

NMEA 2000 GATEWAY FOR THE MUXEN BRAIN

NMEA 2000

Every instrument on the boat’s NMEA 2000 backbone, decoded, ranked and turned into the readings the screens draw.

The gateway joins the boat’s yellow cable as an ordinary device and listens to all of it: position, heading, wind, depth, engine revs, tank levels, AIS traffic. It converts the standard’s radians, kelvins and metres per second into degrees, Celsius and knots, decides which instrument to believe when two of them disagree, and ages every field out so a **frozen reading** never passes for a live one.

SIX THINGS IT PUTS ON THE SCREENS

- 01 THE NAVIGATION PAGE**

Position, heading, course and speed over ground, speed through water, wind, depth and autopilot state, rebuilt once a second.
- 02 THE INSTRUMENT IT BELIEVES**

A boat carries two GPS antennas and two compasses that never quite agree. Rank them per data type and the satellite compass wins heading.
- 03 ENGINES AND THRUSTERS**

Revs, oil pressure, coolant temperature, fuel rate, hours and warning lamps, per engine and keyed by instance number. Bow and stern thrusters too.
- 04 THE TRAFFIC AROUND YOU**

Vessels, navigation marks, search-and-rescue aircraft and safety broadcasts, each target assembled from its messages, with its recent track.
- 05 THE ROUTE THE PLOTTER STEERS**

The active route or GoTo as the chartplotter sees it: next waypoint, bearing, distance, cross-track error and the full waypoint list.
- 06 A GPS THE WHOLE BACKBONE SEES**

A receiver wired to the Brain — USB dongle, LTE modem — goes out onto the backbone: on demand, or only when the boat’s own GPS goes quiet.

KEY SPECIFICATIONS

Network	NMEA 2000 and J1939 at 250 kbit/s; any other bitrate is refused
Presence	Four cooperating devices on four consecutive addresses
Units	Degrees, knots, metres, Celsius — never the standard’s raw units
Freshness	Every field ages out; a reading that stops arriving reads null
Alerts	MUXEN alarms raised on the chartplotter and silenced from the helm

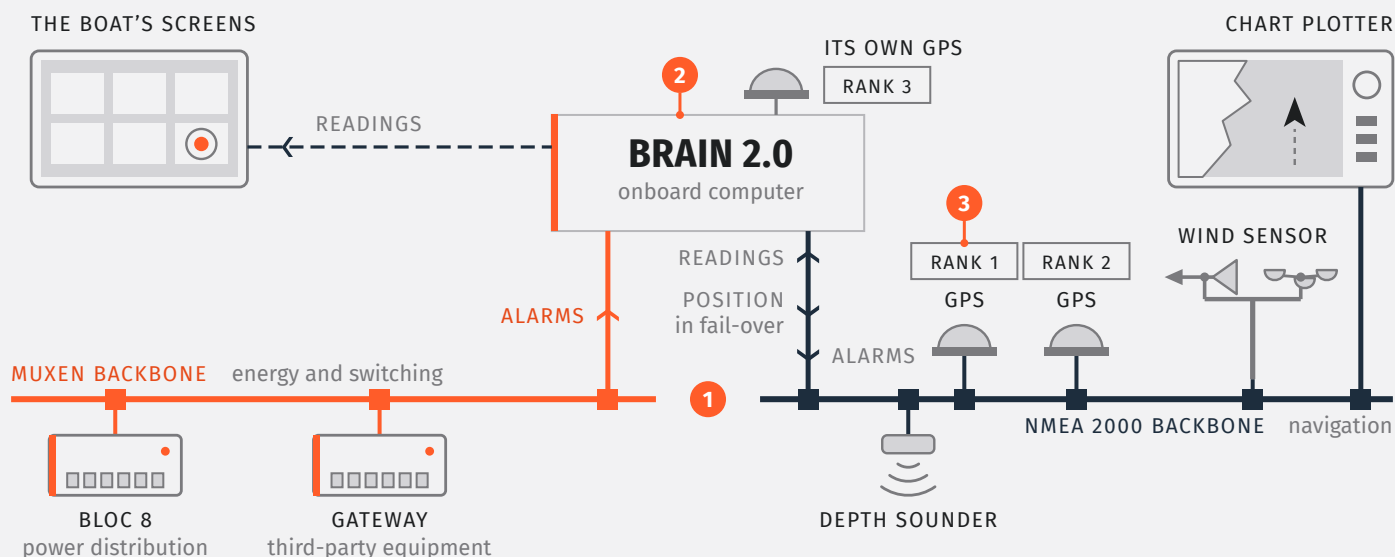
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WIRING IT IN

