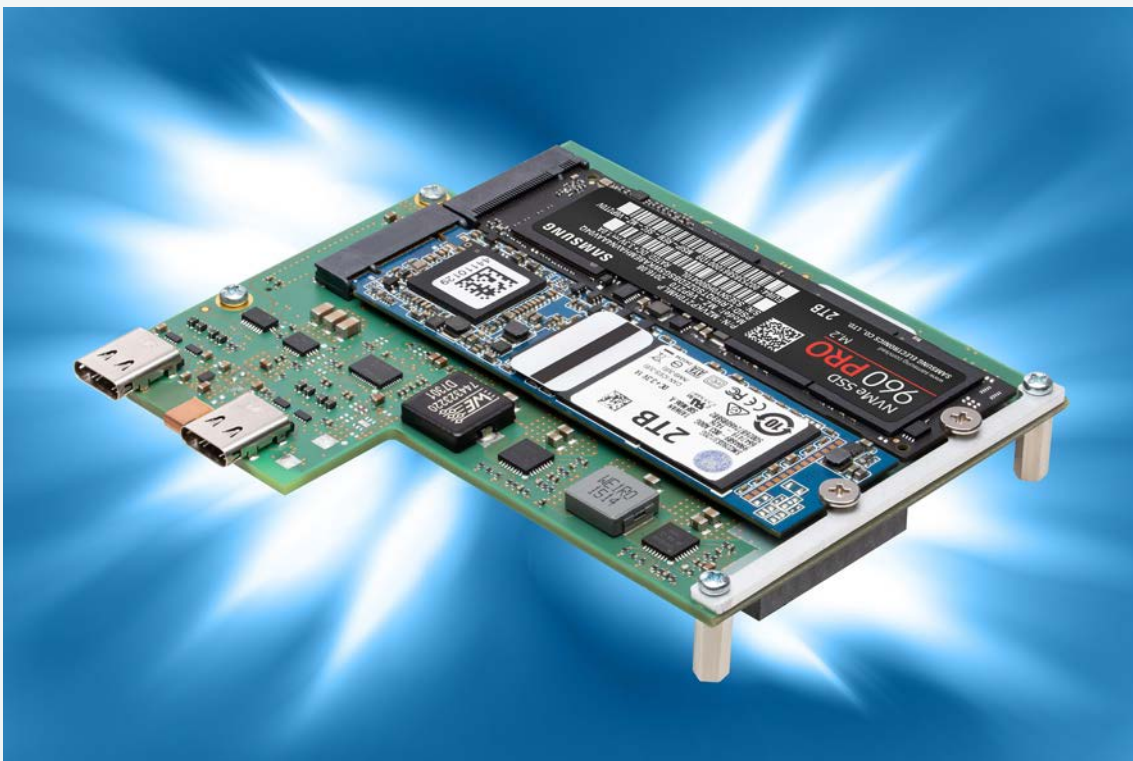# Technical Information

S40-NVME

NVMe SSD Storage & Type-C Front I/O Mezzanine Module

Document No. 8392 • Ed. 8.1 • 18 August 2023

Contents

About this Manual

This manual is a short form description of the technical aspects of the S40-NVME, required for installation and system integration. It is intended for the advanced user only.

Edition History

Ed.	Contents/Changes	Author	Date
1	Technical Information S40-NVME, English, preliminary edition Text #8392, File: s40_ti.wpd	jj	5 December 2016
2	Added photos SC4-CONCERTO w. S40-NVME	jj	31 July 2017
3	Added table Type-C cable assemblies	jj	16 October 2017
4	Reflects PCB revision 1, changed components on Type-C DP ALT mode connector (ParadeTech removed, TI components as replacement), changed M.2 socket height from 2.25H to 3.2H for underside populated M.2 modules	jj	25 January 2018
5	Added photo of front panel with locking Type-C connector, modified top view draft (new locking bar for improved fastening of M.2 modules in rugged environments)	jj	22 May 2018
5.1	PCB revision 2, MTBF added	jj	15 August 2018
6	Photos updated to PCB rev.1	jj	8 October 2018
7	Added photos SC9 w. S40	jj	12 September 2022
8	Added photo SC8 w. S40	jj	3 August 2023
8.1	Photos SC8 w. S40 updated	jj	18 August 2023

Related Documents

For a description of CPU cards which may act as carrier board with respect to the S40-NVME, please refer to the correspondent CPU user guide, available by download (change URL accordingly for other potential carrier cards).

Download S40-NVME Carrier Card User Guides	
SC5-FESTIVAL	www.ekf.com/s/sc5/sc5.html
SC9-TOCCATA	www.ekf.com/s/sc9/sc9.html

Nomenclature

Signal names used herein with an attached '#' designate active low lines.

Trade Marks

Some terms used herein are property of their respective owners, e.g.

▸ Intel, Atom™, Core™, XEON®: ® Intel
▸ CompactPCI, CompactPCI PlusIO, CompactPCI Serial: ® PICMG
▸ Windows: ® Microsoft
▸ EKF, ekf system: ® EKF

EKF does not claim this list to be complete.

