Smart Home Simulator — Build Guide 04

Router Mounting, Patch Panel, CAT Cable Routing, RJ45 Ends, and Punch-Downs

TYPE	PHASE	NETWORK MAP	USE
Tabletop Simulator Panel	Low-Voltage Network Wiring	Router -> patch panel -> keystones	IoT / Smart Home Training

NOTE:	Keep CAT/network wiring separated from the electrical wiring completed in Guide 03. Do not route CAT cable through electrical boxes. Install covers and secure wiring before router configuration begins.

GOAL OF THIS PHASE

Mount the SOHO router and patch panel, route CAT cable to the router ports and keystone jack box, terminate RJ45 ends and punch-downs as needed, make two additional patch cables, and test every CAT connection before moving to router configuration.

- Router has 5 labeled ports: IN, OUT1, OUT2, OUT3, OUT4.
- Router ports route to patch panel ports 1-5 labeled SOHO router ports.
- Patch panel ports 7 and 8 route to the two keystone jacks in the single box.
- Make two additional patch cables: patch panel port 4 to port 7 and patch panel port 5 to port 8.

MATERIALS, HARDWARE & TOOLS

QTY	ITEM	SPEC / NOTES
1	SOHO router	5 ports labeled IN, OUT1, OUT2, OUT3, OUT4.
1	Patch panel	Use at least 8 ports. Ports 1-5 = router ports; 7-8 = keystone runs.
2	Keystone jacks	Install in the single low-voltage box and label 7 and 8.
25’	CAT cable	Use consistent cable type for all runs; leave service loops for maintenance.
2	Additional patch cables	Patch panel port 4 to port 7 and port 5 to port 8 after termination/testing.
15	RJ45 ends / boots	For patch cables or any router-side RJ45 terminations.
1	Punch-down tool	For patch panel and keystone terminations.
1	Cable tester	Use with known-good patch cables to test every connection.
As needed	Velcro ties / clips / labels	Secure and label all cable routes.

NETWORK ROUTING MAP

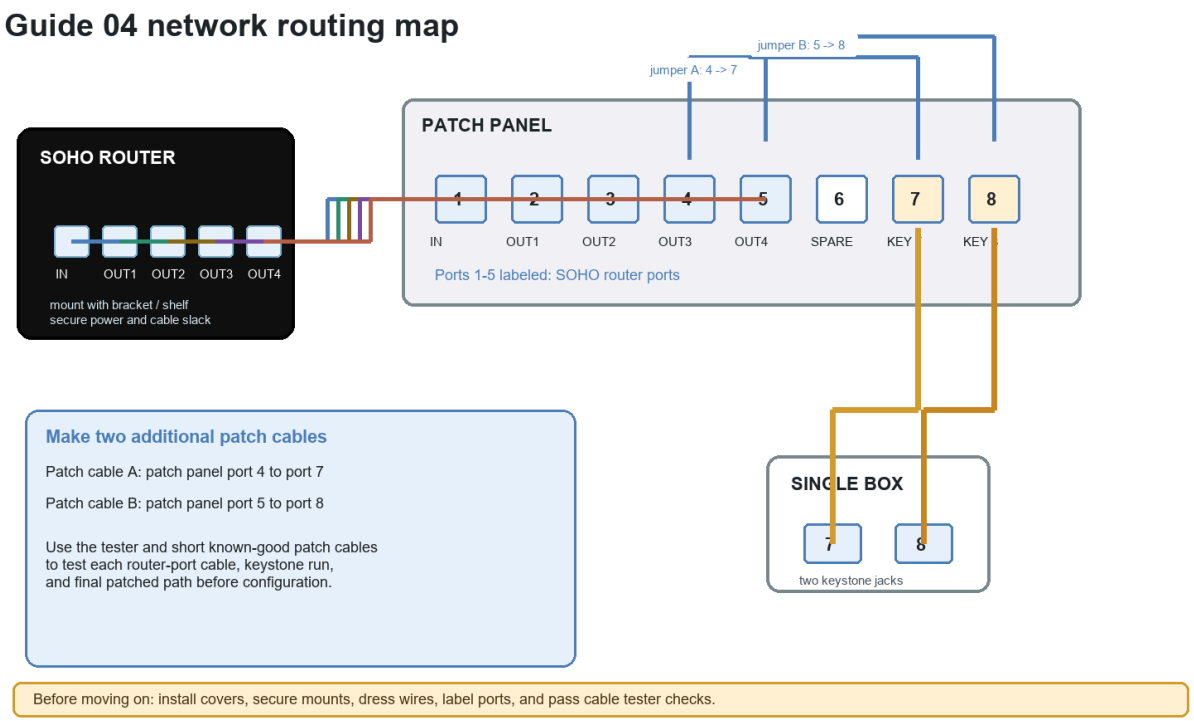


Fig 1 — Router ports route to patch panel ports 1-5; panel ports 7 and 8 route to the keystone box; two jumper patch cables connect patch panel 4 -> 7 and 5 -> 8.

PATCH PANEL PORT	LABEL	ROUTES TO	NOTES
1	SOHO IN	Router IN	Router incoming/WAN-side training port.
2	SOHO OUT1	Router OUT1	Also used for patch cable to port 7.
3	SOHO OUT2	Router OUT2	Also used for patch cable to port 8.
4	SOHO OUT3	Router OUT3	Also used for jumper patch cable to port 7.
5	SOHO OUT4	Router OUT4	Also used for jumper patch cable to port 8.
6	SPARE	Reserve	Leave blank or label spare.
7	KEYSTONE 7	Keystone jack 7	Patch from panel port 4 during final setup.
8	KEYSTONE 8	Keystone jack 8	Patch from panel port 5 during final setup.

