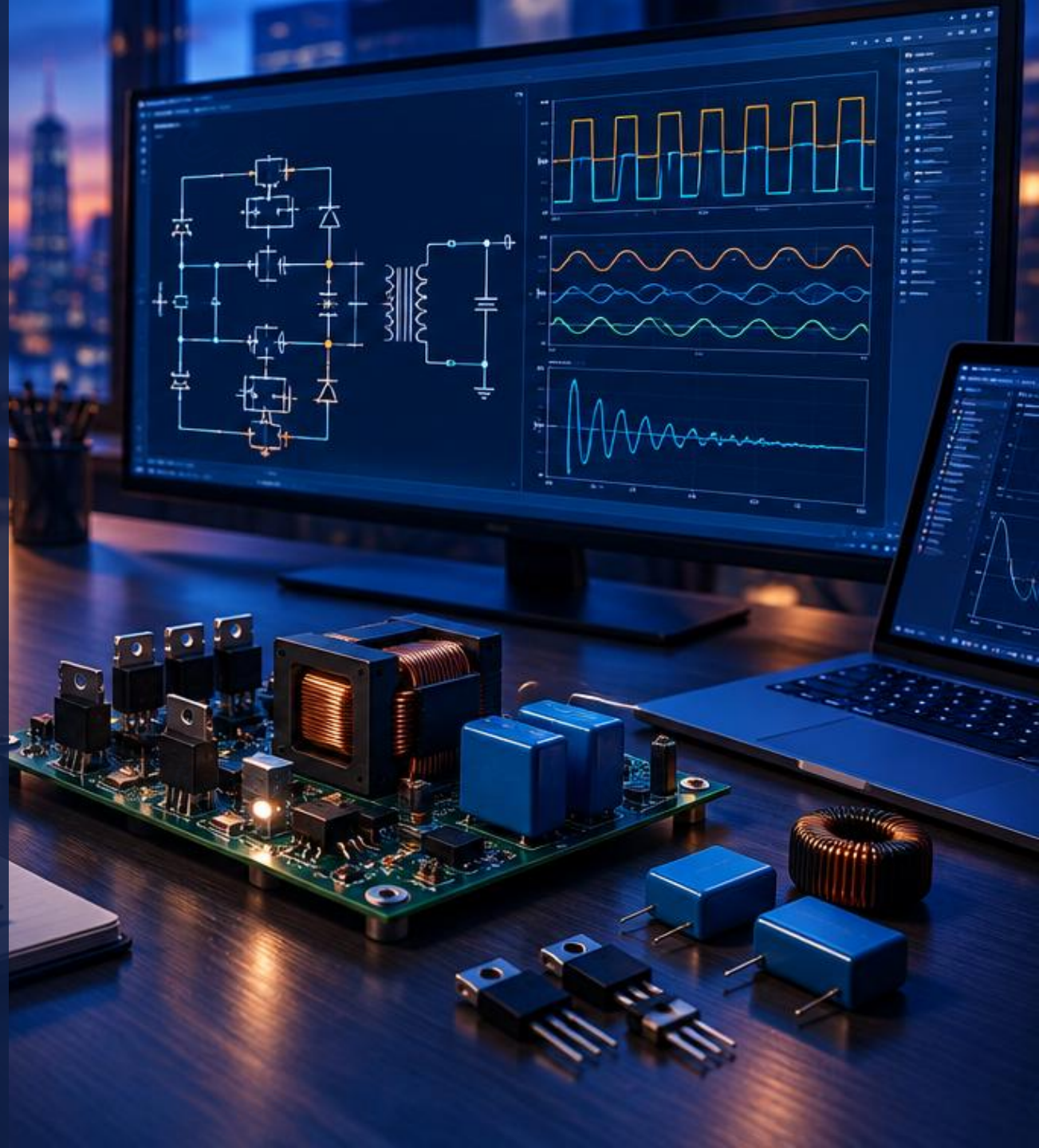
ElecHub

Power electronics design, in one place

From a one-line spec to real parts,
verification, 3D and reports —
and on to expert-built hardware

