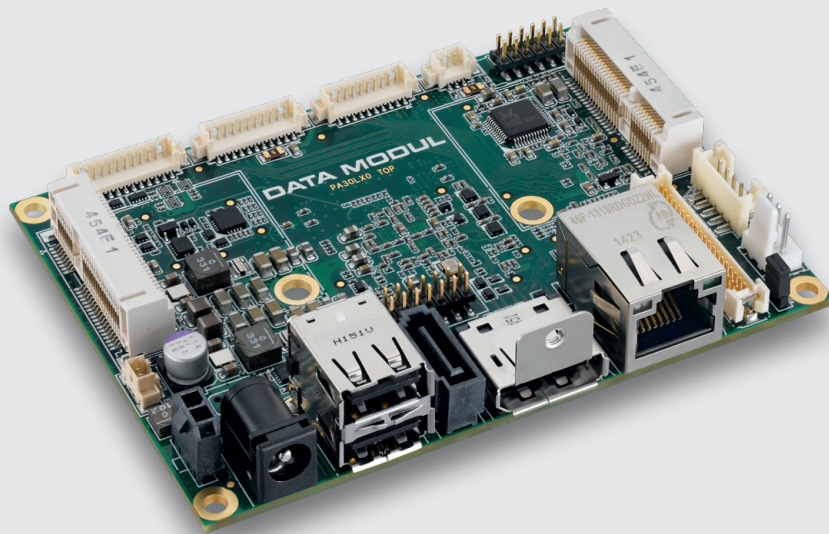


eDM-pITX-BT



Revision History

Revision	Revision History	Date
00	First release	07.01.2016

Reference to this Specification

The purpose of all the figures and illustrations in this Specification is merely to provide a better explanation and can differ to the actual appearance of the devices. They are to be understood as schematic representations.

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[12012718 Rev. 00]

Contents

Operating Instructions	3
Using this Specification	3
Danger Symbols and Levels	3
Danger Symbols	3
Danger Levels	3
General Symbols	3
Technical Support	3
Safety Instructions	4
Conformity	4
Disposal and Recycling	4
Batteries	4
List of Abbreviations	5
Overview	6
System Overview	6
Supported Operating Systems	8
Customized UEFI	8
Tools	8
Block Diagram	8
Ordering Information	9
Feature Specification	9
Processor and Platform Controller Hub (PCH)	9
Memory	9
Graphics Interfaces	9
DisplayPort (X3)	9
LVDS Data (X48)	9
LCD Backlight (X2)	10
USB 2.0 / 3.0 Ports	10
Ethernet Interface (X40)	11
Ethernet LED Functions	11
Audio Interface (X5)	11
Front Panel HD Audio	11
S/PDIF	11
Power Supply	12

Contents

DC Power Input (X42)	12
DC Power internal (X41)	12
Jumper Voltage Level (X51)	12
PCI Express	12
SATA Interfaces	12
SATA (CN1)	12
Serial Ports (COM)	12
CAN (X19)	13
Feature Connectors	14
Button & LEDs (13)	14
I2C / SMB / Watchdog (X14)	14
GPIOs (X15)	14
Real Time Clock (RTC) / Battery	15
Battery Connector X10	15
Thermal / Voltage Monitoring	15
BIOS Flash	15
Cooling Solution	15
CSP Dimension	16
Heatspreader Dimension	16
Embedded Feature Set	17
FAN (X49)	17
Power Loss Control	17
Mechanical System	18
Mechanical Outline	18
Component Placement	18
Top Side	18
Bottom Side	19
Environmental Specifications	20
Limitations of Industrial Version	20
Standards & Certifications	21
EMC Standards	21
Emission	21
Immunity	21
Safety	21
Other Certification	21
Stress Tests	21

Operating Instructions

Using this Specification

- In this Specification, the eDM-pITX-BT is also referred to as „mainboard“.
- Please read this Specification before using this mainboard.
- This Specification contains information about the hardware, software and configuration of the mainboard.
- Awareness of the safety instructions and instructions for use in this Specification will ensure the safe and correct use of the mainboard.
- In addition to the information given here, you should comply with the local regulations for the prevention of accidents and generally applicable safety regulations.

Danger Symbols and Levels

In this Specification, symbols are used to highlight important safety instructions and any advice relating to the device. The instructions should be followed very carefully to avoid any risk of accident, personal injury or property damage.

Danger Symbols

	Dangerous Voltage, Electric shock
	Hazard point
	All DATA MODUL AG products are electrostatic sensitive devices and are packaged accordingly. Do not open or handle a DATA MODUL AG product except at an electrostatic-free workstation. Additionally, do not ship or store DATA MODUL AG products near strong electrostatic, electromagnetic, magnetic, or radioactive fields unless the device is contained within its original manufacturer's packaging. Be aware that failure to comply with these guidelines will void the DATA MODUL AG Limited Warranty.

Danger Levels

DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.
NOTICE	Indicates a property damage message.

General Symbols

Notes that are marked with these symbols contain important or useful information for the operation respectively the handling of the device.

	Additional support or useful information.
	The crossed-out refuse bin indicates that the products must be properly recycled or disposed of appropriately in accordance with national legislation in the respective EU countries. If you wish to dispose of used electrical and electronic products outside the European Union, please contact your local authority so as to comply with the correct disposal method.

Technical Support

DATA MODUL's technicians and engineers are committed to providing the best possible technical support for our customers so that our products can be easily used and implemented. We request that you first visit our website at www.data-modul.com for the latest documentation, utilities and drivers, which have been made available to assist you. If you still require assistance after visiting our website then contact our technical support department by email at support@data-modul.com.

Safety Instructions

Please read and observe the following safety precautions thoroughly in order to prevent or reduce injuries to persons or damage to objects. Please keep this Specification for future reference.

 DANGER! 
- The mainboard may only be installed or used under the conditions that lie within the specified tolerance. In case of failure to comply with the specified conditions which may cause fire, dangerous electric shock, or damage of the mainboard. - Disconnect the power cable before replacing or cleaning the mainboard. Do not use liquid or spray detergents for cleaning - Keep the mainboard away from humidity. - The device must be connected to a grounded main outlet. - Make sure the voltage of the power source is correct before connecting the mainboard to the power outlet. - Do not spill any liquids on the mainboard or into the ventilation openings on the enclosure. - Never push objects of any kind into device through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or dangerous electric shock. - Do not cover the ventilation openings on the enclosure. - Allow sufficient ventilation around the device, so that heat can properly dissipate. Do not block the ventilation openings and do not install the device near radiators or other heat sources. Do not expose the device to permanent direct sunlight or something similar. Do not put anything on top of the device.

