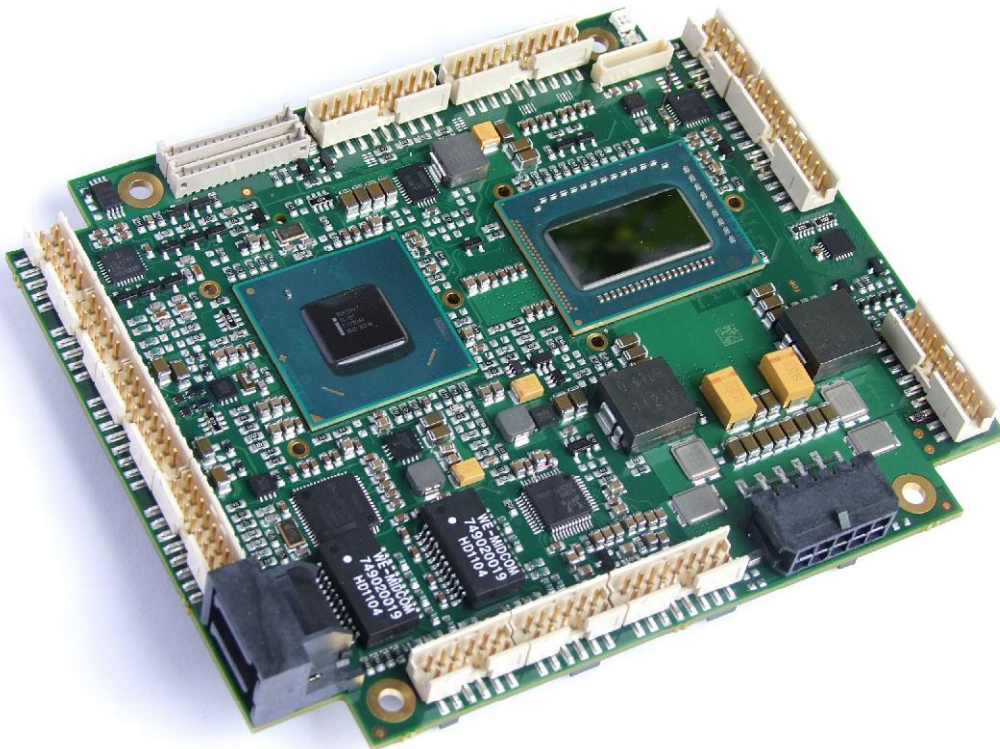


ADLQM67PC

Manual

rev. 0.2



Contents

0	Document History	4
1	Introduction	5
1.1	Important Notes	5
1.2	Technical Support	5
1.3	Warranty	5
1.4	Return Authorization.....	5
1.5	Description of Safety Symbols	6
1.6	RoHS	6
2	Overview	7
2.1	Features	7
2.2	Specifications and Documents.....	9
3	Connectors	10
3.1	Connector Map	11
3.2	Power Supply	12
3.3	System/SM-Bus.....	13
3.4	Memory	14
3.5	PCI/104-Express Bus	17
3.6	DVI/HDMI	19
3.7	DisplayPort	20
3.8	VGA	21
3.9	LCD	22
3.10	USB	24
3.11	LAN.....	25
3.12	Audio	26
3.13	SATA Interfaces	27
3.14	COM1 and COM2.....	28
3.15	GPIO.....	29
3.16	Monitoring Functions	30
4	Status LEDs.....	31
4.1	HD LED	31
4.2	RGB LED.....	32
5	Mechanical Drawing	33
5.1	PCB: Mounting Holes	33
5.2	PCB: Pin 1 Dimensions	34
5.3	PCB: Heat Sink/Die Center	35
5.4	Heat Spreader: Chassis Mount	36
6	Technical Data.....	37
6.1	Electrical Data	37
6.2	Environmental Conditions	37
6.3	Thermal Specifications	38

0 Document History

Version	Changes
0.1	first pre-release
0.2	corrected RAM frequency; explained DP pin 11, minor changes



NOTE

All company names, brand names, and product names referred to in this manual are registered or unregistered trademarks of their respective holders and are, as such, protected by national and international law.

1 Introduction

1.1 Important Notes

Please read this manual carefully before you begin installation of this hardware device. To avoid Electrostatic Discharge (ESD) or transient voltage damage to the board, adhere to the following rules at all times:

- You must discharge your body from electricity before touching this board.
- Tools you use must be discharged from electricity as well.
- Please ensure that neither the board you want to install, nor the unit on which you want to install this board, is energized before installation is completed.
- Please do not touch any devices or components on the board.



CAUTION

As soon as the board is connected to a working power supply, touching the board may result in electrical shock, even if the board has not been switched on yet. Please also note that the mounting holes for heat sinks are connected to ground, so when using an externally AC powered device, a substantial ground plane differential can occur if the external device's AC power supply or cable does not include an earth ground. This could also result in electrical shock when touching the device and the heat sink simultaneously.

1.2 Technical Support

Technical support for this product can be obtained in the following ways:

- By contacting our support staff at +1 858-490-0597 or +49 (0) 271 250 810 0
- By contacting our staff via e-mail at support@adl-usa.com or support@adl-europe.com
- Via our website at www.adl-usa.com/support or www.adl-europe.com/support

1.3 Warranty

This product is warranted to be free of defects in workmanship and material. ADL Embedded Solutions' sole obligation under this warranty is to provide replacement parts or repair services at no charge, except shipping cost. Such defects which appear within 12 months of original shipment of ADL Embedded Solutions will be covered, provided a written claim for service under warranty is received by ADL Embedded Solutions no less than 30 days prior to the end of the warranty period or within 30 days of discovery of the defect – whichever comes first. Warranty coverage is contingent upon proper handling and operation of the product. Improper use such as unauthorized modifications or repair, operation outside of specified ratings, or physical damage may void any service claims under warranty.

1.4 Return Authorization

All equipment returned to ADL Embedded Solutions for evaluation, repair, credit return, modification, or any other reason must be accompanied by a Return Material Authorization (RMA) number. ADL Embedded Solutions requires a completed RMA request form to be submitted in order to issue an RMA number. The form can be found under the Support section at our website: www.adl-usa.com or www.adl-europe.com. Submit the completed form to support@adl-usa.com or fax to +1 858-490-0599 for the USA office, or to rma@adl-europe.com or fax to +49 (0) 271 250 810 20 to request an RMA from the European office in Germany. Following a review of the information provided, ADL Embedded Solutions will issue an RMA number.

1.5 Description of Safety Symbols

The following safety symbols are used in this documentation. They are intended to alert the reader to the associated safety instructions.



ACUTE RISK OF INJURY!

If you do not adhere to the safety advise next to this symbol, there is immediate danger to life and health of individuals!



RISK OF INJURY!

If you do not adhere to the safety advise next to this symbol, there is danger to life and health of individuals!



HAZARD TO INDIVIDUALS, ENVIRONMENT, DEVICES, OR DATA!

If you do not adhere to the safety advise next to this symbol, there is obvious hazard to individuals, to environment, to materials, or to data.



NOTE OR POINTER

This symbol indicates information that contributes to better understanding.

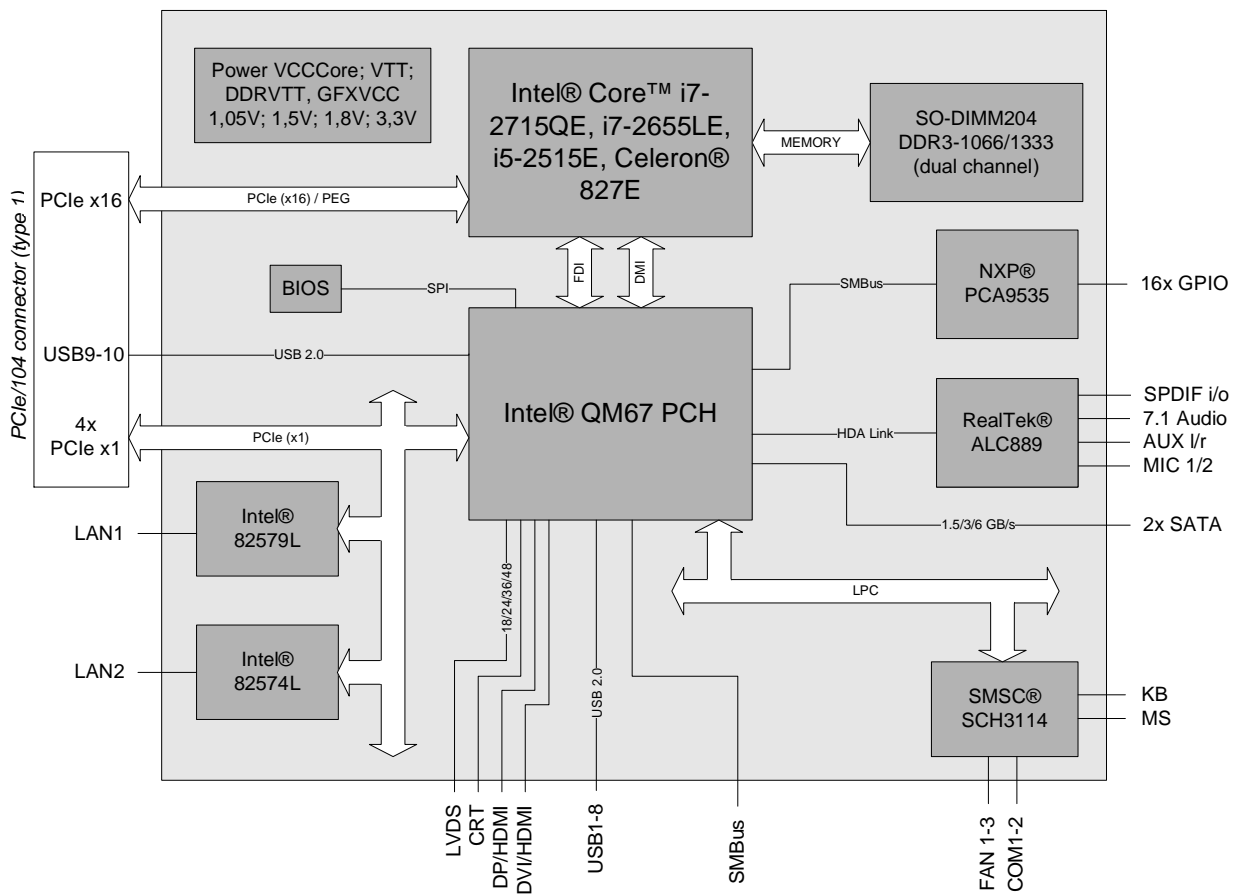
1.6 RoHS

The PCB and all components are RoHS compliant (RoHS = Restriction of Hazardous Substances Directive). The soldering process is lead free.

2 Overview

2.1 Features

The ADLQM67PC is a highly complex computer motherboard in the PC/104™ form factor, complying with the state-of-the-art "PCIe/104™" standard. It's based on Intel®'s SandyBridge™ CPUs (BGA, embedded) combined with the QM67 PCH. Modern DDR3 technology provides top-notch memory performance, accomodating up to 4 GByte of RAM (DDR3-1066/1333/1600) via SO-DIMM204. PCI-Express is available through the PCIe/104-Express Type 1 connector, offering one x16 connection and four x1 lanes for connecting all kinds of expansion cards in a PCIe/104™ stack-down fashion. For connecting graphics devices, several interfaces are available: CRT, LVDS, HDMI, DisplayPort. Additional interfaces include two serial ports, two Gigabit Ethernet interfaces (LAN), two SATA channels (up to 6Gb/s), an audio interface (HDA 7.1), and ten USB channels. There are also 16 discrete programmable GPIO signals available.



