

PCX-IP LW881e

PCX-IP LW1221e

Professional Multichannel Sound Cards with Livewire connectivity



User's manual

**For technical support,
please contact your system supplier.**



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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. The user is cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. To ensure that the use of this product does not contribute to interference, it is necessary to use shielded I/O cables.*

Warning:

Electrostatic discharge (ESD) can damage several components on the board. To avoid such damage in handling the board, take the following precautions:

Bring the device and everything that contacts it to ground potential by providing a conductive surface and discharge paths. As a minimum, observe these precautions:

- *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.*

Due to the reduced length of the PCI EXPRESS™ bus connector and the resulting lack of mechanical stability, we strongly advise against transporting the PCIe® card(s) installed in a computer, unless its chassis or case provides a dedicated support to keep the card securely in place in order to avoid physical damage.

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)

In order to guarantee compliance with the above standards in an installation, the following must be done:

- the provided cable must not be modified
- additional cables used must have their respective shield connected to each extremity

FEATURES

PCX-IP LW881e and PCX-IP LW1221e are sound cards for use with Axia Livewire™ systems, with PCI EXPRESS™ (PCIe®) bus interface. They are in PCI EXPRESS™ x1 format and can thus be plugged into any PCIe® slot (x1, x4, x8, x16).

PCX-IP LW881 main hardware features

- 1 RJ-45 Ethernet port allowing for extraction of up to 8 mono channels from the Livewire network, and insertion of up to 8 mono channels in the Livewire network
- 1 Sub-D 9 pin connector for 5 physical GPI / 5 physical GPO transmitted through the Livewire network.
- 48 kHz sampling frequency
- Several cards can be plugged in one PC

PCX-IP LW1221 main hardware features

- 1 RJ-45 Ethernet port allowing for extraction of up to 2 mono channels from the Livewire network, and insertion of up to 12 mono channels in the Livewire network
- 1 Sub-D 9 pin connector for 5 physical GPI / 5 physical GPO transmitted through the Livewire network.
- 48 kHz sampling frequency
- Several cards can be plugged in one PC

Main software features

- Real-time, simultaneous record and playback in PCM (8, 16 and 24 bits) as well as in MPEG Audio Layer I, Layer II and Layer III*, Float IEEE754 conversion supported (with 24-bit fixed-point dynamic range)
- When using the Digigram np SDK, real-time mixing of several PCM and MPEG audio streams per output channel, direct monitoring, level adjustment, panning, cross-fades, punch-in/punch-out, scrubbing, time-stretching, pitch-shifting, 3-band parametric equalizer, Maximizer, format and frequency conversions.
- Low latency WDM DirectSound, Wave, and ASIO drivers. Under DirectSound and ASIO, the cards operate in PCM mode only (nevertheless, an application can integrate coders/decoders on the host PC). Under Wave, HR boards can operate in both PCM and MPEG (layer 1 and layer 2).

* MPEG Layer III play-only on DSP

MPEG Layer III recording on the host computer is available through Digigram's PC Codec using the np SDK

REQUIREMENTS

Supported operating systems

PCXLivewire cards run under the following operating systems:

- 32-bit OS: Windows XP, Windows Server 2003, Windows Vista, Windows Server 2008, Windows 7, Windows 8
- 64-bit OS: Windows Server 2008, Windows 7, Windows 8.

Minimum hardware requirements

One PCI EXPRESS™ (PCIe®) slot per card (x1, x4, x8, x16).

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

Software requirements

To use your card under Windows, please install the driver from the HR Runtime package version 1.74 or higher. This package includes:

- a Digigram np driver enabling OEM applications to best capitalize on the on-board features (MPEG, mixing, time-scaling, cross-fades,...).
- a WDM DirectSound driver (32 bits or 64 bits according to the OS)
- a Wave driver (32 bits, installation optional)
- an ASIO driver (32 bits and 64 bits, installation optional)

HARDWARE INSTALLATION

Due to the reduced length of the PCI EXPRESS™ bus connector and the resulting lack of mechanical stability, we strongly advise against transporting the PCIe® card(s) installed in a computer, unless its chassis or case provides a dedicated support to keep the card securely in place in order to avoid physical damage.

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 slot and press it down to position it firmly. Tighten the screw.

