WIRING INSTRUCTIONS FOR HENRY SIGNS CONCERNING THE JOHN HANCOCK SIGN

Enclosed are the steps to a successful install of this project

ALDOR
Electronic Services
2961 Industrial Rd.
Ste. #212
Las Vegas, NV 89109
ph: 702-631-3400
fx: 702-631-3401
email: aldor@coam.net
web: www.aldor.net

On the following pages you will find all of the information necessary to wire the John Hancock sign.

While we could dazzle you with complicated schematics and wiring lists to accomplish this task we find our customers are able to better understand the wiring concept using the following information

1st: Don't Panic!

Alan Dorman, the engineer of this project, is available 24/7 to answer any questions you may have. You may reach him at 702-631-3400, his cell is 702-271-1859.

2nd: Common terms

ALDOR uses the following terms.

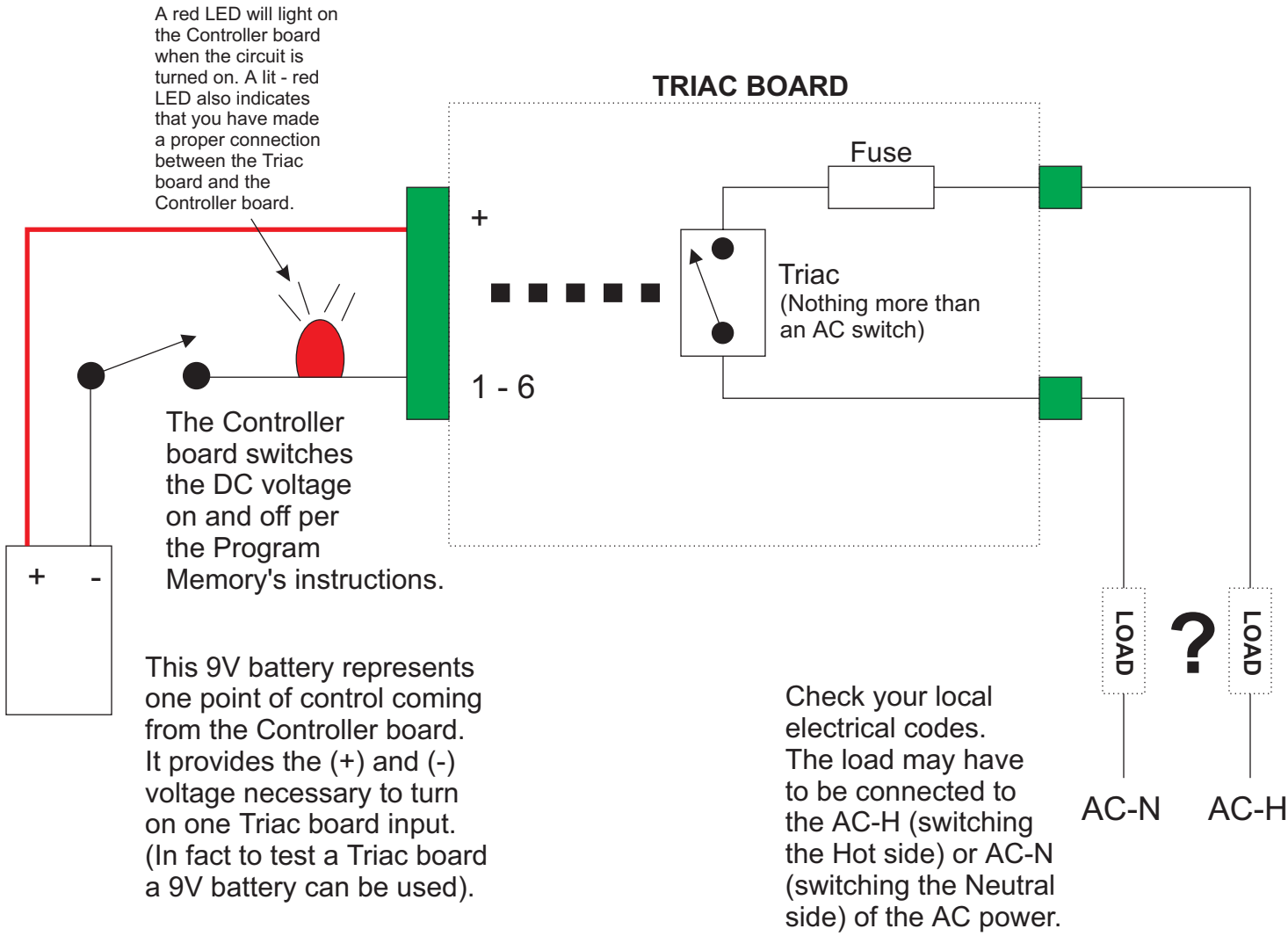
a. **AC Neutral or Return, AC Hot, AC Ground**
The three AC lines of power supplied to the sign.

b. **Phase 'A', Phase 'B', Phase 'C'**
On larger projects the AC power may be split between three phases.

c. **Point**
The common term for one line of control coming from the controller board whose program chip directs this output to turn on and off at the right time. A point also refers to the layout of the signs loads. A point of AC control may consist of a quantity or grouping of lamps that are controlled by one triac on the triac board.
For example one point of the controller board will turn on one triac on a triac board to turn on 36 25 Watt lamps around the border of the sign.

d. **Programming Work Sheet**
The work sheet the sign company uses to layout the points of animation on a sign. The programmer will use this sheet to write the software for the sign. Using this worksheet alone the wiring for the entire sign can be accomplished once the basics of ALDOR Controllers and Triac Boards is understood.

e. **Program Memory**
This chip contains the program that defines the animation the Controller boards sequences to make the loads on the sign turn on and off at the correct time. This chip is also called a EPROM (ee-prom). Each chip will have a program name on it. When a sign contains multiple Controller boards each Controller board will have it's own unique program name. It is important to follow the instructions of the programmer for wiring the Controller boards at the proper places in the sign. Otherwise the animation will be out of sequence.



The programmer will provide a Programming Work Sheet or a Points Layout sheet as a wiring guide for the sign. As can be seen in the above diagram a (+) and (-) are needed for each input of the Triac board in order to turn the triac on. On both the Controller and Triac boards the (+) connection is common every six points so it is not necessary to wire six (+) lines from the Controller board to the Triac board. The Triac is nothing more than a AC switch that turns on and off when it gets a signal from the Controller board. There is a fuse on one side of the triac. Some electrical codes require that the AC-H side of the AC line be fused, others require the AC-N side. Placement of the load is also determined by local codes.

