Front Access 28x96 1.07-Inch Pitch LED Sign Maintenance Manual

Florida DOT Orange County Advanced Traffic Management System (ATMS)
Field System Deployment (Project #Y4-756-DB)

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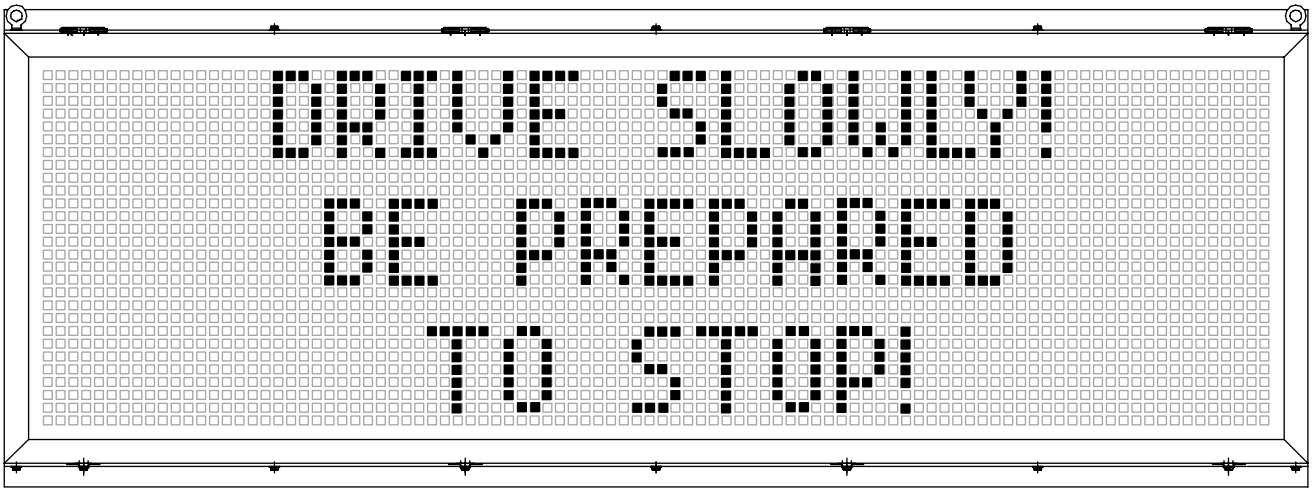

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1.0 Notes

All pages in this manual are 8.5 x 11 inches except Section 6. The pages in this section are 11 x 17 inches.

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2.0 Introduction

2.1 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.

2.2 Revision history

Table 1: Revision history

Revision	Date	Notes
1507600201	September 15, 2005	First release.
1507600201	September 19, 2005	Section 2 “System overview” added.

2.3 Related documentation

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

Table 2: Related documentation

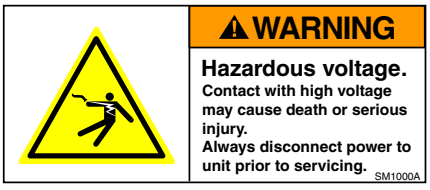
Part #	Manual title	Description
TechMemo #05-0005	Preventing Electrostatic Discharge (ESD) Damage	Describes the precautions to take to protect electronic components from ESD damage.

2.4 Safety information

2.4.1 Equipment symbols

Chassis ground

2.4.2 Warnings and cautions



Other warnings and cautions are posted in appropriate location throughout this manual.

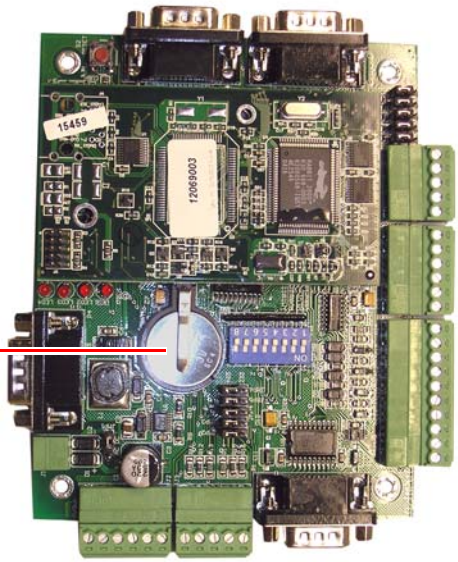
2.4.3 Battery backup

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

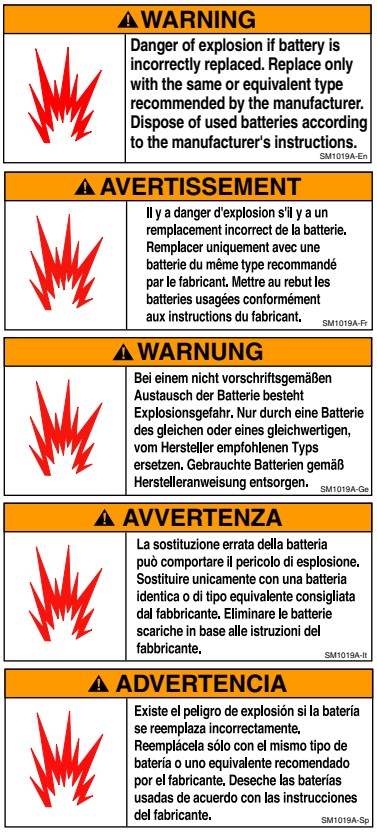
NOTE: The backup batteries only provide enough power to operate the sign's controllers, not the sign's LED displays.

2.4.3.1 3V lithium backup batteries

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



3V lithium battery (Panasonic CR2032 or equivalent).



2.4.3.2 12V lead-acid backup battery

One, 12V, sealed lead-acid battery provides power to the sign's two controller boards in the event of a power loss. This lead-acid battery is located on the sign controller plate:

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

2.5 System overview

This section contains the LED Variable Message Sign (VMS) systems description and a general explanation of how each system operates.

2.5.1 Introduction

The Adaptive LED family of Variable Message Signs are considered to be one of the highest visibility sign systems available. Utilizing the latest generation of Light Emitting Diode (LED) technology has allowed us to construct a high reliability, variable message sign display system.

The LED Variable Message Signs used on this project consist of a front access type with a 8 x 14 display board @ 1.07-inch pitch configured in a full matrix of 28 x 96 pixels. The sign was designed to be used as an outdoor highway information sign. The sign utilizes a corrosion resistant front access housing with control circuitry enclosed within. The only connections necessary are AC power and Communications Input/ Output between the Sign Housing and Ground Cabinet.

The entire sign system may be broken down into four (4) basic subsystems:

- VMS Control System
- LED Brightness Control System
- Environmental Control
- Electrical System

In the following sections, we explain each of the above mentioned systems in general terms for ease of understanding. Referring to the drawings that are called out should help you to gain a general understanding of the LED Variable Message Sign system.

2.5.2 What is a LED?

LED-based signs are one of the most versatile and visible display systems available. We use a cluster of small Light Emitting Diodes (LEDs), to form a pixel. The pixels are arranged in various matrices to form alphanumeric characters. These characters are then linked together to form a LED display line. The display line may be arranged in one of two formats: segmented or full matrix. Both LED formats are capable of displaying any alphanumeric character, including punctuation marks. However, the full matrix format has the added ability to form simple graphics characters.

2.5.3 VMS control system

The VMS control system utilized in the Variable Message Sign consists of the following components:

- IDI1320 controller
- Driver board
- Cable interface board
- LED display board

2.5.3.1 General operation

The controller interfaces with the “Host” computer system, and communicates with the Host through a CAT 5 Ethernet cable or an RS232 Input/Output (1/0) port. Using this network connection or I/0 port, the Host issues commands to, and requests status information from, the LED VMS equipment. The controller monitors and controls the entire LED VMS system. Communications utilized by the controller to and from

the Host and the VMS is accomplished using industry standard 10/100 Ethernet or RS232 communications circuitry and NTCIP protocol.

2.5.4 VMS brightness control system

The VMS is equipped with a brightness control system for the LEDs. The brightness control system ensures that the display is readable in all lighting conditions.

The photocells are enclosed in the photocell assembly to protect them from the environment. Three photocells continually monitor the ambient light conditions. The photocell assembly is constructed in such a manner that adverse weather conditions (i.e. heavy snow) should have no effect on its performance. The main components of the brightness control system are as following:

- Photocell assembly
- Photocells (3, facing the sky, front, and rear of sign)
- IDI 1320 Controller

2.5.4.1 General operation

The photocells are enclosed in the cabinet to protect them from the environment. The photocells continuously monitor the ambient light conditions and sends the information directly to the controller. The controller assembly determines exactly how much ambient light is present through the light sensing photocell and sends the proper command to the display module for it to adjust duty cycle of the LED current drive, thus dimming or brightening the LED modules according to the ambient light (If the on time of the duty cycle is 50% than the brightness will be at 50%. If the on time of the duty cycle is 75% than the brightness will be at 75%, etc.). The photocell assembly is constructed in such a manner that adverse weather conditions (such as heavy snow) should have no effect on its performance.

2.5.5 Environmental control system — sign housing

The environmental control system in the sign housing is responsible for maintaining a working environment for the sign display components and communication electronics in the sign display systems. The environmental control system consists of the following components:

- Temperature sensors
- Fans
- Fan filters
- Relays (for sign fans)
- Humidity sensor
- Fan monitor board
- Heater strip
- Heater relay

2.5.5.1 General operation

The fans are responsible for exchanging air in the sign for temperature control and ventilation through the sign. The fans are automatically turned OFF or ON based on the readings from temperature sensors and sign controller settings. The fan monitor board is used to determine if the fans are operating within specifications and communicates the fan status to the SBC. The humidity sensor, heater strip, fans, and

temperature sensors are all used to determine if there is an environmental condition, which would cause the front plex to fog. Based on an algorithm, if the situation dictates it is needed, the heater strip will be enabled and the fans will blow hot air across the front face.

2.5.6 Electrical system

The electrical supply system is responsible for supplying the necessary power to operate the LED sign system. The sign housing AC and DC electrical system consists of the following components:

- Load center
- GFCI service outlet
- Light
- Door switch
- DC power supply
- Battery backup

2.5.6.1 Electrical distribution (AC)

The AC input to the sign system consists of 120/240 VAC single phase service wired to the load center located in the sign. An outlet is available. A light is turned on when the door is opened. AC is also wired, through the load center, to the DC power supplies.

2.5.6.2 Electrical distribution (DC)

Attached to the back panels in the sign housings are the power supply boxes containing three (3) 12 VDC switching power supplies. The electronics power supplies convert the 120 VAC to the required DC voltage to power all of the electronics in the sign. DC power to the electronics is redundant and has a primary and secondary source of DC power. Therefore, failure of a power supply will not impact sign performance. The controller monitors the status of the power supplies.

A battery backup system is used with the controller. Therefore, if power failure occurs, the controller will still be able to communicate with central. The LED displays are not powered by this battery backup system, so no messages are displayed during a power failure.

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3.0 Equipment description

3.1 General description

- Serviceability: Front access.
- Weight: 560 pounds (approximate).
- Dimensions: see “6.15 Sign dimensions” on page 52.
- Electrical: 120VAC, 50/60Hz, 30A. Typical current draw is approximately 3A.
- Display size: 28 LED pixel rows x 96 LED pixel columns (see Figure 1).
- Character height: 7.49-inches, nominal (see Figure 1).
- Character width: 4.28-inches, nominal (see Figure 1).

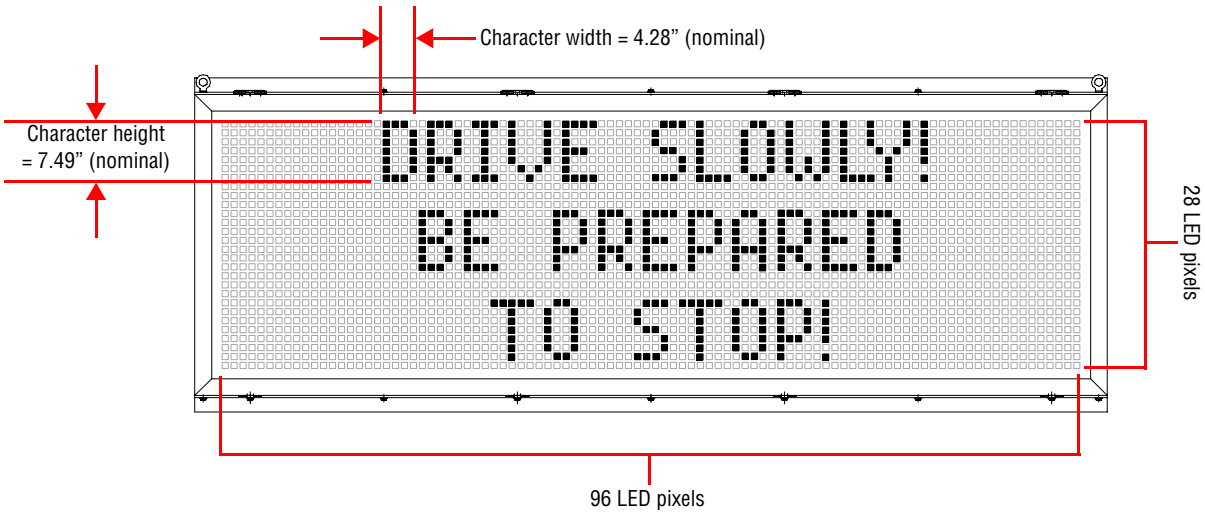


Figure 1: Display size

- Pitch (distance between each LED pixel): 1.07 inches:

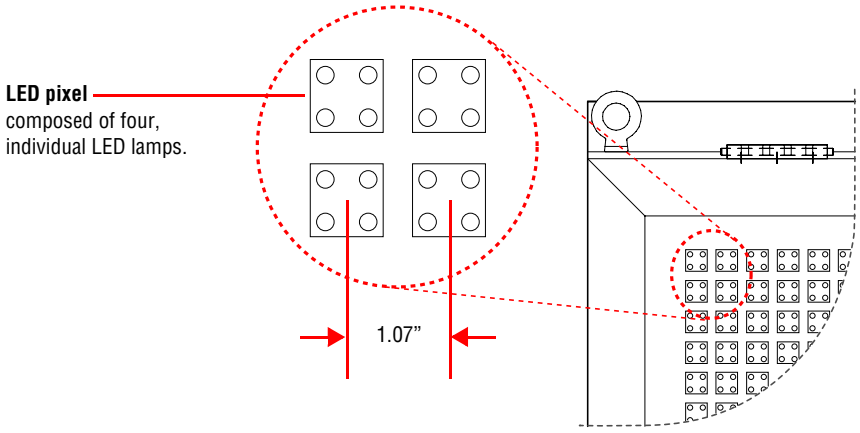
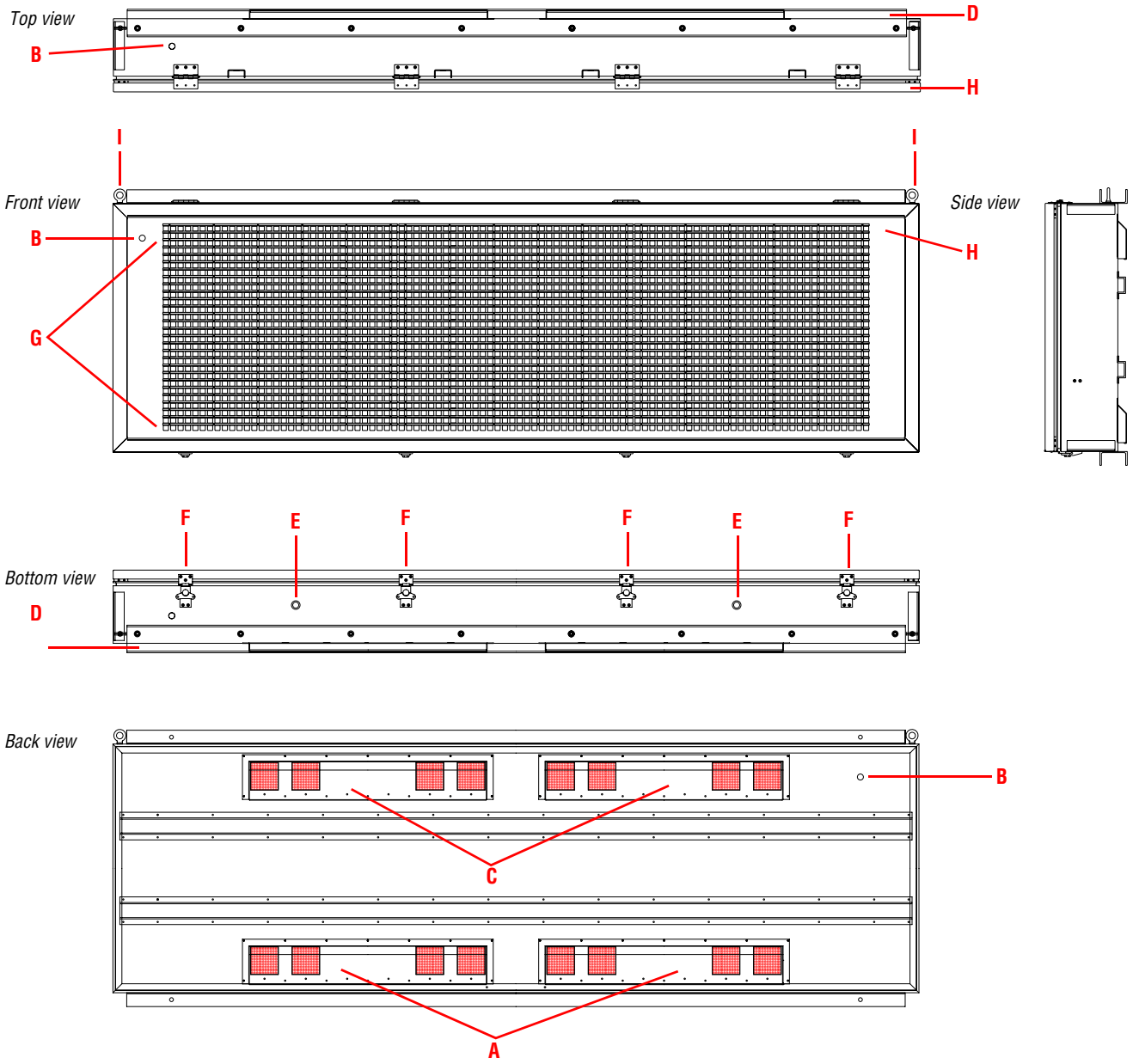


Figure 2: LED pitch

3.2 Outside views

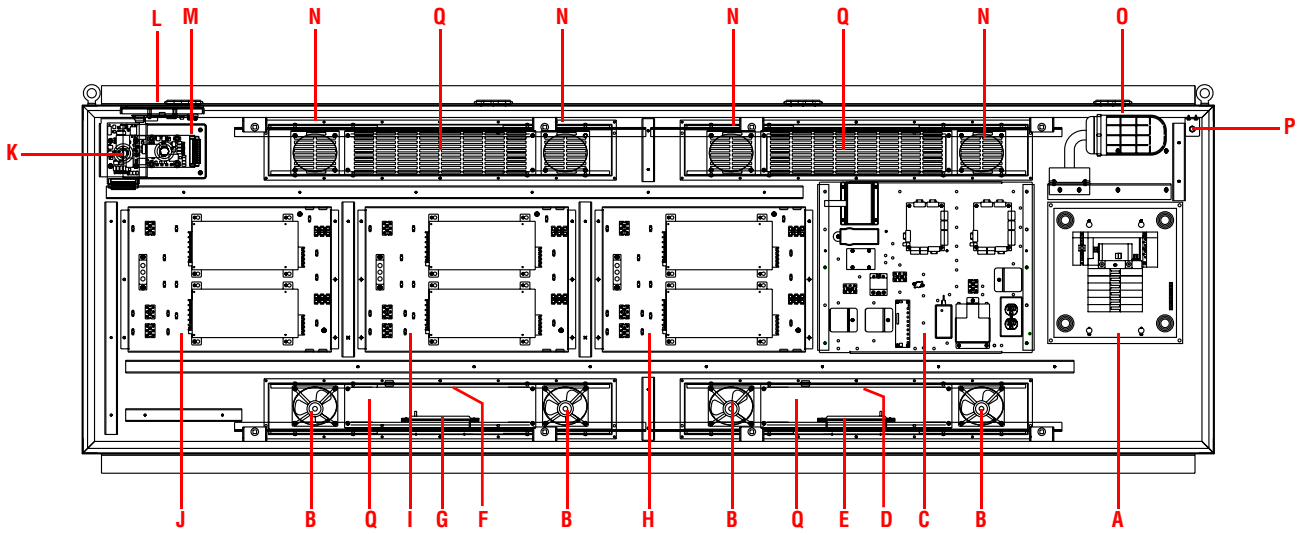


Item	Name	Description
A	Intake air vent	Allows cool air inside sign.
B	Photocell	Used for dimming sign LEDs.
C	Exhaust air vent	Permits hot air from inside sign to exit.
D	Mounting angle	3 x 2 x 1/4-inch aluminum angle used to mount sign to a support structure.
E	Drain hole	Allows any water that accumulates inside sign to escape.
F	Front face frame latch	Used to fasten sign front face frame shut.
G	LEDs	Used to display messages.
H	Front face frame window	Lexan XL10 solar grade polycarbonate, 3/16-inch thick.
I	Lifting eyebolt	Used to lift sign. These should NOT be used to mount the sign.

