Episode Book

EPISODE #5676

DIY Cable Guide: Barrel Jacks, XLR, and What to Avoid

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SYNOPSIS

Daniel sent in a question that cuts to the heart of DIY cabling: which cables actually pay off to learn, and which ones should you never touch? We work through his criteria — parts availability, termination difficulty, and whether a precise run is genuinely hard to buy off the shelf — and the answers split in surprising directions. Low-voltage DC barrel connectors need no soldering at all, but they hide a polarity landmine that has killed consoles. XLR is the flagship win for soldering skill, while crimp XLR is a tooling trap that costs more than every cable you'll ever own. RCA is the beginner job. 3.5mm is the opposite of what you'd expect. And fiber optic isn't a skill wall — it's a safety wall.

TRANSCRIPT



Corn

Here's the question that's been rattling around my head since Daniel sent this in: is there any cable you can make yourself that actually saves you money, or is the whole thing just an elaborate way to feel good about a perfect run?



Herman

That's the tension right there.



Corn

Daniel's got a whole thing this week. He's been keeping track of the cable episodes we've done. Mains plugs, IEC distribution from the UPS, Ethernet crimping. And he points out the trade-off is always the same. It takes a bit of skill, a bit of time to learn, but you end up with a perfect run and no excess, and it's satisfying.



Herman

He's not wrong.



Corn

So he wants to push it into two new categories. First, low-voltage DC, terminated in those parallel barrel heads you see on IP cameras. He notes DC extenders exist, but the same limitation applies as with plugs. Second, audio cabling. XLR, RCA, 3.5mm, and the red and white pairs you run between speakers. Then he broadens all the way out and asks the big one: what common cables and connectors are definitely not appropriate for self-termination, or only appropriate with a lot of skill? And if you had to rank them by how much they actually pay off to learn, what's the list? His criteria are specific. Parts readily available, termination relatively easy and safe, and a precise run hardest to get off the shelf.



Herman

That's a good set of criteria, because they don't all point the same direction.



Corn

No they don't. So let's start with the one that requires no soldering at all.



Herman

The easiest win in this whole space is the low-voltage DC barrel connector, and it's also where the sneakiest failure mode lives.



Corn

Define the stakes for me. What's the actual tension running through all of this?



Herman

A modest learning curve and a bit of tool cost buys you an exact-length run. But the difficulty gradient is steep and it's not obvious where it sits. And easy to terminate does not mean safe to terminate. Those are two different axes and people collapse them.



Corn

And there's an economic counterpoint that complicates the whole satisfying skill framing, right? For XLR, DIY parts cost roughly equals pre-made cable cost.



Herman

Roughly. A two-meter cable comes to somewhere around fifteen to twenty pounds in parts, which is about what you'd pay for a pre-made one. So the payoff is exact length and quality control, not saving money. That's the honest version of it.



Corn

Which is a real reframe. You're not doing this to be cheap.



Herman

You're doing it because the cable fits.



Corn

There's also a crimp versus solder split underneath all of this that I want to get into, because it explains a lot of the weird tool pricing.



Herman

Crimping is objectively better for factories. It makes a gas-tight cold weld, it's faster, it's repeatable. But the tooling cost makes it a trap for individuals. The same logic that makes crimp great for Neutrik's factory makes it useless in your garage.



Corn

So the arc for today is DC barrel connectors first, no soldering but a polarity landmine, then audio where XLR is the flagship win, RCA is the beginner job, 3.5mm is the trap, then the do-not-touch list, then the ranked payoff list.



Herman

That's the shape of it.



Corn

The low-voltage DC connector. Start with what the standard actually is.



Herman

Five point five millimeters outer, two point one inner. That's the ubiquitous one. Sometimes you'll see five point five by two point five, which is the same outer diameter with a fatter center pin, and they will not always mate reliably with each other. That's the first gotcha and nobody warns you.



Corn

And the field-terminable versions come in two forms.



Herman

Two forms. Solderless screw-terminal jacks, where bare wire clamps into a two-pin terminal block, no soldering at all. And pigtail versions, which are a molded barrel plug on a short length of pre-stripped, pre-tinned red and black wire.



Corn

The screw-terminal one is the standout.