elechub.ai



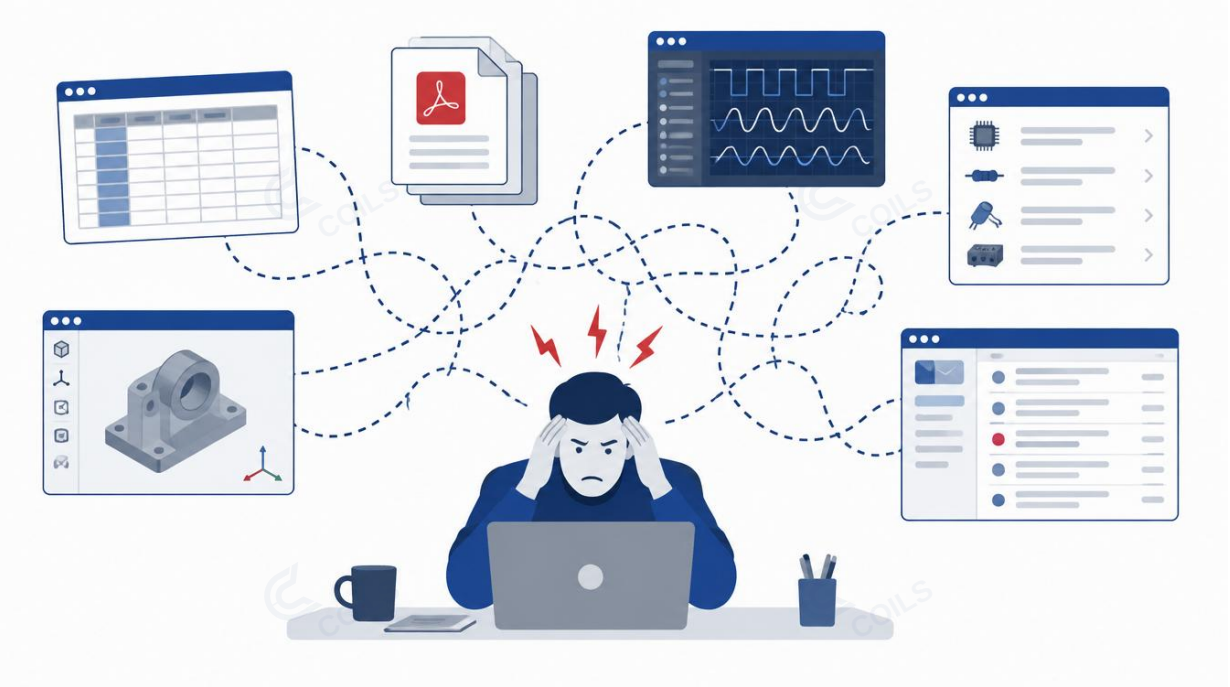
COILS
WIRELESS CHARGING SYSTEM

Service overview · 2026

PROBLEM

Power electronics design still means stitching six tools together by hand

Math in Excel, parts in catalogs, checks in SPICE, shapes in CAD, builds by email — people copy data between them



Math	Topology equations in Excel or by hand — mistakes go unnoticed
Parts	Hunting MOSFETs, cores and capacitors across dozens of datasheets
Verify	Redraw the circuit in SPICE just to check the numbers
Shape	Model inductors and transformers separately in CAD
Build	Search for someone to build it — rationale sent as email attachments

SOLUTION

ElecHub connects those six steps in one screen, one flow

One-line spec > recommendation > calculation > real parts > verification > 3D · reports > expert build





ElecHub home — describe the power supply you want in a sentence and the design begins

13

design tools (system · part · calculator · search)

< 5 ms

deterministic engine compute time

Live

Digi-Key stock and pricing

Source: ElecHub Lab (run 2026-10-01) · compute time as stated on the ElecHub landing page · UI shown in Korean