By following the instructions on the Data Sheets provided for each of the boards a properly connected Controller and Triac board can be realized with minimum effort.
It's nothing more complicated than providing a (+) and (-) DC voltage to the Triac board to switch on a AC load. 4 wires, that's all.

3rd: Install the boards into their enclosures

Use the Enclosure Calculation Sheet to construct the enclosure for the boards. This sheet also provides guidelines on how to mount the boards into the enclosure properly.

DO NOT UNWRAP THE BOARD FROM IT'S PROTECTIVE WRAP UNLESS YOUR NEXT STEP WILL BE MOUNTING IT INTO THE ENCLOSURE.

Lay the board against a piece of thin cardboard taped to the back wall of the enclosure. Mark your holes, screw in the spacers, then mount the board.

SOME COMMON PRECAUTIONS:

Any exposed electronic board or component can be damaged by static electricity. It is good practice to touch the person you are passing the board to before they touch the board. Also touching the enclosure before installing the board will neutralize any static voltage potential that may exist. Chips require the same care and the metal case of any large capacitor on the board should be touched before installing, or removing a chip.

Always make sure that all power has been removed from the board before servicing it. Never ASSume that power has been removed until you test it with a reliable volt meter.

Never lay a powered up board onto a metal surface while power is applied to it.

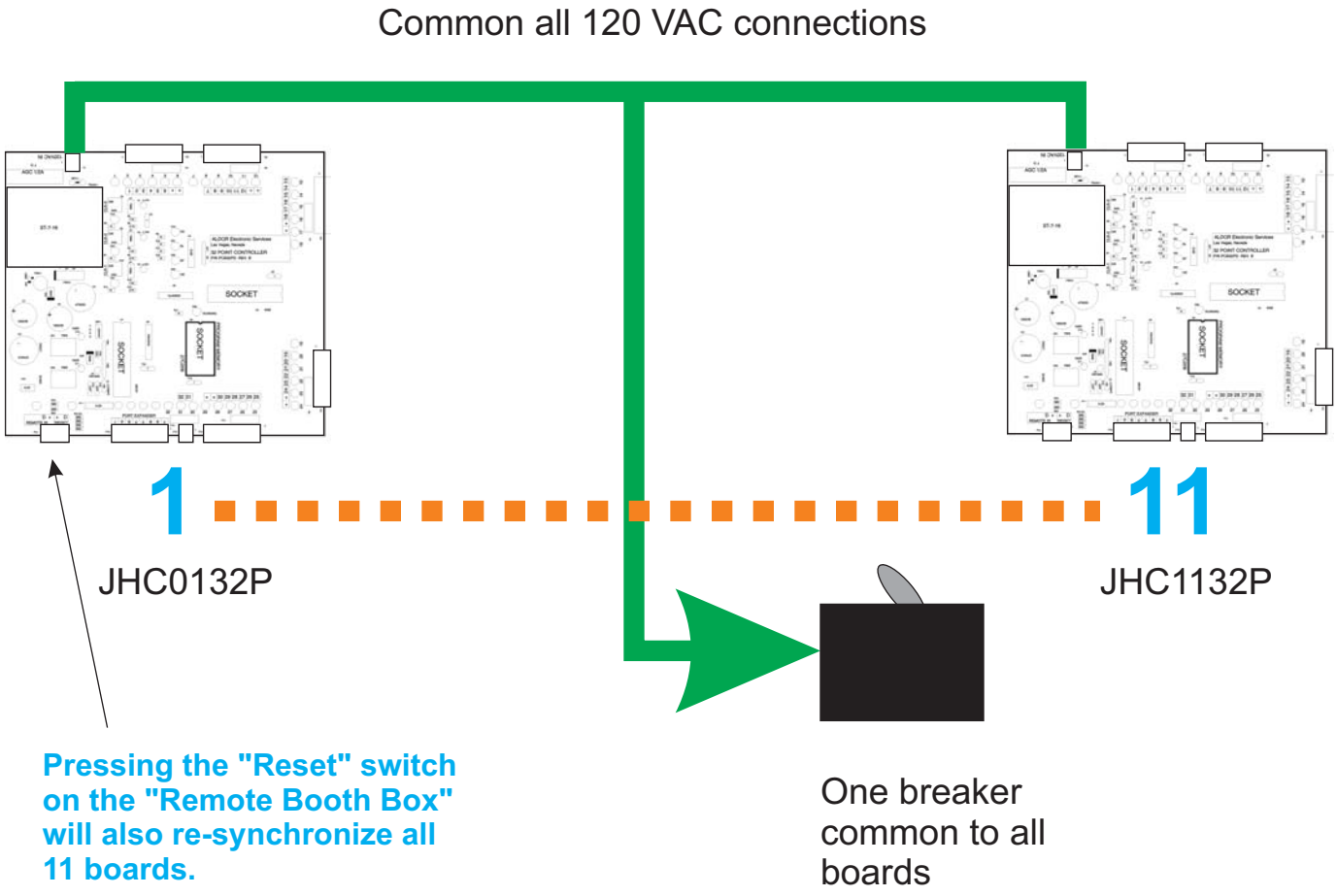
THERE ARE 11 CONTROLLER BOARDS FOR THIS PROJECT. EACH BOARD HAS A DIFFERENT PROGRAM. LOOK AT THE LABEL ON THE PROGRAM MEMORY CHIP AND PLACE THE BOARDS AT THEIR CORRESPONDING LOCATIONS. USING THE CHART BELOW ALSO MOUNT THE PROPER NUMBER OF 12 POINT TRIAC BOARDS AT THAT LOCATION.

Point numbers:	Program name:	# of points:		Number of triac boards:
1 thru 22	JHC0132P	22	left most quadrant of sign	2
23 thru 52	JHC0232P	30		3
53 thru 63	JHC0332P	11		1
64 thru 95	JHC0432P	32		3
96 thru 110	JHC0532P	15		2
111 thru 139	JHC0632P	29		3
140 thru 165	JHC0732P	26		3
166 thru 192	JHC0832P	27		3
193 thru 222	JHC0932P	30		3
223 thru 254	JHC1032P	32		3
255 thru 279	JHC1132P	25	right most quadrant of sign	3

4th: Wire AC power to the Controller boards

Wire the 120 VAC connections on all of the Controller boards, no matter how far away they may be, to one common AC circuit breaker. Each board draws approximately .25 Amps of AC current when operating.

By turning on all of the boards at once each board will be synchronize with the same start up sequence. Turning off an individual board in a multi-board system then turning it on causes it to be out of sequence with the rest of the boards because it starts back at zero count upon power up.



