



AC100

Embedded Blue[®]

DIN Rail AI Edge Computing Platform

NVIDIA[®] Jetson Xavier[™] NX

Wi-Fi & WWAN • PCIe[®] Optical Cabling



Overview

The **AC100** is a boxed-computer intended for AI and real-time edge computing. Equipped with the Nvidia® Jetson Xavier™ NX SoM, the Din Rail box was designed for rugged industrial applications such as IIoT or image processing, and has a wide range 9-57VDC power input.

The AC100 provides typical I/O connectors, e.g. DisplayPort, Ethernet, and USB. A PCIe® M.2 SSD is available as internal mass storage.

The AC100 comes with the L4T (Linux for Tegra) development suite by Nvidia®, customized by EKF.

For wireless networking, the AC100 is equipped with M.2 connectors for a 4G/5G WWAN and dual Wi-Fi 6 modules (must be ordered separately).

As an option, the AC100 can be configured as master or slave in distributed multi-processing applications. For this purpose the box is optionally provided with four MPO/MTP optical cabling ports, each suitable for a PCI Express® Gen3 x4 based fiber optical cable up to 100m. Moreover, these PCIe® interfaces can also be used for attachment of demanding peripheral devices such as high resolution cameras.



Technical Features

General

- ▶ NVIDIA® Jetson Xavier™ NX based box, for DIN rail mount or wall mount
- ▶ M.2 NVMe SSD socket
- ▶ Versatile standard front I/O connector suite (DisplayPort, USB, GbE)
- ▶ Option dual Wi-Fi 6 modules
- ▶ Option WWAN 4G/5G module
- ▶ SMA/SMA-RP antenna connectors
- ▶ Option 4 x PCI Express® x4 MPO/MTP optical cabling ports
- ▶ Dimensions: 65mm (W) x 140mm (H) x 150mm (D) w/o DIN rail bracket
- ▶ Metal case, TS35 DIN rail bracket or wall mount plate
- ▶ M12 power connector
- ▶ Option terminal block power connector
- ▶ Option desktop power adapter connector
- ▶ 9-57VDC power input operation

Front I/O

- ▶ Dual RJ45 Gigabit Ethernet jacks
- ▶ 3 x USB Type-A receptacles
- ▶ Dual DisplayPort connectors
- ▶ Micro SD Card slot
- ▶ Antenna connectors SMA/SMA-RP (WLAN/WWAN)
- ▶ Dual slot Micro SIM Card
- ▶ Up to 4 x MPO/MTP connectors, for 12-fiber PCIe® optical cabling
- ▶ M12-A DC power connector
- ▶ Option ATX auxiliary power connector
- ▶ Option terminal block 3.5mm pitch 4-position screw lock (bottom of box) power input
- ▶ Option rear power connector (desktop supply 4-pos. circular connector)

System-on-Module

- ▶ NVIDIA® Jetson Xavier™ NX
- ▶ AI performance up to 21 TOPS
- ▶ Volta GPU, 384 CUDA® cores, 48 Tensor cores, max. 1100MHz
- ▶ Carmel CPU, ARMv8.2, 3x dual-core CPU clusters (six NVIDIA Carmel processor cores), max. 1900 MHz
- ▶ Memory 8GB/16GB LPDDR4 DRAM, 1600MHz
- ▶ Storage 16GB eMMC 5.1 200 MHz (HS400)
- ▶ Display controller 2 x DP 1.4 up to 3840x2160 at 60 Hz, video H.265 decode/encode
- ▶ PCI Express® 1x4, 1x1 (root hub or endpoint device configurable)
- ▶ Variety of I/O e.g. USB, Gigabit Ethernet, SD Card slot
- ▶ 10W/15W/20W operating modes

Technical Features

Additional Features

- ▶ On-board M.2 SSD socket PCIe® x4, up to 2280 size
- ▶ PCIe® packet switch 6x4
- ▶ Option PCIe® optical cabling via 4 x MPO/MTP connectors (Samtec FireFly™)
- ▶ Option master/slave configuration via PCIe® optical cabling (star topology)
- ▶ Option wireless connection (dual M.2 Wi-Fi 6, M.2 WWAN 4G/5G)
- ▶ Option custom specific mezzanine board design on request

Power Requirements

- ▶ DC Input, wide range 9V-57V
- ▶ Power consumption tbd W max.
- ▶ Fast acting chip fuse (PCB soldered type - no replacement on-site)
- ▶ Protected against reverse polarity
- ▶ ESD protection (TVS)
- ▶ Common mode input filter
- ▶ M12-A 5-pin front panel power connector
- ▶ Option ATX auxiliary power connector
- ▶ Option terminal block 3.5mm pitch 4-position screw lock (bottom of box) power input
- ▶ Option rear power connector (desktop supply 4-pos. circular connector)

Applications

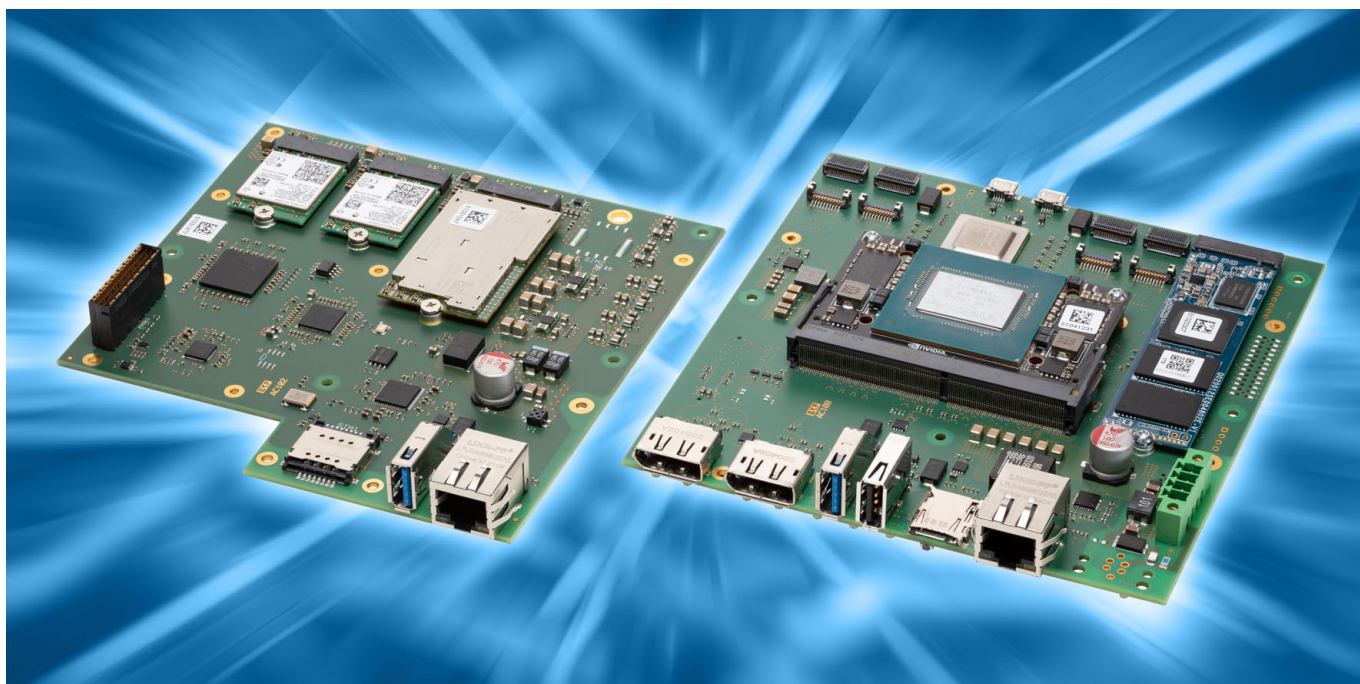
- ▶ Artificial Intelligence CUDA® based edge computing
- ▶ Distributed edge computing, real-time AI
- ▶ PCIe® based optical cabling to slave boxes
- ▶ Data acquisition
- ▶ Industrial networks - IIoT
- ▶ Cable and wireless networking
- ▶ Kiosk systems, information panels
- ▶ Dual 4k display solution, independent operation
- ▶ Single display or headless applications
- ▶ Rugged environments, DIN rail or wall mount options
- ▶ Vehicles, transportation, harvesting, construction machines
- ▶ Robotics
- ▶ Autonomous machines
- ▶ Machine learning
- ▶ Surveillance, mapping
- ▶ ADAS test equipment

