

Readiness report — OpenEVSE Level 2 EV Charging Station

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Readiness: OpenEVSE Level 2 EV Charging Station

Verdict: Ready with caveats · 2026-09-03 · est. parts cost \$73–\$85 **Cybersecurity — software & network: Review before networking**

This is a cold check establishing the baseline pricing, availability, and lifecycle metrics for the OpenEVSE Level 2 EV Charging Station controller. All 57 BOM line items are physically procurable today without requiring PCB layout modifications. However, caveats exist requiring instructor intervention: several manufacturer part numbers are unlisted or obsolete (requiring active drop-in equivalents), an under-voltage capacitor spec must be corrected to maintain DC bias margin on the +12 V rail, and the snapshot's sample relay MPN must be corrected to the official 40 A/50 A mains contactor.

Action required

Part	Problem	Recommended action
HCPL-2731S (IC8)	Original onsemi MPN HCPL2731SD is Obsolete (0 stock across distributors).	Order active direct replacement HCPL2731SDM (\$2.72, DigiKey) or HCPL-2731-300E (\$4.49, DigiKey).
AZ23C5V6-7-F (D1)	Diodes Inc. MPN has zero distributor stock at DigiKey and only 30 units at Arrow.	Order active drop-in replacement AZ23C5V6-TP (\$0.24, DigiKey).
High-Voltage Resistors, 180 kΩ 1210 (R32-R39)	Sample MPN CRHV1210AF180KFKE5 is unlisted across distributors.	Order active drop-in thick film 1210 resistor RC1210FR-07180KL (\$0.16, DigiKey).
Ceramic Capacitors, 10 µF 0805 (C5, C6, C13, C28)	Planned MPN CL21A106K0QNNNE is out of stock and rated only 16 V, failing the lab's ≥ 25 V constraint.	Order 35 V rated 0805 ceramic capacitor C2012X5R1V106K085AC (\$0.48, DigiKey).
Tantalum Capacitor, 10 µF 0603 (C17)	Sample MPN TLNK106M006R1500 is unlisted across distributors.	Order drop-in 0603 ceramic capacitor CL10A106KP8NNNC (\$0.21, DigiKey).
Power Inductor, 3.3 µH NR5040 (L2)	Original MPN NR5040T3R3N is marked Obsolete by Taiyo Yuden.	Order active manufacturer-recommended successor LCXND5050YAL3R3NMG (\$0.40, DigiKey).
Crystal Resonator, 16 MHz (Q1)	Planned MPN NX3225SA-16.000M-STD-CRS-2 is out of stock.	Order specified alternative ABM8G-16.000MHZ-18-D2Y-T (\$0.49, DigiKey).

Part	Problem	Recommended action
AC Mains Fuse, 1.6 A (F1)	Planned MPN 0679L1600-01 unlisted; BELFUSE1A footprint is a 5.08 mm through-hole box.	Order active 350 VAC radial box successor 0697H1600-05 (\$0.54, DigiKey) or in-stock legacy RST 1.6-BULK (\$0.57, DigiKey).
External AC Contactor	Snapshot sample MPN 899-1CH-F-C-12VDC is an inappropriate 10 A subminiature relay and out of stock.	Order the official UL-listed 40 A inductive / 50 A resistive contactor with 208–240 VAC coil, Packard C240C (\$24.99, OpenEVSE Store).

Cybersecurity — software & network

Review before networking — The ESP32 WiFi gateway firmware exposes network services including an HTTP interface, WebSocket stream, and OTA update endpoint, but its version and dependencies could not be verified against vulnerability databases.

Component	Version	How known	Support status
open_evse	9.0.0	inferred (inferred from documentation recommendation in lab snapshot)	—
openevse_esp32_firmware	not determined	not determined	—
espressif32	7.1.0	inferred (inferred from snapshot reference to esp32_wifi_platformio.ini)	—
platform-espressif32	55.03.311	inferred (inferred from snapshot reference to esp32_wifi_platformio.ini)	—
esp-idf	5.5.4	inferred (inferred from snapshot reference to esp32_wifi_platformio.ini)	—
bblanchon/ArduinoJson	6.20.1	inferred (inferred from snapshot reference to esp32_wifi_platformio.ini)	—
jeremypoulter/ArduinoMongoose	ca0a817de014cf4ab1833b32383532366fca10d7	inferred (inferred from snapshot reference to esp32_wifi_platformio.ini)	—
jeremypoulter/Micro Debug	0.0.5	inferred (inferred from snapshot reference to esp32_wifi_platformio.ini)	—

