MB-COMHPCM-1
Preliminary User's Manual

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17.06.2025

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REVISION HISTORY

Rev.	Date	Name	Pos.	Modification
0001	17.06.2025	KG		First edition

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You can register on our website www.tq-group.com to have access to restricted information and automatic update services.
For direct technical support, you can contact our FAE team by email: support@tq-group.com.
Our FAE team can also support you with additional information like 3D-STEP files and confidential information, which is not provided on our public website.
For service/RMA, please contact our service team by email (service@tq-group.com) or your sales team at TQ.

1.7 Tips on Safety

Improper or incorrect handling of the product can substantially reduce its life span.

1.8 Symbols and Typographic Conventions

Table 1: Terms and Conventions

Symbol	Meaning
	This symbol represents the handling of electrostatic-sensitive modules and / or components. These components are often damaged / destroyed by the transmission of a voltage higher than about 50 V. A human body usually only experiences electrostatic discharges above approximately 3,000 V.
	This symbol indicates the possible use of voltages higher than 24 V. Please note the relevant statutory regulations in this regard. Non-compliance with these regulations can lead to serious damage to your health and cause damage / destruction of the component.
	This symbol indicates a possible source of danger. Acting against the procedure described can lead to possible damage to your health and / or cause damage / destruction of the material used.
	This symbol represents important details or aspects for working with TQ-products.
`Command`	A font with fixed width denotes commands, contents, file names, or menu items.

1.9 Handling and ESD Tips

General handling of your TQ-products

	The TQ-product may only be used and serviced by certified personnel who have taken note of the information, the safety regulations in this document and all related rules and regulations. A general rule is, not to touch the TQ-product during operation. This is especially important when switching on, changing jumper settings or connecting other devices without ensuring beforehand that the power supply of the system has been switched off. Violation of this guideline may result in damage / destruction of the MB-COMHPCM-1 module and be dangerous to your health. Improper handling of your TQ-product would render the guarantee invalid.

Proper ESD handling

	The electronic components of your TQ-product are sensitive to electrostatic discharge (ESD). Always wear antistatic clothing, use ESD-safe tools, packing materials etc., and operate your TQ-product in an ESD-safe environment. Especially when you switch modules on, change jumper settings, or connect other devices.

1.10 Naming of Signals

A hash mark (#) at the end of the signal name indicates a low-active signal.

Example: RESET#

If a signal can switch between two functions and if this is noted in the name of the signal, the low-active function is marked with a hash mark and shown at the end.

Example: C / D#

If a signal has multiple functions, the individual functions are separated by slashes when they are important for the wiring.

The identification of the individual functions follows the above conventions.

Example: WE2# / OE#

1.11 Further Applicable Documents / Presumed Knowledge

- **Specifications and manual of the modules used:**
  These documents describe the service, functionality and special characteristics of the module used.
- **Specifications of the components used:**
  The manufacturer's specifications of the components used, for example CompactFlash cards, are to be taken note of. They contain, if applicable, additional information that must be taken note of for safe and reliable operation. These documents are stored at TQ-Systems GmbH.
- **Chip errata:**
  It is the user's responsibility to make sure all errata published by the manufacturer of each component are taken note of. The manufacturer's advice should be followed.
- **Software behaviour:**
  No warranty can be given, nor responsibility taken for any unexpected software behaviour due to deficient components.
- **General expertise:**
  Expertise in electrical engineering / computer engineering is required for the installation and the use of the device.

Implementation information for the carrier board design is provided in the COM-HPC® Design Guide (2) maintained by the PICMG®. This Carrier Design Guide includes a very good guideline to design a COM-HPC® Mini carrier board.

It includes detailed information with schematics and detailed layout guidelines.

Please refer to the official PICMG® documentation for additional information (1), (2).

The COM-HPC® Mini redefines a number of I/O voltages from 3.3 V to 1.8 V, reflecting current processor trends.
Low-speed, single-ended signals, that are directly attached to the COM-HPC® Mini module are redefined to operate at 1.8 V.

2. INTRODUCTION

The COM-HPC® Mini mainboard MB-COMHPCM-1 is a carrier board for COM-HPC® Mini modules. It can be used for panel PCs, embedded computers or as an evaluation platform for COM-HPC® Mini modules.
In combination with a standard COM-HPC® Mini module it forms a very compact hardware kit that can be used for a freely scalable embedded PC platform. Because of this – with uniform interfaces and dimensions – the PC system can be easily adapted to meet the requirements of the application. The manifold extension options and storage media, which can be added, offer a high level of flexibility and allow functionalities and performance to be extended easily, quickly and inexpensively.
Typical usage is in embedded server applications, PC systems for automation, visualisation and monitoring and all applications that place high demands on quality, durability and long-term availability.

2.1 Functional Overview

The following key functions are implemented on the MB-COMHPCM-1:

Supported Modules:

- TQ COM-HPC® Mini modules

External Interfaces:

- 2 × 10 BASE-T / 100 BASE-TX / 1000 BASE-T / 2500 BASE-T Ethernet interface
- 2 × USB 3.2 Gen 2 Type A connector, USB 3.0 compatible
- 2 × USB 3.2 Gen 1 Type A connector, USB 3.0 compatible
- 1 × USB4 Type C connector or DisplayPort (DP++) connector
- 1 × DisplayPort (DP++) connector
- 3 × Audio (headphone out, microphone in, line in)
- Power Button / Reset

Internal Interfaces:

- 1 × LVDS and eDP connector
- 1 × Backlight power connector
- 1 × USB 2.0 on-board header
- 3 × M.2 socket with E key for USB 2.0 and PCI Express x1 (for WLAN / Bluetooth cards)
- 2 × M.2 socket with M key for PCI Express Gen4 x4 (for SSDs)
- 1 × PCI Express standard x16 port to support standard PCI Express Gen4 x4 cards
- 2 × Serial port with RS-232 transceivers
- 2 × GPIO / I^2C / MISC debug connectors
- 1 × FAN

Power supply:

- Voltage: 12 V DC ±5 %

Environment:

- Extended temperature: –20 °C to +85 °C

Form factor / dimensions:

- 170 mm × 170 mm (Mini ITX)

2.2 Specification Compliance

The MB-COMHPCM-1 supports compliant to PICMG® standard COM-HPC® Mini (COM-HPC® Module Base Specification Rev. 1.2).

2.3 Carrier Board Standard Configurations

- MB-COMHPCM-1

Other configurations are available on request.

2.4 Accessories

- **DK-USB-TYPE A-MOL5**
  Adapter cable from internal USB connector to A-Type receptacle, 150 mm long
- **DK-RS232-9-PIN-DSUB-PICOBLADE**
  Adapter cable from internal connector to 9-pin D-Sub male connector, 150 mm long
- **Battery CR2032 lithium coin cell**
- **Meanwell 180W 12V Power Supply GST220A12-R7B**

Please contact support@tq-group.com for details about DisplayPort cables and DisplayPort to DVI/HDMI adapters.