Conformity

This mainboard complies with the following directives of the European Union:

- 2011/65/EU (of 8. June 2011 directive of the European parliament and of the council on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS))
- 2012/19/EC (of 04. July 2012 directive of the European parliament and of the council on waste electrical and electronic equipment (WEEE)).

The manufacturer cannot be held liable for operation outside of the operating conditions described in these operating instructions. Moreover, your product liability and warranty rights shall lapse as a result of this.

Disposal and Recycling



This mainboard has been produced largely from materials that can be disposed of in an environmentally friendly manner and that can be properly recycled. After use the unit will be taken back for reuse or recycling, provided that it is handed back in a condition that corresponds with its use having been in compliance with the intended use. Any non-recyclable parts of the set will be disposed of in the proper manner.
All packaging materials can and should be recycled.

Batteries



WARNING
Risk of explosion!

There is a potential risk of explosion due to improper replacement of the battery. The battery should only be replaced with the same or equivalent type of battery recommended by the manufacturer. Be sure to comply with your local laws and environmental regulations regarding the proper disposal of used batteries.

Do not expose the batteries to excessive heat, do not throw them into a fire, do not recharge them and do not attempt to open them; they could leak or even explode.



The mainboard contains batteries, which cannot be disposed with normal household waste. When disposing of used batteries, please comply with governmental regulations or environmental public instruction's rules that apply in your country / area.

List of Abbreviations

CAN :	Controller Area Network
DP :	DisplayPort
DVI :	Digital Visual Interface
GND :	Ground
HD :	High Definition
HDA :	High Definition Audio
HDMI :	High Definition Multimedia Interface
I²C :	Inter-Integrated Circuit Bus
LAN :	Local Area Network
LCD :	Liquid Crystal Display
LED :	Light Emitting Diode
LVDS :	Low Voltage Differential Signal
NA :	Not Available
NC :	Not Connected
PCIe :	Peripheral Component Interconnect Express
RMA :	Return of Material Authorization
SATA :	Serial AT Attachment (serial interface standard for hard disks)
SDIO :	Serial Digital Input Output
SPDIF :	Sony / Philips Digital Interface
SPI :	Serial Peripheral Interface
SSD :	Solid State Drive
SMD :	Surface Mounted Device
SMT :	Surface Mounted Technology
TMDS :	Transition Minimized Differential Signalling
TFT :	Thin Film Transistor
USB :	Universal Serial Bus

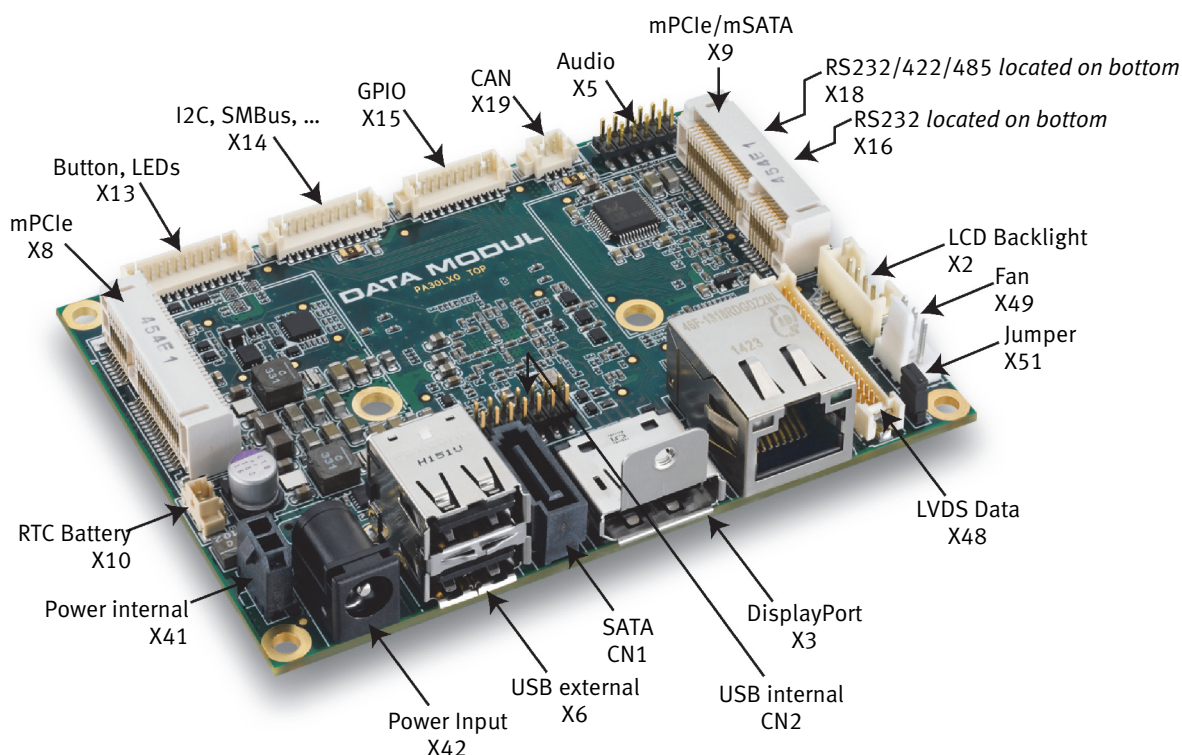
Overview

This specification defines the functionality and requirements for pico-ITX mainboard based on Intel® Bay Trail processors.

System Overview

The table below describes features and properties of mainboard.

The mainboard will have the specified dimensions of 100mm x 72mm.



