

The Bravo AV Consulting Structured Wiring Approach

AUDIO AND VIDEO CABLES MUST BE ENGINEERED TO TRANSMIT DELICATE SIGNALS WITHOUT IMPEDANCE DISTORTIONS OR NOISE INTERFERENCE.

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. Below is BRAVO's approach to structured wiring.

General

All phone, computer, TV and structured 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. 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.

BRAVO will determine the basement "head-end" location with input from the homeowner and builder. The builder should dry-lock (waterproof) the walls and install $\frac{3}{4}$ inch plywood (painted black) to be used by BRAVO to mount equipment. Dry-lock walls 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. Additionally BRAVO recommends that the builder install two or three 2-inch PVC conduits from basement to attic to accommodate your future cabling needs.

There are two main types of wire used in residential structured wiring applications:

1. Coaxial cable for video transmission, and
2. Category 5 or Category 6 cable for data transmission i.e., computer networks and phones.

NOTE: For a discussion on the types of low voltage Category wire please refer to *Classification of Low Voltage Wire*.

Phones

With today's multi-line, multi-function, intercom/speaker phone, we suggest running one CAT 5e 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. For lifestyles that call for a lot of time outdoors on the deck or patio, we can install a weatherproof phone jack on the side of the house.

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 5e with a 350 Mhz bandwidth capacity. We can also install one or more runs for network printers. 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 6 for even greater transmission capacity. With CAT 6 you will be better prepared for new technologies as they become available.

Video Distribution

We run a 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 3.0GHz because this will give you greater transmission capacity for future technologies. This typically adds about \$40 a run. In conjunction with the RG6, we can also run a CAT 5e for communications to video services like Replay TV or TIVO or future services. For homeowner that wants the flexibility of both cable and satellite, we run a second RG6 cable.

Using a professional signal strength meter, BRAVO can determine the strength and quality of the video signal from the cable company. These results in combination with the number of video runs in your house let us design the optimal amplification splitter distribution network to achieve a high quality picture.

Structured Cable

It is Bravo AV's position that structured wiring 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 structured runs in the house to be used for future technologies.

There are two basic compositions of structured cable:

Option 1: Structured cable composed of two RG6 and two CAT5e

Option 2: Structured cable composed of two RG6 and two CAT5e and two multi-mode fiber optic cables. While Verizon may not have started installing fiber to residences in your area they are bringing fiber to houses in other markets.

SUMMARY OF CABLE RECOMMENDATIONS BY USE

Use	Good	Better	Best	Professional
Phone	CAT 5e	Belden CAT 5e	Belden CAT 5e bonded pair	
Computer	CAT 5e	Belden CAT 5e	Belden CAT 6 bonded pair	Belden 10GX
Video Distribution	RG6 quad shield	RG6 quad shield swept to 3GHz	RG6 quad shield swept to 3GHz	Belden or Signature swept to 3GHz
Speaker Wire	16awg	14awg	Tributaries or Belden 12awg	Tributaries or Belden 10awg
Structured Cable	Option 1	Option 1	Option 2	Option 2

Tributaries cable is a 15 year old, award winning, privately owned American company based in Orlando, Florida. Tributaries caters to the Custom Audio video installer by designing and providing a wide range of high quality cables all with a 100% warranty.

Belden CDT

Belden CDT is one of the largest U.S.-based manufacturers of high-speed electronic cables and focuses on products for the specialty electronics and data networking markets. Belden and CDT have existed in one form or another for over 100 years and has annual sales of over \$1 billion dollars.

Belden CDT is linking people and technology by designing, manufacturing, and marketing wire, cable, and fiber optic products for the electronic, electrical and communications markets.

Belden Speaker Wire

We use the best speaker wire Belden has to offer the Next Generation series featuring high purity ETP copper. The high purity copper results in a better signal.

Belden CAT5 and CAT6 bonded pair technology

Belden's breakthrough bonded-pair cables are a patented design that bonds the individual conductors together along their longitudinal axes. This result in a uniform conductor-to-conductor spacing that maintains signal integrity.

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 (two for twinaxial) 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 that goes directly from 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.