

MI8380F series

MI8386F

Intel Alderlake-N Series industrial motherboard

Intel Atom X7211E

Mini-iTx SBC

Dual Lan
HDMI and DisplayPort 1.4
M.2 M-B-E
DDR5 SO-DIMM

DOCUMENTATION REFERENCE

Version 0.6

March 2025

MINI-ITX INDUSTRIAL MOTHERBOARD

- Intel Atom X7211E low power processor 6W
- SO-DIMM DDR5 support
- DUAL INTEL LAN GBE (I210AT/I226) PXE/RPL,WOL
- M.2 KEY-M, E AND B
- DP, HDMI and LVDS
- USB 3.2 AND USB 2.0
- 6X SERIAL
- 5W AUDIO OUT

Trademarks

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Contents

Trademarks.....	1
1 Specification.....	3
1.2 Interfaces lists.....	5
2 Environment and Certification.....	6
3 Block Diagram.....	7
4 Mechanical Drawing.....	8
5 Definition of Jumpers.....	9
5.1 LVDS VDD Select Jumper: 3*2 Pin, 2.54mm (J_V_LVDS1).....	9
5.2 LVDS Backlight PWM/CCFL Select Jumper: 3*1 Pin, 2.54mm.....	9
Notes:.....	9
5.3 COM5 RS232/RS485 Select Jumper: 3*2 Pin, 2.54mm (J_COM5).....	9
5.4 COM6 RS232/RS485 Select Jumper: 3*2 Pin, 2.54mm (J_COM6).....	9
5.5 AT/ATX Mode Select Jumper: 3*1 Pin, 2.54mm (J_AT1).....	9
5.6 CMOS Clear Select: Jumper,3*1 Pin,2.54mm (CLR_CMOS).....	9
6 Definition of Connectors.....	11
6.1 DC_IN2: Wafer, 4*1 Pin 2.54 mm (same connector of floppy but not same pin-out).....	11
6.2 DC_IN1: DC-IN Φ 2.5mm DC Jack, 12V@5A $\pm$ 5% input (12V&24V Auto Detect).....	11
6.3 GBE LAN1: RJ45, 8 Pin (Chipset Intel i210-AT).....	11
6.4 GBE LAN2: RJ45, 8 Pin (Chipset Intel i226).....	11
6.5 eDP/LVDS: Header, 15*2 Pin, 2.00mm.....	12
Note:.....	12
6.6 LVDS Backlight Control Wafer: 6*1 Pin, 2.00mm.....	12
Notes:.....	12
6.7 VGA: Wafer, 12*1 Pin, 2.00mm (Optional feature).....	13
6.8 Amplifier: Wafer, 4*1 Pin, 2.00mm.....	13
6.9 SATA Power: Wafer, 4*1 Pin, 2.00mm.....	13
6.10 USB2.0_1: Wafer, 5*2 Pin, 2.00mm.....	13
6.11 USB2.0_2: Wafer, 5*2 Pin, 2.00mm.....	13
6.12 COM1: DB9/M (Edge connector).....	14
Notes:.....	14
6.13 J_COM2/3/4: Wafer, 9*1 Pin, 1.25mm.....	14
Notes:.....	14
6.14 J_COM5/6: Wafer, 3*1 Pin, 2.00mm.....	14
Notes:.....	14
6.15 GPIO: Wafer, 5*2 Pin, 2.00mm.....	15
Notes:.....	15
6.16 FAN1/2: Wafer, 4*1 Pin, 2.54mm.....	15
6.17 Front Panel: Wafer, 4*2 Pin, 2.00mm.....	15
6.18 dTPM: Header 5*2 Pin, 2.00mm.....	16
6.19 I2C Touch Screen: Wafer, 6*1 Pin, 1.25mm.....	16
7 References descriptions.....	17
Location of important connectors.....	17

8 References (including optional elements).....	18
Parts identification and Accessories.....	19
A) Motherboard P/N: MB-MI8386F.....	19
B) M.2 E, WIFI/Bluetooth network card (preinstalled)(P/N: NIC-RTL8852CE) *Optional.....	19
C) Antenna for WIFI 2.4/5.0/6.0 (P/N: NIC-ANT004-190-F) *Optional.....	19
D) Antenna for WIFI 2.4 / Bluetooth (P/N: NIC-ANT001) *Optional.....	19
E) Chassis mount dual USB (No.5 and 6)(P/N: CAB-USB122S-270) *Optional.....	19
F) Chassis mount DB9M for COM1 or 2,3,4 (P/N: CAB-PK1-115X-380) *Optional.....	19
G) Memory DDR5 SO-DIMM 32G (not present) (P/N: MEM-SO030) *Optional.....	19
H) Nvme SolidStateDisk M.2 M 512GB (not present) (P/N: HD-SSD-PH06) *Optional.....	19
*Optional, need to be specified on a P/O.....	19
9 BIOS Setup.....	20
Reservation.....	20

