

SOURCE	Fusion · project <i>Bus</i> · Bus-Hybrid-Assy
REVISION	2026-09-14, refactored tree
PARTS	103 pieces · 21 unique
KERF	1/8 in per cut
STOCK	8 ft lumber · 4×8 ft sheets
ENVELOPE	175.5 × 32 × 72 in (L×D×H)

PORT-SIDE SHELVES CUT LIST

Every stick and sheet in the shelving unit, as a shopping list, per-board cut patterns, and the sub-assembly each part belongs to. Lengths are finished cut lengths in inches. Stock sizes are nominal; 2×4 is 1½ × 3½ actual, 2×6 is 1½ × 5½, all bought in 8-foot lengths.

If three shelves up instead of four — removing the two topmost shelves (Bay A and Bay C at z 81½, with their z 78 frames) changes the buy to:				
Stock	4 shelves	3 shelves	Fewer to buy	What drops out
2×4 × 8 ft	34	27	-7	4 × 72 rails and 10 × 29 cross members; patterns become 12 → 72, 14 → 29+29+29, 1 → 31+31
2×6 × 8 ft	10	10	0	nothing — leave the posts full height for a later top deck, or cut them 12 in shorter; the board count is the same either way
¾ in plywood, 4×8	5	4	-1	2 × 32×48 and 2 × 24×32; 10 strips from 4 sheets, 2 spare
Everything below is the four-shelf build.				

Shopping list

Stock	Buy	Makes	Net	Waste
2×4 × 8 ft	34	16 × 72 rails · 52 × 29 cross members · 2 × 31 rails	226.8 lf	16.6 %
2×6 × 8 ft	10	18 posts in 6 lengths (72, 62½, 50½, 30½, 25, 18½)	69.1 lf	13.6 %
¾ in plywood, 4×8	5	10 × 32×48 · 4 × 24×32 · 1 × 31×32 (2 strips spare)	4.22 sheets	15.6 %

Waste on the 2×4s is almost entirely the 24-inch offcut left when a 72-inch rail comes out of an 8-footer (16 of them = 32 ft). Nothing in the design is shorter than 29 in, so they can't be reused here; keep them for blocking.

2×4 — frames (34 boards)

Cut	Qty	Used as	
72	16	front/back rails, 8 frames × 2	Cross members are 29 in because the unit is 32 in deep and the rails are 1½ in thick each. Rails are 72 in because every bay is 72 in long; the low step at the left end is the only 31-inch bay.
29	52	cross members, 49 in frames + 3 floor cleats	
31	2	rails, low-step frame	
net	70	2722 in = 226.8 lf	

Cut patterns

16 × 8 ft	72		
17 × 8 ft	29	29	29
1 × 8 ft	31	31	29

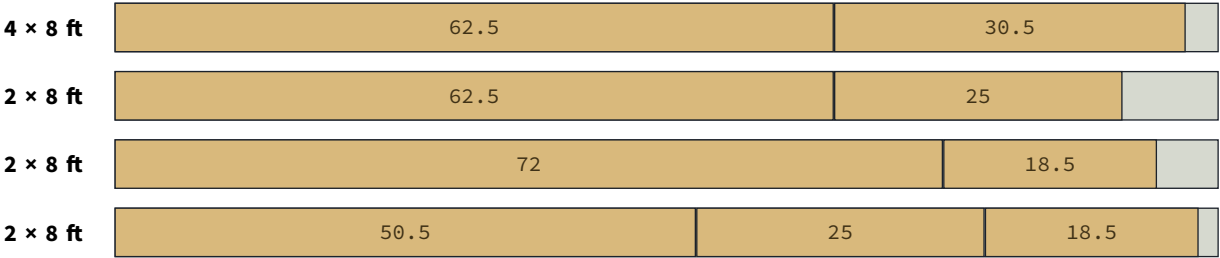
Bars to scale · shaded end is offcut: 24 in, 8¾ in, 4¾ in · kerf not drawn

2×6 — posts (10 boards)

Cut	Qty	Where
72	2	Bay A left end, floor (z 9½) to top
62.5	6	full-height posts, x 1½ / 41 / 128
50.5	2	Bay C posts off the z 31 frame, x 77
30.5	4	Bay B lower posts, x 97 / 113
25	2	low-step posts, x -1½
18.5	2	Bay B short posts, x 60¾
net	18	829 in = 69.1 lf

Posts go front and back in pairs (y -92½ and y -69), so every length above is an even count. x positions are inches from the design origin; z is height above the design origin, floor of the shelving is z 19 except the two 72-inch corner posts and the low step, which reach down to z 9½.

