Lanner
creating value in applied computing

Industrial Communications

Hardware Platforms for Industrial Computing

LEC-6020 V1.0

User's Manual

Publication date: 2014-07-04

About

About

Overview

Icon Descriptions

The icons are used in the manual to serve as an indication of interest topics or important messages. Below is a description of these icons:

NOTE: This check mark indicates that there is a note of interest and is something that you should pay special attention to while using the product.

WARNING: This exclamation point indicates that there is a caution or warning and it is something that could damage your property or product.

Online Resources

The listed websites are links to the on-line product information and technical support.

Resource	Website
Lanner	http://www.lannerinc.com
Product Resources	http://www.lannerinc.com/support/download-center
RMA	http://eRMA.lannerinc.com

Copyright and Trademarks

Acknowledgement

Compliances and Certification

CE Certification

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class A Certification

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Table of Contents

Chapter 1: Introduction

Thank you for choosing the LEC-6020. The LEC-6020 series is an industrial cyber security appliance featuring a different number of serial communication ports as well as Ethernet ports in a compact frame design (65mm(W) x146mm(H) x127mm(D)).

The LEC-6020 has an innovative industrial and mechanical design. It can be placed on desk or mounted on din-rails. This reduces maintenance effort when the device is installed in an industrial setting where access is not convenient.

The LEC-6020 also features a solid and sealed aluminum extrusion framing.

Here is the summary of the key capabilities of LEC-6020:

- Onboard Intel Atom N2600 with Intel NM10 chipset
- 4 serial ports (on model A only) and one serial port (on model C, D)
- Two, five or seven gigabit Ethernet RJ-45 or optical fiber ports (all ports have magnetic isolation protection of 1.5 KV). Moreover, these ports are capable of LAN bypass, supporting dynamic disconnection/bypass on a host system failure, power off or upon software request.
- Two or four USB ports depending on the model number
- Power input via Phoenix contact with power failure relay (B, C, D only)

Please refer to the following chart for a detailed description of the system's specifications.

System Specification

Processor Options		Intel® Atom™ N2600 1.6 GHz
Chipset		Intel NM10
BIOS		AMI 8Mbit SPI Flash ROM
System Memory	Sockets	1 x 204-pin DDR3 SODIMM socket
	Technology	Dual-Channel DDR3 1066/1333MHz, unbuffered, Non-ECC
	Max. Capacity	2 GB
USB		LEC-6020A: USB 2.0 compliant hosts x 4, Type A connector LEC-6020B/C/D: USB 2.0 compliant hosts x 2, Type A connector
Expansion Bus		Mini-PCIe (LEC-6020A only)
OS Support		LEC-6020A/B/D: Linux 2.6, Windows XP Embedded, Window XP, Window 7 Embdded LEC-6020C: Linux 2.6, Windows 7 Embedded
Storage	NAND Flash	None
	HDD Support	SATA connector for SSD/HDD expansion, HDD mounting kits (by request)
	Expansion	CompactFlash socket Type I/II x1
Networking	LAN	LEC-6020A: 3 x 10/100/1000 Mbps ports, Autosensing, RJ45, with one pair of LAN bypass. LEC-6020B: 5 x 10/100/1000 Mbps ports, Autosensing, RJ45, with two pairs of LAN bypass LEC-6020C: 5x10/100/1000Mbps ports, Autosensing, RJ45, with one pair bypass. 2x Gigabit SFP LEC-6020D: 5x10/100/1000Mbps ports, Autosensing, RJ45, with one pair bypass.
	Controller	LEC-6020A: Intel 82574L x 3, LEC-6020B/D: Intel 82574L x 5, LEC-6020C: Intel 82574L x 2, Intel I210x5
	Magnetic Isolation Protection	1.5 KV built-in
Serial Interface	Serial Standard	LEC-6020A: 2 x 10 pin terminal block for 4 x RS-232/422/485, 1 x internal header (RS232 only) LEC-6020B: 1 x internal header for RS-232 LEC-6020C/D: 1 x DB9 for RS-232
	ESD Protection	15 KV for all signals
Serial Signals	RS-232	RTS, Rx, Tx, CTS, GND
	RS-422	TxD+, TxD-, RxD-, RxD+, GND
	RS-485	Data+, Data-, GND
	Baudrate	Supports 50 bps to 115.2 kbps
Display	Graphics Controller	Intel® GMA 3600
	Display Interface	internal pin header
LEDs		LEC-6020A: Power, Storage, Run (user defined), 3 x User defined, 4 x Rx, 4 x Tx. LEC-6020B/D: Power, Storage, Run (user defined), 3 x User defined LEC-6020C: Power, Storage, Run(User defined), 3x User deined, 2x SFP.

Physical Characteristics	Housing	Steel Aluminium
	Weight	1 kg
	Dimensions(WxHxD)	65 x 146 x 127 mm
	Mounting Options	DIN rail and wall mount
Environment	Operating Temperature	-40~70°C
	Storage Temperature	-40~85°C
	Ambient Relative Humidity	5 to 95% (non-condensing)
Power	Input Voltage	+12~36 V DC
	Power Consumption	TBD
	Connector	LEC-6020A: 2-pin terminal block, LEC-6020B/C/D: 6-pin terminal block
Standard and Regulation	EMC	CE, FCC
	Green product	RoHS
Reliability	Alter tool	Built-in buzzer and RTC (real-time clock) with lithium battery backup
	Automatic Reboot Trigger	Watchdog Timer 1~255 level time interval system reset, software programmable
	Warranty	2 years
	MTBF	TBD

LEC-6020A	Intel Atom N2600 1.6 GHz CPU, 3 x Intel GbE w/ one bypass, 4 x RS-232/422/485 w/ ESD, Surge protection, 4 x USB, 1 x Mini-PCIe, +12~36 V DC w/ 2-Pin, DIN-Rail
LEC-6020B	Intel Atom N2600 1.6 GHz CPU, 5 x Intel GbE w/ two bypass, Dual +12~36 V DC w/ 6-Pin w/ power failure relay, DIN-Rail
LEC-6020C	Intel Atom N2600 1.6GHz CPU, 5 x Intel GbE w/ one bypass, 2 x Gigabit SFP, 1 x COM port, Dual +12~36 Vdc w/ 6-pin w/ power failure relay, DIN-Rail
LEC-6020D	Intel Atom N2600 1.6GHz CPU, 5 x Intel GbE w/ one bypass, 1 x COM port, Dual +12~36 Vdc w/ 6-pin w/ power failure relay, DIN-Rail

Package Contents

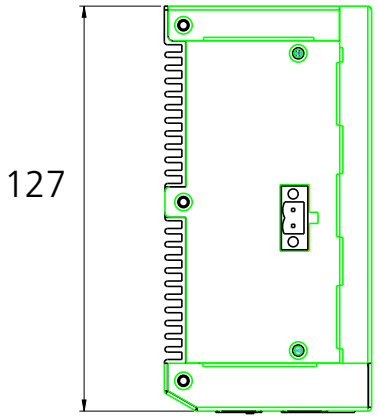
Your package contains the following items:

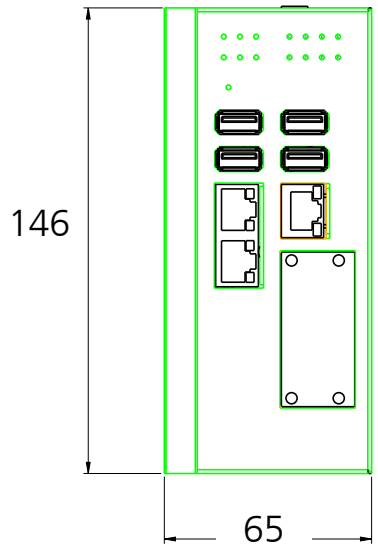
- LEC-6020 Fanless Embedded System
- Drivers and User's Manual CD

