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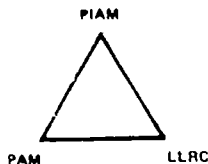IDENTIFIERS   *Environmental Control

ABSTRACT
            Environmental control units, or ECUs, are devices or
systems which allow for alternate access to electronic or electrical
devices and those objects, like draperies and doors, which may be
adapted for use with electricity. Such devices offer the person with
a mobility limitation the opportunity to control his or her
environment, thus enhancing the ability to live, work, and play more
independently. An environmental control system consists of a main
control unit, an input method, a feedback unit or information
display, and the devices to be controlled. More complex systems
combine an ECU with a microcomputer or augmentative communication
device. Typical input modes include switches, joystick, voice,
keypad, or computer interface. ECUs utilize a variety of control
schemes, including infrared, ultrasound, radio waves, and AC
(alternating current) power lines. Guidelines are presented for
choosing an ECU. A table lists 51 ECUs available, the method by which
they are accessed, the types of devices controlled, and price range.
Each product is then described, and the name, address, and telephone
number of the producer or distributor is provided. (JDD)

PAM REPEATER

ENVIRONMENTAL CONTROLS
NO. 83

This edition of the PAM REPEATER is a product of research done at the LLRC in order to provide our readers with a timely look at these specialized products. The guest editor is Helen Schneiderman, a special projects consultant and PIAM Board Member, who has been assisting at the LLRC since October of 1993. She is a former Deputy Director of the Michigan Commission on Handicapper Concerns. Helen has enjoyed the friendly atmosphere at the LLRC, working with the staff, and enhancing her knowledge of assistive technology.

ENVIRONMENTAL CONTROLS

The ability to control one's environment and function independently of others is a skill taken for granted by most people. For those individuals with mobility limitations, however, mastery of their immediate surroundings can be a challenge, and is a task critical to achieving or regaining the ability to live independently.
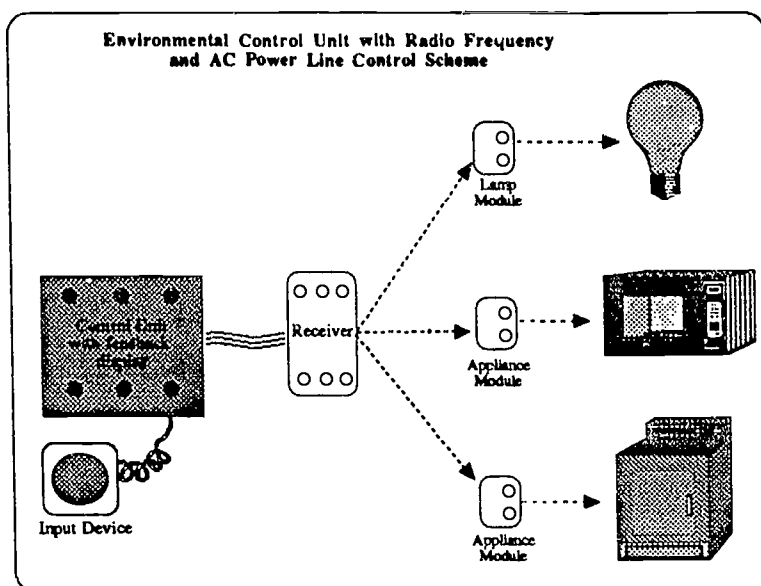
Environmental control units, or ECUs, are devices or systems which allow for alternate access to electronic or electrical devices, and those objects, like draperies and doors, which may be adapted for use with electricity. Such devices offer the person with a mobility limitation the opportunity to control his or her immediate environment, thus enhancing the ability to live, work, and play more independently.

ECUs vary in their degree of complexity. Simple and familiar environmental controls include the remote control for a television or VCR. More elaborate units, such as computer-controlled systems, allow for hands free operation, and control a variety of objects in the home or workplace. For instance, an ECU can enable the user to turn appliances on and off, dim lights, tune a radio or television, open a door, and answer and place telephone calls.

ECUs are differentiated by how they may be operated or accessed; typical input modes include switches, joystick, voice, keypad, or computer interface. Further, ECUs utilize a variety of control schemes, including infrared, ultrasound, radio waves, and AC power line. The mode of operation determines whether devices in one room can be controlled from a different room; for example, infrared signals do not travel through walls. ECUs capable of operating a wide range of objects in the home or workplace are oftentimes a combination of control schemes.

