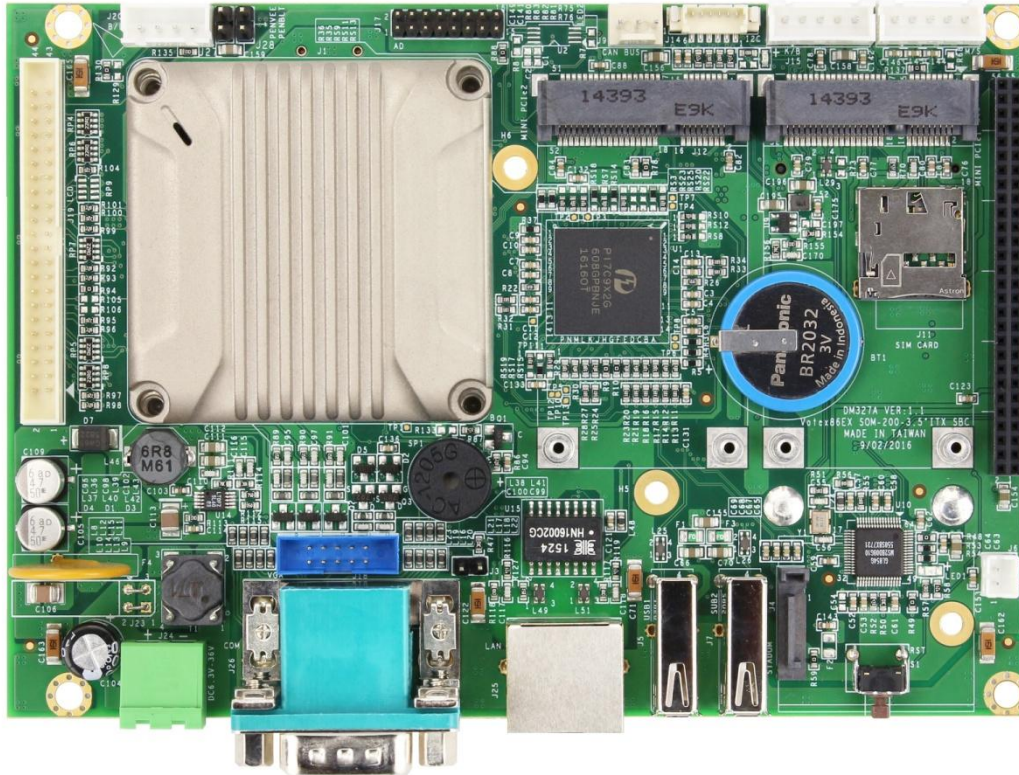




VEX-6225

with

DM&P Vortex86EX
400MHz processor

Version 2.0

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Revision History

Revision	Date	Remark
1.0	May 22, 2017	First version released
2.0	July 13, 2017	Second version released

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1 General Information

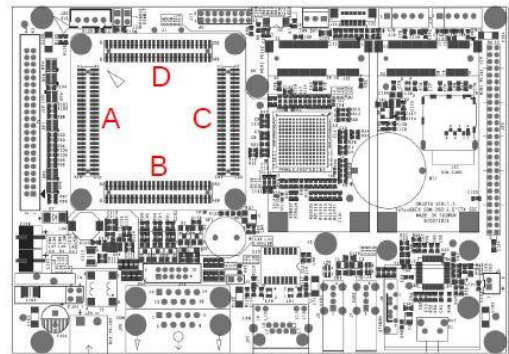
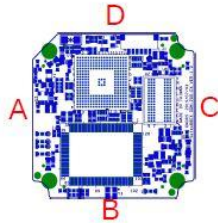
1.1 Overview

Based on SOM200EX module with 512MB DDR3 onboard memory, VEX-6225 offers balanced and stable computing performance for your industrial applications.

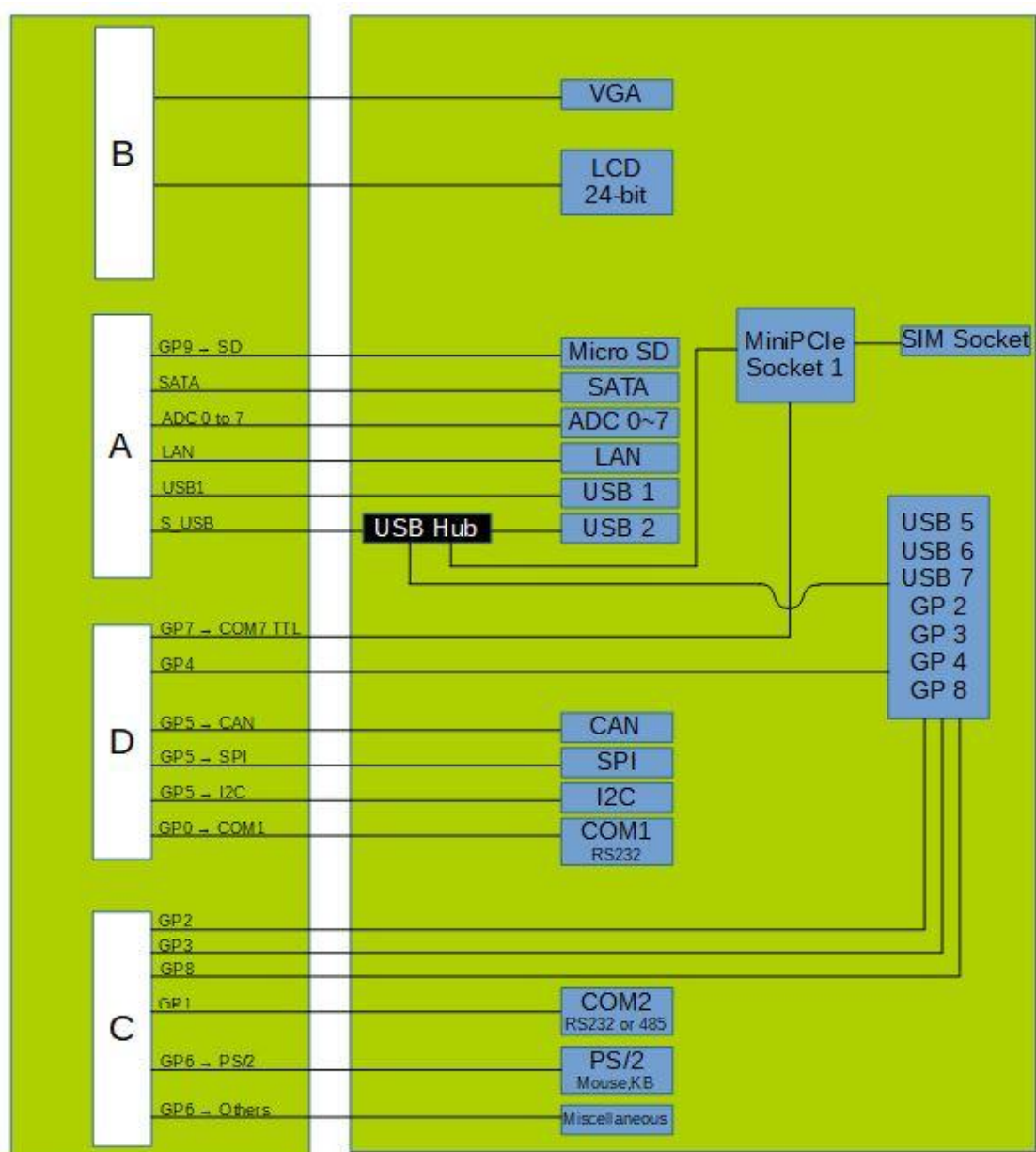
VEX-6225 is equipped with Mini PCIe, USB, COM, SATA, Micro SD, CAN, I²C, ADC, LCD, VGA, LAN and SIM card slot allowing 3G/4G wireless communication plus expansion I/O to meet a variety of application demands like data acquisition, industrial automation, process control, medical device, etc.

Designed to meet 3.5" specification with backward compatibility to provide migration path for projects facing end-of-life challenges with their existing x86 based 3.5" controller. Additionally, the VEX-6225 family of controller is designed as plug in replacement with backward compatibility to support legacy software to extend existing product life cycle without heavy re-engineering.

