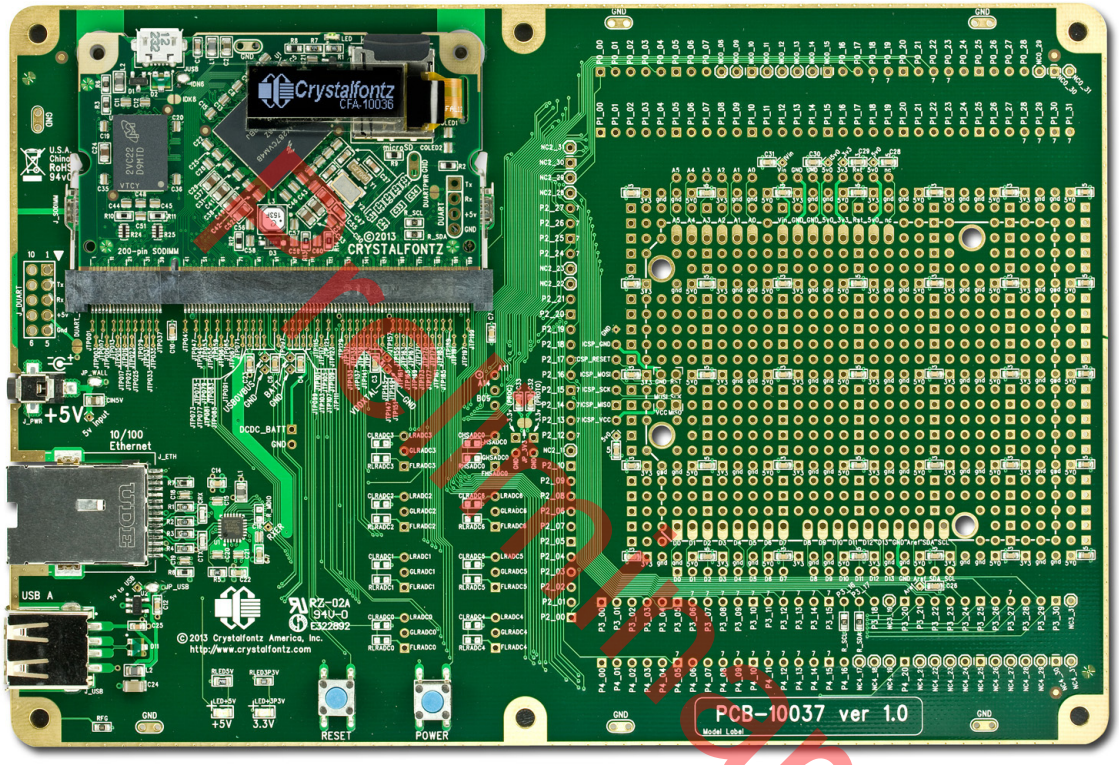
Crystalfontz America, Incorporated

CFA10037 Development Board
User Guide



CFA10037 shown with mounted CFA10036 SOM and CFAL12832D-B OLED

CFA10037 User Guide Release 2013-04-23
for
CFA10037 Hardware Version: v1.0

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CFA10037 Hardware Revision Information

For information about hardware revisions, see the Part Change Notifications (PCNs) under the “Notices” tab on the CFA10037 web page.

CFA10037 User Guide Revision History

Release Date: 2013-04-23
New *User Guide*.

The Fine Print

Special Terms Applicable for the CFA10036 Mounted on the CFA10037 Designated as NOT FCC Approved / FCC NOTICE

The CFA10036 mounted on the optional CFA10037 (written here as CFA10036+CFA10037) has NOT been authorized under the rules of the Federal Communications Commission and may not be offered for further sale or lease, or sold or leased, until authorization is obtained. FCC experimental licensing requirements may apply to Buyer's use.

The CFA10036+CFA10037 is made available solely to allow product developers to evaluate Crystalfontz technology and/or software associated with the CFA10036+ CFA10037 to determine whether to incorporate such items in a finished product. This is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the conditions that this CFA10036+CFA10037 not cause harmful interference to licensed radio stations and that this CFA10037 accept harmful interference. Unless the assembled kit is designed to operate under Part 15 or Part 95 of the FCC Rules, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under Part 5 of the FCC Rules.

This CFA10036+CFA10037 is not an end product or finished appliance and is not intended or authorized to be integrated into end products as is. Buyer may use the CFA10036+CFA10037 to create prototypes for its own internal experimental use, and may add components, features, software and/or functionality, in the process of designing its own final products. Buyer shall only assign technically qualified electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, subsystems and systems to use the CFA10036+CFA10037, and that such use takes place solely in laboratory/development environments (and not in residential environments). The Non-FCC approved CFA10036+CFA10037 is FOR ENGINEERING DEVELOPMENT, DEMONSTRATION, AND/OR EVALUATION PURPOSES ONLY.

CONTENTS

INTRODUCTION

This User Guide has information for the CFA10037 used in these kits: KIT365B37 and KIT366B37

The CFA10037 development board makes it easy to create proof-of-concept designs based on the ARM9-based CFA10036 SOM (System On Module). With integrated Ethernet, USB, JTAG, and power interfaces, the CFA10037 provides base functionality for your unique designs. Combined with the CFA10036, a full working Linux operating system is at your disposal. Instead of taking months to design and produce prototypes, using the CFA10036+CFA10037 can reduce your initial development time to days.

