

MNU-MNG100

UHD, 3GB/S, HD, SD IP SIXFOLD MULTIVIEW BUILDING
BLOCK

Installation and Operation manual

Quad speed
MASTER



AXON NETWORK CORE

 Powered
by **LINUX**

**Modular
Multiview**

4K
ULTRAHD
3840 x 2160

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THE HEART OF BROADCAST

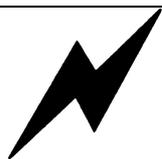
TECHNICAL MANUAL

MNU-MNG100

UHD, 3Gb/s, HD, SD IP sixfold multiview building block



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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.

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



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

Axon Digital Design
MGU200 / MGG200



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

| | |
|--|---------------|
| Table of Contents | 3 |
| Introduction to Synapse | 7 |
| An Introduction to Synapse | 7 |
| Local Control Panel | 7 |
| Remote Control Capabilities | 7 |
| Unpacking and Placement | 8 |
| Unpacking | 8 |
| Placing the card | 8 |
| Power consumption | 8 |
| A Quick Start | 9 |
| When powering-up | 9 |
| Default settings | 9 |
| Changing settings and parameters | 9 |
| Front Panel Control | 9 |
| Example of changing parameters using front panel control | 10 |
| Axon Cortex Software | 11 |
| Menu Structure Example | 11 |
| The MNU-MNG100 Card | 12 |
| Introduction | 12 |
| Features | 13 |
| Position of the inputs on output | Error! |
| Bookmark not defined. | |
| GPI Contacts | 14 |
| Updating the card | 14 |
| Settings Menu | 15 |
| Lock-Mode | 15 |
| Out-FrmtA | 15 |
| Output_Map_A | 15 |
| 4K_Map_A | 15 |
| Out-FrmtB | 16 |
| Output_Map_B | 16 |
| 4K_Map_B | 16 |
| Switch_Back | 16 |
| Inp-Sel | 16 |
| Rx1-ID ~ Rx6-ID | 17 |
| Rx1-Name ~ Rx6-Name | 17 |
| Daisy-HeadA/B | 17 |
| Layout-HeadA/B | 17 |
| ScrLayout | 17 |
| #Inp1_Source ~ #Inp6_Source | 18 |
| #Inp1_x ~ | 18 |
| #Inp6_x | 18 |
| #Inp1_y ~ | 18 |
| #Inp8_y | 18 |
| #Inp1_w ~ #Inp6_w | 18 |
| #Inp1_h ~ | 18 |
| #Inp6_h | 18 |
| #Inp1_BarStyle ~ #Inp6_BarStyle | 18 |
| #Inp1_ShowUMD ~ #Inp6_ShowUMD | 19 |
| #Inp1_ShowTal ~ #Inp6_ShowTal | 19 |
| #Inp1_Area1 ~ #Inp6_Area1 | 19 |
| #Inp1_Area2 ~ #Inp6_Area2 | 19 |

| | |
|--------------------------------------|-----------|
| #Inp1_Area3 ~ #Inp6_Area3 | 19 |
| #Inp1_fill ~ #Inp6_fill | 20 |
| #Inp1_SD_AR ~ | 20 |
| #Inp6_SD_AR | 20 |
| #Inp1_MtrDisplay ~ #Inp4_ MtrDisplay | 20 |
| #Inp1_MtrPos ~ #Inp6_MtrPos | 20 |
| #UMD_BarSize | 21 |
| #Clk_x ~ #Clk2_x | 21 |
| #Clk_y ~ #Clk2_y | 21 |
| #Clk_w ~ #Clk_w | 21 |
| #Clk_h ~ #Clk2_h | 21 |
| #Clk_style ~ #Clk2_style | 21 |
| #Clk_source ~ #Clk2_source | 21 |
| #Clk_Source_Inp ~ #Clk2_Source_Inp | 22 |
| #Clk_Text ~ #Clk2_Text | 22 |
| #Note_Style | 22 |
| Note_Ln1 ~ Note_Ln12 | 22 |
| #Note_x | 22 |
| #Note_y | 22 |
| #Note_w | 22 |
| #Note_h | 23 |
| Inp1_Tal_I1 ~ Inp6_Tal_I1 | 23 |
| Inp1_Tal_I2 ~ Inp6_Tal_I2 | 23 |
| Inp1_Tal_r1 ~ Inp6_Tal_r1 | 23 |
| Inp1_Tal_r2 ~ Inp6_Tal_r2 | 23 |
| Inp1_Border~ Inp6_Border | 24 |
| Inp1_UMDColor ~ Inp6_UMDColor | 24 |
| Inp1_UMDText ~ Inp6_UMDText | 24 |
| Inp1_VITC-Line ~ Inp4_VITC-Line | 24 |
| CtrlMode | 24 |
| TSL-Netw-Port | 24 |
| TSLv5-ScreenNr-A~ TSLv5-ScreenNr-B | 24 |
| Monitor-Temp | 25 |
| CC_Channel | 25 |
| IP_Conf0~ IP_Conf2 | 25 |
| mIP0~ mIP2 | 25 |
| mNM0~ mNM2 | 25 |
| mGW0~ mGW2 | 25 |
| NetwPrefix0~ NetwPrefix2 | 25 |
| mPri_DNS | 25 |
| mSec_DNS | 25 |
| NTPServer | 26 |
| Timezone | 26 |
| Contact_1~Contact_8 | 26 |
| Extra features | 27 |
| Backgrounds | 27 |
| Fonts | 27 |
| Status Menu | 28 |
| Introduction | 28 |
| Ref-Format | 28 |
| gPTP-Clock | 28 |
| Rx1-Status ~ Rx16 -Status | 28 |
| Rx1-Format ~ Rx6-Format | 29 |
| sInp1 ~ sInp6 | 29 |
| sInp1-Map ~ sInp6-Map | 29 |
| sInp1_VI ~ | 30 |
| sInp6_VI | 30 |
| sInp1_WSS-Stnd ~ | 30 |

| | |
|----------------------------------|-----------|
| sInp6_ WSS-Stnd | 30 |
| sInp1_ WSS-Extd ~ | 30 |
| sInp6_ WSS-Extd | 30 |
| sInp1_s2016 ~ sInp6_s2016 | 30 |
| sInp1_CRC_EDH ~ sInp6_CRC_EDH | 30 |
| VITC-Presence | 30 |
| ATC-Presence | 30 |
| LTC_Presence | 30 |
| Ref | 30 |
| GPI | 30 |
| sInp1_Tal_l1 ~ sInp12_Tal_l1 | 30 |
| sInp1_Tal_r1 ~ sInp12_Tal_r1 | 31 |
| sInp1_Tal_l2 ~ sInp12_Tal_l2 | 31 |
| sInp1_Tal_r2 ~ sInp12_Tal_r2 | 31 |
| sInp1_Border ~ sInp12_Border | 31 |
| sInp1_UMDText ~ sInp12_UMDText | 31 |
| sInp1_UMDText2 ~ sInp12_UMDText2 | 31 |
| sInp1_UMDText3 ~ sInp12_UMDText3 | 31 |
| sInp1_UMDColor~ sInp12_UMDColor | 31 |
| Head_A/B_Chain_ID | 31 |
| Head_A/B_Chain_Num | 31 |
| Head_A/B_DVI_HPD | 31 |
| Head_A/B_Lock | 31 |
| Daisy_A/B_in_Lock | 31 |
| Head_A/B_Wordlock | 31 |
| Head_A/B_Daisy_Err | 31 |
| Head_A/B_Irq_Stat | 31 |
| Head_A/B_Prgm_Stat | 31 |
| Head_A/B_Ctrl_Stat | 31 |
| Head_A/B_If_Stat | 31 |
| Head_A/B_ds64br401 | 31 |
| Head_A/B_Idt_I2C | 31 |
| Head_A/B_Idt_Calc | 31 |
| Head_A/B_LMH1983 | 32 |
| Head_A/B_If_reset | 32 |
| Contact-Status | 32 |
| Backpanel-Det | 32 |
| Backplane-ID | 32 |
| Backpanel_Temp | 32 |
| CPU_Fan | 32 |
| CPU_Env_Temp | 32 |
| FOPGA_Core_Temp | 32 |
| Power-Cons | 32 |
| 10GPhy_Core_Temp | 32 |
| Link0 | 32 |
| IP_Addr0 | 33 |
| MAC0 | 33 |
| IP0 | 33 |
| NM0 | 33 |
| GW0 | 33 |
| Link1 ~ Link2 | 33 |
| IP_Addr1 ~ IP_Addr2 | 33 |
| MAC1 ~ MAC2 | 33 |
| IP1 ~ IP2 | 33 |
| NM1 ~ NM2 | 33 |
| GW0 | 33 |
| Events Menu | 35 |
| Introduction | 35 |
| What is the Goal of an event? | 35 |

| | |
|--|-----------|
| MNU-MNG100 Events | 35 |
| Announcements | 35 |
| Input | 35 |
| Ref-Status | 35 |
| What information is available in an event? | 35 |
| The Message String | 36 |
| The Tag | 36 |
| Defining Tags | 36 |
| The Priority | 36 |
| The Address | 36 |
| LED Indication | 37 |
| Error LED | 37 |
| Input_1 LED ~ Input_6 LED | 37 |
| Connection LED | 37 |
| ANC LED | 37 |
| 10 Block Schematic | 38 |
| Connector Panel MNU-MNG100 | 39 |
| Supported protocols | 40 |
| ASCII | 40 |
| TSLv3.1 | 41 |
| TSLv5 | 42 |
| Timezones | 44 |
| GNU Public License version 2 | 46 |

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 (RRC, RRS, ERC or ERS) manual. The method of connecting to a computer using Ethernet is also described in these manuals.



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. Especially with the MNU-MNG100 we strongly advise you to use Axon Cortex, as it can be very hard to set up a multiview without the Axon Cortex multiview GUI.

