PXI-3930

PXI Embedded Controller

User's Manual

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Advance Technologies; Automate the World.

Revision History

Revision	Release Date	Description of Change(s)
2.00	2016/7/13	Initial Release

Preface

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Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.

Additional information, aids, and tips that help users perform tasks.

Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.

Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

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1 Introduction

The ADLINK PXI-3930 PXI™ embedded controller, based on the Intel® Celeron® 2000E processor, is specifically designed for PXI-based testing systems, providing a rugged and stable operating environment for a wide variety of testing and measurement applications.

Combining state-of-the-art Intel® Celeron® 2000E 2.20GHz processors and up to 16 GB of 1600 MHz DDR3L memory, the PXI-3930 utilizes two separate computing engines on a single processor, enabling execution of two independent tasks simultaneously in a multitasking environment.

PXI-based testing systems typically make up a PXI platform and diversified standalone instruments for complex testing tasks. The PXI-3930 provides ample interface choices, including GPIB, USB2.0, and USB3.0, for connecting and controlling instruments. The PXI-3930 also provides dual Gigabit Ethernet ports, one for LAN connection and the other for controlling LXI instruments. With flexible instrument control interfaces and mechanical and electronic reliability, the ADLINK PXI-3930 is more than equal to the challenges of the most demanding PXI-based testing systems.

Memory addressing over 4GB is OS-dependent, such that a 32-bit operating system may be unable to address memory space over 4GB. To fully utilize memory, 64-bit operating systems are required.

1.1 Features

- PXI™-1 PXI Hardware Specification Rev.2.2 complaint
- Intel® Celeron® 2000E 2.2GHz processor for maximum computing power
- Dual channel DDR3L SODIMM up to 16 GB 1600 MHz
- Maximum system throughput 132 MB/s
- Pre-installed 500 GB SATA hard drive
- Supports 2.5" HDD or SSD
- SATA 3Gb/s
- Supports AHCI
- Integrated I/O
  - Dual Gigabit Ethernet ports
  - Four USB 2.0 Ports
  - Built-in GPIB (IEEE488) controller
  - DVI-I video connector
  - Two USB 3.0 Ports
  - Trigger I/O for advanced PXI™ trigger functions
- Programmable watchdog timer

1.2 Specifications

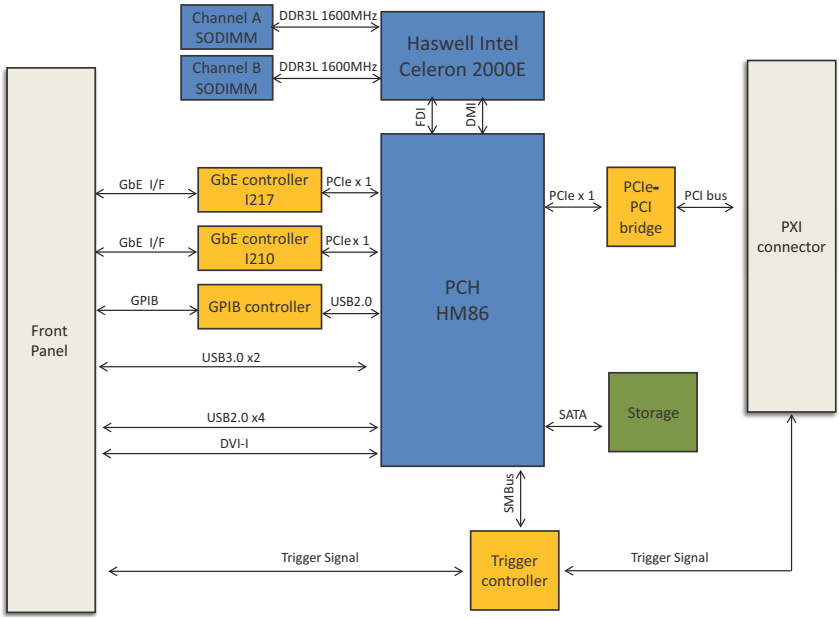


Figure 1-1: PXI-3930 Functional Block Diagram

Processor

- Intel® Celeron® 2000E 2.20GHz processor for maximum computing power
- DMI (Direct Media Interface) with 5 GT/s of bandwidth in each direction

Chipset

Mobile Intel® HM86

Memory

- 2x standard 204-pin DDR3L SODIMM sockets
- Support for 1333/1600MHz RAM up to 16 GB total
- Support for non-ECC unbuffered memory

The externally accessible SODIMM socket can accept replacement DDR3L DRAM DIMM modules. PXI-3930 specifications and stability guarantees are only supported when ADLINK-provided DDR3L DRAM DIMM modules are used.

Video

- DVI output provides up to 1920 x 1200 bpp at 60Hz resolution
- VGA output provides up to 2048 x 1152 bpp at 60Hz resolution
- DVI-I connector for dual digital and analog video signal output via the included ADLINK Y-cable

The PXI-3930 does not support the PXIS-2690P LCD display function as formerly enabled by the PXI-3950.

Hard Drive

Built-in 2.5” 500GB SATA hard drive or 240GB SATA solid state hard drive.

I/O Connectivity

Dual Gigabit Ethernet controllers through two RJ-45 connectors with speed/link/active LED on the faceplate.

USB

Four USB 2.0 and two USB 3.0 ports on the faceplate.

GPIB

Onboard IEEE488 GPIB controller through Micro-D 25-pin connector on the faceplate.

Trigger I/O

One SMB connector on the faceplate to route an external trigger signal to/from PXI trigger bus

Dimensions (3-slot 3U PXI module)

3U/3-slot PXI standard

60.5 W x 128.7 H x 213.2 D mm (2.38 x 5.07 x 8.39 in.)

Slot Requirements

System slot (5V VIO PCI bus) and 2 controller expansion slots on chassis/backplane.

32-bit and 5V VIO PCI bus of system slot.

Do not remove the blue key from the PXI-3930 system connector, only the 5V VIO PCI bus is compatible.
3.3V VIO PCI bus is not.
SEVERE system damage may result.

