

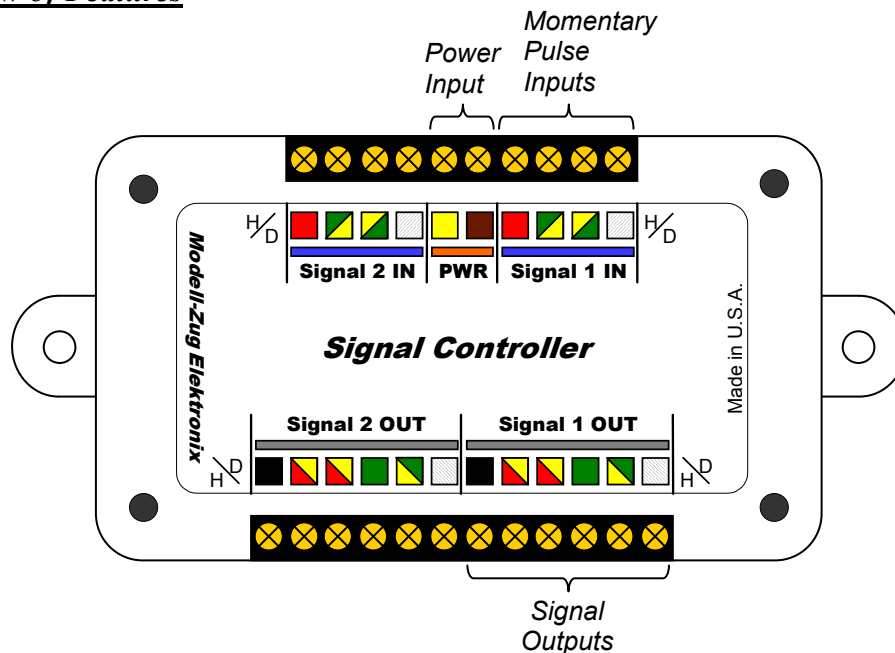


# Signal Controller

## 1. Introduction

Thank you for purchasing this *Modell-Zug Elektronik* product. The *Signal Controller* was specifically designed to provide universal operation of the color light LED signals produced by the Viessmann company. The *Signal Controller* allows for direct control of two independent color light signals with up to four aspects each, or one combination signal containing both a home and distant signal on the same mast. The operating mode of the *Signal Controller* is internally configurable to support simultaneous home and distant signal control as well as a Dark Switching function for use with combination signals. This feature allows for prototypical darkening of the distant signal of a combination mast when its home signal is set to a “Stop” aspect. The *Signal Controller* is also equipped with slow aspect changeover characteristics to more accurately reproduce the prototype. All signal aspects are stored in the *Signal Controller* mechanically by means of miniature latching relays, so that they remain synchronous with the layout settings even when the power is turned off. The *Signal Controller* is remotely controllable by a momentary switch box, circuit tracks, or a digital accessory decoder. Please study the following manual in its entirety to gain full utility and enjoyment from this *Modell-Zug Elektronik* product.

## 2. Overview of Features



### Mechanical Specifications

Dimensions: W 5.37 in.; D 2.63 in.; H 1.26 in. (inc. mounting flanges)  
 Weight: 5 oz.

### Electrical Specifications

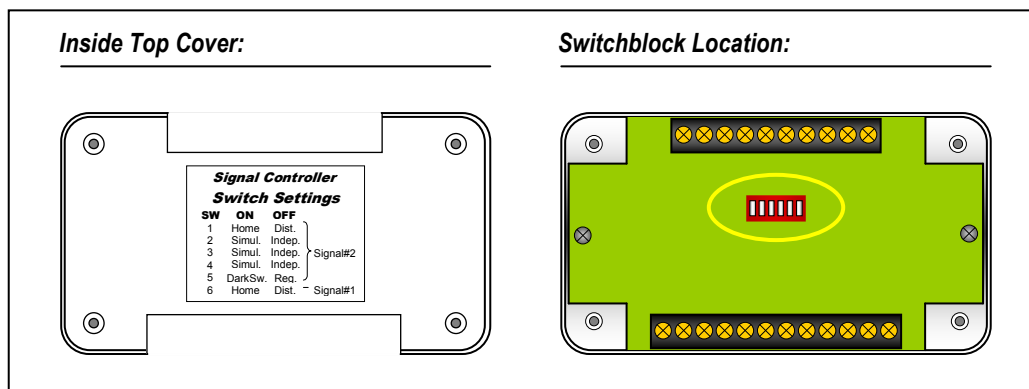
Power Consumption: 1W max. (no input pulse); 1.8W max. (input pulse applied)  
 Power Input Range:  $\pm 22V$  (16VAC) max.  
 Output Current: 11mADC typ.; 24mADC max.  
 Output Voltage: -16VDC typ.; -22VDC max.

