



PHABRIX Sx

Operation Manual

RELEASE INFORMATION

Software Release: 0.10.0104

Date 27 January 2012

DISCLAIMER

Copyright © PHABRIX Ltd. All rights reserved. Software products licensed are owned by PHABRIX Ltd and are protected by international treaty provisions and national copyright laws.

No part of this document may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, recorded or otherwise without the prior written consent of PHABRIX Ltd.

The information in this document has been produced by PHABRIX Ltd with care and is believed to be accurate. PHABRIX Ltd does not assume responsibility for loss or damage resulting from errors, omissions or inaccuracies herein. This document is subject to change and revisions may be made and issued to include such changes.

PHABRIX LTD.

Winchester Road, Burghclere, Newbury, RG20 9EQ, United Kingdom

Tel: +44(0)1635 276302 Web: www.phabrix.com

Contents	Page
Release information.....	2
Disclaimer	2
Phabrix Ltd.....	2
Index	3
Getting Started with Phabrix Sx.....	7
Package Contents	7
General Safety	7
Avoiding Personal Injury	7
Installation Environment	7
Maintenance.....	8
Introduction.....	9
Warranty.....	9
Warranty exceptions	9
Operating conditions	9
External Power Supply.....	9
Maximum Input signals.....	9
LCD Monitor.....	9
LCD Flicker	10
Remote Network Operation	10
Disposing of the unit.....	10
Specification	11
LCD Display	11
SDI Inputs.....	11
AES Inputs.....	11
AES Outputs.....	11
External Reference.....	12

Contents	Page
External Control	12
Headphone Output	12
General.....	12
Operation.....	13
Turning the unit ON or OFF.....	13
Unit Status Line	13
Using The Menus.....	14
Screen-Dump	14
Main Menu.....	14
Generator.....	15
Analyser	15
SIG info.....	15
System.....	15
Logging.....	15
Speaker	15
Cursor/OK keys	15
Signal Generator	16
Video Settings	16
GenLock Settings.....	22
Audio Settings	22
Master.....	23
AES O/P	23
Dolby-Generator (Dolby analysis Option)	23
Dolby Synchronisation – Generator Reference.....	24
Editing Program information	24
Program Meta-Data editing	25

Defaulting program Meta Data.....	26	System wide Settings	42
Embedding Dolby signals on SDI Stream	26	Memories	42
Embedding Dolby signals on AES Stream	26	Saving Memories.....	43
Analyser	26	Recalling Memories.....	43
Picture.....	26	Renaming Memories	43
Audio Meters	27	Adding more Memories	43
Dolby-E Metering (Dolby analysis Option).....	28	Clearing Memories.....	43
SIGNAL DATA (SDI DATA option)	29	Export.....	44
Waveform Monitor	30	Disk Space	44
Waveform controls	30	Command Scripts (cost Option)	45
Setup Button/Dialog	31	Making a script report.....	45
Vector Scope.....	32	Stop on Errors	47
Signal Information	32	Creating a command script:.....	47
Video status	32	Adding steps to a command script.....	47
EDH/CRC Errors.....	32	Editing Steps in a Command Script	47
EDH Data.....	33	Script Actions	47
CABLE LENGTH	33	Deleting steps in a command script.....	49
Active picture crc	33	Deleting a command script:	50
MISC STATUS.....	34	Renaming a command script:	50
Payload ID – SMPTE 352	34	Running a command script:	50
Video Format	34	Looping a command script:.....	50
Audio status	35	Loading Archive File as part of a script	50
ANC Inspector (SDI Data Option)	35	Script Results.....	50
ANC Inspector Setup	36	Editing Command Scripts on a PC:	50
ANC Status (ANC option)	37	Network Setup	51
Using with a Dolby DM100	38	TCP/IP setup.....	51
Dolby-E Status (Dolby-E ANALYSER Option)	38	Remote control of unit (Cost Option)	51
Video Timing	41	Remote web browser access	52

Setting up a Windows™ PC for direct connection	53	Sx file structure	65
Misc.....	54	Patterns.....	65
Changing the date/time:.....	54	Scripts.....	66
Changing the date Format:	54	Setup	66
Setting LCD Brightness.....	54	Idents	66
Setting Screen Saver Mode.....	55	Fonts	66
Setting User Language	55	File Formats.....	67
Changing Options Security Code.....	55	Command Scripts	67
Utils.....	55	ARCHIVE	67
Engineer	56	LOADMEM,.....	67
Clear Memories	56	CHECKERRS,.....	67
Default settings.....	56	CHECK_AP_CRC.....	67
Set User Login	56	PROMPT	67
Generator Free-Run	58	CLEARLOG	67
Software Upgrade.....	58	DISABLEEVT	67
Logging.....	59	ENABLEEVT.....	67
Events Log.....	59	CLEARERRORS	68
Events Log Setup.....	60	LOGCOMMENT.....	68
Audio Thresholds	60	PAUSE.....	68
Video status	60	SAVESTATUS.....	68
AES Status	61	SAVEIMAGE	68
Dolby-E Status (requires Dolby-E Analysis option) ...	61	SELECTTAB.....	68
AES Status	62	SEL_USER.....	68
Logging.....	62	CHECK_EYE.....	68
Log ANC status	63	CHECK_JITTER	68
Speaker	64	CHECK_METER_OFF_LEVEL.....	68
Remote File Access	65	CHECK_METERS_off	69
FTP	65	CHECK_AES_INP	69

GETTING STARTED WITH PHABRIX SX

PACKAGE CONTENTS

The shipping box should contain:

1 black carrying bag containing:

PHABRIX Sx unit

Power Supply Unit

Mains lead

This Manual on a CD, note that the Web Site always contains the latest version of the manual. The version of software that this manual supports is on page 2.

GENERAL SAFETY

AVOIDING PERSONAL INJURY



This instrument is designed for use by qualified personnel only.

No user serviceable parts are provided. Units should be returned to your local PHABRIX agent for servicing.

The Operator should NOT remove the case from the unit.

Do not spill any liquid onto the unit or its power adaptor.

POWER SUPPLY

Make sure that the unit is connected to the correct power supply voltage. A power supply adaptor is supplied with the unit which may be connected to any AC power supply between 100 and 240VAC at 50-60Hz. Only the supplied power adaptor should be used with the unit. Do not use a damaged AC cable with the unit as it may cause a shock or fire hazard. Replacement AC cables are available from your local PHABRIX agent.



If the battery is at too low a voltage for correct operation, the unit will not fully power up but will wait until the AC adaptor is connected. The LCD screen will display a warning message if this is true.

INSTALLATION ENVIRONMENT

OPERATING TEMPERATURE



The unit should only be operated between 0 and 40 °Centigrade. If the unit is operated at a higher temperature there is a possibility of a fire hazard. If the temperature is changed rapidly from a cold environment to a hot environment, moisture can be created internally which can cause malfunction or damage the unit. Allow the unit to sit for 30 minutes without power applied to reduce any possibility of condensation. If the temperature rises above 60°Centigrade a warning dialog will be given. If the temperature rises above 65°Centigrade the unit will be turned OFF. Under both conditions, an event will be added to the event log to show what happened.

INPUT/OUTPUT TERMINALS

Do not connect the input or output BNC connectors to external power as this can damage the internal circuitry and cause the unit to work incorrectly.

WHEN NOT IN USE

Disconnect the unit from the power supply and AC power source when not in use.

MAINTENANCE

Wipe the case, and knobs gently with a soft cloth, lightly dampened with a neutral cleaning agent. A screen cleaning cloth may be used to clean the LCD. Do not apply force to the LCD when cleaning or it may be damaged.



Remove the power supply from the unit and turn OFF before cleaning. Do not allow any water or other liquid to enter the unit while cleaning.

INTRODUCTION

Thank you for purchasing a PHABRIX Sx unit. Please read this manual carefully to ensure safe and correct operation. If, on reading this manual you still have questions on using the unit, please contact PHABRIX via the support web site at <http://www.phabrix.com>. You may also register your product at this web site for a FREE extra 1 years warranty.

WARRANTY

The product has been designed and manufactured to be of the highest quality. However, should the unit develop a fault during the warranty period, please return to your local PHABRIX agent for repair.

WARRANTY EXCEPTIONS

PHABRIX are not responsible for free service during the warranty period under the following conditions:

- Incorrect voltage applied to unit.
- Incorrect power adaptor used.
- Fire, natural disaster.
- Repair of instrument by non PHABRIX approved agent
- Repair of damage caused by third party products.
- Repair of damage caused by improper use.
- Repair without proof of purchase.

OPERATING CONDITIONS

EXTERNAL POWER SUPPLY

DC-5V 5V

MAXIMUM INPUT SIGNALS

SDI input(s) +/- 2V

REF input: +/- 2V

LCD MONITOR

The LCD may have some pixels that are always turned ON or always turned OFF. This is normal and should not affect normal operation.

LCD FLICKER

The unit supports many video standards. The input SDI signal is displayed asynchronously and may flicker on the waveform display or picture display. The unit stores the input SDI signal internally, and then reads the internal frame using the LCD sync signal, which is asynchronous to the input SDI signal. LCD flickering may occur if a frame is skipped or repeated.

REMOTE NETWORK OPERATION

Remote network operation is only guaranteed when connected to a local machine.

DISPOSING OF THE UNIT



This product is subject to the European WEEE (Waste Electrical and Electronic Equipment) directive and should be disposed of according to the regulations of each country.

This unit contains a Lithium Polymer battery which should be disposed of correctly.

Contains hazardous substance information

Part number: PHSXAES

Description: PHABRIX SxA



China RoHS is a two-step process that identifies concentration limits of certain hazardous substances in electronic information products that are sold into China. Per the deadline set by the Chinese government, March 1, 2007, PHABRIX Limited has implemented step one of China RoHS, self declaration of hazardous materials and marking of the product.

PHABRIX products that are sold into the China market have the required marking as indicated by the symbol shown left applied to the product designating that the product meets the China RoHS requirements.

Toxic or Hazardous Substances or Elements

Parts	Hazardous Substances in each Part					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent chrome (Cr(VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Assembled board	○	○	○	○	○	○
Mainframe	○	○	○	○	○	○
LCD	○	○	○	○	○	○
Fan	○	○	○	○	○	○
Wire assembly	○	○	○	○	○	○
Enclosure	○	○	○	○	○	○
Accessory	○	○	○	○	○	○
Packaging	○	○	○	○	○	○
Battery	○	○	○	○	○	○
<p>O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006. X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006.</p>						

SPECIFICATION

LCD DISPLAY

Display Type	4.3 inch TFT colour
Display Format:	480 x 272 24 bits
Backlight	Variable brightness
Screen Saver	Reduces brightness after user adjustable time under battery operation.