An environmental control system consists of a main control unit, an input method, a feedback unit or information display, and the devices to be controlled. Systems which use existing household wiring, or X-10 technology, to remotely control appliances and lamps require, in addition, plug-in modules for each device. More powerful and complex systems combine an ECU with a microcomputer or augmentative communication device. These systems utilize an interface between the control unit and computer, a software program, and a variety of input devices.

Environmental Control Unit with Radio Frequency and AC Power Line Control Scheme

The grid that follows details the variety of ECUs available, the method by which they are accessed, the type of device (s) controlled, and price range.

Choosing an Environmental Control System

The most appropriate ECU matches the goals and functional abilities of the user, the devices to be controlled, and the environment in which it will be used. The decision or choice to use an ECU belongs to the intended user. A variety of issues need to be considered, however, to determine the ECU most appropriate to meet the needs and abilities of that individual. Questions which require answers include:

1. What are the user's functional abilities? How will the user access the ECU?

2. What does the user want to accomplish? What does the user want to control?

3. How much money is the user able to spend?

One way to begin the assessment process is to survey the environment in which the ECU will be used. A tour of the home or workplace for which environmental controls are desired is the first step. In addition, identify the position from which the user will access the ECU, for example, from bed or wheelchair.

Using the grid, identify those products which fit within the user's budget. Next, determine which input or access mode is compatible with the user's functional abilities. An additional issue to consider includes other people in the user's environment who may require control of appliances or devices. It is important to allow those individuals access which does not interfere with the primary user's control.

Once potentially suitable products have been identified, contact manufacturers for more specific information about the units, including the names of companies that install, provide training, service, and maintenance. As the table of products is not exhaustive, and the development of new devices and improvements to those existing occurs regularly, be sure to ask about new products which may not have existed when this publication was produced.

Environmental Control Products by Input Method, Devices Controlled, and Price Range

Product Name	Switch	Joystick	Voice	Keypad	Serial	AC Appliance	X-10	Infrared	Telephone	Hospital Bed	Other	Less than $200	$200-$499	$500-$999	$1000-$1999	$2000-$2999	$3000-$4999	Call For Price
ACS Controller	X	X	X	X	X		X	X	X	X	X						X	
AP-5000	X						X	X	X	X	X		X					
Butler-In-A-Box			X	X	X		X	X	X	X	X							X
CCT Environmental Control	X			X	X		X	X					X					
CHEC 2	X						X	X	X									X
CINTEX	X		X		X		X	X	X						X			
CINTEX2			X		X		X	X	X						X			
Control 1	X				X		X	X	X	X					X			
DEUCE	X						X	X	X	X					X			
Director					X		X	X	X				X					
EZ-Control	X		X		X		X	X	X							X		
EZRA	X						X	X	X	X					X			
Free Switch	X						X					X						
GEWA Infra-Link "Smart House"	X			X				X										X
GEWA Infra-Link Speaker-Telephone	X							X	X				X					
HAL-ES System			X		X		X	X	X						X			
HECS	X					X			X		X						X	
Ideal-Phone					X				X				X					
Imperium 100	X						X						X					
Independence VoicePhone	X		X						X				X					
Infra-Link Remote Control for Elevator	X							X										X
LIAISON	X		X		X		X	X	X								X	

Definitions: Serial – Device controls household items via a computer or communication device. Some products offer alternate control schemes.
AC Appliance – These plug directly into the control unit.
X-10 – Device controls AC appliances via household wiring.
Infrared – Device controls those household items which commonly operate via remote control.