3. FUNCTION

3.1 Block Diagram

The following illustration shows the block diagram of the MB-COMHPCM-1:

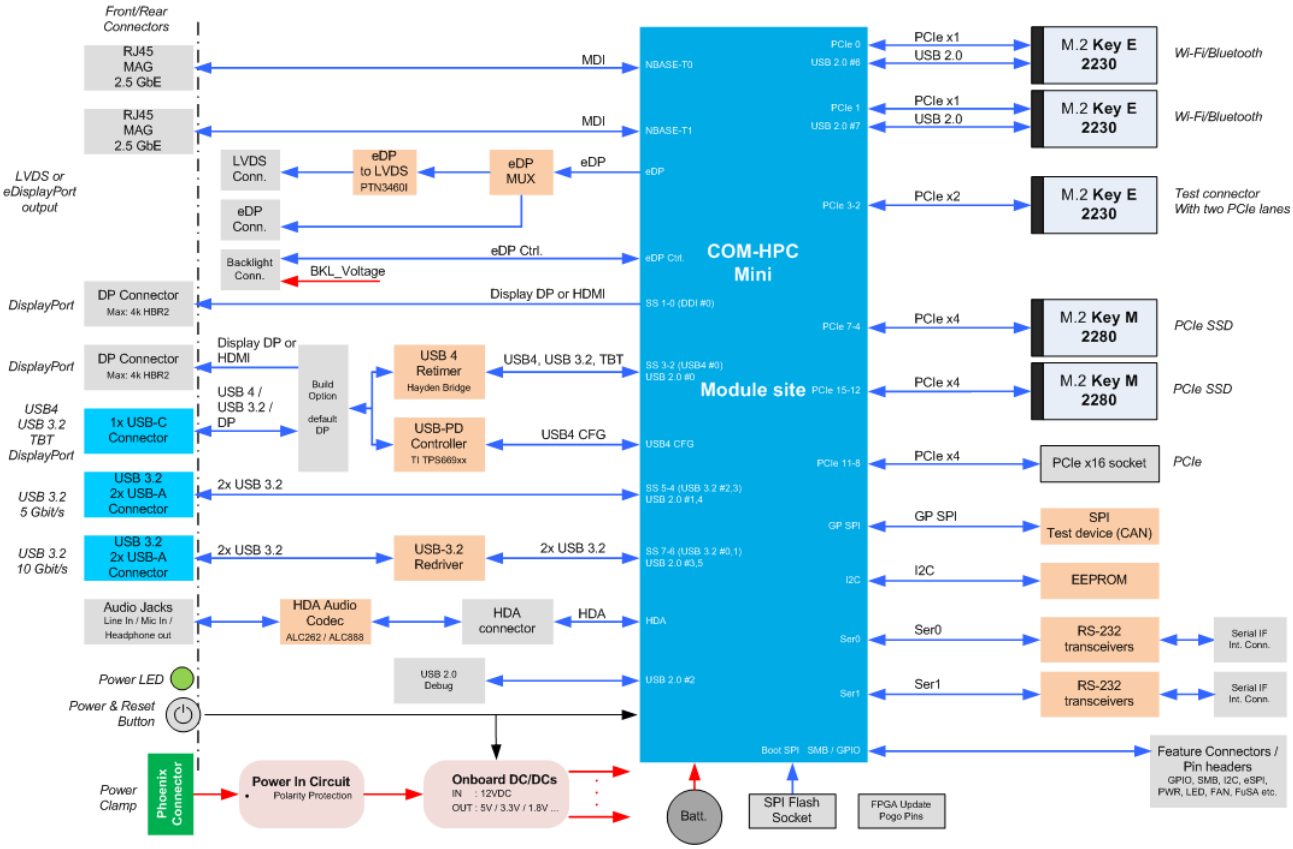

Illustration 1: MB-COMHPCM-1 Block Diagram

3.2 Electrical Specification

3.2.1 Supply Voltage Characteristics

The MB-COMHPCM-1 requires a supply voltage of 12 V DC ±5 %. The input voltages shall rise from 10 % of nominal to 90 % of nominal within 0.1 msec to 20 msec. (0.1 msec ≤ Rise Time ≤ 20 msec).

There must be a smooth and continuous increase of each DC output voltage from 10 % to 90 % of its final set point within the regulation range.

3.2.2 Power Consumption Specification

The power consumption of the system significantly depends on the connected devices; e.g. type of COM-HPC® Mini module, mass storage devices, USB devices, display backlight, etc.

The power consumption of the MB-COMHPCM-1 itself is approximately 2 W.

Note: Power requirement	
	The MB-COMHPCM-1 input current is not fused. The user has to ensure that the input current does not exceed the **maximum current of 25 A (300 W)**. When designing on own power supply, the maximum power consumption of all connected components has to be taken into account.

3.3 Environmental Specification

- Operating temperature, extended: –20 °C to +85 °C
- Storage temperature: –40 °C to +85 °C
- Relative humidity (operating / storage): 10 % to 90 % (not condensing)

3.4 System Components

3.4.1 HD-Audio Controller

The MB-COMHPCM-1 features a Realtek ALC262 High Definition Audio Codec with headphone out, line-in, and microphone in.

