Box wiring diagrams, v10.1: what is wired to what, and why

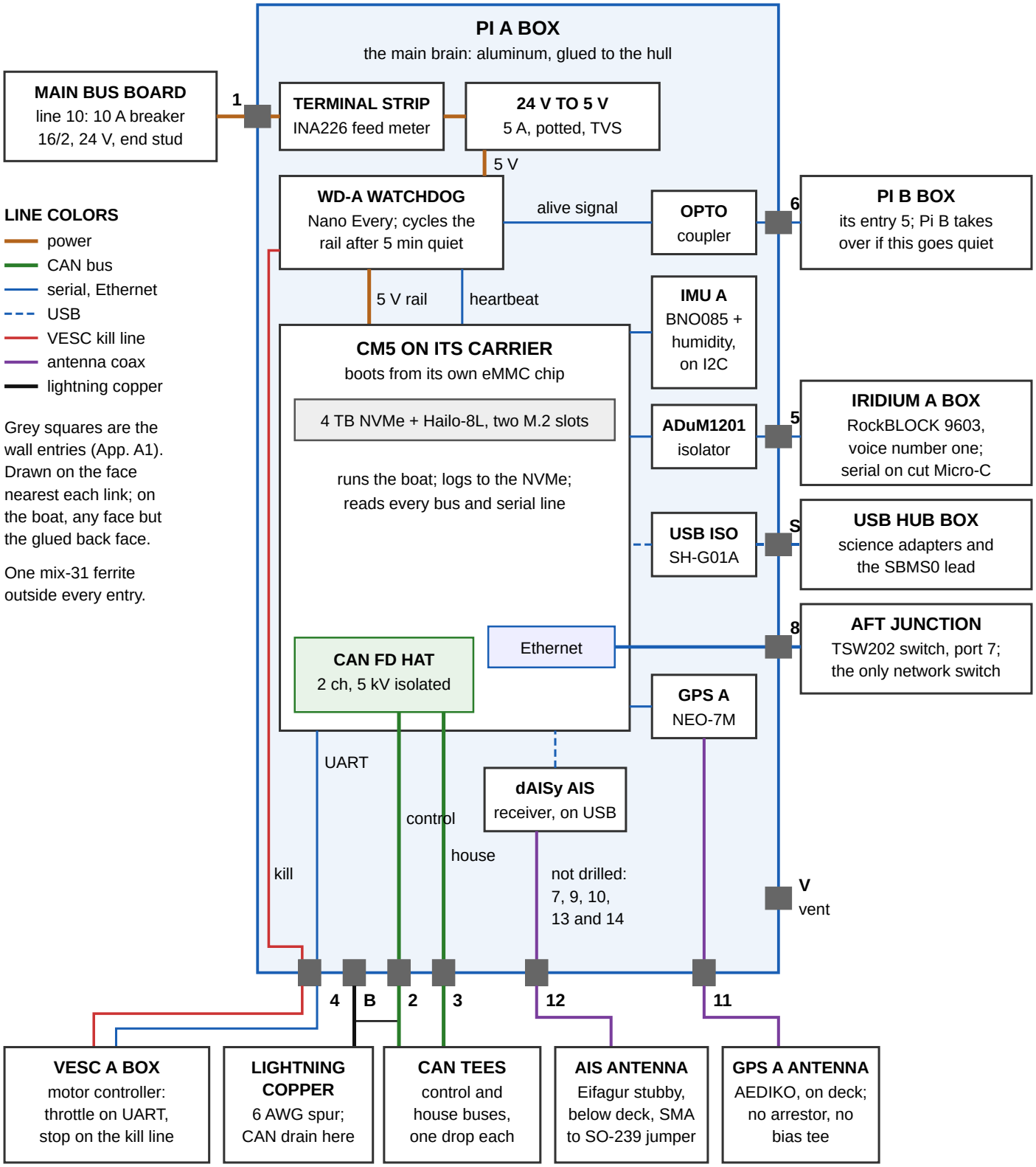
One drawing page per box (the central node has two), then a table of each link and why it is there. Every box with more than one part. Drawn 2026-10-02 from the v10.1 guides and Pending Amendments v10.2. Entry numbers are the wall holes in Electronics and Wiring Plan Appendix A.

Boxes in this set

Pi A box
USB hub box beside Pi A
Pi B box
Central node
BMS box
Aft junction (plastic box)
Network switch box
VESC A box (the main motor controller)
Battery box
Emergency bank
Iridium A box
Iridium B box
Starlink enclosure
Release Node B
Transom terminal box
Wing box

Pi A box: what is wired to what, and why

From Electronics and Wiring Plan v10.1 (Appendix A1, A1a, sec 6.2, 6.6, 7.6) and Compute Bay Housing and Wiring Plan v10.1 (secs 4.1, 4.3, 6, 7), checked against Pending Amendments v10.2. Drawn 2026-10-02.



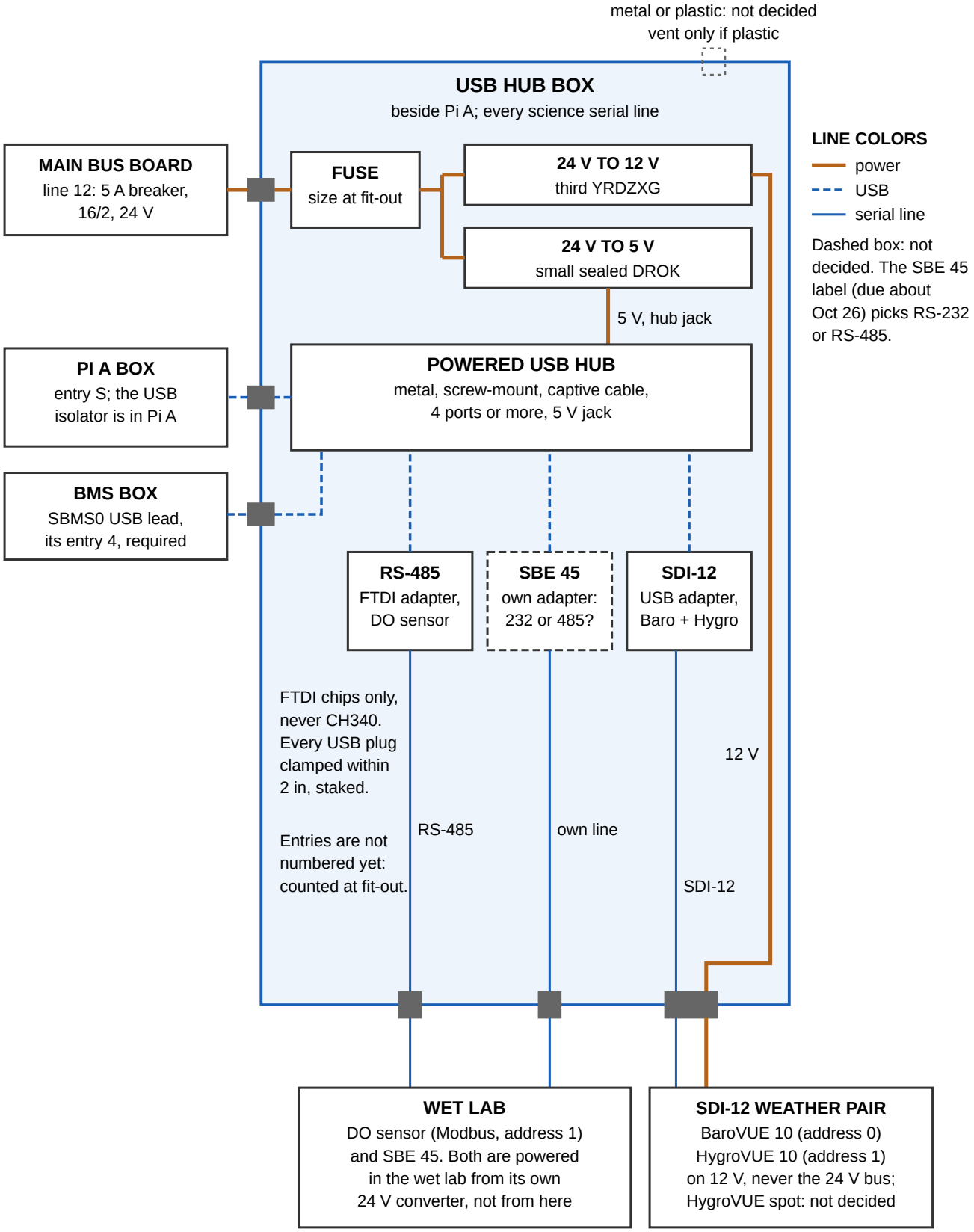
What each link is, and why

Link	What it is	Why
Main bus board to entry 1	24 V on 16/2 from its own 10 A auto-reset breaker (line 10, the bar's end stud). Inside: terminal strip, INA226 feed meter, potted 24 to 5 V, 5 A converter with a TVS diode (a fast surge clamp).	A breaker comes back after a passing fault; a fuse would leave the brain dead. No load current passes through this box but its own feed.
Converter, WD-A, CM5	The 5 V rail runs through WD-A's switch; a heartbeat line runs from the CM5 back to WD-A.	After 5 minutes of silence WD-A cycles the rail. Its switch conducts while WD-A is dead (default ON).
Entry 4 to the VESC A box	One cut Micro-C cable: the CM5's UART throttle and WD-A's kill line. No surge part on it, by choice.	WD-A asserts the kill on heartbeat loss only, so the stop path sits on no bus.
Entries 2 and 3 to the CAN tees	Control and house drops (the boat's data wires), cut Micro-C, into the isolated 2-channel CAN FD HAT. HAT terminators off.	The HAT's 5 kV isolation is the barrier. Two buses, so a babbling device cannot delay steering.
Bond stud B to the lightning copper	A 6 AWG spur. The CAN shield drain lands on this stud and nowhere else aboard.	Boards sit on insulated standoffs, so the circuit negative never touches the box.
Entry 5 to the Iridium A box	Serial line through the ADuM1201 isolator chip in this box.	Isolation beats clamping on a data line. The modem's logic level is still to check (open).
Entry 6 to the Pi B box	The "main island alive" signal from WD-A through an optocoupler (the signal crosses a gap as light). The only wire between the Pi boxes.	If it goes quiet, Pi B takes command. A1 and A2 both put the optocoupler inside; Compute Bay sec 6 says one, on an M12 cordset. Not settled.
Entry S to the USB hub box	The hub's USB lead through the one USB isolator (DSD TECH SH-G01A), clamped within 2 in and staked.	One isolator covers the SBMS0 battery stream and every science adapter.
Entry 8 to the aft junction	One Cat6 to the TSW202, port 7, on an IP67 RJ45 coupler.	Starlink, the cameras and Pi B reach Pi A through that one switch.
Entries 11 and 12, the antennas	11: SMA coax from GPS A (NEO-7M, position only) to an AEDIKO antenna on deck, no arrestor, no bias tee. 12: the dAISy (on USB) to the Eifagur stubby VHF below deck, one SMA to SO-239 jumper.	GPS: two separate chains are the protection. AIS: nothing is above deck, and the em-trak is the second receiver.

Main island, wired to the lightning copper. Every line from off the island crosses an isolator before it touches the CM5: the HAT on CAN, the ADuM1201 on Iridium, the optocoupler on the alive signal, the USB isolator on the hub lead, the switch's transformer on Ethernet. Also inside: IMU A and the humidity breakout on I2C, desiccant, the vent (V). Not drilled: 7, 9, 10, 13, 14. Colors: orange power, green CAN, blue serial, USB (dashed) and Ethernet, red the VESC kill line, purple antenna coax, black the lightning copper.

USB hub box beside Pi A: what is wired to what, and why

From Electronics and Wiring Plan v10.1 (Appendix A1a, sec 6.7, 7.6), Compute Bay Plan v10.1 sec 4.1, System Settings Sheet sec 9, Barometer and Pressure Port sec 1, checked against Pending Amendments v10.2. Drawn 2026-10-02.



