



CPC1001

CPU Module

User Manual

Rev. 001

October 2021



The product described in this manual is compliant with all related CE standards.

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Safety requirements

This Fastwel Group's product is developed and tested for the purpose of ensuring compliance to the electric safety requirements. Its design provides long-term trouble-free operation. The service life of the product can be significantly reduced due to the improper handling during unpacking and installation. Therefore, in the interests of your safety and in order to ensure proper operation of the product, you should follow the recommendations below.

Conventions



Caution, High Voltage!

This sign and text warn of the dangers associated with electrical discharges (> 60 V) when touching the device or any part of it. Failure to follow the precautions mentioned or prescribed in the regulations may endanger your life or health, and may result in damages to the equipment. Please also read the below subparagraph dedicated to the rules for working with high voltage.



Attention! Static-sensitive device!

This sign and text indicate that electronic boards and their components are sensitive to static electricity, so care should be taken when handling this device and performing inspections to ensure integrity and functionality of the device.



Attention! Hot surface!

This sign and text warn of the danger associated with touching hot surfaces of the device.



Attention!

This sign is aimed at drawing your attention to aspects of this User Manual that, if not fully understood or ignored, may endanger your health or cause damages to the equipment.



Note

This sign is used to text fragments that should be read carefully.

This User Manual (hereinafter referred to as the User Manual or UM) covers the CPC1001 CPU Module and contains description, operating principle and technical specifications of CPC1001, as well as establishes the rules and procedures for its operation.

Carefully read this User Manual before using the product.

The manufacturer is not responsible for any possible damages and breakdowns caused by non-compliance with the recommendations and requirements of this User Manual.



Attention!

All operations with this device should only be performed by personnel with sufficient qualifications.

MANUFACTURER'S WARRANTIES

Warranty liabilities

The manufacturer guarantees that CPC1001 meets the requirements of technical specifications of the "CPU MODULE IN SMARC (Smart Mobility ARChitecture) FORMAT" IMES.467444.111 TU provided that the Consumer complies with the operating conditions, transportation, storage, installation and mounting, set by the operational documents.

The manufacturer guarantees that the products supplied by it will not show any manufacturing defects and the materials used comply with the rules of operation and maintenance during the warranty period established at the moment. The Manufacturer's obligation under this warranty is to repair or replace, free of charge, any defective electronic component included in the returned product.

Products that failed through the Manufacturer's fault during the warranty period will be repaired free of charge. In other cases, the Consumer will be billed based on current remuneration rates and the cost of consumables.

Right of limitation liability

The manufacturer is not responsible for any damages caused to the Consumer's property due to the failure of the product in the process of its use.

Warranty period

The warranty period for the manufacturer's products is 36 months from the date of sale (unless otherwise provided by the delivery agreement).

For customized products, the warranty period is 60 months from the date of sale (unless otherwise provided by the delivery agreement).

The warranty set forth above does not extend to and shall not apply to:

1. Products, including software, which have been repaired or altered by other than Fastwel personnel, unless Buyer has properly altered or repaired the products in accordance with procedures previously approved in writing by Fastwel.
2. Products, which have been subject to power supply reversal, misuse, neglect, accident, or improper installation.

Returning a product for repair

1. Apply to Fastwel Company or to any of the Fastwel's official representatives for the Product Return Authorization.
2. Attach a failure inspection report with a product to be returned in the form, accepted by customer, with a description of the failure circumstances and symptoms.
3. Carefully package the product in the antistatic bag, in which the product had been supplied. Failure to package in antistatic material will VOID all warranties. Then package the product in a safe container for shipping.
4. The customer pays for shipping the product to Fastwel or to an official Fastwel representative or dealer.

Transportation, Unpacking and Storage

Transportation

The modules should be transported in the separate manufacturer's packaging (container), consisting of an individual antistatic packaging and a cardboard box.

The packaging should ensure the integrity and performance of the product after transportation.



Attention!

During transportation, the transport packaging should provide proper protection of the product against direct exposure of atmospheric precipitation.

Hauling equipment and climatic conditions

The modules should be transported in closed transport (by road, rail or air in heated and sealed compartments) under storage conditions 5 in accordance with the GOST 15150-69 standard or under storage conditions 3 for sea transportation.

Placement and fastening of shipping containers

The shipping containers should be placed and fastened in such a way that will ensure their stable position, exclude their displacement and damages by impacts during transportation.



Attention!

During handling operations and transportation, the packed modules should not be subjected to sudden shocks, drops or impacts, which may affect their safety and performance.

Storage

Storage conditions of the modules 1 comply with the GOST standard 15150-69.

Unpacking

Safety precautions

Before unpacking, after transportation at negative ambient temperatures, the modules must be kept for 6 hours under storage conditions 1, in accordance with the GOST standard 15150-69.

Do not place the packaged modules near any heat sources before unpacking.

When unpacking the modules, it is necessary to observe all precautions to ensure their safety, as well as marketable condition of manufacturer's consumer packaging.

Assessment of exterior appearance

When unpacking, it is necessary to check the modules for any external mechanical damages after transportation.



Note

If during unpacking you discover that the CPC1001 module has any external mechanical damages or any component from the delivery set (subsection 1.7) is missing, please contact the official distributor from which this product was purchased.

Please retain the product's consumer packaging (box) and antistatic packaging in their original form until the end of the warranty period.

1 Description and operation

1.1 Purpose of the device

Device name: CPC1001 CPU Module.

Product identification: IMES.467444.131.

The CPC1001 processor module (hereinafter referred to as the CPC1001 module or simply as CPC1001) is designed for the use as a high-performance computing core with a wide range of I/O interfaces when building real-time control systems for critical applications with strict requirements for dimensions, power consumption and operating conditions.

1.2 Technical specifications

1.2.1 SMARC form-factor, version 1.1:

- size (without heatsink) – 82.0 × 50.0 × 4.9 mm;
- size (with heatsink) – 82.0 × 50.0 × 8.8 mm;
- weight (without heatsink) – 20 g;
- weight (with heatsink) – 60 g.

1.2.2 Processor i.MX 6Quad (0.8-1.0 GHz):

- 4 Out-of-Order Execution processor cores;
- L1-Cache (32 kB Instructions, 32 kB Data);
- L2-Cache 1024 kB;
- Cortex-A9 NEON MPE (Media Processing Engine) Co-processor;
- Internal multimedia / shared, fast access RAM (OCRAM, 512 kB) Intel Digital Random

Number Generator;

- Secure/non-secure RAM (16 kB);
- External memory interfaces.

1.2.3 RAM:

- DDR3L-1066 SDRAM 4 GB;
- 64-bit data bus.

1.2.4 Flash memory:

- eMMC Flash disk 32 GB;
- SPI-Flash 4 MB;

- I2C-Flash 4 kB.

1.2.5 Connector MXM 3.0:

- 1 x port PCIe x1 (PCIe Base Spec. Rev 2.0), 5 GT/s;
- 1 x port USB 2.0 (host);
- 1 x port USB OTG 2.0;
- 1 x port SATA II (3-Gbps Gen. II);
- 1 x port Gbit Ethernet;
- 2 x SPI ports;
- Port "LVDS Channel A": LVDS;
- Port "HDMI 1.4 HD1080 @ 50Hz";
- 2 x CAN ports;
- 3 x I2C ports;
- 2 x I2S ports;
- SDIO port (combined with GPIO ports);
- 3 x UART ports (LVCMOS, 64-byte FIFO, up to 4 Mbps);
- port MMC 8-bit;
- "RTC battery" port.

1.2.6 Operating system (hereinafter referred to as the OS) boot interfaces:

- selection from eight alternative sources using three configuration inputs;

1.2.7 Watchdog timer: integrated into the processor - interval from 1 μ s to 10 min;

1.2.8 Real Time Clock (power is supplied from the "RTC battery" port);

1.2.9 Software compatibility:

- Linux;
- Android.

