

# A cascading 16:1 vang for the Coronado 15

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This guide is written with the assumption that you are replacing an existing (underpowered) vang on your Coronado 15. Any particular part may be different for your application but shouldn't be too far off base. It's your boat, so it's your responsibility to make sure things work correctly and are safe. I also assume here that you're familiar with basic line work. Whip or melt the ends of any cut lines to prevent unraveling and make sure you're using lines that are strong enough for the purpose.

This project is simple, quick, and relatively inexpensive. Expect to spend an hour or so on it once you have all the parts together.

## How the 16:1 vang works

This is a three-stage cascading system, with the first two stages providing 2:1 purchase and the third providing 4:1. Figure 1 shows the basic layout of the stages and identifies the attachment points and blocks involved. Figure 2 shows how the vang will look when completed. We use the same identification system throughout this guide, with attachment points identified by letters A–G and blocks identified by numbers 1–6. The two sides of the double block, number 3, are referred to as 3a and 3b.

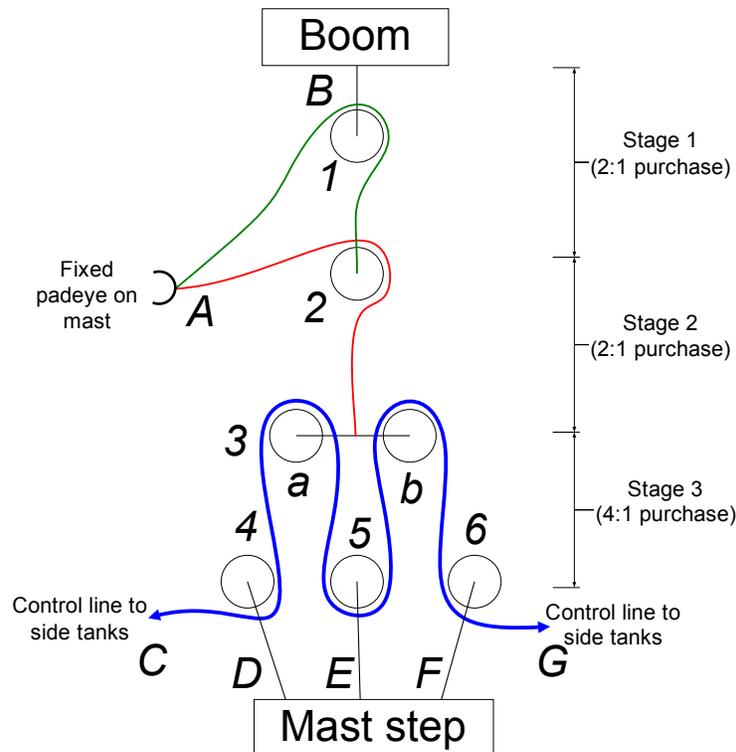


Figure 1. Schematic of the 16:1 vang showing attachment points labeled with letters, blocks labeled with numbers, and stages identified by color. Block 3 is the double block. Block 5 may be attached at A instead of E.

The line for the first stage (in green) starts at a fixed padeye on the lower portion of the mast (A), then runs through a block attached to the boom (1), and terminates attached to the eye or hoop on a second block (2) just below where it passes through the first.

The line for the second stage (in red) also starts at the fixed padeye (A), and passes through the block at the end of the first stage (2), then terminates at the eye or hoop on the double block (3), just below where it passes through block 2.

The third stage, the control line shown in blue, starts at the tank on one side of the boat where it passes through a clam cleat or other cleat (C), runs through blocks to block 4 attached to the mast step (D), then up through one side of the double block (3a). It descends and passes through block 5, which is fixed to either the mast step (E) or the mast padeye (A). The line then ascends and passes through the other side of the double block (3b). Finally, it descends to pass through block 6, fixed to the mast step (F) and runs back down to a clam or other cleat on the tank opposite the starting point (G).

