

# Dynamic Message Signs

---

Qualifications, Technology, Capabilities & Specifications



# Listening to You

---

- DMS Topics
  - Functionality
  - Reliability
  - Legibility
  - Specifications
  - System Integration
  - Support Services
  - Financial
  - Responsiveness

# Listening to You

---

- Wish List and Needs
  - Product Features
  - Product Size
  - Services
  - Specifying DMS Products/Understanding the Criteria

# World Leader in LED Displays



# Our Company



# Transportation Market



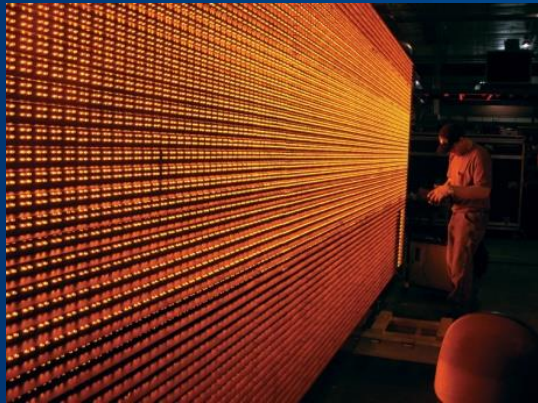
- ITS, Mass Transit, Aviation, and Parking
- Dedicated Manufacturing
- Dedicated Engineering
- Over 5,500 DMS installed nationwide



# Transportation Manufacturing



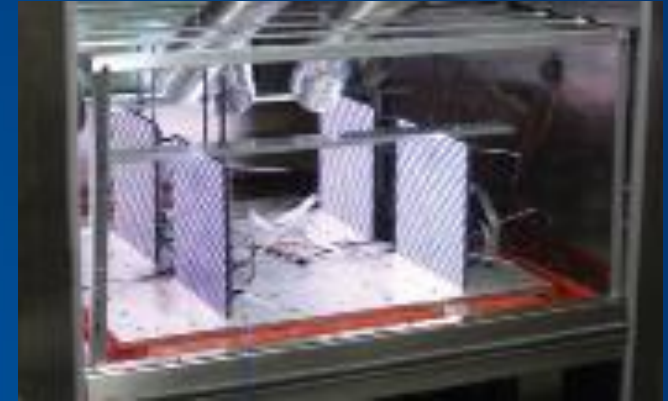
- World Class Manufacturing
- All Products Designed and Manufactured in the USA
- Welding Certifications
- Metal Assembly
- Comprehensive Electronic Assembly Fabrication
- Testing
- Comprehensive QA Program
- ISO 9001:2008 Registered



# Product Reliability Lab



- **Most Advanced In The Industry**
  - HALT Testing
  - Shock, Vibration, Temperature
  - Electrical, Thermal
  - Salt, Fog, Water, Dust
  - Inversion Extreme Testing
  - Assembly and Component Level Testing





# National Standards

- AASHTO Standard Specs, 5<sup>th</sup> Edition
- NTCIP 1203 v3
- ANSI/AWS D1.2, Welding
- MUTCD
- NEMA TS4, Hardware Standards
- UL Certified
- NCHRP Report 412, Fatigue
- In House Testing
- Third Party Testing
- Independent Approvals
- Agency APL and QPL Listings



