



User's Manual

VOX-070-TS-N8M

NXP i.MX 8M Mini

Open Frame Panel PC with 7" TFT LCD and Touch Panels

(Revision V1.0)

REVISION

DATE	VERSION	DESCRIPTION
2024/08/01	Version 1.0	New Release

ICOP TECHNOLOGY INC.

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Manual # IUMVOX-070-TS-N8M Ver. 1.0 Aug, 2024

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This Manual is for the VOX-070-TS-N8M.

SAFETY INFORMATION

- Read these Safety instructions carefully.
- Please carry the unit with both hands, handle carefully.
- Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
- Do not expose your Open Frame Panel PC to rain or moisture in order to prevent shock and fire hazard.
- Input voltage rated +12 ~ 36 VDC
- Operating temperature between 0~60°C / -20~+70°C (Option).
- Keep VOX-070-TS-N8M away from humidity.
- Never touch un-insulated terminals or wire unless your power adaptor is disconnected.
- Locate your Open Frame Panel PC as close as possible to the socket outline for easy access and to avoid force caused by entangling of your arms with surrounding cables from the Open Frame Panel PC.
- USB connectors are not supplied with Limited Power Sources.
- If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.

WARNING!



DO NOT ATTEMPT TO DISASSEMBLE THE CPU Module or CHASSIS (ENCASING) OF THIS PRODUCT. PLEASE CONTACT YOUR DEALER FOR SERVICING FROM QUALIFIED TECHNICIAN.

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Ch. 1

General Information

[1.1 Product Description](#)

[1.2 Product Specifications](#)

[1.3 Inspection standard for TFT-LCD Panel](#)

[1.4 Product Dimensions](#)

[1.5 Ordering Information](#)

1.1 Product Description

ICOP Technology Inc. is proudly going to release a brand new open frame Panel PC, which offers fanless design and low power consumption. The VOX-070-TS-N8M is powered by NXP i.MX 8M Mini, the Quad-Core Cortex-A53 of ARM based processor, and 2GB/4GB LPDDR4 chipset that handles processing more efficiently and provides faster performance. The high LED backlight TFT LCD increases operation convenience and visibility in outdoor environments. The ultra-compact and thin exterior design is perfect for the present demanding embedded and productive applications.

The new VOX-070-TS-N8M includes the versatile I/O ports, Gigabit Ethernet, and support WLAN, etc. can fulfill fundamental functions. Our consistent advantages feature stable performance, extended working temperature support, low power consumption and fanless design. The expandable customize I/O ports by MiniPCIe slot can be accommodated connectivity requirements to industrial machine platforms and industrial automation equipment's needs.

The VOX-070-TS-N8M supports Yocto Linux and Anroid to meet ready-to-market demand and provide competitive advantages for customer.

1.2 Product Specifications

CPU BOARD SPECIFICATIONS

CPU	NXP i.MX 8M Mini-1.6GHz Cortex-A53 Quad Core
Cache	L2: 512KB Cache
Memory	2GB / 4GB LPDDR4 onboard
Watchdog Timer	Support 3 Watchdog Timer
LAN	Integrated Gigabit Ethernet
Audio	High Definition Audio
Internal Drives	16GB / 64GB of eMMC onboard Micro SD slot (Like a card reader only)
Expansion	MiniPCle Slot with Micro SIM Card Holder
I/O	USB2.0 x2 COM x1 (RS232/RS485) RJ-45 Port x1 Audio Line-out x1 WLAN & BT x1 (Option) Software Programing Port x1

MECHANICAL & ENVIRONMENT

Power Requirement	+12 ~ 36VDC Input
Power Consumption	8Watt (Typical)
Operating Temperature	0~60°C / -20~+70°C (Option)
Storage Temperature	-30~+80°C
Operating Humidity	0% ~ 90% Relative Humidity, Non-Condensing
Dimensions	186 x 121.05 x 38.15mm

Weight	530g
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LCD SPECIFICATIONS

Display Type	7" WVGA TFT LCD
Backlight Unit	LED
Display Resolution	1024(W) x 600(H)
Brightness (cd/m ²)	500 nits
Contrast Ratio	800 : 1
Display Color	16.7M
Pixel Pitch (mm)	0.1506 (H) x 0.1432 (V)
Viewing Angle	Vertical 170°, Horizontal 170°
Backlight Lifetime	50,000 hrs