SDI INPUTS

Supported standards	525/59.94, 625/50, 720p/23.98,24/25/29.97/30/50/59.94/60 1035i/59.94/60 1080psF/23.98,24/25/29.97/30 1080i/50/59.94/60 1080p/23.98,24/25/29.97/30/50/59.94/60
Connector	BNC
Input Impedance	75 ohm terminated
Input Return Loss	≥ 15 dB (5MHz to serial clock frequency)
Maximum Input Voltage	+/- 2V



AES INPUTS

Connector	BNC
Input Impedance	75 ohm terminated
Maximum Input Voltage	+/- 2V
Sample Rates	The input has a sample rate converter and so will accept any sample rate from 32kHz to 192kHz.



AES OUTPUTS

Connector	BNC
Input Impedance	75 ohm terminated
Sample Rate	48kHz

EXTERNAL REFERENCE

Input Signal	Tri-level or Bi-Level (black burst) syncs 50/59.94/60Hz
Connector	BNC
Input Impedance	75 ohm terminated
Maximum Input voltage	+/- 2V

EXTERNAL CONTROL

Ethernet	IEEE802.3 100Mb/s
Ethernet Connector	RJ-45
USB	USB 1.1 OTG (On the go - simulates flash disk)
USB Connector	Mini-AB

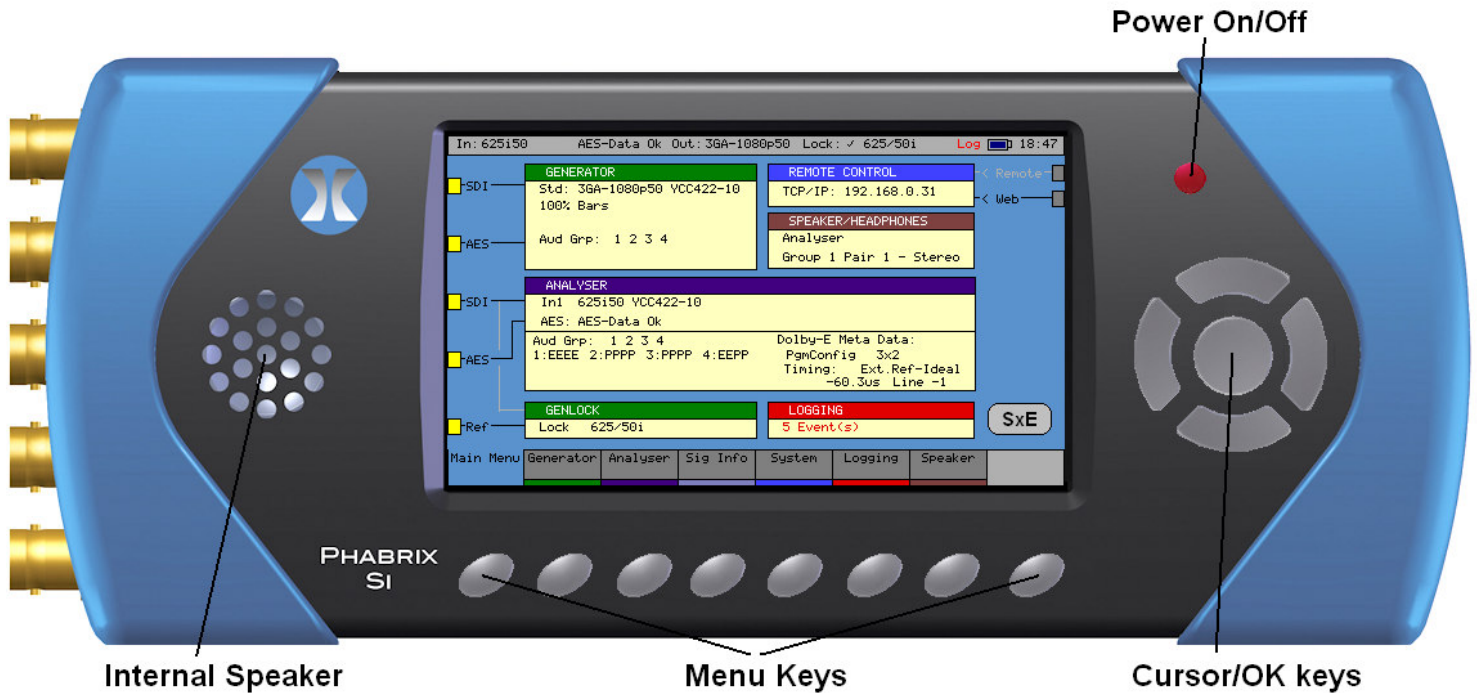


HEADPHONE OUTPUT

Connector	Miniature 3.5mm Stereo Jack
-----------	-----------------------------

GENERAL

Environment	
Operating Temperature	0-40 °C
Operating Humidity	<85% RH (no condensation)
Power Requirements	AC 90-250V 50/60Hz 10W max
Dimensions	230 (L) x 93(H) x 45(D) mm
Weight	2kg
Accessories	Instruction Manual on CD AC Adaptor Power Cord Carry Case



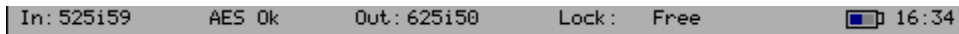
TURNING THE UNIT ON OR OFF

To turn on your PHABRIX Sx press the red button at the top right hand side of the unit.

Once the system has started, pressing the button again will turn it off. If for some reason the unit stops responding, pressing and holding the button for a few seconds will turn it off.

The unit is battery operated and the battery should last for between 3 and 6 hours dependent on which video standard is being used and whether the input and outputs are active. If the unit is turned ON and the battery is almost discharged, it will turn itself OFF. If the battery level starts to get too low for operation a dialog will be displayed prompting the user to turn off the unit. The current settings will also be saved. The unit should then be connected to the power supply unit as soon as possible to recharge the battery. The battery should be fully charged in about 4 hours. The battery will charge faster if the unit is turned off while charging.

UNIT STATUS LINE



The top line of the menus shows the unit status and includes the Input Video status, Genlock status, battery status and current time. If the unit is being powered by the AC adaptor, the battery status will not be shown. If a command script is being run, this is shown on the top line to the left of the time as "Script". A red "Log" is shown on the status line if there are any events in the event log.

If a 3G video standard is selected the video standard display will be shown as 3GA if it is a 3G-Level A standard, 3GB if it is a 3G-Level B dual link standard, 3G2 if it is a 3G-level B dual stream (two patterns) standard or DL if it is a dual link output (SxD only).

The input video standard will be shown in red if the input signal has errors, but only if the analyser is connected to the input. If the analyser is set to monitor the output, the input standard will be shown in brown.

The output standard will be shown in red if the unit is generating errors. The output standard will show OFF if the generator output is Off. (This does not happen on an SxD which has 2 outputs)

The Jitter values will be shown in red if the jitter values are greater than the values specified on the Log Setup page for the relevant jitter meter.

USING THE MENUS

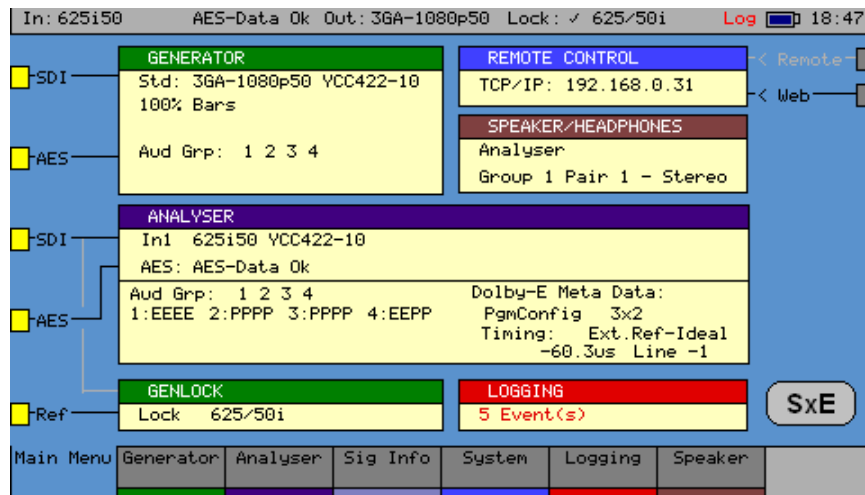
The Menu keys select which instrument is in use as well as selecting the options for the unit. The bottom of the LCD display shows the function of each Menu Key.

When in a specific function e.g. GENERATOR, ANALYSER etc, the cursor controls on the right hand of the unit select a field to edit. The current field has a red box around it. Pressing the OK button starts or ends editing of that field. Check boxes are always in edit mode and pressing the OK button inverts the current state. When editing some types of fields, the menu buttons at the bottom take on different functionality to allow cancelling edit mode or setting the value for the field. When lists of options are displayed the menu buttons allow selection of the first/last item in the list as well as paging through the available options. If the list of items is small, the available items may be displayed on the menu buttons for instant access. The buttons along the bottom of the LCD display change the currently displayed page when not editing a data field. The left hand button always selects the top level menu and system overview page.

SCREEN-DUMP

The current LCD screen may be saved to the internal memory by pressing and holding the OK button. The unit will 'beep' when this happens and a dialog will be displayed which shows the file name that was saved. Files are always saved in the "screendumps" directory of the unit and may be downloaded via FTP or by using the "downloads" link on the web browser.

MAIN MENU



This page displays an overview for the system. It shows the video input and output standards and frame rate. The audio status for the generator shows which audio groups are being generated whilst the audio status for the input shows which groups are present and an overview of the channel status for each audio channel.

Audio channel status is displayed as:

- 'P' if PCM audio is present,
- 'N' if NON-PCM audio is present,
- 'E' if Dolby-E packets are present
- 'D' if Dolby-Digital packets are present
- '+' if Dolby-Plus packets are present
- V if the validity bit is set

Dolby-E program configuration and Timing status is also displayed if the Dolby-E analysis option has been purchased and a Dolby-E signal has been detected on the selected input. If the generator is generating errors then the video standard is displayed in red. If the input detects errors, then the input standard will be displayed in red if the analyser is monitoring the input. If the unit is connected to the network, the current TCP/IP address of the unit is displayed in the Remote Control box. If the unit is NOT connected to a network and is set to DHCP mode, it will show 'acquiring' to show that the connection hasn't been made yet. The model type is displayed at the bottom right corner of the screen.

The menu buttons select the page to display as follows:

GENERATOR

This selects the generator page to allow setup of the generator output.

ANALYSER

This selects the analyser page to allow viewing and setup of the video and audio input signal.

SIG INFO

This selects the detailed signal information page which shows video and audio status for the analyser source.

SYSTEM

This allows setting up of system wide settings including memories and date/time.

LOGGING

This selects the logging page to view and setup the error logging system.

SPEAKER

This selects the speaker/headphone setup page.

CURSOR/OK KEYS

The cursor / OK switch allows the selection of options within each menu screen.

The selected option is highlighted with a red border. To modify the option press the OK button then using the cursor direction keys (←→↑↓) highlight the new option in the drop down window. Press the OK key to confirm.

