Serial ATA
International Organization

Version 1.0
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Serial ATA Interoperability Program Revision 1.4
ULINK MOI for Host Digital Test (ASR, IPM)

Revision History

Revision	Date	Comments
0.7	04/09/2007	Initial draft
0.8	05/18/2007	• Add the procedure of HIPM invoked from Host under Test if HIPM is supported by HUT • Add Appendix on the monitoring procedure for Lecroy CATC Bus Analyzer
0.9	09/11/2007	• Minor update to clarify several definitions • Update the measurement for Lecroy CATC Bus Analyzer
0.91	01/03/2008	Add Appendix on the monitoring procedure for Finisar Bus Analyzer
1.0RC	05/29/2008	Approved by Logo Group and take it to Rev. 1.3 • Change the Interoperability Program Revision from 1.2 to 1.3 • Give out the version number of Drive Master and Script set for this Rev. • Remove VIA VT3353 from the support list since this version of Drive Master for this Rev. hasn't included the correct VIA Chip ID yet. • Appendix D: Add the clarification on monitoring procedure described in this section is for Lecroy CATC Bus Analyzer • Appendix D: CATC IPM-01/09: remove the line in step l and correct the numbering • Appendix D/E: CATC/Finisar IPM-05/06: step i: Clarify the number of PMACK should not be greater than 16
1.0	07/10/2008	Version 1.0 Final for Program Rev. 1.3
1.0.1	09/09/2008	• Resource Requirement regarding the supported OS versions • DriveMaster and Script version number update • HIPM invoke method message box to allow user to select Manual method besides automatic method by ULINK or Vendor tool • HBA Requirement regarding the supported HBAs • ASR-03: extend the wait time from 2 second to 10 second • IPM-01/02/03: merge HIPM Enable (HIPM_En.ens) and HIPM Disable(HIPM_Dis.ens) control into one (HIPM.ens)
0.88	05/02/2009	• Add the support for the changes in UTD 1.4
0.98	07/10/2009	• Add Appendix on the monitoring procedure for SerialTek and Finisar Xgig Protocol Analyzers
1.0RC	07/30/2009	Approved by Logo Group for Program Rev. 1.4
1.0	09/03/09	Version 1.0 Final for Program Rev. 1.4

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ACKNOWLEDGMENTS

The SATA-IO would like to acknowledge the efforts of the following individuals in the development of this test suite.

Yun Wang
yun.wang@ulinktech.com
ULINK Technology, Inc.

REFERENCES

The following documents are referenced in this text:

[1] Serial ATA Revision 3.0
[2] Serial ATA Interoperability Program Unified Test Document Revision 1.4
[3] Serial ATA Interoperability Program Policy Document Revision 1.4

Test Title: SATA-IO IL Host tests

Purpose: Verify that ***H***ost ***U***nder ***T***est (HUT) meets the Digital test requirements described in Serial ATA Interoperability Program Unified Test Document Revision 1.4

Resource Requirements:

1. SATA Host Under Test
2. ULINK SATA Explorer
3. Serial ATA cables
4. Bus Analyzer (or Scope) for ASR/IPM tests
5. Mandatory System for ***T***est ***C***ontrol (System TC):
   a. Motherboard with SATA Controller based on the Intel ICH7R or above chipset
   b. Windows - XP, 2003 or Vista Operating System
   c. 256MB RAM or higher
   d. Minimum 64 MB video card, 128 MB is recommended
   e. At least 150MB free space for system drive
   f. ULINK DriveMaster 2010 with USB key
6. If HUT supports HIPM and it is in the support list of ULINK DriveMaster (See details in Appendix B for HBA support list by ULINK DriveMaster), a System for ***H***ost ***U***nder ***T***est (System HUT) will be needed
   a. If HUT is a motherboard, Windows XP, 2003 or Vista Operating System needs to be installed
   b. If HUT is an add-on card, it needs to be plugged into the system with OS installed
   c. Other requirements for this system are same as the items c-g for System TC
7. If HUT supports HIPM, but it is not in the support list of ULINK DriveMaster, vendor should prepare its own tool in order to put HUT into IPM mode
8. If HUT doesn't support HIPM, the System (System HUT) will not be needed.

Note: In this case, it is recommended that the system is booted into BIOS mode instead of going to Operating System.

**Optional:
One PCI to ATA or PCI to SATA (Depends on the system drive) add-on card
See details in Appendix B

ULINK DriveMaster HBA support List:
See details in Appendix B

Software Revision Number:
ULINK DriveMaster 2010 : version 5.0.850
ULINK SATAIO-IL Digital Host Test Script: version 1.4

Last Modification: 05/8/2009

Test Setup:

1. Connect system drive to add-on controller or Parallel ATA port
2. Connect the Initiator port of ULINK SATA EXPLORER to Port 0 of System for Test Control (System TC, e.g. Intel ICH7R) by using Serial ATA cable
3. Connect the Target (Device) port of Bus Analyzer to the Target port of ULINK SATA EXPLORER by using Serial ATA cable
4. Connect Host Under Test (System HUT) to the Initiator (Host) port of Bus Analyzer by using Serial ATA Cable
5. Insert DriveMaster 2010 Pro USB key into a USB port

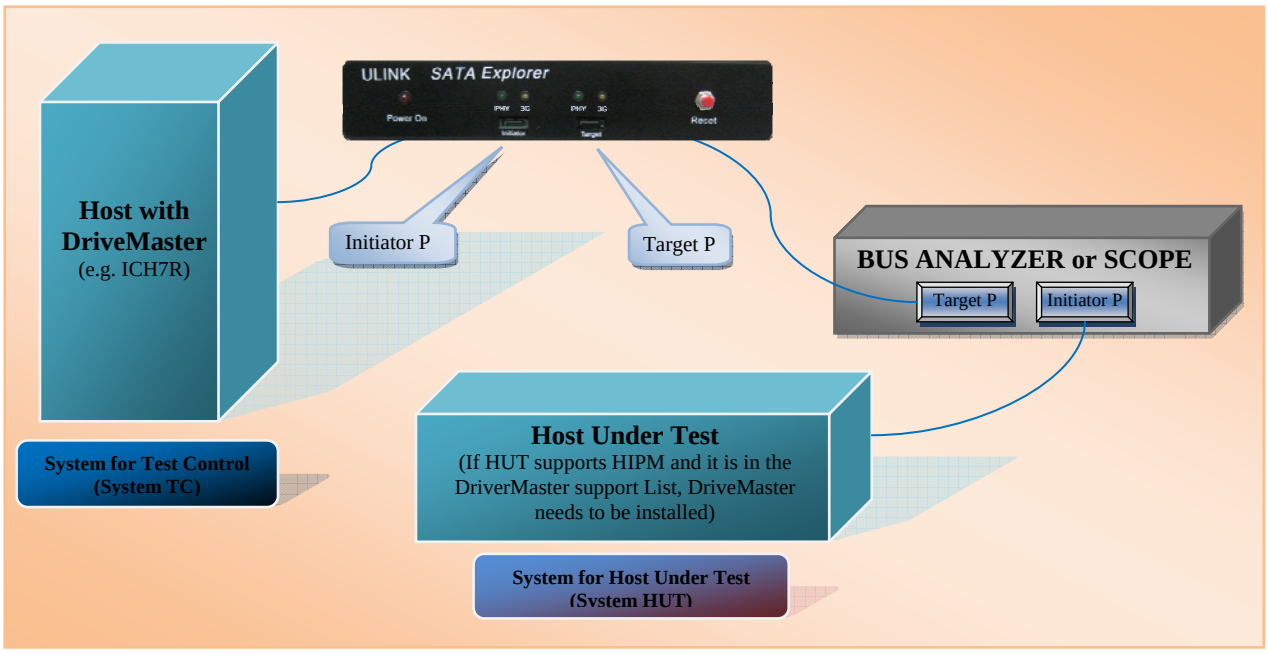

Figure: ULINK Host Digital Test Configuration

Test Procedure:

1. Start DriveMaster 2010 by double-clicking "DriveMaster 2010" icon on the desktop or by selecting from the Start Menu:
   Start / All Programs / ULINK DriveMaster 2010/ DriveMaster 2010
2. Wait for "DriveMaster 2010" window to pop up. Click "Yes" if the current selected HBA is the one you want to use for the testing, else click No and select the matching HBA from the list.
3. Under the 'File' menu in DriveMaster 2010, click 'Open' to select the script. Select "SATAILMain_Selective.ens" or "SATAILMain_Auto.ens" from the folder where the scripts are stored.
   Note: It is recommended that you choose "SATAILMain_Selective.ens" to better customize your testing. See details in Appendix A.
4. Click Run button.
5. Enter Test ID number for Host Under Test, and click OK
6. Select Optional tests from the following message boxes and click OK.
   Does Host Under Test support ASR?
   Does Host Under Test support HIPM?
   Does Host Under Test support DIPM?
   Note: 0:No; 1: Yes; Default: 1
7. If HUT supports HIPM, select one of the following options:
   0: Automatically invoked by ULINK/Vendor Tool; 1: Manually Invoked; Default: 0
8. If HUT supports HIPM, when you see the following messages
   "Please enable Partial mode on Host under Test"
   "Please enable Slumber mode on Host under Test"
   "Please disable HIPM on Host under Test"
   Please perform proper action on Host under Test (see details in Appendix C)
9. If HUT supports HIPM and/or DIPM, correctly response the folllowing messages
   "Please input the Highest Signaling Speed Host Under Test supports (1:Gen-1; 2:Gen-2; 3:Gen-3 and so on; Default:2)"
   "Does Host Under Test support Gen-n Signaling Speed (0:NO; 1:YES; Default:1)?" (n>=1 and n <= the Highest speed supported)
10. When you see the message box "Please start capture", configure and start recording from Bus Analyzer (or Scope) according to the corresponding equipment's MOI (e.g. Appendix D,E,F,G), then click OK

11. When you see the message box “Please stop capture”, stop recording from Bus Analyzer (or Scope) and collect the necessary test results, then click OK.
    Note: The messages in Item 8 and 9 will be prompted during ASR/IPM tests.
12. Exit DriveMaster 2010 when tests are completed.

Test Results:

Test results can be retrieved from c:\SATAILTest\DGT according to the Test ID in log and csv format.

Measurement Tolerance: N/A

Only PASS/FAIL in Digital Test

Approximate Execution Time:

10~20 minutes

Possible Problems:

Appendix A: SCRIPTS

Scripts Dependency

ULINK SATA-IO IL Digital Test Scripts v1.4 can only be run on DriveMaster 2010 v5.0.850. If the version number does not have the exact match, the test will exit and an error message will be shown on the log window.

Scripts Selection

SATAILMain_Selective.ens involves interactive response from the tester. It requires the tester to enter input into the pop-up message box each time to continue the testing.

SATAILMain_Auto.ens will automatically select the default setting of message box in 30 seconds if there is no response from the tester.

Appendix B: Additional Resources Details

PCI to ATA/SATA add-on controller card

If a Parallel ATA hard drive is used as system drive, connect system drive to the Parallel ATA port on the motherboard. If Parallel ATA port is not available, then use a PCI to ATA add-on controller card.

If a Serial ATA Hard Drive is used as system drive, connect system drive to a PCI to SATA add-on controller card.

HBA Support List

ULINK DriveMaster 2010 supports the following HBAs:

1. Intel ICH4 and above, including IDE, AHCI and RAID modes
2. All the HBAs complied with standard AHCI spec.
3. Silicon Image 3124 (PCI-X), 3132 (PCI-E), 3531(PCI-E)
4. Marvell 6081(PCI-X), 61xx(PCI-E)
5. All the HBAs complied with the vendor specs. in item 3 and 4
6. VIA VT5324

HBA Requirement for Mandatory System (System TC)

To minimize the impact to Product Under Test from HBAs (such as the limitations or bugs related to the specific HBAs) and maximize the automation of Digital Tests, ICH7R or above AHCI is currently chosen for Mandatory System (System TC).

Appendix C: Test Procedure

Purpose: Describe ULINK test procedure which complies with Serial ATA Interoperability Program Unified Test Document Revision 1.4

Last Modification: 05/08/2009

ASR-03 : COMRESET OOB Interval

a. A Message Box "Please start capture from Bus-Analyzer or Scope, then click OK!" will be prompted
b. When Bus Analyzer or Scope has set up ready, and OK is clicked by user, the script will continue
c. Put ULINK SATA EXPLORER into Phy Offline mode and wait for 10 second
d. A Message Box "Please stop capture from Bus-Analyzer or Scope, then click OK!" will be prompted
e. After user click "OK", get Host back to normal communication mode
f. Verify the host sending COMRESET repeatable and no faster than 10 ms by checking the capture from Bus Analyzer or Scope (see detail in the corresponding equipment's MOI, e.g. Appendix D,E,F,G)

IPM-01: Partial State exit latency (Host Initiated)

a. If HIPM is not supported by Host, test exits.
b. The Message Box "Please enable Partial Mode on Host under Test if needed, then click OK" will be prompted.
c. If HUT is in the support list of DriveMaster
   - On System HUT, launch DriveMaster and load the script "HIPM.ens", then click "Run" button on the tool bar
   - The Message Box "Select IPM Mode 1: Partial; 2: Slumber; 3. Disable HIPM (default: 1)" will be prompted
   - Enter 1 for Partial mode, and then click OK. DriveMaster will invoke PMREQ_P from Host under Test
d. If HUT is not in the support list of DriveMaster
   - Vendor of HUT needs to use its own tool to invoke PMREQ_P from Host under Test
e. On the System TC, click OK for the message in item b to let the script continue
f. Find out the method that Partial State will be invoked by host:
   - Wait up to 10 seconds
     - Wait for up to 10 second or until Partial state is detected, then wake up the host
     - Run the above sequences for 10 loops and get the Maximum value of the timer.
     - If Partial state is detected at 80% or above, this method is valid; otherwise, this method is invalid
g. If fail to find the method that Partial State will be invoked by host, test exits
h. A Message Box "Please start capture from Bus-Analyzer or Scope, then click OK!" will be prompted
i. When Bus Analyzer or Scope has set up ready, and OK is clicked by user, the script will start the following test in 10 loops
j. Using the method that Partial State will be invoked by the host, check and log IPM status
k. If Partial state is detected, wake up the host, and make sure the host is in Active mode
l. The script may process necessary recovery to make sure the host is ready for next command
m. A Message Box "Please stop capture from Bus-Analyzer or Scope, then click OK!" will be prompted when 10 loops are done
n. User should click "OK" to move onto the next test
o. Verify exit latency from Partial State is within 10 us by checking the capture from Bus Analyzer or Scope (see detail in the corresponding equipment's MOI, e.g. Appendix D,E,F,G)

IPM-02: Slumber State exit latency (Host Initiated)

a. If HIPM is not supported by Host, test exits.
b. The Message Box "Please enable Slumber Mode on Host under Test if needed, then click OK" will be prompted.
c. If HUT is in the support list of DriveMaster
   - On System HUT, launch DriveMaster and load the script "HIPM.ens", then click "Run" button on the tool bar
   - The Message Box "Select IPM Mode 1: Partial; 2: Slumber; 3. Disable HIPM (default: 1)" will be prompted
   - Enter 2 for Slumber mode, and then click OK. DriveMaster will invoke PMREQ_S from Host under Test
d. If HUT is not in the support list of DriveMaster
   - Vendor of HUT needs to use its own tool to invoke PMREQ_S from Host under Test
e. On the System TC, click OK for the message in item b to let the script continue.
f. Find out the method that Slumber State will be invoked by host:
   - Wait up to 10 seconds
     - Wait for up to 10 second or until Slumber state is detected, then wake up the host
     - Run the above sequences for 10 loops and get the Maximum value of the timer.
     - If Slumber state is detected at 80% or above, this method is valid; otherwise, this method is invalid
g. If fail to find the method that Slumber State will be invoked by host, test exits
h. A Message Box "Please start capture from Bus-Analyzer or Scope, then click OK!" will be prompted
i. When Bus Analyzer or Scope has set up ready, and OK is clicked by user, the script will start the following test in 10 loops
j. Using the method that Slumber State will be invoked by the host, check and log IPM status
k. If Slumber state is detected, wake up the host, and make sure the host is in Active mode
l. The script may process necessary recovery to make sure the host is ready for next command
m. A Message Box "Please stop capture from Bus-Analyzer or Scope, then click OK!" will be prompted when 10 loops are done
n. User should click "OK" to move onto the next test
o. Verify exit latency from Slumber State is within 10 ms by checking the capture from Bus Analyzer or Scope (see detail in the corresponding equipment's MOI, e.g. Appendix D,E,F,G)