Feature / Requirement	Description
Processor (BGA)	Intel Bay Trail SoC - Intel® Atom™ E3815, 1.46GHz, 5W TDP - Intel® Celeron® J1900, 2.42GHz, 10W TDP
Memory (BGA)	Single channel DDR3L up to 1600 MT/s
Display interfaces	I/O panel 1x DP++ Internal 1x LVDS 2x24bit (via eDP to LVDS converter PTN3460), Hirose DF13 series 40pins 1x Backlight power connector, JST PH series
USB Ports	I/O panel 2x USB 2.0 (from SoC) Internal 1x USB 2.0 internally (via additional USB Hub USB2513B) 1x on miniPCIe/mSATA slot, half size (via additional USB Hub USB2513B) 1x on miniPCIe slot, half size (via additional USB Hub USB2513B) 1x USB 3.0 internally (from SoC) Internal connector is 2mm pin header, 14 pins, 2 rows, SMD
LAN	Gigabit Ethernet Controller Intel i211 (i210 for Industrial version) I/O panel 1x RJ45 connectors with integrated magnetics and LEDs

Feature / Requirement	Description
Audio	Realtek ALC888S-VD HDA Audio Codec Internal Line Out, Mic In, S/PDIF Out 2mm pin header, 12 pins, 2 rows, SMD
Power In (+12V)	I/O Panel 1x DC Power Jack 5,5x2,5mm Internal 1x Molex Micro-Fit, 2 pins
PCI Express (PCIe) Lanes	Internal 1x miniPCIe half size 1x miniPCIe half size shared with mSATA
SATA	Internal 1x SATA connector 1x mSATA half size shared with miniPCIe
SDIO	SD card socket is not available.
COM	Internal 1x RS-232 1x RS232 / RS-485 / RS422 (RX/TX only) Molex PicoBlade, 5 pins
Fan Connector	Internal Standard 3 pin FAN connector. FAN control circuit on mainboard.
Feature Connectors	Internal 8x GPIOs (4x GPO, 4x GPI) 1x I ² C 1x SMB Watchdog signals Power, Reset, Sleep and LID buttons Power and SATA LEDs Molex PicoBlade
RTC / Battery	Internal RTC Battery will be a wired battery which is covered in a shrinking tube and which can be connected by a 2 pos. connector to the board.
GPIOs	Internal 4x GPO, 4x GPI Feature connector
I ² C	Internal Feature connector
SMB	Internal Feature connector
CAN	SPI to CAN converter Microchip MCP25625, currently no driver support Molex PicoBlade, 3pins
Thermal / Voltage Monitoring	SoC and board controller
BIOS Flash	Standard BIOS Flash Memory
Cooling	A DATA MODUL cooling solution.
DATA MODUL Embedded Feature Set	Accomplished by TI Stellaris Microcontroller (TM4E1231H6ZRB1) I ² C Watchdog PowerLoss LCD Control

Supported Operating Systems

DATA MODUL will provide advanced “Board Support Packages” (BSPs) and API for the mainboard, which will include both the latest tested drivers from the silicon vendors for the components used on the mainboard, the DATA MODUL specific drivers for accessing all of our additional embedded module features.

The following operating systems will be supported by the DATA MODUL BSPs.

- Microsoft® Windows® 7 (32bit and 64bit)
- Microsoft® Windows® 8.X
- Microsoft® Windows® Embedded 7 Standard (WES7)
- Microsoft® Windows® Embedded 8 Standard (WES8)
- Windows Embedded Compact 7 (WEC7)
- Windows Embedded Compact 2013 (WEC2013)
- Linux



For other operating systems, DATA MODUL will provide support to the best of its ability in order to help to utilize these operating systems on the mainboard.

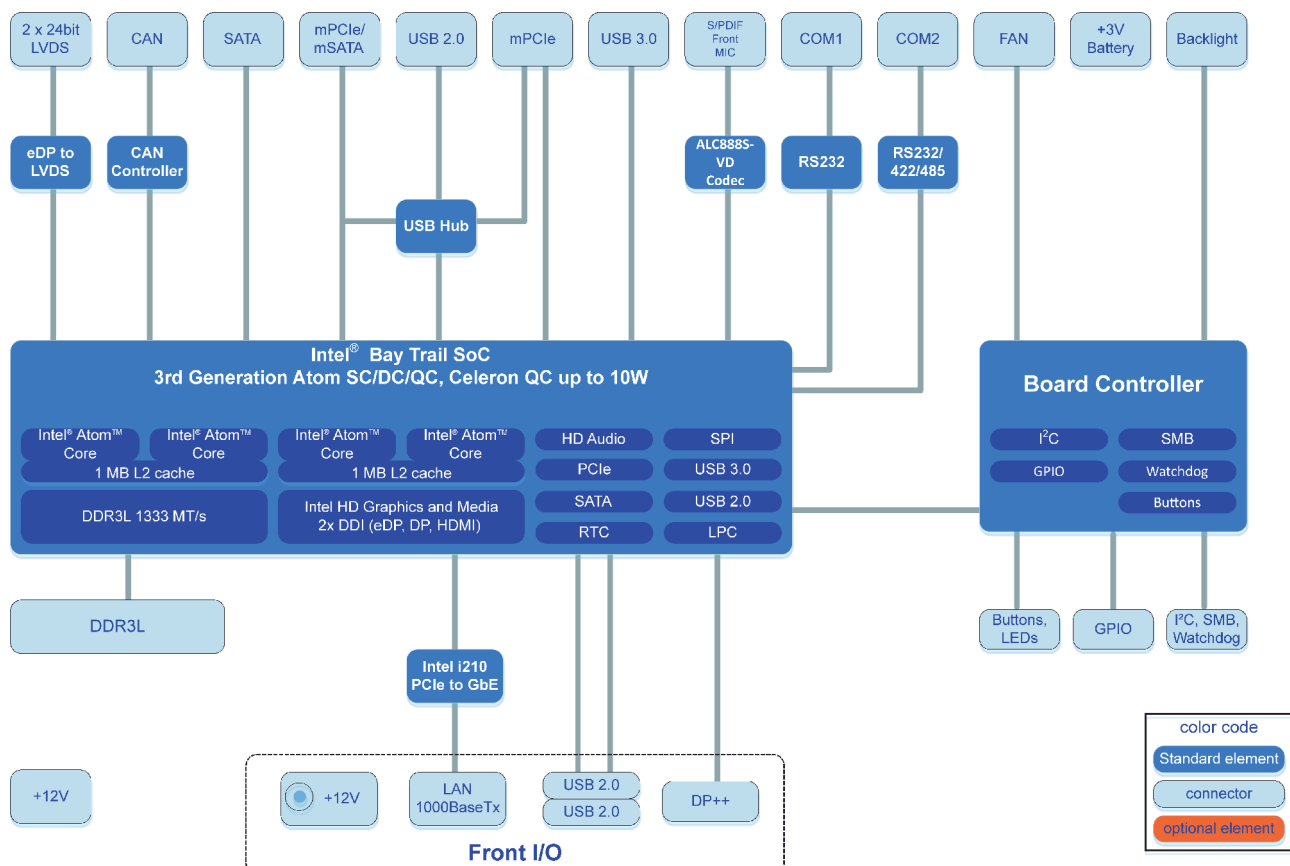
Customized UEFI

DATA MODUL will provide a standard UEFI firmware based on AMI Aptio V UEFI source code with additional DATA MODUL specific features.

