

Environmental Control Unit (ECU): Controlling Small to All (or Electronic Aides to Daily Living)

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VA Polytrauma Rehabilitation
Assistive Technology Grand Rounds
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Background

- Environmental control units (also known as Electronic Aides to Daily Living)
- ECUs or EADLs provide access to someone's environment that has limited mobility and range of motion. Simple things such as controlling lights, television, bed, nurse calls, fans and so on are difficult or impossible for some people to accomplish these tasks.
- ECUs enables accessibility to many household appliances and electronics by activating a switch or using their voice. The user increases their independence and self esteem when they are able to turn on a lamp or the television by themselves and not having to rely on someone else.
- The available ECU system can be as simple as controlling just one item all the way up to controlling any device in the home. There are varying circumstances that will help determine how much control is allowed. The first is the ability to understand the system, if their home can be set up (usually have problems with older homes with wiring) and funding. ECUs are expandable. They can start off with controlling a few items and then increase the number of controlled devices in the home.

Controlling the Small Stuff

- Controlling entertainment based equipment is the most common in many households. This equipment would include the television, dish or satellite, speakers, DVD, VCR, and stereo. These all operate mainly with infrared technology.
- Lights can be controlled and provide safety and security. The lights operate by X10 or Insteon technology. Not every light in the home needs to be controlled, just the ones that the user deems important. The bedroom light is the most common followed by the lights in the living room. In a basic system, up to 16 lights can be controlled. Keep in mind that the lights are for safety, either for illuminating for a safe journey through the house or if a noise is heard and a light can be turned on to see what is going on. One place that is overlooked is the entry way. To be able to turn the entry light on before someone enters or exits the house. Illuminating the path, decreases the risk of falling or driving off the side of the ramp.

Parts and Pieces – i.e. ‘Nuts & Bolts’

- Three main components : a remote, transceiver and a module.
 - The remote is the input device (switch). This sends a signal to operate the device, the transceiver receives the signal then sends it through the house wiring with a unit code and house code. The module receives the signal and performs the action of on/off, dim or bright.
- The following are samples of these devices.



Remotes

- Many types of remotes that can be purchased to control the environment. Only a few can be adapted to accept a specialty switch for those with limited mobility.
- Always provide a remote with more capacity that is required. In other words, if they are asking to control three lights, provide a remote that can control up to five or six devices. This way the system can easily be expanded.
- Remotes should be easy for the user (as well as the caregiver) to operate.
- Specialty switches can include micro switches, fiber optic, wobble, buddy button, big buddy button and so on.

Modules

- Two types of installation for modules:
 - The first is a “plug in” module. These are the most popular because of the ease of installation and the availability of moving the module in case the arrangement of the room changes.
 - The second is a “hardwired” module. These are hardwired into the home, by replacing switches or outlets. An electrician is required for the installation of this type of module. This adds cost to the overall installation or replacement of this type of module.
- The plug in modules are more convenient to install or replaced and makes expanding the controls (adding more devices) much easier and cost effective.
- Both cost about the same to purchase. The hardwired modules tend to have a little long life than the plug in type modules.

Modules continued

- Two basic types of modules: light module and appliance module.
- Lamp modules follow the commands of on/off, bright and dim
- Appliance modules only follow the on/off command and has a higher amperage rating to handle the higher currents
- If someone has the CFL (fluorescent) light bulbs, an appliance module must be substituted for the light module. Fluorescent lights cannot be dimmed, if a light module is used, the bulb will flicker and not operate correctly.
- An appliance module is used for fans, plug in heaters, coffee makers and so on.

Accessories and Descriptions Cont'd

- X-10 plug in filter: reduces the "noise" in the electrical lines in the home. The signals are sent over the ground wire in the home. The plug in filter increases the reliability of the signal to reach the X-10 modules.
- Radio remote packages: provide remote access to the ECU. The user does not have to be in the same room as the ECU to control the environment. This is typically mounted to the wheelchair and allows full function of the Quartet while the user is mobile within the home.
- Wheelchair mounting kit: mounts the remote microphone and switch to the chair.
- Voice back radio package: same as above with the exception of a speaker mounted to the wheelchair. This provides audio feed back from the ECU for commands and the use of the phone when in a remoter part of the home.

Accessories and Descriptions Cont'd

- Pillow speaker: allows for privacy while on the phone. If the user is on the phone with their doctor and the caregiver is in their room, the user says "privacy" and the external speaker is turned off. The only audible command from the Quartet is through the pillow speaker.
- In-line fan module: This is wired in to the overhead fan so that the user can operate it. If the user gets over heated while lying in bed, they are able to turn the fan on or off depending on their needs.
- In-line light module: this one will control the light on the overhead fan/light that is in their room. There are not lamps in the room.
- Open Sesame door opener: This allows for the user to unlock and open the door for caregivers without giving them a key. In case of an emergency, the client, while seated in the wheelchair can unlock and open the door to escape any situation. This also has a battery back up system in case of an emergency (the power goes out) the door is still operational.

