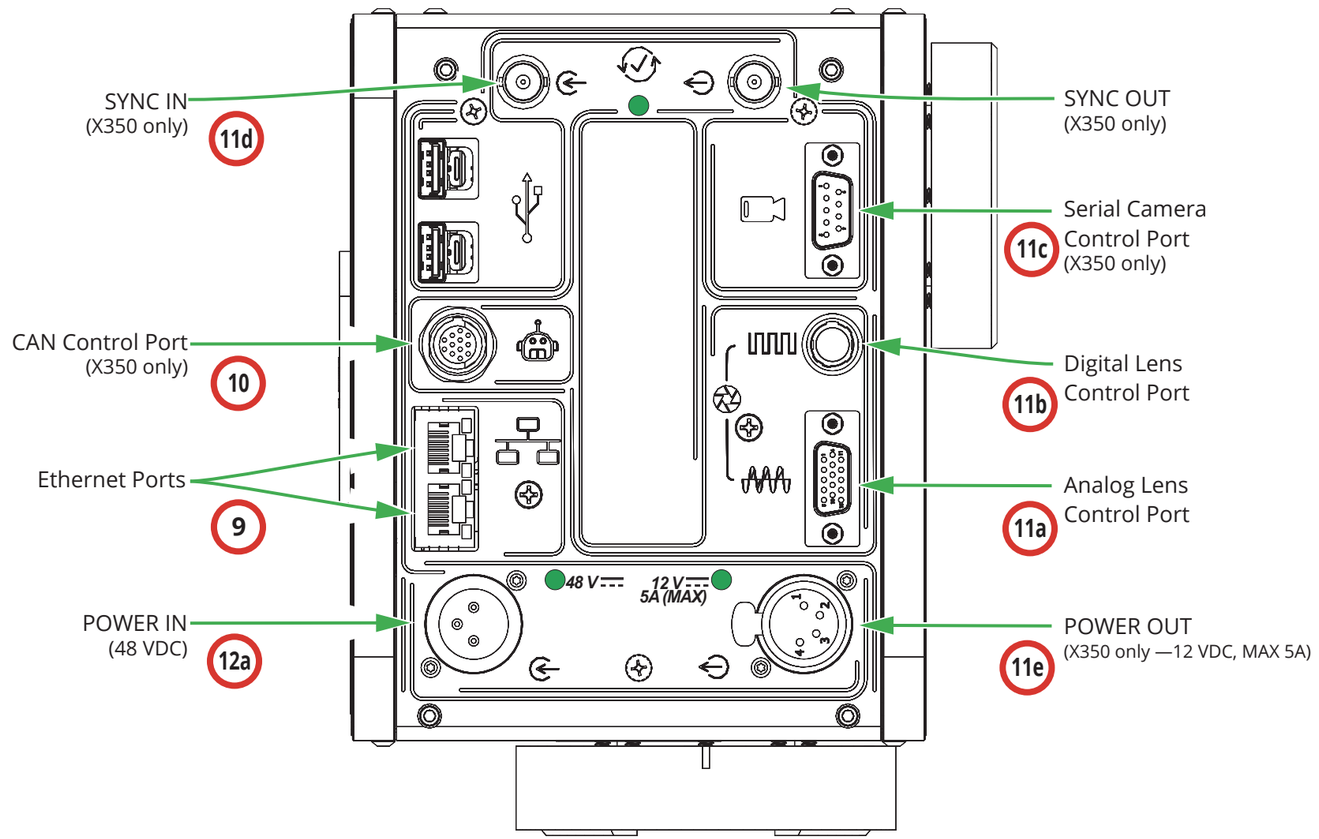
- allow the full range of pan & tilt motion without snagging, or obscuring the camera lens
- prevent strain on cable connections, by attaching cables to the head's handles. Minimize drag by tying cables to a fixed support close to the head, and by keeping the unsupported cable swag short.
- prevent physical damage to the cables, such as can be cause by foot traffic, rolling equipment, etc.
- prevent risk to personnel such as can be caused by tripping over poorly-dressed cables

c) Attach any required safety tethers, looping them through both handles or through only the handle on the payload side of the head (preferred). Ensure all tethers allow full pan & tilt motion without excess slack, and without obscuring the camera lens. Do not dress (bundle or zip-tie) safety tethers!

d) Connect the line cord to the power adapter, and then plug it into a suitable electrical socket.

IMPORTANT: Whenever you disconnect power to the X300 head, wait at least 20 seconds before reconnecting it. Otherwise, the head may not start properly.

Cabling the Head (X350 shown)



Next Steps: Configure the Head and Add it to Robotic Control

13

Before you can use the X300 or X350 head, you must configure its network settings and axis limits using the built-in touchscreen interface (X350 only) and/or the head's web interface (X300 and X350).

Heads can be controlled through Ross Video DashBoard, Ross Video SmartShell. Heads use the Furio API for direct control by Ross Production Switchers, OverDrive, and other third-party devices and controllers. You must add each head to the robotic control system(s) you want to use to control it.

For more information about product features, configuration, and control options, see the ***Technical Manual for X300 and X350 (5100DR-082-xx)***, as well as other manuals available on the Documentation USB drive for Ross Video Studio Robotics (***5100USB-101***). The Documentation USB drive is included.

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