1.3 Inspection standard for TFT-LCD Panel

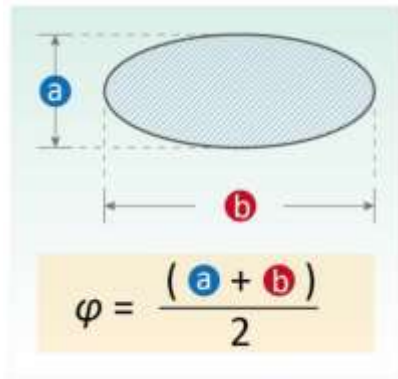
DEFECT TYPE			LIMIT					Note	
VISUAL DEFECT	INTERNAL	SPOT	$\varphi < 0.15\text{mm}$			Ignore		Note1	
			$0.15\text{mm} \leq \varphi \leq 0.5\text{mm}$			$N \leq 4$			
			$0.5\text{mm} < \varphi$			$N=0$			
		FIBER	$0.03\text{mm} < W \leq 0.1\text{mm}, L \leq 5\text{mm}$			$N \leq 3$		Note1	
			$1.0\text{mm} < W, 1.5\text{mm} < L$			$N=0$			
		POLARIZER BUBBLE	$\varphi < 0.15\text{mm}$			Ignore		Note1	
			$0.15\text{mm} \leq \varphi \leq 0.5\text{mm}$			$N \leq 2$			
			$0.5\text{mm} < \varphi$			$N=0$			
		Mura	It' OK if mura is slight visible through 6%ND filter						
ELECTRICAL DEFECT	BRIGHT DOT		A Grade			B Grade			
			C Area	O Area	Total	C Area	O Area	Total	Note3
			$N \leq 0$	$N \leq 2$	$N \leq 2$	$N \leq 2$	$N \leq 3$	$N \leq 5$	Note2
	DARK DOT		$N \leq 2$	$N \leq 3$	$N \leq 3$	$N \leq 3$	$N \leq 5$	$N \leq 8$	
	TOTAL DOT		$N \leq 4$			$N \leq 5$	$N \leq 6$	$N \leq 8$	Note2
	TWO ADJACENT DOT		$N \leq 0$	$N \leq 1$ pair	$N \leq 1$ pair	$N \leq 1$ pair	$N \leq 1$ pair	$N \leq 1$ pair	Note4
	THREE OR MORE ADJACENT DOT		NOT ALLOWED						
	LINE DEFECT		NOT ALLOWED						

(1) One pixel consists of 3 sub-pixels, including R, G, and B dot. (Sub-pixel = Dot)

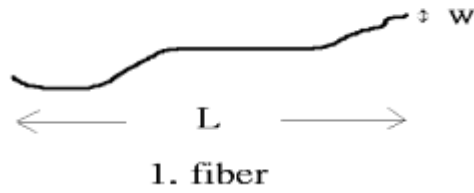
(2) Little bright Dot acceptable under 6% ND-Filter.

(3) If require G0 grand (Total dot $N \leq 0$), please contact region sales.

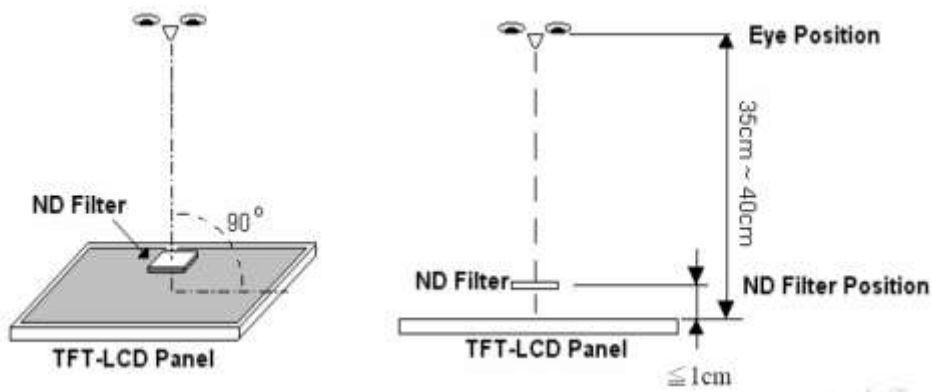
[**Note 1**] W: Width[mm]; L: Length[mm]; N: Number; ϕ : Average Diameter.



