xtramus

LB-300
User's Manual

Foreword

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Revision History

Date	Version	History
2010/09/13	1.0	First draft version
2019/12/24	1.1	Apply new user manual template

Table of Contents

1. LB-300 Overview

1.1. General Description of LB-300

LB-300 is a smart companion for **NuDOG-301** for enhancing networking product function tests and network environment measurement test.

With its single 10/100/1000 Mbps RJ45 port, **LB-300** is a good solution for loopback test in network environment. **LB-300** can filter out broadcast, multicast and null DA (Destination Address) packets and re-send the rest of the incoming packets back to the same network cable by two selective methods: resends directly (**Layer 1 Loopback**) or resends with switched DA/SA (Destination/Source MAC Address) and recalculated CRC for different applications (**Layer 2 Loopback**) of the test.

For fixed network provider, Telecom and ISP Company, **LB-300** and **NuDOG-301** are suitable to test the throughput and latency performance of leased line or ADSL. Both **LB-300** and **NuDOG-301** act as packet generator that is located at CO and CPE side for packets transmission and receiving.

The distance and cable quality is the key factor that affects the transmission bandwidth of ADSL and leased line. The bandwidth is not guaranteed even though the bandwidth allowed is configured at central office. By a pair of **LB-300** and **NuDOG-301**, technical personnel can test and realize the maximum downstream and upstream bandwidth available of the transmission media, such as ADSL by telephone line or wireless transmission for public service. The solution can verify if the transmission bandwidth meets the requirement that customer applied, or realize the maximum available bandwidth of the leased line or ADSL network if bandwidth from central office is unlimited.

With this affordable price and excellent functions for network measurement and test on-site, **LB-300** and **NuDOG-301** are one simple yet effective solution for data transmission test in cable wiring phase or troubleshooting phase for both WAN and LAN.

1.2. Key Features, Benefits & Main Applications of LB-300

Key Features of LB-300

- Support Round Trip (loopback) and End-to-End (bi-directional symmetric/asymmetric) test mode when **LB-300** works with **NuDOG-301**
- Working as a loopback client that returns incoming test streams for loopback (round trip) test
- Working as a packet generator for bi-directional symmetric/asymmetric (End-to-End) network test
- **NuDOG-301**'s software utility **DApps-2544** can remote control the test for both NuDOG-301 and remote LB-300
- Test loopback, throughput and latency function when connected
- Handheld device embedded with built-in high capability NI-HM battery which can be charged with LB-300's Mini-USB port
- Distinctive LED indicators that can pinpoint the current running network's status

Benefits of LB-300

- Support **loopback**, **network throughput** and **latency** tests
- Compact and portable size that is easy to carry for on-site test
- Built-in high capability NI-HM battery which can be charged by Mini-USB port
- Simple and convenient way to examine the maximum network bandwidth of asymmetric network such as ADSL
- Variety of test features when works with **NuDOG-301** and Xtramus software utility such as **DApps-2544**
- LEDs located on LB-300's back panel allow users to interpret network situation fast

Main Applications of LB-300

- Network bandwidth assurance and verification for ADSL or leased line
- Bandwidth test and verification for connection between different locations of office or building
- Throughput and Latency test of point to point wireless transmission for public service
- Solution of Last-mile test between CO (Central Office) and CPE (Customer Premises Equipment)

| Model Name	LB-300	
Frame Format	➢ Ethernet II frame	➢ IEEE 802.3 frame
Interface Ports	**Left Side**	**Right Side**
	10/100/1000 Mbps UTP Ethernet Port × 1 **(10/100 Mbps Half/Full Duplex, 1000 Mbps Full Duplex)**	USB Port (Mini-USB Connector) × 1 Power Switch × 1
Throughput Test	➢ Throughput result for frame length, 64/128/256/512/768/1024/1518 bytes, steps by steps, or configuration in specified range by user ➢ Throughput result according to user defined packet loss tolerance in percentage ➢ Throughput result in percentage that is based on 100 Mbps utilization ➢ Throughput result in FPS (frame per second)	
Latency Test	➢ Latency test for frame length, 64/128/256/512/768/1024/1518 bytes, steps by steps, or configuration in specified range by user ➢ Latency test result according to user defined utilization in percentage ➢ Average Latency in us(microsecond) ➢ Test result according to 2 definitions of RFC2544, Store and Forward, and Cut Through.	
Hardware Information		
Dimension	141 mm x 22 mm x 22 mm	
Temperature	➢ Operating: 0°C~ 40°C (32°F~ 104°F)	➢ Storage: 0°C~ 50°C (32°F~ 122°F)
Humidity	➢ Operating: 0% ~ 85% RH	➢ Storage: 0% ~ 85% RH
Power Source	Two built-in 3.7V NI-MH batteries which can be recharged via LB-300's Mini-USB Port while connected with PC	
Supporting Softwares		
Supporting Softwares	➢ For Loopback Mode with NuDOG-301, NuDOG-301 and utility software DApps-2544 are required ➢ LB Utility for updating firmware and FPGA	