3.5 Connectors and Interfaces

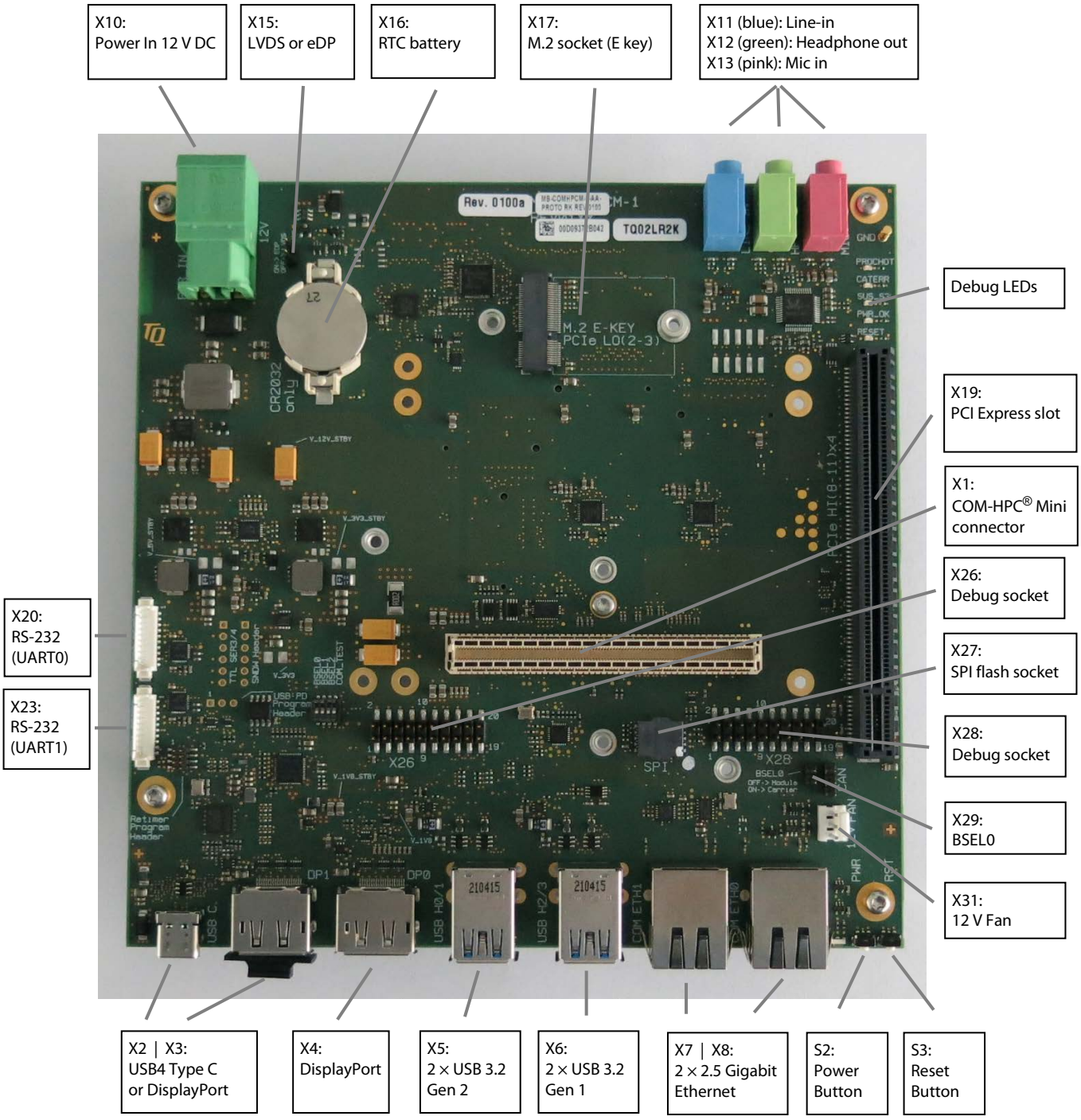

Illustration 2: MB-COMHPCM-1 Top view

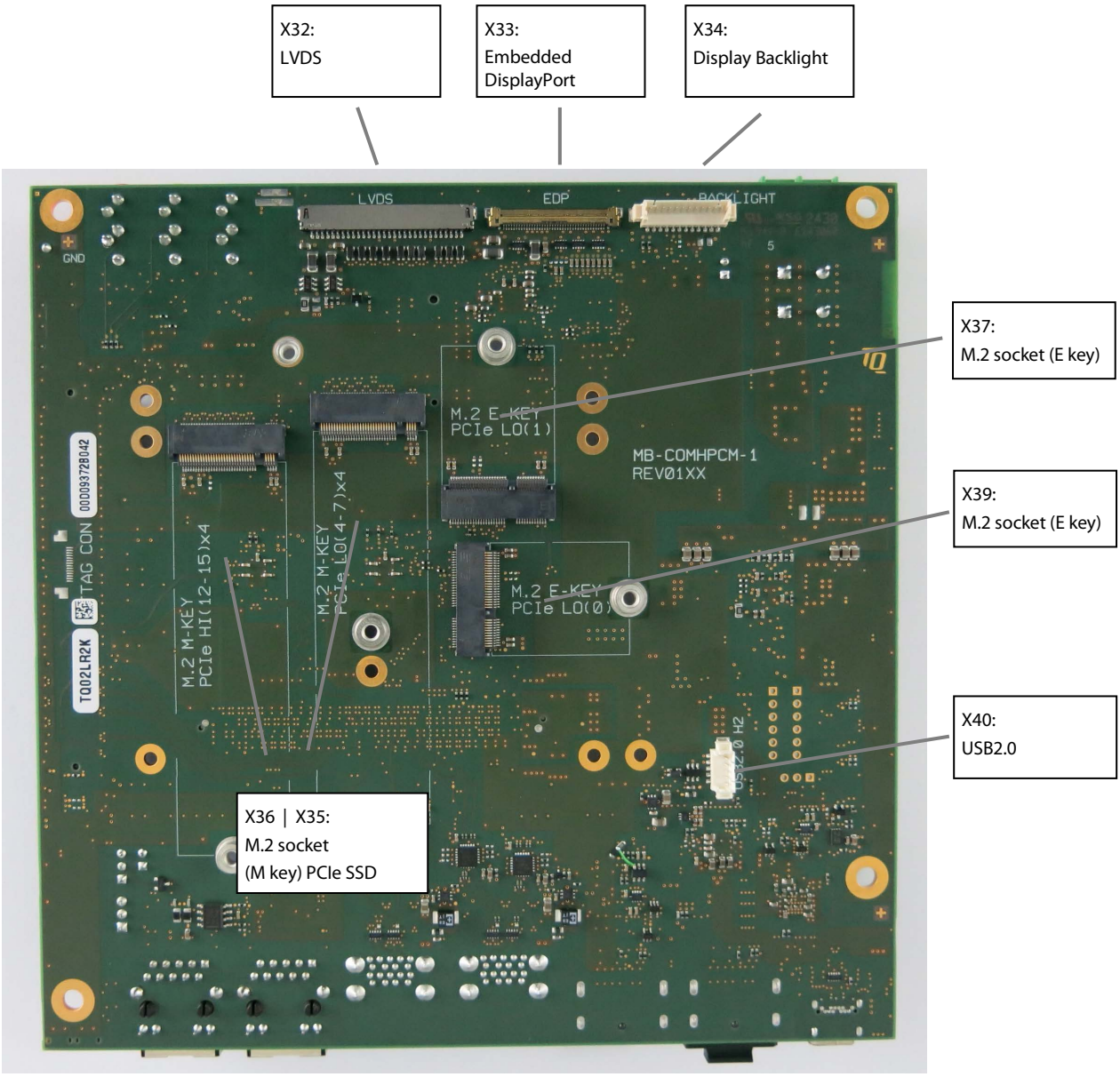

Illustration 3: MB-COMHPCM-1 Bottom view

3.5.1 Power Supply Input connector

The MB-COMHPCM-1 requires a single 12 V DC power supply. The supply voltage must not vary more than ±5 %.

