



sa1- safeEyes

SDI safe area generator

user manual

Table of Contents

1 System Overview	4
1.1 The SA-1 signal processing	5
1.2 Applications for the SA-1	5
1.3 Associated Equipment for the SA-1	6
1.3.1 Chassis Types	6
1.3.2 Control Surfaces	6
2 Installation	8
2.1 Installation of the SA-1 product	8
2.2 Installing the SA-1 into a flexiBox.....	8
2.3 Connecting Video to an SA-1	8
2.4 Connecting Panels to the SA-1	9
3 Operation	10
3.1 Manual control of the SA-1.....	10
3.2 Automation Control of the SA-1	10
3.3 Operational Menus for the SA-1.....	11
4 Technical Appendix.....	23
4.1 Technical Specification for the SA-1	23
4.2 Jumpering the I-BUS (CAN-BUS) Termination	23

Table of Figures

Figure 1-1 The SA-1 safe area generator PCB.....	4
Figure 1-2 Block diagram of SA-1	5
Figure 1-3 flexiBox with flexiPanel fitted.....	6
Figure 1-4 FP-10 desktop modular panel.....	6
Figure 1-5 FP-9 1RU modular panel	7
Figure 2-1 Connections for a SA-1 module showing internal links	8
Figure 2-2 I-Bus Connections and Termination.....	9
Figure 4-1 Location Of I-Bus Termination Link.....	23

1 System Overview

The SA-1 is a full-featured Safe area Generator system compatible with 270Mbit Serial Digital formats. The unit has full internal 10 Bit processing.

The main features of the SA-1 are as follows:

- Provides two generators for Safe area, Safe Caption, Digital and analogue edge in all the current Screen formats (4:3 and 16:9) including "Shoot to protect" with Thick/Thin line and Shade and full blank options.
- Provides one generator for Film Blanking positions providing optional on-screen "White lines", or full "Black" Blanking.
- Provides one generator for Centre Indication, H and V electronic line-up cursors, Box generation with Aspect ratio Readout for 4:3 or 16:9 targets, Analogue blanking, Text Height Measurement, Line and Pixel strobe with readout of line and pixel number.
- Provides an on-screen out of gamut indicator indicating parts of the picture that are out of gamut.
- 625 and 525 line standards Auto sensing.
- 8 User Memories.



Figure 1-1 The SA-1 safe area generator PCB.

