



Going Green with Electronics

Integrated Systems

Dan Fulmer, CTS

Meet the Instructor

- Meet the Instructor – Dan Fulmer

- Founder and President of FulTech Solutions, Inc, Fultech Commercial, LLC and the College of Smart. Frequent national and international speaker. Consumer Electronics Association, CEA TechHome Board 2003-2007, Serves on various Committees for CEA.
- BS Degree from UCF, Studied computer science and environmental engineering, w/minors in physical science and business administration
- 15+ years hands-on experience in design, programming, installation of integrated systems
- Crestron Certified Programmer, DHTI+ Certified, D-Tools Certified Reseller
- InfoComm Certified Technology Specialist/CTS
- Extron AVA Certified
- Published author – wrote annual column in Electronic House on structured cabling, published various articles over past 5 years, CEPro, CEE News, Buildor News, and more
- Award Winning Systems Integrator – 2006 2 Mark Of Excellence Awards, 2007 NAHB Innovative Housing Technology Award – Best Integrator, TechHome Builder, 2007 Best of the Best integrators, holds US Patent-Pending status on his Universal Cabling System (UCS)

General Guidelines

- Cell phones – please turn to vibrate
- Questions
 - I prefer an interactive discussion, please feel free to raise your hands and ask questions during the seminar.
- Additional questions
 - You may email additional questions or come by our showroom for a demonstration, by appointment.
- Additional Information
 - Please see our website www.fultechsolutions.com
 - Search “Fultech” on FaceBook, Twitter and LinkedIn.
 - Visit www.usgbc.org and www.ce.org for more info.

Agenda

- General Guidelines
- Introductions
- Seminar Learning Objectives
 - **Going Green- Why, how it affects your business, Being a Green Building**
 - **Industry Initiatives - Energy Star, LEEDS and other certifications,**
 - **Green Electronics – what are they and how do I use them**
 - **INTEGRATING GREEN – what does this even mean?**
 - **Lighting control and GREEN**
 - **BMS using your existing or planned systems**
- Summary
- Questions and Answers
- Resources

Meet the Participants

- Let's learn about you

- How many are building owners / management?
- Any facilities managers?
- Others, business owners/tenants?
- How long have you been considering greening your facility?
- What green initiatives are you involved in with your company?

- Expectations for this seminar

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Going Green w/electronics **(using Integrated Systems)**

“Go Green”

- Today everyone is talking about going “green” and making a positive impact on the world we live in
 - Recycling
 - Set-back thermostats
 - Light bulb replacement
 - Carpooling
 - Hybrid cars
 - The movie “An Inconvenient Truth”
- -Energy-conscious lifestyles (what we’ve found)
 - The more passive the systems, the more they are utilized.

Sustainability

- Energy efficiency

- Conserve and replace our world's resources
- It saves YOU money, both long and short term.

- Environmental friendliness

- Treat our resources; land, air, water, elements, with respect for longevity and re-use.

- Societal responsibility

- “We did not inherit our earth from our fathers, but borrow it from our children.”

Why Go Green

- Make a difference for your clients and the world
 - People feel good building an earth-friendly building or home
 - People feel good knowing they are living responsibly
 - People feel good understanding they are doing their part and making a difference
- Build bridges to designers, architects, and builders
 - The building community is embracing “green building”
 - **Help them help you – do your research too.**

Why Go Green

- Makes business sense and green sense
- Saving energy is saving real money
- Once initial investment ROI is realized, savings are pure profit
- Helps to makes things easy to operate and manage
- Contribute to your success
- Feel better about what you do

Your Business

- Market your facility as a “green” building
- Use green products
 - Energy star approved products
- Use green services
 - Lighting control programming
 - Automatic shut-off
 - Energy usage management
 - Landscape management
- Practice green in your business
 - Recycle
 - Conserve

Your Approach

- Approach it as evolution, rather than revolution
 - Practice this new way of speaking
 - Share this new way of thinking
 - Engage tenants/contractors on this new level
- Evaluate what you currently are doing
 - Play up positive, energy-conscious things you already do
- Consider ways you can do even more
 - SMS for sprinklers, lower water usage more, get more efficient HVAC systems installed