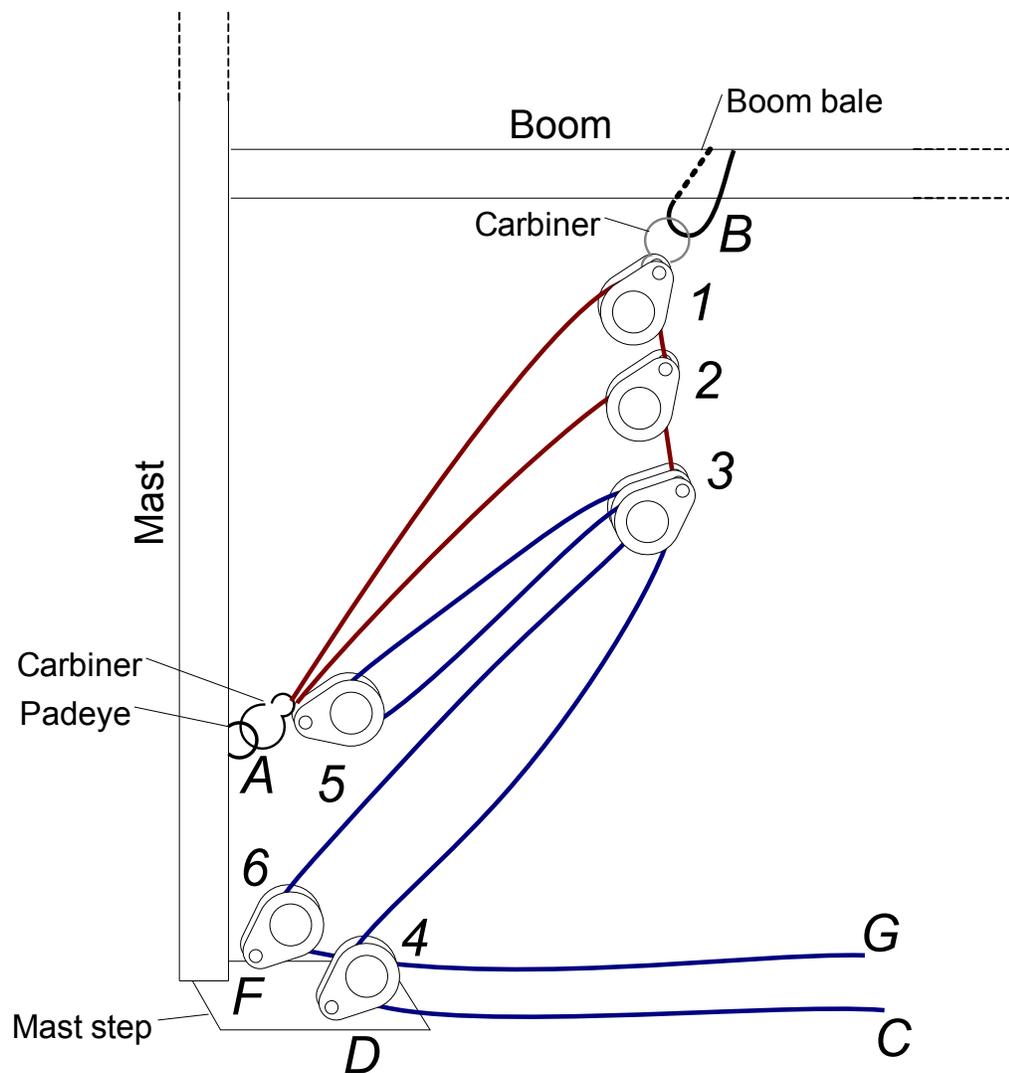


Figure 2. Diagram of how the 16:1 vang will look when rigged on a boat. This layout does not use attachment point E on the mast step; instead, block 5 is attached at point A. Scale and perspective are not precise.

## **Stuff you will need**

- Coronado 15 (with an old, tired, underpowered vang)
- At least 3 small blocks, such as Harken Bullet Blocks (I used swivel blocks; plain ones should work fine)
- A small double block (can be replaced by two more small single blocks; the double is much nicer)
- 15 feet 3/16 or 1/4 inch low-stretch line for cascade (I use 3/16" Samson XLS; it's cheap and works well but is not spliceable)
- 35 feet 1/4 or 5/16 inch low stretch line for control line (1/4" XLS works for me)
- One carbiner or other quick fastener
- A small shackle or (if you trailer your boat a lot, consider a second carbiner)
- Boom bale (if you haven't got one already. DO NOT USE A PADEYE! It will tear out. Trust me on this.)
- Padeye or other attachment point low on the front of your mast (a foot up or less; there should be one there from your old vang)

Both lines have a few extra feet added on them already, so you shouldn't need more than listed here. Thin lines like these tend to be pretty cheap, so don't skimp here. If your boat has some funky setup or looks very different from my pictures, buy the lines a few feet longer. It's easy to cut line off, but a pain to add it.

