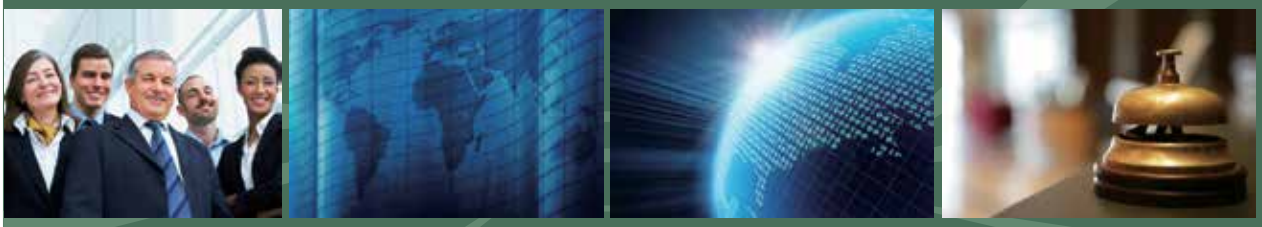
Lanner

Embedded & Industrial Computing

Hardware Platforms for Embedded and Industrial Computing



LEC-7330 V1.0

User's Manual

Release Date: 2015/05/15

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

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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.

Revision History

Version	***Descriptions***
1.0	Official release

Table of Contents

Chapter 1: Introduction

Thank you for choosing LEC-7330. The model is a cost effective embedded system which adopts Intel Bay-Trail CPU to provide moderate performance and low power consumption structure for mission-critical applications. LEC-7330 features rich I/O connectors including 2 LAN ports, 2 serial COM ports, 3 USB ports and 2 display ports (VGA and HDMI) for easy connections with peripheral devices. With a removable and externally accessible HDD/SSD drive bay, system owner can easily replace worn-down disk drive. LEC-7330's compact fan-less design supports many integrated multimedia and I/O features such as video, audio, network, serial functions for various embedded usages, for instance, digital signage.

The following highlights the functionalities of the LEC-7330 system:

- Intel® Celeron® J1900/N2930 or Atom™ E3845
- Hot-swappable SATA Storage
- VGA (1600x1200) & HDMI (1920x1080) Video-out
- DDR3L memory support up to 4GB
- Fanless & Power-conscious
- 2 x 10/100/1000 Mbps Ethernet LAN ports
- Dual Serial COM Ports with RS-232/422/485
- USB 2.0 and 3.0 ports
- Integrated SIM Card Reader
- Single system power +12Vdc input
- -20°C~55°C Operating Temperature
- Dimension (W x H x D) 200 x 88.4 x 143.8 mm
- EMC CE/FCC, Class A

System Specification

Processor	**CPU**	Intel® Celeron® J1900/N2930 or Atom™ E3845
	Frequency	2GHz (J1900), 1.83GHz (N2930), 1.91GHz (E3845)
	Core Number	4C
BIOS		AMI 32bit SPI Flash BIOS
System Memory	Sockets	DDR3L 1333MHz
	Socket	1x 204-pin SODIMM
	Max. Capacity	4 GB
USB		2x USB 2.0 Type A 1x USB 3.0 Type A
Expansion Bus		1 x Full-sized Mini-PCIe Socket with SIM Card Reader
Driver Support		Microsoft Windows Win7, WES7, Win8.1 Linux Kernal 3.12
Storage	HDD/SSD Support	1x 3.5" HDD/SSD Drive Bay
	NAND Flash	1x CompactFlash Type I/II Socket
Networking	LAN	2 x RJ-4510/100/1000 Mbps LAN ports
	Controller	Intel i210
Display	Graphics Controller	Intel® Integrated Graphics Media Accelerator
	Display Interface	HDMI: 1920x1080 VGA: 1600x1200
Audio	Audio Controller	Realtek ALC886
	Audio Interface	2x Phone Jack for MIC-in and Line-out
I/O Interface	Serial	2x RS-232/422/485, DB9 Male
	DIO	2x DI, 2x DO with +5V TTL
	Power-On/Reset Button	1x Power On/Off, 1x Reset
	Remote Power Switch	Yes
	Antenna	2x SMA Antenna Holes
LEDs		Power/Storage Access/3G
Mechanical	Enclosure	Aluminum
	Weight	2.8 Kg
	Dimensions (WxHxD)	200 x 88.4 x 143.8, unit: mm
	Mounting Options	VESA, Wallmount
Environment	Operating Temperature*	0°C~55°C (with Industrial-grade Components)
	Non-operating Temperature	-20°C~70°C
	Relative Humidity	5%~95% (Non-condensing)
	Vibration	IEC 60068-2-64, 0.5Grms, random 5 ~500 Hz, 40 mins/axis
Power	Power Type	ATX
	Power Supply Voltage	+12 VDC
	Connector	DC Jack with Lock
	Power Consumption	Operating: 15.7W Idle: 12.3W
	Power Adaptor	AC to DC AC 90 to 240 VAC Input DC 12V/5A 60W
Certification	EMC	CE, FCC Class A
	Green Product	RoHS
Watchdog	Watchdog Timer	Watchdog Timer 1~255 Level Time Interval System Reset, Software Programmable

Package Contents

Your package contains the following items:

- LEC-7330 Fanless Embedded System
- Mini-PCIe module screws
- Drivers and User's Manual CD
- 60W 12V/5A power adaptor DC Jack with Lock (0P0W060122033)
- 2-pin Terminal Block (P/N: 04AW20023Z101)
- 6-pin Terminal Block (P/N: 04AW20061Z101)

