Eagle Eye Application Note – AN039

Best Practices for Eagle Eye Bridge/CMVR Installations

2022-06-27 Revision 1.1

Target Audience

This Application Note is intended for installers and technicians that perform on-site installations of Eagle Eye Bridges and CMVRs for the Eagle Eye Cloud VMS.

Introduction

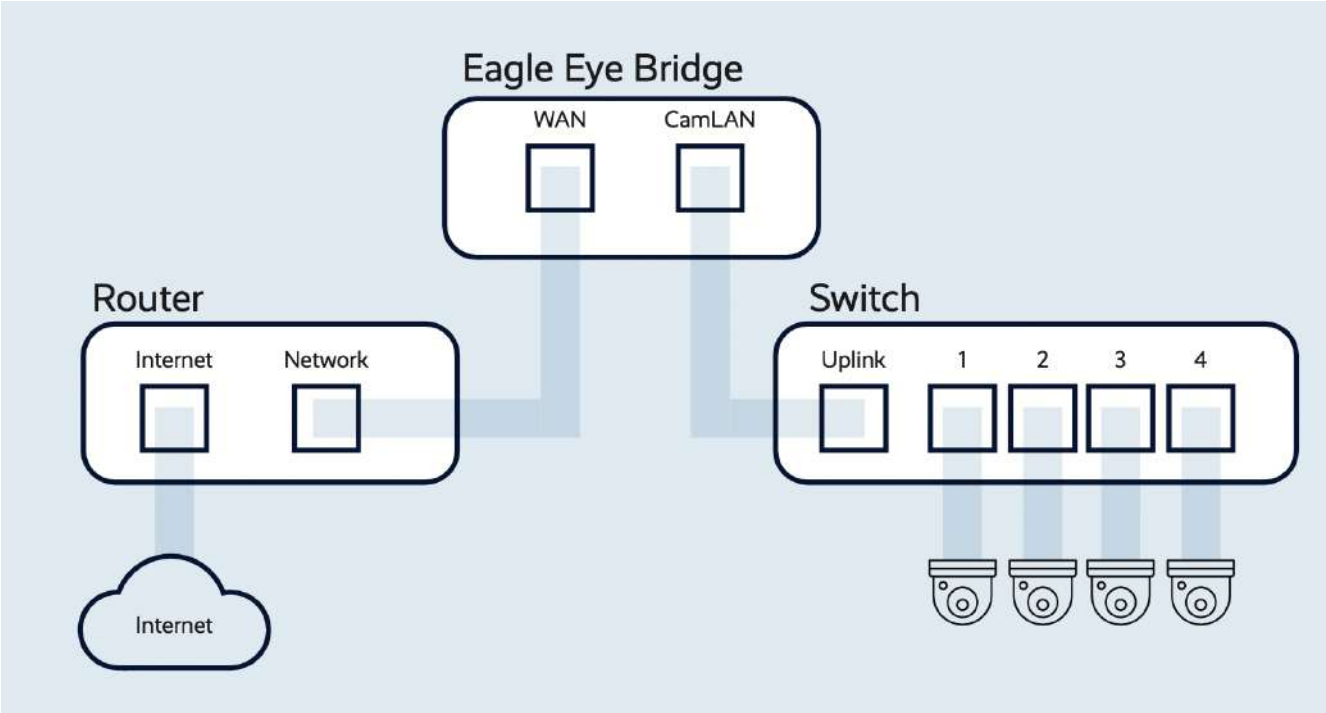
Proper installation of an Eagle Eye Bridge/CMVR is crucial to ensuring reliable operation for customers. Improper installation can result in problems such as overheating, offline cameras, or reliability issues. This Application Note explains some of the best practices for Bridge/CMVR installations as well as practices to avoid.

Eagle Eye Networks provides a variety of Bridges/CMVRs to choose from based upon the application and the installation environment. We strongly recommend using a rack mount bridge if the customer has a rack. A rack mount Bridge/CMVR is the preferred solution in all cases where a rack is present. It will provide the most reliable operation and make for cleaner and more reliable wiring. A Compact Bridge/CMVR, for which this Application Note mainly applies, should only be used when a rack is not available.

This Application Note gives examples for different types of installations. It is by no means exhaustive nor the only way to properly install equipment. Please adapt and utilize this information for your installations.

Bridge Network Ports

Bridges and CMVRs communicate exclusively with the Eagle Eye Cloud Data Center and therefore, do not require any inbound open ports or firewall openings. The image below shows the preferred wiring method for a small scale installation. Note that more security is obtained when the cameras are located on the CamLAN; however, this is not required.



Typical wiring diagram for an Eagle Eye Bridge/CMVR

There is no need to perform any software, firmware, or security updates on an Eagle Eye Bridge/CMVR. Security as well as updates are managed remotely by the system. When the Bridge/CMVR is initially powered on, it will check for firmware updates and automatically apply them. Please allow the Bridge/CMVR update to complete before power cycling or disconnecting from the internet to avoid issues.

Materials Needed for a Quality Installation

For a quality mounting and installation of the Eagle Eye Compact Bridge/CMVR, make sure to have the following:

- Eagle Eye Compact Bridge/CMVR (Provided by Eagle Eye)
- AC power cord and power supply (Provided by Eagle Eye)
- Eagle Eye Installation Kit - tie wraps, velcro, screws, etc. (Provided by Eagle Eye)
- Ethernet cables (Not provided)
- PoE switch (Provided if purchased through Eagle Eye Networks)

- Tools: power drill, crimpers, snips, level, glow rod, ethernet cable tester, RJ45 mod connectors, tie wraps, ladder, patch cables, knife, screws (Not provided)
- Plywood if you are installing onto a wall. We recommend ¾" or 20mm plywood. This gives enough thickness for screws to be installed, hold, and not protrude from the back. Additional details and pricing links listed within the Do's and Don'ts section at the bottom of the document. (Not provided)
- Cameras (Provided if purchased through Eagle Eye Networks)
- UPS (Uninterruptible Power Supply): A UPS is needed for a quality and reliable install. The UPS will eliminate power issues for all electronic equipment and should be used to ensure reliable operation. The UPS should also be used on the router/modem.

Compact Bridge/CMVR and Eagle Eye Install Kit

Eagle Eye Bridges/CMVRs with a '+' in the model have a blue chassis and include an LCD screen. See the Application Note (AN050) on the Compact Bridge/CMVR LCD for details on the LCD screen operation.

Example Compact Plus Model Bridge (304+)

Example Compact Plus Model Bridge (504+)

Plus model Bridges/CMVRs come with an Installation Kit.

Compact Plus Model Bridge/CMVR Installation Kit

Compact Plus Model Bridge/CMVR Installation Kit contents

The Eagle Eye Installation Kit includes:

- 5 Velcro Cable Ties (3 x 150mm, 2 x 250mm) - Bundles cables/cords together and provides mounting to the wall. The holes are to secure the straps to the plywood or wall using screws. Can also be used to mount separate power supplies. Good for cables because you can open them up and add a cable to the bundle (unlike tie wraps where you have to cut and replace).
- 10 Mountable Nylon Zip Ties (5 x 250mm, 5 x 300mm) - Used for mounting power supplies, power strips, and cables to the wall. Also used to strain relief power cords so they don't get accidentally pulled out.
- 1 Eagle Eye Networks Strain Relief Clip - Used to hold cables in place and eliminate accidentally pulling them out. Good for power supply/strip cords and for ethernet cables. Can also be opened once secured so that cables can be added as needed.
- 16 Screws - Used for securing the Bridge/CMVR cables and all the components. If installing on a drywall/stucco, you need to use a piece of plywood to achieve a reliable installation.
    - #8, 1.25” Modified Truss Head Screws (4) - Screws for mounting the bridge, tie wraps, velcro, and Cable Clip to plywood.
    - #6, 1.25” Drywall Screws (12) - Used for mounting cables and cable clips to drywall or other surfaces where a longer screw is needed.
- Installation Kit Card - Find a QR code here to quickly download the Eagle Eye Assistant App and also learn how to share your Eagle Eye Install to social media using the hashtag #EagleEyeInstall.

Also Important:

- Power Cord Clip (attached to the Bridge) - Keeps the power cord secured to the Bridge so that it does not accidentally pull out.

Standard (non-Plus) Compact Bridges/CMVRs include a VESA mounting bracket for mounting.

VESA mounting bracket that is included with standard version Bridges/CMVRs

The VESA mount is only used when installing vertically to a surface like a wall. The mount is secured directly to the plywood, then the Bridge/CMVR is connected to the mount. Note that the mount includes an arrow to indicate which side should be facing up when mounting. Always have the VESA mount arrow facing up. Make sure that the 2 metal clips are facing out as that is what's used to lock the Bridge/CMVR in place to the mount.

Use the 2 raised clips on the VESA mount to clip into either the vertical or horizontal grooves on the bottom side of the Bridge/CMVR. Make sure the power cord and ethernet cables are not pinched when clipping in and that they can be properly routed and secured. Do not allow cords to hang freely.

Categories of Bridge/CMVR Installations

Installations can be broken down into 4 types: Wall-Mount Installations (directly to the wall or on a

wall mounted rack), Shelf Installations, Outdoor Installations, and Rack Installations. This document focuses mainly on indoor installations. Reference the Application Note on outdoor installations (AN051) for additional information. Remember if you have a regular rack use a rack mount Bridge or CMVR. Do not use a Compact Bridge if you have a rack.

A wall-mount installation will generally be more reliable than a shelf installation because the equipment and cables are fixed in place and less likely to be jostled. When the Bridge/CMVR is wall mounted, it is secured and future installers of other equipment wont stack items on top or mistakenly knock cables loose. This all means fewer potential trips to repair.

If given the option, a wall-mount installation is preferred and has several advantages. Namely, the heat dissipation from the chassis is more effective. When the Bridge/CMVR is vertically mounted, it best preserves the installation so in the future when other people use the same space, they don't stack things on top of it or mistakenly knock it loose.

