FIBER OPTIC FIELD GUIDE

Splice Matrix Builder

There's a new tool on the site. The chart builder shows how counts land on the fibers of one cable. The Splice Matrix Builder takes the next step: it shows how those counts flow from one cable to the next at a splice point. Cables in, cables out, the count stack on each, and every fiber-to-fiber connection. Written by a working tech, for working techs.

Johnstone Technical Services · https://johnstonetechs.com/guides/splice-matrix-builder

Why a splice matrix

Every splice tech has done this on the tailgate: a big feeder comes in, a few smaller cables go out, and you're squinting at a work print trying to keep the counts straight. The experienced hands just know how it flows. The new folks don't, and Excel can't draw it for them.

The chart builder answers "which count is on which fiber." The splice matrix answers "where does that count go next."

The Splice Matrix Builder is one splice point, done well. It's not a network documentation system and it isn't trying to be. It's the closure in front of you: the cables entering, the cables leaving, and how the fibers connect across. You can collapse a 1728 down to its tubes to see the whole splice at a glance, then expand the one group you're working to the individual fiber.

Reading a cable stack

A count is a named circuit set, like ABCD001, 1-288. The name and number are the fiber's identity for its whole life across the network, so at a splice you match the same name and number on both sides. That's how a count "flows" cable to cable.

A cable carries one or more counts, and they partition its fibers. A 144ct might be SC5678, 1-48 then ABCD001, 49-96 then dead, 97-144. Those sizes add up to 144. Read a stack correctly and the numbers always balance, which is the quickest way to catch a mistake before you fire the fusion splicer.

Getting started

Open the builder and you get a drop box. Put a file on it — a photo of a work print, a PDF, or a CSV — and it works out what to do with it: a cable schedule goes to the importer, a photo goes to the scanner. Prefer to type it in? Start from scratch. Want a look first? Load a sample splice.

Once a splice is loaded, one action bar sits across the top: Build (add a cable in or out, or a splitter), Connect by count, Auto-arrange, and Save / History / Export. Each splice carries its own Details strip — closure, location, job — and its view controls (collapse, tubes, expand, zoom) right above its matrix. Build more than one splice from a sheet and each opens in its own tab. The big header shrinks out of the way once you start, so the workspace is front and center.

Free in your browser: OTDR trace analyzer, splice matrix builder, fiber analysis, link loss calculator, and more at johnstonetechs.com.
Informational guidance; verify critical measurements against certified test equipment.

Add the cables

Open the builder. Use + Cable in for each feeder and + Cable out for each cable leaving the splice. Click a cable to set its label, fiber count, and whether it's loose-tube or ribbon (with fibers-per-ribbon and ribbons-per-group, exactly like the chart builder, so ribbon stacks color correctly).

Enter the counts

In the same cable editor, type the stack, one line per count: NAME,start-end. For example:

- ABCD001,1-288
- SC5678,1-48
- XD,49-72

The count label shows on every fiber, the tube bands show which counts they carry, and a collapsed cable shows the whole stack like a count sheet.

Connect by count

This is the part that saves the most time. Hit Connect by count and the builder matches counts by name and number across the splice and wires the fibers for you. A count that splits across several output cables is handled automatically, and anything that doesn't have a match on both sides is reported so you can see what didn't splice through.

Prefer to do it by hand? Click a fiber, tube, or cable on one side, then its match on the other. Tube-to-tube maps 1:1; peel a few fibers off to a different group by clicking fiber to fiber.

When a fiber doesn't land at this splice but carries on to the next closure, open its count row and use the ⇥ button to carry it through to another splice tab. It draws as a labelled stub leaving the edge of the sheet, the way an express fiber does on a cut sheet, and clicking the stub jumps to that splice.

Dead and XD counts

Spare or dead fibers get their own label, XD or dead, and their number is the physical fiber (XD 13 is fiber 13). Anything you don't assign a count is filled with XD automatically, so every fiber is accounted for, and dead fibers are left out of the through-splice.

Splitters

A lot of splice points have a passive splitter in them. + Splitter drops one in, from 1x2 up to 1x128, with its typical insertion loss shown next to the ratio. It behaves like any other cable: one input, fed from the feeder's live fiber, and N outputs numbered 1 to N, each labelled INPUT or OUTPUT so you can trace it out to the leg it feeds. Wire it the same way you wire a cable, feeder to its input and its outputs to the legs.

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Scan a work print or route map

Have a photo or PDF of the print? Click Scan and build from it. There are two common layouts, and two ways to frame them:

- Closure cut sheet — several splice points on one page, each with its stack drawn at the cable's end. Select an area and frame the one splice you want. Frame each in turn and each opens as its own tab.
- OSP route or construction map — a cable route along a street, with numbered call-out boxes holding each cable's stack spread across the sheet. Use Scan whole sheet so none of the boxes get cut off.

The reader pulls each cable's stack, keeps the billing and labor lines out of the counts, recognises a splitter drawn on the print and wires it from the feeder, and connects the counts that match across the splice. Where a print color-codes the feeder green and the terminated legs red, it uses that to get input and output right.

