FORTEC
GROUP

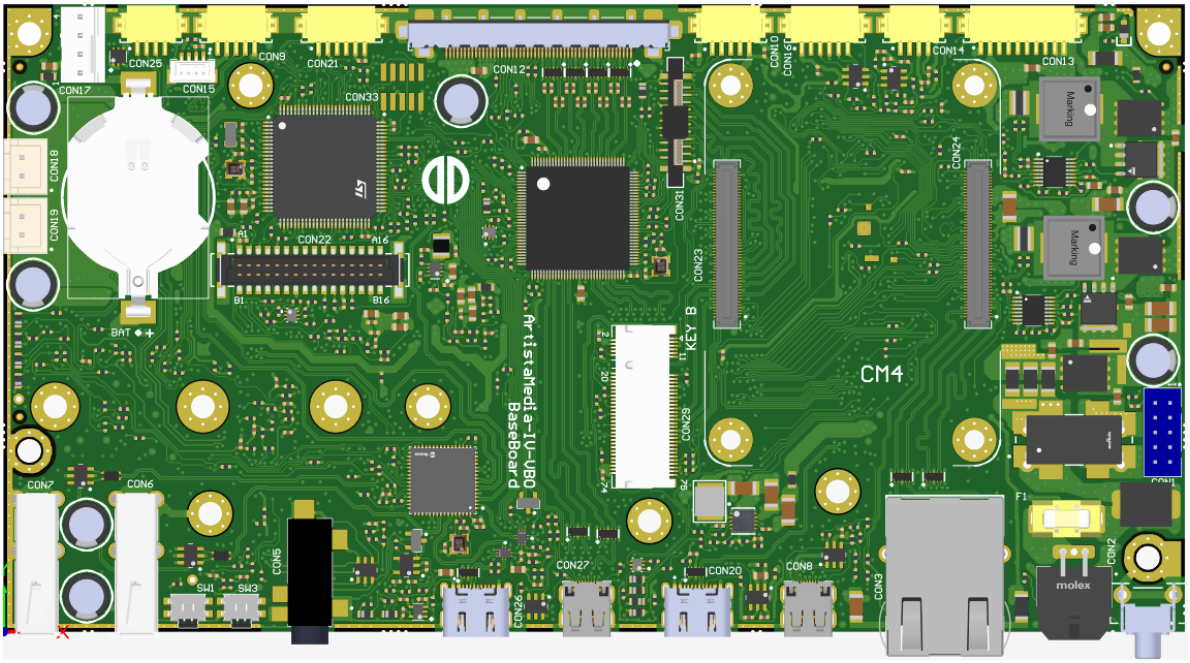
Datasheet

Fortec Integrated

ARTISTAMEDIA-IV-00 VBO,24V

Base Board for Raspberry Pi compute Module 4 and 5 (CM4 / CM5) for V-by-One TFT-Panel

SAP No.: AR-02-220_A1



Version 1.1

12.11.2025

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1 Revision History

Date	Rev. No.	Description	Page
27.06.2025	1.0	New creation	All
12.11.2025	1.1	Add support to CM5	All

2 General Requirements

ARTISTAMEDIA-IV-00 VBO,24V Base Board is a Fortec Integrated TFT controller board based on the IT6807 HDMI2.0b to V-by-One® HS 8-Lane Converter. It holds the ARM based Raspberry Pi Compute Module as an internal video source and is designed for a wide range of TFT displays, multimedia- and HMI applications.

2.1 Key Features

- Supports Raspberry Pi Compute Module 4 and Compute Module 5
- Gigabit Ethernet RJ45 without POE
- 2x USB 2.0 Type-A Host External Connector
- USB 2.0 Type-A Host Internal Connector
- USB 2.0 Type-C Connector for programming the Raspberry Pi software
- MicroSD Card Reader
- 24VDC power input for the external power supply
- 24VDC power input for the internal power supply
- 4x I2C Connector
- 10x GPIOs
- 3x UART Interface
- Fan interface
- IR Remote Control using Fortec Integrated remote controller RC-10-007
- Audio Stereo Line Out
- Audio Amplifier 2x5W sinus at 8Ω
- Low-power Real Time Clock (RTC) including a Lithium battery
- 8-lane V-by-One Interface (up to 3840x2160@60Hz)
- Micro-HDMI Version 2.0 Output of the Raspberry Pi CM4 /CM5
- Micro-HDMI Version 2.0 Input of the IT6807 HDMI2.0b to V-by-One® HS 8-Lane Converter
- Display Power Control Interface
- Backlight Control Interface
- OSD Keypad interface
- M.2 Key B interface
- CSI Camera interface (CM4 only)

2.2 Supported Raspberry Pi Compute Modules

The ArtistaMedia-IV VBO is designed to support the Raspberry Pi Compute Module CM4 / CM5 featuring:

- Support for 1000BASE-TX, 100BASE-TX and 10BASE-T with RJ-45 connector.
- CPU: BCM2711 (CM4) / BCM2712 (CM5)
- RAM: 1GB, 2GB, 4GB, 8GB (up to 16GB for CM5)
- eMMC: 8GB, 16GB or 32GB (up to 64GB for CM5)
- Wi-Fi: optional
- Bluetooth: optional

2.3 Design Guidelines

ARTISTAMEDIA-IV-00 VBO,24V is designed utilizing the following guidelines:

- The electrical design is done in accordance with RoHS, European directive 2002/95/EC.
- ARTISTAMEDIA-IV-00 VBO,24V is designed and manufactured conform to directive 2011/65/EU (RoHS 2).
- All connectors available to the front side meet the fire class UL94V-0.
- ARTISTAMEDIA-IV-00 VBO,24V does not contain any tantalum capacitors.
- The following regulations are also applied:
    - Safety: EN 62368-1
    - EMC/EMI Emission: EN 55032 (Class B)
    - EMC/EMI Immunity: EN 55024, EN55035 (Industrial), EN 61000-4-2.

2.4 Mean Time Between Failure

ArtistaMedia-IV-VBO MTBF is available on request.

2.5 Watchdog Timer

ARTISTAMEDIA-IV-00 VBO,24V provides have a software independent timer to initiate a hardware reset of the LCD-Controller in case of an unrecoverable software malfunction.

2.6 Absolute Maximum Ratings

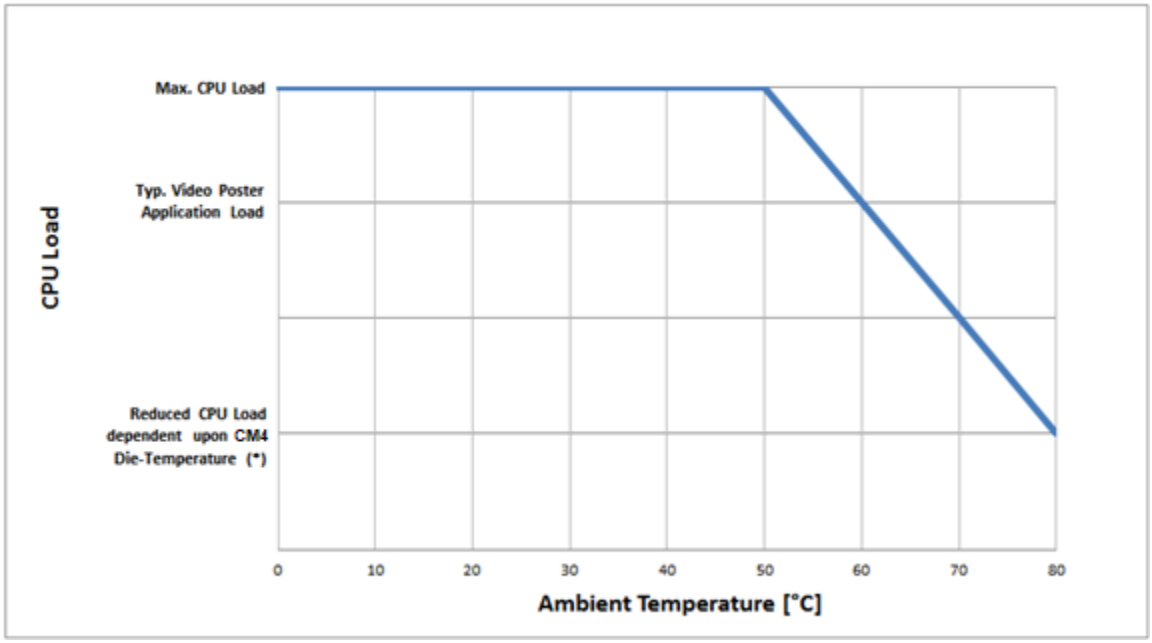
Permanent damage of the device may occur if maximum values are exceeded.

