



## Dream deck

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# Dream





## Cantilevered bays, overhead lattice, custom rails and cascading stairs make this deck unique and highly functional

by Jeff Gorton

**T**his deck isn't huge—about 16 ft. wide x 18 ft. deep plus bays and stairs—but it's big on features. The upper deck is just the right size for entertaining small groups—spacious but intimate. It has cantilevered nooks on both sides that provide space for seating and barbecue storage. The pergola shades the upper deck and the home's interior from the sun, and it offers a space for hanging or climbing plants. The lower deck is a great place to hang out in the sun, while the cascading stairs flow into the yard and provide lots of space for planters and pots.

This deck has some out-of-the-ordinary construction details that contribute to its unique look. For starters, the deck joists run parallel to the house and overhang the beams to form the cantilevered bays on both sides. Rather than a bolted-on ledger board, special “long-tail” joist hangers support the deck at the house. The deck material is also unusual. It's a low-maintenance composite material with a tongue-and-groove shape that

# Deck





**1** Set stakes at the house and drive nails to indicate the beam centers. Stake out batter boards about 1 ft. beyond the perimeter. Stretch a string between the boards parallel to the house. Use the 6-8-10 triangle method to stretch strings perpendicular to the house. Measure diagonally to check for square.

allows you to hide the fasteners by driving them through the tongues.

The rail system combines horizontal boards for privacy and an open design of copper plumbing tubes at the top, allowing you to see out easily. These unusual details make the deck a bit harder to build, so you'll have to follow the photos and drawings carefully to get everything to fit. If you have some carpentry experience, you shouldn't have any trouble building this deck. It's a big project, though, and will probably take you and a helper about two solid weeks to complete. You don't need any special tools, although a power miter saw speeds up the work.

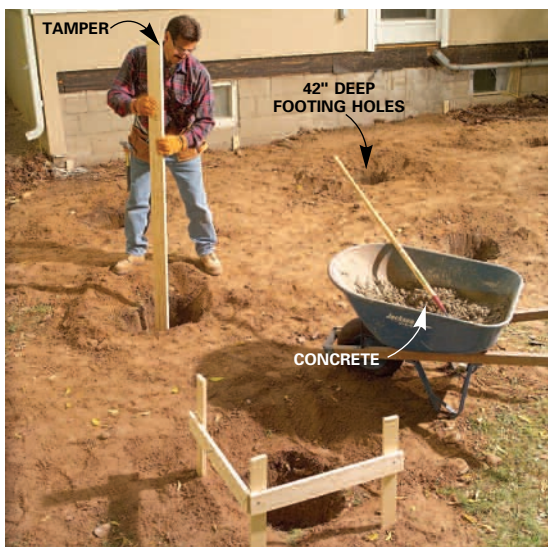
### Plan ahead—you may have to special-order a few items

You'll find treated lumber, cedar boards and many of the metal fasteners at your local home center or full-service lumberyard. You'll probably have to special-order the Geodeck decking, the 6x6 QuattroPosts and the special "long-tail" beam hangers (Kant-Sag MSH222-2). You can substitute other hanger brands, but use joist hangers labeled G-185. These have extra zinc coating to prevent corrosion caused by the chemicals in treated wood. Expect to spend about \$7,000 on materials for this deck.

Before you order materials, submit a deck plan to your local building department. Include details for the footings, attachment to the house, steps and handrails, and brand of composite decking. Some of the details we show may not be acceptable in your area. A few days before you plan to dig the footings, call to have underground utilities in the vicinity of the deck located and marked (888-258-0808). Then follow **Photos 1 – 21** and **Figures A – F** to build the deck, rail and trellis.

### Locate the footing holes accurately with string lines

Start by driving two stakes along the house, centered on the outside beams. Drive nails into these stakes to mark the center of the beams. Next stake out two sets of batter boards about 1 ft. outside the perimeter of the deck (**Photo 1**). The top of the horizon-