Tools

DATA MODUL provides the System Utility CGUTIL (CGUTIL includes flash tool).

Block Diagram



Ordering Information

Model Name	Part No.	Description
eDM-pITX-BT-E3815-1GB	12012500	Pico-ITX SBC with Intel® Atom™ E3815 1.46GHz, 1GB DDR3L Memory onboard
eDM-pITX-BT-E3815-4GB	12012319	Pico-ITX SBC with Intel® Atom™ E3815 1.46GHz, 4GB DDR3L Memory onboard
eDM-pITX-BT-J1900-2GB	12012322	Pico-ITX SBC with Intel® Celeron™ J1900 2.0GHz, 2GB DDR3L Memory onboard
eDM-pITX-BT-J1900-4GB	12012321	Pico-ITX SBC with Intel® Celeron™ J1900 2.0GHz, 4GB DDR3L Memory onboard
eDM-pITX-BT-HSP	12012502	Heatspreader for Pico-ITX eDM-pITX-BT. Stand-offs with 2.7mm bore hole.
eDM-pITX-BT-CSP	12012503	Passive heat sink for Pico-ITX eDM-pITX-BT. Stand-offs with 2.7mm bore hole. (*To use this item it's necessary to order also eDM-pITX-BT-HSP.)
TS16GMSM610	12012814	Half-Size mSATA Flash Drive 16MB MLC (0 - 70°C)
TS32GMSM610	12012815	Half-Size mSATA Flash Drive 32MB MLC (0 - 70°C)

Feature Specification

Processor a Platform Controller Hub (PCH)

The mainboard will be designed to support 3rd Generation Intel® Atom™ and Intel® Celeron™ (Baytrail) SoC.
The following SKU's will be used on the mainboard:

Model Name	Description
eDM-pITX-BT-E3815-1GB	Pico-ITX SBC with Intel® Atom™ E3815 1.46GHz, 1GB DDR3L Memory onboard
eDM-pITX-BT-E3815-4GB	Pico-ITX SBC with Intel® Atom™ E3815 1.46GHz, 4GB DDR3L Memory onboard
eDM-pITX-BT-J1900-2GB	Pico-ITX SBC with Intel® Celeron™ J1900 2.0GHz, 2GB DDR3L Memory onboard
eDM-pITX-BT-J1900-4GB	Pico-ITX SBC with Intel® Celeron™ J1900 2.0GHz, 4GB DDR3L Memory onboard

Memory

The mainboard can be equipped with a maximum of 4GB DDR3L-1600 single channel memory.

Three memory configurations are supported (soldered down):

- 1GB and 4GB for E3815
- 2GB and 4GB for J1900.

Graphics Interfaces

Mainboard supports two independent displays. One is DisplayPort++ and other is 2x24 bit LVDS internal connector for a LCD panel.

DisplayPort (X3)

The mainboard has one DisplayPort DP++ connectors. DP++ port allows HDMI/DVI with external cable adapter. ESD protected.

Connector type: standard DisplayPort with Flange



LVDS Data (X48)

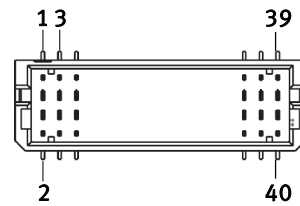
The LVDS interface is created by a PTN3460 eDP to LVDS converter from the embedded DisplayPort.

The EPI data is necessary for the configuration of the flat panel. The EPI support will be included in the UEFI BIOS.

The LVDS interface will be able to drive 1x18/24 and 2x18/24bpp LCD panels with a resolution from 640x480 up to 1920x1200.

Connector type: Hirose DF13, 40 pins

Pin	Function	Pin	Function
1	+3.3V	2	+5V
3	+3.3V	4	+5V
5	N.C.	6	N.C.
7	GND	8	GND
9	ODD_TX1+	10	ODD_TX0+
11	ODD_TX1-	12	ODD_TX0-
13	GND	14	GND
15	ODD_TX3+	16	ODD_TX2+
17	ODD_TX3-	18	ODD_TX2-
19	GND	20	GND
21	EVEN_TX1+	22	EVEN_TX0+
23	EVEN_TX1-	24	EVEN_TX0-
25	GND	26	GND
27	EVEN_TX3+	28	EVEN_TX2+
29	EVEN_TX3-	30	EVEN_TX2-
31	GND	32	GND
33	EVEN_CLK+	34	ODD_CLK+
35	EVEN_CLK-	36	ODD_CLK-
37	GND	38	GND
39	+12V	40	+12V

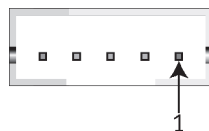


LCD Backlight (X2)

The mainboard provides an internal header for the display backlight connection as described below. Control signals are 3.3V logic by default, a 2mm jumper can be removed from 2mm pin header to change signals to 5V logic.

Connector type: JST PH series, 5 pins

Pin	Function
1	+12V
2	GND
3	BKLT_EN
4	BKLT_CTRL
5	+5V



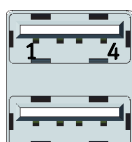
USB 2.0 / 3.0 Ports

The mainboard will provide a total of 6 USB ports.

The will provide one USB 3.0 port which is routed to internal USB 3.0 connector (it will not be standard internal USB 3.0 connector). USB 3.0 port will have a current limitation implemented as well as ESD protection and short and over voltage protection on. The over-current protection circuit (OVC) will be resettable without any user intervention. Max current from external connectors is 1500mA (2x USB 2.0), max current from internal connector is 1500mA (1x USB 2.0, 1x USB 3.0).

From the 5 USB 2.0 ports 2 ports are provided directly by the SoC and the other 3 ports are derived from an on board USB2.0 HUB (USB2513b). USB configuration can be seen in Block Diagram (page 8).

USB 2.0 external (X6): 2x USB 2.0 type A connector (stacked)



USB internal (CN2): 2mm pin header, 14 pins, 2 rows, SMT

Pin	Function	Pin	Function
1	+5V	2	+5V
3	SS_RX+	4	GND
5	SS_RX-	6	USB_D-
7	GND	8	USB_D+
9	SS_TX+	10	GND
11	SS_TX-	12	USB_D- (for USB 3.0)
13	GND	14	USB_D+ (for USB 3.0)

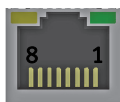


Ethernet Interface (X40)

The motherboard provides one IEEE 802.3 10/100/1000Mb/s Base-TX Ethernet compliant interface.

