

BRIDGING THE GAP BETWEEN DESIGN AND TECHNOLOGY

# ARCHITECT<sup>®</sup> *Residential*



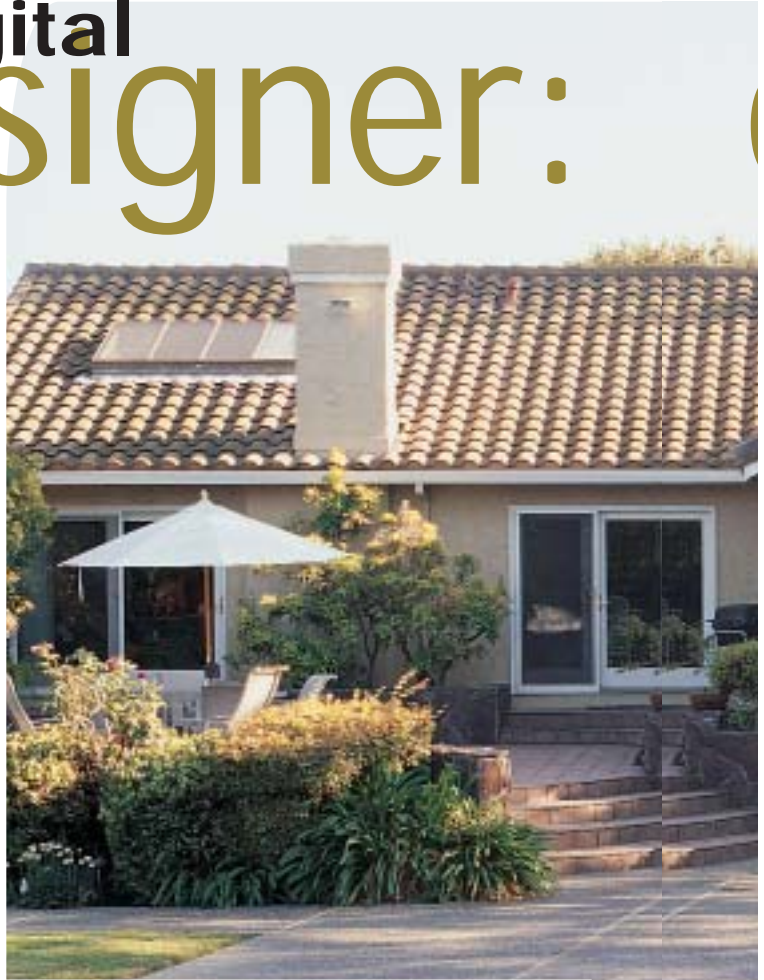
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# digital designer:

By Christina Nelson

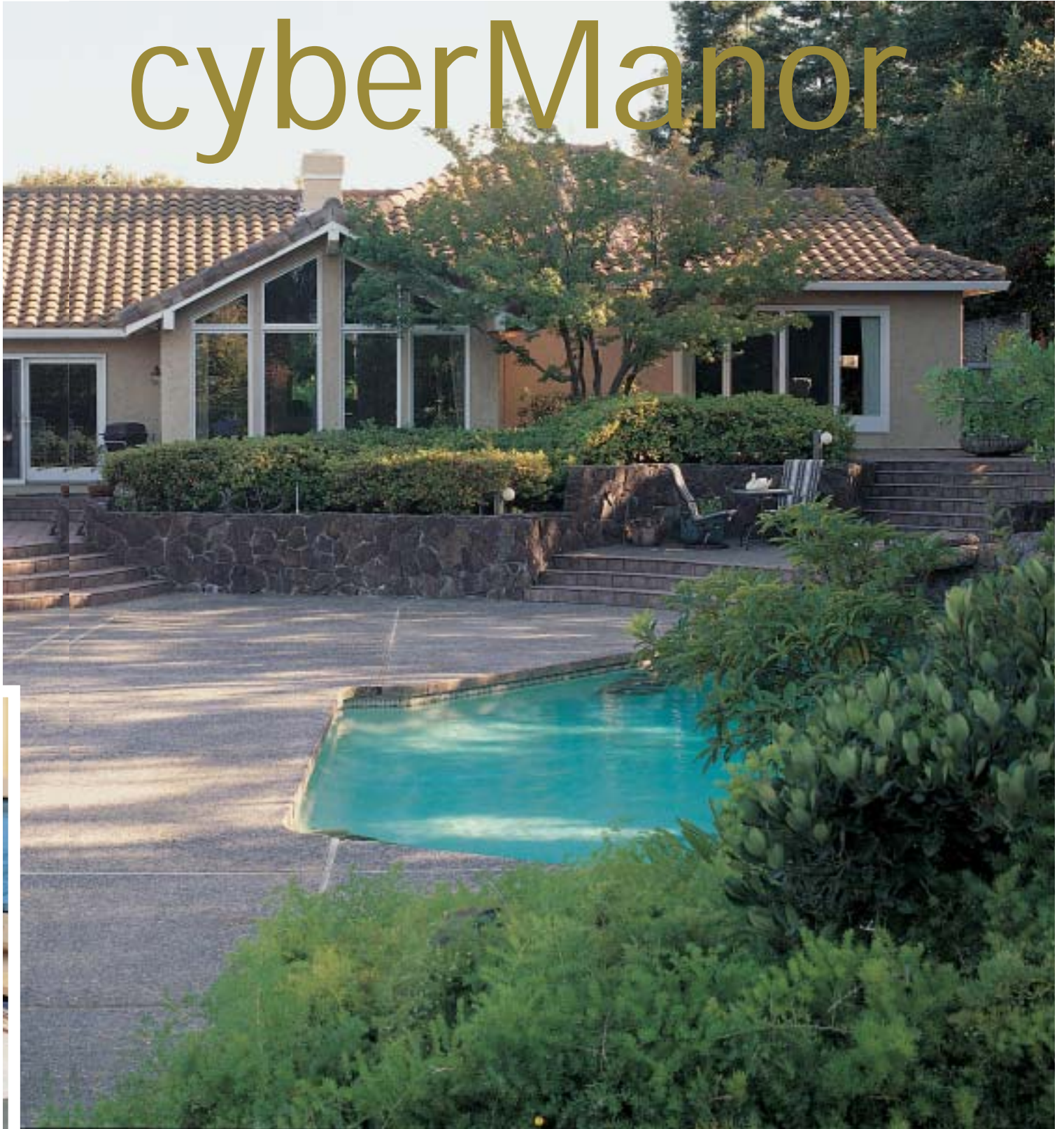
When Gordon van Zuiden completed his studies in mechanical engineering at Stanford University in 1977, he joined Westinghouse in Washington, D.C., to work in what appeared to be the promising field of solar energy. But falling oil prices and the government's lack of interest in alternative energy sources persuaded him to head back West to earn a degree at UCLA's Anderson School of Management. Then, in 1983, the personal computer – the PC – had really just taken hold in the office environment and could be found in only a smattering of homes.

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Kenneth Rice Photography (www.kennricephoto.com)

# cyberManor



Van Zuiden joined Silicon Valley's Advanced Micro Devices as a financial analyst, but, intrigued by the computer's potential in the workplace and beyond, soon left for a firm that customized PCs for corporations. Less than a year later, he was off on his own, co-founding Edge Information Systems, an independent integrator of local and wide area networks for corporate clients in the Bay Area. By 1997, the profitable firm had expanded to seventy employees and was valued at \$30 million. Van Zuiden, VP of sales and marketing, and his partners decided to sell.

While pondering which direction to head next, and enjoying the prospect of some time on his hands, van Zuiden decided to undertake a long-planned kitchen remodel of his 3,000-sq.-ft. family home. "As I started tearing out walls, I thought about designing a digital infrastructure for the entire house, so of course the remodel expanded well beyond the kitchen" he recalls.

"At the time, I didn't yet know that my efforts would evolve into a new profession. But I had been an integrator who took products and bundled them together to provide value and added service for the end-user – in that case the corporate client.