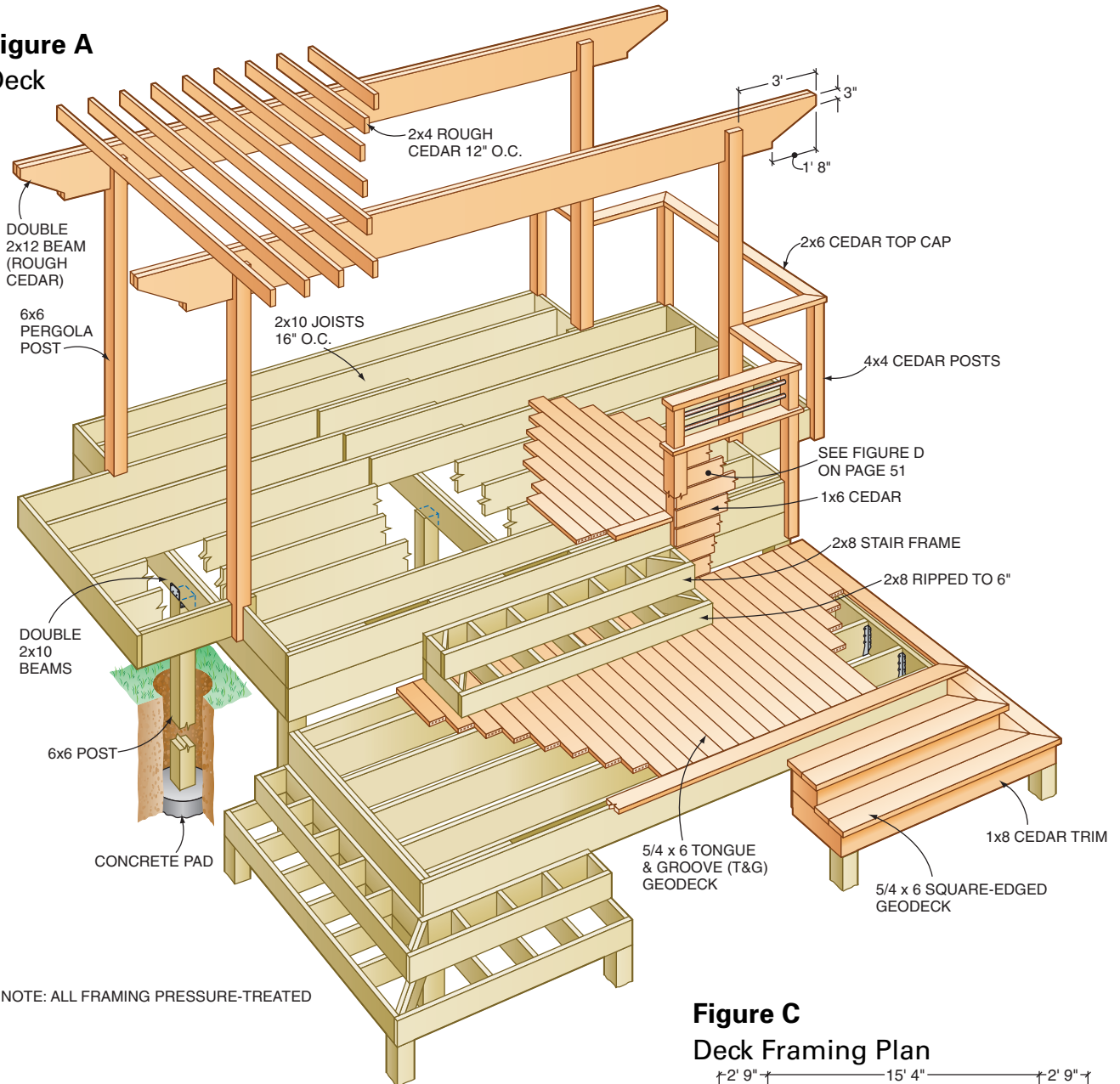


**2** Dig the footing holes. Mix two 80-lb. bags of concrete for each footing hole and shovel it in. Nail a 6-in. 2x4 to the bottom of a longer 2x4 and use this to tamp and flatten the top of the footings.

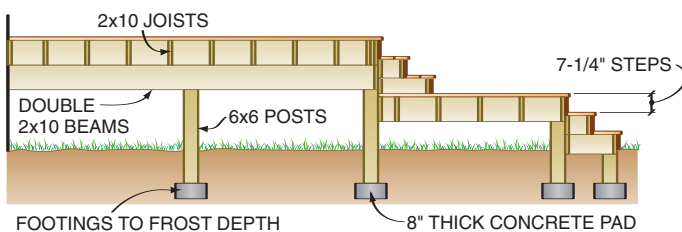


**3** Remove the siding from the level of your finished deck on down. Slide No. 30 building paper and galvanized flashing under the siding and nail it with galvanized roofing nails. Position the beam hangers and nail them to the house framing.

