Lighting Automation Controls

PCC
POWERLINE CONTROL COMPONENTS

Transmitters, Receivers, Signal Couplers, and Accessories for remote control of lighting and electrical loads

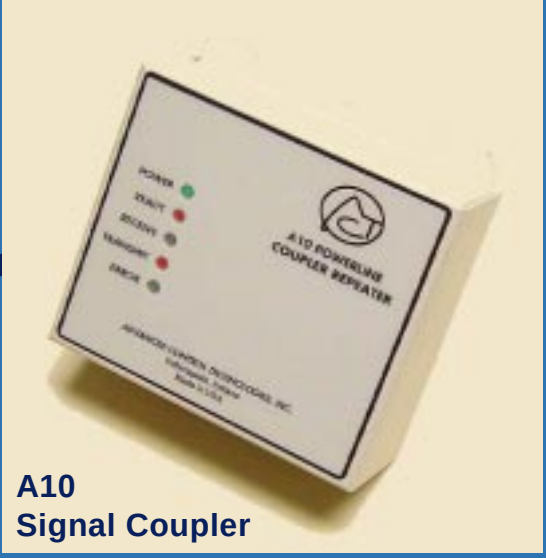
A10 Wall Switch

A10 4-Relay Receiver

Uses Existing Power Wiring as the Signal Grid

Features the reliability of A10 technology

A10
AT004 Test Transceiver



A10
Signal Coupler

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EXPERT TECHNICAL SUPPORT

ACT's Powerline Control Components (PCC) are distributed through an international network of Engineered Systems Centers (ESC). Their experience and training will help you in the design, installation and service of your facility's control system. For the name of your local authorized Engineered Systems Center, call our PCC Techline at (800) 886-2281.

ADVANCED CONTROL TECHNOLOGIES' LIMITED TWO YEAR WARRANTY

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. ACT warrants to the original consumer purchaser that this product is free of defects in materials and workmanship for two (2) years from the purchase date. ACT will correct defects by repair or replacement, at its option, if the product is returned prepaid, with proof of purchase date, to your nearest Engineered Systems Center or point of purchase. This warranty does not cover labor or removal or reinstallation of the product and is void on any product improperly installed, overloaded, abused or altered in any manner. ACT limits the duration of any implied warranty of merchantability to two years and excludes incidental or consequential damages or breach of any warranty on this product. Some states do not allow limitations on how long an implied warranty lasts, or the exclusion of limitation of incidental or consequential damages, so the above exclusions or limitations may not apply.

Glossary of Terms

A10	(Used by ACT) "A10" denotes circuitry designed and incorporated into products manufactured by ACT which provide more reliable powerline carrier communications. The A10 circuitry provides improved transmission and reception. A10 products transmit higher signal levels (6 volts) and have better receive sensitivity (as low as 50 millivolts). Design allows more features than traditional powerline carrier products. A10 products allow the user to configure each unit's "Polite Mode", "All Lights On", "All Lights Off", and "All Units Off" features. A10 products allow for true 2-way communication through "Status Request". All standard A10 products are downwardly compatible to X10 products (standard and extended code). The A10 circuit requires a signal only 35% above line noise.
AGC (Automatic Gain Control)	(Used by others) A signal to noise ratio of 2:1 across the entire sine wave. This means the signal level must be at least 100% above line noise.

Where do PCC installations increase operating convenience and decrease operating costs?