- Processor Intel® Core™ i7-2715QE, i7-2655LE, i5-2515E, or Celeron® 827E
- Chipset Intel® QM67 PCH
- SO-DIMM204 socket for one DDR3-1066/1333/1600 module of up to 4 GByte
- Two serial interfaces COM1-2
- Two LAN interfaces Ethernet 10/100/1000 (Base-T)
- Two SATA channels (1.5/3/6 Gb/s)
- PS2 keyboard / mouse interface

- Ten USB 2.0 interfaces (two on PCI104-Express connector)
- BIOS AMI® Aptio
- DisplayPort interface
- HDMI interface
- CRT connection
- LCD connection via LVDS 18/24bit (dual pixel)
- HDA compatible sound controller with SPDIF in and out
- RTC with external CMOS battery
- PCI-Express bus via PCI/104-Express connector (type 1, one x16, four x1 lanes)
- 16x GPIO
- 5V and 12V supply voltage
- Size: 96 mm x 90 (115.5) mm

2.2 Specifications and Documents

In making this manual and for further reading of technical documentation, the following documents, specifications and web-pages were used and are recommended.

- § PC/104™ Specification
Version 2.5
www.pc104.org
- § PC/104-Plus™ Specification
Version 2.0
www.pc104.org
- § PCI/104-Express™ Specification
Version 2.0
www.pc104.org
- § PCI Specification
Version 2.3 and 3.0
www.pcisig.com
- § ACPI Specification
Version 3.0
www.acpi.info
- § ATA/ATAPI Specification
Version 7 Rev. 1
www.t13.org
- § USB Specifications
www.usb.org
- § SM-Bus Specification
Version 2.0
www.smbus.org
- § Intel® Chipset Description
Intel® 6 Series Chipset Datasheet
www.intel.com
- § Intel® Chip Description
2nd Generation Core™ Processor Family Datasheet
www.intel.com
- § SMSC® Chip Description
SCH3114 Datasheet
www.smsc.com
(NDA required)
- § Intel® Chip Description
82574L Datasheet
www.intel.com
- § Intel® Chip Description
82579L Datasheet
www.intel.com
- § Realtek® Chip Description
ALC885/889 Datasheet
www.realtek.com.tw
- § Chrontel® Chip Description
Chrontel 7318C Datasheet
www.chrontel.com

3 Connectors

This section describes all the connectors found on the ADLQM67PC.

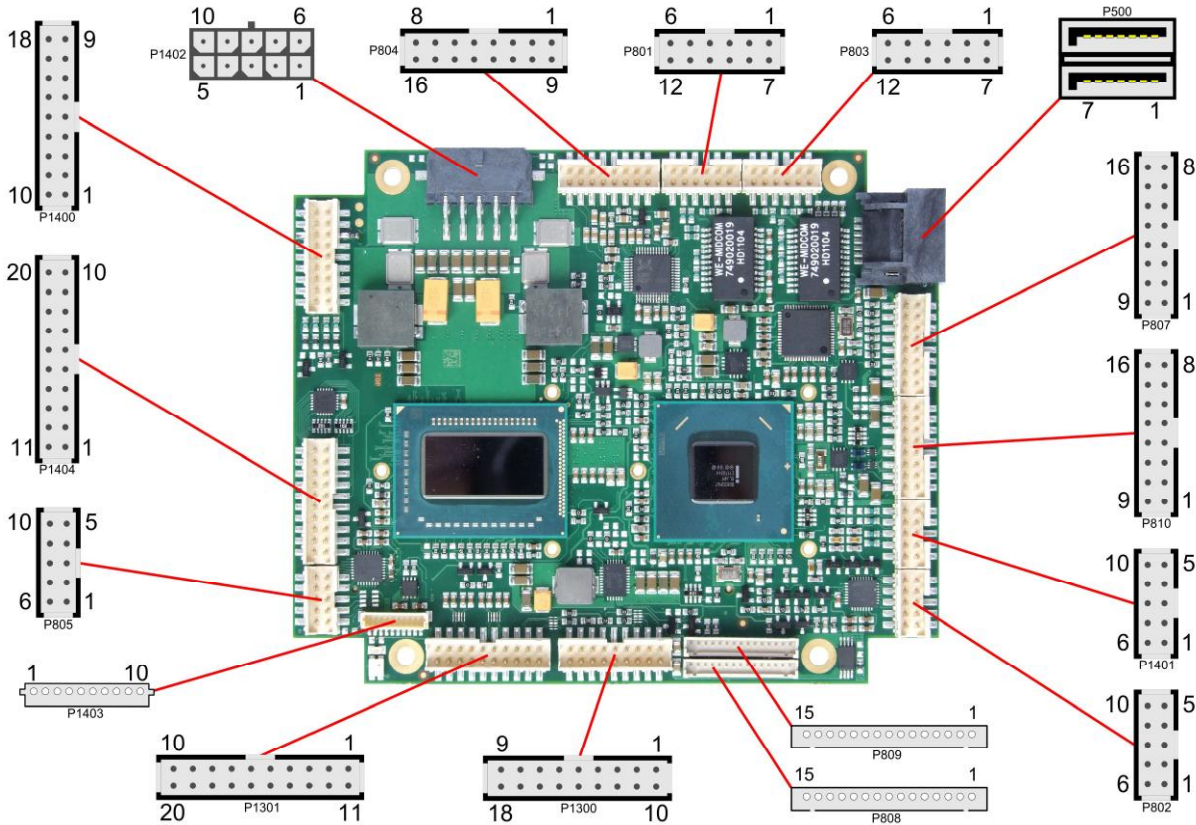


CAUTION

For most interfaces, the cables must meet certain requirements. For instance, USB 2.0 requires twisted and shielded cables to reliably maintain full speed data rates. Restrictions on maximum cable length are also in place for many high speed interfaces and for power supply. Please refer to the respective specifications and use suitable cables at all times.

3.1 Connector Map

Please use the connector map below for quick reference. Only connectors on the component side are shown. For more information on each connector refer to the table below.



Ref-No.	Function	Page
P500	"SATA Interfaces"	p. 27
U600*	"Memory"	p. 14
P801/3	"LAN"	p. 25
P802/5	"COM1 and COM2"	p. 28
P804	"Audio"	p. 26
P807/10	"USB"	p. 24
P808/9	"LCD"	p. 22
P1200*	"PCI/104-Express Bus"	p. 17
P1300	"DVI/HDMI"	p. 19
P1301	"DisplayPort"	p. 20
P1400	"System/SM-Bus"	p. 13
P1401	"VGA"	p. 21
P1402	"Power Supply"	p. 12
P1403	"Monitoring Functions"	p. 30
P1404	"GPIO"	p. 29

* not in the picture above (cf. bottom side of board)

3.2 Power Supply

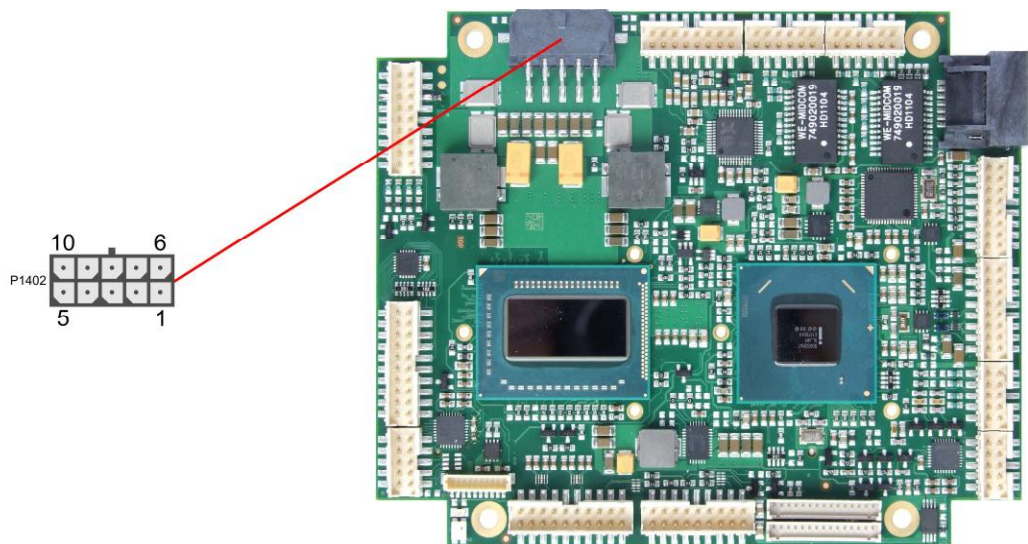
The power supply of the hardware module is realized via a 2x5-pin connector (Molex PS 43045-10xx, mating connector: Molex PS 43025-10xx). Both 5V VCC/SVCC and 12V need to be provided. The 12V input can optionally be tied to 5V if 12V is not required by attached peripherals. It cannot, however, be left unconnected.

 **CAUTION**

The ADLQM67PC includes circuitry that will notify an intelligent power supply to shut down if the processor reaches a critical temperature. This is achieved by deasserting the (low-active) PS_ON# signal found on the SM-Bus connector. When PS_ON# is no longer pulled low, an intelligent power supply would take this as a signal to shut down power. For this to work, PS_ON# must be connected to the power supply's PS_ON input. If PS_ON# is not otherwise connected, the ADLQM67PC can be damaged beyond repair if a thermal shutdown event occurs. In rare instances, if power is not shut down, the board will continue to heat up until failure occurs.

 **NOTE**

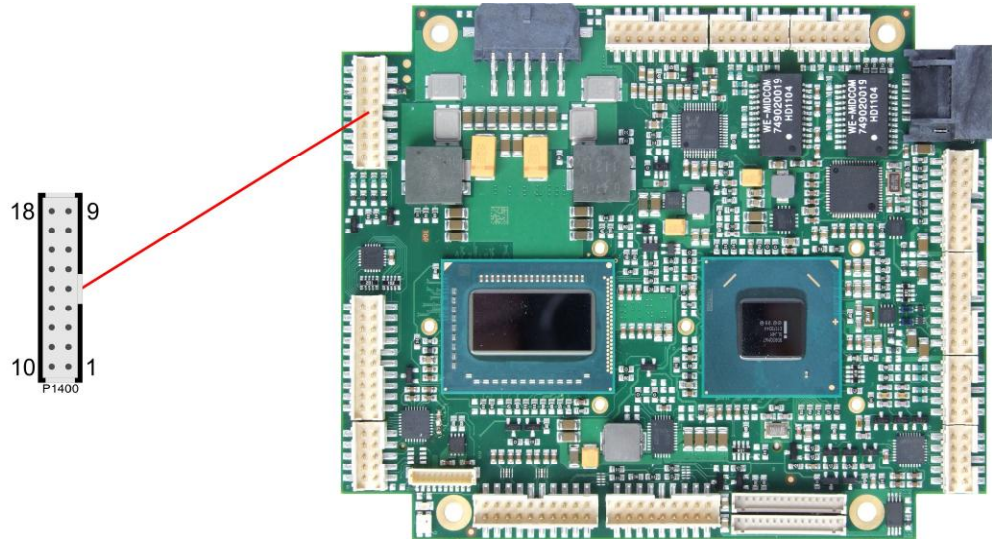
Since this is a 90 degree connector, the symbol in the drawing below represents the connector face as seen from the side (PCB on bottom) rather than from above.



Description	Name	Pin	Name	Description
12 volt supply	12V	1	6	12V
ground	GND	2	7	GND
ground	GND	3	8	SVCC
ground	GND	4	9	GND
5 volt supply	VCC	5	10	VCC

3.3 System/SM-Bus

Both SM-Bus signals, and signals for PS/2 keyboard, PS/2 mouse and speaker are provided through a 2x9pin connector (FCI 98424-G52-18LF, mating connector e.g. FCI 90311-018LF). For the #PSON signal, please refer to the cautionary note in the chapter "Power Supply" (p. 12).