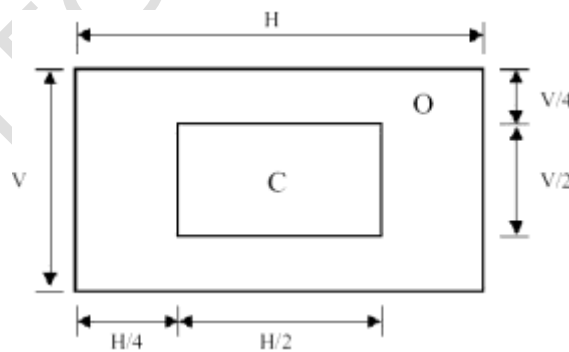
(a) White / Black Spot (b) Polarizer Bubble



[**Note 2**] Bright dot is defined through 6% transmission ND Filter as following.

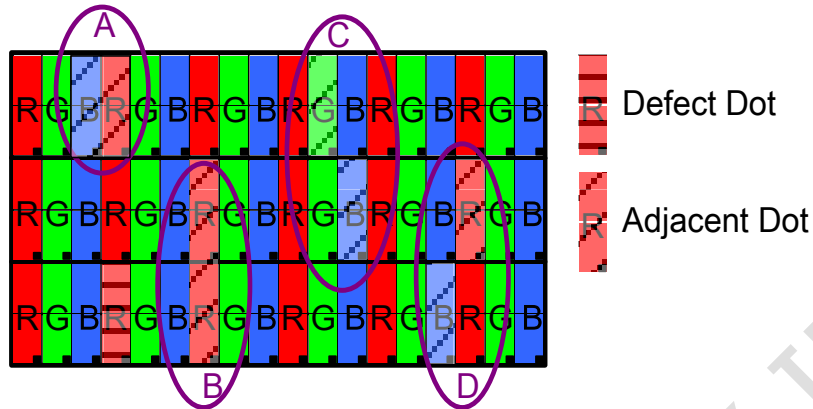


[**Note 3**] Display area



C Area: Center of display area **O Area:** Outer of display area

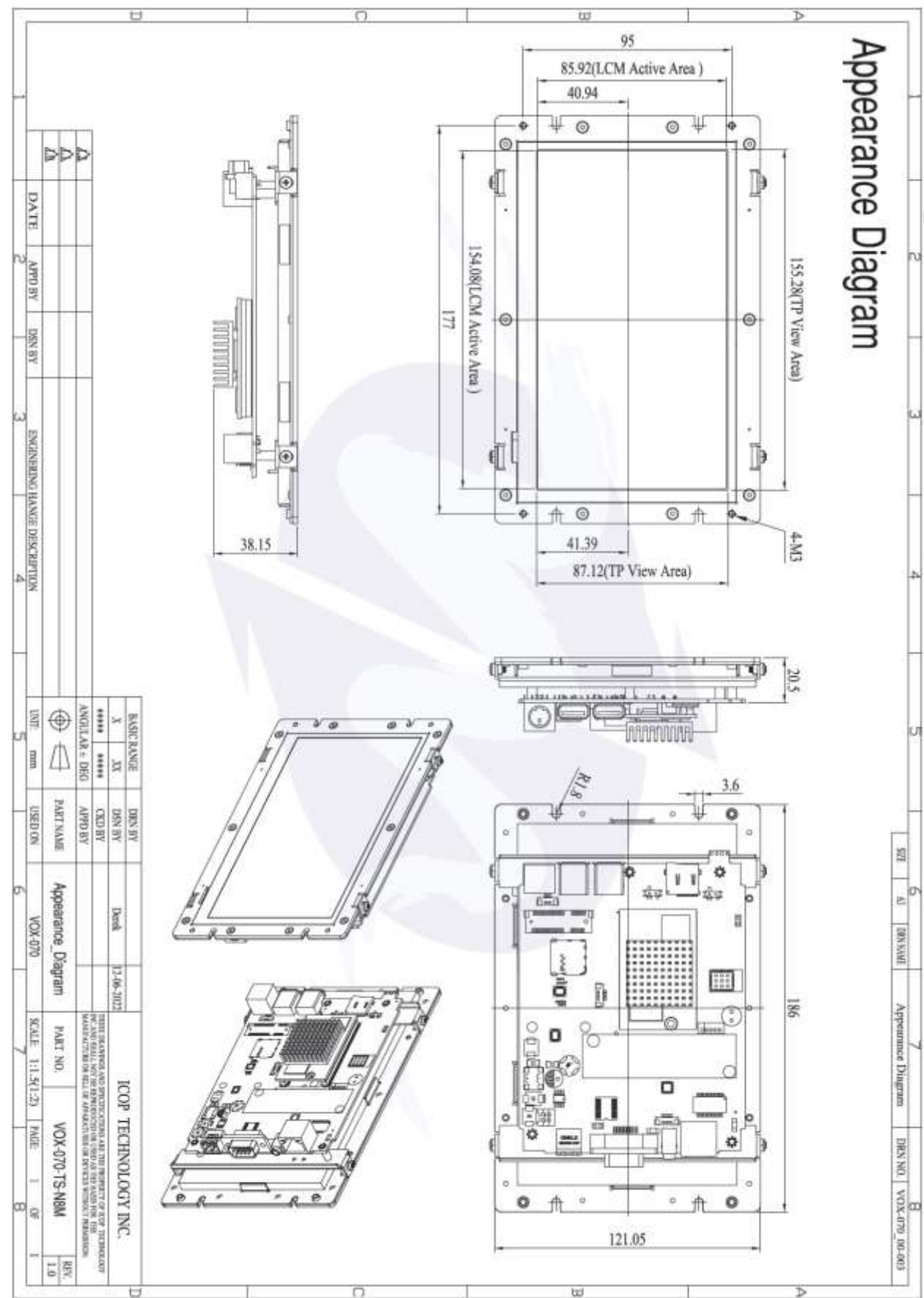
[Note 4] Judge the defect dot and the adjacent dot as following. Allow below (as A, B, C and D status) adjacent defect dots, including bright and dark adjacent dot. And they will be counted 2 defect dots in total quantity.



The defects that are not defined above and considered to be problem shall be reviewed and discussed by both parties.

Defects on the Black Matrix, out of Display area, are not considered as a defect or counted.

1.4 Product Dimensions



1.5 Ordering Information

PART NUMBER	DESCRIPTION
VOX-070-TS-N8M-N5GM	7" OP w/iMX8M Mini /2GB DRAM /16GB eMMC Onboard /2U /1S /GLAN /MiniPCle /MicroSD /Line-out /+12~36V Input
VOX-070-TS-N8M-B5GM	7" OP w/iMX8M Mini /2GB DRAM /16GB eMMC Onboard /2U /1S /GLAN /MiniPCle /MicroSD /Line-out / WLAN&BT /+12~36V Input