1.2.10 Power supply:

- from 3.3 to 5.25 V for the version CPC1001-01;
- from 3.3 to 4.5 V for the version CPC1001-02;
- power consumption:
 - extreme loading scenario – up to 9 W¹;
 - realistic scenario of heavy load – up to 5 W;
 - sleep mode – about 100 mW.

1.2.11 Environmental characteristics:

- operating temperature range from -40 to +85 °C;
- exposure of sinusoidal vibration of 5g for the frequencies ranging from 10 to 500 Hz;
- exposure of multiple shocks 50g and single shocks 100g.

1.2.12 Electromagnetic compatibility:

- CPC1001 is resistant to electromagnetic interference in accordance with the requirements of the GOST CISPR 24;
- level of radio interference caused during operation of CPC1001 does not exceed the values set by the GOST standard 30805.22-2013 for class A production units.

1.2.13 MTBF – 450,000 hours.



Note

The MTBF value is calculated using the Telcordia Issue 1 calculation model (Method I Case 3) for continuous operation when located on the ground under conditions corresponding to the climatic category Moderately Cold Climate 4 in accordance with GOST 15150-69 standard, at an ambient temperature of +30°C.

¹The scenario corresponds to the artificially generated, atypical, extremely heavy use of memory, video, SD and GBE.

1.3 Overview

Fig.1.1 shows the overview of CPC1001-02.



Fig. 1.1 – CPC1001-02

1.4 Dimensions and weight

Dimensions of CPC1001 are as follows:

- CPC1001-01 – max. 82.0 × 50.0 × 8.8 mm;
- CPC1001-02 – max. 82.0 × 50.0 × 4.9 mm.

Weight of CPC1001:

- CPC1001-01 – max. 0.06 kg;
- CPC1001-02 – max. 0.02 kg.

1.5 Ordering information on CPC1001

The manufacturer produces CPC1001 modules with the following design:

- CPC1001-01 IMES.467444.131 - with a power supply voltage ranging from 3.3 to 5.25 V, with an installed heatsink;
- CPC1001-02 IMES.467444.131-01 - with a power supply voltage ranging from 3.3 to 4.5 V, without a heatsink (Fig.1.1).

The CPC1001-02 module is 10-15% more efficient in terms of power consumption, but its consumption along the power supply circuit of the real-time clock is rather high - about 60 μ A, which makes it impractical to use the batteries of 2032 type. When it comes to the CPC1001-01 version, the consumption along the power supply circuit of the real-time clock is about 1 μ A (for more details see subparagraph 2.7 *Power up and down*).

1.6 Structure and operation

1.6.1 Location of CPC1001 elements

Example of how the CPC1001 elements are located is demonstrated with the CPC1001-01 version in Fig. 1.2. The heatsink is used to remove heat from the microchips installed on the CPC1001-01 board (for more details on heat removal, see subparagraph 2.4). I/O interfaces of the SMARC connector are listed in paragraph 1.2. The purpose of pins of the SMARC connector is shown in table. 1.1.

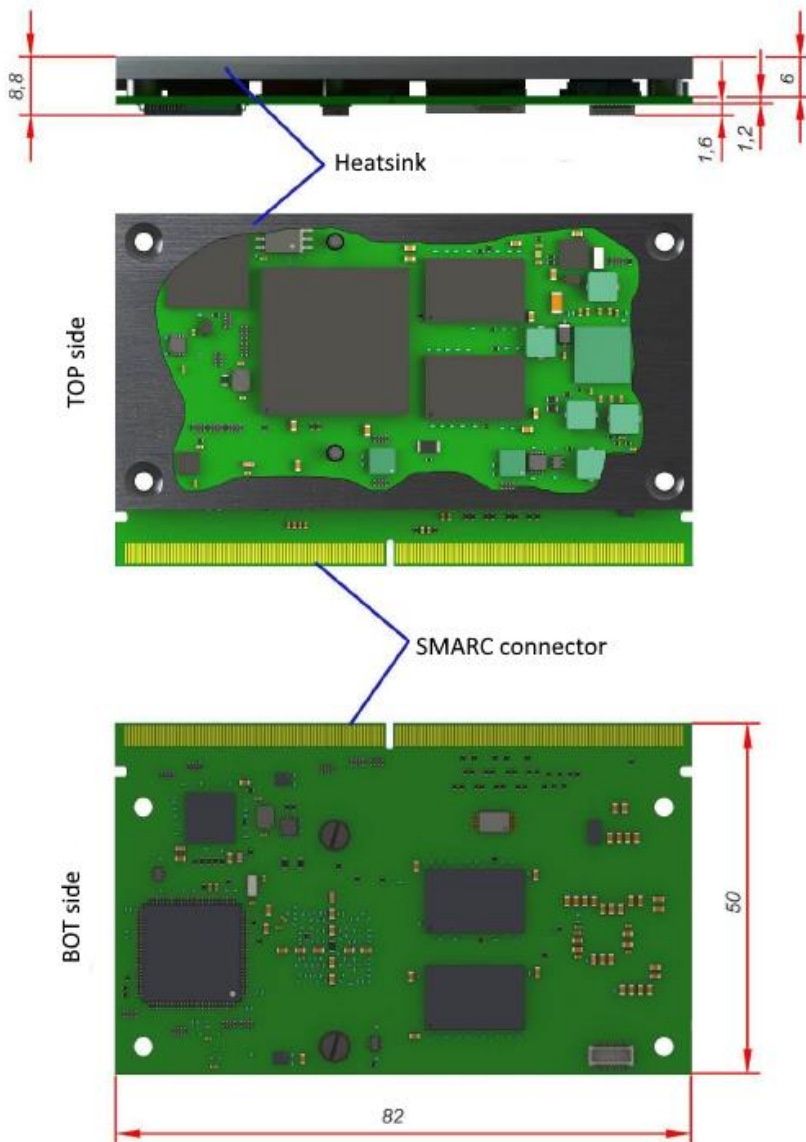


Fig. 1.2 – Structural elements of CPC1001-01

1.6.2 SMARC connector of the CPC1001 module

The SMARC connector is used when installing the module on a carrier board (subparagraph 2.5).

The purpose of the SMARC connector pins of CPC1001 is given in table 1.1.

