IP · BRAND · RISK · REFERENCE DOCUMENT · PUBLIC

IP protection for hardware

Reference for IP strategy in hardware projects — what is and is not protectable, filing costs and timelines, what NDAs actually achieve, contractual clauses that matter, and freedom-to-operate analysis.

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ABSTRACT

Hardware IP protection is a stack of distinct rights: trademarks, design rights, utility patents, copyright on artwork and code, and trade-secret protection of know-how. Each has a different scope, cost, registration timeline, and enforcement profile.

The common error is over-reliance on NDAs (which raise the cost of disclosure but rarely prevent it) and under-investment in trademark registration (the cheapest and most defensible protection for most consumer hardware).

IP RIGHTS STACK — COST vs. SCOPE

PROTECTION TYPE	COVERS	COST/MARKET	TIME	TERM
Trademark FASTEST · CHEAPEST	Name, logo, slogan	$100–500 / market	3–6 mo	**10 yr × ∞**
Design rights MID	Visual appearance	$1.5k–4k / market	6–12 mo	**15–25 yr**
Utility patent SLOW · EXPENSIVE	Novel mechanism	$10k–25k+ / market		**20 yr**
Trade secret CONTRACTUAL	Process know-how, code	Cost of secrecy	N/A	**As long as kept**

RULE OF THUMB — File trademark first. Add design right if appearance is distinctive. Patent only if a real invention exists.

IP RIGHTS STACK RANKED BY COST AND TIMELINE. TRADEMARK IS FASTEST AND CHEAPEST; UTILITY PATENTS ARE SLOWEST AND MOST EXPENSIVE.

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1. What IP exists in hardware

IP is not one thing. It's a stack of separate rights, each with its own scope and enforcement path.

1.1 Asset categories

Brand + product names	Trademarks (fast, cheap, long-lived); the cornerstone protection for consumer hardware
Logos + artwork	Trademarks + copyright; protected on packaging and product
Industrial design (look)	Design patents (US) or registered designs (EU/UK/JP/CN); novel ornamental appearance
Technical inventions (how)	Utility patents; novel and non-obvious functional improvement
Mechanical drawings + CAD	Copyright default (weak in court); treat as trade secret with NDA + access control
Firmware + source code	Copyright by default; critical for software-defined hardware
Marketing materials	Copyright on layouts, photographs, copy
Customer + supplier lists	Trade secret only; contractual confidentiality required
Process know-how	Trade secret; no formal registration

1.2 Protect where you sell

- **A US trademark does not protect you in the EU. A China utility model is not enforceable in Vietnam.**
- **File in your top three target markets first. Add countries when revenue justifies.**
- **China-specific**
  Bad-actor trademark squatters file other companies' brands in China to extract licensing fees. Register early in China even if you don't manufacture there.

> TIP — FILE TRADEMARK FIRST
>
> The trademark is the cheapest, fastest, most defensible protection for most consumer hardware. File before launch — including in China and the top 5–10 target markets.
>
> Add design rights only if appearance is distinctive (the ear cup of a headphone, the specific corner radius of a phone, the distinctive switch shape). Add a patent only if a real invention exists and revenue can support enforcement.

2. Protection types

Each registration type has a different cost, timeline, and scope. Match the right tool to what you're trying to protect.

2.1 Comparison

TYPE	DIY COST / MARKET	ATTORNEY COST / MARKET	TIMELINE	TERM	BEST FOR
Trademark (word)	$250–500	$1 000–2 500	3–6 mo	10 yr renewable	Brand names
Trademark (logo)	$250–500	$1 000–3 000	3–6 mo	10 yr renewable	Logos
Design patent (US)	$500–1 500	$2 000–4 000	6–12 mo	15 yr	Distinctive look
Registered design (EU)	€350	€1 000–2 500	6–12 mo	25 yr (5 + renewals)	Appearance, fast
Registered design (CN)	$400–800	$1 500–3 000	6–9 mo	15 yr	China protection
Utility patent (US)	$5 000+	$10 000–25 000+	2–5 yr	20 yr	Novel mechanism
Utility patent (EP, validated 5 countries)	$15 000+	$25 000–50 000	3–6 yr	20 yr	High-value invention
Utility model (CN, JP, DE)	$500–2 000	$1 500–4 000	6–12 mo	6–10 yr	Faster patent-like protection
Trade secret	Cost of secrecy	Cost of secrecy	N/A	As long as kept	Process know-how

