



# **SLD100/120/200/220**

Solid state drive based SD-SDI uncompressed long time delay with optional two individual output delays and optional logo insertion

**Installation, Operation and Upgrade manual**





*Synapse*

## TECHNICAL MANUAL

SLD100

SLD120

SLD200

SDL220



Lange Wagenstraat 55

NL-5126 BB Gilze

The Netherlands

Phone: +31 161 850 450

Fax: +31 161 850 499

E-mail: [Info@axon.tv](mailto:Info@axon.tv)

Web: [www.axon.tv](http://www.axon.tv)



**WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRICAL SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE**

- ALWAYS disconnect your entire system from the AC mains before cleaning any component. The product frame (SFR18, SFR08 or SFR04) must be terminated with three-conductor AC mains power cord that includes an earth ground connection. To prevent shock hazard, all three connections must always be used.
- NEVER use flammable or combustible chemicals for cleaning components.
- NEVER operate this product if any cover is removed.
- NEVER wet the inside of this product with any liquid.
- NEVER pour or spill liquids directly onto this unit.
- NEVER block airflow through ventilation slots.
- NEVER bypass any fuse.
- NEVER replace any fuse with a value or type other than those specified.
- NEVER attempt to repair this product. If a problem occurs, contact your local Axon distributor.
- NEVER expose this product to extremely high or low temperatures.
- NEVER operate this product in an explosive atmosphere.

**Warranty:** Axon warrants their products according to the warranty policy as described in the general terms. That means that Axon Digital Design BV can only warrant the products as long as the serial numbers are not removed.

**Copyright © 2001 – 2013 AXON Digital Design B.V.**

Date created: 19-06-2012  
Date last revised: 05-12-2013

**Axon, the Axon logo and Synapse are trademarks of Axon Digital Design B.V.**

This product complies with the requirements of the product family standards for audio, video, audio-visual entertainment lighting control apparatus for professional use as mentioned below.



|                 |          |
|-----------------|----------|
| EN60950         | Safety   |
| EN55103-1: 1996 | Emission |
| EN55103-2: 1996 | Immunity |

Axon Digital Design  
SLD100/120/200/220



Tested To Comply  
With FCC Standards

FOR HOME OR OFFICE USE

This device complies with part 15 of the FCC Rules  
Operation is subject to the following two conditions:  
(1) This device may cause harmful interference, and  
(2) This device must accept any interference received, including interference that may cause undesired operation.

## Table of Contents

|  |           |
|--|-----------|
| <b>Introduction to Synapse</b>                           | <b>5</b>  |
| An Introduction to Synapse                               | 5         |
| Local Control Panel                                      | 5         |
| Remote Control Capabilities                              | 5         |
| <b>Unpacking and Placement</b>                           | <b>6</b>  |
| Unpacking  | 6         |
| Placing the card   | 6         |
| (Re)placing Solid State Disk                             | 6         |
| Axon approved disks                                      | 7         |
| <b>A Quick Start</b>                                     | <b>8</b>  |
| When powering-up   | 8         |
| Changing settings and parameters                         | 8         |
| Front Panel Control                                      | 8         |
| Example of changing parameters using front panel control | 9         |
| Axon Cortex Software                                     | 10        |
| Menu Structure Example                                   | 10        |
| <b>The SLD Card</b>                                      | <b>11</b> |
| Introduction   | 11        |
| Features   | 11        |
| Applications   | 12        |
| Block schematic  | 12        |
| <b>Settings Menu</b>                                     | <b>13</b> |
| Introduction   | 13        |
| Out-Frmt   | 13        |
| RunIn-Frames   | 13        |
| RunOut-Frames  | 13        |
| Lock-Mode  | 13        |
| Ref-Type   | 13        |
| Time-Source  | 13        |
| Output1-enable   | 13        |
| Output1-Overlay  | 14        |
| Delay1_Hours   | 14        |
| Delay1_Mins  | 14        |
| Delay1_Seconds   | 14        |
| Delay1_Frames  | 14        |
| Output2-enable   | 14        |
| Output2-Overlay  | 15        |
| Delay2_Hours   | 15        |
| Delay2_Mins  | 15        |
| Delay2_Seconds   | 15        |
| Delay2_Frames  | 15        |
| Panic_Fill   | 15        |
| Monitor-Temp   | 15        |
| Monitor-Disks  | 15        |
| Marker   | 16        |
| PrstEditView   | 16        |
| #Marker-Val  | 16        |
| #Marker-Cmd  | 16        |
| #Marker-Name   | 16        |
| #Marker-H  | 16        |
| #Marker-M  | 16        |
| #Marker-S  | 16        |
| #Marker-F  | 16        |
| LogoA1_Act   | 17        |
| LogoA1_edit  | 17        |
| #LogoA1-Name   | 17        |
| #LogoA1-Origin   | 17        |
| #LogoA1-XPos   | 17        |
| #LogoA1-YPos   | 17        |
| #LogoA1-Width  | 17        |
| #LogoA1-Height   | 17        |
| #LogoA1-Fade-In  | 18        |
| #LogoA1-Fade-Out   | 18        |
| LogoA2_Act   | 18        |
| LogoA2_edit  | 18        |
| #LogoA2-Name   | 18        |
| #LogoA2-Origin   | 18        |
| #LogoA2-XPos   | 18        |

|  |           |
|--|-----------|
| #LogoA2-YPos                               | 18        |
| #LogoA2-Width                              | 18        |
| #LogoA2-Height                             | 19        |
| #LogoA2-Fade-In                            | 19        |
| #LogoA2-Fade-Out                           | 19        |
| LogoB1_Act                                 | 19        |
| LogoB1_edit                                | 19        |
| #LogoB1-Name                               | 19        |
| #LogoB1-Origin                             | 19        |
| #LogoB1-XPos                               | 19        |
| #LogoB1-YPos                               | 19        |
| #LogoB1-Width                              | 20        |
| #LogoB1-Height                             | 20        |
| #LogoB1-Fade-In                            | 20        |
| #LogoB1-Fade-Out                           | 20        |
| LogoB2_Act                                 | 20        |
| LogoB2_edit                                | 20        |
| #LogoB2-Name                               | 20        |
| #LogoB2-Origin                             | 20        |
| #LogoB2-XPos                               | 20        |
| #LogoB2-YPos                               | 21        |
| #LogoB2-Width                              | 21        |
| #LogoB2-Height                             | 21        |
| #LogoB2-Fade-In                            | 21        |
| #LogoB2-Fade-Out                           | 21        |
| NTPServer                                  | 21        |
| NTPOffsetH                                 | 21        |
| NTPOffsetM                                 | 21        |
| IP_Conf0                                   | 21        |
| mIPO                                       | 21        |
| mNMO                                       | 21        |
| mGWO                                       | 21        |
| NetwPrefix0                                | 21        |
| <b>Status Menu</b>                         | <b>22</b> |
| Introduction                               | 22        |
| SDI-Input_1                                | 22        |
| SDI-Input_2                                | 22        |
| Buffer-Size                                | 22        |
| Buffer-Fill                                | 22        |
| Marker1-Pos ~ Marker4_Pos                  | 22        |
| GPI-Active                                 | 22        |
| Disk1_Status                               | 23        |
| Disk1_Model                                | 23        |
| Disk1_Serial                               | 23        |
| Disk1_Size                                 | 23        |
| Disk1_AvgRead                              | 23        |
| Disk1_AvgWrite                             | 23        |
| Disk2_Status                               | 23        |
| Disk2_Model                                | 23        |
| Disk2_Serial                               | 23        |
| Disk2_Size                                 | 24        |
| Disk2_AvgRead                              | 24        |
| Disk2_AvgWrite                             | 24        |
| CPU_Env_Temp                               | 24        |
| CPU_Core_Temp                              | 24        |
| FPGA_Env_Temp                              | 24        |
| FPGA_Core_Temp                             | 24        |
| FPGA_Fan                                   | 24        |
| IP_Addr0                                   | 24        |
| IPO  | 24        |
| MAC0                                       | 24        |
| NMO  | 24        |
| GWO  | 24        |
| <b>Events Menu</b>                         | <b>25</b> |
| Introduction                               | 25        |
| What is the Goal of an event?              | 25        |
| Events                                     | 25        |
| Announcements                              | 25        |
| What information is available in an event? | 25        |
| The Message String                         | 25        |
| The Tag                                    | 25        |
| Defining Tags                              | 26        |
| The Priority                               | 26        |

|   |           |
|---|-----------|
| The Address                                 | 26        |
| <b>LED Indication</b>                       | <b>27</b> |
| Introduction                                | 27        |
| Error LED                                   | 27        |
| Input_1 LED                                 | 27        |
| Input_2 LED                                 | 27        |
| ANC Data LED                                | 27        |
| Reference LED                               | 27        |
| Data Error LED                              | 27        |
| Connection LED                              | 27        |
| Error LED                                   | 27        |
| <b>Connector Panels</b>                     | <b>28</b> |
| D-sub pinning                               | 28        |
| <b>Quad speed bus explained</b>             | <b>29</b> |
| Some examples                               | 31        |
| <b>Uploading logos using cortex</b>         | <b>34</b> |
| Introduction                                | 34        |
| Uploading files                             | 34        |
| <b>Uploading logos using WebDav or FTP.</b> | <b>36</b> |
| Introduction                                | 36        |
| WebDAV                                      | 36        |
| FTP   | 36        |
| Uploading files using Windows XP            | 36        |
| <b>Reprogramming SLDxxx modules</b>         | <b>40</b> |
| Before you start                            | 40        |
| Functionality explanation                   | 40        |
| Choosing .spf files                         | 40        |
| Requirements                                | 40        |
| Using Cortex help files                     | 40        |
| Precautions                                 | 41        |
| Backup your settings                        | 41        |
| At your own risk                            | 41        |
| Setting up card                             | 42        |
| Opening the upload window                   | 43        |
| Selecting the spf file                      | 43        |
| Selecting the right card(s)                 | 44        |
| Starting the upload process                 | 44        |
| Ready programming                           | 45        |
| Update Cortex form (CLF file)               | 45        |
| Testing                                     | 45        |
| <b>GNU Public License version 2</b>         | <b>46</b> |
| <b>Contacting Axon costumer support</b>     | <b>49</b> |

# 1 Introduction to Synapse

## An Introduction to Synapse

Synapse is a modular system designed for the broadcast industry. High density, intuitive operation and high quality processing are key features of this system. Synapse offers a full range of converters and processing modules. Please visit the AXON Digital Design Website at [www.axon.tv](http://www.axon.tv) to obtain the latest information on our new products and updates.

## Local Control Panel

The local control panel gives access to all adjustable parameters and provides status information for any of the cards in the Synapse frame, including the Synapse rack controller. The local control panel is also used to back-up and restore card settings. Please refer to the rack controller manuals for a detailed description of the local control panel, the way to set-up remote control over IP and for frame related settings and status information.

## Remote Control Capabilities

The remote control options are explained in the rack controller manual. The method of connection to a computer using Ethernet is also described in the ERC/ERS/RRC/RRS manual.



**CHECK-OUT: “AXON CORTEX” SOFTWARE WILL INCREASE SYSTEM FLEXIBILITY OF ONE OR MORE SYNAPSE FRAMES**

Although not required to use Cortex with a Synapse frame, you are strongly advised to use a remote personal computer or laptop PC with Axon Cortex installed, as this increases the ease of use and understanding of the modules.

## 2 Unpacking and Placement

### Unpacking

The Axon Synapse card must be unpacked in an anti-static environment. Care must be taken NOT to touch components on the card – always handle the card carefully by the edges. The card must be stored and shipped in anti-static packaging. Ensuring that these precautions are followed will prevent premature failure from components mounted on the board.

### Placing the card

The Synapse card can be placed vertically in an SFR18 frame or horizontally in an SFR08 frame. **We advice not to use the SLD in an SFR04!**

Locate the two guide slots to be used, slide in the mounted circuit board, and push it firmly to locate the connectors.

The SLD100 and SLD200 consist out of two cards, the processing card and the card containing the SSD's. The cards have to be placed next to each other with the SSD card one slot number **lower** than the processing card. This means in an SFR18 the SSD card has to be inserted one slot on the **left** hand side of the processing card. In an SFR08 do **not** try to insert the processing card in slot 5 and the SSD in slot 4. This will **not** work!

Correct insertion of card is essential as a card that is not located properly may show valid indicators, but does not function correctly.

