

Intel® Compute Card Dock DK132EPJ

Technical Product Specification

August 2017
Order Number: J46737-001

Intel® Compute Card Dock DK132EPJ may contain design defects or errors known as errata that may cause the product to deviate from published specifications. Current characterized errata, if any, are documented in Intel® Compute Card Dock DK132EPJ Specification Update.

Revision History

Revision	Revision History	Date
001	First release	August 2017

Disclaimer

This product specification applies to only the standard Intel® Compute Card Dock DK132EPJ.

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Specification Changes or Clarifications

The table below indicates the Specification Changes or Specification Clarifications that apply to the Intel® Compute Card Dock DK132EPJ.

Specification Changes or Clarifications

Date	Type of Change	Description of Changes or Clarifications
		•

Errata

Current characterized errata, if any, are documented in a separate Specification Update. See <http://www.intel.com/ComputeCardSupport> for the latest documentation.

Preface

This Technical Product Specification (TPS) specifies the layout, components, connectors, power and environmental features for the Intel® Compute Card Dock DK132EPJ.



NOTE

In this document, the use of “dock” will refer to Intel® Compute Card Dock DK132EPJ.

Intended Audience

The TPS is intended to provide detailed, technical information about Intel® Compute Card Dock DK132EPJ and its components to the vendors, system integrators, and other engineers and technicians who need this level of information. It is specifically not intended for general audiences.

What This Document Contains

Chapter	Description
1	A description of the hardware used on Intel® Compute Card Dock DK132EPJ
2	A technical description of the Intel® Compute Card Dock DK132EPJ

Typographical Conventions

This section contains information about the conventions used in this specification. Not all of these symbols and abbreviations appear in all specifications of this type.

Notes, Cautions, and Warnings



NOTE

Notes call attention to important information.



CAUTION

Cautions are included to help you avoid damaging hardware or losing data.

Other Common Notation

#	Used after a signal name to identify an active-low signal (such as USBP0#)
GB	Gigabyte (1,073,741,824 bytes)
GB/s	Gigabytes per second
Gb/s	Gigabits per second
KB	Kilobyte (1024 bytes)
Kb	Kilobit (1024 bits)
kb/s	1000 bits per second
MB	Megabyte (1,048,576 bytes)
MB/s	Megabytes per second
Mb	Megabit (1,048,576 bits)
Mb/s	Megabits per second
TDP	Thermal Design Power
Xxh	An address or data value ending with a lowercase h indicates a hexadecimal value.
x.x V	Volts. Voltages are DC unless otherwise specified.
*	This symbol is used to indicate third-party brands and names that are the property of their respective owners.

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1 Product Description

1.1 Overview

The DK132EPJ Compute Card Dock is intended as a device for use with the Intel® Compute Card. The dock will not operate unless a certified Intel® Compute Card is inserted. All features of the dock require an Intel® Compute Card to function.

1.2 Online Support

To find information about...

Intel® Compute Card Dock DK132EPJ

Intel® Compute Card Dock DK132EPJ Support

Available configurations for Intel® Compute Card Dock DK132EPJ

Visit this World Wide Web site:

<http://www.intel.com/ComputeCard>

<http://www.intel.com/ComputeCardSupport>

<http://ark.intel.com>

1.3 Feature Summary

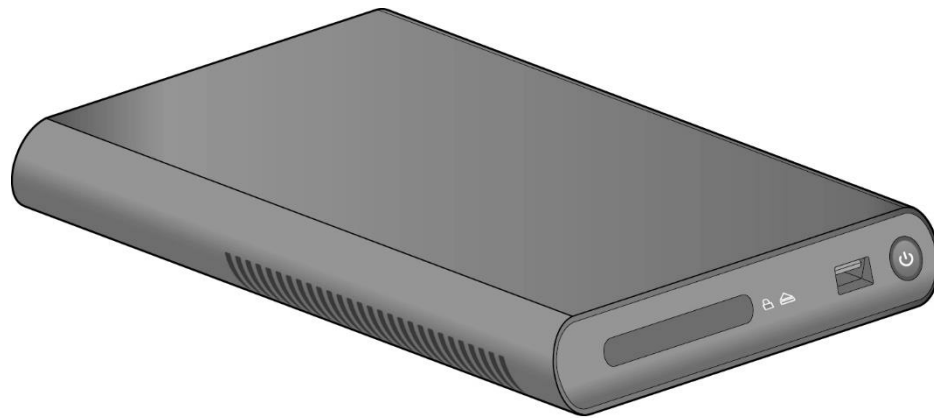
Table 1 summarizes the major features of the Intel® Compute Card Dock DK132EPJ.

Table 1. Feature Summary

Form Factor	5.97 inches by 5.7 inches by 0.81 inches (151.76 millimeters by 145 millimeters by 20.5 millimeters)
Compute Cards Supported	Certified Intel® Compute Cards
Graphics	<ul style="list-style-type: none">Intel® HD Graphics supported via the Intel® Compute Card:<ul style="list-style-type: none">One full size HDMI* connector on the back panelOne mini DisplayPort* connector on the back panel
Peripheral Interfaces	<ul style="list-style-type: none">USB 3.0 ports supported via the Intel® Compute Card:<ul style="list-style-type: none">One port is implemented with an external front panel connectorTwo ports are implemented with external back panel connectors
LAN	<ul style="list-style-type: none">LAN connector supported via the Intel® Compute Card:<ul style="list-style-type: none">One Gigabit (10/100/1000 Mb/s) using the Intel® Ethernet Controller I211-AT

1.3.1 Compute Card Dock Exterior

Figure 1 shows the exterior of the Intel® Compute Card Dock.