Building Technology Systems

- Technologies are grouped into separate systems, each addressing a set of specific needs and functions
- Multiple systems can work together to increase the value and enjoyment of a tenant space and building



Fitting the Systems Together

Think of each system as a piece of a puzzle



Sensors



Systems



Integration Solves the Puzzle

- Definition of an integrated system

- Subsystems are interconnected
- Easy control of the subsystems
- Accessibility of outside services
- Allows remote access and control



- Each puzzle piece provides residents with enjoyment, safety, and satisfaction

- **Integration can make a building “green”**

The Integrated Solution

- You are probably purchasing multiple systems for your building anyway.
 - You are planning your build-out, what should you consider?
 - What type of lights are you buying, are you using occ. sensors, motion sensors, timers, all of the above?
 - Are you using a security system?
 - What about access control and a CCTV camera system and a DVR to record activity? Should I use IP cameras or Standard cameras?
 - Does your HVAC system have any control to it?
 - Can you tie these systems together and should you?

The Integrated Solution (cont'd)

- Security, Access Control, Lights, HVAC, Access Control as a single system?
- Tying these systems together makes for a better, more robust and “smarter” solution. Here are some examples.
 - The access control system can also be used as an employee time clock, to secure the building and to turn on/off any and all other systems on the premises.
 - The security can be tied to the lights to turn them all on in case of emergency, flash them or even create paths, automatically
 - The occupancy sensors used for lights can be used for the other systems instead of installing multiple sensors for multiple systems.

A Passive Total Solution

- Tying these systems together also creates an almost totally passive solution.
 - Systems are programmed to operate based on sensors and inputs from other systems.
 - Using your access control key in the morning,
 - unlocks the door
 - Logs your time in
 - Disarms the security system
 - Turns on main lighting (not occ. Sensor controlled)
 - Turns on the HVAC system
 - Turns on music, video or digital signage around the building
 - At the end of the day, it will similarly turn everything off, based on the last person vacating the building.



Putting it all together

- The results of this are not from the Access Control, security or any other single system, this is the result of Integration of multiple systems via a control system.
 - This actually results in a more robust and reliable system
 - Made up of many individual systems, doing what they are supposed to do (HVAC, Lights, Access Control, Security, etc.).
 - Built-in, inherent redundancy. If the control system were to fail, all systems would still operate normally. If a system fails, the control system can notify you.
 - Much less maintenance cost overall. You get standard, nominal maintenance for your regular systems (HVAC, Access control, etc), and one source for all building management.

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Key Issues

What to Look For

- Products that:
 - Last longer
 - Fail less
 - Consume less energy
- Energy Star rated products
 - NuVo, Crestron, HAI, others
- Ultimately leaves less of a footprint on the planet
 - Less packing, less energy use, less pollution

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Green Electronics

Green Electronics

- Look for Energy Star Logo
- Look for systems that monitor usage and turn off when not in use
- Check components on power usage vs. standby power usage
 - Many products today use almost as much power off, as on
 - You can use a Kill-A-Watt to measure differences in on/off usage
 - Some things you can't control; cable boxes, satellite receivers, etc.
 - Often these cannot be turned off, since reboot times are significant and an annoyance to the end user
- Purchase the most efficient electronics possible, turn off what you can when not in use, the rest will have to stay on

Energy Star Product Example

- NuVo's Essentia E6G

- 6 zone audio switcher
- 40W per zone
- Fully digital system, from power to delivery
- Uses 12lbs less copper per unit, due to power supply
- Uses less than 1A when in standby mode
 - That powers the unit and 6 keypads in standby mode
- Overall – it cost less to produce, get to customer, and when in use, uses much less energy than most amplifier switchers



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The Smart "Green" Building

Integrated Systems

- An fully integrated system can inherently help save energy , IF PROGRAMMED PROPERLY
 - HVAC (all aspects of ventilation- rack room, bathroom vent fans, kitchens)
 - outdoor temp sensors
 - Lighting Controls
 - Drape and blind controls
 - Pool/spa pumps, other mechanical pumps (sprinklers, wells, etc)
- With careful consideration, a Net 0 system can be designed and installed today
 - Program HVAC, lights, shades to work together efficiently
 - Use new advanced technologies to enhance system; ie. RFID to follow users around the facility
 - Choose products for your system that use the least total energy (smart amplifiers, etc).
 - Offset the net addition of the system in average use, with savings in energy from your programming and control.



