User Manual

VDX3-6724

with

DM&P Vortex86DX3 1GHz processor

Half-Size CPU Module with

4S/4USB/VGA/LCD/LVDS/

AUDIO/2LAN/GPIO/

1/2GB DDR3 Onboard

Version 2.0

ICOP Technology Inc.

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Revision History

Revision	Date	Remark
1.0	June 13, 2016	First release
2.0	June 8, 2016	New Add: (1) Working temperature for Dual Core version (2) Cable set for VDX3-6724 with Compact Flash

Table of Contents

1 General Information

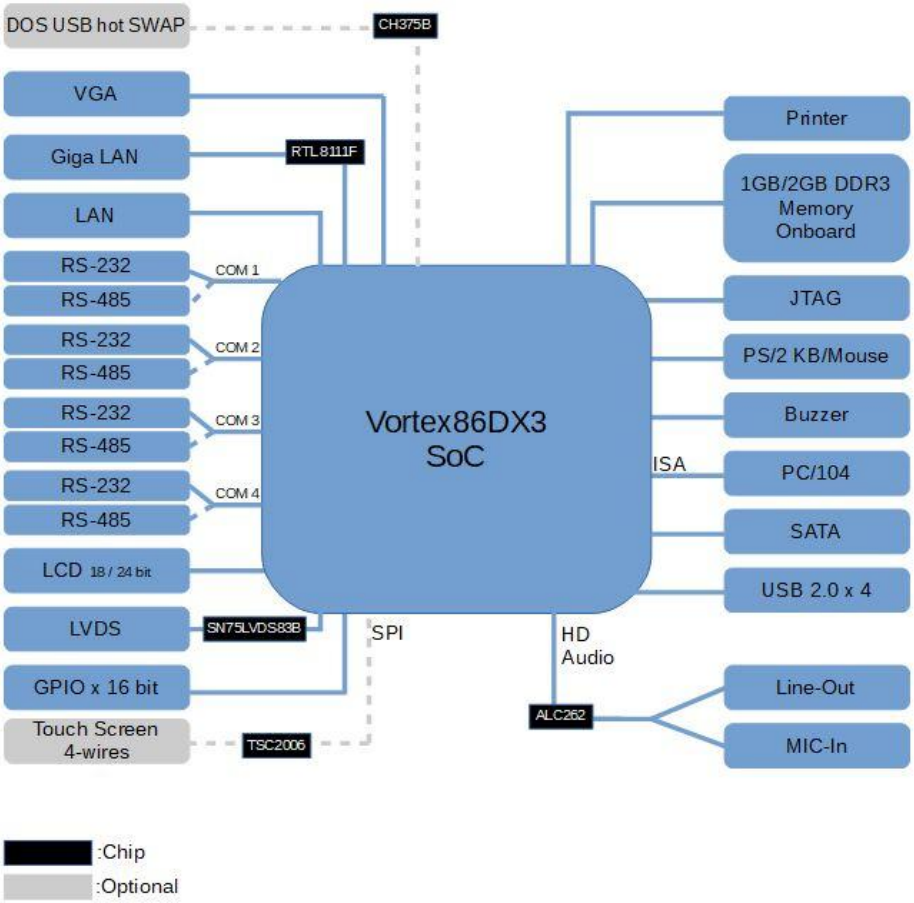
1.1 Overview

The VDX3-6724 is a low-power CPU module which compliant with ETX standard. It takes the advantage of Vortex86DX3 1GHz x86 CPU which integrate the SATA, I2C, VGA, LVDS, PS/2, USB, HD Audio and even with 16-bit ISA bus support.

The VDX3-6724 is designed as a plug in replacement, with backward compatibility to support legacy software to help extend existing product life cycle without heavy re-engineering.

1.2 Block diagram

Board Block Diagram



1.3 Specifications

Processor	DM&P SoC CPU Vortex86DX3 - 1GHz L1:32K I-Cache, 32K D-Cache, L2 Cache:512KB
RAM	1GB/2GB DDR3 Onboard
Bus	PC/104 Standard Compliant
Watchdog Timer	Software programmable from 30.5 us to 512 seconds x2sets
Display	Integrated 2D VGA chip with dual display support (VGA + TTL / VGA + LVDS) VGA: Maximum resolution up to 1920x1080 @ 60Hz LVDS: Maximum resolution up to 1024x768 @ 60Hz Single channel 24-bit LVDS
LAN	Integrated 10/100Mbps Ethernet x1 Realtek 81111F 10/100/1000Mbps Ethernet x1
Audio	HD Audio
Optional Interface	PS/2 touch controller x1 *DOS USB hot SWAP x1
I/O Interface	SATA 7P Connector x1 RS232 port x2 RS232/485 port x2 Parallel port x1 USB port (Ver. 2.0) x4 16-bit GPIO port x1 10/100Mbps Ethernet port x1 10/100/10000Mbps Ethernet port x1

*Foe more detail, please contact ICOP sales.

Connectors	SATA 7P for SATA x1, 2P for SATA Power x1 2.54mm 26-pin box header for Printer x1 2.54mm 20-pin box header for GPIO x1 2.54mm 10-pin box header for USB x2 2.54mm 10-pin box header for RS232 x3 2.54mm 2-pin header for Reset x1 2.0mm 44-pin box header for LCD x1 2.0mm 20-pin header for LVDS x1 2.0mm 8-pin header for Ethernet x1 1.25mm 4-pin wafer for Line-out/MIC-in x2 External RJ-45 connector for Ethernet x1 External Mini DIN connector for KBD/Mouse x1 External D-Sub 15 pins female connector for VGA x1 External D-Sub 9 pins male connector for RS232 x1
Flash Disk Support	Compact Flash Type I/II (Optional) Onboard eMMC 512MB/4GB (Optional)
Power Requirement	Single Voltage +5V @1000mA (Typical)
Dimensions	184mm x 122mm (7.24 x 4.80 inches)
Weight	180g
Operating Temp.	-20℃ ~ +70℃ (Single Core) -10℃ ~ +60℃ (Dual Core) -40℃ ~ +85℃ (Optional for Single Core) -20℃ ~ +70℃ (Optional for Dual Core)
Operating System Support	Free DOS, DOS 6.22, PCDOS 7.1, DR-DOS, x-DOS, OS/2, Windows 7, Windows Embedded Standard 7, Windows Embedded Compact 7, Windows Embedded Compact 6, Windows XP Professional, Windows Embedded Standard(XPE), POS Ready(WePOS), Embedded Linux, QNX, Vxworks and FreeBSD.

