



***How To Wire Motorized  
Projection Screens***





**CinemaSource ,  
18 Denbow Rd., Durham, NH 03824  
[www.cinemasource.com](http://www.cinemasource.com)**

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## ***How to Wire Motorized Projection Screens***

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## **SCREEN MANUFACTURERS PROFILED IN THIS GUIDE:**

DA-LITE SCREEN, 3100 North Detroit St., Warsaw, IN 46581 800-622-3737,  
[www.da-lite.com](http://www.da-lite.com)

DRAPER, 411 S. Pearl St., Spiceland, IN 47385 800-238-7999,  
[www.draperinc.com](http://www.draperinc.com)

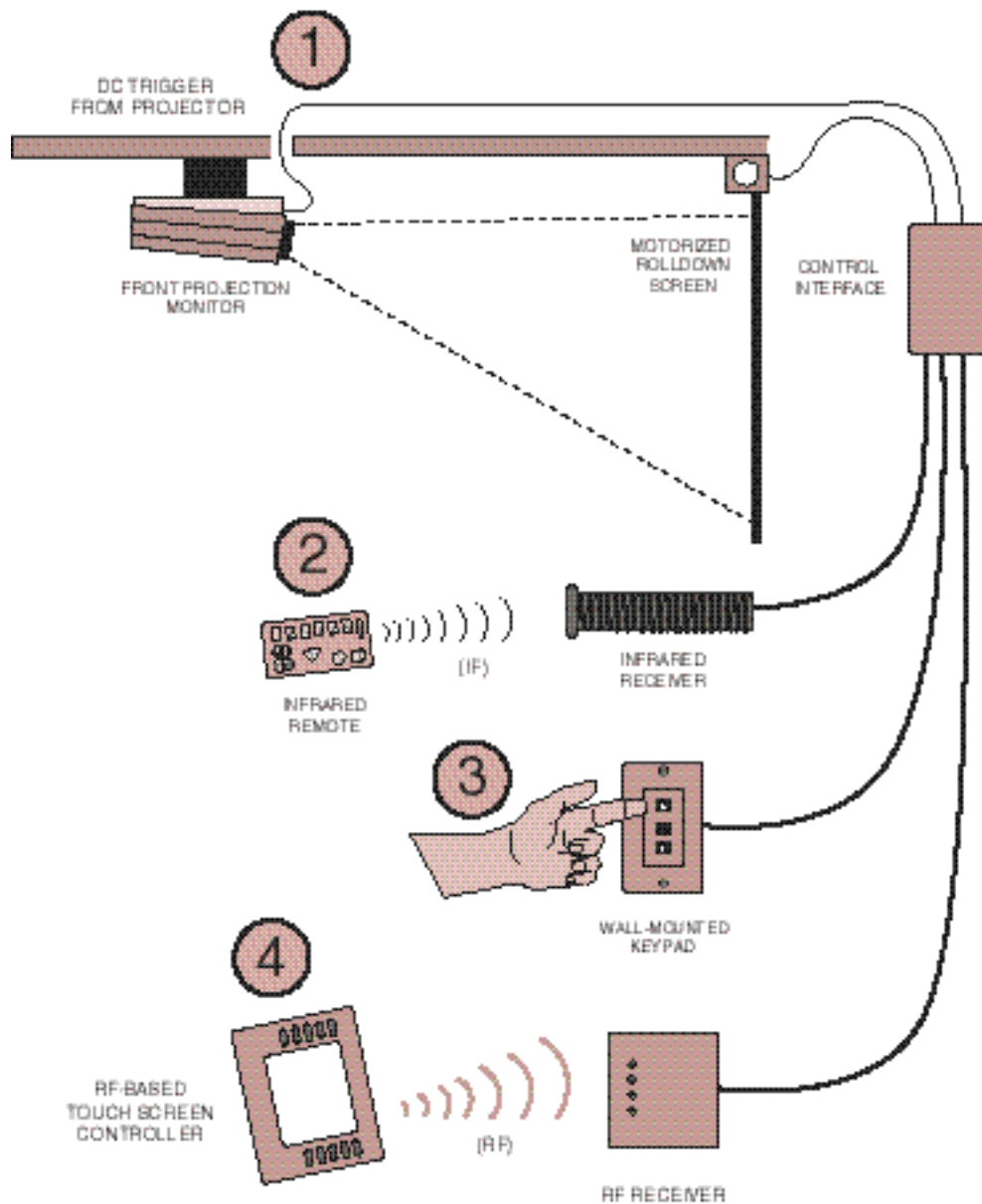
VUTEC Corporation, 5900 Stirling Road, Hollywood, FL 33021 800-770-4700,  
[www.vutec.com](http://www.vutec.com)

STEWART FILMSCREEN, 1161 West Sepulveda Blvd., Torrance, CA 90502  
800-762-4999, [www.stewartfilm.com](http://www.stewartfilm.com)

# CHAPTER EIGHT: Motorized Screen Wiring Techniques

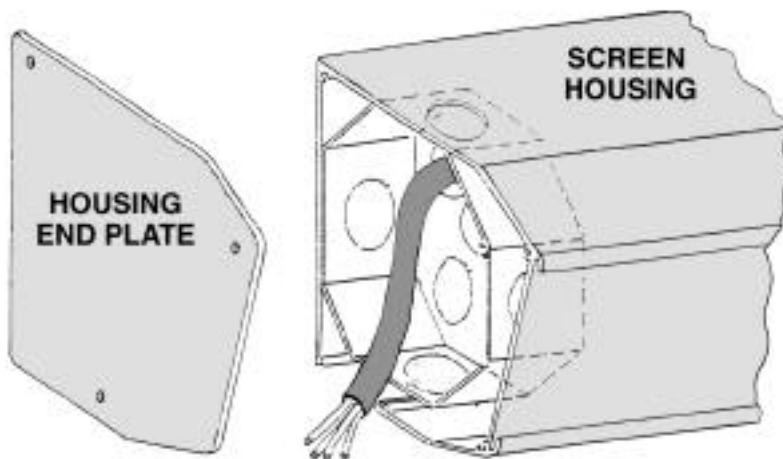
There are many ways to get power to a motorized screen and control it's operation. In the diagram below we illustrate the four most common methods for control.