3.3 Inside view

3.3.1 General view

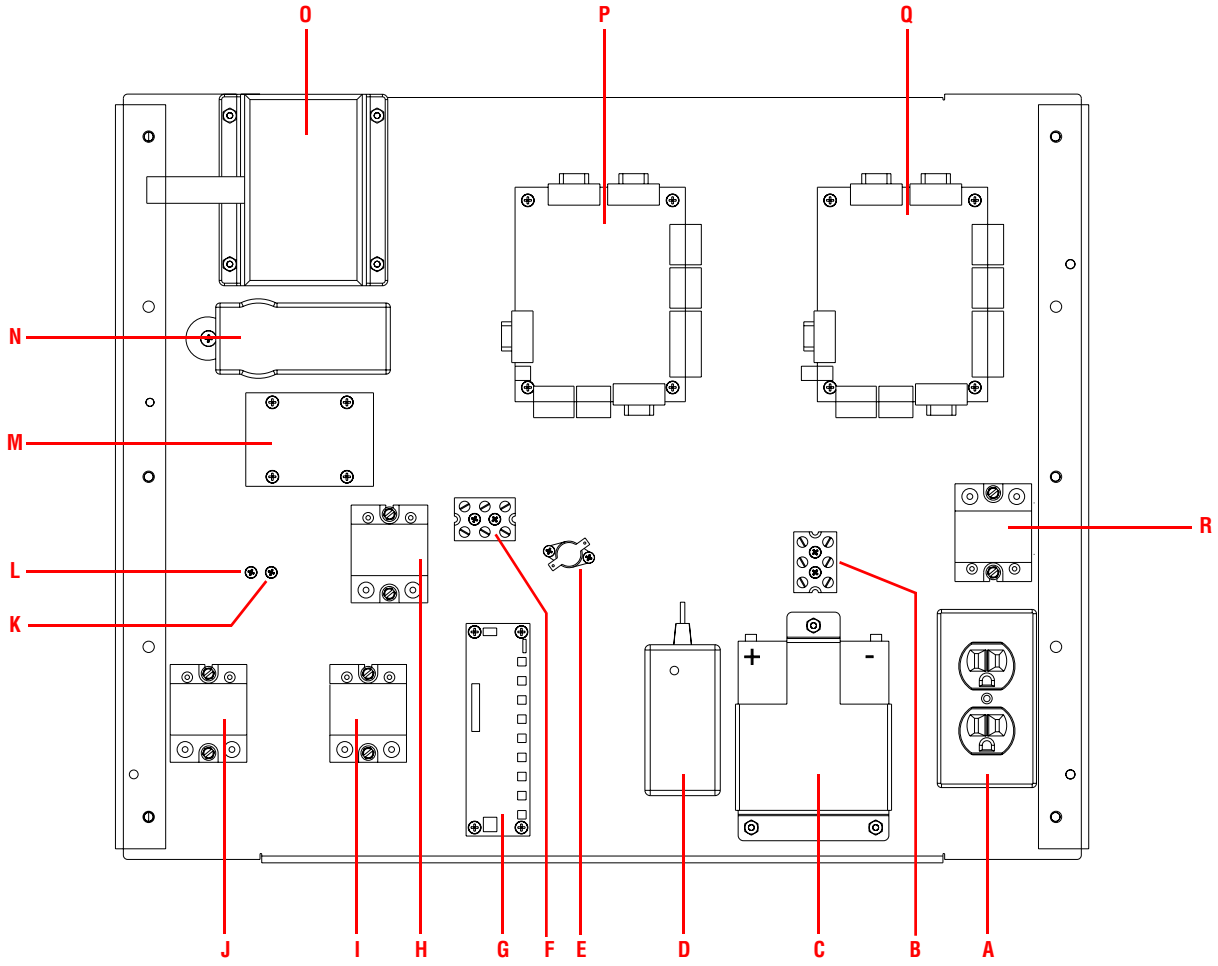
For a larger view of this inside view, see “6.3 Internal view of sign (15072001-04, revision A, sheet 3 of 14)” on page 40.



Item	Name	Description
A	Load center	See “6.6 Load center view (15072001-04, revision A, sheet 6 of 14)” on page 43.
B	Fan	See “6.11 Fans, heaters, and relay information (15072001-04, revision A, sheet 11 of 14)” on page 48.
C	Controller plate	See “6.5 Controller plate view (15072001-04, revision A, sheet 5 of 14)” on page 42.
D	Thermostat #1	See “6.11 Fans, heaters, and relay information (15072001-04, revision A, sheet 11 of 14)” on page 48.
E	Heater #1	
F	Thermostat #2	
G	Heater #2	
H	Power panel #3	See “6.13 Power panel #3 information (15072001-04, revision A, sheet 13 of 14)” on page 50.
I	Power panel #2	See “6.12 Power panel #1 and #2 information (15072001-04, revision A, sheet 12 of 14)” on page 49.
J	Power panel #1	
K	Light sensor #0	The address number of a light sensor is set via SW1 and is the same as the light sensor number. See “6.10 Driver board and light sensor board information (15072001-04, revision A, sheet 10 of 14)” on page 47.
L	Light sensor #1	
M	Light sensor #2	
N	Exhaust vent	Vents hot air from the sign to the outside.
O	Light	See “6.13 Power panel #3 information (15072001-04, revision A, sheet 13 of 14)” on page 50.
P	Front face frame switch	Used to detect if the sign’s front is open or closed and also provides power to the internal light fixture as well as to Relay #4 to sense whether door is open or closed. See “6.13 Power panel #3 information (15072001-04, revision A, sheet 13 of 14)” on page 50.
Q	Air filter cover	Remove to gain access to the exhaust vent or fan air filters.

3.3.2 Controller plate

For a larger view of the controller plate, see “6.5 Controller plate view (15072001-04, revision A, sheet 5 of 14)” on page 42.



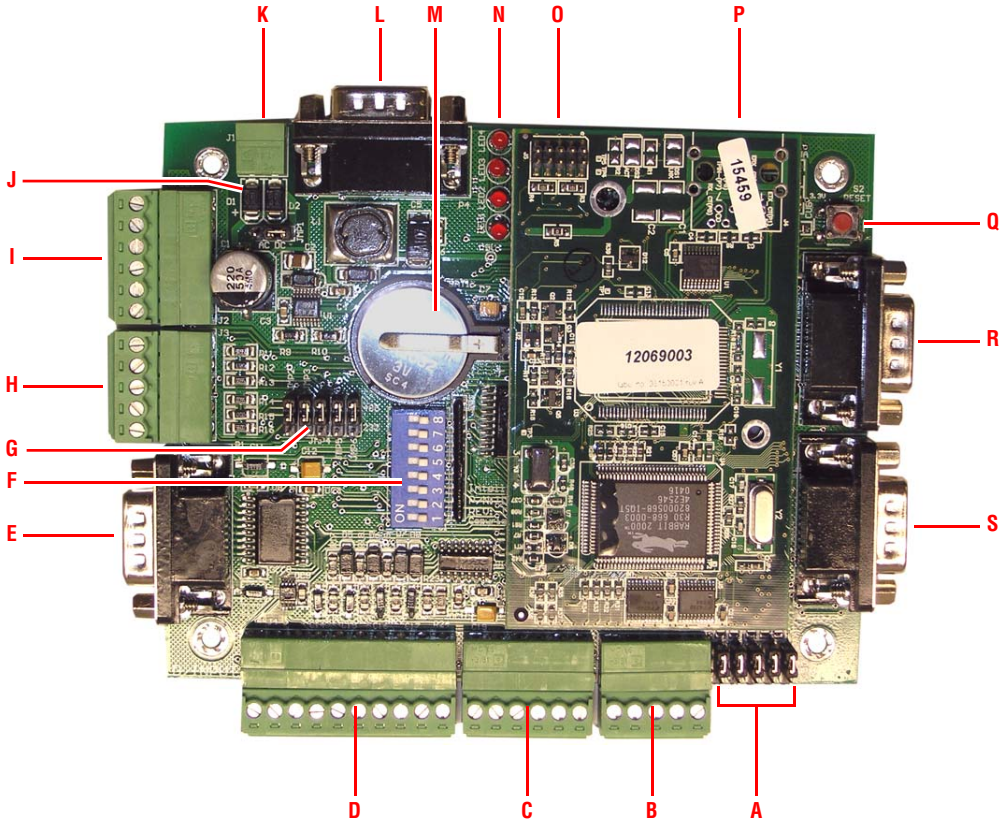
Item	Name	Part #	Description
A	120V outlet	1507500101	See “6.5 Controller plate view (15072001-04, revision A, sheet 5 of 14)” on page 42.
B	Terminal block #2	43201043	See “6.5 Controller plate view (15072001-04, revision A, sheet 5 of 14)” on page 42.
C	12VDC lead-acid battery	1507500201	See “6.5 Controller plate view (15072001-04, revision A, sheet 5 of 14)” on page 42.
D	3-stage battery charger	1507500301	See “6.5 Controller plate view (15072001-04, revision A, sheet 5 of 14)” on page 42. Used to charge the sealed, 12VDC lead-acid battery. An LED indicator on the charger indicates the following charge status: • LED color = red. Stage 1 (“bulk” charge) — In this stage, the charger is in constant current (1.0A +5/-7%) mode with the current remaining at its maximum value. • LED color = red. Stage 2 (“absorption” stage) — In this stage, the charger switches to constant voltage mode (14.7VDC, current is no longer provided at its maximum rate). The charger will continue to provide constant voltage until the charge current decreases to the charge termination level. • LED color = green. Stage 3 (“float” stage) — In this final stage, the battery charger is placed in standby/ready mode (13.7VDC) as the battery will be fully charged.
E	Fan thermostat	30670752	Normally open. Closes when temperature > 120°F and this activates the fans. Relay #4 can also turn on the fans.
F	Terminal block #1	43201043	See “6.5 Controller plate view (15072001-04, revision A, sheet 5 of 14)” on page 42.

G	Fan control	1507101101	Monitors fan speed. Sends alert via NTCIP if fan speed falls below a specified RPM. See “6.11 Fans, heaters, and relay information (15072001-04, revision A, sheet 11 of 14)” on page 48.
H	Relay #3	48000008	Fan relay. See “6.11 Fans, heaters, and relay information (15072001-04, revision A, sheet 11 of 14)” on page 48.
I	Relay #2	48000004	Blankout relay. Customer defined (120V maximum 1A connection). “6.11 Fans, heaters, and relay information (15072001-04, revision A, sheet 11 of 14)” on page 48
J	Relay #1	48000004	Heat strip relay. See “6.11 Fans, heaters, and relay information (15072001-04, revision A, sheet 11 of 14)” on page 48.
K	Ground connection #1	—	
L	Ground connection #2	—	
M	Voltage converter	1507101301	See “6.13 Power panel #3 information (15072001-04, revision A, sheet 13 of 14)” on page 50.
N	Ethernet surge protector	1507101201	Protects controller boards from voltage spikes on incoming Ethernet line. See “6.5 Controller plate view (15072001-04, revision A, sheet 5 of 14)” on page 42. NOTE: If the surge protector is replaced, make sure to ground the protector.
O	Humidity sensor	1507100601	Measures internal relative humidly within 3% accuracy. See “6.5 Controller plate view (15072001-04, revision A, sheet 5 of 14)” on page 42,
P	Controller #1	15029101	See “3.3.3 Controller #1 and #2” on page 18.
Q	Controller #2	12069003	
R	Relay #4	48008203	Front face frame status relay is used to detect if the sign front is opened or closed. See “6.11 Fans, heaters, and relay information (15072001-04, revision A, sheet 11 of 14)” on page 48.

3.3.3 Controller #1 and #2

Both controllers are similar so only Controller #2 is shown. However, Controller #1 has an Ethernet port. For more information:

- **Controller #1** — see "6.7 Controller #1 information (15072001-04, revision A, sheet 7 of 14)" on page 44 and "6.9 Controller #1 and #2 wiring information (15072001-04, revision A, sheet 9 of 14)" on page 46.
- **Controller #2** — see "6.8 Controller #2 information (15072001-04, revision A, sheet 8 of 14)" on page 45 and "6.9 Controller #1 and #2 wiring information (15072001-04, revision A, sheet 9 of 14)" on page 46.



Item	PCB label	Name	Description
A	JP7 to JP11		
B	J6	RS485 Port 1	• Controller #1 — connects to LED displays. • Controller #2 — connects to Light sensors #0, #1, and #2.
C	J5 A/INPUT	Analog inputs	• Controller #1 — connects to Relay #2 and #3, humidity sensor, voltage converter. • Controller #2 — connects to voltage converter.
D	J4 D/INPUT	Digital inputs	• Controller #1 — connects to Relay #4. • Controller #2 — not used.
E	P1	RS232 port	RS232 COMM PORT 0 — not used because J3 is used.
F	S1	DIP switches	• Controller #1 — see "6.7 Controller #1 information (15072001-04, revision A, sheet 7 of 14)" on page 44. • Controller #2 — see "6.8 Controller #2 information (15072001-04, revision A, sheet 8 of 14)" on page 45. • Both controllers — see "6.9 Controller #1 and #2 wiring information (15072001-04, revision A, sheet 9 of 14)" on page 46.
G	JMP2 to JMP6		
H	J3	RS422 port	Used to interface both controllers together.

I	J2	Digital outputs	• Controller #1 — connects to Relays #1, #2, and #3. • Controller #2 — not used.
J	JMP1		
K	J1	Power connector	
L	P4	RS232 port	Not used.
M	BAT1	Battery backup	3V lithium battery (Panasonic CR2032 or equivalent).
N	LED1 to LED4	Diagnostic LEDs	• LED1: ❏ Controller #1 = Heartbeat. ❏ Controller #2 = Heartbeat. • LED2: ❏ Controller #1 = Communications from Ethernet or P3 (laptop computer). ❏ Controller #2 = Not used. • LED3: ❏ Controller #1 = Communications to and from Controller #2. ❏ Controller #2 = Communications to and from Controller #1. • LED4: ❏ Controller #1 = Communications to and from LED display boards. ❏ Controller #2 = Communications to and from Light sensors #0, #1, and #2.
O	J5	Programming port	
P	J4	Ethernet port (not shown).	Only on Controller #1.
Q	S2 RESET	Controller reset switch	Only use if a controller board locks up.
R	P3	RS232 port	RS232 COMM PORT 2 — used to interface laptop computer to Controller #1.
S	P2	RS232 port	RS232 COMM PORT 1 — not used because J6 is being used.

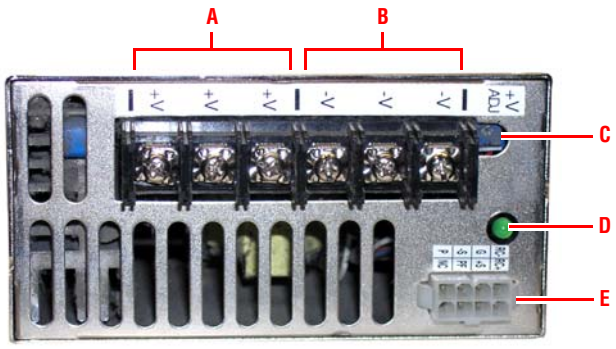
3.3.4 Power panel and power supplies

There are three power panels in the sign. Each panel contains two, 12VDC output power supplies.

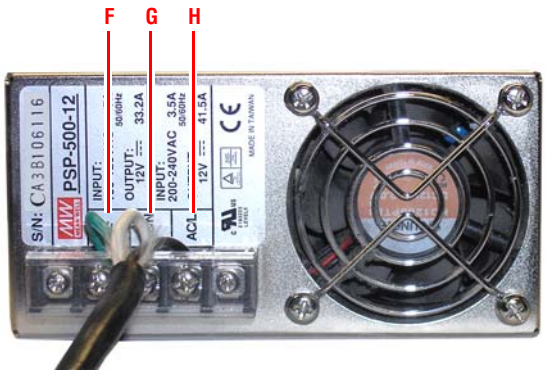
NOTE: Both power supplies may not turn on at the same time if there is not enough display load.

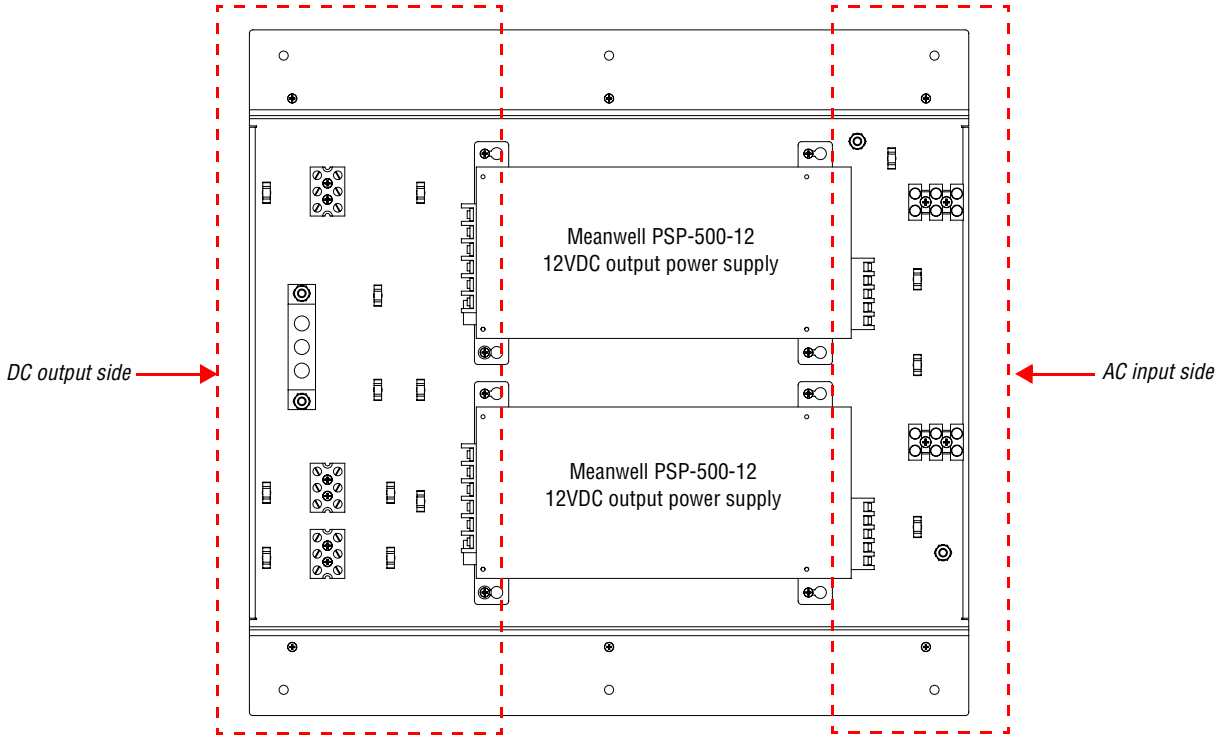
For more information, see “6.4 Power panel view (15072001-04, revision A, sheet 4 of 14)” on page 41.