Tab. 1.1 - Purpose of the SMARC connector pins of the CPC1001 module

Table 1.1 – Purpose of pins of the SMARC connector of CPC1001

TOP pin	Purpose of the SMARC connector pins	Output of i.MX6 processor	BOTTOM pin	Purpose of the SMARC connector pins	Output of i.MX6 processor
		-	S1	PCAM_VSYNC	CSI0_VSYNC ALT0 IPU1_CSI0_VSYNC
P1	PCAM_PXL_CK1	Not connected	S2	PCAM_HSYNC	CSI0_MCLK ALT0 IPU1_CSI0_HSYNC
P2	GND	-	S3	GND	-
P3	CSI1_CK+/ PCAM_D0	CSI0_DAT12 ALT0 IPU1_CSI0_DATA12	S4	PCAM_PXL_CK0	CSI0_PIXCLK ALT0 IPU1_CSI0_PIXCLK
P4	CSI1_CK-/ PCAM_D1	CSI0_DAT13 ALT0 IPU1_CSI0_DATA13	S5	I2C_CAM_CK	KEY_COL3 ALT4 I2C2_SCL
P5	PCAM_DE	CSI0_DATA_EN ALT0 IPU1_CSI0_DATA_EN	S6	CAM_MCK	GPIO_19 ALT3 CCM_CLKO1
P6	PCAM_MCK	-	S7	I2C_CAM_DAT	KEY_ROW3 ALT4 I2C2_SDA
P7	CSI1_D0+/ PCAM_D2	CSI0_DAT14 ALT0 IPU1_CSI0_DATA14	S8	CSI0_CK+/ PCAM_D10	CSI_CLK0P
P8	CSI1_D0-/ PCAM_D3	CSI0_DAT15 ALT0 IPU1_CSI0_DATA15	S9	CSI0_CK-/ PCAM_D11	CSI_CLK0M
P9	GND	-	S10	GND	-
P10	CSI1_D1+/ PCAM_D4	CSI0_DAT16 ALT0 IPU1_CSI0_DATA16	S11	CSI0_D0+/ PCAM_D12	CSI_D0P
P11	CSI1_D1-/ PCAM_D5	CSI0_DAT17 ALT0 IPU1_CSI0_DATA17	S12	CSI0_D0-/ PCAM_D13	CSI_D0M
P12	GND	-	S13	GND	-
P13	CSI1_D2+/ PCAM_D6	CSI0_DAT18 ALT0 IPU1_CSI0_DATA18	S14	CSI0_D1+/ PCAM_D14	CSI_D1P
P14	CSI1_D2-/ PCAM_D7	CSI0_DAT19 ALT0 IPU1_CSI0_DATA19	S15	CSI0_D1-/ PCAM_D15	CSI_D1M
P15	GND	-	S16	GND	-
P16	CSI1_D3+/ PCAM_D8	Not connected	S17	AFB0_OUT	EIM_BCLK ALT5 GPIO6_IO31
P17	CSI1_D3-/ PCAM_D9	Not connected	S18	AFB1_OUT	EIM_WAIT ALT5 GPIO5_IO00
P18	GND	-	S19	AFB2_OUT	EIM_EB0 ALT5 GPIO2_IO28
P19	GBE_MDI3-	GBE_PHY TXRXM_D	S20	AFB3_IN	EIM_EB1 ALT5 GPIO2_IO29
P20	GBE_MDI3+	GBE_PHY TXRXP_D	S21	AFB4_IN	EIM_AD00 ALT5 GPIO3_IO00
P21	GBE_LINK100#	GBE_PHY LED1	S22	AFB5_IN	EIM_AD01 ALT5 GPIO3_IO01
P22	GBE_LINK1000#	GBE_PHY LED2	S23	AFB6_PTIO	EIM_AD02 ALT5 GPIO3_IO02
P23	GBE_MDI2-	GBE_PHY TXRXM_C	S24	AFB7_PTIO	EIM_AD03 ALT5 GPIO3_IO03
P24	GBE_MDI2+	GBE_PHY TXRXP_C	S25	GND	-
P25	GBE_LINK_ACT#	Not connected	S26	SDMMC_D0	SD3_DAT0 ALT0 SD3_DATA0

TOP pin	Purpose of the SMARC connector pins	Output of i.MX6 processor	BOTTOM pin	Purpose of the SMARC connector pins	Output of i.MX6 processor
P26	GBE_MDI1-	GBE_PHY TXRXM_B	S27	SDMMC_D1	SD3_DAT1 ALT0 SD3_DATA1
P27	GBE_MDI1+	GBE_PHY TXRXP_B	S28	SDMMC_D2	SD3_DAT2 ALT0 SD3_DATA2
P28	GBE_CTREF	Not connected	S29	SDMMC_D3	SD3_DAT3 ALT0 SD3_DATA3
P29	GBE_MDI0-	GBE_PHY TXRXM_A	S30	SDMMC_D4	SD3_DAT4 ALT0 SD3_DATA4
P30	GBE_MDI0+	GBE_PHY TXRXP_A	S31	SDMMC_D5	SD3_DAT5 ALT0 SD3_DATA5
P31	SPI0_CS1#	EIM_D19 ALT1 ECSP11_SS1 or ALT5 GPIO3_IO19	S32	SDMMC_D6	SD3_DAT6 ALT0 SD3_DATA6
P32	GND	-	S33	SDMMC_D7	SD3_DAT7 ALT0 SD3_DATA7
P33	SDIO_WP	GPIO_2 ALT6 SD2_WP or ALT5 GPIO1_IO02	S34	GND	-
P34	SDIO_CMD	SD2_CMD ALT0 SD2_CMD	S35	SDMMC_CK	SD3_CLK ALT0 SD3_CLK
P35	SDIO_CD#	GPIO_4 ALT6 SD2_CD_B or ALT5 GPIO1_IO04	S36	SDMMC_CMD	SD3_CMD ALT0 SD3_CMD
P36	SDIO_CK	SD2_CLK ALT0 SD2_CLK	S37	SDMMC_RST#	SD3_RST ALT0 SD3_RESET
P37	SDIO_PWR_EN	GPIO_5 ALT5 GPIO1_IO05	S38	AUDIO_MCK	GPIO_19 ALT3 CCM_CLKO1
P38	GND	-	S39	I2S0_LRCK	CSI0_DAT6 ALT4 AUD3_TXFS
P39	SDIO_D0	SD2_DAT0 ALT0 SD2_DATA0	S40	I2S0_SDOUT	CSI0_DAT5 ALT4 AUD3_TXD
P40	SDIO_D1	SD2_DAT1 ALT0 SD2_DATA1	S41	I2S0_SDIN	CSI0_DAT7 ALT4 AUD3_RXD
P41	SDIO_D2	SD2_DAT2 ALT0 SD2_DATA2	S42	I2S0_CK	CSI0_DAT4 ALT4 AUD3_TXC
P42	SDIO_D3	SD2_DAT3 ALT0 SD2_DATA3	S43	I2S1_LRCK	KEY_COL1 ALT2 AUD5_TXFS
P43	SPI0_CS0#	Not connected	S44	I2S1_SDOUT	KEY_ROW0 ALT2 AUD5_TXD
P44	SPI0_CK	EIM_D16 ALT1 ECSP11_SCLK	S45	I2S1_SDIN	KEY_ROW1 ALT2 AUD5_RXD
P45	SPI0_DIN	EIM_D17 ALT1 ECSP11_MISO	S46	I2S1_CK	KEY_COLO ALT2 AUD5_TXC
P46	SPI0_DO	EIM_D18 ALT1 ECSP11_MOSI	S47	GND	-
P47	GND	-	S48	I2C_GP_CK	GPIO_3 ALT2 I2C3_SCL
P48	SATA_TX+	SATA_TXP	S49	I2C_GP_DAT	GPIO_6 ALT2 I2C3_SDA
P49	SATA_TX-	SATA_TXM	S50	I2S2_LRCK	Not connected
P50	GND	-	S51	I2S2_SDOUT	Not connected
P51	SATA_RX+	SATA_RXP	S52	I2S2_SDIN	Not connected
P52	SATA_RX-	SATA_RXM	S53	I2S2_CK	Not connected
P53	GND	-	S54	SATA_ACT#	GPIO_17 ALT5 GPIO7_IO12

