1. Approaching home automation...

Guide to Course

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2. Wiring in New Construction
3. Wiring in Existing Construction
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5. Infrared & Other Protocols
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In my book Integrating the Smart Home and its Owner ("ISHO" for short) I make mention of the fact that Home Automation is something of a black art. Not in any moral sense, of course, but it is so very undefined that it can mean almost anything. I'd like you to know on this very first page exactly what I mean when I speak of home automation.

First of all, I hate the term.

It doesn't mean anything substantial. Heck, your furnace comes on automatically, doesn't it? And can't you control the light bulb on the other side of the room by flicking a switch? I can hear it now: "Gee," the neighbors say, "you must have an automated home!"

Hardly.

Just because some things happen "automatically" doesn't necessarily imply "home automation." (Ow - the phrase is painful). I much prefer the term "system integration."
"System Integration" speaks to the need for intelligent cooperation between the electronic systems in your home. It could be a matter as small as controlling different lighting zones by time or circumstance, or it may go so far as interfacing audio/video, security, lighting, heating & a/c, sprinkler systems, & oh-gosh-so-many -other-things. Remember the key idea: Integration of systems.

Did you ever have a great idea that really excited you, but found you couldn't put it into words? Turned out that you really didn't have such a good idea of what your great idea was, didn't it?

Once you have a grip on exactly what it is that you're talking about when you say you want to "automate" (ow) your home, it becomes easier to conceptualize what you'll be doing. It becomes something you can actually discuss in concrete terms or, shall we say, "put on paper."

The other concept that will make it easier for you to visualize the how-to's of ... um... system integration - is to think of it in modular terms. Don't worry about seeing the whole until you understand the parts. Put the right pieces into place for your security system. Put the right pieces into place for your lighting. Do it for your sound system, your Theater Room, your HVAC system, your security cameras, et. al. (the extent of my Latin).

But of course you have to do it right. You want to use the right kind of hardware so that they CAN be interfaced.

In ISHO I make a big deal of using an "open architecture," meaning I strongly recommend (for the most part) staying away from proprietary systems. Using common protocols (like X10, IR, contact-closure, etc.) will always allow you to expand in the future & help ensure that you don't run into compatibility problems.

For one thing, you'll save a lot of money this way. For another, most of the serious "bugs" are already worked out. And lastly, you won't find yourself in such a terrible lurch if the manufacturer of your hardware goes out of business or stops supporting its product, because replacement products should be readily available.

So if you're considering adding any kind of intelligence to your home, you should weigh the pro's and con's of what you want both short and long term. If you've got lots of cash & want one of the high-end audio/video automation systems, that's fine. There's some great stuff out there.

If you have the cash.
And if that's all you ever want to do.

But if at some point you might want to integrate your a/v into your other home subsystems, you really should check that whatever you're about to use is open to accepting & utilizing the common protocols.

Next: Best ways to run wire in new construction.

TIP: Browse the different products at SmarthomeUSA.com, and compare the features that they have in common. This will give you a better idea of how you can build an open-architecture system.

Click here to email a friend the link to this free course.

2. Wiring in new construction...

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Obviously it’s a lot easier to get cable where you want during construction than in an existing house, but even so you do have to watch for a few things:

First of all, you should be aware of building codes in your area. They often vary from county to county. You can probably obtain the information you need from your builder, or if you know someone who does this type of thing for a living, they can be a helpful resource, too. Naturally, you can always go to your county officials, & hopefully get straight answers.

If you don't know anyone in a low-voltage industry like security or telephone, then it might be good to strike up a relationship with a local wire distributor.

Hey, this is a good thing anyway. If you can get set up with a house account and buy your materials from them, you can save substantially over what it would cost to buy from retail.

However, you might find that local suppliers will only provide to established businesses. SmarthomeUSA has all the cabling you're likely to need at decent prices (click here). By the way, while you're at SmarthomeUSA's site, you might check out their article "Home Automation System Overview."