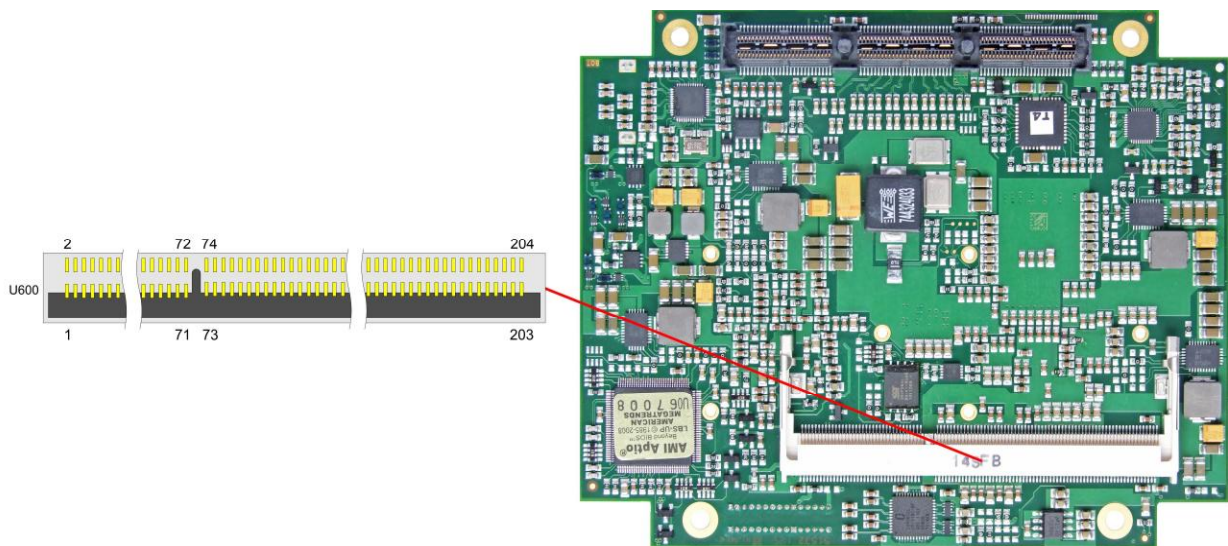
Pinout 2x9pin connector:

Description	Name	Pin	Name	Description
speaker to 5V	SPEAKER	1	10	GND
reset to ground	RSTBTN#	2	11	N/C
keyboard data	KDAT	3	12	KCLK
mouse data	MDAT	4	13	MCLK
battery	BATT	5	14	VCC
power supply on	PS-ON#	6	15	SMBCLK
standby supply 3.3V	S3.3V	7	16	SMBDAT
power button	PWRBTN#	8	17	SMBALERT#
ground	GND	9	18	3.3V

3.4 Memory

There is one conventional SO-DIMM204 socket available to equip the board with memory (DDR3-1066/1333/1600). It is located on the bottom side of the board. For technical and mechanical reasons it is possible that particular memory modules cannot be employed. Please ask your sales representative for recommended memory modules.

With currently available SO-DIMM modules a memory extension up to 4 GByte is possible. The timing parameters for different memory modules are automatically set by BIOS.



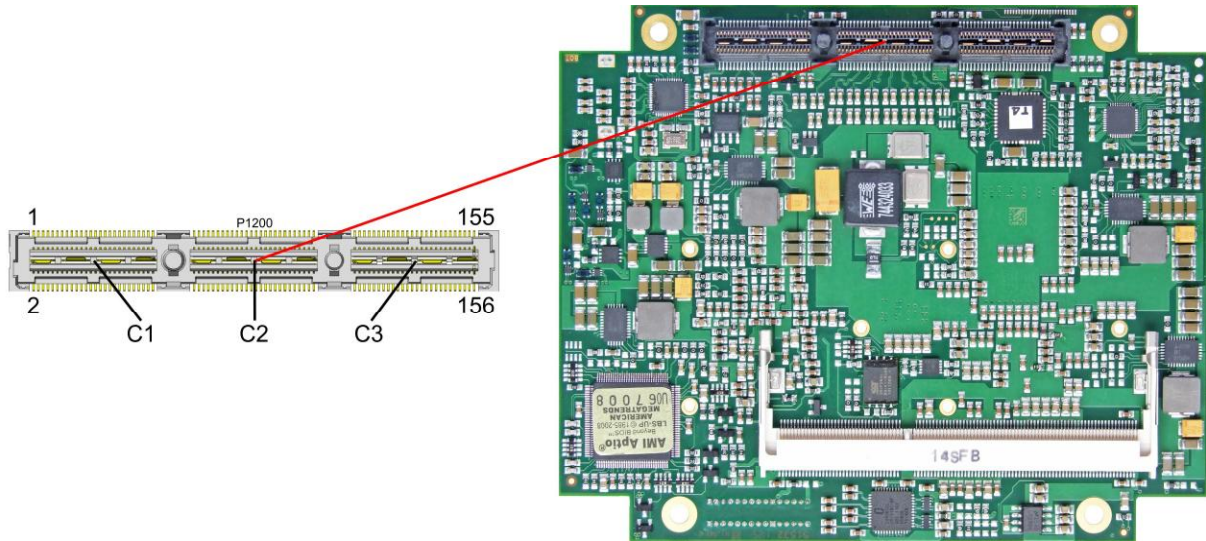
Description	Name	Pin	Name	Description
memory reference current	REF-DQ	1	2	GND
ground	GND	3	4	DQ4
data 0	DQ0	5	6	DQ5
data 1	DQ1	7	8	GND
ground	GND	9	10	DQS0#
data mask 0	DM0	11	12	DQS0
ground	GND	13	14	GND
data 2	DQ2	15	16	DQ6
data 3	DQ3	17	18	DQ7
ground	GND	19	20	GND
data 8	DQ8	21	22	DQ12
data 9	DQ9	23	24	DQ13
ground	GND	25	26	GND
data strobe 1 -	DQS1#	27	28	DM1
data strobe 1 +	DQS1	29	30	RESET#
ground	GND	31	32	GND
data 10	DQ10	33	34	DQ14
data 11	DQ11	35	36	DQ15
ground	GND	37	38	GND
data 16	DQ16	39	40	DQ20
data 17	DQ17	41	42	DQ21
ground	GND	43	44	GND
data strobe 2 -	DQS2#	45	46	DM2
data strobe 2 +	DQS2	47	48	GND
ground	GND	49	50	DQ22

Description	Name	Pin		Name	Description
data 18	DQ18	51	52	DQ23	data 23
data 19	DQ19	53	54	GND	ground
ground	GND	55	56	DQ28	data 28
data 24	DQ24	57	58	DQ29	data 29
data 25	DQ25	59	60	GND	ground
ground	GND	61	62	DQS3#	data strobe 3 -
data mask 3	DQM3	63	64	DQS3	data strobe 3 +
ground	GND	65	66	GND	ground
data 26	DQ26	67	68	DQ30	data 30
data 27	DQ27	69	70	DQ31	data 31
ground	GND	71	72	GND	ground
clock enables 0	CKE0	73	74	CKE1	clock enables 1
1.5 volt supply	1.5V	75	76	1.5V	1.5 volt supply
reserved	N/C	77	78	(A15)	reserved
SDRAM bank 2	BA2	79	80	A14	address 14
1.5 volt supply	1.5V	81	82	1.5V	1.5 volt supply
address 12 (burst chop)	A12/BC#	83	84	A11	address 11
address 9	A9	85	86	A7	address 7
1.5 volt supply	1.5V	87	88	1.5V	1.5 volt supply
address 8	A8	89	90	A6	address 6
address 5	A5	91	92	A4	address 4
1.5 volt supply	1.5V	93	94	1.5V	1.5 volt supply
address 3	A3	95	96	A2	address 2
address 1	A1	97	98	A0	address 0
1.5 volt supply	1.5V	99	100	1.5V	1.5 volt supply
Clock 0 +	CK0	101	102	CK1	clock 1 +
Clock 0 -	CK0#	103	104	CK1#	clock 1 -
1.5 volt supply	1.5V	105	106	1.5V	1.5 volt supply
address 10 (auto precharge)	A10/AP	107	108	BA1	SDRAM bank 1
SDRAM Bank 0	BA0	109	110	RAS#	row address strobe
1.5 volt supply	1.5V	111	112	1.5V	1.5 volt supply
write enable	WE#	113	114	S0#	chip select 0
column address strobe	CAS#	115	116	ODT0	on die termination 0
1.5 volt supply	1.5V	117	118	1.5V	1.5 volt supply
address 13	A13	119	120	ODT1	on die termination 1
Chip Select 1	S1#	121	122	N/C	reserved
1.5 volt supply	1.5V	123	124	1.5V	1.5 volt supply
reserved	(TEST)	125	126	REF-CA	reference current
ground	GND	127	128	GND	ground
data 32	DQ32	129	130	DQ36	data 36
data 33	DQ33	131	132	DQ37	data 37
ground	GND	133	134	GND	ground
data strobe 4 -	DQS4#	135	136	DQM4	data mask 4
data strobe 4 +	DQS4	137	138	GND	ground
ground	GND	139	140	DQ38	data 38
data 34	DQ34	141	142	DQ39	data 39
data 35	DQ35	143	144	GND	ground
ground	GND	145	146	DQ44	data 44
data 40	DQ40	147	148	DQ45	data 45
data 41	DQ41	149	150	GND	ground
ground	GND	151	152	DQS5#	data strobe 5 -
data mask 5	DQM5	153	154	DQS5	data strobe 5 +
ground	GND	155	156	GND	ground
data 42	DQ42	157	158	DQ46	data 46
data 43	DQ43	159	160	DQ47	data 47

Description	Name	Pin		Name	Description
ground	GND	161	162	GND	ground
data 48	DQ48	163	164	DQ52	data 52
data 49	DQ49	165	166	DQ53	data 53
ground	GND	167	168	GND	ground
data strobe 6 -	DQS6#	169	170	DQM6	data mask 6
data strobe 6	DQS6	171	172	GND	ground
ground	GND	173	174	DQ54	data 54
data 50	DQ50	175	176	DQ55	data 55
data 51	DQ51	177	178	GND	ground
ground	GND	179	180	DQ60	data 60
data 56	DQ56	181	182	DQ61	data 61
data 57	DQ57	183	184	GND	ground
ground	GND	185	186	DQS7#	data strobe 7 -
data mask 7	DQM7	187	188	DQS7	data strobe 7 +
ground	GND	189	190	GND	ground
data 58	DQ58	191	192	DQ62	data 62
data 59	DQ59	193	194	DQ63	data 63
ground	GND	195	196	GND	ground
SPD address 0	SA0	197	198	EVENT#	Event
3.3 volt supply	3.3V	199	200	SDA	SMBus data
SPD address 1	SA1	201	202	SCL	SMBus clock
termination current	VTT	203	204	VTT	termination current

3.5 PCI/104-Express Bus

Expansion modules for the PCI-Express bus can be connected to the board using the PCI/104-Express™ connector. This is a "type 1" connector which offers full PCI-Express x16. "Stacking Error" functionality is available. For specifics, please refer to the PCI/104-Express™ documentation (rev. 2.0).

