

NTP TECHNOLOGY

AUDIO ROUTING SOLUTIONS



User Guide

Dual 3G/HD/SD SDI audio embedder/deembedder card for Penta 720

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General description.

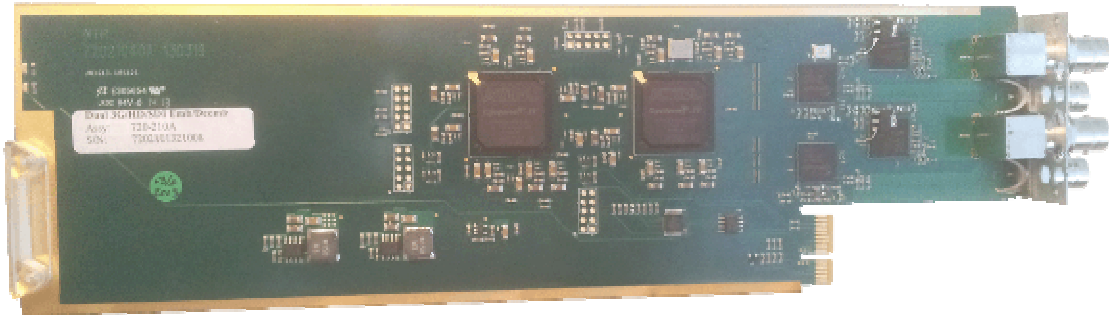


Figure 1, Picture of the card

The Penta 720-210 card is a dual 3G/HD/SD SDI audio embedder/deembedder card for insertion in the Penta 720 Modular I/O router interface. 8 cards can be installed providing a total of 16 3G/HD/SD SDI embedder/deembedders in one unit.

The 720-210 card offers multi format support for SDI formats up to 3G with auto detection of the input format, and can be used for a variety of different applications in an embedded audio and video environment.

The 720-210 card interfaces the embedded audio signals via the internal bus of the Penta 720 and each card provides two times 16 input and 16 output audio channels, giving a total of 256 I/O channels which are interfaced to the matrix core and I/O interfaces..

Penta 720 provides 192 channels on 3 MADI I/Os, 8 AES3 I/O channels (16 mono channels), 64 channels via Pro Tools HDX™ interface, and 64 channels via the NTP IP Ethernet interface powered by Dante.

All installation guides and more documentation can be downloaded from www.ntp.dk

Features

The block diagram of the embedder/deembedder circuit is shown below.

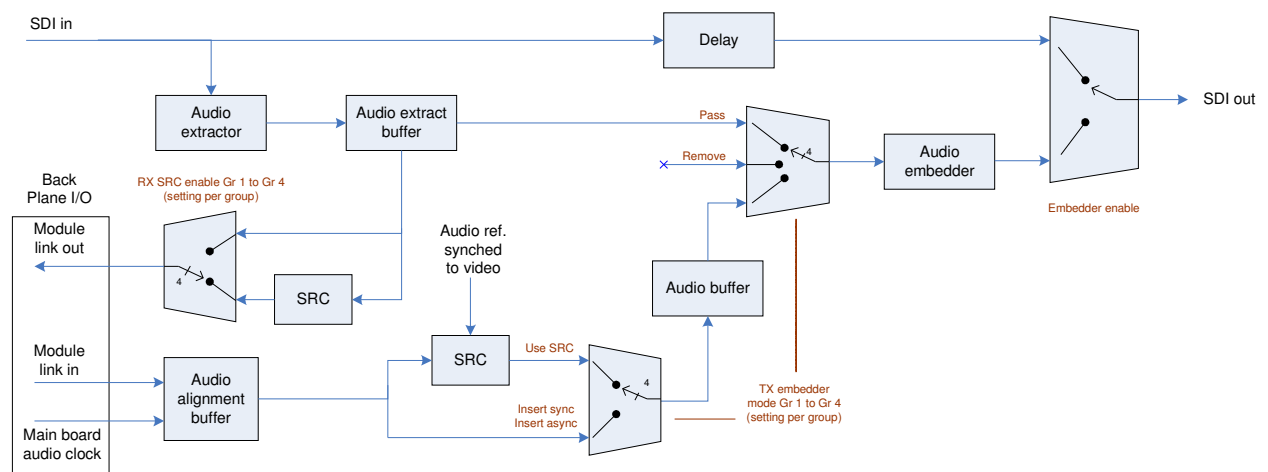


Figure 2, Block diagram of the card

The Penta 720-210 card is a dual 3G/HD/SD SDI audio embedder/deembedder card, which has two separate sets of embedders and deembedders compliant with the relevant SMPTE standards for SD, HD and 3G video SDI signals, and audio embedding and deembedding. Some legacy formats for SD in relation to asynchronous AES sources are however not implemented.