1.1 The SA-1 signal processing

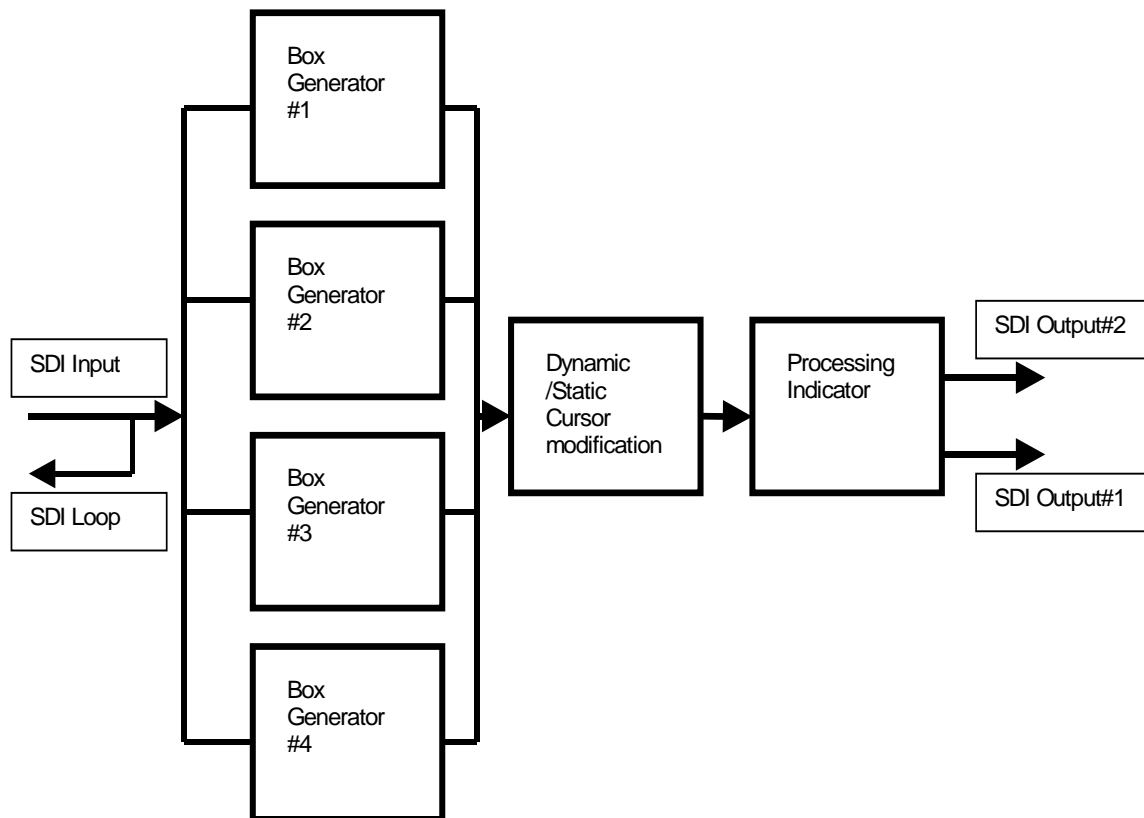


Figure 1-2 Block diagram of SA-1

This unit consists of 4 generic Box indicators, which do all the on screen lines, shading and blanking. Consequently, only four systems can be "on" at any one time. The lines on all four generators can be either "static" or "dynamic". "Static" lines are white lines "Dynamic" lines change their level according to the picture background and so can make them more visible against a white background.

This unit also has a colour space converter, which is used to calculate and indicate parts of the picture that would be processed if the system were put through a legaliser.

1.2 Applications for the SA-1

Applications for the SA-1 include the following:

- Post-production use for deciding where captions and action are safe. (Particularly in a mixed 4:3 and 16:9 environment).
- Evaluating text height for commercials
- Checking Film aspect ratios

1.3 Associated Equipment for the SA-1

The SA-1 is a module and requires both a chassis and a control surface to function.

1.3.1 Chassis Types

- **flexiBox** is a 1RU chassis. The order code is FB-9. This will hold a maximum of 6 SA-1 Modules with “Hot Swap” redundant PSU option and “Hot Swap” SA-1 modules.
- **maxiBox** is an alternative low cost 1RU chassis. The order code is MX-9. This also will hold a maximum of 6 SA-1 modules but it has no redundant PSU option and the SA-1 units must be factory fitted.



Figure 1-3 flexiBox with flexiPanel fitted

1.3.2 Control Surfaces

- **flexiPanel** is a 1RU control surface that fits on the Front of a 1RU flexiBox. The order code is FP-9. A FlexiPanel can also be used in conjunction with a miniBox, in this case the extra accessory (Order code RR-9) will be required
- **FP-10** is a desk mounting control surface (Order code FP-10). This unit is a modular unit which can be used in conjunction with the units below.



Figure 1-4 FP-10 desktop modular panel

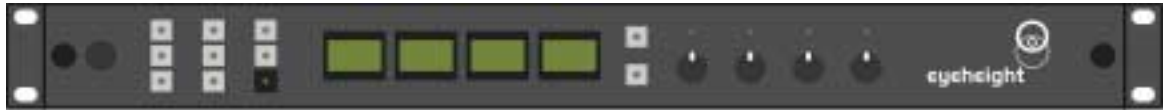


Figure 1-5 FP-9 1RU modular panel

2 Installation

2.1 Installation of the SA-1 product

If this unit is already pre-installed in a flexiBox (FB-9), or a maxiBox, with either a local or a remote panel from the factory then refer to the "Hardware Installation Guide" which will be enclosed with the system. If this unit is pre-installed in a miniBox (MB-9), then also refer to the "Hardware Installation Guide" which will be enclosed with the system

If this unit has been ordered separately, we assume here that you already have a flexiBox system with a Flexipanel and that the flexiBox has at least two spare slots above each other for the SA-1 card.

2.2 Installing the SA-1 into a flexiBox

To install the SA-1 into a flexiBox it is desirable (but not necessary) to power down the flexiBox. Follow these instructions.

On the rear of the flexiBox are 6 slots for Products. Remove any pair of spare blanking plates one above another. There are 2 off M2.5 Screws, which require unfastening for each blanking plate.

Slide the Product PCB into the spare slots and firmly push it "home".

Use the two thumbscrews to fasten the unit in place. Take care that the ribbon cable for the upper circuit board stays attached to the lower board.

Now refer to the "GeNETics User Guide". If your system consists of a single flexiBox with a single flexiPanel then refer to the section titled "flexiPanel Auto Set-up". If your system is part of a network with more than one flexiPanel then refer to the section titled "flexiPanel Manual Set-up". This will guide you through acquiring your product as a device on the flexiPanel.