MOUNT ROUTER AND PATCH PANEL

1. **Choose router location**
   Mount the router where antennas, power cord, and patch cables have clearance. Keep the reset button and labels visible.

2. **Secure router mount**
   Use the router bracket, shelf, Velcro, or approved hardware. The router should not shift when the panel is moved.

3. **Mount patch panel**
   Place the panel near the router with enough room for bend radius and patch cables. Label ports before terminating.

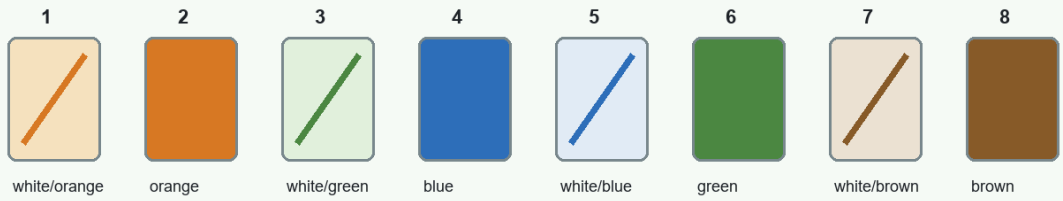
4. **Install keystone plate**
   Install two keystone jacks in the single low-voltage box. Label the jacks 7 and 8 to match the patch panel.

5. **Plan cable paths**
   Route CAT cable along frame edges where possible. Keep cable away from power wiring and sharp edges.

TERMINATE RJ45 ENDS AND PUNCH-DOWNS

RJ45 ends and punch-down color order

Use one wiring standard for the whole simulator. T568B is shown here.



RJ45 plug tip: keep twists as close as possible to the connector, seat all 8 conductors fully, then crimp and test.

Punch-down tip: follow the printed T568B color marks on the patch panel or keystone jack, then trim tails cleanly.

Fig 2 — T568B color order for RJ45 ends and matching punch-downs. Use the same standard on every termination.

1	**Pick one standard** Use T568B for the whole simulator unless your instructor specifies T568A. Do not mix standards on the same run.
2	**Terminate router-side cables** Install RJ45 ends where needed for the router ports. Keep twists close to the connector and crimp fully.
3	**Punch down patch panel ports 1-5** Route the five router port cables to panel ports 1-5. Punch each cable to the printed T568B marks and label SOHO router ports.
4	**Punch down keystone runs** Route patch panel 7 to keystone jack 7 and patch panel 8 to keystone jack 8. Punch both ends using the same color standard.
5	**Make two additional patch cables** Build and label two patch cables: patch panel port 4 -> port 7 and patch panel port 5 -> port 8. Test each cable before using it in the simulator.

TEST CAT CONNECTIONS

TEST	FROM	TO	PASS CRITERIA
Router port run 1	Router IN cable	Patch panel 1	Pins 1-8 pass in order.
Router port run 2	Router OUT1 cable	Patch panel 2	Pins 1-8 pass in order.
Router port run 3	Router OUT2 cable	Patch panel 3	Pins 1-8 pass in order.
Router port run 4	Router OUT3 cable	Patch panel 4	Pins 1-8 pass in order.
Router port run 5	Router OUT4 cable	Patch panel 5	Pins 1-8 pass in order.
Keystone run 7	Patch panel 7	Keystone jack 7	Pins 1-8 pass in order.
Keystone run 8	Patch panel 8	Keystone jack 8	Pins 1-8 pass in order.
Patch cable A	Patch panel 4	Patch panel 7	Known-good link or tester pass.
Patch cable B	Patch panel 5	Patch panel 8	Known-good link or tester pass.

SECURE, COVER, AND DRESS CABLES

1. **Install all covers and mounts**
   Install the keystone wall plate, patch panel cover or strain bar if used, router mount, and any cable-entry covers.

2. **Dress cable bundles**
   Use Velcro ties or clips. Do not crush cables with zip ties. Maintain smooth bends and avoid tight kinks.

3. **Label both ends**
   Label router ports, patch panel ports, keystone jacks, and patch cables so the map can be followed without guessing.

4. **Remove dust and loose scraps**
   Clean up cable jacket scraps, cut wire ends, and drywall dust before powering equipment.

5. **Final move check**
   Gently move or tilt the simulator panel. Router, patch panel, covers, and wiring should stay secure.

FINAL NETWORK CHECKLIST

CHECK	PASS CRITERIA	STATUS
Router mounted	Router is secure and ports are accessible.	[ ] Pass
Patch panel mounted	Patch panel is secure and ports are labeled 1-8.	[ ] Pass
Ports 1-5 mapped	IN, OUT1, OUT2, OUT3, OUT4 route to patch panel 1-5.	[ ] Pass
Ports 7-8 mapped	Patch panel 7 and 8 route to keystone jacks 7 and 8.	[ ] Pass
Patch cables made	Panel 4 -> 7 and panel 5 -> 8 patch cables are built and labeled.	[ ] Pass
Tester passed	All CAT runs and patch cables pass with tester.	[ ] Pass
Covers installed	Keystone plate, router mount, patch panel, and cable covers are installed.	[ ] Pass
Wires secured	All CAT cables are secured and separated from electrical wiring.	[ ] Pass

NEXT PHASE — CONFIGURE THE ROUTER

READY FOR CONFIGURATION Power router Connect admin device Set router login Configure Wi-Fi / LAN Document port map	DO NOT SKIP Confirm all covers are installed Confirm mounts are secure Confirm all CAT tests passed Confirm patch cables are labeled Keep power and data separated

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For classroom, booth, and smart-home simulator training use.