IPM-03: Speed matching upon Resume (Host Initiated)

Note: Each test case will be run in 10 loops

a. If HIPM is not supported by Host, test exits.
b. Set ULINK SATA EXPLORER to "No speed negotiation restrictions" mode
c. Reset ULINK SATA EXPLORER and make sure that it is ready
d. Check the current speed
e. The Message Box
   "Please enable Partial Mode on Host under Test if needed, then click OK"
   "Please enable Slumber Mode on Host under Test if needed, then click OK"
   will be prompted when the testing verifies the speed resuming from the corresponding mode.
f. If HUT is in the support list of DriveMaster
   - On System HUT, launch DriveMaster and load the script "HIPM.ens", then click "Run" button on the tool bar
   - The Message Box "Select IPM Mode 1: Partial; 2: Slumber; 3. Disable HIPM (default: 1)" will be prompted
   - Enter 1 for Partial mode or 2 for Slumber mode, and then click OK. DriveMaster will invoke PMREQ_P/PMREQ_S from Host under Test
g. If HUT is not in the support list of DriveMaster
   - Vendor of HUT needs to use its own tool to invoke PMREQ_P/PMREQ_S properly from Host under Test according to the instruction of the above messages in item d.
h. On the System TC, click OK for the message in item d to let the script continue.
i. Find out the method that Partial/Slumber State will be invoked by host:
   - Wait up to 10 seconds
     - Wait for up to 10 second or until Partial/Slumber state is detected, then wake up the host
     - Run the above sequences for 10 loops and get the Maximum value of the timer.
     - If Slumber state is detected at 80% or above, this method is valid; otherwise, this method is invalid
j. If fail to find the method that Partial/Slumber State will be invoked by host, test exits
k. Resume from Partial/Slumber State
   - Using the method that Partial/Slumber State will be invoked by the host, check IPM status
   - If Partial/Slumber state is detected, wake up the host, and make sure the host is in Active mode
   - The script may process necessary recovery to make sure the host is ready for next command
   - Check the current speed, if it is not the same as item d., Log "FAIL", current setting and expected setting
l. If HUT supports Gen-2 and above signaling speed, and the current ULINK SATA EXPLORER is Gen-n (n>=2), limit the speed negotiation to a rate not greater than Gen-(n-1) (n>=2, and the smaller value of maximum signaling speed supported by Host and ULINK SATA EXPLORER) respectively until Gen-1 communication rate, re-do the item d to k for every speed established.
m. If all the test cases are passed, Log "PASS"
n. The Message Box "Please disable HIPM on Host under Test if needed, then click OK" will be prompted.
o. If HUT is in the support list of DriveMaster
   - On System HUT, launch DriveMaster and load the script "HIPM.ens", then click "Run" button on the tool bar
   - The Message Box "Select IPM Mode 1: Partial; 2: Slumber; Disable HIPM (default: 1)" will be prompted

- Enter 3 for Disable HIPM, and then click OK. DriveMaster will disable HIPM from Host under Test

p. If HUT is not in the support list of DriveMaster
   - Vendor of HUT needs to use its own tool to disable HIPM feature

IPM-04: Lack of IPM support

Note: Each test case will be run in 10 loops

a. If DIPM is supported by Host, test exits.
b. Check the host response to PMREQ_P
   - Issue PMREQ_P, check and log IPM status
   - If Partial state is detected, issue COMWAKE, and Log “FAIL”
   - The script may process necessary recovery to make sure the host is ready for next command
c. Check the host response to PMREQ_S
   - Issue PMREQ_S, check and log IPM status
   - If Slumber state is detected, issue COMWAKE, and Log “FAIL”
   - The script may process necessary recovery to make sure the host is ready for next command
d. If no failure is detected, Log “PASS”

IPM-05: Host response to PMREQ_P

a. If DIPM is not supported by Host, test exits.
b. A Message Box "Please start capture from Bus-Analyzer or Scope, then click OK!" will be prompted
c. When Bus Analyzer or Scope has set up ready, and OK is clicked by user, the script will start the following test in 10 loops
d. Issue PMREQ_P, check and log IPM status
e. If Partial state is detected, issue COMWAKE
f. The script may process necessary recovery to make sure the host is ready for next command
g. A Message Box "Please stop capture from Bus-Analyzer or Scope, then click OK!" will be prompted when 10 loops are done
h. User should click "OK" to move onto the next test
i. Verify there are at least 4 PMACK primitives or PMNAK primitive to respond PMREQ_P by checking the capture from Bus Analyzer or Scope (see detail in the corresponding equipment's MOI, e.g. Appendix D,E,F,G).

IPM-06: Host response to PMREQ_S

a. If DIPM is not supported by Host, test exits.
b. A Message Box "Please start capture from Bus-Analyzer or Scope, then click OK!" will be prompted
c. When Bus Analyzer or Scope has set up ready, and OK is clicked by user, the script will start the following test in 10 loops
d. Issue PMREQ_S, check and log IPM status
e. If Slumber state is detected, issue COMWAKE
f. The script may process necessary recovery to make sure the host is ready for next command
g. A Message Box "Please stop capture from Bus-Analyzer or Scope, then click OK!" will be prompted when 10 loops are done
h. User should click "OK" to move onto the next test
i. Verify there are at least 4 PMACK primitives or PMNAK primitive to respond PMREQ_S by checking the capture from Bus Analyzer or Scope (see detail in the corresponding equipment's MOI, e.g. Appendix D,E,F,G).

IPM-07: Default setting for device Initiated requests

N/A for Host test

IPM-08: Device Initiated Power Management enable/disable

N/A for Host Test.

IPM-09: Partial State exit latency (Device Initiated)

a. If DIPM is not supported by Host, test exits.
b. A Message Box "Please start capture from Bus-Analyzer or Scope, then click OK!" will be prompted
c. When Bus Analyzer or Scope has set up ready, and OK is clicked by user, the script will start the following test in 10 loops
d. Issue PMREQ_P, check and log IPM status
e. If Partial state is detected, issue COMWAKE
f. The script may process necessary recovery to make sure the host is ready for next command
g. A Message Box "Please stop capture from Bus-Analyzer or Scope, then click OK!" will be prompted when 10 loops are done
h. User should click "OK" to move onto the next test
i. Verify exit latency from Partial State is within 10 us by checking the capture from Bus Analyzer or Scope (see detail in the corresponding equipment's MOI, e.g. Appendix D,E,F,G)

IPM-10: Slumber State exit latency (Device Initiated)

a. If DIPM is not supported by Host, test exits.
b. A Message Box "Please start capture from Bus-Analyzer or Scope, then click OK!" will be prompted
c. When Bus Analyzer or Scope has set up ready, and OK is clicked by user, the script will start the following test in 10 loops
d. Issue PMREQ_S, check and log IPM status
e. If Slumber state is detected, issue COMWAKE
f. The script may process necessary recovery to make sure the host is ready for next command
g. A Message Box "Please stop capture from Bus-Analyzer or Scope, then click OK!" will be prompted when 10 loops are done
h. User should click "OK" to move onto the next test
i. Verify exit latency from Slumber State is within 10 ms by checking the capture from Bus Analyzer or Scope (see detail in the corresponding equipment's MOI, e.g. Appendix D,E,F,G).

