

# ■ Don't Forget the "Digital Plumbing"

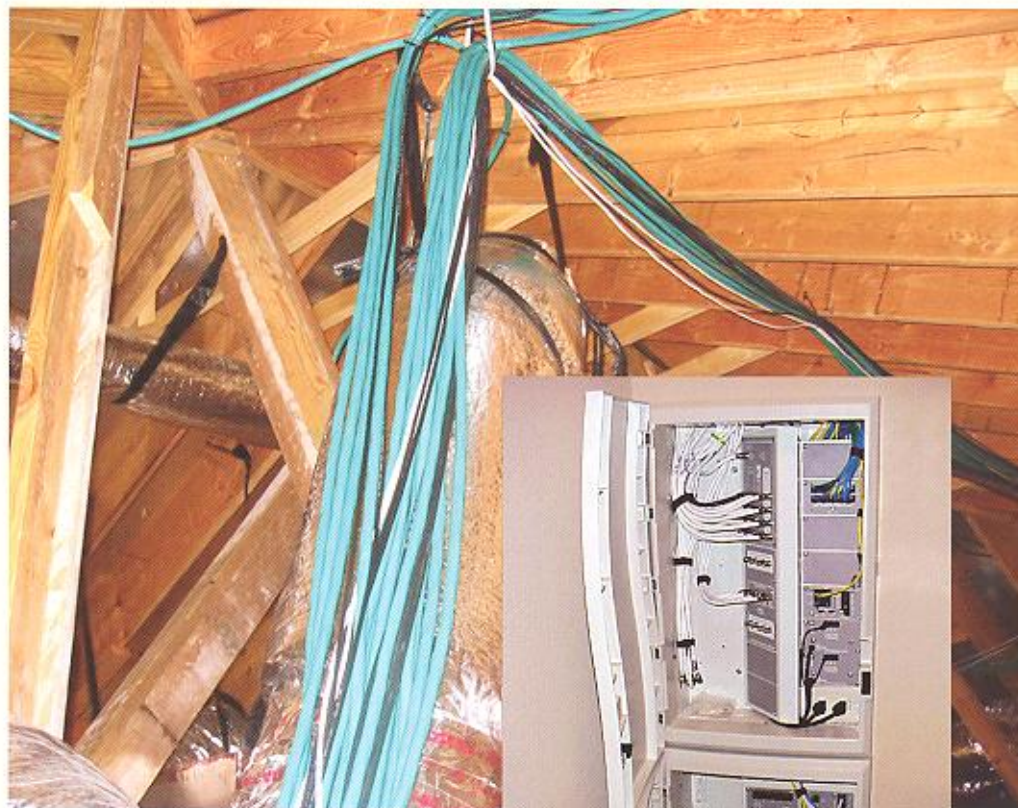
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While I am not quite sure who coined the phrase "digital plumbing," I do know that there isn't another phrase that more accurately depicts the true meaning of non-electrical home wiring. For years we have been avoiding the inevitable, thinking we will be prepared to adapt in the future. Well...the future is here. so start adapting.

## WHAT IS DIGITAL PLUMBING?

Digital plumbing is the installation of wire in a home that facilitates communications between the residents, the home and the outside world. Like traditional plumbing and electrical systems, digital plumbing takes a feed from the outside and runs it to a central point inside the house for distribution. It's from this central junction point that other rooms in the home are connected to share the feed from the outside. Other rooms, such as a home theatre or family room with an entertainment system can serve as a stand-alone sub-distribution center for that particular area. With the right connectivity this area can be integrated back into the main distribution for the home, which will share all of the audio, video, data, and information throughout the house. The primary objective is to create a web of wiring that will allow for seamless integration of any system that the owners adopt, now or in the future. Central distribution points in the home can be called a racks, head ends, distribution centers or structured wiring



cans. There are four key classifications when it comes to home wiring. They are telecom, video distribution, audio distribution and home theatre, and finally, safety/security with home control. While each of these areas represents an individual subsystem that will function independently of the others, it is in the integration of all these systems, accomplished through wiring that will prepare a home for the future.

## TELECOM

Telecom is the fusion of telephone and data communications and embodies how the residents communicate with the inside and outside world. In the home, a data network can be set up so multiple computers can share the same printer, programs, files and most importantly, a common high speed broadband connection to the internet. Dial up Internet is going away according to a Goldman Sachs/Synovate estimate that states by the year 2008 households will with broadband connectivity to the

internet will be almost 70 million while the number of homes with dialup connections will decrease from 48 to 25 million. Given the advent of internet video and music downloading, gaming (PC, XBOX, PS2), and a general need to have multiple computers on the web at the same time, it's not long before data lines will be demanded as a standard feature in new homes. The good news is, that when wired correctly, telephone and data use the same type of wire. When it comes to telecom wiring materials at a minimum Category 5, (CAT5) or CAT5e (enhanced CAT5 for faster speeds,) should be used. CAT6 is a higher quality line rated for faster data speeds and is even better for this application. Other solutions such as CAT3, two pair telephone line and 66

punch blocks are not compatible with current data standards and should not be used. These materials make it impossible for homeowners to reallocate a telephone line for a data line in the future.