Each channel of the Penta 720-210 card has a separate embedder and deembedder which can operate independently or together. In order to embed audio in the SDI video signal a video input has to be applied, since the cards does not have an on board video frame generator.

Deembedding of the audio is always enabled. Sample rate conversion can be enabled for the four embedded audio groups individually. Each embedded audio group consist of two AES/EBU channels i.e. 4 mono channels. The multiplexer/router of the Penta 720 will relate to all audio which is available in the groups.

The frequency of the incoming video can be asynchronous to the audio sample rate of the Penta 720 Multiplexer/router or a different sample rate, In this case 'Rx Src' has to be selected when enabling the audio groups. The Penta 720 frame is normally synchronised to a "house" reference clock signal, which can be different from or equal to the clock reference for the video signal.

The embedder can be configured for each audio group to insert audio synchronously, asynchronously or sample rate converted. Incoming audio groups can also be dropped without insertion or passed trough.

If the frequency of the incoming video is asynchronous to the audio sample rate the 'src' mode has to be selected. Only audio groups that are configured to be inserted can be routed from the Penta 720 Multiplexer/router.

Note that the Penta 720-210 card does not incorporate delay buffers for the audio for alignment of the audio to an inherent video delay. The processing of the audio on the cards has a delay of about 10 samples.

Configuration and operation

The Penta 720 installed with the Penta 720-210 dual 3G/HD/SD SDI audio embedder/deembedder cards can be operated as a part of a router system, where the configuration of the unit is managed by the router control system and the config program of the VMC software package, and the routing of signals via the Statview or VMC 2 software. When the unit is used in stand alone applications the configuration and control is done via the Penta Manager PC software application. The unit will always store the latest settings made, and the Penta Manager operating software is only needed for changing the setup of the unit or monitoring the status.

This section describes the functionality when controlled via Penta Manager but the same functionality is available when managed from an NTP router control system.

For more information on installing the Penta Manager software please refer to the "Penta Manager User Software Type 665-100 User Guide".

Card configuration

The Penta 720-210 dual 3G/HD/SD SDI audio embedder/deembedder card is configured by selecting the Penta 720 unit in the Device Section and then selecting the 'Settings' button. In the Device Settings window the tab 'Card Configurations' has to be activated. Figure 3 below show the setting window for the various I/O cards. For each slot position the card type can be seen. By selecting the required card the configuration can be made.

Two independent 3G/HD/SD SDI audio embedder/deembedder channels are available on each card. The possible setting for each of these channels are:

Embedder	enable or disable	If disabled the SDI output is transparent from the input.
TX sample rate	32, 44,1 or 48 kHz	Defines the sample rate of the embedded audio for the complete SDI frame

Tx embedder mode group 1	pass, remove, src, sync, async	See description above.
Tx embedder mode group 2	pass, remove, src, sync, async	See description above.
Tx embedder mode group 3	pass, remove, src, sync, async	See description above.
Tx embedder mode group 4	pass, remove, src, sync, async	See description above.
Rx SRC group 1	enable or disable	Selection of SRC
Rx SRC group 2	enable or disable	Selection of SRC
Rx SRC group 3	enable or disable	Selection of SRC
Rx SRC group 4	enable or disable	Selection of SRC