## **Rigging the new vang**

- 1) Start with the mast stepped and the boom off the mast but in the boat.
- 2) Remove your old vang control line from the boat. Leave the hardware leading the line to the tanks and the blocks on the mast step in place.
- 3) Detach the old vang and remove it from the boat.
- 4) If your vang was attached to the boom with a padeye, remove the padeye and patch the holes (I used JB Weld). Install a new boom bale (also known as point B) at roughly the same location, angled forward 30 to 45 degrees (to relieve stress on the screws and keep the bale from bending). Do not use a padeye here. It will probably tear out at the worst possible moment, as this vang has a lot of power.
- 5) Use the carbiner to attach one of the small single blocks (block 1) to the boom bale (point B).
- 6) Attach one end of the smaller line to the eye/hoop of another single block (block 2). While splicing in an eye with a metal thimble is recommended, while you're doing the initial set up you can tie it on.
- 7) Run the line up through block 1 so that block 2 hangs below it and the line leaving block 1 is going toward the mast.
- 8) Tie a small loop (~1") in the line about 3 feet from the end attached to block 2.
- 9) Using the small loop and a shackle (or second carbiner), attach the line to the padeye on the

lower mast (at point A). If you trailer your boat or otherwise step your mast frequently, a carabiner will save time and hassle, but decreases the available line a little. This finishes the first stage and begins the second, allowing you to deal with only one line. At this point, your setup should look something like Figure 3.

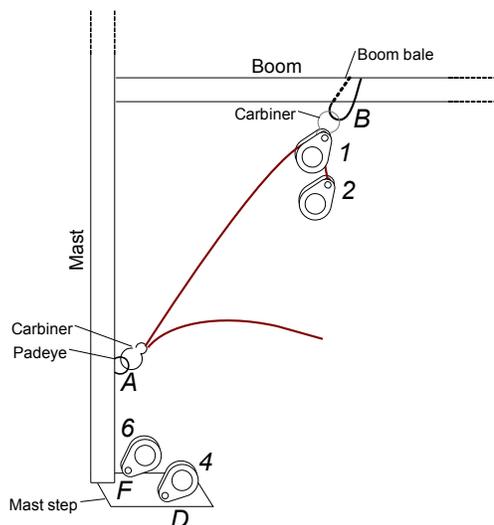


Figure 3. Rigging setup for the first stage, including steps 1 through 9.

- 10) Run the free end of the line through the top of block 2 such that it enters the block on top and exits pointing down.
- 11) Attach the free end of the line to the eye/hoop of the double block (block 3). Again, you can use a splice and thimble here in the final version, but you will need to adjust this during construction (probably substantially) so don't make it permanent at this point. This completes the second stage. You should wind up with something resembling Figure 4.

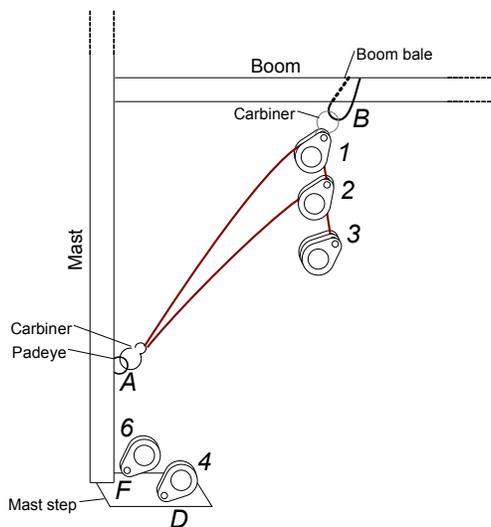


Figure 4. Rigging setup for the first and second stages, through step 11.

- 12) Tie off one end of the thicker, longer control line and pass most of the line through the clam cleat on the side tank (at point C).
- 13) Pass the line through the vang control line hardware until it passes through block 4, the existing block attached to the mast step at point D, and turns upward.
- 14) Run the line through one side of the double block (3a).
- 15) Attach a single block (5) either to the mast step (at E) or the padeye on the mast (A). I used the padeye. If using a carabiner to attach the loop on the cascade line to the padeye (from step 8), attach the block to the carabiner. At this point, your vang should look like Figure 5.

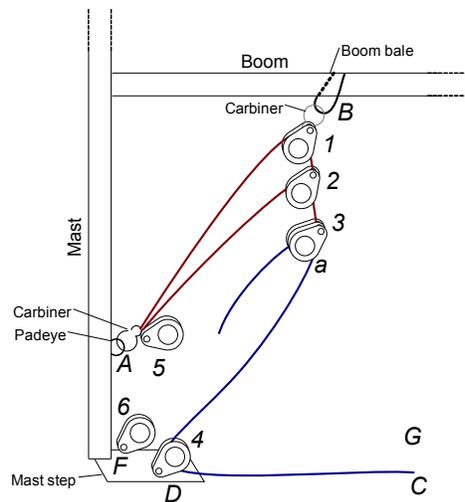


Figure 5. Rigging setup showing through step 15. The first and second stages are complete.

- 16) Run the line down from the double block (3a) and through block 5.
- 17) Run the line back up to the double block and through the other side (3b). The vang should now look something like Figure 6.