Interrupt and memory address

Hardware interrupt and addresses are automatically set up at start-up by the PCI PnP BIOS.

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 specific driver version. In this case, make sure that the updated driver has been approved by your supplier.

The following procedure installs the 'Digigram Hardware Settings' control panel. This application allows the configuration of the hardware resources of Digigram cards for all audio applications. The DHS allows for instance to adjust input and output digital gains and direct monitoring of inputs on outputs.

With the inputs and outputs controlled by the DHS application, the controls available through the DirectSound control panel get invalid :

- Volume control for input
- Volume control for output

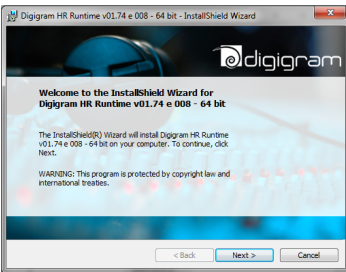
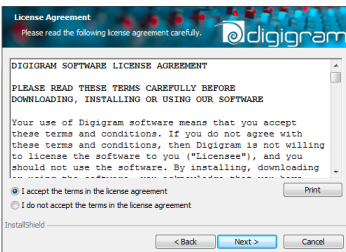
Under Windows XP and Server 2003 you may also install the driver without installing the DHS control panel, and in this case more controls are available through the DirectSound control panel:

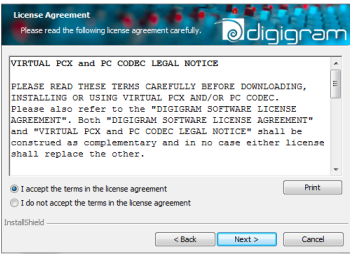
- Volume control for input
- Wave control
- Monitoring control
- Digital input level
- Digital output level

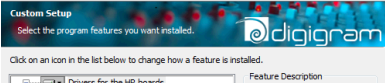
To do so, install the driver with the command line: "setup x_topology" (not available under Windows Vista). For detailed information, please refer to the dedicated document on our web site.

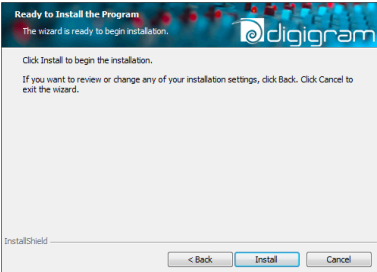
Standard installation

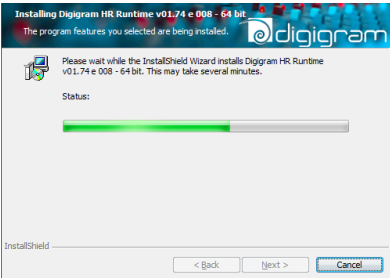
- Shut down your computer and insert your PCX card.
- Restart your computer.
- Click on Cancel if the "Found New Hardware Wizard" appears.
- Double-click on the HR Runtime driver package icon to launch the driver installation.

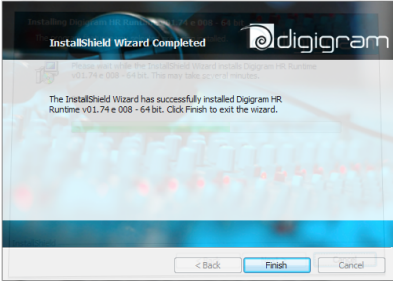
	<p>A welcome message is displayed, click Next to continue.</p>
	<p>The "License Agreement" window appears: read it, and click on "I accept the terms in the license agreement" to approve it.</p>

