ULINK SATA Explorer

User's Guide

Version 2.0.1

ULINK Technology, Inc
http://www.ulinktech.com
June 2009

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I. Introduction

ULINK SATA Explorer (SE) is a hardware test fixture that is used to issue BIST Activate FIS to a host product such as a host controller or a Port Multiplier's device port.

The SE is also used to verify Host Digital test requirements described in SATA-IO Interoperability Program Unified Test Document (UTD).

ULINK SATA Explorer 2.0

A control host with ULINK DriveMaster software will be needed to successfully perform the above tests.

II. Resource Requirements

1. Minimum requirements for the control host with DriveMaster:

- OS: Windows Vista, XP or 2003 Operating System
- CPU: Hyper-Threading CPU. Core 2 Duo is highly recommended.
- RAM: 1024MB. 2048MB is recommended for Vista.
- Chipset: Motherboard with SATA Controller based on the Intel ICHx(R) chipset or equivalent (e.g. HP with AMD chipset or VIA system)
- Add-on: One PCI or PCI-E to ATA or SATA (Depending on the system drive) add-on card (e.g. Promise TX2 plus or equivalent)
- Video: 32MB video card. 64MB is recommended.
- HDD: 100MB free space

2. DriveMaster Version Requirement

DriveMaster 2008 Version 4.0.360 or above

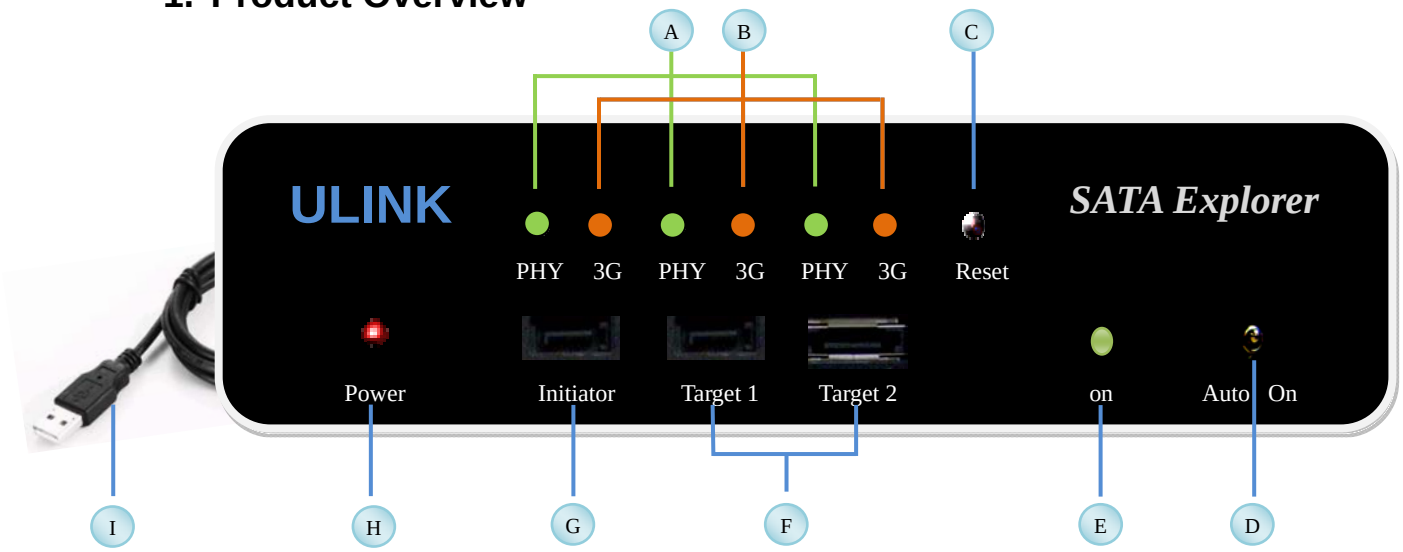
3. Testing Scripts

- SATA-IO Interoperability Program Host Digital Testing Script (purchased separately from ULINK)

- BIST Testing Scripts (bundled with SE)

III. SATA Explorer Interface

1. Product Overview



A PHY ready Indicator: the green LED turns on when properly connected; the LED turns off when there is poor or no connection.