COVERAGE

Not just wireless charging: every area of power electronics, the same way

DC-DC · AC-DC/PFC · battery/BMS · motor inverters · WPT · LED · EMI filters · PCB/thermal · magnetics · antennas



Tool list — system / component design / calculators / parts / design modes

Source: ElecHub Lab tool menu and code registry (2026-10-01) · battery/motor are BETA

System design

DC-DC (7 topologies: Buck, Boost, Buck-Boost, Flyback, Forward, LLC, Full-Bridge) · AC-DC/PFC (5 types) · WPT (4 topologies) · battery packs (6 chemistries) · motor drives · circuit editor

Component design

Capacitor banks (real-part combos) · inductors (733-core sweep) · transformers (Kg method) · 3D design

Calculators (no login)

WPT compensation · antennas (dipole, patch, PCB IFA, NFC loop, helix)

Design modes

LED constant-current drivers · EMI filters (CISPR) · PCB trace width / heatsinks (IPC-2221)

Enter specs: topologies are scored by rules, then you walk through stages S0–S8

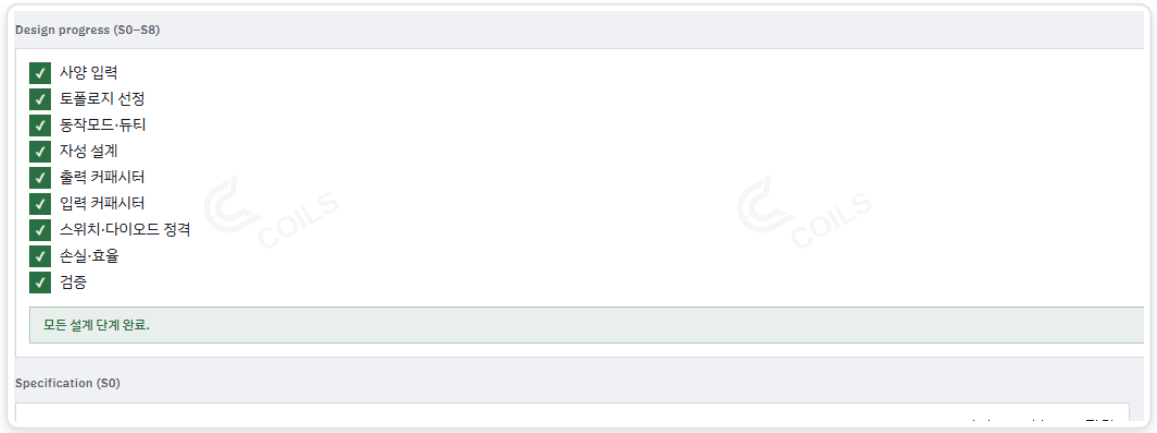
Example: 48 V > 12 V, 10 A auxiliary supply for a service robot (non-isolated, 200 kHz, 95% efficiency)