	<p>Do the same in the next License agreement window for Virtual PCX and PC Code Legal Notice.</p>
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	<p>In the “Custom Setup” window, the “<i>Drivers for the HR boards</i>” that can be installed are listed.</p> <p>The WDM DirectSound driver and the Digigram np driver are automatically installed. Items that can be optionally installed are:</p> <ul style="list-style-type: none"> • Digigram Hardware Settings panel (DHS): installed by default. The DHS control panel allows for adjusting digital level for input/output channels, and monitoring parameters. These settings cannot be controlled through DirectSound controls. If the DHS is not installed, these settings are accessible for the DirectSound controls. This item is not selectable under Windows XP (see X-Topology installation) • Asio driver: installed by default • Wave MME driver: not installed by default • VX devices visible by default (to be selected in case the np based application is not designed to detect the VX card- the use of this option is specified by your software application provider). <p>Click on Next once you have made your selection of items to be installed.</p>
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	<p>In the Window “Ready to Install the Program”, click on Install to start copying the files.</p>
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	<p>In case the User Account Control window prompts you to authorize the driver installation, click on OK. Driver files are then installed on the computer. In case the “Digital Signature Not Found” message appears because non-Microsoft software is about to be installed, click on Continue.</p>
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	<p>Click Finish to complete the driver installation.</p>
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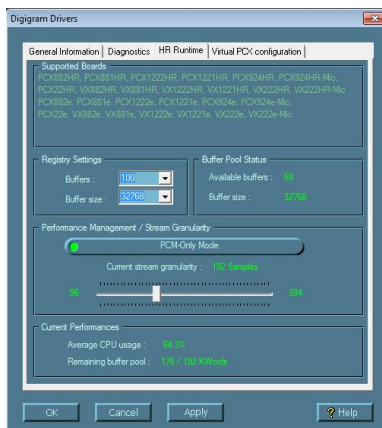
X-Topology installation

Under Windows XP and Windows Server 2003, it is possible to install the drivers without the DHS, so that controls like digital levels and monitoring are accessible from the DirectSound controls. The driver package must then be installed as follows: MsiExec.exe /I abcd.msi X_TOPOLOGY=1, where "abcd.msi" is to be replaced by the name of the driver package.

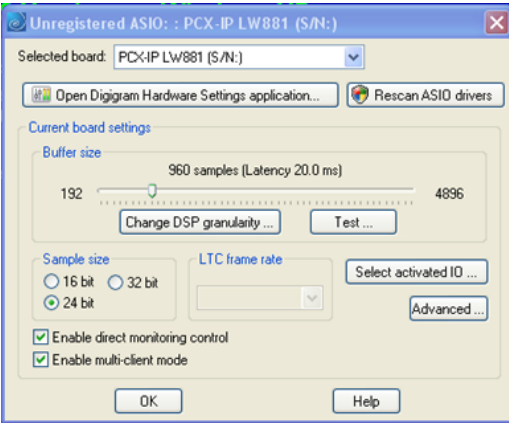
ASIO driver configuration

Note: Under 64-bit operating systems, and for most current ASIO applications (e.g. Cubase, Nuendo, etc...) you have the choice between a 32-bit version and a 64-bit version when installing them. The 64-bit package of HR Runtime installs both a 32-bit ASIO driver and a 64-bit ASIO driver.

To use the ASIO driver on your PCX sound card, the option "PCM only" has to be enabled from the Digigram control panel (CPL). To access this control panel, go to <Start>, <Programs>, <Digigram>, <Digigram Control Center>.

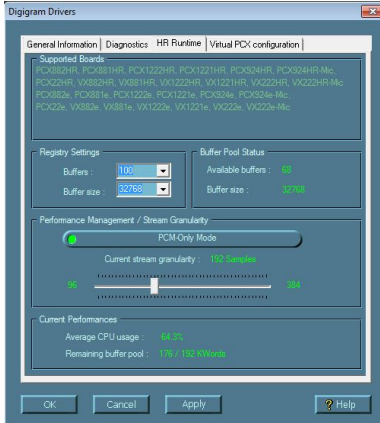


To launch the ASIO control panel, go to <Start>, <Programs>, <Digigram>, <Digigram ASIO HR Settings>.

	<p>It allows to:</p> <ul style="list-style-type: none"> • set/modify the size of ASIO buffers (= latency adjustment) • select the number of bits per sample (16, 24, 32) • select the LTC frame rate • select the I/Os to be used by the application(s) • enable/disable the hardware monitoring control • enable/disable the multi-client mode. When enabled, several applications can access different channels of the card (but one channel cannot be used by several applications) <p>For more information on this ASIO control panel, to refer to its online help.</p>
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Wave driver configuration

In the case the software application exclusively manages PCM audio through the Wave MME interface, the latency of the Wave driver can be optimized by enabling the option “PCM only” in the Digigram control panel (CPL). To access this control panel, go to <Start>, <Programs>, <Digigram>, <Digigram Control Center>.