1a. Compact Bridge/CMVR Wall-Mount Installation

There are several key rules to a good wall-mount installation:

1. Use a piece of plywood (at least 3/4" thick) mounted securely to the studs or concrete. Definitely want to hit the studs in the walls if you can. We often use 24" x 24" pre-cut pieces available from Lowes or Home Depot. No cutting needed.
2. Mount the components to the plywood securely with the Trust Head Screws and leave enough space for cables between the components.
3. Securely mount a power strip to the plywood.
4. Mount the power supplies using tie wraps or other hardware - do not let them hang.
5. Neatly route the wires and secure them to the plywood.
6. Mount the UPS to the plywood or wall.
7. Ensure that all power cords and cables have adequate strain relief and are securely attached to the panel so that if they are accidentally pulled they do not come out.

Always use plywood when mounting to drywall to ensure the stability of the installation and to avoid problems with screws falling out and hardware falling off the wall. The cables should be secured with velcro straps and fastened to the wall through the hole in the velcro strap using the screws in the Installation Kit . Use the VESA mounting bracket for the older model 304/324 Bridge/CMVR installs.

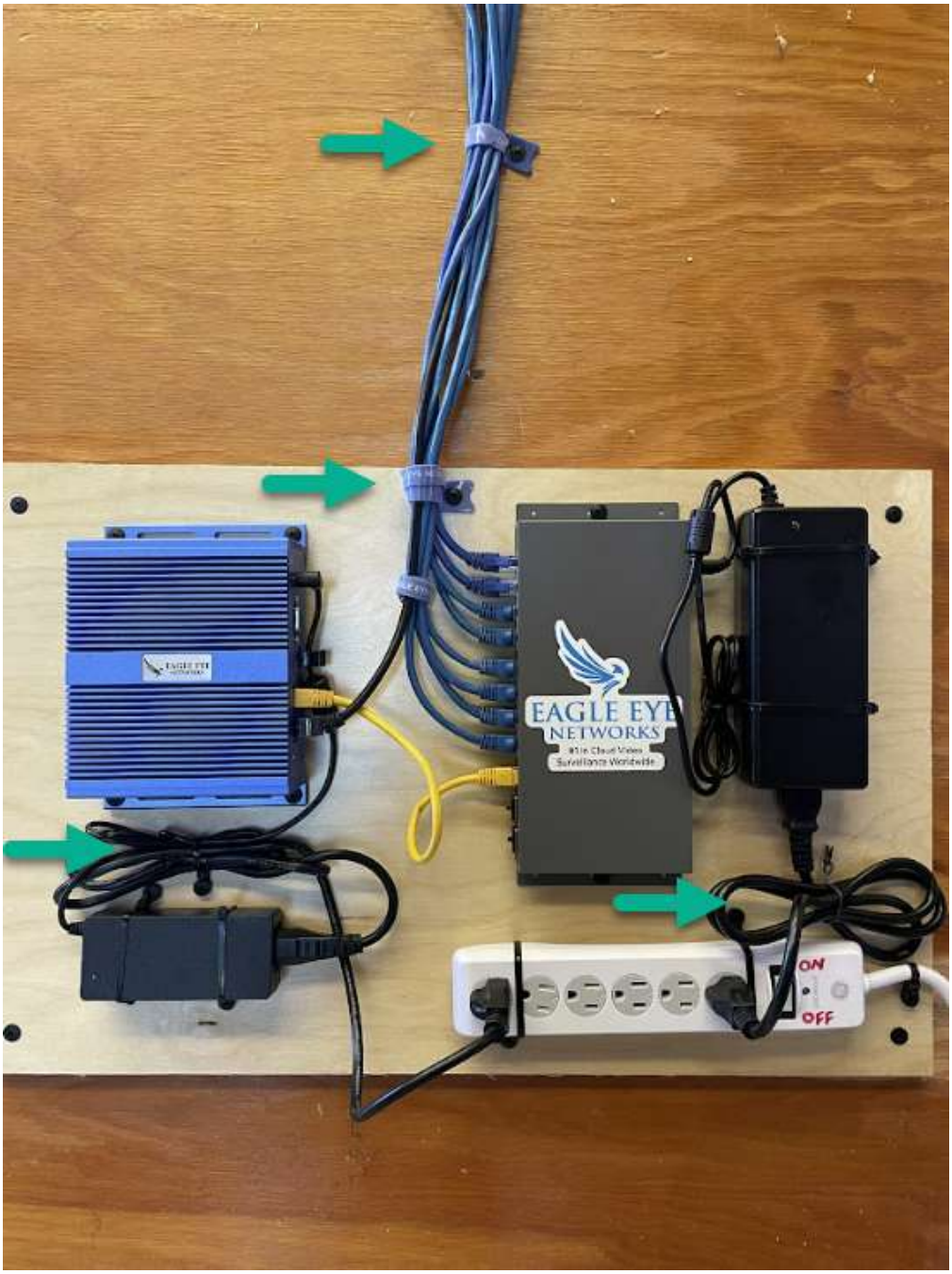
Make sure to mount the power supply and network switch to the wall and do not let cords and cables hang. Most Eagle Eye Compact Bridges/CMVRs also have a cable clip attached to the chassis to help ensure that the power cable does not get pulled out.

Sequence of the installation. Step by Step:

1. Locate a section of the wall in the room where you will do the install. Make sure you can get power (wall outlet on the same wall is good). Clear the area on the wall.

2. Locate the studs if mounting to drywall (use stud finder or knocking method).
3. Attach the plywood to the wall. Use long screws that are sturdy. If attaching to concrete use anchors and pre-drill the holes (lag bolts work well for this).
4. Determine how power and network cables will route to the mounting plywood. Determine power routing from the outlet using a power strip mounted to the board. Make sure the power cord is long enough. Determine network cables entry/exit location (top, bottom, or side entry).
5. Determine location of switch, bridge, power strip, UPS, and power supplies. Remember to leave room for the cables between them. Do not mount them close together. They need space for proper cooling. It is best to place the switch near the network cable entry point.
6. Mount the hardware to the board securely.
7. Mount the power supplies to the board securely using tie wraps.
8. Route the power cords and secure them to the board using tie wraps or velcro ties.
9. Connect the network cables and route them.
10. Organize the network cables and secure them to the board using the velcro ties.

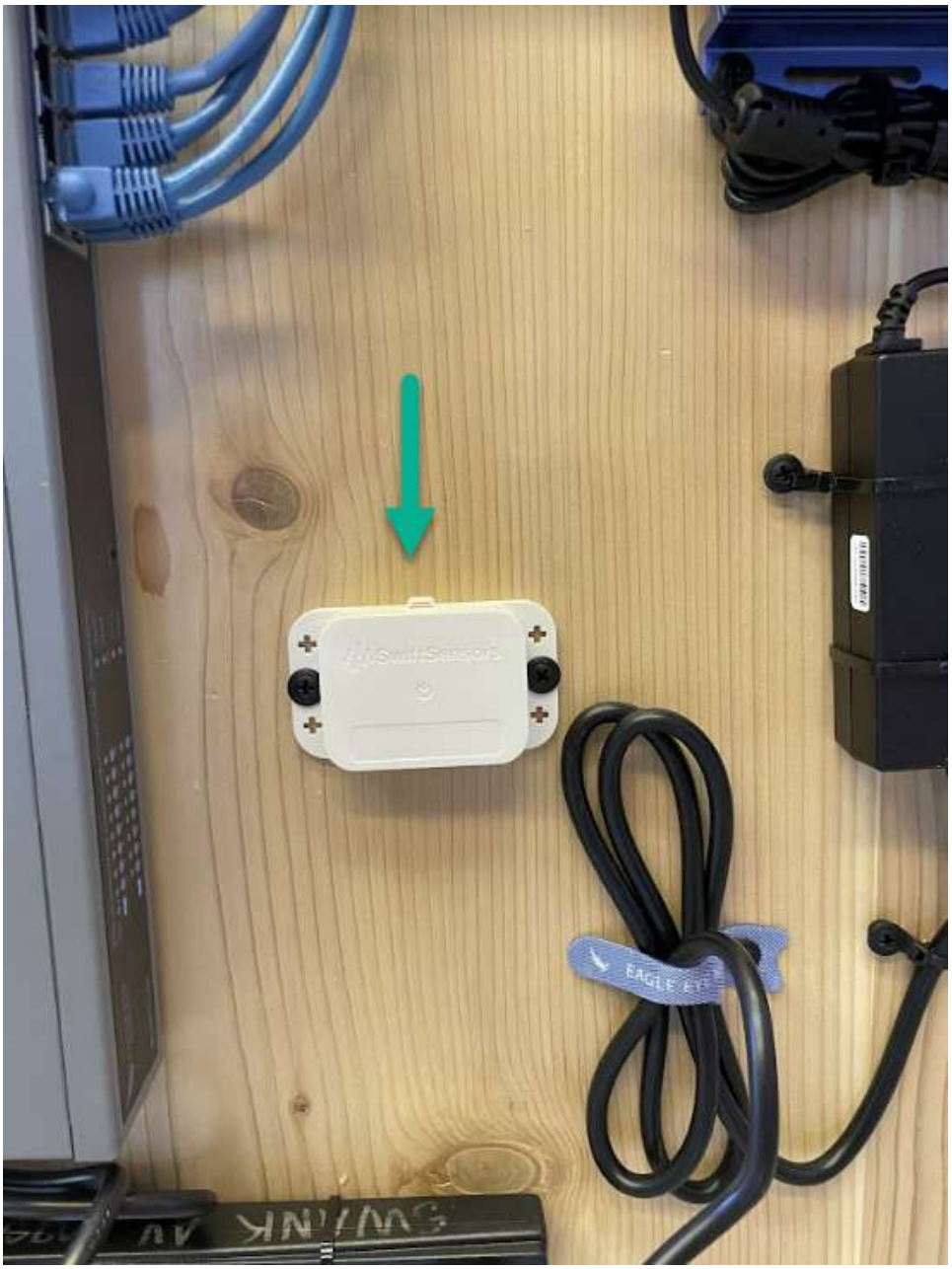
See examples of Wall Mount Installations with best practices and things to avoid below:



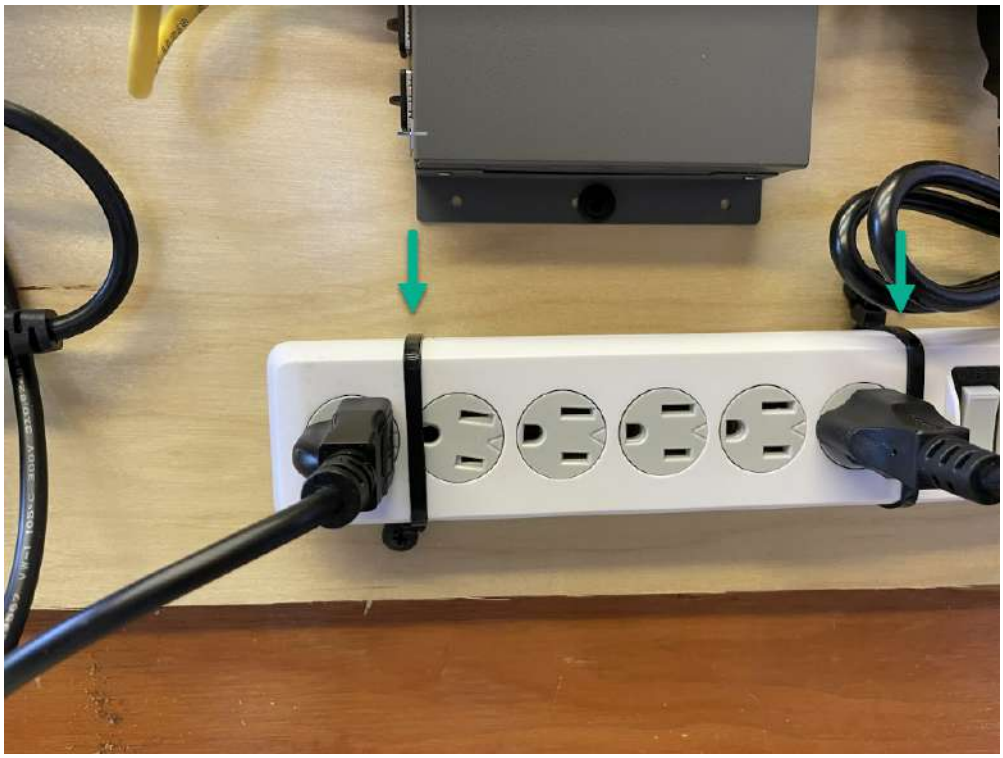
GOOD EXAMPLE: Do coil cables and secure them using velcro straps, tie-downs, and screws.

GOOD EXAMPLE: A Bridge mounted with painted plywood (nice touch) with clean cables and securely fastened hardware. Note the UPS power solution.

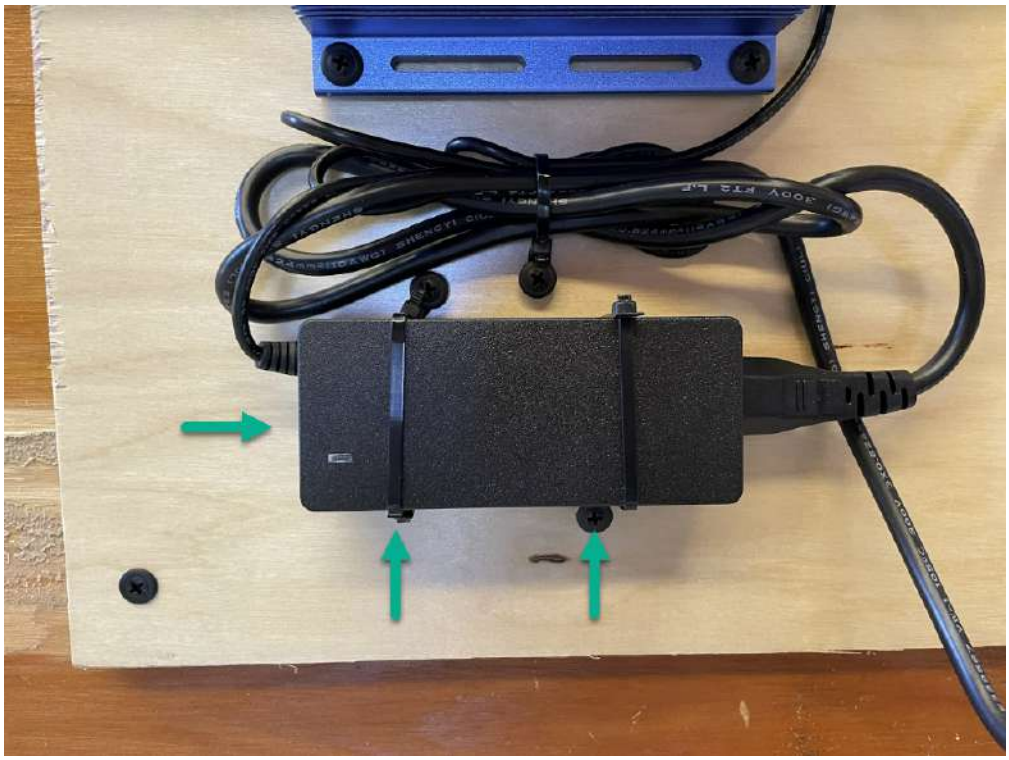
GOOD EXAMPLE: Do leave enough room for ethernet cables to connect to the switch.



GOOD EXAMPLE: Do monitor the temperature of the room where the Bridge/CMVR has been installed.



GOOD EXAMPLE: Do securely mount the power strip.

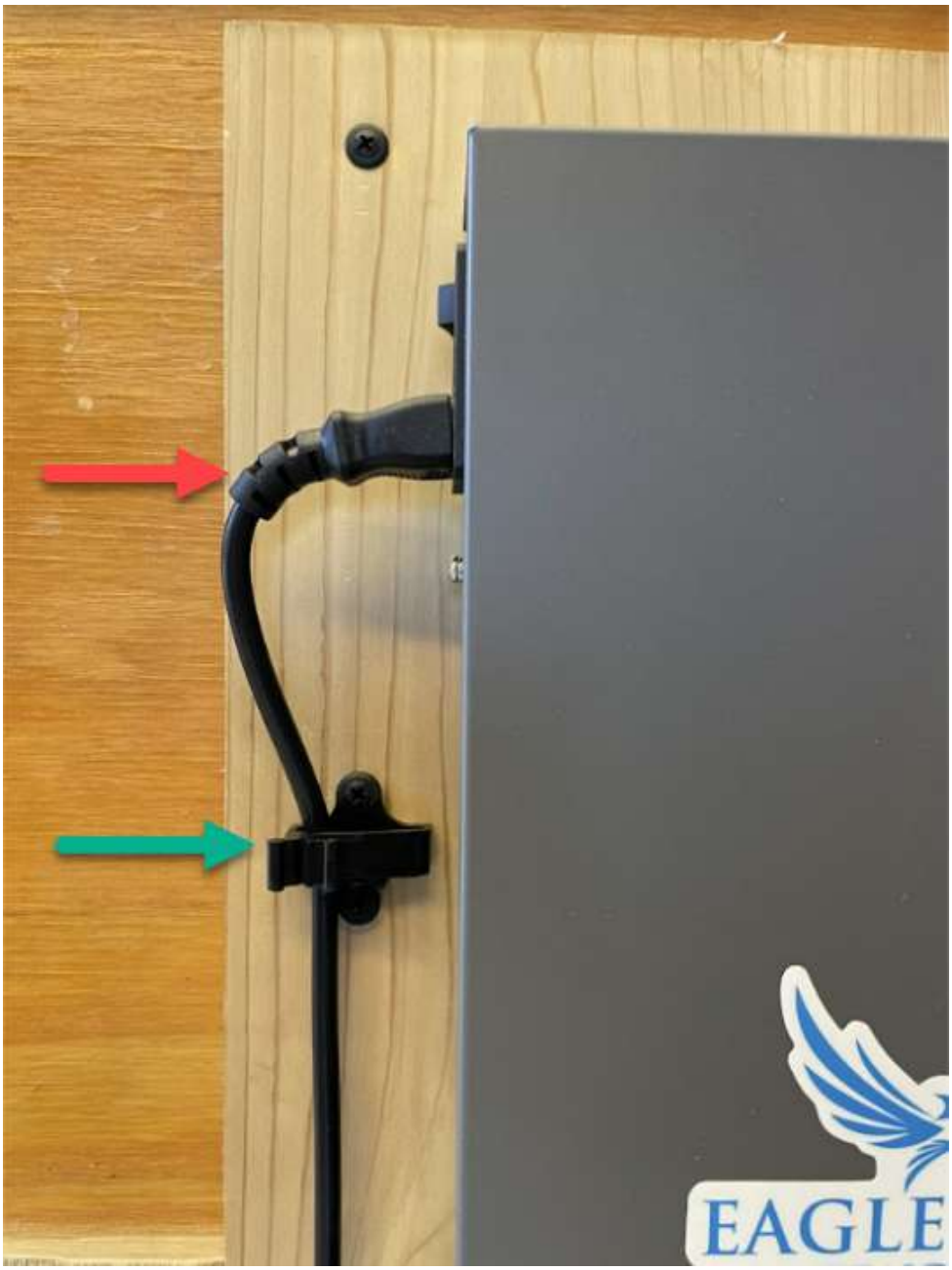


GOOD EXAMPLE: Do securely mount the power supply using zip ties and screws to prevent cords from accidentally falling out.

