SATA Storage Duplicator Instruction on KC705

Rev1.0   24-Sep-13

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This document describes the step to run SATA Duplicator Demo for data duplication from one SATA disk to many SATA disk by using Design Gateway SATA-IP. The demo uses KC705 board and FMC SATA RAID board, provided by Design Gateway, to copy data from one SATA disk to one to three SATA disks at the same time. More details are described as follows.

1   Hardware Setup

Necessary Hardware
1. KC705 Xilinx Evaluation Kit
2. AB09-FMCRAID board from Design Gateway
3. ATX Power Supply for AB09-FMCRAID board
4. Power adapter for KC705 board
5. USB Micro B cable for FPGA configuration
6. PC for FPGA programming
7. 2-4 pieces of 2.5-inch SATA-III Disk

Optional Hardware
1. USB Mini B cable for Serial Monitoring and user control on PC
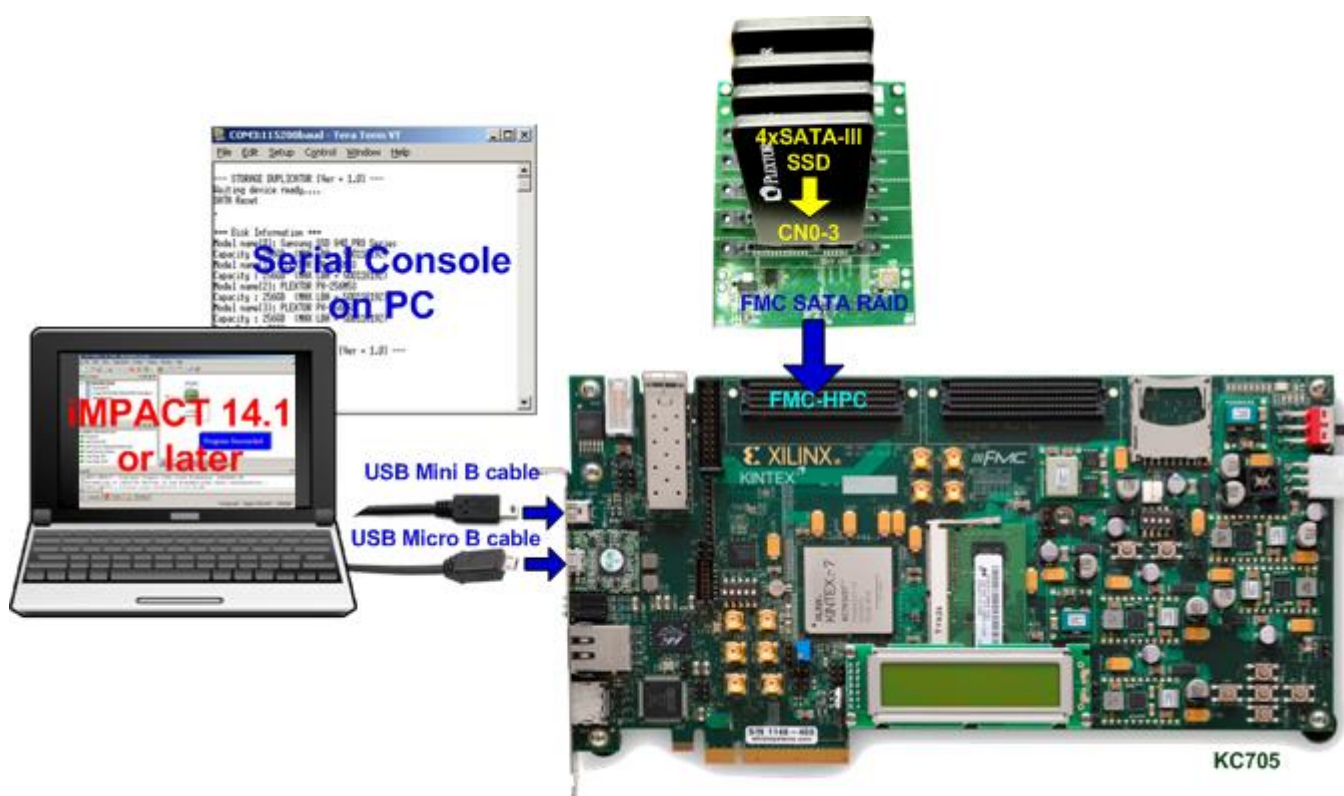

