Interactivity Kit

User Manual

CHRISTIE®

Interactivity Kit

User Manual

020-100856-04

NOTICES

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GENERAL

Every effort has been made to ensure accuracy, however in some cases changes in the products or availability could occur which may not be reflected in this document. Christie reserves the right to make changes to specifications at any time without notice. Performance specifications are typical, but may vary depending on conditions beyond Christie's control such as maintenance of the product in proper working conditions. Performance specifications are based on information available at the time of printing. Christie makes no warranty of any kind with regard to this material, including, but not limited to, implied warranties of fitness for a particular purpose. Christie will not be liable for errors contained herein or for incidental or consequential damages in connection with the performance or use of this material. Canadian manufacturing facility is ISO 9001 and 14001 certified.

WARRANTY

Products are warranted under Christie's standard limited warranty, the complete details of which are available by contacting your Christie dealer or Christie. In addition to the other limitations that may be specified in Christie's standard limited warranty and, to the extent relevant or applicable to your product, the warranty does not cover:

a. Problems or damage occurring during shipment, in either direction.

b. Projector lamps (See Christie's separate lamp program policy).

c. Problems or damage caused by use of a projector lamp beyond the recommended lamp life, or use of a lamp other than a Christie lamp supplied by Christie or an authorized distributor of Christie lamps.

d. Problems or damage caused by combination of a product with non-Christie equipment, such as distribution systems, cameras, DVD players, etc., or use of a product with any non-Christie interface device.

e. Problems or damage caused by the use of any lamp, replacement part or component purchased or obtained from an unauthorized distributor of Christie lamps, replacement parts or components including, without limitation, any distributor offering Christie lamps, replacement parts or components through the internet (confirmation of authorized distributors may be obtained from Christie).

f. Problems or damage caused by misuse, improper power source, accident, fire, flood, lightening, earthquake or other natural disaster.

g. Problems or damage caused by improper installation/alignment, or by equipment modification, if by other than Christie service personnel or a Christie authorized repair service provider.

h. Problems or damage caused by use of a product on a motion platform or other movable device where such product has not been designed, modified or approved by Christie for such use.

i. Problems or damage caused by use of a projector in the presence of an oil-based fog machine or laser-based lighting that is unrelated to the projector.

j. For LCD projectors, the warranty period specified in the warranty applies only where the LCD projector is in "normal use" which means the LCD projector is not used more than 8 hours a day, 5 days a week.

k. Except where the product is designed for outdoor use, problems or damage caused by use of the product outdoors unless such product is protected from precipitation or other adverse weather or environmental conditions and the ambient temperature is within the recommended ambient temperature set forth in the specifications for such product.

l. Image retention on LCD flat panels.

m. Defects caused by normal wear and tear or otherwise due to normal aging of a product.

The warranty does not apply to any product where the serial number has been removed or obliterated. The warranty also does not apply to any product sold by a reseller to an end user outside of the country where the reseller is located unless (i) Christie has an office in the country where the end user is located or (ii) the required international warranty fee has been paid.

The warranty does not obligate Christie to provide any on site warranty service at the product site location.

PREVENTATIVE MAINTENANCE

Preventative maintenance is an important part of the continued and proper operation of your product. Please see the Maintenance section for specific maintenance items as they relate to your product. Failure to perform maintenance as required, and in accordance with the maintenance schedule specified by Christie, will void the warranty.

REGULATORY

The product has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the product is operated in a commercial environment. The product generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of the product in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the user's own expense.
CAN ICES-3 (A) / NMB-3 (A)
이 기기는 업무용 (A 급) 으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이점을 주의하시기 바라며 , 가정 외의 지역에서 사용하는 것을 목 적으로 합니다 .

Environmental

The product is designed and manufactured with high-quality materials and components that can be recycled and reused. This symbol ⌦ means that electrical and electronic equipment, at their end-of-life, should be disposed of separately from regular waste. Please dispose of the product appropriately and according to local regulations. In the European Union, there are separate collection systems for used electrical and electronic products. Please help us to conserve the environment we live in!

Table of Contents

Introduction

The Christie Interactivity Kit uses a breakthrough technology that allows multiple users to interact simultaneously with content on your Christie MicroTiles® or any large-format video wall. This high performance, modular interactivity solution is reusable on different sized rectangular displays, from a 3 x 1 up to a 16 x 6 Christie MicroTiles array or a 12–square meter video wall.

These easy–to–use, field-installable kits attach around the perimeter of your display wall and plug into your computer's USB port without any need for drivers. The Christie Interactivity Kit is automatically recognized as a multi-touch device by Windows® 7 and Windows® 8, and no manual calibration of sensors or cameras is required. Offering superior performance with high touch accuracy and fast response times, this multi–touch solution can support up to 18 touches on a Christie MicroTiles 16 x 6 array.

Parts and Assembly Overview

Interactivity Kit Components

TIP Each connector bar is marked to indicate its position within the Interactivity Kit frame.

light bar connector

master controller

sensor bar connector

top corner (no electronics)

sensor bar

bottom light bar

side light bar

bottom corner

BOTTOM

SIDE
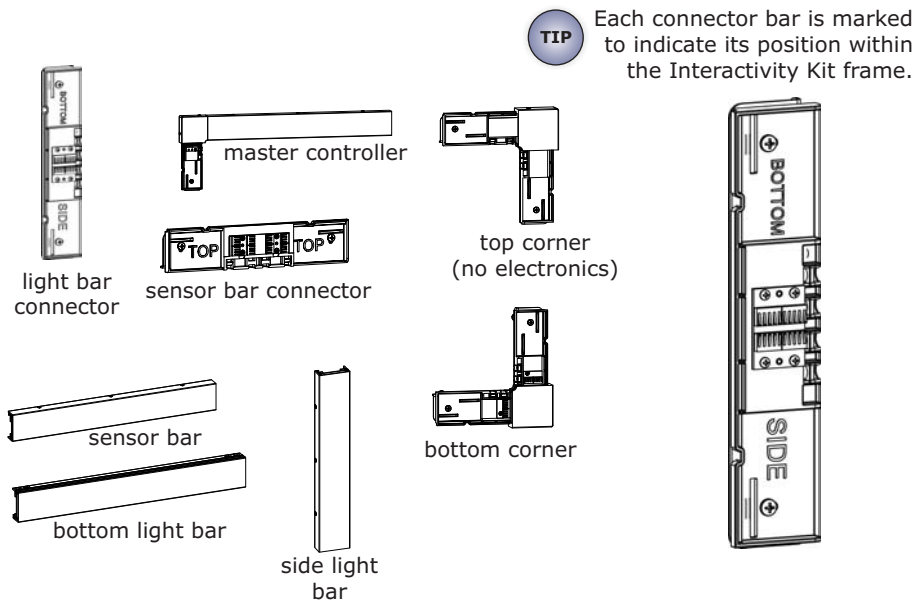
Mounting Components (for MicroTiles only)
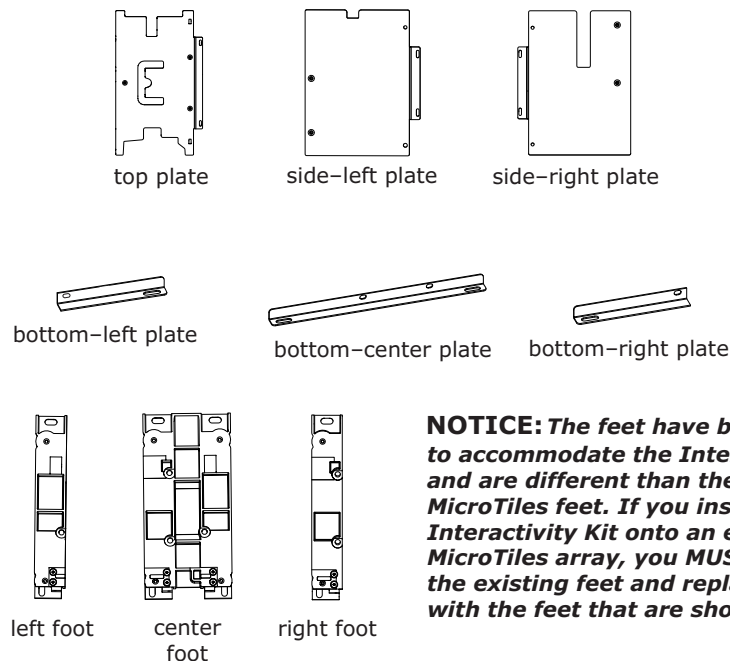
top plate

side–left plate

side–right plate

bottom–left plate

bottom–center plate

bottom–right plate

left foot

center foot

right foot

NOTICE: *The feet have been modified to accommodate the Interactivity Kit and are different than the existing MicroTiles feet. If you install an Interactivity Kit onto an existing MicroTiles array, you MUST remove the existing feet and replace them with the feet that are shown here.*

Order Guide

The Interactivity Kit is modular and fits perfectly around MicroTiles, from 3 x 1 up to 16 x 6 in size. It can also be mounted around other display types, including flat panels; however, in this case the integrator must provide a custom mounting interface.

The quantities of components required for your installation depend on the size of the kit required. Mounting brackets are only available for MicroTiles. For details, see the MicroTiles Designer tool located at *www.christiedigital.com*. Power supplies are sold separately.

Base Kit

The base kit (P/N: 108-438106-xx) contains the parts required for a 3–module wide and 1–module high Interactivity Kit frame. Note, that this does not include the adapter plates, which are mandatory components when mounting to a MicroTiles array. For details, see *Base Kit Mounts for MicroTiles* on page 12.

Item	Part Number	Part Description	Qty.
Master controller	002-120715-xx	The master controller is attached to the top–left corner of the display. It is responsible for computing the touch points and transmitting these coordinates to the operating system over the USB interface.	1
Sensor bar	002-120716-xx	Sensor bars are attached to the top edge of the display.	2
Side light bar	002-120717-xx	Vertical light bars are attached to the left and right side of the display.	2
Bottom light bar	002-120718-xx	The bottom bars (or bottom light source modules) are attached to the bottom edge of the display.	3
Bottom corner	002-120719-xx	The bottom corner light bars are attached to the bottom–left and bottom–right corners.	2
Top corner (no electronics)	002-120720-xx	The top corner is attached to the top–right corner of the display.	1
Sensor bar connector	002-120721-xx	The sensor bar connector connects the adjacent sensor bars.	2
Light bar connector	002-120722-xx	The light bar connector connects the adjacent light bars.	2
USB Cable	016-105184-xx		1

Width Extender Kit

The width extender kit (P/N: 108-439107-xx) lets you expand the width of the configuration by 1–module.

Item	Part Number	Part Description	Qty.
Sensor bar	002-120716-xx	Sensor bars are attached to the top edge of the display.	1
Bottom light bar	002-120718-xx	The bottom light bars are attached to the bottom edge of the display.	1

Item	Part Number	Part Description	Qty.
Sensor bar connector	002-120721-xx	The sensor bar connector connects the adjacent sensor bars.	1
Light bar connector	002-120722-xx	The light bar connector connects the adjacent light bars.	1

Height Extender Kit

The height extender kit (P/N: 108-440109-xx) lets you expand the height of the configuration by 1–module.

Item	Part Number	Part Description	Qty.
Side light bar	002-120717-xx	The side light bars are attached to the left and right side of the display.	2
Light bar connector	002-120722-xx	The light bar connectors connect the adjacent light bars.	2

Base Kit Mounts for MicroTiles

The base kit mounts for MicroTiles (P/N: 108-441100-xx) can be used with the base kit when you mount the Interactivity Kit to a MicroTiles array. The kit contains adapter plates for a 3–module wide and 1–module high configuration.

Item	Part Number	Part Description	Qty.
Top plate	011-104406-xx	The top adapter plate attaches to the top surface of the MicroTiles to provide support for the sensor bars.	3
Bottom–left plate	011-104407-xx	The bottom–left plate, bottom–right plate, and bottom–center plate attach to the MicroTiles feet to provide support for the light bar connectors.	1
Bottom–right plate	011-104408-xx		1
Bottom–center plate	011-104410-xx		1
Side–left plate	011-104411-xx	The side–left and side–right adapter plates attach to the surface of the MicroTiles to provide support for the sensor bars.	1
Side–right plate	011-104412-xx		1
Fastener kit	/	M3 x 12 mm (qty. 9) M6 bolts (qty. 4) M6 nuts (qty. 2) M4 x 6 mm (qty. 6) M3 x 20 mm (qty. 4)	/
Left foot	000-102966-xx	Modified versions of the MicroTiles feet are required to avoid mechanical interference with the Interactivity Kit.	1
Center foot	000-102965-xx		2
Right foot	000-102967-xx		1

Width Extender Mounts for MicroTiles

The width extender mounts for MicroTiles (P/N: 108-442101-xx) can be used with the width extender kit when you mount the Interactivity Kit to a MicroTiles array.

Item	Part Number	Part Description	Qty.
Top plate	011-104406-xx	The top adapter place attaches to the top surface of the MicroTile to provide support for the sensor bars.	1
Bottom–center plate	011-104410-xx	The bottom–center plate attaches to the MicroTiles feet to provide support for the light bar connectors.	1
Center foot	000-102965-xx	A modified version of the MicroTiles center foot is required to avoid mechanical interference with the Interactivity Kit.	1
Fastener kit	/	M4 x 6 mm (qty. 2) M3 x 12 mm (qty. 3)	/

Height Extender Mounts for MicroTiles

The height extender mounts for MicroTiles (P/N: 108-443102-xx) can be used with the height extender kit when you mount the Interactivity Kit to a MicroTiles array.

Item	Part Number	Part Description	Qty.
Side–left plate	011-104411-xx	The side–left and side–right adapter plates attach to the surface of the MicroTiles to provide support for the sensor bars.	1
Side–right plate	011-104412-xx		1
Fastener kit	/	M6 bolts (qty. 4) M6 nuts (qty. 2) M3 x 20 mm (qty. 4)	/

Order Quantities Example

Part Number	Part Description	Qty	Notes
108-438106-xx	Interactivity Kit 3 x 1	1	One per system
108-439107-xx	Interactivity Kit +1 wide	5	Total width = eight modules three are included in the base kit 8 – 3 = 5 width extender kits required
108-440109-xx	Interactivity Kit +1 high	3	Total height = four modules 1 is included in the base kit 4 - 1 = 3 height extender kits required
108-441100-xx	Interactivity Kit MicroTiles mount 3 x 1	1	One per base kit
108-442101-xx	Interactivity Kit MicroTiles mount +1 wide	5	One per width extender kit
108-443102-xx	Interactivity Kit MicroTiles mount +1 high	3	One per height extender kit

The appropriate regional power supply is sold separately.

Dashboard Software Overview

The Interactivity Kit includes a PC–based application that can be used for diagnostic and configuration purposes. The Dashboard software package allows you to diagnose and debug potential problems with all aspects of the Interactivity Kit hardware and software components. For details, see *Operation* on page 24. To download the latest version, go to *www.christiedigital.com*.