2 Unpacking and Placement

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

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

Power consumption The power consumption is higher than usual, because of the high-performance chips on the board. It is therefore highly recommended NOT to use the maximum storage capability of the SFR18 frames, which are equipped with SMP80 power supplies. When your frame is equipped with an SMP80, house a maximum of 12x MGG or MGU cards.

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.

Default settings

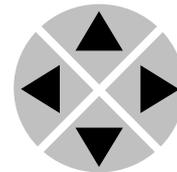
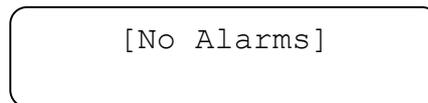
In its default condition, the MNU-MNG100 will act as dual head eightfold split. The auto format detection will recognize the input format. The SDI outputs are set to four-wire 4k resolution with a frame rate of 60 Hz.

Changing settings and parameters

The front panel controls or Axon Cortex 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.

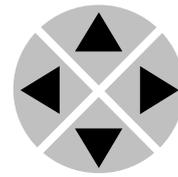
- Press ► To go forward through the menu structure.
- Press ◀ To go back through the menu structure.
- Press ▲ To move up within a menu or increase the value of a parameter.
- Press ▼ To move down through a menu or decrease the value of a parameter.

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

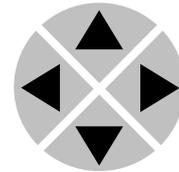
```
RRC18 [Select Card]
>S01=SFS10
```



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
```

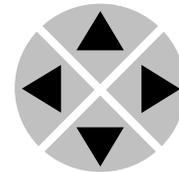


Pressing the ► selects the menu item shown, in this example Settings.

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

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

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

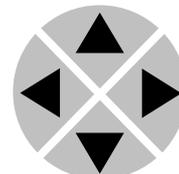


Pressing the ► selects the settings item shown, in this example HD-Format.

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

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