# DMS Applications

Freeway

Arterial

Active Traffic Management

Managed Lanes

Toll Road & Plazas

Travel Time

Lane Status

FLEX Lanes

Parking Management



## The Future Is Here

**HOV to HOT**

**Reversible Lanes**

**Express Lanes**

**Hard Shoulder**

**Managed Lanes**

**Active Traffic Management**

# New Applications: HOT



# New Applications: ATM



# DMS Evolution



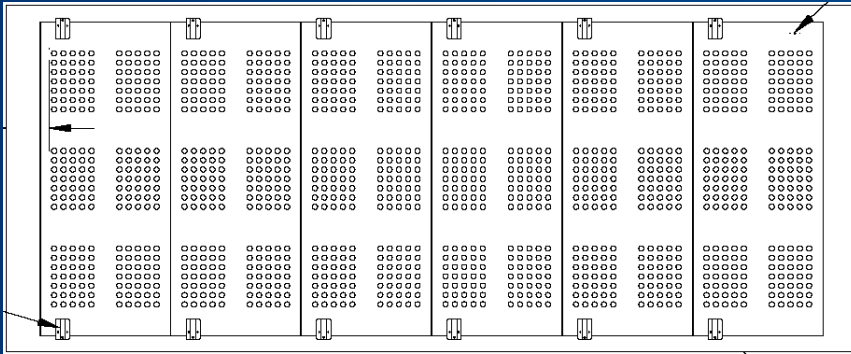
+



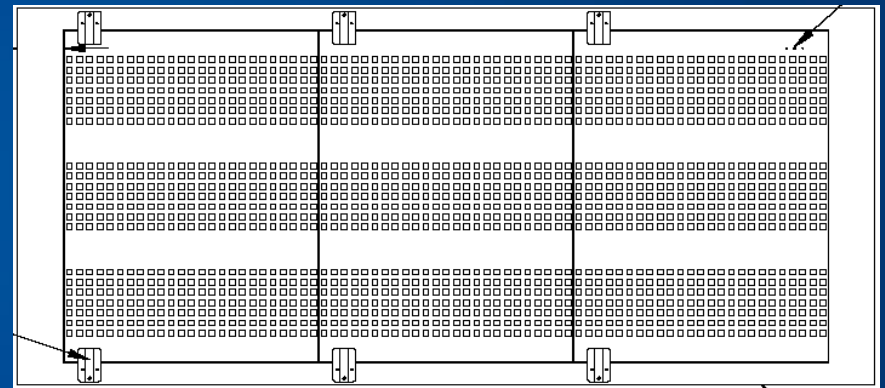
=



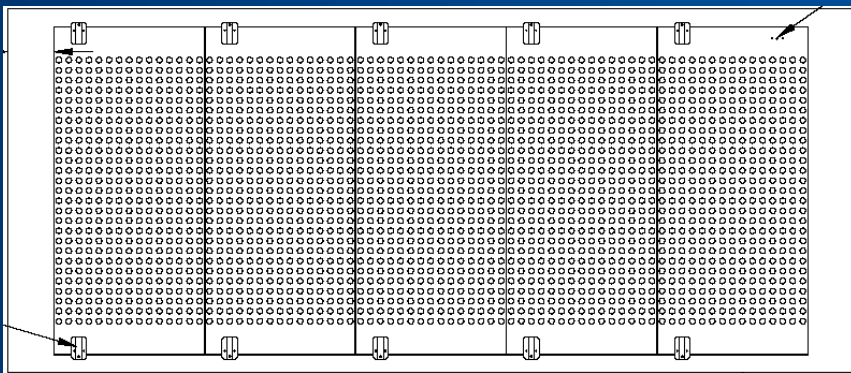
# DMS Evolution



Character Matrix



Line Matrix



Full Matrix

