# Origination Form

## Specifications

| | | | |
|---|---|---|---|
| **Name:** | Ronald Meyer | **Standard Specification Section:** | 682 |
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| **Date:** | 2025-06-12T20:31:47Z | **Associated Specs:** | 996 |

### Summary:

This revision moves material content from 682 into 996-2, removes content associated with obsolete technologies, removes duplicative testing requirements that are already sufficiently addressed in 611-5, and aligns remaining content with current technologies and industry practices.

### Justification:

The changes are needed to move material requirements into Division III for consistency and update technical content to meet stakeholder needs and reflect current technologies and practices.

### Do the changes affect other types of specifications?

Neither

### List Specifications Affected:

| Other Affected Documents/Offices | Contacted | Yes/No |
|---|---|---|
| **Other Standard Plans** | | No |
| **Florida Design Manual** | | No |
| **Structures Manual** | | No |
| **Basis of Estimates Manual** | | No |
| **Approved Product List** | | No |
| **Construction Office** | | No |
| **Maintenance Office** | | No |
| **Materials Manual** | | No |
| **Traffic Engineering Manual** | | No |

## Are changes in line with promoting and making progress on improving safety, enhancing mobility, inspiring innovation, and fostering talent; explain how?

Yes. Changes reflect stakeholder needs, update and clarify technical requirements, and improve consistency of specification content.

## What financial impact does the change have; project costs, pay item structure, or consultant fees?

No expected financial impact.

## What impact does the change have on production or construction schedules?

No expected impacts to production or construction schedules.

## How does this change improve efficiency or quality?

Changes improve efficiency and quality by updating requirements to address user needs, fostering consistency, and adhering to standardized formatting styles.

## Which FDOT offices does the change impact?

Traffic Engineering and Operations Office

## What is the impact to districts with this change?

The updated specification will better reflect the needs of the districts to use current products and technologies.

## Does the change shift risk and to who?

No expected shift in risk.

## Provide summary and resolution of any outstanding comments from the districts or industry.

Comments and Responses are available on the Track the Status of Revisions hyperlink located on the Specifications landing page: https://www.fdot.gov/programmanagement/Specs.shtm

## What is the communication plan?

Through the established specification revision process (e.g., Internal and Industry Review)

## What is the schedule for implementation?

The Standard Specifications eBook and Workbook are effective July 1st every year.

**VIDEO EQUIPMENT**
**(REV 6-12-25)**

ARTICLE 682-2 is deleted and the following substituted:

**682-2 Video Display Equipment.**

**682-2.1 Description:** Furnish and install video display equipment as shown in the Plans.

**682-2.2 Materials:** Video display equipment must have the capability to display analog, digital, and other images associated with the operation of the transportation management center (TMC).

Provide equipment, mounting hardware, cabling, and other video display components that are compatible with each other. All equipment and materials furnished and installed must be reviewed and approved by the Engineer.

**682-2.2.1 Video Display Control System:** Furnish a video display control system that meets the requirements of Section 996.

Provide the video display control system with a minimum configuration of ~~4 composite video inputs, 4 component (red, green, and blue (RGB)) video inputs, and 4 DVI inputs~~4 High-Definition Multimedia Interface (HDMI) inputs and 12 HDMI outputs as well as network connections, decoders, and associated hardware and software required to simultaneously display 32 video streams from different sources ~~to display 32 inputs simultaneously at a minimum resolution of 720 pixels x 480 pixels and a frame rate of 30 fps~~, ~~or as shown in the Plans~~unless otherwise shown in the Plans.

~~Provide the video display control system with a minimum configuration of 4 composite video outputs, 2 component (RGB video outputs), and 4 DVI outputs, or as shown in the Plans. If the projection device requires an analog signal, then breakout cables may be used to convert the DVI output connector to a HD15 analog RGB connector.~~

**682-2.2.2 Video Wall Display:** Furnish and install a video wall display consisting of video display devices described below arranged in a wall, as shown in the Plans, together with a video display control system.

The video wall display must produce, at a minimum, a large-scale, high-resolution video image having accurate color rendition, sufficient image brightness, and a high contrast ratio, as described in 682-2.2.8. The display system must provide access to serviceable components for repair and replacement of electronics, lamps, and optical components without removing the device from service for a period longer than 30 minutes.

Integrate the individual display units in a single, seamless display that provides a continuous image across the entire active display area provided, under the complete control of the TMC operators from their individual shared workstations.

Source all major wall display components from a single provider or manufacturer to ensure that the various devices are compatible with each other and able to function together as an integrated display.

The individual video images must exhibit a uniformity of color quality across the multiple displays. Colors must be displayed evenly across the video wall and the video wall must maintain uniform brightness characteristics from one video display unit to the next in the tiled display, with no degradation in color or brightness uniformity over time. The video wall

display must provide features that allow physical and electronic alignment of the separate high-resolution display units that comprise the wall.