The Dashboard software provides the following features:

- indication that the Interactivity Kit hardware has powered up and is functioning properly
- indication that the calibration process has started and has completed successfully
- indication that the Interactivity Kit is ready to be used
- user-configurable limits for touch size, opacity and duration to filter out unwanted touch events
- displays all functional errors for further diagnostics, such as:
  - calibration state
  - loss of communication

Dashboard Software Requirements

To run the configuration and diagnostic software for the Interactivity Kit, a PC must be connected by USB and must meet the following minimum system requirements:

- Windows® 7
- Microsoft .NET 4.0 Framework

- Visual Studio 10 x64/x86

- Minimum 15 MB HD space

- Celeron processor

- 500 MB RAM

Additional Resources

Christie Interactivity Kit Installation Guide for MicroTiles (P/N: 020-100844-xx)

Purchase Record and Service Contacts

Should you encounter a problem with any part of the Interactivity Kit, contact your dealer. If you have purchased the Interactivity Kit, fill out the information below and keep with your records.

Dealer:
Dealer or Christie sales/service contact phone number:
Serial Number (found on the back of the master controller):
Purchase Date:
Installation Date:

Installation

Tools Required

- T10 torx

- #2 Phillips™ screwdriver

- 2 mm, 2.5 mm, and 5 mm hex drivers

Interactivity Kit Installation for MicroTiles

⚠ CAUTION — If you are mounting the Interactivity Kit to a MicroTiles array it is important that the construction of the array is performed only by trained personnel. It is critical that the alignment between tiles and the screen gaps are accurate to make sure that the Interactivity Kit functions properly.

The Interactivity Kit can accommodate a range of array sizes from 3 x 1 to 16 x 6. The instructions and illustrations within this guide are for building a 3 x 2 MicroTiles array with an Interactivity Kit.

When you build an array that is smaller or larger than a 3 x 2, use these instructions as a guide, but note the following:

- The light bar connectors between the rows are not required for a 3 x 1.

- Arrays larger than a 3 x 2 incorporate additional connectors, sensor bars, and light bars depending on the number of additional rows and columns.

Foot Installation (MicroTiles Only)

NOTICE — The feet have been modified to accommodate the Interactivity Kit and are different than the existing MicroTiles feet. If you install an Interactivity Kit onto an existing Microtiles array, you MUST remove the existing feet and replace them with the specific feet for this kit.

When you mount an array onto a base structure, make sure that the center foot is pushed forward so that the Interactivity Kit adapter plate clears the pedestal.

Install the MicroTiles array using the modified feet that are provided with the Interactivity Kit, rather than the standard feet. For details on how to install a MicroTiles array, see *MicroTiles User Manual (P/N: 020-100329-xx)*.

Feet used on the Interactivity Kit

48.32 mm (1.9")   135.80 mm (5.4")   47.42 mm (1.8")

287.09 mm (11.3")   287.09 mm (11.3")   287.09 mm (11.3")

left foot   center foot   right foot
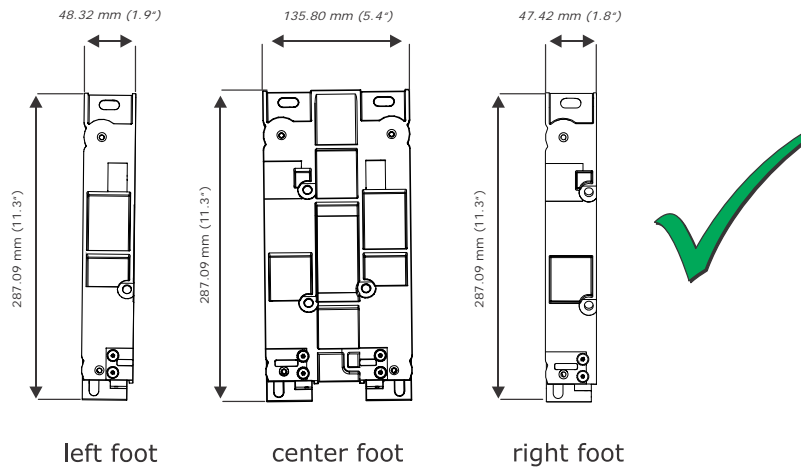
Feet used on existing MicroTile arrays

48.32 mm (1.9")   135.61 mm (5.3")   47.42 mm (1.8")

296.82 mm (11.7")   296.82 mm (11.7")   296.82 mm (11.7")

left foot   center foot   right foot
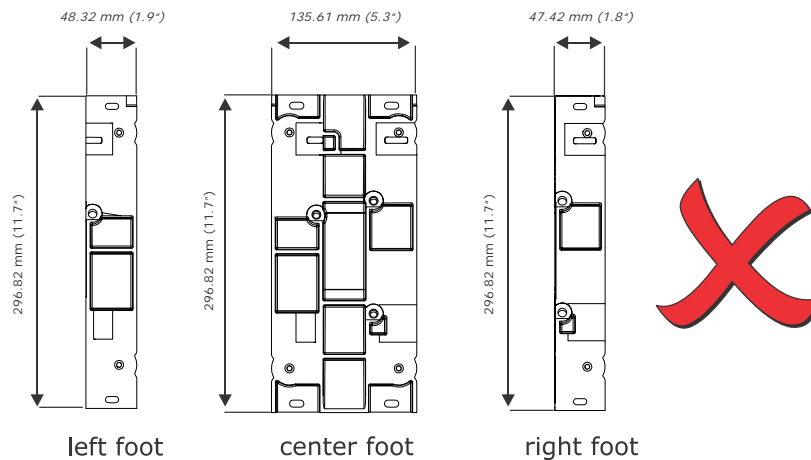
Adapter Plate Installation (MicroTiles Only)

1. Use a T10 torx to remove the three existing M3 screws that secure the top skins to the MicroTiles. Do not remove the skins.

2. Use a T10 torx to remove the two existing M3 screws that secure the side skins to the MicroTiles.
   Do not remove the skins.

3. Position the top adapter plate so that it is inline with the mounting points on the top of the MicroTiles.

4. Use a 2 mm hex driver to install three M3 x 12 mm flathead screws to secure the top adapter plate.

5. Repeat steps 3 and 4 for each top adapter plate.

6. Position the side adapter plate so that it is inline with the mounting points on the side of the MicroTiles.

7. Use a 2 mm hex driver to install two M3 x 20 mm flathead screws to secure the side adapter plate.

8. Repeat steps 6 and 7 for each side adapter plate.

9. For the left–side adapter plates, use a 5 mm hex driver to install an M6 bolt and nut into the four locations illustrated below.

10. For the right–side adapter plates, insert M6 bolts into the four locations illustrated below.

11. Use a 2.5 mm hex driver to install an M4 x 6 mm flathead screw to secure the bottom right and bottom left plates.

12. Use a 2.5 mm hex driver to install two M4 x 6 mm flathead screws to secure the bottom center plate.
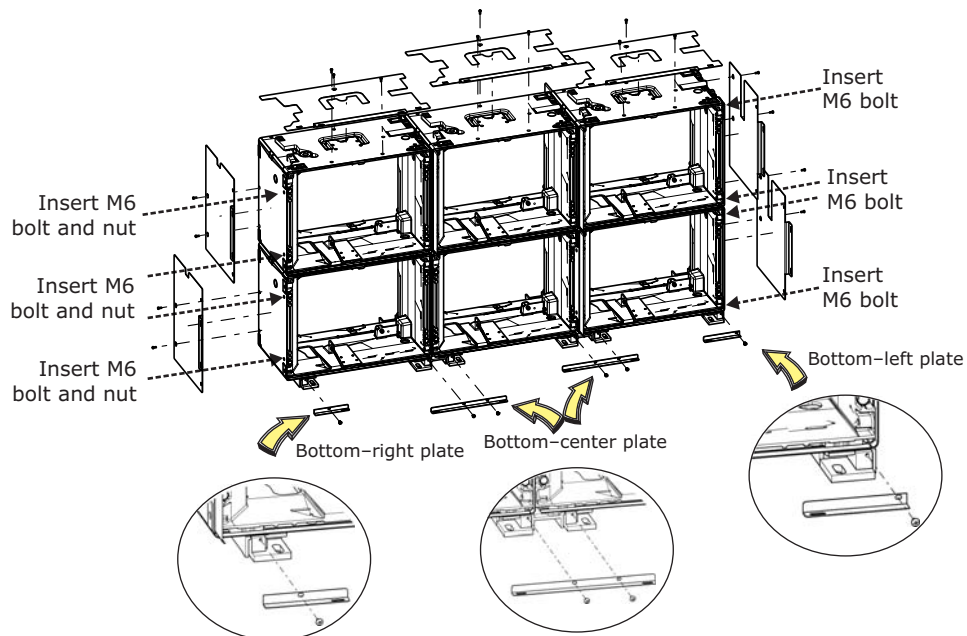
Sensor and Light Bar Connector Installation

NOTICE — Do not use power tools to install the connectors.

The position of the master controller determines how the sensor and light bars line up with the connector plates. The master controller is the only connector that should be tightened completely. All other connectors should be kept loose until the Interactivity Kit is completely installed so that you can make adjustments. Each connector bar is marked to indicate its position within the Interactivity Kit frame.

1. Align the first sensor bar connector with the designated mounting holes on the adapter plate.

2. Use a 2.5 mm hex driver secure the sensor bar connector to the plate using two M4 x 6 mm hex pan head screws. All screws are installed from the inside of the screen. Do not tighten the screws completely. The connector should move freely so you can make alignment adjustments. The connector should be tightened only after the sensor and light bars are installed.

3. Repeat steps 1 and 2 for each of the sensor and light bar connectors, and the top and bottom corners.

4. Align the master controller with the two mounting points on the adapter plates.

5. Use the groove on the master controller to hook it onto the outer back edge of the top– middle and top–left connectors plates, and rotate the bar into position. To avoid damaging the contacts, do not force the sensor bar onto the connectors.

6. Use a 2.5 mm hex driver install the two M4 x 6 mm screws loosely.

7. Position the master controller so that the screws are centered in the slots.

8. Tighten the screws completely.
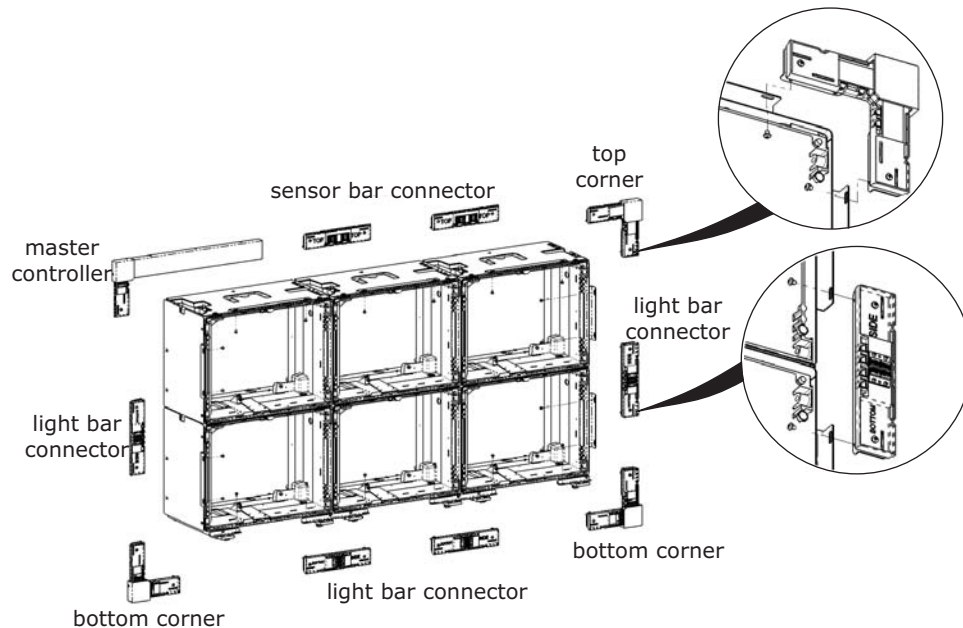
Sensor Bar and Light Bar Installation

When installing the bars make sure the seams between the bars line-up with one another.

1. Install the sensor bars along the top of the array, working from left to right.

2. Use the groove on the sensor bar to hook it onto the outer back edge of the connectors and rotate the bar into position. To avoid damaging the contacts, do not force the sensor bar onto the connectors.

Top View

| NOTICE | Do not attempt to slide the bars onto the connectors. When rotating the bar into position you may need to loosen the captive screws to avoid interference. Do not remove the c–clips securing the captive screws. |
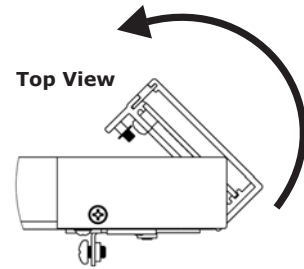
3. Once the sensor bar is hooked onto the connectors, slide the connectors back and forth until the screws are centered in the slots on the bottom of the sensor bar.

4. Use a 2.5 mm hex driver to Loosely tighten the M4 x 6 mm connector screws on the connectors to secure the position.
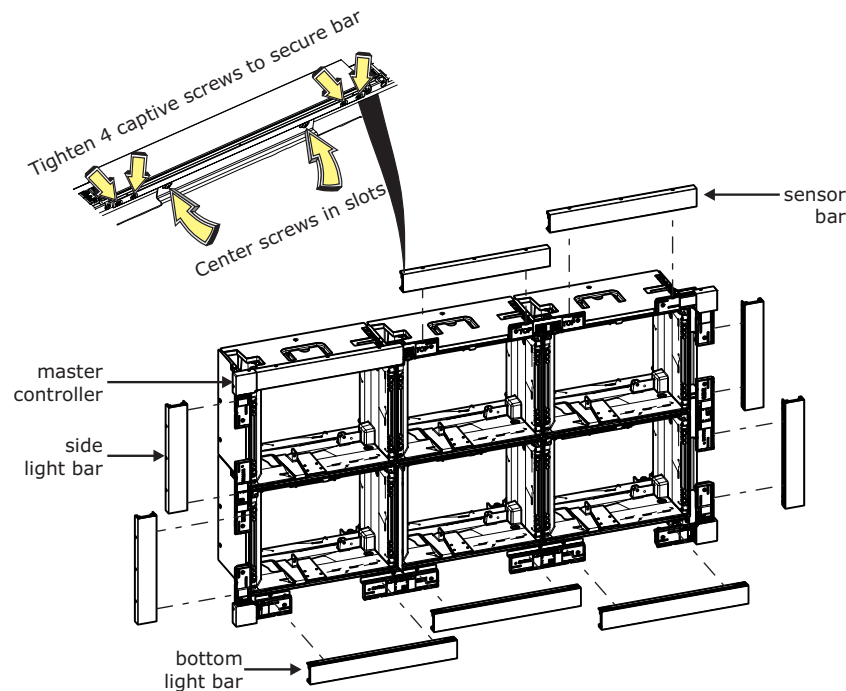
5. Repeat steps 2 to 4 for the light bars that are positioned along the sides and bottom of the array.

6. Manually adjust the bars to minimize gaps.

7. When everything is aligned, completely tighten the M4 x 6 mm connector screws.

8. Use a #2 Phillips™ screwdriver to secure the sensor bars using the pre-attached M3 x 10 mm captive screws (tightened through the bottom of the bars).

9. Tighten all four captive screws to minimize gaps between the bars.

Enable Power to the Interactivity Kit

NOTICE   Use an approved power supply with a 12Vdc, 2.5A minimum rated power source.

Touch data is automatically mapped to a MicroTiles display area; however, if you are using the Interactivity Kit on a different type of display you need to adjust the screen masking area. See *Screen Mask Parameters* on page 36.

