



# DAKTRONICS, INC.

331 32ND AVE.  
P. O. BOX 5128  
BROOKINGS, SD 57005-5128

FAX: (800) 697-4700  
TOLL FREE: (800) 843-5843  
TELEPHONE: (605) 697-4000

Last Modified: 10 May 1999

---

## Test Plan

### Virginia Department of Transportation

### VMS NTCIP Compliance

## Daktronics Vanguard™ VMS

---

**TABLE OF CONTENTS**

1.	Background.....	5
1.1	NTCIP Testing.....	5
1.2	Other Test Documents.....	5
2.	Preparations for Testing.....	5
2.1	VMS Display Setup.....	5
2.2	Class B Connection .....	5
2.3	Class D Connection .....	5
2.4	NTCIP Exerciser .....	6
2.4.1	Daktronics MIB .....	6
2.4.2	Exerciser Settings.....	6
2.4.3	Using the Exerciser .....	6
2.4.3.1	SNMP Get .....	6
2.4.3.2	SNMP Set .....	7
2.4.3.3	SNMP Get Next.....	8
3.	Communication Validation.....	8
3.1	PMPP Tests .....	8
3.1.1	Change Device Address .....	8
3.1.2	Group Address.....	8
3.1.3	Broadcast Address.....	9
3.1.4	HDLC Poll Message.....	10
3.2	HDLC Errors .....	10
3.2.1	No Opening Flag .....	10
3.2.2	Invalid Address.....	11
3.2.3	Invalid Control Byte .....	11
3.2.4	Unknown IPI.....	12
3.2.5	Invalid CRC.....	12
3.3	PPP Errors .....	13
3.3.1	Invalid CHAP Secret .....	13
4.	SNMP .....	13
4.1	SNMP Set and Get Commands .....	13
4.1.1	Set an Object .....	13
4.1.2	Get an Object.....	14
4.1.3	Set Multiple Objects in One Data Packet.....	14
4.1.4	Get Multiple Objects in One Data Packet.....	15
4.2	SNMP Errors .....	15
4.2.1	Error in Set Command (Invalid Value).....	15
4.2.2	Error in Setting Multiple Objects.....	16
4.2.3	Set Read-Only Object (dmsMessageMemoryType object).....	17
5.	Communication Conformance Group Tests .....	17
5.1	Get RS232 Object.....	17
5.2	Get Lapb Object .....	18
5.3	Get SNMP In Object .....	18
5.4	Get SNMP Out Object.....	19
6.	Configuration Conformance Group Tests .....	19
6.1	Get Module Table Entry.....	19

---

7.	Time Management Conformance Group Test .....	20
7.1	Get globalTime Object .....	20
7.2	Test Year 2000 .....	21
7.2.1	Time/Date Roll-Over .....	21
7.2.2	Post Roll-Over Power Down .....	22
7.2.3	Powered Down Roll-Over .....	23
7.2.4	Leap Year .....	23
7.2.5	Year 2001 Time/Date Roll-Over .....	24
7.3	Test Year 2038 .....	24
7.4	Test Daylight Savings.....	25
8.	Report Conformance Group Tests .....	25
8.1	Log an Event.....	25
8.1.1	Set eventClassTable Entry.....	25
8.1.2	Set eventLogConfig Table Entry.....	26
8.1.3	Initiate the Events.....	27
8.1.4	Get eventLog Table Entry .....	27
9.	PMPP Conformance Group Tests.....	29
10.	Sign Configuration and Capability Conformance Group Tests.....	29
10.1	Get Configuration and Capability Entries .....	29
11.	Other Sign Configuration Tests .....	29
11.1	Get Sign Access and Technology Entries .....	29
12.	Font Definition Conformance Group Test.....	30
12.1	Get Font Table Entry .....	30
12.2	Display the Font .....	31
12.3	Download Font .....	32
13.	VMS Configuration Conformance Group Tests.....	33
13.1	Get VMS Configuration Entries .....	33
14.	Multi Configuration Conformance Group Tests .....	33
14.1	Get Multi Configuration Default Entries .....	33
15.	Message Table Conformance Group Tests.....	35
15.1	Get Table Properties.....	35
15.2	Verify Message Table Entry.....	36
16.	Sign Control Conformance Group Tests .....	37
16.1	Get dmsControlMode Object .....	37
16.2	Set dmsSWReset Object.....	38
16.3	Get dmsSWReset Object .....	38
16.4	Activate a Message.....	39
16.5	Get dmsMsgTableSource Object.....	40
16.6	Get dmsMsgRequesterID Object.....	40
16.7	Get dmsMessageTimeRemaining Object .....	41
16.8	Get dmsMsgSourceMode Object .....	41
16.9	Get dmsMemoryMgmt Object.....	42
16.10	Activate Message Error .....	42
17.	Default Message Conformance Group Tests.....	43
17.1	Power Loss Recovery Messages.....	43

---

---

17.2	Communications Loss Message .....	44
17.3	End Duration Message .....	46
17.4	Validate Message Error .....	47
18.	Pixel Service Conformance Group Tests.....	48
18.1	Get Pixel Service Objects.....	48
19.	Illumination / Brightness Conformance Group Tests.....	48
19.1	Get Illumination / Brightness Entries.....	48
19.2	Test Manual Dimming.....	49
19.3	Test Auto Dimming.....	50
20.	Scheduling Conformance Group Tests (Global and DMS).....	51
20.1	Set Schedule - Monday-Friday .....	51
20.1.1	Create Message.....	51
20.1.2	Set dmsActionTable Entry .....	52
20.1.3	Set timeBaseDayPlanTable Table Entry .....	52
20.1.4	Set timeBaseSchedule Table Entry .....	53
20.2	Set Schedule - Single Day (Jan 1) .....	54
20.2.1	Create Message.....	54
20.2.2	Set dmsActionTable Entry .....	55
20.2.3	Set timeBaseDayPlanTable Table Entry .....	55
20.2.4	Set timeBaseSchedule Table Entry .....	55
20.3	Set Schedule - Seasonal (St. Patrick's Day).....	56
20.4	Set Schedule - July 4th .....	57
21.	Auxiliary I/O Conformance Group Tests .....	58
21.1	Get Max Table Entries .....	58
21.2	Get Digital Table Entries.....	59
21.3	Get Analog Table Entries .....	60
22.	Sign Status Conformance Group Tests.....	61
22.1	Get Multi Field Table Entries.....	61
22.2	Get dmsCurrentSpeed.....	62
22.3	Get dmsCurrentSpeedLimit.....	62
22.4	Get watchdogFailureCount.....	63
23.	Pixel Error Status Subconformance Group .....	63
23.1	Good Pixel Test .....	63
23.2	Bad Pixel Test .....	64
24.	Temperature Status Subconformance Group Tests .....	65
24.1	Get Temperatures .....	65
	Appendix A - Illumination Table .....	67

# **TEST PLAN FOR NTCIP COMPLIANCE OF DAKTRONICS VANGUARD VARIABLE MESSAGE SIGNS**

## **1. Background**

### **1.1 NTCIP Testing**

This document provides the NTCIP compliance test plan for the for Daktronics NTCIP-compatible Vanguard™ variable message signs (VMS). It tests compliance of the following items:

- NTCIP Class B communication profile (NEMA TS 3.3)
- “Class D” communication profile defined by Virginia Department of Transportation
- Mandatory objects defined by NEMA documents TS 3.2, TS 3.3, TS 3.4, and TS 3.6 (draft)
- Objects required by a Virginia Department of Transportation contract for variable message signs (Daktronics contract C8014)

This document is derived from the Virginia Department of Transportation prequalification test plan written by the Viggen Corporation.

### **1.2 Other Test Documents**

This is one of three Daktronics documents that contain the software test plan for Daktronics NTCIP-compatible Vanguard™ variable message signs (VMS) and central controller software. The other two documents cover functional testing for the VMS and central controller software.

## **2. Preparations for Testing**

### **2.1 VMS Display Setup**

Ensure that the VMS and VMS controller are wired according to the installation manual.

### **2.2 Class B Connection**

For the majority of the tests in this document, the NTCIP Class B profile will be used for communication. A null-modem cable will be used for connecting the test computer with the display under test. The multi-drop address portion of the test requires a set of RS-232 to RS-422 signal converters, one at each node on the network.

### **2.3 Class D Connection**

Testing of the NTCIP Class D protocol requires a pair of analog telephone modems. One at the central test computer and one at the display. Appropriate telephones lines must be provided for the test.

## 2.4 NTCIP Exerciser

Install the NTCIP Exerciser on a Windows NT machine.

### 2.4.1 Daktronics MIB

Daktronics will provide a floppy disk and paper printouts containing the MIB used by the Vanguard VMS display system. Copy the contents of the disk into the NTCIP exerciser's directory on the test computer. The following files are included:

MIBI	RFC1155.SMI
RFC1158.SMI	RFC1212.SMI
NEMA.SMI	TMIB1.TXT
RFC1213.MIB	RFC1317.MIB
RFC1381.MIB	TS34BGLO.MIB
TS36BVMS.MIB	VANGUARD.MAN

### 2.4.2 Exerciser Settings

The following paragraphs describe the procedures that should be performed in preparation of the testing.

1. Disable all other applications, including the Microsoft Office Toolbar, if running.
2. For NTCIP Class B profile testing, ensure that the NEXERCISER.INI file contains the following lines of text:
  - SERIAL
  - COM1 (or other serial port as appropriate)
  - 9600
3. For NTCIP Class D profile testing, ensure that the NEXERCISER.INI file contains the following lines of text:
  - MODEM
  - COM1 (or other serial port as appropriate)
  - 9600
4. Start the NTCIP Exerciser.
  - If an error-message (MIB Errors Detected) appears, verify that the MIB files provided by Daktronics have been copied into the exerciser's folder on the test computer.
  - If no error message occurs, the NTCIP Exerciser will open and query the user as to select either central or field mode. Select central mode. The main menu will appear. Nothing will be displayed except for a menu bar and a status bar. The main display field of this window is used for line activity monitoring which is explained as part of the test plans.