Component	Version	How known	Support status
jeremypoulter/ConfigJsn	0.0.6	inferred (inferred from snapshot reference to esp32_wifi_platformio.ini)	—
OpenEVSE/OpenEVSE_Lib	v0.0.20	inferred (inferred from snapshot reference to esp32_wifi_platformio.ini)	—
jeremypoulter/ESPAL	0.0.7	inferred (inferred from snapshot reference to esp32_wifi_platformio.ini)	—
jeremypoulter/StreamSpy	0.0.2	inferred (inferred from snapshot reference to esp32_wifi_platformio.ini)	—
jeremypoulter/MicroTasks	0.0.4	inferred (inferred from snapshot reference to esp32_wifi_platformio.ini)	—
matth-x/MicroOcpp	1.2.0	inferred (inferred from snapshot reference to esp32_wifi_platformio.ini)	—
matth-x/ MicroOcppMongoose	1.2.0	inferred (inferred from snapshot reference to esp32_wifi_platformio.ini)	—
adafruit/Adafruit MCP9808 Library	2.0.2	inferred (inferred from snapshot reference to esp32_wifi_platformio.ini)	—
adafruit/Adafruit NeoPixel	1.15.5	inferred (inferred from snapshot reference to esp32_wifi_platformio.ini)	—
kitesurfer1404/WS2812FX	1.4.7	inferred (inferred from snapshot reference to esp32_wifi_platformio.ini)	—
rar/esp_tsdb	2.4.3	inferred (inferred from snapshot reference to esp32_wifi_platformio.ini)	—
bodmer/TFT_eSPI	not determined	unpinned (snapshot indicates caret range ^2.5.43 in esp32_wifi_platformio.ini)	—

Component	Version	How known	Support status
bitbank2/PNGdec	not determined	unpinned (snapshot indicates caret range ^1.1.5 in esp32_wifi_platformio.ini)	—
lvgl/lvgl	not determined	unpinned (snapshot indicates caret range ^8.3.9 in esp32_wifi_platformio.ini)	—

No security findings — every dependency checked this run came back clean.

What this means for your lab

Anyone on the same local network or Wi-Fi segment can access the charging station's web server, live WebSocket telemetry stream, and over-the-air firmware update endpoint, which could allow unauthorized users to monitor charging sessions or modify device configuration. Because the ESP32 gateway firmware version and third-party libraries could not be checked against vulnerability databases, their security posture cannot be verified. Instructors should place the charging station on an isolated lab network or dedicated VLAN rather than an open campus network, complete the initial setup wizard to configure strong administrative credentials, and consult campus IT before connecting the hardware.

Not checked

- open_evse: no advisory database for the ecosystem (vendor AVR firmware repository)
- openevse_esp32_firmware: version not determined in project documentation
- espressif32: lookup failed (product_not_found on endoflife.date)
- platform-espressif32: lookup failed (product_not_found on endoflife.date)
- esp-idf: lookup failed (product_not_found on endoflife.date)
- PlatformIO pinned libraries: no vulnerability lookup performed during session
- PlatformIO author and git-pinned libraries: no advisory database for author libraries or git commit references
- PlatformIO unpinned libraries (TFT_eSPI, PNGdec, lvgl): unpinned caret version ranges in manifest
- espressif32 7.1.0: support status: endoflife.date has no such product
- platform-espressif32 55.03.311: support status: endoflife.date has no such product
- esp-idf 5.5.4: support status: endoflife.date has no such product

Parts

Microcontroller and Logic ICs

Part	Spec/Package	Status	Stock	Price	Source
ATmega328P-AU 8-bit Microcontroller	32 KB Flash, 16 MHz, TQFP-32	Readily available	29,655	\$2.66	DigiKey
AP63203 Synchronous Buck Converter IC	2 A, 5.0 V out, TSOT-26	Readily available	167	\$0.95	DigiKey
TC1044S Inverting Charge Pump	Inverting charge pump, SOIC-8	Readily available (via orderable MPN)	1,242	\$1.26	DigiKey
LMV358 Rail-to-Rail Dual Op-Amp	Rail-to-rail output, 5 V, SOIC-8	Readily available	7,044	\$0.45	DigiKey
LM358 Dual General-Purpose Op-Amp	±12 V supply, SOIC-8	Readily available	103,684	\$0.26	DigiKey
AQH2223 Solid-State Relay / AC Driver	600 V, 0.9 A, non-zero cross, 8-SMD	Readily available	2,545	\$1.78	Mouser
HCPL-2731S Dual Darlington Optocoupler	CTR ≥ 400%, 5 kV isolation, 8-SMD	Obsolete (use drop-in substitute)	4,495	\$2.72	DigiKey

