

MEDIA CENTER
INTEGRATOR
ALLIANCE



Windows Media Center
for custom home integrators

Kreaden Residence
Sunnyvale, California
cyberManor

Installation Case Study



**This document is for informational purposes only.
MCIA MAKES NO WARRANTIES, EXPRESSED OR
IMPLIED, IN THIS SUMMARY.**

© 2009 Media Center Integrator Alliance. All rights reserved.

Microsoft®, Extender for Windows® Media Center, and Xbox 360® are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. The names of actual companies and products mentioned herein may be the trademarks of their respective owners.

MEDIA CENTER INTEGRATOR ALLIANCE

Table of Content

Overview	4
Customer Requirements	5
Design Considerations	7
Installation	9
Customer Feedback and Support	12
Equipment List	13
Project Schedule & Cost	14
Photography	15
Video	18



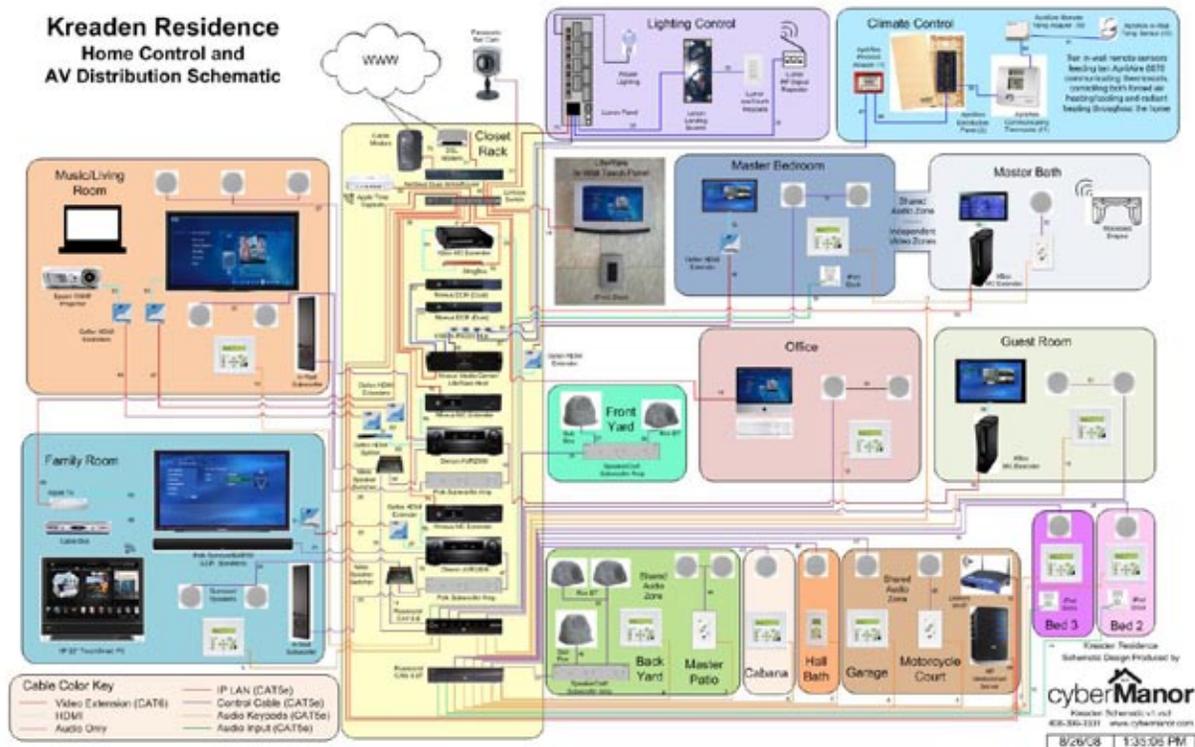
Overview

The installation is best described by reviewing the schematic diagram shown below, which clearly shows the Windows Media Center system architecture deployed in the Kreadens' home.



The Windows Media Center experiences most often enjoyed by our client include:

- Viewing pre-recorded HD cable TV content anywhere in the home
- Viewing digital photographs stored on the central Windows Media Center on any TV in the home
- Listening to digital music throughout the home, viewing the cover art and song titles, and controlling the source, volume and distribution of whole house music from any TV, touch screen or computer location
- Controlling lighting scenes from in-wall keypads, touch screens, or TV displays
- Monitoring and controlling the multi-zone heating and cooling system
- Viewing and controlling front gate access and cameras.



Customer Requirements

Can you give a brief overview of the customer?