① Spec input form



② Rule-based score — Buck 80



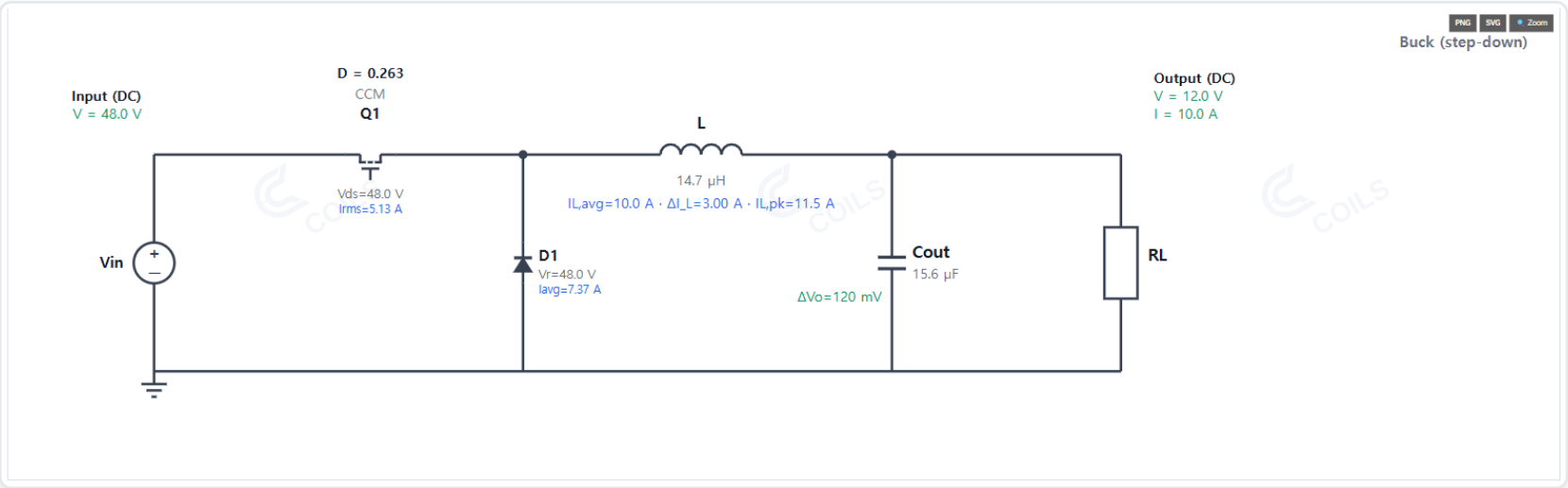
③ Design stages S0–S8 — review and approve each

Topology scores come from rules, not AI guesswork. The designer approves every stage, so the AI never reaches conclusions on its own.

Source: ElecHub Lab DC-DC converter session (2026-10-01) · UI shown in Korean

Results come out as an annotated schematic and a per-part design guide

Duty 0.263 · L 14.7 µH · peak 11.5 A · Cout 15.6 µF — the engine calculates, the AI only explains



Auto-generated schematic — values, voltages and currents; PNG/SVG export



Source: ElecHub Lab DC-DC session — schematic, part design guide (ratings, EMI filter, heatsink) (2026-10-01)

Buck 컨버터 계산 결과입니다 (Vin=48V, Vo=12V, Io=10A, r=0.3, fsw=200kHz 기준):

동작 모드: CCM (연속전도모드) — 임계전류 IoCrit=1.5A < 부하전류 10A이므로 안정적인 CCM 동작

듀티비 D ≈ 0.263 (12V/48V 비율에 손실 보정 반영)

인덕터 L ≈ 14.7 µH

- 리플전류 ΔIL = 3.00 A (= 10A × 0.3)
- 피크전류 ILpk = 11.5 A
- 평균전류 ILavg = 10.0 A → 인덕터 포화전류 정격은 최소 11.5A 이상, 여유 포함 15A급 권장

출력 커패시터 Cout ≈ 15.6 µF (ΔVo=0.12V, r=0.3 조건 기준 최소 용량 — 실제로는 ESR 영향 고려해 더 큰 값/세라믹 병렬 권장)

스위치(상단 FET)

- Vds 정격 ≥ 48 V (여유 포함 60≈80V급 권장)
- Irms ≈ 5.13 A

다이오드/하단 스위치(동기정류 시)

- Vr ≥ 48 V
- Iavg ≈ 7.37 A

다음으로 손실/효율(S7) 검토나 부품 정수(스위치 FET 선정, 커패시터 ESR 영향) 쪽으로 더 들어가 볼까요, 아니면 다른 조건을 바꿔보시겠어요?