Ordering Information

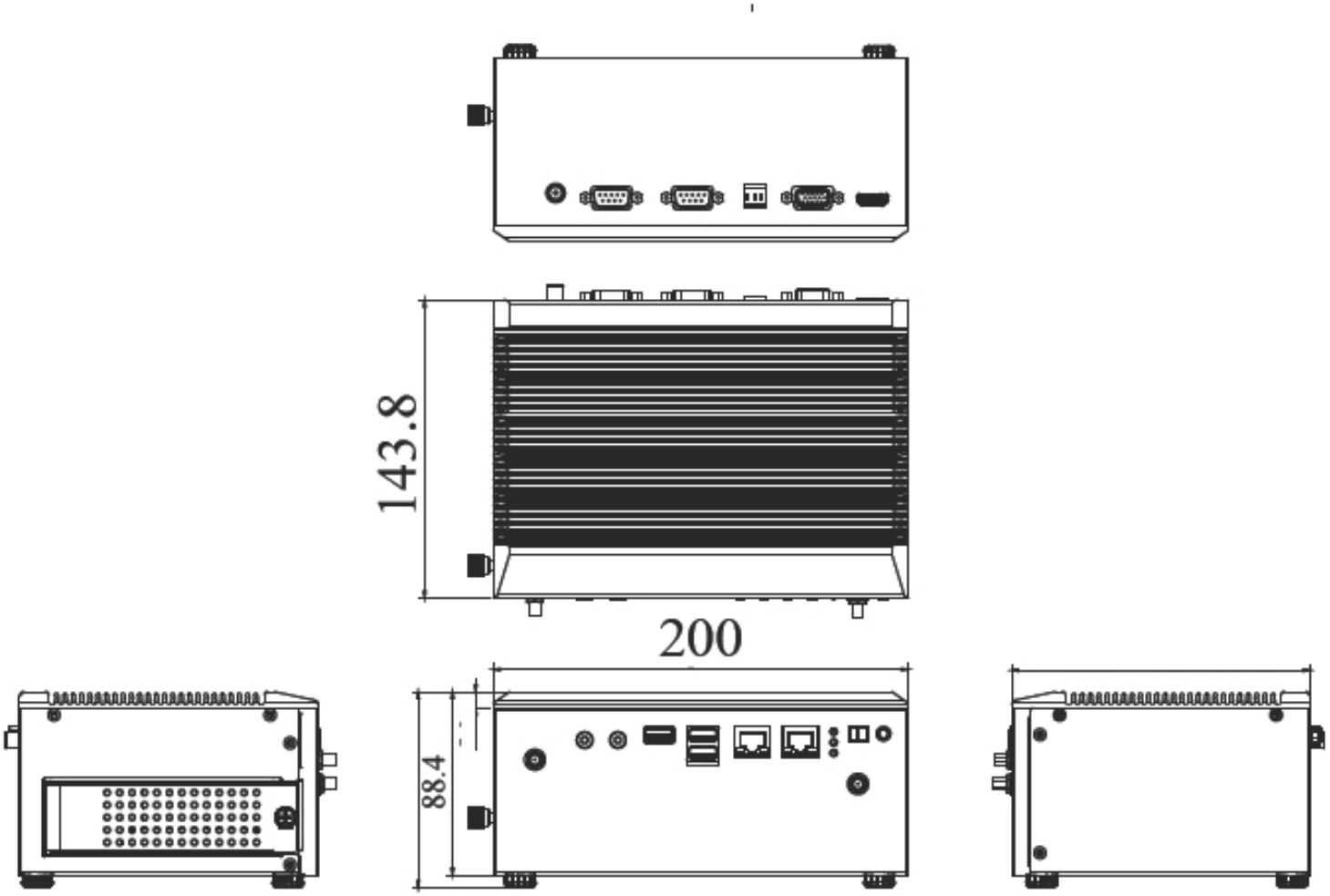
LEC-7330-J11A	Fanless Industrial PC with Intel® Celeron® J1900 (2 GHz) CPU
LEC-7330-N11A	Fanless Industrial PC with Intel® Celeron® N2930 (1.83 GHz) CPU
LEC-7330-E51A	Fanless Industrial PC with Intel® Atom™ E3845 (1.91 GHz) CPU