For detailed information on how to use the Digigram control panel, please refer to its online help (“? Help” button).

Removing the driver

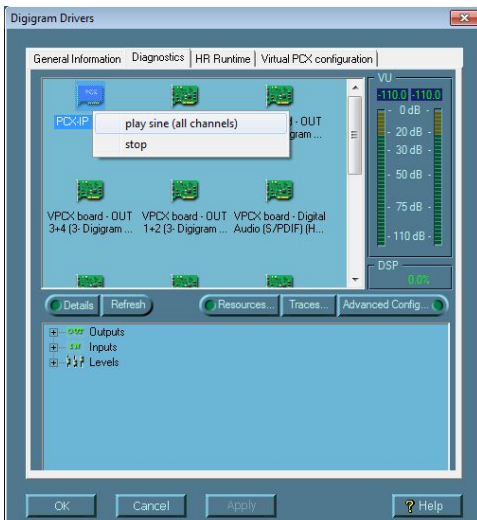
Open the **Windows Control Panel** and double-click on the **Add/Remove Software** icon or **Programs and Features** icon, depending on the Windows flavour.

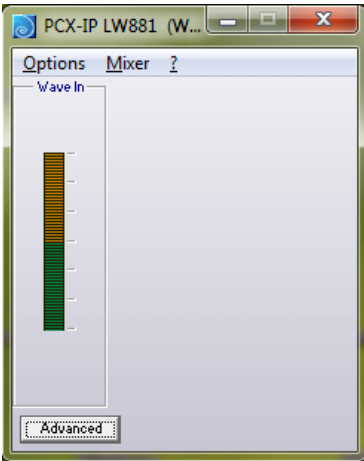
- Select “Digigram HR Runtime ...”, and Change/Remove.
- Select Remove in the HR Runtime window.
- Follow the instructions to finish to remove the driver.

HOW TO CHECK THE INSTALLATION

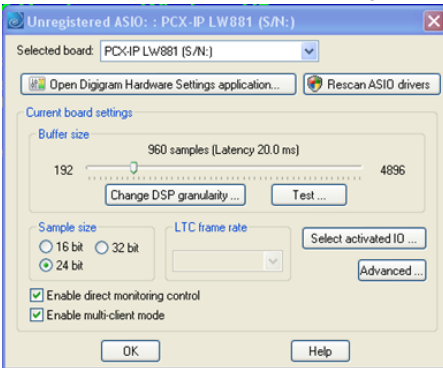
Once the card and the driver have been installed according to the procedure described in this manual, you can check that the PCX card is properly installed and works fine as follows.

- From <Start> <Programs> <Digigram>, select <Digigram Control Center>.
- Select the ‘General Information’ tab.
In the “Modules Information” window, you can see the HR Runtime modules that have been installed, and their versions.
- Select the ‘Diagnostics’ tab to display the installed card(s).





If the ASIO driver has been installed, the card is visible from the ASIO control panel, and from any ASIO application. To launch the ASIO control panel, go to **<Start>**, **<Programs>**, **<Digigram>**, **<Digigram ASIO HR Settings>**.

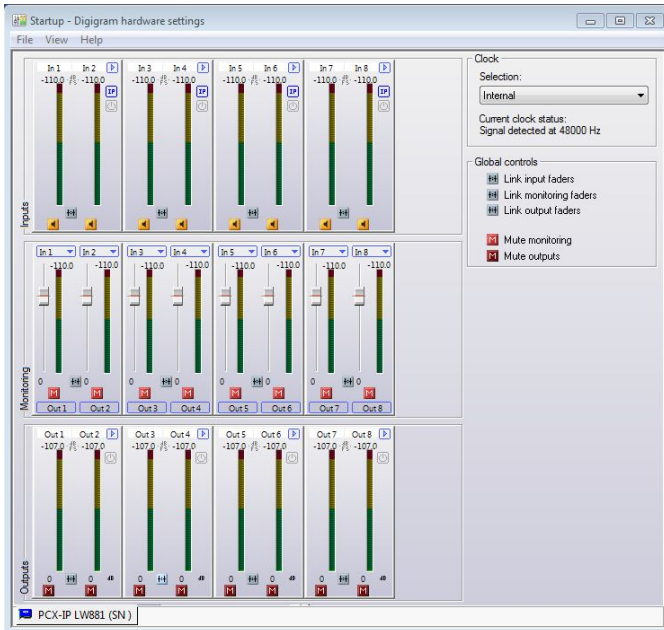


THE “DHS” CONTROL PANEL

Digram Hardware Settings (DHS) is an application allowing to configure the hardware resources of Digigram cards for all audio applications using them.

