Express DR

Manufacturing Test Software 2.1.7

User Guide

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Contents

Prerequisite **5**

Document Organization **5**

Customer Support **5**

Web Site **5**

1 Introduction **6**

2 System Requirements **7**

2.1 Hardware Requirement 7

2.2 Software Requirements 7

2.2.1 Boot Manager Setting 7

3 Express DR Card Installation **8**

3.1 Hardware Overview 8

3.2 Installation Guidelines 8

3.2.1 ESD Protection 8

3.2.2 Installation 9

4 Manufacturer Test Software Installation **10**

4.1 Copy the Source Files 10

4.2 Compile the Source Code 10

4.3 Installation 10

5 Manufacturer Test Program Usage **11**

5.1 Manufacture Serial Number 11

5.2 Test Flow 11

5.3 Test Program Procedure 13

5.4 Test Program Log 17

Preface

Welcome to the Express Data Reduction (DR) card Manufacturing (MFG) Test Software for the family of Exar Express DR cards. This guide contains information specific to the Express DR Manufacturing Test Software 2.1.7 Release for Express DR16xx cards.

Prerequisite

Before proceeding you should generally understand the Express DR Data Compression card. This guide is for the manufacturing operator to test the Express DR card.

Document Organization

This document is organized as follows:

- Chapter 1, Introduction, provides an overview of the Manufacturing Test Software.
- Chapter 2, System Requirements, discusses system requirements that should be met before installing and testing the Express DR card.
- Chapter 3, Express DR Card Installation, instructs the user on how to install the Express DR card.
- Chapter 4, Manufacturer Test Software Installation, describes how to compile and install the driver and the MFG test program.
- Chapter 5, Manufacturer Test Program Usage, gives instructions for how to use the Manufacturing Test Software.

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1 Introduction

Welcome to the Manufacturing Test Software Guide for the Exar Express Data Reduction (DR) DR16xx card family. This guide contains information specific to the Express DR Manufacturing Test Software 2.1.7 Release.

The Express DR 16xx card family consists of:

- Express DR 1600 Data Compression Card (300MBs)
- Express DR 1605 Data Compression/Encryption/HASH Card (300MBs)
- Express DR 1610 Data Compression Card (900MBs)
- Express DR 1615 Data Compression/Encryption/HASH Card (900MBs)
- Express DR 1620 Data Compression Card (1.8GBs)
- Express DR 1625 Data Compression/Encryption/HASH Card (1.8GBs)

2 System Requirements

This chapter discusses system requirements that should be met before installing and testing the Express DR card 16xx.

2.1 Hardware Requirement

In order to install and test the Express DR card 16xx, the following system requirements must be met.

- An available x8 or x16 PCI Express slot in motherboard
- At least 1G physical memory equipped in motherboard

2.2 Software Requirements

The MFG test program must be run on one of the following software platforms:

- Red Hat Enterprise Linux 4 Update 6(2.6.9-67 for i386 32 bit)
- Red Hat Enterprise Linux 4 Update 6(2.6.9-67 for x86_64 64 bit)
- Red Hat Enterprise Linux 5 Update 1(2.6.18-53 for i386 32 bit)
- Red Hat Enterprise Linux 5 Update 1(2.6.18-53 for x86_64 64 bit)
- SUSE Linux Enterprise Server 9 SP 4(Kernel-bigsmp-2.6.5-7-308 for i386 32bit)
- SUSE Linux Enterprise Server 9 SP 4(Kernel-bigsmp-2.6.5-7-308 for x86_64 64 bit)
- SUSE Linux Enterprise Server 10 SP 1(Kernel-bigsmp-2.6.16-46-0.12 for i386 32bit)
- SUSE Linux Enterprise Server 10 SP 1(Kernel-bigsmp-2.6.16-46-0.12 for x86_64 64 bit)

The corresponding Kernel source code is required be installed.

2.2.1Boot Manager Setting

Before starting the MFG test program, the boot manager must be set in order to reserve memory for the MFG test program.

Add a “mem=500M” string to the boot manager Grub as shown to the /etc/grub.conf file. For example,

```
kernel /boot/2.6.9-67.EL-smp mem=500M ro root=LABEL=/
```

Before continuing, reboot the system to make the changes take effect.