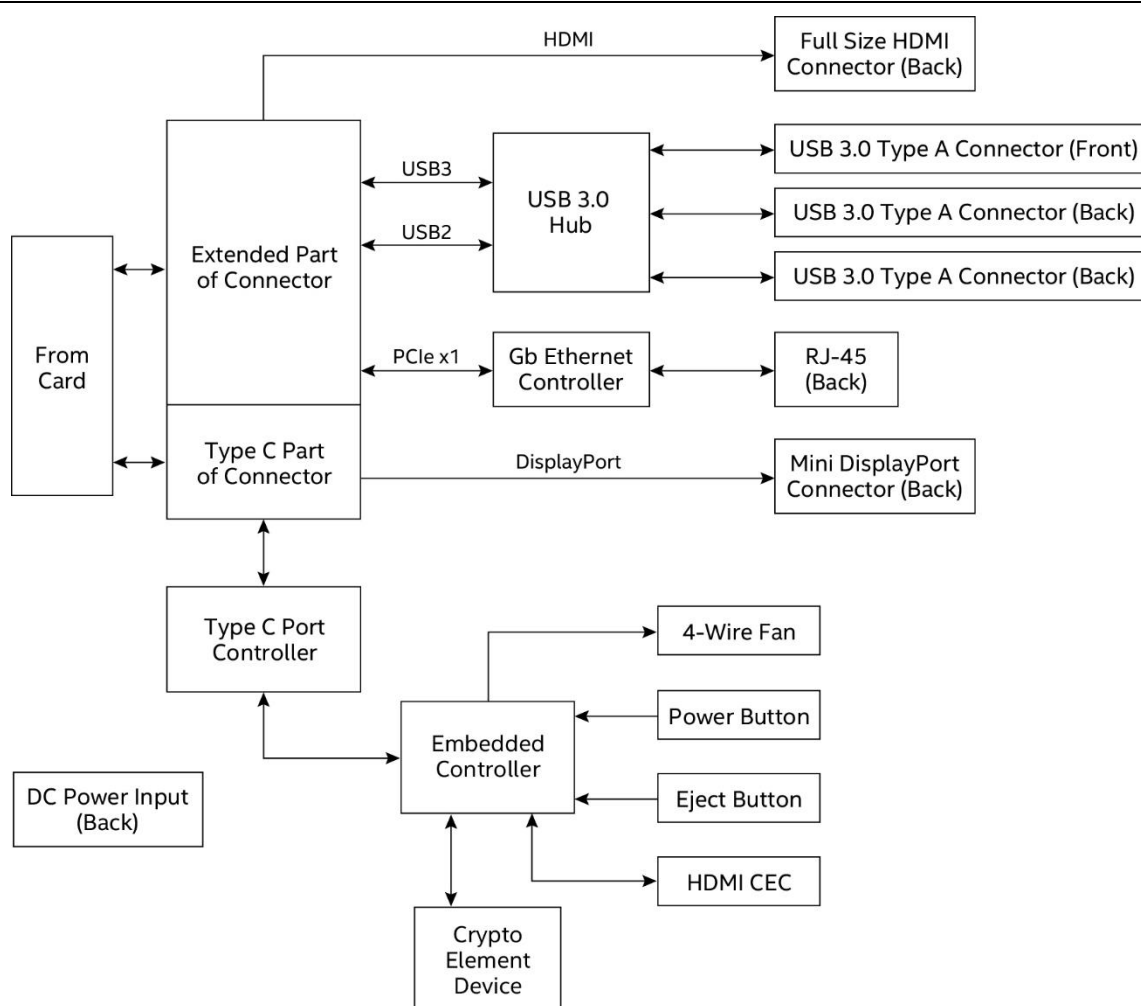


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Figure 1. Compute Card Dock DK132EPJ

1.3.2 Block Diagram

Figure 2 is a block diagram of the major functional areas of Intel® Compute Card Dock DK132EPJ.



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Figure 2. Block Diagram

1.4 Graphics and Audio

1.4.1 High Definition Multimedia Interface* (HDMI*)

The HDMI connector supports standard, enhanced, or high definition video, plus multi-channel digital audio on a single cable. Supported HDMI specifications, resolutions and refresh rates are dependent on the Compute Card that is plugged into the dock.

For information about

HDMI technology

Refer to

<http://www.hdmi.org>

1.4.2 DisplayPort* Interface (DP*)

The DisplayPort connector supports standard, enhanced and high definition video, plus multi-channel digital audio on a single cable. Supported DisplayPort specifications, resolutions and refresh rates are dependent on the Compute Card that is plugged into the dock. Dual Mode DisplayPort is not supported.

For information about

DisplayPort technology

Refer to

<http://www.displayport.org>

1.4.3 Multiple DisplayPort and HDMI Configurations

Multiple DisplayPort and HDMI configurations are dependent on the Compute Card plugged into the dock.

For information about

Multiple display maximum
resolutions

Refer to

<https://www-ssl.intel.com/content/www/us/en/processors/core/CoreTechnicalResources.html>

1.4.4 High-bandwidth Digital Content Protection (HDCP)

HDCP is the technology for protecting high definition content against unauthorized copy or interception between a source (computer, digital set top boxes, etc.) and the sink (panels, monitor, and TVs). The HDCP versions supported by the DisplayPort graphics connector and HDMI graphics connector are dependent on the Compute Card that is plugged into the dock.

1.4.5 Integrated Audio Provided by the HDMI and Mini DisplayPort Interfaces

The HDMI and Mini DisplayPort connectors support digital audio. The specific audio technologies supported are dependent on the Compute Card that is plugged into the dock.

1.5 USB

The USB port arrangement for the Intel® Compute Card Dock DK132EPJ is as follows:

- USB 3.0 ports (maximum current is 900 mA for each port):
 - One port is implemented with an external front panel connector
 - Two ports are implemented with external back panel connectors

All the USB 3.0 ports are super-speed, high-speed, full-speed, and low-speed capable. Which ports are active and the speeds supported will depend on the Compute Card that is plugged into the dock.



