INSTALLATION & CONFIGURATION MANUAL
U4D100

4K ULTRA HD 4 WIRE TO 1080P DOWN CONVERTER

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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 EVS distributor.

● NEVER expose this product to extremely high or low temperatures.

● NEVER operate this product in an explosive atmosphere.

Warranty: EVS warrants their products according to the warranty policy as described in the general terms. That means that EVS Broadcast Equipment SA 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.

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

EVS Broadcast Equipment U4D100	This device complies with part 15 of the FCC Rules
FC Tested To Comply With FCC Standards	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.
FOR HOME OR OFFICE USE	

Table of Contents

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 EVS Broadcast Equipment SA Website at http://www.evs.com 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 manual. The method of connection to a computer using Ethernet is also described in the ERC/ERS/RRC/RRS manual.

! CHECK-OUT: "EVS 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 EVS Cortex installed, as this increases the ease of use and understanding of the modules.

2 Unpacking and Placement

Unpacking

The EVS 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 EVS 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

```
[No Alarms]
```
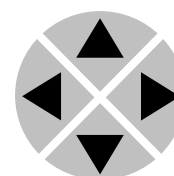
Settings are displayed and changed as follows;

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
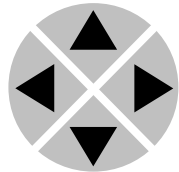
With the display as shown below

```
RRC18 [Select Card]
>S01=SFS10
```
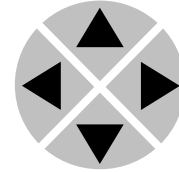
Pressing the ► selects the SFS10 in frame slot 01.

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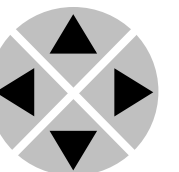
To edit the setting of the menu item press ▲ or ▼.

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

EVS Cortex Software

EVS 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. EVS 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 EVS 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 U4D100 Card

Introduction

The U4D100 is a 4K (3840x2180), 4 wire, to 1080p down-converter. The low latency unit combines and filters the four quadrants into a 1080p (1920x1080) signal.

Features

- Four wire 1080p 50 or 59.94 input (level B compliant)
- One 1080p signal on 4 outputs
- Low Latency (1 1080p Frame 20ms @ 50Hz, 16.7ms @ 59.94 Hz)
- 4K 4 wire (3840 x 2160)
- Compatible with the following formats (auto selecting)
  - 1080p/59.94
  - 1080p/50
- Transparent for 16 channels of embedded audio
- The BPH17 can optionally be fitted with up to two fiber I/O modules (inputs or outputs)
- Full control and status monitoring through the front panel of the SFR04/SFR08/SFR18 frame and the Ethernet port (ACP)