1.4 Ordering Information

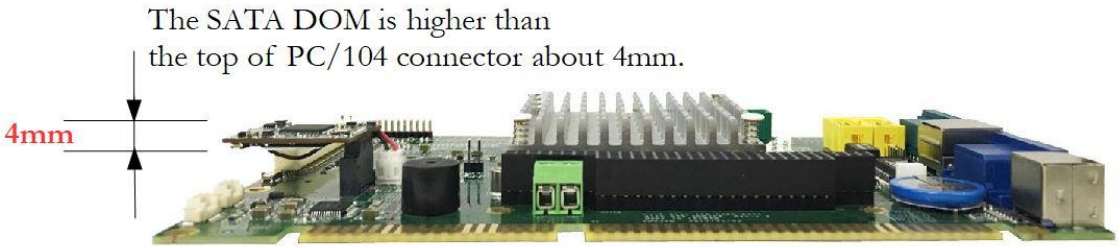
Part Number	Product Description	
VDX3-6724-1G	Vortex86DX3 Half-Size CPU Module with 1GB DDR3	
VDX3-6724-2G	Vortex86DX3 Half-Size CPU Module with 2GB DDR3	
VDX3-6724-2C-1G	Vortex86DX3 Half-Size Dual Core CPU Module with 1GB DDR3	
VDX3-6724-2C-2G	Vortex86DX3 Half-Size Dual Core CPU Module with 2GB DDR3	
VDX3-6724-CF-1G	Vortex86DX3 Half-Size CPU Module with 1GB DDR3 with CF card slot	
VDX3-6724-2C-CF-1G	Vortex86DX3 Half-Size Dual Core CPU Module with 1GB DDR3 with CF card slot	
VDX3-6724-CF-2G	Vortex86DX3 Half-Size CPU Module with 2GB DDR3 with CF card slot	
VDX3-6724-2C-CF-2G	Vortex86DX3 Half-Size Dual Core CPU Module with 1GB DDR3 with CF card slot	
CABLE-6724-SET	GPIO (2.54) x1 RS-232 (2.54) x3 Audio Line x2 YKB x1	Printer (2.54) x1 USB (2.54) x2 NET 4x2 (2.0) x1
CABLE-6724-CF	RS-232 (2.54) x3 Audio Line x2 YKB x1	USB (2.54) x2 NET 4x2 (2.0) x1
ICOP-0096	Vortex86 LVDS 18-bit Converter Kit for LCD Panel Display	
CABLE-LVDS-30	18-Bit LVDS Cable	

*Default setting for processor on VDX3-6724 is Single-core. If Dual-core processor is required, please contact ICOP (info@icop.com.tw).

Storages:

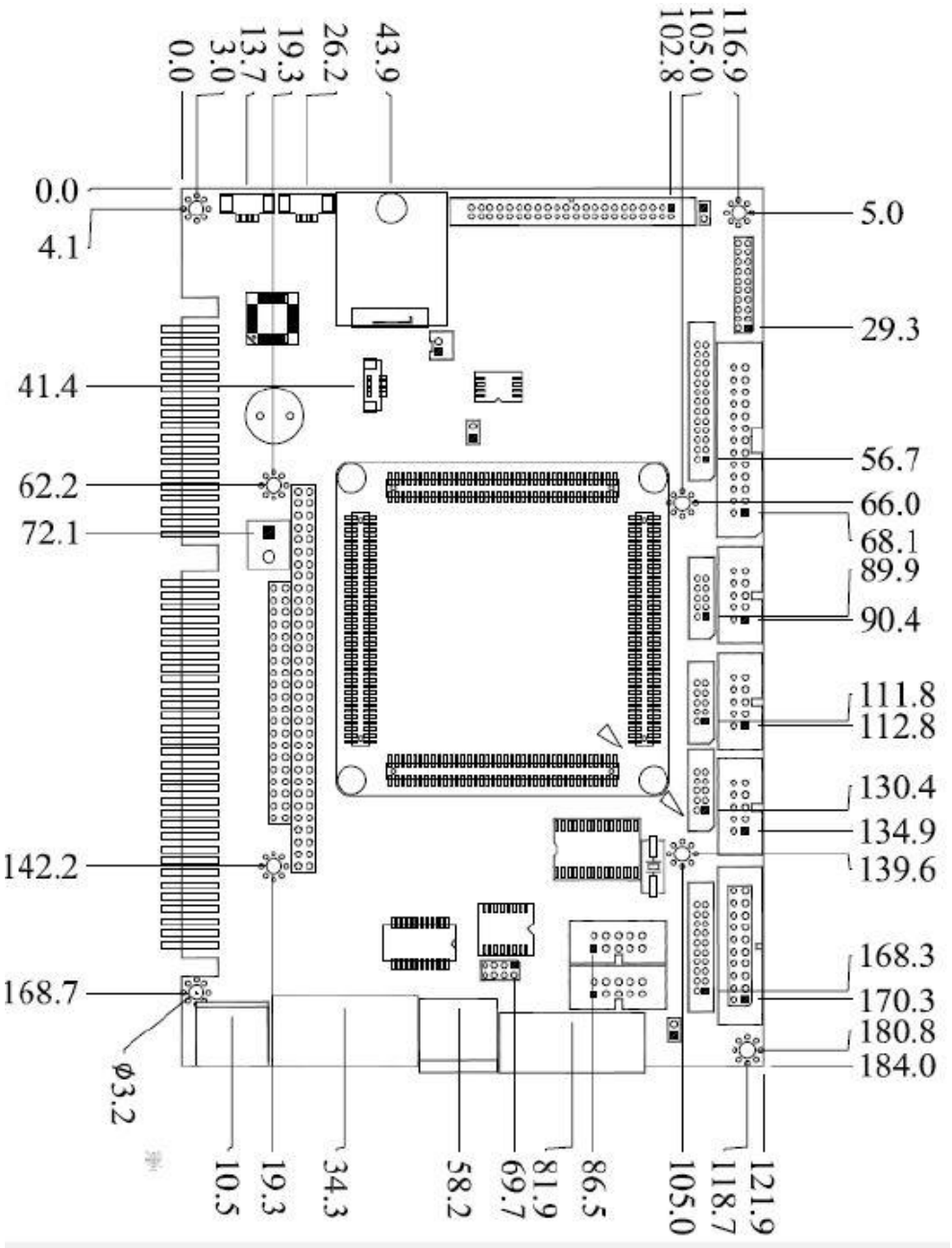
Product Name	MLC	SLC	0℃ ~ +70℃	-40℃ ~ +85℃
SDM-SST-2G-H-M	V		V	
SDM-SST-4G-H-M	V		V	
ISATA-8G-H-M	V		V	
ISATA-16G-H-M	V		V	
ISATA-32G-H-M	V		V	
ISATA-4G-H-M-X	V			V
ISATA-8G-H-M-X	V			V
ISATA-16G-H-M-X	V			V
ISATA-32G-H-M-X	V			V
ISATA-1G-H-S		V	V	
ISATA-2G-H-S		V	V	
ISATA-4G-H-S		V	V	
ISATA-8G-H-S	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