1 Specification

Specifications			
Processor System	Processor		Intel Atom X7211E (6M S-cache, 2c/2t) (Intel Alder Lake-N series)
	TDP		6W Max
	BIOS		AMI UEFI
Memory	Slot Type		DDR5 SO-DIMM
	Memory Type		DDR5 2600MT/s
	Max Memory		16GB
	Channels		Single
I/O Chipset	Super IO		IT8786
Display	Graphics	*2	Intel® UHD Graphics
	HDMI	1	HDMI: max resolution 3840x2160@30Hz
	VGA	*1	Wafer, Need wire connector, Optional
	eDP/LVDS	1	eDP: max resolution up to 4096*2160@60Hz or LVDS max resolution up to 1920x1200@60Hz
	DP	1	DP: max resolution up to 4096*2160@30Hz
Audio	Audio		Realtek ALC897 HDA codec
	AMP		L/R, 5W 8Ω/CH
Storage	SATA		SATA 6Gbps
	M.2	1	1, M.2 M-Key 2242/2280, PCIe x2+SATA SSD
Expansion	M.2	1	1, M.2 E-Key 2230, PCIe x1+USB2.0, support WIFI+BT
		1	1, M.2 B-Key 3042, USB3.0 x1+USB2.0, support 5G+4G
Ethernet	Chipset	2	1x Intel i210AT (1 GbE or 2.5GbE) controller 1x Intel i226 (1 GbE or 2.5GbE) controller
	PXE/RPL Boot		Yes
	Wake On LAN		Yes
	USB3.0	2	USB 3.2 5Gbps

USB	USB2.0	6	USB 2.1
I/O	Serials	6	4x RS232 full-wire + 2x RS232/RS485 2-wire
FAN	Smart Control	2	2x 5/12vdc with PWM
GPIO	GPIO	8	4x GPI, 4x GPO, non-isolated 5V or 3.3V
Power	Power in		DC 12V±5% input (Optional* 12V&24V Auto Adaptive)
Others	Watch Dog Timer	1	System reset, programmable 1-255 sec or min,
	TPM		dTPM2.0
	HW Monitor		System-temp, CPU-temp, Voltage-12V,5V,3.3V, Vcpu,Vddr
	EuP/ErP		Yes
OS	OS Supported	*4	Windows 10 IoT Enterprise 2021 LTSC, Windows 10 (21H2), Windows 11 (21H2) or later, Linux Kernel 5.17 or later
Mechanical	PCB form		170 x 170mm
	Height		PCB: 1.6mm

Notes:

*1 – Connector over cable, optionnal feature

*2 – Embedded to the processor

*3 – Not available on every modele

*4 - Tested

1.2 INTERFACES LISTS

Interfaces		
Rear I/O	Power in	2 DC 12V@5A±5% input (12V&24V Auto Detect) (Note: Φ 2.5mm DC Jack) Internal Molex 4P 2x2 ATX12V
	HDMI	1 HDMI Type-A
	DP	* DP Port TYPE-A
	Audio	1 3.5mm Phone Jack, Line-out/Mic 2in1 Note: Default CTIA, OMTP standard selected by resistors
	LAN	2 RJ45 10/100/1000/2500Mbps
	USB3.0	2 Type-A
	USB2.0	6 2x Type-A, 4x headers
Internal I/O	Serial	1 DB9 COM1, RS232 Notes: [2]: PIN1 of COM1 can be DCD# (default) /5V/12V, selectable by resistor. [3]: PIN9 of COM1 can be RI# (default) /5V/12V, selectable by resistor.
	eDP/LVDS	1 LVDS/eDP: Header, LVDS/eDP selected by resistors with BKLT 12V Control (default 12V) or LVDS Backlight PWM/CCFL Select Jumper VDD 3.3V/5V/12V select jumper(default 3.3V)
	Speaker	2 Header 4P, L/R mix, 5W 8Ω
	Storage	2 1, M.2 M-Key 2242/2280, PCIe x2+SATA SSD 1, SATA 7P, with Power supply connector 12V@2A 5V@2A
	Expansion	2 1, M.2 E-Key 2230, PCIe x1+USB2.0, support WIFI+BT 1, M.2 B-Key 3042, USB3.0 x1+USB2.0, support 5G+4G
	USB2.1	4 10P Headers
	Serial	6 COM1, edge DB9M, COM2/3/4 headers RS232, Full Lanes COM5-6,headers, RS232/RS485, 2/3 wires Note: PIN1 of COM1/2/3/4 can be DCD# (default)/5V, selectable(via resistor) : PIN8 of COM1/2/3/4 can be RI# (default) /12V, selectable(via resistor) : COM5/6 selectable RS232/485
	GPIO	8 Header, 4x GPO, 4x GPI, 5V/3.3V selectable (via resistor)
	I2C	1 Header (6P)
	FAN	2 Header connector 4P, 12V with PWM/Detect
	dTPM	1 Header and SPI signal

