Installing an Outdoor TV

Power drop-down and pop-up actuators add versatility to your mounting options

by Robert Viviano

As demand for outdoor living spaces expands, so does the list of features that our clients want to fill those spaces with. They want to bring the things they enjoy inside their homes to the outside—from full-blown kitchens, bars, and fireplaces to all types of furniture. Now you can add large, flat-screen TVs to the must-have list.

Having installed a number of outdoor TVs over the last few years, we've learned a few things that are necessary to consider for a successful installation, such as the best placement to avoid glare and provide a proper viewing angle, and the relationship of the furniture layout to the TV. Other factors include the type and size of the TV, power and other electronic connections, and types of mounts and—if needed—power actuators for motorized installations. Also, don't forget that an outdoor TV can be affected by weather conditions and wind direction.

Location

The first thing we consider in an outdoor TV installation is location, with the best one being under a permanent roof cover. If that's not possible, the TV will require a weatherproof cover, though waterproof TVs that can sit out in the elements are available if your client wants to spend more than $5,000 for the unit. We typically recommend the $300 to $500 Sam's/Costco TVs if the unit will be protected from weather conditions.

One mistake I often see is mounting a TV to a house wall. While this location is tempting because the installation is quick and easy, it creates two issues. First, deck furniture isn't typically situated to face the house; instead, it's generally oriented to look out over a backyard or garden or to take in lake or mountain views. Second, there's a greater chance that glare will be a problem during the later hours of the day when the sun is low, making the screen virtually impossible to see. Instead, locate an outdoor TV near the outer edge of a deck, toward which the furniture is already pointing.

When locating a TV, make it work with how the deck is used. Consider not only furniture orientation but also the location of the grill so that the cook can watch the game while cooking the steak

PHOTOS BY ROBERT VIVIANO

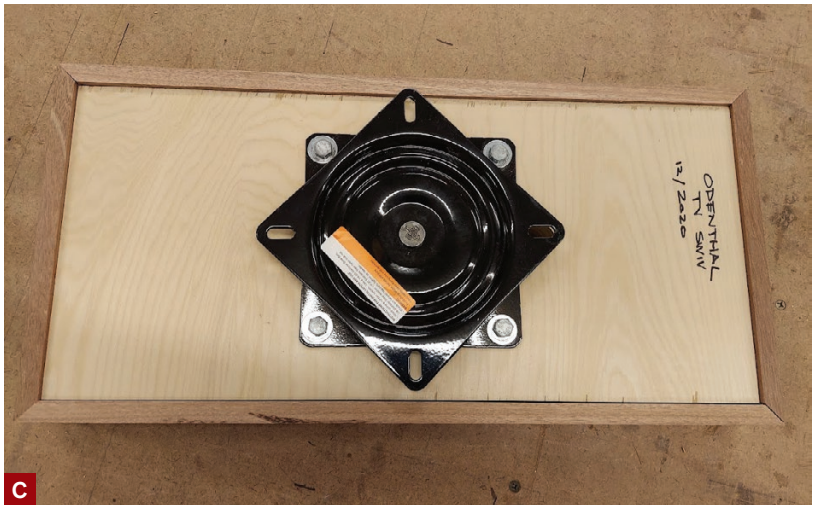

Figure 1. For a basic TV installation on flat and pitched ceilings, the author uses a motorized flip-down mount (A, B). On a flat ceiling, the mount can be fitted with a swivel bracket that allows the viewing angle to be adjusted (C). In a room with a higher ceiling, a TV can be mounted to a vertical drop-down power actuator that retracts the TV into the ceiling (if there is enough clearance above) or into an enclosure mounted on the wall (D).

or burgers. If there's a bar area with stools, is the TV viewable from it? In many cases, using a multidirectional mount rather than a fixed one can solve viewing problems.

TV size. Let's face it, bigger is better, but there are practical limits in an outdoor environment. The larger the TV, the more it tends to act like a sail, with the risk that wind will dislodge or damage it. Size might also be limited based on where it will be attached, such as over a fireplace. If the installation includes a motorized mount, you'll have to consider the movement and load that a large TV will place on the actuators. Bottom line? Make it as large as possible for the conditions.

