

Prepared	Date	Rev	Document
Johan Zackrisson	2026-08-24	1.0	H1190_reference_manual
Approved	Title		
	H1190 Reference Manual		

Contents

1. Document information.....	4
1.1. Introduction.....	4
1.2. Document revisions	4
1.3. References	4
1.4. Copyright notice.....	4
2. Safety instructions and product care	5
2.1. Product care and maintenance	5
2.2. Support and RMA.....	5
3. Starter kit contents	6
3.1. H6089 Qseven module	6
3.2. Q7X-151 Carrier board.....	6
3.3. SD Card	6
3.4. 12V Power supply	6
3.5. H2699 Heat spreader	6
3.6. Quick start guide.....	6
4. BIOS	7
4.1.1 BIOS setup.....	7
4.1.2 BIOS reset.....	7
5. Operating system.....	8
5.1. Pre-installed OS.....	8
5.2. Alternative OS.....	8
5.3. BSP	8
6. Installing the Qseven module.....	9
7. Hardware features.....	10
7.1. Board overview	10
7.2. Power	12
7.2.1 DC input.....	12
7.2.2 Buttons	12
7.2.3 Power settings	12
7.3. Front panel	13
7.4. USB	14
7.5. SDIO	15

Prepared	Date	Rev	Document
Johan Zackrisson	2026-08-24	1.0	H1190_reference_manual
Approved	Title		
	H1190 Reference Manual		

7.6. Display output.....	16
7.6.1 Displayport, DP1/DP2/ eDP.....	16
7.6.2 LVDS	17
7.7. Ethernet	20
7.8. PCI express	20
7.9. SATA.....	21
7.10. Audio	21
7.11. CAN Bus	22
7.12. UART	22
7.13. I2C	23
7.14. SMBUS.....	23
7.15. LPC bus	24
7.16. Thermal.....	24



1. Document information

1.1. INTRODUCTION

The H1190 is a starter kit containing all essentials to get started the H6089 Qseven module. H6089 is a module built around the Intel Elkhart Lake processor family and designed to provide a complete embedded solution while offering the latest in features and technology.

With the included Q7-X151 carrier board, Hectronic BSP and peripherals – most features on the H6089 will be available to you for evaluation or development.

This document is intended as a manual for the engineers using the H1190 starter kit and provides instructions on how to use it to its full potential.

Enjoy using the H6089 board - We designed it to give you a strong sense of embedded performance.

1.2. DOCUMENT REVISIONS

Revision	Date	Signature	Description
0.1	2026-02-17	Erik Wahlund	First draft.
0.2	2026-08-13	Johan Zackrisson	Second draft.
0.3	2026-08-18	Johan Zackrisson	Editorial updates after feedback.
1.0	2026-08-24	Johan Zackrisson	Published version

1.3. REFERENCES

Number	Description	File/URL
[1]	DFI Q7X-151 (R.D1) users manual	www.dfi.com

1.4. COPYRIGHT NOTICE

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Acknowledgement

Hectronic AB would like to express its sincere appreciation to DFI Inc. for granting permission to incorporate selected content from DFI Inc. into this document. This material is used with permission, and all applicable intellectual property rights remain with their respective owner unless otherwise agreed in writing.

2. Safety instructions and product care



Electrostatic discharge (ESD) damage can result in partial or complete device failure, performance degradation, or reduced operation life. To avoid ESD damage, the following precautions are strongly recommended.

2.1. PRODUCT CARE AND MAINTENANCE

H1190/H6089 are bare circuit boards. As such, they are sensitive to electrostatic discharge (ESD) and must be handled in an ESD-protected environment.

- Keep the boards in their ESD shielding bag when not in use.
- Before touching the boards, attach an ESD wrist strap to your wrist and connect its other end to a known ground.
- Handle the devices only in ESD-protected areas where work surfaces, flooring, and seating are properly grounded.
- Hold the device only by its edges and mounting hardware. Avoid touching components and connector pins.
- Please ensure ESD compliant handling of the board when unpacking and connecting peripherals.
- Never connect or disconnect external peripherals with power on.
- Please study all the information in this document carefully before applying power to the system.
- For further information on ESD, visit <https://www.esda.org>

2.2. SUPPORT AND RMA

If you experience any issues with the product or need support, please contact the Hectronic support department through our online form, <https://support.hectronic.se> .

You are also welcome to contact your sales representative with any questions.

3. Starter kit contents

3.1. H6089 QSEVEN MODULE

The kit includes a H6089-0202, which is based on the x6211E dual core CPU and is equipped with 4Gb RAM and 16Gb eMMC.

Other versions may be available upon request.



3.2. Q7X-151 CARRIER BOARD

The Q7X-151 made by DFI inc. is a versatile carrier board packed with useful features.



3.3. SD CARD

An SD card is already inserted in the carrier board. This card is loaded with a Yocto image based on the Hectronic BSP and is ready to boot.



3.4. 12V POWER SUPPLY

100-240VAC 50/60Hz to 12VDC/6A with a 2.5mm barrel connector. EU plug included.



3.5. H2699 HEAT SPREADER

The kit includes the H2699 heat spreader which can dissipate heat from the CPU, RAM and eMMC.

Under normal load, this usually offers sufficient cooling. But if you intend on running a high load for a long period of time, adding a heatsink and fan on top is recommended.

Insufficient cooling can lead to thermal throttling or damage.

3.6. QUICK START GUIDE

Documentation to quickly get you up and running!

4. BIOS

4.1.1 BIOS setup

A BIOS, American Megatrends Inc. AptioV UEFI firmware, is installed onboard H6089.

The starter kit is shipped without password protection or restrictions in the BIOS. Feel free to change the settings you want and don't hesitate to contact Hectronic if you have any specific questions.

The H6089 can be delivered with a customized BIOS tailored to your needs. Contact your Hectronic sales representative for more information.

BIOS setup: press **** during POST*

Boot menu: press **<F7>** during POST*

**Power On Self Test is the first action performed when the unit powers up. To enter BIOS, repeatedly press the delete button immediately after applying power.*

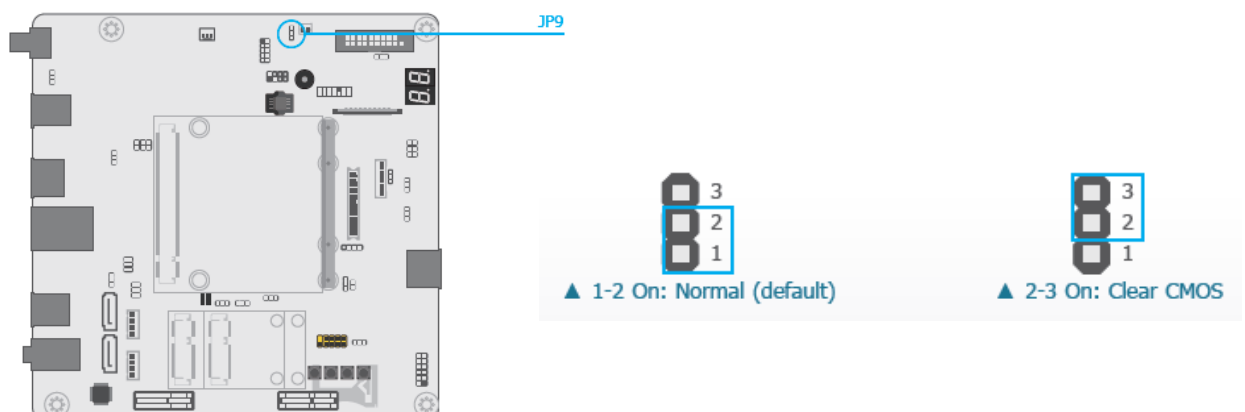
The first time power is applied after installing the H6089 or after performing a BIOS reset, it may take several minutes to start due to memory training. Memory training procedures vary between BIOS versions and may be omitted if you choose to order a customized BIOS.