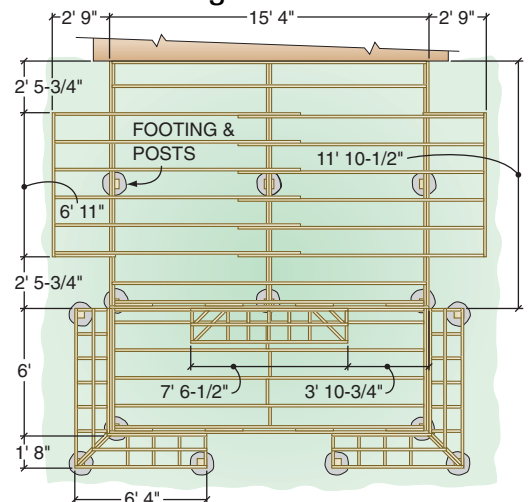
**Figure A**  
Deck



**Figure B**  
Deck Framing Elevation

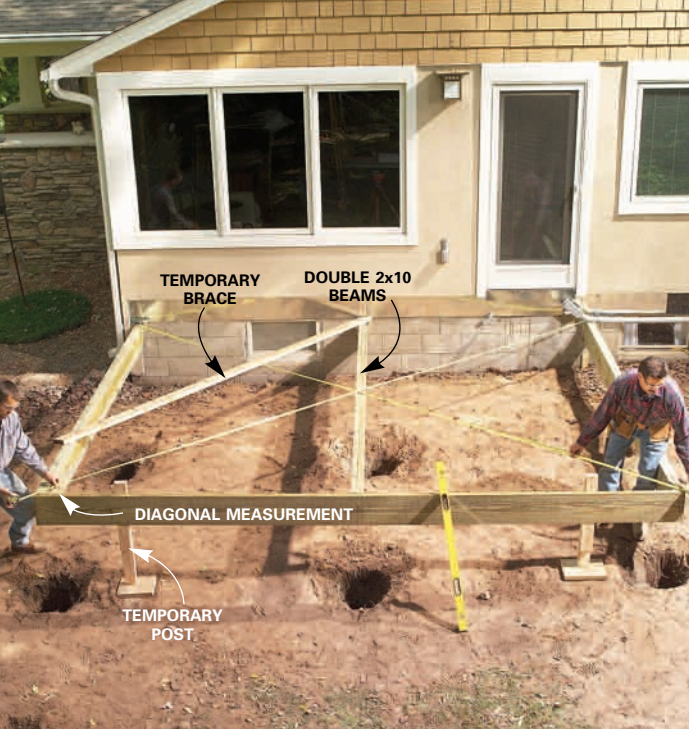


**Figure C**  
Deck Framing Plan





## Dream Deck



**4** Cut and nail together 2x10s for the three double beams. Rest the beams on the beam hangers and nail a 2x10 across the front. Prop the beams so they slope about 2 in. down from the house. Adjust the beam assembly until the diagonal measurements are equal. Then nail on a diagonal brace.

tal boards should be close to level with the top of the stakes near the house. Finally, stretch strings between the stakes and batter boards and square them to the house.

Use the 6-8-10 triangle method to establish lines that are perpendicular to the house (**Photo 1**). Measure 6 ft. along the house then 8 ft. out from the house and mark the string. Then measure between the 6-ft. and 8-ft. marks and move the end of the string line along the batter board until the distance is exactly 10 ft. (**Photo 1**). Double-check your entire string setup by measuring diagonally from corner to corner as in **Photo 4**. Adjust the lines until the diagonal measurements are equal.

After marking the footing locations, dig the holes to the depth required. Make the holes at least 12 in. in diameter to allow room for slightly adjusting the position of the 6x6 treated posts. After your building inspector has approved the excavation, pour an 8-in. deep concrete pad in the bottom of each hole (**Photo 2**).

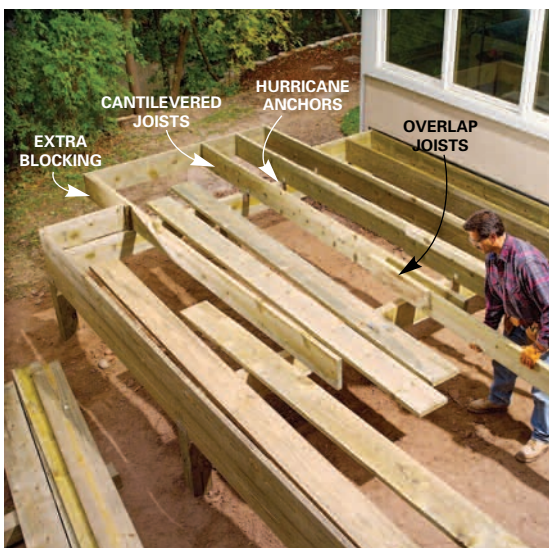
### You don't need a bolted-on ledger board for this deck

The beams are supported by 6x6 posts and are connected to the house by special “long-tail” beam hangers (**Photo 3**). The details of installing flashing and attaching these hangers to your house may differ from what we show, but a successful installation hinges on two key points. After you cut away the siding, slide the flashing under the siding and the existing building paper to make sure it sheds water. And second, nail the hangers into solid wood or consult your building inspector for the correct way to fasten the hangers to concrete, brick or block if necessary. Use 16d common *hot-dipped* galvanized or stainless steel nails to attach the hanger to the house and to the beams. Measure carefully to make sure the hangers are the correct distance down from the top of the deck surface and that they're level with each other (**Photo 3**).