NOTE

Computer systems that have an unshielded cable attached to a USB port may not meet FCC Class B requirements, even if no device is attached to the cable. Use a shielded cable that meets the requirements for full-speed devices.

For information about

Refer to

The location of the USB connectors

Figure 5, page 19

1.6 LAN

The Intel® Compute Card Dock DK132EPJ LAN consists of the following:

- Intel® Ethernet Controller I211-AT (10/100/1000 Mb/s)
- RJ-45 LAN connector with integrated status LEDs

Additional features of the LAN subsystem include:

- CSMA/CD protocol engine
- LAN connect interface between the Processor and the LAN controller
- Power management capabilities
 - ACPI technology support
 - LAN wake capabilities
- LAN subsystem software



NOTE

The onboard LAN functionality will depend on the Intel® Compute Card that is plugged into the dock.

1.6.1 Intel® Ethernet Controller I211-AT

The Intel® Ethernet Controller I211-AT supports the following features:

- Compliant with the 1 Gb/s Ethernet 802.3, 802.3u, 802.3z, 802.3ab specifications
- Multi-speed operation: 10/100/1000 Mb/s
- Full-duplex operation at 10/100/1000 Mb/s; Half-duplex operation at 10/100 Mb/s
- Flow control support compliant with the 802.3X specification as well as the specific operation of asymmetrical flow control defined by 802.3z
- VLAN support compliant with the 802.3q specification
- Supports Jumbo Frames (up to 9 kB)
 - IEEE 1588 supports (Precision Time Protocol)
- MAC address filters: perfect match unicast filters, multicast hash filtering, broadcast filter, and promiscuous mode

1.6.2 R-45 LAN Connector with Integrated LEDs

Two LEDs are built into the RJ-45 LAN connector (shown in Figure 3).

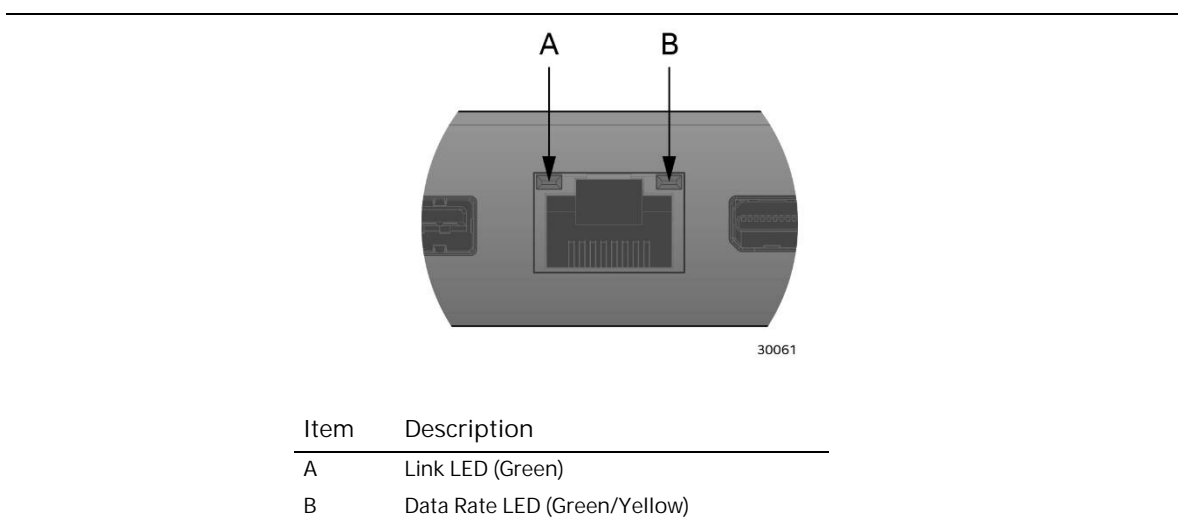


Figure 3. LAN Connector LED Locations

Table 2 describes the LED states when the board is powered up and the LAN subsystem is operating.

Table 2. LAN Connector LED States

LED	LED Color	LED State	Condition
Link	Green	Off	LAN link is not established.
		On	LAN link is established.
		Blinking	LAN activity is occurring.
Data Rate	Green/Yellow	Off	10 Mb/s data rate is selected.
		Green	100 Mb/s data rate is selected.
		Yellow	1000 Mb/s data rate is selected.

1.6.3 LAN Software

Windows* 10 64-bit LAN software and drivers are available from Intel's World Wide Web site.

For information about

Refer to

Obtaining LAN software and drivers

<http://downloadcenter.intel.com>

1.7 Authentication

The Intel® Compute Card and the Intel® Compute Card Dock solution use bidirectional authentication. The Compute Card will attempt to authenticate the Compute Card Dock and the Compute Card Dock will attempt to authenticate the Compute Card. The authentication uses digital keys, which are provisioned by default during manufacturing for every Compute Card and Compute Card Dock. With this provisioning, the Intel® Compute Card Dock will only work with correctly provisioned Intel® Compute Cards.

2 Technical Reference

2.1 Connectors, Buttons and Indicators

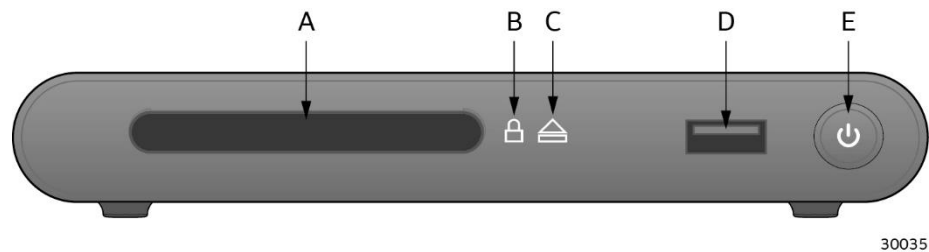


CAUTION

Only the following connectors have overcurrent protection: back panel and front panel USB.