4.1.2 BIOS reset

To restore the BIOS to factory settings:

1. Disconnect the carrier board from power.
2. Connect a jumper between JP9 pin 3-2.
3. Wait 10s and then reconnect the jumper to JP9 pin 1-2.

The same results can also be achieved by entering BIOS and restoring default settings or by disconnecting either the Q7 module or coin cell battery.



5. Operating system

5.1. PRE-INSTALLED OS

Hectronic provides a Yocto based OS pre-loaded on the included SD card.
More information can be found in the Hectronic BSP manual.

Login credentials:

User: **root**

Password: **[no password]**

If you need to restore the SD card to factory settings you can download the evaluation image from the Hectronic GitHub. Use a flashing tool such as balenaEtcher or rufus to load it onto the SD card.

5.2. ALTERNATIVE OS

The H6089 board is a standard x86 platform and supports Windows 10 and Windows 11.
Support for alternative linux distributions can be supported on request. Please contact Hectronic for further information.

5.3. BSP

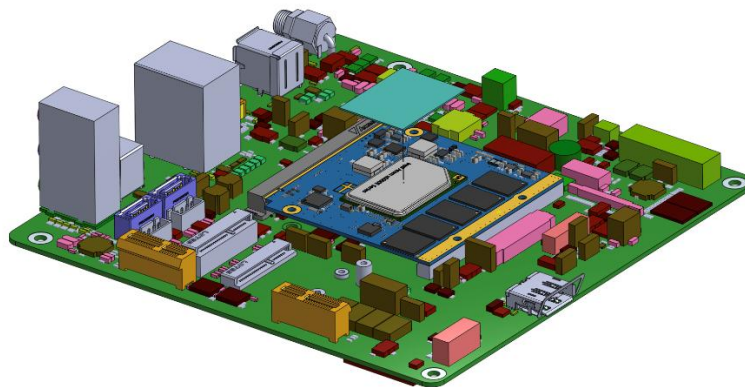
The H6095 BSP is available for download and can be included in your own build.
More information can be found in the Hectronic BSP manual.

6. Installing the Qseven module

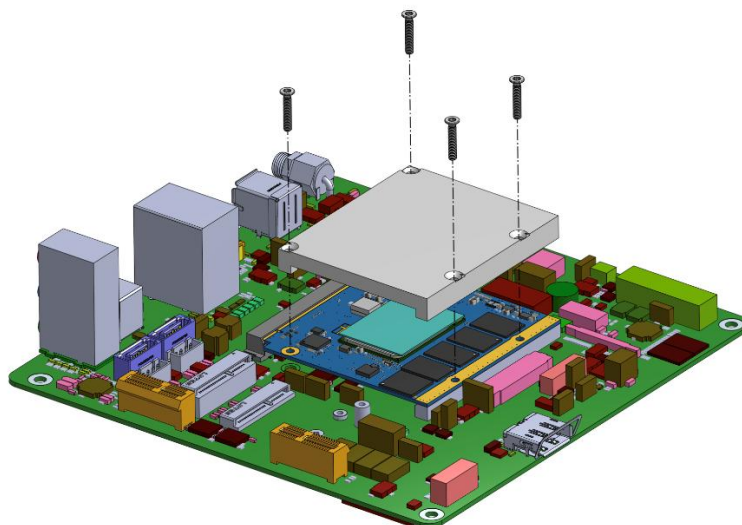
1. Insert the module at an angle.



2. Remove the protective film from both gap pads and apply them to CPU and RAM.



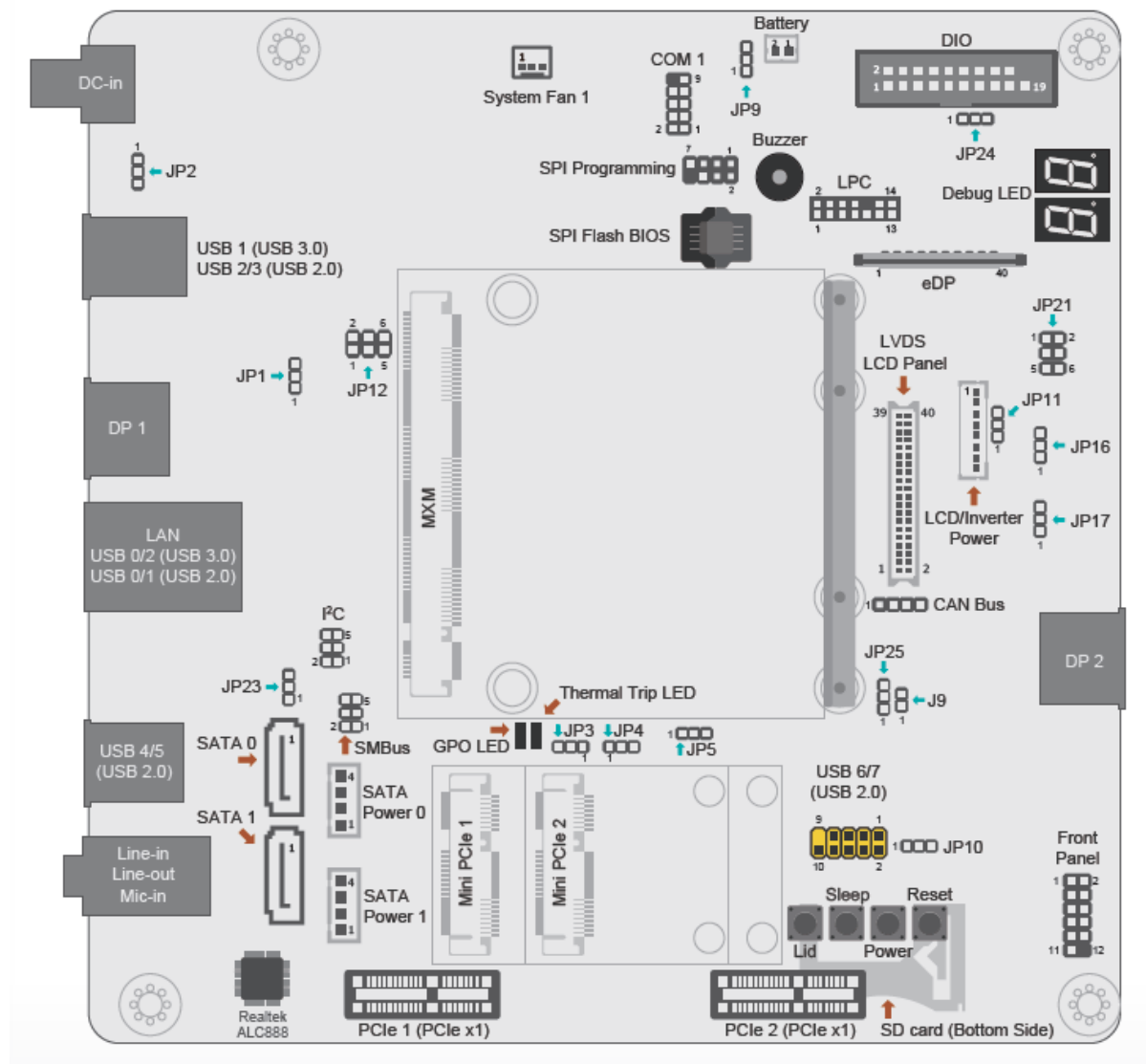
3. Attach the heat spreader with the 4 screws. Recommended torque: **0.6Nm**.