Demonstration of "SDM-SST" SATA DoM on VDX3-6724



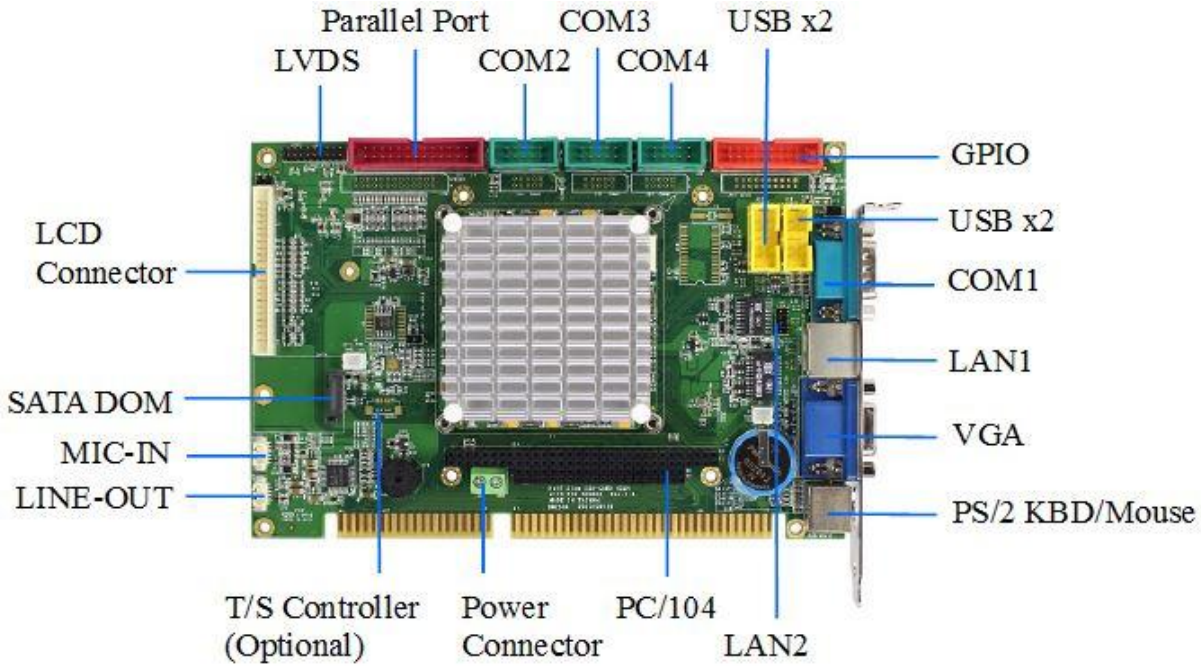
2 Hardware Information

2.1 Board Dimension



2.2 Board Outline

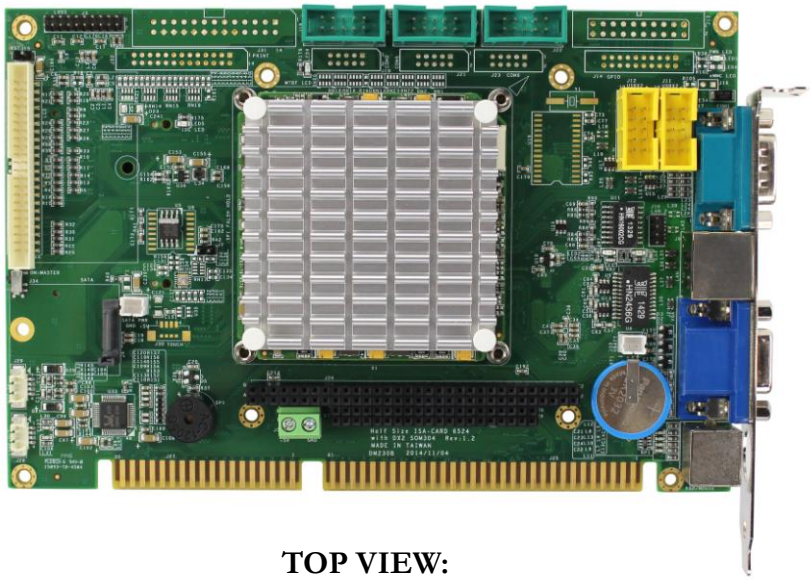
VDX3-6724



Note:

1. COM RS232/485 is selected by BIOS.
2. Onboard SPI ROM (optional) and PS/2 Mouse will be disabled when Touch function (optional) is selected.
3. GPIO will be occupied when eMMC is selected on VDX3-6724.
4. LPT, eMMC, and GPIO are not available on VDX3-6724-CF.
5. CF card slot is only available on VDX3-6724-CF. (see the image below)