Technical Features

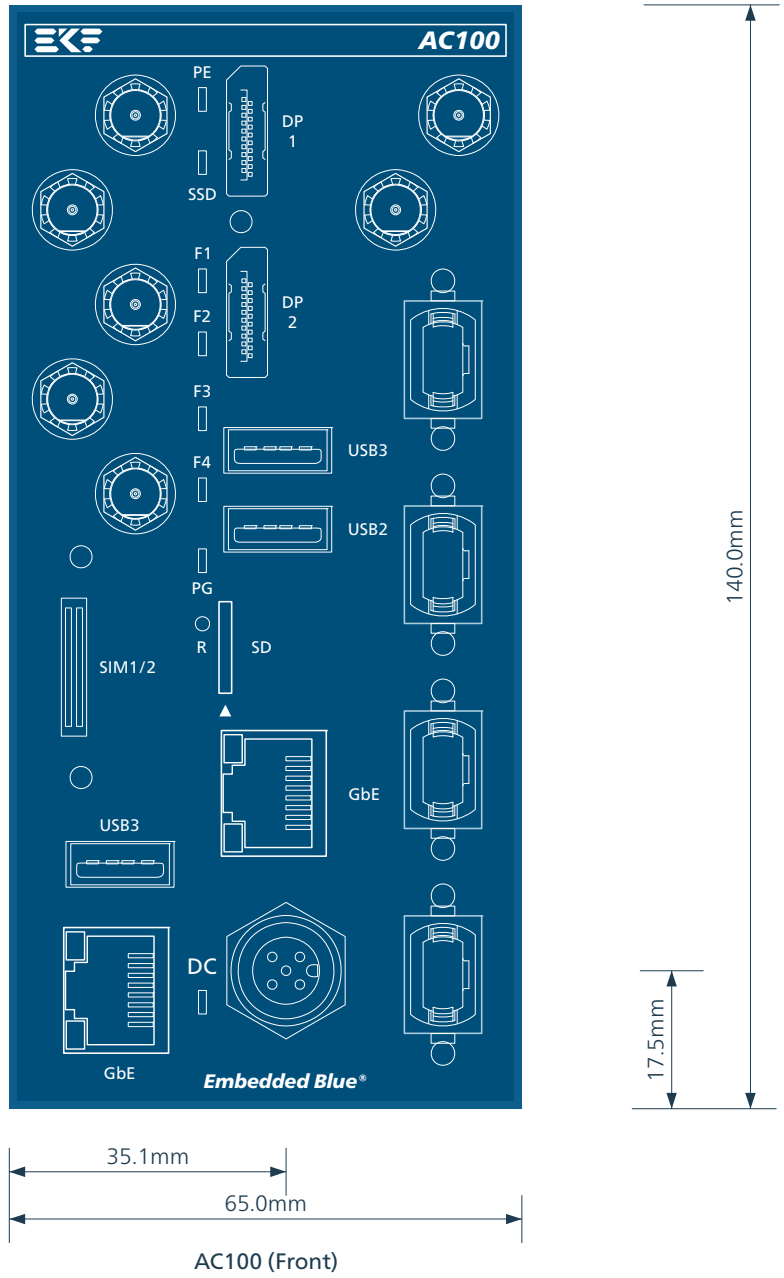
Environmental, Regulatory

- ▶ Designed & manufactured in Germany
- ▶ ISO 9001 certified quality management
- ▶ Long term availability
- ▶ Rugged solution
- ▶ RoHS compliant
- ▶ Operating temperature -40°C to +85°C (industrial temperature range)
- ▶ Storage temperature -40°C to +85°C, max. gradient 5°C/min
- ▶ Humidity 5% ... 95% RH non condensing
- ▶ Altitude -300m ... +3000m
- ▶ Shock 15g 0.33ms, 6g 6ms
- ▶ Vibration 1g 5-2000Hz
- ▶ Protection class IP20
- ▶ EC Regulatory EN55035, EN55032, EN62368-1 (CE)
- ▶ MTBF tbd years

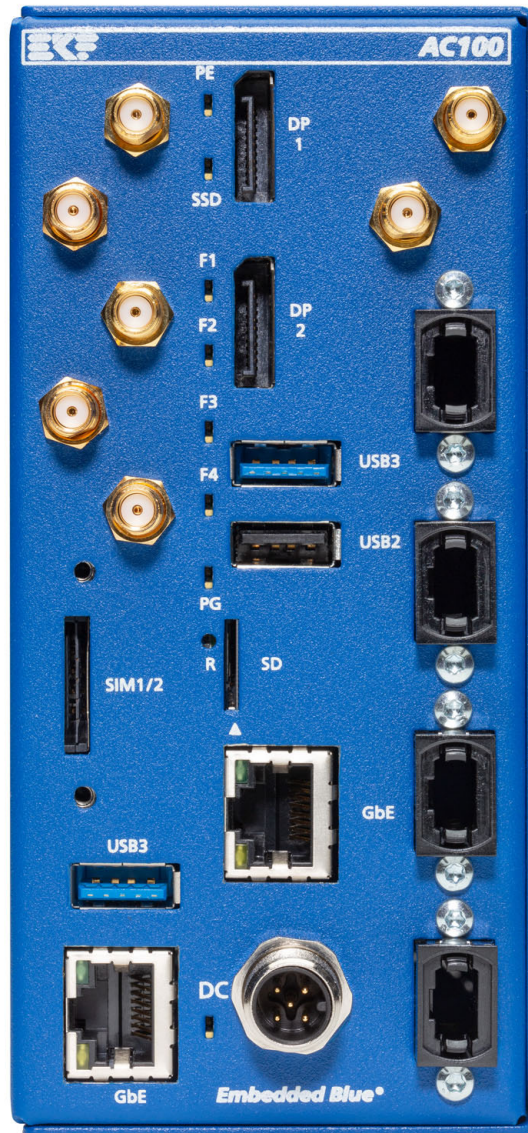
all items may be subject to technical changes w/o further notice



Front View



LEDs	
GbE (RJ45 x2)	upper/green = link, lower/yellow = activity
PE (PCIe® switch)	blue = port0 good, green = voltage good
SSD (PCIe® switch & M.2 NVMe®)	blue = port1 good, green = SSD activity
F1 (PCIe® switch & FireFly)	blue = port10 good, green = FireFly™ #4 present
F2 (PCIe® switch & FireFly)	blue = port9 good, green = FireFly™ #3 present
F3 (PCIe® switch & FireFly)	blue = port3 good, green = FireFly™ #2 present
F4 (PCIe® switch & FireFly)	blue = port2 good, green = FireFly™ #1 present
PG (Jetson® GPIO)	blue = GPIO13, red = GPIO12, green = GPIO04
DC (Power input)	blue = VR power good, red = fault, green = DC input



