CorComp Inc.

Make your house smart with the

99 HOME SENTRY

MODULE AND DATA CABLE

"The home energy manager"

The program that controls lights and appliances throughout your home for added convenience, security, safety and energy savings.

This remarkable concept needs only a TI 99/4A, a TV or monitor and the home control system by

X-10 POWERHOUSE

99 HOME SENTRY

CorComp, Inc.

CorComp,leading manufacturer for the TI 99/4A Home Computer, in cooperation with the world's formost producer of timers, X-10 USA, have added the 99/4A to the long list of personal computers being used to automate homes across America.

The compatibility of the 99 HOME SENTRY program and the X-10 POWERHOUSE system means the owners of the TI 99/4A computer can take control of their homes and enjoy the security, convenience, safety and energy conservation of the "smart home"!

Simply load the 99 HOME SENTRY module, plug the accompanying data cable into the joy stick port of your 99/4A and to the X-10 POWERHOUSE interface and you are ready to take control!

Developed by CorComp, Inc.
2211-G E. Winston Road
Anaheim, CA. 92806

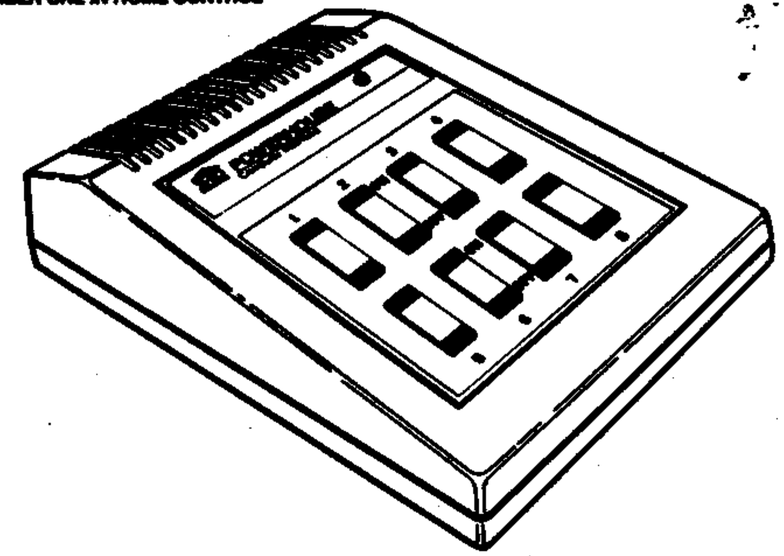
For information about other 99/4A products by CorComp, call (714) 956-4450.

READ SPECIAL FUNCTION COMMANDS - PAGE 2

TI 99 HOME SENTRY

For use with the TI 99/4A Home Computer and the home control system by

X-10 POWERHOUSE™
NUMBER ONE IN HOME CONTROL



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OPERATIONS MANUAL

TI 99/4A Home Computer is a registered trademark of Texas Instruments and X-10 Powerhouse is a registered trademark of X-10 Powerhouse (USA) Inc.

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A. INTRODUCTION

This software, when used in conjunction with a TI-99/4A computer and monitor and the X-10 Powerhouse Interface Unit and associated X-10 Powerhouse Control Modules, is designed to allow you to use your TI-99/4A to establish a set of commands that will be stored in the Interface Unit. The Interface Unit in turn, will control the many varied appliances and machines in the home or office.

This manual assumes that you understand and are familiar with the operation of both the TI-99/4A computer and the X-10 Powerhouse Interface Unit and associated Control Modules. Please consult the associated manuals for these products if you need additional information about them.

B. REQUIRED EQUIPMENT

The software and cable supplied with this manual are designed to operate with the TI-99/4A computer and the X-10 Powerhouse Interface Unit, Model No. CP290. You will also need the following equipment:

- Monitor or TV set for the TI-99/4A.
- X-10 modules of the quantity and type required for the lights and appliances you wish to control.
- 9 volt alkaline battery for the Interface Unit.

C. SYSTEM SET-UP INSTRUCTIONS

1. Connect your TI-99/4A computer to your monitor or TV set.

2. Install a 9 volt alkaline battery in the battery compartment located in the back of the X-10 Powerhouse Interface Unit.

3. Connect the interface cable supplied with the software to the X-10 Powerhouse Interface Unit and to the computer's joy stick port located on the left side of the computer.

4. Plug the X-10 Powerhouse Interface Unit, computer and monitor or TV set into a 120 volt outlet.

5. Install the 99 Home Sentry Module into the Computer's module slot.

6. Turn-on the computer, monitor or TV.

7. If a CorComp Disk Controller is connected to your system then select the number 3 (99 Home Sentry) key and the 99 Home Sentry Menu will appear on the screen in approximately ten seconds. If a CorComp Disk Controller is not connected to your system then select the number 2 (99 Home Sentry) key and the 99 Home Sentry Menu will appear on the screen in approximately ten seconds.

NOTE: If you have completed step C.2 above, then you have a battery back-up system for the program stored in your X10 Interface Unit. If a power failure should occur, the X10 Interface Unit will continue to run on the battery back-up. This will be indicated by the flashing of the red transmit light approximately every 5 seconds. If the X10 Interface Unit is without power for approximately 100 hours you will loose all programmed information you have entered. It is good practice to remove the battery if the X-10 Interface Unit is unplugged from the 120 volt power line or if the X10 Interface Unit is not to be used for a long period of time. Replace the battery at least once a year.

D. SYSTEM OVERVIEW

The system is designed to allow you to program and store up to 128 independent events. These events can be in any form or combination of lights, appliances and other functions for which X10 Powerhouse has control units available.

E. SYSTEM MODES OF OPERATION

After turning on the system, the "99 Home Sentry Menu" (here after called the "Main Menu") will appear on the screen. The Main Menu allows you to select any of the following five menu items:

1. Set Time Mode: Used for setting the system current day and time.

2. Set House Code Mode: Used for setting-up the house code assigned to the eight manually controlled switches on the X-10 Powerhouse Interface Unit.

3. Install Mode: Used for the following:
   a. Installing appliances in rooms.
   b. Selecting house code for each appliance.
   c. Selecting unit code for each appliance.

4. Operate Mode: Used for the following:
   a. Controlling appliance turn-on and turn-off times for specific days of the week.
   b. Controlling light brightness levels.

5. Exit Program: Used to exit the X-10 program and return to the TI or Disk Controller Menu.

F. SPECIAL FUNCTION COMMANDS

As an aid when programming your system when in any of the Main Menu's four modes of operation, the following function commands are available for your use:

- FCTN 9 will cause the screen to revert back to Main Menu.

- FCTN 5 will cause two separate actions when you are in either the Install or Operate Mode;
  - The first time it is pressed, it will delete any data that you entered into the computer since the last time you saved any data and return you to the beginning of your current mode.
  - The second time it is pressed, it will cause the screen to revert back to the select room screen for the mode in which you are presently operating.

- FCTN 1 will delete an appliance in the install mode or delete a timed event in the operate mode.

- [redacted] when in either the Install Mode or the Operate Mode, will cause the screen to "page" forward or backward through each of the rooms only when the "select room location" message is displayed..

FCTN UP or down arrow

G. SET TIME MODE

To select the Set Time Mode, press the number 1 key on the keyboard.

1. The screen will then indicate the current time setting, including the day of the week, time of the day, AM or PM and ask if you want to change it.

2. Pressing the N key will cause the screen to revert back to the Main Menu.

3. Pressing the Y key will allow you to press the SPACE BAR and advance the day of the week as indicated on the screen.

4. Pressing the ENTER key will save the day of the week data and then the screen will ask you to enter a new time. The new time can be selected by pressing the desired NUMBER keys on the keyboard.

5. After entering the four time digits, the screen will ask you to use the SPACE BAR to select the AM or PM indication.

6. Pressing the ENTER key will cause the screen to ask you if you want to save the time as indicated on the screen.

7. Pressing the Y key will cause the time data to be saved and the screen will revert back to the Main Menu.

8. Pressing the N key will cause the new data to not be saved (and thus the original data as indicated in Section G.1. above, will be retained) and the screen will revert back to the Main Menu.

H. SET HOUSE CODE MODE

To select the House Code Mode, press the number 2 key on the keyboard.

1. The screen will then indicate the current house code setting for the eight switches located on the X-10 Powerhouse Interface Unit and ask if you want to change it.

WARNING: IF YOU CHANGE THE HOUSE CODE, ALL DATA CURRENTLY STORED IN THE INTERFACE CONTROL UNIT, INCLUDING TIMER EVENTS AND APPLIANCES WILL BE LOST.

2. Pressing the N key will cause the original house code data to be retained and will take you back to the main menu.

3. Pressing the Y key will ask you to enter a new house code (A through P). To exit without changing the present house code press FCTN 5 or FCTN 9.

4. Once a new house code is entered the screen will immediately indicate that the 99 Home Sentry program is being reloaded.

I. INSTALL MODE

To select the Install Mode, press the number 3 key on the keyboard.

