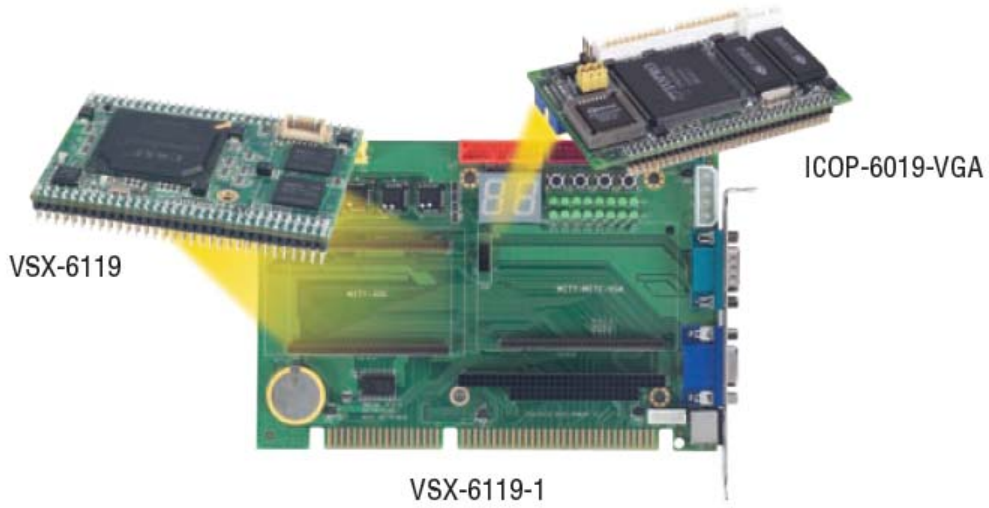

Mity-SoC Development Kit

&

Mity-SoC CPU Module

with 2S/ GPIO 128MB DDR2 Onboard

User's Manual

(Revision 1.0A)

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Manual No. IUM6119000-01 Ver.1.0A March, 2008

Trademarks Acknowledgment

Table of Contents

Chapter 1

Introduction

1.1 Packing List

Product Name	Package
VSX-6119-1	• Vortex86SX CPU Mity-SoC Development board x1 • Manual & Drivers CD x 1 • RS232 cable x 3 • PRINTER cable x1 • IDE cable x 1 • USB cable x 1 (USB port x 2) • GPIO cable x 1 • YKB for PS/2 Keyboard & Mouse x 1

Product Name	Package
VSX-6119	• Embedded Vortex86SX Mity-SoC CPU Module x1

Product Name	Package
ICOP-6019-VGA	• Mity-SoC VGA/LCD development Kit x1

1.2 Product Description

The VSX-6119 family of low-power x86 embedded controller is designed to meet Tiny specification, and integrated with the following features.

- 300 MHz Vortex86SX System-On-Chip
- 128MB DDR2 system memory
- 1 USB 2.0 (host)
- Up to 1 serial ports
- 16-bit GPIO x1
- x-ISA bus
- 2 watchdog timer
- 3 PWM channels
- JTAG interface
- AMI BIOS
- 2MB SPI flash
- Single voltage +5V DC
- Support extended operating temperature range of -20°C to +70°C

The VSX-6119 Mity-SoC family of embedded controller is designed with backward compatibility in mind, to provide migration path for projects facing end-of-life challenges with their existing x86 based Mity-Mite controller. The VSX-6119 family of controller 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.

VSX-6119 is suitable for broad range of data-acquisition, Industrial automation, Process control, Automotive controller, AVL, Intelligent Vehicle management devic,Medical device, Human machine interface, Robotics, machinery control And more…application that required small footprint, low-power and low-cost hardware with open industry standard such asTiny.

1.3 Specifications

- VSX-6119-1 (Mity-SoC ISA bus Development board)

Features	VSX-6119-1
Bus Interface	16-bit x-ISA interface PC/104 standard compliant
Status indicator	Digit Type 7-Segment LED Display for POST Code x2 GPIO LED x16
Connectors	• 2.54mm 26-pin box header for Printer x1 • 2.54mm 20-pin box header for 16-bit GPIO x1 • 2.54mm 10-pin box header for RS-232 x1 • 2.54mm 5-pin box header for Keyboard x1 • 2.54mm 10-pin box header for USB x1 • 2.54mm 2-pin header for Reset x1 • External 15-pin D-Sub female connector for VGA • External 9-pin D-Sub male connector for RS-232 x1 • External Mini DIN connector for Keyboard/Mouse x1 • 4-pin Molex connector for Power input x1 • 2-pin Terminal strip for Power input x1 • DC Jack for Power input x1
Power Requirement	Single Voltage +5V @150mA
Dimension	185 x 122mm (7.28 x 4.8 inches)
Weight	172g
Operating Temperature	-20°C ~ +70°C -40°C ~ +85°C (Optional)

■ VSX-6119

Features	VSX-6119
CPU	DM&P SoC CPU Vortex86SX- 300MHz Real Time Clock with Lithium Battery Backup
Cache	L1:16K I-Cache, 16K D-Cache
BIOS	AMI BIOS
Bus Interface	16-bit x-ISA interface
System Memory	128MB DDR2 onboard
Watchdog Timer	Software programmable from 30.5 us to 512 seconds x2 sets(Watchdog 1 fully compatible with M6117D)
I /O Interface	• RS-232 port x2 • Parallel port x1 • 16-bit GPIO port x1
Connectors	• 2.00 mm ∅ 64-pin header for 16-bit x-ISA x1 • 2.00 mm ∅ 64-pin header for I/O interface x1 • 2.00 mm ∅ 9-pin header for DMA x1 • 1.25mm ∅ 6-pin Wafer for JTAG x1
Flash Disk Support	• Onboard 2MB SPI Flash Disk (Driver: A)
Power Requirement	Single Voltage +5V @240mA
Dimension	65mm X 45mm (2.56 x1.77 inches)
Weight	21g
Operating Temperature	-20°C ~ +70°C -40°C ~ +85°C (Optional)

■ ICOP-6019-VGA

Features	ICOP-6019-VGA
Chipset	TOPRO TP6508IQ VGA and Mono/STN/DSTN/TFT Flat Panel interface support
Bus	16-bit x-ISA interface
Video Memory	Onboard 1MB EDO RAM, support resolution up to 1024x768, 256 colors
Bus Interface	PC/104+ standard compliant
Connectors	• 2.0mm 44-pin box header for LCD x1 • 2.0mm 10-pin box header for VGA x1 • 2.54mm 4-pin wafer for +12V, -12V, -5V DC-in x1
Power Requirement	Single Voltage +5V@200mA
Dimension	80 x 50mm (3.14 x 1.96 inches)
Weight	32g
Operating Temperature	-20°C ~ +60°C

