Synapse

DAW30

8, 4 and 2 channel AES/EBU audio watermark embedder
based on Kantar Media technology

Installation and Operation manual

KANTAR MEDIA

Quad speed
ADD-ON

Committed.

AXON®

Synapse

TECHNICAL MANUAL

DAW30

Hercules 28
NL-5126 RK Gilze
The Netherlands
Phone: +31 161 850 450
Fax: +31 161 850 499
E-mail: Info@axon.tv
Web: 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.

Date created: 12-07-2011
Date last revised: 26-11-2015

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 DAW30 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

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 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 described in those manuals as well.

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

Although not required to use Axon 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.

Locating the card

The Synapse card can be placed vertically in an SFR18 frame or horizontally in an SFR08 or 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.

Note: On power up all LEDs will light for a few seconds, this is the time it takes to initialize the card.

3 A Quick Start

When Powering-up

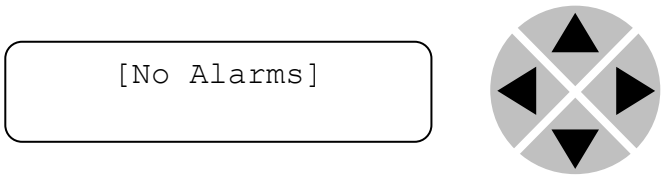
On powering up the Synapse frame, the card set will use basic data and default initialization settings. All LEDs will light during this process. After initialization, several LEDs will remain lit – the exact number and configuration is dependant upon the number of inputs connected and the status of the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

Changing settings and parameters

The front panel controls or 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.

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

Example of changing parameters using front panel control

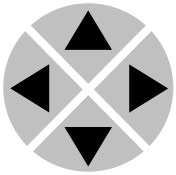
With the display as shown below

```
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 it current setting is `Auto`.

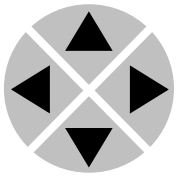
```
SFS10 [Settings]
>SDI-Format=Auto
```

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]
```



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

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 Axon Cortex help files (press F1 in any window).

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 Axon Cortex can be obtained from the rack controller manual and Axon Cortex help files.

4 The DAW30 Card

Introduction

The DAW30 are audio watermarking embedders for Audience measurement (NexTracker™), Second Screen applications (SyncNow®) or a combination of the services. Developed in corporation with Kantar Media this powerful card can encode/watermark up to 8 mono channels in the AES/EBU domain.

The powerful quad speed audio bus makes this card ideal to process embedded domain audio by use of a quad speed enabled Master Card.

Up to 8 channels of inaudible Kantar Media based watermarking including time codes and channel or content identifiers

- Up to 8 channels of inaudible Kantar Media based watermarking with embedded time stamp and channel identification
- Full audio swapping of all input channels allow for a selection of any AES/EBU input or any of the 32 channel bus input to be selected
- 16 stereo channels of audio gain
- 16 stereo channels audio delay up to 4000ms
- 16x 2 channel audio insertion into 32 channel Quad speed audio bus (allows for duplicates)
- Full control and status monitoring through the front panel of the SFR04/SFR08/SFR18 frame and the Ethernet port (ACP)

Digital Audio Watermarking

Digital audio watermarking hides information in an audio stream without the information being audible to the listener. A Radio or TV signal can be identified with channel and precise airing details to perform accurate audience measurement.

NexTracker™

Digital broadcasting represents an increasingly complex challenge for TV audience measurement services, as they must now typically track audiences on a larger number of channels, delivered through a diversified mix of delivery platforms, and watched either in real time or time-shifted mode. Kantar Media's NexTracker™ Audience Measurement is based on audio watermarking technology that is reliably detected independently of broadcast delivery modes and consumers' TV viewing methods.

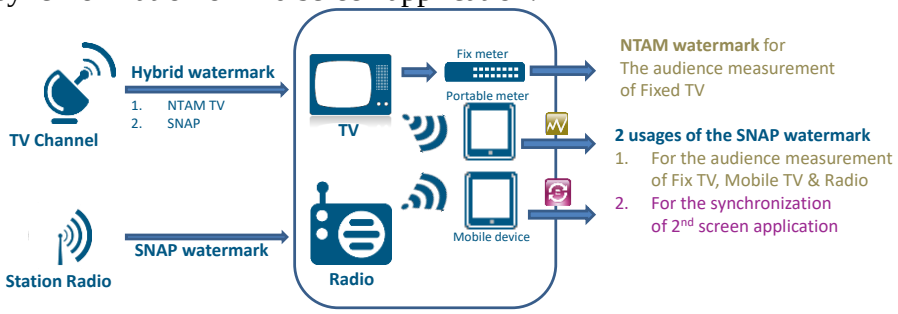
SyncNow®

Kantar Media's state-of-the-art content identification solution allows broadcasters, content producers and interactive application providers to offer time-synchronized-to media applications such as ad-(re)placement, live voting and content-related overlays. Based on Kantar Media 's powerful watermarking technology, it allows for automatic identification of the TV channel being watched and the content being played. Upon identification it enables accurate time synchronization between content played on TV and mobile devices such as tablets and smart phones. The real-time interactivity automatically handles distribution delays and supports time shifted viewing.

SNAP and Hybrid

The SNAP technology is the Kantar Media response to the growing appetite from broadcasters for convergent applications and simpler workflows. SNAP offers a single multipurpose payload that serves TV audience measurement, Radio audience measurement as well as 2nd Screen synchronization applications anywhere.

The hybrid solution, able to embed both the NexTracker and the SNAP watermark or both the NexTracker and the SyncNow 3G Watermark, is also available. The hybrid NextTracker / SNAP is dedicated to manage a smooth transition to the SNAP watermark.
The following figure illustrates the workflow of the watermarks for the TV and Radio audience measurement application and for the synchronization of 2nd screen application:



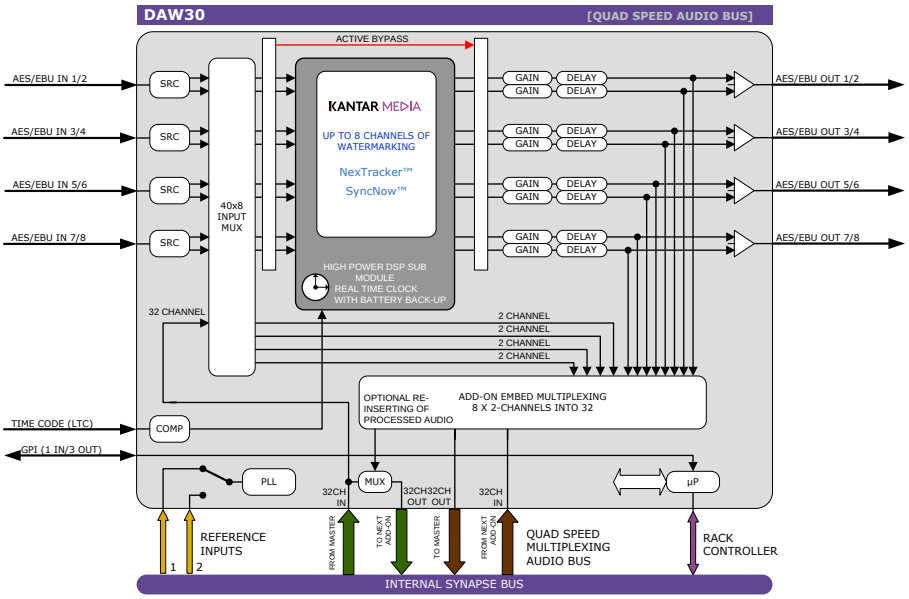
Applications

8, 4 or dual channel audio watermarking in transmission environments for Viewing rate measurements and/or Second Screen applications.

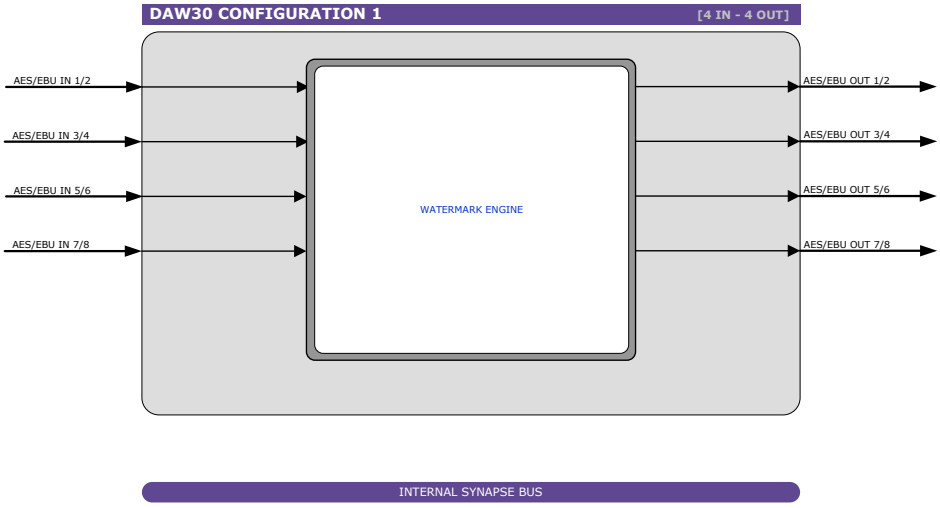
Program Procedure

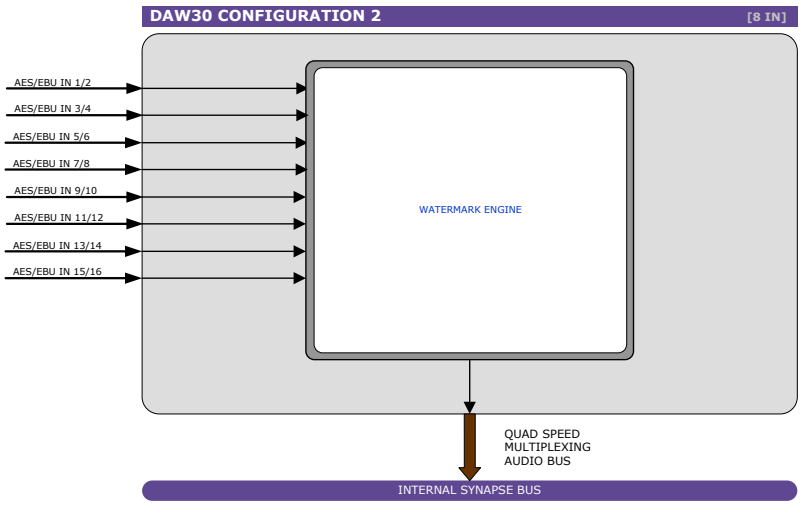
This card can be updated with new firmware when new firmware versions are released. New .spf files will be distributed by Kantar Media or its distributor. To update the DAW you can follow the instructions as described in the reprogramming cards quick guide, downloadable via the Axon website.