## **HOME VIDEO DISTRIBUTION**

Video services enter the home through Cable or Satellite TV provider lines and travel to the main distribution center. From this point the signal is sent throughout the house to all rooms wired for video. An advantage available to homeowners when the video is run to a central distribution point is a process called modulation. A homeowner is able, through modulation, to send video from one room to all rooms wired for video on a predetermined channel. This means that a DVD located in a main viewing area, when played, could play on channel 71 throughout the entire house. Given the need for a telephone connection near many video devices, (satellite TV, TiVo, ect.) it is a good idea to have a phone jack in the same wall plate as the video drop. This will alleviate the need for homeowners to stretch a telephone cord from one side of the room to the other. The typical wire used for mass video distribution is RG-6 Coaxial cable. A higher grade RG-6 Quad is available as a premium product, but is not necessary in all applications. Video can also be distributed over composite, component, and DVI cables. These cables however are typically reserved for shorter runs in the home theatre and for wiring high end TV's in individual rooms. Older video wiring solutions such as RG-59 should no longer be used for any video other than non-modulated security camera video signals.

## **WHOLE HOME AUDIO DISTRIBUTION AND HOME THEATRE**

The ability to create and change the audio atmosphere with the touch of a button is possible with the right wiring. Whole home audio revolves around the desire to have different audio sources available and controllable indifferent zones around the house. The internal distribution point for home audio is referred to as the head-end and will be located where the homeowner expects to locate the home audio equipment. The wiring used from the head-end to the keypad controllers and speakers

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throughout the house is a mixture of 14 and 16 gauge wires (two and four conductor) and usually in an individual CAT5 to support infrared (IR). The IR line allows a remote control to execute a command (change from CD to FM) anywhere a keypad is located. With speakers wired into the audio and a connection to the telephone distribution center, the home audio system can also double as a paging system or a two way voice communication system in some control systems.

The home theatre or media room is usually the only room in the home without windows, and uses a multitude of cables including composite, component, and DVI cables to deliver the best video picture possible. These wires will run to the location where the audio and video equipment for the theatre resides. This theater equipment effectively becomes a subsystem of the home as it can operate independently or serve to feed video to other rooms in the home. Additional audio wiring is run in the front, center, sides and rear of this room to deliver high quality audio in five, six and seven channel formats.

## **SECURITY SAFETY AND HOME CONTROL**

Security Safety and Home Control wiring allows for the integration of burglar and fire protection with the pool and spa, home heating/cooling, lighting systems and even irrigation controls. A home that is correctly pre-wired for security is the base for any home control system. The home control processor uses the security system as an input to sense what is going on in the home. For example, the front door and dining room window are open. A standard security pre-wire uses 22 gauge 2-conductor wire and a series of switches that are drilled into the windows and doors. Adding a few 22 gauge 4-conductor wires to areas like the thermostat, garage doors, pool controls and irrigation systems allows for the homeowner to set routines in the controller which are executed with the push of a single button. For example, a goodnight button could be programmed to set the alarm for the night mode, engage the temperature setback, turn off the pool lights and heater, close the garage door and water the lawn. Most home control systems have Internet interfaces and event

schedulers. Internet interfaces allows access to your home controller from any browser world wide, and the event scheduler will allow you to set routines to all interfaced devices when you are away from home. The most powerful integration comes when the home is linked to a compatible light control system. This is accomplished with CAT5, electrical power line interface modules or serial cable will afford the ultimate in home control. A homeowner will never walk into a dark home again. Lights can be set to turn on in the case of fire to help illuminate halls and rooms during egress.

## **WIRELESS AND FIBER OPTIC TECHNOLOGY**

Wireless technologies are still emerging. They are good for ancillary applications such as taking a laptop out by the pool or connecting a remote touch screen to the network. Ethernet technology, however, has been a stable means of transmitting and receiving data for decades and continues to be the most secure and fastest way to share data. Wireless has undergone three updates in five years and based on current benchmarks, should not be used in a new home as the primary network topology. While fiber lines are available to be run as part of your central distribution infrastructure, currently there are very few applications for these lines. Looking forward, there are no guarantees that when applications such as streaming video is available that the multimode fiber being sold today will be compatible with future applications. It may be more advantageous to invest in conduit so future lines can be easily dropped.

Like the water pipes, air ducts, and electrical lines the "digital plumbing" is not an after market consideration. A line that is run while the home is in the framing stage will, on average, cost three times as much to retrofit after the walls go up. Informing your homebuyers of available wiring projects to support current and future systems with total integration will be the first step you take to building a better product that will stand the test of time. For more information, contact Brian Cabral with Residential Technology Services at (210) 481-3331, here in San Antonio. •