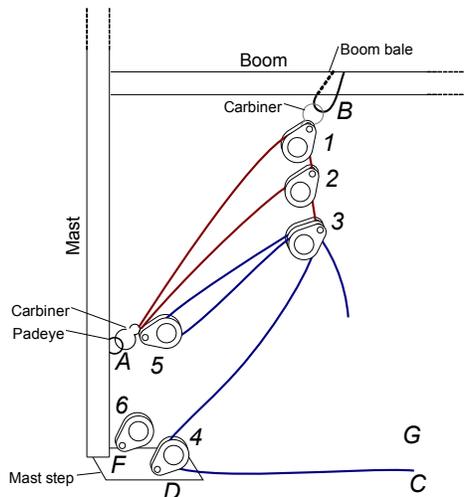


Figure 6. Rigging setup through step 17.

- 18) Run the line down and through the existing single block (number 6) attached to the mast step at F.
- 19) Run the line through the rest of the vang control line hardware along the tank and the clam cleat on the tank opposite where you started (point G). This completes the third stage. The whole thing should look like Figure 2.

## ***Tuning your new vang***

As you probably guessed from the lack of precise line measurements in the rigging section, your vang will need tuning and adjustment before using it. The idea here is to adjust the length of each section of the cascade so that it is no longer than absolutely necessary. This will ensure that your vang has enough line in it to adequately operate in all conditions, but not so much that you have extra line to pull in before it starts working. A little bit too much is fine, a little bit too little is a problem.

### **Put up a sail and let it ride**

To start adjusting your vang, detach it from the boom with the carbiner. Put the boom on the mast and run up a sail. It is easiest to do this step on a trailer or cradle on dry land during a calm day. You will want to have all the controls loose so the boom can be ride as far up as it will with a loose sail.

### **Adjust stage one**

Attach the vang to the boom bale with the carbiner on block 1. If it will not reach the boom bale, move the loop in the cascade line (at the mast padeye—point A) further toward the double block until the vang reaches.

You want the first stage to be just long enough that block 2 hangs directly below block 1 when the vang is entirely released. Adjust the location of the loop in the line until this happens. Make sure you leave an inch or two of line between blocks 1 and 2 so that you have enough slack to clip the carbiner to the boom bale.

### **Adjust stage two**

The second stage should be, again, be just long enough that the double block (block 3) hangs just below block 2. You will probably need to move the double block up the line a few feet; just tie it further up and do not cut the line off quite yet. You may need further adjustments later.

### **Adjust stage three and the control line**

The third stage should be the right length at this point, so you just need to adjust the amount of slack you have at each of the tanks. At this point, your control line should be slack; this gives you the least extra line at the tanks. Adjust the amount of extra line at each tank to your liking. I give myself about 18" past the clam cleat when the line is slack; some like it shorter. Make sure you make this adjustment with the vang loose (i.e. with no tension on it).

## **Testing your adjustments and finishing your vang**

Using the control line, work the vang in and out a few times. Feel how much nicer that is? Doesn't that feel like it will help you win some races? You will probably notice that the lines redistribute somewhat after you've given them a good tug. You can re-adjust the stages at this point if you want.

At this point, you can cut your control line to size and whip/melt the ends. Once you have double-checked everything for safety and secure attachment, take the boat out for a test drive or three, making any necessary changes along the way. Before taking the boat out, make sure any extra line on the end of the second stage is securely wrapped up and out of your way. Once you are satisfied with your new vang's adjustments, you can splice in thimbles, cut your cascade line to size, and finalize the project.

## **Troubleshooting**

I don't have any great troubleshooting or use tips for this project. I have just installed one on my boat (hull 1496), so I'm not sure what can go wrong or how to fix it. Bill Elliott's C-15 tuning guide has some great tips on using it as part of correct boat tune for any and all wind conditions.

## **Shopping for parts**

Most of the expense for this project will be the various blocks you need to make it work. I salvaged several Harken Bullet blocks on swivels from my old traveler, so I only needed to buy one new double block (about \$20 to \$25; I used a Ronstan #81 29mm loop top).

The lines are small diameter and will probably be inexpensive. Make sure you're buying a strong line with low stretch and high UV and abrasion resistance. I used 35 feet of 1/4 inch Samson XLS (about \$0.40 to \$0.50 a foot) and 15 feet of 3/16 inch XLS (about \$0.20 a foot).

Where I live, the one shop with sailboat parts has a less than stellar selection, so I tend to mail order parts. I had to order the lines for this project as the shop here didn't have the small diameter lines. I have had great buying experiences with two companies (not that others aren't great, too):

Salty Dog Marine <http://www.saltydogmarine.com> (great prices on blocks and other gear)

Annapolis Performance Sailing <http://www.apsltd.com> (I got the XLS line from them)

There's always West Marine, too. <http://www.westmarine.com>