Chapter 2:
System Components

System Drawing

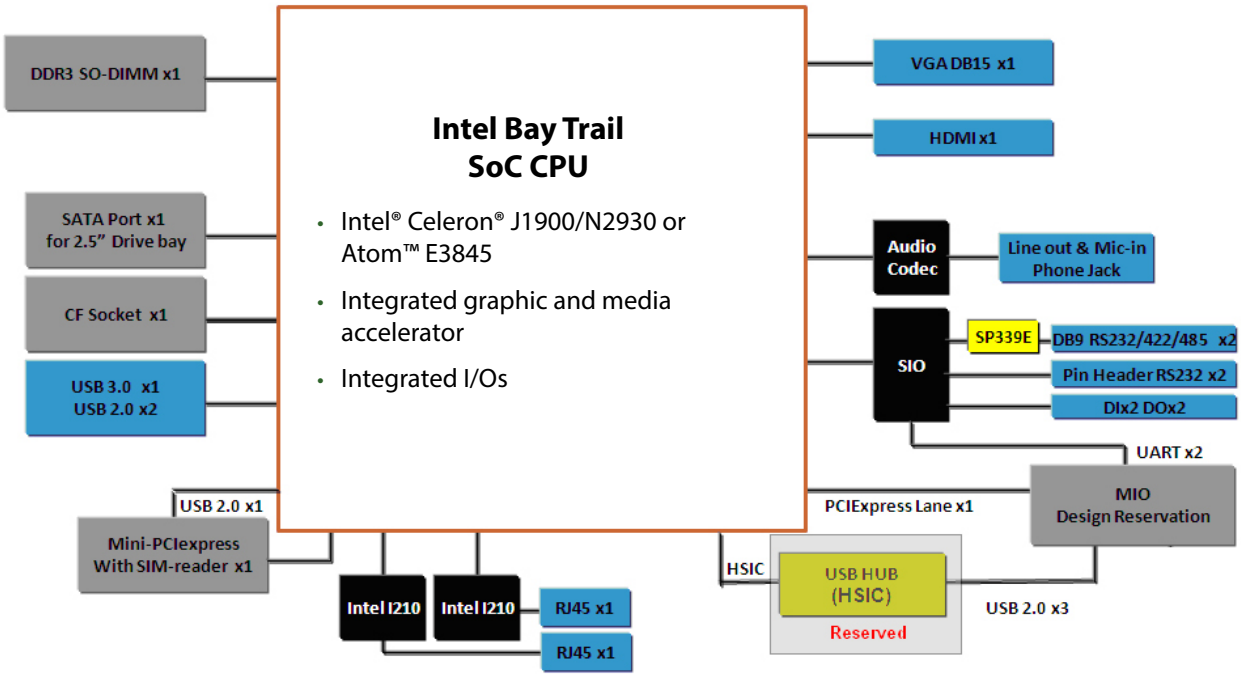
Mechanical dimensions of the LEC-7330

Unit: mm

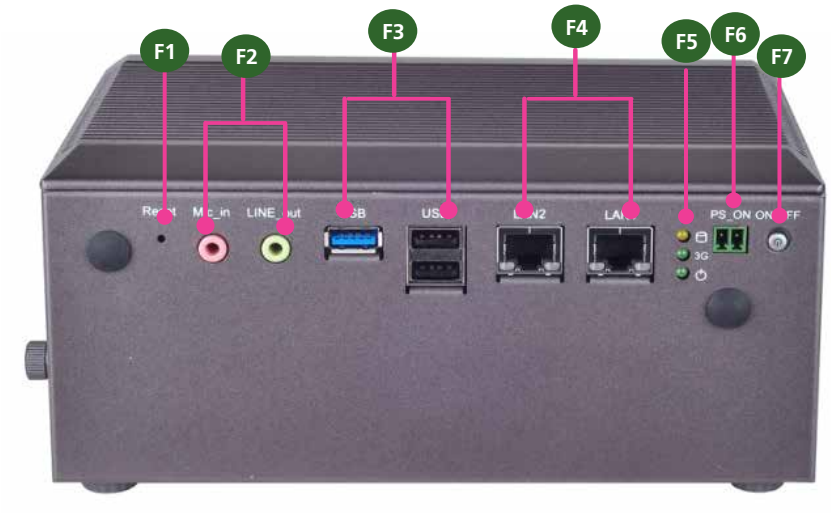


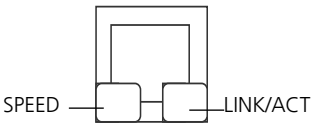
Block Diagram

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

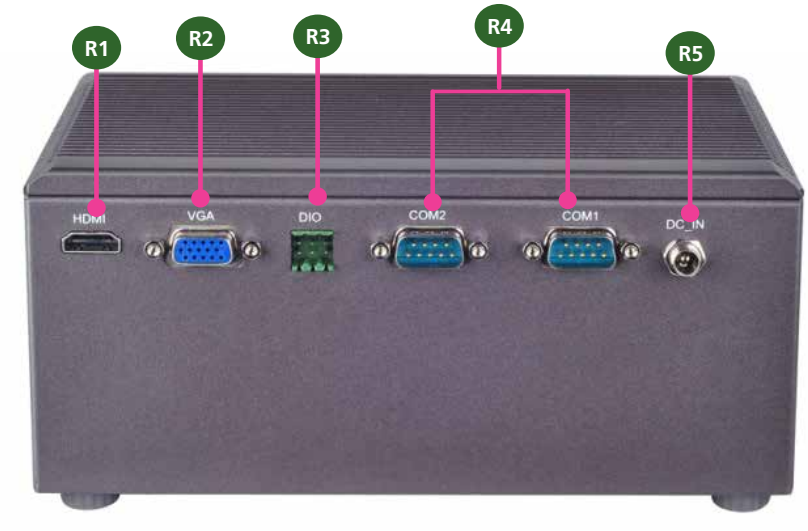


Front I/O Connectors



I/O	Description
F1 Reset	Reset switch
F2 MIC IN/LINE OUT	Connect the audio devices to these ports. The Microphone and line out port are provided by Realtek ALC 886-GR.
F3 Three USB Ports	1 x USB 3.0 Type-A port and 2 x USB 2.0 ports in double-stacked form
F4 Two 10/100/1000Mbps LAN ports 	Two RJ-45 (network) jacks with LED indicators as described below. Both LAN ports are provided by Intel i210. The i210 supports PXE remote boot LINK/ACT (Yellow) • On/Flashing: The port is linking and active in data transmission. • Off: The port is not linking. SPEED (Green/Amber) • Amber: The connection speed is 1000Mbps. • Green: The connection speed is 100Mbps • Off: The connection speed is 10Mbps.
F5 HDD (Yellow) 3G Status (Green) and Power LED (Green)	HDD • Blinking: data access activities • Off: no data access activities 3G Status • Blinking: 3G transmission activities • On: 3G expansion card exists • Off: no 3G expansion card exists Power • On: The computer is on. • Off: The computer is off .
F6 Remote Power Switch	A remote power switch through the Phoenix contact for distant power-on/off control
F7 Power Button with dual LED	ATX Power-on button with LEDs: Standby mode in Red; Power-on mode in Green

Rear I/O Connectors



I/O	Description
R1 HDMI	The HDMI (High-Definition Multimedia Interface) port can support up to 1920x1200 @ 60 Hz resolution.
R2 VGA Port	The displays can support VGA up to 2048x1536 resolution.
R3 DIO	Digital Input/Output Connector 4 DI and DO connections
R4 Serial COM Ports	The serial port consists of a 9-pin, RS232 configured D-SUB connector that allows the connection of a serial peripheral.
R5 Power Adapter Socket	DC-in 12V. Only use the power adapter supplied with the LEC-7480 System

WARNING: Improper installation can cause injury or property damage.

For proper and safe operation use in field site with AC Power, please follow these instructions:

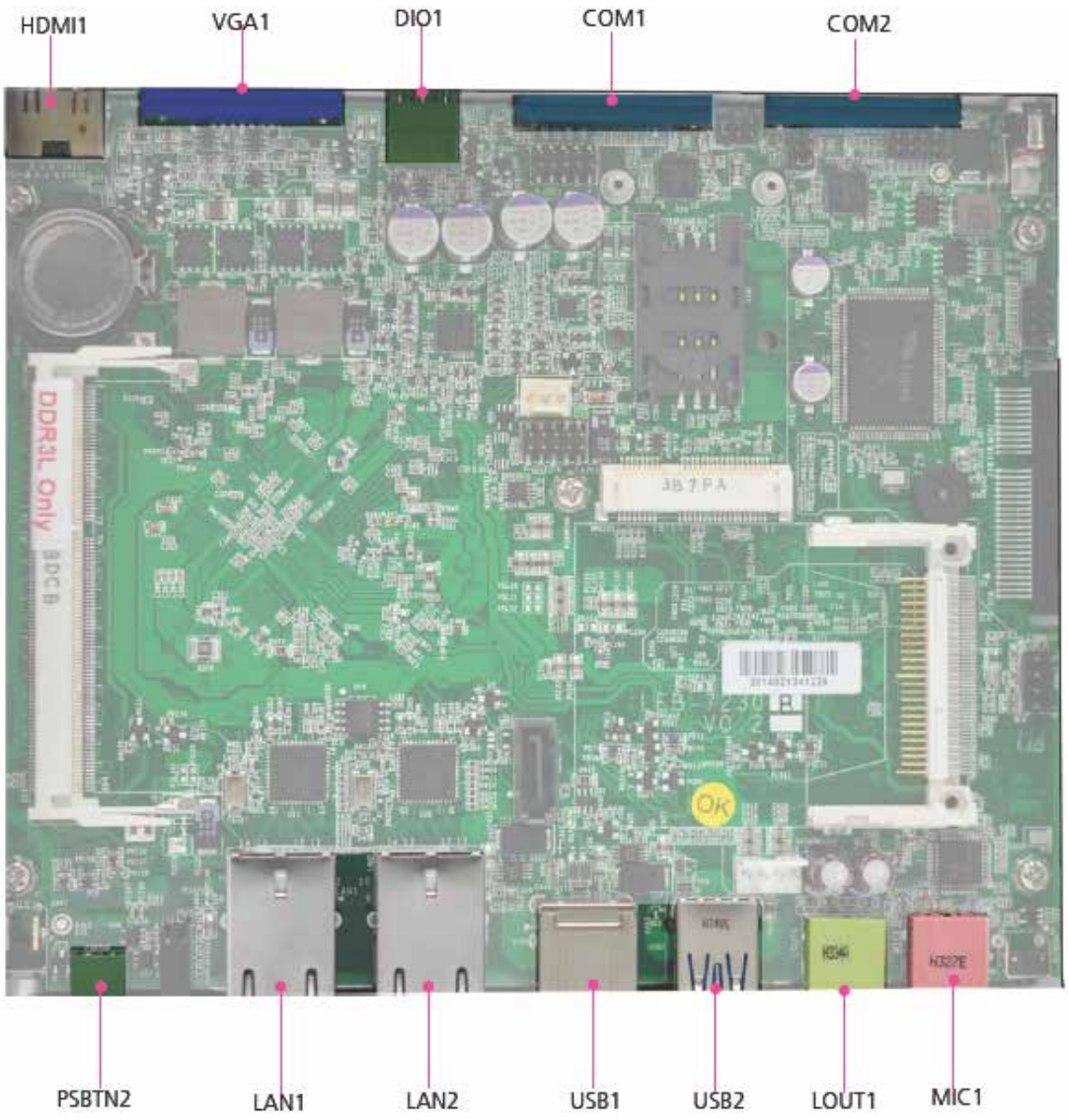
1. Securely plugged and locked the DC-Jack to the machine