J_SIM	1	Connector for SIM socket
J_ESPI	1	Factory, Serial Programmer Interface
J_PRM	1	Factory, Power Monitor Signal

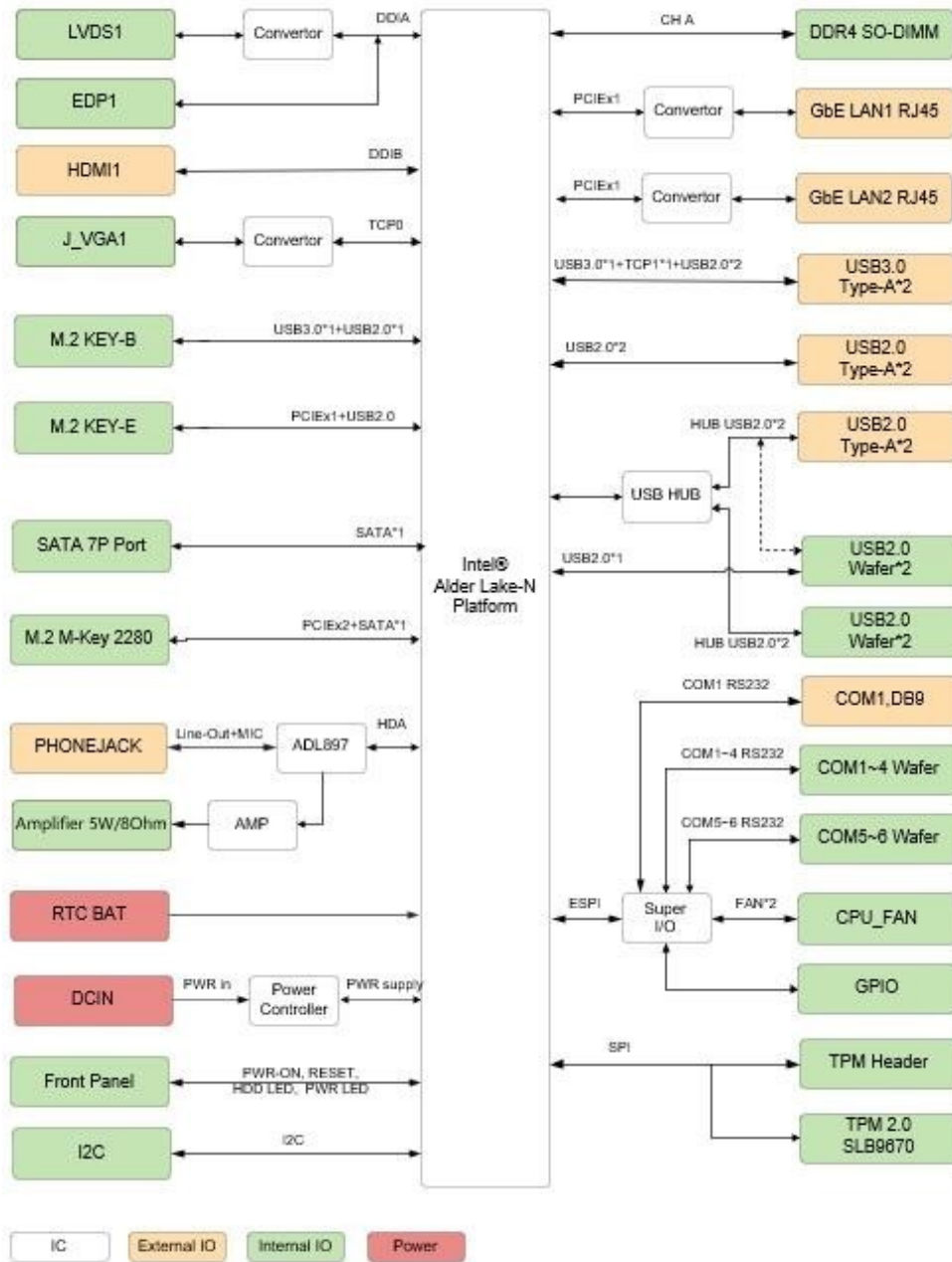
Others

Others	ATX/AT	1	AT/ATX mode(default ATX) 3-pin Jumper
	CLR CMOS	1	Clear CMOS(default normal)
	RTC BATT	1	CR2032 Battery 3.6V replaceable
	Buzzer	1	Onboard Piezo
	Audio	2	Header 4P, L/R mix, 5W 8Ω, Connector 3.5mm Mic In/ Line out (Style TRRS)
	F-Panel	4	Front Panel signal 8P header (LED POWR, LED HDD, Power On, Reset)