In facilities such as:

- Schools and Universities
- Grocery Stores
- Parks and Golf Courses
- Fast Food Restaurants
- Theaters and Auditoriums
- Banks
- Nurseries
- Government Buildings
- Shopping Malls and Stores
- Prisons
- Hotels and Motels
- Automobile Dealership
- Apartment Complexes
- Factories
- Hospitals
- Office Complexes
- Military Installations
- Museums
- Churches
- Nursing Homes

For use in controlling:

- Indoor and Outdoor Lighting
- Landscape Lighting
- Thru-the-wall or Window Air Conditioners
- Swimming Pool Lights, Pumps, and Heaters
- Control of Emergency Generator Lighting Loads
- Athletic Field Lights
- Fan Coil Units
- Deicing Equipment
- Exhaust and Ceiling Fans
- Heat Pumps
- Signal/Directional Lighting
- Multiple Building Automation System Points
- Water Heaters
- Vending Machine Lights
- Wall Outlets powering Copy Machines
- Heating and Ventilating Equipment
- Remote Operation of Security Doors
- Sign Lighting
- Air Conditioning
- Remote Bell Signalling
- Tennis Court Lights
- Fountain Lights and Pumps
- Security Systems

POWERLINE CONTROL COMPONENTS

Product	Catalog #	Description

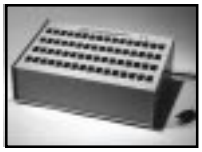
COMPUTER INTERFACE TO POWERLINE

TI103-RS232	**A10** transceiver converts ASCII codes to X10 standard and extended code signals via RS232. Available with a variety of connectors - Ask sales.

MANUAL TRANSMITTERS

TD100	Desk Top 8 Channel Load Controller, 120 VAC. Designed for selective manual remote control of electrical loads in letter groups, capable of addressing all 256 addresses.

TD130	Desk Top Load Controller, 256 address capable using multiple units. Designed for selective manual remote control of electrical loads, automatic refresh, 120 VAC.
TD230	240 VAC, all other same as above.



TD140	Desk Top 64 Channel Load Controller, 256 address capable using multiple units. Designed for selective manual remote control of electrical loads, automatic refresh, 120 VAC.
TD240	240 VAC, all other same as above.

INTERFACE TRANSMITTERS

TI100	64 Channel Dry Contact Interface with Signal Refresh Capability. For use with Programmable Controllers, Telephone PBX systems or any controller using discrete contacts, 120 VAC.
TI200	240 VAC, 50 or 60 Hz, automatic adjusting, all other same as above.

TB134	**A10**, 6-Channel, 120 VAC, Wall/Box mount Transmitter. Selectable for Maintained/Momentary Dry Contact, Rude or Polite transmission, uses Sequential Codes.
TB234	240 VAC, 50 Hz, International wire colors, all other same as above.
TB334	277 VAC, all other same as above.

REMOTE TRANSMITTERS/KEYPADS

TC184	**A10**, 120 VAC, 8 Button, configurable for Status, Rude or Polite, All Lights On, All Units Off, All Lights Off, 8 buttons ON/OFF, 4 buttons ON/ OFF, 3 buttons ON/OFF with All Lights ON/OFF, All Units ON/OFF or Dimming on 4th buttons, suffix I =Ivory only.

TK134	**A10**, A10, 20A, 277 VAC Isolated Contact Relay Fixture Receiver, Standard and Extended Code, Ivory,White,and Almond.
TK334	**A10**, Two Button A10 277 VAC Wall Mounted Transmitter, with Multi-Tap Control, Ivory,White,and Almond.

TK184	**A10**, 120 VAC, 8 Button, configurable for Status, Rude or Polite, All Lights On, All Units Off, All Lights Off, 8 buttons ON/OFF, 4 buttons ON/ OFF, 3 buttons ON/OFF with All Lights ON/OFF, All Units ON/OFF or Dimming on 4th buttons, suffix I =Ivory only.
TK284	**A10**, 240 VAC, 50 Hz, Ivory only, all other same as above.
TK384	**A10**, 277 VAC, Ivory and White only, all other same as above.

POWERLINE CONTROL COMPONENTS

Product	Catalog #	Description

REMOTE TRANSMITTERS/KEYPADS

TK000	1 Button Keypad, 1 ON/OFF, Single Code, Ivory.
TK010	1 Button Keypad, ALL ON/ALL OFF, Ivory.
TK011	Same as above, White.

TK031	2 Button Keypad, 2 ON/OFF, 2 Sequenced Codes, White.