1.4. LB-300 Panel Functions Overview

Left Panel of LB-300

Port	Symbol	Description
RJ45 Port	**10 100 1000M**	10/100/1000 Mbps RJ45 Port for connecting to **NuDOG-301**.
LED	**LED Status**	**Description**
Link/Act	**Green ON**	LB-300 is connected with NuDOG-301 via RJ45 cable.
	Green Blinking	LB-300 is transmitting/receiving packets to/from NuDOG-301.
Full	**Amber ON**	LB-300's RJ45 Port is under Full-Duplex mode.
	OFF	LB-300's RJ45 Port is under Half-Duplex mode.

Right Panel of LB-300

Port	Symbol	Description
Mini-USB Port		Connecting LB-300's Mini-USB Port with PC allows you to upgrade firmware, FPGA, or recharge LB-300's battery. You can recharge the battery by connecting LB-300's adapter to LB-300 Mini-USB Port as well.
Switch	**Symbol**	**Description**
Power Switch	**ON/OFF**	Power ON or OFF LB-300.

LED	LED Status	Description
Power	**Green ON**	LB-300 is power ON.
	OFF	LB-300 is power OFF.
Speed	**Green ON**	The connection speed of LB-300's RJ45 Port is 1000 Mbps.
	Green Blinking	The connection speed of LB-300's RJ45 Port is 10/100 Mbps.
🔋⚡	**Green ON**	LB-300 is recharging its battery.
	Green Blinking	LB-300's battery is low and needs recharging.
Asym.	**Amber ON**	LB-300 is running under Asymmetric (End to End) Mode.
Loopback 1/2	**Green ON**	LB-300 is running under Layer 1/2 Loopback. • **Layer 1 Loopback:** LB-300 filters out broadcast, multicast and null DA packets and resend the rest of incoming packets directly. • **Layer 2 Loopback:** LB-300 resend packets with switched DA/SA (destination/source MAC address) and recalculated CRC for different applications.
Pass	**Green ON**	The Pass LED will be ON if the test passes.
Fail	**Red ON**	The Fail LED will be ON if the test fails.
Tx/Rx	**Green Blinking**	LB-300 is transmitting/receiving packets.
🔗	**Amber ON**	LB-300 has established connection with NuDOG-301.
CRC	**Red Blinking**	LB-300 had received packets with CRC error.
Lost	**Red ON**	Packets are lost during transmitting/receiving.
<64	**Red ON**	Packets with packet lengths less than 64 Bytes are detected.

2. Application Mode of LB-300

When working with N**uDOG-301** and **DApps-2544** utility software, LB-300 can work under two modes:
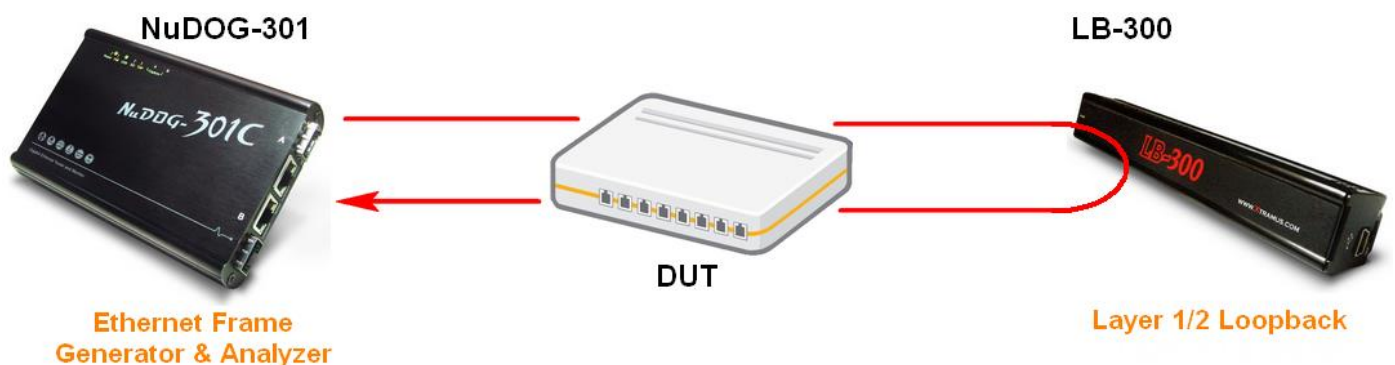
Symmetric/Asymmetric (End to End) Mode

