smartlife
An IT Solutions Company

Cabling for Paging and Audio

How 70-volt systems work, and what to run for them

Overhead paging, background music and plant-wide announcements are low-voltage systems too, and they depend on cable just as the network does. The cable is different, the rules of thumb are different, and a paging system that is hard to understand on the floor is very often a cabling problem, not a speaker problem.

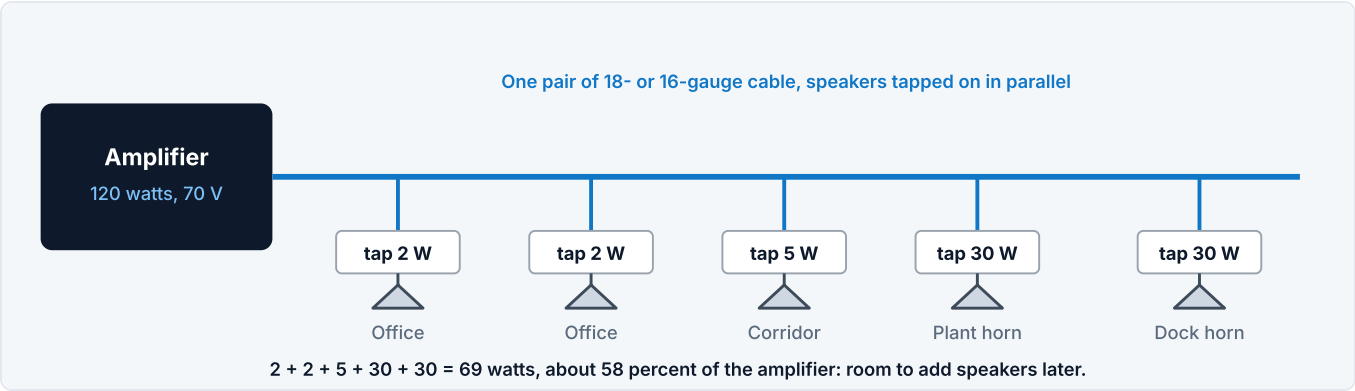
THE SHORT VERSION

- Commercial paging uses 70-volt "constant-voltage" lines so one amplifier can feed many speakers over long distances.
- Each speaker has a small transformer with a wattage tap. Add up the taps and keep the total under the amplifier's rating with margin.
- Speaker lines are usually an 18- or 16-gauge pair. Signal and microphone lines are shielded.
- The same fire ratings apply: plenum-rated cable above a plenum ceiling.

Why 70 volts

A home stereo drives a speaker directly at low voltage and high current. That works for a few feet of heavy wire and falls apart across a warehouse: most of the power would be lost in the cable. A 70-volt system borrows the idea the electric utility uses. The amplifier steps the signal up to a higher voltage and lower current, the cable carries it a long way with little loss, and a small transformer at each speaker steps it back down.

	Home or studio (low impedance)	Commercial 70-volt
Speakers per amplifier	A few, wired with care	Dozens on one line, in parallel
Cable	Heavy gauge, short runs	18 or 16 gauge, hundreds to thousands of feet
Adding a speaker	Changes the load on the amplifier	Tap onto the line anywhere
Volume per speaker	Set at the amplifier	Set by the tap on each speaker
Best for	Music at close range	Speech and background music across a building



A 70-volt line. Each speaker takes only the wattage its tap is set to.

Designing a line

Count watts, not ohms
Each speaker is tapped at a wattage: 1 or 2 watts in an office, 15 or 30 for a horn on a plant floor. Add the taps on a line.

Leave headroom
Keep the total at about 80 percent of the amplifier rating or less. An amplifier run at its limit distorts and fails early.

Zone it
Offices, the production floor and the dock usually want different volumes. Separate lines or zones make that possible.

Match the speaker to the space
Ceiling speakers for offices and corridors, horns for loud or open areas, pendants where the ceiling is high.

Mind polarity
Speakers wired out of phase with their neighbors cancel each other. The cable has a marked conductor for this reason.

Walk it at working volume
Coverage is judged with the machines running, not in an empty building.

The cable

Use	Typical cable	Notes
70-volt speaker lines	18/2 or 16/2 stranded, unshielded	Heavier gauge for long runs and high-wattage horn lines
Line-level audio, page inputs, microphones	22/2 or 18/2 shielded with drain wire	Low-level signals pick up hum without a shield
Talkback and intercom stations	Shielded multi-conductor per the manufacturer	Follow the conductor count the station calls for
IP speakers and IP horns	Cat6 with Power over Ethernet	One cable for audio and power, back to a network switch
Volume controls	Extra pair or conductor as the control requires	Run it with the speaker cable to avoid a second pull

- Use plenum-rated cable (CL2P, CL3P or CMP) above a plenum ceiling and riser-rated cable between floors. The fire rules do not change because the cable carries audio.

- Keep speaker lines out of the same bundle as data cable and microphone cable. A 70-volt line is a strong signal and will be heard on sensitive neighbors.
- Cross power at right angles and do not share conduit with it.
- Splices belong in boxes or on terminal blocks, not twisted and taped above the ceiling.
- Label each line by zone at the head end. It saves hours the first time something stops working.

Paging and the phone system

Most businesses page from a phone. An analog page port or a paging adapter connects the phone system to the amplifier, and a cloud phone system can do the same through an adapter or through IP speakers on the network. When a phone system is replaced, the paging connection is the piece most often forgotten, so we check it before the old system is removed.

IP paging

Newer systems put each speaker on the network. An IP speaker takes a single Cat6 cable for audio and power and can be paged individually, grouped into zones in software, and scheduled for bells and tones. It suits new construction and buildings that already have good cabling. For a large open floor, a 70-volt line of horns is usually still the more economical way to cover the space, and the two are often mixed.

How Smart Life does it

- We install and service paging for plants, warehouses, schools, offices and stores, including systems that page from a cloud phone system.
- We walk the floor during working hours, because coverage depends on how loud the space really is.
- Existing wiring and speakers are tested and kept where they are sound. Often the head end is the problem, not the cable.
- Lines are zoned, labeled and documented, and we show your staff how to use the system.

Cable we use for paging and audio

Select an item for its data sheet.



18/2 speaker cable
Stranded copper · CL3P plenum
Ceiling speaker and paging runs.
Data sheet (PDF)



16/2 speaker cable
Stranded copper · CL3P plenum
Long runs and higher-power horn lines.
Data sheet (PDF)



22/2 sound and security cable
Stranded copper · CL3R riser
Control wiring and small speaker runs.
Data sheet (PDF)



Cat6 plenum cable
23 AWG · CMP
IP speakers and IP horns, powered over the cable.
Data sheet (PDF)

Planning cable for a building? Send us the floor plan or walk it with us. We will mark what belongs where and give you a written estimate.

(502) 251-4775 · smartlifecorp.com/contact

Part of the Smart Life low-voltage cabling series: Low-Voltage Cabling · Cable Grades · Solid Copper vs. CCA · CMP vs. CMR · Power Over the Cable · Cabling for Paging and Audio.