

Intelligent Transportation Systems

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CTMS/CTIS

UC CTMS 3.51 - Test DMS Pixels

Version 1.5

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Revision History

Date	Version	Description	Author
April 30, 2004	1.0	Initial Version	Raj Chaudhuri
May 4, 2004	1.1	Added Flows and Data elements	Raj Chaudhuri
June 22, 2004	1.2	Updated flows. Added special requirements. Added NTCIP MIB information to the data elements section. Added issues	Raj Chaudhuri
July 13, 2004	1.2	Clarified alarm tasks	Raj Chaudhuri
July 20, 2004	1.3	Added instruction priority	Raj Chaudhuri
July 21, 2004	1.3	Added online attribute special requirement	Raj Chaudhuri
July 27, 2004	1.4	Changed Online attribute to Offline status	Raj Chaudhuri
August 17, 2004	1.4	Added New to Special Requirement #4	Raj Chaudhuri
September 13, 2004	1.4	Fixed typo in step 5.4.1	Raj Chaudhuri
November 2, 2004	1.5	Changed Pixel MIBs from NTCIP standard ones to using Skyline specific ones as the error bits and status are more detailed Removed Pixel X Y coordinated fields. Updated flows accordingly	Raj Chaudhuri
November 30, 2004	1.5	Updated data elements – noted the status we care about. Added assumption regarding sign configuration and true feedback	Raj Chaudhuri
January 13, 2005	1.5	Changed reference to user clicking on Execute Pixel Test to be 'Poll', and added verbiage that the pixel test is included in poll.	Nancie Fay
January 14, 2005	1.5	Removed all references to alarms and UC Add Alarm	Nancie Fay

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1. Use Case

1.1 Abstract

A user is able exercises the pixels on a DMS. Upon request, the system performs a pixel test and presents the results to the user (on the Poll DMS screen)

1.2 Actor(s)

Actor	Description
Administrator	The System Administrator for the Colorado Transportation Management Center (CTMC)
Maintenance	The Maintenance person on duty for the Colorado Transportation Management Center (CTMC)
Operator	The Operator on duty for the Colorado Transportation Management Center (CTMC)

2. Flow of Events

2.1 Basic Flow

1. The user is currently viewing the status of a DMS and the DMS Technology is LED or Lamp based (and not Fiber based) (see Pre-condition).
2. The user clicks on Poll.
3. The system submits an instruction to perform a poll including a pixel test for this particular sign (see UC Issue Device Instruction for details).
4. The system waits for the instruction to return.
5. The system receives a successful message.
6. The system logs this event. It passes the following elements to UC Log User Activity: Task Name (Executed Pixel Test), Time (current time), Owner (logged in user), ID (DMS Device ID), Device Type (DMS Device Type), Message Text (blank), Username (blank), Instruction ID (Task instruction ID), Notes (blank).
7. The system saves the data along with the Pixel Test time (current time on the system).
8. The system displays the pixel test data on the DMS status screen. The system presents the following data: Number of Pixel errors, Pixel Test Time. The system provides the ability to see the results in the Poll DMS Screen. In the event the number of Pixel Errors is greater than 0, the system sets the status of this to 'Service'. If the number of Pixel Errors is 0, and there are no other errors for the sign (such as Power error etc), the system sets the status of the sign to 'OK'.
9. The user clicks on the View Pixel Test.
10. The system renders one view of all the pixels bit map patterns provided by the DMS. It renders them based on the state they are in: Pixel Ok, ½ Stuck Off, Stuck Off, ½ Stuck On, Stuck On. Refer to Special Requirements for more. The system provides a way to close this window.
11. The user closes this window.
12. The system returns the user to the View DMS status screen.

2.2 Alternate Flow

1. The user is currently viewing the status of a DMS and the DMS Technology is LED or

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- Lamp based (and not Fiber based) (see Pre-condition).
2. The user clicks on Poll.
3. The system submits an instruction to perform a poll including a pixel test for this particular sign (see UC Issue Device Instruction, UC Poll DMS for details).
4. The system waits for the instruction to return.
5. The system receives a successful message.
 - 5.1. In the event the instruction does not return within the timeout period, the system logs this event with the additional data that this task was not successful.
 - 5.2. The state of the device is set to 'FAILED'.
 - 5.3. Go to end.
 - 5.3.1. In the event there is an error generated the system logs this event with the additional data that this task was not successful.
 - 5.3.2. The state of the device is set to 'FAILED'
 - 5.3.3. Go to end.
6. The system logs this event. It passes the following elements to UC Log User Activity: Task Name (Executed Pixel Test), Time (current time), Owner (logged in user), ID (DMS Device ID), Device Type (DMS Device Type), Message Text (blank), Username (blank), Instruction ID (Task instruction ID), Notes (blank).
7. The system saves the data along with the Pixel Test time (current time on the system)
8. The system displays the pixel test data on the DMS status screen. The system presents the following data: Number of Pixel errors, Pixel Test Time. The system provides the ability to see the results in the Poll DMS Screen. In the event the number of Pixel Errors is greater than 0, the system sets the status of this to 'Service'. If the number of Pixel Errors is 0, and there are no other errors for the sign (such as Power error etc), the system sets the status of the sign to 'OK'.
9. The user clicks on the View Pixel Test.
10. The system renders one view of all the pixels bit map patterns provided by the DMS. It renders them based on the state they are in: Pixel Ok, ½ Stuck Off, Stuck Off, ½ Stuck On, Stuck On. Refer to Special Requirements for more. The system provides a way to close this window.
11. The user closes this window.
12. The system returns the user to the View DMS status screen.

