

LX6464ESe LX1616ESe

EtherSound PCI Express Sound Cards



User guide v1.00

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1 Information for the user

This device complies with part 15 of FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a CLASS B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions contained in this data sheet, may cause harmful interference to radio and television communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- * reorient or relocate the receiving antenna
- * increase the separation between the equipment and the receiver
- * connect the equipment into an outlet on a circuit different from that of the receiver
- * consult the dealer or an experienced audio television technician.

Note: *Connecting this device to peripheral devices that do not comply with CLASS B requirements or using an unshielded peripheral data cable could also result in harmful interference to radio or television reception.*

To ensure that the use of this product does not contribute to interference, it is necessary to use shielded I/O cables.

The user is cautioned that any changes or modifications not expressly approved by Digigram could void the user's authority to operate this equipment.

Warning:



Electrostatic discharge (ESD) can damage components on the board. To avoid such damage in handling the board, take the following precautions: Bring the device and everything that it contacts to ground potential by providing a conductive surface and discharge paths. As a minimum, observe these precautions:



several such damage in handling precautions: contacts it to ground surface and discharge

- *Disconnect all power and signal sources.*
- *Place the device on a grounded conductive work surface.*
- *Ground yourself via a grounding wrist strap or by holding a grounded object.*
- *Ground any tool that will contact the device.*

IMPORTANT NOTICE

This card has been tested and found to comply with the following standards:

- International: CISPR22 Class B.
- Europe: EMC 89/336/CEE (1992) specifications.
- United States: FCC Rules-Part 15-Class B (digital device).

2 Features

LX1616ESe and LX6464ESe are audio cards for PCI EXPRESS™ x1 (PCIe®) bus, and can be inserted in PCIe® (x1, x4, x8 ou x16) slots.

2.1 LX1616ESe main hardware features

- 16 EtherSound ES-100 mono inputs at 44.1 kHz or 48 kHz
- 16 EtherSound ES-100 mono outputs at 44.1 kHz or 48 kHz
- 1 standard Word Clock input with selectable input impedance (jumper)

On the LX1616ESe, EtherSound I/Os can be added by up to three bundles of 16/16 channels through a software key. For this option, please contact your system supplier.

2.2 LX6464ESe main hardware features

- 64 EtherSound ES-100 mono inputs at 44.1 kHz or 48 kHz
- 64 EtherSound ES-100 mono outputs at 44.1 kHz or 48 kHz
- 1 standard Word Clock input with selectable input impedance

2.3 Main software features

- Real-time, simultaneous record and playback in PCM (16 and 24 bits)
- Low latency WDM DirectSound and ASIO drivers.
- Card can be used through the following programming interfaces (APIs): WDM DirectSound, WASAPI, ASIO.

2.4 EtherSound features

- EtherSound ES-100 compatible
- The card can generate the network audio clock, or it can synchronize on the network audio clock
- Network clock and audio clock frequencies supported:
 - 48 kHz if the card generates the audio clock source for the network
 - 44.1 kHz or 48 kHz if the card synchronizes on the EtherSound network or on an external Word Clock

3 Requirements

3.1 Minimum requirements

PC with one free PCI Express slot (x1, x2, x4, x8, x16).

CPU power and memory required depend on the operating system and on the audio application used.

3.2 Software requirements

LX1616ESe and LX6464ESe require installation of the drivers included in the LXES Kit version 1.12 or higher. This kit includes:

- a WDM DirectSound driver
- an ASIO driver

3.3 Supported operating systems

LX1616ESe and LX6464ESe cards run under Windows XP, Windows 7, Windows 8, Windows 2008 Server, Windows 10, 32-bit and 64-bit versions.

4 Hardware installation

The card has to be installed in the computer prior to installing its driver.

Installing the card

Gently plug the card in a free PCI Express slot and press it down to position it firmly. Tighten the screw to attach the card to the PC chassis so that it does not move.

Interrupt and memory address

Hardware interrupt and addresses are automatically set up at start-up by the PC Bios.

5 Software installation

The installation of the driver package requires administrator rights on your computer.