A blurry or low-resolution scan doesn't send you back to a blank page. It builds the cables it can read and flags the ones whose counts it couldn't, so you fill those in by hand. When something is genuinely unclear it asks a short question, and from that box you can answer in words, paste the exact count stack one line per count, or re-frame and scan again. There's a Sample button to see it work first, and you can scan one cable at a time from the cable editor.

Try the scanner on a real sheet. These are anonymized engineer prints you can download and drop onto Scan to watch the builder work:

- FTTH splitter work printPNGA feeder, a 1x16 splitter, and two terminated legs.
- Feeder-to-MST breakoutPNGA feeder broken out to several MST drops, good for connect by count.
- Backbone splicing overviewPNGA high-count route with several splice points and a cross-connect branch.

Want to see how one of these is laid out before you scan it? How to read a fiber optic work print walks through the same sheets box by box.

Import a cable schedule

A hand-drawn print isn't the only thing you can feed it. Import Files takes a PDF or CSV — a count sheet, or an OSP cable schedule straight out of a print set. Drop in one or both end sheets and it lists every OSP cable it found; tick the ones you want and it builds them.

Cable schedules are usually rotated tables: each attribute is a row running the width of the page, and each pigtail assembly is a column. The reader works that out for itself, and it tells the two ends apart by what's in them — a pre-terminated end has strands numbered from 1 and a hardware termination like (4) 24p FAP or 18MMC24P, while the OSP end has absolute strand ranges and says FUSION SPLICE.

Print sets have their quirks, so it calls them out instead of quietly accepting them: a letter O in a cable id (.CO1 for .C01), a mistyped path on one cable out of thirteen, a cable that's missing one of its two ends because you only loaded one sheet. All of that shows up in the import list before you build anything.

Reading happens in your browser. A well-formed sheet never leaves your device.

Backbone runs and pre-terminated cables

An OSP backbone isn't one splice — it's two. A pre-terminated pigtail lands on a cassette or FAP in each building, and each one is fusion-spliced to the OSP cable that runs between them. Import both end sheets and you get the whole run: both splice points, both pre-terminated ends, and the OSP cable down the middle.

One sheet is enough to start. A single schedule gives you a complete splice point — the pigtails, the fusion splice, and the OSP cable they land on — which is everything you need to work that end. The far end draws as an open stub, and importing the other sheet later fills it in and splices the run through. You don't need the whole print set in hand to get a usable matrix.

It's drawn to scale, which is the part that makes it readable. A 192-fiber pigtail is a quarter the height of its 864-fiber OSP cable, a 384 is half, and each one sits beside the exact stretch of the cable it serves. Nothing has to cross, because the position is the answer — you can see at a glance that one pigtail takes strands 1-192 and the next takes 193-384. Ribbon lines carry through the boxes, and strands the cable doesn't use (an engineered 385-432 gap, or an unused tail) are marked rather than hidden.

Pre-terminated cables show the hardware and where it lands — (4) 24p FAP · NAO3 DHA 05.b r09 RU25-24 — in place of the from/to you'd put on a field splice.

When it can't read your sheet

Schedules vary a lot between jobs, and some arrive as a flat scan with no text in them at all. When the builder can't read a file on its own, it asks rather than guessing — a wrong guess produces a diagram that looks right and isn't, which is the worst outcome. You get a plain question with a few options and a box to describe the sheet in your own words, and your answer goes back in. Only the files it couldn't read get sent for help.

Build your splice

Free while in beta, runs in your browser. Add your cables, enter the counts, and connect.

Moving cables around

Every cable has a ⠿ grip in its header. Drag it to reorder cables within a column, to slide one further down the column so it sits opposite its counterpart on the other side, or straight across to move it between cables in and cables out. Hold near the top or bottom and the page scrolls with you, so a long matrix can be crossed in one go.

Moving a cable to the other side removes its splices — a cable cannot splice to its own side — and it tells you how many before it does. The grip is deliberately separate from the header, which still opens and closes the cable when you tap it.

Auto-arrange does the same job automatically: it reorders both sides so the splice lines cross as little as possible. It re-stacks everything, so it clears any gaps you placed by hand. On an imported run it runs once on build, which is why a fresh import usually comes in tidy.

Print and export

What you see is what prints. Print goes straight to your printer from the screen. PDF for the as-built, PNG for a clean image to drop in a report (no more snipping-tool screenshots), or SVG for a scalable copy.

The PDF comes out as 11x17 landscape, like a real engineering print: the scanned sheet on page one, then each splice matrix on its own page, with a header and footer on every page. Built more than one splice from the sheet? Pick which ones go in the PDF, and whether to include the scanned work print.

While the builder is in beta the files are emailed to you rather than downloaded. You are already signed in, so they go to that address with nothing extra to fill in. The file is built in your browser from exactly what is on screen. While the builder is in beta, a copy of each export is also shared with us to improve the reader — it's noted on the PDF and in the email. When this becomes a paid service the direct download comes back.

Save keeps the splice on your account, so you can reopen it from History and carry on.

The builder is free while in beta. You sign in once with your email. It's built to grow into a paid product later, but the counts, the connections, and the diagram are yours to use today.