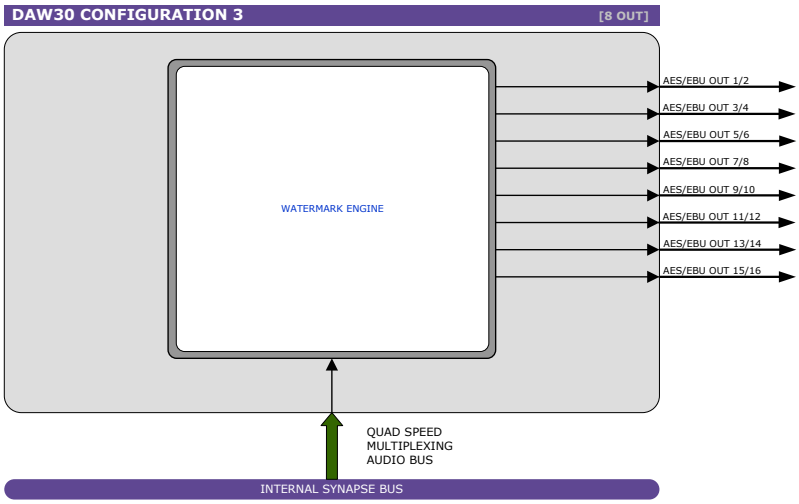
Block Schematic



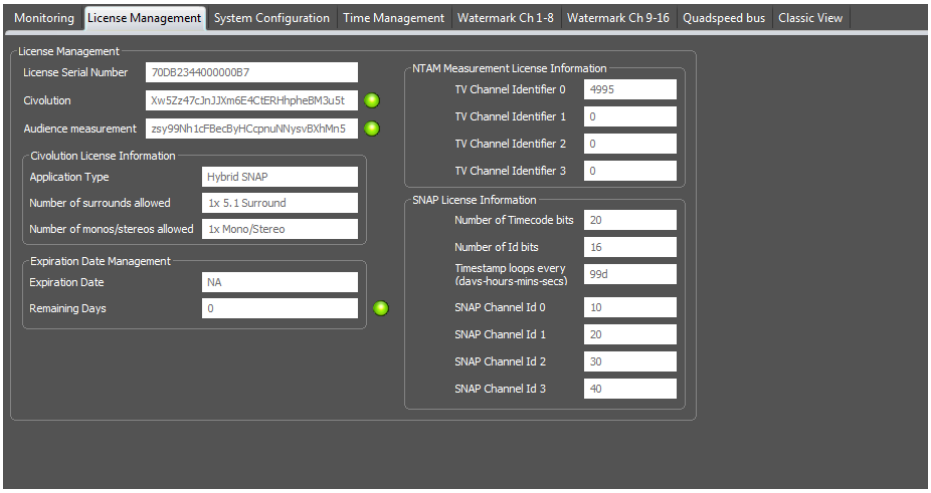
3 different configurations

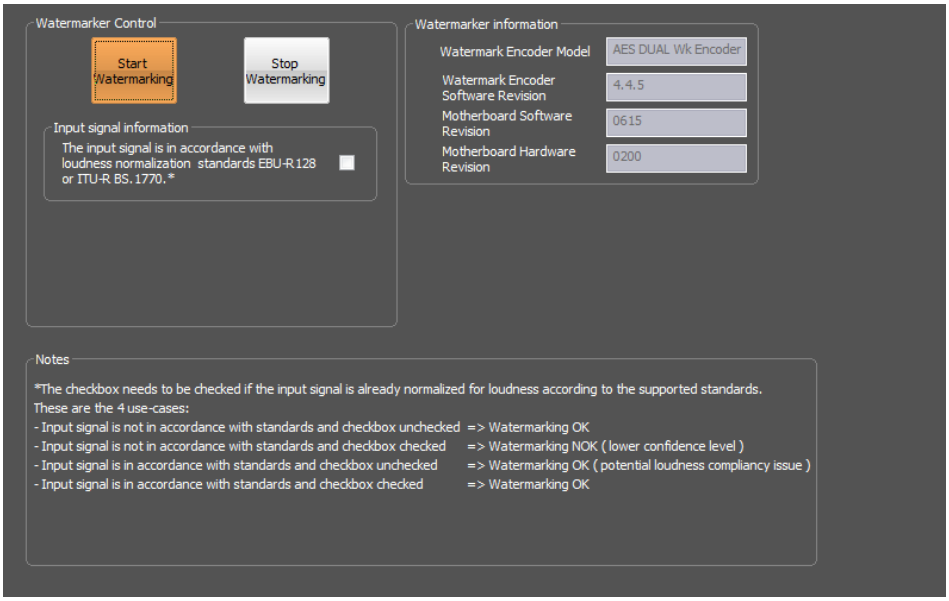


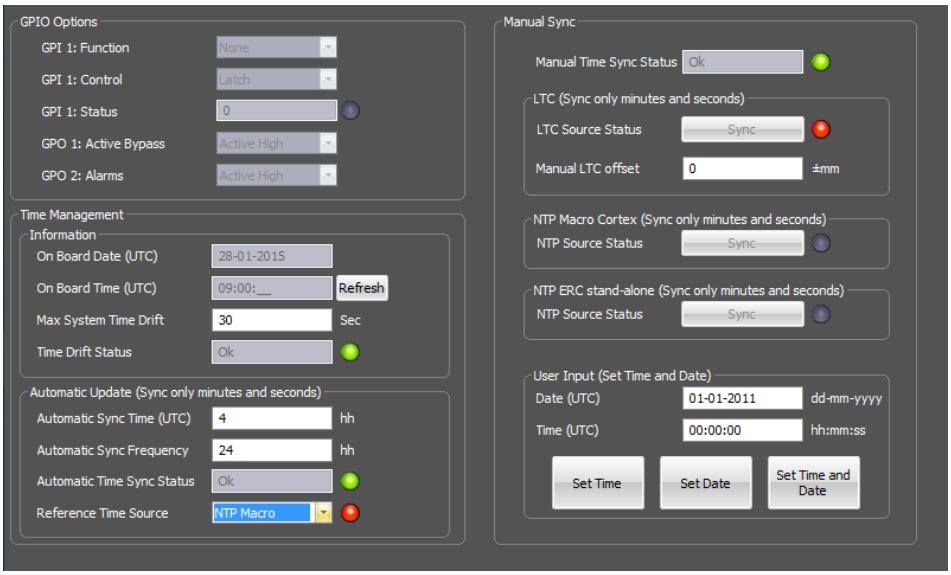




Cortex interface examples

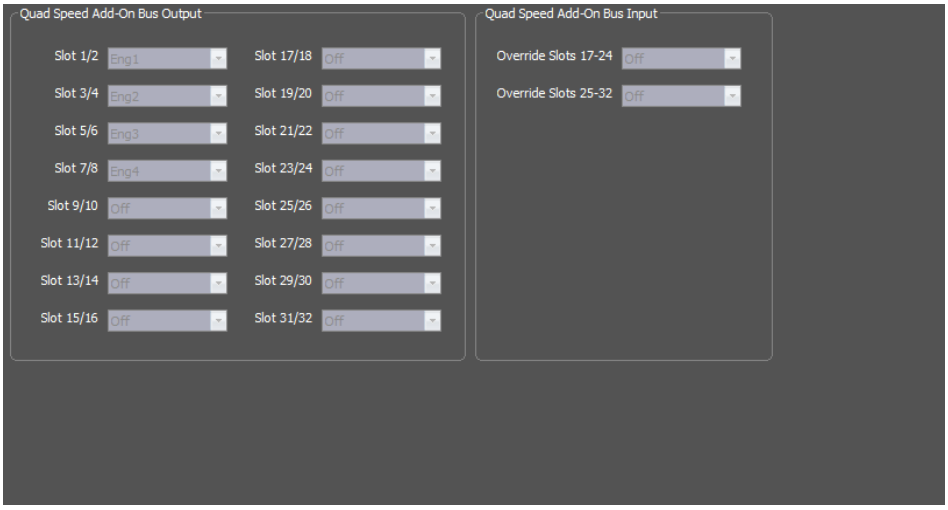



Watermarker Control
Start Watermarking
Stop Watermarking
Input signal information
The input signal is in accordance with loudness normalization standards EBU-R128 or ITU-R BS.1770.*
Watermarker information
Watermark Encoder Model
AES DUAL Wk Encoder
Watermark Encoder Software Revision
4.4.5
Motherboard Software Revision
0615
Motherboard Hardware Revision
0200
Notes
*The checkbox needs to be checked if the input signal is already normalized for loudness according to the supported standards.
These are the 4 use-cases:
- Input signal is not in accordance with standards and checkbox unchecked => Watermarking OK
- Input signal is not in accordance with standards and checkbox checked => Watermarking NOK (lower confidence level)
- Input signal is in accordance with standards and checkbox unchecked => Watermarking OK (potential loudness compliancy issue)
- Input signal is in accordance with standards and checkbox checked => Watermarking OK


GPIO Options
GPI 1: Function
None
GPI 1: Control
Latch
GPI 1: Status
0
GPO 1: Active Bypass
Active High
GPO 2: Alarms
Active High
Time Management
Information
On Board Date (UTC)
28-01-2015
On Board Time (UTC)
09:00:__
Refresh
Max System Time Drift
30
Sec
Time Drift Status
Ok
Automatic Update (Sync only minutes and seconds)
Automatic Sync Time (UTC)
4
hh
Automatic Sync Frequency
24
hh
Automatic Time Sync Status
Ok
Reference Time Source
NTP Macro
Manual Sync
Manual Time Sync Status
Ok
LTC (Sync only minutes and seconds)
LTC Source Status
Sync
Manual LTC offset
0
±mm
NTP Macro Cortex (Sync only minutes and seconds)
NTP Source Status
Sync
NTP ERC stand-alone (Sync only minutes and seconds)
NTP Source Status
Sync
User Input (Set Time and Date)
Date (UTC)
01-01-2011
dd-mm-yyyy
Time (UTC)
00:00:00
hh:mm:ss
Set Time
Set Date
Set Time and Date


Engine Channel 1/2
Engine Channel 3/4
Engine Channel 5/6
Engine Channel 7/8
Source
Channel
Engine Input Status
Audio Designation
WM
Gain
Delay
WM Configuration
SNAP Id
License Information
Number of surrounds allowed
Number of surrounds in use
Number of stereos/monos allowed
Number of stereos/monos in use


Engine Channel 9/10
Source
Channel
Engine Input Status
Audio Designation
WM
Gain
Delay
Ch9
Ch10
Chn 9
Chn 10
Format
NA
Unlocked
Mono chn 1
Stereo
Sur Lf/Rf
Sur Ls/Rs
Mono chn 2
Sur C/LFE
Mono
0.00
dB
ms
WM Configuration
SNAP Id
Engine Channel 11/12
Ch11
Ch12
Chn 11
Chn 12
Mono chn 3
Mono chn 4
Engine Channel 13/14
Ch13
Ch14
Chn 13
Chn 14
Mono chn 5
Mono chn 6
Engine Channel 15/16
Ch15
Ch16
Chn 15
Chn 16
Mono chn 7
Mono chn 8
License Information
Number of surrounds allowed
None
Number of stereos/monos allowed
4x Mono/Stereo
Number of surrounds in use
Number of stereos/monos in use


Quad Speed Add-On Bus Output
Slot 1/2
Eng1
Slot 3/4
Eng2
Slot 5/6
Eng3
Slot 7/8
Eng4
Slot 9/10
Slot 11/12
Slot 13/14
Slot 15/16
Slot 17/18
Slot 19/20
Slot 21/22
Slot 23/24
Slot 25/26
Slot 27/28
Slot 29/30
Slot 31/32
Off
Quad Speed Add-On Bus Input
Override Slots 17-24
Override Slots 25-32

5 Identity Menu

Introduction

The identity menu displays information about the hardware and software of the DAW. The current state of each setting within the DAW and enables the item to be changed or adjusted.

