



Synapse

# GDR108

3Gb/s, HD, SD 1 to 8 distribution amplifier with  
reclocked outputs (ASI/DVB compatible)

## Installation and Operation manual





*Synapse*

**TECHNICAL MANUAL**

GDR108



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**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 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.

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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  
GDR108



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.

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# 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 RRC18, RRC10, RRC04, RRS18 and RRS04 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 (RRC18/RRC10/RRC04/RRS18/RRS04) manual. The method of connection to a computer using Ethernet is described in the 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 SFR04 and SFR08 frame. Locate the two guide slots to be used, slide in the mounted circuit board, and push it firmly to locate the connectors.

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.

### 3 A Quick Start

#### When Powering-up

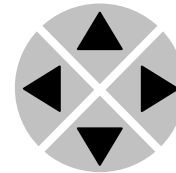
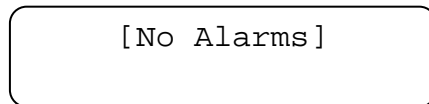
On powering up the Synapse frame, the card set will use basic data and default initialisation settings. All LED's will light during this process. After initialisation, several LED's will remain lit – the exact number and configuration is dependent upon the number of inputs connected and the status of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

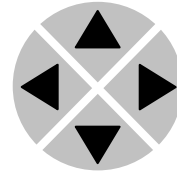
- Press ► To go forward through the menu structure.
- Press ◀ To go back through the menu structure.
- Press ▲ To move up within a menu or increase the value of a parameter.
- Press ▼ To move down through a menu or decrease the value of a parameter.

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 it current setting is Auto.

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

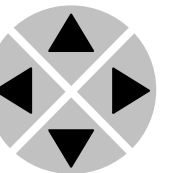


Pressing the ► selects the settings item shown, in this example SDI-Format .

(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-tings	▶ Standard_dig	▶ Auto
▼		▼	▼	▼
S00	RRC18	Status	Mode	625
		▼	▼	▼
		Events	Ref-Input	525
			▼	
			H-Delay	
			▼	
			▼	

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

## 4 The GDR108 Card

### Introduction

The GDR108 is a single channel 3Gb/s, HD, SD SDI reclocking distribution amplifier with 8 outputs. This card is ASI/DVB compatible

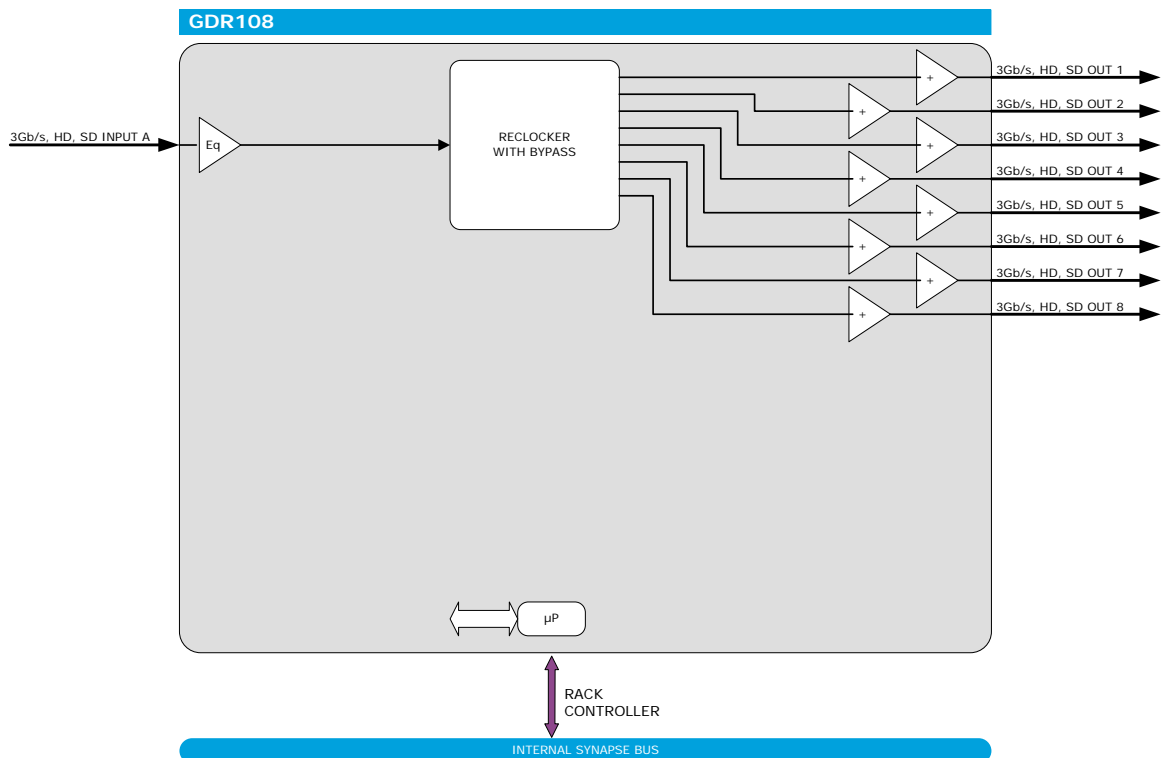
### Features

- Compatible with:
  - SD SDI 270 Mbit/s (SMPTE 259M)
  - HD SDI 1485 Mbit/s (SMPTE 292M)
  - 3Gb/s SDI 2970 Mbit/s (SMPTE 424M)
  - ASI/DVB
- Bypass function of the reclocker for non-standard frequencies
- Optional SFP module on the input (only with BPH35) for fiber, CVBS or SDI input
- Optional SFP module on output 8 (only with BPH36) for 2x fiber, 2x CVBS, 2x SDI outputs or 1x HDMI output

### Applications

- 1 to 8 generic wideband 3Gb/s DA

### Block schematic



## 5 Settings Menu

### Introduction

The settings menu displays the current state of each GDR108 setting and allows you to change or adjust it. Settings can be changed using the front panel of the Synapse frame (SFR18, SFR08 or SFR04) or with Cortex. Also the SCP08 control can be used. Please refer to chapter 3 for information on the Synapse front panel control and Cortex.

*Note:* All items preceded with a #-sign are part of the presets.

### SYSTEM SETTINGS

#### PLL\_set\_A

The GDR108 is capable of re-clocking a range of 3Gbit/s, HD and SD SDI transport stream bitrates. PLL\_Set\_A is used to set the input of the GDR108 to the correct bitrate of the incoming signal. PLL\_Set\_A can be set to Auto, 270 Mb/s, 1485 Mb/s and 2970 Mb/s. The default setting is Auto.

#### Reclocker\_A

The setting item Reclock\_A determines if the incoming signal will be reclocked by the GDR108. The settings are:

- Auto: Auto selection between Bypass and Reclocked.
- Bypass: Does not re-clock the incoming signal
- On: The GDR108 always attempts to re-clock the input

The default setting is Auto.

#### Mute\_A

Mute\_A enables the input of the GDR108 to be muted. The settings of Mute\_A are On, Off, Input Loss or PLL Unlock. Set to Input Loss will mute the input only in case a carrier loss is detected on the input. Set to PLL unlock will mute the input in case the PLL rate is not available. The Default setting is Off.

### HDMI

#### HDMI 1-Format

Here you select the output format of the SFP HDMI output module. Possible modes are:

- RGB444 (default)
- YCrCb422
- YCrCb444

**HDMI 1-DVI-Mode**

With these settings you set the SFP HDMI output module to either DVI-Mode or HDMI-Mode. Default is DVI-Mode.

**HDMI 1\_Mute\_All**

Here you can mute all audio on the SFP HDMI output. Off means no audio mute. On means all audio is muted. Default is off.

**CVBS****CVBS1-In-Format**

With these settings you select the analog input format of the SFP CVBS input. Possible formats are:

- PAL-BGHID (default)
- PAL-N
- NTSC-M
- PAL-M
- NTSC-4.43
- NTSC-J
- PAL-60

## 6 Status Menu

**Introduction** The status menu indicates the current status of each item listed below. There are no defaults for status indicators. Status depends of input signals being present or not.

**SDI-Input\_A** This status item indicates the presence of a valid SDI signal on the input . SDI\_Input\_A indicates if an input signal is Present, Loss or NA (Not Available).

**PLL-rate\_A** PLL\_rate\_A indicates the rate at which the PLL of input A is locked when PLL\_Set\_A is set to auto. PLL\_rate\_A is a copy of the PLL\_Set setting that sets the input. The range of locking rates is as follows: 270 Mb/s, 1485 Mb/s, and 2970 Mb/s

**Backplane-type** This status item indicates the type of backplane (I/O-panel) is currently connected to the card.

### SFP STATUS

**SFP1-Vendor** These status item display the name of the vendor of the SFP module.

**SFP1-Type** These status items display the type name/number of the SFP module.

**SFP1-Temp-Stat** These indicate whether the temperature of the SFP module is Too\_High, High, OK, Low or Too\_Low. Can also be NA in case Temperature monitoring is not available or the module is not inserted.

**SFP1-Volt-Stat** These indicate whether the voltage usage of the SFP module is Too\_High, High, OK, Low or Too\_Low. Can also be NA in case Voltage monitoring is not available or the module is not inserted.

**Port1/2-Enabled** These item indicate whether the corresponding SFP output port is enabled, disabled or NA (Not available, when no input signal is available or a receiver is inserted)

**Port1/2-Power** These status items indicate the current transmitter power of the specified SFP output port between 0mW and 6.55mW. When a receiver is installed or no SFP module is inserted this value is 0.



**Port1/2-Power-Stat**

These indicate whether the output power of the specified SFP output port is Too\_High, High, OK, Low or Too\_Low. Can also be NA in case of an receiver module or no module is inserted.

**Port1/2-Bias**

These status items indicate the current laser bias of the specified port is between 0mA and 300mA. When there is a non fiber SFP or receiver SFP installed, this value will be 0.

**Port1/2-Bias-Stat**

These indicate whether the laser bias of the specified SFP output port is Too\_High, High, OK, Low or Too\_Low. Can also be NA when a non fiber SFP or receiver module is installed.

**Port1/2-Wavelength**

Indicates the current wave length of the corresponding SFP output port between 0nm and 2000nm. When there is a non fiber SFP or receiver module installed, this value will be 0.

## 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 GDR108 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>Input_A</b>	Input A status can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
<b>Lock-Status_A</b>	Input A lock status can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
<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 Synapse Set-up to show the event.

### The Tag

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. 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).

### Defining Tags

The tags defined for the card are:

Event Menu Item	Tag	Tag	Description
Announcements	0 or NA	0 or NA	Announcing of report and control values
Input_A	01 <sub>hex</sub> =INP_LOST	81 <sub>hex</sub> =INP_RETURN	SDI input A lost or returned
Lock-status_A	11 <sub>hex</sub> =PLL_LOCKED	91 <sub>hex</sub> =PLL_UNLOCKED	PLL input A locked or unlock

### 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

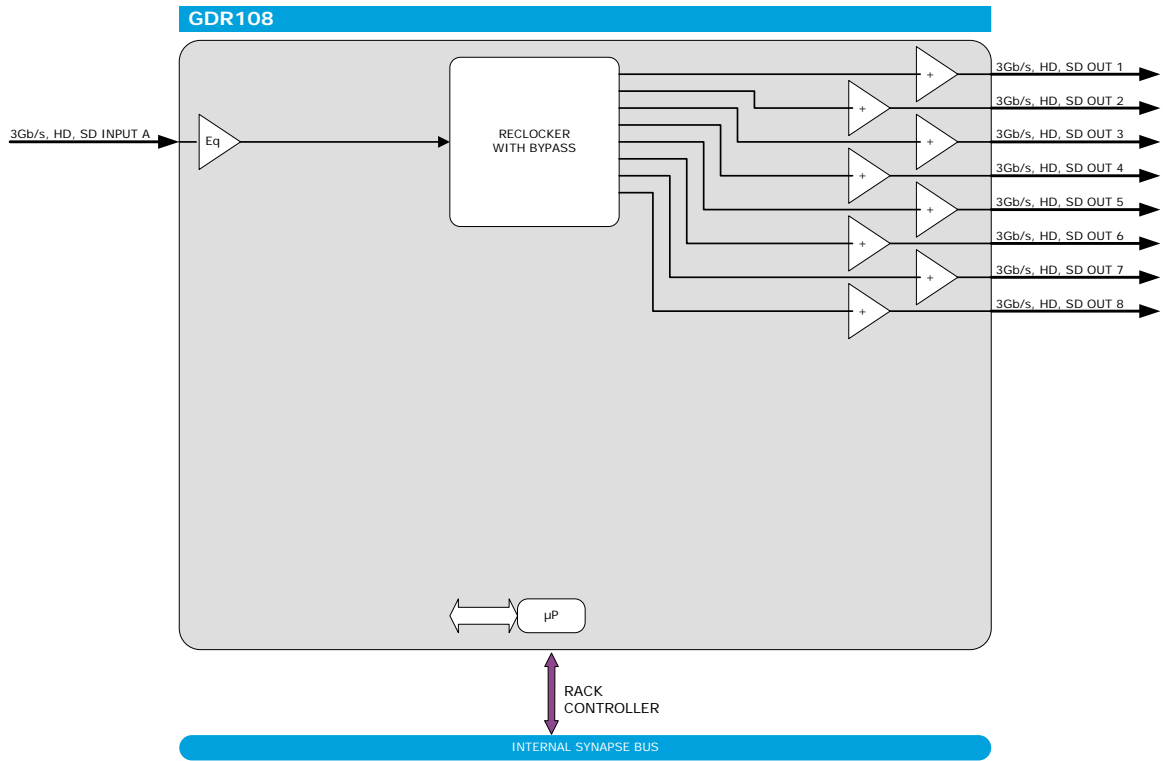
Together with the message string or the tag, the slot number or address of the card is relevant to be able to assign the event to a certain card.



## 8 LED Indication

<b>Error LED</b>	The error LED indicates an error if the internal logic of the GDR108 card is not configured correctly or has a hardware failure.
<b>Input A LED</b>	This LED indicated the presence of a valid video signal on input A.
<b>Connected LED</b>	This LED illuminates after the card has initialised. The LED lights for 0.5 seconds every time a connection is made to the card

# 9 Block Schematic



## 10 Connector Panels

The GDR108 can be used with the BPH34, BPH35, BPH36 and the relay bypass version BHX34. The following table displays the pinout of these backpanels.

BPH34: Standard IO panel

BHX34: Bypass IO panel

BPH35: SFP option IO panel Receiver

BPH36: SFP option IO panel Transmitter

