BACKUP BATTERY BOARD

One board beside the Dyness backup battery (the emergency bank). It holds the two chargers that keep the battery full, the fuse, the plus and minus bars, the breakers for Pi B (the backup computer), Iridium B (the backup satellite radio) and bilge pump 2, and the backup converter's input fuse. Built and wired on the bench, then screwed up as one piece.

WHERE
Beside the Dyness, within a foot

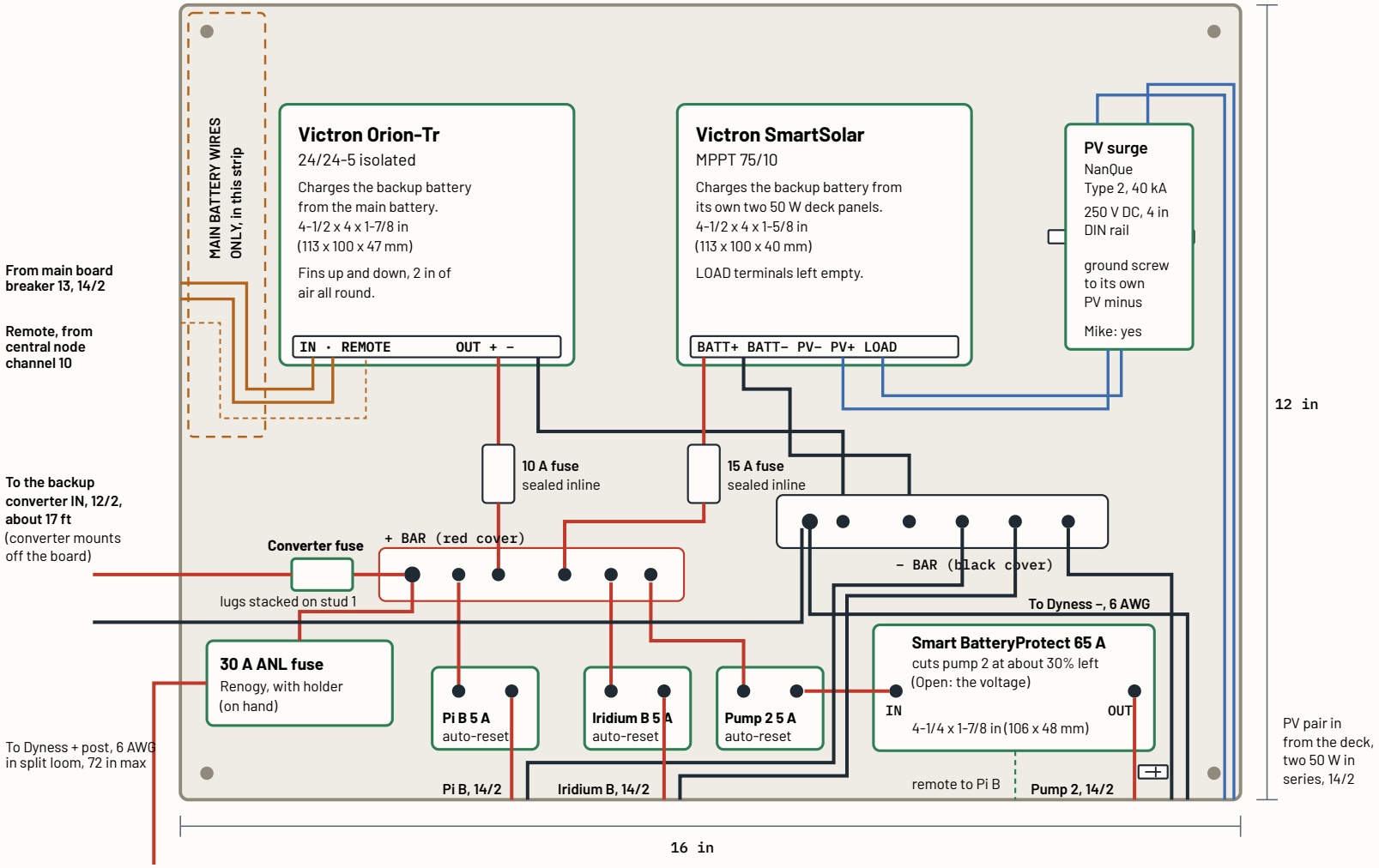
BOARD
16 x 12 in, wood or G10

DRAWN
2026-10-15, Claude · updated 2026-11-01

HOME DOC
Electronics plan A10

PAGE 1. THE BOARD, TO SCALE

1 IN GRID · FACE VIEW, BOARD STANDING UP



PAGE 2. WIRES, PARTS, NOTES

ALL WIRE 14/2 TINNED MARINE DUPLEX, BUT THE TWO 6 AWG BATTERY LEADS AND THE CONVERTER'S 12/2

WIRES

FROM	TO	WIRE	GUARD
Dyness + post	ANL, then + bar stud 1	6 AWG red, in split loom its whole length, as short as the board allows (72 in max)	30 A ANL
Dyness – post	– bar stud 1	6 AWG black	none
Main board breaker 13	Orion-Tr IN + and –	14/2, 17 ft	10 A breaker at the main board
Central node relay channel 10	Orion-Tr remote	14/2	none
Orion-Tr OUT +	+ bar stud 3	14/2, short	10 A fuse
Orion-Tr OUT –	– bar stud 2	same 14/2	
Deck 50 W pair	surge module, then 75/10 PV	14/2	surge module
75/10 BATT +	+ bar stud 4	14/2, short	15 A fuse
75/10 BATT –	– bar stud 3	same 14/2	
+ bar stud 2	Pi B breaker, then Pi B box entry 1	14/2	5 A auto-reset
– bar stud 4	Pi B box	same 14/2	
+ bar stud 5	Iridium B breaker, then Iridium B box	14/2	5 A auto-reset
– bar stud 5	Iridium B box	same 14/2	
+ and – stud 6	Pump 2 breaker, BatteryProtect, pump 2 (1.5KE33CA across)	14/2	5 A (line 15)
BatteryProtect remote	Pi B's side	thin pair	
+ and – stud 1 (stacked)	Converter fuse, backup converter IN	12/2, about 17 ft	Open