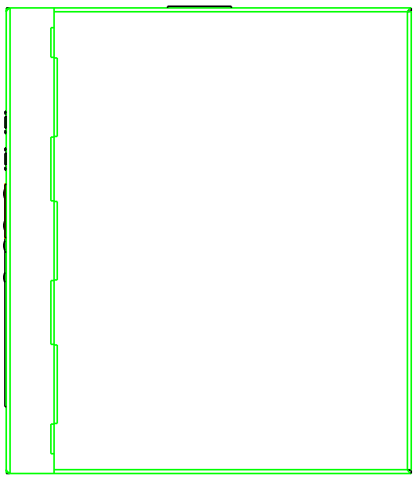
Chapter 2: System Components

System Drawing

Mechanical dimensions of the LEC-6020 Unit: mm

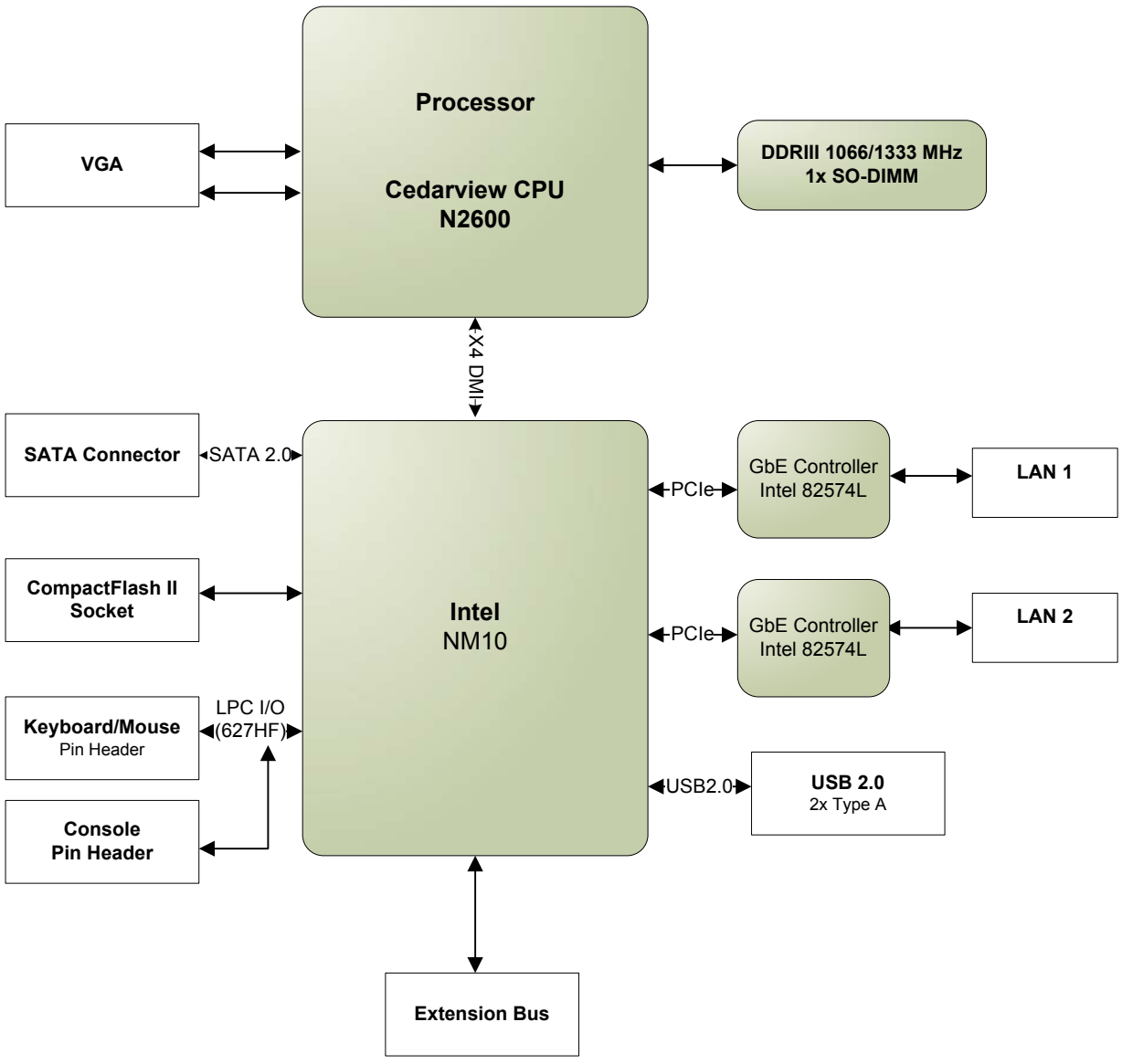




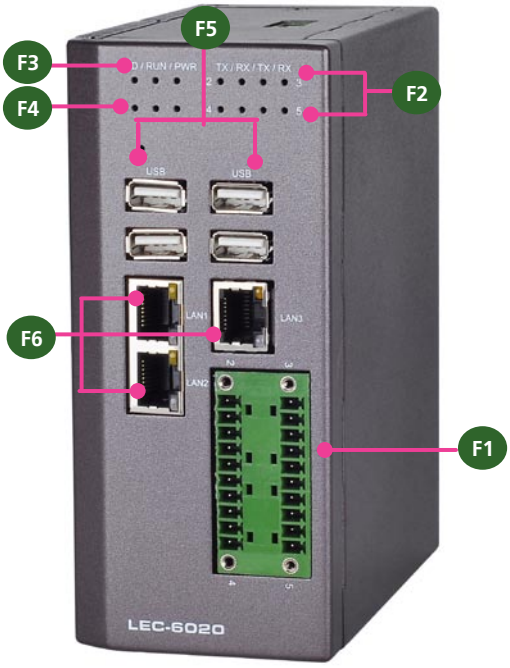


Block Diagram

The block diagram depicts the relationships among the interfaces and modules on the motherboard.



Front Components



Model: 6020A

Model: 6020B

Model: 6020C

Model: 6020D

Component	Description	Pin Definition Reference
F1 Serial Ports COM2~COM5 (model A)	Serial ports through terminal block; COM2~COM5 on the daughter board LEK-6020COM4 support RS-232/422/485 with BIOS selection among RS-232/422/485. There is also another console port (COM1) via pin headers on the main board.	COM1 (of LEK-6020COM4) on page 19

