Low voltage cabling is one of those scopes that everyone depends on and almost no one wants to think about. When it goes in correctly, the building works. People get online, camera feeds are crisp, cards open doors, sensors talk to HVAC, and fire alarm signals reach the panel. When it goes in poorly, you get callbacks, finger-pointing between trades, and tenants who cannot move in on time.

In California, the stakes are even higher. Between the California Electrical Code, Title 24 energy requirements, CalFire and local AHJ preferences, low voltage cable selections are not just a technical debate, they have schedule and inspection risk attached.

This guide walks through five types of low voltage cable that show up again and again on California projects, what each does, what it typically costs, and how to think about them when you are planning work.

What cabling actually does in a building

People often ask some version of the same question: *What does cabling do?* If you strip away all the brand names and buzzwords, cabling provides three functions.

First, it carries signals. Sometimes those signals are Ethernet packets, sometimes an audio stream, sometimes a simple contact closure that says a door is open. The voltage is typically under 50 volts, and in many cases the power is minimal.

Second, it connects systems that are installed at different times by different trades. The best structured cabling I have seen is boring to look at, but it lets a tenant replace their firewall, change their Wi-Fi, or upgrade a camera system without touching the cable.

Third, it creates a physical pathway that respects fire, life safety, and interference rules. The cable itself, the jacks and patch panels, and the pathways and supports form the three primary components of cabling. If any one of those three is sloppy, the whole system suffers, even if the cable is “high end” on paper.

Owners and GCs also ask a more practical variation: *Is cabling the same as wiring?* On a jobsite, “wiring” often means line voltage branch circuits that feed receptacles and lights. “Cabling” usually refers *Cabling Services Provider California* to data, telecom, security, AV, and control wiring. The tools and codes overlap, but the skill sets and testing standards differ. An electrician can absolutely install low voltage cable, but not every electrician owns a Fluke certifier, label printer, and fiber scope, and not every low voltage contractor is licensed or staffed to run 277-volt lighting feeds. Sorting that scope line early is part of a clean project.

Five workhorse low-voltage cable families

There are dozens of specialty cable types in the catalogs. In actual California projects, five families of low voltage cable do most of the work.

- Category twisted pair cable for data and voice (Cat 5e, Cat 6, Cat 6A)
- Fiber optic backbone and high-bandwidth links
- Coaxial cable for legacy cable TV and certain RF systems
- Security and life safety cable for fire alarm, access control, and cameras
- Control and AV signal cable for building automation, sound, and specialty systems

You can find more than five types of cable in the code books and manufacturer lists, so when someone asks “What are the 5 types of cable?” they are usually looking for practical categories like these. Let us go through each in

turn.

1. Category twisted pair cable: the everyday network workhorse

If you look above the ceiling grid in an office TI in San Diego or a medical office in Sacramento, the bundles you see laced to J-hooks are almost always category cable. It is the most common type of cabling used in networks and the one that triggers most of the “How much does cabling cost?” conversations.

What it is

Category cable is a bundle of four twisted copper pairs, usually 23 or 24 American Wire Gauge, wrapped in a jacket. Common flavors on current projects:

Cat 5e

Good up to 1 Gbps, often used in older stock and some residential work, but we rarely spec it on new commercial jobs anymore.

Cat 6

Supports 1 Gbps comfortably and 10 Gbps at shorter distances with good installation practices. This has become the baseline in most California commercial builds.

Cat 6A

Designed for full 10 Gbps up to 100 meters. Thicker, heavier, and a bit more finicky to install, but it future-proofs a lot of spaces.

On top of the category number, you see jacket ratings like CMP (plenum), CMR (riser), and CM (general purpose). In California, whenever your cable passes through return air plenums, CMP is not optional. Inspectors around the Bay Area and LA County are particularly strict about this.

Where it is used

Network drops for desks, conference rooms, access points, printers, IPTV, and many IP security devices still run on copper. Even in buildings with extensive fiber backbones, the “last 300 feet” is often Cat 6 or Cat 6A.

Ten years ago we pulled a lot of Cat 3 for simple analog phones. Now most phone systems in California offices are voice over IP, so the handset and the data jack often share a single Cat 6 run.

Costs and tradeoffs

When someone asks “How much does cabling cost?” they are usually talking about category cable runs. Honest answer: it depends on density, site conditions, and quality.

On a straightforward open office TI with good ceiling access and a centralized IDF, I commonly see installed costs in the range of 140 to 220 dollars per data drop for Cat 6, assuming standard outlet height and no special cable management. That per-drop cost bundles material, labor, jacks, patch panel ports, testing, and labeling.