GOOD EXAMPLE: Do use a UPS battery backup for your installation. This provides more reliable power and avoids corruption. In addition the cameras will operate during power outages.

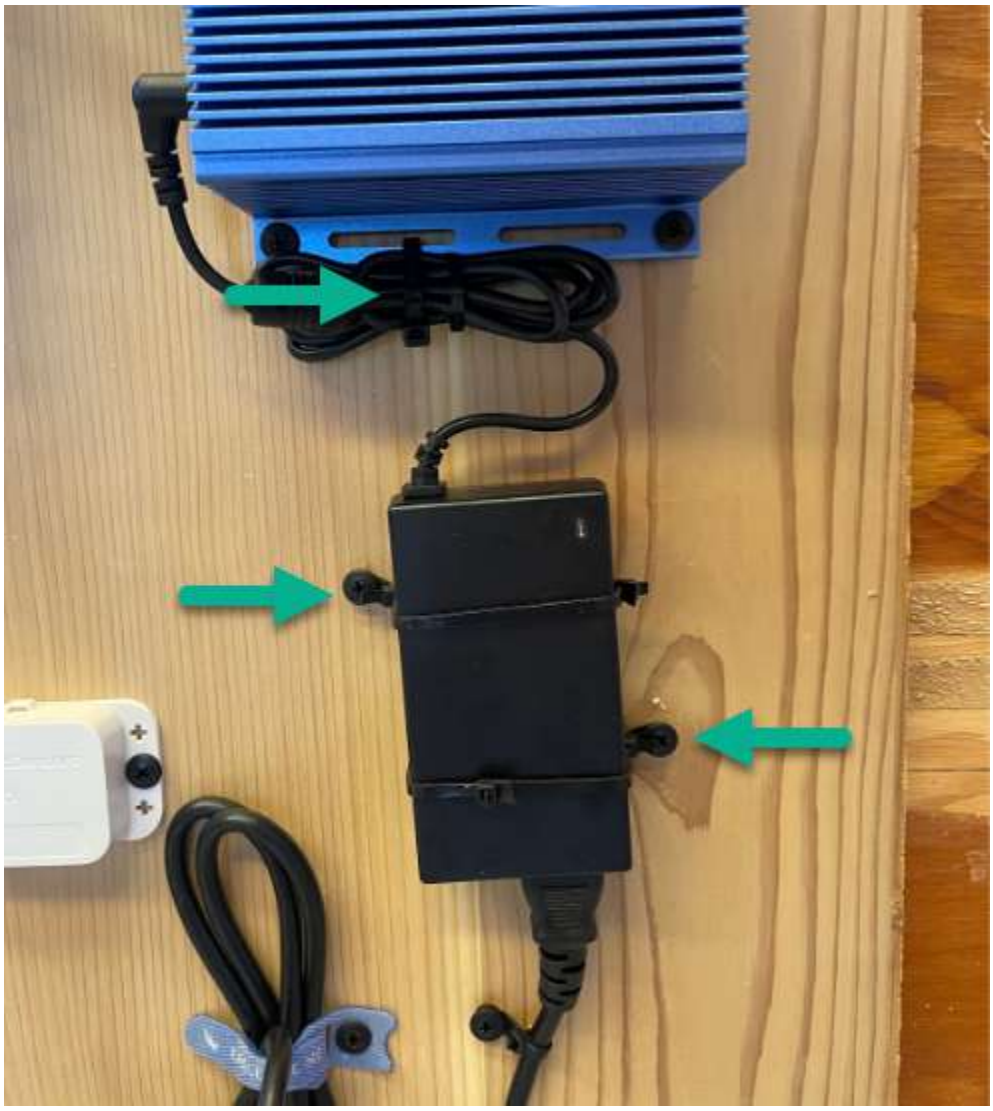
GOOD EXAMPLE: Do mount to plywood with at least 4 large screws directly into studs or use large anchors.

GOOD EXAMPLE: Do secure the power cord to the Bridge/CMVR using the cable clip provided to prevent the power cord accidentally being pulled out.

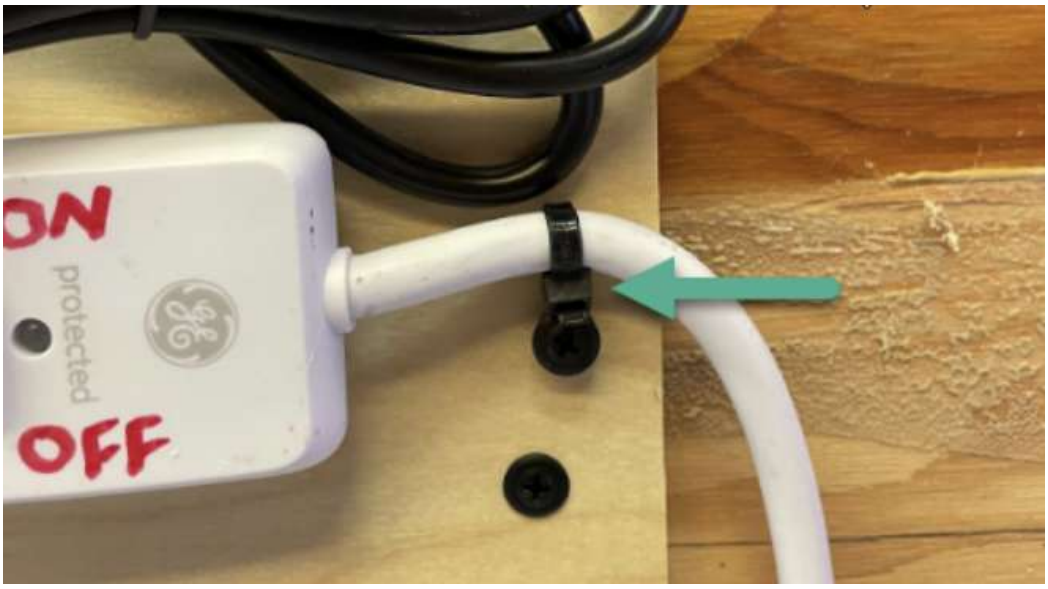


GOOD EXAMPLE: Do strain relief all power cords to avoid them being pulled out accidentally. The install needs to last many years. However, be cautious not to bend the cord too much.

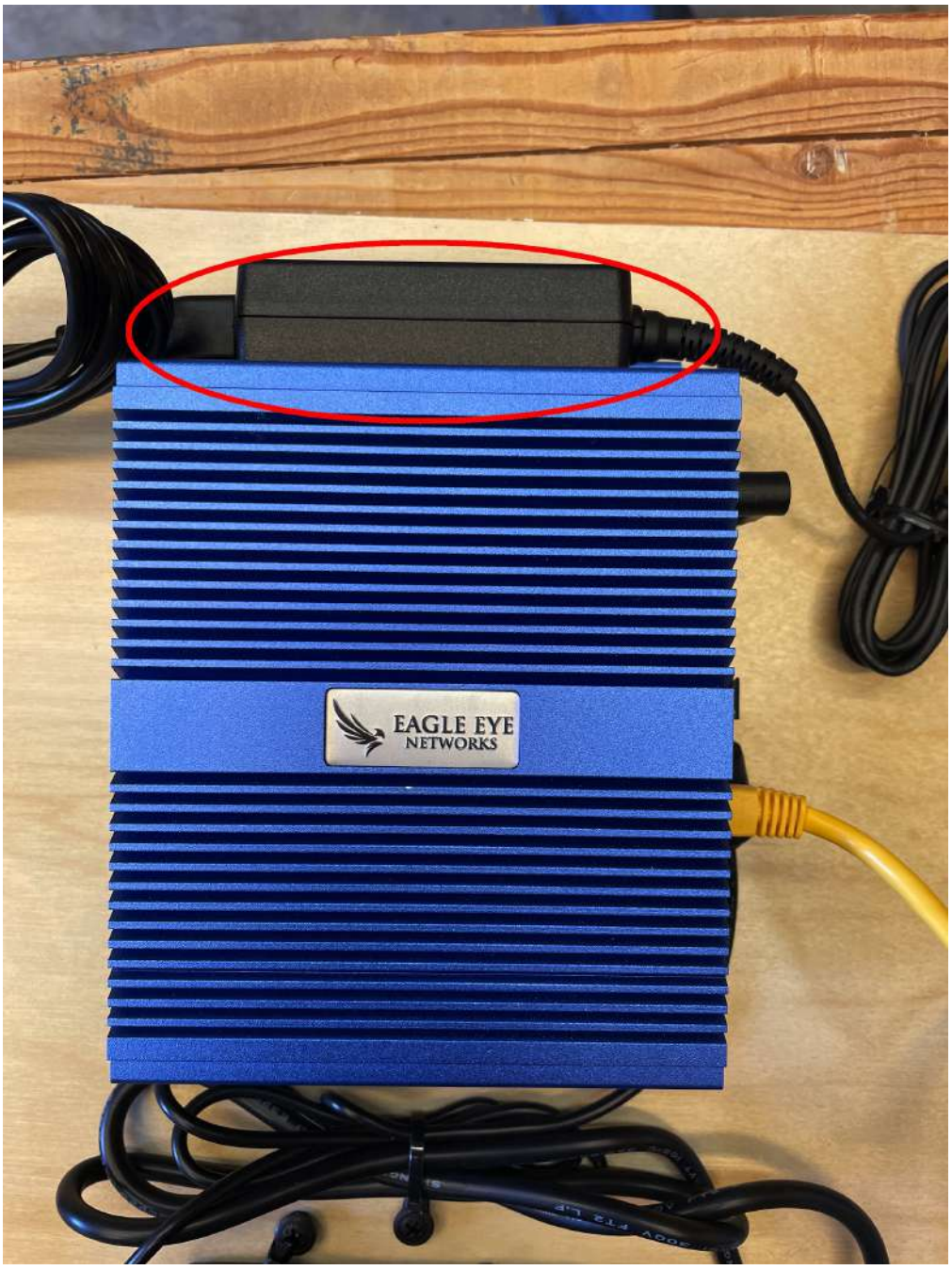
GOOD EXAMPLE: Do strain relief the cords/cables and secure them to the wall. DON'T try and mount directly to drywall - the screws and mounts will tend to work loose over time.