Legal Disclaimer - Liability Exclusion

This document has been edited as carefully as possible. We apologize for any potential mistake. Information provided herein is designated exclusively to the proficient user (system integrator, engineer). EKF can accept no responsibility for any damage caused by the use of this manual.

Standards

Reference Documents		
Term	Document	Origin
CompactPCI® Serial	CompactPCI Serial Specification, PICMG® CPCI-S.0	www.picmg.org
DisplayPort	DisplayPort Alt Mode on USB Type-C	www.vesa.org
M.2	PCI Express M.2 Specification Revision 1.1	www.pcisig.com
NVMe	NVM Express 1.2.1 specification	www.nvmexpress.org
SATA	Serial ATA Specification	www.sata-io.org
USB	Type-C Cable and Connector Specification Rev. 1.2 Type-C Locking Connector Specification Rev. 1.0 Universal Serial Bus Power Delivery Specification Rev. 3.0	www.usb.org

Product Description

Overview

Available as a mezzanine add-on expansion board e.g. to the SC4-CONCERTO and successor CPU carrier cards, the main purpose of the S40-NVME is to provide a mass storage solution, by means of one or two M.2 SSD modules. M.2 (formerly NGFF) has been established as a standard by the PCI-SIG® and is very popular for industrial applications (IoT).

For optimum throughput the PCIe x4 M.2 socket can be populated with an NVMe type SSD. The other M.2 socket is suitable for a SATA 6G SSD.

The S40-NVME accommodates M.2 modules of variable size, starting at 22mm x 30mm (2230) up to 22mm x 80mm (2280), fixed by screw lock. M.2 SATA and NVMe SSD modules are available from several manufacturers, with a maximum capacity of 2TB as of current.

As an option, the S40-NVME is available with additional front panel connectors, augmenting the CPU carrier card connector front I/O suite.

Up to two Type-C receptacles are provided on the S40-NVME, for use as USB 3.1 Gen 1 (5Gbps) host ports (DFP). Dual screw locking Type-C cable connectors are supported. External devices attached can be sourced via V_{BUS} up to 3A/5V. One of the Type-C ports is suitable also for the DisplayPort alternate mode and can be used as third video output. A switch fabric is provided for connector flip control and appropriate DP/USB signal routing.

The S40-NVME connects to the mezzanine expansion connectors HSE1 and HSE2 of the CompactPCI® Serial CPU carrier board, maintaining the 4HP (20.32mm) total assembly height.
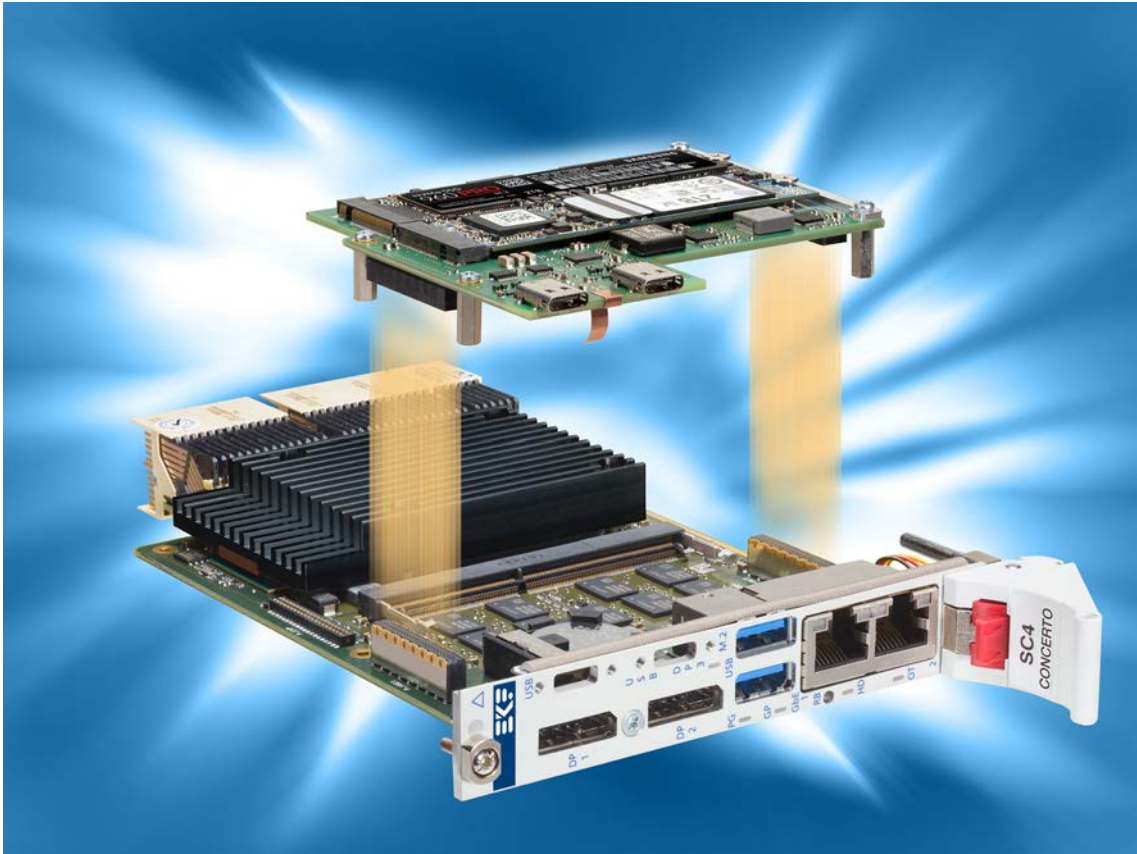
SC4-CONCERTO w. S40

