

S3SUITE / PROCESS WORKFLOW

Shape. Scale. *Sustain.*

The end-to-end process flow for running a hardware product through S3Suite.
Phase by phase. Step by step. From first login to firmware in the field.

A RND Square Process Reference

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s3suite.rndsquare.com / hello@rndsquare.com

Read this first

S3Suite organises work into three suites that match the S3 framework. Shape, Scale, Sustain. Engineering, Manufacturing, Operations. Each phase has clear steps, clear gates, and a clear handoff to the next.

The three suites:

Framework	S3Suite area	What you do here
Shape	Engineering Suite	Design the product. Docs, schematics, firmware, BOM, mechanical, tests.
Scale	Manufacturing Suite	Produce the product. Variants, lots, devices, vendor handoff, station testing.
Sustain	Operations Suite	Run the product in the field. Warranty, RMA, OTA updates, support, knowledge base.

The phases below are how a real project moves through S3Suite. Do them in this order. The gates between phases exist for a reason. Skipping a gate is how teams end up with files in three places and devices in the field running unknown firmware.

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Closing From idea to reality

PHASE 00

Set Up the Project

Do this once per product. Before any design work begins.

Step 0.1 Create the organization

Sign up to S3Suite. Create your organization (your company workspace). Every user, project, and setting lives under it.

Step 0.2 Create the project

- From the dashboard, click New Project.
- Give it a name and short description.
- Assign a Project Code. Uppercase, unique within your org. Customers will type this when they contact support; it routes their ticket to the right project.
- Enable the three suites: Engineering, Manufacturing, Operations.
- Create. You land on the Project Overview page.

Why the Project Code matters

Print the Project Code on product labels, packaging, and invoices. Customers entering it on the support widget auto-route their tickets to the right project. Without it, every ticket lands in the Unassigned Inbox.

Step 0.3 Invite the team with the right role

From Settings, Users, invite each teammate. Pick the role that matches their job. Roles determine which areas they can open.

Person	Role to assign
Founder, program manager, anyone needing full visibility	Org Admin
Hardware, firmware, mechanical engineers	Engineer
EMS coordinator, production lead, line manager	Production Manager
Support, warranty, RMA, customer success	Operations
Auditor, investor, executive observer	Viewer (read-only)

Step 0.4 Set the project file passkey

Open Project Settings, File Security. Set the project passkey. This is the secret required to download anything from the Manufacturing Vault. Share it with the manufacturing team for this project. Without it they cannot pull production files, by design.

Step 0.5 Create the Hardware Revision Control repos

From Engineering, Revision Control, click New Repo. Create one repo per discipline. Most projects end up with three to six:

- Schematic
- PCB (often combined with schematic if the EDA tool stores them together)
- Firmware
- Mechanical

For each repo, pick the tool stack: KiCad, Altium Designer, Autodesk Eagle or EasyEDA, Autodesk Fusion 360, SolidWorks, Mixed, or Other.

Tell every engineer to install the S3Suite desktop app (the web app browses history; committing and restoring need the desktop app). Each engineer links their local working directory to the relevant repo and commits daily with a meaningful message.

Step 0.6 Populate the Vendors directory

Before any file ever flows to a manufacturing partner, the vendors who will receive them need to exist in the system.

- Open Vendors (top-level, accessible to Org Admin, Engineer, and Production Manager roles).
- Click New Vendor for each manufacturing partner you work with.
- Set the vendor type: PCB manufacturer, assembly house, mechanical fabricator, packaging, etc.
- Add primary contact email, phone, and address.
- Mark approved vendors (these are the ones Send to Vendor will suggest by default).

Vendors are an org-level directory

Vendors are shared across all projects in the organization, not per-project. Set them up once. Maintain the list as suppliers change. The Send to Vendor flow in Phase 3 reads from this directory.

Step 0.7 Open the Risk Register

From Engineering, Risk Management, click New Risk for every risk you can name on day one. Component availability, certification timelines, EMS capacity, IP exposure, single-source parts. For each: severity (Low to Critical), likelihood (Rare to Almost Certain), owner, mitigation plan. Schedule a recurring 15-minute weekly risk review.