If the Interactivity Kit does not respond, as indicated in the steps below, see *Open Dashboard Software* on page 24.
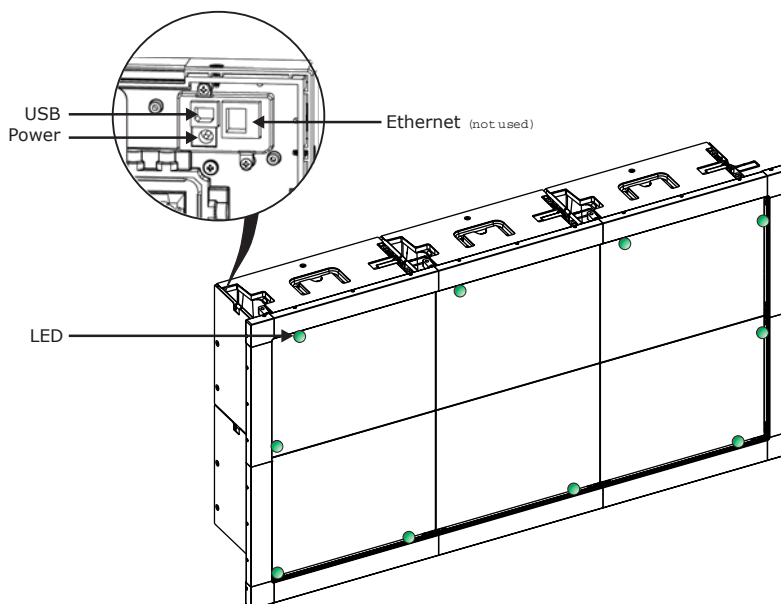
1. Connect the 12V power cable using the DC jack on the back the master controller in the top–left corner of the Interactivity Kit.

    LED Light Status: When the Interactivity Kit is powered on, but the USB is not connected to a computer, the LEDs on the light bars and sensor bars illuminate green and after a few seconds a green continuous flashing light appears in the top–left corner of the kit.

    If any of the light bar or sensor bar LED lights fail to turn on, and there is no flashing light on the master controller, it indicates communication has been lost. See *Touchscreen Does Not Register Touches* on page 43 of the *Interactivity Kit User Manual* (p/n 020-100856-xx).

2. Connect the USB cable, supplied with the base kit to a Windows® 7 or Windows® 8 computer.

    LED Light Status: When the kit is powered on, and the USB cable is connected, the top–left corner LED stops flashing and is solidly illuminated, while all other LEDs dim.

    Typically, Windows® 7 and Windows® 8 takes a few seconds to recognize the multi–touch input device after the USB cable is connected.

3. When powered up and connected, the Interactivity Kit performs a brief self-calibration, during which time you should not touch the screen.

To confirm that calibration has been completed, open the Dashboard software and make sure the message, `Power state: Active` is shown in the status bar. See *Open Dashboard Software* on page 24.

For additional information about Windows® 7 and other operating systems, see *Connect to Operating Systems* on page 22. For some installations, a USB extender is required to transmit a video signal from the media source to the Interactivity Kit.

Not all USB extenders work properly with the Interactivity Kit. Although Christie does not recommend or warrant a specific third-party provider of USB extenders, the following extender has been tested successfully; ICRON USB Ranger 2101, using a 25 ft (7.62 m) Ethernet cable.

It is the responsibility of the customer to make sure a third-party extender will perform as desired in any particular application.

LED light status

- When the Interactivity Kit is powered on, but the USB is not connected to a computer, the LEDs on the light bars and sensor bars illuminate green and after a few seconds a green continuous flashing light appears on the master controller in the top–left corner of the kit.

  If any of the light bar or sensor bar LED lights fail to turn on, and there is no flashing light on the master controller, it indicates communication has been lost.

- When the kit is powered on, and the USB cable is connected, the top–left corner LED stops flashing and is solidly illuminated, while all other LEDs dim.

If the LED lights are not illuminated as described above, see *Touchscreen Does Not Register Touches* on page 43 of the *Interactivity Kit User Manual* (p/n 020-100856-xx).

Disable Power to the Interactivity Kit

Disconnect the power cable from the DC jack on the back of the Interactivity Kit.

Connect to Operating Systems

Touch data is provided to the operating system in three ways:

- Windows® 7 or Windows® 8 multi-touch: Recognized natively by Windows® 7 and Windows® 8 as a multi–touch device.

- Single–touch: Recognized natively in typical Windows®/Mac® operating systems as a generic pointer or mouse.

  Mac® operating systems often do not map the touch data correctly across the entire surface of the display, therefore to achieve satisfactory performance with a Mac®, a custom application or programming is required in combination with the custom multi-touch library.

- Custom multi–touch: Multi-touch data is provided in a custom HID collection, which the developer can utilize when programming their application for any operating system that supports USB HID 1.1.

To take full advantage of the Interactivity Kit may require a custom application, such as Flash, that has been programmed to accept multi–touch gestures and will work with the operating system it is

designed for, such as Windows® or Mac®. For more information on the custom multi–touch HID collection provided by the Interactivity Kit, see Interactivity Kit User Manual (P/N: 020-100856-xx).

Adjust Operating System Settings

Some operating systems may offer a calibration utility to fine–tune the registration of touch events on the display. To access the calibration utility in Windows® 7, select **Start > Control Panel > Tablet PC Settings > Calibrate**. To access additional Windows® 7 settings for touch devices, select **Start > Control Panel > Pen and Touch**. For instructions or adjusting the settings on Windows® 8, refer to the Microsoft help.

Portrait or Rotated Displays

The normal orientation of the Interactivity Kit in relation to the display area has the sensor bars along the top of the display's normal orientation. If the Interactivity Kit and display area are not both in their normal orientation, and one is rotated 90°, 180° or 270° from the other, touch events will not be mapped accurately.

To correctly map the touch data when installing portrait or rotated displays contact Christie Technical Support for assistance at *tech-support@christiedigital.com*.

Operation

Open Dashboard Software

1. Download the Dashboard software from *www.christiedigital.com*.

2. Open the file named Dashboard.zip and extract the contents to your computer.

3. Open the extracted Dashboard folder and navigate to the Redist folder.

4. Double–click on both vcredist_x64.exe and vcredist_x86.exe, in any order. This is only required when the Dashboard software is run for the first time.

5. Double–click the Dashboard application to launch the software. If you are installing the software for the first time you will be prompted to install the Microsoft.NET framework, which should be downloaded online or found in the Redist folder (if offline).

6. After installing the Microsoft.NET framework, execute the Dashboard application again to launch the software. For details, see *Navigate the Dashboard Software* on page 24.

Navigate the Dashboard Software

File Menu

- **Export LED View**: Select this option to save the calibration LED values to an.xml file on your PC. This file is used for debugging purposes.

- **Load Configuration File**: Select this option to load a saved configuration file.

- **Save Configuration File**: Click to save the current configuration settings.
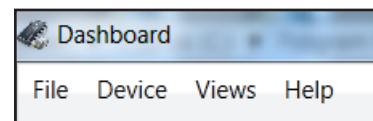
Device Menu

- **Load Configuration from Hardware**: This menu selection allows you to load your saved configuration.

- **Save Configuration to Hardware**: This menu selection allows you to save your configuration.

- **Default Configuration**: This menu selection allows you to load the default configuration.

- **Optimize LEDS:** Click this button to apply any changes made to the Interactivity Kit parameters. Failure to select this button after making parameter changes will result in the changes not being applied.

- **Refresh LED Data**: This menu selection allows you to load the latest calibration value from the system without having to reset.

- **Read LED Data from Hardware**: For future use.

- **Write LED Data from Hardware**: For future use.

- **Log Data**: This menu selection allows you to start and stop the logging USB traffic. See, Diagnostics View, on page 25.

Views Menu

This menu provides links to the Configuration view, Diagnostics view, Test view and the Upgrade view tabs, as well as the LED View window.

Navigation Panes

The Dashboard software offers four different top–level views, which group the different functions together for easy access. Various views can be selected via the tabs located at the top of the window.

- **Diagnostics view**: Displays LED and sensor visibility information.

- **Configuration view**: Allows you to configure the Interactivity Kit based on the application.

- **Test view**: Performs functional tests to confirm normal operation of the Interactivity Kit.

- **Upgrade view**: Allows you to upgrade the Interactivity Kit firmware.
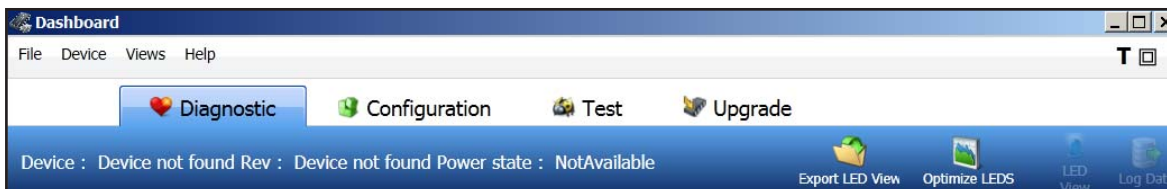
Diagnostics View

The Diagnostic tab allows you to view, debug, and diagnose problems with the Interactivity Kit. Some of the features that are available in this view are highlighted in the illustration and described in the section below.
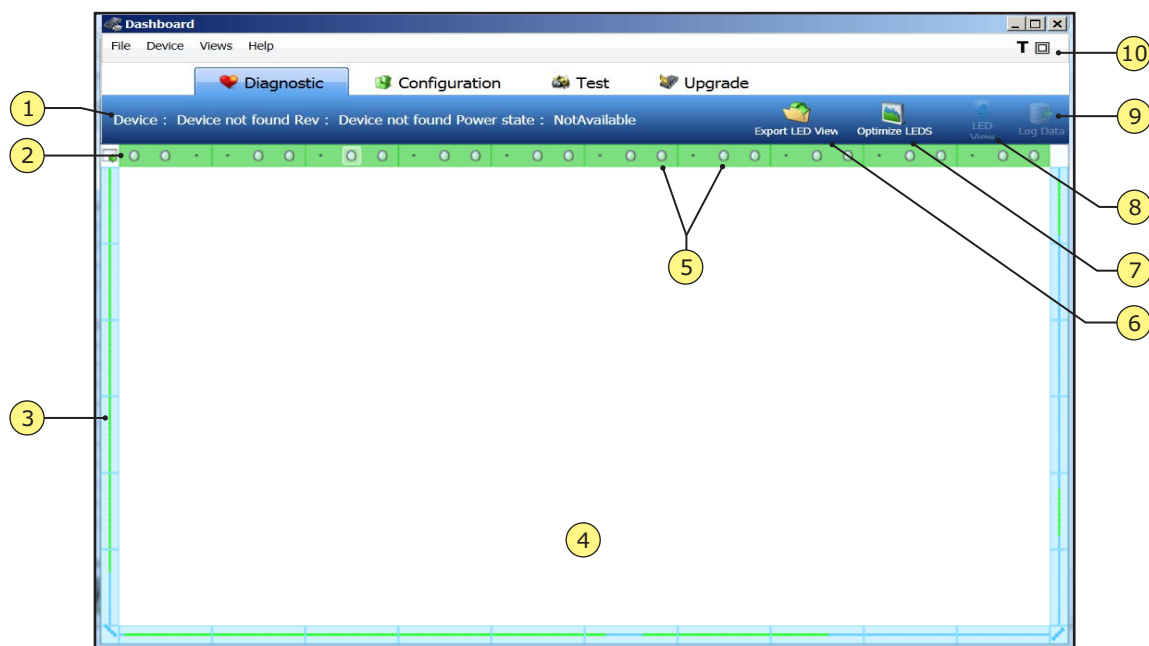
1	Status bar	6	Export LED view
2	Calibration bar	7	Optimized LEDS
3	LED data bars	8	LED view button
4	Drawing canvas	9	Log data
5	Shadow sensors	10	Drawing canvas controls

Status Bar

This bar shows the model number, firmware revision and the power state of the Interactivity Kit.

Calibration Bar

This bar shows the current state of the Interactivity Kit. There are four states of calibration that the Interactivity Kit undergoes, either during boot-up or if the system detects that it is out of calibration:

- **Unconfigured**: The device has not started calibration.
- **Calibration Started**: The device is calibrating. For optimal calibration, do not touch or handle the Interactivity Kit while it is in this state.
- **Calibration Post Delay**: The device has completed calibration and is waiting for post processing to be completed.
- **Calibration Done**: The device has successfully completed calibration and is ready for operation.

LED Data Bars

The bars shown around the edge of the window represent the LEDs that surround the Interactivity Kit. These LEDs are grouped inside the side and bottom light bars. If an LED on screen is illuminated green, it indicates that it is within operating specifications. If an LED is illuminated red, it indicates that the LED is outside of normal operating parameters with respect to the sensor that is highlighted. In this situation, please forward the data saved by the **Export LED** button to Christie's technical support staff at *tech-support@christiedigital.com*.

Drawing Canvas

This area displays all touch events. Each touch is represented by a different color and the width of the touch is represented by the width of the stroke. NOTE: To clear the canvas select the **Backspace** key.

Shadow Sensors

The shadow sensors are represented by the green circles located in the Calibration bar. When you click on any of the shadow sensors the LED data relating to the sensor is shown in the LED data bars.

Export LED View

Click this button to save all LED visibility data to a file for further analysis.

Optimize LEDS

Click this button to apply any changes made to the Interactivity Kit parameters. Failure to select this button after making parameter changes will result in the changes not being applied.

LED View button

Click this button to display all the LED visibility data in another window for further analysis.

Log Data

Click this button to start / stop the logging function. This feature logs all USB traffic into a *.txt* file, located in the \Logs subdirectory of the Dashboard software.

Drawing Canvas Controls

- **Thickness ON\OFF**: Press **T** on the keyboard to toggle the touch thickness. If thickness display is enabled, a **T** icon will be displayed here.

- **Full Screen ON\OFF**: The drawing canvas can be maximized to cover the full screen area of the monitor by clicking on the square icon. Press **ESC** on the keyboard to restore the display to normal.

Configuration View

Configuration view allows you to customize the performance of the Interactivity Kit based on your application needs and specific models.
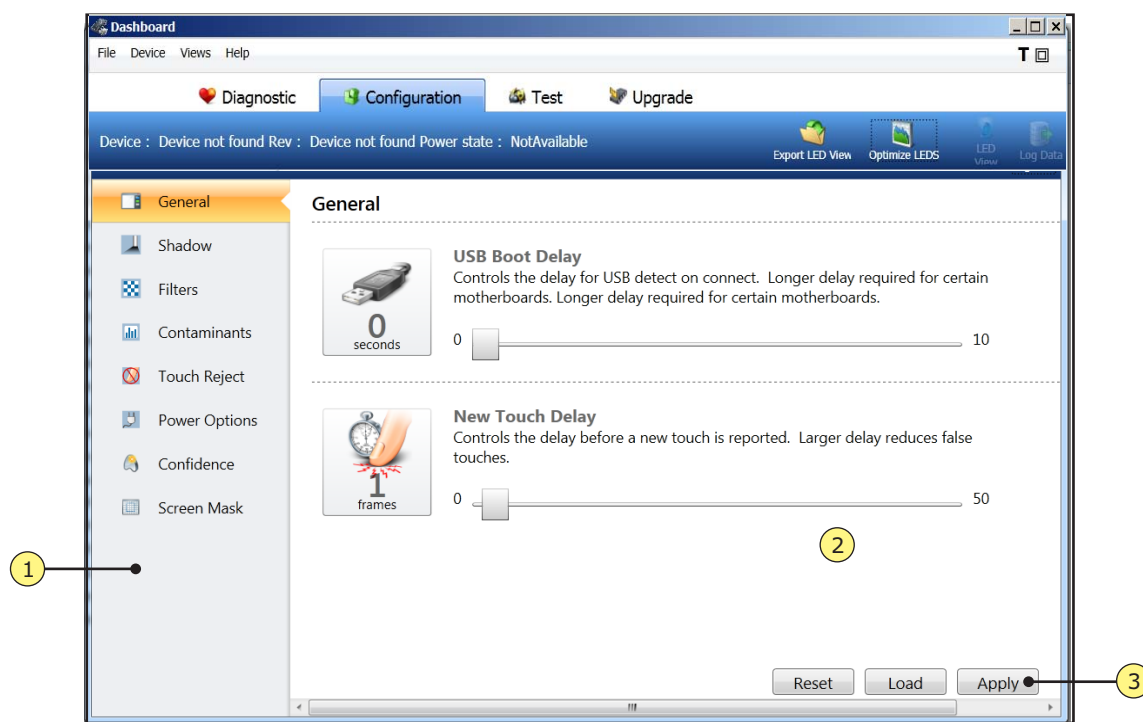
1	Group selection bar
2	Parameter view
3	Reset, Load and Apply

Group selection bar

This menu bar allows you to select the specific group of parameters you want to modify.