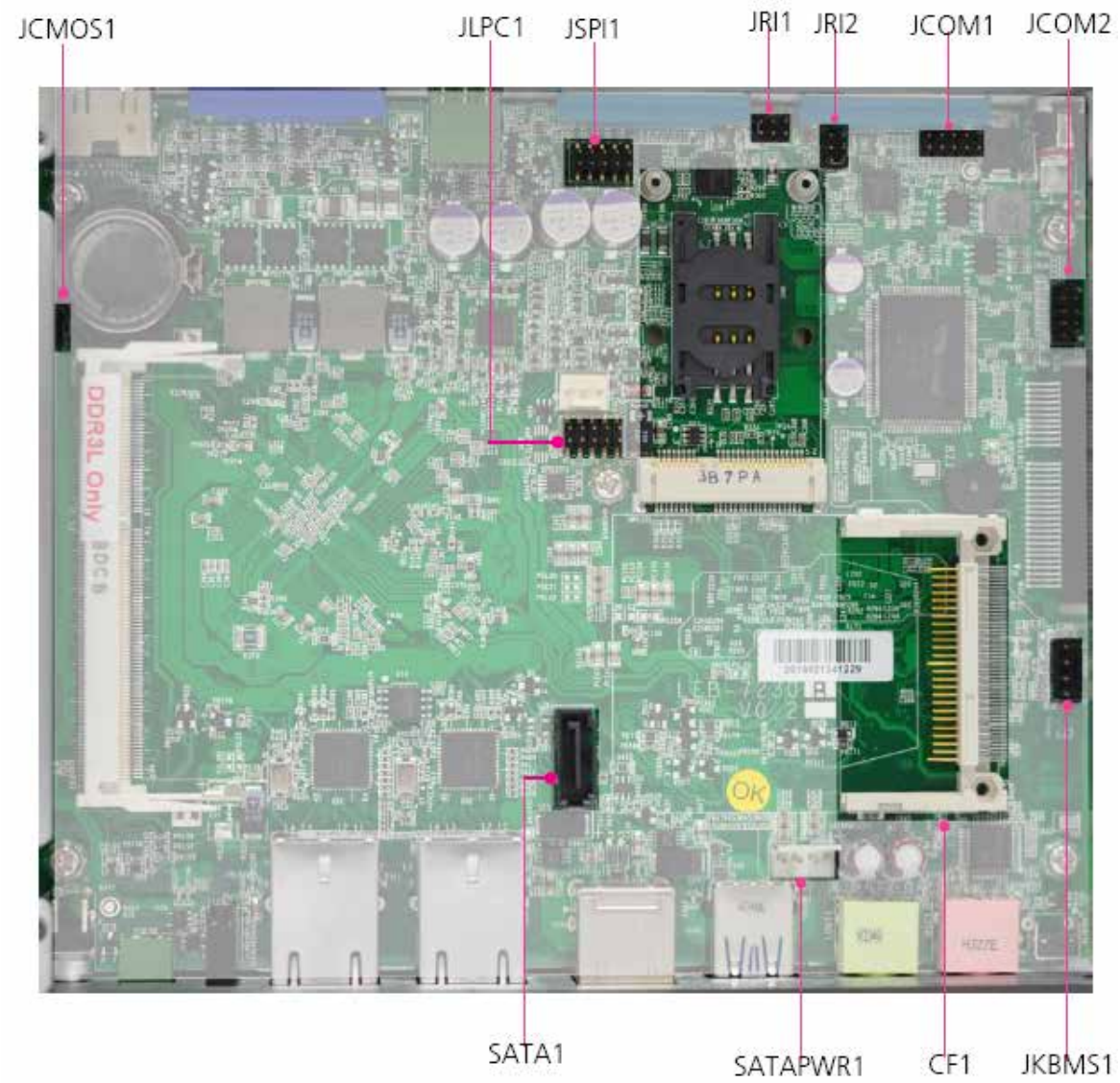
2. Connect the AC adapter power cord into a standard 110v/220v AC outlet

Chapter 3:
Board Layout

Jumpers & Connectors

The following picture highlights the location of the external ports.




JCMOS1
JLPC1
JSPI1
JRI1
JRI2
JCOM1
JCOM2
DDR3L Only
SATA1
SATAPWR1
CF1
JKBMS1

Connectors and Jumpers List

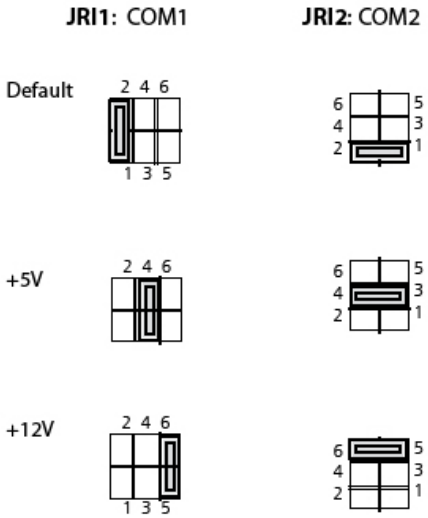
The tables below list the function of each of the board jumpers and connectors by labels shown in the above section. The next section in this chapter gives pin definitions and instructions on setting jumpers.

Table 3.1 Connector List for **LEB-7230** Board

Labels	**Function**
CF1	CompactFlash socket
COM1/COM2	RS-232/422/485 serial COM ports
DIO1	Digital Input/Output in 6-pin terminal block
HDMI1	HDMI display output port
JCMOS1	Clear CMOS setting
JCOM5/6	RS-232 pin headers
JKBMS1	PS/2 keyboard and mouse pin header
JLPC1	Low-Pin-Count pin header
JRI1/2	COM1/COM2 pin 9 signal selection
JSPI1	SPI ROM interface for debug use
MPCIE1	Mini-PCIe socket with a SIM card reader
PSBTN2	Remote power switch in Phoenix connector form
SATA1	7-pin SATA signal connector
SATAPWR1	4-pin SATA power connector
SIM1	SIM card reader
USB1	USB2.0 Type-A double-stacked ports
USB2	USB3.0 Type-A port
VGA1	VGA display port

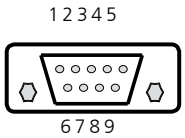
Jumper Settings and Connector Pinouts

JRI1/JRI2: Select COM1/COM2 Pin 9 Function. The pin 9 of COM1 and COM2 can be altered by JRI1 and JRI2 respectively according to the following jumper settings.