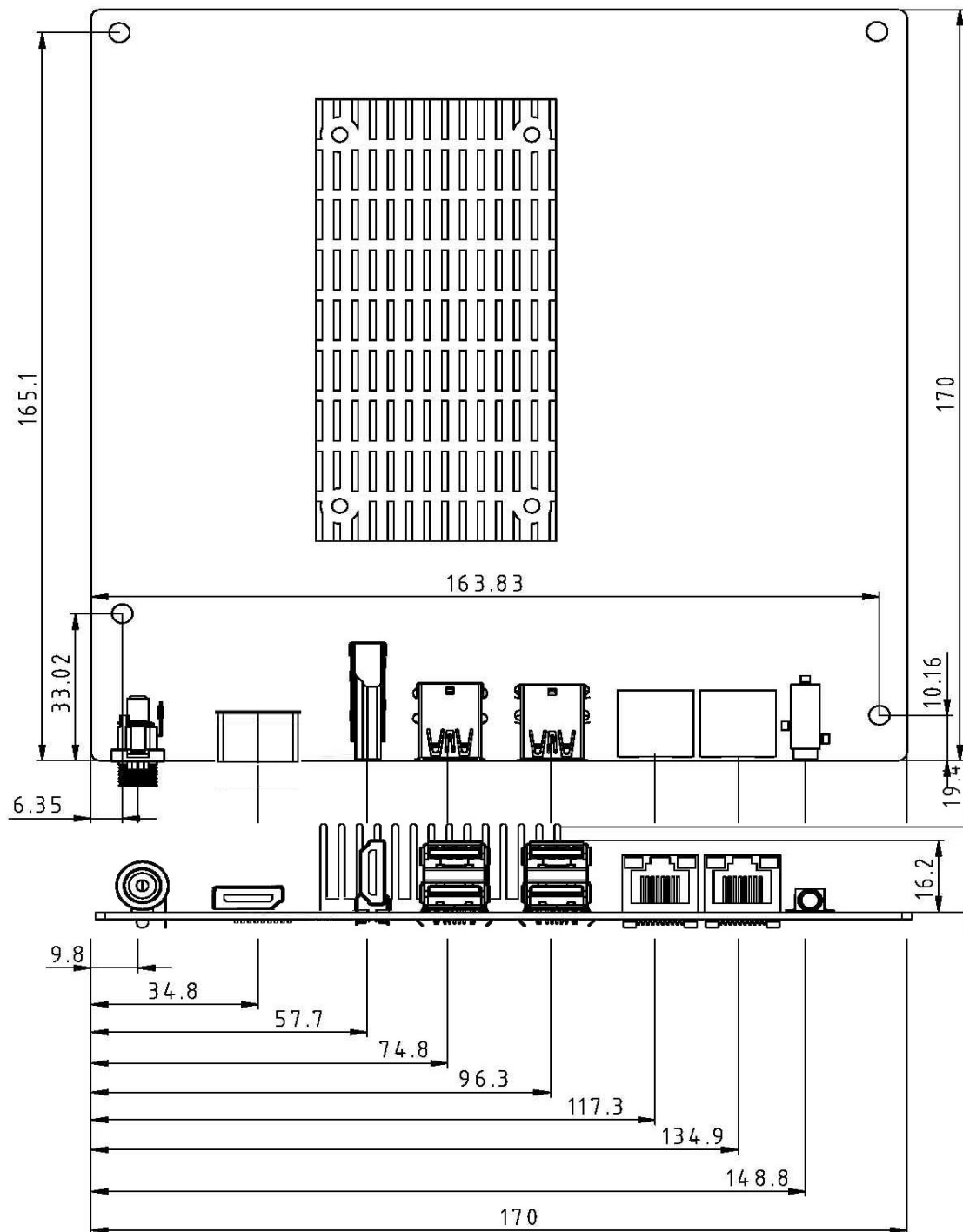
2 Environment and Certification

Others		
Environment	Temperature	Operation: 0 ~ 60℃ Storage: -20 ~ 75℃
	Humidity	5 ~ 95%, Non-condensing
Certification	FCC / UL	Conform.
		(OEM production)

3 Block Diagram



4 Mechanical Drawing



REFERENCE ONLY --- CAN BE CHANGE

5 Definition of Jumpers

5.1 LVDS VDD Select Jumper: 3*2 Pin, 2.54mm (J_V_LVDS1)

Graphic	Setting	Function
	1-2(Default)	3.3V
	3-4	5V
	5-6	12V

5.2 LVDS Backlight PWM/CCFL Select Jumper: 3*1 Pin, 2.54mm

Graphic	Setting	Function
	1-2(Default)	Controlled by PWM
	2-3	Controlled by CCFL ^[1]

Notes:

[1]: Controlled by CCFL by default, PWM# optional. (resistor selectable)

5.3 COM5 RS232/RS485 Select Jumper: 3*2 Pin, 2.54mm (J_COM5)

Graphic	Setting	Function
 	JP1: 1-2 JP2: 1-3,2-4	RS485
	JP1: 5-6 JP2: 3-5,4-6(Default)	RS232

5.4 COM6 RS232/RS485 Select Jumper: 3*2 Pin, 2.54mm (J_COM6)

Graphic	Setting	Function
 	JP1: 1-2 JP2: 1-3,2-4	RS485
	JP1: 5-6 JP2: 3-5,4-6(Default)	S232