7. Hardware features

7.1. BOARD OVERVIEW

Overview of the Q7X-151 by DFI Inc:



The carrier board conforms to the Mini-ITX form factor and can be mounted in most standard PC cases.

Learn more about the Q7X-151 from DFI's official website:

<https://www.dfi.com/product/index/1458>

Overview of the H6089 by Hectronic:

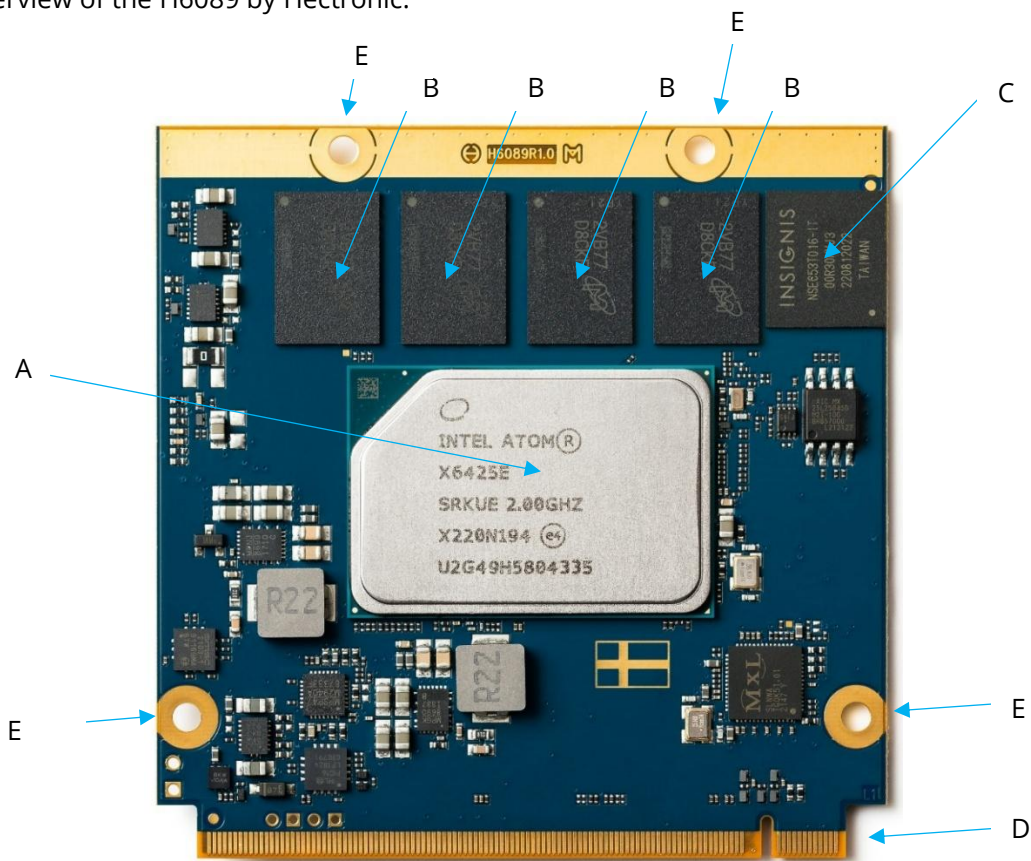


Figure: Computer module, top side view

Reference	Description
A	Intel Elkhart Lake processor
B	LPDDR4x RAM
C	eMMC
D	Qseven MXM connector
E	Mounting screw holes

Table: H6089 key components, top side

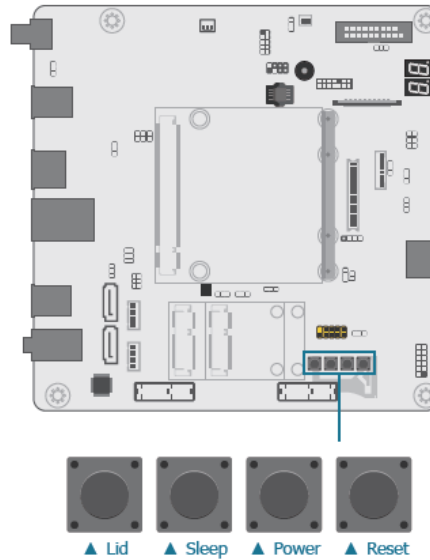
7.2. POWER

7.2.1 DC input

The carrier board is powered from the 2.5mm 12VDC jack on the rear I/O.

7.2.2 Buttons

Switch	Function
SW1	LID (simulate open/closed)
SW2	SLEEP
SW3	POWER
SW4	RESET

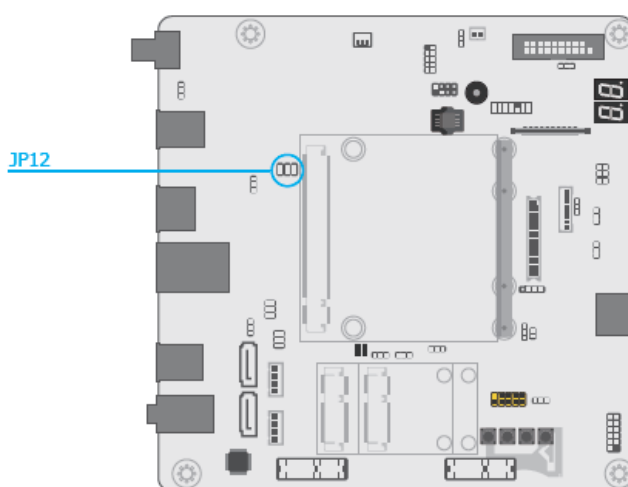


7.2.3 Power settings

The power settings can be changed with jumper JP12.

Jumping pin 1-2 sets the device to ATX mode which enables a more granular control of power states. In ATX mode, the H6089 will require the power button to be pressed to boot.