Figure 1-1 SATA Storage Duplicator Hardware Setup

2 Evaluation procedure

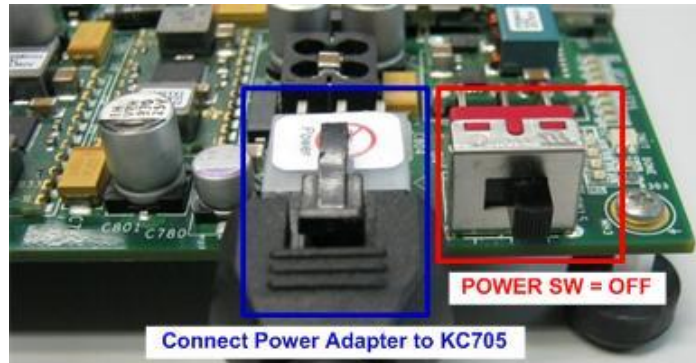1. Check Power Switch on KC705 = OFF position and connect Power adapter to KC705.

Figure 2-1 Power OFF KC705 board

2. Check ATX power supply for FMCRAID board = OFF and connect ATX power to FMCRAID board.

Figure 2-2 ATX Power to FMCRAID Adapter

3. Connect FMCRAID board to FMC-HPC connector (J22) on KC705 board.

Figure 2-3 FMCRAID and FMC HPC Connection

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4. Connect Master SATA-III Disk to CN0 and connect 1-3 Blank SATA-III Disks to CN1 – CN3 on FMCRAID for data duplication from Master to all Blank Disks.
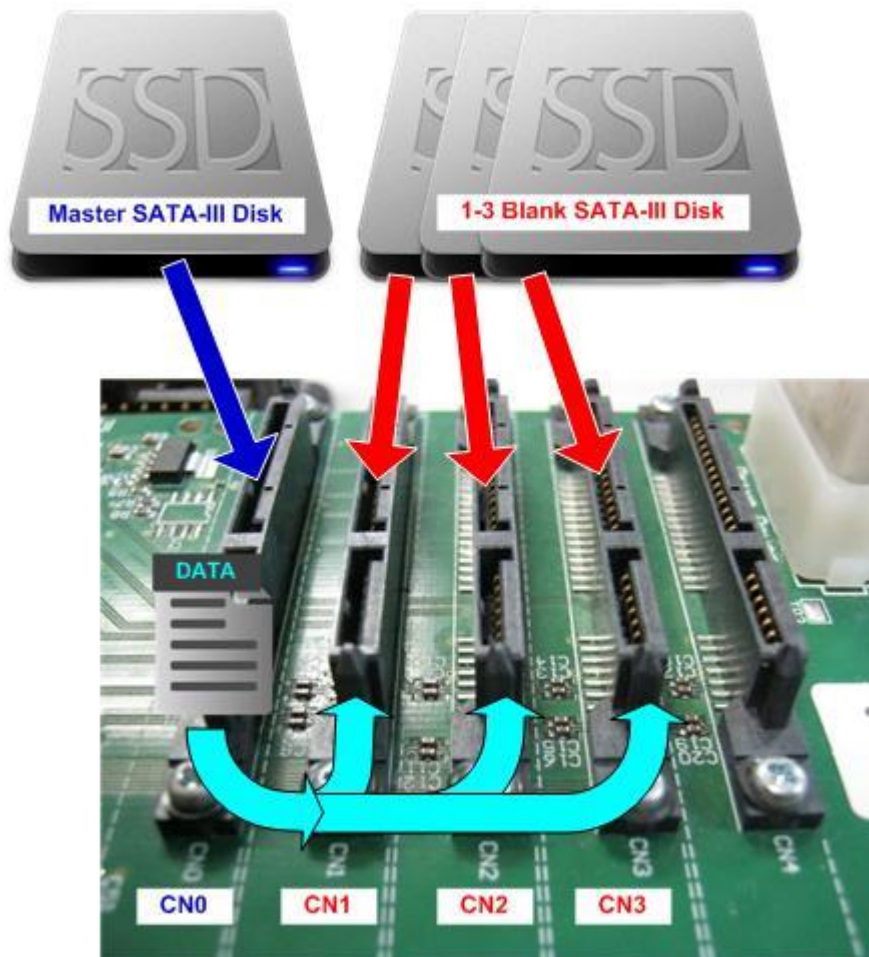