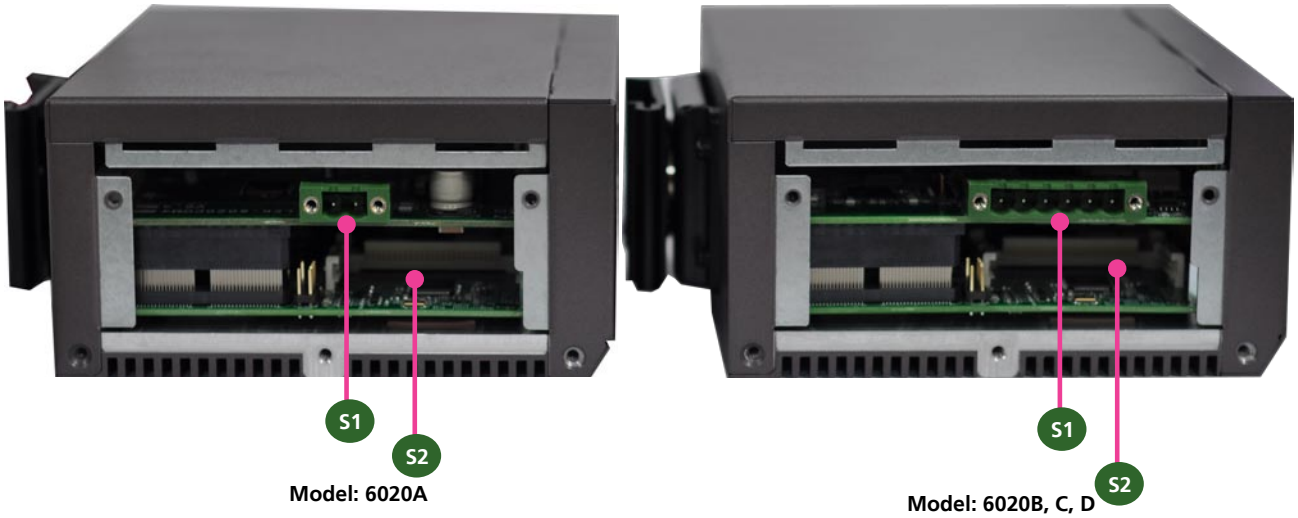
<table>
<tr><th>Component</th><th>Description</th><th>Pin Definition Reference</th></tr>
<tr><td>F2 Serial Port LED</td><td>These two rows are LED indicators of Tx (Data transmitting in yellow) and RX (Data receiving in yellow) for serial port status.<table><tr><td>RX-COM 2</td><td>TX-COM 2</td><td>RX-COM 3</td><td>TX-COM 3</td></tr><tr><td>RX-COM 4</td><td>TX-COM 4</td><td>RX-COM 5</td><td>TX-COM 5</td></tr></table></td><td></td></tr>
<tr><td>F3 HDD/RUN/PWR LED</td><td><table><tr><td>Power</td><td>Green indicates Power-on, where as Off indicates Power-off status.</td></tr><tr><td>Run</td><td>A programmable dual green/ orange LEDs which can be used for indicating system status. For sample code, please look into your Driver and User Manual CD.</td></tr><tr><td>HDD</td><td>Blinking indicates hard disk activities, whereas Off indicates there is no hard disk present or data access activities.</td></tr></table></td><td></td></tr>
<tr><td>F4 Programmable LEDs</td><td>These three LEDs are programmable and can be controlled by SW1.</td><td>SW1 on page 17</td></tr>
<tr><td>F5 Four or Two USB 2.0 Ports (Two ports on model B, C, D)</td><td>An USB type A connector. Model 6020A provides two extra ports from the daughter board.</td><td>USB1/USB2 on page 17; USB2/ USB3 on page 19</td></tr>
<tr><td>F6 Three10/100/1000Mbps LAN ports (5 on model B, D, 7 on model C)</td><td>LEC-6020A: Three RJ-45 (network) connectors LAN1~LAN3 ports are provided by Intel 82574L; LAN1 and LAN2 are capable of bypass. LAN3 supports WOL/PXE functions. (The default setting for PXE is disable; enable it in the BIOS menu.) .

LEC-6020B: It supports two pairs of LAN bypass (LAN1-LAN2, LAN3-LAN4). LAN1~LAN5 ports are provided by Intel 82574L. And LAN5 supports WOL/PXE. (The default setting for PXE is disable; enable it in the BIOS menu.)

LEC-6020C: Five RJ-45 and two optical fiber connectors. LAN1/LAN2 ports are provided by Intel 82574L while LAN3~LAN5 as well as the two fiber ports are provided by Intel I210. LAN1 and LAN2 are capable of bypass. LAN3~LAN5 support WOL. (The default setting for WOL is enable.)

LEC-6020D: Five RJ-45 connectors. LAN1~LAN5 ports are provided by Intel 82574L; LAN1 and LAN2 are capable of bypass. LAN3~LAN5 support WOL/PXE (The default setting for PXE is disable; enable it in the BIOS menu.)</td><td>LAN1~LAN3 (of LEK-6020EN2/ EN2B) on page 21; LANB1~LANB3 and SFP1~SFP2 (of LEK-6020F1)on page 22</td></tr>
<tr><td>F7 COM Port (on model C,D)</td><td>COM Port
The default terminal configurations:
115200 baud rate, 8 data bits, no parity, 1 stop bit , no flow control.</td><td>COM1 (of LEB-6020) on page 18</td></tr>
<tr><td>F8 FX1, FX2 LEDs (</td><td>LEDs for the Fiber ports status.
Blinking: port is active
Yellow: port is linked</td><td></td></tr>
</table>

Side Components



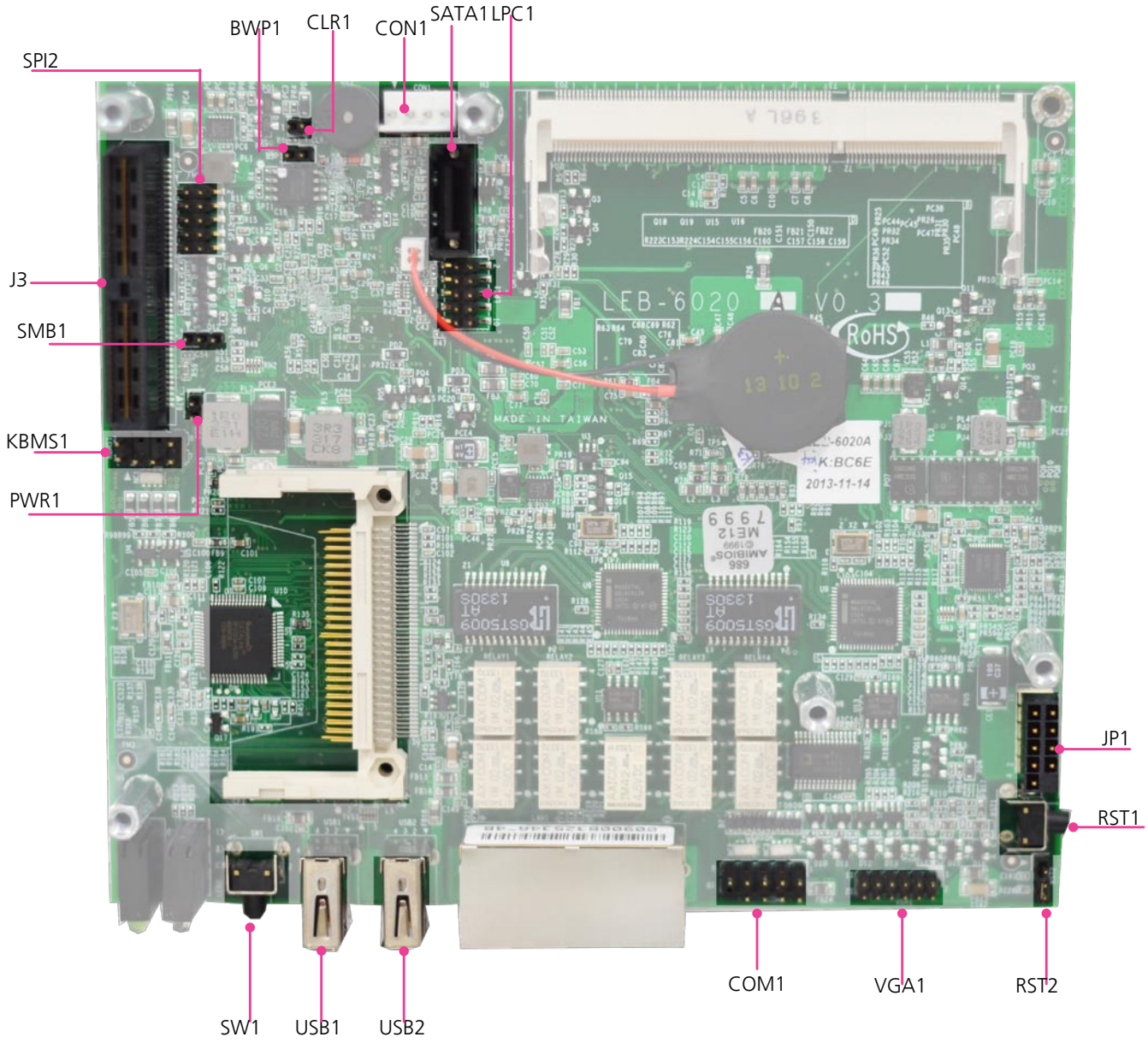
Component	Description	Pin Definition Reference
S1 DC-In (power) 1x2 Pin Phoenix Contact Connector (model A) DC-In (power) 1x6 Pin Phoenix Contact Connector with power failure relay (model B, C, D)	Power-in Connector. The LEC-6020 supports power range between +12~+36V DC-in with or without power relay.	CN1 on page 19; CN1 on page 21
S2 CF Card Slot	A CF card slot with protection lid	CF1 on page 17