TK040	4 Button Keypad, 3 ON/OFF, 3 Sequenced Codes, 1 ALL ON/ALL OFF, Ivory.
TK041	Same as above, White.

TK050*	4 Button Keypad, 3 ON/OFF, 3 Sequenced Codes, 1 Dimming Control, Ivory.
TK051 *	Same as above, White.

TK060	4 Button Keypad, 4 ON/OFF, 4 Sequenced Codes, Ivory.
TK061	Same as above, White.

REMOTE TRANSMITTERS/BASE

TB100	Base, Wall/Box Transmitter, 120 VAC, Requires TK Series Keypad.
TB300*	Base, Wall/Box Transmitter, 277 VAC, Requires TK Series Keypad.

BOX MOUNTABLE RECEIVERS

RB310	277 VAC, SP, 20A, Feed thru Relay, w/o "ALL LIGHTS ON".
RI223	208/240 VAC, SP, 20A, Isolated Contact Relay.

BOX MOUNTABLE RECEIVERS

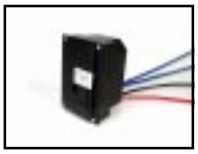
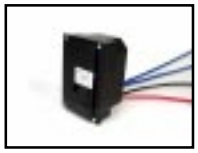
RB104	**A10,** 120/208 VAC, 30A, SPDT (Form C), Isolated Contact Relay Receiver, local ON/OFF/AUTO switch, and terminal for remote ON/OFF switch, mounts on 4-11/16" x 4-11/16" electrical box.
RB204	**A10**, 240 VAC, 50 Hz, 30A all other same as above.
RB304	**A10**, 277/480 VAC, 30A, all other same as above.

SWITCH RECEIVERS

RS114	A10, S.P., 120 VAC, 20A Feed Thru Wall Switch Receiver, Standard and Extended Code, White, Ivory and Almond.
RS115	A10, S.P., 120 VAC, 15A (all other same as above).
RS214	A10, S.P., 240 VAC, 20A (all other same as above).
RS314	A10, S.P., 277 VAC, 20A (all other same as above).

*Dimming function not applicable with 277V receivers

POWERLINE CONTROL COMPONENTS

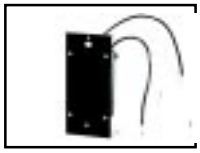
Product	Catalog #	Description
WALL MOUNTED DIMMING RECEIVERS		
	**RD101**	120 VAC, 500W, 4A, 3-Way or Single Incandescent Dimmer, Ivory and White Trim Kits provided. Does not require neutral.
	RD134	A10, 120 VAC, 300W, Single Wall Mount Dimmer Receiver, with Soft Start, Multi-Tap for user-set dim (1 tap), factory dim (2 taps) or full on (3 taps)
	RD161	120 VAC, 500W, 5A, 3-Way or Single, Incandescent & Inductive Dimmer, 2/3 H.P. (or 500VA), Ivory and White Trim Kits provided.
FIXTURE MOUNTED DIMMING RECEIVERS		
	**RD110**	120 VAC, 300W, Incandescent Dimmer Fixture Module, with AGC.
PLUG-IN DIMMING RECEIVERS		
	**RD124**	**A10**, 120 VAC, 300W, Incandescent Plug-In Dimmer Module, Soft Start to Preset Dim Levels, configurable for Unit Address, Extended Code,Dim Rate, 4 Relative Scenes. Responds to ON, OFF, Bright, Dim, All Lights On, All Lights Off, All Units Off (Light Ivory only).
FIXTURE RECEIVER (BOX MOUNTED)		
	**RF124**	A10, 20A, 120 VAC Isolated Contact Relay, Fixture Receiver, Standard and Extended Code.
	RF234	A10, 20A, 208/240 VAC, all other same as above.
DIN RAIL MOUNTED RECEIVERS		
	**RF234**	A10, 20A, 208/240 VAC Isolated Contact Relay Fixture Receiver, Standard and Extended Code, DIN Rail Mounted.
FIXTURE MOUNT RECEIVERS		
	**RF300**	277 VAC, 5A, SP, Fixture Module Feed Through Relay.
	RF310	277 VAC, 20A, SP, Fixture Module Feed Through Relay.
	RF324	A10, 20A, 277 VAC Isolated Contact Relay Fixture Receiver, S & E Code.*
RELAY RECEIVERS		
	**RI104**	**A10**, 120 VAC, 20A fused, Four (4) Isolated Contact (Form A) to Four Sequential Code Relays, SCC* control capabilities, manual override.
	RI304	**A10**, 277 VAC, 20A, all other same as above.
PLUG-IN RECEIVERS		
	**RP124**	120 VAC, 15A, Plug-in Relay Receiver (Light Ivory only).
SIGNAL COUPLING COMPONENTS		
	**CR230**	120/240 VAC, Coupler Repeater, Split-Single Phase, Constant Output Amplitude. Repeats both standard and extended code.

