Software Test Plan

DM3730/AM3703 SOM-LV & DM3730/AM3703 Torpedo SOM

Windows Embedded CE 6.0 Base BSP 3.0
Revision F

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History

Document Changes

The modifications that have been made to this document are listed in Table 1: History.

Date	Revision	Description	Author
07/26/2010	A	Initial revision	Dawn Edlund
09/09/2010	B	Updated WinCE version to 2.0.1, updated document revision to B, added new test per OMAP3WCE600-392.	Dawn Edlund
12/14/2010	C	Updated WinCE version to 2.1.0, updated document revision to C, added Performance Tests (OMAP3WCE600-457), added Test 20 documentation for the NAND Stress Test procedure, updates per OMAP3WCE600-470 and OMAP3WCE600-482. Additional update per OMAP3WCE600-379 (18.01.01 and Appendix B).	Dawn Edlund
03/03/2011	D	Updates per OMAP3WCE600-507: Updated LogicLoader version used to 2.4.14	Dawn Edlund
04/29/2011-06/09/2011		• moved test 03.10.01 to 03.05.1 where it should have been (forgot about placeholder) • Added tests: 23.01.01 04.02.08 15.02.08 03.10.01 • Removed blocked status for tests 04.03.04 and 15.03.04 in TPL. • Updated PERF-01-2 in TM to be covered by test 22.01.01 • Added test (04.02.08) for detect insertion / removal of USB device (MSD) • Changed a couple of OMAP35x to DM37x • Changes made to STP per: https://jira.logicpd.com/browse/DM37SQA-23	David Hoff
6/15/2011	E	Made a pass through for formatting, spelling. Added TODO for KITL test in section 16.	Dan Weaver
		Changes made to STP per: DM37SQA-38	David Hoff
07/18/2013	F	Changes made to STP per: DM37SQA-92 (1 - 21)	David Hoff

Table 1: History

Table of Contents

Subjects and Organization

Introduction

Purpose, Revision Control, Scope, Terminology and Acronyms, and References

Purpose

This document describes the software tests and software verification procedures for the DM37x Windows Embedded CE 6.0 Base BSP.

A primary benefit to the DM37x Windows Embedded CE 6.0 Base BSP platform is a flexible software architecture. While this approach greatly enhances manufacturability and flexibility, it is critical that each software component (and each model supported by the software) be tested fully before the software is released into the field. This document is meant to provide a structured approach to this testing.

Regression testing of this type is statistically significant in a single-unit sample size. These tests are intended to discover repeatable flaws in the software and validate the operation of every available software feature, every communication interface, and the ability of the software to correctly interpret external stimuli.

Besides this introduction, this document is broken into two main sections: functional tests and test support appendices. The appendices are merely present for the reference of the test operator.

Revision Control

This document was prepared by and is under revision control at Logic PD. Changes to this document are to be approved by the software team leader. Should an error be discovered within this document, this document may be updated while test execution is in progress. Should this document change while test execution is in progress, some test cases may be invalidated and repeated at the discretion of the project manager.

Scope

Testing efforts described here are limited to product tests of software only. It is understood that regression testing does not exhaustively test control algorithms and the durability of hardware components. This document is intended to augment a host of other tests that validate the items outside the scope of this document.

This document is meant to be a guideline for conducting a comprehensive test. While it is not practical to test every software scenario, the software test outlined here will yield an adequate investigation into the integrity of software that is to be released.

Software under test (SUT) includes several kernel binary images to be used throughout testing. See version-specific release notes for further information regarding specific binary images and hardware configurations tested.

Terminology and Acronyms

Key terms and acronyms used in this document are listed in Table 2: Terminology.

Term	Definition
/RESET	An input pin to the microcontroller that may be used to demand a software and hardware reset.
ACK/NACK	Command response: Acknowledge (ACK) / Negative Acknowledge (NACK).
DUT	Device under test
Errata Log	A detailed description of all “non-pass” test items, as recorded by the test operator.
JIRA	An issue tracking system used by Logic PD. (http://jira.logicpd.com/secure/BrowseProject.jspa?id=10120)
N/A	Not Applicable
Packet	A group of data sent in sequence from one node to another in a relatively short time.
PC	Personal computer
Test Progress Log	Also “Test Log”. A detailed description of test progress and results as recorded by the test operator.

Table 2: Terminology

Conventions

This document follows certain typographic conventions:

Convention	Description
Bold	Used in test procedures for commands, programs, and options. All terms shown in bold are typed literally.
Italic	Used in test procedures to show arguments and variables that should be replaced with user-supplied values. Italic is also used to introduce new terms, indicate filenames and directories, and to highlight comments in examples.
Bold Italic	Used in test procedures to indicate a particular key on the keyboard to be pressed.
`Constant Width`	Used in test procedures to show the contents of files or the output from commands.
`Constant Width Bold`	Used in test procedures to show commands or other text that should be typed literally by the user.
`Constant Width Italic`	Used in test procedures to show text that should be replaced with user-supplied values
`losh>`	Used in test procedures to show as the **LogicLoader** shell prompt (>).
[]	Square brackets orange in color with Rx-xxx enclosed are used in test procedures to indicate applicable SRS requirement tested in that particular test procedure.
//	When used following a command, text following // are comments.
< >	Used to indicate information to be replaced with user-supplied values. The <> should never be entered.
{}	When used with text light gray in color, indicates Clear Text. Clear Text is used in test procedures to provide addition information and/or clarification.

Table 3: Conventions

References

- DM37x_WinCE600_2_0_Base_BSP_PRS.doc
- DM37x_WinCE600_3_0_Base_BSP_TM.xls

Required PC Software

- Windows XP PC with Microsoft Visual Studio 2005 / Platform Builder
- TeraTerm or some other serial terminal emulator program
- Wireless Ethernet card (if required)
- HP USB Disk Storage Format Tool, v2.0.6

Test Setup

Environment and Test Setup Diagram

Environment
All software tests should be conducted at room temperature and ambient pressure.

Test Setup
For all tests, the Debug Serial UART should be connected to a PC where you can interact with the DUT. Various tests will have you connecting other peripherals as required.

LogicLoader
LogicLoader is required to load the DM37x Windows Embedded CE 6.0 BSP release.

Product Under Test

Environment and Test Setup Diagram

Environment
All software tests should be conducted at room temperature and ambient pressure.

Hardware Configurations
All hardware configurations tested are noted in the Test Progress Log and release notes applicable to the release.

Required Equipment

General Supplies and Measurement Instruments

General Supplies

- ZOOM DM3730 Development Kit:
  - Baseboard
  - DM3730/AM3703 SOM-LV System On Module (SOM)
  - DM3730/AM3703 Torpedo SOM
  - A Logic PD LCD-4.3-WQVGA-20R display
  - Null-modem serial cable
  - Cross-over Ethernet cable
  - USB Mini-B to Standard-A (male) cable
  - SDK2 Header Board (expansion) board with jumper cable
  - Antennae
- PC configured with Windows XP and applicable software
- A Logic PD LCD-4.3-WQVGA-10R Display Kit
- Headphones or speakers with 1/8th inch stereo jack
- USB Devices
  - USB keyboard
  - USB mouse
  - USB mass storage devices (flash/thumb drives)
  - 1.1 and 2.0 devices
  - Low, full, and high speed devices
  - Powered and unpowered hubs
  - USB OTG Mini-A to Standard-A cable *Mini-A ID Pin is grounded*
  - USB OTG Mini-A to Standard-A (female) adapter *Mini-A ID Pin is grounded*
- Bluetooth Devices
  - Keyboard
  - Mouse
- SD cards (2 GB or less, 4 GB or larger)
- SDIO serial/wireless card
- SD card reader/writer

Measurement Equipment

- Stopwatch or timer

Test Strategy

Functional Test, WinCETK, Code Inspection, Stress Test

This test plan assumes that the test engineer will use his or her intuition and creativity to conduct the test plan in a way that is effective and efficient. The test engineer has the freedom to conduct the test plan in their own style, provided that the instructions, requirements, and guidelines are followed as described in this document.

Each requirement in the Software Requirements Specification (SRS) is tested using one of the methods listed below:

Functional test (Conformance Testing)

In most cases, requirements are verified via functional test. Functional test procedures are documented in this STP. It is expected that the test engineer will record any undesired or unexplained operation in the Test Progress Log as if it were a failure that was detected during a specific test.

WinCETK (Unit Testing)

In some cases, WinCETK is used as a test tool. Specific CETK test cases will be traced to the requirements in the Traceability Matrix. It is expected that the test engineer will record any undesired or unexplained operation in the Test Progress Log as if it were a failure that was detected during a specific test.

Code Inspection

In some cases, code inspection is performed to verify requirements which cannot be verified via functional test. Any requirements verified via code inspection will be traced in the Traceability Matrix. It is expected that the test engineer will record any undesired or unexplained operation in the Test Progress Log as if it were a failure that was detected during a specific test.

Stress Test

In some cases, stress testing is performed to verify requirements which are not tested functionally. Stress testing involves testing beyond normal functional handling to determine robustness, availability and error handling under a heavy load. Requirements which have been stress tested will be traced in the Traceability Matrix. It is expected that the test engineer will record any undesired or unexplained operation in the Test Progress Log as if it were a failure that was detected during a specific test.

Testing Procedure Requirements and Guidelines

Acceptable Test Results, Test Progress Reporting, Failure Reporting, and Issue Tracking

In order to provide constructive feedback to the software development team, this software test plan must be conducted in a manner that yields usable results. All test results must be recorded in written and/or electronic form within the Test Progress Log and all failures must be documented and entered in the issue tracking system (JIRA). Failures may also be accompanied by a verbal description at the discretion of the test engineer.

This test plan assumes that the test engineer will use his or her intuition and creativity to conduct the test plan in a way that is effective and efficient. The test engineer has the freedom to conduct the test plan in their own style, provided that the instructions, requirements, and guidelines are followed as described in this document.

In some cases, undesired or unexplained operation may be detected while no specific testing is in progress. It is expected that the test engineer will record any undesired or unexplained operation in the Test Progress Log as if it were a failure that was detected during a specific test.

Acceptable Test Results
All test results must be recorded within the Test Progress Log. Reference to an external document (e.g., written documentation generated by the test engineer, email, photos) is permitted, but discouraged.

Each test case has its own Pass/Fail conditions. It is possible for the DUT to produce the desired outcome but fail to meet the required response time. In this event, the condition tested should be listed as a failure. Distinctions made between failures due to timing and failures due to unexpected operation should be documented in the Test Progress Log. For each test case, indicate the test result with exactly one of the following quantifiers:

Pass - Test passes without any indication of failure.

Pass R/L - Test required redlines to the test procedure to maintain a Pass result.

Concern - Test may or may not have failed due to unexpected or undesired behavior, but is not serious enough to merit a “fail” rating.

Fail - Test fails and may represent a significant issue.

Blocked - Unable to execute test. (Prevented by some other error, not supported by the model, etc.)

na – Test is not applicable. See comments for reason the test is na.