# Dynamic Message Sign Terminology



**Pixel**

**Access**

**Viewing Cone**

**Pixel Pitch**

**Resolution**

**LED Type**

**Font Size**

**Matrix**

**Character Height**

**Interline**

**Inter Character**



# Dynamic Message Sign Terminology



## Pixel

Grouping of LEDs

## Pixel Pitch

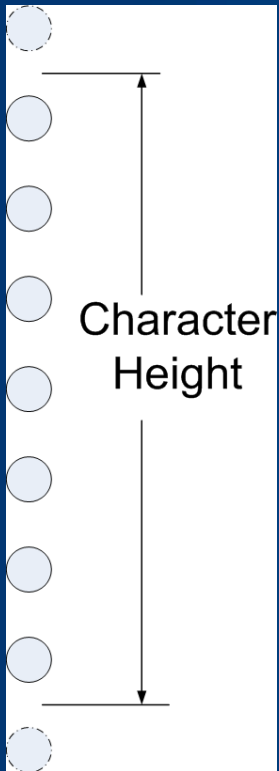
Pixel Spacing, mm

## LED Color

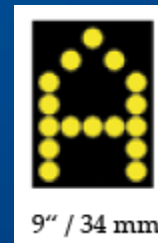
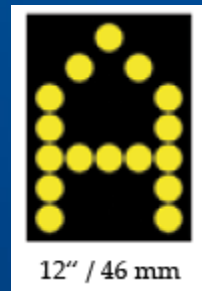
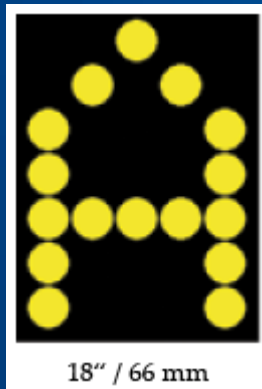
Amber or RGB



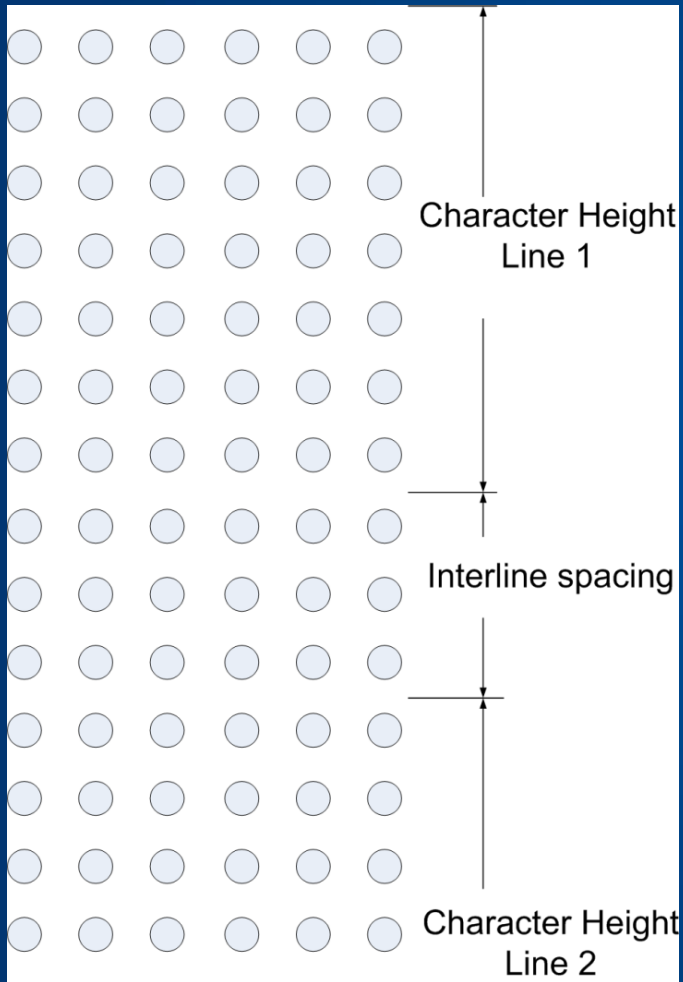
# Terminology: Pixel Pitch



Pitch	Calculation*	Calculated Char Height	Nominal Char Height
66mm (2.6")	2.6" x 7 =	18.2"	18"
46mm (1.8")	1.8" x 7 =	12.6"	12"
34mm (1.3")	1.3" x 7 =	9.31"	9"
20mm (.78")	.78 x 7 =	5.46"	6"