### 3. Operating the Signal Controller

#### **MZE** 3.1 Configuring the Operating Mode

The *Signal Controller* was designed with universal operation in mind and is easily configured to accommodate various signal combinations. The configuration is set by a six-position DIP switch located inside the *Signal Controller* housing, and consists of three selectable mode parameters. The first parameter, Home/Distant mode, configures each side of the *Signal Controller* to drive either a home/yard signal or a distant signal. Each of the two sides of the controller may be used fully independently in either Home or Distant mode by setting switches 1 and 6 accordingly. The second parameter, Simultaneous/Independent mode, configures the controller to allow Signal#2 to run simultaneously with or independent from Signal#1 by setting switches 2-4 ON or OFF. The simultaneous operating mode must be used with a home signal connected as Signal#1 and its distant signal as Signal#2, and provides simultaneous control of both signals through the Signal#1 inputs alone. The third parameter, Dark Switching mode, is controlled by switch 5 and is for use with combination signals to prototypically darken the distant signal (Signal#2) when the home signal (Signal #1) indicates a “Stop” aspect (Hp0, Hp00, or Hp0/Sh1). Even in the “darkened” state, the distant signal setting is retained by the *Signal Controller* and it is displayed again when the home signal aspect changes to either “Go” or “Reduced Speed.” The procedure below explains how to properly set each of the configuration parameters using the internal switchblock.

- 1) The top cover must be removed to access the configuration switchblock, which is located inside the *Signal Controller* housing on the electronics board. Remove the four cross-head screws to remove the top cover.

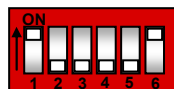


**Figure 1. Configuration Switches**

- 2) Once the cover has been removed, the list of switch functions can be found on the inside of the cover. This is provided for convenience during installation, and is also repeated in Table 1 below:

**Table 1. Configuration Switch Settings**

Switch	ON	OFF	Signal
1	Home/Yard	Distant	#2
2	Simultaneous	Independent	#2
3	Simultaneous	Independent	#2
4	Simultaneous	Independent	#2
5	Dark Switching	Regular	#2
6	Home/Yard	Distant	#1



- 3) Set the configuration switches 1-6 as described in Table 1 for the signal types that will be connected. (Note that use of the Simultaneous mode or Dark Switching mode requires the home signal to be connected as Signal#1 and the distant signal as Signal#2.)



## 3.2 Connecting the Signal Controller

While the *Signal Controller* is capable of controlling a variety of signal combinations, it may also be controlled by several different sources. Each of the Signal IN inputs are activated by a momentary pulse to power ground, similar to a conventional Märklin signal. This can be accomplished remotely using momentary switchboxes, circuit tracks, or digital decoders like the *MZE Decoder Z83/84* or Märklin k83. The Signal OUT outputs connect directly to the various color-coded leads of the signal mast, which are each equipped with a series resistor to protect the LEDs. Depending on which signals are connected, not all of the inputs and outputs may be required. The Signal IN and OUT connections are dual-purpose and are labeled for both home/yard “H” and distant “D” signal control. In general, the connections for home/yard signals are color-coded along the outside, and distant signal connections along the inside of the *Signal Controller* cover. The PWR Input should be connected to a 16VAC (L-O) accessory transformer output to supply power to the controller. The following steps and diagrams illustrate the correct connections for signals and input devices.