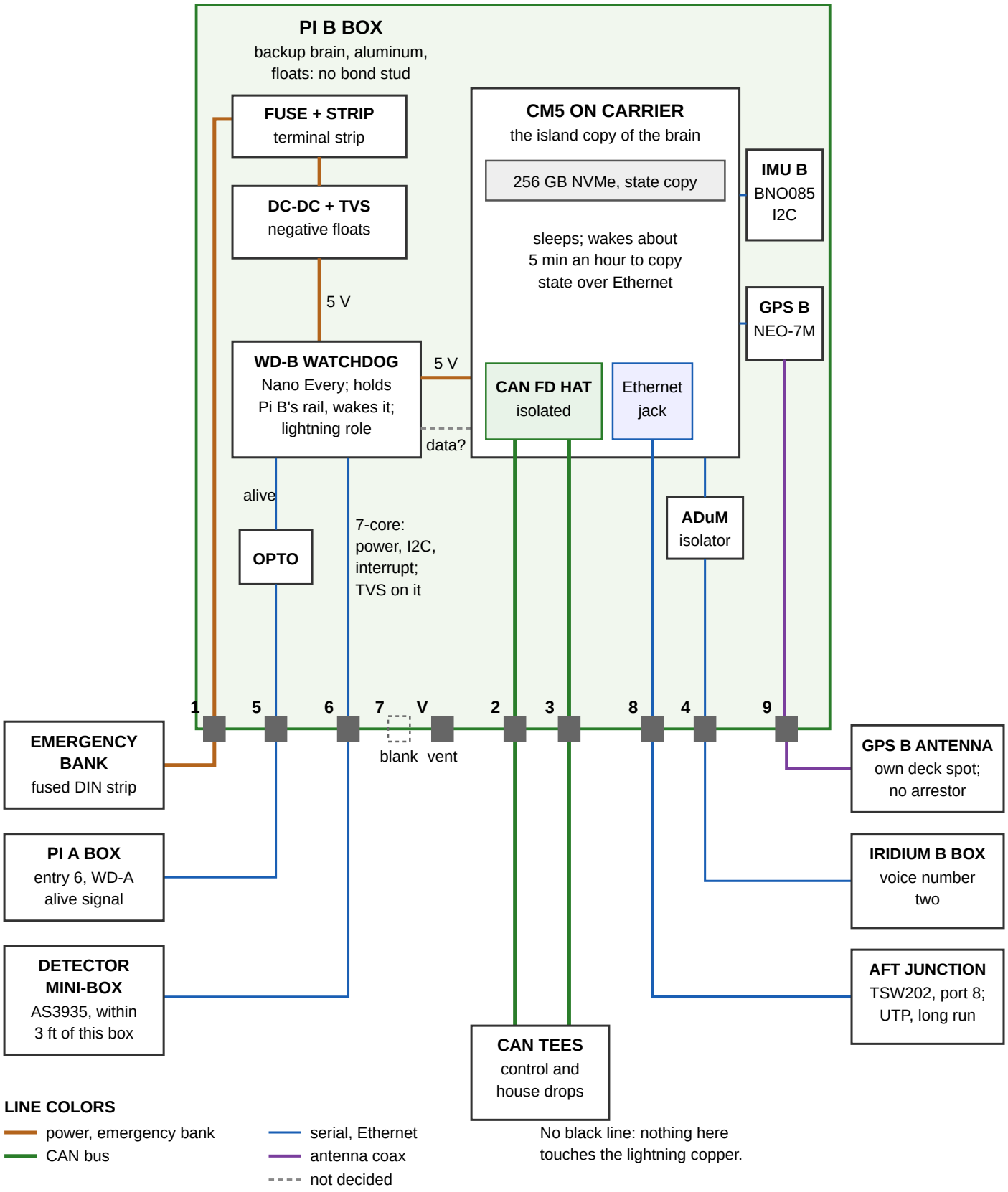
What each link is, and why

Link	What it is	Why
Main bus board to the feed entry	24 V on 16/2 from the hub box's own 5 A auto-reset breaker (stud table line 12). Inside, one fused 24 V line (fuse size set at fit-out) feeds both converters.	Its own breaker, so a hub fault cannot trip Pi A. Where it lands on the bar disagrees in the docs: the stud table says stud 8, A1a says the end stud.
24 to 5 V converter to the hub	A small sealed DROK converter into the hub's 5 V jack.	Pi A feeds nothing on the hub (decided 2026-09-26).
24 to 12 V converter to the weather pair	The third YRDZXG (bench-tested first) puts 12 V on the SDI-12 cable for the BaroVUE 10 and HygroVUE 10. Nothing else hangs on it.	Their top supply is 28 V and the bus reaches 28.4 V, so never the 24 V bus. The wet lab flow meter is not on it any more: it runs from the wet lab's own 24 V converter.
Hub lead to Pi A (entry S)	The hub's captive USB cable to Pi A, through the one USB isolator, which sits on this lead.	One isolator covers every science adapter and the battery stream.
BMS box (its entry 4) to the hub	USB lead from the SBMS0's WiFi/USB add-on board into a hub port. Readings only.	Required: the battery percentage comes from this stream, since the SBMS0 shunt is the only battery current sensor aboard.
RS-485 adapter to the DO sensor	FTDI USB to RS-485 adapter, Modbus RTU, DO sensor at address 1; later Modbus sensors join at 2, 3 and on.	Neither Pi has an RS-485 port. Data only: the DO sensor is powered in the wet lab.
SBE 45 adapter to the SBE 45 (dashed)	Its own adapter, never the DO sensor's line. Not decided: RS-232 (one wire-ended FTDI USB to RS-232 cable) or RS-485 (a second FTDI USB to RS-485 adapter). The label decides, about 2026-10-26.	It answers any character, so each Modbus poll on a shared line would set it talking.
SDI-12 adapter to the weather pair	SDI-12 (a simple three-wire sensor bus) USB adapter: data plus the 12 V. Set the HygroVUE to address 1 before joining; the BaroVUE stays 0.	Both sensors ship at address 0. Where the HygroVUE mounts, and its sun shield, are not decided.
Box, entries, vent	Entries not numbered: counted at fit-out. Metal or plastic not decided; if plastic it takes a membrane vent.	Pending Amendments lists both as open.

Only the hub's USB lead crosses into Pi A, through the one isolator. FTDI silicon only, never CH340 or CH341; a udev rule keyed to each adapter's serial number keeps each sensor's name after a reboot. No quad-UART HAT, no serial add-on boards. Colors: orange power, blue serial and USB (dashed blue).

Pi B box: what is wired to what, and why

From Electronics and Wiring Plan v10.1 (Appendix A2, A10, A12, sec 2.7) and Compute Bay Plan v10.1 (secs 4.2, 5.2, 6, 7, 13.1, 14.1), checked against Pending Amendments v10.2. Drawn 2026-10-02.



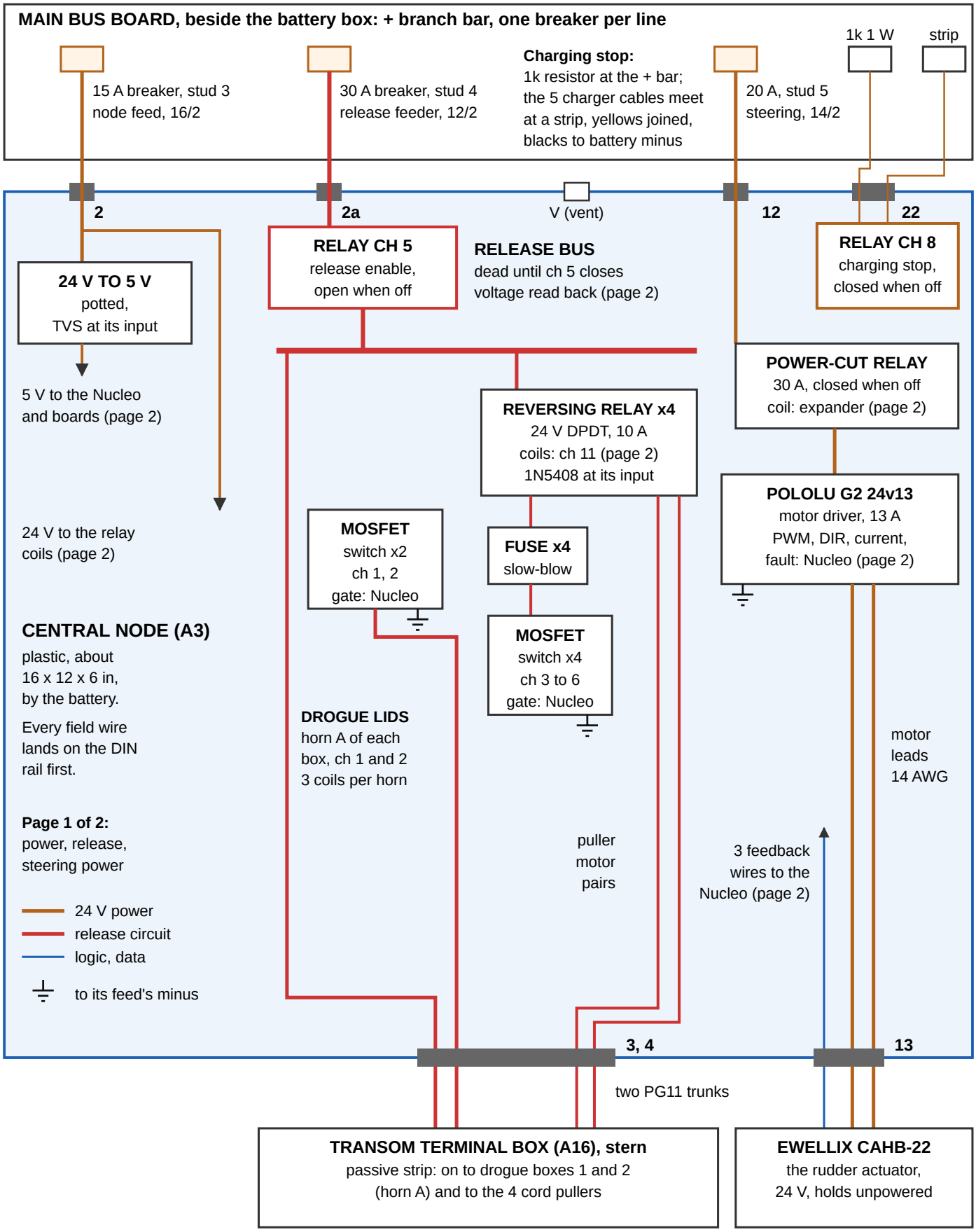
What each link is, and why

Link	What it is	Why
Emergency bank to entry 1	Feed from the Dyness bank's small fused DIN strip (A10). Inside: a fuse and terminal strip, then this box's own DC-DC converter with a TVS diode, its negative left floating (tied to nothing).	Power from the emergency bank only, with no copper path to the main bank, so a surge on the main rail cannot silence both brains. A10 puts the fuse at the DIN strip; Compute Bay 4.2 lists a fuse in the box: one fuse or two is not spelled out.
WD-B to the CM5	The 5 V rail through WD-B's switch (default ON). WD-B runs the wake schedule and can force Pi B awake.	Pi B sleeps most of the time, about 5 minutes an hour awake. How WD-B hands its strike log to Pi B is not written (dashed).
Entry 5 from the Pi A box	The "main island alive" signal from WD-A, through an optocoupler, to WD-B. Cut Micro-C cable.	If it goes quiet, WD-B promotes Pi B to command. Failover sticks until a signed reset by Iridium. A1 and A2 both say the optocoupler is inside; one part cannot be in both boxes.
Entry 6 to the detector mini-box	The 7-core lead, under 3 ft, from WD-B to the AS3935 (3.3 V, ground, I2C, interrupt). A TVS on this lead, on the floating negative (Compute Bay 14.1).	WD-B owns the lightning watch: strike log, 15-minute satellite checks while strikes are heard, the post-strike audit. No shutdown for lightning.
Entries 2 and 3 to the CAN tees	Control and house drops (cut Micro-C), into this box's own isolated CAN FD HAT.	The HAT's isolation is the barrier between the islands on each bus.
Entry 4 to the Iridium B box	Serial line through this box's ADuM1201 isolator. Cut Micro-C cable.	Voice number two lives wholly on this island.
Entry 8 to the aft junction	Plain UTP (unshielded) Cat6, long run to the TSW202, port 8, on a plastic RJ45 coupler.	The jack's transformer isolates it. No metal shell or shield ties this box to Pi A.
Entry 9 to GPS B's antenna	SMA coax from the second NEO-7M, no arrestor, no bias tee.	The beacon role always has live position.
Inside, no wall entry	IMU B (BNO085) on I2C; humidity breakout; desiccant; 256 GB NVMe holding the state copy. Entry 7 blank, V the vent.	

The five isolation rules: emergency-bank power only; every data link optical or transformer coupled; no metal shell or shield to Pi A (plastic glands and couplers, UTP); no bond stud, ever; everything else on the emergency bank (Iridium B, the detector, WD-B) on this side. Colors: orange power, green CAN, blue serial and Ethernet, purple coax, grey dashed not decided.

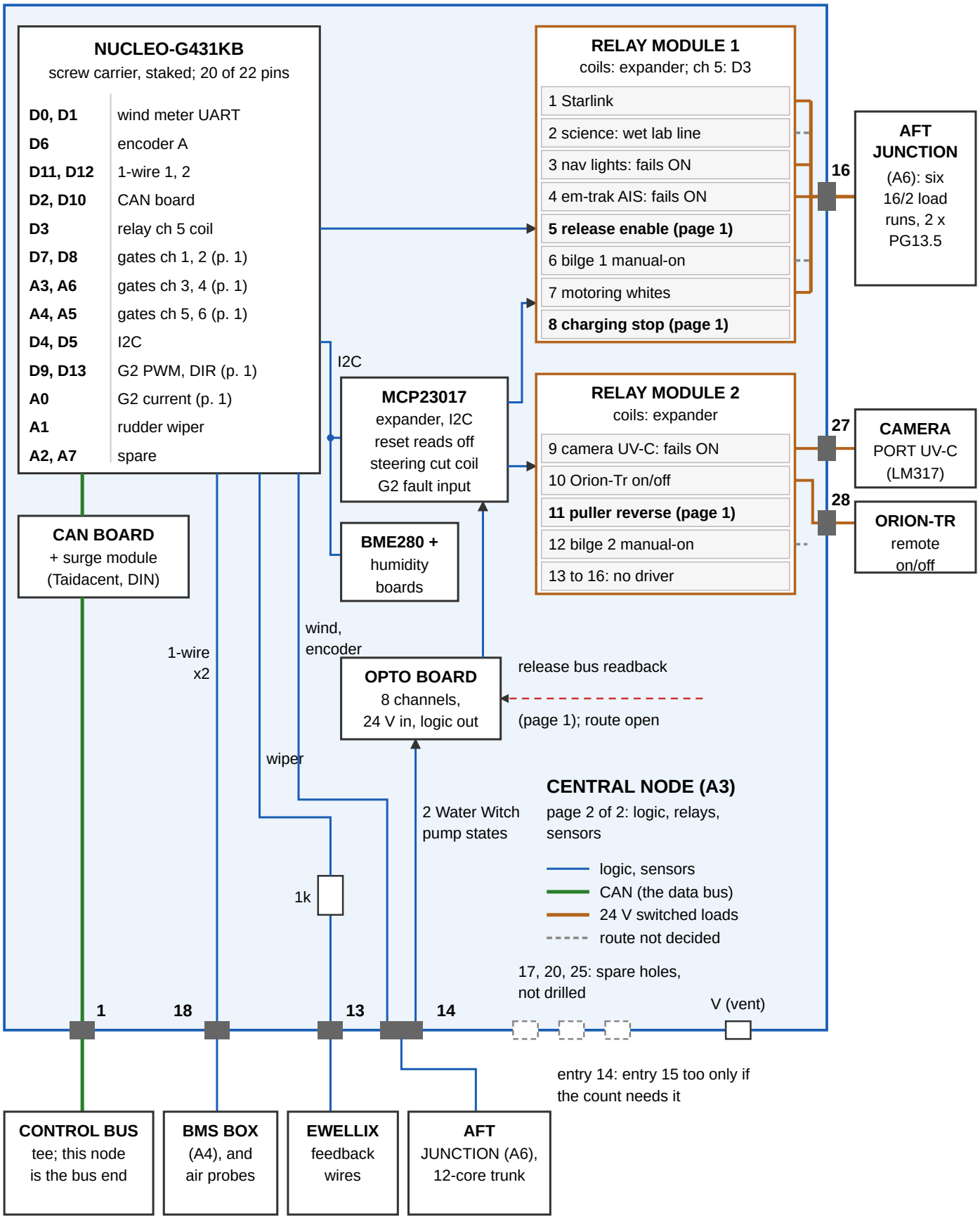
Central node: what is wired to what, and why (1 of 2)

Power, release, steering. From Electronics Plan v10.1 secs 4.1, 5.6, 6.7, 7.6, App. A3. Drawn 2026-10-02.