B SATA 3G speed indicator: for a Gen-1 product the LED is off; for a Gen-2 product, the orange LED turns on.

C Reset button: Reset the status of the SE

D Power Control Switch:

NOTE:

You will need to install the power control driver before it can be controlled by the DriveMaster software.

(For details, please refer to Appendix A Power Control Driver Installation Guide.)

It is recommended to install this driver first. The power of the SE will be automatically controlled by DriveMaster and its scripts when the SE is on.

Mode **On**: The power of the SE is constant and always on.

Mode **Auto**: The power of the SE is controlled by user through DriveMaster.

E Power indicator of the Power Control.

F SATA port connection to host under test (HUT):

Target 1: Internal SATA Connection

Target 2: External SATA Connection

NOTE: You should use only ONE SATA Target port at a time.

G SATA port connection to control host installed with DriveMaster.

H Power indicator of the SE.

I USB port, connecting to one of the USB ports on the control host.

2. Features

- BIST T Mode with standard or user defined 2Dwords data pattern
- BIST L Mode with standard or user defined 2Dwords data pattern (SE 2.0 or above)
- BIST L Mode with composite data pattern (SE 2.0 or above)
- BIST L Mode with internal data pattern (SE 1.0 only)
- ASR control
- Speed Negotiation control
- Signal Loss/Recovery control
- IPM: PMREQ_P, PMREQ_S
- OOB: COMWAKE, COMINIT

IV. Operation Procedure on Host BIST mode

1. Scripts

\Host_JM		
	\Gen1_L	
		\ H_1.5G_L_HFTP.srt
		\…
	\Gen1_TAS	
		\H_1.5G_TAS_HFTP.srt
		\…
	\Gen2_L	
		\ H_3G_L_HFTP.srt
		\…
	\Gen2_TAS	
		\ H_3G_TAS_HFTP.srt
		\…
\PMDev_JM		

	\Gen1_L	
		\ H_1.5G_L_HFTP.srt
		\…
	\Gen1_TAS	
		\H_1.5G_TAS_HFTP.srt
		\…
	\Gen2_L	
		\ H_3G_L_HFTP.srt
		\…
	\Gen2_TAS	
		\ H_3G_TAS_HFTP.srt
		\…

a. Under the main folder of this set of scripts, there are several subfolders:

- \Host_JM: Host in BIST mode by SE
- \PMDev_JM: Port Multiplier's Device Port in BIST mode by SE

b. Under each folder in item (a), there are 4 subfolders:

- \Gen1_L: Gen1 w/BIST L
- \Gen1_TAS: Gen1 w/BIST T+A+S
- \Gen2_L: Gen2 w/BIST L
- \Gen2_TAS: Gen2 w/BIST T+A+S

c. Under each folder in item (b), there is a test script to be used:

Each test script has been coded with individual data patterns. Select a script from here to start BIST with particular mode and data patterns.

d. BIST Modes

Index	Description
0	Far End Transmit Only (T)
1	ALIGN Bypass (T+A)
2	Bypass Scrambling (T+S)
3	Primitive bit (T+P)
4	Bypass ALIGN and Scrambling (T+A+S)
5	Far End Retimed (L)
6	Far End Analog (F)
7	Vendor Unique (V)

e. Data Patterns

Index	Description	Short Name in Filename
0	User Defined	-----
1	Std. Low Frequency Test Pattern (LFTP): 7E7E7E7E 7E7E7E7E	_LFTP

