



Hanging the bracket is only half the battle

# Hiding the Wiring for a Wall-Hung TV

BY BRIAN WALO

**T**here's nothing better than shredding through the packaging on a new flat-panel television like a kid on Christmas morning. There's also nothing worse than realizing that you have to figure out how to mount the TV and decide what to do with the wires.

Sure, it's easy just to drop the new TV set onto the same entertainment center, console, or shelf that the old TV set rested on, but I think that a wall-hung installation is a more fitting choice. Yet nothing detracts

from the sleek appearance of a wall-hung TV quite as much as a bunch of wires running down the wall. In-wall wiring is more complicated, but it provides a clean appearance that you'll appreciate.

## Do I need blocking?

I'm the first one to push clients into going big when they shop for a new TV. For a big TV, there's no doubt about it: Solid blocking in the wall makes bracket installation much easier. But breaking walls open to add extra

support typically isn't worth the effort. Most brackets offer lateral adjustment to catch the studs for just about any location while still remaining hidden behind the TV.

Mounting brackets are fairly simple to install, but don't get so overconfident that you overlook the directions. Some brackets require the use of all included hardware, and some provide an abundance of extras to cover almost every conceivable situation. You're putting a lot of trust in this bracket, so read the directions carefully.

## USE THE BRACKET TO LOCATE THE BOX

A flat-panel bracket is harder to adjust than an electrical box, so pinpoint its location before roughing in the new wiring. Remember that the lag screws included with a flat-panel bracket are large diameter, so it's crucial to drill an adequate pilot hole and to hit the center of the studs to prevent splitting.



**Leave the TV in the box.** Use the cardboard packaging as a second pair of hands, and measure the height and width of the TV to determine the best location for the bracket to be mounted on the wall.

**Box over bracket works best.** With the bracket in place, determine the best location for the power and the A/V connections based on the location of inputs on the TV itself. Unless there's a compelling reason to locate it elsewhere, put the box above the bracket, where there's less chance of wires being pinched when the TV is angled downward. Use the box to mark the drywall cutout.



## Hide the power, and simplify the A/V connection

Installing an outlet on the wall behind the flat-panel TV is the cleanest way to power it because you won't see the cord. The process is the same as installing a receptacle elsewhere (see "4 Worry-Free Wiring Repairs," *FHB* #206 and online at [FineHomebuilding.com](http://FineHomebuilding.com)). Instead of a conventional grounded outlet, I strongly suggest spending \$20 to \$30 on a transient-voltage surge-suppressor (TVSS) receptacle (p. 52). I prefer a TVSS with an

audible alarm that sounds if the protection or function of the outlet has been compromised. It's perfect for a use like this where you can't see an indicator light.

Finding the best way to provide power to your new TV could be tricky. If there is no access from the attic or basement, opening the wall to tap into the nearby wiring will be a necessary hassle. Always make connections to existing power inside an electrical box, being sure that you don't exceed the recommended number of wires in the box.

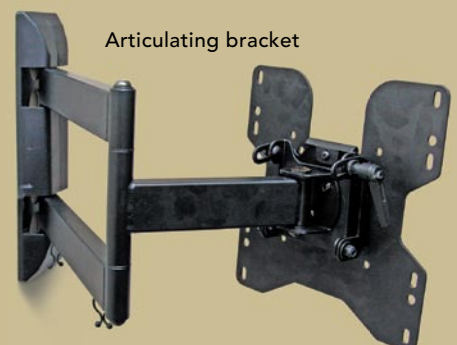
## Don't skimp on the bracket

There is no shortage of brackets for flat-panel TVs, and they can cost from \$40 to \$1000. The basic categories are tilting, articulating, and low-profile (some low-profile models tilt as well). There are even motorized mounts.

A standard, nontilt bracket is adequate when the TV is straight ahead and near eye level. If the TV will be above a piece of furniture or a fireplace, a tilting model is in order. Tilting brackets don't cost much more than standard brackets, so pony up on the front end to avoid an aching neck. Articulating brackets (shown below; [www.mountsmadesimple.com](http://www.mountsmadesimple.com)) allow the TV to be pulled away from the wall, tilted, and pivoted.

The optimum viewing angle is about 10° to 20° from your seated line of sight to the top of the TV, so most tilting brackets incorporate a +/-15° range. You can calculate the viewing angle based on trigonometric functions, but I recommend a simpler approach. Cut a piece of cardboard to the size of the TV, and hang it on the wall to figure out whether your favorite sofa or chair will coexist peacefully with the height and location of the TV (see "Drawing Board," pp. 88, 90).

Finally, don't rely on the flat-panel size range listed on the bracket box. Check the weight of the TV against the weight limit of the bracket.