"As I worked on the house, it became increasingly clear that the integration skills of knowing the right wire to pull, where and how to pull, getting the equipment connected to the wire and talking to other devices, were essential for a truly turn-key solution." "The project entailed six to seven months of wrong directions and lots of frustration," he confesses, "but in the end I realized that it had added great value and service for the whole family. And I also realized that other home owners, who have far less experience and knowledge than I, could benefit greatly. That's really how the business was born."

Today, three years later, cyberManor remains small,



with van Zuiden as president and four other employees, but it has positioned itself firmly in the Silicon Valley residential marketplace. Van Zuiden's clients are mainly well-off, computer-literate home owners seeking digital solutions for their new or remodeled houses, and builders of custom and semi-custom homes. With its business partner, Silicon Valley Installation, cyberManor has integrated – or has in progress – residential systems in about three hundred new and existing homes.

One successful project, recently completed, was the rewiring of a number of homes for data, phone, and video for Santa Clara Development, a high-end semi-custom tract builder. After purchasing the prewired house, homebuyers were offered several options for technology upgrades provided by cyberManor – and there were many takers. One upgrade offered data ports in the bedrooms, office, media center, and garage. A second upgrade included a home control center in the

garage, with the hub/router programmed to serve as a gateway for DSL service.

Van Zuiden has ties with several technology firms and national organizations. He served as the subject matter expert for Cisco Systems' Home Integrator Curriculum, a training program for installers of residential networks. Currently he chairs the Home Networking Council for CEDIA (Custom Electronics Design and Installation Association). A regular columnist for *Residential Systems*, a trade magazine, he is called upon frequently to speak at industry conferences.

Indeed, beyond his firm's stated mission "to assist home owners with the installation, integration, and management of home computer networks and Internet services," he personally has been a key player in laying the digital foundation for the industry as a whole.

*ARCHI-TECH Residential* recently met with van Zuiden to hear more about that digital foundation and its implications for architects and builders, and to discuss home networking solutions available today and some of the promising technologies that will shape the future of the connected home.

**A-T** When people first contact you, do they simply want to link PCs?

**G.v.Z.** The bread and butter of our work is making the connections that people find really necessary. For many home owners, the most important element is an always-on, pervasive e-mail connection, and the ability to get messages easily and through a number of locations in the house. Usually that's the most critical application – the first thing they scream about. It's kind of ironic, really, that in some cases a home owner will accept going without gas or water for a longer period that they'll tolerate going without an Internet connection.

Just behind that capability is the ability to share peripherals and share files. That speaks to the internal networking needs of the home. Telecommuting is a very big element, too. In fact, 90 to 95 percent of our business falls into these three areas. Then, from there, we move into the "what else" category. And "what else" includes an increased interest for IP cameras that can be viewed on any screen, anywhere – especially among people with second homes.

It also includes an increased demand from people who already have a good home theater system to have data stream into that system, primarily for audio. Audio in the



home usually has several sources of content, such as a CD player, a tuner, etc. Now we're moving towards digitally-based audio as another source, a flexible medium with increasingly sophisticated ways to control it.

**A-T** What kind of Internet solutions do you offer?

**G.vZ.** Basically we lay out the beginning of a digital infrastructure in the home, essentially acting like a digital plumber. We take broadband, or even potentially a dial-up connection, and distribute it – much like water – to all the devices currently in the home, such as PCs and printers, and make it available for future products. As we increasingly hear of a “connected world of connected devices,” the process of spilling the flow of data into the house includes highlighting the fact that there will be an increasing number of devices that can take advantage of that content, whether from the Internet or from other devices. As “plug-and-play” becomes more pronounced, it will create a seamless way for devices to “discover” each other, move out of the PC realm into the entertainment area, home theater, home control, and other places inside the house.

**A-T** What is a “residential gateway?”

**G.vZ.** At a minimum, the residential gateway is the device that connects the home's computers to the high-speed broadband Internet access and distributes the data to each computer via Ethernet Category 5 cable, the home phone line, or a fixed wireless solution. Used to its fullest capabilities, the gateway can serve as the intelligent access point for all services to and from the home, including data, voice, and video.