Please note the “Concern” quantifiers need not necessarily be linked to a specific test. If unexpected or concerning operation is witnessed between test cases, an entry in the Test Progress Log should be made. For these concerns, the test case number should be recorded as “N/A.”

Every test result must be recorded in the Test Progress Log. For each test case that does not earn a “Pass” rating, an additional entry indicating the JIRA issue identifier is required. The JIRA issue shall describe the undesired operation.. All non-passing test results must be retested or dismissed by the program/project manager before the software revision under test may be released.

Test Progress Reporting
The primary means for the test engineer to explain test progress, sequencing, and timing is the Test Progress Log. The Test Progress Log is to be appended after each individual test execution. Transferring data from a laboratory notebook into the Test Progress Log in larger sections is permissible but is not recommended.

The Test Progress Log may be completed in written or electronic form. All fields in the Test Progress Log must be completed for each test case that is evaluated, regardless of any information that may seem redundant.

Tests may be repeated at any time. Test repetitions and results should be recorded in the Test Progress Log as if they had not been conducted previously.

The Test Progress Log will track testing progress, test sequencing, and test results. See the Test Progress Log Procedure section for details and examples of appropriate entries.

Failure Reporting
The primary means for the test engineer to explain failures, undesired operation, and unexplained operation to the development team is via the Issue Tracking system (JIRA). All non-passing test results must be marked with a failure indicator in the Test Progress Log and be documented in the issue tracking system (JIRA). The test engineer is also responsible for including all unexplained operation in the issue, even if the unexplained operation was not witnessed while a specific test was in progress.

The Test Progress Log may be completed in written or electronic form. All fields in the Test Progress Log must be completed for each entry, regardless of any information that may seem redundant.

A test that successfully meets all required conditions should not be recorded in the issue tracking system.

Issue Tracking
The software team leader is responsible for updating the open items in the issue tracking database (JIRA). The Test Progress Log from this test plan will be the primary source of issue reporting to the development team and should be completed at the completion of test execution activities.

Functional Tests

Specific Test Cases, Organized by Feature

Unless specified otherwise, no test case is dependent on another test case. The tests need not be conducted in any particular order.

Each test case must be recorded in the Test Progress Log as it is conducted. See the Test Progress Log Procedure for usage requirements and guidelines.

Test 01 - Display

NOTE: MAKE SURE THAT YOU PLUG IN AN EXTRA TORPEDO BOARD AND CHARGE THE BACKUP BATTERY!!! THIS IS VITAL SINCE IT MIGHT TAKE A FULL DAY TO GET THE BACKUP BATTERY FULLY CHARGED. SEE TEST 16.01.03 FOR INSTRUCTIONS TO CHARGE THE BACKUP BATTERY.

Purose
This test verifies that the functional requirements of the Display. The DM37x supports two Logic PD displays: LCD-4.3-WQVGA-20R (display 28) and LCD-4.3-WQVGA-10R (display 15).

Setup
As preparation for this test, execute the following in sequence:

- Unless otherwise indicated, load the RAM image. Remember to set the display to display 28 in LogicLoader before loading the image:

```
losh > video-init 28 16
losh > video-on
```

- See Appendix B for Procedure to load a Hive Image and access the Remote Registry Editor
- For the LCD-4.3-WQVGA-10R, the registry setting LcdType is 15
- For Invalid LCD, the registry setting LcdType is 99
- The path for LcdType:
    - Below ‘New Device’ select the ‘HKEY_LOCAL_MACHINE’ folder
    - Select the \System\GDI\Drivers folder
    - Select ‘LcdType’ and change the value

Test Steps
Perform the following subtests and record results in the action log.

01.01.01 – Backlight

For each display from (LCD-4.3-WQVGA-20R (display 28), LCD-4.3-WQVGA-10R (display 15)):

If testing display 28, load the RAM image after setting the display type in LogicLoader.

If testing display 15, load the Hive image and set the appropriate LcdType, per the **Procedure to load a Hive Image and access the Remote Registry Editor in Appendix B.**

After the image is booted, wait 1 minute and see that the image on the screen gets dimmer.

Verify that the backlight dimmed at about a minute.

End For each display from (LCD-4.3-WQVGA-20R (display 28), LCD-4.3-WQVGA-10R (display 15))

01.02.01 – No Flicker During Boot

POR

For each display from (LCD-4.3-WQVGA-20R (display 28), LCD-4.3-WQVGA-10R (display 15)):

If testing display 28, load the RAM image after setting the display type in LogicLoader.

If testing display 15, load the Hive image and set the appropriate LcdType, per the **Procedure to load a Hive Image and access the Remote Registry Editor in Appendix B.**

As the device boots, verify the screen does not flicker.

Verify the Windows Shell is displayed

POR

End For each display from (LCD-4.3-WQVGA-20R (display 28), LCD-4.3-WQVGA-10R (display 15))

01.03.01 – Basic touch screen functionality

POR

For each display from (LCD-4.3-WQVGA-20R (display 28), LCD-4.3-WQVGA-10R (display 15)):

If testing display 28, load the RAM image after setting the display type in LogicLoader.

If testing display 15, load the Hive image and set the appropriate LcdType, per the **Procedure to load a Hive Image and access the Remote Registry Editor in Appendix B.**

Verify the Windows Shell is displayed

At the Windows shell, touch the screen.

Verify the screen responds by making a circle of dots, then launching the right-click menu.

Dismiss the menu.

Continue to the next test

01.04.01 – Calibrate touch screen

Navigate to Start > Settings > Control Panel.

Launch the Stylus application.

Select the Calibration tab.

Click the “Recalibrate” button.

Perform the calibration process, following the on-screen instructions.

Verify calibration is performed with one attempt

Continue to the next test.

01.05.01 – Touch screen with mouse and keyboard

Attach a mouse and keyboard (use a USB hub if needed).

Verify the touchscreen works.

Remove the mouse.

Verify the touchscreen works.

Remove the keyboard and attach the mouse.

Verify the touchscreen works.

POR

End For each display from (LCD-4.3-WQVGA-20R (display 28), LCD-4.3-WQVGA-10R (display 15))

01.06.01 – LCD controller hardware non-initialization

POR

For each display from (LCD-4.3-WQVGA-20R (display 28), LCD-4.3-WQVGA-10R (display 15)):

POR

Load the Hive image and set the LcdType to invalid (99), per the **Procedure to load a Hive Image and access the Remote Registry Editor in Appendix B.**

Verify the Windows Shell is not displayed

Verify the backlight is not on

POR

End For each display from (LCD-4.3-WQVGA-20R (display 28), LCD-4.3-WQVGA-10R (display 15))

01.07.01 – Display controller at run-time

POR

For each display from (LCD-4.3-WQVGA-20R (display 28), LCD-4.3-WQVGA-10R (display 15)):

If testing display 28, load the RAM image after setting the display type in LogicLoader.

If testing display 15, load the Hive image and set the appropriate LcdType, per the **Procedure to load a Hive Image and access the Remote Registry Editor in Appendix B.**

Verify the Windows Shell is displayed

Navigate to Start > Suspend

Verify the display device controller is turned off

Touch the screen

Verify the display device controller is turned on

End For each display from (LCD-4.3-WQVGA-20R (display 28), LCD-4.3-WQVGA-10R (display 15))

01.07.02 – Display controller after suspend / resume

For each display from (LCD-4.3-WQVGA-20R (display 28), LCD-4.3-WQVGA-10R (display 15)):

If testing display 28, load the RAM image after setting the display type in LogicLoader.

If testing display 15, load the Hive image and set the appropriate LcdType, per the **Procedure to load a Hive Image and access the Remote Registry Editor in Appendix B.**

Verify the Windows Shell is displayed

Navigate to Start > Suspend

Verify the display device controller is turned off

Push the S2 button (resume board)

Using stylus, verify that the image comes back up, and that touch is functioning properly.

End For each display from (LCD-4.3-WQVGA-20R (display 28), LCD-4.3-WQVGA-10R (display 15))

01.08.01 – Inactivity Timeout

POR

For each display from (LCD-4.3-WQVGA-20R (display 28), LCD-4.3-WQVGA-10R (display 15)):

If testing display 28, load the RAM image after setting the display type in LogicLoader.

If testing display 15, load the Hive image and set the appropriate LcdType, per the **Procedure to load a Hive Image and access the Remote Registry Editor in Appendix B.**

Verify the Windows Shell is displayed

Wait for 5 minutes to pass

Verify the display device controller is turned off

Verify the backlight is not on

Touch the screen

Verify that the display device controller is turned on and no white screen appears

Verify that the backlight is turned on

POR

End For each display from (LCD-4.3-WQVGA-20R (display 28), LCD-4.3-WQVGA-10R (display 15))

01.09.01 – Sample applications support

POR

For each display from (LCD-4.3-WQVGA-20R (display 28), LCD-4.3-WQVGA-10R (display 15)):

Copy the inksamp executable file to an sd card

If testing display 28, load the RAM image after setting the display type in LogicLoader.

If testing display 15, load the Hive image and set the appropriate LcdType, per the **Procedure to load a Hive Image and access the Remote Registry Editor in Appendix B.**

Verify the Windows Shell is displayed

Insert the SD card

Copy the inksamp executable file to the \Windows directory

Navigate to My Device\Windows and execute INKSAMP

Touch and hold the stylus to the screen, lift the stylus

Verify from where you touch the screen, there is a variance of no more than 2-3 pixels.

POR

End For each display from (LCD-4.3-WQVGA-20R (display 28), LCD-4.3-WQVGA-10R (display 15))

01.10.01 – Video initialization from LogicLoader

For each display from (LCD-4.3-WQVGA-20R (display 28), LCD-4.3-WQVGA-10R (display 15)):

Enter Session

In LogicLoader, initialize the display:

```
losh > video-init xx 16   {where xx is the applicable option for display}

losh > video-on

losh > video-clear r
```

Verify the display is red

Boot the WinCE image under test

Verify the WinCE desktop is displayed properly

Plug in an USB Mouse

Navigate to Settings > Control Panel

Select Stylus

Select Calibrate

Verify the display calibrates

POR

Enter Session

In LogicLoader, initialize the display:

```
losh > video-open xx 16   {where xx is the applicable option for display}

losh > video-clear b
```

Verify the display is blue

Boot the WinCE image under test

Verify the WinCE desktop is displayed properly

Plug in an USB Mouse

Navigate to Settings > Control Panel

Select Stylus

Select Calibrate

Verify the display calibrates

POR

End For each display from (LCD-4.3-WQVGA-20R (display 28), LCD-4.3-WQVGA-10R (display 15))

01.11.01 – DVI

For each from displays [VGA (640X480), SVGA (800X600), XGA (1024X768), 720P (1280X720)]:

Display 44 - VGA
Display 41 - SVGA
Display 47 - XGA
Display 40 - 720p

Load the Hive image and set the appropriate LcdType (40, 41, 44, 47), per the **Procedure to load a Hive Image and access the Remote Registry Editor in Appendix B.**

Verify that the image booted correctly and looks good.

Plug in a USB keyboard and USB mouse.

Verify that the keyboard and mouse work.