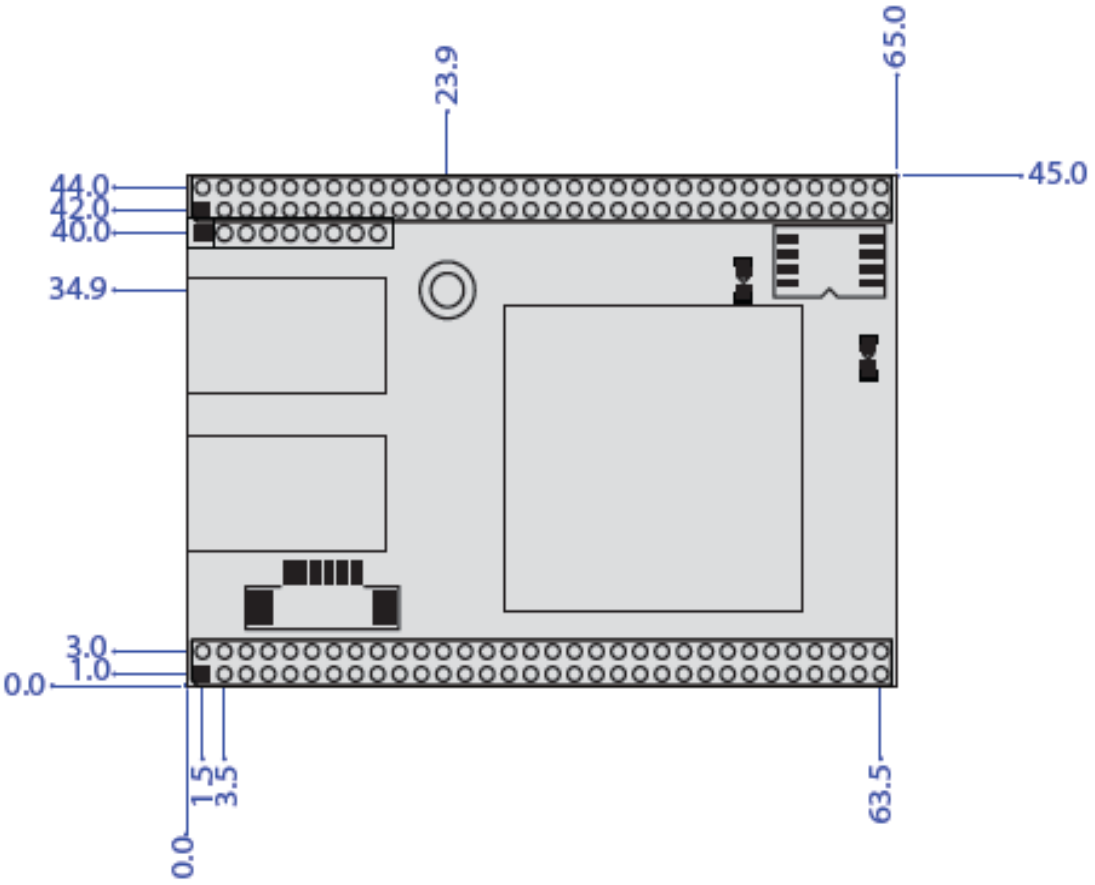
1.4 Order Selection

Mity-SoC CPU Module Ordering Selection

Ordering Type No.	SPI-2MB	TTL	RS-232
VSX-6119-A		V	
VSX-6119-B			V
VSX-6119-C	V	V	
VSX-6119-D	V		V