Cat 6A can add 15 to 40 percent to material and labor because the cable is stiffer, needs larger pathways, and takes more care in termination. The tradeoff is performance and flexibility. If the building will host high density Wi-Fi, labs, or media production, Cat 6A is worth serious consideration.

From an owner’s standpoint, the best wire for home use is often Cat 6, since it will comfortably handle gigabit internet and most consumer gear for years. In higher-end custom homes with large AV and automation systems, I

see more Cat 6A being specified, particularly where the ISP is already selling multi-gigabit service.

Is cabling difficult? For a trained tech with the right testing gear, no. For a DIYer trying to crimp plugs on a ladder at midnight, absolutely. Most of the “difficult” part is not the pulling, it is respecting bend radius, maintaining twist, and then certifying every run so that intermittent issues do not show up three months after move-in.

2. Fiber optic cable: the long-haul specialist

Fiber plays a different role. It is not the cable that goes to every cubicle; it is the spine of the building.

What it is

Instead of copper conductors, fiber uses strands of glass to carry light. The small glass core is wrapped in cladding, strength members, and a jacket. Two main classes show up on projects:

Singlemode

Very small core, supports long distances, often used for campus and backbone links. More sensitive to termination quality, but the optics have become much more affordable.

Multimode

Larger core, works well for short to medium building runs. Types like OM3 and OM4 dominate intra-building work, with OM5 beginning to appear in higher-spec jobs.

California projects often pair plenum-rated fiber in the ceiling with outdoor rated armored fiber for runs between buildings, garages, and IDF closets that are not in conditioned space.

Where it is used

Common uses:

Data center to IDF backbones in office and healthcare buildings.

Rooftop equipment, such as DAS systems and some wireless backhaul. Connections between separate structures on school, university, and corporate campuses. High-resolution camera runs where copper distance limits would be exceeded.

I have worked on hospital projects in Orange County where the main distribution frame to remote closets used a 144-strand singlemode cable, then smaller 12-strand or 24-strand multimode cables fan out on each floor.

Costs and tradeoffs

Material costs for fiber vary widely based on strand count and construction, but on a typical commercial job, the installed cost per terminated fiber strand might land somewhere between 70 and 180 dollars, depending on distance, number of terminations, and whether you are splicing or using pre-terminated assemblies.

Fiber is powerful but unforgiving. You cannot bend it sharply, crush it with staples, or leave dirty connectors. When owners ask “Is cabling difficult?” this is the part of the scope where a non-specialist contractor can get in trouble quickly. It is also where good documentation and labeling pay off; chasing a mislabeled fiber in a 72-strand tray is not anyone’s idea of fun.

3. Coaxial cable: legacy workhorse that refuses to disappear

Even as IP takes over, coaxial cable still appears on California plans. Less than it used to, but more than some designers like to admit.

What it is

Coax consists of a central copper conductor, dielectric insulation, a shielding layer, and an outer jacket. For commercial work, RG-6 and RG-11 show up most often. The shield keeps interference out of the signal, which is why coax served television and RF so well for decades.

Where it is used

Traditional cable TV systems, MATV in hotels, some satellite feeds, certain building DAS and antenna systems, and older camera installations still rely on coax. Some security retrofits in existing LA or Inland Empire warehouses still run HD-over-coax because the existing cabling infrastructure makes it economical.

When someone asks “Who is the cheapest cable provider?” they are usually thinking of residential ISPs and TV packages, not the cable itself. From a low voltage contractor’s perspective, the provider matters less than the signal spec and the pathway. If you want options among providers in the future, pull decent coax now along with data.

Costs and tradeoffs

Installed costs for coax drops are generally lower than fiber, often in the same ballpark as or a bit under Cat 6 in simple runs, but coax is far less flexible for repurposing. You cannot turn a TV drop into a PoE access point without pulling new wire.

The main reason coax survives in projects is device compatibility and sunk infrastructure. On new commercial work, I encourage owners to avoid overbuilding coax unless there is a clear, code-driven or operator-driven reason.

4. Security, fire alarm, and life safety cable

California is strict about fire alarm and life safety systems. The cables that tie that ecosystem together are specialized, and inspectors pay attention to markings and routing.

What it is

Security and life safety cabling typically uses multi-conductor copper in different configurations:

FPL, FPLR, FPLP

Fire alarm power limited cables, with riser and plenum ratings that match their use. These handle notification appliances, initiating devices, and certain control circuits.