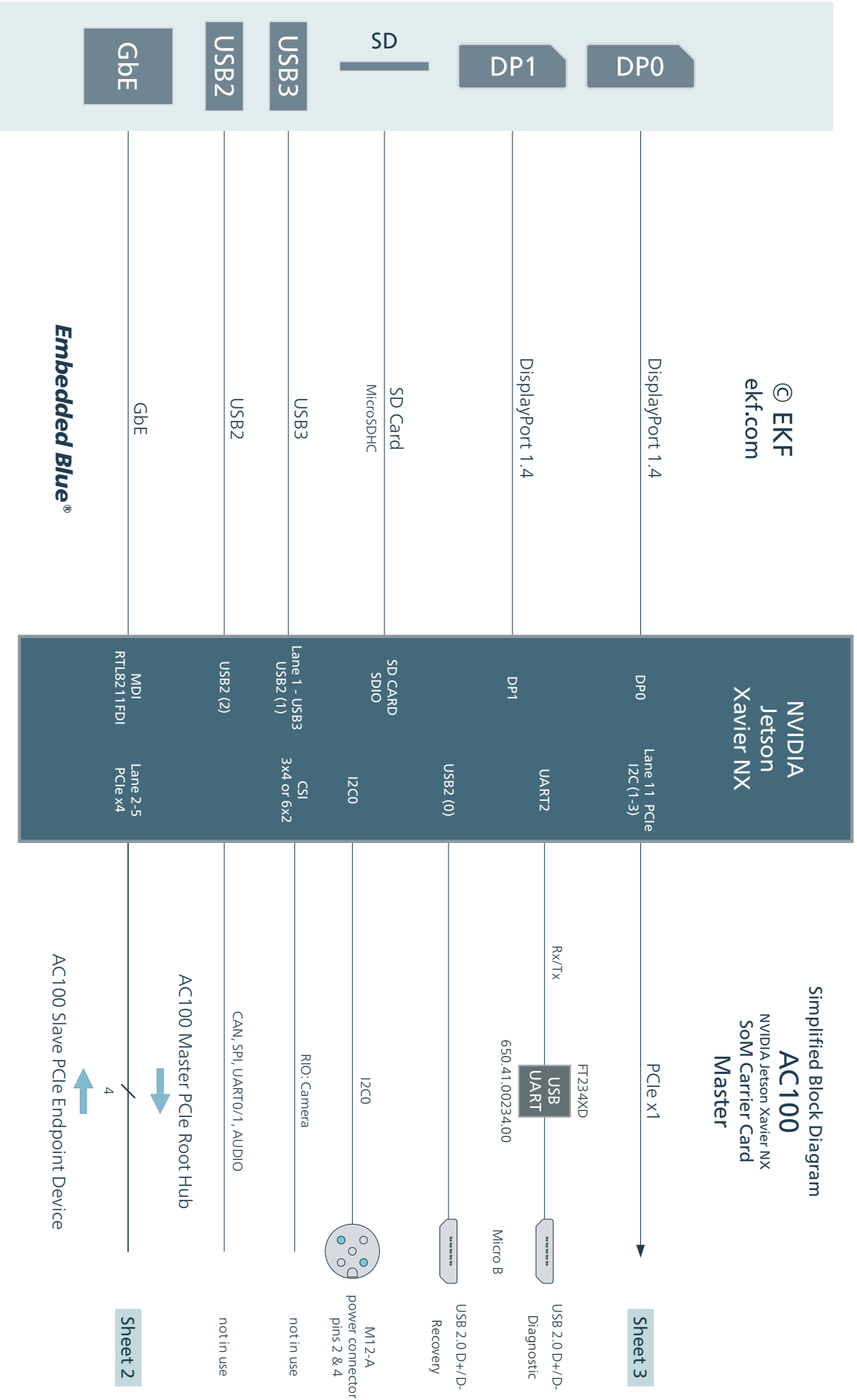
Mounting Plate Option

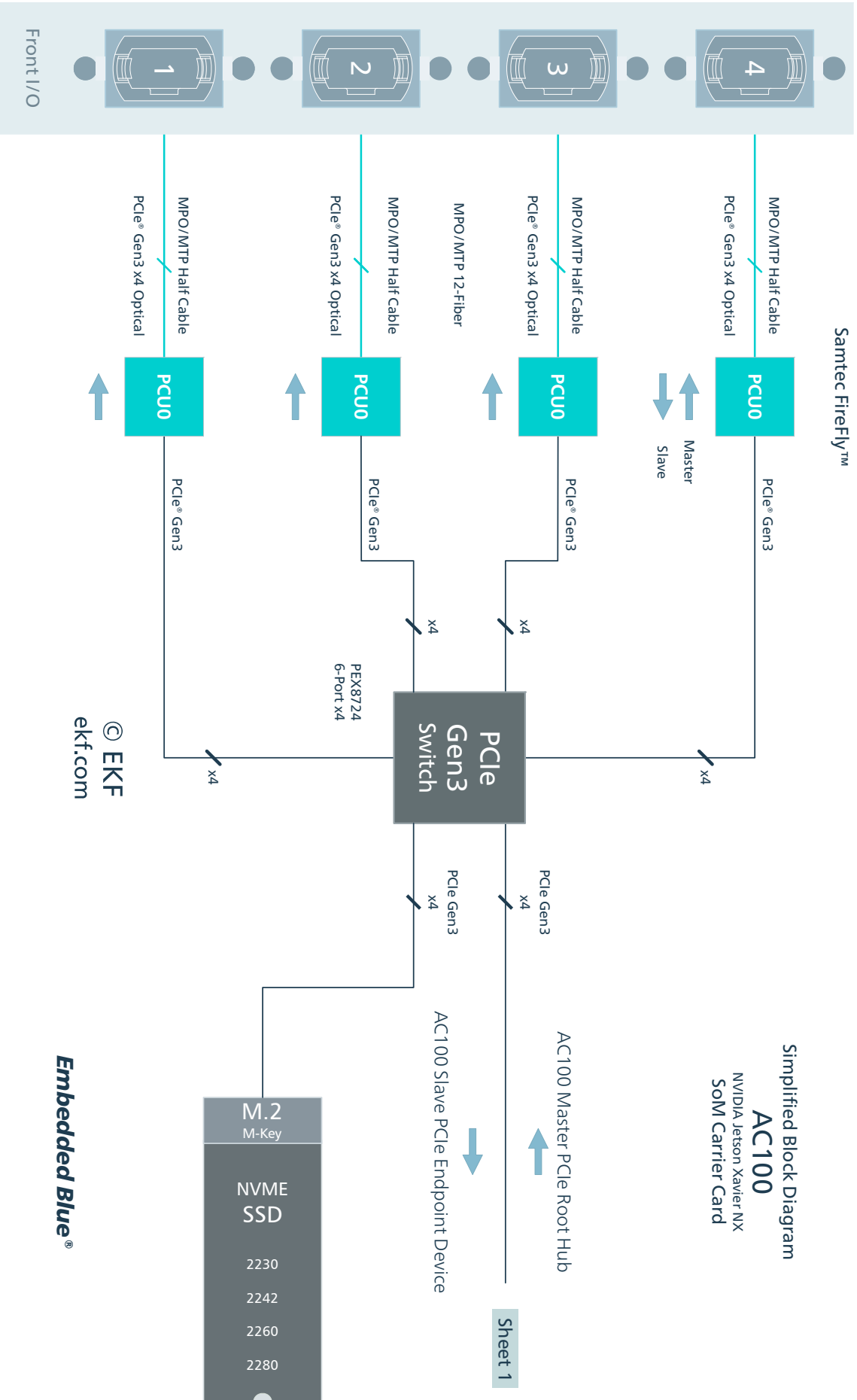


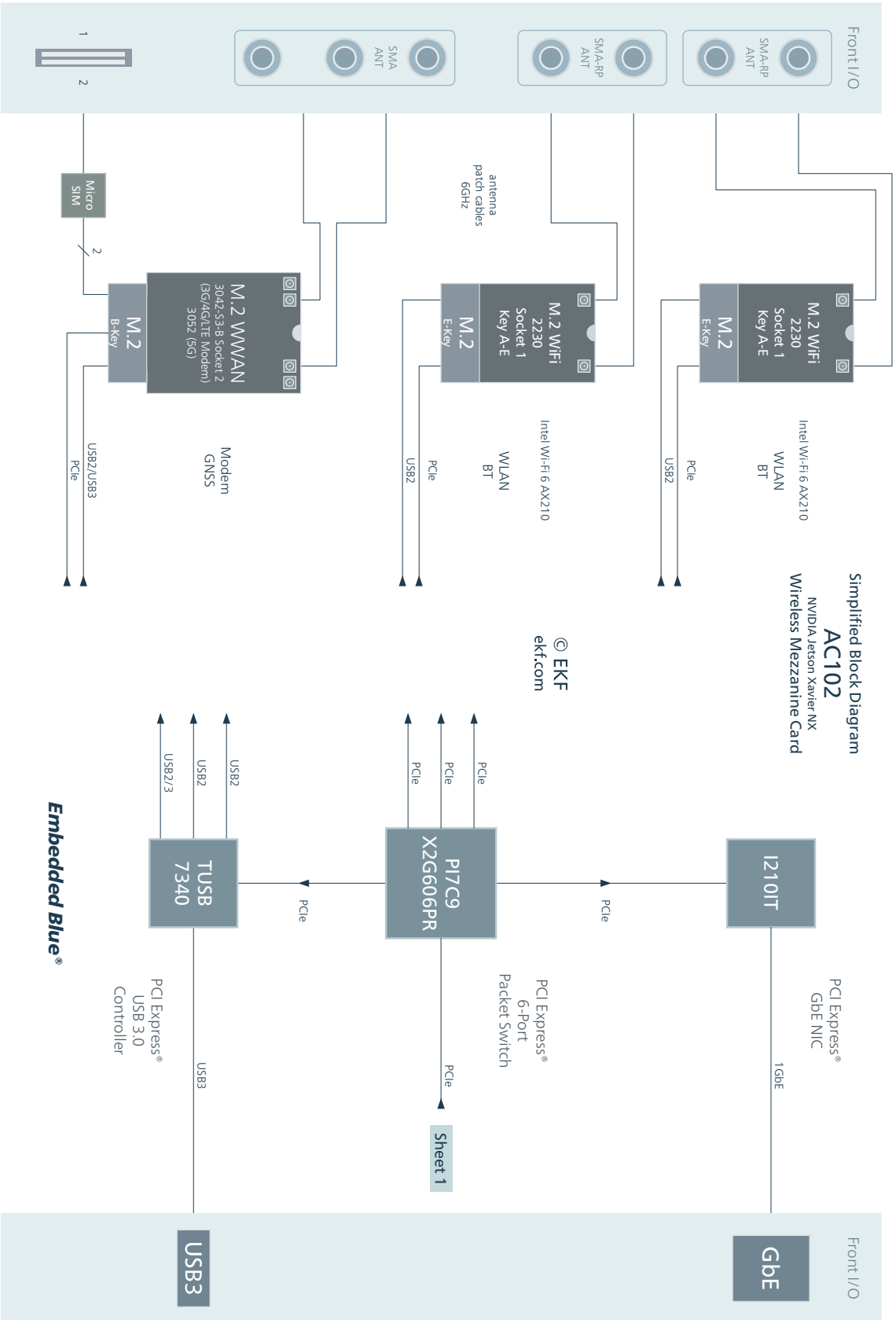
Rear View (DIN Rail)



