VMXP-6427

DM&P Vortex86MX+ 800MHz

3.5” CPU Module

With

7S/4USB/VGA/LCD/LVDS/AUDIO/LAN/GPIO/Printer/CF

512MB or 1GB DDR2 Onboard

User’s Manual

(Revision 1.2A)

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Manual No. IUM6427D000-01 Ver.1.0A April, 2012
Manual No. IUM6427D000-01 Ver.1.1A September, 2012
Manual No. IUM6427D000-01 Ver.1.2A October, 2013

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Chapter 1

Introduction

1.1 Packing List

Product Name	Package
SOM304MX-6427	• HDD 44P (2.0) cable x 1 • RS232 cable x 6 • PRINT cable x1 • USB cable x2 (USB port x 4) • GPIO cable x 1 • Audio cable x 2 • PS/2 Y cable for KB and Mouse x 1 • Screw Kit x 1
SOM304MP-VP	• SOM304MP-VP CPU Module x1

1.3 Product Description

The VMXP-6427, low-power consumption x86 embedded controller is designed to meet 3.5" Form Factor, and integrated with the following features.

- 800 MHz Vortex86MX+ SoC
- Either VGA or TFT/ LVDS LCD support
- 512MB / 1GB DDR2 system memory
- Enhanced IDE (UltraDMA-100/66/33)
- 10/100Mbps Ethernet
- USB 2.0 (host) x4
- Up to 3serial ports
- Parallel port
- 16-bit GPIOs
- HD Audio
- SST NAND Flash Onboard (Opt.)
- 2 watchdog timer
- PWM 16~24 channels
- AMI BIOS
- Single voltage +5V DC
- Support extended operating temperature range of -20°C to +70°C

➢ The VMXP-6427 3.5" 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 3.5" controller. The VMXP-6427 controller is designed to support legacy software to help extend existing product life cycle without heavy re-engineering.

➢ VMXP-6427 is suitable for broad range of data-acquisition, Industrial automation, Process control, Automotive controller, AVL, Intelligent Vehicle management device, Medical device, Human machine interface, Robotics, Machinery control and any application that requires small footprint, low-power and low-cost hardware.

1.4 Specifications

■ SOM304MP-6427

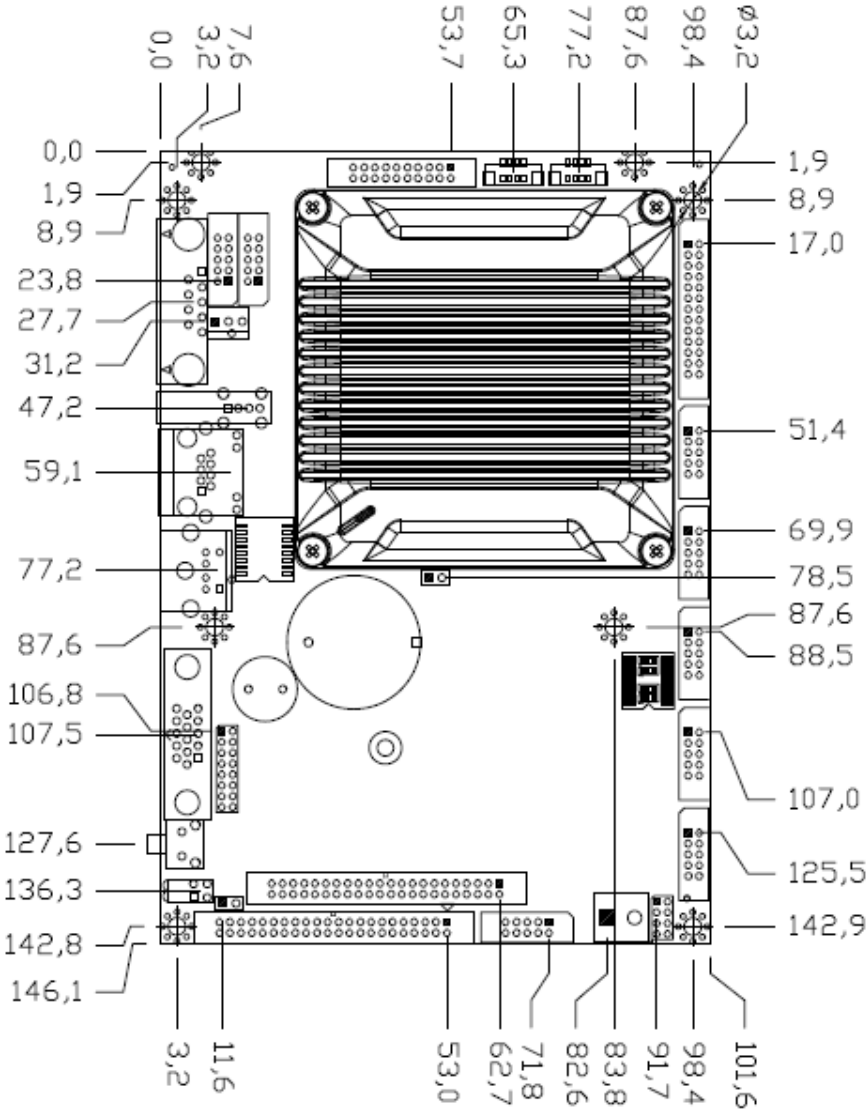
Features	SOM304MP-6427
Connectors	2.00 mm ∅ 44-pin box header for IDE x 1 2.00 mm ∅ 44-pin box header for LCD x 1 2.00 mm ∅ 26-pin box header for Printer x1 2.00 mm ∅ 20-pin box header for 16-bit GPIO x1 2.00 mm ∅ 16-pin box header for LVDS x 1 2.00 mm ∅ 10-pin box header for USB x2 2.00 mm ∅ 10-pin box header for RS-232 x6 2.54 mm ∅ 3-pin header for RS-485 x 1 2.54 mm ∅ 2-pin header for LAN disable x2 2.54 mm ∅ 2-pin header for Reset x1 1.27mm ∅ 76-pin header for Signal x4 1.25 mm ∅ 4-pin Wafer for Line-out/MIC-in x2 External 15-pin D-Sub female connector for VGA x 1 External 9-pin D-Sub male connector for RS-232 x 1 External RJ-45 connector for Ethernet x 1 External USB connector x 1 External Mini DIN connector for Keyboard/Mouse x 1 Type I/II Compact Flash Slot x1
Power Requirement	Single Voltage +5V @ 200mA
Dimension	102 X 146mm (4.01 x 5.75 inches)
Weight	150g
Operating Temperature	0°C ~+60°C -10°C ~+70°C (Optional)