Component	Description	Pin Definition Reference
S3	A reset button	RST1 on page 17

Chapter 3: Board Layout

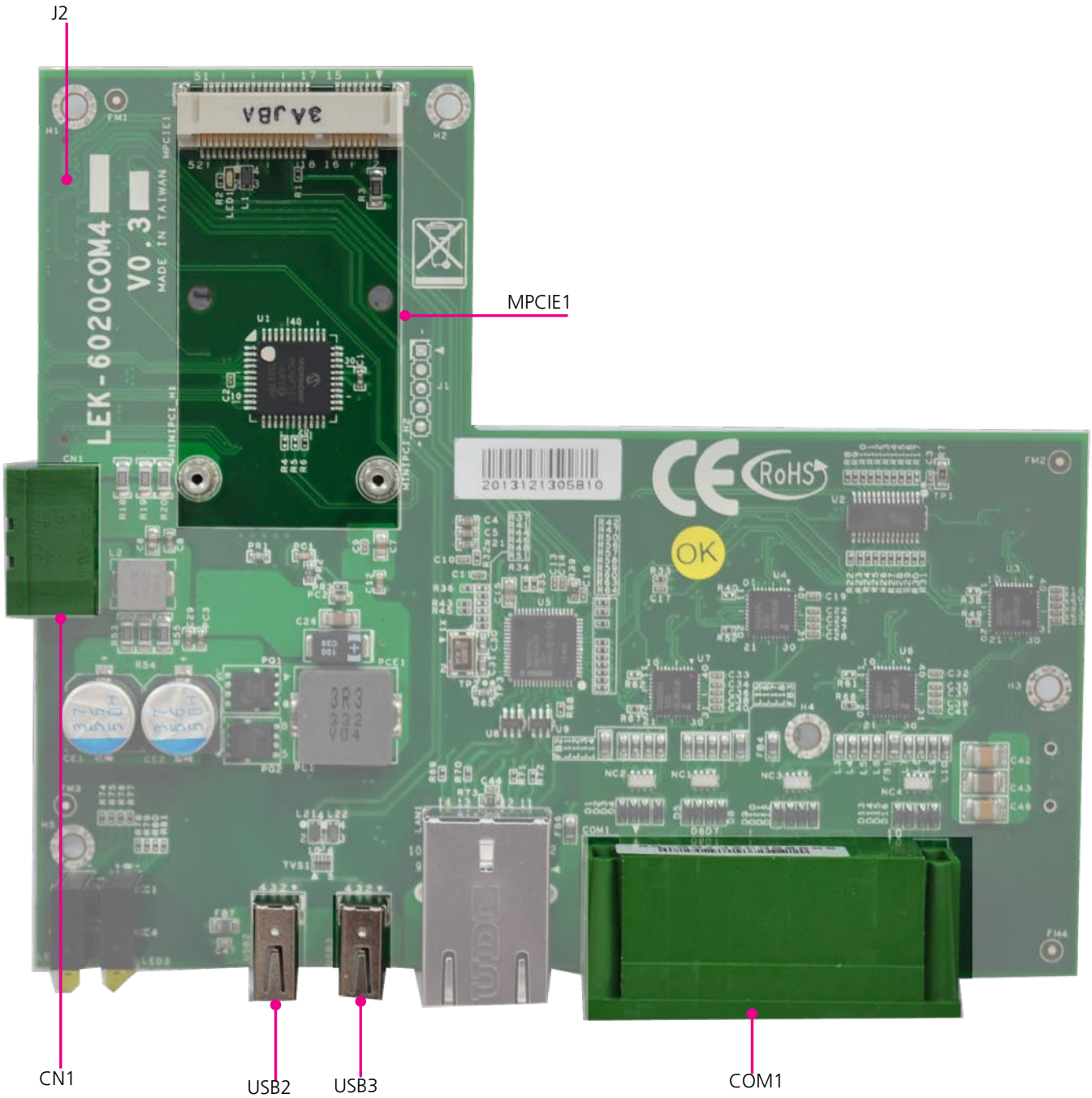
External Connectors

The following picture highlights the location of system jumper settings and connectors of the LEC-6020 main board. Refer to the table 3.1 Connector List for more details.



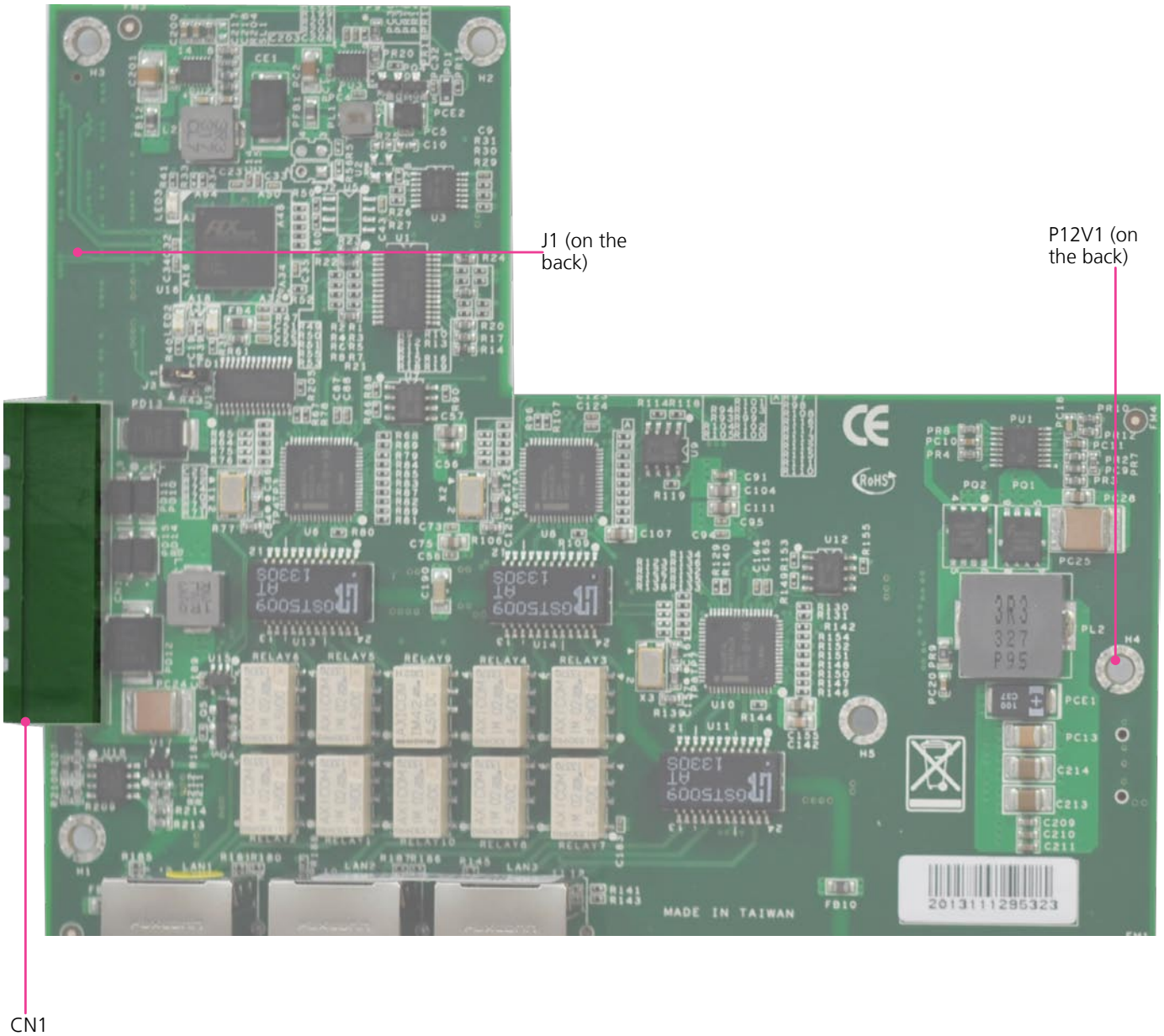
Connectors and Jumpers (daughter board)

The following picture highlights the location of jumpers and connectors of the LEK-6020COM4. Refer to the table 3.2 Connector List for more details.



