

Advanced Variable Message Sign

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What Types of Signs are We Talking About?

- Large overhead signs used on freeways
 - 25 feet wide x 6.75 feet high
 - Dynamic full matrix signs to display traffic advisory information to the motorists
- Does not include
 - Smaller freeway toll and information signs
 - Portable message signs (trailer signs)
 - Extinguishable message signs (fixed message)

How Many Signs Does Caltrans Need?

- Currently Caltrans has over 700 “Model 500” Changeable Message Signs (CMS) deployed statewide
- Planned build out is over 1200 signs

How Do We Procure the 500+ Signs that We Will Need?

- Procurement Options
 - Keep buying Model 500 Signs
 - Buy “Off the Shelf” Signs
 - Create a New Caltrans Sign

Advantages of the Model 500 CMS

- Really easy to procure
- Inexpensive
- Familiarity
- Comes in 3 sizes
 - 25 x 96 pixels (2.75" pitch)
 - 25 x 96 pixels (1.75" pitch)
 - 25 x 48 pixels (1.75" pitch)



Disadvantages of the Model 500 CMS

- Only low resolution
- Amber only (no color option)
- Unable to tell if sign is actually displaying the requested message
- Technology used is antiquated
- Some of the components are starting to become more difficult to acquire

Model 500 Signal Cabling

- Control wiring from the sign to the ground cabinet can be confusing
 - Requires 60 - #18AWG wires



Things I Don't Like About the Model 500

- Door on the front of the sign wastes display area
- If sign is to be deployed into the center median we need to purchase a special “Left Handed Model 500”

How Do We Procure the 500+ Signs that We Will Need?

- Procurement Options
 - ~~Keep buying Model 500 Signs~~
 - Buy “Off the Shelf” Signs
 - Create a New Caltrans Sign

Off-the-Shelf Signs are Very Good



Some Vendors We Spoke With

- ADDCO
- Daktronics
- Skyline
- D3LED
- Swarco
- SES America
- McCain
- Ledstar
- Optec



Comments from Vendors

- “Buying off-the-shelf is the best option and will save you money”

Advantages of an Off-the-Shelf Sign

- Easy to procure
- Inexpensive
- Low and high resolution
- Lots and lots of options

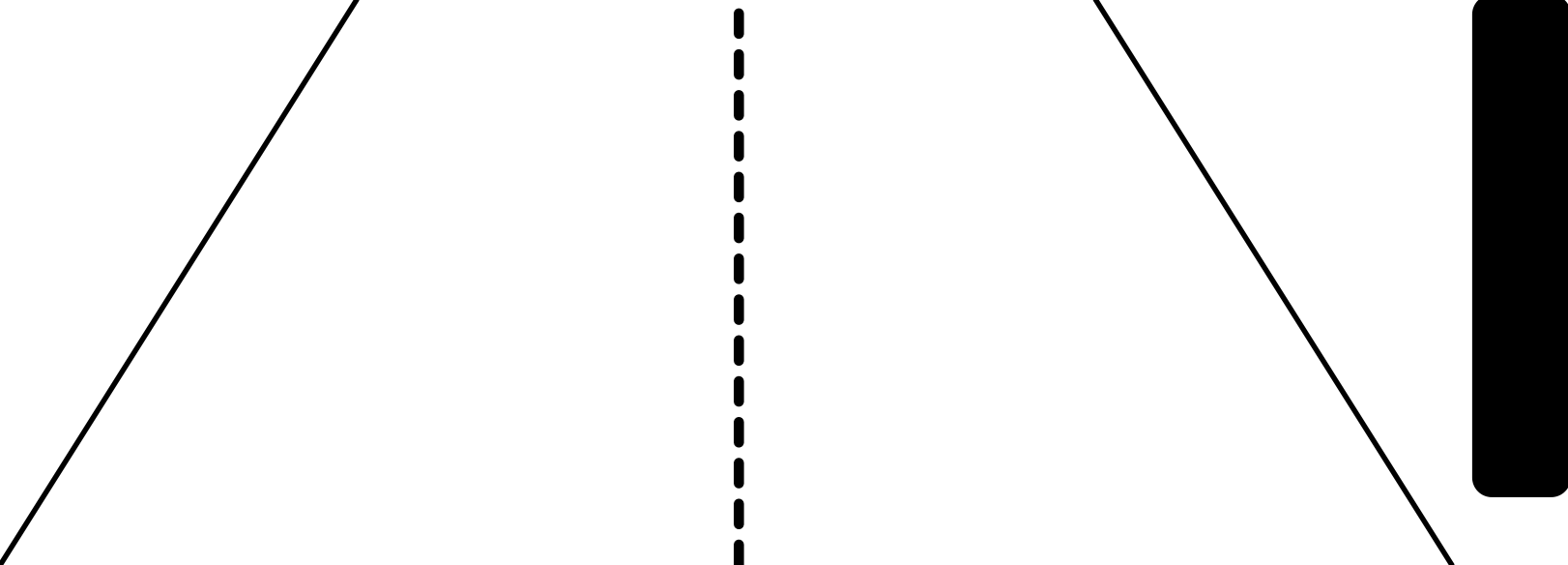
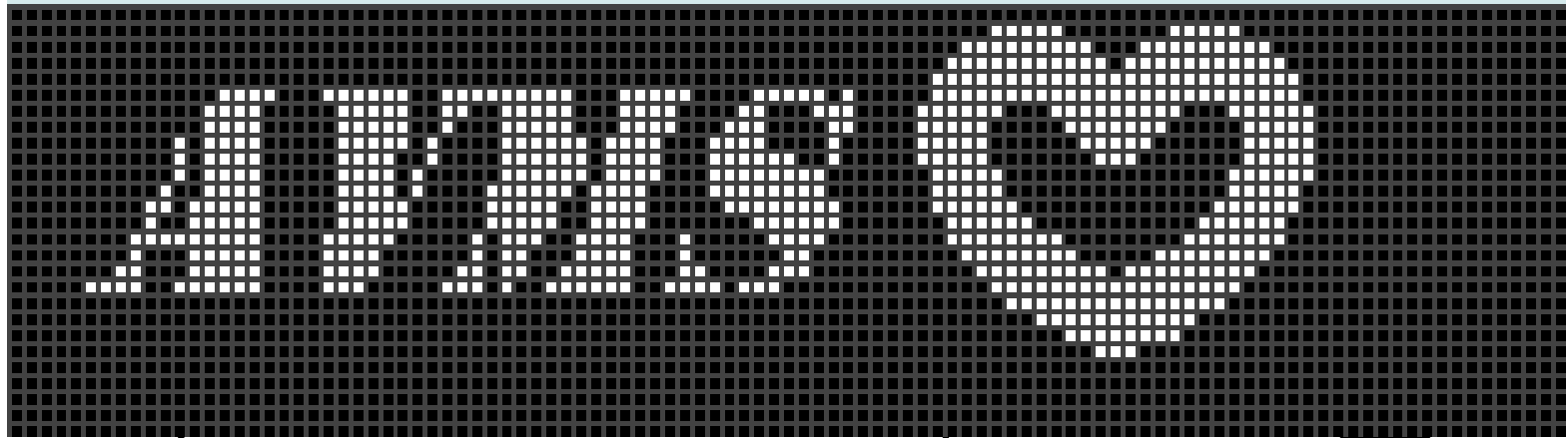
Disadvantages of an Off-the-Shelf Sign

- Non-standard hardware and software
- Increased amount of training required
- Need to stock vendor specific parts for each sign manufacturer
- Replacement parts may require the use of single-source contracts
- Risk that the sign may lose support due to obsolescence
- Design is proprietary
- If the company goes out of business your sign will quickly become unusable

How Do We Procure the 500+ Signs that We Will Need?