Feature Summary

Feature Summary

Form Factor

▸ Proprietary size mezzanine module 84.3mm x 95mm
▸ Fits basically into the 4HP (20.3mm) envelope of the CPU carrier board
▸ Typically delivered as a ready to use assembly unit (including SC4-CONCERTO or successor CPU card)
▸ Mounting position right (on top of a CPU board or CPU side card)

Host I/F Connectors HSE1/HSE2

▸ High speed mezzanine connectors
▸ Suitable for PCI Express® Gen3, SATA 6G, USB 3.0 SuperSpeed, DisplayPort
▸ Bottom mount male connectors HSE1 and HSE2 (high speed expansion)
▸ Mating with the carrier card female connectors HSE1/2
▸ Board-to-board height 10.0mm for a 4HP assembly

HSE1
▸ PCI Express® x4 support (dedicated to the NVMe SSD module M.2 socket
▸ 1 x USB 3.0 5Gbps support (dedicated to the optional Type-C USB front panel connector)
▸ Power sourcing 12V/1.5 A maximum continuous current (2 pins)

HSE2
▸ PCI Express® x4 support (dedicated to PCIe based on-board SATA & USB controllers
▸ DisplayPort support (dedicated to Type-C front panel connector configurable for alternate use)
▸ Power sourcing 12V/3.0 A maximum continuous current (4 pins)

M.2 Module Connectors

▸ Two M.2 sockets 3.2H, for 1 x NVMe SSD, 1 x SATA SSD, maximum M.2 size 2280
▸ M.2 component height labels S1 - S5 (single sided module) and D1 - D4 (double sided module)
▸ Power switches for each socket, undervoltage lockout, short-circuit protection, quick discharge

M1 (NVMe)
▸ M.2 NVME SSD module socket, key Id M, PCIe x4 I/F
▸ PCIe x4 sourced via HSE1 mezzanine connector
▸ Maximum (theoretical) 32Gbps I/O data transfer rate (Gen3 PCIe 8GT/s)

M2 (SATA - Option)
▸ M.2 SATA SSD module socket, key Id B, SATA I/F
▸ Sourced via on-board PCIe to SATA 6G controller Marvell 88SE9170 (wired to HSE2)
▸ Maximum 6Gbps data transfer rate

Feature Summary

Type-C Front Panel Connectors (Option)

▸ Two Type-C front panel receptacles
▸ Suitable for Type-C compliant cable assemblies
▸ Support for Type-C locking plugs (dual screw) according to the 'Locking Connector Spec. Rev. 1.0'
▸ V_{BUS} over voltage, surge, and ESD protection

Upper Receptacle Type-C
▸ Host mode USB 3.1 Gen 1 (5Gbps SuperSpeed), passed through from HSE1 mezzanine connector (CPU carrier card USB host controller e.g. PCH)
▸ Downstream Facing Port (DFP) controller and power switch, up to 5V/3A V_{BUS}
▸ 10Gbps MUX for Type-C flip control (signal flow according to the cable plug orientation)
▸ USB 3.1 Gen 2 ready (10Gbps SuperSpeed+) for future CPU chipset generation

Lower Receptacle Type-C
▸ Two basic operation modes supported:
▸ Host mode USB 3.1 Gen 1 (5Gbps SuperSpeed), sourced from on-board PCIe USB 3.0 host controller
▸ DisplayPort Alternate Mode (VESA ALT Mode), DP video signals derived from HSE2 mezzanine connector (CPU carrier card graphics controller)
▸ Active switch fabric with redriver and equalization - support for USB 3.1 Gen1 5Gbps SS and DisplayPort 1.4 4 Lanes 8.1Gbps (DP characteristics in accordance to CPU carrier card GPU)
▸ Configurations supported VESA C/D/E/F e.g. USB 3.1, DisplayPort 4 lanes, and concurrent USB 3.1 plus DisplayPort 2 lanes
▸ Power switch, up to 5V/3A V_{BUS}

Applications

▸ Low profile mezzanine module for EKF CPU Cards (SC4-CONCERTO and later)
▸ 4HP assembly CPU carrier board and S40-NVME mezzanine card
▸ M.2 based mass storage, 1 x M.2 SATA socket, 1 x M.2 PCIe socket (NVMe)
▸ Optional front panel I/O (2 x Type-C, dual screw locking)
▸ Front I/O 1 x USB 3.1 Gen 1, 1 x USB 3.1 Gen1 & DisplayPort alternate mode