2.3 Connecting Video to an SA-1

A Typical Connection diagram for the SA-1 is shown below. All signals are SDI:

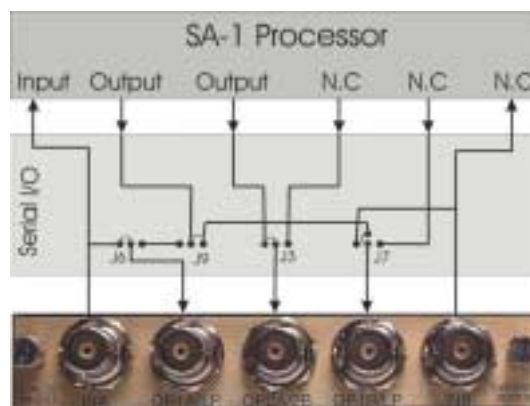


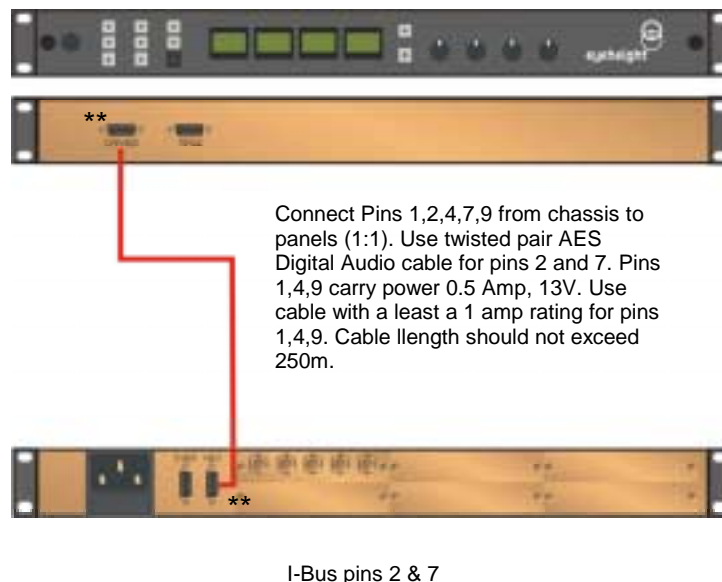
Figure 2-1 Connections for a SA-1 module showing internal links

The SA-1 Module has a number of user configurable jumpers which can change the function of the 5 SDI BNC Connectors. These jumpers are found close to the BNC Connectors.

2.4 Connecting Panels to the SA-1

The SA-1 may be operated using a FP-9 Flexipanel locally mounted. For a more operational environment the SA-1 may be supplied with a desk mounting FP-10 unit and also possible a VP-10 Desk mounting Video T-Bar manual transition unit. For detailed information on connecting remote panels refer to the section "Connection of Remote Panels to a flexiBox" in the geNETics Hardware Installation Guide.

Below is shown a typical system consisting of an SA-1 in a flexiBox controlled by a remote FP-9.



** The I-BUS Network requires terminating with 100 Ohms at each extreme end of the network. Ensure that this is done either by an external 100 ohm resistor OR ONE Panel/Product at each end has the termination set. See the "Genetics User Guide" Under the sections "Flexipanel Power/I-BUS Jumpers". For the 4RU Panels see "4RU Panel (FP-10) Jumpers for I-BUS" and "4RU Panel (VP-10, SW-10, AP-10) Jumpers for I-BUS". Alternatively The termination can be set on a Product (ie the MW-2 module). Information about this is given in this manual.

Figure 2-2 I-Bus Connections and Termination

N.B. From 1/10/02 Eyeheight introduced a change in the flexiBox Chassis. Most versions now have two 9 way connectors on the rear labelled "I-Bus" and "D-Bus". The "I-Bus" connector is the same as the previously labelled "Can-B" connector. Although a maxiBox is shown in this diagram the same arrangement applies for a flexiBox chassis.

3 Operation

3.1 Manual control of the SA-1

Manual Control of the SA-1 is done using one or more of the following control surfaces:

- The 1RU FP-9 Flexipanel.
- The FP10 Desk mounting Panel

The FP-9 and the FP-10 have identical manual control systems. (The FP-10 is simply a desktop version of the FP-9). The SA-1 is, as are all genetics modules, controlled using a set of MENUS. Each of these menus contains up to 3 parameters that are adjusted using the rotary digipots. The Menus define all of the adjustable operational parameters in the SA-1. Pressing the rotary digipots brings the parameter to its default value. Device selection is done using the device select switches which, when pressed, will offer the name of the device in the LCD Window. Modules can be acquired and then de-acquired using the set-up switch. For a full description of the operation philosophy of the geNETics system refer to the “geNETics User Guide” (section “Operation of the flexiPanel”)

A full list of the Menus and their functions are given in section 3 of this chapter.

3.2 Automation Control of the SA-1

Automation of the geNETics products is achieved via an RS422 port.** This port is marked RS422 on the rear of a flexiBox. For the port to work a flexiPanel MUST be connected locally on the front of the flexiBox.

Automation control of the SA-1 can be done using two protocol methods:

- geNETics Automation Protocol.
- PresTX Automation Protocol.