Jumping pin 3-4 sets the device to AT mode which offers higher simplicity and will let the Qseven module boot automatically when power is applied.



▲ 1-2 On: 5V



▲ 3-4 On: 5VSB

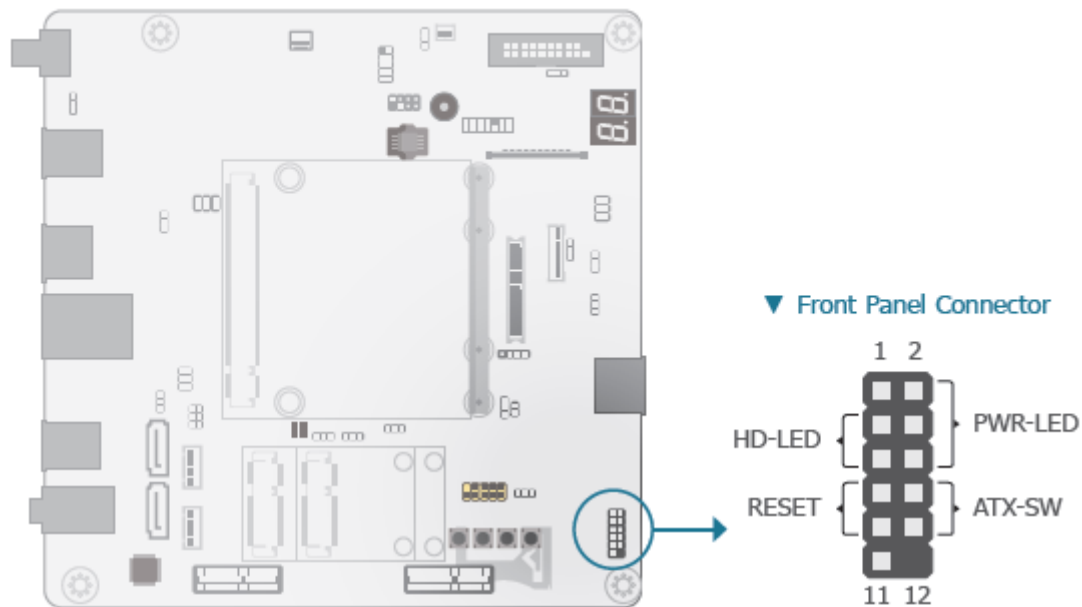


▲ 5-6 On: N.C.

7.3. FRONT PANEL

The front panel connector allows you to connect external PWR and RST buttons which will function like SW3 and SW4. This can be useful if the carrier board is mounted in a case with limited user access to the on-board switches.

PWR-LED and HD-LED are also available from this connector.



▼ Front Panel Pin Assignment

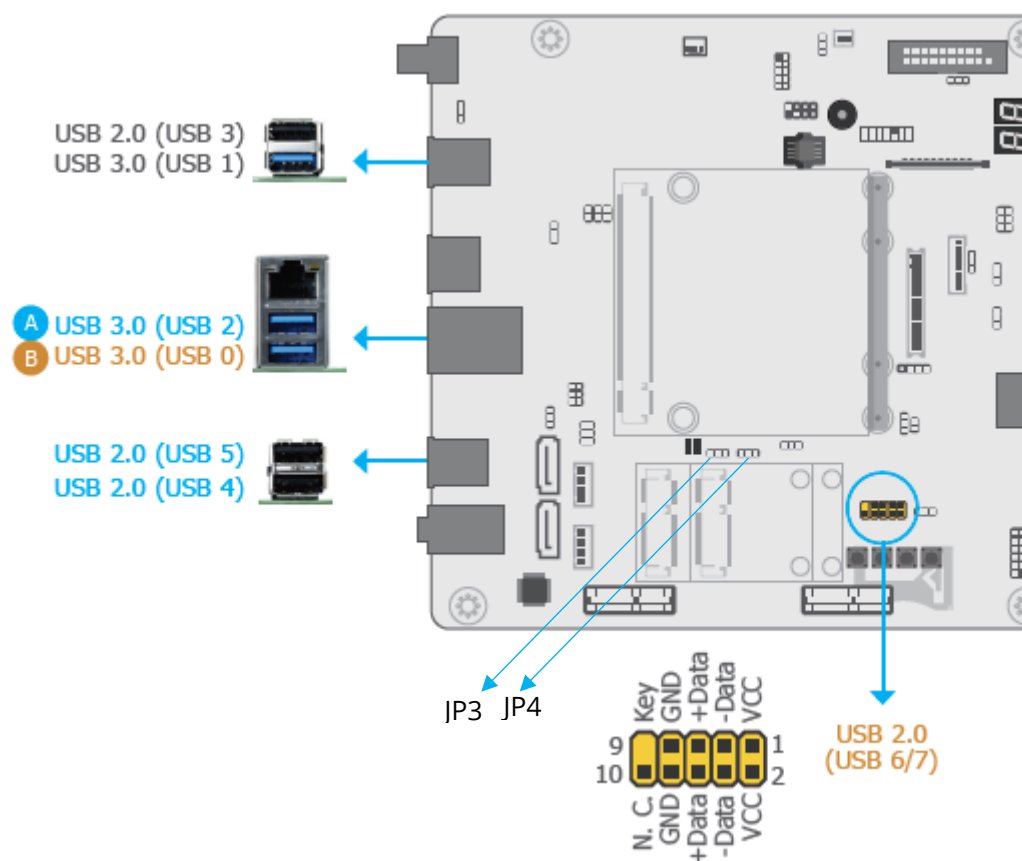
Pin	Assignment	Pin	Assignment
1	N.C.	2	LED Power
3	HDD Power	PWR-LED 4	LED Power
HD-LED 5	Signal	6	Signal
7	Ground	8	Ground
RESET 9	Signal	ATX-SW 10	Signal
11	N.C.	12	---

7.4. USB

The included H6089 module is equipped with 1x USB 3.1 and 8x USB 2.0 interfaces. Other configurations may be available upon request.

The included carrier board is however equipped with a configurable USB layout which can combine certain USB 2.0 buses for extra USB 3.0 buses. See jumper JP3 and JP4.