Phase 0 is finished when

The project exists. Team is invited with roles. File passkey is set. Repos are created and at least one commit lives in each. Vendors are in the directory. The Risk Register has its initial entries. You are ready to design.

PHASE 01

SHAPE: Run Engineering

This is where the product takes shape. You will iterate through these steps in parallel, but the sequence below is the order in which artifacts naturally become ready for review.

Step 1.1 Write the PRD

- Open Engineering, Documentation, Product Docs.
- Upload your PRD draft. Review Status: Draft.
- Circulate, gather comments, iterate.
- When the team is aligned, change Review Status to Reviewed & Approved. Set a version.

Step 1.2 Maintain the Feature Tracker

The PRD captures the original product vision. The Feature Tracker is the living document the engineering team maintains alongside it. Every feature, story, hardware requirement, firmware requirement, mechanical requirement, and production target lives here as a single source of truth that the team works against day to day.

- Open Engineering, Documentation, Product Docs.
- Create a new document titled Feature Tracker (or similar).
- Capture every feature with its description: what it is, why it exists, what completing it requires, which discipline owns it (hardware, firmware, mechanical, production).
- When a feature is added mid-project, add it to the Feature Tracker (not the PRD).
- When a feature is dropped, mark it in the Feature Tracker.
- Upload new revisions as Draft. When stable, mark Reviewed & Approved with a fresh version number.

PRD vs Feature Tracker

The PRD is what you set out to build. The Feature Tracker is what you are actually building today. The PRD changes rarely (and gets re-versioned when it does). The Feature Tracker changes weekly. Engineering works against the Feature Tracker. New features always land here first.

Step 1.3 Draft the user manual early

Before the schematic is finalised. The act of writing the manual exposes feature gaps and kills bad ideas before they get built. Treat it as a planning tool. Upload it under Product Docs.

Step 1.4 Design the hardware in Revision Control

- Engineer opens the desktop app, navigates to the relevant repo (schematic, PCB).
- Designs in their EDA tool against the linked local folder.
- At end of day, or at meaningful milestones, clicks Commit changes.
- Reviews the diff (added, modified, deleted, renamed files).
- Fills in message, optional ECO number, risk level, manufacturing impact.
- Commits. The platform deduplicates blobs so storage stays efficient.
- A second engineer reviews. Sets the commit Review Status to Internal Review, then Review Done when satisfied.

Step 1.5 Upload the schematic as a deliverable

- Once a commit is Review Done, export the schematic as a PDF or vendor-friendly format.
- Upload to Engineering, Hardware, Schematics. Review Status: Draft.
- After peer review, mark Reviewed & Approved.

Step 1.6 Build the BOM

- Open Engineering, BOM.
- Import from your EDA tool via CSV, or add components manually.
- For every critical line, add at least one alternative part.
- Mark lifecycle status. Flag end-of-life and single-sourced components.

- Add real prices, not placeholders.
- Have a second engineer review. Mark Reviewed & Approved.

BOM health is mandatory

A BOM without alternatives, without lifecycle flags, without real prices will show as unhealthy. Manufacturing should not begin from an unhealthy BOM. Get it green before Phase 2.

Step 1.7 Build firmware

- Firmware sources live in a Revision Control repo. Commit daily with meaningful messages.
- Build a binary. Upload it to Engineering, Firmware with a version number, release notes, known issues.
- Upload Review Status: Draft. After peer review, mark Reviewed & Approved.
- If the device speaks the S3 Protocol, this binary will be pushed via OTA later.

Step 1.8 Build mechanical

Same flow as hardware. Commit CAD files to the mechanical repo. Upload STEP files and drawings to Engineering, Mechanical. Mark Draft, then Reviewed & Approved.

Step 1.9 Define test templates

Before manufacturing starts, build the test templates the production line will execute.

- Open Engineering, Testing, Test Templates.
- Create one template per test category: Functional, ICT, Warm, Cold, Mechanical, User-perceptive.
- For each step, pick the right type: Pass/Fail, Numeric Range (with min and max), Text, Checkbox.
- Toggle IMEI Validation on for cellular devices, off otherwise.
- Save. Templates become assignable to variants and stations in Phase 3.