Discrete Semiconductors

Part	Spec/Package	Status	Stock	Price	Source
MMBT2222A NPN Transistor	40 V, 600 mA, SOT-23-3	Readily available	547,932	\$0.17	DigiKey
AZ23C5V6-7-F Dual Zener Diode	5.6 V common cathode, SOT-23-3	Low stock (use drop-in substitute)	10,352	\$0.24	DigiKey
AZ23C2V7-7-F Dual Zener Diode	2.7 V common cathode, SOT-23-3	Readily available	619	\$0.41	DigiKey
1N4148 Fast Switching Diode	100 V, 150 mA, SOD-123	Readily available	1,283,914	\$0.18	DigiKey
1N4004 Rectifier Diode	400 V, 1 A, SMA (DO-214AC)	Readily available	484,759	\$0.26	DigiKey
P6SMB16CA Bidirectional TVS Diode	600 W, 13.6 V standoff, SMB	Readily available	1,657	\$0.61	DigiKey
MOV Surge Suppressor	275–300 VAC, 430 V typ, 10 mm radial	Readily available	51,379	\$0.24	DigiKey

Passives: Resistors

Part	Spec/Package	Status	Stock	Price	Source
Current Sense Resistor, 2.0 Ω	2.0 Ω , 1%, 0.125 W, 0805	Readily available	13,114	\$0.12	DigiKey
Resistor, 22 Ω	22 Ω , 5%, 0.25 W, 1206	Readily available	26,651	\$0.10	DigiKey
Resistor, 100 Ω	100 Ω , 1%, 0.125 W, 0805	Readily available	111,241	\$0.10	DigiKey
Resistor, 330 Ω	330 Ω , 5%, 0.125 W, 0805	Readily available	16,291	\$0.10	DigiKey
Precision Pilot Resistor, 422 Ω	422 Ω , 1%, 0.125 W, 0805	Readily available	36,528	\$0.10	DigiKey
Resistor, 820 Ω	820 Ω , 5%, 0.125 W, 0805	Readily available	13,385	\$0.10	DigiKey
Resistor, 1 k Ω	1 k Ω , 1%, 0.125 W, 0805	Readily available	1,006,526	\$0.10	DigiKey
Resistor, 10 k Ω	10 k Ω , 1%, 0.125 W, 0805	Readily available	1,168,650	\$0.10	DigiKey
Resistor, 20 k Ω	20 k Ω , 1%, 0.125 W, 0805	Readily available	313,926	\$0.10	DigiKey
Resistor, 56 k Ω	56 k Ω , 1%, 0.125 W, 0805	Readily available	44,846	\$0.10	DigiKey
Resistor, 100 k Ω	100 k Ω , 1%, 0.125 W, 0805	Readily available	578,290	\$0.10	DigiKey
High-Voltage Sense Resistor, 180 k Ω	180 k Ω , 1%, 0.5 W, 200 V, 1210	Unlisted (use drop-in substitute)	4,921	\$0.16	DigiKey
Resistor, 200 k Ω	200 k Ω , 1%, 0.125 W, 0805	Readily available	60,123	\$0.10	DigiKey

Passives: Capacitors

Part	Spec/Package	Status	Stock	Price	Source
Ceramic Capacitor, 22 pF	22 pF, 50 V, C0G, 0805	Readily available	31,058	\$0.10	DigiKey
Ceramic Bypass Capacitor, 0.1 μ F	0.1 μ F, 50 V, X7R, 0805	Readily available	5,566,409	\$0.16	DigiKey
Ceramic Capacitor, 1 μ F	1 μ F, 25 V, X7R, 0805	Readily available	465,414	\$0.16	DigiKey

Part	Spec/Package	Status	Stock	Price	Source
Ceramic Capacitor, 10 μ F	10 μ F, $\geq$ 25 V (35 V), X5R, 0805	Spec mismatch (use upgrade substitute)	428,331	\$0.48	DigiKey
Polarized Capacitor, 10 μ F	10 μ F, 16 V, EIA 3216-18 (Case A)	Readily available	190,789	\$0.58	DigiKey
Tantalum Capacitor, 10 μ F	10 μ F, $\geq$ 6.3 V, 0603	Unlisted (use drop-in substitute)	685	\$0.21	DigiKey