Environmental Control Products by Input Method, Devices Controlled, and Price Range

Product Name	Input Method					Devices Controlled						Price Range						
	Switch	Joy-stick	Voice	Key-pad	Serial	AC Appli-ance	X-10	Infra-red	Tele-phone	Hos-pital Bed	Other	Less than $200	$200-$499	$500-$999	$1000-$1999	$2000-$2999	$3000-$4999	Call For Price
Power-Access Automatic Door Opener	X										X				X			
PowerLink 2	X					X						X						
PowerNow					X		X	X	X					X			X	
PROXi	X		X	X	X		X	X	X	X			X					
RC-3000--Remote Control	X			X				X	X					X				
Relax	X							X						X				
Relax	X							X						X				
Sapura S2000 HF	X		X						X			X						
Scan Com	X				X		X	X							X			
Scanning Director	X						X	X						X				
Scanning Remote Control	X							X					X					
Scanning X-10 Powerhouse	X	X			X		X							X				
SenSci					X		X	X	X	X								X
Simplicity Series 5			X				X	X	X	X							X	
Simplicity Series 7	X						X	X	X	X							X	
Single Appliance Continuous Control	X					X						X						
Single Switch TV Control Unit	X										X	X						
Single-Swith Multi Appliance Control	X						X	X					X					
SIR-Handheld				X				X				X						
Synergy Integrated Remote					X		X	X						X				
TEAM					X		X	X					X					
U-Control					X		X	X					X					

Definitions: Serial – Device controls household items via a computer or communication device. Some products offer alternate control schemes.
AC Appliance – These plug directly into the control unit.
X-10 – Device controls AC appliances via household wiring.
Infrared – Device controls those household items which commonly operate via remote control.

Environmental Control Product Descriptions

Product	Description
ACS Controller ACS Technologies, Inc. 1400 Lee Drive, Suite 3 Corapolis, PA 15108 800-227-2922	The ACS Controller can be operated by keyboard input, scanning, and voice. It transmits ultra sound to operate the TASH Ultra-4 remote receiver and radio frequency, via X-10 modules, to control up to 256 electronic devices. Additionally, it can directly operate most devices controlled by infrared signals.
AP-5000 DQP 3001 Deep Lake Road Colville , WA 99114 916-477-1234	Using scanning technology, the AP-5000 controls up to eight user-selectable/definable functions by whistle or optional plug-in switch.
Butler-In-A-Box Mastervoice 10523 Humbolt Street Los Angeles, CA 90720 310-594-6581	Butler-In-A-Box is a comprehensive, voice-activated environmental control system with speech output. The unit recognizes two different voices, allows for 32 voice commands for each user, and responds in a male or female voice in any personality desired.
CCT Environmental Control Consultants for Communication Technology 508 Bellevue Terrace Pittsburgh, PA 15202 412-761-6062	The CCT Environmental Control Unit operates from a computer-based communication device. With the activation of a single switch, or directly from the keyboard, up to 16 electrical switches and outlets can be controlled on-screen.
CHEC 2 Bloorview Children's Hospital 25 Buchan Ct. Willowdale, ON M2J 4S9 416-494-2222	The Computer Home Environmental Control (CHEC 2) system uses dual switches to control 110 volt AC appliances, infrared devices, and telephones.
CINTEX NanoPac, Inc. 4833 South Sheridan Road, Suite 402 Tulsa, OK 74145-5718 918-665-0329	Via switch access or voice, CINTEX is comprehensive environmental control software which also performs word processing, music composition, and speech synthesis functions.
CINTEX2 NanoPac, Inc 4833 South Sheridan Road, Suite 402 Tulsa, OK 74145-5718 918-665-0329	Cintex2 is a comprehensive environmental control system combined with word processing. The system works in conjunction with the IBM Voice Type or Dragon Dictate voice recognition system.
Control 1 Prentke Romich 1022 Heyl Rd. Wooster, OH 44691 800-262-1990	Control 1 is an environmental control unit which may be operated by dual switch, communication aid, or microcomputer. Through the use of eight control receptacles, and optional control modules, the unit can operate up to 256 electrical devices.

Environmental Control Products by Input Method, Devices Controlled, and Price Range

Product Name	Input Method					Devices Controlled						Price Range						
	Switch	Joy-stick	Voice	Key-pad	Serial	AC Appli-ance	X-10	Infra-red	Tele-phone	Hos-pital Bed	Other	Less than $200	$200-$499	$500-$999	$1000-$1999	$2000-$2999	$3000-$4999	Call For Price
UCS 1000 with Tongue Touch Keypad				X			X	X		X								X
Ultra 4 Remote System				X	X		X						X					
ViewKey	X				X		X				X	X						
Wireless Remote VCR Controller				X							X	X						
Wireless TV Remote Control				X							X	X						
X-10 Home Control Interface					X		X											X
X-10 Powerhouse					X		X					X						

Definitions: Serial – Device controls household items via a computer or communication device. Some products offer alternate control schemes.
AC Appliance – These plug directly into the control unit.
X-10 – Device controls AC appliances via household wiring.
Infrared – Device controls those household items which commonly operate via remote control.