Generally speaking, though, here are a few tips: (check these out with Code in your area):

1. TOOLS: Gosh. You need these. Actually, you don't need too much. You'll need a drill with wood "spade" bits (if you can get a cordless drill you'll thank yourself - I'd recommend 18V or better).

You'll also need a stepladder, plastic "tie wraps" (ask a cabling distributor for these - or Radio Shack if you've got mucho moolah), and either a staple gun or some kind of wire anchors for hanging your cabling.

NOTE from Experience: If you use a staple gun, BE CAREFUL! LOOK at every staple you fire! It's worth the extra time to verify that you didn't shoot through the cable when you consider the aggravation that could come trying to troubleshoot later. Believe me, it can take a LOT of time to troubleshoot a cabling issue, especially if you can no longer re-run the wiring (i.e. the problem is now behind drywall!) Also be sure that you don't "pinch" the cable too tightly.

2. TRICKS: While you want to keep your wire runs up inside the ceiling joists so they will be out of the way of drywall, you can take advantage of water pipes and HVAC ductwork by following them. This will save you a lot of drilling through joists. Always look for the simplest path!
3. Low-voltage wire usually cannot be run vertically through cold-air returns, but may be permissible to run horizontally through the chase. Check to see whether you'll need to enclose it in conduit. But don't worry. If you violate code, your friendly inspector will let you know (*Sigh... it's a drag to have to move it). In commercial construction, your wire would also have to be "plenum" grade, though I personally haven't found this to be an issue residentially.

4. **This is an extremely important tip:** Wait until all the other mechanicals have been completed (electric, HVAC, etc.) to do your runs. You might have to check with your builder to make sure he leaves you a time window to complete your work.... Anyway - I can't tell you how many times I've had to repair my cabling because someone else butchered it with a drill - or just plain cut it because it was "in their way." Of course, having said that, make sure you don't do the same thing. Always check the other side of a stud or wall before you drill.

5. Drill your own holes through studs - don't use the electrician's! You want to keep as far away from his stuff as is practical so that you don't pick up electrical noise. If you must run parallel with high voltage, keep at least a foot or two away, & on long runs you may want to zig-zag your cable just to be sure you're avoiding interference.

6. When you're done, you might need to fill the extra space in the holes you drilled with "firestop" (depending on code), which can be found at just about any hardware store. This rule usually only applies to holes drilled vertically inside of walls (through floors and ceilings).

**TIP:** Buy your cable in bulk. It's a lot cheaper that way, and you'll undoubtedly need it.

Click [here](#) to send this on to a friend.

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Next, we'll tackle some of the techniques for getting cable where you need it in existing construction. We'll cover how to fish walls, tricks for getting from the basement to the second floor, & a few other things.

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**3. Wiring an existing home...**
As I said earlier, cabling an existing home is a little different than in new construction. The bad news is that it can be a little trickier - the good news is that you don't have to worry about someone else hacking your work after you leave the job site!

The way you'll approach pulling wire from room to room depends on how your home is built. If you have a one story house built on a slab, your likely route will be up inside the wall and through the attic. If you have a crawl space or unfinished basement you would naturally take that route.

Let's first examine how you pass wiring inside of walls without destroying stuff. Here are the tools that you need:

**Fish Tape.** This is something that you can find at any decent hardware store.

**Stud Finder.** Same thing. Hardware store.

**Miscellaneous.** Drywall knife, retro-fit electrical boxes, electrical tape, flashlight, measuring tape,... some of the same stuff you might find cluttering up your kitchen drawers.

Let's assume for the moment you want to go up the wall into the attic.
You'll be cutting a hole into the drywall where the wires will exit into the room. Using your stud finder (guys at the hardware store can explain this device to you), locate the studs in your wall and trace the outline of your retrofit electrical box with a pencil (someplace where the studs ARE NOT).