WHY THESE SIZES

- **Breakers on the loads, fuses on the chargers.** Same rule as the main board: a blown fuse would leave Pi B or Iridium B dead for the whole trip, so they get auto-reset breakers, like Iridium A. The chargers keep fuses because a breaker that keeps closing into a hard short can weld shut.
- **Pi B 5 A, Iridium B 5 A.** Pi B draws about 3 W awake, its converter at most 25 W, about 1.2 A. Iridium B's converter tops out at 15 W, about 0.7 A. 5 A matches Iridium A and is far under 14 AWG's rating.
- **The 30 A fuse sits on the board, not at the post.** The cable from the post to it runs in split loom its whole length; the boat wiring rule (ABYC E-11) allows up to 72 in that way, against 7 in for a bare cable. The Dyness's own BMS also cuts off a dead short.
- **75/10 15 A, Orion-Tr 10 A.** 1-1/4 times each charger's top output, next size up, as on the main board. 14 AWG carries both.
- **Pump 2 5 A** (Gulper 320, about 3.25 A). **Converter input** about 21 A at full output. Open: fuse or breaker, and its size.

BACKUP CONVERTER AND PUMP 2

- **Backup converter:** Pi B turns it on only when the main side is truly dead; its own low-voltage cutoff (about 30% left) stops it, its restart voltage starts it again. Output to the main bus board's backup-fed bar. Open: where it mounts (likely beside the main bus board); its cutoff and restart voltages, from Victron's manual.
- **Pump 2** runs from this battery at all times (Bilge Pump Wiring drawing). **Battery voltage:** WD-B reads it through two resistors (a divider, from the resistor kit on hand) into a spare analog pin. Open: where the divider takes its reading.

PARTS

PART	STATUS	LINK
Orion-Tr 24/24-5 isolated	Have	
SmartSolar 75/10	Have	
30 A ANL fuse with holder (Renogy)	Have	
Three 5 A stud auto-reset breakers	Have (Aug 16); pump 2's line 15 breaker is here, not on the main board	
BatteryProtect 65 A (BPR065022000)	Buy	Amazon B07MXG5XZ4
1.5KE33CA surge diode	Have (20-pack)	
Backup converter, Orion-Tr Smart 24/24-17 isolated (ORI242440120)	Buy	Amazon B07YN4LGR9
Two sealed inline blade fuse holders, 10 A and 15 A blade fuses	Check the shelf; fuses from the kit on hand	
Bus bar pair, red and black covers, about 6 screws each	Bought 2026-10-15 (Amazon): two sets of 150 A bus bar pairs with covers, $25.64	
NanQue Type 2 PV surge module, 40 kA, the 250 V DC option (same as the five on the main board)	Buy one more, $15.50 (five bought, all on the main board). Mike, Oct 15: yes	Amazon B0DZ267ZV4
14/2 duplex tinned, about 60 ft (a guess: 17 ft Orion feed, about 15 ft deck panels, the Pi B, Iridium B and remote runs, board jumpers)	The Sep 4 roll is spoken for (steering, the five main chargers). A second roll is held: buy it only if the 14/2 on hand runs out at fit-out (Mike, Oct 21)	Amazon B0799HTZB5, GS Power 100 ft, was $59.99
Three PG11 glands	Check the gland kit on hand	
Board, 16 x 12 in: 1/2 in marine plywood or 1/4 in G10	Use scrap	
Boots for the Dyness M8 posts	Already on the Buy list	Amazon search

NOTES

- **Two batteries, kept apart.** Only the two isolated converters touch both: the Orion-Tr and the backup converter. The Orion-Tr's input and remote come in along the left edge and go nowhere else. Every other wire on the board is the backup battery's.
- **The backup minus floats.** No bond wire on the board, the bars or any case. The surge module's ground screw goes to its own PV minus, never to the lightning copper.
- **Mount it standing up**, chargers' fins running up and down, somewhere dry (the Orion-Tr is only splash rated). Bars and breakers under their covers, cables leaving the bottom edge with drip loops; the main battery wires and the Dyness + lead leave by the left edge, in the main battery strip, also with drip loops.
- **On the bench:** meter the Orion-Tr's case to each minus before it goes on the board, as the Electronics plan says.
- **All 14/2 (Mike, Oct 15),** except the two 6 AWG battery leads and the converter's 12/2. 14/2 is too fat for the PG7 glands the docs give these runs (PG7 holds about 1/8 to 1/4 in), so three holes go to PG11 (about 3/16 to 3/8 in) in a 3/4 in hole: Pi B box entry 1, Iridium B box power entry, central node entry 16 (the Orion-Tr remote). The remote plug on the Orion-Tr is a 2-pin screw plug at 5 mm spacing; plugs of that kind take 14 AWG.
- **No on/off switch.** The backup battery must never be off at sea. To work on the board: lift one end of the 30 A ANL fuse, cover the two 50 W panels, and pull the Orion-Tr's green remote plug. The breakers have no off lever, so the Orion-Tr's two input wires stay live until the main battery switch is off.
- This board replaces the "small fused DIN strip beside the battery" in the Electronics plan, A10. The four DIN fuse holders it would have used are free for the cord pullers.