Feature Summary

Environment & Regulatory

- ▸ Designed & manufactured in Germany
- ▸ Certified quality management according to ISO 9001
- ▸ Long term availability
- ▸ Rugged solution
- ▸ Coating, sealing, underfilling on request
- ▸ RoHS compliant
- ▸ Operating temperature 0°C to +70°C (commercial temperature range) available
- ▸ Operating temperature -40°C to +85°C (industrial temperature range) available
- ▸ 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
- ▸ MTBF 50.1 years (MIL-HDBK-217F, SN29500 @+40°C)
- ▸ EC Regulatory EN55035, EN55032, EN62368-1 (CE)

Custom specific modifications or development on request

All items are subject to change

M.2 modules shown in this document are for reference only, and are not scope of delivery

SC9-TOCCATA w. S40

S40-NVME w. SC8-FLUTE CPU Carrier Card

Block Diagram

Front Panel I/O

USB

USB DP

Type-C

USB3

PD CTRL — TPS25810

SS DFP MUX — HD3SS3212

P-HSE1

USB 3.1 SS

Carrier Card HSE1

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PCIe Gen3 x4

Type-C DP ALT Mode

USB3

DisplayPort

PD CTRL — TPS65981

SS DFP DP ALT MUX — TUSB546A

USB 3.1 SS — TUSB7320

PCIe to USB3

Option

4

Simplified Block Diagram
S40-NVME
Rev. 1

3.3V

Power Switch — 45520

Option

SATA 6G

M.2 SATA — Socket Key Id B

3.3V

Power Switch — 45520

M.2 NVMe — Socket Key Id M

12V

12V

DC/DC 7.5A

2 x SiC 401A

DC/DC 6A

3.3V

5V

M.2 SATA SSD

2230
2242
2260
2280

PCIe to SATA — 9170

M.2 PCIe SSD

2230
2242
2260
2280

SC4-CONCERTO

3.2H S1-S5 D1-D4

PCIe

PCIe

3.2H S1-S5 D1-D4

P-HSE2

DisplayPort

Carrier Card HSE2

Top View Component Assembly

SC5-FESTIVAL • CompactPCI® Serial • © EKF • ekf.com

Front Panel

SC4-
CONCERTO
w. S40

SC9- w. S40
TOCCATA
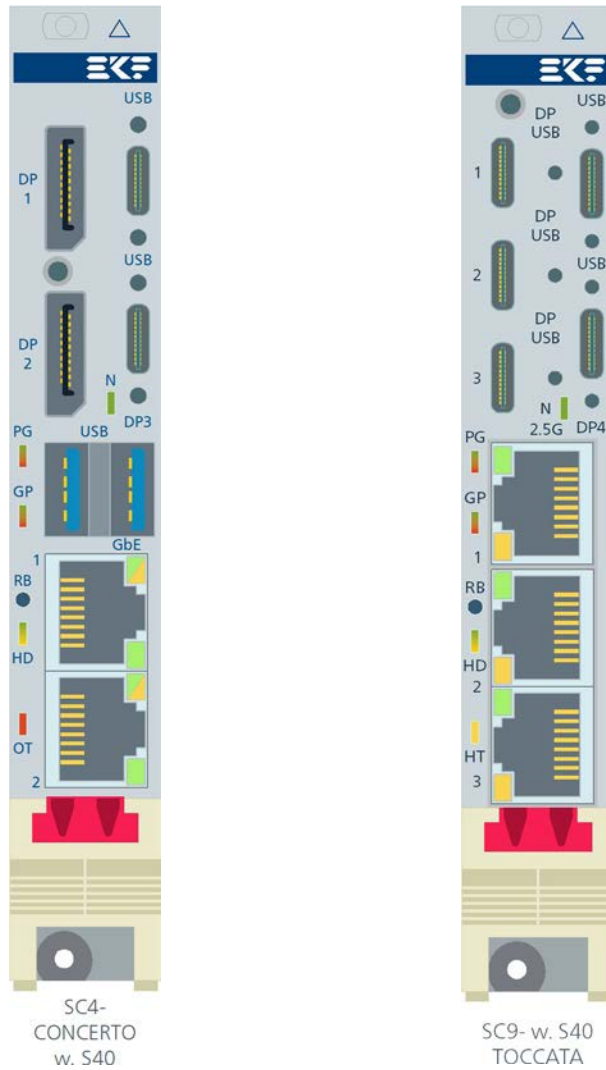
Upper Type-C: USB 3.1 Gen1 (Carrier Card PCH)
Lower Type-C: USB 3.1 Gen1 (S40-NVME Mezzanine USB Controller) & DP3 VESA DisplayPort Alt Mode
LED N: M.2 NVMe Activity

For rugged applications, the front panel is provided with M2 threads, suitable for dual screw Type-C locking plugs, according to the 'USB Type-C Locking Connector Specification' (15mm pitch).