JP4	USB 4/5 (USB 2.0)	Rear Port A	JP3	USB 6/7 (USB 2.0)	Rear Port B
1-2 On	Enabled	USB 2.0	1-2 On	Enabled	USB 2.0
2-3 On (default)	Disabled	USB 3.0	2-3 On (default)	Disabled	USB 3.0

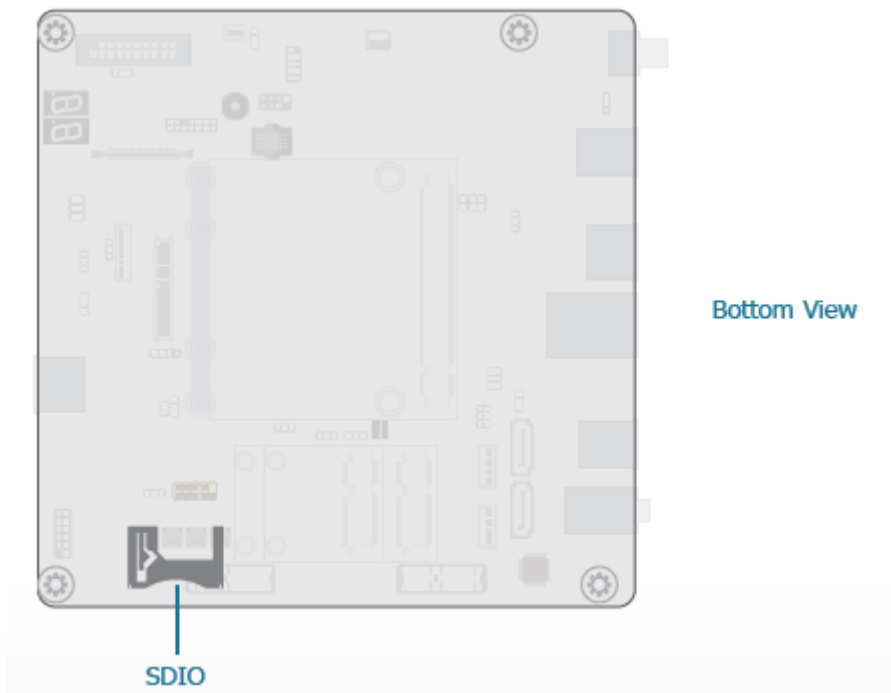


7.5. SDIO

The H6089 is equipped with an SDIO interface. This interface is available as a full-size SD-card slot on the bottom side of the carrier board.

The SDIO interface can be used for general purpose storage or as boot media.

An SD card loaded with a Yocto Linux image comes pre-mounted with the starter kit.



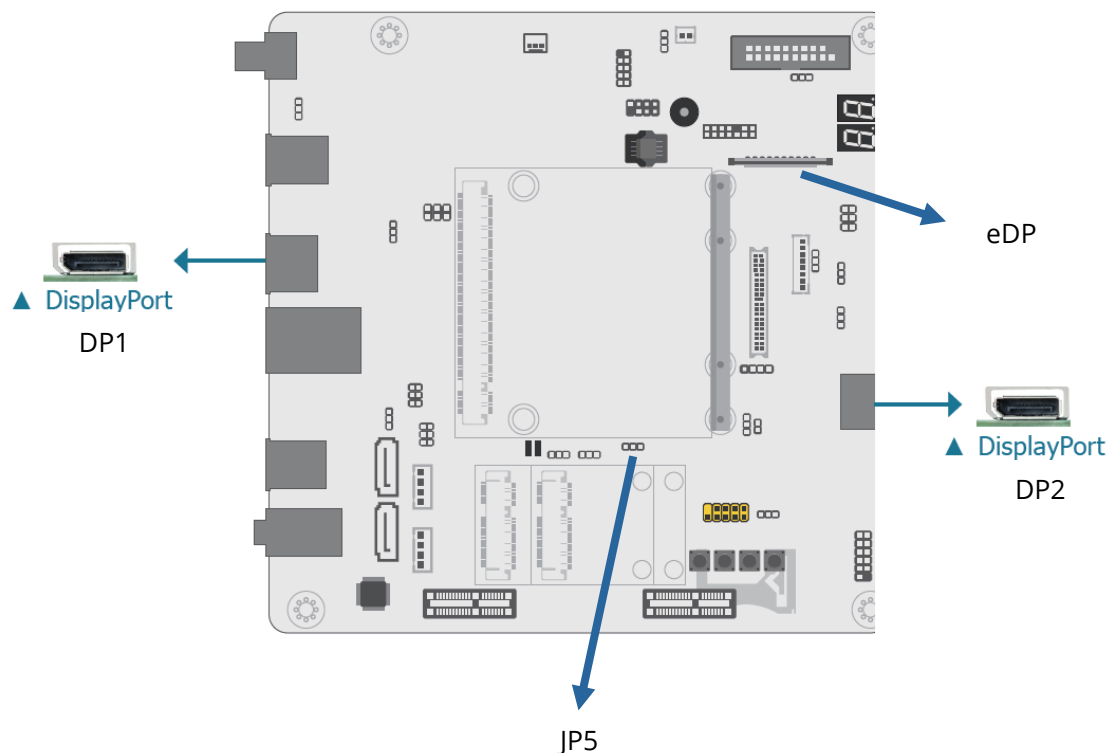
7.6. DISPLAY OUTPUT

7.6.1 Displayport, DP1/DP2/ eDP

DP1 is enabled by default and is provided by the H6089 DP++ interface according to the VESA DisplayPort standard 1.4.

The DP2 interface and the eDP (embedded DisplayPort) are provided by the dual 24bit LVDS interface, use JP5 to toggle between displayport and LVDS mode.

To enable these interfaces, you may need to activate them and change resolution in from BIOS.



JP5 jumper setting:

Pin 1-2	eDP enabled
Pin 2-3	LVDS enabled

7.6.2 LVDS

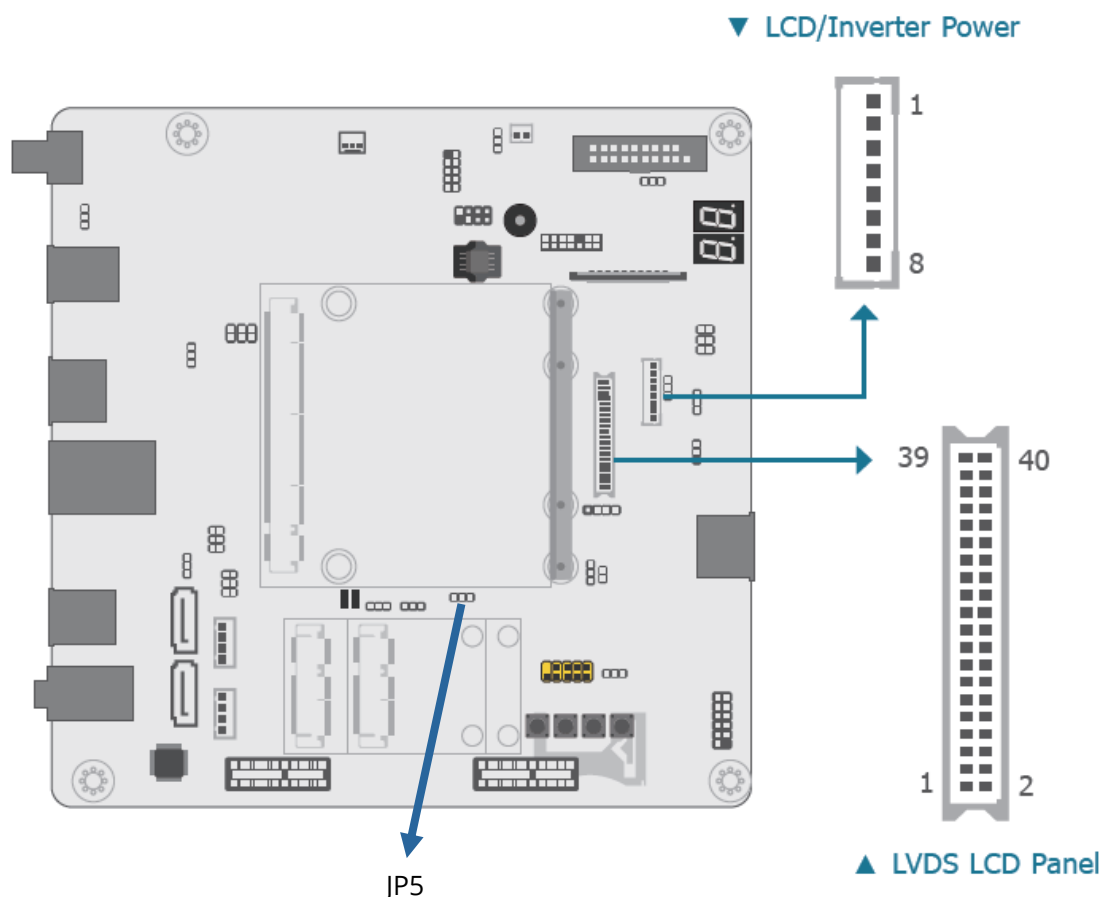
The dual 24bit LVDS interface can be used to connect an LCD display directly to the carrier board. It uses two connectors, one for power and one for data.

