TECHNICAL NOTE INDOOR AP-5XX PENDANT MOUNTS

When needing to mount an AP on a hanging asset (threaded rod, EMT, etc) from an open-plan ceiling that is lacking any suspended ceiling tile T-rails, this is usually called a 'pendant mount'. There are a few options available that allows for an electrical box to be suspended from the pendant, and in most cases, a fairly simple solution can be found for almost every variation. The goal though would be to minimize and custom fabrication, drilling, etc that adds time to the installation. However, in some cases based on the parts used or due to aesthetic requirements, some custom fabrication may be required.

WHICH ARUBA MOUNT WORKS BEST

In terms of minimizing any custom fabrication or drilling, the **AP-MNT-E** is the most flexible option. It comes pre-drilled for the most common US and international standards for most all electrical boxes found in building construction, supporting both 1-gang 4-inch switch or plug electrical box (red stars), as well as 2-gang tab-style attachment tabs found on both 4-inch electrical boxes (yellow stars) as well as the larger 4 ¹¹/₁₆-inch junction boxes (green stars).



Figure 1 – most common mounting holes for electrical boxes

Additionally, the AP-MNT-E mounting bracket has ports through the plate to allow one or more Ethernet cables to pass through from inside the electrical box to the Ethernet port(s) on the AP to minimize cable visibility. From there, the ethernet cable can be passed up through a knockout on the electrical box up to the ceiling and back to the switch. If EMT is used, the Ethernet Cable can be fished up inside the EMT to prevent any visibility of the cable(s) used.

Other Aruba mounts could be used, but they would require some drilling or modification to attach the mount to the electrical box. However, if creativity is needed, nearly anything can be built to support an Aruba AP on a pendant style mount. For the purposes of this document, the AP-MNT-E will be the assume mounting bracket to be used in all cases.

WHICH ELECTIRCAL BOX WILL BE USED?

First things first, the type of box needs to be identified that will be used, assumption is that it will be some form of a square box.



Figure 2 – types of electrical boxes

1-Gang Standard Box

This is usually found where a single switch or single 2-plug receptable is installed. When attaching the AP mount to a 1-gang box, two screws compatible with the two standard mounting tabs will be used to secure the mount to the box (see the red stars on Figure 1). However, it's worth noting that generally speaking, 1-gang electrical boxes are rarely used due to their non-square shape, and the fact that there would only be 2 screws securing the mount to the box.



Figure 3 – a 1-gang electrical box

2-Gang Standard Box

This is the most common electrical box used, both for the square shape, multiple knock-out options, and the 4 mounting tabs available. In the case of a 2-gang standard box, the AP mounting bracket is secured to the box using 4 screws through the mount into the 4 standard mounting tabs (see the yellow stars on Figure 1).



Figure 4 – a 2-gang electrical box

4" Junction Box

These electrical boxes are also very common. They are primarily used by electricians to serve as a protection junction box where wired can be spliced, joined, split, etc as electrical circuits are carried throughout the building. However, a 4" junction box does NOT have the standard switch or plug mounting tabs, and instead have either 2 or 4 screws in the corner that secure a junction box cover. In some cases, customers have used a flat junction box cover and drilled the box cover out with holes to match the mounting bracket and to allow the Ethernet cable to pass through to the AP (if a side knockout is not used). While this will work, it has two drawbacks. First, the drilling/fabrication adds time to the install. Secondly, in most cases, there are only two screws securing the box cover to the box itself. And because the corner screw locations are not standard, Aruba is not able to pre-drill the mounting bracket for these types of boxes.



Figure 5 – a 4" junction box

Another option with the 4" junction box is to install a 2-gang mud ring. This ring attaches to the junction box, like the cover, but provides the 2-gang mounting tabs to secure the Aruba AP mount to. This can be done with standard tools, requires no drilling or custom fabrication, and provides a seamless look once fully assembled.



Figure 6 – a 4' junction box with a 2-gang mud ring

4 11/16" Junction Box

The 4 ${}^{11}/{}_{16}$ " junction box is just a larger version of the 4" junction box. However, the one large difference is most of the 4 ${}^{11}/{}_{16}$ " junction boxes have 4 mounting tabs used to secure larger covers or plug interfaces in industrial applications. As such, in the case of the larger 4 ${}^{11}/{}_{16}$ " junction box, the AP-MNT-E mount is already pre-drilled for these four mounting tabs. As such, if the larger 4 ${}^{11}/{}_{16}$ " junction box is used, the AP-MNT-E can screw directly to the junction box without any additional parts or modifications.