1. The screen will then show the Select Room Menu and ask you to use the SPACE BAR to move the pointer to the desired room or area.

2. Pressing the ENTER key will select the desired room and then the Select Location In Room Menu will appear.

3. Select one of up-to nine locations in the selected room by pressing one of the keys, 1 through 9. The number on the room location guide will then be high-lighted.

NOTE: To change a previously selected appliance, first delete the existing appliance and then select the new appliance. To delete an appliance press the corresponding appliance number and FNCT 1 and the and the message "Delete (Y/N)" will be shown. Pressing "Y" will delete the appliance in addition to the timed events for that appliance.

4. Next, select the appliance you desire by pressing the key number corresponding to the appliance shown in the right portion of the screen. The appliance symbol will then appear to the right of the room location number.

5. Next, select the house code you desire to assign to the appliance location by pressing one alpha key, A through P. The house code will then appear below the room location number.

6. Next, select the unit code you desire to assign to the appliance location by pressing any two desired numeric keys, 01 through 16. The unit code will then appear to the right of the house code number for that particular room location number and the screen will ask you if the information for that particular room location is correct.

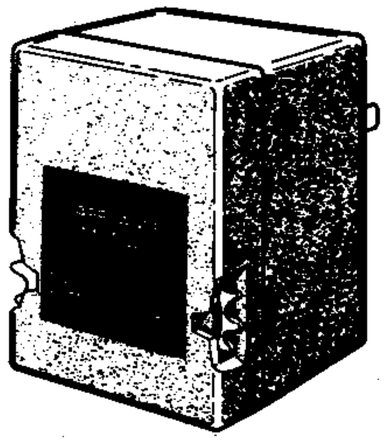
7. Pressing the N key will cause the new data for that particular room location to NOT be saved, the selected appliance will disappear and the screen will ask you if you want to select another location in the room.

8. Pressing the Y key will cause the data for that particular room location to be saved and the screen will then ask you to select another location in the room.

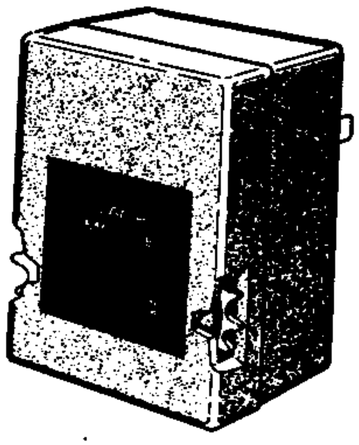
NOTE: The sequence outlined in Section I.3. through I.8. must be repeated for each appliance in each room that you wish to have the X-10 Powerhouse Interface Unit control automatically.

J. X-10 CONTROL MODULE SELECTION

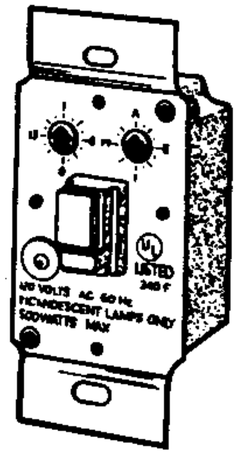
The following time control modules produced by X-10 POWERHOUSE are essential for the operation of this program throughout your home.



APPLIANCE



LAMP



WALL SWITCH

Listed below are the appliances found in the 99 HOME SENTRY program. Each is matched with the appropriate X-10 module.

APPLIANCE	MODULE
1. Ceiling light	Lamp or wall switch module
2. Table lamp	Lamp or wall switch module
3. TV	Appliance module
4. Fan	Appliance module
5. Radio/stereo	Appliance module
6. Air conditioner/heater	Appliance module
7. Coffee pot	Appliance module
8. Crock pot/slow cooker	Appliance module
9. Custom appliance	Appliance module

K. OPERATE MODE

To select the Operate Mode, press the number 4 key on the keyboard.

1. The screen will then show the Select Room Menu and ask you to use the SPACE BAR to move the pointer to the desired room or area.

2. Pressing the ENTER key will select the desired room and then the Select Location In Room Menu will appear. This menu will show each appliance that you selected for that particular room when you were in the Install Mode. This menu also shows Modes 1 through 8 appearing on the right of the screen.

3. Select one of nine locations in the selected room by pressing one of the keys, 1 through 9. The number on the room location guide will then be high-lighted.

4. Next, select the mode you desire to program by pressing the key number corresponding to the mode shown in the right portion of the screen. Refer to Section L for a description on how to set-up each of the eight modes.

NOTE: The sequence outlined in Section K.1. through K.3. must be repeated for each appliance in each room that you wish to have the X-10 Powerhouse Interface Unit control automatically.

NOTE: When the same house code and unit number has been assigned to two or more appliances, then the turn on and turn off times need only be set-up for one of the appliances. The other appliances with the same code will follow the same time sequence.

If an attempt is made to add more than 128 timed events the message "MEMORY FULL" will appear indicating that no more events can be added. Press ENTER to return to the previous screen.

L. DESCRIPTION OF THE EIGHT MODES OF OPERATION FOR EACH APPLIANCE

Following is a description of each of the eight modes together with a description of how to program that particular mode.

1. ON

Allows you to set the selected appliance immediately ON.

To program this mode simply press key number 1 and data will be sent to the X10 Interface Unit that will immediately turn the selected appliance ON. The screen will then revert back to the select location in the room menu.

2. DIM

Allows you to immediately set the brightness level of the selected light.

To program this mode simply press key number 2 and a brightness indicator will appear on the lower right of the screen. Press the SPACE BAR to increment the brightness level indication and then press the ENTER key when the desired brightness is reached. The data will then be sent to the X10 Interface Unit that will immediately set the selected appliance to the selected brightness. The screen will revert back to the select location in the room menu. The DIM function can be used for the ceiling light or table lamp.

3. OFF

Allows you to set the selected appliance immediately OFF.
To program this mode simply press key number 3 and data will be sent to the X10 Interface Unit that will immediately turn the selected appliance OFF. The screen will then revert back to the select location in the room menu.

4. NORMAL

Allows you to set, for each selected day of the week, the exact ON times and exact OFF times for each selected appliance. Note that one or more ON/OFF sequences can be programmed for the selected appliance during any one day.

To program this mode simply press key number 4 and the days

of the week will appear in the upper right of the screen. Press the Y key to select the day and the N key to not select the day of the week. A ✓mark will appear below each day selected. Then press the ENTER key to save the data.

The screen will then ask if you want to set the ON time. Pressing the Y key will allow you to set the ON time by pressing the appropriate numeric keys. The screen will then ask you to select the desired AM/PM designation by pressing the SPACE BAR and then pressing the ENTER key to save the data.

NOTE: When setting ON times for lamps, at this point the screen will ask you if you want to set the lamp at full brightness. Pressing the Y key will cause the data to be saved and the screen will revert back to the selected room menu. However, pressing the N key will cause the screen to allow you to set the brightness, as shown in the lower right portion of the screen, by pressing the SPACE BAR and then pressing the ENTER key.

The screen will then ask if you want to set the OFF time. Pressing the Y key will allow you to set the OFF time by pressing the appropriate numeric keys. The screen will then ask you to select the desired AM/PM designation by pressing the SPACE BAR and then press the ENTER key to save the data.

The screen will then ask if you want to set additional ON/OFF times. Pressing the Y key will allow you to set additional ON and OFF periods for the selected appliance within a 24 hour period for the days selected. Pressing the N key will return you to the mode select screen.

5. SECURITY

The procedure for using this mode is exactly the same as for the NORMAL mode. However, the X10 Interface Unit will cause each ON time and each OFF time you have selected to actually vary at random within one hour of the time you had previously selected.

To program this mode, the procedure is identical to that for the NORMAL mode as described in Section L.4. above.

6. TODAY

Allows you to set for today only, the exact ON and OFF times for the selected appliance. At 12 midnight the commands are cleared from the X10 Interface Unit's memory.

To program this mode, the procedure is identical to that for the NORMAL mode as described in Section L.4. above.

7. TOMORROW

Allows you to set for tomorrow only, the exact ON and OFF times for the selected appliance. At 12 midnight tomorrow the commands are cleared from the X10 Interface Unit's memory.

To program this mode, the procedure is identical to that for the NORMAL mode as described in Section L.4. above.

8. REVIEW MODE

Allows you to review all of the ON times, brightness levels and OFF times that have been previously set-up for each of the appliances in the selected room. The mode will not function if no ON/OFF times have been established.

To use this mode, first select the room location you wish to review. Then press the number 8 key (the REVIEW mode) and all ON and OFF times that have been established for that particular room location will be displayed on the screen. Pressing the SPACE BAR will advance you to the next timed event.

NOTE: By pressing FCTN 1, when the established ON/OFF times are being displayed on the screen, the screen will ask if you wish to delete the ON/OFF time. Pressing the Y key will cause the ON/OFF time established for that room location to be deleted. Pressing the N key will cause the ON/OFF time data to be retained.