VDX3-6724-CF

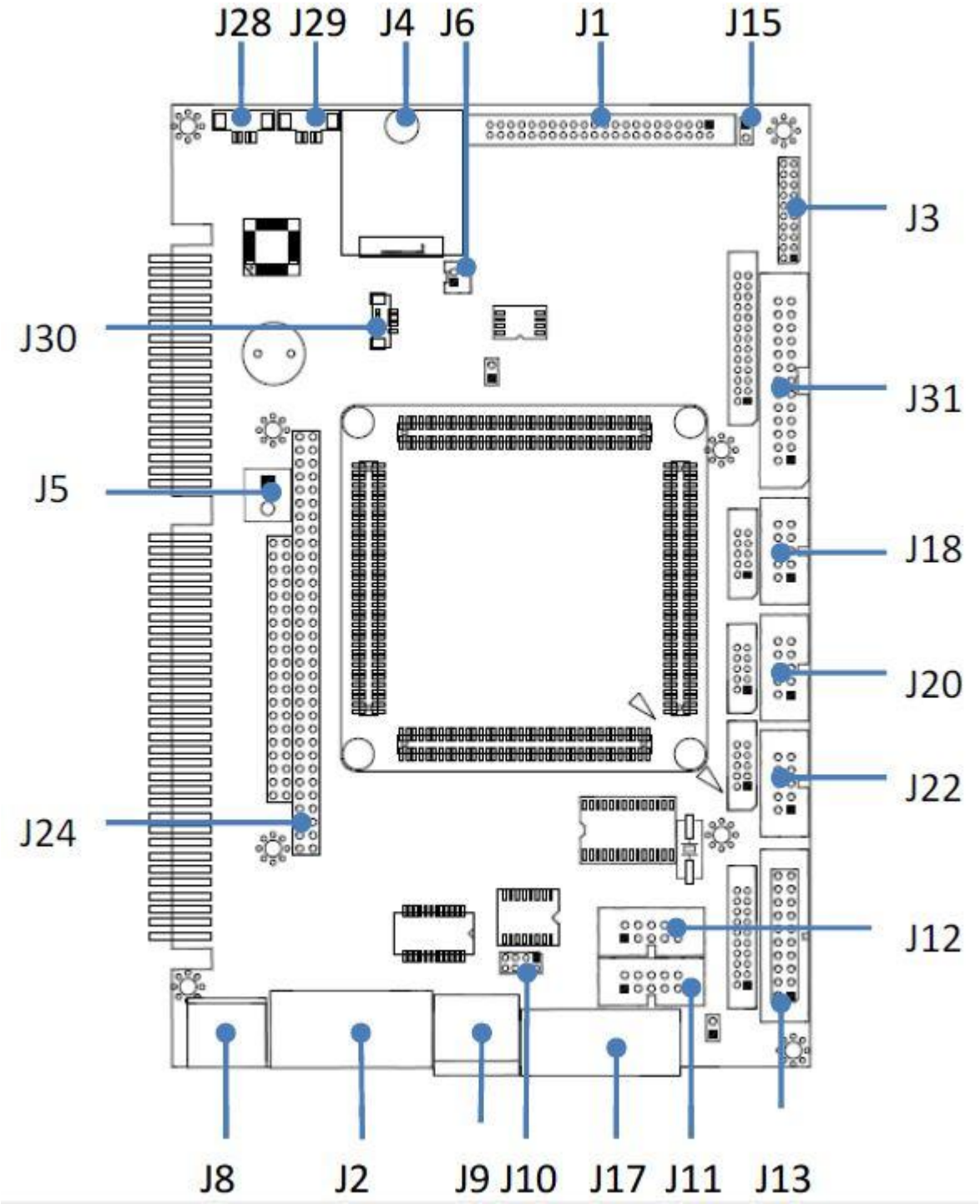


TOP VIEW:

BOTTOM VIEW:

2.3 Connector and Jumper Location and Summary

Jumper Location:



Jumper Summary:

Nbr.	Name	Type of Connections	Nbr of Pin
J1	LCD	Box Header, 2.0mm, 2x22	44
J2	VGA	15-pin D-Sub Female	15
J3	24-bit LVDS	Pin Header, 2.0mm, 10x2	20
J4	SATA DOM	SATA 7P Connector, 7x1	7
J5	Power Connector	Terminal Block, 5.0mm, 2x1	2
J6	SATA DOM Power	Box Header, 2.0mm, 1x2	2
J8	PS/2 Keyboard/Mouse	Mini-DIN Female	6
J9	LAN1	RJ45 Connector	8
J10	LAN2	Pin Header, 2.0mm, 4x2	8
J11	USB0&1	Box Header, 2.54mm, 5x2	10
J12	USB2&3	Box Header, 2.54mm, 5x2	10
J13	GPIO (Port6/7)	Box Header, 2.54mm, 10x2	20
J15	Reset	Pin Header, 2.54mm, 1x2	2
J17	COM1(RS232/485 or optional TTL/P4)	D-Sub Male	9
J18	COM2(RS232/485 or optional TTL/P5)	Box Header, 2.54mm, 5x2	10
J20	COM5(RS232/485 or optional TTL/P0)	Box Header, 2.54mm, 5x2	10
J22	COM6(RS232/485 or optional TTL/P1)	Box Header, 2.54mm, 5x2	10
J24A	PC104 Connector – 64 pins	Box Header, 2.54mm, 32x2	64
J24B	PC104 Connector – 40 pins	Box Header, 2.54mm, 20x2	40
J28	Line-Out	Wafer, 1.25mm, 4x1	4
J29	MIC-In	Wafer, 1.25mm, 4x1	4
J30	Touch screen Controller (Optional)	Wafer, 1.25mm, 4x1	4
J31	Print	Box Header, 2.0mm, 13x2	26
J34	Master/Slave for CF Card	Slide switch	3
CF1	CF card slot		
SP1	Buzzer		

2.4 Pin Assignments & Jumper Settings

J1: LCD

Pin#	Single Name	Pin #	Single Name
1	+3.3V	2	+3.3V
3	LG2	4	LG3
5	LG4	6	LG5
7	NC	8	NC
9	LR0	10	LR1
11	LR2	12	LR3
13	LR4	14	LR5
15	GND	16	NC
17	NC	18	NC
19	NC	20	GND
21	NC	22	NC
23	LB0	24	LB1
25	LB2	26	LB3
27	LB4	28	LB5
29	NC	30	NC
31	LG0	32	LG1
33	GND	34	GND
35	NC	36	LCLK
37	NC	38	LDE
39	NC	40	LHSYNC
41	NC	42	LVSYNC
43	LBACKL	44	LVDDEN

(Please refer to Appendix for TFT Flat Panel Data Output)

J2: VGA

Pin#	Single Name	Pin #	Single Name
1.	R OUT	2	G OUT
3	B OUT	4	NC
5	GND	6	GND
7	GND	8	GND
9	NC	10	GND
11	NC	12	DDCDAT
13	HSYNC	14	VSYNC
15	DDCCLK		

J3: LVDS (24-bit Support Only)

Pin#	Single Name	Pin #	Single Name
1	VCC3 (+3.3V)	2	VCC3 (+3.3V)
3	GND	4	GND
5	RxIN0+	6	RxIN0-
7	RxIN1-	8	GND
9	GND	10	RxIN1+
11	RxIN2+	12	RxIN2-
13	CKIN-	14	GND
15	GND	16	CKIN+
17	RxIN3-	18	GND
19	GND	20	GxIN3+

J4: SATA DOM

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

J5: Power Connector (Terminal Block 5.0mm)

Pin#	Single Name
1	+5V
2	GND

J6: SATA DOM POWER

Pin#	Single Name	Pin #	Single Name
1	VCC	2	GND

J9: LAN1 (RJ45)

Pin#	Single Name	Pin #	Single Name
1	ATX+	2	ATX-
3	ARX+	4	LED0
5	LED0+	6	ARX-
7	LED1+	8	LED1

J10: LAN2

Pin#	Single Name	Pin #	Single Name
1	ATX+	2	ATX-
3	ARX+	4	LED0
5	LED0+	6	ARX-
7	LED1+	8	LED1

J11: USB0&1

Pin#	Single Name	Pin #	Single Name
1.	VCC	2	VCC
3	LUSBD0-	4	LUSBD0-
5	LUSBD0+	6	LUSBD1+
7	GND	8	GND
9	GGND	10	GGND

J12: USB2&3

Pin#	Single Name	Pin #	Single Name
1.	VCC	2	VCC
3	LUSBD2-	4	LUSBD3-
5	LUSBD2+	6	LUSBD3+
7	GND	8	GND
9	GGND	10	GGND

*USB3 supports DOS USB hot SWAP (Optional). For more detail, please contact ICOP sales.

J13: GPIO (Port 6/7)

Pin#	Single Name	Pin #	Single Name
1.	GND	2	VCC
3	GP60	4	GP70
5	GP61	6	GP71
7	GP62	8	GP72
9	GP63	10	GP73
11	GP64	12	GP74
13	GP65	14	GP75
15	GP66	16	GP76
17	GP67	18	GP77
19	VCC	20	GND

*When onboard eMMC is enabled, GPIO will be disabled.