```
SFS10 [Edit setting]
SDI-Format>Auto
```



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

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

Axon Cortex Software

Axon Cortex 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. 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.

To download Axon Cortex, please refer to our website: www.axon.tv. For instruction about how to use Axon Cortex, please check the Axon Cortex help files for details (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 | |
| | | | ▼ | |
| | | | ▼ | |



Note Further information about Front Panel Control and Synapse Cortex can be obtained from the RRC, RRS, ERC and ERS operational manuals and the Cortex help files

4 The MNU-MNG100 Card

Introduction

SynView is Axon’s next generation Synapse modular multi-viewer. The feature-set has been increased tremendously with double the amount of inputs and up to 8 times the amount of outputs (heads) UHD/4K/60Hz output resolution on display outputs and a 6-fold increase of processing power.

The system consists of 6 basic models. These versions can be mixed and matched to build a hybrid multiviewer with up to hundreds of inputs and 8 1080p heads (on SDI) or two heads with UHD/4K resolution. Multiple connector panels will be available to allow for different I/O configurations.

There are currently 6 models defined below their differences:

| differentiation Model name Application | SDI IN | SDI OUT | IP inputs | IP outputs | PIP | monitoring |
|--|--------|---------|---------------|------------|-----|------------|
| MNU-MNG100 Production SDI inputs | 8 | 8 | - | - | 16 | basic |
| MGU-MNG100 Production SDI inputs | 8 | 2 | - | - | 16 | basic |
| MGU100 Monitoring SDI inputs | 8 | 8 | - | - | 8 | extensive |
| MGG100 Monitoring SDI inputs | 8 | 2 | - | - | 8 | extensive |
| MNU100 Network IP inputs | - | 8 | 2x6 backup | - | 8 | basic |
| MNG100 Network IP inputs | - | 2 | 2x6 backup | - | 8 | basic |

The above cards have the same output configuration with up to dual head UHD/4k on dual quad 3Gb/s SDI (with a 5V powered quad SDI to HDMI converter), or 8 heads on SDI.

The cards can be combined in any combination up to 12 cards in the new SFR18 gen3 with the new SMP175 power supply.

Because of the external Daisy Chain mini SAS-HD connector you can build a multi viewer with in theory an unlimited amount of input channels as you can chain the cards even between frames.

Like with the original SynView system you can split the multiviewer into smaller chunks of cards.

A MNU-MNG100 can also be used stand alone as a dual quadsplit (or even octsplit) with 8 1080p pictures spread over 2 UHD screens (pixel mapping with no scaling).

Features

- 2x 10Gb Ethernet inputs displaying the content of maximum 6 sources with ST2022-6 and ST2110 (Q1) inputs
- Each input can be displayed on each head with individual scale and position
- Low latency (20 ms for 50Hz, 17 ms for 59.94Hz)
- Full RGB domain (internal 20bit processing for scaling)
- Up to 2x 4k/UHD (2160p60) resolution on dual quad SDI (with use of a quad SDI to HDMI converter) (MNU100)
- Up to 8 3Gb/s SDI outputs
- **Full variable scaling and positioning for all individual inputs**
- All inputs compatible with (**mixing is allowed with different frame rates**):
 - 1080p 50 and 59.94
 - 1080i and 720p 50 and 59.94 Hz
 - 1080p (sf) and 720p 29.97/25/24
 - SD 625 and 525
- 48 audio bars free assignable from 96 embedded sources and/or 32 sources via the Quad Speed Audio bus
- Three assignable regions in or under monitor: Input format, Static UMD and Dynamic UMD, VITC, ATC, LTC, Aspect Ratio
- Lock to input, reference or free running
- Audio metering
 - Up to 48 Bar-graphs per card per head
 - Masked or transparent bar-graphs
 - AES/EBU, BBC, Nordic scales and VU
 - Customizable color schemes for audio meters
- Two definable clocks per head
 - Analog
 - Digital
 - Normal
 - Up Counter
 - Down Counter
 - Combined
- Two Clocks can be assigned to VITC, ATC, LTC, NTP (Ethernet) or system
- UMD colors: gray, green, red and amber
- Border, UMD and tally brightness adjustment
- Safe area:
 - Action
 - Graphics
 - Action + Graphics
 - Shoot and protect 4:3
 - Shoot and protect Action
 - Shoot and protect Graphics
 - Shoot and protect Action + Graphics
- Automatic 4:3 and 16:9 modes through VI or WSS triggers (SD-SDI inputs)
- GPI control for:
 - Aspect ratio (4:3 or 16:9)
 - Full screen or quad mode
 - Tally
- Locks to Bi-level, Tri-level syncs or SDI input

- Full control and status monitoring through the front panel of the SFR08/SFR18 frame and the Ethernet port (ACP)

GPI Contacts

With the local GPI contacts you can control (in settings) the following objects:

- Full screen or eight-split
- Tally and Border indication.
- Counter

See chapter 10 for the connections.

Updating the card

This card has an unconventional way of updating with new or other firmware. How this is done can be read in the ‘How to update Linux based cards’ chapter in the Synapse card upgrade manual. It is downloadable on the axon website.

5 Settings Menu

| OUTPUT | | | | | | | | | | | | | |
|---------------------|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Lock-Mode | <p>The MNU100 can be locked to a reference (in the SFR18 and SFR08, there are 2 reference inputs. Ref1 = top input. Ref 2 = bottom input), to an input or to its own oscillator. Lock-Mode determines how the card is locked. Options are Ref1, Ref2, Freerun and SDI1. If SDI1 is selected, the card will lock to the first input. Default setting is Ref1.</p> <p>Note: To prevent picture “hopping” on the multiview output, make sure that the input (or the card) is locked to a reference.</p> | | | | | | | | | | | | |
| Out-FrmtA | <p>The Out-FrmtA menu item sets the output resolution as present at the SDI output connector 1 to 4.</p> <p>The selectable resolutions are (Default setting is 2160p50) :</p> <table border="0"> <tr> <td>▪ 2160p50</td> <td>▪ 1080p50</td> </tr> <tr> <td>▪ 2160p60</td> <td>▪ 1080p60</td> </tr> <tr> <td>▪ 2160i50</td> <td>▪ 1080i50</td> </tr> <tr> <td>▪ 2160i60</td> <td>▪ 1080i60</td> </tr> </table> <p>For the MNG100 the resolution table is slightly different.</p> <p>The Out-FrmtA menu item sets the output resolution as present at the SDI output connector 1. SDI output connectors 2 to 4 are a copy of connector 1. The selectable resolutions are (Default setting is 1080p50) :</p> <table border="0"> <tr> <td>▪ 1080p50</td> <td>▪ 1080i50</td> </tr> <tr> <td>▪ 1080p60</td> <td>▪ 1080i60</td> </tr> </table> <p>Note: vertical refresh rate of the display has to be 50 or 60 Hz. The card can use either 50 or 60 Hz monitors (continental of US) independent of the inputs.</p> | ▪ 2160p50 | ▪ 1080p50 | ▪ 2160p60 | ▪ 1080p60 | ▪ 2160i50 | ▪ 1080i50 | ▪ 2160i60 | ▪ 1080i60 | ▪ 1080p50 | ▪ 1080i50 | ▪ 1080p60 | ▪ 1080i60 |
| ▪ 2160p50 | ▪ 1080p50 | | | | | | | | | | | | |
| ▪ 2160p60 | ▪ 1080p60 | | | | | | | | | | | | |
| ▪ 2160i50 | ▪ 1080i50 | | | | | | | | | | | | |
| ▪ 2160i60 | ▪ 1080i60 | | | | | | | | | | | | |
| ▪ 1080p50 | ▪ 1080i50 | | | | | | | | | | | | |
| ▪ 1080p60 | ▪ 1080i60 | | | | | | | | | | | | |
| Output_Map_A | <p>The Output_Map_A menu item sets the output in 3G mapping</p> <ul style="list-style-type: none"> ▪ Level-A ▪ Level-B-DL | | | | | | | | | | | | |
| 4K_Map_A | <p>In 4K/UHD output mode the system can be setup in two output modes. This will be 4Ch_4Quadrants or 4Ch_SI. The default setting is 4Ch_4Quadrants.</p> | | | | | | | | | | | | |

Out-FrmtB

The `Out-FrmtB` menu item sets the output resolution as present at the SDI output connector 5 to 8.

The selectable resolutions are (Default setting is 2160p50) :

- 2160p50
- 2160p60
- 2160i50
- 2160i60
- 1080p50
- 1080p60
- 1080i50
- 1080i60

For the MNG100 the resolution table is slightly different. The `Out-FrmtB` menu item sets the output resolution as present at the SDI output connector 5. SDI output connectors 6 to 8 are a copy of connector 5.

The selectable resolutions are (Default setting is 1080p50) :

- 1080p50
- 1080p60
- 1080i50
- 1080i60

Note: vertical refresh rate of the display has to be 50 or 60 Hz. The card can use either 50 or 60 Hz monitors (continental of US) independent of the inputs.

Output_Map_B

The `Output_Map_B` menu item sets the output in 3G mapping

- Level-A
- Level-B-DL

4K_Map_B

In 4K/UHD output mode the system can be setup in two output modes. This will be `4Ch_4Quadrants` or `4Ch_SI`. The default setting is `4Ch_4Quadrants`.

Switch_Back

The MNU-MNG100 has backup switch functionality. In case streams are not active the card is able to switch over to another stream.

When `Input-Sel` is set to `On` the input will switch back immediate when the failed input returned `Ok`.