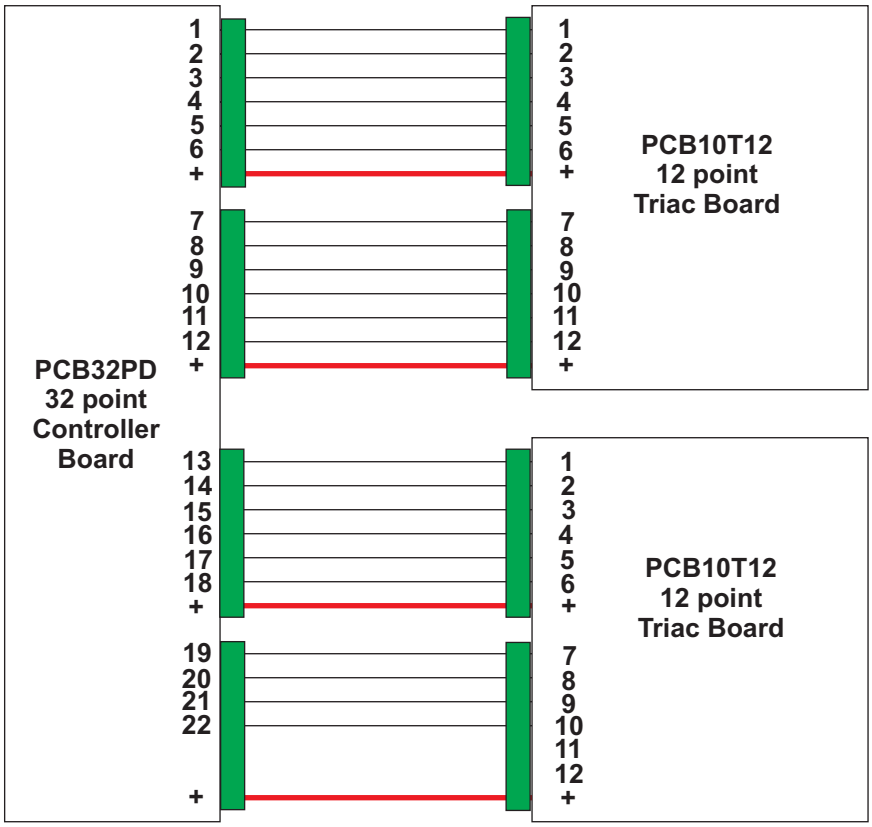
Once the power is applied to the Controller boards the three on-board clock LED's will start flashing. If they are not flashing check the AC power connection and the on board ½ A fuse. By the way: these 3 clocks serve no purpose in the John Hancock sign, a remote clock from the "Remote Booth Box" sequences this sign.

5th: Wire the Controller boards to the Triac boards

CAUTION!
DISCONNECT ALL AC POWER FROM THE SYSTEM BEFORE DOING ANY WIRING ON ANY OF THE FOLLOWING STEPS.

Looking at the Points Layout sheet the amount of points or triacs that will be turned on per controller is shown. For example the JHC0132P controller at location number one (of 11 locations) will be driving 22 points. This will require two Triac boards. All 12 triacs on the first board will be driven while 10 on the second Triac board will be used.

Using type TFFN stranded 18ga. wire (or equivalent) connect outputs 1 through 22 on the Controller board to the triac boards inputs. After all 22 connections are made go back and wire a (+) connection from the Controller board to the (+)'s of the triac boards (4 more wires). All (+) connections on the Controller board are common and any (+) can be used from any of the Controllers connectors to complete the connection.



JHC0132P shown:

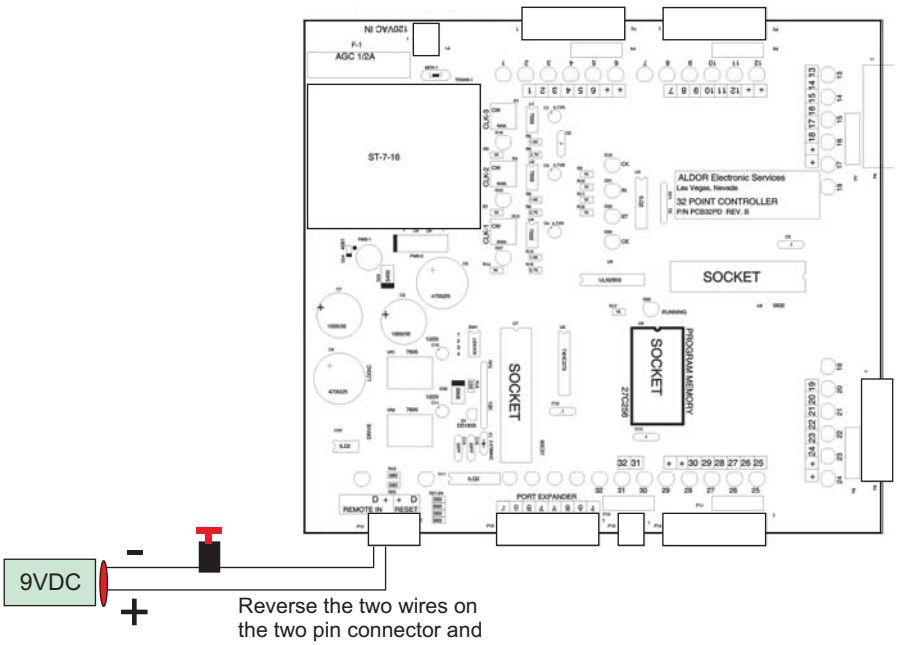
The example at the left shows the wiring for board number 1 of the 11 Controller boards. Looking at the Points Layout sheet it can be seen that 22 points of control (triacs) need to be wired.

Using the Points Layout sheet all eleven 32 point Controller boards can be wired to the correct amount of Triac boards and their corresponding triac inputs.

6th: Test the Controller board to Triac board connection.

Later in these instructions you will be installing the "Remote Booth Box" which will allow the entire sign to be controlled remotely. There are 4 switches on this box. Turning on a switch causes the sign to do a different lighting pattern or animation. By turning on switch number 4 the sign turns on solid and stays on until a different switch is turned on.
Coincidentally the small DIP switch located on each 32 point Controller board will set an individual board to the lighting pattern that would have been set by the "Remote Booth Box". Only the board, whose switches you are setting, will change its pattern. The other 10 boards will not be effected.
Because the "Remote Booth Box" has not been connected yet a clock signal, that normally comes from the "Remote Booth Box" needs to be injected into the "Remote In" of connector P12.