Identities can be viewed using the front panel of the Synapse frame (SFR18, SFR08 or SFR04) or Axon Cortex. Please refer to chapter 3 for information on the Synapse front panel control and Axon Cortex.

Card name

This field displays the name of the Synapse module in this case DAW.
Name in Cortex: `Input and Output Configuration`
Name in SNMP: `cardname`

User label

In this field the user can give a name to the card.
Name in Cortex: `Input and Output Configuration`
Name in SNMP: `userlabel`

Card description

This field displays a simple explanation of the card does.
Name in Cortex: `Input and Output Configuration`
Name in SNMP: `carddescription`

Software rev

This field displays the current version of the Axon software.
Name in Cortex: `Input and Output Configuration`
Name in SNMP: `softwarerev`

Hardware rev

This field displays the current version of the Axon hardware.
Name in Cortex: `Input and Output Configuration`
Name in SNMP: `hardwarerev`

Productcode

This field displays the productcode.
Name in Cortex: `Input and Output Configuration`
Name in SNMP: `productcode`

Serialnumber

This field displays the serial number of the Axon Motherboard
Name in Cortex: `Input and Output Configuration`
Name in SNMP: `productcode`

Card ID

This field displays the card ID of the Axon Motherboard
Name in Cortex: `Input and Output Configuration`
Name in SNMP: `cardID`

Civ License

In this field the user enters the Kantar Media license.
Name in Cortex: `Input and Output Configuration`
Name in SNMP: `civLicense`

Aud License

In this field the user enters the Audience Measurement Company license.
Name in Cortex: `Input and Output Configuration`
Name in SNMP: `audLicense`

Wk_Hardware_Name

This field displays the name of the daughterboard of the DAW.
Name in Cortex: `Input and Output Configuration`
Name in SNMP: `wkHardwareName`

Wk_Hardware_Rev

This field displays the hardware revision of the daughterboard of the DAW.
Name in Cortex: `Input and Output Configuration`
Name in SNMP: `wkHardwareRev`

Wk_Product_Code

This field displays the product code of the daughterboard of the DAW.
Name in Cortex: `Input and Output Configuration`
Name in SNMP: `wkProductCode`

WK_Serial_nr

This field displays the serial number of the daughterboard of the DAW.
Name in Cortex: `Input and Output Configuration`
Name in SNMP: `wkSerialnr`

Wk_Card_ID

This field displays the Card ID of the daughterboard of the DAW.
Name in Cortex: `Input and Output Configuration`
Name in SNMP: `wkCardID`

Wk_Enc_Version

This field displays the Kantar Media software version of the daughterboard of the DAW.
Name in Cortex: `Input and Output Configuration`
Name in SNMP: `wkEncVersion`

Wk_Enc_Model

This field displays the model of the daughterboard of the DAW.
Name in Cortex: `Input and Output Configuration`
Name in SNMP: `wkEncModel`

6 Settings Menu

Introduction

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

Settings can be changed using the front panel of the Synapse frame (SFR18, SFR08 or SFR04) or Axon Cortex. Please refer to chapter 3 for information on the Synapse front panel control and Axon Cortex.

Menu Separators

Throughout the settings menu and the *.MIB files there are menu-separators. These lines have no function in the card but are intended to make the classic view in Cortex more readable for the user. Sets or Gets through SNMP are therefore not possible on these items. These items are not shown in Cortex.

These items are:

Classic View	Mib
SYSTEM CONTROL	sYSTEMCONTROL
GPIO OPTIONS	gPIOOPTIONS
TIME MANAGEMENT	tIMEMANAGEMENT
WM CONTROL	wMCONTROL
INPUT CONTROL	iNPUTCONTROL
CHANNEL 1/2 to CHANNEL 15/16	cHANNEL1slash2 to cHANNEL15slash16
QUADSPEED INPUT	qUADSPEEDINPUT
QUADSPEED OUTPUT	qUADSPEEDOUTPUT

SYSTEM CONTROL

Wk_Enc_Synchro

The DAW can be used as an ADD_ON card (in combination with an embedder/de-embedder card) In that case the card will extract the reference from the master card, referred to the setting `MasterCard`. It is also possible to use an external signal to lock to. In that case you are referred to the settings:

`AES1` = Locks to the AES/EBU signal on input 1 (default)
`Mastercard` = Locks to the ADD-ON bus input.
`Ref1` = The B&B reference input of the rack-controller
`Ref2` = The second B&B reference input of the rack controller (if available)

Note: When using more than 8 input channels (so also using inputs of the add-on bus), you'll have to set this to `Mastercard`.

Name in Cortex: `Synchronization Mode on Monitoring tab`
Name in SNMP: `wkEncSynchro`

In_Out_Config

`In_Out_Config` determines in which configuration the inputs and outputs work. There are 3 modes:

- `4In-4Out`: 4 AES/EBU input and 4 AES/EBU outputs
- `8In`: 8 AES/EBU input and no outputs
- `8Out`: no inputs and 8 AES/EBU outputs

Name in Cortex: `Input and Output Configuration on Monitoring tab`
Name in SNMP: `inOutConfig`

SRC

Even though the Watermark encoder is designed to work with 48KHz sample rates only it can sometimes be a preference to by-pass the Sample Rate Converters at the input in a 48KHz synchronous environment. This option gives you the possibility to disable the Sample Rate Converters at the physical AES inputs. It is recommended to leave these set to ON.

If you don't want to use them make sure all your sources are originated from a 48KHz synchronous environment and make sure that the card is locked to a Reference input or through a Mastercard which is locked to a Reference input before switching them off (`Dolby-E`).

Name in Cortex: `Sample Rate Converters` on `Monitoring tab`
Name in SNMP: `sRC`

GPI OUTPUT OPTIONS

GPI1_Out_Control

The DAW has 2 GPI outputs. With this setting you define how the first output is triggered. This output can be either triggered as an `Active High` (5V) signal or as an `Active low` signal. The output of the GPI contact is non-latched (level triggered, when a contact is closed all the time)

Name in Cortex: `GPO 1: Active Bypass` on tab `Time Management`
Name in SNMP: `gPI1OutControl`

GPI2_Out_Control

The DAW has 2 GPI outputs. With this setting you define how the second output is triggered. This output can be either triggered as an `Active High` (5V) signal or as an `Active low` signal. The output of the GPI contact is non-latched (level triggered, when a contact is closed all the time)

Name in Cortex: `GPO 2: Alarms` on tab `Time Management`
Name in SNMP: `gPI2OutControl`

Note: In addition of the two controllable gpi outputs there is an additional third GPI output (GPO 2 on page 41). This output indicates the passive bypass status. When this signal is high the card has a latency of 120 ms and when it is low the latency is 0 ms

Control

Sets the function of the GPI contact (see Connector Panels for the pinout). Possible GPI functions are:

- None: GPI contact is ignored.
- Stop Wm: when the GPI is activated the watermark engine is stopped. A manual action is then needed to start it again. If the engine is already stopped nothing happens.
- Start Wm: when GPI is activated the watermark engine is started. If the engine is already started nothing happens. The engine can still be stopped manually.
- Stop/Start Wm: Start and stop the watermark engine via the GPI contact. If GPI status is 0 the watermarking is stopped and when the status is 1 it is started.

The current status of the GPI contact is shown in the status item GPI or in Cortex GPI 1: Status.

NOTE: activation of the GPI contact is dependent on how the contact is closed, so make sure to set the GPI-Ctrl setting to the corresponding value.

Name in Cortex: `GPI 1: Function` on tab `Time Management`
Name in SNMP: `control`

GPI-Ctrl

`Latch`: Latching GPI mode. When a contact is closed momentarily (edge triggered).

`Non-Latch`: Non-latching GPI mode. When a contact is closed all the time (level triggered).

Name in Cortex: `GPI 1: Control` on tab `Time Management`
Name in SNMP: `gPICtrl`

TIME MANAGEMENT

Wk_Enc_Time_Src

The DAW watermarking engine requires a time stamp. With this setting you select which time-code source you want to use: `LTC`, `NTP Macro` or `NTP ERC`. `NTP ERC` can only be used with an ERC/ERS rack controller. The ERC needs to be set to a correct ntp-server, and the Time_Broadcast needs to be set to On. Default is LTC.

If NTP Macro is used as time source (located in Cortex Folder \ GlobalMacros) the IP and Slot variables can be set in ApplicationVariables file located at Cortex Folder\Variables\ ApplicationVariables.cvf. NTP Macro uses the PC time, and therefore it must be tied to a NTP Server or needs to be set to UTC

Name in Cortex: `Reference Time Source` on tab `Time Management`
Name in SNMP: `wkEncTimeSrc`

Wk_Enc_LtcManOff

This option allows the user to add an additional offset in minutes to be added to the Time extracted from the LTC. The offset possible offset is from -59 min to +59 min. (more information on LTC can be found in SMPTE 12M standard)
Name in Cortex: `Manual LTC offset` on tab `Time Management`
Name in SNMP: `wkEncLtcManOff`

Wk_Enc_SyncStart

This field indicates at which time during the day the automatic synchronization to an external time code source as specified with the Wk_enc_Time_Src option occurs. The user can set the hour of this update. The delay to the next update is set with Wk_Enc_SyncDelay.