End For each from displays [VGA (640X480), SVGA (800X600), XGA (1024X768), 720P (1280X720)]:

01.12.01 – Rotated Screen

POR

Load the Hive image for the rotated screen (portrait instead of landscape)

After the image is booted, wait 1 minute and see that the image on the screen gets dimmer.

Verify that the backlight dimmed at about a minute.

Connect the mouse to the USB port.

Use the mouse to navigate to Start > Settings > Control Panel.

Launch the Stylus application.

Select the Calibration tab.

Click the “Recalibrate” button.

Perform the calibration process, following the on-screen instructions.

Verify calibration is performed with one attempt

Exit the calibration screen. At the Windows shell, touch the screen.

Verify the screen responds by making a circle of dots, then launching the right-click menu.

Dismiss the menu.

Navigate to Start > Suspend

Verify the display device controller is turned off

Push the S2 button (resume board)

Using stylus, verify that the image comes back up, and that touch is functioning properly.

Insert the SD card

Copy the inksamp executable file to the \Windows directory

Navigate to My Device\Windows and execute INKSAMP

Touch and hold the stylus to the screen, lift the stylus

Verify from where you touch the screen, there is a variance of no more than 2-3 pixels.

01.13.01 Display Brightness Control – Dim to Bright

NOTE: In this test, the display is set to a “dimmer” level in normal state, and a “brighter” level in Standby state.

POR

Load the Hive image.

Set the DutyCycle array in the registry [HKEY_LOCAL_MACHINE\Drivers\BuiltIn\Backlight] of the SOMs as below. See Appendix B for instructions on how to change the Windows registry.

- DUT 1: [16, 64, 64, 0, 0]
- DUT 2: [16, 32, 32, 0, 0]
- DUT 3: [8, 32, 32, 0, 0]

Load the image with new values in the registry.

Verify that the brightness of DUT 1 is about the same as that of DUT 2, and that DUT 3 is the dimmest

.

Wait about 1 minute and let the device go into Standby state.

Verify that the screen is brighter.

Verify that the brightness of DUT 2 is about the same as that of DUT 3, and that DUT 1 is the brightest.

Touch the screen to bring the device out of Standby state.

Verify that the screen is dimmer.

Verify that the brightness of DUT 1 is about the same as that of DUT 2, and that DUT 3 is the dimmest.

Test 02 - Audio Output Tests

Purpose
This test verifies that the functional requirements of audio output.

Setup
Equipment

- Speakers
- Headset

Populate SD Card

Copy the following audio files to a desktop PC and an sdcard. The files can be found in the SVT Tools directory:

- LPCM-test-8bps.wav
- LPCM-test-16bps.wav
- LPCM-test-mono.wav
- LPCM-test-stereo.wav
- LPCM-test-{8,11,16,22,44,48}KHz.wav

Configure Windows Media Player

Use these steps to configure Windows Media Player. This only needs to be done once for this test, but should be executed before any particular subtest.

1. Launch Windows Media Player by selecting Start > Programs > Media Player.
2. Ensure that audio is not muted, by clicking the Playback menu and verifying that Mute does not have a check next to it.
3. Click the center of the volume bar. This instruction is intended to ensure that a recording is audible during playback. Depending on the power and sensitivity of your speakers, you may need to modify the selected volume for comfort.

Test Steps
Perform the following subtests and record results in the action log.

02.01.01 – Sample rates

Launch Windows Media Player by selecting Start > Programs > Media Player.

Configure Windows Media Player, if necessary.

Open each of the audio sample recording files. Verify that each plays properly.

The audio sample data files are named "LPCM-test-<sample rate>" where <sample rate> is the sample rate in bps of the recording.

02.02.01 – Audio channels

Launch Windows Media Player by selecting Start > Programs > Media Player.

Configure Windows Media Player, if necessary.

Open the mono and stereo recording files.

Verify that each plays properly.

The audio channel test recordings are named "LPCM-test-<channel>" where <channel> is either "mono" or "stereo".

02.03.01 – Audio Sample Frequencies

Launch Windows Media Player by selecting Start > Programs > Media Player.

Configure Windows Media Player, if necessary.

Open the sample frequency files.

Verify that each plays properly.

The audio channel test recordings are named "LPCM-test-<KHz>" where <KHz> is {8,11,16,22,44,48} KHz of the recording.

02.04.01 – Volume

Launch Windows Media Player by selecting Start > Programs > Media Player.

Configure Windows Media Player, if necessary.

Open any audio recording.

Play the recording.

As the recording plays, adjust the volume up and down using the volume bar.

Verify that the volume level changes appropriately.

02.05.01 – Muting

Launch Windows Media Player by selecting Start > Programs > Media Player.

Configure Windows Media Player, if necessary.

Open any audio recording.

Select the Playback menu and select “Mute”. Ensure that a check mark is next to the Mute option.

Play the recording. Verify that audio cannot be heard.

Select the Playback menu and click “Mute”.

Verify that audio can be heard.

02.06.01 –Simultaneous Playback of Multiple Audio Streams

Launch Windows Media Player by selecting Start > Programs > Media Player.

Configure Windows Media Player, if necessary.

Open File > Playlist > Organize Playlists

Select New to create a new playlist

Select OK

Select multiple files to include in the playlist

Select OK

View the files added to the playlist and select OK

Navigate to File > Playlist

Select the playlist created previously

Select Play arrow in the window

Verify all files play properly

02.07.01 – AUDIO INPUT SUPPORT

POR

Copy the AudioRecord executable file to an sd card

Load the RAM image

Insert the sd card

Copy the AudioRecord executable file to the \Windows directory

Insert a microphone or headset to the audio in jack of the device

Navigate to My Device\Windows and execute AudioRecord

In the Dialog box, select the Record button

Speak in to the microphone or headset

Select End to stop the recording

Inser t the headset to the audio out jack of the device

In the Dialog box, select the Play button

Verify what was recorded is heard in the headset

POR

02.08.01 – Audio driver after suspend / resume.

Navigate to Start > Suspend

Verify the display device controller is turned off

Push the S2 button (resume board)

Launch Windows Media Player by selecting Start > Programs > Media Player.

Play any audio file

Verify that the audio file plays properly.

Test 03 - Wired Ethernet Tests

Purpose
This test verifies that the functional requirements for wired Ethernet are met.

Setup
As preparation for this test, execute the following in sequence:

- Connect the board to an Ethernet network that has a DHCP server running.
- Determine a static IP address that can be used for these tests.
- Load any standard image

Test Steps
Perform the following subtests and record results in the action log:

03.01.01 – Enabled on boot

Ensure that the device is connected to a network via Ethernet.

Open a command prompt by using Start > Run and launching “cmd”.

Run ipconfig.

```
> ipconfig
```

Verify that the Ethernet adapter [SMSC_LAN92X1] is listed in the output and has been assigned an IP address other than 0.0.0.0

03.02.01 – Static IP address

Ensure that the device is connected to a network via Ethernet.

Navigate to Start > Settings > Network and Dial-up Connections.

Launch “SMSC_LAN921X”.

Select the radio button labeled “Specify an IP address”.

In the ‘smsc_lan921x Ethernet Driver’ window, select the ‘Specify an IP Address’ radio button.

In the ‘IP Address’ value box, specify an appropriate IP address

In the ‘Subnet Mask’ value box, specify an appropriate subnet mask

Select OK.

Open a command prompt by using Start > Run and launching “cmd”.

Run ipconfig.

```
> ipconfig
```

Verify that the Ethernet adapter [SMSC_LAN92X1] has been assigned the IP address specified earlier in this test.

Ping Host PC to confirm that the IP address is working.

> ping <host pc ipaddress>

Verify a ping response is received.

03.03.01 – Dynamic IP Address

Ensure that the device is connected to a network via Ethernet.

Navigate to Start > Settings > Network and Dial-up Connections.

Launch “SMSC_LAN921X”.

Select the radio button labeled “Obtain an IP address via DHCP”.

Click OK.

Open a command prompt by using Start > Run and launching “cmd”.

Run ipconfig.

```
> ipconfig
```

Ensure that the Ethernet adapter [SMSC_LAN92X1] has been assigned an IP address (the address should be anything except 0.0.0.0.)

Ping Host PC to confirm that the IP address is working.

> ping <host pc ipaddress>

Verify a ping response is received.

Open a command prompt by using Start > Run and launching “cmd”.

Run ipconfig /release.

```
> ipconfig /release
```

```
> ipconfig
```

Ensure that the Ethernet adapter [SMSC_LAN92X1] has been released (the address should be 0.0.0.0.)

Run ipconfig /renew.

```
> ipconfig /renew
```

```
> ipconfig
```

Ensure that the Ethernet adapter [SMSC_LAN92X1] has been assigned an IP address (the address should be anything except 0.0.0.0.)

Ping Host PC to confirm that the IP address is working.

> ping <host pc ipaddress>

Verify a ping response is received.

03.04.01 – Network Support Commands

Ensure the network is up > ipconfig

From the pc, telnet to the device

Verify telnet is successful.

Run Ndisconfig

```
> ndisconfig
```

Verify information is displayed listing Protocols and Adapters.

Run netstat

```
> netstat
```

Verify information is displayed regarding the usages of netstat

Run route

```
> route
```

Verify that route information is displayed

POR

Copy the netlog.dll and netlogctl executable file to an sd card

Load the RAM image

Insert the sd card

Copy the files to the \Windows directory

Open a command prompt by using Start > Run and launching “cmd”.

```
>  netlogctl load
```

Open internet explorer, wait for the browser to load, then close internet explorer

Open a command prompt by using Start > Run and launching “cmd”.

- `netlogctl stop`

Navigate to My Device

Copy ‘netlog0.cap’ to the ‘SD Card’

Remove the sd card

Open the log file (netlog0.cap) on the pc using a hex editor

Verify the application captured and reported data to netlog

03.05.01 – 1 GB Ethernet switch

Connect the DUT to a 1 GB Ethernet switch connected to the network

POR

Load and boot the image

Navigate to Start > run > ‘cmd’

Obtain the SUT’s IP address

> ipconfig

Ping the host PC from the device

> ping <host pc ipaddress>

Verify successful ping

Ping the device from the host PC

> ping <device ipaddress>

Verify successful ping

POR

03.06.01 – Cross-over Cable

Connect PC and device with a cross-over cable

Set Static IP address / netmask on the workstation via Network Connections using IP address 172.20.1.2 and netmask of 255.255.0.0

In LogicLoader, set Static IP address / netmask / gateway on the device where the IP address is 172.20.1.3, netmask is 255.255.0.0 and the gateway is the PC IP address, 172.20.1.2:

```
losh> ifconfig sm0 172.20.1.3 255.255.0.0 172.20.1.2
```

Verify a successful ping from the device to the PC

Verify a successful ping from the PC to the device

Load the RAM image

Select Start > Settings > Network and Dial-up Connections

Open ‘SMSC_LAN921X’

In the ‘smsc_lan921x Ethernet Driver’ Settings Window, select ‘IP Address’ tab

Select the ‘Specify an IP address’ radio button

Enter the IP address: 172.20.1.3

Enter the Subnet Mask: 255.255.0.0

Enter the Default Gateway: 172.20.1.2

Select OK

Open a command prompt by using Start > Run and launching “cmd”.