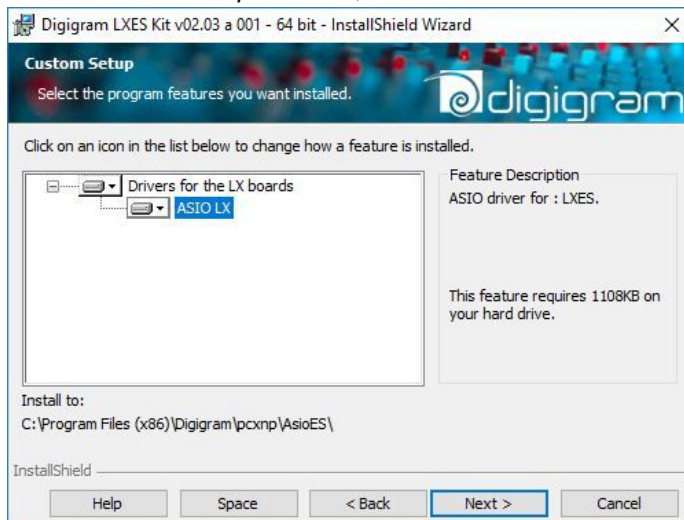
Please visit the Digigram web site at www.digigram.com for the most recent driver.

In case you run a specific application developed or installed by a Digigram Partner, this application might require the use of a given driver version. In this case, make sure that the updated driver has been approved by your supplier.

5.1 Installation under Windows

- Shutdown your computer and insert your card.
- Restart your computer.
- Click on Cancel if the “Found New Hardware” Wizard appears.
- Double-click on the **LXES Kit vxx.msi** icon to launch the driver installation.
- A welcome message is displayed, click **Next** to continue.
- The “License Agreement” window appears: read it, and click on **“I accept the terms in the license agreement”** to approve it.

- In the “*Custom Setup*” window, the “Drivers for the LX6464ESe board” are displayed.



In case you do not need the ASIO driver to be installed, click on the arrow on the left of “ASIO LX”, and select “This feature will not be available”.

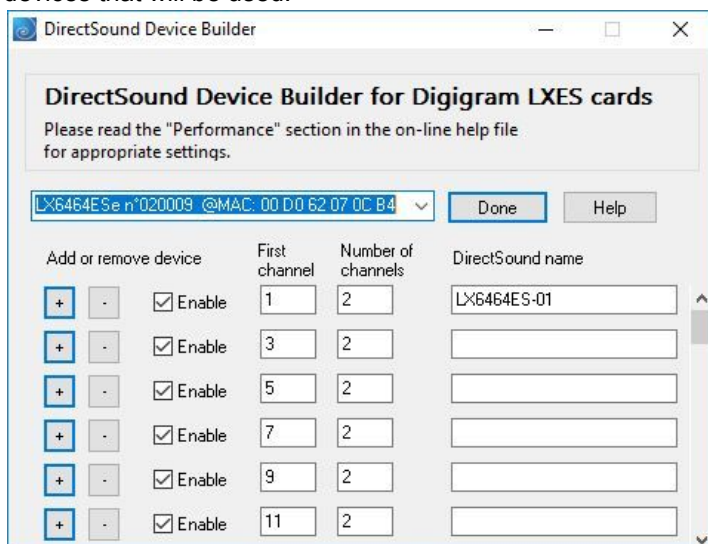
By default, the WDM DirectSound driver and the ASIO driver are installed.

Click **Next**.

- In the “*Ready to Install the Program Window*”, click on **Install** to start copying the files.
- In case the “*Digital Signature Not Found*” message appears, click on **Continue** in the “*Hardware installation*” window.
- Click on **Continue** in the “Hardware installation” window.
- Once the files have been copied to your disk and the driver has been started, the firmware version of your card will be checked against the version included in the driver package.

WARNING: if the firmware of your card requires an update, it will start automatically at this stage. The update is recommended, it ensures optimal performances and robustness of the system. The update **MUST IN NO CASE BE INTERRUPTED.** If you do so, the card will have to be returned to our After Sales Service.

- The “DirectSound Device Builder application” is then displayed to define the DirectSound devices that will be used.