Central node: what is wired to what, and why (2 of 2)

Logic, relays, sensors. Pins: Compute Bay Plan sec 10.2; relays: sec 11; holes: Electronics Plan App. A3. Drawn 2026-10-02.



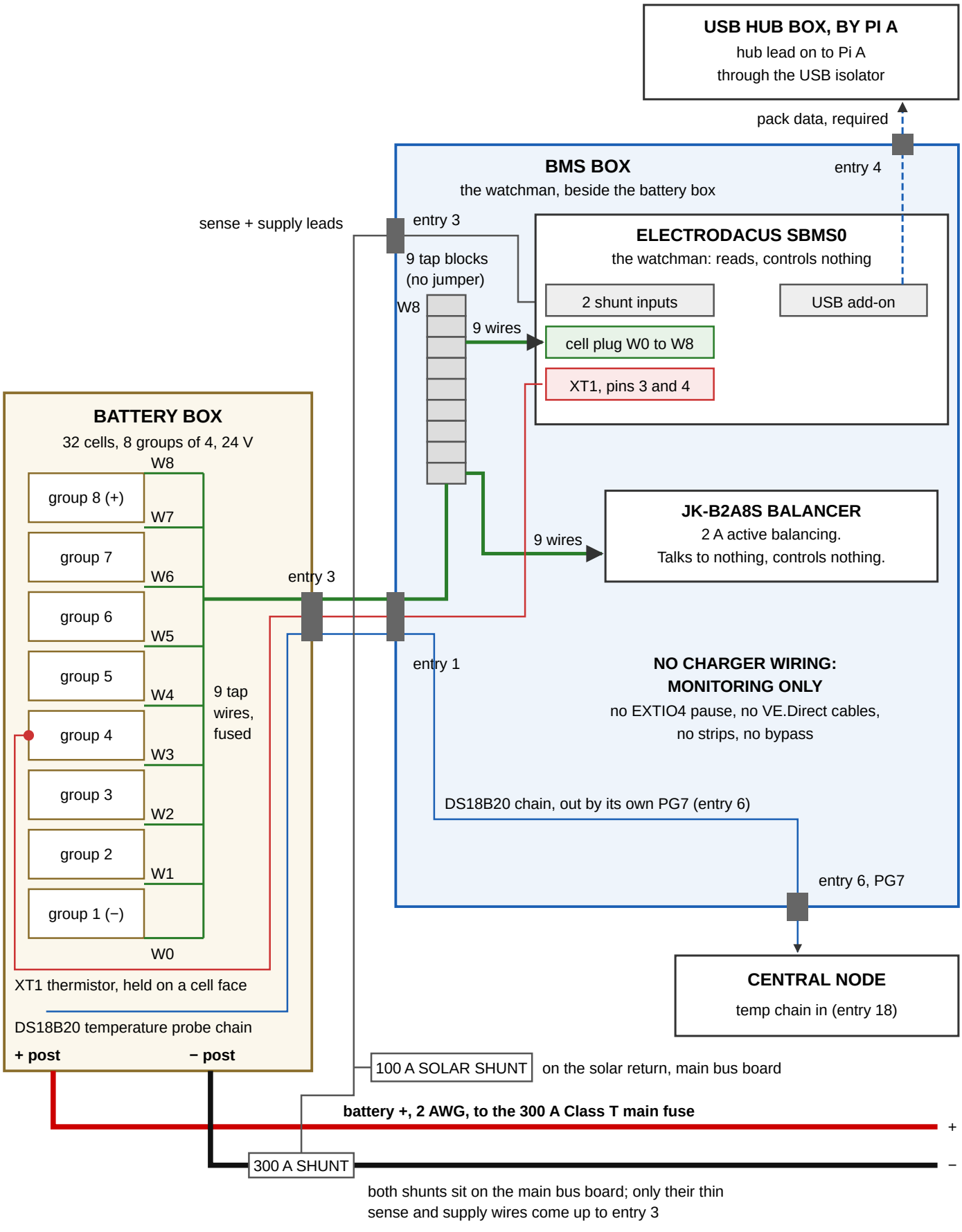
What each link is, and why

Link	What it is	Why
Node feed (entry 2)	16/2 from its own 15 A auto-reset breaker, stud 3, PG9. Feeds the 24 to 5 V converter and the relay coils.	Brains only. Release, steering and the charging stop each have their own feed, so a tripped node breaker cannot take them too.
Release feeder (entry 2a) to relay ch 5	12/2 on its own 30 A breaker, stud 4, alone; PG11 or PG13.5 once the jacket is measured. Ch 5 (normally open, coil on pin D3) feeds the release bus.	A burn draws about 25 A for up to 60 s, never on the node's feed. 12/2 matches Release Node B, so both paths lose about the same voltage.
Release bus to drogue lids (ch 1, 2)	Bus to horn A on each drogue box (3 coils side by side, 12.5 A), back to its MOSFET switch. 14 AWG fire pairs (the 14/4 bought).	Ch 5 closed and the MOSFET on must both happen. Horn B is Release Node B's; either horn alone cuts the strap.
Release bus to cord pullers (ch 3 to 6)	Each: bus to its reversing relay (24 V DPDT, 10 A, 1N5408 at its input), to a slow-blow 5 x 20 mm fuse, to its MOSFET. Motor pair out to the trunk.	Forward is release; the relay coils hang on ch 11, used only in a shore test. The fuse, sized at the bench test, is the fire guard.
Trunks to the transom box (entries 3, 4)	Two PG11 trunks: 2 fire pairs plus 4 puller pairs, about 12 cores; count at loom time. Puller pair gauge: not decided.	Two trunks instead of four long runs. Reverse adds no wires aft.
Steering (entries 12, 13)	In: 14/2 from its own 20 A breaker, stud 5, through the 30 A power-cut relay (closed when unpowered) to the Pololu G2 24v13. Out: two 14 AWG motor leads and 3 feedback wires (brown 3.3 V, white ground, green wiper via a 1k to A1). PG11 each.	A dead node leaves the rudder fed. A drive usually fails stuck on; this relay is then the only stop.
Charging stop (entry 22)	Thin wire from the 1k 1 W resistor at the + bar, through ch 8's normally closed contact, one run back to the strip joining the five Victron remote cables' yellows. PG9, no fuse.	Charging on by default; coil on (shore command, 5-day deadman) stops all five. A dead node drops it. The 1k holds a short to 29 mA.
CAN, logic and relay boards (entry 1)	Control bus drop, PG7, via a DIN surge module to the CAN board; this node is the bus end. D3 drives ch 5; the MCP23017 expander drives every other coil and the steering cut, and reads 4 inputs.	The expander is never in the release chain. A reset reads as off: loads drop, steering stays fed, charging goes on.
Switched loads out (16, 27, 28)	16, PG13.5 x2: 16/2 runs to the aft junction (ch 1, 3, 4, 7; ch 2, 6, 12 routes not decided). 27, PG7: ch 9 to the camera port UV-C. 28, PG7: ch 10 to the Orion-Tr.	Nav lights, em-trak and UV-C fail on. No Pi heard for the set time: the node lights the nav lights and drops ch 8.
Sensors in (entries 14, 18)	Entry 14, PG11: 12-core aft trunk (wind, encoder A, two Water Witch states). Entry 18, PG9: 1-wire chain 1 (battery probes) and chain 2 (air).	Chain 1 is the battery trip. Entry 15 only if needed; 17, 20, 25 are spares, not drilled.

Release needs two acts: ch 5 closed and that channel's MOSFET on, both from native Nucleo pins. Colors: orange 24 V, red release, blue logic, green CAN bus (the boat's data wire); grey dashed is not decided; the ground mark is that feed's minus.

BMS box: what is wired to what, and why

From Electronics and Wiring Plan v10.1 (sec 6.7, Appendix A3, A4, A9) and Battery Box Building Guide v10.1 Part 8, with the two shunts written in 2026-09-28. Drawn 2026-09-07, revised 2026-10-02. The table and notes are on the next page.



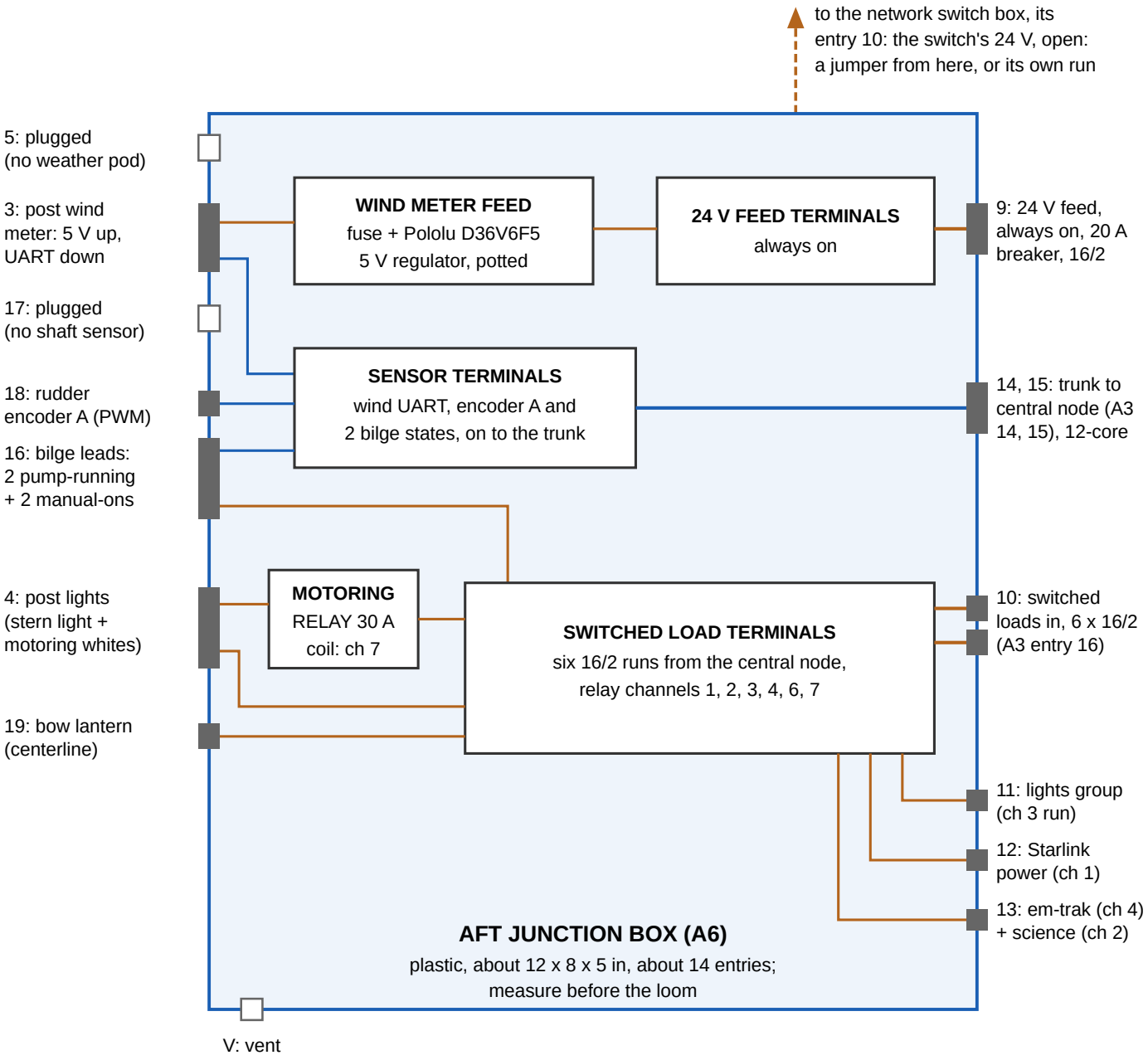
What each link is, and why

Link	What it is	Why
Battery box (its entry 3) to BMS box (entry 1, PG13.5)	One bundle, sealant-filled: 9 tap wires W0 to W8 (shared by both boards, each fused at its ring), the XT1 thermistor, the DS18B20 temperature chain. No gas sensor lead (gas sensors deleted).	The taps let the SBMS0 read all 8 group voltages and let the balancer move charge between groups. The thermistor reads pack temperature for the watchman.
Main bus board to BMS box (entry 3, PG9)	The thin sense and supply leads from the two FL-15 shunts (75 mV): the 300 A on the pack negative, the 100 A on the solar return. The SBMS0 is powered from the pack through its own supply lead.	The 300 A shunt gives pack current for the state of charge; the 100 A gives total solar current, which also shows how fast the deck panels fade at sea.
BMS box to the USB hub box beside Pi A (entry 4, PG7)	USB lead from the SBMS0 add-on board into the powered hub. Required. The hub lead into Pi A carries the one USB isolator, which covers this lead and every science adapter.	The battery percentage comes from this stream: the 300 A shunt is the only battery current sensor aboard. A quiet stream raises an alert and the Pi sheds loads on a fixed cautious schedule.
BMS box to the central node (entry 6, PG7)	The temperature chain. It touches neither board: in with the bundle by entry 1, out by its own PG7 to central node entry 18.	The six pack probes carry the battery trip: 150 F, or a 10 F rise in five minutes, isolates the bank.
Balancer to anything	Nothing but the 9 taps.	It only evens out the groups. No data, no control, no wire to the node or the Pi.
Entries 2 and 5	Not drilled.	The charger on/off cables meet on the main bus board and go to the central node (A3 entry 22); the charge bypass is deleted.