5.5 AT/ATX Mode Select Jumper: 3*1 Pin, 2.54mm (J_AT1)

Graphic	Setting	Function
	1-2(Default)	ATX mode
	2-3	AT mode

5.6 CMOS Clear Select: Jumper, 3*1 Pin, 2.54mm (CLR_CMOS)

Graphic	Setting	Function
	1-2(Default)	Normal

	2-3	Clear CMOS
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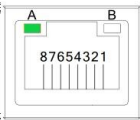
6 Definition of Connectors

6.1 DC_IN2: Wafer, 4*1 Pin 2.54 mm (same connector of floppy but not same pin-out)

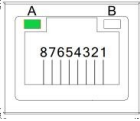
Graphic	Pin	Definition	Pin	Definition
	1	VCCIN	3	GND
	2	VCCIN	4	GND

6.2 DC_IN1: DC-IN Φ 2.5mm DC Jack, 12V@5A $\pm$ 5% input (12V&24V Auto Detect)

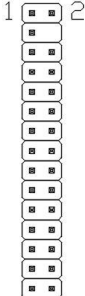
6.3 GBE LAN1: RJ45, 8 Pin (Chipset Intel i210-AT)

Graphic	Pin	Definition	Pin	Definition
	1	XMDI_0+	5	XMDI_2+
	2	XMDI_0-	6	XMDI_2-
	3	XMDI_1+	7	XMDI_3+
	4	XMDI_1-	8	XMDI_3-
	A	Active LED	B	Speed LED
		ACT: Twinkling Yellow		1000M: Turn Orange
		Only LINK: Lights Off		100M: Turn Green
		Stop: Lights Off		10M: Lights Off

6.4 GBE LAN2: RJ45, 8 Pin (Chipset Intel i226)

Graphic	Pin	Definition	Pin	Definition
	1	XMDI_0+	5	XMDI_2+
	2	XMDI_0-	6	XMDI_2-
	3	XMDI_1+	7	XMDI_3+
	4	XMDI_1-	8	XMDI_3-
	A	Active LED	B	Speed LED
		ACT: Twinkling Yellow		1000M: Turn Orange
		Only LINK: Lights Off		100M: Turn Green
		Stop: Lights Off		10M: Lights Off

6.5 eDP/LVDS: Header, 15*2 Pin, 2.00mm

Graphic	Pin	Definition	Pin	Definition
	1	VDD_PANEL ^[1]	2	VDD_PANEL ^[1]
	3	VDD_PANEL ^[1]		
	5	EDP1_HPD/ LVDS_PRSENT#	6	EDP1_HPD/ LVDS_PRSENT#
	7	LVDS_A_DATA0-	8	LVDS_A_DATA0+
	9	LVDS_A_DATA1-	10	LVDS_A_DATA1+
	11	LVDS_A_DATA2-	12	LVDS_A_DATA2+
	13	GND	14	GND
	15	LVDS_A_CLK-	16	LVDS_A_CLK+
	17	LVDS_A_DATA3-	18	LVDS_A_DATA3+
	19	LVDS_B_DATA0- EDP1_TX0- ^[2]	20	LVDS_B_DATA0+ EDP1_TX0+ ^[2]
	21	LVDS_B_DATA1- EDP1_TX1- ^[2]	22	LVDS_B_DATA1+ EDP1_TX1+ ^[2]
	23	LVDS_B_DATA2- EDP1_TX2- ^[2]	24	LVDS_B_DATA2+ EDP1_TX2+ ^[2]
	25	GND	26	GND
	27	LVDS_B_CLK- EDP1_TX3-	28	LVDS_B_CLK+ EDP1_TX3+ ^[2]
	29	LVDS_B_DATA3- EDP1_AUX- ^[2]	30	LVDS_B_DATA3+ EDP1_AUX+ ^[2]

Note:

[1]: Panel Power VDD is 3.3V by default, 5V/12V is selectable by “LVDS VDD Select Jumper” (JC_LVDS1, Mark 8).

[2]: It supports eDP by default and can support LVDS if specified. (resistor selectable)

6.6 LVDS Backlight Control Wafer: 6*1 Pin, 2.00mm

Graphic	Pin	Definition	Pin	Definition
	1	GND	4	LVDS_BKLT_EN
	2	GND	5	VCC12
	3	LVDS_BKLT_CTL ^[1]	6	VCC12

Notes:

[1]: LVDS_BKLT can be controlled by PWM(Default) /CCFL, selectable by “LVDS Backlight PWM/CCFL Select Jumper”

6.7 VGA: Wafer, 12*1 Pin, 2.00mm (Optional feature)

Graphic	Pin	Definition	Pin	Definition
	1	GND	7	CRT_G
	2	CRT_VS	8	GND
	3	CRT_HS	9	CRT_B
	4	GND	10	GND
	5	CRT_R	11	CRT_SDA
	6	GND	12	CRT_SCL