Articulating bracket

## POWER COMES FIRST

Flat-panel installations require power (line voltage) and A/V connections (low voltage). I use double-gang electrical boxes because they allow for both connections in one spot. They also provide a hole big enough to fit an arm through, which is helpful when routing and fastening the wiring in the wall. Cut three holes: one behind the TV, one near the entertainment equipment, and a third somewhere between the two. Even if the in-wall area above the firebox is open, route the wiring through holes in the studs or fasten it securely; never install it loosely behind the framing.

### Surge insurance.

It's a good idea to protect your TV by using a surge-suppressing outlet ([www.passandseymour.com](http://www.passandseymour.com)). This über-outlet is about the same size as a GFCI, but will give your new TV an extra level of protection against unlikely power spikes. Choose a model with an audible alarm that sounds when protection has failed, a handy feature when the outlet is located behind a TV where indicator lights can't be easily seen.



**Break the ears for a flush fit.** When installing receptacles in an old-work electrical box, slide the box into the hole in the wall to hold it securely while you work, but don't fasten it yet. When permanently installed, the grounded slot of the three-prong outlets should be on top. It helps to remove the "ears" from the receptacle to ensure a tight fit against the box so that the cover plate seats flat against the wall.



**Careful cuts.** A hole in the cabinet provides access to a nearby outlet or power in the crawl-space below and will later be used to connect A/V cables as well. Use an oscillating multitool or a small reciprocating saw for clean cuts in these tight quarters.



**Conduit is faster than fish tape.** After the holes have been drilled, snake the cable from the bracket hole to the temporary middle hole, then down into the cabinet. Insert a short run of conduit between the cabinet and the crawl-space, and snake the cable through it. Once the cable is in place, slide the conduit off like a sock.

Ask your local building officials about the electrical code being enforced in your area, and follow it. The type of cables required and the location of draft-stopping vary by region. If you aren't 100% confident of your knowledge of local codes or of your electrical-installation and safety skills, consult a licensed electrician who will know how to get the job done right.

Finally, if you've shopped for audio/video (A/V) cable, you know there are seemingly endless options that can be as specific to the setup as your fingerprint is to you. I keep

things simple by choosing a high-definition multimedia interface (HDMI) cable. HDMI cables combine all the signals required for full digital media and multichannel surround sound into one thin cable. At a big-box retail store, these cables are pricey—typically between \$8 and \$10 per ft.—but I have had good luck with the \$1- to \$3-per-ft. HDMI cables from [www.mycablemart.com](http://www.mycablemart.com). □

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## WIRE A/V WITH UPGRADES IN MIND

There are two things to remember when running low-voltage audio/video (AV) cable through a wall. First, it must be isolated from any existing line-voltage wiring to prevent electrical interference and the risk of electrical shock. Second, it's always a good idea to leave room for upgrades so that you're ready when technology changes and you want to move to a newer, better A/V setup. Fortunately, it's easy to accomplish both tasks with the help of flexible plastic tubing.

**Cheaper than a crystal ball.** Because change is the only constant in the home-technology business, snake 1¼-in. electrical nonmetallic tubing (ENT) from the low-voltage portion of the electrical box behind the TV to the cabinet to allow for easy upgrades or future changes to the A/V wiring.



**Good fences make good neighbors.** Line-voltage and low-voltage equipment can't be installed in the same work box unless they are separated by a box divider, which slides into tabs in the electrical box.



**Get creative with fastening.** It's tough to hold the ENT conduit, a PVC strap, the screw, and a drill in one hand. Instead, fasten the nylon strap to the stud; then secure the ENT with nylon zip ties. Orient the strap so that the conduit is on the far edge of the stud where it won't be hit with drywall screws when you patch the hole in the wall.



**Plug and play.** After connecting the ENT to the electrical box with a threaded adapter and securing the electrical box in the wall, slide the HDMI cable (below) through the conduit, and hook it up to the receptacle.



## Don't mix signals

Regardless of the type of A/V cable you choose, most are shielded to protect against the electromagnetic interference that causes signal loss. Because flat-panel

TVs require line- and low-voltage wiring to be installed in close proximity, it's important to follow these simple rules to avoid potential interference or hazards.

- When A/V cables run parallel to line-voltage household wiring, keep them at least 4 in. to 6 in. apart. If cables

must cross, keep the intersection at a 90° angle to minimize the point of contact.

- Don't run line- and low-voltage cables through the same holes in studs or joists, and don't share staples. Potential for electromagnetic interference aside, if the cables were to become

chafed, line voltage could be introduced to the smaller cables, creating shock and fire hazards or damaging sensitive electronics.

- If routed into the same electrical box, line- and low-voltage cables must be separated by a plastic divider (photo above).