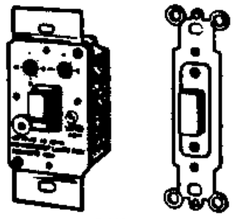
M. EXIT PROGRAM

To select the Exit Program, press the number 5 key when the screen is showing the Main Menu and the system will revert back to the TI or Disk Manager screen.

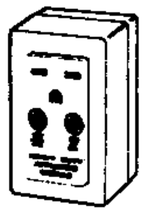
X-10® POWERHOUSE™

NUMBER ONE IN HOME CONTROL

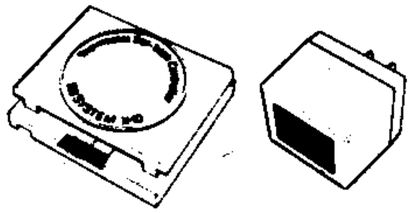
Wall Switch Module
CAT NO. W5741
Maximum rating, incandescent lamp:
500 watts.



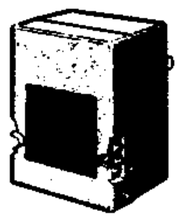
3-Way
Wall Switch Module
CAT. NO. W52677
Maximum rating, incandescent lamp:
500 watts.



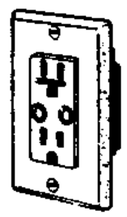
Heavy Duty
Appliance Module
CAT. NO. HD243/245
Maximum rating 15/20 amps.
Split phase systems only.



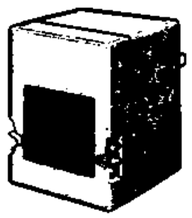
Thermostat Controller
CAT. NO. TH2807
Automatically turns down central heating/air conditioning when you're sleeping or not at home.



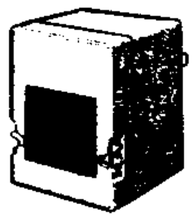
Lamp Module
CAT. NO. LM511
Maximum rating, incandescent lamp:
300 watts.



Wall Receptacle Module
CAT. NO. SR227
Maximum rating, 15 amps.



2-Prong Polarized
Appliance Module
CAT. NO. AM286
Maximum ratings, Resistive load: 15 amps.
Motor load: 1/3 HP, Incandescent lamp:
500 watts, Television: 400 watts.



3-Prong Grounded
Appliance Module
CAT. NO. AM611
Maximum ratings, Resistive load: 15 amps.
Motor load: 1/3 HP, Incandescent lamp:
500 watts, Television: 400 watts.

CORCOMP, INC.
LIMITED WARRANTY

CorComp warrants the 99 HOME SENTRY MODULE AND DATA CABLE which it manufactures to be free from defects in materials and work-manship for a period of 120 days from the date of purchase.

During the 120 days warranty period CorComp will repair or replace, at its option any defective products or parts at no additional charge, provided the product is returned, shipping pre-paid to CorComp. The Purchaser is responsible for insuring any product so returned and assumes the risk of loss during shipping, all replaced parts and products become the property of CorComp.

RETURN MATERIAL AUTHORIZATION (RMA) NUMBER

Any CorComp product which is returned to CorComp for any reason must reference a RMA number. A RMA number will be issued to a customer after the following information has been given to the Customer Service Department:

1. CorComp product model number.
2. Product serial number or date code.
3. Description of system configuration.
4. Name and telephone number of technical contact in case additional information is required.

All products shall be returned to CorComp freight prepaid.

Note: If the customer does not contact the Customer Service Department for a RMA number, and the package arrives at CorComp, the package will be returned to the sender, freight collect and the product not repaired.

SHIP TO:
2211-G Winston Road
Anaheim, CA 92806

WARRANTY COVERAGE

This 99 HOME SENTRY MODULE AND DATA CABLE is warranted against defective materials or workmanship. THIS WARRANTY IS VOID IF PRODUCT HAS BEEN DAMAGED BY ACCIDENT, UNREASONABLE USE, NEGLECT, IMPROPER SERVICE OR OTHER CAUSES NOT ARISING OUT OF DEFECTS IN MATERIALS OR WORKMANSHIP.

WARRANTY DISCLAIMERS

ANY IMPLIED WARRANTIES ARISING OUR OF THIS SALE, INCLUDING, BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE ABOVE 120 DAY PERIOD. CORCOMP INCORPORATED SHALL NOT BE LIABLE FOR LOSS OR USE OF THE HARDWARE AND THE RELATED FIRMWARE AND/OR SOFTWARE OR OTHER INCIDENTAL OR CONSEQUENTIAL COSTS, EXPENSES, OR DAMAGES INCURRED BY THE CONSUMER OR ANY OTHER USER.

Some states do not allow the exclusion or limitation of implied warranties or consequential damages, so the above limitations or exclusion may not apply to you in those states.

LEGAL REMEDIES

This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

This contains 2 manuals. The upper portion of each page is the Programming guide, the lower portion is Owner's manual.

USA
X-10 (USA) Inc.
185A LeGrand Ave.
Northvale, NJ. 07647
(201) 784-9700

Canada
X-10 Home Controls Inc.
1200 Aerowood Drive, Unit 20
Mississauga, Ontario L4W 2S7
(416) 624-4446

Printed in Hong Kong

LIMITED 1-YEAR WARRANTY
X-10 PRODUCTS

X-10 (USA) INC. warrants X-10 products to be free from defective material and workmanship for a period of one (1) year from original date of purchase at retail. X-10 (USA) agrees to repair or replace, at its sole discretion, a defective X-10 product if returned to X-10 (USA) within the warranty period and accompanied by proof of purchase.

If service is required under this warranty:

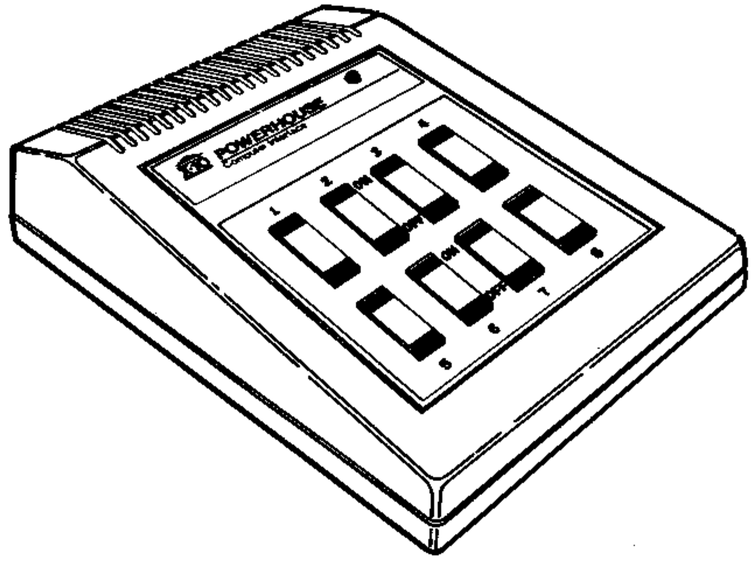
1. Return defective unit, postage or freight prepaid to:
   X-10 (USA) INC.
   185A Legrand Ave.
   Northvale, NJ 07647
2. Enclose dated proof of purchase.
3. Enclose check or money order for $2.00 to cover handling and return postage.
4. X-10 (USA) is not responsible for shipping damage. Units to be returned should be packed carefully.

This warranty does not extend to any X-10 products which have been subject to misuse, neglect, accident, incorrect wiring or to use in violation of operating instructions furnished by us, nor extend to any units altered or repaired for warranty defect by anyone other than X-10 (USA). This warranty does not cover any incidental or consequential damages and is in lieu of all other warranties expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sale of our products.

Some states do not allow limitations on how long an implied warranty lasts, and/or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific rights and you may also have other rights which vary from state to state.

PRINTED IN HONG KONG

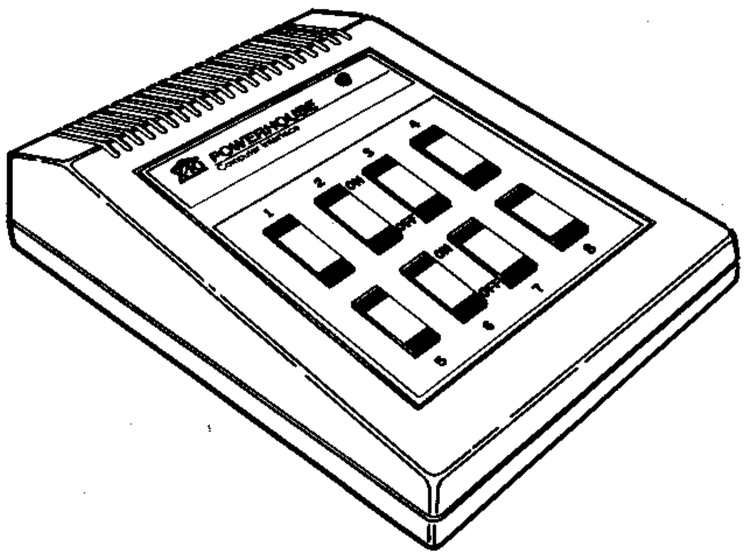
X-10® POWERHOUSE™



COMPUTER INTERFACE MODEL No. CP290 PROGRAMMING GUIDE

X-10® POWERHOUSE™

Model CP290



Computer Interface Owner's Manual

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INTRODUCTION

The *POWERHOUSE*™ Computer Interface can deter intruders by making your home look and sound lived in whether or not you are there. You never have to come home to a dark house again, or leave the outside lights on all day to get the key in the door at night. The POWERHOUSE Computer Interface can turn the outside lights on for you.