Run ipconfig.

```
> ipconfig
```

Ensure that the Ethernet adapter [SMSC_LAN92X1] has been assigned an IP address (the address should be anything except 0.0.0.0.)

Ping Host PC to confirm that the IP address is working.

```
> ping 172.20.1.2
```

Verify a ping response is received.

From the PC, ping the device to confirm that the IP address is working.

```
> ping 172.20.1.3
```

Verify a ping response is received.

Remove the cross-over cable and restore network settings on both the pc and device.

03.07.01 – Cable Removal/Insertion Detection

Boot the device with the network cable inserted

Open a command prompt by using Start > Run and launching “cmd”.

Ensure a network connection is established (icon in system tray)

> ipconfig

Remove the network cable

> ipconfig

Verify the network connection is not established (x appears in the system tray over the network connection icon)

Insert the network cable

> ipconfig

Verify the network connection is re-established (x disappears in the system tray over the network connection icon)

03.08.01 – Non-blocking Disconnect

After establishing a network connection, disconnect the network cable.

Navigate to “My Device”.

Verify that there is not a delay initiating navigation or resolving navigation.

Reboot the device without reconnecting the network cable.

Verify that the system does not “hang” or delay during boot.

03.09.01 – Ethernet driver after suspend / resume

Navigate to Start > Suspend

Verify the display device controller is turned off

Push the S2 button (resume board)

Navigate to Start > Run

Enter the cmd

Ping the host PC from the device

> ping <host pc ipaddress>

Verify successful ping

Ping the device from the host PC

> ping <device ipaddress>

Verify successful ping

Test 04 - USB Host

Purpose
This test verifies that the functional requirements for USB host are met.

Setup
As preparation for this test, the following information is critical:

- Load any standard image.
- On the baseboard, ensure J42 does not have a jumper.
- NOTE for Torpedo, USB4 is tested

Test Steps

Perform the following subtests and record results in the action log.

04.01.01 – USB KB after Suspend/Resume

POR

Boot the device.

Plug a USB keyboard into the USB Host port on the baseboard.

Select Start > Run.

Type on the USB keyboard.

Verify that characters are entered as you type.

Select Start > Suspend.

Verify the screen goes black

Tap the screen

Verify the Windows CE screen is displayed

Select Start > Run.

Type on the USB keyboard.

Verify that characters are entered as you type.
POR

04.01.02 – USB Mouse after Suspend/Resume

Remove the USB keyboard from the USB Host port

Plug a USB mouse into the USB Host port on the baseboard.

Exercise the mouse

Verify mouse movement and selection is operable.

Select Start > Suspend.

Verify the screen goes black

Tap the screen

Verify the Windows CE screen is displayed

Exercise the mouse

Verify mouse movement and selection is operable.

POR

04.01.03 – USB Mass Storage after Suspend/Resume

Plug a USB MSD into the USB Host port on the baseboard.

Select ‘My Device’

Verify the MSD device appears in ‘My Device’

Select Start > Suspend.

Verify the screen goes black

Tap the screen

Verify the Windows CE screen is displayed

Select ‘My Device’

Verify the MSD device appears in ‘My Device’

POR

04.02.01 – USB KB detect at boot and at run-time

POR

Boot the device.

Plug a USB keyboard into the USB Host port on the baseboard.

Select Start > Run.

Type on the USB keyboard.

Verify that characters are entered as you type.

POR

Boot the device.

Select Start > Run.

Type on the USB keyboard.

Verify that characters are entered as you type.

Remove the USB Keyboard

POR

04.02.02 – USB Mouse detect at boot and at run-time

POR

Boot the device.

Plug a USB mouse into the USB Host port on the baseboard.

Exercise the mouse

Verify mouse movement and selection is operable.

POR

Boot the device.

Verify mouse movement and selection is operable.

POR

04.02.03 – USB Powered Hub+KB+Mouse detect at boot and at run-time

POR

Boot the device.

Plug a powered USB Hub into the USB Host port on the baseboard.

Plug a USB keyboard into the powered USB Hub.

Plug a USB mouse into the powered USB Hub.

Select Start > Run.

Type on the USB keyboard.

Verify that characters are entered as you type.

Exercise the mouse

Verify mouse movement and selection is operable.

POR

Boot the device.

Select Start > Run.

Type on the USB keyboard.

Verify that characters are entered as you type.

Exercise the mouse

Verify mouse movement and selection is operable.

POR

04.02.04 – USB Powered Hub+MSD1+MSD2 detect at boot and at run-time

POR

Boot the device.

Plug a powered USB Hub into the USB Host port on the baseboard.

Plug two MSDs into the USB Hub

Select ‘My Device’

Verify ‘Hard Disk’ and ‘Hard Disk2’ are displayed

POR

Boot the device.

Select ‘My Device’

Verify ‘Hard Disk’ and ‘Hard Disk2’ are displayed

POR

04.02.05 – USB UNPowered Hub+KB+Mouse detect at boot and at run-time

POR

Boot the device.

Plug an unpowered USB Hub into the USB Host port on the baseboard.

Plug a USB keyboard into the USB Hub.

Plug a USB mouse into the USB Hub.

Select Start > Run.

Type on the USB keyboard.

Verify that characters are entered as you type.

Exercise the mouse

Verify mouse movement and selection is operable.

POR

Boot the device.

Select Start > Run.

Type on the USB keyboard.

Verify that characters are entered as you type.

Exercise the mouse

Verify mouse movement and selection is operable.

POR

04.02.06 – USB UNPowered Hub+MSD1+MSD2 detect at boot and at run-time

POR

Boot the device.

Plug a unpowered USB Hub into the USB Host port on the baseboard.

Plug two MSDs into the unpowered USB Hub

Select ‘My Device’

Verify ‘Hard Disk’ and ‘Hard Disk2’ are displayed

POR

Boot the device.

Select ‘My Device’

Verify ‘Hard Disk’ and ‘Hard Disk2’ are displayed

POR

04.02.07 – USB Mass Storage detect at boot and at run-time

POR

Boot the device.

Plug a USB MSD into the USB Host port on the baseboard.

Select ‘My Device’

Verify the MSD device appears in ‘My Device’

POR

Boot the device.

Select ‘My Device’

Verify the MSD device appears in ‘My Device’

POR

04.02.08 – USB insertion / removal

POR

Boot the device.

Plug a USB MSD into the USB Host port on the baseboard.

Select ‘My Device’

Verify the MSD device appears in ‘My Device’

Unplug the USB MSD from the USB Host port on the baseboard.

Plug the USB MSD into the USB Host port on the baseboard.

Verify the MSD device appears in ‘My Device’

Unplug the USB MSD

Plug in a USB keyboard

Navigate to Start > run > ‘cmd’

Verify that the keyboard is functioning

Remove the keyboard

Plug in the USB keyboard again

Navigate to Start > run > ‘cmd’

Verify that the keyboard is functioning

Remove the keyboard

Plug in a USB mouse

Verify that the mouse is functioning

Unplug the USB mouse

Plug in the USB mouse

Verify that the mouse is functioning

04.03 USB SPEC

04.03.01 – USB 1.1

Verify USB 1.1 devices are functional.

04.03.02 – USB 2.0

Verify USB 2.0 devices are functional.

04.03.03 – Low Speed

Verify USB Low Speed devices are functional.

04.03.04 – Full Speed

Verify USB Full Speed devices are functional.

04.03.05 – High Speed

Verify USB High Speed devices are functional.

Test 05 - Serial

Purpose
This test verifies that the functional requirements for serial UART support.

Setup
Load any standard image.

Test Steps

05.01.01 Serial Testing is performed by CETK 06.01.04

Test 06 - CETK Testing

Purpose

This section provides directions for running CETK testing.

Setup

As preparation for this test, you will need to obtain the SQA laptop containing Windows Embeded C.E. 6.0 Test Kit.

Test Steps

Perform the following subtests and record results in the action log:

NOTE: You can run multiple tests in a single run in order to run them overnight, but you will have to break apart the log file into the separate test logs after. You should not run the tests that take < 1 minute in a multiple test run as they will disconnect the SOM when done and not run the other tests. To run multiple tests, first go through and select them individually and look at the tree structure to see boxes are checked. Then you can deselect all tests and manually select the ones you wish to run. Below is a list of the boxes for each test suite:

GTC Print Resolution and Time (< 1 minute)
OAL Timer Tests > GTC Print Resolution and Time

High Perf Timer Print Resolution and Time (< 1 minute)
OAL Timer Tests > High Perf Timer Print Resolution and Time

RTC Real-Time Functions (~ 27 minutes)
OAL Timer Tests > RTC Real-Time Functions

Serial Port Driver Test (< 1 minute)
Serial Port > Serial Port Test

Test Instruction Cache (~ 50 minutes)
OAL Cache Tests > Test Instruction Cache

Test Write-back (~ 1 hr 50 min)
OAL Cache Tests > Test Write-back

Test Write-through (~ 1 hr 50 min)
OAL Cache Tests > Test Write-through

Wall Clock and RTC Drift Test (~ 3 hrs)
OAL Timer Tests > Wall Clock and RTC Drift Test

06.01 CETK testing

Note: Use the following directions to run tests 06.01.01 - 06.01.08. The directions are the same for all tests, only selecting a different test to run.

Boot the SOM you wish to run CETK testing on with the version of Windows being tested (SUT).

Power on (if not already) the SQA Windows C.E. 6.0 laptop and get to the desktop screen.

Start up Windows Embeded C.E. 6.0 Test Kit:

Start > Windows Embeded C.E. 6.0 Test Kit

Connect the Som to the Windows C.E. 6.0 laptop using a USB standard-A to usb mini-B (otg) cable. This should kick in the ActiveSync connection

On the laptop, make sure that the ActiveSync connection is seen.

In Windows Embeded C.E. 6.0, make the connection to the Som:

Connection > Start Client > Connect > Default Device

Select the new device in the tree structure on screen and double click to expand the tree.

Right click on **Windows Embedded CE Test Catalog**.

Deselect all tests.

Right click on **Windows Embedded CE Test Catalog**.

Select the test suite you wish to run (see box above for list of test suites and times). All of the tests need to be run, but the order in which they are run does not matter

Click on **Test Suites > Apply suite > test suite**

In Tera Term, select **Edit > Clear Buffer** to empty the screen.

In Tera Term, setup a log file (**File > log**). Be sure to select the “timestamp” option. Save the log files into a folder named after the part number of the SOM being tested, in a folder named CETK in the results folder for the SUT.

Example:

```
CETK
  |-->  1017318 ->   |  GTC Print Resolution and Time
  |                  |  RTC Real Time Functions
  |
  |
  |->  1021711 ->    |  GTC Print Resolution and Time
  |                  |  RTC Real Time Functions
  |
  |
  |->  1021817 ->    |  GTC Print Resolution and Time
                     |  RTC Real Time Functions
```

In Windows Embeded C.E. 6.0 right click on **Windows Embedded CE Test Catalog** and select **Start Tests**

On Tera Term you will see the output of the tests. Some of them do not show very much at all. At the end of every test is a summary. This information should be put onto the PERF sheet of the TPL.