The generous prototype area features well-decoupled ground and +3.3v and +5v planes for good power distribution. The CFA10036 connects to the CFA10037 via its JDEC MO-224E SODIMM connector. Using 0.1" center headers and socketed hook-up wire (see WR-JMPY-40 and WR-JMPY-41) you can connect any of the pins on the CFA10036's to any location on the CFA10037's prototype area. The prototype area even has hole patterns compatible with Arduino UNO R3 shields.

To get the mechanical stability expected in embedded systems, we slightly extended the CFA10036's SODIMM form factor and added two mounting holes. These mate perfectly with blind threaded SMT standoffs that hold the CFA10036 securely to the CFA10037.

To make prototyping even easier, carrier boards for Crystalfontz TFT LCD displays are available to mount on the CFA10037. Software support for the displays are already built into the Linux mainline kernel. For more information, see KITS AND ACCESSORIES (Pg. 7).

MAIN FEATURES

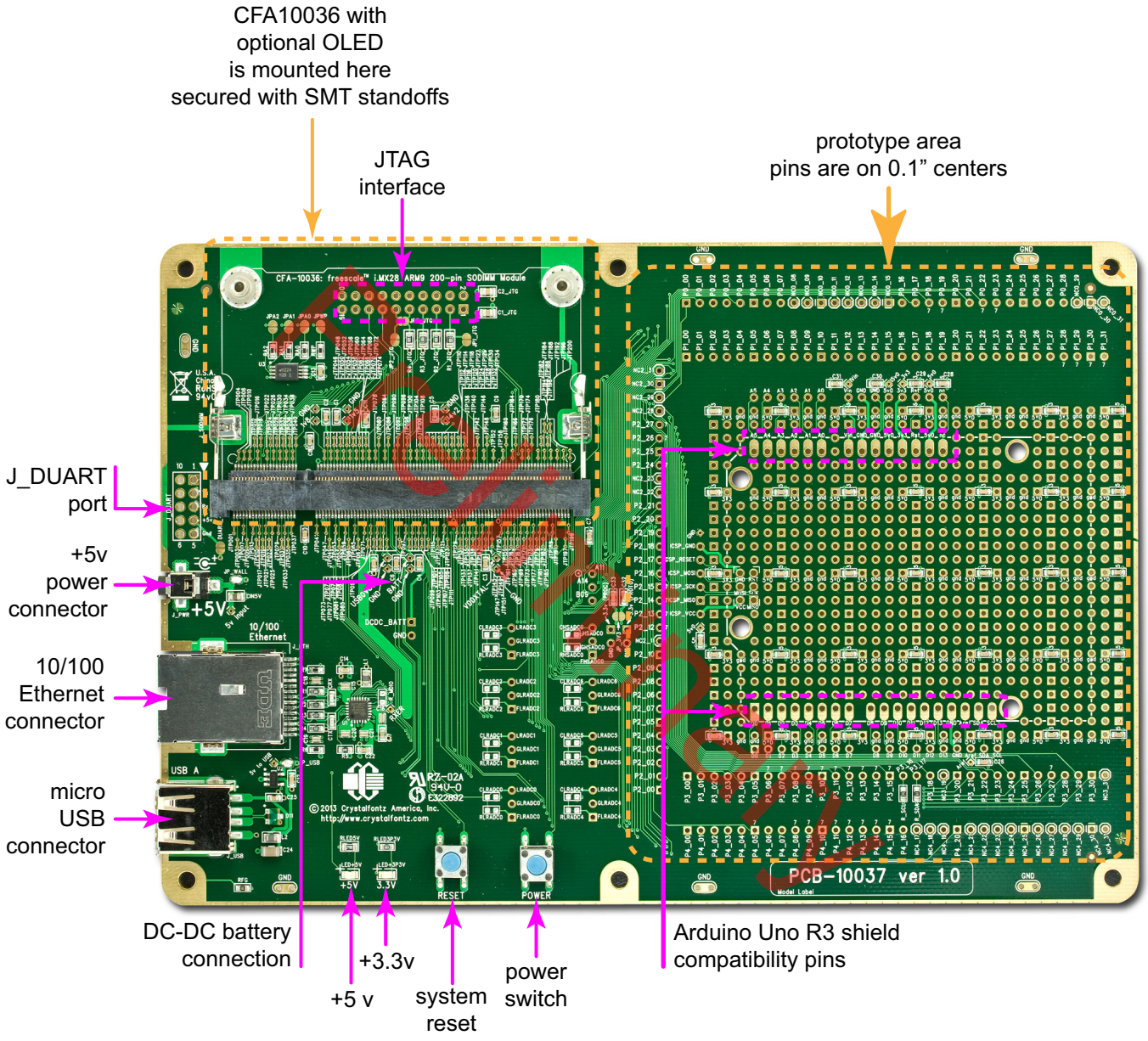


Figure 1. CFA10037 Main Features

The main features are:

- ❑ Access to all the port pins of the CFA10036 in the prototype area, which includes all the port pins of its i.MX28 processor. The CFA10037 has a generous number of pins with power distribution in a prototype-friendly 0.1" center format. Using headers and socketed hook-up wire (see WR-JMPY-40 and WR-JMPY-41), you can connect any of the pins on the CFA10036 to any location in the CFA10037’s prototype area.
- ❑ The CFA10037 has a 5-volt power supply connector that can power the CFA10036 across the SODIMM socket.

