

# 1 GENERAL INFORMATION

## 1.1 Product description

The PCX924-Mic is a Card (PCI bus) designed for professional audio applications on a Personal computer. The PCX924-Mic is a full-duplex sound card for simultaneous and independent record and playback delivering audio quality. This solution bringing new possibilities to journalist workstations and other recording applications.

The PCX924-Mic allowed, among others thing, a real-time, simultaneous compression and decompression during record and playback in MPEG (layer I and II) formats, decoding MPEG audio layer III, and decoding and mixing of multiple PCM and MPEG audio streams

The PCX924-Mic has 24-bits converters, one balanced analog line input, one balanced analog line output, two GPI (dry contact) outputs and inputs, headphone output and LTC and CDROM(+10dBu) inputs. S/PDIF or AES/EBU digital input and output allow direct digital transfer.

### Key features:

#### PCX924:

- Balanced digital stereo input/output in AES/EBU or S/PDIF formats.
- AES11 synchronization.
- Simultaneous record and playback in PCM (8, 16 and 24 bits).
- Real-time, simultaneous compression and decompression during record and playback in MPEG (layer I and II) formats.
- MPEG audio layer III decoding.
- Decoding and mixing of multiple PCM and MPEG audio streams.
- Multiple PCX924 cards can be used in a single PC (up to 16 inputs and 16 outputs).
- Direct recording from a PC's built-in CD-ROM.
- Digigram np SDK and Wave compliant.
- Special features when using applications based on Digigram's np SDK:
- Panning, cross fade, punch-in/punch-out, scrubbing, time-stretching, pitch-shifting, format and frequency conversions.
- Multiple applications may share the resources of a single card.
- Interboard synchronization of multiple PCX924 cards in a single PC.
- Synchronization via an LTC (SMPTE) time code input.

#### Additional key features PCX924-Mic:

- Balanced microphone input with 48 V phantompower supply and compressor-limiter-expander.
- Mic gain: 0 - 66 dB.
- Mix of mic and line input before A/D conversion.
- On output streams: 3-band parametric equalizer and "maximizer" (24-bit effects on embedded DSP).

Depending of applications, different options are available:

- PCX924 and PCX924-Mic
- PCX22
- VX222 and VX222-Mic

Mains differences between PCX924-Mix, PCX924, VX222-Mic, VX222 and PCX22, are summarized in the chart following :

	<b>PCX 924</b>	<b>PCX924-Mic</b>	<b>PCX22</b>	<b>VX222-Mic</b>	<b>VX222</b>
Analog inputs	One balanced	One balanced	-	One balanced	One balanced
Digital inputs	One AES/EBU or S/PDIF	One AES/EBU or S/PDIF	-	One AES/EBU or S/PDIF	One AES/EBU or S/PDIF
Other inputs	LTC,CDROM 5+10dBu), two GPI (dry contact)	LTC,CDROM 5+10dBu), two GPI (dry contact)	two GPI (dry contact)	two GPI (dry contact)	two GPI (dry contact)
Analog output	One balanced	One balanced	One balanced	One balanced	One balanced
Digital output	One AES/EBU or S/PDIF	One AES/EBU or S/PDIF	One AES/EBU or S/PDIF	One AES/EBU or S/PDIF	One AES/EBU or S/PDIF
Other output	Headphone (600Ω) Two GPI (relay,0.5A, 48VCC)	Headphone (600Ω) Two GPI (relay,0.5A, 48VCC)	Headphone (600Ω) Two GPI (relay,0.5A, 48VCC)	Headphone (600Ω) Two GPI (relay,0.5A, 48VCC)	Headphone (600Ω) Two GPI (relay,0.5A, 48VCC)
Mic inputs	-	Yes	-	Yes	-
AES11 syncr.	Yes	Yes	-	Yes	Yes

All options of PCX924-Mic use the same printed circuit; Software is different, depending of the option.  
For more information, see product's data sheet at section 1.6.