The Ethernet port on the mainboard will use the integrated MAC from the Intel® Gigabit Ethernet i211 (i210 for Industrial version). This IEEE 802.3 10/100/1000Mb/s Base-TX Ethernet compliant interface is routed to a RJ45 connector located on the I/O panel of the mainboard. The RJ45 connector (TAB up) will incorporate the magnetics transformer and two link and activity LEDs in G/YG configuration.

Connector type: RJ45 with integrated magnetics



Ethernet LED Functions

Speed LED	On	Off
Green	100 Mbit/s	10 Mbit/s
Yellow	1000 Mbit/s	-
Link LED	On	Off
Green	Link (Ethernet network connection available)	Activity (blinking - data transfer in progress)

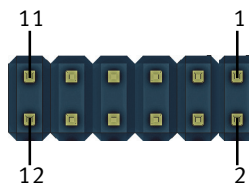
Audio Interface (X5)

Front Panel HD Audio

HDA audio codec Realtek ALC888S-VD are routed to the internal audio connector. 2mm pin header is used for all audio signals. Connector also provide +5V power for external devices (amplifiers, S/PDIF optical).

Connector type: 2mm pin header, 12pins, 2 rows

Pin	Function	Pin	Function
1	MIC_L	2	GND (analog)
3	MIC_R	4	+5V (analog)
5	MIC_JD	6	LINE_R
7	GND (analog)	8	LINE_L
9	LINE_JD	10	+5V
11	GND	12	S/PDIF out



S/PDIF

S/PDIF out signal is routed to 2mm header, see chapter Front Panel HD Audio.

Power Supply

The mainboard offers two options for connection of an external power supply unit (PSU) which must fulfill the following requirements:

- Supply Voltage: +12V
- Tolerance: $\pm 10\%$
- Ripple: $< 50 \text{ mV}_{pp}$

Power Supply Configurations

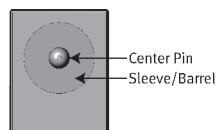
The board supports two different power supply configurations: DC jack on the I/O panel and internal DC connector. Max input current is 5A (power consumption of and connected devices, which expect power from, must not exceed 60W).

DC Power Input (X42)

The mainboard can be powered from an external power supply connected to the DC power jack on the I/O panel.

Connector type: DC jack 5.5 x 2.5 mm

Pin	Function
Center Pin	+12V
Sleeve/Barrel	GND

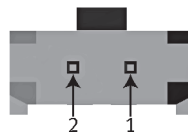


DC Power internal (X41)

Additional the mainboard can be powered from an external power supply connected to the internal 4 pin connector.

Connector type: Molex Micro-Fit, 2 pins

Pin	Function
1	+12V
2	GND



Jumper Voltage Level (X51)

Voltage level for LCD backlight control (X2 pin 3 & 4, backlight enable and control)

- Jumper inserted: +3.3V (default)
- Jumper removed: +5V

PCI Express

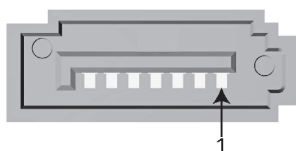
PCIe lanes are connected to Intel I210/I211 GbE, miniPCIe half size (X8), miniPCIe/mSATA half size (X9).

SATA Interfaces

PCIe lanes are connected to SATA connector, miniPCIe/mSATA (X9) half size.

SATA (CN1)

Connector type: standard SATA, SMT, vertical

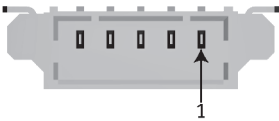


Serial Ports (COM)

The mainboard provides two RS232 ports, second port is provided by Intersil ISL3331 and can be switched from RS232 to RS422/RS485 located on the same connector. Both ports are connected to the internal headers. Connecting TX and RX pair for RS485 is expected externally (optionally on by assembly option). Termination is also expected externally (inside a cable adapter). Connectors are right angled on the bottom side of.

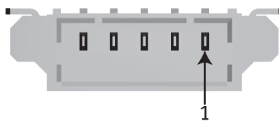
Connector type (X16, RS232): Molex PicoBlade, 5 pins, SMT

Pin	Function
1	GND
2	TXD
3	RTS#
4	CTS#
5	RXD



Connector type (X18, RS232/RS422/RS485): Molex PicoBlade, 5 pins, SMT

Pin	Function RS232	Function RS422/RS485
1	GND	GND
2	TXD	TX-
3	RTS#	TX+
4	CTS#	RX+
5	RXD	RX-

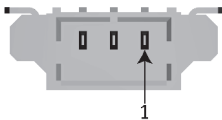


CAN (X19)

The provides a CAN connection via SPI to CAN converter (MCP25625), no driver support now. CAN is not terminated by default (external termination is expected).

Connector type: Molex PicoBlade, 3 pins, SMT

Pin	Function
1	CAN_H
2	CAN_L
3	GND



Feature Connectors

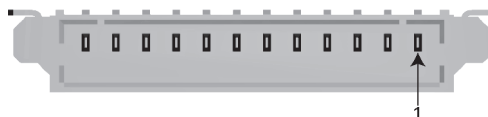
The mainboard provides a features on 3 connectors. The connectors provide ability to connect external buttons (Power, Reset, Sleep, LID), LEDs (Power, SATA), I2C, SMB and 8x GPIO.

Button & LEDs (X13)

Connector type: Molex PicoBlade, 12 pins, SMT

Pin-out:

Pin	Function
1	LID_BTN#
2	GND
3	SLP_BTN#
4	GND
5	RST_BTN#
6	GND
7	PWR_BTN#
8	GND
9	PWR_LED (LED Anode)
10	GND (LED Cathode)
11	SATA_LED (LED Anode)
12	SATA_ACT# (LED Cathode)

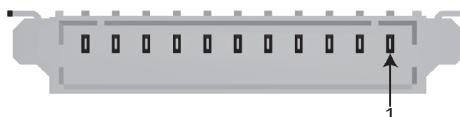


I2C / SMB / Watchdog (X14)

Connector type: Molex PicoBlade, 11 pins, SMT

Pin-out:

Pin	Function
1	BATLOW#
2	+3.3V
3	I2C_CLK
4	I2C_DAT
5	GND
6	SMB_CLK
7	SMB_DAT
8	SMB_ALERT#
9	GND
10	WD_TRIG#
11	WD_OUT

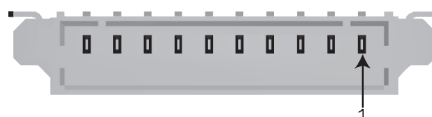


GPIOs (X15)

Connector type: Molex PicoBlade, 10 pins, SMT

Pin-out:

Pin	Function
1	GPIO
2	GPI1
3	GPI2
4	GPI3
5	GND
6	GPO0
7	GPO1
8	GPO2
9	GPO3
10	+3.3V



Real Time Clock (RTC) / Battery

The mainboard provides an internal Real-Time-Clock that is buffered in power off mode by a battery cell. The implementation is done by a wired solution with connector whereas the battery (CR2032) itself is covered in a shrinking tube and the connection will be done by a 2 pins header. The enveloped battery will be finally glued to a specific position.

