USB HUB BOX (A1A)

The small box beside Pi A that holds the USB hub and everything plugged into it, the 12 V supply for the two weather sensors, and the ends of the wing cable. The MOTU M2 is in its own box; only its USB lead comes in here. Page 1 shows roughly where each part sits, page 2 the wiring, page 3 every wire from and to. Not to scale.

BOAT
Boat 1, Prime Ranger

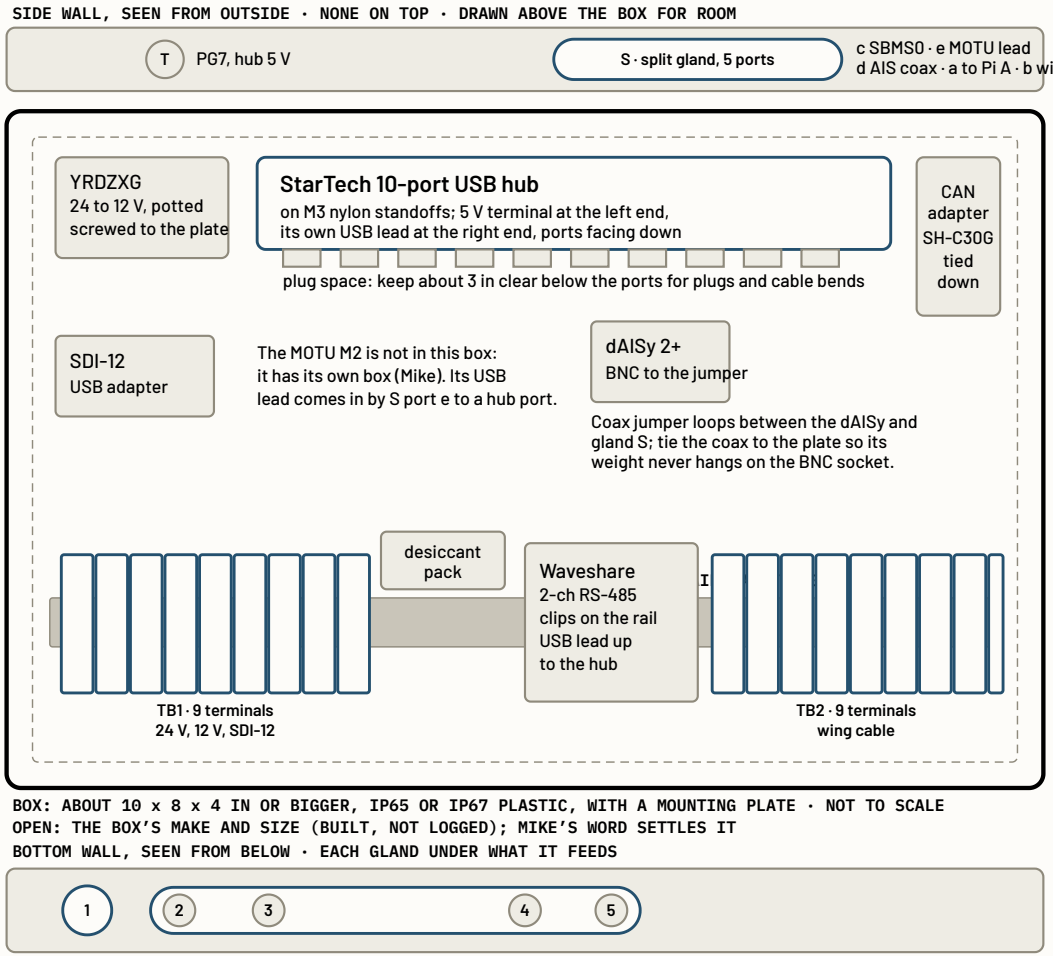
DOC SET
v10.4

DRAWN
Oct 20, 2026 · Updated 2026-11-01

HOME GUIDE
Electronics plan A1a; Box Wiring Sheet A1a

WHERE THE PARTS SIT, LID OFF

NOT TO SCALE · OPEN: THE BOX'S MAKE AND SIZE



Entries

Side wall (leads that keep plugs)
S split gland, 5-port, M30 thread, 1-3/16 in hole
T PG7, 1/2 in hole: hub 5 V

Bottom (bare wire ends)
1 PG9: 24 V in, 16/2
B 4-port split gland: 2 BaroVUE, 3 HygroVUE, 4 SBE 45 line, 5 DO sensor line