■ SOM304MP-VP

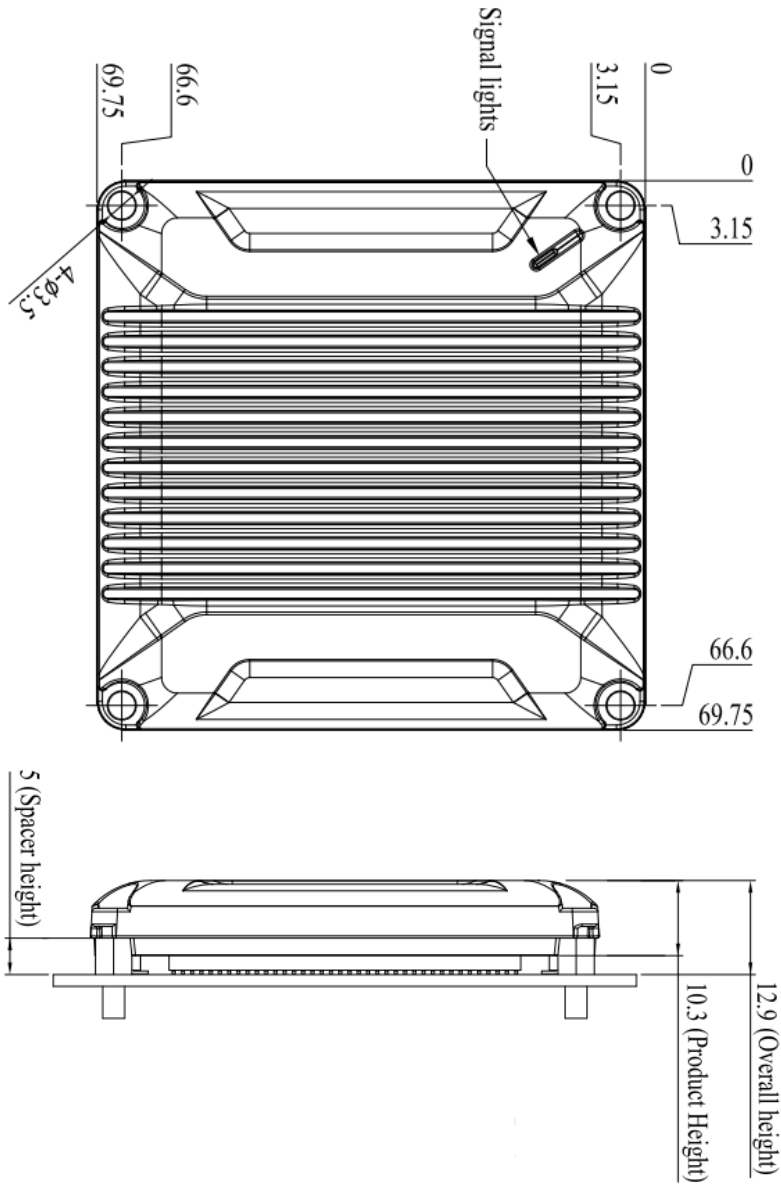
Features	SOM304MP-VP
CPU	DM&P SoC CPU Vortex86MX+- 800MHz Real Time Clock with Lithium Battery Backup
Cache	L1:16K I-Cache, 16K D-Cache, L2 Cache 256KB
BIOS	AMI BIOS
Bus Interface	PCI bus standard compliant LPC Bus & SPI Bus
System Memory	512MB/1GB DDR2 Onboard
Watchdog Timer	Software programmable from 30.5 us to 512 seconds x2 sets(Watchdog 1 fully compatible with M6117D)
VGA	Integrated 2D VGA chip VGA and TFT Flat Panel Interface Support (Either VGA or LCD) Share system memory 16MB/32MB, Mono, DSTN, STN, TFT Flat Panel interface support & resolution up to 1280x1024, 16M colors
LAN	Integrated 10/100M Ethernet
AUDIO	ALC 262 (HD Audio)
I /O Interface	• Enhanced IDE port (UltraDMA-100/66/33) x1 • RS-232 port x3 • USB port (Ver2.0) x4 • Parallel port x1 • 16-bit GPIO port x2 • 10/100Mbps Ethernet port x1
Flash Disk Support	• Onboard SST Flash Disk (512MB/1GB/2GB/4GB are Optional) • MSTI EmbedDisk Module (16MB and above) • 44-pin IDE to Micro SD (optional)
PWM	16~24 channels
Power Requirement	Single Voltage +5V @ 700mA (with 2GB NAND Flash)
Dimension	70 (L) x70 (W) x10.5 (H) mm (with cover)
Weight	25g
Operating Temperature	0°C ~+60°C -10°C ~+70°C (Optional)