It can wake you up to stereo or TV news, light up your bedroom, hallway, bathroom; start the coffee, start your central heating or air conditioning, warm up the curlers, and all before you're even out of bed; but it's smart enough not to wake you up on weekends.

At night it can lower the heat, play music or your favorite late night TV show for as long as you set it, and can first dim and later turn out the lights automatically.

X-10® POWERHOUSE™

INTRODUCTION

Software is required in order to use your computer to program the POWERHOUSE™ computer interface but if you are a "non technical" person, don't be frightened off by this manual - you don't need it. If you purchased software for the Apple IIe/IIc, Commodore 64 or IBM PC that's all you need. The software comes with it's own manual and is supplied with a data cable to connect the interface to your computer.

A utility program of simple Basic statements is included with the software packages sold for Apple, Commodore and IBM and this programming guide is provided for anyone wishing to either modify the software available for Apple Commodore or IBM or write their own software.

The interface must be connected to your computer for programming but once programmed it can be disconnected and will continue to send commands to the X-10 modules under time control.

The main functions of the interface are summarized as follows.

- Maintains a real time clock
- Stores the timed events relating to control of lights and appliances in the home.
- Stores the graphics data required by the computer to display the details of lamps and appliances entered into the house by the user.
- Transmits X-10 control signals onto existing house wiring to control lights and appliances connected to X-10 modules.

A 9 volt Alkaline battery (sold separately) will provide approximately 100 hours back up for the interface clock and stored data. When the interface is running on battery power, the L.E.D. pulses approximately once every 5 seconds.

The Computer Interface works with the Apple IIe and IIc, the Commodore 64 and the IBM PC. A different program and data cable are necessary for each computer and therefore the disk and cable are sold separately as a kit.

This manual describes how to set up the interface and the various modules (see Appendix B for module types available) and how to **manually** operate the modules from the interface. It is recommended that you set up your interface to control the X-10 modules manually before connecting it to your computer.

If you already own other X-10 components, and are adding the Computer Interface to your system, you may wish to skip this manual and go directly to the manual supplied with the software.

A Word of Caution...
Keep in mind that your Computer Interface will **always** turn lamps and appliances on or off the instant you press the rocker keys or at the times you have previously programmed it to do so. That's obvious—but there can be some unexpected consequences.

For example, an empty coffee pot can be remotely turned on. If that should happen, your coffee pot may be damaged from overheating. If an electric heater is turned on by remote control while clothing just happens to be draped over it, a fire could result.

Therefore, always be aware of what appliance you are turning on or off so that potentially dangerous situations will not occur.

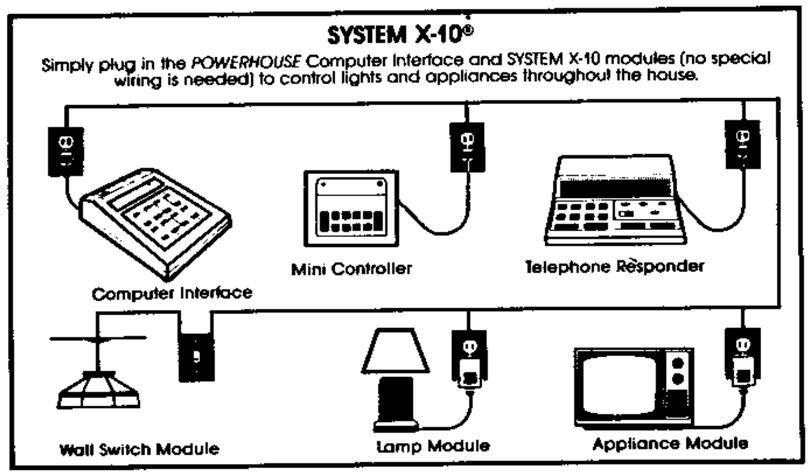
Up to **128** timer events + **256** ICONS (Graphical pictures of lights and appliances) can be stored in the interface. A timer event is any number of unit codes on the same housecode programmed to go on or off at a particular time at a specified brightness level on any day or days of the week. E.G. modules A1, A4, A7 and A15 programmed to go on at 70% brightness on mondays, wednesdays and fridays at 7:30 p.m. is just one event and 128 events can be stored.

The interface has 8 rocker keys to give manual control of unit codes 1 thru 8 on the base housecode. Base housecode is set to "A" on power up but can be changed by software.

PROGRAMMING

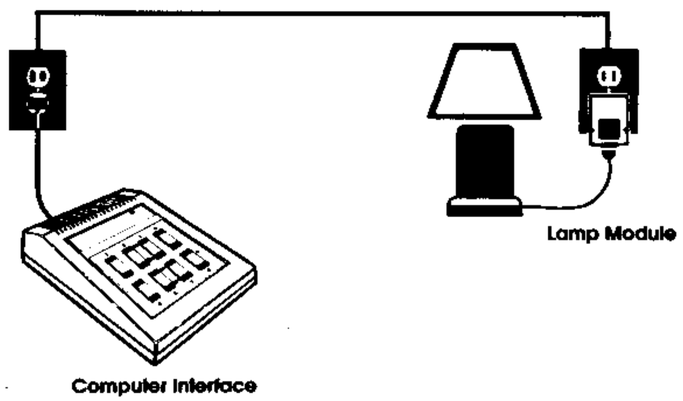
The interface is programmed to recognize 8 different types of instruction from the computer and each instruction has an ID number between 0 and 7. Each instruction from the computer has a leading SYNC pattern of 16 x FF bytes. The ID number tells the interface what type of data to expect and a check sum is maintained which is compared with the last byte of data in the instruction. If the check sums agree, the interface will acknowledge back to the computer and obey the instruction. It is suggested that if no response to an instruction is received within 10 seconds, the computer should advise the user of a potential problem with the connections to the interface. E.G. the program could display a message such as "Error check interface connections. Press joystick button to continue".

The *POWERHOUSE* Computer Interface controls lights and appliances throughout your home from any convenient location. You plug lamps into Lamp Modules, plug appliances into Appliance Modules and replace wall light switches with Wall Switch Modules. You can then control virtually everything electrical in your home using the Computer Interface with your Home Computer (see separate manual supplied with software). You can also use the Interface to manually turn on or off up to 8 lamps or appliances from its rocker keys.



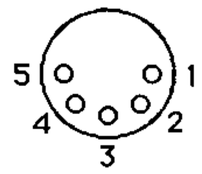
The Computer Interface tells the modules what to do. Command signals are sent over your existing house wiring to the module or modules you select. The modules respond to the command signals. The Lamp Module turns **on and off, dims and brightens** lamps. The Appliance Module turns an appliance like a TV, window fan or stereo **ON and OFF.** It can also be used for a lamp—but cannot dim it. The Wall Switch Module turns **on and off, dims and brightens** lights which are normally operated by a wall switch. See Appendix B for module types and ratings.

Command signals are sent over house wiring.



The interface is programmed via the 5 pin DIN socket on the back of the interface. The pin connections are as shown below.

LOOKING AT BACK OF INTERFACE



PIN	DESCRIPTION
1	-
2	RECEIVE (INPUT)
3	GROUND
4	TRANSMIT (OUTPUT)
5	-

The input signals from the computer (receive data input) are connected between pins 3 and 2.

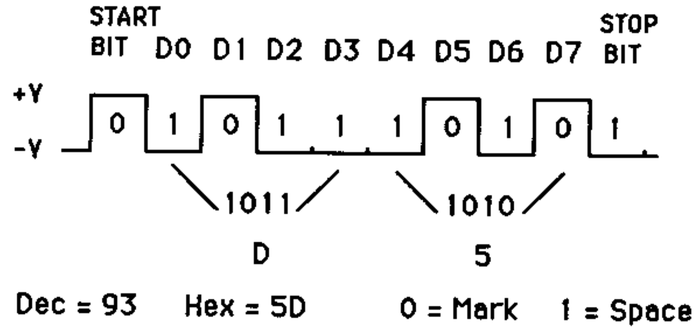
The output signals to the computer (transmit data output) are connected between pins 3 and 4.

A data cable is available for Apple, Commodore and IBM and is packaged with the software for these computers.

Voltage levels meet RS-232 specifications and the data format is RS-232 with the following characteristics.

Baud rate : 600.
Data bits : 8.
Parity : None.
Stop bits : 1.

BYTE FORMAT



A gap of 1 millisecond should be left between each byte of data sent.