* Standard and Extended Code

POWERLINE CONTROL COMPONENTS

Product	Catalog #	Product Description

SIGNAL COUPLING COMPONENTS



CP000	120/277 VAC, Passive Phase Coupler, 4 wire, 1:1 Ratio.
CP010	120/277 VAC, Passive Phase Coupler, 4 wire, 10:1 Ratio.
CP020	120/277 VAC, Passive Phase Coupler, 4 wire, 6:1 Ratio.
CP400	480 VAC, Passive Phase Coupler, 2 wire.

CA000	120/277 VAC, Active Signal Coupling Amplifier, with SCC.
CA200	240 VAC, Active Signal Coupling Amplifier, with SCC.

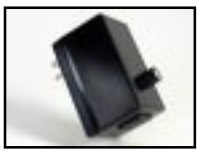
A10 MULTIFUNCTION SIGNAL COUPLER REPEATER

CR134	**A10**, 120/208 VAC, Coupler Repeater, Intelligent Signal Carrying Conductor (SCC) capability, with DIP Switch Selectable Options for operation.
CR234	120/240 VAC, Split-Single Phase, all other same as above.
CR244	240/415 VAC, 50 Hz, all other same as above.
CR334	277/480 VAC, all other same as above.
CR254	120/240 VAC Split Single Phase with High Leg Delta Capability, all other same as above.

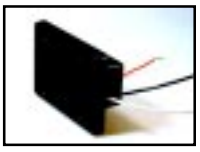
ACCESSORIES

AC100	Choke, Rated to 277 VAC, 5A.

AF100	Filter, 120 VAC, 5A, Plug-in Module, 40:1 blocking.



AF120	Filter, 120 VAC, 15A, Plug-in Module, 30:1 blocking.



AF300	120-277 VAC, 20A, 3 Wire, Low Pass Filter, 40:1 blocking.

AF310	120-277 VAC, Two Wire, Low Pass Filter.

AX000	120:240/277/480 VAC, Coupling Transformer.

POWERLINE CONTROL COMPONENTS

Product	Catalog #	Product Description

SERVICE TOOLS

AT004 — **A10,** PCC 120 to 277 VAC Test Transceiver. Transmits X10 and receives A10 and standard X10 (including Preset Dim) and extended code. Selectable 0°, 30°, 60°, 90°, 120°, 150° transmit pulse. Logs noise and signal levels up to 24 hours. Has auto transmit mode for system testing, can be used as test transmitter. Equipped with 120 VAC plug, plus extra cable with alligator clips for higher voltages. Use to configure A10 products.

AT001 — Signal Test Transmitter, 120/277 VAC, **A10** (6V) or Standard X10 (3V) transmission level.

SPECIAL PRODUCTS

SCOPE TEST 2 — **Reduces the high voltage (from up to 277 VAC)** to approximately one twentieth its original voltage while allowing Powerline Control pulses to pass through and be viewed on a standard oscilloscope display.