Figure 2-4 Connect SATA-III Disk to FMCRAID

5. Connect USB micro B cable on U29 of KC705 to USB Port on PC for JTAG programming. For optional, connect USB mini B cable from J6 on KC705 to USB Port on PC for Serial Console.

Figure 2-5 Connect Micro USB/Mini USB Cable

6. Set Power SW = ON and power on ATX power supply.

7. For optional, open Serial Monitoring software such as HyperTerminal by using Baud Rate=115,200 Data=8 bit Non-Parity Stop=1.
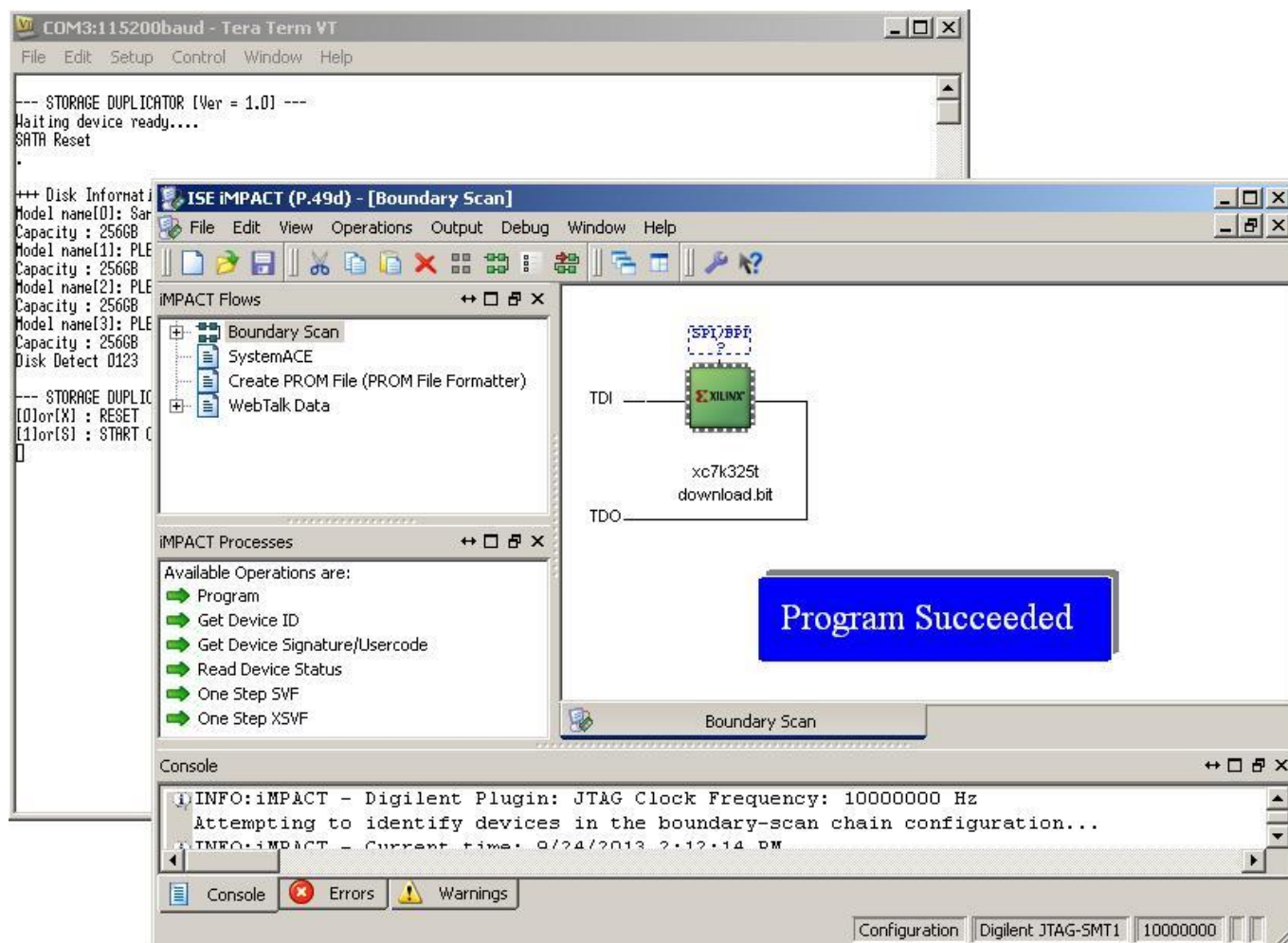8. On PC, open ISE iMPACT 14.1 or later version and download configuration bit file to KC705 board.