TURN ON ONLY SWITCH 4 ON THE 32 POINT CONTROLLER AND USE THE 9 VDC BATTERY AND 2 PIN CONNECTOR TO INJECT THIS CLOCK. PLUG THE 2 PIN CONNECTOR INTO THE 2 PINS CORRESPONDING WITH THE "D" AND "+" OF THE REMOTE IN CONTACTS OF CONNECTOR P12. PRESS THEN RELEASE THE PUSHBUTTON SWITCH TO INJECT ONE CLOCK PULSE INTO THE 32 POINT CONTROLLER. IF THE CONTROLLER CONNECTIONS TO THE TRIAC BOARD ARE CORRECT ALL OF THE RED LED LAMPS, UP TO THE POINT COUNT FOR THIS LOCATION, WILL LIGHT UP AND STAY LIT. ENSURE ALL BOARD SWITCHES ARE OFF BEFORE MOVING ON TO THE NEXT BOARD.



Reverse the two wires on the two pin connector and use it to reset the board by plugging it into the other side of P12, the 4 pin connector.

If groups of lights do not light make sure that the (+) was connected properly.

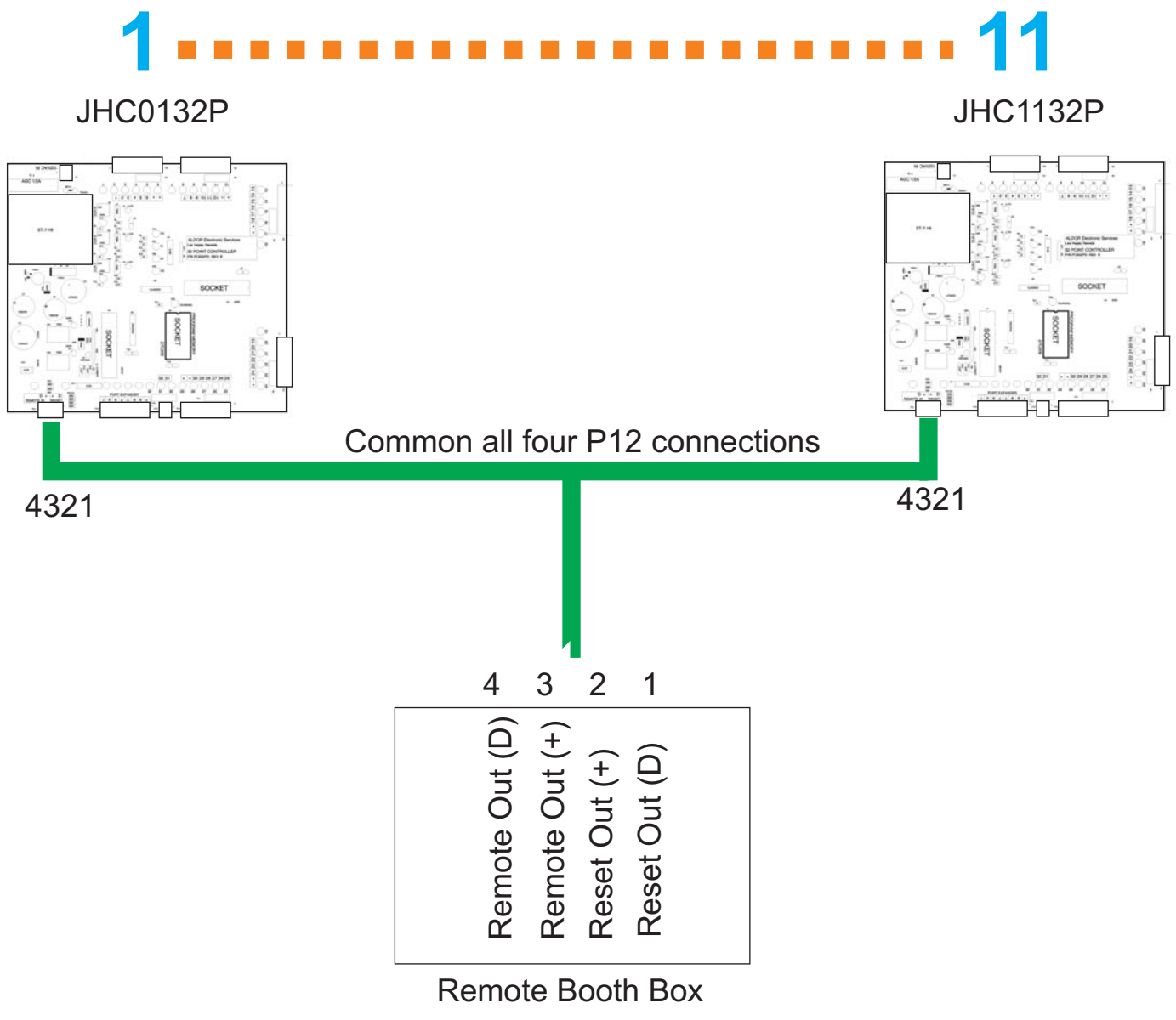
If an individual LED does not light check the numbered connection corresponding to the LED.

To confirm that the "Opto Triac Switch" chip on the triac board is not bad swap it with a known good one.

If you suspect the output of the Controller board is bad verify that the rest of the connection is good by connecting a different Controller output to the line.

7th: Wire the "Remote In" and "Reset" connector plugs.

Connector P12 on all of the Controller boards should be wired together, in parallel, and be ran to a common connection box. This will be the point where the cable that runs from the "Remote Booth Box" enters and is also connected. Identify the four wires used on this 4 conductor run. You will need to connect these wires to the proper pins on the "Remote Booth Box".



8th: Test the "Remote In" and "Reset In" connections back to the booth.

A couple of two-way radios would help here.

Before connecting the 4 leads coming from the Controller boards to the "Remote Booth Box" perform the following test to ensure that all wires are connected correctly.

No AC power need to be applied to the Controller boards during this test.