2.1.1 Front Panel

Figure 4 shows the location of the features on the front of the Intel® Compute Card Dock DK132EPJ chassis.



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Figure 4. Front Panel Layout

Table 3. Front Panel Shown in Figure 4

Item from Figure 4	Description
A	Compute Card Slot (see section 2.1.1.1)
B	Lock Indicator (see section 2.1.1.2)
C	Eject Button / Eject Indicator (see section 2.1.1.3)
D	USB 3.0 port (see section 1.5)
E	Power Button / Power Indicator (see section 2.1.1.4)

2.1.1.1 Compute Card Slot

This is the opening in the dock where the Intel® Compute Card is plugged in.



NOTE

The Intel® Compute Card will need to complete the authentication process when first plugged into the dock. During authentication the power indicator will blink. If authentication passes, the power indicator will turn solid and the boot process will start. If authentication fails, the lock indicator and the eject indicator will blink. See section 2.1.1.5 for the Indicator states. As long as power is supplied to the dock, the authentication process is not necessary. If power is removed from the dock, authentication will be required.

2.1.1.2 Lock Indicator

This will indicate if the Intel® Compute Card is locked into the dock or is unlocked and can be ejected from the dock by pressing the eject button. See section 2.1.1.5 for the Lock Indicator states.

2.1.1.3 Eject Button / Eject Indicator

Press this button to eject the Intel® Compute Card from the dock if the lock indicator is not on. If the lock indicator is on, then the Compute Card cannot be ejected using the eject button. See section 2.1.1.5 for the Eject Button Indicator states.



NOTE

The Intel® Compute Card will need to enter S4 or S5 before being ejected from the dock.

There may be a delay in the Intel® Compute Card being ejected from the dock if additional cooling is needed to reduce the skin temperature of the Intel® Compute Card.

A software utility for the DK132EPJ is available for Windows* 10 to allow the Compute Card to be locked or unlocked and ejected. This utility can be downloaded from www.intel.com/downloadcenter

2.1.1.4 Power Button / Power Indicator

The power button on the dock will follow the BIOS settings in the Intel® Compute Card that is plugged into it. Refer to the appropriate Compute Card Technical Product Specification for more information on BIOS setup. See section 2.1.1.5 for the Power Button indicator states.

2.1.1.5 Indicator Table

The Indicators located on the front panel of the dock consist of the following.

- Lock Icon with White LED Indicator
- Eject Card Button with White LED Indicator
- Power Button with White LED Indicator

The below table lists all of the indicator states used by the dock.

Table 4. Indicator States Table

Dock State	Lock Indicator	Eject Button Indicator	Power Button Indicator
No Power – No Card	OFF	OFF	OFF
No Power – Card	OFF	OFF	OFF
Power – No Card	OFF	OFF	OFF
Power - Card – Not Locked	OFF	ON	ON
Power - Card – Locked	ON	OFF	ON
Power – Invalid Card	BLINK @ 1 Hz	BLINK @ 1 Hz	OFF
Power – Card Insert – Authentication	OFF	ON	BLINK @ 1 Hz

Dock State	Lock Indicator	Eject Button Indicator	Power Button Indicator
No Power – Invalid Card	OFF	OFF	OFF
Power – Card Eject – Not Locked	OFF	BLINK @ 2 Hz	ON
Power – Card Eject - Locked	BLINK @ 0.5 Hz for 3 secs.	OFF	ON
Power - Card – S3 – Locked	ON	OFF	BLINK @ 0.25 Hz
Power - Card – S3 – Not Locked	OFF	ON	BLINK @ 0.25 Hz
Power - Card Eject – S3 – Locked	BLINK @ 0.5 Hz for 3 secs.	OFF	BLINK @ 0.25 Hz
Power - Card Eject – S3 – Not Locked ¹	OFF	BLINK @ 2 Hz	BLINK @ 0.25 Hz
Power - Card – S4 – Locked	ON	OFF	OFF
Power - Card – S4 – Not Locked	OFF	ON	OFF
Power - Card Eject – S4 – Locked	BLINK @ 0.5 Hz for 3 secs.	OFF	OFF
Power - Card Eject – S4 – Not Locked	OFF	BLINK @ 2 Hz	OFF
Power - Card – S5 – Locked	ON	OFF	OFF
Power - Card – S5 – Not Locked	OFF	ON	OFF
Power - Card Eject – S5 – Locked	BLINK @ 0.5 Hz for 3 secs.	OFF	OFF
Power - Card Eject – S5 – Not Locked	OFF	BLINK @ 2 Hz	OFF
No Power - Card – S4 – Locked	OFF	OFF	OFF
No Power - Card – S4 – Not Locked	OFF	OFF	OFF
No Power - Card Eject – S4 – Locked	OFF	OFF	OFF
No Power - Card Eject – S4 – Not Locked	OFF	OFF	OFF
No Power - Card Eject – S5 – Locked	OFF	OFF	OFF
No Power - Card Eject – S5 – Not Locked	OFF	OFF	OFF

1. When the eject button is pressed the system will transition from S3 to S0, enter S5 (shutdown) and then the card will be ejected. The power LED will change from blinking to solid and then turn off after shutdown.

Table 5. LED Blink

Frequency	Time On	Time Off
0.25 Hz	2 seconds	2 seconds
0.5 Hz	1 second	1 second
1.0 Hz	0.5 seconds	0.5 seconds
2.0 Hz	0.25 seconds	0.25 seconds

2.1.2 Back Panel

Figure 5 shows the location of the components on the back of the Intel® Compute Card Dock DK132EPJ chassis.