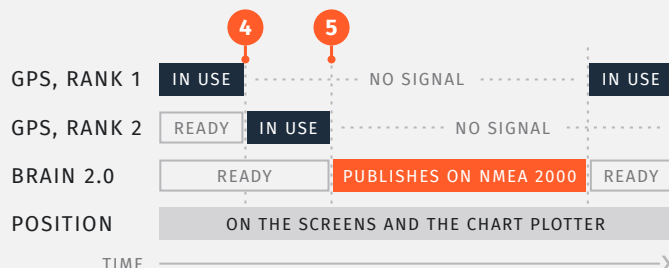
TYPICAL INSTALLATION

One Brain between the boat's two backbones, MUXEN and NMEA 2000. It ranks the instruments that send the same data, steadies the wind and keeps a position on the screens when a GPS stops.

ONE BRAIN, TWO NETWORKS, THREE GPS SOURCES



THE SAME BOAT, OVER TIME



THE WIND, FROM THE MASTHEAD TO THE SCREENS



1 TWO SEPARATE NETWORKS

The MUXEN backbone carries energy and switching, the NMEA 2000 backbone the navigation instruments. They are **never wired together**: the Brain has a port for each.

2 WHAT CROSSES BETWEEN THEM

The Brain is the **only link** between the two. It passes the readings to the boat's screens, and MUXEN's alarms to the chart plotter, where the crew can silence them.

3 ONE SOURCE PER READING

Two GPS antennas or two depth sounders never quite agree. The installer **ranks them** once, for each kind of reading, and the screens show the preferred one.

4 AUTOMATIC FAIL-OVER

When the GPS, wind or depth sensor in use goes quiet, the next takes over **within seconds**. The preferred one gets the job back soon after it returns with stable data.

5 THE BRAIN'S OWN RECEIVER

The BRAIN 2.0 has a GPS receiver of its own. In fail-over mode, after a minute with no GPS on the NMEA 2000 backbone, it **publishes its position** for the chart plotter.

6 A STEADY WIND

The masthead reading is damped: **steady** in the gusts and the roll, quick on a real shift. When no instrument sends true wind, it is computed from the boat's speed.

NMEA 2000 MESSAGE REFERENCE

THE PGNS IT DECODES

Every message type this gateway understands on the backbone, by family. A boat needs none of it to work; an installer reading a network capture, or matching a new instrument against the gateway, needs **all of it**.

NETWORK AND IDENTITY

59392	ISO Acknowledgment
59904	ISO Request
60928	Address Claimed
65240	Commanded Address
126208	Request / Command / Acknowledge Group Function
126464	Transmit and Receive PGN Lists
126993	Heartbeat
126996	Product Information
126998	Configuration Information

ALERTS

126983	Alert
126984	Alert Response
126985	Alert Text

POSITION AND NAVIGATION

65256	Vehicle Direction/Speed (J1939)
65267	Vehicle Position (J1939)
129025	Position, Rapid Update
129026	COG & SOG, Rapid Update
129029	GNSS Position Data
129044	Datum
129283	Cross Track Error
129284	Navigation Data
129285	Route/WP Information
129291	Set & Drift, Rapid Update
130577	Direction Data

TIME AND DATE

126992	System Time
129033	Time & Date

GNSS AND SATELLITES

129539	GNSS DOPs
129540	GNSS Satellites in View
129542	GNSS Range Residuals
129547	GNSS Pseudorange Error Statistics

STEERING AND ATTITUDE

127237	Heading/Track Control
127245	Rudder
127250	Vessel Heading
127251	Rate of Turn
127257	Attitude

SPEED, DEPTH AND LOG

128000	Nautical Leeway Angle
128259	Speed, Water Referenced
128267	Water Depth
128275	Distance Log

ENVIRONMENT

127258	Magnetic Variation
130306	Wind Data
130310	Environmental Parameters
130311	Environmental Parameters (deprecated)
130312	Temperature
130313	Humidity
130314	Actual Pressure
130316	Temperature, Extended Range

