# Configuring a Nexus Instrument System for the J/105

For me, outfitting J/105 #198, LEGACY, in 1998 was great fun. Finally I had the chance to set a boat up just the way I wanted. One of the decisions I spent a lot of time on was selecting the electronics, particularly the instruments. After being frustrated for ten years with the limited instrumentation that came with my previous boat, I was excited to be able to take advantage of the improvements in technology and pricing. After examining many different systems, I choose Nexus for its capabilities, display quality, and price-performance.

The system on LEGACY is based on the Nexus N3000 System integrated with a Garmin 215D GPS Chartplotter and a Nexus autopilot. The N3000 System includes speed, depth, wind, and heading sensors, one Multi-Function Display (MFD), and the server unit. To this I added a Nexus Tactical display, a Wind Data display, two mast-mounted MultiXL displays, a Nexus GPS Repeater, and a Nexus Remote Control with sockets at the helm and nav station. The Nexus technology does not *require* a central processor, although the N3000 system includes one, primarily to simplify the connections. In the Nexus system, each sensor and display is intelligent, putting processed information on the Nexus bus that all other components can use. A failure of any one component will not disable the system, though that component may need to be disconnected if it is causing bus errors. The functions available for display are based on the sensors installed. Install the speed impeller and you get boat speed and temperature. Add a masthead wind sensor and you get apparent wind speed and angle as well as true wind speed, angle, and VMG. Add the fluxgate compass or heading info from your GPS and you can not only view the boat's heading, but also the true wind direction (i.e. the wind is from 317°).

The Nexus MultiXLs are the focal point of my display system. Each MultiXL can display two lines of digital information allowing me to display the four most important performance parameters forward on the mast where everyone in the crew can see them. Normally we display Boat Speed and True Wind Speed on the upper display and Boat Heading and True Wind Direction on the bottom display. By mounting a large heel-angle indicator below the two MultiXLs, I've got everything I need to sail the boat fast - performance info, heel angle, and jib telltales - right in my line of site.

The remaining four Nexus displays are located in the recesses in the back of the cabin trunk, though on newer boats the same instruments could be located in the instrument pod above the companionway hood. The form-factor of the standard Nexus displays is a perfect fit for either location. A Multi-Function Display and a Tactical Data Display are installed to port of the companionway. On the starboard side reside a Wind Data Display and a Nexus GPS Repeater. These instruments display the secondary information that is used by the helmsman and tactician, but does not have need to be seen by the entire crew.

The MFD is the jack-of-all-trades of the Nexus system. Like the MultiXLs, the MFD can simultaneously display two lines of digital information from four "pages" of data containing over 35 possible functions. On LEGACY, we configure the MFD to display speed and the 10-minute countdown timer before the start. After the start I use the Remote Control to switch the MFD to depth and VMG. We also use the MFD to

check water temperature, battery voltage, and other occasionally used functions.
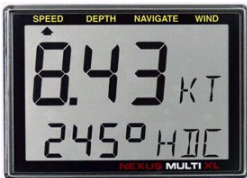
The Tactical Data Display shows two digital values allowing me to see both my current heading and the memorized heading at the same time. It also has an analog display that shows graphically, via fanning LCD segments, how much you're lifted or headed from the memorized heading. This analog section of the display can also display course deviation from an apparent wind angle or a GPS course-to-steer value. When memorizing a course heading, the Nexus system is smart enough to know which tack I'm on when I press the memory button, so I don't have to worry about pressing a port or starboard button. LEGACY has a heading button installed on each side of the cockpit next to the traveler controls; I can press either one to set the current heading value. The Tactical Data Display also has a unique header-alarm function. After setting the header-alarm for, say 10 degrees, the Tactical Data will sound an alert if you exceed that value for more than five seconds, and then show the number of seconds that the header has exceeded the alarm value. By the way, when using the Nexus starting timer function, the analog part of the Tactical and Wind displays automatically turn into a visual count down graphic during the last sixty seconds.