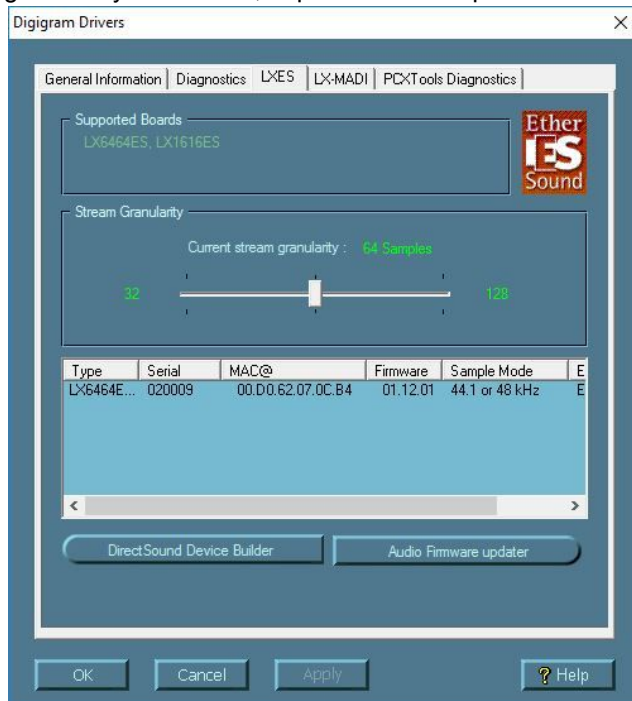


By default, only one DirectSound stereo device is declared (first two channels of the card). You can declare additional devices by using the “+” button (if they are not already listed). For each new device, enter the first channel used by this device (it cannot be used by another one), the number of channels of the device, and the name of the device under Windows Server 2003 and

XP. For more recent Windows flavours, the name of the device can only be changed from the Windows 'Sound' Control Panel . A DirectSound device can be multichannel (the application must be able to manage this type of device). For more details, please refer to the online help of this application.

Note: The **“DirectSound Device Builder”** application can be launched at any time once the driver of the LX6464ESe is installed (from **<Start>**, **<Programs>**, **<Digigram>**, **<Digigram Control Center>**). It is necessary to reboot the computer to apply the changes.

- From the “Digigram drivers” window that is displayed, in the LX-ES tab, select the processing granularity of the card, expressed in samples.



A granularity of 64 samples is the default value (recommended). Under DirectSound, selecting a lower value (32) will decrease the latency, but may limit the number of devices that can be used simultaneously without dropouts.

When using the ASIO interface, the granularity may be set to 32 samples (the ASIO driver uses a single 64-channel device, which is much more efficient than using multiple separate devices). For more details, please see the Control Panel online help or the **“Performance”** section of the DirectSound Device Builder, or the ASIO control panel online help.

Click on **Ok**.

- Click on the **Finish** button to complete the driver installation.

5.2 Removing the driver under Windows

- Open the **Windows Control Panel** and double-click on the **Programs and Features** icon.
- Select **“Digigram LXES Kit ...”**, and **Change/Remove**.
- Select **Uninstall**.
- Follow the instructions to finish removing the driver.

6 How to check the installation

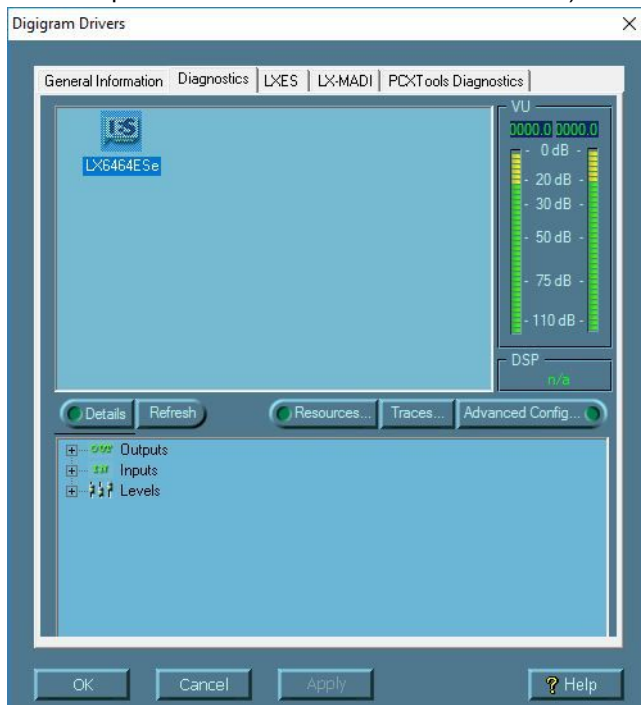
Once the driver and the card are installed according to the procedure described in this manual, you can verify that the card works correctly as follows.