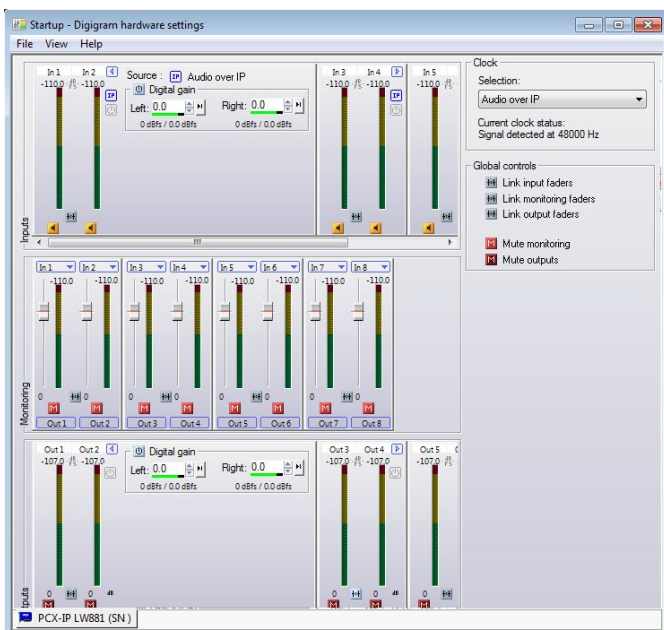
The parameters of an resource being managed by the DHS application can not be modified from another applications. To enable an audio application to modify a Digigram card resource, this resource must not be managed by the DHS.

Note: As soon as a resource of a card is managed by the DHS, the clock selection of this card must be defined in the DHS.



The DHS allows to:

- adjust digital gains of input and output signals
- mute / unmute input and output signals
- Select the input monitored on an output (zero latency hardware monitoring)
- Set the monitoring gains



For more detailed information on how to use this control panel, please refer to its on-line help.

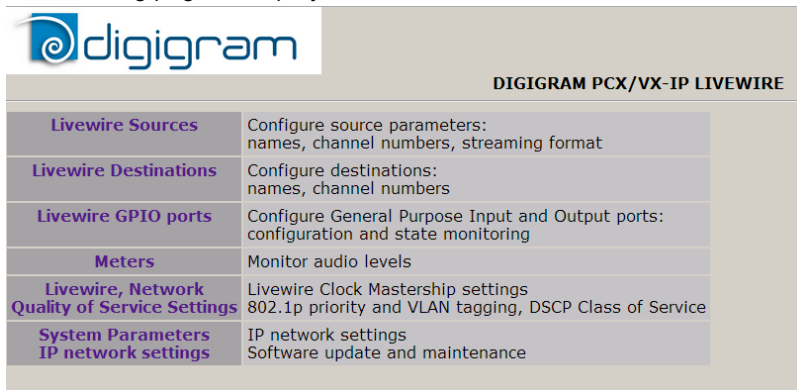
CONFIGURATION OF LIVEWIRE PARAMETERS

To be able to configure the Livewire parameters from the WEB pages of the PCX card, it is necessary to connect a NIC card of the computer to the Livewire network.

The PCX card default IP address is: 192.168.0.100.

Enter this IP address in your WEB browser address bar.

The following page is displayed.



