



Troubleshooting an Ockam system

This paper describes how to bring up an Ockam instrument system for the first time. It could apply to new installations, but the installer is usually around for that. Rather, this paper is written for somebody with no previous experience bringing up a system in an unknown condition for the first time. We will concentrate on the basic functions, boatspeed, apparent wind and heading, and get them working correctly.

After the system is up and running, tuning up and calibration is the next step and is covered in the manual.

Reference will be made to various manuals.

The system manual is available at:

<http://www.ockam.com/pdfman.pdf>.

Newer systems use the Tryad processor and the Multiplex interface

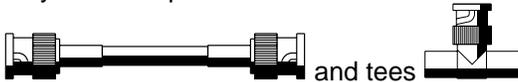
<http://www.ockam.com/T1.pdf>

<http://www.ockam.com/T2.pdf>.

Look-see

Poke around and find the system components. The CPU¹ is usually aft near the power source. The masthead and boatspeed interfaces² are usually forward near their sensors. The Heading interface³ could be either forward or aft.

- The system is powered from the ship's battery. Power goes to the CPU where it is regulated and sent on to all other system components over the bus network consisting of coax cable

with BNC connectors  and tees

- Examine the condition of the cables and connectors. If they're cruddy, you might want to do some prophylactic replacement or cleanup to save yourself time.
- Be sure the sensors (boatspeed paddles, masthead and cable, compass) are attached to their respective interfaces.
- If you have 005 displays⁴, you will need the set of cards that define what they display. You will especially want to find the following cards:

Test Configuration	Boatspeed	Windspeed Apparent	Heel
Test Errors	Windangle Apparent	Heading	

- If you have Matrix displays⁵, familiarize yourself with their operation. You should set up some pages for troubleshooting. Include the functions mentioned above for the 005 display.

¹ The classic CPU is shown in pdfman p. 68. The Tryad processor is covered in T1.pdf.

² Classic interfaces are shown in pdfman; Masthead on p. 84 Boatspeed on p. 80. Newer systems usually use the Multiplex Interface for both functions (T2.pdf).

³ Heading is shown on p. 91. Older units look like the Rudder interface (p. 111) except it says 'Heading' instead of 'Rudder'.

⁴ The 005 display is shown on p. 73. The cards are listed on p. 62.

- Magnum jumbo displays⁶ are usually controlled by remote buttons. Menu 14 has calcs, configuration and errors, and Menu 15 has everything.
- If possible, manipulate the sensors to check for bad bearings and such. You should pull the boatspeed paddle(s) and check for fowling and freely turning impellers.

Check for Power

When you turn the power on, light(s) on the CPU should flash or come on. If not, do Power Troubleshooting (pdfman p. 35). Don't rely on displays to tell you if power is getting to the CPU.

- For the classic 001 CPU, the light should flash. If it comes on solid, it indicates either low battery voltage or a shorted bus (p. 36).
- The T1 processor takes about 30 seconds to boot up, during which some of the indicator lights will come on. After boot is complete, the status light should show green or flash red, indicating errors (covered later).

Bring the Displays up

When you power up the system, do all the displays come on? If not, do Open and Shorted Bus Troubleshooting (pdfman p. 41).

Test your ability to select functions either with buttons or cards. All systems output at least 'Test Configuration', 'Test Errors' and 'Time'.

Check the Interfaces

On a display, select (or insert the card) Test Configuration (pdfman p. 20). This number indicates which interfaces the CPU is communicating with.

- If dividing by 2 gives an odd number, your system has boatspeed.
- If dividing by 4 gives an odd number, your system has wind.
- If dividing by 8 gives an odd number, your system has heading.

If you don't have at least these interfaces, find the interface(s) responsible for the missing elements and do Bus Troubleshooting (p. 41) on them.

Check for reasonable numbers for Boatspeed (0.00), Windangle Apparent (where the masthead vane is pointing; positive to starboard, minus to port, 0 ahead, 180 astern), Windspeed Apparent (if the cups are turning, a number greater than 0.0), Heading (agrees with the binnacle) and Heel (near zero).

If there are any major problems at this point, you should probably call in an expert⁷ or pack up the interfaces and sensors and send them in for us to look at.

Motoring around

⁵ The Matryx display is described beginning on p. 135.

⁶ Magnum displays are described beginning on p. 76.

⁷ Our dealer list is at <http://www.ockam.com/ockserv.htm>.

The next step is to test proper operation of the inputs. Take the boat out and motor in a straight line. Check for;

- Boatspeed responds with reasonable numbers. Check the value against GPS Speed Over Ground.
- Heading agrees with the binnacle.
- Windspeed Apparent looks reasonable.
- Windangle Apparent agrees with the masthead vane.
- Log any Test Errors that come up.

Repeat at 60° increments around a full circle to test Heading vs. the binnacle and Windangle Apparent against the vane.

If things seem to work OK, you're pretty close to a working system. Review Functional Troubleshooting (p. 35) and read about any Test Errors encountered (p. 38) for help with any problems encountered.

Sailing around

Next, go sailing. Here we're looking more closely at Windangle Apparent, Heading and Heel.

- When on starboard tack, Heel and Windangle Apparent should both be positive, and when on port, negative. If opposite, flip the heel sign switch on the interface (pdfman p. 84).
- Heel should give a reasonable number.
- Windangle Apparent should accurately follow the wind vane all the way around the clock.
- Check Heading against the binnacle while heeled to check the sensor under sailing conditions.

Repeat on both tacks, beating, reaching and running.

Fixing problems

Apparent wind: See <http://www.ockam.com/TroubleshootingWind.pdf>.

Boatspeed: See <http://www.ockam.com/TroubleshootingBoatspeed.pdf>.

Heading: See <http://www.ockam.com/TroubleshootingHeading.pdf>.

Wind direction: See <http://www.ockam.com/TroubleshootingTrueWind.pdf>.