2.6.1 Environmental Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit	Note
Storage Temperature	T_{st}	-35	+85	°C	1
Operating Temperature	T_{op}	-20	+80	°C	1, 2

Note (1): This is the temperature range of the ArtistaMedia-IV Base Board without Compute Module.

Note (2): Thermal Derating Characteristic of Compute Module
The maximum allowed ambient temperature of Compute Module highly depends on the CPU load. The thermal derating characteristic shown in the diagram below is the result of internal load and temperature tests. All tests were done without airflow and without any additional cooling elements. By applying airflow or a passive heat sink to the Compute Module, the maximum allowed ambient temperature can be increased. For further details concerning temperature limitations please refer to the original datasheet of the Raspberry Compute Module. Cooling of the Compute Module is described in 3 Interfaces



(*) The standard Raspbian OS includes a mechanism that throttles the performance of the Compute Module at high temperatures. It is the responsibility of the user to make use of this mechanism and to monitor and limit the Die-Temperature of the CPU.

2.6.2 Electrical Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit	Note
Supply Voltage (24V)	V_{in}	-30	+30	VDC	1
Continuous Input Current	I_{in}	0	8	A	1
Continuous Backlight Current	$I_{bkl\ (24V)}$	-	3	A	1, 2
Peak Backlight Current	$I_{bkl\ (24V)}$	-	10	A	1, 2, 3
Continuous Panel Current	$I_{panel\ (12V)}$	-	5	A	1
Peak Panel Current	$I_{panel\ (12V)}$	-	10	A	1, 3
Continuous USB Current per Port	I_{USB}	-	0.5	A	1
Peak USB Current per Port	I_{USB}	-	1	A	1, 3

Note (1): Within operating temperature range.
Note (2): Backlight controller is directly connected to the power supply.
Note (3): The maximum peak current for 10ms duration.

2.7 Electrical Characteristics

All measurements are done at 25°C ambient temperature.

Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit	Note
Supply Voltage (24V)	V_{in}		20.4	24	28.8	VDC	
Current Consumption	I_{in}	Baseboard only	-	20	-	mA	
		Baseboard incl. CM4	-	200	-	mA	1

Note (1):
The Compute Module is playing a UHD video, with no panel and no other peripheral devices connected.

3 Interfaces

3.1 Power Supply Input / Output

- The external power supply input CON2 is protected against EMI, ESD and reverse voltage.
- The internal power supply input / Output CON1 can be used either for
  - Powering the ARTISTAMEDIA-IV-00 VBO,24V as an input or
  - Powering some peripherals such as backlight or the extended ArtistaMedia-IO board, providing protected voltage from CON2.
- The power stage is currently limited to prevent blowing the fuse during normal operation.

3.2 Ethernet Port

- Support for 1000BASE-TX, 100BASE-TX and 10BASE-T with RJ-45 connector.
- Half-duplex and full-duplex operation.
- Auto-negotiation and parallel detection.
- No PoE support.
- Connector (CON3) for Ethernet on the front side of board.

3.3 Two external USB Host Connectors (Type A)

- On-board USB 2.0 Host for high speed (480Mbit/s), full speed (12Mbit/s) and low speed (1.5Mb/s) operation located on the front side.
- USB 2.0 ports available via USB connector type A (CON6, CON7).

3.4 Internal USB Host Connector

- On-board USB 2.0 Host for high speed (480Mbit/s), full speed (12Mbit/s) and low speed (1.5Mb/s) operation located on the back side.
- Available via CON9 for internal system connections.

3.5 USB Type-C Connector

- Used for flashing the firmware, EDIDs and Panel Configurations into the Board.
- Used for accessing the eMMC flash memory on the Raspberry Pi Compute Module with a PC as mass storage device for firmware installation.
- USB 2.0 Host for high speed (480Mbit/s), full speed (12Mbit/s) and low speed (1.5Mb/s) operation.
- Related connector: CON26.
- No Power Delivery support.

3.6 MicroSD Card Reader

- Supports microSD and microSDXC cards.
- Available via CON4
- This Interface internally shared the same SDIO-Bus, that is connected to the eMMC memory on the standard RPI CM4 / CM5.
- This Interface with microSD-Card can only be used in combination with RPI CM4/ CM5 Lite

3.7 HDMI Input

- Micro HDMI2.0 (Type-D) input connected to the HDMI-V-by-One Bridge. It can be used even when no Compute Module is assembled.
- Support resolutions up to 3840x2160@60Hz.
- Related connector: CON27.

3.8 HDMI Output

- Micro HDMI2.0 (Type-D) output connected to the Compute Module HDMI1.
- Support resolutions up to 3840x2160@60Hz.
- Related Connector: CON8.

3.9 Internal HDMI Interface

- HDMI2.0 interface connected to the Compute Module HDMI0.
- Support resolutions up to 3840x2160@60Hz.
- Provides EDID for Compute Module suitable to the panel configuration.

3.9.1 EDID

- For normal operation, the EDID memory is write protected and readable by the Compute Module.
- During the programming the EDID by the LCD-Controller the EDID memory is disconnected from Compute Module.

3.10 I2C and USB Touch Screen Interface

- Support of USB-HID touch screen controller. Project based firmware adaptation required. Used connector (CON9)
- Support of I2C touch screen controller. Project based firmware adaptation required. Used Connector (CON16)

3.11 V-by-One Data Output

ARTISTAMEDIA-IV-00 VBO,24V is designed to drive almost every available TFT panel with V-by-One interface using an FFC cable or a Micro Coax cable. All display parameters can be set by Fortec Integrated upon request or by the optional available configuration software ArtistaM4Rover.

Features of the V-by-One interface:

- 18 bit or 24 bit per pixel
- 8-lane interface
- Supports panel resolutions up to UHD (3840x2160@60Hz)
- Switchable GPIOs for panel control providing one of the three voltage levels: Tri-State, 0V or 3.3V.
- Switchable I2C interface for panel control providing one of the three voltage levels: Tri-State, 0V or 3.3V.

Supported display power supply levels:

- +12.0V

3.12 Backlight Interface

The backlight power- and control-Interface directly connects to a panel backlight converter or LED power supply for the display backlight. Additional control lines for switching the backlight on/off and for regulating display brightness are available.

- CON13 provides a +24V, switchable, rising-time-controlled supply voltage for powering the backlight controller.
- CON1 provides a protected +24V for powering the external backlight controller.
- Brightness DC control voltage in the range of 0V to 5V.
- Brightness PWM control with the 3.3V or 5V level, 0 to 100% duty cycle and 100 Hz to 20 kHz frequency range.
- Backlight Enable signal with options of 0V, 3.3V or 5V voltage level.

3.13 Audio Out

3.13.1 Audio Line Out

- Audio Line Out: Single-ended 2.1VRMS ground centered analog outputs supporting loads down to 1kOhm per pin (left and right channel).
- Volume control is possible via Keypad and Remote control.
- Audio Line Out is available via phone jack (CON5) on the front side of the baseboard or 5-Pin Hirose Connector (CON25) for internal in-system connection.

