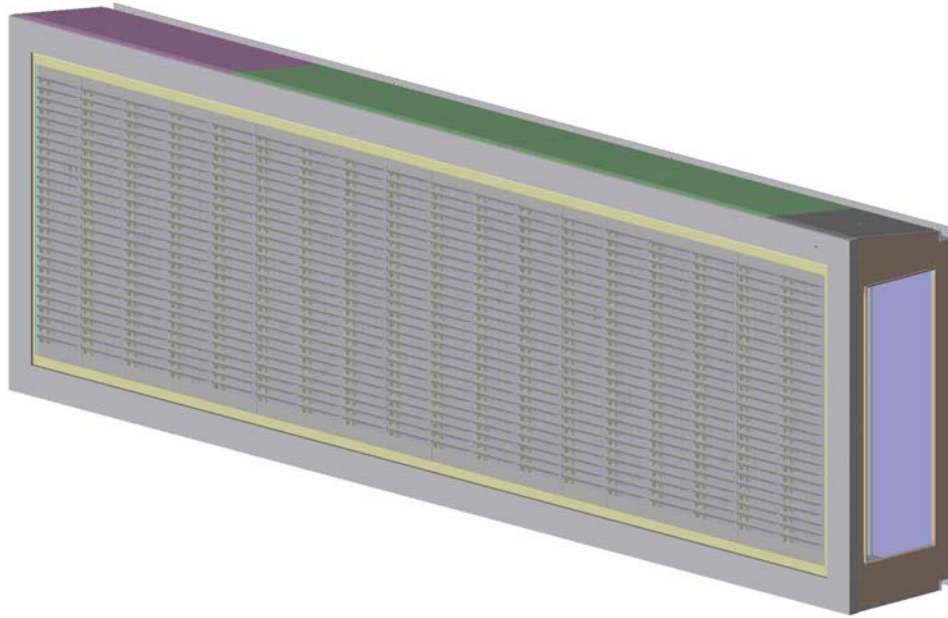


AlphaXpress DMS Walk-in Sign Maintenance Manual

Florida I-75 P1509-4



Manual part number: 1509610302 rev. A

Revision date: June 26, 2007

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Safety

Safety information

Equipment symbols



Chassis ground

Warnings and cautions

Warnings and cautions are posted in appropriate locations throughout this manual.

Battery backup

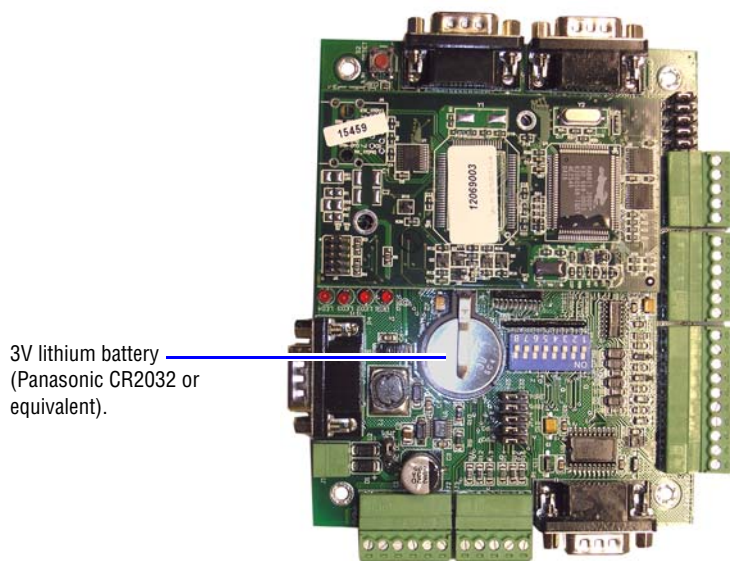
In the event of a power loss, three lithium and one lead-acid batteries provide power to the sign's three controller boards.

Note: The backup batteries only provide enough power to backup the sign's controllers memory during a power loss, not the sign's LED displays.

3V lithium backup batteries

WARNING! Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Figure 1. One 3V lithium battery is located on each of the sign's controller boards.



3V lithium battery
(Panasonic CR2032 or
equivalent).

12V lead-acid backup battery

One, 12V, sealed lead-acid battery provides power to the sign's Controller #3 board in the event of a power loss.

Figure 2. 12V, 5.0Ah sealed lead-acid battery (YUASA NPS-12 or equivalent).



Introduction

Purpose

This manual is intended as a guide for maintenance and repairs considered field serviceable.

This field service manual supplies technical information for service and technical personnel so that they can maintain the equipment at the assembly but not the component level.

Revision history

Revision	Date	Notes
1509610302 rev. A	June 25, 2007	Initial Release.

Related documentation

Technical documentation can be found at Adaptive's web site (<http://www.adaptivedisplays.com>):

Part #	Manual title	Description
TechMemo #05-0005	Preventing Electrostatic Discharge (ESD) Damage	Describes the precautions to take to protect electronic components from ESD damage.
1509650203	P1509-4 27x126 Wiring diagram	Sign wiring diagram.

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Installation

Fan and light switch location

Two, 12-hour timer switches that control sign lighting and fans are located at the sign entrance.

Figure 3. Lighting and fan timer switches

Light timer switch

Fans (vent) timer switch



Emergency light

The backup emergency light and battery are shipped in a separate box inside the sign. For installation instructions refer to document number 1509610304A included in the box with the light and battery.

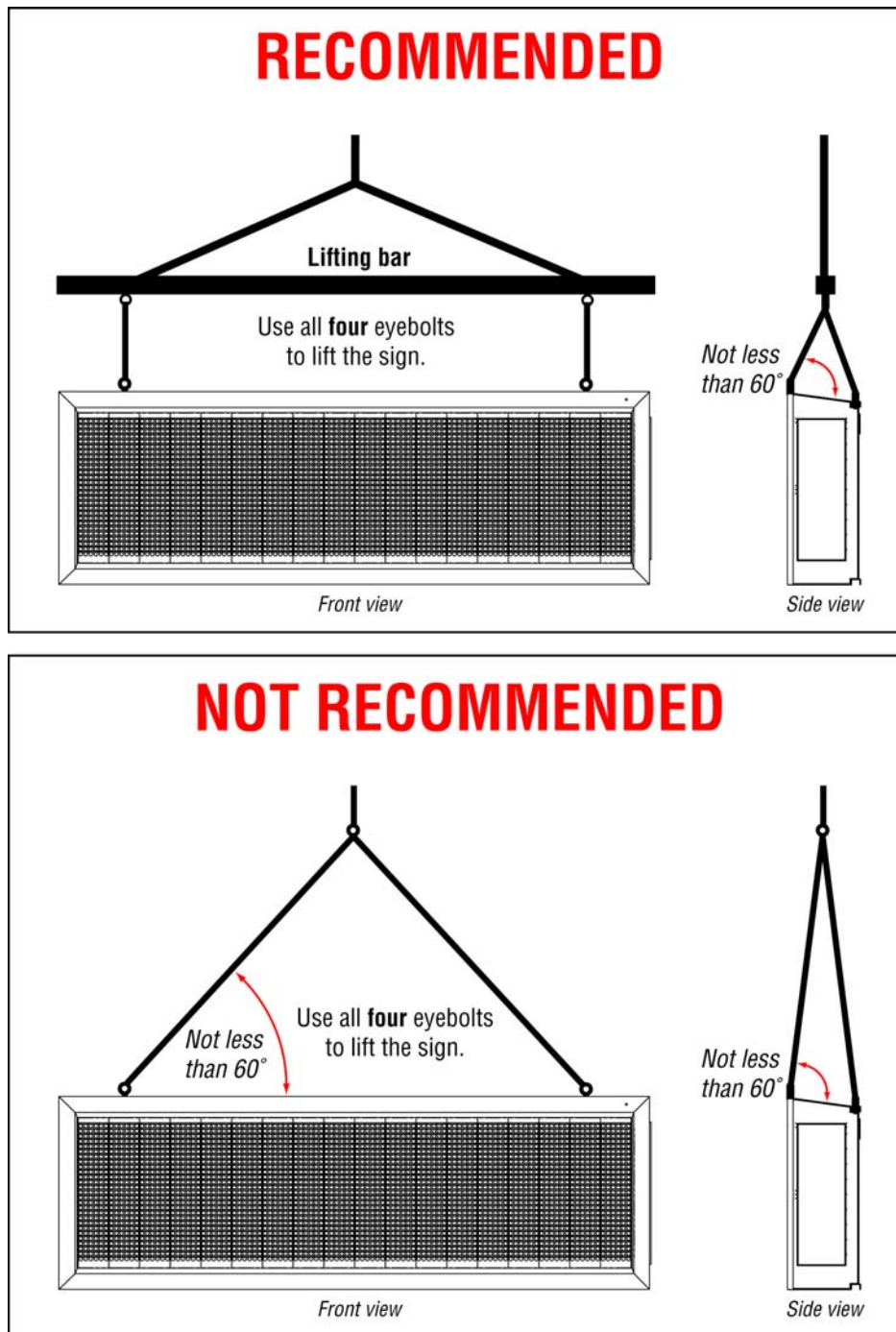
Mechanical installation

Lifting the sign

WARNING! Crush hazard! Do not lift sign with more than a 15 degree tilt.

Always use lifting bar to lift sign. Otherwise eyebolts may break and sign may fall, causing serious injury or death.

Figure 4. Sign lifting guidelines.



Mounting the sign

Figure 5. Use all girder brackets on the back of the sign to attach the unit to a support structure.

Girder brackets — use **all brackets** to mount the sign.

- Attach the sign to the support structure using **all eight bolts** on each of the brackets.
- Tighten each bolt to 45 foot-pounds.

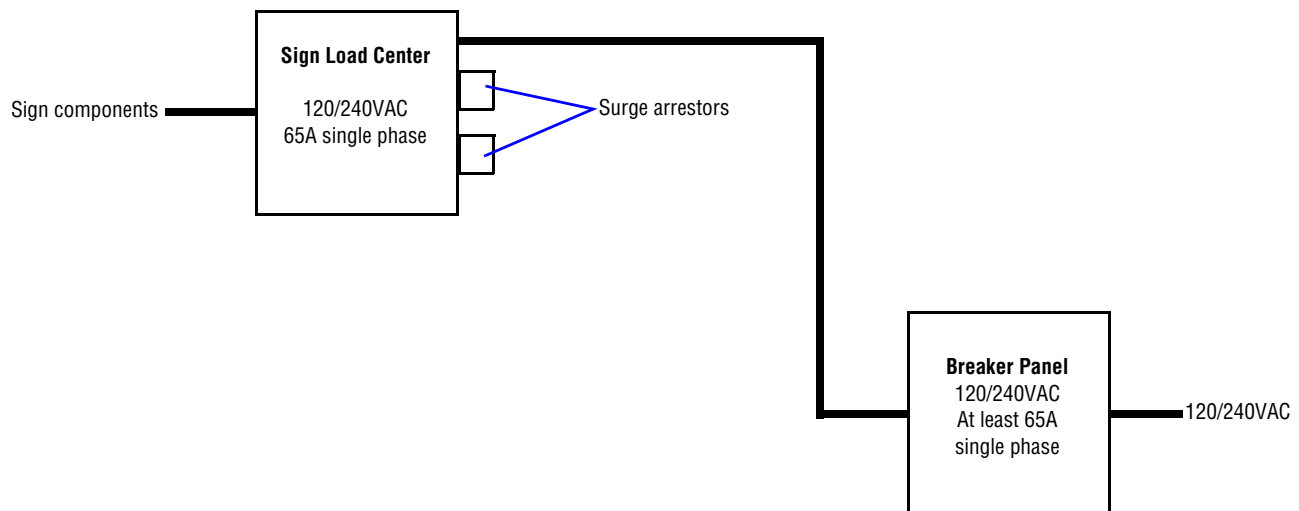


Note: This is a representative view of sign. This sign is shown with tilting brackets; however, the actual sign was requested with no tilting brackets and just I beams.

Electrical installation

WARNING! Hazardous voltage. Contact with high voltage may cause serious injury or death. Always disconnect power to unit prior to servicing.

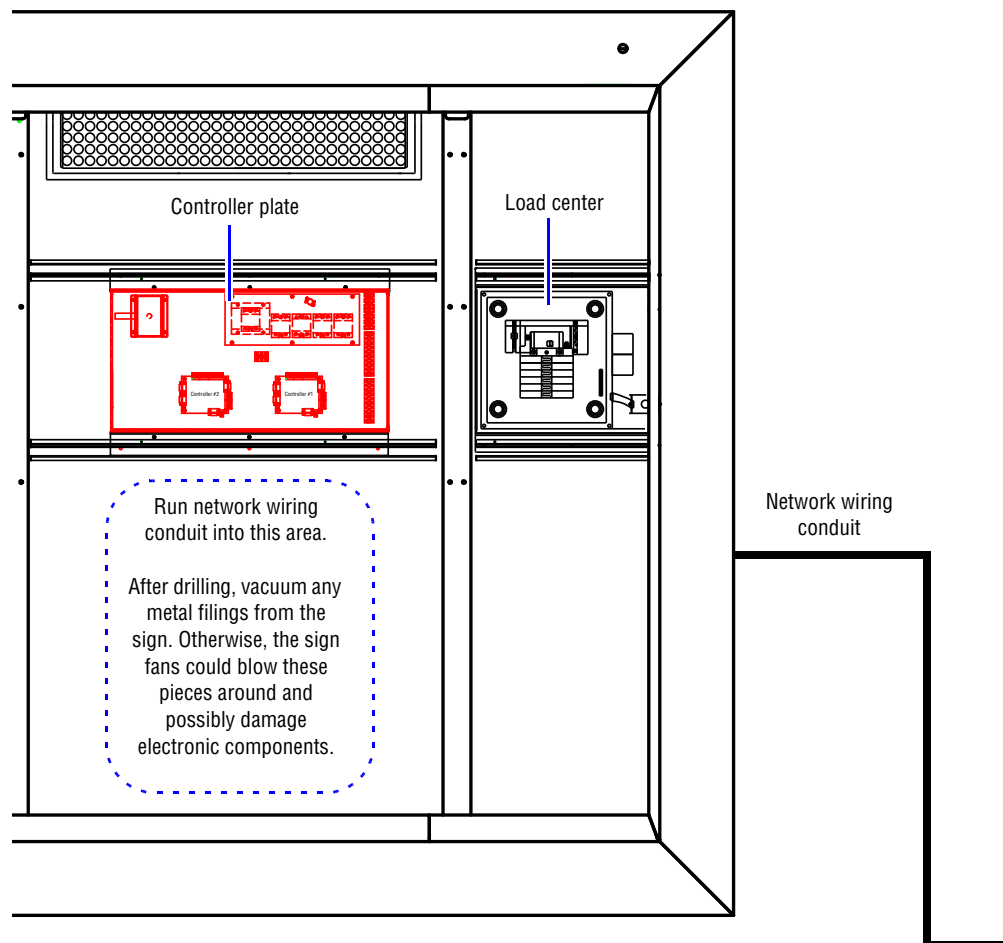
Figure 6. Electrical installation details.