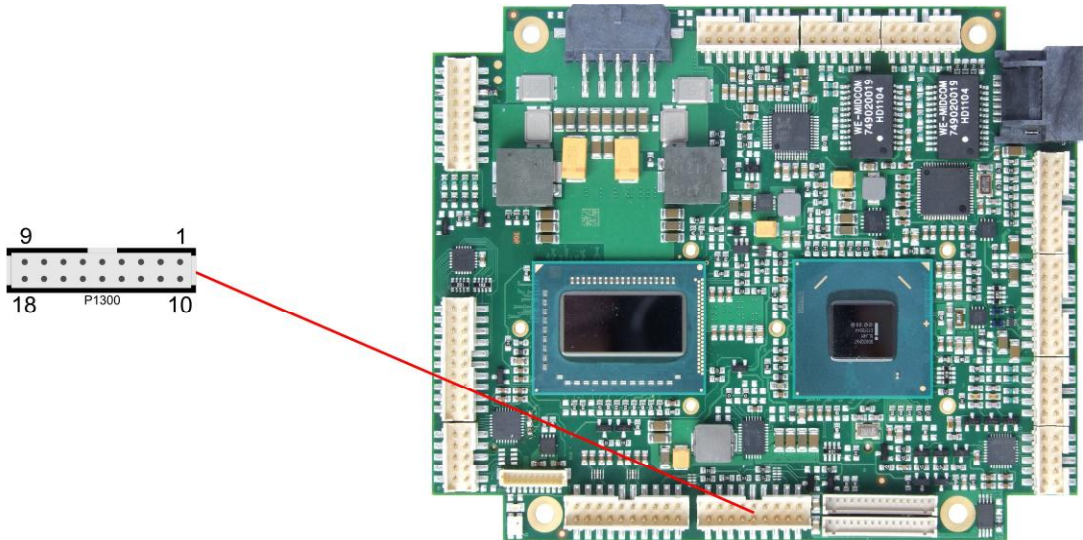


Description	Name	Pin	Name	Description
reserved	N/C	1	2	PERST# PCIe reset
3.3 volt supply	3.3V	3	4	3.3V 3.3 volt supply
display data channel clock	DDPC-CLK	5	6	N/C reserved
display data channel data	DDPC-DAT	7	8	N/C reserved
ground	GND	9	10	GND ground
transmit lane 2 +	PET2	11	12	PET1 transmit lane 1 +
transmit lane 2 -	PET2#	13	14	PET1# transmit lane 1 -
ground	GND	15	16	GND ground
transmit lane 3 +	PET3	17	18	PET4 transmit lane 4 +
transmit lane 3 -	PET3#	19	20	PET4# transmit lane 4 -
ground	GND	21	22	GND ground
receive lane 2 +	PER2	23	24	PER1 receive lane 1 +
receive lane 2 -	PER2#	25	26	PER1# receive lane 1 -
ground	GND	27	28	GND ground
receive lane 3 +	PER3	29	30	PER4 receive lane 4 +
receive lane 3 -	PER3#	31	32	PER4# receive lane 4 -
ground	GND	33	34	GND ground
clock slot 1 +	PECLK1	35	36	PECLK0 clock slot 0 +
clock slot 1 -	PECLK1#	37	38	PECLK0# clock slot 0 -
5 volt standby supply	SVCC	39	40	SVCC 5 volt standby supply
clock slot 2 +	PECLK2	41	42	PECLK3 clock slot 3 +
clock slot 2 -	PECLK2#	43	44	PECLK3# clock slot 3 -
CPU direction	CPU_DIR	45	46	PWRGOOD powergood
SMBus data	SMBDAT	47	48	PECLKx16 clock x16 slot +
SMBus clock	SMBCLK	49	50	PECLKx16# clock x16 slot -
SMBus alert	SMBALERT	51	52	PSON# PSU on
link reactivation	PEWAKE#	53	54	PEGENA# PCIe graphics enable
ground	GND	55	56	GND ground

Description	Name	Pin		Name	Description
x16 transmit lane 8 +	PE16T8	57	58	PE16T0	x16 transmit lane 0 +
x16 transmit lane 8 -	PE16T8#	59	60	PE16T0#	x16 transmit lane 0 -
ground	GND	61	62	GND	ground
x16 transmit lane 9 +	PE16T9	63	64	PE16T1	x16 transmit lane 1 +
x16 transmit lane 9 -	PE16T9#	65	66	PE16T1#	x16 transmit lane 1 -
ground	GND	67	68	GND	ground
x16 transmit lane 10 +	PE16T10	69	70	PE16T2	x16 transmit lane 2 +
x16 transmit lane 10 -	PE16T10#	71	72	PE16T2#	x16 transmit lane 2 -
ground	GND	73	74	GND	ground
x16 transmit lane 11 +	PE16T11	75	76	PE16T3	x16 transmit lane 3 +
x16 transmit lane 11 -	PE16T11#	77	78	PE16T3#	x16 transmit lane 3 -
ground	GND	79	80	GND	ground
x16 transmit lane 12 +	PE16T12	81	82	PE16T4	x16 transmit lane 4 +
x16 transmit lane 12 -	PE16T12#	83	84	PE16T4#	x16 transmit lane 4 -
ground	GND	85	86	GND	ground
x16 transmit lane 13 +	PE16T13	87	88	PE16T5	x16 transmit lane 5 +
x16 transmit lane 13 -	PE16T13#	89	90	PE16T5#	x16 transmit lane 5 -
ground	GND	91	92	GND	ground
x16 transmit lane 14 +	PE16T14	93	94	PE16T6	x16 transmit lane 6 +
x16 transmit lane 14 -	PE16T14#	95	96	PE16T6#	x16 transmit lane 6 -
ground	GND	97	98	GND	ground
x16 transmit lane 15 +	PE16T15	99	100	PE16T7	x16 transmit lane 7 +
x16 transmit lane 15 -	PE16T15#	101	102	PE16T7#	x16 transmit lane 7 -
ground	GND	103	104	GND	ground
SDVO data	SDVODAT	105	106	SDVOCLK	SDVO clock
ground	GND	107	108	GND	ground
x16 receive lane 8 +	PE16R8	109	110	PE16R0	x16 receive lane 0 +
x16 receive lane 8 -	PE16R8#	111	112	PE16R0#	x16 receive lane 0 -
ground	GND	113	114	GND	ground
x16 receive lane 9 +	PE16R9	115	116	PE16R1	x16 receive lane 1 +
x16 receive lane 9 -	PE16R9#	117	118	PE16R1#	x16 receive lane 1 -
ground	GND	119	120	GND	ground
x16 receive lane 10 +	PE16R10	121	122	PE16R2	x16 receive lane 2 +
x16 receive lane 10 -	PE16R10#	123	124	PE16R2#	x16 receive lane 2 -
ground	GND	125	126	GND	ground
x16 receive lane 11 +	PE16R11	127	128	PE16R3	x16 receive lane 3 +
x16 receive lane 11 -	PE16R11#	129	130	PE16R3#	x16 receive lane 3 -
ground	GND	131	132	GND	ground
x16 receive lane 12 +	PE16R12	133	134	PE16R4	x16 receive lane 4 +
x16 receive lane 12 -	PE16R12#	135	136	PE16R4#	x16 receive lane 4 -
ground	GND	137	138	GND	ground
x16 receive lane 13 +	PE16R13	139	140	PE16R5	x16 receive lane 5 +
x16 receive lane 13 -	PE16R13#	141	142	PE16R5#	x16 receive lane 5 -
ground	GND	143	144	GND	ground
x16 receive lane 14 +	PE16R14	145	146	PE16R6	x16 receive lane 6 +
x16 receive lane 14 -	PE16R14#	147	148	PE16R6#	x16 receive lane 6 -
ground	GND	149	150	GND	ground
x16 receive lane 15 +	PE16R15	151	152	PE16R7	x16 receive lane 7 +
x16 receive lane 15 -	PE16R15#	153	154	PE16R7#	x16 receive lane 7 -
ground	GND	155	156	GND	ground
5 volt supply	VCC	C1			
5 volt supply	VCC	C2			
12 volt supply	12V	C3			

3.6 DVI/HDMI

The ADLQM67PC provides a DVI/HDMI interface which is realized as a 2x9pin header (FCI 98424-G52-18LF, mating connector e.g. FCI 90311-018LF).

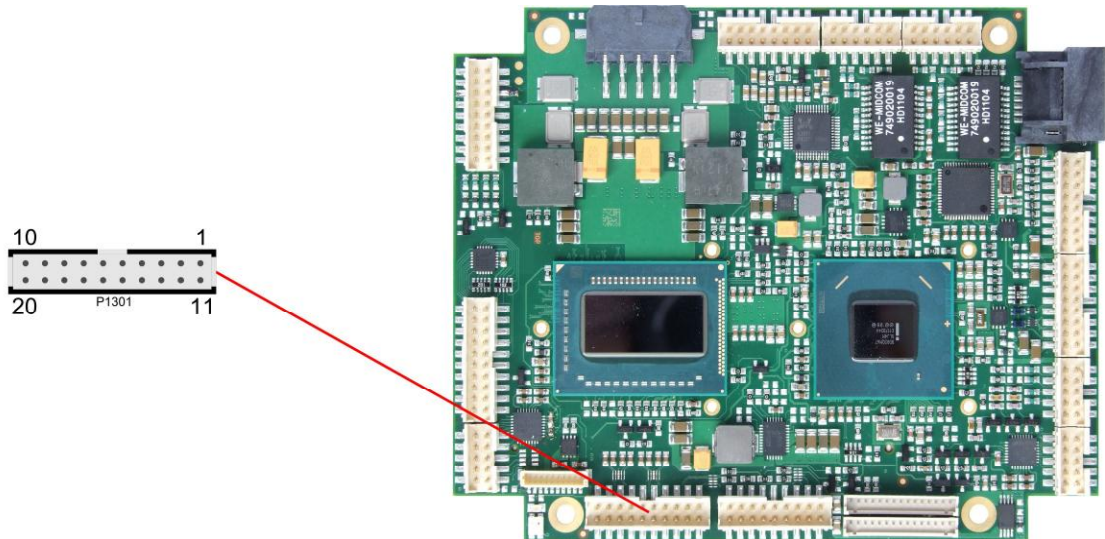


Pinout 2x9pin connector DVI/HDMI:

Description	Name	Pin	Pin	Name	Description
HDMI panel detected	HPD_SINK	1	10	N/C	reserved
SMBus clock (DDC)	SCL_SINK	2	11	SDA_SINK	SMBus dat (DDC)
5 volt supply	VCC	3	12	GND	ground
ground	GND	4	13	TMDS_CLK#	DVI clock -
DVI data 0 -	TMDS_D0#	5	14	TMDS_CIK	DVI clock +
DVI data 0 +	TMDS_D0	6	15	GND	ground
ground	GND	7	16	TMDS_D1#	DVI data 1 -
DVI data 2 -	TMDS_D2#	8	17	TMDS_D1	DVI data 1 +
DVI data 2 +	TMDS_D2	9	18	GND	ground

3.7 DisplayPort

The ADLQM67PC offers a DisplayPort interface which is realized as 2x10pin connector (FCI 98424-G52-20LF, mating connector e.g. FCI 90311-020LF). This interface can also be operated in HDMI/DVI mode. To achieve this, pin 11 must be connected to 3.3V (e.g. pin 3).



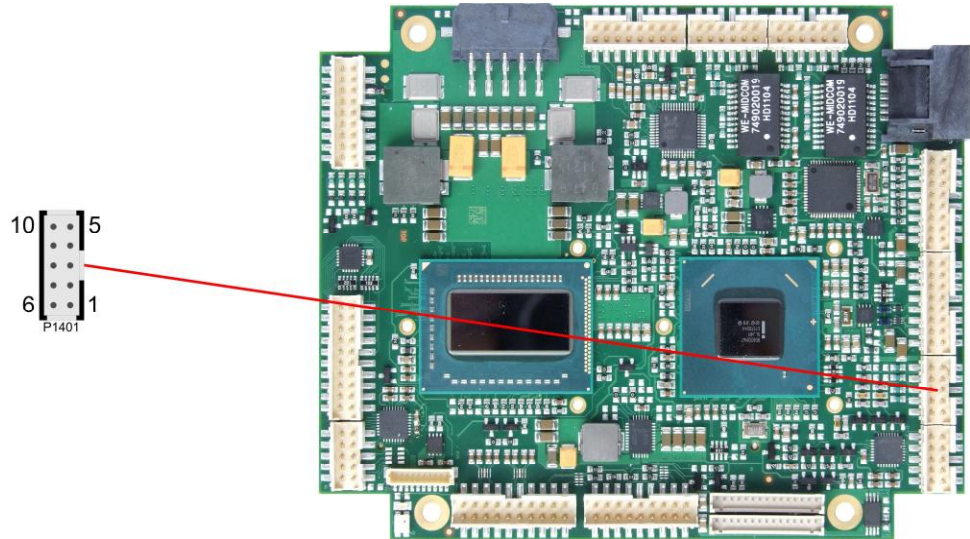
Pinout 2x10pin DisplayPort connector:

Description	Name	Pin	Name	Description	
hotplug detect	DPHPD	1	11	HDMIEN	HDMI enable
displayport aux +	DPAUX	2	12	DPAUX#	displayport aux -
3.3V supply	3.3V	3	13	GND	ground
ground	GND	4	14	DPL3#	displayport lane 3 -
displayport lane 2 -	DPL2#	5	15	DPL3	displayport lane 3 +
displayport lane 2 +	DPL2	6	16	GND	ground
ground	GND	7	17	DPL1#	displayport lane 1 -
displayport lane 0 -	DPL0#	8	18	DPL1	displayport lane 1 +
displayport lane 0 +	DPL0	9	19	GND	ground
reserved	N/C	10	20	GND	ground

3.8 VGA

The CRT-VGA signals are provided by a 2x5pin connector (FCI 98424-G52-10LF, mating connector e.g. FCI 90311-010LF).

