

Stud Finders and

These tools can provide invaluable information, but don't bet your job on what they tell you

BY ANDY BEASLEY

The first home in the United States built with studs is generally believed to have been erected in 1833. The exact date that remodelers first began tapping on walls and wishing for an accurate way to locate studs is not recorded, but I'd suppose it was around 1834. Although today we still rely on a little guesswork when searching for hidden objects, we now have technical capabilities that those early builders and homeowners couldn't have imagined. Modern tools can find studs, plumbing, and live electrical wiring.

Three types to choose from

The simplest of these tools use rare-earth magnets to locate the fasteners connecting surface materials to the underlying framing. If those don't get the job done, we can turn to electronic stud finders, which rely on a capacitance sensor to measure surface density (see "How It Works," pp. 20-21). These are designed to locate wood and metal studs immediately behind a surface, but they also can pinpoint other inhabitants of a wall cavity—like metal pipes. It's important to remember that basic electronic stud finders display all objects as studs; it's left to the user's judgment to determine what is a stud and what isn't. The best tools are multiscanners, which add a separate metal-scan mode with an impedance measurement. Finally, almost all the electronic tools incorporate an additional sensor that detects the electromagnetic field generated by live, unshielded AC wiring.

The test is finished now, so if anyone is building a very small house and needs a few walls (sidebar below), I might have what you need.

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HOW WE TESTED



I built four miniature walls to simulate the variety of challenges a scanner might face in the real world. The first wall—sort of a kiddie pool for stud finders—had lightly textured, ½-in. drywall. I cranked the level of difficulty up a notch with the second wall, adding a layer of ¼-in. pine beadboard to a ½-in. drywall substrate. The third mock-up had a thick (¾ in.) coat of plaster over ⅝-in.-thick wood lath. The fourth hurdle—which proved to be a significant one—fea-

tured ceramic tile over ½-in. cement backerboard.

I put each tool through the same test on all four walls. I hunted for wood and metal studs, steel conduit, copper and ABS pipe, and PEX tubing. I slipped in various types of insulation to see how well the tools ignored these obstacles. Finally, I ran a length of nonmetallic sheathed cable—energized with live AC current—at various depths and locations to test the tools' AC-sensing capabilities.

Wall Scanners



AUTHOR'S
BEST OVERALL
CHOICE



Bosch GMS 120

Price: \$100

This new-to-market tester was the best all-around performer. It located wood and metal studs with respectable accuracy, and was second only to the Milwaukee in metal detection. Although somewhat erratic on the beadboard, it performed admirably on the other wall surfaces. Its only weakness is a relatively narrow AC scan, which called for a more careful search to ensure that no wires were overlooked.

TEST RESULTS

Each tool was rated based on its effectiveness in locating various materials inside four types of walls.

D	B	P	T	
Dark Red	Dark Red	Dark Red	Dark Red	Excellent
Medium Red	Medium Red	Medium Red	Medium Red	Good
Light Red	Light Red	Light Red	Light Red	Fair

ELECTRICITY

Most of these tools can alert you to the presence of hot, unshielded AC wiring (shielded wires are not detectable). Throughout this test, however, I saw many false alarms and, even worse, missed alarms. To improve my odds of getting an accurate report, I made multiple scanning passes and a lot of pencil marks. The most useful technique I found was to place my free hand on the wall near the tool to ground the surface and thus narrow

the search. But the takeaway lesson is this: Use the scanner's AC indications as the starting point of your hunt, never as your final answer. And always turn off the power before you cut or smash anything.

PLASTIC PIPE

Although inadvertently cutting through a plastic pipe isn't as catastrophic as chewing into a live wire, it would rank pretty high on the universal aggravation scale. Unfortunately, the ability of these tools to detect

plastic materials is virtually nil. None of the tools located a 2-in. ABS pipe behind a wall, none found dry ½-in. PEX tubing, and only one (the Bosch) hinted at the PEX when it was filled with water (but had no way of identifying it as such).

