BravoAV Integration. Automation. Imagination.

Bravo AV's Structured or Whole-House Wiring Approach

THE QUALITY OF THE CABLE YOU USE IS CRITICALLY IMPORT TO THE PERFORMANCE OF YOUR SYSTEM

Introduction

As you prepare to make a significant investment in audio and video components it is important that you use high-quality cables to avoid throwing high definition signals down the drain. Audio and video cables must be engineered to transmit delicate signals over long distances without signal loss, impedance distortions, or noise interference. Everything about the construction of the cable makes a noticeable difference in performance. At Bravo AV we believe you should put the best quality cable in the wall, that fits your budget, because once it is in the wall it is not coming out and running new wire later is very expensive.

Quality equipment and cabling do a much better job of delivering the audio & video signals from the source to its destination without degradation to the signal. Better sound and pictures are a direct result of adding less noise and distortion.

Cables can contribute a great deal of noise and distortion to both the sound and the image as a result of the way the cable is designed (type of copper, gauge, lengths) and how well the cable is shielded (designed to reject noise from outside interference.) Reducing the noise anywhere within the system will increase the overall performance of the system.

General

All phone, computer, TV and fiber cable(s) are "home-run" from various rooms throughout the house to a designated cable "head-end" location in the basement. All cables will be run as far away from high voltage wiring and florescent fixtures as possible in order to reduce interference. In addition, our technicians will ensure that the cables are not bent too sharply or pulled with too much force to avoid damaging the cable. All cables will be labeled at the head-end and professionally terminated to maintain the integrity of the transmission chain. Improperly terminated cables can lead to signal loss and therefore compromise audio and video quality. Below is BRAVO's approach to structured or whole-house wiring.

AV Head-End

BRAVO will determine the basement "head-end" location with input from the homeowner and builder. The builder should dry-lock (waterproof) the exterior walls and install ¾ inch plywood (painted black) to be used by BRAVO to mount equipment. Dry-lock walls and painting all other surfaces accomplish two things: 1) they prevent moisture transfer through the outer wall and 2) they keep concrete dust down, both of which could damage the electronics. This room should be well lit and adequately ventilated. Where possible this room will be away for electrical panels.

Conduits for the future

BRAVO recommends that the builder install two or three, strategically located, 2-inch PVC conduits from basement to attic to accommodate your future cabling needs. In addition to the basement to attic conduit runs Bravo may elect to run conduit to the home theater, high performance media room and/or the office.

Types of cable

There are four main types of wire used in structured or whole-house wiring applications:

1) Coaxial cable for video transmission
2) Category 6 or Category 7 cable for data transmission i.e., computer networks and phones. For a discussion on the types of low voltage Category wire please refer to our article *Classification of Low Voltage Wire*.
3) Speaker wire. Please see Bravo AV's article on *Speaker Wire*.
4) Fiber. Fiber optic cable for future transmission speed needs. Typically, in residential applications we use Multimode OM3 Fiber

Digital Video Distribution

There is another type of cable commonly used for video distribution called HDMI. HDMI is the global standard for connecting high-definition Consumer Electronics and PC products. It's the uncompressed, all-digital interface that delivers both dazzling quality and unmatched ease of use. HDMI transmits all types of audio and video through a single digital link. HDMI is an all-digital interface that requires NO conversion or compression needed. The typical residential application for HDMI is to connect source devices, like a cable box, to the TV

Phones

With today's multi-line, multi-function, intercom/speaker phone, we suggest running one CAT 6 phone line to each bedroom and multipurpose/high-use room to provide you with a wiring infrastructure capable of supporting an intelligent and reliable phone system. We generally do not run a phone line into formal dining rooms or other rooms used for formal entertaining. For large garages, we suggest one phone line. While almost everyone has a cell phone, the intercom feature and door station (door station allows you to talk to the person at the door from any phone in the house) of the phone system is invaluable in a big house. Also using a regular phone system rather that your cell phone reduces your exposure to electromagnetic radiation for you cell phone.

Computers

We suggest one run to each room that may require a computer connection now or in the future. We run our basic computer network in CAT 6 with a minimum of 350 MHz bandwidth capacity. We can also install one or more runs for network printers and or other network devices. By using a networked printer, you are able to share a relatively expensive resource (e.g. a color laser printer) with everyone in the family. For an additional charge per run, we can install CAT 7 for even greater

transmission capacity. With CAT 7 you will be better prepared for new technologies as they become available. With the amount of streaming content and the speed of today computers we strongly recommend CAT 7 wiring. CAT 7 is different from CAT 5 and CAT 6 in that is has a shield around each of the four pairs along with a shield around all 4 pairs. This is very helpful at reducing the negative affect of EMF noise

Video Distribution

We run an RG6 coaxial cable in your home, not the less expensive and less capable RG59, for better video distribution. We also use quality compression fittings not crimp-on fittings for better and more reliable connections. We recommend that our customers use the upgraded version of RG6 referred to as RG6 Digital 3.0 GHz because this will give you greater transmission capacity for future technologies. In conjunction with the RG6, we can also run a CAT 6 for communications to video services like Netflix or TIVO or future services. For the homeowner who wants the flexibility of both cable and satellite, we run a second RG6 cable.