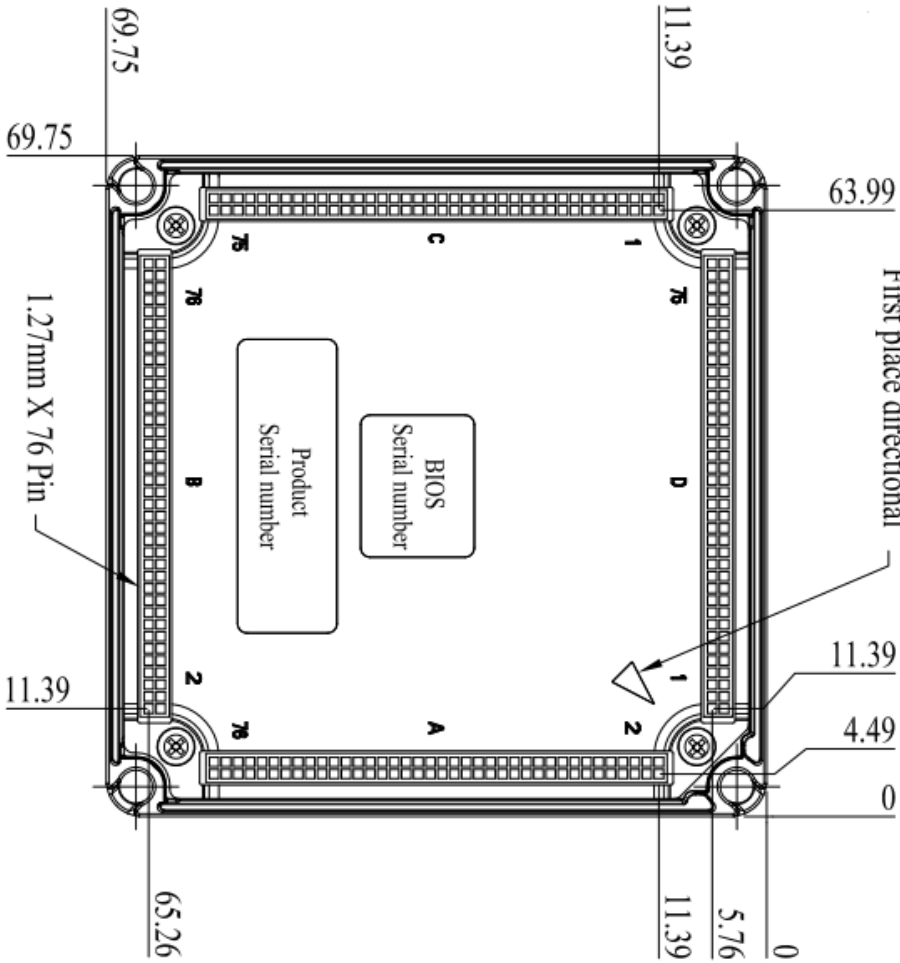
1.5 Board Dimension

- SOM304MP-6427



■ SOM304MP-VP

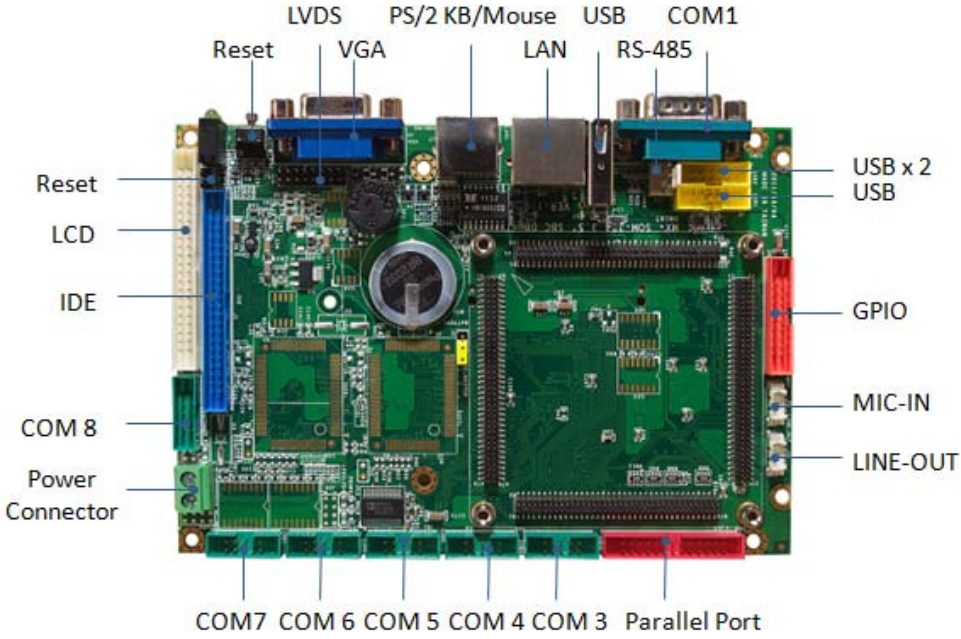

Signal lights
69.75
66.6
3.15
0
0
3.15
4-Ø3.5
66.6
69.75
5 (Spacer height)
10.3 (Product Height)
12.9 (Overall height)


69.75
11.39
69.75
63.99
First place directional
1.27mm X 76 Pin
BIOS
Serial number
Product
Serial number
11.39
11.39
4.49
0
65.26
11.39
5.76
0