### 3.2.1 Connection to Signals:

- 1) Figures 2 and 3 below show the correspondence between the Signal IN & OUT connections of the *Signal Controller* and the indication lamps of each signal type. Note the difference between the input and output connections of the *Signal Controller* for home/yard signals and distant signals. This correspondence is valid for combination home&distant signals as well.
- 2) The control leads of each signal mast are color-coded, however some signals contain multiple leads of the same color. To determine the R1 lead from the R2 lead on a 4-aspect Home Exit signal, for example, briefly connect each red lead individually along with the black lead to the accessory (L-O) output of a standard Märklin transformer. The same process applies for distant and combination signals.
- 3) Depending on your application, the signal(s) may be connected to the *Signal Controller* in any method shown in Figures 2-5 as described in steps a-c below:
  - a) If you wish to control one, or two signals completely independent of each other, the connection diagrams shown in Figures 2 and 3 below may be used for any one or two Home, Yard, or Distant signal(s). The Home/Distant mode configuration switches for each side of the controller must be set accordingly.
  - b) To control a home and distant signal pair simultaneously, follow the connections shown in Figure 4 below. The configuration switches must be set as shown in Figure 4 for the Simultaneous operating mode to function correctly. Input control should be provided through the Signal#1 IN connections only, this will control both signals at the same time.
  - c) Control of a combination signal with Dark Switching of the distant indicator requires the connections shown in Figure 5 below. The configuration switches must also be set as shown in Figure 5 for correct operation. (Note that the two signals are operated independently since the distant signal indicates the aspect of the next home signal, and not the home signal on the combination mast.)

### 3.2.2 Connection to Input Devices & Power Supply:

- 4) To control the signal aspect settings, the Signal IN inputs must be connected to a momentary switchbox, circuit tracks, or a digital accessory decoder. Each input may be connected to a different type of device since they are all independent from each other. For example, Signal#1 IN Red may be controlled by a circuit track, while Signal#1 IN Green is controlled by a switchbox, and Signal#1 IN Yellow is controlled by a digital decoder. Follow the diagram in Figure 6 below to connect the appropriate input devices to the *Signal Controller*.
- 5) The *Signal Controller* PWR input must be connected to a 16VAC power source, such as the L-O (Yellow-Brown) output of a standard Märklin transformer, as shown in Figure 6 below. A separate lighting/accessory transformer is recommended for larger layouts to provide proper power division between trains and accessories. The PWR input connection polarity is very important since the input devices must be switched to the same voltage as the *Signal Controller* power supply ground terminal (○).

### 3.2.3 Verify Connections

- 6) Once all of the connections have been completed and verified, apply power, and check that all functions work properly. Enjoy operating the Viessmann color light signals with the *MZE Signal Controller*!