3 Express DR Card Installation

This chapter briefly describes the Express DR card installation process.

3.1 Hardware Overview

Your Express DR 16xx card should look similar to the picture shown in the figure below. There may be slight differences between the card pictured and the card you receive (card color, socket versus soldered components, etc.).

There are five LEDs on the Express DR 16xx card. In the upper left hand corner, from top to bottom, is Link (green), Busy (orange), PLL Lock (green), and Power (green). The LED near the face plate represents Error (amber).

The Express DR 16xx card can be powered from any available 12V PCIe slot. The Express DR card supports 8 lanes of full duplex transceivers which plug into either x8 or x16 slots. All communication to the card is via the PCIe bus.

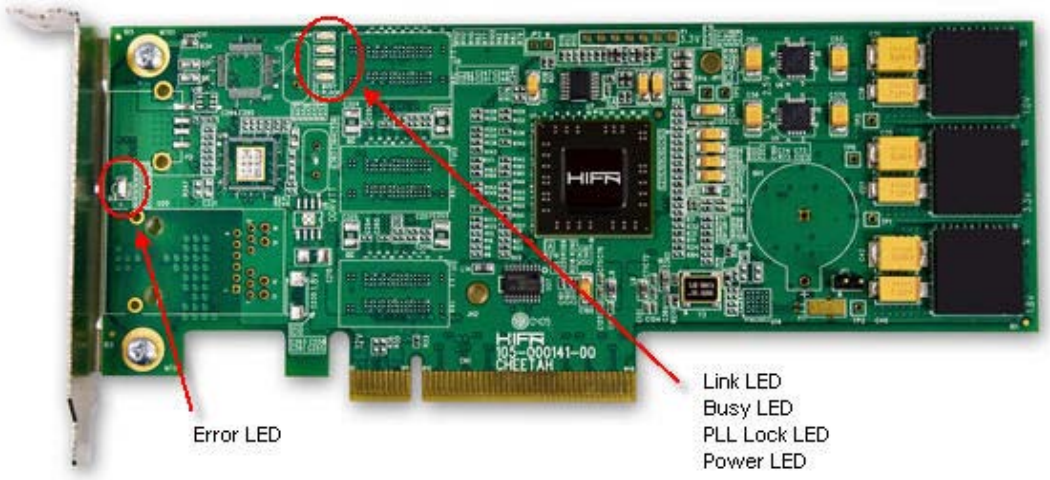

Figure 1 Express DR 16xx Card

3.2 Installation Guidelines

3.2.1 ESD Protection

Warning

When handling the board, wear an ESD wrist-strap or foot-strap to dissipate any build-up of static charge.

The Express DR card is not designed to withstand ESD discharges. If the Express DR card is being moved from anywhere other than an ESD-protected area, cover the card with anti-static material.

3.2.2 Installation

To install the Express DR card, perform the following steps:

1. Power off the system and unplug the power cord.

Caution

Failure to unplug the power cord could damage the adapter or cause physical danger. Follow any specific instructions that came with your system about installing adapter cards.

2. Firmly insert the Express DR card into the selected PCIe slot.
3. If using a chassis, ensure that the card is fully seated, replace the slot cover, and secure the bracket to the system chassis.
4. Plug in the power cord and turn on the system power.

4 Manufacturer Test Software Installation

This chapter will describe how to compile and install the driver and the Manufacturer Test program.

4.1 Copy the Source Files

Copy all the program files from the CD-ROM to a working directory on your computer, such as /home/. If any of the files are compressed, decompress the main source code files with the Linux tar command:

```
[root@hifn-server dev]# tar xzfv DR_MFG_V2.1.7_20100601.release.tar.gz
```

4.2 Compile the Source Code

Navigate to your working directory and then enter the following command to compile the source code.

```
[root@hifn-server dev]# make
```

After the compiling successfully completes, the generated files *dre_test.ko, dre_mm.ko* and *dre_mfg* will be populated in the working directory.

4.3 Installation

The MFG test program loads the kernel module automatically. Before running the test program, you must unload any existing Express DR kernel modules.