3.13.2 Audio Amplifier

- One stereo amplifier 2x5W sinus power at 8Ω is available on CON18 and CON19 for left and right.
- The output power is limited to 2x5W at 0dB.

3.14 Real Time Clock

- The real time clock of the ARTISTAMEDIA-IV-00 VBO,24V is battery buffered.
- The battery (type CR2032) is removable.
- The lifetime of the RTC is at least 15 years for the whole temperature range.

3.15 General Purpose Interfaces

- One I2C interface connects on CON16 to the Raspberry Pi Compute Module (for touch screen etc.).
- One I2C interface connects to the System-Controller (can be used for a light sensor or temperature sensor to automatically adjust the panel backlight=brightness).
- One UART connects directly to the Compute Module (for debug console),
- GPIOs of the Compute Module and system controller accessible via pin header (CON22)

3.16 Cooling and fan interface

- ARTISTAMEDIA-IV-00 VBO,24V can be cooled by using a heat sink, attached to the Compute Module.
- The fan interface supports standard +12V fans providing PWM input and tachometer output. The +12V power for the fan comes from the internal +12V voltage converter.

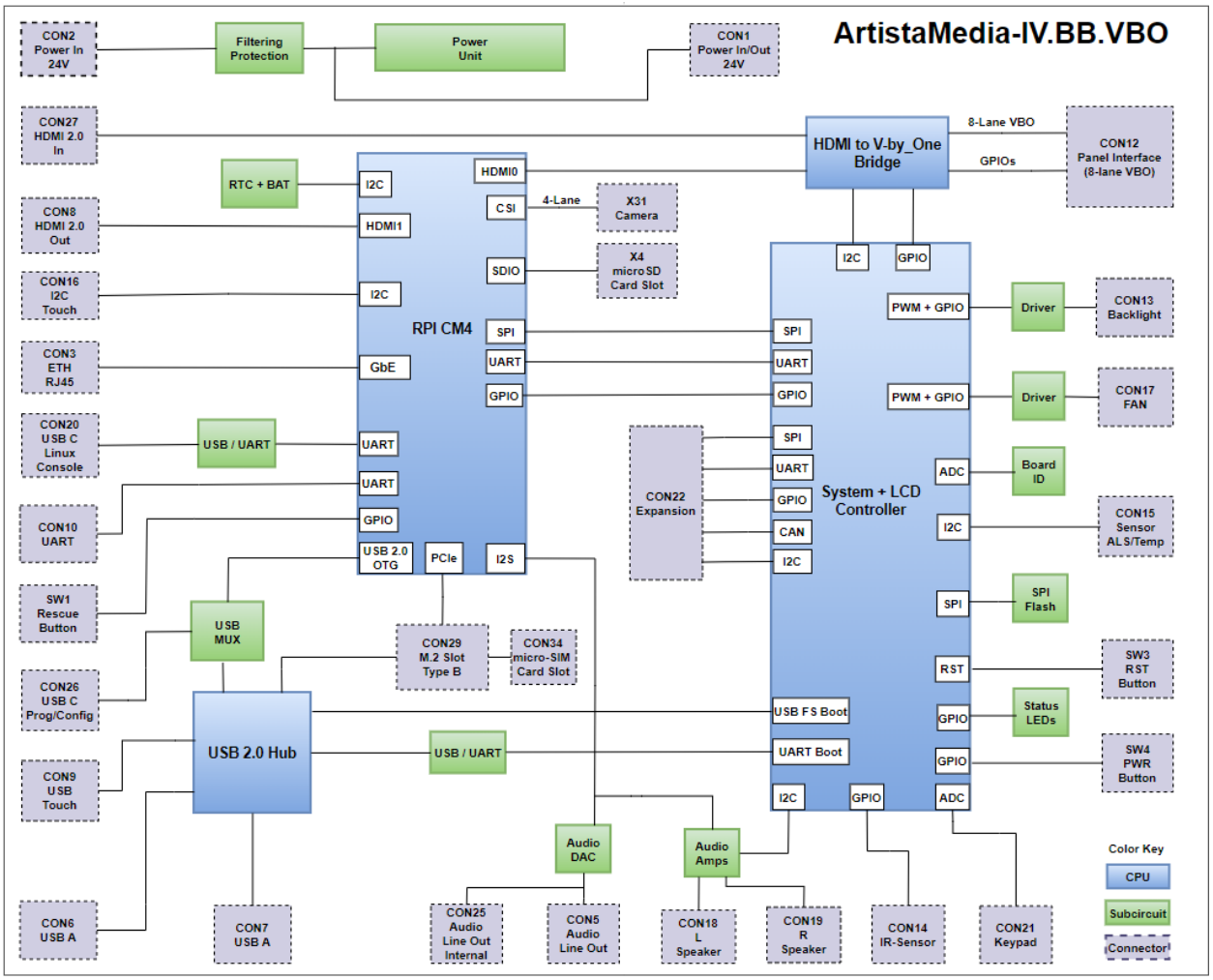
3.17 Extended IO-Board

To expand the functionality of the ARTISTAMEDIA-IV-00 VBO,24V a separate IO-Board can be connected to the IO-Connector CON22.

This connection provides the following interfaces and controls available on one edge of the PCB:

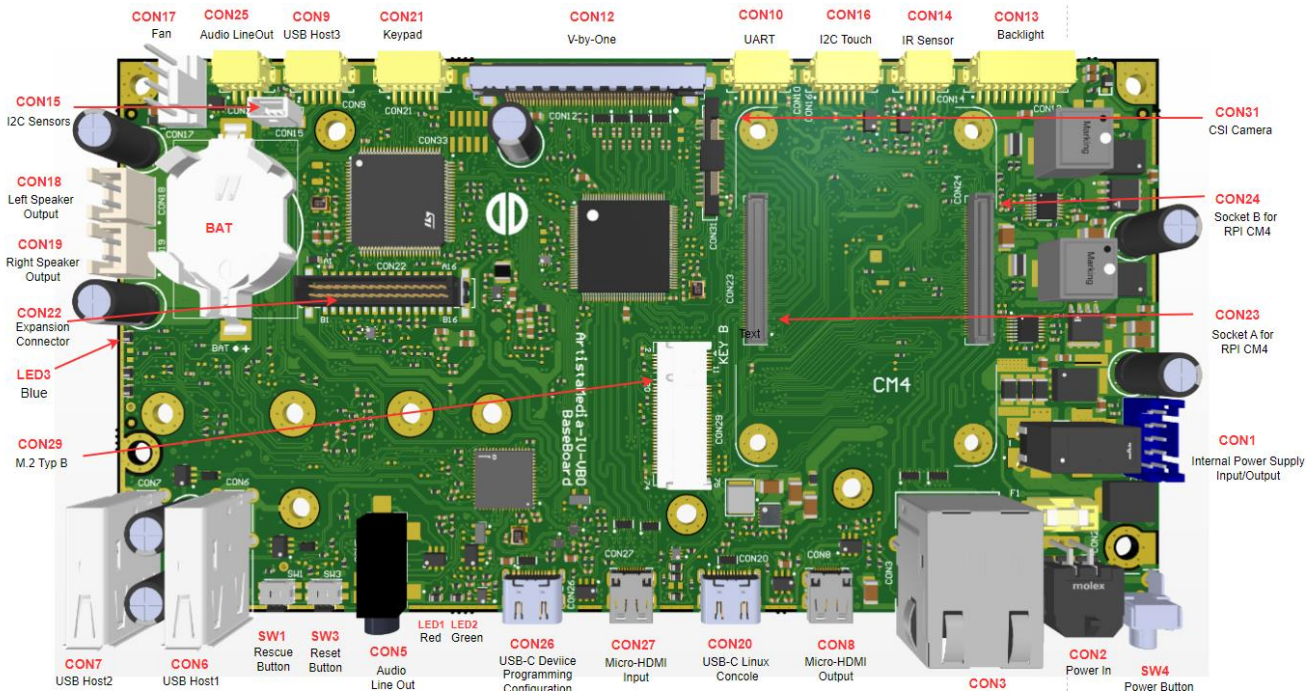
- 2x UART to realize a field bus like RS485 / RS422 / RS232
- 2x CAN controller Interface
- SPI-Interface
- I2C interface.
- Diverse GPIOs

