Field Test Procedure Instructions

For all Vanguard (NTCIP) VFC/DMP controlled displays

DD4757157

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Introduction

This instructions document describes how to complete the field tests for a LED dynamic message display site for Daktronics Vanguard Displays. The purpose of this test is:

1. To check that the display and related equipment supplied by Daktronics has been installed properly.

2. To check that all display and related equipment supplied by Daktronics is functioning. Special emphasis is placed on items that, if bad, are not expected to show up as being bad during normal operation. Example: earth grounding not connected.

3. To put the display into the state needed so that it is ready for normal operation without the need for an additional visit before beginning normal operation.

4. As a record that all tests and setup tasks have been performed at each particular site so that it will not be necessary to re-visit sites later because of not being sure whether or not certain tests or setup items have been done.

   a. Document all testing results on the Vanguard displays checklist as a record of completing the testing

Note:

This is not a test of all software functions or hardware design limits; this would be very time consuming, and would be redundant, as those tests need to be done only once.

Depending what display you are working on, some of the tests listed on this instruction sheet will not be tested on some display types. Use the checklist to ensure that you complete the applicable tests for your display (example; displays that don't support pixel test will not have test S8 Pixel testing listed on the check sheet).

The test messages to be used should be the test messages listed or messages such as "Testing; Message 1" or "Testing in Progress", that will not misdirect traffic. If the customer is present during commissioning, it is recommended to have them preview and approve the test message before displaying it.

Test equipment required:

- Boom truck, or whatever is required to get up into the display
- Digital multi-meter
- Laptop computer, with vanguard software
- Ethernet Cable
- Common hand tools
- Flash Drive/Memory Stick

Display/Cabinet Inspections

1. Visual inspection of displays(s) and/or Traffic (Control) Cabinet-

   A. Visually inspect the outside of all displays and/or cabinet for damage from transport and installation. Ensure all light sensors are unobstructed.
   B. Visually inspect that all mounting hardware is installed and secure on all display(s) and/or cabinet
   C. Inspect the inside of the display(s) and/or cabinet for damage. Check for loose parts, connections and wiring, inside of the sign including the inside of the power supply enclosure, and service control panel.
   D. Open each door and access panel; verify that all mounting hardware is installed properly.
   E. Check that all conduits that enter the display(s) and/or cabinet are sealed inside.

2. Grounding-

   A. Check that earth grounding wires are secured to earth ground rod(s) at the display(s), cabinet and/or power source.
   B. Verify that earth ground wire and ground rods are connected properly per site riser.
      a. Note: Earth ground wire must be a different wire than the power ground wire.

3. Incoming power verification

   A. If site has control cabinet that feeds power to the display, measure incoming power to the cabinet. If site doesn't have a control cabinet, go to **step B.**
      a. Remove any covers needed to expose the incoming power wires.
      b. If cabinet has a breaker panel, make sure that all breakers are **off** (the surge suppressor breaker can remain on).
      c. Verify that the incoming power is terminated correctly to main power termination points (reference display or cabinet power drawings if necessary).
      d. Apply power from the external source or cabinet, using a safe procedure measure the AC voltage at the following points
         i. For sites with 120 power (1 Line, 1 Neutral, 1 ground)
            1. Measure Line 1 to Neutral, should measure between 105-125 VAC
            2. Measure Neutral to Ground, should measure less than 10VAC
         i. For sites with 120/240 power (2 lines, 1 Neutral, 1 ground)
            1. Measure Line 1 to Neutral, should measure between 105-125 VAC
            2. Measure Line 2 to Neutral, should measure between 105-125 VAC
            3. Measure Neutral to Ground, should measure less than 10VAC
         ii. For international Sites 230 VAC
            1. Measure Line 1 to Neutral, should measure between 218 - 240 VAC
            2. Measure Neutral to Ground, should measure less than 10 VAC
      e. For displays with AC power go to **step B,** for DC Power go to **step C.**
   B. **For signs with AC Power going to the displays:**
      a. Remove any covers needed to expose the incoming power wires.
         i. If display has a breaker panel, make sure that all breakers are **off** (the surge suppressor breaker can remain on).
         ii. Verify that the incoming power is terminated correctly to main power termination points (reference display power drawings if necessary).

iii. Apply power to the display from the external source or cabinet, using a safe procedure measure the VAC voltage at the main termination points.
1. For sites with 120 power (1 Line, 1 Neutral, 1 ground)
   a. Measure Line 1 to Neutral, should measure between 105-125 VAC
   b. Measure Neutral to Ground, should measure less than 10VAC
2. For sites with 120/240 power (2 lines, 1 Neutral, 1 ground)
   a. Measure Line 1 to Neutral and Line 2 to Neutral, should measure between 105-125 VAC
   b. Measure Neutral to Ground, should measure less than 10VAC
3. For international Sites 230 VAC
   a. Measure Line 1 to Neutral, should measure between 218 - 240 VAC
   b. Measure Neutral to Ground, should measure less than 10 VAC
iv. Document Power readings
1. Test Point 1 (**TP1**) Line to Neutral Voltage
   a. For sites with 2 Line voltage reading document both L1toN/L2toN
      i. (ex. L1-121/L2-119 VAC)
2. Test Point 2(**TP2**) Neutral to ground
b. Document power reading and re-install any covers that were removed to test the incoming power.
c. Check that all control equipment inside the sign is switched off, and turn on the main circuit breaker, followed by all circuit breakers.