Weight

0.91kg

Environmental

Operating temperature with SSD	0 to 55°C
Operating temperature with HDD	0 to 50°C
Storage temperature	-20 to 70°C
Relative humidity , non-condensing	5 to 95%

Shock and Vibration

Functional shock 30 G, half-sine, 11 ms pulse duration

Random vibration:

- Operating 5 to 500 Hz, 0.21 Grms, 3 axes
- Non-operating 5 to 500 Hz, 2.46 Grms, 3 axes

NOTE:

Environmental & Shock and Vibration values are only guaranteed with use of an ADLINK-provided SSD/HDD

Certification

Electromagnetic compatibility:

- EMC/EMI: CE, FCC Class A
- CE Compliance EN 61326-1

The PXI-3930 meets the essential requirements of applicable European Directives.

Power Requirements

Voltage Rail	+3.3V	+5V	+12V	Total
Maximum power consumption	0.52	35	1.92	37.44W
Idle power consumption	0.36	12.5	1.32	14.18W

1.3 Front Panel I/O & Indicators

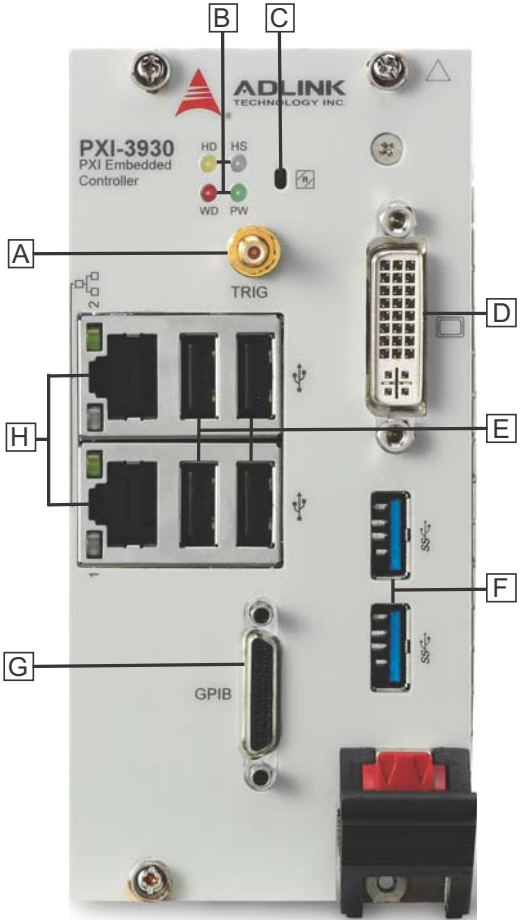


Figure 1-2: Front Panel

A	PXI Trigger Connector (SMB jack)	**E**	4X Type A USB 2.0 connectors
B	LED indicators	**F**	2X USB 3.0
C	Reset	**G**	GPIB Connector (Micro D-Sub 25P)
D	DVI-I Connector	**H**	2X Gigabit Ethernet

Table 1-1: Front Panel Legend

1.3.1 PXI Trigger Connector

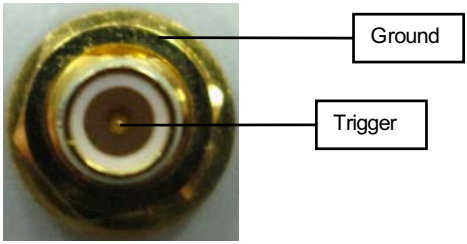


Figure 1-3: PXI Trigger SMB Jack

The PXI trigger connector is a SMB jack, used to route external trigger signals to or from the PXI backplane. Trigger signals are TTL-compatible and edge sensitive. The PXI-3930 provides four trigger routing modes from/to the PXI trigger connector to synchronize PXI modules, including

- From a selected trigger bus line to PXI trigger connector
- From the PXI trigger connector to a selected trigger bus line
- From software trigger to a selected trigger bus line
- From software trigger to PXI trigger connector

All trigger modes are programmable by the provided driver. Please refer to Section A: PXI Trigger I/O Function Reference for further information.

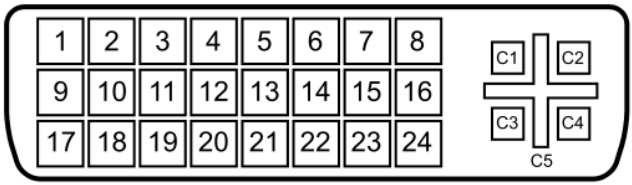
1.3.2 DVI-I Connector

The DVI-I connector connects the PXI-3930 to a monitor, of which both digital (DVI) and analog (VGA) are supported. If connecting to an analog (VGA) monitor, the included Y-cable must be installed on the DVI-I connector.

Dual display function, providing simultaneous DVI & VGA display, is available, also with the addition of the included ADLINK Y-cable.

NOTE:

The PXI-3930 supports native monitor hot-plugging in DVI-D monitors, under Windows 7 with Intel Media Accelerator graphics driver installed, and in VGA monitors with the included ADLINK Y-cable.



Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	TMDS Data2-	9	TMDS Data1-	17	TMDS Data0-	C1	Analog Red
2	TMDS Data2+	10	TMDS Data1+	18	TMDS Data0+	C2	Analog Green
3	Shield Ground	11	Shield Ground	19	Shield Ground	C3	Analog Blue
4	Reserved	12	Reserved	20	Reserved	C4	Analog HSYNC
5	Reserved	13	Reserved	21	Reserved	C5	Analog Ground
6	DDC Clock	14	+5V Power	22	Ground		
7	DDC Data	15	Ground	23	TMDS Clock+		

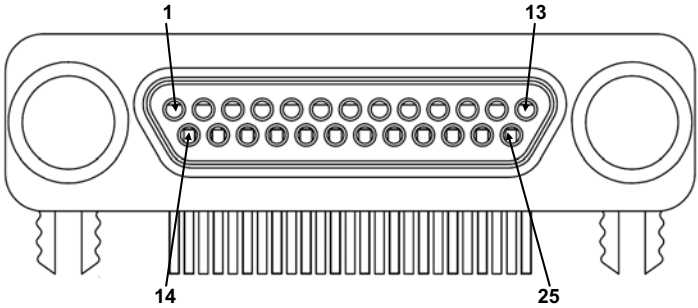
Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
8	Analog VSYNC	16	Hot Plug Detect	24	TMDS Clock-		