S40-NVME w. SC5-FESTIVAL CPU Carrier Card

Technical Reference - Connectors

M.2 SSD Host Connectors

The S40-NVME is provided with two M.2 (formerly NGFF) module host connectors. One socket is M-keyed, for PCIe x4 based SSD modules, and the other is B-keyed for SATA type SSD modules. After inserted, the M.2 module must be locked manually by a screw (M2.5 threaded inserts provided on the PCB), in order to withstand shock and vibration. The S40-NVME accepts module sizes up to 2280 on both connectors. A special locking bar is available as accessory (EKF part no. 710.9.M_2.B) for a 2280 size SATA module, since the PCB does not provide an insert on this outer edge position. With respect to the top and bottom component height, the 3.2H M.2 sockets are suitable for most module styles (labels), S1 - S5 and D1 - D4, according to the PCI Express M.2 Specification (Figure 3 Naming Nomenclature).

Both M.2 host connectors can be used independent of each other. Single and dual SSD operation is supported. The PCIe x4 SSD is suitable for demanding applications, but legacy operating systems may not include NVMe drivers. The M.2 SATA SSD can be used as backup storage, or even as reasonably priced single mass storage device, and requires common AHCI drivers.

There are also PCIe x4 based SSDs available for OEMs which comply with the AHCI (SATA) protocol, for legacy systems. When ordering PCIe based SSD modules, be sure to chose the version which is most suitable for your application.
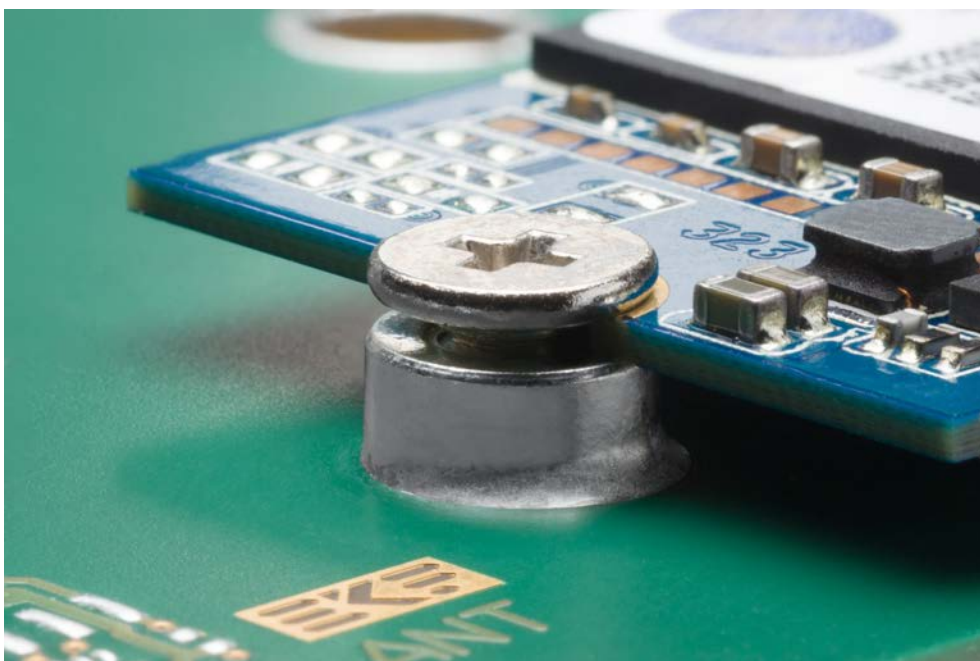
M.2 Module Fixation (Picture Similar)

M.2 - 1 (PCIe x4)

NVMe PCIe x4 M.2 M-Key 3.2H • Pin 1 - 38 EKF Part #255.50.2.2232.1			
GND	1	2	+3.3V
GND	3	4	+3.3V
PETN3	5	6	NC
PETP3	7	8	NC
GND	9	10	LED1#
PERN3	11	12	+3.3V
PERP3	13	14	+3.3V
GND	15	16	+3.3V
PETN2	17	18	+3.3V
PETP2	19	20	NC
GND	21	22	NC
PERN2	23	24	NC
PERP2	25	26	NC
GND	27	28	NC
PETN1	29	30	NC
PETP1	31	32	NC
GND	33	34	NC
PERN1	35	36	NC
PERP1	37	38	NC

NVMe PCIe x4 M.2 M-Key continued • Pin 39 - 75			
GND	39	40	SMB_CLK *
PETN0	41	42	SMB_DATA *
PETP0	43	44	ALERT *
GND	45	46	NC
PERN0	47	48	NC
PERP0	49	50	PERST#
GND	51	52	CLKREQ#
REFCLKN	53	54	PEWAKE#
REFCLKP	55	56	RSV
GND	57	58	RSV
M-Key	59	60	M-Key
M-Key	61	62	M-Key
M-Key	63	64	M-Key
M-Key	65	66	M-Key
NC	67	68	SUSCLK
PEDET	69	70	+3.3V
GND	71	72	+3.3V
GND	73	74	+3.3V
GND	75		