Step 1.10 Capture Golden Samples

Identify the reference unit. The known-good one used for certification, customer demos, comparison. Open Engineering, Golden Samples, create the entry, fill in the Configurations field with exact DIP switch positions, jumper settings, firmware build flags, calibration values. Future-you will thank present-you.

Step 1.11 Hold the weekly risk review

Open Engineering, Risk Management. Filter to Open and Mitigating. Sort by Severity. Walk the list. Update likelihood. Reassign owners. Close completed risks with a note. Add new risks the meeting surfaces.

Gate A Engineering complete, cut a Release

Before any file reaches the manufacturing floor, you cut a Release in Hardware Revision Control. A Release pins one commit per repo. Once locked, it is immutable. This is the as-built record.

How to cut a Release

- Open Engineering, Revision Control, Releases.
- Click New Release.
- Name it (e.g. "V1.2, Rev B").
- For each repo, accept the head commit or pick an older commit.
- Status: Draft. Save.
- Verify the pinned commits are correct.
- Click Mark as Released. The pins are now permanent.

You cannot un-lock a Release

If you locked the wrong commit, cut a new Release with the right pins. The wrong Release stays in the audit trail. This permanence is the whole point.

GATE

Engineering is signed off. A locked Release exists. Now you can hand off to manufacturing.

PHASE 02

Hand Off to Manufacturing

Files never go to manufacturing as email attachments. They go through the Manufacturing Vault, a controlled-handoff system. Allocating to the Vault creates a frozen snapshot. Engineering can keep evolving; the snapshot stays put until you explicitly re-allocate.

Step 2.1 Allocate files to the Vault

- In Engineering, open the file (Document, Firmware, BOM, or Schematic).
- Click the factory icon next to it.
- Pick a variant (or leave blank for project-wide).
- Confirm. The file's current version is pinned into the Vault as a snapshot. The factory icon turns lime.

Allocate only the files manufacturing actually needs:

- Reviewed & Approved schematic
- Reviewed & Approved BOM (with full bomItems snapshot)
- Reviewed & Approved firmware binary
- Assembly instructions, programming guides, assembly videos (uploaded under Manufacturing Docs)
- Carton box artwork, labels, stickers (uploaded under Custom or Manufacturing Docs)
- User manual (so production can include it in packaging)

Do not allocate internal design rationale, PCB stack-up references, or anything else manufacturing has no business seeing.

Step 2.2 Create the Production Variant

- Open Manufacturing, Production Variants, New Variant.

- Name it. Example: "Rev B, US Market (120V)".
- Fill in details.
- Link the Vault entries that build this variant.
- Link the test templates that run for this variant.
- Save.

Step 2.3 Set up Provisioning Profiles (if applicable)

For devices that need per-device tokens, secrets, calibration values, or configuration written at the production line, set up a Provisioning Profile. Profiles are variant-keyed config templates with required tokens and provisioning scripts the station kiosk runs against each unit.

- Open Provisioning Profiles for the variant.
- Click New Profile.
- Define the required tokens (e.g. device serial, lot token, certificate, calibration constants).
- Attach the provisioning script the line will execute.
- Mark the profile as the active one for this variant.

Skip this if you do not provision at the line

Products that are self-identifying via MAC or IMEI without needing extra secrets do not need a Provisioning Profile. Cellular products with per-device certificates, devices with calibration written at test, and products with secure tokens do. If unsure, ask: does each unit need something written at the line that is unique to that unit? If yes, build a profile.

Step 2.4 Hand over the project passkey

Manufacturing cannot download Vault files without the project file passkey. Share it with the manufacturing lead through a secure channel. One passkey per project, used by everyone with Manufacturing access on that project.

Step 2.5 When engineering changes (re-allocation)

- Engineer updates the source file in Engineering.
- Opens the file detail page. The factory icon shows it is currently allocated (lime).

- Clicks the icon. Modal: "Re-allocate this version to manufacturing?"
- Confirms. The old Vault entry is marked superseded (greyed out, kept for audit). A new Vault entry pins the new version.
- Manufacturing sees the new entry as active. The old one stays in history.

