

Smart Home Simulator — Build Guide 01

Frame, Drywall Ledge, Cut List, and Panel Assembly

TYPE	FRAME METHOD	SURFACE	USE
Tabletop Simulator Panel	2x4 Square-Notched + Mitered	1/2" Drywall	IoT / Smart Home Training

SAFETY:

Use eye and ear protection for saw operations. Wear a dust mask when cutting drywall. Support long boards and sheet goods during cuts. Keep hands clear of blades and clamp work before drilling or fastening.

GOAL OF THIS PHASE

Build a rigid tabletop wall panel with a 2x4 frame and a recessed 1/2" drywall face. The inside edge of every frame member receives a square ledge so the drywall rests flat and screws into the frame cleanly.

- Cut the 1/2" x 1/2" square notch on all 2x4 pieces before miter cuts.
- Keep the ledge facing inward on all rails and stiles.
- Measure diagonals before final screws so the frame stays square.
- Do not over-drive drywall screws; set them just below the paper surface.

MATERIALS, HARDWARE & TOOLS

QTY	ITEM	SPEC / NOTES
2	2x4 Studs, 8 ft / 96"	Each board yields one rail and one stile. Cut leg/foot stock off each end first.
1	1/2" Drywall Sheet	Cut to fit inside frame; face rests on the 1/2" ledge.
20	R4 Multi-Purpose Screws 9x2-21/2"	Frame corner assembly plus drywall-to-ledge fastening.
As needed	Sandpaper / sanding block	Smooth proud screw heads and rough drywall edges.

RECOMMENDED TOOLS

Table saw for two rip passes
Miter saw for 45 degree cuts
Drill / driver and countersink bit
Speed square and tape measure
Drywall knife and T-square

BUILD RULES

Cut leg stock before ripping the ledge
Rip the notch before mitering final lengths
Pre-drill near board ends to prevent splits
Check both diagonals before final screws
Screw drywall into the ledge every 12"
Panel must sit flat before cutouts begin

2X4 PREP — SQUARE NOTCH & FULL-LENGTH RIP

NOTE: The inside corner of the 2x4 gets a SQUARE notch: 1/2" wide x 1/2" deep, running the full length of the board. This leaves a flat 1/2" ledge. The drywall face rests on this ledge and is screwed into it.

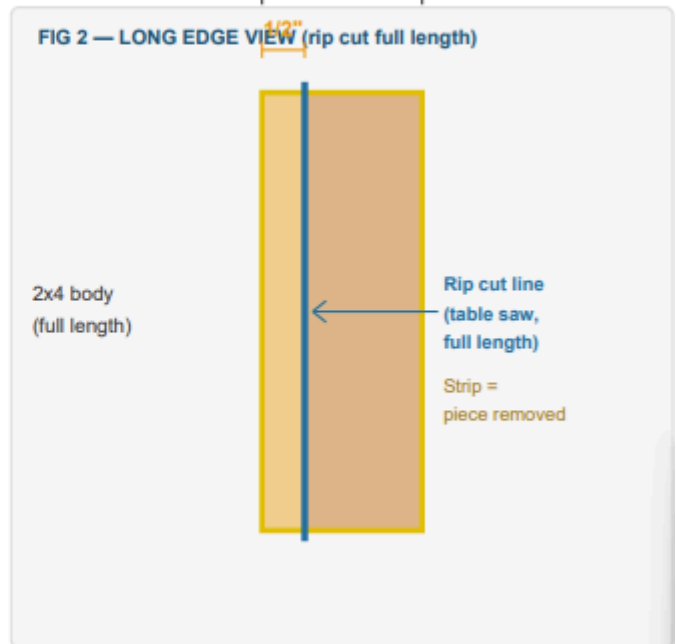
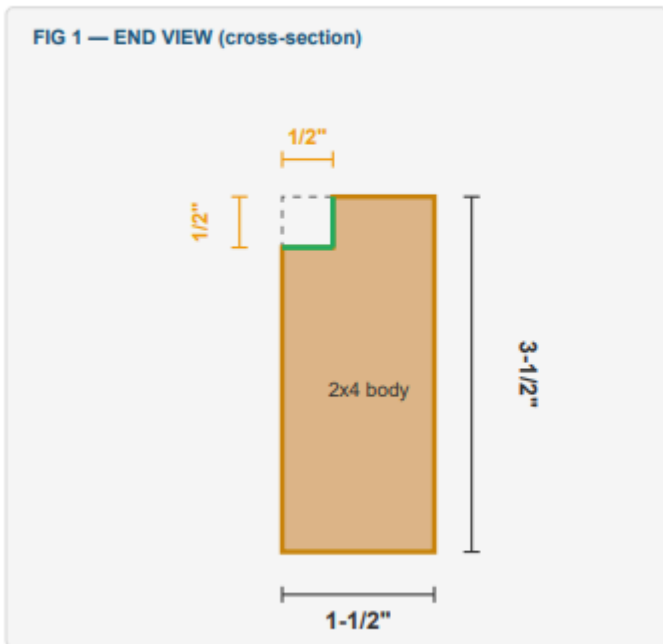