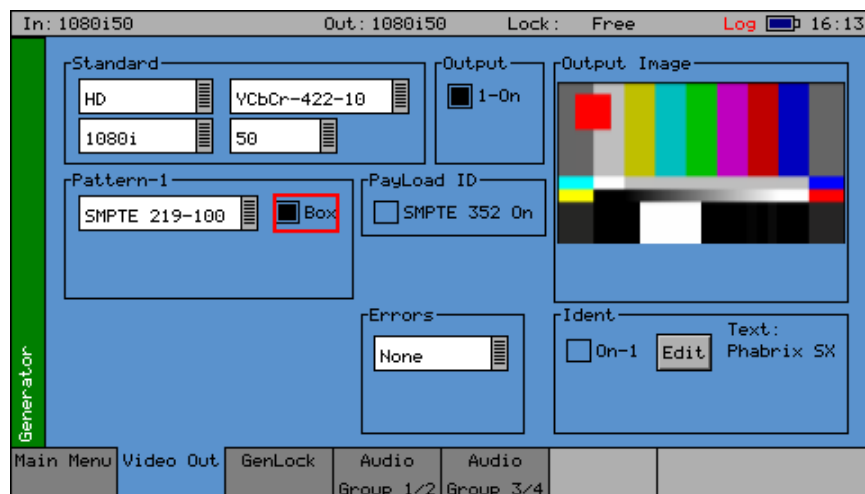
Alternatively the options may be displayed along the bottom of the screen just above the 8 menu keys. Press the corresponding menu key to select the desired option.



To move the red highlight box within a menu screen, use the cursor direction key (←→↑↓).

SIGNAL GENERATOR

VIDEO SETTINGS



The unit supports all SD and HD SDI output standards including the 3GHz standards at 1080p/50/59/60. It will support Y,Cr,Cb formats as well as RGB formats.

Output On: Turns ON the output circuitry. Un-check this to save battery power if you are not using the video output. On SxA/SxE units the output standard will show OFF if this is not checked.

Standard: Sets the video output format. **NOTE: This has had a major change in version 0.10.xxxx.** Four drop-down boxes are used to select video standard. The top-left box selects the basic mode of the unit and determines whether it is generating normal SD/HD vide or 3G level A or level B video. Dual streams refer to the ability of the unit to generate two separate pictures when transmitting 3G-level B in some formats. Which mode is selected determines which formats are available.

Only valid frame rates for the output standard may be selected.

Colour Format: Currently only YCbCr 4:2:2 10 bit picture formats are supported by the standard product but an Option may be purchased to enable other colour formats. The following colour modes may be selected dependent on line standard selected:

YCbCr 422 10bit	YCbCr 444 12bit	YCbCr 444 10bit	YCbCrA 4444 10bit	YCbCr 422 12bit
RGB 444 10bit	RGBA 4444 10bit	RGB 444 12bit		

Pattern: This selects the video pattern that is output by the generator. Many standard patterns are provided by the unit. You may also download your own test patterns to the unit into the 'Patterns' directory and then select them using the 'User File' option in this field. See the 'Unit File Structure - Patterns' section for file formats supported. If a 'User File' has been selected, the 'i' button beside the file can be selected to get information on the file properties. Unsupported file types will be displayed as a black image. If the video standard is changed while a user file is loaded and there is no file for the new standard present, a black image will be loaded and the User File blanked.





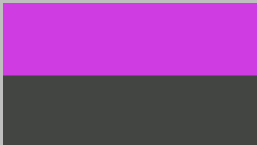
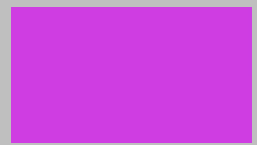
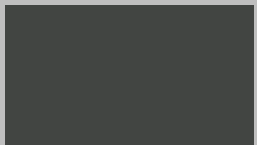



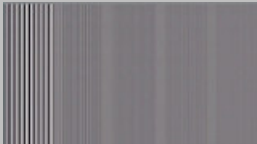
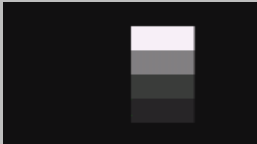





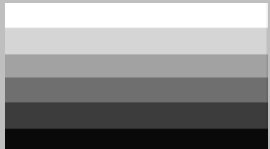

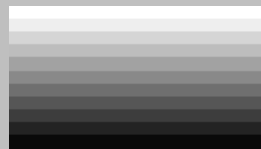

NOTE: If Check field/Pathological is selected when a dual stream format has been selected, BOTH outputs will be forced to check field due to internal hardware limitations. If another pattern is selected, the Check field pattern will be de-selected. The exceptions to this are when Colour Field or Zone Plate are selected as test patterns.

The Check field/Pathological/PLL Check/EQ Check patterns will only look like the picture above when a YCbCr 422 10 bit colour mode is selected. Other colour modes will have different pictures but still create the SDI data stream required by SMPTE.

A bouncing Box may be overlaid on the current test pattern by selecting the Box checkbox field.

Available Patterns:

		
100% Bars	75% Bars	75% Bars + Red
		
SMPTE Bars	Check-field Pathological	EQ Test
		
PLL Test	Luma Ramp	Legal Ramp
		
Valid Ramps	Multi-Burst	Pluge
		
Bowtie	Tartan Bars	Grey Bars - 5

		
Grey Bars – 5 -vertical	Grey Bars - 11	Grey Bars – 11 - vertical
		Black, Red, Green, Blue, Yellow, Cyan, Magenta, White, Custom
SMPTE 219/ARIB-28 Bars – 3 variants	Zone plate	Colour Field
Downloadable files in bitmap(.bmp), 10bit DPX/YUV (.dpx, .yuv), Targa (.tga) and Phabrix .pat/.rgb/.yc4 compressed files		
User File		

Colour Field If colour field is the selected test pattern, another control selects which colour to generate. Three user definable custom colours may be defined using the “->” button. Custom colours are edited using the Red-Green-Blue sliders. When setting the colour using the RGB sliders, the YCbCr values will show the values for the current colour space. When setting the colour using the YCbCr sliders, the RGB values will show the values for the current colour space.

Zone Plate A basic zone plate generator is supplied with all units. The zone plate selector will only contain a single zone plate entry. If the Zone Plate option has been purchased, then the zone plate selector will contain 3 user customisable zone plates as well as several pre-determined zone plates. The ‘->’ button displays a dialog which allow the parameters of the zone plate to be adjusted for the custom zone plates. Any of the preset zone plates may be copied to the custom zone plates to act as a starting point for a new zone plate. As the zone plate settings are stored in user memories a large number of custom zone plates are available for use. (See Zone plate dialog below for more details)

Preset Zone Plates provided with zone plate option:

Moving Zone-2H	A moving zone plate centred on the screen.
----------------	--

Static Zone-2H	A static zone plate centred on the screen from DC to the nyquist frequency at left/right edges.
Static Zone-2V	A static zone plate centred on the screen from DC to the nyquist frequency at top/bottom edges.
Sweep-Horiz	A horizontal sweep from DC to nyquist frequency horizontally
Sweep-Vert	A vertical sweep from DC vertically
Grating-50kHz	A 50kHz frequency sine wave when using an HD output
Grating-1MHz@HD	A 1MHz frequency sine wave when using an HD output
Grating-5MHz@HD	A 5MHz frequency sine wave when using an HD output

Zone Plate Dialog This allows editing of Custom zone plate settings. Three custom zone plates may be set up by the user and may be copied from one of the standard zone plate presets using the 'Copy To' button.

Mode This sets which type of Zone Plate is being produced. It may be Zone Plate (circular pattern) Grating (Linear horizontal or vertical grid) Sweep (Frequency sweeps from start to end Frequency)

Start Phase This sets the start phase of the sinewave generated by the zone plate generator and is set in degrees from 0-360

Phase Rate This is used to set the rate of change of phase of the sinewave and thus changes the speed that the zone plate moves at. It is specified in degrees per frame.

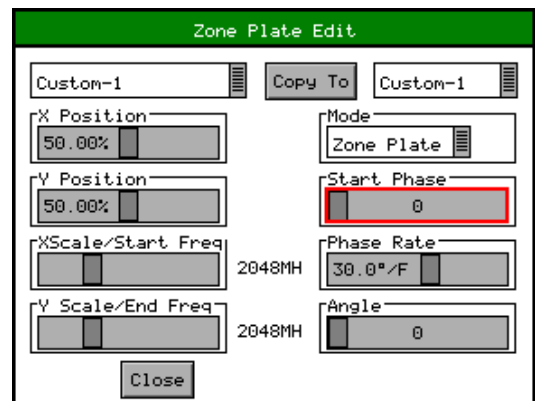
Angle This changes the angle of the zone plate and thus can change a horizontal sweep into a vertical sweep or rotate an elliptical zone plate pattern.

XScale/Start Freq. This sets the horizontal scale of grating patterns or the start value of the zone plate sweep frequency.

YScale/End Freq. This sets the vertical scale of grating patterns or the end value of the zone plate sweep frequency.

EDH: If the output signal is SD (PAL-625 or NTSC-525) the insertion of EDH information may be turned on or off.

Errors: This field enables the insertion of CRC or EDH errors into the video signal. This allows checking of third party error detection circuitry. In SD there is one EDH ancillary packet per field. When errors are being inserted every EDH value gets deliberately corrupted. This creates one error count per field. (Actually one AP error and one FF error). In HD there is a CRC value calculated for each line. When errors are being inserted the CRC value on line number 1 gets



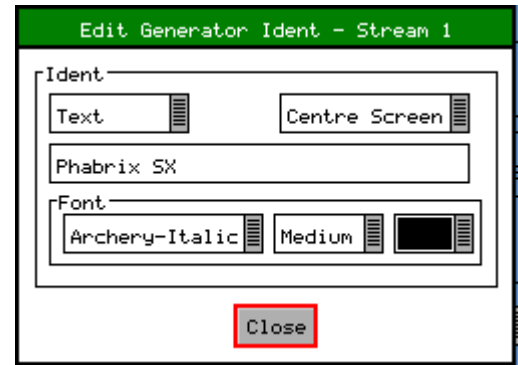
deliberately corrupted. This creates one CRC error count per frame. There is also the option to generate CRC errors (not SD EDH errors) on only the switching line in field 1 which can be used to check that any downstream equipment ignores errors on switching lines.

SMPTE 352 This checkbox allows the SMPTE 352 Payload ID field to be inserted into the video output stream. The state of this checkbox is stored separately for SD, HD and HD-3G line standards. Note that for HD-3G line standards the Payload ID should be turned ON.