Notice: The principal breaker in the Sign Load Center removes power from all the sign components *except the surge arrestors*. To remove power from the surge arrestors, power must be switched off at the customer provided Breaker Panel.

Sign to central network connection

Figure 7. Inside sign view.



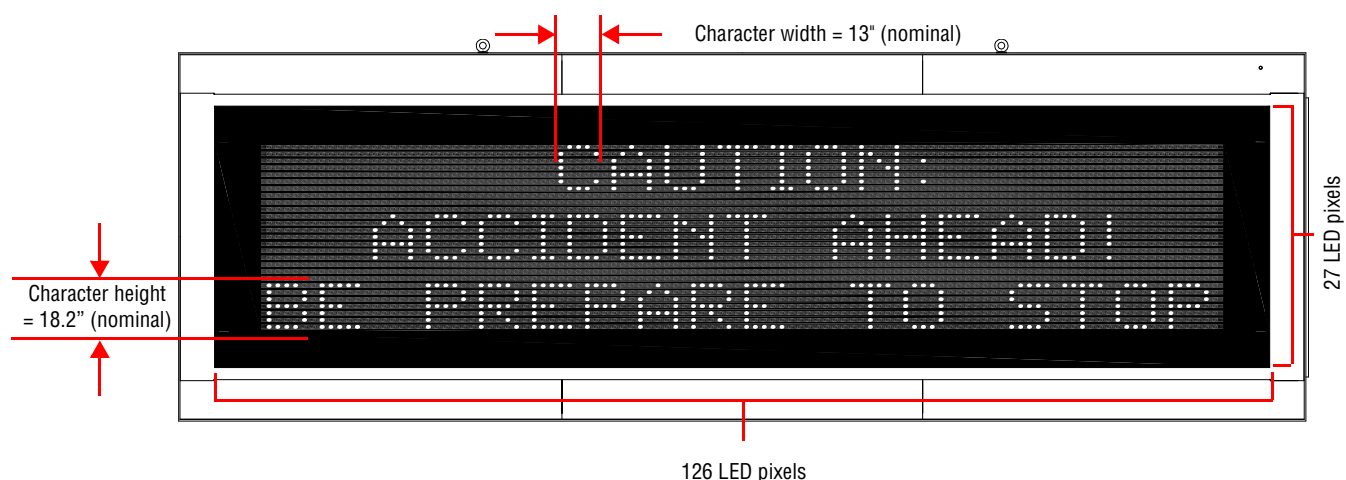
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Equipment description

General description

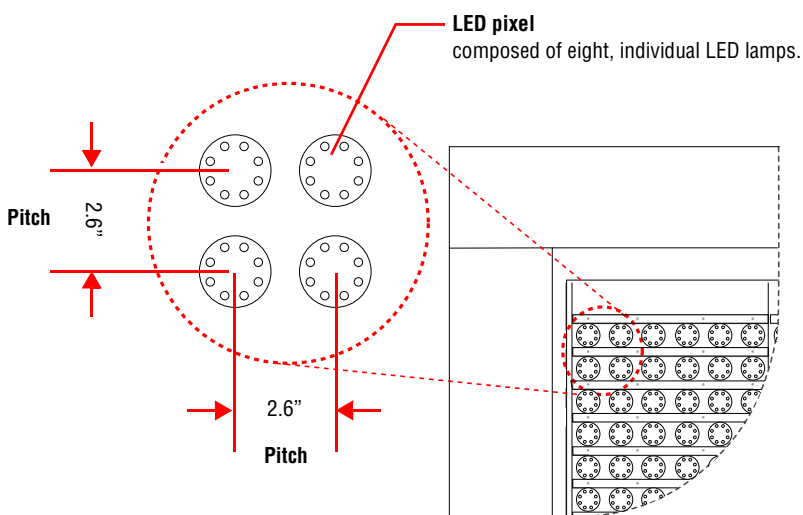
- Serviceability: Walk in
- Weight: 4000 pounds (Not to exceed, approximately. Does not include tilting beams on rear of sign.)
- Display technology: LED
- Display size: 27 rows x 126 columns (see Figure 8)
- LED matrix: 9 pixels high x 6 pixels wide
- Character height: 18 inches, nominal (see Figure 8)
- Character width: 9 inches, nominal (see Figure 8)

Figure 8. Display size.



- Pitch (distance between each LED pixel): 2.6 inches:

Figure 9. LED pitch



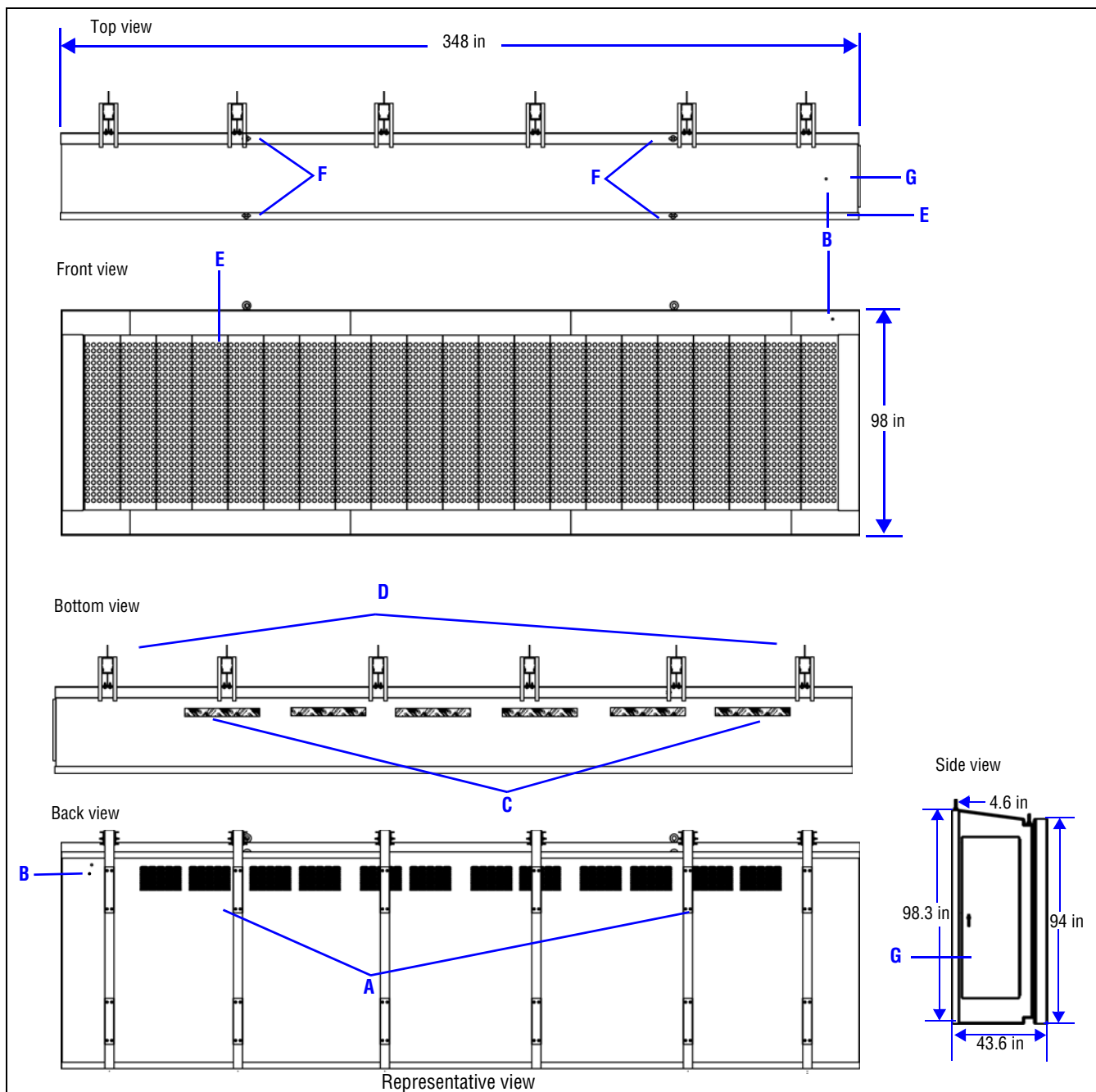
Equipment identification

An equipment label is located inside the sign near the door, above the load center panel.



Item	Name	Description
A	MODEL NUMBER	<div>AX9700FM-27X126-18A</div> <div>Character height (18 inches) Character color ("A" = amber)</div> <div>Display size</div> <div>"FM" = Full Matrix</div> <div>AlphaXpress 9700 sign</div>
B	ELECTRICAL INFORMATION	Input voltage, frequency, and amperage.
C	DATE OF MANUFACTURE	Month, date, and year the sign was made.
D	SERIAL NUMBER	Consecutive, unique identification number.

Outside views

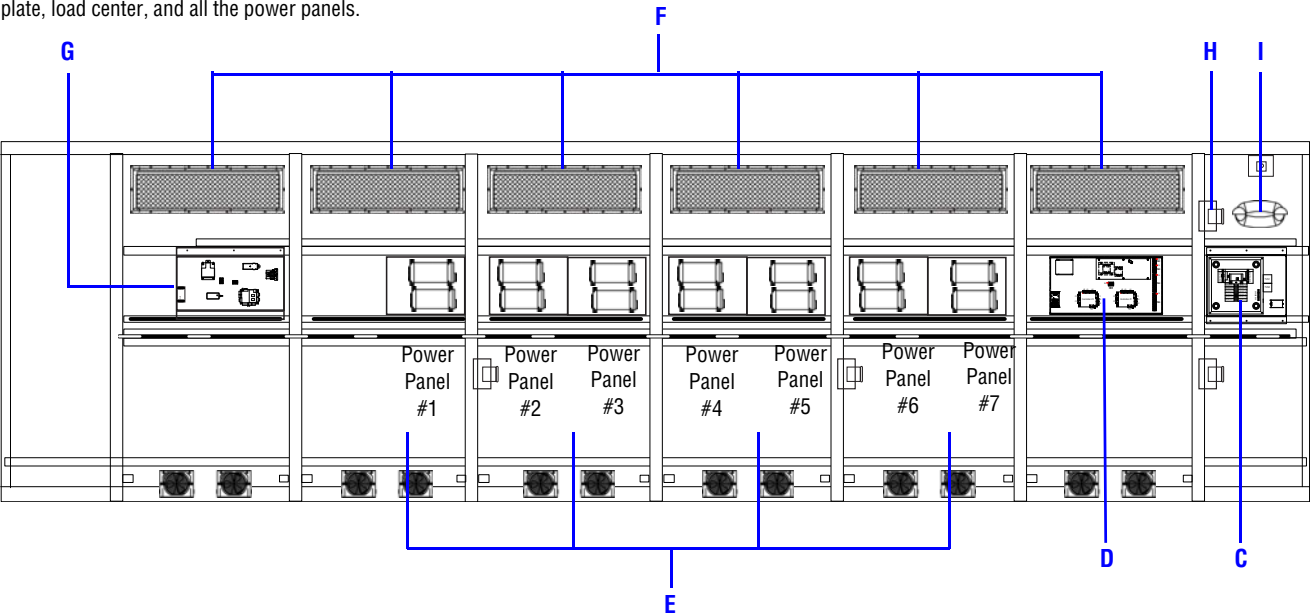


Item	Name	Description
A	EXHAUST VENTS	Fans located on the sign floor <i>push</i> air out of the sign and through these vents.
B	LIGHT SENSOR	Used for dimming the sign LEDs. There are 3 light sensors used in the sign.
C	FLOOR VENTS	Fans located on the floor <i>pull</i> air through the floor vents.
D	MOUNTING BEAMS	Six beams used to mount the sign on a structure and to angle the sign face $\pm 3^\circ$.
E	LEDS	Used to display messages.
F	LIFTING EYEBOLTS	Used to lift the sign into place for mounting. All four eyebolts must be used to lift this sign (see "Mechanical installation" on page 10).
G	ACCESS DOOR	Allows walk-in entry to the inside of the sign. Note: To keep the door open, use the locking arm inside the sign.

Inside views

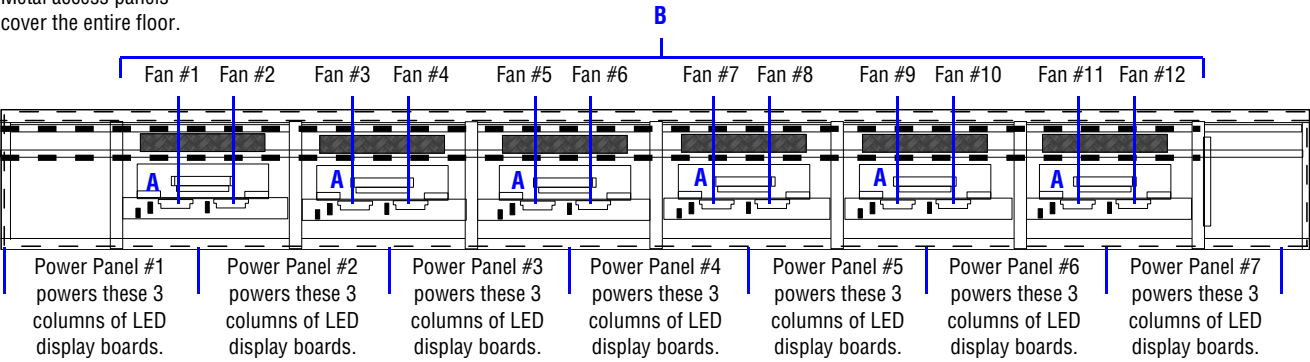
Inside front view

Protective panels cover the controller plate, load center, and all the power panels.