IPM-11: Speed matching upon Resume (Device Initiated)

Note: Each test case will be run in 10 loops

a. If DIPM is not supported by Host, test exits.
b. Set ULINK SATA EXPLORER to "No speed negotiation restrictions" mode
c. Reset ULINK SATA EXPLORER and make sure that it is ready
d. Check the current speed
e. Perform the following tests:
   - Resume from Partial State
     - Issue PMREQ_P, check IPM status
     - If Partial state is detected, issue COMWAKE
     - The script may process necessary recovery to make sure the host is ready for next command
     - Check the current speed, if it is not the same as item d., Log "FAIL", current setting and expected setting
   - Resume from Slumber State
     - Issue PMREQ_S, check IPM status
     - If Slumber state is detected, issue COMWAKE
     - The script may process necessary recovery to make sure the host is ready for next command
f. Check the current speed, if it is not the same as item d., Log "FAIL", current setting and expected setting. If HUT supports Gen-2 and above signaling speed, and the current ULINK SATA EXPLORER is Gen-n (n>=2), limit the speed negotiation to a rate not greater than Gen-(n-1) (n>=2, and the smaller value of maximum signaling speed supported by Host and ULINK SATA EXPLORER) respectively until Gen-1 communication rate, re-do the item c and d for every speed established.
g. If all the test cases are passed, Log "PASS"

Appendix D: Monitoring Procedure for LeCroy CATC

Purpose: Describe the monitoring procedure for LeCroy CATC

Resource Requirements:

- A system with LeCroy CATC software installed
- LeCroy SATracer SATA Protocol Analyzer

Last Modification: 05/29/2008

ASR-03: COMRESET OOB Interval

a. Wait for DriveMaster prompt a message box "Please start capture from Bus-Analyzer or Scope, and then click OK!"
b. In the LeCroy SATracer window, select "Setup" menu -> "Recording Options…".
   - Under "General" Tab, select the "Event Trigger" radio button.
   - It is recommended to use 256 MB for "Buffer Size."
   - Under "Recording Rules" Tab, select "New Event" -> "Bus Conditions and OOB Signals". Drag and drop the "Bus Condition" icon into the light blue "Global State" field.
   - Right click the "Bus Condition" icon and select "Properties…".
   - In the "Event Properties" dialog,
     - Under "Bus Condition" Tab, select "COMINT/COMRESET" in the "OOB Signals" box and select all channels under "Channels" on the left.
     - Under "Actions" Tab, select "Trigger Analyzer" in "Internal Triggering" box
     - Close "Event Properties" dialog.
   - Click "OK" to close the "Recording Options" dialog.
c. Click the "Start Recording" button in the SATracer application
d. Click "OK" in DriveMaster for message box in item a to let DriveMaster continue
e. Wait for DriveMaster prompt a message box "Please stop capture from Bus-Analyzer or Scope, then click OK!"
f. In the LeCroy SATracer window, click the "Stop Recording" button. Allow the trace to upload to the Host System. Save the trace.
g. Click "OK" in the DriveMaster for the message in item f to let DriveMaster continue
h. In the trace displayed in the LeCroy SATracer window, identify the Frame Number for the first through tenth COMRESET signals sent from Host under Test.
i. Under the "Report" menu, select "Timing Calculations". In the Timing Calculations dialog, enter the Frame Number of two consecutive COMRESET under "From Beginning of:" and "To Beginning of:" click the "Calculate" button. Repeat this for all ten intervals between COMRESET signals.
j. The "Total Time" will display the time from the beginning of the first COMRESET to the beginning of the second COMRESET from Host under Test.
k. Add 0.00230 msec (a nominal COMRESET time) to the value in item j.
l. If none of the time calculated in the above steps will be faster (smaller) than 10 ms, this case will be passed.
m. Report the worst-case result (the smallest) in the result summary sheet.

IPM-01: Partial State exit latency (Host Initiated)
IPM-09: Partial State exit latency (Device Initiated)

a. Wait for DriveMaster prompt a message box "Please start capture from Bus-Analyzer or Scope, and then click OK!"
b. In the LeCroy SATracer window, select "Setup" menu -> "Recording Options…".
   - Under "General" Tab, select the "Event Trigger" radio button.
   - It is recommended to use 256 MB for "Buffer Size."
   - Under "Recording Rules" Tab, select "New Event" -> "Primitives". Drag and drop the "Primitives" icon into the light blue "Global State" field.
   - Right click the "Primitives" icon and select "Properties…"
   - In the "Event Properties" dialog,
     - Under "Primitives" Tab, select "PMREQ_P" and select all channels under "Channels" on the left.
     - Under "Actions" Tab, select "Trigger Analyzer" in "Internal Triggering" box
     - Close "Event Properties" dialog.
   - It is recommended to filter out some unnecessary information such as "SYNC" and "FLOW CTRL PRIMATIVE"
   - Click "OK" to close the "Recording Options" dialog.
c. Click the "Start Recording" button in the SATracer application
d. Click "OK" in DriveMaster for message box in item a to let DriveMaster continue
e. Wait for DriveMaster prompt a message box "Please stop capture from Bus-Analyzer or Scope, and then click OK!"
f. In the LeCroy SATracer window, click the "Stop Recording" button. Allow the trace to upload to the Host System. Save the trace.
g. Click "OK" in the DriveMaster for the message in item f to let DriveMaster continue
h. In the trace displayed, first, identify the Frame Number for the first COMWAKE signal transmitted by ULINK SATA EXPLORER after PMREQ_P. Next identify the frame number of ALIGN signal transmitted by the HUT after the previous COMWAKE
i. Under the "Report" menu, select "Timing Calculations". In the "Timing Calculator" dialog, enter the Frame Number properly from the above identification. Click the "Calculate" button to get the measured timing of waking up.
j. Subtract 1.21 usec (a nominal COMWAKE time) from the measured value in item i.
k. Repeat item h to j for all ten intervals.
l. If none of the time calculated in the above steps will be larger than 10 us, this case will be passed.
m. Report the worst-case result (the largest) in the result summary sheet.

IPM-02: Slumber State exit latency (Host Initiated)
IPM-10: Slumber State exit latency (Device Initiated)

a. Wait for DriveMaster prompt a message box "Please start capture from Bus-Analyzer or Scope, and then click OK!"
b. In the LeCroy SATracer window, select "Setup" menu -> "Recording Options…".
   - Under "General" Tab, select the "Event Trigger" radio button.
   - It is recommended to use 384 MB for "Buffer Size."
   - Under "Recording Rules" Tab, select "New Event" -> "Primitives". Drag and drop the "Primitives" icon into the light blue "Global State" field.
   - Right click the "Primitives" icon and select "Properties…"
   - In the "Event Properties" dialog,
     - Under "Primitives" Tab, select "PMREQ_S" and select all channels under "Channels" on the left.
     - Under "Actions" Tab, select "Trigger Analyzer" in "Internal Triggering" box
     - Close "Event Properties" dialog.
   - It is recommended to filter out some unnecessary information such as "SYNC" and "FLOW CTRL PRIMATIVE"
   - Click "OK" to close the "Recording Options" dialog.
c. Click the "Start Recording" button in the SATracer application
d. Click "OK" in DriveMaster for message box in item a to let DriveMaster continue
e. Wait for DriveMaster prompt a message box "Please stop capture from Bus-Analyzer or Scope, and then click OK!"
f. In the LeCroy SATracer window, click the "Stop Recording" button. Allow the trace to upload to the Host System. Save the trace.
g. Click "OK" in the DriveMaster for the message in item f to let DriveMaster continue
h. In the trace displayed, first, identify the Frame Number for the first COMWAKE signal transmitted by ULINK SATA EXPLORER after PMREQ_S. Next identify the frame number of ALIGN signal transmitted by the HUT after the previous COMWAKE
i. Under the "Report" menu, select "Timing Calculations". In the "Timing Calculator" dialog, enter the Frame Number properly from the above identification. Click the "Calculate" button to get the measured timing of waking up.
j. Subtract 1.21 usec (a nominal COMWAKE time) from the measured value in item i.
k. Repeat item h to j for all ten intervals.
l. If none of the time calculated in the above steps will be larger than 10 ms, this case will be passed.
m. Report the worst-case result (the largest) in the result summary sheet.