After the beam hangers have been attached to the house, the next step is to construct the beams and install them on temporary supports. Since the tongue-and-



**5** Mark the 6x6 posts to fit under the beams and cut them to length. Then position the posts with their outside edges flush with the beams (Figure C) and attach them with metal post-to-beam anchors (**Photo 7**).



**6** Cut the 2x10 joists and position them according to the dimensions in Figure C. Attach them to the beams with hurricane anchors. Overlap the cantilevered joists in the middle.



groove decking boards fit tight together, without space for water to run through, slope the deck about 2 in. away from the house for drainage. Do this by leveling the beams and marking the temporary 2x4 supports. Then measure down 2 in. and make another set of marks. Line up the beams with the lower marks. Tie all three beams together with a 2x10 across the front. Then square and brace the beams (**Photo 4**).

With the beams in place, it's easy to measure for the posts. Just cut them a little long and drop them into the holes (**Photo 5**). Place the uncut factory end of the post down for the best rot resistance. Then mark the post at the bottom of the joist and cut each post at the marks. Connect the posts to the beams with metal post-to-beam anchors (**Photo 7**). Double-check that the beam assembly is square. Then fill the holes with the soil you removed, packing it as you go.

**7** Attach the beams for the lower deck section to the two outside posts with special inverted flange joist hangers. Cut and attach the corner posts and square the assembly as shown in Photos 4 and 5. Nail joist hangers to the beams. Use a 2x10 scrap to aid in positioning.



**8** Cut the joists to length, drop them into their hangers and nail them with galvanized hanger nails. Cut and nail blocking between the joists at the midpoint.





**9** Set a full-length deck board to overhang the joists by 1-1/2 in. and screw temporary blocks behind it. Cut six deck boards for the cantilevered section and press the tongues and grooves together. Measure the overhang (it should be 1-1/2 in.) and nail the first board into place. Unscrew the blocks and slide the decking back.



**10** Slide the tongues and grooves together and line up the ends. Then nail through the tongue into each joist at the angle shown. Use 10d stainless steel ring shank nails.



**11** Run the edge of your saw bed against the straightedge to cut a straight line for the recessed stair nosing board. Remove the tongue at one end with a chisel to allow a tight fit. Nail on the stair nosing board.

### Adding joists is a snap

Prepare for installing the joists by marking their positions on the top of the beams. Study **Figures A and C** for help in positioning the joists that overhang the beams. They overlap in the center and require additional blocking at the overhang to line up correctly. Cut the joists and tack them to the beams. Check that the overhanging sections are square to the main deck. Also sight down the front joist and outside joists of the overhanging sections to make sure they're straight. When you're confident everything's square and straight, fasten the joists to the beams with hurricane ties (Kant-Sag RT-7; **Photo 6**).

The joists for the lower deck section fit inside the beams, rather than run overtop. Build the beams and support them on posts just as you did for the upper section (**Photo 7**). Then cut the joists to fit inside and attach them with metal joist hangers and galvanized joist hanger nails (**Photo 8**). Add a row of blocking down the center to increase stiffness. The extra joists and blocking on the front of both the upper and the lower sections are needed to support the deck board that forms the stair nosing (**Photo 8** and **Figure C**).

### We designed this deck to use all full-width and continuous-length deck boards

To avoid having to rip the deck boards lengthwise and expose the hollow inside, we planned the deck framing to accommodate full-width boards. Adjust your framing dimensions if you use a different-width deck board. With careful planning, you'll have 1-1/2 in. overhangs.

The horizontal 1x6s in the railing cover the hollow ends of the deck boards. We left a 1/2-in. space between the deck boards and rail to allow water and debris to escape.

**Photo 9** shows how to get started installing the decking. Precutting and laying out the boards without nailing them gives you a chance to double-check your framing and make sure the first 12-ft. long deck board is straight and has the proper overhang. You'll have to drive nails through the top face of the first board (**Photo 9**).



Nail the remaining deck boards through their tongues into each joist (**Photo 10**). We used 2-1/2 in. stainless steel ring-shank siding nails, but 2-1/2 in. hot-dipped galvanized nails will also work.

Sight down the first full-length board to make sure it's perfectly straight. It's difficult to correct problems later. Leave the ends of the boards long and use a straight board as a guide to cut them later (**Photo 11**).

Along the edge of the lower platform and at the stairs, use square-edged rather than tongue-and-groove decking (**Photo 11 inset** and **Photo 19**). **Photo 19** shows how to cut and nail the stair nosings and border pieces. Face-nail these boards.

## Take your time crafting the posts; they're full of tricky details

The rail system starts with posts that are notched 1-1/2 in. to fit around the joists and drilled to accept the 1-in. copper tubing. The trickiest part about making the posts is keeping track of the orientation of the notches and holes. Here's a tip. Cut the posts to length and distribute them to their locations on the deck. Move from one to the next, marking the notches and holes. Then move them to your sawhorses for cutting and drilling (**Photo 12**).