**Not available on VDX3-6724-CF

J15: RESET

Pin#	Single Name	Pin #	Single Name
1.	RST_SW	2	GND

J17: COM1 RS232/485 D-Sub 9 pin

(Optional: TTL/ GPIO-P4)

Pin#	Single Name	Pin #	Single Name
1.	DCD1/1RS485-	2	RXD1/1RS485+
3	TXD1	4	DTR1
5	GND	6	DSR1
7	RTS1	8	CTS1
9	RI1	10	NC

J18: COM2 RS232/485

(Optional: TTL/ GPIO-P5)

Pin#	Single Name	Pin #	Single Name
1.	DCD2/2RS485-	2	RXD2/2RS485+
3	TXD2	4	DTR2
5	GND	6	DSR2
7	RTS2	8	CTS2
9	RI2	10	NC

J20: COM5 RS232

(Optional: TTL/ GPIO-P6)

Pin#	Single Name	Pin #	Single Name
1.	DCD5	2	RXD5
3	TXD5	4	DTR5
5	GND	6	DSR5
7	RTS5	8	CTS5
9	RI5	10	NC

J22: COM6 RS232

(Optional: TTL/ GPIO-P1)

Pin#	Single Name	Pin #	Single Name
1.	DCD6	2	RXD6
3	TXD6	4	DTR6
5	GND	6	DSR6
7	RTS6	8	CTS6
9	RI6	10	NC

J24A: PC/104 Connector – 64 pin

Pin#	Single Name	Pin #	Single Name
1.	IOCHCHK*	2	GND
3	SD7	4	RESETDRV
5	SD6	6	VCC
7	SD5	8	IRQ9
9	SD4	10	-5V
11	SD3	12	RDQ2
13	SD2	14	-12V
15	SD1	16	OWS
17	SD0	18	+12V
19	IOCHRDY	20	GND
21	AEN	22	SMEMW*
23	SA19	24	SMEMR*
25	SA18	26	IOW*
27	SA17	28	IOR*
29	SA16	30	DACK3*
31	SA15	32	DRQ3
33	SA14	34	DACK1*
35	SA13	36	DRQ1*
37	SA12	38	REFRESH*
39	SA11	40	SYSCLK
41	SA10	42	IRQ7
43	SA9	44	IRQ6
45	SA8	46	IRQ5
47	SA7	48	IRQ4
49	SA6	50	IRQ3
51	SA5	52	DACK2*
53	SA4	54	TC
55	SA3	56	BALE
57	SA2	58	VCC
59	SA1	60	OSC
61	SA0	62	GND
63	GND	64	GND

J24B: PC/104 Connector – 40 pin

Pin#	Single Name	Pin #	Single Name
1.	GND	2	GND
3	MEMCS16*	4	SBHE*
5	IOCS16*	6	SA23
7	IRQ10	8	SA22
9	IRQ11	10	SA21
11	IRQ12	12	SA20
13	IRQ15	14	SA19
15	IRQ14	16	SA18
17	DACK0*	18	SA17
19	DRQ0	20	MEMR*
21	DACK5*	22	MEMW*
23	DRQ5	24	SD8
25	DACK6*	26	SD9
27	DRQ6	28	SD10
29	DACK7	30	SD11
31	DRQ7	32	SD12
33	VCC	34	SD13
35	MASTER*	36	SD14
37	GND	38	SD15
39	GND	40	NC

J28: Line-Out

Pin#	Single Name
1.	LOUTR
2	GND
3	GND
4	LOUTL

J29: MIN-In

Pin#	Single Name
1	MICVREF
2	GND
3	GND
4	MIC-IN

J30: Touch screen (Optional)

Pin#	Single Name
1	Y-
2	X-
3	Y+
4	X+

*Onboard SPI ROM (optional) and PS/2 Mouse will be disabled when Touch function (optional) is selected.

J31: Print

Pin#	Single Name	Pin #	Single Name
1	STB-	14	AFD-
2	PD0	15	ERR-
3	PD1	16	INIT-
4	PD2	17	SLIN-
5	PD3	18	GND
6	PD4	19	GND
7	PD5	20	GND
8	PD6	21	GND
9	PD7	22	GND
10	ACK-	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SLCT	26	NC

*Not available on VDX3-6724-CF

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 Windows Embedded Compact 7, Windows Embedded CE6.0, and Windows XP Embedded (Win XPe), etc. For details, please visit
http://tech.icop.com.tw/.

4 Basic BIOS Setting

4.1 Introduction

Featuring AMI BIOS, the VDX3-6724 module is a one stable module board for your applications. In this section, we will introduce you some basic AMI BIOS setting such as CPU speed adjusting, console redirection, and IDE configuration, etc.

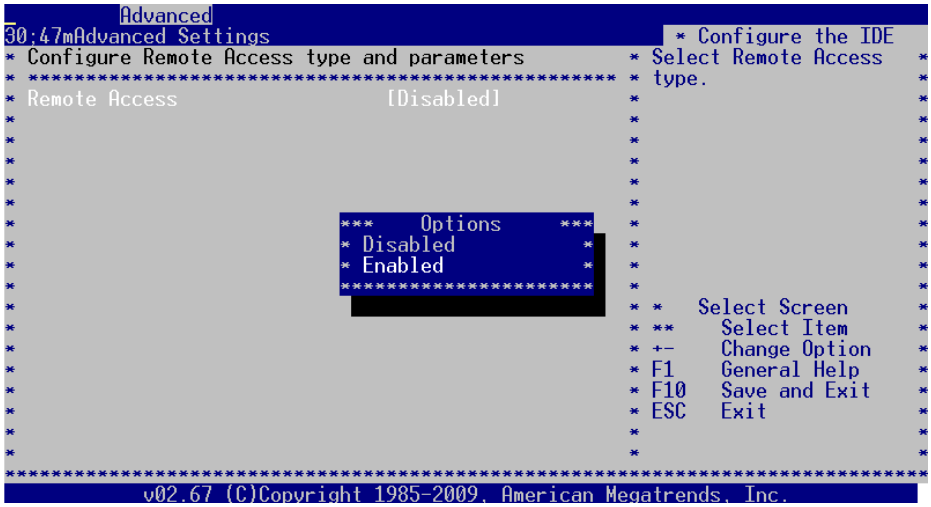
4.2 CPU Clock Adjusting

For CPU clock adjusting, please contact your contact window directly or mail info@icop.com.tw.

4.3 Console Redirection

Access to computer board through serial port, you can work on VDX3-6724 without VGA display or monitor. The default access port is COM1 and disabled. If you would like to use this function, please go to the path below to enable Console Redirection.