VOX-070-TS-N8M-N5GMI	7" OP w/iMX8M Mini /2GB DRAM /16GB eMMC Onboard /2U /1S /GLAN /MiniPCle /MicroSD /Line-out /+12~36V Input -20°C to +70°C
VOX-070-TS-N8M-B5GMI	7" OP w/iMX8M Mini /2GB DRAM /16GB eMMC Onboard /2U /1S /GLAN /MiniPCle /MicroSD /Line-out / WLAN&BT /+12~36V Input -20°C to +70°C
VOX-070-TS-N8M-N6HM (Build To Order)	7" OP w/iMX8M Mini / 4GB DRAM / 64GB eMMC Onboard /2U /1S /GLAN /MiniPCle /MicroSD /Line-out /+12~36V Input
VOX-070-TS-N8M-B6HM (Build To Order)	7" OP w/iMX8M Mini / 4GB DRAM / 64GB eMMC Onboard /2U /1S /GLAN /MiniPCle /MicroSD /Line-out / WLAN&BT /+12~36V Input
VOX-070-TS-N8M-N6HMI (Build To Order)	7" OP w/iMX8M Mini / 4GB DRAM / 64GB eMMC Onboard /2U /1S /GLAN /MiniPCle /MicroSD /Line-out /+12~36V Input -20°C to +70°C
VOX-070-TS-N8M-B6HMI (Build To Order)	7" OP w/iMX8M Mini / 4GB DRAM / 64GB eMMC Onboard /2U /1S /GLAN /MiniPCle /MicroSD /Line-out / WLAN&BT /+12~36V Input -20°C to +70°C
CABLE-MINIDIN8P-30	Software Programming Cable for VOX-070-TS-N8M Series