Table 1-2: DVI-I Pin Assignment

1.3.3 GPIB Connector

The GPIB connector on PXI-3930 is a micro D-sub 25P connector, controlling external bench-top instruments. Connection to other instruments requires the ACL-IEEE488-MD1-A cable. The on-board GPIB controller provides:

- Full compatibility with IEEE 488 standard
- Up to 1.5MB/s data transfer rates
- Onboard 2 KB FIFO for read/write operations
- Driver APIs compatible with NI-488.2 driver software
- Connection with up to 14 instruments



Pin	Signal	Description	Pin	Signal	Description
1	DIO1#	GPIB Data 1	14	DIO5#	GPIB Data 5
2	DIO2#	GPIB Data 2	15	DIO6#	GPIB Data 6
3	DIO3#	GPIB Data 3	16	DIO7#	GPIB Data 7
4	DIO4#	GPIB Data 4	17	DIO8#	GPIB Data 8
5	EOI	End Or Identify	18	REN	Remote Enable
6	DAV	Data Valid	19	Ground	Signal Ground
7	NRFD	Not Ready For Data	20	Ground	Signal Ground

Pin	Signal	Description	Pin	Signal	Description
8	NDAC	No Data Accepted	21	Ground	Signal Ground
9	IFC	Interface Clear	22	Ground	Signal Ground
10	SRQ	Service Request	23	Ground	Signal Ground
11	ATN	Attention	24	Ground	Signal Ground
12	Chassis Ground	Chassis Ground	25	Ground	Signal Ground
13	Ground	Signal Ground			

Table 1-3: GPIB Pin Description

1.3.4 Reset Button

The reset button, activated by insertion of any pin-like implement, executes a hard reset for the PXI-3930.

1.3.5 LED Indicators

Four LED indicators on the faceplate indicate operational status of the PXI-3930, as follows.

Figure 1-4: LED Indicators

LED indicator	Color	Description
PW	Green	Indicates system power. Remains lit when the system boots normally and main power supply is functioning.
HD	Yellow	Indicates operating state of the HDD or SSD. Flashes during access to or activity on the SATA HDD.
WD	Red	Indicates status of the watchdog timer, lighting when watchdog timer has expired. Please refer to Appendix B for watchdog timer programming information.
HS	Blue	Indicates system status, blinking on and off once during boot when system status is good, and continuously blinking or remaining lit when the system malfunctions.

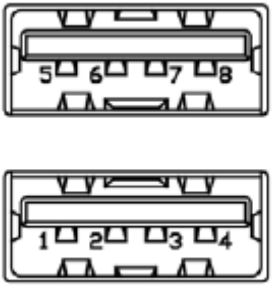
Table 1-4: LED Indicator Legend


NOTE:

In the event of malfunction, clear the CMOS (See “Clearing CMOS” on page 23) and reboot the system. If the system fails to respond properly, please contact ADLINK for assistance.

1.3.6 USB 2.0 Ports

The PXI-3930 provides four USB 2.0 ports via USB Type A connectors on the faceplate, all compatible with hi-speed, full-speed and low-speed USB devices. Supported boot devices include USB flash drive, USB floppy, USB CD-ROM, and others, with boot priority and device settings configurable configured in BIOS. See “Boot Setup” on page 43 for more information.



Pin	Signal
1/5	Power 5V
2/6	USB Data-
3/7	USB Data +
4/8	Ground

Table 1-5: USB 2.0 Port Pin Assignment

1.3.7 Gigabit Ethernet Ports

Dual Gigabit Ethernet connection is provided on the PXI-3930 front panel.

Pin	1000Base-T Signal	100/10Base-T Signal
1	MDI0+	TX+
2	MDI0-	TX-
3	MDI1+	RX+
4	MDI2+	Reserved
5	MDI2-	Reserved
6	MDI1-	RX-
7	MDI3+	Reserved
8	MDI3-	Reserved

Table 1-6: PXI-3930 Ethernet Port Pin Assignments

The Ethernet ports each include two LED indicators, one Active/Link indicator and one Speed indicator, functioning as follows.

	LED	Status	Description
 	Active/Link (Yellow)	Off	Ethernet port is disconnected
		On	Ethernet port is connected with no data transmission
		Flashing	Ethernet port is connected with data transmitted/received
	Speed (Green/ Orange)	Off	10 Mbps
		Green	100 Mbps
		Orange	1000 Mbps

1.3.8 USB 3.0 Ports

The PXI-3930 provides two Type A USB 3.0 ports on the front panel, supporting SuperSpeed, Hi-Speed, full-speed, and low-speed transmission for downstream. Multiple boot devices, including USB flash, USB external HD, and USB CD-ROM drives are supported, with boot priority configured in BIOS.

NOTE: While the USB 3.0 ports allow boot from CD-ROM, OS installation via CD-ROM is not supported