Use the command *lsmod* to check for other installed Express DR kernel modules.

```
[root@hifn-server dev]# lsmod | grep “dre”
```

If you find any other installed Express DR kernel modules, use the command *rmmod* to uninstall them. For example:

```
[root@hifn-server dev]# lsmod | grep “dre”
Module                  Size  Used by
dre_dr                453412  0
[root@hifn-server dev]# rmmod dre_dr
```

5 Manufacturer Test Program Usage

This section describes the Hifn MFG test program usage. The MFG Test Program 2.1.7 supports the Express DR16xx boards.

5.1 Manufacture Serial Number

Hifn's Operations department determines the manufacturing serial numbers. The serial number is composed of 18 digits. An explanation of the serial number is defined below:

Manufacturer ID: 2 digit factory code
Product ID: 4 digit production model or part number
Revision Number: 2 digit revision of build (number must match BOM revision)
Year: 2 digit year of manufacture (2008 =08)
Month/ Day: 4 digit month and day of manufacture (0131 = January 31st)
Sequence Number: 4 digit one day production, in sequential order

5.2 Test Flow

Figure 2 illustrates the full featured test flow. Some steps are card type specific.

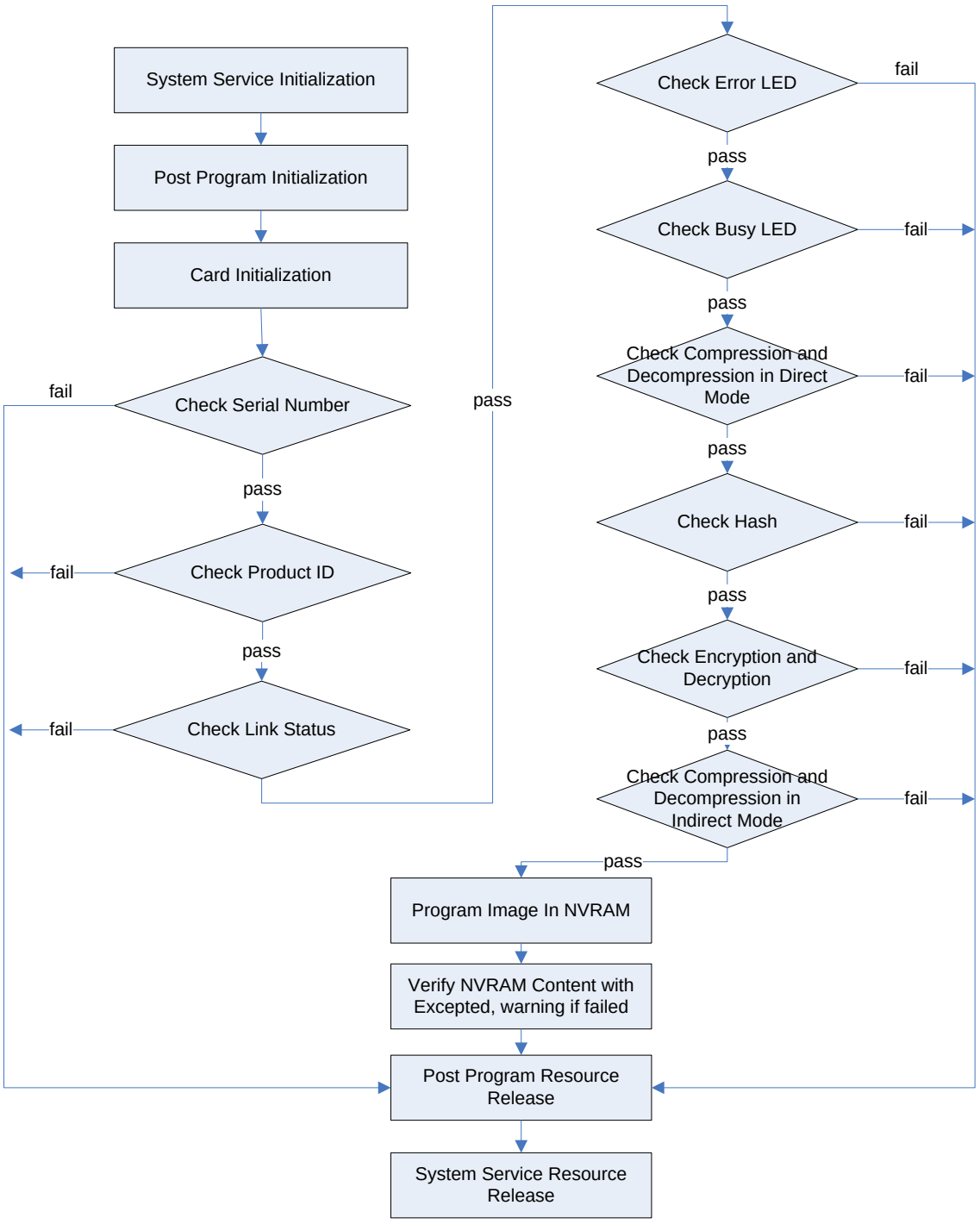

Figure 2 MFG Test Program Flow

5.3 Test Program Procedure

Step 1 Running the Program

. To run the program, boot the machine and enter the commands below:

```
<ctrl><Alt<F1>
```

The user will then be prompted to log in:

User: hifn
Password: hifnroot

After login, proceed to the user working subdirectory, e.g., /home/mfg_v2.1.7:

```
cd /home/mfg_v2.1.7
```

./dre_mfg

When the test completes, the operator should shut down the system with the command:

```
shutdown –h now
```

Step 2 Serial Number Verification

The program will prompt you for the card serial number that is printed on the card. If the serial number is valid, the program will continue to the next step.

```
==========================
Please Input the Serial Number: 010141000904120001
```

Otherwise, the program will display error information and terminate. For example:

```
==========================
Please Input the Serial Number: 010151000904120001
Invalid Production ID.
```

Step 3 Product ID Verification

The Subsystem ID Verification does not require the operator's intervention. If it is correct, the program will display the product ID and indicate that this item has passed and continue to the next step.

```
==========================
Checking Product ID ...-----PASS
The Product is DR 1615.
```

If the Subsystem ID is not correct, the program will indicate this item has failed. It will display error information and terminate.

```
==========================
Checking Product ID ...-----FAIL