Ch. 2

System Installation

[2.1 CPU Board Outline](#)

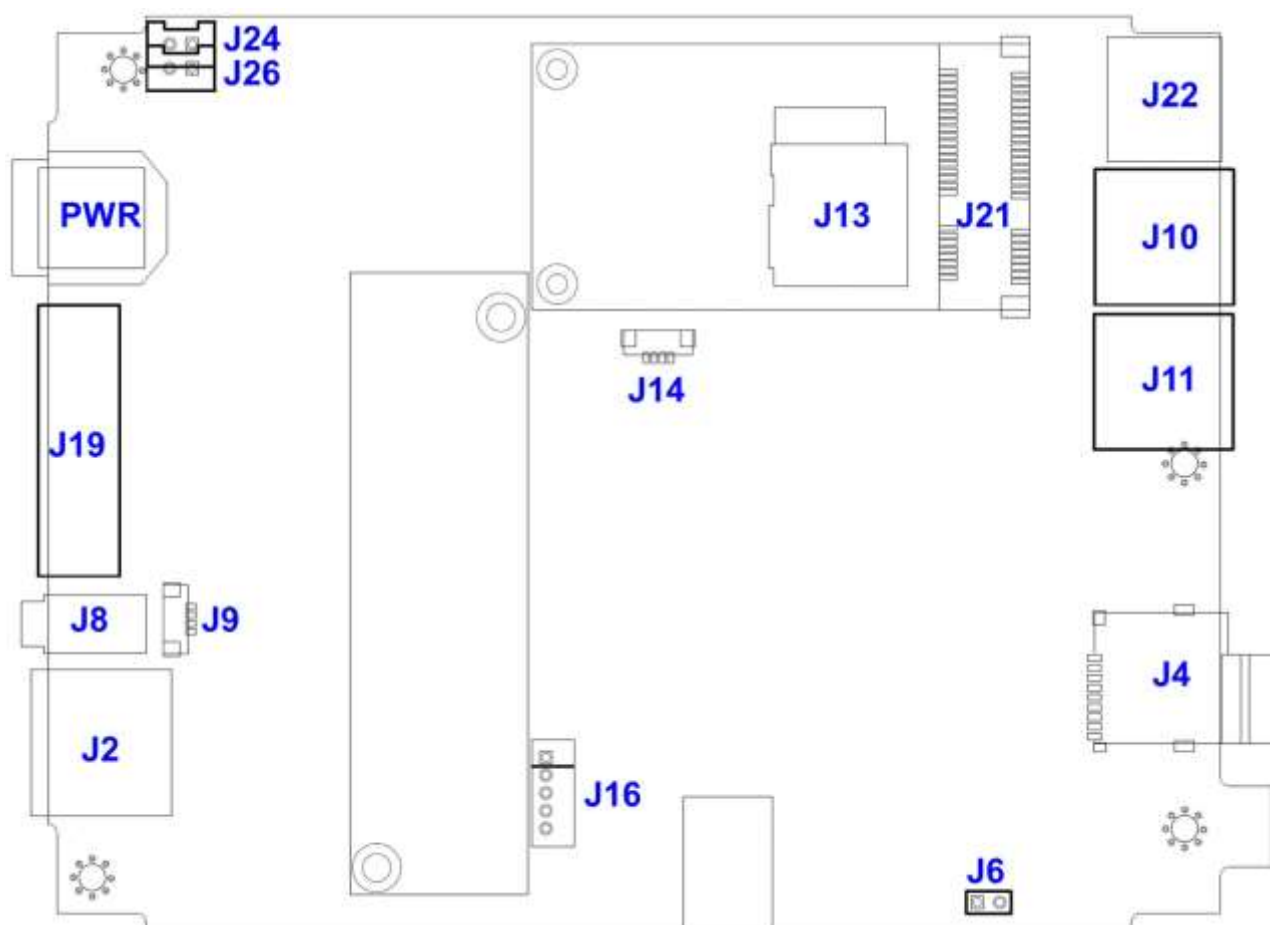
[2.2 Connector Summary](#)