- Open the Digigram Control Center panel from the Start menu, Digigram group.



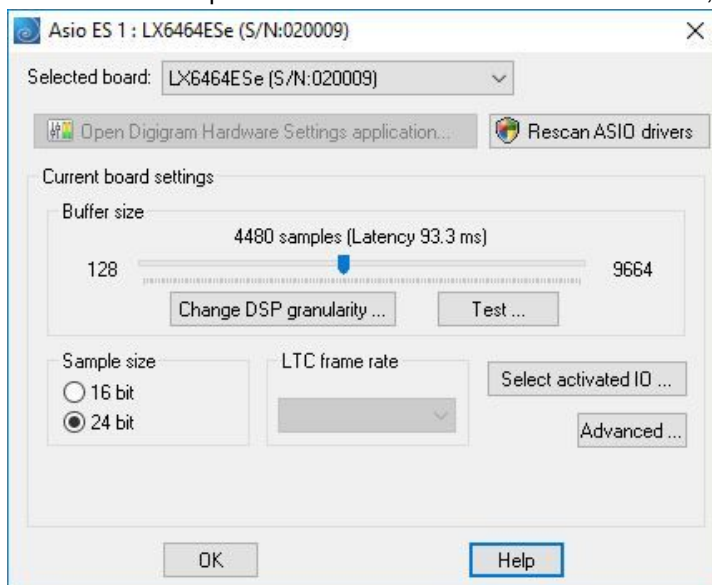
The LX card should be listed.

- To check that the card works fine, it is possible to play a sine signal on all the outputs of the card (64 mono outputs routed to the EtherSound channels). Select the “Diagnostics” tab.



Right click on the icon of the card, and select “Play sine”. The vu-meter reflects the audio activity. To stop the playback, right click on the icon of the card, and select “Stop”.

- To check that the DirectSound devices are well installed, go to **<Control Panel>**, **<Hardware and Sound>**, **<Sound>** (Tab Playback, Recording): the declared DirectSound devices are displayed. The first stereo device of the LX card is named LX6464ES-01. Under Windows XP, other devices have the names defined from the DirectSound Device Builder application. For more recent Windows versions, the other declared playback devices are listed as “Line output”, and the recording devices are listed as “Line inputs”. You may change their names by right clicking on the device name, and selecting “Properties”, “General” tab.
- For testing a DirectSound playback device, right click on it, and select **“Test”**. The vu-meter should indicate the audio level that is played out.
- If the ASIO option has been selected during installation, the card is visible through any ASIO compliant application, and through the ASIO control panel. The ASIO control panel can be launched from the Start menu, Digigram group, ASIO ES settings.



If the card is not displayed in the Digigram Control Center panel:

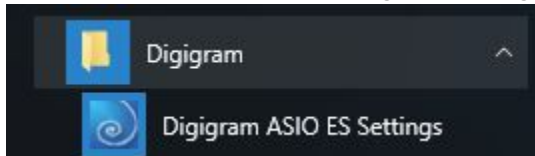
- Make sure that the card is correctly inserted in the PCI Express slot, and screwed on the PC chassis.
- Make sure that the golden tracks of the PCI Express connector of the LX card are clean. You may use a rag to clean the connector if it is a bit dirty.
- If necessary, uninstall the driver as described in this manual, and re-install it.