Installing a gateway essentially gives the home up to 253 private Internet addresses for intelligent devices to communicate within the home network and to the Internet. For example, one of those devices could be a pan and tilt camera mounted at the front door. This camera could be viewed and controlled by any computer with a Web browser in the home or from any computer anywhere in the world that is connected to the Internet. You could be at work and still see who's coming to your front door!



Hand-held wireless tablet, the AquaPAD is the web-appliance shared by family members to access household messaging, entertainment, and control functions.

It is sometimes difficult for the home owner to envision that the term “gateway” encompasses several devices in one. It can serve as the switch that enables each computer in the house to talk to each other and the Internet at the same time, and it can

host the wireless access point that allows laptops which roam throughout the home to stay connected to the high-speed Internet connection and the home's shared network printers. It's really the brains of the digital infrastructure.

**A-T** What are the most promising new technologies for the home?

**G.vZ.** There are five areas where we now offer our customers digital services to take advantage of state-of-the-art,

network-attached products: whole-house audio, camera/video, data storage, print, and home control. Our integrated technology solutions clearly demonstrate that networking intelligent digital products in the home is far more valuable to a home owner than standalone products.

Although we're only at the beginning of this new age of the connected lifestyle, I think this is where the industry is headed. Virtually all of the home's devices will be connected to the Internet and talk to each other, and second homes will also be broadband connected for remote control of lights, temperature, security. And as people's lives become more and more Internet-enabled, they will discover places they can turn to for finances, health, entertainment, as well as for control of the home.

New devices will be designed to “click to” to see their status. If you can control them from any station you already have in the house, that's good, but if you can control them from your fingertips while roaming the house with a portable tool like a web tablet, that's much better. The web tablet is one device of the future that's here now. With a wireless touchpad, every control is literally at your fingertips, the screen is the same as on your PC, and you can not only control for all the functionality of the house, but – by the way – it's also the place to surf the net, get personal e-mail, write letters from the backyard and have them print out in the office.

**A-T** With California's energy problems, it would seem there would also be interest in connecting devices for energy management.

**G.vZ.** You know, there's still a lot that needs to come together to make that a viable option. We've moved from data to distributed audio and video (though video is more difficult), and I think the next evolution is in home controls. It's attractive to consider controlling lights, thermostats, the pool equipment via a computer-based interface to which you can add intelligence as to what rules apply, but you need to talk of home control in conjunction with the utility companies. And the problem is that we don't have the utilities' involvement.

Wouldn't it be great if the utility meter was intelligent enough to report on the monthly bill not just that you spent \$350 but that you spent \$150 on electricity, of which \$25 went to the refrigerator and \$10 to the dryer? Then you could start to understand the true nature of costs and even more so introduce controls to run some of those services differently, more intelligently. One difficulty, of course, is that the expense of making the meters intelligent is great.

**A-T** Do you have many opportunities to work with architects on remodels or new homes?

**G.vZ.** Not nearly as many as I'd like. It's more often the case that the plans are done and construction is under way when we become involved. The architectural community hasn't even devised any symbols for this technology to incorporate into their plans, although CEDIA is trying to establish a standard with an initial set of icons and universal standards. Typically, an architect and his client will take the floor plan and just draw in a zone by hand. Too often, they don't think about where to place drop zones until they're making an on-site inspection during construction.

Remodeling is a big part of our business – much more than retrofit. I think remodelers and architects can offer their clients a phenomenal service by advising them about the benefits of integrating technology when they know the walls and perhaps even floors will be torn out and it will be relatively easy to install the data infrastructure.

For the most part, though, the demand that drives our services is builder-based, primarily in the custom home market. We've also done work for builders of semi-custom tract-based homes, and there is a big distinction there. The tract builder is buying structured wiring on the speculation that it will be of value to the home owner and differentiate his business, and he can enjoy some financial benefit by passing on the costs. By contrast, the custom builder usually brings us in because his



client demands certain technology in the home. It's often not clear to the builder what benefit will accrue, if any, and he doesn't really understand the process.