### 2.4.3 Using the Exerciser

#### 2.4.3.1 SNMP Get

1. Open the exerciser and select the "Send" sub-menu from under "Message" of the main window.

2. The “Send Message” window will appear. Select the “Edit” button within this window and the “Browse Object” window will appear.
3. Browse the “Object Tree” display field until the desired object is found. Highlight the object and select the “Add” button. The object will be added to the “Selected Object” list. If multiple objects need to be received, additional objects may be highlighted and added. If the object is within a table, the “Select Instance” window will appear and the user will be required to enter the appropriate index / indexes. Note: If a table object is followed by “.3.1”, the object has two indexes which need to be entered in the “Select Instance” window. The first entry index would be 3 and the second entry index would be 1.
4. Select the “OK” button once all the desired objects have been added to the “Selected Object” list. The “Browse Object” window will disappear and the “Send Message” window will reappear.
5. Make sure the “Get” radio button is selected and select the “Send” button to get the object values. The main window will reappear and communications will be initiated. While communicating, the line activity window of the main window will display the status of the communications. After a short time, communications will cease and the desired object values should be received.
6. To view the requested values, select “Message” and “Browse” from the drop down menu. The “Browse Object” window will then appear. Highlight the object in the “Selected Object” list to view the current value. The current value will be displayed in the “Current Value” field.

#### **2.4.3.2 SNMP Set**

1. Open the exerciser and select the “Send” sub-menu from under “Message” of the main window.
2. The “Send Message” window will appear. Select the “Edit” button within this window.
3. The “Browse Object” window will appear. Browse the “Object Tree” display field until the desired object is found. Highlight the object and select the “Add” button. The object will be added to the “Selected Object” list. If multiple objects need to be set, additional objects may be highlighted and added. If the object is within a table, the “Select Instance” window will appear and the user will be required to enter the appropriate index / indexes. Note: If a table object is followed by “.3.1”, the object has two indexes which need to be entered in the “Select Instance” window. The first entry index would be 3 and the second entry index would be 1.
4. Select the object from the “Selected Object” list and then select the radial button indicating the desired display mode. Valid display modes are “Decimal”, “Hexadecimal”, “ASCII String”, and “Object Identifier”.
5. Select the “New Value” edit field to enter the desired value for the object and select the “Enter Value” button to set the new value. The new value will be displayed across from the object in the “Value” list.
6. Select the “OK” button once all new values have been entered for the objects. The “Browse Object” window will disappear and the “Send Message” window will reappear. Finally, make sure the “Set” radial button is selected and select the “Send” button to set the object values. The main window will reappear and communications will be initiated. While communicating, the line activity window of the

main window will display the status of the communications. After a short time, communications will cease and the desired objects should be set.

### 2.4.3.3 SNMP Get Next

Follow the same procedure as for the SNMP Get command, but specify “Get Next” on the “Send” screen. Instead of returning the object specified, it will return the next available object stored in the MIB.

## 3. Communication Validation

These tests are used to validate the various data link protocols used in the implementation of NTCIP.

### 3.1 PMPP Tests

These tests verify that the PMPP implementation works properly upon receiving a valid PMPP data frame. These tests should only be performed for the Class B Profile.

#### 3.1.1 Change Device Address

1. Within the DMS device, change the address of the sign from “Drop #1” to another “Drop #”.
2. Restart the Daktronics VMS controller.
3. In the “Send Message” window, change the “Drop #” to the number that was set within the DMS device. Get the globalMaxModules.0 Object. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalConfiguration / globalMaxModules.
4. Verify that the get response is identical to those received in Section 3.1.1.

<b>TEST RESULTS:</b>		
<input type="checkbox"/>	PASS	<input type="checkbox"/>
		FAIL
Notes:		
_____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

#### 3.1.2 Group Address

1. Select a number (x) between 1 and 62, inclusive and record here: \_\_\_\_\_
2. Set the hdlcGroupAddress.1 object to a value of  $x*4 + 3$ .
3. Restart the Daktronics VMS controller.

4. In the “Address” section of the “Send Message” window, set the “Drop #” to x and select the “Group Address” check box.
5. Set the globalTime.0 Object to a value of 870393600 (August 1, 1997). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime.0.
6. Verify that no response was received.
7. In the “Address” section of the “Send Message” window, set the “Drop #” back to the specific address of the VMS controller and deselect the “Group Address” check box.
8. Get the globalTime.0 object. Verify that it is set to the value set previously plus the time differential since the set command was executed.

<b>TEST RESULTS:</b>		
<input type="checkbox"/>	PASS	<input type="checkbox"/>
FAIL		
<b>Notes:</b>		
_____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 3.1.3 Broadcast Address

1. In the “Address” section of the “Send Message” window, set the “Drop #” to “63” and select the “Group Address” check box.
2. Set the globalTime.0 Object to a value of 870393600 (August 1, 1997). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime.0.
3. Verify that no response was received.
4. In the “Address” section of the “Send Message” window, set the “Drop #” back to the specific address of the VMS controller and deselect the “Group Address” check box.
5. Get the globalTime.0 object. Verify that it is set to the value set previously plus the time differential since the set command was executed.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 3.1.4 HDLC Poll Message

1. While in the “Send Message” window, set the “Class” to “Poll”.
2. Press the “Send” button.
3. Verify that a valid response was received (typically, an unnumbered poll).

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 3.2 HDLC Errors

This section tests the high-level data link control (HDLC) protocol. Specifically, it ensures that the device properly handles incoming messages that are improperly formatted at the lower layers. It should be performed for both Class B and Class D Profile implementations.

### 3.2.1 No Opening Flag

1. Get the globalMaxModules.0 Object. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalConfiguration / globalMaxModules.
2. Verify that a get response message was received in response.
3. Repeat step 1, but check the “Edit Byte Stream before Sending” checkbox prior to selecting the “Send” button. The “Edit Byte Stream” window will appear. Delete the opening flag byte of the “Opening Flag” edit field. Finally, select the “OK” button.
4. Verify that no response message was received.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 3.2.2 Invalid Address

1. In the “Send Message” window, change the “Drop #” to a number that is different than what is set within the DMS device. Get the globalMaxModules.0 Object. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalConfiguration / globalMaxModules.
2. Verify that the device does not respond.
3. In the “Send Message” window, set the “Drop #” to the number that is set within the DMS device.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 3.2.3 Invalid Control Byte

1. Get the globalMaxModules.0 Object, but check the “Edit Byte Stream before Sending” checkbox prior to pressing the “Send” button. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalConfiguration / globalMaxModules.
2. The “Edit Byte Stream” window will appear. Change the control byte to a hex number other than 0x03, 0x13, or 0x33. Finally, select the “OK” button.
3. Verify that the device does not respond.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 3.2.4 Unknown IPI

1. Get the globalMaxModules.0 Object, but check the “Edit Byte Stream before Sending” checkbox prior to pressing the “Send” button. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalConfiguration / globalMaxModules.
2. The “Edit Byte Stream” window will appear. Change the IPI byte to a hex value other than what is there. Select the “OK” button.
3. Verify that the device does not respond.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 3.2.5 Invalid CRC

The purpose of this test is to test the sign controller software's capability to detect CRC errors in the data packet content itself.

1. Get the globalMaxModules.0 Object, but check the “Edit Byte Stream before Sending” checkbox prior to pressing the “Send” button. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalConfiguration / globalMaxModules.
2. Change the “CRC” field (e.g. change a 3E to a 25). Finally, select the “OK” button.
3. Verify that the device does not respond.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 3.3 PPP Errors

This section tests the point-to-point protocol (PPP) for dial-up networks. The steps contained within this section should only be performed if testing the Class D Profile.

#### 3.3.1 Invalid CHAP Secret

1. Under Tools - Options, Change the CHAP Secret to something other than the secret that the device is expecting.
2. The device should send an LCP reject data packet when negotiating the CHAP authentication.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 4. SNMP

This section tests the simple network management protocol (SNMP) implementation. These tests should be performed for both Class B and Class D Profile networks.

### 4.1 SNMP Set and Get Commands

These tests are designed to ensure that the SNMP agent within the device will properly respond to properly encoded messages. It also ensures that the lower layers properly respond to properly encoded messages.

#### 4.1.1 Set an Object

1. Use the procedure indicated in Section 2.4.3.2 SNMP Set to set the globalTime Object to a decimal value of "870393600" seconds (the difference between midnight of August 1, 1997 from midnight of

January 1, 1970). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime / globalTime.0

- Record the computer's current system time in the space provided below. This value will be used later in this test.

\_\_\_ : \_\_\_ : \_\_\_ (h:m:s) system time

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 4.1.2 Get an Object

- Get the globalTime.0 Object. The Decimal value received should be a value of 870393600 + the elapsed seconds since the object was set above. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime.0.

\_\_\_ : \_\_\_ : \_\_\_ (h:m:s) system time                      elapsed seconds \_\_\_\_\_

\_\_\_ : \_\_\_ : \_\_\_ (h:m:s) reported time                      elapsed seconds \_\_\_\_\_

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 4.1.3 Set Multiple Objects in One Data Packet

- Set the following objects in one data packet:
  - Set the dmsIllumControl Object to a Decimal value of "4" (manual). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / illum / dmsIllumControl.