AI explanation (quotes engine values)

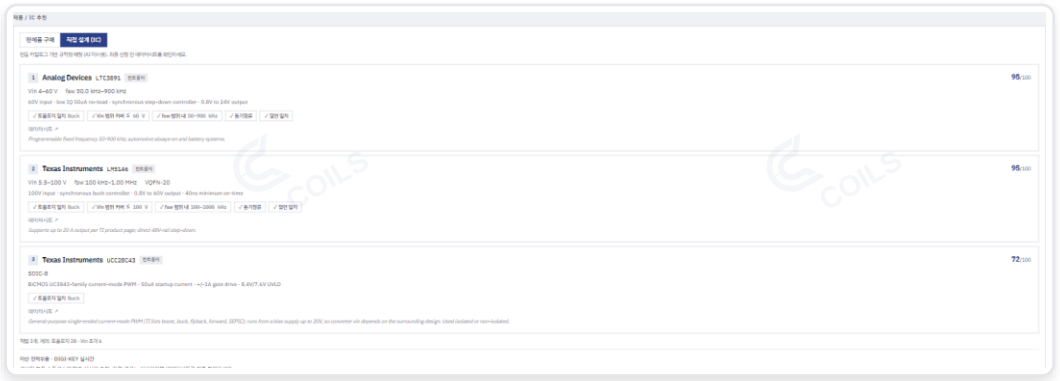
PARTS · BOM

Designs end with parts you can order today, not ideal components

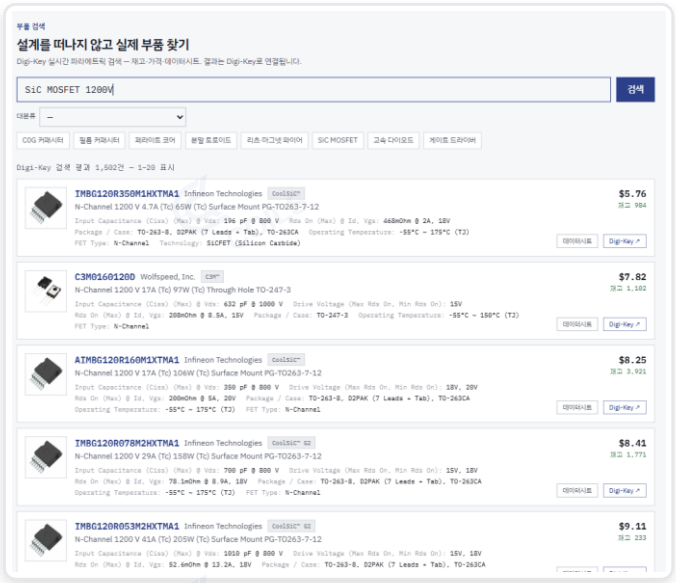
Buy a ready-made module · Build with a controller IC · live Digi-Key search for individual parts



Buy — module recommendations (load ratio, input range, efficiency fit)



Build — controller IC recommendations (ADI LTC3891, TI LM5146 ···)



Part search — Digi-Key stock, price, datasheet

System design > ratings > ranked candidates (margin, Rds(on), ESR, stock, price; obsolete penalized) > BOM CSV in one click

733
powder cores in catalog

1,491
capacitors (real parts)