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

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

## 1.3 Tested System Details

The FCC IDs for all equipment, plus description of all cables used in the tested system are :

<b>Trade Mark – Model Number (Serial number)</b>	<b>FCC ID</b>	<b>Description</b>	<b>Cable description</b>
PCX924-Mic* <sup>①</sup> (sn: 00094)	IGTPCX924	Audio type PCI card	All I/O cables are shielded
PCX924-Mic* <sup>②</sup> (sn: 00097)	IGTPCX924	Audio type PCI card	All I/O cables are shielded
HEWLETT PACKARD pn:D6769A (sn: FR83332107)	D. of C.	Personnel Computer	All data cables are shielded Power cable unshielded
HEWLETT PACKARD pn:D2846 (sn JP74001000)	D. of C.	21" color monitor	Shielded video cable with ferrite at each end Power cable unshielded
HEWLETT PACKARD pn:C4732-60111 (sn: M971168931)	GYUR38SK	Keyboard	Shielded cable
HEWLETT PACKARD pn:C3751B (sn: LZA62831261)	DZL211029	Mouse	Shielded cable
HEWLETT PACKARD pn:C6410A Deskjet 895Cxi (sn: MY9761915T)	D. of C.	Parallel printer	Shielded cable
HEWLETT PACKARD 48GX (sn: ID83802369)	None	Serial graphic calculator	Shielded cable
TELEX (sn: none)	None	Microphone	Shielded cable
INTEL YC76 (sn: 0045143)	EDUYC76	USB WebCam	Shielded cable
LABTEC LT100 pn:D8387A (sn: none)	None	Headphone	Shielded cable
SENNHEISER HD435 MANHATTANN (sn: none)	none	Headphone	Shielded cable
Digigram (sn: none)	None	Load box	Power cable unshielded

\*Equipment Under Test

(<sup>①</sup>): Equipment used for radiated emission test

(<sup>②</sup>): Equipment used for conducted emission test

## **1.4 Test Methodology**

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4-1992, CISPR22-1997/A1:2000 and EN55022:1998/A1:2000.

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.

## **1.5 Test facility**

Tests have been performed on September 27<sup>th</sup> 2002.

The test facility used to collect the radiated and conducted data is the SMEE Actions Mesures facility, located ZI des Blanchisseries, 38500 VOIRON, France. 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 C63.4-1992 in a letter dated August 04, 1999 (registration number 94821).

This test facility has also been accredited by COFRAC (French accreditation authority for European union test lab accreditation organization), accreditation number 1-0844 as compliant with test site criteria and competence in EN55022/CISPR22 norms for 89/336/EEC European EMC Directive application. All pertinent data for this test facility remains unchanged.

## 1.6 Data sheet of the product

### 1.6.1 Specifications of the PCX924-Mic & PCX924 card

For more specifications see "User's manual PCX924.pdf" file.

#### CONFIGURATION

Bus/Format	PCI slave mode
Size	226 mm x 99 mm
Digital Signal Processor	56303 at 100 Mhz
Power requirements(+3.3V/+5V / +12V / -12V)	0.5A / 0.1A / 0.2A / 0.1A
Operating: temp / humidity (non non-condensing)	0°C/+50°C • 5%/90%
Storage: temp / humidity (non non-condensing)	-5°C/+70°C • 0%/95%

#### INPUTS / OUTPUTS

Analog line inputs (stereo)	one balanced
Maximum input/impedance	+22 dBu/ >10k $\Omega$
Programmable input gain	analog and digital
Digital inputs (stereo)	one AES/EBU or S/PDIF
Other inputs	LTC, CDROM (+10dBu), two GPI (dry contact)
Analog outputs (stereo)	one balanced
Maximum output/impedance	+22 dBu/low impedance
Programmable output level	digital and analog
Digital outputs (stereo)	one AES/EBU or S/PDIF
Other outputs	headphone (600 $\Omega$ ), two GPI (relay, 0.5A, 48VCC)
Access to main status bits of digital frame	Yes
AES11 synchronization	Yes
Connectors	15-pin SUB-D for analog I/O; 15-pin HD SUB-D for digital I/O, sync. and GPI