Connectors and Jumpers (daughter board)

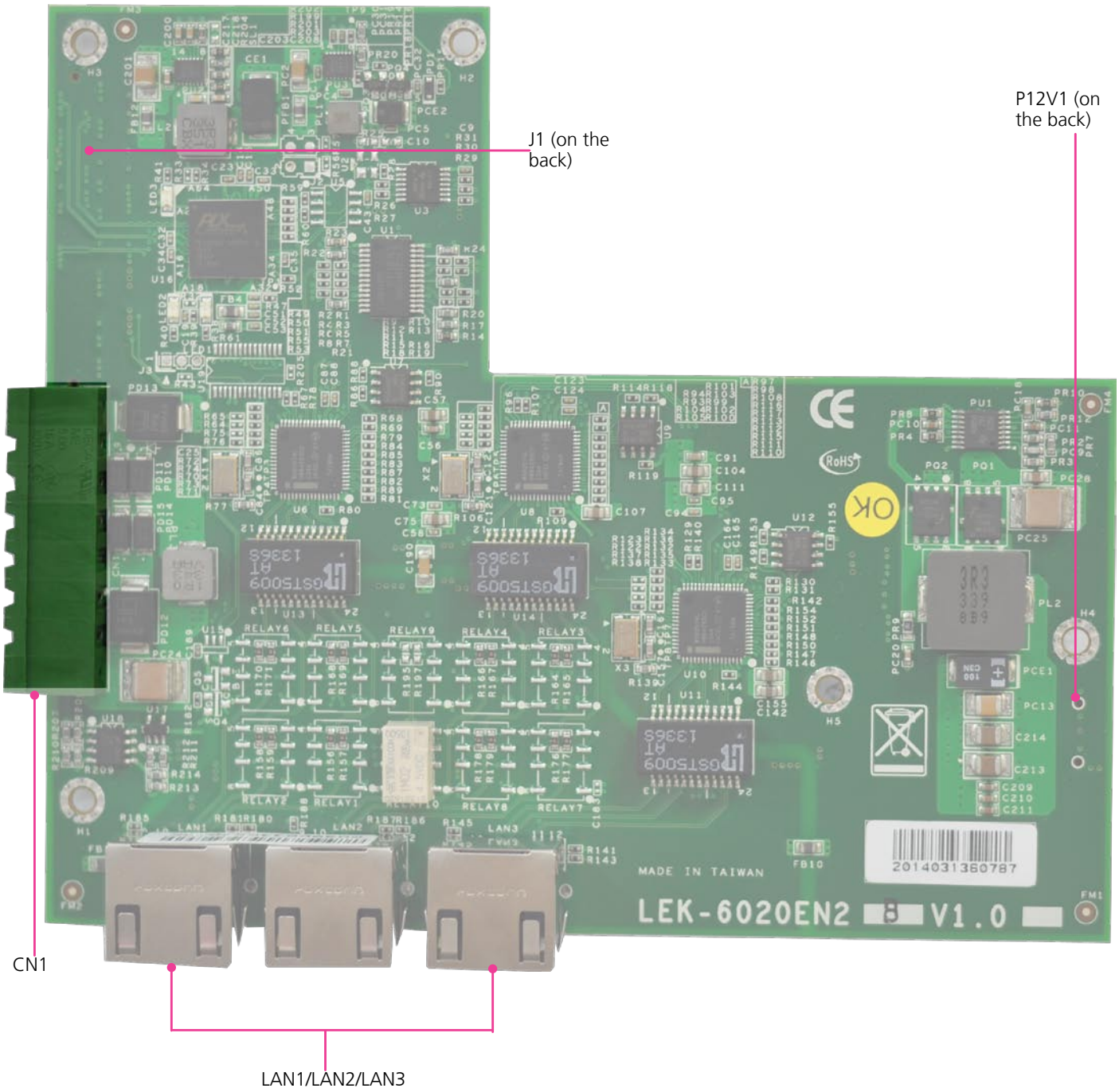
The following picture highlights the location of internal connectors and jumpers on the daughter board LEK-6020EN2. Refer to the table 3.3 Connector List for more details.



LEK-6020EN2

Connectors and Jumpers (daughter board)

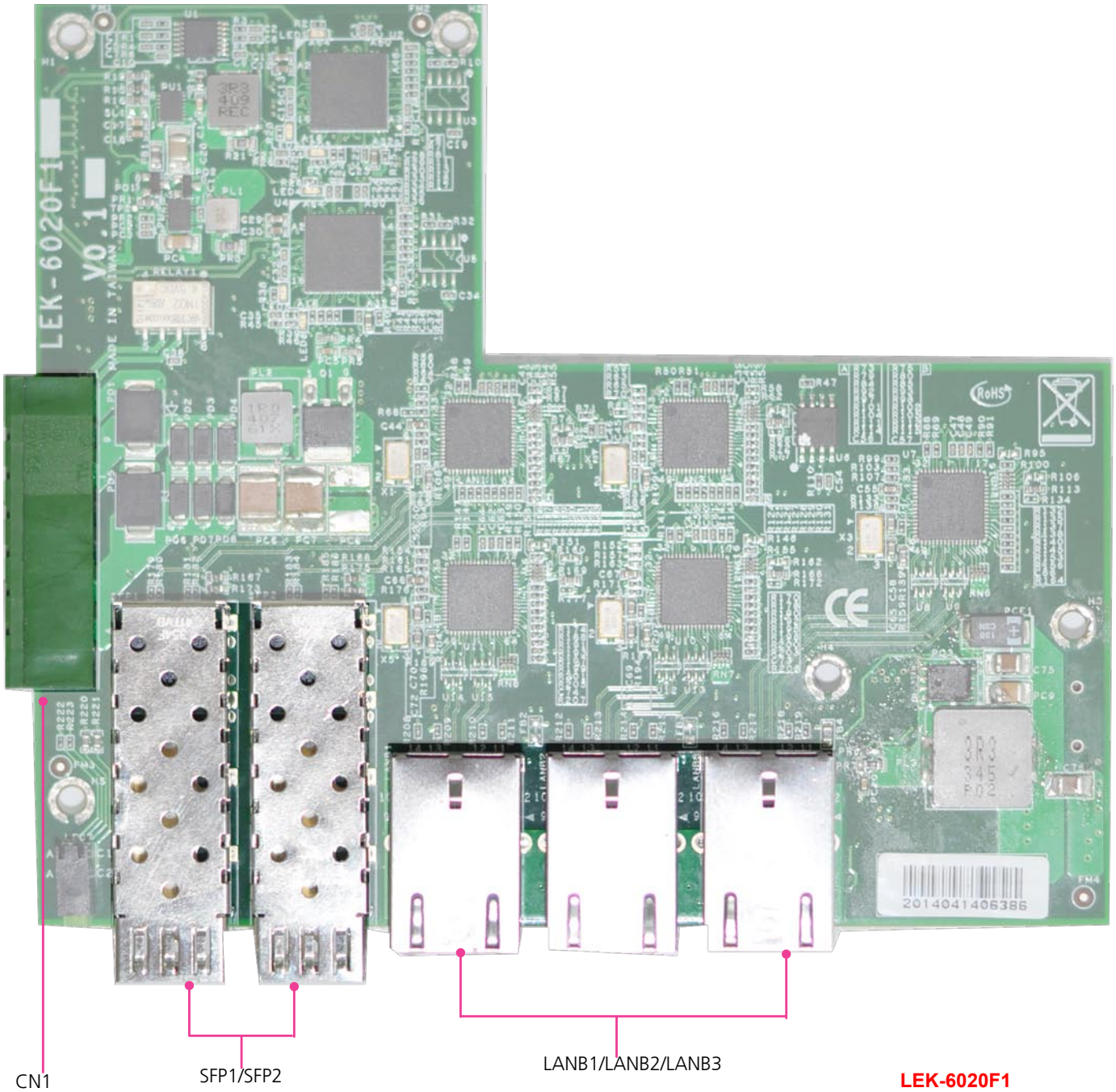
The following picture highlights the location of internal connectors and jumpers on the daughter board LEK-6020EN2B. Refer to the table 3.3 Connector List for more details.



LEK-6020EN2B

Connectors and Jumpers (daughter board)

The following picture highlights the location of internal connectors and jumpers on the daughter board LEK-6020F1. Refer to the table 3.4 Connector List for more details.