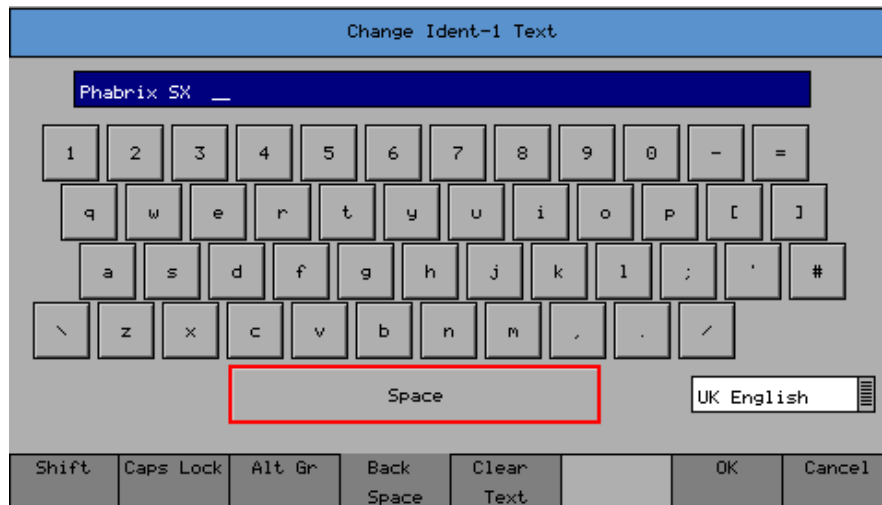
Ident: An picture or text 'Ident' may be set to identify an SDI source. This Ident can be turned on/off from this page but changing the text/font/bitmap is performed by selecting the Edit button to bring up the Ident Dialog. An overview of what the Ident is can be seen beside the Edit button. **Note:** If zone plate or colour field are selected, text cannot be overlaid over them.

A smaller version of the video output signal is displayed on this page with any overlaid ident.

Ident Dialog This dialog allows selection of either a user defined bitmap picture which has been downloaded into the 'Idents' directory of the unit or user defined text. For both types, the position of the ident can be set to one of Top-Left, Top-Centre, Top-Right, Left-Centre, Centre-Screen, Right Centre, Bottom-Left, Bottom-Centre, Bottom-Right. When text ident is used, the font, font size and colour can be specified. Several fonts are built in to the unit, other true-type (.tff) fonts may be downloaded as required.

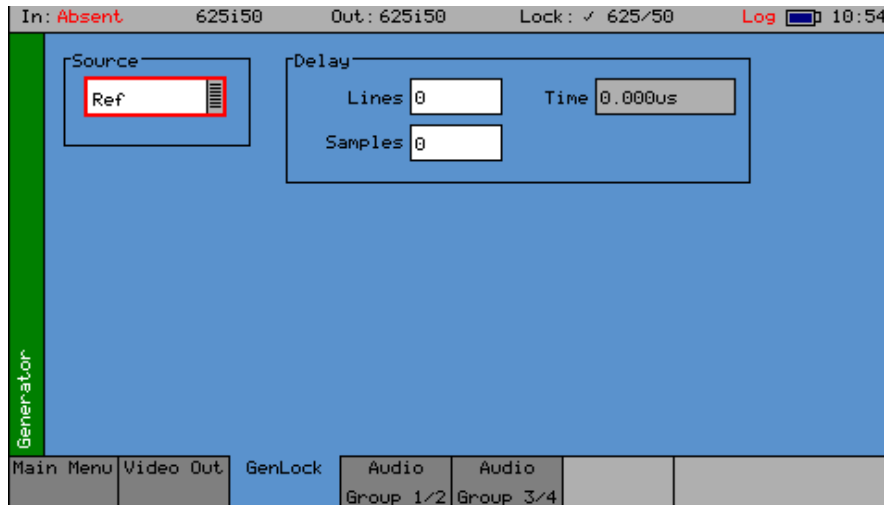


Text Ident Keyboard



When editing text, the keyboard above is displayed to allow easy editing. Move the cursor to select the key to 'press' and then press 'Ok' to 'press' it. The Shift menu key causes the next keyboard to change to shift mode for the next key press. The Caps Lock menu key locks the keyboard in all capitals mode. The Alt Gr. key shows any language dependent alternate keys that may be pressed. Several country keyboard styles are provided. Note that not all fonts support all non-English characters.

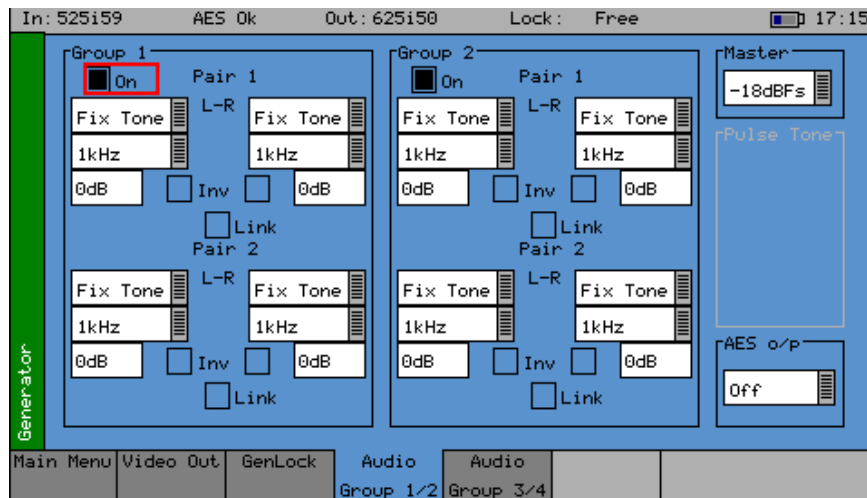
GENLOCK SETTINGS



Source: The generator may be locked to an input reference which may be either the reference input which is a Bi-Level/Tri-Level sync or may be locked to the video input. Alternatively, the generator may free run.

Delay: If the Genlock source is not set to free-run, the video output is frame locked to the reference. The delay of the video output may be adjusted by lines and samples with the delay also shown in micro-seconds.

AUDIO SETTINGS



The unit can embed an audio signal on all 16 embedded audio outputs. If the SxA version has been purchased, the AES output source may also be set up.

Group n: Each of the four groups may be separately enabled. When enabled, the source and level of each channel in a pair can be selected.

Source: The source for each channel may be Silence, Fixed tone (a range of fixed frequencies), variable tone (where the frequency can be set on 1Hz steps from 1Hz to 23.99kHz), white noise. The AES input may also be selected if present. If the Dolby Generation option has been purchased, the source may be set to 'Dolby' at which time the other channel in the audio pair is also set to 'Dolby' and gain control disabled.

Inv: This check-box phase-inverts the audio signal to allow checking of third-party audio mixing.

Link: This links the left and right channels of a pair so that changing the level on the left hand channel changes the level on the right hand channel.

MASTER

The master level sets the 0dB level for all the embedded audio channels. Thus if the Master level is set to -18dB and group 1 pair 1 output is set to -2dB, the actual level output on that pair is -20dB. This feature allows all embedded outputs to be adjusted together as well as giving a simple method to change from -18dB to -20dB based standard levels. The Master level will not adjust the level of an AES input signal selected for embedding on SDI output.

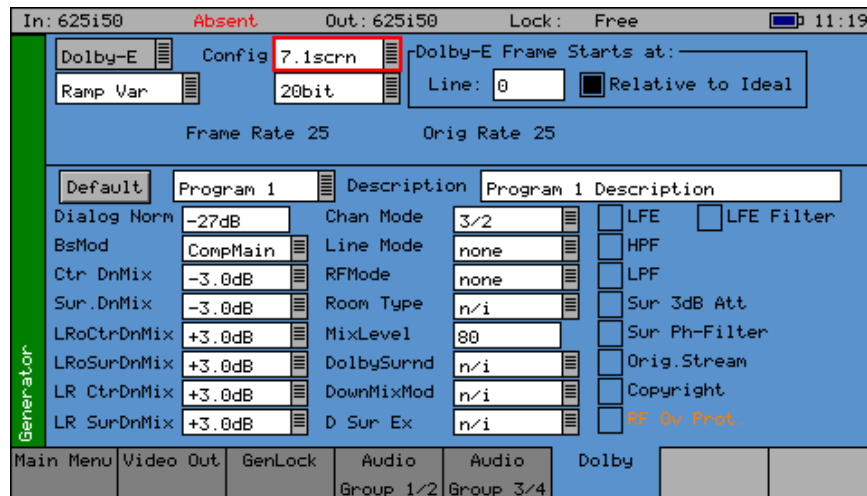
AES O/P

This is only available on the SxA and SxE models. The AES o/p control selects the source for the AES output of the unit. The source can be:

- The AES input (via the built-in sample rate converter) to allow easy conversion to 48kHz sample rate AES signals.
- A mirrored output of the specified embedded AES stream contained within the SDI output to allow easy generation of audio tones or white noise.
- One of the embedded input pairs on the SDI input to allow use as a de-embedder.
- Off, if the output is not required.

Note that the AES output is always at a 48kHz sample rate. The AES input may be at any sample rate from 32kHz to 192kHz.

DOLBY-GENERATOR (DOLBY ANALYSIS OPTION)



This option allows generation of Dolby-E pre-encoded test signals.

NOTE: With this software version Non-Keyed signals are generated which may be incompatible with certain VTRs.

DOLBY SYNCHRONISATION – GENERATOR REFERENCE

- **Free Run:** If the generator is not locked to reference, the Dolby signal will be generated synchronous to the generator. If the generator is running at a fast progressive rate (50-60 fps) it will generate packets on every other frame.
- **External Reference/Ext SDI reference:** If the generator is locked to an external signal, the reference signal MUST be of an appropriate standard. See the table below for examples.

Video Output Format	Valid Reference Formats
1080i50	1080i50, 625i50(PAL)
1080i59	1080i59, 525i59(NTSC)
1080p25	1080p25, 1080i50, 625i50(PAL)
1080p29	1080p29, 1080i59, 525i59(NTSC)
720p50	1080p25, 720p25, 1080i50, 625i50(PAL) – due to length of packet being over 1 frame long
720p59	1080p29, 720p29, 1080i59, 525i59(NTSC) – due to length of packet being over 1 frame long
1080p50	1080p25, 720p25, 1080i50, 625i50(PAL) – due to length of packet being over 1 frame long
1080p59	1080p29, 720p29, 1080i59, 525i59(NTSC) – due to length of packet being over 1 frame long

EDITING PROGRAM INFORMATION

- **Stream type:** Only Dolby-E streams can be generated with this software version.
- **Config, Bit Depth:** The program configuration and Bit Depth can be changed to load the pre-encoded file.
- **Stream contents:** The tones generated are of a fixed pre-defined frequency. Four sets of pre-encoded streams are provided:
 - **Ramp Var:** Each channel has a different frequency to allow checking of channels. The levels are ramped so that different channels have different levels.

- -3dB Fixed: All the tones are at -3dB co-phased/timed and are at the same frequency.
- -18dB Fixed: All the tones are at -3dB co-phased/timed and are at the same frequency.
- -20dB Fixed: All the tones are at -3dB co-phased/timed and are at the same frequency.