4 Block Diagram

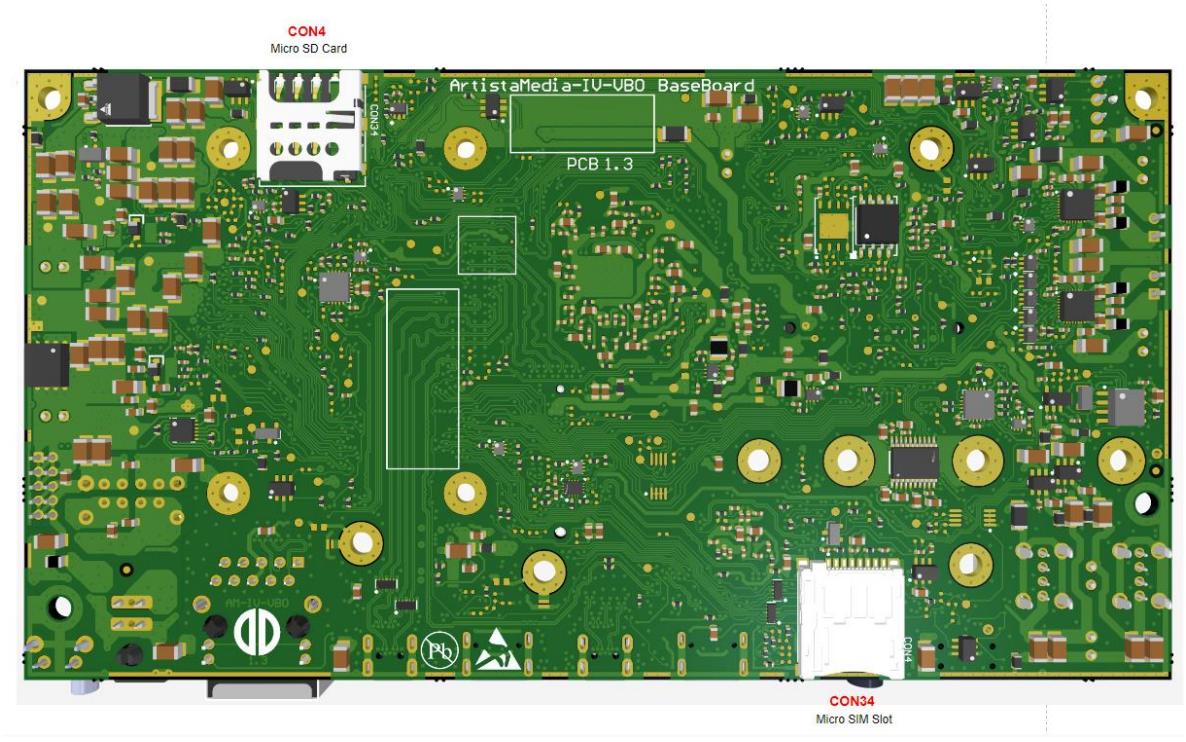


5 Connector Overview

5.1 Top View



5.2 Bottom View



Item	Description	Part Number	Mating type	Manufacturer
CON1	Internal Power Supply Input/Output	B10B-PHDSS-(LF)(SN)	PHDR-10VS	JST
CON2	External Power Supply Input	43045-0200	43025-0200	Molex
CON3	Ethernet Magnetic RJ45	ARJM11C7-502-AB-EW2	SS-39500-001	ABRACON LLC
CON4	MicroSD Card Reader	502774-0891	microSDHC CARD	Molex
CON5	External Audio Line Out	35RASMT4BHNTRX	35HDNNS	Switchcraft
CON6	External USB Host 1, Type A	614004134726	1734372-1	WE
CON7	External USB Host 2, Type A	614004134726	1734372-1	WE
CON8	Micro HDMI (Type-D) Output	685119248123	KA-40-135	Wurth Electronics
CON9	Internal USB Host 3, Pin Header	DF13A-5P-1.25H(75)	DF13-5S-1.25C	Hirose
CON10	UART1 (RPI CM4 / CM5)	DF13A-5P-1.25H(75)	DF13-5S-1.25C	Hirose
CON12	V-by-One	FI-RE51S-HF	FI-RE51CL	JAE
CON13	Backlight Power Supply	DF13A-10P-1.25H(75)	DF13-10S-1.25C	Hirose
CON14	Infrared Sensor	DF13A-4P-1.25H	DF13-4S-1.25C	Hirose
CON15	I2C Light/ Temperature Sensor (controlled by System Controller)	501331-0407	501330-0400	Molex
CON16	I2C Touch	DF13A-6P-1.25H(75)	DF13-6S-1.25C	Hirose
CON17	Fan	47053-1000	47054-1000	Molex
CON18	Left Speaker Output	B2B-XH-A	XHP-5	JST
CON19	Right Speaker Output	B2B-XH-A	XHP-5	JST
CON20	USB Type-C CM4 / CM5 Linux Console	DX07S016JA1R1500	KA-40-131	JAE
CON21	Keypad Connector	DF13A-6P-1.25H(75) A1252WR-SF-06PD01	DF13-6S-1.25C	Hirose Joint Tech
CON22	Expansion Port for I/O Module (male)	M55-7003242R	M55-6003242R (female)	Harwin
CON23	Socket A for Raspberry Pi CM4 / CM5	DF40HC(3.0)-100DS-0.4V(58)	DF40C-100DP-0.4V	Hirose
CON24	Socket B for Raspberry Pi CM4 / CM5	DF40HC(3.0)-100DS-0.4V(58)	DF40C-100DP-0.4V	Hirose
CON25	Internal Audio Line Out	DF13A-4P-1.25H	DF13-6S-1.25C	Hirose
CON26	USB Type-C Device, CM4 / CM5 Programming	DX07S016JA1R1500	KA-40-131	JAE
CON27	Micro HDMI (Type-D) Input	685119248123	KA-40-135	Wurth Electronics
CON29	M.2 Type B	MDT420B03001	TBD	Amphenol
CON31	CSI Camera Connector	687322124422	RPIZ CAM 5MP 170	Wurth Electronics
CON34	Micro SIM Card Connector	78727-0001	Slot Micro SIM Card	Molex

5.3 Controls

5.3.1 Buttons

SW1	Rescue System (1)	436333045822	Wurth Electronics
SW3	Reset System-Controller (optional)	436333045822	Wurth Electronics
SW4	Shutdown / Power on of CM4 / CM5 (2)	1301.9503	Schurter

(1): SW1 is only achievable by using tools.
(2): SW4 is achievable without any tools.

5.3.2 Status LEDs

LED	Color	Status	Description
LED1	Red	On	On-board System Controller is in standby/sleep mode because no input signal was detected
		Flashing	Blank or corrupted panel configuration, please contact Fortec support
LED2	Green	On	On-board System Controller synched to input signal & processing it
		Flashing	On-board System Controller is searching for an input signal
LED3	Blue	On	12V panel power supply is switched on
		Off	12V panel power supply is switched off

6 Connector Pinout

6.1 CON1 – Internal Power Supply Input/Output Connector

Connectors CON1 and CON2 are NOT connected in parallel, see 3.1 Power Supply Input / Output.

Pin	Signal	Description
1	Vin-out	Positive Power Supply Input or Protected Output
2	Vin-out	Positive Power Supply Input or Protected Output
3	Vin-out	Positive Power Supply Input or Protected Output
4	Vin-out	Positive Power Supply Input or Protected Output
5	Vin-out	Positive Power Supply Input or Protected Output
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	GND	Ground
10	GND	Ground

6.2 CON2 – External Power Supply Input Connector

Connectors CON1 and CON2 are NOT connected in parallel, see 3.1 Power Supply Input / Output.