Figure 2-6 Software use on PC

9. Check system status from LED, LCD, and Serial Console (Optional).
   a) LED Status: LED0/2/4/6 are all ON while LED1/3/5/7 are ON/OFF depending on disk connection on CN0-3.

Figure 2-7 LED status if four SATA-III Disk connected

LED	ON	OFF
LED0	OK	150 MHz of SATA clock on FMC SATA RAID cannot lock. Please check 150 MHz clock source on FMC SATA RAID board.
LED1	OK	SATA-IP cannot detect SATA device. Please check SATA Disk at CN0 and the connection.
LED2	Same description to LED0.	
LED3	Same description to LED1, but check SATA Disk at CN#1.	
LED4	Same description to LED0.	
LED5	Same description to LED1, but check SATA Disk at CN#2.	
LED6	Same description to LED0	
LED7	Same description to LED1, but check SATA Disk at CN#3.	

Table 1 LED Status description on KC705 board

b) LCD Display: "Sata Duplicator" on 1st line is displayed with "Disk Detect XXXX" text on 2nd line. The last four characters are referred to disk status on CN0-3 sequentially. Three status can be displayed, i.e.
   - 0–3 : Disk on CN0-3 is ready to use
   - X   : Disk on CN0-3 is not available
   - E   : Disk size on CN1-3 is less than CN0, so duplication will not run on this channel.
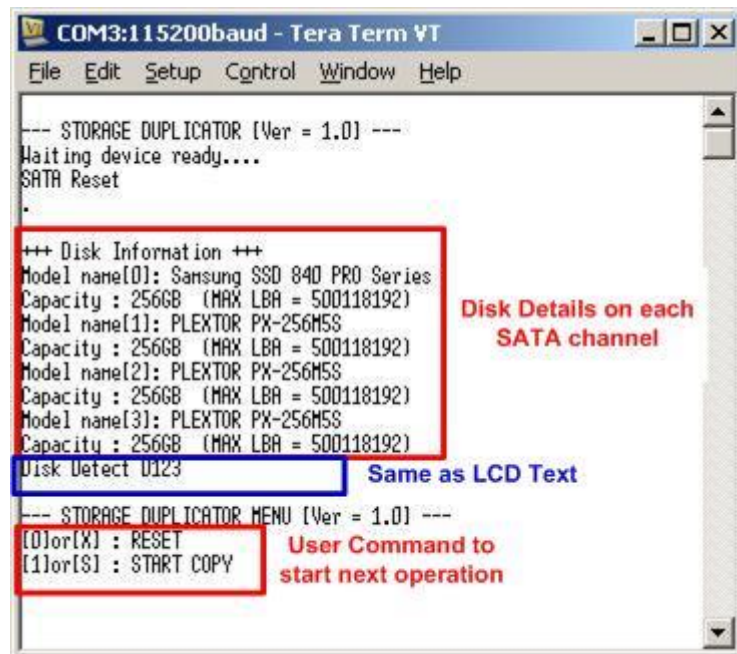