Fixed Frequency values for “Fixed level” streams above:

Frame Rate	Normal Frequency	LFE Frequency
23.98	4.8kHz	211Hz
24	6kHz	240Hz
25/50	6kHz	240Hz
29.97/59.84	6kHz	133Hz
30/60	6kHz	240Hz

- **Dolby-E start line:** The start line can be used to set valid or invalid ranges to allow checking of the Dolby-E guard band on downstream equipment. If the start line is set outside the valid range specified by Dolby, the line number will be displayed in **RED**.
- **Relative to Ideal:** If this check box is checked, the line number displayed is relative to the Dolby specified ideal line. A value of ‘0’ therefore starts the Dolby-E packet on the ‘Ideal Line’ for that video format.
- **Frame Rate/Original rate:** These two fields are set by default to the currently generated frame rate but may be modified by the user to test downstream equipment.



Note that if generating a progressive fast rate video standard such as 720p50, 720p59 or 720p60 etc. the Dolby-E signal will always be generated at the related slower rate. This is a Dolby restriction as the packets are over 1 frame in length for these video formats.

PROGRAM META-DATA EDITING

Many of the meta-data fields may be edited to test downstream equipment. The Channel Mode field may be edited to invalid settings but they will be shown in **RED** to show that they are invalid. The settings currently being edited are for the selected program but multiple program meta data values can be modified and the settings for all programs are stored in memories.

Meta data changes and line changes will happen cleanly so that no corruption to the Dolby signal will occur.



A maximum of 30 characters may be used for program description text. If the text is longer than this, extra characters will be ignored.

DEFAULTING PROGRAM META DATA

Pressing the “Default” button will return program meta-data settings to their default values.

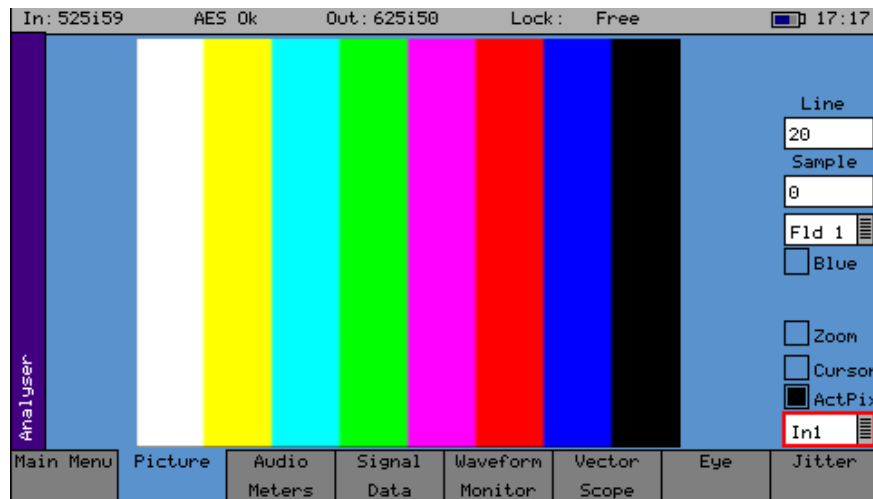
EMBEDDING DOLBY SIGNALS ON SDI STREAM

To embed Dolby signals on an SDI stream, the Audio source for that channel should be set to ‘Dolby’. These source selections are found on the Generator – Audio Group 1,2,3,4 pages. Selecting one channel of an audio pair to ‘Dolby’ will force the other channel in the pair to select ‘Dolby’ also. As the Dolby streams are data, the volume and phase controls are disabled. Changing a channel from Dolby to another source will cause the other channel in the pair to select silence.

EMBEDDING DOLBY SIGNALS ON AES STREAM

To embed Dolby signals on the AES output, the Audio source for the AES output should be set to ‘Dolby’. This selection is found on the right hand side of the Generator – Audio Group 1,2,3,4 pages.

ANALYSER



The signal analyser displays the video input or output signal. On any page, if the page button is pressed again the video signal will be displayed in full screen mode. While in full screen mode, if the video input signal is not present, a message saying ‘No Video’ will be shown. The source for the analyser is set by the field at the bottom right of the page. The current line and sample are the same for all pages of the analyser and therefore when selecting a sample on the Signal Data page, the cursor will show where that is on the ‘Full Picture’ page.

PICTURE

On this page, the video picture is displayed in a window as a down-converted display. The picture will automatically view the horizontal or vertical blanking areas if the line or sample values are in the blanking area. If the focus cursor is moved to the picture window and OK pressed, the cursor may be used to scroll around the window. Press OK again to cancel this mode. When in zoom mode, the cursor is always in the centre of the window and the picture scrolls behind it. If the cursor is moved to an area of interest on the picture, the same area will be visible on the SDI data option (if purchased).



If the picture window is focussed and current tab button is pressed again to enter full-screen mode, the cursors may be moved by pressing the OK button again. **NOTE:** The normal cursor menu keys may be used but are not visible. Press OK again to cancel cursor adjustment mode.

Line: Specify the current line for analysis.

Sample: Specify the current sample for analysis.

Field: (Only for interlaced formats) This control selects the field for analysis. If the current line is in Field 1, changing the field will change to the same line in field 2. The field number will change to show the correct field for the current line number.

Blue: Show only the Blue aspect of the picture Blue.

Aspect Ratio: The aspect ratio of PAL (625 lines) may be set to be either 4:3 or 16:9 as required for the source signal. NTSC (525) signals are always 4:3 aspect ratio and HD signals are always 16:9.

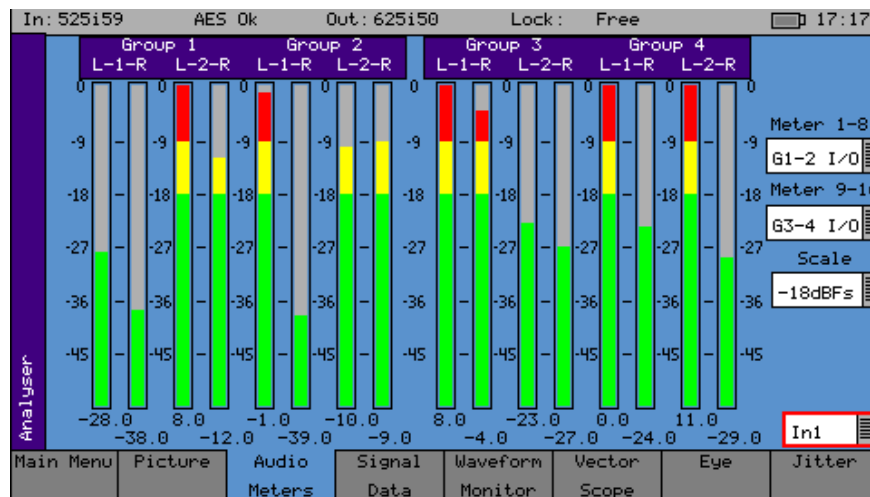
Zoom: If not checked, the picture displayed is a down-converted picture to fill the window or the full screen as requested. If checked, then a pixel on the units LCD display will reflect a pixel in the video signal. In zoom mode, no filtering is used.

ActPix: If checked, only active picture is displayed for picture view and waveform monitor, all other VBI data such as TRS words ANC data and audio is blanked.

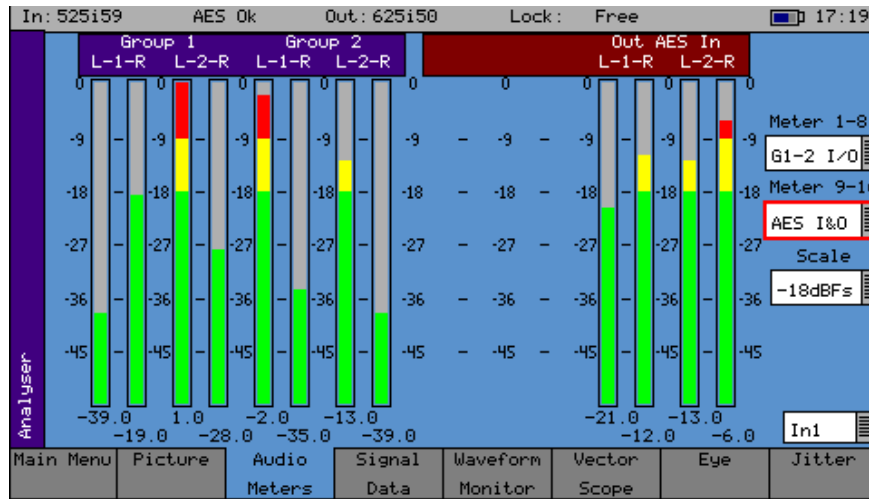
Cursor: A cursor may be turned ON over the area of the picture specified by the specified line and sample.

Source: The analyser can view either the video SDI input or the Generator output so that comparisons can be made between input and output.

AUDIO METERS

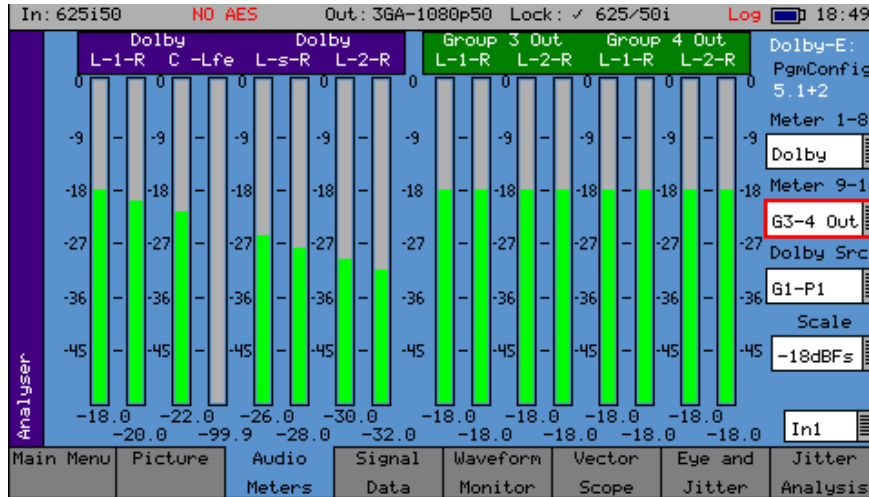


This page shows up to 16 audio channels. The source for each block of 8 meters may be independently set to allow simultaneous metering of 8 inputs and 8 outputs or all 16 channels in an embedded SDI stream. If AES inputs or outputs are present (SxA) then these may also be metered. At the bottom of each meter is the current audio level for that channel in dBfs (decibels relative to 0dB full-scale).



The scale used by the meters may be set to -18dB or -20dB according to the standard operating level used.

DOLBY-E METERING (DOLBY ANALYSIS OPTION)



If the Dolby option has been purchased, the meters may be set to display the encoded Dolby levels for the specified audio pair or AES input.




NOTE that Dolby audio cannot be heard on the speaker as a Dolby decoder is not present.