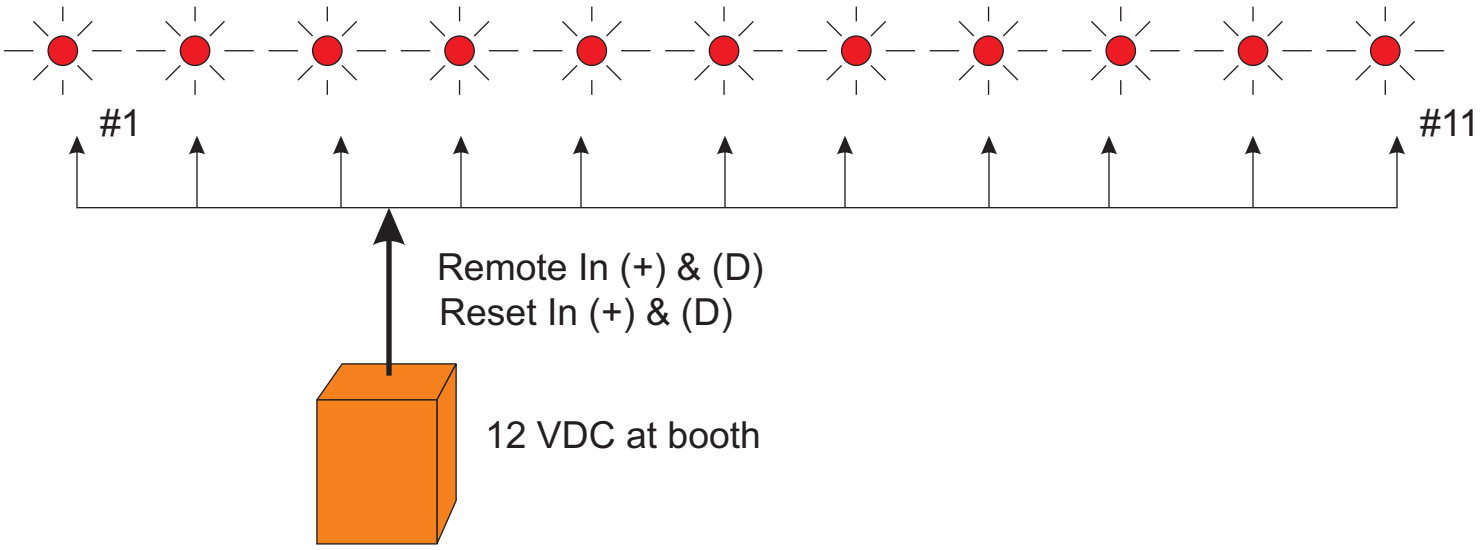
Using a 12 VDC lantern battery connect its positive terminal to BOTH the "Remote In" and "Reset In" (+) wires of the booth end of the cable.

Next touch the "D" of the "Remote In" wire to the negative terminal of the battery.

Each of the 11 red "Remote In" LED lamps on the 11 Controller boards should light.

Perform the same test on the "Reset In" line running to the booth.

Verify that all LED lamps light as predicted. Check your wiring to see if there are any errors. Use the 9 VDC battery and 2 pin assembly to verify that the LED lights when voltage is applied directly to it. If it does then the wiring to the "Remote Booth Box" is incorrect.

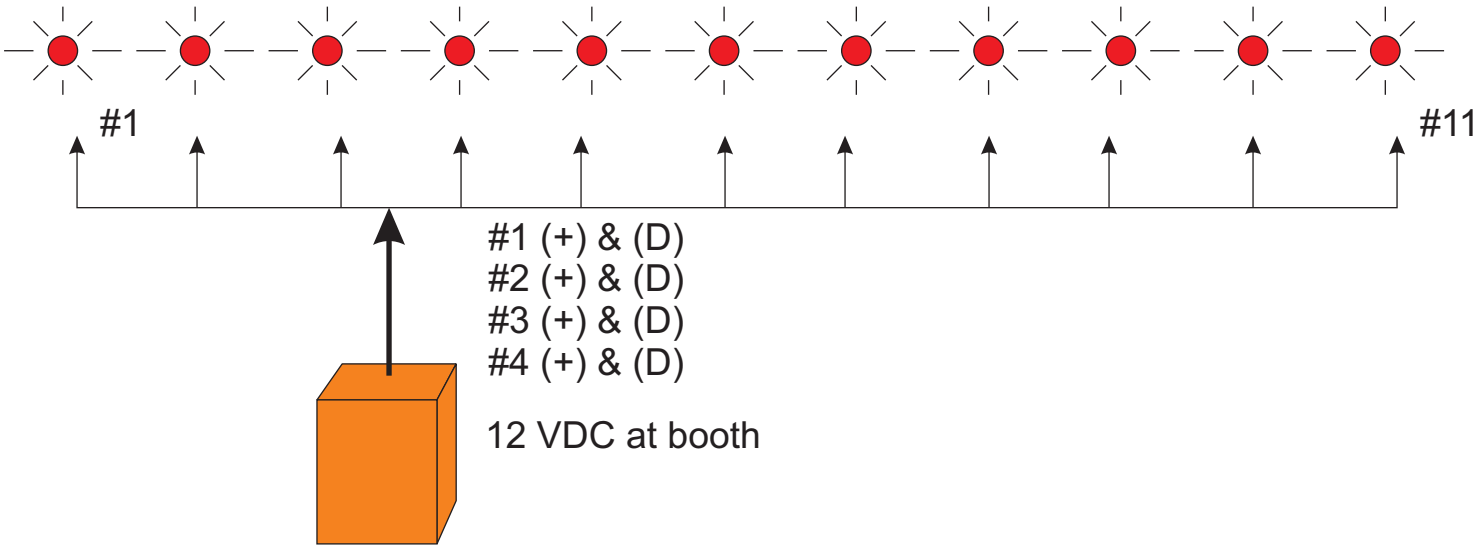


9th: Connect the Port Expander plugs in parallel and run to the booth.

Refering to Step 7 parallel the 8 connections at each Controllers "port Expander" plug (P15) and connect to the cable that runs to the booth.

Using step 8 test each pair to verify that the LED's on the controllers light when voltage is applied at the booth with the 12 VDC battery.

Make sure that these wire pairs are clearly marked so they can be connected to the "Remote Booth Box" later on.



This concludes the remote wiring for the main sign and the 11 Controller Boards.
Next the Base Ball and Bat sign will be wired.
Two more wires are needed from the "Remote Booth Box" to the 6 point controller located at the sign.