Power supply DC output (front view)



Power supply AC input (back view)

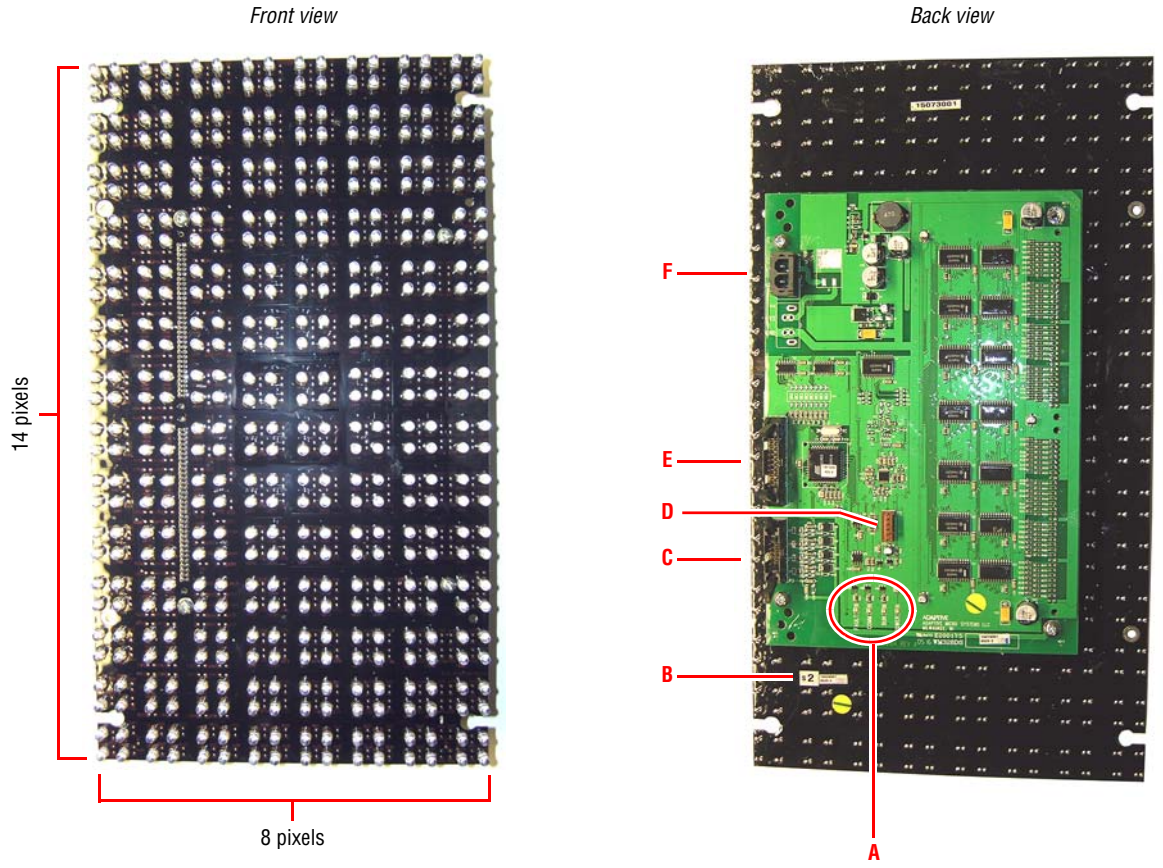




Item	Power supply label	Name	Description
A	V+	12VDC +	DC output
B	V-	12VDC -	
C		DC output voltage adjust	Adjustment range = 10 to 13.2VDC. Output should be set to 12VDC.
D		Input power indicator	Green = AC voltage supplied to power supply.
E		Signal connector	Used for remote control, remote sense, and power good signal.
F	⏚	AC in ground	AC input (90-264VAC, 47-63Hz)
G	AC/N	AC in neutral	
H	AC/L	AC in neutral	

3.3.5 LED driver board

There are 24 LED driver boards in a sign. Each board is 8 x 14 pixels, and each pixel is composed of 4 LED lamps.



Item	PCB label	Name	Description
A	LD1	POWER	On = 5V supplied to LED driver board.
	LD2	FAULT	On = one or more bad LED lamps on the LED driver board (if in normal operating mode).
	LD3	COMM	• On = There is NO communication from sign controller. • Off = There is communication from the sign controller.
	LD4	RUN	Flashing = LED driver board processor operating.
B		BIN label	Information on the intensity and wavelength of the LED lamps.
C	P3		Connects to Controller #1 via a ribbon cable.
D	P5		Programming port for the LED driver board processor.
E	P2	LED driver board address	This address is set using an address plug: **Jumper wires** These wires are placed according to "6.14 Address plug information (15072001-04, revision A, sheet 14 of 14)" on page 51. Plugs into P2

F	P1	+V1	DC power from power supplies. For connection details, see the following: • "6.10 Driver board and light sensor board information (15072001-04, revision A, sheet 10 of 14)" on page 47, • "6.12 Power panel #1 and #2 information (15072001-04, revision A, sheet 12 of 14)" on page 49, • "6.13 Power panel #3 information (15072001-04, revision A, sheet 13 of 14)" on page 50.

4.0 Maintenance

4.1 Front lens cleaning

4.1.1 Required materials

- a cleaning brush with very long and soft bristles
- a mild, nonabrasive liquid detergent (liquid glass cleaner)
- soft cloth or soft paper towels
- filters and/or filter material when required

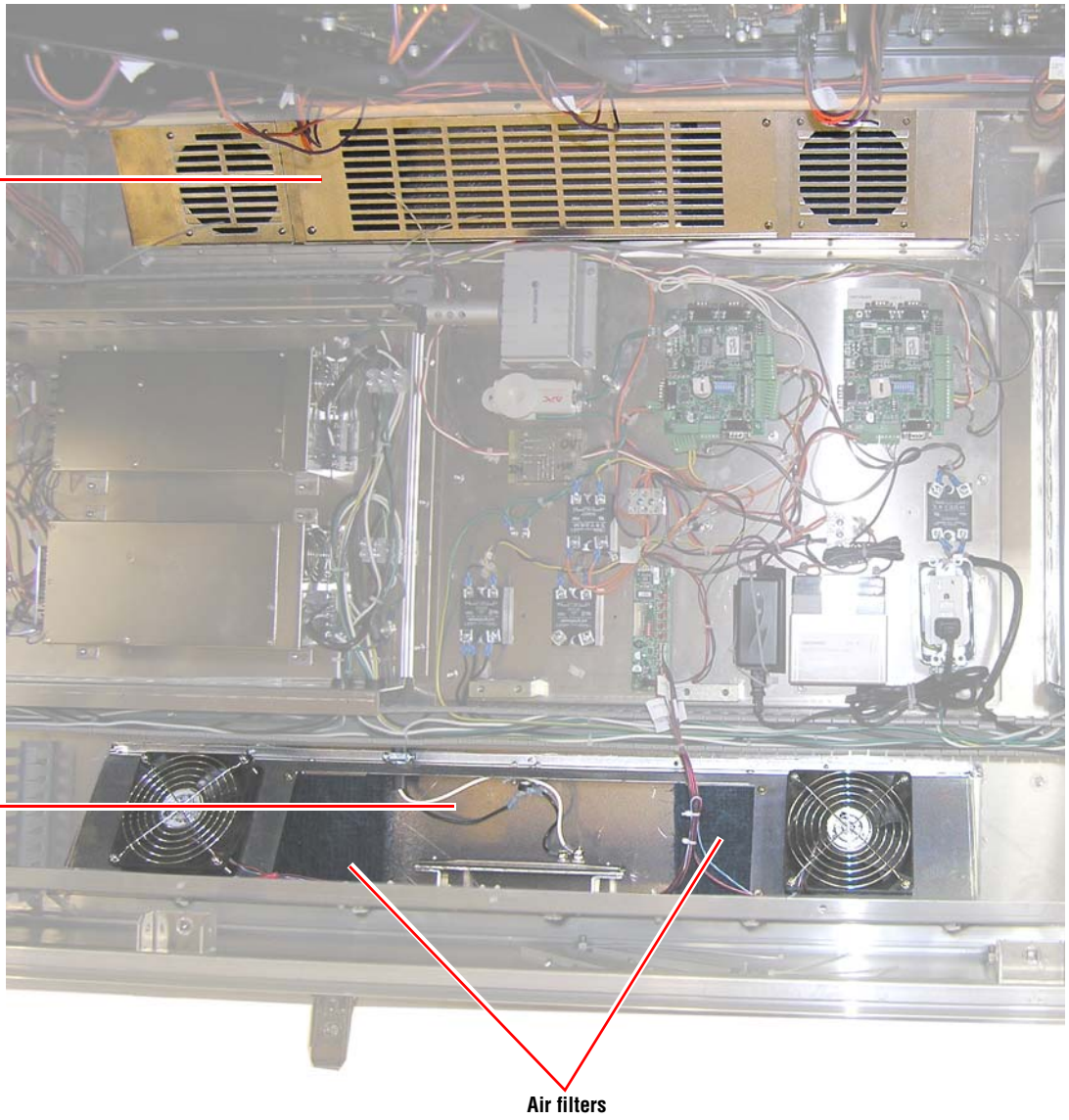
4.1.2 Cleaning procedure

1. Mix the detergent with water in a large bucket to create the cleaning solution. The solution may be put in a spray bottle for spot cleaning.
2. Put the cleaning brush in the bucket until saturated with the cleaning solution or a spray bottle may be used.
3. When the brush is wet, use it to clean the sign's lens and louvers with a horizontal motion, starting from the top and progressing toward the bottom.

4.2 Air filter cleaning

The exhaust vent and fan air filters should be checked every 6 months. To clean an air filter, do the following:

1. Open the sign. See "5.3 Opening a sign" on page 28.
2. Remove the air filter cover:



3. If an air filter needs cleaning, wash it using warm water and dish cleaning liquid. Rinse the air filter in clean water. Then dry the air filter with a clean cloth.
4. Return the clean air filter to the sign.
5. Reattach the air filter cover.
6. Close the sign.

4.3 Physical Inspection

4.3.1 Exterior inspection

- Check for any physical damage to the exterior of the sign.
- Check for any physical damage to the interior of the sign.
- Check for loose nuts, bolts, hinges, doors, etc. on the sign.
- 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.

4.3.2 Interior inspection

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

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5.0 Part replacement

5.1 List of field-replaceable parts

Table 3: Field-replaceable parts

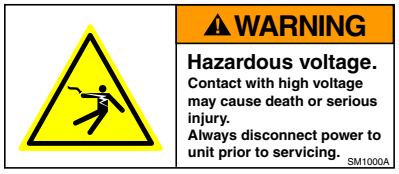
Part name	page
Controller #1, Controller #2 boards	page 29
Power supply	page 32
Relay #1, #2, #3, and #4	page 34
LED driver board	page 35

5.2 Controlling electrostatic discharge (ESD)

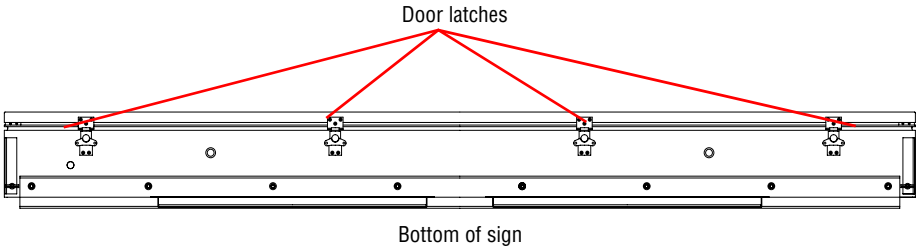
This equipment contains components that may be damaged by “static electricity”, or electrostatic discharge. To prevent this from happening, be sure to follow the guidelines in Adaptive Tech Memo 00-0005, *“Guidelines for Controlling Electrostatic Discharge Damage”*, available at Adaptive’s web site at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

5.3 Opening a sign

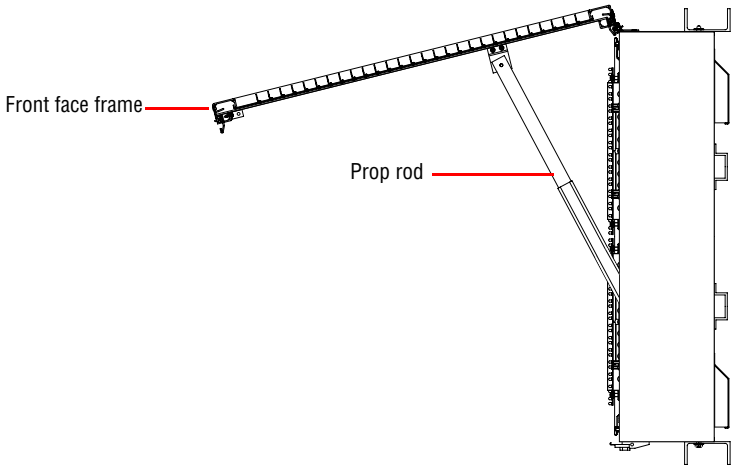
1. Remove power from sign.



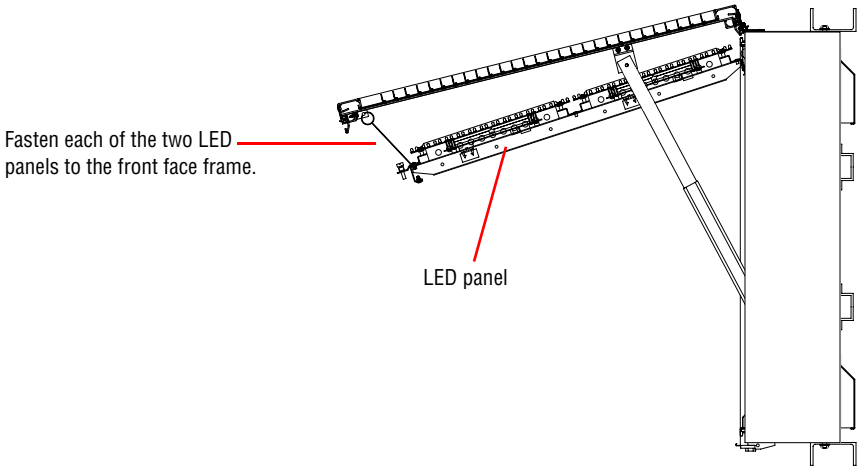
2. Unhook the four latches that are used to keep the sign's front face frame closed:



3. Lift the front face frame up until the frame's prop rods lock into place:



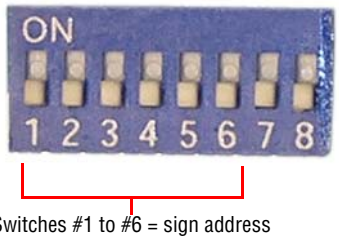
4. Lift each of the two LED panels up and fasten each to the underside of the front face frame:



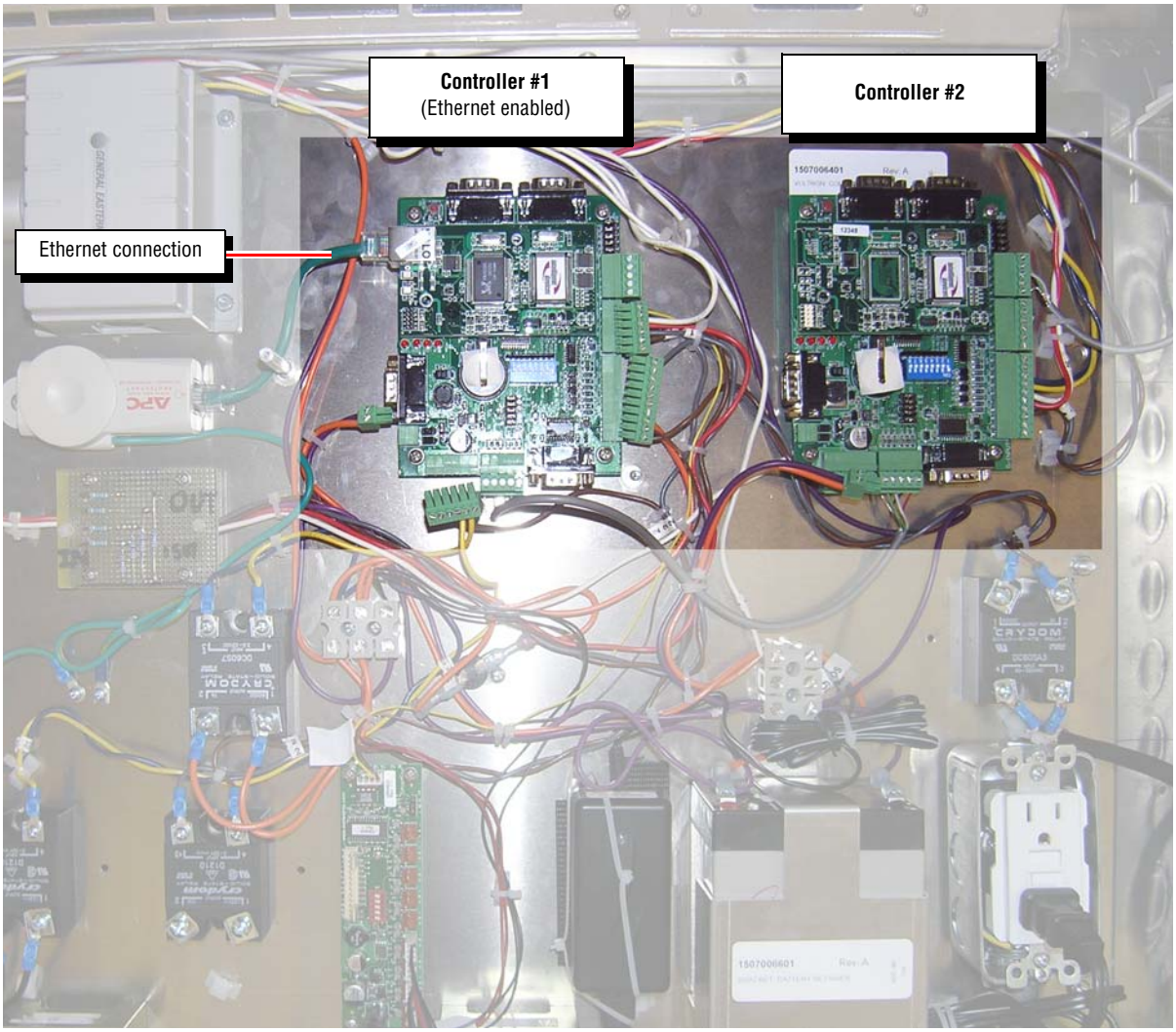
5.4 Controller board replacement

5.4.1 Install the new controller board

1. Open the sign. See "5.3 Opening a sign" on page 28.
2. Locate the controller board to be replaced (either Controller #1 or #2). Note the sign address — DIP switches #1 to #6 — on the controller to be replaced:



3. Disconnect all cables from the controller board to be replaced:



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

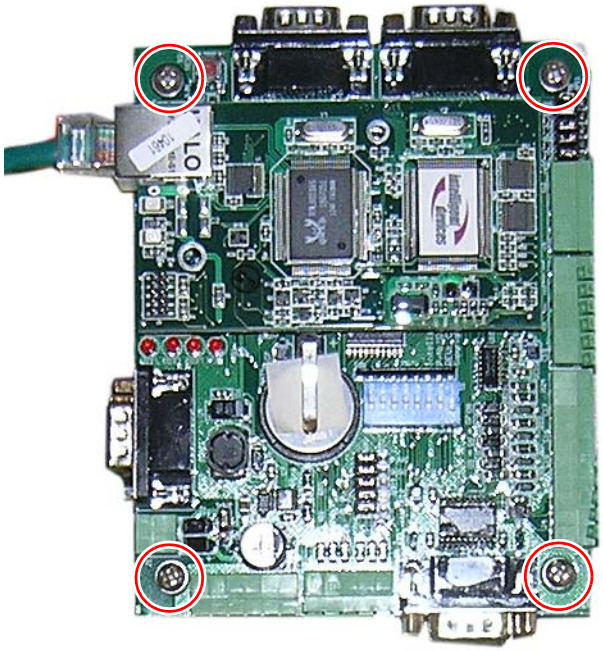


Figure 3: Controller #1 board

5. Fasten the new controller board to the sign. Then reconnect all the cables to the new board.

5.4.2 Initialize the new controller board

6. Set the controller DIP switches as follows:
   - ❏ If Controller #1 was replaced, then set switches #7 and #8 ON. Set all other switches OFF.
   - ❏ If Controller #2 was replaced, then set switch #7 ON. Set all other switches OFF.
7. Apply power to the controller board. During initialization controller board LED4 (see "3.3.3 Controller #1 and #2" on page 18) will remain on.
8. When LED4 starts *flashing* after 30 to 60 seconds, set DIP switches #1 to #6 to the sign address you previously recorded. Leave switches #7 and #8 as they were set in step 6.
9. Press the new controller board reset switch (see "3.3.3 Controller #1 and #2" on page 18).
10. If Controller #1 was replaced, follow the steps in "Set the IP address for new Controller #1 board".