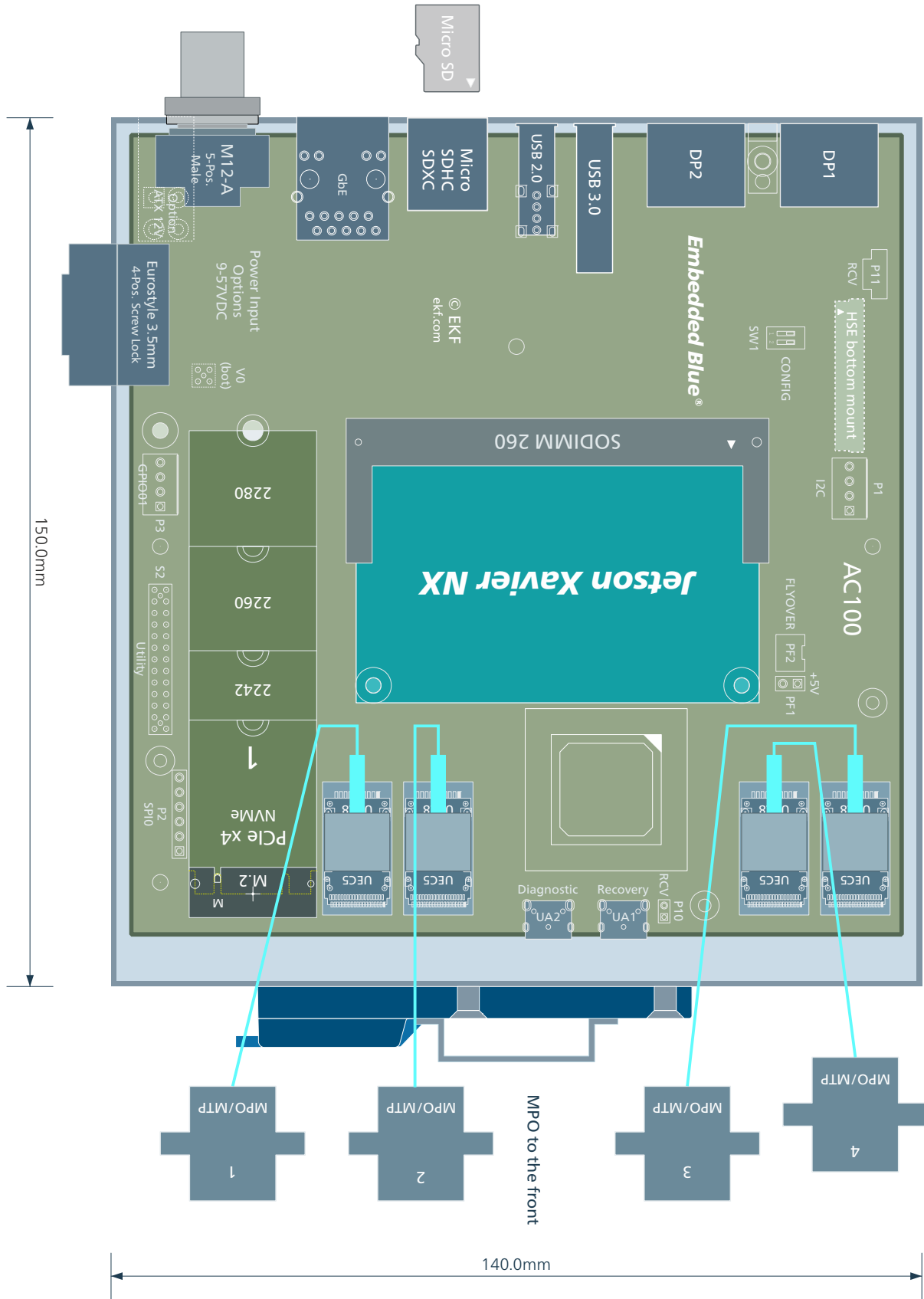
Block Diagram



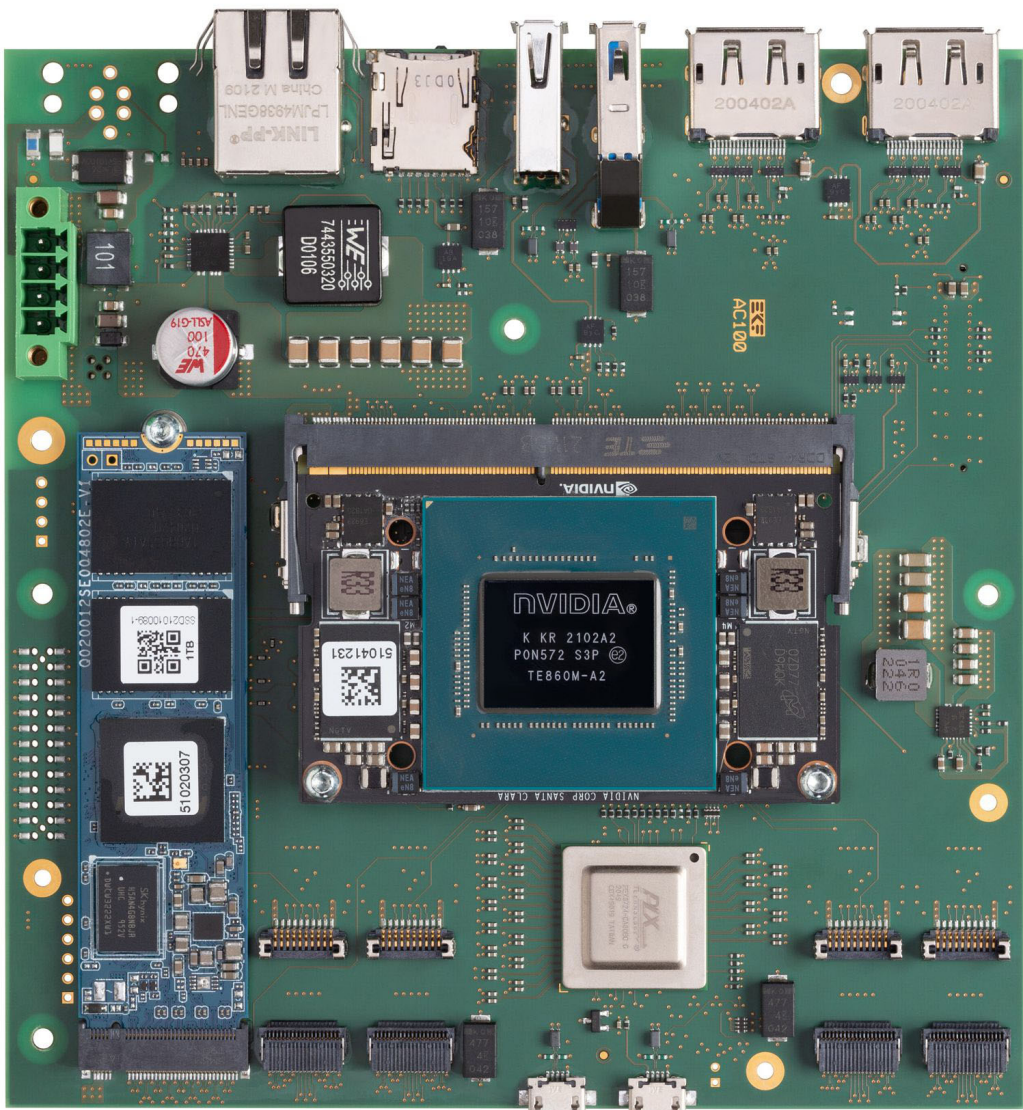


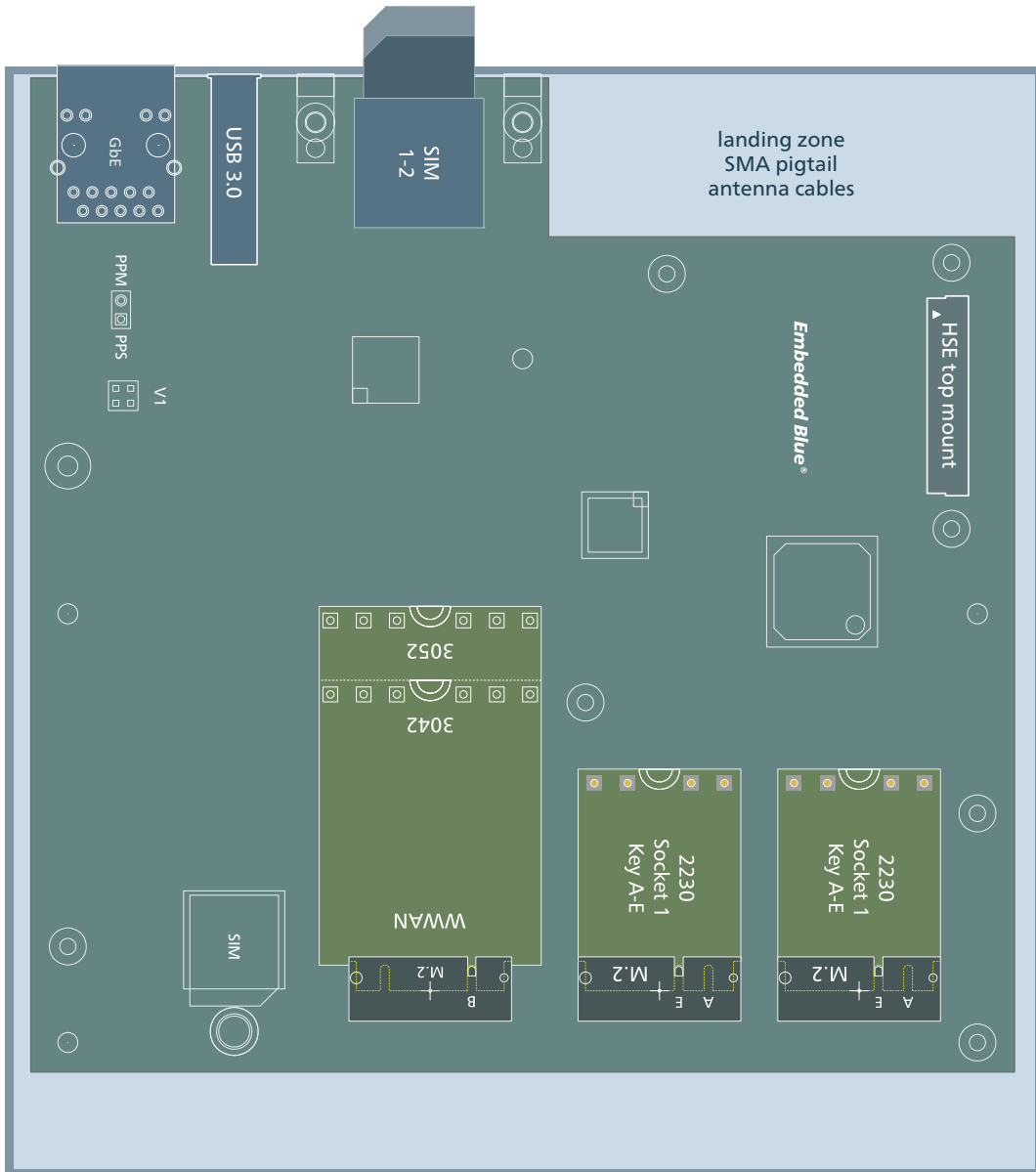


Component Orientation

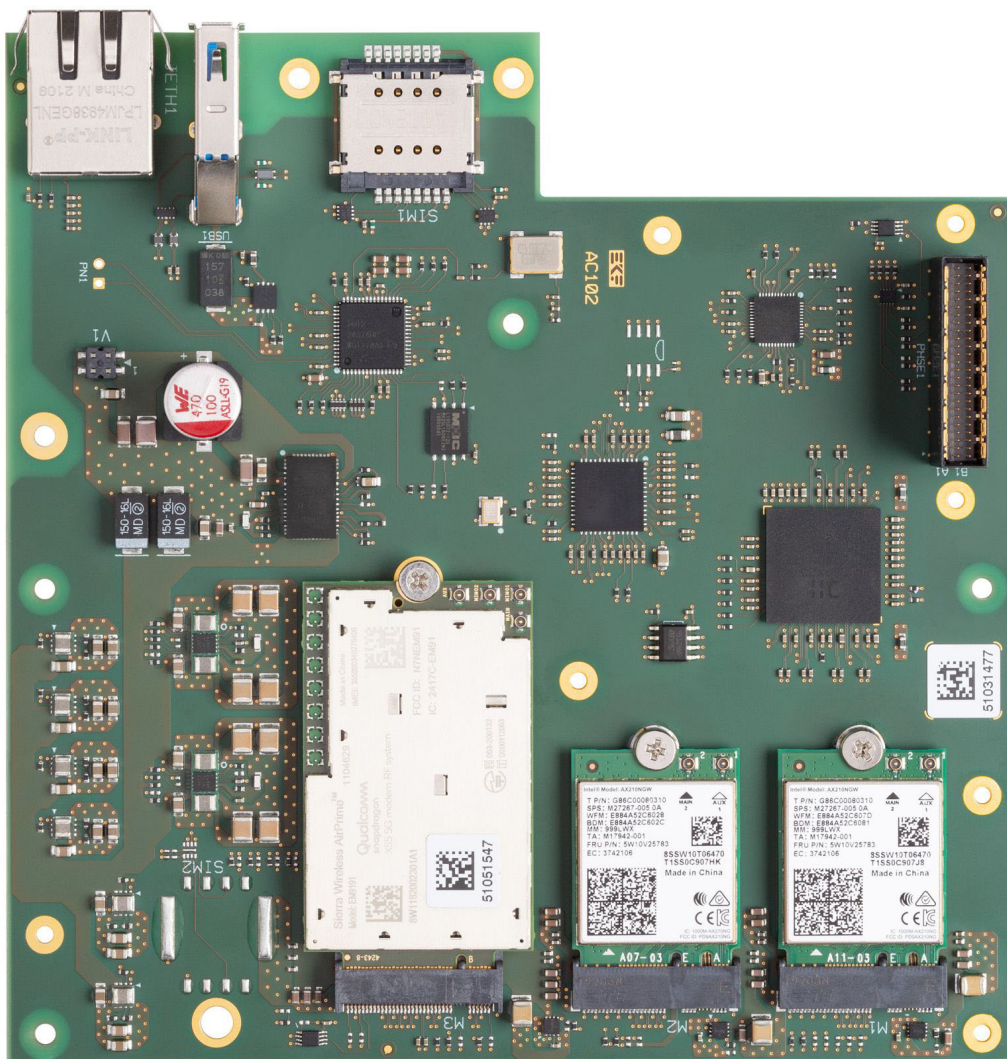


AC100 Rev.2

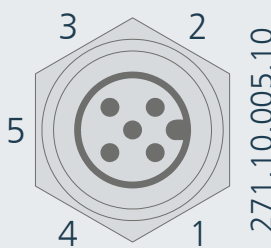




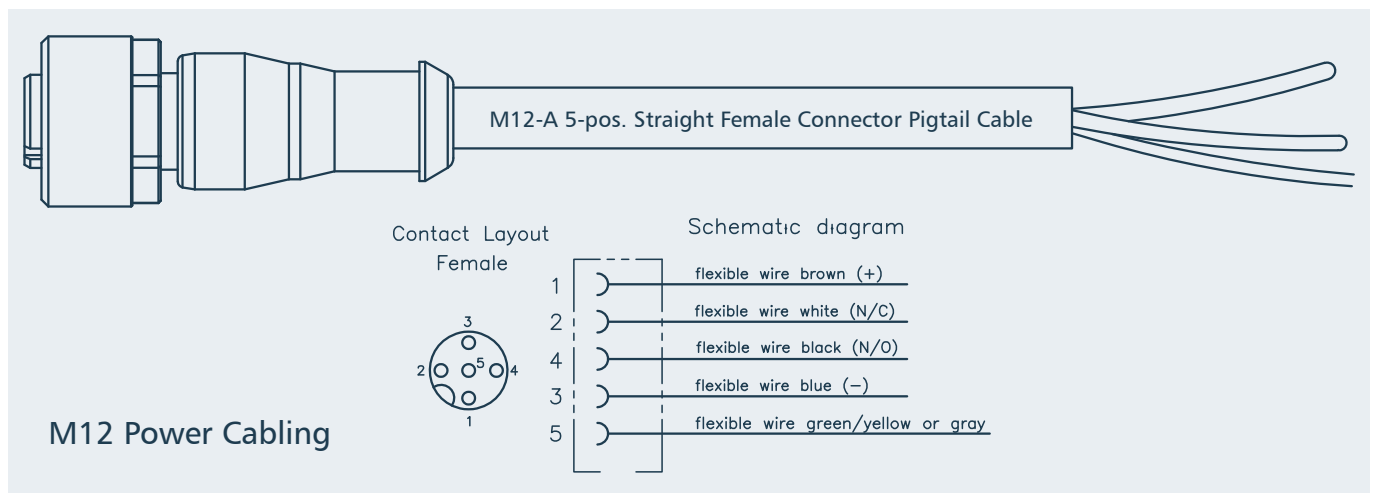
AC102 • Mezzanine Module • © EKF • ekf.com



Option M12-A Power Connector

M12-A 5-Position Male 4A/Pin		
	+V=9-57VDC	1 +V
		2 Reserved
		3 -V (GND)
		4 Reserved