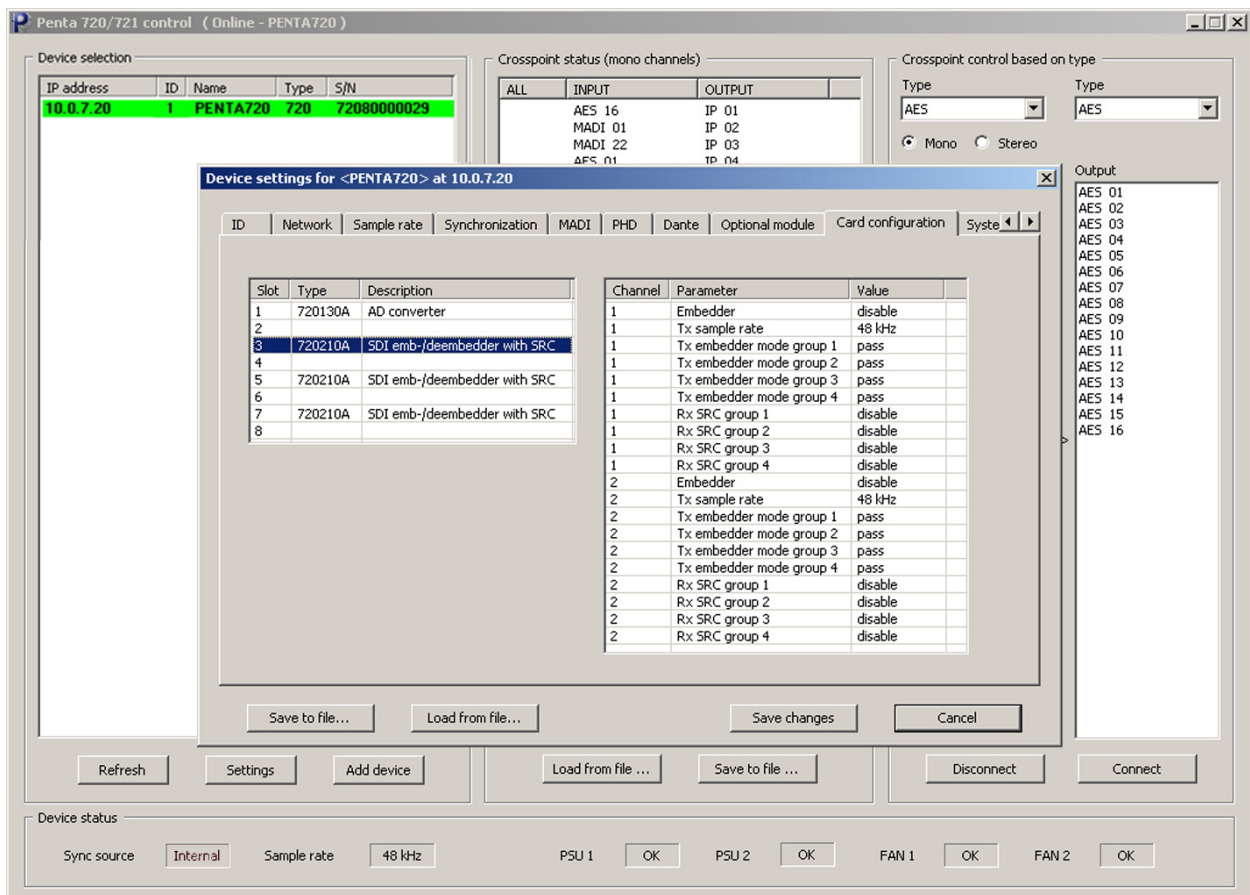


Figure 3, Configuration of the I/O cards

Embedded audio routing

Once the Penta 720-210 dual 3G/HD/SD SDI audio embedder/deembedder cards are configured the audio can be routed via the cross point control interface of the Penta Manager software. The names of the audio channels relate to the card position in which the Penta 720-210 cards are installed in the Penta 720 frame, and appears as mono channels in the cross point control I/O list. This means that a maximum of 32 input channels and 32 output channels are available on each card.

Routing should be established between the appropriate digital interface on the Penta 720 frame I/O structure and the card channels.

Routing can be done dynamically, with no audible artefacts.

Figure 4 below show the routing window of the Penta Manager.