X10: Power Input connector

- Connector type: Phoenix PC4/2-G-7,62
- Mating connector: Phoenix PC4/2-ST-7,62 (up to 20 A)
  Phoenix PC5/2-ST-7,62 (up to 25 A)

Table 2: Power-In connector

Pin	Signal	Remark
1	12 V	Max. 25 A, current limit has to be supported by power supply
2	GND	–

Note: Power requirement	
	The MB-COMHPCM-1 input current is not fused. The user has to ensure that the input current does not exceed the **maximum current of 25 A (300 W)**. Additionally the cable diameter has to be selected in correlation to the maximum current.

3.5.2 DisplayPort Interface

The MB-COMHPCM-1 features up to two DisplayPort interfaces.

- X3: DisplayPort 0 with 4k (HBR2) on standard DisplayPort connector
- X4: DisplayPort 1 with 4k (HBR2) on standard DisplayPort connector

The DisplayPort 1 interface and the USB4 Type C port are factory-configured. The user has to select one of the interfaces.

Table 3: COM-HPC® Mini SuperSpeed DisplayPort port mapping

COM-HPC® Mini SuperSpeed port	MB-COMHPCM-1 connector
SuperSpeed port 1 – 0	DisplayPort connector X4
SuperSpeed port 3 – 2	DisplayPort connector X3

3.5.3 USB Host Interfaces

The MB-COMHPCM-1 features several USB Host interfaces.

X5: USB 3.2 Gen 2 (up to 10 Gb/s) double Type A connector with USB 3.0 compatibility
Power: up to 1.5 A @ 5 V

X6: USB 3.2 Gen 1 (up to 5 Gb/s) double Type A connector with USB 3.0 compatibility
Power: up to 1.5 A @ 5 V

X40: USB 2.0 host extension connector for usage of a USB 2.0 host port with an adapter cable

- Connector type: Molex 53398-0571
- Mating connector: Molex 51021-0500 crimp housing

Table 4: USB 2.0 Host Extension connector

Pin	Signal	Remark
1	+5 V	–
2	D–	–
3	D+	–
4	GND	–
5	GND	–

Table 5: COM-HPC® Mini SuperSpeed USB 3.2 and USB 2.0 port mapping

COM-HPC® Mini SuperSpeed port	COM-HPC® Mini USB 2.0 port	MB-COMHPCM-1 connector
SuperSpeed port 7	USB 2.0 port 5	USB Type A connector X5, top
SuperSpeed port 6	USB 2.0 port 3	USB Type A connector X5, bot
SuperSpeed port 5	USB 2.0 port 4	USB Type A connector X6, top
SuperSpeed port 4	USB 2.0 port 1	USB Type A connector X6, bot

3.5.4 USB4 Type C Interface

The USB Type-C sub-system supports USB2.0, USB 3.2, USB4, and DPoC (DisplayPort over Type-C) protocols.

X2: USB4 Type C connector with USB4 compatibility
Power: up to 3 A @ 5 V

The DisplayPort 1 interface and the USB4 Type C port are factory-configured. The user has to select one of the interfaces.

3.5.5 Ethernet Interface

The MB-COMHPCM-1 features two NBASE-T Ethernet ports with automatic speed configuration 10 BASE-T / 100 BASE-TX / 1000 BASE-T / 2500 BASE-T. The Ethernet ports of the COM-HPC® Mini module are routed to connectors X7 and X8.

Table 6: Ethernet LEDs

LED	Status
Left, green (Link)	Off: No link
	On: Link established with 2500 BASE-T
Right, yellow (ACT)	Off: No activity
	On: Activity

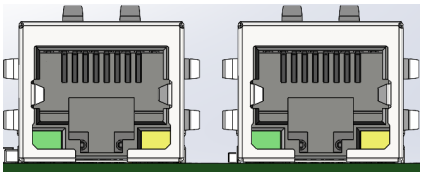

Illustration 4: RJ45 connectors

3.5.6 Serial (RS-232) Interface

The MB-COMHPCM-1 features two RS-232 serial ports at the on-board connector.

X20, X23: RS-232 connector

- Connector type: Molex 53398-1071
- Mating connector: Molex 51021-1000 crimp housing

Table 7: Serial port RS-232 pinout via cable to 9-pin D-Sub

Pin	MB-COMHPCM-1 connector	9-pin D-Sub connector (with D-Sub adapter)
1	NC	–
2	NC	RXD
3	RXD	TXD
4	RTS	–
5	TXD	GND
6	CTS	–
7	NC	RTS
8	NN	CTS
9	GND	–
10	NC	–

Illustration 5: 10-pin RS-232 connectors

3.5.7 Embedded Display and LVDS connector

The COM-HPC® Mini module only supports an embedded DisplayPort (eDP); the LVDS interface is no longer supported. However, an eDP-to-LVDS bridge is provided on the MB-COMHPCM-1 for the LVDS interface. The user can select the eDP or LVDS display interface via a jumper. A power supply connector for the backlight is provided on the MB-COMHPCM-1.
Please contact support@tq-group.com for further information about eDP or LVDS display support.

X33: eDP connector

- Connector type: JAE HD1S040HA1
- Mating connector: JAE HD1P040MA1

Table 8: eDP connector

Pin	Signal	Remark
1	NC	–
2	GND	–
3	TX3–	Lane 3 differential pair
4	TX3+	
5	GND	–
6	TX2–	Lane 2 differential pair
7	TX2+	
8	GND	–
9	TX1–	Lane 1 differential pair
10	TX1+	
11	GND	–
12	TX0–	Lane 0 differential pair
13	TX0+	
14	GND	–
15	AUX+	AUX - channel
16	AUX–	
17	GND	–
18	3V3	3.3 V supply voltage
19	3V3	
20	3V3	
21	3V3	
22	NC	–
23	GND	–
24	GND	
25	GND	
26	GND	
27	HPD	Hot Plug Detect
28	GND	–
29	GND	
30	GND	
31	GND	
32	BLKT_EN	Backlight enable 3.3 V
33	BLKT_CTRL	Backlight (brightness) control 3.3 V
34	VDD_EN	Panel power enable 3.3 V
35	NC	–
36	V_BLKT	12 V Backlight supply voltage
37	V_BLKT	
38	V_BLKT	
39	V_BLKT	
40	NC	–

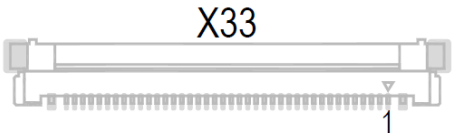

Illustration 6: eDP connector

Close jumper X15 to select the eDP interface on the MB-COMHPCM-1.