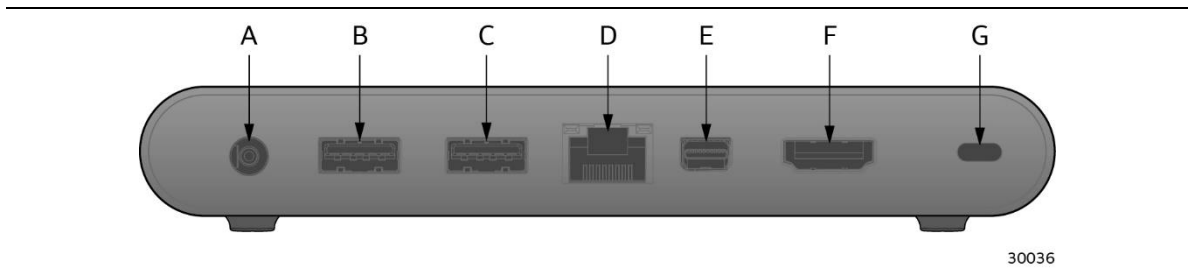


Figure 5. Back Panel Layout

Table 6. Back Panel Shown in Figure 5

Item from Figure 5	Description
A	19V DC power input jack (see section 0)
B	USB 3.0 Port (see section 1.5)
C	USB 3.0 Port (see section 1.5)
D	Ethernet port (see section 1.6)
E	Mini DisplayPort connector (see section 1.4.2)
F	HDMI connector (see section 1.4.1)
G	Security Lock



NOTE

The Mini DisplayPort connector on the back panel does not support Dual Mode DisplayPort (DP++). Mini DisplayPort active adapters will be required to convert to HDMI, DVI or VGA. Passive adapters are not supported.

2.2 Dimensions

Figure 6, Figure 7 and Figure 8 illustrate the dimensions of the Intel® Compute Card Dock DK132EPJ. Dimensions are given in millimeters.