Applications

- Down conversion for 4K production sets

Block schematic
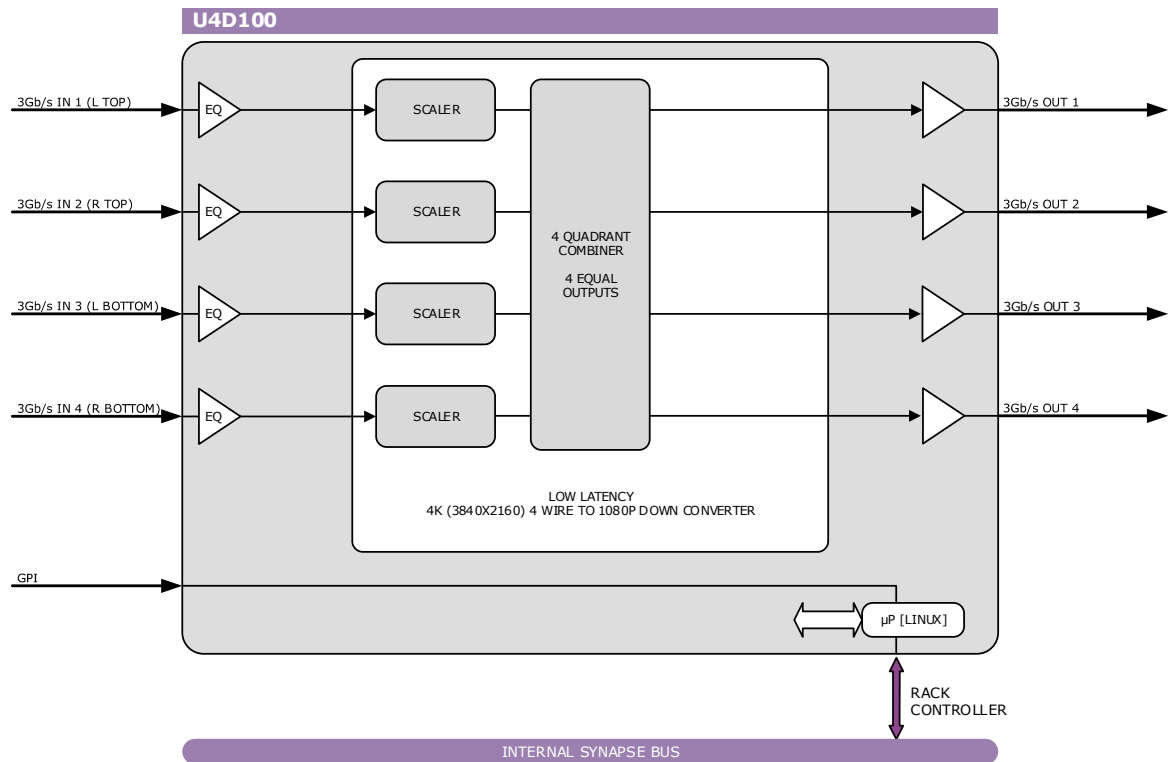
5 Settings Menu

Introduction

The settings menu displays the current state of each 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. 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

IO_Prst_Act

With this item you can manually change the currently active IO settings. Can be any preset between 1 and 8. By default it is set to 1. Menu settings that are preceded with a '# '-prefix are part of the preset, *except for* the anaglyph mode presets.

IO_Prst_Edit

Here you can select which of the 8 selectable IO settings presets you want to edit. Changing this will not change the active preset, unless the currently active preset is the same you are going to edit. Menu settings that are preceded with a '# '-prefix are part of the preset, *except for* the anaglyph mode presets.

#Out-Frmt

With `Out-Frmt` you can set what the output format is. Possible settings are:
- `1080p60`
- `1080p50`
- `Auto`

#Out_Map

The setting item `Out_Map` determines if the output signal is mapped according Level-A or Level-B. on input A will be reclocked by the GDR216. The settings are:
- `Auto`: Ouput mapping follows input map detection.
- `Level-A`: Fixed level-A
- `Level-B`: Fixed level-B

The default setting is `Auto`.

#Mode

The setting `Mode` determines if the output signal is down converted or the input is passed to the output. Settings are
- `Pass (Default)`
- `Down`

#H-Sharpness	With `H-Sharpness` you can select how much detail enhancement you want to add. Ranges from 0% to 100%. The Default is `0%`.
#H_delay	The `H-Delay` setting allows adjustment of the Horizontal phase of the output signal with respect to the selected reference input.
	The `H-Delay` setting gives a delay in addition to the reference timing. For example: if the `H-Delay` is set to 10 pixels, the output signal will be delayed by reference timing + 10 pixels. The signal is delayed (advanced) with respect to the phase of the reference signal. The available range is from 0 to a maximum of 2639 pixels (depends on I/O format). The default setting is `0px`.
#V_delay	`V-Delay` setting allows adjustment of the vertical phase of the output signal with respect to the selected reference input.
	The `V-Delay` setting gives a delay in addition to the reference timing. For example: if the `V-Delay` is set to 10 TV HD lines, the output signal will be delayed by reference timing + 10 TV HD lines. The signal is delayed (advanced) with respect to the phase of the reference signal. The available range is from 0 to a maximum of 1124 lines. The default setting is `0ln`.
#F_delay	`F-Delay` sets the amount of delayed Frames. The available range is from 0 to 7 frames. Default is `0F`.
#OSD-Style	Selects the style of the On Screen Display text. The following are possible: ▪ `Off.` ▪ `Transp`: Enables the text in transparent mode. ▪ `Masked:` Enables the text in masked mode. ▪ `Blink-Transp`: Blinkes the text in transparent mode. ▪ `Blink-Masked:` Blinkes the text in masked mode.
Lock-Mode	`Lock-Mode` determines whether the card is locked to his `input` (input 1), to the reference (`Ref1` or `Ref2`) or `freerun` (not locked). By default it is set to `Ref1`.
Ref-Type	Sets the type of incoming reference. Can be either Bi-Level or `Tri-Level`. Default is `Bi-Level`.