Accessories and Descriptions

- X-10 lamp modules: work under the light menu. One lamp module controls one lamp. It will turn on, turn off, dim and brighten.
- X-10 appliance module: control appliances such as fans, door openers, page-turners, etc.
- Bed cable: interfaces directly to the back of the ECU to control the functions on beds.
- External infrared eye extension: sometimes needed to control the device (TV, VCR) in the same room as the ECU. If the ECU is located in a place that the infrared eye on the front of the unit cannot see the device, the external infrared eye can be located to make control possible.
- X-10 mini controller: provides access to the controlled lamps to other family members, caregivers control of the lamps or lights.

Accessories and Descriptions Cont'd

- Universal module: device is a switch closer and or a buzzer. Would be used if an auxiliary device were planned. This provides a momentary switch closer to the device in order to operate it. An example is a page-turner. The other use is a buzzer. This allows a caregiver to plug this unit in to any outlet in a room that their in. If for example that they are in the kitchen preparing meals, and the Quartet user needs them, the user can signal that they need assistance.
- Power mids: translates infrared to radio frequency and then back to infrared signal. For example, a Quartet is positioned by the bed due to the hardwiring of the bed cable. This will allow the user to operate any infrared device in a room other than the bedroom. Radio frequency can travel through walls and infrared signals cannot.
- Phase coupler: used when the X-10 signal works on one side of the home and not the other. This allows for the transmission of the X-10 signal to cross through the breaker box in the home. A plug in phase coupler is recommended because of the ease of installation. The only other option is to have an electrician hardwire a phase coupler in the breaker box.

Controlling Even More


- Some other devices that can be controlled are door openers, bed (head up/down, foot up/down and bed up/down), blinds or curtains, phone, ceiling or floor fans, air conditioners, nurse calls and so on.
- To control these items, a much different remote or input device is required. All of these devices receive different types of signals to operate, a basic remote will not work everything. A unit is needed that will send multiple types of signals.
- Two ways to categorize commercially available ECUs: stand alone systems (they perform ECU functions only) and integrated systems (part of or integrated with other assistive technology).
- The following slides will provide a look at some of these ECUs.

STAND ALONE SYSTEMS

Stand Alone Systems

- Stand alone systems provide the most control in an environment
- Some but not all would include phone, nurse call, lights, appliances, bed control, accessories (door openers, page turners)
- A few of the stand alone systems have the option of having a radio package that would mount to the chair so that the ECU could be used form the bed as well as the chair.

Series All-In-One



Voice and Switch Activated
All-In-One Environmental Control Unit

Overview:
The Series All-In-One is a compact, versatile, and powerful environmental control unit designed for use in the home. It provides a wide range of control options, including voice and switch activation, for a variety of applications. The Series All-In-One is a compact, versatile, and powerful environmental control unit designed for use in the home. It provides a wide range of control options, including voice and switch activation, for a variety of applications.

Control Items:

- Lights (up to 16 channels)
- Fans (up to 16 channels)
- Heating (up to 16 channels)
- Cooling (up to 16 channels)
- Music (up to 16 channels)
- TV (up to 16 channels)
- Video (up to 16 channels)
- Phone (up to 16 channels)
- Nurse call (up to 16 channels)
- Door openers (up to 16 channels)
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Additional Features with each unit:

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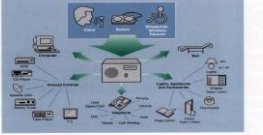
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ENVIRONMENTAL CONTROL SYSTEM


SiCare
pilot

Natural Speech Recognition for Controlling your Environment!

Simply and intuitively control your environment, one request at a time. No buttons to push, no wires to connect. Just speak and the SiCare Pilot will do the work for you.

Simple controls for your environment. Infrared for use in the home, or the wireless remote for use in hospital.

TV ON CHANNEL UP



Standard Model: \$1,199.00 US

Voice recognition: \$1,399.00 US

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ONLY FROM TASH

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Email: info@tash.com Website: www.tash.com

To Order Call 1-800-663-6665

SiCare Light II features:

- Pre-programmed menu structure
- IR and X-10 interfaces
- Easy-to-train IR learning
- See "Shared Features" below for more

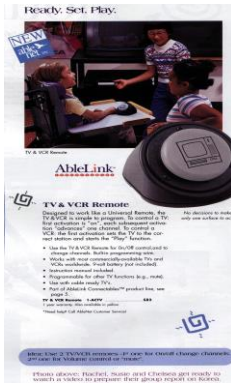
For IR and RF Environments – SiCare Standard
A step above the Light II, the SiCare Standard adds fully customizable menus and RF (Radio Frequency) control to reach even more devices.
Users with multiple IR and RF devices in their home, or who need an unlimited number of functions should choose the SiCare Standard.