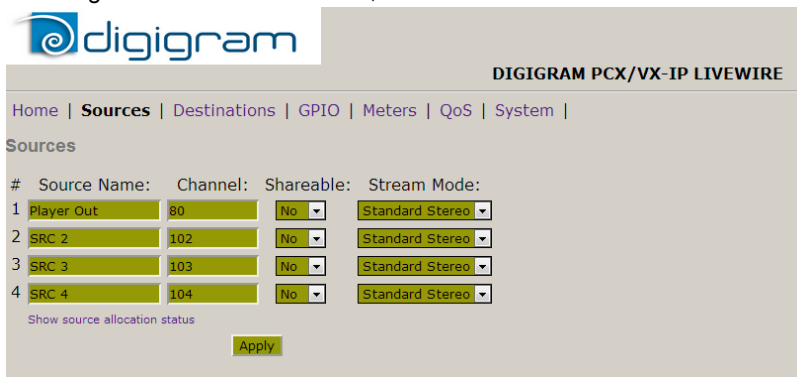
Configuration of sources

Configuring Livewire sources is necessary to assign the playback devices of the PCX-IP to Livewire inputs.

PCX-IP 881e features 8 mono playback devices to be injected to 8 Livewire mono inputs.

PCX-IP 1221e features 12 mono playback devices to be injected to 12 Livewire mono inputs.

To configure the Livewire sources, click on "Livewire Sources". The following page is displayed.



From this page, you can :

- Give a name to each local input to the Livewire node: **Source Name** (16 printable characters max). This can typically be the name given to a channel of a playback application running on the PCX-IP card (ex: PCX-IP Player 1).
- Assign a livewire channel to each source: **Channel**. The channel number must be unique, and between 1 and 32767.
- Set parameters for each source:
 - **Shareable**:
 - **Stream Mode**: Select "Live Stereo" for streams where low latency is required, and select "Standard Stereo" otherwise.

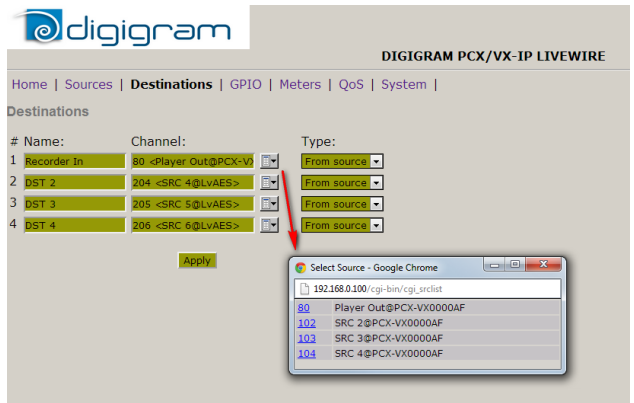
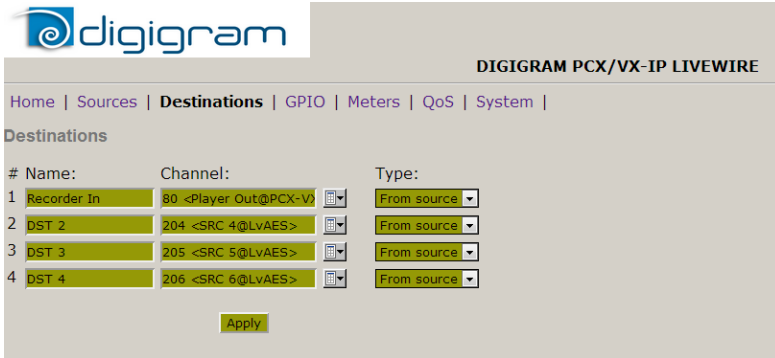
Configuration of destinations

Configuring Livewire Destinations is necessary to assign the recording devices of the PCX-IP to the Livewire outputs.

PCX-IP 881e features 8 mono recording devices receiving 8 Livewire mono outputs.

PCX-IP 1221e features 2 mono recording devices receiving 2 Livewire mono outputs.

To configure the Livewire Destinations, click on "Destinations". The following page is displayed.