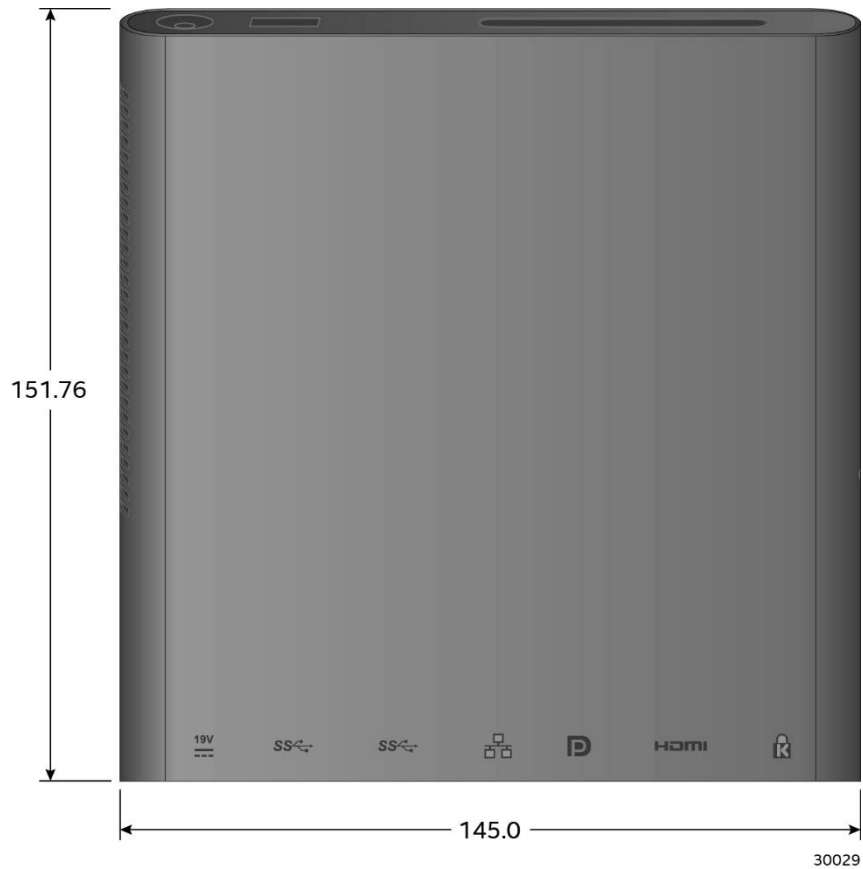


Figure 6. Dock Dimensions – Top View

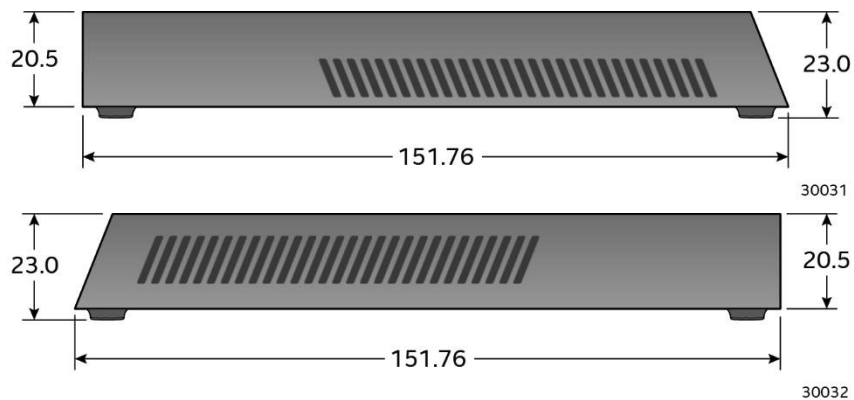


Figure 7. Dock Dimensions – Side Views

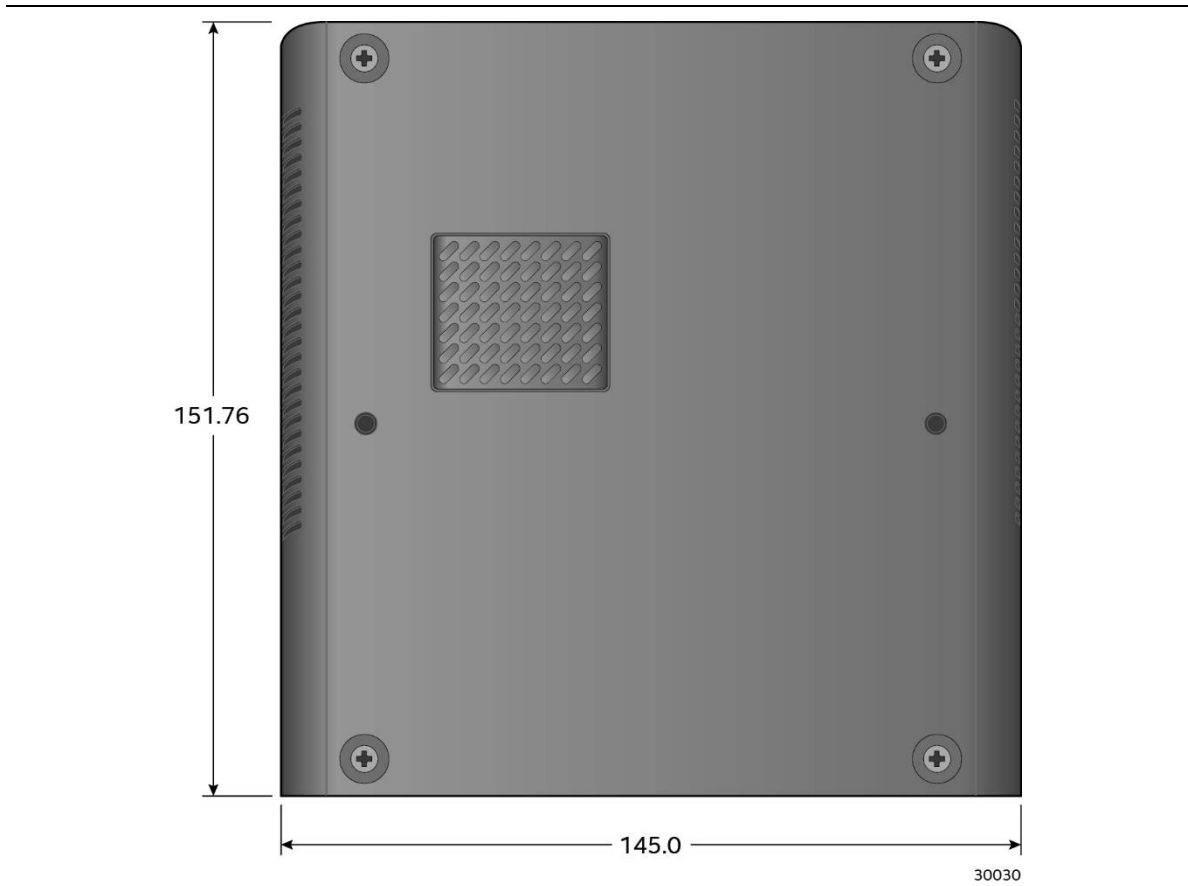


Figure 8. Dock Dimensions – Bottom View

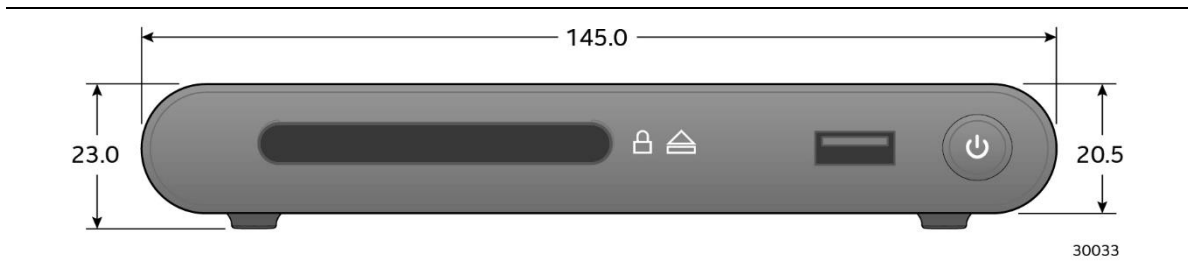


Figure 9. Dock Dimensions – Front View

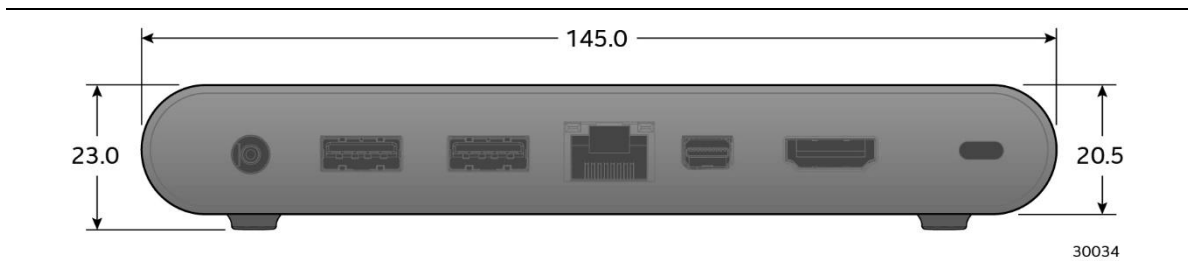
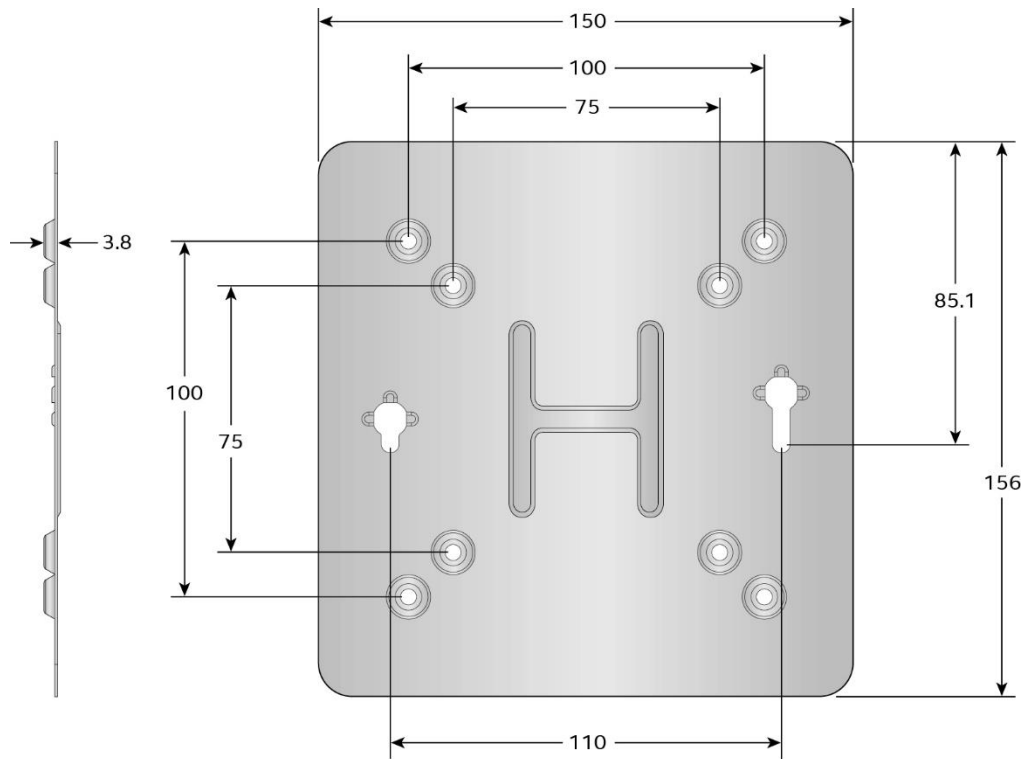


Figure 10. Dock Dimensions – Back View

2.3 VESA Bracket

Figure 11 illustrates the dimension of the VESA mount bracket included with the Intel® Compute Card Dock DK132EPJ. Supported VESA patterns are 75 x 75 and 100 x 100.



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Figure 11. VESA Bracket Dimensions

Figure 12 illustrates what the VESA mount bracket attached on the dock looks like.



Figure 12. VESA Bracket Attached

Figure 13 illustrates the VESA mount installation procedure.

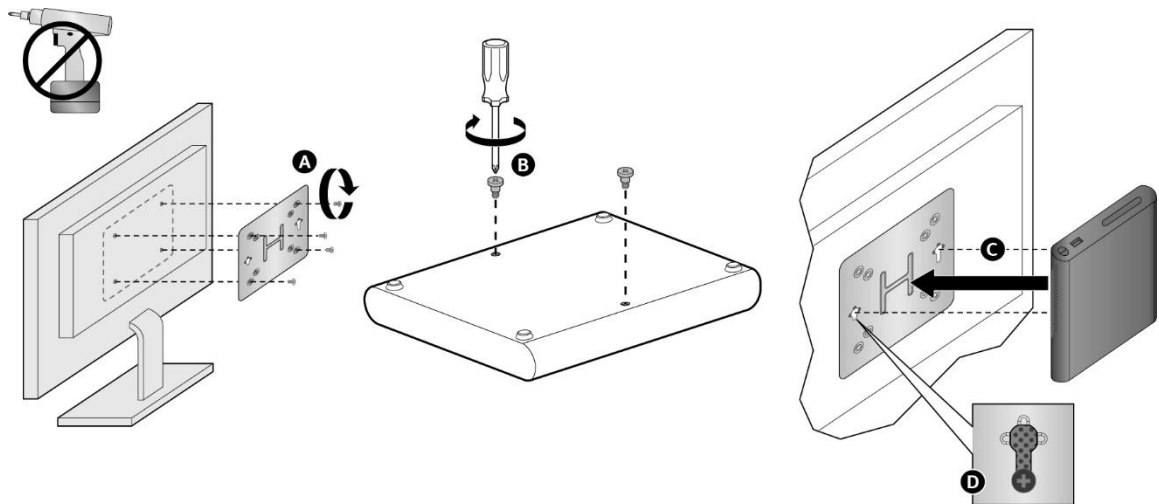


Figure 13. VESA Bracket Installation