22/2, 22/4, 18/2, 18/4

Shorthand for gauge and conductor count, used in door contacts, request-to-exit devices, card readers, some low voltage power feeds, and sensor loops.

Composite and bundled security cables

Multiple jacketed cables under one overall jacket, used to simplify pulls to doors or specific devices.

California Fire Code and local AHJs frequently require plenum or riser rated fire alarm cable, proper separation from power conductors, and UL listed compatibility with the specific panel.

Where it is used

Fire alarm initiating and notification circuits, elevator shunt trip monitoring, card access doors, motion detectors, glass breaks, and some camera power all rely on these cable types. In mixed-use projects, you often see the same riser spaces carrying fire alarm, security, and BMS cabling in shared supports, which makes clean separation and labeling important.

Costs and tradeoffs

The raw cable is not terribly expensive by the foot; the labor is where costs add up. Access at doors and devices, coordination with door hardware, and compliance with drawings and sequence of operations define the effort.

For budgeting purposes, owners often lump all “security cabling” into one line item. In practice, the installed cost for a card reader at a California storefront might range anywhere from 700 to 1,400 dollars for the full hardware and wiring package, while the low voltage cable portion might only be 80 to 200 dollars of that. When you ask “How much does cabling cost?” in this context, you are mostly paying for trade coordination and commissioning, not the copper itself.

5. Control, automation, and AV signal cable

This is the broadest category, and on many California projects, it is also the most fragmented. One trade handles building automation, another does audio, a third does specialty systems, and each brings its own favored cable.

What it is

Control and AV cables include:

Thermostat and control cable

Typically 18 to 22 gauge, 4 to 18 conductors, used for HVAC control, low voltage relays, dampers, and sensors.

Shielded twisted pair signal cable

Used for RS-485, BACnet MSTP, certain dimming control protocols, and other low-level signals that need shielding against electrical noise.

Speaker cable

Typically 16 or 14 gauge stranded, sometimes plenum rated for in-ceiling runs in return air spaces.

Specialty AV and control cable

HDBaseT runs, control signal bundles, and manufacturer-specific composites for room control systems, video walls, and similar applications.

The variety is wide, but the unifying theme is relatively low voltage and the need for noise immunity and reliability.

Where it is used

Digital lighting control systems that satisfy Title 24, HVAC control and monitoring, sound systems in schools and churches, training rooms with integrated AV, and specialty manufacturing controls all use these cable families.

On a sprawling high school campus in the Central Valley, for example, we pulled miles of 18/2 and 18/4 for classroom lighting control, along with shielded twisted pair for BACnet and proprietary control loops between rooftop units and central plant.

Costs and tradeoffs

Control cables are often an afterthought in budgets, which is a mistake. A single home run for a lighting control loop might cost less than a Cat 6 data drop, but the aggregate cost across a large building adds up quickly.

One nuance in California: some jurisdictions and design teams now prefer that even control cabling be plenum rated above ceilings, to simplify inspection and reduce future questions about return air handling spaces. That can add 20 to 40 percent to cable material costs compared to non-plenum variants, but it tends to avoid arguments during inspections.

The three types of cabling people usually mean

There is a lot of confusion around the phrase “What are the three types of cabling?” Different textbooks and vendors answer differently, but in practical commercial work, people usually mean:

Copper twisted pair

Category cable and multi-conductor control and security wiring.

Coaxial

For RF, TV distribution, and some legacy video feeds.

Fiber optic

For long distance and high bandwidth backbones.

Wireless often gets thrown into the conversation as a “fourth type,” but it still depends heavily on the first three for its backbone and power.

How much does cabling cost in California projects?

Costs vary by region and union jurisdiction, but several patterns hold across the state.

Material and copper volatility

Cable prices move with copper and with supply chain hiccups. During tight periods, we have seen category cable costs jump 15 to 25 percent in a few months. Fiber jackets and specialty plenum compounds can swing as well.

Labor and site conditions

Working above a clean, open ceiling grid in a shell office is inexpensive compared to pulling through congested, existing plenums in an occupied San Francisco high-rise. Working at night in healthcare or mission-critical facilities adds premiums.

System requirements

Some systems require full certification to standards like TIA-568, end-to-end testing, and detailed as-builts. Others only require continuity and insulation resistance tests. The former takes more time and higher-end testing equipment.

Rough order of magnitude ranges, for planning only:

Simple residential low voltage prewire

Maybe 1,500 to 6,000 dollars for a modest home with a handful of Cat 6, coax, and security runs, more in higher end builds.

