

Anatomy of a Digital Home Upgrade

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The most common audio video and home control upgrade that we currently perform for our client's existing homes is upgrading their older analogue based electronic infrastructure to a distributed audio video and home control system - utilizing best of breed digital, network connected home solutions.



The typical existing high end home AV and home control infrastructure is as follows:

The clients' home has 3-5 TVs distributed throughout the home. These TVs are the older analogue component based televisions and they are connected to a component based receiver that forwards content from a DVD/CD player or Jukebox, a VCR, and a cable or satellite set top box. In most high end homes these sources are placed at the head end rack and switched across an analogue matrix switcher to each TV in the home so that each TV can watch all sources. To control this experience at a given TV there is usually a touch screen controller from Crestron or AMX that serves as the touch screen control point for the AV distribution (and for home control, we will get to that later).

There is also a music distribution system in the home that distributes disc based music content (CD/DVD or music player/servers) that are also located in the central rack, amplified in the rack and switched via an audio matrix switcher that will direct specific music content to a given room in the home. This transport controls for this music is controlled by a touchscreen or a keypad, usually located in the wall of a given audio zone.

Lastly, there may be a lighting control system, HVAC or pool control, security and entry control that is part of the home automation platform (typically Crestron or AMX), and these systems can be controlled by one of several touch screens that are located throughout the home.

To make all of this work correctly from a touchscreen or keypad control requires an extensive amount of custom programming to have all the devices communicate with a central Crestron or AMX processor and to create an intuitive user interface on the touchscreen or keypad controllers that enable these services to be easily controlled throughout the home. If there were any hardware or software changes to these systems over time they would have required a custom programming update to keep these systems working properly.

Given the rapid technological advancements of AV and home control products in the home a business model that requires custom programming changes to enable new products or services to enter the home is increasingly difficult to manage and sustain. This analogue AV architecture also requires a great deal of physical hardware because content is stored on discrete discs and can only serve one TV zone at a time – there is inherently a lot of duplicate AV source hardware (receivers and AV source content) in these analogue based homes. All of this hardware needs to communicate across IR, RF, and serial based systems that are prone to communication failures over time (emitters can come loose, cables disconnected, RF interference issues could arise, etc.).

Central processor based home control systems are at the heart of the control and AV distribution of these homes – if there is a hardware or software failure it effects all of the home system controls, the AV, lights, heating, security, etc. – undeniably a high risk infrastructure model.

Given all of these inherent issues in these older analogue based infrastructures we are finding very strong acceptance among these homeowners to upgrade to a digital infrastructure based on best of breed, network connected subsystems in the home.

Here is a detailed overview of the home technology solutions that we provide our clients today:



Distributed TV Infrastructure

Today cable and satellite providers offer server/client set top box solutions for our clients. TiVo uses one cable card as a source for 6 tuners in a head end 450 HD recording hour server that distributes live or recorded TV to up to 10 TVs simultaneously in the home across CAT5e wire to a small, thin TiVo Mini decoders.

This AV content includes all standard cable TV content and over the top broadband content from NetFlix, Amazon UnBox, Pandora, YouTube, Hulu and many other entertainment sources. With one TV Mini located next to each TV our clients have access to over 95% of the content they regularly consume. Once in a while we will add an Apple TV or BluRay player to fill in for the other content they may want to enjoy – typically we will install these small AV devices behind, or next to, the TV in the home theater or main family room environment.

Satellite providers also have similar client/server products if the homeowner prefers satellite content over cable (or is not able to receive cable services).



Distributed Audio Infrastructure

cyberManor believes the best digital music platform that we can offer our customers is Sonos. This product line allows us to replace all the CD/DVD players and music servers in the head end rack with the Sonos Connect or Connect Amplifier products. Most often the rack has an existing whole house audio amplification system that we can use in conjunction with the Sonos Connect products. We install a Connect unit for each audio zone in the home. This solution gives our clients an easy to use iOS, Android, PC, or MAC interface to control all of their own digital music content or subscription content from anywhere they are inside or outside their home via their wired or wireless network infrastructure. This audio content can be played in each individual room, a group of rooms, or the whole home. Perhaps the best feature of this infrastructure, besides the inherent simplicity and reduction in the number of components, is that the software automatically upgrades as new features become available – such as the new Beats audio subscription service. No custom programming is required to enable new features that enrich this digital music platform over time.

Note: The existing Crestron or AMX audio keypads on the wall are now unusable since they are not compatible with the Sonos whole house music system. These can either be covered up or replaced with Apple iPod or iPad Mini in wall control stations. Sonance (and several other manufacturers) make in-wall mounts that can be used to place these Apple touchscreen products in the wall. They are constantly being charged using the existing home run CAT5 wire now connected to a PoE connection located at the AV rack head end.