Integrating GREEN

- LOAD Shedding - You can integrate several sub-systems to monitor other systems to control usage when electricity needs to be conserved, and also monitor via your touchscreens and PCs so you can control what's being used and how much.
 - Electric Meters
 - Inverters
 - Gas meters
 - Solar water heaters
 - Other Solar Panel and energy usage monitoring systems to control usage



Lighting Control and Green

- Lighting Control is a great way to save energy
 - You save when dimming a light, nearly the percentage you dim
 - This can be as effective, with better results than CFL & flourescents
- CFLs are not always the answer
 - CFLs are not dimmable – even dimmables don't dim well below 50%
 - Many CFLs cannot go on/off/on quickly enough for some rooms, warmup times can be an issue. Not good with motions.
 - CFLs do not really output a good light color
 - Not great for lighting design, Ok for commercial but LEDs much cheaper than even 1 year ago. Better solution



LEDs making headway

- Our offices have only LEDs in it. Most draw 12W each, some as little as 5W. Great light output and dimmable.
- Cost is nominal 1 year ago were \$200 each, now <\$150 each.
- Retrofittable solutions – easily fit LEDs into many existing cans and fixtures, even flourescents



LED Fluorescent Replacements

- Replacement LEDs Tubes are also available for similar cost
- These offer similar light output output to T8 bulbs at 15W each vs 40W
- 50,000 hour life
- 3000K color temp

EarthLED
DIRECTLED™ FL



Fluorescent Tube Replacement Solution

Other Lighting Solutions

- Occupancy Sensors – choose ones that work
 - And work for your situation
 - Wall vs ceiling
 - dumb vs smart
 - Can work with other systems
 - Can be over-ridden
 - Dual technology a must
 - Infrared AND ultrasonic
 - Learning devices are the best
 - Non Proprietary is best solution usually. Simple contact closure.



The Results

- A seamless and easy to use Building and Energy Management System
 - Almost all systems discussed offer LEED Points
 - Connecting all of your buildings systems
 - Passive system, easy to use by all
 - Actively accessible, via internet
 - Integrates systems making them easier
 - System offers multiple results now
 - Access control can be used as a time clock
 - CCTV can be used to verify shipments or protect against losses
 - Systems can be made safer – a button lockdown when office is occupied by 2 or fewer employees.



Bringing it all together



Go Green with Crestron - Demo - Windows Internet Explorer
http://www.crestron.com/solutions/go_green/demo/

Master Bedroom

XM Radio

12:00

Manage Electricity Gas Water Solar

CITY UTILITY \$ 0 3 2 . 0 8

SOLAR YIELD \$ 0 1 2 . 0 4

NET \$ 0 2 0 . 0 4

Hour Day Week Month Year

Energy Mgmt

close window

Room Volume

Channel

Internet 125%

Results

- Systems can now be used;
 - For Asset Management
 - For Securing resources
 - For Resource management
 - For Continued management and maintenance of systems
 - To Tie multiple properties and locations together for ease of management and oversight
 - And are inherently scalable, upgradeable and expandable

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Industry Initiatives

Initiatives

- USGBC – United States Green Building Council
- LEED – Leadership in Energy and Environmental Design
- Energy Star rating system
- European Union RoHS – Restriction of Hazardous Substances
- California Electronic Waste Recycling Act of 2003

