Genex

Genex Research Limited

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Genex AES Expansion Card
Operational Manual

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Revision 1.1

Contents

Important notes

Unpacking

- After unpacking the AES Expansion Card, save all the packing materials in case you ever need to ship the unit. Thoroughly inspect the card for signs of damage. Report any shipment damage to the carrier at once. The following accessories are included with the card:-

    1. User Guide.

Installation

- The Genex AES Expansion Card is installed into either of the two slots found on the back of the Genex GXA8 A/D converter or the Genex GXD8 D/A converter. The card should only be inserted or removed when the main unit is switched off.

Technical Support

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- Technical Support is available on line through the Genex web site at:-
- http://www.genex.co.uk/   or by emailing: support@genex.co.uk.

Layout of this Manual

- Sections in this manual appear in the following order.

    1. A brief introduction to the Genex AES Expansion Card (GX8-AES) and how to fit it into either of the slots

    2. A pin-out of the 25-way connector on the back panel

    3. An explanation how the main uses for an AES Expansion card in a GXA8 or GXD8

Introduction to the Genex GX8-AES

Description

- The GX8-AES™ card provides four AES/EBU inputs and outputs to the Genex GXA8™ and GXD8™ audio converters. This is in addition to the AES/EBU outputs (GXA8) or inputs (GXD8) found on the converters already as standard. It slides easily yet firmly into the back of the GXA8 and GXD8 converters and uses a 25-way D-type connector for fully balanced AES/EBU i/o. The pinout is identical to similar AES/EBU connectors found on other Genex equipment. A breakout cable is available separately.

- The GX8-AES card provides AES/EBU access to all eight channels when running in dual-wire mode and to four channels when running in quad-wire mode. It is therefore essential for multi-channel 176.4kHz or 192kHz projects.

- The GX8-AES card contains the Paqrat® bit-split decoder for digital-digital conversion back to 24-bit.

- The GX8-AES card is ideal for additional AES/EBU i/o when used in a Pro Tools® setup

Installing the GX8-AES Card

1. To install the AES card make sure the power is off. You may keep the GXA8 or GXD8 plugged in to a switch off power outlet to maintain a ground connection. Keep the GX8-AES card in its packaging until you are ready to fit it.

2. Using a Phillips screwdriver, remove the plate covering the vacant expansion slot at the back of the GXA8 or GXD8. Make sure you do not lose the screws.

3. Firstly touch the GXA8 or GXD8 to remove any static charge you may have built up, then remove the GX8-AES from its packaging and slide gently into the empty slot in the back of the GXA8 or GXD8. Push it home firmly until the back plate is right against the back panel of the converter. Note that the slot that is used will determine what audio channels are output (GXA8) or input (GXD8) when used in dual or quad-wire (see Operation on page 5). You should note which slot you do use to relate to the front panel SLOT1 and SLOT2 indicators.

4. Finally fix the card in place with the screws you removed in step 2 above.
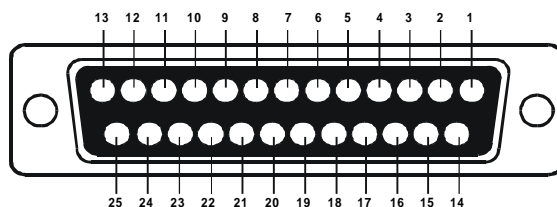
Your card is now ready to use.

Card Connections

Rear Panel

1. 25-way "D-type" connector

This contains the 4 AES/EBU i/o pairs. The pinout is identical to all similar interfaces on other Genex equipment and is shown below:-

Pin number	Description	Pin Number	Description
1	AES 1 input +	14	AES 1 input -
2	AES 1 input GND	15	AES 2 input +
3	AES 2 input -	16	AES 2 input GND
4	AES 3 input +	14	AES 3 input -
5	AES 3 input GND	15	AES 4 input +
6	AES 4 input -	16	AES 4 input GND
7	AES 1 output +	14	AES 1 output -
8	AES 1 output GND	15	AES 2 output +
9	AES 2 output -	16	AES 2 output GND
10	AES 3 output +	14	AES 3 output -
11	AES 3 output GND	15	AES 4 output +
12	AES 4 output -	16	AES 4 output GND
13	n/c		

Diagram and Table of 25-way D-type Pinout

Operation

Using the GX8-AES Card in a GXA8

Using the AES expansion card in the GXA8 provides additional digital i/o for the converter. This is useful for:-

Input

Paqrat® bit-split digital decoding

- By using the GX8-AES card in the GXA8, 24-bit recordings made using Paqrat bit-splitting technology (e.g., with the GXA8 onto a legacy 16-bit recorder) can be reconstituted back to 24-bits in the digital domain and output to a 24-bit digital editor or workstation.