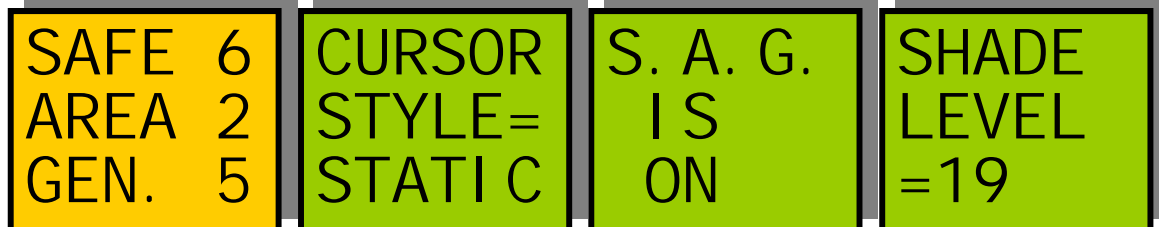
Genetics protocol is described in detail in the “GeNETics User Guide” section titled “Automation Protocol on the geNETics Platform”. The menu list in section 3 of this chapter contains the data information for the protocol.

PresTX Automation Protocol is used only for the PresTX Presentation Mixer and channel branding system. In this case an AU-2 Automation card is also required. Refer to the PresTX Product manual

**On most flexiBoxes later than 1/10/02 the RS422 port has been replaced by a “D-Bus” Port. The D-Bus port is for High Speed data transfer and is not used for serial control. In order to achieve serial control of any products on an I-Bus network Eyeheight Ltd have developed a RS232→I-bus converter “dongle”, (DG-9) which enables greater flexibility of products on the I-Bus network whilst using the same protocols as the RS422 port. Please refer to the “User guide for the DG-9 eyeheight dongle and set-up software.

3.3 Operational Menus for the SA-1

Menu 00-03: Top level controls



Menu Num.	Heading	Automation	Function
0	Unit Title (Safe Area Gen.)	None	
1	Cursor Style	0=static 1=dynamic	The cursors can either be “white”, this is “static” mode, or vary themselves according to the background picture. The latter will maintain visibility against white backgrounds. This is “dynamic” mode.
2	Cage ON or OFF	0=off 1=on	This will switch in and out the system as a whole, effectively putting it into bypass mode. The displays will "Dull" when this happens.
3	Shade Level	1→1000	This sets the darkness of the “shaded” cursor styles. This value is between 1 (no shade) and 99 (heavy shade)

Menu 04-07: Main Safe Areas



Menu Num.	Heading	Automation	Function
4	Safe Area 1 on-off	On Off [0→1]	This Switches on and off the currently selected area. Pressing

			the "Red" switch next to this one and adjusting the rotary digipots with the lighted green LED's chooses the Selected area.
5	Area selected by menu#4	<p><u>Digipot A</u> S.Action S.Capt. Dig Edge An Edge [0→3]</p> <p><u>Digipot B</u> 4:3 16:9 16p4:3 16p149 43p16:9 [0→4]</p> <p><u>Digipot C</u> Thin Thick Shade Black [0→3]</p>	<p>When this button is pressed to "Green". The Three-line display in the window indicates the three options, which can be changed by adjusting the three rotary digipots A, B and C.</p> <p>"A" Determines the basic Function</p> <ul style="list-style-type: none"> • Selects "Safe Action" option • Selects "Safe Caption" option • Selects "Digital Edge" option • Selects the "An. Edge" option <p>"B" Determines the Screen Format</p> <ul style="list-style-type: none"> • Standard 4:3 Screen • Standard 16:9 Screen • 16:9 Shoot to protect 4:3 • 16:9 Shoot to protect 14:9 (*) • 4:3 Shoot to protect 16:9 (*) <p>(*) -- Not available in 525</p> <p>"C" Determines the Style of Indicate</p> <ul style="list-style-type: none"> • Thin White lines are used • Thick White lines are used • Shade is used for "danger area" • Black is used for "danger area"
6	Safe Area 2 on-off	On Off [0→1]	This Switches on and off the currently selected area. Pressing the "Red" switch next to this one and adjusting the rotary digipots with the lighted green LED's chooses the Selected area.
7	Area selected by menu#6		When this button is pressed to "Green". The Three-line display in the window indicates the three options, which can be changed by adjusting the three rotary digipots A, B and C.

		<u>Digipot A</u> S.Action S.Capt. Dig Edge An Edge [0→3]	<p>“A” determines the basic Function</p> <ul style="list-style-type: none"> • Selects "Safe Action" option • Selects "Safe Caption" option • Selects "Digital Edge" option • Selects the "An. Edge" option
		<u>Digipot B</u> 4:3 16:9 16p4:3 16p149 43p16:9 [0→4]	<p>“B” Determines the Screen Format.</p> <ul style="list-style-type: none"> • Standard 4:3 Screen • Standard 16:9 Screen • 16:9 Shoot to protect 4:3 • 16:9 Shoot to protect 14:9 (*) • 4:3 Shoot to protect 16:9 (*) <p>(*) -- Not available in 525</p>
		<u>Digipot C</u> Thin Thick Shade Black [0→3]	<p>“C” Determines the Style of Indicate</p> <ul style="list-style-type: none"> • Thin White lines are used • Thick White lines are used • Shade is used for "danger area" • Black is used for "danger area"

Menu 08-11: Film Areas, gamut indicator.