IPM-05: Host response to PMREQ_P
IPM-06: Host response to PMREQ_S

a. Wait for DriveMaster prompt a message box “Please start capture from Bus-Analyzer or Scope, and then click OK!”
b. In the LeCroy SATracer window, select “Setup” menu -> “Recording Options…”.
   - Under “General” Tab, select the “Event Trigger” radio button.
   - It is recommended to use 256 MB for “Buffer Size.”
   - Under “Recording Rules” Tab, select “New Event” -> “Primitives”. Drag and drop the “Primitives” icon into the light blue “Global State” field.
   - Right click the “Primitives” icon and select “Properties…”
   - In the “Event Properties” dialog,
     - Under “Primitives” Tab, select “PMREQ_P”(IPM-05)/“PMREQ_S”(IPM-06) and select all channels under “Channels” on the left.
     - Under “Actions” Tab, select “Trigger Analyzer” in “Internal Triggering” box
     - Close “Event Properties” dialog.
   - It is recommended to filter out some unnecessary information such as “ALIGN”, “SYNC” and “FLOW CTRL PRIMATIVE”
   - Click “OK” to close the “Recording Options” dialog.
c. Click the “Start Recording” button in the SATracer application
d. Click “OK” in DriveMaster for message box in item a to let DriveMaster continue
e. Wait for DriveMaster prompt a message box “Please stop capture from Bus-Analyzer or Scope, and then click OK!”
f. In the LeCroy SATracer window, click the “Stop Recording” button. Allow the trace to upload to the Host System. Save the trace.
g. Click “OK” in the DriveMaster for the message in item f to let DriveMaster continue
h. In the trace displayed in the LeCroy SATracer window, identify the Frame Number for the first “PMREQ_P”(IPM-05)/“PMREQ_S”(IPM-06) which the analyzer triggered on. Next identify whether PMNAK or PMACK primitive is transmitted by Host under Test in response to the “PMREQ_P”(IPM-05)/“PMREQ_S”(IPM-06).
i. If PMNAK or at least 4 PMACK primitives are transmitted in each of ten loops, the test will be “passed”.

Appendix E: Monitoring Procedure for Finisar Bus Doctor

Purpose: Describe the monitoring procedure for Finisar Bus Doctor

Resource Requirements:

- A system with Finisar Bus Doctor software installed
- Finisar Bus Doctor SATA Protocol Analyzer

Last Modification: 05/28/2008

ASR-03: COMRESET OOB Interval

a. Wait for DriveMaster prompt a message box "Please start capture from Bus-Analyzer or Scope, and then click OK!"
b. In the Finisar Bus Doctor window, select "File" menu -> "New Analyzer Window…", "Select Analyzer" window will be prompted. Choose the appropriate Bus Doctor, and then click "Use Selected Analyzer" button.
   - Click "Config" button on the tool bar, "Analyzer Configuration" window will be prompted.
   - Under "Buffer Size" tab, it is recommended to set "Size of Each Segment" to "32 Meg Events".
   - Under "State/Timing" tab
     - Select "State Mode"
     - Check "Frames", "Primitives", "Errors", and "OOB Signals" for both "Host -> Device" and "Device -> Host"
     - Set "Speed" to "3.0 Gb/s" or "1.5 Gb/s" properly
   - Under "Trigger/Stop" tab,
     - Select "Stop After Trigger"
     - Set "Trigger On" to "OOB Signaling", and check "H->D COMRESET" ONLY
     - Set "Pre/Post Trigger Capturing" to "Pre Trigger = 10%" and "Post Trigger = 90%"
   - Click "OK" to close the "Analyzer Configuration" window.
c. Click the "Run" button on the tool bar in the Bus Doctor CE application
d. Click "OK" in DriveMaster for message box in item a to let DriveMaster continue
e. Wait for DriveMaster prompt a message box "Please stop capture from Bus-Analyzer or Scope, then, click OK!"
f. In the Finisar Bus Doctor window, click the "Stop" button on the tool bar. Allow the trace to upload to the Host System. Save the trace.
g. Click "OK" in the DriveMaster for the message in item f to let DriveMaster continue
h. In the trace displayed in the Finisar Bus Doctor window, identify the "Store #" for the first through tenth COMRESET signals sent from Host under Test.
i. Select the first "Store #" of two consecutive COMRESET, then right-click to select "Set Timestamp Origin". The "Timestamp" in the selected "Store #" will change to "0 ns."
j. The "Timestamp" on the second "Store #" of two consecutive COMRESET will display the time from the beginning of the first COMRESET to the beginning of the second COMRESET from Host under Test.
k. Add 0.000988 msec (a nominal COMRESET time) to the value in item j.
l. If none of the time calculated in the above steps will be faster (smaller) than 10 ms, this case will be passed.
m. Report the worst-case result (the smallest) in the result summary sheet.

IPM-01: Partial State exit latency (Host Initiated)
IPM-09: Partial State exit latency (Device Initiated)

a. Wait for DriveMaster prompt a message box "Please start capture from Bus-Analyzer or Scope, and then click OK!"
b. In the Finisar Bus Doctor window, select "File" menu -> "New Analyzer Window…", "Select Analyzer" window will be prompted. Choose the appropriate Bus Doctor, and then click "Use Selected Analyzer" button.
   - Click "Config" button on the tool bar, "Analyzer Configuration" window will be prompted.
   - Under "Buffer Size" tab, it is recommended to set "Size of Each Segment" to "64 Meg Events".
   - Under "State/Timing" tab
     - Select "State Mode"
     - Check "Frames", "Primitives", and "Errors" for both "Host -> Device" and "Device -> Host"
     - Check "Include SYNCs and ALIGNs" under "Primitives" in "Host -> Device" section
     - Check "OOB Signals" under "Device -> Host".
     - Set "Speed" to "3.0 Gb/s" or "1.5 Gb/s" properly
   - Under "Trigger/Stop" tab,
     - Select "Stop After Trigger"
     - Set "Trigger On" to "Primitive", and select "PMREQ_P" from "Any Primitive" drop down list
     - Select "H -> D" (IPM-01)/"D -> H" (IPM-09) under the "Direction"
     - Set "Pre/Post Trigger Capturing" to "Pre Trigger = 10%" and "Post Trigger = 90%"
   - Click "OK" to close the "Analyzer Configuration" window.
c. Click the "Run" button on the tool bar in the Bus Doctor CE application
d. Click "OK" in DriveMaster for message box in item a to let DriveMaster continue
e. Wait for DriveMaster prompt a message box "Please stop capture from Bus-Analyzer or Scope, and then click OK!"
f. In the Finisar Bus Doctor window, click the "Stop" button. Allow the trace to upload to the Host System. Save the trace.
g. Click "OK" in the DriveMaster for the message in item f to let DriveMaster continue
h. In the trace displayed in the Finisar Bus Doctor window, under "Command Listing" window, first identify the "COMWAKE" signal transmitted by ULINK SATA EXPLORER after PMREQ_P.
i. And then right-click on "COMWAKE OOB" to select "Set Timestamp Origin". Next identify ALIGN signal transmitted by the HUT after the previous COMWAKE. The corresponding time displayed in "Timestamp" field is the measured time of waking up.
j. Subtract 0.549 usec (a nominal COMWAKE time) from the measured value in item i.
k. Repeat item h to j for all ten intervals.
l. If none of the time calculated in the above steps will be larger than 10 us, this case will be passed.
m. Report the worst-case result (the largest) in the result summary sheet.

IPM-02: Slumber State exit latency (Host Initiated)
IPM-10: Slumber State exit latency (Device Initiated)

a. Wait for DriveMaster prompt a message box "Please start capture from Bus-Analyzer or Scope, and then click OK!"
b. In the Finisar Bus Doctor window, select "File" menu -> "New Analyzer Window…", "Select Analyzer" window will be prompted. Choose the appropriate Bus Doctor, and then click "Use Selected Analyzer" button.
   - Click "Config" button on the tool bar, "Analyzer Configuration" window will be prompted.
   - Under "Buffer Size" tab, it is recommended to set "Size of Each Segment" to "64 Meg Events".
   - Under "State/Timing" tab
     - Select "State Mode"
     - Check "Frames", "Primitives", and "Errors" for both "Host -> Device" and "Device -> Host"
     - Check "Include SYNCs and ALIGNs" under "Primitives" in "Host -> Device" section
     - Check "OOB Signals" under "Device -> Host".
     - Set "Speed" to "3.0 Gb/s" or "1.5 Gb/s" properly
   - Under "Trigger/Stop" tab,
     - Select "Stop After Trigger"
     - Set "Trigger On" to "Primitive", and select "PMREQ_S" from "Any Primitive" drop down list
     - Select "H -> D" (IPM-02)/"D -> H" (IPM-10) under the "Direction"
     - Set "Pre/Post Trigger Capturing" to "Pre Trigger = 10%" and "Post Trigger = 90%"
   - Click "OK" to close the "Analyzer Configuration" window.
c. Click the "Run" button on the tool bar in the Bus Doctor CE application
d. Click "OK" in DriveMaster for message box in item a to let DriveMaster continue
e. Wait for DriveMaster prompt a message box "Please stop capture from Bus-Analyzer or Scope, and then click OK!"
f. In the Finisar Bus Doctor window, click the "Stop" button. Allow the trace to upload to the Host System. Save the trace.
g. Click "OK" in the DriveMaster for the message in item f to let DriveMaster continue
h. In the trace displayed in the Finisar Bus Doctor window, under "Command Listing" window, first identify the "COMWAKE" signal transmitted by ULINK SATA EXPLORER after PMREQ_S.
i. And then right-click on "COMWAKE OOB" to select "Set Timestamp Origin". Next identify ALIGN signal transmitted by the HUT after the previous COMWAKE. The corresponding time displayed in "Timestamp" field is the measured time of waking up.
j. Subtract 0.549 usec (a nominal COMWAKE time) from the measured value in item i.
k. Repeat item h to j for all ten intervals.
l. If none of the time calculated in the above steps will be larger than 10 ms, this case will be passed.
m. Report the worst-case result (the largest) in the result summary sheet.