- 1) Via 12 Volt DC Trigger
- 2) Via IR remote control
- 3) Via wall mounted key pad
- 4) Via RF remote control

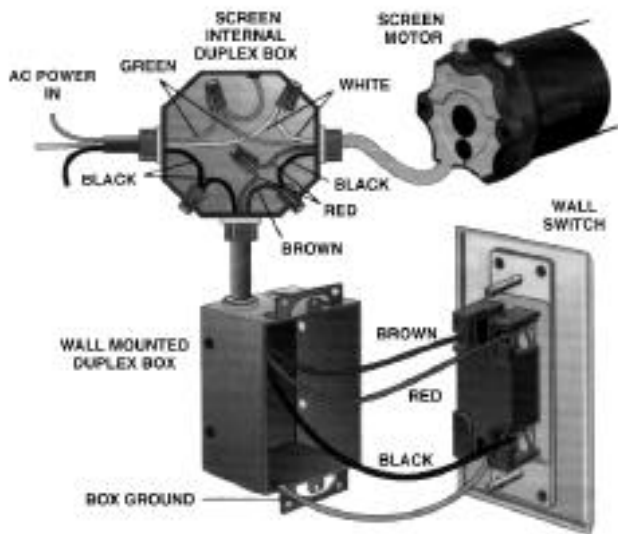


### Motorized Screen Wiring

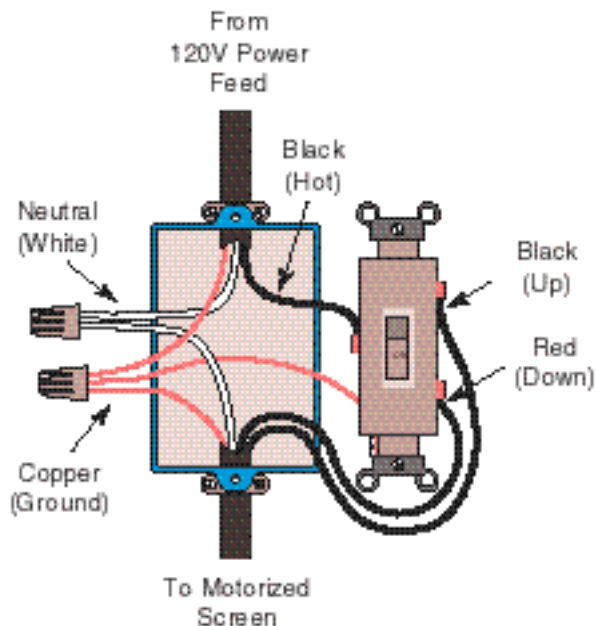
Motorized screens are shipped with a "pigtail" wire that exits the end of the screen housing. Typically the pigtail has four conductors, one ground (green), one neutral (white) and two hots. One of the hot conductors is used to lower the screen and the other to raise it.



### Two methods of hardwiring a single motorized screen to a wall mounted up/down switch



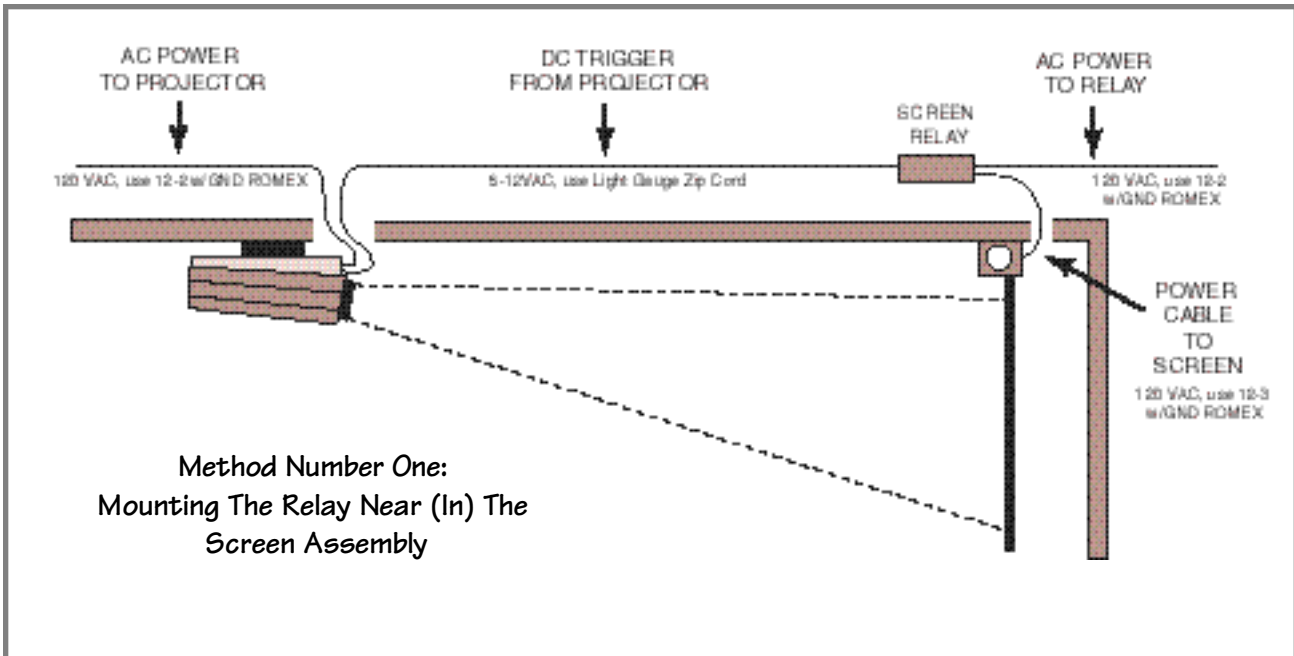
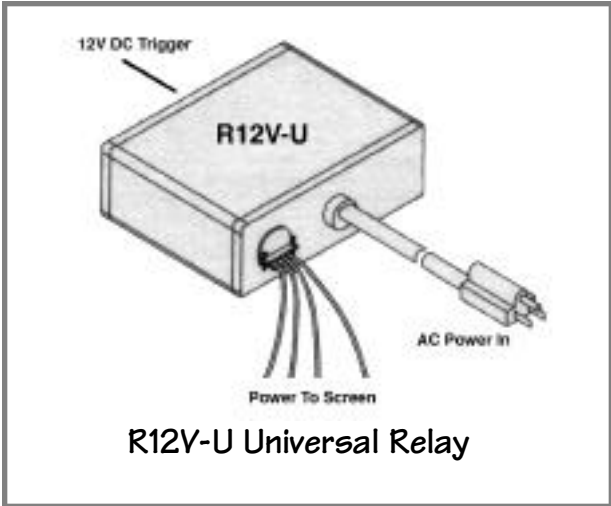
Method One: Using a "job box" to terminate the wires from screen assembly and the wall switch.