**OH - BY THE WAY:** Scope out your path BEFORE you do anything! **First,** make sure there are no obstructions in the wall with your stud finder. Once in a while a piece of lumber is installed horizontally in a wall & can interfere with the fish. If you don't detect anything this way, then cut just a small hole and run your fish tape up the wall to make sure it doesn't hit anything before ceiling height.

**Second,** measure the exact distance of your proposed cut from a corner, & go up into the attic & do the same. You need to be able to drill down into the wall chase at the exact spot above your proposed "hole-in-the-wall."

While you're in the attic (if everything looks clear), drill your hole through the wood plate and drop your fish tape all the way down (if there's no insulation you can just drop a weighted string). You are now ready to cut the drywall below, reach in to grab the string or fish tape, use electrical tape to tie your wiring on, and go back up into the attic to pull away!

As a side note, a funny thing happened to a customer of mine when he followed me up into an attic. It seems that he thought it was okay to walk on the drywalled ceiling. Well, it wasn't... *Alright - it wasn't funny, either.....* But the point is, be careful where you step. Keep your feet on wood!

At the other end of your run, you'll repeat the process. The order in which you do things may vary, but this is basically how it's done.

Not too difficult, was it? Except for the nasty attic insulation (ecch!)....

*(By the way, this tutorial is much too brief to go into details of what kind of wiring you'd wish to run for specific purposes. Integrating the Smart Home and its Owner covers specifics about audio, video, data, security, & other cabling. You can check it out by clicking here.)*

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**IF YOU'RE RUNNING THROUGH THE BASEMENT** it's not much different. Again you'll measure carefully, scope out the path... but this
time you'll be drilling UP from the basement into the wall space. To make sure you drill up into a wall space and not through your hardwood floor (been there done that), measure carefully off some reference point visible from both the basement and upstairs. Heat ducts make good reference points. You can also look for nails and water pipes running up from the basement as good indicators of wall locations.

ONE OTHER CAUTION: Do your best to make sure of where electrical runs are inside the walls when you drill. Blue flame is pretty, but you'd rather not see it. Remember that romex (electrical cable) often runs vertically and may be directly attached to the studs, though not always - or it may run horizontally from outlet to outlet. Don't be paranoid, just careful. **Drill slowly when you think you're about to break through, and once your drill exits the other side of a wood stud or plate, BACK OFF.**

FROM BASEMENT TO SECOND FLOOR: Here you have to be clever. Hypothetically speaking, you could violate code and find a cold air return that runs directly from the basement in a straight line to the second floor. If so, you'd just have to pop open the return in the basement, and open the vent on the second floor so you could drill into the attic space. Hypothetically speaking.

Aside from this, you might find a common chase that was built into the house for pipes or cabling, etc. Sometimes a chimney has dead space around it that you can use. If you can't find a good hidden path, running wires through closet spaces or laundry chutes may accomplish the mission. If need be, you can then dress it up with "wire molding" from the hardware store so it's not so unsightly.

The last resort would be to take the wiring outside the house, hide it the best you can by running it behind downspouts/gutters, etc., & back into the basement/attic at the other end.

Next, we'll begin to talk about one of the most commonly used and flexible protocols that you can use & how to make it work correctly for you!

**TIP:** When a wall is impossible to fish, you can score a groove in the drywall and hide your wire behind spackling. It involves a little repair work, but it gets the job done.

Do you know someone who would benefit from this information? Click [here](#) to enlighten a friend.
4. Getting used to X10...

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You may or not be a fan of X10 technology (maybe you don't even know what it is yet), but whether it excites you or not, it's likely to be a major player in your home automation design.

Just in case you don't know, X10 is a technology that sends signals over your existing electrical powerlines. It "piggybacks" the electrical sine wave to communicate between X10 devices that are either plugged-in or hardwired to your home's electric.

There's a lot of advanced X10 theory that isn't really all that necessary to understand (unless you're doing serious troubleshooting), so let's just focus briefly on how it works and what you can do with it.