Mike Kreaden has worked as an engineer and technologist for 21 years, and specifically in internet technology and software since 1997. Mike has assembled various home theater and networking solutions in his own home, but got frustrated with his inability to put in the time to do things right. Prior to this solution, he did not run Windows Media Center, nor did he own any Xbox devices. Now, the integrated system we designed and installed is the central pillar of his family's home media and control infrastructure, working side by side with the PC and Mac OS computers they use to create and author digital content.

What type of home entertainment system did they have previously?

Standalone televisions and single-zone music systems. There was no centralized audio and video storage; all entertainment was on CD or DVD media.

Were they aware of Windows Media Center before the installation?

Mike was aware of Windows Media Center and the Life|ware home automation and control platform.

What were the top three or four must have requirements?

The top priorities of the homeowner included:

- A single, consistent user interface for control of all electronic systems in the home, specifically audio/video, lighting, security, HVAC and cameras.
- A user interface that was not only locally accessible from wall mounted touch screens, onscreen TV displays, desktop computers and ultra-mobile portable platforms, but also remotely accessible over a secure remote access connection.
- A centralized, large hard drive for storage of all HD recorded content that could be easily retrieved and controlled from all TV locations in the home by any user at any time, without interfering with the viewing experience of anyone else in the home.
- Redundant systems: If an issue with the operation of the central control system arose, the whole-house audio, lighting, security and HVAC systems needed to function independently.
- A scalable, flexible and expandable system that would allow the addition of more centralized storage, audio/video rooms or control devices as the client's needs evolve and grow.

What home control and entertainment requirements did they have?

The Kreaden's desired a centralized, accessible, state-of-the-art system to run their entire home. Mike required that all of his subsystems—multimedia, HVAC, lighting and security/accessibility—be IP-compliant. He especially wanted centralized control and management of digital content and A/V systems in order to ensure a modern, clean look in all rooms of the home. All equipment, except for Xbox units that do double duty as gaming units, is rack mounted in the main equipment closet.

The ability to provide a simple-to-use, unified interface/user experience was paramount in our choice of platform. One interface—Life|ware running Windows Media Center—drives the entire home. The interface includes:

- Lighting control
- Television (live, recorded and guide)
- Video (streaming and Blu-ray)
- Climate control (radiant heating and air conditioning)
- Surveillance cameras
- Remote door strikes at front gate and front door
- Remote control of window shades
- Remote control of water fountain
- Internet access via Slingbox to remotely control home and remotely view content

Cross-platform compatibility was another driver for many of the choices made; iPod/iTunes, Windows Media Center, Xbox, MacOS and Windows all had to work in concert in the home. This requirement made a coupling of Windows Media Center and Life|ware was the obvious and best choice.

How do they consume and purchase media? (e.g. TV, music, photos, videos, movies, etc.)

- All HDTV is purchased from the local cable company and recorded on the central Windows Media Center for playback at any of the extenders around the house.
- Music purchased in CD format is ripped by the client onto the central Windows Media Center. Additionally, DRM-free music is purchased from online sources such as iTunes. All music is available to be enjoyed in each room via the Russound whole-house music system or through the local Windows Media Center extenders.
- Photos taken by the client can be viewed on all of the home's TV and computer screens.
- Blu-ray movies are played back in the home's surround sound zones or downloaded from Netflix and played back on Xbox extenders.

Design Considerations

Where is the home?

Sunnyvale, California

Was it a retrofit or a new construction and how did that impact the design and implementation?

It was almost all new construction. Eighty percent of the home was torn down to the foundation. The greatest challenge is that it was an Eichler home; it had a cement floor, almost all windows for walls and very little attic space. All of the wire had to be pre-planned and run in conduits in the cement slab flooring; there was very little opportunity to go back after the fact and add any new wire runs.

What is the size of the home?

Approximately 3,000 square feet

How many rooms are in the home?

There are a total of 9 rooms in the home including a Music/Living Room, Family Room, Master Bedroom, Office, Kids Bedrooms (2), Guest Bedroom, and detached Cottage.

How many distributed audio/video zones are in the home?

Eight

How were the technical complexities of the installation made transparent to the customer?

One of the keys to the successful implementation and use of this system was to provide an interface control platform that allowed each member of the Kreaden family to easily control the content and automation of the home. The Windows Media Center media management interface, complemented by the Life|ware home control interface, gave the family a single, consistent, graphically-rich interface to control their content and home automation from various devices: RTI handheld remotes, TV displays via Niveus N7 media server and Xbox360 extenders, in-wall touch screens from Life|ware, a 22-inch HP Touchsmart PC, various Windows PCs, and even an iMac where the Windows Media Center extender interface was connected via a SlingBox.