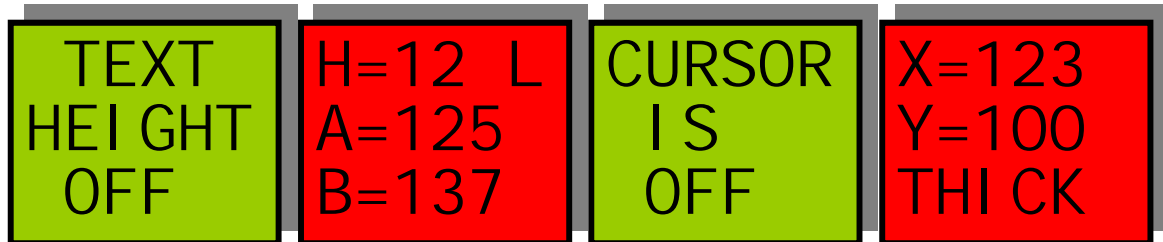


Menu Num.	Heading	Automation	Function
8	Film area on-off.	0=off 1=on	This Switches on and off the currently selected Film Blanking area. The Selected area is chosen by pressing the "Red" switch next to this one and adjusting the rotary digipots with the green LED's which are alight.

9	Select Film area	<p><u>Digipot A</u> 1.55s 1.66s 1.78s 1.85s 2.05s 2.35s 1.33w 1.55w 1.66w 1.85w 2.05w 2.35w [0→11]</p> <p><u>Digipot B</u> Line offset [0→575]</p> <p><u>Digipot C</u> Thin Thick Shade Black [0→3]</p>	<p>When this button is pressed to "Green". The Three-line display in the window indicates the three options, which can be changed by adjusting the three rotary digipots A, B and C.</p> <p>"A" Determines the basic Function</p> <ul style="list-style-type: none"> • 14:9 AR viewed on a 4:3 Glass • Super16 viewed on a 4:3 Glass • 16:9 AR viewed on a 4:3 Glass • 1.85 AR viewed on a 4:3 Glass • 2.05 AR viewed on a 4:3 Glass • Cinemascope Vw'd on 4:3 Glass • 4:3 Viewed on a 16:9 Glass • 14:9 Viewed on a 16:9 Glass • Super16 Viewed on a 16:9 Glass • 1.85 Viewed on a 16:9 Glass • 2.05 Viewed on a 16:9 Glass • Cinemascope Vw'd on 16:9 Glass <p>Digipot "B" determines the position of the frame vertically in line increments. These frames are often offset to include subtitles or teletext.</p> <p>"C" Determines the type of Indication</p> <ul style="list-style-type: none"> • Thin White lines are used • Thick White lines are used • The unused area is shaded • The unused area is blanked
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10	Gamut Warning	0=off 1=on	This approximates the out of gamut parts of the picture. This is set to +0.5% above 0.7V RGB gamut and 0.5% below 0V RGB gamut with respect to the analogue domain.
11	Out of Gamut Colour Out of Gamut Flash Warning	<u>Digipot A</u> Black Blue Red Purple Green Cyan Yellow White [0→7] <u>Digipot B</u> Steady Flash [0→1]	When this button is pressed to "Green". The Three-line display in the window indicates the two options, which can be changed by adjusting the two rotary digipots A and B. This is the colour used to fill in the illegal parts of the picture in "Show" or "Flash" indicates modes. <ul style="list-style-type: none"> • Gamut Indication is steady. • Gamut Indication flashes.

Menu 12-15: Text height measure and cursor activation.



Menu Num.	Heading	Automation	Function
12	Text Height Measurement	0=off 1=on	This activates the text height measurement cursors. These can be adjusted using menu 13
13	Top Cursor Adjustment Bottom Cursor Adjustment The Top line of the	<u>Digipot A</u>	When this button is pressed to "Green". The Three-line display in the window indicates the two options, which can be changed by adjusting the two rotary digipots A and B. "A" is position of the top cursor in

	Window indicates the text height in lines. This INCLUDES the cursor width. (I.e. a text height of 2 lines has NO gap in between the cursors.	0→575 [0→575] <u>Digipot B</u> 0→575 [0→575]	line increments “B” is position of the bottom cursor in line increments
14	Horizontal and vertical cursors	Off On [0→1]	This activates the vertical and horizontal line-up cursors.
15	Horizontal and vertical adjustment of cursors in menu#14 and Cursor style.	<u>Digipot A</u> Horiz' Position [0→359] <u>Digipot B</u> Vertical Position [0→288] <u>Digipot C</u> Thin Thick [0→1]	When this button is pressed to "Green". The Three-line display in the window indicates the three options, which can be changed by adjusting the two rotary digipots A, B and C. “A” adjusts the horizontal position of the cursors from the centre of picture. “B” adjusts the vertical position of the cursors from the centre of picture. “C” selects between thick and thin line cursors.