Herman

It's the standout. No soldering iron needed, it's reusable, and it converts bare wire into a standard barrel socket. The ratings are generous for what it is. Zero to thirty volts DC, recommended twelve or twenty-four, max five amps. Screw terminals accept up to sixteen gauge wire. Vendors describe it flatly as no soldering, no tape, reusable, professional finish. And for once the vendor copy is accurate.



Corn

Sixteen gauge is plenty for a camera.



Herman

Sixteen gauge at twelve volts for a camera drawing maybe half an amp is enormous headroom. You could run a small village off that.



Corn

So where's the limitation relative to just buying a DC extender?



Herman

Pre-made extension cables are cheap and everywhere. You can get them in any length you want, more or less. But they come in fixed lengths, and every one of them adds a plug and jack junction. And each junction is a potential intermittent-contact point and a voltage-drop point on a long twelve-volt run. Cutting to length with a field-terminated plug removes that extra junction.



Corn

One junction instead of two.



Herman

One junction instead of two, and the one that remains is one you made, which is either an improvement or a liability depending on your work.



Corn

And the barrel jack itself is friction-fit. It's not locking.



Herman

Correct. It's friction-fit. So a hand-terminated plug is no more secure than a factory one. That's worth sitting with, because it means the security argument doesn't favor DIY. What favors DIY is the junction count.



Corn

Then there's the real hazard.



Herman

Polarity.



Corn

Say it plainly.



Herman

There is no universal standard for barrel-jack polarity. Center-positive and center-negative are both fairly common. Guitar pedals famously use center-negative. Most consumer gear drifted to center-positive. And getting it backwards can destroy a device.



Corn

No protection circuit in a lot of these.



Herman

A lot of them. The NES and SNES are the classic example. Standard barrel jack, reversed polarity, no protection circuit. Plug the wrong supply in and you've killed a console.



Corn

So this is cheap to learn and expensive to get wrong.



Herman

Cheap to learn, expensive to get wrong. And it complicates the assumption that easy equals safe. The screw-terminal jack is trivially easy to terminate. It's also trivially easy to terminate backwards. There's no keying, there's no chirality, nothing stops you.



Corn

You just have to know your device.



Herman

You have to know your device and you have to check. Every single time. Which is a different skill from soldering.



Corn

Now to the category where soldering actually earns its keep.



Herman

XLR is the flagship. This is the one where the skill pays off cleanly.



Corn

Why does soldering dominate here when crimping is technically superior?



Herman

Hugh Robjohns at Sound On Sound put it well. Soldering is a familiar, well-established, relatively easy-to-learn technique that uses commonly available, low-cost tools. Decades of proven reliability in the field, and it can be repaired easily in the field with standard tools and skills. That last part is the real answer to your question.



Corn

Repairability.



Herman

Repairability. A soldered XLR fails in the field and you fix it in the field with a cheap iron. A crimped one fails and you need the crimp tool. Which brings us to the killer detail.



Corn

The crimp XLR trap.



Herman

Crimp XLRs exist. Neutrik makes them. But they're arguably better suited to large-scale factory manufacturing. The dedicated Neutrik crimp tool costs around four hundred pounds. Call it five hundred dollars. And inserting or releasing the contacts needs further special tools on top of that.



Corn

So it's not a four hundred pound tool, it's a four hundred pound tool plus.



Herman

Plus. And Robjohns's line is that this is not something you're likely to find in most audio repair shops, let alone the field. Which is the whole point. The crimp is objectively the better joint and it is completely irrational for an individual to buy into it.



Corn

Because the tooling cost only amortizes across a factory.



Herman

Across thousands of units. At one cable, the tool costs more than every XLR you will ever own.



Corn

Now tell me about the actual wiring, because I think people find three-conductor intimidating.



Herman

Balanced XLR is three conductors. Signal positive, signal negative, and shield slash ground. That's it. It's not complicated. The one number that matters is length. Recommended maximum run is about a hundred feet, thirty meters.



Corn

And beyond that?



Herman

Beyond that you're asking the balanced pair to reject more than it comfortably can, and the shield is picking up more than it's draining. Thirty meters is the number to remember.



Corn

What about the parts side?



