

## OPERATIONAL DESCRIPTION

### 1.1. Equipment description



Digigram now offers PCI Express versions of its PCX924HR, PCX924HR-Mic and PCX22HR sound cards, which offer stereo inputs and outputs, perfect for on-air automation, production and other mission-critical applications. Exacting specs, outstanding quality, absolute reliability and total connectivity make this new generation the number one choice for pro audio manufacturers and software vendors. These PCI Express stereo sound cards share the same features as the HR series and integrate seamlessly with the same professional audio software.



These sound cards are visiblu ready : get connected to the world of distributed IP audio. A solution based on visiblu®, the Network Audio Operating System by Digigram, takes advantage of their power for low latency wide area network encoding and processing, whether they are located next door or hundreds of miles away.

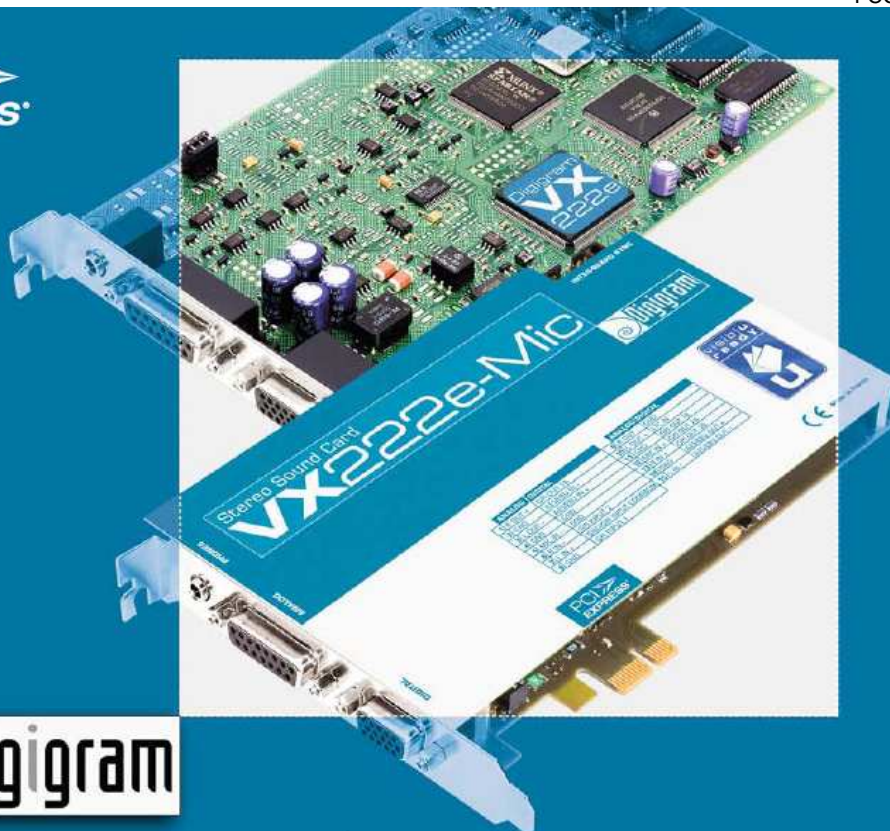
#### Key features

- 24-bit/192kHz AD/DA converters
- +24 dBu maximum analog signal levels
- Hardware sample rate converter on the digital input
- AES/EBU, LTC, and interboard synchronization inputs
- Native, low-latency HR drivers package: WDM DirectSound, ASIO, Wave and driver for Digigram SDK
- DirectSound driver signed by Microsoft Windows Hardware Quality Labs

#### PCX924e-Mic additional features:

- One professional grade analog mic preamp with analog compressor limiter, mixed with the analog line inputs
- AES42 support for AES42 digital microphones recording

PCI  
EXPRESS<sup>®</sup>



**Digigram**

Professional stereo sound cards

# VX222e and VX222e-Mic

boarding pass to a new world

Digigram now offers PCI Express versions of its VX222HR and VX222HR-Mic linear sound cards for demanding applications in broadcast, production, or voice-over recording. Exacting specs, outstanding quality, absolute reliability and total connectivity make this new generation the number one choice for pro audio manufacturers and software vendors. The VX222e and VX222e-Mic stereo sound cards share the same features as the HR series and integrate seamlessly with the same professional audio software.