06.01.01 CETK testing - GTC Print Resolution and Time

RUN CETK TESTING - SELECT TEST GTC PRINT RESULTION AND TIME

06.01.02 CETK testing - High Perf Timer Print Resolution and Time

RUN CETK TESTING - SELECT HIGH PERF TIMER PRINT RESOLUTION AND TIME

06.01.03 CETK testing - RTC Real Time Functions

RUN CETK TESTING - SELECT RTC REAL TIME FUNCTIONS

06.01.04 CETK testing - Serial Port Driver Test

RUN CETK TESTING - SELECT SERIAL PORT DRIVER TEST

06.01.05 CETK testing - Test Instruction Cache

RUN CETK TESTING - SELECT TEST INSTRUCTION CACHE

06.01.06 CETK testing - Test Write-back

RUN CETK TESTING - SELECT TEST WRITE-BACK

06.01.07 CETK testing - Test Write-through

RUN CETK TESTING - SELECT TEST WRITE-THROUGH

06.01.08 CETK testing - Wall Clock and RTC Drift Test

RUN CETK TESTING - SELECT WALL CLOCK AND RTC DRIFT TEST

Test 07 - MMC/SD Tests

Purpose
This test verifies that the functional requirements for MMC/SD cards are met.

Setup
As preparation for this test, execute the following:

- Create a FAT file system on a MMC/SD cards if there is not one already present.

Test Steps
Perform the following subtests and record results in the action log:

07.01.01 At Boot

For each storage card (MMC SD/HDSD)
Insert a storage card.
Boot the device.
Navigate to “My Device”.
Verify the card was detected (an icon representing the card is displayed: “SD Card”)

07.02.01 File system

For each storage card (MMC SD/HDSD)
Boot the device.
Insert a storage card.
Navigate to “My Device”.
Verify the card was detected (an icon representing the card is displayed: “SD Card”)
Navigate to Start > Run, and launch the command prompt “cmd”.
Create a file with some test data on the device.
`> echo “junk” > /junk.txt`
Copy junk.txt to the storage card.
`> copy junk.txt “SD Card”`
Verify that the file is present on the storage card by navigating to My Device > SD Card. It should contain a file “junk.txt”. Verify that the file copied to the storage card is the same as the original file.
Delete the file junk.txt from the storage card by clicking and holding, then selecting “Delete” (or by selecting it and pressing delete on a keyboard, if present.)

07.03.01 Detect Insert/Removal

For each storage card (MMC SD/HDSD)

Boot the device.
Insert a storage card.
Navigate to “My Device”
Verify that the card was detected (an icon representing the card is displayed: “SD_Card”)
Remove the storage card.

Verify that the card removal was detected (the icon representing the card is no longer displayed)

07.04.01 Hardware write protect

Note: Torpedo boards do not support Hardware Write Protecton

Flip write protect switch on the storage card to the write-protected location.
Boot the device.
Insert the card.
Navigate to the device folder. My Device > SD_Card.
Create a new folder by pressing and holding in a space without an icon. Select “New Folder”.
Verify that a read-only error occurs and that the folder was not created.

07.05.01 SDIO Serial / Wireless cards

Plug in a SDIO wireless card.
Navigate to “My Device”
Verify that the card was detected (an icon labeled “SD_Card” is displayed)
Plug in a SDIO Serial card.
Navigate to “My Device”
Verify that the card was detected (an icon labeled “SD_Card” is displayed)

07.06.01 Ready times

Navigate to “My Device”.
While watching a timer or stopwatch, insert a MMC/SD card.
Verify the SD card appears (an icon labeled “SD_Card” is displayed) without error within 2 seconds of inserting the MMC/SD card.

07.06.02 Reinsert time

Navigate to “My Device”.
Insert a MMC/SD card.
Look at the icon labeled “SD_Card” on the “My Device” screen.
Eject the card and start the stop watch.

Reinsert it immediately after the icon labeled “SD_Card” disappears.
Verify the card is recognized as inserted within 6 seconds of ejecting the card.

07.07.01 MMC/SD driver after suspend / resume

Remove the SD card, if it is inserted

Navigate to Start > Suspend

Push the S2 button (resume board)

Inset a SD card

Navigate to My Device > SD card

Verify that the “SD card” icon appears and can be accessed.

Remove the SD card

Verify that the “SD Card” icon disappears.

Test 08 - Touch Screen Tests

Purpose

This test verifies that the functional requirements for Touch Screen are met.

Setup

Test Steps

08.01.01 Touch Screen tests are verified in Test 01-Display

Test 09 - SPI Tests

Purpose

This test verifies that the functional requirements for the SPI interface are met.

Test Steps

09.01.01 Loopback test

Attach an expansion board to the SOM-LV

Attach a jumper cable to J4.SPI RX with the J4.SPI TX

POR

Copy the spi_test_app executable file to an sd card

Load the RAM image

Insert the sd card

Copy the spi_test_app executable file to the \Windows directory

Navigate to My Device\Windows and execute spi_test_app

On the PC, in the TeraTerm window, verify the test completed and passed

Remove the jumper from the expansion board

Navigate to My Device\Windows and execute spi_test_app

On the PC, in the TeraTerm window, verify the test completed and failed

POR

09.02.01 SPI driver after suspend / resume

Attach an expansion board to the SOM-LV

Attach a jumper cable to J4.SPI RX with the J4.SPI TX

POR

Copy the spi_test_app executable file to an sd card

Load the RAM image

Navigate to Start > Suspend

Push the S2 button (resume board)

Insert the sd card

Copy the spi_test_app executable file to the \Windows directory

Navigate to My Device\Windows and execute spi_test_app

On the PC, in the TeraTerm window, verify the test completed and passed

Remove the jumper from the expansion board

Navigate to My Device\Windows and execute spi_test_app

On the PC, in the TeraTerm window, verify the test completed and failed

POR

Test 10 - YAFFS Flash File System

Purpose
This test verifies that the functional requirements for the MTD interface are met.

Setup
As preparation for this test, perform the following:

Test Steps
Perform the following subtests and record results in the action log:

10.01.01 – YAFFS partition

POR

In LogicLoader, erase NAND

losh> erase /dev/nand0 B18 B4078

Load the RAM image

Select ‘My Device’

Verify ‘YAFFS_PART1’ displayed

Select ‘YAFFS_PART1’

Verify there are no files in ‘YAFFS_PART1’

POR

In LogicLoader, create a yaffs partition with a file

losh> part-add /dev/nand0 b 20 2000

losh> mount yaffs /dev/nand0b /yp

losh> cp <somefile> /yp/<somefile>

where <somefile> is a file > 16 MB

losh> ls yp

Ensure the file was copied to the yaffs partition

POR

Load the RAM image

Select ‘My Device’

Verify ‘YAFFS_PART1’ displayed

Select ‘YAFFS_PART1’

Verify <somefile> is located in ‘YAFFS_PART1’

Delete <somefile> from ‘YAFFS_PART1’

POR

In LogicLoader, create and mount the yaffs partition

losh> part-add /dev/nand0 b 20 2000

losh> mount yaffs /dev/nand0b /yp

In LogicLoader, verify the file was deleted from the yaffs partition

losh> ls yp

Load the RAM image

Select ‘My Device’

Verify ‘YAFFS_PART1’ displayed

Select ‘YAFFS_PART1’

Verify <somefile> is not displayed in ‘YAFFS_PART1’

10.02.01 – YAFFS driver after suspend / resume

POR

In LogicLoader, create a yaffs partition with a file

losh> erase /dev/nand0 B18 B4078

losh> part-add /dev/nand0 b 20 2000

losh> mount yaffs /dev/nand0b /yp

losh> cp <somefile> /yp/<somefile>

losh> ls yp

Ensure the file was copied to the yaffs partition

POR

Load the RAM image

Navigate to Start > Suspend

Push the S2 button (resume board)

'My Device'

Verify 'YAFFS_PART1' displayed

Select 'YAFFS_PART1'

Verify <somefile> is located in 'YAFFS_PART1'

Delete <somefile> from 'YAFFS_PART1'

POR

In LogicLoader, create and mount the yaffs partition

losh> part-add /dev/nand0 b 20 2000

losh> mount yaffs /dev/nand0b /yp

In LogicLoader, verify the file was deleted from the yaffs partition

losh> ls yp

Test 11 - System-Wide Power Management

Purpose

This test verifies that the functional requirements for system-wide power management are met.

Setup

Test Steps

11.01.01 Power Management Testing is performed via Windows CETK

Test 12 - Wireless Ethernet Tests

Purpose

This test verifies that the functional requirements for Wireless Ethernet are met.

Setup

As preparation for this test, execute the following in sequence:

- Connect the board to a wireless Ethernet network that has a DHCP server running.
- Determine a static IP address on the wireless network you can use for these tests.
- Antenna required (Wireless may function without an antenna; however, with-antenna is the intended use case).
- To ensure wireless is actually tested, disconnect the wired Ethernet cable.

Test Steps

Perform the following subtests and record results in the action log.

12.01.01 – Scan for available networks.

Open the ‘TIWLNAPI1’ window by selecting the wireless network icon in the toolbar. This is two monitors with an X over them.

Verify that available networks are displayed in the ‘Wireless Information’ tab.

12.02.01 – Successfully connect/ping to a wireless network (dhcp)

Open the ‘TIWLNAPI1’ window by selecting the wireless network icon in the toolbar. This is two monitors with an X over them.

Select a network listed in the ‘Wireless Information’ tab

Select the ‘Connect’ button to open the ‘Wireless Network Properties’ window

Verify the SSID is displayed in the ‘Network Name (SSID):’ value list

Input the applicable Encryption Type and Key

Verify that the “Status” field eventually reads, “Connected to ,<network>”.

Select the ‘IP Information’ tab

Verify the Address Type is DHCP

Verify an IP Address was assigned.

Open a command prompt by selecting Start > Run, typing “cmd”, and pressing Enter.

From the device, ping a known host

Verify a response is received from the known host

From the known host, ping the device

Verify a response is received from the device

12.03.01 – Successfully connect/ping to a wireless network (static)

Select Start > Settings > Network and Dial-up Connections

Open the TIWLNAPI1 icon

In the ‘tiwlnapi1 Settings’ window select the ‘Specify an IP address’ radio button

Enter the applicable IP Address, Subnet Mask and addresses

Select ‘OK’

Open the ‘TIWLNAPI1’ window by selecting the wireless network icon in the toolbar. This is two monitors with an X over them.

Select a network listed in the ‘Wireless Information’ tab

Select the ‘Connect’ button to open the ‘Wireless Network Properties’ window

Verify the SSID is displayed in the ‘Network Name (SSID):’ value list

Input the applicable Encryption Type and Key

Verify that the “Status” field eventually reads, “Connected to ,<network>”.

