



Custom Installed Residential Electronics: What are my options and how much should I spend?

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There are a great number of different electronic “systems” that can be integrated into homes these days. They are characterized by a vast number of different technical approaches, functionalities, and price points. The sheer number of options and the subtle, but important technical and operational differences makes it difficult to sort out what is best in different situations.

Here is a brief summary of the different types of systems and typical price points. We also provide some suggestions about the types of systems that are both good value and likely to provide lasting satisfaction. Naturally, it is difficult to generalize, but we hope this frank appraisal helps to guide you to a good decision.

Structured Wiring

Nearly all homes include some sort of structured wiring today. Structured wiring is simply a term for an organized approach to distributing *telephone*, *data*, and *video* signals throughout a home. While installing structured wiring is a “no brainer”, pulling in miles of cat 5 (data/tel) and/or RG6 (video) cable to “future proof” a home is a frequent waste of money.

We advocate a structured wiring plan that comprehends *current needs*, *technology trends*, and *likely changes* in needs. From these perspectives it is worthwhile to note:

- Many more devices are becoming internet dependent or make use of internet sourced content (e.g. blu-ray players, TV’s, internet radios)
- Music & Video distribution are increasingly taking place on data (Ethernet) networks
- Wi-Fi (wireless) data transmission works well for “casual” purposes, but can have transient reception problems, doesn’t support video well, and is prone to equipment failure (particularly residential grade gear)
- Certain satellite & cable receivers require a telephone connection to access pay-per-view services
- Most residential phones are now cordless
- Most homes get an interior “update” once every decade or so



Given these influences, and the fact that pre-wiring is very inexpensive relative to “after the fact” modifications, we suggest a pre-wire that includes connections in the following areas:

Telephone

- At least one central area/floor (kitchen, den, etc) plus bedrooms
- Near all possible satellite receivers

Data (Ethernet)

- Near desktop computers (den, kitchen, bedrooms)
- Anywhere there might be a peripheral (printer, scanner, etc)
- “Important” TV’s
- Home theatre equipment area
- Music system areas

Cable/Satellite

- Near any likely TV location – but noting if locations high on a wall aren’t used there is a visible plate

Thus, an “average” four-bedroom house might have the following:

- 8 telephone jacks (includes 4 bedrooms)
- 12 data jacks
- 6 video ports

The cost of the pre-wire and completion (including equipment cabinet and required devices) would be about **\$4,500** depending on the size of the house and difficulty of pre-wire phase.



Multi-room Audio

Multi-room audio can provide different and easily accessible sources of music playing in each *zone* of a system. A zone is simply a room or area that is connected to play one source throughout. The music is typically played over unobtrusive in-ceiling speakers and controlled via keypads in the walls.

More sophisticated systems employ keypads with displays that provide *feedback* of important information on the source and selection being played and allow easy access to centrally stored music libraries or iPods.

Multi-room has become very popular, is found in a good percentage of nicer homes and likely adds significant resale value.

The cost of multi-room audio systems is heavily driven by the choice of speakers. A six-zone system will have one controller, one multi-channel amp, one set of sources, six keypads, and 12 speakers. As multi-room is basically “background” music, we believe in using good quality (i.e. decent sounding & long lasting) speakers without getting into the premium end of the range.

While it is possible to build a low-cost multi-room system with one “big zone” employing only the amp, volume controls in the walls, and a source we don’t believe this makes sense except for the simplest of systems.

The installed cost of a good six-zone system is typically about **\$14,500**. We have based this figure on using a Crestron “Adagio” controller, Apad keypads, and Paradigm AMS150 (8 in, coaxial) speakers. Other brands of a similar quality would close in price. Adding another six zones (using Crestron expander) would add about \$10,000 to this figure. Not using all of the possible 12 zones would save about \$1,500/zone.



Lighting Controls

Lighting controls are becoming much more popular as people realize the benefits they can provide. These include:

- One touch control of lighting “scenes” throughout the home that can include dozens of traditional switched circuits – including “all off” functions when leaving or at night
- Automatic (time of day, dusk, holiday, etc) “return home” and other scenes
- Energy savings by automatic dimming and control of unused lights
- Elimination of unsightly banks of switches/dimmers

Lighting control costs tend to fall into two groups; premium products with superior engineering, flexibility, and a wide variety of aesthetic choices, and price driven products with relatively limited functionality and aesthetic choices.

Like multi-room audio, lighting controls are finding their way into a significant number of nicer homes and seem to be a powerful selling feature when the house is resold.