These sound cards are visiblu ready : get connected to the world of distributed IP audio. A solution based on visiblu®, the Network Audio Operating System by Digigram, takes advantage of their power for low latency wide area network encoding and processing, whether they are located next door or hundreds of miles away.

## Key features

- 24-bit/192kHz AD/DA converters
- +24 dBu maximum analog signal levels
- 3-band parametric EQ and maximizer,
- LTC, and interboard synchronization inputs
- Native, low-latency HR driver package: WDM DirectSound, ASIO, Wave and driver for Digigram SDK
- DirectSound driver signed by Microsoft Windows Hardware Quality Labs

## VX222e-Mic additional features:

- One professional grade analog mic preamp with analog compressor limiter, mixed with the analog line inputs
- Hardware sample rate converter on the digital input
- AES42 support for AES42 digital microphones recording

	PCX924e	PCX924e-Mic	PCX22e
Configuration			
Bus/Format	PCI Express™ X1 (compatible with X1, X2, X4, X8, X12, X16, X32 slots)		
Digital Signal Processor	Motorola 56303 at 100 MHz		
RAM	512 kWords		
Size	168 mm x 99 mm x 20 mm		
Power requirements (+3.3V/+12V)	1 A / 0.2 A	1.3 A to 2.3 A / 0.22 A	0.92 A / 0.18 A
Operating: temp / humidity (non-condensing)		0°C / +50°C • 5% / 90%	
Storage: temp / humidity (non-condensing)		-5°C / +70°C • 0% / 95%	
Inputs			
Balanced analog line inputs (mono)	2	2	-
Maximum line input level/impedance	+24 dBu / >10 kOhms	+24 dBu / >10 kOhms	-
Programmable input gain	Analog and digital	Analog and digital	-
Digital inputs (stereo)	1 AES/EBU with switchable hardware sample rate converter, ratio from 1:8 to 7.5:1, up to 192kHz	1 AES/EBU with switchable hardware sample rate converter, ratio from 1:8 to 7.5:1, up to 192kHz	-
AES/EBU sync input		Yes	
AES11 synchronization		Yes	
Other inputs		2 GPI (dry contact), LTC	
Outputs			
Servo-balanced analog line outputs (mono)		2	
Maximum output level / impedance		+24 dBu / < 100 Ohms	
Digital outputs (stereo)		1 AES/EBU	
Programmable output gain		Analog and digital	
Other outputs		1 stereo headphone output (600 Ohms), 2 GPO (relay, 0.5 A, 48 VCC)	
Connectors			
Internal connector		Inter-board synchronization	
External connectors	15-pin Sub-D for analog I/Os, 15-pin HD Sub-D for digital I/Os, Sync., and GPIO 1 mini jack 3.5 mm TRS female jack for headphone stereo output		
Audio specifications. Measurements done at Fs=48 kHz unless stated otherwise, with filter on the 22 Hz - 22 kHz range			
Sampling frequencies available	Programmable from 8 to 192 kHz		
A/D and D/A converters resolution	24 bits		
Supported audio formats	PCM (8, 16, 24 bits), Float IEEE754, MPEG (Layer I, II, and III up to 48 kHz)		
Frequency response (record + play)	at 48 kHz: 20 Hz - 20 kHz: +0 /-0.3 dB at 96 kHz: 20 Hz - 40 kHz: +0 /-0.4 dB at 192 kHz: 20 Hz - 80 kHz: +0 /-1.1 dB		
Channel phase difference: 20/20kHz	< 0.2°/2°		
Dynamic range (A-weighted)	Analog In: >104 dB*, Analog out: > 106 dB		
THD + noise 1 kHz at -2 dBfs	Analog In: <-97 dB*, Analog out: <-95 dB AES/EBU in sample rate converter: <-130 dB*		
Crosstalk (Analog in or out)	1 kHz at 24 dBu: <-115 dB, 15 kHz at 24 dBu: <-100 dB		
Development environments			
Digigram management	np SDK (HR Runtime, PCM and MPEG)		
Other management	Wave (PCM, MPEG), ASIO, and DirectSound (PCM)		
Supported operating systems	Windows Vista, 2000, XP¹, and Windows 2003 Server¹		
Main on-board processing features (with np SDK)	MPEG, PCM and Float IEEE754 play, rec, direct monitoring, real-time mixing, level adjustment, 3-band parametric equalizer, maximizer, panning, cross-fade, punch-in/punch-out, scrubbing, time-scaling, pitch-shifting		
PCX924e-Mic			
Additional analog microphone input			
Balanced analog microphone input (mono)	1, with analog expander/compressor/limiter This input is mixed with the two line inputs before A/D conversion		
48V phantom power supply	Yes		
Programmable mic gain	0 to 66 dB in 0.5 dB steps		
Maximum mic input level/impedance	+10 dBu / >10 kOhms		
Equivalent Input Noise, A/D-D/A at 48kHz, G=60 dB, Z=200 Ohms	<-125 dBm		
AES/EBU input special features			
Support of AES42 digital microphones	Yes, with digital phantom power supply (10 V min / 250 mA max)		
Remote control of digital microphones	Yes		
AES42 synchronization mode	Operational mode 1 (the microphone generates its own clock)		