Monitoring only. No wire leaves this box to a charger, relay or load. No CAN and no RS-485. The only data wire is the USB lead to the hub box beside Pi A, which is required. The charge limits live in the five solar chargers' own lithium profiles. Nothing stops charging in the cold automatically: Pi A alerts shore below 33 F on any pack probe, and shore can send the 5-day charging stop (relay channel 8). Changed since 2026-09-27: the second shunt (100 A, solar return) is drawn in. Colors: green taps, red thermistor and battery +, blue data and temperature chain, black battery negative, grey shunt leads.

Aft junction (plastic box): what is wired to what, and why

The plastic aft junction box at the stern. Beside it sits the aluminum network switch box, which takes every network cable; it has its own pages, next. From Electronics and Wiring Plan v10.1 (Appendix A6, secs 4.1, 7.6), Pending Amendments v10.2. Drawn 2026-10-03. The table is on the next page.



Passive: no computer. Far ends: the post, the central node (Sheet A3), the bilge pumps, the bow lantern. No network cable comes into this box: they all go to the switch box.

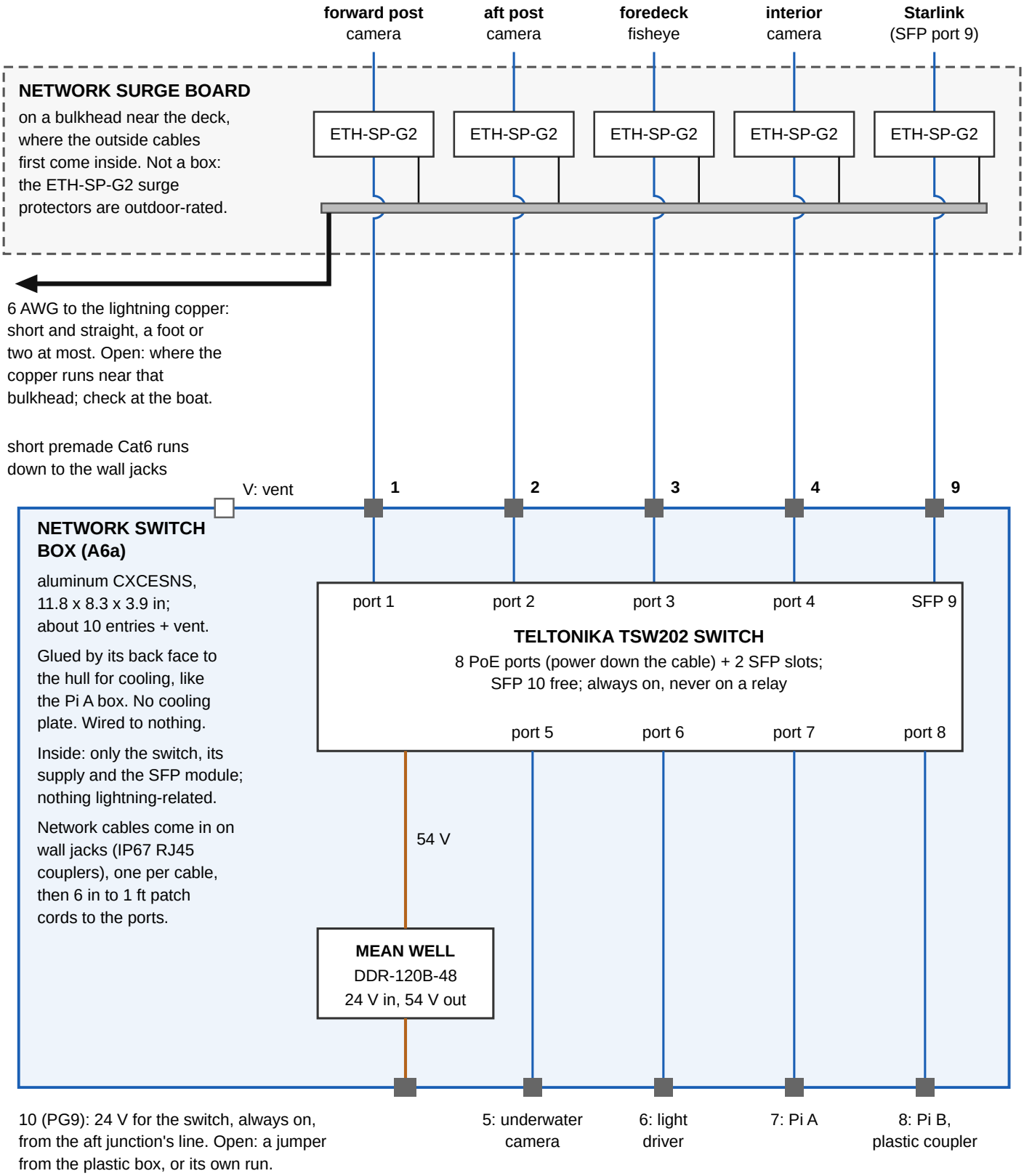
Aft junction (plastic box): what each link is, and why

Link	What it is	Why
Entry 9: 24 V feed	Always on, 16/2 from its own 20 A breaker (bar stud 6). Feeds the post feeds, one fuse each. *Open:* whether the switch box's 24 V (its entry 10) is a short jumper from these terminals or its own run.	The switch must never be on a relay: losing it blinds Starlink and cuts the Ethernet between the Pis.
Entry 3: post wind meter	The Calypso CMI1018: 5 V up from the Pololu D36V6F5 just after its fuse; its UART down to the sensor terminals and on to the trunk.	The meter dies on 24 V; the regulator is fitted and potted at the bench.
Entries 16, 18 and the trunk (14, 15)	The two Water Witch pump-running outputs (24 V = pump running) and rudder encoder A ride the 12-core trunk to the central node, with the wind UART.	The node reads the bilge states on its opto board and encoder A on its timer pin (confirm at fit-out). One trunk is likely enough; drill 15 only if the count needs it.
Entry 10 in, entries 11 to 13, 4, 16, 19 out: switched loads	Six 16/2 runs from the central node relays: Starlink power (ch 1), science (ch 2), nav lights (ch 3, fails ON), em-trak (ch 4, fails ON), bilge pump 1 manual-on (ch 6), motoring-white coil (ch 7). Pump 2's manual-on (ch 12) rides a 16/2 run or the trunk.	Everything switched is switched at the node; this box only lands and passes it on. *Disagreement:* the wet lab now has its own 16/2 line switched inside the node (Electronics plan 7.6), but A6 still sends "science (ch 2)" here (Pending Amendments, the wet lab power route).
Motoring relay, entry 4	A 30 A relay here, coil on channel 7 (normally open), feeds the two all-round whites up the post lights cable.	An all-round white shown while sailing is the wrong picture, so this one fails OFF. The stern light and bow lantern ride channel 3 directly and fail ON.
Network cables: none here	Entries 1, 2, 6 to 8 and 20 to 24 moved to the network switch box; their numbers are kept and not drilled here.	Every network cable ends at the one switch, in its own aluminum box beside this one.

A patch panel. No computer, about 14 entries (15 if the second trunk is drilled) plus the vent; measure the box before the wires are cut. Lighting leaves three ways (entries 4, 11, 19); settle the split at loom time. Colors: blue data, orange 24 V power; dashed means not decided.

Network switch box: what is wired to what, and why

The aluminum box beside the plastic aft junction box; above it, the network surge board near the deck (a board, not a box). From Electronics and Wiring Plan v10.1 (Appendix A6a, secs 6.1, 6.4), Compute Bay Housing and Wiring Plan v10.1 (secs 2.3, 4.4, 11), Lightning Ground System Guide v10.1 (secs 6.2, 7.4), Pending Amendments v10.2. Drawn 2026-10-03. The table is on the next page.



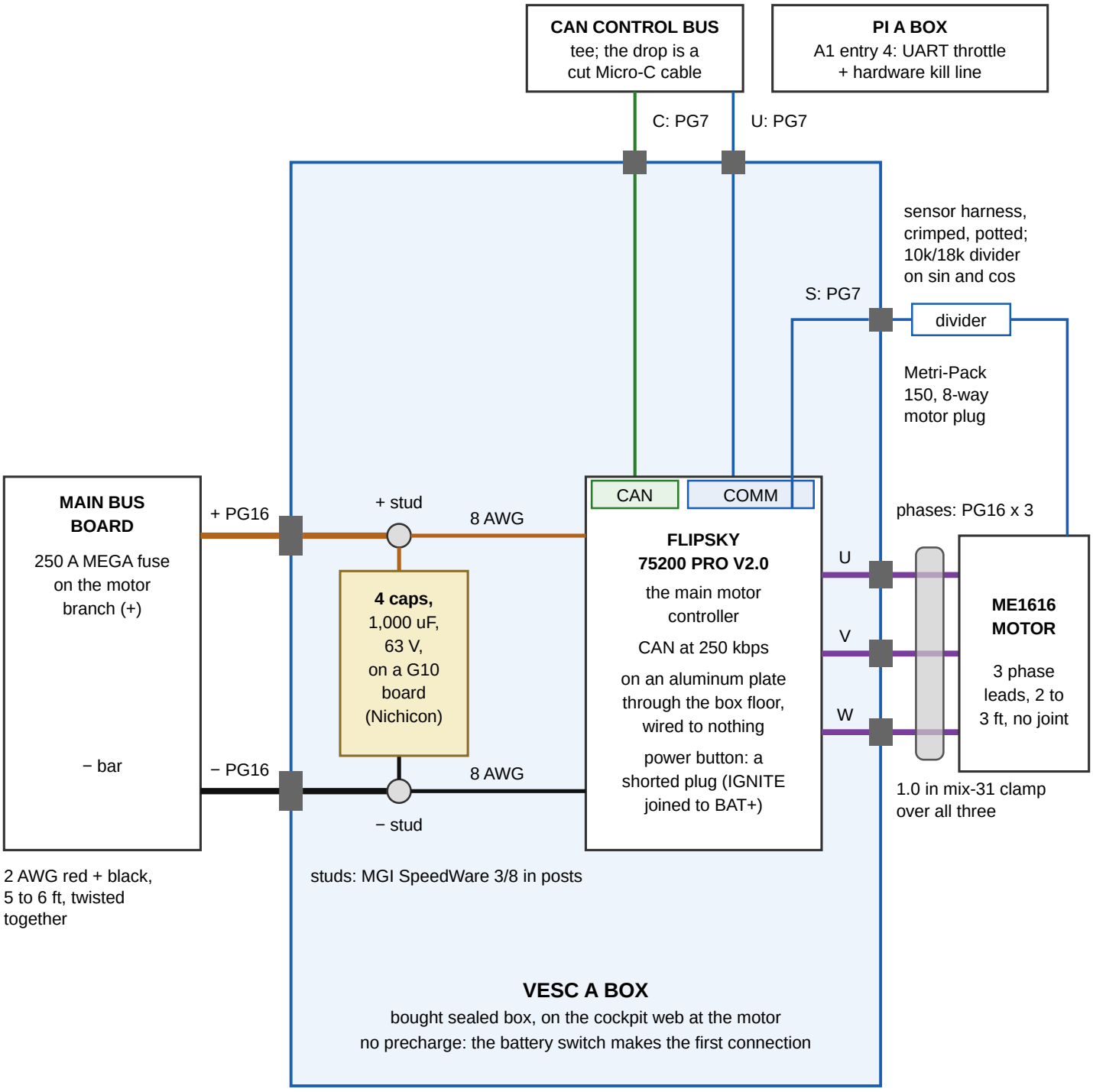
Network switch box: what each link is, and why

Link	What it is	Why
Post cameras, foredeck fisheye, interior camera, Starlink: through the surge board to switch box entries 1 to 4 and 9	One Ubiquiti ETH-SP-G2 Ethernet surge protector each (bought 2026-10-01, outdoor-rated) on a small board on a bulkhead near the deck, where the cables first come inside; then a short premade Cat6 down to the switch box's wall jacks, low in the hull; then a 6 in to 1 ft patch cord to switch ports 1 to 4 and SFP 9 (Starlink through a copper SFP module).	These five run on deck or near it. The protector stops a surge where it comes in, before it can reach the one switch that carries every camera, Starlink and the Pi to Pi link. Keep the cables before the protectors apart from the cables after them.
Protector grounds to the lightning copper, at the surge board	All five ground leads on one small tinned bar on the board; one 6 AWG lead, short and straight, a foot or two at most, to the nearest point on the lightning network (bonding list item 11). *Open:* where the lightning copper runs near that bulkhead; check at the boat.	The shorter and straighter the ground lead, the less surge voltage it lets through. The switch box has no ground lead and nothing lightning-related inside.
Network cables, all	Premade, plugs and all; none crimped on the boat. Extra coiled near the surge board in small tight strapped coils about 8 in across, camera-side coils apart from switch-side coils. No coils in the switch box. No sharp bends at any plug.	A big loose loop catches a nearby strike like an antenna; small tight coils catch far less. Check each plug passes the deck holes and glands on its route, or use a split gland.
Switch box entries 5 to 8: underwater camera, light driver, Pi A, Pi B	RJ45 couplers straight to ports 5, 6, 7 and 8. Pi B's coupler is plastic. No surge protector.	These stay low inside the boat. Pi B's plastic coupler keeps its island from touching the boat's metal.
Switch box entry 10: 24 V feed	Always on, from the aft junction's line (the plastic box's entry 9: 16/2 from its own 20 A breaker, bar stud 6). Feeds the Mean Well DDR-120B-48 (set and sealed at 54 V) for the switch. *Open:* whether it comes by a short jumper from the plastic box or by its own run.	The switch must never be on a relay: losing it blinds Starlink and cuts the Ethernet between the Pis.
Switch box glued to the hull	The aluminum box's back face glued to the hull in heat-carrying epoxy, like the Pi A box; wired to nothing. No cooling plate.	Puts the switch's heat into the hull. The box touches no other metal, so it has no lightning connection at all.