Under this mode, DUT is connected between **NuDOG-301** and **LB-300**. Test packets are sent between NuDOG-301 and LB-300 in a one-way direction, while the DUT serves as the middle point.

While working with NuDOG-301 under the End to End Mode, **LB-300** works as a packet generator for bi-directional symmetric/ asymmetric (end-to-end) network tests which allows:

- Performing symmetric/asymmetric network throughput tests with two packet generator: **NuDOG-301** and **LB-300**
- Performing Round-Trip Latency Test that tests the average latency from packet generator (**NuDOG-301**) to the **LB-300**

Loopback (Round-trip) Mode

Under **Loopback Mode**, DUT is connected between **NuDOG-301** and **LB-300**. Test packets are sent between **NuDOG-301** and **LB-300** in a loop-back manner, while the DUT serves as the middle point.

LB-300 works as a loopback client that returns incoming test streams for loopback (round-trip) test, and supports **2** loopback modes:

- **Layer 1 Loopback:** LB-300 will filter out broadcast, multicast and null DA packets and resend the rest of incoming packets directly
- **Layer 2 Loopback:** LB-300 will resend packets with switched DA/SA (destination/source MAC address) and recalculated CRC for different applications
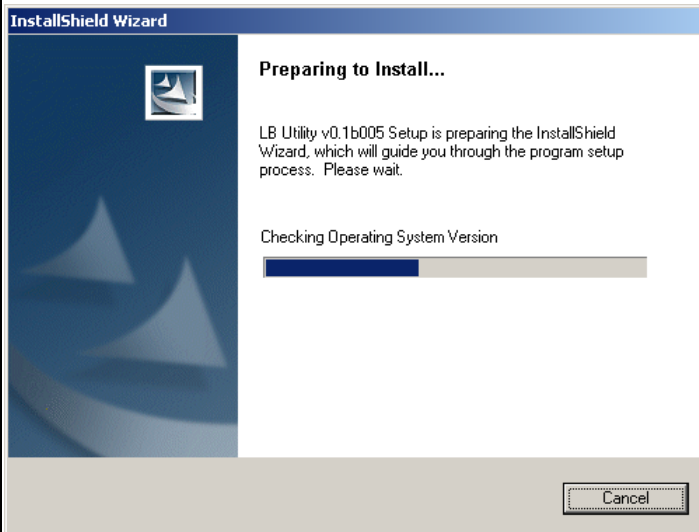
3. Install/Uninstall LB Utility