2	Std. Mid Frequency Test Pattern (MFTP): 78787878 78787878	_MFTP
3	Std. High Frequency Test Pattern (HFTP):4A4A4A4A 4A4A4A4A	_HFTP
4	Std. Lone-Bit Pattern (LBP -ve): 0C8B0C8B 0C8B0C8B	_LBP-
5	Std. Lone-Bit Pattern (LBP +ve): 8B0C8B0C 8B0C8B0C	_LBP+
6	SATA Transmitter Jitter(SXJT-Chuck): F4EBF4EB 78064AF5	_SXJT
7	Low-Transition Density /w Hi-Freq Pat.(LTDHFP):7E7E7E7E 7E7E7EB5	_LTDHFP
8	Lone-Bit Pattern(LBP80):8DFC91E3 916394E3	_LBP80
9	Simultaneous Switching Patterns(SSOP): 7F7F7F7F 7F7F7F7F	_SSOP
10	Low Frequency Spectral Content(LFSCP): 54F4ABAB ABEB5454	_LFSCP
11	Lone-Bit Pattern(-ve):91E392E3 94E391E3	_SLBP-
12	Lone-Bit Pattern(+ve):8BFC8DFC 8EFC8BFC	_SLBP+
13	Lone-Bit Pattern(ECN18):0C8B0C6B 0C8B0C6B	_LBPECN18

NOTE: Index 8 (LBP80) and Index 13 (LBPECN18) are LBP patterns with alternating disparity.

2. Configurations

a. Host in BIST mode by SE

- Connect the test port of the control host to the initiator port on the SE ① → ②
- Connect the Target port of the SE to the test port on the HUT ③ → ④