8 INTERFACE DESCRIPTION AND INSTALLATION

The *POWERHOUSE* Computer Interface connects to your home computer RS-232 port. It will work with the Apple IIe and IIc, the Commodore 64 and the IBM PC. The data cable and the software program, are different for each brand of computer, and for this reason are sold together as a separate kit. The software comes with its own manual so we won't go into too much detail here (see software manual for your particular brand of computer). You can also write your own software with the aid of the programming gulde supplied with the interface.

The software provides a graphical representation of the rooms in your house on your monitor or TV screen. You install ICONS (pictures of lights and appliances) in these graphical rooms to represent the lamps and appliances which are plugged into X-10 modules. These ICONS are then selected using the joystick, and a series of questions such as "do you want to turn the light On or Off" are answered by selecting with the joystick and confirming with the joystick button. You can also program lights and appliances to go on and off at specific times by simply using the joystick to select answers to the questions given; eg. "do you want the light to go on TODAY, TOMORROW, EVERY DAY or SPECIFIC DAYS, etc.

All installed Icons and programmed information are stored in the Interface which has its own real time clock and battery back-up. After programming, the Interface can be disconnected from the computer and will continue to send signals to the modules at the specified times. This allows you to use the computer for other applications. The rocker keys on the Interface allow instant manual control of up to 8 modules without reconnecting to the computer.

Before connecting the Interface to your computer, it is recommended that you first set up your modules and check that the Interface works manually from its 8 rocker keys. First plug the Interface into a 120 V outlet where you intend to leave it. The Interface will be set to **Housecode A** when you first plug it in. This can be changed later under program control but for now you should set up your modules to work on Housecode A and any unit code between 1 and 8. Install a 9 V Alkaline battery in the battery compartment on the Interface. The Interface will then retain all programmed information, during a power outage of up to 100 hours, or if you wish to move the Interface to another room. The Transmit light will pulse on, approximately once every 5 seconds when the Interface is unplugged from the 120 V outlet and a 9 V battery is installed. This is to remind you that it is running on battery power.

A start bit signifies that a string of 8 data bits will follow. A start bit is always a SPACE bit, i.e. "0". A stop bit signifies that the data is finished and separates one byte from another. A stop bit is always a MARK bit, "1".

DOWNLOAD BASE HOUSECODE

When the interface is first powered up, the Base Housecode is set to "A". To change this you must first send a leading SYNC pattern of 16 x FF bytes to the interface, followed by the identifier "0" for "download base housecode" and then a byte of data, the upper nibble of which contains the housecode information. See below.

BYTE	D7	D6	D5	D4	D3	D2	D1	D0	
1-16	1	1	1	1	1	1	1	1	SYNC, 16 x FF.
17	0	0	0	0	0	0	0	0	ID 0, download base housecode.
18	HOUSECODE				0	0	0	0	See table 1.

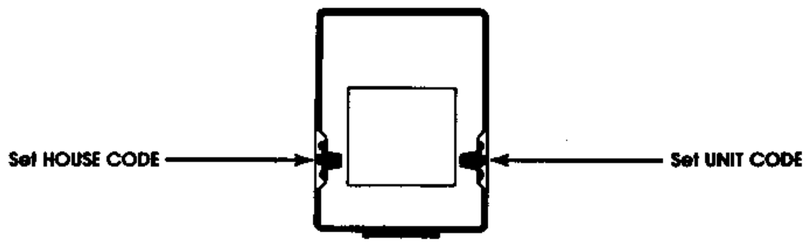
TABLE 1

house code	byte 18 (Hex)	house code	byte 18 (Hex)	house code	byte 18 (Hex)	house code	byte 18 (Hex)
A	60	B	E0	C	20	D	A0
E	10	F	90	G	50	H	D0
I	70	J	F0	K	30	L	B0
M	00	N	80	O	40	P	C0

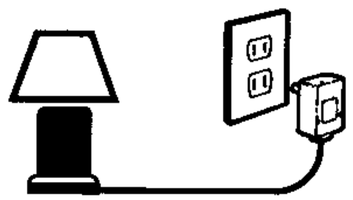
Base housecode is used by the rocker keys on the interface. Changing the base housecode will reset all timer events and graphics data stored in the interface, therefore before downloading a new base housecode to the interface, the program should warn the user of this. E.G. the program could display a message such as "Warning changing base housecode will erase all program information. Continue with change yes/no".

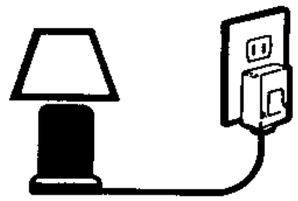
10 SETTING UP LAMPS

1. Set the red **Housecode** dial on the Lamp Module to **"A"**. You can choose a different code later when setting up the computer, for now you are just checking that you can control the module in the desired location from the location where you intend to place the interface (the interface is set to house code A when you first plug it in).
2. Set the black **Unit Code** dial on the Lamp Module to a number between 1 and 8. You can choose a different code later when setting up the computer (the software automatically offers you the next code available as you install ICONS but also allows you to select a different code).



3. Check that the lamp switch is in the ON position, unplug the lamp from the receptacle and plug it into the Lamp Module.





4. Plug the Lamp Module into a standard 120 V AC wall outlet.
5. The lamp will be OFF at this time.
6. Repeat steps above for any other lamps you wish to set up.
7. To turn the Lamp Module ON or OFF, Press ON or OFF side of the rocker key on the interface corresponding to the unit code which you set on the lamp module.

   Refer to Appendix D—troubleshooting if this does not happen.

After a successful download, the interface will acknowledge by sending the "ACK" message to the computer.

ACK MESSAGE

BYTE	D7	D6	D5	D4	D3	D2	D1	D0	
1-6	1	1	1	1	1	1	1	1	FF X 6
7	0	0	0	0	0	0	0	S	STATUS

The STATUS bit is reset to "0" during power up of the interface and is set to "1" by a download of data from the computer (any data with byte 17 equal to ID 0,1,2, or 3). The STATUS bit is used to warn the computer that the interface has been powered down. E.G. a STATUS bit equal to "0" could tell the program to display a message such as "The interface has been powered down and contains no data. Press joystick button to continue".

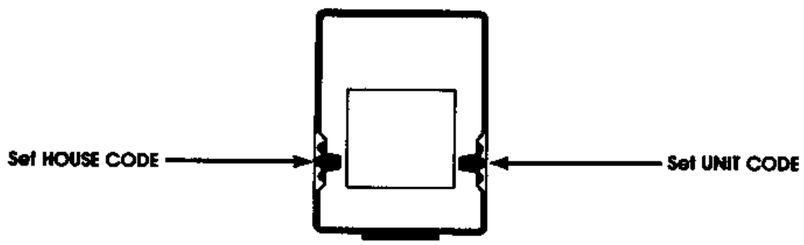
DIRECT COMMAND (instant ON or OFF)

To turn something ON or OFF or adjust the brightness level of a light instantly, it is first necessary to send a leading SYNC pattern of16 X FF bytes of data to the interface. This is then followed by the identifier "1" for "direct command" and then 4 bytes of data followed by a check sum. The check sum is the sum of bytes 18 thru 21. See below.

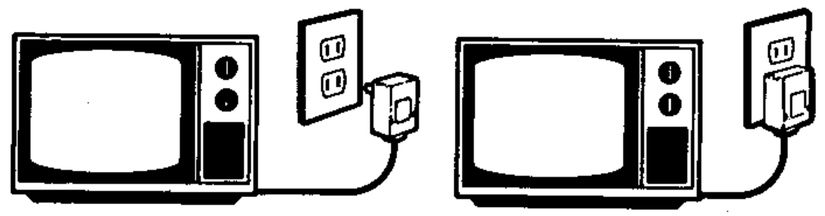
BYTE	D7	D6	D5	D4	D3	D2	D1	D0	
1-16	1	1	1	1	1	1	1	1	SYNC FF X 16.
17	0	0	0	0	0	0	0	1	ID1, Direct command.
18		LEVEL				FUNCTION			See notes 1 and 2.
19		HOUSECODE			0	0	0	0	See table 1, page 10.
20	9	10	11	12	13	14	15	16	Bit mapped unit codes of
21	1	2	3	4	5	6	7	8	X-10 modules.
22				CHECK SUM					Sum of bytes 18 - 21.

12 SETTING UP APPLIANCES

1. Set the red **Housecode** dial on the Appliance Module to **"A"**. You can choose a different code later when setting up the computer (see page 10).
2. Set the black **Unit Code** dial on the Appliance Module to number between 1 and 8. Again you can choose a different code later when setting up the computer.



3. Check that the appliance switch is in the ON position, unplug the appliance from the receptacle and plug it into the Appliance Module.



4. Plug the Appliance Module into a standard 120 V AC wall outlet (appliance may be ON or OFF at this time).
5. Repeat steps above for any other appliances you wish to control.
6. To turn the Appliance Module ON or OFF, Press ON or OFF side of rocker key on the Interface corresponding to the unit code you set on the appliance module.