Pin	Signal	Description
1	GND	Ground
2	Vin	Positive Power Supply Input

6.3 CON3 – RJ45 Ethernet Connector

Pin	Signal	Description
1	TD+	Transmitted Data
2	TD-	Transmitted Data -
3	RD+	Received Data +
4	TCT	Transmitter Center Tap
5	RCT	Receiver Center Tap
6	RD-	Received Data -
7	NC	Not Connected
8	GND	GND

6.4 CON4 – MicroSD Card Reader

Pin	Signal	Description
1	SD_DAT2	SD Serial Data 2
2	SD_DAT3	SD Serial Data 3
3	SD_CMD	Command
4	VDD	3.3V Power Supply
5	SD_CLK	Clock
6	VSS	Ground
7	SD_DAT0	SD Serial Data 0
8	SD_DAT1	SD Serial Data 1
9 to 14	GND	Ground

6.5 CON5 – External Stereo Audio Line Out Connector

Both CON5 and CON25 are connected in parallel.

Pin	Signal	Description
1	GND	Ground
2	LINE_ROUT	Right Channel Line Out
3	LINE_LOUT	Left Channel Line Out
4	LINE_RDET	Right Channel detection
5	LINE_LDET	Left Channel detection

6.6 CON6 – External USB Host 1 Type-A Connector

Pin	Signal	Description
1	VBUS	+5V Power Output for external device (max. 0.5A, fuse protected)
2	D-	USB Data - Line
3	D+	USB Data + Line
4	GND	Ground

6.7 CON7 – External USB Host 2 Type-A Connector

Pin	Signal	Description
1	VBUS	+5V Power Output for external device (max. 0.5A, fuse protected)
2	D-	USB Data - Line
3	D+	USB Data + Line
4	GND	Ground

6.8 CON8 – Micro HDMI (Type-D) Output Connector

Pin	Signal	Description
1	HDMI_HPD	Hot Plug Detection
2	HDMI_UTIL	HDMI Utility Not connected internally
3	HDMI_TX2_P	Differential TMDS Data 2 Positive Output
4	GND	Ground
5	HDMI_TX2_N	Differential TMDS Data 2 Negative Output
6	HDMI_TX1_P	Differential TMDS Data 1 Positive Output
7	GND	Ground
8	HDMI-TX1_N	Differential TMDS Data 1 Negative Output
9	HDMI-TX0_P	Differential TMDS Data 0 Positive Output
10	GND	Ground
11	HDMI_TX0_N	Differential TMDS Data 0 Negative Output
12	HDMI_CLK_P	Differential TMDS Clock Positive Output
13	GND	Ground
14	HDMI_CLK_N	Differential TMDS Clock Negative Output
15	HDMI_CEC	Consumer Electronic Control
16	GND	Ground
17	HDMI_SCL	DDC Clock
18	HDMI_SDA	DDC Data
19	HDMI_VCC	+5V Output

6.9 CON9 – Internal USB Host 3 Pin Header Connector

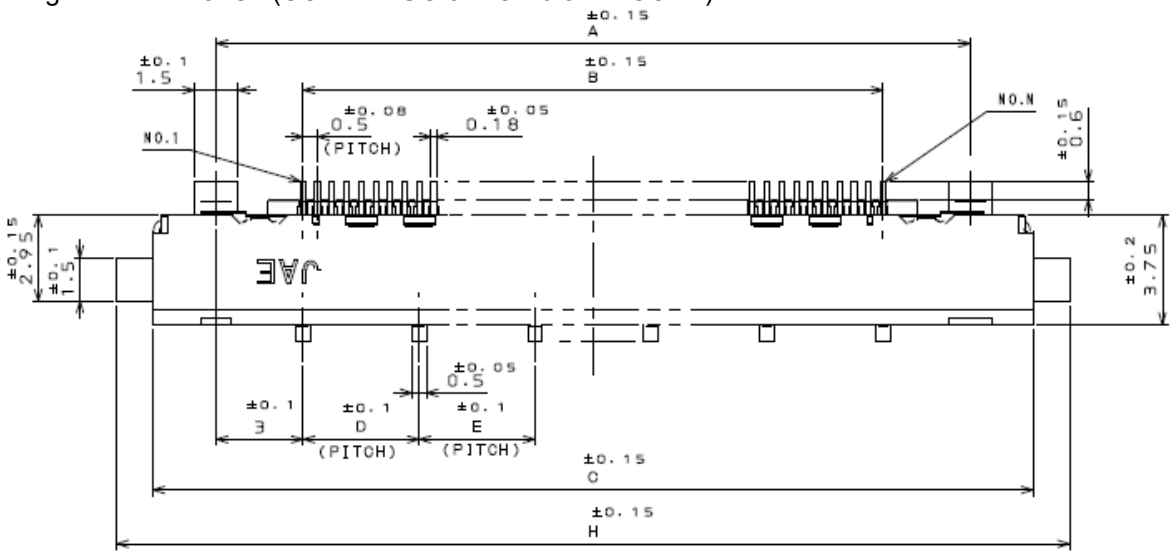
Pin	Signal	Description
1	VBUS	+5V Power Output for external device (max. 0.5A fuse protected)
2	GND	Ground
3	D-	USB Data -
4	D+	USB Data +
5	GND	Ground

6.10 CON10 – UART1 Pin Header Connector (RPI CM4 / CM5)

Pin	Signal	Description
1	UART5 (CM4) / UART4 (CM5) TX	Serial Output from LCD-Controller
2	UART5 (CM4) / UART4 (CM5) RX	Serial Input to LCD-Controller
3	+3.3V	3.3V Power Output
4	+5V	5V Power Output
5	GND	Ground

6.11 CON12 – 8-lane V-by-One Connector

The 8-lane v-by-one connector for panel interface.
Manufacturer: JAE
Type: FI-RE51S-HF
Rated Current: AC, DC 0.7A per terminal.
Matching Part: FI-RE51CL (CONN PLUG 51POS 0.5MM COAX)



Pin	Signal	Description
1	GND	Ground
2	TX7P	Vx1 lane 7+
3	TX7N	Vx1 lane 7-
4	GND	Ground
5	TX6P	Vx1 lane 6+
6	TX6N	Vx1 lane 6-
7	GND	Ground
8	TX5P	Vx1 lane 5+
9	TX5N	Vx1 lane 5-
10	GND	Ground
11	TX4P	Vx1 lane 4+
12	TX4N	Vx1 lane 4-
13	GND	Ground
14	TX3P	Vx1 lane 3+
15	TX3N	Vx1 lane 3-
16	GND	Ground
17	TX2P	Vx1 lane 2+
18	TX2N	Vx1 lane 2-
19	GND	Ground

Pin	Signal	Description
20	TX1P	Vx1 lane 1+
21	TX1N	Vx1 lane 1-
22	GND	Ground
23	TX0P	Vx1 lane 0+
24	TX0N	Vx1 lane 0-
25	GND	Ground
26	LOCK	Lock Detect Input, 2)
27	HPD	Hot Plug Detect Input, 2)
28	GPIO0	General Purpose Input Output, 1)
29	GPIO1	General Purpose Input Output, 1)
30	GPIO2	General Purpose Input Output, 1)
31	GPIO3	General Purpose Input Output, 1)
32	SDA / GPIO4	I2C Data Line / General Purpose Input Output, 1) 3)
33	SCL / GPIO5	I2C Clock Line / General Purpose Input Output, 1)
34	SDA / GPIO4_ALT	I2C Data Line / General Purpose Input Output, 1) 3)
35	GPIO6	General Purpose Input Output, 1)
36	GPIO7	General Purpose Input Output, 1)
37	GPIO8	General Purpose Input Output, 1)
38	GND	Ground
39	GND	Ground
40	GND	Ground
41	GND	Ground
42	GND	Ground
43	NC	Not connected
44	LCD_SVCC	Switched VDD 12V
45	LCD_SVCC	Switched VDD 12V
46	LCD_SVCC	Switched VDD 12V
47	LCD_SVCC	Switched VDD 12V
48	LCD_SVCC	Switched VDD 12V
49	LCD_SVCC	Switched VDD 12V
50	LCD_SVCC	Switched VDD 12V
51	LCD_SVCC	Switched VDD 12V

NOTES:

1) GPIO option can be activated by firmware. Overcurrent protected by a serial 300R resistor. Default state: Hi-Resistance Input.
2) Terminated by a 10KOhm resistor to +3.3V.
3) SDA / GPIO4 and SDA / GPIO4_ALT are interconnected using a 22 Ohm resistor.