1.3.9 Onboard Connections and Settings

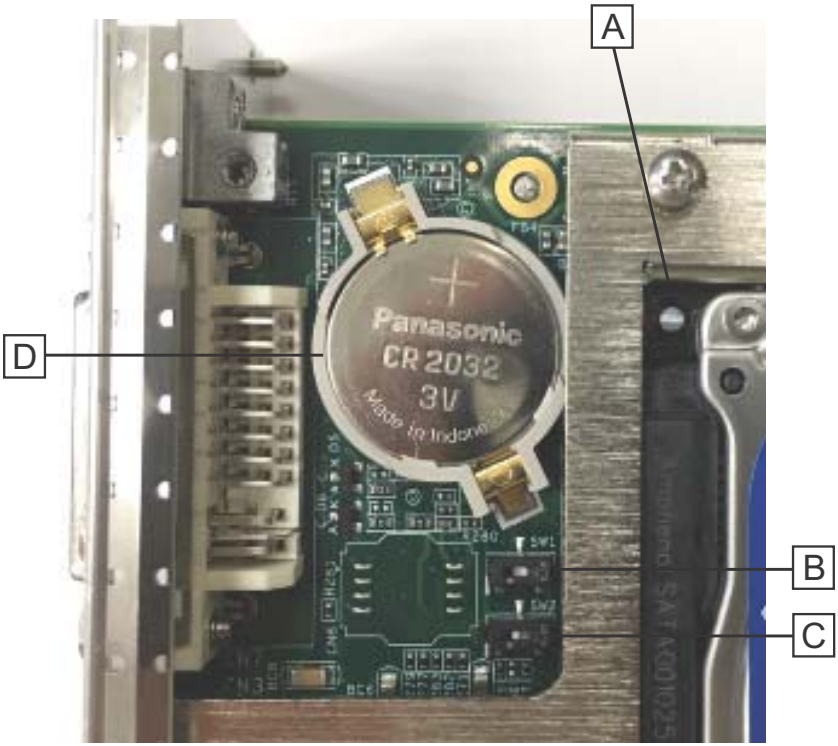


Figure 1-5: Onboard Configuration

A	SATA Connector
B	Clear CMOS switch
C	BIOS flash backup switch
D	System Battery

Table 1-7: Onboard Configuration Legend

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2 Getting Started

This chapter describes procedures for installing the PXI-3930 and making preparations for its operation, including hardware and software setup. Please note that the PXI-3930 is shipped with RAM and HDD or SSD preinstalled. Please contact ADLINK or authorized dealer if there are any problems during the installation.

Diagrams and illustrated equipment are for reference only. Actual system configuration and specifications may vary.

2.1 Package Contents

Before beginning, check the package contents for any damage and ensure that the following items are included:

- PXI-3930 Controller (equipped with RAM and HDD or SSD)
- Dual display Y-cable
- PXI-3930 Quick Start Guide

If any of these items are missing or damaged, contact the dealer from whom you purchased the product. Save the shipping materials and carton in case you want to ship or store the product in the future.

Do not install or apply power to equipment that is damaged or missing components. Retain the shipping carton and packing materials for inspection. Please contact your ADLINK dealer/vendor immediately for assistance and obtain authorization before returning any product.

2.2 Operating System Installation

For more detailed information about the operating system, refer to the documentation provided by the operating system manufacturer. Preferred/supported operating systems for PXI-3930 are:

- Windows XP
- Windows 7 32/64-bit
- For other OS support, please contact ADLINK

Most operating systems require initial installation from a hard drive, floppy drive, or CD-ROM drive. The PXI-3930 controller supports USB CD-ROM drive, USB flash disk, USB external hard drive, or a USB floppy drive as the first boot device. See “Boot Setup” on page 43 for information about setting the boot devices. These devices should be configured, installed, and tested with the supplied drivers before attempting to load the new operating system.


NOTE:

Read the release notes and installation documentation provided by the operating system vendor. Be sure to read all the README files or documents provided on the distribution disks, as these typically note documentation discrepancies or compatibility problems.

1. Select the appropriate boot device order from the BIOS Boot Setup Menu based on the OS installation media used. For example, if the OS is distributed on a bootable installation CD, select USB CD-ROM as the first boot device and reboot the system with the installation CD in the USB CD-ROM drive
2. Proceed with the OS installation as directed and be sure to select appropriate device types if prompted. Refer to the appropriate hardware manuals for specific device types and compatibility modes of ADLINK PXI products.
3. When installation is complete, reboot the system and set the boot device order in the SETUP boot menu accordingly.

2.2.1 Driver Installation

Download requisite drivers, as follows, from http://www.adlink-tech.com.

1. Fully install Windows, which contains most standard I/O device drivers
2. Install the chipset driver
3. Install the graphic driver
4. Install the Ethernet driver
5. Install the GPIB driver
6. Install the management engine driver
7. Install the PXI trigger driver
8. Install the WDT (watchdog timer) driver
9. Install the USB 3.0 driver

2.2.2 Installation Environment

When preparing to install any equipment described in this manual, see “Chapter A: Important Safety Instructions.

Only install equipment in well lit areas on flat, sturdy surfaces with access to basic tools such as flat- and cross-head screwdrivers, preferably with magnetic heads as screws and standoffs are small and easily misplaced.

Recommended Installation Tools

- Phillips (cross-head) screwdriver
- Flat-head screwdriver
- Anti-static wrist strap
- Anti-static mat

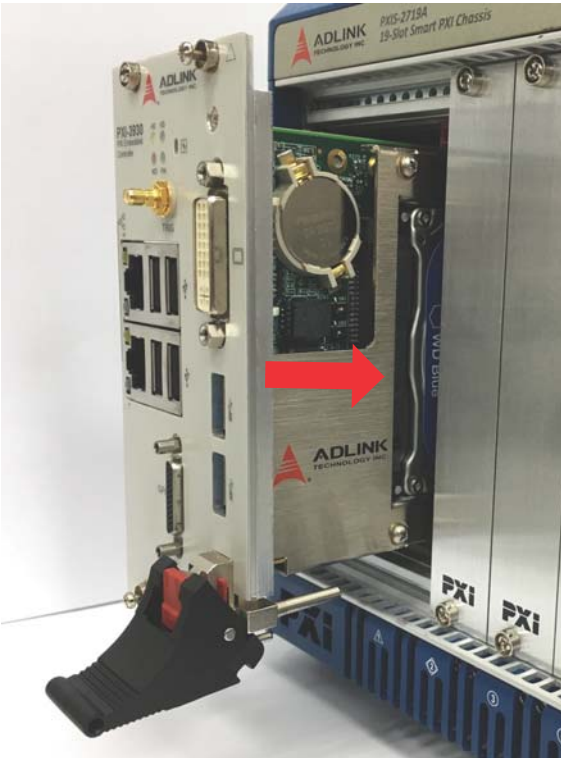
ADLINK PXI-3930 system controllers are electrostatically sensitive and can be easily damaged by static electricity. The equipment must be handled on a grounded anti-static mat, and operators must wear an anti-static wristband, grounded at the same point as the anti-static mat.

Inspect the carton and packaging for damage. Shipping and handling may cause damage to the contents. Ensure that all contents are undamaged before installing.

All equipment must be protected from static discharge and physical shock. Never remove any of the socketed parts except at a static-free workstation. Use the anti-static bag shipped with the product to handle the equipment and wear a grounded wrist strap when servicing or installing.

2.2.3 Installing the PXI-3930

1. Locate the system controller slot (Slot 1)
2. Depress the red locking lever and release the latch
3. Align the controller's top and bottom edges with the card guides, and carefully slide the PXI-3930 into the chassis, as shown



4. Elevate the latch until the PXI-3930 is fully seated in the chassis backplane.
5. Fasten the four mounting screws on the faceplate of PXI-3930, and connect all peripheral devices.