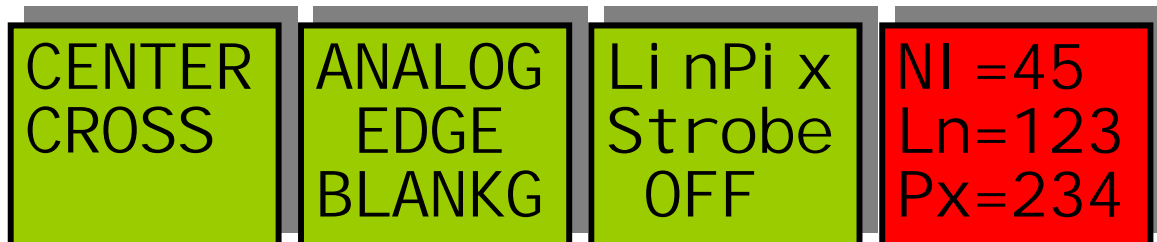
Menu 16-19: User defined box.

USER BOX OFF	SI DES L=123 R=456	TopBot T=100 B=200	Rati o s1. 45 w2. 23
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Menu Num.	Heading	Automation	Function
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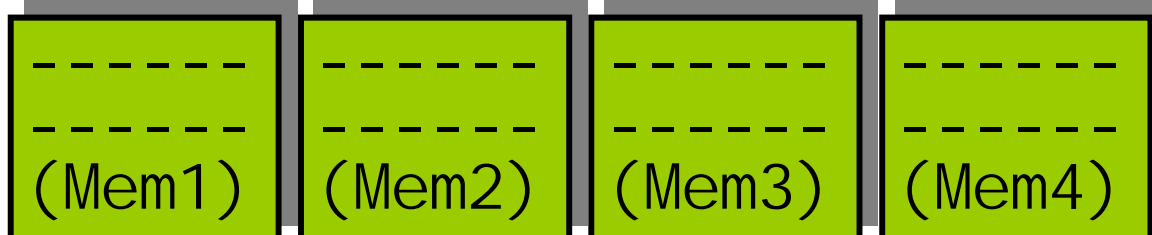
16	User Defined Box with Aspect Ratio Readout.	0=off 1=on	Activates the User Defined Box Generator.
17	Position of the sides in the User Defined box in activated by menu#17	<u>Digipot A</u> [0→719] <u>Digipot B</u> [0→719]	When this button is pressed to "Green". The Three-line display in the window indicates the two options, which can be changed by adjusting the two rotary digipots A and B. "A" defines the position of the LHS "B" defines the position of the RHS
18	Position of the top and bottom of the User Defined box in activated by menu#17	<u>Digipot A</u> [0→575] <u>Digipot B</u> [0→575]	When this button is pressed to "Green". The Three-line display in the window indicates the two options, which can be changed by adjusting the two rotary digipots A and B. "A" defines the position of the Top "B" defines the position of Bottom
19	Aspect Ratio Readout (Note the numbers shown here are fictitious!)	No Adj	This gives readout of the Aspect Ratio of the user-defined box. There are two readouts the readout prefixed by the "s" is the AR when the picture is viewed on a 4:3 monitor. The readout prefixed by the "w" is the AR when the picture is viewed on a 16:9 monitor.

Menu 20-23: Centre-edge and line-pixel strobe tools.



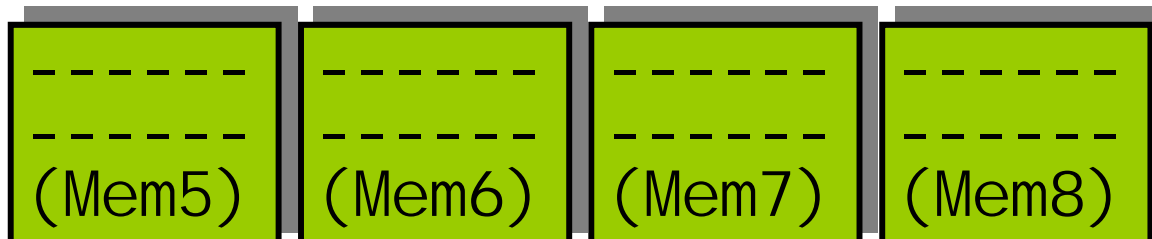
Menu Num.	Heading	Automation	Function
20	Picture Centre	Cross Square Dot Off [0→3]	This Activates the centre position of the screen indicator. It has three styles as shown (left).
21	Edge Blanking	Digital Analog [0→1]	This activates analogue side blanking. Digital Blanking is effectively edge Blanking Off.
22	Line and Pixel Strobe	Off On [0→1]	This activates the line and pixel strobe lines. This is used to strobe out TV Lines and Pixel positions.
23	Line and pixel Strobe Adjustment and Readouts.	<u>Digipot A</u> 0→575 [0→575] <u>Digipot B</u> 0→719 [0→719]	When this button is pressed to "Green". The Three-line display in the window indicates the two options, which can be changed by adjusting the two rotary digipots A and B. "A" strobos a line number. This is shown in the readout as NI (Non Interlaced between 0→575[*]) and also as Ln (Television Line number 1→625[*]) [*] 0→487 and 1→525 for 525 line systems "B" strobos out a pixel number. (Note that the pixel number is represented from 0→719, this is often specified as a number from 1→720. If it is specified in this way, add +1 to the above readout)