- **General**: These parameters relate to USB and initial touch delays. See General Parameters, on page 29.

- **Shadow**: These parameters relate to how the Interactivity Kit defines a touch and when it is reported as a valid touch. See Shadow Parameters, on page 30.

- **Filters**: These parameters relate to how data is filtered by the Interactivity Kit before it is sent via the USB. See Filter Parameters, on page 32.

- **Contaminants**: These parameters allow you to control how the calibration algorithms are implemented in the firmware. See Contaminants Parameters, on page 32.

- **Touch Reject**: These parameters allow you to set the minimum and maximum size of touch objects. See Touch Rejection Parameters, on page 33.

- **Power Options**: These parameters allow you to select from Active, Idle, and Sleep states. See Power Option Parameters, on page 34.

- **Confidence**: These parameters allow you to control the multi-touch confidence level that is required for the display to report the data. See Confidence Parameters, on page 35.

- **Screen Mask**: These parameters allow you to mask off an area of the screen. See Screen Mask Parameters, on page 36.

Parameter View

This area of the window lists the specific parameters in the selected group and allows you to make modifications to the values. For details, see *Parameter Descriptions on page 29*.

Reset, Load and Apply

NOTICE The Reset and Apply options save, but do not apply any changes that have been made. In order to apply changes to the Interactivity Kit select Optimize LEDs.

- Select **Load** to load a pre-defined set of parameters.

- Select **Reset** to return the configuration parameters back to the default, factory state.

- Select **Apply** to save the current set of parameters being displayed to a file located on your computer. The **Apply** button allows you to make changes on multiple screens. To apply these changes select **Optimize LEDs**.

Parameter Descriptions

General Parameters

The **Reset** and **Apply** options save, but do not apply any changes that have been made. In order to apply changes to the Interactivity Kit select **Optimize LEDs**.

USB Boot Delay

This parameter controls the amount of time the Interactivity Kit waits for the USB to be detected once it is plugged in, or when it is rebooted.

A longer delay might be required by certain motherboards or when connecting to certain USB 3.0 ports. Increase this value, if the Interactivity Kit is not being reliably detected by the operating system.

New Touch Delay
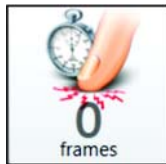
This parameter controls the delay between a new touch event and when the Interactivity Kit reports the data.

The lower the touch delay, the faster the screen reports new touch events.

The higher the touch delay, the longer the screen waits to confirm that the new touch event is valid and does not disappear. This parameter is useful when trying to eliminate glitches or invalid touches caused by environmental contamination, such as rain.

This parameter is also useful when the application requires a certainty that a touch event was intended by the user, such as a financial application.

Value	Result
0	Can detect a credit car tapping or bouncing off the screen.
3	Can detect a finger tapping or bouncing off the screen.
5	Requires the user to intentionally press down.
10+	Requires a touch with a noticeable delay.

Shadow Parameters

The Interactivity Kit works by detecting the shape, angle and size of the shadow that is cast by the touch object when it touches the screen.

 The **Reset** and **Apply** options save, but do not apply any changes that have been made. In order to apply changes to the Interactivity Kit select **Optimize LEDs**.

Separation Threshold

This parameter controls the inter-finger separation, which results in two separate touch points. The smaller the separation threshold, the closer your fingers can be and still be resolved as two separate touch points. The larger this number, the farther apart they have to be.

In situations where the Interactivity Kit is exposed to debris, water, high ambient light levels and other environmental conditions the 'noise' in the system can be misinterpreted as multiple merged shadows instead of one, resulting in additional touch points being mistakenly reported.

If an application requires a high confidence level when working with multi-touch data or if a minimum touch distance is required between any two touch points, this parameter should be increased.

Maximum Shadow
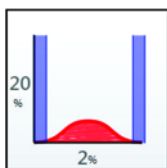
This parameter can be used to adjust the hover distance above the protective glass or reject environmental contaminants based on their opacity.

If a translucent or semi-transparent object was placed on the screen the shadow would not be very 'dark' or saturated as a certain percentage of light would still pass through. A very 'dark' shadow would be created if an opaque object, such as a metal stylus was touching the screen. The lower the number, the more sensitive the Interactivity Kit will be and will allow a minimal shadow of 20% density to create a touch (a very transparent object). Higher numbers decrease the sensitivity and will only allow opaque objects to generate a touch.

Value	Result
20%	Very sensitive: water, plastic credit cards, pens, translucent paint brushes will activate touch. Requires a very firm screen surface, such as glass or wood, that does not flex when touched by a user.
40%	Reject minor environmental factors, such as small drops of water, dust build-up and transparent objects, such as plastic pens. MicroTiles installations will require a minimum of 40% to compensate for variances of screen installations and flex due to user touch.
80%	Reject major environmental factors, such as splashing and running water, dark liquids, coffee, etc.
95%	Very insensitive: Only very opaque objects, such as fingers, metal stylus and other solid objects.

Minimum Shadow
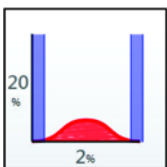
This parameter defines the edges of the shadow and controls the point at which the shadow ends and becomes background ambient light. The background levels can be noisy due to environmental factors such as water droplets, dust, and high ambient light. In this situation, noise can be introduced into the calculation of the touch point as well. The lower the value, the more accurate the system will be. As this value

increases, the stability of the touch point will be increased in a noisy environment at the loss of resolution and accuracy of the touch data.

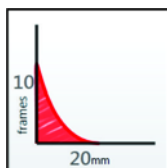| Value	Result
2%	Highly accurate, but small drops of water can result in noisy data.
5%	Unaffected by small drops of water and contaminants.
10%	Insensitive to large drops of splashing water and other dark liquids such as coffee etc.

Filter Parameters

The Interactivity Kit implements a two–dimensional digital filter, which dynamically changes the filter size based on speed of user motion, and is used to filter the touch data before being reported via the USB. The filter is capable of smoothing out anomalies, glitches, and various sources of noise in the system. In general, the larger the values of the filter, the smoother the touch data will be at an increase of latency.

 The **Reset** and **Apply** options save, but do not apply any changes that have been made. In order to apply changes to the Interactivity Kit select **Optimize LEDs**.

Filter Size

This parameter controls the latency of the filter by adjusting how many frames of data are sampled and filtered together. The lower the value, the smaller the applied filter, resulting in significant sensitivity. A low value allows a sensitivity of sub-pixel resolution so even small motions would be reported. This can result in jitter when the user is expected to hold their finger still for a certain period of time to activate a command (right–click by holding down for one second, as an example). By increasing this value, small user motions would be filtered out resulting in a loss of resolution but greater stability.

Filter Depth
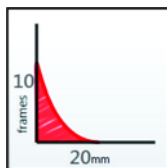
This parameter controls the fall-off and sensitivity of the filter to high–speed motions. The intent of this filter is to provide a stable touch response with very low noise when a finger is not moving and also provide low latency when the user is moving quickly. The larger the value, the slower the fall-off and the filter is therefore active at higher motion speed. The lower the value, the faster the fall-off and high speed motions will be subject to lower latencies.

Contaminants Parameters

In order to determine that a shadow is present, it is important to note that a shadow is a relative decrease of light from the ambient level. An accurate knowledge of the ambient light level is required to be able to calculate shadow areas. The ambient light level itself can change due to temperature changes, LED variations, environmental contaminants, and dust build-up. A dynamic auto–calibration feature compensates for these ambient light changes. This feature implements a type of low-pass filter that constantly adjusts the definition of the background light levels.

The **Reset** and **Apply** options save, but do not apply any changes that have been made. In order to apply changes to the Interactivity Kit select **Optimize LEDs**.

Contamination Reject Period
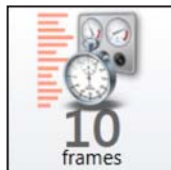
This parameter controls the actual sampling period for the rejection algorithm. A large sampling period slows down the filter, resulting in a slower response to environmental effects, such as rain and water. However, a large sampling period results in a higher touch accuracy. A small sampling period speeds up the filter's ability to react to contaminants, but reduces the accuracy of the system. The table below describes some sample values and the associated time to reject 50% of the signal.

Value	Calibration Time	Result
2 frames	18 seconds	Very fast rejection to environmental conditions such as water, ice, etc. Ideal for public and outdoor kiosks.
50 frames	450 seconds	Provides an ideal trade-off between medium speed calibration and resulting inaccuracies.
200 frames	1800 seconds	Very slow rejection. Required in situations where touch event persists for long period of time.

Recovery Speed

This parameter controls the speed at which the calibration filter recovers when a touch object has been removed from the screen. A high value results in a very fast recovery, whereas a low value results in a recovery speed that is comparable to the contamination reject period.

Touch Rejection Parameters
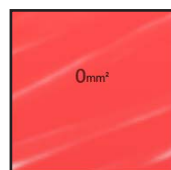
These parameters control the conditions under which the Interactivity Kit is able to automatically reject various touch events. The Dashboard software is capable of detecting the shape and area of the touch object contacting the screen. It is possible to reject specific touches based on the surface area of the contact. This is useful in situations with palm rejection and environmental debris rejection. Also, in any application where a high confidence level that only a specific class\shape of touch object was used to activate the screen is required.

The **Reset** and **Apply** options save, but do not apply any changes that have been made. In order to apply changes to the Interactivity Kit select **Optimize LEDs**.

Touch Reject Enable

This parameter can enable and disable the touch rejection algorithm in the firmware. All touches regardless of contact area are reported when this is disabled. When enabled, the parameters below are used to determine when a touch is reported to the operating system.

Minimum Area
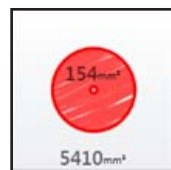
This controls the minimum contact area required before a touch is activated, in square millimeters. The software checks to make sure that the minimum area is smaller than the maximum area.

Maximum Area

This controls the maximum contact area required before a touch is rejected, in square millimeters. The software checks to make sure that the maximum area is larger than the minimum area. If a value of 0 is selected for this parameter, the Interactivity Kit will reject all touch inputs.

Using the minimum and maximum parameters described above, an application can configure the system to reject extraneous inputs from palms, shirt sleeves, dirt and debris very accurately. Users should make sure that there is a fair gap between minimum area and maximum area. Minimizing this gap will result in loss of touch as there can be a wide variance to an object such as a human finger as it touches across the screen surface.

Power Option Parameters

These parameters control the conditions by which the Interactivity Kit goes into low power and sleep states. The specific power draw and performance metric can also be adjusted to achieve the required current draw in the various power modes.

- **Active Mode**: Full power, high performance, multi-touch state.

- **Idle Mode**: Low power, single touch state. As soon as a touch is detected, the Interactivity Kit automatically reverts back to Active mode.

- **Sleep Mode**: Very low power, no touch state. The Interactivity Kit is in deep sleep, and does not detect any touch event. This state is triggered by the USB going into SUSPEND or SLEEP, and can also be triggered by the application using a special USB command. The screen will revert back to Active mode when the USB exits suspend or sleep state.

Active Mode Settings

The **Reset** and **Apply** options save, but do not apply any changes that have been made. In order to apply changes to the Interactivity Kit select **Optimize LEDs**.

LED Brightness

This parameter controls the brightness, of the LEDs located around the perimeter of the display. Lowering this value results in a dimmer LED and lowers the operating current of the system while in Active mode. By lowering the brightness, the signal–to–noise ratio is also effectively lowered and will result in more noise in the system. If high ambient light rejection is required or if the display is operated in an environment where it is susceptible to dirt, debris and other contaminants, a high LED brightness value will be required.

LED brightness is affected by the size of your display. For example, on larger displays a low LED brightness setting may not register a touch due to the amount of shadow that is cast. If this occurs the LED brightness must be increased.

Frame Time
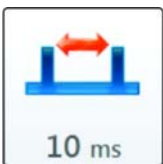
This parameter controls the period at which the Interactivity Kit is scanned for touch events while in Active mode. The lower the frame time, the faster the display is being scanned resulting in a higher current draw, but the latency of the system is also minimized. Higher values will result in slower scans, which decrease the current draw at a cost of higher latency.

Idle Power Mode settings

The **Reset** and **Apply** options save, but do not apply any changes that have been made. In order to apply changes to the Interactivity Kit select **Optimize LEDs**.

Time to Idle

Idle mode is triggered when the Interactivity Kit detects that there has not been a valid touch event for a certain period of time. This parameter controls how long the Interactivity Kit waits before switching from Active mode to Idle mode. When set to **Never**, Idle mode is disabled and the display only operates in Active mode.

LED Brightness

This parameter controls the brightness and current of the LED while the display is in Idle mode. This allows you to effectively optimize power draw in Idle mode.

Frame Time
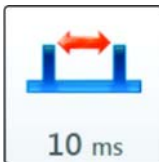
This parameter controls the period of time it takes to register a touch and switch from Idle mode to Active mode.

Select Power Mode

These settings enable you to instantaneously switch to any power mode. Select from **Active**, **Idle** and **Sleep**.
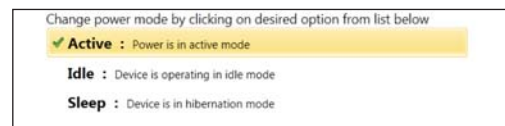
Confidence Parameters

The **Reset** and **Apply** options save, but do not apply any changes that have been made. In order to apply changes to the Interactivity Kit select **Optimize LEDs**.

Confidence factors are based on a variety of parameters; such as, signal to noise ratio and clear visibility of a touch object from multiple shadow sensors. This confidence measurement can be used to eliminate ghost touches, if required. When the confidence level is set high, the probability of a ghost touch is minimized greatly, but breaks can appear as only touch data that has the highest confidence will be reported. When the confidence level is set too low, there is a greater probability of ghost data, but breaks will be minimized even during times of low visibility or high occlusion.

Example of High Confidence
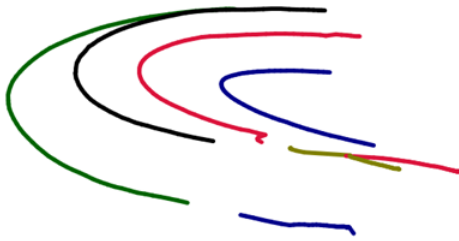
With high confidence three of the four lines have a break in the middle due to lack of confidence.