LB Utility allows the user to view LB-300 system information and update firmware/FPGA when LB-300 is connected to PC via mini-USB cable. Before using **LB Utility**, you have to install it first. Please follow the steps down below to install **LB Utility**.
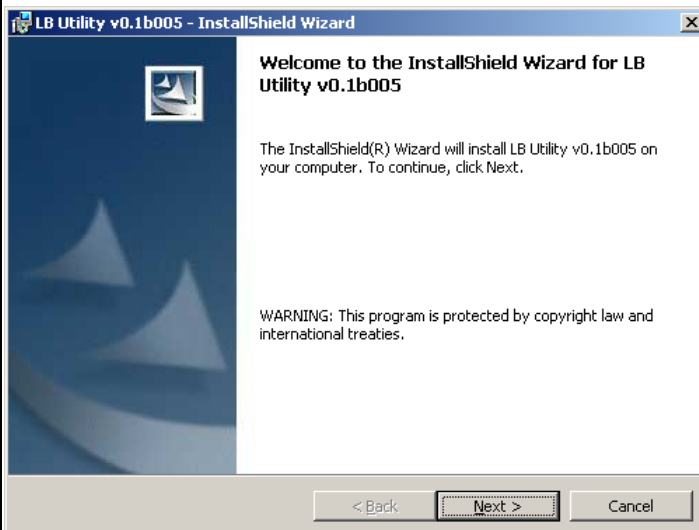
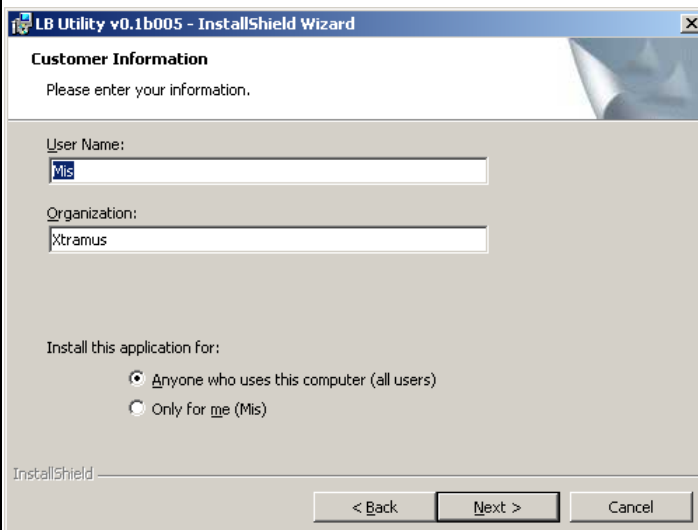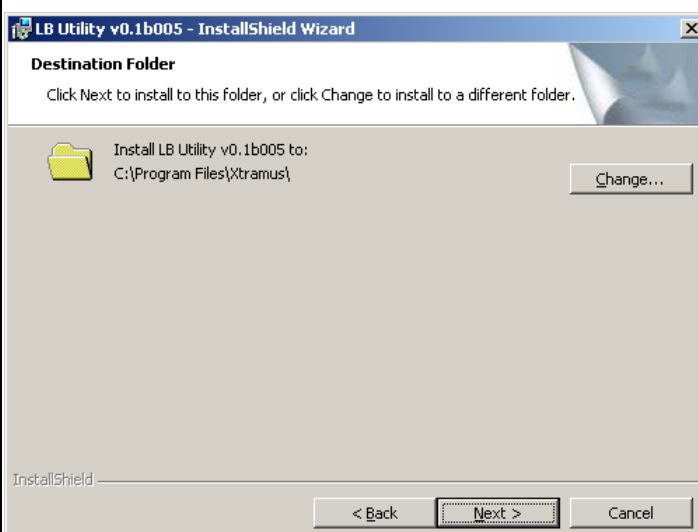| Installing LB Utility	
	1. Double-click LB Utility installation program and start the installation process.
	2. InstallShield Wizard is starting to install LB Utility. If you would like to cancel installation, click "**Cancel**".
	3. Click "**Next**" to continue installation.

LB Utility v0.1b005 - InstallShield Wizard

License Agreement
Please read the following license agreement carefully.

End User License Agreement

IMPORTANT NOTICE
This is a license agreement between you (either an individual or a single entity) and Xtramus Technologies ("Xtramus").

Before installing or using this software, please read the following license terms carefully. By installing or using this software, you are deemed to accept this license agreement. Do not install or use this software if you do not accept or agree with these license terms.

◉ I accept the terms in the license agreement
○ I do not accept the terms in the license agreement

InstallShield
< Back   Next >   Cancel

4. Click "**I accept the terms in the license agreement**", and click "**Next**" to continue.

LB Utility v0.1b005 - InstallShield Wizard

Customer Information
Please enter your information.

User Name:
Mis

Organization:
Xtramus

Install this application for:
◉ Anyone who uses this computer (all users)
○ Only for me (Mis)

InstallShield
< Back   Next >   Cancel

5. You can input **Username** and **Organization** in the related fields. Click "**Next**" to continue.

LB Utility v0.1b005 - InstallShield Wizard

Destination Folder
Click Next to install to this folder, or click Change to install to a different folder.