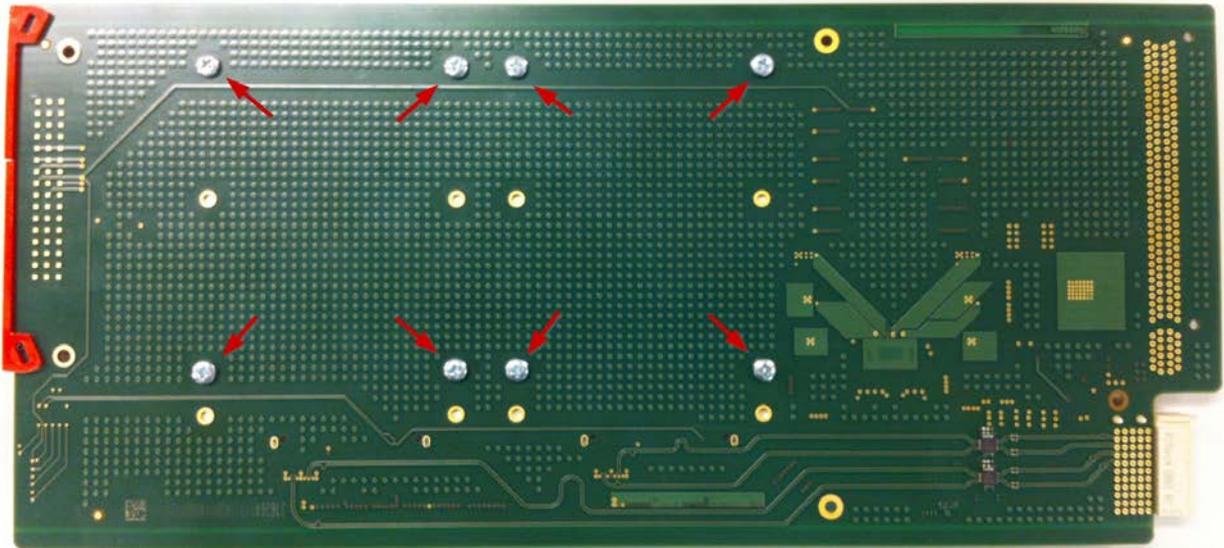
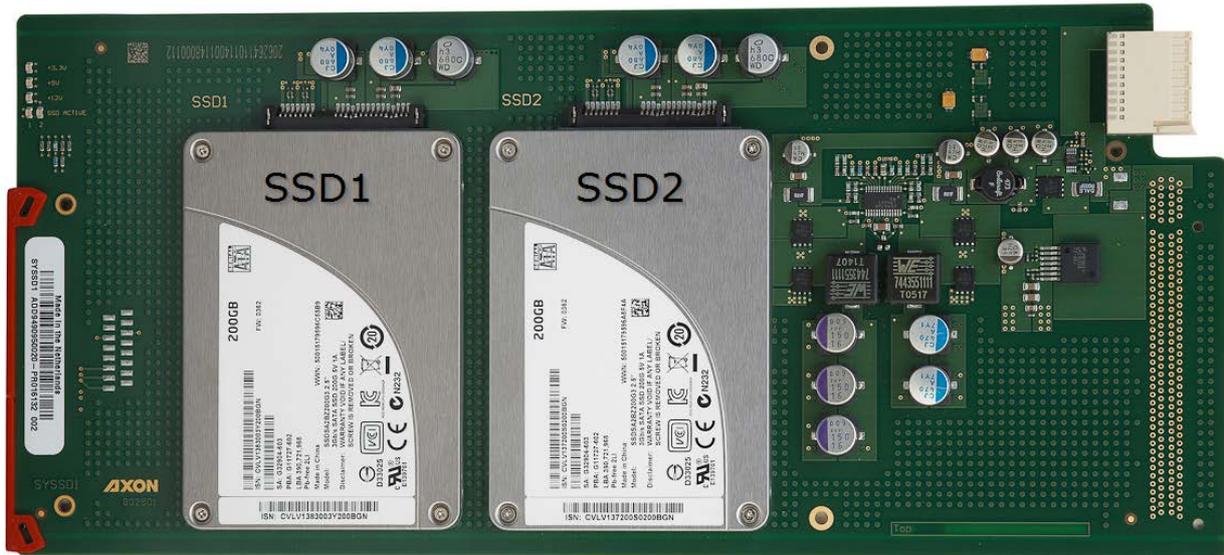
**NOTE:** On power up all LED's will light for a few seconds, this is the time it takes to initialise the card.

### (Re)placing Solid State Disk

The Solid state disks have to be manually (re)placed. To do this, synapse card which contains the SSD's will have to be pulled out of the frame. This will cause output downtime!

**After reseating the card, the buffer will be cleared and the recording starts from the beginning!**

SSD1 is the disk closest to the card grip. SSD2 is the disk closest to the card connector, clearly indicated on the PCB itself. Use a small Philips screwdriver to unscrew the 4 screws of the disk that requires replacement. Carefully slide the disk out of the SATA connectors. Take the new disk and gently slide it into the SATA connectors. When the disk is in place, screw the disk steadfast onto the board with the 4 screws (M3\*5CK). Below pictures (next page) shows the position of the disks and the screws of each SSD on the **bottom side** of the card.



**Axon approved disks**

Please only use Axon tested and approved disks. These can be ordered at Axon or you can buy them yourself. The Approved disks are:

- Intel SSD S3700 100 GB SSDSC2BA100G301 (1,5h delay); Axon art. Nr: MIC0000000001
- Intel SSD S3700 200 GB SSDSC2BA200G301 (3h delay) ; Axon art. Nr: MIC0000000002
- Intel SSD S3700 400 GB SSDSC2BA400G301 (6h delay) ; Axon art. Nr: MIC0000000003

<http://ark.intel.com/nl/search?q=s3700>

### 3 A Quick Start

#### When powering-up

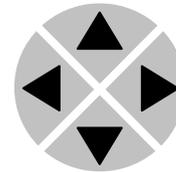
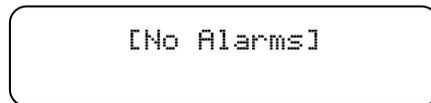
On powering up the Synapse frame, the card set will use basic data and default initialisation settings. All LED's will light during this process. After initialisation, several LED's will remain lit – the exact number and configuration is dependent upon the number of inputs connected and the status of the inputs.

#### Changing settings and parameters

The front panel controls or the Axon Cortex can be used to change settings. An overview of the settings can be found in chapter 5, 6 and 7 of this manual.

#### Front Panel Control

Front Panel Display and Cursor



Settings are displayed and changed as follows;

Use the cursor 'arrows' on the front panel to select the menu and parameter to be displayed and/or changed.

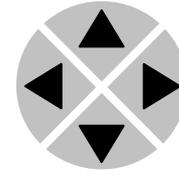
- Press ► To go forward through the menu structure.
- Press ◀ To go back through the menu structure.
- Press ▲ To move up within a menu or increase the value of a parameter.
- Press ▼ To move down through a menu or decrease the value of a parameter.

NOTE: Whilst editing a setting, pressing ► twice will reset the value to its default.

**Example of  
changing  
parameters using  
front panel control**

With the display as shown below

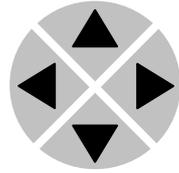
```
RRC18 [Select Card]
>S01=SFS10
```



Pressing the ► selects the SFS10 in frame slot 01.

The display changes to indicate that the SFS10 has been selected. In this example the Settings menu item is indicated.

```
SFS10 [Select Menu]
>Settings
```

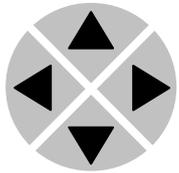


Pressing the ► selects the menu item shown, in this example Settings.

(Pressing ▲ or ▼ will change to a different menu eg Status, Events).

The display changes to indicate that the SFS10 Settings menu item SDI-Format has been selected and shows that its current setting is Auto.

```
SFS10 [Settings]
>SDI-Format=Auto
```

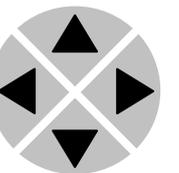


Pressing the ► selects the settings item shown, in this example SDI-Format.

(Pressing ▲ or ▼ will change to a different setting, eg Mode, H-Delay).

The display changes to indicate that the SFS10 Edit Setting menu item SDI-Format has been selected.

```
SFS10 Edit Setting]
SDI-Format>Auto
```



To edit the setting of the menu item press ▲ or ▼.

All menu items can be monitored and/or changed in this way. Changing a setting has an immediate effect.



**Axon Cortex  
Software**

Axon Cortex can be used to change the settings of Synapse modules from a PC, either locally or remotely. The software enables communication based on TCP/IP between the Setup PC and Synapse frames/modules.

Each Synapse frame is addressed through its rack controller's unique IP address, giving access to each module, its menus and adjustment items. Axon Cortex has access to data contained within the Synapse module and displays it on a GUI. The software has an intuitive structure following that of the module that it is controlling.

For operation of Axon Cortex, please refer to the Cortex help files.

**Menu Structure  
Example**

| Slot | Module | Item            | Parameter      | Setting |
|------|--------|-----------------|----------------|---------|
| ▲    |        |                 |                |         |
| ▲    |        |                 |                |         |
| S02  |        | Identity        |                |         |
| ▲    |        | ▲               |                |         |
| S01  | SFS10  | ▶ Set-<br>tings | ▶ Standard_dig | ▶ Auto  |
| ▼    |        | ▼               | ▼              | ▼       |
| S00  | RRC18  | Status          | Mode           | 625     |
|      |        | ▼               | ▼              | ▼       |
|      |        | Events          | Ref-Input      | 525     |
|      |        |                 | ▼              |         |
|      |        |                 | H-Delay        |         |
|      |        |                 | ▼              |         |
|      |        |                 | ▼              |         |

**NOTE:** Further information about Front Panel Control and Axon Cortex can be obtained from the ERC, ERS, RRC and RRS operational manuals and the Cortex help files.

## 4 The SLD Card

### Introduction

The SLD100/200 family are a long time SD-SDI uncompressed baseband video delays. It can store and delay SD material, including all blanking, as RAW data.

The 100 has one delayed output the 200 has 2 delayed outputs individually adjustable as for instance +1 hour and +2 hour. The SLDx20 adds a bug inserter for channel ident applications but also as an emergency overlay with its full frame capability.

These long time delays can store and delay up to 6 hours of SDI material depending on the size of disks, bitrates and ANC data. (with 2x 400G drives)

The use of SSD disks makes this unit extremely reliable, low power and it will provide low maintenance.<sup>1)</sup> The delay length is depending on the used size of the SSD disks giving increased capacity at low cost in upcoming years.

MTBF of disks is dependent on storage capacity and brand (type). Twice the storage than needed means theoretical twice the lifecycle as this is coupled to the amount of write cycles, not read cycles.

Compared to competitive server based solutions the SLD100 family can be considered as very GREEN. The power consumption of this dual slot device is approximately 40W. This is a 10 fold saving of a comparable server based unit that draws > 350W average saving a significant amount of money due to the low operating power and accompanying air conditioning.

The hardware of the long time delays is fully 3Gb/s and HD-SDI capable ensuring future proof investment for later planned updates into 3Gb/s and HD

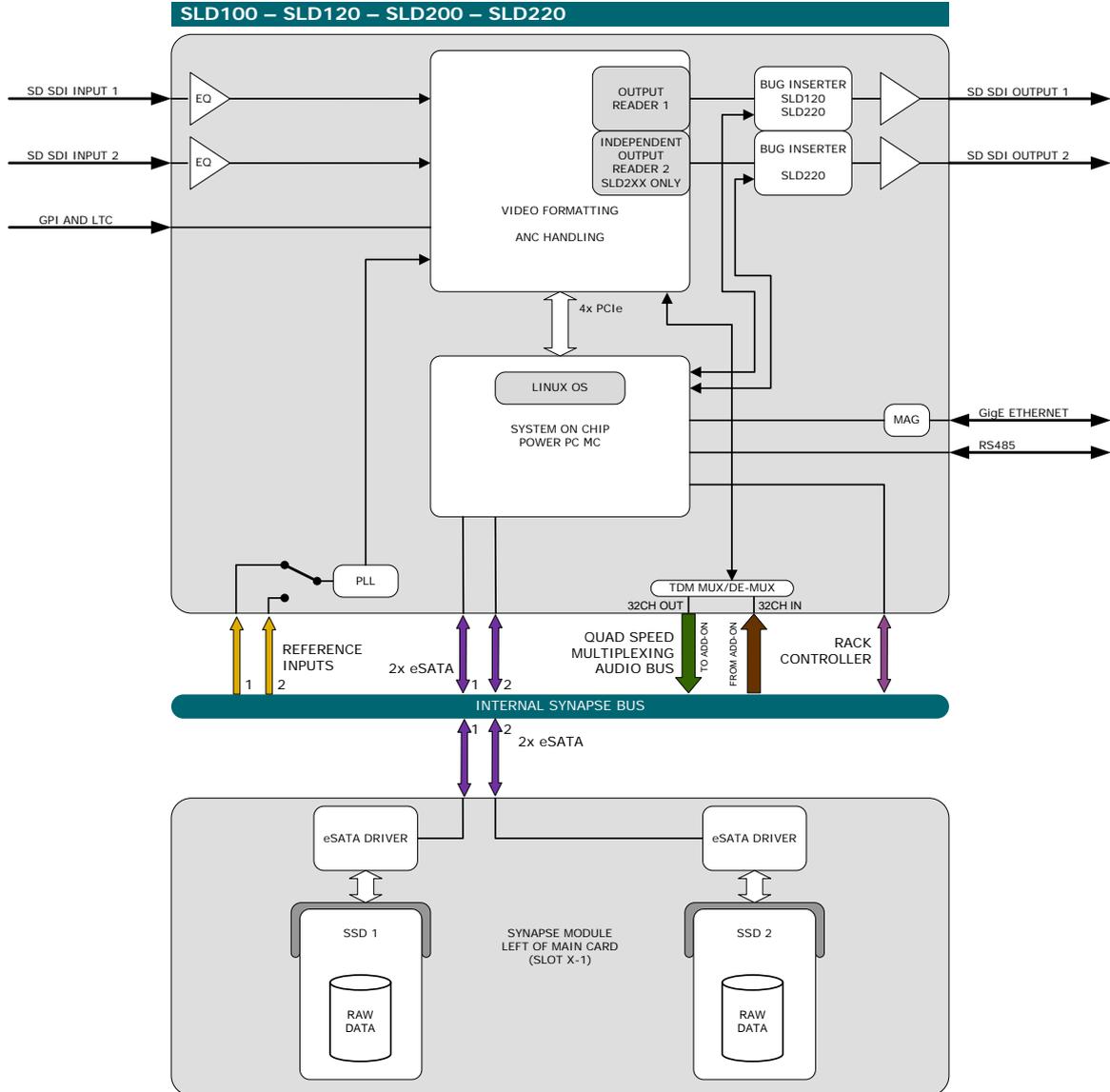
### Features

- SLD100 = basic single channel delay unit
- SLD120 = as SLD100 with additional bug inserter
- SLD200 = dual output delay unit (fully independent outputs with independent delay settings)
- SLD220 = as SLD200 with two additional bug inserters
- Capable of delaying video up to 6 hours (with 2 400G disks), ANC data and disk space
- Two preset banks per bug inserter (SLD120/220 only) with memory for 16 bugs and 4 full screen stills independent per output (two keyers)
- Output freezes on disk failure
- Targa logo support
- SSD20 card added for SMART disk status
- RAW delay
- Compatible with 270 Mbit/s (SMPTE 259M) 50 and 59.94Hz
- Full control and status monitoring through the front panel of the SFR04/SFR08/SFR18
- frame and the Ethernet port (ACP)

## Applications

- +1 hour film channels (up to +6 hours)
- Time zone compensation
- Clip server

## Block schematic



## 5 Settings Menu

|                       |  |
|-----------------------|--|
| <b>Introduction</b>   | <p>The settings menu displays the current state of each SLD setting and allows you to change or adjust it. Settings can be changed using the front panel of the Synapse frame (SFR18 or SFR08) or with Cortex. Also the Synapse or Cortex control panels can be used. Please refer to chapter 3 for information on the Synapse front panel control and Cortex.</p> <p><i>Note:</i> All items preceded with a #-sign are part of the presets.</p> |
| <b>Out-Frmt</b>       | <p>With <code>Out-Frmt</code> you can set what the output should be. This setting is only used for the delay options. This will not up/down/cross convert your input signal. Possible settings are:</p> <ul style="list-style-type: none"> <li>▪ SD525</li> <li>▪ SD625</li> </ul>   |
| <b>RunIn-Frames</b>   | <p>Here you set what should be on the output during run-in (the time between input and the start of the delayed output). You can choose the output during this period to be a colorbar, black, grey, green or a freeze of the first frame to be played. Default is Freeze.</p>   |
| <b>RunOut-Frames</b>  | <p>Here you set what should be on the output during run-out (The time after all the Record-Run content has been played). You can choose the output during this period to be a colorbar, black, grey or green. Default is Colorbar.</p>   |
| <b>Lock-Mode</b>      | <p><code>Lock-Mode</code> determines to what source the card is locked. This setting is fixed to reference input 1 (Ref1).</p>   |
| <b>Ref-Type</b>       | <p>Sets the type of incoming reference. This setting is fixed to Bi-Level.</p>   |
| <b>Time-Source</b>    | <p>Here you set the time synchronization source. Currently fixed to NTP.</p>   |
| <b>Output1-enable</b> | <p>Enables or disables output 1. What the output will be in delay, with respect to the input, is set with the settings with a 'Delay1_'-prefix. Can also be set to <code>Pause</code> (which will pause the output on the current frame) or to <code>Edit</code> (the output jumps to the active marker that can be modified)</p>  |

## Output1-Overlay

The SLD has on screen display which can show different kinds of information as overlay over video output 1. For the SLD120 and SLD220 you can set a logo as overlay on output 1.