1.5 Board Dimension

- VSX-6119



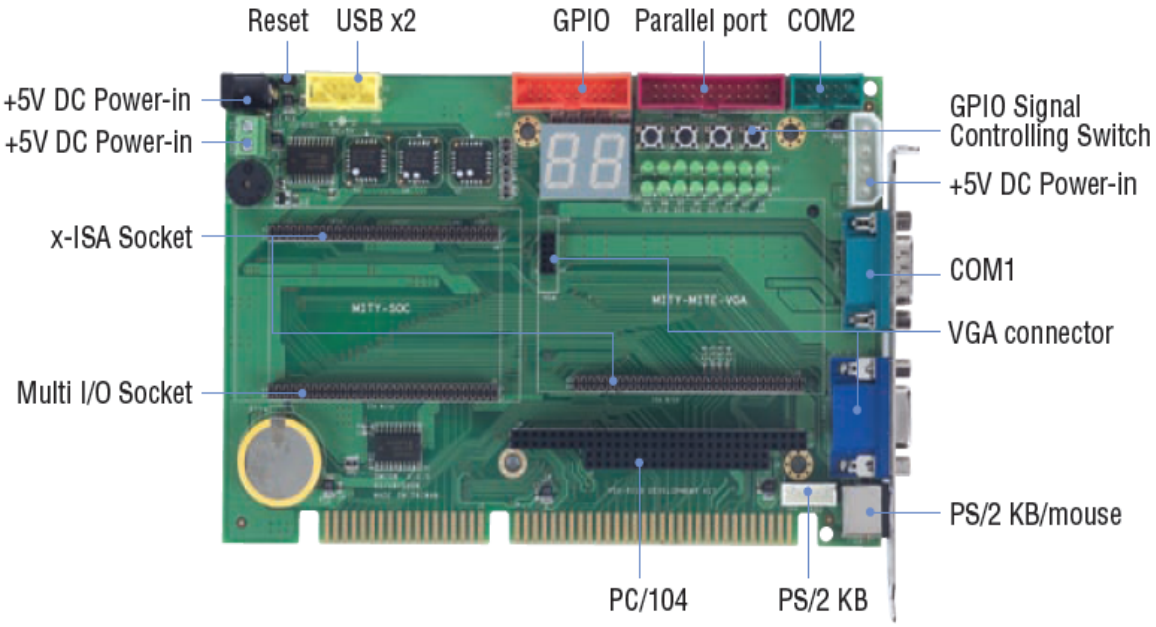
Unit: mm

Chapter 2

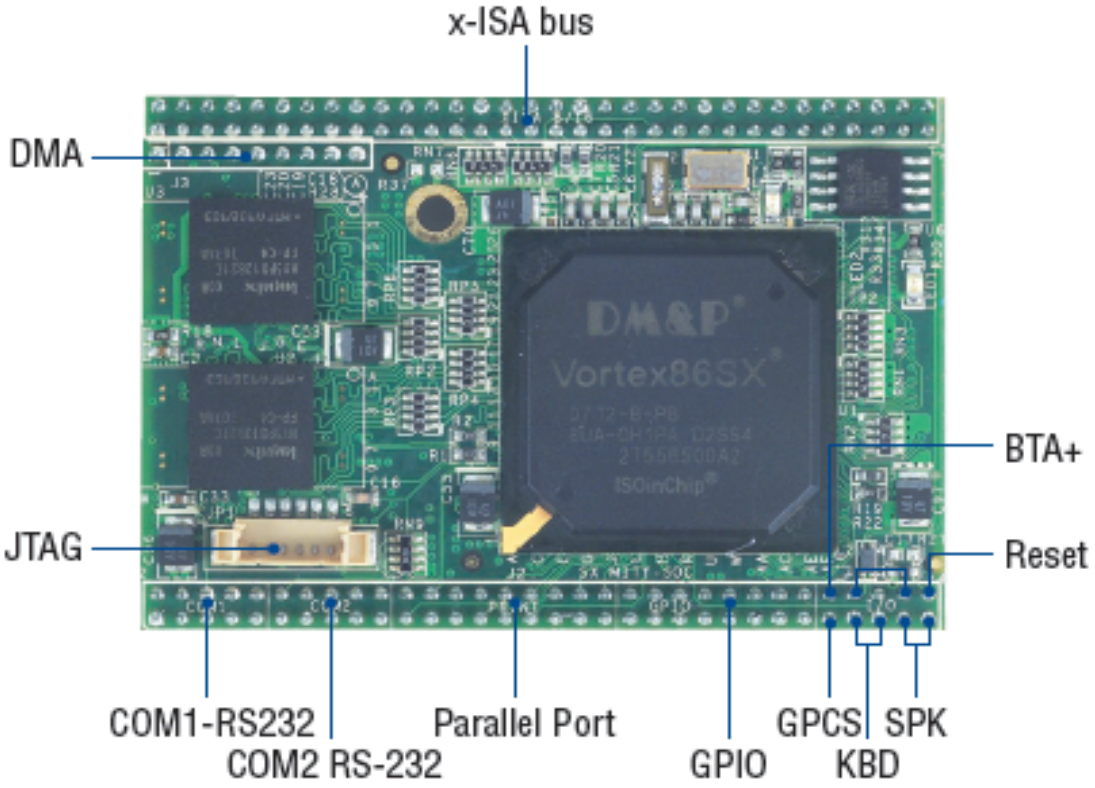
Installation

2.1 Board Outline

■VSX-6119-1 (Mity-SoC ISA bus Development board)



■VSX-6119

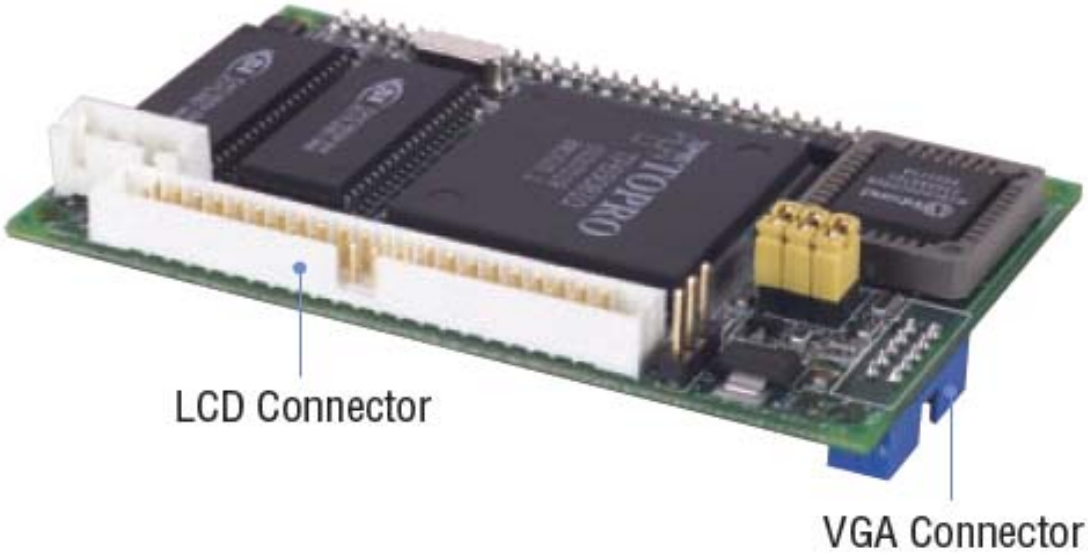


*Compatible with ICOP-6019

Note: VGA function support (ICOP-6019-VGA) via x-ISA Interface

http://www.icop.com.tw/products_detail.asp?ProductID=212

■ ICOP-6019-VGA

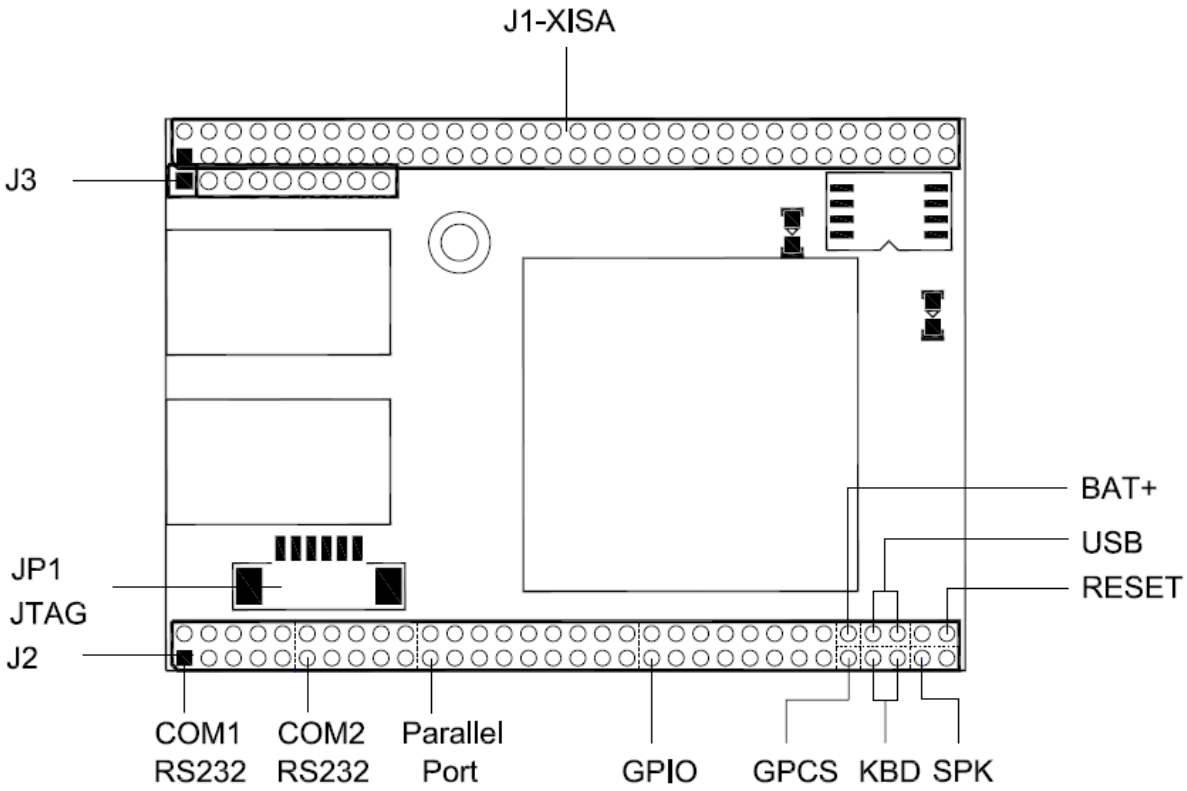


If you need more information about ICOP-6019-VGA, please visit our website:

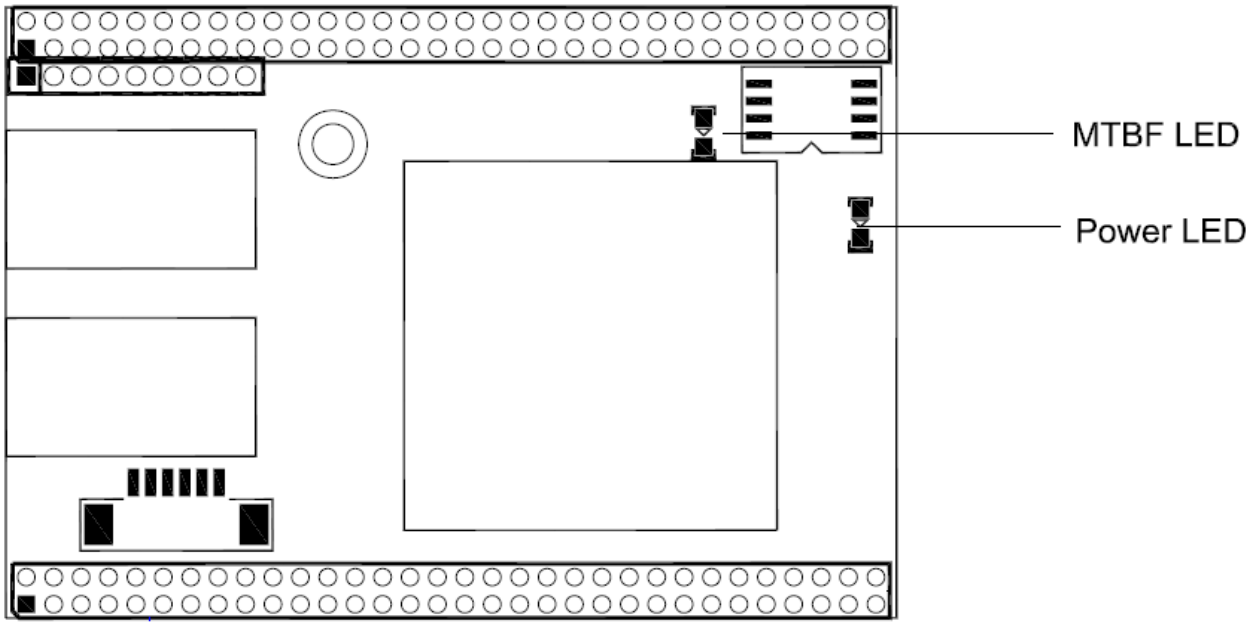
http://www.icop.com.tw/USER_S_MANUAL/CPU_BOARD/MITY-MITE_MODULE/ICOP-2820.pdf

2.2 Connectors & Jumpers Location

Connectors



Jumpers & LEDs



2.3 Connectors & Jumpers Summary

- VSX-6119-1 (Mity-SoC ISA bus Development board)

Summary Table

Nbr	Description	Type of Connections	Pin nbrs.
J1	x-ISA Connector – 64 pin	Box Header, 2.0∅, 32x2	64-pin
J2	ISA bus Connector, SL62	62-pin Gold finger	62-pin
J3	ISA bus Connector, SL36	36-pin Gold finger	36-pin
J4	PC104 Connector – 64 pin	Box Header, 2.54∅ ,32x2	64-pin
J5	PC104 Connector – 40 pin	Box Header, 2.54∅ ,20x2	40-pin
J6	Mity-Mite VGA Connector	Box Header, 2.0∅, 32x2	64-pin
J7	USB	Pin Header, 2,54∅,5x2	10-pin
J8	I / O Connector – 64 pin	Box Header, 2.0∅, 32x2	64-pin
J9	GPIO Port	Box Header, 2.54∅ ,10x2	20-pin
J10	COM1	D-Sub Connector	9-pin
J11	COM2	Box Header, 2.54∅, 5x2	10-pin
J12	Reset	Pin Header, 2.54∅, 1x2	2-pin
J13	PS/2 Keyboard	Box Header,2.54∅, 1x5	5-pin
J14	VGA	D-Sub female connector	15-pin
J15	Power Connector	Terminal Block 5.0∅ , 2x1	2-pin
J16	Power Connector	DC -JACK	3-pin
J17	Power Connector	Box Header, 5.0∅ Molex	4-pin
J18	VGA connector	Box Header, 2.54∅ , 5x2	10-pin
J19	PS/2 Keyboard	Mini-Din Connector	9-pin
J20	PRINT	Box Header, 2.54∅ ,13x2	26-pin
S1~S4	Switch Input		
U5	80 PORT (7Segment Display)	18-pin DIP SSD	18-pin
SP1	BUZZER		
GP0~GP15	LED Display		

2.4 Pin Assignments & Jumper Settings

- VSX-6119-1 (Mity-SoC ISA bus Development board)

J1: x-ISA Connector – 64pin

Pin #	Signal Name	Pin #	Signal Name
1	GND	2	SBHE
3	RSTDRV	4	SD7
5	VCC	6	SD6
7	SD8	8	SD5
9	SD9	10	SD4
11	SD10	12	SD3
13	SD11	14	SD2
15	SD12	16	SD1
17	SD13	18	SD0
19	GND	20	IOCHRDY
21	SMEMW	22	AEN
23	SMEMR	24	SA19
25	IOW	26	SA18
27	IOR	28	SA17
29	SD14	30	SA16
31	SD15	32	SA15
33	MEMCS16	34	SA14
35	ICOS16	36	SA13
37	REFRESH	38	SA12
39	SYSCLK	40	SA11
41	IRQ7	42	SA10
43	IRQ6	44	SA9
45	IRQ5	46	SA8
47	IRQ4	48	SA7
49	IRQ3	50	SA6
51	IRQ10	52	SA5
53	IRQ11	54	SA4
55	BALE	56	SA3
57	VCC	58	SA2
59	OSC	60	SA1
61	GND	62	SA0
63	IRQ12	64	IRQ14

J2: ISA Bus SL62 – 62-pin Gold finger (Total 98 pins)

Pin #	Signal Name	Pin #	Signal Name
1 (A1)	IOCHCK	2 (B1)	GND
3	SD7	4	RSTDRV
5	SD6	6	VCC
7	SD5	8	IRQ9
9	SD4	10	-5V
11	SD3	12	DRQ2
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

J3: ISA bus SL36 – 36-pin Gold finger (Total 98 pins)

Pin #	Signal Name	Pin #	Signal Name
1 (A1)	SBHE	2 (B1)	MEMCS16
3	LA23	4	IOCS16
5	LA22	6	IRQ10
7	LA21	8	IRQ11
9	LA20	10	IRQ12
11	LA19	12	IRQ15
13	LA18	14	IRQ14
15	LA17	16	DACK0
17	MEMR	18	DRQ0
19	MEMW	20	DACK5
21	SD8	22	DRQ5
23	SD9	24	DACK6
25	SD10	26	DRQ6
27	SD11	28	DACK7
29	SD12	30	DRQ7
31	SD13	32	VCC
33	SD14	34	MASTER
35	SD15	36	GND

J4: PC104 Connector – 64pin

Pin #	Signal Name	Pin #	Signal Name
1	IOCHCHK *	2	GND
3	SD7	4	RESETDRV
5	SD6	6	VCC
7	SD5	8	IRQ9
9	SD4	10	-5V
11	SD3	12	DRQ2
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