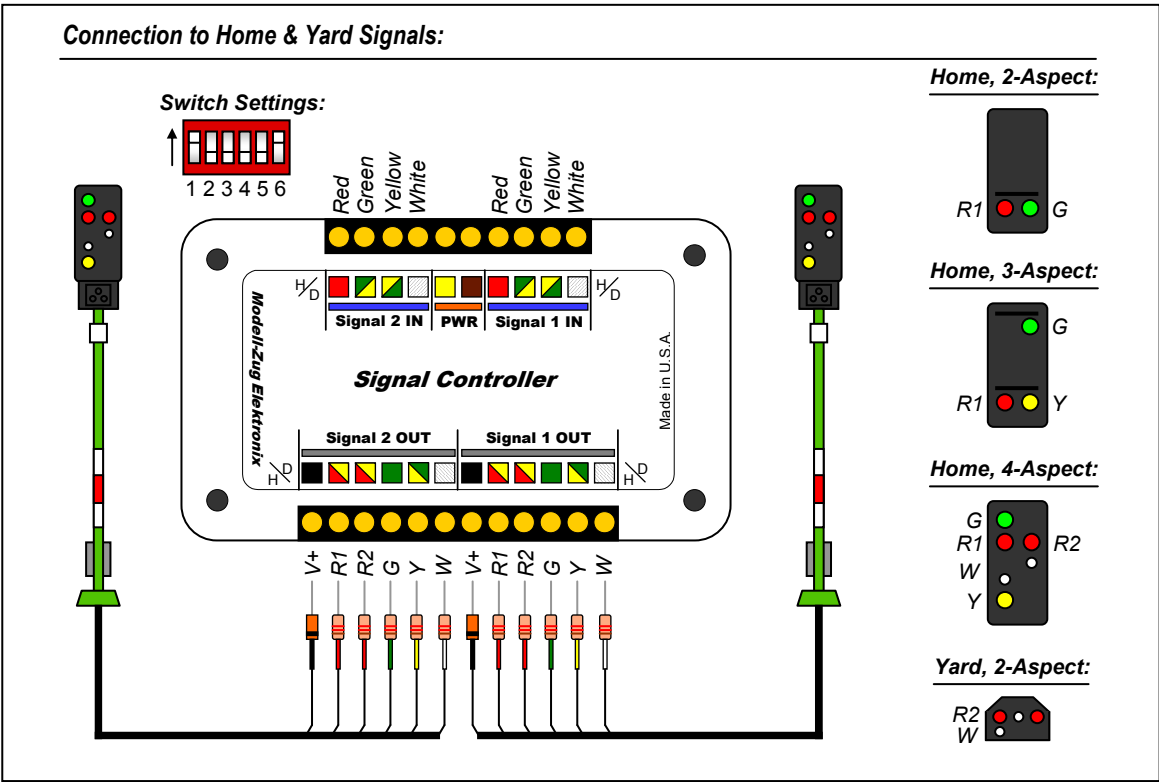


Figure 2. Connections for Home/Yard Signals

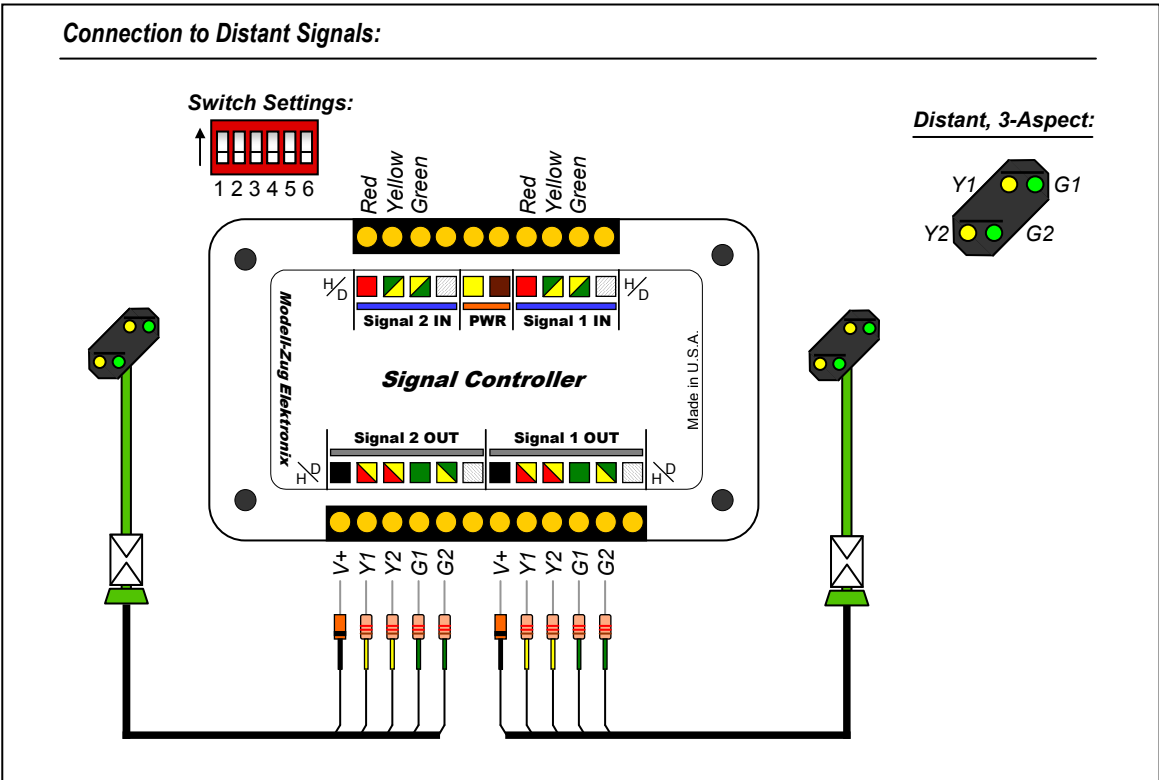