Connectors and Jumpers List

The tables below list the function of each of the board jumpers and connectors by labels shown in the above section. The next section in this chapter gives pin definitions and instructions on setting jumpers.

Table 3.1 Connector List for **LEB-6020**

Labels	Function	Pin Definition Reference Page
BWP1	SPI ROM Write Portect	Reserved for Factory Use
CF1	CF Connector	P17
CLR1	Clear CMOS	P18
COM1	Serial Port 1 Connector	P18
CON1	SATA Power Connector	P17
J3	Board to Board Connectorr	P18
JP1	Board to Board Power Connector	P18
KBMS1	Keyboard and Mouse Connector	P18
LPC1	Low-pin Count Connector	Reserved for Factory Use
PWR1	Power Button Connector	P18
RST1	Reset Button	P17
RST2	HW/SW Reset Select	P17
SATA1	SATA Connector	P17
SMB1	SMBus Connector	Reserved for Factory Use
SPI2	SPI ROM Connector	Reserved for Factory Use
SW1	LED2 Control Button	P17
USB1	USB 2.0 Connector	P17
USB2	USB 2.0 Connector	P17
VGA1	VGA Connector	P17

Table 3.2 Connector List for **LEK-6020COM4**

Labels	Function	Pin Definition Reference Page
COM1	COM Port 2~5	P19
CN1	Power Connector	P19
J2	Board to Board Connector	P20
USB2	USB 2.0 Connector	P19
USB3	USB 2.0 Connector	P19
P12V1	Board to Board Power Connector	P19
MPCIE1	Mini-PCIe Connector	P20

Table 3.3 Connector List for **LEK-6020EN2/LEK-6020EN2B**

Labels	Function	Pin Definition Reference Page
CN1	DC-in Power Connector	P21
J1	Board to Board Connector	P21
LAN1~LAN3	RoHS RJ45 Jack	P21
P12V1	Board to Board Power Connector	P21

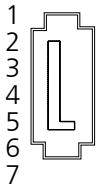
Table 3.4 Connector List for **LEK-6020F1**

Labels	Function	Pin Definition Reference Page
CN1	Power Connector	P22
J1	Board to Board Connector	P22
LANB1, LANB2, LANB3	RoHS RJ45 Jack	P22
P12V1	Board to Board Power Connector	P22
SFP1, SFP2	RoHS SFP Connector	P22

Jumper Settings

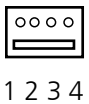
LEB-6020

Serial-ATA Connector (SATA1): It is for connecting a 2.5" harddisk to be served as your system's storage. It can support SATA II which features Data transfer rates up to 3.0 Gb/s (300 MB/s).



Pin No.	Function
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

4-pin Serial-ATA Power Connector (CON1): It is for connecting the SATA power cord.



Pin No.	Function
1	12V
2	Ground
3	Ground
4	5V

USB Port (USB1, USB2):

Pin No.	Pin Name
1	VCCUSB01
2	USB0N_REAR_L
3	USB0P_REAR_L
4	GND

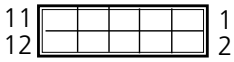
Reset Button (RST1)

LED2 Control Button (SW1): This control button is a programmable button to control the behavior of the three LEDs of LED2.

HW/SW Reset (RST2)

Pin No.	Pin Name
1-2	Software Reset
2-3 (Default)	Hardware Reset

VGA Port (VGA1)

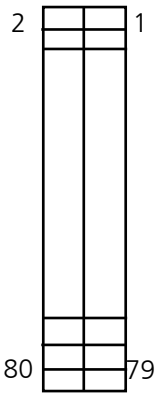


Pin No.	Description	Pin No.	Description
1	CON_RED	2	CRT_ON
3	CON_GREEN	4	GND_VGA
5	CON_BLUE	6	GND_VGA
7	CON_HSYNC	8	GND_VGA
9	CON_VSYNC	10	GND_VGA
11	CON_DDC_DAT	12	CON_DDC_CLK

Compact Flash Connector (CF1)

PIN	Description	PIN	Description
1	GND	26	DET1
2	CF_DD3	27	CF_DD11
3	CF_DD4	28	CF_DD12
4	CF_DD5	29	CF_DD13
5	CF_DD6	30	CF_DD14
6	CF_DD7	31	CF_DD15
7	-CF_DCS0	32	-CF_DCS1
8	GND	33	CF_VS1
9	GND	34	CF_DIOR_N
10	GND	35	CF_DIOW_N
11	GND	36	P3V3S
12	GND	37	CF_IDEIRQ
13	CF_PW	38	CF_PW
14	GND	39	MST_SLV
15	GND	40	CF_VS2
16	GND	41	CF_IDERST_N
17	GND	42	CF_IORDY
18	CF_DA2	43	CF_DMARQ
19	CF_DA1	44	CF_DDACK_N
20	CF_DA0	45	CFACT_N
21	CF_DD0	46	CF_PDIAG
22	CF_DD1	47	CF_DD8
23	CF_DD2	48	CF_DD9
24	NC	49	CF_DD10
25	CF_DIS_N	50	GND

Board to Board Connector (J3)

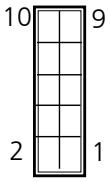


PIN	Description	PIN	Description
1	GND	2	GND
3	USB_P2_DN	4	PCIE_RX2_DN
5	USB_P2_DP	6	PCIE_RX2_DP
7	GND	8	GND
9	USB_P3_DN	10	PCIE_TX2_C_DN
11	USB_P3_DP	12	PCIE_TX2_C_DP
13	GND	14	GND
15	USB_P6_DN	16	PCIE_RX3_DN
17	USB_P6_DP	18	PCIE_RX3_DP
19	GND	20	GND
21	SMB_CLK_RESUME_IO	22	PCIE_TX3_C_DN
23	SMB_DATA_RESUME_IO	24	PCIE_TX3_C_DP
25	GND	26	GND
27	USB_OC_N23	28	CLK_MULTI_IO_ DN
29	PM_CLKRUN_N	30	CLK_MULTI_IO_ DP
31	GND	32	GND
33	CLK_33M_TPM	34	CLK_MINIPCIE_ DN
35	L_AD3	36	CLK_MINIPCIE_ DP
37	L_AD2	38	GND
39	L_AD1	40	GND
41	L_AD0	42	PLTRST_BUF2_N
43	L_FRAME_N	44	WAKE_N
45	SER_IRQ	46	SIO_GP00
47	P5VS	48	SIO_GP01
49	P5VS	50	COM2_RTS#
51	P5VS	52	COM2_TXD#
53	P5VS	54	COM2_CTS#
55	P5VS	56	COM2_RXD#
57	WDTO_OUT#	58	COM3_RTS#
59	P3V3S	60	COM3_TXD#
61	P3V3S	62	COM3_CTS#
63	P3V3S	64	COM3_RXD#
65	P3V3S	66	COM4_RTS#
67	P3V3S	68	COM4_TXD#
69	P3V3S	70	COM4_CTS#
71	SIO_GP54	72	COM4_RXD#
73	P1V5	74	COM5_RTS#
75	P1V5	76	COM5_TXD#
77	P1V5	78	COM5_CTS#
79	P1V5	80	COM5_RXD#

Clear CMOS jumper (CLR1): It is for clearing the CMOS memory.