* Logic level 1.8V signals - LSF0204 level shifter to 3.3V on-board

PCI Express® M.2 Specification Socket 3 PCIe-based Module Pinout (Module Key M)

M.2 - 2 (SATA)

AHCI SATA M.2 B-Key 3.2H • Pin 1 - 38 EKF Part #255.50.1.2232.10			
CFG-3 *	1	2	+3.3V
GND	3	4	+3.3V
GND	5	6	NC
NC	7	8	NC
NC	9	10	DAS/DSS **
GND	11	12	B Key
B Key	13	14	B Key
B Key	15	16	B Key
B Key	17	18	B Key
B Key	19	20	NC
CFG-0 *	21	22	NC
NC	23	24	NC
NC	25	26	NC
GND	27	28	NC
NC	29	30	NC
NC	31	32	NC
GND	33	34	NC
NC	35	36	NC
NC	37	38	DEVSLP **

* 10k pull-up +3.3V

** 10k pull-down to GND

AHCI SATA M.2 B-Key continued • Pin 39 - 75			
GND	39	40	SMB_CLK
SATA B+ (SSD OUT)	41	42	SMB_DATA
SATA B- (SSD OUT)	43	44	ALERT#
GND	45	46	NC
SATA A- (SSD IN)	47	48	NC
SATA A+ (SSD IN)	49	50	NC
GND	51	52	NC
NC	53	54	NC
NC	55	56	RSV
GND	57	58	RSV
NC M-Key	59	60	NC M-Key
NC M-Key	61	62	NC M-Key
NC M-Key	63	64	NC M-Key
NC M-Key	65	66	NC M-Key
NC	67	68	SUSCLK
CFG-1 *	69	70	+3.3V
GND	71	72	+3.3V
GND	73	74	+3.3V
CFG-2 *	75		

* 10k pull-up +3.3V

PCI Express® M.2 Specification Socket 2 Key B-M SATA-based SSD Module Pinout

Type-C Front I/O

As an option, the S40-NVME mezzanine is equipped with one or two Type-C front panel connectors, basically to be used as USB 3.1 Gen 1 DFP (Downstream Facing Ports aka host). Both receptacles are suitable for dual-screw locked cable connectors according to the 'Type-C Locking Connector Specification Rev. 1.0'. Based on the USB PD BMC protocol (CC signals used for communication w. UFP), +5V V_{BUS} power supply is provided up to 3A on each connector, and a circuit protection prevents from damages caused by external V_{BUS} over voltage, surge, and ESD.

The optional upper Type-C connector provides an USB 3.1 Gen 1 SuperSpeed port (formerly known as USB 3.0, 5Gbps), derived from the CPU carrier card across the mezzanine connector HSE1. An integrated Downstream Facing Port (DFP) controller and power switch is combined with a 10Gbps MUX for Type-C flip control (signal flow according to the cable plug orientation). This circuitry is ready for USB 3.1 Gen 2 (10Gbps SuperSpeed+), for future CPU chipset generation.

The optional lower Type-C connector in addition offers 'DP Alt Mode' operation, detected via CC wires (BMC protocol). A special multiplexer is used to swap between either USB or DisplayPort based devices, in order to deliver the requested signal type including flip control. An attached USB device is supported via the on-board PCIe to USB 3.0 5Gbps controller (TI 7320). When operated as DisplayPort video output, these signals are derived from the CPU carrier card across the mezzanine connector HSE2.

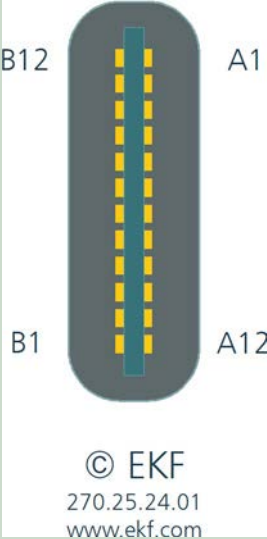| Type-C Cable Assemblies	
270.25.9.10.10	Type-C cable assembly with locking connectors, 1m
270.25.9.20.01	Type-C to Type-A (female) cable adapter, 10cm
270.25.9.50.20	Type-C DP Alt Mode 4k @60Hz cable assembly, 2m
other configurations on request	

Type-C (Upper)

Type-C Receptacle - Upper Position Front Panel - USB DFP				
	GND	b12	a1	GND
	$RX1+$	b11	a2	TX1+
	$RX1-$	b10	a3	TX1-
	V_{BUS}	b9	a4	V_{BUS}
	SBU2 *	b8	a5	CC1
	D-	b7	a6	D+
	D+	b6	a7	D-
	CC2	b5	a8	SBU1 *
	V_{BUS}	b4	a9	V_{BUS}
	TX2-	b3	a10	RX2-
	TX2+	b2	a11	RX2+
	GND	b1	a12	GND

B12 · A1
B1 · A12

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* 100k PD - not in use for USB

A TPS25810 USB Type-C DFP controller & power switch (setup for 3A V_{BUS} PD) is wired to the CC1/CC2configuration channel pins of the Type-C receptacle. The controller delivers a polarity signal for the HD3SS3212 high speed multiplexer which reflects the Type-C cable plug orientation (flip control). As result, the USB SuperSpeed signals (TX/RX) are routed appropriate either to the A-contacts, or B-contacts. TVS diodes and common mode filters are provided for signal protection, and a TPD1S514 OVP circuit prevents from externally applied over-voltage across the V_{BUS} pins.