These are the possible overlays:

- **HW-status:** showing CPU Environment temp, CPU core temp, FPGA Environment temp, FPGA Core temp and FPGA fan speed.
- **Disk-Status:** showing overall SSD status (tested mean the disk is tested Axon approved, untested means the disk is not tested and thus not approved by Axon), SSD model, SSD serial number, SSD size (in GB), Average reading bitrate and average writing bitrate.
- **Buffer-Status:** showing the status of the buffer and the markers. The total size of the buffer (the maximum achievable delay), the amount of buffer which is currently filled, The position of Output 1 and the position of Output 2. Next to these 4 buffer statuses the 4 marker values are indicated. In the graphical display of the buffer the markers are indicated in the respective colors.
- **Logo-InsertterA:** Overlay the logo(s) which is set with the Logo-insertterA settings (SLD120 and SLD220 only).
- **Logo-InsertterB:** Overlay the logo (s) which is set with the Logo-insertterB settings SLD220 only).
- **Panic1 ~ Panic4:** Four selectable full screen logo's intended for emergency application. (SLD120 and SLD220 only).

## Delay1\_Hours

With this setting you set the video delay hours of output 1 (with respect to the input).

## Delay1\_Mins

Here you set the video delay minutes of output1 (with respect to the input)

## Delay1\_Seconds

Here you set the video delay seconds of output1 (with respect to the input)

## Delay1\_Frames

Here you set the video delay frames of output1 (with respect to the input)

## Output2-enable

Enables or disables output 2. On the SLD100/120 the delay of output 2 is the same as the delay of output 1, set with the Delay1\_xxx settings. With the SLD200/220 output 2 can have a different delay than output 1. What the output will be in delay, with respect to the input, is set with the settings with a 'Delay2\_'-prefix in the SLD200/220. When the delay of output 2 on a SLD200/220 should be the same as output 1, you can set this setting to Delay1. Can also be set to **Pause** (which will pause the output on the current frame, only applicable for an SLD200/220) or to **Edit** (the output jumps to the active marker that can be modified, also only applicable for an SLD200/220)

|  |   |
|--|---|
| <b>Output2-Overlay</b>                     | The SLD has on screen display which can show different kinds of information as overlay over video output 2. For the SLD120 and SLD220 you can set a logo as overlay on output 2. The same overlays are possible as explained in Output1_Overlay.  |
| <b>Delay2_Hours</b><br>(SLD200/220 only)   | With this setting you set the video delay hours of output 2 (with respect to the input).  |
| <b>Delay2_Mins</b><br>(SLD200/220 only)    | Here you set the video delay minutes of output 2 (with respect to the input)  |
| <b>Delay2_Seconds</b><br>(SLD200/220 only) | Here you set the video delay seconds of output 2 (with respect to the input)  |
| <b>Delay2_Frames</b><br>(SLD200/220 only)  | Here you set the video delay frames of output 2 (with respect to the input)   |
| <b>Panic_Fill</b>                          | <p>Sets the fill mode of the Panic (emergency) overlay.</p> <p>Set to <b>Fit</b> will respect the incoming aspect ratio and fill the window using the maximum available length or width and leaving the empty areas black.</p> <p>Set to <b>Zoom</b>, the screen will be zoomed in, with respect to the incoming aspect ratio, causing the picture to be cut off on the sides when the window is not of the same aspect ratio.</p> <p>Set to <b>Anamorphic</b>, the picture will be set to fill the entire window but when the input aspect ratio is not the same as the aspect ratio of the window, the view will be anamorphic.</p> <p>In <b>Raw</b> the logo is displayed without adjustments.</p> |
| <b>Monitor-Temp</b>                        | With this setting you can change the way the temperature is measured. Can be set to <b>On</b> (constantly monitor the temperatures and update the temperature status items), <b>Once</b> (measure the temperatures and update the temp status items once, after which this setting returns of off) or <b>Off</b> (don't update the temp statuses).  |
| <b>Monitor-Disks</b>                       | With this setting you can change the way the disks are checked. Can be set to <b>On</b> (constantly monitors the statuses of the disks and updates the disk status items), <b>Once</b> (check the disk status and update the disk status items once, after which this setting returns to off) or <b>Off</b> (don't update the disk statuses).   |

|                     |  |
|---------------------|--|
| <b>Marker</b>       | This is the sort-of preset master for the marker settings. There are 4 marker presets: Marker_1, Marker_2, Marker_3 and Marker_4. With this setting you select which marker you want to view and/or change the settings of. Settings with a '#Marker-' prefix (further down the menu) are all part of this preset.   |
| <b>PrstEditView</b> | The markers function as a preset. With this setting set to Follow Active, the Marker settings will follow the active marker when the active Marker is changed. This to avoid confusion when changing the active. Set to Independent the Marker setting will not automatically follow active marker changes. By default set to Follow Active.   |
| <b>#Marker-Val</b>  | This is the actual value of the marker (selected with the Marker preset master setting). The value in the classic view is set in frames (up to 2147483647 frames). Please use the Cortex CLF of the SLD to change this setting in a more human-readable format (hours, minutes, seconds, frames).  |
| <b>#Marker-Cmd</b>  | There are a few default commands which you can perform with the marker presets: <ul style="list-style-type: none"> <li>- None: do nothing with the marker.</li> <li>- Mark Inp: the value of the marker is set to resemble the current input position.</li> <li>- Set Delay1: The 'Delay1_' settings are set to resemble the marker value. In other words: output 1 will start playing from the point of the marker.</li> <li>- Set Delay2 (SLD200 only): The 'Delay2_' settings are set to resemble the marker value. In other words: output 2 will start playing from the point of the marker.</li> <li>- Clear: completely clear the marker value (set to -1).</li> </ul> |
| <b>#Marker-Name</b> | With this setting you can give a name to the marker selected with the marker preset master setting. Maximum of 16 characters is allowed.   |
| <b>#Marker-H</b>    | Here you can set the marker position in hours  |
| <b>#Marker-M</b>    | Here you can set the marker position in minutes  |
| <b>#Marker-S</b>    | Here you can set the marker position in seconds  |
| <b>#Marker-F</b>    | Here you can set the marker position in frames   |

## LOGO-INSERTER

|  |   |
|--|---|
| <p><b>LogoA1_Act</b><br/>(SLD120/220 only)</p>     | <p>With this active preset it is possible to select presets of logo A1 for the processed output (8 preset available). These presets will have an instant effect on the output. If the menu item is preceded by ‘<b>#LogoA1-</b>’, it is possible to add this setting to a preset. The presets are stored in memory. It is also possible to change factory presets. Changing these presets has direct effect on the processed output.</p>  |
| <p><b>LogoA1_edit</b><br/>(SLD120/220 only)</p>    | <p>With the edit preset item it is possible to create your own presets for logo A1 without the applied changes having any instant effect on the processed output. There are 8 possible offline adjustable presets. You can freely change the selected edit preset, without the active preset being set to another setting. It will have no immediate effect on the processed output, until LogoA1_act is changed to the setting you adjusted with LogoA1_edit.</p>  |
| <p><b>#LogoA1-Name</b><br/>(SLD120/220 only)</p>   | <p>This setting displays the first 16 characters of the filename for the current LogoA1_edit logo. This is a read only item.</p> <p>If no logo is shown, one of the following messages are shown:</p> <ul style="list-style-type: none"> <li>▪ No file: There is no file to be displayed,</li> <li>▪ Unknown file format: File format isn’t recognized/suitable</li> <li>▪ VRAM, Out of Mem: Video RAM is out of memory. Nevertheless, files are being stored on the flash disk.</li> <li>▪ Error: file corruption: Uploaded file is corrupt and will be renamed to &lt;filename.extension&gt;.error</li> </ul> |
| <p><b>#LogoA1-Origin</b><br/>(SLD120/220 only)</p> | <p>With this setting you can change the #LogoA1-XPos and #LogoA1-YPos settings to default to Top-Left, Top-Right, Bottom-Left, Bottom-Right or Center positions. Default is Top-Left.</p>   |
| <p><b>#LogoA1-XPos</b><br/>(SLD120/220 only)</p>   | <p>This setting sets the horizontal position of logo A1. Can be ranging from -2047px till 2048 pixels. Default is pixel 0.</p>  |
| <p><b>#LogoA1-YPos</b><br/>(SLD120/220 only)</p>   | <p>This setting sets the vertical position of logo A1. Can be ranging from -2047px till 2048 pixels. Default is pixel 0.</p>  |
| <p><b>#LogoA1-Width</b><br/>(SLD120/220 only)</p>  | <p>This menu item indicates the width of the image currently in use by logo A1. This is a read only item.</p>   |
| <p><b>#LogoA1-Height</b><br/>(SLD120/220 only)</p> | <p>This menu item indicates the height of the image currently in use by logo A1. This is a read only item.</p>  |



**#LogoA1-Fade-In**  
(SLD120/220 only)

This item sets the fade-in time of logo A1 in frames, ranging from 0 to 200 frames. 0 frames is default.

**#LogoA1-Fade-Out**  
(SLD120/220 only)

This item sets the fade-out time of logo A1 in frames, ranging from 0 to 200 frames. 0 frames is default.

**LogoA2\_Act**  
(SLD120/220 only)

With this active preset it is possible to select presets of logo A2 for the processed output (8 preset available). These presets will have an instant effect on the output. If the menu item is preceded by '**#LogoA2-**', it is possible to add this setting to a preset. The presets are stored in memory. It is also possible to change factory presets. Changing these presets has direct effect on the processed output.

**LogoA2\_edit**  
(SLD120/220 only)

With the edit preset item it is possible to create your own presets for logo A2 without the applied changes having any instant effect on the processed output. There are 8 possible offline adjustable presets. You can freely change the selected edit preset, without the active preset being set to another setting. It will have no immediate effect on the processed output, until LogoA2\_act is changed to the setting you adjusted with LogoA2\_edit.

**#LogoA2-Name**  
(SLD120/220 only)

This setting displays the first 16 characters of the filename for the current LogoA2\_edit logo. This is a read only item.

If no logo is shown, one of the following messages are shown:

- No file: There is no file to be displayed,
- Unknown file format: File format isn't recognized/suitable
- VRAM, Out of Mem: Video RAM is out of memory. Nevertheless, files are being stored on the flash disk.
- Error: file corruption: Uploaded file is corrupt and will be renamed to <filename.extension>.error

**#LogoA2-Origin**  
(SLD120/220 only)

With this setting you can change the #LogoA2-XPos and #LogoA2-YPos settings to default to Top-Left, Top-Right, Bottom-Left, Bottom-Right or Center positions. Default is Top-Left.

**#LogoA2-XPos**  
(SLD120/220 only)

This setting sets the horizontal position of logo A2. Can be ranging from -2047px till 2048 pixels. Default is pixel 0.

**#LogoA2-YPos**  
(SLD120/220 only)

This setting sets the vertical position of logo A2. Can be ranging from -2047px till 2048 pixels. Default is pixel 0.