This interface allows the connection of a standard VGA-monitor. I2C communication is supported.



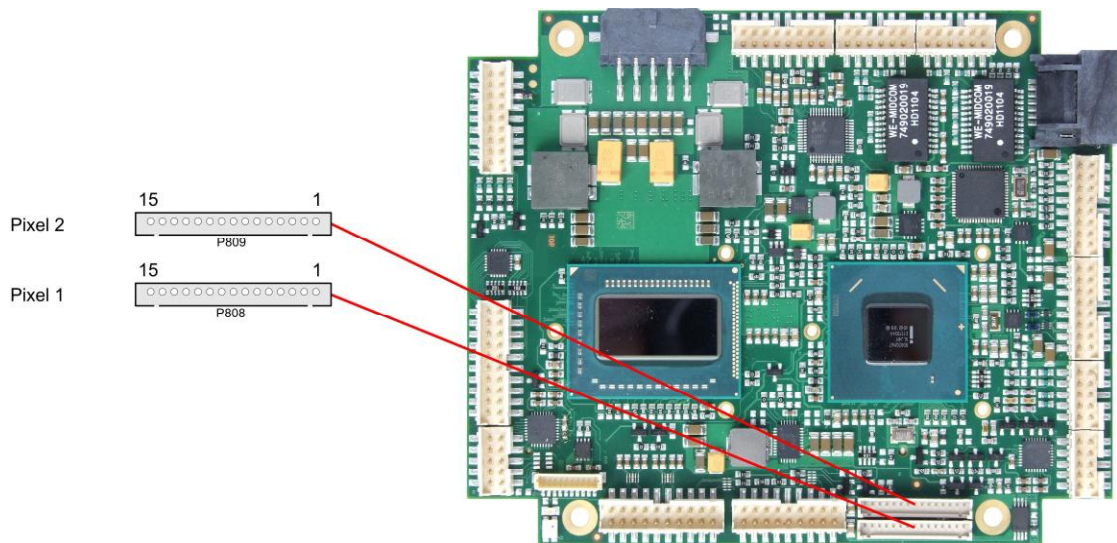
Description	Name	Pin	Name	Description	
analog red	RED	1	6	GND	ground
analog green	GREEN	2	7	DDDA	DD data
analog blue	BLUE	3	8	DDCK	DD clock
vertikal sync	VSYNC	4	9	GND	ground
horizontal sync	HSYNC	5	10	GND	ground

3.9 LCD

The LCD is connected via two 15 pin connectors (Hirose DF13-15P-1.25DSA, mating connector: DF13-15S-xxx). The power supply for the display is also provided through these connectors. The ADLQM67PC board only supports displays with LVDS interface. For displays with digital interface an extra receiver board is available. There is no support for DSTN displays.

With the LVDS interface it is possible to trigger LVDS displays with a maximum of 24 Bit colour depth and one or two pixels per clock. For single pixel displays only one connector is necessary. However, if you want to read the display's EDID data the second connector must be connected.

The display type can be chosen over the BIOS setup. Please contact your sales representative regarding an appropriate cable to connect your display.



The following table shows the pin description for the first bit ("even" pixel).

Pin	Name	Description
1	GND	ground
2	GND	ground
3	TXO00#	LVDS even data 0 -
4	TXO00	LVDS even data 0 +
5	TXO01#	LVDS even data 1 -
6	TXO01	LVDS even data 1 +
7	TXO02#	LVDS even data 2 -
8	TXO02	LVDS even data 2 +
9	TXO0C#	LVDS even clock -
10	TXO0C	LVDS even clock +
11	TXO03#	LVDS even data 3 -
12	TXO03	LVDS even data 3 +
13	BL_VCC	switched 5 volt for backlight
14	FP_3.3V	switched 3.3 volt for display
15	FP_3.3V	switched 3.3 volt for display

The following table shows the pin description for the second bit ("odd" pixel). This connector will only be used if a display with two pixels per clockcycle is to be connected.

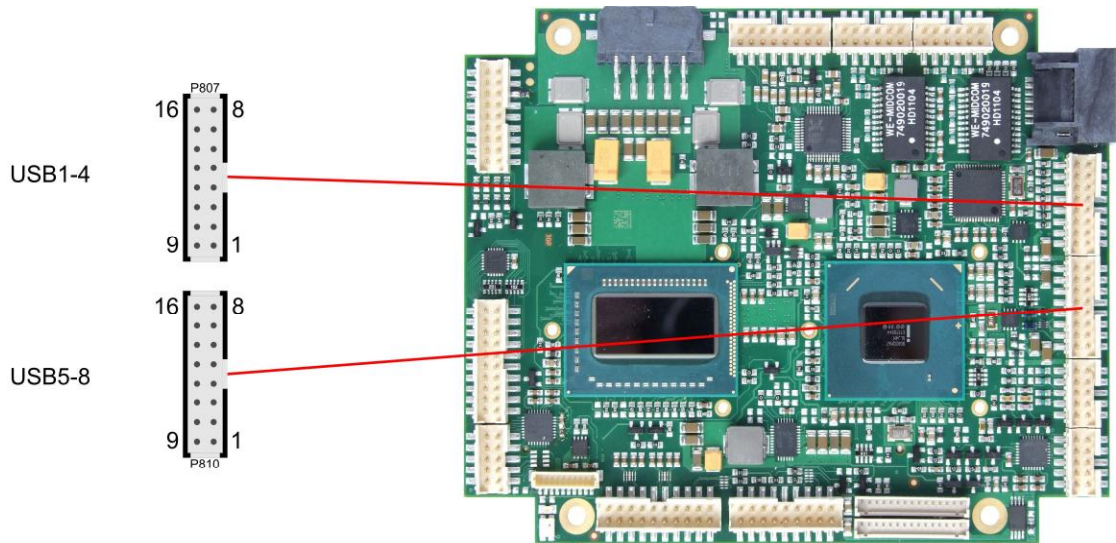
Pin	Name	Description
1	GND	ground
2	GND	ground
3	TXO10#	LVDS odd data 0 -
4	TXO10	LVDS odd data 0 +
5	TXO11#	LVDS odd data 1 -
6	TXO11	LVDS odd data 1 +
7	TXO12#	LVDS odd data 2 -
8	TXO12	LVDS odd data 2 +
9	TXO1C#	LVDS odd clock -
10	TXO1C	LVDS odd clock +
11	TXO13#	LVDS odd data 3 -
12	TXO13	LVDS odd data 3 +
13	DDC_CLK	EDID clock for LCD
14	DDC_DAT	EDID data for LCD
15	VCC	5 volt supply

3.10 USB

USB channels 1 to 8 are provided via two 2x8pin connectors (FCI 98424-G52-16LF, mating connector e.g. FCI 90311-016LF).

All USB-channels support USB 2.0. You may note that the setting of USB keyboard or USB mouse support in the BIOS-setup is only necessary and advisable, if the OS offers no USB-support. BIOS-setup can be changed with a USB keyboard without enabling USB keyboard support. Running a USB supporting OS (such as Microsoft® Windows®) with these features enabled may lead to significant performance or functionality limitations.

Every USB interface provides up to 500 mA current and is protected by an electronically resettable fuse.



Pinout USB 1-4:

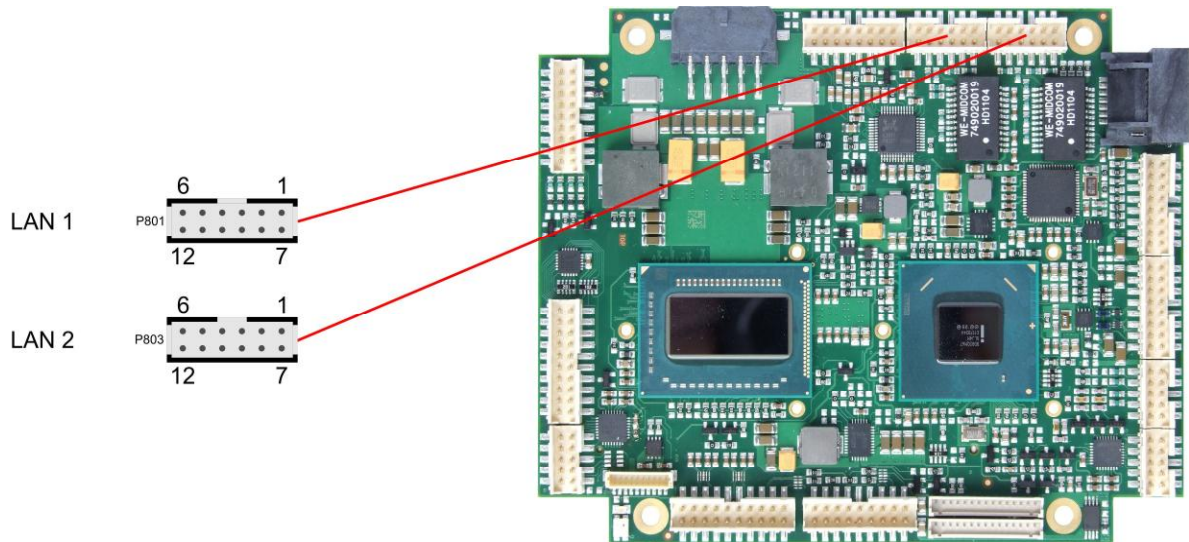
Description	Name	Pin	Name	Description
5 volt for USB1	USB1 VCC	1	9	USB2VCC
minus channel USB1	USB1#	2	10	USB2#
plus channel USB1	USB1	3	11	USB2
ground	GND	4	12	GND
ground	GND	5	13	GND
plus channel USB3	USB3	6	14	USB4
minus channel USB3	USB3#	7	15	USB4#
5 volt for USB3	USB3VCC	8	16	USB4VCC

Pinout USB 5-8:

Description	Name	Pin	Name	Description
5 volt for USB5	USB5 VCC	1	9	USB6VCC
minus channel USB5	USB5#	2	10	USB6#
plus channel USB5	USB5	3	11	USB6
ground	GND	4	12	GND
ground	GND	5	13	GND
plus channel USB7	USB7	6	14	USB8
minus channel USB7	USB7#	7	15	USB8#
5 volt for USB7	USB7VCC	8	16	USB8VCC

3.11 LAN

Both LAN interfaces are provided via a 2x6pin connector (FCI 98424-G52-12LF, mating connector e.g. FCI 90311-012LF). The interfaces support 10BaseT, 100BaseT, and 1000BaseT compatible network components with automatic bandwidth selection. Additional outputs are provided for status LEDs. Auto-negotiate and auto-cross functionality is available, PXE and RPL are available on request.