Chapter 2

Installation

2.1 Board Outline

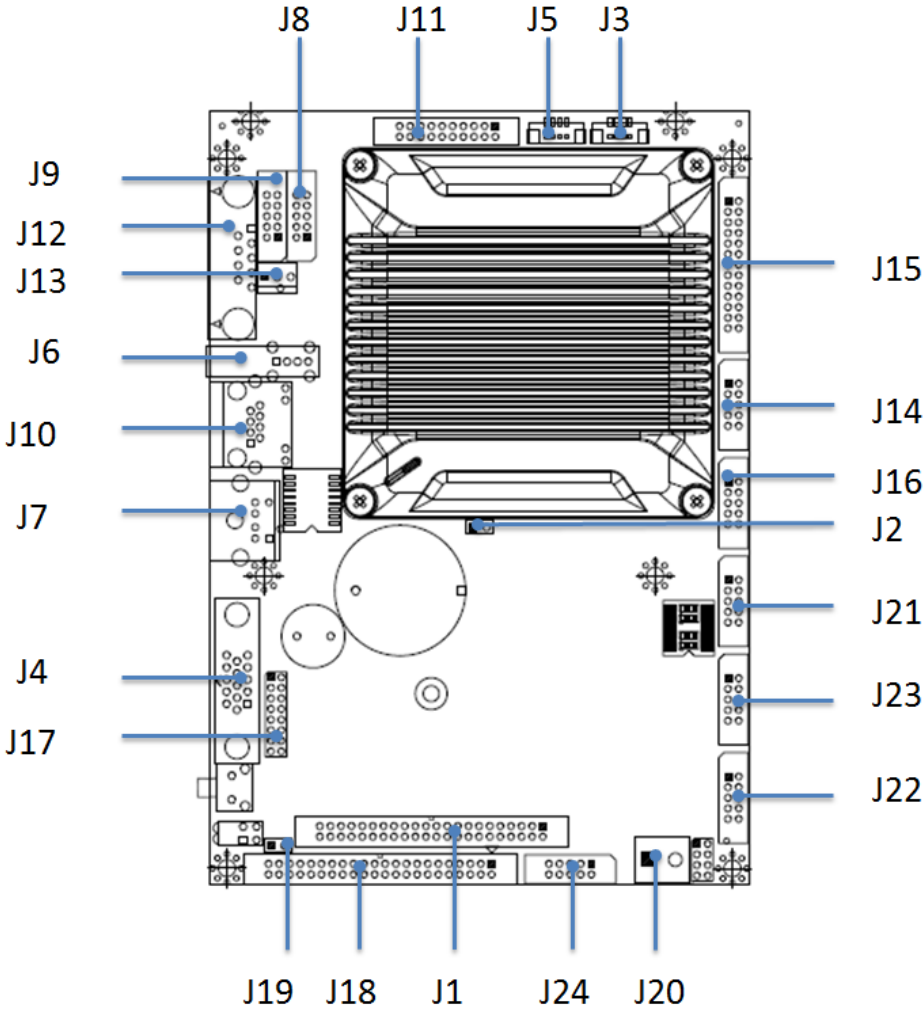


(Note1: COM1 RS232/422/485 is selected by BIOS setting)

(Note2: Onboard SST Flash Disk: 512MB/1GB/2GB/4GB are Optional)

2.2 Connectors & Jumpers Location

Connectors



2.3 Connectors & Jumpers Summary

Summary Table

Nbr	Description	Type of Connections	Pin nbrs.
J1	IDE Connector	Box Header, 2.0∅ ,20x2	40-pin
J2	CF Card Master/Slave Select	Pin Header, 2.54∅, 2x1	2-pin
J3	LINE-OUT	Wafer, 1.25∅ , 4x1	4-pin
J4	VGA	D-Sub Female	15-pin
J5	MIC-IN	Wafer, 1.25∅ , 4x1	4-pin
J6	USB 2	USB connector	4-pin
J7	PS/2 Keyboard / Mouse	Mini-DIN Female	6-pin
J8	USB 1	Box Header,2.0∅ , 5x2	10-pin
J9	USB 0/ USB 3	Box Header,2.0∅ , 5x2	10-pin
J10	10/100Base-T Ethernet LAN	RJ45 Connector	8-pin
J11	GPIO (Port 0 / 1 /PWMx16)	Box Header, 2.0∅ ,10x2	20-pin
J12	COM1	D-Sub Male	9-pin
J13	RS-485	Molex Header,2.54∅, 3x1	3-pin
J14	COM3	Box Header, 2.0∅ 5x2	10-pin
J15	PRINT	Box Header, 2.0∅ , 13x2	26-pin
J16	COM4	Box Header, 2.0∅ 5x2	10-pin
J17	LVDS	Pin Header, 2.0∅ 8x2	16-pin
J18	LCD	Box Header,2.0∅ ,22x2	44-pin
J19	Reset	Pin Header, 2,54∅,1x2	2-pin
J20	Power Connector	Terminal Block 5.0∅,2x1	2-pin
J21	COM5	Box Header, 2.0∅ 5x2	10-pin
J22	COM7	Box Header, 2.0∅ 5x2	10-pin
J23	COM6	Box Header, 2.0∅ 5x2	10-pin
J24	COM8	Box Header, 2.0∅ 5x2	10-pin
CF1	Compact Flash	Type I/II CF Connector	50-pin
PWR LED	Power Active LED (Red)	LED-SMD	
IDE-LED	IDE Active LED (Green)	LED-SMD	
SP1	BUZZER		
S1	RESET SWITCH		

