

Intel® NUC Pro Chassis Element CMCM2FB and CMCM2FBAV Product Specification

Revision 1.2

Regulatory Model: CMCM2FB

March 2022

Intel® NUC Pro Chassis Element CMCM2FB or CMCM2FBAV 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 this product specification.

Revision History

Revision	Revision History	Date
1.0	First release	August 2020
1.1	Add Resolution and Framerate Details for Capture Card	December 2020
1.2	Added Reliability Section	March 2022

Disclaimer

This product specification applies to only the standard Intel® NUC Pro Chassis Element with product codes BKCMCM2FB and BKCMCM2FBAV.

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Preface

This Product Specification specifies the layout, components, connectors, power and environmental features for the Intel® NUC Pro Chassis Element



NOTE

In this document, the use of “Intel® NUC Pro Chassis Element” will refer to the CMCM2FB and CMCM2FBAV versions of the Intel® NUC Pro Chassis Element.

Intended Audience

The document is intended to provide technical information about Intel® NUC Pro Chassis Element 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 Intel® NUC Pro Chassis Element features
2	A technical description of the Intel® NUC Pro Chassis Element

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.

Intel® NUC Pro Chassis Element Identification Information

NUC Pro Chassis Element Identification Information

Original SA Revision	Product Code	Capture Card	AC Cord	Notes
K93662-202	BKCMCM2FB	No	None	1
K93662-202	BKCMCM2FB1	No	US	1
K93662-202	BKCMCM2FB2	No	EU	1
K93662-202	BKCMCM2FB3	No	UK	1
K93662-202	BKCMCM2FB4	No	AU	1
K93663-202	BKCMCM2FBAV	Yes	None	1
K93663-202	BKCMCM2FBAV1	Yes	US	1
K93663-202	BKCMCM2FBAV2	Yes	EU	1
K93663-202	BKCMCM2FBAV3	Yes	UK	1
K93663-202	BKCMCM2FBAV4	Yes	AU	1

Notes:

1. The SA number is found on the bottom of the chassis

Specification Changes or Clarifications

The table below indicates the Specification Changes or Specification Clarifications that apply to the Intel® NUC Pro Chassis Element CMCM2FB and CMCM2FBAV.

Specification Changes or Clarifications

Date	Type of Change	Description of Changes or Clarifications

Errata

Current characterized errata, if any, will be documented in Section 3 of this Product Specification.

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1 Product Description

1.1 Overview

The Intel® NUC Pro Chassis Element is a chassis solution for the Intel® NUC Compute Element. The chassis provides an active enclosure for the NUC Compute Element.

The Intel® NUC Pro Chassis Element require a compatible Intel® NUC Compute Element in order to operate.

For information on compatible devices for use with the Intel® NUC Pro Chassis Element see <http://www.intel.com/NUCElements>.

1.2 Version Summary

There are two different chassis versions of this model of Intel® NUC Pro Chassis Element available which are summarized in Table 1. Unless otherwise noted in this document, not all features are available on all versions of the Intel® NUC Pro Chassis Element.

Table 1. Chassis Version Summary

Version	HDMI Ports	M.2 Connectors	LAN	USB 2 Ports	USB 3 Ports	HDMI In	HDMI Pass-Thru	Audio In (stereo)	Audio Out (stereo)
CMCM2FB	2	2	2	3	3	0	0	0	0
CMCM2FBAV	2	2	2	3	3	1	1	1	1



NOTE

Intel® NUC Pro Chassis Elements listed in Table 1 have been certified for use as a component in Information Technology Equipment in certain countries. The system integrator is responsible for testing and acquiring any additional country-specific regulatory approvals, including all system-wide certifications.

To find information about...

Intel® NUC Compute Element

Intel® NUC Pro Chassis Element Support

Intel® NUC Element Warranty Information

Available configurations for Intel® NUC Pro Chassis Element

Intel Processors

Intel Graphics

Intel Wireless

Intel Technologies

Visit this World Wide Web site:

<https://www.intel.com/NUCElements>

<https://www.intel.com/NUCElementsSupport>

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

<https://ark.intel.com>

<https://www.intel.com/processors>

<https://www.intel.com/graphics>

<https://www.intel.com/wireless>

<https://www.intel.com/technology>

1.3 Feature Summary

Table 2 summarizes the major features of the Intel® NUC Pro Chassis Elements.