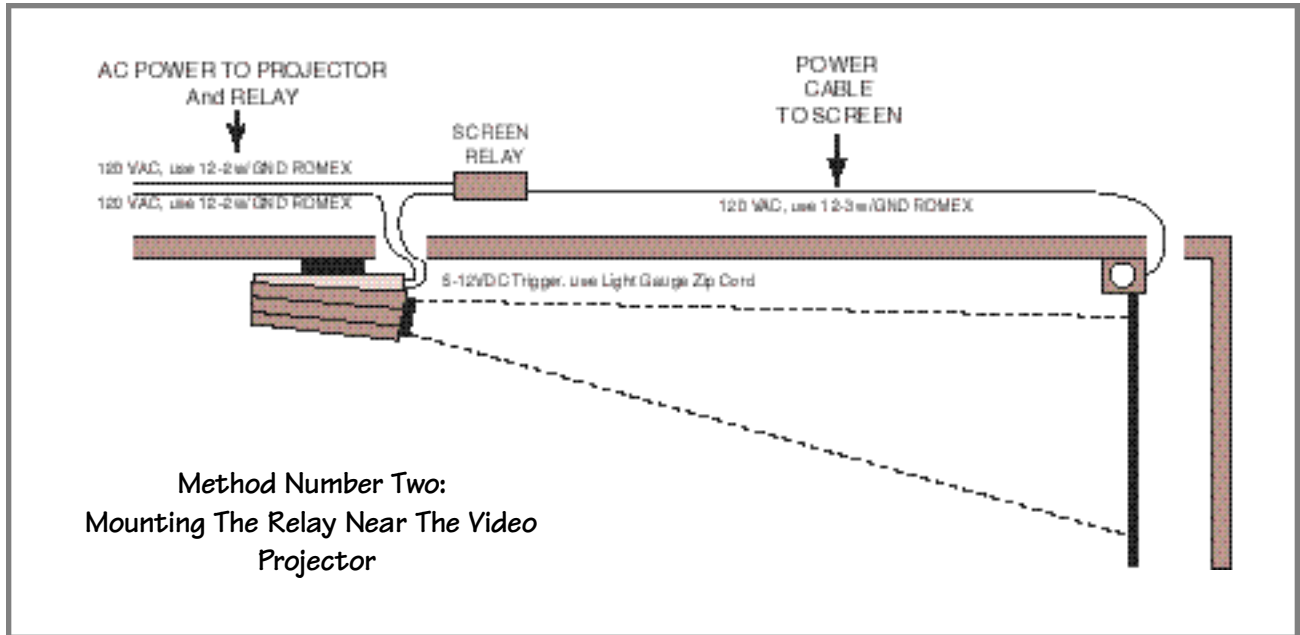


Method Two: Terminating the wires from screen assembly and the wall switch in the wall switch J box.

## Screen Control Using Relays

One of the easiest ways to control the operation of an electric screen is to wire it to a relay which is triggered when the projector is turned on. This can easily be accomplished using Vutech's R12V-U universal relay (right) or their R12V-LI relay. The R12V-LI relay is actually an assembly that bolts to the left side of the Lectric screen housing (adds 1.25" to the length) and fully contains the relay and wiring. Below we illustrate two popular configurations for wiring video projectors and projection