\* PCX924e &amp; PCX924e-Mic only - (1) 32-bit version

## VX222e

## VX222e-Mic

Configuration	
Bus/Format	PCI Express™ X1 (compatible with X1, X2, X4, X8, X12, X16, X32 slots)
Digital Signal Processor	Motorola 56303 at 100 MHz
RAM	128 kWords 512 kWords
Size	168 mm x 99 mm x 20 mm
Power requirements (+3.3V/+12V)	1 A / 0.2 A 1.3 to 2.3 A / 0.22 A
Operating: temp / humidity (non-condensing)	0°C / +50°C • 5% / 90%
Storage: temp / humidity (non-condensing)	-5°C / +70°C • 0% / 95%
Inputs	
Balanced analog line inputs (mono)	2
Maximum line input level/impedance	+24 dBu / <10 kOhms
Programmable input gain	Analog and digital
Digital inputs (stereo)	1 AES/EBU 1 AES/EBU, AES42 compatible
Hardware sample rate converter	No Switchable, ratio from 1:8 to 7.5:1, up to 192kHz
AES/EBU sync input	No Yes
AES11 synchronization	Yes
Other inputs	2 GPI (dry contact), LTC
Outputs	
Servo-balanced analog line outputs (mono)	2
Maximum output level / impedance	+24 dBu / < 100 Ohms
Digital outputs (stereo)	1 AES/EBU
Programmable output gain	Analog and digital
Other outputs	1 stereo headphone output (600 Ohms), 2 GPO (relay, 0.5 A, 48 VCC)
Connectors	
Internal connector	Inter board synchronization
External connectors	15-pin Sub-D for analog I/Os, 15-pin HD Sub-D for digital I/Os, Sync., and GPIO Mini jack headphone stereo output (3.5 mm TRS female jack)
Audio specifications. Measurements done at Fs=48 kHz unless stated otherwise, with filter on the 22 Hz- 22 kHz range	
Sampling frequencies available	Programmable from 8 to 192 kHz
A/D and D/A converter resolution	24 bits
Supported audio formats	PCM (8, 16, 24 bits), Float IEEE754
Frequency response (record + play)	at 48 kHz: 20 Hz - 20 kHz: +0 /-0.3 dB at 96 kHz: 20 Hz - 40 kHz: +0 /-0.4 dB at 192 kHz: 20 Hz - 80 kHz: +0 /-1.1 dB
Channel phase difference: 20/20kHz	<0.2°/2°
Dynamic range (A-weighted)	Analog In: >104 dBA, Analog Out: > 106 dBA
THD + noise 1 kHz at -2 dBfs	Analog In: <-97 dB, Analog Out: <-95 dB VX222e-Mic sample rate converter: <-130 dB
Crosstalk (Analog in or out)	1 kHz at +24 dBu: <-115 dB, 15 kHz at +24 dBu: <-100 dB
Development environments	
Digigram management	np SDK (HR runtime, PCM only)
Other management	Wave, ASIO, DirectSound (all PCM only)
Supported operating systems	Windows Vista, 2000, XP <sup>1</sup> , and Windows 2003 <sup>1</sup> Server
Main on-board processing features	Direct monitoring, real-time mixing, level adjustment, 3-band parametric equalizer, maximizer, panning, cross-fade, punch-in/punch-out, scrubbing

## VX222e-Mic

Additional analog microphone input	
Balanced analog microphone input (mono)	1, with analog expander/compressor/limiter This input is mixed with the two line inputs before A/D conversion
48V phantom power supply	Yes
Programmable mic gain	0 to 66 dB in 0.5 dB steps
Maximum mic input level/impedance	+10 dBu / >10 kOhms
Equivalent Input Noise, A/D-D/A at 48kHz, G=60 dB, Z=200Ohms	<-125 dBm
AES/EBU input special features	
Support of AES42 digital microphones	Yes, with digital phantom power supply (10 V min / 250 mA max)
Remote control of digital microphones	Yes
AES42 synchronization mode	Operational mode 1 (the microphone generates its own clock)

(1) 32-bit version

## 1.2. Related Submittal(s) / Grant(s)

All host equipment used in the test configuration are FCC granted, when relevant.