We used manufactured 6x6 posts for the trellis (QuattroPost brand; see Buyer's Guide, p. 55). They won't split and twist like regular 6x6s and are almost perfectly straight. The hollow interior makes it easier to cut and notch these posts. Standard 6x6s

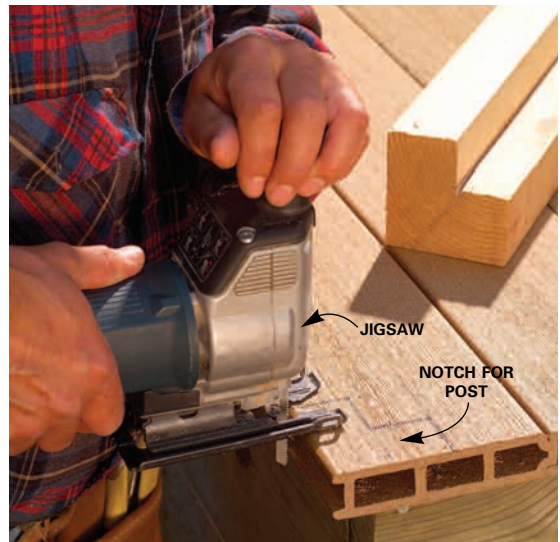
## Aged copper

The copper tubing will age naturally to a mellow bronze color, and after many years may turn green. We accelerated the process by thoroughly cleaning the copper with steel wool, and then applying copper aging solution according to the manufacturer's instructions. You can find copper aging solution at antiques stores, paint stores and hobby shops. Gun bluing solution will also work.

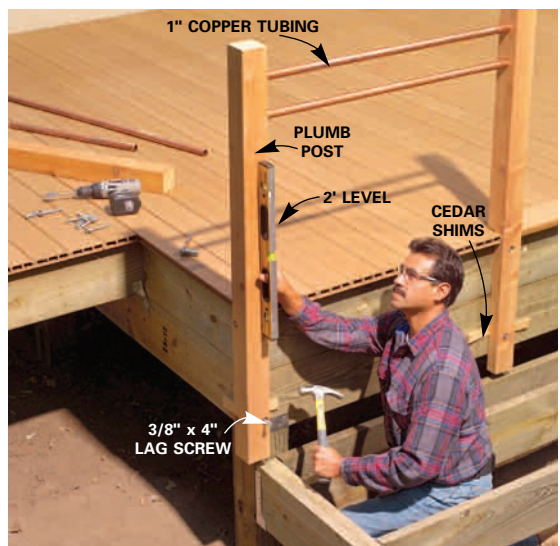
**12** Mark the 1-1/2 in. notches for the six 4x4 corner posts to fit over the joists and decking. First, cut them with your circular saw. Pry out the cutout piece and clean up the notch with a sharp chisel. Notch four 4x4 posts for the ends. Drill 1-1/8 in. holes 3/4 in. deep for the copper railings (Figure D).



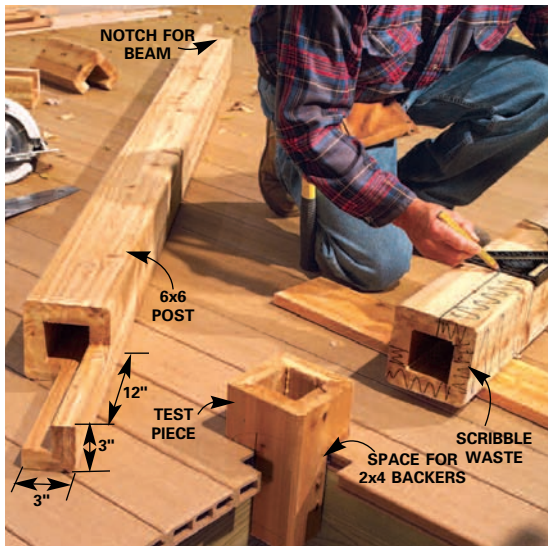
**13** Mark the corners and end post locations on the decking. Notch out the decking with a jigsaw to allow the posts to fit tight to the joists.



**14** Drill 1-in. countersink holes and 3/8-in. clearance holes in the posts for the lag screws. Cut the copper tubes and set them in their holes. Plumb the posts with shims and attach them with lag screws.