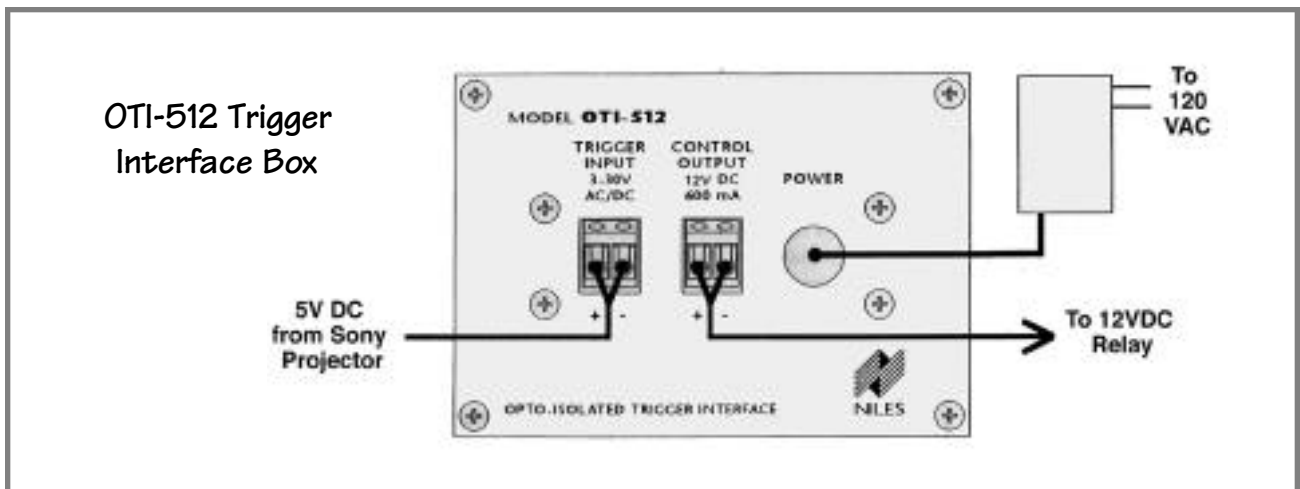




## Interfacing To Sony Videoprojectors



Many of the new Sony projectors (D50Q, G70Q, 400Q, etc.) have 5VDC accessory trigger outputs. This can present a problem when interfacing with a standard 12VDC/120VAC relays. To help with situations such as this, Niles Audio manufactures the OTI-512 trigger interface box. As the diagram below illustrates, with a trigger voltage between 3-30 VAC/VDC, it will output 12VDC to control relays or other switching devices.



## IR Wireless Screen Control

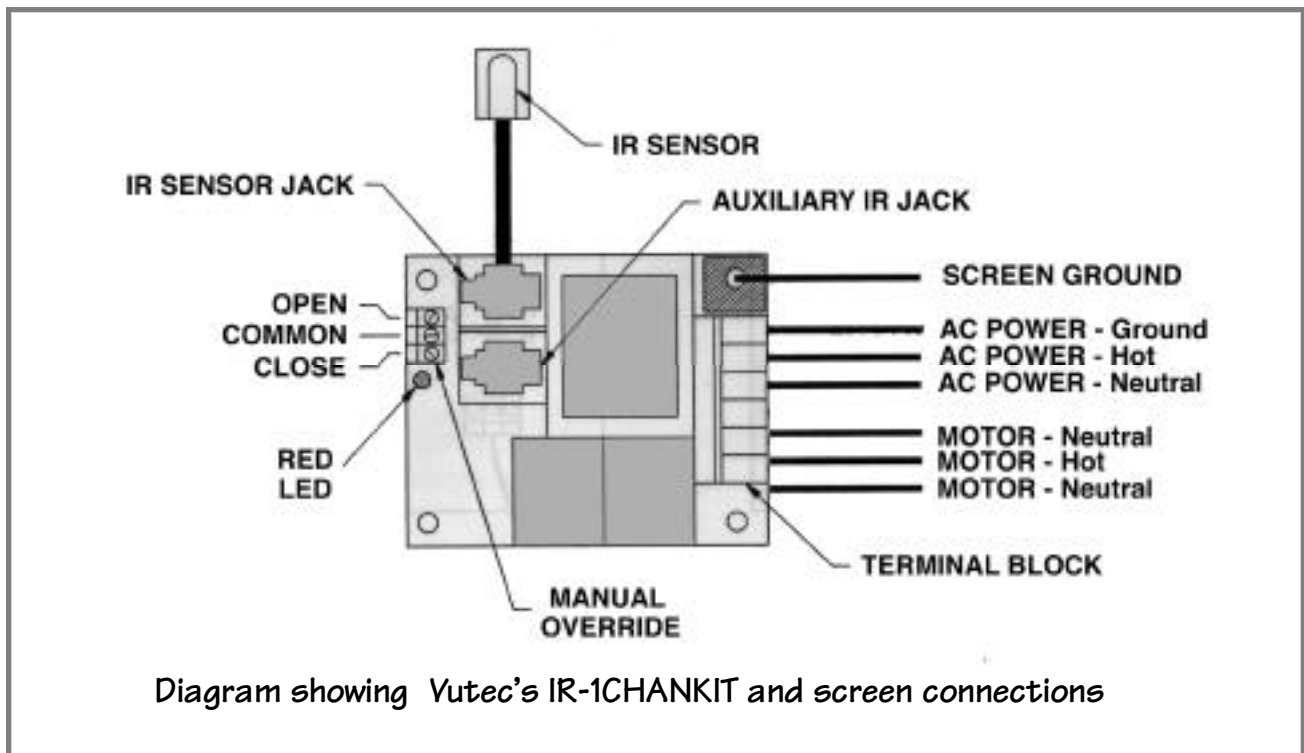
Vutec offers their IR-series remote control kits for the operation of motorized screens and other devices. The diagram below illustrates the heart of the system. It is a small PC system board (2" x 2.5") that interfaces with the AC power wires and screen power cable via a screw-down terminal block. A six foot phone-type cable with a small infra-red receiver hard wired on one end plugs into a jack on the board. Due to its small size, one can mount this PC system board in a variety locations and route the IR



sensor to any location that is convenient for the remote control to be pointed at.

For more complex systems with multiple screens or other devices, multiple PC boards can be daisy chained together and programmed to perform different functions. Each PC system board can switch a 125VAC 4 Amp inductive device or up to 1/3 HP.

Included in the kit is a 12 channel IR remote control. It operates at 38Khz which works with all North American learning remotes and IR repeater systems. Although single screen systems would just use a single channel for screen up/screen down control, daisy chained systems can be used to control up to 12 devices.





## RF Wireless Screen Control

The Vutec Wireless Remote Control System allows one to control the operation of a single motorized screen. (Multiple screen controls are available also.) Key presses on a small hand-held transmitter generate up, down or stop commands which are then received by the control unit and used to control the operation of the screen. An optional low voltage control switch can be ordered that allows the same up/down and stop functions to be controlled. The schematic below illustrates how a typical system is wired. The advantage of using RF-based remote control systems is that they are immune to ambient light or physical obstructions that can interfere with conventional IR-based systems. They are ideal for commercial installations where ambient light control is not an option.