INTERNATIONAL

PROGRAMMABLE TRANSMITTERS

TI203-RS232 — **A10** transceiver allows communication via computer RS232 port to transmit and receive Powerline Carrier Commands in 9600/19200 baud. Compatible with X10 protocol including Extended Code 1 and Standard Code Preset Dim Commands. Plugs into standard Australian wall outlet.

TI213-RS232 — **A10** transceiver allows communication via computer RS232 port to trans mit and receive Powerline Carrier Commands in 9600/19200 baud. Compatible with X10 protocol including Extended Code 1 and Standard Code Preset Dim Commands. Plugs into standard European wall outlet.

TI223-RS232 — **A10** transceiver allows communication via computer RS232 port to trans mit and receive Powerline Carrier Commands in 9600/19200 baud. Compatible with X10 protocol including Extended Code 1 and Standard Code Preset Dim Commands. User supplies plug. Requires 230 VAC.

PLUG-IN DIMMERS

RD224 — A10, 240 VAC, 300W, Plug-in Dimmer, supports and remembers up to 4 scenes, DIM levels, has soft start (starts OFF and increases to preset dim level), Euro-Schuko plug configuration.

PLUG-IN RELAY

RP224 — A10, 240VAC, 15A, Plug-in Relay Receiver, 256 Addresses, Push button manual override, Load Sense, holds last state on power loss. Advanced A10 circuitry, X10 signal compatible, Euro-Schuko plug configuration.

INTERNATIONAL

How does the new A10 enhanced circuitry improve performance?

A10 CIRCUITRY PROVIDES THE FOLLOWING PERFORMANCE ENHANCEMENTS:

1. **Signal Strength -** A10 increases the signal strength of powerline transmitters from 3 volts peak to peak to 6 volts peak to peak, effectively doubling the performance of ACT transmitters over competitive products.
2. **Receive Sensitivity -** A10 also improves the performance of powerline receivers by reducing the required signal level to 50 millivolts compared to the 100 millivolts required by competitive receivers.
3. **Signal to Noise Ratio -** Current competitive products have an AGC circuit that helps to overcome noisy environments. That AGC circuit requires a 2:1 ratio of signal to noise to operate reliably. A10 requires only a 1.35:1 ratio.
4. **Noise Threshold -** A10 can operate in power line environments with as much as 3 volts of noise. Competitive products quit operating if the noise level exceeds 1 volt.
5. **Two Way Communication -** A10 modules provide both receive and transmit capability, providing user confidence in reliable operation.

A10 CIRCUITRY PROVIDES THE FOLLOWING NEW FEATURES:

1. **Automatic Acknowledgment (Yes / No) -** Enables the receiver to automatically send its status after receiving a valid command.
2. **Respond to Status Request (Yes / No) -** Allows ACT to enable the receiver to respond to a Status Request command, e.g. ON, OFF.
3. **Device address (Standard) -** Allows the user configure A10 the unit's address and operating characteristics using its external "push button".
4. **Respond to All Units Off (Yes / No) -** Allows the user to configure individual devices to respond or ignore an All Units Off command.
5. **Respond to All Lights Off (Yes / No) -** Allows the user to configure individual devices to respond or ignore an All Lights Off command.
6. **Handle Line Collisions (Yes / No) -** Allows the user to configure for collision detection strategy.
7. **Respond to All Lights On (Yes / No) -** Allows the user to configure individual devices to respond/ignore an All Lights On command.
8. **Polite? (Yes / No) -** Allows the user to configure the transmitter to wait for 8, 9 or 10 zero crossings of silence on the power line before attempting to transmit its data.
9. **Allow Changing the Retries (1, 2, or 3) -** This feature allows ACT to adjust the number of transmission retries when in Polite mode.
10. **Enable Priority Queuing (Yes / No) -** Allows ACT to enable the product for "transmit priority" queuing based on the device's number code.
11. **Transmission locations (0°, 30°, 60°, 90°, 120°, 150°) -** Allows ACT to set how the device sends data on the power line.

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