Example of Low Confidence
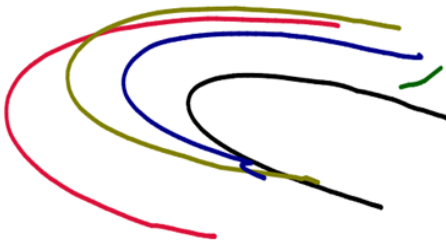
With low confidence there are no breaks, but there is a stray streak at the beginning of the curve.

Screen Mask Parameters
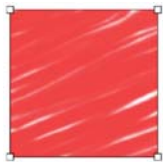
The screen mask parameters allow you to configure the active touch area when the Interactivity Kit bezel is larger than the underlying display.

How to Calculate Screen Mask Parameters

1. Calculate the active touch area of the Interactivity Kit. In this example the frame is seven modules wide, and four modules high. Each module width is 408 mm (16"), and each module height is
   306 mm. Therefore, in this example the touch area of the Interactivity Kit measures 2856 mm x 1224 mm.

2. Measure the width from the inside edge of the left-side bar on the Interactivity Kit to the left-edge of the display area. In this example the measurement equals 61.4 mm. Subtract 5.4 mm from the measurement to compensate for the offset of the 0,0 position of the active touch area. As a result, the required offset is 56 mm.

3. Measure the gap from the inside-top edge of the top sensor bar to the top of the display area. In this example, the measurement equals 9.9 mm. Subtract 5.4 mm from the vertical measurement to compensate for the offset of the 0,0 position of the active touch area. As a result, the required offset is 4.5 mm.

4. Repeats steps 2 and 3 to calculate the required offsets for the bottom and right sides. Once all four sides are calculated, convert the offsets to percentages of the active touch area, as illustrated below.
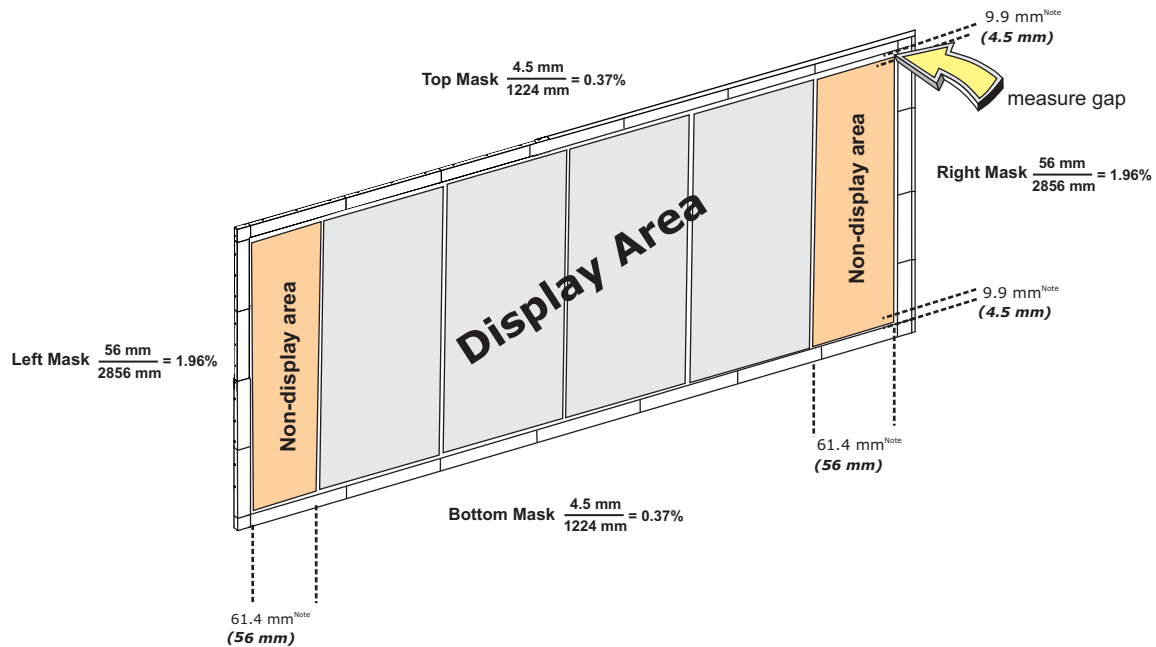
NOTE: You must always subtract 5.4 mm from the width and height when calculating the required offset.
This is because there is a 5.4 mm margin between the inside-edge of the frame and the touch area, around the entire frame.

Test View

Test view allows you to perform a fully functional and diagnostic test.
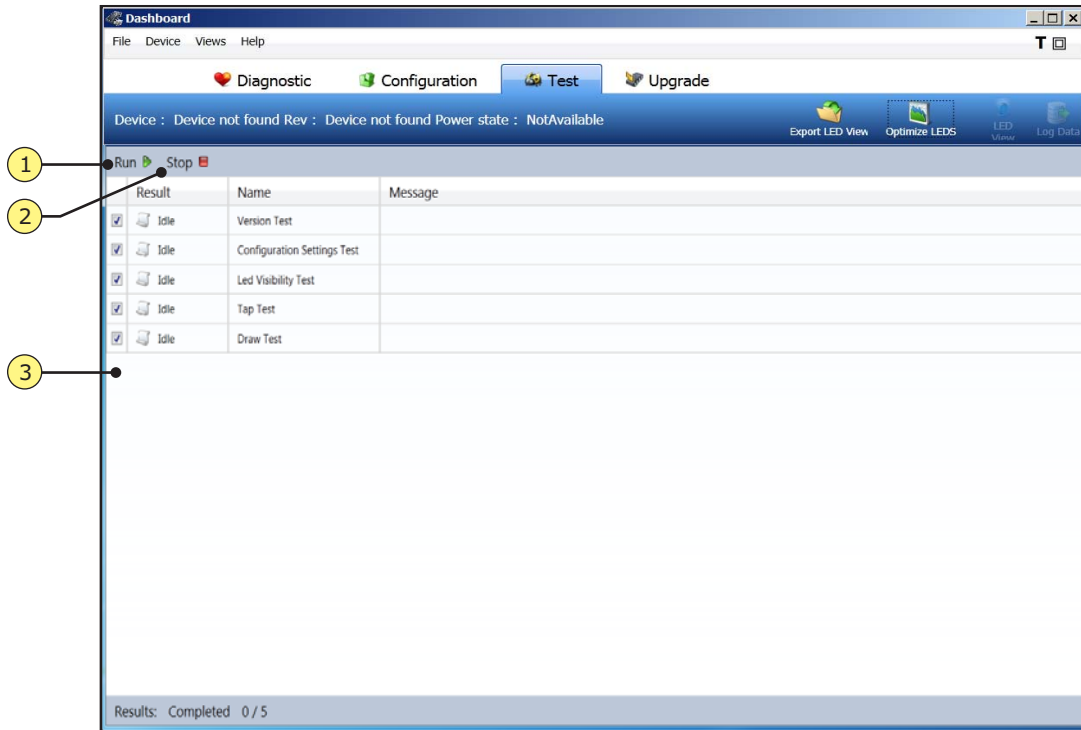
1	Run button
2	Stop button
3	Test window

Run button

Click this button to start the test.

Stop button

Click this button to stop the test in progress.

Test window

This window displays all the information from the tests, including PASS\FAIL status and any errors encountered.

The five individual tests are as follows:

- **Version Test**: Confirms that the current production firmware version has been sent to the master controller.

- **Configuration Settings Test**: Confirms that the current Configuration Parameters have been sent to the master controller.

- **LED Visibility Test**: Confirms that all LEDs are within operating parameters to all shadow sensors. When all LEDs are in this state they illuminate green in the Diagnostic View. See Diagnostics View, on page 25.

- **Tap Test**: During this test you are required to tap on the circles that appear on the display, in the order they appear. The test is successful when there are no glitches reported anywhere else on the display.

- **Draw Test**: During this test you are required to draw a line inside the bounding box that appears, from start to end, with no break, and without deviating from the bounded area.

Upgrade View

| NOTICE | The Interactivity Kit supports a custom firmware file. Performing an upgrade with any other file can permanently damage the Interactivity Kit and should be avoided. |

These parameters allow you to update the Interactivity Kit firmware. All firmware filenames have the following format; Firmware-MT-INTERKIT TS-Ver-0411.EDFU and Firmware-SLAVE-Ver-0206.EDFU. Only these files will be recognized as valid upgrade files by the system. There are two different firmware files, one for the master controller and one for the sensor bars. For details, see *Firmware Upgrade* on page 40.
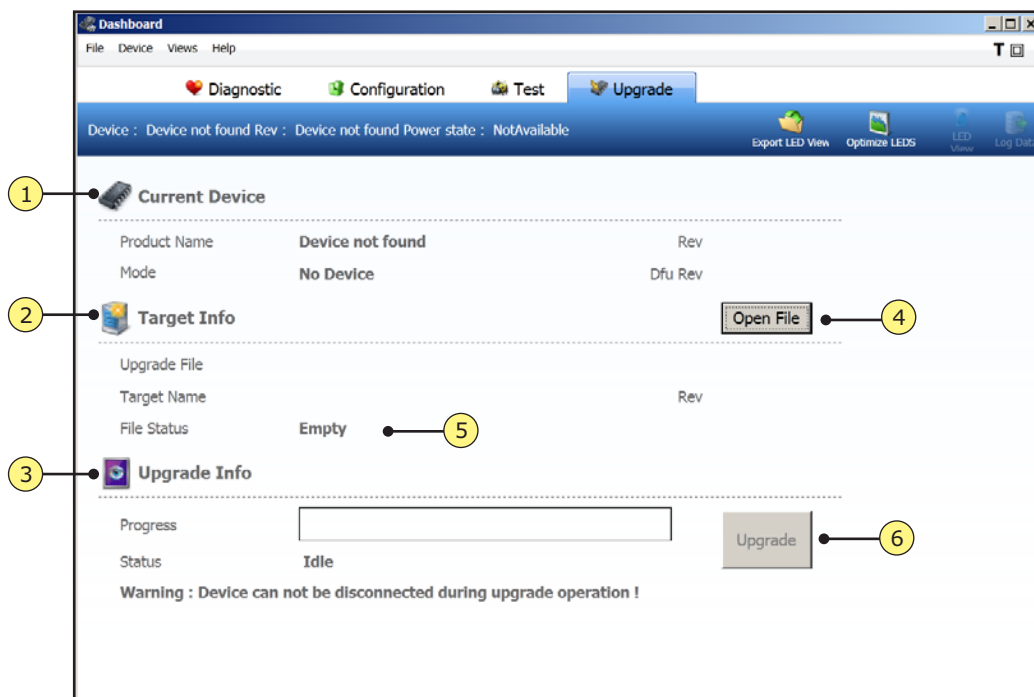
1	Current Device Information

2	Target Information
3	Upgrade Info
4	Open File Button
5	File Status
6	Upgrade Button

Current Device Information

Displays the product name, revision number and other information specific to the plugged in device.

Target Information

Displays information specific to the upgrade file that was selected.

Upgrade Info

Displays the current status and progress of the upgrade process.

Open File Button

Click to select the firmware upgrade file. The software automatically detects whether the upgrade file is intended for the master controller or the sensor bars. This reduces the chances that you incorrectly load the sensor bar code into the master, or vice versa.

File Status

Displays any errors encountered. The Product Name and Target Name strings must match for an upgrade to occur.

Upgrade Button

NOTICE   Do not disconnect the USB or disable power during a device upgrade.

Once the correct target file has been selected and no errors have been encountered, click this button to initiate a device upgrade command. If a file intended for the sensor bar was selected, the software will prompt you to select the specific bar to upgrade. For details, see *Firmware Upgrade* on page 40.

Firmware Upgrade

A specific device driver must be installed in order to install a firmware upgrade. See Interactivity Kit User Manual (P/N: 020-100856-xx) for details.

Master Controller Firmware Upgrade

Always upgrade the master controller first and then each individual sensor bar.

1. Click the **Upgrade** tab.

2. Click **Open File** and browse explorer to the target file, Firmware-MT-INTERKIT. Once the file is uploaded, the Target Info section of the screen shows the upgrade file, target name, and file status.

3. Click **Upgrade**. The firmware upgrade for the master controller takes approximately 25 seconds. The upgrade is complete once the top status bar menu displays `Power State: Active`.
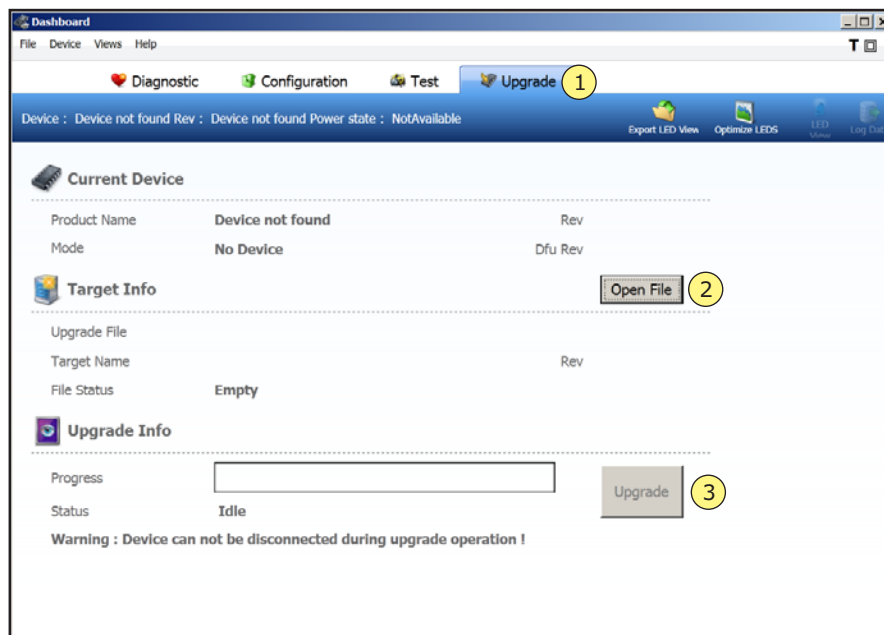
Slave Firmware Upgrade

NOTICE   Do not disconnect the USB or power cable during an upgrade.

1. Click **Open File** and browse explorer to the target file, Firmware-SLAVE-INTERKIT. Once the file is uploaded, the Target Info section of the screen shows the upgrade file, target name, and file status.

2. Click **Upgrade**.

3. The Slave Selection pop up window appears. Use your mouse or keypad to highlight the sensor bar you want to upgrade.

   You can only update one sensor bar at a time. Each sensor bar must be updated or the Interactivity Kit will not function properly.

4. Click **Upgrade**. The upgrade is complete once the top status bar menu displays `Power State: Active`.

   Firmware upgrade for a sensor bar takes approximately 20 seconds.
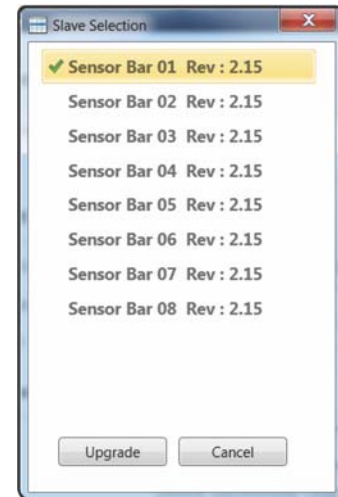
Troubleshooting

Touchscreen Does Not Register Touches

If touch works through the Dashboard software it indicates a problem with your application.