6.12 CON13 – Backlight Power Supply Connector

Pin	Signal	Description
1	BKLT_PWR	Switchable backlight power supply: + 24V (ArtistaMedia-IV-VBO)
2	BKLT_GND	Ground
3	BKLT_EN	Backlight Enable Signal: 3.3V or 5V, configured by FW
4	BRT_ADJ	Backlight Dimming: Analog (DC) or PWM, configured by FW
5	NC	Reserved
6	NC	Reserved
7	BKLT_PWR	Switchable backlight power supply: + 24V (ArtistaMedia-IV-VBO)
8	BKLT_PWR	Switchable backlight power supply: + 24V (ArtistaMedia-IV-VBO)
9	BKLT_GND	Ground
10	BKLT_GND	Ground

6.13 CON14 – Infrared Sensor Connector

I/R input connector to both the System Controller. If the Compute Module has been shut down, the System Controller makes sure that the Compute Module is waking up.
When an I/R sensor is connected to CON14, an I/R remote control can be used to adjust panel brightness, audio volume, power and many other parameters. See chapter 8.1 I/R Sensor ZU-02-406 and I/R Remote Control RC-10-007 for more details.

Pin	Signal	Description
1	IR DATA	Data Input from IR Sensor
2	+3.3V	3.3V Power Output (Standby Voltage)
3	+5V	5V Power Output
4	GND	Ground

6.14 CON15 – I2C Light Sensor Connector

I2C input connector of the LCD-Controller chip. When a light sensor is connected to CON12, the LCD-Controller automatically adjusts panel brightness according to the ambient light. See chapter 8.3 for more details.

Pin	Signal	Description
1	+3.3V	3.3V Power Output
2	GND	Ground
3	SCL	I2C Clock
4	SDA	I2C Data

6.15 CON16 – I2C Touch Connector

This connector can be used to connect an I2C touch or any other I2C device to the Compute Module.

Pin	Signal	Description
1	+3.3V	3.3V Power Output
2	TOUCH_SDA1	Touch Controller I2C Data
3	TOUCH_SCL1	Touch Controller I2C Clock
4	GND	Ground
5	TOUCH_INT_N	Touch Controller Interrupt
6	TOUCH_RESET_N	Touch Controller Reset

6.16 CON17 – Fan Connector

Pin	Signal	Description
1	GND	Ground
2	+12V	Power Supply Output
3	TACHO	RMP Speed Signal
4	PWM	PWM Output Signal(+5V)

6.17 CON18 – Left Speaker Output Connector

Pin	Signal	Description
1	LOUT-	Left Speaker -
2	LOUT+	Left Speaker +

6.18 CON19 – Right Speaker Output Connector

Pin	Signal	Description
1	ROUT-	Right Speaker -
2	ROUT+	Right Speaker +

6.19 CON20 – USB Type-C Connector (Compute Module Linux Console)

This connector provides access to the Debug Console of the Compute Module.
The UART interface (TXD0, RXD0) is available as a COM port.
The conversion between USB2.0 and UART performs a standard Bridge USB-to-UART.

Pin	Signal	Description
1&12	GND	Ground
2&11	VBUS	+5V Power Input from an external host
3	CC1	Pulled down to GND, not Connected internally
4	SBU2	Not Connected internally
5	D_N	USB Data -
6	D_P	USB Data +
7	D_P	USB Data +
8	D_N	USB Data -
9	CC2	Pulled down to GND, not Connected internally
10	SBU1	Not Connected internally
S1 to S6	GND	Shield Pins connected to GND

6.20 CON21 – Keypad Connector

Keypad connector controlled by the LCD-controller. When an external keypad connected, brightness, audio volume and power on/off are available. See chapter 8.2 OSD Keypad ZU-02-398 for more details.

Pin	Signal	Description
1	KEYPAD DATA	Analog Keypad Signal
2	GND	Ground
3	LED RED	Status LED – Red (Sleep Mode)
4	LED GREEN	Status LED – Green (Sync Mode)
5	GND	Ground
6	+3.3V	3.3V Power Output (Standby)

6.21 CON22 – Expansion Port for I/O Module

General purpose connector of the Compute Module and System Controller.

Pin	Signal	Description
A1	3.3V	Power Supply (Standby)
A2	I2C_SDA	I2C Data
A3	SPI_SCK	I2C Clock
A4	GND	Ground
A5	SPI_MISO	SPI DI
A6	UART4_RX	UART4 Receiver
A7	UART2_TX	UART2 Transmitter
A8	GPIO	General Purpose In/Out
A9	GND	Ground
A10	CAN2_TX	CAN2 Controller Transmit Signal
A11	CAN1_RX	CAN1 Controller Receive Signal
A12	GPIO	General Purpose In/Out
A13	GPIO	General Purpose In/Out
A14	GND	Ground
A15	24V	Supply Voltage
A16	24V	Supply Voltage
B1	I2C_SCL	I2C Clock
B2	GND	Ground
B3	SPI_MOSI	SPI DO
B4	SPI_CS	SPI Chip Select
B5	UART4_TX	UART4 Transmitter
B6	UART2_RX	UART2 Receiver
B7	GND	Ground
B8	CAN2_RX	CAN2 Controller Receive Signal
B9	GPIO	General Purpose In/Out
B10	GPIO	General Purpose In/Out
B11	CAN1_TX	CAN1 Controller Transmit Signal
B12	5V	Supply Voltage
B13	GPIO	General Purpose In/Out
B14	GPIO	General Purpose In/Out
B15	GND	Ground
B16	24V	Power Supply

6.22 CON25 – Internal Stereo Audio Line Out Pin Header

Connectors CON5 and CON25 are connected in parallel. Both can be used at the same time if the impedances are considered accordingly.

Pin	Signal	Description
1	GND	Ground
2	LINE ROUT	Right Channel Line Out
3	LINE LOUT	Left Channel Line Out
4	MUTE_N	Mute Signal (active low): Open drain output with 47.5kOhm pull up resistor to 3.3V. This pin is pulled low in mute mode and can be used to mute an external audio device.

6.23 CON26 – USB Type-C Connector (Compute Module Firmware Update)

This connector is only used for FW programming. Connecting an external host PC to this connector automatically resets the Compute Module controller and simultaneously disabled the internal eMMC flash memory on the Compute Module. Thus, the Compute Module controller falls back to booting from USB, allowing a FW update by using for example the following USB Boot SW:
https://www.raspberrypi.org/documentation/hardware/computemodule/cm-emmc-flashing.md

Pin	Signal	Description
1&12	GND	Ground
2&11	VBUS	+5V Power Input from an external host
3	CC1	Pulled down to GND, not Connected internally
4	SBU2	Not Connected internally
5	D_N	USB Data -
6	D_P	USB Data +
7	D_P	USB Data +
8	D_N	USB Data -
9	CC2	Pulled down to GND, not Connected internally
10	SBU1	Not Connected internally
S1 to S6	GND	Shield Pins connected to GND

6.24 CON27 – Micro HDMI (Type-D) Input Connector

This external HDMI-Signal is connected to the onboard HDMI/VBO-Bridge as first input, the second input of the HDMI/VBO-Bridge is connected to the RPI CM4 / CM5 (HDMI0). The bridge can be controlled to select between one of the available HDMI-Sources, the content of the selected HDMI-Source is converted to VBO-Signal and can be displayed on the connected panel.