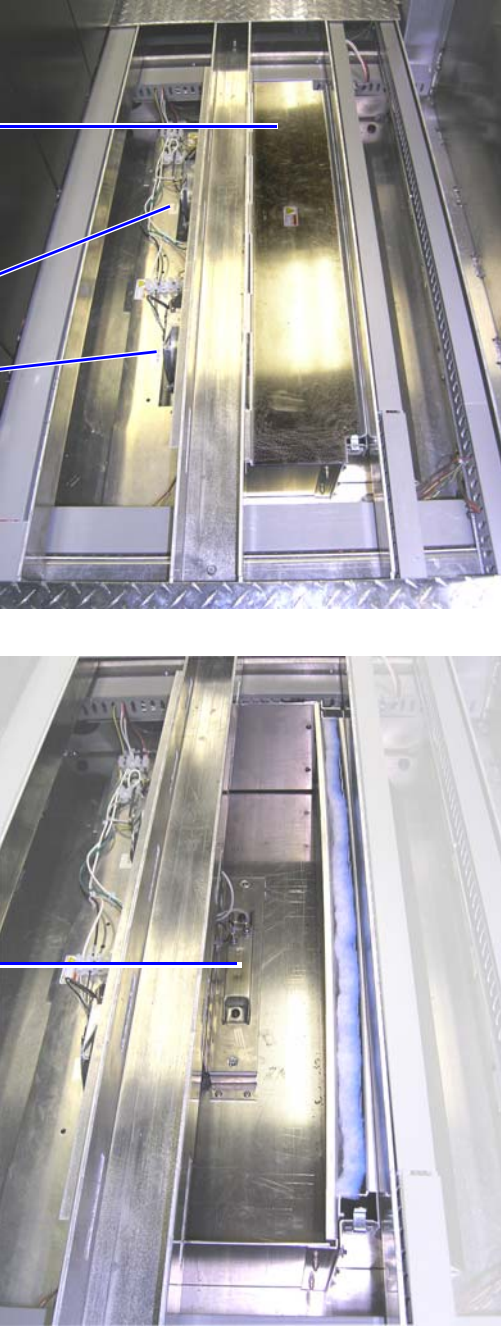


Inside bottom view

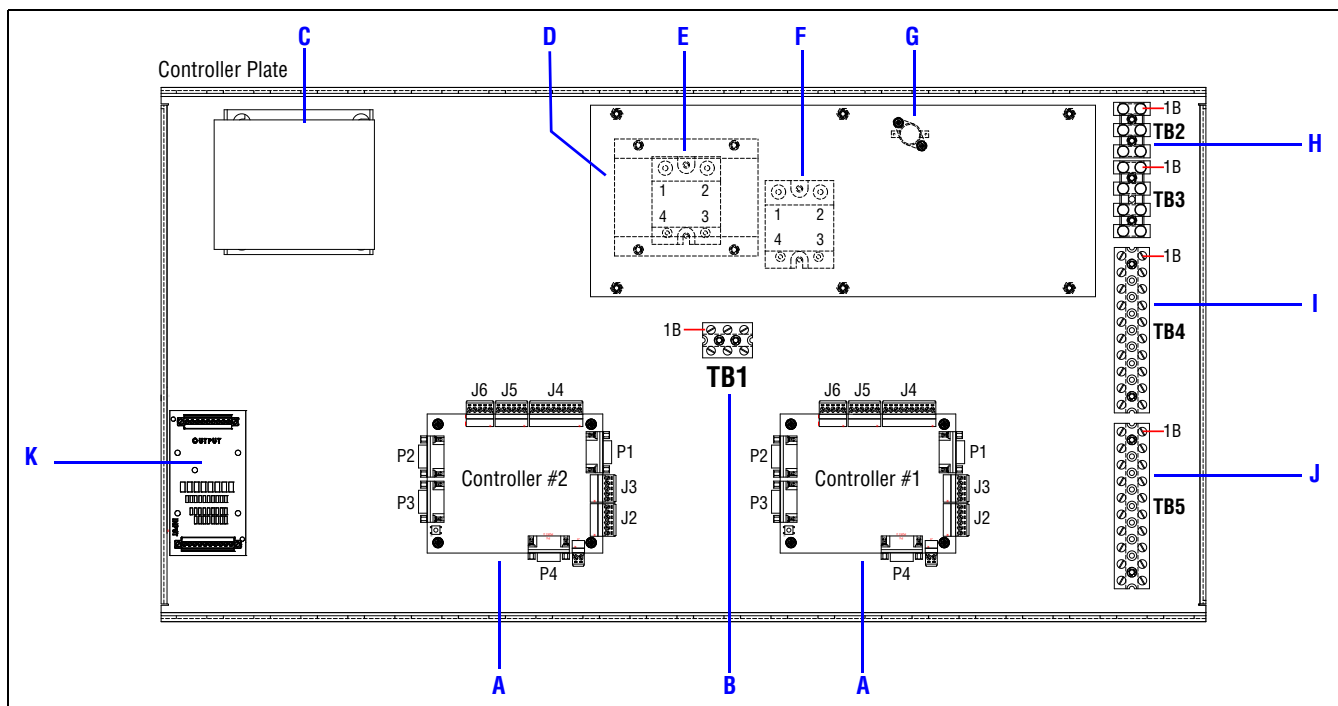
Metal access panels cover the entire floor.



Item	Name	Description
A	HEATER	Used to reduce humidity inside the sign. Heaters are enclosed inside a metal case suspended above the sign floor.

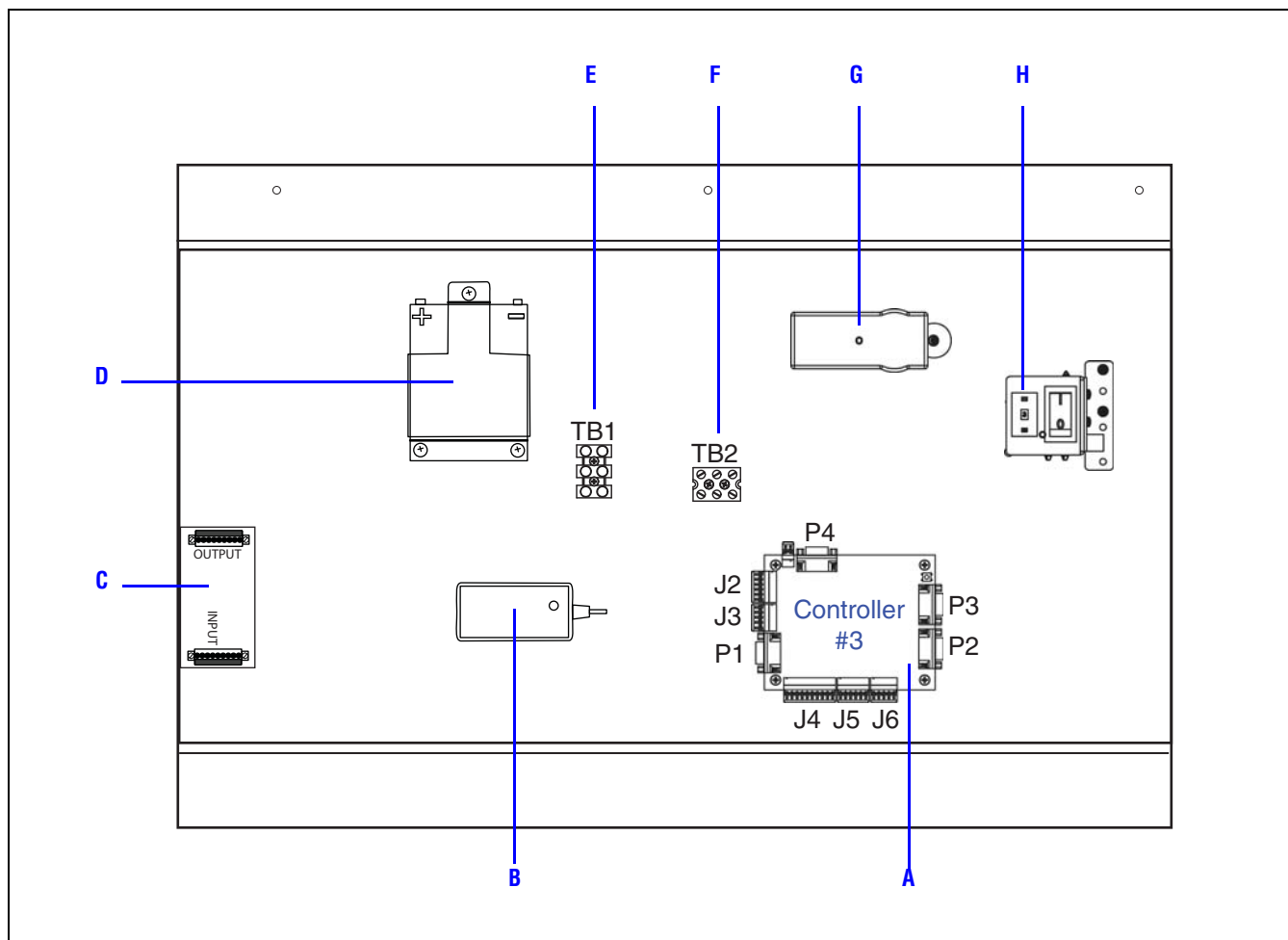
B	FAN HOUSING	<p>A total of 12 fans are located underneath the sign's metal flooring. The fans blow air into the sign from the vents in the bottom of the sign:</p> <div style="display: flex; align-items: center;"> <div style="flex: 1;"> <p>Heater and fan filter cover</p> <p>Fans (metal flooring over fans has been removed)</p> <p>Heater (protective cover removed)</p> <p>WARNING! Burn hazard. Hot surface. Do not touch.</p> </div> <div style="flex: 2;">  </div> </div>
C	LOAD CENTER	See "Load center panel" on page 25.
D	CONTROLLER PLATE	Used for controllers #1 and #2. See "Controller plate with sign controllers #1 and #2" on page 20.
E	POWER PANELS	Provides DC power for driver boards, fan monitor boards, controllers, light sensors, and other devices powered from DC voltage. See "Sign power panels" on page 24.
F	AIR VENT FILTER	Clean and replace as needed.
G	CONTROLLER PLATE	Contains Controller #3 which is used to communicate to the Central/Traffic Operations Center.
H	TIMER SWITCHES	Light and fan timer switches.
I	EMERGENCY LIGHT	Turns on only when power is lost to the circuit breaker for the lights or when all the breaker(s) in the load center are off.

Controller plate with sign controllers #1 and #2



Item	Name	Part #	Description
A	CONTROLLER #1 CONTROLLER #2	12069003	These two boards control sign operation in conjunction with Controller #3 which is connected to an NTCIP network.
B	TERMINAL BLOCK #1	43201044	Distributes power to the relays and humidity sensor.
C	HUMIDITY SENSOR	1507100601	Measures internal relative humidity within 3% accuracy.
D	PLASTIC COVER	1509000501	Protection against hazardous voltages from the relays underneath the cover.
E	RELAY #1	48000009	Normally open. When closed, this relay activates the heaters.
F	RELAY #2	48000009	Normally open. When closed, this relay activates the fans.
G	THERMOSTAT	30670005	Normally open. Closes when temperature > 120°F and activates the fans. Opens when temperature < 90°F.
H	TERMINAL BLOCK #2 AND #3	43201036 (TB2) 43201047 (TB3)	Distributes AC through relays and thermostats to heaters, beacons, and fans.
I	TERMINAL BLOCK #4	43201054	Provide wiring for status signals such as power fail signals for power supplies, fan monitoring, door switch, and DC power for the controller assembly.
J	TERMINAL BLOCK #5	43201054	
K	VOLTAGE DIVIDER BOARD	1509101202	For supplied voltages over 5.0 VDC, scales the voltage (V_{out}) which is proportional to the voltage (V_{in}). Supplied voltages may be from batteries, power supplies, and other external analog signals.

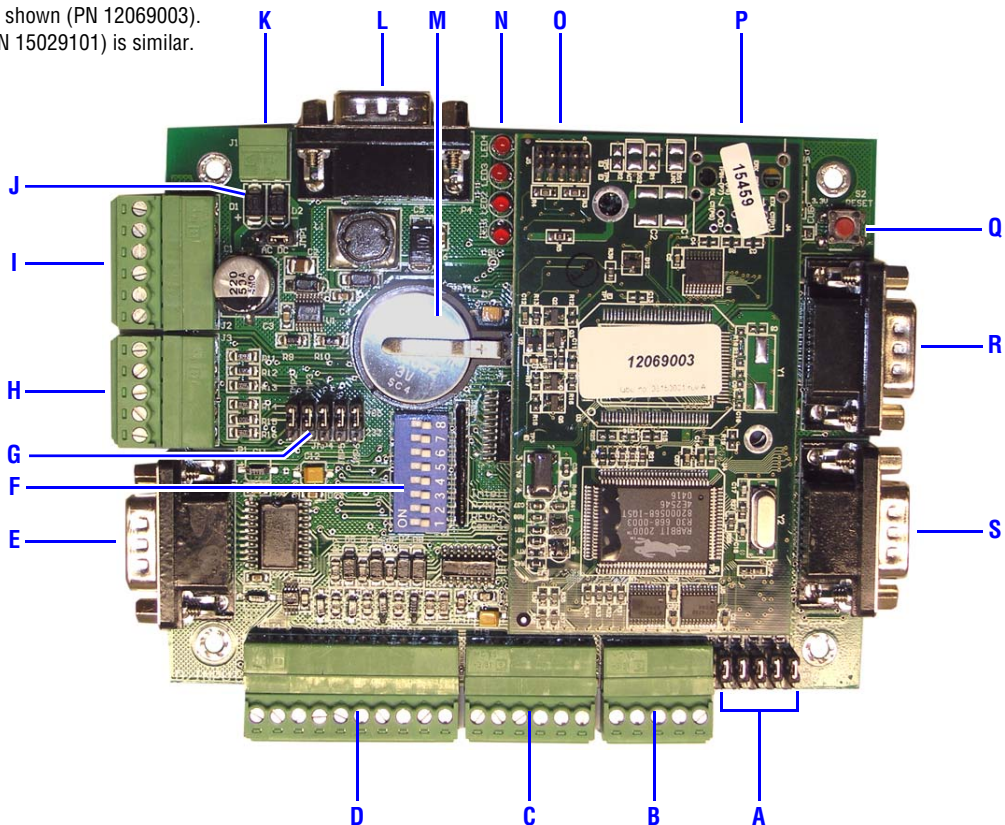
Controller plate with sign Controller #3



Item	Name	Part #	Description
A	CONTROLLER #3	15029101	This controller (#3) is connected to an NTCIP network and works in conjunction with the two sign controller boards to control sign operation.
B	CHARGER	1507500301	Battery charger.
C	VOLTAGE DIVIDER BOARD	1509101202	For supplied voltages over 5.0 VDC, creates a voltage (V_{out}) which is proportional to the voltage (V_{in}). Supplied voltages may be from batteries, power supplies, and other external analog signals.
D	BATTERY	1507500201	Provides power to the controller.
E	TERMINAL BLOCK #1	43201036	Distributes power from the battery to the controller.
F	TERMINAL BLOCK #2	43201043	Distributes battery power for the controller. Also provides the point for fusing the power from the battery.
G	ETHERNET SURGE SUPPRESSOR	1507101201	Protects the Ethernet data line.
H	MESSAGE SELECTOR	N/A	Used to select changeable message slots 81 to 95.