Table 2. Feature Summary

Chassis Size	200 millimeters by 144.4 millimeters by 35 millimeters
Graphics Outputs	<p>Integrated graphics support with Intel® HD Graphics Technology</p> <ul style="list-style-type: none"> • Two HDMI 2.0a • Built in CEC for all HDMI ports • High-Bandwidth Digital Content Protection support for content protection <ul style="list-style-type: none"> ○ HDCP 1.4 and 2.2 supported via HDMI • Resolutions and refresh rates supported <ul style="list-style-type: none"> ○ Up to 4K @ 60Hz ○ Up to 1080p @ 120Hz • 1080p 60fps HDMI Input (for CMCM2FBAV capture card use only) • 1080p 60fps HDMI Pass-Thru (for CMCM2FBAV capture card use only)
Audio	<ul style="list-style-type: none"> • Intel® High Definition (Intel® HD) Audio via HDMI • 1 Audio Stereo Input (for CMCM2FBAV capture card use only) • 1 Audio Stereo Output (for CMCM2FBAV capture card use only)
Storage	<ul style="list-style-type: none"> • One M.2 22x80 Key M slot for PCIe x4 NVMe or SATA SSDs • One M.2 22x80 Key M slot for PCIe x4 NVMe or PCIe add in devices
Wireless LAN	Intel® NUC Compute Element supplies the solution, antennas provided
Wired LAN	<ul style="list-style-type: none"> • Intel® Ethernet Connection I219-LM (Support for Intel® vPro™ Technology when using a vPro™ enabled NUC Compute Element) • Intel® Ethernet Controller I211-AT
USB 2.0 Ports	3 (1 Front Panel, 2 Back Panel)
USB 3.x¹ Ports	3 (1 Front Panel, 2 Back Panel)
Operating Systems Support (64-bit only)	<ul style="list-style-type: none"> • Windows* 10 Home • Windows 10 Pro • Windows 10 Enterprise • Windows 10 Education • Windows 10 IoT Enterprise <p>Some Linux* operating systems may be compatible. Check with the specific Linux distribution to make sure that support is available for this platform.</p>
Connector Supported	Lotes APCI0468-P001A01 Edge Mount Connector
Thermal Solution	Active
Sustained Operation (24x7 usage)	Sustained Operation is defined as 24x7 operation for 5 years with 50% system utilization on average, with an expected service rate of 1% per year during this period.

¹ USB 3.x port speed is determined by the Intel® NUC Compute Element.



NOTE

For more information on the internal headers and connectors refer to the Intel® NUC Rugged Board Element Product Specification.

https://www.intel.com/content/dam/support/us/en/documents/intel-nuc/nuc-elements/CMB1AB_PROD_SPEC.pdf

2 Technical Reference

2.1 Block Diagrams

Figure 1 is a block diagram of the major functional areas of NUC Pro Chassis Element CMCM2FB.