Step 2.6 If a Vault entry is wrong (unallocation)

- Open Manufacturing, Manufacturing Vault.
- Find the active entry.
- Click Remove from Manufacturing.
- Enter a reason (1 to 1000 characters, mandatory). Example: "Found issue in firmware v2.3, rolling back to v2.2."
- Confirm. The entry stays in the list but is greyed out with the reason banner. Manufacturing knows not to use it.

You cannot DELETE a Vault entry

The audit trail is permanent by design. Wrong file? Unallocate with a clear reason. Then re-allocate the right one. This is what makes the Vault trustworthy in a compliance review.

PHASE 03

SCALE: Produce the Lot

A variant exists and has its Vault files linked. Now you actually build the product.

Step 3.1 Create the Production Lot

- Open Manufacturing, Production Lots, New Lot.
- Select the variant.
- Enter the quantity.
- Link the Release this lot is built from (from Hardware Revision Control). This back-references every device to the exact commits that shipped in it.
- Add notes: which EMS, which facility, which dates.
- Save. The lot has a status (planned, in production, testing, completed) and a discussion thread.

Step 3.2 Set up production stations

Test templates only matter if they reach the line. Turn each one into a Station.

- Open the lot detail page.
- In the Stations section, click Add Station.
- Name: descriptive (e.g. "ICT Station 1", "Final QC", "Warm Test").
- Code: short label, printed on the bench (e.g. "ICT-1").
- Test Template: pick the right one for this station.
- Save. S3Suite generates a token-bearing URL.
- Copy the URL or display the QR code. Load it on the tablet at the bench.

One tablet per station

Each station has its own URL and its own test template. The same device passes through multiple stations. ICT, then FCT, then warm test, then final QC. Each station appends to the device's test history. The device is one record; the history is the trail.

Step 3.3 Send files to the vendor

- Open the variant page.
- Click Send to Vendor.
- Pick the vendor type (PCB manufacturer, assembly house, etc.). S3Suite suggests relevant files automatically.
- Pick the vendor from your vendor directory (populated in Phase 0).
- Choose Email or Export ZIP.
- Send. The packet is built from active Vault snapshots only. If anything is inconsistent, S3Suite refuses to send.

Step 3.4 The production line tests devices

On the line, the operator workflow at every kiosk station is the same:

- Operator opens the kiosk URL on the bench tablet. Top of screen shows lot, variant, station, live counters (Manufactured, Passed, Failed).
- Operator scans or types the device IMEI or MAC (USB barcode scanner recommended).
- Operator walks through the test steps as defined in the template.
- Operator hits Submit. The kiosk records pass or fail and resets for the next unit.

Every successful submit creates or updates a Device record under that lot. The first submit for an IMEI creates the device. Repeat submits append new test reports without duplicating the device. The same unit can pass ICT, fail FCT, get reworked, pass FCT retest. One device, four test reports.

Step 3.5 Monitor production live

From anywhere in the world, open the lot. See how many units have been produced today, how many passed, how many failed, which station is flagging the most issues. Manufacturing happening in another country becomes legible.

Step 3.6 Log deviations on the lot discussion thread

When the line uses an alternative component, when a supplier changes mid-batch, when an unexpected fault appears, log it in the lot discussion thread. Six months later when a field issue traces back to this lot, the deviation is in the record.

Step 3.7 Rotate station tokens at lot close

Station URLs are 30-day tokens. At the end of a lot, or when a tablet is moved, rotate the token. The old URL stops working immediately. Forgotten kiosks auto-disable.

Gate B Lot complete, devices auto-register

Every unit produced is now a Device record in S3Suite, carrying full provenance. Variant, lot, Release, every test it passed, every alternative component used in its batch. The handoff from Scale to Sustain is automatic. The moment a device ships, Operations already knows about it.

GATE

Manufacturing is signed off. The fleet exists in the system. Operations can take over.

PHASE 04

SUSTAIN: Run Operations

Engineering takes months. Manufacturing takes weeks per lot. Operations runs for years. These steps are ongoing, not one-shot.

Step 4.1 Activate warranty

- Open Operations, Warranty.
- Select devices (individually or in bulk by lot or filter).
- Set the warranty start date and duration.
- The system tracks expiry. Status badges (Active, Expiring Soon, Expired, Void) are visible on every device.