C. For signs with DC Power going to the displays:
a. Apply power to the display by ensuring that the display power supplies are turned on and turning on DC breakers in the cabinet; Measure voltage at the following test points; all voltage reading should be between 22-VDC- and 25.5-VDC. (document Readings on checklist)
   i. **TP1** (VDC at termination block or breaker in the display)
   ii. **TP2** (VDC at furthest module from termination point in the display)
      1. If you have multiple display complete the test on all displays and document one of the displays readings on the checklist. All displays need to be within normal operating range listed above.

4. Display and cabinet outlet, ventilation, and access point checks

A. If equipped (VF-20xx, VF-24xx, control cabinet); Check all cabinet and displays convenience outlets and control equipment outlets by using a multi-meter, each outlet should measure between 105 and 125 VAC. For international sites ensure between 218 VAC and 240 VAC.
B. If equipped (control cabinet, VF-20xx and VF-24xx);
   a. For (VF-20xx) Turn on each "Light Timer" switch individually momentarily; lights should turn on.
   b. For (VF-24xx, control cabinet) Open each door and verify lights turn on.
C. If equipped (VF-20xx only); turn on each "Personal Ventilation Timer" switch individually; ventilation fans should turn on each time.
D. If equipped; Push the button for the ventilation fans and verify they turn on. Release it and they should turn off.
E. If equipped; ensure all ventilation points and/or filters are not plugged.
F. **All displays**; check any doors and/or access points to ensure that they are secure.
   a. For displays with external latching modules make sure all modules are secured and latch to the display.

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5. Controller setup-

    A. If applicable; Verify fiber has been terminated, connected correctly, and VCB are addressed per the contract drawings (DMP-5050 sites don't have fiber, or VCBs).

    B. Turn on the sign controller power switch, check that the power indicator LED is on.

    C. Make sure firmware is most current version, if not download and install latest firmware.
          a. For the latest firmware go to
              http://dakfiles.daktronics.com/downloads/Transportation/Firmware/VFC_-DMP505x/
                i. Inside this folder will be the latest firmware for the Player (DMP), the Video Processor (VIP), and VCB.
                ii. For instructions on how to update the firmware on the controller follow KB article
                    https://www.daktronics.com/support/kb/Pages/DD3076316.aspx.

    D. Configure the controller for sign control; address, module type, sign height, sign width, sign type, access type, and peripherals. See contract site config sheet for details.
          a. Download the contract Site config from Dakfiles (files are listed by Contract #).
                i. /Transportation/Contract_Documents/SiteConfigs

    E. Set the time, date, and correct time zone.
          a. Login to the DMP and VIP UI using a computer and set the time on the VIP and DMP
          b. Set Time on the VFC LCD screen or NTCIP icon on the DMP UI
                i. https://www.daktronics.com/support/kb/Pages/DD4078750.aspx

6. Display Test patterns

    A. Alphabet: This test should show the alphabet across the screen, if it does not reach the border then the configuration is likely incorrect. Also check that alphabet characters are in correct order to ensure module addressing.

    B. Line numbers: This will indicate if the signal cables are running to the VCB correctly.

    C. Module address: This will verify addressing on modules is correct.

    D. Blank: Ensure all LEDs go off fully.

7. Display Signal and Pixel Testing-

    A. Display signal testing **(select test a or b).**
          a. **For VFC connected to a VCB II**; test fiber redundancy:
                i. Verify that DS signal lights on the VFC and VCB lights use
                    /support/kb/Pages/DD4050435
                      1. Verify that DS1 - DS2 on the VFC are flashing white (red indicates fiber failure).
                      2. Verify that PL6-1 – PL6-4 are blinking on the VCB.
                ii. Display alphabet test pattern then disconnect fiber port B from VFC.
                      1. Check the signal loss value on the controller under configuration/system/optional/signal loss.
                      2. Leave the test pattern running for a minimum of 60 seconds longer than the signal loss setting.
                          a. If test pattern goes off, then troubleshoot fiber connections.
                      3. Plug fiber port B back in and repeat test with fiber port A unplugged.
          b. **For VFC or DMP connected to a PLR or SATA**; use the VIP diagnostics to test signal connections

i. Use DD2699549 /support/kb/Pages/DD2699549.aspx

B. Pixel Test, if supported

    a. Pixel Test is **not supported** on 6 series displays (VS6, VC6, and VT6)

    b. On all other displays Select Sign #, (2) diagnostics, (5) Pixel Test Activation, (1) Confirm, (1) List of results.

    c. Verify no pixels are failing

        i. if you have pixels reporting failed replace module or fix connections and repeat the pixel test until no errors are reported.

    d. Repeat test on all other signs.