#### AUDIO SPECIFICATIONS

Sampling frequencies available	Programmable from 8 to 50 kHz in 100 Hz steps.
A/D and D/A converter resolution	24 bits
Frequency response at 48 kHz (record + play)	20 Hz–20 kHz: $\pm 0.2$ dB
Signal to noise ratio (unweighted)	>95 dB
Distortion + noise at 1 kHz (record + play)	<-90 dB (0.002 %)
Channel phase difference: 20 Hz/20 kHz	<0.5°/2°
Analog channel cross talk	<-115 dB

## -Mic VERSION SPECIAL FEATURES

Number of mic inputs	1 with 48V phantom power supply
Programmable mic gain	0 to 66 dB in 0.5 dB steps
Maximum input level/impedance	+10 dBu/2k $\Omega$
D E.I.N. A/D-D/A at 48kHz, G=60dB	<-125 dBu
Programmable noise gate threshold	-72 dB, -52 dB, -34 dB
Programmable compressor/limiter threshold	From -28 dB to 0 dB
Programmable compressor ratio	1:1, 1.5:1, 2:1, 3:1, 4:1, 5:1, 10:1, 13:1
Programmable compressor/limiter gain	From 0 to 15 dB
Limiter ratio	15:1
Compressor/limiter attack and release time	22 ms, 220 ms
Management of line and mic inputs	Mixed together before A/D, with independent level and mute controls
Programmable DSP effects on output stream	3-band parametric equalizer, maximizer

## 1.6.2 Specifications of the VX222 card

For more specifications see "User's manual VX222.pdf" file.

### CONFIGURATION

Bus/Format	PCI slave mode
Size	226 mm x 99 mm
Digital Signal Processor	56303 at 100 Mhz
Power requirements(+3.3V/+5V / +12V / -12V)	0.5A / 0.1A / 0.2A / 0.1A
Operating: temp / humidity (non non-condensing)	0°C/+50°C • 5%/90%
Storage: temp / humidity (non non-condensing)	-5°C/+70°C • 0%/95%

### INPUTS / OUTPUTS

Analog line inputs (stereo)	one balanced
Maximum input/impedance	+22 dBu/ >10k $\Omega$
Programmable input gain	digital
Digital inputs (stereo)	one AES/EBU or S/PDIF
Other inputs	two GPI (dry contact)
Analog outputs (stereo)	one balanced
Maximum output/impedance	+22 dBu/low impedance
Programmable output level	digital and analog
Digital outputs (stereo)	one AES/EBU or S/PDIF
Other outputs	headphone (600 $\Omega$ ), two GPI (relay, 0.5A, 48VCC)
Access to main status bits of digital frame	Yes
AES11 synchronization	Yes
Connectors	15-pin SUB-D for analog I/O; 15-pin HD SUB-D for digital I/O, sync. and GPI

### AUDIO SPECIFICATIONS

Sampling frequencies available	8, 11.025, 16, 22.05, 24, 32, 44.1, 48kHz
A/D and D/A converter resolution	24 bits
Frequency response at 48 kHz (record + play)	20 Hz-20 kHz: $\pm$ 0.2 dB
Signal to noise ratio (unweighted)	>95 dB
Distortion + noise at 1 kHz (record + play)	<-90 dB (0.002 %)
Channel phase difference: 20 Hz/20 kHz	<0.5°/2°
Analog channel cross talk	<-115 dB

### 1.6.3 Specifications of the VX222-Mic card

For more specifications see "User's manual VX222-Mic.pdf" file.