1.2 Block diagram

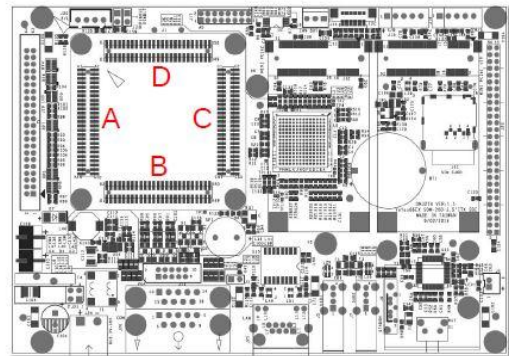
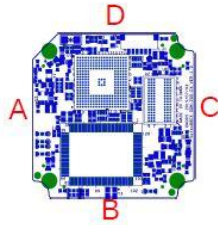


VEX-6225-43VE

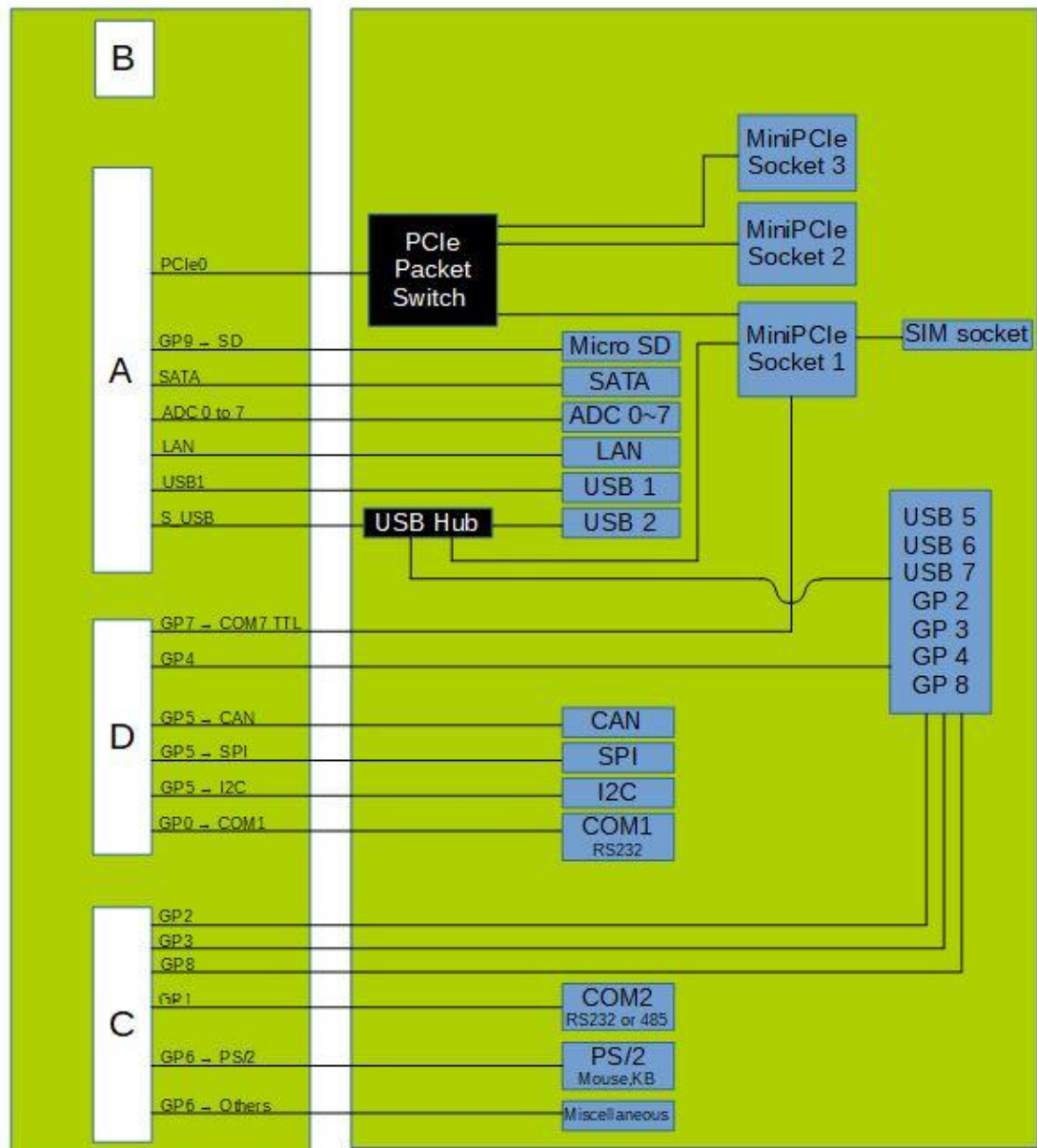


SOM200EX43VGNE1

SOM200EX Carrier Board



VEX-6225-43EE



SOM200EX43EGNE1

SOM200EX Carrier Board

1.3 Specifications

CPU	Vortex86EX 400MHz, L1 I/D-Cache 16/16KB, L2 128KB
RMA	512MB DDR3 Onboard
BIOS	Coreboot BIOS
Bus	USB-signal 3G/4G modem with Mini PCI Express From Factor x1 Mini PCI Express Socket x2 (Optional) Expansion I/O x1 (Optional) (A)USB x3 + 8-bit GPIO x3, or (B)USB x3 + COM x3, or (C)USB x3 + Printer x1 + SPI Bus x1
Display	Integrated 2D VGA chip with VGA and TFT Flat Panel Interface Support VGA: Maximum resolution up to 1024 x 768 @60Hz LCD: Maximum resolution up to 1024 x 768 @60Hz
LAN	Integrated 10/100Mbps Ethernet
Disk Support	SATA DOM Micro SD
I/O Interface	8CH 11-bit ADC x1 USB(ver2.0) x2 RS232 x1 RS232/485 x1 CAN x1 I ² C x1
Connectors	Mini PCI Express Socket x3 Micro SD Card Slot x1 SIM Card Slot x1 1.25mm 6-pin wafer for I ² C x1 2.0mm 56-pin female connector for Expansion I/O x1 2.0mm 10-pin box header for VGA x1 2.0mm 44-pin box header for LCD x1 2.0mm 16-pin header for ADC x1 2.54mm 3-pin molex header for CAN x1 2.54mm 5-pin box header for Keyboard x1 2.54mm 5-pin box header for Mouse x1 2.54mm 2-pin header for RS232/485 switching x1 External D-Sub 9-pin male connector for RS232 x1 External D-Sub 9-pin male connector for RS232/485 x1 External RJ45 connector for Ethernet x1 External Standard USB port x 2 2-pin power terminal connector x1 2-pin box header for +5V DC Output x1 7-pin SATA connector for SATA DOM x1
Power Requirement	+12 – 24VDC Input Typical Consumption: +12VDC Input @ 200mA
Operating Temperature	-20 - +70°C -40 - +85°C (Optional)

Operating Systems	DOS Windows CE6 Windows Embedded Compact 7 x-Linux Linux QNX VxWorks FreeBSD
Dimension	102 x 146mm (4.01 x 5.75 inches)
Weight	165g

1.4 Ordering Information

1.4.1 VEX-6225

PART NO.	VEX-6225-43VE	VEX-6225-43EE
CPU (MHz)	400MHz	400MHz
DRAM (DDR3)	512MB	512MB
Storage	SATA, Micro SD	SATA, Micro SD
Display	VGA, LCD	N/A
LAN	1	1
SIM Card Slot	1	1
USB (ver. 2.0)	2	2
COM*	2	2
CAN	1	1
I ² C	1	1
11-bit ADC	1	1
Expansion I/O	1	1
Mini PCIe Socket 1**	1	1
Mini PCIe Socket 2	N/A	1
Mini PCIe Socket 3	N/A	1