  1. Having fitted the GX8-AES card into the GXA8, connect the AES outputs of the recorder to the AES expansion card via a Genex AES breakout cable. Ensure the channels are connected up in the correct order.

  2. Using CLOCK SOURCE, select the GX8-AES card as the clock source (i.e., Slot 1 or Slot 2).

  3. Using INPUT SOURCE, select the GX8-AES card as the input source (i.e., Slot 1 or Slot 2). Alternatively, the GXA8 may be clock master, if this method is easier; jitter is not an issue as there is no conversion to or from analogue.

  4. Using BIT SPLIT, select DECODE

- The main AES outputs of the GXA8 (and indeed the outputs on the GX8-AES card itself as well as any card plugged into the other slot, including the Pro Tools card) will now output a fully restored 24-bit signal.

- Note that if a 24-bit, 96kHz recording has been made on a legacy 26-bit, 8-channel recorder bit-split encode and dual-wire operation, the bit-split is still decoded but the 24-bit output will remain as 96kHz *dual-wire* (i.e., the *clock* rate will stay at 48kHz). The AES OUTPUT *must* be set to SINGLE.

Pro Tools® digital inputs

- The GX8-AES card provides a GXA8 connected to Pro Tools with four AES inputs (eight audio channels) into Pro Tools. The GX8-AES may selected as the Pro Tools input source in two ways:-

  1. Select the GX8-AES card slot (the one *not* occupied by the Pro Tools card) as the input source using the INPUT SOURCE button on the front panel. This will select all eight audio channels as from the GX8-AES.

  2. Leave the INPUT SOURCE set to ANALOGUE. Use the *Other Options* panel within the Pro Tools Hardware Setup control panel to select *Digital* for each channel pair. This method allows a mix of analogue and digital inputs. Note that the PPMs on the GXA8 will not show the digital input level in this case but will stay showing the analogue input level for all channels.

- Ensure that the digital source is locked to the rest of the Pro Tools system. See the Genex Workstation Interface card user manual for more information.

Format Conversion

- By combining the GX8-AES card with another expansion card (e.g., ADAT, TDIF, SDIF) it is possible to convert between these formats

- Note that it is not possible at this time to convert digitally from single-wire to dual-wire, dual-wire to single-wire, or any other combination.

Output

Duplicate AES/EBU outputs

- With the GXA8 running in single-wire mode, the AES/EBU outputs on the GX8-AES card will be a duplicate of the main AES/EBU outputs on the GXA8. It does not matter into which slot the card is plugged. There is also no sample offset between the two sets of outputs.

Eight channels of dual-wire, four channels of quad-wire

- With the GX8-AES card plugged into Slot 2 (the lower slot), access is gained to channels five to eight when running the converter in dual-wire. This is the *only* way to output eight channels of 192kHz audio. The following table shows what is output from what slot in what mode:

Sample Rate	Wire Mode	Main AES Outputs	Slot One Outputs	Slot Two Outputs
44.1 / 48kHz	Single	Channels 1-8	Channels 1-8	Channels 1-8
88.2 / 96kHz	Dual	Channels 1-4	Channels 1-4	Channels 5-8
176.4 / 192kHz	Quad	Channels 1-2	Channels 1-2	Channels 3-4

- Note that Slot 1 always outputs the same as the main AES outputs. This is for situations where the expansion card is not AES, but a different format (e.g., ADAT).

Pro Tools digital outputs

- In Pro Tools mode, when the main AES outputs on the GXA8 are connected to a DAC (e.g., GXD8) for analogue output, the GX8-AES card provides a second bank of AES outputs. Alternatively, the GX8-AES card may be used to connect to the GXD8 instead.