		5 FE (Shield)

Mating Pigtail Cable Assemblies 1.5m w. Female Straight Plug	
EKF	271.10.505.22.015
Phoenix Contact	1669822
Tyco	2273035-1

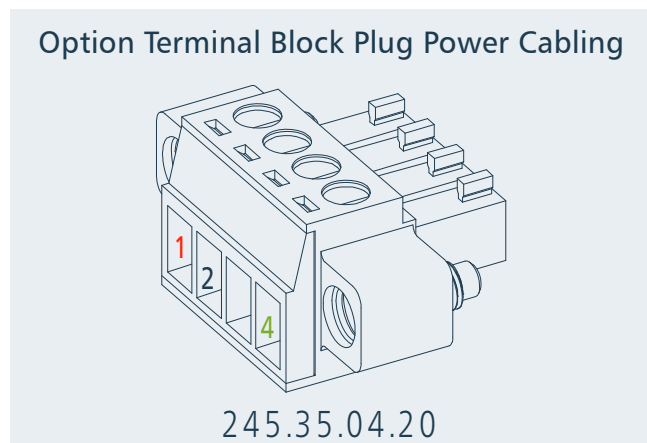


M12 Pigtail Cable

Option Terminal Block Power Connector

3.50mm 4-Position Terminal Block			
<p>245.35.04.00</p> <p>1 2 3 4</p>	<p>+V=9-57VDC</p>	1	+V
		2	-V (GND)
		3	RSV
		4	FE (Shield)

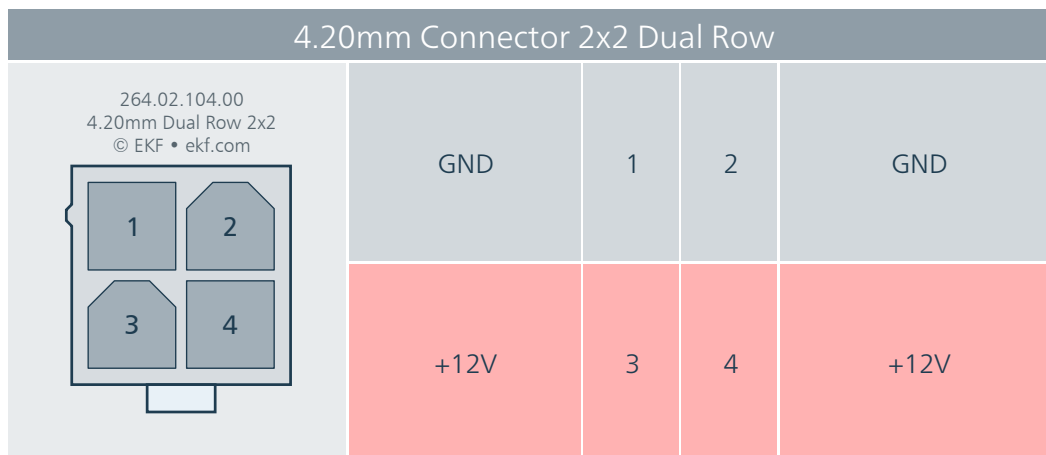
Mating Plugs w. Screw Lock	
EKF	245.35.04.20
FCI Amphenol	20020000-C041B01LF
Molex	39504-0004
Phoenix Contact	1847071
Tyco	284510-4



Mating DIN Rail Power Supply	
EKF	352.1.075.24.1
Meanwell	NDR-75-24, 75W 24VDC/3.2A

Option ATX Auxiliary Power +12V

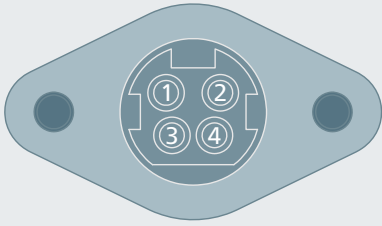
As an alternate, the PCB can be equipped with a 2x2 pin 4.2mm pitch dual row wire to board header (ATX 12V 4-pin), for attachment of a suitable cable assembly to the front. Many PC power supplies are provided with a mating cable harness.