Because Lithium batteries do not have industrial temperature range, the industrial version of will not be equipped by external CR2032 battery and customer will use his own solution for RTC battery backup.

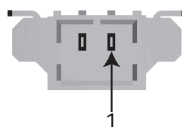


The mainboard retains the CMOS settings and configuration data in the UEFI flash chip. Given this fact, a battery buffered RTC is only necessary for maintaining the date and the time of the system.

Battery Connector X10

Connector type: Molex PicoBlade Header 1.25mm

Pin	Function
1	+3.3V
2	GND



Thermal / Voltage Monitoring

Thermal or voltage monitoring are provided by SoC and board controller. Board controller measures board temperature and input voltage. CPU temperature is read by SoC sensor.

BIOS Flash

The UEFI for the mainboard will be based on the AMI Aptio® UEFI 2.x firmware and will support the DATA MODUL Embedded Features. The UEFI is stored in a serial SPI Flash on the mainboard.

No connection for external BIOS flash memory.

Cooling Solution

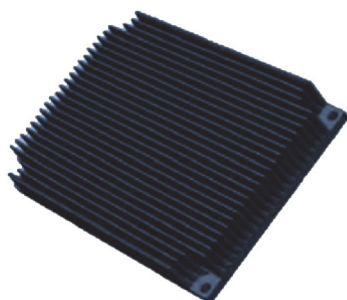
The mainboard SBC offers Ultra Low Power boards with high computing performance and outstanding graphics. Due to its low power consumption, the SBC generates less heat and therefore requires less active cooling, allowing the use of quieter, lower profile coolers that are better suited to small form factor systems.

Nonetheless, all electronics contain semiconductor devices which have operating temperature ranges that should be adhered to. This means that for reliable operation, the thermal design of the mainboard must be carefully considered. For this reason, it is imperative to provide sufficient air flow to each of the components, to ensure the specified operating temperature of the mainboard is maintained.

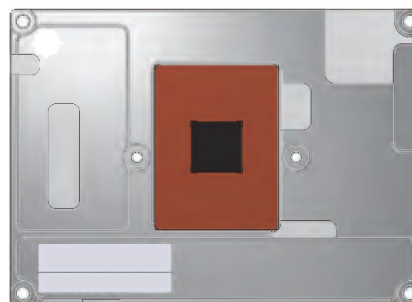
The mainboard is supported by three cooling solutions:

- HSP Heatspreader
- CSP Cooling Solution Passive (for the 5W CPU)

The outer dimensions (length and width) of the coolings are identical to the Pico-ITX mainboard standard (72mm x 100mm).



Passive Cooling Solution



Heatspreader



You can also use a custom cooling solution for the mainboard. When a passive cooling is used, the end user must ensure that adequate air flow is maintained.



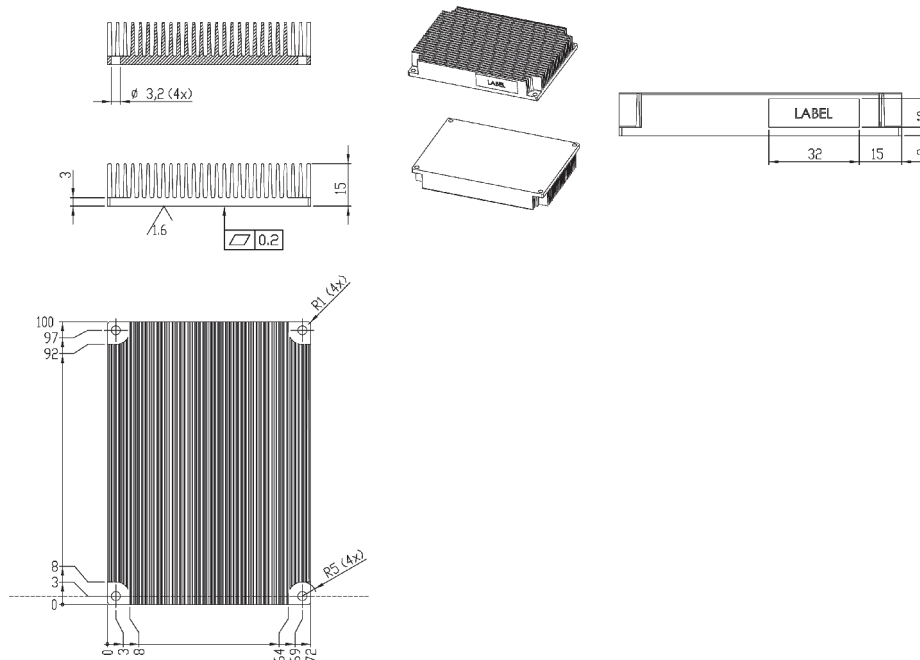
CAUTION!

The DATA MODUL heatspreader is only suitable for use within commercial temperature ranges (0°C to 60°C). It is not designed to be used within industrial temperature ranges (-40°C to 85°C). When using a heatspreader with mainboard commercial grade variants, the maximum operating temperature refers to any measurable spot on the heatspreader's surface.

DATA MODUL strongly recommends that you use the appropriate heatspreader on the mainboard and within operating temperatures of 0°C to 60°C. If you use heatspreaders that are not specified for the mainboard or use the mainboard industrial variants, then it is your responsibility to ensure that all components found on the module operate within the component manufacturer's specified temperature range.

