



CASE STUDIES

Case Study: QI™ Plug-and-Play Electrical Architecture, General Inventions, LLC

An Investor Readiness collaboration: the commercialization strategy, operational scale-up roadmap, and investor-diligence package that carry a patent-protected plug-and-play electrical system from validated prototype toward commercial market entry.

This is a named Investor Readiness collaboration in which Garrett Partridge LLC serves as the commercialization and operations architect for General Inventions, LLC, the inventor of QI™ (Quick Install), a patent-protected, plug-and-play electrical system covered by U.S. Utility Patent 10,326,263 B2. QI replaces manual, hand-wired installation with a direct-connect architecture across three patented core components, the gang box, the breaker, and the breaker panel, converting a slow, skill-intensive process into a fast mechanical assembly, the shift PEX brought to plumbing. In prototype testing and the company's internal modeling, QI is engineered to install components 8 to 10 times faster, take a breaker-panel install from 8 to 10 hours to roughly one hour, cut total jobsite electrical labor by about half, and reduce copper use by up to 40 percent. General Inventions had a patented, prototype-proven invention; what it did not yet have was the operation and the diligence case an investor pressure-tests before funding a hardware scale-up. Garrett Partridge LLC built that: the commercialization strategy, the operational scale-up roadmap, and the investor-diligence package that carry QI from a proven prototype toward a certified, manufacturable, fundable product. It is the same prototype-to-scale operations work Garrett runs for defense-hardware founders, pointed here at an electrical system.

The collaboration, and the gap it closed

General Inventions, LLC, the company of inventor Thomas E. S. Haskins, holds something rare in the electrical trade: a granted utility patent on a genuinely different way to wire a building. Its QI™ system, Quick Install, turns the century-old ritual of stripping, routing, and hand-terminating conductors into a direct-connect, plug-and-play assembly. The invention is real, it is protected, and its prototypes work.

That is exactly the position where good hardware companies stall. An investor can see the product. What they cannot see, and what they diligence hardest, is the operation that turns a working prototype into a certified, manufacturable product at volume. Can you build this repeatedly, to code, at a cost that holds, through a certification gate, into a market defended by entrenched incumbents? A patent does not answer that question. An operation does.

Garrett Partridge LLC entered as the commercialization and operations architect to close that gap. The work was not to improve the invention. It was to build the three things a hardware scale-up is funded and judged on: a commercialization strategy that routes around the incumbents, an operational scale-up roadmap anchored on the certification path, and an investor-diligence package that answers the volume question before it is asked. This is the Investor Readiness engagement, and the hardware in front of it happens to be electrical rather than a defense sensor. The operation is the same.

Pre-market engagement. QI is at working-prototype stage with UL certification as the primary remaining gate. The performance figures in this study are from prototype testing and the company's internal modeling, not field results from a certified, shipping product.

The challenge: a century-old install process in a \$270B+ industry

For more than a hundred years, electrical installation has barely changed: strip the wire, route it by hand, terminate it, and repeat that hundreds or thousands of times per building. It is one of the last major construction trades still run on manual craft, and the economics of that craft are under strain.

The pressure is concrete. Skilled electricians are in short supply and the shortage is worsening. Copper is expensive and manual routing wastes it. Codes grow more complex. And a single breaker panel can absorb 8 to 10 hours of a licensed electrician's time before a device is ever installed. Those hours land on a construction schedule that developers are under pressure to compress, so slow electrical work delays revenue on the whole project.

This plays out inside a roughly \$270 to \$280 billion U.S. electrical construction and supply industry, per General Inventions' market analysis and consistent with independent estimates for U.S. electrical contracting. A large, slow, labor-bound market carrying three cost centers at once, labor, time, and materials, addressed so far by tools that chip at the edges. That gap between the size of the market and the age of the method is what makes it a candidate for a structural change rather than another incremental product.

The solution: a patent-protected plug-and-play architecture

QI™ replaces internal wiring complexity with a direct-connect architecture across three patented core components, so the installer seats parts together instead of building each connection by hand.