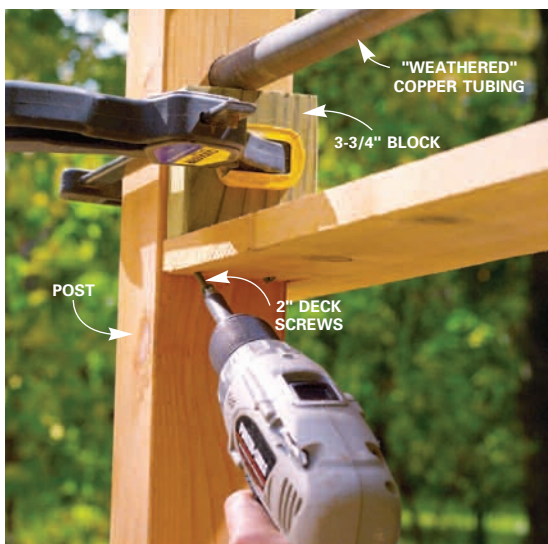
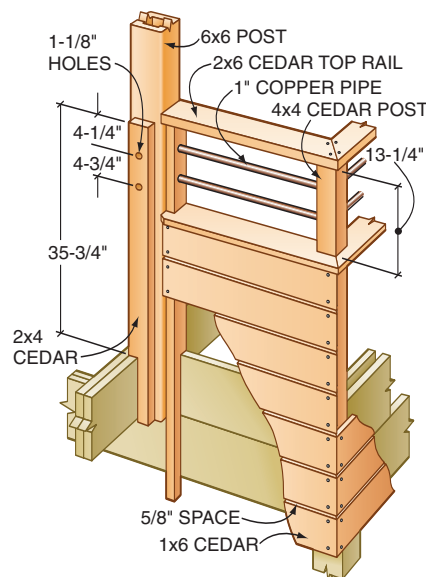


**15** Cut a test piece from a 6x6 scrap and use it to check the deck notching and as a guide for laying notches on the 6x6 pergola posts. Mark the waste with a scribbled line to avoid confusion. Use a circular saw to cut the notches and finish them with a handsaw.

will also work, but they're likely to crack. Double-check measurements before cutting. You don't want to goof up on these expensive posts.

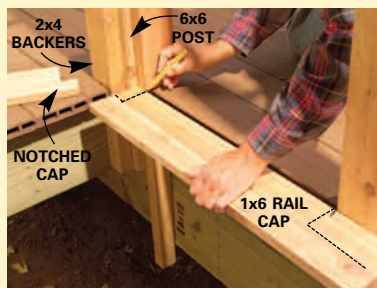
Notch the decking for the posts (**Photo 12**). Then drive 3/8-in. x 4-in. lag screws through predrilled 3/8-in. clearance holes to secure the posts. Use a tubing cutter to cut the copper tubing and install it along with the posts. Don't forget to cut, drill and center the two short pieces of 2x4 cedar that support the top railing and copper tubes on each cantilevered section (**opening photo**).

**Figure D**  
Pergola Post

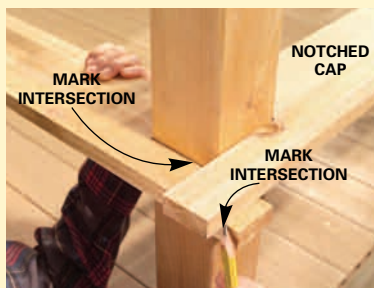


**16** Cut the lower rail caps to fit (see "Marking and Cutting the Lower Rail Cap," below). Butt a 3-3/4 in. block against the copper tube and clamp it in place. Predrill holes. Then drive 2-in. deck screws to support the 1x6 caps. Cut, fit and nail the 2x6 top rail into place.

## Marking and cutting the lower rail cap



**1** Cut the 1x6 lower rail caps, allowing extra length. Mark the post locations. Then use a Speed square to mark the 3-1/2 in. deep notches at these locations. Saw out the notches for the posts.



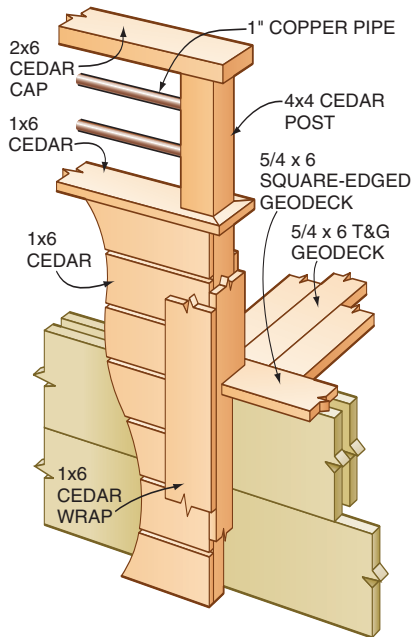
**2** Mark the intersection of the two tails. Make another mark on each cap where they intersect at the post. Connect the marks and cut the angle with a power miter saw or circular saw.