NOTE: only minutes, seconds, and milliseconds are updated with automatic updates.

Name in Cortex: `Automatic Update Time (UTC)` on tab `Time Management`
Name in SNMP: `wkEncSyncStart`

Wk_Enc_SyncDelay

Sets the delays between the automatic updates. Default 24h, so once a day.

Name in Cortex: `Automatic Update Frequency` on tab `Time Management`
Name in SNMP: `wkEncSyncDelay`

Wk_Enc_Force_Src

It is possible to do a forced synchronization from the following sources.

`LTC=` If the LTC source is valid a forced synchronization will be carried out with the current LTC source
`NTP Macro=` If the NTP source is valid a forced synchronization will be carried out with the current NTP time
`NTP Erc=` If the NTP source is valid a forced synchronization will be carried out with the current NTP time
`MAN Time =` A forced synchronization will be carried with the time specified user input fields.
`MAN Date =` A forced synchronization will be carried with the date specified user input fields.
`MAN Time Date =` A forced synchronization will be carried with the time and date specified user input fields.

If `NTP Erc` is selected as an option in `Wk_Enc_Force_Src`, the user should be aware that the ERCxx/ERSxx will broadcast ntp time every 30 seconds. If a Forced Synchronization is done it could take up to 30 seconds for the menu-item to return to its idle state. This because the card has to wait for the NTP time to be received before doing the forced synchronization.

Note that in case of a `Force LTC or NTP Synchronization` only the minutes and seconds are updated not the hours and date!
The hours and date can be set with a manual synchronisation.

Name in Cortex: sync buttons located on the tab Time Management
Name in SNMP: `wkEncForceSrc`

Wk_Enc_ForceSync

Setting this item to `sync` will force the DAW to synchronize to the time source. After selecting and completing the synchronization the card will return the menu-item to the `Idle` state. If `NTP Erc` is selected as an option in `Wk_Enc_Force_Src`, please be aware that the ERCxx/ERSxx will broadcast ntp time every 30 seconds. If a Forced Synchronization is done it could take up to 30 seconds for the menu-item to return to its idle state. This because the card has to wait for the NTP time to be received before doing the forced synchronization.

`Idle =` no forced synchronization is carried out
`Sync` = forced into synchronization according to what is set with setting `WK_Enc_Force_Src`

Name in Cortex: sync buttons located on the tab Time Management
Name in SNMP: `wkEncForceSync`

Wk_Enc_Ntp_Time

As the card itself has no direct NTP input possibility Cortex is responsible for sending over the NTP time to the card. Cortex will put this time upon request from the DAW card in this field. **Users should not use this field!**

Name in Cortex: No view of this menu-item in the cortex view.
Name in SNMP: `wkEncNtpTime`

Wk_Enc_Ntp_Date

As the card itself has no direct NTP input possibility Cortex is responsible for sending over the NTP time to the card. Cortex will put this time upon request from the DAW card in this field. **Users should not use this field!**

Name in Cortex: No view of this menu-item in the cortex view.
Name in SNMP: `wkEncNtpDate`

Wk_Enc_Man_Time

This menu-item sets the time which is used when the user does a `Force MAN Synchronization` from the menu-item `Wk_Enc_ForceSync`
The format of this field is hh:mm:ss if an user puts in a time which is not in this format it will revert to the last known and correctly formatted time. It is also possible to partial update the time by using 'xx' for the fields that should be kept: e.g. 12:xx:xx only updates the hour field, all other time fields are kept.

Name in Cotex: `Time (UTC)` on tab `Time Management`
Name in SNMP: `wkEncManTime`

Wk_Enc_Man_Date

This menu-item sets the date which is used when the user does a `Force MAN Synchronization` from the menu-item `Wk_Enc_ForceSync`

The format of this field is dd-mm-yyyy if an user puts in a time which is not in this format it will revert to the last known and correctly formatted time. It is also possible to partial update the date by using 'xx' for the fields that should be kept: e.g. xx-06-2014 only updates the year and month field, the day field is kept.

Name in Cotex: `Date (UTC)` on tab `Time Management`
Name in SNMP: `wkEncManDate`

RefreshTime

Button to refresh the time display in Cortex.

Name in Cotex: `Refresh` button on tab `Time Management`
Name in SNMP: `updateTime`

WM CONTROL

Wk_Enc_Mode

With this menu setting you start or stop the watermarking encoder. The watermark encoder will only start if the following conditions are met.

- Kantar Media license valid
- Audience measurement license valid
- Chosen configuration is valid according to licenses

Name in Cortex: `Start` & `Stop` button on System Configuration Tab
Name in SNMP: `wkEncMode`

Wk_Enc_LoudNorm

With this setting you can select whether the incoming signal is in accordance with loudness normalization standards EBU-R128 or ITU-R BS.1770.

This checkbox in Cortex needs to be checked if the input signal is already normalized for loudness according to the supported standards. These are the 4 use-cases:

- Input signal is not in accordance with the standards and the checkbox is unchecked => Watermarking OK
- Input signal is not in accordance with the standards and the checkbox is checked => Watermarking NOK (lower confidence level)
- Input signal is in accordance with the standards and the checkbox is unchecked => Watermarking OK (potential loudness compliancy issue)
- Input signal is in accordance with the standards and the checkbox is checked => Watermarking OK

Name in Cortex: Checkbox for input signal information on tab System Configuration
Name in SNMP: `wkEncLoudNorm`

Wk_SN_Enable_OVR
(only applicable for app. type SyncNOW 3G)

Enables the overmarking function for the SyncNow application type only. If it is set to `overmarking` the minimum delay will be 120 ms.

If the option `No Overmarking / Low Latency` is chosen the minimum delay will be 30 ms. When you choose `No Overmarking / Passthrough` is selected the delay will be a minimum of 120ms. The pass-through feature allows for automatically releasing the watermarking process whenever the input stream is already embedded with watermarks using the same watermarking key as the one defined in the Kantar Media license. This feature is exclusively available with 3G technology; unlike the overmarking capability, it gives precedence to the previously embedded watermark over the current watermark

Name in Cortex: Overmarking on tab `System Configuration`

Name in SNMP: `wkSNEnableOVR`

Wk_SN_Enable
(only applicable for app. type Hybrid SyncNOW 3G)

This setting enables or disables the SyncNow3G™ algorithm

Name in Cortex: Sync Now Enable on tab `System Configuration`

Name in SNMP: `wkSNEnable`

Wk_Enc_TimeDrift

With this setting the user can specify what the maximum allowed drift in seconds is between the internal RTC clock and the Reference Time Source. The card will check every 10 minutes whether the threshold is not exceeded (the time comparison is done only on the minutes and seconds parts). Default it set to 30 sec, but can be set to an acceptable drift value.

If the threshold is exceeded it will trigger the alarm "SYSTEM_MAX_TIME_DRIFT_EXCEEDED"

Name in Cortex: Max System Time Drift on tab `Time Management`

Name in SNMP: `wkEncTimeDrift`

INPUT CONTROL

Sel_Ch1 ~ Sel_Ch16

With these settings you select which audio source you want to use for process channel 1 till channel 16. You can choose either `Local` audio (using the card's own AES/EBU inputs) or audio coming from the `Master` card via the ADD-ON bus.

Note: when the card is set to `8Out` mode (in the `In_Out` setting) the local inputs aren't used and therefore can't be selected here.

Name in Cortex: pull down on tabs `Watermark Ch 1-8 and Watermark Ch 9-16`
Name in SNMP: `selChn1 ~ selChn16`

Chn1 ~ Chn16

With these settings you select the actual source channel in the above selected source.

Note: When Local is selected, you can choose channel 1 till channel **8**. When Master is selected, you can choose channel 1 till channel **32**.

Name in Cortex: pull down on tabs Watermark `Ch 1-8 and Watermark Ch 9-16`
Name in SNMP: `chn1 ~ chn16`

Wk_Cfg_Chn1/2 ~ Wk_Cfg_Chn15/16

The watermarking engine includes config data which tells the encoder what kind of audio is in the specific audio-pair. Can be one of the following:

- `Bypass`
- `Mono L`
- `Mono R`
- `Stereo`
- `Surr Lf/Rf`
- `Surr C/LFE`
- `SurrLs/Rs`

Note that the LED located under WM in the Watermark Channel 1 to 8 and Watermark Channel 9 to 16 in Cortex indicates which channel exactly is watermarked. For example in case of a surround source only Lf/Rf and C are watermarked.

Name in Cortex: Audio Designation Buttons on tabs `Watermark Ch 1-8 and Watermark Ch 9-16`

Name in SNMP: `wkCfgChn1slash2 ~wkCfgChn15slash16`

Wk_Aud_Chn1/2~ Wk_Aud_Chn15/16

(only applicable for app. type with NTAM support)

This parameter corresponds to the NextTracker content identifier that will be embedded into the Payload

Name in Cortex: **Aud Id** on tabs `Watermark Ch 1-8` and `Watermark Ch 9-16`
Name in SNMP: `wkAudChn1slash2~ wkAudChn15slash16`

Wk_SNAP_Chn1/2~ Wk_SNAP_Chn15/16

(only applicable for app. type with SNAP support)

This parameter corresponds to the SNAP content identifier that will be embedded into the Payload

Name in Cortex: **SNAP Id** on tabs `Watermark Ch 1-8` and `Watermark Ch 9-16`

Name in SNMP: `wkSNAPChn1slash2 ~ wkSNAPChn15slash16`

Wk_Sn_Chn1/2~ Wk_Sn_Chn15/16
(only applicable for app. type with SyncNOW 3G support)

This parameter corresponds to the SyncNow content identifier that will be embedded into the Payload

Name in Cortex: **SN Id** on tabs `Watermark Ch 1-8` and `Watermark Ch 9-16`
Name in SNMP: `wkSnChn1slash2 ~ wkSnChn15slash16`

Gain-CH_1 ~ Gain-CH_16

These items allow you to gain the audio for each individual channel in a range from `-60dB` to `12 dB` in steps of `0.25 dB`. `-999dB` mutes this channel. Default is `0dB`.

Name in Cortex: Gain Controls on tabs `Watermark Ch 1-8 and Watermark Ch 9-16`
Name in SNMP: `gainChn1 ~ gainChn16`

Delay_CH_1/2 ~ Delay_CH_15/16

These settings allow you to delay the audio of each individual channel in a range of `0` to `4000` ms. In steps of `1.00 ms`. Default is `0ms`.