Trade Mark – Model Number (Serial number)	FCC ID	Description	Cable description
<b>PCX924e-MIC *</b> (sn : 2383.00020001)	IGTPCX924E	PCI Express sound card	I/O cables shielded
DELL PRECISION 390 Model: DCTA (sn: JGC8F2J)	DoC	Personal computer	Power cord unshielded. All other cable shielded.
Hewlett Packard pn:D2846 (sn: JP74001000)	DoC	Monitor	Power cord unshielded. Video cable shielded with ferrites
Hewlett Packard pn:C3751A (sn: LOA54656002)	DZL211029	Mouse	PS2 cable (1.2m)
TRUST SK-720R (sn: 10887)	DoC	Keyboard	PS2 cable (1.2m)
Hewlett Packard DESKJET 895cxi (sn: HU9C51T11C)	none	Parallel printer	Power cord unshielded. All other cable shielded.
DIGIGRAM - Audio Load Box (sn: none)	none	I/O Load box	Earth wire (1.5m)
TELEX 700373-000	none	Microphone	Audio cable (2m)

\*: Equipment under test.

Note: the PCX924e-MIC board is the complete hardware configuration of the product range:

- PCX924e (without the MIC daughter board)
- VX222e-MIC (software limited with MIC daughter board)
- VX222e (software limited without MIC daughter board)
- PCX22e (digital only without MIC daughter board)

Fonction	PCX924e	PCX22e	VX222e	VX222e-Mic	PCX924e-Mic
<b>Analog Inputs Stereo</b>	One Balanced	-	One Balanced	One Balanced	One Balanced
<b>Digital Inputs</b>	One AES/EBU	-	One AES/EBU	One AES/EBU	One AES/EBU
<b>Other Inputs</b>	LTC , two GPI (dry contact)	LTC , two GPI (dry contact)	LTC , two GPI (dry contact)	LTC , two GPI (dry contact)	LTC , two GPI (dry contact)
<b>Analog Outputs Stereo</b>	One Balanced	One Balanced	One Balanced	One Balanced	One Balanced
<b>Digital Outputs</b>	One AES/EBU	One AES/EBU	One AES/EBU	One AES/EBU	One AES/EBU
<b>Other Outputs</b>	HeadPhone (600Ω) , two GPO (0,5V , 48Vcc)	HeadPhone (600Ω) , two GPO (0,5V , 48Vcc)	HeadPhone (600Ω) , two GPO (0,5V , 48Vcc)	HeadPhone (600Ω) , two GPO (0,5V , 48Vcc)	HeadPhone (600Ω) , two GPO (0,5V , 48Vcc)
<b>MIC Input Mono</b>	-	-	-	Yes	Yes
<b>Digital Synchro input</b>	Yes	Yes	-	Yes	Yes

### **1.3. Test Methodology**

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4-2003, FCC Part 15 Subpart B.

Radiated testing was performed at an antenna to EUT distance of 10 meters. During testing, all equipment's and cables were moved relative to each other in order to identify the worst case set-up.

### **1.4. Test facility**

Tests have been performed on December 10<sup>th</sup> to 12<sup>th</sup>, 2007.

This test facility has been fully described in a report and accepted by FCC as compliant with the radiated and AC line conducted test site criteria in ANSI C63.4-2003 in a letter dated July 14, 2005 (registration number 94821).

This test facility has also been accredited by COFRAC (French accreditation authority for European Union test lab accreditation organization) according to NF EN ISO/IEC 17025, accreditation number 1-1633 as compliant with test site criteria and competence in 47 CFR Part 15/ANSI C63.4 and EN55022/CISPR22 norms for 2004/108/EEC European EMC Directive application. All pertinent data for this test facility remains unchanged.