Every network cable ends here. Nine RJ45 wall jacks (a tenth only if SFP 10 is used), the 24 V feed and a vent. Entry 11 is not drilled (no ground lead: the protectors' ground is at the surge board); entry 12, SFP 10, gets a coupler only if wanted. The surge protectors sit outside this box, on their board near the deck. Colors: blue Ethernet, orange 24 V or 54 V power, black ground to the lightning copper; dashed outline means a board, not a box.

VESC A box (the main motor controller): what is wired to what, and why

From Electronics and Wiring Plan v10.1 (Appendix A7, secs 7.5, 7.6), Build Guide v10.1 sec 5.1, System Settings Sheet v10.1 sec 2, Reference/Controller_Capacitor_Bank_2026-09-26, Pending Amendments v10.2. A7 does not number the holes, so the letters are the box sheet's. Drawn 2026-10-02.



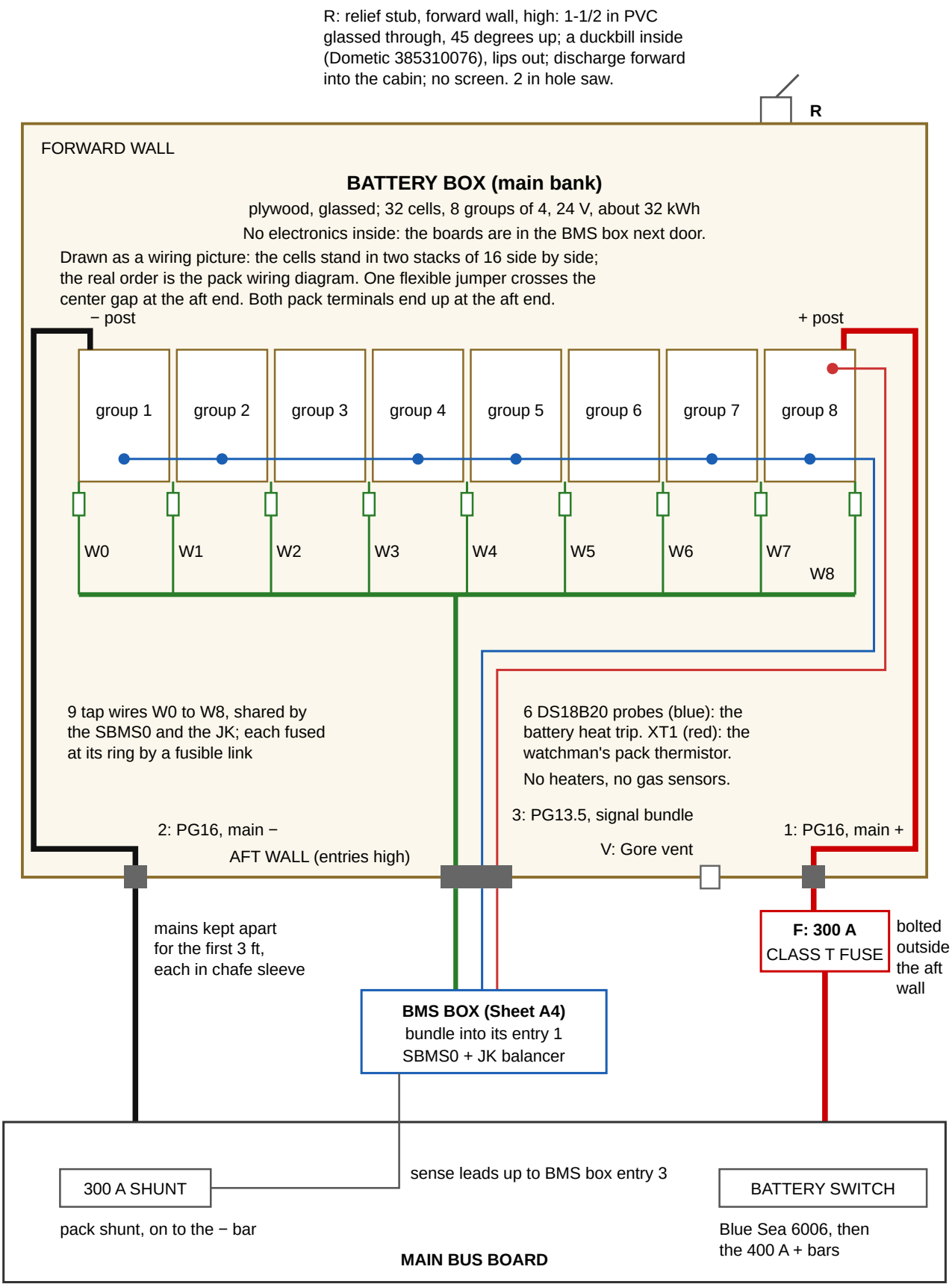
What each link is, and why

Link	What it is	Why
+ and − (PG16 each): battery feed	2 AWG red and black, 5 to 6 ft, twisted together, from the main bus board: + through the 250 A MEGA fuse on the motor branch, − from the − bar. Each lands first on its stud.	Sized for the CUT-BURST (about 180 A battery side for seconds), not for cruise (about 85 A, 2 kW). Twisting shrinks the loop that makes voltage spikes.
Studs and capacitor board	Two insulated MGI SpeedWare 3/8 in posts (ordered 2026-09-26). On each: the 2 AWG lug, the controller's own 8 AWG lead cut short, the capacitor board's copper strip. Four Nichicon 1,000 uF 63 V on a G10 board.	The long battery leads ring on every switching edge; owners report blown capacitors, then transistors. The extra capacitors right at the controller soak that up. Nothing is spliced or soldered to a wire.
C (PG7): CAN control bus drop	CAN plug, JST-GH 5-pin: CANH, CANL and GND only; PWR.ON left open. 250 kbps.	The normal path for throttle and readings. On a CAN timeout the controller ramps to zero and the boat sails.
U (PG7): UART and kill to Pi A	Its own Micro-C cable, cut in the middle, to Pi A entry 4; never shares a CAN cable. Lands on the COMM plug (JST-PH 8-pin: TX, RX, GND) plus the kill line. No surge part, by Mike's choice.	The backup throttle path: Pi A switches to it if CAN is silent over 2 s. The kill line is the hardware backstop under the Pi's jam logic.
S (PG7): motor sensor	The ME1616's SinCos sensor harness (six wires, crimped, potted): sin to ADC1, cos to ADC2, 5 V and GND on the COMM plug, through a 10k/18k divider on each signal unless the bench check shows the tops stay under 3.2 V. The KTY84/130 motor temperature pair on the same lead.	The sensor lets the motor start hard from a standstill; without it the controller runs sensorless, fine at cruise. The temperature sensor derates the motor by itself even if the Pi is down.
Phases U, V, W (PG16 x 3)	The motor's own three orange leads, 2 to 3 ft, lugs fitted, labelled; one 1.0 in mix-31 clamp ferrite over all three just outside.	No joint anywhere in the 300 A path. Short and bundled, so their fields cancel.
Shorted plug, cooling plate	A crimped plug joins IGNITE to BAT+ in place of the power button. The controller sits on an aluminum plate through the box floor, set in epoxy, wired to nothing.	The board runs whenever the battery is connected. The plate is the controller's whole heat defense; size it before the box is drilled.

One controller on Boat 1. Losing it costs time, not the trip: the wing sails the boat. VESC B is Boat 2 only. No precharge (Mike, 2026-09-29): the battery switch is built to make the first connection. Bench first: find pin 1 on each plug with a meter, check the sensor tops, check the motor reads room temperature within about 5 F. Colors: orange battery +, black battery −, purple motor phases, green CAN, blue UART and sensor.

Battery box: what is wired to what, and why

From Electronics and Wiring Plan v10.1 (Appendix A9, A4, sec 7.6) and Battery Box Building Guide v10.1 (Parts 5, 7, 8, 9), Pending Amendments v10.2. Drawn 2026-10-02.



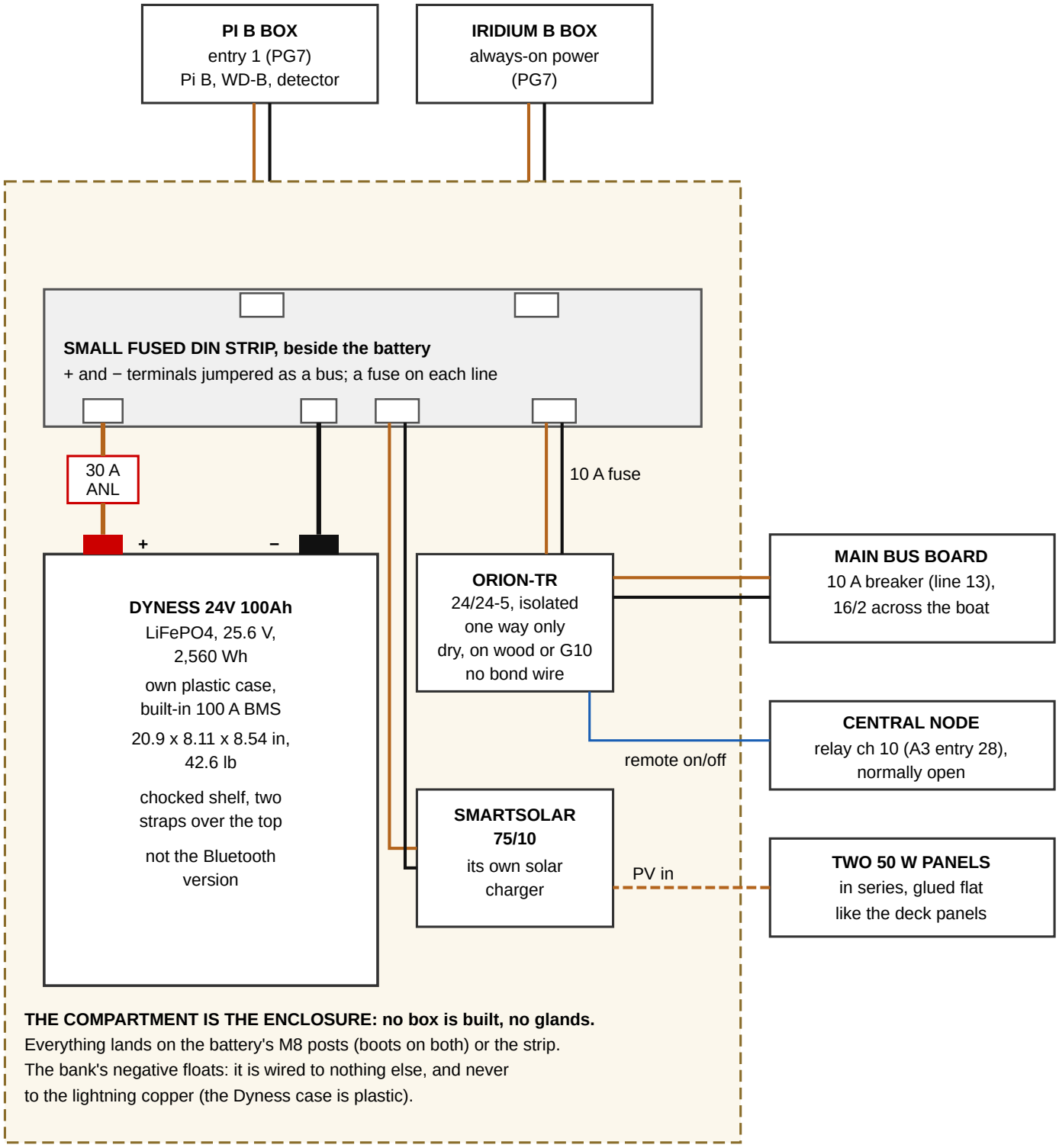
What each link is, and why

Link	What it is	Why
Entry 1 (PG16): main +	2 AWG from the pack + post, straight over the aft G10 plate at measured post height, out with a drip loop to the 300 A Class T fuse (F) bolted outside the aft wall at mid-height on the + side (within 12 in of the gland), then sleeved 2 AWG to the Blue Sea 6006 battery switch and the 400 A bars.	The fuse at the box protects the whole run to the board. The room for the fuse block is not yet measured: hold it in place before drilling. Any bolt through the wall is bedded in sealant.
Entry 2 (PG16): main −	2 AWG from the pack − post to the 300 A shunt on the main bus board, then the − bar.	The shunt is where the watchman reads pack current. For the first 3 ft the + and − mains run apart, each in chafe sleeve, never crossing: a short just past the fuse could pass more than its 10,000 A rating.
Entry 3 (PG13.5): signal bundle to the BMS box	Nine tap wires W0 (most negative post) to W8 (most positive), ring ends under the busbar nuts, each fused at its ring; the XT1 thermistor; the six-probe DS18B20 chain. Sleeved in glue-lined heat shrink, tied to a strip on the box, never to the cells, with slack for the 0.15 in post growth.	The taps feed both the SBMS0 and the JK. A shorted tap opens its own fuse and stays cold. The probes carry the battery trip: 150 F, or a 10 F rise in five minutes, isolates the bank.
V: Gore vent (M12)	The breathing inlet, high on the aft wall.	Lets the sealed box breathe with temperature without taking in water.
R: relief stub	Forward wall, high: 1-1/2 in Sch 40 PVC glassed through, 45 degrees up, a toilet duckbill inside, lips out, discharge forward into the cabin.	If a cell ever vents, the gas leaves away from the electronics. The duckbill stays shut otherwise. No screen, bug cap or flame mesh.