Mating cable connectors are available e.g. from Molex, under the Mini-Fit® Jr.™ brand. A suitable housing would be e.g. the Molex part #0039013042, to be used with crimp terminals e.g. Molex part #0039000060 (18-24 AWG). Other manufacturers for 4.20mm style connectors are e.g. Würth and TE.

The M12-A power connector and the ATX power connector are exclusive manufacturing alternates.

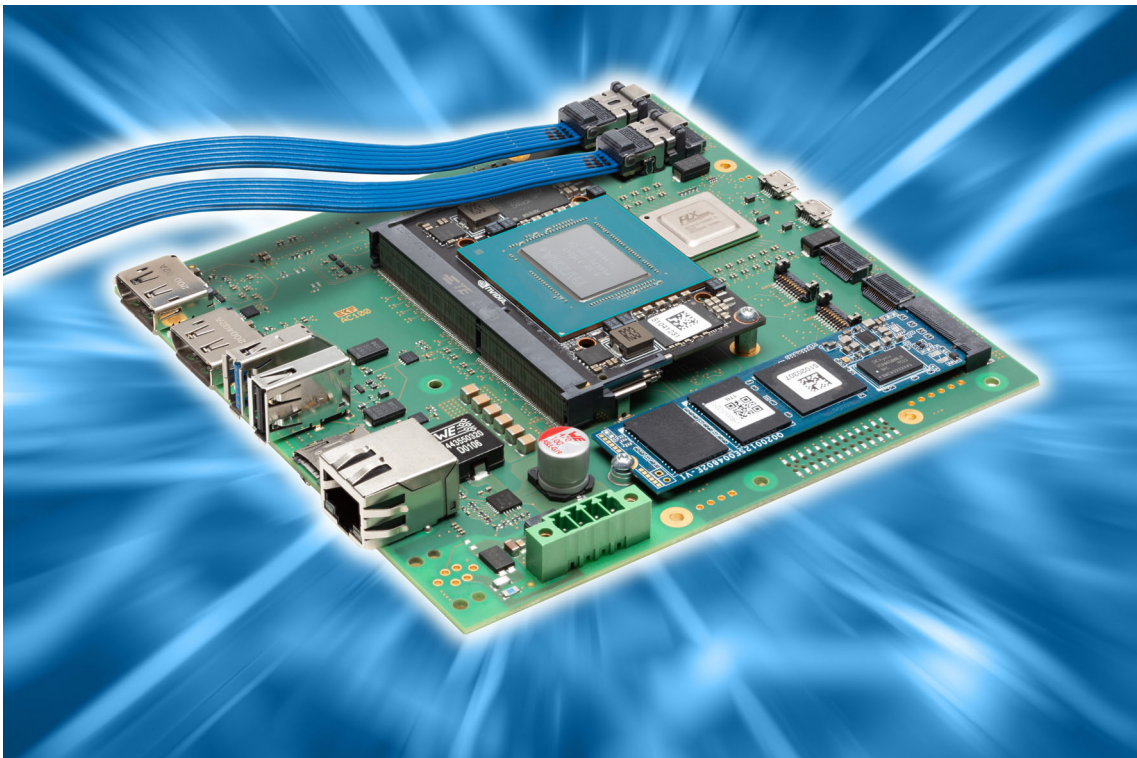
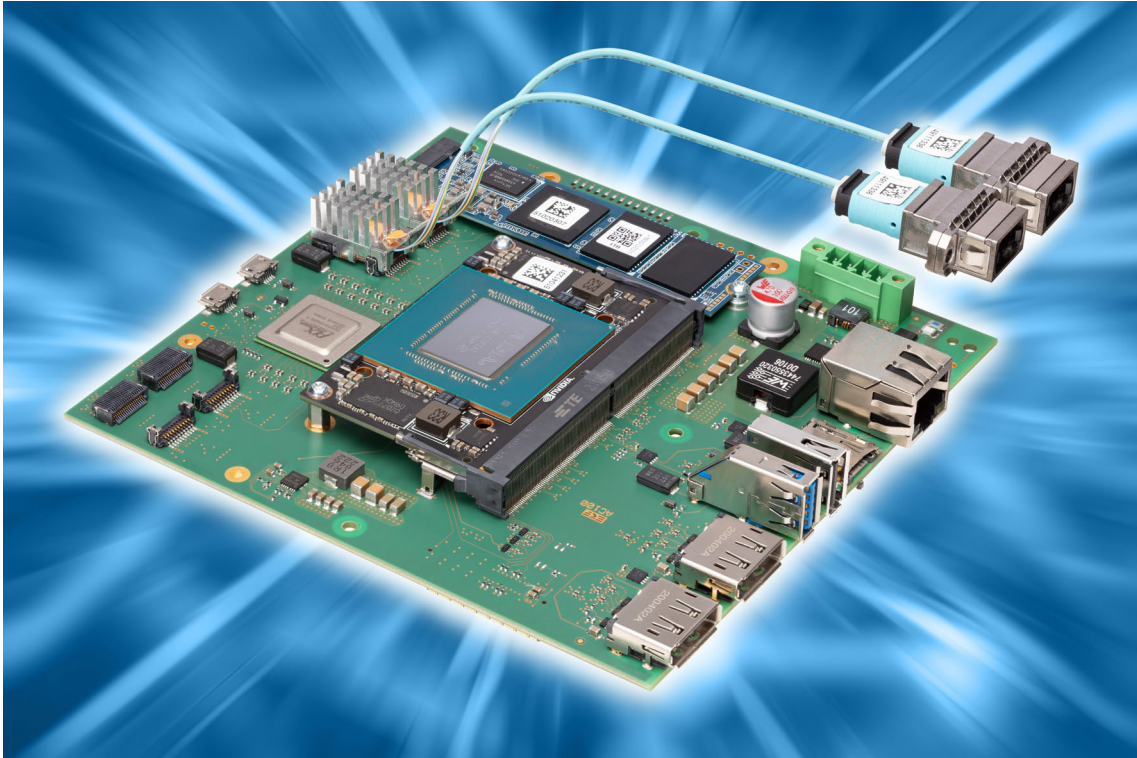
Option Rear Power Connector

Circular 4-Position Power Receptacle (7.5A/Pin)			
 <p>271.04.004.10</p>	<p>+V=9-57VDC</p>	1	+V
		2	+V
		3	-V (GND)
		4	-V (GND)
		Shield	Reserved *

* power supply cable harness may connect GND to Shield

Mating Desktop Power Adapter w. Cable Assy	
EKF	353.1.120.24.1
FSP Technology	FSP120-AAAN3, 120W 24VDC/5A