Set to `Off`, the channels will not switch back after input recovers from an error, even when input B (the backup) has an error. The switch stays switched infinite, and is only reset if the configuration is changed manually.

Can also be set to `BackUp_Fail` in which case the input will switch back when input B (Backup) fails and the input A (Main) is `Ok`. This mode avoids the immediate switch-back of the `Switch-Back On` mode, until it really has to switch back to the `Ok` main channel. Default is `BackUp_Fail`. See appendix 1 for the exact switch behaviour.

Inp-Sel

When set to `Auto`, the card will use the Switch back functionality

In `Stream A` or `Stream B` respectively the inputs of SFP A or B will be used.

Rx1-ID ~ Rx6-ID

This is a string which holds the information of a specific stream. This can be copied from an Axon gateway card i.e. an NIO440.

A string ID could look like this

s2022-6:239.100.0.1:10001:01

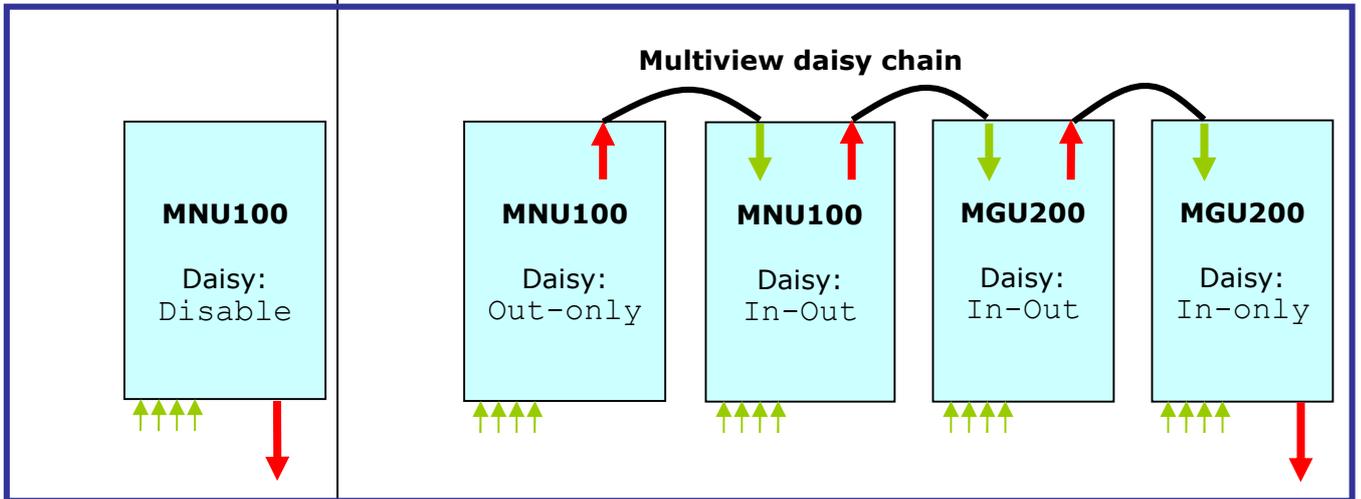
Which exists of the standard, in this case ST2022-6, the multicast address the MV needs to listen too. The UDP port number that needs to be blocked. And the format of the video which is transported over this stream.

Rx1-Name ~ Rx6-Name

Rx-Name allows the user to add a Name to the corresponding Receiver. This name can be used as Mnemonics in routing systems.

Daisy-HeadA/B

With this setting, you can set how the card is functioning in a multiview setup. You can set the card to In-Only to only receive Video over the bus from other cards and not output any signals to the bus (last card in the multiview card chain). When set to Out-Only the card will only output its signal to the bus and not accept Video from the bus (first card in the multiview chain). When set to In-Out the card will both accept Video input from the bus as well as output its signals to the bus (cards in the middle of a multiview chain). Disable will set the card to work on its own (=Default setting)



Layout-HeadA/B

With this setting you can choose between 8 different layout presets. These presets are stored on the MNU-MNG100 card. If more layout presets need to be stored, use Cortex. Adjusting the settings of these presets and changing this menu item to other presets will have direct effect on the output. All menu items preceded with a '#' sign are possible to add to the selected preset. The presets are stored in memory. Default is Preset_1.

ScrLayout

With this setting, you can edit the 8 presets without the changes having any direct effect on the output (unless you are editing the preset, which is set as active layout). Adjusting the settings of these presets and changing this menu

item to other presets will have no direct effect on the output.

You can use this option to change screen layout presets without these changes being visible directly on the output. Changes will only become visible when `ScrLayout-HeadA/B` are changed to the preset to just edit.

All menu items preceded with a #-sign are possible to add to the selected preset. The presets are stored in memory. Default is `Preset 1`.

LAYOUT

**#Inp1_Source ~
#Inp6_Source**

With this setting you can switch the input source to any window. There is a choice for switching the window to `Off` or to use `SDI-1` to `SDI-6` as input. Switching an input `Off` will disable the window of that input entirely. Default for window 1 is `SDI-1`, window 2 is `SDI-2` etc..

**#Inp1_x ~
#Inp6_x**

The `#Inp_x` setting sets the X coordinate of the top left corner of the window of the input. Settings are done with percentages (with 0.5% increments) of the total width of the screen.

Default for `#Inp1_x` is 1.0%

Default for `#Inp2_x` is 34.0%

Default for `#Inp3_x` is 67.0%

Default for `#Inp4_x` is 1.0%

Default for `#Inp5_x` is 34.0%

Default for `#Inp6_x` is 67.0%

**#Inp1_y ~
#Inp8_y**

The `#Inp_y` settings set the Y coordinate of the top left corner of the window of the input. Settings are done with percentages (with 0.5% increments) of the total heights of the screen.

Default for `#Inp1_y` is 1.0%

Default for `#Inp2_y` is 1.0%

Default for `#Inp3_y` is 1.0%

Default for `#Inp4_y` is 34.0%

Default for `#Inp5_y` is 34.0%

Default for `#Inp6_y` is 34.0%

**#Inp1_w ~
#Inp6_w**

The `#Inp_w` settings set the width of the window of the input. Settings are done with percentages (with 0.5% increments) of the total width of the screen. Default for all `#Inp_w` settings are 32.0%

**#Inp1_h ~
#Inp6_h**

The `#Inp_h` settings set the height of the window of the input. Settings are done with percentages (with 0.5% increments) of the total height of the screen. Default for all `#Inp_h` settings are 32.0%

#Inp1_BarStyle ~

These settings set the individual bar styles (UMD and Tally) of the input

| | |
|--------------------------------------|---|
| #Inp6_BarStyle | windows. It can be set to be displayed Under the window, Over the window. Default is Under. |
| #Inp1_ShowUMD ~ #Inp6_ShowUMD | Enables the under monitor display to be visible or invisible. Choices are Off or On. Default this setting is Off. |
| #Inp1_ShowTal ~ #Inp6_ShowTal | With these items you can show or hide the Tallies. Switched On, they are displayed. Switched Off, they will not be displayed. Default is On. |
| #Inp1_Area1 ~ #Inp6_Area1 | <p>The xQW200/220 card can show up to 3 separate text fields under or in the separate windows (UMD). With these settings you can set what text should be in area1 of the UMD. Can be set to:</p> <ul style="list-style-type: none"> ▪ Disabled (no area 1 UMD field) ▪ Static UMD (showing text as set in the corresponding Inp_UMDText setting) ▪ Dynamic UMD (shows dynamic UMD text as set in the control settings) ▪ Video Format (showing the input format of that window) ▪ VITC ▪ ATC ▪ Aspect Ratio (shows incoming aspect ratio data) ▪ LTC1 (shows LTC on input 1) ▪ LTC2 (shows LTC on input 2) <p>Default for Area1 is Disabled.</p> |
| #Inp1_Area2 ~ #Inp6_Area2 | <p>With these settings you can set what text should be in Area 2 of the UMD. Can be set to:</p> <ul style="list-style-type: none"> ▪ Disabled ▪ Static UMD ▪ Dynamic UMD ▪ Video Format ▪ VITC ▪ ATC ▪ Aspect Ratio ▪ LTC1 ▪ LTC2 <p>Default for Area2 is Disabled.</p> |
| #Inp1_Area3 ~ #Inp6_Area3 | <p>With these settings you can set what text should be in Area 3 of the UMD. Can be set to:</p> <ul style="list-style-type: none"> ▪ Disabled ▪ Static UMD |

- Dynamic UMD
- Video Format
- VITC
- ATC
- Aspect Ratio
- LTC1
- LTC2

Default for Area3 is Disabled.

**#Inp1_fill ~
#Inp6_fill**

The #Inp_fill settings will let you set how the window will be filled with the input. It can be set to `Fit` (respecting the input aspect ratio and using the maximum available width or heights to show the complete picture, the rest is blacked), `Zoom` (zooming in the picture with respect to the aspect ratio, causing cut off on the sides), `Anamorphic` (filling the entire window with the picture causing anamorphic view when Aspect ratio of the input is not the same as the aspect ratio of the window).

Default for all #Inp_fill settings is `Fit`.

**#Inp1_SD_AR ~
#Inp6_SD_AR**

This setting sets the Aspect Ratio of the input when this input is SD. It can be set to the following options:

- 12F12 (4:3 source Full screen on 4:3 receiver)(default)
- 16L12 (16:9 source as letterbox on 4:3 receiver)
- 16F16 (16:9 source Full screen on 16:9 receiver)
- 12P16 (4:3 source as pillar-box on 16:9 receiver)
- VI (use Video Index aspect ratio)
- WSS (use Widescreen Signaling aspect ratio)
- WSS-Ext'd (use Widescreen Signaling Extended aspect ratio)

Note: The card only reacts to WSS signals if #Inp_SD_AR is set to VI.

**#Inp1_MtrDisplay ~
#Inp4_ MtrDisplay**

With this setting, you can select the style of the audiometer bars for each individual input. You can choose between

- L/R2 (Stereo channel at Left/Right side of Window)
- L/R4 (2 Stereo channels at Left/Right side of Window)
- 2+2 (Stereo channel at Left and Right side of Window)
- L/R5.1 (5.1 channel at Left/Right side of Window)
- L/R8 (4 Stereo channels at Left/Right side of Window)
- 4+4 (2 Stereo channels at Left and Right side of Window)
- L/R16 (8 Stereo channels at Left/Right side of Window)
- 8+8 (4 Stereo channels at Left/Right side of Window)
- L/R5.1+2 (5.1 plus Stereo channel at Left/Right side of Window)

Default for all #Inp_MtrDisplay settings is L2.

**#Inp1_MtrPos ~
#Inp6_MtrPos**

With these settings, you can select a position for the audio meter bars. For now it is possible to set them `Over` or at the `Side` of the picture. You can also turn them `Off`. By default it is set to `Off`.

#UMD_BarSize Sets the height of the UMD regions below the windows. This can be adjusted in a percentage of the output resolution. The size can be set from 0.5% to a maximum of 15% of the output resolution. Default is 3%.

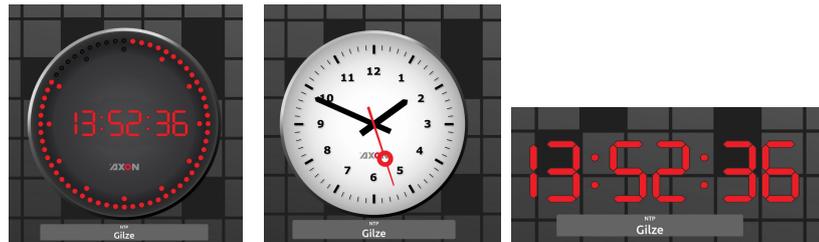