**3** Lap the cut piece ovetop and mark the angle on the lower piece. Cut this angle and check the fit.



**Figure E**  
Deck Railing

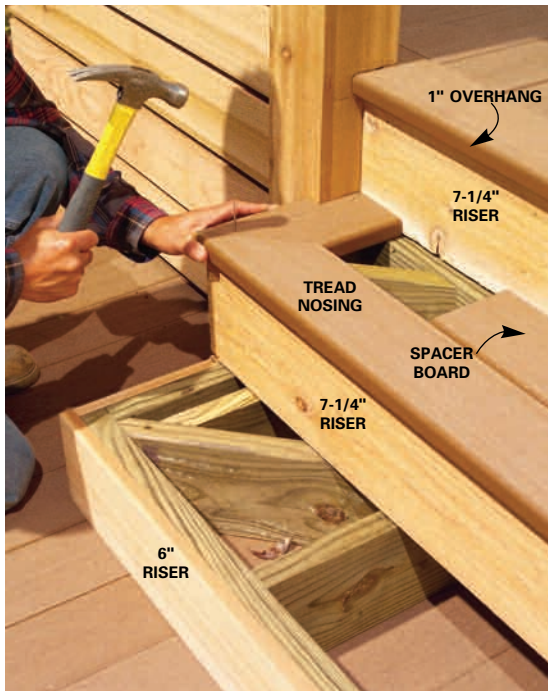


**17** Space the horizontal 1x6s with 5/8-in. thick blocks and nail them to the posts. Rip and notch boards to wrap the end posts. See Figure E, left.



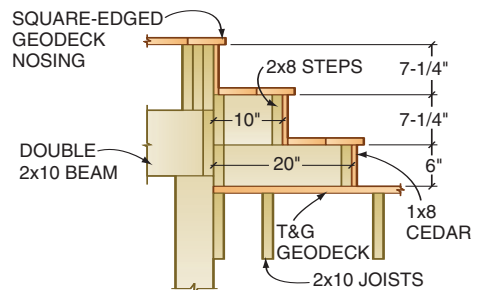
**18** Rip 2x8s for the lower stair and build the stair platforms. Stack and level them. Nail the platforms to the deck and to each other. Dig footings and pour concrete pads for the bottom stairs. Cut 6x6 posts to support them.





**19** Cover the framing with 1x8 cedar riser boards ripped to fit. Then cut and nail on the treads. Use square-edged Geodeck for the treads. Miter the corners of the outside treads to conceal the hollow interior of the deck boards.

**Figure F**  
Stair Elevation



Fitting the 1x6 lower rail cap is challenging, since it's notched around each post and mitered at the corners. The key is to mark boards in place whenever possible. See "Marking and Cutting the Lower Rail Cap," p. 50. Even though the cap fits between the posts at about 21 in. above the deck, mark the notches at deck level. This will ensure that the posts will be parallel to each other when the caps are screwed in.

## Install the horizontal 1x6s

Start at the top and work down, using 5/8-in. blocks to maintain even spaces between boards. Cut the end of the 1x6s square and overlap them at the outside corners. Plan the overlaps so the butt ends of the boards are facing the sides of the deck where they're less conspicuous. Measure down to the decking at opposite ends before nailing each row to keep the boards parallel to the decking. The lower boards hide the treated framing. Cover the ends of the boards near the stairs by wrapping the boards and 4x4 posts with 1x6s (**Photo 17** and **Figure E**). You'll have to rip and notch the 1x6 boards to fit.

## You don't need to cut complicated stringers for these stairs

Rather than notch 2x12s to make traditional stair stringers, we chose to build and stack platforms. This method requires more lumber but eliminates complicated layout work. If the top surface of your deck is 42-1/2 in. above the ground, you can build the two sets of steps exactly as shown in **Figure A**. Otherwise you'll have to adjust the rise or