Figure 7 – a 4 ¹¹/₁₆" Junction Box

Example images of the AP-MNT-E on different electrical boxes



1-gang side-by-side



1-gang assembled



2-gang side-by-side



Large junction box side-by-side



2-gang assembled



Large junction assembled

FIGURE 8 – EXAMPLES OF ELECTRICAL BOXES AND ARUBA AP MOUNT

BUILDING THE PENDANT

When building a pendant support, the primary options are either threaded rod or electric metallic tubing (EMT), cut to custom lengths based on the amount of drop required. Other options have been done by other customers using things like Unistrut or other custom applications, but those are outside the scope of this document

Threaded Rod Pendants

Threaded rod is fairly simple. Long threaded rods are purchased and cut to length. The top side is secured either within a clamping system of some kind, or threaded in to a receptacle to secure the rod to the ceiling or ceiling structure. The lower end usually has matching nuts and washers that secure the electrical box to the bottom of the threaded rod.

Most electrical boxes have a knock-out in the back-center of the box. A nut and washer are threaded on to the bottom of the rod, leaving enough rod to go through the box with enough room for another washer and nut. Once knocked out, the threaded rod is inserted into the back of the box, the lower waster and nut are threaded on and then the two nuts are tightened against each other to secure the electrical box to the bottom of the threaded rod.





Figure 9 – assembling threaded rod to electrical box



Figure 10 – Assembly diagram

Once the box is assembled to the threaded rod, the cable can be routed through the electrical box, up through the AP mounting bracket, and the bracket secured to the electrical box as shown in Figure 10 above. When the cable is routed through the AP mount, for the AP-534/535 and AP-555, the cable should come out on the side of the arrows on the mount to ensure the cable can get directly to the AP Ethernet ports. For the AP-504/505 and AP-514/515, the cable should come out under the arrow to be able to go directly to the ethernet ports.



Figure 11 – example cable routing for AP-53x and AP-555

Once fully assembled, with the AP mount secured to the electrical box, and the AP is attached to the AP mount (secured with the spring pin and Philips screw), the end result should be a visually integrated mounting solution that is streamlined and minimally intrusive.



Figure 12 – Assembled threaded rod pendant mount

EMT Pendant Mount

EMT mounts are similar in process to a threaded rod, but are usually a bit more involved due to the weight of the EMT, the need to thread each end to attach the EMT flange with custom lengths, and the fact that the size/diameter of the EMT changes the bolt pattern of the flange. As a result, use of EMT with a flange may require custom drilling of either the electrical box, or the AP mount. However, the reason EMT is often favored is that the ethernet cable can be internally routed inside the EMT, completely obscuring any cable visibility. And any EMT can be paint matched to the interior décor, adding to the camouflage.

With EMT, the installers can either attach an electrical box to the bottom of the EMT/flange assembly in cases where there needs to be a biscuit box or some other termination point between the AP and uplink cable. However, if the cable is directly taken from the AP back to the switch, the Aruba AP-MNT-E can be directly attached to the flange.

In the case of EMT with a flange, the figured below indicate how the flange and either electrical box or AP mount would marry up. In most cases though, unless the flanges are matched to the electrical box or AP mount, custom drilling will be required.



³⁄₄" EMT with Flange and 4" electrical box side-by-side. The electrical boxes will not have any standard mounting holes, so the flange must be used as a template to drill the back of the box to provide screw holes to secure the flange to the electrical box.



This ½" flange PARTIALLY lines up with some holed on the back of this electrical box, but it off-sets the EMT conduit from the center knock-out punch, so the cable may not be able to pass through the EMT in this case.



This $\frac{3}{4}$ " flange only partially lines up with the two holes in the back, so screws may or may not be able to get through securely. But it does keep the center of the EMT conduit over the center knockout so the cable can pass through.



In cases where the AP-MNT-E needs to directly attach to the flange, the AP-MNT-E must be drilled out to match the flange screw holes.

CONCLUSION

Hopefully, this guide provides some context around building pendant mounts. While as much as possible with standard electrical boxes and common hardware, there are always circumstances that require some customization, fabrication, or modifications in certain situations. Most qualified installers will have the experience and know how to make it work.

Additionally, Aruba has Aruba Ecosystem partners like Oberon, Ventev, AccelTex, and others that make preassembled mounts that provide a turn-key solution that is integrated with Aruba products and allows for faster installation, assembly, and deployment, often with more customizable options and other features that may be of interest to the customer.

REFERENCES TO ARUBA ECOSYSTEM PARTNERS

- <u>https://www.oberoninc.com/</u>
- <u>http://www.acceltex.com/</u>
- <u>https://www.ventevinfra.com/</u>



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