#Clk_x ~ #Clk2_x This sets the vertical position of the first onscreen graphical clock. Can range from 0% (top) to 100% (bottom) of the total screen height. By default it is set to 0%.

#Clk_y ~ #Clk2_y This sets the horizontal position of the first onscreen graphical clock. Can range from 0% (top) to 100% (bottom) of the total screen width. By default it is set to 0%.

#Clk_w ~ #Clk_w Sets the first onscreen clock width. Can be set from 2,5% to 100%. Note that the Clock will always be forced completely round. So when Clk_h is set smaller than Clk_w, Clk_w will be adjusted to the same value as Clk_h. Default is 10%.

#Clk_h ~ #Clk2_h Sets the first onscreen clock height. Can be set from 2,5% to 100%. Note that the Clock will always be forced completely round. So when Clk_w is set smaller than Clk_h, Clk_h will be adjusted to the same value as Clk_w. Default is 10%.

#Clk_style ~ #Clk2_style This sets the graphical style of the first onscreen clock. Available styles are: Analog, digital or combined (analog clock with digital clock in its background). Set to Off will turn off the onscreen clock. Default is off.



Combined

Analog

Digital

#Clk_source ~ #Clk2_source This sets the time source of the first onscreen clock. Can be the VITC or the ATC of input 1 to input 8. It can also be set to System, in which case the clock will show the card's internal clock (uptime). The Multi view card also has two LTC inputs, physically available on the Dsub connector on the backplane. You choose between LTC1 and LTC2 input.

It is possible to synchronize the internal clock to an NTP server. This way, with #Clk_source set to NTP, the clock will be indicating the correct NTP time as set with the settings NTPServer and Timezone further down the settings menu. By default it is set to System.

**#Clk_Source_Inp ~
#Clk2_Source_Inp**

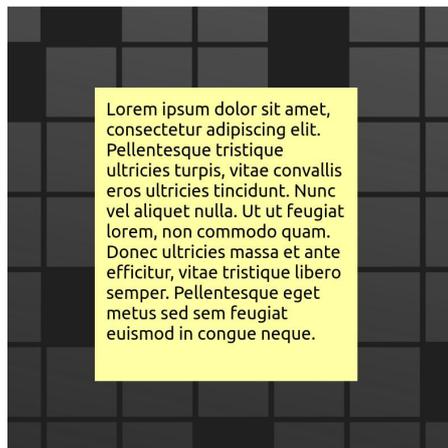
When Timecode is going to be used from SDI, the user needs to assign which input this needs to be. This is a choice between SDI-1 to SDI-8. The default setting is SDI-1.

**#Clk_Text ~
#Clk2_Text**

Sets text which is visible underneath the first clock. Can contain a maximum of 32 characters.

NOTEPAD

Inside the SynView multi viewer we have the option to use an Notepad on screen to put notes on.



#Note_Style

This enables the user to make the notepad visible or invisible. This setting needs to be `On` to be visible or `Off` to be invisible. Default is `Off`.

**Note_Ln1 ~
Note_Ln12**

These settings form the notepad. Eleven lines of random text can be inserted in these settings. Best used in combination with Axon Cortex or Cerebrum.

#Note_x

This sets the vertical position of the first onscreen Notepad. Can range from 0% (top) to 100% (bottom) of the total screen height. By default it is set to 0%.

#Note_y

This sets the horizontal position of the first onscreen Notepad. Can range from 0% (top) to 100% (bottom) of the total screen width. By default it is set to 0%.

#Note_w

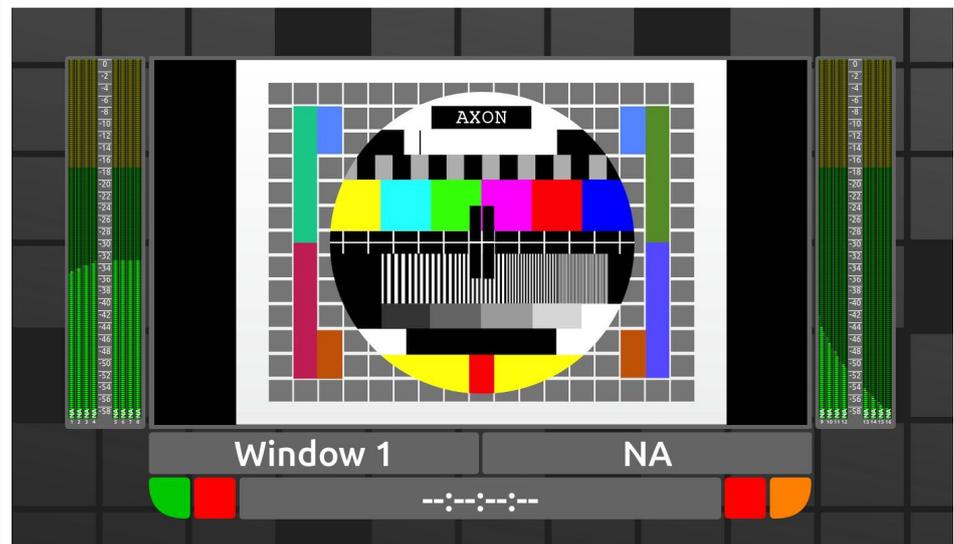
Sets the first onscreen clock width. Can be set from 2,5% to 100%. Note that the Clock will always be forced completely round. So when `Note_h`

is set smaller than Note_w, Note_w will be adjusted to the same value as Note_h. Default is 10%.

#Note_h

Sets the first onscreen clock height. Can be set from 2,5% to 100%. Note that the Clock will always be forced completely round. So when Note_w is set smaller than Note_h, Note_h will be adjusted to the same value as Note_w. Default is 10%.

Tally & under monitor display (UMD) Color Settings



**Inp1_Tal_l1 ~
Inp6_Tal_l1**

The SynView Multiviewer cards have four tallies. Two on the left and two on the right. These settings change the colour of the left most Tally of the inputs 1 to 6. Possible colours are Green, Red, Gray or Amber. Default for all inputs is Gray.

**Inp1_Tal_l2 ~
Inp6_Tal_l2**

The SynView Multiviewer cards have four tallies. Two on the left and two on the right. These settings change the colour of the second left Tally of the inputs 1 to 6. Possible colours are Green, Red, Gray or Amber. Default for all inputs is Gray.

**Inp1_Tal_r1 ~
Inp6_Tal_r1**

The SynView Multiviewer cards have four tallies. Two on the left and two on the right. These settings change the colour of the first right Tally of the inputs 1 to 6. Possible colours are Green, Red, Gray or Amber. Default for all inputs is Gray.

**Inp1_Tal_r2 ~
Inp6_Tal_r2**

The SynView Multiviewer cards have four tallies. Two on the left and two on the right. These settings change the colour of the Right most Tally of the inputs 1 to 6. Possible colours are Green, Red, Gray or Amber.

| | |
|---|--|
| | Default for all inputs is Gray. |
| Inp1_Border~ Inp6_Border | With Border you can set the color of the Border of each input. Can be set to Gray, Green, Red, Amber, Off (no bars, just text) or set to follow the color of the left tally (Follow_tal_l1/l2) or the right tally (Follow_tal_r1/r2). By default it is set to Gray. |
| Inp1_UMDColor ~ Inp6_UMDColor | With UMDColor you can set the color of the UMD bars of each input. Can be set to Gray, Green, Red, Amber, Off (no bars, just text) or set to follow the color of the left tally (Follow_tal_l1/l2) or the right tally (Follow_tal_r1/r2). By default it is set to Gray. |
| Inp1_UMDText ~ Inp6_UMDText | The text filled out in this setting is being shown when the option #Inp1_Area1 ~ #Inp6_Area3 is set to show Static UMD. The default value is Window 1 ~ Window 6. |
| TIMECODE SETTINGS | |
| Inp1_VITC-Line ~ Inp4_VITC-Line | These settings lets you select in which line the VITC time is located in each corresponding input. Can be any line between 7 and 22. Default is line 17. |
| EMBEDDER | |
| | The SynView multiview card is able to extract a stereo pair of audio per input. These 8 stereo pairs will then be combined to 16 again and these channels will be embedded in the first SDI output. |
| Tally & under monitor display (UMD) Color Settings | |
| CtrlMode | This setting selects the used protocol to select Tally and UMD ACP menu: Setting selected through menu GPI: setting via GPI TSL: Use the serial TSL protocol (v3.1) for tally/umd info TSLv5: Use TSLv5 protocol (see appendix) The TSL protocol will always work in 16 character mode. |
| TSL-Netw-Port | This is setting the portnumber where the multiviewer will listen to for the TSLv5 commands |
| TSLv5-ScreenNr-A~ TSLv5-ScreenNr-B | TSLv5 has the possibility to use device and window addressing. This setting is the device addressing. For each card, the user will need to put a different number in. The PIP's in the screen will then be numbered automatically from |

1 to 16.

TEMPERATURE MONITORING

- Monitor-Temp** This setting will show the temperature in the temperature monitor status. Default the setting is set to Off.
- CC_Channel** The MNU-MNG100 is able to decode closed captions and display them on screen. There are four choices. At this moment, we supply the sources, which are available in field 1.
- CC1 and CC2 are closed caption services 1 and 2. T1 and T2 are Text services 1 and 2.

NETWORK SETTINGS

The first settings for the IP Addresses are being used for the 1G Ethernet connection. The IP settings for 1 and 2 are being used for the 10G connections over the SFP modules.

- IP_Conf0~
IP_Conf2** With this setting you can let the card obtain an IP address automatically via DHCP, or appoint a manual set IP address. Default is Manual .
- mIP0~ mIP2** 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~ mNM2** With IP_Conf0 set to manual, with this setting you can set a Netmask. Default is 255.255.0.0
- mGW0~ mGW2** With IP_Conf0 set to manual, this setting let you set a Standard Gateway. Default is set to 172.16.0.1
- NetwPrefix0~
NetwPrefix2** With IP_Conf0 set to manual, this item lets you set a network mask prefix varying from 0 to 30 bit. the mNM0 network mask changes accordingly.
- mPri_DNS** Primary Domain name server to be used for resolving hostnames. Default IP address is 0.0.0.0.
- mSec_DNS** Secondary Domain name server to be used for resolving hostnames. Default IP address is 0.0.0.0.

NTPServer With this string, you can set an NTP server name or IP address to which the system clock should then synchronize. The NTP connection should be made via the Ethernet connection on the back panel. The default site is pool.ntp.org.

Timezone This setting allows for setting the timezone for the multiviewer. This is a text based entry field. In appendix .. you will find the table to choose from. Default the Multi viewer is setup to Europe/Amsterdam.

GPI FUNCTIONALITY

In this ACPv1 release we will have limited GPI functionality. The functions are limited to address one tally per physical pin. Fixed mapping between contacts and inputs. i.e. Contact_1 will address tally functionality of PIP 1.

The GPI functions will be expanded when this product is released as ACPv2 product.