Sign controllers

Sign controllers #1, #2, and #3 are nearly identical although they have different part numbers.

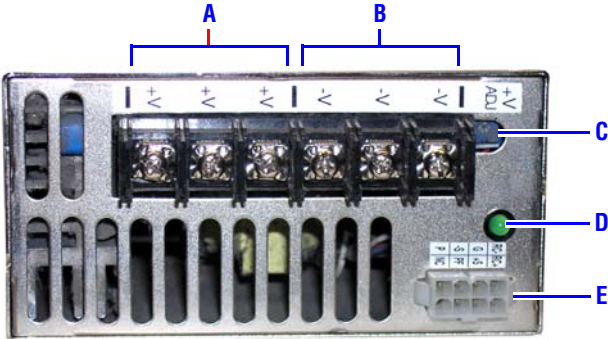
<p>Controller #1/#2 shown (PN 12069003). Controller #3 (PN 15029101) is similar.</p> 			
Item	PCB label	Name	Description
A	JP7 TO JP11	COMM PORT SELECTION JUMPERS FOR J6 AND P2	Set to RS485 with termination.
B	J6	RS485 PORT 1	
C	J5 A/INPUT	ANALOG INPUTS	
D	J4 D/INPUT	DIGITAL INPUTS	
E	P1	RS232 PORT	Only used for Controller #3. Not used for Controller #1 or Controller #2.
F	S1	DIP SWITCHES	
G	JMP2 TO JMP6		Set to RS485 without termination for Controller #2, for Controller #1 set to RS485 with termination on. Picture above shows termination on. For termination off, JMP 2-5 should be to the RS232 side. Set to RS232 or RS485, depending on the use of the J3/P1 port by customer for Controller #3.
H	J3	RS422 PORT	
I	J2	DIGITAL OUTPUTS	
J	JMP1		Set to DC.
K	J1	POWER CONNECTOR	Connects to Power Panel for DC Power for Controller #1 and #2. Controller #3 is battery backed up.
L	P4	RS232 PORT	Not used.
M	BAT1	MEMORY BACKUP	3V lithium battery (Panasonic CR2032 or equivalent).

N	LED1 TO LED4	DIAGNOSTIC LEDS	<ul style="list-style-type: none"> • LED1—All controllers = Heartbeat. • LED2: <ul style="list-style-type: none"> <input type="checkbox"/> Controller #1 & #2 = Communications from Controller #3 on J3. <input type="checkbox"/> Controller #3 = Communications from Central/Local port P1 and P3. • LED3: <ul style="list-style-type: none"> <input type="checkbox"/> Controller #1 & #2 = Not used. <input type="checkbox"/> Controller #3 = Flashes when transmitting to sign controllers 1 and 2. • LED4: <ul style="list-style-type: none"> <input type="checkbox"/> Controller #1 = Flashes when transmitting out of J6 LED display board. <input type="checkbox"/> Controller #2 = Flashes when transmitting out of J6 light sensor. <input type="checkbox"/> Controller #3 = Flashes when receiving communication from sign controllers 1 and 2.
O	J5	PROGRAMMING PORT	Used to program the controller with a rabbit programming cable.
P	J4	ETHERNET PORT	Installed only on Controller #3
Q	S2 RESET	CONTROLLER RESET SWITCH	Used to do a soft reset on the controller.
R	P3		Only used on Controller #3
S	P2		Not used.

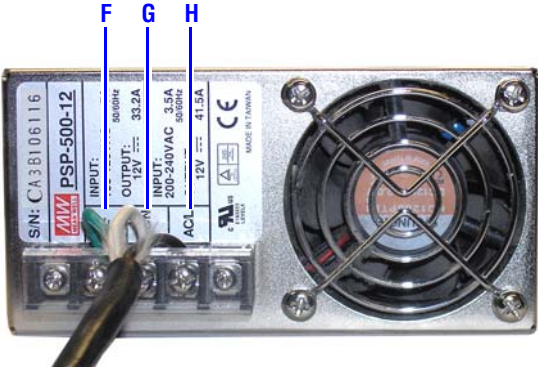
Sign power panels

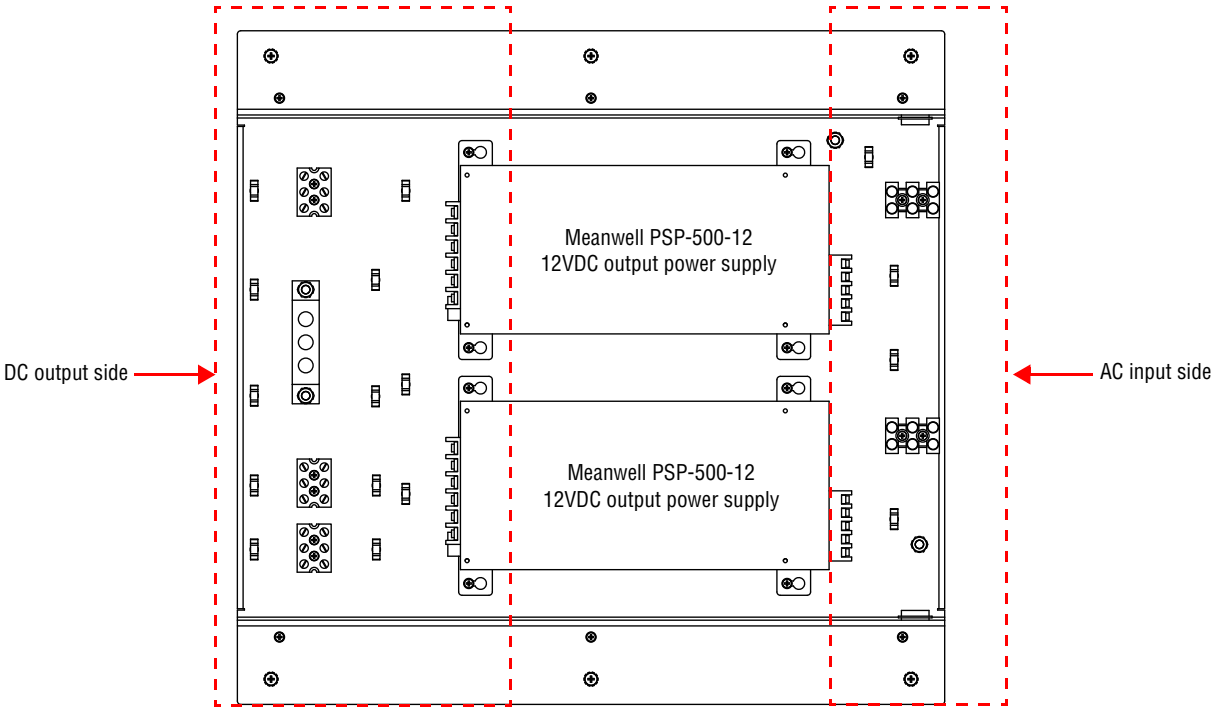
There are seven power panels in the sign (see “Inside views” on page 18). Each panel contains two, Meanwell PSP-500-12 12VDC output power supplies. **Note:** Both power supplies may not turn on at the same time if there is not enough load present.


Power supply DC output (front view)



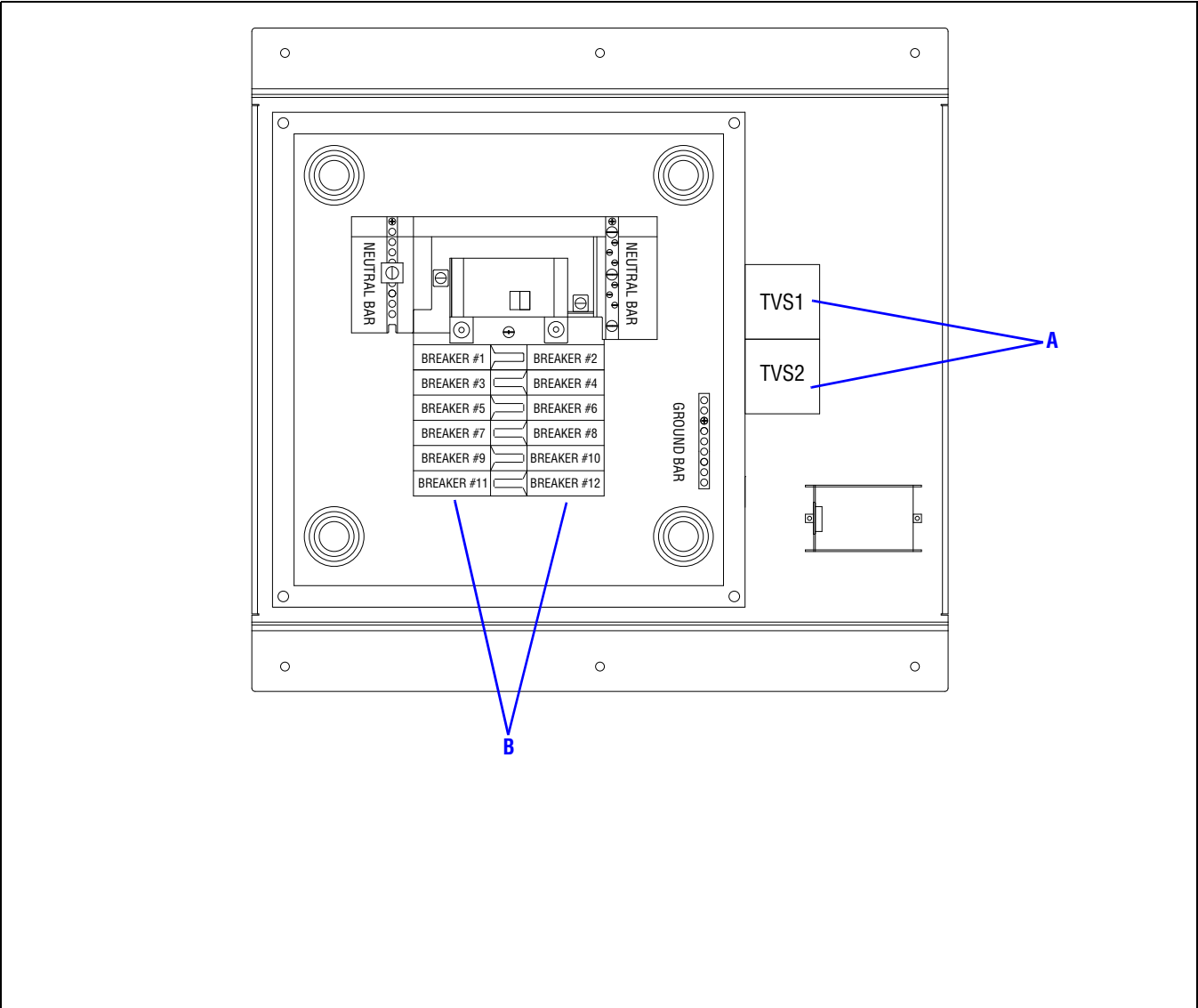
Power supply AC input (back view)





Item	Power supply label	Name	Description
A	V+	12VDC +	DC output
B	V-	12VDC -	
C	—	DC OUTPUT VOLTAGE ADJUST	Adjustment range. Output should be set to 12VDC. For power sharing to work correctly, the output of both power supplies must be set to exactly the same voltage.
D	—	INPUT POWER INDICATOR	Green = AC voltage supplied to power supply.
E	—	SIGNAL CONNECTOR	Used for power sharing function, remote sense, and power good signal.
F		AC IN GROUND	AC input (90-264VAC, 47-63Hz)
G	AC/N	AC IN NEUTRAL	
H	AC/L	AC IN LINE	

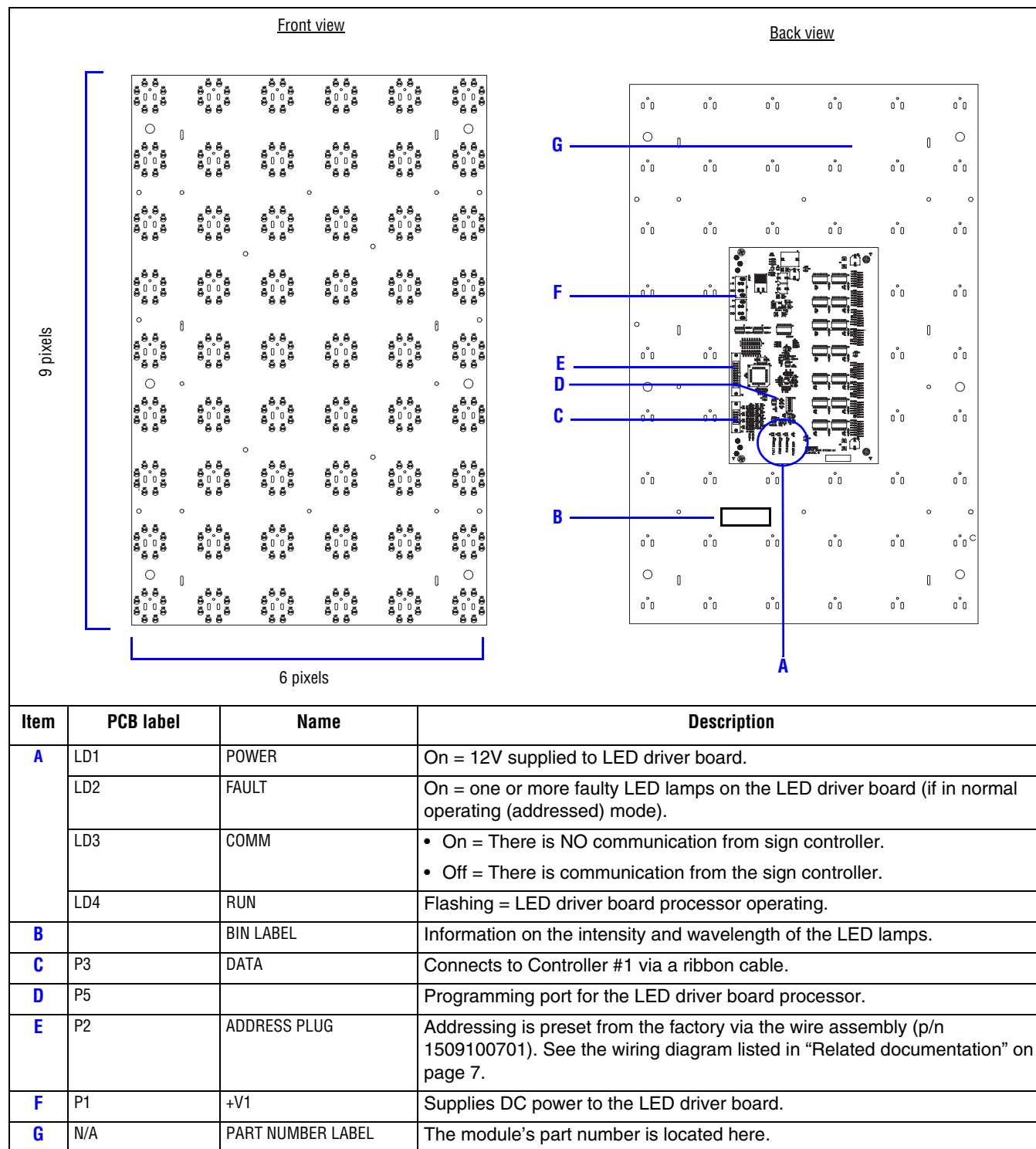
Load center panel



Item	Name		Part #	Description
A	SURGE ARRESTORS		30350019	Citel M18-120 surge arrestor. There is a surge arrestor for each line brought into the sign.
B	SIGN CIRCUIT BREAKERS	BREAKER #1	48100005	PS1, 3, 5, 7, battery backup
		BREAKER #2	48100005	PS2, 4, 6, 8
		BREAKER #3	48100005	9, 11, 13
		BREAKER #4	48100005	10, 12, 14
		BREAKER #5	48100005	Lights
		BREAKER #6	48100005	Fans
		BREAKER #7	48100006	Outlets
		BREAKER #8	48100006	Heaters
		BREAKER #9 - 12	—	Not Used

LED driver board

There are 63 LED driver boards in a sign. Each board is 6 x 9 pixels, and each pixel is composed of eight LED lamps.