   Refer to Appendix D—troubleshooting if this doesn't happen.

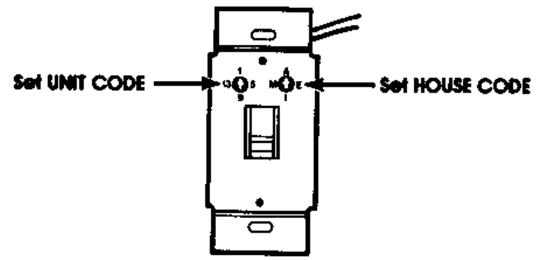
NOTE 1

"LEVEL" is dimmer setting for lamps. This applies only to X-10 lamp modules and wall switch modules. Level F Hex is full DIM and level 0 Hex is full BRIGHT. The lamps specified by bytes 20 and 21 will switch on, adjust to full brightness and then DIM to the level specified by the upper nibble of byte 18. All codes between 0 Hex and F Hex are acceptable thus providing 16 descrete light levels.

NOTE 2

D3	D2	D1	D0	FUNCTION	EXPLANATION
0	0	1	0	ON	Modules with housecodes as specified by upper nibble of byte 19 and unit codes as specified by bytes 20 and 21 will turn on.
0	0	1	1	OFF	As above, except turn OFF.
0	1	0	1	DIM	Lamp modules and wall switch modules addressed as above will turn on, adjust to full intensity and then DIM to the level specified by upper nibble of byte 18. Appliance modules do not respond to bright and dim codes.

1. Using a small screwdriver, turn the red **Housecode** dial on the Wall Switch Module to **"A"**. Turn the black **Unit Code** dial to a number between 1 and 8. You can choose a different code later when setting up the computer (see page 10).

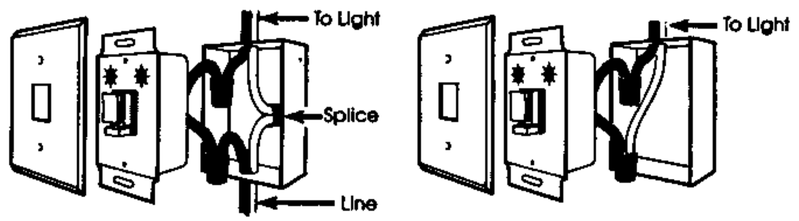


WS711

STOP 3. TURN OFF THE POWER AT THE CIRCUIT BREAKER OR FUSE.

4. Remove existing wall switch plate, unscrew the old switch from the wall box, and disconnect the wires from it.
5. See the diagrams on page 15. Connect the wires on the Wall Switch Module (black and blue) to the same two wires that went to the old switch using the wire nuts provided. Make sure that the connections are tight and that there are no bare "whiskers" of wire which can touch the wall box.

Fixture at end of Line **Module at end of Line**



Use electrical tape to cover bare wire ends if necessary.

6. Screw the Wall Switch Module back into the wall box. Move the power slide switch to the ON position (to the right, in the center). Do not replace the wall plate yet as you may want to change the unit code to another number when you set up the Interface from the computer.
7. Repeat steps above for any other wall switches you want to control.
8. To turn module ON or OFF, Press ON or OFF side of rocker switch on the Interface corresponding to the unit code set on wall switch module.

NOTE 3

If the check sum is accepted, the interface will send the ACK response to the computer and will then transmit the X-10 codes onto the house wiring. When the power line transmission is complete the command is uploaded to the computer (see command upload, page 17). Also, if X-10 codes are transmitted by pressing the keys on the interface, at the end of each transmission the codes are uploaded to the computer. This allows the computer to keep track of the ON/OFF status of the modules while it is connected to the computer.

DIRECT COMMAND EXAMPLES

Example 1: Turn ON modules A1 and A4

BYTES	1-16	17	18	19	20	21	22
DATA	FF	01	02	60	00	90	F2

Example 2 : Turn OFF modules A1 and A4

DATA	FF	01	03	60	00	90	F3

Example 3 : Turn ON lamp module B9 and DIM to 50%

DATA	FF	01	75	E0	80	00	D5

Example 4 : Turn OFF all modules with housecode A

DATA	FF	01	03	60	FF	FF	61

16 APPENDIX A

Local Control

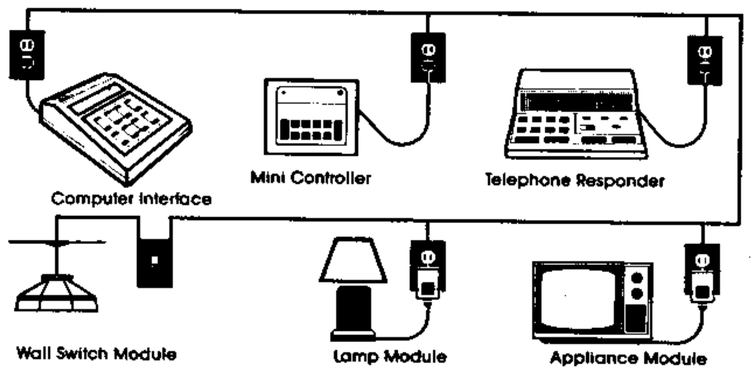
You can turn ON a light or appliance connected to a module, with its own power switch. Simply turn the switch OFF then ON again once or twice. For lamps with three-way bulbs, you will have to rotate the power switch several times before the light comes ON. An Instant—On TV connected to an appliance module cannot be turned on with its own switch; it will work from the interface or another X-10 controller only.

The Wall Switch Module can be turned ON or OFF locally using its push button.

Wall Switch Module
CAT. NO. WS741

Add other controllers

You can have greater benefits if you add other controllers to your system. The Computer Interface allows manual control of up to 8 modules from its rocker switches whether or not it is connected to the computer. It would be useful to have this manual override capability from other locations. The Mini Controller allows you to manually turn ON or OFF up to 8 lights and appliances and DIM and BRIGHTEN lamps from any room in the house. It is also perfect for controlling lights, music and TV within one room—a bedroom for example.



COMMAND UPLOAD (interface to computer)

This follows every transmission of X-10 codes onto the power line either from pressing the rocker keys, or from direct commands, or from timed events. This enables the computer to keep track of the ON/OFF status of lights and appliances.

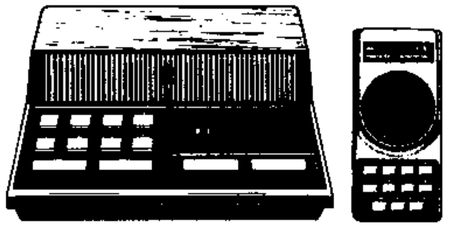
BYTE	D7	D6	D5	D4	D3	D2	D1	D0	
1-6	1	1	1	1	1	1	1	1	FF X 6.
7	0	0	0	0	0	0	0	S	Status.
8	HOUSECODE				FUNCTION				See note 4 below.
9	9	10	11	12	13	14	15	16	Bit mapped unit codes of
10	1	2	3	4	5	6	7	8	X-10 modules.
11	BASE HOUSECODE				0	0	0	0	Same as table 1, page 10.
12	CHECK SUM								Sum of bytes 8-11.

NOTE 4 - Housecode same as table 1. Function same as note 2, page 4 except that the code for DIM is UPLOADED to the computer as 0100 (4 Hex).

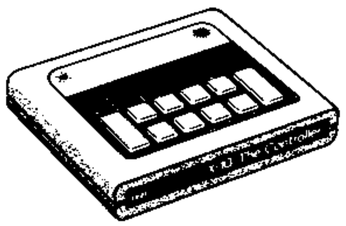
SET CLOCK (computer to interface)

To set the clock in the interface it is first necessary to send a leading SYNC pattern of 16 X FF bytes of data. This is followed by the identifier "2" for set clock and then 3 bytes of data followed by a check sum. This check sum is the sum of bytes 18 thru 20. See below.

BYTE	D7	D6	D5	D4	D3	D2	D1	D0	
1-16	1	1	1	1	1	1	1	1	SYNC 16 X FF.
17	0	0	0	0	0	0	1	0	ID2, for set clock.
18	0	0	MINUTES						HEX 00 to 3B (0 TO 59).
19	0	0	0	HOURS					HEX 00 to 17 (O TO 23).
20	0	Sun	Sat	Fri	Thu	Wed	Tue	Mon	Bit mapped days.
21	CHECK SUM								Sum of bytes 18 to 20.

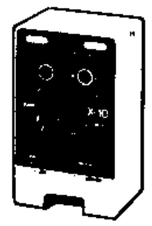


Telephone Responder
CAT. NO. TR2700
Plugs into standard modular telephone jack and standard 120 Volt wall outlet. Enables you to telephone your home from anywhere and turn lights, appliances or central heating/ air conditioning on and off.



Mini Controller
CAT. NO. MC260
Just plug it in (no special wiring is needed) and instantly control 8 lights and appliances throughout the house with the push of a button from one convenient location.