Name in Cortex: Delay Controls on tabs `Watermark Ch 1-8 and Watermark Ch 9-16`
Name in SNMP: `delayChn1 ~ delayChn16`

QUADSPEED BUS INPUT CONTROL

Override 17/24

If you want to pass processed audio from one quad speed add-on card to the other (for instance if you want to pass decoded Dolby E audio from this card to for instance a Loudness Control or Dolby D encoder add-on card next to this card) you have to use this setting. You can choose to override input channels 17/24 on the add-on bus of the next card (right side) with output channels 1 to 8 or pass the master-card audio.

Name in Cortex: Override Slots 17-24 on tab Quadspeed bus
Name in SNMP: `override17slash24`

Override 25/32

If you want to pass processed audio from one quad speed add-on card to the other (for instance if you want to pass decoded Dolby E audio from this card to for instance a Loudness Control or Dolby D encoder add-on card next to this card) you have to use this setting. You can choose to override input channels 25/32 on the add-on bus of the next card (right side) with output channels 9 to 16 or pass the master-card audio.

Name in Cortex: Override Slots 25-32 on tab Quadspeed bus
Name in SNMP: `override25slash32`

QUADSPEED BUS OUTPUT CONTROL

Slot1/2 ~ Slot31/32

These menu items are to fill the Quad speed audio bus with the appropriate outputs. You can fill any of the 16 audio pairs (32 channels in total) with the following sources:

- `Eng1`: the output of watermark engine 1 (Chn1/2)
- `Eng2`: the output of watermark engine 2 (Chn3/4)
- `Eng3`: the output of watermark engine 3 (Chn5/6)
- `Eng4`: the output of watermark engine 4 (Chn7/8)
- `Eng5`: the output of watermark engine 5 (Chn9/10)
- `Eng6`: the output of watermark engine 6 (Chn11/12)
- `Eng7`: the output of watermark engine 7 (Chn13/14)
- `Eng8`: the output of watermark engine 8 (Chn15/16)
- `Aes1/2 ~ Aes15/16`: forwards the audio of the corresponding AES input to the bus

You can also switch the corresponding pair to `off`, making that audio pair empty.
Name in Cortex: Slot1/2 ~ slot 15/16 on tab `Quadspeed bus`
Name in SNMP: `slot1slash2 ~ slot15slash16`

7 Status Menu

Introduction

The status menu indicates the current status of each item listed below. For each status change described below you can get notified by:

- Monitoring view under the tab "Monitoring"
- GPIO. To monitor GPIO, you will need to use the RJ45 connector on the i/o panel of the board. The pin out is located in chapter 10.
- SNMP traps. You will need to have a SNMP manager and need to configure the SNMP trap destinations in the rack controller of your frame. (RRS04/08/18 only).

Menu Seperators

Throughout the status menu and the *.MIB files there are menu-separators. These lines have no function in the card so ever but are intended to make the classic view more readable for the user. These items are not shown in Cortex.

These items are:

Classic View	Mib
System Status	systemStatusS
License Status	licenseStatus
Time_Src_Status	timeSrcStatus
Wk_Input_Status	wkInputStatus

SYSTEM STATUS

Wk_Enc_Status

Indicates the overall status of the DAW, can be:

- `Firmware update`: indicates that the Kantar Media firmware is being upgraded and that the card is inaccessible during this time.
- `Running`: Aes Watermark encoder is running without any problems.
- `Warning`: AES Watermark encoder is still running but there is a fault detected however this fault is not critical for correct operation. These faults are: Max time drift exceeded, temperature fault, automatic sync failure, and source clock loss.
- `Error`: The AES Watermark encoder has detected a critical fault and has stopped watermarking. Audio is being bypassed. The latency will still be 120ms. Critical faults are: Watchdog error, invalid licenses and daughterboard errors.
- `Active Bypass`: Watermark encoder is not running, audio is being bypassed. The latency will still be what is shown in `WkLatency` and `GPO1`is triggered like is described in `GPI1_Out_Control`.

Name in Cortex: `General Status` on tab `Monitoring`
Name in SNMP: `wkEncStatus`

Reference_Stat

Indicates the status of the reference input of the frame , and the format of it (30Hz or 25Hz).

Note that this status will be NA when the menu-item Wk_Enc_synchro is set to AES1 or Mastercard. The status of the reference input on the frame is only shown when either Ref 1 or Ref 2 is selected.

Name in Cortex: `Reference status` on tab
Name in SNMP: `referenceStatus`

GPI

Shows the status of the GPI input.

Name in Cortex: `GPI 1:Status` on tab `Time Management`
Name in SNMP: `gPI`

Source_Clk_Status

Indicates the status of the time source which is chosen as synchronization source. The status can be either Ok or Error.

Name in Cortex: `Reference Time Source` on tab `Monitoring`

Name in SNMP: `sourceClkStatus`

Time_Drift_Status

This status indicates whether the maximum time drift of the DAW as specified in the status-item `Wk_Enc_TimeDrift` is exceeded.

The status can be either Ok or Error.

Name in Cortex: `Time Drift Status` on tab `Monitoring`
Name in SNMP: `timeDriftStatus`

Db_Status

This status indicates whether the daughterboard on the DAW has an error. The status can be either Ok or Error.

Name in Cortex: `Daughterboard Status` on tab `Monitoring`
Name in SNMP: `dbStatus`

Watchdog_Status

This status indicates whether the watchdog on the DAW is running. The status can be either Ok or Error.

Name in Cortex: `Watchdog Status` on tab `Monitoring`
Name in SNMP: `watchdogStatus`

Wk_Temp_Status

This status indicates whether the daughterboard on the DAW is not exceeding its temperature threshold of 80 degrees Celsius.

The status can be either Ok or Error.

Name in Cortex: `Temperature Status` on tab `Monitoring`
Name in SNMP: `wkTempStatus`

LICENSE STATUS

Lic_Civ_Valid

Indicates if the license supplied by Kantar Media is valid.

Name in Cortex: `Kantar Media` on tab `Monitoring`
Name in SNMP: `licCivValid`

Lic_Civ_Exp_Stat

Indicates if the Kantar Media license is expired.

Name in Cortex: `Expiration Date` on tab `Monitoring`

Name in SNMP: `licCivExpStat`

Lic_Aud_Valid

Indicates if the Audience Measurement License is valid.

Name in Cortex: `Audience Measurement` on tab `Monitoring`
Name in SNMP: `licAudValid`

Wk_Enc_App_Type

Indicates the license type, can be `None`, `NTAM`, SNAP, SyncNow 3G, Hybrid SNAP or Hybrid SyncNow3G.

Name in Cortex: `Application Type` on tab `License Management`
Name in SNMP: `wkEncAppType`

Wk_Enc_Tc_Size

This parameter corresponds to the timecode bits, size expressed in bit number.

Name in Cortex: `Number of Timecode bits` on tab `License Management`

Name in SNMP: `wkEncTcSize`

Wk_Enc_Id_Size

This parameter corresponds to the SyncNow content identifier size expressed in bit number.

Name in Cortex: `number of Id bits` on tab `License Management`
Name in SNMP: `wkEncIdSize`

Wk_Enc_Aud_Id0~ Wk_Enc_Aud_Id3

This parameter corresponds to the Nextracker content identifier.

Name in Cortex: **TV Channel identifier 0~3** on tab `License Management`

Name in SNMP: `wkEncAudId0 ~ wkEncAudId3`

Wk_Enc_SNAP_Id0~ Wk_Enc_SNAP_Id3

This parameter corresponds to the SNAP content identifier.

Name in Cortex: `SNAP Channel ID 0~3` on tab `License Management`

Name in SNMP: `wkEncSNAPId0 ~ wkEncSNAPId3`

Wk_Enc_MaxLoop

This parameter corresponds to the maximum value that the TimeStamp can reach before being reset.

Name in Cortex: `Timestamp loops every` on tab `License Management`
Name in SNMP: `wkEncMaxLoop`

Wk_Enc_5.1

This status items indicates the number of the discrete 5.1 surround that are allowed to be watermarked by the DAW. This status item can be `None`, `1x 5.1 Surround` or `2x 5.1 Surround`.

Name in Cortex: `Number of surrounds allowed` on tab `License Management`
Name in SNMP: `wkEnc5dot1`

Wk_Enc_Mon_Ster

This status items indicates the number of the Mono or Stereo that are allowed to be watermarked by the DAW. This status item can be:

- `None`
- `1x Mono/Stereo`
- `2x Mono/Stereo`
- `3x Mono/Stereo`
- `4x Mono/Stereo`

Name in Cortex: `Number of monos/stereos allowed` on tab `License Management`
Name in SNMP: `wkEncSterMon`

In_Use_5.1

This status items indicates the number of the discrete 5.1 surround that are in use by the DAW. This status item can be `None`, `1x 5.1 Surround` or `2x 5.1 Surround`.

Name in Cortex: `Number of surrounds in use` on tabs `Watermark Ch 1-8` and `Watermark Ch 9-16`
Name in SNMP: `inUse5dot1`

In_Use_Mon_Stereo

This status items indicates the number of the Mono or Stereo that are in use by the DAW. This status item can be:

- `None`
- `1x Mono/Stereo`
- `2x Mono/Stereo`
- `3x Mono/Stereo`
- `4x Mono/Stereo`

Name in Cortex: `Number of monos/stereos in use` on tabs `Watermark Ch 1-8` and `Watermark Ch 9-16`
Name in SNMP: `inUseSterMon`

Time_Src Status

Wk_Enc_Time

This item shows the current internal DAW time

Name in Cortex: `On Board Time` on tabs `Time Management and Monitoring`
Name in SNMP: `wkEncTime`

Wk_Enc_Date

This item shows the current internal DAW date

Name in Cortex: `On Board Date` on tabs `Time Management and Monitoring`
Name in SNMP: `wkEncDate`

LTC_Input

Shows if the LTC input is `OK` or `Not OK`.

Name in Cortex: `LTC Source Status` on tab `Time Management`
Name in SNMP: `lTCInput`

NTP_Input

Shows if the NTP input is `OK` or `Not OK`.

Name in Cortex: `NTP Source Status` on tab `Time Management`
Name in SNMP: `nTPInput`

Auto_Sync_Status

This status monitors the daily time update of the DAW which takes place at the time the user has specified in the menu-item `Wk_Enc_Time_Sync`. The status can be either Ok or Error.

Note that it always reflects the status of the last automatic update which has occurred.

Name in Cortex: `Automatic Time Sync Status` on tab `Monitoring and Time Management`
Name in SNMP: `autoSyncStatus`

Man_Sync_Status

This status monitors the manual synchronizations which can be done by the user.

The status can be either Ok or Error.

Name in Cortex: `Manual Time Sync Status` on tab `Time Management`
Name in SNMP: `manSyncStatus`

NTP_Sync_Status

This is not a real status it is used to tell Cortex whenever the DAW requires a NTP sync.