**682-2.2.3 Video Wall Support Structure:** Furnish and install an aluminum or steel-frame structure that supports the video display units as mounted and stacked to form the matrix for the video wall display. The support structure must consist of stackable display units that maintain a consistent maximum horizontal and vertical spacing of 0.04 inches between adjacent display units in the video wall matrix.

Fabricate the support structure specifically to ensure that a continuous, accurate image is provided on the screens without any distortion or unused screen space and that no observable distortions are present in the installed video wall display due to normal building vibration. Each completed structure must be enclosed such that there is no ambient light effect on the screen from behind the display.

Ensure that the components of the individual video displays can be serviced without disturbing the integrity of the entire video wall display.

**682-2.2.4 ~~Rear Projection~~ Video Display Devices:** Use ~~rear projection~~ video displays that are suitable for digital video wall applications in mission-critical TMCs where video wall image quality, operational reliability, and serviceability objectives as stated in this Specification can be achieved.

~~Use rear projection video displays that display a minimum of a single or quad-split, four-paned CCTV camera video image.~~ Each video display must be able to be independently controlled from any of the ~~central~~ TMC operator or shift supervisor workstations, and ~~that each video display can~~ be integrated with additional ~~video units~~displays to form a single video wall (i.e., a large ~~display, or a~~ virtual desktop display where video windows containing content from various sources can be positioned and resized by the operator).

~~Ensure that the rear projection video display facilitates lamp replacement without the need to readjust the image being projected on the screen.~~

The ~~rear projection~~ video display intensity must be sufficient for effective and comfortable viewing by TMC operations personnel under normal lighting conditions, subject to approval by the Department. ~~The unit's display engine must produce a minimum light output of 550 ANSI lumens.~~

~~The rear projection video units must have the following minimum features and characteristics:~~

~~1. Screen brightness achieved by a combination of projection techniques and screen materials, so that the video display has a minimum brightness measurement of 130 candelas per square meter (cd/m2) across the outside viewing surface of the projection screen.~~

~~2. Brightness uniformity that meets or exceeds 80 percent across the display unit, as measured using a photometer.~~

~~3. A multi-lamp optical engine must be provided for rear projection video units that do not use light-emitting diodes (LEDs) for illumination. Multi-lamp optical engines must provide a failover feature whereby a second lamp can be automatically activated when the first lamp fails. Ensure displays with multi-lamp optical engines provide indication of lamp status.~~

~~4. Multi-lamp optical engines must include both a "hot standby" mode in which failover to the second lamp takes no more than two seconds and a "cold standby"~~

~~mode in which failover and the time for the display to return to full light output does not exceed 30 seconds.~~

~~5. A display module that uses modular component architecture to permit service or replacement of serviceable parts without removing the projection engine.~~

~~6. Each unit must be completely enclosed and light tight, with fixed panels for access to the lamp, power supply, and projection engine.~~

**682-2.2.5 ~~Flat Panel Display:~~** ~~Furnish and install a flat panel display unit to reproduce video and computer graphics information. The device must display, at a minimum, a high-resolution, distortion-free image and maintain a consistent level of illumination across the entire screen area. Ensure that it has the following minimum features and characteristics:~~

~~1. Dimensions of 24 inches high by 41 inches wide by 4 inches deep, or as shown in the Plans.~~

~~2. Ability to be installed on the face of a standard wall or flush mounted within the wall system.~~**Video Display Performance Requirements:** Use narrow bezel video displays meeting the minimum requirements in Table 682-1 unless otherwise shown in the Plans.

Table 682-1
Minimum Requirements for Video Display Devices

| | |
|---|---|
| Type | Depending on TMC design, as shown in the Plans |
| Size | Depending on TMC design, as shown in the Plans |
| Resolution | 1920 x 1080 |
| Brightness | 700 nit |
| Contrast Ratio | 1100:1 |
| Viewing Angle | 170° |
| Display Colors | 16.7M |
| Connectivity | HDMI 2.0 |

**682-2.2.6 Cabling:** Furnish each video display component with all required appurtenances, including all the necessary cables, with proper length and connectors for power and communication, as defined by the manufacturer. Ensure that cabling conforms to applicable EIA/TIA standards. Size the power cables to meet NEC requirements. Provide communication cables from each video display component to the network communication devices that are appropriate for and compatible with the technology employed (e.g., fiber optic, twisted pair, or coaxial), and meet the minimum size and bandwidth specifications the manufacturer requires.

Provide all cabling of adequate length, along with the compatible connectors and any ancillary equipment necessary to fully interconnect the video components and display control systems needed to achieve the functions required. Label all cables at both ends, as approved by the Engineer.

**682-2.2.7 Electrical:** Provide equipment that operates on 120 $V_{AC}$ at a frequency of 60 Hz. Furnish a transformer or other necessary means of power conversion for any device that requires another voltage or frequency.