The gang box terminates wiring at the box rather than the device, so outlets and switches seat directly with no exposed conductors. This is the largest and least popular share of jobsite electrical work, and it is where the biggest labor reduction is projected to land. The breaker accepts hot, neutral, and ground directly, eliminating internal panel routing and reducing wiring to a single insertion step. The breaker panel relocates its buses beneath the breakers so each breaker connects directly to all buses, turning the whole panel into a pre-routed, modular assembly.

All three are protected under a single granted U.S. utility patent, 10,326,263 B2, and the company holds a system-level IP position extending across more than 20 additional filings on the same plug-and-play principle. The defensibility is not in any one device. It sits in the interdependent system design, which is what creates ecosystem lock-in once a builder adopts one component. The clearest analogy is PEX in plumbing: not a better pipe, but a different, faster, mechanical way to assemble the whole system.

The moat is the system, not the part. A granted utility patent covers all three cores, and once one QI component is adopted on a jobsite, the rest integrate as one architecture rather than competing part by part.

The operational impact

QI is designed to attack labor, time, and materials at once, which is the combination that makes adoption an economic decision rather than a preference. Contractors would complete more jobs per month at higher margin, and builders would realize revenue sooner because electrical work stops gating the schedule. The figures below are QI's prototype-tested and internally modeled performance targets, stated as such. They are not field results from a certified, shipping product.

- 8 to 10 times faster component installation across the system.
- Breaker-panel install projected from 8 to 10 hours down to roughly one hour.
- About a 50 percent reduction in total jobsite electrical labor across a full build.
- Up to an 80 percent reduction in the outlet and switch wiring that dominates jobsite hours.
- Up to a 40 percent reduction in copper use, because eliminated routing eliminates waste.
- Safer, more standardized installs: fewer exposed conductors, lower error rates, easier inspection.

When the faster method is also the cheaper and safer one, the contractor and the builder each choose it for their own reasons. That is the difference between a product people might try and one the economics pull into use.

The value add: strategy, scale-up roadmap, and a diligence package

Garrett Partridge LLC built the operational and commercial case around the invention. Three deliverables, each aimed at a specific thing an investor or a market will test. Each one exists as a concrete artifact today; they are what this engagement produced.

- Commercialization strategy. A traditional entry, retail to distributor to contractor, hands the incumbents a veto over a challenger. The strategy is demand-first instead: prove the speed and cost advantage directly with builders and developers, create pull at the jobsite level, and let distribution follow the demand rather than gate it. It is the path that let PEX route around the incumbent supply chain in plumbing, adapted to how buildings get electrified.
- Operational scale-up roadmap. The sequence that carries QI from working prototype to a certified, manufacturable product. UL certification is named as the primary gating milestone, with a realistic path to a fully certified market launch and simpler product lines able to launch earlier on shorter certification paths. The roadmap orders the certification path, the tooling and manufacturing setup, and the ecosystem rollout across the product lines, so capital is spent against milestones rather than all at once.

- Investor-diligence package. The operational data room a technical investor asks for and most hardware startups cannot produce: the prototype-to-production plan, the unit and cost assumptions, the IP-defensibility map read at the system level rather than device by device, the certification and go-to-market gates, and an honest readiness assessment of what still has to be built before the round opens. It answers the question that sinks hardware raises, can you actually build this at volume, with a plan a technical investor can pressure-test.

The invention proves the product can work. The operation proves the company can build it. Garrett Partridge LLC was brought in to build the second one, so the first could be funded.

What this collaboration changes, in practice

Read the three deliverables as one system and the logic is clear. The commercialization strategy defines the market path. The scale-up roadmap makes that path executable against a certification gate. The diligence package makes it fundable. Together they turn a patented invention into an operation an investor can underwrite and a builder can adopt.