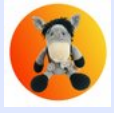
Herman

Neutrik connectors are the name that keeps coming up. Klotz or Sommer for the cable. And there's a very blunt diyAudio poster who says anything more expensive than two pounds per meter is just for show and has no actual benefit. Which is worth hearing, because the audio cable market has the same disease the Ethernet market has.



Corn

Where the marketing outruns the physics.



Herman

Every time. A two-meter XLR in parts lands around fifteen to twenty pounds. Which is roughly the price of a pre-made cable. So you're not saving. And then there's the Gearspace position, which is the honest one: I would never buy an audio cable. You either solder it yourself, or you pay a premium for someone else to solder it and package it.



Corn

So the premium you're avoiding isn't materials, it's labor.



Herman

It's labor and packaging and margin. Which, honestly, is fair enough if you don't want to solder. But if you do want to, there's no money in the materials to be saved. The saving is exact length.



Corn

RCA next.



Herman

RCA is the beginner job. Single center conductor plus a shield, simpler than XLR, same principle. It's the classic red and white stereo pair. Great for exact-length interconnects where a stock one-meter cable is either too short or leaves a coil behind the rack.



Corn

And I should flag, Daniel, that our sourcing on RCA specifically is thinner than the rest. We're reasoning by analogy to XLR rather than from a dedicated guide.



Herman

That's fair and I'd rather say it than pretend otherwise. But the principle holds. Two conductors, one of them a shield, and the shield is usually the return. If you can solder an XLR you can solder an RCA. It's less to go wrong.



Corn

And then the trap.



Herman

Three point five millimeter is the trap. This is where the intuition inverts. Smaller connector, harder job. The solder tabs are tiny and close together. You want a fine tip, and you want to heat-shrink each conductor before assembly to avoid bridging tip to ring.



Corn

Which is a short.



Herman

Which is a short, and on a headphone jack that's a silent channel or a dead amp. Verchil's guide rates three point five millimeter durability as low, fragile tip, difficult to solder by hand without magnification. The contact rating is somewhere between one thousand and three thousand insertion cycles, which tells you what the connector is designed for. It's designed to be plugged in and left in.



Corn

And TRRS adds a fourth conductor.



Herman

TRRS adds a fourth conductor and it adds a pinout trap. CTIA and OMTP are two different wiring standards for the same physical plug. They differ in which ring carries which signal. If you build to the wrong one, the mic function fails or the audio comes out wrong. You have to match your device, and you have to know which standard your device uses.



Corn

So the smallest connector is the hardest, and it carries a standard that isn't universal.



Herman

Which is the opposite of what anyone expects going in.



Corn

Alright. Give me the do-not-touch list.



Herman

Fiber optic is the clearest no. This isn't a skill wall, it's a safety wall. Cutting fiber produces small invisible glass shards that are easily absorbed through the eyes, lungs and skin. And once that happens the body has no way of removing them. That's a quote and it's not alarmism.



Corn

That's grim.



Herman

It's grim, and it's also not the only reason. Proper termination needs a fusion splicer or a polished epoxy-and-cleave kit. Plus chemicals and adhesives that require MSDS review. It's an entirely different trade with entirely different equipment.



Corn

So a soldering iron isn't even in the conversation.



Herman

A soldering iron is not in the conversation. Nothing you own is in the conversation.



Corn

What else.



Herman

Medium and high-voltage power cable. Five kilovolts to thirty-five. The termination on those rebuilds electric stress control at the cut end. That's the whole job. That's what separates it from low-voltage splicing. You're not joining copper, you're managing the electric field at the point where the cable geometry changes.



Corn

Which is a completely different discipline.



Herman

Completely different. If you don't know what stress control means you should not be near it, and if you do know what it means, you know why you shouldn't.



Corn

Crimp XLR.



Herman

Technically possible, four hundred pound tool, irrational. It's on the list not because it's dangerous but because it's a trap that looks like a shortcut.



Corn

HDMI.



Herman

Flagged as an assertion to verify rather than something I've got a source for. High-speed differential pairs, molded connectors, impractical. But I'd note it as my read rather than a finding.



Corn

Fair.



Herman

And then the ranked list, which is the synthesis.



Corn

Give it to me.