[2.3 Connector Pin Assignments](#)

[2.4 Boot Mode And Pin Mux Settings](#)

[2.5 External I/O Overview](#)

2.1 CPU Board Outline



CPU Board

2.2 Connector Summary

No.	Description	Type of Connections	Pin #
J2	Ethernet	RJ45 Connector	8-pin
J4	Micro SD Card Socket	Micro SD Socket	9-pin
J6	Enable RS232/RS485	2.54mm 2-pin header	2-pin
J8	Audio Line-out	1.25mm Phone Jack	5-pin
J9	Audio Mic-in (Reserved)	1.25mm 4-pin wafer	4-pin
J10	USB 2.0	USB 2.0 Connector	6-pin
J11	USB 2.0	USB 2.0 Connector	6-pin
J13	Micro SIM Card Holder	Micro SIM Card Holder	4-pin
J14	I2C (For External Gamma Firmware Programming Only)	1.25mm 4-pin wafer	4-pin
J16	USB 2.0 (For USB Touch Controller or Reserved)	2.00mm 5-pin wafer	5-pin
J19	COM1 (RS232/RS485)	D-Sub Male Connector	9-pin
J21	Mini-PCle	Mini-PCle Socket	52-pin
J22	Software Programming Port (Reserved)	Mini DIN Socket	8-pin
J24	SW1 Power Switch (8A)	2.54mm 2-pin wafer	2-pin
J26	SW2 Power Switch (5A)	2.54mm 2-pin wafer	2-pin
PWR	Power Connector (5A)	Mini DIN Socket	3-pin
PWR	Power Connector (8A)	Power Plug	2-pin

2.3 Connector Pin Assignments

J2: RJ45

Pin #	Signal Name	Pin #	Signal Name
1	BI-DA+	2	BI_DA-
3	BI_DB+	4	BI_DC+
5	BI_DC-	6	BI_DB-
7	BI_DD+	8	BI_DD-

J4: Micro SD Card Socket

Pin #	Signal Name	Pin #	Signal Name
1	DAT2	2	DAT3-
3	CMD	4	VDD
5	CLK	6	VSS
7	DAT0	8	DAT1

J6: Enable RS232 / RS485

Pin #	Signal Name
1-2 Open	COM1 RS232
1-2 Close	COM1 RS485

J8: Audio Line-out

Pin #	Signal Name	Pin #	Signal Name
1	AMUTE	2	AOR
3	AOL	4	AOL

J9: Audio Mic-in (Reserved)

Pin #	Signal Name	Pin #	Signal Name
1	MIC_IN	2	GND_AUD
3	GND_AUD	4	MIC_IN

J10: USB 2.0

Pin #	Signal Name	Pin #	Signal Name
1	VCC	2	USBD3-
3	USBD3+	4	GND
5	FGND	6	FGND

J11: USB 2.0

Pin #	Signal Name	Pin #	Signal Name
1	VCC	2	USBD4-
3	USBD4+	4	GND
5	FGND	6	FGND

J13: Micro SIM Card Holder

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

J14: I²C (For External Gamma Firmware Programming Only.)