- Set the dmsIllumManLevel Object to a Decimal value of “255” (100%). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / illum / dmsIllumManLevel.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

#### 4.1.4 Get Multiple Objects in One Data Packet

1. Get and verify the following objects in one data packet:

- Get the dmsIllumControl Object. The Decimal value received should be a value of “4” (manual). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / illum / dmsIllumControl.
- Get the dmsIllumBrightLevelStatus.0 Object. The Decimal value received should be a value of “170” or 67% (Daktronics Scaler) x 255 => 170. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / illum / dmsIllumBrightStatus.0.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 4.2 SNMP Errors

### 4.2.1 Error in Set Command (Invalid Value)

1. Get the dmsMessageStatus.3.1 Object. Record the value. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.

Message Status 3.1                      \_\_\_\_\_



4. Get the dmsMessageStatus.3.1 Object. Record the value. This value should be the same value as recorded in step 1 of clause 5.1. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
5. Message Status 3.1 \_\_\_\_\_

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

**4.2.3 Set Read-Only Object (dmsMessageMemoryType object)**

1. Set the dmsMessageMemoryType.3.1 Object to a Decimal value of “4” (Change changeable memory to volatile memory). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageMemoryType / dmsMessageMemoryType.X.
2. While attempting to set the dmsMessageMemoryType.3.1 Object, the line activity window of the main window should indicate an error by displaying an ErrorNumber of 5 (GenErr) and an ErrorIndex of 1 (pointing to the first object that causes the error).

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

**5. Communication Conformance Group Tests**

**5.1 Get RS232 Object**

1. Get the rs232PortInSpeed.1 Object. The tree path is: iso / organization / dod / internet / mgmt / mib-2 / transmission / rs232 / rs232PortTable / rs232PortEntry / rs232PortInSpeed.1.
2. Verify that the device responds with a valid value.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 5.2 Get Lapb Object

1. Get the lapbOperT1AckTimer.1 Object. The tree path is: iso / organization / dod / internet / mgmt / mib-2 / transmission / lapb / lapbOperTable / lapbOperEntry / lapbOperT1AckTimer.1.
2. Verify that the device responds with a valid value.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 5.3 Get SNMP In Object

1. Get the snmpInPkts.0 Object. The tree path is: iso / organization / dod / internet / mgmt / mib-2 / snmp / snmpInPkts.0.
2. Verify that the device responds with a valid value; record the value. Value \_\_\_\_\_
3. Get the snmpInPkts.0 Object. The tree path is: iso / organization / dod / internet / mgmt / mib-2 / snmp / snmpInPkts.0.
4. Verify that the device responds with a value one greater than in step 2. Value \_\_\_\_\_

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 5.4 Get SNMP Out Object

1. Get the snmpOutPkts.0 Object. The tree path is: iso / organization / dod / internet / mgmt / mib-2 / snmp / snmpOutPkts.0.
2. Verify that the device responds with a valid value; record the value. Value \_\_\_\_\_
3. Get the snmpOutPkts.0 Object. The tree path is: iso / organization / dod / internet / mgmt / mib-2 / snmp / snmpOutPkts.0.
4. Verify that the device responds with a value one greater than in step 2. Value \_\_\_\_\_

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 6. Configuration Conformance Group Tests

### 6.1 Get Module Table Entry

1. Get the globalMaxModules.0 Object. Record the value in the space provided below. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalConfiguration / globalMaxModules.0.
  - globalMaxModules.0: \_\_\_\_\_
2. Get the following objects in a single query:



<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 7.2 Test Year 2000

### 7.2.1 Time/Date Roll-Over

1. Set the globalTime Object to a decimal value of “946684739” (equals in seconds the difference between 11:59PM of December 31, 1999 from midnight of January 1, 1970). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime / globalTime.0
2. Set the dmsMessageStatus.3.2 Object to a Decimal value of “6” (modifyReq). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
3. Set the dmsMessageMultiString.3.1 Object to an ASCII String of  

```
"[f2,5] [f9,2]/[f8,2]/[f10,2][n13][f1,5] [f9,2]/[f8,2]/[f11,4]"
```
4. (24 hour format time, month, day, 2 digit year) . The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageMultiString.X.
5. Set the dmsMessageRunTimePriority.3.2 Object to a decimal value of “100”. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
6. Set the dmsMessageStatus.3.2 Object to a Decimal value of “7” (validateReq). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageRunTimePriority.X.
7. Get the dmsMessageStatus.3.2 Object. The Decimal value of this particular object may have different values depending on the processing speed of the device and the complexity of the messageMultiString. If the value is 3 (validating), repeat this test, if the value is 4 (valid), the message content has been validated successfully, and if the value is 5 (error), the message content had some error and the message text cannot be used. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.

- Before setting the dmsActivateMessage Object, activate another application called "DMS.exe". This application will provide the appropriate value needed to activate the message that is already stored within the VMS Controller.

Enter the following values:

Duration: 100 (expresses the time in minutes that a message is to be displayed)  
 ActivatePriority: 255 (highest priority to ensure that message will always start)  
 MessageMemoryType: 3  
 MessageNumber: 2  
 MessageMultiString: [f2,5] [f9,2]/[f8,2]/[f10,2][n3][f1,5] [f9,2]/[f8,2]/[f11,4]  
 MessageCRC: xxxx (determined automatically by the software)  
 SourceAddress: 1 (transmitted as 4-byte IP Address, set to a fictitious value in this example)

- Now, set the dmsActivateMessage Object to the Hexadecimal string found in the "Output String" field of "DMS.exe". The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / signControl / dmsActivateMessage. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / signControl / dmsActivateMessage. The sign should display the current time and date.
- Set the globalTime Object to a decimal value of "946684739" (equals in seconds the difference between 11:59PM of December 31, 1999 from midnight of January 1, 1970). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime / globalTime.0
- Wait approximately two minutes until the time / date roll over and verify.

<b>TEST RESULTS:</b>	<input type="checkbox"/> PASS	<input type="checkbox"/> FAIL
<b>Notes:</b>		
_____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 7.2.2 Post Roll-Over Power Down

- Reset power to the Sign Controller.
- Set the dmsActivateMessage object to run the message from the previous test. Verify that the time and date shown on the display are still correct.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

**7.2.3 Powered Down Roll-Over**

1. Verify that daylight savings is disabled on the display (set it to 2). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime / globalDayLightSavings.0
2. Set the globalLocalTimeDifferentialParameter to a value of 0. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime / globalLocalTimeDifferentialParameter.0
3. Remove power from the Sign Controller and wait approximately two minutes. Apply power to the Sign Controller.
4. Set the dmsActivateMessage object to run the message from the previous test. Verify that the time and date shown on the display are still correct.
5. Verify that the time and date displayed on the sign properly rolled-over when the Sign Controller was powered down.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

**7.2.4 Leap Year**

1. Set the globalTime Object to a decimal value of “951782339” (equals in seconds the difference between 11:59PM of February 28, 2000 from midnight of January 1, 1970). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime / globalTime.0.
2. Wait approximately two minutes and verify that the time is 12:01AM and the day is February 29, 2000.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

**7.2.5 Year 2001 Time/Date Roll-Over**

1. Set the globalTime Object to a decimal value of “978307139” (equals in seconds roughly the difference between 11:59PM of December 31, 2000 from midnight of January 1, 1970). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime / globalTime.0
2. Wait approximately two minutes until the time / date roll over and verify.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

**7.3 Test Year 2038**

1. Set the globalTime Object to a decimal value of 2147483600. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime / globalTime.0
2. Wait approximately one minute until the time rolls over 0x80000000.
3. Get globalTime Object and ensure the value is positive and encoded in five bytes.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 7.4 Test Daylight Savings

1. Verify that daylight savings is enabled on the display (set it to 3). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime / globalDayLightSavings.0
2. Set the globalLocalTimeDifferentialParameter to a value of 0. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime / globalLocalTimeDifferentialParameter.0
3. Set the globalTime Object to a decimal value of “923191140” (equals in seconds the difference between 1:59AM of April 4, 1999 from midnight of January 1, 1970). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime / globalTime.0
4. Wait approximately two minutes and verify that the globalLocalTimeDifferentialParameter has been changed to accommodate daylight savings.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 8. Report Conformance Group Tests

### 8.1 Log an Event

#### 8.1.1 Set eventClassTable Entry

1. Get the maxEventClasses.0 Object. Record the value in the space provided below. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalReport / maxEventClasses.0. Ensure this value is at least 7.