- ❑ Micro USB 2.0 OTG connector.
- ❑ Blind threaded SMT standoffs hold the CFA10036 securely to the CFA10037.
- ❑ USB 2.0 OTG connector.
- ❑ The CFA10037 brings out the BATT pin from the CFA10036 / i.MX28 processor. This pin can be used to support connection to a lithium-ion (Lion) battery. (Please refer to the Freescale i.MX28 Data Sheet.)
- ❑ An additional access point for the DUART port. You can connect a USB633 TTL-to-USB converter to the dedicated J_DUART and then connect a WR-USB-Y03 cable from the USB633 to your host.
- ❑ For hardware-level debugging, a 20-pin JTAG connector is provided that will connect to a compatible JTAG debugger.

SMT standoff

KITS AND ACCESSORIES

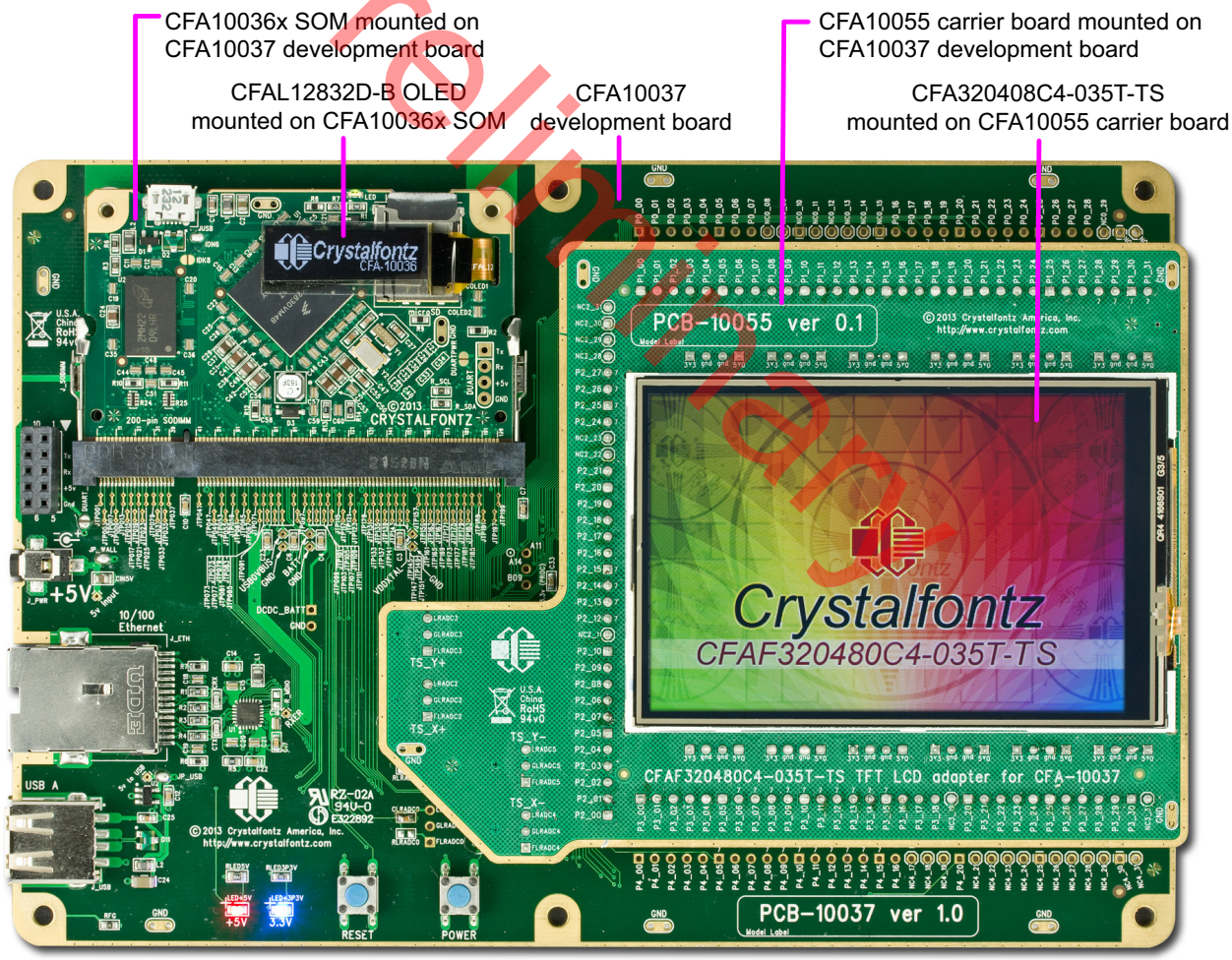


Figure 2. Kit Example

Accessories and kits compatible with the CFA10037 are described below.

CFA10036 SOM (System On Module) with Optional CFAL12832D-B OLED

The CFA10036 is a small, highly functional ARM9-based Linux SOM (System On Module) shipped with a full Linux operating system. Because a full Linux mainline kernel is already ported to the CFA10036, you can devote your resources to applications in the languages of your choice. It is low cost, easy to use, and has lots of GPIO.

The optional CFAL12832D-B 128x32 OLED graphics module displays light (near-white) characters on a dark (near-black) background. Less than 0.5-inch high (11.5 mm), the CFAL12832D-B mounts onto the CFA10036 with a ZIF connector. The OLED is useful for status messages and debugging.

Carrier Boards for TFT Displays (TFT LCD Adapters)

A TFT display mounted on a carrier board can be mounted to the CFA10037 development board along with the CFA10036 and the optional CFAL12832D-B. The following carrier boards and TFT displays are available.