Select the ‘IP Information’ tab

Verify the Address Type is Static

Verify an IP Address previously assigned is displayed.

Open a command prompt by selecting Start > Run, typing “cmd”, and pressing Enter.

From the device, ping a known host

Verify a response is received from the known host

From the known host, ping the device

Verify a response is received from the device

Select Start > Settings > Network and Dial-up Connections

Open the TIWLNAPI1 icon

In the ‘tiwlnapi1 Settings’ window select the ‘Obtain an IP address via DHCP’ radio button

Select ‘OK’

12.04.01 – Successfully renew DHCP lease - wireless network

Open the ‘TIWLNAPI1’ window by selecting the wireless network icon in the toolbar. This is two monitors with an X over them.

Select a network listed in the ‘Wireless Information’ tab

Select the ‘Connect’ button to open the ‘Wireless Network Properties’ window

Verify the SSID is displayed in the ‘Network Name (SSID):’ value list

Input the applicable Encryption Type and Key

Verify that the “Status” field eventually reads, “Connected to <network>”.

Select the ‘IP Information’ tab

Verify the Address Type is DHCP

Verify an IP Address was assigned and note the address

Select the ‘Renew’ button and wait a moment

Verify the Address Type remains DHCP

Verify the IP Address is other than 0.0.0.0

From the device, ping a known host

Verify a response is received from the known host

From the known host, ping the device

Verify a response is received from the device

12.05.01 – Dynamic IP Address

Ensure that the device is connected to a wireless network via Ethernet.

Open a command prompt by using Start > Run and launching “cmd”.

Run ipconfig.

```
> ipconfig
```

Ensure that the Ethernet adapter [tiwlnapi1] has been assigned an IP address (the address should be anything except 0.0.0.0.)

Ping Host PC to confirm that the IP address is working.

> ping <host pc ipaddress>

Verify a ping response is received.

Run ipconfig /release.

```
> ipconfig /release
```

Close the command prompt window

Open the ‘TIWLNAPI1’ window by selecting the wireless network icon in the toolbar. This is two monitors with an X over them.

In the ‘IP Information’ tab, verify the IP address is 0.0.0.0

In the ‘”Wireless Information’ tab, verify the Status is displayed as Connected.

Open a command prompt by using Start > Run and launching “cmd”.

Run ipconfig /renew.

```
> ipconfig /renew
```

```
> ipconfig
```

Ensure that the Ethernet adapter [tiwlnapi1] has been assigned an IP address (the address should be anything except 0.0.0.0.)

Open the ‘TIWLNAPI1’ window by selecting the wireless network icon in the toolbar. This is two monitors with an X over them.

In the ‘IP Information’ tab, verify the IP address is anything but 0.0.0.0

In the ‘”Wireless Information’ tab, verify the Status is displayed as Connected.

Open a command prompt by using Start > Run and launching “cmd”.

From the device, ping a known host

Verify a response is received from the known host

From the known host, ping the device

Verify a response is received from the device

12.06.01 – Network Support Commands

Ensure that the device is connected to a wireless network.

Open a command prompt by using Start > Run and launching “cmd”.

From the pc, telnet to the device

Verify telnet is successful.

Run ndisconfig

```
> ndisconfig
```

Verify information is displayed listing Protocols and Adapters.

Run netstat

```
> netstat
```

Verify information is displayed regarding the usages of netstat

Run route

```
> route
```

Verify that route information is displayed

POR

Reconnect to the wireless network

Copy the netlog.dll and netlogctl executable file to an sd card

Load the RAM image

Insert the sd card

Copy the files to the \Windows directory

Connect to a wireless network.

Open a command prompt by using Start > Run and launching “cmd”.

```
>  netlogctl load
```

Open internet explorer, wait for the browser to load, then close internet explorer

Open a command prompt by using Start > Run and launching “cmd”.

- `netlogctl stop`

Navigate to My Device

Copy ‘netlog0.cap’ to the ‘SD Card’

Remove the SD card

Open the log file (netlog0.cap) on the pc using a hex editor

Verify the application captured and reported data to netlog.

12.07.01 – Bluetooth and Wireless

Connect to a Bluetooth device, as per the directions in test 13.01.01

Once the Bluetooth device is connected and functioning connect to the wireless network:

Open the ‘TIWLNAPI1’ window by selecting the wireless network icon in the toolbar. This is two monitors with an X over them.

Select a network listed in the ‘Wireless Information’ tab

Select the ‘Connect’ button to open the ‘Wireless Network Properties’ window

Verify the SSID is displayed in the ‘Network Name (SSID):’ value list

Input the applicable Encryption Type and Key

Verify that the “Status” field eventually reads, “Connected to ,<network>”.

Select the ‘IP Information’ tab

Verify the Address Type is DHCP

Verify an IP Address was assigned.

Open a command prompt by selecting Start > Run, typing “cmd”, and pressing Enter.

From the device, ping a known host

Verify a response is received from the known host =

From the known host, ping the device

Verify a response is received from the device

Verify that the Bluetooth device is still functioning

12.08.01 – Wireless driver after suspend / resume

Load Image

Navigate to Start > Suspend

Verify the display device controller is turned off

Push the S2 button (resume board)

Open the ‘TIWLNAPI1’ window by selecting the wireless network icon in the toolbar. This is two monitors with an X over them.

Select a network listed in the ‘Wireless Information’ tab

Select the ‘Connect’ button to open the ‘Wireless Network Properties’ window

Verify the SSID is displayed in the ‘Network Name (SSID):’ value list

Input the applicable Encryption Type and Key

Verify that the “Status” field eventually reads, “Connected to ,<network>”.

Select the ‘IP Information’ tab

Verify the Address Type is DHCP

Verify an IP Address was assigned.

Open a command prompt by selecting Start > Run, typing “cmd”, and pressing Enter.

From the device, ping a known host

Verify a response is received from the known host

From the known host, ping the device

Verify a response is received from the device

Test 13 - Bluetooth Tests

Purpose
This test verifies that the functional requirements for Bluetooth interface are met.

Setup
As preparation for this test, execute the following in sequence:

- Load any standard image
- Attach wireless antenna to socket J3 on SOM.
- Prepare a Bluetooth-capable device (Laptop, Bluetooth adapter, etc) with known Bluetooth address.
- Apple BT Keyboard, BT Mouse, PC with BT

Test Steps
Perform the following subtests and record results in the action log:

13.01.01 – Bluetooth HID - KB/Mouse

POR

Load Image

Navigate to Start > Settings > Control Panel.

Launch the “Bluetooth Device Properties”.

Click “Scan Device” button.

Wait until the “Untrusted” and/or “Trusted” device lists populate.

Verify BT test hardware is discovered

Move known test devices to the “Trusted” device list

Double-Click the BT device in the ‘Trusted’ window

Unselect ‘Encrypt’

Unselect ‘Authenticate’

Select ‘Active’ to enable the device

Verify a red check-mark appears indicating device activation

If BT keyboard:

Navigate to Start > Run

Enter cmd to open a command prompt window

Type characters using the BT Keyboard

Verify the KB is functional

End If BT Keyboard

If BT Mouse:

Exercise the mouse

Verify mouse movement and selection is operable.

Verify touch works by touching the screen

End If BT Mouse

POR

13.02.01 – Bluetooth Personal Area Networking (PAN)

POR

Load Image

On the PC:

Navigate to Start > Control Panel > Bluetooth Devices

In the ‘Bluetooth Devices’ window, select the ‘Options” tab

Under Discovery, select the ‘Turn discovery on’ checkbox

Under Connections, Select ‘Allow Bluetooth devices to connect to this computer’

Select Apply

Select OK

Navigate to Start > Settings > Control Panel.

Launch the “Bluetooth Device Properties”.

Click “Scan Device” button.

Wait until the “Untrusted” and/or “Trusted” device lists populate.

Verify BT test hardware (PC) is discovered

POR

13.03.01 – Bluetooth driver after suspend / resume

POR

Load Image

Navigate to Start > Suspend

Verify the display device controller is turned off

Push the S2 button (resume board)

Navigate to Start > Settings > Control Panel.

Launch the “Bluetooth Device Properties”.

Click “Scan Device” button.

Wait until the “Untrusted” and/or “Trusted” device lists populate.

Verify BT test hardware is discovered

Move known test devices to the “Trusted” device list

Double-Click the BT device in the ‘Trusted’ window

Select ‘Active’ to enable the device

Verify a red check-mark appears indicating device activation

If BT keyboard:

Navigate to Start > Run

Enter cmd to open a command prompt window

Type characters using the BT Keyboard

Verify the KB is functional

End If BT Keyboard

If BT Mouse:

Exercise the mouse

Verify mouse movement and selection is operable.

Verify touch works by touching the screen

End If BT Mouse

Verify that the Bluetooth driver is functional after suspend / resume

Test 14 - DSP Tests

Purpose

This test verifies that DSP software (DSP/BIOS Link (a.k.a. dsplink) and Codec Engine) is working.

Setup

Test Steps

14.01.01 Not applicable to WinCE BSP 3.0.0 – not implemented.

Test 15 - USB OTG Tests

Purpose

This test verifies that the functional requirements for USB OTG host and USB OTG device are met.

Setup

As preparation for this test, the following information is critical:

- On the baseboard, ensure a jumper is not placed at J42.
- Ensure ActiveSync 4.5 is installed on the host PC
- For USB OTG Host tests:
  - A USB OTG Mini-A to Mini-B cable plugged into the device at boot. The Mini-A end should be plugged in to the device. An “A” is embossed on the Mini-A connector end of the cable. The Mini-B connector end of the cable may, or may not, be connected to a device.
  - A USB OTG Mini-A to Standard-A (female) adapter may be used, and must also be plugged into the device at boot. The Mini-A end should be plugged in to the device. The Mini-B connector end of the cable may, or may not, be connected to a device.
- For USB OTG device tests:
  - Logic PD supplies a USB Mini-B to Standard-A (male) cable as part of the development kit. This cable should be used when testing USB OTG device mode. It may or may not be plugged in at boot.

Test Steps

Perform the following subtests and record results in the action log.

USB OTG HOST TESTS

15.01.01 – USB KB after Suspend/Resume

Plug the USB OTG Mini-A to Standard-A (female) adapter into the USB OTG port on the baseboard.

POR

Boot the device and load the RAM image

Plug a USB KB into the USB OTG Mini-A to Standard-A (female) adapter

Select Start > Run.

Type on the USB keyboard.

Verify that characters are entered as you type.

Select Start > Suspend.

Verify the screen goes black

Tap the screen

Verify the Windows CE screen is displayed

Select Start > Run.

Type on the USB keyboard.

Verify that characters are entered as you type.

15.01.02 – USB Mouse after Suspend/Resume

Plug the USB OTG Mini-A to Standard-A (female) adapter into the USB OTG port on the baseboard.

POR

Plug a USB Mouse into the USB OTG Mini-A to Standard-A (female) adapter

Boot the device and load the RAM image

Exercise the mouse

Verify mouse movement and selection is operable.

Select Start > Suspend.