Small commercial tenant improvement

Often 8,000 to 40,000 dollars for structured cabling in a 3,000 to 15,000 square foot space, depending heavily on drop count and fiber needs.

Mid to large commercial projects

Structured cabling packages can run into the hundreds of thousands or more when you add multiple IDFs, fiber backbones, Wi-Fi, cameras, and access control.

For owners, a useful rule of thumb is to specify performance and testing requirements first, then ask bidders to break out cabling labor and cabling material separately. That way you can compare bids without getting lost in markup games.

Who actually installs all this: electricians or low-voltage specialists?

People regularly ask “Do electricians install cable outlets?” The answer is that it depends on the contract and licensing in your jurisdiction, but in California both C-10 electrical contractors and C-7 low voltage contractors do this kind of work.

On smaller projects and residential builds, the electrical contractor often handles every type of wiring, from panel feeders to TV coax. On larger commercial and institutional projects, it is more common to see:

The C-10 handling conduit, power wiring, some pathways, and often fire alarm.

A C-7 or a specialized integrator handling data, security, AV, and sometimes fiber terminations.

What matters more than the license letter is experience and test equipment. Installing a data outlet involves more than just fishing a cable into a box. It includes jack termination, patch panel dressing, certification, labeling to a standard, and documentation that will still make sense three years later when a new tenant moves in.

Is low-voltage cabling difficult to install and manage?

From a distance, pulling cable looks simple. The difficulty comes from doing it in a way that holds up under load and inspection.

Several factors make low voltage cabling more demanding than bare copper cost would suggest:

Performance margins

Category and fiber cables are engineered for specific frequencies and distances. Exceed bend radius, untwist too much at the jack, or kink a fiber, and you can have a “good enough to pass continuity” cable that still fails certification.

Interference and separation

Running control or data cables parallel and tight to power feeders can introduce noise and cause intermittent issues. California inspectors also care about separation to satisfy both code and manufacturer requirements.

Labeling and record keeping

Ten cables look manageable. Three hundred cables that all look identical become an operational nightmare without a disciplined labeling scheme and as-built documentation.

Working in existing spaces

Retrofits through old, congested plenums, asbestos-contaminated shells, or fully furnished Class A offices are not simple. Night shifts, infection control barriers in healthcare, and noise limits all add complexity.

A seasoned low voltage crew makes this look easy. That gives the impression that cabling is inherently simple, when what you are really seeing is practiced technique.

Practical decisions for owners and project managers

Several choices early in design and preconstruction have more impact than long spreadsheets of part numbers. To keep this simple, here is a short checklist you can use when planning a California project.

- Decide on a baseline category: Cat 6 for most, Cat 6A where high density or long lifecycle is expected.
- Specify plenum vs riser cable clearly by area, taking into account California mechanical code and actual return air paths.
- Define backbone strategy early: singlemode vs multimode fiber, strand counts, and campus vs building scope.
- Clarify responsibilities: which trade installs pathways, pulls cable, terminates, and tests each system.
- Require test results and labeling standards in the spec, and make closeout submittals a condition of final payment.

Those five steps, taken seriously, prevent most of the low voltage drama I see on projects.

Matching cable choices to real-world needs

Not every project needs the latest spec. Some questions, answered from real field experience:

What is the best wire for home use?

For most California homes today, a combination of Cat 6, RG-6 coax, and a few security and control cables covers nearly every use case. If the budget allows and the owner is tech-forward, upgrading key runs to Cat 6A is sensible.

What is the most common type of cabling used in networks?

In existing office buildings across the state, Cat 5e still dominates in raw installed miles, but new work is overwhelmingly Cat 6, with Cat 6A growing rapidly in new core and shell and higher end tenant improvements.

What are the three primary components of cabling?

Think in terms of cable, connectivity, and pathways. The physical copper or fiber, the jacks, plugs, patch panels, and splices that make connections, and the conduits, trays, J-hooks, and racks that support and protect it. Skimp on any of those and performance suffers.

What are the 5 types of cable?

Most building professionals break it into category twisted pair, fiber optic, coaxial, security and fire alarm, and control and AV. There are more subtypes, but those five families cover most practical decisions.

The key is matching those cable families to the life of the building, not just to the immediate tenant. Over the last fifteen years in California, I have seen countless spaces where a small initial savings on wire turned into big retrofit bills when technology caught up. Cabling, once buried above a finished ceiling or cast into a core riser, is not the easiest thing to upgrade.

If you treat cabling as long-term infrastructure, not consumable material, the right choice usually becomes easier to spot.