Install LB Utility v0.1b005 to:
C:\Program Files\Xtramus\   Change...
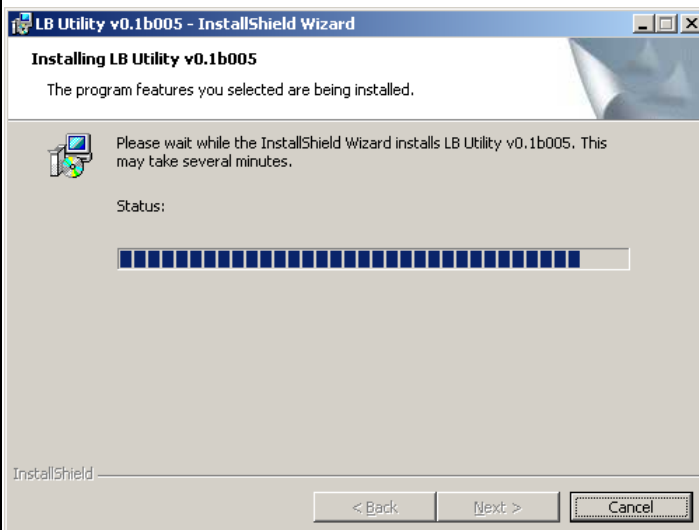
InstallShield
< Back   Next >   Cancel

6. Click the **Change…** button to install the program to another folder, or click **Next** button to install the program into the default destination folder, and then continue next step. Click **Back** button to go back to the previous step to modify.
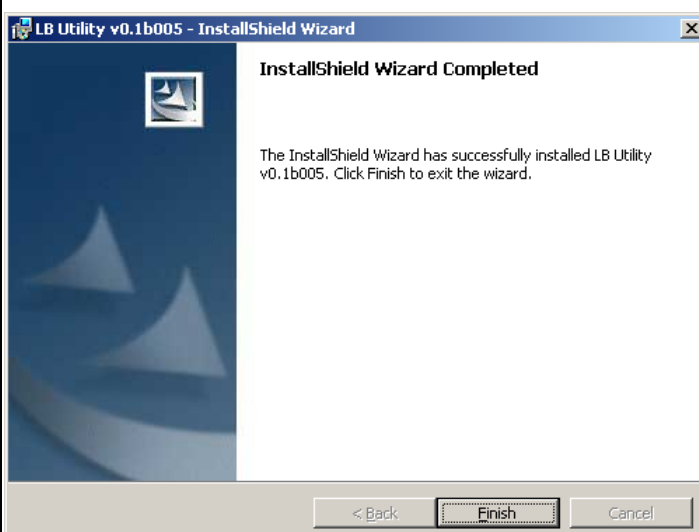
7. LB Utility InstallShield Wizard will start installing momentarily. Click "**Install**" button to continue.

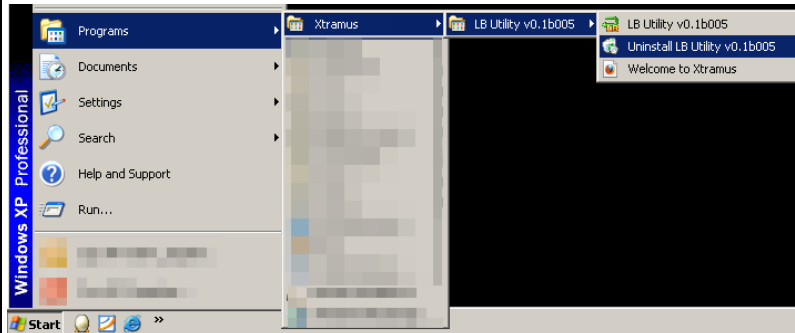8. InstallShield Wizard is installing LB Utility.

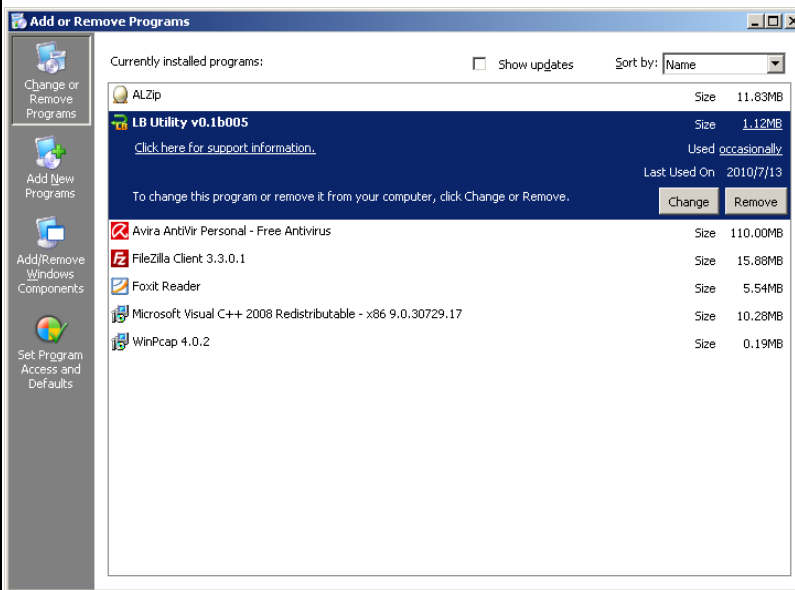9. LB Utility installation completes. Click **Finish** button to exit.