Jumper Setting / Function	SW1/SW4
RI# (default)	1-2
+5V	3-4
+12V	5-6

RS-232 Serial Port (COM1 and COM2): 2 x RS-232/422/485 ports through a D-SUB9 connector.



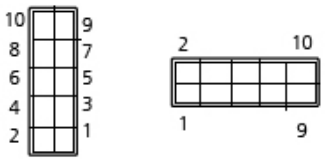
Pin No.	Description
	RS-232
1	Data Carrier Detect (DCD #)
2	Receive Data (RXD)
3	Transmit Data (TXD)
4	Data Terminal Ready (DTR #)
5	Ground (GND)
6	Data Set Ready (DSR #)
7	Request To Send (RTS #)
8	Clear To Send (CTS #)
9	Ring Indicator (RI #)

Pin No.	Description
	RS-422
1	TXD-
2	TXD+
3	RXD+
4	RXD-
5	GND

Pin No.	Description
	RS-485
1	DATA-
2	DATA+
3	
4	
5	GND

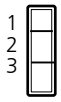
Notes: to switch among RS-232/422/485 signals, it is recommended to perform it through BIOS menu.

JCOM5/6: RS-232 pin header



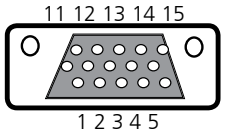
Pin No.	Description
	RS-232
1	Data Carrier Detect (DCD #)
2	Receive Data (RXD)
3	Transmit Data (TXD)
4	Data Terminal Ready (DTR #)
5	Ground (GND)
6	Data Set Ready (DSR #)
7	Request To Send (RTS #)
8	Clear To Send (CTS #)
9	Ring Indicator (RI #)

Clear CMOS jumper (JCMOS1): It is for clearing the CMOS settings.



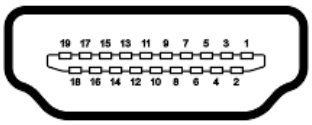
Pin No.	Signal
1-2	Normal (Default)
2-3	Clear CMOS

VGA (VGA1): VGA display port



Pin	Signal	Pin	Signal	Pin	Signal
1	Red Color Signal	6	GND	11	NC
2	Green Color Signal	7	GND	12	DDC DATA
3	Blue Color Signal	8	GND	13	HSYNC
4	Reserved	9	+5V	14	VSYNC
5	GND	10	GND	15	DDC CLK

HDMI Connector (HDMI1): High-Definition Multimedia Interface Connector



Pin	Signal	Pin	Signal
1	DATA2+	2	GND
3	DATA2-	4	DATA1+
5	GND	6	DATA1-
7	DATA0+	8	GND
9	DATA0-	10	CLK+
11	GND	12	CLK-
13	N.C	14	N.C
15	DDC CLK	16	DDC DAT
17	GND	18	HDMI_VCC
19	HPD		

Serial-ATA Connector (SATA1): 7-pin SATA signal connector for SATA HDD/SSD

Pin No.	Signal
1	GND
2	TX0_P
3	TX0_N
4	GND
5	RX0_N
6	RX0_P
7	GND

4-pin Serial-ATA Power Connector (SATAPWR1): It is for connecting the SATA power cord.

Pin No.	Signal
1	12V
2	GND
3	GND
4	+5V

Dual USB 2.0 Port (USB1):

USB 3.0 Port (USB2)

Pin No.	Signal
1	+5V
2	DATA-
3	DATA+
4	GND
5	SSRX-
6	SSRX+
7	GND
8	SSTX-
9	SSTX+

PSBTN2: remote power switch through Phoenix Contact connector for distant power switch.

Pin No.	Pin Name
1	PS_ON
2	GND

DC_IN: A DC jack connector with lock for external power supply.

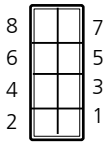
Pin No.	Pin Name
1	DC_IN (+)
2	DC_IN (-)

DIO1: Digital Input/Output in 6-pin terminal block form

Pin NO.	Description	Pin NO.	Description
1	DIO_0	2	DIO_1
3	DIO_2	4	DIO_3
5	+5V	6	GND

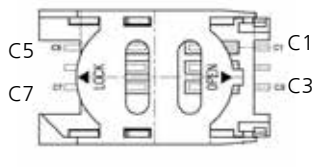
TTL Level is +5V; Maximum input/output current for each port is 25mA			
For all Input/ output pins:	Voltage	Logic	Register
	DI: < 0.8V Do: <0.4V	Low	0
	DI: 2~5V Do: 5V	High	1
The default value is 0			

JKBMS1: PS/2 Keyboard and Mouse Connector



Pin NO.	Description	Pin NO.	Description
1	VCC	2	MSCLK
3	MSDATA	4	KEY
5	KBDATA	6	KEY
7	GND	8	KBCLK

SIM1: SIM card reader



Pin NO.	Signal	Pin NO.	Signal
C1	UIM_PWR	C5	GND
C2	UIM_RST#	C6	UIM_VPP
C3	UIM_CLK	C7	UIM_DATA

CF1: CompactFlash socket

Pin	Signal	Pin	Signal
1	GND	26	-CD1
2	D3	27	D11
3	D4	28	D12
4	D5	29	D13
5	D6	30	D14
6	D7	31	D15
7	-CS0	32	-CS1
8	A10 (GND)	33	-VS1
9	ATA_SEL#	34	-IORD
10	A9 (GND)	35	-IOWR
11	A8 (GND)	36	-WE
12	A7 (GND)	37	INTRQ
13	VCC	38	VCC
14	A6 (GND)	39	-CSEL
15	A5 (GND)	40	-VS2
16	A4 (GND)	41	-RESET
17	A3 (GND)	42	IORDY
18	A2	43	DMARQ
19	A1	44	-DDACK
20	A0	45	-DASP
21	D0	46	-PDIAG
22	D1	47	D8
23	D2	48	D9
24	-IOCS16	49	D10
25	-CD2	50	GND

MPCIE1: Mini PCI Express Connector with PCI Express 1X and USB 2.0 signals and a SIM card reader

PIN	Signal	PIN	Signal
1	WAKE#	2	+3.3Vaux
3	COEX1	4	GND
5	COEX2	6	+1.5V
7	CLKREQ#	8	UIM_PWR
9	GND	10	UIM_DATA
11	REFCLK-	12	UIM_CLK
13	REFCLK+	14	UIM_RESET
15	GND	16	UIM_VPP
Key			
17	RSVD	18	GND
19	RSVD	20	W_DISABLE#
21	GND	22	PERST#
23	PERn0	24	+3.3Vaux
25	PERp0	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PETn0	32	SMB_DATA
33	PETp0	34	GND
35	GND	36	USB_D-
37	GND	38	USB_D+
39	+3.3Vaux	40	GND
41	+3.3Vaux	42	LED_WWAN#
43	GND	44	LED_WLAN#
45	RSVD	46	LED_WPAN#
47	RSVD	48	+1.5V
49	RSVD	50	GND
51	RSVD	52	+3.3Vaux

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, please remove all power sources/supplies before starting any hardware installation.