Herman

Number one, XLR. Cheap parts, easy soldering, huge payoff for exact-length mic and line runs. This is the canonical DIY win.



Corn

And the payoff is length, not money.



Herman

Length and quality control. Number two, low-voltage DC barrel with a screw terminal. Near-zero skill, no soldering, and it removes a junction on camera runs. Watch polarity. Number three, RCA. Simple solder, useful for exact-length interconnects. Number four, three point five millimeter and TRRS. High skill, fragile, pinout traps. Only worth it for repair, not routine builds.



Corn

Not for building, but for saving something.



Herman

For saving something. Number five, Ethernet RJ45, which we've done before, and I'll just note that EZ-RJ45 jacks make it easy to get cables working properly the very first time. Number six, fiber, mains, and medium voltage. Do not self-terminate.



Corn

That's the map, and the bottom of it matters more than the top.



Herman

It does. People obsess over what they could learn and skip the question of what they shouldn't touch.



Hilbert

The plug was fine for four months and then it wasn't.



Corn

Go on.



Hilbert

It was a run of IP cameras around the back of a building, six of them, and every camera on the run would drop out for a few seconds at a time. Not all at once, not on a schedule, just whenever it felt like it. I chased that for an afternoon. I swapped the switch port. I re-terminated the Ethernet ends. I reseated every connector on the run twice.



Corn

What was it?



Hilbert

A field-terminated DC barrel plug. The center pin had been crimped onto the wire rather than soldered, and the friction fit had loosened just enough over the months to arc intermittently. I know it was crimped because I was the one who crimped it.



Herman

So you're telling us you did the thing you're warning us about.



Hilbert

I'm telling you I did it and I found it. What I'd correct is the two of you have been talking about polarity as the hazard. Polarity is the hazard if you're careless once. But a polarity mistake kills a device once and you learn and you never do it again. A loose barrel plug kills your weekend every few months and you never quite figure out why.



Corn

Because it works almost all the time.



Hilbert

It works almost all the time. And that's worse than not working at all. When a camera's dead you go look at the camera. When it works ninety-eight percent of the time you go look at the network, the switch, the software, the recording server. You go everywhere except the plug you made yourself, because you know you made it and you trust it.



Herman

So you've got the same failure pattern as the DC extenders we were criticizing, just from the other direction.



Hilbert

You've got the junction you bought and the junction you made and there's no reason the one you made is better. It's only better if you did it well.



Corn

What did you do about it?



Hilbert

Zip tie or a dab of hot glue on every field-terminated barrel plug I make now. Both if I've got them. I haven't had a dropout since. It's not elegant and it's not in any datasheet but it's what I'd tell anyone doing this.



Herman

It reframes the whole thing, honestly. We've been saying a hand-terminated plug is no more secure than a factory one as if that's reassuring.



Hilbert

It's not reassuring. It applies to both of them. A friction fit is a friction fit. You're relying on the tolerance of two pieces of metal and nothing else. The fix for that is not a better plug, it's mechanical restraint.



Corn

That's a good place to pull back and look at the whole map.



Herman

It is. And I'll put the open question out there. If the payoff for XLR is exact length and quality control rather than saving money, and the payoff for the DC barrel connector is removing a junction rather than saving money either, then is the real value of self-termination just the satisfaction of a precise run? Or is there a category where DIY actually wins on cost?



Corn

I'd want to know the answer to that before recommending anyone buy an iron.



Herman

The other thing that strikes me is how inverted the gradient is. The smallest connector, three point five millimeter, is the hardest. The easiest, the screw-terminal DC barrel, carries the sneakiest failure pattern. That pattern probably holds well beyond cables.



Corn

It usually does. The thing with no barrier to entry is the thing with no barrier to getting it subtly wrong.



Herman

Which makes the ranked list something other than a to-do list. It's a map of where the skill pays off and where it's a trap.



Corn

And the do-not-touch list is the part that actually matters. Nobody's going to hurt themselves soldering an XLR. People hurt themselves with fiber.



Herman

Every time.



Corn

That's the show. Thanks to Hilbert Flumingtop, our producer. This has been My Weird Prompts. If you want to tell us we got something wrong, or you've got a better rank ordering, email us at show at my weird prompts dot com.



Herman

We'll be back soon.