This interface can also be disconnected and replaced with the DP2 or eDP interface. Use JP5 to toggle between the two.



Before connecting an LVDS display, make sure all jumper settings are correct!
(next page)

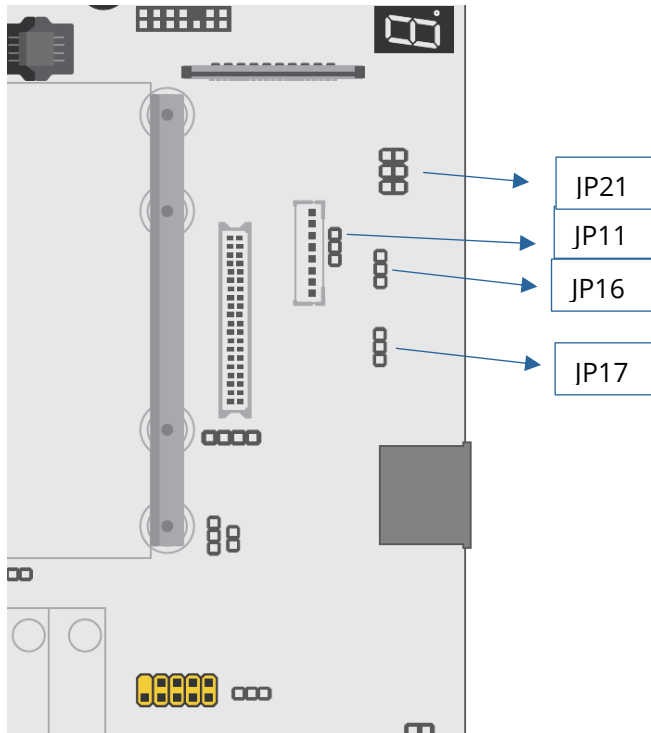
Location of LVDS interface connectors:



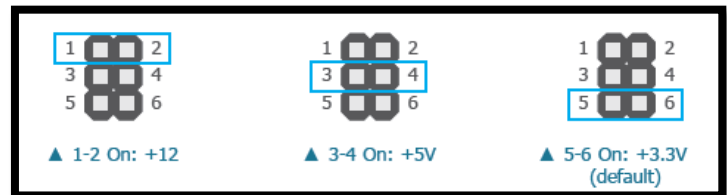
JP5 jumper setting:

Pin 1-2	eDP enabled
Pin 2-3	LVDS enabled

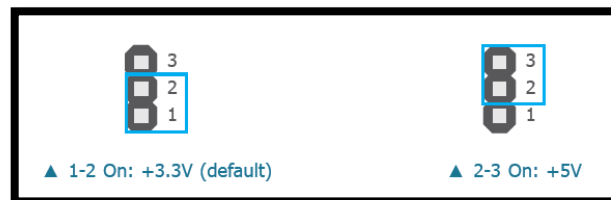
Location of jumper pins:



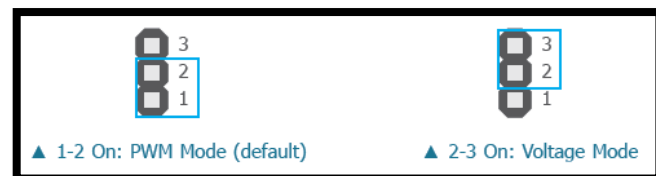
- **Panel power** can be set to either +3.3V, +5V or +12V with JP21:



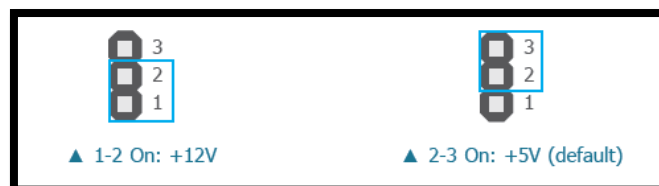
- **Backlight power** can be toggled between +3.3V and +5V with JP16:



- **Dimming mode** can be set to PWM or fixed voltage mode with jumper JP11:



- **LCD/Inverter power mode** can be set to +5V or +12V with JP17:



▼ LVDS LCD Panel Pin Assignment

Pin	Function	Pin	Function
1	GND	2	GND
3	LVDS_Out3+	4	LVDS_Out7+
5	LVDS_Out3-	6	LVDS_Out7-
7	GND	8	GND
9	LVDS_Out2+	10	LVDS_Out6+
11	LVDS_Out2-	12	LVDS_Out6-
13	GND	14	GND
15	LVDS_Out1+	16	LVDS_Out5+
17	LVDS_Out1-	18	LVDS_Out5-
19	GND	20	GND
21	LVDS_Out0+	22	LVDS_Out4+
23	LVDS_Out0-	24	LVDS_Out4-
25	GND	26	GND
27	LVDS_CLK1+	28	LVDS_CLK2+
29	LVDS_CLK1-	30	LVDS_CLK2-
31	GND	32	GND
33	LVDS_DDC_CLK	34	N.C.
35	LVDS_DDC_DATA	36	+3.3V
37	Panel Power	38	Panel Power
39	Panel Power	40	Panel Power

▼ LCD/Inverter Power Pin Assignment

Pin	Function
1	GND
2	GND
3	Panel Inverter Brightness Voltage Control
4	Panel Power
5	+3.3V
6	Panel Backlight On/Off Control
7	LCD/Inverter Power: 12V/5V (default)
8	LCD/Inverter Power: 12V/5V (default)

To enable the LVDS interface you may need to enable the interface and change the resolution in the BIOS settings.