Mezzanine Interface AC100/AC102

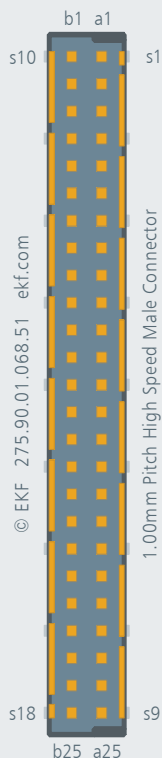
HSE (AC100) • High Speed Expansion (Bottom Mount)				
Carrier card connector 8mm female ERNI Microspeed 275.90.08.068.01				
	PCIE1_CLKREQ#	a1	b1	GND
	PCIE1_TX0P	a2	b2	GPO FireFly 1 B12 *
	PCIE1_TX0N	a3	b3	GPO FireFly 2 B12 *
	GND	a4	b4	GND
	PCIE1_RX0N	a5	b5	GPO FireFly 3 B12 *
	PCIE1_RX0P	a6	b6	GPO FireFly 4 B12 *
	GND	a7	b7	GND
	SPI1_MISO (1.8V) *	a8	b8	GPI FireFly 1 A12 *
	SPI1_MOSI (1.8V) *	a9	b9	GPI (FireFly 2 A12 *
	GND	a10	b10	GND
	SPI1_CS0 (1.8V) *	a11	b11	GPI FireFly 3 A12 *
	SPI1_CS1 (1.8V) *	a12	b12	GPI FireFly 4 A12 *
	GND	a13	b13	GND
	I2S1_DOUT (1.8V)	a14	b14	I2C0_SCL (3.3V)
	I2S1_DIN (1.8V)	a15	b15	I2C0_SDA (3.3V)
	GND	a16	b16	GND
	I2S1_FS (1.8V)	a17	b17	I2C1_SCL (3.3V)
	I2S1_SCLK (1.8V)	a18	b18	I2C1_SDA (3.3V)
	GND	a19	b19	GND
	WWAN_MOD_RST#	a20	b20	PCIE_CLK_P
	PCIE1_RST#	a21	b21	PCIE_CLK_N
	+3.3V	a22	b22	+5V
	+3.3V	a23	b23	+5V
	CAN_RX (3.3V CMOS) *	a24	b24	SPI1_SCK (1.8V) *
	CAN_TX (3.3V CMOS) *	a25	b25	ISOGND FireFly 1-4 A11/B11 *

* was RSV before PCB rev. 2

- these signals are intended for use on planned new mezzanines
- as of current these signals are only optional via 0R (no stuff by default)

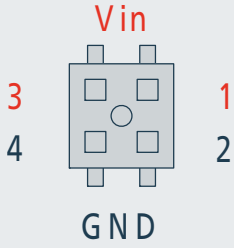
HSE (AC102) • High Speed Expansion (Top Mount)

Mezzanine card connector 10mm male ERNI Microspeed 275.90.10.068.51



GND	b1	a1	GND
RSV	b2	a2	PCIE_1TP
RSV	b3	a3	PCIE_1TN
GND	b4	a4	GND
RSV	b5	a5	PCIE_1RN
RSV	b6	a6	PCIE_1RP
GND	b7	a7	GND
RSV	b8	a8	RSV
RSV	b9	a9	RSV
GND	b10	a10	GND
RSV	b11	a11	RSV
RSV	b12	a12	RSV
GND	b13	a13	GND
I2C0_SCL (3.3V)	b14	a14	RSV
I2C0_SDA (3.3V)	b15	a15	RSV
GND	b16	a16	GND
I2C1_SCL (3.3V)	b17	a17	RSV
I2C1_SDA (3.3V)	b18	a18	RSV
GND	b19	a19	GND
PCIE_CLK_P	b20	a20	WWAN_MOD_RST#
PCIE_CLK_N	b21	a21	PLTRST#
RSV	b22	a22	RSV
RSV	b23	a23	RSV
RSV	b24	a24	RSV
RSV	b25	a25	RSV

V0 (AC100) V1 (AC102) • DC High Voltage (Bottom/Top Mount)
 2x2 2.00mm Socket Pass Through w. Stacker >2A/Pin

	V_{IN} 9-57VDC	1	2	GND
	V_{IN} 9-57VDC	3	4	GND

On-Board Connectors & Switches

S2 • Utility Connector • AC100			
2x13 2.0mm Socket			
Signals from Jetson, 3.3V Signal Level Shifted			
SLEEP_WAKE#	1	2	GND
+5V	3	4	UART0_TXD
MOD_SLEEP#	5	6	UART0_RXD
SHUTDOWN_REQ#	7	8	UART0_RTS#
GPIO01	9	10	UART0_CTS#
USB2_EN	11	12	+3.3V
GND	13	14	SD_PWRON
USB3_EN	15	16	+3.3V
WWAN_RST#	17	18	GND
GPIO09	19	20	GND
USB3_OC#	21	22	+5V
GPIO12	23	24	FAN_TACH_5V
GPIO13	25	26	FAN_PWM_5V

P1 • I ² C • AC100	
Male Locking Pin Header 2.54mm WR-WTB	
5V Level Shifted	
1	+5V
2	I2C0_SDA
3	I2C0_SCL
4	GND

P2 • SPI • AC100 Pin Header 2.54mm (not stuffed) Signals from Jetson	
1	SPI0_SCK
2	SPI0_MISO
3	SPI0_MOSI
4	SPI0_CS0#
5	SPI0_CS1#
6	+3.3V

P3 • GPIO01 • AC100 Male Locking Pin Header 2.54mm WR-WTB 3.3V Level Shifted	
1	RSV
2	RSV
3	GPIO01
4	GND

P10 • Force Recovery • AC100 Pin Header 2.0mm (not stuffed) Wired to Jetson	
1	FORCE_RECOVERY# (1.8V)
2	GND

P11 • Force Recovery • AC100 Rev. 2 Pin Header 1.25mm PicoBlade (not stuffed) Wired to Jetson Suitable 3-Wire Cable Assy 276.91.003.15 Suitable Microswitch Assy 710.3.020.0 (cut wire 3)	
1	GND
2	FORCE_RECOVERY# (1.8V)
3	SYS_RESET# (1.8V)

PF1 • FireFly™ • AC100 Pin Header 2.54mm (not stuffed) Camera Power Jumper to FireFly Sockets Pins B8/B9	
1	+5V
2	+CAM_PWR

PF2 • FireFly™ • AC100 Pin Header 2x5 1.27mm (not stuffed) FireFly Sockets Pins A12/B12/A11/B11			
ISOGND FireFly 1-4 A11 B11	1	2	GND
GPO FireFly 1 B12	3	4	GPI FireFly 1 A12
GPO FireFly 2 B12	5	6	GPI FireFly 2 A12
GPO FireFly 3 B12	7	8	GPI FireFly 3 A12
GPO FireFly 4 B12	9	10	GPI FireFly 4 A12

PN1 • PPS/PPM • AC102 Pin Header 2.54mm (not stuffed) Wired to I210-IT NIC	
1	PPS SDP2
2	PPM SDP3

DSW1 • PCIe Configuration • AC100 DIP-Switch Wired to Jetson & PEX8724 PCIe® Switch	
Slider 1 = ON	Force Root Port
Slider 1 = OFF	Root/Endpoint Control via Jetson GPIO07
Slider 2 = ON	Switch EEPROM 1 enabled
Slider 2 = OFF	Switch EEPROM 2 enabled

TSW1/2 • Tactile Switches • AC100 Tactile Switches Bottom Mount, Wired to Jetson	
TSW1 (Front of PCB)	SYS_RESET#
TSW2 (PCB Rear Edge)	FORCE_RECOVERY#

SIM Card Holders

The AC100 is equipped with three SIM card holders, a dual slot Mini SIM 2FF socket for 25mmx15mm cards, and optionally a Micro SIM 3FF card socket for a 15mmx12mm SIM card.

The sockets were constructed for 0.76mm thick Mini and Micro SIM cards. However, often SIM cards come as pre-cut assembly with a Nano SIM in its center, which is defined for a thickness of only 0.67mm. In rare cases, this may lead to contact problems.

As a professional solution, the Nano SIM 4FF can be put into an adapter for use with sockets designed for 2FF or 3FF SIMs. A simple workaround to improve contact pressure would be to attach a suitable self-adhesive Kapton label on the SIM card assembly back side, in order to bridge the gap of 0.09mm.



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Nano SIM 4FF to 3FF/2FF Adapters



https://www.ekf.com/a/DIN_Rail_on_off_500x280.mp4

Ordering Information

For popular AC100 SKUs please contact sales@ekf.de



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