Pin #	Signal Name	Pin #	Signal Name
1	VCC	2	GND
3	I2C_SCL	4	I2C_SDA

J16: USB2.0 (For USB Touch Controller or Reserved)

Pin #	Signal Name	Pin #	Signal Name
1	VCC	2	USBD6-
3	USBD6+	4	GND
5	FGND		

J19: COM1 (RS232 / RS485)

Pin #	Signal Name	Pin #	Signal Name
1	N/C	2	RXD1
3	TXD1	4	N/C or RS485+
5	GND	6	N/C or RS485+
7	RTS1	8	CTS1
9	N/C		

J21: Mini-PCle

Pin #	Signal Name	Pin #	Signal Name
1	PCIE_nWAKE	2	+3.3V
3	N/C	4	GND
5	N/C	6	+1.5V
7	N/C	8	SIM-VCC
9	GND	10	SIM-IO
11	PE0_CLK-	12	SIM-CLK
13	PE0_CLK+	14	SIM-RST
15	GND	16	SIM-VPP
Mechanical Key			
17	N/C	18	GND
19	N/C	20	W_DISABLE
21	GND	22	PE0_RST
23	PE0_RX-	24	+3.3V
25	PE0_RX+	26	GND
27	GND	28	+1.5V
29	GND	30	N/C
31	PE0_TX-	32	N/C
33	PE0_TX+	34	GND
35	GND	36	PE0_USB-
37	GND	38	PE0_USB+
39	+3.3V	40	GND
41	+3.3V	42	LED_WWAN#
43	GND	44	N/C
45	N/C	46	N/C
47	N/C	48	VCC1.5
49	N/C	50	GND
51	N/C	52	+3.3V

J22: Software Programming Port**(Reserved)**

Pin #	Signal Name	Pin #	Signal Name
1	VCC	2	USBD1--
3	USBD1+	4	USBD_ID
5	GND	6	GND
7	TXD2	8	RXD2

SW1: SW1 Power Switch (8A)

Pin #	Signal Name
1-2 Open	Power Off
1-2 Close	Power On

SW2: SW2 Power Switch (5A)

Pin #	Signal Name
1-2 Open	Power Off
1-2 Close	Power On

PWR: Power Connector (5A)

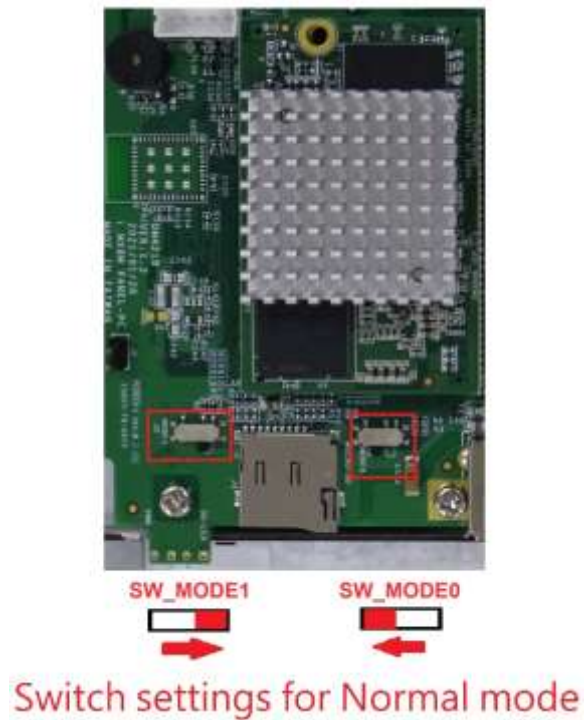
Pin #	Signal Name
1	+5V
2	GND
3	N/C
4	GND

PWR: Power Connector (8A)