In case, that the tally is used with a protocol, as TSL there are far more functions possible. With GPI triggered tallies, the functionality is limited.

Usage: The user needs to assign a color to the specific tallies and when the tally is triggered by a contact closure, the tally is activated. The tally will stay activated during this closure and will deactivate when the contact is open.

Contact_1~Contact_8 This contact will be assignable to trigger Tally_L1, Tally_R2, Tally_L1+R2, Border or UMD

6 Extra features

Backgrounds

The SynView multi view system has also capabilities for displaying background graphics. Factory default, there will be an axon background. For the user it is possible to put another picture on the board, which will be used as background. This picture will be scaled to the resolution set on the output.

The location of these logo's can be found on the first card of the multiview system. To access this, you need to connect to the card with FTP or WebDav. When the IP address of the 1G port is being accessed with one of the protocols mentioned, three folders are found. Background_A, Background_B and Fonts.

When a picture, with the .png format will be dropped into one of the background directories, the card automatically will use the picture for the one of the backgrounds.

Fonts

The SynView multi view system has also capabilities for displaying different fonts. Factory default, there will be an axon which is used. For the user it is possible to put another font on the board, which will be used as font for all text displayed.

The location of this font can be found on all cards of the multiview system. To access this, you need to connect to the card with FTP or WebDav. When the IP address of the 1G port is being accessed with one of the protocols mentioned, three folders are found. Background_A, Background_B and Fonts.

When a font, with the .ttf or .otf format will be dropped into the font directory, the card needs to be restarted to use this.

7 Status Menu

| | |
|--------------------------------------|--|
| Introduction | The status menu indicates the status of each item listed below. |
| Ref-Format | This status item indicates the presence and format reference in applied to the system. This is displayed as: <ul style="list-style-type: none">▪ NA▪ 1080p60▪ 1080p50▪ 1080i60▪ 1080i50▪ 1080p30▪ 1080p25▪ 1080p24▪ 1035i60▪ 720p60▪ 720p50▪ 720p30▪ 720p25▪ 720p24▪ SD525▪ SD625 |
| PTP STATUS | |
| gPTP-Clock | The PTP-clock status will display if the card is being locked to PTP or not. In case the card is Locked to a grandmaster PTP clock, it will indicate Slave to this clock. In case there is no Master in a system, the first card which can act as Master will take over. In this case the card will announce Master. In cas the card cannot lock to a PTP system it notifie that the card is Not Locked |
| RX STATUS | |
| Rx1-Status ~ Rx16 -Status | If the stream is received in good order, the receiver will de-capsulate the IP packets into SDI. When this is working, the corresponding Rx-Status will indicate Active. In all other cases, it will indicate Inactive. |

**Rx1-Format ~
Rx6-Format**

This status item indicates the presence and format of a valid signal Receiver 1 until receiver 6. This is displayed as:

- NA
- 1080p60
- 1080p50
- 1080i60
- 1080i50
- 720p60
- 720p50
- SD525
- SD625

sInp1 ~ sInp6

This status item indicates the presence and format of a valid signal in input 1 until input 6. This is displayed as:

- NA
- 2160p50
- 2160p60
- 1080p60
- 1080p50
- 1080i60
- 1080i50
- 1080p30
- 1080p25
- 1080p24
- 1035i60
- 720p60
- 720p50
- 720p30
- 720p25
- 720p24
- SD525
- SD625

**sInp1-Map ~
sInp6-Map**

This status shows in case of 3Gb/s signal what the mapping of the signal is.

- NA
- Level-B-DS
- Level-B-DL
- Level-B-DSSC
- Level-A
- PsF
- 720p24

SD525

| | |
|--|---|
| sInp1_VI ~ sInp6_VI | This status shows the Aspect Ratio of the inputs when this input is SD. It can have to the following values: <ul style="list-style-type: none"> • 4:3_0 to 16:9_7 • NA when no VI is there. |
| sInp1_WSS-Stnd ~ sInp6_WSS-Stnd | This status shows the Aspect Ratio of the inputs when this input is SD. It can have to the following values: <ul style="list-style-type: none"> • 1_vid to 8_flm • NA when no WSS-Stnd is there. |
| sInp1_WSS-Extd ~ sInp6_WSS-Extd | This status shows the Aspect Ratio of the inputs when this input is SD. It can have to the following values: <ul style="list-style-type: none"> • 4:3_0 to 16:9_7 • NA when no WSS-Extd is there. |
| sInp1_s2016 ~ sInp6_s2016 | Displays the current value of the SMPTE2016 data of the corresponding input (also known as AFD). Can be any AFD value between AFD1 and AFD16. That or NA (no AFD found) |
| sInp1_CRC_EDH ~ sInp6_CRC_EDH | Displays if the signal is okay, Or has CRC or EDH errors. |
| VITC-Presence | Displays which inputs contain VITC data. This is displayed as _____ when none of the inputs contains VITC, 1234 if all inputs contain VITC and for instance _2_4 when inputs 2 and 4 contain VITC and input 1 and 3 do not. |
| ATC-Presence | Displays which inputs contain ATC data. This is displayed as _____ when none of the inputs contains ATC, 1234 if all inputs contain ATC and for instance _2_4 when inputs 2 and 4 contain ATC and input 1 and 3 do not. |
| LTC_Presence | Indicates if there is an LTC input present on the backpanel. Only possible on the G-H-SQW220 models. Inidcated as OK, NA (not available) or Error (wrong input data). |
| Ref | Indicates the status of the reference input. Can be NA or present. |
| GPI | This item displays the status of the GPI contacts. |
| sInp1_Tal_l1 ~ sInp12_Tal_l1 | These items display the status of the left most tally of the input window. It can be Green, Red, Amber or Off. |

| | |
|---|--|
| sInp1_Tal_r1 ~ sInp12_Tal_r1 | These items display the status of the first right tally of the input window. It can be Green, Red, Amber or Off. |
| sInp1_Tal_l2 ~ sInp12_Tal_l2 | These items display the status of the left tally of the input window It can be Green, Red, Amber or Off. |
| sInp1_Tal_r2 ~ sInp12_Tal_r2 | These items display the status of the right most tally of the input window It can be Green, Red, Amber or Off. |
| sInp1_Border ~ sInp12_Border | These items display the status of the input's window border colour. It can be Green, Red, Amber or Off. |
| sInp1_UMDText ~ sInp12_UMDText | These items display the status of the input's window UMD text. Can be a string with a maximum length of 17 characters. |
| sInp1_UMDText2 ~ sInp12_UMDText2 | These items display the status of the input's window UMD text. Can be a string with a maximum length of 17 characters. |
| sInp1_UMDText3 ~ sInp12_UMDText3 | These items display the status of the input's window UMD text. Can be a string with a maximum length of 17 characters. |
| sInp1_UMDColor~ sInp12_UMDColor | These items display the status of the input's window UMD color. It can be Green, Red, Amber or Off. |
| Head_A/B_Chain_ID | Tbd |
| Head_A/B_Chain_Num | Tbd |
| Head_A/B_DVI_HPD | Tbd |
| Head_A/B_Lock | Tbd |
| Daisy_A/B_in_Lock | Tbd |
| Head_A/B_Wordlock | tbd |
| Head_A/B_Daisy_Err | Tbd |
| Head_A/B_Irq_Stat | Tbd |
| Head_A/B_Prgm_Stat | Tbd |
| Head_A/B_Ctrl_Stat | Tbd |
| Head_A/B_If_Stat | Tbd |
| Head_A/B_ds64br401 | Tbd |
| Head_A/B_Idt_I2C | Tbd |
| Head_A/B_Idt_Calc | Tbd |

| | |
|--------------------------|--|
| Head_A/B_LMH1983 | Tbd |
| Head_A/B_If_reset | Tbd |
| Contact-Status | Displays the currently closed GPI contacts. This is displayed as for instance 1010000 when contacts 1 and 3 are closed and for instance 0111000 when contacts 2, 3 and 4 are closed. |
| Backpanel-Det | This status will show if the back panel of the multiviewer is connected or not. The statuses which can be shown are Connected or disconnected |
| Backplane-ID | This status will show what kind of back panel is detected. The ID, which should be shown as the MV card detects a BPH41, is 4. |
| Backpanel_Temp | This status will show the temperature of the 10G PHY. The temp range will be between -40deg . . .125deg . |
| CPU_Fan | This status will show the rpm's of the fan. The range of the rpm's is between -0rpm . . .32767rpm . |
| CPU_Env_Temp | This status will show the temperature of the CPU. This sensor is located next to the CPU. The temp range will be between -40deg . . .125deg . |
| FPGA_Core_Temp | This status will show the inner temperature of the FPGA. The temp range will be between -40deg . . .125deg . |
| Power-Cons | This status will show the power consumption of the MV board. The power consumption range will be between -0 .00W . . .50 .00W |

NETWORK STATUS

| | |
|-------------------------|--|
| 10GPhy_Core_Temp | This status will show the temperature of the 10G PHY. The temp range will be between -40deg . . .125deg . |