Delay-Status	It is possible to display the processing time of the card in the status menu. This setting allows you to switch this function ON or OFF.
	Due to bus traffic the default setting is OFF.

	NETWORK

IP_Conf0	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.
mIP0	When IP_Conf0 is set to manual, you can type in the preferred IP address here. By default it is set to 172.16.1.2
mNM0	With IP_Conf0 set to manual, with this setting you can set a Netmask. Default is 255.255.0.0
mGW0	With IP_Conf0 set to manual, this setting let you set a Standard Gateway. Default is set to 172.16.0.1
NetwPrefix0	Here you can set the proper network prefix if required.

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.

sInp1

This status item indicates the presence and format of a valid signal in input 1. This is displayed as:
- `1080P60`
- `1080p50`
- `NA`

IO-Delay

Displays the total delay in ms between the Input and Output.

Value between 20`ms` and 160`ms`.

Ref

Displays whether a correct reference is found (`Present`) or not (`NA`)

NET STATUS

IP_Addr0

This item displays the status of the IP address. It can be manual, DHCP asking, DHCP Leased or DHCP Infin.

Mac0

This item displays the MAC address of the card.

IP0

This item displays the current IP address of the card.

NM0

This item displays the current Netmask of the card.

GW0

This item displays the current Standard Gateway of the card.

7 Events Menu

Introduction

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.

What is the Goal of an event?

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.

Events

The events reported by the U4U100 are as follows;

Announcements

`Announcements` is not an event. This item is only used for switching the announcement of status changes on/off. 0=off, other =on

Ref-Status

Reference status can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting. Default is Off.

What information is available in an event?

The message consists of the following items;

1) A message string to show what has happened in text, for example: "INP_LOSS", "REF_LOSS", "INP_RETURN".

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.

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.

4) A slot number of the source of this event.

The Message String

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_{hex}) (e.g. 129 (81_{hex}) 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_{hex} =INP_LOST	81_{hex} =INP_RETURN	SDI input A lost or returned
Lock-status_A	11_{hex} =PLL_LOCKED	91_{hex} =PLL_UNLOCKED	PLL input A locked or unlock
Input_B	12_{hex} =INP_LOST	92_{hex} =INP_RETURN	SDI input B lost or returned
Lock-status_B	51_{hex} =PLL_LOCKED	$d1_{hex}$ =PLL_UNLOCKED	PLL input B locked or unlock
Active_Out_A	19_{hex} =IN_B_->_OUT_A	99_{hex} =IN_A_->_OUT_A	Active output A is In_B or In_A
Active_Out_B	$1a_{hex}$ =IN_A_->_OUT_B	$9a_{hex}$ =IN_B_->_OUT_B	Active output B is In_A or In_B