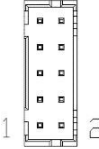
6.8 Amplifier: Wafer, 4*1 Pin, 2.00mm

Graphic	Pin	Definition	Pin	Definition
	1	SPK_OUT_L-	3	SPK_OUT_R-
	2	SPK_OUT_L+	4	SPK_OUT_R+

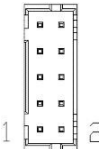
6.9 SATA Power: Wafer, 4*1 Pin, 2.00mm

Graphic	Pin	Definition	Pin	Definition
	1	VCC12	3	GND
	2	GND	4	VCC5

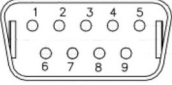
6.10 USB2.0_1: Wafer, 5*2 Pin, 2.00mm

Graphic	Pin	Definition	Pin	Definition
	2	VCC5	1	VCC5
	4	USB2.0_2-	3	USB2.0_1-
	6	USB2.0_2+	5	USB2.0_1+
	8	GND	7	GND
	10	GND	9	GND

6.11 USB2.0_2: Wafer, 5*2 Pin, 2.00mm

Graphic	Pin	Definition	Pin	Definition
	2	VCC5	1	VCC5
	4	USB2.0_2-	3	USB2.0_1-
	6	USB2.0_2+	5	USB2.0_1+
	8	GND	7	GND
	10	GND	9	GND

6.12 COM1: DB9/M (Edge connector)

Graphic	Pin	Definition	Pin	Definition
	1	DCD	2	DSR
	3	RXD	4	RTS
	5	TXD	6	CTS
	7	DTR	8	RI
	9	GND		

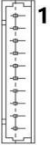
Notes:

[*]: COM1 and J_COM1 share the same signal, they can't be accessed simultaneously.

[1]: PIN1 of COM1 can be DCD# (default) /5V/12V, selectable by resistor.

[2]: PIN9 of COM1 can be RI# (default) /5V/12V, selectable by resistor.

6.13 J_COM2/3/4: Wafer, 9*1 Pin, 1.25mm

Graphic	Pin	Definition	Pin	Definition
	1	DCD/5V	6	CTS
	2	DSR	7	DTR
	3	RXD	8	RI/12V
	4	RTS	9	GND
	5	TXD		

Notes:

[1]: PIN1 of COM1/2/3/4 can be DCD# (default) /5V, selectable by resistor.

[2]: PIN8 of COM1/2/3/4 can be RI# (default) /12V, selectable by resistor.

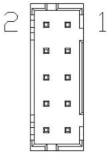
6.14 J_COM5/6: Wafer, 3*1 Pin, 2.00mm

Graphic	Pin	Definition	Pin	Definition
	1	RXD/RS485+ ^[1]	3	GND
	2	TXD/RS485- ^[1]		

Notes:

[1]: J_COM5/6 can be selected by "COM5/6 RS232/RS485 Select Jumper"

6.15 GPIO: Wafer, 5*2 Pin, 2.00mm

Graphic	Pin	Definition	Pin	Definition
	1	SIO_GPI71 (0xA06 Bit1, H ^[1])	2	SIO_GPI70 (0xA06 Bit0, H ^[1])
	3	SIO_GPI73 (0xA06 Bit3, H ^[1])	4	SIO_GPI72 (0xA06 Bit2, H ^[1])
	5	SIO_GPO75 (0xA06 Bit5, H ^[1])	6	SIO_GPO74 (0xA06 Bit4, H ^[1])
	7	SIO_GPO77 (0xA06 Bit7, H ^[1])	8	SIO_GPO76 (0xA06 Bit6, H ^[1])
	9	GND	10	+3.3V ^[2]

Notes:

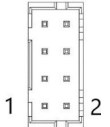
[1]: "H" or "L" means the default voltage is High or Low level (3.3V GPIO).

[2]: Power on this Pin is 3.3V by default, 5V is available if specified. (resistor selectable)

6.16 FAN1/2: Wafer, 4*1 Pin, 2.54mm

Graphic	Pin	Definition	Pin	Definition
	1	GND	3	FAN Speed Detection
	2	VCC12	4	FAN Speed Control

6.17 Front Panel: Wafer, 4*2 Pin, 2.00mm

Graphic	Pin	Definition	Pin	Definition
	2	HDD_LED+	1	PWR_LED+
	4	HDD_LED-	3	PWR_LED-
	6	RESET-	5	PWR_ON+
	8	RESET+	7	PWR_ON-

6.18 dTPM: Header 5*2 Pin, 2.00mm

Graphic	Pin	Definition	Pin	Definition
	1	VCC3.3A	2	SPI_CS2
	3	PLTRST_N	4	SPI_MISO
	5	SPI_CLK	6	GND
	7	SPI_MOSI		
	9	SPI_PP	10	SPI_PIRQ