Pin	Signal	Description
1	HDMI_HPD	Hot Plug Detection
2	Reserved	Not connected
3	HDMI_TX2_P	Differential TMDS Data 2 Positive Input
4	GND	Ground
5	HDMI_TX2_N	Differential TMDS Data 2 Negative Input
6	HDMI_TX1_P	Differential TMDS Data 1 Positive Input
7	GND	Ground
8	HDMI-TX1_N	Differential TMDS Data 1 Negative Input
9	HDMI-TX0_P	Differential TMDS Data 0 Positive Input
10	GND	Ground
11	HDMI_TX0_N	Differential TMDS Data 0 Negative Input
12	HDMI_CLK_P	Differential TMDS Clock Positive Input
13	GND	Ground
14	HDMI_CLK_N	Differential TMDS Clock Negative Input
15	HDMI_CEC	Consumer Electronic Control
16	GND	Ground
17	HDMI_SCL	DDC Clock
18	HDMI_SDA	DDC Data
19	HDMI_VCC	+5V Input

6.25 CON29 – M.2 Key B

The M.2 connector provides several high-speed interfaces, which are required to connect computer expansion cards, especially for LTE-module. Limited by the CM4 / CM5, only 1xPCIe and only 1xUSB2.0 (no USB3.0) are available.

Pin	Signal	Description
1	CONFIG_3	Defines module type
2	3.3 V	Supply pin
3	GND	Ground
4	3.3 V	Supply pin
5	GND	Ground
6	FULL_CARD_POWER_OFF#	Out
7	USB_D+	USB2.0 Positive Line
8	W_DISABLE#	Out
9	USB D-	USB2.0 Negative Line
10	GPIO_9/DAS/DSS	M2_DAS_DSS
11	GND	Ground
12 to 19	removed	Mechanical notch B
20	GPIO_5	NC
21	CONFIG_0	Defines module type
22	GPIO_6	USB_DETECT
23	GPIO_11	Wake WWAN
24	GPIO_7	M2.TP7 (Test Point)
25	DPR	Dynamic Power Range
26	GPIO_10	GPS_DISABLE
27	GND	Ground
28	GPIO_8	NC
29	PERn1 / USB RX- /SSIC-RxN	NC
30	UIM-RESET	Input
31	PERp1 / USB RX+/ SSIC-RxP	NC
32	UIM-CLK	Input
33	GND	Ground
34	UIM-DATA	I/O
35	PETn1 / USB TX- /SSIC-TxN	NC
36	UIM-PWR	Input
37	PETp1 / USB TX+/SSIC-TxP	NC
38	DEVSLP	NC
39	GND	Ground
40	GPIO_0/SMB_CLK	I2C Clock
41	SATA-B+/PERn0	PCIe Lane 0 Rx-

42	GPIO_1/SMB_DATA	I2C Data
43	SATA-B-/PERp0	PCIe Lane 0 Rx+
44	GPIO_2/ALERT#	NC
45	GND	Ground
46	GPIO_3	LCD Controller GPIO PE3
47	SATA-A-/PETn0	PCIe Lane 0 Tx-
48	GPIO_4	NC
49	SATA-A+/PETp0	PCIe Lane 0 Tx+
50	PERST#	PCIe reset
51	GND	Ground
52	CLKREQ#	Reference clock request signal
53	REFCLKN	PCIe Reference Clock-
54	PEWAKE#	NC
55	REFCLKP	PCIe Reference Clock+
56	MFG1	NC
57	GND	Ground
58	MFG2	NC
59	ANTCTL0	NC
60	COEX3	NC
61	ANTCTL1	NC
62	COEX_TXD	NC
63	ANTCTL2	NC
64	COEX_RXD	NC
65	ANTCTL3	NC
66	SIM DETECT	Out
67	RESET#	Out
68	SUSCLK	NC
69	CONFIG_1	Defines module type
70	3.3V / VBAT	Supply pin
71	GND	Ground
72	3.3V / VBAT	Supply pin,
73	GND	Ground
74	3.3V / VBAT	Supply pin
75	CONFIG_2	Defines module type

6.26 CON31 – CSI Camera Connector

The CSI Camera Connector provides an FFC interface to a camera module compatible with Raspberry Pi Zero. The camera connectors are not used in CM5 due to limitations on the CM4 / CM5 compatibility.

Pin	Signal	Description
1	CAM_VCC_3V3	+3.3V Supply Voltage
2	CAM_SDA	I2C Clock
3	CAM_SCL	I2C Data
4	GND	Ground
5	CAM_GPIO1	CM4 GPIO1 / CM5 not used
6	CAM_GPIO0	CM4 GPIO0 / CM5 not used
7	GND	Ground
8	CAM_D3_P	Differential Data Lane 3 Positive Output
9	CAM_D3_N	Differential Data Lane 3 Negative Output
10	GND	Ground
11	CAM_D2_P	Differential Data Lane 2 Positive Output
12	CAM_D2_N	Differential Data Lane 2 Negative Output
13	GND	Ground
14	CAM_CLK_P	Differential Clock Lane Positive Output
15	CAM_CLK_N	Differential Clock Lane Negative Output
16	GND	Ground
17	CAM_D1_P	Differential Data Lane 1 Positive Output
18	CAM_D1_N	Differential Data Lane 1 Negative Output
19	GND	Ground
20	CAM_D0_P	Differential Data Lane 0 Positive Output
21	CAM_D0_N	Differential Data Lane 0 Negative Output
22	GND	Ground