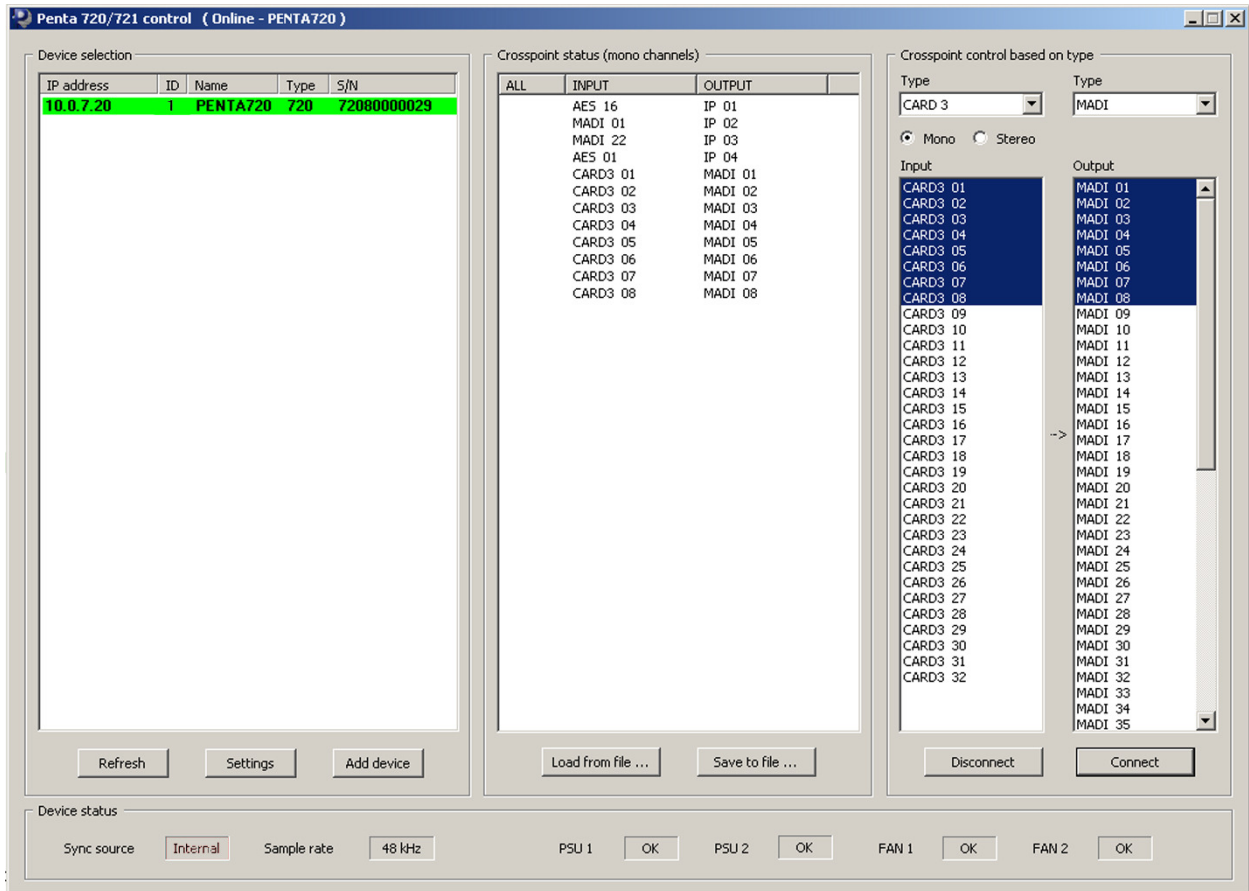
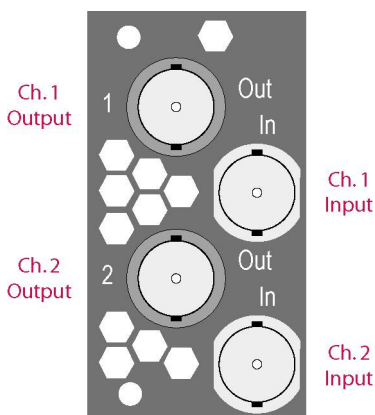


Figure 4, Routing window

Video I/O Connection



The SDI/HD/3G embedder/deembedder card for the Penta 720 is interfaced via 4 BNC connectors on the card, which are accessible from the rear panel of the Penta 720 chassis.

The two top connectors are used for SDI channel 1 and the lower connectors for SDI channel 2.

For more a detailed description of the card please refer to the specific user guides for these cards

Specifications

General

Signal type compliance	Serial digital video acc. to SMPTE,
Formats: SD	292M, 424M, 259M, SMPTE 425 A+B 525 / 59.94Hz, 625/50Hz
Formats: HD	720p / 60 / 59.94 / 50 / 30 / 29.97 / 25 / 24 / 23.98 Hz 1080i / 60 / 59.94 / 50 Hz 1080p / 30 / 29.97 / 25 / 24 / 23.98 Hz 1080psF / 25 / 24 / 23.98 Hz
Formats: 3G.....	1080p / 60 / 59.94 / 50 Hz (Level A)
Return Loss	> 15dB (270Mbit and 1.48 Gbit) > 10dB (2.97Gbit)
Input impedance	75 Ohm
Connector	BNC

SDI input

Signal Type	3G/HD/SD with automatic video format and standard detection,
No. of inputs.....	2
Cable length 3G/HD/SD.....	120/180/320 m (Belden 1694A)

SDI output

Signal Type	3G/HD/SD .Output format Follows input format
No. of outputs	2
Timing Jitter	3G/HD/SD: < 2.0/1.0/0.2 UI
Alignment Jitter	3G/HD/SD: < 0.3/0.2/0.2 UI

Audio I/O, processing

No. of inputs/outputs.....	16 channel on each SDI I/O
Deembedding modes	16 channels, selectable SRC for Gr. 1 to Gr. 4, Selectable pass through or drop for all channels
Embedding modes.....	16 channels, selectable for Gr. 1 to Gr. 4 Pass through, Insert synchronously, asynchronously or with SRC
Audio/Video sync	Synchronously or asynchronously with SRC
Sample rates.....	32, 44,1 and 48 kHz.

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