OPTIONAL DC WALL SWITCH

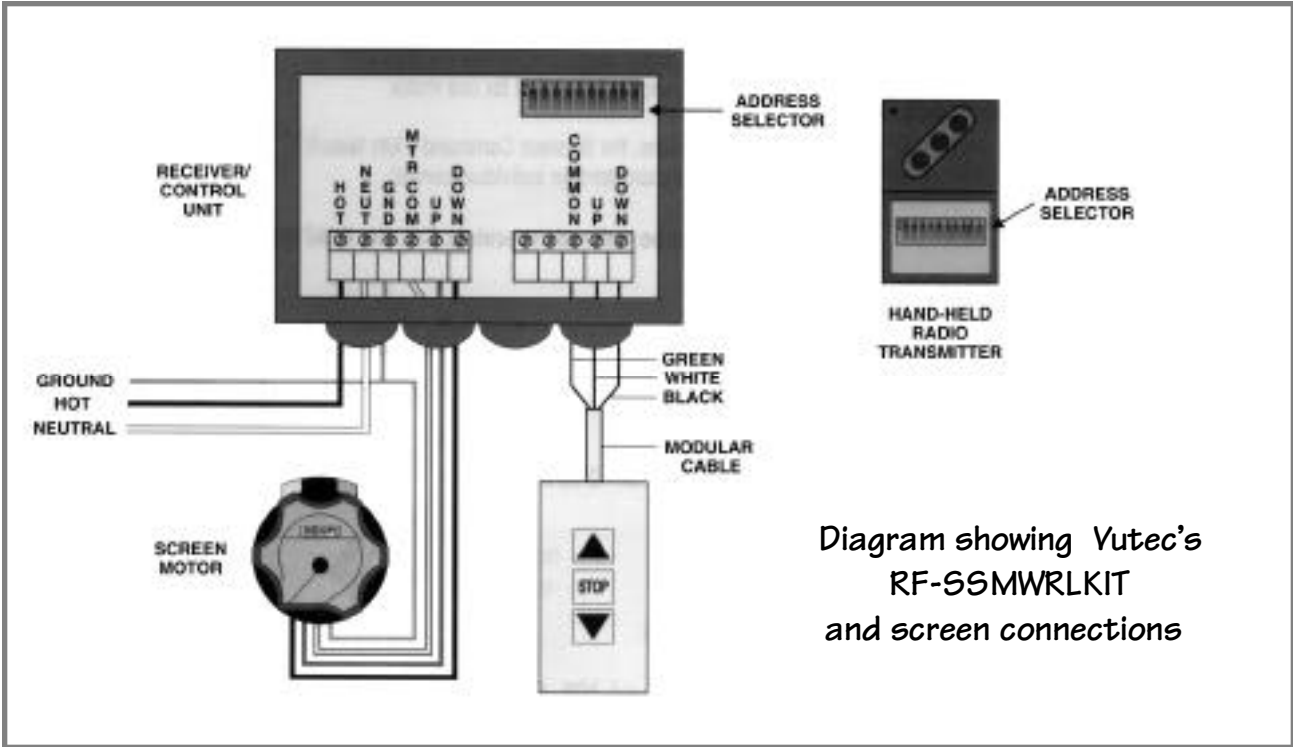
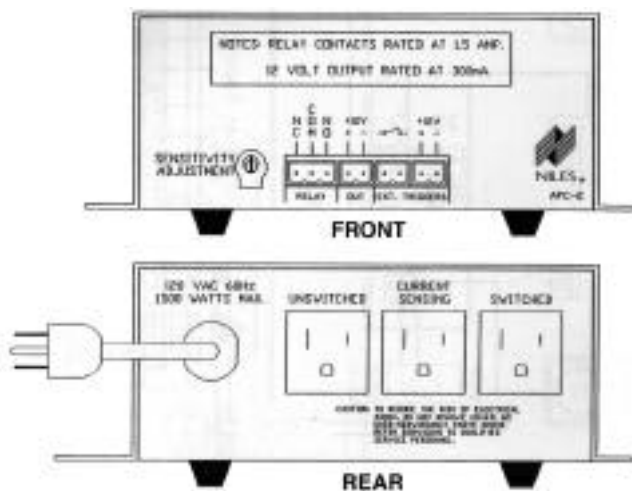
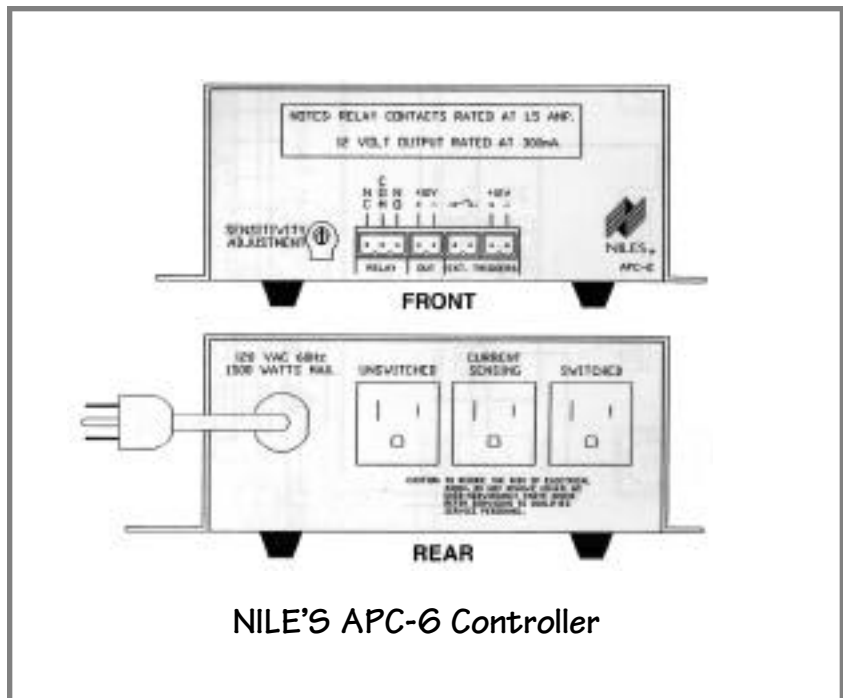
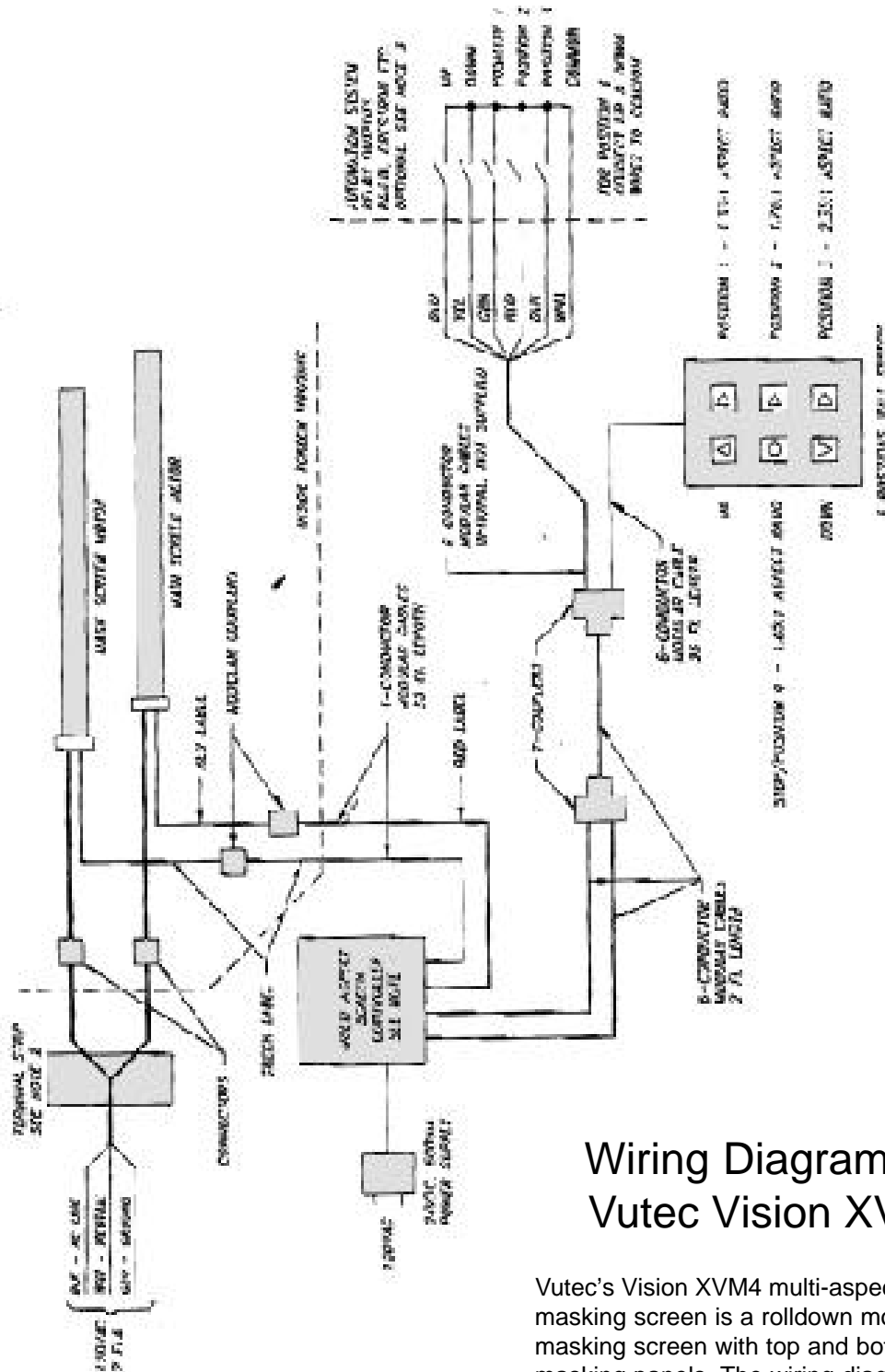