The Timer
CAT. NO. TC262
Just plug it in (no special wiring is needed) and program up to 8 lights, appliances, and central heating/air conditioning to turn on and off up to twice a day at the times you want.



Burglar Alarm Interface
CAT. NO. BA284
Connects to your present burglar alarm system. Frightens intruders by flashing lights or blasting stereo, TV or radio together with your existing alarm.

SET CLOCK EXAMPLES

EXAMPLE 1 To set clock to 9:30 a.m. on Monday.

BYTE	1-16	17	18	19	20	21
DATA	FF	02	1E	09	01	28

EXAMPLE 2 To set clock to 7:45 p.m. on Friday.

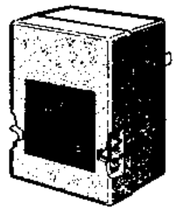
BYTE	1-16	17	18	19	20	21
DATA	FF	02	2D	13	10	50

TIMER EVENT OR GRAPHICS DATA DOWNLOAD

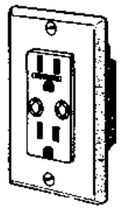
(Computer to Interface)

To download either a timer event or graphics data you must first send a leading sync pattern of 16 X FF bytes. The ID. (Byte 17) is 3 HEX for both timer events and graphics data but D2 in Byte 19 is a "0" for timer events and a "1" for graphics data.

Timer events are stored in bytes 0 to 1023 of the 2k x 8 RAM in the Interface. Only bytes 20 to 27 of the downloaded message are stored. Each group of 8 bytes is assigned a number between 0 and 1016 (128 groups of 8 bytes) as specified by A0 - A4 in byte 18 and A5 - A6 in byte 19. D0, D1 and D2 in byte 18 are **always** 0 so these event numbers increase in steps of 8. The computer should keep track of the event numbers and load new events into vacant address locations. Byte 20 designates the type of timer event as shown in table 4. Bytes 21 thru 23 set the time and day of the event. Bytes 24 and 25 specify which modules will be controlled and byte 26 specifies the housecode of these modules. Byte 27 specifies whether the module(s) will turn ON, OFF or DIM and to what brightness level. Byte 28 is the sum of bytes 20 to 27. See page 21.

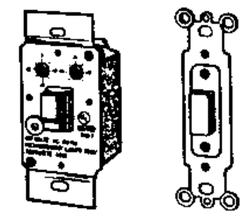


Lamp Module
CAT. NO. LM511
Maximum rating, Incandescent lamp: 300 watts.

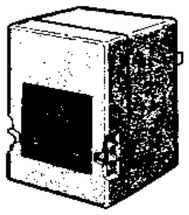


Wall Receptacle Module
CAT. NO. SR227
Maximum rating, 15 amps.

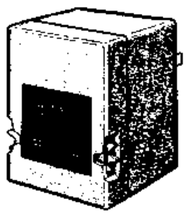
Wall Switch Module
CAT NO. WS711
Maximum rating, Incandescent lamp: 500 watts.



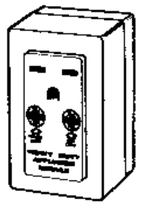
3-Way
Wall Switch Module
CAT. NO. WS2677
Maximum rating, Incandescent lamp: 500 watts.



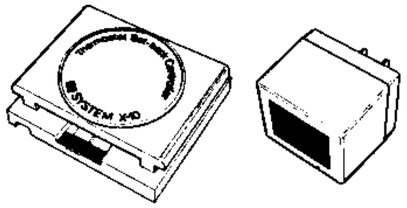
2-Prong Polarized
Appliance Module
CAT. NO. AM286
Maximum ratings, Resistive load: 15 amps, Motor load: 1/3 HP, Incandescent lamp: 500 watts, Television: 400 watts.



3-Prong Grounded
Appliance Module
CAT. NO. AM611
Maximum ratings, Resistive load: 15 amps, Motor load: 1/3 HP, Incandescent lamp: 500 watts, Television: 400 watts.



Heavy Duty
Appliance Module
CAT. NO. HD243/245
Maximum rating 15/20 amps.
Split phase systems only.



Thermostat Controller
CAT. NO. TH2807
Automatically turns down central heating/air conditioning when you're sleeping or not at home.

TIMER EVENT DOWNLOAD

BYTE	D7	D6	D5	D4	D3	D2	D1	D0	
1-16	1	1	1	1	1	1	1	1	SYNC 16 X FF
17	0	0	0	0	0	0	1	1	ID3,event/graphics download.
18	A4	A3	A2	A1	A0	0	0	0	A0 to A6, Binary coding of
19	X	X	X	X	X	0	A6	A5	event number.
20	0	0	0	0	MODE				See table 4, pages 22 &23.
21	0	Sun	Sat	Fri	Thu	Wed	Tue	Mon	Bit map of days.
22	0	0	HOUR						HEX 00 to 17 (0 to 23).
23	0	0	0	MINUTE					HEX 00 to 3B (0 to 59).
24	1	2	3	4	5	6	7	8	Bit map of unit codes.
25	9	10	11	12	13	14	15	16	Bit map of unit codes.
26	HOUSECODE				0	0	0	0	Same as table 1, page 10.
27	LEVEL				FUNCTION				Same as notes 1 and 2.
28	CHECK SUM								Sum of bytes 20 to 27.

X = DONT CARE

TABLE 4 - TIMER MODE SELECTION

BYTE 20 lower nibble

D3	D2	D1	D0	MODE	EXPLANATION
1	0	0	0	NORMAL	occurs on a weekly cycle at same time each day, on day or days specified by byte 21 and at the time specified by bytes 22 and 23. The function and codes for the event are specified by bytes 24 to 27.
1	0	0	1	SECURITY	Same as NORMAL mode except that the event time will be different each day and will be within one hour after the time specified by byte 22. (varies in a pseudo random pattern). SECURITY is only available in EVERYDAY and SPECIFIC DAYS modes, see note 5, page 24.

22 APPENDIX C—SOME DONT'S

DON'T Use a **Wall Switch Module** to control a Fluorescent light, a fan, or any kind of appliance. This could cause damage to the module and/or the light/appliance.

DON'T Use a **Wall Switch Module** to control an outlet unless you are sure no one will plug an appliance (a vacuum cleaner, for example) into the outlet. See above.

DON'T Use a **Lamp Module** to control a fluorescent light, a fan, or any kind of appliance.

DON'T Use a **Lamp Module** or a **Wall Switch Module** to control a lamp or fixture which already has a dimmer on it.

DON'T Use a module to control something which would be dangerous if it were turned on remotely while unattended; eg., an empty coffee pot, an electric fan with poorly protected blades, etc.

DON'T Use a **Wall Switch Module** for lamps less than 60 watts.

DON'T Leave a wireless intercom or baby monitor in the permanent transmit (or talk) mode. Its transmissions could "block out" X-10 transmissions.

DON'T Exceed the rating of the modules:

Lamp Module—300 watts **incandescent** only.
Wall Switch Module—500 watts **incandescent** only.
Appliance Module—appliances rated 15 Amp. resistive (such as coffee pots and heaters) or 1/3 H.P. motor load, or 400 watts for TV sets or 500 watts for lamps, because of the "inrush current" from a cold lamp.

TABLE 4 - TIMER MODE SELECTION (continued)

BYTE 20 lower nibble

D3	D2	D1	D0	MODE	DESCRIPTION
0	1	0	0	TODAY	EVENT occurs only TODAY at the time specified by bytes 22 and 23. and will be cleared from memory at midnight TODAY.
0	0	1	0	TOMORROW	EVENT occurs only TOMORROW at the time specified by bytes 22 and 23. and will be cleared from memory at midnight TOMORROW.
0	0	0	0	CLEAR	Clears from memory, the event specified by the event number stored in bytes 18 and 19.

NOTE 5

In addition to TODAY and TOMORROW, it is suggested that the program offer the user the choice of EVERYDAY and SPECIFIC DAYS. If EVERYDAY is chosen, byte 21 should be sent as 7F HEX (all days selected). If SPECIFIC DAYS is chosen, byte 21 should indicate which days were chosen.

GRAPHICS DATA DOWNLOAD

Graphics data is stored in bytes 1024 to 1535 of the 2k x 8 RAM in the Interface. Only bytes 20 and 21 of the downloaded message are stored. Each pair of bytes is assigned a number between 0 and 511 as specified by A0 to A6 in byte 18 and A7 in byte 19. D0 in byte 18 is **always** '0' so these address numbers increase in steps of 2 (for graphics type and X-10 code of 256 objects). Note also that in byte 19 D1 is **always** "0" and D2 is **always** "1". The computer should keep track of the message numbers and load new messages into vacant address locations. The contents of bytes 20 and 21 depends on the graphics approach used by the programmer (see note 6), the interface merely stores this data and will upload it to the computer upon request (see graphics upload, page 33). Byte 22 is the sum of bytes 20 and 21. See page 25.

1. If a module won't go on or off manually from the rocker keys:

Check that you have power to the outlet controlling the module and the switch on the light or appliance is ON.