NOTE

It is recommend to mount the DK132EPJ dock with the Compute Card slot facing up and the back panel facing down. Other mounting orientations are not recommended.

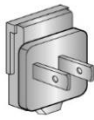
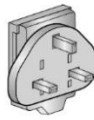
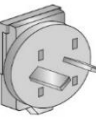
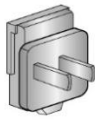
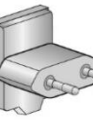
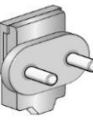
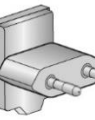
Table 7. Intel® Compute Card Dock Weight Information

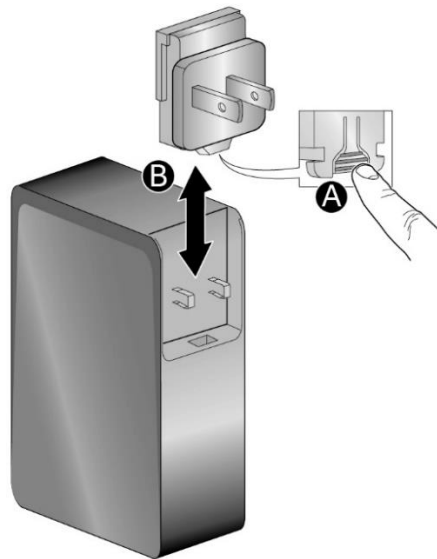
Item	Weight (grams)
Compute Card Dock only	454g
Compute Card Dock with power adapter, plugs and VESA bracket	820g
Compute Card Dock in 5 pack box	5,715.3g

2.4 Power Supply

The Intel® Compute Card Dock DK132EPJ uses an AC to DC power adapter with a six foot attached cable with a barrel connector. Figure 14 shows the power adapter, the plugs that are included with the dock and how to attach a plug to the adapter.