Carrier Board	TFT mounted on top of Carrier Board		Active Area Diagonal
CFA100554	CFAF320480C4-035T		3.5-inch
CFA100558	CFAF320480C4-035T-TS *(Photo shows touch screen.)*		
CFA100564	CFAF480800FT2-040T		4.0-inch

CFA10040PWR

The CFA10040PWR is a110 VAC +5v wall power supply that can be used to power the CFA10037.

WR-USB-Y03 Cable

The WR-USB-Y03 is about 6-feet long. This cable has two different types of USB connectors, one smaller than the other. Connect the cable's smaller 2 mm female USB connector to the module's USB connector. Connect the cable's larger USB-A female connector to host's USB-A connector.

WR-JMPY-40 and WR-JMPY-41

Five packages of 20 each (total 100) female-to -female jumper wires, useful to connect to the optional CFA10037 prototype area headers. Assorted colors.

- WR-JMPY-40: Seven inches long *(shown in photo above).*
- WR-JMPY-41*:* Four inches long.

HARDWARE DESIGN INFORMATION

The schematic can be downloaded as a PDF file here. All CAM files can be downloaded in a zipped folder here.

PHYSICAL CHARACTERISTICS

Specifications	
Overall Dimensions	184.5 (W) x 125 (H) millimeters
Weight	TBD grams
Operating Temperature	-20°C
Humidity (RH noncondensing)	0%

VIBRATION

Test conditions:

- GR-63-CORE 5.4.2, Office Vibration, Alternative Test: 5-100-5 Hz at 1.0 g with a sweep rate of .25
- Octave/minute, 35 minutes per axis.
- MIL-STD 810F, Figure 514C-17, Random: 1 hour per axis.
- MIL-STD 810F, Figure 514C-18, Sine: 1 hour per axis.

For details see APPENDIX B: Vibration Test Report (Pg. 11)

APPENDIX A: QUALITY ASSURANCE STANDARDS

INSPECTION CONDITIONS

- Environment
  - Temperature: 25±5°C
  - Humidity: 30~85% RH

ACCEPTANCE SAMPLING

DEFECT TYPE	AQL*
Major	≤.65%
Minor	<1.0%
* Acceptable Quality Level: maximum allowable error rate or variation from standard	

DEFECTS CLASSIFICATION

Defects are defined as:

- A *major defect* is a defect that substantially reduces usability of unit for its intended purpose.
- A *minor defect*: is a defect that is unlikely to reduce usability for its intended purpose.

ACCEPTANCE STANDARDS

#	DEFECT TYPE	ACCEPTANCE STANDARDS CRITERIA	MAJOR / MINOR
1	PCB defects	1. Oxidation or contamination on connectors.* 2. Wrong parts, missing parts, or parts not in specification.* 3. Jumpers set incorrectly. 4. Solder (if any) on bezel, LED pad, zebra pad, or screw hole pad is not smooth. **Minor if display functions correctly. Major if the display fails.*	Minor
2	Soldering defects	1. Unmelted solder paste. 2. Cold solder joints, missing solder connections, or oxidation.* 3. Solder bridges causing short circuits.* 4. Residue or solder balls. 5. Solder flux is black or brown. **Minor if display functions correctly. Major if the display fails.*	Minor

APPENDIX B: VIBRATION TEST REPORT

KeyTronicEMS
Trust. Commitment. Results.

Test: Sine & Random Vibration **Reliability Laboratory**

Originator: Brent Crosby – Crystalfontz America
Test Coordinator: Larry Bettinger - lbetting@keytronic.com 509-927-5577
Test Started: April 9, 2013
Test Completed: April 10, 2013

Summary:

The following Crystalfontz America samples were submitted for operational vibration testing:

Sample Description	S/N
533 Yellow	1148533YYHD063605
533 Blue	1234533TMITD075774
633 Yellow	1037633YYH297069
633 White	1217633TFHD356000
735 Yellow	1212735TFK0002778
735 White	1212735TFK0002778
2x CFA-10036 ver. 1.0	Pilot run samples, no S/N assigned.
2x CFA-10037 ver. 1.0	Pilot run samples, no S/N assigned.

Test Conditions:

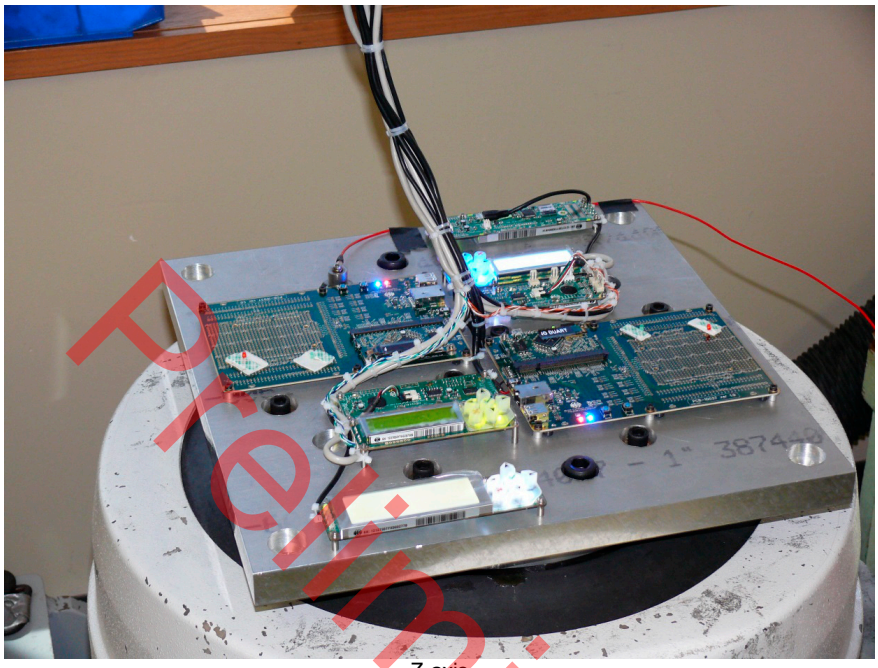
The samples were mounted to a customer's fixture plate which was bolted directly to the slip table for the X and Y-axes. For the Z-axis the fixture was bolted to the tester with a small aluminum coupling plate. The vibration testing was performed on a Ling Dynamic Systems V730 vibrator with a Data Physics SignalStar Scalar vibration control system version 2.2.923. The samples were subjected to following profiles:

- GR-63-CORE 5.4.2, Office Vibration, Alternative Test: 5-100-5 Hz at 1.0 g with a sweep rate of .25 octave/minute, 35 minutes per axis.
- MIL-STD 810F, Figure 514C-17, Random: 1 hour per axis.
- MIL-STD 810F, Figure 514C-18, Sine: 1 hour per axis.

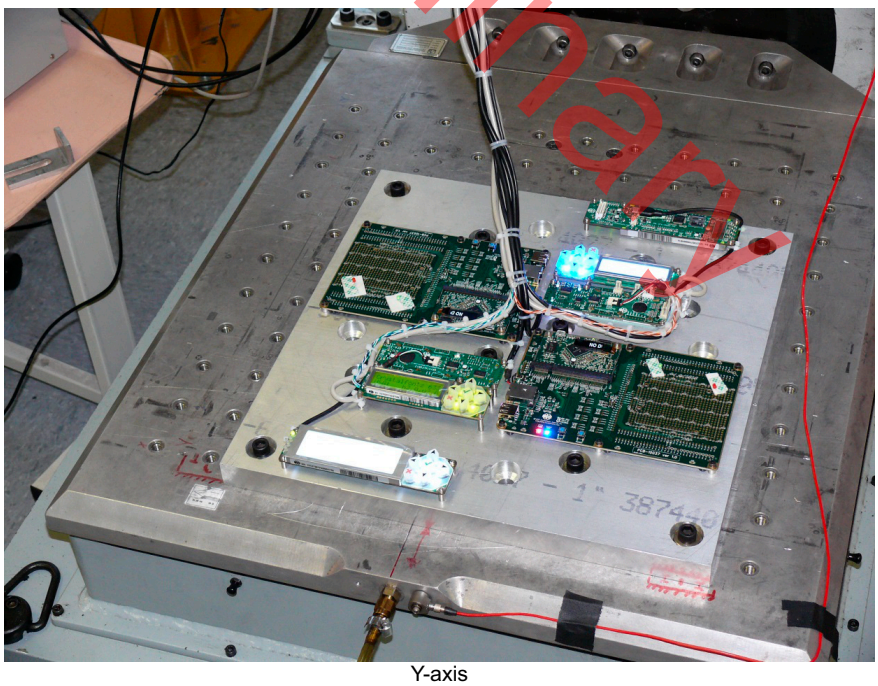
Equipment used:

Equipment	Model	S/N	Calibration Due Date
Endevco Control Accelerometer	7221	AM67	12-03-13
Endevco Charge amplifier	2721B	ER01	12-03-13
Data Physics Vibration controller	SignalStar Scalar	74244	05-29-13

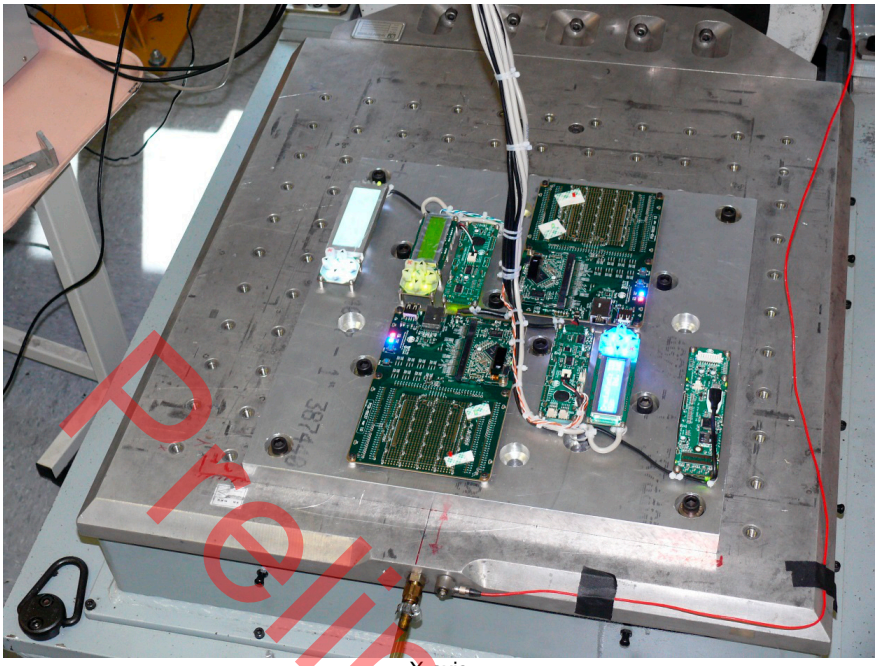
Test Setups:



Z-axis

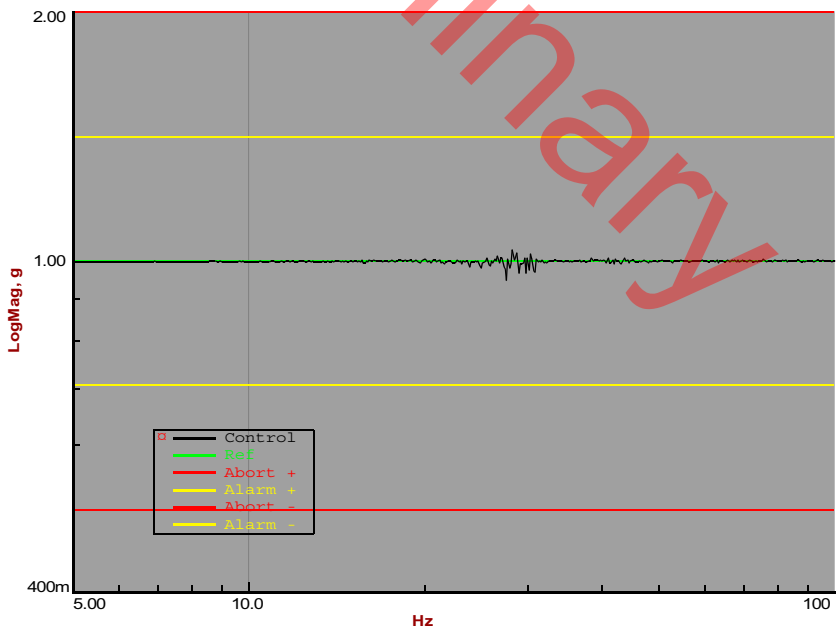


Y-axis

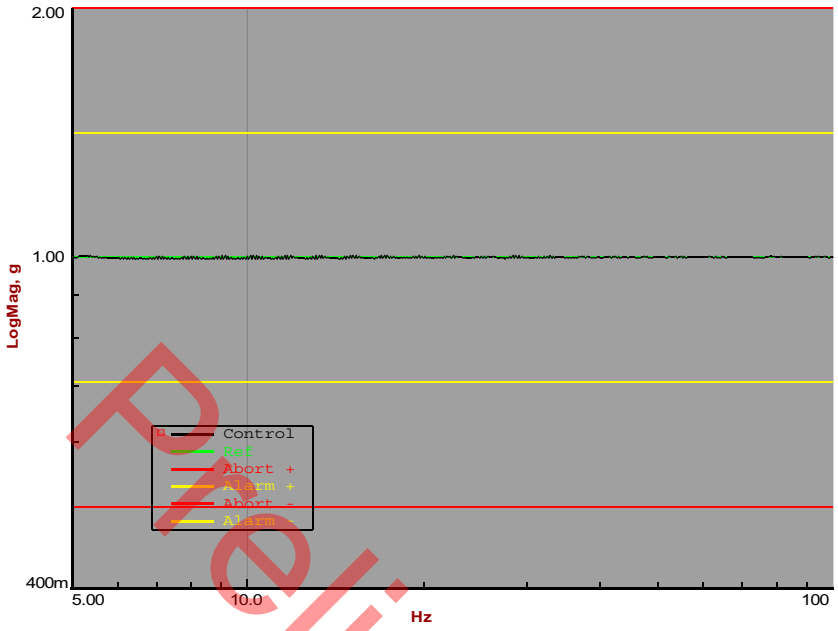


X-axis

Control accelerometer vibration level graphs:



Z-axis (GR-63-CORE 5.4.2, Office Vibration, Alternative Test)