J5: PC104 Connector – 40pin

Pin #	Signal Name	Pin #	Signal 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

J6: Mity-Mite VGA Connector

Pin #	Signal Name	Pin #	Signal Name
1	GND	2	SBHE
3	RSTDRV	4	SD7
5	VCC	6	SD6
7	SD8	8	SD5
9	SD9	10	SD4
11	SD10	12	SD3
13	SD11	14	SD2
15	SD12	16	SD1
17	SD13	18	SD0
19	GND	20	IOCHRDY
21	SMEMW	22	AEN
23	SMEMR	24	SA19
25	XIOW	26	SA18
27	XIOR	28	SA17
29	SD14	30	SA16
31	SD15	32	SA15
33	MEMCS16	34	SA14
35	TOCS16	36	SA13
37	REFRESH	38	SA12
39	SYSCLK	40	SA11
41	IRQ7	42	SA10
43	IRQ6	44	SA9
45	IRQ5	46	SA8
47	IRQ4	48	SA7
49	IRQ3	50	SA6
51	IRQ10	52	SA5
53	IRQ11	54	SA4
55	BALE	56	SA3
57	VCC	58	SA2
59	XOSC	60	SA1
61	GND	62	SA0
63	IRQ12	64	IRQ14

J7: USB

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

J8: I /O Connector – 64pin

Pin #	Signal Name	Pin #	Signal Name
1	DCD1	2	RXD1
3	TXD1	4	DTR1
5	GND	6	DSR1
7	RTS1	8	CTS1
9	RI1	10	VCC
11	DCD2	12	RX2
13	TXD2	14	DTR2
15	GND	16	DSR2
17	RTS2	18	CTS2
19	RI2	20	VCC
21	PD0	22	SLCT
23	PD1	24	PR
25	PD2	26	BUSY
27	PD3	28	ACK\
29	PD4	30	SLCTIN\
31	PD5	32	INIT\
33	PD6	34	ERROR\
35	PD7	36	AUTOFD\
37	GND	38	STORBE\
39	GP0	40	GP8
41	GP1	42	GP9
43	GP2	44	GP10
45	GP3	46	GP11
47	GP4	48	GP12
49	GP5	50	GP13
51	GP6	52	GP14
53	GP7	54	GP15
55	GPCS0	56	VBAT
57	KBDAT	58	HDCS0
59	KBCLK	60	HDCS1
61	SPKR	62	RESETL
63	GND	64	PWG

J9: GPIO

Pin #	Signal Name	Pin #	Signal Name
1	GND	2	VCC
3	GP00	4	GP10
5	GP01	6	GP11
7	GP02	8	GP12
9	GP03	10	GP13
11	GP04	12	GP14
13	GP05	14	GP15
15	GP06	16	GP16
17	GP07	18	GP17
19	VCC	20	GND

J10: COM 1

Pin #	Signal Name	Pin #	Signal Name
1	DCD1	2	RXD1
3	TXD1	4	DTR1
5	GND	6	DSR1
7	RTS1	8	CTS1
9	RI1	10	GND
11	GND		

J11: COM 2

Pin #	Signal Name	Pin #	Signal Name
1	DCD2	2	RXD2
3	TXD2	4	DTR2
5	GND	6	DSR2
7	RTS2	8	CTS2
9	RI2	10	NC

J12: RESET

Pin #	Signal Name	Pin #	Signal Name
1	VCC3	2	GND

J13: PS/2 Keyboard

Pin #	Signal Name	Pin #	Signal Name
1	KBCLK	2	KBDAT
3	NC	4	GND
5	VCC		

J14: VGA

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

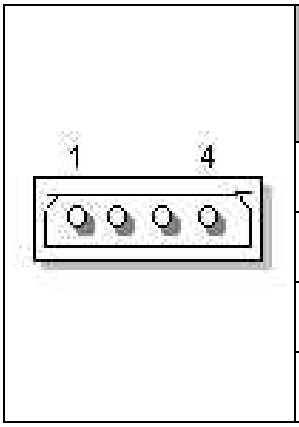
J15: Power Connector (Terminal Block 5.0mm)

Pin #	Signal Name
1	+5V
2	GND

J16: Power Connector (DC-JACK)

Pin #	Signal Name
1	+5V
2	GND
3	NC

J17: Power Connector – 4-pin Header (P4 Molex 5mm)



Pin #	Signal Name
1	+5V
2	GND
3	GND
4	+12V

J18: VGA

Pin #	Signal Name	Pin #	Signal Name
1	R OUT	2	GND
3	G OUT	4	GND
5	B OUT	6	GND
7	HSYNC	8	GND
9	VSYNC	10	GND

J19: PS/2 Keyboard / Mouse

Pin #	Signal Name	Pin #	Signal Name
1	KBDATA	2	NC
3	GND	4	VCC
5	KBCLK	6	NC
7	MSDATA	8	NC
9	GND	10	VCC
11	MSCLK	12	NC
13	GGND	14	GGND
15	GGND	16	GGND
17	GGND		

■ VSX-6119

Summary Table

Nbr	Description	Type of Connections	Pin nbrs.
J1	x-ISA Connector – 64 pin	Pin Header, 2.0∅, 32x2	64-pin
J2	I / O Connector – 64 pin	Pin Header, 2.0∅, 32x2	64-pin
J3	DMA control	Pin Header, 2,0∅,1x9	9-pin
JP1	JTAG	Box Header, 125∅ , 6x1	6-pin
PWR-LED	Power Active LED (Red)	LED-SMD	
MTBF- LED	MTBF-Out (Orange)	LED-SMD	

J1: x-ISA Connector – 64pin

Pin #	Signal Name	Pin #	Signal Name
1	GND	2	SBHE
3	RSTDRV	4	SD7
5	VCC	6	SD6
7	SD8	8	SD5
9	SD9	10	SD4
11	SD10	12	SD3
13	SD11	14	SD2
15	SD12	16	SD1
17	SD13	18	SD0
19	GND	20	IOCHRDY
21	SMEMW	22	AEN
23	SMEMR	24	SA19
25	IOW	26	SA18
27	IOR	28	SA17
29	SD14	30	SA16
31	SD15	32	SA15
33	MEMCS16	34	SA14
35	ICOS16	36	SA13
37	REFRESH	38	SA12
39	SYSCLK	40	SA11
41	IRQ7	42	SA10
43	IRQ6	44	SA9
45	IRQ5	46	SA8
47	IRQ4	48	SA7
49	IRQ3	50	SA6
51	IRQ10	52	SA5
53	IRQ11	54	SA4
55	BALE	56	SA3
57	VCC	58	SA2
59	OSC	60	SA1
61	GND	62	SA0
63	IRQ12	64	IRQ14