- Procurement Options
 - ~~Keep buying Model 500 Signs~~
 - ~~Buy “Off the Shelf” Signs~~
 - Create a New Caltrans Sign

Creating a New Message Sign



What do We Want

- Basically what we want is a sign that works like the existing Model 500 but with new and improved features
- We also want a sign that fits perfectly into our existing regional architecture
 - Sizes/resolution similar to our existing model 500 signs
 - Needs to fit on existing structures
 - Needs to use existing Caltrans communications protocols

What New Features do We Want

- We want to know if the requested message is actually displayed
- Power savings
- Low voltage for additional safety
- Simplified troubleshooting
- Color sign option
- Support NTCIP communications standards

Development Process

- Think Systems Engineering



Developing the Specification

- Early work was done in 2007 by Caltrans Department of Research and Innovation
 - Developed Concept of Operations and Draft Requirements
- Requirements specified 3 different sign sizes
 - Model 710 27 x 105 pixels (2.75" pitch)
 - Model 720 27 x 95 pixels (1.75" pitch)
 - Model 730 27 x 60 pixels (1.75" pitch)

Development Team

- David Wells (Caltrans HQ) was the Project Manager and created the text of the specification
- Maria Hionides (Caltrans HQ) created the AVMS drawings
- Minh Tran (Caltrans Transportation Lab) provided testing support
- Advanced Variable Message Sign Workgroup consisting of 23 Caltrans District Engineers statewide provided design feedback

Specification Timeline

- Project was assigned to our section in October 2009
- High level design completed in March 2010
- Held our first statewide internal meeting in April 2010
- Held numerous statewide meetings with Caltrans Stakeholders and Sign Manufacturers
 - 460 comments about the proposed specification were recorded
- Released AVMS Specification in January 2011

We have a Specification, What Now?

Steps to make the AVMS

1. Make prototype Pixel Matrix Models
2. Develop software to control the sign
 - Option A. Software developed by each manufacturer
 - Option B. Software developed by Caltrans (option we selected)
3. Have a prototype AVMS built

Other Options I Considered

- Ask for a transfer to another department
- Try to get promoted
- Retire

Developing the Pixel Matrix Module

Pixel Matrix Module is the most essential element of the sign

Each
Pixel Matrix Module
acts like a
mini-message sign

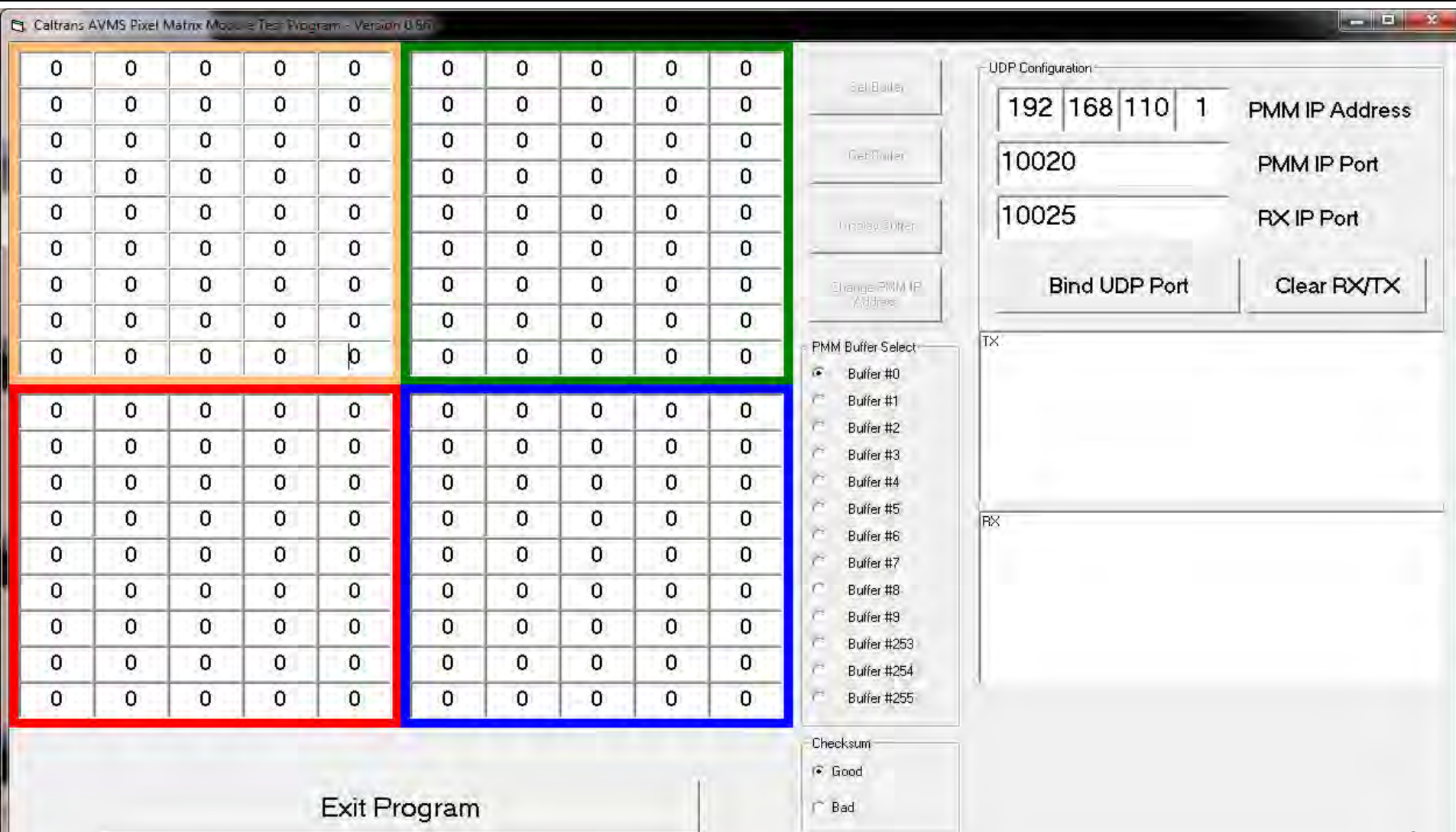
Developing the Pixel Matrix Module

- Most vendors had no desire to build a “Caltrans Pixel Matrix Module” and it took 9 months of searching to find a vendor willing to build the first prototype modules
 - Purchase order issued November 2011
 - Paid less than \$5000 for 6 modules
- Based on additional user comments, we updated the specification and ordered a second set of Pixel Matrix Modules in September 2012