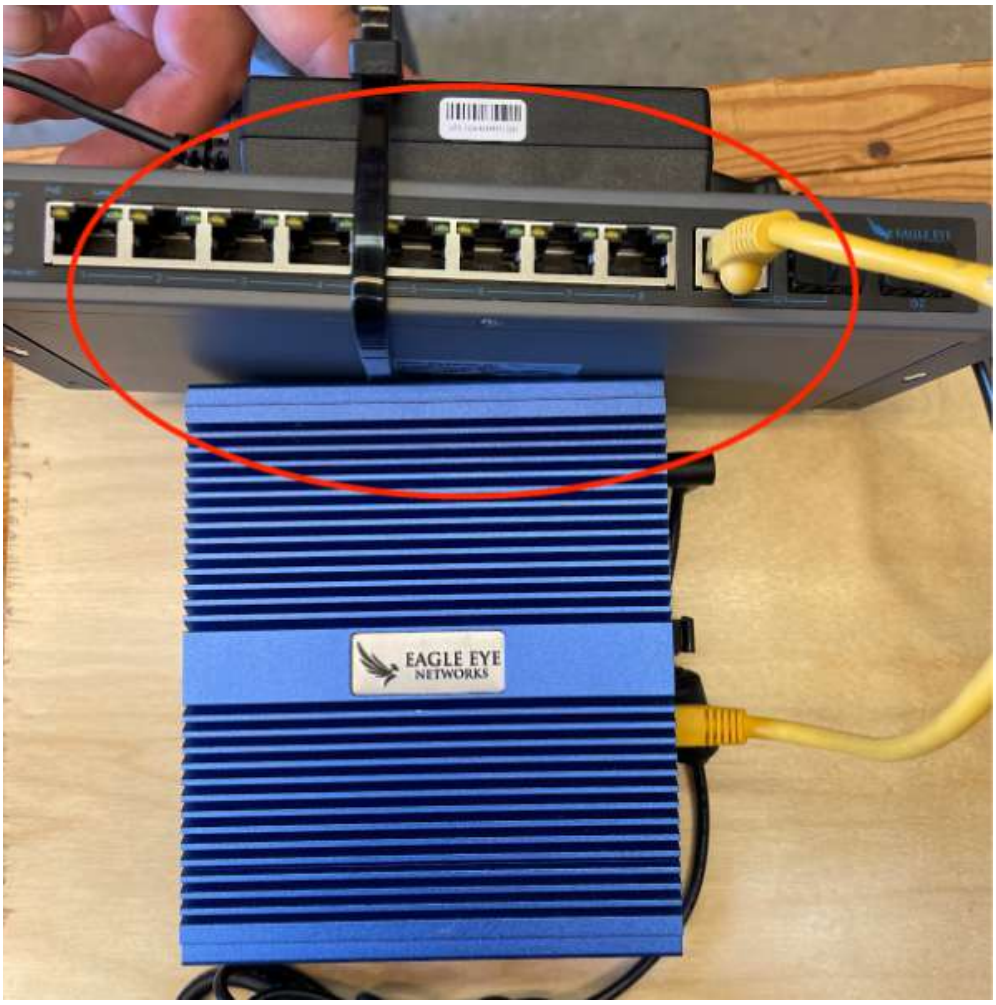
GOOD EXAMPLE: Do secure the power supply to the wall ensuring it does not come loose and cords don't fall out. Do leave enough room between devices to avoid overheating.



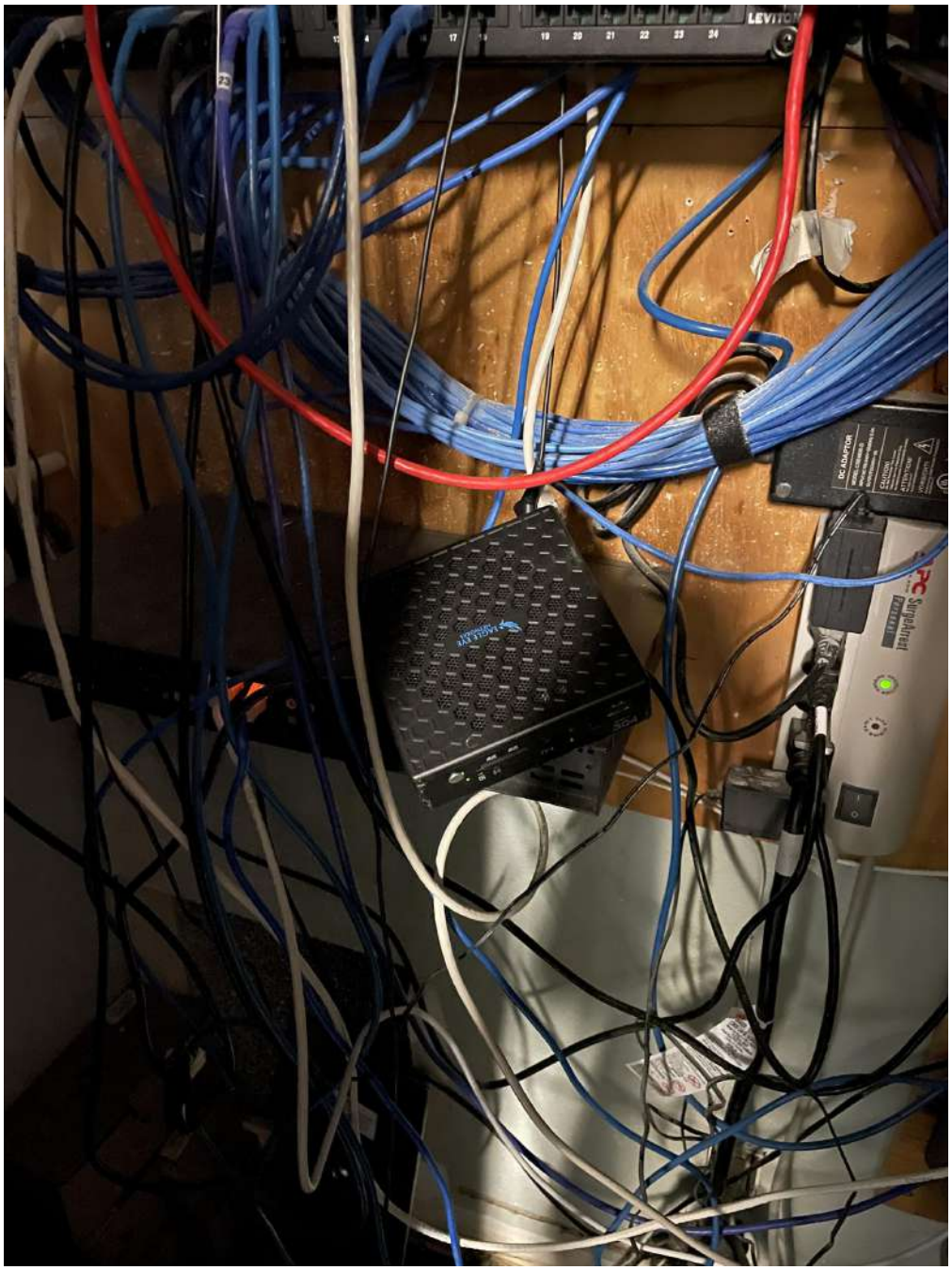
GOOD EXAMPLE: Do secure the power strip to the wall to ensure it is not taken and Do strain relief the cable so that its not pulled accidentally causing issues.



BAD EXAMPLE: DO NOT attach the power supply to the Bridge/CMVR as this can result in overheating. DO NOT place power supply on top of the Bridge/CMVR. DO NOT place anything on top of the equipment.



BAD EXAMPLE: DO NOT set equipment on top of the Bridge or the Switch. Stacking power supplies or equipment will reduce reliability due to heat. It will also fall off and likely disconnect. Remember other people will come into the area and bang and bump your installation.



BAD EXAMPLE: DO NOT fail to secure the Bridge/CMVR, cables, and cords to the wall. Always secure the equipment to the wall and ensure that cords and cables have been organized and secured.