TOP pin	Purpose of the SMARC connector pins	Output of i.MX6 processor	BOTTOM pin	Purpose of the SMARC connector pins	Output of i.MX6 processor
P54	SPI1_CS0#	EIM_RW ALT2 ECSPi2_SS0 or ALT5 GPIO2_IO26	S55	AFB8_PTIO	EIM_AD08 ALT5 GPIO3_IO08
P55	SPI1_CS1#	EIM_LBA ALT2 ECSPi2_SS1 or ALT5 GPIO2_IO27	S56	AFB9_PTIO	EIM_AD09 ALT5 GPIO3_IO09
P56	SPI1_CK	EIM_CS0 ALT2 ECSPi2_SCLK	S57	PCAM_ON_CSI0#	Not connected
P57	SPI1_DIN	EIM_OE ALT2 ECSPi2_MISO	S58	PCAM_ON_CSI1#	GND
P58	SPI1_DO	EIM_CS1 ALT2 ECSPi2_MOSI	S59	SPDIF_OUT	ENET_RXD0 ALT3 SPDIF_OUT
P59	GND	-	S60	SPDIF_IN	ENET_RX_ER ALT3 SPDIF_IN
P60	USB0+	USB_OTG_DP	S61	GND	-
P61	USB0-	USB_OTG_DM	S62	AFB_DIFF0+	EIM_AD06 ALT5 GPIO3_IO06
P62	USB0_EN_OC#	EIM_D22 ALT4 USB_OTG_PWR or ALT5 GPIO3_IO22 EIM_D21 ALT4 USB_OTG_OC or ALT5 GPIO3_IO21	S63	AFB_DIFF0-	EIM_AD07 ALT5 GPIO3_IO07
P63	USB0_VBUS_DET	USB_OTG_VBUS	S64	GND	-
P64	USB0_OTG_ID	GPIO_1 ALT3 USB_OTG_ID or ALT5 GPIO1_IO01	S65	AFB_DIFF1+	EIM_AD08 ALT5 GPIO3_IO08
P65	USB1+	USB_H1_DP	S66	AFB_DIFF1-	EIM_AD09 ALT5 GPIO3_IO09
P66	USB1-	USB_H1_DN	S67	GND	-
P67	USB1_EN_OC#	EIM_D31 ALT6 USB_H1_PWR or ALT5 GPIO3_IO31 EIM_D30 ALT6 USB_H1_OC or ALT5 GPIO3_IO30	S68	AFB_DIFF2+	EIM_AD10 ALT5 GPIO3_IO10
P68	GND	-	S69	AFB_DIFF2-	EIM_AD11 ALT5 GPIO3_IO11
P69	USB2+	Not connected	S70	GND	-
P70	USB2-	Not connected	S71	AFB_DIFF3+	EIM_AD12 ALT5 GPIO3_IO12
P71	USB2_EN_OC#	Not connected	S72	AFB_DIFF3-	EIM_AD13 ALT5 GPIO3_IO13
P72	PCIE_C_PRSENT#	Not connected	S73	GND	-
P73	PCIE_B_PRSENT#	Not connected	S74	AFB_DIFF4+	EIM_AD14 ALT5 GPIO3_IO14
P74	PCIE_A_PRSENT#	GPIO_18 ALT5 GPIO7_IO13	S75	AFB_DIFF4-	EIM_AD15 ALT5 GPIO3_IO15
	<key>	-		<key>	-
P75	PCIE_A_RST#	EIM_A19 ALT5 GPIO2_IO19	S76	PCIE_B_RST#	Not connected
P76	PCIE_C_CKREQ#	Not connected	S77	PCIE_C_RST#	Not connected
P77	PCIE_B_CKREQ#	Not connected	S78	PCIE_C_RX+	Not connected
P78	PCIE_A_CKREQ#	GPIO_0 ALT5 GPIO1_IO00	S79	PCIE_C_RX-	Not connected
P79	GND	-	S80	GND	-

TOP pin	Purpose of the SMARC connector pins	Output of i.MX6 processor	BOTTOM pin	Purpose of the SMARC connector pins	Output of i.MX6 processor
P80	PCIE_C_REFCK+	Not connected	S81	PCIE_C_TX+	Not connected
P81	PCIE_C_REFCK-	Not connected	S82	PCIE_C_TX-	Not connected
P82	GND	-	S83	GND	-
P83	PCIE_A_REFCK+	CLK1_P	S84	PCIE_B_REFCK+	Not connected
P84	PCIE_A_REFCK-	CLK1_N	S85	PCIE_B_REFCK-	Not connected
P85	GND	-	S86	GND	-
P86	PCIE_A_RX+	PCIE_RXP	S87	PCIE_B_RX+	Not connected
P87	PCIE_A_RX-	PCIE_RXM	S88	PCIE_B_RX-	Not connected
P88	GND	-	S89	GND	-
P89	PCIE_A_TX+	PCIE_TXP	S90	PCIE_B_TX+	Not connected
P90	PCIE_A_TX-	PCIE_TXM	S91	PCIE_B_TX-	Not connected
P91	GND	-	S92	GND	-
P92	HDMI_D2+	HDMI_D2P	S93	LCD_D0	DISP0_DAT0 ALT0/1 IPU1/2_DISP0_DATA00
P93	HDMI_D2-	HDMI_D2M	S94	LCD_D1	DISP0_DAT1 ALT0/1 IPU1/2_DISP0_DATA01
P94	GND	-	S95	LCD_D2	DISP0_DAT2 ALT0/1 IPU1/2_DISP0_DATA02
P95	HDMI_D1+	HDMI_D1P	S96	LCD_D3	DISP0_DAT3 ALT0/1 IPU1/2_DISP0_DATA03
P96	HDMI_D1-	HDMI_D1M	S97	LCD_D4	DISP0_DAT4 ALT0/1 IPU1/2_DISP0_DATA04
P97	GND	-	S98	LCD_D5	DISP0_DAT5 ALT0/1 IPU1/2_DISP0_DATA05
P98	HDMI_D0+	HDMI_D0P	S99	LCD_D6	DISP0_DAT6 ALT0/1 IPU1/2_DISP0_DATA06
P99	HDMI_D0-	HDMI_D0M	S100	LCD_D7	DISP0_DAT7 ALT0/1 IPU1/2_DISP0_DATA07
P100	GND	-	S101	GND	-
P101	HDMI_CK+	HDMI_CLKP	S102	LCD_D8	DISP0_DAT8 ALT0/1 IPU1/2_DISP0_DATA08
P102	HDMI_CK-	HDMI_CLKM	S103	LCD_D9	DISP0_DAT9 ALT0/1 IPU1/2_DISP0_DATA09
P103	GND	-	S104	LCD_D10	DISP0_DAT10 ALT0/1 IPU1/2_DISP0_DATA10
P104	HDMI_HPD	HDMI_HPD	S105	LCD_D11	DISP0_DAT11 ALT0/1 IPU1/2_DISP0_DATA11
P105	HDMI_CTRL_CK	KEY_COL3 ALT4 I2C2_SCL	S106	LCD_D12	DISP0_DAT12 ALT0/1 IPU1/2_DISP0_DATA12
P106	HDMI_CTRL_DAT	KEY_ROW3 ALT4 I2C2_SDA	S107	LCD_D13	DISP0_DAT13 ALT0/1 IPU1/2_DISP0_DATA13
P107	HDMI_CEC	KEY_ROW2 ALT6 HDMI_TX_CEC_LINE	S108	LCD_D14	DISP0_DAT14 ALT0/1 IPU1/2_DISP0_DATA14
P108	GPIO0/CAM0_PWR#	NANDF_WP ALT5 GPIO6_IO09	S109	LCD_D15	DISP0_DAT15 ALT0/1 IPU1/2_DISP0_DATA15
P109	GPIO1/CAM1_PWR#	NANDF_RB0 ALT5 GPIO6_IO10	S110	GND	-
P110	GPIO2/CAM0_RST#	NANDF_D0 ALT5 GPIO2_IO00	S111	LCD_D16	DISP0_DAT16 ALT0/1 IPU1/2_DISP0_DATA16
P111	GPIO3/CAM1_RST#	NANDF_D1 ALT5 GPIO2_IO01	S112	LCD_D17	DISP0_DAT17 ALT0/1 IPU1/2_DISP0_DATA17