Maintenance

Air filter cleaning

The exhaust vent and fan air filters should be checked every six months.

WARNING! Hazardous voltage. Contact with high voltage may cause serious injury or death. Always disconnect power to unit prior to servicing.

⇒ To clean the air vent filter

1. Locate the air vents (see “Inside views” on page 18.)
2. Remove the air vent cover.

Air vent cover
for exhaust air vent
filters.



Push air vent cover up.
Then pull off from the
bottom.

3. Pull out the air vent filter.



4. If the air vent filter needs cleaning, wash it using warm water and dish cleaning liquid. Rinse the filter in clean water. Then dry the filter with a clean cloth.

If the filter needs to be replaced, the filter material is available under McMaster-Carr p/n 2122K254 and can be cut to size.

5. Return the clean air vent filter to the sign.

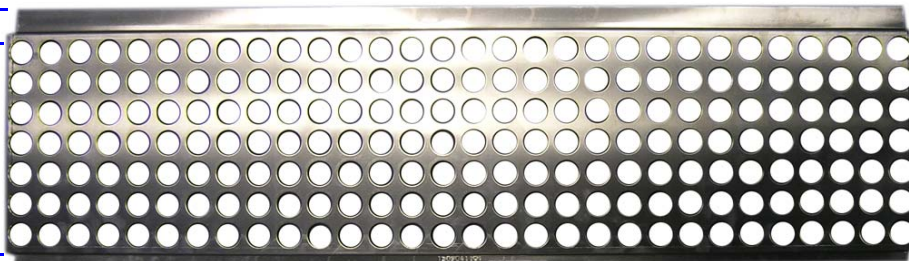
White side of filter
faces towards the
inside of the sign.



6. Reattach the air filter cover.



Long edge —
Long edge
faces up.
Short edge —



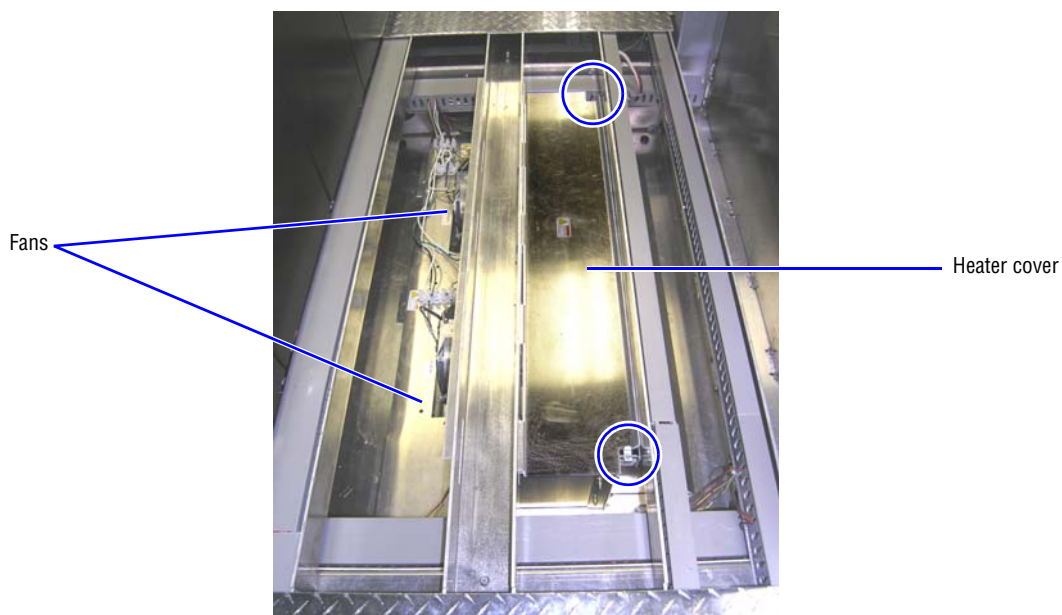
Fan filter cleaning

WARNING! Hazardous voltage. Contact with high voltage may cause serious injury or death. Always disconnect power to unit prior to servicing.

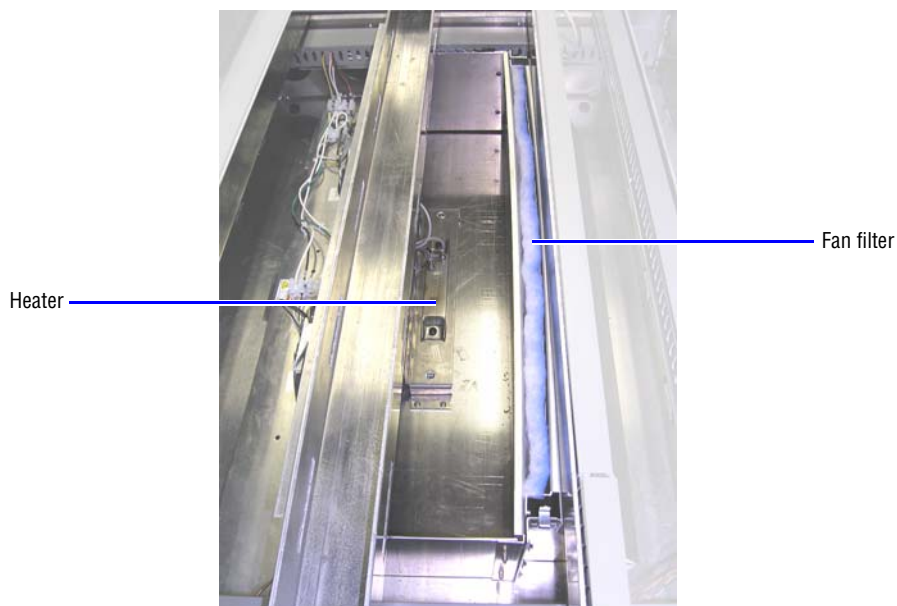
⇒ To clean fan filters

1. Locate the fan housing (see “Inside views” on page 18).
2. Lift the metal access floor panel from over the fan and heater housing. Detach the two latches (circled below) holding the heater cover to the sign.

CAUTION! Heater may be very hot and may burn you if it has been activated due to humidity.



3. Remove the heater cover.



4. Remove the fan filter.

5. If the fan filter needs cleaning, wash it using warm water and dish cleaning liquid. Rinse the filter in clean water. Then dry the filter with a clean cloth. If the filter needs to be replaced, the filter material is available under McMaster-Carr p/n 2122K254.
6. Install the fan filter.
7. Reattach the fan cover.
8. Re-install the metal access cover previously removed.

Physical Inspection

Exterior inspection

- Check for any physical damage to the exterior of the sign.
- Check for loose nuts, bolts, hinges, doors, etc. on the sign.
- Check for corrosion, especially on the mounting hardware.
- Check the electronics for foreign debris and general cleanliness.
- Check the interior of the sign for foreign debris and general cleanliness.
- Check the exterior of the sign for general cleanliness.
- Check the LEDs of the sign for general cleanliness and visibility.

Interior inspection

- Check each surge protector on the load side of the sign (see “Inside views” on page 18). Make sure the LED on each device is lit.

If the LED indicator on a surge protector is off, the surge protector (pn 30352001SP2) must be replaced.



LED indicators

- Check for any obvious physical damage to the interior.
- Check for loose nuts, bolts, hinges, doors, etc.
- Check the electronics for foreign debris and general cleanliness.
- Verify the sign's drain holes are not plugged.

Note: Verify the 100A breaker is turned on in the breaker panel.

Troubleshooting

This chapter contains the LED Variable Message Sign (VMS) Troubleshooting and a general explanation of how each problem can be isolated through a step by step direction.

Introduction

Due to the complexity of the electronic equipment, it is impossible to describe every possible malfunction that could occur. The intent of this section is to follow a path from the beginning to the end of each system so that a general understanding of the operating system is established. When the sign is not functioning properly, these procedures should help you access the electronics and isolate the defective component(s) in the sign. The defective components may then be removed and replaced with a known good component. The topics discussed and most common problems that you might experience are listed below.

If none of the procedures suggested in this chapter produce a satisfactory solution, you may contact the Adaptive Micro Systems Service Department at 414-357-2020 during normal business hours.

Tools required for troubleshooting and repair

In all cases of troubleshooting and repair, some tools are required to perform these tasks. The following is a list of common test equipment and tools required to test, remove and replace a defective PCB and/or piece of hardware:

- DMM (Digital multimeter)
- 1/8" slotted screwdriver
- 3/16" slotted screwdriver
- #2 Phillips screwdriver
- #3 Phillips screwdriver
- 3/16" nutdriver
- 1/4" nutdriver
- 3/8" nutdriver
- 7/16" nutdriver
- 6" or 8" slip joint pliers
- Needle nose pliers
- Wire strippers (multi-gauge)

Access to the electronics and operating system is required to perform the procedures listed herein. Make sure that you have all codes, keys, combinations, and special entry tools.

Common problems

WARNING! Hazardous voltage. Contact with high voltage may cause serious injury or death. Always disconnect power to unit prior to servicing.

Inoperative AC power		
Possible cause	Recommended solutions	Notes
1. Cable connection not properly secured or came off	<ul style="list-style-type: none"> Check all cables to make sure they are properly connected and making positive contact. Verify AC power is flowing to the panel providing power to the sign controllers. Verify AC power is flowing to the main controller (Controller #3). In the load center, verify AC is applied to the power supply boxes across the breakers. If a problem is found during testing, repair or replace the faulty component. 	<p>In the power supply panels, verify AC power is supplied to all the power supplies, across input terminals. Referring to the wiring diagram listed in “Related documentation” on page 7 for the power supply panel view, measure across TB1 and TB2 to verify AC voltage is present.</p>
2. Faulty power supply		
3. Circuit breaker tripped		
4. Corroded terminals		
5. Blown lighting arrestor		

Inoperative DC power		
Possible cause	Recommended solutions	Notes
1. Cable connection not properly secured or came off	<ul style="list-style-type: none"> Check the DC power side of the sign. In the power supply panels, verify 12VDC power is present at the +V (orange) and -V (violet), terminals TB3 and TB4. Verify the LED driver board is receiving power. Check the LED indicator LD1 (labeled POWER). If it is lit, then the board is receiving power. Also check the power connector for 12VDC (V+ is orange and V- is violet). On the light sensor/temperature sensor board LS0-2, check for +12VDC (pin 11) and GND (pin 9) on the boards. If a problem is found during testing, repair or replace the faulty component. 	
2. Faulty power supply		
3. Faulty printed circuit board		
4. Corroded terminals		

Nonfunctional brightness control, nonfunctional sign		
Possible cause	Recommended solutions	Notes
All three photocell sensors in the sign are not functioning.	<ul style="list-style-type: none"> • Check all connections to and from the photocell sensor board to make sure they are secure. • Check for 12VDC power at the photocell. • Check the sign software to make sure the sign is not in a “blank” mode. • Check the address switch on the photocell. • Check the configuration jumpers on the controller board. • Verify the light sensors are addressed properly. Verify the COM LED indicator is flashing on each light sensor. <ul style="list-style-type: none"> ❑ Use Intelligent Control to make sure the sign is in Photocell mode. ❑ Front light sensor verification: <ul style="list-style-type: none"> — Cover the back and top light sensors. — Using Intelligent Control, check the Status screen to see if a photocell reading is present. If above 2 out of 15, cover the front photocell. The value should decrease to 1. If all is as described, go to top light sensor verification. — If the value is less than 2 out of 15, shine a floodlight on photocell to saturate the light sensor. The value should change within 30 seconds. If status of the light value increases, continue to top light sensor verification. If status does not increase, then replace the light sensor board. ❑ Top light sensor verification: <ul style="list-style-type: none"> — Cover the front and back light sensors. — Using Intelligent Control, check the Status screen to see if a photocell reading is present. If above 2 out of 15, cover the top photocell. The value should decrease to 1. If all is as described, go to back light sensor verification. — If the value is below 2 out of 15, shine a floodlight on photocell to saturate the light sensor. The value should change within 30 seconds. If status of the light value increases, continue to back light sensor verification. If status does not increase, then replace the light sensor board. ❑ Back light sensor verification: <ul style="list-style-type: none"> — Cover the top and back light sensors. — Using Intelligent Control, check the Status screen to see if a photocell reading is present. If above 2 out of 15, cover the back photocell. The value should decrease to 1. If all is as described, all light sensors are working properly. — If the value is below 2 out of 15, shine a floodlight on photocell to saturate the light sensor. The value should change within 30 seconds. If status of the light value increases, then all light sensors are working. If value does not increase, then replace the pcb assembly. — Remove and replace the board. 	If at least one photocell is functioning properly, the sign will dim according to ambient light levels.

Nonfunctional single LED(s), functional sign

Possible cause	Recommended solutions	Notes
Faulty LED	Remove and replace the LED driver board containing the faulty LED(s).	

Nonfunctional single pixel(s), functional sign

Possible cause	Recommended solutions	Notes
Faulty pixel	<ul style="list-style-type: none"> In Intelligent Control, run the Pixel Test to locate where the faulty pixel is located. Remove and replace the LED driver board containing the faulty pixel(s). 	