| Link0 | <p>This setting indicates the link speed of the Ethernet connection. If nothing is connected the card will show Disconnected.</p> <ul style="list-style-type: none"> ▪ 10 Mb ▪ 100 Mb ▪ 1 Gb ▪ Unknown |

| | |
|----------------------------|--|
| 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 of the 1G PHY |
| IP0 | This item displays the current IP address of the card of the 1G PHY |
| NM0 | This item displays the current Netmask of the card of the 1G PHY |
| GW0 | This item displays the current Standard Gateway of the card of the 1G PHY |
| Link1 ~ Link2 | <p>This setting indicates the link speed of the Ethernet connection. If nothing is connected the card will show <i>Disconnected</i>.</p> <ul style="list-style-type: none"> ▪ 10 Mb ▪ 100 Mb ▪ 1 Gb ▪ 10 Gb ▪ Unknown |
| IP_Addr1 ~ IP_Addr2 | This item displays the status of the IP address. It can be manual, DHCP asking, DHCP Leased or DHCP Infin. |
| MAC1 ~ MAC2 | This item displays the MAC address of the card of the 10G PHY's |
| IP1 ~ IP2 | This item displays the current IP address of the card of the 10G PHY's |
| NM1 ~ NM2 | This item displays the current Netmask of the card of the 10G PHY's |
| GW0 | This item displays the current Standard Gateway of the card of the 10G PHY's |

|

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. |
| MNU-MNG100 Events | The events reported by the MNU-MNG100 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 |
| Input | Input can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting. |
| Ref-Status | Ref-status can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting This information is only needed when the GPI16 card is used or when software is implemented. |
| What information is available in an event? | The message consists of the following items; <ol style="list-style-type: none">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 MNU-MNG100 are:

| Event Menu Item | Tag | | Description |
|-----------------|-----------------------------|-------------------------------|---|
| Announcements | 0 or NA | 0 or NA | Announcing of report and control values |
| Input | 01 _{hex} =INP_LOSS | 81 _{hex} =INP_RETURN | primary input lost or returned |

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.

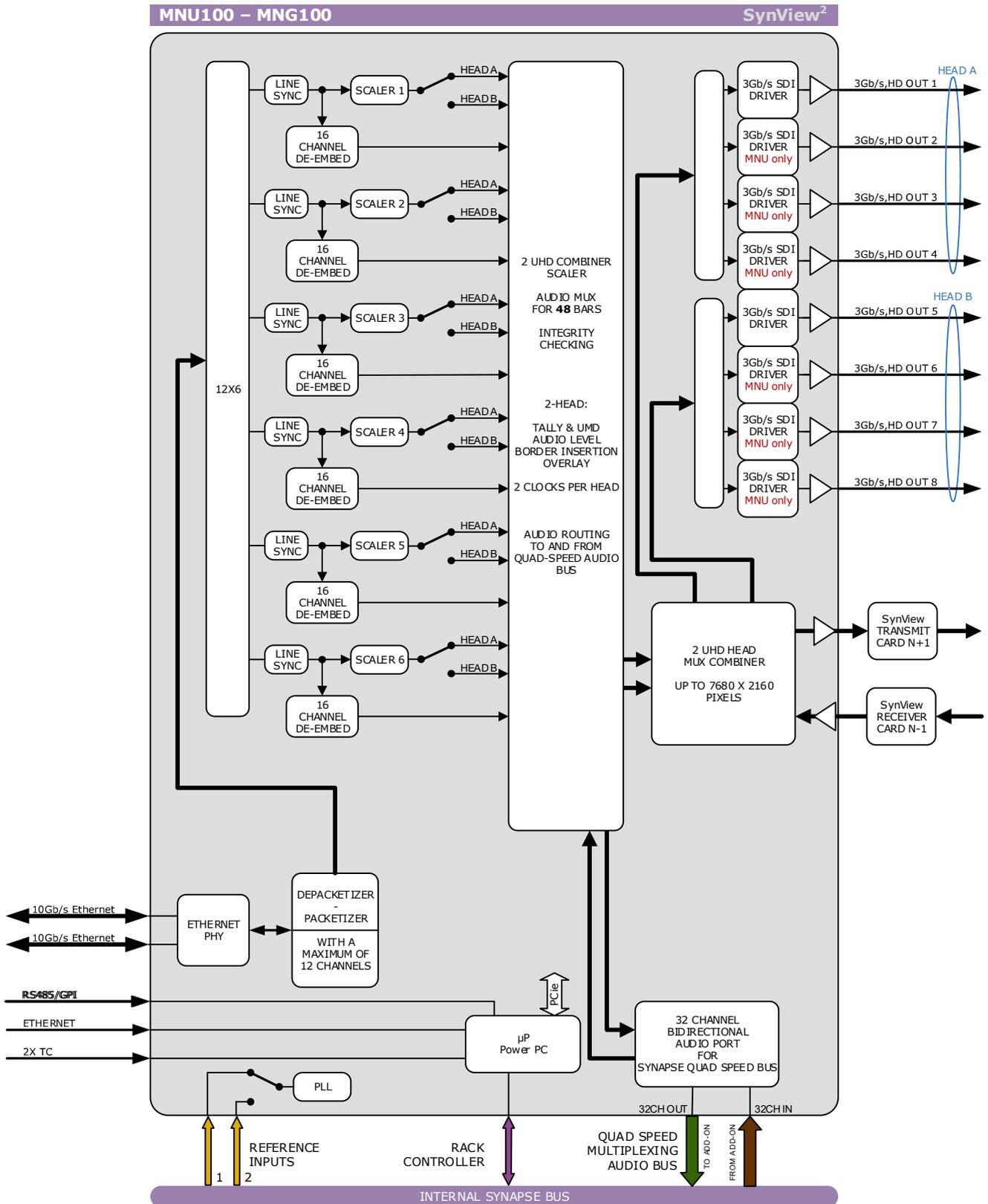
The Address | Together with the message string or the tag, the slot number or address of the card is relevant to be able to assign the event to a certain card.

9 LED Indication

| | |
|----------------------------------|--|
| Error LED | The error LED indicates an error if the internal logic of the HQW200 card is not configured properly, or when there is a hardware failure. |
| Input_1 LED ~ Input_6 LED | These LED indicates the presence of a valid SDI (SD or HD) video input signal. |
| Connection LED | This LED illuminates after the card has initialized. The LED lights for 0.5 seconds each time a card is connected. |
| ANC LED | This LED indicates presence of ancillary data (like ATC timecode) |

All LED's will illuminate several seconds during start-up.

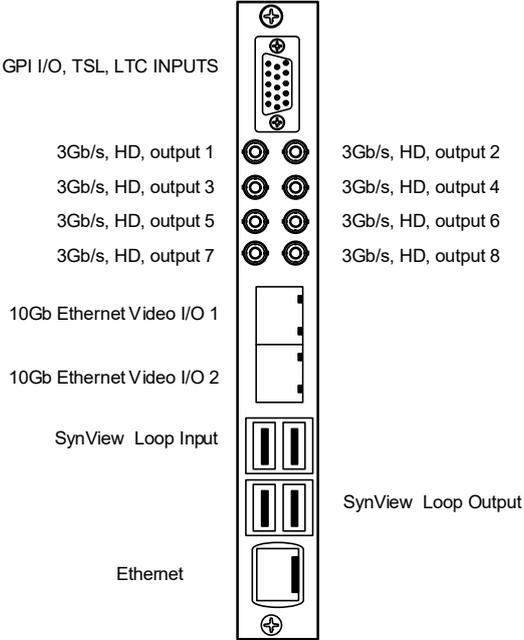
10 Block Schematic



11 Connector Panel MNU-MNG100

The MNU-MNG100 can be used with the following backplanes:

BPH47



Note: GPI's work in a latching mode

Appendix 1: Supported protocols

ASCII

Electrical: RS232 (max 30 meters)

9.6 kbaud

8-bit

2 stop bits.

No parity, X-on/X-off

Commands:

Loading the display : ZDaanabcdefgh<cr>

ZD = command identification “display set”

aa = UMD address in HEX form as selected at the UMD

n = display number (1..n)

abcdefgh = characters for the display

<cr> = carriage return (end and sync character)

Setting the Tally LEDs : ZT aantt<cr>

ZT = command identification “Tally set”

aa = UMD address in HEX form as selected at the UMD

n = display number (1..n)

tt = TALLY led LEFT,RIGHT (0=off,1=on)

<cr> = carriage return (end and sync character)

Adjusting the brightness: ZBaanv<cr>

ZB = command identification “brightness set”

aa = UMD address in HEX form as selected at the UMD

n = display number (1..n)

v= “+” = lighter, “-“ = darker

<cr> = carriage return (end and sync character)

Adjusting Display/Tally Color: ZLaaIcc<cr>

ZL = command identification “display set”

aa = UMD address in HEX form as selected at the UMD

II = display number or tally led –number from left to right

00 1st Display

1 2nd Display

80 1st Tally LED

81 2ND Tally LED

82 3rd Tally LED

83 4th Tally LED

cc = Color-Code

00 Black

11 Green

21 Red

31 Amber

<cr> = carriage return (end and sync character)

Adjusting the display and tally brightness ZSaadb<cr>

ZS = command identification “display and tally brightness”

aa = UMD address in HEX form as selected at the UMD

d = display

bb = Brightness (00..64 HEX notation)
<cr> = carriage return (end and sync character)

TSLv3.1

This protocol sets out to define the method of communication between a TSL controller and peripheral devices on a multi-drop device bus. The protocol described is for one way communication only. It details physical layer, link layer and message structure.

Electrical:

RS 422/ RS 485

8 bit data

1 stop

even parity

38k4 baud

Dynamic UMD Protocol:

Header (1 byte) : Display address(0-126) + 80 hex

(control byte and display data will be sent)

Control (1 byte) : bit0 = tally1 (1=on, 0=off)

bit1 = tally2 (1=on, 0=off)

bit2 = tally3 (1=on, 0=off)

bit3 = tally4 (1=on, 0=off)

bit4-5 = brightness data

bit 4=0,bit 5=0 (0 brightness)

bit 4=0,bit 5=1 (1/7 brightness)

bit 4=1,bit 5=0 (1/2 brightness)

bit 4=1,bit 5=1 (full brightness)

bit 6 = reserved (clear to 0)

bit 7 = cleared to 0

Display Data (16bytes) = 16 displayable ASCII characters in the range 20 hex to 7E hex. All 16 characters must be sent.

Single Dynamic Displays

For 8 character displays only the first 8 characters of the display data are used, the remaining 8 are needed just for padding. Only tallies 1&2 are use for single displays.

Dual Dynamic Displays

Dual 8 character displays are treated as a single display of 16 characters, the first 8 characters for the left-hand side and the second 8 characters for the right-hand side. Tallies 1&2 are for the left display and tallies 3&4 for the right display.

Triple/Quad Dynamic Displays

These units take two addresses.
Address 1, for display 1, tally 1 & 2
Address 1 for display 2, tally 3 & 4
Address 2 for display 3, tally 5 & 6
Address 2 for display 4, tally 7 & 8

TSLv5

This protocol is a new 16 bit UMD protocol, with no reverse compatibility to previous TSL UMD protocols. The primary points for this protocol to provide over previous versions are as follows:

1. Display addressing up to 65,535 per screen
2. ASCII or Unicode character sets
3. Variable length mnemonics
4. IP based packet communication, with optional wrapper for stream based comms
5. Multiple display updates per packet

Physical Layer

Packets are sent via UDP. Maximum packet length is 2048 bytes. Optionally, the protocol can operate over TCP/IP, or any other byte stream interface, with the following wrapper scheme:

DLE is defined as 0xFE
STX is defined as 0x02

Packet start is delimited by the sequence DLE/STX.

Any occurrence of the DLE character in the packet is byte stuffed to DLE/DLE.

Any byte count fields in the packet are not affected by the byte stuffing.

Message Format

16 bit values are sent as little-endian, i.e. LSB/MSB.

The packet is defined as follows:

PBC / VER / FLAGS / SCREEN / (<DMSG> (/ <DMSG>)...) or (SCONTROL)

PBC (16 bit):

Total byte count of following packet

VER (8 bit):

Minor version number (e.g. V5.00, VER = 0). Note this byte can be used as versioning control for the following definitions. Whilst any future changes to this protocol will aim to be backward compatible, this is not guaranteed.

FLAGS (8bit):

Defined as follows:

Bit 0: Clear for ASCII based strings in packet, set for Unicode

UTF-16LE

Bit 1: If set, data after SCREEN is screen control data (SCONTROL) – otherwise it's display message data (DMSG)
Bit 2-7: Reserved (clear to 0)

SCREEN (16 bit):

Primary index for use where each screen entity would have display indices (defined below) starting from 0.
Index 0xFFFF is reserved as a "Broadcast" to all screens.
If not used, set to 0.

Display Message (<DMSG>) Definition

This message definition is sent per display, and there can be several in a packet (up to max packet length). Constructed as follows:

INDEX / CONTROL / (LENGTH / TEXT) or
(CONTROL DATA)

INDEX (16 bit):

The 0 based address of the display, up to 65534 (0xFFFFE).
Address 0xFFFF is reserved as a "Broadcast" address to all displays.

CONTROL (16 bit):

Display control and tally data as follows:

Bit 0-1: RH Tally Lamp state

Bit 2-3: Text Tally state

Bit 4-5: LH Tally Lamp state

Bit 6-7: Brightness value (range 0-3)

Bit 8-14: Reserved (clear to 0)