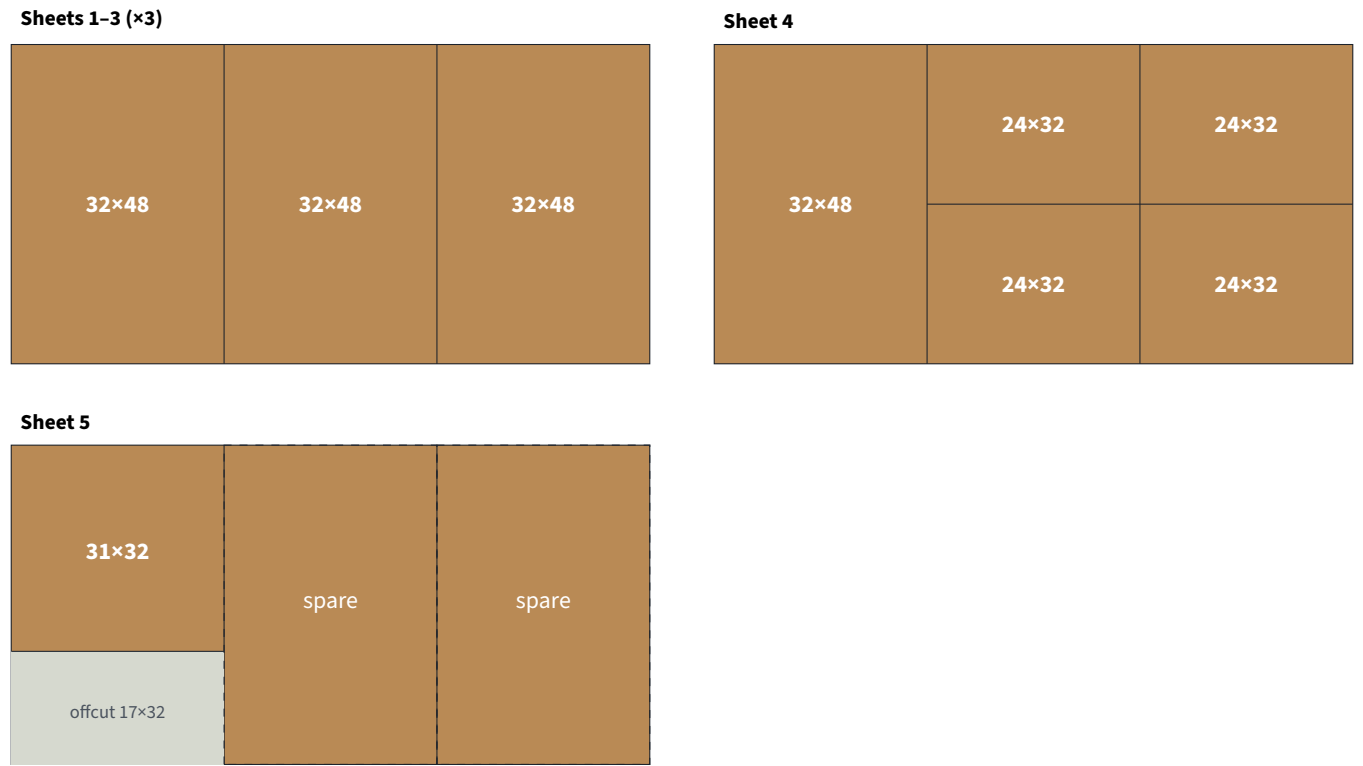
Cut patterns



Offcuts: 2⅞, 8⅞, 5⅞, 1¾ in. The 50½ + 25 + 18½ board leaves only 1¾ in — check that board is a full 96 before cutting.