Please note that the upper Type-C receptacle USB port is derived from the CPU carrier card across the HSE1 mezzanine connector. With respect to the SC4-CONCERTO CPU, this is an USB 3.1 Gen 1 (5Gbps SuperSpeed) connection, but further CPU boards may also deliver Gen 2 (10Gbps SuperSpeed+).

Type-C (Lower)

Type-C Receptacle - Lower Position Front Panel USB Downstream Facing Port (DFP) and VESA DisplayPort Alt Mode				
	GND	b12	a1	GND
	RX1+	b11	a2	TX1+
	RX1-	b10	a3	TX1-
	V_{BUS}	b9	a4	V_{BUS}
	SBU2	b8	a5	CC1
	D-	b7	a6	D+
	D+	b6	a7	D-
	CC2	b5	a8	SBU1
	V_{BUS}	b4	a9	V_{BUS}
	TX2-	b3	a10	RX2-
	TX2+	b2	a11	RX2+
	GND	b1	a12	GND

B12   A1
B1   A12

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The on-board TUSB546A is a highly integrated solution which offers flexible USB Type-C switching and redriving support for USB 3.1 Gen1 5.0Gbps and DisplayPort Alternative Mode up to 8.1Gbps. Simplified, the chip provides an active switch fabric for USB and DP, including flip control, so that an externally attached device (either USB or DP) is supplied automatically with the suitable interface signals. Even a concurrent configuration with USB SS and DP (two lanes) is supported.

Other than with the upper Type-C receptacle, the USB signals here are derived from an on-board PCIe to USB 3.0 host controller. The 4-lane DisplayPort however interface is directly passed from the CPU carrier card via HSE2 (3rd DP video output on an Intel® CPU/GPU). Both signal groups are inputs to the switch fabric and routed to the lower Type-C connector with suitable gain and phase correction.

A TPS65981 USB Type-C power delivery controller & power switch has been setup for 3A V_{BUS}. TVS diodes and common mode filters are provided for signal protection, and a TPD1S514 OVP circuit prevents from externally applied over-voltage across the V_{BUS} pins.

Mezzanine Connectors HSE1, HSE2

The S40-NVME is provided with two male mezzanine connectors on the bottom side of the PCB, which mate with the female mezzanine connectors on the carrier CPU card, for a resulting board-to-board mounting height of 10.0mm.

HSE1

HSE1 is used to pass a PCIe x4 link from the CPU carrier card to the on-board M.2 NVMe connector. In addition, a SuperSpeed USB 3.1 channel is wired across HSE1 to the upper front panel Type-C connector.

HSE2

HSE2 is provided to supply the S40-NVME mezzanine with additional PCIe lanes, and a third DisplayPort video channel (two DP connectors already available from carrier card CPU).

Two PCIe x1 links from HSE2 are in use, as an option, wired to on board controllers (SATA and USB). The PCIe to SATA controller (Marvell 9170) is required for the M.2 SATA based socket. The PCIe to USB 3.0 (USB 3.1 Gen 1) controller (TI 7320) is provided as an option for the lower Type-C connector.

The DisplayPort lanes from HSE2 are likewise wired to the optional lower Type-C connector, for the Type-C DP alternate use (through switches and flip circuitry).

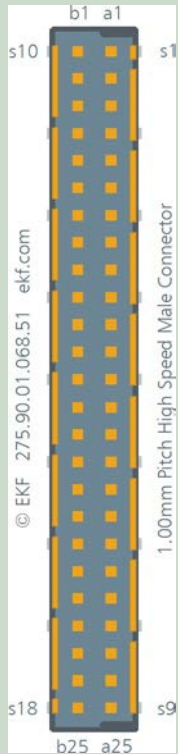Carrier card connector 8mm female ERNI Microspeed 275.90.08.068.01
Supplement 1mm male connector for nominal height 9mm (C4*, B2B 9.5mm)
Supplement 2mm male connector for nominal height 10mm (S2*, S4*, B2B 10.0mm)
Supplement 2mm male connector for nominal height 10mm (S6*, S8*, B2B 10.8mm)
Supplement 10mm male connector for nominal height 18mm (SC* side card, B2B 18.7mm)