Illustration 7: Config jumper: eDP or LVDS

X32: LVDS connector

- Connector type: Hirose DF19G-30P-1H
- Mating connector: Hirose DF19-30S-1C

Table 9: LVDS connector

Pin	Signal	Remark
1	A0–	Odd bus
2	A0+	Odd bus
3	A1–	Odd bus
4	A1+	Odd bus
5	A2–	Odd bus
6	A2+	Odd bus
7	GND	–
8	ACLK–	Odd bus
9	ACLK+	Odd bus
10	A3–	Odd bus
11	A3+	Odd bus
12	B0–	Even bus
13	B0+	Even bus
14	GND	–
15	B1–	Even bus
16	B1+	Even bus
17	GND	–
18	B2–	Even bus
19	B2+	Even bus
20	BCLK–	Even bus
21	BCLK+	Even bus
22	B3–	Even bus
23	B3+	Even bus
24	GND	–
25	5V_PANEL	5 V Panel supply voltage
26	5V_PANEL	
27	5V_PANEL	
28	3V3_PANEL	3.3 V Panel supply voltage
29	3V3_PANEL	
30	3V3_PANEL	

Illustration 8: LVDS connector

X34: Display Backlight connector

- Connector type: Molex 53398-1271
- Mating connector: Molex 51021-1200

Table 10: Backlight connector

Pin	Signal	Remark
1	VCC_BKLT_OUT	Backlight voltage output
2		
3		
4	GND	–
5		
6		
7	NC	–
8	LCD0_BKLT_EN	Display 0 Backlight Enable 3.3 V
9	LCD0_BKLT_CTRL	Display 0 Backlight (brightness) 3.3 V
10	3V3_PROG [1]	3.3 V input (programming)
11	EDID_CLK [2]	EDID I²C clock 3.3 V
12	EDID_DAT [2]	EDID I²C data 3.3 V

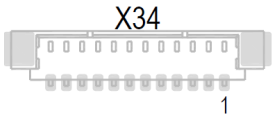

Illustration 9: Backlight connector

1: The EEPROM can be powered by the 3V3_PROG pin.

2: These pins can be used to program the on-board EDID EEPROM.

3.5.8 M.2 sockets with M key (PCI Express SSD devices)

The MB-COMHPCM-1 provides two sockets for PCI Express based M.2 SSD with 22 mm width and 80 mm length.
Single and double-sided M.2 2280 modules with M key (PCI Express only) can be used.
The data transfer rate of this interface mainly depends on the COM-HPC® Mini module and the connected device.
The MB-COMHPCM-1 supports PCI Express Gen 5 data transfer rate.

Table 11: COM-HPC® Mini PCI Express port mapping

COM-HPC® Mini PCI Express port	MB-COMHPCM-1 connector
Group 0 low port 7 – 4	M.2, X35
Group 0 high port 15 – 12	M.2, X36

3.5.9 M.2 sockets with E key (I/O devices)

The MB-COMHPCM-1 provides three sockets for M.2 modules with 22 mm width and 30 mm length.
One USB 2.0 and PCI Express x1 signals are routed to these sockets.
Single and double-sided M.2 2230 modules with E or A&E key can be used.
The transfer rate of this interface mainly depends on the COM-HPC® Mini module and the connected device.

Table 12: COM-HPC® Mini PCI Express and USB port mapping

COM-HPC® Mini PCI Express port	COM-HPC® Mini USB 2.0 port	MB-COMHPCM-1 connector
Group 0 low port 0	USB 2.0 port 6	M.2, X39
Group 0 low port 1	USB 2.0 port 7	M.2, X37
Group 0 low port 2 – 3	–	M.2, X17

3.5.10 PCI Express connector

The MB-COMHPCM-1 provides a standard PCI Express x16 slot with a PCI Express x4 configuration.
The data transfer rate of this interface mainly depends on the COM-HPC® Mini module and the connected device.
The MB-COMHPCM-1 supports PCI Express Gen 5 data transfer rate.

Table 13: COM-HPC® Mini PCI Express port mapping

COM-HPC® Mini PCI Express port	MB-COMHPCM-1 connector
Group 0 high port 11 – 8	PCI Express connector X19

3.5.11 Audio connectors

The MB-COMHPCM-1 provides an audio codec to support the following audio features:

- Microphone in (pink)
- Headphone out (green)
- Line in (blue)

X11, X12, X13: Audio connectors

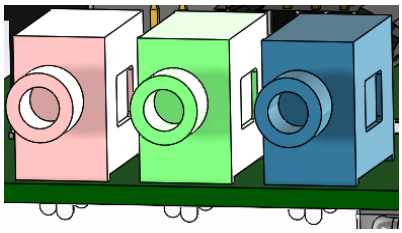

Illustration 10: Audio connectors

3.5.12 Fan connector

The MB-COMHPCM-1 provides a connector for 12 V fans.

X31: 12 V fan connector

- Connector type: Tyco 640456-3
- Mating connector: 3-pin fan connector (2.54 mm pitch)

Table 14: Fan connector

Pin	Signal	Remark
1	GND	–
2	Fan Voltage	Output voltage (0 to 12 V PWM)
3	SENSE	Sense input for fan speed

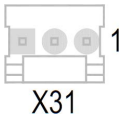

Illustration 11: Fan connector

3.5.13 Debug connector

The MB-COMHPCM-1 provides several COM-HPC® Mini signals at two headers. These headers are for debugging and software development purposes. The user can access the SMBus, I²C bus and several other signals.

The COM-HPC® Mini redefines a number of I/O voltages from 3.3 V to 1.8 V, reflecting current processor trends.
Low-speed, single-ended signals, that are directly attached to the COM-HPC® Mini module are redefined to operate at 1.8 V.

- Connector type: Male Pin header with 2 rows and 2.54 mm pitch

Table 15: GPIO Signal Debug connector X28

Pin	Signal	Remark
1	V_1V8_STBY	1.8 V supply
2	GND	–
3	GPIO_00	GPIO bidir signal to module 1.8 V
4	GPIO_06	GPIO bidir signal to module 1.8 V
5	GPIO_01	GPIO bidir signal to module 1.8 V
6	GPIO_07	GPIO bidir signal to module 1.8 V
7	GPIO_02	GPIO bidir signal to module 1.8 V
8	GPIO_08	GPIO bidir signal to module 1.8 V
9	GPIO_03	GPIO bidir signal to module 1.8 V
10	GPIO_09	GPIO bidir signal to module 1.8 V
11	GPIO_04	GPIO bidir signal to module 1.8 V
12	GPIO_10	GPIO bidir signal to module 1.8 V
13	GPIO_05	GPIO bidir signal to module 1.8 V
14	GPIO_11	GPIO bidir signal to module 1.8 V
15	NC	–
16	NC	–
17	SMB_CLK_3V3	SM bus clock signal from module 3.3 V
18	SUS_S3#	Suspend to Ram signal from module 1.8 V
19	SMB_DAT_3V3	SM bus data bidir signal to module 3.3 V
20	SUS_S4_S5#	Soft-off signal from module 1.8 V