Figure 3. Connections for Distant Signals

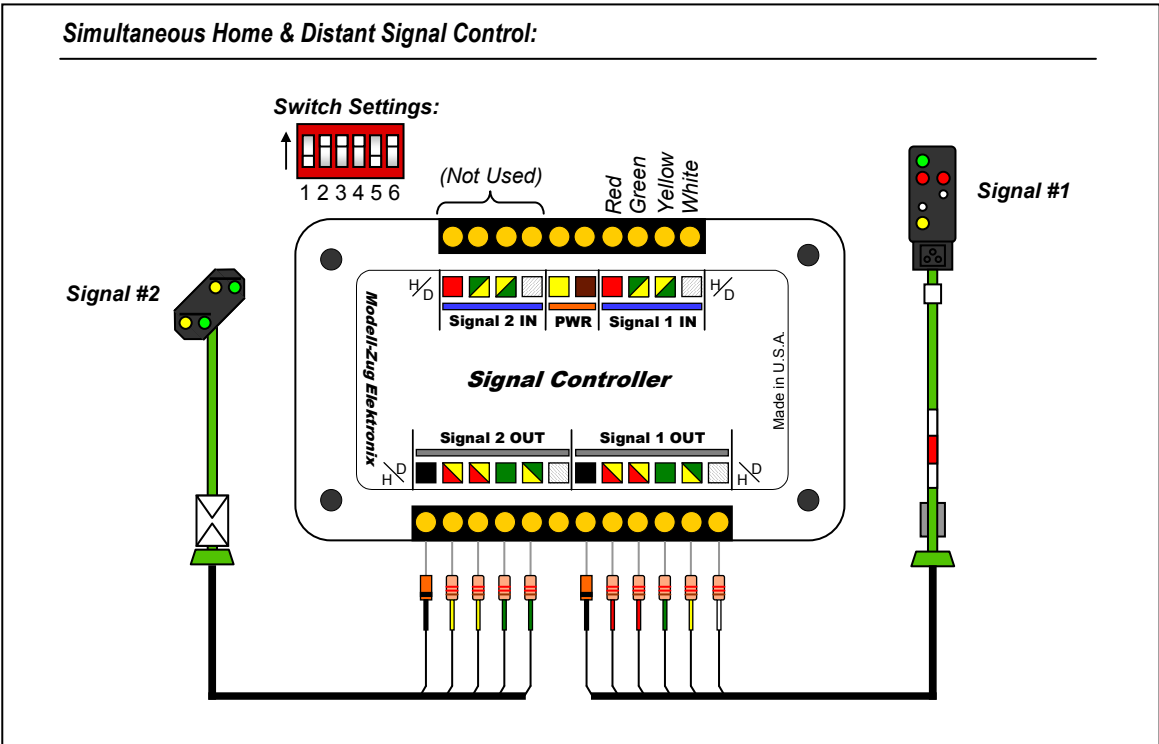


Figure 4. Connections for Simultaneous Control