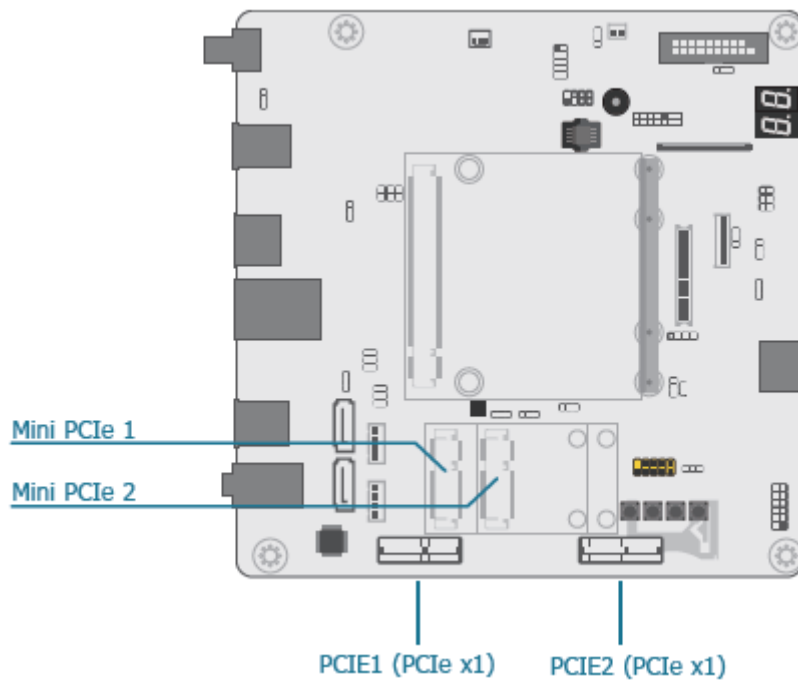
7.7. ETHERNET

GbE ethernet is available from the RJ45 port on the rear I/O. More network interfaces can be added with the addition of a PCIe NIC.

7.8. PCI EXPRESS

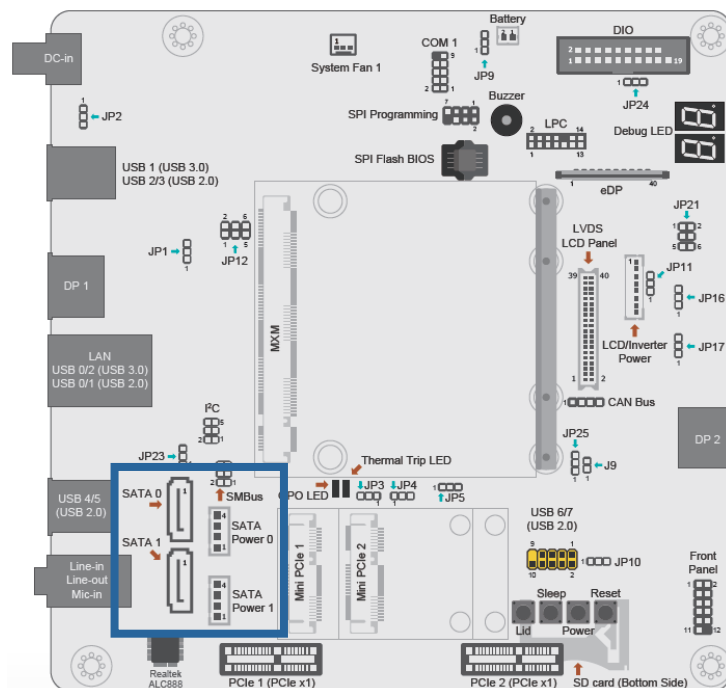
H6089 supplies four 1x lane PCIe Gen 3.0 interfaces to the carrier board

These interfaces are available from the two standard PCIe x1 slots as well as two mini PCIe interfaces.



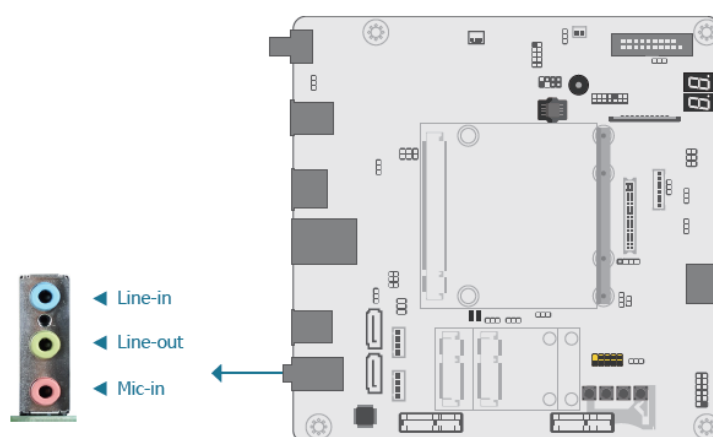
7.9. SATA

2 SATA 3.0, 6Gb/s interfaces are available along with SATA power connectors as shown below.



7.10. AUDIO

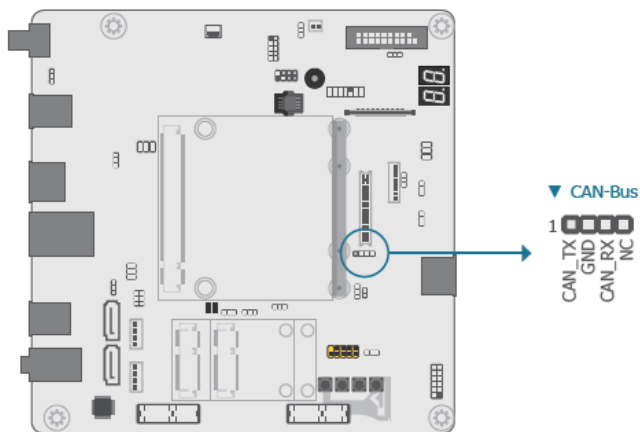
HDA/I2S audio is available directly from the H6089. The carrier board is equipped with a Realtek ALC886 5.1-channel HDA codec available from the rear IO.



7.11. CAN BUS

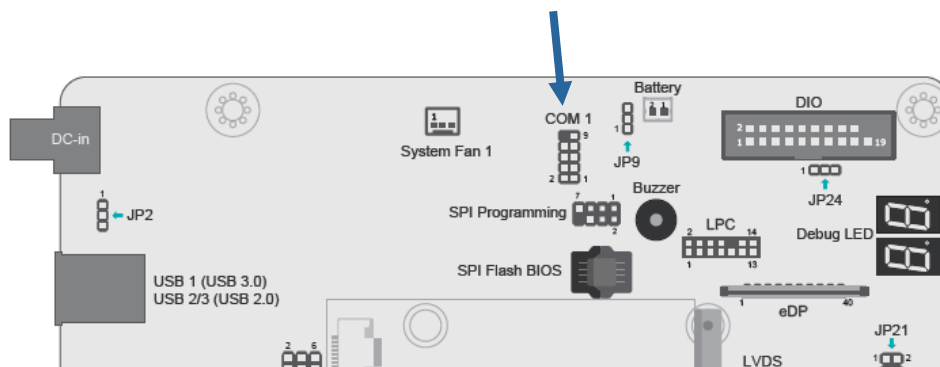
The H6089 is equipped with one CAN interface which supplies logic to a CAN transceiver on the carrier board. This interface is available from a pin header on the carrier board and officially supports speeds up to *1Mb/s.