104
DC-DC modules

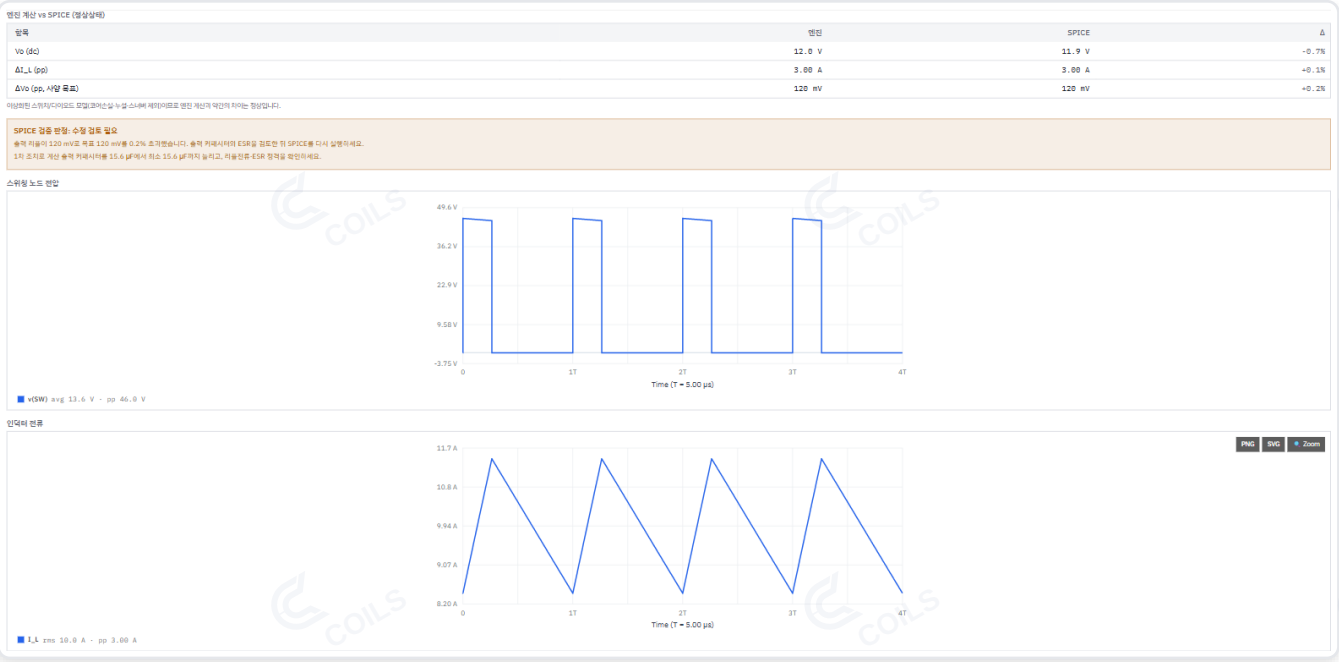
44
controller / gate ICs

Source: ElecHub Lab screens · catalog counts from the ElecHub codebase (2026-10-01)

VERIFY

In-browser SPICE checks the calculation right away

ngspice time-domain simulation with no install — engine and SPICE values side by side, with a verdict on the gap



Engine vs SPICE — Vo −0.7 % · ΔI_L +0.1 % · ΔVo +0.2 %, switch-node and inductor-current waveforms



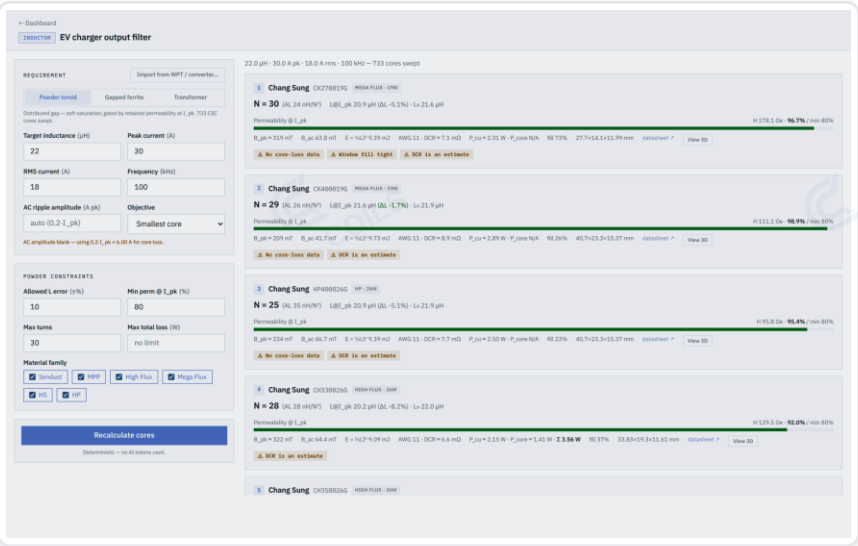
Circuit editor — schematic + SPICE + AI copilot, LTspice export

- Automatic verdict: if ripple exceeds the target, it flags “review needed” and suggests a fix
- Circuit editor: drop in converter/WPT blocks > run immediately
- LTspice .asc import/export, SPICE .cir, PNG/SVG