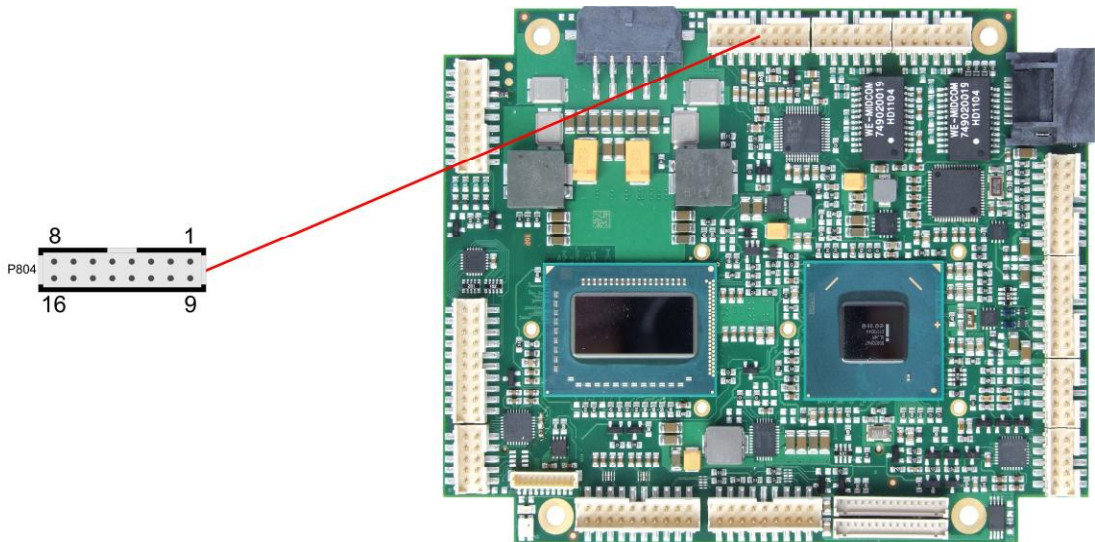
Pinout LAN interface:

Description	Name	Pin	Name	Description
LAN activity	LINKACT	1	7	SPEED1000 LAN speed 1000Mbit
LAN channel 1 plus	LAN1	2	8	LAN0 LAN channel 0 plus
LAN channel 1 minus	LAN1#	3	9	LAN0# LAN channel 0 minus
LAN channel 3 plus	LAN3	4	10	LAN2 LAN channel 2 plus
LAN channel 3 minus	LAN3#	5	11	LAN2# LAN channel 2 minus
LAN speed 100Mbit	SPEED100	6	12	3.3V 3.3 volt supply

3.12 Audio

The ADLQM67PC's audio functions are provided via a 2x8pin connector (FCI 98424-G52-16LF, mating connector e.g. FCI 90311-016LF). This interface provides eight output channels for full 7.1 sound output. Two microphone inputs and two AUX inputs are also available.

The signals "SPDIFI" and "SPDIFO" provide digital input and output. If a transformation to a coaxial or optical connector is necessary this must be performed externally.

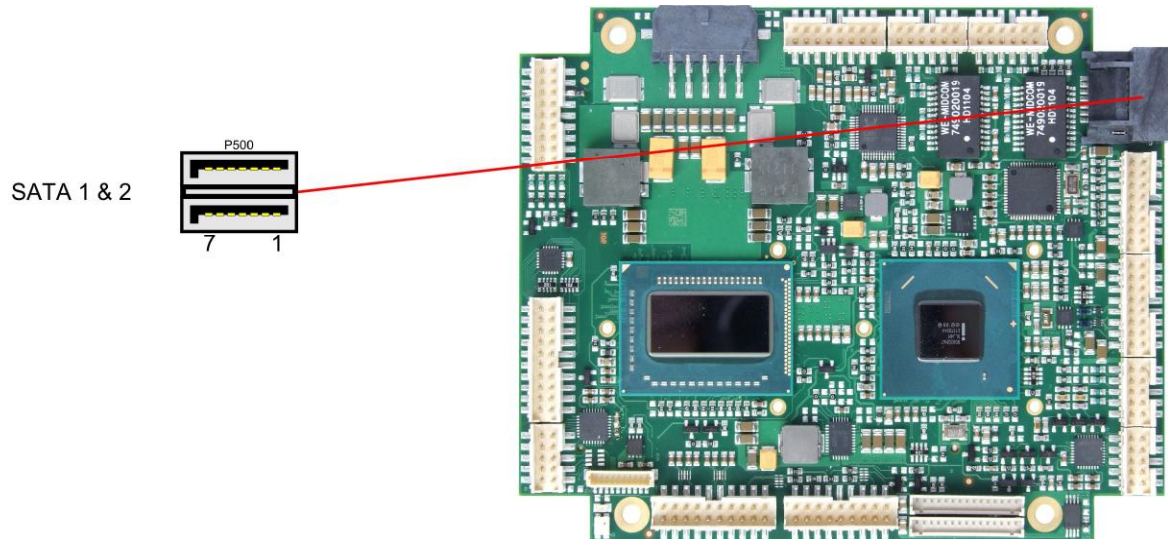


Description	Name	Pin	Name	Description
digital output SPDIF	SPDIFO	1	9	3.3V
digital input SPDIF	SPDIFI	2	10	S_AGND
sound output right	LOUT_R	3	11	LOUT_L
AUX input right	AUXA_R	4	12	AUXA_L
microphone input 1	MIC1	5	13	MIC2
surround out right	SOUT_R	6	14	SOUT_L
center output	CENOUT	7	15	LFEOUT
side surround out right	SSOUT_R	8	16	SSOUT_L

3.13 SATA Interfaces

The ADLQM67PC provides two SATA interfaces allowing transfer rates of up to 6 Gbit per second. These interfaces are made available via two 7 pin connectors.

The required settings are made in the BIOS setup.

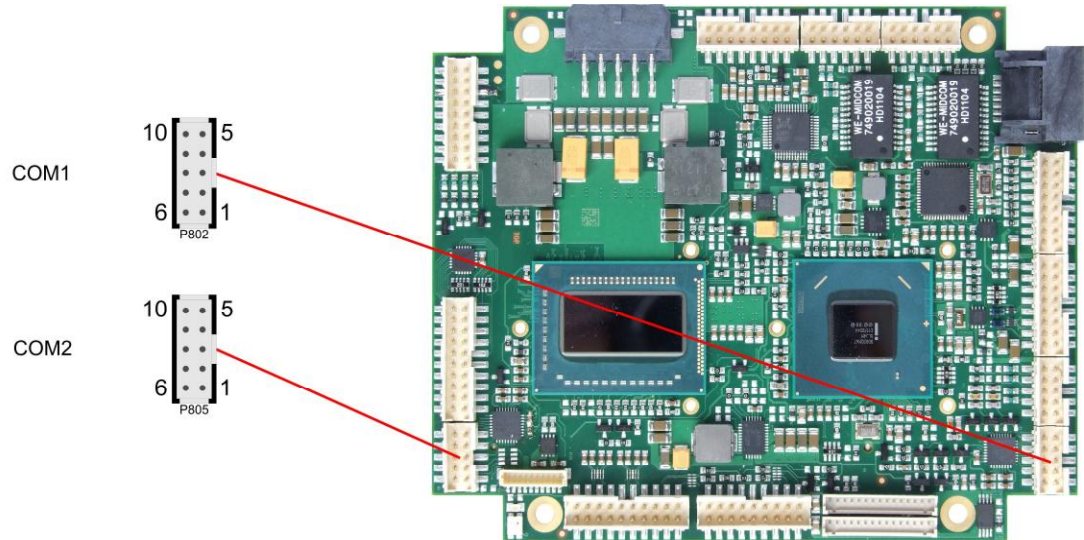


Pinout SATA:

Pin	Name	Description
1	GND	ground
2	SATATX	SATA transmit +
3	SATATX#	SATA transmit -
4	GND	ground
5	SATARX	SATA receive +
6	SATARX#	SATA receive -
7	GND	ground

3.14 COM1 and COM2

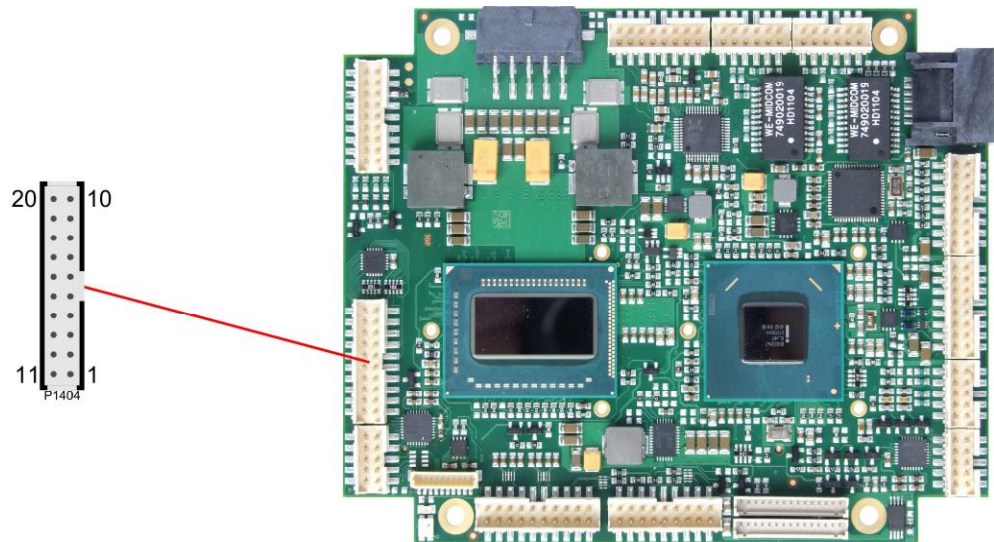
The serial interfaces COM1 and COM2 are provided via a 2x5pin connector (FCI 98424-G52-10LF, mating connector e.g. FCI 90311-010LF).



Description	Name	Pin	Name	Description	
data carrier detect	DCD	1	6	DSR	data set ready
receive data	RXD	2	7	RTS	request to send
transmit data	TXD	3	8	CTS	clear to send
data terminal ready	DTR	4	9	RI	ring indicator
ground	GND	5	10	VCC	5 volt supply

3.15 GPIO

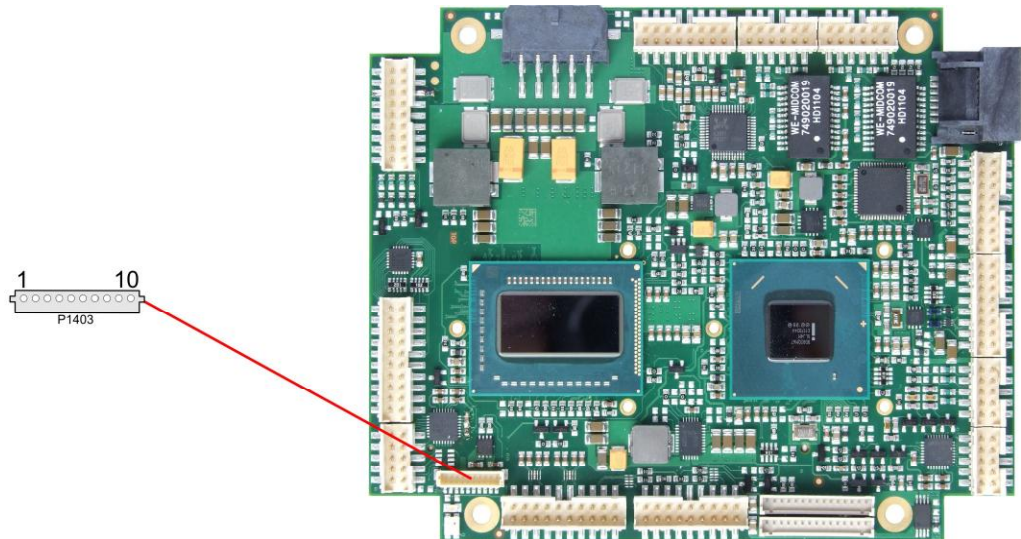
The General Purpose Input/Output interface is made available through a 2x10 pin connector (FCI 98424-G52-20LF, mating connector e.g. FCI 90311-020LF). To make use of this interface the SIO unit must be programmed accordingly. Please refer to your sales representative for information on available software support.