# Terminology: Spacing



66mm = 2.6 inches

46mm = 1.8 inches

34mm = 1.3 inches

20mm = 0.78 inches

# Terminology: Access Types

Refers To How The  
Components Are Accessed

Front Access

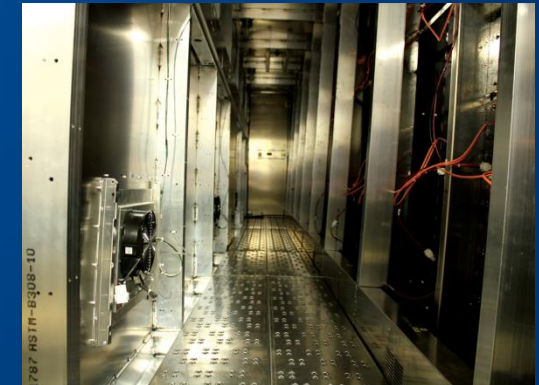


Walk In Access



# Walk-In Access

- Freeway Location, Typically
- Half Span, Full Span, Cantilever, Shoulder Mount
- No Lane Closures, Typically
- Convenient Access To All Components
- Safe Working Environment
- Available Models: VF-2020



# Front Access

- Arterial and Active Traffic Management
- Cantilever, Shoulder Mount, Lane Use
- No-Lift, Vertically Hinged Doors
- Smaller Cabinet Area
- Available Models:
  - VF-2420
  - VX-2420 or VX-2428 for ATM
  - VF-2320
  - VS6 Small Arterial



# Rear Access

- Freeway Location, Typically
- Application Dependent
- Structure Dependent
- Available Models: VF-2120



# Dedicated or “Embedded” DMS



- Travel Time, Toll Rate
- Lightweight, Low Profile
- Direct Static Sign Installation
- All Equipment At Ground Level
- Easy Maintenance
- Easy Installation
- Full Featured
- Available Models: VM-1020
  - Monochrome Amber (A)
  - Tri-Color (R/G)
  - Full Color RGB (20mm)