**#LogoA2-Width**  
(SLD120/220 only)

This menu item indicates the width of the image currently in use by logo A2. This is a read only item.

|  |  |
|--|--|
| <b>#LogoA2-Height</b><br>(SLD120/220 only)   | This menu item indicates the height of the image currently in use by logo A2. This is a read only item.  |
| <b>#LogoA2-Fade-In</b><br>(SLD120/220 only)  | This item sets the fade-in time of logo A2 in frames, ranging from 0 to 200 frames. 0 frames is default.   |
| <b>#LogoA2-Fade-Out</b><br>(SLD120/220 only) | This item sets the fade-out time of logo A2 in frames, ranging from 0 to 200 frames. 0 frames is default.  |
| <b>LogoB1_Act</b><br>(SLD220 only)           | With this active preset it is possible to select presets of logo B1 for the processed output (8 preset available). These presets will have an instant effect on the output. If the menu item is preceded by '#LogoB1-', it is possible to add this setting to a preset. The presets are stored in memory. It is also possible to change factory presets. Changing these presets has direct effect on the processed output.   |
| <b>LogoB1_edit</b><br>(SLD220 only)          | With the edit preset item it is possible to create your own presets for logo B1 without the applied changes having any instant effect on the processed output. There are 8 possible offline adjustable presets. You can freely change the selected edit preset, without the active preset being set to another setting. It will have no immediate effect on the processed output, until LogoB1_act is changed to the setting you adjusted with LogoB1_edit.  |
| <b>#LogoB1-Name</b><br>(SLD220 only)         | <p>This setting displays the first 16 characters of the filename for the current LogoB1_edit logo. This is a read only item.</p> <p>If no logo is shown, one of the following messages are shown:</p> <ul style="list-style-type: none"><li>▪ No file: There is no file to be displayed,</li><li>▪ Unknown file format: File format isn't recognized/suitable</li><li>▪ VRAM, Out of Mem: Video RAM is out of memory. Nevertheless, files are being stored on the flash disk.</li><li>▪ Error: file corruption: Uploaded file is corrupt and will be renamed to &lt;filename.extension&gt;.error</li></ul> |
| <b>#LogoB1-Origin</b><br>(SLD220 only)       | With this setting you can change the #LogoB1-XPos and #LogoB1-YPos settings to default to Top-Left, Top-Right, Bottom-Left, Bottom-Right or Center positions. Default is Top-Left.   |
| <b>#LogoB1-XPos</b><br>(SLD220 only)         | This setting sets the horizontal position of logo B1. Can be ranging from -2047px till 2048 pixels. Default is pixel 0.  |
| <b>#LogoB1-YPos</b><br>(SLD220 only)         | This setting sets the vertical position of logo B1. Can be ranging from -2047px till 2048 pixels. Default is pixel 0.  |

|  |   |
|--|---|
| <b>#LogoB1-Width</b><br>(SLD220 only)    | This menu item indicates the width of the image currently in use by logo B1. This is a read only item.  |
| <b>#LogoB1-Height</b><br>(SLD220 only)   | This menu item indicates the height of the image currently in use by logo B1. This is a read only item.   |
| <b>#LogoB1-Fade-In</b><br>(SLD220 only)  | This item sets the fade-in time of logo B1 in frames, ranging from 0 to 200 frames. 0 frames is default.  |
| <b>#LogoB1-Fade-Out</b><br>(SLD220 only) | This item sets the fade-out time of logo B1 in frames, ranging from 0 to 200 frames. 0 frames is default.   |
| <b>LogoB2_Act</b><br>(SLD220 only)       | With this active preset it is possible to select presets of logo B2 for the processed output (8 preset available). These presets will have an instant effect on the output. If the menu item is preceded by ' <b>#LogoB2-</b> ', it is possible to add this setting to a preset. The presets are stored in memory. It is also possible to change factory presets. Changing these presets has direct effect on the processed output.                                     |
| <b>LogoB2_edit</b><br>(SLD220 only)      | With the edit preset item it is possible to create your own presets for logo B2 without the applied changes having any instant effect on the processed output. There are 8 possible offline adjustable presets. You can freely change the selected edit preset, without the active preset being set to another setting. It will have no immediate effect on the processed output, until LogoB2_act is changed to the setting you adjusted with LogoB2_edit.             |
| <b>#LogoB2-Name</b><br>(SLD220 only)     | This setting displays the first 16 characters of the filename for the current LogoB2_edit logo. This is a read only item.   |
|  | If no logo is shown, one of the following messages are shown: <ul style="list-style-type: none"> <li>▪ No file: There is no file to be displayed,</li> <li>▪ Unknown file format: File format isn't recognized/suitable</li> <li>▪ VRAM, Out of Mem: Video RAM is out of memory. Nevertheless, files are being stored on the flash disk.</li> <li>▪ Error: file corruption: Uploaded file is corrupt and will be renamed to &lt;filename.extension&gt;.error</li> </ul> |
| <b>#LogoB2-Origin</b><br>(SLD220 only)   | With this setting you can change the #LogoB2-XPos and #LogoB2-YPos settings to default to Top-Left, Top-Right, Bottom-Left, Bottom-Right or Center positions. Default is Top-Left.  |
| <b>#LogoB2-XPos</b><br>(SLD220 only)     | This setting sets the horizontal position of logo B2. Can be ranging from -2047px till 2048 pixels. Default is pixel 0.   |

|  |   |
|--|---|
| <b>#LogoB2-YPos</b><br>(SLD220 only)     | This setting sets the vertical position of logo B2. Can be ranging from -2047px till 2048 pixels. Default is pixel 0. |
| <b>#LogoB2-Width</b><br>(SLD220 only)    | This menu item indicates the width of the image currently in use by logo B2. This is a read only item.                |
| <b>#LogoB2-Height</b><br>(SLD220 only)   | This menu item indicates the height of the image currently in use by logo B2. This is a read only item.               |
| <b>#LogoB2-Fade-In</b><br>(SLD220 only)  | This item sets the fade-in time of logo B2 in frames, ranging from 0 to 200 frames. 0 frames is default.              |
| <b>#LogoB2-Fade-Out</b><br>(SLD220 only) | This item sets the fade-out time of logo B2 in frames, ranging from 0 to 200 frames. 0 frames is default.             |

## NTP SETTINGS

|                   |  |
|-------------------|--|
| <b>NTPServer</b>  | With this setting you set the NTP server (either an IP address or a dynamic url). For instance: <code>pool.ntp.org</code> or <code>192.168.1.10</code> |
| <b>NTPOffsetH</b> | Here you can manually set an offset in hours (timezone compensation). Day-light saving is not taken into account!                                      |
| <b>NTPOffsetM</b> | Here you can manually set an offset in minutes (timezone compensation).  |

## NETWORK

|                    |   |
|--------------------|---|
| <b>IP_Conf0</b>    | With this setting you can let the card obtain an IP address automatically via DHCP, or appoint a manual set IP address. By default this setting is set to Manual. |
| <b>mIPO</b>        | When IP_Conf0 is set to manual, you can type in the preferred IP address.   |
| <b>mNMO</b>        | With IP_Conf0 set to manual, with this setting you can set a Netmask.   |
| <b>mGWO</b>        | With IP_Conf0 set to manual, this setting let you set a Standard Gateway.   |
| <b>NetwPrefix0</b> | This item sets the network prefix with IP_conf0 set to manual. Can be set between 0 and 30 bit. By default it is set to 0 bit                                     |

## 6 Status Menu

|                                      |  |
|--------------------------------------|--|
| <b>Introduction</b>                  | The status menu indicates the current status of each item listed below.  |
| <b>SDI-Input_1</b>                   | <p>This status item indicates the presence and format of a valid signal in input 1. This is displayed as:</p> <ul style="list-style-type: none"><li>▪ 1080P60</li><li>▪ 1080p50</li><li>▪ 1080i60</li><li>▪ 1080i50</li><li>▪ 1080p30</li><li>▪ 1080p25</li><li>▪ 1080p24</li><li>▪ 1035i60</li><li>▪ 720p60</li><li>▪ 720p50</li><li>▪ SD525</li><li>▪ SD625</li><li>▪ NA</li></ul> |
| <b>SDI-Input_2</b>                   | This status item indicates the presence and format of a valid signal in input 2. This is displayed as listed under SDI-Input1.   |
| <b>Buffer-Size</b>                   | Indicates the total buffer size with the currently installed solid state disks (hh:mm:ss).   |
| <b>Buffer-Fill</b>                   | Indicates the buffer size which is currently in use (hh:mm:ss)   |
| <b>Marker1-Pos ~<br/>Marker4_Pos</b> | Indicates the position of each individual marker in hh:mm:ss (delay with respect to the input).  |
| <b>GPI-Active</b>                    | Indicates which GPI value is currently active.   |

## DISK STATUS

|                       |  |
|-----------------------|--|
| <b>Disk1_Status</b>   | <p>This status item indicates the overall disk status of SSD 1:</p> <p>OK - Tested: The disk is OK and it's a model which is tested and approved by Axon.</p> <p>OK - Untested: The disk is OK but it's a model which is not tested by Axon and therefore unapproved.</p> <p>Slow: The disk is getting slow and should be replaced</p> <p>Unstable: The disks SMART values indicate that this disk is unstable and should be replaced</p> <p>MTBF Reached: The disk's MTBF (the manufacturer's given Main Time Between Failures) is reached. Replacement is advised.</p> |
| <b>Disk1_Model</b>    | Indicates the model number of SSD 1.   |
| <b>Disk1_Serial</b>   | Indicated the serial number of SSD 1.  |
| <b>Disk1_Size</b>     | Indicates the disk size of SSD 1 in GB.  |
| <b>Disk1_AvgRead</b>  | Indicates the average reading bitrate of SSD 1 in MBps.  |
| <b>Disk1_AvgWrite</b> | Indicates the average writing bitrate of SSD 1 in MBps   |
| <b>Disk2_Status</b>   | <p>This status item indicates the overall disk status of SSD 2:</p> <p>OK - Tested: The disk is OK and it's a model which is tested and approved by Axon.</p> <p>OK - Untested: The disk is OK but it's a model which is not tested by Axon and therefore unapproved.</p> <p>Slow: The disk is getting slow and should be replaced</p> <p>Unstable: The disks SMART values indicate that this disk is unstable and should be replaced</p> <p>MTBF Reached: The disk's MTBF (the manufacturer's given Main Time Between Failures) is reached. Replacement is advised.</p> |
| <b>Disk2_Model</b>    | Indicates the model number of SSD 2.   |
| <b>Disk2_Serial</b>   | Indicated the serial number of SSD 2.  |



|                       |  |
|-----------------------|--|
| <b>Disk2_Size</b>     | Indicates the disk size of SSD 2 in GB.                        |
| <b>Disk2_AvgRead</b>  | Indicates the average reading bitrate of SSD 2 in MBps.        |
| <b>Disk2_AvgWrite</b> | Indicates the average writing bitrate of SSD 2 in MBps.        |
| <b>CPU_Env_Temp</b>   | Indicates the CPU environment temperature in degrees Celsius.  |
| <b>CPU_Core_Temp</b>  | Indicates the CPU Core temperature in degrees Celsius.         |
| <b>FPGA_Env_Temp</b>  | Indicates the FPGA environment temperature in degrees Celsius. |
| <b>FPGA_Core_Temp</b> | Indicates the FPGA Core temperature in degrees Celsius.        |
| <b>FPGA_Fan</b>       | Indicates the FPGA fan speed in rounds per minute.             |

#### NET STATUS

|                 |  |
|-----------------|--|
| <b>IP_Addr0</b> | This item displays the status of the IP address. It can be manual, DHCP asking, DHCP Leased or DHCP Infin. |
| <b>IPO</b>      | This item displays the current IP address of the card.   |
| <b>MAC0</b>     | This item displays the MAC address of the card.  |
| <b>NMO</b>      | This item displays the current Netmask of the card.  |
| <b>GWO</b>      | This item displays the current Standard Gateway of the card.   |

## 7 Events Menu

|   |   |
|---|---|
| <b>Introduction</b>                               | An event is a special message that is generated on the card asynchronously. This means that it is not the response to a request to the card, but a spontaneous message.   |
| <b>What is the Goal of an event?</b>              | The goal of events is to inform the environment about a changing condition on the card. A message may be broadcast to mark the change in status. The message is volatile and cannot be retrieved from the system after it has been broadcast. There are several means by which the message can be filtered.   |
| <b>Events</b>                                     | The events reported by the card are as follows;   |
| <b>Announcements</b>                              | Announcements is not an event. This item is only used for switching the announcement of status changes on/off. 0=off, other =on   |
| <b>What information is available in an event?</b> | <p>The message consists of the following items;</p> <ol style="list-style-type: none"> <li>1) A message string to show what has happened in text, for example: “INP_LOSS”, “REF_LOSS”, “INP_RETURN”.</li> <li>2) A tag that also shows what happens, but with a predefined number: e.g. 1 (= loss of input), 2 (= loss of reference), 129(= 1+128 = return of input). For a list of these predefined tags see the table on the next page.</li> <li>3) A priority that marks the importance of an event. This value is defined by the user and can have any value between 1 and 255, or 0 when disabled.</li> <li>4) A slot number of the source of this event.</li> </ol> |
| <b>The Message String</b>                         | The message string is defined in the card and is therefore fixed. It may be used in controlling software like Cortex to show the event.   |
| <b>The Tag</b>                                    | <p>The tag is also defined in the card. The tag has a fixed meaning. When controlling or monitoring software should make decisions based on events, it is easier to use the tag instead of interpreting a string. The first implementation is the tag controlled switch in the GPI16.</p> <p>In cases where the event marks a change to fault status (e.g. 1 for Loss of Input) the complement is marked by the tag increased by 128 (80<sub>hex</sub>) (e.g. 129 (81<sub>hex</sub>) for Return of Input).</p>  |

**Defining Tags**

The tags defined for the card are:

| Event Menu Item | Tag     | Description                               |
|-----------------|---------|---|
| Announcements   | 0 or NA | Announcement of report and control values |

**The Priority**

The priority is a user-defined value. The higher the priority of the alarm, the higher this value. Setting the priority to Zero disables the announcement of this alarm. Alarms with priorities equal or higher than the Error Threshold setting of the RRC will cause the error LED on the Synapse rack front panel to light.