TOP pin	Purpose of the SMARC connector pins	Output of i.MX6 processor	BOTTOM pin	Purpose of the SMARC connector pins	Output of i.MX6 processor
P112	GPIO4/HDA_RST#	NANDF_D2 ALT5 GPIO2_IO02	S113	LCD_D18	DISP0_DAT18 ALTO/1 IPU1/2_DISP0_DATA18
P113	GPIO5/PWM_OUT	SD1_DAT2 ALT3 PWM2_OUT	S114	LCD_D19	DISP0_DAT19 ALTO/1 IPU1/2_DISP0_DATA19
P114	GPIO6/TACHIN	SD1_CLK ALT3 GPT_CLKIN SD1_DAT0 ALT3 GPT_CAPTURE1 SD1_DAT1 ALT3 GPT_CAPTURE2	S115	LCD_D20	DISP0_DAT20 ALTO/1 IPU1/2_DISP0_DATA20
P115	GPIO7/PCAM_FLD	NANDF_D3 ALT5 GPIO2_IO03	S116	LCD_D21	DISP0_DAT21 ALTO/1 IPU1/2_DISP0_DATA21
P116	GPIO8/CAN0_ERR#	NANDF_D4 ALT5 GPIO2_IO04	S117	LCD_D22	DISP0_DAT22 ALTO/1 IPU1/2_DISP0_DATA22
P117	GPIO9/CAN1_ERR#	NANDF_D5 ALT5 GPIO2_IO05	S118	LCD_D23	DISP0_DAT23 ALTO/1 IPU1/2_DISP0_DATA23
P118	GPIO10	NANDF_D6 ALT5 GPIO2_IO06	S119	GND	-
P119	GPIO11	NANDF_D7 ALT5 GPIO2_IO07	S120	LCD_DE	DIO_PIN15 ALTO/1 IPU1/2_DIO_PIN15
P120	GND	-	S121	LCD_VS	DIO_PIN3 ALTO/1 IPU1/2_DIO_PIN3
P121	I2C_PM_CK	CSI0_DAT9 ALT4 I2C1_SCL	S122	LCD_HS	DIO_PIN2 ALTO/1 IPU1/2_DIO_PIN2
P122	I2C_PM_DAT	CSI0_DAT8 ALT4 I2C1_SDA	S123	LCD_PCK	DIO_DISP_CLK ALTO/1 IPU1/2_DIO_DISP_CLK
P123	BOOT_SEL0#	CPLD	S124	GND	-
P124	BOOT_SEL1#	CPLD	S125	LVDS0+	LVDS0_TX0_P
P125	BOOT_SEL2#	CPLD	S126	LVDS0-	LVDS0_TX0_N
P126	RESET_OUT#	EIM_A18 ALT5 GPIO2_IO20	S127	LCD_BKLT_EN	EIM_A21 ALT5 GPIO2_IO17
P127	RESET_IN#	POR#	S128	LVDS1+	LVDS0_TX1_P
P128	POWER_BTN#	ONOFF	S129	LVDS1-	LVDS0_TX1_N
P129	SER0_TX	EIM_D24 ALT2 UART3_TX_DATA	S130	GND	-
P130	SER0_RX	EIM_D25 ALT2 UART3_RX_DATA	S131	LVDS2+	LVDS0_TX2_P
P131	SER0_RTS#	EIM_D23 ALT2 UART3_CTS_B	S132	LVDS2-	LVDS0_TX2_N
P132	SER0_CTS#	EIM_EB3 ALT2 UART3_RTS_B	S133	LCD_VDD_EN	EIM_A20 ALT5 GPIO2_IO18
P133	GND	-	S134	LVDS_CK+	LVDS0_CLK_P
P134	SER1_TX	CSI0_DAT10 ALT3 UART3_TX_DATA	S135	LVDS_CK-	LVDS0_CLK_N
P135	SER1_RX	CSI0_DAT11 ALT3 UART3_RX_DATA	S136	GND	-
P136	SER2_TX	EIM_D26 ALT4 UART2_TX_DATA	S137	LVDS3+	LVDS0_TX3_P
P137	SER2_RX	EIM_D27 ALT4 UART2_RX_DATA	S138	LVDS3+	LVDS0_TX3_N
P138	SER2_RTS#	EIM_D28 ALT4 UART2_CTS_B	S139	I2C_LCD_CK	GPIO_3 ALT2 I2C3_SCL
P139	SER2_CTS#	EIM_D29 ALT4 UART2_RTS_B	S140	I2C_LCD_DAT	GPIO_6 ALT2 I2C3_SDA

TOP pin	Purpose of the SMARC connector pins	Output of i.MX6 processor	BOTTOM pin	Purpose of the SMARC connector pins	Output of i.MX6 processor
P140	SER3_TX	Not connected	S141	LCD_BKLT_PWM	SD1_DAT3 ALT3 PWM1_OUT
P141	SER3_RX	Not connected	S142	LCD_DUAL_PCK	DI0_PIN4 ALT0/1 IPU1/2_DIO_PIN4
P142	GND	-	S143	GND	-
P143	CAN0_TX	GPIO_7 ALT3 FLEXCAN1_TX (3.3V)	S144	RSVD/EDP_HPDP	Not connected
P144	CAN0_RX	GPIO_8 ALT3 FLEXCAN1_RX (3.3V)	S145	WDT_TIME_OUT#	GPIO_9 ALT1_WDOG1_B
P145	CAN1_TX	KEY_COL4 ALT0 FLEXCAN2_TX (3.3V)	S146	PCIE_WAKE#	KEY_COL2 ALT5 GPIO4_IO10
P146	CAN1_RX	KEY_ROW4 ALT0 FLEXCAN2_RX (3.3V)	S147	VDD_RTC	-
P147	VDD_IN	-	S148	LID#	EIM_D20 ALT5 GPIO
P148	VDD_IN	-	S149	SLEEP#	EIM_A25 ALT5 GPIO
P149	VDD_IN	-	S150	VIN_PWR_BAD#	-
P150	VDD_IN	-	S151	CHARGING#	NANDF_CS3 ALT5 GPIO6_IO16
P151	VDD_IN	-	S152	CHARGER_PRSENT#	NANDF_CLE ALT5 GPIO6_IO17
P152	VDD_IN	-	S153	CARRIER_STBY#	EIM_A17 ALT5 GPIO2_IO21
P153	VDD_IN	-	S154	CARRIER_PON	EIM_A16 ALT5 GPIO2_IO22
P154	VDD_IN	-	S155	FORCE_RECOV#	NANDF_CS1 ALT5 GPIO6_IO14
P155	VDD_IN	-	S156	BATLOW#	NANDF_CS2 ALT5 GPIO6_IO15
P156	VDD_IN	-	S157	TEST#	NANDF_CS0 ALT5 GPIO6_IO11
		-	S158	VDD_IO_SEL_D#	GND



Notes to the Table 1.1:

- The differences from the SMARC specification are highlighted in red (signal P43 (SPI0_CS0 #) - not connected; signals P143 - P146 (CAN0 / 1) - 3.3V).
- In accordance with the SMARC specification, version 1.1, VDD_IO_SEL_D# signal (pin S158 of the SMARC connector) is no longer designed for (compared to the SMARC 1.0 version) indication of the voltage level VDD_IO; in CPC1001 VDD_IO=1,8 V for all the signals, except for those, for which the voltage level of 3.3 V (auxiliary signals of SDIO, USB, PCIE, SATA and GBE interfaces), as well as CAN0/1 signals, are set by the specification.

1.6.3 Compliance of the SMARC interfaces and interface controllers of i.MX6

For reference, Table 1.2 shows the compliance of the SMARC interfaces and interface controllers of the i.MX6 processor in CPC1001.

Table 1.2 – Compliance of the SMARC interfaces and i.MX6 processor

SMARC	i.MX6	Devices on CPC1001
I2C_HDMI	I2C2	-
I2C_LCD	I2C3	-
I2C_CAM	I2C2	RTC PCF8523TK, address 0xD0, (only in version CPC1001-01)
I2C_PM	I2C1	EEPROM AT24C32D, address 0xA0
I2C_GP	I2C3	-
SPI0	ECSPI1	EEPROM AT45DB321E, EIM_EB2 ALT1 ECSPI1_SS0 or ALT5 GPIO2_IO30
SPI1	ECSPI2	-
I2S0	AUD3	-
I2S1	AUD5	-
SER0	UART3	-
SER1	UART1	-
SER2	UART2	-
CAN0	FLEXCAN1	-
CAN1	FLEXCAN2	-

1.6.4 Arrangement of 16-bit parallel bus

An additional feature of the CPC1001 module, which may be of interest within a number of applications, is the possibility of organizing a high-performance 16-bit parallel bus with a multiplexed address based on the EIM interface controller of the i.MX6 processor. The bus uses the signals listed in Table 1.3.