Menu 24-27: Memory Controls



Menu Num.	Heading	Automation	Function
24	MEM1	1=Recall	Pressing this will recall Memory number 1. User Names can be programmed in to the memories using a keyboard. See "geNETics User guide", section "Giving product Memories names"
25	MEM2	1=Recall	Pressing this will recall Memory number 2.
26	MEM3	1=Recall	Pressing this will recall Memory number 3.
27	Back	1=Recall	Pressing this will recall Memory number 4.

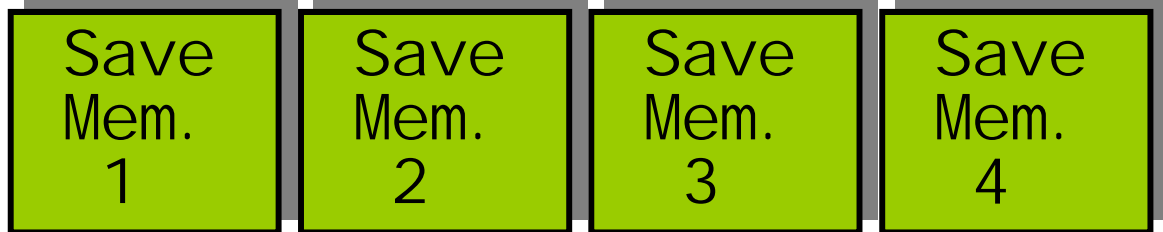
Menu 28-31: Memory Controls



Menu Num.	Heading	Automation	Function
28	MEM4	1=Recall	Pressing this will recall Memory number 5.
29	MEM5	1=Recall	Pressing this will recall Memory number 6.

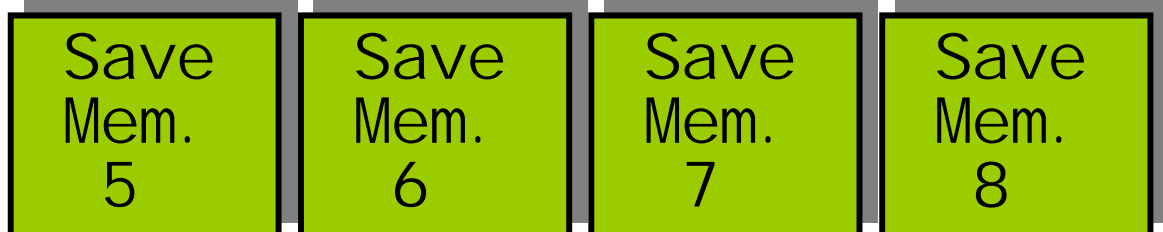
30	MEM6	1=Recall	Pressing this will recall Memory number 7.
31	Back	1=Recall	Pressing this will recall Memory number 8.

Menu 32-35: Memory Controls



Menu Num.	Heading	Automation	Function
32	Save Mem. 1	1= Save	Pressing this will Save Memory number 1.
33	Save Mem. 2	1= Save	Pressing this will Save Memory number 2.
34	Save Mem. 3	1= Save	Pressing this will Save Memory number 3.
35	Back	1= Save	Pressing this will Save Memory number 4.

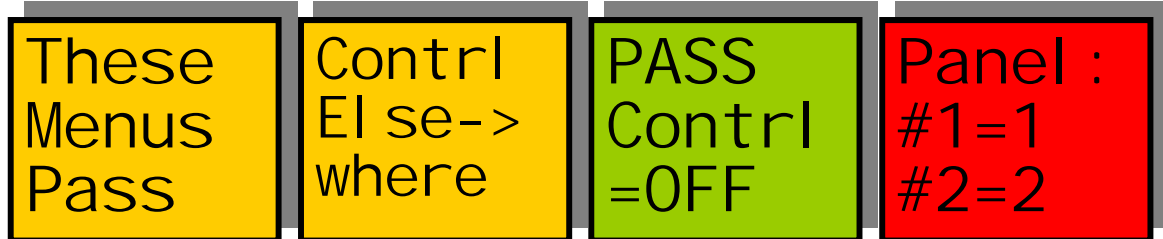
Menu 36-39: Memory Controls



Menu Num.	Heading	Automation	Function
36	Save Mem. 4	1= Save	Pressing this will Save Memory number 5.
37	Save Mem. 5	1= Save	Pressing this will Save Memory number 6.