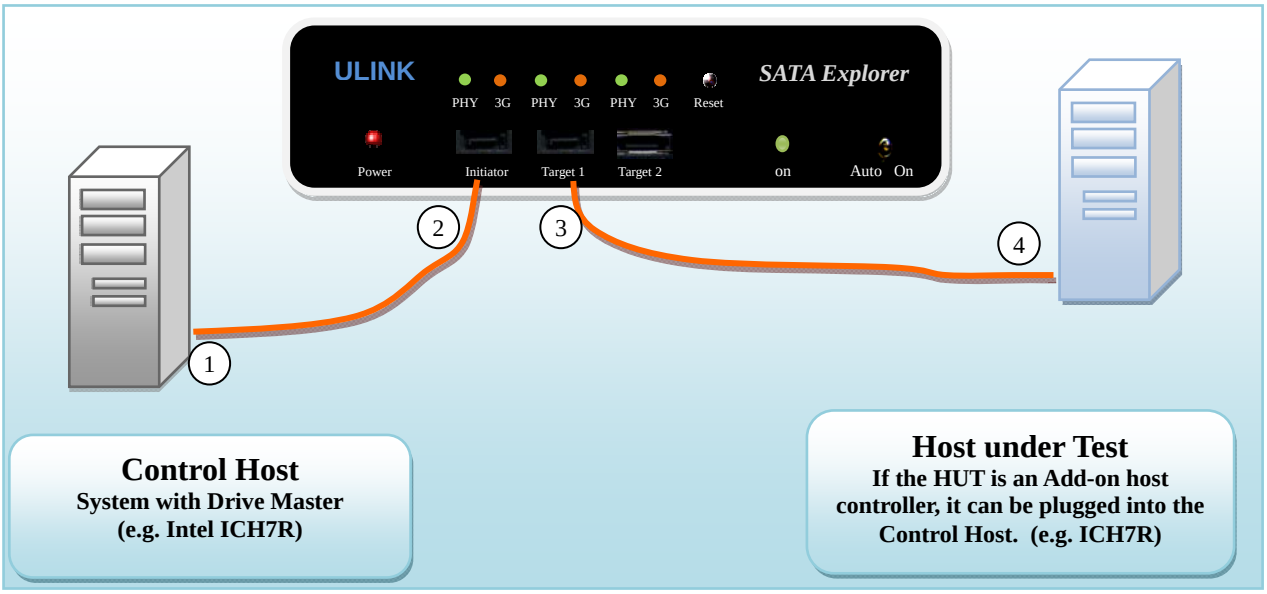


Figure 1: Host BIST Test Configuration

- In this test, HUT shall be separated from the host controller which is installed with DriveMaster, i.e., this test does not support putting one port in BIST mode from another port on the same Host controller.
- To avoid the OS interfering with the HUT, it is recommended that HUT, after powering on, enters into BIOS setup and stays in BIOS setup mode during the entire test process. If the HUT runs the OS, it is recommended to disable or uninstall the HUT device driver.
- For some HBAs (e.g. ICHx(R)), non-AHCI mode may need to be selected from BIOS setup in order to put the HUT into BIST mode.

b. Port Multiplier's Device Port in BIST mode by SE

- Connect Port 0 from the control host (Port Multiplier Aware HBA) to the host port of the Port Multiplier ① → ②

- Connect Port X from the control host (Port Multiplier Aware HBA) to the Initiator port of the SE ③ → ④
- Connect the Target Port of the SE to the device Port Y of Port Multiplier ⑤ → ⑥

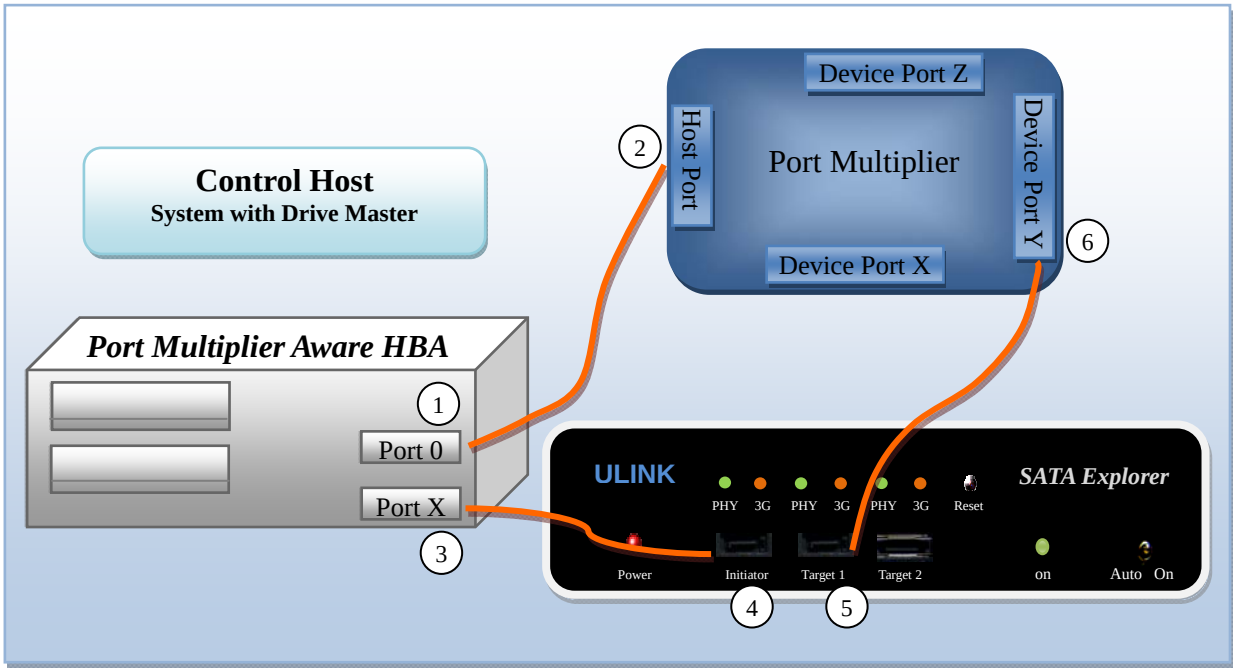


Figure 2: Port Multiplier's Device Port BIST Test Configuration

- The control host must support the Port Multiplier function.
- To run a test script, make sure the script is running on Port X instead of Port 0 on the control host, i.e. the current selected port in DriveMaster is Port X.

c. Important Notes

- **RESET Button on SE**

  Before each BIST test, it is recommended to reset SE and wait for the "PHY" LED to turn on. This is especially critical when running the BIST L test.