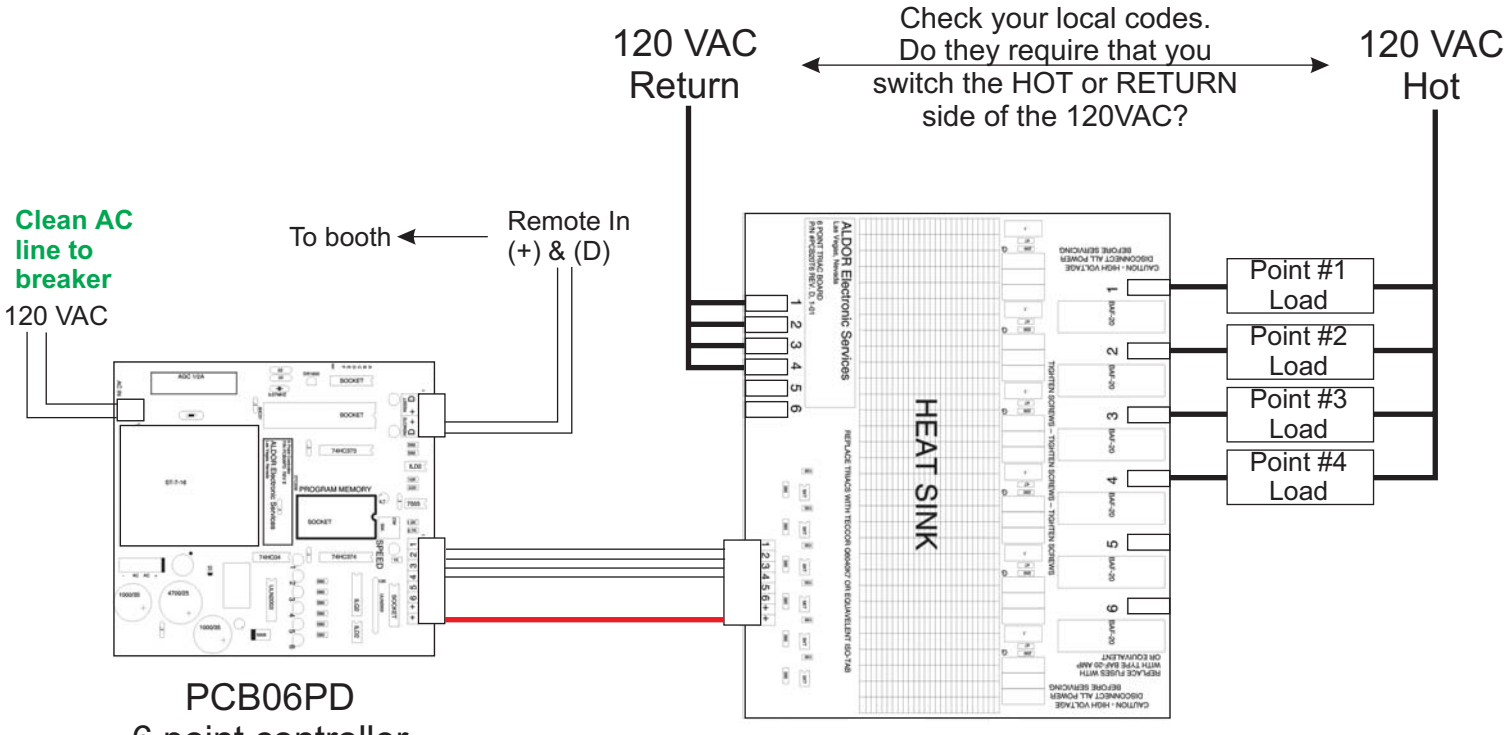
10th: Wiring the bat and ball sign.

Use the "Enclosure Calculation Sheet" to build the enclosure and mount the boards properly.

Four points of control will be animated by the 6 point controller board and the 6 point triac board. The theory of operation is that the sign will remain blank until the "Remote In" of the 6 point controller board receives a 12 VDC signal from the "Remote Booth Box". When this happens the sign will light up - first point 1 then 2 and so on to point 4. It will then turn off till the 12 VDC from the booth is reapplied.

Make sure that you use neon transformers that are designed for flashing circuits as some of the transformers sold have a very sensitive GFI circuit that will trip every time the circuit is turned on and off.

Below is a wiring diagram for this circuit. Once it is wired test the "Remote In" on the 6 point controller at the "Remote Booth Box" location by following Step 8.



PCB06PD
6 point controller

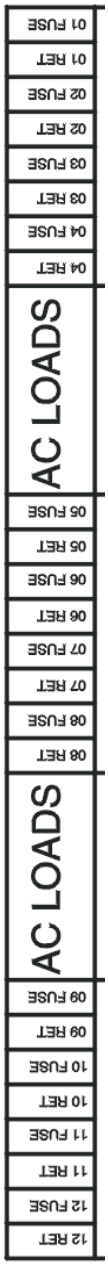
PCB20T6
6 point triac

Program Name
JHCBBAL

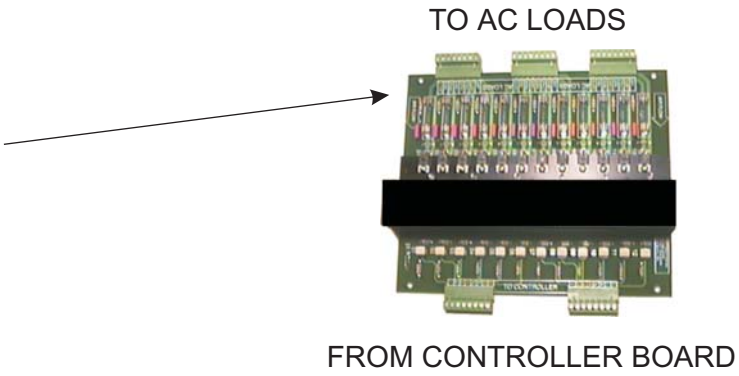
11th: Wiring the AC loads to the triac boards.

Using the "Points Layout Sheet" wire the lamps in the sign to the proper outputs of the triac board. All common AC connections to the board should be connected off board. There should be only one wire per connector pin on the board. Refer to Step 6 to test the connections to the loads, turn on the controller and see if the loads light.

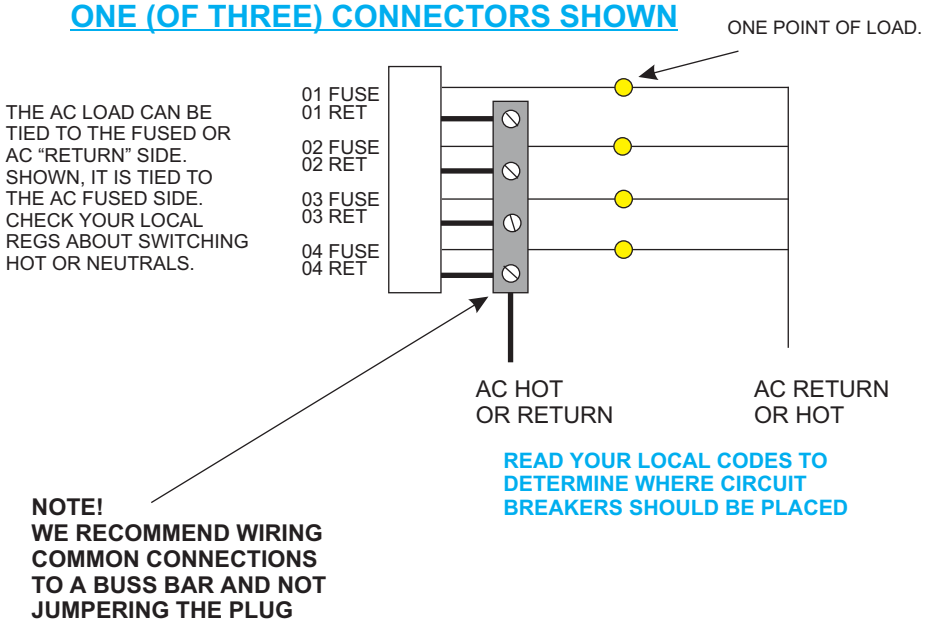
HOW TO WIRE AC LOADS TO THE 12 POINT 10 AMP TRIAC BOARD



The output edge of the PCB10T12 triac board showing the markings on the board which identify the outputs that are to be wired.