6.19 I2C Touch Screen: Wafer, 6*1 Pin, 1.25mm

Graphic	Pin	Definition	Pin	Definition
	1	VCC3.3	4	TCH_RST_N
	2	GND	5	TCH_I2C_SCL
	3	TCH_INT_N	6	TCH_I2C_SDA

6.20 CMOS Battery: Wafer, 2*1 Pin, 1.25mm

Graphic	Pin	Definition	Pin	Definition
	1	VCC_BAT	2	GND

6.21 J_ESPI: Serial programming interface (Factory)

Graphic	Pin	Definition	Pin	Definition

6.22 J_PRM1: Power Report monitor interface (Factory)

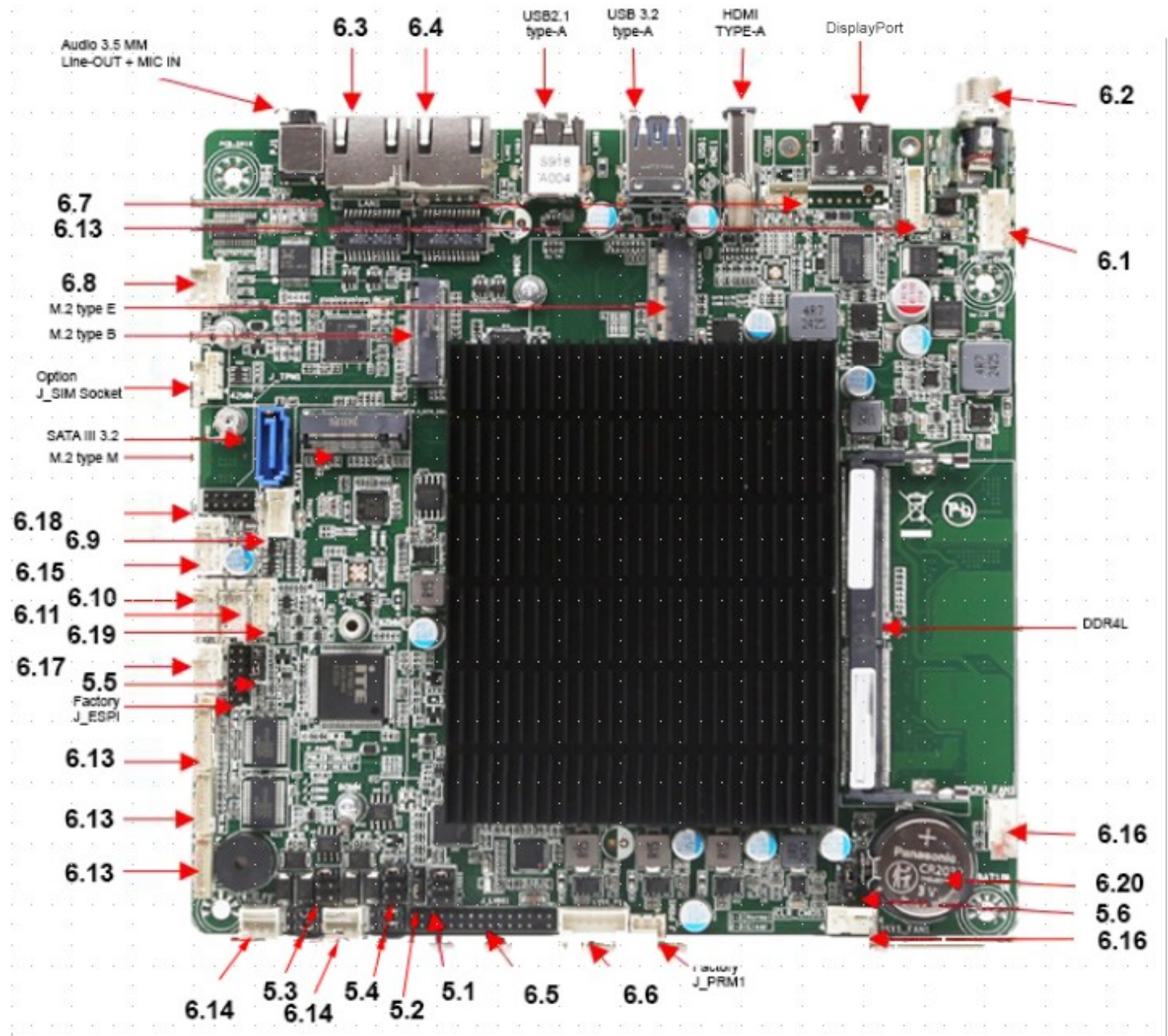
Graphic	Pin	Definition	Pin	Definition

6.23 J_SIM1: Connection for SIM socket "Subscriber Identity Module" signal (Special)

Graphic	Pin	Definition	Pin	Definition
	0	VCC – Voltage 3/5	0	GND - Ground
	0	CLK - Clock	0	RST - Reset
	0	VPP - Programing	0	DATA – I/O serial