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.
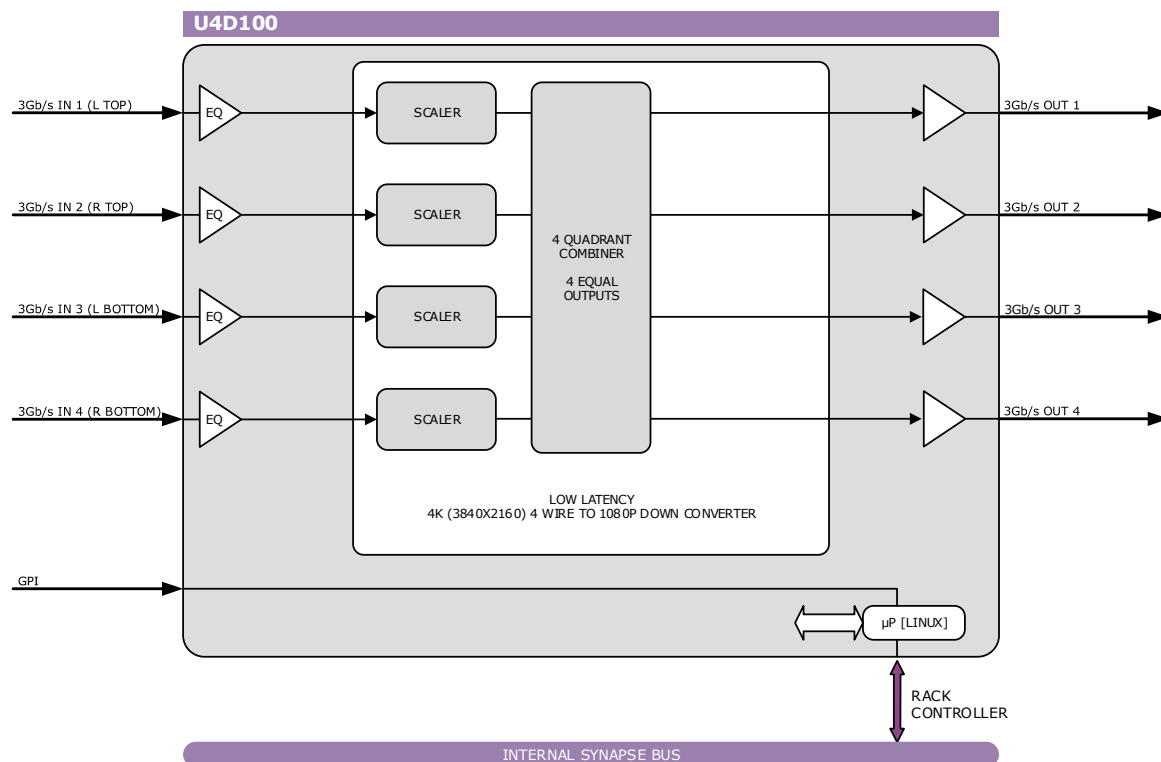
The Address