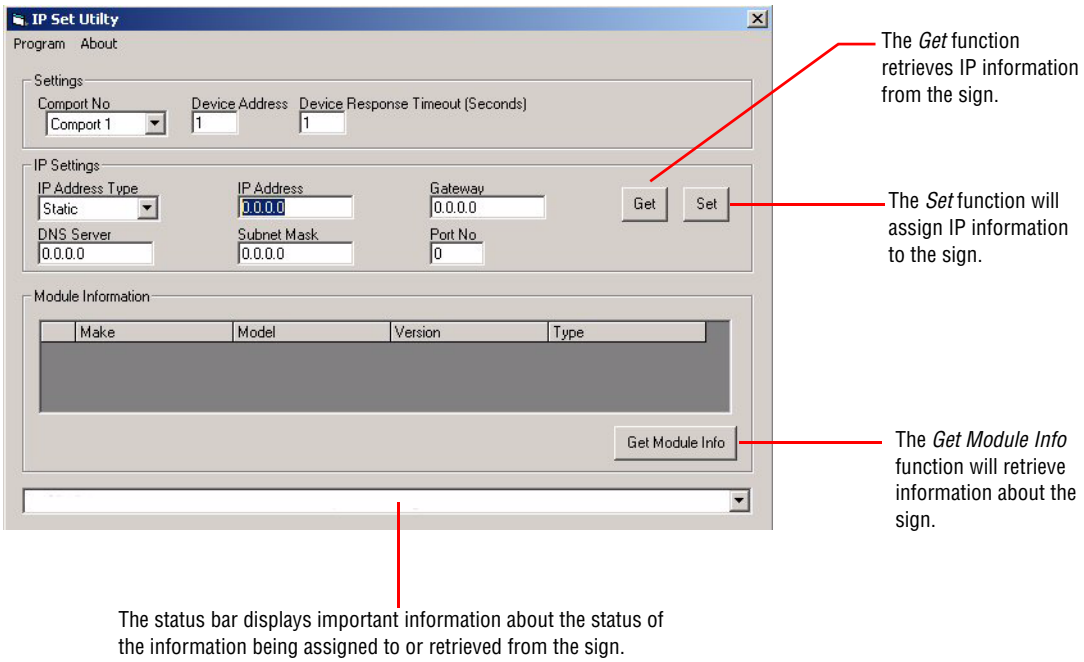
    If Controller #2 was replaced, close the sign and apply power. Installation is now complete.

5.4.3 Set the IP address for new Controller #1 board

11. Using a null modem cable, connect a laptop computer
12. To assign an IP address, the IP Set Utility program must be installed on the computer which will be communicating to the sign. Contact Technical Services at (800)558-7022 to receive this program.
13. Open IP Set Utility program — select *Start* > *Programs* > *IPSetUtility* > *IP Set Utility*.

14. Enter the appropriate information in the *IP Set Utility* window (pictured below):

    NOTE: If the controller is operational, use *Get* to see if the sign's IP address can be retrieved.



15. Click ***Set*** to set the IP Address (each sign must have a unique IP address).
16. After the IP address is set, detach the computer from the controller board.
17. Close the sign.

5.5 Power supply replacement

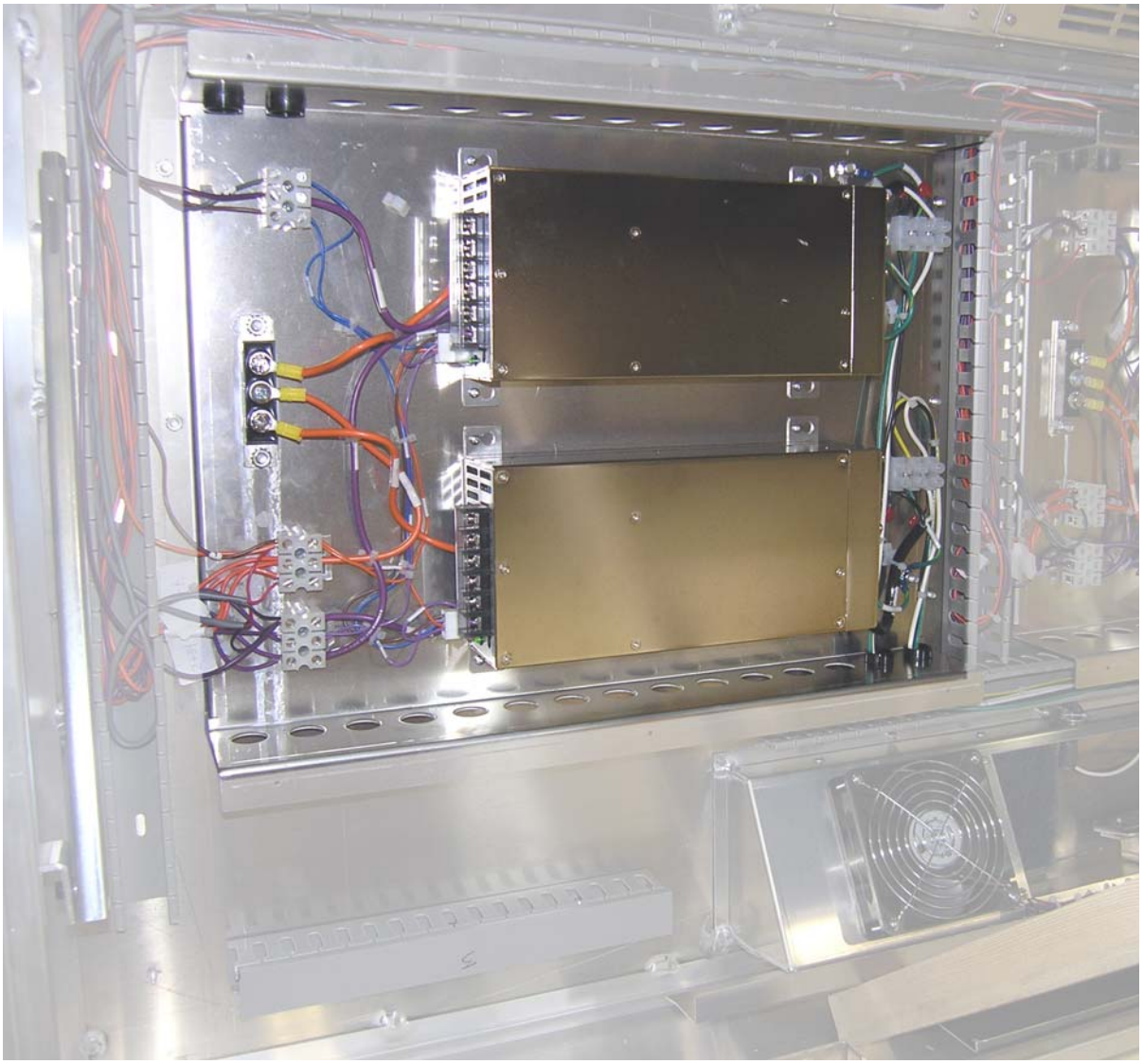
1. Open the sign. See "5.3 Opening a sign" on page 28.
2. Remove all wires from the power supply to be replaced:

   DC connections:

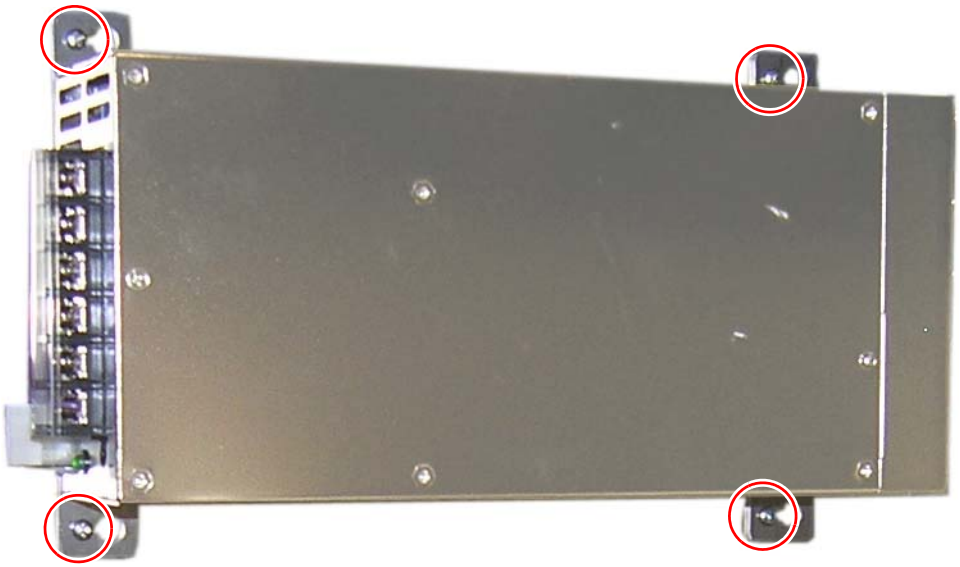
   - ❏ V+ (orange-colored wire)
   - ❏ V- (violet-colored wire)
   - ❏ Signal harness

   AC connections:

   - ❏ Hot (black wire)
   - ❏ Neutral (white wire)
   - ❏ Ground (green wire)



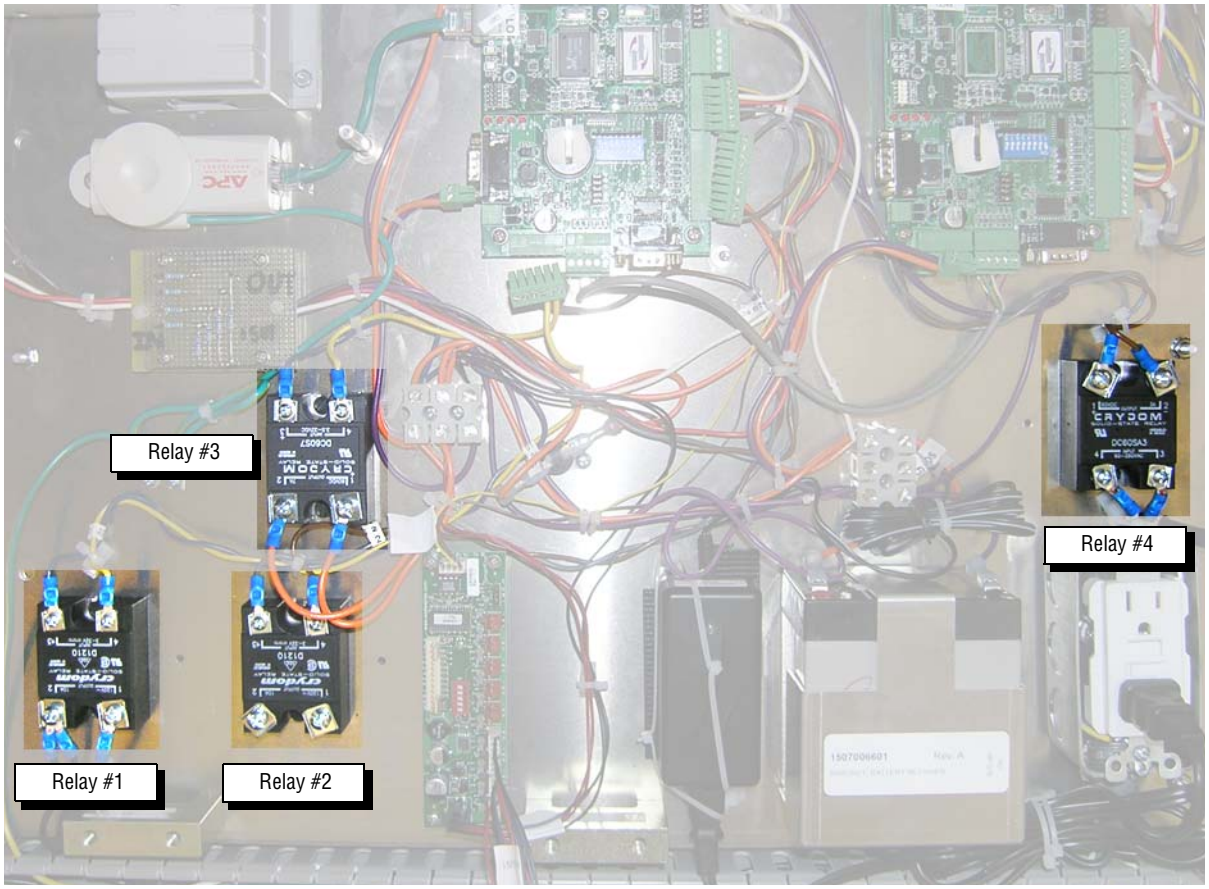
3. Remove the four screws (circled below) that hold the power supply to the sign:



4. Fasten the new power supply to the sign. Then reconnect all the wires to the new power supply.
5. Close the sign and then apply power to the sign.

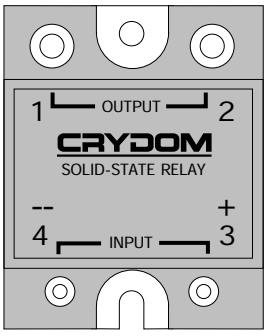
5.6 Relay replacement

1. Open the sign. See "5.3 Opening a sign" on page 28.
2. Locate the relay to be replaced:



3. If there is a cover over the relay to be replaced, remove it. Then disconnect all the wires from the relay.

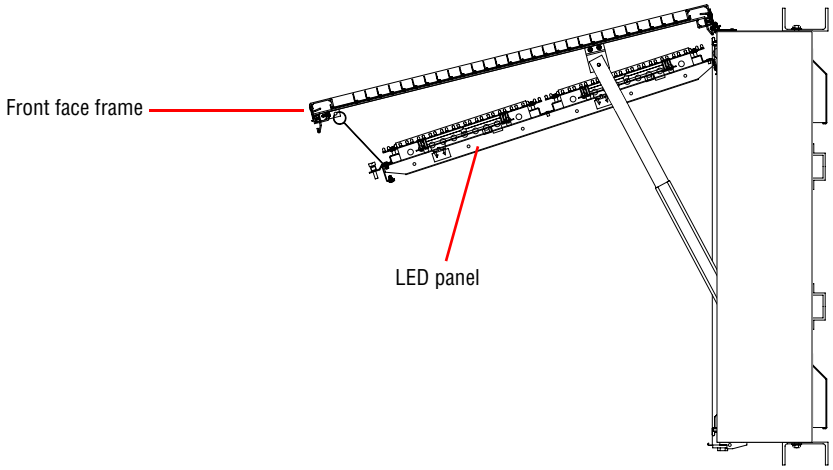
   NOTE: Before disconnecting, mark each wire with the terminal number (1 to 4) to which it is connected.



4. Remove the screws holding the relay to the sign.
5. Attach the new relay to the sign.
6. Reconnect the wires to the new relay and reattach the relay cover (if any).

5.7 LED driver board replacement

1. Open the sign. See “5.3 Opening a sign” on page 28.
2. Locate the LED driver board to be replaced.
3. Remove the cables from the back of the LED driver board:
   - ❑ Power cable (P1)
   - ❑ Address plug (P2)
   - ❑ Communications cable (P3)
4. Unfasten the LED panel from the front face frame. Then lower the LED panel:



5. Remove the four screws that hold the LED driver board to the LED panel.
6. 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.
7. Raise the LED panel up and fasten this panel to the front face frame.
8. Reconnect the cables to the LED driver board.
9. Close the sign and apply power to the sign.

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6.0 Equipment drawings

The following equipment drawings are included in this manual:

- “6.1 Table of contents (15072001-04, revision A, sheet 1 of 14)” on page 38.
- “6.2 Top level view of system (15072001-04, revision A, sheet 2 of 14)” on page 39.
- “6.3 Internal view of sign (15072001-04, revision A, sheet 3 of 14)” on page 40.
- “6.4 Power panel view (15072001-04, revision A, sheet 4 of 14)” on page 41.
- “6.5 Controller plate view (15072001-04, revision A, sheet 5 of 14)” on page 42.
- “6.6 Load center view (15072001-04, revision A, sheet 6 of 14)” on page 43.
- “6.7 Controller #1 information (15072001-04, revision A, sheet 7 of 14)” on page 44.
- “6.8 Controller #2 information (15072001-04, revision A, sheet 8 of 14)” on page 45.
- “6.9 Controller #1 and #2 wiring information (15072001-04, revision A, sheet 9 of 14)” on page 46.
- “6.10 Driver board and light sensor board information (15072001-04, revision A, sheet 10 of 14)” on page 47.
- “6.11 Fans, heaters, and relay information (15072001-04, revision A, sheet 11 of 14)” on page 48.
- “6.12 Power panel #1 and #2 information (15072001-04, revision A, sheet 12 of 14)” on page 49.
- “6.13 Power panel #3 information (15072001-04, revision A, sheet 13 of 14)” on page 50.
- “6.14 Address plug information (15072001-04, revision A, sheet 14 of 14)” on page 51.
- “6.15 Sign dimensions” on page 52.

6.1 Table of contents (15072001-04, revision A, sheet 1 of 14)

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REV.	DESCRIPTION	ECO	BY	DATE
A	RELEASED FOR PRODUCTION	MJB	-	07/10/05

DIMENSIONS ARE INCH [mm]
AND TOLERANCES ARE AS FOLLOWS
UNLESS OTHERWISE SPECIFIED.