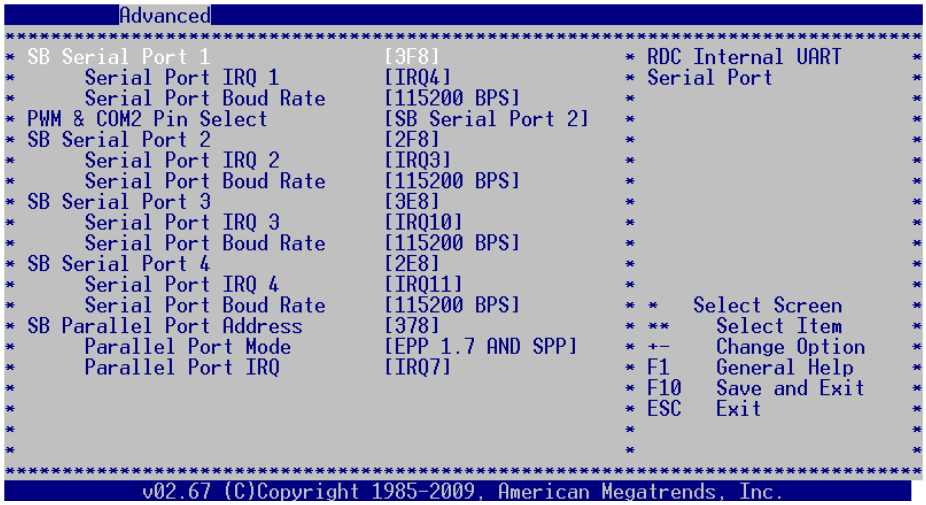
Path: Advanced >Remote Access Configuration >Remote Access [Enabled]



4.4 Serial Ports Switching

Serial ports on VDX3-6724 are set RS232 as default. If you need RS485 be your default serial ports. Please contact your contact window directly or mail info@icop.com.tw. And you can refer to the below instruction to select the IRQ mode according to your demands.

Path: Advanced >Serial/Parallel Port Configuration



4.5 IDE Configuration

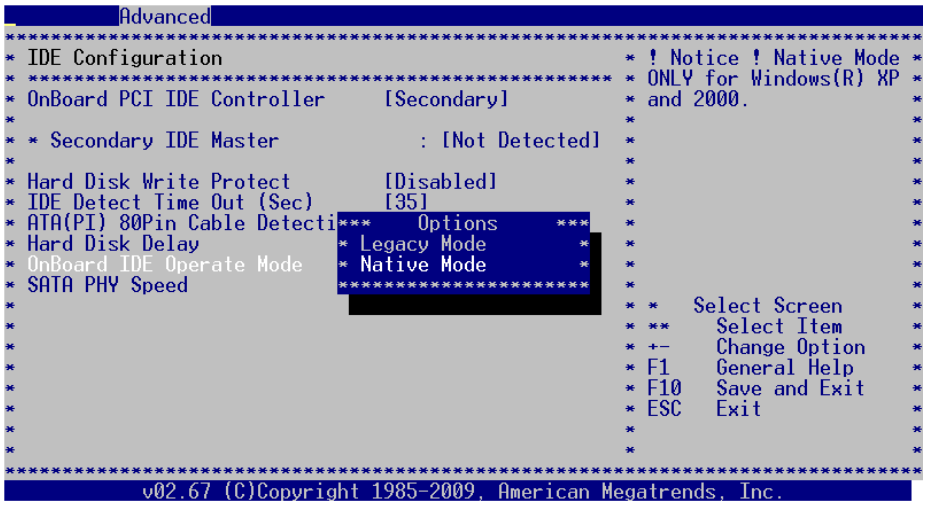
The default IDE configuration is for Windows Operating System, and the setting as below:

Onboard IDE Operate Mode: [Legacy Mode]
IDE Compatibility: [Disabled].

If you would like to use Linux on VDX3-6724, please follow below instructions:

Onboard IDE Operate Mode: [Native Mode]
IDE Compatibility: [Enabled].

Path of Onboard IDE Operate Mode:
Advanced >IDE Configuration >Onboard IDE Operate Mode [Native Mode]

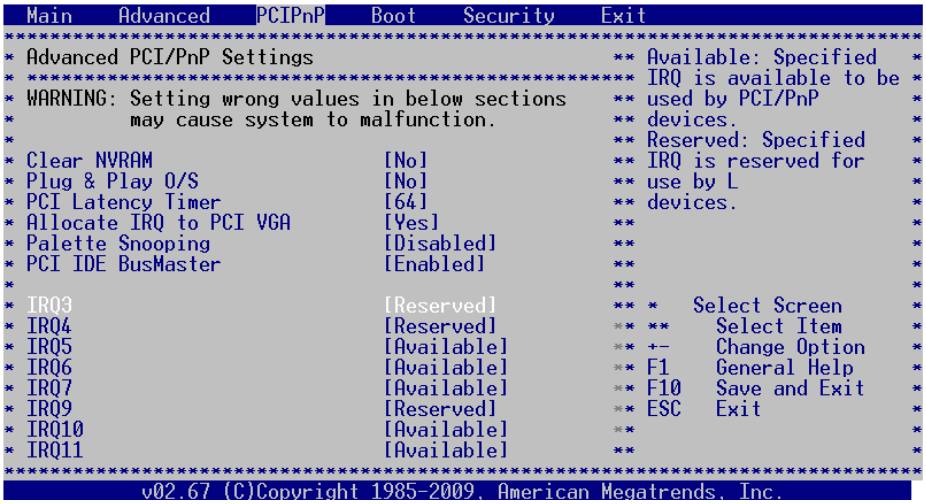


4.6 Advanced PCI-PnP Setting

Two statuses for IRQ setting:

[Reserved]: IRQ will free to be allocated by PnP BIOS.
[Available]: IRQ will not free to be allocated by PnP BIOS.

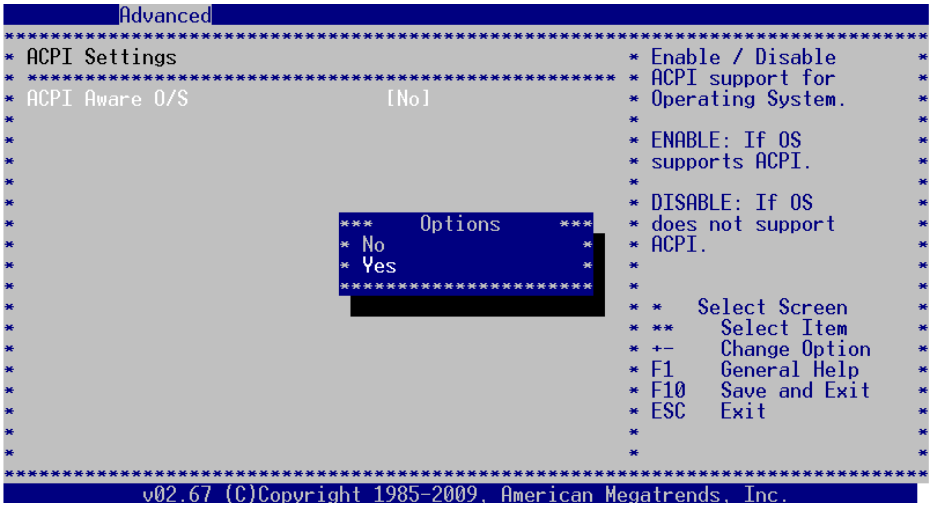
Path: PCIPnP >IRQ



4.7 ACPI Enable

To install Windows 7 on ICOP computer boards, please enable ACPI as the following instruction.