Product	Description
DEUCE DU-IT 8765 Twp. Rd. 513 Shreve, OH 44676-9421 216-567-2906	DEUCE is an environmental control unit which operates a telephone, 4 AC outlets on the back of the unit, 4 outlets for special accessories, and is designed to send signals through household wiring to control lamps and appliances.
Director Prentke Romich 1022 Heyl Rd. Wooster, OH 44691 800-262-1990	Director is an environmental control system designed to operate with speech-output communication devices such as Touch Talker, Light Talker, Liberator, or with other devices which output ASCII code in an RS232 serial format. The Director controls any item that uses a remote control and can operate household appliances and lamps with optional electrical modules.
EZ-Control Neil Squire Foundation 1046 Deep Cove Road North Vancouver, BC V7G 1S3 604-929-2414	The E-Z Control is a switch-operated environmental control system. Its modular design allows the user to purchase only the desired components.
EZRA KY Enterprises 3039 E. 2nd St. Long Beach, CA 90803-5164 310-433-5244	EZRA is a switch-operated environmental control system. EZRA's control unit plugs into a television, dedicated to EZRA, to operate infrared and 110 volt, AC appliances.
Free Switch Adaptech, Inc. ISU Research Park 2501 North Loop Drive Ames, IA 50010 800-723-2783	The Free Switch controls up to 4 AC-powered devices via a Taction pad, or touch sensitive switch.
GEWA Infra-Link "Smart House" Infra-Link, Inc P. O. Box 1008 Portland, OR 97207-1008 800-395-3596	The Gewa "Smart House" offers comprehensive environmental control of all electrical devices in the home as well as those objects convertible to AC current, such as draperies, doors and windows. All devices are controlled by multi-fuction Infra-Link transmitters.
GEWA Infra-Link Speaker-Telephone Infra-Link, Inc. P. O. Box 1008 Portland, OR 97207-1008 800-395-3596	The GEWA Infra-Link Speaker Telephone is a modified Panasonic Speaker-Phone that allows for hands-free, remote operation.
HAL-ES System Circuit Rider Corp. 2914 Russell Avenue North Minneapolis, MN 55411-1068 612-588-7019	The Home Automation Link (HAL) system provides voice recognition, speech synthesis, and environmental control for the IBM AT or compatibles. Accessed through the HAL Entry System, the environmental control software allows for voice operation of infrared, 110 volt, AC-controlled devices, and telephones.

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Product	Description
HECS Prentke Romich 1022 Heyl Rd. Wooster, OH 44691 800-262-1990	Originally designed for a hospital or rehabilitation center environment, the Hospital/Home Environmental Control System (HECS) allows a non-ambulatory patient to control a variety of devices, including a nurse call, telephone, TV, and electric bed through the use of a single switch.
Ideal-Phone IDEAMATICS 1364 Beverly Road, Suite 101 McLean, VA 22101-3617 703-903-4972	Operated via a personal computer, Ideal-Phone allows the user to place and receive calls from the keyboard.
Imperium 100 Teledyne Brown Engineering P. O. Box 897 Jackson, AL 36545-0897 800-944-8002	The Imperium 100 environmental control system is a switch-activated unit which controls 110 volt AC devices via household wiring.
Independence VoicePhone InvoTek 700 West 20th Street, ENRC Fayetteville, AR 72701 501-575-7659	The Independence VoicePhone is switch-activated and voice-operated. The device has memory for up to fifty phone numbers.
Infra-Link Remote Control for Elevator Infra-Link, Inc. '. O. Box 1008 Portland, OR 97207-1008 800-395-3596	The Infra-Link Remote Control for Elevators allows for wireless control of elevator operations including opening doors, selecting floors, and activating the emergency call button.
LIAISON DU-IT 8765 Twp. Rd. 513 Shreve, OH 44676-9421 216-567-2906	LIAISON is an integrated computer work station, designed for individuals with high-level spinal cord injuries, that includes the full range of environmental control features.
Power-Access Automatic Door Opener Minnesota Automated Technologies, Inc. 6416 Indian Hills Road Minneapolis, MN 55439 612-944-1494	The Power-Access Automatic Door Opener is operated by an electrical signal and may be activated by a wide array of controls adapted for special needs.
PowerLink 2 AbleNet 1081 Tenth Avenue S.E. Minneapolis, MN 55414-1312 800-322-0956	PowerLink 2 allows switch access to operate up to two electrical appliances connected directly to the control unit.