*COM2 can be configured as RS232 or RS485

**Mini PCIe Socket 1 is only available for USB-signal 3G/4G modem

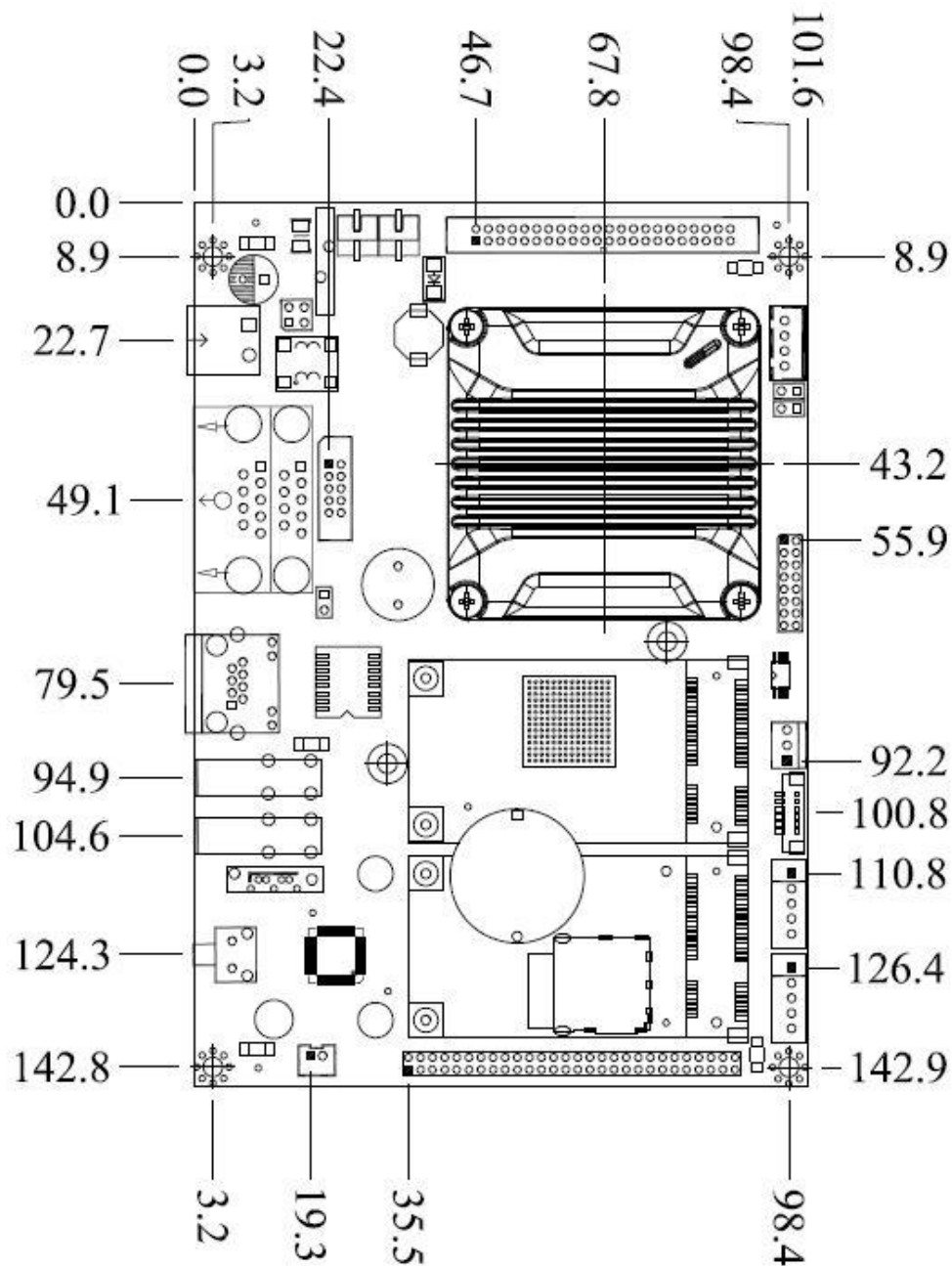
1.4.3 SATA DOM

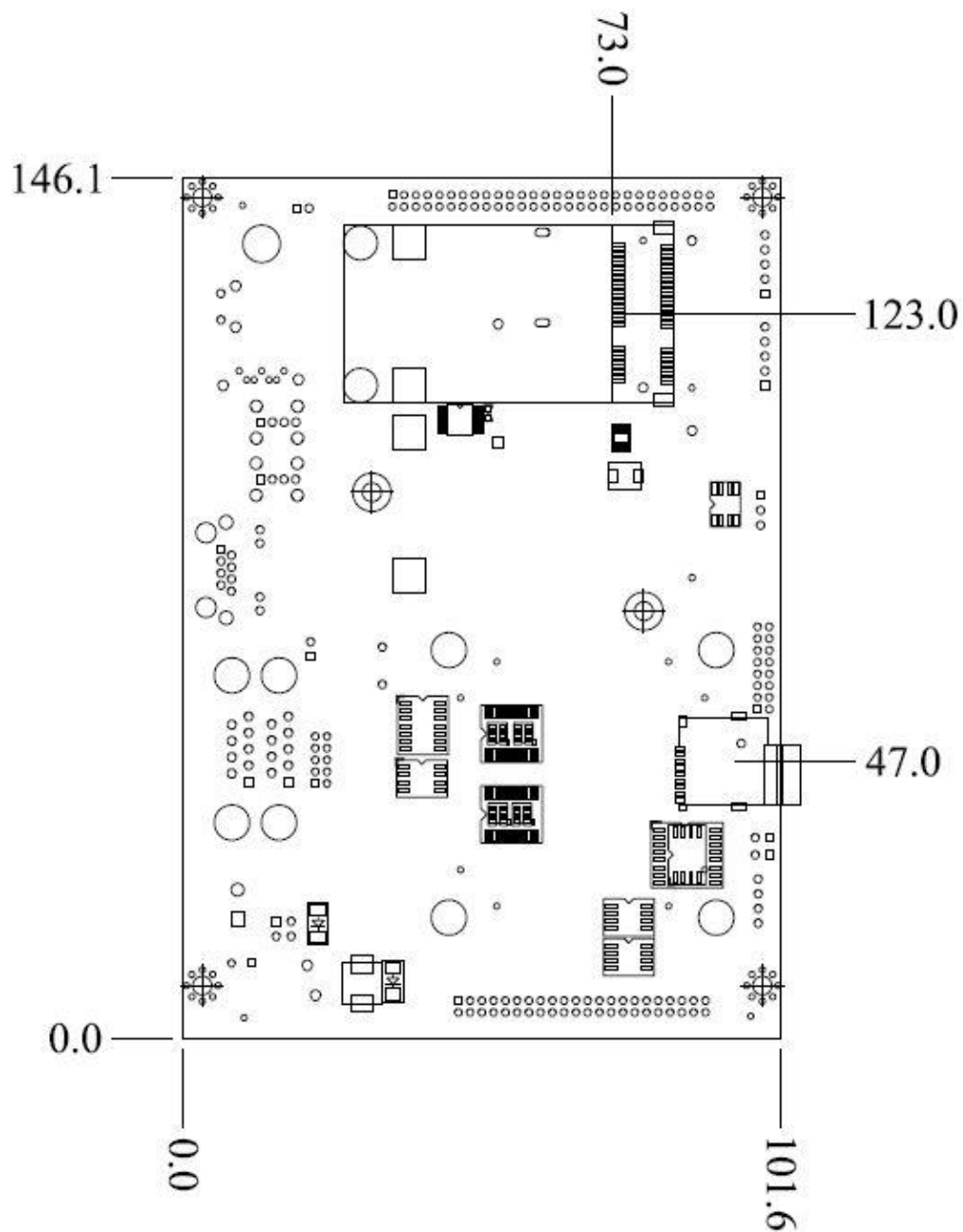
Product Name	MLC	SLC	0°C ~ +70°C	-40°C ~ +85°C
SDM-SST-2G-H-M	V		V	
SDM-SST-4G-H-M	V		V	
SDM-SST-2G-H-S-X		V		V
SDM-SST-4G-H-S-X		V		V
SDM-SST-8G-H-S-X		V		V
ISATA-8G-H-M	V		V	
ISATA-16G-H-M	V		V	
ISATA-32G-H-M	V		V	
ISATA-8G-H-M-X	V			V
ISATA-16G-H-M-X	V			V
ISATA-32G-H-M-X	V			V
ISATA-1G-H-S		V	V	
ISATA-2G-H-S		V	V	
ISATA-4G-H-S		V	V	
ISATA-8G-H-S		V	V	
ISATA-16G-H-S		V	V	
ISATA-16G-H-S-X		V		V