SIGNAL DATA (SDI DATA OPTION)

In: 3GA-720p50		Out: 3GA-720p50		Lock: Free		16:09							
	3955	3956	3957	3958	3959	0	1	2	3	4	5	6	Type
22v1	040	3FF	000	000	2AC	040	040	040	040	040	040	040	Grid
v2	200	3FF	000	000	2AC	200	200	200	200	200	200	200	Line
23v1	040	3FF	000	000	2AC	040	040	040	040	040	040	040	26
v2	200	3FF	000	000	2AC	200	200	200	200	200	200	200	Sample
24v1	040	3FF	000	000	2AC	040	040	040	040	040	040	040	0
v2	200	3FF	000	000	2AC	200	200	200	200	200	200	200	Hex
25v1	040	3FF	000	000	2AC	040	040	040	040	040	040	040	10bit
v2	200	3FF	000	000	2AC	200	200	200	200	200	200	200	In1
26v1	040	3FF	000	000	200	093	200	27D	200	3AC	200	3AC	
v2	200	3FF	000	000	200	004	200	004	200	004	200	004	
27v1	040	3FF	000	000	200	093	200	27D	200	3AC	200	3AC	
v2	200	3FF	000	000	200	004	200	004	200	004	200	004	
28v1	040	3FF	000	000	200	093	200	27D	200	3AC	200	3AC	
v2	200	3FF	000	000	200	004	200	004	200	004	200	004	
29v1	040	3FF	000	000	200	093	200	27D	200	3AC	200	3AC	
v2	200	3FF	000	000	200	004	200	004	200	004	200	004	
30v1	040	3FF	000	000	200	093	200	27D	200	3AC	200	3AC	
v2	200	3FF	000	000	200	004	200	004	200	004	200	004	
31v1	040	3FF	000	000	200	093	200	27D	200	3AC	200	3AC	
v2	200	3FF	000	000	200	004	200	004	200	004	200	004	

This page shows the video signal as a data stream in several formats as described below. In each mode, the data may be displayed in hexadecimal, decimal or binary formats. The binary format is not available in grid mode. The data may also be displayed as 10bit or 8bit format.

To simplify scrolling around the SDI signal view, use the cursor keys to move the red focus rectangle to the data display and press OK. The focus rectangle should change to a blue colour and the cursor keys allow the display to be scrolled in any direction. The menu keys at the bottom allow the Line/Sample to be adjusted by 10 or 100 in any direction.

 **Note:** The line number of a line of video changes at the end of active video. This gives the strange side effect that the line number for pixels in horizontal blanking is the same as the line number for the active picture **after** that line.

Grid: In this mode the data is shown in an X-Y format with lines and samples at the same time. Thus this is a representation of the picture but in data format. If the cursor keys are used to select the grid window and 'OK' pressed, the cursor keys will scroll around the window. The luma (Y) channel is shown in white whilst the Cr and Cb channels are shown in with a red or blue tint respectively.


Strm: This is one of 3 modes for displaying the samples on the current line only. The cursor keys may be used to scroll the sample number when 'OK' has been pressed. The 'info' column shows the type of data being displayed.

AP Active picture
 VBL Vertical blanking
 HBL Horizontal blanking

Comp: This is a similar to the Strm mode above but in a component mode with Cr and Cb in different columns. See Strm mode above for the info column description.

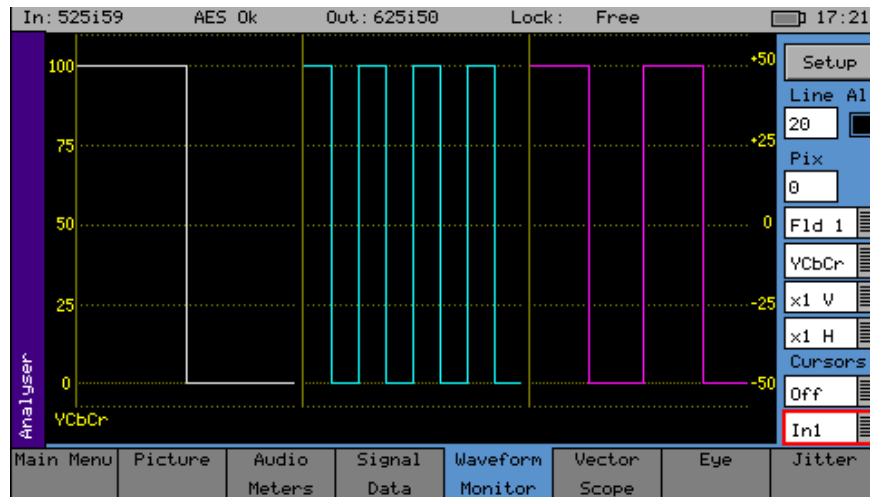
Split: This mode shows the 2 streams split into 4 parts to show Y, Y', Cr and Cb in separate columns. See Strm mode above for the info column description.

Source: The analyser can view either the video SDI input or the Generator output so that comparisons can be made between input and output.

 **Note:** When in Colour modes other than YCbCr 422 10 bit, the pixel RGB or YCbCr values are packed into 10 bit values across the different streams and thus will give unfamiliar values. When the 'UnPack' check box is checked the values in the active

picture are unpacked to RGB or YCbCr values.

WAVEFORM MONITOR



The waveform monitor displays the analyser input in an oscilloscope like form.

The display may be restricted to a single line or all lines may be displayed at the same time. The display can be formatted as all streams (Luma and Chroma) or just a single stream. The streams may be in YCbCr or GBR formats.

The display may also be magnified to examine a specific part of the waveform.

WAVEFORM CONTROLS

The line, sample and field controls all track the related controls on other pages.

The 'All' checkbox forces the waveform monitor to display all lines, overlaid on each other. Otherwise the specified line is displayed.

The waveform display format is set using the 'Setup' button. The waveform monitor displays the selected signal in one of 5 formats as set by the Mode control:

YCbCr	The Y, Cr and Cb waveforms are shown as three separate waveforms in a Parade format
Y	Only the luminance channel is shown
Cb	Only the blue chroma channel is shown
Cr	Only the red chroma channel is shown
GBR	The Green, Blue and Red waveforms are shown as three separate waveforms in a Parade format
Red	Only the red channel is shown
Green	Only the blue chroma channel is shown
Blue	Only the red chroma channel is shown

The next 2 controls show the vertical and horizontal magnifications. If either value is set to a value other than x1, a vertical or horizontal offset will be shown on the bottom right edge of the waveform display. The offsets are set by moving the focus cursor to the waveform window and pressing OK. The menu keys can then be used to scroll around the window. The offset will be the same for all magnifications values so switching between x1 and x5 will not lose the offset used in x5 mode.

The vertical offset values are in signal level bits but displayed in the current scale units so switching between scales will keep the same offsets.

Cursor Mode: Cursors may be displayed over the waveform to allow measurement of time or amplitude values. The cursor may be set to several modes:

Off: Cursors are hidden

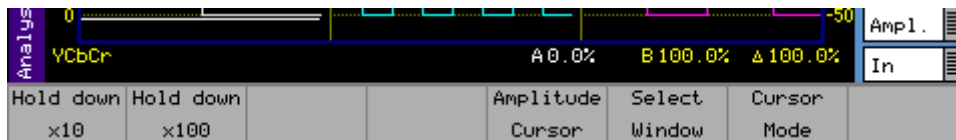
Pict: The cursor is displayed at the current pixel point. If in YCbCr or RGB mode, three cursors are displayed. Otherwise a single cursor is displayed. The cursor position tracks across the picture monitor and Signal Data tabs.

Ampl: Two cursors are displayed to allow measurement of signal amplitudes.

Time: Two cursors are displayed to allow measurement of signal timing.

Both: Amplitude and time cursors are displayed.

To use the cursors, use the navigation keys to move the focus to the waveform display and press OK. You should then get a display similar to that below. Note that the menu keys shown depend on the display mode and cursor mode.



The navigation keys now move the selected cursor around the waveform display which will scroll if moved out of the visible area. The x10 and x100 buttons magnify the action of the navigation keys if held down.

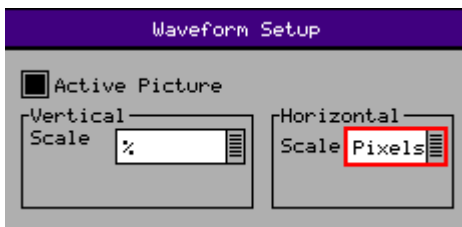
The **Select Window** button is only available in YCbCr or RGB modes and selects the window that the cursor is displayed in.

The **Amplitude Cursor** and/or the **Timing Cursor** buttons switch the currently active cursor. In each direction two cursors are displayed. The currently active cursor is the one displayed as a full line (rather than the dotted cursor). The bottom of the waveform screen shows the cursor measurements in the current format which may be Decimal, Percentage or Hexadecimal for amplitude measurements or Pixels/uS for timing measurements. The difference between the two cursors is also displayed in absolute form.

The **Cursor Mode** button changes the current mode without having to leave the navigation window.

Source: The analyser can view either the video SDI input or the Generator output so that comparisons can be made between input and output.

SETUP BUTTON/DIALOG



Active Picture: If checked, only active picture is displayed for picture view and waveform monitor, all other VBI data such as TRS words ANC data and audio is blanked. This control tracks the state of the **ActPix** control on the Picture tab.

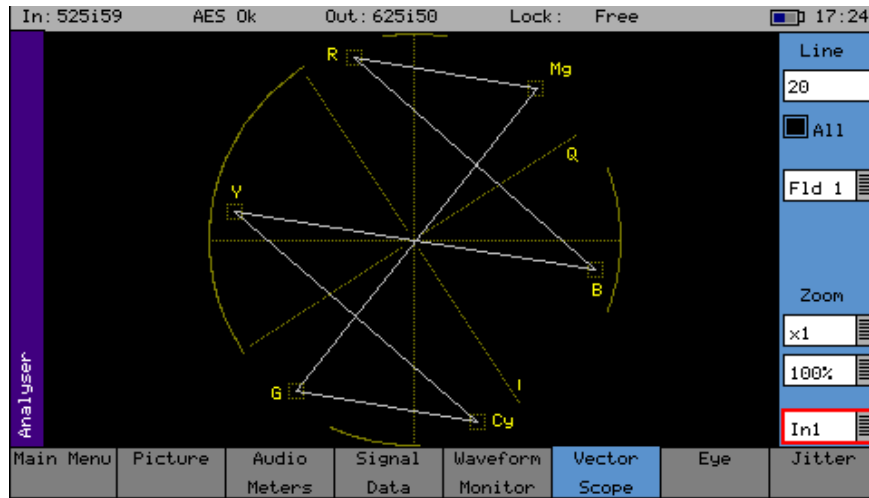
Vertical Scale: The axes and measurements for the waveform monitor can be displayed either in percentages or in hex or decimal values as required.

Horizontal Scale: The timing measurements may be set in either pixels or micro-seconds (us)

VECTOR SCOPE

The vector scope may be set to show either the 100% bar positions or 75% positions. The colour bar position boxes will change according to the colour space for the current input video standard.