An X10 system has the ability to control up to 256 different devices. Each device receives a 2-part address consisting of "House Code" and...
"Unit Code." Sixteen house codes (A through P) and sixteen unit codes (1 through 16) provide the 256 different unique addresses.

In Integrating the Smart Home and its Owner I give a simple illustration:

"A simple but common application would be to turn on lights with an X10 remote, say, from your car as you pull into your driveway. This is so easy to do you'll have this under your belt in the next 60 seconds. Get an X10 UHF Receiver (base) module, set its address to A-1 (or whatever) and plug it into a wall outlet, and then plug your lamp into the module (make sure the lamp is in the "on" position. Now, with your X10 remote (set to the same address) you can turn the light on/off from probably 20 - 50 feet away. It uses RF (radio frequency), so you won't need line of sight like infrared."

Here you're seeing an example of using two different protocols together (UHF and X10). This is a minor point here, but it illustrates how your power to automate increases (almost exponentially) as different protocols are added to your design.

I'm getting a little off the subject of X10 here, but this is a good opportunity to mention that X10, contact closure, infrared, RS485, RS232, UHF, etc. can all be interfaced with an intelligent controller to give you almost limitless capabilities! X10 has at times gotten a bad rap for its simplicity and potential problems (I'll talk about this in a minute), but it can be a tremendously powerful ally when used alongside other technologies.

X10 has probably been used for lighting control more than anything else, but it can also be used for HVAC control, appliances, & lots of other stuff. Heck, there's even an X10 module that will do contact closure for you so you don't have to run wires!

Now, concerning some of the "issues" people have had with X10: It's true that not every X10 installation is completely successful, usually due to a signal that gets lost in transmission. In most cases that's not actually X10's fault. The typical home has two "legs" or "phases" in its electrical system, & sometimes the X10 signal has to cross from one phase to the other. To do this, the signal may actually have to leave your home & travel some distance before it can return. Strange but true! By the time it gets back, the signal might have attenuated to the point that it's no longer useful. Similar things can happen in large houses. The point is, this is not such a hard thing to fix. Signal bridges & amps/repeaters can resolve most of these problems.

Obviously I go into more detail in the book. There we also take a look at some of the different X10 light switches & other products, and compare them for their functionality. As a for-instance, a very basic X10 light
switch may cost about $15, but will lack a lot of the elegance and functionality of PCS or upscale Leviton switches. These better switches look and feel like regular "paddle-style" switches, & will operate manually just like a quality dimmer switch (smooth manual operation is an important feature). They also have some other functions, like built-in scene capability & the ability to "micro-dim."

Next: Infrared systems, etc.

**TIP:** X10 is an extremely affordable and easy way to get started. If you're hesitant to pour a lot of money into a system, buy a few X10 modules & remotes. It would probably cost more to take your family to dinner! AND - your money won't be wasted in the long run because X10 is useable in almost all HA designs.

Introduce someone to home automation. Click here to share the download link with a friend.

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5. Infrared, relays, digital inputs, etc....

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Last time we took a brief look at X10. While it's one of the most common and easy to use protocols you'll encounter, it can't do everything by itself. For real flexibility in your home system integration, you'll need to use some other things:

- **Infrared**: typically used for your audio & video system, but some lighting systems like Lutron's Spacer also utilize IR.
- **Relays**: can be used for a multitude of purposes. One application might be to use a relay to switch audio output from one set of speakers to another.
- **Digital Inputs**: used to monitor low-voltage activity, as you might wish to do on a security system loop.
- **Others**: DTMF (telephone touch-tones), RS232, RS485.

Let's take a look at each one of these. Most people are familiar with infrared. It's the way your television remote communicates with the TV. The unfortunate thing about IR is that it can't pass through solid objects. And so UHF (radio frequency) has gained in popularity in recent years.