Path: Advanced >Power Management Configuration > ACPI Configuration >ACPI Aware O/S



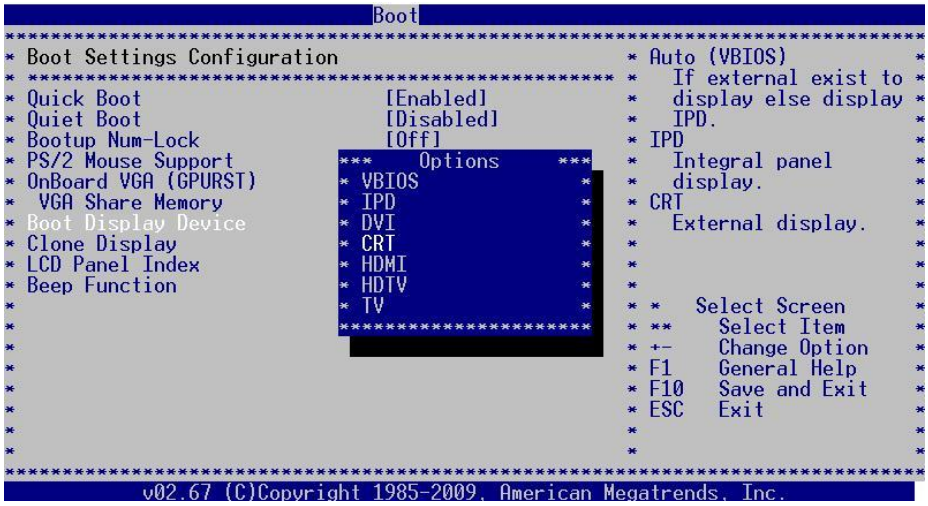
5 Basic LCD Panel Setting

5.1 Introduction

The VDX3-6724 offers two different interfaces which support maximum resolution up to 1920 x 1080 (at 60 MHz) connecting to VGA and LCD Flat Panel with 18-bit/24bit LVDS.

The default setting of **Boot Display Device [VBIOS]** and **LCD Panel Index [VBIOS]** with **Clone Display [ENBALED]** support dual display (LCD and VGA) on VDX3-6726.

If your VGA display shifts because of the above setting, please switch **Boot Display Device [VBIOS] to [CRT]** as the following image:



**Boot Display Device [VBIOS]: LCD and VGA display supported with display setting based on your required LCD specification.

[CRT]: VGA display supported

5.2 Pin Assignment of LVDS

Please refer Page 20 for LVDS pin assignment.

5.3 Basic BIOS Setting for LCD

If you would like to use LCD panel with VDX3-6726, please follow below instruction:

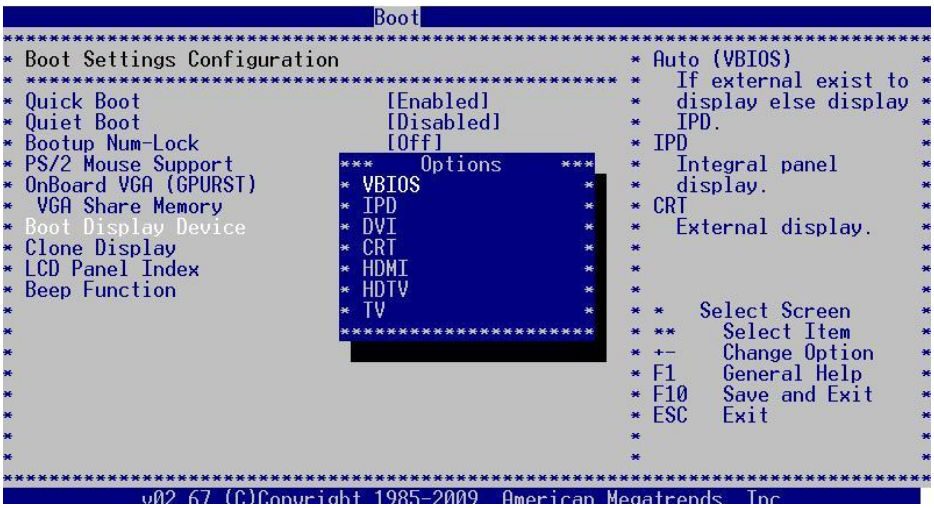
Boot Display Device [VBIOS]

LCD Panel Index according to your LCD resolution from VBIOS to 5.

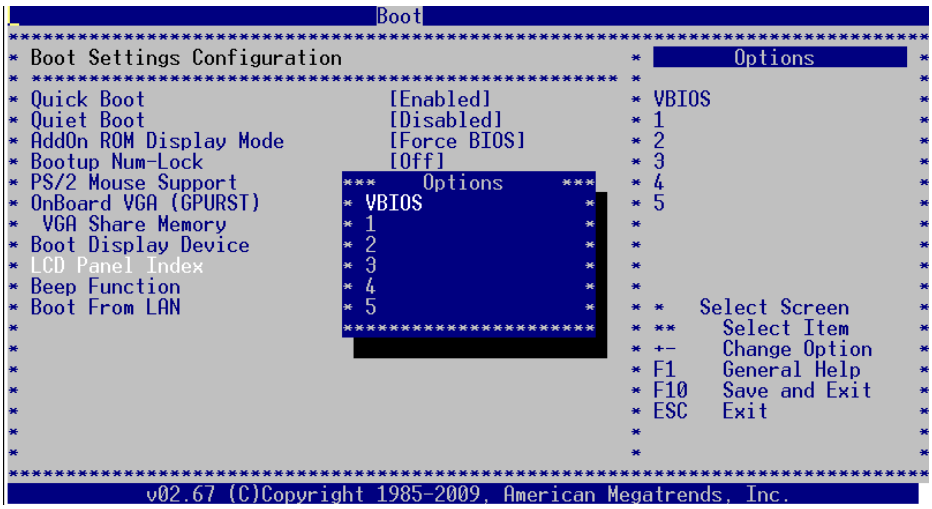
Options	Resolution of the LCD Panel
VBIOS	the Required LCD Specification
1	640 x 480
2	800 x 480
3	800 x 600
4	1024 x 600
5	1024 x 768

Path of Boot Display Device setting:

Boot >Boot Settings Configuration >Boot Display Device [VBIOS]



Path of <u>LCD Panel Index setting</u>:
Boot >Boot Settings Configuration >LCD Panel Index [ ]



***The **[VBIOS]** difference between **Boot Display Device** and **LCD Panel Index**:

Boot Display Device [VBIOS]: Display Output Setting
LCD Panel Index [VBIOS]: Display Resolution Setting