2.2 Trademark filing process

1. **Trademark search** — USPTO TESS (free), EUIPO eSearch (free), WIPO Global Brand Database (free). 1–2 hours DIY. 2. **Application** — USPTO TEAS Plus ($250/class), EUIPO (€850/class for 1 class + €50 for 2nd + €150 for each additional). 30 min DIY. 3. **Examination** — 3–4 months for first action. Office action possible (refusal for similarity, descriptiveness). 4. **Publication for opposition** — 30 days (US), 3 months (EU). Existing trademark owners can oppose. 5. **Registration** — If no opposition or all overcome, certificate issues. 6. **Renewal** — 10 years from registration; renewable indefinitely with use.

2.3 International filing via Madrid Protocol

A single application can cover 130+ countries through WIPO.

- **Base application in your home country (required)**
  Apply for trademark domestically first.
- **International application**
  Submit to WIPO listing target countries. Cost: ~$300 base fee + ~$80–500 per country (varies).
- **National examination**
  Each country examines per its rules; can refuse.
- **Best for**
  Filing in 3+ countries at once. Below 3 countries, direct national filings are usually cheaper.

2.4 Patent search tools

TOOL	COST	COVERAGE	NOTES
Google Patents (patents.google.com)	Free	Global	Best free search; full text
USPTO Patent Public Search	Free	US	Authoritative US
Espacenet (worldwide.espacenet.com)	Free	Global	EPO interface
WIPO PatentScope	Free	Global PCT applications	Pre-publication searches
Lens.org	Free	Global	Academic-friendly
Derwent Innovation	$$$$	Global	Professional search tool
Patbase	$$$$	Global	Professional analysis
Patent attorney FTO opinion	$1 500–10 000	Targeted	Legal opinion, defensible in court

3. NDAs and supplier risk

Most founders over-rely on NDAs and under-invest in contractual structure. Both are useful; neither replaces the other.

3.1 What an NDA actually achieves

Does

- **Raises cost of disclosure**
- **Provides legal standing if breach is provable**
- **Slows casual copying**
- **Signals seriousness to the counterparty**
- **Creates obligation that survives bankruptcy (sometimes)**

Does NOT

- **Block ideas already known to the counterparty**
- **Stop a sub-supplier the original hires**
- **Cost-effectively enforce in foreign courts**
- **Survive certain bankruptcy scenarios**
- **Cover information the supplier developed independently**

3.2 NDA template structure

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1. Confidential Information defined - All technical documents, drawings, specs, firmware, BoM - Excludes: public information, prior knowledge, independent dev 2. Permitted use - Strictly for the purpose stated in the agreement - No transfer to third parties without written approval 3. Term - Confidentiality survives 3-5 years post-termination 4. Return / destruction of materials - Upon termination, return or certify destruction 5. Remedies - Liquidated damages clause (e.g. $50k per breach) - Injunctive relief specified 6. Governing law + jurisdiction - Choose neutral (Hong Kong, Singapore for cross-border) 7. Subsidiaries + sub-suppliers - Bind sub-contractors to equivalent terms
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3.3 Supplier IP risk: lower than founders fear

- **Most factories don't want your specific design**
  They want repeat orders. A copy of your product, sold under their own brand, breaks the repeat-order relationship.
- **Exceptions**
  Pure trading companies (not real factories), factories whose existing product range overlaps yours significantly, factories that have already done the work for a copycat.
- **Mitigation**
  Manufacture critical IP-bearing parts (firmware, custom IC, distinctive mechanical) at a different vendor from the assembly site. Distribute supply.