2.2.4 Replacing the Hard Drive or Solid State Drive

The PXI-3930 provides a SATA 2.0 port with a pre-installed 2.5" SATA hard drive or solid state drive. Replacing the HDD or SSD is accomplished as follows.

1. Locate the four screws attaching the drive to the bracket on the side of the PXI-3930.
2. Remove the screws, as shown.

3. Gently lift and remove the SATA HDD or SSD
4. To install a HDD or SSD or other compatible SATA hard drive, reverse the steps and reinstall the PXI-3930 into the PXI system.

2.2.5 Replacing the Battery Backup

The PXI-3930 is provided with a 3.0 V “coin cell” lithium battery, replacement of which is as follows.

1. Turn off the PXI chassis.
2. Remove the PXI-3930 embedded controller from the chassis. Observe all anti-static precautions.
3. To remove the battery, gently insert a small (approx. 5 mm) flathead screwdriver under the battery at the negative retaining clip. Gently pry up and the battery should easily pop out.
4. Place a fresh identical battery (CR2032 or equivalent) in the socket, ensuring that the positive pole (+) is facing upwards. The battery is most easily seated by first being inserted under the positive retaining clip, and then pushed downward at the negative retaining clip. The battery should easily snap into position.
5. Reinstall the embedded controller into the PXI chassis and restore power.

2.2.6 Clearing CMOS

In the event of a system malfunction causing the PXI-3930 to halt or fail to boot, clear the CMOS and restore the controller BIOS to its default settings. To clear the CMOS:

1. Shut down the controller operating system and turn off the PXI Chassis.
2. Remove the PXI-3930 from the chassis. Observe all anti-static precautions.
3. Locate the CMOS clear switch (SW1) on the board (See “Onboard Connections and Settings” on page 15). Move the switch from Normal position

to Clear position

and wait for 5 seconds, then return the switch to Normal position.

4. Remount the controller into the PXI chassis.
5. Press "Delete" or "ESC" to enter the BIOS setup when the splash logo appears.
6. Press "F3" to load Optimized defaults in BIOS setup
7. Modify the system date and time
8. Press "F4" to save configuration and exit

2.2.7 Initiating Backup BIOS Flash

BIOS flash on the PXI-3930 is divided into Backup and Normal sections. In the event of a system malfunction causing the active PXI-3930 BIOS to crash and then fail to boot, the system automatically switches to the secondary backup BIOS.

NOTE: Please contact technical support to resolve halting or failure to boot issues caused by corrupted BIOS.

Appendix A - PXI Trigger I/O Function Reference

This appendix describes use of the PXI trigger I/O function library for the PXI-3930 controller, to program routing of trigger signals between the trigger I/O SMB connector on the faceplate and the PXI trigger bus on the backplane.

A.1 Data Types

The PXI-3930 library uses these data types in pxitrigio.h in the directory X:\ADLINK\PXI Trigger IO\Include. It is recommended that you use these data types in your application programs. The table shows the data type names, ranges, and corresponding data types in C/C++, Visual Basic, and Delphi for reference.

Type	Description	Range	Type		
			C/C++ (for 32-bit compiler)	Visual Basic	Pascal (Delphi)
U8	8-bit ASCII character	0 to 255	unsigned char	Byte	Byte
I16	16-bit signed integer	-32768 to 32767	short	Integer	SmallInt
U16	16-bit unsigned integer	0 to 65535	unsigned short	Not supported by BASIC, use the signed integer (I16) instead	Word
I32	32-bit signed integer	-2147483648 to 2147483647	long	Long	LongInt
U32	32-bit unsigned integer	0 to 4294967295	unsigned long	Not supported by BASIC, use the signed long integer (I32) instead	Cardinal

Type	Description	Range	Type		
			C/C++ (for 32-bit compiler)	Visual Basic	Pascal (Delphi)
F32	32-bit single-precision floating-point	-3.402823E38 to 3.402823E38	float	Single	Single
F64	64-bit double-precision floating-point	1.797683134862315E308 to 1.797683134862315E309	double	Double	Double

A.2 Function Library

This section provides detailed definitions of the functions available in the PXI-3930 function library. Each function includes a description, list of supported cards, syntax, parameter list and Return Code information.

A.2.1 TRIG_Init

Description

Initializes trigger I/O function of PXI-3930 controller. TRIG_Init must be called before the invocation of any other trigger I/O function.

Supported Controllers

PXI-3930, PXI-3980

Syntax

C/C++

```
I16 TRIG_Init()
```

Visual Basic

```
TRIG_Init As Integer
```

Parameter

None

Return Code

```
ERR_NoError
ERR_BoardBusy
ERR_OpenDriverFail
ERR_GetGPIOAddress
```

A.2.2 TRIG_Close

Description

Closes trigger I/O function of PXI-3930 controller, releasing resources allocated for the trigger I/O function. Users must invoke TRIG_Close before exiting the application.

Supported Controllers

PXI-3930, PXI-3980

Syntax

C/C++

```
I16 TRIG_Close()
```

Visual Basic

```
TRIG_Close() As Integer
```

Parameter

None

Return Code

```
ERR_NoError
ERR_BoardNoInit
```

A.2.3 TRIG_SetSoftTrg

Description

Generates a TTL trigger signal to the trigger I/O SMB connector on the faceplate or the PXI trigger bus on the backplane by software command

Supported Controllers

PXI-3930, PXI-3980

Syntax

C/C++

```
I16 TRIG_SetSoftTrg(U8 Status)
```

Visual Basic

```
TRIG_SetSoftTrg (ByVal status As Byte) As
Integer
```

Parameters

Status

Logic level of trigger signal.

Available value description:

0: Logic low

1: Logic high

Return Code

```
ERR_NoError
ERR_BoardNoInit
```

A.2.4 TRIG_Trigger_Route

Description

Routes the trigger signal between the trigger I/O SMB connector on the faceplate and the PXI trigger bus on the backplane. This function also allows routing of the software-generated trigger signal to SMB connector or trigger bus.