2.4 Pin Assignments & Jumper Settings

J1: IDE (44 Pins)

Pin #	Signal Name	Pin #	Signal Name
1	IDERST	2	GND
3	IDED7	4	IDED8
5	IDED6	6	IDED9
7	IDED5	8	IDED10
9	IDED4	10	IDED11
11	IDED3	12	IDED12
13	IDED2	14	IDED13
15	IDED1	16	IDED14
17	IDED0	18	IDED15
19	GND	20	NC
21	IDEREQ	22	GND
23	IDEIOW	24	GND
25	IDEIOR	26	GND
27	ICHRDY	28	GND
29	IDEACK	30	GND
31	IDEINT	32	NC
33	IDESA1	34	IDECBLID
35	IDESA0	36	IDESA2
37	IDECS-0	38	IDECS1
39	IDELED	40	GND
41	VCC	42	VCC
43	GND	44	NC

J2: CF Card Master / Slave Select

Pin #	Signal Name
CLOSE	Master
OPEN	Slave

J3: LINE OUT

Pin #	Signal Name
1	LOUTR
2	GND
3	GND
4	LOUTL

J4: 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		

J5: MIC-IN

Pin #	Signal Name
1	MIC-INR
2	GND
3	GND
4	MIC-INL

J6: USB 2

Pin #	Signal Name	Pin #	Signal Name
1	VCC	2	LUSBD2-
3	LUSBD2+	4	GND
5	GGND	6	GGND
7	GGND	8	GGND

J7: PS/2 KBD / Mouse

Pin #	Signal Name	Pin #	Signal Name
1	KBCLK	2	MSCLK
3	GND	4	KBDAT
5	MSDAT	6	VCC
7	GGND	8	GGND
9	GGND		

J8: USB 1

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

J9: USB 0/ USB 3

Pin #	Signal Name	Pin #	Signal Name
1	VCC	2	VCC
3	LUSBD3-	4	LUSBD0-
5	LUSBD3+	6	LUSBD0+
7	GND	8	GND
9	GGND	10	GGND

J10: LAN /RJ45

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

J11: GPIO (Port 0 / Port 1/PWMx16)

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

J12: COM1 (Optional: TTL/ GPIO-P4 / PWMx8)

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		

J13: RS485 (Auto direction)

Pin #	Signal Name
1	RS485＋
2	RS485－
3	GND

J14: COM3 (Optional: TTL)

Pin #	Signal Name	Pin #	Signal Name
1	DCD3	2	RXD3
3	TXD3	4	DTR3
5	GND	6	DSR3
7	RTS3	8	CTS3
9	RI3	10	VCC

J15: PRINT

Pin #	Signal Name	Pin #	Signal 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

J16: COM4 (Optional: TTL)

Pin #	Signal Name	Pin #	Signal Name
1	DCD4	2	RXD4
3	TXD4	4	DTR4
5	GND	6	DSR4
7	RTS4	8	CTS4
9	RI4	10	NC

J17: LVDS

Pin #	Signal Name	Pin #	Signal Name
1	VCC3 (3.3V)	2	VCC3 (3.3V)
3	GND	4	GND
5	Y0P	6	Y0M
7	Y1M-	8	GND
9	GND	10	Y1P+
11	Y2P	12	Y2M-
13	CLKOUTM-	14	GND
15	GND	16	CLKOUTP

J18: LCD (DVO) Connector

Pin #	Signal Name	Pin #	Signal 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

J19: RESET

Pin #	Signal Name	Pin #	Signal Name
1	Reset	2	GND

J20: Power Connector (Terminal Block 5.0mm)

Pin #	Signal Name
1	+5V
2	GND

J21: COM5 (Optional: TTL)

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

J22: COM7 (Optional: TTL)

Pin #	Signal Name	Pin #	Signal Name
1	DCD7	2	RXD7
3	TXD7	4	DTR7
5	GND	6	DSR7
7	RTS7	8	CTS7
9	RI7	10	NC

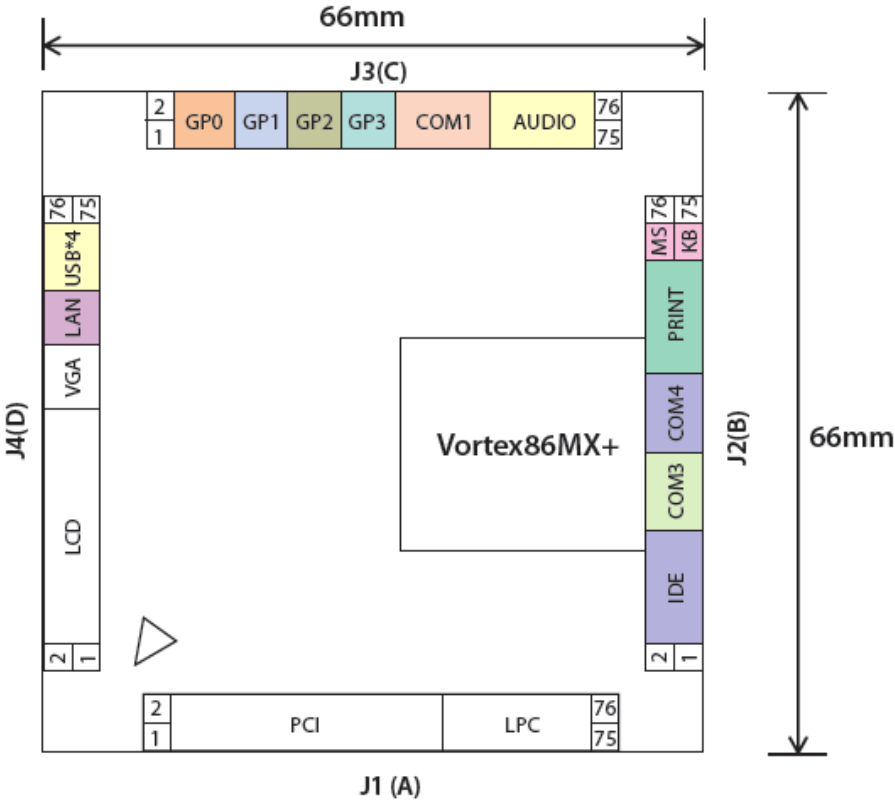
J23: COM6 (Optional: TTL)