Initial Tests of the Pixel Matrix Modules

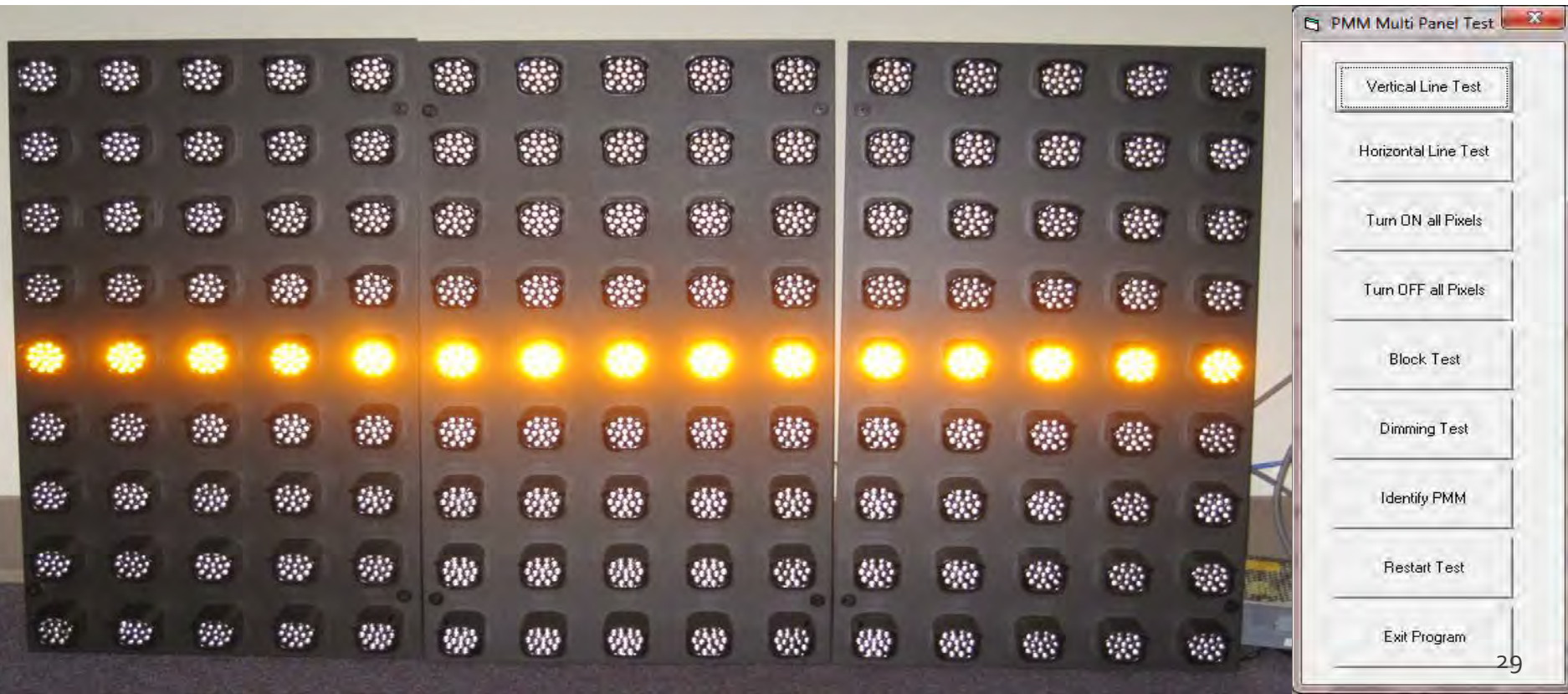
- Test software created in-house using Visual Basic 6
- Allowed us to test Prototype Pixel Matrix Modules to the AVMS Specification before the full sign was built
- Shared software with the contractor so that they could also use it for their initial development

Pixel Matrix Single Module Test Software



Testing Multiple Pixel Matrix Modules

- We also created a program to display vertical and horizontal lines for testing multiple Pixel Matrix Modules



Other Test Performed at Our Lab

- 40 Candela pixel output over the full temperature range (-37 to +74 Celsius)
- Physical dimensions
- Communications using the AVMS internal communications protocol
- Display of messages

Pixel Matrix Modules – Initial Tests Complete

Pixel Matrix Modules
WORK!

Time to Move on to our Next Step

Developing the Sign Control Software

- Contracted in June 2012 to develop AVMS System Software
- Software developed using Java
- Apache Tomcat used for web services
- Cost to develop: \$467,000
- Development of the System Software was completed in June of 2014

Sign Control Software Ownership

As Stated in the Contract

“Contractor shall not copyright any software or documentation delivered under this Contract. All software and documentation delivered under this Contract shall become the property of the State and may be copyrighted by the State...”

Developing a Prototype Sign

- Ordered a full Prototype AVMS in December 2012.
- AVMS arrived in California at the manufacturer's plant in May 2013
- Arrived at Caltrans September 2013
- Prototype cost: \$92,000

Development Issues

- System Software Developer did not have a prototype sign with which develop and validate their software until May 2013
- Prototype Sign Developer did not have the System Software to ensure they were manufacturing the AVMS correctly