Conduct TMC field reviews to examine the electrical distribution panels allocated for various equipment items and the electrical schedules for each. Make any changes, additions, or corrections to the electrical panels, wiring, outlets, and connectors that may be deemed necessary to adequately power ~~of the~~ the equipment proposed for a video display project at the intended location, subject to the approval of the Engineer. Make any changes to the building's electrical wiring in accordance with applicable codes and permits, and with the NEC.

Modifications to an existing building's wiring or the video wall electrical wiring plans must be signed and sealed by a Specialty Engineer, and submitted for approval.

~~**682-2.2.8 Performance:** Use only display devices meeting the following minimum requirements.~~

| ~~Table 682-1<br>Minimum Requirements for Display Devices~~ | | | | |
|---|---|---|---|---|
| | ~~Flat Panel Display~~ | | | ~~Rear Projection Video Display~~ |
| ~~Type~~ | ~~Direct View LCD~~ | | | ~~DLP or LCD~~ |
| ~~Size~~ | ~~(dependent on TMC design, as shown in the Plans)~~ | | | |
| ~~Aspect Ratio~~ | ~~(dependent on TMC design, as shown in the Plans)~~ | | | |
| ~~Resolution~~ | ~~1600 x 1200 / 1280 x 768 pixels; 16.7 million colors~~ | | | ~~1024 x 768 pixels~~ |
| | | | | |
| ~~Viewing Angle~~ | ~~170 degrees horizontally and vertically~~ | ~~160 degrees horizontally and vertically~~ | | ~~160 degrees horizontally and vertically~~ |
| ~~Half Gain Angle~~ | ~~—~~ | ~~—~~ | | ~~±40 degrees horizontally and vertically~~ |
| ~~Contrast Ratio~~ | ~~500:1~~ | ~~600:1~~ | | ~~600:1~~ |
| ~~Screen Brightness *~~ | ~~250 cd/m2~~ | ~~450 cd/m2~~ | | ~~130 cd/m2~~ |
| ~~Lamp Life~~ | ~~—~~ | ~~—~~ | | ~~8,000 hrs. (avg.)~~ |
| ~~Video Inputs~~ | ~~Analog/digital via 15-pin D-sub (HD-15) connector; DVI-D connector.~~ | ~~Composite video (NTSC) on RCA connector; analog/digital via 15-pin D-sub (HD-15) connector; DVI-I connector; HDMI.~~ | | ~~Composite video (NTSC) on BNC; RGB via 15-pin D-sub (HD-15) connector; DVI-D connector.~~ |
| ~~Operating Temperature and Humidity~~ | ~~32° to 95°F. 20 to 80%.~~ | ~~32° to 95°F. 20 to 80%.~~ | | ~~32° to 95°F. 20 to 80%.~~ |
| ~~Power Requirements~~ | ~~120 $V_{AC}$ at 60 Hz~~ | ~~120 $V_{AC}$ at 60 Hz~~ | | ~~120 $V_{AC}$ at 60 Hz~~ |
| ~~* Measured using a photometer.~~ | | | | |

**682-2.3 Installation:** Do not proceed with any part of the procurement, construction, or installation of the video display equipment until the construction plans and materials are approved by the Engineer. Submit to the Engineer documentation, including the manufacturers' product specification sheets and a detailed description of each item's function as well as a

compliance matrix that confirms all equipment meets or exceeds the requirements of these Specifications.

Configure each video display unit to provide individual, independent control from each operator workstation.

Create the video wall display by arranging individual video display units in a framework or apparatus that creates the video wall configuration as shown in the Plans. The finished video wall must provide a single, apparently seamless display area. The adjacent individual display units must be aligned physically and electronically so that image content stretched across multiple monitors align within plus or minus 2 lines of horizontal and vertical resolution.

All ~~rear projection~~ video display device~~unit~~ controls must be accessible ~~at all times when~~after the devices are permanently installed. Ensure that installation and positioning does not conceal or limit access to any display unit controls at any time during active use.

Follow proper ventilation and cooling procedures for the equipment installed, as determined by the equipment manufacturers. Provide electrical requirements and power distribution units and power supplies for the video display components ~~as needed~~as needed.

**682-2.4 Testing:** Submit a detailed system acceptance test plan to the Engineer for review and approval. Prepare a test plan that covers all areas of system function described in this Section, and that is developed according to the various equipment manufacturers' recommendations.

Check and test the satisfactory operation of all video display components upon completion of the equipment's installation. At minimum, include in the video display system test the testing of each color video monitor type, each secondary display output at workstations, each ~~rear projection~~ video display device~~unit~~, and the video wall display's image alignment and control functions.

~~Subject the video wall display to a 90 day operational observation period. During this time, perform any and all maintenance, recalibration, system checking, and display modifications required by the Engineer. The Engineer has the option to require a restart of the observation period if a major system flaw or failure occurs.~~