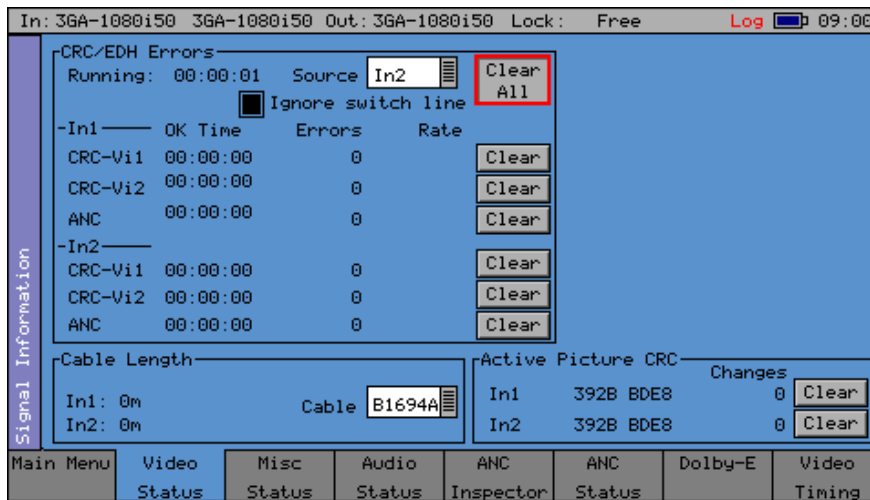
The 'All' checkbox forces the waveform monitor to display all lines, overlaid on each other. Otherwise the specified line is displayed.



SIGNAL INFORMATION

These pages give a detailed view of the status of the input (or generator output) signal. They are sub-divided into Video, Misc, Audio and Ancillary (ANC) status.

VIDEO STATUS



EDH/CRC ERRORS

This displays the EDH or CRC status of the analyser input as appropriate for the video standard being monitored. The status of each EDH/ CRC count is displayed as the number of seconds since an error occurred. The individual CRC fields may be reset individually or together. The 'running time' field shows the time since the last error reset occurred. The error rate field shows the number of errors per

second. The running time will also be affected by the input being lost or being intermittent. CRC errors are ignored on the switching line if the 'Ignore switch line' check box is checked.

ANC checksum errors are also detected and counted and may be logged.



When analysing a 3G-Level B signal, the CRC status is displayed for each link or stream present according to the input video format. On an SxD with 2 video inputs, only one 3G-Level B may be analysed for CRC status at a time.

EDH DATA

If the signal is SD (PAL-625 or NTSC-525) the EDH values for both active picture (AP) and full-field (FF) are displayed for each field. To enable engineers checking EDH integrity, the EDH values calculated for active picture and full-field are also displayed.

Under normal conditions, the EDH-AP values should be constant, the full-field values may change if audio or other ancillary data is embedded in the SDI signal.

The EDH flags for active picture, full-field and ancillary data are also displayed for diagnostic purposes.

Edh: Error Detected Here:

This is set to 1 if a SDI error was detected. In the case of ancillary data, this means that one or more ANC data packets had an incorrect checksum.

Eda: Error Detected Already:

This is set to 1 if a SDI error was detected in the signal received by the previous device.

Idh: Internal error Detected Here:

This is set to 1 if a hardware error was detected in the previous device.

Ida: Internal error Detected Already: This is set to 1 if an idh flag was received by the previous device.

Ues: unknown error status: This is set to 1 if the previous device received an SDI signal from a device not supporting EDH.



Note that there is only one EDH detector which is connected to the input currently being analysed. On An SxD with 2 video inputs, only the current input being analysed can check for EDH errors.

CABLE LENGTH

The Sx measures the cable length connected to the SDI input BNC and the measurement is only an approximate value.

The cable type may be set to one of the following:

Belden 8282, 1694A, 1505, 1855A.

Canare L-5CFB

Image 1000

The selected cable type will affect the cable length measurement.

ACTIVE PICTURE CRC

16-bit CCITT CRCs are calculated for the active picture data of the received signal. This can be used to give a known value for known static picture content and allows the user to determine if the active picture content is as expected.

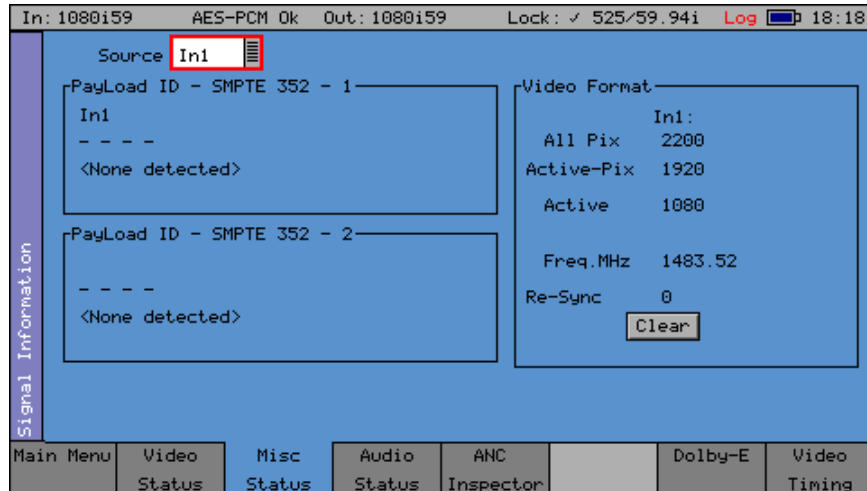
CRCs are calculated independently upon each 10-bit stream (luminance and chrominance) of the interface.

For example the generated 1920x1080, 100% bars in YCC422-10 should always produce a luminance CRC of 0x0AB4 and a chrominance CRC of 0xB88E, no matter what scanning mode (interlaced, segmented frame or progressive) or frame rate is used.

Note: when using 4:4:4, 4:4:4:4 or 12-bit video formats (in dual-link or 3Gbps) the CRCs are calculated for each of the *packed* 10-bit virtual interfaces and will therefore generate different values from those for YCC422-10.

See the “Active Picture CRC Technical Information” section at the end of the manual for details of CRC calculation.

MISC STATUS



PAYLOAD ID – SMPTE 352

If the unit has detected a SMPTE 352 ancillary packet, it will be displayed here in hex and decoded format.

The display shows the transport media, frame rate and interlaced/progressive/segmented frame mode, as well as colour format, bit depth, dynamic range and channel number. See the SMPTE 352 specification for further details.



When analysing a 3G-Level B signal, the SMPTE 352 status is displayed for each link or stream present according to the input video format. On an SxD with 2 video inputs, only one 3G-Level B may be analysed for 352 status at a time.

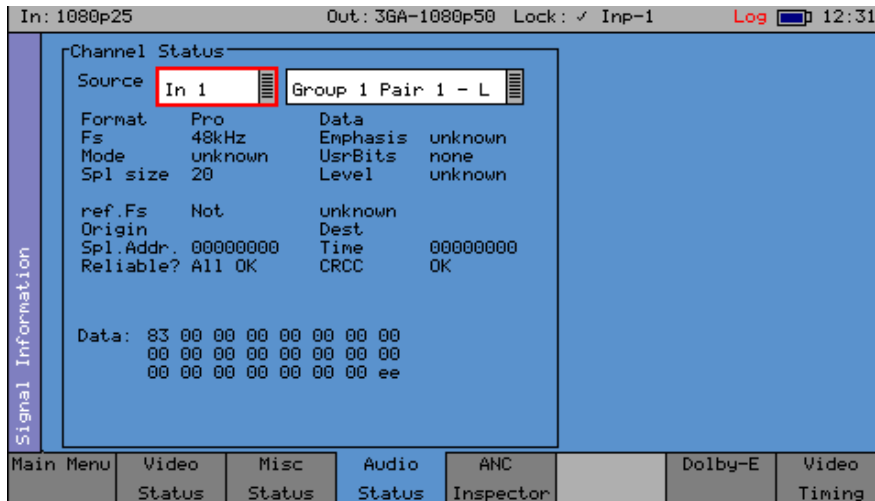
VIDEO FORMAT

This displays the currently detected line length for both active video and full line including blanking as well as the number of active lines for the inputs present. NOTE: The video frequency displayed is only correct if the unit has been calibrated and free running or has been connected to an accurate reference input.

If the input signal is not a known signal (i.e. the line count or pixel count is not recognised) The input status on the top line will show “Invalid” but the values in this section will be updated every few seconds.

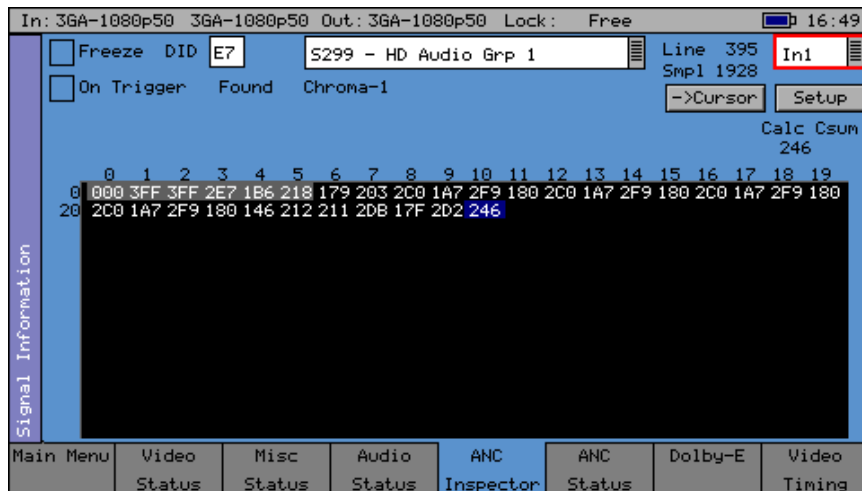
The Re-sync counter displays the number of times the SDI data has been re-synchronised and can help detect intermittent SDI signal problems.

AUDIO STATUS



The Channel Status for the selected audio channel is displayed in decoded form as well as a hexadecimal dump of the bytes. The source may either come from the input signal or from the generator for comparison purposes.

ANC INSPECTOR (SDI DATA OPTION)



This option allows Ancillary data packets to be detected and checked for errors. The packet type can be selected using either the drop down list of known packets or the DID/SDID number fields. If the DID/SDID values match a known type, then that type will be selected in the drop down list. This may be further filtered using the Check Boxes on the Setup dialog.

The Line and sample number of the detected packet is displayed to facilitate debugging of generation equipment. The complete data packet is displayed as a hexadecimal grid at the bottom of the page and may also be decoded into text above the grid.

If an error occurs in the packet, the header and checksum are displayed in red.

The display of data may be frozen by pressing the **Freeze** checkbox.

The 'Found' description shows in which stream the ANC packet was detected, Chroma or Luma and what kind of trigger was detected. This may be:

- C Checksum Error
- D DBN (Data block number) Error
- P Parity Error
- G ANC Gap error

Several of the above flags may be displayed at the same time.