From this page, you can :

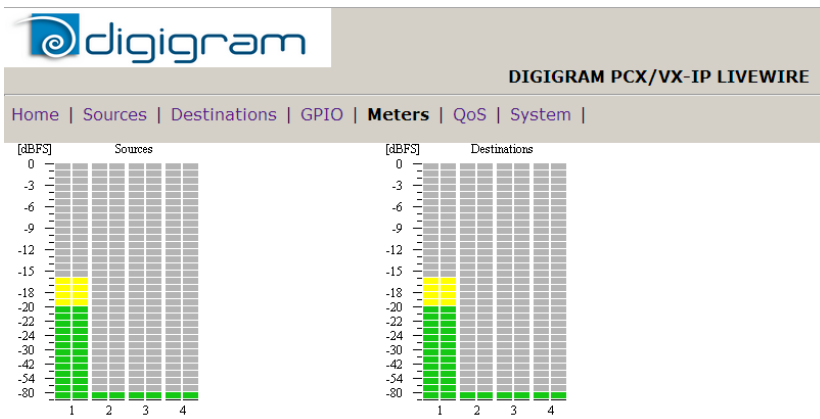
- Give a name to each local output to the Livewire node: **Name** (16 printable characters max). This can typically be the name given to a channel of a recording application on the PCX-IP card (ex: PCX-IP Rec1).
- Select one of the available Livewire channels to be extracted and assign to the corresponding PCX-IP input.
- Set the **Type** for each selected livewire channel:
 - From source:
 - To source:

Configuration of GPIOs



Vu_meters

This page displays the vu-meters of the signals available on the Livewire sources (typically audio coming from software players) and destinations (typically Livewire channels to be recorded by software recorders).
Click on "Meters" to display the vu-meters page.



QoS

In most of the cases, the parameters of the “QoS” page should not be changed. In case you need to modify them, you may refer to documents available from Axia WEB site.

The screenshot shows the 'QoS' configuration page. At the top, there is a navigation menu: Home | Sources | Destinations | GPIO | Meters | **QoS** | System. The page is titled 'DIGIGRAM PCX/VX-IP LIVEWIRE'. Below the title, there are two main sections: 'Synchronization / Livewire Clock' and 'Live Audio / Clock Streams'.
Synchronization / Livewire Clock:
 Livewire clock master priority: 3 (default)
 Livewire clock mode: IP low rate (default)
Live Audio / Clock Streams:
 802.1Q tagging: Enabled
 802.1Q VLAN ID: 0
 802.1p priority: 6 (recommended)
 DSCP Class of Service: 48 CS6 (recommended)
Standard Audio Streams:
 Receive buffer size [ms] (default 100): 100 (15 - 100)
 802.1Q tagging: Disabled
 802.1Q VLAN ID: 0
 802.1p priority: 5 (recommended)
 DSCP Class of Service: 46 Expedited Forwarding (recommended)
 An 'Apply' button is located at the bottom of the page.

System parameters

The “System” page allows setting the network parameters of the PCX-IP card. These parameters are the usual parameters of a network interface like:

- Host name: used to identify the PCX-IP card on the network.
- Network address: IP address of the PCX-IP card on the network. There must be no other node with the same IP address.
- Netmask: mask to identify the sub network the nodes belongs to
-

The screenshot shows the 'System' configuration page. At the top, there is a navigation menu: Home | Sources | Destinations | GPIO | Meters | QoS | **System**. The page is titled 'DIGIGRAM PCX/VX-IP LIVEWIRE'. Below the title, there are two main sections: 'IP settings' and 'User password'.
IP settings:
 Host name: PCX-VX0000AF (1-12 characters: letters, numbers, hyphen)
 Network address: 192.168.0.100
 Netmask: 255.255.255.0
 Gateway: 0.0.0.0
 NTP server: 0.0.0.0 (takes effect after reset)
 Timezone: UTC+0 (takes effect after reset)
 Syslog server (IP address): 0.0.0.0
 Syslog severity level filter: Warning: warning conditions
User password:
 New password: ***** (5-8 characters: letters and numbers)
 Retype new password: ***** (verify)
Firmware version:
 Hardware revision: PCX/VX-IP LIVEWIRE
 Bank 0: ver. 1.0.2f (build mar. nov. 27 10:35:18 CET 2012)
 Bank 1: empty
 update: Choisissez un fichier. Aucun fichier choisi
 Warning: System will reboot after changing current bank.
 An 'Apply' button is located at the bottom of the page.