Mounting Options

Our go-to method is to mount the TV to a ceiling with a motorized flip-down mount, such as Vivo's Vesa E-FD55 (less than $200 on Amazon). On flat ceilings, we often add a swivel base so that the viewing angle can be adjusted. We make the base out of scrap LVL clad to match the ceiling finish, and we mount it to an outdoor ball-bearing boat-seat swivel. This assembly blends in well with the ceiling. If the location is windy, we can add a stop pin to lock the swivel in place (**Figure 1**).

Another option is to mount the TV to a power drop-down actuator, operated by remote control, that retracts the TV completely into the ceiling or a wall enclosure. A lid can be fitted to the bottom of the TV hoist so that it closes off when the unit is retracted, but the lid needs to be sized precisely with about a 1/8-inch gap around the margin to fit into the opening. The drop-down mechanism we use has a bounce sensor (very important); when the wind picks up, the mechanism automatically retracts into the ceiling to protect the TV (and itself) from damage.

To mount a power drop-down to an under-deck dry system, we fabricate a

Figure 2. When you're installing an outdoor TV above a fireplace, the author recommends locating it close to a mantel that projects at least 10 inches to help divert heat away from the TV, with the mantel no higher than 5 feet above the floor to preserve viewing angles (A). Sometimes, an insulated flue runs behind the TV, so when building a recessed TV cabinet (B), the author will jog around the flue pipe and add fireproof rigid insulation about 2 inches thick for extra insurance (C).

bracket that mounts to the side of the beam and cantilevers out close to the ceiling. We make it out of stainless steel (I have a background in metal fabrication), matching the drop-down mount's bolt pattern to the bracket. A metal shop could fabricate a similar bracket out of mild steel and paint it.

Fireplace mount. Another common place to mount a TV is above an outdoor fireplace, which is usually well-protected from weather and located where it can be seen on a deck or patio. But heat from the fireplace needs to be taken into account, especially if the unit has a gas flame. Usually, these units don't have a flue, so all the heat comes out the front and can melt the TV. In fact, we won't install a TV above any fireplace that doesn't have a mantel to divert the heat, preferably one made of stone that projects at least 10 inches out from the face of the fireplace (**Figure 2**).

Another thing to keep in mind with a fireplace mount—especially if there is a mantel—is the height of the TV. If the TV is too high, it will be uncomfortable to watch, especially when the deck or patio is small. Our recommendation is to make sure the top of the mantel is no higher than 5 feet above the deck and keep the TV as close as possible to the mantel.

There are several mounting options, including simple wall mounts that just tilt and are mostly tucked tight to the wall (again, Amazon is a good source). There are also mounts that pull out away from the wall so the TV can be swiveled in different directions, but these mounts can get you into trouble. If they pull out too far, the wind can grab the TV and mangle it very quickly. To limit the risk, we recommend pull-out swivel mounts that project out only about 6 to 8 inches, with less rotation.

Sometimes, we mount a TV into a recessed box that is made to fit the TV's size. Sizing the box to be about 6 inches deep with a 2-inch margin around the TV provides a custom fit that protects the TV from side winds and blocks the back of the TV from view.

We build these boxes with poplar sides and 3/4-inch birch-plywood fronts and backs, sealing the wood with a coat of polyurethane varnish or a primer/sealer on the back to help keep the wood stable. I use a hidden magnetic push latch for the door so that hardware isn't visible. Inside the compartment is where outlets for A/C power and data/cable are mounted.

Figure 3. While manufactured outdoor TV cabinets are available, the author prefers to build custom units that he matches to the other finishes in the room and equips with a power pop-up actuator (A). These lifts (a good source is tvliftcabinet.com) allow the TV to drop down out of sight when not being viewed, with the cabinet lid closing over it automatically (B, C, D). If the TV needs to be able to rotate, the lift can be installed in a cabinet with a pull-out drawer mounted with heavy-duty slides that allow the whole assembly to extend out away from the wall (E, F, G).