Table 1.3 – Signals of parallel bus

SMARC	Parallel bus
SPI1_CK	EIM_CS0, ALT0 EIM_CS0_B
SPI1_DO	EIM_CS1, ALT0 EIM_CS1_B
SPI1_DIN	EIM_OE, ALT0 EIM_OE_B
SPI1_CS0#	EIM_RW, ALT0 EIM_RW
SPI1_CS1#	EIM_LBA, ALT0 EIM_LBA_B
AFB0_OUT	EIM_BCLK, ALT0 EIM_BCLK
AFB1_OUT	EIM_WAIT, ALT0 EIM_WAIT_B
AFB2_OUT	EIM_EB0, ALT0 EIM_EB0_B
AFB3_IN	EIM_EB1, ALT0 EIM_EB1_B
AFB4_IN	EIM_AD00, ALT0 EIM_AD00
AFB5_IN	EIM_AD01, ALT0 EIM_AD01
AFB6_PTIO	EIM_AD02, ALT0 EIM_AD02
AFB7_PTIO	EIM_AD03, ALT0 EIM_AD03
AFB8_PTIO	EIM_AD04, ALT0 EIM_AD04
AFB9_PTIO	EIM_AD05, ALT0 EIM_AD05
AFB_DIFF0+	EIM_AD06, ALT0 EIM_AD06
AFB_DIFF0-	EIM_AD07, ALT0 EIM_AD07
AFB_DIFF1+	EIM_AD08, ALT0 EIM_AD08
AFB_DIFF1-	EIM_AD09, ALT0 EIM_AD09
AFB_DIFF2+	EIM_AD10, ALT0 EIM_AD10
AFB_DIFF2-	EIM_AD11, ALT0 EIM_AD11
AFB_DIFF3+	EIM_AD12, ALT0 EIM_AD12
AFB_DIFF3-	EIM_AD13, ALT0 EIM_AD13
AFB_DIFF4+	EIM_AD14, ALT0 EIM_AD14
AFB_DIFF4-	EIM_AD15, ALT0 EIM_AD15

1.7 Delivery checklist

CPC1001 is supplied as follows:

- CPC1001 module in an antistatic bag;
- Packaging.

1.8 Packaging

1.8.1 Size of the consumer container and weight of the packaged product

Upon delivery, CPC1001 is packed in individual consumer packaging (cardboard box) with dimensions 155 x 140 x 45 mm. The device's weight in package: - no more than 0.2 kg.

1.8.2 Labelling of consumer containers

Consumer packaging is labelled by means of an individual identifier (sticker).

The container sticker should have the following information:

- Product designation according to the ordering information (subparagraph 1.5);
- Product version;
- Product serial number;
- Manufacturer's trademark;
- Barcode.

1.8.3 Order of packing

Retain the original packaging for storing the product or for shipping in case of a warranty event. If it is necessary to transport or store the product, pack it in the same way as it was packed at the time of receipt (product in an antistatic bag). The box should be sealed to maintain its integrity during transportation.

2 Intended use

2.1 Operating limitations

Operation of CPC1001 is not allowed under the influence of external factors that do not comply with paragraph 1.2.11.

Fastwel Group does not recommend long-term operation of the products near the limit values of the operating temperature range. The nature of these processes is common for reducing the mean time between failures due to the increased likelihood of failure. Long-term operation of the product within the operating temperature range is not limited.

Any exposure to electromagnetic interference that does not comply with paragraph 1.2.12, should be avoided.

It is not allowed to send signals to the contacts of the SMARC connector (see Fig.1.2), which parameters do not meet the requirements of the I/O interfaces (paragraph 1.6.2, Table 1.1).

Power supply that does not meet the requirements of paragraph 1.2.10 is not allowed.

2.2 Safety requirements

This Fastwel product has been developed and tested in accordance with electrical safety requirements. It is designed for long-term and fail-safe operation. The service life of the device can be significantly reduced due to improper handling. Therefore, in the interests of your safety and to ensure the proper operation of the product, you should adhere to the requirements and recommendations given in this User Manual.

For maintaining the warranty, no alterations or modifications should be performed on the product. Any changes and improvements unauthorized by Fastwel Group will void the warranty.

The products should not be exposed to mechanical shocks and drops. Do not leave the module in the non-operating position without protective packaging. Please remember that any mechanical damage makes the product ineligible for warranty service.



Warning!

Installing CPC1001 on a carrier board is allowed only when the power is off.

There is a risk of electric shock during installation and maintenance of the products, so always disconnect the power supply during any preliminary works and preparations.



The product contains components sensitive to static electricity. Observe the following precautions to avoid damaging the module:

- You should remove the static charge from your clothes before touching the module. The best way to do so is by touching any metal part of the system enclosure.
- Do not touch electronic components or connector pins.
- If possible, always work with the module in workplaces protected against static electricity.

2.3 Information on the types of hazardous effects

In terms of its design, the device is safe for human life and health when used in accordance with this User Manual and contains no public health hazards (paragraph 1.2.12).

2.4 Heat removal

Reliable operation of the CPC1001 module requires a properly designed heat removal system, with due consideration to the following factors:

- the heat removal of the module largely depends on the executable end-user and system software and, therefore, must be estimated for each specific application (the reference information is given in paragraph 1.2.10);
- the heat-dissipation plate of the CPC1001-01 module, without an additionally installed heatsink (and fan), in general, would be insufficient for proper heat dissipation;
- Operating system, depending on its settings, is capable of monitoring the readings of the temperature sensor² built into the processor module during operation and can respond to exceeding of configurable thresholds³ as follows:
 - respond by decreasing in the frequency of computing cores and processor's graphics controller if the first threshold is exceeded (recommended value: +85 °C);
 - respond by an immediate shutdown if the second threshold is exceeded (recommended value: +105 °C);

For long-term failsafe operation, the temperature of the CPU module, measured on its enclosure or on the heat-distribution plate (the recommended temperature measurement zone is shown in Fig. 2.2), should not exceed +95 °C under all permissive external conditions.

If the natural heat dissipation is insufficient, a heatsink should be used (it is recommended to install the heatsink using a thermal paste) and, if necessary, a fan should also be used, the requirements for which are determined based on the operating features, with due consideration to the information given above. If the CPC1001-01 module is used, the heatsink is fastened to the heat-distribution plate with four M3 screws in the corresponding holes (see Fig. 2.2).



Attention!

The maximum permissible depth of securing the screws into the M3 holes of the heatsink of the CPC1001-01 module (Fig. 2.2) is 4 mm.

2.5 Installation of CPC1001

The carrier board for the CPC1001 must comply with the SMARC specification version 1.1 subject to the compatibility restrictions specified in the *Note* given in subparagraph 1.6.2.

Information on mating connectors of the carrier board and standoffs recommended to installation of CPC1001 is given in the table 2.1

² Measurement error may be up to ± 6 °C.

³ Thresholding method depends on the operating system used.

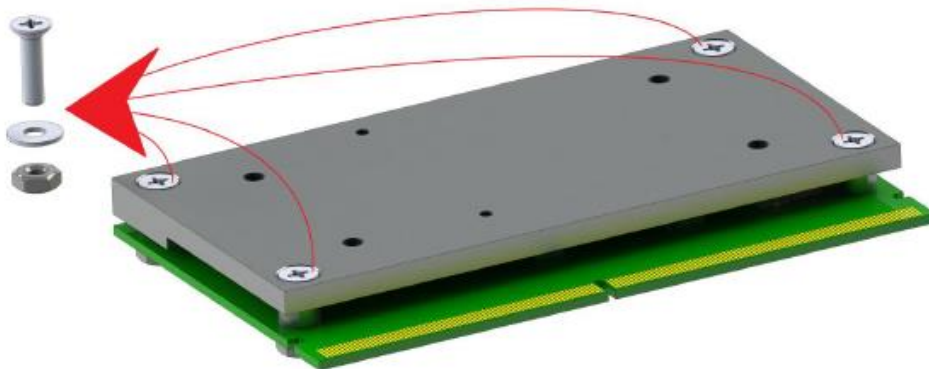
Table 2.1 – Recommended components for CPC1001 installation to the carrier-board

Stack height, mm	Connector (Foxconn)	Standoffs (Würth Elektronik)	Note
1.5	AS0B826-S43*	9774015151	If you need to use components with a stack height of less than 2.7 mm on the carrier board, you may need a recess for the CPC1001 connector of the Molex type 50003340200 (used for technological purposes at manufacturer facilities), see Fig. 2.2
2.7	AS0B826-S55*	9774027151	
5.0	AS0B826-S78*	9774050151	

**Attention!**

Immediately prior to installing the CPC1001-01 module on the carrier board, remove the **shipping** screws and fasteners (see Fig. 2.1):

- Countersunk screw M2.5x10 - 4 pcs.
- Nut M2.5 - 4 pcs.
- Washer - 4 pcs.