J2: I /O Connector – 64pin

Pin #	Signal Name	Pin #	Signal Name
1	DCD1	2	RXD1
3	TXD1	4	DTR1
5	GND	6	DSR1
7	RTS1	8	CTS1
9	RI1	10	VCC
11	DCD2	12	RX2
13	TXD2	14	DTR2
15	GND	16	DSR2
17	RTS2	18	CTS2
19	RI2	20	VCC
21	PD0	22	SLCT
23	PD1	24	PR
25	PD2	26	BUSY
27	PD3	28	ACK\
29	PD4	30	SLCTIN\
31	PD5	32	INIT\
33	PD6	34	ERROR\
35	PD7	36	AUTOFD\
37	GND	38	STORBE\
39	GP0	40	GP8
41	GP1	42	GP9
43	GP2	44	GP10
45	GP3	46	GP11
47	GP4	48	GP12
49	GP5	50	GP13
51	GP6	52	GP14
53	GP7	54	GP15
55	GPCS0	56	VBAT
57	KBDAT	58	HDCS0
59	KBCLK	60	HDCS1
61	SPKR	62	RESETL
63	GND	64	PWG

J3: DMA control

Pin #	Signal Name	Pin #	Signal Name
1	40MHZ	2	GND
3	DACK1	4	DACK3
5	DRQ1	6	DRQ3
7	TC	8	MEMR
9	MEMW		

JP1: JTAG

Pin #	Signal Name	Pin #	Signal Name
1	VCC	2	GND
3	TCK	4	TDO
5	TDI	6	TMS

2.5 System Mapping

System Mapping (系統佔用位址說明)

Memory Mapping

Address	Description	Usage
0000:0000-9000:FFFF	System RAM	*
A000:0000-A000:FFFF	EGA/VGA Video Memory	
B000:0000-B000:7FFF	MDA RAM, Hercules graphics display RAM	
B000:8000-B000:FFFF	CGA display RAM	
C000:0000-C000:7FFF	EGA/VGA BIOS ROM	
C000:8000-C000:FFFF	Boot ROM enable.	*
D000:0000-D700:FFFF	Expansion ROM space.	
D800:0000-DB00:FFFF	SPI FLASH space.	*
DC00:0000-DF00:FFFF	Expansion ROM space.	
E000:0000-E000:FFFF	USB Legacy SCSI ROM space.	*
F000:0000-F000:FFFF	Motherboard BIOS	*

I/O Mapping

I/O Address	Owner	Usage
0000h - 000Fh	DMA 8237-1	*
0010h - 0017h	COM 9	
0018h - 001Fh	Empty	
0020h - 0021h	PIC 8259-1	*
0022h - 0023h	6117D configuration port	*
0024h - 002Dh	Empty	
002Eh - 002Fh	Forward to LPC BUS	*
0030h - 003Fh	Empty	
0040h - 0043h	Timer counter 8254	*
0044h - 0047h	Empty	
0048h - 004Bh	PWM counter 8254	*
004Ch - 004Dh	Empty	
004Eh - 004Fh	Forward to LPC BUS	*
0050h - 005Fh	Empty	
0060h	Keyboard data port	*
0061h	Port B + NMI control port	*
0062h - 0063h	8051 download 4K address counter	*

0064h	Keyboard status port	*
0065h	WatchDog0 reload counter	*
0066h	8051 download 8bit data port	*
0067h	WatchDog1 reload counter	*
0068h - 006Dh	WatchDog1 control register	*
006Eh - 006Fh	Empty	
0070h - 0071h	CMOS RAM port	*
0072h - 0075h	MTBF counter	*
0076h - 0077h	Empty	
0078h - 007Ch	GPIO port 0,1,2,3,4 default setup	*
007Dh - 007Fh	Empty	
0080h - 008Fh	DMA page register	*
0090h - 0091h	Empty	
0092h	System control register	*
0093h - 0097h	Empty	
0098h - 009Ch	GPIO direction control	*
00A0h - 00A1h	PIC 8259-2	*
00A2h - 00BFh	Empty	
00C0h - 00DFh	DMA 8237-2	*
00E0h - 00FFh	Empty	
0100h - 0101h	GPCS1 default setting address	*
0170h - 0177h	IDE1 (IRQ 15)	
01F0h - 01F7h	IDE0 (IRQ 14)	
0220h - 0227h	COM8 Forward to LPC BUS	
0228h - 022Fh	COM7 Forward to LPC BUS	
0238h - 023Fh	COM6 Forward to LPC BUS	
0278h - 027Fh	Printer port (IRQ 7, DMA 0)	*
02E8h - 02EFh	COM4 (IRQ 11)	
02F8h - 02FFh	COM2 (IRQ 3)	*
0338h - 033Fh	COM5 Forward to LPC BUS	
0376h	IDE1 ATAPI device control write only register	*
03E8h - 03Efh	COM3 (IRQ 10)	
03F0h - 03F7h	Floppy Disk (IRQ 6, DMA 2)	
03F6h	IDE0 ATAPI device control write only register	*
03F8h - 03FFh	COM1 (IRQ 4)	*
0480h - 048Fh	DMA High page register	*
0490h - 0499h	Instruction counter register	*
04D0h - 04D1h	8259 Edge,/ level control register	*
0CF8h - 0CFFh	PCI configuration port	*
D400h - D4FFh	on board LAN	
FC00h - FC05h	SPI Flash BIOS control register	*
FC08h - FC0Dh	External SPI BUS control register (output pin configurable GPIO3[0-3])	*

IRQ Mapping

IRQ#	Description	Usage
IRQ0	System Timer	*
IRQ1	Keyboard Controller	*
IRQ2	Cascade for IRQ8 - 15	
IRQ3	Serial Port 2	*
IRQ4	Serial Port 1	*
IRQ5	Unassigned	
IRQ6	Unassigned	
IRQ7	Parallel Port	*
IRQ8	Real Time Clock	*
IRQ9	USB	*
IRQ10	USB	*
IRQ11	Unassigned	
IRQ12	Unassigned	
IRQ13	Math Coprocessor	*
IRQ14	Unassigned	
IRQ15	Unassigned	

DMA Mapping

DMA#	Description	Usage
DMA0		
DMA1		
DMA2	Floppy Disk Controller	
DMA3		
DMA5		
DMA6		
DMA7		

2.6 Watchdog Timer

There are two watchdog timers in Vortex86SX CPU. One is compatible with M6117D watchdog timer and the other is new. The M6117D compatible watchdog timer is called WDT0 and new one is called WDT1.

We also provide DOS, Linux and WinCE example for your reference. For more technical support, please visit: http://www.dmp.com.tw/tech or download the PDF file: http://www.dmp.com.tw/tech/vortex86sx/

2.7 GPIO (General Purpose Input / Output)

40 GPIO pins are provided by the Vortex86SX for general usage in the system. All GPIO pins are independent and can be configured as inputs or outputs, with or without pull-up/pull-down resistors.

We also offer DOS, Linux and WinCE example for your reference. For more technical support, please visit: http://www.dmp.com.tw/tech or download the PDF file: http://www.dmp.com.tw/tech/vortex86sx/

2.8 SPI flash (Serial Peripheral Interface)

As SPI Flash (Serial Peripheral Interface) offers many benefits including: reduced controller pin count, smaller and simpler PCBs, reduced switching noise, less power consumption, and lower system cost

Many of users may consider using a formatted SPI flash to boot for the system or emulate SPI flash as Floppy (A: Driver or B: Driver). Then you must know how to set for this condition in CMOS Setup and boot up under DOS 6.22, X-DOS, DR-DOS and Free DOS.