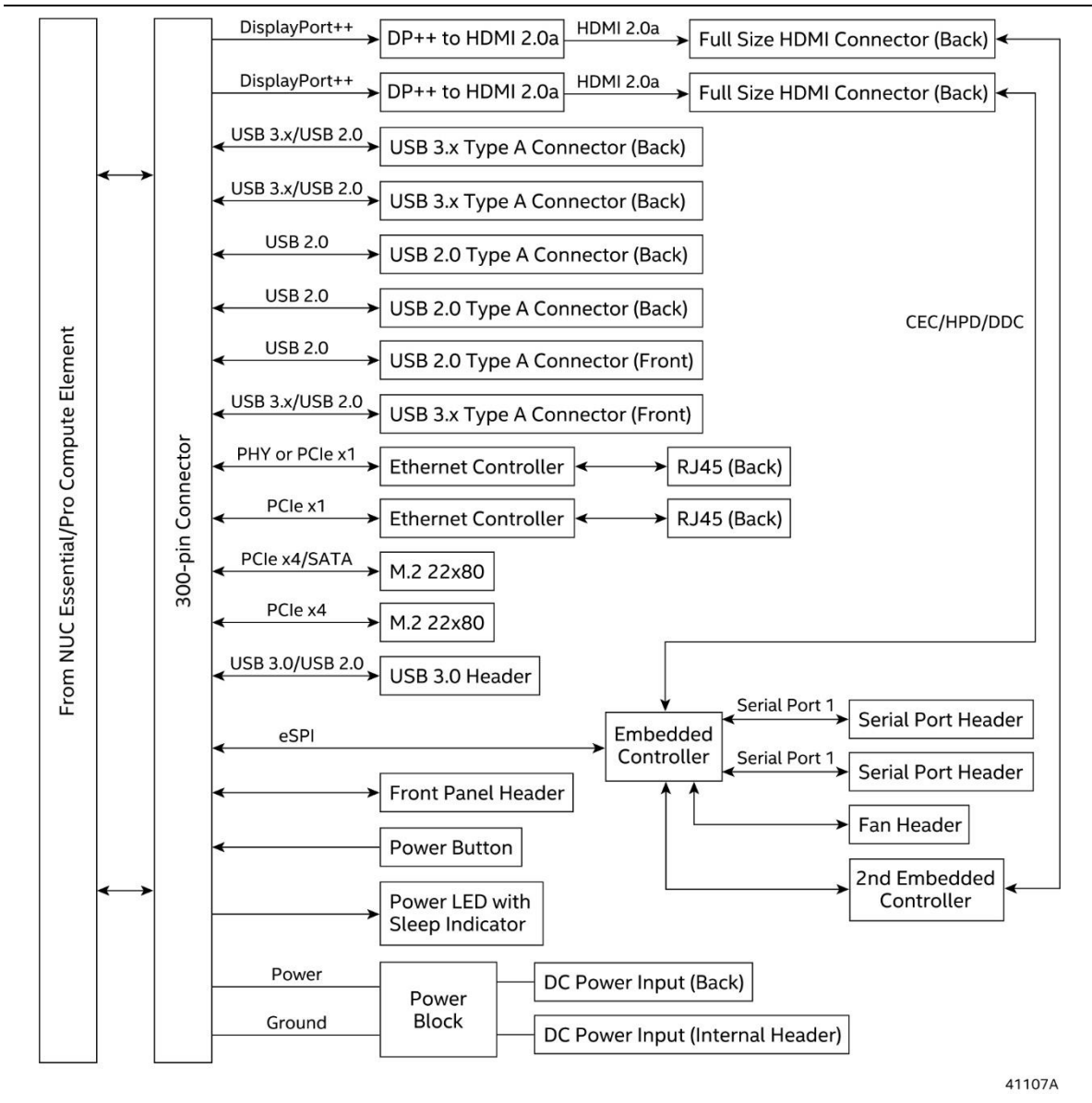


Figure 1. CMCM2FB Block Diagram

Figure 2 is a block diagram of the major functional areas of NUC Pro Chassis Element CMCM2FBAV.