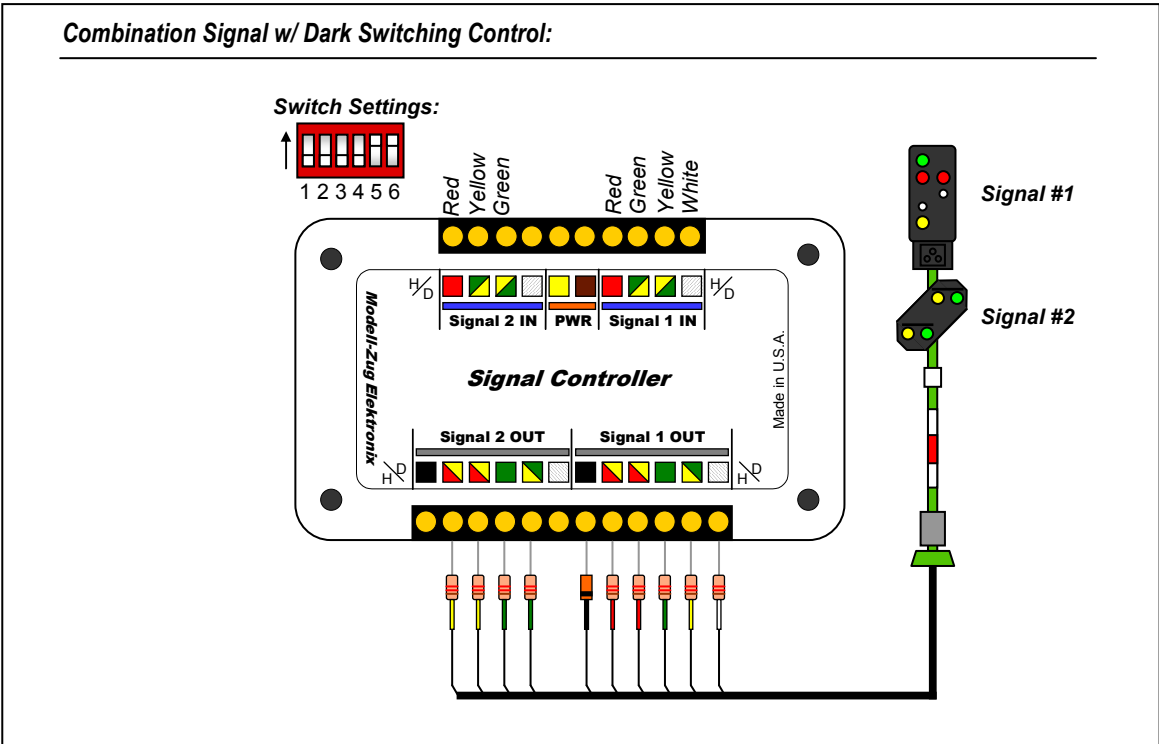
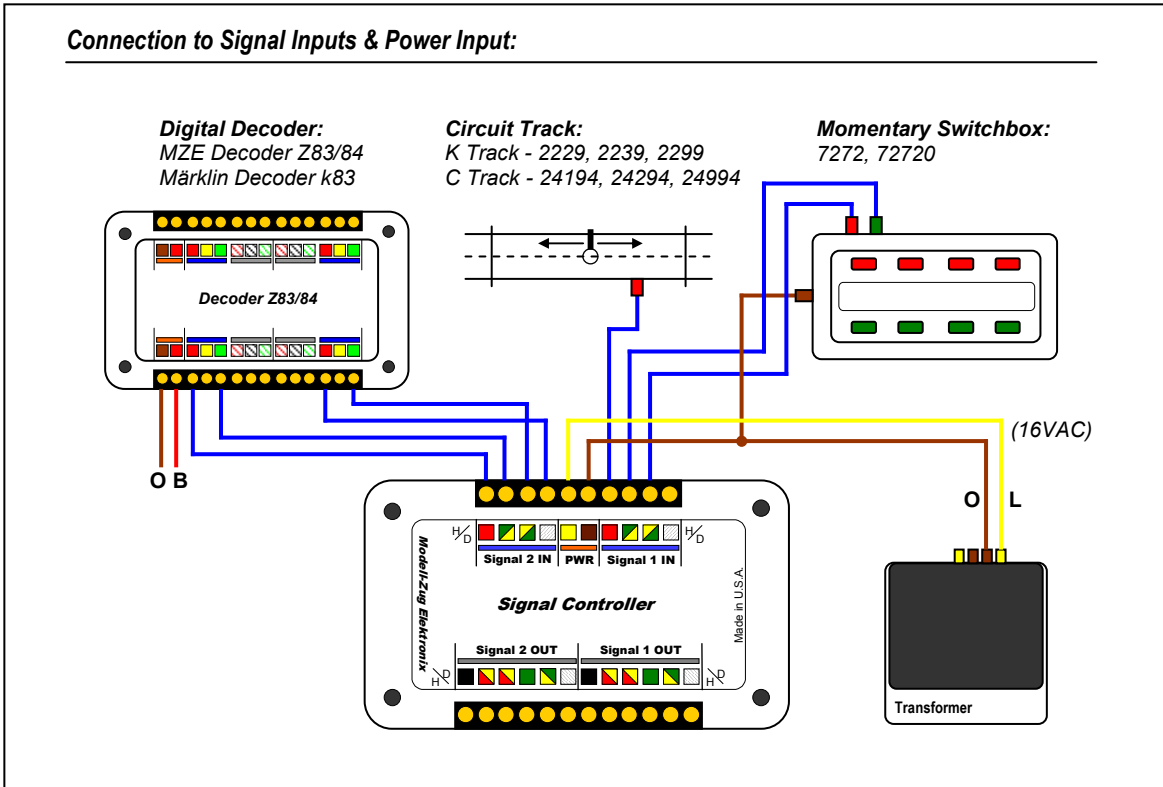


Figure 5. Connections for Combination Signals



*Figure 6. Input Connections*