**A-T** What do you say to the reluctant or skeptical builder?

**G.vZ.** I try to make him aware of the potential benefits of incorporating technology from the ground up. I say something to this effect: You wouldn't have built a house in the '30s or '40s without considering electrical wiring. You put it in because you knew there were devices such as toasters and lights that would benefit from it, but you didn't really know what other devices might be available in the future. Today, you have to consider that this new utility of the information age, the Internet, has at least as much value as any other utility you're plumbing a house for. And, if you don't plumb properly for that now, the house will be obsolete before your clients move in.

The home has become so much more complex in the last fifteen or twenty years. People are eager to incorporate more things. Independent of the data side, there's home theater, whole-house audio, sophisticated keypads. What we're seeing are layers and layers of complexity brought on by low-voltage applications that were never there before. Yes, it adds to the lead time for both architects and builders; yes, it's more work. I still see multi-million dollar homes that are not wired.

In general, anyone purchasing a home priced over a

million dollars is going to be computer-savvy. What's going to happen when he brings his PC into the beautifully paneled home office with built-in walnut cabinetry and discovers there's nowhere to plug in?

**A-T** What message do you have for architects?

**G.vZ.** I really try to educate architects to the concept that today's homes increasingly need a new room they might not have thought about before: a dedicated equipment room where all the components and devices can be housed, whether it's the structured wiring cabinet, various control boxes, lighting controls. Depending on the size of the house, it might be an eight by ten space, and it must be conditioned, ventilated, and easily accessible.

The challenge, of course, is that we're talking about a percentage of valuable square footage. The architect can offer a solution by thinking through where it's logical to allocate the room. When there's not enough space, the data gear is usually relegated to the garage, under stairwells, into closets, or even to the attic. That's all very limiting to the home owner in terms of expanding the network and to the kinds of services that can be integrated.

The garage, while readily accessible, can be a tough environment as you don't want the equipment to freeze or over-heat or become covered with dust. In remodels, however, the garage is often the only place available.

**A-T** What about new construction?

**G.vZ.** Every job in new construction entails pulling a large number of cables to a number of rooms. The best performance is always with wire and if you structure wiring in a "star" topology – run it to a central location, then distribute it – it's a flexible and reliable medium. Whether for phone, data, or video, the distribution panel is in one place and you can provide services as needed to any given spot in the house. Typically we pull wire into every bedroom, whether the home owner knows he'll need it or not, put a data port in the kitchen and entertainment area, and for future use add intelligent wire to the thermostat and lighting controls.

One of the big issues is the challenge of helping home owners to understand not just what applications they might use, but

where physically in the home they might use them. It's one thing to design an office layout with all the computer equipment on one wall and then discover later that it would have been better on that other wall. Generally people don't want to see too many wires, so ideally we like to place the drop zone (two coaxial cables and two CAT 5 cables) in the area where the equipment will reside.

If there's uncertainty, it makes sense to think about putting

another drop zone on an opposing wall – which means another whole wire pull. This solution provides increased flexibility but adds to the expense because each of those wires has to be home run all the way back to the control center. It really pays to think through the layout in advance because it's one of the key parameters that dictate costs.

Another parameter, of course, is the square footage of the house. For a 3,000 to 4,000-sq.-ft. home with three to four bedrooms, we're probably looking at seven to ten drop zones. For the infrastructure wiring, paneling, and termination points to create an Internet-ready home, the range is likely

between \$5000 and \$10,000. With equipment and devices attached, the price could go up to \$20,000 or \$30,000.

**A-T** It sounds like design and planning are critical to creating a home flexible enough to handle future needs.

**G.vZ.** It is the opportunity that gets me excited. Now I can see more clearly how cyberManor might work with architects and builders. If we're going to participate in doing all the controls for the house, then we're not just confined to a couple of PCs in an office, but we can influence decisions as they relate to lighting, the security system, and so forth. All the elements of the house come under our digital domain, so to speak. And the critical point here is the need to plan in advance and coordinate efforts. If people want to go towards this lifestyle, which they apparently do, the technology can't simply be treated as an added feature after the fact. ■



Home Control Center in the garage contains phone and video patch panels and hub/router which serves as a gateway and firewall.

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