The status can be either NTP Sync Idle or NTP Sync Needed.

Name in Cortex: Not visible in Cortex
Name in SNMP: `nTPSyncStatus`

Wk_Exp_Date

Shows the expiration date for a time limited Kantar Media License.

Name in Cortex: `Expiration Date` on tabs Monitoring and `License Management`

Name in SNMP: `wkExpDate`

Wk_Exp_Rem_Days

Shows the remaining number of days for a time limited Kantar Media License.

Name in Cortex: `Remaining days` on tabs Monitoring and `License Management`

Name in SNMP: `wkExpRemDays`

WK Input Status

Wk_Input_Chn1 ~ Wk_Input_Chn16

This items indicate the status of each individual input channel going to the watermark engine. This can be `Silence`, `Clipped`, `OK` or `NA` (not available)

Name in Cortex: `Ch1 ~Ch16` located in the groupbox `Engine Input Status` on tabs `Watermark Ch 1-8` and `Watermark Ch 9-16`
Name in SNMP: `wkInputChn1 ~ wkInputChn16`

Wk_Format_Chn1/2 ~ Wk_Format_Chn15/16

Display the format of each audio pair at the input of the watermark engine. The watermark encoder is designed to work **only** with PCM 48 KHz. However the detection at the input can differentiate between a number of different formats for easy detecting of wrong source channels at the input.

These formats can be one of the following:

- `NA`
- `PCM`
- `Null`
- `AC-3`
- `TimeStmp`
- `MPEG-1`
- `MPEG-2`
- `SMPTE-KLV`
- `Dolby E`
- `Caption data`
- `UserDef`
- `Rsvd (Reserved)`

Name in Cortex: `Format` located in the groupbox `Engine Input Status` on tabs `Watermark Ch 1-8` and `Watermark Ch 9-16`
Name in SNMP: `wkFrmtChn1slash2 ~ wkFrmtChn15slash16`

Aes_Input_0102 ~Aes_Input_1516

This item displays whether there is a signal detected on the physical AES input. This can be Ok, NA

Name in Cortex: `backpanel view` located on tab `Monitoring`
Name in SNMP: `aesInput0102 ~ aesInput1516`

8 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.

DAW Events

The events reported by the DAW 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

Name in SNMP: `announcements`

Reference

`Reference` can be selected between 0 .. 255. 0= no event, 1..255 are the priority setting. If the reference is lost an Event will be generated at the priority. Default: 1

Name in SNMP: `reference`

Temperature

`Temperature` can be selected between 0 .. 255. 0= no event, 1..255 are the priority setting. If the temperature reaches 80 degrees Celsius an Event will be generated at the priority. Default: 1

Name in SNMP: `temperature`

Source Clock

`Source Clock` can be selected between 0 .. 255. 0= no event, 1..255 are the priority setting. If the source clock is lost an Event will be generated at the priority. Default: 1

Name in SNMP: `sourceClock`

Time Drift

`Time Drift` can be selected between 0 .. 255. 0= no event, 1..255 are the priority setting. If the maximum time drift is exceeded an Event will be generated at the priority. Default: 1

Name in SNMP: `timeDrift`

Daughterboard

`Daughterboard` can be selected between 0 .. 255. 0= no event, 1..255 are the priority setting. If the daughterboard has an error an Event will be generated at the priority. Default: 1

Name in SNMP: `daughterboard`

Watchdog

`Watchdog` can be selected between 0 .. 255. 0= no event, 1..255 are the priority setting. If the reference is lost an Event will be generated at the priority. Default: 1

Name in SNMP: `watchdog`

Automatic Sync

`Automatic Sync` can be selected between 0 .. 255. 0= no event, 1..255 are the priority setting. If the reference is lost an Event will be generated at the priority. Default: 1

Name in SNMP: `automaticSync`

GENERIC_1

`GENERIC_1` can be selected between 0 .. 255. 0= no event, 1..255 are the priority setting. If the Kantar Media license is expired an Event will be generated at the priority. Default: 1

Name in SNMP: `gENERIC1`

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 DAW are:

Event Menu Item	Tag		Description
Announcements	0x00or NA	0 or NA	Announcing of report and control values
Reference	$0x02_{hex}$=REF_LOSS	82_{hex}=REF_RETURN	reference lost or returned
Temperature	$0x0A_{hex}$=TEMP_TOO_HIGH	$8A_{hex}$=TEMP_OK	Temperature too high or ok
Source clock	$0x60_{hex}$=SOURCE_CLK_LOSS	$E0_{hex}$=SOURCE_CLK_RETURN	Time Source clock lost or returned
Time drift	$0x61_{hex}$=SYSTEM_MAX_TIME_DRIFT_EXCEEDED	$E1_{hex}$=SYSTEM_TIME_DRIFT_OK	Max system time drift ok or exceeded
Daughterboard	$0x62_{hex}$=DAUGHTERBOARD_ERROR	$E2_{hex}$=DAUGHTERBOARD_OK	Daughterboard error or ok
Watchdog	$0x63_{hex}$=WATCHDOG_ERROR	$E3_{hex}$=WATCHDOG_OK	Watchdog error or ok
Automatic sync	$0x64_{hex}$=AUTO_SYNC_FAILED	$E4_{hex}$=AUTO_SYNC_OK	Automatic synchronization failed or ok
GENERIC_1	$0x3A_{hex}$=GENERIC_1_ON	$0xbA_{hex}$=GENERIC_1_OFF	Kantar Media License Expired or Ok

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 ERC/ERS/RRC/RRS 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.

9 LED Indication

Introduction

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 DAW.

5.1 Out Ok

Not used for this specific hardware and software combination.

ERROR

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

INPUT 1 ~ INPUT 8

These LEDs indicated the presence of a valid AES/EBU signal on the inputs 1 till 8.

REFERENCE

This LED indicates the presence of a valid reference signal.

DATA ERROR

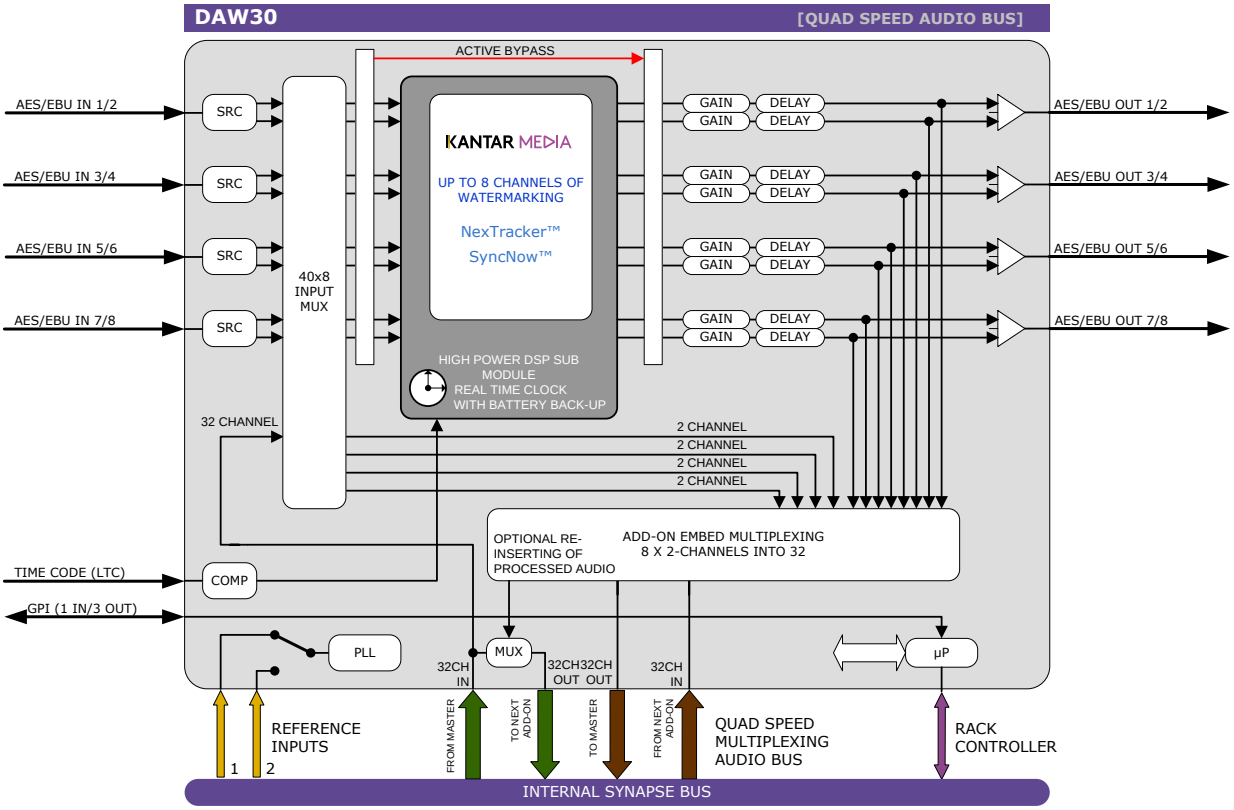
This Led is not used on the DAW

CONNECTION

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

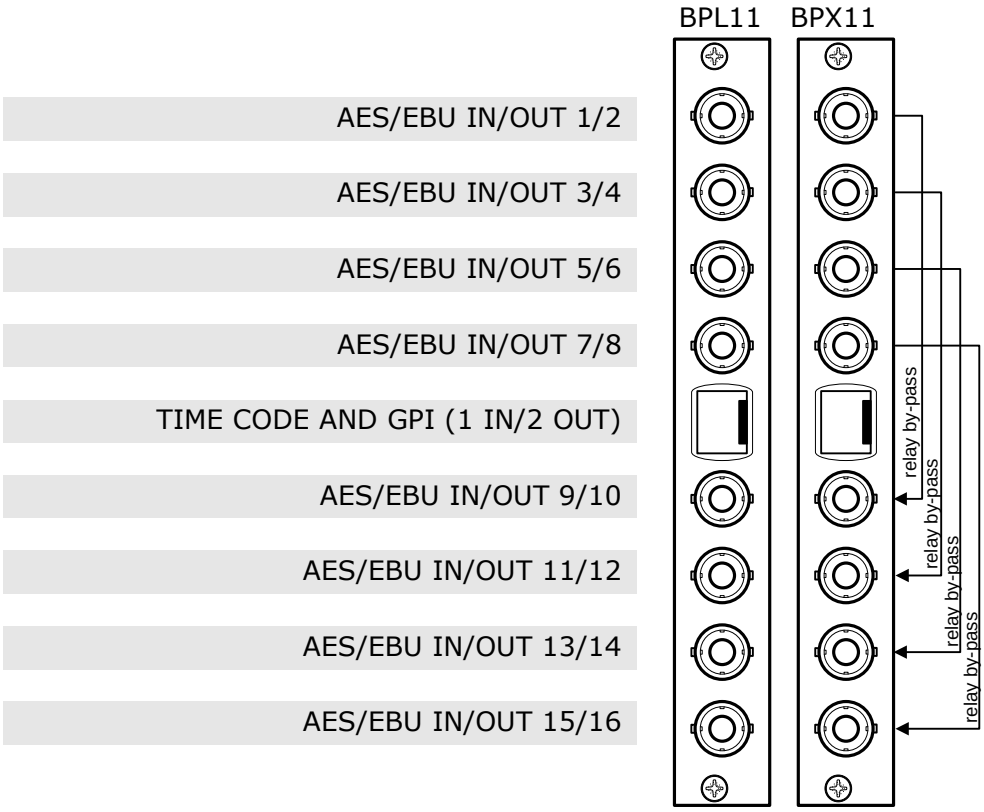
Note: When LEDS are blinking constantly, the card is still programming.