1. Go to **Control Panel** > **Hardware & Sounds**. If the **Pen and Touch** feature is shown it confirms that touch is enabled. If the feature is not shown connect a touch device to the unit and restart the system.

2. Enter the **Pen and Touch** window and set **Finger Selection** to **Input Mode**.

Or:

1. Check the current status of the LEDs. In a powered up state and when the USB is not connected, the top–left LED flashes and the LEDs on the light bars and sensor bars will illuminate green. If any of the LEDs on the inside face of the sensor and light bars does not illuminate, it indicates that a connection is broken.

   a. Make sure the light bars and sensor bars are properly aligned. Please note that it is possible to install the touch frame such that one or more edges are sitting too far back relative to the display surface, thereby obscuring a range of LEDs from the sensors. For details, see *Installation on page 16.*

   b. Make sure the sensor bars and/or light bars are secured to the connectors.

   c. Inspect parts to make sure nothing is damaged. If necessary, clean the connectors using an alcohol wipe.

   d. If a connection is broken, swap out the sensor bar where the connection is broken to see where the communication loss is occurring.

2. Connect the USB device supplied with the base kit to a Windows® 7 or Windows® 8 computer. When the USB device is connected the top–left corner LED is illuminated and all other LEDs are powered off.

3. If you are using a Windows platform, go to **Control Panel >Device Manager> Microsoft Configuration Device**.

   If touch behavior is enabled you will see the following:

   - 1x USB

   - 2x HID computer devices (02453 baanto)

   Having these devices present indicates the drivers for touch capability are present and functioning. If these items are not listed contact Christie Technical Support at *tech-support@christiedigital.com.*

4. When contacting Christie Technical Support provide the following files to assist with your service call:

a. The calibrated LED values, which is generated by selecting the **Export LED View** option via the Dashboard software.

b. The USB traffic logs, which is generated by selecting the **Log Data** option via the Dashboard software. See *Diagnostics View* on page 25.

c. The LED visibility data, which is generated by selecting the LED View button via the Dashboard software. See *Diagnostics View* on page 25.

Single Touch Registered as Double / Triple Touch

1. Go to **Control Panel** > **Hardware & Sounds** > **Tablet PC Settings**.

2. If the **Calibrate** button is grayed out restart the system.

3. Follow the on screen prompts.

Or:

1. Increase **Filter Size** to filter out small user motions, and decrease **Filter Depth**. See *Filter Parameters* on page 32.

Or:

1. Decrease the touch confidence value. See *Confidence Parameters* on page 35.

If the above steps do not resolve the issue contact Christie Technical Support at *tech-support@christiedigital.com*.

Inconsistent Touch Recognition / Line Breaks

All optical based systems will have small areas of the touch surface which are less sensitive than the rest. Often these are located at the most acute angles to the sensors or cameras, where it is difficult to triangulate touch events, or in areas where the infrared light must travel the furthest. In the case of the Interactivity Kit, this means that touch performance will be less sensitive at the very top of the display, and at the center-top in very large configurations. This should be taken into consideration when designing the user experience and layout of the touch interface for a particular application.

1. Lower the Confidence level from 100% to 75%. See *Configuration View* on page 28 and *Confidence Parameters* on page 35.

2. Click **Optimize LEDs** to apply the changes.

3. Increase the Minimum Shadow from 6% to 10%. See *Minimum Shadow* on page 31.

4. Click **Optimize LEDs** to apply the changes.

5. Increase the Maximum Shadow from 40% to 80%. See *Maximum Shadow* on page 31.

6. Click **Optimize LEDs** to apply the changes.

Touches Consistently Offset

If you are using Windows® 7 or Windows® 8:

1. Go to **Control Panel** > **Hardware & Sounds** > **Tablet PC Settings**.

2. If the **Calibrate** button is grayed out restart the system.

3. Follow the on screen prompts.

If you are using a custom application it may be possible to correct any inaccuracies through transposing the touch data.

Touch Accuracy Varies Across Entire Surface

- If you are using the Interactivity Kit on something other than a MicroTiles array, the active touch surface must be masked so that it matches the active display surface. See *Screen Mask Parameters* on page 36.

- Some operating systems, including Mac®, may not register touch data from the Interactivity Kit accurately across the entire display surface. For best results use Windows® 7 or Windows® 8. If you are using a custom application it may be possible to correct any inaccuracies through transposing the touch data.

- Make sure the resolution of the source computer matches the aspect ratio of the display surface.

- If the display is comprised of multiple flat panels, make sure the bezel gaps are consistent and compensated for by either the panels or the source computer's graphics card. Compensation involves hiding a logical number of pixels where the physical bezels are located, so that images spread across multiple panels are not distorted.

Touches Mapped to one Display Output Only

When using the Christie Interactivity Kit with a computer that has more than one graphic output, the graphics card must support desktop "spanning", otherwise the Christie Interactivity Kit will be associated with the primary output only.

Simply "extending" the desktop across multiple outputs will not work. The Interactivity Kit will only associate with the primary output.

Touches Registered in the Perpendicular or Opposite Direction

The normal orientation of the Christie Interactivity Kit in relation to the display is such that the sensors are along the top of the display. If the Interactivity Kit and display are not both in their

normal orientation, and one is rotated 90°, 180° or 270° from the other, touch events will not be mapped accurately. Contact Christie Technical Support for assistance.

Double Touches Registered as Single Touches

Make sure touch confidence is set to 100%. See *Confidence Parameters* on page 35.

Test Touch Performance

This section outlines the recommended settings and best practices for testing touch performance.

Default Settings (Configuration tab)	
General Parameters	USB Boot Delay: 0 New Touch Delay: 0
Shadow Parameters	Separation Threshold: 5% Maximum Shadow: 40% Minimum Shadow: 6%
Filter Parameters	Filter Size: 10 frames Filter Depth: 20 mm
Contaminant Parameters	Contamination Rejection Period: 10 frames Recovery Speed: 4 counts
Touch Reject Parameters	Disabled by default.
Power Options	Active Mode LED Brightness: 100%
Confidence Parameters	Touch Confidence: 100%
Screen Mask Parameters	Top Mask: 0% Bottom Mask: 0% Left Mask: 0% Right Mask: 0%

Test Conditions	
Lighting	250 foot–candles NOTE: Use a T10 illuminance meter to measure lighting.
Touch Objects	• Finger • Paint brush: Brush type 10 NOTE: Use digital caliper to measure paint brush diameter.
Touch Object Distance	In direct contact with screen area
Touch Object Pressure	Apply very light pressure to avoid flexing screen
Touch Object Position	Keep touch object perpendicular to the screen at all times to avoid any unresponsiveness of touch. If you are using your finger make sure to keep your knuckles off of the touch plane.
Speed	Move at such a speed that the draw–line is able to keep up with your movement.

Test Conditions	
Multi–touch Separation	• Fingers ≥15 mm • Paint brushes: 50 mm

Instructions

1. Open the Dashboard software

2. Make sure the default settings specified in *Test Touch Performance* on page 46 are set.

3. Open the diagnostic drawing canvas in full screen mode. See *Diagnostics View* on page 25.

4. Draw test patterns on the display surface using either a straight finger, with tight knuckles away from the touch plane, or a brush, type 10 (15-20 mm). Keep your finger or brush perpendicular to the display and in continuous contact with the display surface. Apply light pressure to make sure the display surface does not bend or flex. Use a slow-moderate speed across the screen, so the "draw-line" is able to keep up with your movement.

Recommended Test Patterns

It is recommended that between drawing each test pattern, you take a photograph of the display. To clear the display select the **Backspace** key. The table below, outlines the test patterns to use for the three types of touches. If you are testing the double or triple touch make sure your fingers are spaced approximately 15 mm apart, or that the paint brushes are approximately 50 mm apart, and of equal distance from the screen.

Single Touch	Double Touch	Triple Touch
around the edge	around the edge	around the edge
grid pattern	grid pattern	vertical lines
circular pattern	circular pattern	horizontal lines
X pattern	X pattern	X pattern

- **Around the Edge**: Start at the top–left corner of the display and draw a continuous line around the outer edge of the display.

- **Grid Pattern**: Start at the top–left corner of the display. If using MicroTiles, draw a vertical line from the top to bottom at the middle of each tile, and repeat at all seams and outside edges. Draw a horizontal line from left to right at the middle of each tile, and repeat at all seams and outside edges. If the Interactivity Kit is installed on something other than the MicroTiles, space vertical lines 16" (408 mm), and horizontal lines 12" (306 mm) apart.

- **Circular Pattern**: If using MicroTiles, draw a continuous circular pattern on each tile, starting from the top–left corner of the tile. Work from the left to the right of the display.

- **Vertical Lines**: Draw a vertical line from the top to the bottom of the display surface, spaced 16" (408 mm) apart. If using MicroTiles, draw along the screen gaps.

- **Horizontal Lines**: Draw a horizontal line from one side to the other of the display surface, spaced 12" (306 mm) apart. If using MicroTiles, draw along the screen gaps.

- **X Pattern**: If using MicroTiles, draw an "x" on each tile.

Packet Structures

The following section provides information for application developers.

USB General Structure

Top Level Collection

Once the Interactivity Kit is identified on the operating system, five top level USB HID collections become available. The table below identifies these collections.

Collection Description	Report Data	Firmware Version
Windows® 7 and Windows® 8 Touch Collection	Multi-touch packets	4.0
Microsoft Device Configuration Collection	Control packets	4.0
Generic Mouse Collection	n/a	4.0
Generic Pointer Collection	Single–touch packet	4.0
Touch (custom HID) Collection	Multi-touch packets / control packets	4.0

Vendor ID and Product ID

The Interactivity Kit can be identified through the VID (0 x 2453) and the PID (0 x 0100).

Microsoft Device Configuration Collection

This collection is used by Windows® 7 or Windows® 8 to configure the Interactivity Kit into multi–touch mode. If not configured, the Interactivity Kit does not report WIN7 touch packets, and defaults to generic pointer and custom HID packets only.

Win7 Touch (multi-touch digitizer) Collection

This collection reports data packets that are compatible with the Microsoft Windows® 7 and Windows® 8 requirements. Go to *www.microsoft.com* for details.

The Interactivity Kit supports the following data models described by Microsoft. Starting with Windows® Vista, touch digitizers appear through the USB HID interface as a touch digitizer (page 0x0D, usage 0x04).

These usages are supported:

- X (page 0x01, usage 0x30) and Y (page 0x01, usage 0x31)

- Tip switch (page 0x0D, usage 0x42)

- In-range (page 0x0D, usage 0x32)

- Width and height (page 0x0D, usages 0x48 and 0x49)

The tip switch is used to indicate finger contact and lift–off from the digitizer surface, similar to how a pen reports contact with the digitizer. Both in–range and tip switch are reported when a finger comes in contact with the touch screen surface.

Generic Pointer Collection

Windows$^®$ 7 and Windows$^®$ 8 automatically configures the Interactivity Kit into multi-touch digitizer mode; all other operating systems will default to legacy mode and enable the mouse collection.

The pointer collection is only used when the Interactivity Kit is connected to an operating system that does not natively support a multi–touch digitizer. If the Interactivity Kit has not been configured to enable the multi–touch digitizer mode via the Microsoft Device Configuration, the screen defaults to legacy mode where the pointer collection is activated. The pointer collection reports single touch data as absolute X, Y positions.

Touch Collection (custom HID)

Application developers can read touch and configuration packets directly from the firmware using a custom HID collection (UsagePage = 0 x 8c and Usage 0 x 01). This collection exposes a number of packet structures, both control and input transfers.

Input Reports

Touch Report

This is a 64–byte input report that provides application developers with native multi–touch data. The (X,Y) position data for each touch is reported as a 16–bit number with a range of (0, 4095). Position (0,0) is the top–left of the Interactivity Kit whereas (4094, 4094) is the bottom–right. Position (4095, 4095) signifies that the touch is not present or it has been removed from the screen.

This report is supported in Rev 4.0, and can be described as follows:

Byte	Value	Description
0	0x0F	Report ID
1	0x00 – 0x10	HI BYTE, X Position 0
2	0x00 – 0xFF	LO BYTE, X Position 0
3	0x00 – 0x10	HI BYTE, Y Position 0
4	0x00 – 0xFF	LO BYTE, Y Position 0

Byte	Value	Description
5	0x00 – 0x10	HI BYTE, Thickness 0
6	0x00 – 0xFF	LO BYTE, Thickness 0
7	0x00 – 0x10	HI BYTE, X Position 1
8	0x00 – 0xFF	LO BYTE, X Position 1
9	0x00 – 0x10	HI BYTE, Y Position 1
10	0x00 – 0xFF	LO BYTE, Y Position 1
11	0x00 – 0x10	HI BYTE, Thickness 1
12	0x00 – 0xFF	LO BYTE, Thickness 1
13	0x00 – 0x10	HI BYTE, X Position 2

Control Transfers

Firmware Revision Report

This is a 4–byte GET, CONTROL request that returns the firmware revision. This report is supported in firmware version 4.0.

Byte	Value	Description
0	0x02	Report ID
1	0x00 – 0xFF	major revision
2	0x00 – 0xFF	minor revision
3	0x00	not used

Power Mode Report

This is a 3–byte GET\SET, CONTROL request that configures power mode. This report is supported in firmware version 4.11.

Byte	Value	Description
0	0x05	Report ID
1	0x01 – 0x03	Power mode, Active = 1, Idle = 2, Sleep = 3
2	0x00	not used

Configuration Report

This is a 12–byte GET\SET, CONTROL request that can read\write the configuration parameters to and from the EEPROM of the Interactivity Kit. This report is supported in firmware version 4.0.

Byte	Value	Description
0	0x03	Report ID

Byte	Value	Description
1	0x00 – 0x0A	USB boot delay
2	0x00 –0x32	New blob delay
3	0x05 – 0x19	Shadow separation
4	0x14 – 0x5F	Maximum shadow value
5	0x02 – 0x0A	Minimum shadow value
6	0x02 – 0x14	Filter size
7	0x02 – 0xC8	Calibration period
8	0x02 – 0x32	Recovery speed
9	0x05 – 0x96	Filter distance
10	0x00	not used
11	0x00	not used
12	0x00	not used

Configuration 2 Report

This is a 12–byte GET\SET, CONTROL request that can read\write additional configuration parameters to and from the EEPROM of the Interactivity Kit. This report is supported in firmware version 4.11.

Byte	Value	Description
0	0x04	Report ID
1	0x00 – 0x01	Touch rejection flags (Enable = 1, Disable = 0)
2	0x00 –0xFF	LO BYTE, minimum contact area for rejection
3	0x00 – 0xFF	HI BYTE, minimum contact area for rejection
4	0x00 – 0xFF	LO BYTE, maximum contact area for rejection
5	0x00 – 0xFF	HI BYTE, maximum contact area for rejection
6	0x0F – 0xC4	Active power mode, LED brightness
7	0x0A – 0x32	Active power mode, frame time
8	0x00 – 0xFF	Idle power mode, time to idle, Never = 0
9	0x0F – 0xC4	Idle power mode, LED brightness
10	0xC4 – 0xFF	LO BYTE, idle power mode, frame time
11	0x00 – 0xFF	HI BYTE, idle power mode, frame time
12	0x00	not used

Calibration Report

This is a 1–byte SET, CONTROL request that restarts the calibration process. This report is supported in firmware version 4.0.