**The H6089 supports CAN-FD up to 8Mb/s. Although the carrier board doesn't officially support CAN-FD, transmission speeds up to 5Mb/s have been found to work. Since CAN-FD is not officially supported, we can't guarantee its performance. Use CAN-FD at your own discretion.*



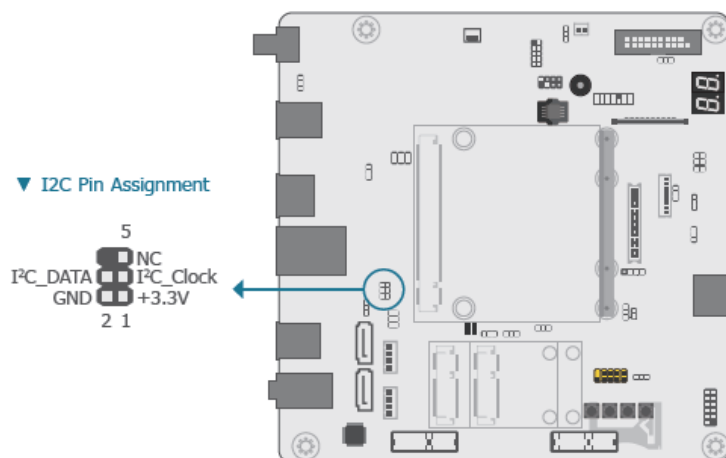
7.12. UART

COM1 can be used as a serial console with the included Yocto linux image. It communicates at 115200b and uses pin 2 for RX and pin 3 for TX.



7.13. I2C

The I2C bus is accessible from a pin header on the carrier board.



7.14. SMBUS

The SMBus is accessible from a pin header on the carrier board.

Note that some devices already occupy certain addresses:

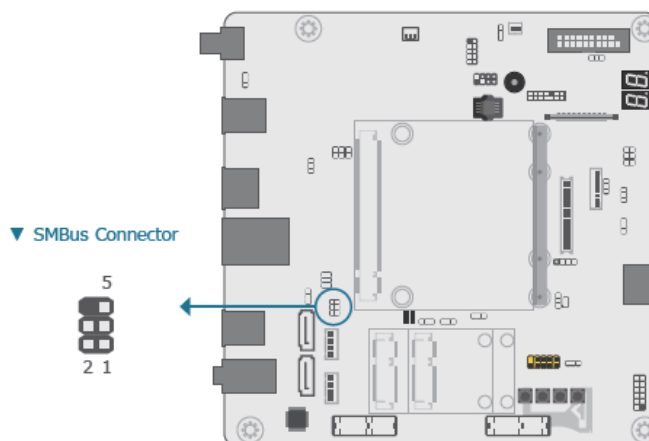
Occupied address Device

0x19	H6089 PIC, microcontroller for system management.
0x41	H6089 PMIC
0x57	H6089 EEPROM, storage of system info (serial number, MAC etc.)
0x60	H6089 Displayport to LVDS converter
0x2E	H6089 Fan controller (not equipped on the provided version of H6089)
0xFF	H6089 CPU
0xD8/ 0xD9	Carrier board PCIe buffer

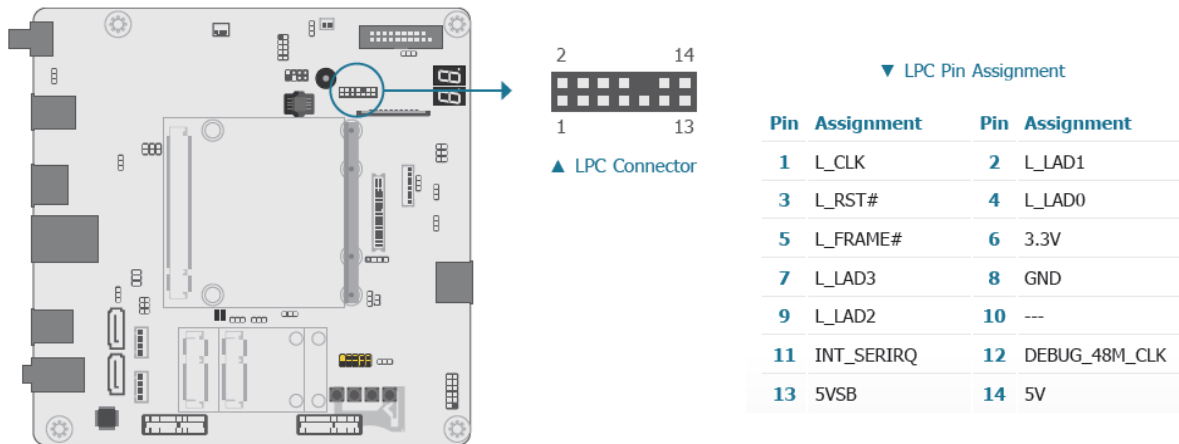
**Note: 7bit address without R/W bit.*

▼ SMBus Pin Assignment

Pin	Assignment	Pin	Assignment
1	3V3SB	2	GND
3	SMBus_Clock	4	SMBus_DATA
5	SMBus_Alert	6	---



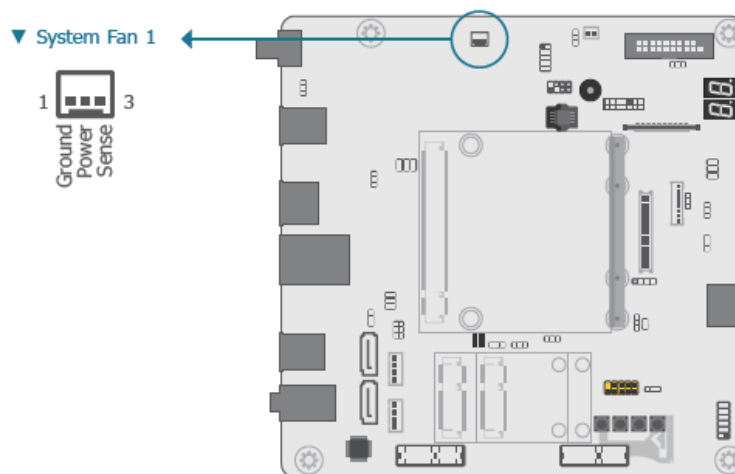
7.15. LPC BUS



7.16. THERMAL

The H6089 board needs to be equipped with passive or active cooling depending on the implementation. A heat spreader is included in the H1190 kit but may need the addition of a heat sink or fan if the system is planned for high load or continuous operation.

A fan can be powered from the on-board fan connector. Please note that the included version of H6089 does not have hardware support for active thermal management/ PWM. This means that the system will always run this fan at 100% duty cycle.



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