Figure 2-8 LCD Text Display after system initialize

Figure 2-9 is the example LCD text when Disk on CN0 and CN1 are ready, while CN2 is not available and Disk size on CN3 is too less.

Figure 2-9 LCD Text Display when Disk not available or error.

c) Serial Console: Display Disk information and main menu when initialize complete. "Disk
    Detect XXXX" text message which has same description as LCD text are also displayed on
    Serial Console. The main menu will be displayed for receiving next command from user.

3 Main Menu

User can send inputs to system by two ways, i.e. using PUSH SW or Serial Console. There are two commands in this demo, i.e. Reset and Start copy. More details are described as follows.

3.1 SATA RESET

1) By using RESET SW
User can press CPU RST SW (SW7) to reset system. After push RESET, "Sata Duplicator" text will be displayed on LCD and "Disk Detect XXXX" message will be displayed when all disk initialize complete. The LCD message will be similar to Figure 2-8.

Figure 3-1 RESET SW (SW7)

2) By using Serial Console
For start operation by Serial console, input '0' or 'X' to reset the system. "SATA Reset" message will be displayed and then display all disk information in system to show disk model and size. Finally, "Disk Detect XXXX" text message are displayed to show disk status on each SATA channel.
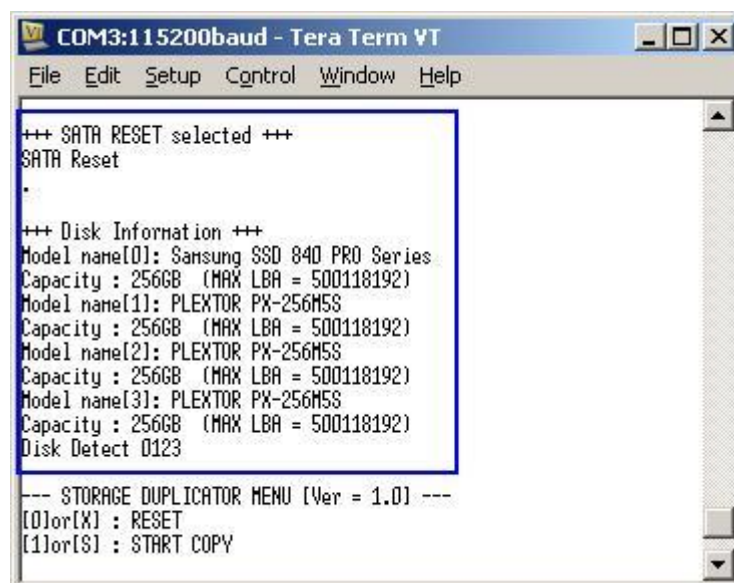

Figure 3-2 Serial Console when SATA is reset

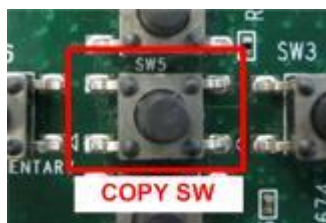## 3.2 START COPY

1) By using SW5

Figure 3-3 COPY SW (SW5)