High Speed Expansion P-HSE1				
CFG_34 *	b1	a1	CFG_12 *
3_PCIE_TXP	b2	a2	1_PCIE_TXP
3_PCIE_TXN	b3	a3	1_PCIE_TXN
GND	b4	a4	GND
3_PCIE_RXN	b5	a5	1_PCIE_RXN
3_PCIE_RXP	b6	a6	1_PCIE_RXP
GND	b7	a7	GND
4_PCIE_TXP	b8	a8	2_PCIE_TXP
4_PCIE_TXN	b9	a9	2_PCIE_TXN
GND	b10	a10	GND
4_PCIE_RXN	b11	a11	2_PCIE_RXN
4_PCIE_RXP	b12	a12	2_PCIE_RXP
GND	b13	a13	GND
2_USB3_TXP	b14	a14	1_USB2_P
2_USB3_TXN	b15	a15	1_USB2_N
GND	b16	a16	GND
2_USB3_RXP	b17	a17	2_USB2_P
2_USB3_RXN	b18	a18	2_USB2_N
GND	b19	a19	GND
PCIE_CLK_P	b20	a20	1_2_USB_OC#
PCIE_CLK_N	b21	a21	PLTRST#
+5VS [1]	b22	a22	+3.3VS [1]
+5VS [1]	b23	a23	+3.3VS [1]
+5VPS [2]	b24	a24	+3.3VA [3]
+12VPS [2]	b25	a25	+12VPS [2]

*   CFG_12 and CFG_34 = open on S40 (10k PU on CPU carrier board) indicating that a PCIe x4 link is requested

1) Power rail switched on in S0 state only
2) Power rail switched on in S0-S4 state
3) Power always on

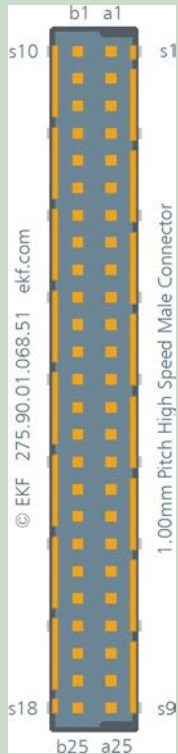Carrier card connector 8mm female ERNI Microspeed 275.90.08.068.01
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Supplement 2mm male connector for nominal height 10mm (S6*, S8*, B2B 10.8mm)
Supplement 10mm male connector for nominal height 18mm (SC* side card, B2B 18.7mm)

High Speed Expansion P-HSE2				
3_PCIE_TXP	b1	a1	1_PCIE_TXP
3_PCIE_TXN	b2	a2	1_PCIE_TXN
GND	b3	a3	GND
3_PCIE_RXN	b4	a4	1_PCIE_RXN
3_PCIE_RXP	b5	a5	1_PCIE_RXP
GND	b6	a6	GND
4_PCIE_TXP	b7	a7	2_PCIE_TXP
4_PCIE_TXN	b8	a8	2_PCIE_TXN
GND	b9	a9	GND
4_PCIE_RXN	b10	a10	2_PCIE_RXN
4_PCIE_RXP	b11	a11	2_PCIE_RXP
GND	b12	a12	GND
DP_LANE2_P	b13	a13	DP_LANE0_P
DP_LANE2_N	b14	a14	DP_LANE0_N
GND	b15	a15	GND
DP_LANE3_P	b16	a16	DP_LANE1_P
DP_LANE3_N	b17	a17	DP_LANE1_N
GND	b18	a18	GND
DP_AUX_P	b19	a19	PCIE_CLK_P
DP_AUX_N	b20	a20	PCIE_CLK_N
DP_CFG1	b21	a21	GND
DP_HPD	b22	a22	SMB_SCL [1]
PLTRST#	b23	a23	SMB_SDA [1]
+12VPS [2]	b24	a24	+12VPS [2]
+12VPS [2]	b25	a25	+12VPS [2]

PCIe pre-configured 1x4, 2x2, 4x1 via soft-straps (Flash image), programming tool will be provided by EKF

1) Connection to SMBus, isolated after system reset
2) Power rail switched on in S0-S4 state

Ordering Information

Ordering Information
For popular S40-NVME SKUs please refer to www.ekf.com/liste/liste_21.html#S40

Please note that the S40-NVME is a carrier card which typically comes <u>without</u> M.2 module(s) populated, unless otherwise expressly ordered. Photos shown within this document and at other places may be equipped with M.2 modules just for application demonstration. If you need a turnkey solution with M.2 NVMe and/or M.2 SATA storage modules populated, please contact sales@ekf.com before ordering.

Alternate Products

Low Profile CPU Card Mezzanine Storage Modules	
S20-NVME	M.2 NVMe Socket, 1 x Type-C USB Front I/O
S48-SSD	Dual M.2 NVMe Socket, 1 x Type-C USB Front I/O
S80-P6	M.2 NVMe & P6 Backplane Connector (8 x Gb Ethernet switch)
S82-P6	M.2 NVMe & P6 Backplane Connector (4 x Gb Ethernet NIC)

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