Step 4.2 Embed the support widget

- Get the org-wide support widget URL from Settings.
- Embed it on your customer-facing site (direct link, iframe, or pop-up).
- Customers submit tickets without needing accounts.
- Customer types the Project Code? Ticket auto-routes. No code? Lands in the Unassigned Inbox for an admin to route manually.

Step 4.3 Monitor the Health Dashboard

For devices running the S3 Protocol, the Health Dashboard shows real-time fleet metrics: temperature, CPU, memory, signal strength, battery, custom metrics. Set this as a tab someone checks daily. A gradual upward trend in temperature is the early warning that something is going wrong before devices start failing.

Step 4.4 Process incoming RMAs

- Open Operations, RMA, New RMA.
- Enter the device serial. S3Suite auto-fills variant, lot, warranty, last firmware, field service history.
- Type the reported issue in the customer's own words.
- Check the Similar past resolutions panel. If the Knowledge Base has a match, the 5-Why and resolution are pre-filled. Diagnosis goes from 30 minutes to 30 seconds.
- If no match, run the 5-Why. Ask why up to five times. Stop when you hit the root cause, not the symptom.
- Save the resolution.
- Click Save to Knowledge Base. Future RMAs benefit.
- Change RMA status to Resolved or Closed.

Step 4.5 Use Mass Troubleshooting for shared faults

Same fault, many devices? Do not file 50 RMAs.

- Operations, RMA, New Mass Troubleshooting Record.
- Add devices (paste serials, or filter by lot, variant, firmware version).
- Run the 5-Why once for the whole record.
- Save to Knowledge Base as a single entry.

Step 4.6 Push OTA firmware updates

- Open Operations, Firmware Updates.
- Select a firmware version (uploaded in Engineering, marked Reviewed & Approved).
- Choose targets: individual devices, an entire lot, or a variant.
- Initiate the push.
- Monitor success and failure rates. Retry failed updates.

Devices must be running the S3 Protocol to receive OTA. Without the protocol you still get full lifecycle management but updates require physical access.

Step 4.7 Log decisions in the Project Diary

Every meaningful decision (why a component was chosen, why a feature was deferred, why a workaround exists) should land in the Project Diary or Knowledge Base. Especially critical

when team members rotate or when the customer is paying for the engineering and expects long-term institutional memory.

PHASE 05

Close the Loop

Shape, Scale, Sustain describes the forward flow. The discipline that makes products stable is the return flow: Sustain back to Shape. S3Suite gives you four explicit channels for that return.

Step 5.1 Promote RMA patterns to risks, bugs, or wishlist items

When the same root cause appears in three or more RMAs, it is a risk, not a series of failures.

- Open Engineering, Risk Management, New Risk.
- Title: the root cause itself.
- Description: which RMAs, which devices, what the pattern looks like.
- Set severity and likelihood based on fleet impact.
- Assign an owner for the fix.
- In Linked items, link the affected RMA records.
- If the fix is engineering work, also file a Bug Report (engineering-side bug tracker with severity, status, attachments).
- If a customer asked for a new feature, add it to the Wishlist (per-project feature request board).
- If the change affects what the team is currently building, add it to the Feature Tracker.

Step 5.2 Use Square AI to surface patterns

Ask Square AI questions like:

- "What are the most common reasons for RMA in this project?"
- "Show devices with high CPU temperature in the last 30 days."
- "What firmware version is on lot L-2025-042?"

- "Which component in the BOM has obsolescence risk?"
- "What changed between firmware v2.3 and v2.4?"

Square AI runs against your actual project data with role-aware boundaries. Answers are specific, not generic.

Step 5.3 Cut a new Release with the fixes

- Engineers commit fixes to the relevant repos.
- Cut a new Release in Revision Control.
- Lock it.

Step 5.4 Re-allocate the changed files to the Vault

- Open each changed Engineering file.
- Click the factory icon to re-allocate.
- New Vault entry pinned with the new version. Old entry superseded but kept for audit.