IPM-05: Host response to PMREQ_P
IPM-06: Host response to PMREQ_S

a. Wait for DriveMaster prompt a message box "Please start capture from Bus-Analyzer or Scope, and then click OK!"
b. In the Finisar Bus Doctor window, select "File" menu -> "New Analyzer Window…", "Select Analyzer" window will be prompted. Choose the appropriate Bus Doctor, and then click "Use Selected Analyzer" button.
   - Click "Config" button on the tool bar, "Analyzer Configuration" window will be prompted.
   - Under "Buffer Size" tab, it is recommended to set "Size of Each Segment" to "32 Meg Events".
   - Under "State/Timing" tab
     - Select "State Mode"
     - Check "Frames", "Primitives", "Errors", and "OOB Signals" for both "Host -> Device" and "Device -> Host"
     - Set "Speed" to "3.0 Gb/s" or "1.5 Gb/s" properly
   - Under "Trigger/Stop" tab
     - Select "Stop After Trigger"
     - Set "Trigger On" to "Primitive", and select "PMREQ_P"(IPM-05)/"PMREQ_S"(IPM-06) from "Any Primitive" drop down list
     - Select "D -> H" under the "Direction"
     - Set "Pre/Post Trigger Capturing" to "Pre Trigger = 10%" and "Post Trigger = 90%"
   - Click "OK" to close the "Analyzer Configuration" window.
c. Click the "Run" button on the tool bar in the Bus Doctor CE application
d. Click "OK" in DriveMaster for message box in item a to let DriveMaster continue
e. Wait for DriveMaster prompt a message box "Please stop capture from Bus-Analyzer or Scope, and then click OK!"
f. In the Finisar Bus Doctor window, click the "Stop Recording" button. Allow the trace to upload to the Host System. Save the trace.
g. Click "OK" in the DriveMaster for the message in item f to let DriveMaster continue
h. In the trace displayed in the Finisar Bus Doctor window, identify the first "PMREQ_P" (IPM-05)/"PMREQ_S" (IPM-06) which is triggered on. Next identify whether PMNAK or PMACK primitive is transmitted by Host under Test in response to the "PMREQ_P" (IPM-05)/"PMREQ_S" (IPM-06).
i. If PMNAK or at least 4 PMACK primitives are transmitted in each of ten loops, the test will be "passed".

Appendix F: Monitoring Procedure for SerialTek BusXpert

Purpose: Describe the monitoring procedure for SerialTek BusXpert

Resource Requirements:

- A system with SerialTek BusXpert software installed
- SerialTek BusXpert Protocol Analyzer

Last Modification: 05/30/2009

ASR-03: COMRESET OOB Interval

a. Wait for DriveMaster prompt a message box "Please start capture from Bus-Analyzer or Scope, and then click OK!"
b. In the SerialTek BusXpert "Select an Analyzer" window, choose the appropriate Analyzer, and then click "OK" button.
   - Click "Analyzer" button to launch "Analyzer Setting" page,
     - Set "Stop Mode" to "Trigger"
     - Set "Trigger Position" to 10%
     - Set "Buffer Size" to 10%
     - Set "Rate" to "6.0 Gbps" or "3.0 Gbps" or "1.5 Gbps" properly
   - Click "Filter" button to launch "Filter Setting" page,
     - Check "Host/Device" for the field of "Specify options by:"
     - Under "All links" column
       - Check "Capture this link"
       - Check "OOB events"
       - Check "Primitives"
   - Click "Trigger" button to launch "Trigger" page,
     - Drag and drop OOB from left side list into "Wait for 1 of those events" field in "State1" window on "Sequencer1" tab
     - Select "Host ->Device" from "Any direction" dropdown list
     - Check "COMINIT/COMRESET" ONLY
c. Click the "Start Capture" button in the BusXpert Application
d. Click "OK" in DriveMaster for message box in item a to let DriveMaster continue
e. Wait for DriveMaster prompt a message box "Please stop capture from Bus-Analyzer or Scope, then, click OK!"
f. In the SerialTek BusXpert window, click the "Stop Capture" button. Allow the trace to upload to the Host System. Save the trace.
g. Click "OK" in the DriveMaster for the message in item f to let DriveMaster continue
h. In the "Spreadsheet View" displayed in the SerialTek BusXpert window, identify the first through tenth COMRESET signals sent from Host under Test.
i. Select the first of two consecutive COMRESET, then right-click to select "Set X". Select the second of two consecutive COMRESET, then right-click to select "Set O".
j. On the status bar which is at the bottom of the window, "Time X->O" field will display the time from the beginning of the first COMRESET to the beginning of the second COMRESET from Host under Test.
k. Add 0.00230 msec (a nominal COMRESET time) to the value in item j.
l. If none of the time calculated in the above steps will be faster (smaller) than 10 ms, this case will be passed.
m. Report the worst-case result (the smallest) in the result summary sheet.

IPM-01: Partial State exit latency (Host Initiated)
IPM-09: Partial State exit latency (Device Initiated)

a. Wait for DriveMaster prompt a message box "Please start capture from Bus-Analyzer or Scope, and then click OK!"
b. In the SerialTek BusXpert "Select an Analyzer" window, choose the appropriate Analyzer, and then click "OK" button.
   - Click "Analyzer" button to launch "Analyzer Setting" page,
     - Set "Stop Mode" to "Trigger"
     - Set "Trigger Position" to 10%
     - Set "Buffer Size" to 20%
     - Set "Rate" to "6.0 Gbps" or "3.0 Gbps" or "1.5 Gbps" properly
   - Click "Filter" button to launch "Filter Setting" page,
     - Check "Host/Device" for the field of "Specify options by:"
     - Under "All links" column
       - Check "Capture this link"
       - Check "OOB events"
       - Check "Primitives"
       - Check "Align" and "Sync" under "Primitives"
   - Click "Trigger" button to launch "Trigger" page,
     - Expand "Primitive" folder, drag and drop "PMREQ_P" from left side list into "Wait for 1 of those events" field in "State1" window on "Sequencer1" tab
     - Select "Host -> Device" (IPM-01)/"Device -> Host" (IPM-09) from "Any direction" dropdown list
c. Click the "Start Capture" button in the BusXpert Application
d. Click "OK" in DriveMaster for message box in item a to let DriveMaster continue
e. Wait for DriveMaster prompt a message box "Please stop capture from Bus-Analyzer or Scope, and then click OK!"
f. In the SerialTek BusXpert window, click the "Stop Capture" button. Allow the trace to upload to the Host System. Save the trace.
g. Click "OK" in the DriveMaster for the message in item f to let DriveMaster continue
h. In the "Spreadsheet View" displayed in the SerialTek BusXpert window, first identify the "COMWAKE" signal transmitted by ULINK SATA EXPLORER after PMREQ_P, then right-click to select "Set X".
i. Next identify "ALIGN" signal transmitted by the HUT after the previous COMWAKE, then right-click to select "Set O". On the status bar which is at the bottom of the window, "Time X->O" field will display the measured time of waking up.
j. Subtract 1.21 usec (a nominal COMWAKE time) from the measured value in item i.
k. Repeat item h to j for all ten intervals.
l. If none of the time calculated in the above steps will be larger than 10 us, this case will be passed.
m. Report the worst-case result (the largest) in the result summary sheet.