Dumb by design: cells and sensors only. Every board that thinks is in the BMS box next door. Five holes plus the fuse bolts; none through the lid. Deleted, do not re-propose: heaters, gas sensors, the high-water sensor, the overboard relief duct. Battery switch off before anyone touches the mains. Colors: red battery + and thermistor, black battery −, green taps, blue temperature chain, grey shunt leads.

Emergency bank: what is wired to what, and why

From Electronics and Wiring Plan v10.1 (Appendix A10, A3 entry 28, sec 7.6), Compute Bay Housing and Wiring Plan v10.1 (secs 5.2, 11), Build Guide v10.1 secs 4.3 and 4.4, Pending Amendments v10.2. Drawn 2026-10-02.



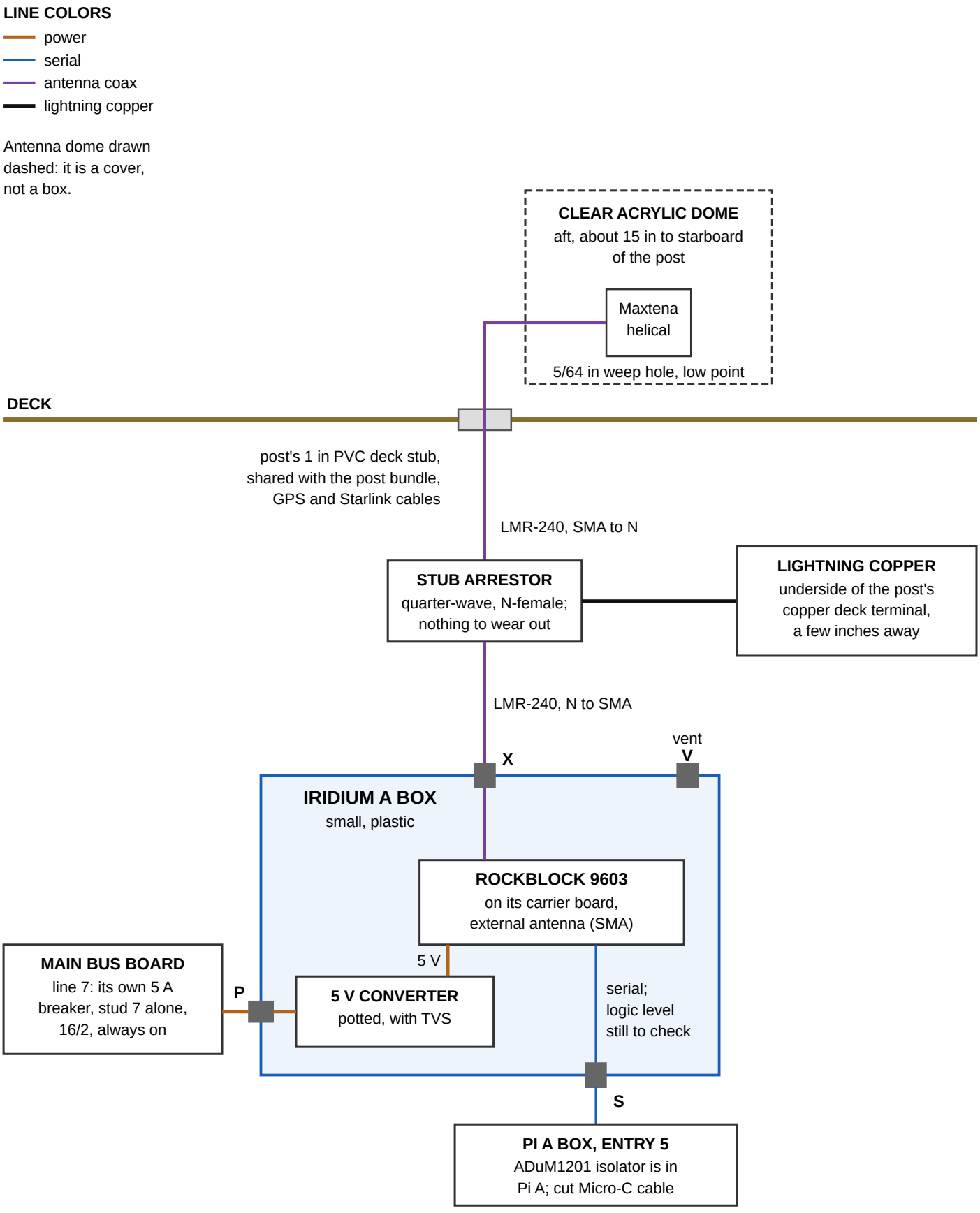
What each link is, and why

Link	What it is	Why
+ post to the strip	An inline 30 A ANL fuse within a few inches of the + post, then to the strip's + side. The − post goes straight to the strip's − side. Insulating boots on both M8 (5/16 in) posts.	The ANL protects the cable; the loads are tiny (about 25 to 32 Wh a day), so there is room to spare.
Strip to the Pi B box (A2 entry 1)	A fused + and − pair. Pi B's box also feeds WD-B and the lightning detector. Fuse size not written: drawn without a size.	The backup computer must run when the main bank is lost. It is the only island that may never touch the main bank's copper.
Strip to the Iridium B box	A fused + and − pair, always on, never switched. Fuse size not written.	Iridium B is the backup island's voice to shore; no distribution failure may cut it.
Orion-Tr 24/24-5 to the strip	Its output, which must float, through its own 10 A fuse, a few inches away. Within about a foot of the Dyness, upright, dry (it is only IP43), on wood or G10 with no bond wire; meter its case to each negative on the bench.	The routine float and the monthly exercise recharge. Transformer isolated with a one-way gate, so a main-bus fault cannot drain or back-feed the bank.
Main bus board to the Orion-Tr input	16/2 across the boat from its own 10 A breaker (line 13, bar stud 6).	The only power bridge between the islands, and it is isolated.
Central node to the Orion-Tr remote terminal	A two-core run from relay channel 10 (A3 entry 28), normally open; daily timer and the monthly exercise recharge.	A dead central node leaves the Orion-Tr off, and the bank's own panels keep it charged.
Two 50 W panels to the SmartSolar 75/10, and the 75/10 to the strip	The panels in series into the 75/10; its battery output to the strip. Fuse size on that line not written.	The bank recharges even with the main bus or the central node dead.

A bought battery, not a built box. No hole schedule, no gland list; the real work is restraint: 42.6 lb at 20.9 in long must hold in a knockdown and a full inversion. Still open with the maker: whether the low-temperature cutoff blocks charging only or discharge too, and the standby draw (no concern on Boat 1's route). Also open: how the monthly exercise discharges and logs, since nothing links this bank to the main bus or carries its data. Colors: orange +, black −, dashed orange solar input, blue the remote on/off wire.

Iridium A box: what is wired to what, and why

From Electronics and Wiring Plan v10.1 (Appendix A11, sec 6.5, 7.6), Lightning Ground System Guide v10.1 sec 7.1, Instrument Post Guide v10.1 secs 11.1 and 16.1, checked against Pending Amendments v10.2. Drawn 2026-10-02.



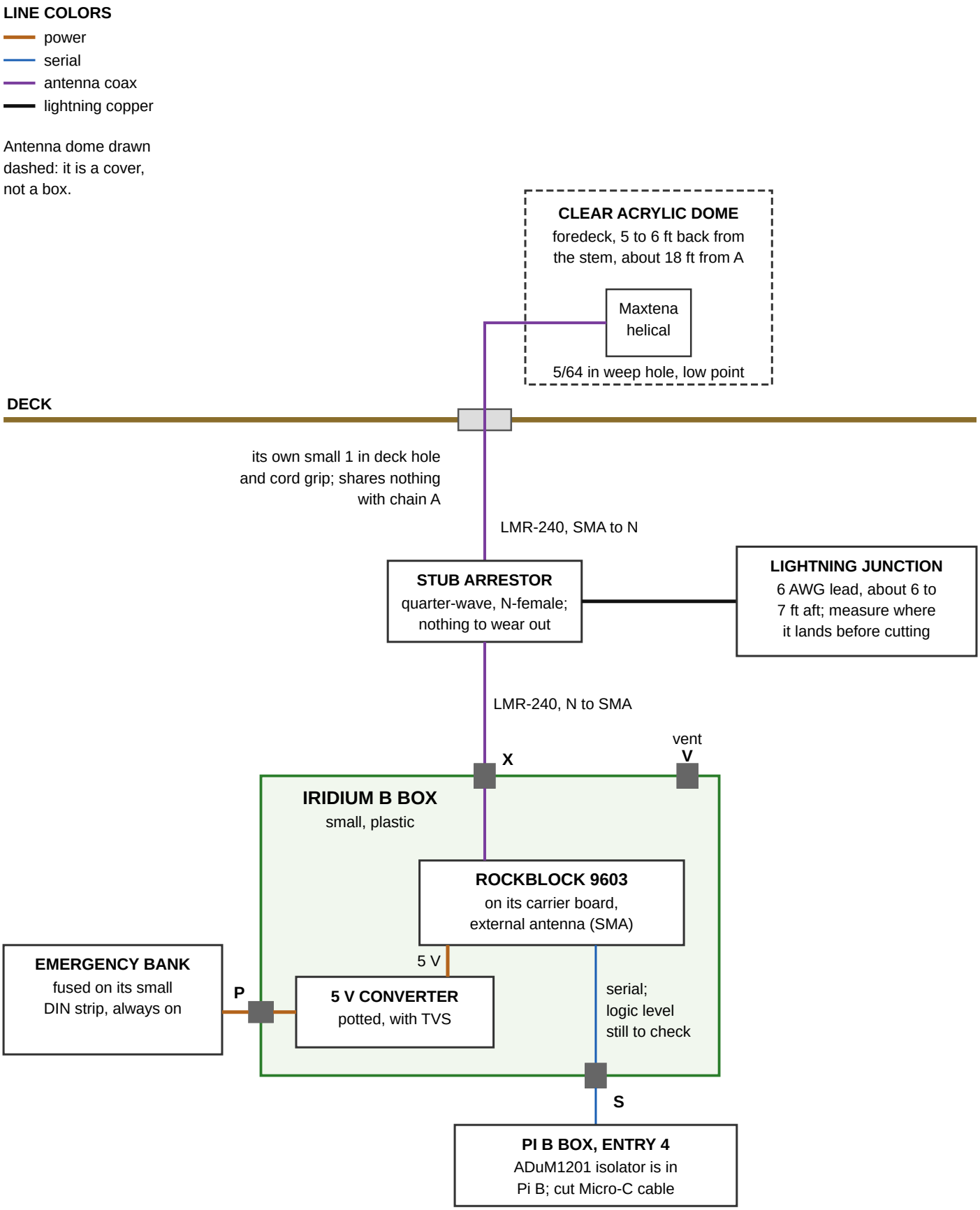
What each link is, and why

Link	What it is	Why
Main bus board to entry P	24 V, always on: 16/2 on its own 5 A auto-reset breaker (line 7, stud 7 alone). Inside: the potted 5 V converter with a TVS diode, feeding the RockBLOCK.	A breaker comes back after a passing fault; a fuse would leave the voice dead (Mike, 2026-09-28). The 5 A breaker is still to buy.
Entry S to Pi A (its entry 5)	Serial line on a cut Micro-C cable. The ADuM1201 isolator chip sits inside the Pi A box, not here.	Isolation beats clamping on a data line. The RockBLOCK's serial logic level is not yet checked against the Pi (open).
Entry X to the stub arrestor	LMR-240 coax, SMA to N, straight to the quarter-wave stub (a shaped coax stub that shorts a surge but passes the signal).	The stub is the only coax protection, because it cannot wear out. No coax safing relays anywhere aboard.
Stub arrestor to the lightning copper	The stub lands on the underside of the post's copper deck terminal, a few inches from the deck stub.	A short path to ground for a surge on the coax. Meter it center to shield at first setup and record the reading: that is the post-strike check.
Arrestor to the antenna	LMR-240, SMA to N, up through the post's 1 in deck stub to the Maxtena M1621HCT-P helical under its own clear dome, glued to a pad, never unplugged (no bulkhead connector).	The two Iridium chains share no dome, deck hole, cable, gland, arrestor or fuse, so one side-flash cannot take both.