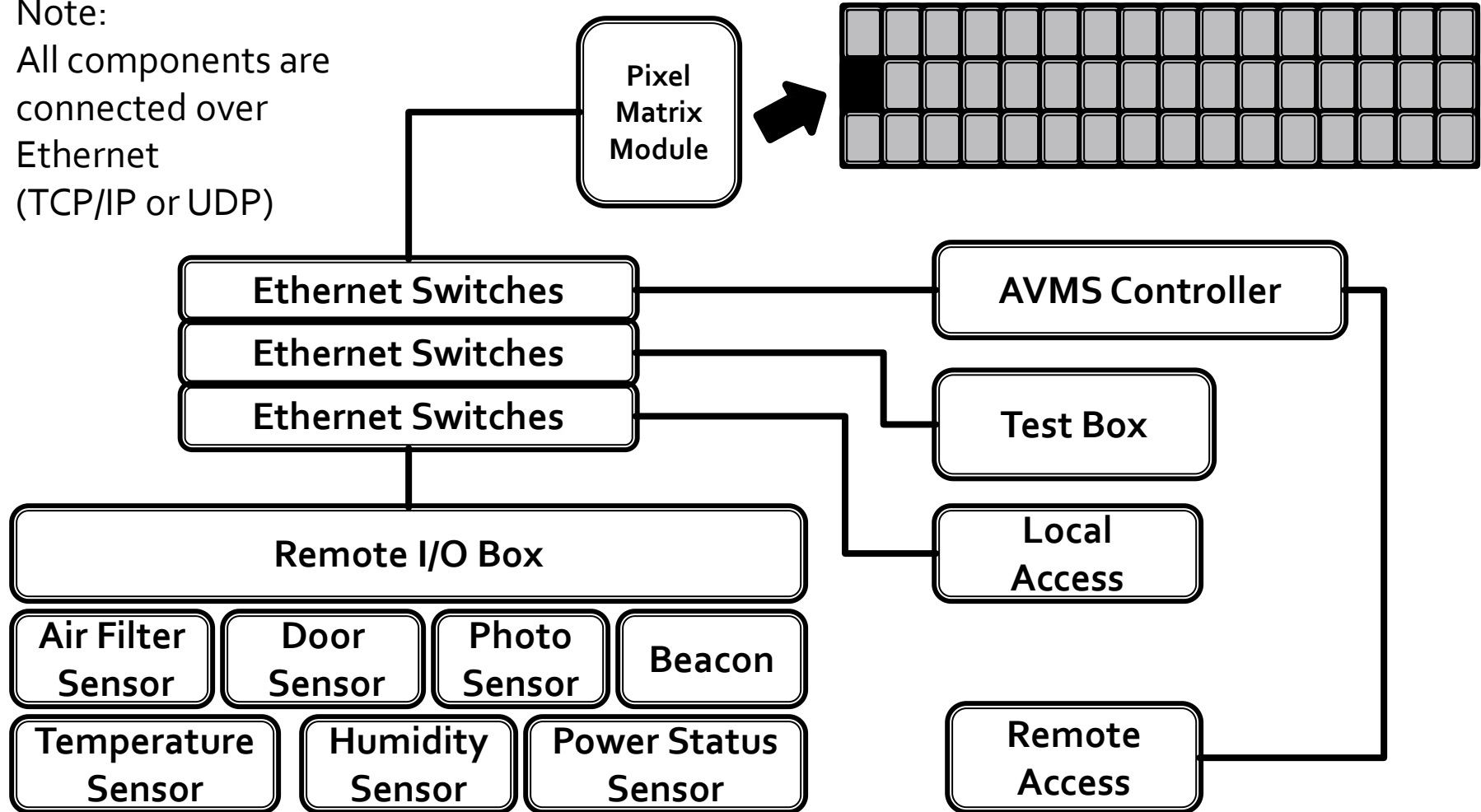
Finally the AVMS came to Life



AVMS Block Diagram

Note:

All components are connected over Ethernet (TCP/IP or UDP)



AVMS Front Door Access

- Access doors hidden behind Pixel Matrix Modules for greater visibility.
- Access doors on both sides allow us to install control equipment on either side.



What's behind the door?

- Remote I/O Box
- Test Box
- Ethernet Switches
- 24 Volt Power Supplies
- Circuit Breakers
- AC Outlets
- Controller



Only 3 Parts are Not “Off the Shelf”

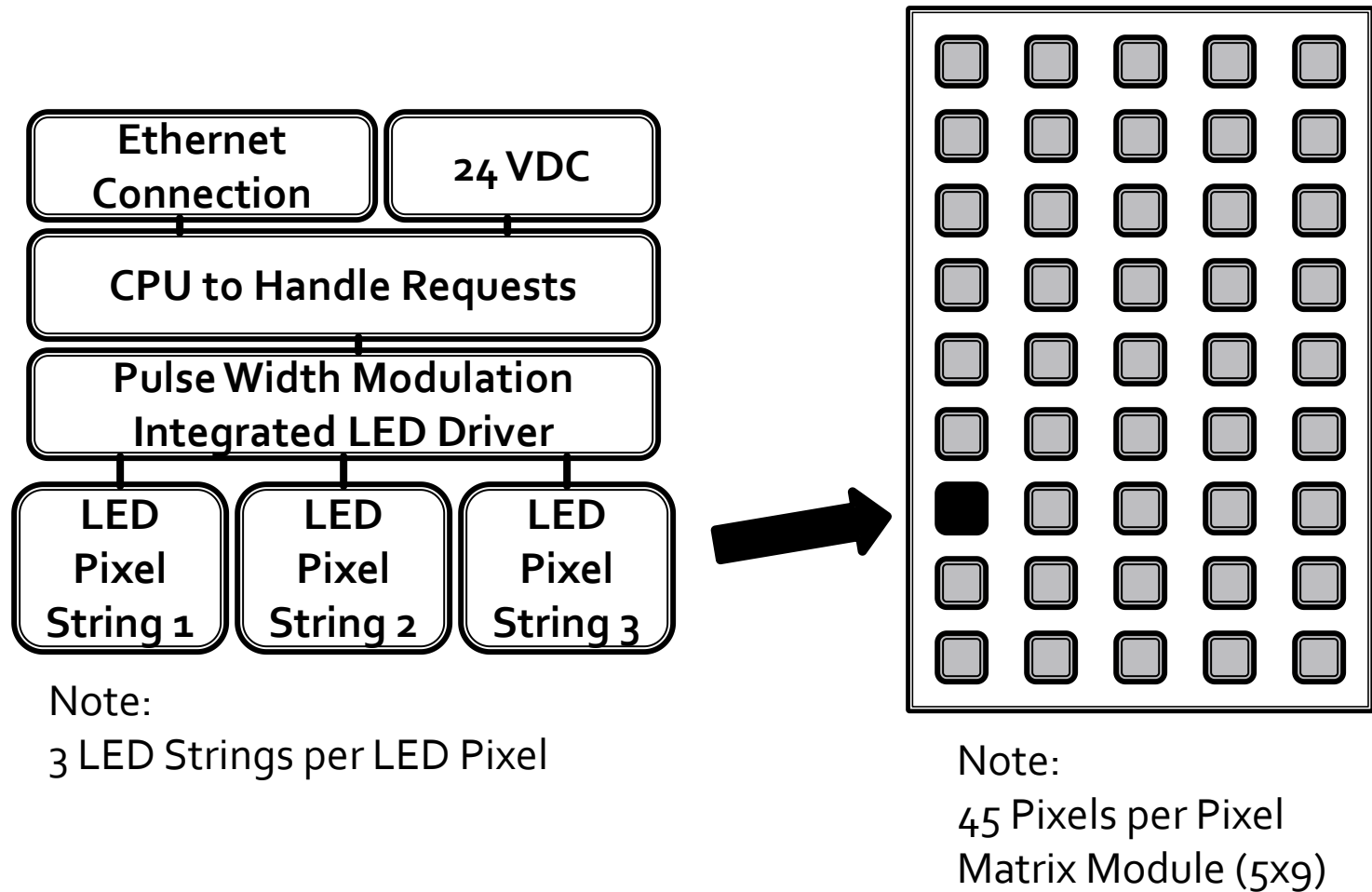
- AVMS Specification requires only 3 parts that are not “Off the Shelf”
 - **Pixel Matrix Module** – Displays messages
 - **Remote I/O Box** – Collects sensor data (doors, photo sensors, ext.) and transmit it to the AVMS controller over Ethernet
 - **Test Box** – Allows maintenance to test the sign in the field

Pixel Matrix Module

- Only 2 connections
 - Ethernet
 - 24VDC Power
- Each LED puts out 40 Candelas
- Will blank out if no message received by the AVMS Controller for 5 minutes