Using the GX8-AES Card in a GXD8

Using the AES expansion card in the GXD8 provides additional digital i/o for the converter. This is useful for:-

Output

Paqrat® bit-split digital decoding

- By using the GX8-AES card in the GXA8, 24-bit recordings made using Paqrat bit-splitting technology (e.g., with the GXA8 onto a legacy 16-bit recorder) can be reconstituted back to 24-bits in the digital domain and output to a 24-bit digital editor or workstation.

  1. Having fitted the GX8-AES card into the GXA8, either connect the AES outputs of the recorder to the main AES inputs on the GXD8 or to the AES expansion card via a Genex AES breakout cable. Ensure the channels are connected up in the correct order.
  2. Select the appropriate clock source and input source
  3. Using BIT SPLIT, select DECODE

- The AES expansion card outputs and the outputs any card plugged into the other slot will now output a fully restored 24-bit signal.

- Note that if a 24-bit, 96kHz recording has been made on a legacy 26-bit, 8-channel recorder bit-split encode and dual-wire operation, the bit-split is still decoded but the 24-bit output will remain as 96kHz *dual-wire* (i.e., the *clock* rate will stay at 48kHz). The AES INPUT *must* be set to SINGLE.

Pro Tools® digital outputs

- The GX8-AES card provides a GXD8 connected to Pro Tools with four AES outputs (eight audio channels) out of Pro Tools. These will carry the same audio as the analogue outputs.

Format Conversion

- By combining the GX8-AES card with another expansion card (e.g., ADAT, TDIF, SDIF) it is possible to convert between these formats

- Note that it is not possible at this time to convert digitally from single-wire to dual-wire, dual-wire to single-wire, or any other combination.

Input

Duplicate AES/EBU inputs

- With the GXD8 running in single-wire mode, the GX8-AES card provides the GXD8 with a second set of AES/EBU inputs.

Eight channels of dual-wire, four channels of quad-wire

- With the GX8-AES card plugged into Slot 1 or 2, it is possible to input 8 channels of dual-wire and four channels of quad-wire. This is the *only* way to input eight channels of 192kHz audio. The four AES/EBU inputs on the GX8-AES card may be used in combination with the main GXD8 AES/EBU inputs or instead with digital inputs of another card plugged into the other slot. The INPUT SOURCE button determines what bank of inputs (main, slot 1 or slot 2) drive what analogue outputs.

- The following table shows what is output from what slot in what mode:

Wire Mode	Input Source	Analogue Outputs			
		1 and 2	3 and 4	5 and 6	7 and 8
Single	Main AES	Main AES	Main AES	Main AES	Main AES
	Slot One	Slot One	Slot One	Slot One	Slot One
	Slot Two	Slot Two	Slot Two	Slot Two	Slot Two
Dual	Main AES	Main AES	Main AES	Slot One	Slot One
	Slot One	Slot One	Slot One	Slot Two	Slot Two
	Slot Two	Slot Two	Slot Two	Slot One	Slot One
Quad	Main AES	Main AES	Slot One	No Output	
	Slot One	Slot One	Slot Two		
	Slot Two	Slot Two	Slot One		

- These combinations, in conjunction with the INPUT SOURCE button, allow eight channels of dual-wire to be input via two slot cards and therefore from two ADAT or TDIF sources.

Pro Tools digital Inputs

- In Pro Tools mode, when the main AES inputs on the GXD8 are connected from an ADC (e.g., GXA8) for analogue input, the GX8-AES card provides a second bank of AES inputs. Alternatively, the GX8-AES card may be used to connect to the GXA8 instead. The GX8-AES may selected as the Pro Tools input source in two ways:-

   1. Select the GX8-AES card slot (the one *not* occupied by the Pro Tools card) as the input source using the INPUT SOURCE button on the front panel. This will select all eight audio channels as from the GX8-AES.

   2. Leave the INPUT SOURCE set to AES. Use the *Other Options* panel within the Pro Tools Hardware Setup control panel to select *Digital* for each channel pair. This method allows a mix of main AES inputs and GX8-AES card inputs. Note that the PPMs on the GXA8 will always show the main AES input level in this case.

Ensure that the digital source is locked to the rest of the Pro Tools system. See the Genex Workstation Interface card user manual for more information.

Specification

Resolution .... up to 24 Bits
Channels .... 8 inputs 8 outputs
Sample rate .... up to 96kHz
Power requirements...5V dc via slot interface

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