- maxEventClasses: \_\_\_\_\_
2. Get values of eventClassNumber.1, eventClassLimit.1, eventClassClearTime.1, and eventClassDescription.1 and record
 

eventClassNumber.1 \_\_\_\_\_

eventClassLimit.1 \_\_\_\_\_

eventClassClearTime.1 \_\_\_\_\_

eventClassDescription.1 \_\_\_\_\_
  3. Pick a number (x) between 2 and 7 and record: \_\_\_\_\_
  4. Set the following objects in one data packet:
    - Set the eventClassLimit.x Object to a Decimal value between 3 and 200 and record: \_\_\_\_\_ .
    - Set the eventClassClearTime.x Object to an appropriate value (e.g., “978307139”) and record value: \_\_\_\_\_ .
    - Set the eventClassDescription.x Object to an appropriate ASCII string value and record \_\_\_\_\_
  5. Pick another different number (y) between 2 and 7 and record: \_\_\_\_\_
  6. Set the following objects in one data packet:
    - Set the eventClassLimit.y Object to a Decimal value between 3 and 200 and record: \_\_\_\_\_ .
    - Set the eventClassClearTime.y Object to an appropriate value (e.g., “978307139”) and record value: \_\_\_\_\_ .
    - Set the eventClassDescription.y Object to an appropriate ASCII string value and record \_\_\_\_\_

### 8.1.2 Set eventLogConfig Table Entry

1. Get the maxEventLogConfigs.0 Object. Record the value in the space provided below. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalReport / maxEventLogConfigs.0. Ensure this value is at least 50.
  - maxEventLogConfigs: \_\_\_\_\_
2. Get values of eventConfigID.1, eventConfigClass.1, eventConfigMode.1, eventConfigCompareOID.1, eventConfigLogOID.1, eventConfigAction.1 and record

eventConfigID.1 \_\_\_\_\_

eventConfigClass.1 \_\_\_\_\_

eventConfigMode.1 \_\_\_\_\_

eventConfigCompareOID.1 \_\_\_\_\_

eventConfigLogOID.1 \_\_\_\_\_

eventConfigAction.1 \_\_\_\_\_

3. Select three numbers between 1 and 50, inclusive and record: a=\_\_\_\_\_, b=\_\_\_\_\_, c=\_\_\_\_\_
4. Set values as shown for the following objects (x is from Section 10.1.1, blanks indicate user-fill-in):

(Instance)	a	b	c
eventConfigClass	1	x	y
eventConfigMode	2 (on change)	3 (greater than)	4 (less than)
eventConfigCompareValue	0	_____	_____
eventConfigCompareValue2	0	0	0
eventConfigCompareOID	_____	_____	_____
eventConfigLogOID	_____	_____	_____
eventConfigAction	3	3	3

### 8.1.3 Initiate the Events

1. Perform operations to ensure that each of the configured events occur and record the time at which they occur.

	a	b	c
Time :	_____	_____	_____

### 8.1.4 Get eventLog Table Entry

1. Get the maxEventLogSize.0 Object. Record the value in the space provided below. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalReport / maxEventLogSize.0. Ensure the value is at least 200.

- maxEventLogSize: \_\_\_\_\_

2. Get and record the following objects: Note: Each of these objects has a base tree path of: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalReport / eventLogTable / eventLogEntry.

- eventLogClass.1.a: \_\_\_\_\_
- eventLogNumber.1.a: \_\_\_\_\_
- eventLogID.1.a: \_\_\_\_\_
- eventLogTime.1.a: \_\_\_\_\_
- eventLogValue.1.a: \_\_\_\_\_
- eventLogClass.x.b: \_\_\_\_\_
- eventLogNumber.x.b: \_\_\_\_\_
- eventLogID.x.b: \_\_\_\_\_
- eventLogTime.x.b: \_\_\_\_\_
- eventLogValue.x.b: \_\_\_\_\_
- eventLogClass.y.c: \_\_\_\_\_
- eventLogNumber.y.c: \_\_\_\_\_
- eventLogID.y.c: \_\_\_\_\_
- eventLogTime.y.c: \_\_\_\_\_
- eventLogValue.y.c: \_\_\_\_\_

3. Verify that the event time stamps agree (approximately) with the times recorded above.

<b>TEST RESULTS:</b>		
<input type="checkbox"/>	PASS	<input type="checkbox"/> FAIL
<b>Notes:</b>		
_____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 9. PMPP Conformance Group Tests

1. Get and record the maxGroupAddresses Objects. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / protocols / profiles / profilesPMPP.

- maxGroupAddresses: \_\_\_\_\_

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 10. Sign Configuration and Capability Conformance Group Tests

### 10.1 Get Configuration and Capability Entries

1. Get and record the following objects in a single query:

Note: Each of these objects has a base tree path of: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsSignCfg.

- dmsSigntype: \_\_\_\_\_ (6) vmsFull
- dmsBeaconType: \_\_\_\_\_ (2) none

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 11. Other Sign Configuration Tests

### 11.1 Get Sign Access and Technology Entries

1. Get and record the following objects in a single query:

Note: Each of these objects has a base tree path of: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsSignCfg.

- dmsSignAccess: \_\_\_\_\_ (2) Walk-in
- dmsSignTechnology: \_\_\_\_\_ (2) LED

<b>TEST RESULTS:</b>		
<input type="checkbox"/>	PASS	<input type="checkbox"/> FAIL
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 12. Font Definition Conformance Group Test

### 12.1 Get Font Table Entry

1. Get the numFonts.0 Object. Record the value in the space provided below. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / fontDefinition / numFonts.0. Ensure that the value is at least 2.

- numFonts: \_\_\_\_\_

2. Select a font table entry and get and record the values ( X = \_\_\_ ):

Note: Each of these objects has a base tree path of: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / fontDefinition / fontTable / fontEntry.

- FontNumber.\_\_\_ \_\_\_\_\_
- fontName.\_\_\_: \_\_\_\_\_
- fontHeight.\_\_\_: \_\_\_\_\_
- fontCharSpacing.\_\_\_: \_\_\_\_\_
- fontLineSpacing.\_\_\_: \_\_\_\_\_
- fontVersionID.\_\_\_ \_\_\_\_\_

<b>TEST RESULTS:</b>		
<input type="checkbox"/>	PASS	<input type="checkbox"/>
<input type="checkbox"/>	FAIL	
Notes:		
_____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 12.2 Display the Font

1. Set the dmsMessageStatus.3.1 Object to a Decimal value of “6” (modifyReq). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.3.1.
2. Set the dmsMessageMultiString.3.1 Object to an ASCII String of “[foX]0123456789AaBbCcXxYyZz” (X being the Font Table Entry retrieved above). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageMultiString.3.1.
3. Set the dmsMessageStatus.3.1 Object to a Decimal value of “7” (validateReq). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.3.1.
4. Get the dmsMessageStatus.3.1 Object. The Decimal value of this particular object may have different values depending on the processing speed of the device and the complexity of the messageMultiString. If the value is 3 (validating), repeat this test, if the value is 4 (valid), the message content has been validated successfully, and if the value is 5 (error), the message content had some error and the message text cannot be used. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.3.1.
5. Before setting the dmsActivateMessage Object, activate another application called "DMS.exe". This application will provide the appropriate value needed to activate the message that is already stored within the VMS Controller.

Enter the following values:

Duration:	10 (expresses the time in minutes that a message is to be displayed)
ActivatePriority:	255 (highest priority to ensure that message will always start)
MessageMemoryType:	3
MessageNumber:	1
MessageMultiString:	0123456789AaBbCcXxYyZz(needed to determine the MessageCRC)
MessageCRC:	xxxx (determined automatically by the software)
SourceAddress:	1 (transmitted as 4-byte IP Address, set to a fictitious value in this example)

Now, set the dmsActivateMessage Object to the Hexadecimal string found in the “Output String” field of “DMS.exe”. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / signControl / dmsActivateMessage. The sign should display the text “0123456789AaBbCcXxYyZz”.

6. Verify that the font line height, line spacing, and line spacing on the display are the same as recorded in Section 10.1.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 12.3 Download Font

1. Select an ASCII character number (e.g., A = 0x41, a = 0x61) and record the character and value:  
\_\_\_\_\_
2. Select a bitmap to download for the character and record the selected bitmap: \_\_\_\_\_
3. Download the bitmap
4. Display a message containing just that character
5. Download the old bitmap to the character.
6. Upload the character. Verify that the character has been replaced by the new character.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 13. VMS Configuration Conformance Group Tests

#### 13.1 Get VMS Configuration Entries

1. Get and record the following objects in a single query:

Note: Each of these objects has a base tree path of: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / vmsCfg.

- vmsCharacterHeightPixels: \_\_\_\_\_ (0 = variable)
- vmsCharacterWidthPixels: \_\_\_\_\_ (0 = variable)
- vmsSignHeightPixels: \_\_\_\_\_ (27)
- vmsSignWidthPixels: \_\_\_\_\_ (105)
- vmsHorizontalPitch: \_\_\_\_\_ ( )
- vmsVerticalPitch: \_\_\_\_\_ ( )

<b>TEST RESULTS:</b>		
<input type="checkbox"/>	PASS	<input type="checkbox"/>
FAIL		
Notes:		
_____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 14. Multi Configuration Conformance Group Tests

#### 14.1 Get Multi Configuration Default Entries

1. Get and record the following objects in a single query:

Note: Each of these objects has a base tree path of: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / multiCfg /.

- defaultBackgroundColor: \_\_\_\_\_ (0 = black)
- defaultForegroundColor: \_\_\_\_\_ (9 = amber)
- defaultFlashOn: \_\_\_\_\_ (3 = 0.3 sec)
- defaultFlashOff: \_\_\_\_\_ (3 = 0.3 sec)

- defaultFont: \_\_\_\_\_ (1)
- defaultJustificationLine: \_\_\_\_\_ (2 = left)
- defaultJustificaitonPage: \_\_\_\_\_ (2 = top)
- defaultPageOnTime: \_\_\_\_\_ (50 = 5.0 sec)
- defaultPageOffTime: \_\_\_\_\_ (0 = 0.0 sec)
- defaultCharacterSet: \_\_\_\_\_ (2) eight bit

1. Verify the default values by displaying a message. Set the dmsMessageStatus.3.1 Object to a Decimal value of “6” (modifyReq). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
2. Set the dmsMessageMultiString.3.1 Object to any valid MULTI string. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageMultiString.X.
3. Set the dmsMessageStatus.3.1 Object to a Decimal value of “7” (validateReq). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
4. Get the dmsMessageStatus.3.1 Object. The Decimal value of this particular object may have different values depending on the processing speed of the device and the complexity of the messageMultiString. If the value is 3 (validating), repeat this test, if the value is 4 (valid), the message content has been validated successfully, and if the value is 5 (error), the message content had some error and the message text cannot be used. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
5. Before setting the dmsActivateMessage Object, activate another application called "DMS.exe". This application will provide the appropriate value needed to activate the message that is already stored within the VMS Controller.