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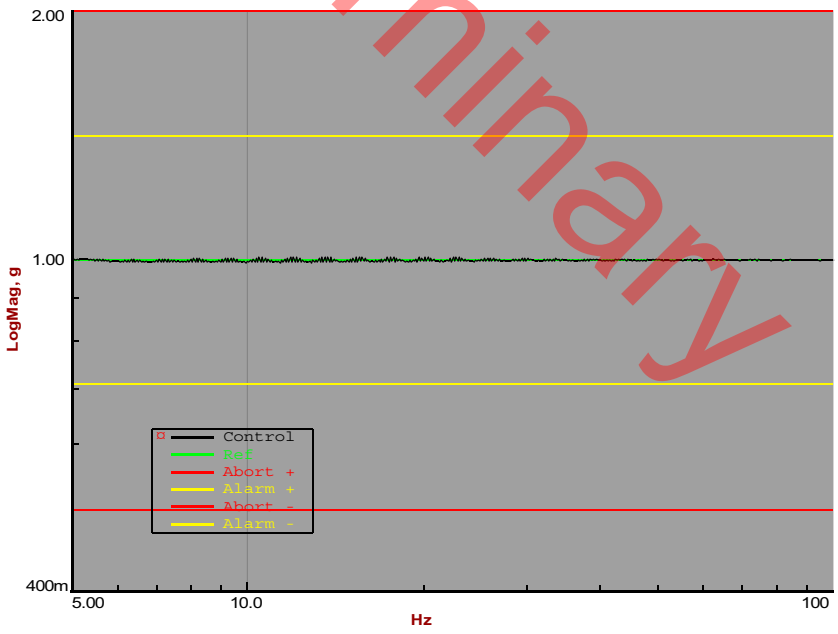
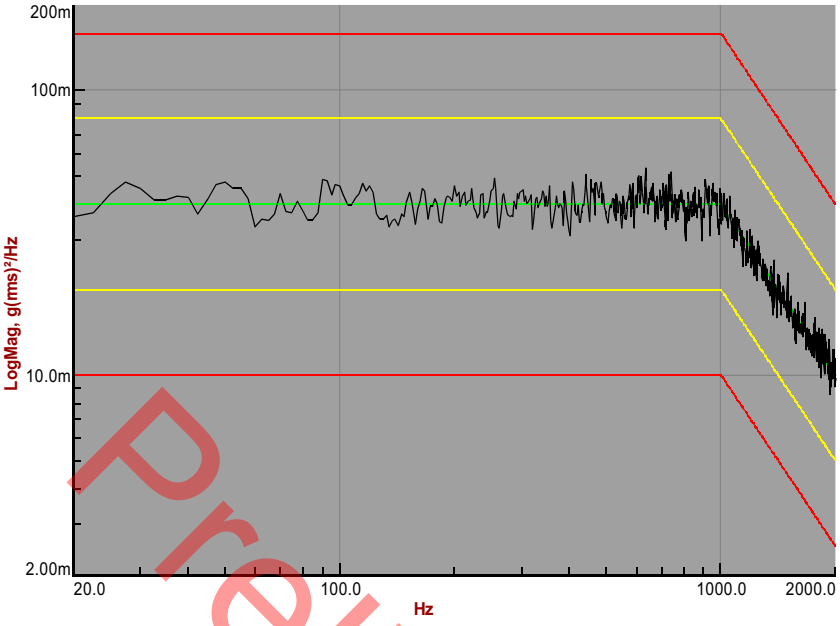
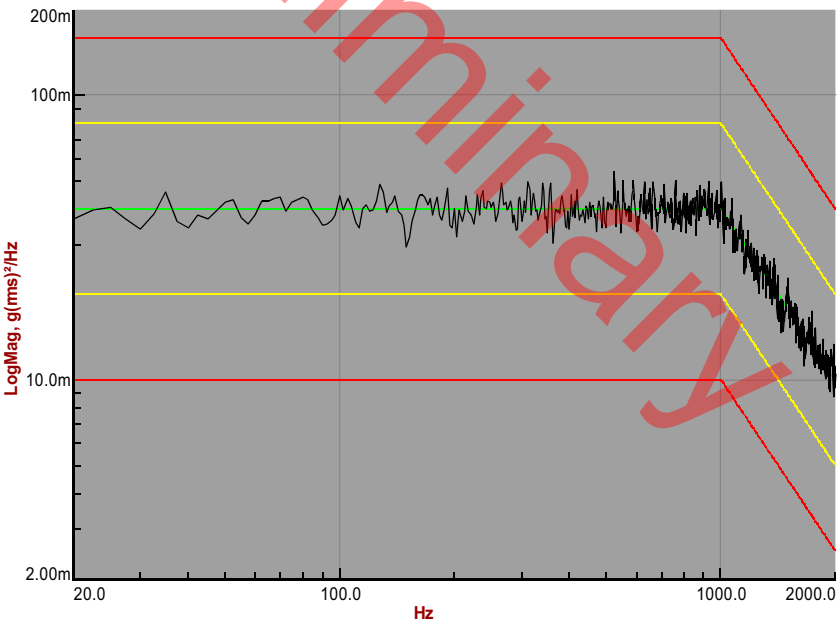


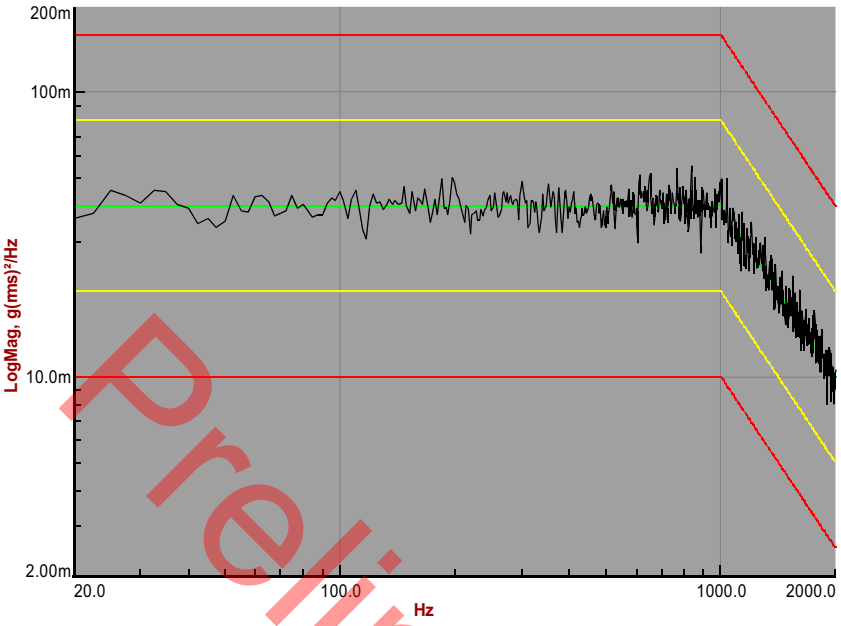
X-axis (GR-63-CORE 5.4.2, Office Vibration, Alternative Test)