2 Hardware Information

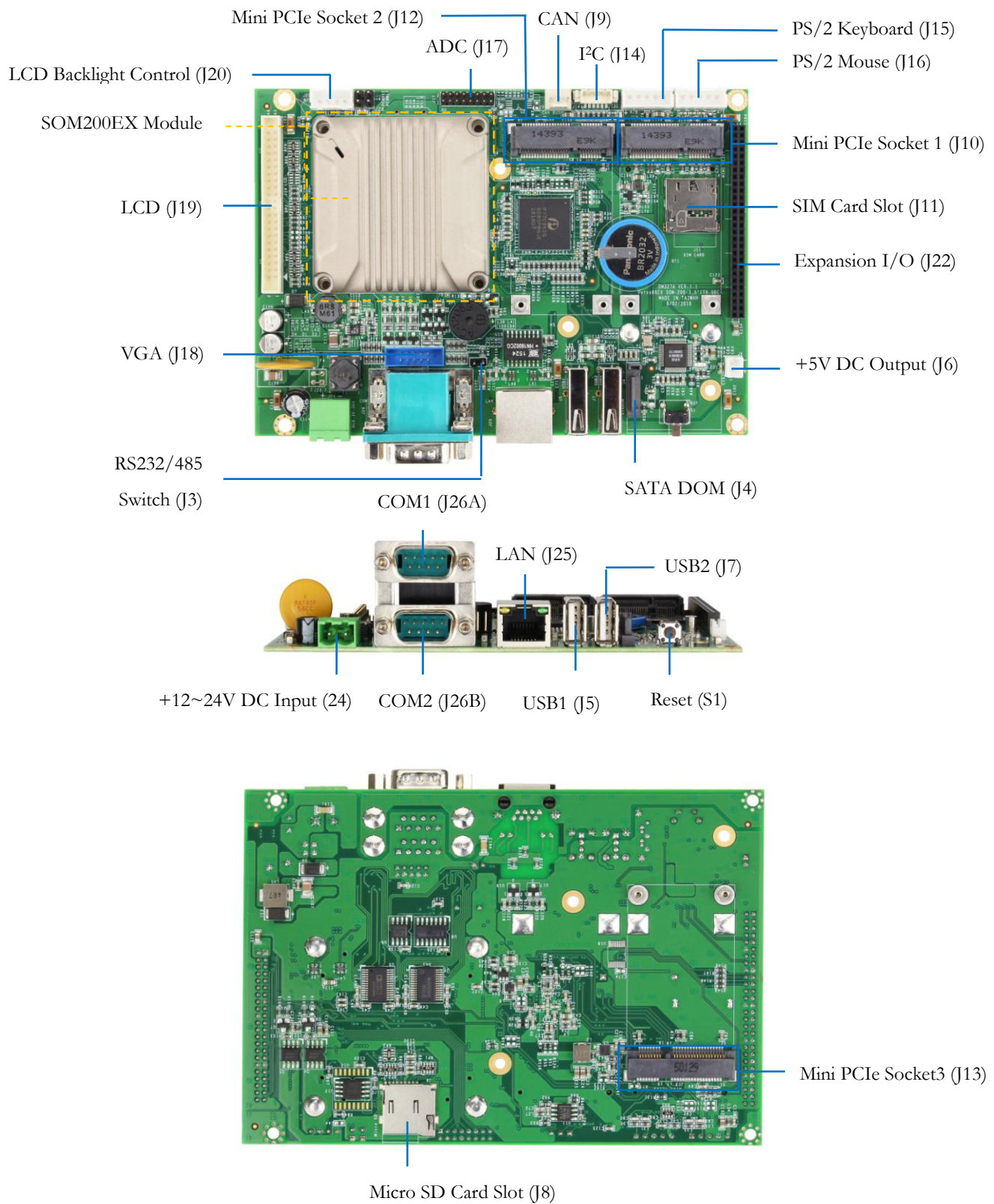
2.1 Dimension

TOP



Bottom

2.2 Board Outline



2.3 Connector and Jumper Summary

Nbr.	Name	Type of Connections	Pin of Nbr.
J3	RS232/485 Switch for COM2	Pin Header, 2.54mm, 2x1	2
J4	SATA DOM	SATA 7P Connector, 7x1	7
J5	USB1	Type A USB connector	4
J6	+5V DC Output	Box Header, 2.0mm, 1x2	2
J7	USB2	Type A USB connector	4
J8	Micro SD Slot	Standard Micro SD Slot	9
J9	CAN	Molex Header, 2.54mm, 1x3	3
J10	Mini PCIe Socket1*	Standard Mini PCI Express Connector	52
J11	SIM Card Slot	Standard SIM Card Slot	8
J12	Mini PCIe Socket2	Standard Mini PCI Express Connector	52
J13	Mini PCIe Socket3		
J14	I ² C	Wafer, 1.25mm, 1x6	6
J15	PS/2 Keyboard	Box Header, 2.54mm, 1x5	5
J16	PS/2 Mouse	Box Header, 2.54mm, 1x5	5
J17	ADC	Pin Header, 2.0mm, 8x2	16
J18	VGA	Box Header, 2.0mm, 5x2	10
J19	LCD	Box Header, 2.0mm, 22x2	44
J20	LCD Backlight Control	Box Header, 2.54mm, 1x4	4
J22	Expansion I/O	Box Header, 2.0mm, 28x2	56
J24	+12 to 24V DC Input	Terminal Block, 2x1	2
J25	LAN	RJ45 Connector	8
J26A	COM1	D-Sub 9-pin male connector	9
J26B	COM2**	D-Sub 9-pin male connector	9

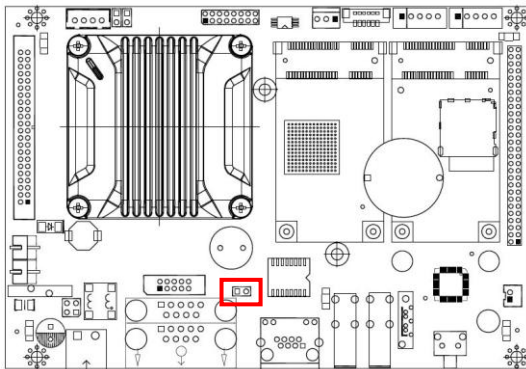
*Mini PCIe Socket 1 is only available for USB-signal 3G/4G modem

**COM2 can be configured as RS232 or RS485

2.4 Pin Assignments & Jumper Settings

J3: RS232/485 Switch for COM2

2-pin header switch (2.54mm) which used to changing COM2 from RS232 to RS485, and vice versa.



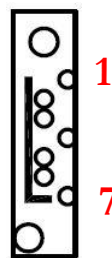
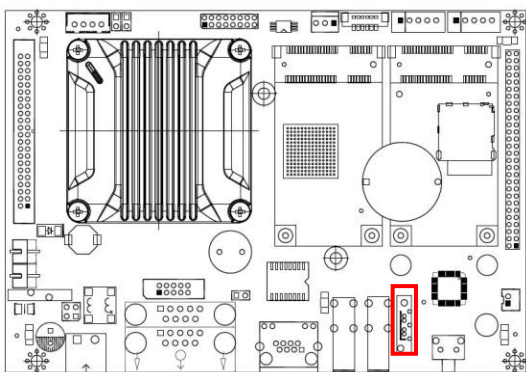
Pin#	Single Name
1.	GND
2	RS485

OPEN: Enable RS232

CLOSE: Enable RS485

J4: SATA DOM

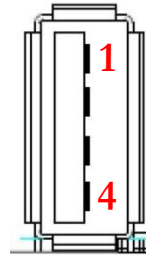
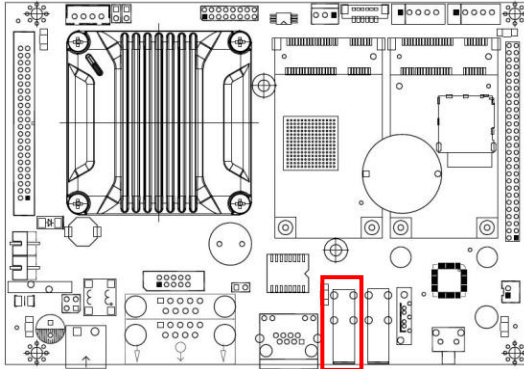
Standard 7-pin SATA connector for SATA storage. The 7th pin of SATA DOM connector is set to GND as default. If you would like to have +5V DC power supply from the 7th pin connector, please contact us at info@icop.com.tw.



Pin#	Single Name
1.	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

J5: USB1

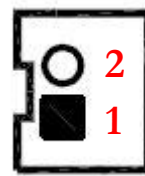
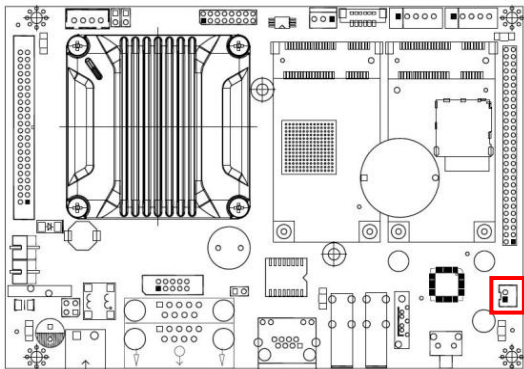
Vertical USB female connector with USB 2.0 support, Type A



Pin#	Single Name
1.	VCC
2	USB_DATA-
3	USB_DATA+
4	GND

J6: +5V DC Output

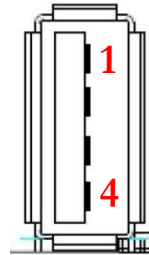
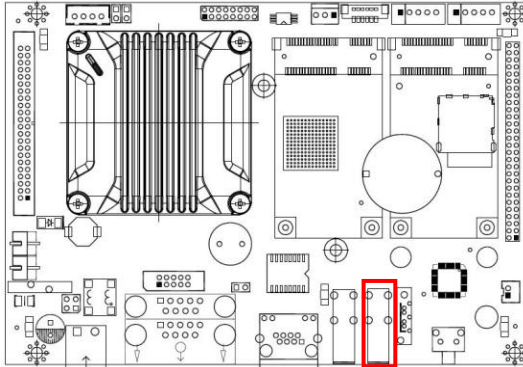
2-pin box header (2.0mm) for +5V DC output, which is often used by a power supply to SATA storage.