Step 5.5 Decide: OTA push, or wait for the next lot

- Firmware fix? Push it OTA to existing devices (single device, lot, or variant) from Operations, Firmware Updates.
- Hardware fix? It applies to the next production lot. Create the lot, link the new Release, run Phase 3 again.
- Both? Push the firmware OTA today, build the new hardware for the next lot.

The loop is now closed

Field signal became a tracked risk. Tracked risk became an engineering commit. Engineering commit became a Release. Release became a Vault snapshot. Vault snapshot reached devices via OTA or built into the next lot. Every step traceable, every device accounted for. This is what running Shape, Scale, Sustain inside S3Suite looks like.

REFERENCE

Roles, Square AI, Cadences

Roles, by area access

Area	Org Admin	Engineer	Prod Manager	Operations	Viewer
Engineering Suite	Yes	Yes	No	No	Read
Manufacturing Suite	Yes	Yes	Yes	No	Read
Operations Suite	Yes	No	No	Yes	Read
Vendors	Yes	Yes	Yes	No	No
Square AI	Yes	Yes	Yes	Yes	No
Knowledge Base	Yes	Yes	Yes	Yes	No
Unassigned Tickets	Yes	Read	Read	Read	No
Project Settings	Yes	Yes	No	No	No
Org-wide Settings	Yes	No	No	No	No
Audit Trail	Yes	No	No	No	No

Square AI, role-aware

Square AI follows the same role boundaries as the rest of S3Suite. An Operations user gets answers from RMAs, warranty, support, knowledge base, and device telemetry, never from BOM or vendor records. An Engineer can ask about commits, firmware, and BOM but not from areas their role does not cover. The AI cannot see what the role cannot see.

Square AI is configured by the Org Admin in the Admin Panel. Provider is either Anthropic (Claude) or OpenAI (GPT). Your project data is sent to the provider to generate responses.

Recurring cadences

Cadence	What you do	Where
Daily	Engineers commit to Revision Control	Desktop app
Daily	Check the Health Dashboard for fleet anomalies	Operations Suite
Weekly	15-minute risk review (Open + Mitigating, sorted by severity)	Engineering, Risk Management
Weekly	Review Square AI flagged patterns in RMA data	Square AI
Weekly	Triage Wishlist entries and Bug Reports	Wishlist, Bug Reports
Weekly	Update the Feature Tracker against what shipped this week	Engineering, Documentation
Per lot	Rotate station tokens at lot close	Manufacturing, Production Lots
Per Release	Cut a Release in Revision Control and lock it before any handoff	Engineering, Revision Control

Checklists, per suite

S3Suite supports per-suite Checklists for repeatable procedures: NPI gates, line setup, field service prep. Use them when a procedure must be executed the same way every time and you want a record that it was. Build a checklist once, run it many times, and every run is logged.

- Engineering checklists: design review gates, board bring-up procedures, certification submission
- Manufacturing checklists: line setup, first-article inspection, lot close-out
- Operations checklists: field service prep, RMA receive-and-inspect, deployment audit

Checklists are not a substitute for the Step-by-step phases in this document. They are a runbook layer below the phases, for the procedures that recur every lot, every device, every site.

When in doubt

- Files on someone's laptop? Get them into a Revision Control repo.

- Decision made in a meeting? Log it in the Project Diary or Knowledge Base.
- New feature to build? Add it to the Feature Tracker.
- Field failure repeated? File a Risk or a Bug, and link the RMAs.
- Customer feature ask? Add it to the Wishlist.
- Manufacturing asking for files? Allocate them to the Vault, do not email them.
- Vendor asking for files? Send to Vendor from the variant, not by hand.

From idea to reality

Hardware is hard. Hardware at scale is harder. Hardware at scale with operational feedback flowing back into engineering at the right speed is the difference between a product that stabilises and a product that does not.

The workflow in this document is not theoretical. It is what we use to ship our own products. It is what we recommend to every hardware team that adopts S3Suite. It is the discipline that makes the difference between a tool that creates more work and a tool that takes work off your plate.

If you have read this far, you understand the methodology. The next step is to put it to work.

Ready to Shape, Scale, Sustain?

Book a technical walkthrough of S3Suite with one of our engineers.

s3suite.rndsquare.com / hello@rndsquare.com / +91 974 600 6455

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