Product	Description
PowerNow afko International, Inc. 1438 West Broadway, Suite B240 Tempe, AZ 85282 602-731-9805	PowerNow is a portable environmental control system that allows, via X-10 technology, Macintosh PowerBook users to control electrical appliances as well as infrared devices.
PROXi Madenta Communications Inc. 9411A-20 Ave. Edmonton, AB T6N 1E5 403-450-8926	PROXi is a fully integrated environmental control system operated by a Macintosh or IBM-compatible computer. On -screen images provide complete control of the telephone, lights, infrared devices, and intercom. It can be accessed by voice, point and click, keyboard, or single switch.
RC-3000--Remote Control Speakerphone Ameriphone 7231 Garden Grove Blvd. Suite E Garden Grove , CA 92641-4219 714-897-0808	Accessed by either switch or large button keypad, the RC-3000 automtically dials the "operator" or whatever number is stored in the first memory position. Incoming calls may be answered by pressing the remote button.
Relax Synergy 66 Hale Road East Walpole, MA 02032 508-668-7424	The Relax remotely controls infrared devices via a single switch, scanning operation. Non-infrared devices may be controlled with the purchase of an X-10 Controller and X-10 modules.
Relax TASH Unit 1-91 Station Street Ajax, ON L1S 3H2 905-686-4129	Relax is an infrared transmitter operated by a single switch to control infrared devices. The unit can be programmed to accept up to 40 remote functions (10 functions on 6 devices). Control of AC appliances is possible with purchase of the optional X-10 Controller.
Sapura S2000 HF Temasek Telephone, Inc. 260 East Grand Ave. #19 South San Francisco, CA 94080 800-647-8887	The Sapura S2000 HF is a voice-activated, hands free speaker phone that answers incoming calls. The optional sip and puff attachment allows the user to place outgoing calls.
Scan Com Med Labs 28 Vereda Cordillera Goleta, CA 93117 805-968-2486	Scan Com offers a computer-based environmental control system that operates both AC and infrared devices.
Scanning Director Prentke Romich 1022 Heyl Rd. Wooster, OH 44691 800-262-1990	The Scanning Director allows the user to operate any device controlled with a remote. With optional electrical modules, the user is able to control standard 110 volt, AC appliances and lamps.

Product	Description
Scanning Remote Control DU-IT 8765 Twp. Rd. 513 Shreve, OH 44676-9421 216-567-2906	The DU-IT Scanning Remote Control is an infrared remote control unit designed to replace hand-held, finger-operated devices. It enables the user to operate a variety of infrared-controlled devices.
Scanning X-10 Powerhouse Prentke Romich 1022 Heyl Rd. Wooster, OH 44691 800-262-1990	The Scanning X-10 Powerhouse is a switch operated scanning device which controls up to 8 electrical appliances. Purchase of another receiver allows for control of an additional 8 devices. The unit is also operable via the joystick on powered wheelchairs with ECU ports.
SenSei Safko International, Inc. 1438 West Broadway, Suite B240 Tempe, AZ 85282 602-731-9805	The Sensei Computer System is a comprehensive environmental control system which combines both hardware and software components to control a full range of electrical appliances, infrared devices, and the telephone.
Simplicity Series 5 Quartet Technology Inc. 52 Davis Rd. Tyngsboro, MA 01879 508-692-9313	The Simplicity Series 5 is voice-activated and responds in a human voice. The unit is "trainable" to the user's voice in as little as 4 minutes.
Simplicity Series 7 Quartet Technology Inc. 52 Davis Rd. Tyngsboro, MA 01879 508-692-9313	Via voice menu, the Simplicity Series 7 allows the user to liste and select the desired operation with a variety of switching alternatives.
Single Appliance Continuous Control Unit Toys for Special Children 385 Warburton Ave. Hastings-On-Hudson, NY 10706 800-832-8697	This unit, which works much like a standard garage door opener, allows the user to operate any AC appliance or device by continuously depressing the cordless remote switch.
Single Switch TV Control Unit Toys for Special Children 385 Warburton Ave. Hastings-On-Hudson, NY 10706 800-832-8697	This cordless unit allows the user to control the basic functions of any television set by operating a single switch (not included with unit).
Single-Swith Multi Appliance Control Unit Toys for Special Children 385 Warburton Ave. Hastings-On-Hudson, NY 10706 800-832-8697	Using radio signals, this cordless unit allows the user to control up to 8 AC appliances by operating a single switch remote.