Supported Controllers

PXI-3930, PXI-3980

Syntax

C/C++

```
I16 TRIG_Trigger_Route (U32 source, U32 dest,
U32 halfway)
```

Visual Basic

```
TRIG_Trigger_Route (ByVal source As Long,
ByVal dest As Long, ByVal halfway As Long) As
Integer
```

Parameters

source

Source of trigger routing. It can be one of the following values.

Available value	Description
PXI_TRIG_VAL_SMB	SMB connector on the faceplate
PXI_TRIG_VAL_SOFT	Software-generated trigger signal
PXI_TRIG_VAL_TRIG0	PXI trigger bus #0
PXI_TRIG_VAL_TRIG1	PXI trigger bus #1
PXI_TRIG_VAL_TRIG2	PXI trigger bus #2
PXI_TRIG_VAL_TRIG3	PXI trigger bus #3
PXI_TRIG_VAL_TRIG4	PXI trigger bus #4
PXI_TRIG_VAL_TRIG5	PXI trigger bus #5
PXI_TRIG_VAL_TRIG6	PXI trigger bus #6
PXI_TRIG_VAL_TRIG7	PXI trigger bus #7

dest

Destination of trigger routing. It can be one of the following values.

Available value	Description
PXI_TRIG_VAL_SMB	SMB connector on the faceplate
PXI_TRIG_VAL_TRIG0	PXI trigger bus #0
PXI_TRIG_VAL_TRIG1	PXI trigger bus #1
PXI_TRIG_VAL_TRIG2	PXI trigger bus #2
PXI_TRIG_VAL_TRIG3	PXI trigger bus #3
PXI_TRIG_VAL_TRIG4	PXI trigger bus #4
PXI_TRIG_VAL_TRIG5	PXI trigger bus #5
PXI_TRIG_VAL_TRIG6	PXI trigger bus #6
PXI_TRIG_VAL_TRIG7	PXI trigger bus #7

halfway

Halfway point of trigger routing. This parameter is used only to route the software-generated trigger signal to the SMB connector on the faceplate. In this case, the halfway should

be set as one of the trigger bus lines, otherwise as PXI_TRIG_VAL_NONE.

Available value	Description
PXI_TRIG_VAL_NONE	No halfway point
PXI_TRIG_VAL_TRIG0	PXI trigger bus #0
PXI_TRIG_VAL_TRIG1	PXI trigger bus #1
PXI_TRIG_VAL_TRIG2	PXI trigger bus #2
PXI_TRIG_VAL_TRIG3	PXI trigger bus #3
PXI_TRIG_VAL_TRIG4	PXI trigger bus #4
PXI_TRIG_VAL_TRIG5	PXI trigger bus #5
PXI_TRIG_VAL_TRIG6	PXI trigger bus #6
PXI_TRIG_VAL_TRIG7	PXI trigger bus #7

Return Code

```
ERR_NoError
ERR_BoardNoInit
ERR_Set_Path
```

A.2.5 TRIG_Trigger_Clear

Description

Clears the trigger routing setting

Supported Controllers

PXI-3930, PXI-3980

Syntax

C/C++

```
I16 TRIG_Trigger_Clear()
```

Visual Basic

```
TRIG_Trigger_Clear() As Integer
```

Parameters

None

Return Code

```
ERR_NoError
ERR_BoardNoInit
```

```
ERR_Trigger_Clr
```

A.2.6 TRIG_GetSoftTrg

Description

Acquires the current software trigger state, with default state after system boot of Logic Low

Supported Controllers

PXI-3930, PXI-3980

Syntax

C/C++

```
I16 TRIG_GetSoftTrg(U8 *Status)
```

Visual Basic

```
TRIG_GetSoftTrg (status As Byte) As Integer
```

Parameters

Status

Returns the logic level of software trigger signal

Returned value:

0: Logic low

1: Logic high

Return Code

```
ERR_NoError
ERR_BoardNoInit
ERR_Query_Status
```

A.2.7 TRIG_Trigger_Route_Query

Description

Acquires the current trigger signal routing path

Supported Controllers

PXI-3930, PXI-3980

Syntax

C/C++

```
I16  TRIG_Trigger_Route_Query  (U32*  source,
U32* dest, U32* halfway)
```

Visual Basic

```
TRIG_Trigger_Route_Query (source As Long, dest
As Long, halfway As Long) As Integer
```

Parameters

source

Returns to the current source of trigger routing, with possible values including:

Available Definition	Defined Value
PXI_TRIG_VAL_NONE	0
PXI_TRIG_VAL_SMB	2
PXI_TRIG_VAL_SOFT	3
PXI_TRIG_VAL_TRIG0	111
PXI_TRIG_VAL_TRIG1	112
PXI_TRIG_VAL_TRIG2	113
PXI_TRIG_VAL_TRIG3	114
PXI_TRIG_VAL_TRIG4	115
PXI_TRIG_VAL_TRIG5	116
PXI_TRIG_VAL_TRIG6	117
PXI_TRIG_VAL_TRIG7	118

dest

Returns to the current destination of trigger routing, with possible values including:

Available Definition	Defined Value
PXI_TRIG_VAL_NONE	0
PXI_TRIG_VAL_SMB	2
PXI_TRIG_VAL_TRIG0	111
PXI_TRIG_VAL_TRIG1	112
PXI_TRIG_VAL_TRIG2	113
PXI_TRIG_VAL_TRIG3	114
PXI_TRIG_VAL_TRIG4	115

Available Definition	Defined Value
PXI_TRIG_VAL_TRIG5	116
PXI_TRIG_VAL_TRIG6	117
PXI_TRIG_VAL_TRIG7	118

halfway

Returns to the current halfway point of trigger routing, with possible values including:

Available Value	Description
PXI_TRIG_VAL_NONE	0
PXI_TRIG_VAL_TRIG0	111
PXI_TRIG_VAL_TRIG1	112
PXI_TRIG_VAL_TRIG2	113
PXI_TRIG_VAL_TRIG3	114
PXI_TRIG_VAL_TRIG4	115
PXI_TRIG_VAL_TRIG5	116
PXI_TRIG_VAL_TRIG6	117
PXI_TRIG_VAL_TRIG7	118

Return Code

```
ERR_NoError
ERR_BoardNoInit
ERR_Query_Status
```

A.2.8 TRIG_GetDriverRevision

Description

Acquires the PXI Trigger software driver version; format of the version number is major.minor1.minor2