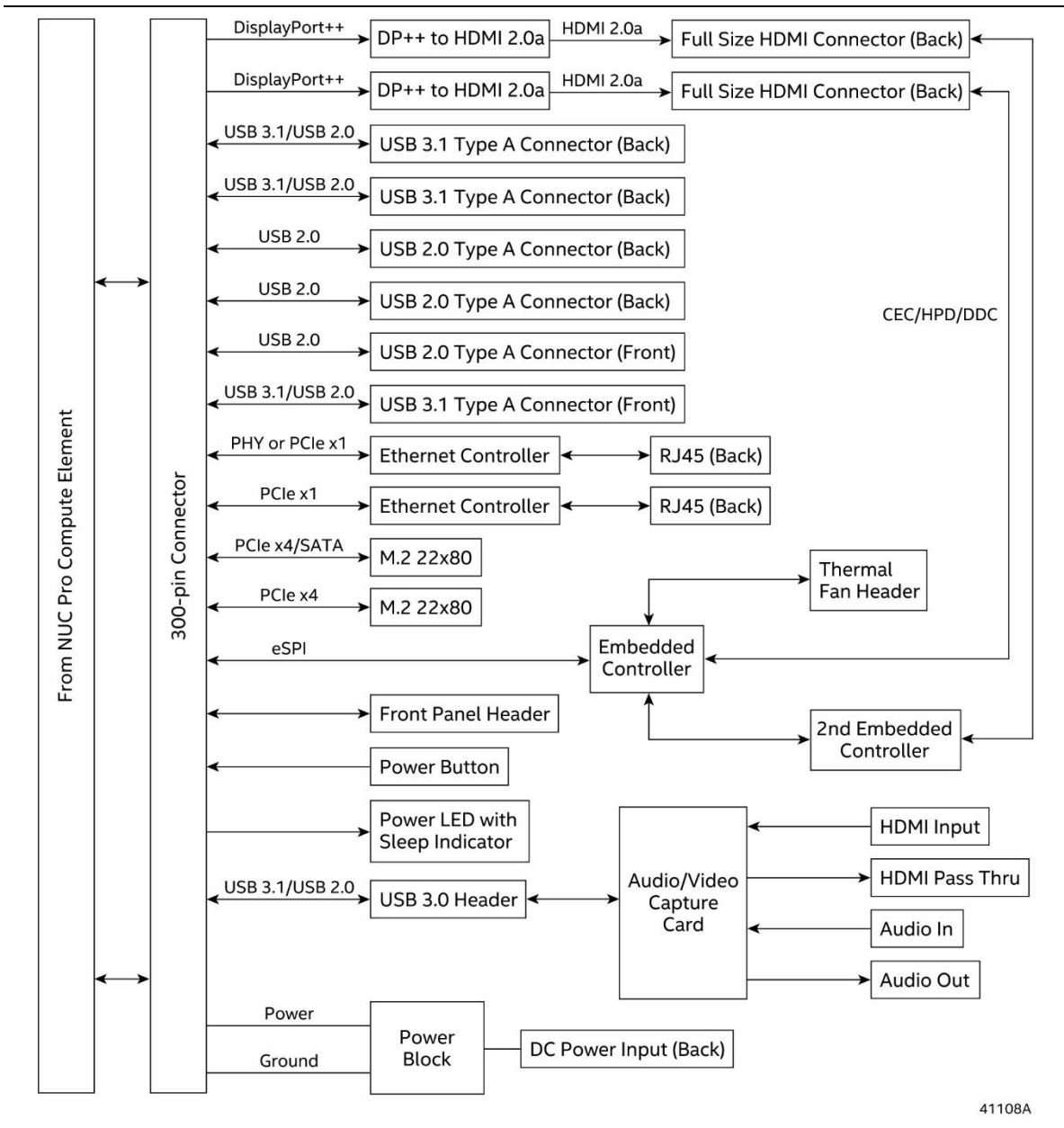
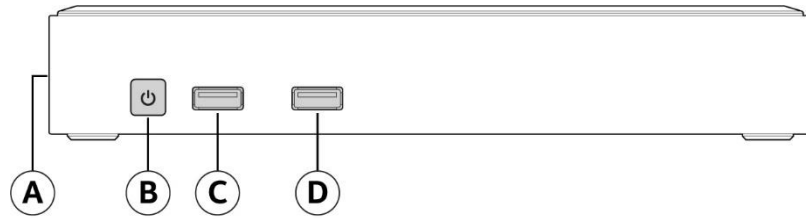


Figure 2. CMCM2FBAV Block Diagram

2.2 Features

The NUC Pro Chassis Elements have front panel and back panel input/output connectors. See the below figures for the locations of the connectors.



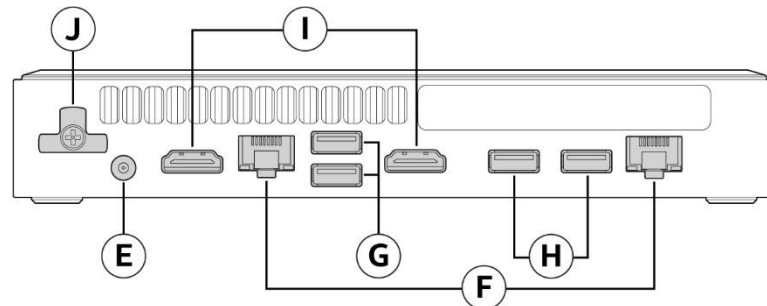
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Figure 3. CMCM2FB/CMCM2FBAV Front Panel

Table 3. CMCM2FB/CMCM2FBAV Front Panel Connectors

Item	Description	Item	Description
A	Anti-Theft Key Lock Hole	C	USB 3.x ¹ Port
B	Power Button	D	USB 2.0 Port

¹ USB 3.x port speed is determined by the Intel® NUC Compute Element.