Bit 15: Control Data: following data to be interpreted as Control data rather than Display data when set to 1.

2 Bit Tally values are:

0 = OFF, 1 = RED, 2 = GREEN, 3 = AMBER.

Display Data: (CONTROL bit 15 is cleared to 0)

LENGTH (16 bit):

Byte count of following text.

TEXT:

UMD text, format defined by FLAGS byte.

Control Data: (CONTROL bit 15 is set to 1)

Not defined in this version of protocol.

Screen control (SCONTROL) Definition (FLAGS bit 1 set to 1)

Not defined in this version of protocol.

Appendix 2: Timezones

Africa

Africa/Abidjan
Africa/Accra
Africa/Addis_Ababa
Africa/Algiers
Africa/Asmara
Africa/Asmera
Africa/Bamako
Africa/Bangui
Africa/Banjul
Africa/Bissau
Africa/Blantyre
Africa/Brazzaville
Africa/Bujumbura
Africa/Casablanca
Africa/Ceuta
Africa/Conakry
Africa/Dakar
Africa/Dar_es_Salaam
Africa/Djibouti
Africa/Douala
Africa/El_Aaiun
Africa/Freetown
Africa/Gaborone
Africa/Harare
Africa/Johannesburg
Africa/Juba
Africa/Kampala
Africa/Khartoum
Africa/Kigali
Africa/Kinshasa
Africa/Lagos
Africa/Libreville
Africa/Lome
Africa/Luanda
Africa/Lubumbashi
Africa/Lusaka
Africa/Malabo
Africa/Maputo
Africa/Maseru
Africa/Mbabane
Africa/Mogadishu
Africa/Monrovia
Africa/Nairobi
Africa/Ndjamena
Africa/Niamey
Africa/Nouakchott
Africa/Ouagadougou
Africa/Porto-Novo
Africa/Sao_Tome
Africa/Timbuktu
Africa/Tripoli
Africa/Tunis
Africa/Windhoek

America

America/Adak
America/Anguilla
America/Antigua
America/Araguaina
America/Argentina
America/Argentina/Buenos_Aires
America/Argentina/Catamarca
America/Argentina/ComodRivada
via
America/Argentina/Cordoba
America/Argentina/Jujuy
America/Argentina/La_Rioja
America/Argentina/Mendoza
America/Argentina/Rio_Gallegos
America/Argentina/Salta
America/Argentina/San_Juan
America/Argentina/San_Luis
America/Argentina/Tucuman
America/Argentina/Ushuaia
America/Aruba
America/Asuncion
America/Atikokan
America/Atka
America/Bahia
America/Bahia_Banderas
America/Barbados
America/Belem
America/Belize
America/Blanc-Sablon

America/Boa_Vista
America/Bogota
America/Boise
America/Buenos_Aires
America/Cambridge_Bay
America/Campo_Grande
America/Cancun
America/Catamarca
America/Cayenne
America/Cayman
America/Chihuahua
America/Coral_Harbour
America/Cordoba
America/Costa_Rica
America/Creston
America/Cuiaba
America/Curacao
America/Danmarkshavn
America/Dawson
America/Dawson_Creek
America/Detroit
America/Dominica
America/Edmonton
America/Eirunepe
America/El_Salvador
America/Ensenada
America/Fort_Nelson
America/Fort_Wayne
America/Fortaleza
America/Glace_Bay
America/Godthab
America/Goose_Bay
America/Grand_Turk
America/Grenada
America/Guadeloupe
America/Guatemala
America/Guayaquil
America/Guyana
America/Halifax
America/Havana
America/Hermosillo
America/Indiana
America/Indiana/Indianapolis
America/Indiana/Knox
America/Indiana/Marengo
America/Indiana/Petersburg
America/Indiana/Tell_City
America/Indiana/Vevay
America/Indiana/Vincennes
America/Indiana/Winamac
America/Indianapolis
America/Inuvik
America/Iqaluit
America/Jamaica
America/Jujuy
America/Juneau
America/Kentucky
America/Kentucky/Louisville
America/Kentucky/Monticello
America/Knox_IN
America/Kralendijk
America/La_Paz
America/Lima
America/Louisville
America/Lower_Princes
America/Maceio
America/Managua
America/Manaus
America/Marigot
America/Martinique
America/Matamoros
America/Mazatlan
America/Mendoza
America/Menominee
America/Merida
America/Metlakatla
America/Mexico_City
America/Miquelon
America/Moncton
America/Monterrey
America/Montevideo
America/Montreal
America/Montserrat
America/Nassau
America/Nipigon

America/Nome
America/Noronha
America/North_Dakota
America/North_Dakota/Beulah
America/North_Dakota/Center
America/North_Dakota/New_Sale
m
America/Ojinaga
America/Panama
America/Pangnirtung
America/Paramaribo
America/Phoenix
America/Port-au-Prince
America/Port_of_Spain
America/Porto_Acre
America/Porto_Velho
America/Puerto_Rico
America/Punta_Arenas
America/Rainy_River
America/Rankin_Inlet
America/Recife
America/Regina
America/Resolute
America/Rio_Branco
America/Rosario
America/Santa_Isabel
America/Santarem
America/Santiago
America/Santo_Domingo
America/Scoresbysund
America/Shiroke
America/Sitka
America/St_Barthelemy
America/St_Johns
America/St_Kitts
America/St_Lucia
America/St_Thomas
America/St_Vincent
America/Swift_Current
America/Tegucigalpa
America/Thule
America/Thunder_Bay
America/Tijuana
America/Toronto
America/Tortola
America/Vancouver
America/Virgin
America/Whitehorse
America/Winnipeg
America/Yakutat
America/Yellowknife

Antarctica

Antarctica/Casey
Antarctica/Davis
Antarctica/DumontDURville
Antarctica/Macquarie
Antarctica/Mawson
Antarctica/McMurdo
Antarctica/Palmer
Antarctica/Rothera
Antarctica/South_Pole
Antarctica/Syowa
Antarctica/Troll
Antarctica/Vostok

Arctic

Arctic/Longyearbyen

Asia

Asia/Aden
Asia/Almaty
Asia/Amman
Asia/Anadyr
Asia/Aqtou
Asia/Aqtobe
Asia/Ashgabat
Asia/Ashkhabad
Asia/Atyrau
Asia/Baghdad
Asia/Bahrain
Asia/Baku
Asia/Bangkok
Asia/Barnaul
Asia/Beirut
Asia/Bishkek
Asia/Brunei
Asia/Calcutta
Asia/Chita
Asia/Choibalsan
Asia/Chongqing
Asia/Chungking
Asia/Colombo
Asia/Dacca
Asia/Damascus
Asia/Dili
Asia/Dushanbe
Asia/Famagusta
Asia/Gaza
Asia/Harbin
Asia/Hebron
Asia/Ho_Chi_Min
Asia/Hovd
Asia/Irkutsk
Asia/Istanbul
Asia/Jakarta
Asia/Jayapura
Asia/Jerusalem
Asia/Kabul
Asia/Kamchatka
Asia/Kashgar
Asia/Kathmandu
Asia/Katmandu
Asia/Khandyga
Asia/Kolkata
Asia/Krasnoyarsk
Asia/Kuala_Lumpur
Asia/Kuching
Asia/Kuwait
Asia/Macao
Asia/Macau
Asia/Magadan
Asia/Makassar
Asia/Manila
Asia/Muscat
Asia/Nicosia
Asia/Novokuznetsk
Asia/Novosibirsk
Asia/Omsk
Asia/Oral
Asia/Phnom_Penh
Asia/Pontianak
Asia/Pyongyang
Asia/Qatar
Asia/Qyzylorda
Asia/Rangoon
Asia/Riyadh
Asia/Saigon
Asia/Sakhalin
Asia/Samarkand
Asia/Seoul
Asia/Shanghai
Asia/Singapore
Asia/Srednekolymsk
Asia/Taipei
Asia/Tashkent
Asia/Tbilisi
Asia/Tehran
Asia/Tel_Aviv
Asia/Thimbu
Asia/Thimphu
Asia/Tomsk
Asia/Ujung_Pandang
Asia/Ulaanbaatar
Asia/Ulan_Bator
Asia/Urumqi
Asia/Ust-Nera
Asia/Vientiane
Asia/Vladivostok
Asia/Yakutsk
Asia/Yangon
Asia/Yekaterinburg
Asia/Yerevan

Atlantic

Atlantic/Azores
Atlantic/Bermuda
Atlantic/Canary
Atlantic/Cape_Verde
Atlantic/Faeroe

Atlantic/Faroe
Atlantic/Jan_Mayen
Atlantic/Madeira
Atlantic/Reykjavik
Atlantic/South_Georgia
Atlantic/St_Helena
Atlantic/Stanley

Australia

Australia/ACT
Australia/Broken_Hill
Australia/Canberra
Australia/Currie
Australia/Eucla
Australia/Hobart
Australia/LHI
Australia/Lindeman
Australia/Lord_Howe
Australia/Melbourne
Australia/NSW
Australia/North
Australia/Perth
Australia/Queensland
Australia/South
Australia/Tasmania
Australia/Victoria
Australia/West
Australia/Yancowinna

Brazil

Brazil/Acre
Brazil/DeNoronha
Brazil/East
Brazil/West

Canada

Canada/Atlantic
Canada/Central
Canada/East-Saskatchewan
Canada/Eastern
Canada/Mountain
Canada/Newfoundland
Canada/Pacific
Canada/Saskatchewan
Canada/Yukon

Chile

Chile/Continental
Chile/EasterIsland

Europe

Europe/Amsterdam
Europe/Andorra
Europe/Astrakhan
Europe/Athens
Europe/Belfast
Europe/Belgrade
Europe/Berlin
Europe/Bratislava
Europe/Brussels
Europe/Bucharest
Europe/Budapest
Europe/Busingen
Europe/Chisinau
Europe/Copenhagen
Europe/Dublin
Europe/Gibraltar
Europe/Guernsey
Europe/Helsinki
Europe/Isle_of_Man
Europe/Istanbul
Europe/Jersey
Europe/Kaliningrad
Europe/Kiev
Europe/Kirov
Europe/Lisbon
Europe/Ljubljana
Europe/Luxembourg
Europe/Madrid
Europe/Malta
Europe/Mariehamn
Europe/Minsk
Europe/Monaco
Europe/Nicosia
Europe/Oslo

Europe/Podgorica
Europe/Prague
Europe/Riga
Europe/Rome
Europe/Samara
Europe/San_Marino
Europe/Sarajevo
Europe/Saratov
Europe/Simferopol
Europe/Skopje
Europe/Sofia
Europe/Stockholm
Europe/Tallinn
Europe/Tirane
Europe/Tiraspol
Europe/Ulyanovsk
Europe/Uzhgorod
Europe/Vaduz
Europe/Vatican
Europe/Vienna
Europe/Vilnius

Europe/Volgograd
Europe/Warsaw
Europe/Zagreb
Europe/Zaporozhye
Europe/Zurich

Indian

Indian/Antananarivo
Indian/Chagos
Indian/Christmas
Indian/Cocos
Indian/Comoro
Indian/Kerguelen
Indian/Mahe
Indian/Maldives
Indian/Mauritius
Indian/Mayotte
Indian/Reunion

Mexico

Mexico/BajaNorte

Mexico/BajaSur
Mexico/General

Pacific

Pacific/Apia
Pacific/Auckland
Pacific/Bougainville
Pacific/Chatham
Pacific/Chuuk
Pacific/Easter
Pacific/Efate
Pacific/Enderbury
Pacific/Fakaofu
Pacific/Fiji
Pacific/Funafuti
Pacific/Galapagos
Pacific/Gambier
Pacific/Guadalcanal
Pacific/Guam
Pacific/Johnston
Pacific/Kiritimati

Pacific/Kosrae
Pacific/Kwajalein
Pacific/Majuro
Pacific/Marquesas
Pacific/Midway
Pacific/Nauru
Pacific/Niue
Pacific/Norfolk
Pacific/Pago_Pago
Pacific/Palau
Pacific/Pitcairn
Pacific/Pohnpei
Pacific/Ponape
Pacific/Port_Moresby
Pacific/Rarotonga
Pacific/Saipan
Pacific/Samoa
Pacific/Tahiti
Pacific/Tarawa
Pacific/Tongatapu
Pacific/Truk

Pacific/Wake
Pacific/Wallis
Pacific/Yap

US

US/Alaska
US/Aleutian
US/Arizona
US/Central
US/East-Indiana
US/Eastern
US/Hawaii
US/Indiana-Starke
US/Michigan
US/Mountain
US/Pacific
US/Samoa

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