**Fig. 2.1 – Removal of the shipping screws on CPC1001-01**

Installing CPC1001 on a carrier board is allowed only when the power is off. Failure to comply with the above requirements may result in damages to the CPC1001 module and the carrier board.

The SMARC connector of the CPC1001 module should be carefully inserted into the mating connector of the carrier board (if necessary, pre-install the heatsink and the fan on CPC1001 (subparagraph 2.4)).

When installed on the carrier board, the CPC1001 module is fastened on the standoffs using 4 x M2.5 screws through the $\varnothing 2.9$ mm holes (see Fig. 2.2).

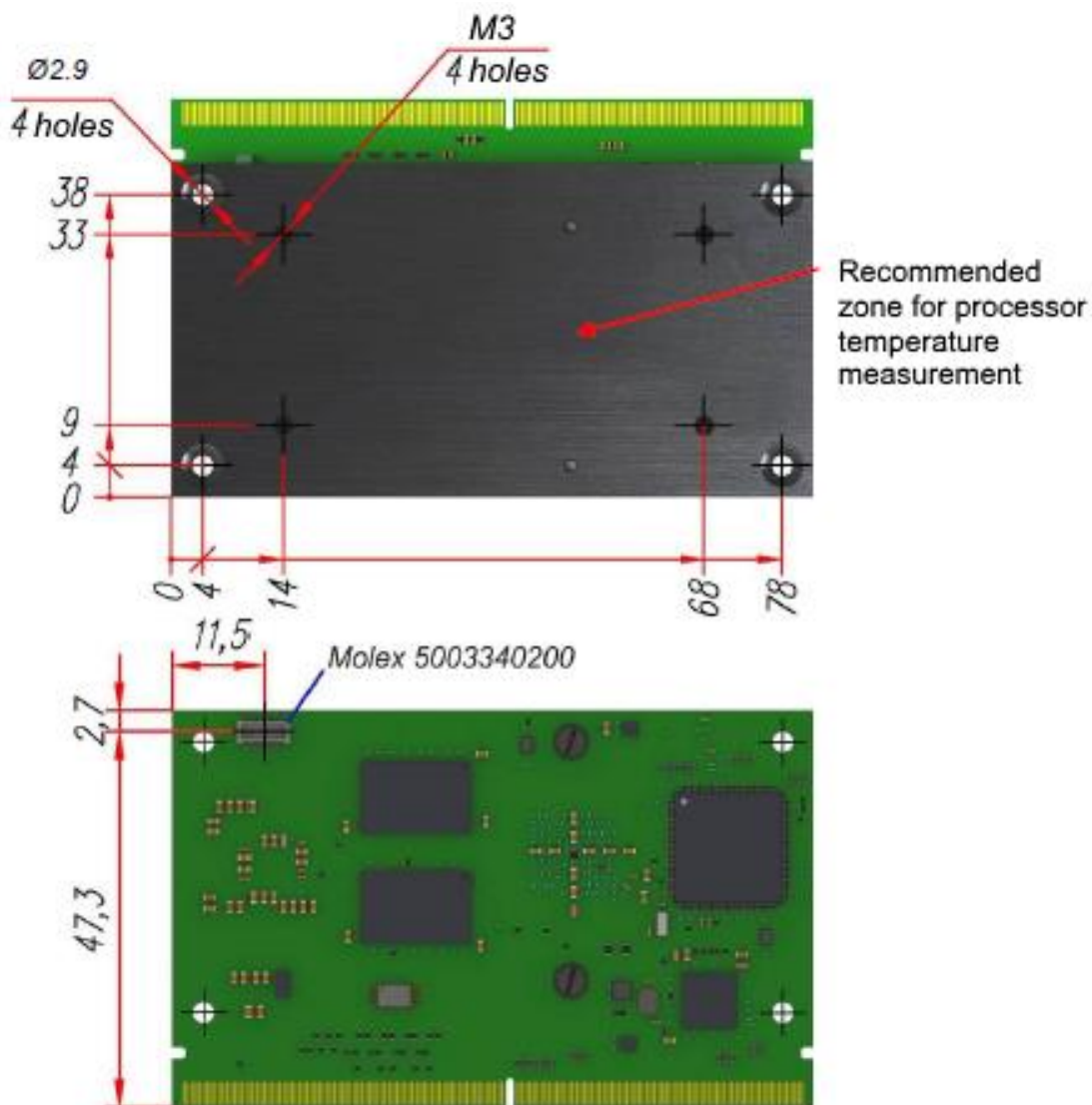


Fig. 2.2 – Mounting dimensions of CPC1001-01

2.6 Selection of OS boot source

One of the 8 possible sources of OS boot is selected by setting static levels at the inputs `BOOT_SEL [2 ... 0]#` (pins P125 ... 123 of the SMARC connector) in accordance with table. 2.2.

Table 2.2 – Boot sources of CPC1001

BOOT_SEL[2...0]#	OS boot source
000	SATA on the carrier board
001	SD card on the carrier board (μ SDHC2)
010	eMMC Flash on the carrier board (μ SDHC3)
011	SPI Flash on the carrier board (SPI0_CS1#) EIM_D19 ALT1 ECSP11_SS1 or ALT5 GPIO3_IO19
100	MMC-card on the carrier board (μ SDHC2)
101	Serial Boot (USB_OTG)
110	Onboard eMMC Flash (μ SDHC4)
111	Onboard SPI Flash (SPI0_CS0#) EIM_EB2 ALT1 ECSP11_SS0 or ALT5 GPIO2_IO30



BOOT_SEL [2... 0] # signals in CPC1001 have a pull-up, which ensures a high signal level (“1”) where there are no external connections. To set the low level of signal (“0”), the relevant circuit on the carrier board must be grounded. The state of the BOOT_SEL [2 ... 0]# signals is considered only at the time of the end of the CPC1001 hardware reset signal, therefore the selected source will be saved during any further reboots initiated by the operating system or when the watchdog timer is triggered.

For rebooting from the sources located on the carrier board, the corresponding devices must be supplied with power by the time the boot starts. That is, it should not depend on the CARRIER_PWR_ON and CARRIER_STBY# signals. The SDIO_PWR_EN signal, however, *can* be used to control power to the SD card on the carrier board.

2.7 Power up and down

The power is fed via the SMARC connector (subparagraph 1.6.2). Requirements to the supply voltages of CPC1001 are given in Table 2.3.