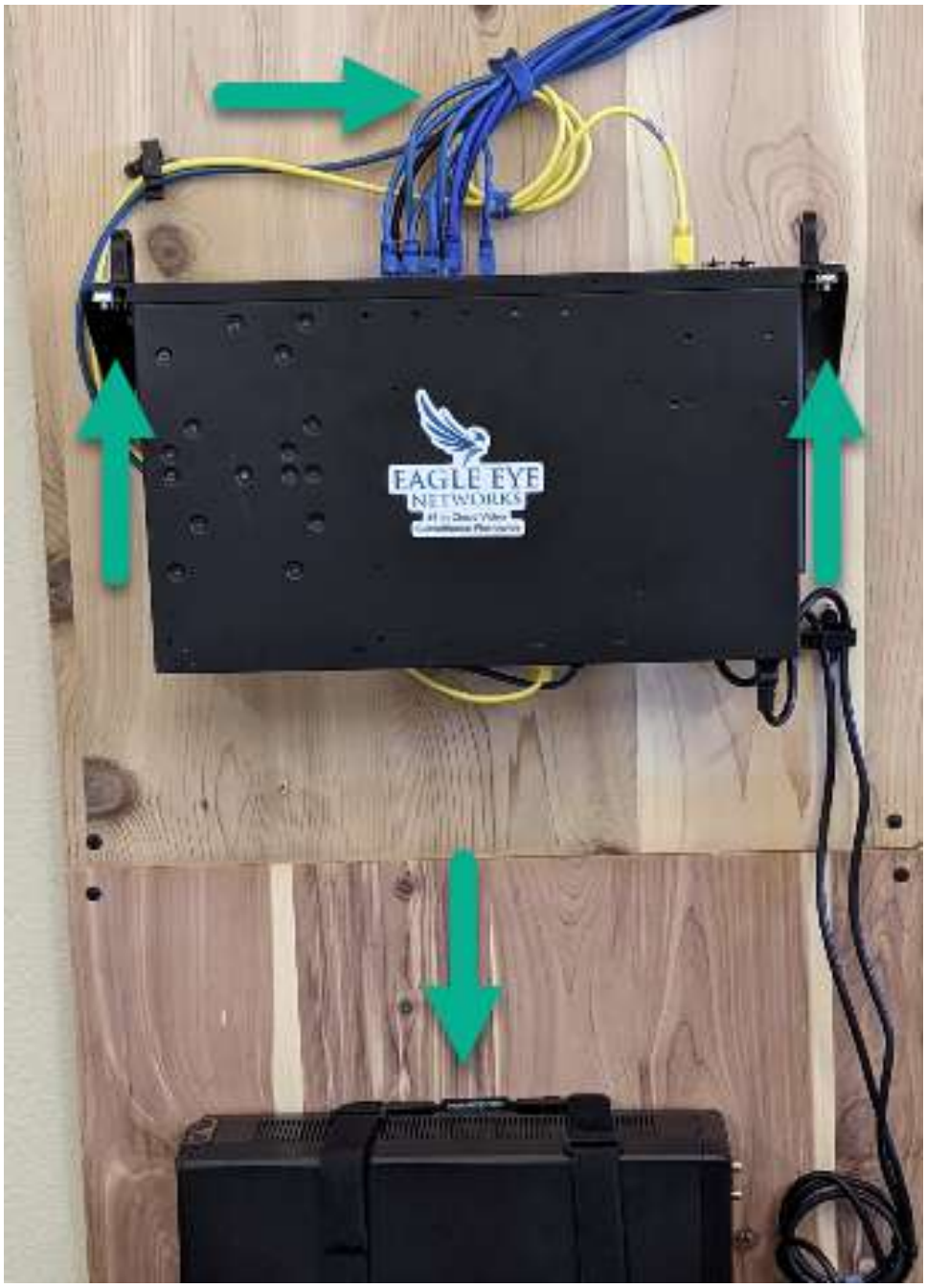
1b. Rack Mounted Wall Installation

If installing a Rack-Mountable Bridge/CMVR but mounting inside a rack is not possible, a Rack-Mounted Wall Installation is recommended over a shelf. A Wall-Mountable Rack is specifically designed for this type of situation. Click on the hyperlink below to see our recommendation. Please use caution with a metal wall-mountable rack due to the additional concern of grounding and/or EMI-related (electromagnetic interference) issues.

https://www.amazon.com/gp/product/B0822MF4R5/ref=ppx_yo_dt_b_search_asin_title?ie=UTF8&psc=1

Folding Steel Wall-Mountable Simple Vertical Rack and Server Rack (2U35P)

Wall-Mountable Rack installation examples below:



GOOD EXAMPLE: Do use a wall-mountable rack over plywood, secure cables, and utilize a UPS battery backup solution.

GOOD EXAMPLE: Do use a wall-mountable rack, strain relief cords, and secure them to the plywood.

2a. Shelf Installation - CAN Screw Equipment to Shelf

There are several key rules to a good shelf installation:

1. Use a shelf that is secured to the studs of the wall (or plywood) or use quality wall anchors through the drywall.
2. Mount the bridge securely to the shelf using screws (avoid the use of adhesives). Not doing this puts the Bridge/CMVR at risk of being knocked off and becoming damaged or disconnected.
3. Consider the space the shelf provides to best determine if there is space for additional equipment. If not, additional equipment should be mounted to the wall as described in the previous section.

4. As indicated above, mount the power supplies using tie wraps or other methods and neatly route the wires and secure them.
5. Neatly route the wires and secure them to the wall or shelf.
6. Strain relief the cords so that if they are accidentally pulled they do not come out.

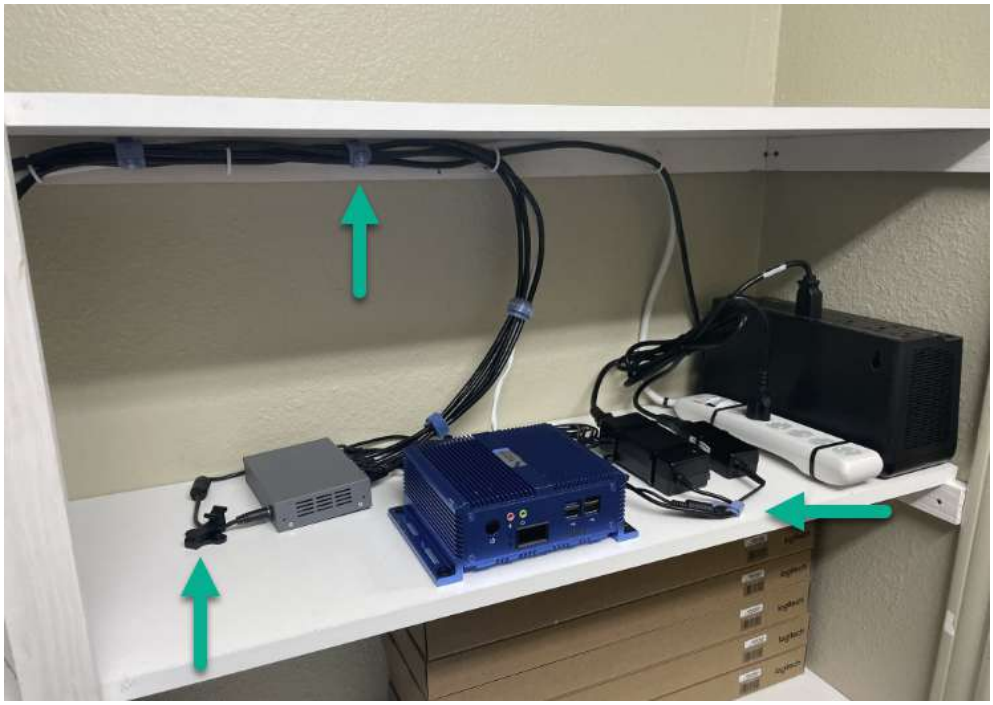
Installing a Bridge/CMVR on a shelf can be done if wall mounting is not possible. First, make sure that the shelf is properly anchored to the wall and can carry the weight of Bridge/CMVR and anything else that the shelf will hold. If installing a shelf as part of the installation, it is recommended that plywood be used or that it is secured directly to studs. The Bridge should always be screwed down to the shelf if possible.

The power supply should be either mounted to the wall with cables secured or positioned and secured to the shelf so that it doesn't come loose or become disconnected. Always use the strain relief clip to secure the power cable to the Bridge/CMVR.

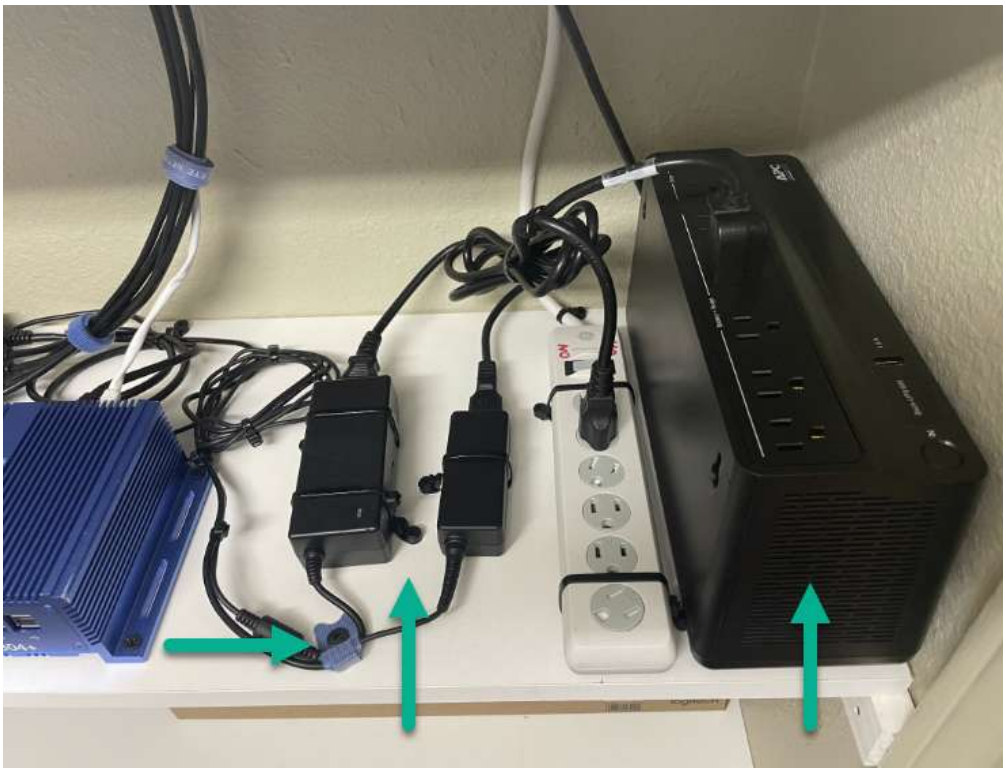
The switch (and its power supply if it has a separate one) should either be mounted to the wall with cables secured or positioned and secured to the shelf so that it doesn't come loose or become disconnected.

The router should not be in close proximity to the Bridge/CMVR due to overheating concerns. If the size of the shelf permits it, the router and power cables can be secured on top of the shelf but enough room should be left between the Bridge/CMVR so that overheating doesn't take place and cables don't get rattled loose.

Remember to use short ethernet cables if possible to avoid entanglement and a messy installation.