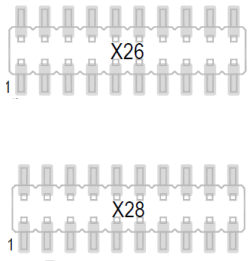

Illustration 12: Debug connectors

Table 16: I²C and COM Signal Debug connector X26

Pin	Signal	Remark
1	V_3V3_STBY	3.3 V supply
2	GND	–
3	COM_TEST#	COM Test signal to module 1.8 V
4	GND	–
5	RST_BTN#	Reset Button to module 1.8 V
6	GND	–
7	PWR_BTN#	Power Button to module 1.8 V
8	CARRIER_HOT#	Carrier hot signal to module 1.8 V
9	WD_STROBE#	Watchdog Strobe signal to module 1.8 V
10	THRMTRIP#	Thermtrip signal from module 1.8 V
11	WD_OUT#	Watchdog Out signal from module 1.8 V
12	NC	NC
13	ACPRESENT#	AC present signal to module 1.8 V
14	BATLOW#	Battery low signal to module 1.8 V
15	LID#	Lid button signal to module 1.8 V
16	Wake1#	Wake up signal to module 1.8 V
17	SLEEP#	Sleep button signal to module 1.8 V
18	RAPID_SHUTDOWN	Trigger for Rapid Shutdown to module 1.8 V
19	I2C0_ALERT#	I2C0 Alert signal to module 1.8 V
20	SMB_ALERT#	SM bus alert signal to module 1.8 V

3.5.14 Debug LEDs

The MB-COMHPCM-1 provides several LEDs for debug purposes.

Table 17: Debug LEDs

Function	PCB text	Remark
SUS S3	S3 act.	Green if module is in power-saving S3 mode (Suspend to RAM)
Power Good #	PWR OK	Green if PWR_OK signal is not valid
Reset active	RESET	Green if module PLTRST# signal is asserted
CATERROR signal	CATERR	Red if module catastrophic error signal is asserted
PROCHOT signal	PROCHOT	Red if module processor hot signal is asserted

3.5.15 SPI Flash Socket

The MB-COMHPCM-1 provides a socket for 1.8 V SPI flashes. This is useful for BIOS updates.
1.8 V SPI flashes with SO8W package can be used.
When the jumper “BSEL0” is set, the BIOS in the socket is active.

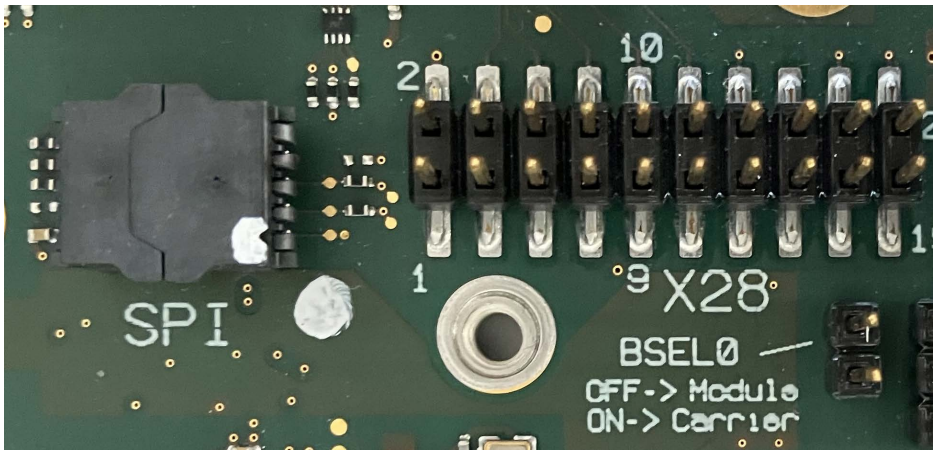

Illustration 13: SPI socket and BSEL0 Jumper

3.5.16 COM-HPC® Mini connector

COM-HPC® Mini modules feature one high performance 400-pin connector, originally introduced by Samtec.
Multiple vendors offer this connector now as well. Connector (X1) has four rows A, B, C, and D.
Connectors with 5 mm or 10 mm stack height are available. The connector on the carrier board determines the stack height.
The board-to-board stack height of MB-COMHPCM-1 and TQMxCU1-HPCM is 10 mm.