7 DirectSound mixer panel

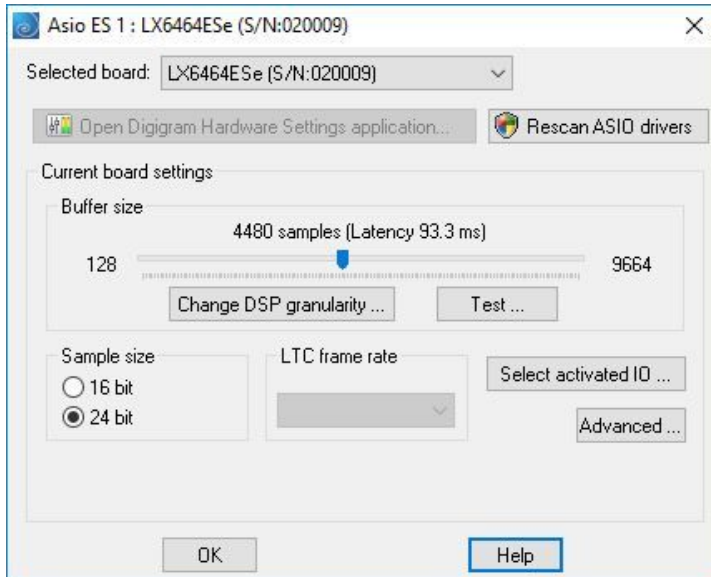
The card does not dispose of digital gain. Under the Windows 'Volume' control panel only a 'Mute' is available.

8 Asio control panel

To use the card through an ASIO based application, make sure the ASIO driver option has been checked during the installation, as described above. The ASIO driver parameters can be configured from the "ASIO ES Settings" panel, available from <Start>, <Programs>, <Digigram>, <Digigram ASIO ES Settings>.



It can also be launched directly from the ASIO software applications, as most of them feature a "Preferences" or equivalent menu allowing to configure the ASIO devices to be used.



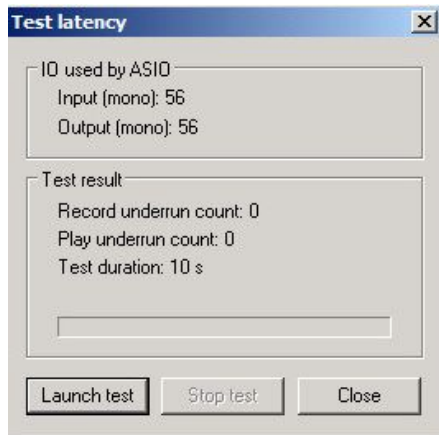
Buffer size

The buffer size determines the size in samples per buffer used by the Asio driver to transfer audio data from/to the board's Input/Output. The lower the buffer size, the lower the latency.

The range of the buffer size settings depends on the stream granularity defined in the Digigram Control Center. You can access this parameter by clicking on the "**Change DSP granularity**" button.

Note that, audio dropouts may be experienced when using very small buffer size.

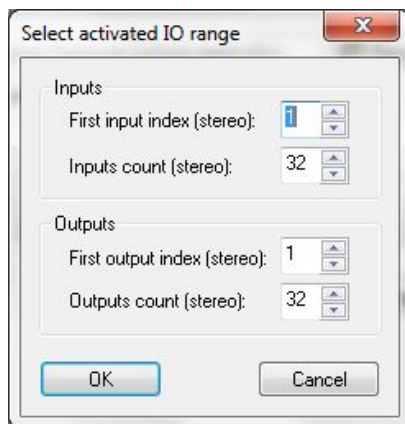
It is possible to check if audio dropouts are experienced. First of all start the ASIO based application. Allocate the ASIO channels in this application. Open this ASIO control panel, and click on the "**Test**" button.



Click on **“Launch test”** to start the test. Errors are listed in the window. Stop the test by clicking on **“Stop test”**. In case errors are reported, buffer size has to be increased.

Select Activated IO

Clicking on this button allows selecting the channels that are managed by the ASIO driver. By default, all the channels are enabled.



9 Clock and routing

The clock management as well as the assignment of devices to EtherSound channels (“I/O mapping”) are done through Digigram EScontrol application, or a through a third party EtherSound management application.