Description	Name	Pin	Name	Description	
ground	GND	1	11	3.3V	3.3 volt supply
GP input/output 00	GPIO00	2	12	GPIO10	GP input/output 10
GP input/output 01	GPIO01	3	13	GPIO11	GP input/output 11
GP input/output 02	GPIO02	4	14	GPIO12	GP input/output 12
GP input/output 03	GPIO03	5	15	GPIO13	GP input/output 13
GP input/output 04	GPIO04	6	16	GPIO14	GP input/output 14
GP input/output 05	GPIO05	7	17	GPIO15	GP input/output 15
GP input/output 06	GPIO06	8	18	GPIO16	GP input/output 16
GP input/output 07	GPIO07	9	19	GPIO17	GP input/output 17
3.3 volt supply	3.3V	10	20	GND	ground

3.16 Monitoring Functions

Additional monitoring functions, such as the status of the fan or of other devices connected over SM-Bus (e. g. temperature sensor), are accessible via an 10 pin connector (JST BM10B-SRSS-TB, mating connector: SHR-10V-S(-B)).

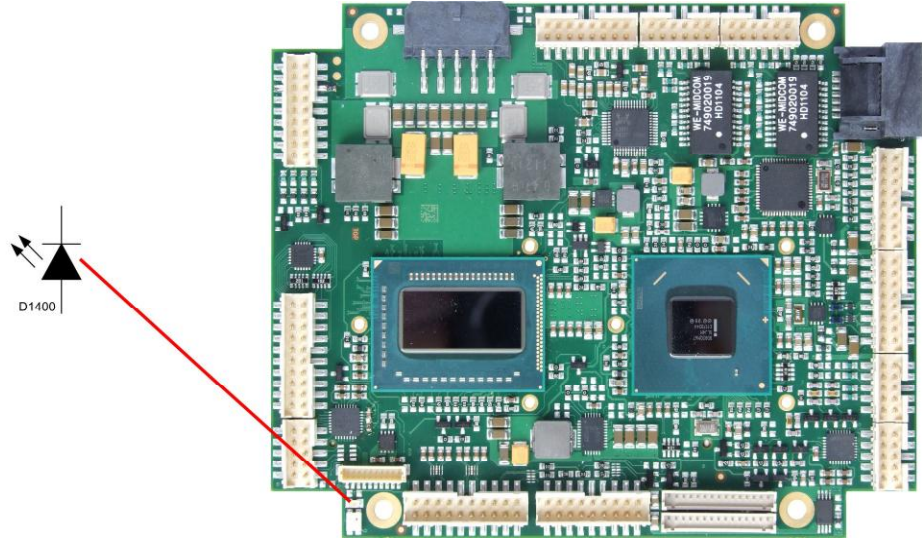


Pin	Name	Description
1	3.3V	3.3 volt supply
2	CS-SMB-CLK	SMBus clock
3	CS-SMB-DAT	SMBus data
4	GND	ground
5	VCC	5 volt supply
6	FANCTRL1	fan 1 monitoring signal
7	FANON1	5 volt supply (switched)
8	FANCTRL2	fan 2 monitoring signal
9	FANON2	5 volt supply (switched)
10	FANCTRL3	fan 3 (external) monitoring signal

4 Status LEDs

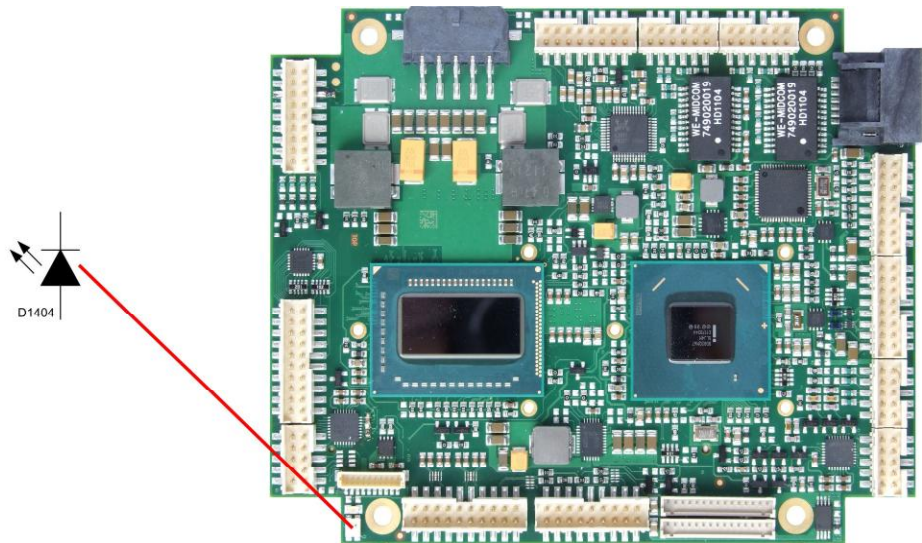
4.1 HD LED

Harddisk activity is signalled by a dedicated LED.



4.2 RGB LED

The ADLQM67PC has an RGB LED, which can signal status messages by using different colors and flash intervals.



Status Codes RGB LED:

Color	Interval	Meaning
none	solid	Invalid system state
White	solid	The microcontroller has just been flashed and is being prepared for normal operation after reboot
Cyan	solid	Reserved
Magenta	solid	Reserved
Blue	solid	Reserved
Yellow	solid	Reserved
Green	solid	Board operates normal
Red	solid	Board is in Reset
Green/Yellow	flashing	Bootloader operates normal
Red	flashing	Firmware is being started (start sequence still running)
Red/Yellow	flashing	Bootloader is being started (start sequence still running)
Red/Magenta	flashing	Checksum error during I2C transmission in bootloader
Red/Blue	flashing	Update completed, waiting for manual Reset
Yellow	flashing (10s)	S5 state
Yellow	flashing (6s)	S4 state
Yellow	flashing (3s)	Reserved
Yellow	flashing (0.5s)	Reserved



NOTE

If the board appears to be in Reset (Red LED lit) then this could also indicate a PCI104-Express "stacking error". Such an error could occur when the stack contains a peripheral card which has the wrong type of connector (PC1104-Express Type 1 instead of Type 2 or vice versa).

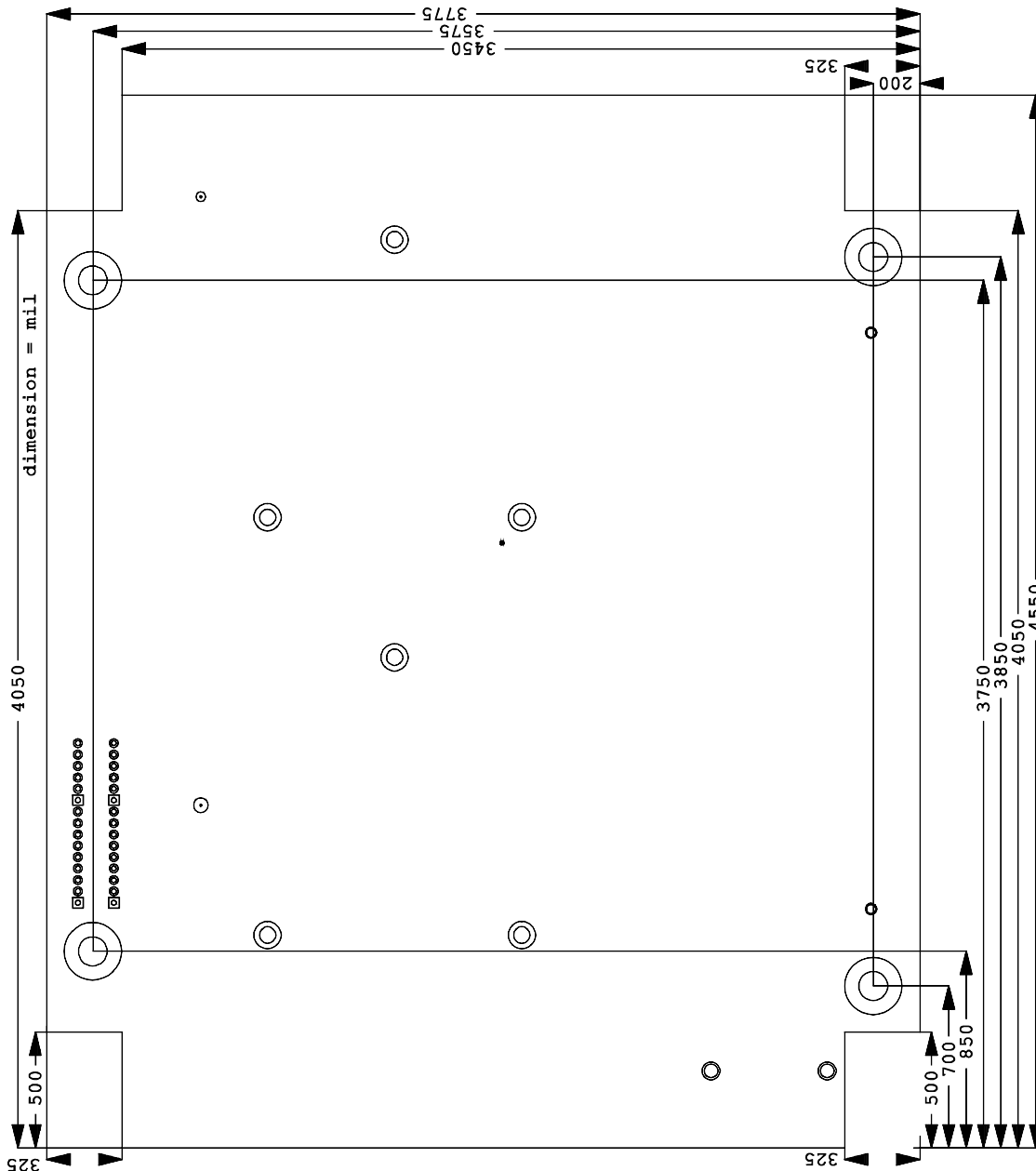
5 Mechanical Drawing

5.1 PCB: Mounting Holes

A true dimensioned drawing can be found in the PC/104 specification.

i **NOTE**

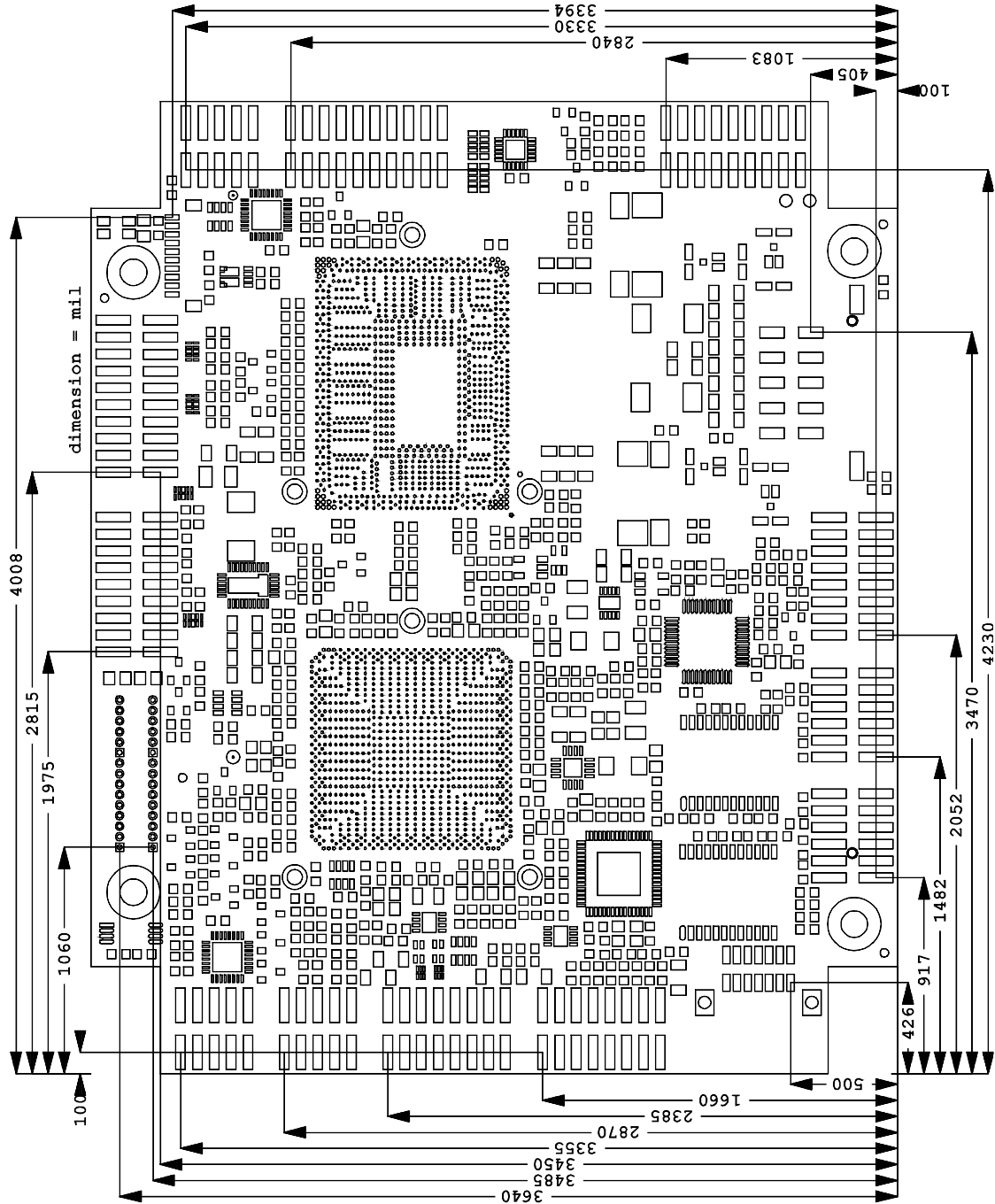
All dimensions are in mil (1 mil = 0,0254 mm)