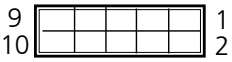
Pin No.	Pin Name
1-2	Clear CMOS
NC (Default)	Normal

Board to Board Power Connector (JP1)



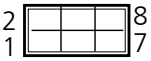
Pin No.	Pin Name	Pin No.	Pin Name
1	NC	2	P12V
3	GND	4	P12V
5	GND	6	P12V
7	GND	8	P12V
9	GND	10	P12V

Serial Port Connector (COM1)



Pin No.	Pin Name	Pin No.	Pin Name
1	SP1_DCD#	2	SP1_DSR#
3	SP1_RXD	4	SP1_RTS#
5	SP1_TXD	6	SP1_CTS#
7	SP1_DTR#	8	SP1_RI#
9	CAGND		

Keyboard and Mouse Connector (KBMS1)



Pin No.	Pin Name	Pin No.	Pin Name
1	P5VS	2	MSCLK
3	MSDAT	4	
5	KBDAT	6	
7	GND	8	KBCLK

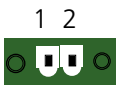
Power Button (PWR1)

Pin No.	Pin Name
1-2	Power On/Off
NC (Default)	Normal

LEK-6020COM4

Connectors on LEK-6020COM4

DC-in Connector (CN1)

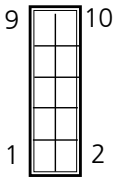


Pin No.	Pin Name
1	GND
2	10.8V~36V

USB Port (USB2, USB3)

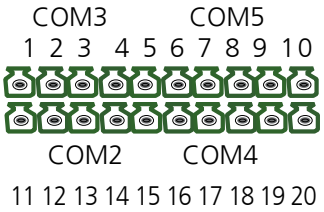
Pin No.	Pin Name
1	VCCUSB23
2	USB3N_REAR_L
3	USB3P_REAR_L
4	GND

Board to Board Power Connector (P12V1)



Pin No.	Pin Name	Pin No.	Pin Name
1	NC	2	P9V
3	GND	4	P9V
5	GND	6	P9V
7	GND	8	P9V
9	GND	10	P9V

RS-232/422/485 Serial Port (COM2~COM5, COM1)



PIN NO.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
RS-232			COM3_RXD	COM3_TXD	COM3_GND			COM5_RXD	COM5_TXD	COM5_GND
RS-422	COM3_TX+	COM3_TX-	COM3_RX-	COM3_RX+	COM3_GND	COM5_TX+	COM5_TX-	COM5_RX-	COM5_RX+	COM5_GND
RS-485	COM3_DATA+	COM3_DATA-			COM3_GND	COM5_DATA+	COM5_DATA-			COM5_GND
PIN NO.	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
RS-232			COM2_RXD	COM2_TXD	COM2_GND			COM4_RXD	COM4_TXD	COM4_GND
RS-422	COM2_TX+	Com2_TX-	COM2_RX-	COM2_RX+	COM2_GND	COM4_TX+	COM4_TX-	COM4_RX-	COM4_RX+	GND
RS-485	COM2_DATA+	COM2_DATA-			COM2_GND	COM4_DATA+	COM4_DATA-			COM4_GND

Note: The default protocol is in RS-485. To select among RS-232, 422 and 485, use the BIOS menu

Mini-PCIe Connector (MPCIE1)

PIN	Description	PIN	Description
1	WAKE_N	2	VCC3P3_MINI1
3	NC	4	GND
5	NC	6	P1V5
7	MINI_CLKREQ_N1	8	NC
9	GND	10	NC
11	CLK_MINIPCIE_DN	12	NC
13	CLK_MINIPCIE_DP	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	RF_KILL_N1_R
21	GND	22	PLTRST_PCIE_N
23	PCIE_RX2_DN	24	VCC3P3_MINI1
25	PCIE_RX2_DP	26	GND
27	GND	28	P1V5
29	GND	30	SMB_CLK_RESUME_IO
31	PCIE_TX2_C_DN	32	SMB_DATA_RESUME_IO
33	PCIE_TX2_C_DP	34	GND
35	GND	36	USB_P6_DN_L
37	GND	38	USB_P6_DP_L
39	VCC3P3_MINI1	40	GND
41	VCC3P3_MINI1	42	3G_LED1_WWAN_N
43	GND	44	NC
45	NC	46	NC
47	NC	48	P1V5
49	NC	50	GND
51	NC	52	VCC3P3_MINI1

Board to Board Connector (J2)

PIN	Description	PIN	Description
1	GND	2	GND
3	USB_P2_DN	4	PCIE_RX2_DN
5	USB_P2_DP	6	PCIE_RX2_DP
7	GND	8	GND
9	USB_P3_DN	10	PCIE_TX2_C_DN
11	USB_P3_DP	12	PCIE_TX2_C_DP
13	GND	14	GND
15	USB_P6_DN	16	PCIE_RX3_DN
17	USB_P6_DP	18	PCIE_RX3_DP
19	GND	20	GND
21	SMB_CLK_RESUME_IO	22	PCIE_TX3_C_DN
23	SMB_DATA_RESUME_IO	24	PCIE_TX3_C_DP
25	GND	26	GND
27	USB_OC_N23	28	CLK_MULTI_IO_DN
29	PM_CLKRUN_N	30	CLK_MULTI_IO_DP
31	GND	32	GND
33	CLK_33M_TPM	34	CLK_MINIPCIE_DN
35	L_AD3	36	CLK_MINIPCIE_DP
37	L_AD2	38	GND
39	L_AD1	40	GND
41	L_AD0	42	PLTRST_BUF2_N
43	L_FRAME_N	44	WAKE_N
45	SER_IRQ	46	SIO_GP00
47	P5VS	48	SIO_GP01
49	P5VS	50	COM2_RTS#
51	P5VS	52	COM2_TXD#
53	P5VS	54	COM2_CTS#
55	P5VS	56	COM2_RXD#
57	WDTO_OUT#	58	COM3_RTS#
59	P3V3S	60	COM3_TXD#
61	P3V3S	62	COM3_CTS#
63	P3V3S	64	COM3_RXD#
65	P3V3S	66	COM4_RTS#
67	P3V3S	68	COM4_TXD#
69	P3V3S	70	COM4_CTS#
71	SIO_GP54	72	COM4_RXD#
73	P1V5	74	COM5_RTS#
75	P1V5	76	COM5_TXD#
77	P1V5	78	COM5_CTS#
79	P1V5	80	COM5_RXD#

LEK-6020EN2/LEK-6020EN2B

Connectors on LEK-6020EN2/LEK-6020EN2B

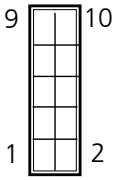
DC-in Connector (CN1)

Pin No.	Pin Name
1	DC_PWR2
2	GND
3	ALARM2
4	ALARM1
5	DC_PWR1
6	GND

Board to Board Connector (J1)

PIN	Description	PIN	Description
1	GND	2	GND
3	USB_P2_DN	4	PCIE_RX2_DN
5	USB_P2_DP	6	PCIE_RX2_DP
7	GND	8	GND
9	USB_P3_DN	10	PCIE_TX2_C_DN
11	USB_P3_DP	12	PCIE_TX2_C_DP
13	GND	14	GND
15	USB_P6_DN	16	PCIE_RX3_DN
17	USB_P6_DP	18	PCIE_RX3_DP
19	GND	20	GND
21	SMB_CLK_RESUME_IO	22	PCIE_TX3_C_DN
23	SMB_DATA_RESUME_IO	24	PCIE_TX3_C_DP
25	GND	26	GND
27	USB_OC_N23	28	CLK_MULTI_IO_ DN
29	PM_CLKRUN_N	30	CLK_MULTI_IO_ DP
31	GND	32	GND
33	CLK_33M_TPM	34	CLK_MINIPCIE_ DN
35	L_AD3	36	CLK_MINIPCIE_ DP
37	L_AD2	38	GND
39	L_AD1	40	GND
41	L_AD0	42	PLTRST_BUF2_N
43	L_FRAME_N	44	WAKE_N
45	SER_IRQ	46	SIO_GP00
47	P5VS	48	SIO_GP01
49	P5VS	50	COM2_RTS#
51	P5VS	52	COM2_TXD#
53	P5VS	54	COM2_CTS#
55	P5VS	56	COM2_RXD#
57	WDTO_OUT#	58	COM3_RTS#
59	P3V3S	60	COM3_TXD#
61	P3V3S	62	COM3_CTS#
63	P3V3S	64	COM3_RXD#
65	P3V3S	66	COM4_RTS#
67	P3V3S	68	COM4_TXD#
69	P3V3S	70	COM4_CTS#
71	SIO_GP54	72	COM4_RXD#
73	P1V5	74	COM5_RTS#
75	P1V5	76	COM5_TXD#
77	P1V5	78	COM5_CTS#
79	P1V5	80	COM5_RXD#