Enter the following values:

Duration:	10 (expresses the time in minutes that a message is to be displayed)
ActivatePriority:	255 (highest priority to ensure that message will always start)
MessageMemoryType:	3
MessageNumber:	1
MessageMultiString:	(String used above)needed to determine the MessageCRC)
MessageCRC:	xxxx (determined automatically by the software)
SourceAddress:	1 (transmitted as 4-byte IP Address, set to a fictitious value in this example)

Now, set the dmsActivateMessage Object to the Hexadecimal string found in the “Output String” field of “DMS.exe”. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / signControl / dmsActivateMessage.

1. Verify that the appropriate text is displayed while font 1 is used and the text is left top-left justified.
2. To verify that the above Objects are Read / Write, set the following objects in one data packet:
  - Set the defaultJustificationLine Object to a different value.
  - Set the defaultJustificaitonPage Object to a different value.
3. Verify that the text is displayed appropriately.

<b>TEST RESULTS:</b>		
<input type="checkbox"/>	PASS	<input type="checkbox"/>
FAIL		
Notes:		
_____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 15. Message Table Conformance Group Tests

### 15.1 Get Table Properties

1. Get and record the following objects in a single query:

Note: Each of these objects has a base tree path of: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage. And verify against project specifications.

- dmsNumPermanentMsg: \_\_\_\_\_
- dmsNumChangeableMsg: \_\_\_\_\_
- dmsMaxChangeableMsg: \_\_\_\_\_
- dmsFreeChangeableMemory: \_\_\_\_\_
- dmsNumVolatileMsg: \_\_\_\_\_
- dmsMaxVolatileMsg: \_\_\_\_\_
- dmsFreeVolatileMemory: \_\_\_\_\_

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 15.2 Verify Message Table Entry

1. Select a valid row in the table and record selection
2. Set the dmsMessageStatus.x.x (where x.x reflects the row number for the test) Object to a Decimal value of “6” (modifyReq). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
3. Set the dmsMessageMultiString.x.x Object to a valid MULTI string. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageMultiString.X.
4. Set the dmsMessageStatus.x.x Object to a Decimal value of “7” (validateReq). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
5. Get the dmsMessageStatus.x.x Object. The Decimal value of this particular object may have different values depending on the processing speed of the device and the complexity of the message Multi-String. If the value is 3 (validating), repeat this test, if the value is 4 (valid), the message content has been validated successfully, and if the value is 5 (error), the message content had some error and the message text cannot be used. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
6. Before setting the dmsActivateMessage Object, activate another application called "DMS.exe". This application will provide the appropriate value needed to activate the message that is already stored within the VMS Controller.

Enter the following values:

Duration:	user selected (record) (expresses the time in minutes that a message is to be displayed)
ActivatePriority:	user selected (record) (highest priority to ensure that message will always start)
MessageMemoryType:	3
MessageNumber:	1
MessageMultiString:	the string selected above(needed to determine the MessageCRC)
Beacons:	No (0)

PixelService: No (0)  
 MessageCRC: xxxx (determined automatically by the software)  
 SourceAddress: 1 (transmitted as 4-byte IP Address, set to a fictitious value in this example)

Record the “DMS.exe” entries in the DMS: column of the table below. Now, set the dmsActivateMessage Object to the Hexadecimal string found in the “Output String” field of “DMS.exe”. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / signControl / dmsActivateMessage. The sign should display the text appropriately.

7. Get, record and verify the following objects in a single query:

- dmsMessageMemoryType: \_\_\_\_\_
- dmsMessageNumber: \_\_\_\_\_
- dmsMessageMultiString: \_\_\_\_\_
- dmsMessageOwner: \_\_\_\_\_
- dmsMessageCRC: \_\_\_\_\_
- dmsMessageBeacon: \_\_\_\_\_
- dmsMessagePixelFormatService: \_\_\_\_\_
- dmsMessageRunTimePriority: \_\_\_\_\_
- dmsMessageMsgStatus \_\_\_\_\_

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 16. Sign Control Conformance Group Tests

### 16.1 Get dmsControlMode Object

1. Get the dmsControlMode.0 Object. The value received should be a Decimal value of “4” (central). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / signControl / dmsControlMode.0.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

2. Repeat this procedure testing any other required modes.

### 16.2 Set dmsSWReset Object

1. Set the dmsSWReset.0 Object to a Decimal Value of “1”. The Sign Controller should reset itself. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / signControl / dmsSWReset.0.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 16.3 Get dmsSWReset Object

1. Get the dmsSWReset.0 Object. The value received should be a Decimal value of “0”. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / signControl / dmsSWReset.0.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 16.4 Activate a Message

1. Set the dmsMessageStatus.3.1 Object to a Decimal value of “6” (modifyReq). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
2. Set the dmsMessageMultiString.3.1 Object to an ASCII String of “ACTIVATE MESSAGE”. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageMultiString.X.
3. Set the dmsMessageStatus.3.1 Object to a Decimal value of “7” (validateReq). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
4. Get the dmsMessageStatus.3.1 Object. The Decimal value of this particular object may have different values depending on the processing speed of the device and the complexity of the messageMultiString. If the value is 3 (validating), repeat this test, if the value is 4 (valid), the message content has been validated successfully, and if the value is 5 (error), the message content had some error and the message text cannot be used. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageRunTimePriority.X.
5. Before setting the dmsActivateMessage Object, activate another application called "DMS.exe". This application will provide the appropriate value needed to activate the message that is already stored within the VMS Controller.

Enter the following values:

Duration:	10 (expresses the time in minutes that a message is to be displayed)
ActivatePriority:	255 (highest priority to ensure that message will always start)
MessageMemoryType:	3
MessageNumber:	1
MessageMultiString:	ACTIVATE MESSAGE(needed to determine the MessageCRC)
MessageCRC:	xxxx (determined automatically by the software)
SourceAddress:	1 (transmitted as 4-byte IP Address, set to a fictitious value in this example)

Now, set the dmsActivateMessage Object to the Hexadecimal string found in the “Output String” field of “DMS.exe”. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / signControl / dmsActivateMessage. Record this string in the space provided below. This string will be used later in this test. The sign should display the text “ACTIVATE MESSAGE”.

\_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_

(Duration, ActivatePriority, MsgMemoryType, MessageNumber, MessageCRC, SourceAddress)

1. Record the current time in the space below. This reading will be used later in this test

\_\_\_\_ : \_\_\_\_ : \_\_\_\_ (h:m:s)

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 16.5 Get dmsMsgTableSource Object

1. Get and record the dmsMsgTableSource.0 Object. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / signControl / dmsMsgTableSource.0. Record the received value in the space provided below.

\_\_\_\_, \_\_\_\_ , \_\_\_\_ ( MemoryType, MessageNumber, MessageCRC )

Note: It is assumed that the display is still running the message that was activated in the test above. The MessageCRC and the MessageCRC recorded in Section 18.4 should be the same.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 16.6 Get dmsMsgRequesterID Object

1. Get the dmsMsgRequesterID.0 Object. . The value received should be equal to the SourceAddress recorded in the Activate Message String of Section 18.4. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / signControl / dmsMsgRequesterID.0.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 16.7 Get dmsMessageTimeRemaining Object

1. Get and record the dmsMessageTimeRemaining.0 Object. The Decimal value received should be a value of 10 minus the elapsed minutes since the message of activated in Section 18.4. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / signControl / dmsMessageTimeRemaining.0.

- dmsMessageTimeRemaining: \_\_\_\_\_

2. Record the current time in the space below. Calculate the elapsed minutes since the time was recorded in Section 18.4. Verify that the dmsMessageTimeRemaining Object is correct.

\_\_\_ : \_\_\_ : \_\_\_ (h:m:s)

2. Repeat this procedure using different durations.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 16.8 Get dmsMsgSourceMode Object

1. Get the dmsMsgSourceMode.0 Object. The value received should be a Decimal value of “8” (central). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / signControl / dmsMsgSourceMode.0.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 16.9 Get dmsMemoryMgmt Object

1. Get the dmsMemoryMgmt.0 Object. The value received should be a Decimal value of “2” (normal). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / signControl / dmsMemoryMgmt.0.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 16.10 Activate Message Error

1. Set the dmsMessageStatus.3.1 Object to a Decimal value of “6” (modifyReq). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
2. Set the dmsMessageMultiString.3.1 Object to an ASCII String of “MESSAGE ERROR”. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageMultiString.X.
3. Set the dmsMessageStatus.3.1 Object to a Decimal value of “7” (validateReq). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
4. Get the dmsMessageStatus.3.1 Object. The Decimal value of this particular object may have different values depending on the processing speed of the device and the complexity of the messageMultiString. If the value is 3 (validating), repeat this test, if the value is 4 (valid), the message content has been validated successfully, and if the value is 5 (error), the message content had some error and the message text cannot be used. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageRunTimePriority.X.





iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / signControl / dmsMsgTableSource.0. Record the received value in the space provided below.

\_\_\_ , \_\_\_ \_\_ , \_\_\_ \_\_ ( Memory Type, Message Number, Message CRC )

This value and the value recorded in 2 should match.