There are two ways to uninstall LB Utility:

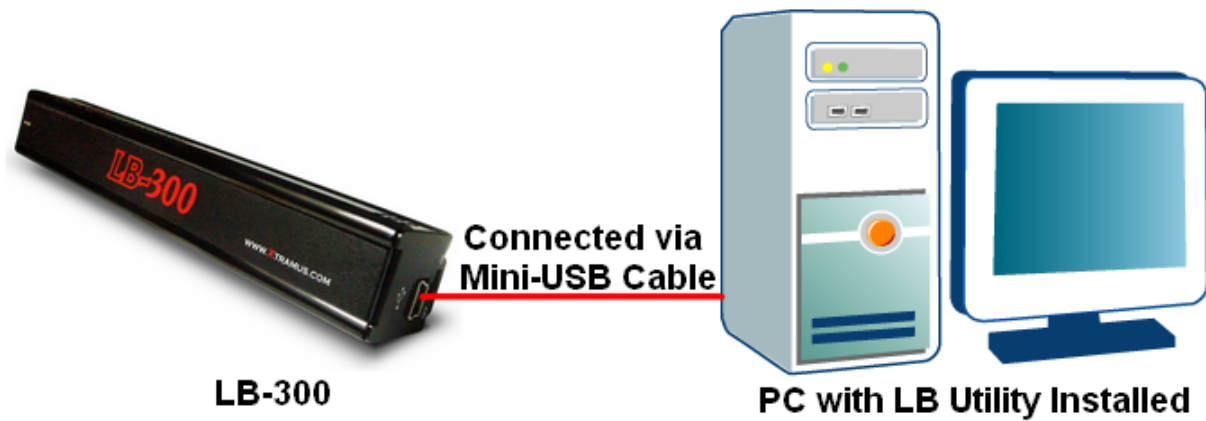| LB Utility Un-installation	
	• Click **Start** → **Programs** → **Xtramus** → **LB Utility** → **Uninstall LB Utility**.
	• Go to the **Control Panel**, choose **LB Utility** from installed program list, and click "**Remove**" to uninstall.