Wing cable: by S port b

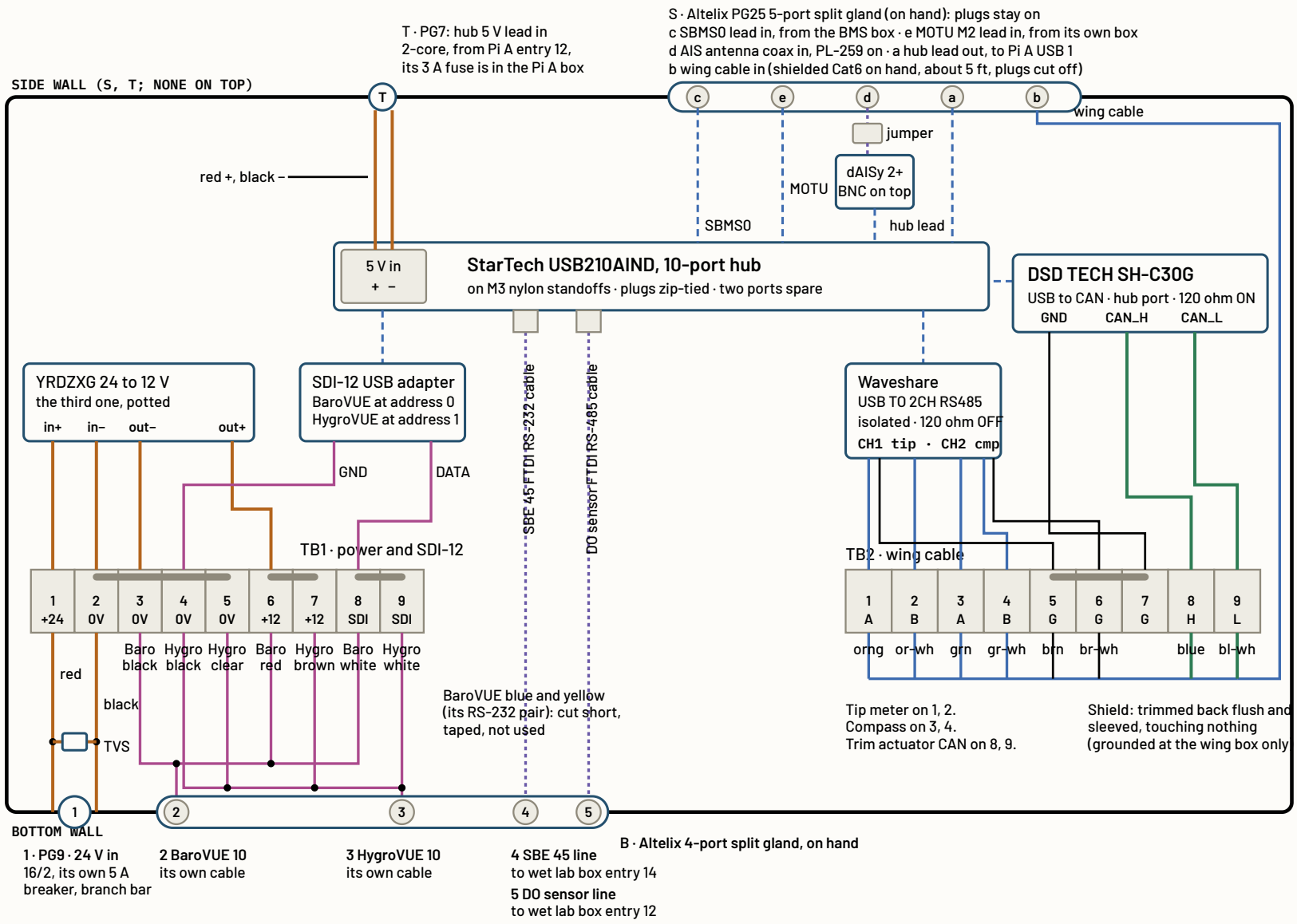
PG9 5/8 in, split glands 1-3/16 in. 16/2 is oval: fill that gland with sealant.

Where it goes

Beside Pi A, bottom wall down, within reach of Pi A's USB lead and the 5 V lead.
The FTDI cables are 6 ft: the wet lab box within about 5 ft.
No vent. Nothing in this box goes to the lightning copper.

WIRING

DOT = JOINED · LINES CROSSING WITH NO DOT DO NOT TOUCH · GRAY BAR = TERMINALS BRIDGED



24 V, 12 V and 5 V power · USB lead · Wing RS-485 pairs · Wing CAN pair · Ground · Sensor wires

Cable passing through (coax, FTDI)

WIRE LIST: EVERY WIRE, FROM AND TO

TB = DIN TERMINAL STRIP · TOP = THE SIDE TOWARD THE HUB

POWER AND THE TWO WEATHER SENSORS (TB1)