Supported Controllers

PXI-3930, PXI-3980

Syntax

C/C++

```
I16    TRIG_GetDriverRevision(unsigned    short
*major, unsigned short *minor1, unsigned short
*minor2)
```

Visual Basic

```
TRIG_GetDriverRevision   (major   As   Integer,
minor1 As Integer, minor2 As Integer) As Inte-
ger
```

Parameters

major

Returns the major version number of the pxi trigger software driver

minor1

Returns the first minor version number of the pxi trigger software driver

minor2

Returns the second minor version number of the pxi trigger software driver

Return Code

```
ERR_NoError
ERR_Query_Revision
```

Appendix B - Watchdog Timer

This appendix describes use of the watchdog timer (WDT) function library for the PXI-3930 controller. The watchdog timer is a hardware mechanism resetting the system when the operating system or application halts. After starting, periodic reset of the watchdog timer in the application before expiry is required. Once the watchdog timer expires, a hardware-generated signal is sent to reset the system.

B.1 WDT Function Library

B.1.1 InitWDT

Initializes watchdog timer function. InitWDT must be called before the invocation of any other WDT function.

Supported Controllers

PXI-3930, PXI-3980

Syntax

C/C++

```
BOOL InitWDT()
```

Visual Basic

```
InitWDT() As Boolean
```

Parameter

None

Return Code

`True`	If watchdog timer is successfully initialized
`False`	If watchdog timer fails to initialize

B.1.2 SetWDT

Sets the timeout value for watchdog timer. The timeout value uses seconds as a unit. ResetWDT or StopWDT should be called prior to expiration of the watchdog timer, or the system will be reset.

Supported Controllers

PXI-3930, PXI-3980

Syntax

C/C++

```
BOOL SetWDT(unsigned long second)
```

Visual Basic

```
InitWDT(ByVal second as Long) As Boolean
```

Parameter

second

Specifies the timeout value of the watchdog timer.

Value Description

Value	Description
0 to 255	If the value of the *second* parameter is between 0 and 255, the resolution of the watchdog timer is 1 second
Over 255	If the value of the *second* parameter exceeds 255, the resolution of the watchdog timer is 1 minute, that is, if a value of 400 is given, the actual timeout value is 400/60 + 1 = 7 minutes

Return Code

`True`	If timeout value of watchdog timer is successfully set
`False`	If timeout value of watchdog timer fails to be set

B.1.3 StartWDT

Starts watchdog timer function. Once invoked, the watchdog timer countdown starts, and ResetWDT or StopWDT should be called before the expiration of the watchdog timer, or the system will be reset.

Supported Controllers

PXI-3930, PXI-3980

Syntax

C/C++

```
BOOL StartWDT()
```

Visual Basic

```
StartWDT() As Boolean
```

Parameter

None

Return Code

`True`	If watchdog timer starts successfully
`False`	If watchdog timer fails to start

B.1.4 ResetWDT

Resets the watchdog timer to the initial timeout value specified in SetWDT function, and ResetWDT or StopWDT should be called before the expiration of the watchdog timer, or the system will be reset.

Supported Controllers

PXI-3930, PXI-3980

Syntax

C/C++

```
BOOL ResetWDT()
```

Visual Basic

```
ResetWDT() As Boolean
```

Parameter

None

Return Code

`True`	If watchdog timer resets successfully
`False`	If watchdog timer fails to reset

B.1.5 StopWDT

Stops the watchdog timer.

Supported Controllers

PXI-3930, PXI-3980

Syntax

C/C++

```
BOOL StopWDT()
```

Visual Basic

```
StopWDT() As Boolean
```

Parameter

None

Return Code

`True`	If watchdog timer stops successfully
`False`	If watchdog timer fails to stop

Appendix C BIOS Setup

The Basic Input/Output System (BIOS) provides a basic level of communication between the processor and peripherals. In addition, the BIOS also contains code for various advanced features applied to the PXI-3930 controller. The BIOS setup program includes menus for configuring settings and enabling PXI-3930 controller features.

Changing BIOS settings may result in incorrect operation and possibly an inability to boot. If this occurs, follow the instructions in Section 2.2.6: Clearing CMOS to clear CMOS and restore default settings. In general, do not change a BIOS setting unless you are absolutely certain of the consequences.

C.1 Starting the BIOS

1. Power on or reboot the PXI-3930 controller.
2. Press the <Delete> key when the controller beeps. This should be concurrent with the main startup screen. The BIOS setup program loads after a short delay.
3. The Main menu is displayed when you first enter the BIOS setup program.

In most cases, the < Delete > key is used to invoke the setup screen. There are several cases that use other keys, such as < F1 >, < F2 >, and so on.

The main BIOS setup menu is the first screen that you can navigate. Each main BIOS setup menu option is described in this user's guide.

The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. "Grayed" options cannot be configured, "Blue" options can be.

The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

Navigation

The BIOS setup/utility uses a key-based navigation system called hot keys. Most BIOS setup utility hot keys can be used at any time during setup navigation, as follows.

Key(s)	Function
Right Arrow, Left Arrow	Moves between different setup menus
Up Arrow, Down Arrow	Moves between options within a setup menu
<Enter>	Opens a submenu or displays all available settings for a highlighted configuration option
<Esc>	Returns to the previous menu and shortcuts to the Exit menu from top-level menus
<+> and <–>	Cycles between all available settings
<Tab>	Selects time and date fields
<F1>	Opens the general help window for the BIOS
<F2>	Loads previous values into the BIOS
<F3>	Loads the optimal default BIOS settings
<F4>	Saves the current configuration and exits BIOS setup

Table C-1: BIOS Hot Key Functions

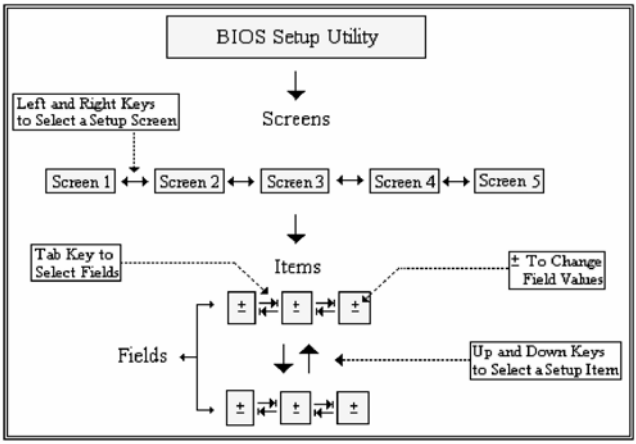


Figure C-1: BIOS Setup Navigation


NOTE:

A hot key legend is located in the right frame on most setup screens.