Unknown product ID.
```

Step 4 Link status Verification

The Link status Verification does not require the operator's intervention. If it is correct, the program will display that this item has passed. It will display Link status information and continue to the next step.

If the card is in a x8 PCI Express slot, it will display:

```
==========================
Checking Link Status...-----PASS
PCI Express Link has been trained to x8 lane
```

If link status is not correct, the program will indicate this item has failed and terminate.

```
==========================
Checking Link Status...-----FAIL
```

Step 5 Error LED Verification

This step requires the operator to visually confirm that the Error LED is lighting properly. At the prompt message, the operator should input “y” or “n” accordingly. If the Error LED test passes, the program will continue to the next step.

```
==========================
Checking Error LED...
Is the Error LED lit? [y/n]y
Error LED check-----PASS
```

If the Error LED tests do not pass, the program will indicate this item has failed and terminate.

```
==========================
Checking Error LED...
Is the Error LED lit? [y/n]n
Error LED check-----FAIL
```

Step 6 Busy LED Verification

This step requires the operator to visually confirm that the Busy LED is lighting properly. At the prompt message, the operator should input “y” or “n” accordingly. If the Busy LED test passes, the program will continue to the next step.

```
==========================
Checking Busy LED...
Is the Busy LED lit? [y/n]y
Busy LED check-----PASS
```

If the Busy LED tests do not pass, the program will indicate this item has failed and terminate.

```
==========================
Checking Busy LED...
Is the Busy LED lit? [y/n]n
Busy LED check-----FAIL
```

Step 7 Compression and Decompression in Direct Mode Verification

This step does not require the operator’s intervention. If it is correct, the program will display that this item has passed and continue to the next step.

```
==========================
Checking Com-Decompression with regular data appended CRC...
Direct Mode, Ring 0 -----PASS
Direct Mode, Ring 1 -----PASS
```

If it is not correct, the program will indicate this item has failed and terminate.

```
==========================
Checking Com-Decompression with regular data appended CRC...
Direct Mode, Ring 0 -----FAIL
```

Step 8 Hash Verification

This step applies to DR1605/DR1615/DR1625 cards. This step does not require the operator's intervention. If it is correct, the program will display that this item has passed and continue to the next step.

```
==========================
Checking HASH...
Checking MD5 digest -----PASS
Checking SHA1 digest -----PASS
Checking SHA256 digest -----PASS
```