#### CONFIGURATION

Bus/Format	PCI slave mode
Size	226 mm x 99 mm
Digital Signal Processor	56303 at 100 Mhz
Power requirements(+3.3V/+5V / +12V / -12V)	0.5A / 0.1A / 0.2A / 0.1A
Operating: temp / humidity (non non-condensing)	0°C/+50°C • 5%/90%
Storage: temp / humidity (non non-condensing)	-5°C/+70°C • 0%/95%

#### INPUTS / OUTPUTS

Analog line inputs (stereo)	one balanced
Maximum input/impedance	+22 dBu/ >10k $\Omega$
Programmable input gain	digital
Digital inputs (stereo)	one AES/EBU or S/PDIF
Other inputs	two GPI (dry contact)
Analog outputs (stereo)	one balanced
Maximum output/impedance	+22 dBu/low impedance
Programmable output level	digital and analog
Digital outputs (stereo)	one AES/EBU or S/PDIF
Other outputs	headphone (600 $\Omega$ ), two GPI (relay, 0.5A, 48VCC)
Access to main status bits of digital frame	Yes
AES11 synchronization	Yes
Connectors	15-pin SUB-D for analog I/O; 15-pin HD SUB-D for digital I/O, sync. and GPI

#### AUDIO SPECIFICATIONS

Sampling frequencies available	Programmable from 8 to 50 kHz in 100 Hz steps.
A/D and D/A converter resolution	24 bits
Frequency response at 48 kHz (record + play)	20 Hz–20 kHz: $\pm 0.2$ dB
Signal to noise ratio (unweighted)	>95 dB
Distortion + noise at 1 kHz (record + play)	<-90 dB (0.002 %)
Channel phase difference: 20 Hz/20kHz	<0.5°/2°
Analog channel cross talk	<-115 dB

## -Mic VERSION SPECIAL FEATURES

Number of mic inputs	1 with 48V phantom power supply
Programmable mic gain	0 to 66 dB in 0.5 dB steps
Maximum input level/impedance	+10 dBu/2k $\Omega$ .
E.I.N. A/D-D/A at 48kHz, G=60 dB	<-125 dBu
Programmable noise-gate threshold	-52 dB, -42 dB, -32 dB
Programmable compressor/limiter threshold	From -28 dB to 0 dB
Programmable compressor ratio	1:1, 1,3:1, 1,5:1, 2:1, 3:1, 5:1
Programmable compressor/limiter gain	From 0 to 15 dB
Limiter ratio	15:1
Compressor/limiter attack and release time	22 ms, 220 ms
Management of line and mic inputs	Mixed together before A/D, with independent level and mute controls
Programmable DSP effects on output stream	3-band parametric equalizer, maximizer



## 1.6.4 Specifications of the PCX22 card

For more specifications see "User's manual PCX22.pdf" file.

### CONFIGURATION

Bus/Format	PCI slave mode
Size	226 mm × 99 mm
Digital Signal Processor	56303 at 100 Mhz
Power requirements(+3.3V/+5V / +12V / -12V)	0.5A / 0.1A / 0.2A / 0.1A
Operating: temp / humidity (non non-condensing)	0°C/+50°C • 5%/90%
Storage: temp / humidity (non non-condensing)	-5°C/+70°C • 0%/95%

### INPUTS / OUTPUTS

Inputs	Two GPI (dry contact)
Analog outputs (stereo)	one balanced
Maximum output/impedance	+22 dBu/ low impedance
Programmable output level	Digital and analog
Digital output (stereo)	one AES/EBU or S/PDIF
Other outputs	headphone (600 $\Omega$ ), two GPI (relay, 0.5A, 48VCC)
Access to main status bits of digital frame	Yes
Connectors	15-pin SUB-D for analog I/O; 15-pin HD SUB-D for digital I/O, sync. and GPI

### AUDIO SPECIFICATIONS

Sampling frequencies available	8, 11.025, 16, 22.05, 24, 32, 44.1, 48kHz
A/D and D/A converter resolution	24 bits
Frequency response at 48 kHz (record + play)	20 Hz–20 kHz: $\pm 0.2$ dB
Signal to noise ratio (unweighted)	>95 dB
Distortion + noise at 1 kHz	<-90 dB (0.002 %)
Channel phase difference: 20 Hz/20kHz	<0.5°/2°
Analog channel cross talk	<-115 dB

### PERFORMANCES

<b>Maximum audio streams at 48kHz without effects, through np SDK</b>	
PCM 16bits	20 mono / 10 stereo
MPEG Audio Layer II*	20 mono / 20 stereo
MPEG Audio Layer III*	8 mono / 4 stereo