USGBC



- USGBC – United States Green Building Council
- Purpose:
 - To transform the way buildings and communities are designed, build and operated, enabling an environmentally and socially responsible, healthy and prosperous environment that improves the quality of life
 - Most new buildings today are **REQUIRED** to have some sort of building control systems installed

LEED

- LEED - Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ Green building rating system
 - Set of standards for design, construction, and operation of buildings to be environmentally sound and sustainable
- LEED AP – Accredited Professional
 - Established 1993 by USGBC
 - Accreditation earned by passing an exam
- LEED Certified Building
 - LEED is the nationally accepted benchmark for the design, construction and operation of high performance green buildings. LEED gives building owners and operators the tools they need to have an immediate and measurable impact on their buildings' performance.

Energy Star Rating System



- **For the Home and Business**
- Energy efficient choices can save businesses about a third on their energy bill with similar savings of greenhouse gas emissions, without sacrificing features, style or comfort. ENERGY STAR helps you make the energy efficient choice.
- **If looking for new products, look for ones that have earned the ENERGY STAR. They meet strict energy efficiency guidelines set by the EPA and US Department of Energy.**
- **If looking for a new home or building, look for one that has earned the ENERGY STAR rating and/or LEED certification**
- **If looking to make larger improvements to your home, EPA offers tools and resources to help you plan and undertake projects to reduce your energy bills and improve home comfort.**
- **Many new products we sell are becoming Energy Star Certified**

LEED Certified Building

- LEED certification applies to the entire built environment, not individual components or systems
- Measures in five areas
 - Sustainable site development
 - Water savings
 - Energy efficiency
 - Materials selection
 - Indoor air quality

Green Facts	
Project Title	Adobe Systems Inc.
Building Use	Multi-Use
Location	San Jose, CA
Size	325,421 SF
Cost	NA
LEED for Existing Buildings Rating out of	
Total Score	69
Sustainable Sites	14
Water Efficiency	5
Energy & Atmosphere	23
Materials & Resources	16
Indoor Environmental Quality	22
Innovation & Design Process	5
Certification Level	Platinum
Energy Savings 15,575,599 kWh/yr, \$637708/yr	
Carbon Emissions Avoided (tons)	3,582,410 tons
Water Savings (gallons/yr, \$/yr)	9287 Ccu. feet, \$25913/yr
Waste Diverted (tons)	1433.06/tons/yr
Project Team Profile	
Owner	Adobe Systems Incorporated
Facility Mgr. / Property Mgr.	<small>Tina L. Tye, Facilities Manager for Adobe, George Conner, General Manager for Cushman & Wakefield @ Adobe</small>
LEED Consultant	Tia Heneghan, CTG Energetics, Inc.
Maintenance Contractor	Cushman & Wakefield
Cleaning Contractor	GCA Services Group
<small>*estimated NA= "Not Applicable" or "Not Available"</small>	

EU RoHS

- European Union Restriction of Hazardous Substances
- Initiated in 2006
- Restricts the sale of products with hazardous substances –
 - Lead
 - Mercury
 - Cadmium
 - Hexavalent chromium
 - Polybrominated biphenyls
- Other countries are moving to adopt RoHS
 - Australia, Canada, China and Japan

California Leads the Way

- 2003 – Electronic Waste Recycling Act of 2003
- 2007 – Enacted similar laws to EU RoCH directive
 - Ban the sale of electrical and electronic equipment with hazardous substances
- 2007 – CFL Requirements
 - advancing CFL light bulb requirements, that continue to spread across the country

Summary

- Industry initiatives such as Energy Star and the USGBC LEED program are helping to push involvement
- Your buildings can Benefit from Being efficient
- Offering “Green” in your buildings will benefit you and your tenants
- Going Green doesn't have to COST you
- Green IS the BUZZ Word now, ride the wave!



Questions, Answers and Resources

- Questions and Answers

The only dumb question is the one not asked!



- Additional Resources

- Energy Star

- www.energystar.gov

- USGBC – United States Green Building Council / LEED

- www.usgbc.org

- Fultech

- www.fultechsolutions.com

- Calculate your impact

- www.myfootprint.com