Pin#	Single Name
1.	VCC
2	GND

J7: USB2

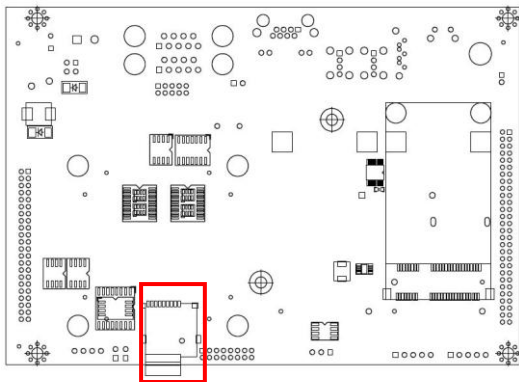
Vertical USB female connector with USB 2.0 support, Type A



Pin#	Single Name
1.	VCC
2	USB_DATA-
3	USB_DATA+
4	GND

J8: Micro SD Slot

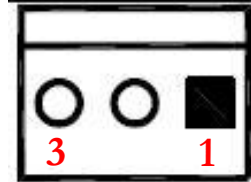
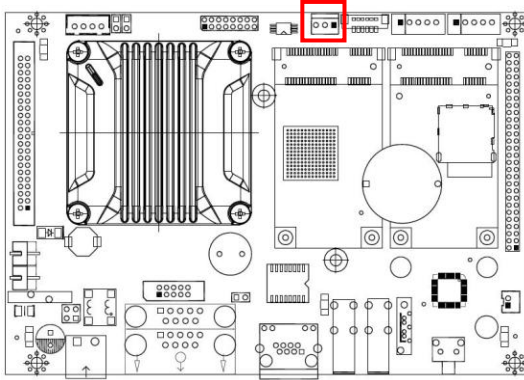
Standard Micro SD slot for Micro SD card



Pin#	Single Name
1.	DAT2
2	DAT3
3	CMD
4	VDD
5	CLK
6	VSS
7	DAT0
8	DAT1
9	Card Detect

J9: CAN

3-pin molex header (2.54mm) for CAN which supports CAN bus 2.0A/B with data rate up to 1 Mbps.

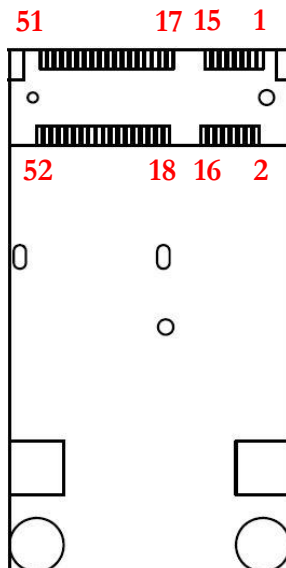
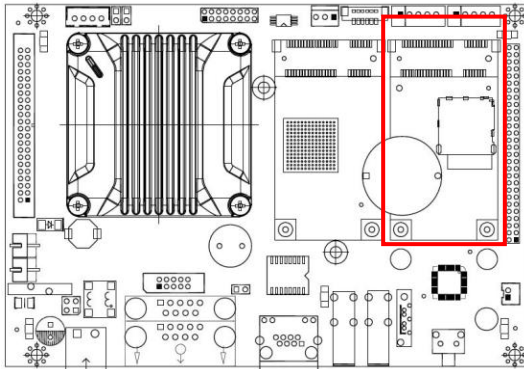


Pin#	Single Name
1.	CAN_H
2	CAN_L
3	GND

J10: Mini PCIe Socket1

(Only for USB-signal 3G/4G modem)

Standard 52-pin female Mini PCI Express connector with Mini PCI Express 1.0 support



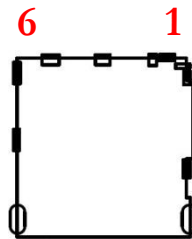
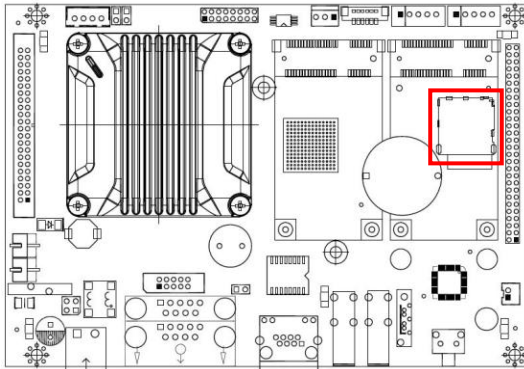
Pin#	Single Name	Pin #	Single Name
1.	NC	2	+3.3V AUX
3	NC	4	GND
5	NC	6	GPIO_0
7	NC	8	SIM_PWR
9	GND	10	SIM_DATA
11	VREF 1.8V	12	SIM_CLK
13	NC	14	SIM_RESET
15	GND	16	SIM_VPP
17	NC	18	GND
19	NC	20	W_DISABLE#
21	GND	22	PERST#
23	PERn0	24	+3.3V AUX
25	PERp0	26	GND
27	GND	28	+1.5V
29	GND	30	NC
31	NC	32	NC
33	SYS RESET	34	GND
35	GND	36	USB_D-
37	GND	38	USB_D+
39	+3.3V AUX	40	GND
41	+3.3V AUX	42	LED_WWAN#
44	GND	44	GPIO_1
45	CTS	46	GPIO_3
47	RTS	48	GPIO_2
49	RXD	50	GND
51	TXD	52	+3.3V AUX

Signal Table for Mini PCI Express

Signal	USB	PCI Express
J10	V	
J12		V
J13		V

J11: SIM Card Slot

Standard SIM card holder

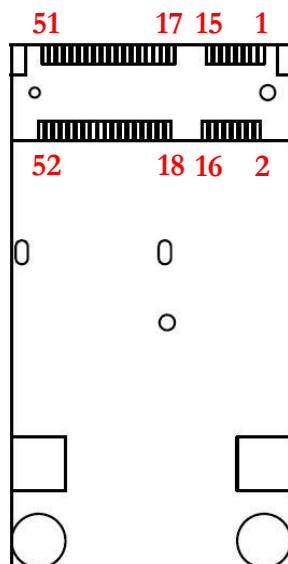
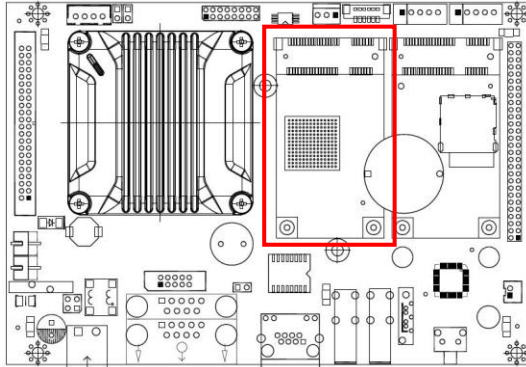


Pin#	Single Name
1.	SIM-VCC
2	SIM-RST
3	SIM-CLK
4	GND
5	SIM-VPP
6	SIM-IO

J12: Mini PCIe Socket2

(Available on VEX-6225-43EE)

Standard 52-pin female Mini PCI Express connector with Mini PCI Express 1.0 support

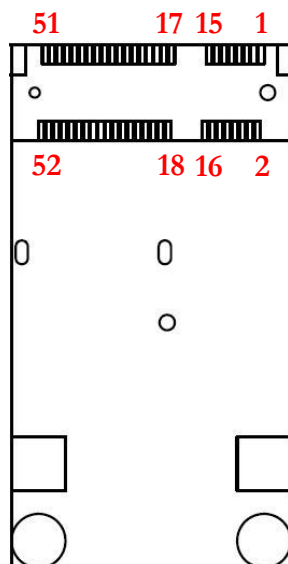
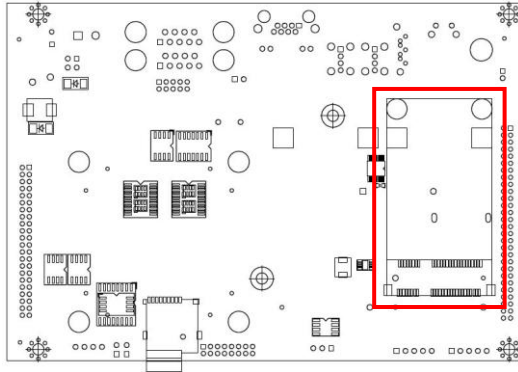