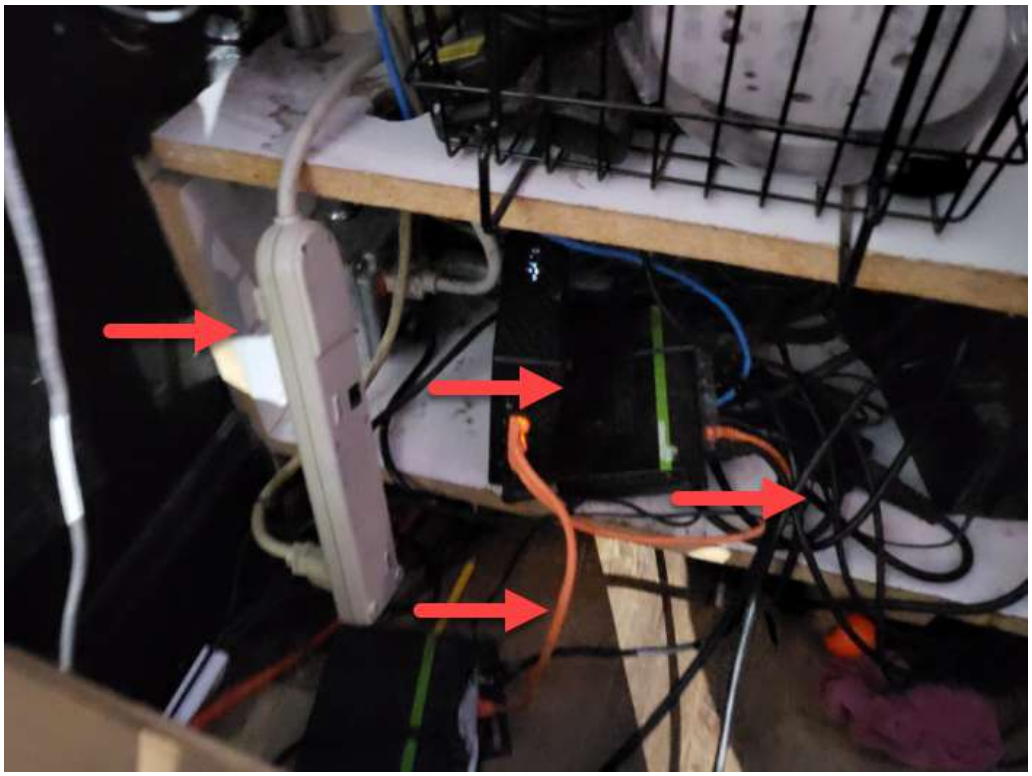


GOOD EXAMPLE: Do use a clean, organized shelf free of clutter and with devices, cables, and cords organized. There are no cords hanging down and cables are using the strain relief clip.



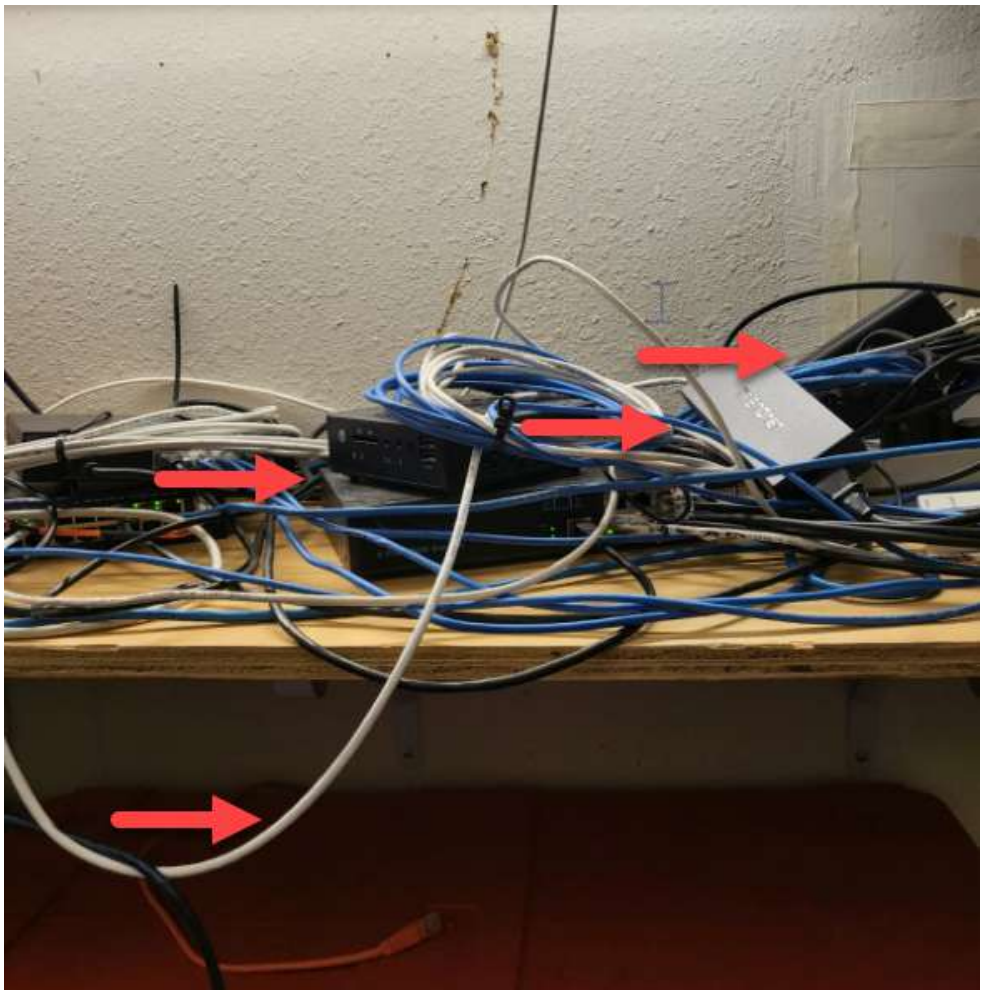
GOOD EXAMPLE: Do use a UPS solution, secure power cords, and ensure all devices have space between them to help avoid overheating.

DO NOT leave the sticker on the Bridge/CMVR or leave cables and cords unsecured. DO NOT allow the switch and/or power supply to be on top of or in close proximity to the Bridge/CMVR. DO secure the Bridge, router, and cables to the wall.

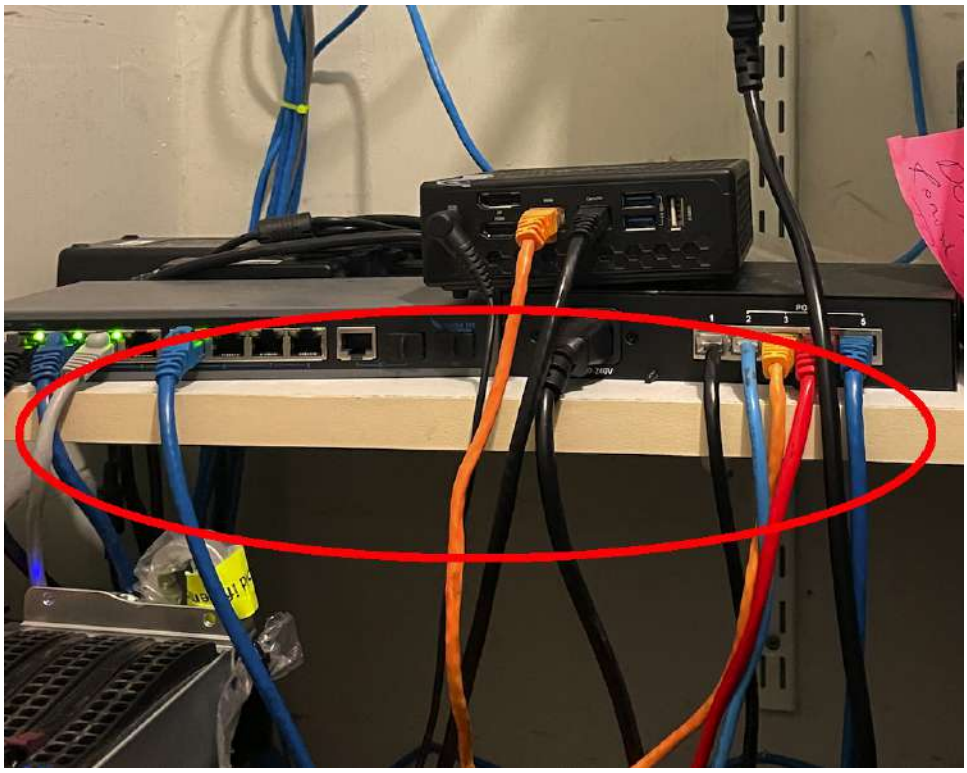


BAD EXAMPLE: DO NOT let cables, cords, and power supplies hang loose. DO NOT stack the switch on top of the Bridge/CMVR.

BAD EXAMPLE: DO NOT stack electronics on top of each other as this can cause overheating. DO NOT allow cords to be free-hanging and unsecured as they may come loose or become disconnected.



BAD EXAMPLE: DO NOT stack electronics on top of each other as this can cause overheating concerns. DO NOT allow cords to be free-hanging and unsecured as they may come loose or become disconnected. DO organize cables and secure them.



BAD EXAMPLE: DO NOT leave cables hanging loose. Always secure them to each other and the wall.

BAD EXAMPLE: DO NOT stack books or papers on top of the Bridge which can block ventilation and lead to overheating.

2b. Shelf Installation - CAN NOT Screw Equipment to Shelf

If performing a shelf installation is not possible due to concerns over damaging the shelf when screwing in and securing the equipment, adhesive tape can be utilized. Make sure to use a high-quality double-sided adhesive tape to secure the equipment to the shelf. Click on the hyperlink below to see our recommendation.