Board to Board Power Connector (P12V1)



Pin No.	Pin Name	Pin No.	Pin Name
1	NC	2	P9V
3	GND	4	P9V
5	GND	6	P9V
7	GND	8	P9V
9	GND	10	P9V

LAN Connectors (LAN1~LAN3)

Pin No.	Pin Name	Pin No.	Pin Name
1	P1_MDXP0	7	P1_MDXP3
2	P1_MDXN0	8	P1_MDXN3
3	P1_MDXP1	9	P3V3S
4	P1_MDXP2	10	P1_LED_LINK_N
5	P1_MDXN2	11	P1_LINK1000
6	P1_MDXN1	12	P1_LINK100

LEK-6020F1

Connectors on LEK-6020F1

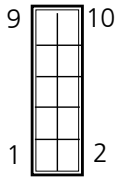
DC-in Connector (CN1)

Pin No.	Pin Name
1	DC_PWR2
2	GND
3	ALARM2
4	ALARM1
5	DC_PWR1
6	GND

Board to Board Connector (J1)

PIN	Description	PIN	Description
1	GND	2	GND
3	NC	4	ICH_C_PCIE_RX_N1
5	NC	6	ICH_C_PCIE_RX_P1
7	GND	8	GND
9	NC	10	ICH_C_PCIE_TX_N1
11	NC	12	ICH_C_PCIE_TX_P1
13	GND	14	GND
15	NC	16	ICH_C_PCIE_RX_N2
17	NC	18	ICH_C_PCIE_RX_P2
19	GND	20	GND
21	SMB_CLK_RESUME_IO	22	ICH_C_PCIE_TX_N2
23	SMB_DATA_RESUME_IO	24	ICH_C_PCIE_TX_P2
25	GND	26	GND
27	NC	28	PEX_REFCLKN_1
29	NC	30	PEX_REFCLKP_1
31	GND	32	GND
33	NC	34	PEX_REFCLKN_2
35	NC	36	PEX_REFCLKP_2
37	NC	38	GND
39	NC	40	GND
41	NC	42	PLTRST_BUF1_N
43	NC	44	PCIE_WAKE_N
45	NC	46	NC
47	P5VS	48	NC
49	P5VS	50	NC
51	P5VS	52	NC
53	P5VS	54	NC
55	P5VS	56	NC
57	NC	58	NC
59	P3V3S	60	NC
61	P3V3S	62	NC
63	P3V3S	64	NC
65	P3V3S	66	NC
67	P3V3S	68	NC
69	P3V3S	70	NC
71	NC	72	NC
73	P1V5	74	NC
75	P1V5	76	NC
77	P1V5	78	NC
79	P1V5	80	NC
81	GND	82	GND
83	GND	84	GND
85	GND	86	GND
87	GND	88	GND

Board to Board Power Connector (P12V1)



Pin No.	Pin Name	Pin No.	Pin Name
1	NC	2	P9V
3	GND	4	P9V
5	GND	6	P9V
7	GND	8	P9V
9	GND	10	P9V

RJ45 LAN Connectors (LANB1~LANB3)

Pin No.	Pin Name	Pin No.	Pin Name
1	P1_MDXP0	8	P1_MDXN2
2	P1_MDXN0	9	P1_MDXP3
3	P1_MDXP1	10	P1_MDXN3
4	P1_MDXN1	11	P1_LINK100_R
5	LAN1_1.5	12	P1_LINK1000_R
6	LAN1_1.5	13	P3V3S
7	P1_MDXP2	14	P1_LED_ACT_R

SFP Fiber Connectors (SFP1~SFP2)

Pin No.	Pin Name	Pin No.	Pin Name
1	GND	11	GND
2	SFP0_TX_FAULT	12	SFP0_RD_N
3	SFP0_TX_DIS	13	SFP0_RD_P
4	SFP0_I2C_SDA	14	GND
5	SFP0_I2C_SCL	15	P3V3_SFP0_R
6	SFP0_MOD_ABS	16	P3V3_SFP0_T
7	SFP0_RS0	17	GND
8	SFP0_RX_LOS	18	SFP0_TD_P
9	SFP0_RS1	19	SFP0_TD_N
10	GND	20	GND

Chapter 4: Hardware Setup

Preparing the Hardware Installation

To access some components and perform certain service procedures, you must perform the following procedures first.

WARNING: To reduce the risk of personal injury, electric shock, or damage to the equipment, remove the power cord to remove power from the server. Portions of the power supply and some internal circuitry remain active until power is removed.

1. Unpower the LEC-6020 and remove the power cord.
2. The top cover has an L shape. Unscrew the threaded screw one the back near the din-rail and the screws on the two sides as show in the picture.
3. Slide the cover backwards to open the cover.

Installing the System Memory

The motherboard supports DDR3 memory that features data transfer rates of 1066/1333 MHz to meet the higher bandwidth requirements of the latest operating system and Internet applications. It comes with one Double Data Rate 3 (DDR3) Small Outline Dual In-line Memory Module (SO-DIMM) socket.

1. Align the memory module's key with the SO-DIMM socket's key.
2. Install the SO-DIMM.

Note:

1. SO-DIMMs installed should meet the required speed which is 1066/1333 MHz. Do not install SO-DIMM supporting different speeds.
2. The motherboards can support up to 2 GB memory capacity in maximum.

Installing a CompactFlash Card

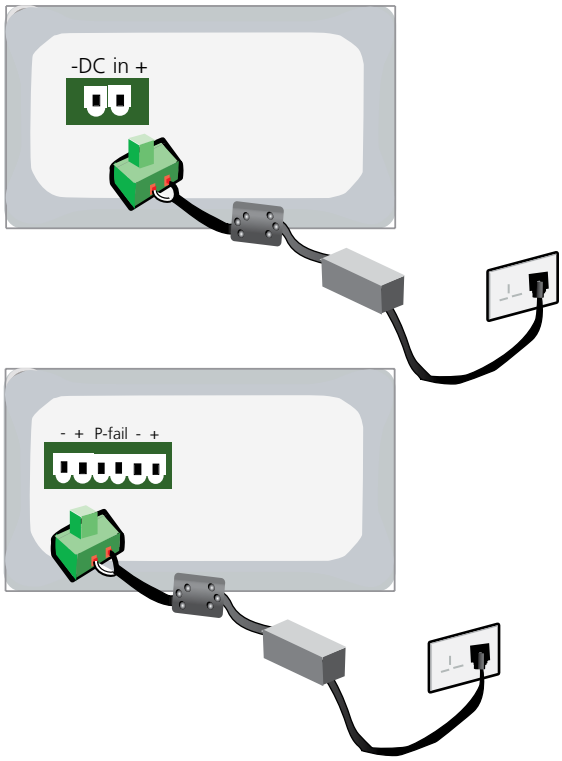
LEC-6020 provides one CompactFlash slot. Follow the procedures bellow to install a CompactFlash card.

1. Unscrew the screws on the side to take out the cover.
2. Align CompactFlash and the card slot with the arrow on the CompactFlash pointing toward the connector.
3. Insert the CompactFlash into the connector.
4. Close the cover and fasten it with the screws to the slot.

Note: The device has an error proof design so that the card will not be inserted if it is in the wrong orientation. You should insert the CF card with the arrow on the CompactFlash facing up and pointing toward the connector.

Connecting Power

Connect the LEC-6020 to a 12~36 VDC power source. The power source comes from the AC/DC Adapter through a Phoenix contact. This power socket is specially designed to guard against fault in power contact, i.e., the reverse of the electrical polarity will not damage the system.



Appendix A: Programming Watchdog Timer

A watchdog timer is a piece of hardware that can be used to automatically detect system anomalies and reset the processor in case there are any problems. Generally speaking, a watchdog timer is based on a counter that counts down from an initial value to zero. The software selects the counter's initial value and periodically restarts it. Should the counter reach zero before the software restarts it, the software is presumed to be malfunctioning and the processor's reset signal is asserted. Thus, the processor will be restarted as if a human operator had cycled the power.

For sample watchdog code, see *WD* folder under Driver and Utility on the *Driver and Manual CD*