C. If equipped; Verify ACP is working properly.

8. Display Load and UPS testing

A. Load test the display

    a. **When load testing during Daytime:** Run the "All On 100% Burn" test pattern and leave the brightness set to 100%.

    b. **When load testing during Nighttime:**

        i. Select test patterns and go down to and select "all on red 10%".

        ii. **If applicable**; Turn on fans and heaters; log into controller, select sign 1, (2) diagnostics, down arrow to (2) run fans and heaters, select option from list and then (1) turn on. Repeat this process for anything listed in run fans and heaters selection screen.

    c. **If applicable**; Visually inspect fan and/or heaters/Airflow sensors are operating correctly.

        i. Verify that all fan and heaters that are controlled by the controller are turned on

        ii. Verify that all fans, heaters, and airflow sensors that report status to the controller are reporting correctly.

B. Using a safe procedure, check and record the voltage using same test points and voltages from test **3 (B or C):**

    a. Ensure that the voltage is:

        i. AC display- within 10 VAC from the previous readings in test 3

        ii. DC displays- reading is above 22 VDC

    b. Document Test point voltage

C. Stop test pattern or turn off fans.

    a. **Daytime**: Test patterns None.

    b. **Nighttime**: When finished set test pattern to none and return fans to normal. Select sign 1, (2) diagnostics, down arrow to (2) run fans and heaters, select option from list and then (2) restore normal operation for anything listed in run fans and heaters selection screen.

    c. Re-install the panel board cover.

D. If site has a UPS, Test UPS Function

    a. If supported; verify that the UPS is reporting to correct status to the controller.

        i. Remove AC power from the UPS by unplugging the UPS or turning off the breaker for the UPS.

        ii. Verify that the status of the UPS changed from AC line to Battery on the controllers peripheral list (this can take a couple of minutes depending on what UPS is used).

    b. **For a UPS that only backs up the control equipment**, verify that the controller and all necessary comms equipment are still powered up and running of the UPS battery.

c. **For a UPS that backs up the display and control equipment**, verify that the display, controller, and any communication equipment are still operating correctly.
   i. Note: All display features will not be powered by the display, such as fans and lights. Also, the controller might run in a dimmer mode depending on what UPS is used.
d. Restore AC power to the UPS.

9. Peripheral testing-

A. Verify all peripherals are operating and reporting properly. Failed peripherals will show timed out, failed, or COM loss (some displays will only have a light and temp depending on type, use the config sheet to determine that all peripherals are showing in the controller).
   a. Light: Light sensor should read appropriate value for lighting conditions.
   b. Temperature: Should show reasonable temperatures for current conditions.
   c. Humidity: Should show reasonable humidity for current conditions.
   d. Current dimming level- home screen select (3) dimming; should be set to automatic.
   e. Power supplies: Should show values for voltage.
   f. Switches
      i. Door(s): Should show open or closed based on current door conditions.
      ii. If equipped: I/O switches- verify that any OVHT, Binary, Moxa, BCD switch, DM-100 are correctly activating any required messages.
         1. If equipped; verify that any outputs that are configured and working correctly (GPO triggered with a message and personal comfort heater activates).
   g. Surge: Should show pass if operating properly.
B. Record data on checklist
   a. Record date, time, and sky conditions.
   b. Light, Temp, Humidity, and Dimming level on checklist.

10. NTCIP test message

A. Using Vanguard or NTCIP software run a test message (with beacons if applicable) and verify that the sign size is correct and the brightness it good.
   a. Create sign in Vanguard or other NTCIP software, create message to display on the sign that will fill entire sign and does not mislead traffic.
   b. If sign has beacons, then include beacons in the test message.
   c. Play message on sign using Vanguard or other NTCIP software for 6 minutes.
   d. Once 6 minutes expires turn power off to the controller and power back on and verify current message displays on the sign after controller boots back up.
   e. Remove message from display and delete the message from the controller's memory

11. Document firmware and site info

A. Record the firmware version numbers (from the sign controller "Version Information" page), and the dimensions of the sign.
B. Make sure site information filled is filled out: serial numbers, site location, phone number, sign dimension, firmware versions, etc.

12. complete Quality feedback form DD2560877 (last page of the FTP checklist)

13. Reinstall all enclosure covers and close all doors (if applicable; make sure that they are locked).

Sign completed Field Test procedure and return it to the Daktronics project manager.