1. Unpower the LEC-7330 and remove the power cord.

2. Loosen and remove the 4 rubber feet from the bottom cover of the LEC-7330 System.

3. It is recommended to have LEC-7330 stand from the side and lift the top cover as shown in the image below.

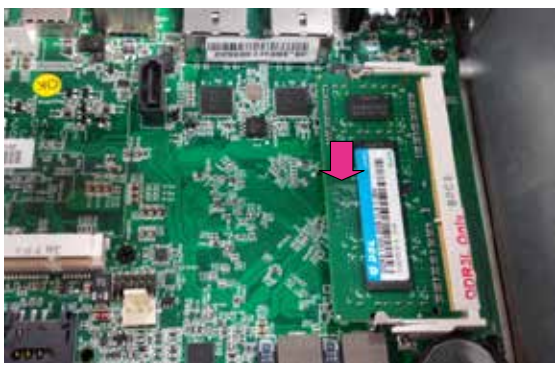
Installing the System Memory

Please follow the steps below for installing the system memory.

1. Locate the system module socket on the motherboard. Please remember that this socket is for DDR3L only.

2. Align the module notch and insert the DDR3L module as shown in the image below. Please keep in mind that the socket only supports DDR3L 1333 MHz, 204-pin SO-DIMM with 4GB.

3. Press the module down until it firmly fits in place.



Reminder: the motherboard supports DDR3L 1333MHz 4GB 204-pin SO-DIMM.

Installing the CompactFlash Card

Please follow the steps below for installing a CompactFlash card.

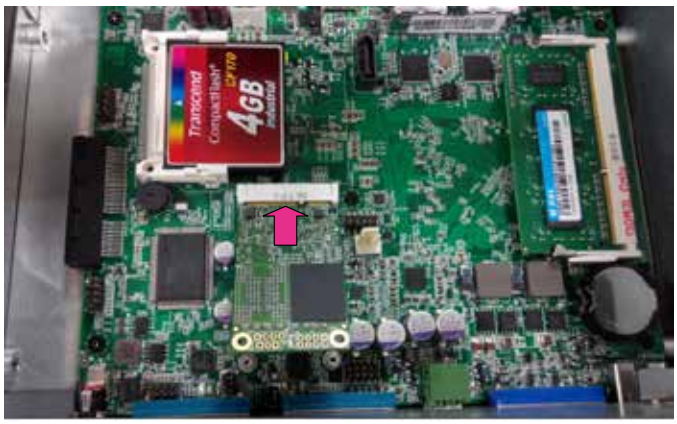
1. Align CompactFlash card and the card slot with the arrow pointing toward the connector. The card fits only the correct way into the slot; do not force the card into the slot.

2. Push the card to insert into the connector until it firmly fits into place.

Installing the Mini-PCIe Module

Please follow the steps below for installing a mini-PCIe module.

1. Align the module keys between the mini-PCIe module and the corresponding socket. Then, insert the module as shown in the image below.



2. Press the module down and secure it with two screws, as circled in the image below.

Installing the Disk Drive

LEC-7330 comes with a removable, hot-swappable SATA 3.5" disk drive bay. The disk drive can be installed or replaced by an externally accesible way. Please follow the steps below for instructions.

1. Locate the SATA signal and power connectors on the disk drive bay, which is attached to the top cover.

2. Connect SATA signal and power cables.

3. Connect another end of the SATA signal and power cables to the corresponding connectors on the motherboard.

4. Close the top cover back and locate the door of the disk drive bay at the side of LEC-7330. Rotate and loosen the lock-screw.

5. Open the door of the disk drive bay and gently pull it out.

6. Take the disk drive bay out.

7. Place a 3.5" SATA disk drive in the same direction as shown in the image below.

SATA connectors

8. Align the 3 screw holes between the disk drive and the bay for each side. Then, secure the disk drive with screws.

9. Insert the disk drive bay with installed 3.5" SATA disk drive back into LEC-7330.

10. Push it all the way to the end and close the door. Remember to tighten the lock-screw.

Remember to tighten it once the door is closed.

Appendix A:
Digital Input/Output

The Digitanl I/O on the rear panel is designed to provide the input and output operations for the system. For sample DIO code, look for LEC-7330 Utility on the *Driver and Manual CD*. Make sure that you have installed the Lanner GPIO driver as instructed below.

Driver Installation

Before you could access or control the operation of the GDigital I/O functions, install the the L_IO driver which is the library and driver needed for Lanner General Purpose Input/Output interface or functions.

To install the L_IO driver:

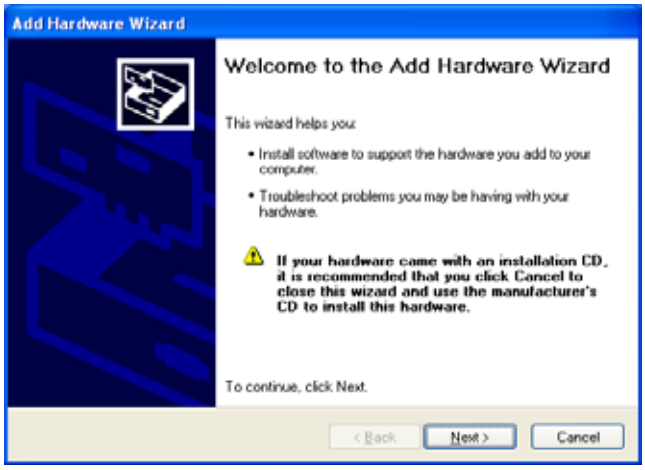
1. Restart the computer, and then log on with Administrator privileges.

2. Insert the Drivers and User's Manual CD to the USB-optical drive.

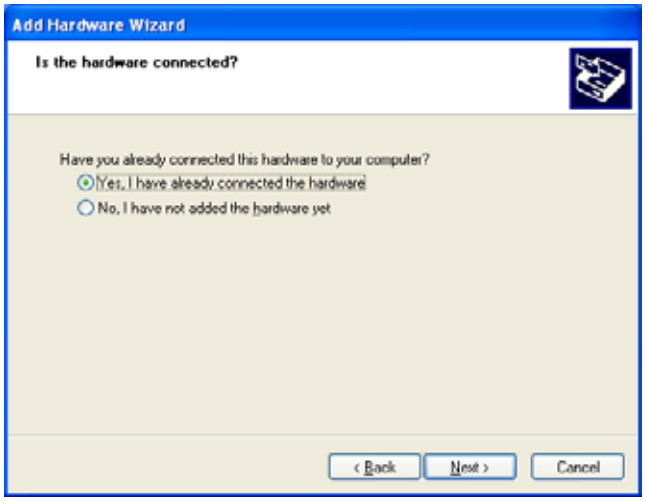
3. Browse the contents of the support CD to locate the file in the LIO folder.