For more technical support, please visit: http://www.dmp.com.tw/tech or download the PDF file: http://www.dmp.com.tw/tech/vortex86sx/

Chapter 3

SVGA Setup

(For ICOP-6019-VGA /LCD Module)

3.1 Introduction

The ICOP-6019-VGA has an on-board VGA interface. The specifications and features are described as follows or please visit our website:
http://www.icop.com.tw/products_detail.asp?ProductID=7

3.1.1 Chipset

The ICOP-6019-VGA uses a HMC HM86508 for its SVGA controller, which supports conventional analog CRT monitor or flat panel. In addition, it also supports interlaced and non-interlaced analog monitors (color and monochrome VGA) in high-resolution modes while maintaining complete IBM VGA compatibility. Multiple frequency (multisync) monitors are handled as if they were analog monitors.

3.1.2 Display memory

With 1 MB memory, the VGA controller can drive CRT displays or color panel displays with resolutions up to 1024 x 768 at 256 colors.

3.2 Flat Panel Connectors

Flat Panel Pin Assignment

Pin	Description	Pin	Description
1	+12V	2	+12V
3	GND	4	GND
5	PVcc	6	PVcc
7	ENAVEE	8	ENAVEE
9	P0	10	P1
11	P2	12	P3
13	P4	14	P5
15	P6	16	P7
17	P8	18	P9
19	P10	20	P11
21	P12	22	P13
23	P14	24	P15
25	P16	26	P17
27	P18	28	P19
29	P20	30	P21
31	P22	32	P23
33	GND	34	GND
35	SHFCLK	36	FLM
37	M	38	LP
39	GND	40	ENABKL
41	GND	42	ASHFCLK
43	Vcc	44	Vcc

Description for the Pin of the Flat Panel Connector

Name	Description
P0~P23	Flat panel data output
ENABKL	Activity Indicator and Enable Backlight outputs
SHFCLK	Shift clock. Pixel clock for flat panel data
M	M signal for panel AC drive control
LP	Latch pulse. Flat panel equivalent of HSYNC
FLM	First line marker. Flat panel equivalent of VSYNC
+12V	+12V power from PC power supply
ENAVDD	Power sequencing controls for panel LCD bias volt
ENAVEE	Power sequencing controls for panel LCD bias volt
–SHFCLK	The inverter signal of SHFCLK
VDDM	3.3V or 5V selected by JP6

3.3 Flat Panel Jumper setting

J1: LCD Type Select

	Type of Display	1-2	3-4	5-6	Address of VGA BIOS
1	Standard CRT	C	C	C	00000~07FFF Hex
2	Mono DSTN 640x480	C	C	O	08000~0FFFF Hex
3	Color DSTN 640x480	C	O	C	10000~17FFF Hex
4	16-bit TFT 640x480	C	O	O	18000~1FFFF Hex
5	18/24-bit TFT 640x480	O	C	C	20000~27FFF Hex
6	16-bit TFT 800x600	O	C	O	28000~2FFFF Hex
7	18/24-bit TFT 800x600	O	O	C	30000~37FFF Hex
8	EL 640x480	O	O	O	38000~3FFFF Hex

Note: “C” means “close”; “O” means “open”

J3: LCD voltage select

Voltage	Pin1-2	Pin 2-3
5V	close	
3.3V		close

3.4 Flat Panel BIOS and Wiring

Below is a list of optional Flat Panel SVGA BIOS. The VGA BIOS is combined with the system BIOS in a single. To change to another BIOS please contact your local dealer.

MLCD.dat - Data File for MONO DSTN640*480 (Default)
Example: (1) HOSIDEN HLM6667
(2) HITACHI LMG5160XUFC
(3) CASIO MD650TS00-01
(4) OPTREX DMF_50260NFU-FW-8

DSTN.dat - Data file for Color DSTN640*480
Example: (1) Sanyo LCM-5331-22NTK
(2) SHARP LM64C35P

TFT_S1.dat - Data File for TFT640*480-Sync (16 BIT)
TFT_S2.dat - Data File for TFT640*480-Sync (18/24 BIT)

Example: (1) HITACHI TX26D60/TX24D55
(2) TOSHIBA LTM09C015A
(3) SHARP LQ10D321

TFT_LP1.dat - Data File For TFT640*480-LP (16 BIT)
TFT_LP2.dat - Data File For TFT640*480-LP (18/24 BIT)
Example: (1) Toshiba LTM09c015A)

TFT86_S1.dat - Data File for TFT800*600_sync (16 BIT)
TFT86_S2.dat Data File for TFT800*600_sync (18/24 BIT)
Example: (1) NEC NL8060AC26-05
(2) NEC NL8060AC26-04
(3) NEC NL8060BC31-02

EL.dat - Data File for EL640*480

Example: (1) PLANAR EL640.480-A

PLASMA.dat - Data File for PLASMA640*480

Example: (1) PANASONIC S817

CRT / Flat Panel Mode

All the above BIOS support either CRT only, Flat Panel only or CRT/Flat Panel simultaneously. To set the mode a Panel Switching Utility is used.
USAGE:

At DOS prompt type >*SW508* then Screen will show

1. CRT Only
2. Panel Only
3. CRT/Panel Simutaneous

NEC NL6448AC33-18 wiring

NEC NL6448AC33-18		ICOP-2820V CON1	
Pin	**Pin Name**	**Pin**	**Pin Name**
CN1-1	GND	3	GND
CN1-2	CLK	35	SHFCLK
CN1-3	Hsync	38	LP
CN1-4	Vsync	36	FLM
CN1-5	GND	4	-
CN1-6	R0	27	P18
CN1-7	R1	28	P19
CN1-8	R2	29	P20
CN1-9	R3	30	P21
CN1-10	R4	31	P22
CN1-11	R5	32	P23
CN1-12	GND	33	-
CN1-13	G0	19	P10
CN1-14	G1	20	P11
CN1-15	G2	21	P12
CN1-16	G3	22	P13
CN1-17	G4	23	P14
CN1-18	G5	24	P15
CN1-19	GND	34	-
CN1-20	B0	11	P2
CN1-21	B1	12	P3
CN1-22	B2	13	P4

CN1-23	B3	14	P5
CN1-24	B4	15	P6
CN1-25	B5	16	P7
CN1-26	GND	39	-
CN1-27	ENAB	37	MDE
CN1-28	Vcc	43	Vcc
CN1-29	Vcc	44	Vcc
CN1-30	NC	-	-
CN1-31	NC	-	-

NEC NL6448AC30-10 wiring

NEC NL6448AC30-10		**ICOP-2820V CON1**	
Pin	**Pin Name**	**Pin**	**Pin Name**
CN1-1	CLK	42	SHFCLK
CN1-2	Hsync	38	LP
CN1-3	Vsync	36	FLM
CN1-4	DE	37	MDE
CN1-5	-	-	P0
CN1-6	B0	10	P1
CN1-7	B1	11	P2
CN1-8	B2	12	P3
CN1-9	B3	13	P4
CN1-10	-	14	P5
CN1-11	-	15	P6
CN1-12	G0	16	P7