IPM-02: Slumber State exit latency (Host Initiated)
IPM-10: Slumber State exit latency (Device Initiated)

a. Wait for DriveMaster prompt a message box "Please start capture from Bus-Analyzer or Scope, and then click OK!"
b. In the SerialTek BusXpert "Select an Analyzer" window, choose the appropriate Analyzer, and then click "OK" button.
   - Click "Analyzer" button to launch "Analyzer Setting" page,
     - Set "Stop Mode" to "Trigger"
     - Set "Trigger Position" to 10%
     - Set "Buffer Size" to 20%
     - Set "Rate" to "6.0 Gbps" or "3.0 Gbps" or "1.5 Gbps" properly
   - Click "Filter" button to launch "Filter Setting" page,
     - Check "Host/Device" for the field of "Specify options by:"
     - Under "All links" column
       - Check "Capture this link"
       - Check "OOB events"
       - Check "Primitives"
       - Check "Align" and "Sync" under "Primitives"
   - Click "Trigger" button to launch "Trigger" page,
     - Expand "Primitive" folder, drag and drop "PMREQ_S" from left side list into "Wait for 1 of those events" field in "State1" window on "Sequencer1" tab
     - Select "Host -> Device" (IPM-02)/"Device -> Host" (IPM-10) from "Any direction" dropdown list
c. Click the "Start Capture" button in the BusXpert Application
d. Click "OK" in DriveMaster for message box in item a to let DriveMaster continue
e. Wait for DriveMaster prompt a message box "Please stop capture from Bus-Analyzer or Scope, and then click OK!"
f. In the SerialTek BusXpert window, click the "Stop Capture" button. Allow the trace to upload to the Host System. Save the trace.
g. Click "OK" in the DriveMaster for the message in item f to let DriveMaster continue
h. In the "Spreadsheet View" displayed in the SerialTek BusXpert window, first identify the "COMWAKE" signal transmitted by ULINK SATA EXPLORER after PMREQ_S, then right-click to select "Set X".
i. Next identify "ALIGN" signal transmitted by the HUT after the previous COMWAKE, then right-click to select "Set O". On the status bar which is at the bottom of the window, "Time X->O" field will display the measured time of waking up.
j. Subtract 1.21 usec (a nominal COMWAKE time) from the measured value in item i.
k. Repeat item h to j for all ten intervals.
l. If none of the time calculated in the above steps will be larger than 10 ms, this case will be passed.
m. Report the worst-case result (the largest) in the result summary sheet.

IPM-05: Host response to PMREQ_P
IPM-06: Host response to PMREQ_S

a. Wait for DriveMaster prompt a message box "Please start capture from Bus-Analyzer or Scope, and then click OK!"
b. In the SerialTek BusXpert "Select an Analyzer" window, choose the appropriate Analyzer, and then click "OK" button.
   - Click "Analyzer" button to launch "Analyzer Setting" page,
     - Set "Stop Mode" to "Trigger"
     - Set "Trigger Position" to 10%
     - Set "Buffer Size" to 10%
     - Set "Rate" to "6.0 Gbps" or "3.0 Gbps" or "1.5 Gbps" properly
   - Click "Filter" button to launch "Filter Setting" page,
     - Check "Host/Device" for the field of "Specify options by:"
     - Under "All links" column
       - Check "Capture this link"
       - Check "OOB events"
       - Check "Primitives"
   - Click "Trigger" button to launch "Trigger" page,
     - Expand "Primitive" folder, drag and drop "PMREQ_P"(IPM-05)/"PMREQ_S"(IPM-06) from left side list into "Wait for 1 of those events" field in "State1" window on "Sequencer1" tab
     - Select "Device -> Host" from "Any direction" dropdown list
c. Click the "Start Capture" button in the BusXpert Application
d. Click "OK" in DriveMaster for message box in item a to let DriveMaster continue
e. Wait for DriveMaster prompt a message box "Please stop capture from Bus-Analyzer or Scope, and then click OK!"
f. In the SerialTek BusXpert window, click the "Stop Capture" button. Allow the trace to upload to the Host System. Save the trace.
g. Click "OK" in the DriveMaster for the message in item f to let DriveMaster continue
h. In the "Spreadsheet View" displayed in the SerialTek BusXpert window, identify the first "PMREQ_P" (IPM-05)/"PMREQ_S" (IPM-06) which is triggered on. Next identify whether PMNAK or PMACK primitive is transmitted by Host under Test in response to the "PMREQ_P" (IPM-05)/"PMREQ_S" (IPM-06).
i. If PMNAK or at least 4 PMACK primitives are transmitted in each of ten loops, the test will be "passed".

Appendix G: Monitoring Procedure for Finisar Xgig

Purpose: Describe the monitoring procedure for Finisar Xgig

Resource Requirements:

- A system with Finisar Xgig software installed
- Finisar Xgig SAS/SATA Protocol Analyzer

Last Modification: 07/02/2008

ASR-03: COMRESET OOB Interval

a. Wait for DriveMaster prompt a message box "Please start capture from Bus-Analyzer or Scope, and then click OK!"
b. Get Xgig setup properly, click "Configure Devices (ports)" button on the toolbar
   - In "Size Options" section
     - Set "Number of Segments" to 1
     - Set "Trace Size (MB)" to 256
     - Set "Post Trigger Fill (%)" to 90
   - In "Signal Regeneration and Link Speed" section
     - Set "Speed" to "6.0 Gb/s" ,"3.0 Gb/s" or "1.5 Gb/s" properly
   - Select "Stop capture after trigger" from the right bottom drop-down list
   - In "Capture" tab, select "Capture ONLY".
   - Select "SAS Port (1,1,1) from "My Domain" section
   - Select "Tigger" tab,
     - Select "On…" in "Tigger the ports in the domain"
     - Open "Finisar Library" folder from "Available Templates"
     - Open "OOB&Speed Negotiation"\"OOB signals" folder
     - Drag and drop "COMINIT-COMRESET" to the window in "Tigger" tab
   - In "SAS/SATA" tab,
     - In "Out of Band & Speed Negotiation" section, select "Capture all OOB & Speed Negotiation"
     - In "Always exclude the following checked primitives:" section, check
       - SATA_HOLD, SATA_HOLDA and SATA_R_IP
       - ALIGNs and NOTIFYs that are outside OOB and speed negotiation
       - SAS Scrambled Idle Dwords and SATA_SYNC
     - In "When random Dwords are captured…", select "Compress to a count of Dwords"
c. Click the "Start Capture" button on the tool bar in the Xgig application
d. Click "OK" in DriveMaster for message box in item a to let DriveMaster continue
e. Wait for DriveMaster prompt a message box "Please stop capture from Bus-Analyzer or Scope, then, click OK!"
f. In the Finisar Xgig Trace Control window, click the "Stop" button on the tool bar. Allow the trace to upload to the Host System. Save the trace.
g. Click "OK" in the DriveMaster for the message in item f to let DriveMaster continue
h. In the trace displayed in the Finisar Xgig TraceView window, identify the first through tenth COMRESET signals sent from Host under Test
i. In the Finisar Xgig TraceView window, select "Tools\Delta Calculator …". In Delta Calculator window, select "Delta Start Time: " field, then identify the first of two consecutive COMRESET in the trace window, the corresponding time stamp should be shown in "Delta Start Time" field
j. In Delta Calculator window, select "Delta Stop Time:" field, then identify the second of two consecutive COMRESET in the trace window, the corresponding time stamp should be shown in "Delta Stop Time" field

k. The “Delta Time:” shown at the top of Delta Calculator window will be the time from the beginning of the first COMRESET to the beginning of the second COMRESET from Device under Test.
l. Add 0.00230 msec (a nominal COMRESET time) to the value in item k.
m. If none of the time calculated in the above steps will be faster (smaller) than 10 ms, this case will be passed.
n. Report the worst-case result (the smallest) in the result summary sheet.