Nonfunctional pixels on entire display board(s), functional sign

Possible cause	Recommended solutions	Notes
Faulty pixel	<ul style="list-style-type: none"> In Intelligent Control, run the Pixel Test to locate where the faulty pixel(s) is/are located. Verify that the DC power supplies are not faulty and test for presence of voltage. If the test indicates a faulty set of power supplies, remove and replace the power supply supplying power to the display boards. If the voltage at the LED driver board is less than 10.5VDC, this may show pixel failures for the pixel diagnostics. If power supplies are OK, remove and replace the LED driver board containing the faulty pixel(s). 	

Part replacement

List of field-replaceable parts

Part name	Page
Sign controllers	page 36
Main controller (Controller #3)	page 39
Power supplies	page 41
Relay #1 and #2	page 43
Flasher	page 43
LED driver board	page 45
Fans	page 48
Light sensor	page 49

Controlling electrostatic discharge (ESD)

Notice: This equipment contains components that may be damaged by “static electricity”, or electrostatic discharge. To prevent this from happening, be sure to follow the guidelines in Adaptive Tech Memo 00-0005, “*Guidelines for Controlling Electrostatic Discharge Damage*”, available at Adaptive’s web site at <http://www.adaptivedisplays.com>.

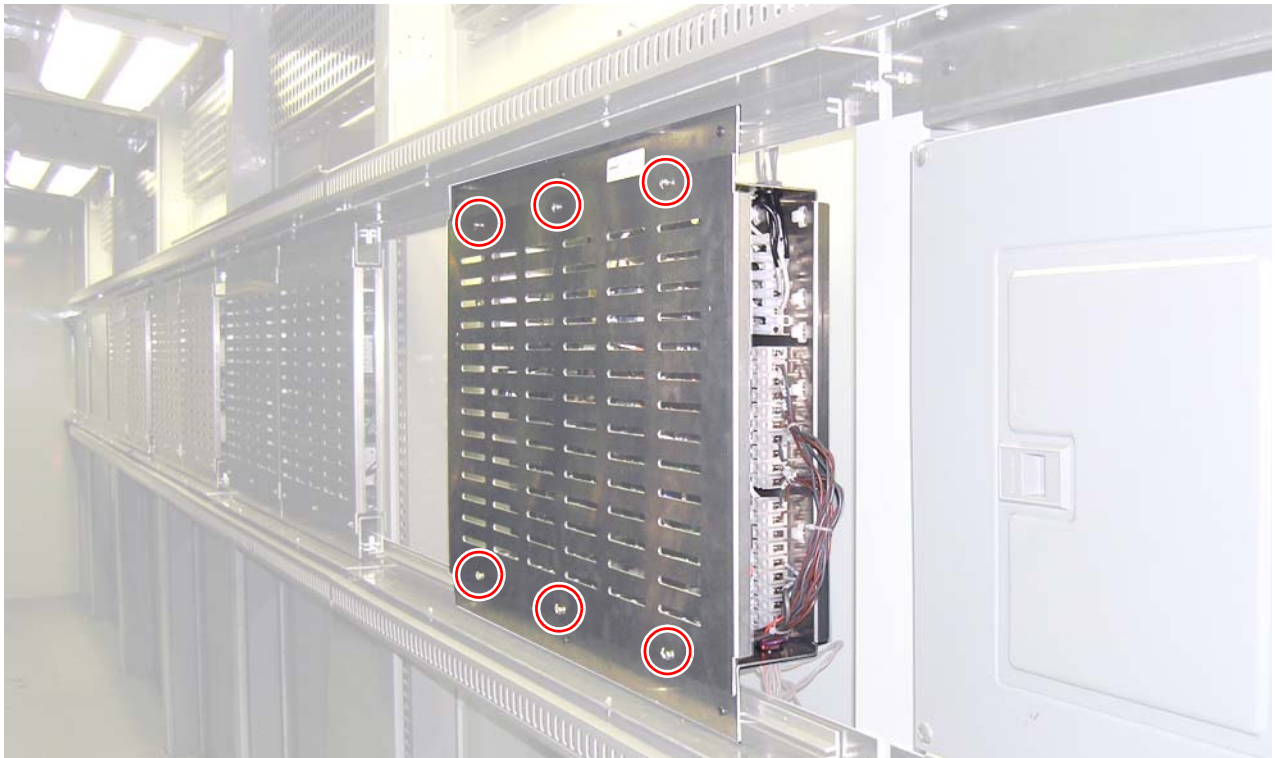
Sign controller board replacement

WARNING! Hazardous voltage. Contact with high voltage may cause serious injury or death. Always disconnect power to unit prior to servicing.

⇒ To replace Controller #1 or #2 board

1. Switch all sign breakers to the OFF position, except the breaker for the sign lights. See “Load center panel” on page 25.
2. Loosen, but do not remove, the screws (circled below) on the protective cover over the controller plate. Then remove the cover:

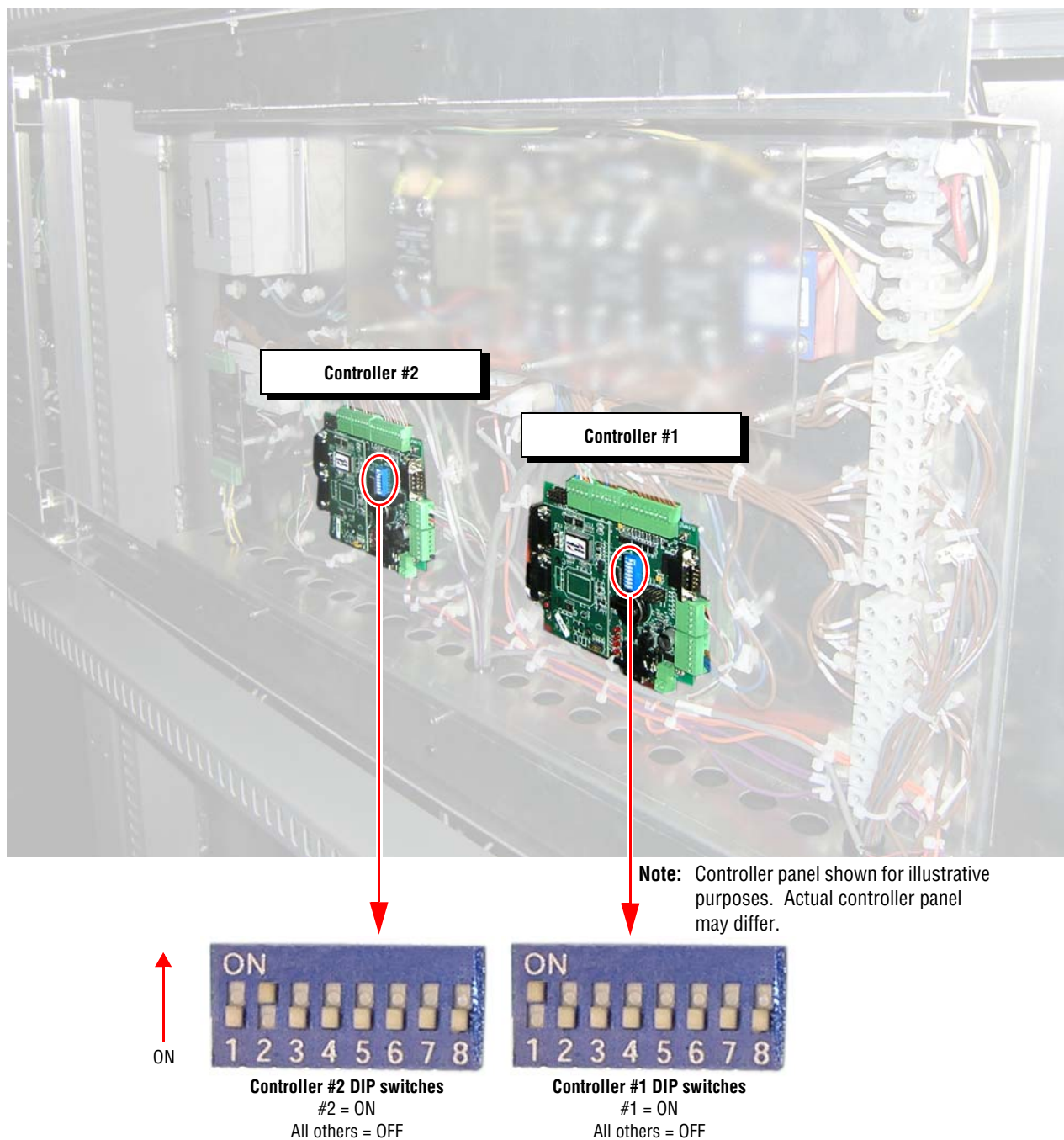
Figure 10. Screw locations on the controller's cover.



3. Locate the controller board (either Controller #1 or #2) to be replaced. See “Inside views” on page 18.

4. Set the DIP switches and jumpers on the *replacement* controller board so they match the DIP switch settings on the board to be replaced.

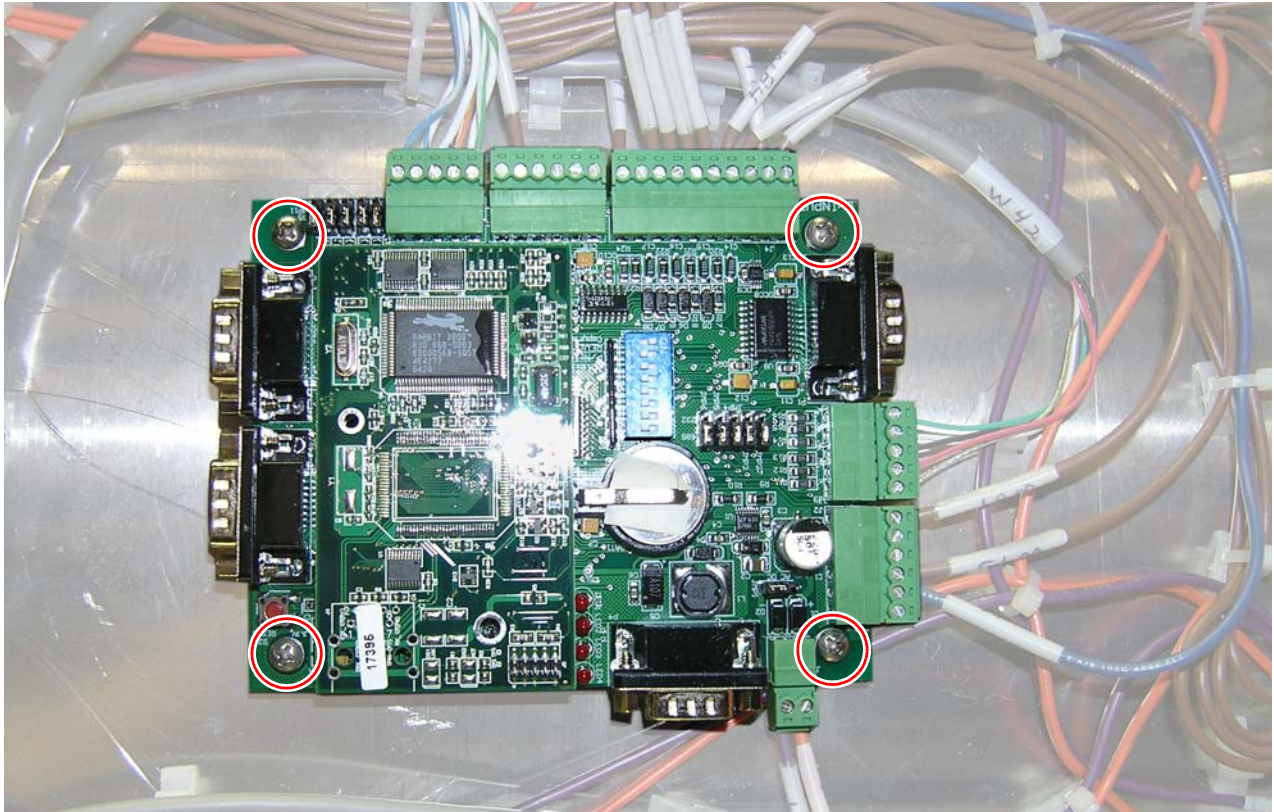
Figure 11. DIP switch settings on the sign controller boards.



5. Disconnect all cables from the controller board to be replaced.

6. Remove the four screws (circled below) that hold the controller board to the sign:

Figure 12. Locations of the screws securing the controller board to the sign.



7. Fasten the new controller board to the sign. Then reconnect all the cables to the new board.
8. Reattach the protective cover over the controller plate.
9. Close the sign and apply power to the sign.

Controller #3 board replacement

WARNING! Hazardous voltage. Contact with high voltage may cause serious injury or death. Always disconnect power to unit prior to servicing.

⇒ To replace the Controller #3 board

1. Remove power from the Controller #3 panel.
2. Locate the controller board to be replaced.
3. Set the DIP switches and jumpers on the replacement board to match the DIP switches and jumpers on the board being replaced.

Figure 13. Controller #3 panel DIP switch settings.

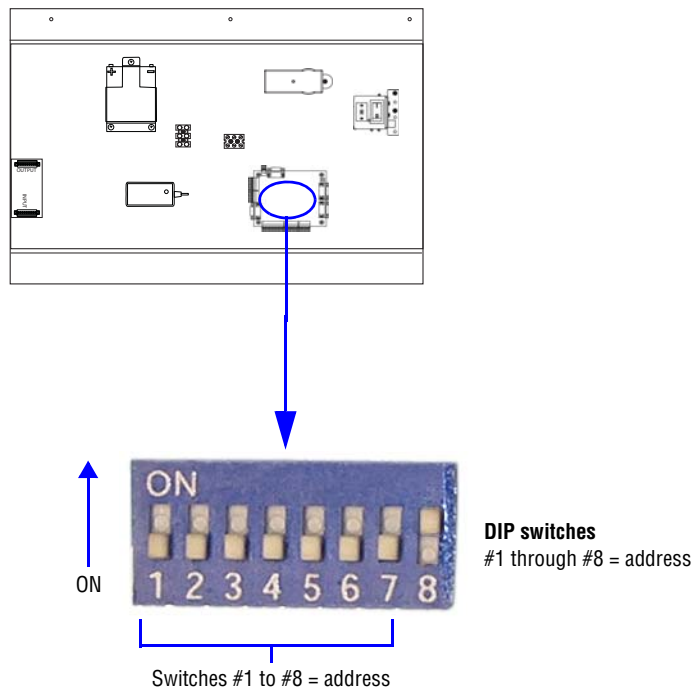
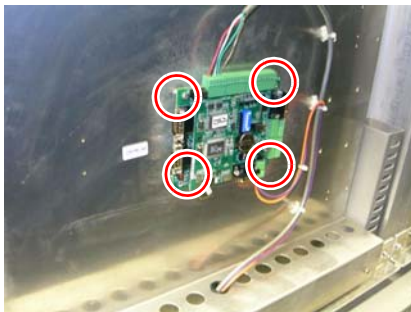


Table 1: DIP switch addressing

Dipswitch	Address
1	1
2	2
3	4
4	8
5	16
6	32
7	64
8	128

4. Disconnect all the cables from the controller board to be replaced.
5. Remove the four screws (circled below) that hold the controller board to the panel. Remove the controller board from the sign.