5.2 PCB: Pin 1 Dimensions



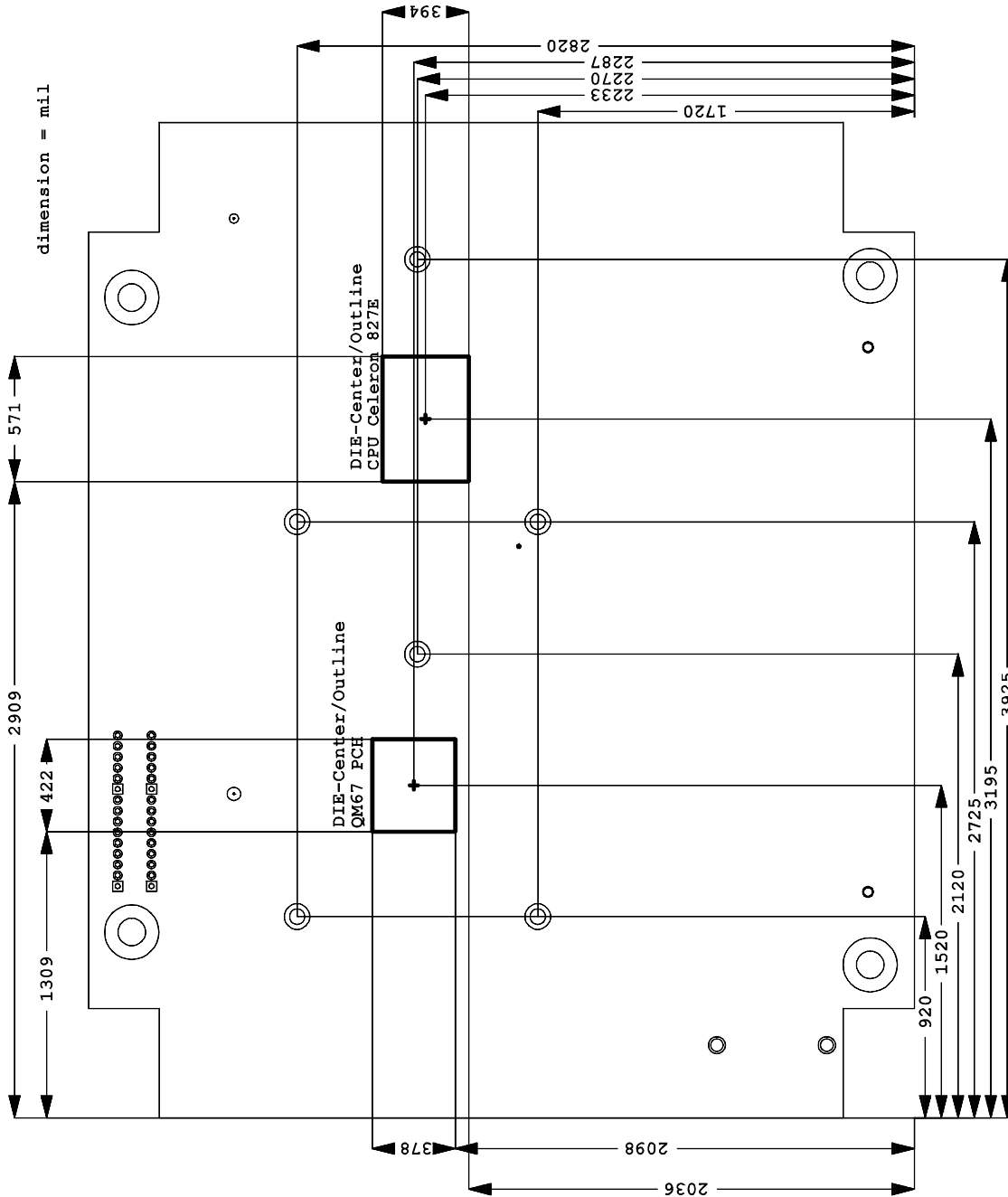
All dimensions are in mil (1 mil = 0,0254 mm)



5.3 PCB: Heat Sink/Die Center

i **NOTE**

All dimensions are in mil (1 mil = 0,0254 mm)

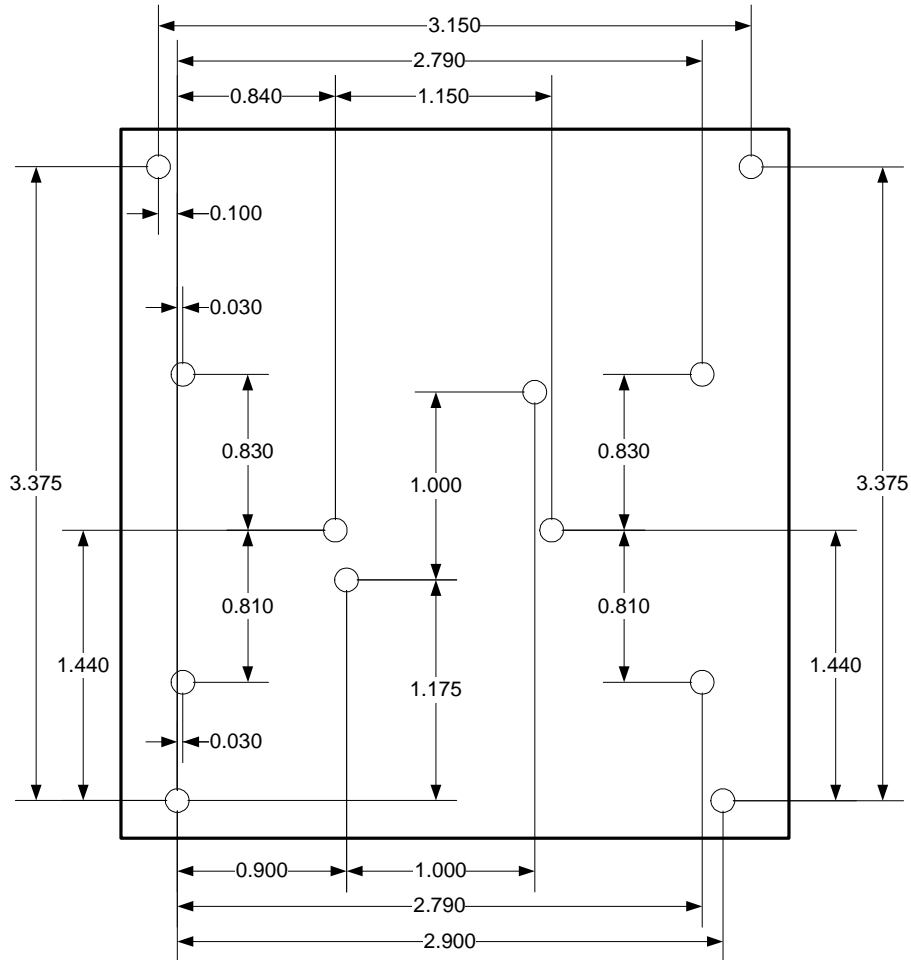


5.4 Heat Spreader: Chassis Mount

The figure below includes all hole spacing for each heat spreader available and can be used to aid in mating the heat spreader to a bulkhead or chassis.

i **NOTE**

Dimensions are in inch (1 in = 2.54cm; 1 mil = 0.0254 mm)



6 Technical Data

6.1 Electrical Data

Power Supply:

Board:	5 Volt and 12 Volt (+/- 5%)
RTC:	>= 3 Volt

Electric Power Consumption:

Board:	tbd
RTC:	<= 10 μ A

6.2 Environmental Conditions

Temperature Range:

Operating:	-25°C to +70°C (using approved thermal solution) -40°C up to +85°C (when pre-screened for use with an approved thermal solution)
Storage:	-40°C up to +85°C
Shipping:	-40°C up to +85°C, for packaged boards

Temperature Changes:

Operating:	0.5°C per minute, 7.5°C per 30 minutes
Storage:	1.0°C per minute
Shipping:	1.0°C per minute, for packaged boards

Relative Humidity:

Operating:	5% up to 85% (non condensing)
Storage:	5% up to 95% (non condensing)
Shipping:	5% up to 100% (non condensing), for packaged boards

Shock:

Operating:	150m/s ² , 6ms
Storage:	400m/s ² , 6ms
Shipping:	400m/s ² , 6ms, for packaged boards

Vibration:

Operating:	10 up to 58Hz, 0.075mm amplitude 58 up to 500Hz, 10m/s ²
Storage:	5 up to 9Hz, 3.5mm amplitude 9 up to 500Hz, 10m/s ²
Shipping:	5 up to 9Hz, 3.5mm amplitude 9 up to 500Hz, 10m/s ² , for packaged boards



CAUTION

Shock and vibration figures pertain to the motherboard alone and do not include additional components such as heat sinks, memory modules, cables etc.

6.3 Thermal Specifications

The board is specified to operate in an environmental temperature range from -25°C to +70°C when using an approved thermal solution, and an extended temperature range of -40°C to +85°C when pre-screened for use with an approved thermal solution.

Maximum die temperature is 100°C. To keep the processor under this threshold an appropriate cooling solution needs to be applied. This solution has to take typical and maximum power consumption into account. The maximum power consumption may be twice as high and should be used as a basis for the cooling concept. Additional controllers may also affect the cooling concept. The power consumption of such components may be comparable to the consumption of the processor.

The board design includes thermal solution mounting points that will provide the best possible thermal interface between die and solution. Since we take thermal solutions seriously we have several advanced, aggressive cooling solutions in our product portfolio. Please contact your sales representative to order or discuss your thermal solution needs.



CAUTION

The end customer has the responsibility to ensure that the die temperature of the processor does not exceed 100°C. Permanent overheating may destroy the board!

In case the temperature exceeds 100°C the environmental temperature must be reduced. Under certain circumstances sufficient air circulation must be provided.



CAUTION

The ADLQM67PC includes circuitry that will notify an intelligent power supply to shut down if the processor reaches a critical temperature. This is achieved by deasserting the (low-active) PS_ON# signal found on the SM-Bus connector. When PS_ON# is no longer pulled low, an intelligent power supply would take this as a signal to shut down power. For this to work, PS_ON# must be connected to the power supply's PS_ON input. If PS_ON# is not otherwise connected, the ADLQM67PC can be damaged beyond repair if a thermal shutdown event occurs. In rare instances, if power is not shut down, the board will continue to heat up until failure occurs.