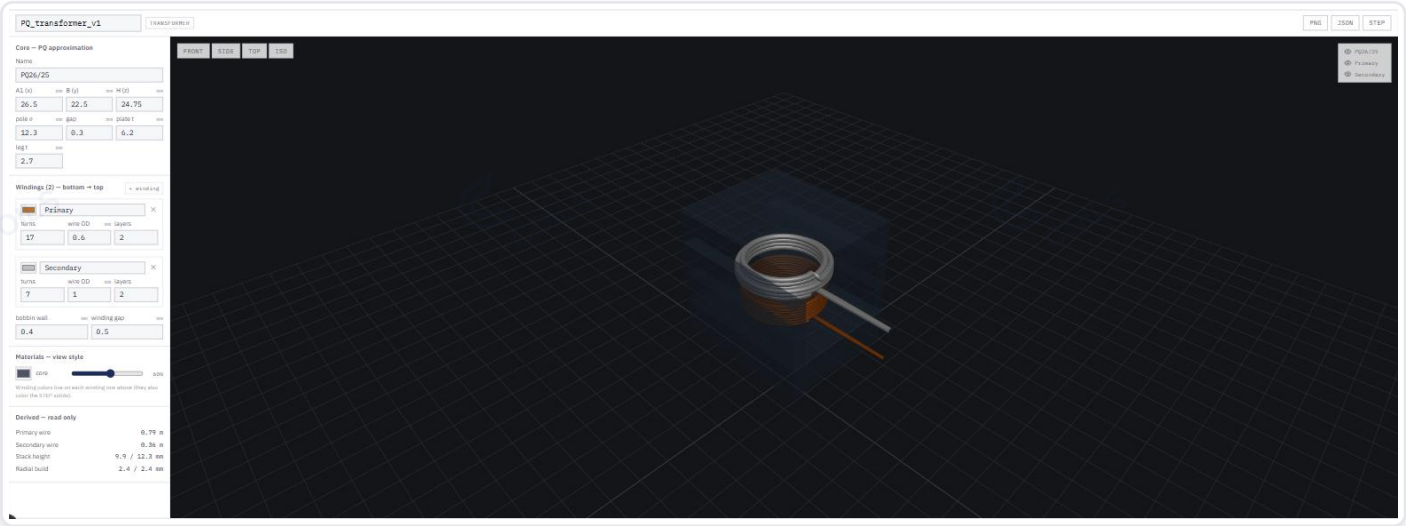
Source: ElecHub Lab DC-DC session SPICE run (2026-10-01) · circuit editor image from ElecHub product material

Magnetics are designed on real cores, with 3D shapes and STEP files

Inductor from system design > core sweep > 3D model > STEP and drawings, one click at a time



Inductor design — 733-core sweep ranked by turns, saturation, loss



3D design — parametric transformer (PQ26/25, primary 17T · secondary 7T)



STEP

straight into CAD (B-rep)

PDF

spec sheet + dimensioned drawing

SVG·PNG

drawings and images

JSON

reusable parameters

Source: ElecHub Lab 3D design (2026-10-01) · inductor image from ElecHub product material

EXPERT NETWORK

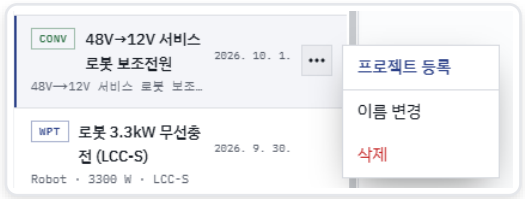
We connect you with experts so your design actually gets built

Get help at any design stage · when done, register the design as a project > matching > escrow





ElecHub project registration — outsourcing, consulting, seminars



Design session menu > "Register project"