Figure 14. Locations of the screws securing the controller board to the panel.



6. Fasten the new controller board to the sign.
7. Reconnect all the cables to the new controller board.
8. Apply power to the controller plate.

⇒ To set the IP address for new Controller #3 board

Note: To assign an IP address, the IP Set Utility program must be installed on the computer that will be communicating to the sign. Contact Adaptive Technical Services at (800) 558-7022 or (414) 357-2020 if you do not have this program.

1. Using a null modem cable, connect a laptop computer to the controller board at P3 (next to the Reset button). See “Sign controllers” on page 22 for the P3 location.
2. Open IP Set Utility program — select **Start > Programs > IPSetUtility > IP Set Utility**.
3. Enter the appropriate information in the *IP Set Utility* window (See the following illustration.).

Note: If the controller is operational (LED 1 is normally flashing), use *Get* to see if the sign’s IP address can be retrieved.

Figure 15. Setting the IP address for the controller.

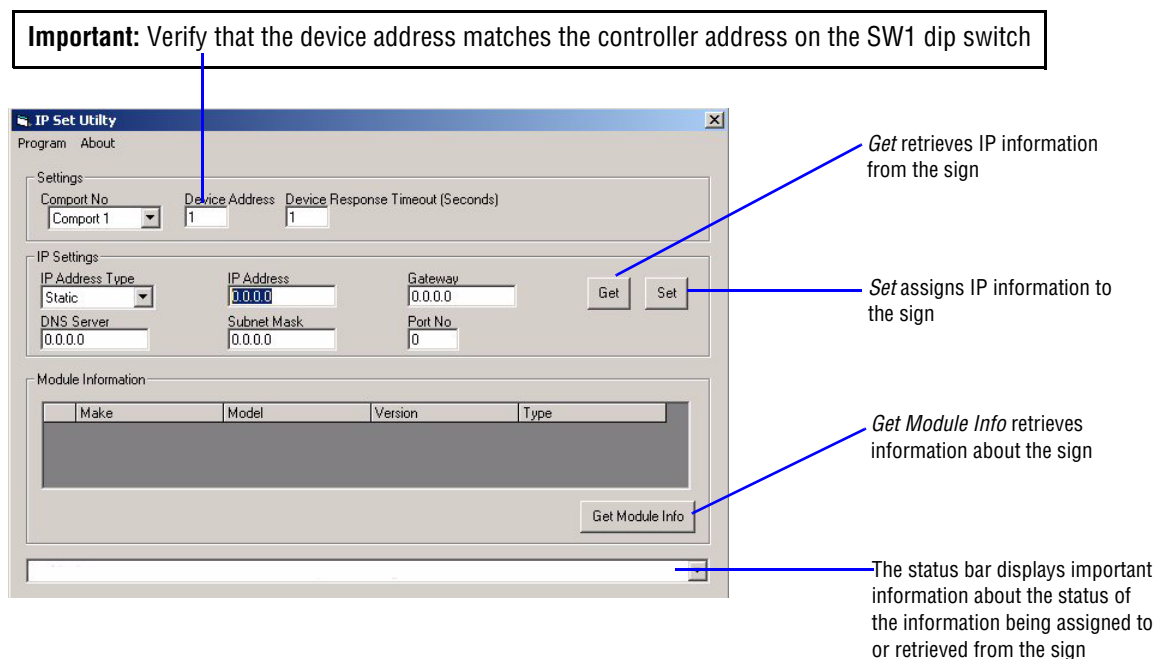


Table 2: DIP switch positions and decimal values

DIP switch positions	Equivalent decimal values
1	1
2	2
3	4
4	8
5	16
6	32
7	64
8	128

Example: if SW1 has position 1 and position 4 on, then it is set to address 9.

4. Click **Set** to set the IP address (each sign must have a unique IP address).

Note: The DIP switches must be set to the same value as the last number of the IP address.

5. After the IP address is set, detach the computer from the controller board.
6. Reset the controller and verify operation of controller.

Power supply replacement

WARNING! Hazardous voltage. Contact with high voltage may cause serious injury or death. Always disconnect power to unit prior to servicing.

⇒ to replace the sign power supplies

1. Turn all sign breakers to the OFF position, except the breaker for the sign lights. See “Load center panel” on page 25.
2. Loosen, but do not remove, the screws (circled below) on the protective cover over the power panel. Then remove the cover.

Figure 16. Screw locations on the power panel's cover.



3. Remove all wires from the power supply to be replaced:

DC connections:

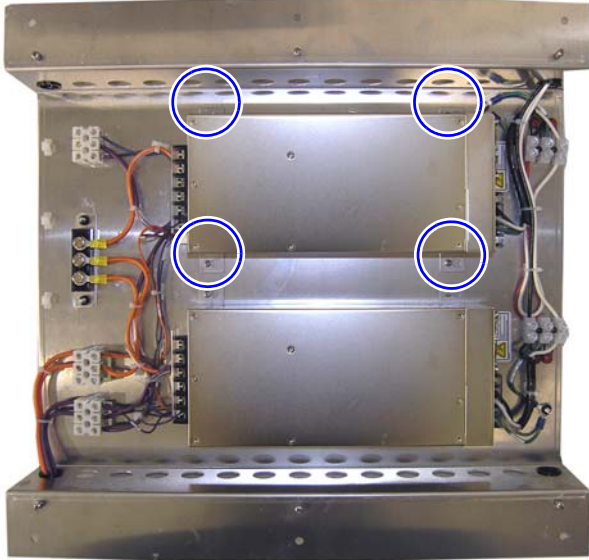
- V+ (orange-colored wire)
- V- (violet-colored wire)
- Signal harness (may be easier to remove once the power supply brackets are loosened)

AC connections:

- Hot \Line (black wire)
- Neutral \N (white wire)
- Ground (green wire)

4. Loosen the four screws (circled below) that hold the power supply to the power panel. Then slide the power supply out.

Figure 17. Locations of the screws securing the power supply to the power panel.



5. Fasten the new power supply to the power panel. Then reconnect all the wires to the new power supply.
6. Reattach the protective cover to the power panel.
7. Apply power to the sign and verify operation.

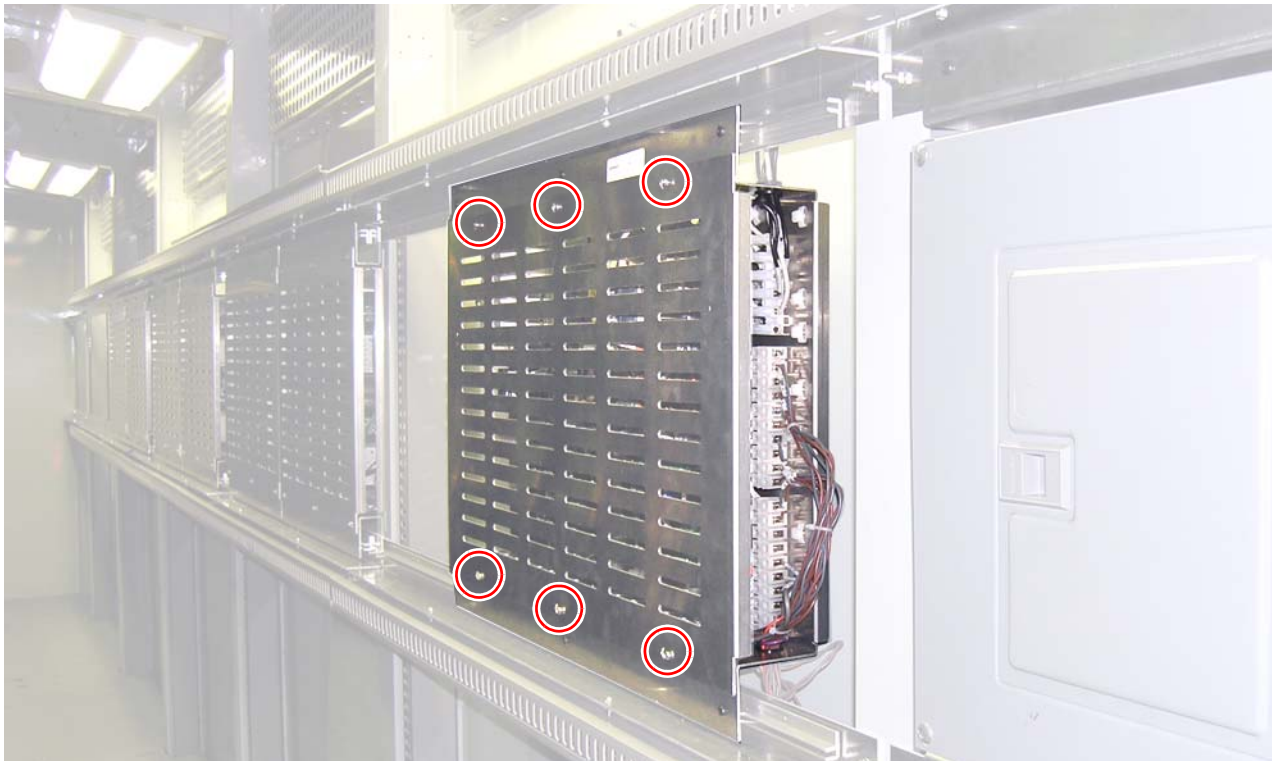
Relay replacement

WARNING! Hazardous voltage. Contact with high voltage may cause serious injury or death. Always disconnect power to unit prior to servicing.

⇒ To replace the relay

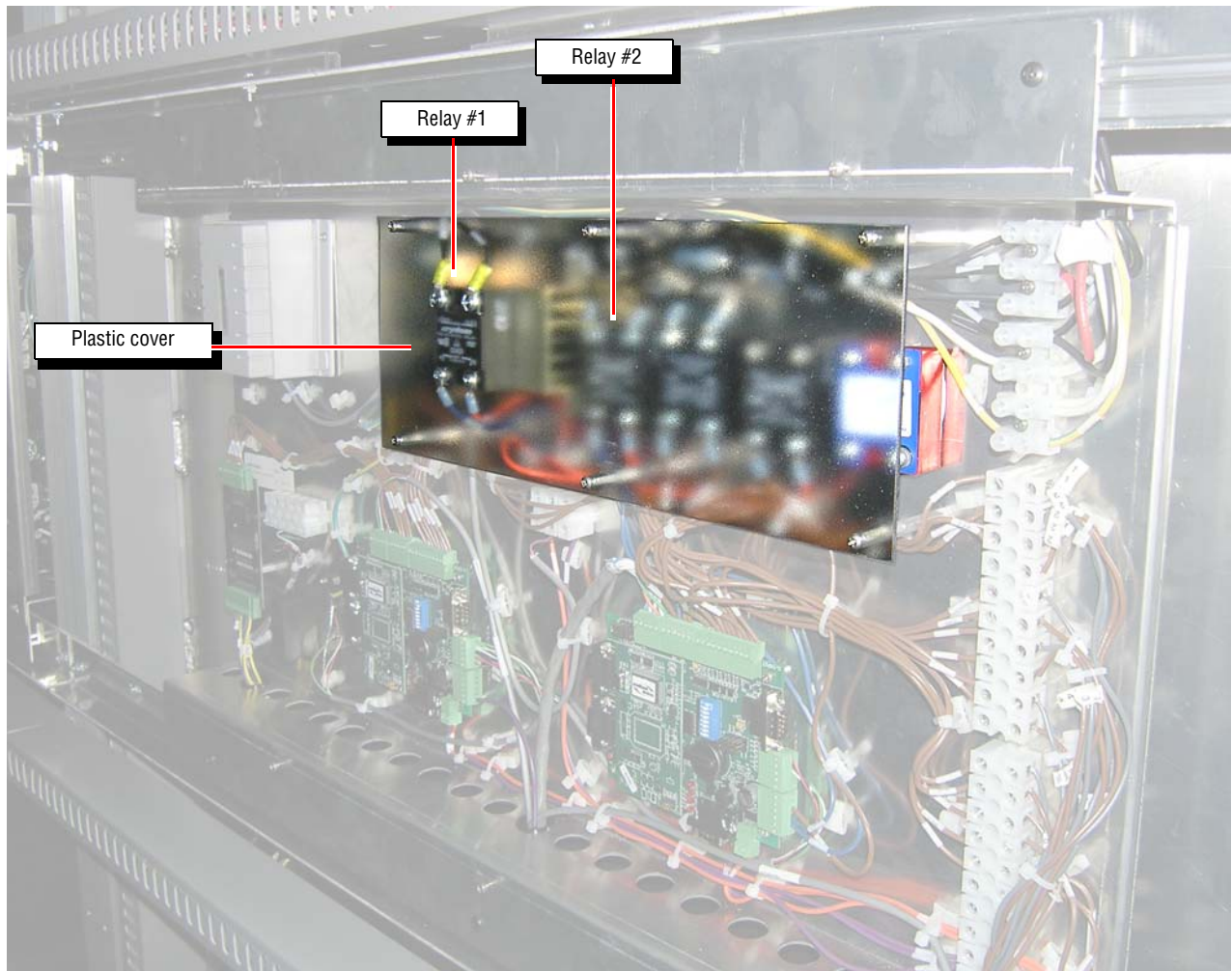
1. Switch all sign breakers to the OFF position, except the breaker for the sign lights. See “Load center panel” on page 25.
2. Loosen, but do not remove, the screws (circled below) on the protective cover over the controller plate. Then remove the cover.

Figure 18. Locations of the screws on the controller plate's cover.



3. Locate the relay (or the flasher) to be replaced.

Figure 19. Relay locations.



4. Before disconnecting the wires attached to the relay, mark the location of each wire so that the replacement relay can be connected properly.
5. Disconnect the wires.
6. Remove the screws holding the relay to the controller panel.
7. Attach the new relay to the controller panel.
8. Reconnect the wires to the new relay.
9. Reattach the plastic cover over the relays.
10. Reattach the protective cover over the controller plate.
11. Apply power to the sign.

LED driver board replacement

Note: To match the color and intensity of the sign's LEDs, you may need to determine the BIN letter of the LED driver board to be replaced (see “LED driver board” on page 26).

WARNING! Hazardous voltage. Contact with high voltage may cause serious injury or death. Always disconnect power to unit prior to servicing.

⇒ To replace an LED driver board

1. Switch all sign breakers to the OFF position, except the breaker for the sign lights. See “Load center panel” on page 25.
2. Locate the LED driver board to be replaced.
3. Remove the protective panel that covers the back of this LED driver board.