Connect AC loads and power using type THHN 10 or 12 gage stranded wire.



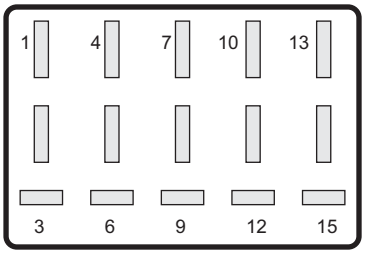
12th: Wiring the "Remote Booth Box".

By now it should be obvious that ALDOR has designed it's products to be as simple and uncomplicated as possible. The triacs turn on by completing a simple two wire circuit from the controller. The controller gets controlled remotely with those same simple circuits. A (+) and a (-) minus or (D) is all that is needed to make something happen.

The "Remote Booth Box" consists of a 12 VDC power supply, some switches to turn on the controllers Remote and Reset In to control the entire sign remotely. There is also a controllable rate flasher circuit that is used to set the rate of the signs animations.

All of these connections enter the "Remote Booth Box" through a 15 pin connector that plugs into the side of the box. The connector has been pre-wired and labeled and you can terminate its pigtail into a junction box where the cable from the sign enters.

The pinout, looking into the side of the box, is shown below. And below that is the wiring guide.



REMOTE BOOTH BOX	PIN #	REMOTE CONNECTION
SWITCH #1	1	PORT EXPANDER P15 PIN 7 (1D) 32 PT CONTROLLERS
SWITCH #2	2	PORT EXPANDER P15 PIN 6 (2D) 32 PT CONTROLLERS
SWITCH #3	3	PORT EXPANDER P15 PIN 3 (3D) 32 PT CONTROLLERS
SWITCH #4	4	PORT EXPANDER P15 PIN 2 (4D) 32 PT CONTROLLERS
CLOCK #1	5	REMOTE IN P12 PIN 4 (D) 32 POINT CONTROLLERS
RESET #1	6	RESET IN P12 PIN 1 (D) 32 POINT CONTROLLERS
BALL #1	7	REMOTE IN OF 6 POINT CONTROLLER (D)
NO CONNECTION	8	N/C
ANY +	9	PORT EXPANDER P15 PIN 8 (1+) 32 POINT CONTROLLERS
ANY +	10	PORT EXPANDER P15 PIN 5 (2+) 32 POINT CONTROLLERS
ANY +	11	PORT EXPANDER P15 PIN 4 (3+) 32 POINT CONTROLLERS
ANY +	12	PORT EXPANDER P15 PIN 1 (4+) 32 POINT CONTROLLERS
ANY +	13	REMOTE IN P12 PIN 3 (+) 32 POINT CONTROLLERS
ANY +	14	REMOTE IN P12 PIN 2 (+) 32 POINT CONTROLLERS
ANY +	15	REMOTE IN OF 6 POINT CONTROLLER (+)

WIRING COLORS FOR REMOTE CONNECTION PLUG

REMOTE BOOTH BOX	PIN #	WIRE COLOR
SWITCH #1	1	GREEN / WHITE
SWITCH #2	2	YELLOW
SWITCH #3	3	WHITE/BLUE/RED
SWITCH #4	4	WHITE/BLACK
CLOCK #1	5	ORANGE
RESET #1	6	RED/BLUE
BALL #1	7	BLACK
NO CONNECTION	8	N/C
ANY +	9	THE SAME RED WIRE FOR 9-15
ANY +	10	
ANY +	11	
ANY +	12	
ANY +	13	
ANY +	14	
ANY +	15	

13th: Testing the "Remote Booth Box" wiring to the boards.

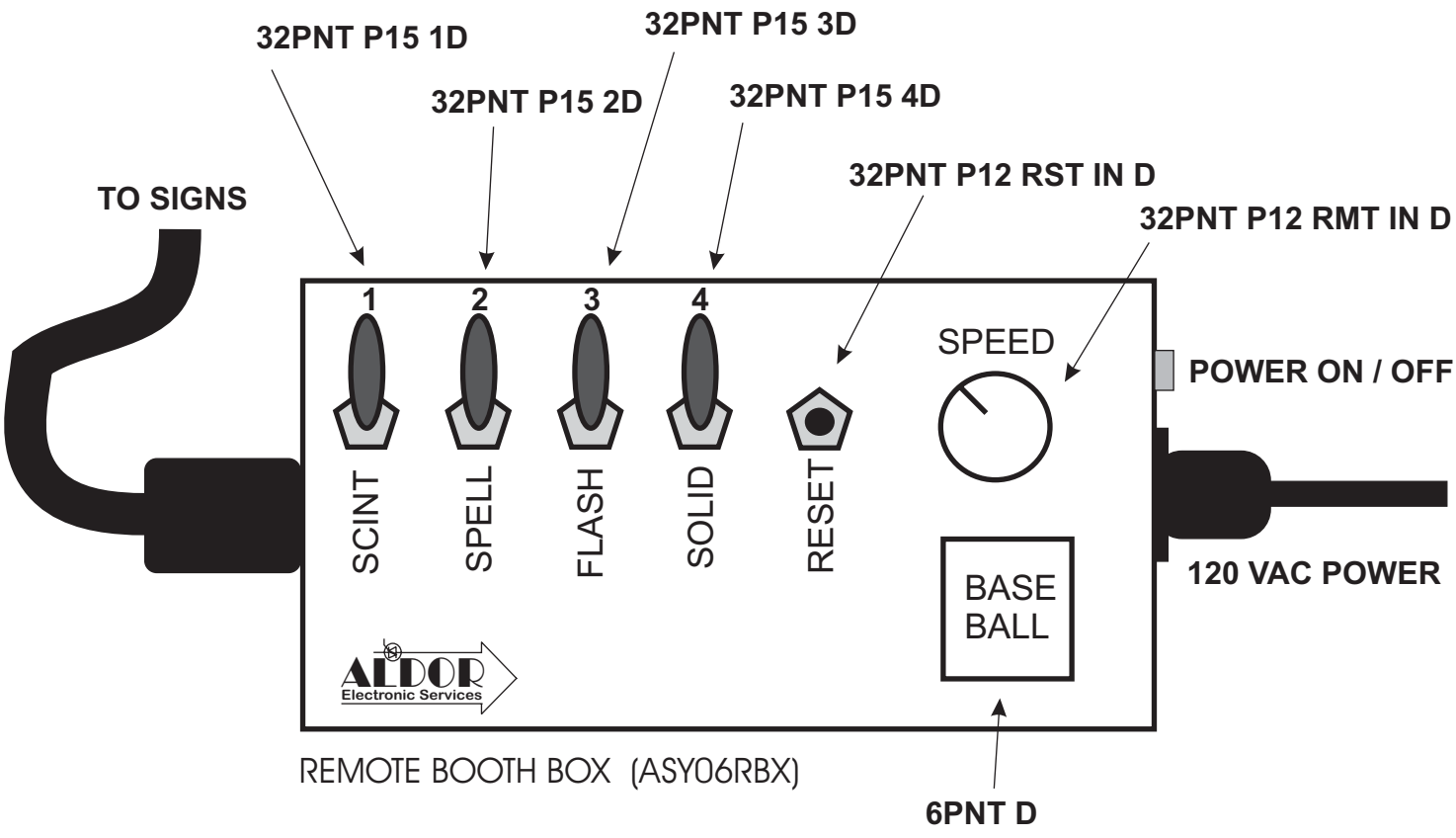
The "Remote Booth Box" should be tested to make sure that when a switch is activated on the box the proper LED(s) light on the Controller boards, including the 6 point controller. Each switch on the box will activate a different LED or group of LED's on the controllers.