Pixel Matrix Module Block Diagram



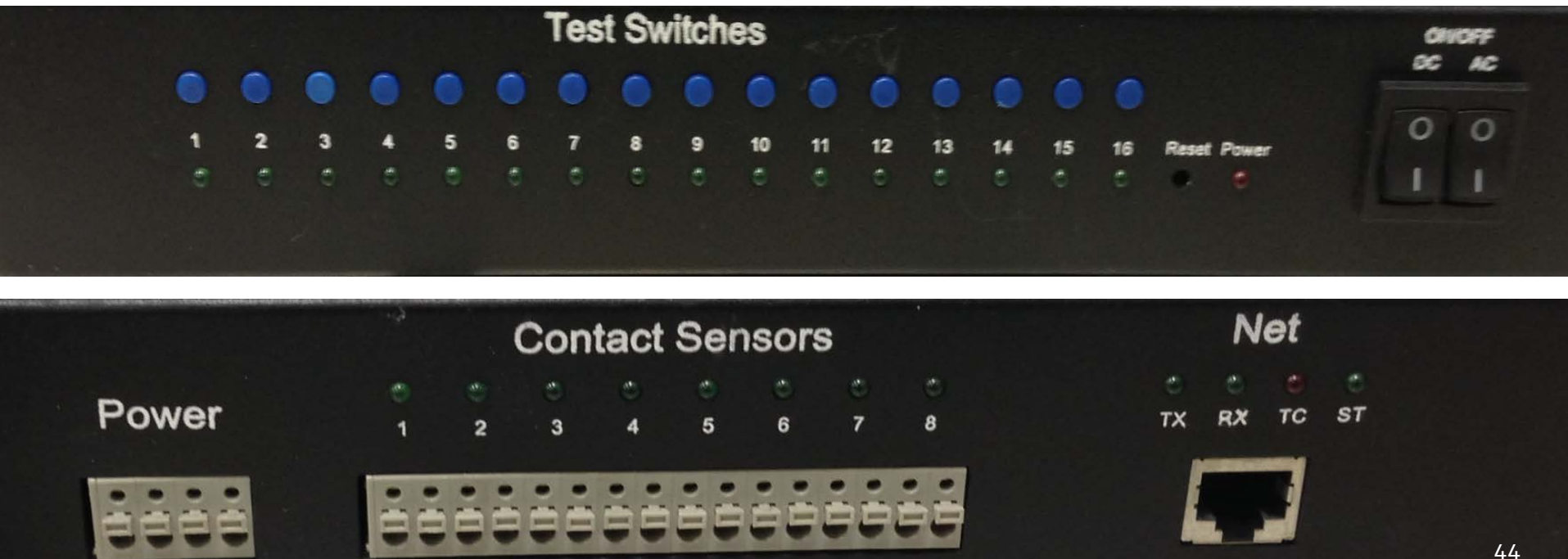
Remote I/O Box

- Discrete Inputs(ON/OFF)
 - Humidity
 - Door
 - Fan
 - Power Supply
 - Air Filter
 - Beacon Status
 - Special Message Inputs
- Analog Inputs
 - Photocell
 - Temperature
- 2 Relay Outputs
 - Beacon
 - Power Saving Subpanel



Test Box

- Allows maintenance to run simple tests on the sign
- Discrete inputs to detect ground cabinet intrusion and to activate special messages



Most of the Sign Designed to be “Off the Shelf”

- Ethernet Switches
- 24 Volt Power Supplies
- Breakers
- Ethernet Cable
- Controller

Standard Ethernet Switches



Standard 24VDC Power Supplies



Standard Outlets and Breakers



Off-the-Shelf Controller Requirements

- 2 Independent Ethernet Ports
- Metal Housing
- Wide Temperature (-37 to 74 Celsius)
- No Fan
- Solid State (no hard drive)
- Able to run Caltrans AVMS System Software

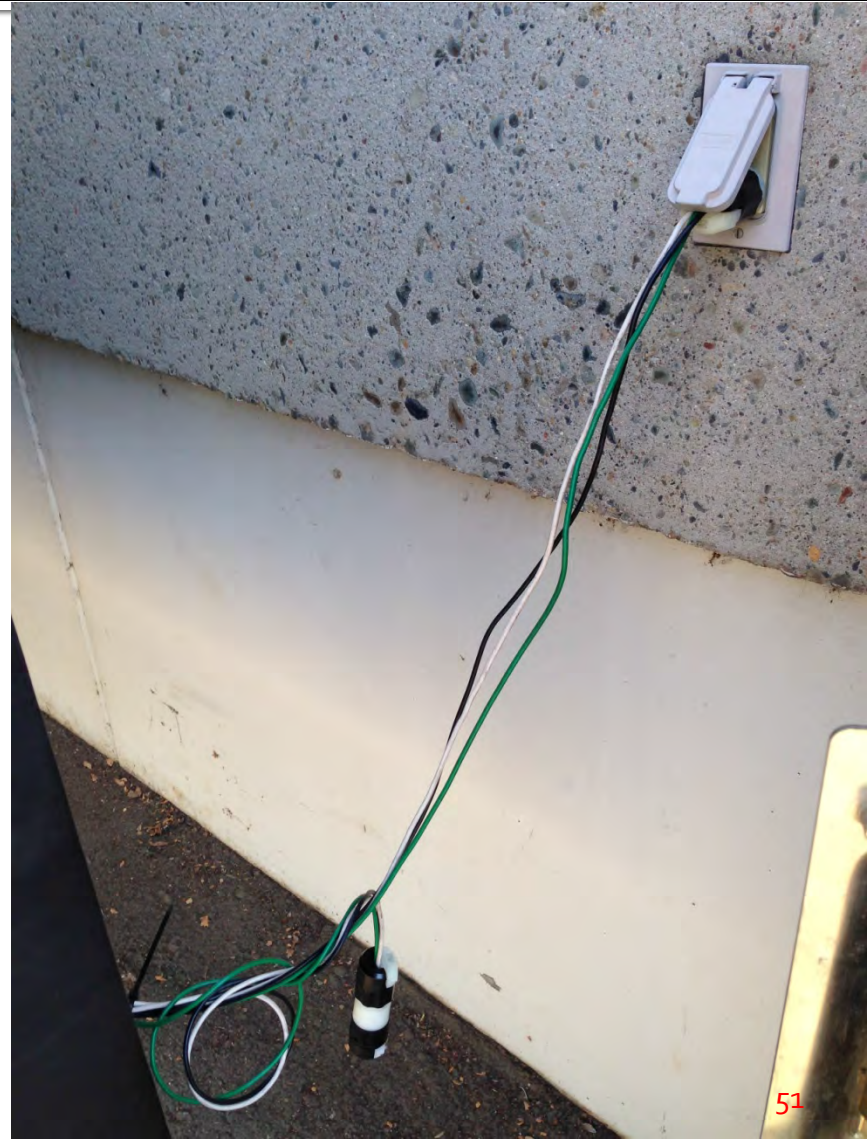
Off-the-Shelf Controller

A Moxa 2101 Controller running Linux was used for the prototype, but any off the shelf controller that meets our requirements is allowed.



How did we Connect the Sign's Power?