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

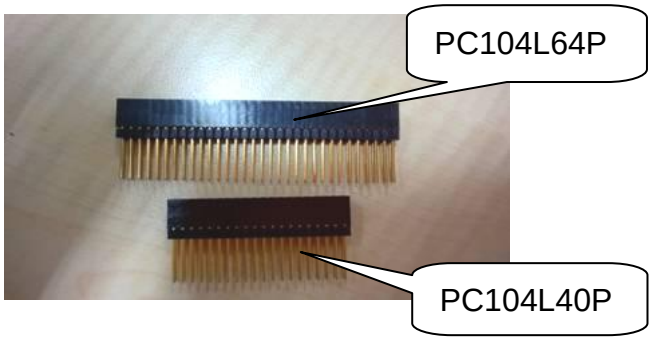
TFT Panel Data Output

LCD Pin#	Single Name	Digital 18 Bits	RGB 24 Bits
1	LCDVCC (+3.3)	VDD	VDD
2	LCDVCC (+3.3)	VDD	VDD
3	FPD12	G2	G4
4	FPD13	G3	G5
5	FPD14	G4	G6
6	FPD15	G5	7
7	FPD16	/	R0
8	FPD17	/	R1
9	FPD18	R0	R2
10	FPD19	R1	R3
11	FPD20	R2	R4
12	FPD21	R3	R5
13	FPD22	R4	R6
14	FPD23	R5	R7
15	GND	VSS	VSS
16	NC	/	/
17	NC	/	/
18	NC	/	/
19	NC	/	/
20	GND	VSS	VSS
21	FPD0	/	B0
22	FPD1	/	B1
23	FPD2	B0	B2
24	FPD3	B1	B3
25	FPD4	B2	B4
26	FPD5	B3	B5
27	FPD6	B4	B6
28	FPD7	B5	B7
29	FPD8	/	G0
30	FPD9	/	G1

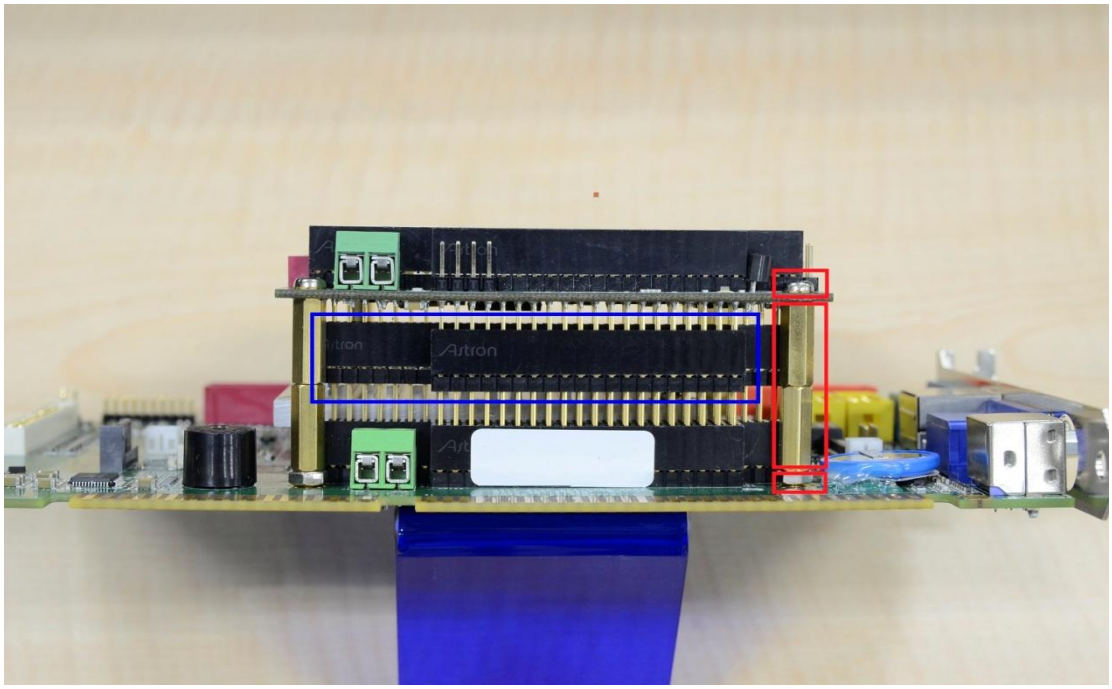
LCD#	Single Name	Digital 18 Bits	RGB 24 Bits
31	FPD10	G0	G2
32	FPD11	G1	G3
33	GND	VSS	VSS
34	GND	VSS	VSS
35	NC	/	/
36	FP1CLK	XCLK	XCLK
37	NC	/	/
38	FP1DE	DEN	DEN
39	NC	/	/
40	FP1HS	HSYNC	HSYNC
41	NC	/	/
42	FP1VS	VSYNC	VSYNC
43	FPENBLT	ADJ	ADJ
44	FPENVDD	VDDEN	VDDEN

Stacking Solution for Daughter Board

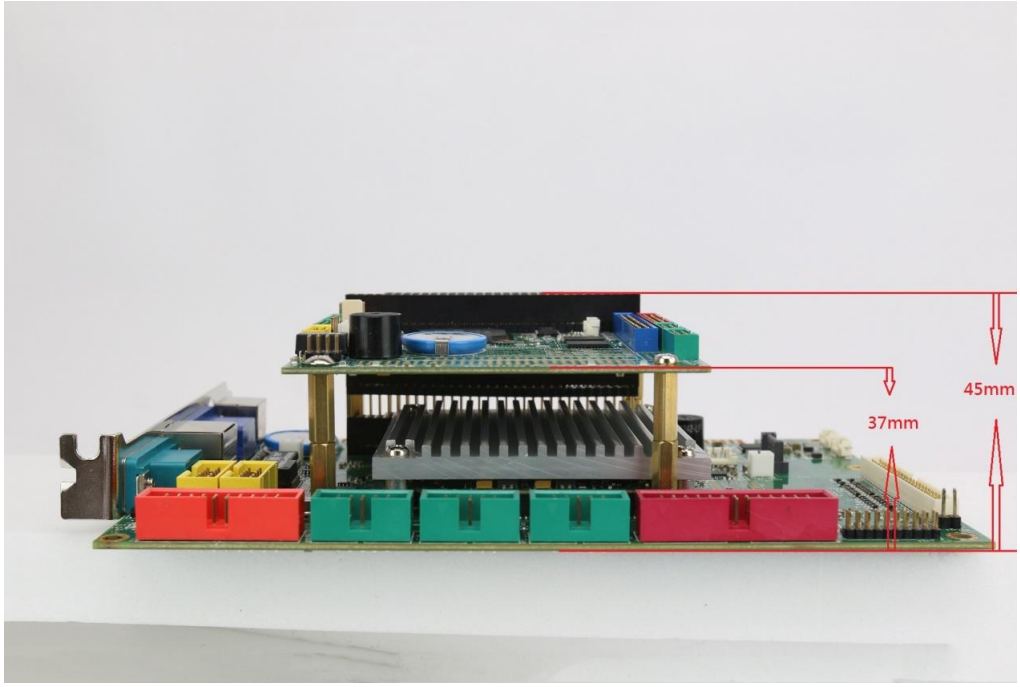
1. Please prepare PC104L40P x 1 and PC104L64P x 1 (as the image below shown).



2. Put on the nuts, pillars, screws and PC104 connector (as the image below shown)



3. As the image below shown after stacking.
   Note: Please contact ICOP if the nuts, pillars and screws are required.



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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