IPM-01: Partial State exit latency (Host Initiated)
IPM-09: Partial State exit latency (Device Initiated)

a. Wait for DriveMaster prompt a message box “Please start capture from Bus-Analyzer or Scope, and then click OK!”
b. Get Xgig setup properly, click “Configure Devices (ports)” button on the toolbar
   - In “Size Options” section
     - Set “Number of Segments” to 1
     - Set “Trace Size (MB)” to 512
     - Set “Post Trigger Fill (%)" to 90
   - In “Signal Regeneration and Link Speed” section
     - Set “Speed” to “6.0 Gb/s” ,“3.0 Gb/s” or “1.5 Gb/s” properly
   - Select “Stop capture after trigger” from the right bottom drop-down list
   - In “Capture” tab, select “Capture ONLY”.
   - Select “SAS Port (1,1,1)”(IPM-01)/“SAS Port (1,1,2)”(IPM-09) from “My Domain” section
   - Select “Tigger” tab,
     - Select “On…” in “Tigger the ports in the domain”
     - Open “Finisar Library” folder from “Available Templates”
     - Open “Primitives”\“STP-SATA” folder
     - Drag and drop “SATA_PMREQ_P” to the window in “Tigger” tab
   - In “SAS/SATA” tab,
     - In “Out of Band & Speed Negotiation” section, select “Capture all OOB & Speed Negotiation”
     - In “Always exclude the following checked primitives:” section, check
       - SATA_HOLD, SATA_HOLDA and SATA_R_IP
       - SAS Scrambled Idle Dwords and SATA_SYNC
     - In “When random Dwords are captured…”, select “Compress to a count of Dwords”
c. Click the “Start Capture” button on the tool bar in the Xgig application
d. Click “OK” in DriveMaster for message box in item a to let DriveMaster continue
e. Wait for DriveMaster prompt a message box “Please stop capture from Bus-Analyzer or Scope, and then click OK!”
f. In the Finisar Xgig Trace Control window, click the “Stop” button on the tool bar. Allow the trace to upload to the Host System. Save the trace.
g. Click “OK” in the DriveMaster for the message in item f to let DriveMaster continue
h. In the Finisar Xgig TraceView window, select “Tools\Delta Calculator …”. In Delta Calculator window, select “Delta Start Time: ” field, then identify COMWAKE signal transmitted by the ULINK SATA EXPLORER after PMREQ_P in the trace window, the corresponding time stamp should be shown in “Delta Start Time” field
i. In Delta Calculator window, select “Delta Stop Time:” field, then identify COMWAKE signal transmitted by the HUT after the previous COMWAKE in the trace window, the corresponding time stamp should be shown in “Delta Stop Time” field
j. The “Delta Time:” shown at the top of Delta Calculator window will be the measured time of waking up.
k. Subtract 1.21 usec (a nominal COMWAKE time) from the measured value in item j.
l. Repeat item h to k for all ten intervals.
m. If none of the time calculated in the above steps will be larger than 10 us, this case will be passed.
n. Report the worst-case result (the largest) in the result summary sheet.

IPM-02: Slumber State exit latency (Host Initiated)
IPM-10: Slumber State exit latency (Device Initiated)

a. Wait for DriveMaster prompt a message box “Please start capture from Bus-Analyzer or Scope, and then click OK!”
b. Get Xgig setup properly, click “Configure Devices (ports)” button on the toolbar
   - In “Size Options” section
     - Set “Number of Segments” to 1
     - Set “Trace Size (MB)” to 512
     - Set “Post Trigger Fill (%)" to 90
   - In “Signal Regeneration and Link Speed” section
     - Set “Speed” to “6.0 Gb/s” ,“3.0 Gb/s” or “1.5 Gb/s” properly
   - Select “Stop capture after trigger” from the right bottom drop-down list
   - In “Capture” tab, select “Capture ONLY”.
   - Select “SAS Port (1,1,1)”(IPM-02)/“SAS Port (1,1,2)”(IPM-10) from “My Domain” section
   - Select “Tigger” tab,
     - Select “On…” in “Tigger the ports in the domain”
     - Open “Finisar Library” folder from “Available Templates”
     - Open “Primitives”\“STP-SATA” folder
     - Drag and drop “SATA_PMREQ_S” to the window in “Tigger” tab
   - In “SAS/SATA” tab,
     - In “Out of Band & Speed Negotiation” section, select “Capture all OOB & Speed Negotiation”
     - In “Always exclude the following checked primitives:” section, check
       - SATA_HOLD, SATA_HOLDA and SATA_R_IP
       - SAS Scrambled Idle Dwords and SATA_SYNC
     - In “When random Dwords are captured…”, select “Compress to a count of Dwords”
c. Click the “Start Capture” button on the tool bar in the Xgig application
d. Click “OK” in DriveMaster for message box in item a to let DriveMaster continue
e. Wait for DriveMaster prompt a message box “Please stop capture from Bus-Analyzer or Scope, and then click OK!”
f. In the Finisar Xgig Trace Control window, click the “Stop” button on the tool bar. Allow the trace to upload to the Host System. Save the trace.
g. Click “OK” in the DriveMaster for the message in item f to let DriveMaster continue
h. In the Finisar Xgig TraceView window, select “Tools\Delta Calculator …”. In Delta Calculator window, select “Delta Start Time: ” field, then identify COMWAKE signal transmitted by the ULINK SATA EXPLORER after PMREQ_S in the trace window, the corresponding time stamp should be shown in “Delta Start Time” field
i. In Delta Calculator window, select “Delta Stop Time:” field, then identify COMWAKE signal transmitted by the HUT after the previous COMWAKE in the trace window, the corresponding time stamp should be shown in “Delta Stop Time” field
j. The “Delta Time:” shown at the top of Delta Calculator window will be the measured time of waking up.
k. Subtract 1.21 usec (a nominal COMWAKE time) from the measured value in item j.
l. Repeat item h to k for all ten intervals.
m. If none of the time calculated in the above steps will be larger than 10 us, this case will be passed.
n. Report the worst-case result (the largest) in the result summary sheet.

IPM-05: Host response to PMREQ_P
IPM-06: Host response to PMREQ_S

a. Wait for DriveMaster prompt a message box "Please start capture from Bus-Analyzer or Scope, and then click OK!"
b. Get Xgig setup properly, click "Configure Devices (ports)" button on the toolbar
   - In "Size Options" section
     - Set "Number of Segments" to 1
     - Set "Trace Size (MB)" to 512
     - Set "Post Trigger Fill (%)" to 90
   - In "Signal Regeneration and Link Speed" section
     - Set "Speed" to "6.0 Gb/s" ,"3.0 Gb/s" or "1.5 Gb/s" properly
   - Select "Stop capture after trigger" from the right bottom drop-down list
   - In "Capture" tab, select "Capture ONLY".
   - Select "SAS Port (1,1,2)" from "My Domain" section
   - Select "Tigger" tab,
     - Select "On…" in "Tigger the ports in the domain"
     - Open "Finisar Library" folder from "Available Templates"
     - Open "Primitives"\"STP-SATA" folder
     - Drag and drop "SATA_PMREQ_P"(IPM-05)/"SATA_PMREQ_S"(IPM-06) to the window in "Tigger" tab
   - In "SAS/SATA" tab,
     - In "Out of Band & Speed Negotiation" section, select "Capture all OOB & Speed Negotiation"
     - In "Always exclude the following checked primitives:" section, check
       - SATA_HOLD, SATA_HOLDA and SATA_R_IP
       - SAS Scrambled Idle Dwords and SATA_SYNC
     - In "When random Dwords are captured…", select "Compress to a count of Dwords"
c. Click the "Start Capture" button on the tool bar in the Xgig application
d. Click "OK" in DriveMaster for message box in item a to let DriveMaster continue
e. Wait for DriveMaster prompt a message box "Please stop capture from Bus-Analyzer or Scope, and then click OK!"
f. In the Finisar Xgig Trace Control window, click the "Stop" button on the tool bar. Allow the trace to upload to the Host System. Save the trace.
g. Click "OK" in the DriveMaster for the message in item f to let DriveMaster continue
h. In the trace displayed in the Finisar Xgig TraceView window, identify the first "PMREQ_P" (IPM-05)/"PMREQ_S" (IPM-06) which is triggered on. Next identify whether PMNAK or PMACK primitive is transmitted by Host under Test in response to the "PMREQ_P" (IPM-05)/"PMREQ_S" (IPM-06).
i. If PMNAK or at least 4 PMACK primitives are transmitted in each of ten loops, the test will be "passed".