However, while there is plenty of room for UHF applications in your integration design, I'd recommend staying with IR for your audio/video. The reason is that it's much easier to interface with an infrared system (i.e. lots of smart controllers can issue or receive IR commands).

You can have a standalone whole-house IR system that gives you control over your stereo from individual rooms. The design may vary a little depending on the maker of the hardware, but basically it works something like this: Back at the stereo system resides a "junction box" (Xantech's term). From this junction box hardwired IR emitters run to your stereo components. Going in the other direction, cabling leads from the junction box to each room where you want IR control, and terminates into an IR sensor of some sort. From any of those distant rooms you can aim your remote at the sensor & the commands are relayed through the junction box & emitters to your components. *Integrating the Smart Home and its Owner* has more information on
infrared systems if you're interested.

Now - if you have a JDS Stargate controller & add its IRXpander, you can have complete automated control over anything in your IR system! Simply run one of the IRXpander's emitters to one of your IR system's sensors, & Stargate can assume control over your A/V equipment. The opposite is true, too. The IRXpander can receive commands from your IR system as well, enabling you to manually trigger desired events from an infrared remote!

Stargate has a bank of built-in relays, or you can simply buy X10 based relays. Using the example cited in the first paragraph above, you could simply run speaker wire from your stereo amplifier to Stargate's "common" terminals, & then run speaker wire from the "normally closed" terminals to one set of speakers, and from the "normally open" terminals to another pair of speakers. Remote commands (issued either manually by yourself or automatically based on circumstance) can switch from one pair of speakers to the other.

A little bit of rewiring can use the same setup to switch between audio sources rather than between speakers. For instance, at my house when the stereo is playing and the telephone rings, Stargate switches the speakers over to its own built-in amp & announces via caller-ID who's calling.... In any event, this is just one example of what you can do with relays. ISHO goes into significantly more detail on your audio and video distribution systems.

I probably make as much use of Digital Inputs as anything else. If you have a hard-wired security system you can simply run the loop through one of Stargate's DI's & all kinds of information is automatically passed to your automation system. Your home will have the capability to respond to movement (based on input from motion detectors), the opening/closing of doors, and alarm conditions.

I once forgot to put my pet ferret up before I left home. When I was about an hour away, I received an automatic phone call telling me that my alarm was going off - repeatedly! The little guy kept setting off the motion sensors (as well as the neighbors & police). So I learned my lesson. A quick little programming trick, and now whenever I set the alarm I get an audible reminder to make sure my pet isn't loose.

You may or may not use other protocols depending on your design and whether you use Stargate or some other interface. Just so you'll know, Stargate & many other controllers can also respond to DTMF (telephone
touch-tones). This way you can manually issue commands from any telephone - from anywhere in the world!

**RS232** is generally just a reference to serial communications between your PC and Stargate. Also, the Caddx NX8 series of security panels can communicate completely with Stargate via a single RS232 connection. You don't even need to use the digital inputs!

**RS485** is used for hardwired communication with RCS keypads (designed specifically for Stargate) and also with RCS or Enerzone Thermostats. In the case of Stargate, a single Category 5 cable runs through each thermostat or keypad (they're wired in series, that is), so installation is really a snap! Then it's just a matter of programming ... something we'll get into in a later issue.

Next ... **audio and video distribution**.

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**Tip:** Most of your wiring needs can be met using only Category 5 cable, coax, and speaker wire.

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6. Audio & Video Distribution....

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Distributed audio is probably one of the most common things done by homeowners today. Who doesn't enjoy the ability to listen to and control their stereo in remote rooms?

The basic structure of a distributed audio system is simple. Run a single 4-conductor speaker wire from your stereo to each room where you want audio. You could take the speaker wire directly to your speakers, but I'd recommend running through a volume control first. That way, you can (obviously) control volume in each room, or just plain turn the sound off if you wish. From the volume control you'd then run a 2-conductor to each of two speakers. In Integrating the Smart Home and its Owner I speak at length about some other considerations like speaker placement, in-walls vs. free-standing speakers, etc. (Click here). While you're pulling speaker wire, you might as well pull either shielded 3-conductor (22 guage) or a Cat5 wire for your IR system that we talked about last time!