.X	±0.030 [0.76]
.XX	±0.015 [0.38]
.XXX	±0.005 [0.13]
ANGLES	±1°
FORM DIM.	±0.015 [0.38]

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APPROVED BY — DATE

ADAPTIVE
Adaptive Micro Systems LLC
7840 North 86th Street
Milwaukee, WI 53224 USA

TITLE: WIRING DIAGRAM FOR 28X96
8 x 14 FRONT ACCESS SIGN

SIZE: B | DRAWING NO.: 15072001-04 | REVISION: A
PLOT SCALE: 1=4 | CUSTOMER | SHT: 1 OF 14

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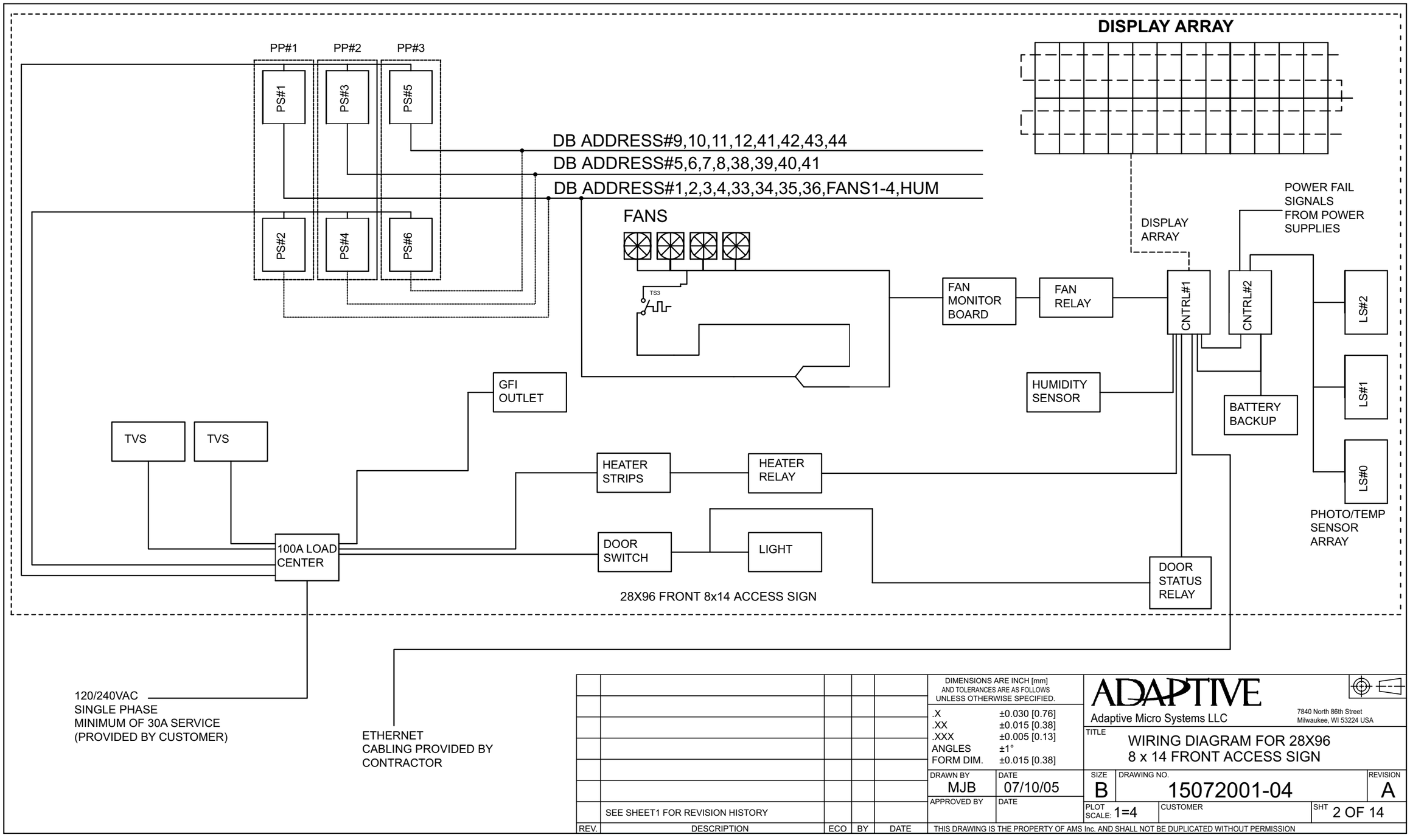
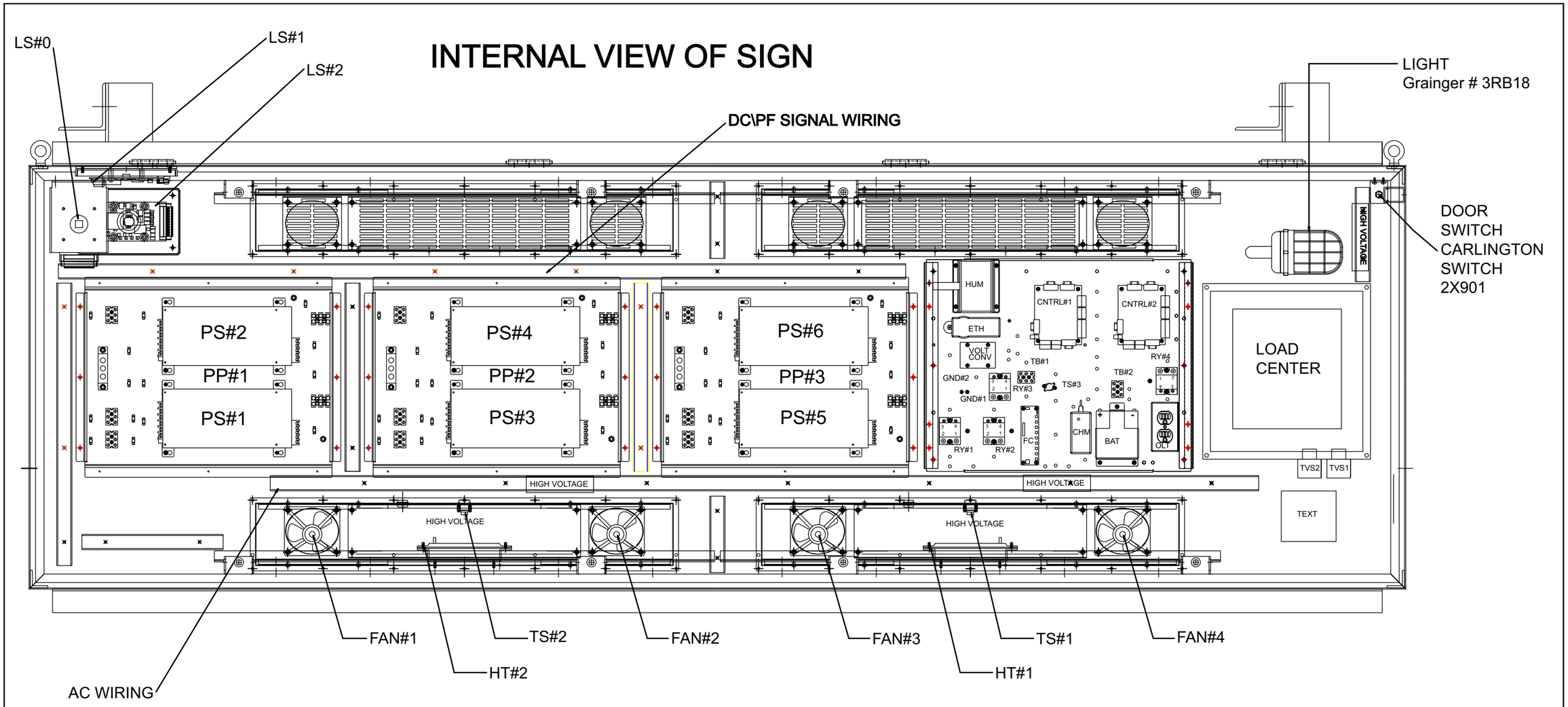
6.2 Top level view of system (15072001-04, revision A, sheet 2 of 14)



6.3 Internal view of sign (15072001-04, revision A, sheet 3 of 14)



REV.	DESCRIPTION	ECO	BY	DATE
	SEE SHEET 1 FOR REVISION HISTORY			

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TITLE
WIRING DIAGRAM FOR 28X96
8x14 FRONT ACCESS DESIGN

SIZE	DRAWING NO.	REVISION
B	15072001-04	A

PLOT SCALE:	CUSTOMER	SHT
1=4		3 OF 14

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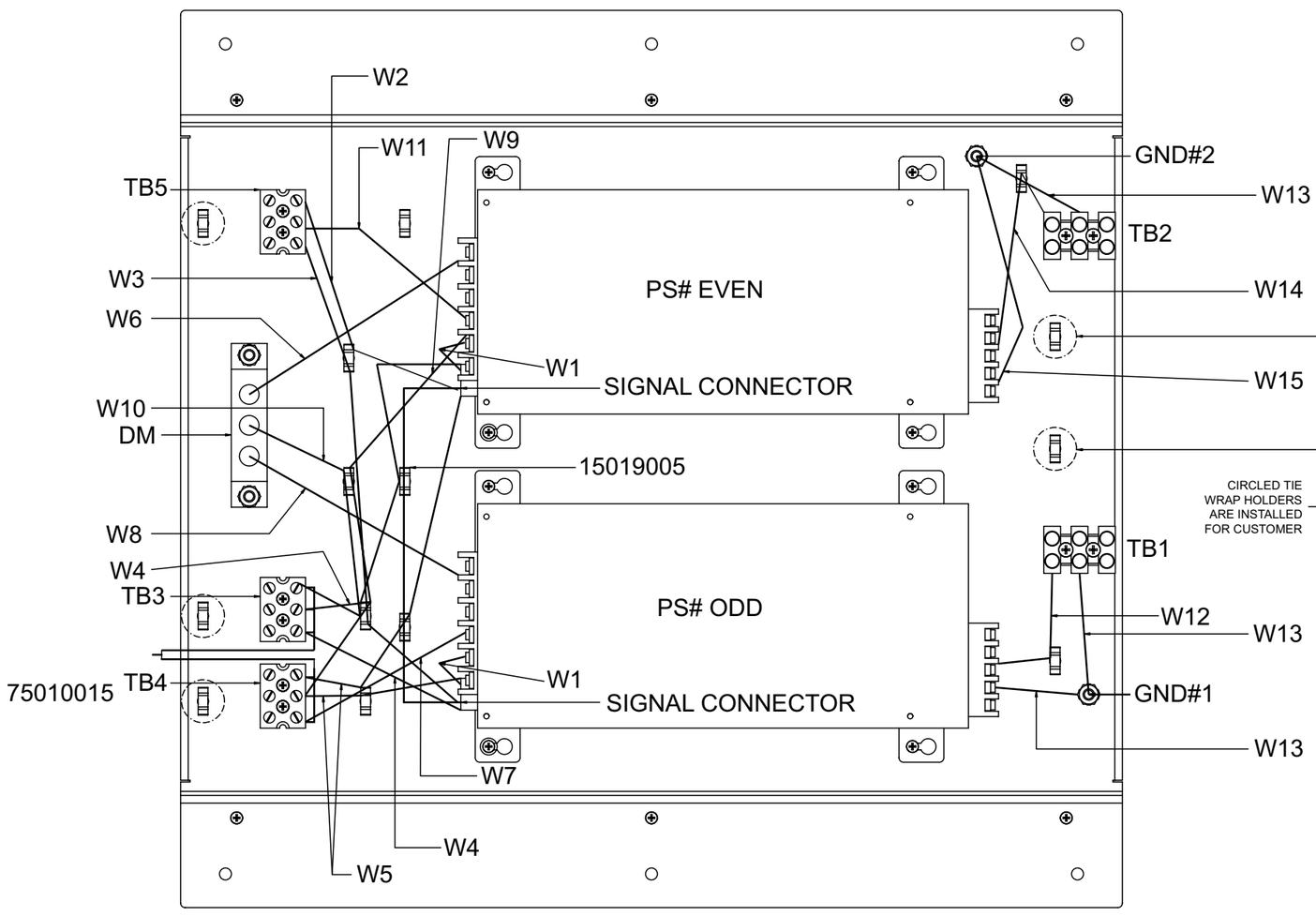
6.4 Power panel view (15072001-04, revision A, sheet 4 of 14)



POWER PANEL VIEW

HOW TO REPLACE PS1-6 (40756302)

1)TURN AC POWER OFF TO FAILED POWER SUPPLY

2)MEASURE VOLTAGE BETWEEN TB3 AND TB4. THIS SHOULD BE AROUND 12VDC. THIS MEASUREMENT WILL BE USED LATER FOR SETTING NEW POWER SUPPLY.

3)TURN AC POWER OFF TO BOTH BREAKERS PROVIDING POWER TO THE POWER PANEL WHICH HAS THE FAILED POWER SUPPLY

2)DISCONNECT AC POWER FROM FAILED POWER SUPPLY(LINE, NEUTRAL, AND GROUND)

3)DISCONNECT DC POWER FROM FAILED POWER SUPPLY(ORANGE, VIOLET WIRES CONNECTED TO V+,V-)

4)DISCONNECT SIGNAL HARNESS FROM FAILED POWER SUPPLY. DISCONNECT W1 FROM V- OF FAILED POWER SUPPLY.

5)LOOSEN 4 MOUNTING SCREWS AND SLIDE FAILED POWER SUPPLY TO REMOVE FROM POWER PANEL.

6)IF NECESSARY, PLACE BRACKETS FROM FAILED POWER SUPPLY ON NEW POWER SUPPLY.

7)PLACE NEW POWER SUPPLY ON MOUNTING SCREWS AND TIGHTEN DOWN.

8)ATTACH AC WIRES TO LINE,NEUTRAL, GROUND(WHITE IS NEUTRAL(N),BLACK(L),GREEN(GROUND))

9)ATTACH DC WIRES TO V+ AND V-,(ORANGE CONNECTS TO V+ AND VIOLET CONNECTS TO V-)

10)PLUG IN SIGNAL HARNESS AND CONNECT VIOLET(W1) TO V-

11)APPLY POWER TO NEW POWER SUPPLY ONLY.

12)MEASURE VOLTAGE BETWEEN TB3 AND TB4 AND SET TO THE SAME VALUE MEASURED IN STEP 2. THIS SHOULD BE AROUND 12VDC.

13)TURN BREAKER ON TO OTHER POWER SUPPLY ON POWER PANEL.

14)MEASURE VOLTAGE AT TB3 AND TB4, THIS SHOULD BE THE SAME VOLTAGE SET FROM PREVIOUS STEP.

15)MEASURE VOLTAGE ON OUTPUT OF POWER SUPPLIES(V+ AND V-). THESE VALUES SHOULD BE WITHIN A FEW HUNDREDTHS OF EACH OTHER. IF THEY ARE NOT RE-ADJUST PER STARTING FROM STEP 11.

NOTE: POWER SUPPLY #1 AND #2 MAY NOT POWER UP AT THE SAME TIME IF THERE IS LESS THAN 10% LOAD ON THEM. IF NECESSARY,INCREASE THE DISPLAY LOAD TO GET BOTH TO TURN ON. THE POWER SUPPLIES ARE LABELED ON THE PANEL.

PARTS LIST FOR PANEL

DESIGNATOR	AMS#	MANUFACTURER PART#
PS EVEN AND ODD	40756302	MEANWELL: PSP-500-12
TB1 & 2	43201036	ALTECH: HE10HWPR/03
TB3, 4, & 5	43201043	MARATHON: 0987 RZ TC 03
WIRE KIT	15019006	
SIGNAL HARNESS BETWEEN PS'S	15019005	
COVER	68150102	
PS PLATE	1507000101	
DM	30300002	INTERNATIONAL RECTIFIER: 220CMQ030

EQUIVALENTS MAY BE SUBSTITUITED UPON ENGINEERING APPROVAL.

REV.	DESCRIPTION	ECO	BY	DATE
	SEE SHEET 1 FOR REVISION HISTORY			

DIMENSIONS ARE INCH [mm] AND TOLERANCES ARE AS FOLLOWS UNLESS OTHERWISE SPECIFIED.

.X	±0.030 [0.76]
.XX	±0.015 [0.38]
.XXX	±0.005 [0.13]
ANGLES	±1°
FORM DIM.	±0.015 [0.38]

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Adaptive Micro Systems LLC
7840 North 86th Street
Milwaukee, WI 53224 USA

TITLE: WIRING DIAGRAM FOR 28X96 8x14 FRONT ACCESS DESIGN

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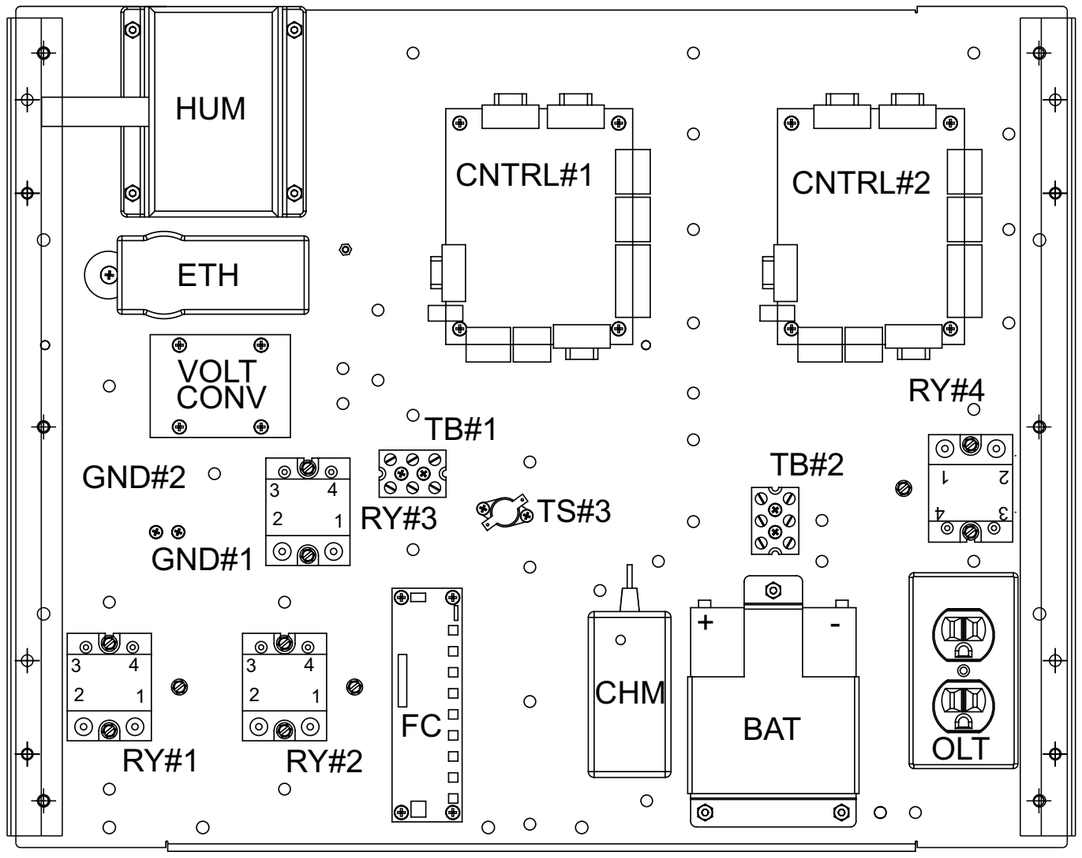
6.5 Controller plate view (15072001-04, revision A, sheet 5 of 14)

CONTROLLER PLATE VIEW



CONTROLLER PLATE PARTS LIST

DESIGNATOR	AMS#	MANUFACTURER PART#	NOTES
HUM	1507100601	GENERAL EASTERN: MRH-3-OA	
ETH	1507101201	APC # PNET1	
VOLT CONV	1507101301	N/A	
RY#1	48000004	CRYDOM: D1210	
RY#2	48000004	CRYDOM: D1210	
RY#3	48000008	CRYDOM # DC60S7	
RY#4	48008203	CRYDOM: DC60SA3	
FC	1507101101	CONTROL RESOURCES# 030M920	
CHM	1507500301	CELL-CON # 452240-00192	NEEDS TO BE USED WITH AMS LINECORD# 73990012
BAT	1507500201	YUASA # NP5-12	
TB#1	43201043	MARATHON: 0987 RZ TC 03	
TB#2	43201043	MARATHON: 0987 RZ TC 03	
TS#3	30670752	SELCO: CA-120	TS3 — Close > 120°F.
CNTRL#1	15029101	N/A	
CNTRL#2	12069003	N/A	
OLT	1507500101	LEVITON: 8599-W	

EQUIVALENT PARTS MAY BE SUBSTITUTED UPON ENGINEERING APPROVAL

REV.	DESCRIPTION	ECO	BY	DATE
	SEE SHEET 1 FOR REVISION HISTORY			

DIMENSIONS ARE INCH [mm] AND TOLERANCES ARE AS FOLLOWS UNLESS OTHERWISE SPECIFIED.