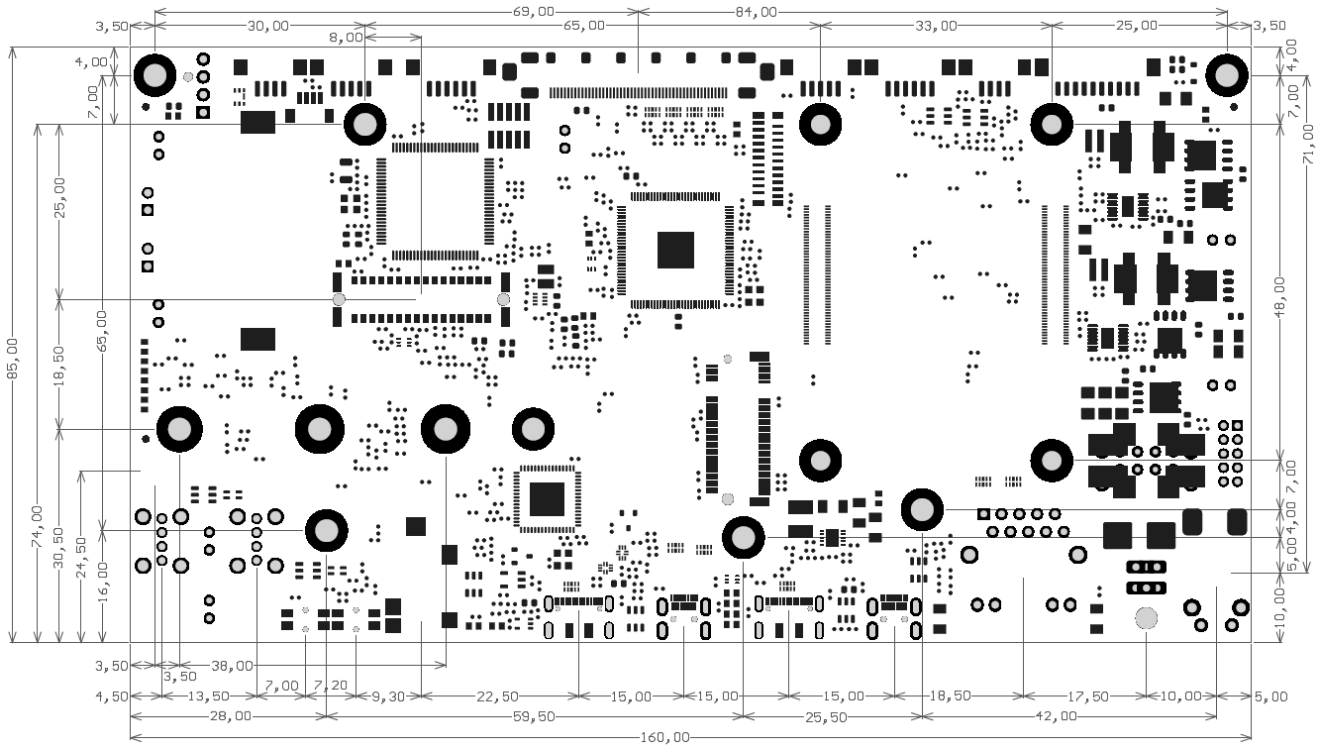
6.27 CON34 – Micro SIM Card

The Micro SIM Card slot is connected to the M.2 Key B interface CON29.

Pin	Signal	Description
C1	UIM-PWR	Power supply
C2	UIM-RESET	Reset
C3	UIM-CLK	Clock
C4	UIM_C4	Not Connected
C5	GND	Ground
C6	UIM_C6_VPP	Not Connected
C7	UIM-DATA	Data

C8	NC	Not Connected
1	GND3	Ground
2	GND2	Ground
3	GND1	Ground
4	DETECT CONTACT	M2_SIM_DETECT
5	GND4	Ground
6	GND5	Ground
7	DETECT_SPRING	Ground
8	GND6	Ground

7 Mechanical Dimensions



		Min	Typ	Max
Weight		93 g	95 g	100 g
Width		84,9 mm	85,0 mm	85,1 mm
Length		159,9 mm	160,0 mm	160,1 mm
Height	**PCB**	1,44 mm	1,6 mm	1,76 mm
	Components on Top	14,4	14,5 mm	15,0 mm
	Components on Bottom	2,18	2,26	2,5 mm

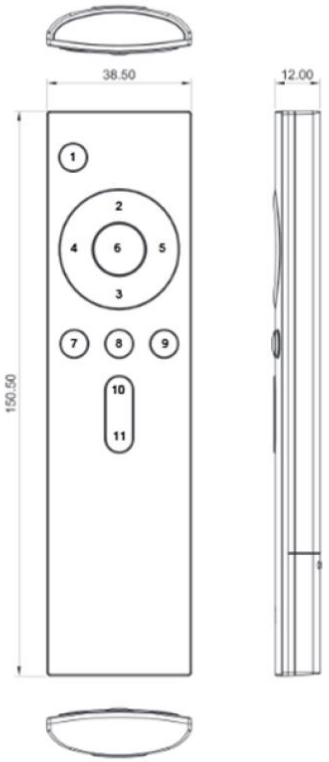
8 Accessories

8.1 I/R Sensor ZU-02-406 and I/R Remote Control RC-10-007

As an alternative to the external keypad, the Compute Module can be controlled through infrared. IR sensor and IR remote control devices are provided by Fortec Integrated.
Fitting cable to CON14: KA-30-467.

Position	Code	Function
1	0x01	Power
2	0x0D	Key Up
3	0x11	Key Down
4	0x0E	Key Left / decrease Brightness
5	0x10	Key Right / increase Brightness
6	0x0F	Key Enter
7	0x27	Menu
8	0x13	Exit
9	0x05	Mute
10	0x04	Volume +
11	0x03	Volume -

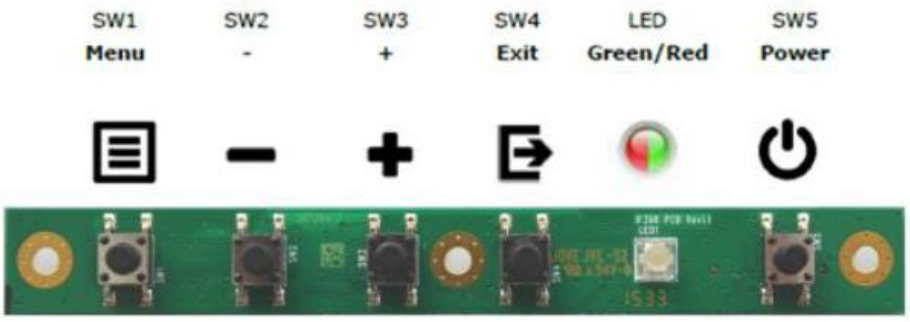
RC-10-007 Button Position



RC-10-007 Picture

8.2 OSD Keypad ZU-02-398

An OSD keypad can be used to control brightness, volume and power on/off.
Fitting cables to CON21: KA-30-394 (80cm) or KA-30-613 (45cm)



The following table gives an overview about the functionality.

Menu / SW1	- / SW2	+ / SW3	SW4 / Exit	LED	SW5 / Power
Select	Hotkey Volume	Hotkey Brightness	Exit	Same as LED1+2 in chapter 5.3.2.	Power ON/OFF

8.3 Light Sensor ZU-02-412

This light sensor can be connected for automatic adjustment to panel brightness according to the ambient light.
Fitting cable to CON15: KA-30-786.

8.4 Temperature Sensor ZU-02-389

A temperature sensor is available to check the temperature of a TFT panel or any other hardware. FW support is provided upon request. Fitting cable to CON15: KA-30-323.

9 Ordering Information

Part Number	Description	Panel Interface	Power Supply	Note
AR-02-220_A1	ARTISTAMEDIA-IV-00 VBO,24V	V-by-One	+24V	Base Board only

10 Reference Kits

10.1 V-by-One 8-lane 4K2K@60Hz SVCC=12V

Ordering Code	Description	Comment
CH-01-050R1.1	M280DGJ-L30	SVCC=12V
KA-25-013	Cable BL SmartLEDIII/A1024HA-06PN 250mm	Mating to CON13
IN-54-009R1.1	Converter SmartLEDIVB-009 (12/24V,PDIM)	Backlight Controller
KA-20-100	Conv.cable Prisma/SmartLEDII-IV 500mm	Mating to CON13
KA-10-209	Cable Prisma-4K VBO/FI-RE51CL#1 500mm	FFC, mating to CON12
KA-31-382	Cable 43025-0200/AWG20 open end 700mm	Mating to CON2
PC-02-028	Raspberry Pi Mod. CM4108016 (16G/8G/WL)	
TBD	Raspberry Pi Mod. CM5104032 (32G/4G/WL)	
ZU-02-406	IF406-00 Small Size IR-Sensor	
KA-30-467	Cable Prisma/IF406 (IR-Sensor) 1000mm	Mating to CON14
RC-10-007	IR Remote Control / RC-5 Code	
ZU-02-398	IF398-00-OSD-Board-Universal 4+1Button	
KA-30-394	Cable OSD IF398/PrismaCompactMedia 800mm	Mating to CON21
ZU-02-412	IF412-00 Light Sensor	
KA-30-786	Cable Prisma-IIIA_A-Media / IF412 800mm	Mating to CON15
ZU-02-389	IF389-00 Temperature Sensor (I2C)	
KA-30-323	Cable Prisma-IIIA / IF389 500mm	Mating to CON15
ZX-42-128	Battery Button Cells CR2032 Blister Pack	
TBD	Heatsink for CM4	
TBD	Heatsink for CM5	
TBD	Antenna for CM4	
TBD	RPIZ CAM 5MP 170 Raspberry Pi Zero	

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