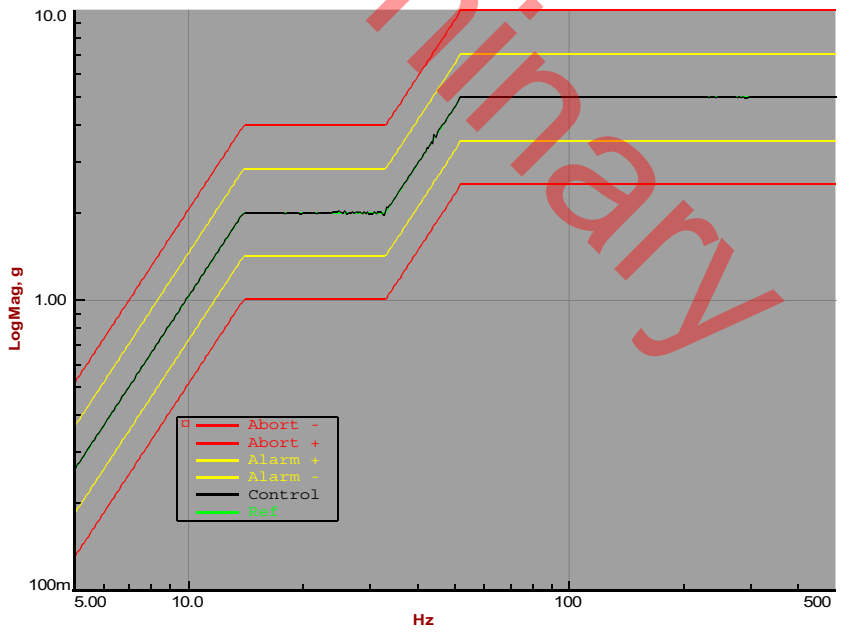
X-axis (MIL-STD 810F, Figure 514C-17, Random)



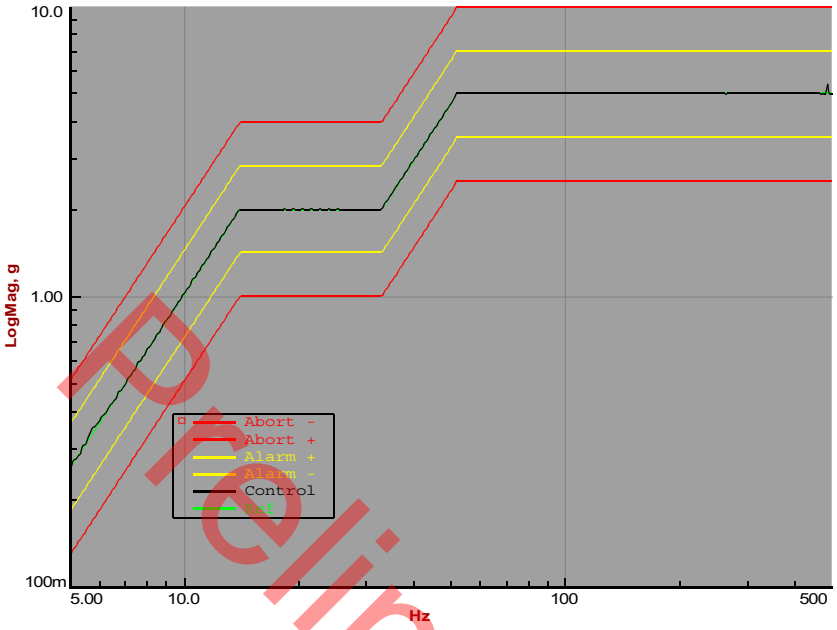
Y-axis (MIL-STD 810F, Figure 514C-17, Random)



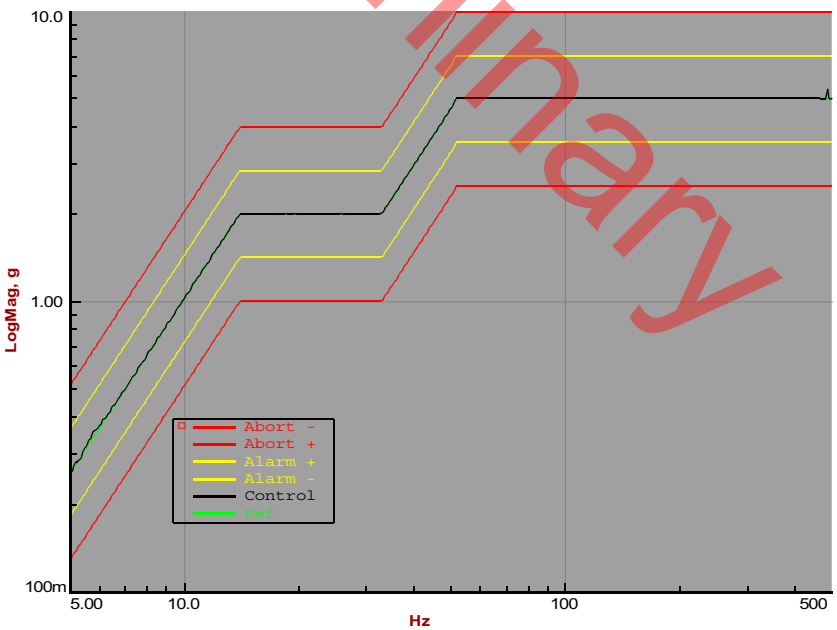
Z-axis (MIL-STD 810F, Figure 514C-17, Random)



Z-axis (MIL-STD 810F, Figure 514C-18, Sine)



Y-axis (MIL-STD 810F, Figure 514C-18, Sine)



X-axis (MIL-STD 810F, Figure 514C-18, Sine)