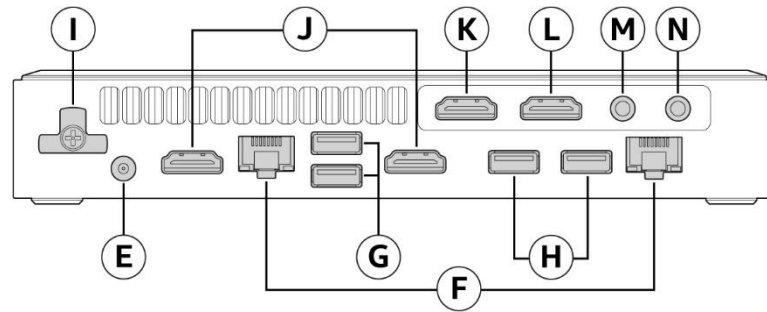
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Figure 4. CMCM2FB Back Panel

Table 4. CMCM2FB Back Panel Connectors

Item	Description	Item	Description
E	Power Input Jack	H	USB 2.0 Ports
F	Ethernet Connectors (RJ-45)	I	HDMI Ports
G	USB 3.x ¹ Ports	J	Power Cable Retention Bracket

¹ USB 3.x port speed is determined by the Intel® NUC Compute Element.



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Figure 5. CMCM2FBAV Back Panel

Table 5. CMCM2FBAV Back Panel Connectors

Item	Description	Item	Description
E	Power Input Jack	J	HDMI Ports
F	Ethernet Connectors (RJ-45)	K	HDMI Pass Thru Port
G	USB 3.x ¹ Ports	L	HDMI Input Port
H	USB 2.0 Ports	M	Audio Out Jack
I	Power Cable Retention Bracket	N	Audio In Jack

¹ USB 3.x port speed is determined by the Intel® NUC Compute Element.

2.3 Power

The Intel® NUC Pro Chassis Element uses a supplied AC to DC power adapter with a six-foot attached cable with a barrel connector.

- 90-264 Volts AC input, 47-63 Hz
- 19 Volts 4.74 Amps DC output
- 3-pin AC power cord (options include no AC power cord, US AC power cord or EU AC power cord)
- Delayed AC start is supported



CAUTION

It is strongly recommended to make sure that the NUC Pro Chassis Element is powered off and AC power is removed before removing the NUC Compute Element from the board connector. Removing the NUC Compute Element from the board connector while powered on may cause damage to the NUC Compute Element, operating system corruption, create a no boot condition or result in data loss. If the Blue LED on the board is illuminated, do not remove the NUC Compute Element from the board connector.

2.4 M.2 Connectors

The NUC Pro Chassis Element has 2 M.2 connectors.

- The M.2 connector parallel to the 300-pin connector has support for both PCIe NVMe and SATA storage solutions.
- The M.2 connector perpendicular to the 300-pin connector has support for PCIe NVMe storage solutions only.



NOTE

The Intel® NUC 8 Essential Compute Element CM8PCB4R only has support for NVMe based storage solutions when used with either of the M.2 connectors.

2.5 Intel® vPro® Technology

Intel® vPro™ Technology is a collection of platform capabilities that support enhanced manageability, security, virtualization, and power efficiency.

For information about	Refer to
Intel® vPro® Technology	http://support.intel.com/support/vpro/



NOTE

Intel® vPro® Technology is only supported on the Intel® NUC Pro Chassis Element if an Intel NUC Compute Element with Intel® vPro® Technology support is connected.

2.6 Display Emulation

The Intel® NUC Pro Chassis Element supports emulation of displays using the HDMI ports so that the system may be remotely accessed in a headless configuration or be capable of tolerating display connectivity interruptions without the operating system redetecting and rearranging the overall display layout. The display emulation feature may be enabled in Intel® NUC Compute Element BIOS Setup (Advanced → Video → “Display Emulation” drop down menu) with the following options:

- “No display emulation” (default selection): the system operates normally.
- “Virtual display emulation”: provides a 1280x1024 virtual display when no displays are connected to the system and provides an additional 1280x1024 virtual display if one display is attached to the system. If two display are attached to the system these displays will be enabled and no virtual displays will be provided.
- “Persistent display emulation”: emulates that both displays are always connected to the system no matter their actual connection status. The EDID information from each display will remain programmed through S3, S4, and S5 power states until the feature is disabled or a power cycle event (G3 global state) occurs.
 - When “Persistent display emulation” is enabled another drop-down menu (“Inconsistent Display Warning”) will become visible that allows the user to select the behavior of the system when the display device EDID is inconsistent with the EDID stored by the system.
 - “Block boot” (default selection): the BIOS will display a warning message with options and will wait indefinitely for a user selection.
 - “Countdown”: the BIOS will display a warning message with options and will wait 10 seconds before booting.