- We just plugged it in to a standard 120V AC outlet
 - 30-Amp breaker recommended



Some Advantages of the Design

- Simpler to maintain
 - Majority of the components are off the shelf
 - All components have easy front access
 - No ground cabinet required
 - No more complicated CMS wiring harnesses. Just Ethernet and 120 VAC Power
 - Sign is Ambidextrous (can be mounted in the median or on the shoulder)
- Safer
 - A Pixel Matrix Modules powered by 24 VDC

What Controls the Sign?

- AVMS System Software is used to:
 - Display messages and return status using the NTCIP and Caltrans SignView Protocol
 - Allow users to interface with the sign through a Graphical User Interface (GUI)
- Network Security
 - Secure Hypertext Transfer Protocol (HTTPS)
 - Secure Shell (SSH)
 - Secure File Transfer Protocol (SFTP)
 - Telnet disabled
 - File Transfer Protocol (FTP) disabled

AVMS System Software

- Developed in Java to allow the AVMS System Software to run on either a Linux or Windows Operating System
- Graphical User Interface works best using a Firefox browser

Communications

- Handles both National (NTCIP) and Caltrans (SignView) communications protocols

The screenshot shows a software interface for controlling traffic signs. At the top, a digital sign displays the text "TRAFFIC OPERATIONS" in yellow, pixelated characters. Below the sign, a control panel contains the following information:

- Connected To: Test AVMS Via Network
- Message From The CMS Controllor
- Message Type: Detail Request (selected from a dropdown menu)
- Displaying: 2 Pages (Extended)
- Since: 3:25 1/6/2007
- On Until: The TMC Turns Off The CMS
- Page Display Time: 2.4 Seconds
- A "Send Message" button is located at the bottom left of the control panel.

AVMS System Software User Interface



AVMS CONTROLLER GUI

Location: Location

Mode: CENTRAL

Model: Model 710

Color Scheme: Amber

Software Version: 20140509 - v1.01.35

SYSTEM

OPERATION

LIBRARY

DIAGNOSTICS

DATE AND TIME

AVMS Current Date and Time

Date:

Wed Apr 15, 2015

Time:

11:25:40

LOCAL

Change

Refresh

Standard Time Zone:

-8

hours

Daylight Saving:

Enabled

[More](#)

GUI Makes it Easy for Users to:

- Connect to the sign locally and remotely
- Create, preview and display messages
- Import low resolution graphics
- Schedule messages to be displayed based on the time of day, week or month
- Adjust sign brightness
- Perform remote diagnostics
- Verify if a requested message is actually up

User Interface User Tree

System	Operations	Library	Diagnostics
Date and Time	Activate a Message	Device Messages	Display Buffers
PMM Brightness Multipliers	Preview a Message	Device Schedules	Remote I/O Box
Ethernet Addresses	Sign Brightness	Device Graphics	Test Box
		Default Messages	Test Box Tests
		Special Messages	Warning and Error Log

Sign Status

- Current time and date
- Current message
- Message source
- Brightness

LOGOUT

April 17, 2015 - 15:42:20

Current Message C5: [g12]

Message Source: Central (75)

Brightness Mode: Auto, 78%

Brightness Multipliers

- Color balances the sign as LED's luminosity changes over time

PMM BRIGHTNESS MULTIPLIERS

PMM Brightness Multipliers

	Color	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
LINE 1	Amber	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Red	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Green	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Blue	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
LINE 2	Amber	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Red	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Green	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Blue	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
LINE 3	Amber	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Red	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Green	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Blue	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Activate a Message

- Uses simple dropdowns to select a message
- Can select a maximum message display duration
- Can store up to 25 permanent and 25 changeable messages

ACTIVATE A MESSAGE

Message Type:

Permanent

Changeable

Schedule

Message list:

Select a changeable message...

Select a changeable message...

1: [fo1]ABCDEFGHJKLMNOPQO[nl]12345678901234567[nl]1ABCDEFGHJKLMNOPQO
2: [fo1]METS TRANSLAB[nl]WELCOMES[nl]DRISI
3: [fo1][cf0,191,0]Test GREEN[cf][nl][cf255,0,0]Test RED[cf][nl][cf255,231,0]
4: [g1]
5: [g12]
6: [fo1][pt5o5]Pixels On Break..[nl]-> -> -> <- <- [nl]1/2 Sec Flash
7: [fo1][pt24o0]SELECT[nl]DAVID WELLS[nl][fo1]FOR OFFICE CHIEF
8: [fo1][pt10o10]Heart Rate Check[nl]60 Beats[nl]Minute
9: [fo1][pt3o3]Time to Test[nl] Fast[nl]Flashing - 3/10 S
10: [g3]
11: [fo1][pt36o0][nl] I AM THE AVMS[nl][np][pt36o0]I LIGHT UP YOUR[nl]L
12: [fo1>Welcome Guests[nl]Thanks for[nl]Visiting Me !!!
13: [fo1][pt20o50]I am the NEW [nl]AVMS 710[nl]Caltrans Best !!!
14: [fo1][pt50o200]Who Goes There?[nl](o) (o)[nl]I'm Watching You
15: [fo2][pt20o20]TGIF !!![np][fo2][pt10o10][nl]
16: [fo1][g4][pt24o12][np]VOTE FOR[nl]ELECTRICAL DESIGN[nl] THE FUT
17: [fo1][pt50o0]www[nl]bravomikeaviation[nl]com
18: [fo2]HAPPY[nl][np]MONDAY
19: [fo1][pt24o0>Welcome HAMID[nl] [nl]

Preview a Message

- Allows you to preview a message before displaying it on the sign



The screenshot shows the AVMS CONTROL interface. At the top left is the Caltrans logo. To its right is the title 'AVMS CONTROL'. Below the logo, there are fields for 'Location: Location', 'Model: Model 710', and 'Color Scheme: Amber'. A navigation bar contains four buttons: 'SYSTEM', 'OPERATION', 'LIBRARY', and 'DIAGN'. The main section is titled 'PREVIEW A MESSAGE'. It includes a 'Message Type:' section with 'Permanent' and 'Changeable' buttons. Below this is a 'Message list:' section with a text input field containing the command '3: [fo1][cf0,191,0]Test GREEN[cf][nl][cf255,0,0]Test RED[cf][nl][cf255,0,0]Test YELLOW[cf][nl]'. A 'Preview message' button is located below the input field. At the bottom, a preview of the message display shows three lines of text: 'TEST GREEN' in green, 'TEST RED' in red, and 'TEST YELLOW' in yellow, all in a pixelated font on a black background.