Byte	Value	Description
0	0x088	Report ID

Dynamic Firmware Upgrade

The Interactivity Kit requires a special driver to install a firmware upgrade.The Dynamic Firmware Upgrade (DFU) allows the firmware of the touch controller to be updated in the field without the need to take the touch screen apart. The touch screen enters a special DFU mode, where the new firmware is flashed using special USB packets.

The driver is able to communicate to the BOOT LOADER that resides in a special location of the controller's memory and erases the old firmware and programs the new file.

NOTICE
- The driver will only have to be installed the first time an upgrade is performed.
- The driver is only compatible in Microsoft products, such as XP and Windows® 7.

Automatic Installation

If the computer performing the upgrade process is connected to the Internet, Windows® will automatically detect the boot loader, download the driver from Microsoft and install the device driver. Once the touch screen (in DFU mode) is detected, the message `Installing device driver software` is displayed in the status bar. Once the device driver has been installed, the upgrade process will automatically continue.

Manual Installation

Perform the steps below if there is no Internet connection, or the driver fails to install.

1. Go to **Control Panel > Device Manager**.
2. Scroll down to **STM32 DFU DEVICE**.
3. Right–click and select **Update Driver Software**.
4. Select **Browse My Computer for Driver Software**.
5. Click **Browse** and select the driver sub-directory inside the Baanto Dashboard software directory.
6. If a Windows Security dialog box appears, select **Install the driver software anyway**.

Specifications

Coverage

- Surface width: 3 – 16 modules: 1224 mm – 6528 mm (48.19" – 257.01")

- Surface height: 1 – 6 modules: 306 mm – 1836 mm (12.05" – 72.28")

- Maximum surface size: 11.99 sq m. (129.0 sq. ft.)

- Maximum surface diagonal: 267"

Touch

The touch specifications provided are for single–touch applications. Touch performance will vary slightly depending on the number and location of touches.

- Technology: Baanto™ ShadowSense™

- Simultaneous touches

    - Varies with width; three touches typical per two module widths up to a maximum of 18 touches.
      For example:

        - 3 modules wide: up to 4 touches

        - 6 modules wide: up to 9 touches

        - 12 modules wide: up to 18 touches

        - 16 modules wide: up to 18 touches

- Touch object: Finger, gloved hand, any object

- Touch resolution

    - Varies with width. For example:

        - 3 modules wide: 0.3 mm (0.01")

        - 6 modules wide: 0.6 mm (0.02")

        - 12 modules wide: 1.2 mm (0.05")

        - 16 modules wide: 1.6 mm (0.06")

- Minimum touch size: 5 mm (0.20")

- Distance between touches: 15 mm edge–to–edge (0.59")

- Distance to surface: ≤5 mm (0.20") typical

- Accuracy: ±5 mm (0.20") across 90% of surface

Interface

- Host connection: USB/HID, no driver required

- Device

    - Touch data is provided to the operating system in three ways:

        - Windows® 7 and 8 multi-touch: Recognized natively by Windows® 7 and 8 as a multi–touch device.

        - Single–touch: Recognized natively in typical Windows®/Mac® operating systems as a generic pointer or mouse.

          Mac® operating systems often do not map the touch data correctly across the entire surface of the display, therefore to achieve satisfactory performance with a Mac®, a custom application or programming is required in combination with the custom multi-touch library.

        - Custom multi-touch: Multi-touch data is provided in a custom HID collection, which developers can utilize when programming their application for any operating system that supports USB HID 1.1.

Power

The System is rated at 12Vdc, 2.5A. Input is provided by any approved power supply with output voltage of 12Vdc, minimum 2.5A rated output current and rated as Limited Power Source. The power supply is sold separately.

- Interactivity Kit only: 12Vdc; 2.5A

Environmental

- Operating temperature: 0 to 35° C (32° to 95° F)

- Operating humidity: 5 to 90% non-condensing

- Storage temperature: -20° to 50° C (-4° to 122°F)

Physical

- Frame width: 52.6 mm (2.07")

- Frame depth: 24.5 mm (0.96")

- Weight

    - Varies with size, for example:

        - 3 x 1: 4.4 kg (9.6 lbs)

        - 6 x 4: 10.7 kg (23.6 lbs)

- 12 x 4: 17.7 kg (39.0 lbs)
- 16 x 6: 24.3 kg (53.5 lbs)

Shipping Dimensions and Weight

Base Kit (P/N: 108-438106-xx)

- Max. shipping dimensions (L x W x H): 555 x 340 x 410 mm (21.9" x 13.4" x 16.1")
- Max. shipping weight (includes packaging): 9.3 kg (20.5 lbs)

Base Kit Mounts for MicroTiles (P/N: 108-441100-xx)

- Max. shipping dimensions (L x W x H): 455 x 335 x 70 mm (17.9" x 13.2" x 2.8")
- Max. shipping weight (includes packaging): 7 kg (15 lbs)

Width Extender Kit (P/N: 108-439107-xx)

- Max. shipping dimensions (L x W x H): 455 x 265 x 42 mm (17.9" x 10.4" x 1.7")
- Max. shipping weight (includes packaging): 2 kg (4.4 lbs)

Height Extender Kit (P/N: 108-440109-xx)

- Max. shipping dimensions (L x W x H): 360 x 295 x 75 mm (14.2" x 11.6" x 2.9")
- Max. shipping weight (includes packaging): 1.5 kg (3.3 lbs)

Regulatory

Safety

- CAN/CSA C22.2 No. 60950–1
- UL 60950–1
- IEC 62471/EN62471
- IEC 60950
- CE (EU)
- FCC

Certifications

The Interactivity Kit is designed to comply with the rules and regulations required for the product to be sold in various regional markets, including; USA/Canada, European Union, Australia, China, Korea, Japan, Mexico, Argentina, Ukraine, Russia, South Africa, Kuwait and Saudia Arabia.

Electro-magnetic Compatibility

Emissions

- FCC, Part 15, Subpart B, Class A - Unintentional Radiators
- CISPR 22 / EN55022 Class A - Information Technology Equipment

Immunity

- CISPR 24 /EN55024 EMC Requirements - Information Technology Equipment Size

Environmental

- EU Directive (2002/95/EC) on the restriction of the uses of certain hazardous substances (RoHS) in electrical and electronic equipment and the applicable official amendment(s).
- EU Directive (2002/96/EC) on waste and electrical and electronic equipment (WEEE) and the applicable official amendment(s).
- Regulation (EC) No. 1907/2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) and its amendments.

Reliability and Serviceability

Reliability

Mean Time Between Failures (MTBF) 50,000 hours

Serviceability

The table below describes the mean time to repair (MTTR) each specific module that would need to be replaced in an event of a failure. The MTTR for the entire product is a function of the array size.

Module	MTTR	Precondition
Light bar or sensor bar	< 10 mins	Front access required
Connectors	< 20 mins	Front and top access required
Master controller	< 10 mins	Front, top and back access required

Appendix A: HID Device Descriptor

```
const u8 CustomHID_ReportDescriptor[CUSTOMHID_SIZ_REPORT_DESC] =
{
// Touch Screen collection bytes 10+56*5+21 = 311 bytes
//10 bytes - header
0x05, 0x0d, // USAGE_PAGE (Digitizers)
0x09, 0x04, // USAGE (Touch Screen)
0xa1, 0x01, // COLLECTION (Application)
0x85, touch screen_REPORT_ID, // REPORT_ID (Touch)
0x09, 0x22, // USAGE (Finger)
//68 bytes - individual touch collection
0xa1, 0x02, // COLLECTION (Logical)
0x09, 0x42, // USAGE (Tip Switch)
0x15, 0x00, // LOGICAL_MINIMUM (0)
0x25, 0x01, // LOGICAL_MAXIMUM (1)
0x75, 0x01, // REPORT_SIZE (1)
0x95, 0x01, // REPORT_COUNT (1)
0x81, 0x02, // INPUT (Data,Var,Abs)
0x95, 0x07, // REPORT_COUNT (7)
0x81, 0x03, // INPUT (Cnst,Ary,Abs)
0x09, 0x51, // USAGE ( Contact Identifier)
0x75, 0x08, // REPORT_SIZE (8)
0x95, 0x01, // REPORT_COUNT (1)
0x81, 0x02, // INPUT (Data,Var,Abs)
0x05, 0x01, // USAGE_PAGE (Generic Desk..
0x26, 0xff, 0x0f, // LOGICAL_MAXIMUM (4095)
0x75, 0x10, // REPORT_SIZE (16)
0x55, 0x0f, // UNIT_EXPONENT (-1)
0x65, 0x11, // UNIT(Inch,SI Linear)
0x09, 0x30, // USAGE (X)
0x35, 0x00, // PHYSICAL_MINIMUM (0)
0x46, LOWBYTE(WIDTH_OF_SCREEN), // PHYSICAL_MAXIMUM (WIDTH)
HIBYTE(WIDTH_OF_SCREEN),
0x81, 0x02, // INPUT (Data,Var,Abs)
0x46, LOWBYTE(HEIGHT_OF_SCREEN), // PHYSICAL_MAXIMUM (HEIGHT)
HIBYTE(HEIGHT_OF_SCREEN),
0x09, 0x31, // USAGE (Y)
0x95, 0x01, // REPORT_COUNT (1)
0x81, 0x02, // INPUT (Data,Var,Abs)
0x05, 0x0d, // USAGE_PAGE (Digitizers)
0x09, 0x48, // USAGE (Width)
0x81, 0x02, // INPUT (Data,Var,Abs)
0x09, 0x49, // USAGE (Height)
0x81, 0x02, // INPUT (Data,Var,Abs)
0x95, 0x01, // REPORT_COUNT (1)
0xc0, // END_COLLECTION
```

//68 bytes - individual touch collection

0xa1, 0x02, // COLLECTION (Logical)

0x09, 0x42, // USAGE (Tip Switch)

0x15, 0x00, // LOGICAL_MINIMUM (0)

0x25, 0x01, // LOGICAL_MAXIMUM (1)

0x75, 0x01, // REPORT_SIZE (1)

0x95, 0x01, // REPORT_COUNT (1)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x95, 0x07, // REPORT_COUNT (7)

0x81, 0x03, // INPUT (Cnst,Ary,Abs)

0x09, 0x51, // USAGE (Contact Identifier)

0x75, 0x08, // REPORT_SIZE (8)

0x95, 0x01, // REPORT_COUNT (1)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x05, 0x01, // USAGE_PAGE (Generic Desk..

0x26, 0xff, 0x0f, // LOGICAL_MAXIMUM (4095)

0x75, 0x10, // REPORT_SIZE (16)

0x55, 0x0f, // UNIT_EXPONENT (-1)

0x65, 0x11, // UNIT(Inch,SI Linear)

0x09, 0x30, // USAGE (X)

0x35, 0x00, // PHYSICAL_MINIMUM (0)

0x46, LOWBYTE(WIDTH_OF_SCREEN), // PHYSICAL_MAXIMUM (WIDTH)

HIBYTE(WIDTH_OF_SCREEN),

0x81, 0x02, // INPUT (Data,Var,Abs)

0x46, LOWBYTE(HEIGHT_OF_SCREEN), // PHYSICAL_MAXIMUM (HEIGHT)

HIBYTE(HEIGHT_OF_SCREEN),

0x09, 0x31, // USAGE (Y)

0x95, 0x01, // REPORT_COUNT (1)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x05, 0x0d, // USAGE_PAGE (Digitizers)

0x09, 0x48, // USAGE (Width)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x09, 0x49, // USAGE (Height)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x95, 0x01, // REPORT_COUNT (1)

0xc0, // END_COLLECTION

//68 bytes - individual touch collection

0xa1, 0x02, // COLLECTION (Logical)

0x09, 0x42, // USAGE (Tip Switch)

0x15, 0x00, // LOGICAL_MINIMUM (0)

0x25, 0x01, // LOGICAL_MAXIMUM (1)

0x75, 0x01, // REPORT_SIZE (1)

0x95, 0x01, // REPORT_COUNT (1)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x95, 0x07, // REPORT_COUNT (7)

0x81, 0x03, // INPUT (Cnst,Ary,Abs)

0x09, 0x51, // USAGE (Contact Identifier)

0x75, 0x08, // REPORT_SIZE (8)

0x95, 0x01, // REPORT_COUNT (1)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x05, 0x01, // USAGE_PAGE (Generic Desk..

0x26, 0xff, 0x0f, // LOGICAL_MAXIMUM (4095)

0x75, 0x10, // REPORT_SIZE (16)

0x55, 0x0f, // UNIT_EXPONENT (-1)

0x65, 0x11, // UNIT(Inch,SI Linear)

0x09, 0x30, // USAGE (X)

0x35, 0x00, // PHYSICAL_MINIMUM (0)

0x46, LOWBYTE(WIDTH_OF_SCREEN), // PHYSICAL_MAXIMUM (WIDTH)

HIBYTE(WIDTH_OF_SCREEN),

0x81, 0x02, // INPUT (Data,Var,Abs)

0x46, LOWBYTE(HEIGHT_OF_SCREEN), // PHYSICAL_MAXIMUM (HEIGHT)

HIBYTE(HEIGHT_OF_SCREEN),

0x09, 0x31, // USAGE (Y)

0x95, 0x01, // REPORT_COUNT (1)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x05, 0x0d, // USAGE_PAGE (Digitizers)

0x09, 0x48, // USAGE (Width)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x09, 0x49, // USAGE (Height)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x95, 0x01, // REPORT_COUNT (1)

0xc0, // END_COLLECTION

//68 bytes - individual touch collection

0xa1, 0x02, // COLLECTION (Logical)

0x09, 0x42, // USAGE (Tip Switch)

0x15, 0x00, // LOGICAL_MINIMUM (0)

0x25, 0x01, // LOGICAL_MAXIMUM (1)

0x75, 0x01, // REPORT_SIZE (1)

0x95, 0x01, // REPORT_COUNT (1)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x95, 0x07, // REPORT_COUNT (7)

0x81, 0x03, // INPUT (Cnst,Ary,Abs)

0x09, 0x51, // USAGE (Contact Identifier)

0x75, 0x08, // REPORT_SIZE (8)

0x95, 0x01, // REPORT_COUNT (1)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x05, 0x01, // USAGE_PAGE (Generic Desk..

0x26, 0xff, 0x0f, // LOGICAL_MAXIMUM (4095)

0x75, 0x10, // REPORT_SIZE (16)

0x55, 0x0f, // UNIT_EXPONENT (-1)

0x65, 0x11, // UNIT(Inch,SI Linear)

0x09, 0x30, // USAGE (X)

0x35, 0x00, // PHYSICAL_MINIMUM (0)

0x46, LOWBYTE(WIDTH_OF_SCREEN), // PHYSICAL_MAXIMUM (WIDTH)

HIBYTE(WIDTH_OF_SCREEN),

0x81, 0x02, // INPUT (Data,Var,Abs)

0x46, LOWBYTE(HEIGHT_OF_SCREEN), // PHYSICAL_MAXIMUM (HEIGHT)

HIBYTE(HEIGHT_OF_SCREEN),

0x09, 0x31, // USAGE (Y)

0x95, 0x01, // REPORT_COUNT (1)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x05, 0x0d, // USAGE_PAGE (Digitizers)

0x09, 0x48, // USAGE (Width)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x09, 0x49, // USAGE (Height)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x95, 0x01, // REPORT_COUNT (1)

0xc0, // END_COLLECTION

//68 bytes - individual touch collection

0xa1, 0x02, // COLLECTION (Logical)

0x09, 0x42, // USAGE (Tip Switch)

0x15, 0x00, // LOGICAL_MINIMUM (0)

0x25, 0x01, // LOGICAL_MAXIMUM (1)

0x75, 0x01, // REPORT_SIZE (1)

0x95, 0x01, // REPORT_COUNT (1)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x95, 0x07, // REPORT_COUNT (7)

0x81, 0x03, // INPUT (Cnst,Ary,Abs)

0x09, 0x51, // USAGE (Contact Identifier)

0x75, 0x08, // REPORT_SIZE (8)

0x95, 0x01, // REPORT_COUNT (1)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x05, 0x01, // USAGE_PAGE (Generic Desk..