For “mission critical” products like lighting controls (the impact of light switch not working is very different that that of a faulty TV) we favor erring on the side of quality. Lutron is the undisputed leader in lighting controls, but Crestron and others also make high quality systems.

A modestly sized Lutron system consisting of 24 “loads” (controlled circuits) and two keypads would run about **\$12,500** (installed, using Lutron 4 series Homeworks equipment and “Maestro” dimmers). Adding incremental loads to this system would run about \$400/load up to the practical limit of about 50 loads for a Series 4 system. After that you would use a “Series 8” system but the *average* cost per load remains in the \$500 neighborhood.

Lutron recently introduced a new version of their wireless lighting controls (Radio Ra II) which are intended for retrofits and smaller projects in new homes. The cost of the “Ra” dimmers is about the same as the Homeworks products, but in a typical installation you would save about \$1,000 on the pre-wire, and about another \$1,000 on the controller.



A number of other firms have also brought more cost effective approaches to the market, at the expense of some flexibility and aesthetics. If you can live with these limitations, Control 4 offers is one of the best alternatives. A comparable Control 4 lighting system (24 loads, 2 keypads) would run about **\$7,500** (about \$310/load). Control4 also makes a full line of automation products and is very cost effective when you want to lots of integration in a home.

Electronic Shades and Draperies

Like lighting controls, electronics shades have become much more prevalent. Arguably, they are an integral part of a total light control system and have many benefits, including:

- One button convenience
- Energy savings
- Privacy
- Protection of furnishings from UV rays
- Silent operation

While there are several manufacturers, only one fully integrates their shade controls with their lighting controls; Lutron, thus we use them exclusively.

The cost of shades is naturally heavily dependent on the size of the window and the type of fabric chosen. However, it is our experience that for many homes a budget of about **\$1,800/window** is a good estimate of the average cost of automated shades.



Home Theatre

“Home theatres” are available in an extremely wide range of prices, from the sub-\$1,000 “home theatre in a box”, to dedicated custom installations well into the six figures. Naturally, the “best” choice in any situation is a function desired performance and budget.

Here are a couple of examples of what we feel represents excellent value in two of the most common situations; the “family room” home theatre located in a multi-purpose room, and a “dedicated” home theatre in a room primarily used for “media”. Of course, you can always spend much more (or less) than the suggestions below, but we feel that these systems represent the best value for their relative performance levels. Cutting back will noticeably decrease performance, and by the same token you’d need to increase the budgets a fair bit to gain a significant increase in performance.

Family Room Systems

A budget conscious, but still high performing family room system would include the following:

- Panasonic 50 in plasma display
- Sony “Elevated Standard” 7.1 receiver
- Sony blu-ray player
- Shaw HD cable box
- Paradigm “Monitor” series bookshelf speakers for Left, Center, & Right
- Paradigm “ASM” in-ceiling speakers for surrounds (four)
- Paradigm subwoofer
- RTI control system with small LCD touchpad remote
- Ultralink power conditioner & cables
- Installation, set up, & training

The total cost of this system would typically come to less than **\$14,000** (depending on installation complexity).



Of course many upgrades are possible, but those that typically are of most interest include:

- 58 in plasma – add \$1,600
- Floorstanding R & L speakers (for music lovers) – add \$500 to \$1,500
- State of the art receiver (Arcam AVR600) – add \$4,500 (this receiver is so good it warrants consideration in any system where audio performance is important)

Dedicated Theatre System

A front projection system in a dedicated room with high performance goals, but remaining “real world” in price would include:

- Sony VPLVW10 projector
- Grandview 100 inch screen
- Sony ES receiver
- Sony Blu-ray
- Shaw HD cable box
- Paradigm 7.1 speaker system (floor, wall, & sub)
- RTI control system with larger LCD touch panel
- Ultralink power conditioner & cables
- Middle Atlantic sliding equipment rack
- Installation set up & training

The total cost of this system would come to about **\$18,500**, again depending somewhat on the required installation labor.

Upgrades that would appeal to audio/videophiles include:

- Sony VPLVW70 projector (better optics & black levels) – add \$4,500
- Stewart screen designed especially for the Sony projector – add \$1,100
- Arcam AVR600 receiver – worth it for great audio quality – add \$4,500
- Upgraded speakers – Sky is the limit here, but adding another \$3,000 to would be a significant upgrade.

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We hope you find this overview useful, and encourage you to call us if you have any questions or topics you'd like to discuss