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SIZE: B — DRAWING NO.: 15072001-04 — REVISION: A

PLOT SCALE: 1=4 — CUSTOMER — SHT 5 OF14

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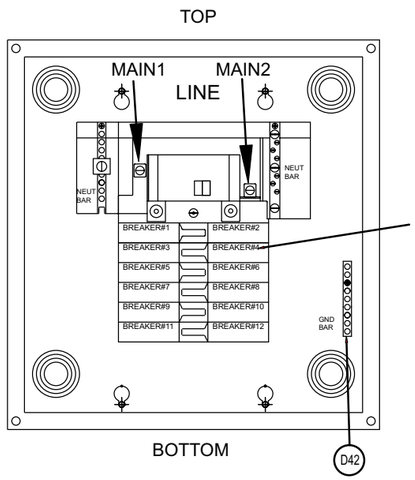
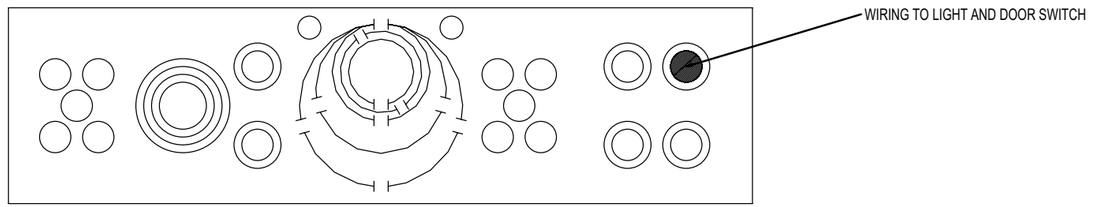
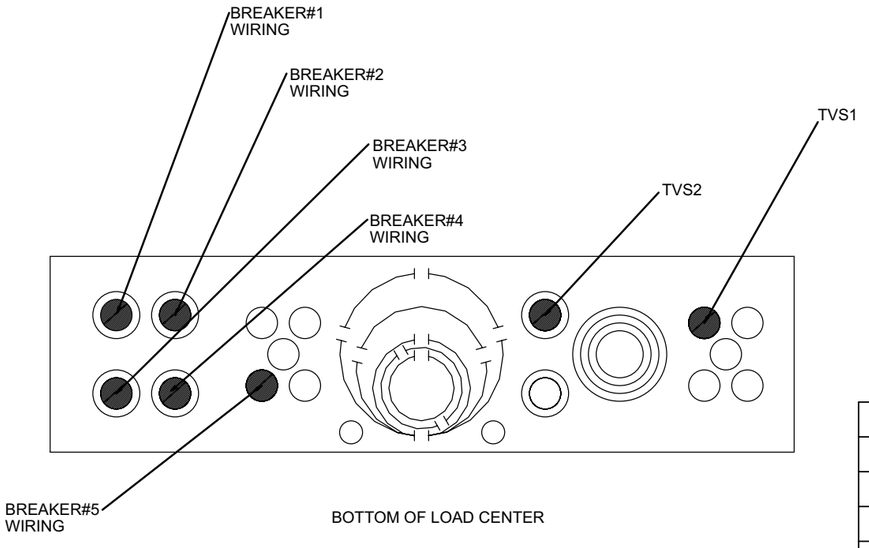
6.6 Load center view (15072001-04, revision A, sheet 6 of 14)

LOAD CENTER VIEW





TOP OF LOAD CENTER



BOTTOM OF LOAD CENTER

DESIGNATOR	AMS#	MANUFACTURER PART#	NOTES
TVS 1 & 2	30352001	CITEL: M18-120	
LOAD CENTER COVER	48100017	SQUARE D # QOC12US	
GND BAR	48100019	SQUARE D # PK9GTA	
LOAD CENTER	48100018	SQUARE D # QO112M100	
BREAKER 1-7	48100005	SQUARE D: QO115	

REV.	DESCRIPTION	ECO	BY	DATE
	SEE SHEET 1 FOR REVISION HISTORY			

DIMENSIONS ARE INCH [mm] AND TOLERANCES ARE AS FOLLOWS UNLESS OTHERWISE SPECIFIED.

.X	±0.030 [0.76]
.XX	±0.015 [0.38]
.XXX	±0.005 [0.13]
ANGLES	±1°
FORM DIM.	±0.015 [0.38]

DRAWN BY: MJB DATE: 07/10/05
APPROVED BY: DATE:

ADAPTIVE
Adaptive Micro Systems LLC
7840 North 86th Street
Milwaukee, WI 53224 USA

TITLE: WIRING DIAGRAM FOR 28X96 8x14 FRONT ACCESS DESIGN

SIZE: B DRAWING NO.: 15072001-04 REVISION: A
PLOT SCALE: 1=4 CUSTOMER SHT 6 OF 14

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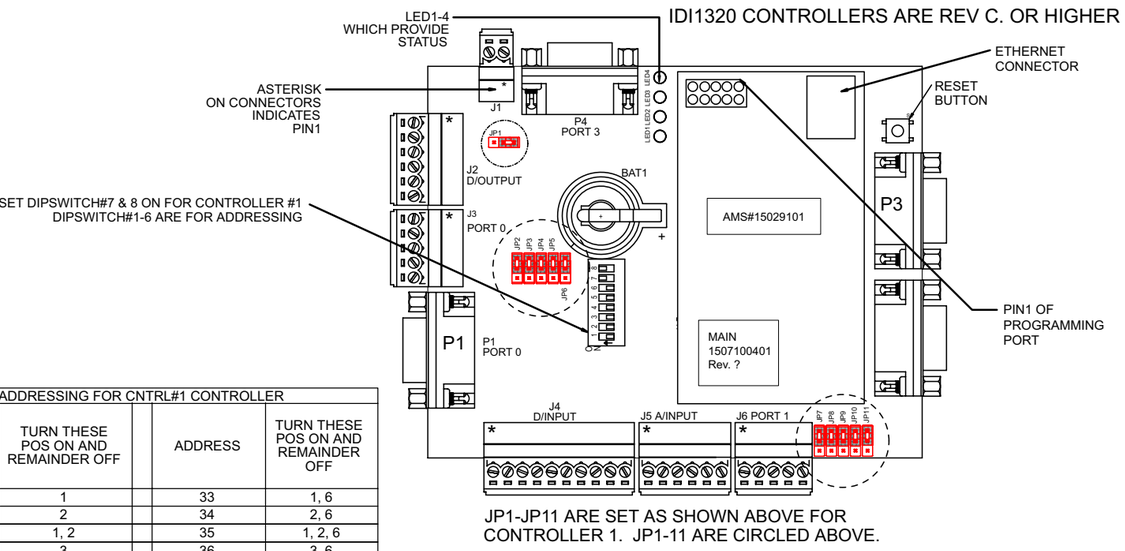
6.7 Controller #1 information (15072001-04, revision A, sheet 7 of 14)

CNTRL#1 INFORMATION

CONTROLLER#1 PINOUT MAPPING

DESIGNATOR	PIN#	DESCRIPTION	AUX IO LOCATION	NOTES
J1		POWER CONNECTOR		
	1	DC GND / AC/N	N/A	JUMPER SET TO DC
	2	DC POSITIVE / AC/L	N/A	
J2		DIGITAL OUTPUTS		
	1	GND		
	2	DIGITAL OUT 3	3.66	FAN CONTROL
	3	DIGITAL OUT 2	3.67	HEATER CONTROL RELAY
	4	DIGITAL OUT 1	3.68	BLANKOUT RELAY
	5	DIGITAL OUT 0	3.69	Firmware Defined
	6	VCC		
J3		COMM PORT		RS422 COMM BETWEEN CONTROLLERS
P1		COMM PORT		CENTRAL CONTROL PORT
J4		DIGITAL INPUTS		
	1	DIGITAL IN 0	3.2	DOOR SWITCH (5VDC AT THIS POSITION MEANS DOOR IS OPEN)
	2	DIGITAL IN 1	3.3	FAN MONITORING FROM FAN CONTROL BOARD (5V AT THIS POSITION, WHILE THE FANS ARE SPINNING, MEANS THAT THE FANS ARE OPERATING CORRECTLY.)
	3	DIGITAL IN 2	3.4	TB VOLTAGE MONITOR (ABOVE 5V FANS ARE ACTIVATED)
	4	DIGITAL IN 3	3.5	FUTURE USE

DESIGNATOR	PIN#	DESCRIPTION	AUX IO LOCATION	NOTES
J5		ANALOG INPUTS		
	1	GND		
	2	ANALOG IN 3	2.4	PS#2 & PS#1 OUTPUT (The value is 0 - 4800. This is scaled as follows: (((Value in Location)/4800) *19.2) = Voltage On Power Supply
	3	ANALOG IN 2	2.3	PS#4 & PS#3 OUTPUT (The value is 0 - 4800. This is scaled as follows: (((Value in Location)/4800) *19.2) = Voltage On Power Supply
	4	ANALOG IN 1	2.2	PS#5 & PS#6 OUTPUT (The value is 0 - 4800. This is scaled as follows: (((Value in Location)/4800) *19.2) = Voltage On Power Supply
	5	ANALOG IN 0	2.1	Humidity Sensor (The value is 0 - 4800. This is scaled as follows: (((Value in Location)/4800) *19.2) = (Humidity Sensor Voltage. (Humidity Sensor Voltage/ .01 = Percentage of Humidity
	6	VCC		
J6		COMM PORT	N/A	
	1	GND		CONFIGURED FOR RS422 COMM TO DISPLAY ARRAY
	2	TX+		
	3	TX-		
	4	RX-		
	5	RX+		
P2		COMM PORT	N/A	NOT USED
P3		COMM PORT	N/A	LOCAL PORT
P4		COMM PORT	N/A	NOT USED



ADDRESSING FOR CNTRL#1 CONTROLLER			
ADDRESS	TURN THESE POS ON AND REMAINDER OFF	ADDRESS	TURN THESE POS ON AND REMAINDER OFF
1	1	33	1, 6
2	2	34	2, 6
3	1, 2	35	1, 2, 6
4	3	36	3, 6
5	1, 3	37	1, 3, 6
6	2, 3	38	2, 3, 6
7	1, 2, 3	39	1, 2, 3, 6
8	4	40	4, 6
9	1, 4	41	1, 4, 6
10	2, 4	43	2, 4, 6
11	1, 2, 4	43	1, 2, 4, 6
12	3, 4	44	3, 4, 6
13	1, 3, 4	45	1, 3, 4, 6
14	2, 3, 4	46	2, 3, 4, 6
15	1, 2, 3, 4	47	1, 2, 3, 4, 6
16	5	48	5, 6
17	1, 5	49	1, 5, 6
18	2, 5	50	2, 5, 6
19	1, 2, 5	51	1, 2, 5, 6
20	3, 5	52	3, 5, 6
21	1, 3, 5	53	1, 3, 5, 6
22	2, 3, 5	54	2, 3, 5, 6
23	1, 2, 3, 5	55	1, 2, 3, 5, 6
24	4, 5	56	4, 5, 6
25	1, 4, 5	57	1, 4, 5, 6
26	2, 4, 5	58	2, 4, 5, 6
27	1, 2, 4, 5	59	1, 2, 4, 5, 6
28	3, 4, 5	60	3, 4, 5, 6
29	1, 3, 4, 5	61	1, 3, 4, 5, 6
30	2, 3, 4, 5	62	2, 3, 4, 5, 6
31	1, 2, 3, 4, 5	63	1, 2, 3, 4, 5, 6
32	6		

LED1-4 FUNCTIONALITY

LED1-HEARTBEAT
LED2-COMMUNICATIONS FROM ETHERNET OR P3(LOCAL LAPTOP PORT)
LED3-COMMUNICATIONS TO AND FROM SC#2
LED4-COMMUNICATIONS TO AND FROM DISPLAY BOARDS

HOW TO INTIALIZE SIGN CONTROLLERS

1)POWER IS NOT APPLIED TO CONTROLLER

2)TURN DIPSWITCH TO THE FOLLOWING SETTINGS:
SIGN CONTROLLER #1
7 & 8 ON AND REMAINDER OFF
SIGN CONTROLLER#2
7 ON AND REMAINDER OFF

3)APPLY POWER TO CONTROLLER. LED4 NEXT TO PROGRAMMING PORT WILL STAY ON DURING INITIALIZATION. LED1 FLASHES CONSTANTLY BECAUSE THIS IS THE HEARTBEAT
ONCE THE LED BEGINS FLASHING(THIS WILL TAKE APPROXIMATELY 30-60 SECONDS) THE CONTROLLER NEEDS
TO BE CONFIGURED AS FOLLOWS.

4)SIGN CONTROLLER #1(CNTRL#1)-TURN DIPSWITCH 1-6 TO APPROPRIATE ADDRESS ON AND LEAVE 7 AND 8 ON. RESET CONTROLLER AFTER SETTING DIPSWITCH.

5)SIGN CONTROLLER #2(CNTRL#2)-TURN DIPSWITCH 2 ON AND 7 ON, REMAINDER OFF. RESET CONTROLLER AFTER SETTING DIPSWITCH.

REV.	DESCRIPTION	ECO	BY	DATE
	SEE SHEET 1 FOR REVISION HISTORY			

DIMENSIONS ARE INCH [mm] AND TOLERANCES ARE AS FOLLOWS UNLESS OTHERWISE SPECIFIED.

.X	±0.030 [0.76]
.XX	±0.015 [0.38]
.XXX	±0.005 [0.13]
ANGLES	±1°
FORM DIM.	±0.015 [0.38]

DRAWN BY: MJB — DATE: 07/10/05
APPROVED BY — DATE

ADAPTIVE
Adaptive Micro Systems LLC
7840 North 86th Street
Milwaukee, WI 53224 USA

TITLE: WIRING DIAGRAM FOR 28X96 8x14 FRONT ACCESS DESIGN

SIZE: B — DRAWING NO.: 15072001-04 — REVISION: A
PLOT SCALE: 1=4 — CUSTOMER — SHT 7 OF 14

THIS DRAWING IS THE PROPERTY OF AMS Inc. AND SHALL NOT BE DUPLICATED WITHOUT PERMISSION

6.8 Controller #2 information (15072001-04, revision A, sheet 8 of 14)

CNTRL#2 INFORMATION

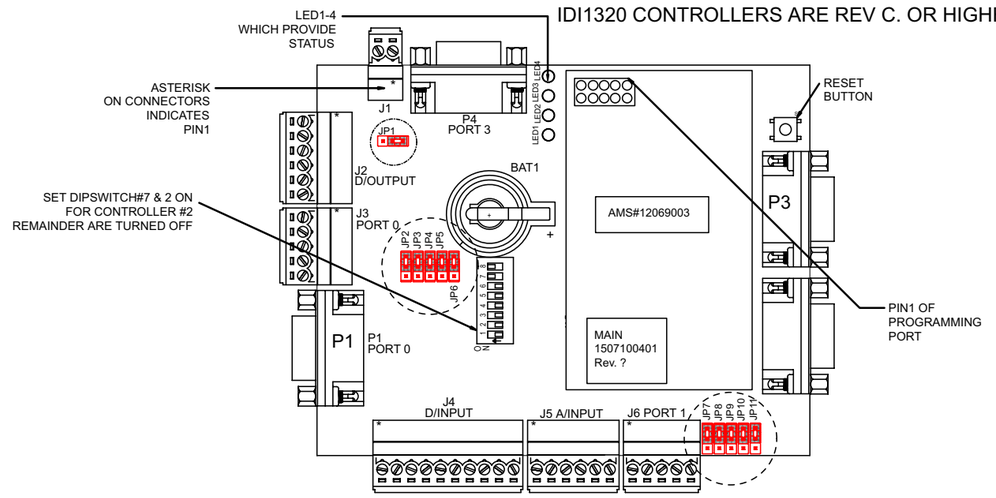
CONTROLLER#2 PINOUT MAPPING

DESIGNATOR	PIN#	DESCRIPTION	AUX IO LOCATION	NOTES
J1		POWER CONNECTOR		
	1	DC GND / AC/N	N/A	JUMPER SET TO DC
	2	DC POSITIVE / AC/L	N/A	
J2		DIGITAL OUTPUTS		
	1	GND		
	2	DIGITAL OUT 3	3.71	FUTURE USE
	3	DIGITAL OUT 2	3.72	FUTURE USE
	4	DIGITAL OUT 1	3.73	FUTURE USE
	5	DIGITAL OUT 0	3.74	FUTURE USE
	6	VCC		
J3		COMM PORT		RS422 COMM BETWEEN CONTROLLERS
P1		COMM PORT		NOT USED
J4		DIGITAL INPUTS		
	1	DIGITAL IN 0	3.11	FUTURE USE
	2	DIGITAL IN 1	3.12	FUTURE USE
	3	DIGITAL IN 2	3.13	PF#1 - SEE NOTE 1
	4	DIGITAL IN 3	3.14	PF#2 - SEE NOTE 1
	5	DIGITAL IN 4	3.15	PF#3 - SEE NOTE 1
	6	DIGITAL IN 5	3.16	PF#4 - SEE NOTE 1
	7	DIGITAL IN 6	3.17	PF#5 - SEE NOTE 1
	8	DIGITAL IN 7	3.18	PF#6 - SEE NOTE 1
	9	GND		
	10	VCC		

DESIGNATOR	PIN#	DESCRIPTION	AUX IO LOCATION	NOTES
J5		ANALOG INPUTS		
	1	GND		
	2	ANALOG IN 3	2.12	FUTURE USE
	3	ANALOG IN 2	2.11	FUTURE USE
	4	ANALOG IN 1	2.10	FUTURE USE
	5	ANALOG IN 0	2.9	BATTERY VOLTAGE MONITORING (The value is 0 - 4800. This is scaled as follows: (((Value in Location)/4800) *19.2) = BATTERY VOLTAGE.
	6	VCC		
J6		COMM PORT	N/A	
	1	GND		CONFIGURED FOR RS422 COMM TO PHOTO/TEMP ARRAY
	2	TX+		
	3	TX-		
	4	RX-		
	5	RX+		
P2		COMM PORT	N/A	NOT USED
P3		COMM PORT	N/A	NOT USED
P4		COMM PORT	N/A	NOT USED
U9		ONBOARD TEMPERATURE SENSOR	2.13	

NOTE: 5V AT J4 TB MEANS PS IS WORKING OK. POWER SUPPLIES MUST BE LOADED ENOUGH TO TURN ON BECAUSE THEY ARE PARALLED. THIS INFORMATION APPLIES ALL PF SIGNALS.

IDI1320 CONTROLLERS ARE REV C. OR HIGHER



JP1-JP11 ARE SET AS SHOWN ABOVE FOR CONTROLLER 1. JP1-11 ARE CIRCLED ABOVE.