2. Set the dmsTimeCommLoss.0 Object to a Decimal Value of “50400” (35 days). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / signControl / dmsTimeCommLoss.0.
3. Set the dmsMessageStatus.3.1 Object to a Decimal value of “6” (modifyReq). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
4. Set the dmsMessageMultiString.3.1 Object to an ASCII String of “ACTIVATE MESSAGE”. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageMultiString.X.
5. Set the dmsMessageStatus.3.1 Object to a Decimal value of “7” (validateReq). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
6. Get the dmsMessageStatus.3.1 Object. The Decimal value of this particular object may have different values depending on the processing speed of the device and the complexity of the messageMultiString. If the value is 3 (validating), repeat this test, if the value is 4 (valid), the message content has been validated successfully, and if the value is 5 (error), the message content had some error and the message text cannot be used. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageRunTimePriority.X.
7. Before setting the dmsActivateMessage Object, activate another application called "DMS.exe". This application will provide the appropriate value needed to activate the message that is already stored within the VMS Controller.

Enter the following values:

Duration:	10 (expresses the time in minutes that a message is to be displayed)
ActivatePriority:	255 (highest priority to ensure that message will always start)
MessageMemoryType:	3
MessageNumber:	1
MessageMultiString:	ACTIVATE MESSAGE(needed to determine the MessageCRC)
MessageCRC:	xxxx (determined automatically by the software)
SourceAddress:	1 (transmitted as 4-byte IP Address, set to a fictitious value in this example)

Now, set the dmsActivateMessage Object to the Hexadecimal string found in the “Output String” field of “DMS.exe”. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / signControl / dmsActivateMessage.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 17.3 End Duration Message

1. Set the dmsEndDurationMessage.0 Object to message type 2 and message number 3 (“line” test pattern for testing module rows). Record the object value in the space provided below. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / signControl / dmsEndDurationMessage.0.

\_\_\_\_, \_\_\_\_ \_\_\_\_, \_\_\_\_ \_\_\_\_ ( Memory Type, Message Number, Message CRC )

2. Set the dmsMessageStatus.3.1 Object to a Decimal value of “6” (modifyReq). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
3. Set the dmsMessageMultiString.3.1 Object to an ASCII String of “TESTING DURATION”. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageMultiString.X.
4. Set the dmsMessageStatus.3.1 Object to a Decimal value of “7” (validateReq). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
5. Get the dmsMessageStatus.3.1 Object. The Decimal value of this particular object may have different values depending on the processing speed of the device and the complexity of the messageMultiString. If the value is 3 (validating), repeat this test, if the value is 4 (valid), the message content has been validated successfully, and if the value is 5 (error), the message content had some error and the message text cannot be used. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageRunTimePriority.X.
6. Before setting the dmsActivateMessage Object, activate another application called "DMS.exe". This application will provide the appropriate value needed to activate the message that is already stored within the VMS Controller.

Enter the following values:

Duration:	1 (expresses the time in minutes that a message is to be displayed)
ActivatePriority:	255 (highest priority to ensure that message will always start)
MessageMemoryType:	3
MessageNumber:	1
MessageMultiString:	TESTING DURATION(needed to determine the MessageCRC)



- Get the dmsValidateMessageError.0 Object. The Decimal value received should be “5” (syntaxMULTI). The tree path is: iso / organization / dod / internet / private / experimentalenterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsValidateMessageError.X.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 18. Pixel Service Conformance Group Tests

### 18.1 Get Pixel Service Objects

- Get and record the following objects in a single query:

Note: Each of these objects has a base tree path of: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / signControl /.

- vmsPixelServiceDuration: \_\_\_\_\_
- vmsPixelServiceFrequency: \_\_\_\_\_
- vmsPixelServiceTime: \_\_\_\_\_

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 19. Illumination / Brightness Conformance Group Tests

### 19.1 Get Illumination / Brightness Entries

- Get the following objects in a single query:

Note: Each of these objects has a base tree path of: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / illum /.

- dmsIllumMaxPhotocellLevel: \_\_\_\_\_
- dmsIllumNumBrightLevels: \_\_\_\_\_

<b>TEST RESULTS:</b>		
<input type="checkbox"/>	PASS	<input type="checkbox"/>
FAIL		
<u>Notes:</u>		
_____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 19.2 Test Manual Dimming

1. Set the dmsIllumControl Object to a Decimal value of “4” (manual). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / illum / dmsIllumControl.
2. Set the dmsIllumManLevel Object to a Decimal value of “255” (100%). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / illum / dmsIllumManLevel.
3. Get the dmsIllumBrightStatus.0 Object. The Decimal value received should be a value of “170” or 67% (Daktronics Scaler) x 255 => 170. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / illum / dmsIllumBrightStatus.0.
4. Select a manual dimming level ranging form 0-255 and set the dmsIllumManLevel Object. Record the selected level in the space below.
  - Manual Dimming Level \_\_\_\_\_
5. Get the dmsIllumBrightStatus.0 Object. Record the Decimal value in the space below and calculate the expected value. Verify that these values are equal.
  - dmsIllumBrightStatus.0 \_\_\_\_\_

Calculation: 67% x Manual Dimming Level (recorded in step 4) = > \_\_\_\_\_



<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 20. Scheduling Conformance Group Tests (Global and DMS)

### 20.1 Set Schedule - Monday-Friday

#### 20.1.1 Create Message

1. Verify that daylight savings is disabled on the display (set it to 2). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime / globalDayLightSavings.0
2. Set the globalLocalTimeDifferentialParameter to a value of 0. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime / globalLocalTimeDifferentialParameter.0
3. Set the dmsMessageStatus.3.1 Object to a Decimal value of “6” (modifyReq). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
4. Set the dmsMessageMultiString.3.1 Object to an ASCII String of “M-F [f2,5] [f9,2]/[f8,2]/[f10,2]” (24 hour format time, month, day, 2 digit year). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageMultiString.X.
5. Set the dmsMessageRunTimePriority.3.1 Object to a decimal value of “100”. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
6. Set the dmsMessageStatus.3.1 Object to a Decimal value of “7” (validateReq). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
7. Get the dmsMessageStatus.3.1 Object. The Decimal value of this particular object may have different values depending on the processing speed of the device and the complexity of the messageMultiString. If the value is 3 (validating), repeat this test, if the value is 4 (valid), the message content has been validated successfully, and if the value is 5 (error), the message content had some error and the message text cannot be used. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.

8. Activate another application called "DMS.exe". This application will provide the appropriate value needed for the scheduler.

Enter the following values:

Duration: 10 (expresses the time in minutes that a message is to be displayed)  
 ActivatePriority: 255 (highest priority to ensure that message will always start)  
 MessageMemoryType: 3  
 MessageNumber: 1  
 MessageMultiString: M-F [f2,5] [f9,2]/[f8,2]/[f10,2](needed to determine the MessageCRC)  
 MessageCRC: xxxx(determined automatically by the software)  
 SourceAddress: 1 (transmitted as 4-byte IP Address, set to a fictitious value in this example)

Record the Hexadecimal string found in the "Output String" field of "DMS.exe" in the space provided below. This string will be used later in this test.

\_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_

(Duration, ActivatePriority, MsgMemoryType, MessageNumber, MessageCRC, SourceAddress)

### 20.1.2 Set dmsActionTable Entry

1. Get the numActionTableEntries.0 object. Record the value in the space provided below. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsSchedule / numActionTableEntries.

- numActionTableEntries: \_\_\_\_\_
- Set the dmsActionMsgCode.1 object to a value of the MsgMemoryType, MessageNumber, and MessageCRC recorded above in Step 5 of the previous test. The tree path of: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsSchedule / dmsActionTable / dmsActionEntry.

### 20.1.3 Set timeBaseDayPlanTable Table Entry

1. Get the maxDayPlans.0 Object. Record the value in the space provided below. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / timebase / maxDayPlans.

- maxDayPlans: \_\_\_\_\_

2. Get the maxDayPlanEvents.0 Object. Record the value in the space provided below. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / timebase / maxDayPlanEvents.

- maxDayPlanEvents: \_\_\_\_\_

3. Set the following timeBaseSchedule Table entries:

Note: Each of these objects has a base tree path of: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / timebase / timeBaseDayPlanTable / timeBaseDayPlanEntry /.

- Set the dayPlanHour.1.1 Object to a Decimal value of “0”.
- Set the dayPlanMinute.1.1 Object to a Decimal value of “0”.
- Set the dayPlanActionNumberOID.1.1 Object to the OID 1.3.6.1.4.1.1206.4.2.3.8.2.1.1.1.0

#### 20.1.4 Set timeBaseSchedule Table Entry

1. Get the maxTimeBaseScheduleEntries.0 Object. Record the value in the space provided below. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / timebase / maxTimeBaseScheduleEntries.

- maxTimeBaseScheduleEntries: \_\_\_\_\_

2. Set the following timeBaseSchedule Table entries:

Note: Each of these objects has a base tree path of: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / timebase / timeBaseScheduleTable / timeBaseScheduleEntry /.

- Set the timeBaseScheduleMonth.1 Object to a Hexadecimal value of “1F FE” (or 8090 decimal) to select all months.
  - Set the timeBaseScheduleDay.1 Object to a Hexadecimal value of “7C” (or 124 decimal) to select Monday through Friday.
  - Set the timeBaseScheduleDate.1 Object to a Hexadecimal value of “FF FE” (or 65534 decimal) to select the 1<sup>st</sup> through 15<sup>th</sup> days of the month.
  - Set the timeBaseScheduleDayPlan.1 Object to a Decimal value of “1” (dayPlan number 1).
1. Set the globalTime Object to a decimal value of “920851139” (equals in seconds difference between 11:59PM of March 7,1999 (Sunday Night) from midnight of January 1, 1970). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime / globalTime.0.
  2. Wait approximately one minute and verify that the message is displayed.
  3. Set the globalTime Object to a decimal value of “921283139” (equals in seconds the difference between 11:59PM of March 12, 1999 (Friday) from midnight of January 1, 1970). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime / globalTime.0.
  4. Wait approximately one minute and verify that the scheduled message is stopped. The message that running prior to the scheduled message will now run or the sign will be blank.