Voice number one: main bank, always on, near Pi A. Stubs on hand: only one PolyPhaser TSX-NFF has a delivery record; Mike counts the stubs before paying or cancelling the Fairview order. Open, an inference from the drawing, not in the docs: the stub ties the coax shield to the copper, so unless the potted 5 V converter is isolated, the modem's negative meets the copper here too. Colors: orange power, blue serial, purple coax, black lightning copper.

Iridium B box: what is wired to what, and why

From Electronics and Wiring Plan v10.1 (A10, A11, sec 6.5, 7.6), Lightning Ground System Guide sec 7.1, Instrument Post Guide secs 11.1 and 16.1, Compute Bay Plan sec 5.2, Pending Amendments v10.2. Drawn 2026-10-02.



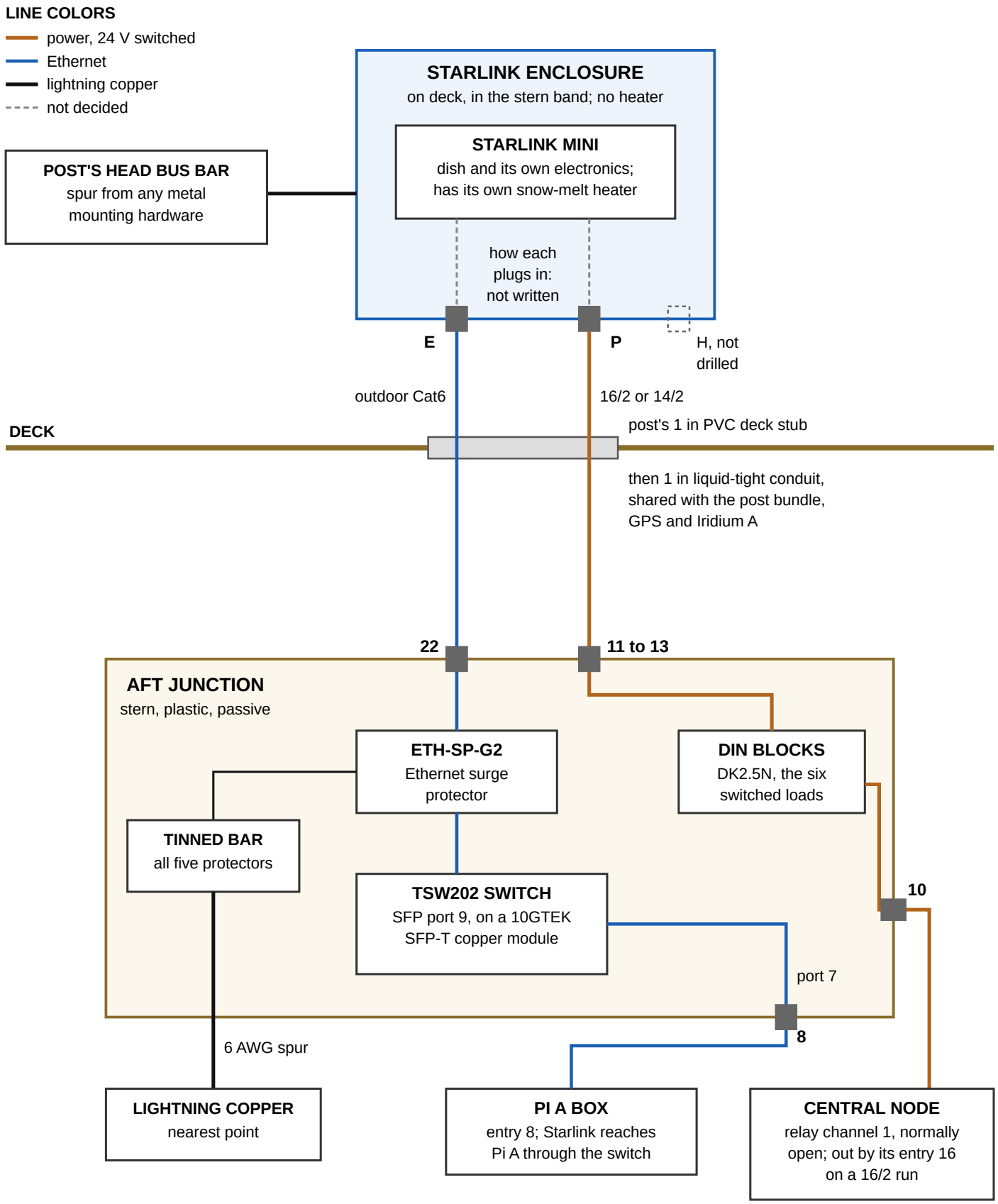
What each link is, and why

Link	What it is	Why
Emergency bank to entry P	Always on, from the Dyness bank’s small fused DIN strip (A10). Inside: the potted 5 V converter with a TVS diode.	Lives wholly on the emergency island, so a fault that silences voice A cannot reach voice B.
Entry S to Pi B (its entry 4)	Serial line on a cut Micro-C cable. The ADuM1201 isolator sits inside the Pi B box.	Keeps the island’s data links isolated. Serial logic level still to check (open).
Entry X to the stub arrestor	LMR-240 coax, SMA to N, to its own quarter-wave stub, below deck at its own hull entry.	Nothing in a stub can wear out; it works or is plainly broken.
Stub arrestor to the lightning junction	A 6 AWG lead, about 6 to 7 ft aft to the junction. Measure where it lands before cutting the wire.	Gives a surge on B’s coax its own short way to the copper, apart from chain A.
Arrestor to the antenna	Up through its own small 1 in deck hole with a cord grip, to its own Maxtena helical under its own clear dome on the foredeck.	Forward and apart from A: no shared dome, hole, cable, gland, arrestor or fuse.

Voice number two: emergency bank, always on, near Pi B, nothing shared with voice A. Open, an inference from the drawing, not in the docs: the island’s negative must float, yet the stub ties the coax shield to the copper; unless the potted 5 V converter is isolated, that ties the island to the copper here. Colors: orange power, blue serial, purple coax, black lightning copper.

Starlink enclosure: what is wired to what, and why

From Electronics and Wiring Plan v10.1 (A3, A6, A13, sec 6.3), Lightning Ground System Guide secs 6.2 and 7.4, Compute Bay Plan sec 11, Wire and Cable Buy List, Pending Amendments v10.2. Drawn 2026-10-02.



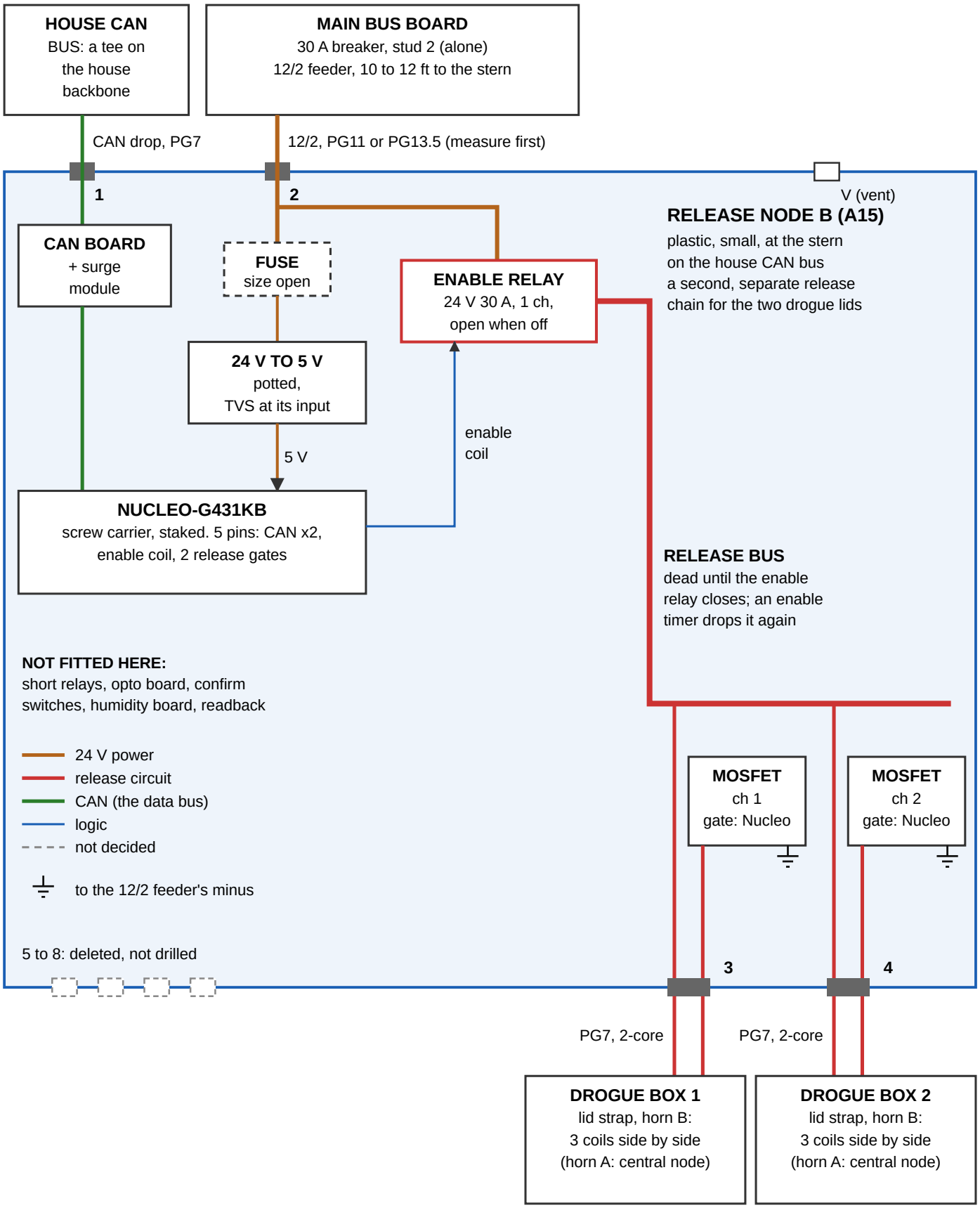
What each link is, and why

Link	What it is	Why
Enclosure entry E to aft junction entry 22	Outdoor Cat6 from the Mini down through the post's 1 in deck stub and conduit, on IP67 RJ45 couplers at both walls, to an Ubiquiti ETH-SP-G2 surge protector beside the switch, then the TSW202's SFP port 9 on a 10GTEK SFP-T copper module.	Starlink is expendable; the protector is there to save the switch, which also carries the cameras and the Pi to Pi link. Keep this cable 12 in from the post's copper where the run allows.
Surge protector to the lightning copper	Its ground lead goes to one small tinned bus bar shared by all five protectors; one 6 AWG spur from that bar to the nearest point on the lightning copper.	One short ground for all five (item 11 on the list of things wired to the copper).
Central node relay channel 1 to entry P	Normally open relay channel 1 in the central node switches 24 V; the run goes out the node's entry 16 to aft junction entry 10, across its DIN blocks, out by entries 11 to 13 (a load bundle), up through the deck stub to the enclosure's PG9 entry P.	So the Pi can shed Starlink or power-cycle it; load shedding drops it first as the bank runs down. Wire size disagrees: the Wire List says 16/2 for the six switched runs and 14/2 for the bundles out of the aft junction.
Inside the enclosure (dashed)	How the 24 V and the Cat6 plug into the Starlink Mini is not written in the docs.	Settle it before the enclosure is drilled.
Mount hardware to the post's head bus bar	Any metal mounting hardware gets one spur to the post's head bus bar (Lightning Guide 6.2, item 9).	Keeps a side-flash on the mount off the cables.
Entry H	Not drilled: no enclosure heater. Deleted, do not re-propose.	The dish melts its own snow.

Declared sacrificial: no coax, no arrestor, no heater. Losing it costs bandwidth, not the boat; Iridium is the guaranteed floor. The switch is always on from the house branch, never on a relay channel. Colors: orange power, blue Ethernet, black lightning copper, grey dashed not decided.

Release Node B: what is wired to what, and why

From Electronics Plan v10.1 secs 4.2, 7.6, App. A15; Compute Bay Plan sec 10.3; Drogue Box Guide sec 5. Drawn 2026-10-02.