Back at the stereo end, you'll now have a mess of speaker wires that you have to connect to your stereo. If you just hook them all directly to your receiver you'll probably overload it. Generally amps are made to handle about two pairs of speakers (one pair per set of A & B terminals). More than that and you can do damage to your speakers or amp.

So, to compensate you need some sort of "impedance-matching" device. A good quality Speaker Selector box will enable you to connect and play multiple pairs concurrently. Cheaper ones will only allow you to choose one pair at a time.

Distributed Video is a little more complex. In this case you might be injecting security cameras into your CATV system, or perhaps you want to feed a VCR/ DVD to all TV's in the home. It's a bit much to go into all
the necessary detail here, *ISHO gets pretty explicit*, but in a nutshell what you'll need to do is use a modulator to place each of your video sources onto unused channels. *A modulator is a device that can take an incoming signal that's on, let's say, channel 3 - and adjust it's output to place it on another unused channel*. Then, from the modulator(s) your video feeds through a combiner (sort of like a backwards cable-TV splitter) to inject it into your TV cable system.

**Once you've got this infrastructure in place you can consider how you might use it in your automation design.** Consider what we've talked about so far with Stargate. It has the ability to send and receive IR commands (something your video devices are likely to participate in); you perhaps will have your security system interfaced with the digital inputs on Stargate, and probably you'll have some X10 devices here and there.

Hey, maybe you'll run your doorbell wiring through a Digital Input? This way, you can tell Stargate that when someone rings the doorbell, you want the TV to mute and change channels to the front door security camera. So Who's there? Heck, you didn't even have to ask...

**Tip:** You don't actually have to pull that huge glob of speaker wires to your stereo where it will be difficult to hide. You could instead locate the speaker selector box (which connects to all the wires) in a hidden location, and pull a single 4-conductor wire from there back to the stereo. Much cleaner this way!

Do you know someone who would benefit from this information? Click here to let a friend know about this free information.

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7. Programming Logic....

Guide to Course
If you've read over the other six issues of this course, you have a general idea of what's involved in an open architecture automation system (excuse me - *integrated* system!). We've talked about these things from a modular perspective, meaning each subsystem (X10, IR, contact-closure/relay, I/O or digital input, UHF, etc.) is an independent part of a greater whole. If your subsystems are designed correctly, they can easily be *integrated* into a single intelligent design.

There's **one piece missing** that we haven't covered yet: the brain of the whole operation. While there are a number of similar products available, as you probably know I tend to recommend Stargate for its cost, support, and flexibility.

Many people might be scared to think of "programming" anything, but the truth is that Stargate's logic is extremely simple. You don't have to learn javascript, visual basic, or any other programming language. All you really need is the ability to read English and an imagination.
The WinEVM software in Stargate uses a simple "if-then" and "if-then-else" logic. I've included a screen shot of a sample event for you below.

```
EVENT: trash night
if - Always
   Time is After 8:00 PM
   and (C1:family PIR) Toggles
   Then
      \Voice:trash night [Spkr]
      
      IF
         Date is After Mar 15
         and Date is Before Mar 27
      Then
         \Voice:dr.get appt. [CO]
      End
   Next
End
```

This is a simple little "event" that uses the security system's motion detector to remind me every Sunday night after 8 p.m. to take the trash out. Every hour after 8 o'clock Stargate will watch for motion near the stereo speakers. When it "sees" that I'm nearby, it announces the reminder.

You can also seen an example of what's called a "nested" if-then event. In plain English, IF it's after 8 p.m. on Sunday night, AND IF the date is between March 15 and March 27, then Stargate was to remind me of a doctor's appointment. I did do one thing wrong, though. When I wrote this, I directed the audio output to the CO (telephone) line instead of the stereo speakers. Guess what appointment I missed?