10 Block Schematics



11 Connector Panel

The DAW can be used with the BPL11 and BPX11 back plane only:



<u>Pinning of RJ45 connector:</u>

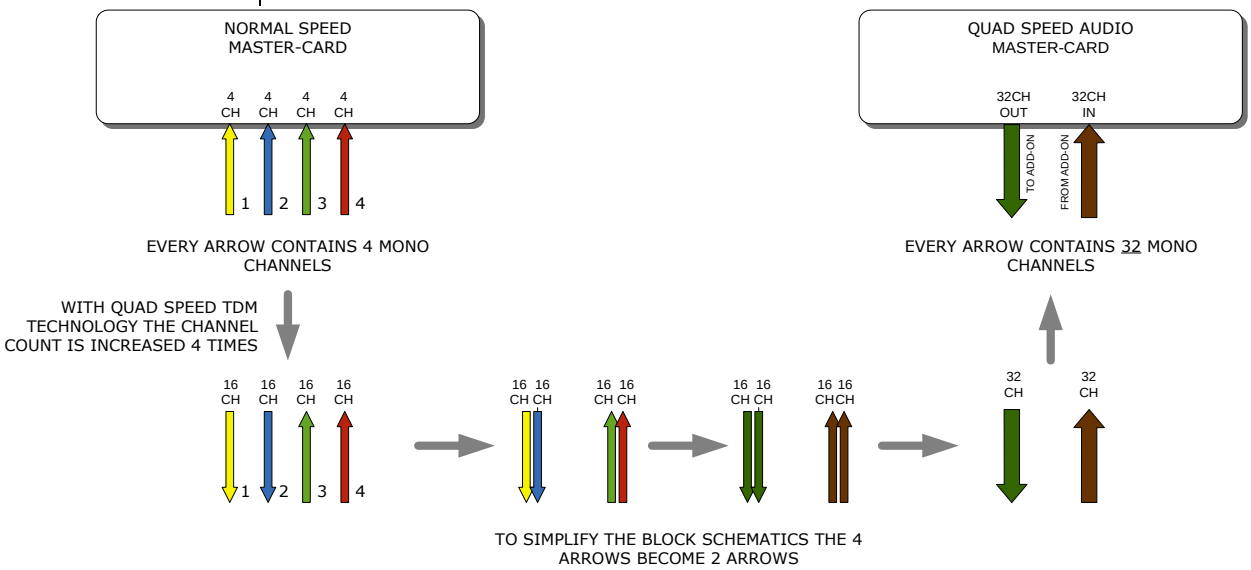
pin1: GPI 0
pin2: LTC , negative input
pin3: GPO 0 (5V)
pin4: not used
pin5: GPO 2 (5V)
pin6: GPO 1 (5V)
pin7: LTC, positive input
pin8: GND

Note: LTC in positive and negative is a differential input with an input range voltage of 0V to 5V.

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

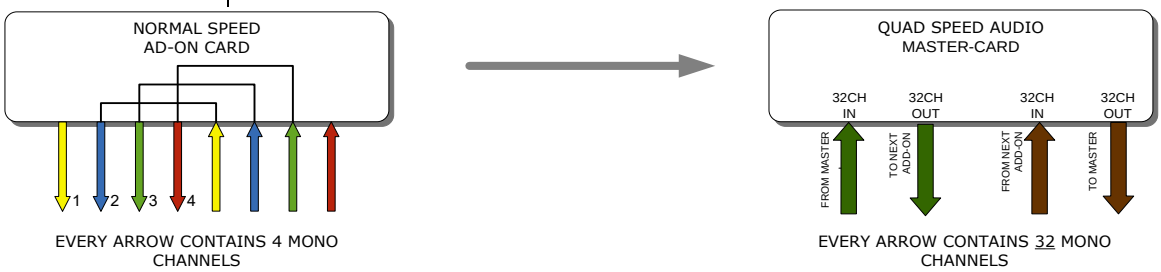
Some MASTER-CARD's will have two modes and some MASTER-CARD's will only have the Quad Speed mode [where the logical ADD-ON cards are only available in Quad Speed mode:

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:

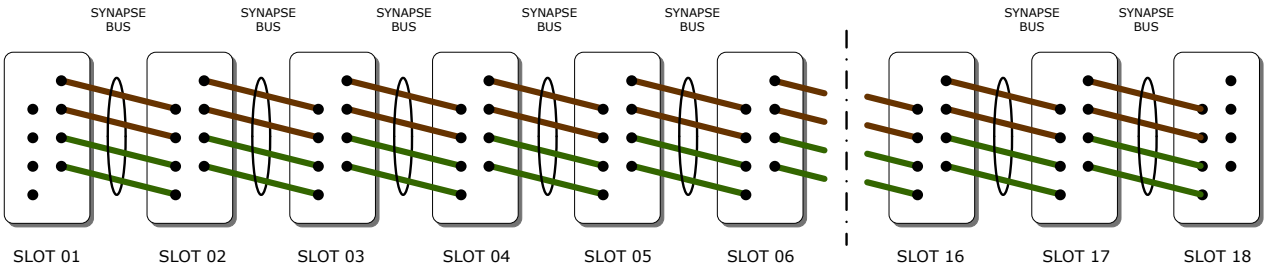
- Up to 32 channels output from the master card with looping to up to 3 ADD-ON cards
  - The ADD-ON card just picks the channels it wants to process
  - Some ADD-ON cards will have the possibility to re-inject processed audio onto the next ADD-ON card
- Up to 32 channels input on the master card
  - 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 ADD-ON card. This is however a more intelligent looping with optional re-insertion and multiplexing of signals.

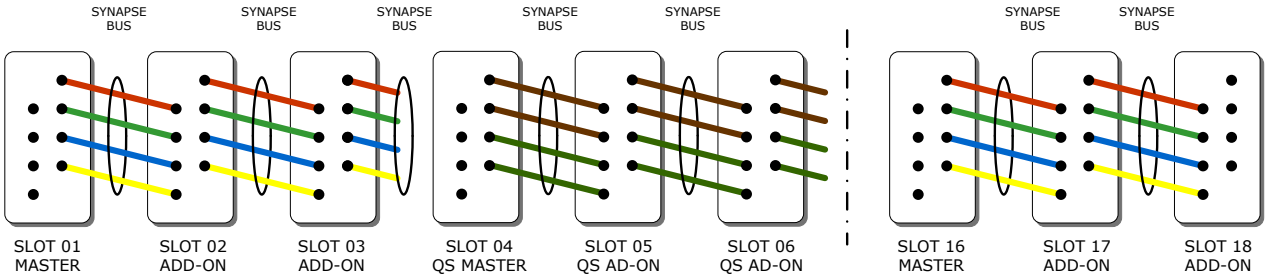
Cascading of Quad Speed cards works identical to normal add-on cards. Every connection in the example below transports 16 mono audio channels (= 32 channels per color). It shows the inter slot connections ‘in quad Speed mode’ as part of the frame bus PCB.



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.

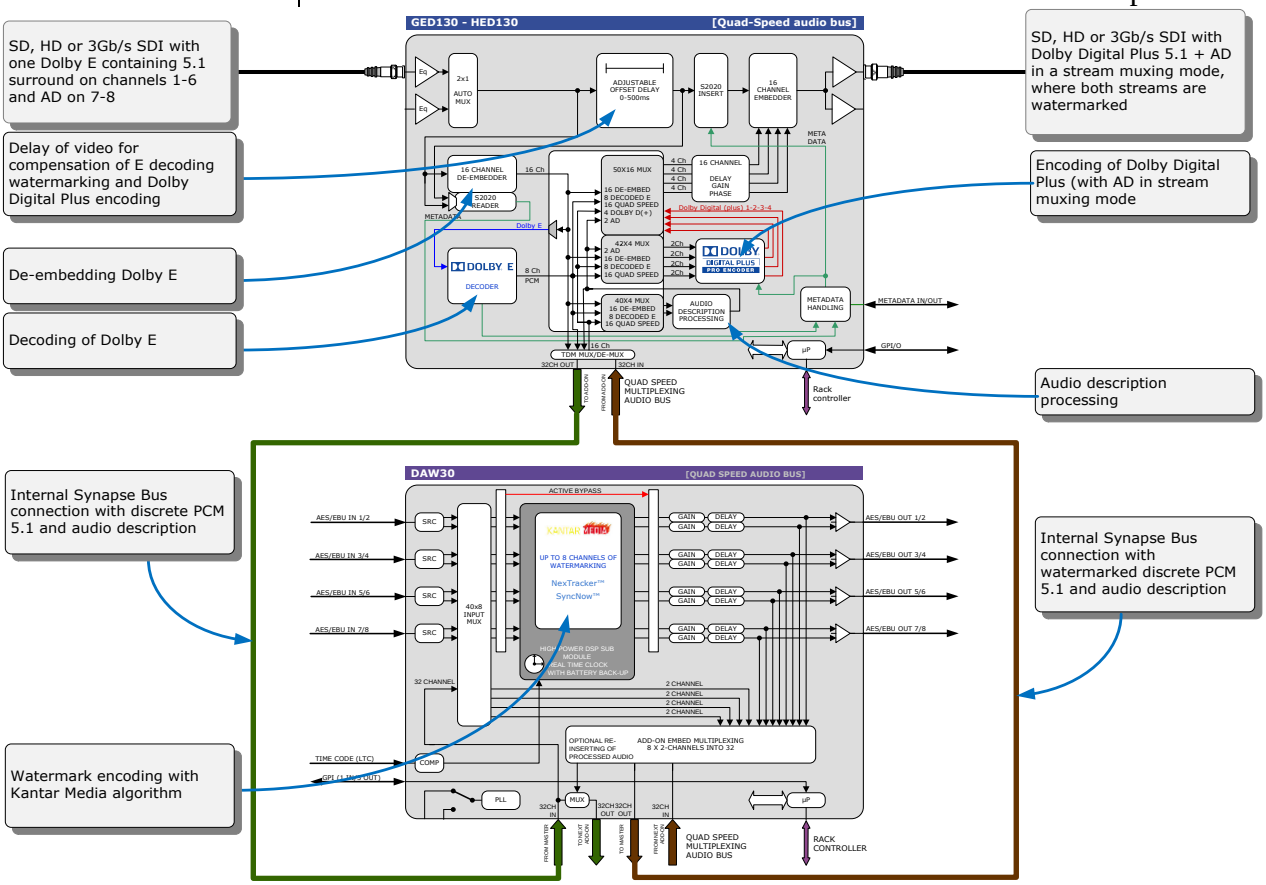
You can mix normal speed Master-Cards with Quad Speed MASTER-Cards in one frame as the MASTER-CARD breaks the connection to the left hand card. All cards to the right of the master must be in the same mode as the master.