Diagram showing Vutec's RF-SSMWRLKIT and screen connections

## Screen Control Via Current Sensing Devices

Niles Audio Corporation offers several devices to facilitate the control of projection screens and powering up of home theater systems. Their APC-6 Controller is one of their most popular. As the diagram below illustrates, the APC-6 senses the current draw from a connected component (the projection monitor, in this case) and powers up the rest of the system. Niles Audio components are sold through their nationwide network of dealers.





## Wiring Diagram For Vutec Vision XVM4

Vutec's Vision XVM4 multi-aspect ratio masking screen is a roll-down motorized masking screen with top and bottom masking panels. The wiring diagram above illustrates how the dual motor masking system connects to the control modules.

## X-10 Screen Control

**X**-10 is a language whereby commands, like "lower screen", are sent to electronic devices over standard electrical wiring. Each device on a X-10 network resides at a specified "address" and a command can tell a single device, or group of devices, to switch on or off. Managing the signals traveling through your wiring network are controllers and modules, the core components of a X-10-based control system.

The controllers come in a variety of flavors from many manufacturers including the developer of X-10 technology, X-10 (USA). Languages like X-10 are commonly called powerline carrier, or PLC, technologies. One of the most basic controllers on the market is the X-10 Mini-Controller, a table-top unit that accommodates up to four separate device codes. Several devices can be set to the same address code, so the unit can actually control more than four devices.

There are a variety of X-10 modules available. Regardless of the module type, each device gets its own address, which you set with a screwdriver on the X-10 module. Multiple devices can share the same address, if they're all supposed to be operated together. For instance, you can have the same address on the "down" motor on an electric screen and various lights in a home theater room. That way, when you push the key for "screen down, let's start the show", the screen will lower and the show lights will dim.