CN1-13	G1	17	P8
CN1-14	G2	18	P9
CN1-15	G3	19	P10
CN1-16	-	20	P11
CN1-17	R0	21	P12
CN1-18	R1	22	P13
CN1-19	R2	23	P14
CN1-20	R3	24	P15
CN1-21	-	-	P16
CN1-22	-	-	P17
CN1-23	-	27	P18
CN1-24	-	28	P19
CN1-25	-	29	P20
CN1-26	-	30	P21
CN1-27	-	31	P22
CN1-28	-	32	P23
CN1-29	PVcc	5	LCD Vdd
CN1-30	Vcc	43	Vcc
CN1-31	MODE	44	Vcc
CN1-32	GND	3	GND
CN1-33	GND	4	GND
CN1-34	Vdd +12	1	+12
CN1-35	ENABKL	40	ENABKL
CN1-36	GND	39	GND

LJ32H028 wiring

LJ32H028		ICOP-2820V CON1	
Pin	**Pin Name**	**Pin**	**Pin Name**
CN1-1	D1	11	P2
CN1-2	D0	12	P3
CN1-3	D3	9	P0
CN1-4	D2	10	P1
CN1-5	CP2	35	SHF_CLK
CN1-6	GND	3,4	GND
CN1-7	CP1	38	LP
CN1-8	GND	33,34	GND
CN1-9	S	36	FLM
CN1-10	-	-	-
CN1-11	-	-	-
CN1-12	-	-	-
CN1-13	+5V	43,44	+5V(Vdd)
CN1-14	-	-	-
CN1-15	+12V	1,2	+12V

SHARP LQ10D42 wiring
(640 X 480 TFT Color)

SHARP LQ10D42		ICOP-2820V CON1	
Pin	**Pin Name**	**Pin**	**Pin Name**
CN1-1	GND	3,4	GND
CN1-2	CLK	42	SHFCLK

CN1-3	Hsync	38	LP
CN1-4	Vsync	36	FLM
CN1-5	GND	3,4	GND
CN1-6	R0	21	P12
CN1-7	R1	22	P13
CN1-8	R2	23	P14
CN1-9	R3	24	P15
CN1-10	R4	25	P16
CN1-11	R5	26	P17
CN1-12	GND	3,4	GND
CN1-13	G0	15	P6
CN1-14	G1	16	P7
CN1-15	G2	17	P8
CN1-16	G3	18	P9
CN1-17	G4	19	P10
CN1-18	G5	20	P11
CN1-19	GND	3,4	GND
CN1-20	B0	9	P0
CN1-21	B1	10	P1
CN1-22	B2	11	P2
CN1-23	B3	12	P3
CN1-24	B4	13	P4
CN1-25	B5	14	P5
CN1-26	GND	3,4	GND
CN1-27	ENAB	40	M
CN1-28	Vcc	43,44	Vcc +5V

CN1-29	Vcc	43,44	Vcc +5V
CN1-30	R/L	-	-
CN1-31	U/D	-	-

SHARP LQ12S31 wiring
(800 X 600 TFT Color)

SHARP LQ12S31		**ICOP-2820V CON1**	
Pin	**Pin Name**	**Pin**	**Pin Name**
CN1-1	GND	3	GND
CN1-2	CLK	35	SHFCLK
CN1-3	GND	4	GND
CN1-4	Hsync	38	LP
CN1-5	Vsync	36	FLM
CN1-6	GND	8	GND
CN1-7	GND	8	GND
CN1-8	GND	8	GND
CN1-9	R0	27	P18
CN1-10	R1	28	P19
CN1-11	R2	29	P20
CN1-12	GND	8	GND
CN1-13	R3	30	P21
CN1-14	R4	31	P22
CN1-15	R5	32	P23
CN1-16	GND	39	GND
CN1-17	GND	39	GND

CN1-18	GND	39	GND
CN1-19	G0	19	P10
CN1-20	G1	20	P11
CN1-21	G2	21	P12
CN1-22	GND	39	
CN1-23	G3	22	P13
CN1-24	G4	23	P14
CN1-25	G5	24	P15
CN1-26	GND	41	GND
CN1-27	GND	41	GND
CN1-28	GND	41	GND
CN1-29	B0	11	P2
CN1-30	B1	12	P3
CN1-31	B2	13	P4
CN1-32	GND	41	GND
CN1-33	B3	14	P5
CN1-34	B4	15	P6
CN1-35	B5	16	P7
CN1-36	GND	41	GND
CN1-37	ENAR	37	M
CN1-38	TST	-	-
CN1-39	Vcc	43	+5Vcc
CN1-40	Vcc	44	+5Vcc
CN1-41	TST	-	-

Chapter 4

Driver Installation

LAN

The Vortex86SX processor also integrated 10/100Mbps Ethernet controller that supports both 10/100BASE-T and allows direct connection to your 10/100Mbps Ethernet based Local Area Network for full interaction with local servers, wide area networks such as the Internet.

I/O and IRQ settings can be done by software with the supplied utility software, or it can be set for Plug and Play compatibility. The controller supports: Half / Full-Duplex Ethernet function to double channel bandwidth, auto media detection.

The Vortex86SX-6119 Mity-SoC CPU board provides the VGA and LAN drivers for DOS 6.22 Windows CE 5.0 and Windows Embedded CE 6.0. Please get the drivers from the Driver CD which attached with the standard packing of Vortex86SX-6119 board or please get it from DMP official website: http://www.dmp.com.tw/tech/vortex86sx/ .

Vortex86SX-6119 Mity-SoC also supports most of the popular Linux distributions, for more detail information, please visit DMP official website: http://www.dmp.com.tw/tech/vortex86sx/

Appendix

A. TCP/IP library for DOS real mode

DSock is a TCP/IP library for DOS real mode, which is used by RSIP. It provides simple C functions for programmer to write Internet applications. ICOP also provide Internet examples using DSock: BOOTP/DHCP, FTP server, SMTP client/server, HTTP server, TELNET server, Talk client/server, etc.

DSock provides a lot of example source code. Programmer can add Internet functions to their project easily and save development time. With a utility "MakeROM", programmer also can make a ROM image to fit their application, those examples can be seen in the following Application systems: Mity-Mite Serial Server, Web Camera Tiny Server and RSIP Serial Server.

DSock is free for All ICOP products using M6117D/Vortex86/Vortex86SX CPU and ICOP also provide the business version of DSock for those customers who are using other x86 CPUs. If you would like to use DSock or business version of DSock, Please mail to info@icop.com.tw or contact your regional sales.

Please download the trial DSock software and Utilities from our website:
http://www.dmp.com.tw/tech/dmp-lib/dsock/

B. VSX-6119 & VSX-6119-1 Schematic

Schematic information can help baseboard designer to optimize exactly how each of these functions implements physically. Designer can place connectors precisely where needed for the application on a baseboard designed to optimally fit a system's packaging.

Please contact or e-mail our regional sales to get VSX-6119 & VSX-6119-1 Schematic.

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.