**The Address**

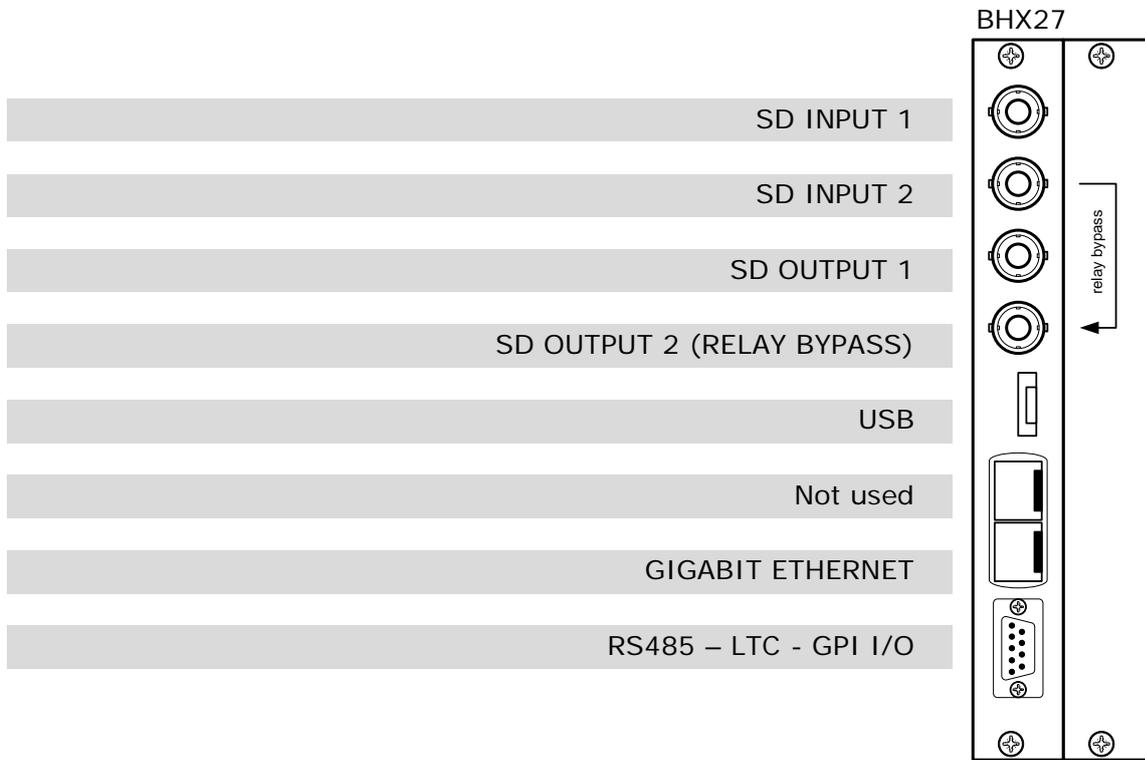
Together with the message string or the tag, the slot number or address of the card is relevant to be able to assign the event to a certain card.

## 8 LED Indication

|                       |   |
|-----------------------|---|
| <b>Introduction</b>   | LEDS are located on the front of the card next to the card grip as shown in the picture below. The LEDS give an indication of the status of the SLD100/200. |
| <b>Error LED</b>      | The error LED indicates an error if the internal logic of the card is not configured correctly or has a hardware failure.                                   |
| <b>Input_1 LED</b>    | This LED indicated the presence of a valid SDI video signal on input 1.   |
| <b>Input_2 LED</b>    | This LED indicated the presence of a valid SDI video signal on input 2.   |
| <b>ANC Data LED</b>   | Indicates the presence of embedded audio within the input signal.   |
| <b>Reference LED</b>  | Indicated the presence of a valid reference signal on the selected reference input connector (ref-1 or ref-2).  |
| <b>Data Error LED</b> | This LED indicates a CRC error.   |
| <b>Connection LED</b> | This LED illuminates after the card has initialized. The LED lights for 0.5 seconds every time a connection is made to the card.                            |
| <b>Error LED</b>      | The error LED indicates an error if the internal logic of the card is not configured correctly or has a hardware failure.                                   |

## 9 Connector Panels

The SLD100 and 200 can be used with the BHX27 backpanel. The following table displays the pinout of these backpanels in combination with the card.

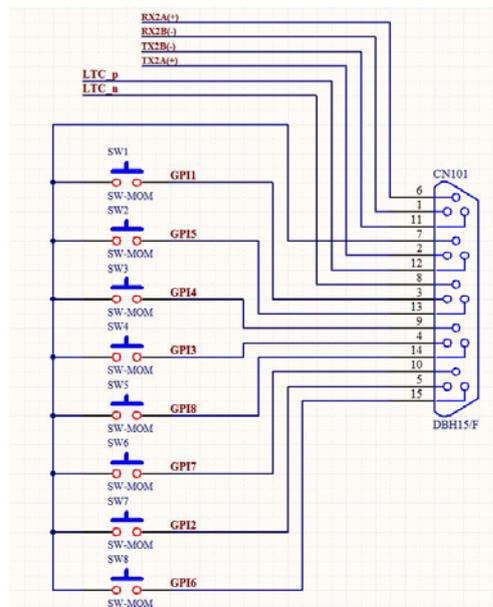


### D-sub pinning

**Note:** GPI's work in a latching mode

Of the 15-pole subD connector:

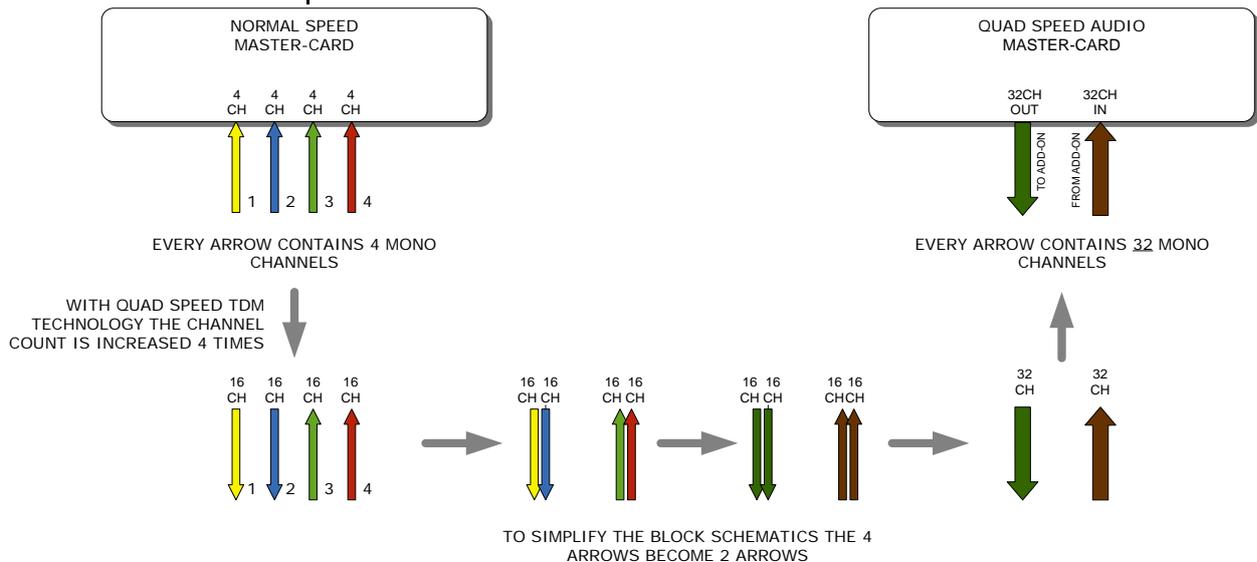
- pin 01 = RX2B
- pin 02 = TX2A
- pin 03 = GPI\_1
- pin 04 = GPI\_3
- pin 05 = GPI\_2
- pin 06 = RX2A
- pin 07 = GND
- pin 08 = LTC-
- pin 09 = GPI\_4
- pin 10 = GPI\_7
- pin 11 = TX2B
- pin 12 = LTC+
- pin 13 = GPI\_5
- pin 14 = GPI\_8
- pin 15 = GPI\_6



## Appendix 1 Quad speed bus explained

The internal audio ADD-ON bus needed an upgrade for some applications. We wanted more channels (32 per video stream seem possible in the near future). And we want the bus to be bidirectional, so 32 channels in and 32 channels out at the same time.

The new interface needed to be compatible with all existing hardware (frames) and in the implementation of the master card it sometimes needed to be backward compatible with the original ADD-ON bus.



So the MASTER-CARD is now firmware enhanced to run 32 channels in either direction (64 channels total) instead of 16 channels in one direction

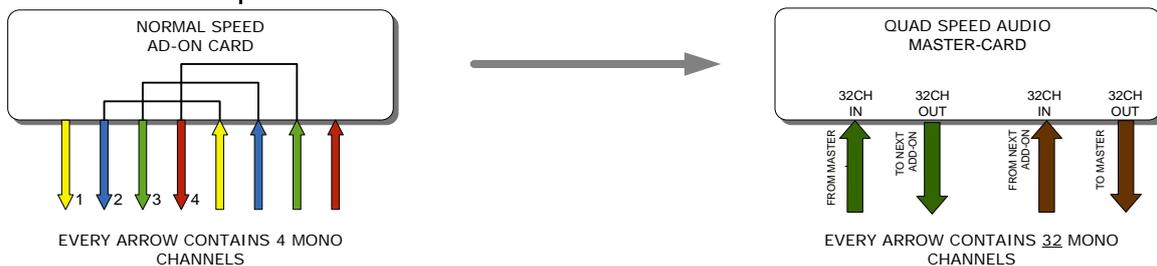
Some MASTER-CARD's will have two modes and some MASTER-CARD's will only have the Quad Speed mode [where the logical ADD-ON cards are only available in Quad Speed mode]:

***Dual mode MASTER-CARD's have a menu item to select the appropriate mode are. If a mode is selected all ADD-ON cards to that Master need to be in the same mode.***

The following features and rules will apply:

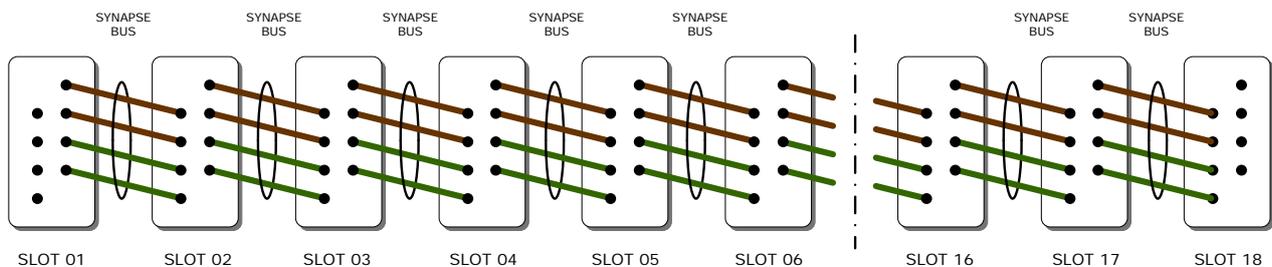
- Up to 32 channels output from the master card with looping to up to 3 ADD-ON cards
  - The ADD-ON card just picks the channels it wants to process
  - Some ADD-ON cards will have the possibility to re-inject processed audio onto the next ADD-ON card
- Up to 32 channels input on the master card
  - If the master card can handle less than 32 channels, the lowest channel numbers will be used, as the ADD-ON card will always generate 32 channels (where some channels can be empty or silent)
- Channel shuffling is done in the ADD-ON card
  - The Master Card has only one setting to enable the quad speed audio bus

- Every Quad-Speed ADD-ON card takes 32 channels from the ‘right hand ADD-ON card’ and adds (or overwrites) the local processed channels.
  - This can be done for any of the channels that are processed in the ADD-ON card
- Some Master Cards are switchable between normal and quad-speed bus
- Channel designations on the block schematics:
  - Channel 1-32 (or less) are injected into the dark green large arrow from Master Card to ADD-ON card and looped on to the next ADD-ON card via the dark green arrow
  - The ADD-ON card injects up to 32 channels into the brown large arrow
  - An ADD-ON card will also actively loop extra processed channels into the next ADD-ON card, and finally into the Master Card
- The cross looping of the original design is now a straight loop
- The quad speed bus can also work in one direction
  - You can use a Quad Speed audio bus to de-embed audio from the master and present on the ADD-ON card as AES/EBU, Bitstream (like Dolby) or analog audio
  - If applicable the ADD-ON card can also be used as in injection point of physical audio streams



*The ADD-ON cards also provide a looping function from one ADD-ON to the next. This is however a more intelligent looping with optional re-insertion and muxing of signals.*

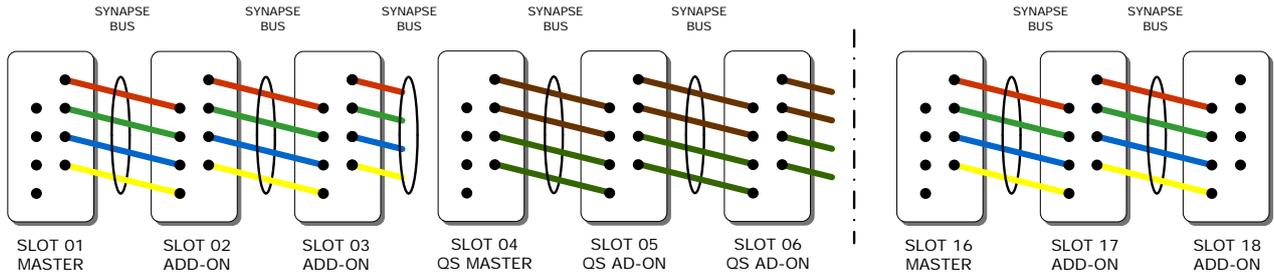
Cascading of Quad Speed cards works identical to normal add-on cards. Every connection in the example below transports 16 mono audio channels (= 32 channels per color). It shows the inter slot connections ‘in quad Speed mode’ as part of the frame bus PCB.



The system makes use of the same passive copper traces on the internal bus PCB as normal add-on bus cards.