Amazon.com: Double-sided, Heavy Duty, Waterproof Mounting Tape

Double-sided, heavy-duty, waterproof mounting adhesive tape

3. Installation in IT Closet

Use a rack mount if you have a rack but know that Compact Bridges/CMVRs can also be mounted within racks if available. Otherwise, mount the Compact Bridge/CMVR to a wall using plywood or install it on a shelf and secure it. If you are going to put it in a rack, ensure there is enough space and

make sure that it goes on top of a shelf and not directly on the PDU. Leave at least 1U between the Bridge/CMVR and any other equipment within the rack.

The recommended temperature range for a server room is between 50 and 82 degrees, with the **optimal server room temperature being between 68 and 71 degrees**. Having the Bridge/CMVR in a location that stays within the optimal server room temperature in addition to a proper installation is the best way to ensure reliability and keep from overheating. Any installation above or below the recommended temperature range is not recommended and can lead to failure.

DO NOT use a Compact Bridge/CMVR if you have a rack. DO NOT leave the sticker with the Attach ID as this is a security problem.

Installation on the Floor

Don't ever do this.

Installation in NEMA Outdoor Box

For more details and example outdoor installations, see the Application Note (AN051) on Outdoor Installations.

Importance of a UPS (Uninterruptible Power Supply)

It is recommended to use a UPS for powering all the cameras, routers, switches, and modems. Since a UPS works independently, it will continue to provide power when the main power supply fails.

For projects without the usage of emergency power, a UPS is still recommended in order to obtain orderly system shutdowns and prevent disk corruption. If a disk becomes severely corrupted, files can be damaged and the system could become unrecoverable.

Both battery backup, and emergency power are recommended for video recording installations. Since the video system can still perform a hard shut-down while transitioning to emergency power, having the UPS in place is needed to prevent file corruption.

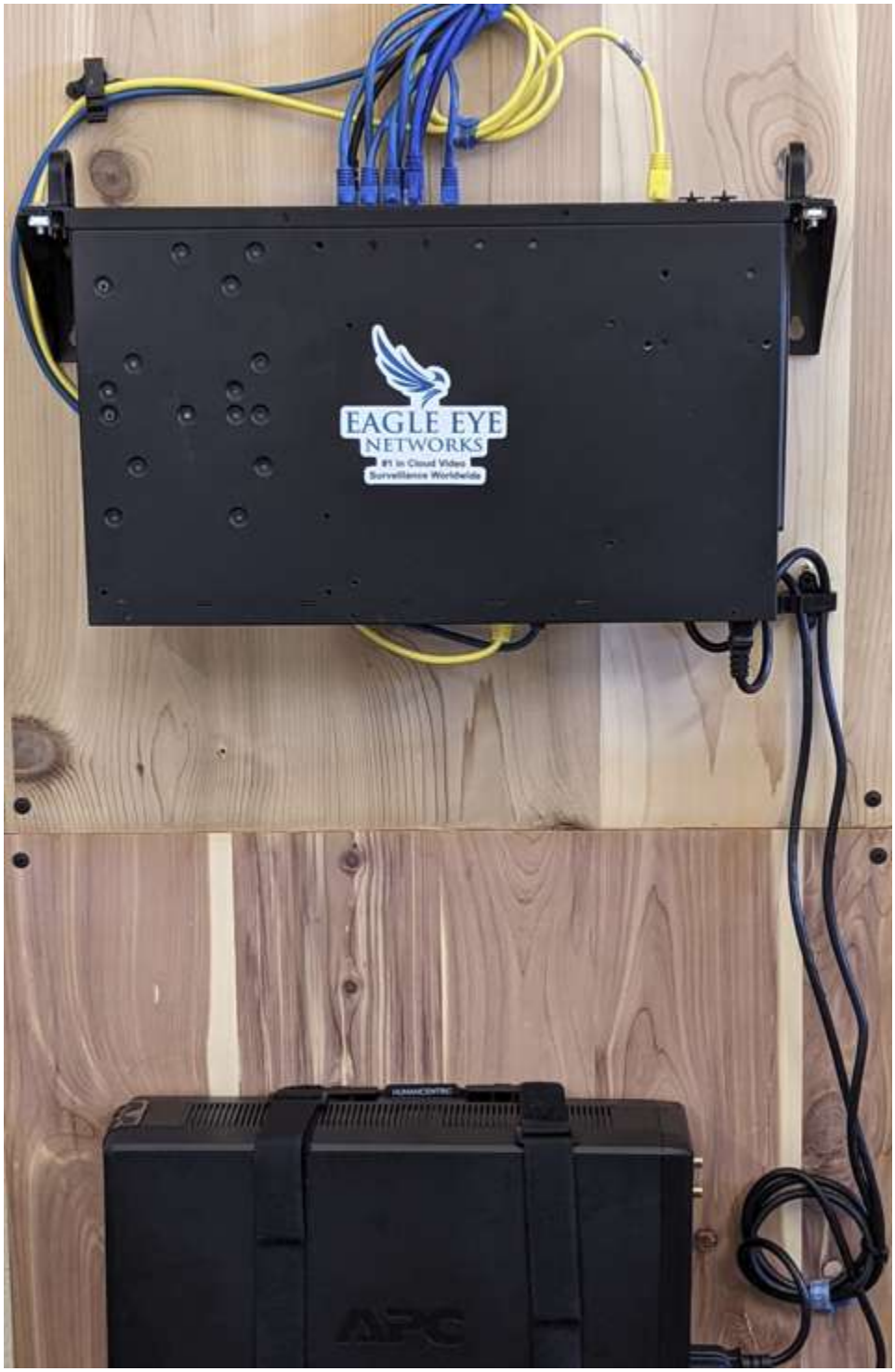
Recommendations for UPS solutions listed below. Smaller systems can use a UPS like the one below:

https://www.apc.com/us/en/product/BE600M1/apc-backups-600va-120v-1-usb-charging-port-7-nema-outlets-2-surge/

Larger systems can use a UPS like the one below:

https://www.apc.com/us/en/product/BR1500G/apc-powersaving-backups-pro-1500-1500va-120v-lcd-10-nema-outlets-5-surge/

Example wall mounted installation with a UPS battery backup solution below:



DO use a UPS battery backup solution on your installations

Installation Do’s and Don’ts

DO:

- Secure the Bridge/CMVR to a stable surface so it doesn't become disconnected.
    - If mounting to a wall, ensure that the Bridge/CMVR is properly secured to plywood.
        - Refer to local guidelines and regulations regarding plywood specifications.
        - Using plywood will save time and money in the long-run. It should be viewed as standard on Compact Bridge/CMVR installations. It is more sturdy than drywall, relatively inexpensive, can be replaced easily, if needed, and is not a conductive material. Performing an installation with plywood to begin with will reduce the chance of issues that would require a site visit later. This can also be done in advance of visiting the site to further save time.
        - The dimensions of the piece of plywood should be a minimum of 16" wide to span across two studs. Sheets are sold as small as 2 ft. squares but can be larger to save cost and cut later. Adjust the size accordingly and consider whether you'll also mount the switch and/or other hardware to it before making a decision.
        - Pricing estimates can be found below for Lowes and Home Depot (but fluctuate and can't be guaranteed).
            - A ½" thick, 2 x 4 ft. sheet can be found for Approx. $20 - $28.
            - A ½" thick, 4 x 8 ft. sheet can be found for Approx. $40+.
                - Handprint 23/32 in. x 2 ft. x 2 ft. Sanded Plywood 300950
                - Columbia Forest Products 3/4 in. x 2 ft. x 2 ft. PureBond Poplar Plywood Project Panel (Free Custom Cut Available) 2922
                - Columbia Forest Products 3/4 in. x 2 ft. x 2 ft. PureBond Pre-Primed Poplar Plywood Project Panel (Free Custom Cut Available) 3165
                - Columbia Forest Products 3/4 in. x 2 ft. x 2 ft. PureBond Pre-Primed Poplar Plywood Project Panel (Free Custom Cut Available) 3165
                - 23/32-in x 2-ft Bcx Pine Sanded Plywood
                - 3/4-in x 2-ft Lauan Sanded Plywood
        - If a plywood installation is not possible, drywall anchors must be used to secure the Bridge. Not doing this can leave the Bridge/CMVR vulnerable to coming loose and becoming disconnected.
    - If installing outdoors into stucco or cement, use a NEMA enclosure, wall anchors, and avoid damp areas or places where condensation can build up.
- Use the material provided in the Installation Kit.
    - Using the power cable clip is key when mounting vertically on a wall as the weight of the cord could cause it to disconnect.
    - Screws are provided and should be used with outer edge holes for stability. However, if there is a requirement to mount to a DIN Rail, there are also additional screw slots on each side of the device that can be utilized.
- Bring a laptop, monitor, and keyboard, or use the Mobile Bridge Configurator.
    - If you have a mobile hotspot, you can connect the Bridge/CMVR with the USB cable to determine if there is a firewall issue on-site.
- Get local network configuration information before the installation commences, if possible.

- Send Eagle Eye Networks a picture of the installation or post to social media using the hashtag #EagleEyeInstall.

DO NOT:

- To prevent overheating:
    - Do Not put items on top of the Bridge/CMVR.
    - Do Not put the Bridge on top of other equipment or cables.
    - Do Not block the ventilation of the Bridge/CMVR.
    - Do Not attach a power supply to the Bridge/CMVR or switch.
    - Do Not install a Bridge/CMVR in a tight space or cabinet without good air circulation.
        - Do Not put in a non-NEMA rated enclosure/box.
    - Do Not cover the Bridge/CMVR with papers, books, or stack anything on top of the bridge as this can lead to overheating and going offline.
    - Do Not install the Bridge/CMVR in close proximity to other wiring, cables, electronics, or sources of heat.
    - Do Not install the Bridge/CMVR above a stove or on top of a refrigerator.
- Do Not stretch power cords too tightly or bend cables.
- Do Not let the power cord hang freely.
- When installing on a shelf or within a cabinet, make sure the device is anchored and that cables will not be pitched when closing the door or pulled out mistakenly.