Verifying that all eleven 32 point controllers light properly would be redundant because these were already tested in step 8.

Turn on the "Remote Booth Box" but leave the sign electronics off. Make sure that all of the switches on the box are in the OFF position.

Use the wiring list on page 12 and turn on each switch one at a time.
Verify that the proper LED lights as indicated by the list. Note that the "Remote In" LED will be flashing on and off as the clock signal is sent to the sign boards.

THE "REMOTE BOOTH BOX" AND THE REMOTE INPUTS IT CONTROLS



14th: Special features of the "bat and Ball" signs 6 point controller.

The 6 point controller contains two different programs to animate the bat as it strikes the ball. The first program is activated when the DIP switches on the controller board are all off.

The second program is activated when DIP switch 1 is turned on and left on.

The first program simply steps the bat to the ball while the second program sweeps the bat to the ball. Select the animation your customer likes best and set the DIP switch accordingly.

The speed of the animation is adjusted by the on-board clock. use a small flat-blade screwdriver to set the speed accordingly.

Below are the programming points for each program.
When the "Baseball" pushbutton is pressed on the "Remote Booth Box" the sign will do the animation.

PROGRAM #1 - DIP SWITCH 1 OFF

	POINT			
STEP	1	2	3	4
1	●	○	○	○
2	○	●	○	○
3	○	○	●	○
4	○	○	○	●
5	○	○	○	●
6	○	○	○	○

PROGRAM #2 - DIP SWITCH 1 ON

	POINT			
STEP	1	2	3	4
1	●	○	○	○
2	●	●	○	○
3	●	●	●	○
4	●	●	●	●
5	○	●	●	●
6	○	○	●	●
7	○	○	○	●
8	○	○	○	●
9	○	○	○	○

Every time the DIP switch is changed the 6 point controller board should be reset so the software recognizes the switch change. Turning DIP switch #8 on then off will reset the board. Turning the board on then off also resets it.

GIVE A COPY OF THE NEXT PAGE TOTHE BOOTH OPERATOR

JOHN HANCOCK SIGN ANIMATION
REMOTE BOOTH BOX OPERATION

Assuming that the sign is powered up the Remote booth Box will select the animations that will be displayed.

THE 4 SWITCHES CONTROLLING THE MAIN SIGNS ANIMATION SEQUENCES

0. With all switches off the sign will be blank. The Baseball switch will still control the smaller sign.

1. When switch number 1 is turned on the sign will scintillate.

2. When switch number 2 is turned on the sign will spell from left to right.

3. When switch number 3 is turned on the sign will flash on and off.

4. When switch number 4 is turned on the sign will be on solid.

The software looks at the switches from left to right.

For example: If switch 1 and 3 are on the sign will scintillate but will never flash on and off until switch number 1 is turned off.

The software will complete the current animation before looking for a new switch setting.

For example: The sign is spelling on from left to right, half way through the spell action a different switch is turned on. The software will not start the new request until the spell action is completed.

The reset switch should ONLY be pressed if the signs animation looks out of sequence or before the start of each days activities after the main power to the sign is turned on, but is not necessary even then. This switch will not reset the Baseball sign.

Don't use the clock control as your personal little joy stick. sweeping it back and forth could cause the animation to go out of sequence. There are 11 remote computer chips out there depending on a stable clock to stay in step. It is best to turn all of the switches off, adjust the clock, then do a new animation.

Turning off all of the switches will darken the sign but main power to the sign will still be on. Turning off the Remote Booth Box will not turn off main power to the sign either.

If you have any questions contact Henry Signs.

JOHN HANCOCK SIGN ANIMATION
REMOTE BOOTH BOX OPERATION

Assuming that the sign is powered up the Remote booth Box will select the animations that will be displayed.

THE 4 SWITCHES CONTROLLING THE MAIN SIGNS ANIMATION SEQUENCES

0. With all switches off the sign will be blank. The Baseball switch will still control the smaller sign.

1. When switch number 1 is turned on the sign will scintillate.

2. When switch number 2 is turned on the sign will spell from left to right.

3. When switch number 3 is turned on the sign will flash on and off.

4. When switch number 4 is turned on the sign will be on solid.

The software looks at the switches from left to right.

For example: If switch 1 and 3 are on the sign will scintillate but will never flash on and off until switch number 1 is turned off.

The software will complete the current animation before looking for a new switch setting.

For example: The sign is spelling on from left to right, half way through the spell action a different switch is turned on. The software will not start the new request until the spell action is completed.

The reset switch should ONLY be pressed if the signs animation looks out of sequence or before the start of each days activities after the main power to the sign is turned on, but is not necessary even then. This switch will not reset the Baseball sign.

Don't use the clock control as your personal little joy stick. sweeping it back and forth could cause the animation to go out of sequence. There are 11 remote computer chips out there depending on a stable clock to stay in step. It is best to turn all of the switches off, adjust the clock, then do a new animation.

Turning off all of the switches will darken the sign but main power to the sign will still be on. Turning off the Remote Booth Box will not turn off main power to the sign either.

If you have any questions contact Henry Signs.

FLUFF

SOME MORE INFORMATION ABOUT ALDOR PRODUCTS