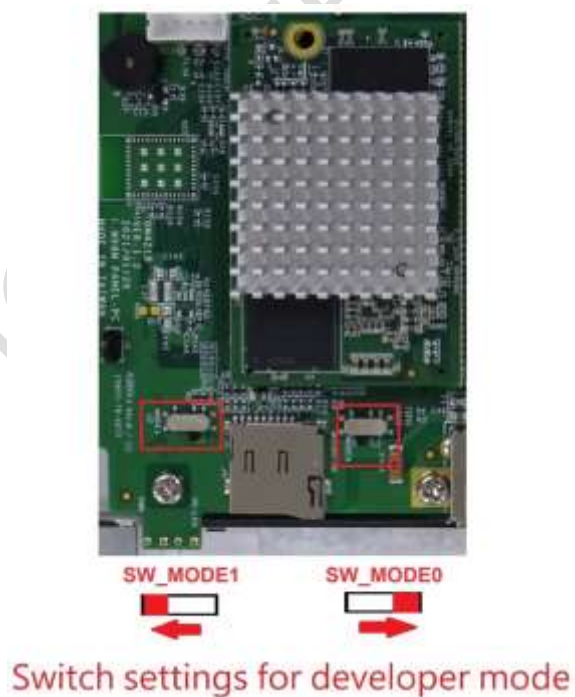
Pin #	Signal Name
1	+12 ~ 36V
2	GND

2.4 Boot Mode Settings

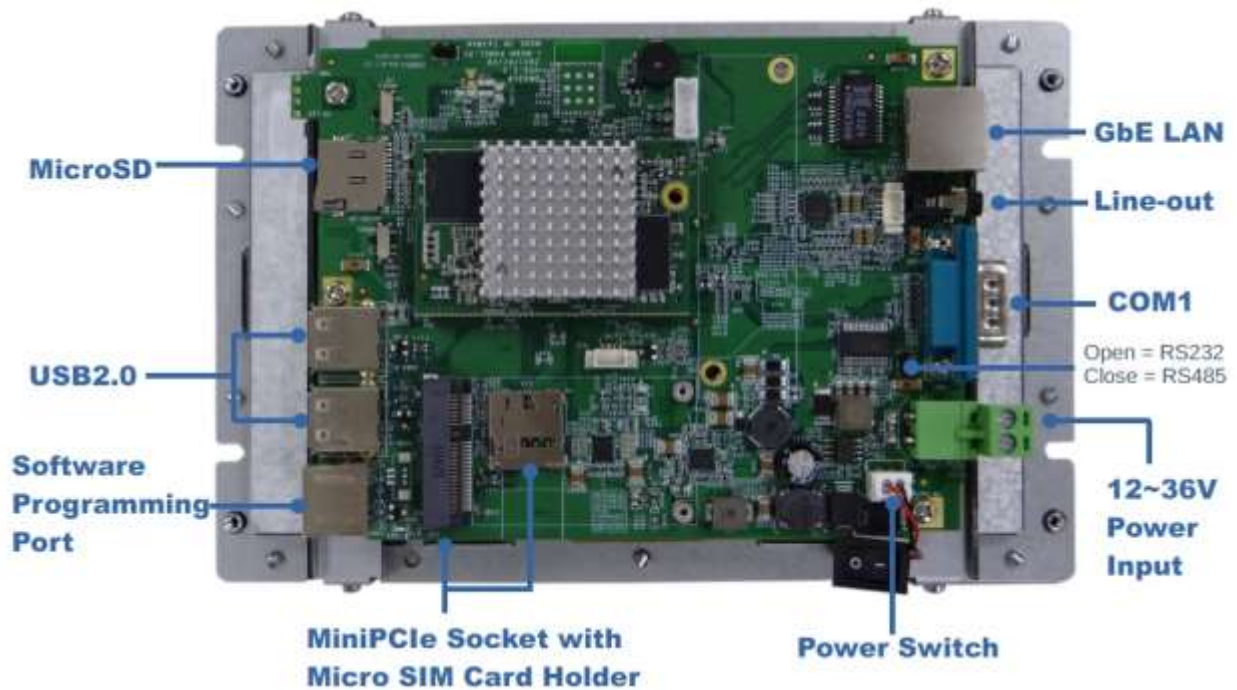
Two switches setting for Normal mode, internal flash booting.



Two switches setting for Developer mode, which allow user to write the image in the eMMC.



2.5 External I/O Overview



NOTE

1. MiniPCle Socket supports PCIe and USB signals.
2. Micro SIM Card Holder is only for MiniPCI slot.
3. The RS232/485 function of COM1 is selected by J6 headers.
(Please refer the section 2.2 and 2.3.)

Ch. 3

Software Resource

[3.1 ICOP Wiki](#)

ICOP TECHNOLOGY INC.

3.1 ICOP Wiki

ICOP Technology has a wiki site which provides all of the software support for VOX-070-TS-N8m such as demo image, recipe, and testing method.

Please contact info@icop.com.tw or your ICOP sales representative.

ICOP TECHNOLOGY INC.

Warranty

This product is warranted to be in good working order for a period of one year 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 at no 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 will be 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.

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