X-10 addresses are easy to set: You can choose a specific "House" code (A-P) and "Unit" code (1-16), for a total of 256 possible addresses. Alight in the room might be set to A1. The electric drapes might be G15. Each pushbutton on



X-10 Appliance Module

a controller is set up to correspond with the addresses you've assigned to your devices. When the module hears

its command code, it "wakes up" and listens next for a function command like on or off, or dim or brighten. (Some controllers also include an "all units on" command and "all units off" command.) This allows you to control several devices in the room with a single key press.

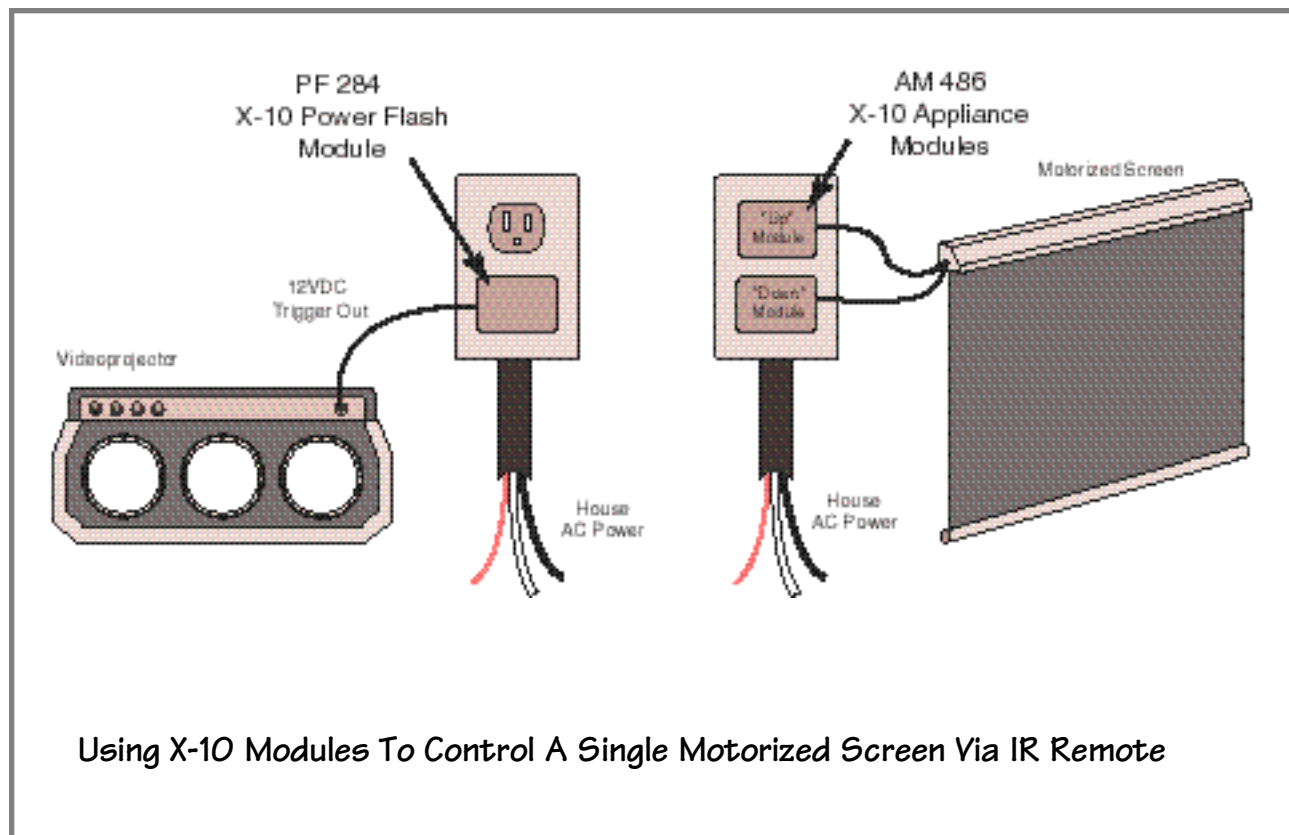
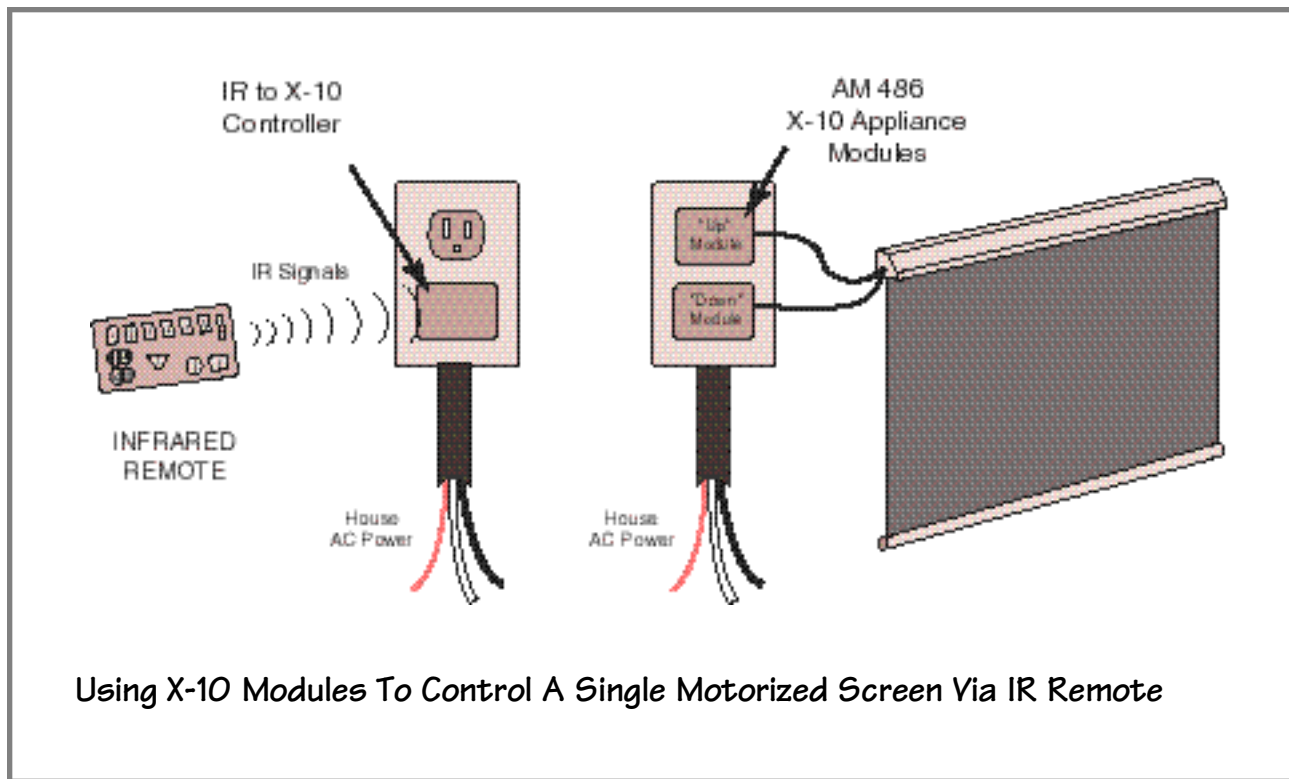
With the addition of other interfaces you can make your X-10 system communicate with non-X-10 devices like the DC screen trigger output of a video projector. The PF284 Powerflash module enables an X-10 system to receive and react to "relay" signals from a voltage source such as this.