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Product	Description
SIR-Handheld ynergy 66 Hale Road East Walpole, MA 02032 508-668-7424	The SIR-Handheld remotely operates infrared devices and is intended for use by individuals with good hand control. Non-infrared devices may be controlled with the purchase of an X-10 controller and X-10 modules.
Synergy Integrated Remote Synergy 66 Hale Road East Walpole, MA 02032 508-668-7424	The Synergy Integrated Remote is an environmental control system operable through a personal computer. Synergy offers an environmental control system internal to the Synergy personal computer or one that may be connected to the serial port of a laptop computer.
TEAM Microsystems Software 600 Worcester Rd. Framingham, MA 01701 800-828-2600	TEAM, or Transparent Environmental Access Module, is environmental control software that operates both AC and infrared devices via optional X-modules and infrared controllers and receiver.
U-Control Words+ 40015 Sierra Highway, Building B-145 Palmdale, CA 93550 805-266-8500	U-Control is an environmental control unit operated from a computer-based communication device. U-Control works from any Words+ communication software (EZ Keys, WSKE, Talking Screen) to operate infrared and 110 volt, AC appliances.
UCS 1000 with Tongue Touch Keypad New Abilities Systems, Inc. 1940 Colony Street, Suite 2 Mountain View, CA 94043 415-988-8889	The UCS 1000 is an integrated system of components that allows the user to access a personal computer, hospital bed, motorized wheelchair and a variety of devices operable through household wiring, via the use of an intra-oral, tongue touch keypad.
Ultra 4 Remote System TASH Unit 1-91 Station Street Ajax, ON L1S 3H2 905-686-4129	The Ultra 4 Remote System controls electrical devices via ultrasound transmission. The hand-held transmitter is intended for use by those with good hand and finger control. Alternate transmitters are available which allow for operation via mouthstick or headpointer, dual switches, or joystick. The user can operate up to four devices per room with the portable transmitter.
ViewKey VME Technologies, Inc. 5202 Westland Blvd. Baltimore, MD 21227 410-455-6397	ViewKey is software for Macintosh computers which allows users to "talk", write, and control a variety of devices which operate through household wiring. ViewKey can be operated via eye blink, sip and puff, or other single switch input. Environmental control functions require the purchase of the optional X-10 computer interface and lamp modules.
Wireless Remote VCR Controller Toys for Special Children 385 Warburton Ave. Hastings-On-Hudson, NY 10706 800-832-8697	Using infrared technology, this keyboard-type unit uses colorful, clearly-labeled, two inch buttons to control VCR functions such as play, record, fast forward, reverse, and pause.

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Product	Description
Wireless TV Remote Control Toys for Special Children 385 Warburton Ave. Hastings-On-Hudson, NY 10706 800-832-8697	Using infrared technology, this keyboard-type unit uses colorful, clearly-labeled, 2 inch buttons to control television channel, sound, and on/off functions.
X-10 Home Control Interface X-10 (USA), Inc. 185A LeGrand Ave. Northvale, NJ 07647 201-784-9700	The X-10 Home Control Interface, via X-10 modules, controls lights and appliances throughout home by sending signals through standard household wiring. The Home Control Interface connects to a Macintosh computer and can program up to 256 X-10 modules.
X-10 Powerhouse Words+ 40015 Sierra Highway, Building B-145 Palmdale, CA 93550 805-266-8500	The X-10 Powerhouse connects to the serial port of a computer or communication device to operate 110 volt AC-controlled appliances.

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