Caltrans

AVMS CONTROL

Location: Location

Model: Model 710

Color Scheme: Amber

SYSTEM OPERATION LIBRARY DIAGN

PREVIEW A MESSAGE

Message Type: Permanent Changeable

Message list:

3: [fo1][cf0,191,0]Test GREEN[cf][nl][cf255,0,0]Test RED[cf][nl][cf255,0,0]Test YELLOW[cf][nl]

Preview message

TEST GREEN
TEST RED
TEST YELLOW

Setting Sign Brightness

- Manual and Automatic Brightness Control
- Ability to disable any photocell

The screenshot displays the AVMS CONTROL web interface. At the top, the Caltrans logo is on the left, and the title 'AVMS CONTROL' is on the right. Below the title, there are fields for 'Location: Location', 'Model: Model 710', and 'Color Scheme: Amber'. A navigation bar contains four buttons: 'SYSTEM', 'OPERATION', 'LIBRARY', and 'DIAGN'. The main content area is titled 'SIGN BRIGHTNESS'. It features a 'Sign brightness' section with two tabs: 'Automatic' (selected) and 'Manual'. Below the tabs, the 'Brightness' is set to 78 %, and the 'Manual Brightness Value' is also set to 78 % with a dropdown arrow. There are 'Refresh' and 'Set' buttons. Below this is a 'Photosensor control' section with three rows, each for a photocell. Each row shows the photocell number, its current brightness percentage, and 'Enable'/'Disable' buttons. Photocell #1 is at 73 %, Photocell #2 is at 52 %, and Photocell #3 is at 55 %.

Photocell	Brightness (%)	Control
Photocell #1	73	Enable / Disable
Photocell #2	52	Enable / Disable
Photocell #3	55	Enable / Disable

Simple Message Creation

- Simply type in the message
- You can preview the message before saving it
- One or two page messages
- Double and single stroke fonts

The interface displays a preview of the message "I AM THE AVMS" on a black background. Below the preview, the configuration for two pages is shown. Each page has a font dropdown set to "1: 7H5WF Caltrans Single Stroke", a "Graphic" button, and a "Page timing" section with "On-time" and "Off-time" fields set to 36 and 0 respectively. The text is entered in three lines per page, with a "Color Text" button for each line.

Page	Line	Text	Length	Action
Page 1	Line 1		105	Color Text
	Line 2	I AM THE AVMS	22	Color Text
	Line 3		105	Color Text
Page 2	Line 1	I LIGHT UP YOUR	16	Color Text
	Line 2	LIFE	82	Color Text
	Line 3		105	Color Text

At the bottom, there are "Cancel" and "Save" buttons.

Built in Scheduler

- Allows the user to schedule a message to be displayed at a requested time and date directly from the AVMS user interface

Model: Model 710 Color Scheme: Amber Software Version: 20140509 -

SYSTEM OPERATION LIBRARY DIAGNOSTICS

SCHEDULES

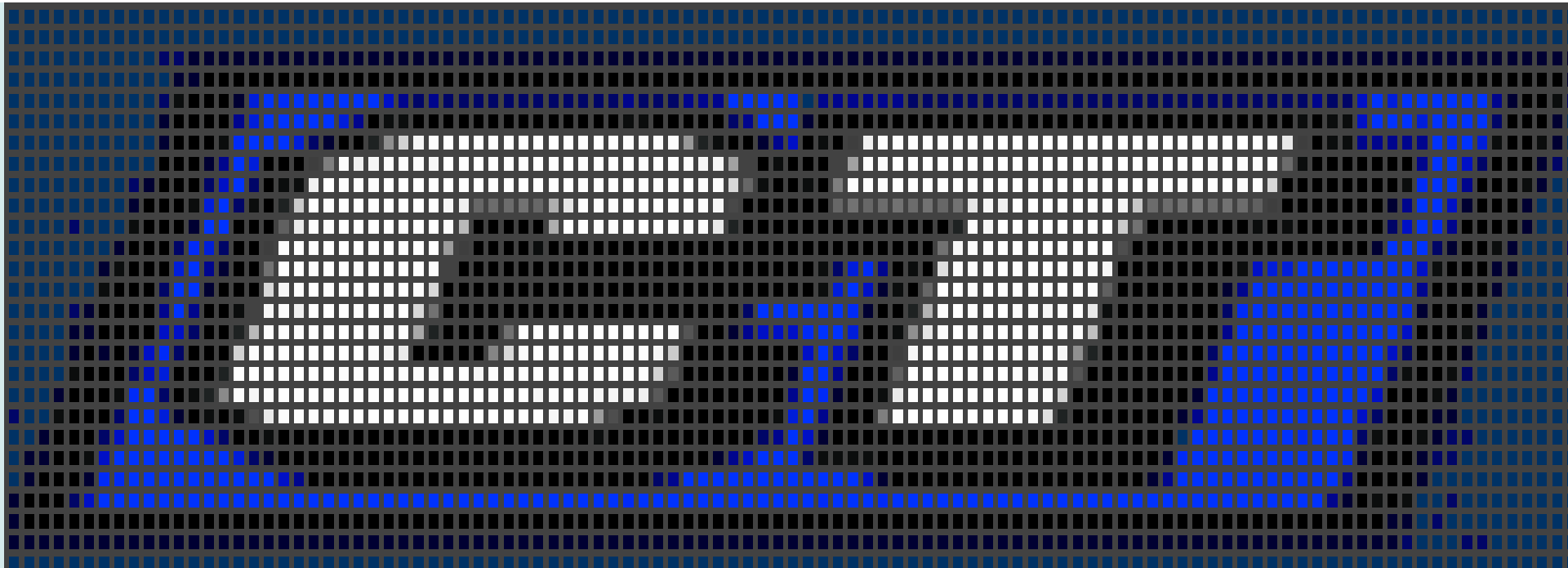
Schedule Number	1	
MonthsJ.....	
Days of WeekT..	
Days of Month	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31	
Entry	Time	Message
1	10:00	C1
2	12:00	B1
3	00:00	
4	00:00	
5	00:00	
6	00:00	

<< Previous Next >>

Refresh schedule Edit schedule

Graphics

- User can create and import low resolution graphics



NTCIP Default Messages

- Short Power Recovery
- Long Power Recovery
- Communications Loss
- End Duration



AVMS CONTROLLER GUI

Location: Location Mode: CENTRAL

Model: Model 710 Color Scheme: Amber Software Version: 20140509 - v1.01.35

SYSTEM OPERATION LIBRARY DIAGNOSTICS

DEFAULT MESSAGES

Short Power Recovery

Message Type: Blank Number: 1 Power Loss Time: 0 seconds

Change Refresh

Long Power Recovery

Message Type: Blank Number: 1

Change Refresh

Communications Loss

Message Type: Blank Number: 1 Comms Loss Time: 0 minutes (0 = disabled)

Change Refresh

End Duration

Message Type: Blank Number: 1

Change Refresh

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Special Messages

- Up to 4 special messages can be activated utilizing a relay output from a fog warning, ice detection, speed or other warning or advisory system

The screenshot displays the AVMS CONTROLLER GUI. At the top, the Caltrans logo is on the left, and the title 'AVMS CONTROLLER GUI' is in a blue header. Below the header, system information is shown: 'Location: Location', 'Mode: CENTRAL', 'Model: Model 710', 'Color Scheme: Amber', and 'Software Version: 20140509 - v1.01.35'. A navigation bar contains four buttons: 'SYSTEM', 'OPERATION', 'LIBRARY', and 'DIAGNOSTICS'. The 'SPECIAL MESSAGES' section is highlighted in blue. It contains four message configuration boxes. Each box has a title (e.g., 'Special Message #1'), a 'Message Type' dropdown, a 'Number' dropdown, and a text input field. The first box shows 'Changeable' for Message Type, '1' for Number, and a long alphanumeric string in the text field. The other three boxes show 'Blank' for Message Type and '1' for Number, with empty text fields. Each box has 'Change' and 'Refresh' buttons on the right. The number '68' is at the bottom right.