Lighting, HVAC, Pool, Hot Tub, Security and Access Control Infrastructure

These controls are frequently tied into the main home control processor (usually from Crestron or AMX). When we remove this processor from the rack we still need to support these various subsystems. It is our opinion that these systems are best controlled via a smart phone application written by the manufacturer of the subsystem instead of being custom programmed by a custom electronics integrator. The manufacturer typically will have far greater programming resources than a custom electronics integrator for creating the best user interface experience for today and tomorrow.

The lighting systems we usually encounter are from Lutron and Vantage. Both of these systems are based on centralized lighting control processors that now have iOS and Android control application interfaces that can be used to control these systems inside or from outside the home. (in some cases the processor or the firmware of these systems may have to be upgraded to be compatible with these new iOS or Android applications).



There are usually a wide range of existing heating and cooling systems in these homes and frequently we can replace the thermostat with a NEST thermostat that has an elegant physical and software interface that our clients find much easier to use and program than their existing thermostat.



For pool and hot tub control the manufacturers are typically Pentair ScreenLogic and Jandy. Both of these company's manufacture controller upgrades that allow these systems to be controlled by iOS and/or Android interfaces. We typically partner with a local pool company to install these upgrades since these companies are most familiar with pool and hot tub control equipment. We make sure that we have a wired or wireless network port available that they can connect their pool and hot tub gateway into the home's local area network.



Security camera and access control are usually proprietary closed systems. We remove those systems and install the Mobotix line of iOS controllable IP cameras and access control stations. These systems provide very high resolution images (up to 5MB) that our client can easily see and control locally in their homes or remotely when they travel. The Mobotix front door station is an attractive unit that allows our clients to see and speak to the guest at their front door from their smart phone anywhere in the world and even open the door via their phone as needed. One very attractive feature of this solution is that a land based phone is not required to speak to the guest at the front door or trigger a door opening – this can all be done via a smart phone whenever the homeowner is inside or outside the home. This is a very important feature for front door access stations since many homes are eliminating land based phone lines and only keeping their cell phones.

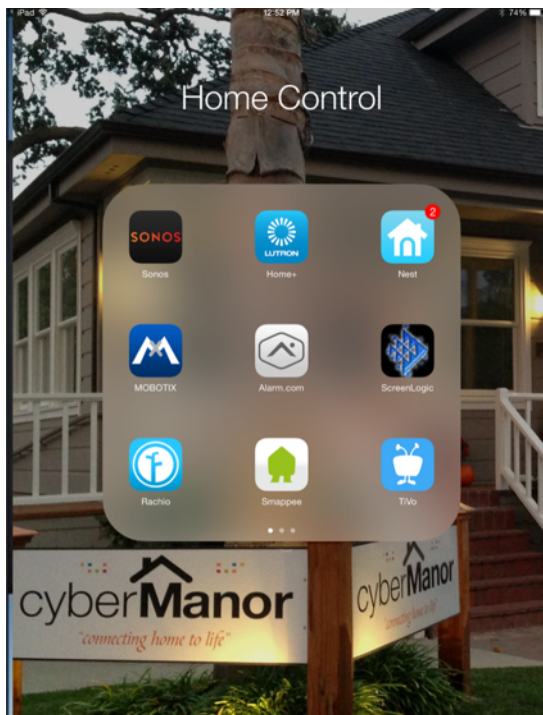


The last main subsystem is the security system in the home. Most security panels can be upgraded with communication interfaces that connect them to the home network and allow these security systems to be controlled from a smart phone application. Alarm.com provides a very rich software application that allows the homeowner to arm and disarm the home from their smart phone anywhere in the world, see who has entered or left the home, and determine if any motion or door/window sensors were triggered. Similar to the pool/hot tub communication interface installation – we usually partner with a local security system provider and have them install this communication interface which we connect to the home's network.

Summary

The home technology upgrade is completed in our client's home when each AV and control system is on the home network where they can be controlled from an application on our client's smart phone or tablet wherever they happen to be in the world – in their home, backyard, or while travelling. The best of breed systems and applications that we referenced in this paper include:

- TiVO for whole house TV viewing
- Sonos for whole house audio
- NEST for HVAC control
- Mobotix for camera and security control
- Lutron or Vantage for lighting control
- Jandy or Pentair for hot tub and/or pool control
- Alarm.com for security control



To simplify access to these control applications on our client's smart phone device we install all of these applications in one folder labeled Home Control. This folder exists on all of their iOS and Android devices and makes it very easy to find and use any of these home control applications.

When we have completed these projects the client usually has less than half of the hardware they originally had in their home, reduced power consumption (since they have less equipment), a high resolution user mobile interface that they can easily understand (and automatically updates) and far more audio and video entertainment options. When we are done with our upgrade (usually in less than one week) they show all their friends at their next party the great system we installed in their home that now works reliably each time. Their friends call cyberManor to have the same AV upgrade completed in their home – now that's a profitable, recurring revenue business model that works!



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