User can press COPY SW (SW5) to start data duplication from disk on CN0 to disk on CN1 – CN3. Progress status in percent unit is displayed on LCD message, as shown in Figure 3-4.
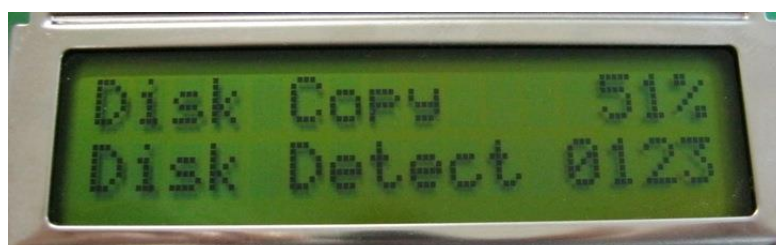

Figure 3-4 Disk Copy Progress Status on LCD

After complete, "Complete XXXX" with speed performance will be displayed, as shown in Figure 3-5. XXXX is referred to disk status on CN0-3 sequentially.

Figure 3-5 Copy Complete Status on LCD

If any error is detected on which channel, 'E' status will be displayed instead of number 0-3, as shown in Figure 3-6. This is example output when error is found on CN2 and CN3.

Figure 3-6 Copy Complete with error disk on LCD

2) By using Serial Console

Input '1' or 'S' to start data duplication by Serial Console. Similar to using SW5 input, Disk duplication progress status in percent unit is displayed on Serial Console, as shown in Figure 3-7.
Figure 3-8 shows message and transfer performance when data duplication complete without any error.
Figure 3-9 shows the example message when error is detected during data duplication on CN2 and CN3.
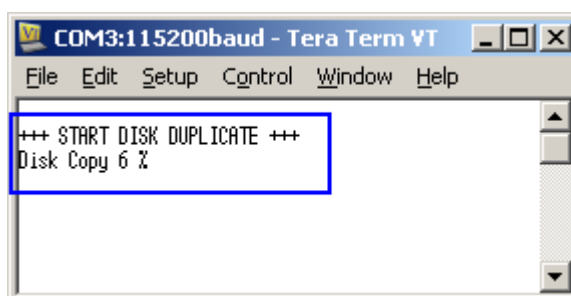

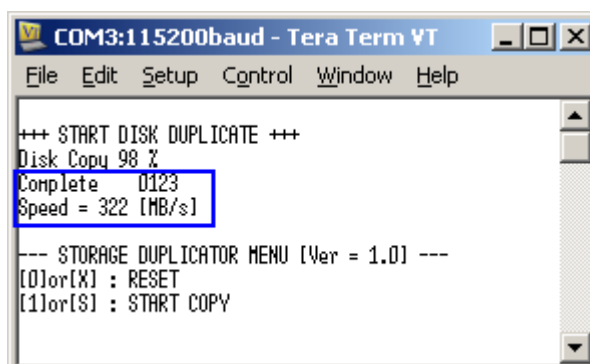Figure 3-7 Disk Copy Progress Status on Serial Console

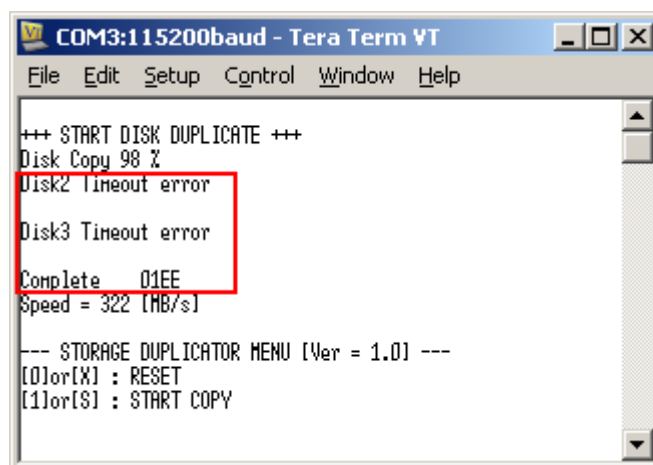Figure 3-8 Copy Complete Status on Serial Console

Figure 3-9 Copy Complete with error disk on Serial Console

4   Revision History

Revision	Date	Description
1.0	24-Sep-13	Initial version release