**The maximum amount of ADD-ON cards in Quad Speed mode is 3. These 3 ADD-ON cards will run all on the same clock in the same phase as the MASTER-CARD. This guarantees that audio channels that are processed in different ADD-ON cards will still operate in the same phase, something very important when processing multiple discrete surround channels.**

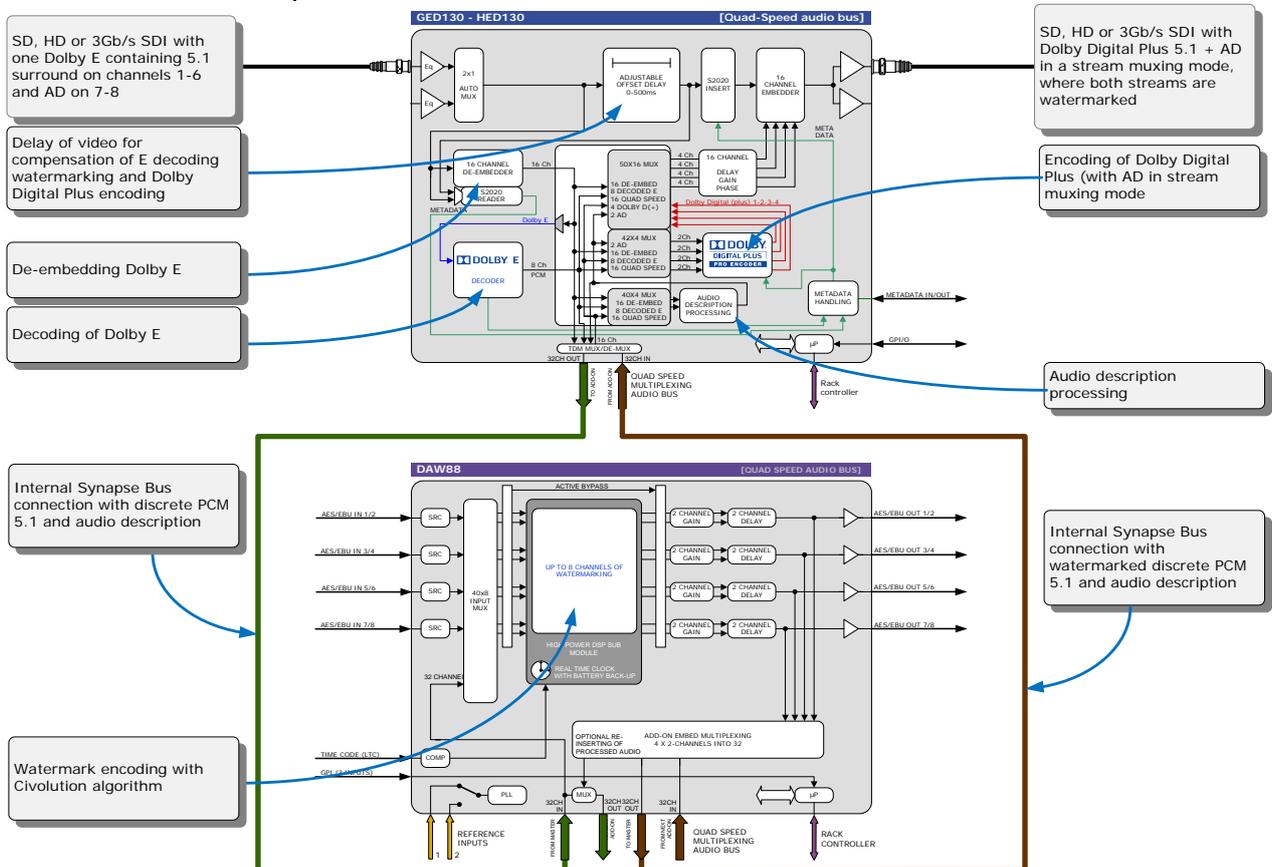
You can mix normal speed Master-Cards with Quad Speed MASTER-Cards in one frame as the MASTER-CARD breaks the connection to the left hand card. All cards to the right of the master must be in the same mode as the master.



Mixing normal ADD-ON with Quad Speed ADD-ON combo's in one frame is allowed

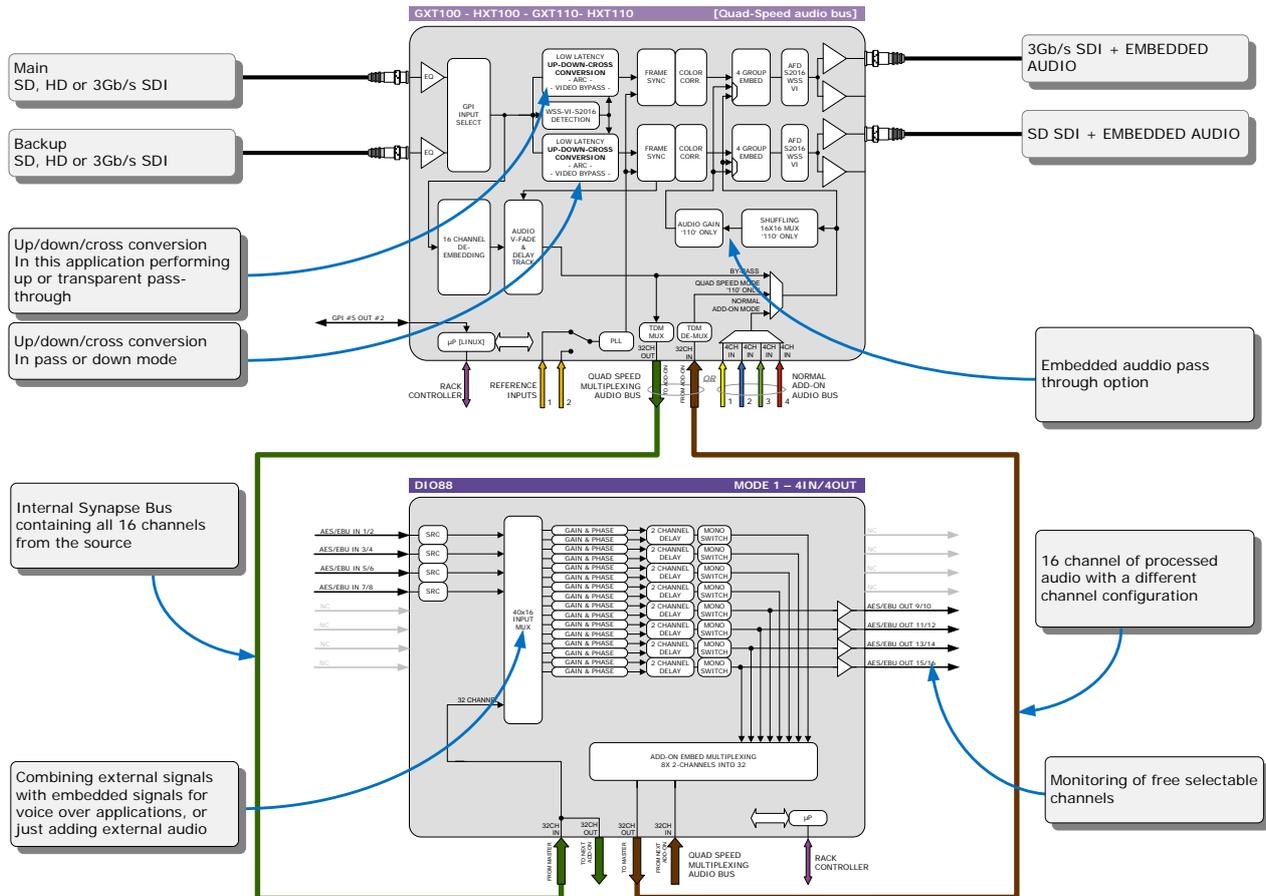
**Some examples**

This is an Example where we combine a MASTER-CARD that performs embedded domain Dolby E to Dolby Digital Plus encoding. Between the E-decoding and Dolby Digital Plus encoding we want to watermark the left, right and center channel of a the decoded discrete 5.1 surround channels and watermark a PCM channel used as a voice over for audio description.



Embedded domain Dolby E to Dolby Digital Plus with Watermarking. The only connection to the outside world are two BNC cables.

Another example of the Quad-Speed audio ADD-ON bus shows a transmission application where a dual up/down/cross output card is connected to a DIO88 in a setup where the embedded audio combined with external audio and a convenient PCM monitoring is available.



In the following example (next page) you will see a 4 card application that performs a massive amount of processing divided over 1 MASTER-CARD and 3 ADD-ON cards. This is a typical 'ingest' configuration and is used where the infrastructure does not use Dolby E (two in this example) but PCM+s2020. The input is a SD, HD or 3Gb/s SDI containing 2 Dolby E streams and 8 mono PCM streams. The output is the same SDI stream but with a selection of 16 channels selected out 8 original PCM channels and 16 PCM channels that are decoded from the Dolby E streams. The combo performs the following processing:

- De-embedding of 8x PCM and 2x Dolby E
- Decoding of two independent Dolby E streams
- Loudness processing of up to 16 channels sourced by any of the 8x PCM or decoded Dolby E streams
- Upmixing of a 2.0 to 5.1 if a Dolby E stream is not available
- Physical monitoring of all processed PCM streams
- Preset based shuffling of all source channels into 16 channels with the appropriate offset delays
- S2020 metadata insertion sourced from the E decoders, embedded s2020, generated presets or an external feed
- Video delay to compensate for audio propagation delay
- Embedding of up to 16 channels

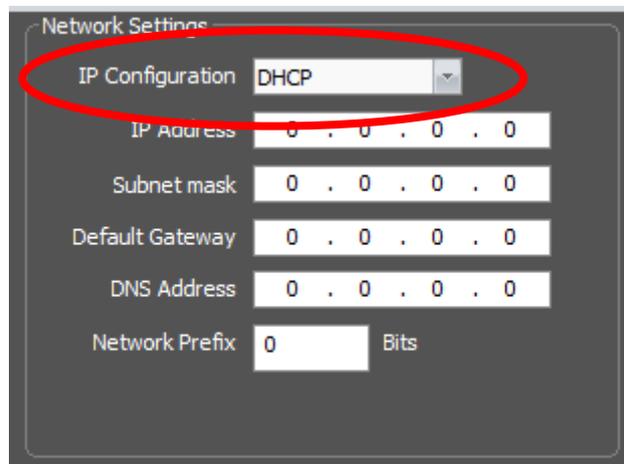


## Appendix 2 Uploading logos using cortex

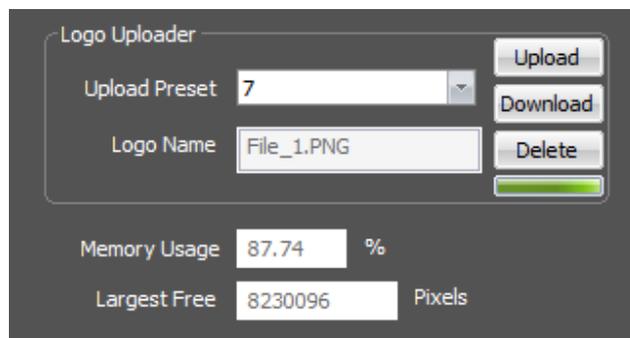
**Introduction** The most common and easy way to upload logo or fonts is to use Cortex, which contains a GUI view to upload logos and fonts. Cortex is downloadable on our website free of charge.

**NOTE** For uploading logo's the bottom Ethernet connection must be used!

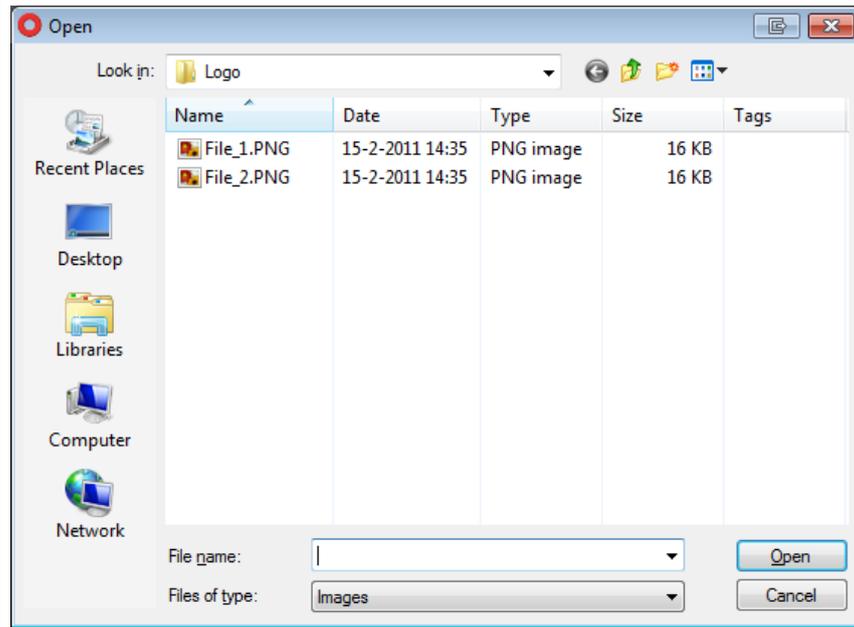
**Uploading files** Configure the IP address of the SLD network interface using Cortex 1.01 or higher. Use DHCP or fixed IP address on your network and also configure the subnet mask. Note the SLD may be on the same network as the rack controller. The IP addresses shown here are just examples, replace these addresses with others if needed. See picture below.



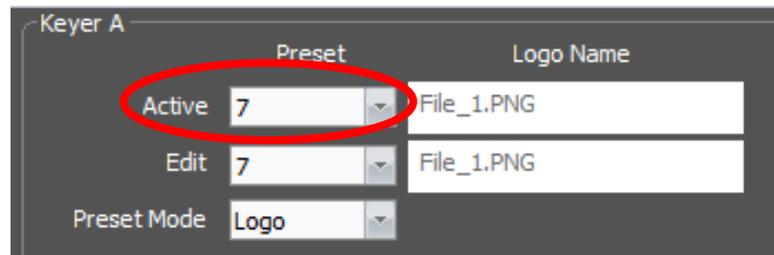
Select the “upload preset” from the drop down list, and press the Upload button.



Select a PNG file and click the Open button. The logo files must be of the PNG type, RGB plus alpha channel. Interlaced PNG files with “Adam 7” coding are not supported. TGA files are not supported.. Animated OXA files are not supported. Other file formats are not supported and recognized. This is by design.



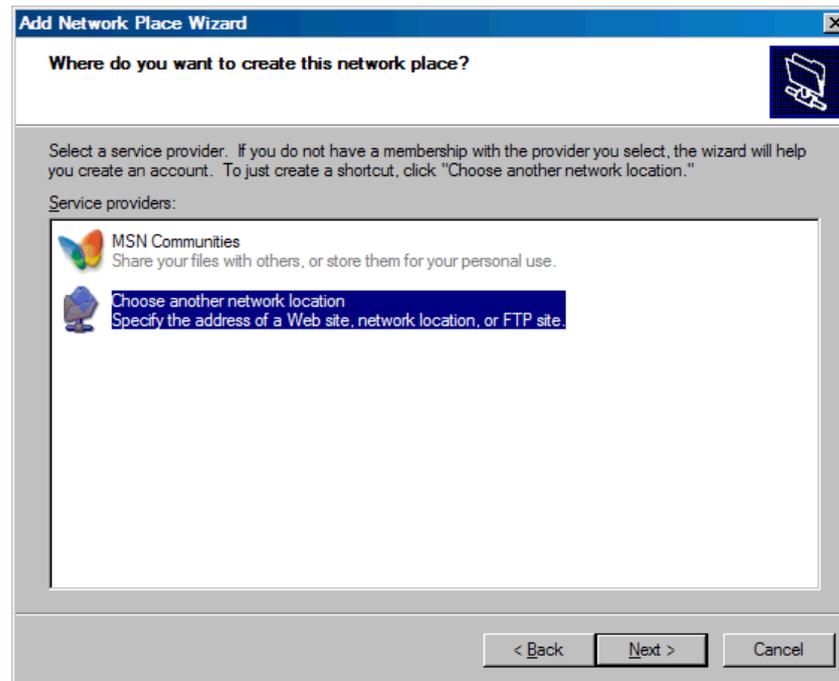
The Upload will start. Now you only need to set the Active-Preset.