Human error is always possible, but it's usually not too difficult to figure out where your problem is when things aren't quite right. Actually, the better you get at this, the more complex your scenarios can become. IF-THEN and IF-THEN-ELSE may seem almost too simple (and it is easy), but with nested events and some of the more advanced features of Stargate programming that you'll eventually learn, you'll soon be doing some pretty impressive things.

JDS has given me permission to post a demo of their WinEVM software (click here). If you download it you can get a better look at what it's like to work with event-based programming. The demo is actually a version of older software, so it's been improved somewhat - but it still gives a pretty accurate idea of what it's like to use Stargate.

In the book we study some of the events that are in the demo. We take them apart, put them back together again, and then try a few simple exercises of our own to get a little more familiar with programming.

With the newer WinEVM software you'll be able to seamlessly integrate your security, heating & a/c, infrared commands, X10, I/O, and relays.

Again, it's just a matter of building your different subsystems correctly (so that they can be interfaced), and then bringing them all together with
Stargate. That's the **modular - open architecture** approach that practically guarantees you the greatest flexibility in design.

Obviously there's a lot more to learn, and most of it you'll learn just by doing. If you're going to move forward from here, I strongly recommend *Integrating the Smart Home and its Owner*. I'm not going to tell you that you can't learn System Integration without it, because you surely can. However, you don't have to suffer the same learning curve that I did.

I spent literally thousands of dollars on hardware, travel, and training that I know I'll never use. I'll never use it because I **won't** use it. All that money and time was spent on stuff that I've since discovered wasn't really practical or efficient. I'm simply saying that you don't need to go through all that. For a relatively measly few dollars you can really save yourself a lot of time and money.

In addition to a more in-depth look at what we've been discussing, the book covers a number of other issues:

- **Security** - the best panel to use with a JDS system. How to install your sensors in series or parallel, programming, and the foibles of doing it wrong (*that's right - you can really learn a lot from my mistakes!*).

- **HVAC** - how to take your existing furnace and/or AC, and make it respond intelligently to time or circumstance.

- **Data Networking** - build your own hardwired PC LAN, with instructions for pinouts, termination of jacks, router or hub integration, and initiating TCP/IP or NetBEUI communications.

- **Security Cameras / Webcams** - using cameras to monitor the front door, or checking in visually from anywhere in the world via the Internet - and how to automatically take and send snapshots to a remote location when your security system is violated! *A Smart Home is a Safe Home.*

- **Other Miscellaneous** - automating garage doors, gas fireplaces, ... if it uses contact-closure or low voltage, you can interface with it.

Anyway, check out the book's [webpage](#). With a complete guarantee of satisfaction, what have you got to lose?

This concludes the *Integratorpro Introduction to Home Automation Course*. I hope it's given you a good look into what I believe is a solid approach to home systems integration. Thank you for your interest, and
I hope you had your imagination fired up!

**P.S.** You're welcome to sign up for the X10 Files newsletter for more great tips and information by clicking [here](http://www.x10.com/newsletter).

*Tip:* the X10 Files newsletter (see above) will keep you up-to-date with some of the exciting developments in home automation.

*Click [here](http://www.x10.com/newsletter) to share this with a friend.*

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**YOU CAN GET MORE DETAIL** about how to automate your home from start to finish and save thousands of dollars by doing it yourself. Check out [http://www.integratorpro.com](http://www.integratorpro.com) for my helpful book, *"Integrating the Smart Home and its Owner."* It's loaded with useful advice and specific product recommendations.

Over the years I've found these to be some of the most cost-effective quality alternatives to the high priced systems sold through custom installation companies.

Thanks again,

Andy Jackson,
Integratorpro.com

...or send an e-mail to comments@integratorpro.com with your thoughts.