Pin#	Single Name	Pin #	Single Name
1	NC	2	+3.3V AUX
3	NC	4	GND
5	NC	6	NC
7	NC	8	NC
9	GND	10	NC
11	REFCLK-	12	NC
13	REFCLK+	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	NC
21	GND	22	PERST#
23	PERn0	24	+3.3VAUX
25	PERp0	26	GND
27	GND	28	NC
29	GND	30	NC
31	PETn0	32	NC
33	PETp0	34	GND
35	GND	36	NC
37	GND	38	NC
39	+3.3V AUX	40	GND
41	+3.3V AUX	42	NC
44	GND	44	NC
45	NC	46	NC
47	NC	48	NC
49	NC	50	GND
51	NC	52	+3.3V AUX

J13: Mini PCIe Socket3

(Available on VEX-6225-43EE)

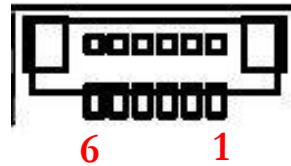
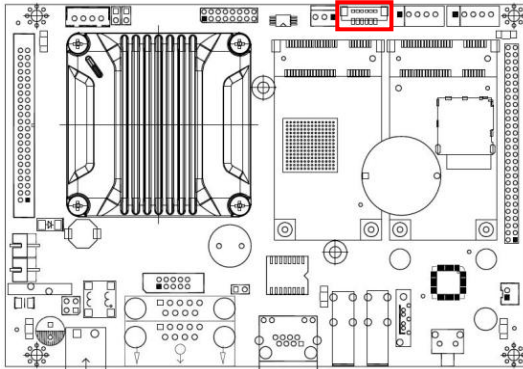
Standard 52-pin female Mini PCI Express connector with Mini PCI Express 1.0 support



Pin#	Single Name	Pin #	Single Name
1	NC	2	+3.3V AUX
3	NC	4	GND
5	NC	6	NC
7	NC	8	NC
9	GND	10	NC
11	REFCLK-	12	NC
13	REFCLK+	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	NC
21	GND	22	PERST#
23	PERn0	24	+3.3V AUX
25	PERp0	26	GND
27	GND	28	NC
29	GND	30	NC
31	PETn0	32	NC
33	PETp0	34	GND
35	GND	36	NC
37	GND	38	NC
39	+3.3V AUX	40	GND
41	+3.3V AUX	42	NC
44	GND	44	NC
45	NC	46	NC
47	NC	48	NC
49	NC	50	GND
51	NC	52	+3.3V AUX

J14: I²C

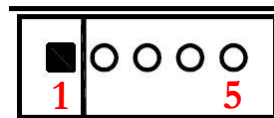
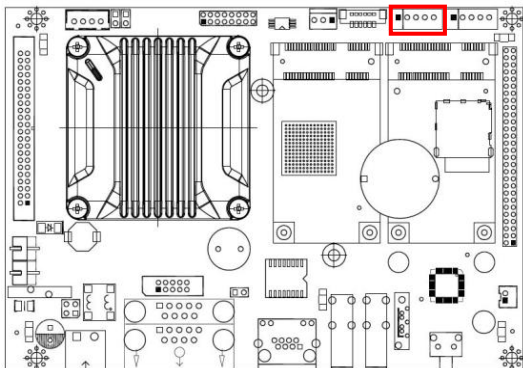
6-pin wafer (1.25mm) for I²C interface. Connector type:



Pin#	Single Name
1	VCC3
2	GND
3	S_SCL
4	S_SDA
5	NC
6	VCC

J15: PS/2 Keyboard

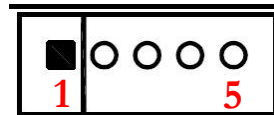
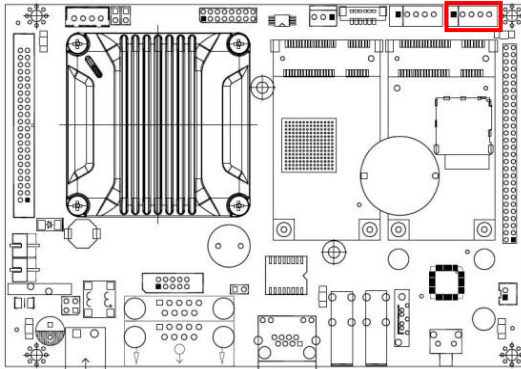
5-pin male header (2.54mm) for PS/2 keyboard



Pin#	Single Name
1	KBCLK
2	KBDATA
3	NC
4	GND
5	VCC

J16: PS/2 Mouse

5-pin male header (2.54mm) for PS/2 Mouse



Pin#	Single Name
1	MSCLK
2	MSDATA
3	NC
4	GND
5	VCC

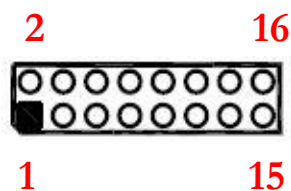
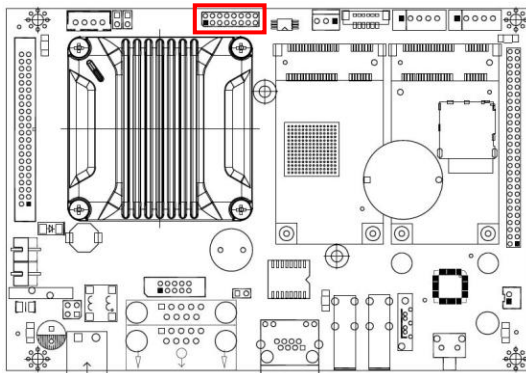
J17: ADC

11-bit analog-to-digital converter with 100k/S support. The ADC adopts Successive Approximation Register(SAR) architecture which use a 9-bit charge scaling sub-DAC for MSB and a 2-bit voltage scaling sub-DAC for LSB. The input range is between 0 and 3.3V.

Operating temperature support with 1.62V to 1.98V, 100kS/s SAR A/D Converter 8-channel input.

Input signal range: 0V to 3.3V

Operating voltage range: 2.93V to 3.63V

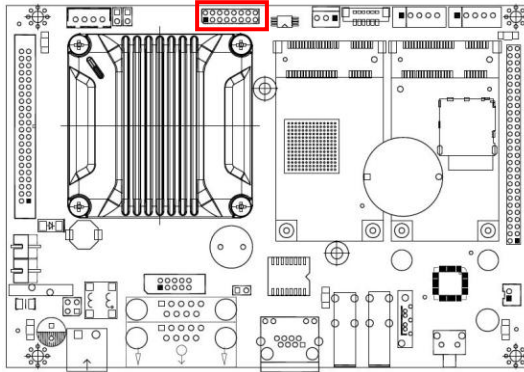


Pin#	Single Name	Pin#	Single Name
1	ADC_0	2	GND
3	ADC_1	4	GND
5	ADC_2	6	GND
7	ADC_3	8	GND
9	ADC_4	10	GND
11	ADC_5	12	GND
13	ADC_6	14	GND
15	ADC_7	16	GND

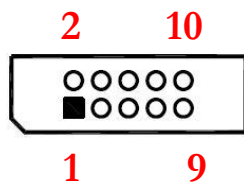
J18: VGA

10-pin male box header (2.0mm) for standard VGA output.

Maximum resolution support up to 1024 x 768 @60Hz



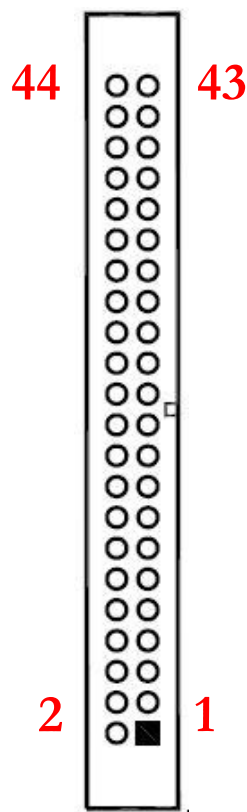
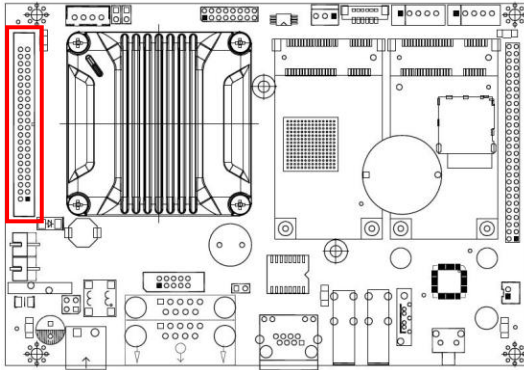
Pin#	Single Name	Pin #	Single Name
1	ROUT	2	GND
3	GOUT	4	GND
5	BOUT	6	GND
7	HSYNC	8	GND
9	VSYNC	10	GND



J19: LCD

44-pin male box header (2.0mm) for standard LCD output.