SURFACES

Dirty Harry insisted that people know their limitations, and the same applies to these tools. Don't expect good results when scanning through

tile, carpeted floors, foil-backed wallpaper, or plaster and stucco with embedded metal mesh. Similarly, uneven surfaces can present problems because the tools register surface irregularities as changes in density. (The beadboard and tile joints on my test walls produced scanner faults and the appearance of many imaginary studs.) In these situations, I held a thin piece of cardboard from a cereal box between the tool and the surface to improve results.

Electronic stud finders



■ ■ ■ ■ ■
D B P T

Black & Decker SF100

Price: \$10

A basic electronic stud finder without AC warning capability, this tool proved reasonably effective on the drywall and beadboard walls. It even managed to locate some conduit and pipes, although it could not differentiate them from studs, which is a disaster waiting to happen.



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D B P T

Greenlee SF-420AC

Price: \$40

This stud finder performed like a bad tennis player: It faulted too often. The uneven surfaces of the drywall and beadboard walls appeared to confuse it, resulting in too many faults and imaginary stud identifications. However, when used with saintly patience, it accurately located the center of wood and metal studs on all but the tile wall.



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D B P T

Ryobi Tek4 Professional Stud Sensor

Price: \$50

Powered by a 4v Li-ion battery, the Tek4 was at its best on drywall and plaster. It located studs fairly accurately on the other walls, but sorting through its frequent faults became a chore. It often warned of AC when there was no AC present, and it could not detect a live wire behind the tile wall.



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D B P T

Stanley IntelliSensor Pro

Price: \$30

This was my favorite among the basic stud finders. It was reasonably accurate, performed well on irregular surfaces, and often located metal pipes behind the wall (but could not distinguish them from studs). Unfortunately, its AC detection was so broad that it was difficult to narrow down the actual location of a wire.

FROM ONE EXTREME TO THE OTHER

If your idea of remodeling is to hang a picture over an unsightly wall crack, an inexpensive, low-tech magnetic stud finder might be all you need. On the other end of the spectrum, highly complex projects (or tool fanatics) may call for significantly better—albeit more costly—technology.

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D B P T

C.H. Hanson Stud4Sure

Price: \$12

This stud finder's powerful magnet located wood and metal studs behind both the drywall and beadboard surfaces. On the tile wall, it had just enough strength to latch onto the screws in the cement backerboard.



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D B P T

Magic Stud Finder

Price: \$20

Weaker magnets limited this stud finder to the drywall-only surface. I liked the way the small magnetic disks remained on the wall to eliminate the need for multiple pencil marks, but this tool won't be my choice for the tougher scenarios like plaster and tile walls.

Wall scanners



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D B P T

Zircon StudSensor e40

Price: \$20

This entry-level Zircon did well on drywall, but often falsely identified studs at beadboard grooves. It proved relatively ineffective on plaster and tile. Its AC warning function frequently announced wires that weren't present, while sometimes missing wires that were.



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D B P T

Greenlee SF-530

Price: \$64

Although it doesn't look the same, this multiscanner's body was labeled "powered by Zircon," and its instruction manual was the same as that used for the Zircon MultiScanner Pro SL. Its performance was marginally better than its Zircon relative.



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D B P T

Zircon MultiScanner i520

Price: \$47

By far the best Zircon model, the MultiScanner i520 is quite accurate at finding both wood and metal studs. It located steel conduit up to 1 in. deep behind the wall surfaces; however, it never hinted at the copper pipes. AC detection was quite good: It gave no false alarms and, with care, was able to trace live wires with respectable accuracy.



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D B P T

Zircon MultiScanner Pro SL

Price: \$33

This scanner was an average, unremarkable performer. In metal-scan mode, it accurately located the center of metal studs, but it was never able to find copper pipes at any depth. Although the tool sometimes gave false AC alarms, it never overlooked any actual live wires.

Milwaukee Sub-Scanner 2290-21

Price: \$350

This 12v tool is definitely the king when searching for metal. It was the best at locating both copper and steel in the wall mock-ups, and it was the only tool that reliably found rebar in concrete. Unfortunately, the tool is large and would be difficult to use in tight spaces. To my surprise, I found the AC function too sensitive for practical use on walls. It indicated the presence of live wires before the tool actually passed over their location.

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D B P T