The Wind Data display is unique in showing two pieces of digital information, a graphical display of apparent AND true wind angle, plus the percentage increase or decrease of any speed function. The analog section of the Wind Data to the right is showing the apparent wind from about 75 degrees to starboard, while the true wind is about 135 degrees. At the same time, opposite the wind direction

indication is the graph of the measured performance value showing a one-segment (2%) reduction in this value. While this "performance gauge" is typically used to track changes in boat speed, other values that can be displayed include: VMG, True Wind Speed, Apparent Wind Speed, Speed Over Ground, Preferred Wind Angle, Current Drift Speed, and Target Boat Speed (if a PC is connected to the system to provide the targets).

My favorite function on the Wind Data display is the Next Heading function. When selected, this function alternately displays your current heading and the heading on the other tack assuming a tack or jibe to the same true wind angle. This is especially useful downwind with the rapidly changing jibing angles of a sprit boat. As we're approaching a layline or considering a tactical jibe, I look at the Next Heading value then eyeball the pedestal compass to get a good visual of what our course will be after the jibe. This sure beats trying to do the math in my head!

The final display on LEGACY is the Nexus GPS Repeater. This instrument is connected in parallel with the Nexus N3000 to the NEMA-out bus of the Garmin 215D GPS, rather than to the Nexus bus. The GPS Repeater can simultaneously display Speed Over Ground, Course Over Ground, Distance to Waypoint, Bearing to Waypoint, and steering guidance. This allows you to quickly evaluate the effect of current and leeway. With a Nexus GPS Repeater installed, you always have the navigational info you need visible to the helmsman.

The Nexus Remote Control is unique in its ability to function as both a display and a control unit for the instruments and autopilot. The Remote Control serves as a "dual-MFD", since it has left and right sides for each display page. It can control any of the other instruments except the GPS Repeater, which does not connect to the Nexus bus. It can also serve as the control for the autopilot. Normally my Remote Control is mounted on the pedestal while sailing and used to control the instruments and autopilot or, with the 15-foot cord, I can control the autopilot from under the dodger in bad weather. We also installed a socket for the Remote Control at the nav station for use below decks. This allows me to monitor any Nexus or navigation function from the nav station or the V-berth in an anchorage. In fact, by passing the remote out the hatch in the head, I can control the autopilot from the foredeck. Now if only someone would develop a remote control throttle for those single-handed dockings!

The Garmin GPS is mounted on a swinging arm just inside the companionway, which allows it to be tucked safely away during races or be easily visible from the helm when desired. It's connected to the NEMA input of the Nexus system unit, which makes all of its navigation data available through the Nexus bus to the displays and the autopilot. In fact, if the Nexus fluxgate compass fails, the instruments and autopilot can be configured to use the GPS for heading information. The integration of the Nexus autopilot with the Nexus instrument system and GPS allows the autopilot to steer to a compass heading referencing the fluxgate, to an apparent wind angle referencing the masthead wind transducer, or to an actual course track based on the steering directions from the GPS.

The integration of the instruments, autopilot, and GPS was much easier than I expected and has worked well. Another feature of the Nexus system is the small size of their cables. Compared to the coax cables used by some other systems, the 1/4" Nexus four-conductor cable can be run anywhere easily. I've also been pleased with the lighting on the Nexus instruments. The background glows orange against the black LCD segments and can be adjusted to three intensity levels. Finally, the damping level can be adjusted independently for each display based on the data you typically show on that instrument.

Is the Nexus system perfect? Well, no. My base system was installed before the MultiXLs were available. When I added them to the system, I experienced some intermittent problems because my server unit did not have a strong enough power supply to run all the displays on the system. Nexus already had an improved server unit in production and immediately shipped me a new one, which has performed fine. Another quirk occurs if you have more than one MultiXL installed. The first time they are connected to the system they must be added one-at-a-time with a power-on cycle between each connection so they will pick up individual bus-IDs or they will not be separately addressable. Finally, I wish they offered a tall masthead mount that would get the sensors up high for improved accuracy downwind.

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These are minor issues, however, and I can recommend Nexus instruments without hesitation. The features exceeded my expectations, the integration was easy, my service experience has been good, and the pricing is competitive!