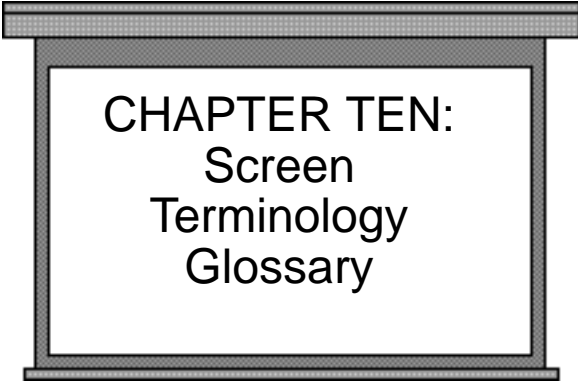
### X-10 Who to Call:

Advanced Services Inc.	800-263-8608
Compco Engineering	615-436-5189
Home Automation Systems	800-367-9836
Home Controls, Inc.	800-266-8765
Home Intelligence Corp.	619-538-4235
JDS Technologies	800-983-5537
Leviton Manufacturing Co.	800-323-8920
Powerline Control Systems	800-526-0027
Worthington Distribution	800-282-8864
X-10 (USA) Inc.	201-784-9700

On the Internet:  
 The X-10 FAQ (Frequently Asked Questions)  
<ftp://ftp.scruz.net/users/cichlid/public/x10faq>  
 X-10's site: [www.X10.com](http://www.X10.com) [comp.home.automation](http://comp.home.automation)

IR interfaces are also available that add infrared control of X-10 devices. These interfaces include the IR Xpander from JDS, HomeVision from Worthington Distribution, IR Master from Dancraft, IR Mini from X-10, and Universal IR Controller from Compco Engineering.





## CHAPTER TEN: Screen Terminology Glossary

**Ambient Light:** The light in a viewing room produced by sources other than the screen

**Aspect Ratio:** The numeric relationship between a screen's height and width. Generally speaking an aspect ratio defines a "shape".

**Black Drop:** On a rolldown flat screen this is the area that is black on the top or bottom of the picture areas.

**Brightness:** A viewer's subjective response to a display's luminance

**Contrast ratio:** The numeric relationship between the brightest and darkest portions of a video display. It is generally expressed in foot-lamberts as a ratio of max/min.

**CRT:** Cathode ray tube, a vacuum tube where electrons are drawn to phosphor targets via high voltage potentials. This is the technology behind standard "picture" tube-type televisions.

**DLP:** Digital light processor, a technology based on the Texas Instruments DMD micromirror imaging chips. These chips have a field of reflecting mirrors that can be modulated to produce video images.

**Foot-Lambert:** A unit of luminance equivalent to 1 lumen per square foot.

**Fresnel Lens:** A device constructed of a large number of closely spaced concentric circles cut into an optical surface. The circles are cut so that they reduce the incident bend angles of the projection source and collimate the light into one beam.

**Gain:** A measurement of the amount of light radiating perpendicularly from a screen. Unity gain (a gain of 1) is generally standardized via a block of magnesium carbonate.

**LCD:** Liquid Crystal Display, a technology of video display that uses liquid crystal "shutters" to modulated the light passing through the imaging chips. Also referred to as "Transmissive LCD technology".

**Lens Speed:** The ability of a lens to pass light. Expressed in a ratio, it is the focal length of the lens divided by the effective diameter of the lens. A fast lens passes more light and gets a lower rating.

**Lumen:** The quantity of visible light falling on a 1 square foot surface of a sphere 1 foot in radius as radiated by a source of 1 standard candle. This specification is often used to rate the light output of video projectors. Look for ANSI lumen ratings, it is a standardized measurement.

**Luminance:** The brightness of a light source measured in foot-lamberts.

**Pixel:** A picture element. On digital devices, images are usually constructed of pixels fields divided into rows and columns.

**Resolution:** The limit of a display's ability to present fine detail. "Optical resolution" is usually the number of lines seen, "video resolution" is usually the number of "line pairs" seen.

**Scan Lines:** A CRT-based video display creates images by rapidly sweeping electron beam across a phosphor target. As these lines are swept from top to bottom they create scan lines.

**Throw Distance:** The distance from the screen surface to a video display device. This is an important number used in the installation of a video display.

**Viewing Angle:** An angle that specifies a particular viewing location measured from a perpendicular from the screen surface.



NOTES: