

*Synapse*

GPI16

**Universal GPI Card with 10 GPI inputs  
and 16 GPI outputs**

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**TECHNICAL MANUAL**

**GPI16**

**Universal GPI Card with 10 GPI inputs  
and 16 GPI outputs**



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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

<p>Axon Digital Design GPI16</p> <p> Tested To Comply With FCC Standards</p> <p>FOR HOME OR OFFICE USE</p>	<p>This device complies with part 15 of the FCC Rules Operation is subject to the following two conditions:</p> <p>(1) This device may cause harmful interference, and</p> <p>(2) This device must accept any interference received, including interference that may cause undesired operation.</p>
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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 and RRC04 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 manual.



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

Although not required to Setup a Synapse frame, you are strongly advised to use a remote personal computer or laptop PC with the Synapse Setup software 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.

### Locating the card

The Synapse card can be placed vertically in an SFR18 frame or horizontally in an SFR04 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.

REMARK: On power up all LEDs 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 LEDs will light during this process. After initialisation, several LEDs will remain lit – the exact number and configuration is dependant upon the number of inputs connected and the status of the inputs.

#### Default settings

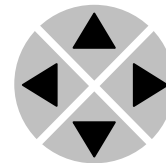
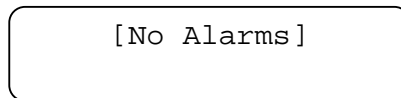
In the default condition, the GPI16 acts as a universal GPI input & Output card for the Synapse SFR18/SFR04 frame.

#### Changing settings and parameters

The front panel controls or the Synapse Set-Up Software 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 ▼

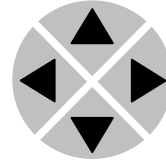
To move down through a menu or decrease the value of a parameter.

REMARK: 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

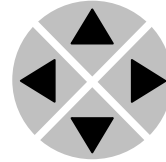
```
RRC18 [Select Card]
>S01=SFS10
```



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
```

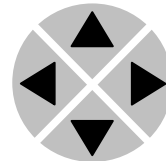


Pressing the ► selects the menu item shown, in this example Settings.

(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
```

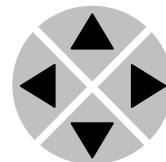


Pressing the ► selects the settings item shown, in this example SDI-Format.

(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]
```



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.

## Synapse Setup Software

Synapse Setup Software 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. The Synapse Setup software 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.

Having selected the desired Frame and Module from the GUI Synapse Network View, select the menu item that you wish to open. Opening the menu item gives a complete list of available properties with their associated Value.

For example to change a setting e.g. SDI-Format, select SDI-Format from the list of settings by 'double clicking' to open a dialogue box. The dialogue box allows parameters to be changed or set to default value. On completion close the dialogue box.

## Menu Structure Example

Slot	Module	Item	Parameter	Setting
▲				
▲				
S02		Identity		
▲				
S01	SFS10	Settings	SDI-Format	Auto
▼				
S00	RRC18	Status	Mode	625
		▼		
		Events	Ref-Input	525
			▼	
			H-Delay	
			▼	
			▼	

REMARK: Further information about Front Panel Control and Synapse Setup Software can be obtained from the RRC18 and RRC04 operational manuals.

## 4 The GPI16 Card

### Introduction

The AXON GPI16 card is a universal Synapse GPI I/O (Input/Output) card. The card is capable of forcing GPI output triggering based on events that are generated by cards located in the same rack. (E.g. An alarm/event generated by any specific card in frame. This alarm/event is put on the bus. The GPI16 card will monitor the internal bus for events and close a relay in case of an event.)

The GPI16 can also be used as a slave card for Synapse functions, the 8x1 switcher or the VWI10 card for example. In these applications it is possible to control functions directly in to a Master, e.g. GPI based channel selection of the 8x1 switcher SDX08.

### Back planes

The GPI16 can be used with the BPL06 backplane.

### Miscellaneous

The GPI16 cards fit into the Axon SFR18 or SFR04 rack.

LEDs on the front of the board indicate the presence of electrical input signals & Processor Errors.

The GPI16 can be controlled by Axon Synapse Set-Up Software.

## 5 Settings Menu

### Introduction

The settings menu displays the current state of each setting within the GPI16 and enables the item to be changed or adjusted.

Settings can be changed using the front panel of the Synapse frame (SFR18 or SFR04) or Synapse Setup software.

Please refer to chapter 3 for information on the Synapse front panel control and Synapse Setup software.

### Source

The settings item `Source` controls the functionality of the card. The GPI16 can be either used as a general purpose card or a card dedicated to one master card.

The settings of `Source` are;

**Frame:** The GPI16 is set to general purpose where events from several cards within the Synapse frame can be mapped to the GPI16. The card can be placed in any slot of the frame.

**Mastercard:** When the GPI16 is set to `Mastercard`. The GPI16 then functions as an interface between a mastercard (VWI10, SDX08, ARC20) and hardware switches or automation pulses. The GPI16 card has to be placed at the right side of a mastercard.

The default setting of `Source` is `Frame`.

### GPI\_in

`GPI_in` can be set to `Latch`, `Non_Latch`, or `Loop-Through`. `Latch` when a contact is closed all the time. `Non_Latch` when a contact is closed momentarily. `Loop-Through` When you want the GPI outputs to be triggered by the GPI inputs.

The default setting of `GPI_in` is `Non_Latch`.

### DeBounce

`DeBounce ON` will de-bounce the GPI inputs when a mechanical switch is used. `OFF` will de-activate this feature. `OFF` also improves the reaction speed.

Default is `On`.

### GPO\_1-Card

When the settings item `Source` is set to `Frame`, the setting `GPO_1-Card` is active. `GPO_1-Card` maps GPI output 1 to the card in the selected slot within the Synapse frame. `GPO_1-Card` select slots 1 to 18 and can also be given the setting 0. When `GPO_1-Card` is set to 0, all slots with the `Tag` selected will provide the source for the GPI switching, (see Setting item `GPO_1-Tag` below). The default setting of `GPO_1-Card` is 0.

**GPO\_1-Tag**

When the settings item `Source` is set to `Frame`, the setting `GPO_1-Tag` is active. `GPO_1-Tag` selects the `Tag` that will be used to enable the GPI output to switch for the card selected in setting item `GPO_1-Card`.

There is no TAG selected, when the value of the `GPO_1-Card` is 0.

The TAG number can be found in the events menu of the card that has to be controlled. E.g. loss of input is TAG1. And also the TAG can be found in the manual of the card that has to be controlled.

Most important TAGS:

Lost input = TAG1

Lost reference = TAG2

EDH status = TAG3

ANC status = TAG4

Audio data = TAG5

GRP-insert = TAG6

The default setting of `GPO_1-Tag` is 0.

**GPO\_2-Card to  
GPO\_16-Card**

The functionality of `GPO_2-Card` to `GPO_16-Card` is the same as `GPO_1-Card`. Please refer to the above description for details.

**GPO\_2-Tag to  
GPO\_16-Tag**

The functionality of `GPO_2-Tag` to `GPO_16-Tag` is the same as `GPO_1-Tag`. Please refer to the above description for details.

**GPOut\_1-Default ~  
GPOut\_16-Default**

The GPI outputs are based on mechanical relays. The advantage of using a relay is the galvanic isolation and polarity independent switching capabilities. The relays have switch over contacts with a normally closed (NC) and normally open (NO) contacts. The default position is: On. This means that in the default state all relays are activated and the NO contact is closed. The advantage is that if the card loses power all relays will be in their non-activated state.

The settings menu items `GPOut_1-Default` till `GPOut_16-Default` allows the relays to be put in their released (non-activated) state which also can be used as manual triggering of the GPI outputs. The state can also be changed by the GPIInputs 1 till 10.

The settings of `GPOut_1-Default` are `On`, `Off` and `GPI_1` till `GPI_10`. The default setting of `GPOut_1-Default` is `On`.

## 6 Status Menu

**Introduction** | The status menu indicates the current status of each item listed below.

**GPIIn\_1** | The status item GPIIn\_1 indicates that GPI input 1 has been triggered. If a voltage is supplied to the input the status will be displayed as On, if a voltage is not present the Status will be Off.

**GPIIn\_2 to GPIIn\_10** | Please refer to the description of GPIIn\_1

**GPOut\_1** | The status item GPOut\_1 indicates that GPI output 1 has been triggered. This means that activation of this GPI output relay changes it from the default state selected in GPOut\_1-Default.  
For example, if GPOut\_1-Default is set to Off. In its un-triggered state the GPOut\_1 indicates Off. When the output is triggered the status changes to On.

**GPOut\_2 to GPOut\_16** | Please refer to the description of GPOut\_1

## 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>GPI16 Events</b>	The events reported by the GPI16 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>GPI_1</b>	GPI_1 generates a GPI trigger and can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting. When a GPI input is activated, an event will be generated.
<b>GPI_2 to GPI10</b>	Please refer to GPI_1.
<b>What information is available in an event?</b>	The message consists of the following items; <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.

When an 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 GPI16 are:

Event	Tag*		Description
Menu Item			
Announcements	0 or NA	0 or NA	Announcing of report and control values
GPI	08 <sub>hex</sub> =GPI ON #	88 <sub>hex</sub> = GPI OFF #	GPI relay event

\* For all tags see selected card numbers

## 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.

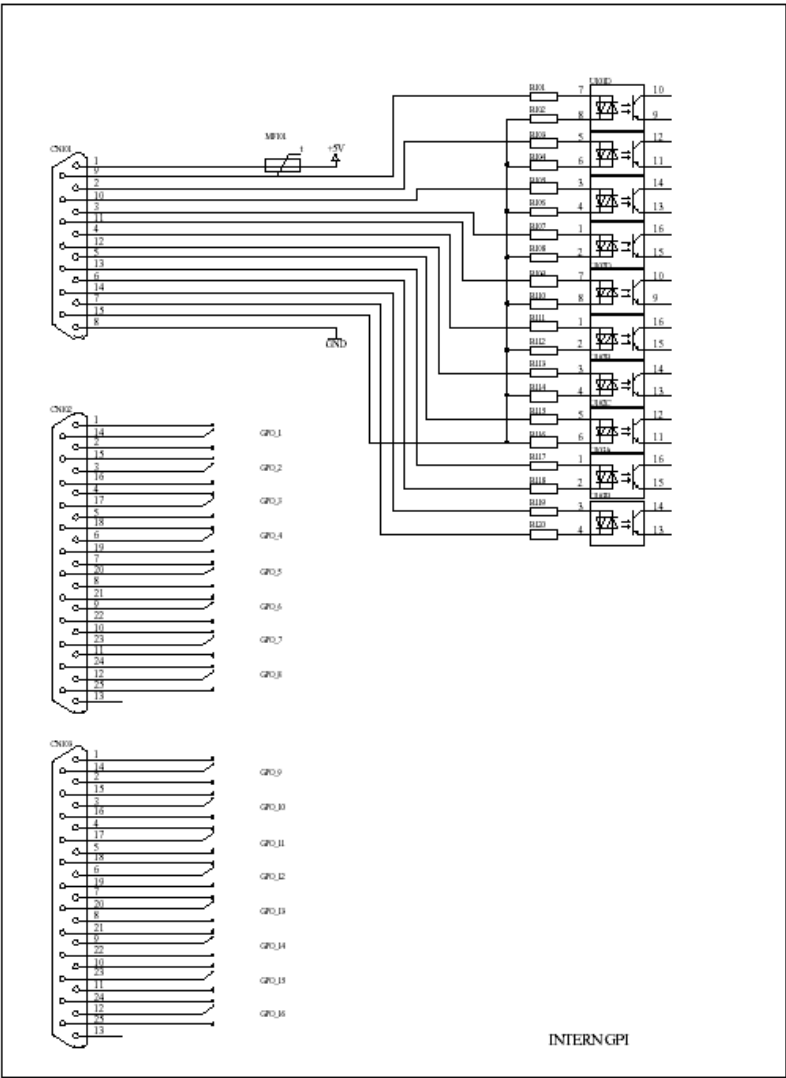
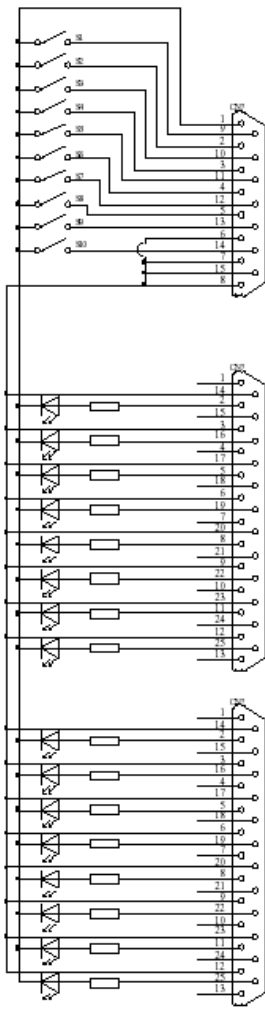
## The Address

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.

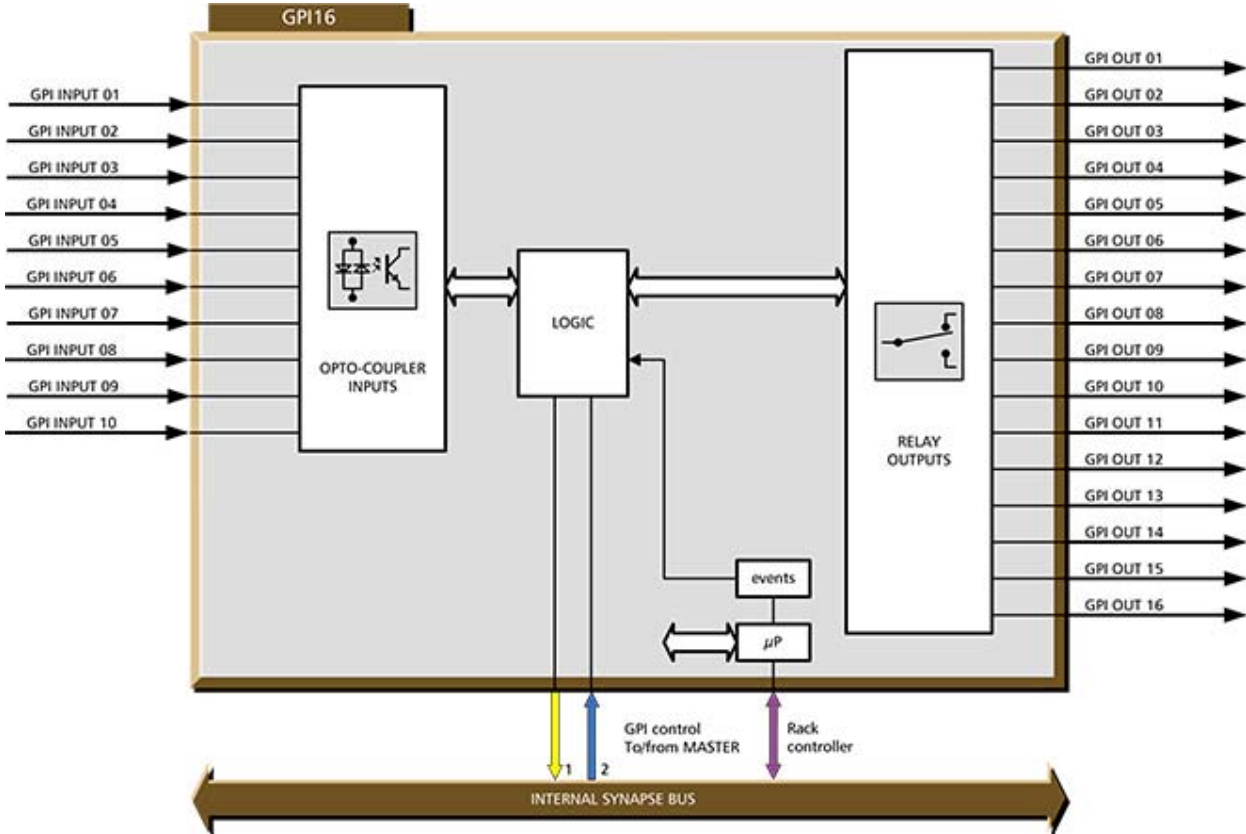
## 8 LED Indication

<b>Error LED</b>	The error LED indicates an error if the internal logic of the GPI16 card is not configured correctly or has a hardware failure.
<b>Input LED</b>	The Input LED illuminated to indicate a GPO trigger.
<b>Connection 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 Connection Details



# 10 Block Schematic



# 11 Connector Panel

The GPI16 can be used with the following backplane: BPL06.