In our TV boxes, we include a door at the bottom that allows wires to be dropped into the wall behind the TV. Boxes can also be used to house DVD players and other audio equipment, remotes for the TV, lights, fans, other accessories, and soundbars; be sure to consult with your customers about their specific plans when you're designing the box, since these devices will change its dimensions. We also recommend that the box be painted black, just like the TV that it surrounds, to keep the focus on the screen.

Cabinet Mount

TVs can also be mounted in a cabinet, either a stand-alone unit from a third-party supplier [like Cabinet Tronix] or a custom-made built-in unit. We prefer built-ins, and to make them more dramatic, we like to equip them with power pop-up actuators (**Figure 3**).

We build our cabinets using $^{3}/_{4}$-inch birch plywood for the back and sides, where the mechanicals get mounted, and 1-by poplar for the face frames.

Figure 4. To install a pop-up style of TV lift in an outdoor bar located along the edge of the area that is protected by a roof, the author devised a gutter system to channel water away from the assembly (A). When the TV is retracted and the lid is closed, water is prevented from getting into the enclosure, while the lid lifts up and out of the way when the mechanism raises the TV into viewing position (B).

Then we clad the cabinet box with PVC panels and top it with a PVC hinged flip lid that conceals the TV when it drops down into the cabinet. When the pop-up actuator moves the TV upward, it pushes the lid open. The lid needs to stay leaning against the lift shaft so that when the shaft retracts, the lid will close by itself when the TV is lowered into the cabinet.

Our cabinets aren't waterproof, but they stay stable because we install them where they aren't continually exposed to weather. Keeping in mind that anything mechanical will at one time or another need to be serviced or replaced, we make the front PVC cladding easy to remove to provide access to the equipment. With this PVC cover removed, we make it a point to inspect the actuator movement and make sure the wiring can flex without binding or snagging as the TV raises and lowers. We don't want the TV to unplug itself.

There are two types of pop-up actuators; one holds the TV in a fixed position, while the other can rotate when at the top of lift. When installing a rotating pop-up actuator, we plan for space behind the unit to allow the TV to swing. In tight situations where customers also want rotation, we have built units with a pull-out drawer. If you do that, make sure you get the heaviest stainless-steel ball-bearing slides you can buy. I've found that online marine suppliers are a good source for hardware used in outdoor applications. With a swivel-type TV mount, the rotating TV will push the lid over to lay flat, so keep in mind that the lid will have to be manually flipped back to the closed position when the TV retracts.

A creative yet challenging version of the pop-up style that we built was in the backsplash area of an outdoor bar. The countertop was made using custom concrete, the lid had to lift and retract with the TV, and the assembly had to be waterproof since it was located near the edge of the covered area.

To prevent water from getting inside the box, we added a gutter system on each side so that the lid would overlap the gutter and any water reaching the edge would channel out and away. The other thing I was concerned about was that the mechanism would eventually wear to the point that it wouldn't seat the lid exactly every time, or that outdoor dampness would affect the movement and cause damage to the concrete top. Our solution was to spring-load the cap to the mechanism so that when the top seated, it would rely on the springs to constantly adjust as needed (**Figure 4**).

Electronics

We leave the wiring and electronics to the pros. Many of our customers are already engaged with a contractor who installed their in-house media system, and we try to coordinate with the audio and TV guys during the planning process and before we close things up.

When planning outlets, for example, we need to account for all the equipment so not to be short on power sources for soundbars and amplifiers, as well as the TV. Speakers may need to be wired in and cut out. It's a lot cheaper to run wiring when all is open than it is to run even a simple wire to a specific location after the fact. To limit our liability, we want the audio/video guys to do a last-minute check that they have all their wires in place before we close things up.

For a cleaner look, we recommend using a streaming data connection rather than a hard-wired cable. This requires just one duplex outlet in the ceiling for the TV; multiple wires are more challenging to conceal. ❖

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