4. LB Utility Functions

4.1. Starting LB Utility

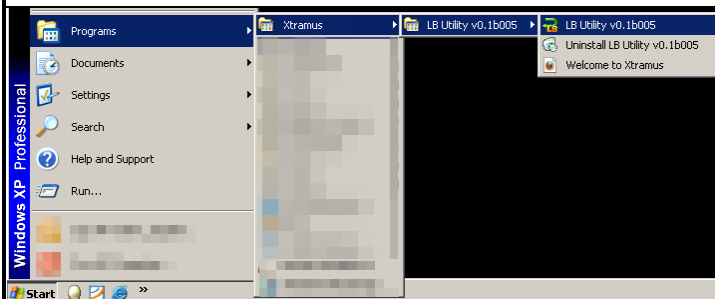Before starting LB Utility, please be sure that LB-300 is connected to your PC via a Mini-USB cable as shown in the figure down below:
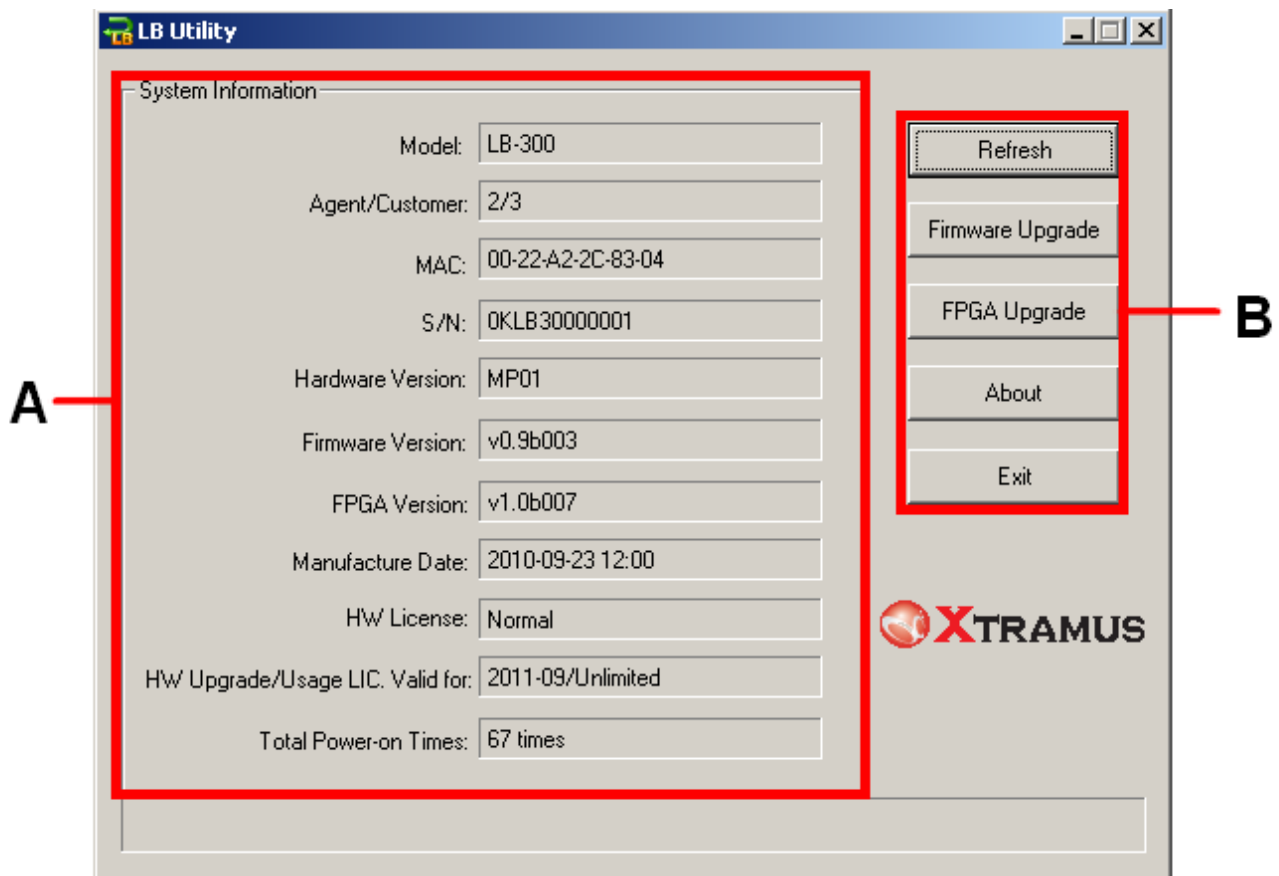

You can start LB Utility by:

Starting LB Utility	
	• Double-click LB Utility icon located on your PC's desktop
	• Click **Start → Programs → Xtramus → LB Utility → LB Utility**.

4.2. LB Utility Functions

LB Utility Functions Overview		
A	**System Information**	The **System Information** field displays system information such as model name, MAC address, serial number, hardware/firmware/FPGA version, and other information regarding to your LB-300.
B	**LB Utility Buttons**	**LB Utility Buttons** allows you to refresh the information displayed on **System Information** field and upgrade LB-300's firmware/FPGA.

4.2.1. System Information

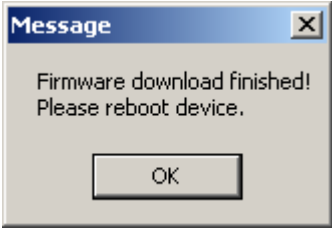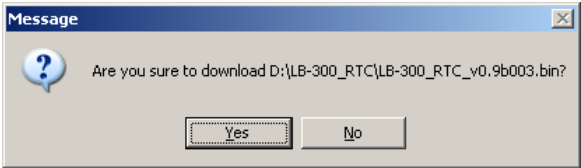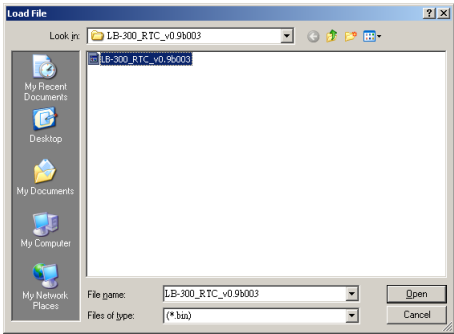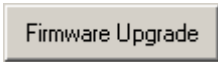| Descriptions – System Information	
Model	This field displays the **model name** of the device connected to your PC.
Agent/Customer	This field displays the code that represents the agent/customer.
MAC	The MAC address of the device connected to your PC.
S/N	The **serial number** (the ID number for the device) of the device connected to your PC.
Hardware Version	The **current hardware version** of the device connected to your PC.
Firmware Version	The **current firmware version** of the device connected to your PC.
FPGA Version	The **current FPGA (Field-Programmable Gate Array) version** of the device connected to your PC.
Manufacture Date	The date and time when the device connected to your PC is manufactured.
HW License	The hardware license status of the device connected to your PC. • **Normal:** The hardware is licensed and can be used for unlimited number of times. Also, you can update firmware/FPGA within the time period of the hardware license. • **Demo:** The hardware license is for demo purposes and will be invalid after the set number of demo times or date.
HW Upgrade/Usage LIC. Valid for	This field displays the valid date for upgrading firmware/FPGA (You can't upgrade firmware/FPGA that's newer than the date listed here) and the number of times available for using the device connected to your PC.
Total Power-on Times	The number of times when the device connected to your PC is power-on.