LED1-4 FUNCTIONALITY

LED1-HEARTBEAT
LED2-NOT USED
LED3-COMMUNICATIONS TO AND FROM SC#1
LED4-COMMUNICATIONS TO AND FROM PHOTO/TEMP ARRAY

HOW TO INTIALIZE SIGN CONTROLLERS
1)POWER IS NOT APPLIED TO CONTROLLER

2)TURN DIPSWITCH TO THE FOLLOWING SETTINGS:
SIGN CONTROLLER #1
7 & 8 ON AND REMAINDER OFF
SIGN CONTROLLER#2
7 ON AND REMAINDER OFF

3)APPLY POWER TO CONTROLLER. LED4 NEXT TO PROGRAMMING PORT WILL STAY ON DURING INITIALIZATION. LED1 FLASHES CONSTANTLY BECAUSE THIS IS THE HEARTBEAT ONCE THE LED BEGINS FLASHING(THIS WILL TAKE APPROXIMATELY 30-60 SECONDS) THE CONTROLLER NEEDS
TO BE CONFIGURED AS FOLLOWS.

4)SIGN CONTROLLER #1(CNTRL#1)-TURN DIPSWITCH 1-6 TO APPROPRIATE ADDRESS ON AND LEAVE 7 AND 8 ON. RESET CONTROLLER AFTER SETTING DIPSWITCH.

5)SIGN CONTROLLER #2(CNTRL#2)-TURN DIPSWITCH 2 ON AND 7 ON, REMAINDER OFF. RESET CONTROLLER AFTER SETTING DIPSWITCH.

REV.	DESCRIPTION	ECO	BY	DATE
	SEE SHEET 1 FOR REVISION HISTORY			

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.XXX	±0.005 [0.13]
ANGLES	±1°
FORM DIM.	±0.015 [0.38]

DRAWN BY: MJB DATE: 07/10/05
APPROVED BY: DATE:

ADAPTIVE
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Milwaukee, WI 53224 USA

TITLE: WIRING DIAGRAM FOR 28X96 8x14 FRONT ACCESS DESIGN

SIZE: B | DRAWING NO.: 15072001-04 | REVISION: A
PLOT SCALE: 1=4 | CUSTOMER | SHT: 8 OF 14

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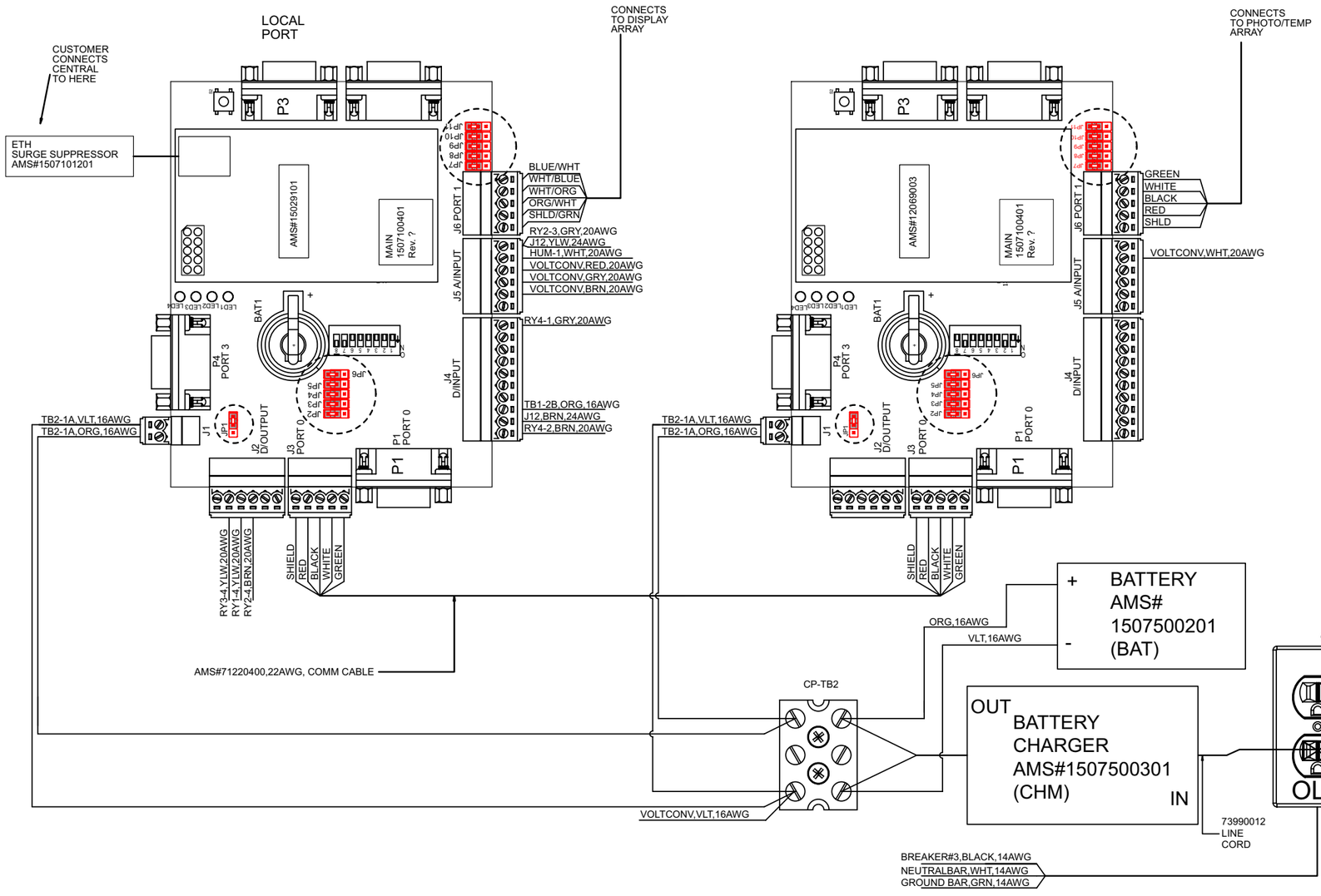
6.9 Controller #1 and #2 wiring information (15072001-04, revision A, sheet 9 of 14)

Controller Auxiliary I/O Assignments

Abbreviaions:			
PS	Power Supply		
SC	Sign Controller		
Aux I/O	Direction	Function	Origin
3.1	In	SC#1 all digital ins	SC#1
3.2	In	Door Switch	SC#1 DIGITAL IN 0
3.3	In	Fan Monitoring	SC#1 DIGITAL IN 1
3.4	In	Fan Activated by Thermostat	SC#1 DIGITAL IN 2
3.5	In	Future Use	SC#1 DIGITAL IN 3
3.6	In	Future Use	SC#1 DIGITAL IN 4
3.7	In	Future Use	SC#1 DIGITAL IN 5
3.8	In	Future Use	SC#1 DIGITAL IN 6
3.9	In	Future Use	SC#1 DIGITAL IN 7
External Aux I/O			
3.10	In	SC#2 All digital inputs	SC#2
3.11	In	not use	SC#2 DIGITAL IN 0
3.12	In	not use	SC#2 DIGITAL IN 1
3.13	In	PS#1 PF#1	SC#2 DIGITAL IN 2
3.14	In	PS#2 PF#2	SC#2 DIGITAL IN 3
3.15	In	PS#3 PF#3	SC#2 DIGITAL IN 4
3.16	In	PS#4 PF#4	SC#2 DIGITAL IN 5
3.17	In	PS#5 PF#5	SC#2 DIGITAL IN 6
3.18	In	PS#6 PF#6	SC#2 DIGITAL IN 7
3.19	In	not use	SC#2
DIGITAL OUT			Dest.
3.65	Out	SC#1 Summary dig out	SC#1
3.66	Out	DigOut Future Use	SC#1 Digital Out 3
3.67	Out	Blank Out Sign	SC#2 Digital Out 2
3.68	Out	Heater Control	SC#1 Digital Out 1
3.69	Out	Fan Control	SC#1 Digital Out 0
3.70	Out	SC#2 Summary dig out	SC#2
3.71	Out	DigOut Future Use	SC#2 Digital Out 3
3.72	Out	DigOut Future Use	SC#2 Digital Out 2
3.73	Out	DigOut Future Use	SC#2 Digital Out 1
3.74	Out	DigOut Future Use	SC#2 Digital Out 0
ANALOG IN			
Aux I/O	Direction	Function	Origin
2.1	In	Humidity Pecent	SC#1 Analog IN 0
2.2	In	PS#5 PS#6 Voltage	SC#1 Analog IN 1
2.3	In	PS#3 PS#4 Voltage	SC#1 Analog IN 2
2.4	In	PS#1 PS#2 Voltage	SC#1 Analog IN 3
2.5	In	Control Cab temp	SC#1 on board sensor
2.6	In	Photocell Front	SC#1
2.7	In	Photocell Back	SC#1
2.8	In	Photocell Ambient	SC#1
2.9	In	Battery Backup Voltage	SC#2 Analog IN 0
2.10	In	Future use	SC#2 Analog IN 1
2.11	In	Future use	SC#2 Analog IN 2
2.12	In	Future use	SC#2 Analog IN 3
2.13	In	SC#2 Onboard Temperature	SC#2
2.14	In	Temperature from LS#0	SC#2 LS#0
2.15	In	Temperature from LS#1	SC#2 LS#1
2.16	In	Temperature from LS#2	SC#2 LS#2
2.17	In	Avg Temp from LS#0-2	SC#2



REV.	DESCRIPTION	ECO	BY	DATE
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.XX	±0.015 [0.38]
.XXX	±0.005 [0.13]
ANGLES	±1°
FORM DIM.	±0.015 [0.38]

DRAWN BY	DATE	APPROVED BY	DATE
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SIZE	DRAWING NO.	REVISION
B	15072001-04	A

PLOT SCALE: 1=4 | CUSTOMER | SHT 9 OF 14

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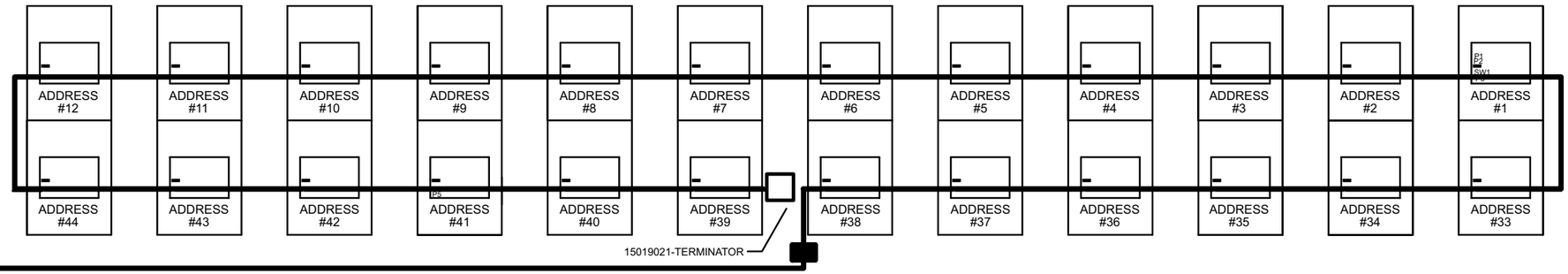
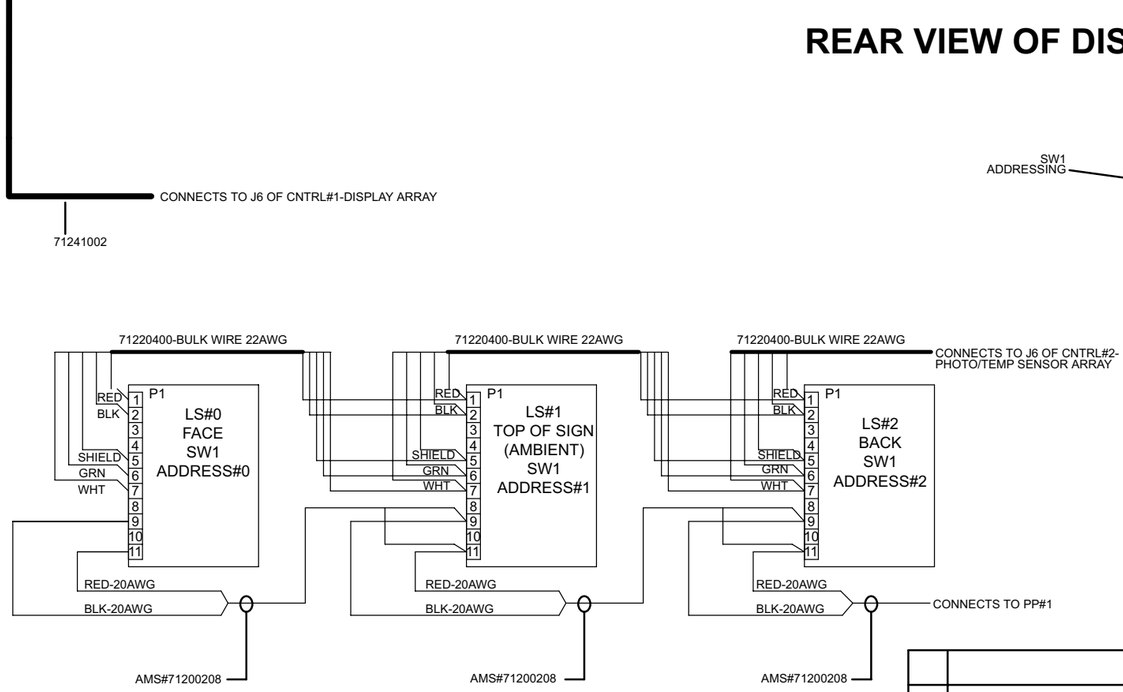
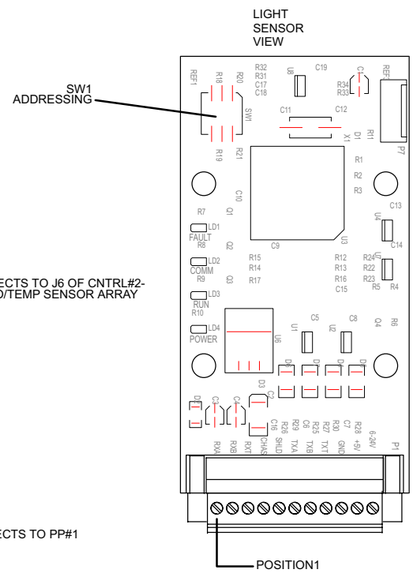
6.10 Driver board and light sensor board information (15072001-04, revision A, sheet 10 of 14)

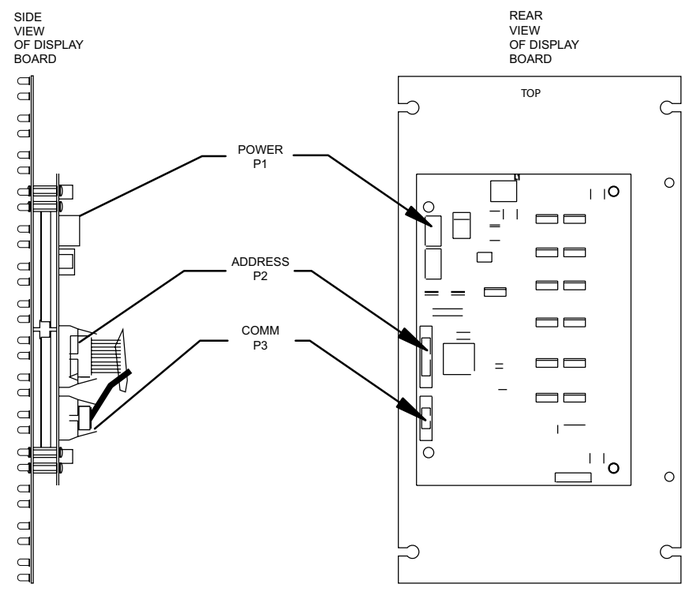
DISPLAY ARRAY AND PHOTO/TEMP ARRAY INFORMATION



REAR VIEW OF DISPLAY ARRAY







NOTES:

1)P2 ON DRIVE CARD ADDRESSES MODULE. USE AMS#43302014 WIRE ASSEMBLY SEE ADDRESSING OF P2 ON ANOTHER PAGE
2) RIBBON CABLING BETWEEN DRIVER TO DRIVER IS AMS#71281003
3)CABLING ADDRESS#38 POSITION BACK TO CONTROLLER IS AMS#71241002
4)DRIVER BOARDS ARE AMS#15073001
5)LIGHT SENSORS ARE AMS#15019010

REV.	DESCRIPTION	ECO	BY	DATE
	SEE SHEET 1 FOR REVISION HISTORY			

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ANGLES	±1°
FORM DIM.	±0.015 [0.38]

DRAWN BY	DATE
MJB	07/10/05
APPROVED BY	DATE

Adaptive Micro Systems LLC
7840 North 86th Street
Milwaukee, WI 53224 USA

TITLE
WIRING DIAGRAM FOR 28X96
8 x 14 FRONT ACCESS DESIGN

SIZE	DRAWING NO.	REVISION
B	15072001-04	A

PLOT SCALE:	CUSTOMER	SHT
1=4		10 OF 14

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6.11 Fans, heaters, and relay information (15072001-04, revision A, sheet 11 of 14)

FAN4
FAN3
FAN2
FAN1
FANS ARE COMAIR ROTRON PART#MC12B7
AMS#1507100801 WIRE ASSEMBLY FOR FAN POWER
RED - +12VDC
BLK - GND
BLUE - TACH PULSES
BUTTSPLICES AMS#43302004
AMS#1507100901
CP-TB#1-2A-RED
CP-TB#1-3B-BLK
FAN CONTROL MODULE POWER
J11
J1
J2
J3
J4
HEAT STRIPS ARE MCMASTERCARR#3576K11
DIPSWITCH
FAN CONTROL MODULE STATUS 5V IS FED FROM THE CONTROLLER TO THE DIGITAL INPUT. IF 5V IS AT THE CONTROLLER TB, FANS ARE OPERATING PROPERLY. VERIFY THAT ALL DIPSWITCHES ARE ON FOR THE FAN CONTROL MODULE.
ON
FC
AMS#1507100801
CNTRL#1-J4-2,BRN
CNTRL#1-J5-6-YLW
CP-TB1-1B,16AWG,ORG
CP-TB1-2B,16AWG,ORG
B A
TS3
CP-TB1-2A,-16AWG
CP-TB1-1A,16AWG,ORG
2 FAN RELAY RY#3 1
4 3
CNTRL#1-J2-1,20AWG,YLW
CP-TB#1-1B,20AWG,BLUE
PP#1-TB3-1A,16AWG,ORG
RY#3-1-16AWG,ORG
J11-1507100901 WIRE ASY,RED
RY#3-2,16AWG,ORG
PP#1-TB4-1A,16AWG,VLT
CP-TB1
TS#3-A,ORG,16AWG
CNTRL#1-J4-3,ORG,16AWG
TS#3-B,ORG,16AWG
J11-BLK,24AWG
WHT,14AWG,NEUTRAL BAR
WHT,14AWG,NEUTRAL BAR
B A
TS1
TS1 and TS2 — Open > 150°F, Close < 120°F.
HEAT STRIP (HT#2)
HEAT STRIP (HT#1)
TS2
BLK,14AWG,RY#1-2
BLK,14AWG,BREAKER#5
2 HEAT STRIP RELAY RY#1 1
4 3
TB#1-1B-BLUE,20AWG
CNTRL#1-J2-3-YLW,20AWG
CNTRL#1,J5-5,20AWG,WHT
PP#1-TB4-1A,20AWG,BLK
PP#1-TB3-1A,20AWG,RED
1 3 5
HUMIDITY SENSOR
BLANKOUT
2 RELAY RY#2 1
4 3
CNTRL#1-J2-4,20AWG,BRN
CP-TB#1-1B,20AWG,GRY

NOTES:
1)TS#3 IS AMS#30670752. LOCATED ON CONTROLER PLATE.
2)TS#1&2 ARE AMS#30670754. SELCO: 0A-150

REV.	DESCRIPTION	ECO	BY	DATE
	SEE SHEET 1 FOR REVISION HISTORY			

DIMENSIONS ARE INCH [mm] AND TOLERANCES ARE AS FOLLOWS UNLESS OTHERWISE SPECIFIED.