The < F8 > key on your keyboard is the Fail-Safe key. It is not displayed on the key legend by default. To set the Fail-Safe settings of the BIOS, press the < F8 > key on your keyboard. It is located on the upper row of a standard 101 keyboard. The Fail-Safe settings allow the motherboard to boot up with the least amount of options set. This can lessen the probability of conflicting settings.

C.2 Main Setup

When you first enter the Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab.

The Main Setup menu provides basic controller information and allows the system time and date to be set, as follows.

Item	
BIOS Information	Includes BIOS version and date
System Information	Lists processor and PCH information
System Management	Includes board information and system health data
System Date & Time	
System Date	Sets system date, entered in MM/DD/YY format
System Time	Sets system time, entered in HH:MM:SS format.
Access Level	Displays current access level, default is Administrator

Table C-2: BIOS Main Setup Menu

C.3 Advanced Setup

Select the Advanced tab from the setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as SuperIO Configuration, to go to the submenu for that item. Display an Advanced BIOS Setup option by highlighting it using the < Arrow > keys. The Advanced BIOS Setup options are as follows.

Item	
CPU Configuration	Displays processor type, speed, system bus speed, and other information
Memory Configuration	Displays memory information
Graphics Configuration	Configures graphics
USB Configuration	Provides USB support and lists devices in USB ports
Hardware Health Configuration	Displays system voltages and temperatures
Onboard Device Configuration	Enables/disables LAN and SATA ports
Advanced Power Management	Shows Watch Dog Timer status

Table C-3: BIOS Advanced Setup Menu

C.4 Boot Setup

Item	
Boot Configuration	
Setup Prompt Timeout	Sets time window in which Setup key can be selected, in seconds
Boot Numlock State	Sets keyboard Numlock status
Quiet Boot	When disabled, allows POST messages to be viewed, with default Enabled
Fast Boot	Sets boot with initialization of minimal devices required to launch active boot option
Boot Option Priorities	
1st Boot	Selects primary boot source, with default SATA HDD
2nd Boot	Selects secondary boot source
Hard Drive BBS Priorities	Sets order of legacy devices in this group

Table C-4: BIOS Boot Setup Menu

C.5 Security Setup

The system can be configured to require all users to enter a password (either Administrator or User) every time the system boots or when Setup is executed. Administrators and User passwords activate different levels of security.

If passwords are used, the system prompts for a three- to twenty-character password. Typed passwords are not displayed.

Item	
Password Description	
Administrator Password	Sets administrative level password for BIOS
User Password	Sets user level passwords for BIOS

Table C-5: BIOS Security Setup Menu

CAUTION:

Passwords are not recoverable. Please ensure that all passwords are recorded elsewhere. If your passwords are lost, NVRAM must be erased and reconfigured.

C.6 Save & Exit Setup

The following options for saving and exiting can be chosen in this menu.

Save Changes and Exit

- Save Changes and Reset
- Discard Changes and Reset

Save Option

- Save Changes
- Discard Changes
- Restore Defaults
- Save as User Defaults
- Restore User Defaults

The "Restore the default values for all setup options" selection does not restore the original boot priority sequence. You must use the Boot Setup Menu (see “Boot Setup” on page 43) to manually restore the boot priority sequence.

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Important Safety Instructions

For user safety, please read and follow all instructions, Warnings, Cautions, and Notes marked in this manual and on the associated device before handling/operating the device, to avoid injury or damage.

S'il vous plaît prêter attention stricte à tous les avertissements et mises en garde figurant sur l'appareil , pour éviter des blessures ou des dommages.

- Read these safety instructions carefully
- Keep the User's Manual for future reference
- Read the Specifications section of this manual for detailed information on the recommended operating environment
- The device can be operated at an ambient temperature of 50ºC
- When installing/mounting or uninstalling/removing device; or when removal of a chassis cover is required for user servicing (See "Getting Started" on page 25.):
  - Turn off power and unplug any power cords/cables
  - Reinstall all chassis covers before restoring power
- To avoid electrical shock and/or damage to device:
  - Keep device away from water or liquid sources
  - Keep device away from high heat or humidity
  - Keep device properly ventilated (do not block or cover ventilation openings)
  - Always use recommended voltage and power source settings
  - Always install and operate device near an easily accessible electrical outlet
  - Secure the power cord (do not place any object on/over the power cord)
  - Only install/attach and operate device on stable surfaces and/or recommended mountings
- If the device will not be used for long periods of time, turn off and unplug from its power source

- Never attempt to repair the device, which should only be serviced by qualified technical personnel using suitable tools
- A Lithium-type battery may be provided for uninterrupted backup or emergency power.

Risk of explosion if battery is replaced with one of an incorrect type; please dispose of used batteries appropriately.
Risque d'explosion si la pile est remplacée par une autre de type incorrect. Veuillez jeter les piles usagées de façon appropriée.

- The device must be serviced by authorized technicians when:
  - The power cord or plug is damaged
  - Liquid has entered the device interior
  - The device has been exposed to high humidity and/or moisture
  - The device is not functioning or does not function according to the User's Manual
  - The device has been dropped and/or damaged and/or shows obvious signs of breakage
- Disconnect the power supply cord before loosening the thumbscrews and always fasten the thumbscrews with a screwdriver before starting the system up
- It is recommended that the device be installed only in a server room or computer room where access is:
  - Restricted to qualified service personnel or users familiar with restrictions applied to the location, reasons therefor, and any precautions required
  - Only afforded by the use of a tool or lock and key, or other means of security, and controlled by the authority responsible for the location

	**BURN HAZARD** Touching this surface could result in bodily injury. To reduce risk, allow the surface to cool before touching. ***RISQUE DE BRÛLURES*** *Ne touchez pas cette surface, cela pourrait entraîner des blessures.* *Pour éviter tout danger, laissez la surface refroidir avant de la toucher.*

Getting Service

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