Fig 1 (left) — End view: 2x4 cross-section with 1/2" x 1/2" square notch, green = ledge | Fig 2 (right) — Long edge: rip cut runs full board length



Fig 3 — Corner joint: green dashed lines = 1/2" x 1/2" interior ledge on stile and rail — drywall screws to this ledge

CUT LIST

SIZE:

Dimensions assume a 48" x 24" panel. Adjust to your wall size. Always confirm actual ledge-to-ledge drywall size before cutting the drywall panel.

PIECE	QTY	RAW LENGTH	MITER	NOTES
Top Rail	1	43"	45 deg both ends	Outside dimension
Bottom Rail	1	43"	45 deg both ends	Outside dimension
Left Stile	1	26"	45 deg both ends	Outside dimension
Right Stile	1	26"	45 deg both ends	Outside dimension
Drywall Panel	1	41" x 24"	Square cuts	Rests on 1/2" inside ledge all around
Bottom Foot	2	16"	Square cuts	Outside Dimension

STEP-BY-STEP BUILD INSTRUCTION

1

Cut the 16" leg/foot stock off each 2x4 first

Before any ripping, cut the leg or foot piece from each 8 ft board. Plan lengths so each board still yields one rail and one stile.

2

Cut the 1/2" x 1/2" square notch

Make two rip passes on the table saw: one along the face and one along the edge. The ledge must run the full board length.

3

Miter cut all four frame pieces

Set the miter saw to 45 degrees. Rails target the outside width; stiles target the outside height. Keep the ledge facing inward.

4

Dry-fit and square the frame

Lay all four pieces flat. Measure both diagonals. Equal diagonals mean the frame is square.

5

Assemble frame with 2.5" screws

Pre-drill at each miter corner. Use two - three screws per corner and verify square before fully seating.

6 Cut drywall to size.
Measure ledge-to-ledge on all sides. Score the front paper, snap the drywall, and cut the backing paper.
Test-fit before final install.

7 Set drywall on the ledge and screw.
Rest the drywall face on the 1/2" ledge all around. Drive screws through the drywall face into the ledge about every 12".

8 Final check before cutouts.
The panel should be rigid, corners tight, screw heads just below the surface, and the frame sitting flat.

FINAL FRAME CHECKLIST

CHECK	PASS CRITERIA	STATUS
Frame square	Both diagonal measurements match.	<input type="checkbox"/> Pass
Ledge direction	All four ledges face inward toward the drywall.	<input type="checkbox"/> Pass
Corners tight	45 degree miters close without large gaps.	<input type="checkbox"/> Pass
Drywall seated	Drywall rests flat on the ledge around the full perimeter.	<input type="checkbox"/> Pass
Screws set	Screw heads sit just below the paper and do not break through.	<input type="checkbox"/> Pass
Panel stable	Frame sits flat and does not wobble during layout work.	<input type="checkbox"/> Pass

NEXT PHASE — BOX LAYOUT & CUTOUTS

<p>READY FOR GUIDE 02</p> <ul style="list-style-type: none"> Single-gang electrical boxes Round light boxes Outlet and device plates Painter's tape layout Cutout marking and drilling 	<p>DO NOT SKIP</p> <ul style="list-style-type: none"> Confirm panel is square before cutouts Keep boxes clear of frame members Check front layout and rear clearance Label openings before wiring Vacuum drywall dust after cutting
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