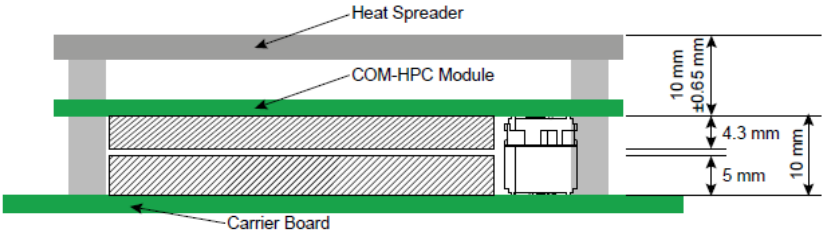

Illustration 14: COM-HPC® Mini board-to-board distance

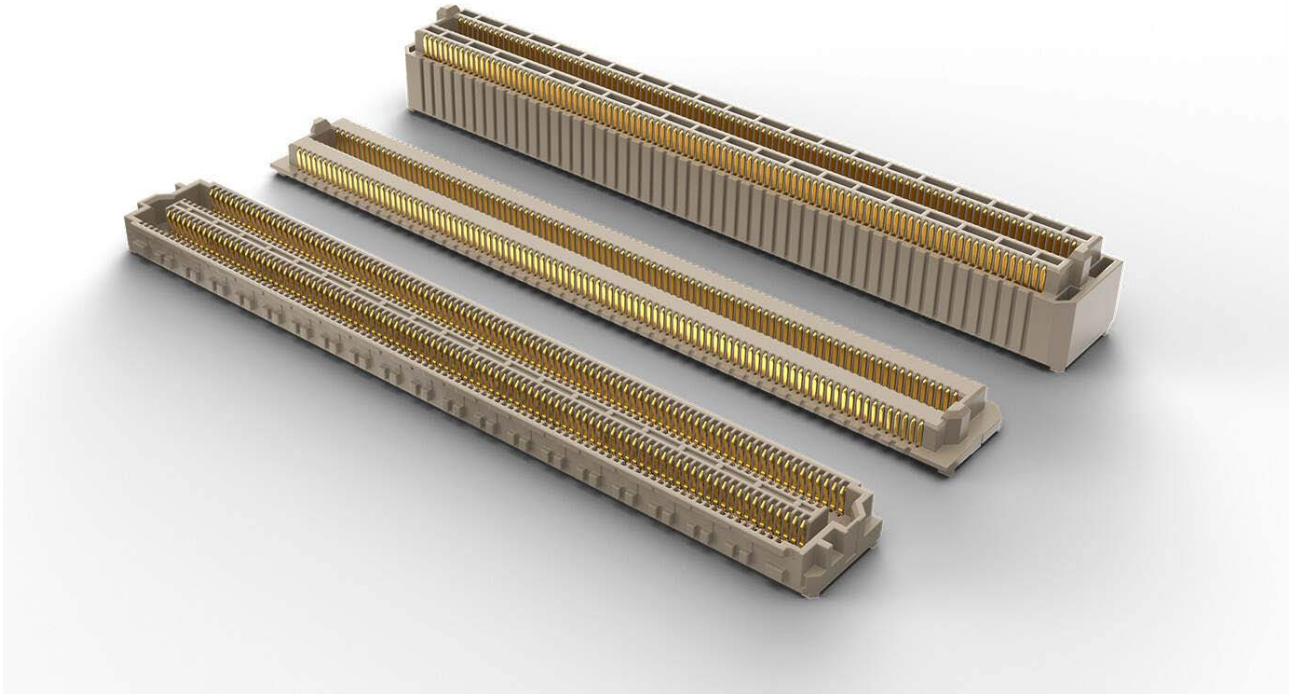

Illustration 15: COM-HPC® Mini connectors

3.6 Buttons

3.6.1 Reset Button

The MB-COMHPCM-1 provides a Reset button (S3). Pressing the button triggers the COM-HPC® Mini module RSTBTN# signal.

3.6.2 Power Button

The MB-COMHPCM-1 provides a Power button (S2). Pressing the button triggers the COM-HPC® Mini module PWRBTN# signal. This initiates a power state transition (e.g. from S0 to S5).

3.7 PCIe Lane assignment

The PCIe lanes of the COM-HPC® Mini module are assigned as shown in the following table.
Attention: not all CPUs provide all lanes.

Table 18: PCIe lane assignment

PCIe Lane	Device	Connector	Lane-config.
0	M.2 E key	X39	x1
1	M.2 E key	X37	x1
2	M.2 E key	X17	x1
3			x1
4	M.2 M key	X35	x4
5			
6			
7			
8	PCIe x16	X19	x4
9			
10			
11			
12	M.2 M key	X36	x4
13			
14			
15			

4. MECHANICS

4.1 Dimensions

The MB-COMHPCM-1 has dimensions of 170 mm × 170 mm, according to the Mini-ITX form factor.

Please contact support@tq-group.com for more details about 2D/3D Step models.

4.2 Protection Against External Effects

The MB-COMHPCM-1 is not protected against dust, external impact and contact (IP00).
Adequate protection has to be guaranteed by the surrounding system.

5. SOFTWARE

5.1 System Resources

Please contact support@tq-group.com for further information of the on-board components.

5.2 Driver Download

The MB-COMHPCM-1 is well supported by the Standard Operating Systems, which already include most of the drivers required.
It is recommended to use the latest drivers for best performance and the full feature set of the COM-HPC® Mini module.

Please contact support@tq-group.com for further drivers.

6. SAFETY REQUIREMENTS AND PROTECTIVE REGULATIONS

6.1 EMC

The MB-COMHPCM-1 was developed according to the requirements of electromagnetic compatibility (EMC). Depending on the target system, anti-interference measures may still be necessary to guarantee that the limits for the overall system including housing are met.

6.2 ESD

In order to avoid interspersion on the signal path from the input to the protection circuit in the system, the protection against electrostatic discharge should be arranged directly at the inputs of a system. Most external interfaces are protected using ESD protection diodes. Measurements for ESD protection have to be done with the electronic parts mounted in a housing. Since TQ-Systems GmbH does not offer a housing for the MB-COMHPCM-1, no special preventive measures are taken.

6.3 Operational Safety and Personal Security

Due to the occurring voltages (12 V DC), tests with respect to the operational and personal safety have not been carried out.

6.4 Cyber Security

A Threat Analysis and Risk Assessment (TARA) must always be performed by the customer for their individual end application, as the MB-COMHPCM-1 is only a sub-component of an overall system.

6.5 Reliability and Service Life

No detailed MTBF calculation has been done for the MBa8MP-RAS314.
The MBa8MP-RAS314 is designed to be insensitive to vibration and impact.

6.6 Export Control and Sanctions Compliance

The customer is responsible for ensuring that the product purchased from TQ is not subject to any national or international export/import restrictions. If any part of the purchased product or the product itself is subject to said restrictions, the customer must procure the required export/import licenses at its own expense. In the case of breaches of export or import limitations, the customer indemnifies TQ against all liability and accountability in the external relationship,irrespective of the legal grounds. If there is a transgression or violation, the customer will also be held accountable for any losses, damages or fines sustained by TQ. TQ is not liable for any delivery delays due to national or international export restrictions or for the inability to make a delivery as a result of those restrictions. Any compensation or damages will not be provided by TQ in such instances.

The classification according to the European Foreign Trade Regulations (export list number of Reg. No. 2021/821 for dual-use-goods) as well as the classification according to the U.S. Export Administration Regulations in case of US products (ECCN according to the U.S. Commerce Control List) are stated on TQ´s invoices or can be requested at any time. Also listed is the Commodity code (HS) in accordance with the current commodity classification for foreign trade statistics as well as the country of origin of the goods requested/ordered.

6.7 Warranty

TQ-Systems GmbH warrants that the product, when used in accordance with the contract, fulfills the respective contractually agreed specifications and functionalities and corresponds to the recognized state of the art.
The warranty is limited to material, manufacturing and processing defects. The manufacturer's liability is void in the following cases:

- Original parts have been replaced by non-original parts.
- Improper installation, commissioning or repairs.
- Improper installation, commissioning or repair due to lack of special equipment.
- Incorrect operation
- Improper handling
- Use of force
- Normal wear and tear

6.8 RoHS

The MB-COMHPCM-1 is manufactured RoHS compliant.

- All components and assemblies are RoHS compliant
- The soldering processes are RoHS compliant

6.9 WEEE®

The final distributor is responsible for compliance with the WEEE® regulation.

Within the scope of the technical possibilities, the MB-COMHPCM-1 was designed to be recyclable and easy to repair.

6.10 REACH®

The EU-chemical regulation 1907/2006 (REACH® regulation) stands for registration, evaluation, certification and restriction of substances SVHC (Substances of very high concern, e.g., carcinogen, mutagen and/or persistent, bio accumulative and toxic). Within the scope of this juridical liability, TQ-Systems GmbH meets the information duty within the supply chain with regard to the SVHC substances, insofar as suppliers inform TQ-Systems GmbH accordingly.

6.11 Statement on California Proposition 65

California Proposition 65, formerly known as the Safe Drinking Water and Toxic Enforcement Act of 1986, was enacted as a ballot initiative in November 1986. The proposition helps protect the state's drinking water sources from contamination by approximately 1,000 chemicals known to cause cancer, birth defects, or other reproductive harm ("Proposition 65 Substances") and requires businesses to inform Californians about exposure to Proposition 65 Substances.