10 Specifications

Configuration

	LX1616ESe	LX6464ESe
Bus/Format	PCI EXPRESS™ (PCIe®) x1 (x2, x4, x8, x16, x32 compatible)	
Size	111.15mm* x 169 mm x 20 mm (* including the PCIe connector)	
Power requirements (+3.3 V / +12 V)	0.4 A / 0.12 A	
Operating: temp / humidity (non-condensing)	0°C / +50°C • 5% / 90%	
Storage: temp / humidity (non-condensing)	-5°C / +70°C • 0% / 95%	

Inputs/Outputs

	LX1616ESe	LX6464ESe
Inputs	- 16 EtherSound channels at 44.1 or 48 kHz	- 64 EtherSound channels at 44.1 or 48 kHz
Outputs	- 16 EtherSound channels at 44.1 or 48 kHz	- 64 EtherSound channels at 44.1 or 48 kHz
Other inputs	Word clock, 44.1 or 48 kHz, with selectable input impedance (High Z / 75 ohms) <i>(can be used if card delivers the master clock for the EtherSound network).</i>	

Connectors

	LX1616ESe	LX6464ESe
EtherSound IN	RJ45 female	
EtherSound OUT	RJ45 female	
Word Clock IN	BNC female	
Word Clock input impedance	Jumper: High Z / 75 ohms	

EtherSound

	LX1616ESe	LX6464ESe
Technology	ES-100	
Functions	Compatible with Ring Redundancy mode Can generate the audio network clock in all modes	
Network clock frequencies supported	Can generate a 48 KHz audio clock for the EtherSound network Can synchronize on an EtherSound network at either 44.1 or 48 kHz	
Other inputs	Word clock LX card can generate a 44.1 or 48 kHz audio clock synchronized on the Word Clock In	
EtherSound virtual control port	Virtual Ethernet interface, enabling a software application such as EScontrol, installed on the same PC as the LX card, to control and monitor the EtherSound network through the LX card.	

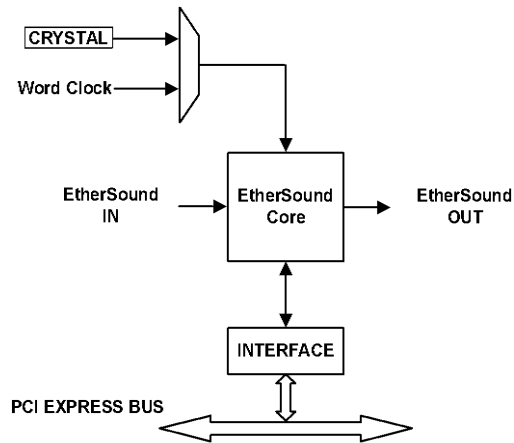
Audio specifications

	LX1616ESe	LX6464ESe
Audio sampling frequencies supported	48 kHz, 44.1 kHz	
Supported audio formats	PCM 16, 24, 24 bits "packed" (packets of 32 bits)	

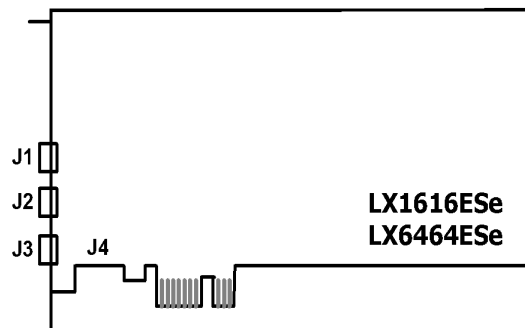
Development environments

	LX1616ESe	LX6464ESe
Management	DirectSound, WASAPI, ASIO	
Supported operating systems	Windows XP, Windows 7 / Windows 8 / Windows 2008 Server Windows 10 (32-bit and 64-bit versions)	

11 Schematic diagram



12 Connectors




J1: RJ-45 connector - EtherSound IN

J2: RJ-45 connector - EtherSound OUT

J3: BNC connector - Word Clock IN

J4: Jumper – WordClock input impedance selection

- High impedance: 
- 75 ohms: 