ENGINE AND TRANSMISSION

127488	Engine Parameters, Rapid Update
127489	Engine Parameters, Dynamic
127490	Engine Parameters, Static
127493	Transmission Parameters, Dynamic
127494	Transmission Parameters, Static
127496	Trip Parameters, Vessel
127497	Trip Parameters, Engine
127498	Engine Parameters, Static
130576	Trim Tab Status

J1939 ENGINE AND GENSET

61443	Electronic Engine Controller 2
61444	Electronic Engine Controller 1
61445	Electronic Engine Controller 3
65214	Auxiliary I/O Status
65242	Software Identification
65253	Engine Hours, Revolutions
65260	Vehicle Identification Number
65262	Engine Temperature 1
65263	Engine Fluid Level/Pressure 1
65266	Fuel Economy, Liquid
65270	Inlet/Exhaust Conditions 1
65271	Vehicle Electrical Power 1
65272	Transmission Fluids

ELECTRICAL

127501	Binary Switch Bank Status
127503	AC Input Status
127504	AC Output Status
127505	Fluid Level
127506	DC Detailed Status
127507	Charger Status
127508	Battery Status
127509	Inverter Status
127513	Battery Configuration Status
127744	AC Power / Current, Phase A
127745	AC Power / Current, Phase B
127746	AC Power / Current, Phase C
127747	AC Voltage / Frequency, Phase A
127748	AC Voltage / Frequency, Phase B
127749	AC Voltage / Frequency, Phase C
127750	Converter Status
127751	DC Voltage / Current

NMEA 2000 MESSAGE REFERENCE

AIS

129038	AIS Class A Position Report
129039	AIS Class B Position Report
129040	AIS Class B Extended Position Report
129041	AIS Aids to Navigation Report
129793	AIS UTC and Date Report
129794	AIS Class A Static and Voyage Related Data
129795	AIS Addressed Binary Message
129796	AIS Acknowledge
129797	AIS Binary Broadcast Message
129798	AIS SAR Aircraft Position Report
129801	AIS Addressed Safety Related Message
129802	AIS Safety Related Broadcast Message
129809	AIS Class B Static Data, Part A
129810	AIS Class B Static Data, Part B
129812	AIS Single Slot Binary Message

DIGITAL SELECTIVE CALLING

129808	DSC Call Information
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ROUTE AND WAYPOINT SERVICE

130064	Database List
130065	Route List
130066	Route/WP-List Attributes
130067	Route, WP Name & Position
130068	Route, WP Name
130069	XTE Limit & Navigation Method
130074	WP List, WP Name & Position

RADAR AND TARGET TRACKING

128520	Tracked Target Data
128521	Tracked Target Information
128522	Radar Guard Zone
128523	Radar Data Processing Status
128524	Radar Sweep Status

THRUSTER, WINDLASS AND WATERMAKER

128006	Thruster Control Status
128007	Thruster Information
128008	Thruster Motor Status
128777	Anchor Windlass Operating Status
128780	Linear Actuator
130567	Watermaker Input Setting and Status
130568	Watermaker Operating Status
130569	Watermaker Production Status

PROPRIETARY

65293	Cyclops Marine — Load Data
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ALSO COMPATIBLE WITH J1939 FOR BUS AND TRUCK

The same gateway reads the **FMS-Standard V04** messages a truck, bus or coach puts on its J1939 line — speed, brakes, fuel, doors and tachograph — and publishes them in the units the screens draw.

ENGINE, BRAKES AND SPEED

61440	Electronic Retarder Controller 1
61441	Electronic Brake Controller 1
61449	Vehicle Dynamic Stability Control 2
64962	Electronic Engine Controller 14
65265	Cruise Control / Vehicle Speed 1

FUEL AND DISTANCE

64777	High-Resolution Fuel Consumption
65110	Aftertreatment 1 Tank 1 Information
65217	High-Resolution Vehicle Distance
65257	Fuel Consumption, Liquid
65276	Dash Display 1

DOORS AND CHASSIS

64933	Door Control 2
65102	Door Control 1
65112	Air Suspension Control 4
65198	Air Supply Pressure

ELECTRICAL AND CABIN

64695	Vehicle Electrical Power 4
65237	Alternator Status
65269	Ambient Conditions

DRIVER, TACHOGRAPH AND FMS

64893	FMS Tell-Tale Status
64977	FMS-Standard Interface Identification
65131	Driver's Identification
65132	Tachograph
65254	Time/Date