Other key design considerations were stipulated by the homeowner. First, the homeowners requested that in the event of a temporary failure of the central media server that the family could still operate all lights, thermostats, whole-house music. To address this concern, we installed independent, keypad-controlled Lutron HomeWorks, Russound whole house audio, and Aprilaire thermostats systems to provide that level of fault tolerance.

In addition, content stored on the home's media server had to be safely backed up and easily scalable for the home's growing collection of digital entertainment. We installed server- and network-attached storage products from Niveus Media and HP's Windows home server to accomplish these key objectives.

What were the unique considerations related to Windows Media Center?

Windows Media Center is unique because it delivers on the coveted promise that an entire home's digital ecosystem can be easily managed and controlled by a consistent and pervasive user interface.

Our client can manage the family's recorded HDTV content, photos and music from multiple control points throughout the home. The interface possesses the same look and feel as the control and management interface for the family's lighting, thermostat and security systems.

This installation leverages the state of the art of many of the currently available Windows Media Center hardware and software driver technologies, specifically the control of:

- Four CableCARD tuners to six rooms in the home
- A whole-house Russound UNO music system
- A Lutron HomeWorks lighting control system that also controls motorized window treatments
- A multi-zone floor radiant heating system and home air conditioning
- Entry gate and front door access control system

In addition, we have leveraged many of the Media Center-supported platforms to maximize the number of distributed control points the customer enjoys, specifically:

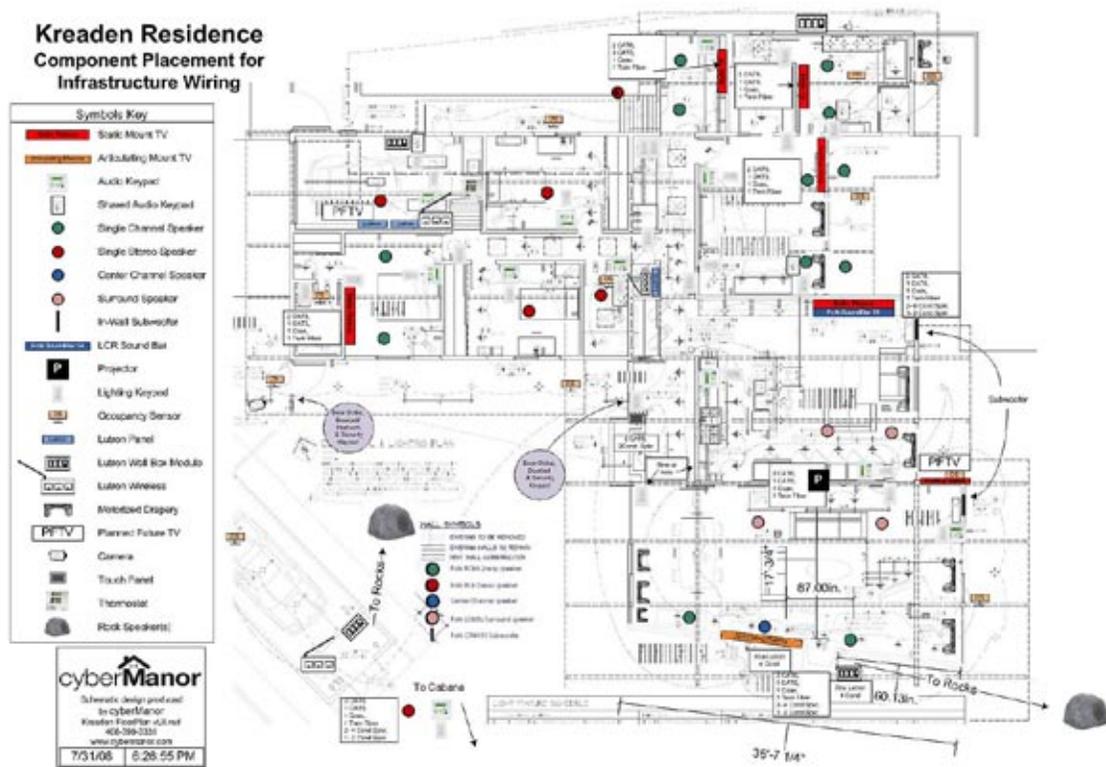
- Windows Media Center Extenders that support onscreen display controls
- In-wall Embedded XP touch screens for Life|ware home control extensions
- Ultra-mobile XP touch screen tablets for Life|ware home control extensions
- RTI universal remote controls for handheld media management and home control capability

Lastly, we overcame the technical A/V distribution challenge of placing a majority of the A/V source equipment in a centralized rack to minimize the amount of A/V equipment that would be placed in a given room. Optimally, the client only wanted large flat screens on the walls in his primary viewing areas. This required that we run HDMI signals over CAT6 shielded cables to these rooms (over GEFEN extenders) to support the A/V distribution of centralized HD content.