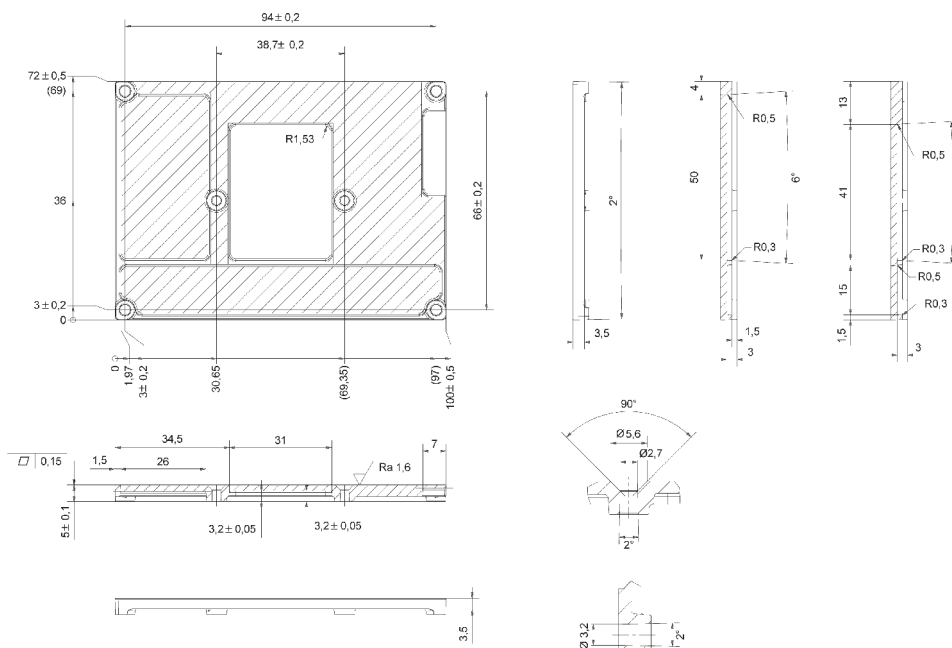
Humidity specifications are for non-condensing conditions.

CSP Dimension



All measurements are in millimeters. Torque specification for the screws is 0.6 Nm. Mechanical system assembly mounting shall follow the valid DIN/ISO specifications.

Heatspreader Dimension



All measurements are in millimeters. Torque specification for the screws is 0.6 Nm. Mechanical system assembly mounting shall follow the valid DIN/ISO specifications.

**CAUTION!**

When using the heatspreader in a high shock and/or vibration environment, DATA MODUL recommends the use of a thread-locking fluid on the cooling solution screws to ensure the above mentioned torque specification is maintained.

Embedded Feature Set

The mainboard is equipped with a so called board controller which provides some “Embedded” features like I2C bus, Watchdog, Power Loss, LCD Control

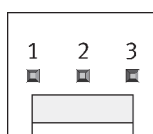
On mainboard this board controller is realized by a Texas Instruments Tiva™ TM4E1231H6ZRBI microcontroller.

FAN (X49)

The mainboard is equipped with standard FAN connector, 3 pins, 2.54mm pitch. FAN control circuit (PWM) is located on mainboard, FAN voltage is +12V.

Connector type: Standard PC FAN, 3 pins

Pin	Function
1	GND
2	+12V
3	SENSE



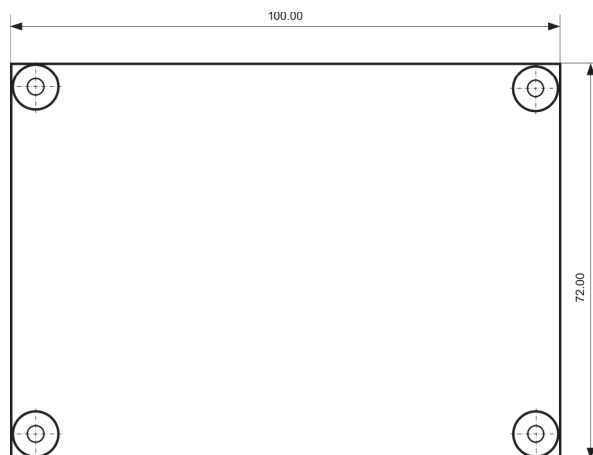
Power Loss Control

The cBC has full control of the power-up of the SBC, therefore can be used to specify the behavior of the system after an AC power loss condition. Supported modes are “Turn On”, “Remain Off” and “Last State”.

Mechanical System

Mechanical Outline

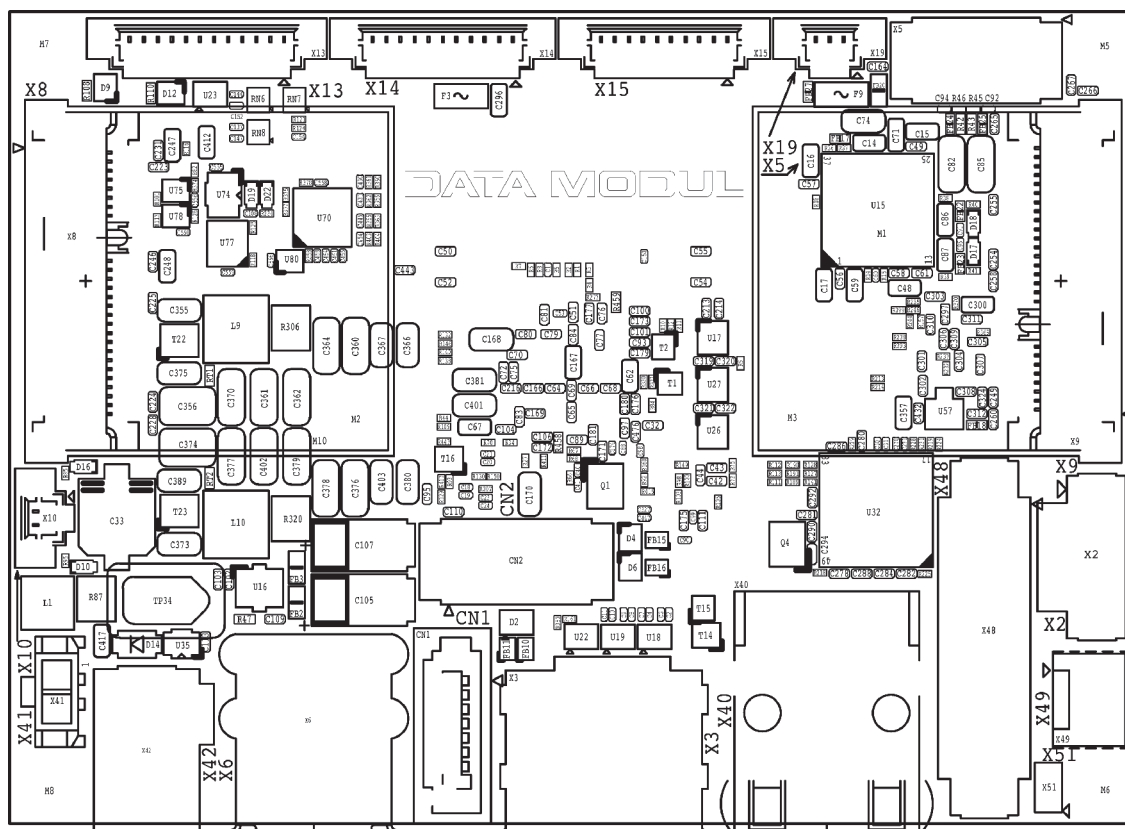
The mainboard dimensions are illustrated by the following drawing.