WIRE	FROM	TO
24 V red	Gland 1, the 16/2	TB1-1 bottom
24 V black	Gland 1, the 16/2	TB1-2 bottom
Surge diode 1.5KE33CA	TB1-1, one leg	TB1-2, the other leg (no band to watch: it works either way round)
Converter in +	YRDZXG	TB1-1 top
Converter in –	YRDZXG	TB1-2 top
Converter out –	YRDZXG	TB1-3 top (its second black lead)
Converter out + (12 V)	YRDZXG	TB1-6 top
BaroVUE black (ground)	Split gland B, port 2	TB1-3 bottom
BaroVUE red (12 V)	Split gland B, port 2	TB1-6 bottom
BaroVUE white (SDI-12)	Split gland B, port 2	TB1-8 bottom
BaroVUE blue, yellow	Split gland B, port 2	Cut short, taped (not used)
HygroVUE black (ground)	Split gland B, port 3	TB1-4 bottom
HygroVUE clear (shield)	Split gland B, port 3	TB1-5 bottom
HygroVUE brown (12 V)	Split gland B, port 3	TB1-7 bottom
HygroVUE white (SDI-12)	Split gland B, port 3	TB1-9 bottom
Adapter – (ground)	SDI-12 adapter, one 3-pin SDI-12 terminal	TB1-4 top

THE WING CABLE (TB2)

CAT6 WIRE	TB2	THEN A SHORT WIRE TO
Orange	1 bottom	Waveshare CH1 A (tip meter)
Orange-white	2 bottom	Waveshare CH1 B
Green	3 bottom	Waveshare CH2 A (compass)
Green-white	4 bottom	Waveshare CH2 B
Brown	5 bottom	Waveshare PE next to A1, B1 (its channel 1 ground)
Brown-white	6 bottom	Waveshare PE next to A2, B2 (its channel 2 ground)
(none)	7	CAN adapter GND (its 5V0 terminal left empty)
Blue	8 bottom	CAN adapter CAN_H
Blue-white	9 bottom	CAN adapter CAN_L
Shield	Trimmed back flush, sleeved, touches nothing (grounded at the wing box only)	
Cable	Mike's shielded Cat6 on hand, about 5 ft (Oct 21); strapped within a few inches of the box	
Entry	Split gland S, port b, on the side wall, laid in from the side (port takes 0.15 to 0.30 in cable; the Cat6 on hand is 0.225 in, Mike, Oct 29)	
Bridges	TB2-5 to 7 (the ground for all three)	

USB AND COAX: WHAT PLUGS INTO WHAT

ITEM	PLUGS INTO
Hub's own USB lead	Out by S port a, to Pi A USB 1
CAN adapter's USB lead	Hub port (Mike, Oct 20)
SBMS0 lead	In by S port c, into a hub port

Adapter S (data)	Same terminal; its + left empty	TB1-8 top
Bridges	TB1-2 to 5 (all 0 V) · TB1-6 to 7 (12 V) · TB1-8 to 9 (SDI-12)	

HUB POWER

WIRE	FROM	TO
5 V red	Gland T, from Pi A (3 A fuse there)	Hub terminal +
5 V black	Gland T, from Pi A	Hub terminal –

Iridium A's USB cable	Not in this box: to its USB isolator on Pi A's second USB port, in the Pi A box (Mike, Oct 20)
AIS antenna coax (PL-259)	In by S port d, into the Superbat jumper; jumper's BNC into the dAISy
dAISy (mini USB lead)	Hub port
SDI-12 adapter	Hub port
Waveshare wing reader	Hub port
MOTU M2's USB lead	In by S port e from the MOTU's own box, into a hub port
SBE 45 FTDI cable	Hub port; its bare end out by split gland B port 4 to the wet lab box
DO sensor FTDI cable	Hub port; its bare end out by split gland B port 5 to the wet lab box
Two spare hub ports	Empty

NOTES

Any device may take any hub port: each one is named by its serial number, not its port (System Settings Sheet sec 9). Every USB plug is tied down within 2 in and staked; at the hub, ties go round the hub body and across the plug grips. A ferrule on every stranded wire end. The wing Cat6 is likely solid 23 AWG: its wires go into the terminals bare, no ferrule, and the cable is strapped within a few inches of the box so the wires cannot flex there. Terminators: the CAN adapter's 120 ohm switch ON, the Waveshare's two OFF. Set the HygroVUE to address 1 (send `0A1!` to it alone) before it joins the BaroVUE. No fuse in this box (Mike, Oct 14). One 1.5KE33CA surge diode across the 24 V input, legs short and sleeved (Mike, Oct 22). Wire colors for the two weather sensors are from Campbell's manuals; read the labels on the cables to be sure. The MOTU M2 is in its own box (Mike); only its USB lead comes in here. Split gland S and gland T sit on a side wall: no holes on top of any box (Mike, Oct 31). Open: the box's make and size (built; not logged); Mike's word settles it.