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

J24: COM8 (Optional: TTL)

Pin #	Signal Name	Pin #	Signal Name
1	DCD8	2	RXD8
3	TXD8	4	DTR8
5	GND	6	DSR8
7	RTS8	8	CTS8
9	RI8	10	NC

■ SOM304MP-VP


66mm
J3(C)
2
1
GP0
GP1
GP2
GP3
COM1
AUDIO
76
75
J4(D)
USB*4
LAN
VGA
LCD
MS
KB
PRINT
COM4
COM3
IDE
Vortex86MX+
J2(B)
66mm
PCI
LPC
J1 (A)

■ SOM304MP-VP

SOM304MP-VP Signal Assignment

J1(A)				J2(B)			
Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
1	GND	2	GND	1	IDERST	2	GND
3	AD0	4	AD1	3	IDED7	4	IDED8
5	AD2	6	AD3	5	IDED6	6	IDED9
7	AD4	8	AD5	7	IDED5	8	IDED10
9	AD6	10	AD7	9	IDED4	10	IDED11
11	CBE-0	12	AD8	11	IDED3	12	IDED12
13	AD9	14	AD10	13	IDED2	14	IDED13
15	AD11	16	AD12	15	IDED1	16	IDED14
17	AD13	18	AD14	17	IDED0	18	IDED15
19	AD15	20	CBE-1	19	PDEREQ	20	IDECBLID
21	PAR	22	DEVSEL-	21	IDEIOW	22	IDESA0
23	STOP-	24	IRDY-	23	IDEIOR	24	IDESA1
25	GND	26	GND	25	IDERDY	26	IDESA2
27	TRDY-	28	CBE-2	27	IDEACK	28	IDECS0
29	FRAME-	30	AD17	29	IDEINT	30	IDECS1
31	AD16	32	AD19	31	AIDELED	32	GND
33	AD18	34	AD21	33	GND	34	GND
35	AD20	36	AD23	35	CTS3\	36	DSR3\
37	AD22	38	CBE-3	37	DTR3\	38	RXD3\
39	AD24	40	AD25	39	RI3\	40	RTS3\
41	AD26	42	AD27	41	TXD3\	42	DCD3\
43	AD28	44	AD29	43	CTS4\	44	DSR4\
45	PGNT-2	46	AD30	45	DTR4\	46	RXD4\
47	PGNT-1	48	AD31	47	RI4\	48	RTS4\
49	PGNT-0	50	PREQ-2	49	TXD4\	50	DCD4\
51	PCICLK3	52	PREQ-1	51	PPD0	52	PSTB-
53	PCICLK2	54	PREQ-0	53	PPD1	54	PAFD-
55	PCICLK1	56	PCIRST-	55	PPD2	56	PERROR-
57	INT-A	58	INT-D	57	PPD3	58	PINIT-
59	INT-C	60	INT-B	59	PPD4	60	PSLIN-
61	GND	62	GND	61	PPD5	62	PACK-
63	LAD0	64	LFRAME-	63	PPD6	64	PBUSY
65	LAD1	66	LDRQ-	65	PPD7	66	PPE
67	LAD2	68	SERIRQ	67	GND	68	PSLCT
69	LAD3	70	PCIRST-	69	RESET	70	GND
71	GND	72	GND	71	MSCLK	72	KBCLK
73	CLK24MOUT	74	GND	73	MSDATA	74	KBDAT
75	GND	76	GND	75	VBATT	76	SPEAKER

J3(C)				J4(D)			
Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
1	GND	2	GND	1	GND	2	GND
3	GP00	4	GP01	3	FPD0	4	FPD1
5	GP02	6	GP03	5	FPD2	6	FPD3
7	GP04	8	GP05	7	FPD4	8	FPD5
9	GP06	10	GP07	9	FPD6	10	FPD7
11	GP10	12	GP11	11	FPD8	12	FPD9
13	GP12	14	GP13	13	FPD10	14	FPD11
15	GP14	16	GP15	15	FPD12	16	FPD13
17	GP16	18	GP17	17	FPD14	18	FPD15
19	GND	20	GND	19	GND	20	GND
21	GP20	22	GP21	21	FPD16	22	FPD17
23	GP22	24	GP23	23	FPD18	24	FPD19
25	GP24	26	GP25	25	FPD20	26	FPD21
27	GP26	28	GP27	27	FPD22	28	FPD23
29	GP30	30	GP31	29	FP1HS	30	FP1VS
31	GP32	32	GP33	31	FP1DE	32	FP1DET
33	GP34	34	GP35	33	G_GPIO2	34	G_GPIO3
35	GP36	36	GP37	35	FP1CLK	36	TVCLKIN
37	GND	38	GND	37	GND	38	GND
39	CTS1\	40	TXDEN1	39	DDC1CLK	40	DDC1DAT
41	DTR1\	42	DSR1\	41	FPENBLT	42	FPENVDD
43	RI1\	44	RXD1\	43	FPENVEE	44	GND
45	TXD1\	46	RTS1\	45	HSYNC	46	GND
47	GND	48	DCD1\	47	VSYNC	48	BOUT
49	GND	50	GND	49	DDCDAT	50	ROUT
51	GND	52	GND	51	DDCCLK	52	GOUT
53	GND	54	GND	53	GND	54	GND
55	GND	56	GND	55	DUPLEX	56	LINK/ACTIVE
57	GND	58	GND	57	LANTX-	58	LANRX-
59	MIC_IN_R	60	MIC_IN_L	59	LANTX+	60	LANRX+
61	GND_AUD	62	GND_AUD	61	GND	62	GND
63	LINE_IN_L	64	LOUT_L	63	USBD3-	64	USBD2-
65	LINE_IN_R	66	LOUT_R	65	USBD3+	66	USBD2+
67	GND_AUD	68	GND_AUD	67	USBD1-	68	USBD0-
69	SPDIF	70	GND	69	USBD1+	70	USBD0+
71	GND	72	GND	71	GND	72	GND
73	VCC	74	GND	73	GND	74	USBIN+
75	VCC	76	GND	75	VCC3-OUT	76	USBIN-