¾ in plywood — 15 panels from 5 sheets

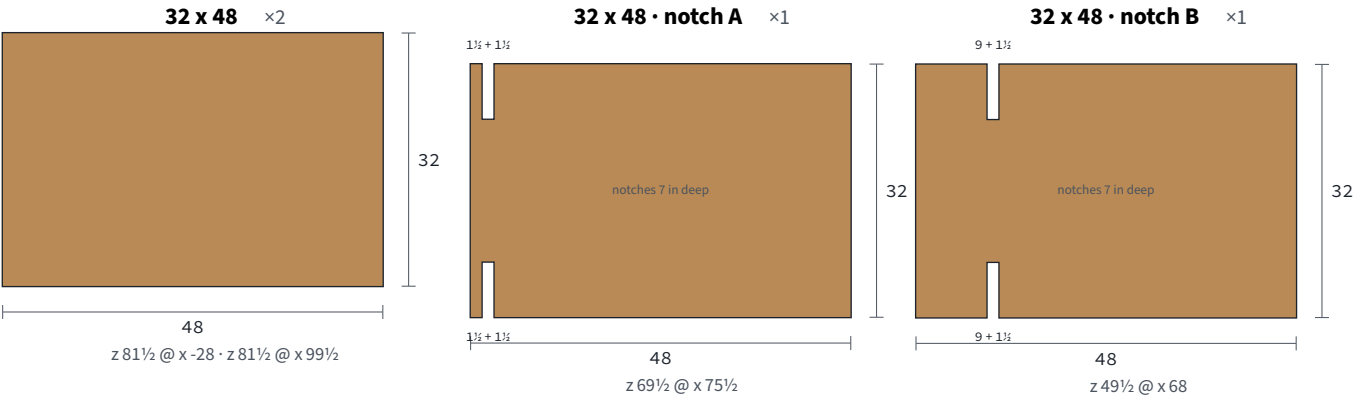
Crosscut each 4×8 sheet across its length into three 32 × 48 strips (cuts at 32 and 64). Ten strips go up as-is; two are halved into 24 × 32; one is trimmed to 31 × 32 for the low step. Two strips are spare.