.X	±0.030 [0.76]
.XX	±0.015 [0.38]
.XXX	±0.005 [0.13]
ANGLES	±1°
FORM DIM.	±0.015 [0.38]

DRAWN BY: MJB DATE: 07/10/05
APPROVED BY: DATE:

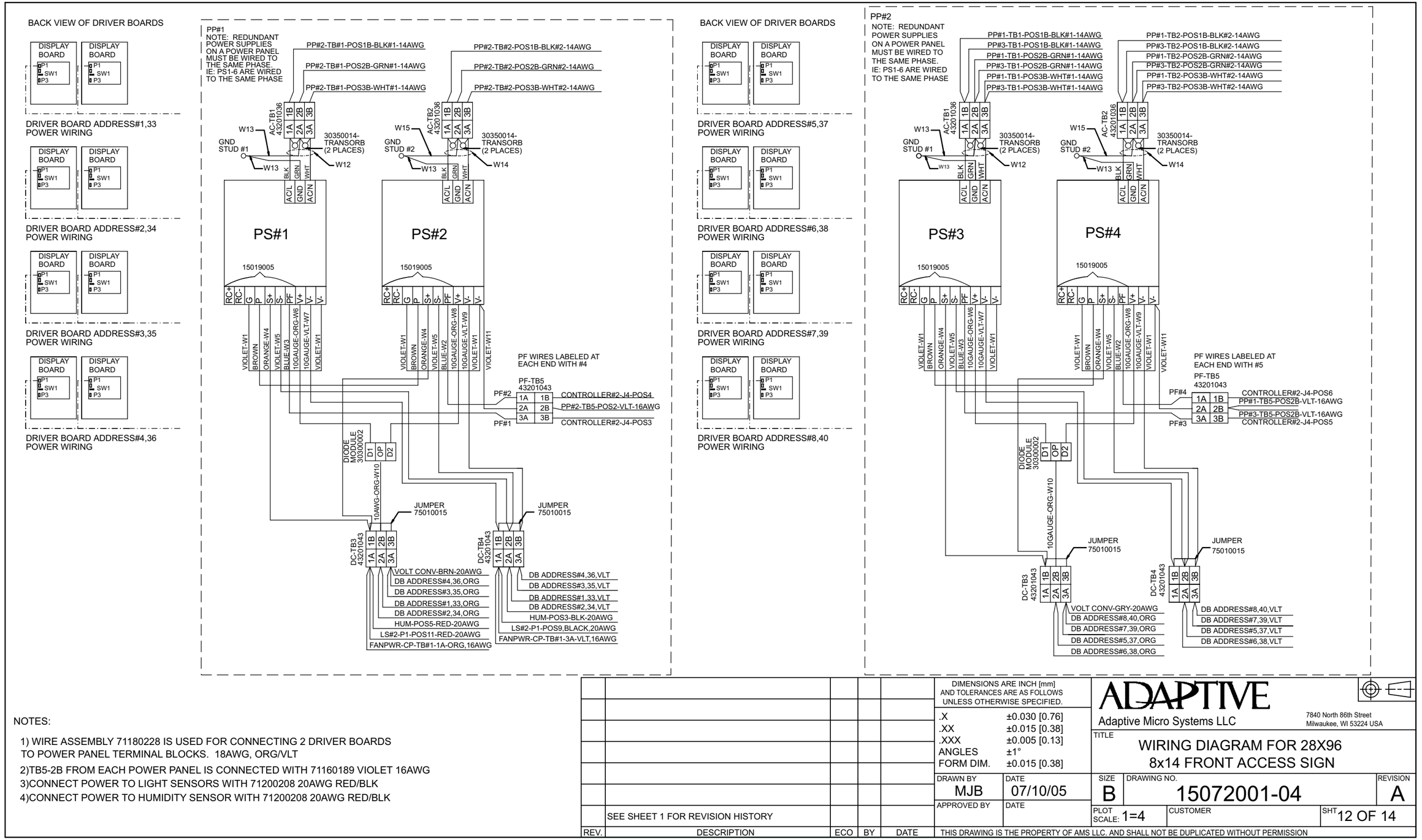
ADAPTIVE
Adaptive Micro Systems LLC
7840 North 86th Street
Milwaukee, WI 53224 USA

TITLE: WIRING DIAGRAM FOR 28X96 8X14 FRONT ACCESS SIGN

SIZE: B DRAWING NO.: 15072001-04 REVISION: A
PLOT SCALE: 1=4 CUSTOMER SHT: 11 OF 14

THIS DRAWING IS THE PROPERTY OF AMS LLC. AND SHALL NOT BE DUPLICATED WITHOUT PERMISSION

6.12 Power panel #1 and #2 information (15072001-04, revision A, sheet 12 of 14)



NOTES:

1) WIRE ASSEMBLY 71180228 IS USED FOR CONNECTING 2 DRIVER BOARDS TO POWER PANEL TERMINAL BLOCKS. 18AWG, ORG/VLT

2)TB5-2B FROM EACH POWER PANEL IS CONNECTED WITH 71160189 VIOLET 16AWG

3)CONNECT POWER TO LIGHT SENSORS WITH 71200208 20AWG RED/BLK

4)CONNECT POWER TO HUMIDITY SENSOR WITH 71200208 20AWG RED/BLK

REV.	DESCRIPTION	ECO	BY	DATE
	SEE SHEET 1 FOR REVISION HISTORY			

DIMENSIONS ARE INCH [mm] AND TOLERANCES ARE AS FOLLOWS UNLESS OTHERWISE SPECIFIED.

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TITLE: WIRING DIAGRAM FOR 28X96 8x14 FRONT ACCESS SIGN

SIZE: B DRAWING NO.: 15072001-04 REVISION: A
PLOT SCALE: 1=4 CUSTOMER SHT 12 OF 14

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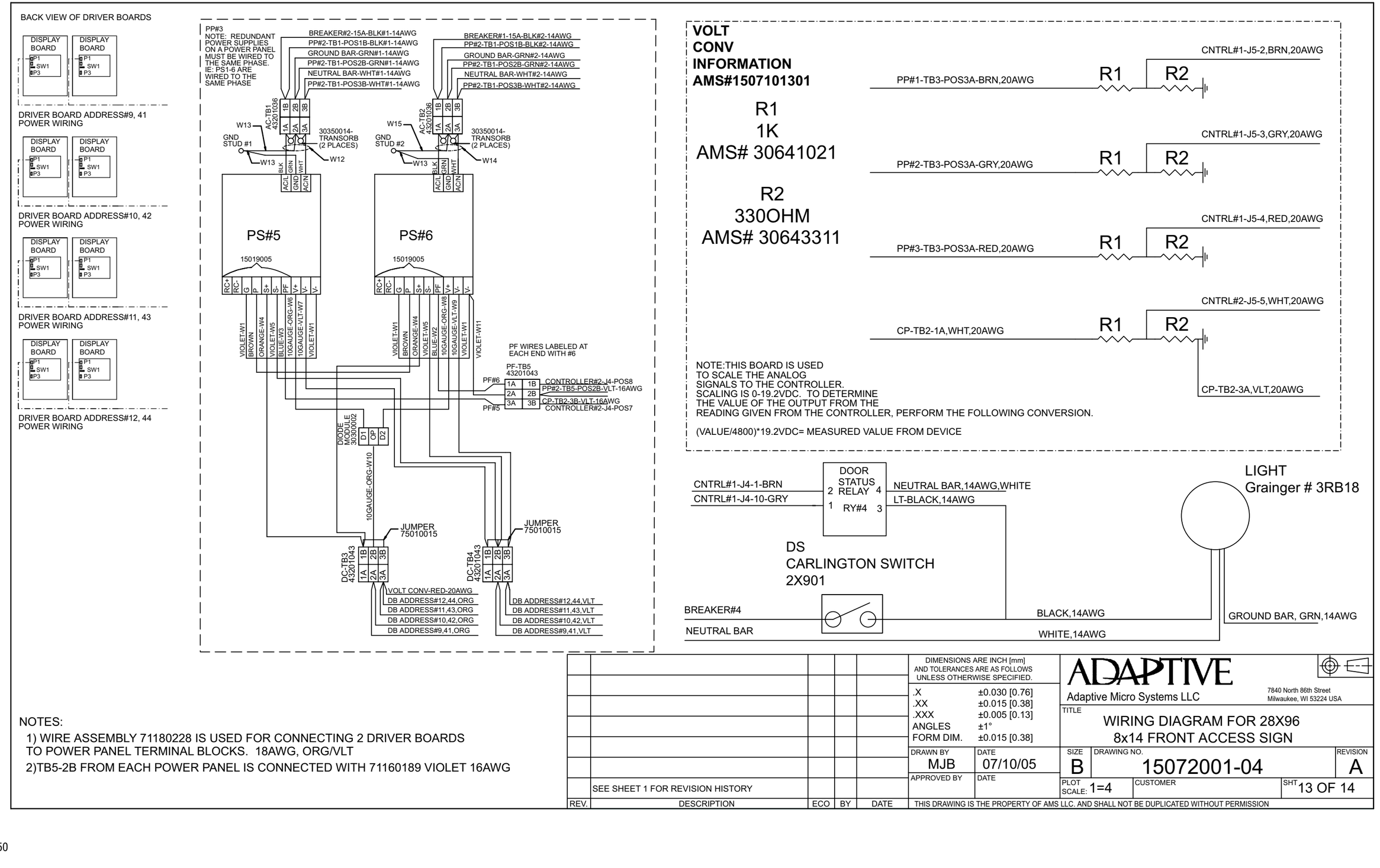
6.13 Power panel #3 information (15072001-04, revision A, sheet 13 of 14)



NOTES:

1) WIRE ASSEMBLY 71180228 IS USED FOR CONNECTING 2 DRIVER BOARDS TO POWER PANEL TERMINAL BLOCKS. 18AWG, ORG/VLT

2)TB5-2B FROM EACH POWER PANEL IS CONNECTED WITH 71160189 VIOLET 16AWG

REV.	DESCRIPTION	ECO	BY	DATE
	SEE SHEET 1 FOR REVISION HISTORY			

DIMENSIONS ARE INCH [mm] AND TOLERANCES ARE AS FOLLOWS UNLESS OTHERWISE SPECIFIED.

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.XX	±0.015 [0.38]
.XXX	±0.005 [0.13]
ANGLES	±1°
FORM DIM.	±0.015 [0.38]

DRAWN BY: MJB — DATE: 07/10/05
APPROVED BY — DATE

ADAPTIVE
Adaptive Micro Systems LLC
7840 North 86th Street
Milwaukee, WI 53224 USA

TITLE: WIRING DIAGRAM FOR 28X96 8x14 FRONT ACCESS SIGN

SIZE: B — DRAWING NO.: 15072001-04 — REVISION: A
PLOT SCALE: 1=4 — CUSTOMER — SHT 13 OF 14

THIS DRAWING IS THE PROPERTY OF AMS LLC. AND SHALL NOT BE DUPLICATED WITHOUT PERMISSION

6.14 Address plug information (15072001-04, revision A, sheet 14 of 14)

ADDRESS PLUG SETUP INFORMATION

ADDRESS #1 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #2 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #3 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #4 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #5 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #6 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #7 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #8 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #9 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #10 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #11 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #12 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #33 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #34 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #35 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #36 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #37 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #38 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #39 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #40 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #41 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #42 JUMPER HOUSING ITEM #E51 P2

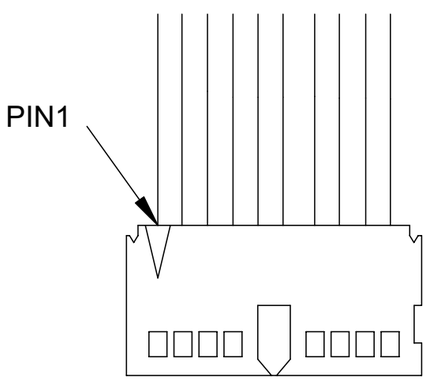
PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X

ADDRESS #43 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X

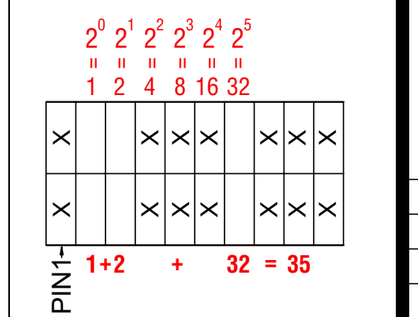
ADDRESS #44 JUMPER HOUSING ITEM #E51 P2

PIN1	
X	X
X	X
X	X
X	X
X	X
X	X
X	X



ADDRESSING HOUSING
FRONT VIEW
AMS#43302014

How Address Plugs are Encoded:



X IN A POSITION ON AMS#43302014 JUMPER HOUSING MEANS THE WIRE IS INSTALLED.
REMOVE WIRES FROM POSITIONS NOT
CONTAINING AN X.

REV.	DESCRIPTION	ECO	BY	DATE
	SEE SHEET 1 FOR REVISION HISTORY			

DIMENSIONS ARE INCH [mm]
AND TOLERANCES ARE AS FOLLOWS
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ANGLES	±1°
FORM DIM.	±0.015 [0.38]

DRAWN BY	DATE
MJB	07/10/05
APPROVED BY	DATE

ADAPTIVE
Adaptive Micro Systems LLC
7840 North 86th Street
Milwaukee, WI 53224 USA

TITLE
WIRING DIAGRAM FOR 28X96
8x14 FRONT ACCESS DESIGN

SIZE	DRAWING NO.	REVISION
B	15072001-04	A

PLOT SCALE:	CUSTOMER	SHT
1=4		14 OF 14

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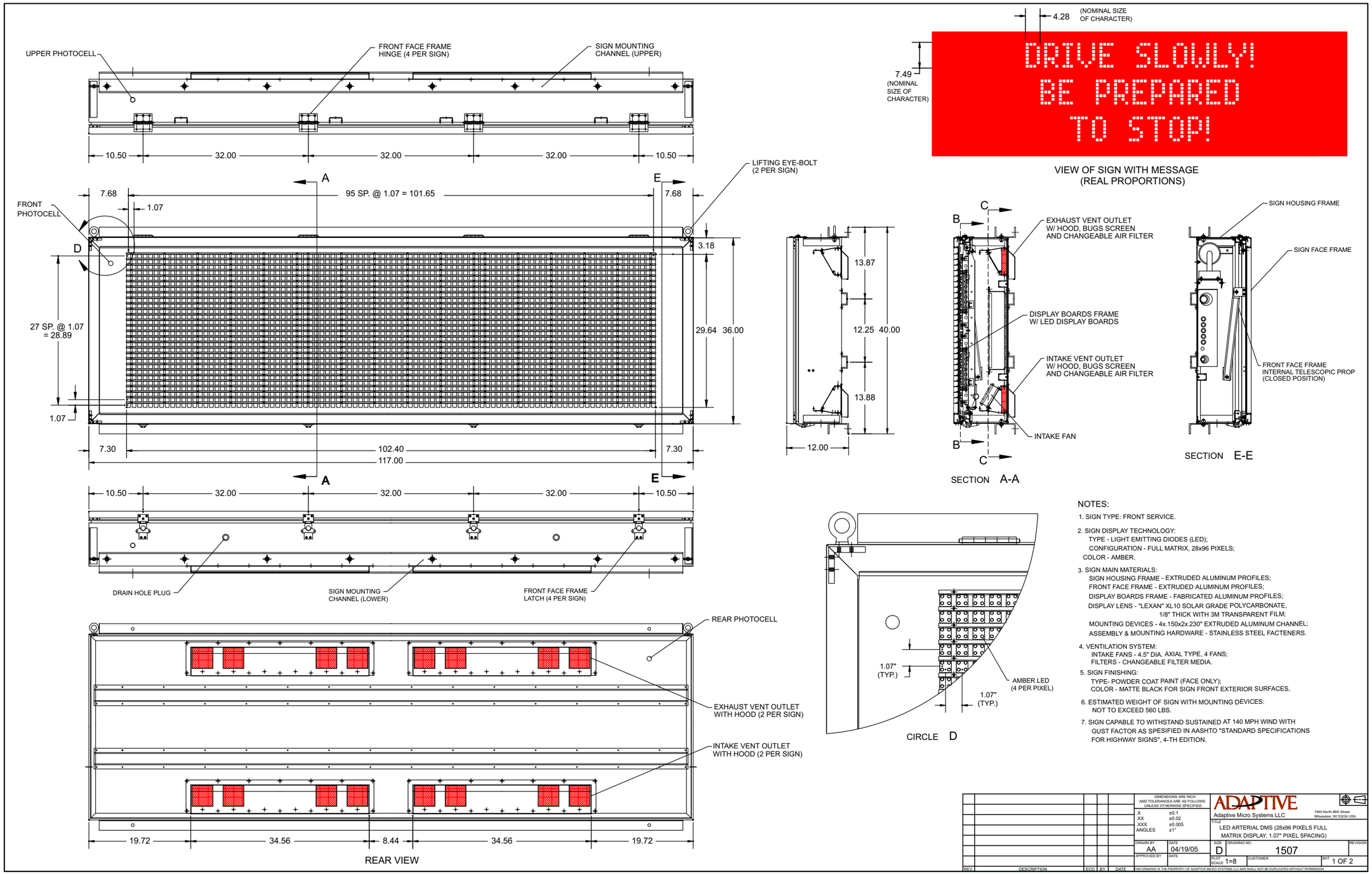
6.15 Sign dimensions



NOTES:

1. SIGN TYPE: FRONT SERVICE.
2. SIGN DISPLAY TECHNOLOGY:
   TYPE - LIGHT EMITTING DIODES (LED);
   CONFIGURATION - FULL MATRIX, 28x96 PIXELS;
   COLOR - AMBER.
3. SIGN MAIN MATERIALS:
   SIGN HOUSING FRAME - EXTRUDED ALUMINUM PROFILES;
   FRONT FACE FRAME - EXTRUDED ALUMINUM PROFILES;
   DISPLAY BOARDS FRAME - FABRICATED ALUMINUM PROFILES;
   DISPLAY LENS - "LEXAN" XL10 SOLAR GRADE POLYCARBONATE, 1/8" THICK WITH 3M TRANSPARENT FILM;
   MOUNTING DEVICES - 4x.150x2x.230" EXTRUDED ALUMINUM CHANNEL;
   ASSEMBLY & MOUNTING HARDWARE - STAINLESS STEEL FACTENERS.
4. VENTILATION SYSTEM:
   INTAKE FANS - 4.5" DIA. AXIAL TYPE, 4 FANS;
   FILTERS - CHANGEABLE FILTER MEDIA.
5. SIGN FINISHING:
   TYPE- POWDER COAT PAINT (FACE ONLY);
   COLOR - MATTE BLACK FOR SIGN FRONT EXTERIOR SURFACES,
6. ESTIMATED WEIGHT OF SIGN WITH MOUNTING DEVICES:
   NOT TO EXCEED 560 LBS.
7. SIGN CAPABLE TO WITHSTAND SUSTAINED AT 140 MPH WIND WITH GUST FACTOR AS SPESIFIED IN AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY SIGNS", 4-TH EDITION.

REV	DESCRIPTION	ECO	BY	DATE

DIMENSIONS ARE INCH AND TOLERANCES ARE AS FOLLOWS UNLESS OTHERWISE SPECIFIED.
X ±0.1
.XX ±0.02
.XXX ±0.005
ANGLES ±1°

DRAWN BY: AA — DATE: 04/19/05
APPROVED BY — DATE

ADAPTIVE
Adaptive Micro Systems LLC
7940 North 86th Street
Milwaukee, WI 53224 USA

TITLE: LED ARTERIAL DMS (28x96 PIXELS FULL MATRIX DISPLAY, 1.07" PIXEL SPACING)

SIZE: D — DRAWING NO.: 1507 — REVISION

PLOT SCALE: 1=8 — CUSTOMER — SHT 1 OF 2

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