Speaker Cable

Speaker wire consists of equal numbers of electrical conductors insulated from each other surrounded by a protective jacket. One conductor (or group of conductors) is referred to as the positive conductor (red) and the other is referred to as the negative conductor (black). Copper is the most common conductor metal.

For whole-house wiring (multi-room audio) four-conductor wire is most often pulled to reduce both the amount of cable used and the amount of labor. The color code for four-conductor wire is speaker one: Red (positive), Black (negative) speaker two: White (positive), Green (negative).

Its purpose is to carry an electrical signal (voltage and current) from the amplifier (or the amplifier section of a receiver) to the speakers.

Most important factor when selecting speaker wire is the actual amount of copper in the wire referred to as Gauge abbreviated awg. At the number goes down the wire get bigger. Typical speaker wire gauges are 16, 14, 12 and 10. With each decrease in gauge (bigger wire size) you will reduce resistance by approximately 50%. This is significant!

Fiber Cable

It is Bravo AV's position that fiber should be used as an approach to future proofing your home in addition to running the necessary cabling for your existing telephone, cable, satellite & networking systems. Therefore our design contemplates strategically located fiber runs in the house to be used for future technologies.

Summary of Cable Recommendations by Use

Use	Good	Better	Best	Professional
Phone	CAT 6	Belden CAT 6	Belden CAT 6	
Computer	CAT 6	Belden CAT 6	Belden CAT 6 bonded pair	AudioQuest CAT 7
Video Distribution	RG6 quad shield	RG6 quad shield swept to 3GHz	RG6 quad shield swept to 3GHz	Belden Broadcast Quality
Speaker Wire	16awg	14awg	Belden 12awg	Belden 10awg
Fiber	Multimode OM3	Multimode OM3	Multimode OM3	Multimode OM3
HDMI (1)	Chocolate	Carbon	Coffee	Diamond

(1) We use AudioQuest HDMI

What Bravo runs

Phone and Computer: CAT 6 is minimum. CAT 5 is obsolete
Videos Distribution: RG6 Coax Quad Shield minimum
Speaker Wire: 14 gauge minimum
Fiber: Multimode dual strand OM3

Overall Summary

The type and quality of wire that go into to you house can greatly affect the overall performance of the system. It is comparatively cheap to run a cable when the walls are open that later when the walls are sheet rocked and closed up. You also want to have an overall design that meets today's needs and give you some extra capacity to meet the demands of the future.

CABLING TERMS

AWG (American wire gauge): The diameter of a wire. The higher the number (gauge) the smaller the diameter. Speaker wire is typically 12 – 16awg.

Bandwidth: In audio, the range of frequencies within which a device operates. In video, the range of frequencies passed from the input to the output.

CATV (Community Antenna Television): An RF distribution system which distributes television broadcast programs, original programs, premium programming and other services using a network of coaxial cable.

Coaxial Cable (Coax): A popular transmission medium usually consisting of one central wire surrounded by a delicate insulator and encased in either a wire mesh or an extruded metal sheathing. Also, a concentric cable consisting of a center conductor, a dielectric, and a shield. Coax used for most MATV and CATV work has a characteristic impedance of 75 ohms. RG59, RG6 and RG11 are all types of coax cable.

Headend: An electronic control or distribution center for networks (*e.g.,* Phone, LANs, CATV, CCTV or Audio) where incoming signals may be rerouted, amplified, converted or processed. The headend may include antennas, amplifiers, demodulators, modulators, processors, splitters and other related equipment.

Home Run: A cable run that goes directly for a given location in the house to the head -end.

LAN (Local Area Network): A data communications system confined to a certain area. The area served may consist of a single building, or a cluster of buildings.

Patch Panel (Splice Block): A device that consolidates cables in a central location, allowing for easy changes.

Prewire: The installation of cables and wires during a new home's construction done before the sheetrock phase. It includes the AC electrical wiring, as well as the low voltage, home systems cabling. Some of the home systems that require prewiring are security, home theater and entertainment, phones, door-phones, PC and internet networks, surveillance cameras, driveway vehicle detection, communicating thermostats, motorized window treatments, entry systems and irrigation systems**.**

RJ-11 connector: The modular phone jack/plug commonly used at the two ends of telephone cords and also used for modem, FAX and other computer peripheral connections.

RJ-45 connector: The modular jack/plug commonly used at the two ends of computer network.

Run or Drop - A length of cable or wire that is run from a room to the head-end location.

Splitter: A signal divider that splits an incoming signal into multiple output signals, as would be required to supply multiple TV sets from a common antenna. Without the impedance balancing provided by a splitter, the supply of multiple loads from a common antenna compromises signal strength. In doing so, splitters reduce the signal power available to each output. As a result, a distribution amplifier may be a better solution for a larger number of receivers or for weaker signal conditions.

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