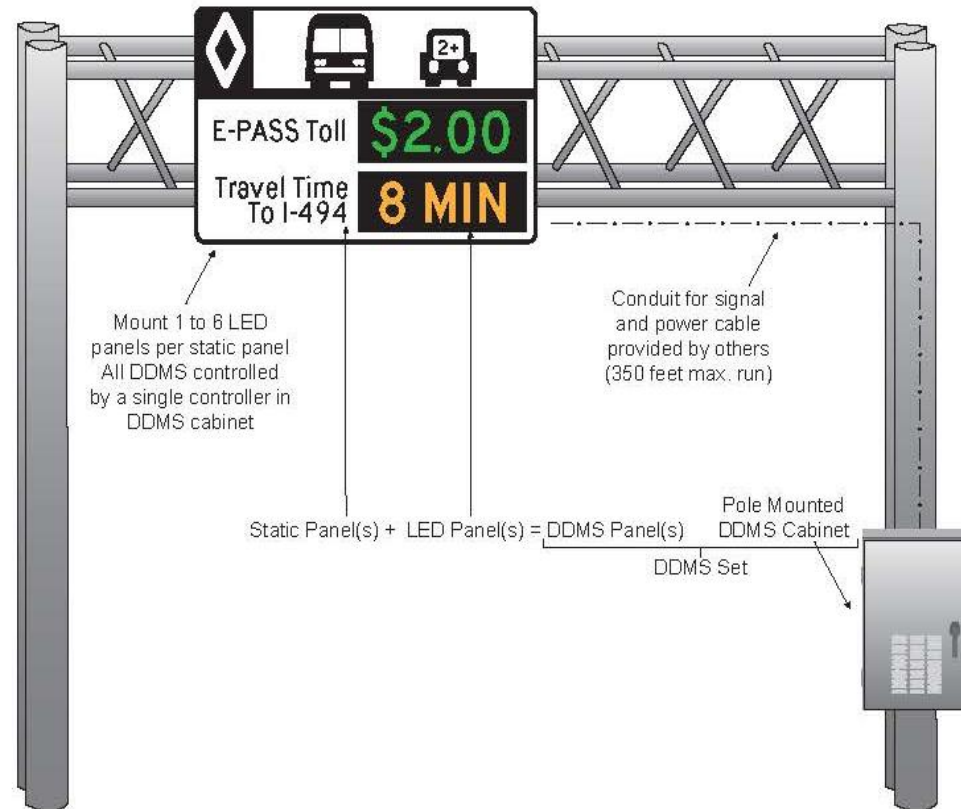


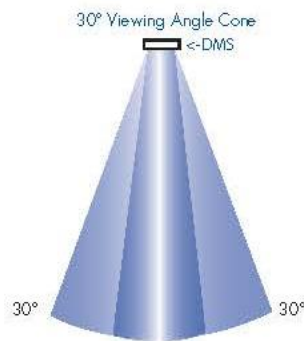
# Dedicated DMS



## BENEFITS TO AGENCIES:

- Easily facilitate congestion pricing and display travel time information.
- High reliability, full diagnostics, and simple roadside maintenance. They greatly reduce bucket truck maintenance, improving safety and reducing costs. Only the modules reside inside the LED panels.
- Optimal brightness for legibility in all conditions. The DDMS features an industry-established LED brightness of 9,200 cd/m<sup>2</sup>.
- Automatic control of all displays at each site—easily manage travel times, update prices, and convert lanes from High Occupancy Vehicle (HOV) to High Occupancy Toll (HOT) or Truck-Only Toll (TOT).
- The thin, lightweight LED panels bolt easily on static panels, which can then be mounted on structure. They can also be installed on static panels on-site.





## KEY FEATURES

### CABINET STYLE

- Front service access
- Aluminum mask over polycarbonate face optimizes contrast
- Many standard configurations
- Standard 18-inch and 12-inch character heights
- Considerably lighter than traditional DMS
- Mounts to static panels

### APPEARANCE

- Low-profile design eliminates shadows on accompanying static panels
- 30-degree viewing angle
- Amber, red/green/amber and full-color models available
- Amber 9,200 cd/m<sup>2</sup>, Red/Green/Amber 5,000 cd/m<sup>2</sup>, White 12,400 cd/m<sup>2</sup> LED brightness for ITS legibility
- Ambient light sensors in each display are regulated by the controller to provide uniform brightness to each site
- High-intensity LED technology

### RELIABILITY

- Run diagnostics for all displays in a set at one time
- Easily maintain components from a roadside DDMS cabinet
- Redundant power systems maximize uptime
- Easy front access for replacement of modules
- Install an optional Auxiliary Control Panel inside the DDMS cabinet for simple on-site maintenance without a laptop [optional]
- Operating temperature range: -40° F to 140° F [-34° C to 74° C]

### STANDARDS

- NTCIP v2 compliant control system
- NEMA TS 4 standards
- UL listed
- NEC
- AASHTO

# Dynamic Message Sign Specifications



## THE BASICS-NEED TO KNOW

**Application:** Walk In, Front Access, Embedded

**Type of Display:** Monochrome Amber or Full Color\*

(Full Color: 34mm or 20mm)

**Pixel Pitch:** 66mm, 46mm, 34mm, 20mm

**# of Lines**

**# of Characters Per Line**

**Height of Characters:** 6", 9", 12", and 18"

(Height usually determined by MPH at location)