- 100-240V AC Input 50-60 Hz 1.5 A
- 19V 3.43 A DC output
- 2-pin AC Power Cord Plug

Plug							
Code	US	UK	AU	CN	EU	IN	KR
Country	United States/ Japan	United Kingdom	Australia	China	European Union	India	South Korea



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Figure 14. Power Adapter and Plugs Included with the Dock

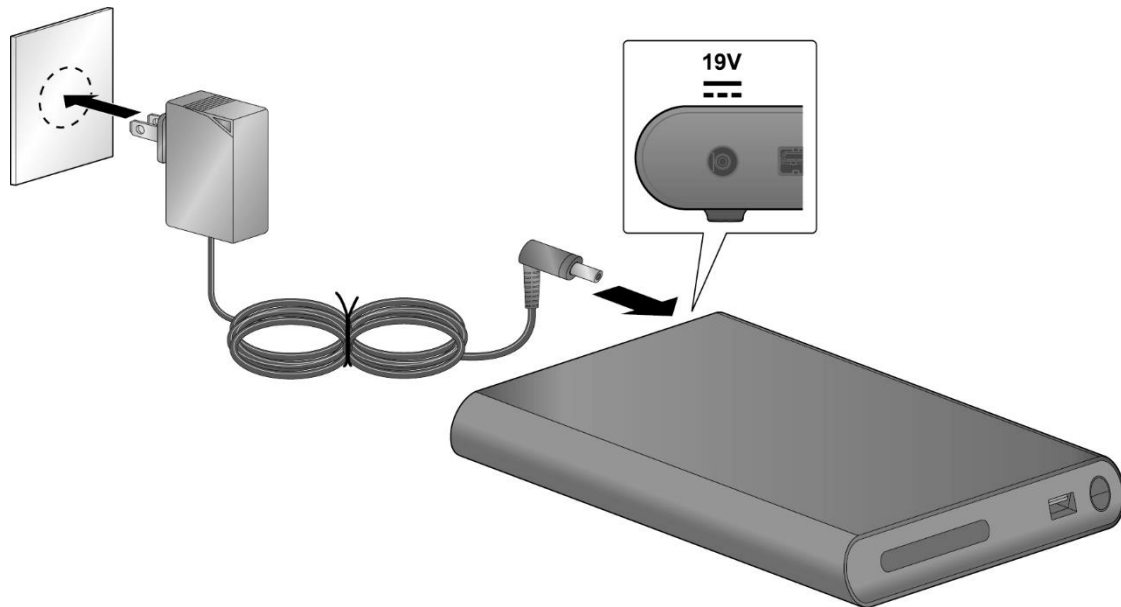


NOTE

Not all power adapter plugs may be included in the package.

2.4.1 Power Supply Connector

The Intel® Compute Card Dock DK132EPJ is powered through a 19V DC connector on the back panel (see Figure 14). The back panel DC connector is compatible with a 5.5 mm/OD (outer diameter) and 2.5 mm/ID (inner diameter) plug, where the inner contact is +19 ($\pm 10\%$) V DC and the shell is GND.



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Figure 15. Using the Power Adapter with the Dock

2.4.2 Power Requirements

The Intel® Compute Card Dock DK132EPJ requires the following which is supplied by the included FSP Group Inc. model number FSP065-10AABA power adapter.

- Voltage: 19 V $\pm 5\%$
- Current (RMS max): This rating is dependent on the Intel® Compute Card plugged into the DK132EPJ Dock

2.5 Reliability

The Mean Time Between Failures (MTBF) prediction is calculated using component and subassembly random failure rates. The calculation is based on the Telcordia SR-332 Issue 2, Method I, Case 3, 55 °C ambient. The MTBF prediction is used to estimate repair rates and spare parts requirements. The MTBF for Intel® Compute Card Dock DK132EPJ is 99,105 hours not including the fan. The fan life expectancy is 50,000 hours.

2.6 Environmental

Table 8 lists the environmental specifications for the Intel® Compute Card Dock DK132EPJ.

Table 8. Environmental Specifications

Parameter	Specification		
Temperature			
Non-Operating	-40 °C to +60 °C		
Operating	0 °C to +35 °C The operating temperature of the dock may be determined by measuring the air temperature from the junction of the heatsink fins and fan in a closed chassis, while the system is in operation.		
Shock			
Unpackaged	50 g trapezoidal waveform Velocity change of 170 inches/s ²		
Packaged	Half sine 2 millisecond		
	Product Weight (pounds)	Free Fall (inches)	Velocity Change (inches/s ²)
	<20	36	167
	21-40	30	152
	41-80	24	136
	81-100	18	118
Vibration			
Unpackaged	5 Hz to 20 Hz: 0.01 g ² Hz sloping up to 0.02 g ² Hz 20 Hz to 500 Hz: 0.02 g ² Hz (flat)		
Packaged	5 Hz to 40 Hz: 0.015 g ² Hz (flat) 40 Hz to 500 Hz: 0.015 g ² Hz sloping down to 0.00015 g ² Hz		

Note: Before attempting to operate this dock, the overall temperature of the dock must be above the minimum operating temperature specified. It is recommended that the dock temperature be at least room temperature before attempting to power on the dock. The operating and non-operating environment must avoid condensing humidity.