Verify the screen goes black

Tap the screen

Verify the Windows CE screen is displayed

Exercise the mouse

Verify mouse movement and selection is operable.

15.01.03 – USB Mass Storage after Suspend/Resume

POR

Plug the USB OTG Mini-A to Standard-A (female) adapter into the USB OTG port on the baseboard.

Boot the device and load the RAM image

Plug a USB MSD into the USB OTG Mini-A to Standard-A (female) adapter

Select ‘My Device’

Verify the MSD device appears in ‘My Device’

Open a file on the MSD

Verify that the file opened.

Select Start > Suspend.

Verify the screen goes black

Tap the screen

Verify the Windows CE screen is displayed

Select ‘My Device’

Verify the MSD device appears in ‘My Device’

Open a different file on the MSD

Verify that the file opened.

15.02.01 – USB KB detection at run-time and boot

Plug the USB OTG Mini-A to Standard-A (female) adapter into the USB OTG port on the baseboard.

POR

Boot the device and load the RAM image

Plug a USB KB into the USB OTG Mini-A to Standard-A (female) adapter

Select Start > Run.

Type on the USB keyboard.

Verify that characters are entered as you type.

POR

Boot the device and load the RAM image

Select Start > Run.

Type on the USB keyboard.

Verify that characters are entered as you type.

Remove the USB OTG Mini-A to Standard-A (female) adapter + KB

Remove the USB KB from the USB OTG Mini-A to Standard-A (female) adapter

15.02.02 – USB Mouse detection at run-time and boot

Plug the USB OTG Mini-A to Standard-A (female) adapter into the USB OTG port on the baseboard.

POR

Boot the device and load the RAM image

Plug a USB Mouse into the USB OTG Mini-A to Standard-A (female) adapter

Exercise the mouse

Verify mouse movement and selection is operable.

Verify touch works by touching the screen

POR

Boot the device and load the RAM image

Verify mouse movement and selection is operable.

Remove the USB OTG Mini-A to Standard-A (female) adapter + Mouse

Remove the USB Mouse from the USB OTG Mini-A to Standard-A (female) adapter

15.02.03 – USB Powered Hub+KB+Mouse detection at run-time and boot

Plug the USB OTG Mini-A to Standard-A (female) adapter into the USB OTG port on the baseboard.

POR

Boot the device and load the RAM image

Plug a Powered USB Hub into the USB OTG Mini-A to Standard-A (female) adapter

Plug a USB keyboard into the powered USB Hub.

Plug a USB mouse into the powered USB Hub.

Select Start > Run.

Type on the USB keyboard.

Verify that characters are entered as you type.

Exercise the mouse

Verify mouse movement and selection is operable.

POR

Boot the device and load the RAM image

Select Start > Run.

Type on the USB keyboard.

Verify that characters are entered as you type.

Exercise the mouse

Verify mouse movement and selection is operable.

Remove the USB OTG Mini-A to Standard-A (female) adapter + Hub

Remove the USB Powered Hub from the USB OTG Mini-A to Standard-A (female) adapter

Remove the KB and Mouse from the USB Hub.

15.02.04 – USB Powered Hub+MSD1+MSD2 detection at run-time and boot

Plug the USB OTG Mini-A to Standard-A (female) adapter into the USB OTG port on the baseboard.

POR

Boot the device and load the RAM image

Plug a Powered USB Hub into the USB OTG Mini-A to Standard-A (female) adapter

Plug two MSDs into the powered USB Hub.

Select ‘My Device’

Verify ‘Hard Disk’ and ‘Hard Disk2’ are displayed

Open a file on each of the MSD’s

Verify that the file’s opened.

POR

Boot the device and load the RAM image

Select ‘My Device’

Verify ‘Hard Disk’ and ‘Hard Disk2’ are displayed

Open a different file on each of the MSD’s

Verify that the file’s opened.

Remove the USB OTG Mini-A to Standard-A (female) adapter + Hub

Remove the USB Powered Hub from the USB OTG Mini-A to Standard-A (female) adapter

Remove the MSDs from the USB Hub.

POR

15.02.05 – USB UNPowered Hub+KB+Mouse detection at run-time and boot

Plug the USB OTG Mini-A to Standard-A (female) adapter into the USB OTG port on the baseboard.

POR

Boot the device and load the RAM image

Plug a UNPowered USB Hub into the USB OTG Mini-A to Standard-A (female) adapter

Plug a USB keyboard into the USB Hub.

Plug a USB mouse into the USB Hub.

Select Start > Run.

Type on the USB keyboard.

Verify that characters are entered as you type.

Exercise the mouse

Verify mouse movement and selection is operable.

POR

Boot the device and load the RAM image

Select Start > Run.

Type on the USB keyboard.

Verify that characters are entered as you type.

Exercise the mouse

Verify mouse movement and selection is operable.

Remove the USB OTG Mini-A to Standard-A (female) adapter + Hub

Remove the USB Powered Hub from the USB OTG Mini-A to Standard-A (female) adapter

Remove the KB and Mouse from the USB Hub.

POR

15.02.06 – USB UNPowered Hub+MSD1+MSD2 detection at run-time and boot

> **NOTE**: There is a limit of 150mA on the OTG port. If the MSD or a combination of MSDs exceeds this limit, the device(s) will not be recognized.

Plug the USB OTG Mini-A to Standard-A (female) adapter into the USB OTG port on the baseboard.

POR

Boot the device and load the RAM image

Plug an UNPowered USB Hub into the USB OTG Mini-A to Standard-A (female) adapter

Plug two MSDs into the powered USB Hub.

Select ‘My Device’

Verify ‘Hard Disk’ and ‘Hard Disk2’ are displayed

Open a file on each of the MSD’s

Verify that the file’s opened.

POR

Boot the device and load the RAM image

Select ‘My Device’

Verify 'Hard Disk' and 'Hard Disk2' are displayed

Open a different file on each of the MSD's

Verify that the file's opened.

Remove the USB OTG Mini-A to Standard-A (female) adapter + Hub

Remove the USB UNPowered Hub from the USB OTG Mini-A to Standard-A (female) adapter

Remove the MSDs from the USB Hub.

POR

15.02.07 – USB Mass Storage detection at run-time and boot

Plug the USB OTG Mini-A to Standard-A (female) adapter into the USB OTG port on the baseboard.

POR

Boot the device and load the RAM image

Plug a USB MSD into the USB OTG Mini-A to Standard-A (female) adapter

Select 'My Device'

Verify the MSD device appears in 'My Device'

Open a file on the MSD

Verify that the file opened.

POR

Boot the device and load the RAM image

Select 'My Device'

Verify the MSD device appears in 'My Device'

Open a different file on the MSD

Verify that the file opened.

Remove the USB OTG Mini-A to Standard-A (female) adapter + MSD

Remove the USB MSD from the USB OTG Mini-A to Standard-A (female) adapter

POR

15.02.08 – USB OTG insertion / removal

Plug the USB OTG Mini-A to Standard-A (female) adapter into the USB OTG port on the baseboard.

POR

Boot the device.

Plug a USB MSD into the USB OTG adapter in the OTG port on the baseboard.

Select ‘My Device’

Verify the MSD device appears in ‘My Device’

Unplug the USB MSD (device and adapter) from the USB OTG port on the baseboard.

Plug the USB MSD/adapter into the USB OTG port on the baseboard.

Verify the MSD device appears in ‘My Device’

Unplug the USB MSD/adapter

Plug in a USB keyboard/adapter

Navigate to Start > run > ‘cmd’

Verify that the keyboard is functioning

Remove the keyboard/adapter

Plug in the USB keyboard/adapter again

Navigate to Start > run > ‘cmd’

Verify that the keyboard is functioning

Remove the keyboard/adapter

Plug in a USB mouse/adapter

Verify that the mouse is functioning

Unplug the USB mouse/adapter

Plug in the USB mouse/adapter

Verify that the mouse is functioning

15.03 USB SPEC

15.03.01 – USB 1.1 R4-02-01

Verify USB 1.1 devices are functional.

15.03.02 – USB 2.0 R4-02-02

Verify USB 2.0 devices are functional.

15.03.03 – Low Speed R4-02-03

Verify USB Low Speed devices are functional.

15.03.04 – Full Speed R4-02-04

Verify USB Full Speed devices are functional.

15.03.05 – High Speed R4-02-05

Verify USB High Speed devices are functional.

15.04 USB OTG DEVICE

15.04.01 ActiveSync connection and file backed storage system

POR

Boot the device and load the RAM image

On the DUT select Start > Settings > Control Panel > System

Select the memory tab and move the slider so that the available memory is large enough to handle the file that you will copy (move it up to near the top)

Connect the USB OTG standard cable (USB Mini-B to Standard-A). The Mini-B is plugged into the USB OTG port on the device, and the Standard-A is plugged into the host pc.

Verify an ActiveSync connection is established on the host pc.

On the host pc, in the Microsoft ActiveSync window, open the 'Explore' folder icon

Verify the 'Mobile Device' window opens and displays the contents of the DM37x

Copy a file of at least 16 MB in size from the desktop to the device.

On the device, select ‘My Device’

Verify the file is displayed in the ‘My Device’ window

On the host pc, in the Microsoft ActiveSync window:

Verify the file is displayed

On the device, delete the file that was copied

On the host pc, refresh Microsoft ActiveSync window:

Verify the file is not displayed

POR

Test 16 - OAL

Purpose

This test verifies that the functional requirements for the OAL interface are met.

Setup

Test Steps

16.01 OAL

16.01.01 OAL testing is performed via Windows CETK.

16.01.03 RTC / Backup Battery test

To charge the small silver battery on the baseboard, boot to LogicLoader and perform the following steps:

```
#Updated commands using new LogicLoader I2C write

losh> w /b 0x004b006d 0x1c /dev/pm0

exit
#to raise the current more, use this command
losh> w /b 0x004b006d 0x1F /dev/pm0
```

Using a board with a fully charged battery:

POR (if not on)

Double tap the time in the lower left portion of the screen

Set the time to 12.01 pm (seconds don't matter), note the date

Tap 'apply' then tap 'ok'

POR the board and remove the AC power cord

*** Wait one (1) hour before plugging board back in***

Plug the board back in and power on.

Boot WinCE

Double tap the time in the lower left portion of the screen

Verify that the date is the same and the time is around 1:01 pm (depending on how long it was off)

Test 17 - GPIO

Purpose

This test verifies that the functional requirements for the GPIO interface are met.

Setup

Test Steps

17.01.01 - GPIO

GPIO is verified via Test 18.01.01 – Power-Button device driver.

Test 18 - Power-Button Device Driver

Purpose
This test verifies that the functional requirements for Power-Button interface are met.

Setup

Test Steps
Perform the following subtests and record results in the action log:

18.01.01 – OEMPowerOff – S2 button (SOM-LV), S2 button (Torpedo)

POR

Load the RAM image

For the SOM-LV, press the S2 button

For the Torpedo, press the S2 button

Verify that the backlight has been turned off.

For the SOM-LV, press the S2 button

For the Torpedo, press the S2 button

Verify that the backlight turns on.

Verify that the Windows CE desktop appears normal.