What were the top 3 design challenges with this installation?

- Limited conduit paths for low voltage wire runs (due to the Eichler construction)
- Running HDMI signals over long distances from the equipment closet to the TVs throughout the home
- Creating the simplest and best user interface experience for a given application in a given room or area

Schematics and Diagrams



Installation

What were the top 3 integration challenges with this installation?

The greatest challenges encountered during the **installation** phase included:

- Integration and consistent, reliable performance from the CableCARDS
- Windows Media Center Extenders

The installation of four CableCARD tuners presented a number of challenges. Initially, almost half of the CableCARDS we received from our local service provider were bad. Secondly, the installation of four CableCARD tuners attached to the Niveus Windows Media Center required the programming of some relatively complex registry edits. Thirdly, the ATI firmware to support these CableCARDS was initially somewhat buggy, but the upgraded release in May solved most of these issues.

Windows Media Center Extenders also proved to be a challenge. We tried the Niveus Edge, Xbox, Linksys and DLINK extenders and found that we had the greatest overall success with the Niveus and Xbox extenders. The issues we encountered included intermittent loss of connection between the extenders and the host Windows Media Center computer, very long boot-up times and occasional

freezing of the images. At this point, we are only using the Niveus and Xbox products, which have been very stable over the last three to four months.

From a **usage perspective**, the primary new challenges have been:

- Offering the client a web surfing experience that provided access to additional entertainment sites from any of the TV viewing areas (since extenders don't allow web browsing)
- Simplified integration of an iTunes music management experience and a Blu-ray HD movie experience

The job was challenging and rewarding from a number of perspectives. We were integrating some products that were still in a state of hardware/software development, specifically CableCARD integration, new Windows Media Center Extender offerings and RTI remote controls. When we pre-wired the home in the summer of 2007, we knew what components we wanted at the end of those wires, but in some cases those products were just being completed at the time we were trimming out the home. In an ideal world, we would have had time to pre-test these new products before installing them, but with these leading-edge solutions, we didn't have that in-house "burn-in" time luxury.

The other significant challenge was the very limited closet space in which we had to centrally locate all of the home's data, audio, video and control equipment. Our lead installer, Chris Rosiak, turned the walls of the equipment closet into what looked like the instrumentation panel of an airplane cockpit; if there was an open square inch of wall or ceiling space in the closet, it was put to good use for various electronic components in the system.

The project was very rewarding in that not only was our initial design concept completed and effectively executed, but it was also enhanced by product offerings for which we had not even planned in 2007. Specifically, HP's release of a new, affordable 20-plus-inch touch screen line gave us a fantastic new way to allow our client to easily control the home's media and automation. New iPhone and iTouch software applications released at the end of 2008 further enhanced our client's control options.

The promise and vision of a whole-house, easy-to-use and reliable solution based on the Windows Media Center platform was finally realized with this installation. We look forward to it serving as a blueprint for future installations.

How did Windows Media Center make installation easier?

cyberManor is a proponent of open, standards-based, scalable architectural solutions for the home. This standardized architecture gives our company the greatest number of affordable products from which to choose to best design integrated home solutions for our clients. The Windows Media Center/Extender architecture is the only architecture that lets us centrally store, distribute and manage digital home media (such as recorded HDTV, movies, photos, music, internet content) and provide home automation (lights, cameras, security, HVAC) with a common graphical user interface—specifically, the Windows Media Center interface. This graphical interface is not restricted to PC-based displays; one can display it on in-wall touch screens, handheld remotes and portable touch screen products such as the Apple iTouch and iPhone. This open hardware and software architectural flexibility, combined with a standardized graphical interface, gives the Windows Media Center solution a competitive advantage over other whole-house control solutions.

What were some of the challenges of working with Windows Media Center?