The engagement is pre-market. QI is at working-prototype stage, reviewed favorably by electricians, engineers, and builders, with UL certification as the primary remaining gate before a certified commercial launch. Among those who have evaluated it is Suffolk Construction, one of the largest builders in the United States, which reviewed the system and expressed interest. The performance figures here are prototype and internal-modeling targets, framed as such, and this study will be updated as the product clears certification and reaches the field. What already exists is the operator's work: the strategy, the roadmap, and the diligence package are concrete deliverables, not projections.

This is the operator's contribution to a hard-tech company, and it does not depend on the hardware being electrical. The same prototype-to-scale operation and diligence case apply whether the product is a defense sensor onshoring into New England or a plug-and-play electrical system. The engagement model behind it is Investor Readiness, and the method behind every engagement is Standard Work 2.0™.

FREQUENTLY ASKED

What did Garrett Partridge LLC actually do for General Inventions?

Built the operation and the diligence case around a validated invention. The work was the commercialization strategy, a demand-first go-to-market that routes around entrenched electrical-supply incumbents; the operational scale-up roadmap, the sequence from working prototype to a certified, manufacturable product anchored on the UL-certification gate; and the investor-diligence package, the prototype-to-production plan, cost and unit assumptions, IP-defensibility map, and honest readiness read that a technical investor diligences before funding a hardware raise. The invention was already the client's. The operation that scales it is what this engagement built.

What is the QI plug-and-play electrical system?

QI™ (Quick Install), from General Inventions, LLC, is a patent-protected, plug-and-play electrical system covered by U.S. Utility Patent 10,326,263 B2. It replaces manual, hand-wired installation with a direct-connect architecture across three patented core components: a gang box that terminates wiring at the box, a breaker that accepts hot, neutral, and ground directly, and a breaker panel with buses pre-routed beneath the breakers. Devices and conductors seat together instead of being wired by hand, the same mechanical shift PEX brought to plumbing.

How much faster is installation, and how solid are these numbers?

In prototype testing and General Inventions' internal modeling, QI is engineered to install components 8 to 10 times faster, take a breaker-panel install from 8 to 10 hours to roughly one hour, cut total jobsite electrical labor by about half, and reduce copper use by up to 40 percent. These are prototype and modeled targets, stated as such: QI is pre-market, with UL certification as the primary remaining gate. They are not field results from a certified, shipping product, and this study will be restated as the product reaches the field.

Why does a hardware inventor need an operations architect and an investor-diligence package?

Because a patent proves the product can work, and an investor funds the company that can build it. Technical investors diligence the operation hardest: the prototype-to-production plan, the cost curve, the certification path, the supply and capacity assumptions, and the honest read on what still has to be built. Most hardware startups can show the product and cannot produce that operational data room. Building it, before the raise opens, is what turns a validated invention into a fundable company, and it is the Investor Readiness engagement this collaboration ran under. It is the same work whether the hardware is an electrical system or a defense sensor.

Is QI on the market yet?

Not yet. QI is at working-prototype stage, with a fully functional breaker-panel prototype and beta prototypes of the breaker and gang box, reviewed favorably by electricians, engineers, and builders, including Suffolk Construction, which evaluated the system and expressed interest. UL certification is the primary remaining gate before a certified commercial launch, with simpler product lines able to launch earlier on shorter certification paths. The commercialization strategy, scale-up roadmap, and diligence package described here are built to carry it through that gate and into the market.

Sources

1. U.S. Patent 10,326,263 B2, the granted utility patent covering the QI gang box, breaker, and breaker panel (Google Patents)
<https://patents.google.com/patent/US10326263B2/en>
 2. Arizton, U.S. Electrical Contractors Market, an independent estimate of the U.S. electrical construction market size
<https://www.arizton.com/market-reports/us-electrical-contractors-market>
 3. Standard Work 2.0, the operating method behind every engagement
[/method](#)
 4. Investor Readiness, the engagement model this collaboration ran under
[/engagements/investor-readiness](#)
 5. Case Study: Standard Work 2.0™ at a Defense ATE Contract Manufacturer
[/resources/case-study-standard-work-defense-test-systems](#)
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