NOTE

“Persistent display emulation” is not compatible with HDCP 2.2 displays.

When using “Persistent display emulation” it would be expected behavior for the system not to properly drive displays different than those connected when the feature was enabled, as the EDID parameters of the initially connected displays are still being driven by the system. A power cycle (AC power loss) is required to retrain the system with a different display configuration.

2.7 Wireless Enable/Disable Jumper

CAUTION

Do not change the jumper with the power on. Always turn off the power and unplug the power cord from the carrier board before changing a jumper setting. Otherwise, the board could be damaged.

The jumper position determines whether the wireless module on the NUC Compute Element is enabled or disabled. See Figure 6 for the location of the jumper. Table 6 describes the jumper settings.

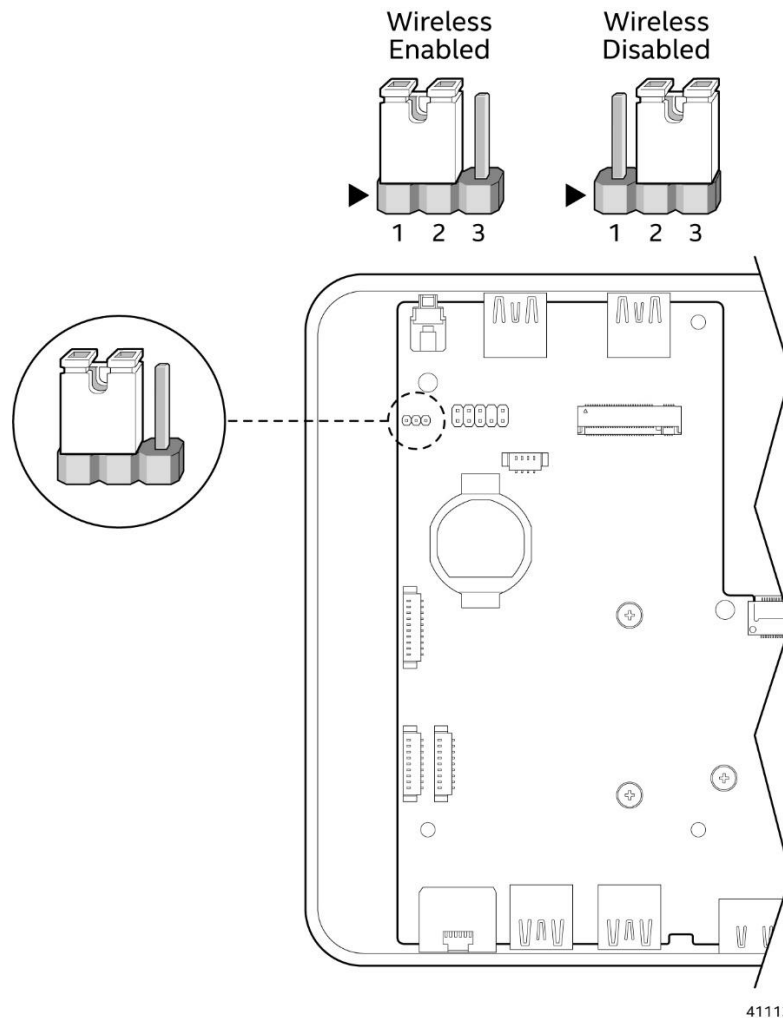


Figure 6. Wireless Enable/Disable Jumper Location

Table 6. Wireless Enable/Disable Jumper Settings

Function/Mode	Jumper Setting	Configuration
Enable	1-2	Wireless and Bluetooth will be enabled on the NUC Compute Element
Disable	2-3	Wireless and Bluetooth will be disabled on the NUC Compute Element

2.8 Mechanical

2.8.1 Form Factor

The following figures illustrate the mechanical form factor of the Intel® NUC Pro Chassis Element along with the VESA bracket. Dimensions are given in millimeters (mm).