**Font Size:** Dictated by Pixel Pitch and Character Size

**Intended Use:** Text Only or Text and Graphics

**Physical Dimensions and/or Weight Limitations (if any)**

\* Embedded may be Full Color (RGB), Tri-Color or Monochrome Amber

# Dynamic Message Sign Specifications



## **FREEWAY DMS EXAMPLE [FDMS]**

**Application: Walk In**

**Type of Display: Full Color**

**Pixel Pitch: 20mm**

**# of Lines: Three (3)**

**# of Characters Per Line: Twenty One (21)**

**Height of Characters: 18"**

**(Travel Speeds of 55MPH and over require 18 Inch Characters)**

**Font Size: 20mm using 18" Characters: 23x15 Font with  
Inter Character Spacing of 4**

**Intended Use: Text and Graphics**

**Daktronics Model: VF-2020-96x400-20-RGB**

# Dynamic Message Sign Specifications



## ARTERIAL DMS EXAMPLE [ADMS]

**Application: Front Access**

**Type of Display: Full Color**

**Pixel Pitch: 20mm**

**# of Lines: Three (3)**

**# of Characters Per Line: Eighteen (18)**

**Height of Characters: 12"**

**(Travel Speeds of 45MPH)**

**Font Size: 20mm using 12" Characters: 15x10 Font with  
Inter Character Spacing of 3**

**Intended Use: Text and Graphics**

**Daktronics Model: VF-2420-80x240-20-RGB**

# Dynamic Message Sign Specifications



## **FREEWAY LANE STATUS DMS EXAMPLE [LDMS]**

**Application: Front Access/Embedded (Dedicated DMS)**  
(Typically attached along the bottom of a static sign on the structure)

**Type of Display: Full Color**

**Pixel Pitch: 20mm**

**# of Lines: One (1)**

**# of Characters Per Line: Eighteen (18)**

**Height of Characters: 18"**

(Travel Speeds of 55MPH and over require 18 Inch Characters)

**Font Size: 20mm using 18" Characters: 22x14 Font with  
Inter Character Spacing of 4**

**Intended Use: Text**

**Daktronics Model: VM-1020-24x336-20-RGB**

# Dynamic Message Sign Specifications



## ARTERIAL LANE STATUS DMS EXAMPLE [ALDMS]

**Application: Front Access/Embedded (Dedicated DMS)**  
(Typically attached along the bottom of a static sign on the structure)

**Type of Display: Full Color**

**Pixel Pitch: 20mm**

**# of Lines: One (1)**

**# of Characters Per Line: Eighteen (18)**

**Height of Characters: 12"**

(Travel Speeds of 45MPH and less typically use 12 inch Characters)

**Font Size: 20mm using 12" Characters: 14x8 Font with  
Inter Character Spacing of 3**

**Intended Use: Text**

**Daktronics Model: VM-1020-16x208-20-RGB**

# Dynamic Message Sign Specifications



## **FREEWAY TOLL RATE DMS EXAMPLE [TDMS]**

**Application: Front Access/Embedded (Dedicated DMS)**

**(Typically attached to the front of a static sign)**

**Type of Display: Full Color**

**Pixel Pitch: 20mm**

**# of Lines: One (1)**

**# of Characters Per Line: Seven (7)**

**Example: \$000.00**

**Height of Characters: 18"**

**(Travel Speeds of 55MPH and over require 18 Inch Characters)**

**Font Size: 20mm using 18" Characters: 22x14 Font with  
Inter Character Spacing of 4**

**Intended Use: Text**

**Daktronics Model: VM-1020-24x128-20-RGB**



# Dynamic Message Sign Specifications



## ARTERIAL TOLL RATE DMS EXAMPLE [ATDMS]

**Application: Front Access/Embedded (Dedicated DMS)**

(Typically attached to the front of a static sign)

**Type of Display: Full Color**

**Pixel Pitch: 20mm**

**# of Lines: One (1)**

**# of Characters Per Line: Seven (7)**

Example: \$000.00

**Height of Characters: 12"**

(Travel Speeds of 45MPH and less typically use 12 Inch Characters)

**Font Size: 20mm using 12" Characters: 14 x8 Font with  
Inter Character Spacing of 3**

**Intended Use: Text**

**Daktronics Model: VM-1020-16x80-20-RGB**

# Dynamic Message Sign Specifications



<b>20mm</b>	<b>FONT</b>	<b>INTER- CHARACTER</b>	<b>INTER-LINE</b>
6"	7x5	1	3
9"	12x8	2	6
12"	15x10	3	8
12" TDMS/LDMS	14x8	3	8
15"	19x13	4	10
18"	23x15	4	12
18" TDMS/LDMS	22x14	4	12
<b>34mm</b>	<b>FONT</b>	<b>INTER-CHARACTER</b>	<b>INTER-LINE</b>
9"	7x5	1	3
12"	9x6	2	4
15"	11x8	2	5
18"	14x10	2	6
<b>46mm</b>	<b>FONT</b>	<b>INTER-CHARACTER</b>	<b>INTER-LINE</b>
12"	7x5	1	3
18"	11x8	1	5
<b>66mm</b>	<b>FONT</b>	<b>INTER-CHARACTER</b>	<b>INTER-LINE</b>
18"	7x5	1	3