Maximum resolution support up to 1024 x 768 @60Hz

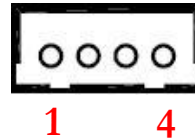
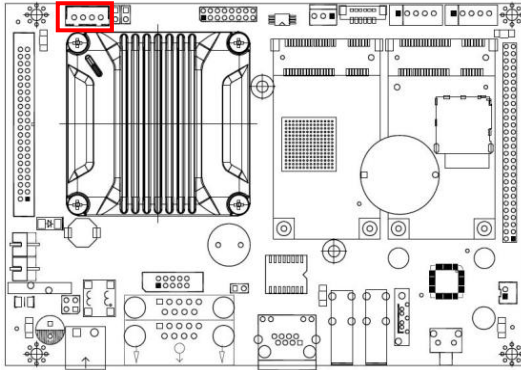


Pin#	Single Name	Pin #	Single Name
1.	VDD	2	VDD
3	G4	4	G5
5	G6	6	G7
7	R0	8	R1
9	R2	10	R3
11	R4	12	R5
13	R6	14	R7
15	VSS	16	NC
17	NC	18	NC
19	NC	20	VSS
21	B0	22	B1
23	B2	24	B3
25	B4	26	B5
27	B6	28	B7
29	G0	30	G1
31	G2	32	G3
33	VSS	34	VSS
35	NC	36	XCLK
37	NC	38	DEN
39	NC	40	HSYNC
41	NC	42	VSYN
43	ADJ	44	VDDEN

J20: LCD Backlight Control

Dimming control for LCD panel display. (Cooperated software is required.)

Connector type: 4-pin male box header (2.54mm)

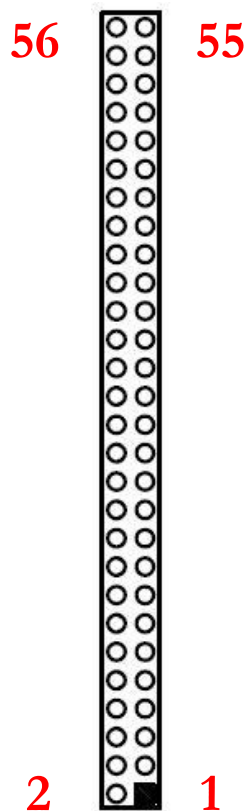
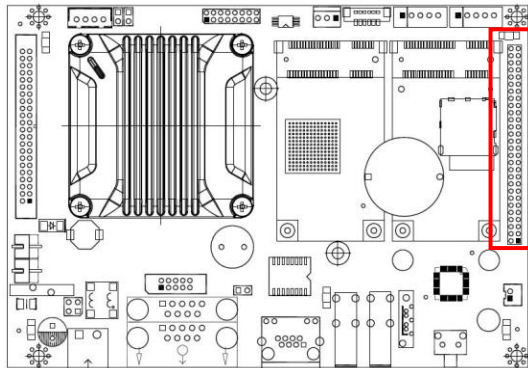


Pin#	Single Name
1	Backlight On/Off (+3.3V)
2	GND
3	Backlight On/Off (+5V)
4	PWM

J22: Expansion I/O

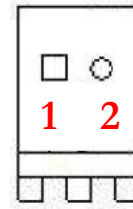
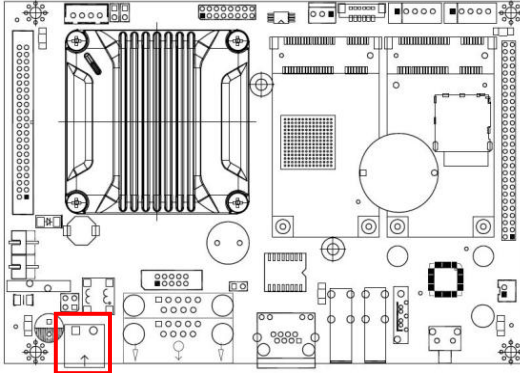
Three I/O combinations are available from the Expansion I/O port:

- (A) USB x3 + 8-bit GPIO x3, or
- (B) USB x3 + COM x3, or
- (C) USB x3 + Printer x1 + SPI Bus x1



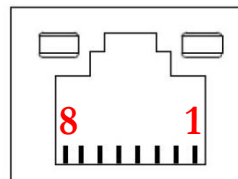
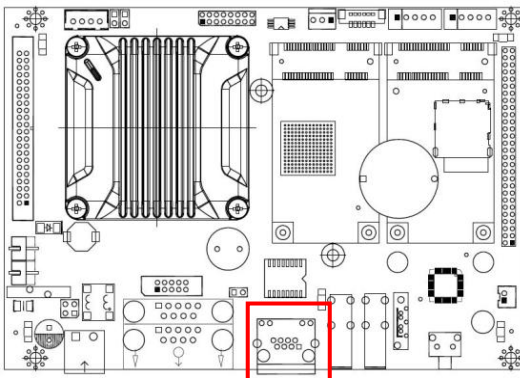
Pin#	Single Name	Pin #	Single Name
1.	VCC	2	VDD3
3	VCC	4	VDD3
5	NC	6	NC1_LINE
7	GUSBD7+	8	GUSDD5+
9	GUSBD7-	10	GUSDD5-
11	VCC1.8	12	GND
13	REST	14	GUSDD6+
15	RSTDRV	16	GUSDD6-
17	GND	18	GND
19	GP80	20	GP81
21	GP82	22	GP83
23	GP84	24	GP85
25	GP86	26	GP87
27	GND	28	GND
29	GP20	30	GP21
31	GP22	32	GP23
33	GP24	34	GP25
35	GP26	36	GP27
37	GND	38	GND
39	GP30	40	GP31
41	GP32	42	GP33
43	GP34	44	GP35
45	GP36	46	GP37
47	GND	48	GND
49	GP40	50	GP41
51	GP42	52	GP43
53	GP44	54	GP45
55	GP46	56	GP47

J24: Power



Pin#	Single Name
1.	+12 ~ 24v DC In
2	GND

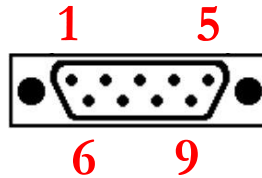
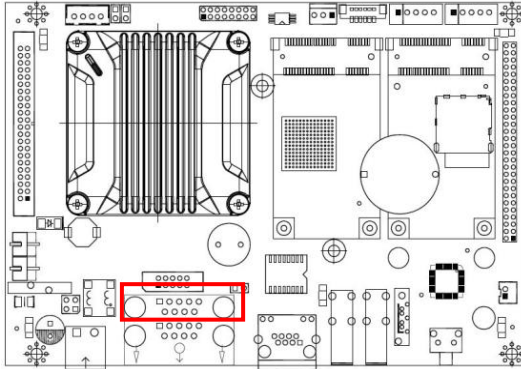
J25: LAN



Pin#	Single Name
1.	TD+
2	TD-
3	RO+
4	NC
5	NC
6	RO-
7	NC
8	NC

J26A: COM1

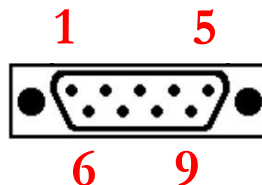
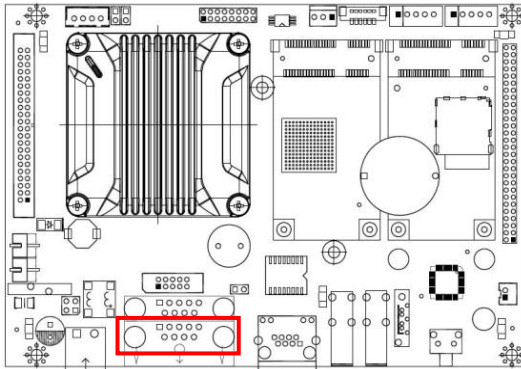
Standard D-sub 9 pins male serial port connector



Pin#	Single Name
1.	DCD1
2	RXD1
3	TXD1
4	DTR1
5	GND
6	DSR1
7	RTS1
8	CTS1
9	RI1

J26B: COM2

Standard D-sub 9 pins male serial port connector.. COM2 can be RS232 or RS485 through RS232/485 switch (J3).



Pin#	Single Name
1.	DCD2/RS485-
2	RXD2/RS485+
3	TXD2
4	DTR2
5	GND
6	DSR2
7	RTS2
8	CTS2
9	RI2

3 Software Resources

3.1 ICOP Technical Resource Website

In the following website, you will find our latest user manuals, including OS support resources systems such as evaluation images for 32-bit Window operating systems. For details, please kindly visit the following link: <http://tech.icop.com.tw/>

For resource of 32-bit Linux operating systems, please directly contact us at info@icop.com.tw or contact your ICOP contact window.