Check that the red light on the interface goes on when you press a rocker key.

Check that the unit code and housecode on the module are set correctly. The housecode on the Interface will be "A" unless you changed it when you set up the program.

Try plugging the module and the Interface into the same outlet. If it doesn't work in ANY outlet, not even with the module and the Interface in the same duplex receptacle (top and bottom) replace the module. If it works in some outlets but not in others, contact the factory for help.

2. If the Interface appears to be "completely dead."

Before returning it, unplug it from the 120 V outlet, remove the battery and wait 10 seconds. Then reconnect it to the outlet, re-install the battery and see if it works. Note, you will have lost all of your programmed information by doing this but if the Interface now works this indicates that the microprocessor was "latched up," a rare condition which can occur with CMOS circuitry.

3. If a module doesn't go on or off at the programmed times.

First check that the module works from the Interface keys; see No. 1 above. Connect the Interface to the computer and select the REVIEW mode. Check that you entered time, day and am/pm correctly for the module in question.

If you find NO PROGAM (i.e., no timed events, etc.) check the battery in the Interface. You may have had a power outage, and if the battery is dead, you could have lost all of your program.

Check that the clock (time and day) is set correctly at the initial set-up stage.

Check that the housecode is set correctly at the initial set-up stage.

GRAPHICS DATA DOWNLOAD

BYTE	D7	D6	D5	D4	D3	D2	D1	D0	
1-16	1	1	1	1	1	1	1	1	SYNC 16 X FF
17	0	0	0	0	0	0	1	1	ID3,event/graphics download.
18	A6	A5	A4	A3	A2	A1	A0	0	A0 to A7, binary number for
19	X	X	X	X	X	1	0	A7	graphics object-256 objects.
20				GRAPHICS DATA					User RAM to define type and
21				GRAPHICS DATA					X-10 code of graphics object.
22				CHECK SUM					Sum of bytes 20 and 21.

X = DON'T CARE

NOTE 6

A suggested allocation for byte 20 is shown below.

BYTE 20	D7	D6	D5	D4	D3	D2	D1	D0
	1=ON 0=OFF			ICON TYPE				

FOR EXAMPLE

ICON of a lamp shown in the ON state.

1	0	0	0	0	0	0	1

ICON of a T.V. shown in the ON state.

1	0	0	0	0	0	1	0

ICON of a coffee pot shown in the ON state.

1	0	0	0	0	0	1	1

ICON of a fan shown in the OFF state.

0	0	0	0	0	1	0	0

INTERCOM SYSTEMS.

Intercom systems which send voice signals over existing electrical wiring may interfere with the operation of your Interface when the intercom is in use. If the intercom system has its own separate wiring it will not interfere with the Interface.

POWER INTERRUPTIONS.

Your Interface has battery back up (if you installed a 9 V Alkaline battery) to protect your program in the event of a power outage. However, when the power is restored after an outage, Lamp Modules and Wall Switch Modules will normally be OFF. Appliance Modules will stay as they were before the interruption.

Radio—TV Interference.

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been tested and found to comply with the specifications in subpart J of part 15 of FCC rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, you should try to correct the interference by one of the following measures.

- Reorient the antenna of the receiver experiencing the interference.
- Relocate the interface with respect to the receiver.
- Move the interface away from the receiver.
- Plug the Interface into a different outlet so that the interface and the receiver are on different branch circuits.

If necessary, consult your dealer or an experienced radio/television technician for additional suggestions. You may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the United States Government Printing Office, Washington, DC 20402, Stock No. 004-0035-4.

Byte 20 = 0 indicates a vacant ICON storage location. To clear an ICON from the interface you need to send a graphics download with byte 20 = 0. Note, after doing this, you should also send a DOWNLOAD TIMER EVENT message with byte 20 = 0 (to clear any timed events for the removed ICON).

A suggested allocation for byte 21 is shown below.

BYTE 21	D7 D6 D5 D4	D3 D2 D1 D0
	HOUSECODE OF STORED ICON	UNIT CODE OF STORED ICON

REQUEST CLOCK AND BASE HOUSECODE

(interface to computer)

To upload the time and base housecode from the interface it is first necessary to send a leading SYNC pattern of 16 X FF bytes, followed by an ID4 for request clock and base housecode. See below.

BYTE	D7	D6	D5	D4	D3	D2	D1	D0	
1-16	1	1	1	1	1	1	1	1	SYNC FF X 16
17	0	0	0	0	0	1	0	0	ID4, request clock and base housecode.

If the interface receives the request correctly it will respond by uploading the clock and base housecode to the computer, as shown on page 29. If the request is not received correctly, no response is given.

CLOCK AND BASE HOUSECODE UPLOAD

BYTE	D7	D6	D5	D4	D3	D2	D1	D0	
1-6	1	1	1	1	1	1	1	1	SYNC 6 X FF.
7	0	0	0	0	0	0	0	S	status bit. *
8	0	0	MINUTES						HEX 00 to 3B (0 to 59).
9	0	0	0	HOURS					HEX 00 to 17 (0 to 23).
10	0	Sun	Sat	Fri	Thu	Wed	Tue	Mon	Bit mapped days.
11	BASE HOUSECODE				0	0	0	0	Same as table 1.
12	CHECK SUM								Sum of bytes 8 to 11.

* The STATUS bit is reset to "0" during power up of the interface and is set to "1" by a DOWNLOAD of data from the computer (any data with byte 17 equal to ID 0,1,2, or 3). The STATUS bit is used to warn the computer that the interface has been powered down. E.G. a STATUS bit equal to "0" could tell the program to display a message such as " The interface has been powered down and contains no data. Press joystick button to continue".

REQUEST TIMER EVENTS (interface to computer)

To upload the timer events from the interface it is first necessary to send a leading SYNC pattern of 16 X FF bytes, followed by an ID5, for request timer events. See below.

BYTE	D7	D6	D5	D4	D3	D2	D1	D0	
1-16	1	1	1	1	1	1	1	1	SYNC FF X 16
17	0	0	0	0	0	1	0	1	ID5, request timer events.

The interface will respond by uploading to the computer, all of the 128 events starting with number 1, as shown on page 31. A vacant event space is represented by a single FF byte, this shortens the time for the upload. The check sum does not include these FF bytes.

TIMER EVENTS UPLOAD

EXAMPLE WHERE ONLY FIRST TWO EVENTS ARE PROGRAMMED

BYTE	D7	D6	D5	D4	D3	D2	D1	D0	
1-6	1	1	1	1	1	1	1	1	SYNC FF X 6.
7	0	0	0	0	0	0	0	S	Status.
8-15	EVENT NUMBER 1 AS DOWNLOADED,8 BYTES.								
16-23	EVENT NUMBER 2 AS DOWNLOADED,8 BYTES.								
24-149	1	1	1	1	1	1	1	1	FF X 126 to indicate 126 vacant event spaces.
150	CHECK SUM								Sum of bytes 8 to 23 (FF bytes ignored).

REQUEST GRAPHICS DATA (interface to computer)

To upload graphics data from the interface it is first necessary to send a leading SYNC pattern of 16 X FF bytes followed by an ID6, for request graphics data. See below.

BYTE	D7	D6	D5	D4	D3	D2	D1	D0	
1-16	1	1	1	1	1	1	1	1	SYNC FF X 16
17	0	0	0	0	0	1	1	0	ID6, request graphics data.

The interface will respond by uploading to the computer, all of the 256 ICONS starting with number 1, as shown on page 33. A vacant ICON space is represented by a single FF byte, this shortens the time for the upload. The check sum does not include these FF bytes.

GRAPHICS DATA UPLOAD

EXAMPLE WHERE ONLY 5 ICONS ARE PROGRAMMED

BYTE	D7	D6	D5	D4	D3	D2	D1	D0	
1-6	1	1	1	1	1	1	1	1	SYNC FF X 6.
7	0	0	0	0	0	0	0	S	Status.
8-9				ICON NUMBER 1					2 bytes.
10-11				ICON NUMBER 2					2 bytes.
12-13				ICON NUMBER 3					2 bytes.
14-15				ICON NUMBER 4					2 bytes.
16-17				ICON NUMBER 5					2 bytes.
18-268	1	1	1	1	1	1	1	1	FF x 251 to indicate 251 vacant ICON spaces.
269				CHECK SUM					Sum of bytes 8 to 17 (FF bytes ignored.

DIAGNOSTIC

The interface has a self test diagnostic routine which is initiated by sending a leading SYNC pattern of 16 X FF bytes followed by an ID7. Upon receiving this instruction, the interface will run a self check on it's own hardware and software (firmware). The output of the interface (pins 3 and 4) will go low for 10 seconds as part of this test. If the check is o.k. the interface will respond by sending the ACK with status "0". If a fault is diagnosed, the interface will send ACK with status "1" or will not respond.

BYTE	D7	D6	D5	D4	D3	D2	D1	D0	
1-16	1	1	1	1	1	1	1	1	SYNC FF X 16
17	0	0	0	0	0	1	1	1	ID7, initiate self test.