- Set the globalTime Object to a decimal value of “921542400” (equals in seconds difference between 12:00PM of March 16,1999 from midnight of January 1, 1970). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime / globalTime.0.

<b>TEST RESULTS:</b>		
<input type="checkbox"/>	PASS	<input type="checkbox"/>
	FAIL	
<b>Notes:</b>		
_____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 20.2 Set Schedule - Single Day (Jan 1)

### 20.2.1 Create Message

- Set the dmsMessageStatus.3.2 Object to a Decimal value of “6” (modifyReq). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
- Set the dmsMessageMultiString.3.2 Object to an ASCII String of “[f2,5] [f9,2]/[f8,2]/[f10,2]” (24 hour format time, month, day, 2 digit year). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageMultiString.X.
- Set the dmsMessageRunTimePriority.3.2 Object to a decimal value of “100”. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
- Set the dmsMessageStatus.3.2 Object to a Decimal value of “7” (validateReq). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
- Get the dmsMessageStatus.3.2 Object. The Decimal value of this particular object may have different values depending on the processing speed of the device and the complexity of the messageMultiString. If the value is 3 (validating), repeat this test, if the value is 4 (valid), the message content has been validated successfully, and if the value is 5 (error), the message content had some error and the message text cannot be used. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsMessage / dmsMessageTable / dmsMessageEntry / dmsMessageStatus.X.
- Activate another application called "DMS.exe". This application will provide the appropriate value needed for the scheduler.

Enter the following values:

Duration: 10 (expresses the time in minutes that a message is to be displayed)

---

ActivatePriority:	255 (highest priority to ensure that message will always start)
MessageMemoryType:	3
MessageNumber:	2
MessageMultiString:	[f2,5] [f9,2]/[f8,2]/[f10,2](needed to determine the MessageCRC)
MessageCRC:	xxxx(determined automatically by the software)
SourceAddress:	1 (transmitted as 4-byte IP Address, set to a fictitious value in this example)

Record the Hexadecimal string found in the “Output String” field of “DMS.exe” in the space provided below. This string will be used later in this test.

\_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_

(Duration, ActivatePriority, MsgMemoryType, MessageNumber, MessageCRC, SourceAddress)

### 20.2.2 Set dmsActionTable Entry

1. Set the following dmsActionTable Table entries:

Note: Each of these objects has a base tree path of: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsSchedule / dmsActionTable / dmsActionEntry.

- Set the dmsActionMsgCode.2 Object to a value of the MsgMemoryType, MessageNumber, and MessageCRC recorded in Step 5.

### 20.2.3 Set timeBaseDayPlanTable Table Entry

1. Set the following timeBaseSchedule Table entries:

Note: Each of these objects has a base tree path of: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / timebase / timeBaseScheduleTable / timeBaseScheduleEntry /.

- Set the dayPlanHour.2.1 Object to a Decimal value of “0”.
- Set the dayPlanMinute.2.1 Object to a Decimal value of “0”.
- Set the dayPlanActionNumberOID.2.1 Object to the OID 1.3.6.1.4.1.1206.4.2.3.8.2.1.1.2.0

### 20.2.4 Set timeBaseSchedule Table Entry

1. Set the following timeBaseSchedule Table entries:

Note: Each of these objects has a base tree path of: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / timebase / timeBaseScheduleTable / timeBaseScheduleEntry /.

- Set the timeBaseScheduleMonth.2 Object to a Hexadecimal value of “2” to select the month of January.

- Set the timeBaseScheduleDay.2 Object to a Hexadecimal value of “FE” for everyday day of the week.
  - Set the timeBaseScheduleDate.2 Object to a Hexadecimal value of “2” for the 1<sup>st</sup> day of the month.
  - Set the timeBaseScheduleDayPlan.2 Object to a Decimal value of “2” (dayPlan number 2).
1. Set to set the globalTime Object to a decimal value of “946684739” (equals in seconds the difference between 11:59PM of December 31, 1999 from midnight of January 1, 1970). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime / globalTime.0.
  2. Wait approximately one minute and verify that the message is displayed.
  3. Now, set to set the globalTime Object to a decimal value of “946771139” (equals in seconds the difference between 11:59PM of January 1, 2000 from midnight of January 1, 1970). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime / globalTime.0.
  4. The message should remain on the sign for approximately one minute and then stop.

<b>TEST RESULTS:</b>	<input type="checkbox"/>	PASS	<input type="checkbox"/>	FAIL
<u>Notes:</u>				
_____				
_____				
_____				
_____	_____	_____		
Tester	Date	Time		

### 20.3 Set Schedule - Seasonal (St. Patrick’s Day)

1. Set the following timeBaseSchedule Table entries:

Note: Each of these objects has a base tree path of: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / timebase / timeBaseScheduleTable / timeBaseScheduleEntry /.

- Set the timeBaseScheduleMonth.3 Object to a Hexadecimal value of “8” for the month of March.
- Set the timeBaseScheduleDay.3 Object to a Hexadecimal value of “FE” (or 254 decimal) for everyday of the week.
- Set the timeBaseScheduleDate.3 Object to a Hexadecimal value of “20000” (or 131072 decimal) for the 17<sup>th</sup> day of the month.



2. Wait approximately one minute and verify that the message is displayed.
3. Now, set to set the globalTime Object to a decimal value of “1057363139” (equals in seconds roughly the difference between 11:59PM of July 4, 2003 from midnight of January 1, 1970). The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / global / globalTimeManagement / globalTime / globalTime.0.

Note: If July 5<sup>th</sup> was the current date the day would be Wednesday and message one would still run because of schedule one. This is the reason year 2003 was chosen.

4. The message should remain on the sign for approximately one minute and then stop.
5. Repeat steps 1-5, but change the message run date to Friday July 3, 1998.
6. Repeat steps 1-5, but change the message run date to Monday July 5, 1999.

<b>TEST RESULTS:</b>		
<input type="checkbox"/>	PASS	<input type="checkbox"/>
FAIL		
<u>Notes:</u>		
_____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 21. Auxiliary I/O Conformance Group Tests

### 21.1 Get Max Table Entries

1. Get and record the following objects in a single query:

Note: Each of these objects has a base tree path of: iso / organization / dod / internet / private / experimental / exp-global / auxiliaryIO /.

- maxAuxIODigital: \_\_\_\_\_
- maxAuxIOAnalog: \_\_\_\_\_

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 21.2 Get Digital Table Entries

1. Select one digital table entry and record the values ( X = \_\_\_ )::

These objects are based on the hardware configuration of the sign. The auxDescriptions may be any of the following:

DCOKXX-XXX	Power Supply Status
SWCHXX-XXX	Thumbwheel Switch
SACTXX-XXX	Thumbwheel Activation
BECNXX-XXX	Beacons
FANSXX-XXX	Fans
DOORXX-XXX	Door Status
UNUSED	I/O Not Used

**Note:** Each of these objects has a base tree path of: iso / organization / dod / internet / private / experimental / exp-global / auxiliaryIO / auxIOTable / auxIOEntry /.

- auxPortType.3.X: \_\_\_\_\_
- auxPortNumber.3.X: \_\_\_\_\_
- auxDescription.3.X: \_\_\_\_\_
- auxResolution.3.X: \_\_\_\_\_
- auxValue.3.X: \_\_\_\_\_
- auxPortDirection.3.X: \_\_\_\_\_

2. Select one additional digital table entry and record the values ( X = \_\_\_ ):

**Note:** Each of these objects has a base tree path of: iso / organization / dod / internet / private / experimental / exp-global / auxiliaryIO / auxIOTable / auxIOEntry /.

- auxPortType.3.X: \_\_\_\_\_
- auxPortNumber.3.X: \_\_\_\_\_
- auxDescription.3.X: \_\_\_\_\_
- auxResolution.3.X: \_\_\_\_\_
- auxValue.3.X: \_\_\_\_\_
- auxPortDirection.3.X: \_\_\_\_\_

**TEST RESULTS:**     PASS     FAIL

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

\_\_\_\_\_

Tester                                  Date                                  Time

### 21.3 Get Analog Table Entries

1. Select one analog table entry and record the values ( X = \_\_\_ ):

These objects are based on the hardware configuration of the sign. The auxDescriptions may be any of the following:

- Device # - I/O Board Address
- TEMPXX-XXX                  Temperature Sensor
- LGHTXX-XXX                  Light Sensor
- UNUSED                          I/O Not Used

**Note:** Each of these objects has a base tree path of: iso / organization / dod / internet / private / experimental / exp-global / auxiliaryIO / auxIOTable / auxIOEntry /.

- auxPortType.2.X: \_\_\_\_\_
- auxPortNumber.2.X: \_\_\_\_\_

- auxDescription.2.X: \_\_\_\_\_
- auxResolution.2.X: \_\_\_\_\_
- auxValue.2.X: \_\_\_\_\_
- auxPortDirection.2.X: \_\_\_\_\_

2. Select one additional analog table entry and record the values ( X = \_\_\_ ):

**Note:** Each of these objects has a base tree path of: iso / organization / dod / internet / private / experimental / exp-global / auxiliaryIO / auxIOTable / auxIOEntry /.