You can use the Edit-Preset to change the position, fade and animation playback.

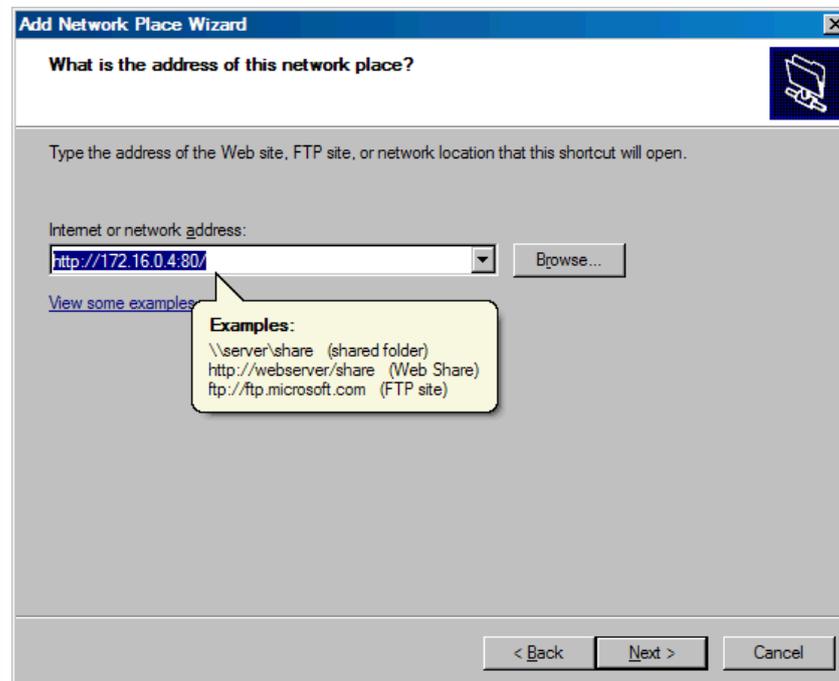
## Appendix 3 Uploading logos using WebDav or FTP.

|   |   |
|---|---|
| <b>Introduction</b>                     | <p>The most common and easy way to upload logo or fonts is to use Cortex, which contains a GUI view to upload logos and fonts. If you are not using Cortex, you can still upload logos and fonts.</p>   |
|   | <p>To upload logo and/or font files to the SLD without using Cortex, attach the card using its Ethernet port to a computer that support WebDAV (Web Folders).</p>   |
| <b>WebDAV</b>                           | <p>WebDAV is an abbreviation for "Web-based Distributed Authoring and Versioning" (published as an open standard under RFC 2518). WebDAV is a set of extensions to the HTTP protocol which allows users to collaboratively edit and manage files on a web server. This is achieved by making use of a WebDAV compatible client / application.</p>   |
|   | <p>For example, it is possible to use recent versions of Microsoft's Internet Explorer (versions 6.0 and higher). Using a WebDAV compatible client, the user connects to the server and is able to browse and manage files in a similar way as with a network share or an FTP server.</p>   |
|   | <p>In other words, what this protocol does is that it makes it possible to browse, create, remove, upload, download, rename, etc. files and directories on a web server. One of the most important advantages of this technology is that it uses port 80 for network traffic. This means that if you are able to surf the site from your workstation, you can also use WebDAV to administer it. It does not require firewall reconfiguration.</p> |
| <b>FTP</b>                              | <p>FTP (File Transport Protocol) is a very commonly used network protocol used to exchange and manipulate files over a TCP computer network. This protocol is also compatible with the SLD cards. An FTP client may connect to an FTP server (in this case the logo/text inserter) to manipulate files on that server.</p>  |
| <b>Uploading files using Windows XP</b> | <p>Go to 'My Network Places' from the Windows Start Menu, or via 'My Computer' -&gt; 'Other Places'. Select 'Network Tasks' -&gt; 'Add a network place' This opens the 'Add Network Place' wizard.</p>  |
|   | <p>Click 'Next' and select 'Choose another network location'. Click Next again. You should be looking at a screen as displayed on the next page.</p>  |

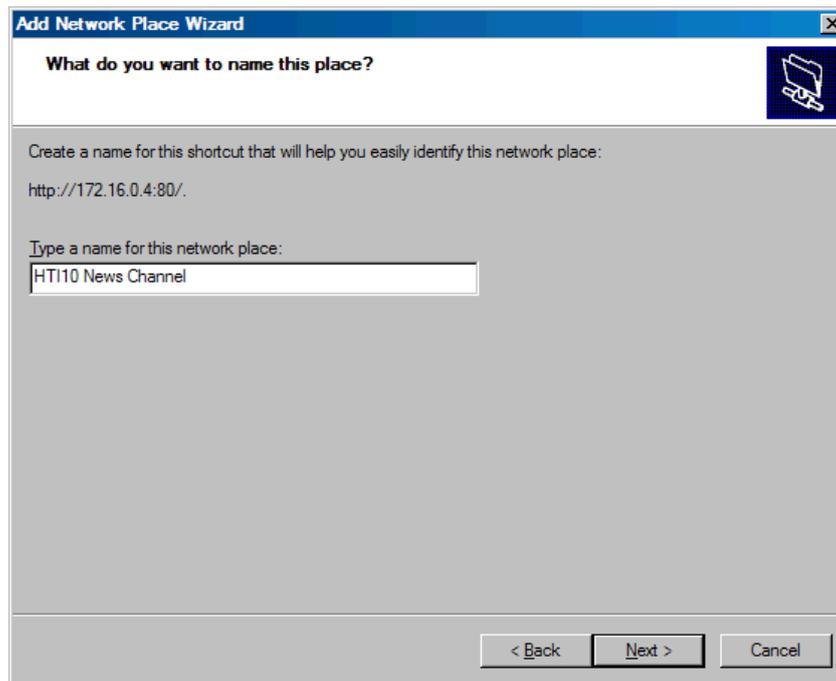


The wizard now asks for the network address. Fill in 'http://' followed by the IP address of the H-SLI card (see IP0 status item in the menu), followed by ': 80/' in order to access the card via WebDav. Fill in 'ftp://' followed by the IP address of the card will access the card via FTP.

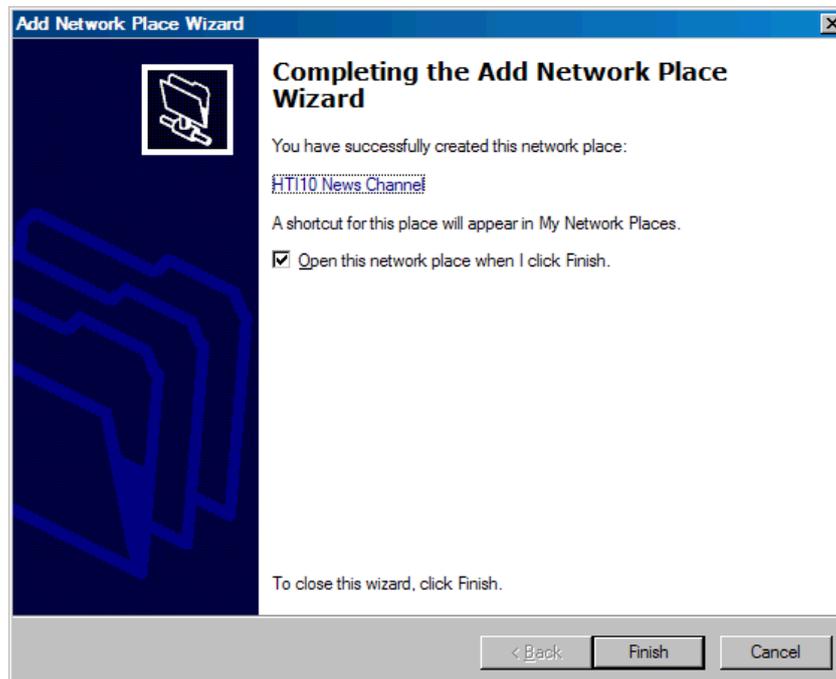
For example if the IP address of the card is 172.16.0.4, enter 'http://172.16.0.4:80/' or 'ftp://172.16.0.4/' and click 'Next'. Should result in the following example screen:



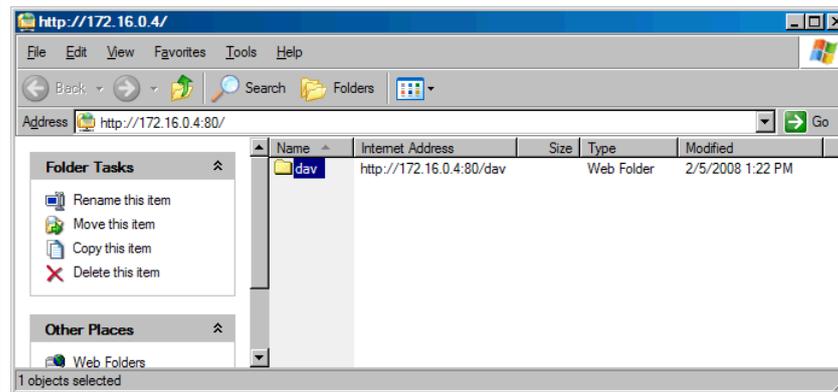
The wizard now asks for a name. Type a useful name for your own use, such as SLD News Channel.



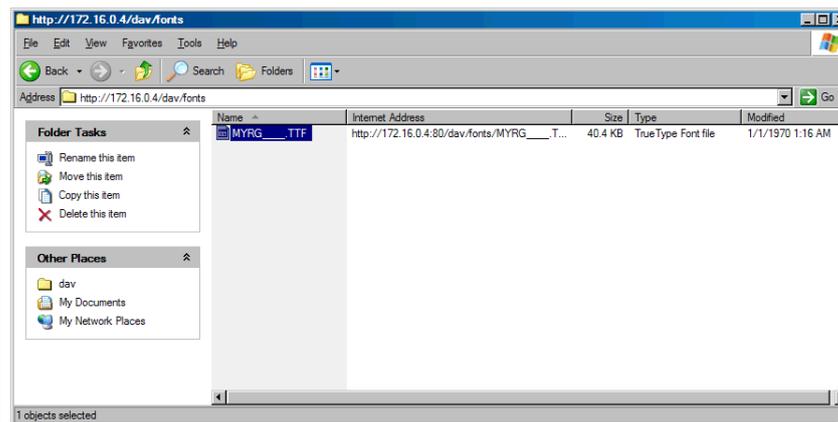
Click 'Next', and Click 'Finish' on the following screen:



A new Explorer window will appear that shows the contents of the WebDAV Web Folder or FTP folder on the SLD card. Looking as follows:



Double-click on the 'dav' folder in case you accessed it via WebDav. You can now use the most common file operations such as Delete, Move, Copy to upload logos and fonts as you are used to in a Windows XP environment. You can simply drag and drop your logos and/or fonts in this map.



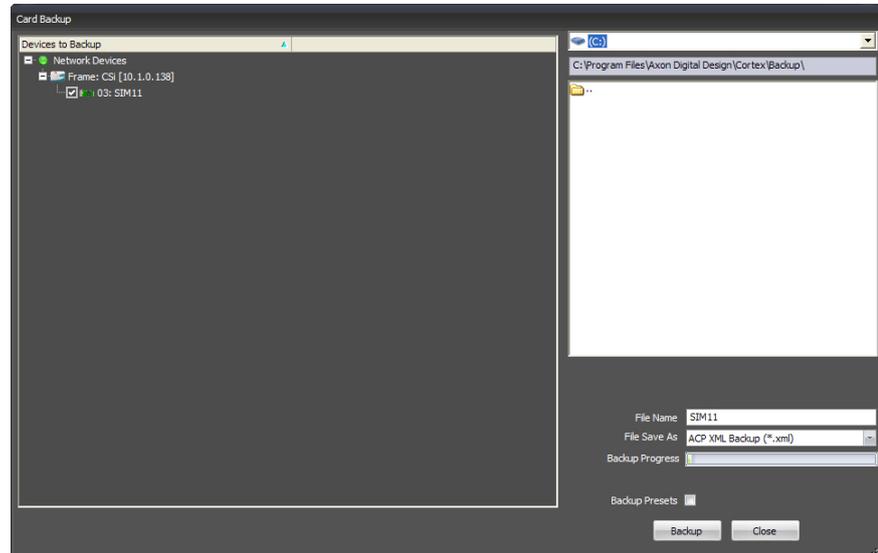
### Before you start

|                                  |   |
|----------------------------------|---|
| <b>Functionality explanation</b> | <p>A Synapse card's functionality is decided by 2 parts: the hardware platform and the software (a.k.a. firmware) that resides on the hardware platform. Changing the firmware of the cards means changing the way the card functions. To keep improving quality and to answer our customer's demands, Axon sometimes releases new software revisions of Synapse cards. These software revisions are formatted in 1 file per revision, with a .spf extension. Customers can download these .spf files from our website, or receive them via e-mail from our support so they can upgrade or reprogram their own cards.</p>   |
| <b>Choosing .spf files</b>       | <p>Not all .spf files are compatible with all hardware platforms. To know for certain that you are choosing a compatible .spf file you have to know the hardware revision of your card. This revision number can be found in the menu of the card via the control panel on the frames (select card, select 'about', check HW number) or via Cortex (Axon's control software) (select frame, select card, select 'Identity', check 'hardware rev').</p> <p>Knowing the hardware revision number, you can go to our website (<a href="http://www.axon.tv">www.axon.tv</a>) and go to our download firmware section. Here you select the card you wish to upgrade. You will see a list of available firmware upgrades of this particular card. The firmware files that are compatible with your card should display your card's hardware revision number in table next to "Hardware versions". If this is not the case you will not be able to upgrade your card with that file.</p> |
| <b>Requirements</b>              | <p>For reprogramming or upgrading cards, you need the Cortex program installed on a PC or laptop which is connected to the same network to which the card is connected also. You can download the program free of charge from our website. For this this card you need to use Cortex version v1.091 or later. Updating the card must be done locally (direct connection) through the Ethernet of the backplane. The bottom Ethernet connection must be used.</p>  |
| <b>Using Cortex help files</b>   | <p>This manual describes how to upgrade cards using Cortex. When you are using Cortex and require card further instructions, please refer to the Cortex help files (select 'Card' in the menu &gt; select 'Upload Firmware' (the firmware uploading window will open) &gt; press F1).</p>   |

## Precautions

### Backup your settings

It is advised to backup the settings before upgrading the card. To do this, select the frame and card you want to upgrade. Then choose “Card” in the menu and select “Backup card”. An exact copy of the card’s menu can be stored as .xml file in the following window. The next image displays the window where this is done.