3. Special Requirements

1. The system displays the pixels in different statuses (failure modes and ok) using colors. The following are just samples. During implementation, the final colors will be chosen:
 - Pixel Ok (black – i.e. blank with grey border)
 - ½ Stuck Off (brown)
 - Stuck Off (red)
 - ½ Stuck On (orange)
 - Stuck On (yellow)
2. Pixel Test will ONLY occur for LED, Lamp based DMS Technology. This will not be provided for Fiber based DMSs
3. This task will always have the priority of 'medium' when issued by a user
4. This task can only be performed on devices whose status is NOT Offline and NOT New

4. Assumptions

1. The application will render the True Feedback and Pixel Test Results based on the configuration of the sign in the CTMS system itself (hence, based on the settings read in during the most recent Read from Sign). If the sign's configuration is changed and a Read from Sign has not been performed, the rendering may be incorrect

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5. Pre-Conditions

UC CTMS 3.50 – Poll DMS

UC CTMS 3.00 – Control DMS (has elected to View Status on a DMS)

6. Post-Conditions

Pixel test is performed on a DMS

7. Extension Points

UC CTMS 4.10 – Issue Device Instruction

UC CTMS 8.10 – Log User Activity

8. Issues / Constraints / Questions

9. Data Elements

Name	Description	Validation	Standard NTCIP Tag?	NTCIP / Skyline Tag Name & MIB info
Device ID	Sign ID	Not null	n/a	
Device Status	Status of the Sign. Refer to UC Poll DMS	Not null	n/a	
Pixel Test Time	The time the test was executed	Not null. Date/Time	N	pixelTestTime 1.3.6.1.4.1.1206.3.18.2.3.9.9
Number of Pixel Errors	Number of Pixel error This Skyline mib will list the number of pixel error sets (that correspond to a pixel failure set - pixelTestFailureData has the details)	Integer. Size=10	N	pixelFailureTableNumRows 1.3.6.1.4.1.1206.4.2.3.9.7.2 pixelFailureDetectionType 1.3.6.1.4.1.1206.4.2.3.9.7.3.1.1 (need to be of type PixelTest(2)) ← NTCIP MIBs that we will not use These are the Skyline ones we should use as they have more detailed data pixelTestFailureTableNumRows 1.3.6.1.4.1.1206.3.18.2.3.9.7 pixelTestFailureTable 1.3.6.1.4.1.1206.3.18.2.3.9.8
Pixel Failure Index	Enumerated listing of row entries	Integer. Size=10	N	pixelTestFailureEntry 1.3.6.1.4.1.1206.3.18.2.3.9.8.1 pixelTestFailureIndex 1.3.6.1.4.1.1206.3.18.2.3.9.8.1.1

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Pixel Status	<p>This data string contains from 1 to 50 pixel test failure 'sets'. A set is a single type of pixel error (ie. stuck on) that exists in a specified number of contiguous pixels. In this case, contiguous pixels are found by rows of pixels within a single module, left to right then top to bottom, and then by rows of modules, left to right then top to bottom. Some manufacturers refer to a module as a character module.</p> <p>A single pixel test error set is comprised of 5 bytes as follows:</p> <p>Bytes 1 & 2: Offset of first pixel from upper left corner of sign Bytes 3 & 4: Number of contiguous pixels with same error type Byte 5: Error type or status (see below)</p> <p>Note that the first pixel offset is an integer value based on the same ordering of pixels as described for contiguous errors. The first pixel in the upper left corner of the sign is offset one (1).</p> <p>The error type or status is a bit pattern as follows:</p> <p>Bit 0 0: Full/Half-pixel A not stuck off / 1: Full/Half-pixel A stuck off Bit 1 0: Full/Half-pixel A not stuck on / 1: Full/Half-pixel A stuck on Bit 2 0: No Color Error / 1: Color Error Bit 3 0: no electrical error/ 1: electrical error Bit 4 0: no mechanical error / 1: mechanical error Bit 5 0: Full-pixel reporting (ignore bits 6-7) / 1: half-pixel reporting Bit 6 0: Half-pixel B not stuck off / 1: Half-pixel B stuck off Bit 7 0: Half-pixel B not stuck on / 1: Half-pixel B stuck on</p> <p>If the number of pixels with same error type is zero (0), it shall be interpreted as an indication that too many errors exist to be reported. Such a set (overflow set) may follow other sets which specify the maximum number of errors which the sign can support.</p> <p>The length of this data object in bytes is 5 times the number of pixel error sets</p> <p>Note. The system will access and report back on only the following statuses (bits): 0, 1, 5, 6, 7</p>	For each Pixel Failure String. Size=5 Not sure how big this needs to be (Value can range from 5 to 250) Not null	Y	pixelTestFailureData 1.3.6.1.4.1.1206.3.18.2.3.9.8.1.2
Short Error Status	<p>Bit 5=Pixel Error</p> <p>This field will set the status of the DMS. Refer to UC Poll DMS Data Elements</p>	Integer. Size=8 Not null	Y	shortErrorStatus 1.3.6.1.4.1.1206.4.2.3.9.7.1

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