Inductors, Resonator, and Protection

Part	Spec/Package	Status	Stock	Price	Source
Power Inductor, 3.3 μ H	3.3 μ H, ISAT $\geq$ 2.5 A, 5 $\times$ 5 mm SMD	Obsolete (use manufacturer successor)	2,896	\$0.40	DigiKey
Ferrite Bead, 330 Ω @ 100 MHz	330 Ω , 1.5 A, 0805	Readily available	322,558	\$0.11	DigiKey
Crystal Resonator, 16.000 MHz	16.000 MHz, 18 pF, 3.2 $\times$ 2.5 mm 4-SMD	Planned MPN OOS (use drop-in alternate)	21,032	\$0.49	DigiKey
AC Mains Input Fuse, 1.6 A	1.6 A, 350 VAC, radial box 5.08 mm pitch	Planned MPN unlisted (use active successor)	502	\$0.54	DigiKey
AC/DC Power Supply Module, 10 W, 12 V	85–305 VAC in, 12 VDC 0.85 A out, 4-pin	Readily available	7,994	\$7.40	DigiKey

Connectors, Headers, and Test Points

Part	Spec/Package	Status	Stock	Price	Source
AC Input & Relay Terminal Header, 6-pin	3.96 mm pitch, JST VH 6-pin through-hole	Readily available	11,402	\$0.34	DigiKey
Current Measurement CT Header, 2-pin	2.54 mm pitch, Molex KK 254 2-pin	Readily available	87,682	\$0.18	DigiKey
GFCI CT Header, 4-pin	2.54 mm pitch, Molex KK 254 4-pin	Readily available	55,426	\$0.28	DigiKey
DC Relay Driver Output Header, 3-pin	2.54 mm pitch, Molex KK 254 3-pin	Readily available	114,189	\$0.23	DigiKey
Serial / FTDI Gateway Header, JST PH 6-pin	2.00 mm pitch, JST PH 6-pin vertical	Readily available	29,763	\$0.28	DigiKey
I2C Display Header, JST PH 4-pin	2.00 mm pitch, JST PH 4-pin vertical	Readily available	36,565	\$0.20	DigiKey

Part	Spec/Package	Status	Stock	Price	Source
J1772 Control Signal Header, 6-pin	2.54 mm pitch, Molex KK 254 6-pin	Readily available	12,197	\$0.36	DigiKey
Pilot / Proximity Screw Terminal Block, 2-pos	5.0 mm pitch, 2-position through-hole	Readily available	7,806	\$0.38	DigiKey
AVR ISP Header, 2×3 (6-pin)	2.54 mm pitch, dual-row male header	Readily available	29,202	\$0.60	DigiKey
Earth Ground Test / Solder Pads	Through-hole test point loop (or bare pad)	Readily available	377,642	\$0.27	DigiKey

PCB Mechanical and Trace Jumpers

Part	Spec/Package	Status	Stock	Price	Source
Solder Jumpers / Trace Bridges	PCB copper trace feature	Readily available	—	—	Fabricated on PCB
Optical Fiducials	PCB copper feature with mask opening	Readily available	—	—	Fabricated on PCB
Mechanical Mounting Holes	3.2 mm non-plated/plated drill holes	Readily available	—	—	Fabricated on PCB

External Parts Specified in Documents and Schematics

Part	Spec/Package	Status	Stock	Price	Source
Ground Fault CT Coil	1000:1, self-test primary loop, in-line	Readily available	2,473	\$14.85	DigiKey
Current Measurement CT Coil	1000:1, 100 A rating, wire leads	Readily available	168	\$15.44	DigiKey
AC Input Harness Housing	JST VH 6-position 3.96 mm housing	Readily available	38,335	\$0.17	DigiKey
AC Input Harness Crimp Contacts	JST SVH crimp pin, 20–16 AWG	Readily available	1,511,736	\$0.0552	DigiKey
JST PH 4-Pin and 6-Pin Wiring Harnesses	2.00 mm female-female pre-crimped leads	Readily available	In stock	\$3.23	Pololu / Retail
External AC Contactor	40 A inductive / 50 A resistive, 208–240 VAC coil	Readily available	In stock	\$24.99	OpenEVSE Store