3.4 Supplier contracts that matter more than NDAs

CLAUSE	WHAT IT COVERS
Tooling ownership	Mold belongs to buyer, not factory; physical possession + access rights
IP ownership	All designs, drawings, firmware, brand stay with buyer
Non-compete on derivatives	Factory cannot make variants for other clients for X years (typically 2-3)
Exclusivity (where leverage exists)	Factory cannot make exactly this product for other clients
Right to inspect	On-site visits, production records, sub-supplier audits
Penalty clauses	Liquidated damages for IP breach (typically 5–10× order value)
Subsidiary binding	All subsidiaries and sub-suppliers bound by same terms

WATCH OUT — AMAZON COPYCATS

Copying happens, but it usually comes from e-commerce sellers who scrape Amazon, not from your factory. IP defence budget is often better spent on: - Amazon Brand Registry ($50/yr per registered brand) - Active monitoring of competitor listings - Fast iteration to outpace copycats - Trademark enforcement on imitation marks

These together cost less than one utility patent and prevent more lost revenue.

4. Freedom to operate (FTO)

The reverse risk: importing a product that infringes a patent or trademark someone else holds. Real liability — customs can seize shipments, distributors can drop the product, patent holder can sue.

4.1 Before tooling — basic search

- **Patent search**
  Google Patents (free), USPTO, Espacenet. Filter by classification + keywords.
- **Design search**
  Same databases, filter by registered designs.
- **Trademark search**
  USPTO TESS, EUIPO eSearch.
- **Marketplace search**
  Amazon, Etsy, AliExpress, Walmart. Check for active brand registry.
- **Cost**
  Free (DIY) to $500–1 500 (professional FTO opinion).

4.2 Reading a search hit

- **Patent age**
  Patents older than 20 years from filing have expired. Recent patents (under 5 yr) highest risk.
- **Geographic scope**
  A US patent is only enforceable in the US. Check coverage in your target markets.
- **Claim scope**
  A patent's **claims** define what's protected, not the drawings or abstract. Read carefully.
- **Owner status**
  Active company vs. defunct vs. patent troll. Trolls are more litigious; defunct may not enforce.
- **Family members**
  Check WIPO PatentScope for international family. A US-only patent + EU equivalent could double the exposure.

4.3 Options if conflict found

OPTION	WHEN BEST	COST
Read claims with attorney	"Looks similar" may not actually infringe	$500–2 500 opinion
Design around	Cheaper than license; change one claim element	Engineering effort
License	If holder is reasonable; royalty 2–8 % typical	License fee + royalty
Patent invalidity challenge	If patent is weak	$10 000–100 000+
Walk away	Small product, big risk	$0

4.4 Common FTO myths

- **Myth: "A patent search is enough to clear the design."**
  A search finds existing patents; an FTO opinion analyzes whether your specific design infringes the claims.
- **Myth: "Provisional patent applications protect publicly."**
  Provisionals are not published unless converted to full applications.
- **Myth: "Marking 'Patent Pending' deters competitors."**
  It does, but only if you actually have a filed application.

- **Myth: "Trade dress is automatic."**
  Trade dress (e.g., the iPhone shape) requires market recognition + secondary meaning before enforceable.

5. IP strategy by stage

Match IP filings to the stage of the product.

STAGE	WHAT TO FILE	COST (USD)
Pre-launch	Trademark (word + logo) in top markets; design rights if distinctive look	$3 000–10 000
Post-launch (year 1)	Utility patents on novel inventions if revenue justifies	$20 000–50 000
Year 2-3	Trademark in additional markets; design rights in additional markets	$5 000–15 000
Year 4+	Patent prosecution / continuation; licensing program; enforcement	$50 000+

5.1 Budget benchmarks for a typical consumer hardware company

- **Year 1 (pre-launch + early sales): $5 000–15 000 for trademarks + design registrations**
- **Year 2-3 (growth): $15 000–50 000 for additional filings, possibly first patent**
- **Year 4+ (scaled product): $50 000+ for portfolio building, defensive patents, enforcement**

> FINAL NOTE. 80 % of IP defence in hardware is "register the trademark, write the contracts, ship faster than the copycats." Patents are tier-1 protection; tier-1 problems are not what kill most early hardware products. Get the trademark filed this month.