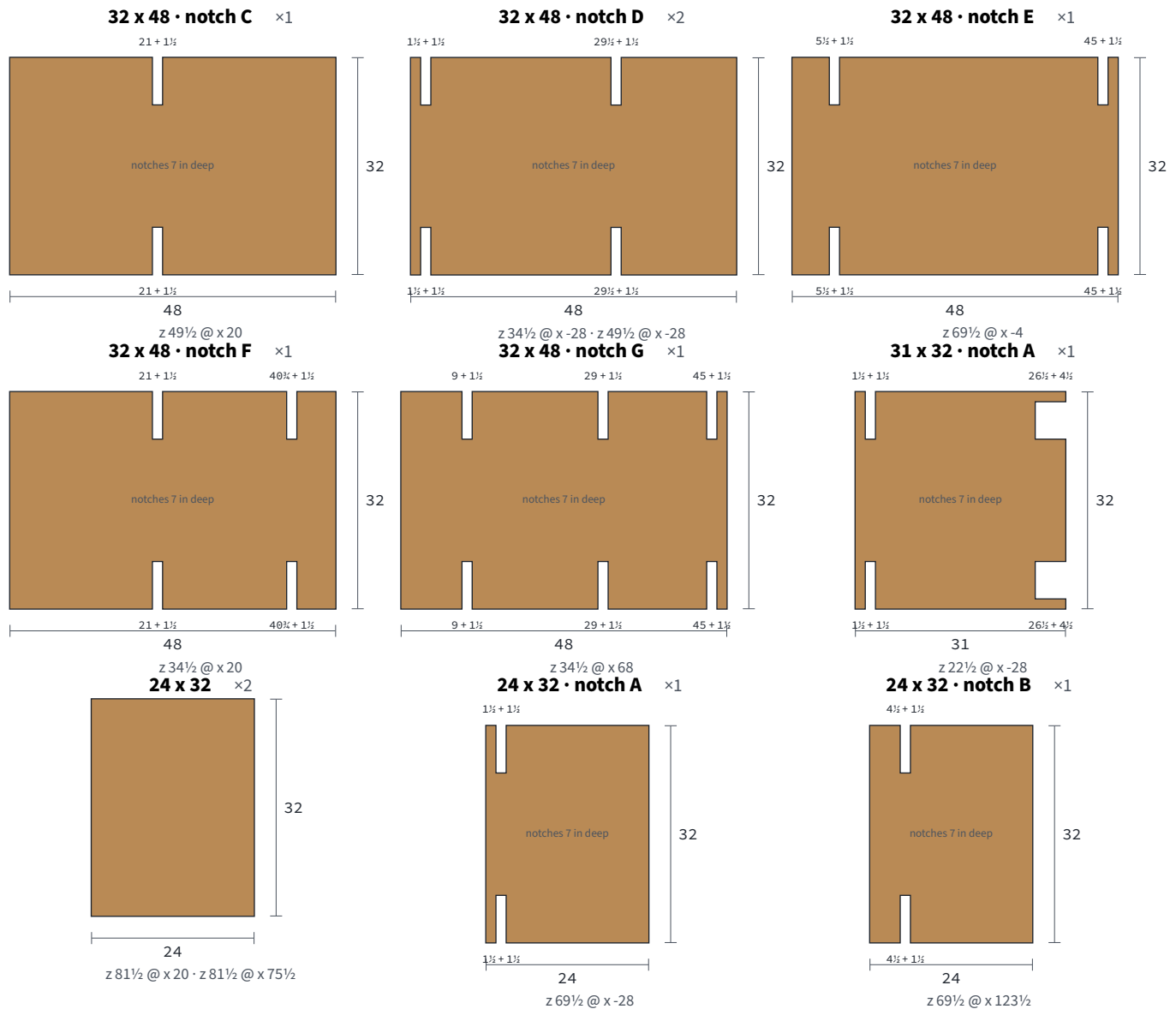


Panel	Qty	Deck (z = top of frame)	Notches
32 × 48	2	z 81½ top, Bay A and Bay C	none
32 × 48	8	z 34½ ×3 · z 49½ ×3 · z 69½ ×2	post notches, 7 patterns (A–G), drawn below
24 × 32	2	z 81½ top	none
24 × 32	2	z 69½, ends of Bay A / Bay C	post notches (A, B), drawn below
31 × 32	1	z 22½ low step	post notches
net	15	19,424 in ² = 4.22 sheets → 5	

Panel patterns

Every unique panel outline, read from the model. Notch callouts are offset + width from the panel’s left edge (as installed, looking down); front-edge notches are labelled below the panel, back-edge above. All notches are 7 in deep unless the panel says otherwise. Mark them from these dimensions, then check against the installed posts before cutting.





How the parts are grouped in Fusion

Same 103 bodies, now as 21 reusable part components inside reusable frames (42 components total, down from 104). Identical frames are one component placed more than once, so editing a frame edits every level that uses it.

Port Side Shelves (Assembly)

Posts (2x6)

18 posts, 6 part types

Bay A - Left, x -28..44

Frame A z19 (31 in rails, 3 cross) x1

Frame A z31/z46/z78 (72 in rails, 5 cross) x3 ← one component

Frame A z66 (72 in rails, 6 cross) x1

Bay B - Center lower, x 44..116

Frame B z31/z46 (72 in rails, 7 cross) x2 ← one component

Bay C - Right upper, x 75.5..147.5

Frame C z66 (72 in rails, 6 cross) x1

Frame C z78 (72 in rails, 5 cross) x1

Floor cleats z19 (2x4) 3 x 29 in

Decks (3/8 ply) z 22.5 (1) 34.5 (3) 49.5 (3) 69.5 (4) 81.5 (4)