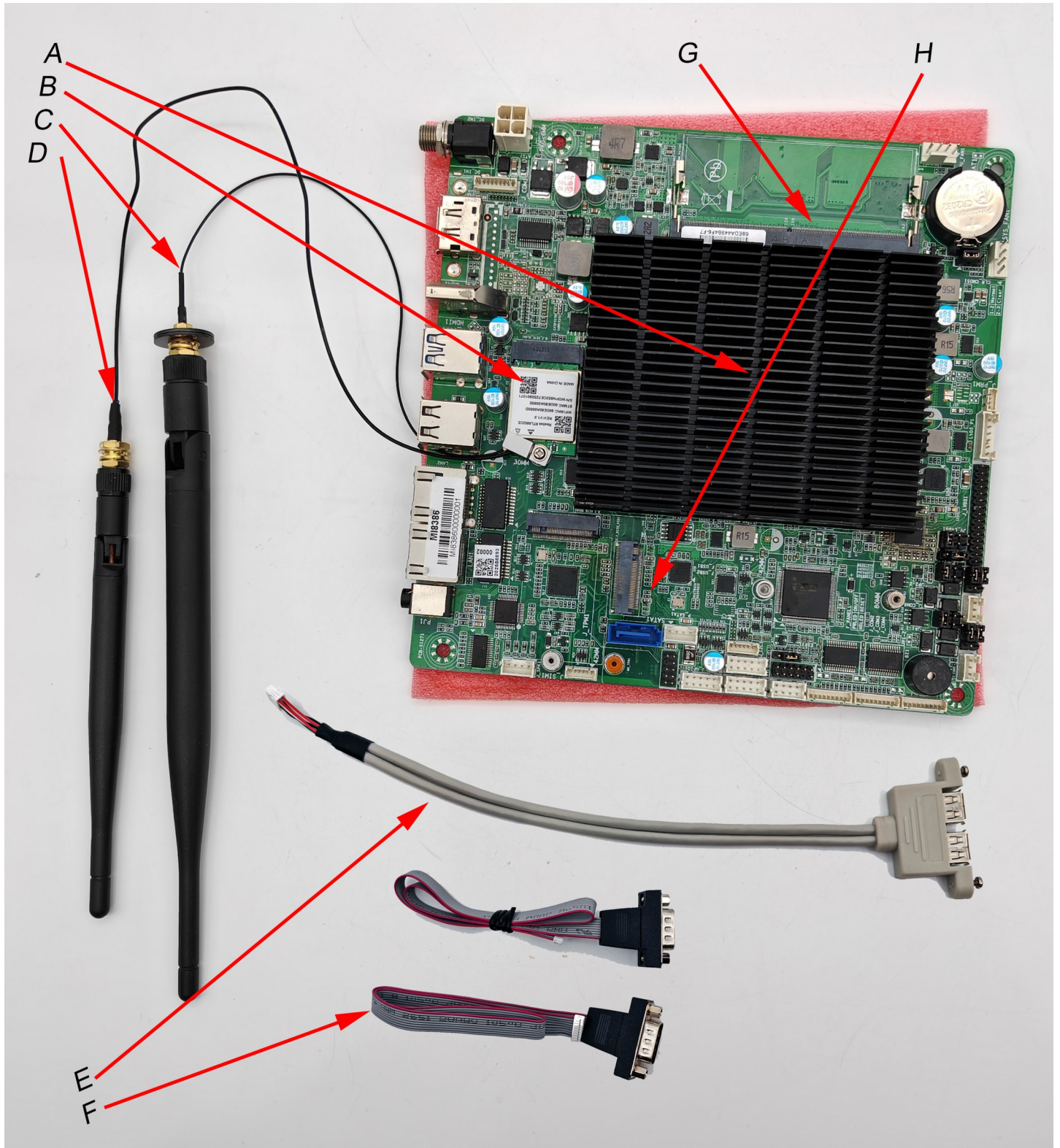
7 References descriptions

Location of important connectors



8 References (including optional elements)

Element that could be delivered with your sample



Parts identification and Accessories.

- A) Motherboard P/N: MB-MI8386F
- B) M.2 E, WIFI/Bluetooth network card (preinstalled)(P/N: NIC-RTL8852CE) *Optional
- C) Antenna for WIFI 2.4/5.0/6.0 (P/N: NIC-ANT004-190-F) *Optional
- D) Antenna for WIFI 2.4 / Bluetooth (P/N: NIC-ANT001) *Optional
- E) Chassis mount dual USB (No.5 and 6)(P/N: CAB-USB122S-270) *Optional
- F) Chassis mount DB9M for COM1 or 2,3,4 (P/N: CAB-PK1-115X-380) *Optional
- G) Memory DDR5 SO-DIMM 32G (not present) (P/N: MEM-SO030) *Optional
- H) Nvme SolidStateDisk M.2 M 512GB (not present) (P/N: HD-SSD-PH06) *Optional

*Optional, need to be specified on a P/O.

9 BIOS Setup

Reservation