SPECIFICATIONS

Configuration

	PCX-IP LW881e / PCX-IP LW12121e
Bus/Format	PCI Express™ (PCIe x1) (x2, x4, x8, x16 compatible)
Digital Signal Processor	Motorola 56321 at 240 MHz
RAM	512 kWords
Size	168 mm x 111 mm x 20 mm
Power requirements (+3.3V/+5V / +12V / -12V)	2.5 A / 0 A / 0.1 A / 0 A
Operating: temp / humidity (non-condensing)	0°C/+50°C . 5%/95%
Storage: temp / humidity (non-condensing)	-5°C/+70°C . 0%/95%

Inputs/Outputs

	PCX-IP LW881e	PCX-IP LW12121e
Livewire input mono channels	8	2
Livewire output mono channels	8	12
Programmable input/output digital gain	from -110 dB à +18 dB	from -110 dB à +18 dB
General Purpose Inputs & Output	5	5

Sampling frequency

Sampling frequencies available	48 kHz
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Connectors

Ethernet	RJ-45
GPIO	Sub-D 15 pins

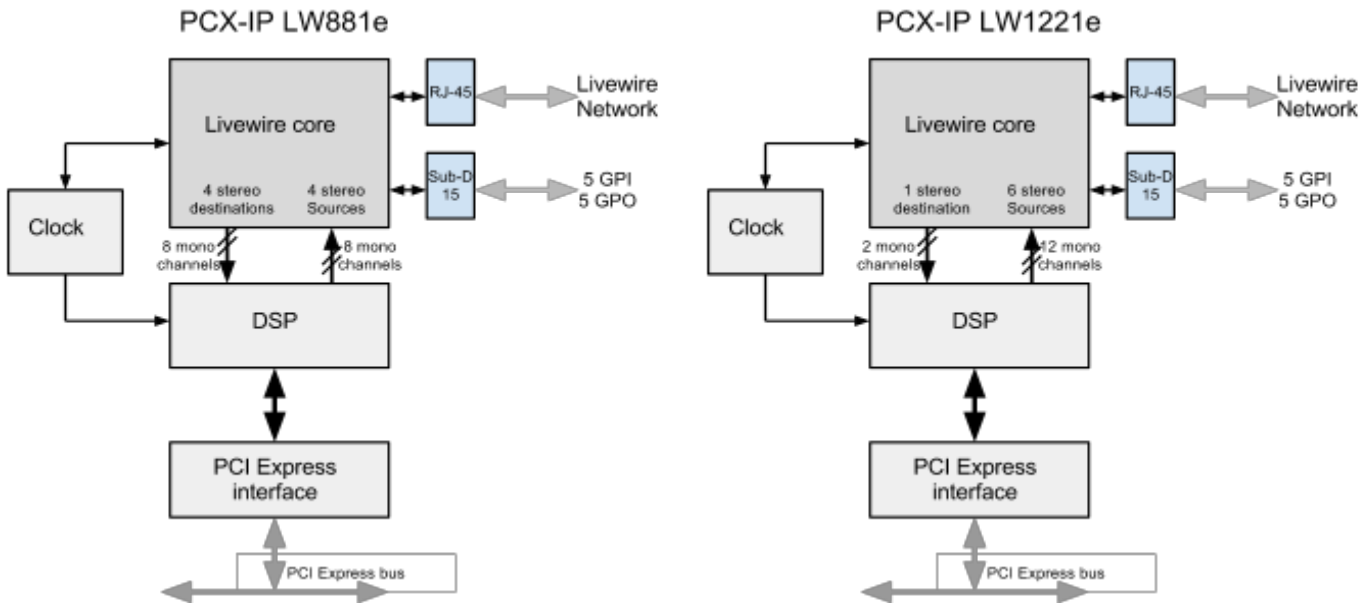
Development environments & supported operating systems

Diagram management	np SDK (HR Runtime, PCM & MPEG)
Other APIs	DirectSound, DirectKS (PCM) ASIO (PCM) Wave ^{1*} (PCM & MPEG Layer I & II)
OS supported	Windows XP, Windows Server 2003, Windows Server 2008, Windows 7, Windows 8

¹ * Windows XP and Server 2003 only; for Windows Vista, a Wave driver is available on request.

APPENDICES

Schematic diagrams



GPIOs connector pinout

The pinout of the GPIOs on the Sub-D 15 pin-connector of the PCX card is identical to the GPIO connector used in Axia nodes.