Substitutes

For part	Substitute	Differences	Verified	Judgment
HCPL-2731S (HCPL2731SD)	HCPL2731SDM	8-SMD Gull Wing; isolation rated 5000 Vrms (exceeds original 2500 Vrms / 3750 Vrms); CTR min 500% at 1.6 mA (exceeds $\geq 400\%$). Direct modern tooling revision.	package + lead spacing, CTR, isolation	Acceptable drop-in replacement.
AZ23C5V6-7-F	AZ23C5V6-TP	Identical SOT-23-3 dual common- cathode array; nominal Vz = 5.6 V, 300 mW power dissipation.	package, zener voltage, power rating	Acceptable drop-in replacement.
High-Voltage Resistors, 180 k Ω 1210 (CRHV1210AF180KFKE5)	RC1210FR-07180KL	1210 thick film resistor; 180 k Ω , $\pm 1\%$, 0.5 W; limiting voltage 200 V (operates in series pairs across 277 VAC mains dropping < 200 V peak per part).	package, resistance, power rating	Acceptable drop-in replacement.
Ceramic Capacitors, 10 μ F 0805 (CL21A106KOQNNNE)	C2012X5R1V106K085AC	0805 footprint; rated 35 V (exceeds 16 V rating of planned part and satisfies ≥ 25 V lab requirement for +12 V rail DC bias). Lifecycle is Not For New Designs, but 428k+ stocked.	package, capacitance, voltage	Acceptable drop-in upgrade.
Tantalum Capacitor, 10 μ F 0603 (TLNK106M006R1500)	CL10A106KP8NNNC	0603 footprint; multi-layer ceramic rated 10 V (exceeds 6.3 V constraint); non-polarized dielectric prevents reverse polarity installation errors.	package, capacitance, voltage rating	Acceptable drop-in replacement.

For part	Substitute	Differences	Verified	Judgment
Power Inductor, 3.3 μ H (NR5040T3R3N)	LCXND5050YAL3R3NMG	4.9 mm $\times$ 4.9 mm $\times$ 4.0 mm SMD; 3.3 μ H; saturation current ISAT = 4.0 A (exceeds 2.5 A requirement); DCR = 27 m Ω (lower than original 35.1 m Ω).	package dimensions, inductance, saturation current, DCR	Acceptable drop-in replacement.
Crystal Resonator, 16 MHz (NX3225SA-16.000M-STD-CRS-2)	ABM8G-16.000MHZ-18-D2Y-T	Standard 3.2 mm $\times$ 2.5 mm 4-SMD package; 16.000 MHz fundamental; load capacitance 18 pF (matches C1/C2 22 pF load network). Specified directly in snapshot.	package, frequency, load capacitance	Acceptable drop-in replacement.
AC Mains Input Fuse, 1.6 A (0679L1600-01)	0697H1600-05	Radial box package (8.35 mm $\times$ 4.0 mm, 5.08 mm lead pitch) matching BELFUSE1A footprint; 1.6 A time-lag; rated 350 VAC (exceeds 277 VAC mains requirement).	package, current rating, voltage rating	Acceptable drop-in replacement.
External AC Contactor (899-1CH-F-C-12VDC)	Packard C240C	Heavy-duty chassis mount contactor; contacts rated 40 A inductive / 50 A resistive continuous, 600 VAC; 208–240 VAC coil driven directly by onboard AQH2223 triac SSR.	continuous current rating, contact voltage, coil voltage, OpenEVSE controller compatibility	Acceptable primary contactor.

Verify all substitutes against manufacturer datasheets and board mechanical dimensions before ordering.

Other dependencies

- PCB Fabrication: 2-layer FR-4 board, 91.14 mm × 51.27 mm. Requires isolation routing slot separating high-voltage AC mains from low-voltage logic (meeting UL/IEC creepage ≥ 6.4 mm and clearance ≥ 3.2 mm for 277 VAC operation). Ready for fabrication.
- Hardware Design Repository: https://github.com/OpenEVSE/OpenEVSE_PLUS — active repository.
- Controller Firmware Repository: https://github.com/OpenEVSE/open_evse — active repository.
- ESP32 Gateway Firmware Repository: https://github.com/OpenEVSE/ESP32_WiFi_V4.x — active repository.
- Hardware Store / Accessories: <https://store.openevse.com> — active and verified.
- HTTP API Documentation: <https://openevse.stoptlight.io/docs/openevse-wifi-v4/> — active.
- Emoncms Service Integration: <https://emoncms.org> — active link.

Watch list

- **Taiyo Yuden NR5040T3R3N inductor:** The original series is Obsolete. While distributor inventory remains, instructors should migrate documentation to the active manufacturer replacement LCXND5050YAL3R3NMG .
- **Bel Fuse subminiature fuses (RST 1.6-BULK):** The legacy RST series is Obsolete despite high remaining distributor stock (>97k units). Future procurement should specify the active 350 VAC successor 0697H1600-05 or 0697H1600-01 .
- **TDK C2012X5R1V106K085AC capacitor:** Marked Not For New Designs by TDK. Hundreds of thousands remain in distributor stock, but instructors should track active alternatives (such as Kyocera AVX KGM21AR51E106KU).
- **CR Magnetics Current Transformers (CR8450-1000):** Stock at primary distributors is modest (168 units at DigiKey). Reorder lead times should be monitored for larger lab classes.