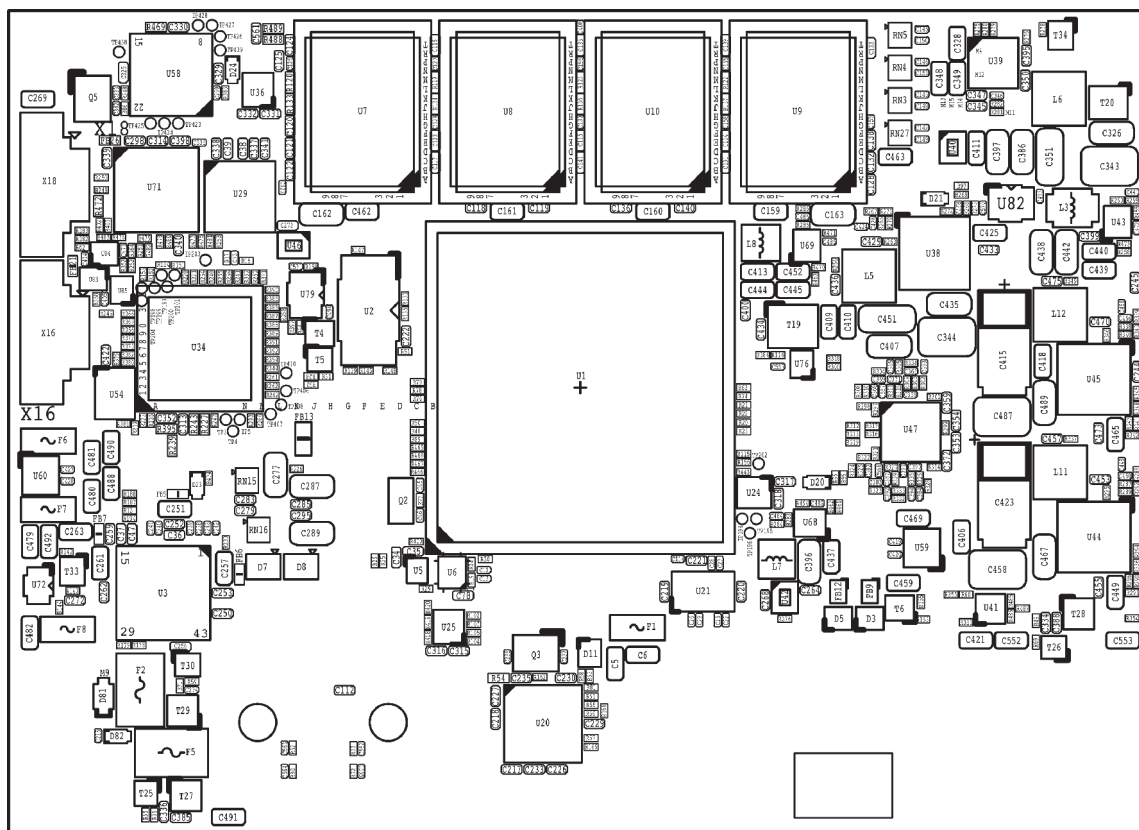
Component Placement

Processor on the BOTTOM side. Connectors on the TOP side, a Molex PicoBlade connectors could be right angled and placed on BOTTOM side (to board edge). DC jack located in the corner (end of the I/O panel).

Top Side



Bottom Side



Environmental Specifications

The mainboard will be able to be operated and stored under the following environmental conditions.

Temperature

Operating:	0°C to +60°C (commercial)
Operating:	-40°C to +85°C (industrial)*
Storage:	-20°C to +80°C (commercial)
Storage:	-40°C to +85°C (industrial)*

* with limitations, see chapter „Limitations of Industrial Version“

Humidity

Operating:	10% to 90% (non condensing)
Storage:	5% to 95% (non condensing)

Limitations of Industrial Version

The mainboard will be available also in Industrial version with temperature range -40 to +85 degrees of Celsius. This temperature range is supported only by Intel Atom. Industrial version will be created with E3815 processor only.

Not all features will be supported on this version. The industrial will not have these features or accessory:

- Audio codec (no audio output or input)
- DC jack 5.5x2.5mm (internal power connector only)
- LVDS (no connection to LCD Panel via LVDS)
- External Lithium 3V battery for RTC backup.

Standards & Certifications

EMC Standards

Emission

According to EN 55022 ed. 3:2011

Basic Standards: EN 61000-6-3

Radiated Emission:

- Frequency range 30MHz – 1GHz, 1GHz – 6GHz

Conducted Emission:

- Frequency range 150kHz – 30Mhz
- Emission over DC input and Ethernet

Immunity

According to EN 55024 ed. 3:2011

Basic Standards: EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6

External connectors ESD protected +/-4kV contact discharge, +/-8kV air discharge.

Safety

According to EN 60950-1 ed. 2:2006

Other Certification

- UL Certificate
Critical components must be UL certified according to UL requirements (connectors, PCB...)
- REACH Declaration (1907/2006 (REACH))
- RoHS Declaration (Certificate of Compliance)

Stress Tests

- Stationary Vibration Sinusoidal (non operating)
IEC60068-2-6 – Test Fc
Frequency range: 5-9 Hz with 3.5mm
Frequency range: 9-200 Hz with 10m/s²
Frequency range: 200-500 Hz with 15m/s²
- Stationary Vibration Random (non operating)
IEC60068-2-64 – Test Fh
Frequency range: 10-200 Hz with ASD=1m²/s³
Frequency range: 200-500 Hz with ASD=0.3m²/s³
Duration per axis: 30min (effective value aeff: 1.91g)
- Mechanical Shock / Impact (non operating)
IEC60068-2-67 – Test Ea
Acceleration: a=30g
duration t=6ms
form half-sine
Number of impacts: +50/-50 (total 300)
Recovery time: 3s

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DATA MODUL's worldwide offices

can be found on our website:
[www.data-modul.com/eu/sm/
contact-us/offices.html](http://www.data-modul.com/eu/sm/contact-us/offices.html)