The TQ device or product is not designed or manufactured or distributed as consumer product or for any contact with end-consumers. Consumer products are defined as products intended for a consumer's personal use, consumption, or enjoyment. Therefore, our products or devices are not subject to this regulation and no warning label is required on the assembly.

Individual components of the assembly may contain substances that may require a warning under California Proposition 65. However, it should be noted that the Intended Use of our products will not result in the release of these substances or direct human contact with these substances. Therefore you must take care through your product design that consumers cannot touch the product at all and specify that issue in your own product related documentation.

TQ reserves the right to update and modify this notice as it deems necessary or appropriate.

6.12 EuP

The Eco Design Directive, also Energy using Products (EuP), is applicable to products for the end user with an annual quantity >200,000. The MB-COMHPCM-1 must therefore always be seen in conjunction with the complete device.

The available standby and sleep modes of the components on the MB-COMHPCM-1 enable compliance with EuP requirements for the MB-COMHPCM-1.

6.13 Battery

No batteries are assembled on the MB-COMHPCM-1 by default. The MB-COMHPCM-1 provides a battery socket, which can be equipped with a CR2032, 3.0 V lithium coin cell. The MB-COMHPCM-1 provides current limiting circuitry and protection against reverse current.

6.14 Packaging

The MB-COMHPCM-1 is delivered in reusable packaging.

6.15 Other Entries

By environmentally friendly processes, production equipment and products, we contribute to the protection of our environment. The energy consumption of this subassembly is minimised by suitable measures.

Since there is currently no technical equivalent alternative for printed circuit boards with bromine-containing flame protection (FR-4 material), such printed circuit boards are still used.

Capacitors and transformers containing PCB (polychlorinated biphenyls) are not used.

These points are an essential part of the following laws:

- The law to encourage the circular flow economy and assurance of the environmentally acceptable removal of waste as at 27.9.94
  (source of information: BGBl I 1994, 2705)
- Regulation with respect to the utilization and proof of removal as at 1.9.96
  (source of information: BGBl I 1996, 1382, (1997, 2860))
- Regulation with respect to the avoidance and utilization of packaging waste as at 21.8.98
  (source of information: BGBl I 1998, 2379)
- Regulation with respect to the European Waste Directory as at 1.12.01
  (source of information: BGBl I 2001, 3379)

This information is to be seen as notes. Tests or certifications were not carried out in this respect.

7. APPENDIX

7.1 Acronyms and Definitions

The following acronyms and abbreviations are used in this document.

Table 19: Acronyms

Acronym	Meaning
AHCI	Advanced Host Controller Interface
BIOS	Basic Input/Output System
CAN	Controller Area Network
CMOS	Complementary Metal Oxide Semiconductor
CODEC	Code/Decode
COM	Computer-On-Module
CPU	Central Processing Unit
CSM	Compatibility Support Module
cTDP	Configurable Thermal Design Power
DC	Direct Current
DDC	Display Data Channel
DDI	Digital Display Interface
DDR	Double Data Rate
DMA	Direct Memory Access
DP	DisplayPort
DVI	Digital Visual Interface
EAPI	Embedded Application Programming Interface
ECC	Error-Correcting Code
EDID	Extended Display Identification Data
eDP	embedded DisplayPort
EEPROM	Electrically Erasable Programmable Read-Only Memory
EFI	Extensible Firmware Interface
EMC	Electromagnetic Compatibility
ESD	Electrostatic Discharge
FAE	Field Application Engineer
FIFO	First In First Out
flexiCFG	Flexible Configuration
FPGA	Field Programmable Gate-Array
FR-4	Flame Retardant 4
GPIO	General-purpose Input/Output
HDA	High Definition Audio
HDMI	High Definition Multimedia Interface
HEVC	High Efficiency Video Coding
HSP	Heat Spreader
HT	Hyper-Threading
I	Input
I PD	Input with internal Pull-Down resistor
I PU	Input with internal Pull-Up resistor
I/O	Input/Output
I²C	Inter-Integrated Circuit
IEC	International Electrotechnical Commission
IoT	Internet of Things
IP00	Ingress Protection 00

Acronym	Meaning
IRQ	Interrupt Request
JEIDA	Japanese Electronics Industry Development Association
JPEG	Joint Photographic Experts Group
JTAG®	Joint Test Action Group
LED	Light Emitting Diode
LPDDR5	Low Power Double Data Rate 5
ME	Management Engine
MMC	Multimedia Card
MPEG	Moving Picture Experts Group
MST	Multi-Stream Transport
MT/s	Mega Transfers per second
MTBF	Mean operating Time Between Failures

Table 19: Acronyms (continued)

Acronym	Meaning
N/A	Not Available
NC	Not Connected
O	Output
OD	Open Drain
OpROM	Option ROM
OS	Operating System
PC	Personal Computer
PCB	Printed Circuit Board
PCH	Platform Controller Hub
PCI	Peripheral Component Interconnect
PCIe	Peripheral Component Interconnect Express
PD	Pull-Down
PEG	PCI Express for Graphics
PICMG®	PCI Industrial Computer Manufacturers Group
POST	Power-On Self-Test
PU	Pull-Up
PWM	Pulse-Width Modulation
RAID	Redundant Array of Independent/Inexpensive Disks/Drives
RAM	Random Access Memory
RMA	Return Merchandise Authorization
RoHS	Restriction of (the use of certain) Hazardous Substances
RSVD	Reserved
RTC	Real-Time Clock
SATA	Serial ATA
SCU	System Control Unit
SD	Secure Digital
SD/MMC	Secure Digital Multimedia Card
SDIO	Secure Digital Input/Output
SIMD	Single Instruction, Multiple Data
SMART	Self-Monitoring, Analysis and Reporting Technology
SMBus	System Management Bus
SO-DIMM	Small Outline Dual In-Line Memory Module
SPD	Serial Presence Detect
SPI	Serial Peripheral Interface
SPKR	Speaker
SSD	Solid-State Drive
STEP	Standard for Exchange of Products
TDM	Time-Division Multiplexing
TDP	Thermal Design Power
TPM	Trusted Platform Module
UART	Universal Asynchronous Receiver/Transmitter
UEFI	Unified Extensible Firmware Interface
USB	Universal Serial Bus

Acronym	Meaning
VC-1	Video Coding (format) 1
VESA	Video Electronics Standards Association
VGA	Video Graphics Array
VP8	Video Progressive (compression format) 8
WDT	Watchdog Timer
WEEE®	Waste Electrical and Electronic Equipment
WES	Windows® Embedded Standard

7.2 References

Table 20: Further Applicable Documents and Links

No.	Name	Rev. / Date	Company
(1)	PICMG® COM-HPC® Module Base Specification	Rev. 1.2	PICMG
(2)	PICMG® COM-HPC® Carrier Design Guide	Rev. 2.2	PICMG PDF

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