0x26, 0xff, 0x0f, // LOGICAL_MAXIMUM (4095)

0x75, 0x10, // REPORT_SIZE (16)

0x55, 0x0f, // UNIT_EXPONENT (-1)

0x65, 0x11, // UNIT(Inch,SI Linear)

0x09, 0x30, // USAGE (X)

0x35, 0x00, // PHYSICAL_MINIMUM (0)

0x46, LOWBYTE(WIDTH_OF_SCREEN), // PHYSICAL_MAXIMUM (WIDTH)

HIBYTE(WIDTH_OF_SCREEN),

0x81, 0x02, // INPUT (Data,Var,Abs)

0x46, LOWBYTE(HEIGHT_OF_SCREEN), // PHYSICAL_MAXIMUM (HEIGHT)

HIBYTE(HEIGHT_OF_SCREEN),

0x09, 0x31, // USAGE (Y)

0x95, 0x01, // REPORT_COUNT (1)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x05, 0x0d, // USAGE_PAGE (Digitizers)

0x09, 0x48, // USAGE (Width)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x09, 0x49, // USAGE (Height)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x95, 0x01, // REPORT_COUNT (1)

0xc0, // END_COLLECTION

//34 bytes - touch screen footer

0x05, 0x0d, // USAGE_PAGE (Digitizers)

0x27, 0xff, 0xff, 0xff, 0x0f, // LOGICAL_MAXIMUM (268435455)

0x75, 0x20, // REPORT_SIZE (32)

0x95, 0x01, // REPORT_COUNT (1)

0x09, 0x56, // USAGE (Scan Time)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x09, 0x54, // Usage (Actual Count)

0x25, 0x05, // LOGICAL_MAXIMUM (5)

0x95, 0x01, // REPORT_COUNT (1)

0x75, 0x08, // REPORT_SIZE (8)

0x81, 0x02, // Input (Data,Var,Abs)

0x85, MAX_COUNT_REPORTID, // REPORT_ID (Feature)

0x09, 0x55, // USAGE(Maximum Count)

0x95, 0x01, // REPORT_COUNT (1)

0x25, 0x02, // LOGICAL_MAXIMUM (2)

0xb1, 0x03, // FEATURE (Data,Var,Abs)

0xc0, // END_COLLECTION

// Device Configuration Collection 26 bytes

0x09, 0x0E, // Usage (Device Configuration)

0xA1, 0x01, // Collection (Application)

0x85, CONTROL_FEATURE_REPORT_ID, // Report Id (4)

0x09, 0x23, // Usage (Device Settings)

0xA1, 0x02, // Collection (Logical)

0x09, 0x52, // Usage (Device Mode)

0x09, 0x53, // Usage (Device Id)

0x15, 0x00, // Logical Minimum (0)

0x25, 0x0A, // Logical Maximum (10)

0x75, 0x08, // Report Size (8)

0x95, 0x02, // Report Count (2)

0xB1, 0x02, // Feature (Data,Var,Abs)

0xC0, // End Collection

0xC0, // End Collection

// Mouse Collection 51 bytes

0x05, 0x01, // USAGE_PAGE (Generic Desktop)

0x09, 0x02, // USAGE (Mouse)

0xa1, 0x01, // COLLECTION (Application)

0x85, MOUSE_REPORT_ID, // REPORT_ID (Mouse)

0x09, 0x01, // USAGE (Pointer)

0xa1, 0x00, // COLLECTION (Physical)

0x05, 0x09, // USAGE_PAGE (Button)

0x19, 0x01, // USAGE_MINIMUM (Button 1)

0x29, 0x02, // USAGE_MAXIMUM (Button 2)

0x15, 0x00, // LOGICAL_MINIMUM (0)

0x25, 0x01, // LOGICAL_MAXIMUM (1)

0x75, 0x01, // REPORT_SIZE (1)

0x95, 0x02, // REPORT_COUNT (2)

0x81, 0x02, // INPUT (Data,Var,Abs)

0x95, 0x06, // REPORT_COUNT (6)

0x81, 0x03, // INPUT (Cnst,Var,Abs)

0x05, 0x01, // USAGE_PAGE (Generic Desktop)

0x09, 0x30, // USAGE (X)

0x09, 0x31, // USAGE (Y)

0x75, 0x10, // REPORT_SIZE (16)

0x95, 0x02, // REPORT_COUNT (2)

0x15, 0x00, // LOGICAL_MINIMUM (0)

0x26, 0xff, 0x7f, // LOGICAL_MAXIMUM (32767)

0x81, 0x02, // INPUT (Data,Var,Abs)

0xc0, // END_COLLECTION

0xc0, // END_COLLECTION

//93 bytes - Touch Digitizer Collection

0x05, 0x01, // USAGE_PAGE (Generic Desktop)

0x09, 0x01, // USAGE (Pointer) //mouse = 0x02, pointer = 0x01

0xa1, 0x01, // COLLECTION (Application)

0x85, POINTER_REPORT_ID, // REPORT_ID (Touch)

0x05, 0x01, // USAGE_PAGE (Generic Desktop)

0x09, 0x01, // USAGE (Pointer)

0xa1, 0x00, // COLLECTION (Physical)

0x05, 0x09, // USAGE_PAGE (Button)

0x19, 0x01, // USAGE_MINIMUM (Button 1)

0x29, 0x01, // USAGE_MAXIMUM (Button 1)

0x15, 0x00, // LOGICAL_MINIMUM (0)

0x25, 0x01, // LOGICAL_MAXIMUM (1)

0x35, 0x00, // PHYSICAL_MINIMUM(0)

0x45, 0x01, // PHYSICAL_MAXIMUM(1)

0x66, 0x00, 0x00, // UNITS (NONE)

0x75, 0x01, // REPORT_SIZE (1)

0x95, 0x01, // REPORT_COUNT (2)

0x81, 0x62, // INPUT (Data,Var,Abs,NWrp,Lin,NPrf,Null,Bit)

0x75, 0x01, // REPORT_SIZE (1)

0x95, 0x07, // REPORT_COUNT (7)

0x81, 0x01, // INPUT (Cnst,Var,Abs)

0x05, 0x01, // USAGE_PAGE (Generic Desktop)

0x09, 0x30, // USAGE (X)

0x16, 0x00, 0x00, // LOGICAL_MINIMUM (0)

0x26, 0xff, 0x0f, // LOGICAL_MAXIMUM (4095)

0x36, 0x00, 0x00, // PHYSICAL_MINIMUM (0)

0x46, 0xff, 0x7f, // PHYSICAL_MAXIMUM (32767)

0x66, 0x00, 0x00, // UNITS (NONE)

0x75, 0x10, // REPORT_SIZE (16)

0x95, 0x01, // REPORT_COUNT (1)

0x81, 0x62, // INPUT (Data,Var,Abs,NWrp,Lin,NPrf,Null,Bit)

0x09, 0x31, // USAGE (Y)

0x16, 0x00, 0x00, // LOGICAL_MINIMUM (0)

0x26, 0xff, 0x0f, // LOGICAL_MAXIMUM (4095)

0x36, 0x00, 0x00, // PHYSICAL_MINIMUM (0)

0x46, 0xff, 0x7f, // PHYSICAL_MAXIMUM (32767)

0x66, 0x00, 0x00, // UNITS (NONE)

0x75, 0x10, // REPORT_SIZE (16)

0x95, 0x01, // REPORT_COUNT (1)

0x81, 0x62, // INPUT (Data,Var,Abs,NWrp,Lin,NPrf,Null,Bit)

0xc0, // END_COLLECTION

0xc0, // END_COLLECTION

// Legacy collection bytes 147 bytes

0x05, 0x8c, // USAGE_PAGE (Custom)

0x09, 0x01, // USAGE (Custom)

0xa1, 0x01, // COLLECTION (Application)

// ANGLE INFO IN

0x85, USB_ANGLEPKT_NUM, // REPORT_ID (0x09)

0x09, USB_ANGLEPKT_NUM, // USAGE (ADC IN)

0x15, 0x00, // LOGICAL_MINIMUM (0)

0x25, 0xff, // LOGICAL_MAXIMUM (255)

0x95, 0x3f, // REPORT_COUNT (63)

0x75, 0x08, // REPORT_SIZE (8)

0x81, 0x82, // INPUT (Data,Var,Abs,Vol)

// POSITION INFO IN

0x85, USB_POSITIONPKT_NUM, // REPORT_ID (0x0f)

0x09, USB_POSITIONPKT_NUM, // USAGE (ADC IN)

0x15, 0x00, // LOGICAL_MINIMUM (0)

0x25, 0xff, // LOGICAL_MAXIMUM (255)

0x95, 0x3f, // REPORT_COUNT (63)

0x75, 0x08, // REPORT_SIZE (8)

0x81, 0x82, // INPUT (Data,Var,Abs,Vol)

//Generic Data IN

0x85, USB_GENERICDATA_PKT, // REPORT_ID (0x0b)

0x09, USB_GENERICDATA_PKT, // USAGE (ADC IN)

0x15, 0x00, // LOGICAL_MINIMUM (0)

0x25, 0xff, // LOGICAL_MAXIMUM (255)

0x95, 0x3f, // REPORT_COUNT (63)

0x75, 0x08, // REPORT_SIZE (8)

0x81, 0x82, // INPUT (Data,Var,Abs,Vol)

0x85, USB_GENERICWORD_PKT, // REPORT_ID (0x0c)

0x09, USB_GENERICWORD_PKT, // USAGE (ADC IN)

0x15, 0x00, // LOGICAL_MINIMUM (0)

0x25, 0xff, // LOGICAL_MAXIMUM (255)

0x95, 0x3f, // REPORT_COUNT (63)

0x75, 0x08, // REPORT_SIZE (8)

0x81, 0x82, // INPUT (Data,Var,Abs,Vol)

0x85, USB_GENERICLONGWORD_PKT, // REPORT_ID (0x0d)

0x09, USB_GENERICLONGWORD_PKT, // USAGE (ADC IN)

0x15, 0x00, // LOGICAL_MINIMUM (0)

0x25, 0xff, // LOGICAL_MAXIMUM (255)

0x95, 0x3f, // REPORT_COUNT (63)

0x75, 0x08, // REPORT_SIZE (8)

0x81, 0x82, // INPUT (Data,Var,Abs,Vol)

0x85, USB_FIRMWARE_PKT, // REPORT_ID (0x02)

0x09, USB_FIRMWARE_PKT, // USAGE (Get Firmware Rev)

0x15, 0x00, // LOGICAL_MINIMUM (0)

0x25, 0xff, // LOGICAL_MAXIMUM (255)

0x75, 0x08, // REPORT_SIZE (8)

0x95, 0x03, // REPORT_COUNT (3)

0xb1, 0x82, // FEATURE (Data,Var,Abs,Vol)

0x85, USB_CONFIG_PKT, // REPORT_ID (0x03)

0x09, USB_CONFIG_PKT, // USAGE (Get Config)

0x15, 0x00, // LOGICAL_MINIMUM (0)

0x25, 0xff, // LOGICAL_MAXIMUM (255)

0x75, 0x08, // REPORT_SIZE (8)

0x95, 0x0C, // REPORT_COUNT (12)

0xb1, 0x82, // FEATURE (Data,Var,Abs,Vol)

0x85, USB_CONFIG_PKT2, // REPORT_ID (0x04)

0x09, USB_CONFIG_PKT2, // USAGE (Get Config2)

0x15, 0x00, // LOGICAL_MINIMUM (0)

0x25, 0xff, // LOGICAL_MAXIMUM (255)

0x75, 0x08, // REPORT_SIZE (8)

0x95, 0x0c, // REPORT_COUNT (12)

0xb1, 0x82, // FEATURE (Data,Var,Abs,Vol)

0x85, USB_CONFIG_PWR, // REPORT_ID (0x05)

0x09, USB_CONFIG_PWR, // USAGE (Get Power Mode)

0x15, 0x00, // LOGICAL_MINIMUM (0)

0x25, 0xff, // LOGICAL_MAXIMUM (255)

0x75, 0x08, // REPORT_SIZE (8)

0x95, 0x02, // REPORT_COUNT (3)

0xb1, 0x82, // FEATURE (Data,Var,Abs,Vol)

0x85, USB_SETUP_PKT, // REPORT_ID (0x55)

0x09, USB_SETUP_PKT, // USAGE (Get Setup Packet)

0x15, 0x00, // LOGICAL_MINIMUM (0)

0x25, 0xff, // LOGICAL_MAXIMUM (255)

0x75, 0x08, // REPORT_SIZE (8)

0x95, 0x01, // REPORT_COUNT (1)

0xb1, 0x82, // FEATURE (Data,Var,Abs,Vol)

0x85, USB_READ_CALIB, // REPORT_ID (0x77)

0x09, USB_READ_CALIB, // USAGE (Get Setup Packet)

0x15, 0x00, // LOGICAL_MINIMUM (0)

0x25, 0xff, // LOGICAL_MAXIMUM (255)

0x75, 0x08, // REPORT_SIZE (8)

0x95, 0x01, // REPORT_COUNT (1)

0xb1, 0x82, // FEATURE (Data,Var,Abs,Vol)

0x85, USB_WRITE_CALIB, // REPORT_ID (0x66)

0x09, USB_WRITE_CALIB, // USAGE (Get Setup Packet)

0x15, 0x00, // LOGICAL_MINIMUM (0)

0x25, 0xff, // LOGICAL_MAXIMUM (255)

0x75, 0x08, // REPORT_SIZE (8)

0x95, 0x01, // REPORT_COUNT (1)

0xb1, 0x82, // FEATURE (Data,Var,Abs,Vol)

0x85, USB_START_CALIB, // REPORT_ID (0x88)

0x09, USB_START_CALIB, // USAGE (Restart Calibration)

0x15, 0x00, // LOGICAL_MINIMUM (0)

0x25, 0xff, // LOGICAL_MAXIMUM (255)

0x75, 0x08, // REPORT_SIZE (8)

0x95, 0x01, // REPORT_COUNT (1)

0xb1, 0x82, // FEATURE (Data,Var,Abs,Vol)

0x85, USB_SYS_DFU_RESET, // REPORT_ID (2)

0x09, USB_SYS_DFU_RESET, // USAGE (Get Firmware Rev)

0x15, 0x00, // LOGICAL_MINIMUM (0)

0x25, 0xff, // LOGICAL_MAXIMUM (255)

0x75, 0x08, // REPORT_SIZE (8)

0x95, 0x01, // REPORT_COUNT (3)

0xb1, 0x82, // FEATURE (Data,Var,Abs,Vol)

0xc0 // END_COLLECTION

}; // CustomHID_ReportDescriptor

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