Test 19 - LED “Light-Switch” Device Driver

Purpose

This test verifies that the functional requirements for the LED Device Driver interface are met.

Setup

Test Steps

19.01.01 The LED Device Driver is not tested in this release.

Test 20 - NAND Read/Write File Transfer Stress Test

Purpose
This stress test verifies the NAND large-file transfer.

Setup

Test Steps
Here is a NAND stress test you can use to run 24hrs and verify is NAND can hold up to the copy/delete testing. You will need to copy the final file from NAND to the SD Card and check the MD5Sum after the completion of the test.

Nand_st._bat – 90 sec NAND stress test
Nand_stress._bat – 24 hr NAND stress test
SOM_LV_NK.bin - ~27MB BIN file

20.01.01 – NAND Stress Test

FOR DM3730/AM3703 SOM-LV and DM3730/AM3703 TORPEDO SOM:
1. Copy SOM_LV_NK.bin, Nand_stress.bat, and Nand_s.bat from host computer to SD card.
2. If logfiles are required, open a terminal console window and setup logging.
3. Insert SD Card into test device.
4. Boot device, WinCE 6.0 binary image to Windows CE desktop.
5. Open ‘cmd’ prompt (start -> programs -> command prompt).
6. Type ‘call \"SD Card"\Nand_stress.bat’ for full 24 hour test.

FOR SOM-LV:
7. At the completion of the test, copy the SOM_LV_NK.bin4801 file from YAFFS partition to SD from your CE explorer.
8. Use your host computer to copy this to the original SOM_LV_NK.bin file using MD5SUM, if compare is successful, test passes.

FOR TORPEDO:
Writes to SD in CE does not work on Torpedo. There are three methods available to copy the SOM_LV_NK.bin4801 file from the device to the host computer. Please review both methods below and choose the most suitable method based on intended use.

METHOD #1
7. Connect the host computer to the device using ActiveSync and copy SOM_LV_NK.bin4801 from the device to the host computer.

8. Use your host computer to compare SOM_LV_NK.bin4801 to the original SOM_LV_NK.bin file using MD5SUM, if compare is successful, test passes.

OR,

METHOD #2

7. At the completion of the test, rename SOM_LV_NK.bin4801 to a short 8.3 name for LOLO
8. Reboot device into LogicLoader and run the following commands to copy the file from the YAFFS partition.
   a. losh> mount fatfs /dev/sdmmc0a /sd -rw
   b. losh> mount yaffs /dev/nand0 /yp
   c. losh> cp /yp/<short 8.3 filename> /sd/<short 8.3 filename>
9. Use your host computer to compare <short 8.3 filename> to the original SOM_LV_NK.bin file using MD5SUM, if compare is successful, test passes.

OR,

METHOD #3

7. Reboot the SOM into LogicLoader.
8. Mount the NAND
   a. losh> mount yaffs /dev/nand0 /mp
9. Do an md5sum of the file.
   a. losh > md5sum /mp/SOM_LV_NK.bin4801
10. Do an md5sum of the original on the workstation. If the md5sums match, the test passes.

Test 21 - Dynamic Voltage and Frequency Scaling (DVFS)

Purpose

This stress test verifies the DVFS feature.

Setup

Test Steps

21.01.01 – Operating Mode verification

POR

Boot the device and load the RAM image

Open a command window

Enter

```
>cmd
>do opm
```

Verify the dvfs options are displayed

```
>do opm ?
```

Verify the Current Frequencies MPU=800.00 MHz, IVA=660.00 MHz and Core=400.00 MHz

```
>do opm 1 –f
>do opm ?
```

Verify the Current Frequencies MPU=300.00 MHz, IVA=260.00 MHz and Core=400.00 MHz

```
>do opm 2 –f
>do opm ?
```

Verify the Current Frequencies MPU=600.00 MHz, IVA=520.00 MHz and Core=400.00 MHz

```
>do opm 3 –f
>do opm ?
```

Verify the Current Frequencies MPU=800.00 MHz, IVA=660.00 MHz and Core=400.00 MHz

```
>do opm 4 –f
```

```
>do opm ?
```

Verify the Current Frequencies MPU=1000.00 MHz, IVA=800.00 MHz and Core=400.00 MHz

```
>do opm -0 –f
```

Verify the dvfs options are displayed

```
>do opm 7 –f
```

Verify the dvfs options are displayed

```
>do opm 05 –f
```

Verify the dvfs options are displayed

POR

Boot the device and load the RAM image

Open a command window

Enter

```
>cmd
```

```
>do opm ?
```

Verify the Current Frequencies MPU=800.00 MHz, IVA=660.00 MHz and Core=400.00 MHz

POR

Test 22 - Qbench - Performance testing

Purpose
This stress test verifies the NAND large-file transfer.

Setup
Software used for testing:

- QBench Pro Release 1.3 (http://www.qualnetics.com/qbench.php)

The steps below show how to execute the QBench tests on the DM3730/AM3703 SOM-LV and i.MX31 SOM-LV platforms.

22.01.01 - Performance testing

On the workstation, locate the 'testing files' folder in SVN for WinCE600.

In the folder, open the qbench.bat file for editing (it may not say .bat)

In the qbench file are 4 lines for writing results to the log file. You need to replace the name of the image being tested to the SUT and DUT, similar to below. Make sure you do the same thing to all 4 lines:

"\SD Card\OMAP35x_SOM-LV_1016346_svn13930_qblog.log"

➔

"\SD Card\<*windows filename*>_<*som part number*>_<*som type*>_qblog.log"

Save the changed file to an SD card with the SUT on it (do not save it into svn again).

Save a copy of the Q-Bench_Pro_1.3 folder onto the SD card as well.

Insert the SD card and boot to LogicLoader (or boot then insert).

Erase NAND to ensure nothing interferes with testing:

losh > erase /dev/nand0 B0 B4096

Load the windows image being tested:

losh > load bin /sd/<*filename of SUT*>

Boot into Windows:

If DM37x:

losh > exec

if IMX31:

losh> exec rtc:rtc_imx31_pmic:dbg_leds:1:dbg_serial:IMX31_UART:*disp_num:x*

where x = lcd number (i.e.15 or 28)

Once Windows is up and running correctly, insert a USB stick

Open the command line window (type cmd):

Start > Run > cmd

On the command line, start the test by typing the following:

"/SD Card/qbench.bat"

When testing is complete (about 20 - 30 min), remove the sd card, and transfer log files to the PC. Commit them to svn in a folder named "qbench" in the results folder for the SUT.

Test 23 - Performance Tests

Purpose
These tests are intended to document performance measurements.

Test Steps

Perform the following subtests and record results in the action log.

Power measurement

23.01.01 – Power usage per state

***WARNING!!!! THE JUMPER JP6 ON THE SDK2 BASEBOARD *MUST* BE IN THE 2-3 DGND POSITION AND NOT THE 1-2 5V POSITION WHILE USING WATTSON OR THE READINGS WILL BE INCORRECT"**

Boot the system and Load the image.

Connect the DUT to your Workstation using a USB-A to miniUSB-B connector plugged into the PWR MEAS Mini USB port on the baseboard.

Load the Wattson power measurement program on your workstation.

Go to 'My Device' on the SUT in order to ensure system is in full operation mode.

On Wattson, hit the reset button to reset the avg power.

Wait 10 seconds and record the average power consumption on the TPL as (Power – On).

After WinCE has been up for a minute, the screen will dim. After the screen dims, hit the reset on Wattson.

Wait 10 seconds and record the average power consumption on the TPL as (Power – UserIdle).

After WinCE has been up for 6 minutes (1min user idle + 5 min system idle), the screen should turn off.

Wait 10 seconds and record the average power consumption on the TPL as (Power – SystemIdle).

Hit the S2 button to wake up the system.

Hit the S2 button again to put the system into Suspend Mode.

After putting the system into Suspend Mode, hit the reset button in Wattson.

Wait 10 seconds and record the average power consumption on the TPL as (Power – Suspend).

Appendix A: Test Progress Log

The Test Progress log must be appended at the completion of each individual test case. Only five test result qualifiers are permitted. See the section on test requirements and guidelines for additional information. For ease of reference, a list of the acceptable test results has been duplicated here.

The Test Progress Log is an excel spreadsheet under version control.

Pass - Test passes without any indication of failure.

Pass R/L - Test required redlines to the the test procedure to maintain a Pass result.

Concern - Test may or may not have failed due to unexpected or undesired behavior, but is not serious enough to merit a "fail" rating. A concern will be entered into the issue tracking system.

Fail - Test fails and may represent a significant issue. A failure will be entered into the issue tracking system.

Blocked - Unable to execute test (prevented by some other error, not supported by the model, etc.). Depending on the reason, blocked issues may need to be entered into the issue tracking system.

na – Test is not applicable. See comments for reason the test is na.

Example Entries

The following are examples of proper Test Progress Log entries. Note that all of the tests that are not recorded as "PASS" in the Progress Log would also be documented with greater detail in the issue tracking system.

Test #	Test Results	Issue #	Test Date	Initials	Execution Time (hour)	Notes
02.01	Pass		5/7/9	DVE	.25	
02.02	Fail	JIRA-1234	5/7/9	DVE	1.5	
02.03	Concern	JIRA-1235	5/7/9	DVE	.5	Could be SRS or SW or HW issue
02.04	Pass		5/7/9	DVE	1.75	
02.05	Blocked		5/7/9	DVE	.25	Hardware unavailable
02.06	Blocked	JIRA-1240	5/7/9	DVE	2.0	Hardware became too hot

Appendix B: Procedure to load a HIVE Image and access the Remote Registry Editor

POR

losh> ifconfig sm0 dhcp

losh> ifconfig

losh> bootme &

On the pc, open MS Visual Studio

Select Target > Connectivity Options

In the drop down for both Download and Transport settings, select Ethernet

Select the Settings button by the Download Ethernet selection

In the ‘Ethernet Download Settings’ selection box, select the applicable Active target device (note: In the losh shell, following the bootme command, the device name will be displayed)

Select OK

Select Close

Select Target > Attach Device

Browse for the applicable **Hive** image and select Open

When the image has downloaded, in the losh shell:

losh> exec

When the Windows shell is displayed on the device, connect a USB Standard-A to mini-A cable to establish an ActiveSync connection with the pc. The Standard-A connector to the pc, and the mini-A to the device. Ensure the ActiveSync connection was successful.

In MS Visual Studio, select Target > Remote Tools > Registry Editor

In the ‘Select a Windows CE Device’ window, select New Device, then OK

In the ‘Windows CE Remote Registry Editor’ Expand ‘New Device’

Navigate to the Registry path and update the value (see test specific information)

Close the ‘Windows CE Remote Registry Editor’ window

For the SOM-LV, press the S2 button on the device (Suspend)

For the Torpedo, press the S2 button on the device (Suspend)

Remove the USB Standard-A to mini-A cable from the device

POR

losh> ifconfig sm0 dhcp

losh> ifconfig

losh> bootme &

On the pc, verify the image is downloaded

When the image has downloaded, in the losh shell:

losh> exec