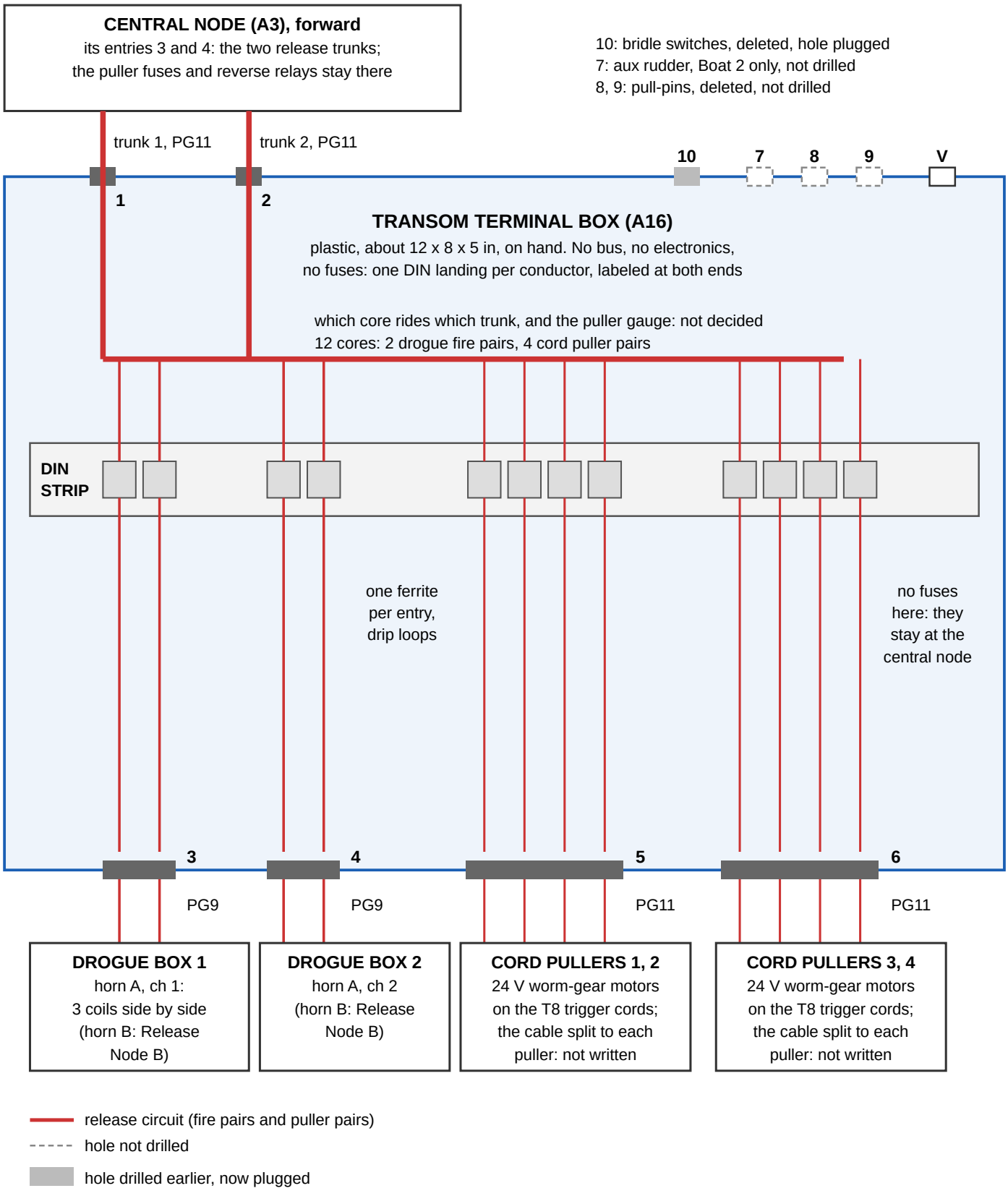
What each link is, and why

Link	What it is	Why
Main bus board to the node (entry 2)	12/2 feeder on its own 30 A breaker, stud 2, alone, 10 to 12 ft to the stern. Gland PG11 or PG13.5: measure the jacket first. One landing feeds the enable relay; the potted 24 to 5 V converter (TVS at its input) feeds the Nucleo.	Its own branch, so a fault on the central node's feeds cannot silence this chain. A breaker, not a fuse, so a passing fault does not kill releases for the mission.
Fuse inside the box	Listed in Appendix A15 contents. Its size and whether it sits ahead of the converter only or the enable relay too: not written (drawn dashed).	Open; see the report of conflicts.
CAN house drop (entry 1)	Micro-C drop from the last tee on the house backbone, PG7 (this node is the bus end: the terminator plug sits on that tee), through a Taidacent RS-12V/2S surge module to the CAN board and the Nucleo.	A different bus from the central node, so one dead bus cannot remove every release. Pi A commands both.
Enable relay to the release bus	One 24 V 30 A single-channel relay module, open when unpowered, coil on a Nucleo pin. It is the only thing that puts 24 V on the release bus. An enable timer drops it if no release follows.	Condition 1 of 2.
Release bus to drogue box 1 (entry 3)	2-core cable, PG7, its own route: release bus to horn B's three coils side by side, back to MOSFET switch ch 1, low side, gate on a Nucleo pin.	Condition 2 of 2. Horn A of the same lid is the central node's; either horn alone cuts the strap.
Release bus to drogue box 2 (entry 4)	Same as entry 3, MOSFET ch 2.	Same as entry 3.
Entries 5 to 8	Not drilled: 5 and 6 were pull-pin stations (Boat 1 has no pins); 7 and 8 were opto sense leads.	Four holes and a vent. No short relays, no opto board, no readback.

The same two-step lock as the central node, on separate parts, power, bus and routes. Close the enable relay, then turn on the channel's MOSFET; neither alone does anything, and unpowered neither is possible. Fire one release bus at a time: the central node's first. Colors: orange 24 V, red release circuit, green CAN bus (the boat's data wire), blue logic; grey dashed means not decided.

Transom terminal box: what is wired to what, and why

From Electronics Plan v10.1 App. A3 and A16; Wire and Cable Buy List C3; Drogue Box Guide secs 5, 6. Drawn 2026-10-02.



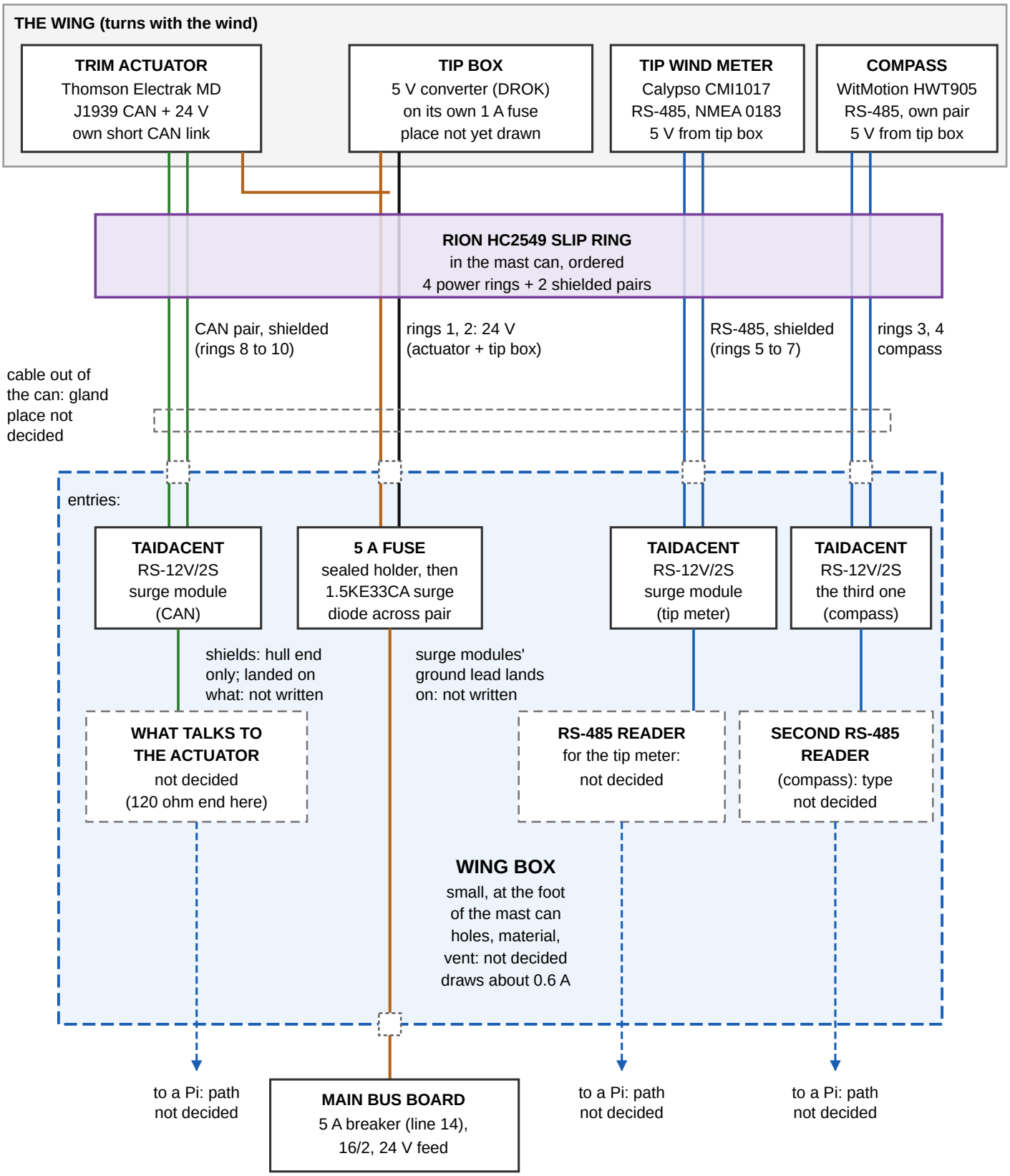
What each link is, and why

Link	What it is	Why
Central node to this box (entries 1, 2)	Two release trunks, PG11 each, from central node entries 3 and 4: the two drogue fire pairs (horn A, 14 AWG, on the 14/4 bought) and the four cord puller power pairs. About 12 cores; count at loom time. Which cores ride which trunk, and the puller pair gauge: not decided.	Two trunks forward instead of four long runs, about two holes fewer in the central node wall.
Inside: the DIN strip	One landing per conductor, a label at both ends. No electronics, no fuses; the fuses stay at the central node end.	A stern fault is found with a meter at the strip, not by pulling a trunk. Nothing in here can fail while powered. Cost: two extra screw joints on every conductor.
To drogue box 1 and 2 (entries 3, 4)	One pair each, PG9, to horn A's three coils side by side on each lid strap (12.5 A per horn). Each through its own potted gland low on the transom.	The central node's half of each lid. Horn B goes direct from Release Node B on a separate route, never in the same gland, loom or trunk.
To the cord pullers (entries 5, 6)	PG11 each, two puller pairs per gland (the order tracker's pick is 18/4, cut into 4-core runs). How each cable splits to its two pullers is not written.	The four 24 V worm-gear pullers wind in the T8 trigger cords. Single path: no second chain reaches them.
Holes not used	7: aux-rudder release, Boat 2 only, not drilled. 8, 9: pull-pin runs, deleted, not drilled. 10: bridle tension switches, deleted; the PG9 is plugged.	The speed drop and the aft camera confirm the drogue is out, so no confirm or sense wires come back.

Passive: a strip in a box, nothing that can fail while powered. Every conductor lands once and is labeled at both ends; chafe-sleeve the trunks where they enter, drip loops on everything, one ferrite per entry. Colors: red release circuit; grey dashed a hole not drilled.

Wing box: what is wired to what, and why

From Electronics and Wiring Plan v10.1 (Appendix A17, sec 7.6), Wing Power System v10.1 (secs 1A, 8.7), Compute Bay Housing and Wiring Plan v10.1 sec 14.1, Pending Amendments v10.2 (the HC2549 slip ring and wing compass of 2026-10-01) and Reference/Wing_HC2549_and_Compass_Install_2026-10-01. Dashed means not decided. Drawn 2026-10-02.



What each link is, and why

Link	What it is	Why
24 V feed in	16/2 from its own 5 A breaker on the main bus board (line 14), then the box's own 5 A fuse in a sealed holder, then a 1.5KE33CA surge diode across the pair (it conducts from 31.4 V, either way round). Out on rings 1 and 2.	Feeds the trim actuator (0.6 A, 2.6 A at full load, under 2 mA asleep) and the tip box. A shorted diode blows the 5 A fuse: the wing loses trim, the hull is never shorted. Pulling this fuse is the feather test.
CAN pair (rings 8 to 10)	The actuator's own short CAN link, J1939, through a Taidacent RS-12V/2S surge module. A 120 ohm terminator at each end. Kept off the boat's two CAN buses.	A strike down the mast stops at the box. *Not decided:* what on the hull side talks to the actuator and how it reaches a Pi (dashed).
Tip meter RS-485 pair (rings 5 to 7)	The Calypso CMI1017's RS-485, sending plain NMEA 0183 wind sentences, through a second Taidacent. Its 5 V is made at the tip from the 24 V pair.	The wing-tip cross-check on the post wind meter. *Not decided:* the reader (dashed).
Compass RS-485 pair (rings 3 and 4)	The WitMotion HWT905's own pair on the ring's two spare power rings (decided 2026-10-01), through a third Taidacent (about $22, Amazon B0BGL675ND) to a second RS-485 reader.	Gives the wing's turn rate for the steadying software and its angle (compass heading minus hull heading). Its own pair, so a fault on the meter's pair cannot silence it. *Not decided:* the reader's type (dashed).
Shields	Both shielded pairs are grounded at the hull end only.	*Not written:* what each shield, and each surge module's ground lead, lands on in this box.
Angle sensor cable and its 5 V regulator	Gone. The PST360 angle sensor was dropped for the compass (2026-10-01), so no sensor cable comes down outside the ring, and the Pololu D36V6F5 planned here has no job.	Electronics plan A17 and Wing Power System 8.7 still list the sensor and its regulator; the compass replaces both.
The box itself	Hole schedule, glands, material, vent, and where the cable leaves the can: not decided.	Placing the box and drawing the slip ring mount settle these.

Every wire from the slip ring gets a fuse or a surge part where it enters this box, so a strike on the mast stops here and does not reach the other boxes. A direct hit may kill the actuator, the tip meter, the compass or the ring; that costs trim, not the boat, because the wing turns edge-on with no power. Colors: orange 24 V, black 24 V return, green CAN, blue RS-485, purple the slip ring; dashed means not decided.