2.5 System Mapping

System Mapping

Memory Mapping

Address	Description	Usage
00000000 - 0009FFFF	System RAM	*
000A0000 - 000AFFFF	EGA/VGA Video Memory	*
000B0000 - 000B7FFF	MDA RAM, Hercules graphics display RAM	*
000B8000 - 000BFFFF	CGA display RAM	*
000C0000 - 000C7FFF	EGA/VGA BIOS ROM	*
000C8000 - 000CFFFF	Boot ROM enable	
000CC000 - 000CFFFF	Console Redirection enable	
000D0000 - 000D7FFF	Expansion ROM space	
000D8000 - 000DBFFF	SPI FLASH Emulation Floppy A Enable	
000DC000 - 000DFFFF	Expansion ROM Space	
000E0000 - 000EFFFF	USB Legacy SCSI ROM space	
000F0000 - 000FFFFF	Motherboard BIOS	*
FEBD9000 - FEBD9FFF	Standard OpenHCD USB Host Controller	*
FEBDA000 - FEFBAFFF	Standard OpenHCD USB Host Controller	*
FEFBB400 - FEFBB4FF	On board Ethernet Adapter	*
FEBDB800 - FEFBB8FF	Standard Enhanced PCI to USB Host Controller	*
FEFBBC00 - FEFBBCFF	Standard Enhanced PCI to USB Host Controller	*

I/O Mapping

I/O Address	Owner	Usage
0000h - 000Fh	DMA 8237-1	*
0010h - 0017h	COM 9	

0020h - 0021h	PIC 8259-1	*
0022h - 0023h	Indirect Access Registers (6117D configuration port)	*
002Eh - 002Fh	Forward to LPC BUS	
0040h - 0043h	Timer Counter 8254	*
0048h - 004Bh	PWM counter 8254	*
004Eh - 004Fh	Forward to LPC BUS	
0060h	Keyboard / Mouse data port	*
0061h	Port B + NMI control port	*
0062h - 0063h	8051 download 4k address counter	*
0064h	Keyboard/ Mouse status/ command port	*
0065h	WatchDog0 reload counter	*
0066h	8051 download 8bit data port	*
0067h	WatchDog1 reload counter	*
0068h - 006Dh	WatchDog1 control counter	*
0070h - 0071h	CMOS RAM port	*
0072h - 0075h	MTBF control register	*
0078h - 007Ch	GPIO port 0,1,2,3,4 default setup	*
0080h - 008Fh	DMA page register	*
0092h	System control register	*
0098h - 009Ch	GPIO direction control	*
00A0h - 00A1h	PIC 8259-2	*
00C0h - 00DFh	DMA 8237-2	*
00E0h – 00EFh	DOS 4G Page access	*
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 (IRQ7, DMA 0)	*
02E8h – 02EFh	COM4 (IRQ 11)	*
02F8h – 02EFh	COM2 (IRQ3)	*
0338h – 033Fh	COM5 Forward to LPC BUS	
0376h	IDE1 ATAPI device control write only register	*
03E8h – 03EFh	COM3 (IRQ 10)	*
03F0h – 03F7h	Floppy Disk (IRQ6, DMA2)	
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	*
DE00h – DEFFh	On board LAN	*
FC00h – FC05h	SPI Flash BIOS control register	*
FC08h – FC0Dh	External SPI BUS control register	*

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	USB	*
IRQ6	USB	*
IRQ7	Printer Port	*
IRQ8	Real Time Clock	*
IRQ9	USB/ Ethernet 10/100M LAN	*
IRQ10	Serial Port 3	
IRQ11	Serial Port 4	
IRQ12	Mouse	*
IRQ13	Math Coprocessor	*
IRQ14	Hard Disk Controller#1	*
IRQ15	Hard Disk Controller#2	*

DMA Mapping

DMA#	Description	Usage
DMA0		
DMA1		
DMA2	Floppy Disk Controller	
DMA3		
DMA4		
DMA5		
DMA6		
DMA7		

2.6 Watchdog Timer

There are two watchdog timers in Vortex86SX/DX/MX+ 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

2.7 GPIO (General Purpose Input / Output)

40 GPIO pins are provided by the Vortex86SX/DX/MX+ 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

2.8 PWM (Pulse-width modulation)

Pulse-width modulation (PWM) of a signal or power source involves the modulation of its duty cycle, to either convey information over a communications channel or control the amount of power sent to a load.