If any tests do not pass, the program will indicate this item has failed and terminate.

```
==========================
Checking HASH...
Checking MD5 digest -----PASS
Checking SHA1 digest -----FAIL
```

Step 9 Encryption and Decryption Verification

This step applies to DR1605/DR1615/DR1625 cards. This step does not require the operator's intervention. If it is correct, the program will display that this item has passed and continue to the next step.

```
==========================
Checking Encryption and Decryption...
AES-GCM :
Known answer test -----PASS
Pairwise checking -----PASS
AES-CBC :
Known answer test -----PASS
Pairwise checking -----PASS
AES-XTS (data include DIF):
Known answer test -----PASS
Pairwise checking -----PASS
```

If any tests do not pass, the program will indicate this item has failed and terminate.

```
==========================
Checking Encryption and Decryption...
AES-GCM :
Known answer test -----PASS
Pairwise checking -----PASS
AES-CBC :
Known answer test -----FAIL
```

Step 10 Compression and Decompression in Indirect Mode Verification

This step does not require the operator's intervention. If it is correct, the program will display that this item has passed and continue to the next step.

```
==========================
Checking Com-Decompression with regular data appended CRC...
InDirect Mode, Ring 0 -----PASS
InDirect Mode, Ring 1 -----PASS
```

If it is not correct, the program will indicate this item has failed and terminate.

```
==========================
Checking Com-Decompression with regular data appended CRC...
InDirect Mode, Ring 0 -----FAIL
```

Step 11 Update the Board Configuration

This step does not require the operator's intervention. This step will update the board configuration to the flash.

```
=========================
Updating the flash data...
```

Step 12 Verify the Board Configuration

This step does not require the operator's intervention. The program will verify the flash content and display the verification result:

```
=========================
Verifying the flash data...
MFG Flash Region       Verification -----PASS
hwFeature Flash Region Verification -----PASS
swFeature Flash Region Verification -----PASS
=========================
```

Step 13 Generate Log File

After the test program logs the results to a file, the operator must verify that the file was written. The file is saved in a folder created by the test program. The folder is named according to the date the test program is run. For example, if the test program is run on May 8, 2009, the serial number of the card is 010141000905080001, and the current working directory is /home/dev_mfg, the log file will be saved as /home/dev_mfg/20090508/010141000905080001.

5.4 Test Program Log

All output in the test program will be saved in the log file. The log file name is the serial number with suffix ".log". The following is an example output for the log file:

```
/*************************************/
/*      DR16XX MFG Program v2.1.7       */
/*************************************/
Start Time: 11:19:21
=========================================
Checking Product ID ...-----PASS
The Product is DR 1625.
Checking Link Status...-----PASS
PCI Express Link has been trained to x8 lane
Checking Error LED...
Is the Error LED lit?[y/n]y
Error LED check-----PASS
Checking Busy LED...
Is the Busy LED lit?[y/n]y
Busy LED check-----PASS
Checking Com-Decompression with regular data appended CRC...
Direct Mode, Ring 0 -----PASS
Direct Mode, Ring 1 -----PASS
Checking HASH...
Checking MD5 digest -----PASS
Checking SHA1 digest -----PASS
Checking SHA256 digest -----PASS
Checking Encryption and Decryption...
AES-GCM :
Known answer test -----PASS
Pairwise checking -----PASS
AES-CBC :
Known answer test -----PASS
Pairwise checking -----PASS
AES-XTS (data include DIF):
Known answer test -----PASS
Pairwise checking -----PASS
Checking Com-Decompression with regular data appended CRC...
InDirect Mode, Ring 0 -----PASS
InDirect Mode, Ring 1 -----PASS
Updating the flash data...
Verifying the flash data...
MFG Flash Region       Verification -----PASS
hwFeature Flash Region Verification -----PASS
swFeature Flash Region Verification -----PASS
=========================================
End Time: 11:19:35
Total Time: 14 seconds
```

Document Revision History

Revision 00

Initial release.

Revision 01

Added steps to section 5.3 to provide better direction for manufacturing personnel

Revision 02

Changed Figure 2.
Added step 12 that verifies the card configuration.

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