# CALCULATING MATRIX SIZE

- STEP 1: Determine Pixel Pitch
- STEP 2: Determine Height of Character
- STEP 3: Determine # of Lines
- STEP 4: Determine # of Characters Per Line
- STEP 5: Identify the Font Size to be used (see previous page)
- STEP 6: Determine Matrix Height and Width

# CALCULATING MATRIX SIZE

- Font pixel height X number of lines +
  - (Number of lines – 1) X interline spaces = Matrix height
- 

- Example: 20mm, Walk In DMS, 3 Lines, 21 Characters Per Line using standard 23x15 Font with InterLine Spacing of 12
- $23 \times 3 = 69 +$
- $(3 \text{ lines} - 1) \times 12 \text{ interline spaces} = 24$
- $69 + 24 = 93$
- Round to the nearest manufactured matrix size
- Daktronics Matrix Height: 96



# CALCULATING MATRIX SIZE

- Font pixel width + inter-character pixels X characters per line = matrix width
- 
- Example: 20mm, Walk In DMS, 3 Lines, 21 Characters Per Line using standard 23x15 Font with Inter-Character Spacing of 4
  - 15 pixels wide + 4 inter-character pixel X 21 characters per line = 399 pixels wide
  - Round up to the next manufactured matrix size
  - Daktronics Matrix Width Size: 400



# THE RESULTS

- Walk In (our VF-2020)
- Matrix Height: 96
- Matrix Width: 400
- Pixel Pitch: 20mm
- Color: RGB
- **VF-2020-96x400-20-RGB**
- 3 Lines, 18" Characters, 21 Characters Per line using 23x15 Font with Intercharacter spacing of 4; Interline spacing of 12



# VFC Sign Controller



- NTCIP 1203 v3 Compliant
- Touch screen LCD Interface
- User Friendly
- Embedded Ethernet and serial ports
- Fiber From Controller To DMS
- Full Messaging and Diagnostics
- Equipment Cabinet Mount, Typical
- Multi-sign control (max of 8 DMS)



# VFC Auxiliary Controller



- Local/Remote Sign Control
- Laptop Port
- Duplicates the VFC
- Sign Installation, Typical





# Vanguard Central Control Software



- Complete DMS Control
- Message Creation, Editing
- Text, Graphics, Color
- NTCIP 1203 v03 compliant
- Scheduling
- Scenarios, Message Plans
- Full Diagnostics, Reporting
- Content Studio
- Client-Server Based



Vanguard Professional  
Message Scheduler

Vanguard Professional  
Display Monitor

Vanguard Professional  
Content Studio



# Equipment Cabinets

- Pole Mount
- Ground Mount

Models:

334

336S

P4400



# Customer Service



- Overview and Model Specifications/
- Project Management
- Submittal Preparation
- Complete Technical Manuals
- On-Site Installation Technicians
- Field Maintenance Capabilities



# Service Plan Options

- Multiple Service Agreement options
- Standard Maintenance Agreements
  - Gold: Parts Only Repair and Technical Support
  - Platinum: Full Service Agreement
- Local Service Capability
- Complete Training of Agency Staff



# Summary

- Daktronics Strengths
  - Product features increase Customer ROI
  - Industry standards involvement
  - Experience and Track Record
  - Financial Strength
  - Technical Staff
  - Committed to Customer Service
  - Always willing to help where help is needed

**LEADING  
THE WAY**

# Questions?