The popular applications of pulse width modulation are in speed control of electric motors, volume control of Class D audio amplifiers or brightness control of light sources and many other power electronics applications.

The Vortex86DX /Vortex86MX+ SoC integrated 32 channels of PWM interface enabling the Automation, robotic industry to a New Age x86 SoC platform and we also offer the sample code of PWM which will guide the engineer to control the PWM functionality smoothly.

For more inquire of this sample code that please contact our sales team or mail to:
info@icop.com.tw

Chapter 3

Driver Installation

VGA

The Vortex86MX+ processor is integrated RDC Display chip which is an ultra-low powered graphics chipset with total power consumption at around 1-1.5 W. It is capable in providing VGA display output up to 1600x1200. With DVO interface, developers could easily connect flat Panel to support TFT and LVDS output.

LAN

The Vortex86MX+ processor also integrated 10/100Mbps Ethernet controller that supports both 10/100BASE-T and al lows direct connection to your 10/100Mbps Ethernet based Local Area Network for full interaction with local servers, wide area networks such as the Internet.

The controller supports: Half / Full-Duplex Ethernet function to double channel bandwidth, auto media detection.

AUDIO

The ALC262 series are 4-Channel High Definition Audio Codecs with UAA (Universal Audio Architecture) featuring two 24-bit stereo DACs and three 20-bit stereo ADCs, they are designed for high performance multimedia desktop and laptop systems. The ALC262 series incorporates proprietary converter technology to achieve over 100dB Signal-to-Noise ratio playback quality; easily meeting PC2001 requirements and also bringing PC sound quality closer to consumer electronic devices.

Operating system support

The Vortex86MX+ 6427 3.5" CPU board supports Embedded software: Free DOS, DOS 6.22, Windows CE 6.0, Windows XP Professional, Windows Embedded standard (XPE) and Windows 2000 (SP4).

Vortex86MX+ 6427 also supports most of the popular Linux distributions, for more detail information, please visit DMP official website: http://www.dmp.com.tw/tech/vortex86mx/

Appendix

A. TFT Flat Panel Data Output

LCD Pin	Vortex86MX+/DX2 PIN NAME	DIGITAL 18-BIT	RGB 24-BIT
1	LCDVCC(+3.3V)	VDD	VDD
2	LCDVCC(+3.3V)	VDD	VDD
3	FPD12	G2	G4
4	FPD13	G3	G5
5	FPD14	G4	G6
6	FPD15	G5	G7
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
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

B. TFT Flat Panel Support List

Size	Brand	Resolution	Model No.
3.5”	Planar	160x120	EL320.240.36-HB
5.7”	Planar	320x240	EL160.120.39
5.7”	TOSHIBA	320x240	LTA057A343F
5.7”	Sharp	320x240 (QVGA/VGA)	LQ057Q3DC02
5.7”	Data Image	640x480	FG050710DSSWJG01/DG01
5.7”	Ampire	640x480	AM-640480GTMQW-T00H
6.4”	PVI	640x480	PD064VT5
6.4”	LG	640x480	LB064V02
6.5”	Optrex	640x480	T-51750GD065J-FW-ADN
7”	Ampire	800x480	AM-80480STMQW-TA0
7”	Data Image	800x480	FG0700A0DSSWBG01
7”	URT	800x480	UMSH-8173MD-1T
7”	Emerging Display	800x480	ET0700G0DH6
7”	Innolux	800x480	AT070TN83 V.1 (10131)
8”	Sharp	640x480	LQ080V3DG01
10.4”	Toshiba	640x480	LTD104C11S
10.4”	Optrex	640x480	T-55532D104J-LW-A-AAN
12.1”	LG	800x600	LB121S03

C. LVDS Flat Panel Support

Size	Brand	Resolution	Model No.
5.7”	AMPIRE	640x480	AM-640480G4TNQW
6.5”	AUO	640x480	G065VN01
7”	HannStar	800x480	HSD070LDW1
7”	Ampire	800x480	AM-800480R3TMQW
8.4”	AUO	800x600	G084SN03 V3
8.9”	CPT	1024x600	CLAA089NA0ACW
8.9”	HannStar	1024x600	HSD089IFW1
10.1”	HannStar	1024x600	HSD100IFW1
10.1”	AUO	1024x600	B101AW06_V0
10.4”	AUO	800x600	G104SN02 V2
10.4”	Ampire	800x600	AM-800600LTNQW
12.1”	AUO	800x600	G121SN01
15”	AUO	1024x768	G150XG01

D. Flat Panel Wiring and Lighting

- Hardware

  Before you connect the TFT LCD Flat Panel with Vortex86MX+ 6427, please make sure that the input Voltage of LCD is +3.3V or Not

- BIOS

  Please contact or e-mail our regional sales to get the special BIOS for the any TFT LCD Flat Panels.

- Wiring LCD Cable

  Please refer to Page 12, 13 (J15: LCD & J16: LVDS connector) and Page22~25. Or for more LCD lighting and integration service, please contact our regional sales or mail to info@icop.com.tw ,if you have any questions.

E. 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/Vortex86DX/Vortex86MX+ 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/

F. BIOS Default setting

If the system cannot be booted after BIOS changes are made, Please follow below procedures in order to restore the CMOS as default setting.

- Press “End” Key, when the power on

- Press <Del> to enter the AMI BIOS setup
- Press “F9” to Load Optimized Defaults
- Press “F10” to Save configuration changes and exit setup

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.