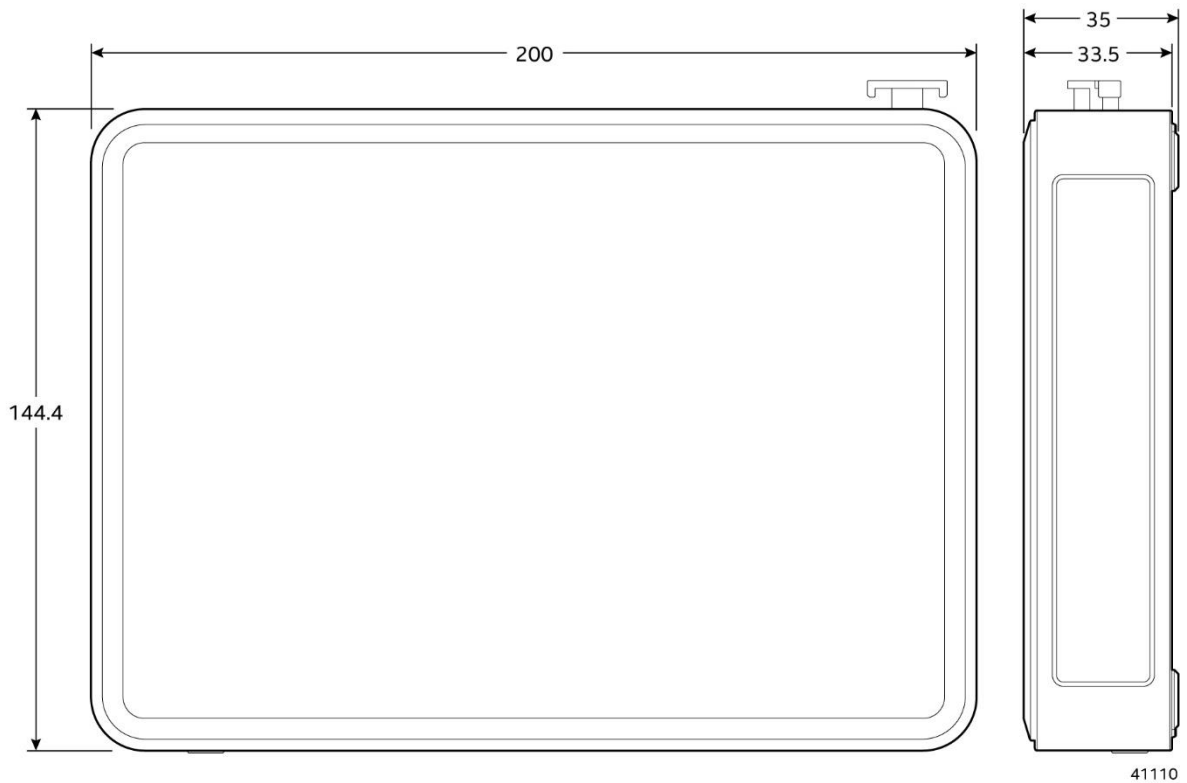


Figure 7. CMCM2FB and CMCM2FBAV Dimensions

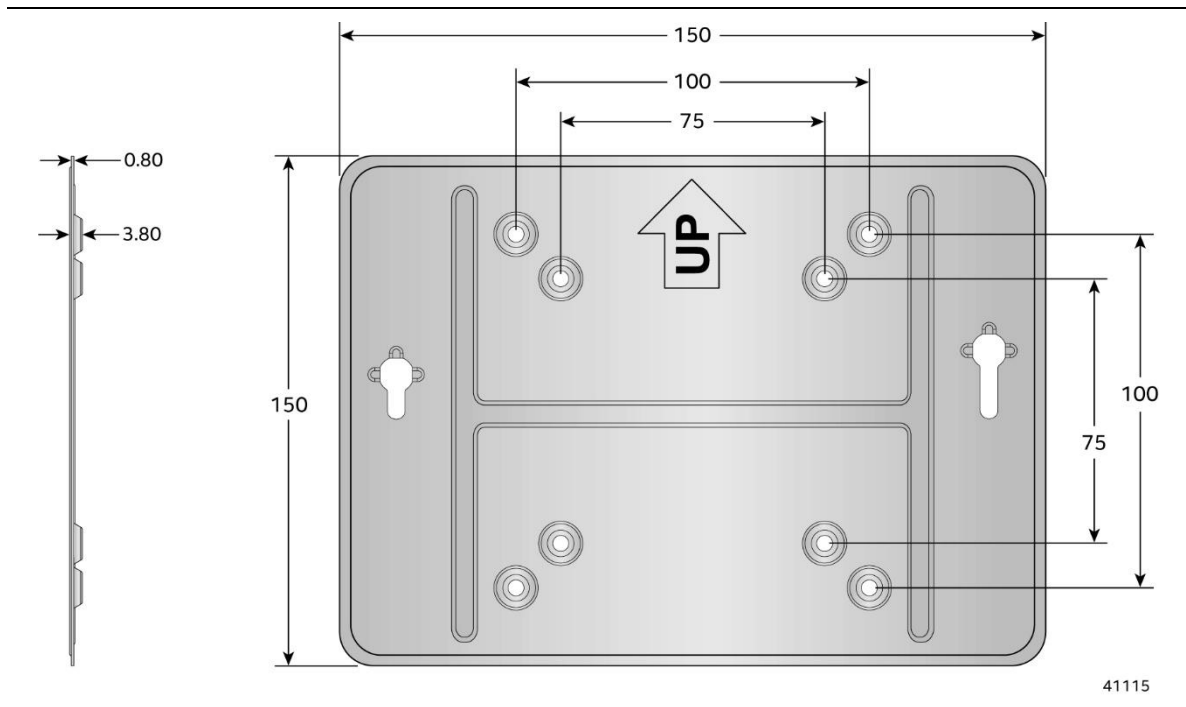


Figure 8. VESA Bracket Dimensions

2.8.2 Weights

Table 7 lists select weights of the kit and the VESA bracket.

Table 7. Select Weights

Item	Weight (in kg)
CMCM2FB	0.771
CMCM2FB with VESA Bracket	0.956
CMCM2FBAV	0.814
CMCM2FBAV with VESA Bracket	0.994
VESA Bracket	0.185

2.9 Thermal

The Intel® NUC Pro Chassis Element comes with a complete thermal solution for the Intel® NUC Compute Element. The thermal solution includes a cold plate with thermal interface material, heat pipes, heat sink, and fan.



CAUTION

Do not change the thermal interface material on the cold plate. Doing so may cause thermal issues resulting in damage to the board.

2.10 Reliability

The Intel® NUC Pro Chassis Element has a demonstrated Mean Time Between Failure (MTBF) of 50,000 hours when running under load for 90 days at 40° C ambient temperature with an Intel® NUC 8 Compute Element or an Intel® NUC 11 Compute Element installed.

2.11 Environmental

Table 8 lists the environmental specifications for the Intel® NUC Pro Chassis Elements.

Table 8. Environmental Specifications

Parameter	Specification	
Temperature		
Non-Operating	-40 °C to +60 °C	
Operating (Chassis)	0 °C to +35 °C	
Shock (Board)		
Unpackaged	25 g trapezoidal waveform	
	Velocity change of 250 inches/s ²	
Packaged	Free fall package drop machine set to the height determined by the weight of the package.	
	Product Weight (pounds)	Free Fall (inches)
	<20	36
	21-40	30
	41-80	24
	81-100	18
Vibration (Chassis)		
Unpackaged	5 Hz to 20 Hz: 0.001 g ² /Hz sloping up to 20 Hz @ 0.01 g ² /Hz	
	20 Hz to 500 Hz: 0.01 g ² /Hz (flat)	
	Input acceleration is 2.20 g RMS	
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	
	Input acceleration is 1.09 g RMS	

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

3 Characterized Errata

This section of the document communicates product Errata for the Intel® NUC Pro Chassis Element CMCM2FB and CMCM2FBAV.

Errata are design defects or deviations from current published specifications for a given product. Published errata may or may not be corrected. Hardware and software designed to be used with any given processor stepping must assume that all errata documented for that process stepping are present on all devices.

There are no known characterized errata.