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.
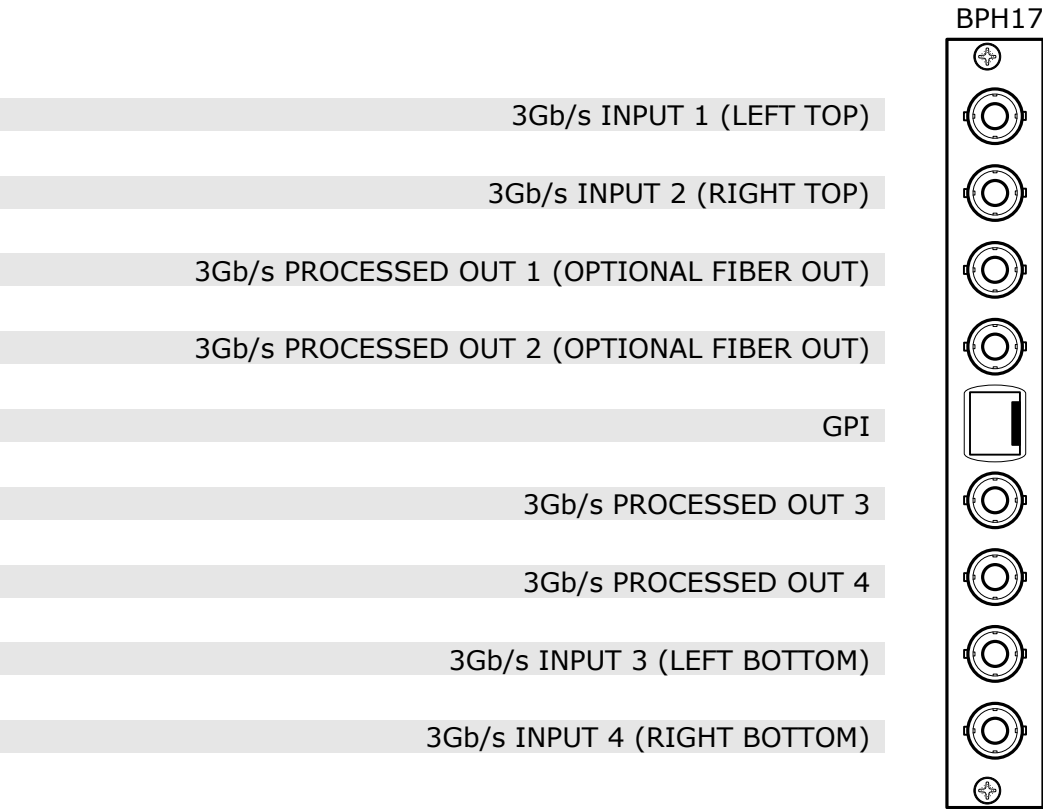
8 LED Indication

Error LED The error LED indicates an error if the internal logic of the card is not configured correctly or has a hardware failure.

Input_1 LED This LED indicated the presence of a valid SDI video signal on input 1.

Reference LED Indicated the presence of a valid reference signal on the selected reference input connector (ref-1 or ref-2).

Connection LED This LED illuminates after the card has initialized. The LED lights for 0.5 seconds every time a connection is made to the card.

Error LED The error LED indicates an error if the internal logic of the card is not configured correctly or has a hardware failure.
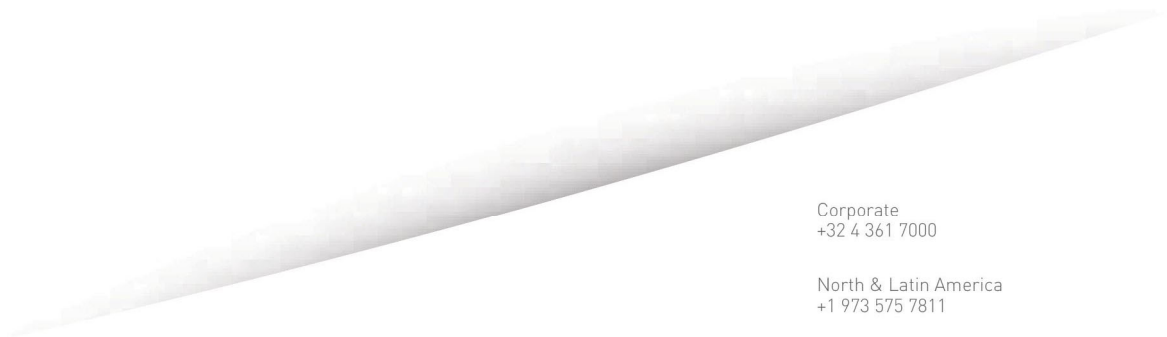
9 Block Schematic

10 Connector Panels

The U4D100 can be used with the BPH17

BPH17

3Gb/s INPUT 1 (LEFT TOP)

3Gb/s INPUT 2 (RIGHT TOP)

3Gb/s PROCESSED OUT 1 (OPTIONAL FIBER OUT)

3Gb/s PROCESSED OUT 2 (OPTIONAL FIBER OUT)

GPI

3Gb/s PROCESSED OUT 3

3Gb/s PROCESSED OUT 4

3Gb/s INPUT 3 (LEFT BOTTOM)

3Gb/s INPUT 4 (RIGHT BOTTOM)

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