## Materials List

| Item                                             | Qty.        | Item                                                                     | Qty.        |
|--------------------------------------------------|-------------|--------------------------------------------------------------------------|-------------|
| <b>FOUNDATION</b>                                |             | 1x8 x 10' cedar boards                                                   | 6           |
| 1x3 pine (batter boards and stakes)              | 24 lin. ft. | <b>PERGOLA</b>                                                           |             |
| Bagged concrete mix                              | 28 bags     | 6x6 x 10' QuattroPost                                                    | 4           |
| 6x6 x 8' .60 treated lumber                      | 7           | 2x4 x 12' rough cedar                                                    | 18          |
| <b>BEAMS AND JOISTS</b>                          |             | 2x12 x 16' rough cedar (beams)                                           | 6           |
| 2x10 x 12' .40 treated lumber (joists and beams) | 24          | <b>HARDWARE</b>                                                          |             |
| 2x10 x 16' .40 treated lumber (joists and beams) | 14          | 12" galvanized metal flashing                                            | 18 lin. ft. |
| <b>STAIR FRAME</b>                               |             | 3-1/8" x 22-1/4" adjustable strap hanger "long-tail" (Kant-Sag MSH222-2) | 3           |
| 2x8 x 8' .40 treated lumber                      | 30          | 6x6 post cap (Kant-Sag PB66-6)                                           | 11          |
| <b>DECKING</b>                                   |             | Hurricane ties (Kant-Sag RT 7)                                           | 20          |
| 5/4 x 6 t&g Geodeck, 12' lengths                 | 52          | Double 2x10 inverted flange hangers (Kant-Sag HD210-21F)                 | 2           |
| 5/4 x 6 t&g Geodeck, 14' lengths                 | 7           | Single 2x10 joist hangers (Kant-Sag HD210)                               | 12          |
| 5/4 x 6 square-edged Geodeck, 16' lengths        | 12          | 3/8" x 4" galvanized lag screws (rail posts)                             | 36          |
| <b>RAILING</b>                                   |             | 3/8" washers (for lag screws)                                            | 36          |
| 4x4 x 10' cedar (rail posts)                     | 3           | 16d common double-dipped galvanized nails                                | 10 lbs.     |
| 4x4 x 8' cedar (rail post)                       | 2           | 8d stainless steel ring-shank siding nails (decking)                     | 10 lbs.     |
| 1x6 x 12' cedar boards (rails and post wrap)     | 20          | 1" galvanized roofing nails                                              | 1 lbs.      |
| 1x6 x 14' cedar boards                           | 8           | Galvanized joist hanger nails                                            | 5 lbs.      |
| 2x4 x 12' cedar (rail backing)                   | 4           | 8d galvanized casing nails                                               | 2 lbs.      |
| 2x6 x 8' cedar (rail cap)                        | 3           | 16d galvanized casing nails                                              | 2 lbs.      |
| 2x6 x 12' cedar (rail cap)                       | 2           | 2" deck screws                                                           | 1 lb.       |
| 1" copper plumbing, 10' lengths                  | 10          | 2-1/2" deck screws                                                       | 2 lbs.      |
| <b>STAIR RISERS AND TRIM</b>                     |             |                                                                          |             |
| 1x8 x 8' cedar boards                            | 10          |                                                                          |             |



## Dream Deck

change the number of steps to fit your situation. To simplify the design process, draw the entire stair system actual size on a large piece of cardboard (**Figure F**). It takes an hour or so but helps prevent mistakes. Codes vary slightly, so check with your building inspector before constructing the stairs. In general, plan for a rise (distance from the top of one tread to the top of the next tread) of between 6 and 7-1/2 in. and a tread about 10 in. (11 in. with the nosing). Finish the stairs with 1x8 riser boards, ripped to fit, and treads (**Photo 19**). On sloping lots, you can regrade the lawn a little to make the lowest rise more consistent.

### Set beams on the notched 6x6 posts and add 2x4s to complete the pergola

To avoid having to special-order 22-ft. long beam material, simply splice shorter pieces as we show (**Photos 20 and 21**). A single 2x12 has enough strength. The second 2x12 simply improves the appearance. Start by arranging the 16-ft. 2x12s for the best grain and color match at the splices. Then lay out and cut one tail (**Figure A**) and use it as a pattern to mark and cut the three remaining tails. Use 2-1/2 in. deck screws to connect the beams to the notched 6x6 posts. Install the first layer (**Photo 20**). Then nail the second layer to the first with 2-1/2 in. galvanized casing nails. Complete the lattice by screwing the 12-ft. 2x4s to the beams (**Photo 21**).

### Finish the wood parts of your deck to protect and preserve them

We applied Cabot's clear finish for the most natural look. The drawbacks to clear finishes like this is that they don't protect against graying as well as finishes with more pigment and they must be reapplied annually. In general, the more pigment, or color, a deck finish has, the greater protection it offers.



### Buyer's Guide

**GEODECK:** (781) 275-3600. [www.geodeck.com](http://www.geodeck.com). Composite decking material.

**QUATTROPOST BY SYNERGY PACIFIC:** (250) 546-6808. [www.synergypacific.com](http://www.synergypacific.com). Manufacturer of 6x6 QuattroPost. If you need help finding a dealer, send an e-mail to [sales@quattropost.com](mailto:sales@quattropost.com).

**20** Cut decorative ends and splice the front 2x12s over the center of the posts. Attach them with 2-1/2 in. deck screws. Nail a second 2x12 to the first to create a beam. Splice the second 2x12 in the center.



**21** Mark the top of the 2x12s for the 2x4 lattice boards. Cut the 2x4s to length and mark the beam locations on them. Align the marks and screw them together with 2-1/2 in. deck screws.

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Photography • BILL ZUEHLKE  
Technical Art • FRANK ROHRBACH III  
Deck Design • MARCELO VALDES, SALA ARCHITECTS  
Deck Consultant • DECK AND DOOR COMPANY, BOB HEIDENRICH, JON BRENNHOFER