Technical Support Directly from ICOP

To offer you more accurate and specific solutions for the technical situations you have, please prepare the information below before contacting ICOP:

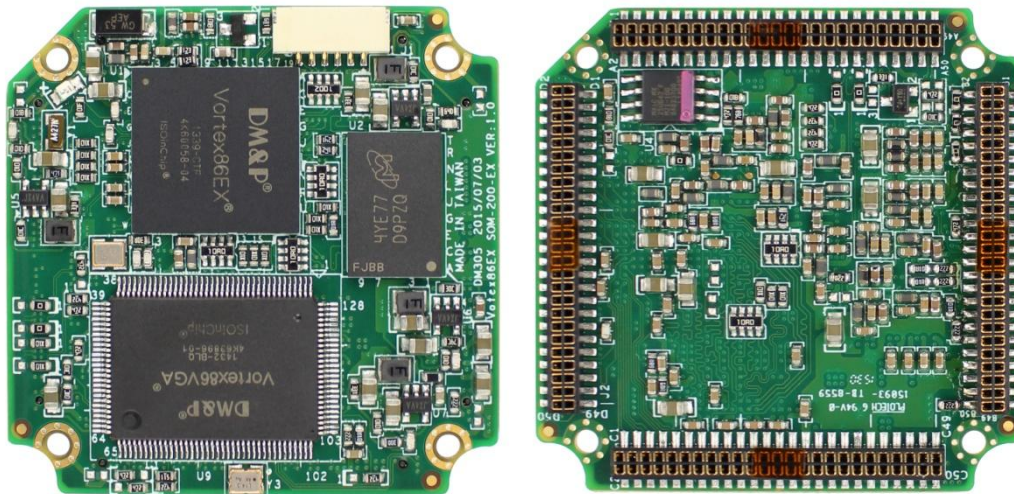
- Product name and serial number
- Description of the H/W environment (i.e.: working temperature, I/O board information, information of connection between main board and IO boards, and/or other devices, etc)
- Description of the S/W environment (i.e: operating system, version, application software, and/or other related information, etc.)
- A detailed description and photos of the technical situation
- Any complement or technical situations you want ICOP more focusing on

User Manual Feedback

To make this user manual more complete, if you have any comments or feedbacks to this manual, please feel free to write to info@icop.com.tw or contact your ICOP sales representative.

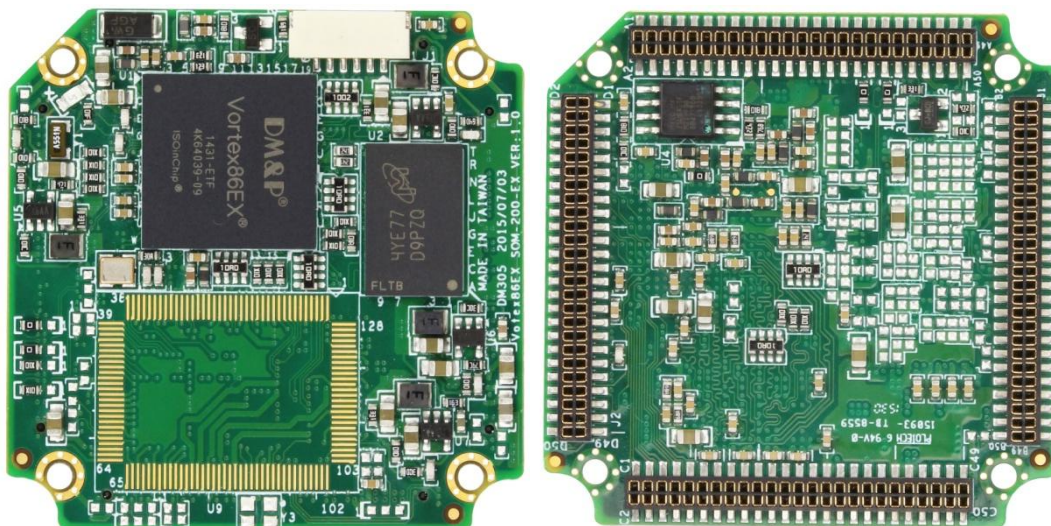
Appendix

SOM200EX Module:



SOM200EX43VGNE1

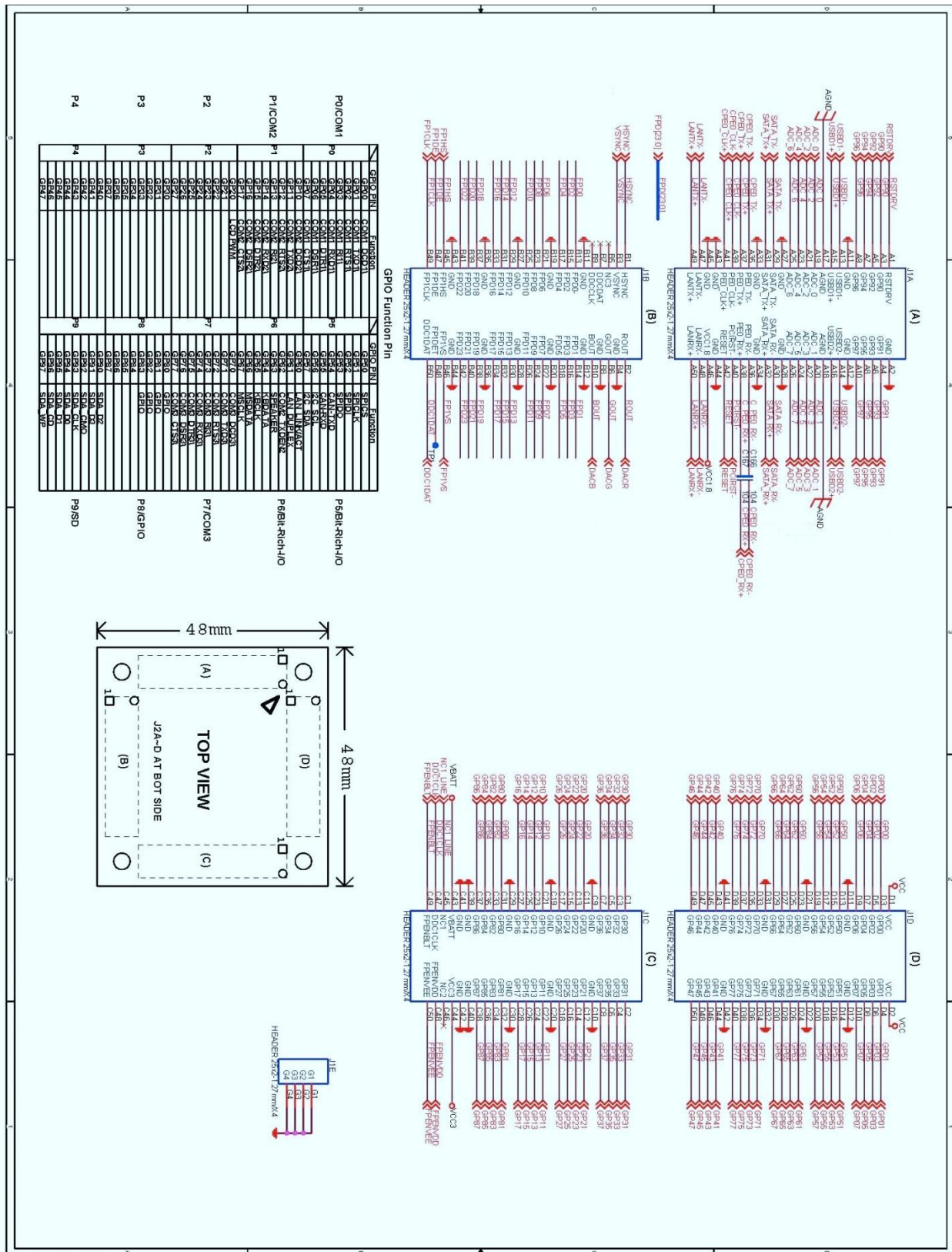
Vortex86EX SOM 200pin CPU Module
with 512MB DDR3/2USB/SATA/VGA/ADC/
PCIe (only for USB-signal 3G/4G modem)



SOM200EX43EGNE1

Vortex86EX SOM 200pin CPU Module
512MB/2USB/SATA/LAN/ADC/PCIe

Design Reference for SOM200EX Module



Warranty

This product is warranted to be in good working order for a period of one year (12 months) from the date of purchase. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it without additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster. Vendor assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, originality to use this product. Vendor will not be liable for any claim made by any other related party. Return authorization must be obtained from the vendor before returned merchandise is accepted. Authorization can be obtained by calling or faxing the vendor and requesting a Return Merchandise Authorization (RMA) number. Returned goods should always be accompanied by a clear problem description. Should you have questions about warranty and RMA service, please contact us directly.

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