* You can refresh the information displayed on System Information by clicking the "Refresh" button located on the right side of LB Utility.

4.2.2. LB Utility Buttons

Descriptions – System Information	
Refresh	Click this button to refresh the information displayed on **System Information**.
Firmware Upgrade	Click this button to upgrade LB-300's firmware. Please follow the instructions down below to upgrade LB-300's firmware. *** Note: LB-300 must be connected to your PC via Mini-USB cable at all time during the upgrading.** 1. Click the **Firmware Upgrade** button. 2. A **Load File** window will pop up. Please select LB-300 firmware file path, and click **Open**. LB-300 firmware contains two files in the format of " *** .bin**" and " *** .hex**". Please select the file with the format of " *** .bin**". 3. A message window will pop up. Click **YES** to start upgrading firmware, or click **NO** to cancel. 4. Upgrade completed! LB-300 will reboot after upgrading firmware.

FPGA Upgrade	Click this button to upgrade LB-300's FPGA. Please follow the instructions down below to upgrade LB-300's FPGA. *** Note: LB-300 must be connected to your PC via Mini-USB cable at all time during the upgrading.**

FPGA Upgrade

1. Click the **FPGA Upgrade** button.

2. A **Load File** window will pop up. Please select LB-300 FPGA file path, and click **Open**. LB-300 FPGA is in the format of " *** .bin**".

3. A message window will pop up. Click **YES** to start upgrading FPGA, or click **NO** to cancel.

4. Upgrade completed! LB-300 will reboot after upgrading FPGA.

About	An **About LB Utility** window will pop up after clicking the **About** button. You can view LB Utility's version on this window. Click **OK** to close the **About LB Utility** window.
Exit	A message window will pop up after clicking the **Exit** button. Click **YES** to exit LB Utility, or click **NO** to cancel.

5. Notices Regarding to LB-300

5.1. LB-300 Battery

LB-300 is embedded with two built-in NI-MH batteries, making it portable and easy to carry for on-site test. However, there are few things that should be noted:

- LB-300's batteries can only be charged either by connecting LB-300 with PC via Mini-USB cable, or by the external power adapter that comes with LB-300's package.
- When LB-300's running time is drastically shortened and its batteries need to be replaced, it is recommended that you should have authorized Xtramus technicians to change LB-300's batteries for you. Replacing LB-300's batteries on your own is dangerous, and will damage its warranty label on LB-300's outer case, thus making its warranty void.

It is recommended to fully-charge LB-300 before using it for the first time. Also, it is crucial to know the running time of LB-300 under different test environments. Please refer to the table down below for LB-300's battery information:

Link Mode	Utilization	Operation Time under Fresh Battery
1000 Mbps Gigabit Ethernet	100%	100 minutes
	10%	110 minutes
100 Mbps Fast Ethernet	100%	200 minutes
	10%	220 minutes
10 Mbps Fast Ethernet	100%	180 minutes
	10%	205 minutes
Battery Charging Time	Charging Device	Charging Time
	External Power Adapter	420 minutes if battery is totally exhausted

5.2. Other Notices Regarding to LB-300

For safety issues, please notice the following notices listed down below when using LB-300:

- Using LB-300 for a long period of time will cause its aluminum case extremely hot, and might cause hardware malfunctions and burning sensations for the users.
- It is recommended not to use LB-300 for more than 4 hours under room temperature, especially when it is operating in Wirespeed transmitting/receiving.