AVMS CONTROLLER GUI

Location: Location Mode: CENTRAL

Model: Model 710 Color Scheme: Amber Software Version: 20140509 - v1.01.35

SYSTEM OPERATION LIBRARY DIAGNOSTICS

SPECIAL MESSAGES

Special Message #1

Message Type: Changeable Number: 1

[fo1]ABCDEFGHJKLMNOPQ[ni]12345678901234567[ni]1ABCDEFGHJKLMNOP2

Change Refresh

Special Message #2

Message Type: Blank Number: 1

Change Refresh

Special Message #3

Message Type: Blank Number: 1

Change Refresh

Special Message #4

Message Type: Blank Number: 1

Change Refresh

68

Know What's Going On at the Sign Before You Go

- Ambient Brightness
- Temperature
- Power Source
- Fan and Filter Status
- Humidity
- Power Supply Status
- Door Status
- Pixel Status
- Special Message Relay Status
- Beacon Status

Remote I/O Box

Status: **Good** Power: **Alternate**

Photocell #1:	38 %	Temperature #1:	77 °F	24 VDC PS1:	Normal
Photocell #2:	47 %	Temperature #2:	77 °F	24 VDC PS2:	Normal
Photocell #3:	18 %	Humidity:	Normal	24 VDC PS3:	Normal
				24 VDC PS4:	Normal
		Fan #1:	Off	24 VDC PS5:	Normal
Left door:	Open	Fan #2:	On	24 VDC PS6:	Normal
Right door:	Open	Filter:	Clogged	24 VDC PS7:	Normal
Beacon Commanded:	Off	Subpanel Relay Commanded:	Off		
Beacon Actual:	Off	Subpanel Actual:	Off		
Special Message 1:	Off	Special Message 2:	Off		

Enabled Disabled Enabled Disabled

Know if Your Message is Up

- We know when a requested message is up through pixel open/short detection on every pixel.




Built-In Diagnostics

- No special software needed.
- Can be run locally or remotely from the TMC.
- Test Box included with every sign means you don't need a laptop to run the tests locally.



Error Log

- Logs sensor failures
- Logs communications errors
- Logs re-boots



AVMS CONTROLLER GUI

Location: LocationMode: CENTRAL

Model: Model 710Color Scheme: AmberSoftware Version: 20140509 - v1.01.35

SYSTEMOPERATIONLIBRARYDIAGNOSTICS

WARNING AND ERROR LOG

Search:

Date	Time	Log
2015-04-10	07:42:14	Sign has been blank for 5 minutes or more!
2015-04-08	08:50:16	Humidity sensor restored!
2015-04-08	06:07:38	Humidity sensor failure!
2015-04-07	11:08:39	Humidity sensor restored!
2015-04-07	06:20:48	Humidity sensor failure!
2015-04-03	11:08:40	Sign has been blank for 5 minutes or more!
2015-03-26	10:10:51	Sign has been blank for 5 minutes or more!
2015-03-24	14:53:04	Sign has been blank for 5 minutes or more!
2015-03-19	05:23:13	Test Box asynchronous message has not been received by the Sign Controller for more than 10 minutes.
2015-03-19	05:13:13	pwrFail time=1; curTime=102723; uptime=135720; lastTS=101529
2015-03-19	05:12:34	AVMS started , model=710_mono
2015-03-19	05:09:56	AVMS started , model=710_mono
2015-03-16	13:32:12	Process snmp msg exception
2015-03-16	13:32:05	Process snmp msg exception
2015-03-16	13:31:58	Process snmp msg exception

Showing 1 to 15 of 33 entriesPreviousNext

Refresh

User Interface Administrator Options

- **Users**
 - User names, passwords and privileges
- **Log**
 - Who logged onto the AVMS
- **Setup**
 - Sign type
- **Configuration**
 - Backup, import and export

Software Testing

- Prototype sign is on the Caltrans network and is continuously monitored by a video camera
 - Makes it accessible for testing statewide
- Ability to display messages
- Ability to communicate with Caltrans District Central Systems
- Software stability
- Does the GUI reflect what is happening on the sign

New Sign Capabilities

- Users can create special messages that are activated by a relay from fog, ice or speed sensors
- Users can create a special message for long power outage, short power outage, loss of communication and end of message events
- All pixels can now be turned on at the same time
 - Model 500 CMS limited output to no more than 50% of the pixels

New Sign Capabilities

- Display text, low resolution graphics, or a combination of both text and graphics at the same time
- Activate a Beacon for message emphasis
- Flexible design supports both amber and color signs

Advantages of a Caltrans Sign

- Parts are interchangeable between manufactures
- Non-proprietary
- Color (Red, Green, Blue) option
- Can tell you if a message is actually displayed
- Low voltage design for safety
- Uses less power

Disadvantages of a Caltrans Sign

- Low resolution (no high resolution option)
- Few options
 - Model 710 27 x 105 pixels (2.75" pitch)
 - Model 720 27 x 95 pixels (1.75" pitch)
 - Model 730 27 x 60 pixels (1.75" pitch)
- Only 2 Manufacturers

Power Savings

- Sign uses less than 125 watts when the sign is BLANK and the fans are off (existing CMS uses 300 watts)
- 1950 Watts when 50% of the pixels are turned on at the maximum brightness (existing CMS uses 2760 watts)
- 3250 Watts when every pixel are turned on at the maximum brightness

What Needed Changing

- Fans were not placed well
- Power Savings was added as a requirement
- Door latching needed to be fixed
- Refresh rate on some Pixel Matrix Modules was slow causing strobe effects when viewed on a traffic monitoring camera

CMS Model 500 vs AVMS Model 710

CMS Model 500

- 96 pixels wide x 25 pixels high
- 2.75" pixel pitch
- Weight 2400 lbs
- 306" wide
- 81" high
- 16" deep
- Two Vendors

AVMS Model 710

- 105 pixels wide x 27 pixels high
- 2.75" pixel pitch
- Weight 2400 lbs
- 300" wide
- 86.16" high
- 16" deep
- Two vendors

Where are We at Today?

- Purchased 12 AVMS Signs for initial test deployment in April 2015
- Caltrans is developing a software maintenance contract to deal with any software issues discovered during deployment
- Purchased Color Pixel Matrix Modules for testing in October 2014

Cost

- We are currently purchasing 87 signs
 - 75 Model 500 CMS @ \$71,925.00 each
 - 12 Model 710 AVMS @ \$69,300.00 each

**This makes the Model 710 AVMS \$2675.00
cheaper than the Model 500 CMS**

Just in Case you Were Wondering

Why did we call it a VMS and not a CMS?

New sign name changed from a Changeable Message Sign to a Variable Message Sign in order to follow the naming conventions used in the National Transportation Communication for Intelligent Transportation Systems Protocol (NTCIP) standards

Further Information

Current AVMS specification is available at:
<http://www.dot.ca.gov/hq/traffops/tech/avms/avms.pdf>

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