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

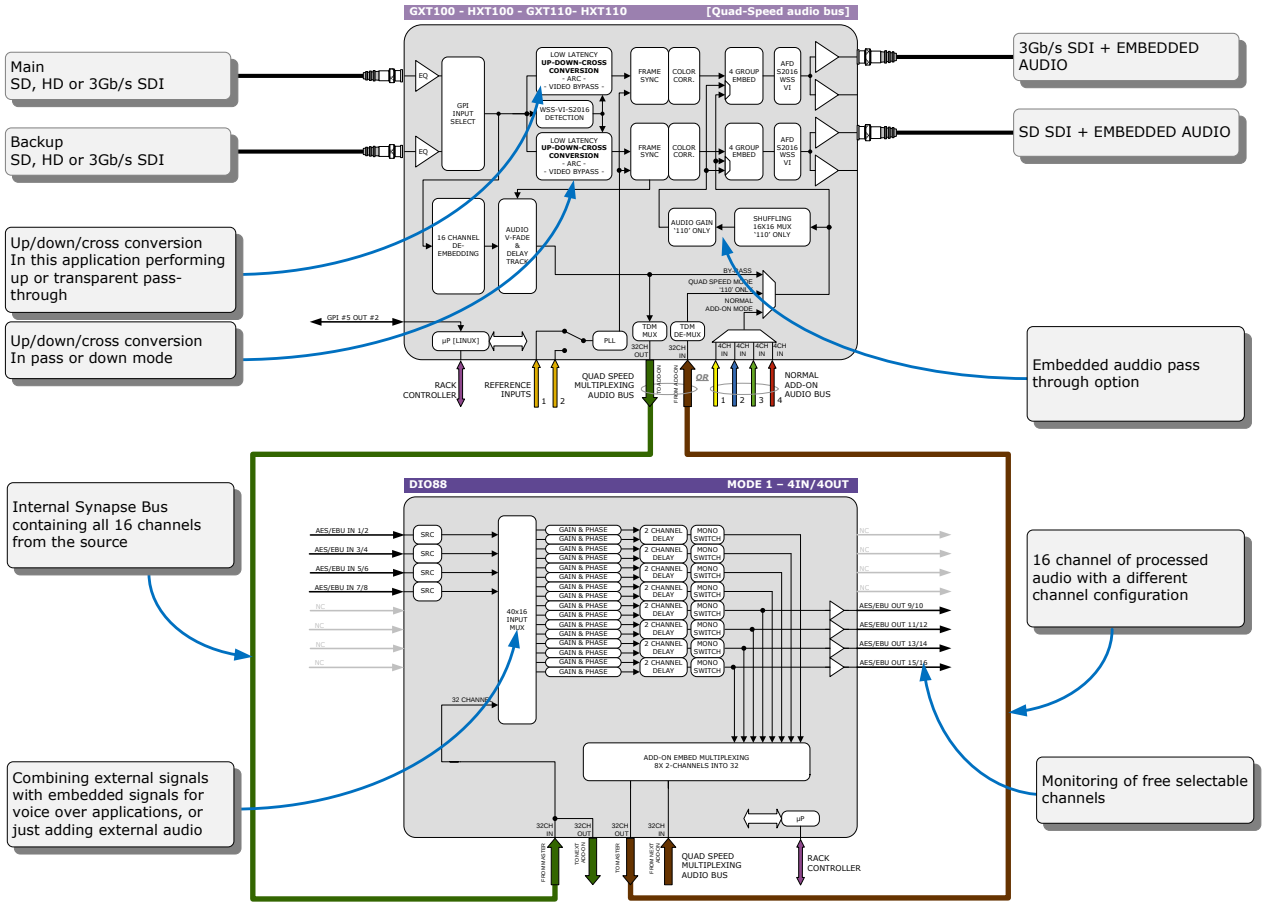
Some examples

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.



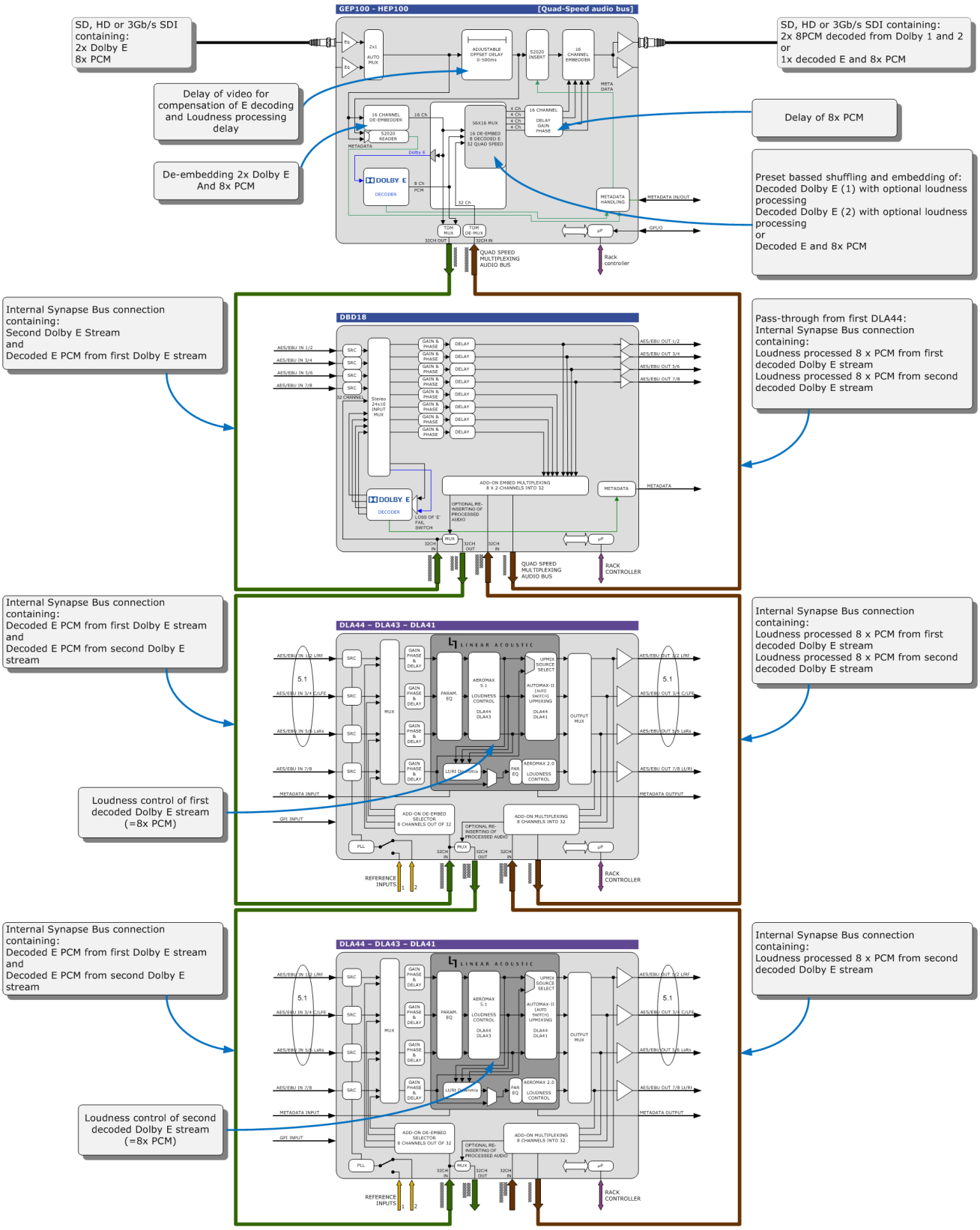
Embedded domain Dolby E to Dolby Digital Plus with Watermarking. The only connection to the outside world are two BNC cables.

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


GEP100 - HEP100
[Quad-Speed audio bus]
SD, HD or 3Gb/s SDI containing:
2x Dolby E
8x PCM
SD, HD or 3Gb/s SDI containing:
2x 8PCM decoded from Dolby 1 and 2
or
1x decoded E and 8x PCM
Delay of video for compensation of E decoding and Loudness processing delay
Delay of 8x PCM
De-embedding 2x Dolby E And 8x PCM
Preset bassed shuffling and embedding of:
Decoded Dolby E (1) with optional loudness processing
Decoded Dolby E (2) with optional loudness processing
or
Decoded E and 8x PCM
QUAD SPEED MULTIPLEXING AUDIO BUS
Rack controller
Internal Synapse Bus connection containing:
Second Dolby E Stream
and
Decoded E PCM from first Dolby E stream
DBD18
Pass-through from first DLA44:
Internal Synapse Bus connection containing:
Loudness processed 8 x PCM from first decoded Dolby E stream
Loudness processed 8 x PCM from second decoded Dolby E stream
Internal Synapse Bus connection containing:
Decoded E PCM from first Dolby E stream
and
Decoded E PCM from second Dolby E stream
DLA44 – DLA43 – DLA41
Internal Synapse Bus connection containing:
Loudness processed 8 x PCM from first decoded Dolby E stream
Loudness processed 8 x PCM from second decoded Dolby E stream
Loudness control of first decoded Dolby E stream (=8x PCM)
Internal Synapse Bus connection containing:
Decoded E PCM from first Dolby E stream
and
Decoded E PCM from second Dolby E stream
DLA44 – DLA43 – DLA41
Internal Synapse Bus connection containing:
Loudness processed 8 x PCM from second decoded Dolby E stream
Loudness control of second decoded Dolby E stream (=8x PCM)