4. From the control panel, click the ADD Hardware program

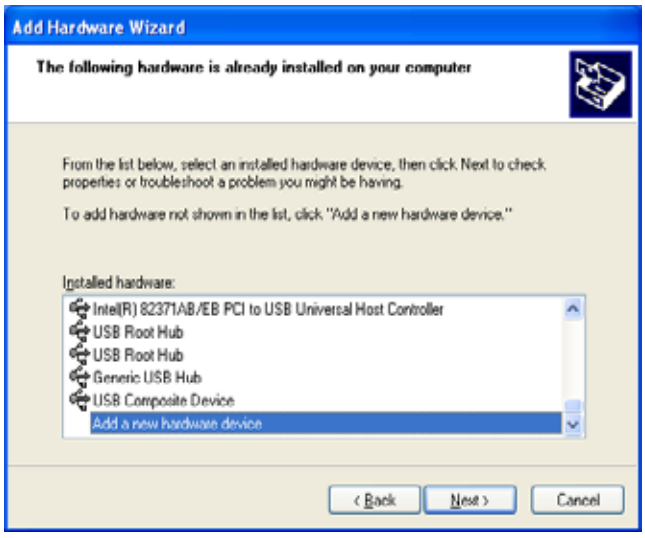
5. Select Next to proceed



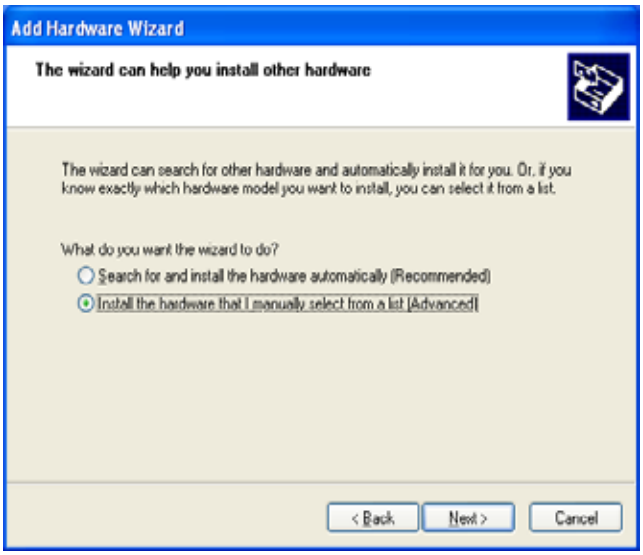
6. Answer "Yes" to the question and select Next to proceed.



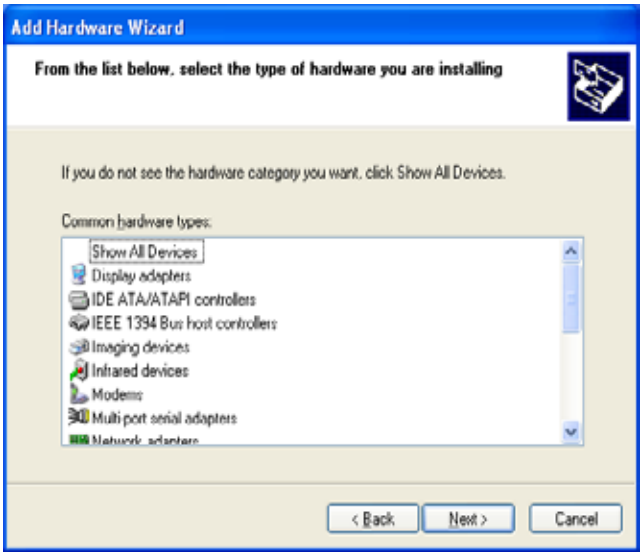
7. Select Add a new hardware device.



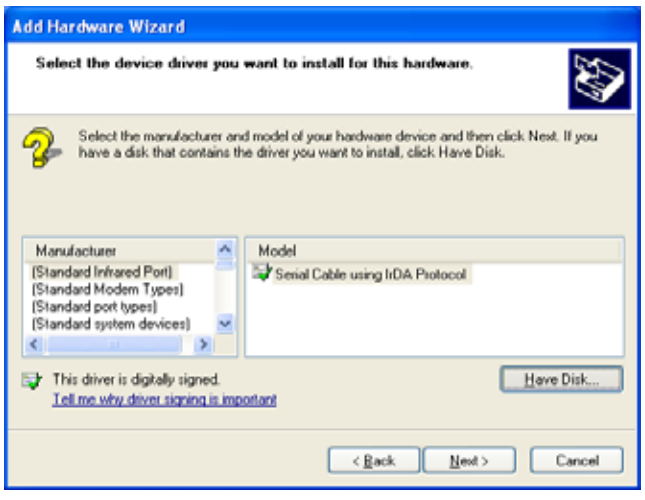
8. Choose to select the hardware Manually



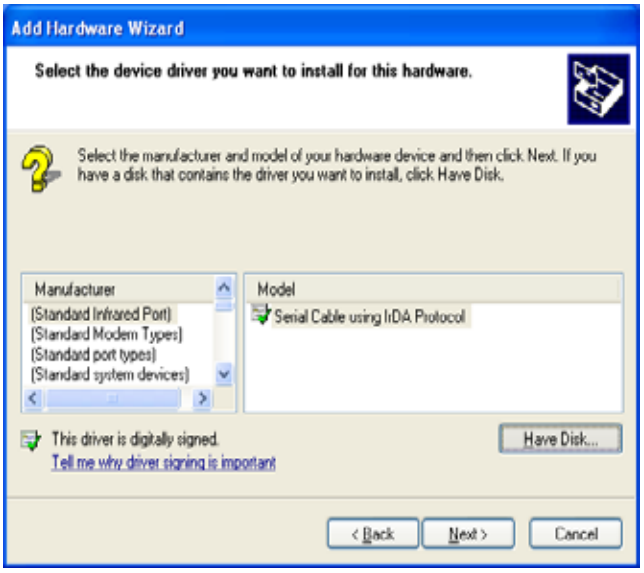
9. Choose Show all device and click Next.