Table 2.3 – Requirements to the supply voltages of CPC1001

Version	VDD_IN, V	VDD_RTC, V	Note
CPC1001-01 IMES.467444.131	From 3.3 to 5.25	From 2.0 to 3.3	 <p>✦ The VDD_RTC voltage is not necessary for power-up and normal operation of CPC1001-01 and is used only for energy-independent power supply of PCF8523TK real-time clock, installed only in this version.</p> <p>✦ Power consumption along the VDD_RTC circuit – about 1 μA.</p> <p>✦ A voltage converter is installed in CPC1001-01, which brings the input voltage VDD_IN to a level acceptable for feeding the processor node with power; due to the losses in this converter, CPC1001-01 power consumption is 10-15% higher than that of CPC1001-02, where the voltage VDD_IN is used directly for feeding power to the processor node.</p>
CPC1001-02 IMES.467444.13101	From 3.3 to 4.5	From 2.8 to 3.3	 <p>✦ The VDD_RTC voltage is required for power-up and proper operation of CPC1001-02 and also for energy-independent power supply of the real-time clock integrated into the i.MX6 processor.</p> <p>✦ Power consumption along the VDD_RTC circuit is about 60 μA, which makes the use of 2032 batteries unnecessary.</p> <p>✦ After power on, the CPC1001-02 provides a voltage of about 3V to the VDD_RTC input; If it is necessary to protect the VDD_RTC source from charging, it is recommended to use a Schottky diode or a voltage stabilizer with reverse current protection on the carrier board.</p>

When the power is supplied for the first time, the CPC1001 module turns on automatically; for the CPC1001-01 version, the VDD_IN voltage would be sufficient, and for the CPC1001-02 version, the VDD_RTC voltage is additionally required. In the future, as long as the necessary supply voltages are maintained, the following possibilities exist for the CPC1001 to switch between the "on" and "off" states:

- Power shutdown managed by operating system, a request for which can be initiated by short-term grounding of the POWER_BTN # circuit.
- Forced shutdown in emergency cases (in particular, in case of system hangs), initiated by continuous grounding of the POWER_BTN # circuit for more than 5 seconds.
- "Manual" switching on, initiated by short-term grounding of the POWER_BTN # circuit.
- Scheduled activation using the alarm clock function of the real time clock integrated in the i.MX6 processor.

For grounding the POWER_BTN # circuit (pin P128 of the SMARC connector), the relevant button on the carrier board can be used.

Switching on the CPC1001 can be delayed by keeping the VIN_PWR_BAD # signal (pin S150 of the SMARC connector) at the low ("0") level. Only an open drain driver can be connected to this circuit on the carrier board.

The CPC1001 provides means for the forced hold-on of the critical output control signals in a safe state after power-on, until their software initialization. Completion of software initialization should be signaled by switching to the “0” state of the CFG_DONE # (ENET_TX_EN, ALT5 GPIO1_IO28) signal specially dedicated for this purpose, after which the forced holding is terminated. The behavior of dependent signals is shown in Table. 2.4.

Table 2.4 – Dependency of critical output signals

Signal	Prior to setting CFG_DONE="0"	After setting CFG_DONE="0"	Note
CARRIER_PWR_ON	0	EIM_A16 ALT5 GPIO2_IO22	-
CARRIER_STBY#	0	EIM_A17 ALT5 GPIO2_IO21	-
RESET_OUT#	0	EIM_A18 ALT5 GPIO2_IO20	-
PCIE_A_RST#	0	EIM_A19 ALT5 GPIO2_IO19	-
LCD_VDD_EN	0	EIM_A20 ALT5 GPIO2_IO18	-
LCD_BKLT_EN	0	EIM_A21 ALT5 GPIO2_IO17	-
SPDIF_OUT	0	ENET_RXD0 ALT3 SPDIF_OUT	-
PCAM_MCK	0	GPIO_19 ALT3 CCM_CLKO1	-
CAM_MCK			
AUDIO_MCK			
USB0_EN_OC#	0	EIM_D22 ALT4 USB_OTG_PWR	<ul style="list-style-type: none"> ✦ To activate USBx_EN_OC# or to recover it after an emergency shutdown, a USBx_PWR switch from “0” to “1” is required. ✦ To deactivate USBx_EN_OC# , switching USBx_PWR to “0” would be sufficient.
USB1_EN_OC#	0	EIM_D31 ALT6 USB_H1_PWR	

2.8 Removal of CPC1001

To remove the CPC1001 you should remove the screws holding the module and disconnect the SMARC CPC1001 connector from the carrier board connector.



Attention! Hot surface!

Do not pack the CPC1001 module until it is completely cooled!

Be careful; Don't forget that the heat distribution plate of CPC1001-01 may get too hot!

3 Maintenance and repairs

3.1 Maintenance

The device does not require maintenance during its entire service life.

3.2 Repairs

All repairs of CPC1001 are performed by the manufacturer.

The main provisions and reasons for carrying out warranty repairs are set out in section of this User Manual dedicated to the *Manufacturer's Warranty*.



Attention!

Any independent repairs of the devices are prohibited.

ANNEX A: DISCLAIMER

This Disclaimer contains special operating conditions of Fastwel in the following areas: intellectual property, warranty policy, conditions of the order and delivery.

1 INTELLECTUAL PRORETY

1.1 If any infraction, interference, improper use, illegitimate exploitation and/or violation of the industrial and/or intellectual property rights of any third party and/or property, exploitation during the use of Fastwel Embedded Module will take place – Fastwel does not guarantee to replace the materials, computer programs, procedures or equipment affected by the complaint and under no circumstances doesn't bear responsibility in any form for possible refusal in case of such a replacement.

1.2 Use of the Fastwel products as well as the objects of intellectual property containing in them, in the ways and for the purposes, not provided by the present user manual and datasheet isn't allowed without preliminary written approval of Fastwel.

1.3 Fastwel is not responsible for possible incidents and losses, related to the operation of end devices, in which the original Fastwel equipment is used.

2 WARRANTY POLICY

2.1 When the detected flaws in an element can be corrected without decreasing the foreseen technical features and functionality for it, User may demand Fastwel the urgent correction of the failures in additionally agreed period and an increasing of the period of the guarantee of the element equal as the time elapsed from the formal request to repair the failures, until the receipt of the repaired element. All costs associated to the correction of failures, included those of assembly, dismantle, transport, tests, etc., if they exist, shall be prosecuted according the Warranty Policy of Fastwel.

3 ORDER AND DELIVERY CONDITIONS

3.1 The general rule is that all Fastwel equipment prices are determined with due consideration of delivery under the EXW terms and conditions (Incoterms 2010). Delivery of the products under other terms and conditions should be preliminary agreed and stated in writing between the parties.

3.2 Unless otherwise expressly agreed with Fastwel, all the deliveries of Fastwel equipment will be carried out only after the official purchase order is obtained and provided that the ordered products have been prepaid in full. Other terms and conditions of cooperation should be made in writing.

3.3 Any delivery of Fastwel electronics is submitted with the right package in accordance with the current rules and standards in the Member States of the European Economic Area. The purchaser independently bears all risks regarding the compliance of package and marking of Fastwel products with legislation requirements being in effect at the place of purchased products destination (in the buyer's country). The specified condition excludes unequivocally any liability of Fastwel for possible non-compliance of package and marking of products with the requirements of legislation of the country of products destination.

3.4 In general, all components of the supply are properly protected with respect to freight, in order to avoid any damage to the supply, third parties, environmental damages or unrelated goods, as consequence of wrong packaging.

3.5 Each package unit is labeled on the exterior area with the indications of product's Part Number and Serial Number.

3.6 The support documents for the order should be made either in English or in Russian unless otherwise agreed between parties in writing.

3.7 Fastwel does not pay penalties and does not cover costs associated with delay in the delivery of the products caused by actions of the third parties, force-majeure etc. - Fastwel doesn't bear any responsibility for non-execution or inadequate execution of the obligations in a case when it is caused by actions of the third parties (for example producers or suppliers of accessories), force majeure etc.

3.8 Fastwel declares that independently and at any time without damage, it has an exclusive right to define and change functionality architecture, bill of materials of its products without any preliminary coordination and approvals of the third parties.

4 OTHER CONDITIONS

4.1 Fastwel has the obligation to respect the current Russian legislation (including, but not limited to environmental, labor, social laws) in each moment and to apply it to its embedded electronics considering all and each execution phase, that is to say, from the design until the commissioning and subsequent maintenance. In this regard Fastwel is not liable to the user or other persons in connection with possible changes of the company's rules (including, but not limited to warranty, ordering policy) caused by changes of the Russian legislation.

4.2 Unless otherwise expressly agreed in writing, Fastwel provides no training for assembly\installation\adjustment\operation of its equipment.