- auxPortType.2.X: \_\_\_\_\_
- auxPortNumber.2.X: \_\_\_\_\_
- auxDescription.2.X: \_\_\_\_\_
- auxResolution.2.X: \_\_\_\_\_
- auxValue.2.X: \_\_\_\_\_
- auxPortDirection.2.X: \_\_\_\_\_

**TEST RESULTS:**     PASS     FAIL

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

\_\_\_\_\_                      \_\_\_\_\_                      \_\_\_\_\_  
 Tester                                      Date                                      Time

## 22. Sign Status Conformance Group Tests

### 22.1 Get Multi Field Table Entries

1. Get the statMultiFieldRows.0 Object. Record the value in the space provided below. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsStatus / statMultiFieldRows.0.

- statMultiFieldRows: \_\_\_\_\_

2. Get and verify the following multi field table entries

Note: Each of these objects has a base tree path of: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsStatus / statMultiFieldTable / statMultiFieldEntry.

- stateMultiCurrentFieldValue.1: \_\_\_\_\_ (12 hour time format)
- stateMultiCurrentFieldValue.2: \_\_\_\_\_ (24 hour time format)

1. Select a one addition multi field table entry and get and record the values ( X = \_\_\_ ):

- statMultiFieldIndex.X: \_\_\_\_\_
- statMultiFieldCode.X: \_\_\_\_\_
- stateMultiCurrentFieldValue.X: \_\_\_\_\_

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 22.2 Get dmsCurrentSpeed

1. Get and record the dmsCurrentSpeed.0 Object. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsStatus / dmsCurrentSpeed.

- dmsCurrentSpeed.0: \_\_\_\_\_

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 22.3 Get dmsCurrentSpeedLimit

1. Get and record the dmsCurrentSpeedLimit.0 Object. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsStatus / dmsCurrentSpeed.

- dmsCurrentSpeedLimit.0: \_\_\_\_\_

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 22.4 Get watchdogFailureCount

1. Get and record the watchdogFailureCount.0 Object.

- watchdogFailureCount.0: \_\_\_\_\_

2. Reset the field controller.

3. Get and record the watchdogFailureCount.0 Object. The Decimal value should be incremented by 1.

- watchdogFailureCount.0: \_\_\_\_\_

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 23. Pixel Error Status Subconformance Group

### 23.1 Good Pixel Test

1. Get and record the pixelFailureTableNumRows.0 Object. If the number of bad pixels exceeds this value during the test, the test will stop and report the bad pixels. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsStatus / StatError.

- pixelFailureTableNumRows.0: \_\_\_\_\_

2. Set the pixelTestActivation Object to a Decimal value of “3” (test). The sign should begin the pixel test and take several minutes to complete. The tree path is: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsStatus / StatError / pixelTestActivation.

- Verify that no bad pixels were reported by getting the first entry of the table. Each pixelFailureXLocation and pixelFailureYLocation Object should have a value of 0.

Note: Each of these objects has a base tree path of: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsStatus / StatError / pixelFailureTable / pixelFailureEntry.

- pixelFailureXLocation.2.1: \_\_\_\_\_
- pixelFailureYLocation.2.1: \_\_\_\_\_
- pixelFailureStatus.2.1: \_\_\_\_\_

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
<u>Notes:</u> _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

### 23.2 Bad Pixel Test

- Disconnect a pixel board from the sign and repeat the pixel test by setting the pixelTestActivation Object to a Decimal value of “3” (test).
- Verify that bad pixels were reported at the appropriate X,Y positions by getting several entries of the table.

( X = \_\_\_ ):

- pixelFailureXLocation.2.X: \_\_\_\_\_
- pixelFailureYLocation.2.X: \_\_\_\_\_
- pixelFailureStatus.2.X: \_\_\_\_\_

( X = \_\_\_ ):

- pixelFailureXLocation.2.X: \_\_\_\_\_
- pixelFailureYLocation.2.X: \_\_\_\_\_
- pixelFailureStatus.2.X: \_\_\_\_\_

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## 24. Temperature Status Subconformance Group Tests

### 24.1 Get Temperatures

1. Get the following objects in a single query:

Note: Each of these objects has a base tree path of: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsStaus / statTemp /.

- tempMinAmbient: \_\_\_\_\_
- tempMaxAmbient: \_\_\_\_\_
- tempMinSignHousing: \_\_\_\_\_
- tempMaxSignHousing: \_\_\_\_\_

1. Alter the temperature and query the object again:

Note: Each of these objects has a base tree path of: iso / organization / dod / internet / private / enterprises / nema / transportation / devices / dms / dmsStaus / statTemp /.

- tempMinAmbient: \_\_\_\_\_
- tempMaxAmbient: \_\_\_\_\_
- tempMinSignHousing: \_\_\_\_\_
- tempMaxSignHousing: \_\_\_\_\_

Verify that the temperatures have changed.

<b>TEST RESULTS:</b> <input type="checkbox"/> PASS <input type="checkbox"/> FAIL		
Notes: _____		
_____		
_____		
_____	_____	_____
Tester	Date	Time

## Appendix A - Illumination Table

Photocell Reading / Sign Light Level

1-1	1	313-327	28	897-912	55	1391-1408	82	1882-1900	109
2-2	2	328-341	29	913-958	56	1409-1425	83	1901-1919	110
3-3	3	342-362	30	959-976	57	1426-1443	84	1920-1938	111
4-4	4	363-375	31	977-995	58	1444-1461	85	1939-1957	112
5-5	5	376-387	32	996-1016	59	1462-1479	86	1958-1976	113
6-6	6	388-407	33	1017-1033	60	1480-1496	87	1977-1995	114
7-7	7	408-418	34	1034-1049	61	1497-1514	88	1996-2014	115
8-8	8	419-433	35	1050-1066	62	1515-1532	89	2015-2034	116
9-10	9	434-447	36	1067-1083	63	1533-1550	90	2035-2053	117
11-15	10	448-453	37	1084-1099	64	1551-1568	91	2054-2072	118
16-20	11	454-467	38	1100-1116	65	1569-1586	92	2073-2092	119
21-25	12	468-502	39	1117-1133	66	1587-1604	93	2093-2111	120
26-30	13	503-529	40	1134-1150	67	1605-1622	94	2112-2130	121
31-39	14	530-547	41	1151-1167	68	1623-1641	95	2131-2150	122
40-50	15	548-586	42	1168-1183	69	1642-1659	96	2151-2169	123
51-62	16	587-605	43	1184-1200	70	1660-1677	97	2170-2189	124
63-79	17	606-623	44	1201-1217	71	1678-1695	98	2190-2208	125
80-107	18	624-651	45	1218-1235	72	1696-1714	99	2209-2228	126
108-134	19	652-672	46	1236-1252	73	1715-1732	100	2229-2248	127
135-161	20	673-704	47	1253-1269	74	1733-1751	101	2249-2267	128
162-187	21	705-727	48	1270-1286	75	1752-1769	102	2268-2287	129
188-212	22	728-783	49	1287-1303	76	1770-1788	103	2288-2307	130
213-237	23	784-798	50	1304-1321	77	1789-1806	104	2308-2327	131
238-262	24	799-812	51	1322-1338	78	1807-1825	105	2328-2347	132
263-286	25	813-839	52	1339-1355	79	1826-1844	106	2348-2367	133
287-301	26	840-854	53	1356-1373	80	1845-1863	107	2368-2387	134
302-312	27	855-896	54	1374-1390	81	1864-1881	108	2388-2407	135

---

2408-2427 136	2897-2917 160	3398-3418 184	3898-3917 208	4381-4400 232
2428-2447 137	2918-2938 161	3419-3439 185	3918-3938 209	4401-4420 233
2448-2467 138	2939-2959 162	3440-3460 186	3939-3958 210	4421-4439 234
2468-2487 139	2960-2979 163	3461-3481 187	3959-3979 211	4440-4459 235
2488-2507 140	2980-3000 164	3482-3502 188	3980-3999 212	4460-4478 236
2508-2527 141	3001-3021 165	3503-3523 189	4000-4020 213	4479-4498 237
2528-2548 142	3022-3042 166	3524-3544 190	4021-4040 214	4499-4517 238
2549-2568 143	3043-3063 167	3545-3565 191	4041-4060 215	4518-4536 239
2569-2588 144	3064-3084 168	3566-3586 192	4061-4081 216	4537-4555 240
2589-2609 145	3085-3104 169	3587-3606 193	4082-4101 217	4556-4575 241
2610-2629 146	3105-3125 170	3607-3627 194	4102-4121 218	4576-4594 242
2630-2649 147	3126-3146 171	3628-3648 195	4122-4141 219	4595-4613 243
2650-2670 148	3147-3167 172	3649-3669 196	4142-4161 220	4614-4632 244
2671-2690 149	3168-3188 173	3670-3690 197	4162-4181 221	4633-4651 245
2691-2711 150	3189-3209 174	3691-3711 198	4182-4202 222	4652-4670 246
2712-2731 151	3210-3230 175	3712-3731 199	4203-4222 223	4671-4689 247
2732-2752 152	3231-3251 176	3732-3752 200	4223-4242 224	4690-4708 248
2753-2772 153	3252-3272 177	3753-3773 201	4243-4262 225	4709-4726 249
2773-2793 154	3273-3293 178	3774-3794 202	4263-4281 226	4727-4745 250
2794-2814 155	3294-3314 179	3795-3814 203	4282-4301 227	4746-4764 251
2815-2834 156	3315-3335 180	3815-3835 204	4302-4321 228	4765-4782 252
2835-2855 157	3336-3356 181	3836-3855 205	4322-4341 229	4783-4801 253
2856-2876 158	3357-3376 182	3856-3876 206	4342-4361 230	4802-4820 254
2877-2896 159	3377-3397 183	3877-3897 207	4362-4380 231	4821-16000 255