  With the SE 2.0, you will not need to click the RESET button before each BIST test.

- **Data pattern in BIST L**

  For the SE 1.0, the data pattern issued with BIST L is not the pattern coded with the test scripts. The data pattern is an internal data FIS, but it can behave as a

reference. For example, it can be used to check if the HUT supports disconnection.

For the SE 2.0, the data pattern issued with BIST L will be the same as the pattern coded with the test scripts, i.e. it will be the data pattern as described in item IV.1.e on page 4-5. Also SE 2.0 supports COMP the pattern issued with BIST L.

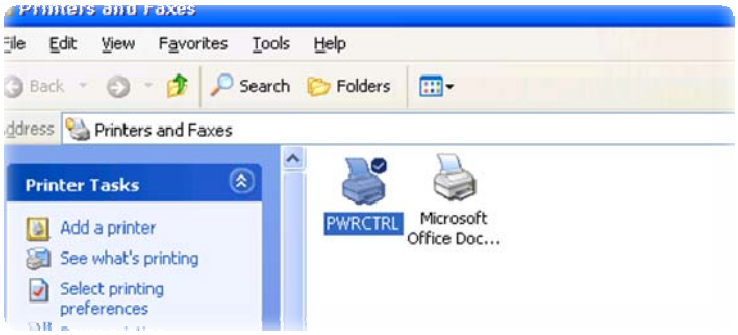
- **PUT Disconnection Support**

  Since the SE is only used as a BIST Stimulus tool, when user switches the connection of PUT from SE to monitoring tool (e.g. Scope); user needs to be aware of the disconnection support of PUT. If the disconnection of PUT is not supported, BIST may exit when this switch of connection happens; therefore, certain configuration to prevent from BIST exit should be taken care by user.

Appendix A Power Control Driver Installation Guide

The power of the SE is controlled through a *virtual printer*.

1. Plug the USB cable of the SE into USB port on the control host
2. Go to the **Printers and Faxes** folder under the Start Menu and add a printer.
3. Add a local printer and make sure the auto detection box is *unchecked.*
4. Select the USB port that the SE is connected to.
5. Select the printer driver for either “Epson DFX-5000” or “Epson 600Q ESC/P2”.
6. Change the printer name to **PWRCTRL**.



Appendix B ULINK MOI for SATA-IO Host Digital Test (ASR, IPM)

The SE is used to verify if the HUT meets the Host Digital Test requirements described in Serial ATA Interoperability Program Unified Test Document. The complete Method of Implementation (MOI) for the Host Digital Test is published on the Website of Serial ATA International Organization (SATA-IO).

- For SATA IO members:
  http://www.serialata.org/membersonly.asp

- For Non-SATA IO members:
  http://www.serialata.org/interoperabilitydocumentation.asp

Appendix C Putting a Gen-2 Host into BIST T+A+S mode with LFTP pattern

1. Setup the hardware according to Figure 1 on Page 6.
2. Run DriveMaster
3. Select “File\Open”
4. Select “Host_JM” folder
5. Select the subfolder “Gen2_TAS”
6. Select the script “H_3G_TAS_LFTP.srt”
7. Click “Run” on the toolbar
8. If the script runs successfully, you will see the error count as zero and a description of what test has been run.
9. Now you can use Scope and other related equipment for the measurement.
10. When you start next BIST test, click the Reset button on the SE and wait for the “PHY” LED to turn on. For SE 2.0, user, you do not need to do the last step.