	Mem. 5		number 6.
38	Save Mem. 6	1= Save	Pressing this will Save Memory number 7.
39	Back	1= Save	Pressing this will Save Memory number 8.

Menu 40-44: Duplex (second/third panel) control.



Menu Num.	Heading	Automation	Function
40	Info "These menus Pass"	None	
41	Info "Control Elsewhere"	None	
42	Pass Control Enable	0=off 1=on	This causes control to be passed to one or two FlexiPanels on the same I-BUS network with "panel numbers" shown in the next red LCD Window. When control is passed you will see the middle and lower lines of the LCD Display say either "OK" or "FAIL" depending on whether control was successfully passed on to either of the selected panels. Further presses of this button will enable or disable the control.
43	"Panel" numbers to which control can be passed. This feature is used to pass temporary control over	<u>Digipot A</u> 0→58 [0→58]	When this button is pressed, it changes to "Green". The Three-line display in the window then indicates the two options, which can be changed by adjusting the two rotary digipots A and B. "A" will alter the first panel number to which you would like to pass control.

	to another panel. Upon passing temporary control over to another panel, that panel will have a flashing "device button LED" indicating that control is available on this device button.	<u>Digipot B</u> 0→58 [0→58]	<p>"B" will alter the second panel number to which you would like to pass control.</p> <p>The panel number of any panel can be found by a momentary press of the set-up button. Setting either of the above panel numbers to "0" will stop any control being passed.</p>
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Menu 44-47: Top Level Controls



Menu Num.	Heading	Automation	Function
44	Set As Pow On Memory	1=save	Pressing this will save the current set up as the power on default.
45	Recall Pow On Memory	1=Recall	Pressing this will recall the power on default settings.
46	TOTAL RESET	1=Reset	Pressing this will reset the system.
47	Software Version	N/A	Shows the current software version.

4 Technical Appendix

4.1 Technical Specification for the SA-1

Number of Inputs	1
Type of Inputs	270Mbit Serial Digital Video Inputs 75 Ohm
Line Length	At least 200 Meters of PSF1/3 (Typically 275 Meters)
Number of Outputs	3 Output BNC's per Card (Configurable).
Type Of Outputs	270Mbit Serial Digital Video Outputs, 75 Ohm, 800mV
Total Number Of BNC Connections	5, consisting of 1 Fixed Input and 3 Jumper Configurable outputs. (One BNC not used)
SDI Output Jitter	The system will add less than 0.2UI to the input Jitter. (This is only guaranteed on issue 2 or later cards)
Current Consumption	<800mA at +5V
Size	215mm by 100mm

4.2 Jumpering the I-BUS (CAN-BUS) Termination

The I-BUS Network is the "control system" under which all Products and Panels are networked together. Under certain circumstances it is necessary to terminate the network. This can be done on a Panel or a "Product". To terminate this product, locate J6 on the SA-1 Processor Card supplied which is between U1 (The large square "chip") and the Edge connector. (This is on the half of the card labelled "CHP-100 Spartan2 Processor"). Jumper this with a 2mm link.

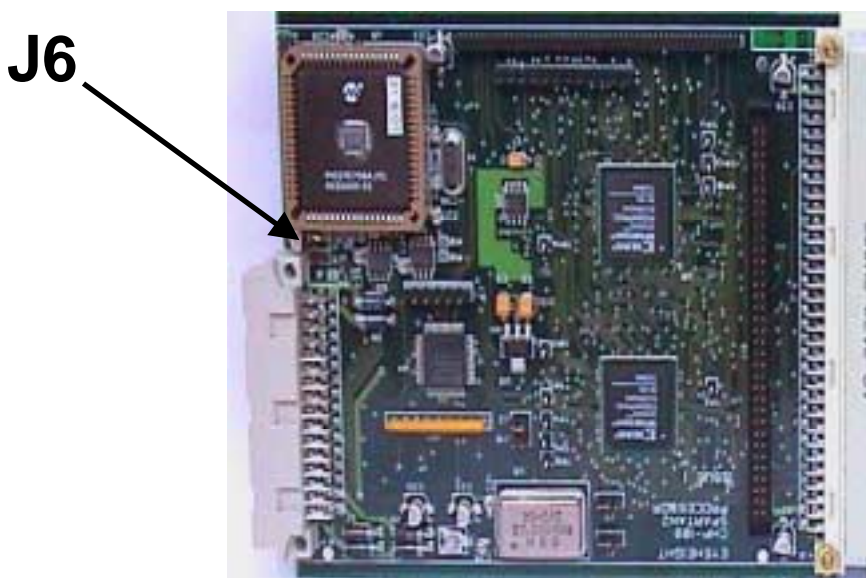


Figure 4-1 Location Of I-Bus Termination Link