Windows Media Center's strength, as an open platform, is also its weakness. Just as financial leverage can be a two-edge sword, so can open standards. Open standards place the burden of integration squarely on the custom installer, since we combine best-of-breed products to develop a customized integrated solution for our clients. No single manufacturer (like Crestron, AMX, Control4, HomeLogic, etc.) is providing our company with an integrated suite of partner-tested products to enhance the likelihood that we will have a long-term reliable solution for our clients.

What recommendations do you have for other integrators using Windows Media Center?

Use Windows Media Center and the Extenders in your showroom and home to learn how to best design and integrate this technology. Keep up with new developments by reading the trade magazines, attending trade shows, participating in online Windows Media Center forums; stay current! And become a member of the Media Center Integrator Alliance.

Here are some other recommendations:

- Our preference is to use a centralized headless Windows Media Center instead of multiple PCs. The benefits of having centralized, protected HD content distributed across Extenders, coupled with the ease of maintaining, scaling and backing up one large centralized hard drive, exceed the value gained by having the local processing power of multiple Media Centers in multiple rooms.
- Always get DRM-free content where possible. Offload this content to a home server product to minimize the hard drive storage impact on the home's centralized media server, which contains the CableCARDS.
- Use a cable TV set-top box as a source to a receiver or a TV in a primary viewing room (in addition to the extender). If there is a problem with the extender for TV viewing, the client still has a traditional set-top box source to watch TV.



On Left:
Main rack rear

On Right:
Closest rack rear

Customer Feedback and Support

What was the customer's overall reaction to the installation?

These are Mike Kreaden's words:

"Without a doubt, the best part of the system is Life|ware. This is the missing link to unify and simplify the integration of all of these systems. I love the fact that we can script 'scenes'—basically sequences of actions to perform across many systems. I have a 'firepit scene' that I use when relaxing by our meeting area around our firepit; -landscape and house lighting is automatically turned on at specific intensities and a favorite playlist from Windows Media Center is played (at a pre-determined level) in the outdoor garden zone via our Russound system. Other key automation scenes like pre-set comfort controls for A/C, and shower and tub scenes that automatically lower the shades, set the lighting, turn on the fan, etc., are what we like best about our system. The ability for fine-grained control of these systems, down to individual lights and devices, is what I know will pay dividends for us for years to come."

Did the customer have any specific support requirements?

No, just that we respond to his needs in a timely fashion. We did set up a remote access support line via the Log Me In service that has been very helpful for us. Of the dozen or so service requests we have had over the last year from Mike, only one required 24-hour response, and it was related to his internet going down. It is generally true that when our clients' entertainment systems are down, it's an inconvenience that is OK to repair within 72 hours, but when their internet is down and it affects their work, repair response time is of paramount importance.

What specific support challenges of this installation?

Initially, the key support challenge was with the proper pairing of the CableCARDs and reliable Extender network connections. These issues have now been resolved.

What have you learned about supporting Windows Media Center systems?

Because Media Center is based on Windows' open software platform, we have to be very careful of what goes on this system. The general rule is that we don't want any other applications on the central server other than those that are essential to the media management and control capabilities of the platform. We are very restrictive about what a client can do to add software to this platform; it is no different than what you might see in a computer terminal in a public place, where many of the download software applications are disabled. Until we are confident that a software or firmware upgrade will not jeopardize the stability of our solution (which we accomplish by in-house testing or the confirmed testing of our manufacturer partners), we will not add it to our client's Media Center infrastructure. Services such as LogMeIn have proven to be an invaluable asset to provide remote troubleshooting and programming updates of our client's system.

It is important for someone on our staff to keep current on Media Center and Life|ware developments from a variety of manufacturer sites, forums, and blogs. These can be your best technical support resources to help troubleshoot Windows Media Center support issues.

Equipment List

QTY	EQUIPMENT DETAIL
1	Apple TV with 160GB Drive
11	Aprilaire 8870 RS-232 Thermostat
	Commscope SpeedWrap Cable
2	Denon 2808 Receiver
1	Elite 100-inch Pull-up Screen
1	Epson 1080p Projector
	Exceptional Innovation Life ware (50 License Pack)
1	Exceptional Innovation 8.9-inch In-wall Touch Screen
5	Gefen HDMI-CAT5 Baluns
1	Global Cache GC-100 Contact Closure
1	HP 22-inch Touch Screen IQ Computer
1	Linksys Business Class 24 Port 10/100/1000 Switch
2	Linksys Wireless Access Point (b/g/n)
	Lutron HomeWorks Lighting Control System and SeeTouch Keypads
	Windows Media Center Software (Vista)
3	Windows Media Center Extenders (Xbox)
1	Middle Atlantic Rack 41 Space
1	NETGEAR DualWAN Router
1	Niles SAS1 Audio Switching Module
1	Niveus Media Server, Rainier Edition
2	Niveus Media Extender, Edge
2	Niveus Media Digital Cable Card Receiver
1	Panamax M5100 10 Outlet, Noise Filtration, Surge Protector
2	Panasonic Pan/Tilt POE Exterior Camera
1	Polk Audio Surround Sound Bar 50 Speaker
3	RTI T2C Universal Remote
2	Russound CAV Multi-room Audio System, UNO S2 keypads and iPOD Docks
6	Samsung LCD and Plasma TVs
2	Samsung Blu-ray Player
7	Sanus Mounts
1	Sling Media Slingbox
1	Somfy Motorized Shade
10	SpeakerCraft in-wall and landscape speakers