SiCare Standard features:

- 96 different words available in menus
- RF and IR interfaces for all devices and X-10 controls
- Programmable, adjustable menus with support for macros
- Designed for complex home automation systems

Shared Features:

- Voice training with no computer required
- Convenient graphic display
- Auditory and Visual feedback
- "Direct Learning" infrared for easy programming with your existing remotes
- Supports external microphones
- Latest generation speech recognition technology
- Internal microphone
- External keys for caregiver use



The Mini Relax is a scanning infrared transmitter that controls up to six functions of a TV, DVD player, or any other device that operates using infrared (IR) technology. Complete with large and colorful graphics, Mini Relax provides visual and auditory feedback and an adjustable scanning speed, where applicable. The Mini Relax mounts easily with the Relax, Mini Relax Connector.

Key Features
 6 trainable IR functions
 Auditory and Visual feedback
 Switch access (Direct or Scanning)

INTEGRATED SYSTEMS

Dragon Naturally Speaking



J-Say Pro brings together Dragon NaturallySpeaking Professional version 12, from Nuance.

However although the product integrates these two applications, it also presents the User with an easy to understand interface enabling interaction with the computer using natural language and easy to remember and understand vocabulary.

X10 Computer Control 33

Intelligent Control For Your Home

3-Way X10 Control With Audio/Video IR Control, Analog/Digital Sensor Inputs, & Relay Outputs

JDS TimeCommander™ (Plus)

TimeCommander Plus has 6 infrared universal sensors.

Temperature Sensor Plate With RFI Filtering

Temperature Sensor IC Chip

JDS TimeCommander™

For more information, visit www.amsarhome.com or call (800) 242-7329

28 X10 Computer Control

CP290 Home Automation Interface

- Designed for full home control
- Features icons for home use
- Can be used for TV control
- Can be used for lighting control
- Can be used for heating control
- Can be used for security control
- Can be used for entertainment control
- Can be used for environmental control

Plato™ for Windows-Software

Add "Virtual Reality" Capabilities to the X10 CP290 Home Automation Interface

- Features an advanced graphical user interface for your home
- Home environment lights and TV control interface
- Can be used for lighting control
- Can be used for heating control
- Can be used for security control
- Can be used for entertainment control
- Can be used for environmental control

Macintosh Software for X10 CP290 and ActiveHome Interfaces

- Home environment lights and TV control interface
- Can be used for lighting control
- Can be used for heating control
- Can be used for security control
- Can be used for entertainment control
- Can be used for environmental control

The Tech/Speak with Environmental Controls combines augmentative communication with the added functionality of environmental control, providing an added level of empowerment to the user. Within each of four on-off combinations, up to eight devices can be programmed to activate simultaneously. The device functions through radio frequency. Real voice audio reproduction. Control up to 32 electrical devices and/or light fixtures. Total of 6 levels, each has 8 locations designed for Environmental Controls. The first row on each level is allocated for Environmental Control functions.



Vanguard

• Built-in infrared control gives independent operation of a TV, VCR, etc.

• I can say what I want.

DynaVox

Built-in remote control

Durable, rubberized case

Flexible selection methods

Natural language formation

INSTEON PowerLinc USB With mControl Software is an environmental control module designed for use by individuals with spinal cord injury or severe physical disabilities. It enables the user to control lights, appliances, heating and air conditioning systems, and alarm systems through a personal computer or television. This home automation interface module transmits and receives Insteon or X10 signals between home automation devices and a PC via a Universal Serial Bus (USB) port on the computer.

COMPATIBILITY: For use on IBM and compatible computers.

POWER: Uses internal battery.

SYSTEM REQUIREMENTS: Runs from Windows XP Media Center Edition 2005, Windows 2000, or Windows XP Pro; viewable from Internet Explorer 6.0 or greater.



The DynaVox EyeMax System

Blowing augmented communication's success with the blink of an eye.



Integration with Power Mobility

- Group three power chairs have the capability to control a few devices from the input device of the chair.
- Power chair mobility devices have the ability to control a computer mouse through a bluetooth signal. This works through the driver input device for the chair. A transmitter is mounted and wired to the wheelchair and a dongle is plugged into a USB port. This allows the user to move the cursor on the screen.
- An IR transmitter can be installed on to the chair or some of the chairs have the IR control built into the display. This will allow access to devices that are controlled with infrared signals. Televisions, DVDs, Stereo, Cable boxes and so on are now accessible to power chair users.
- Not all power chair have this ability due to the limitations of the electronics of the lower classifications of chairs.

Thank you Very much for your time..
Any Questions?

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