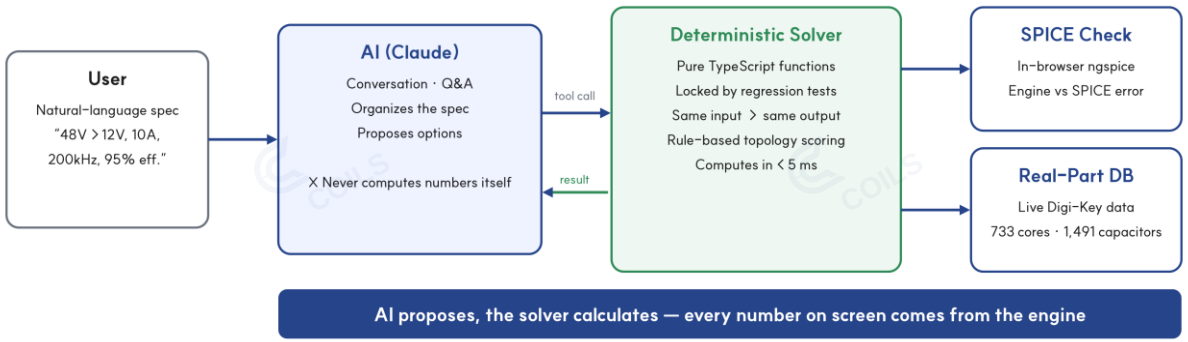


- Specs and verification results are copied into the project draft — no rewriting requirements
- Escrow payments through the platform; review deliverables and chat on the project page
- Community: Q&A and shared design cases

Source: ElecHub main site project/community pages, ElecHub Lab session menu (2026-10-01)

Why not just ask ChatGPT or Claude?

General AI produces plausible sentences; ElecHub produces reproducible numbers and real parts



The AI handles conversation, explanation and suggestions; every calculation is done by a verified solver. The same specs give the same result tomorrow.

- AI model choice: Claude Opus 5 · Sonnet 5 · Haiku 4.5
- Engine, SPICE and part DB run independently of AI tokens
- The tool enforces the design sequence (S0–S8), so no step is skipped

	General AI chatbot	ElecHub
Numbers	Generated by the language model inside text	Deterministic engine locked by regression tests — same input, same value
Verification	Up to the user	Cross-checked with in-browser ngspice, error shown
Parts	Check part numbers and stock yourself	Live Digi-Key stock and price, obsolete parts penalized
Outputs	Text answers	Schematic · BOM CSV · STEP · LTspice · report
Continuity	Context must be rebuilt after the chat	Saved as a project; system and part designs linked
Build	—	Register project > expert matching · escrow

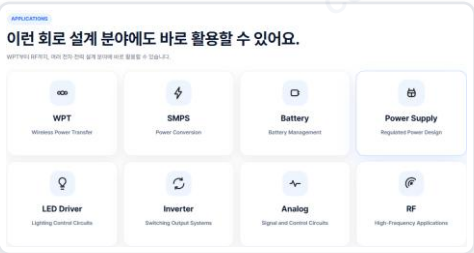
Source: ElecHub architecture (deterministic engine, tool calling, ngspice-wasm, Digi-Key V4) · general AI column reflects typical usage

FOR WHOM

Who should use it, and when?

From first-time designers to teams that need fast reviews and companies looking for builders





Applications: WPT · SMPS · Battery · Power Supply · LED Driver · Inverter · Analog · RF

Source: ElecHub main site applications page (2026-10-01)

Startup and SME hardware teams

With a single power engineer — early design and part selection in an hour, not a day

Students and junior engineers

Learn by following the design sequence — rationale and warnings at every stage

Experienced engineers

Faster reviews — topology, core and part alternatives in seconds

Companies outsourcing design

Brief experts precisely with a project that carries specs and verification results

ElecHub

Start designing for free

Sign up at elechub.ai — your first design in 30 seconds

Free

Free

Try the tools · basic storage

Design engine · calculators · part search

Pro

₩19,900 / month

For regular personal design work

More storage · more AI usage · advanced

Expert

₩59,900 / month

For several projects at once

Max storage · max AI usage · priority support

See the elechub.ai pricing page for detailed limits · VAT excluded

Power electronics design in one place — all the way to build.

COILS WIRELESS CHARGING SYSTEM