### At your own risk

During the upgrade process, the card will stop functioning for a period of time. Make sure the card you are going to upgrade is currently *not* being used by anyone in your company.



### Note

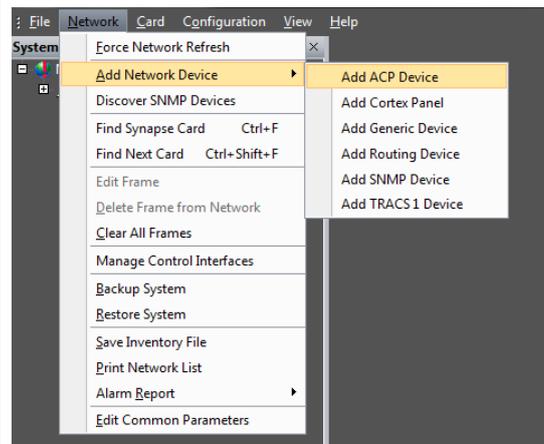
Use cortex version 1.09.01 or later. This software can be downloaded from our website. [www.axon.tv](http://www.axon.tv)

## Setting up card

To be able to program the card direct we need to perform two steps. One is setting up of the IP address of the card and second will be making the board recognized as stand alone entity.

To set-up the IP address of the card goto the system view within the Cortex program. Select the SLDxxx and goto the device view tab. Within the device tab you will be able to setup the IP address, netmask and gateway.

The next step is to make the card available as a stand alone card within the system. To add this card you need to go to the network tab at the top of the cortex program. Then go to add network device and choose add ACP device.



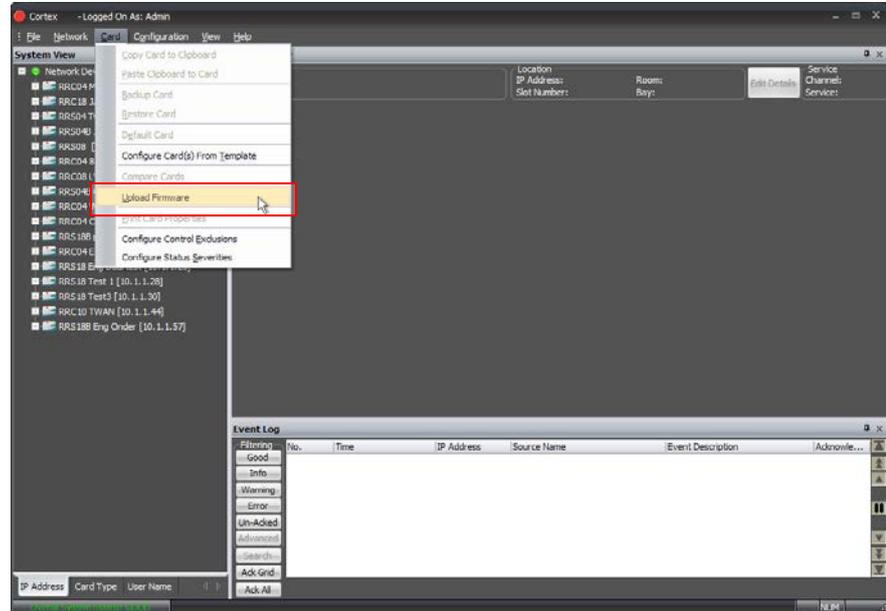
Fill out the name of the card and also the ip address.



# Upload firmware

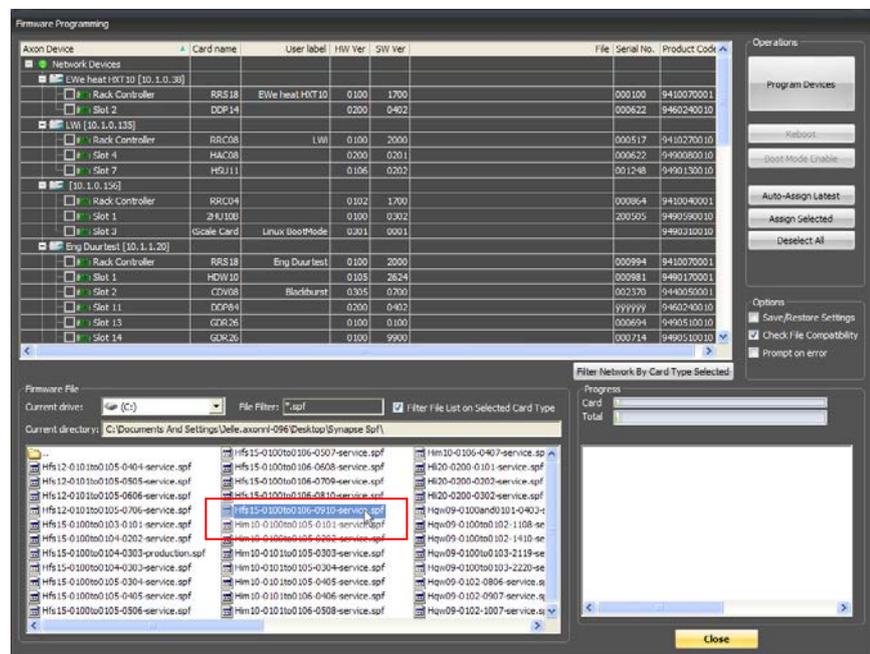
Opening the upload window

You can start upgrading the card. To do this, click 'Card' in the top menu and select 'Upload Firmware' from the dropdown box as displayed below.



Selecting the spf file

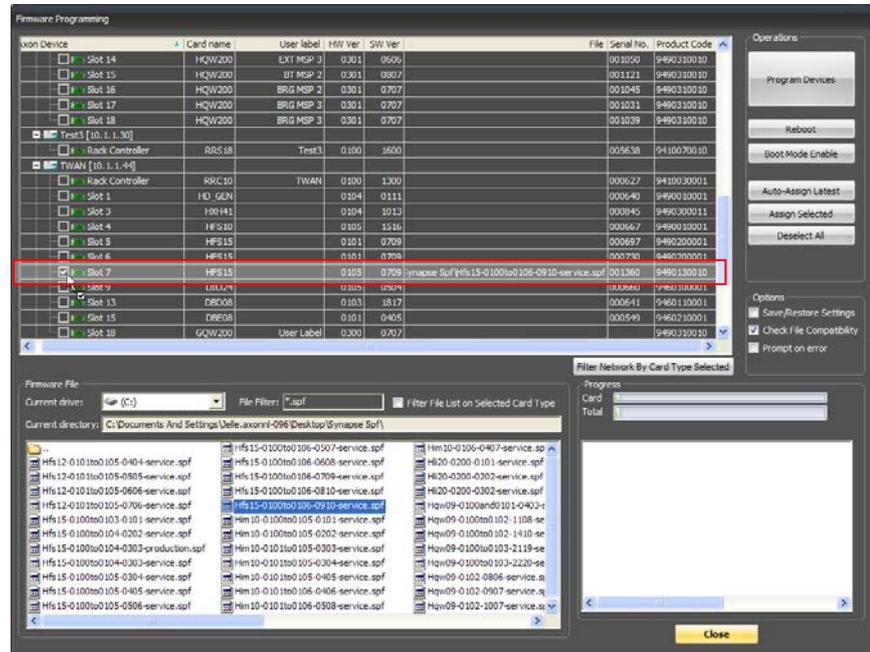
A new window will open, showing you the firmware upload functions. **At first you must select which .spf file you want to load.** You do this in the bottom dialog as shown below.



To select which .spf you would like to upload into the card, you click the 'Current drive' button and select the folder which holds your .spf files.

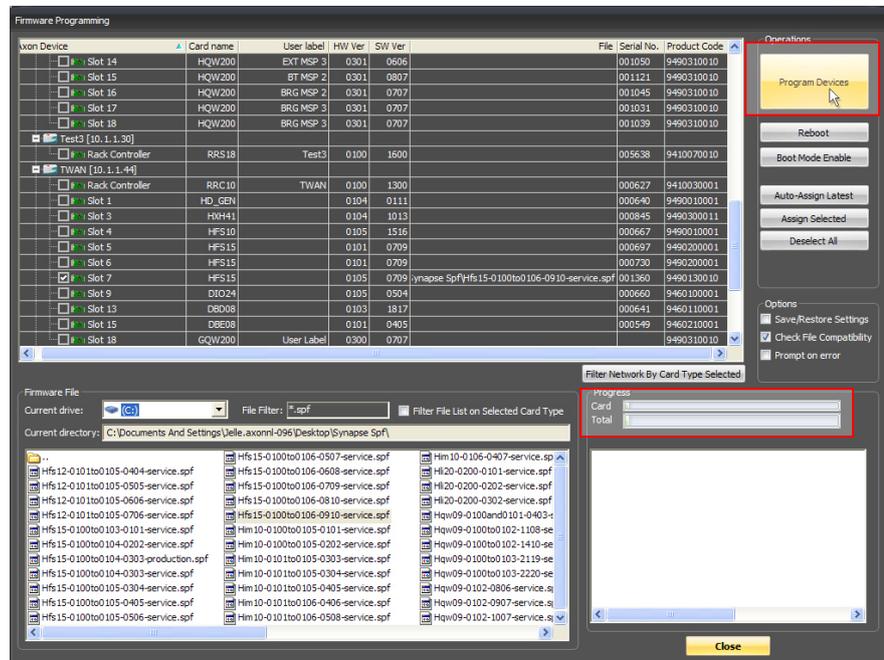
### Selecting the right card(s)

When you selected the .spf file, check the card(s) in which you want to load this .spf file. You can load multiple cards with the same .spf file at the same time. When the selected .spf file can not be loaded in the card you try to check an error message will appear in the bottom right box. Selecting a card is done as displayed on the next page.



### Starting the upload process

After you have selected the card(s) you want to program, click the 'Program Devices' button in the upper right corner to start the upload process as shown below.



You can see the progress of the upload process in the Progress groupbox bars in the lower right quadrant of the upload window. ***The card is not finished programming yet! See next Page!***

**Note**

**CARD IS FINISHED PROGRAMMING WHEN THE LED'S STOP BLINKING. THIS WILL TAKE LONGER THAN THE FILE TRANSFER TO THE CARD**

**Ready programming**

When the file has successfully been uploaded, the progress bar will be at 100% and in the box below it says 'Ready programming card'. To make sure the card is working properly, we advise to reset the card manually by pulling it out and putting it back into the frame. When the card is recognized with the right cardname, the firmware upgrade has been successful.

**Update Cortex form (CLF file)**

To make sure Cortex is up to date with your card's new firmware, please make sure to update the card's Cortex form so all new functions can be used. To do this simply copy the .clf, which is usually included with your firmware download, into the '[installation folder of Cortex]\Forms\Device' folder. With a default installation this should be:

C:\program files\Axon Digital Design\Cortex\Forms\Device\

Make sure to reboot Cortex after you copied the .clf file to this folder.

**Testing**

When all previous instructions have been completed the card should be functioning properly. We advise however to test the card's functionality before you are going to put it into real on-air use.



## This product contains open-source software

This product contains open-source software licensed under the GNU Public License (GPL). A copy of the GNU Public License is included below. Under this license you are eligible to receive a copy of the source code of this software including any changes.

Axon Digital Design shall provide the source code on request either through physical distribution or electronic communication. For physical distribution you may be charged a fee that covers distribution costs. This offer is valid up to three years after date of purchase. Please direct your request to the support department of Axon Digital Design.

Axon Digital Design supports open-source software by participating in the development of open-source projects or submitting improvements to these projects. For more information see <http://opensource.axon.tv/>

## GNU Public License version 2

### TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you".

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

- a) You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.
- b) You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License.
- c) If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following:

- a) Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,
- b) Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,



- c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

4. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.

6. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

7. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

8. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

9. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.



## **NO WARRANTY**

**11. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.**

**12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.**



## Contacting Axon customer support

Our customer support is committed to solve every problem you might have all around the world. You can contact our customer support here:

E-mail: [support@axon.tv](mailto:support@axon.tv)

Internet: [www.axon.tv](http://www.axon.tv)

### **Head office:**

Axon Digital Design B.V.  
Lange Wagenstraat 55  
5126 BB Gilze  
The Netherlands

Phone: +31 161 850 450

Fax: +31 161 850 499

E-mail: [info@axon.tv](mailto:info@axon.tv)

### **UK office:**

Axon Digital Design Ltd.  
1 Forest Court  
Oaklands Park  
Wokingham, Berkshire  
United Kingdom

Tel.: + 44 (0)118 973 8920

Fax: +44 (0) 118 973 8921

E-mail: [info-uk@axon.tv](mailto:info-uk@axon.tv)

### **China office:**

China Representative Office  
Room 804, 2nd Department, No.1 Building  
Beijing Image, No.115 Fucheng Road  
Haidian District, 100036 Beijing, China

Tel.: +86 (0) 108 814 4199

Fax: +86 (0) 108 814 4199

E-mail: [info-cn@axon.tv](mailto:info-cn@axon.tv)