Project Schedule & Cost

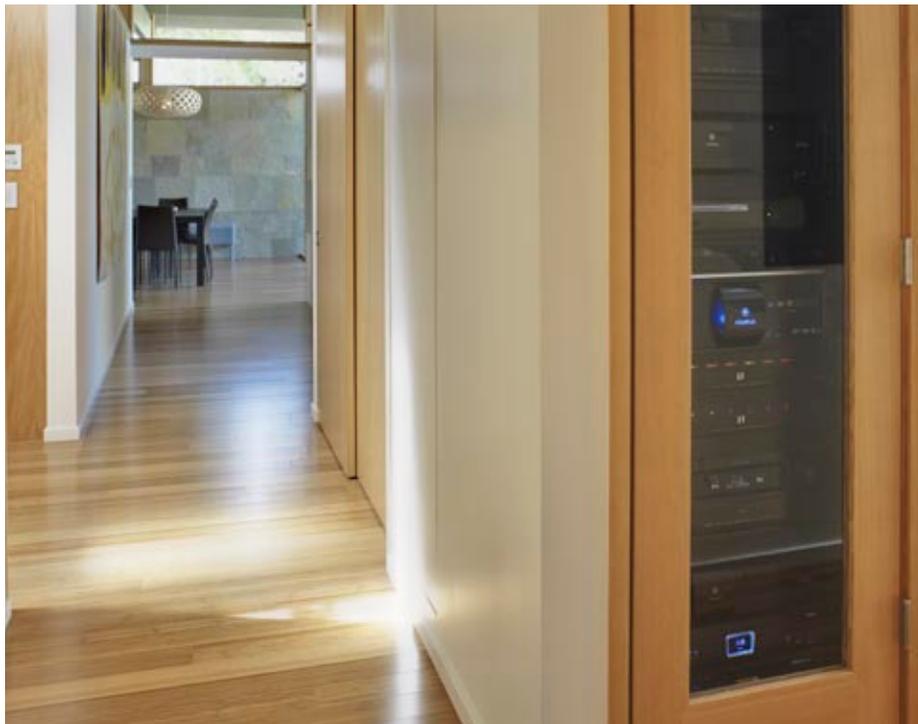
The project was completed over the period from 7-2007 to 12-2008.

TASK	DAYS	COST
Infrastructure Wiring		
Rough In	20	\$20,000
Trim Out	2	\$20,000
Equipment Installation	20	\$20,000
Programming	16	\$16,000
Design, CAD, Project Management, Training	14	\$14,000
Equipment		
Hallway Rack Components	10	\$50,000
Family Room	3	\$7,000
Music/Dining Room	3	\$7,000
Master Bedroom	1	\$1,000
Master Bathroom	1	\$1,500
Office	1	\$1,000
Shed	1	\$1,000
Guest Room	1	\$1,000
Whole House Systems		
Lutron Lighting Control	7	\$42,000
Russound Audio	2	\$11,500
Aprilaire Thermostats	2	\$6,000
Panasonic Cameras	1	\$3,000
Life ware Software Control	7	\$13,000
TOTAL	112	\$235,000

Photography



The Music/Living Room in the Kreaden Home showcases the recessed plasma with the Windows Media Center Interface.



The centralized A/V and control rack is located in the hallway and serves each of the home's viewing and listening zones.



The HP touch screen in the kitchen is a central point of home audio and automation control.



The Master Bathroom TV isn't just for entertainment. It also serves as the graphical control screen interface for audio and automation control for the room.



The master bedroom features a flat panel with all Windows Media Center entertainment experiences.



The Life|ware touch panel in main entryway allows the homeowner to control all home automation features upon first entering their home.

Video

Click the image below to go to video URL.