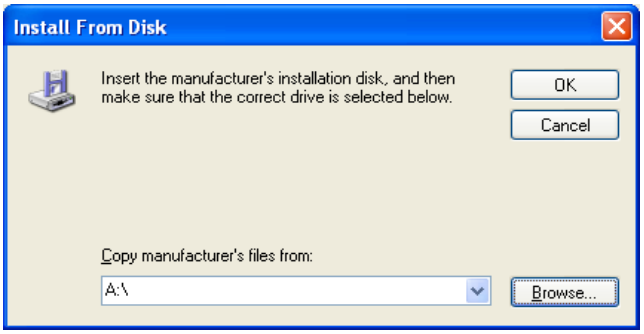
10. Click HaveDisk to locate the L_IO.inf file



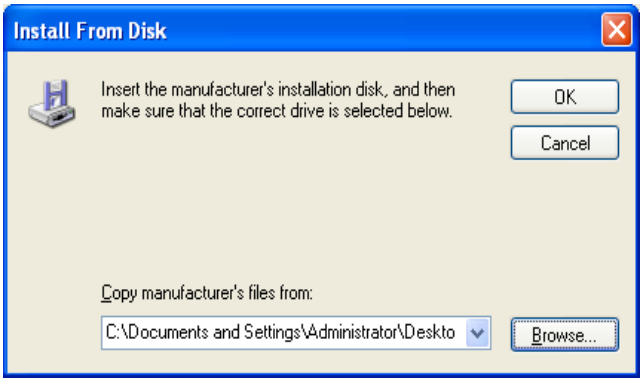
11. Click HaveDisk to locate the L_IO.inf file



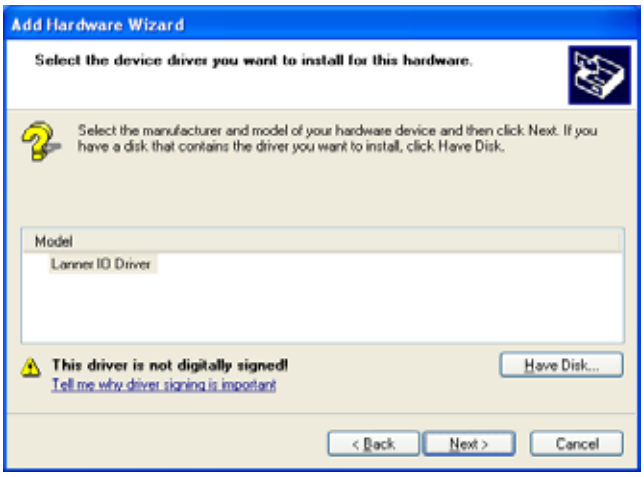
12. Select the L_IO.inf



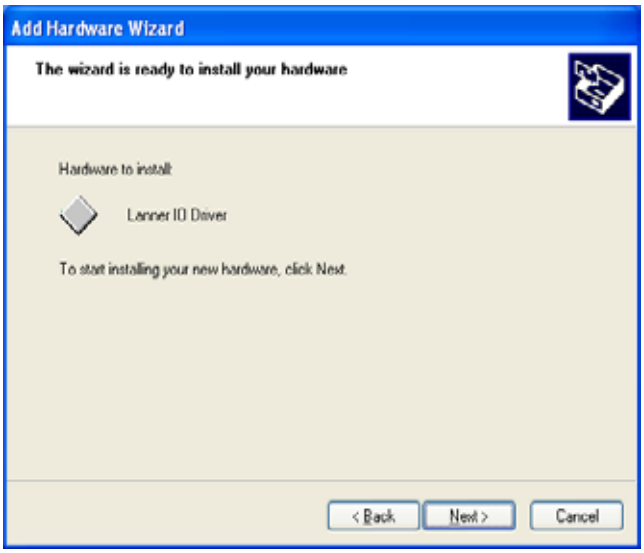
13. Select OK to confirm with the installation



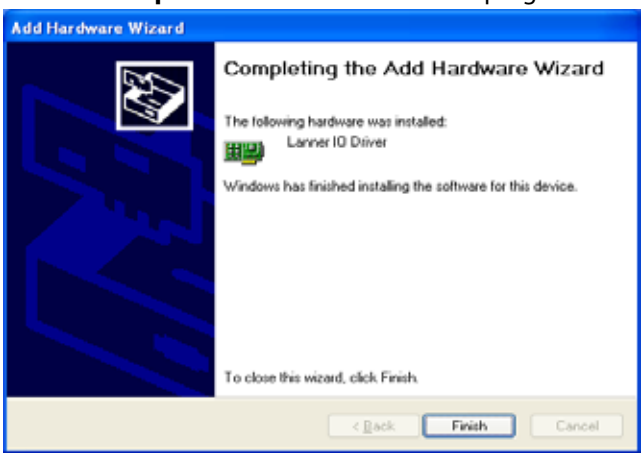
14. Select the Lanner IO driver and click Next.



15. Click Next



16. Click **Complete** to close the installation program.



To verify the GPIO driver installation, do the following steps:

1. Right-click on the My Computer icon, and then select Properties form the menu.
2. Click the Hardware tab, then click the Device Manager button.
3. Click the + sign next to the Lanner_Device, then the Lanner IO Driver should be listed.

Appendix B: Programming System Watchdog Timer of the LEC-7330

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, look for *watchdog* folder under LEC-7480 Utility on the *Driver and Manual CD*

Appendix C: Terms and Conditions

Warranty Policy

1. All products are under warranty against defects in materials and workmanship for a period of one year from the date of purchase.
2. The buyer will bear the return freight charges for goods returned for repair within the warranty period; whereas the manufacturer will bear the after service freight charges for goods returned to the user.
3. The buyer will pay for repair (for replaced components plus service time) and transportation charges (both ways) for items after the expiration of the warranty period.
4. If the RMA Service Request Form does not meet the stated requirement as listed on "RMA Service," RMA goods will be returned at customer's expense.
5. The following conditions are excluded from this warranty:

Improper or inadequate maintenance by the customer Unauthorized modification, misuse, or reversed engineering of the product Operation outside of the environmental specifications for the product.

RMA Service

Requesting a RMA#

1. To obtain a RMA number, simply fill out and fax the "RMA Request Form" to your supplier.
2. The customer is required to fill out the problem code as listed. If your problem is not among the codes listed, please write the symptom description in the remarks box.
3. Ship the defective unit(s) on freight prepaid terms. Use the original packing materials when possible.
4. Mark the RMA# clearly on the box.

Note: Customer is responsible for shipping damage(s) resulting from inadequate/loose packing of the defective unit(s). All RMA# are valid for 30 days only; RMA goods received after the effective RMA# period will be rejected.

RMA Service Request Form

When requesting RMA service, please fill out the following form. Without this form enclosed, your RMA cannot be processed.

RMA No:	Reasons to Return: □ Repair(Please include failure details) □ Testing Purpose
Company:	Contact Person:
Phone No.	Purchased Date:
Fax No.:	Applied Date:
Return Shipping Address: _____ Shipping by: □ Air Freight □ Sea □ Express_____ □ Others:_____	

Item	Model Name	Serial Number	Configuration

Item	Problem Code	Failure Status

*Problem Code:

01:D.O.A.	07: BIOS Problem	13: SCSI	19: DIO
02: Second Time R.M.A.	08: Keyboard Controller Fail	14: LPT Port	20: Buzzer
	09: Cache RMA Problem	15: PS2	21: Shut Down
03: CMOS Data Lost	10: Memory Socket Bad	16: LAN	22: Panel Fail
04: FDC Fail	11: Hang Up Software	17: COM Port	23: CRT Fail
05: HDC Fail	12: Out Look Damage	18: Watchdog Timer	24: Others (Pls specify)
06: Bad Slot			

Request Party

Authorized Signature / Date

Confirmed By Supplier

Authorized Signature / Date