Figure 20. Hand hold locations on the protective panel.

Use these hand holds to lift the panel up and then off.

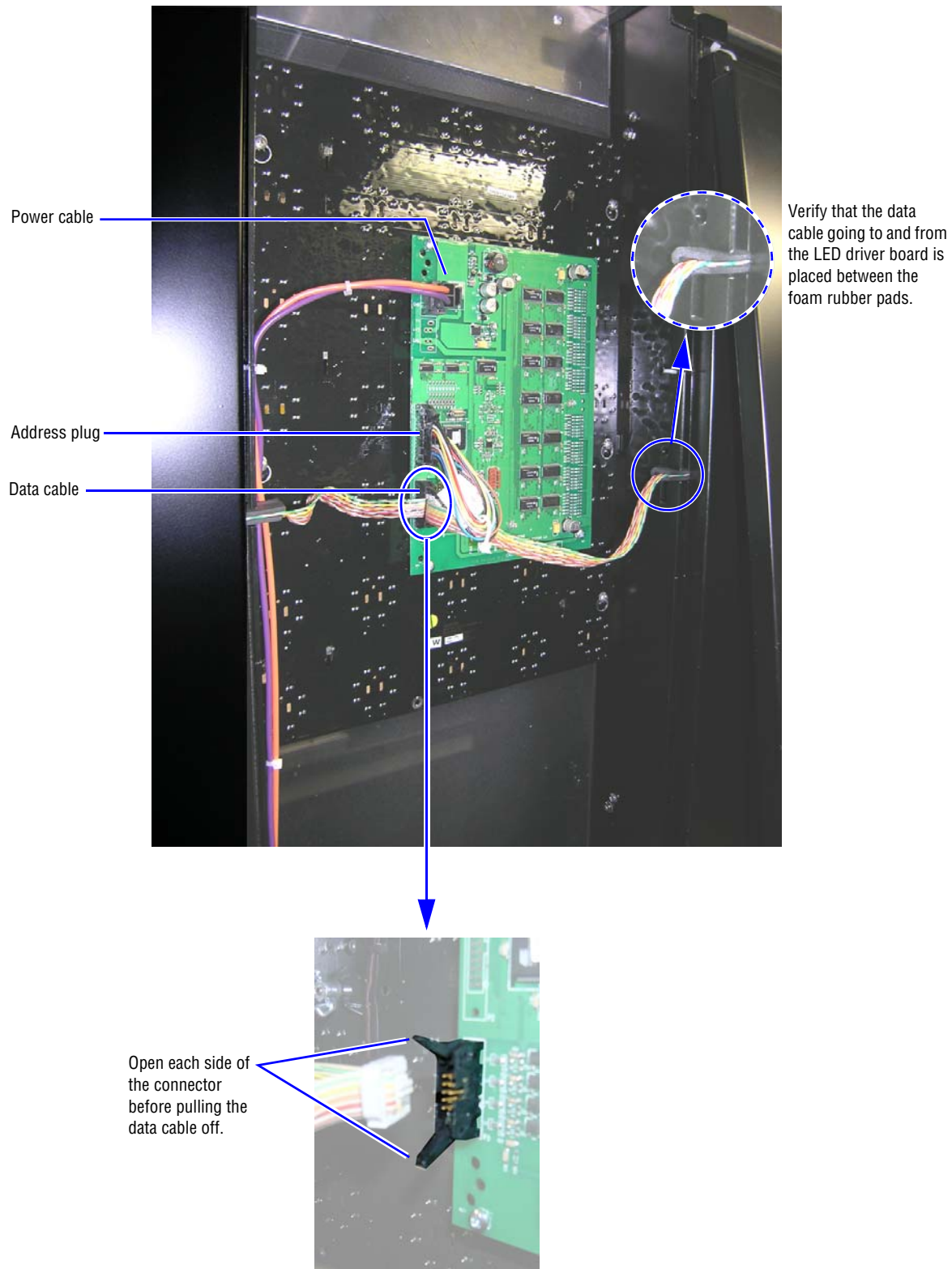
Place the panel out of the way.



4. In the following order, remove the following from the back of the LED driver board:

- Power cable (P1)
- Address plug (P2)
- Communications cable (P3)

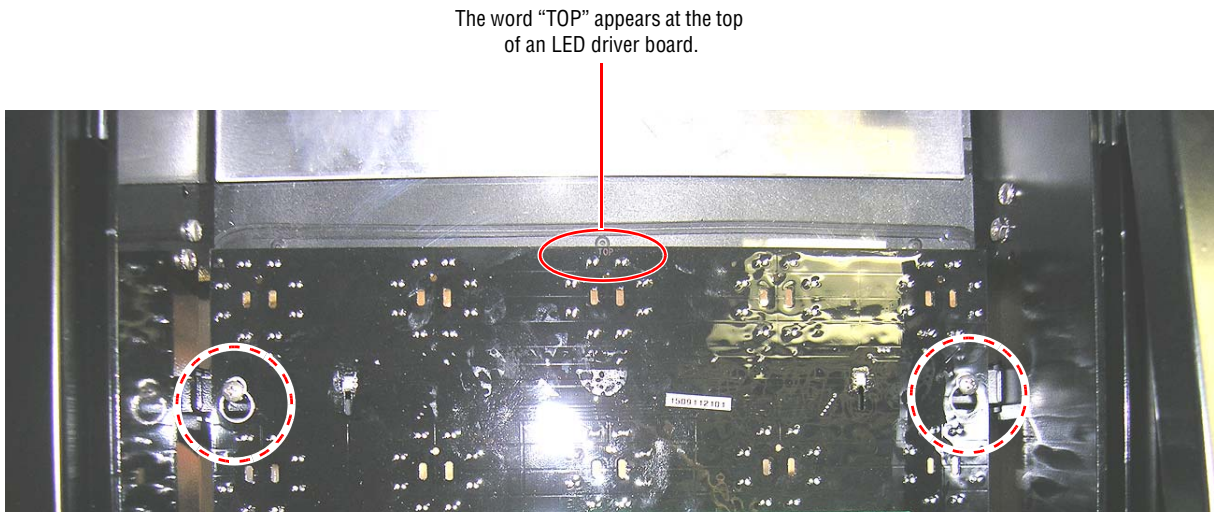
Figure 21. P1, P2, and P3 locations on the LED driver board.



5. Attach a failure tag indicating failure details so the problem can be diagnosed and the fix verified.

6. Loosen the six screws (two are circled below) that hold the LED driver board to the sign. Then remove the board.

Figure 22. Screw locations on the LED driver board.



7. Attach the new LED driver board to the LED panel.

Note: The top of the LED driver board is marked with the word "TOP" on the front of the board.

8. Connect the following in the order listed:

- Address plug (P2)
- Comm ribbon cable (P3)
- Power (P1)

9. Reattach the protective panel that covers the back of this LED driver board.

10. Apply power to the sign.

Fan replacement

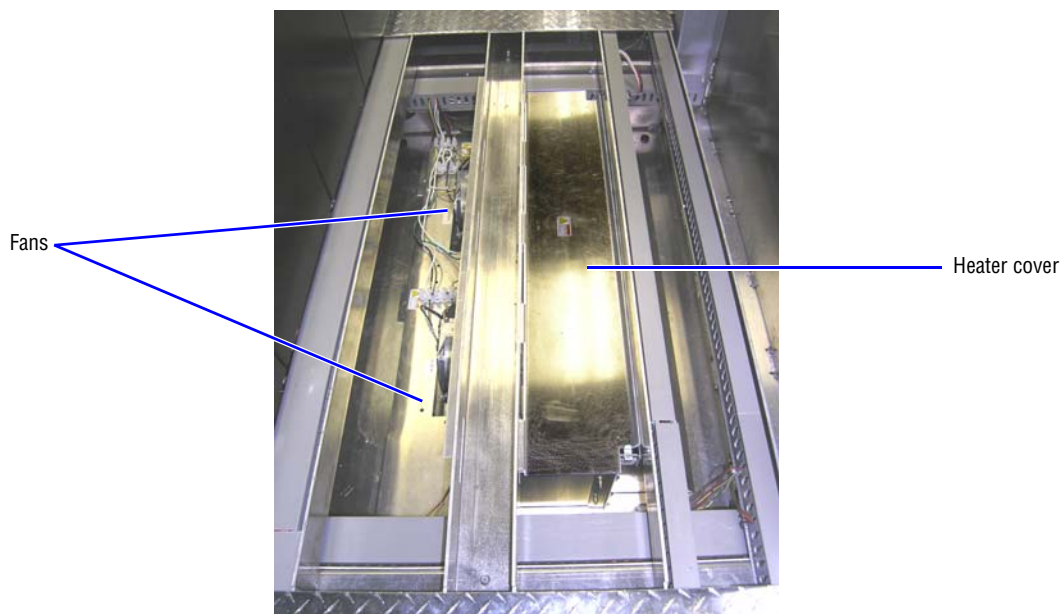
Note: To replace the filter for a fan, see “Fan filter cleaning” on page 29.

WARNING! Hazardous voltage. Contact with high voltage may cause serious injury or death. Always disconnect power to unit prior to servicing.

⇒ To replace a fan

1. Switch all sign breakers to the OFF position, except the breaker for the sign lights. See “Load center panel” on page 25.
2. Remove the metal access floor panel from over the fan that will be replaced:

Figure 23. Fan locations.



3. Remove the fan to be replaced from the fan assembly. Note the orientation. Fan arrows point toward the front of the sign.

Note: Before removing the wires attached to the fan, mark the location of each wire so that the replacement fan can be connected properly.

4. Cut the wires on the new fan to length and strip the 3/8-inch off the ends.
5. Attach the replacement fan by connecting the following wiring:

AC Wiring	DC Wiring
Black to Black	Red to Red
White to White	Blue to Blue
	Yellow to Yellow

6. Place the metal access floor panel back.
7. Close the sign.
8. Apply power and test the fan by verifying that it is blowing toward front of sign.

Light sensor replacement

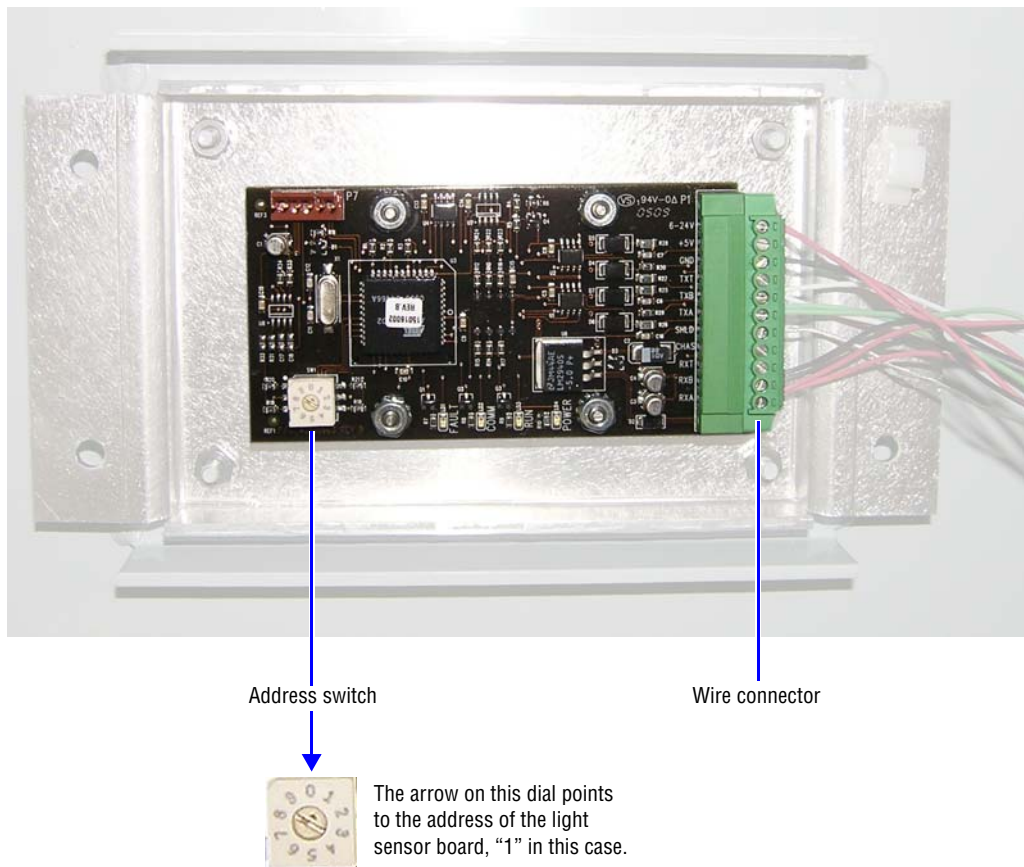
WARNING! Hazardous voltage. Contact with high voltage may cause serious injury or death. Always disconnect power to unit prior to servicing.

⇒ To replace the light sensor

1. Switch all sign breakers to the OFF position, except the breaker for the sign lights. See “Load center panel” on page 25.
2. Locate the light sensor to be replaced.

Note: Three light sensors are used in the sign. All three are located above the sign entrance door.

Figure 24. Light sensor.

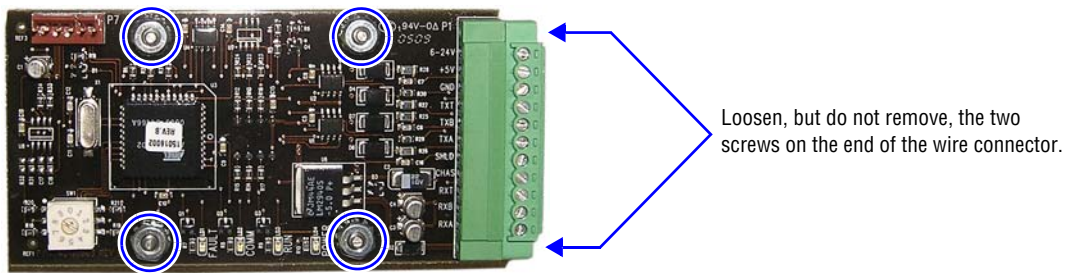


3. Set the address switch on the *replacement* light sensor board to the setting on the board that will be replaced:

- Address 0 = light sensor on *front* of sign.
- Address 1 = light sensor on *top* of sign.
- Address 2 = light sensor on *back* of sign.

4. Use a small, flat blade screwdriver to remove the wire connector from the light sensor that is being replaced. Then remove the four nuts (circled below) that hold the board to the sign.

Figure 25. Light sensor board.



5. Attach the replacement light sensor to the sign and verify the address as indicated in Step 3.
6. Reapply power to sign.
7. Verify replacement light sensor is functioning properly.

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