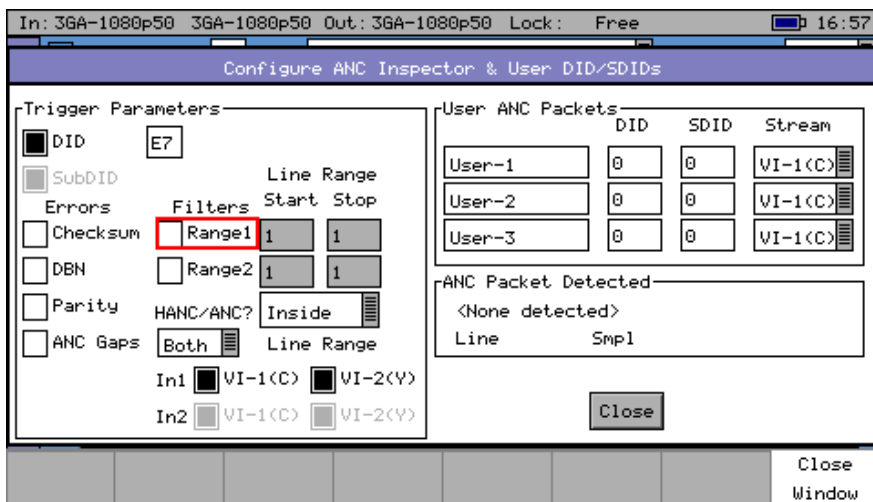
The ANC packets detected may be filtered using the Setup dialog. This allows a great deal of freedom in setting when the display will be triggered.

If the **On Trigger** checkbox is checked the data packet will cause the display to be frozen and the Freeze checkbox will turn red when a trigger condition is met. See the section on the ANC Inspector setup dialog below. Un-checking the freeze button will restore normal operation.

The “->Cursor” button will copy the Line and Sample numbers to the SDI data view cursors to simplify navigation to the ANC packet under investigation.

ANC INSPECTOR SETUP

If the Setup button is pressed a dialog box is shown to allow the ANC packet trigger parameters to be set. The trigger parameters allow only selected lines to be checked or excluded when checking for the presence of packets.

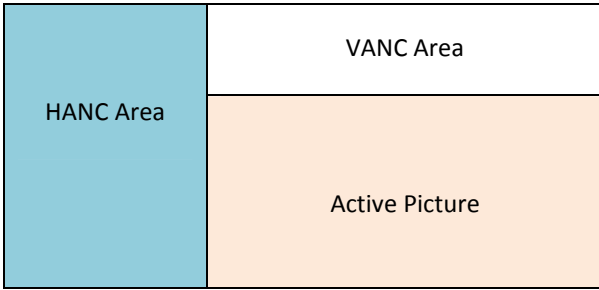


LINE RANGE FILTERS

If either of the Line Range Filter check boxes are checked then the range of lines that the ANC inspector will check is limited to that range. If the Selection below the range is set to “Inside” then it will only check ANC packets inside the range (including the start and end lines). If it is set to “Outside” then it will only check ANC packets outside the specified range.

HANC/VANC? FILTER

This is another filter for simpler selection of where to search for packets. It may be selected to search the HANC are, the VANC area or both areas.



ERROR TRIGGERS

If any of the “Errors” check boxes are checked, then the ANC packet data will only be displayed if an error occurs. The error states detected are:

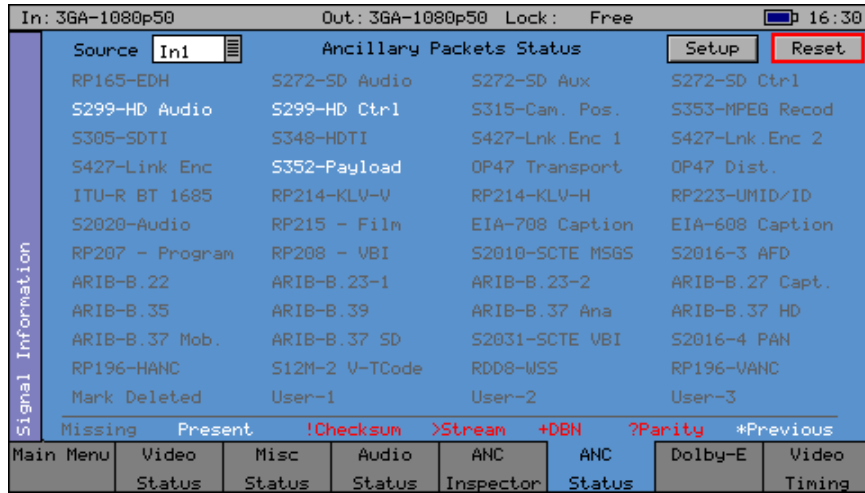
- **Checksum:** A checksum error in a packet was detected. (Sum of data between DID and final UDW)
- **DBN:** A Data Block number error was detected in an audio packet. The DBN field (in the same place as the SDID) of an audio packet should either be 0 and never change OR increment from 1...255 and then start at 1 again.
- **Parity:** A parity error was detected for the DID, SDID and DataCount words in a packet. (Even Parity used and bit 9 is inverse of bit 8)
- **ANC Gaps** The ANC packets were separated by a gap containing video blanking data. EDH (DID=0xf4) packets are ignored. **NOTE:** If an EDH packet is marked for deletion, this will result in an ANC GAP error.

The Setup dialog also shows when an ANC packet has been detected and where it was found. This makes changing a filter simpler as the effect of the filter can be determined without closing the dialog.

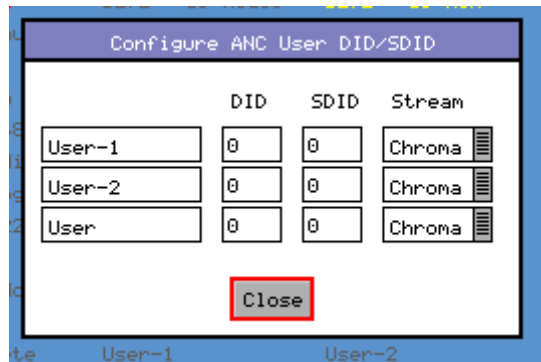
This dialog also allows the user defined ANC packets to be configured.

ANC STATUS (ANC OPTION)

The ANC status shows which ANC packets are present on the SDI input and whether they have any errors. Each field is colour coded according to whether the ANC packet is present (White), missing (Grey), has errors (Red), or has previously had errors (yellow). If the field has errors then a symbol beside the field shows which error type it is. The bottom of the page shows the symbol for each type of error. The **Reset** button resets the “Previous Errors” state.



The **Setup** button and dialog allows user defined ANC packets to be configured.



The packet name, data ID (DID) and SDID may be specified for up to 3 user-defined ancillary packets. The stream field specifies whether the packet should be on the chroma stream, the luminance stream or both.

USING WITH A DOLBY DM100

The DM100 generator must be locked to "Video Reference 48kHz". This is found on the Setup- I/O Control – Gen Clock Source Menu. If this is NOT set, the AES input will not be locked and errors will be detected as the AES input runs in and out of lock.

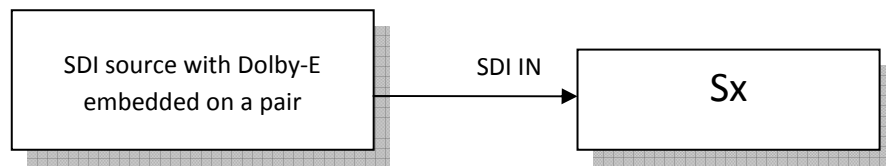
The DM100 AES output needs to be setup to generate Non-Audio AES data or the sample rate converter on the AES input will corrupt the data. Go to Setup-AES3 Output-Audio Mode and set to "Non-Audio" mode.

DOLBY-E STATUS (DOLBY-E ANALYSER OPTION)

The Dolby-E status option allows display of the Dolby-E meta data present in the selected audio stream and determines whether the Dolby-E packet is timed correctly on the SDI video stream. This option therefore allows the Dolby-E aspect of the signal to be timed correctly at all stages in a broadcast chain.

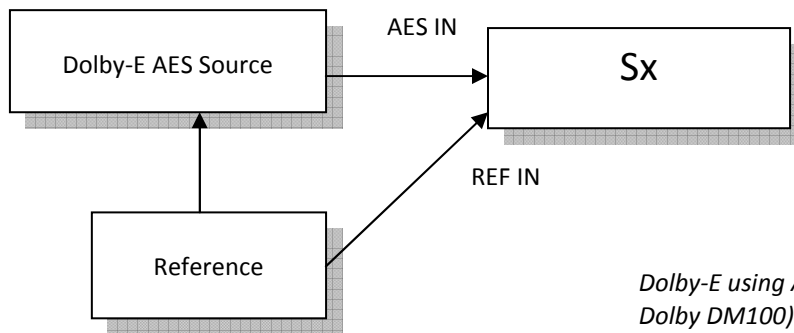


NOTE: In order for the Dolby-E data to be decoded correctly, the internal audio circuitry requires a reference that is synchronized to the input signal. The Generator Reference **MUST** therefore NOT be set to Free-Run or Dolby-E errors may be detected. The description field will display "Invalid Reference" if an incorrect reference is selected.



Dolby-E using SDI signal with Embedded Dolby-E

In the example above, the SDI signal contains embedded audio with Dolby-E present on one or more audio pairs. The Sx needs to lock its internal audio clock to the SDI signal (Generator – Genlock – Source=Input 1) and the Dolby Timing source should be set to SDI.



Dolby-E using AES source (such as Dolby DM100)

In the example above, the AES signal contains a Dolby-E stream. The Sx needs to lock its internal audio clock to the external reference signal (Generator – Genlock – Source=1Ref) and the Dolby Timing source should be set to Ext.Ref. The AES source MUST be locked to the same reference as the Sx.

Source selection: The Dolby-E may be monitored from any of the SDI input embedded audio channel pairs or the AES input.

Dolby Framing Values: It is important for the Dolby-E packet to be positioned well away from the video switching line so that Dolby-E packets are not corrupted by downstream switchers. At all places in the signal chain where audio can be delayed by a different value to the video, the Dolby-E packet needs to be re-timed to make sure that this timing specification is met. The position of the Dolby-E packet in the video frame is displayed in lines and micro-seconds (us).

Timing source: Dolby-E timing may be measured relative to the SDI input or the External reference. If the 'Ideal' checkbox is checked, the Dolby-E Frame timing is relative to the normal position that it should be, i.e. it should be as close to 0 as possible. Each video standard has a specified 'Ideal' line number that the Dolby-E packet should start on. If the Dolby-E timing line is outside the valid range of lines it will be displayed in red. If it is outside the ideal range it will be displayed in dark green – this is still a valid Dolby-E position but not recommended by Dolby. The timing measurement is always displayed in terms of the SDI input lines and thus if an AES input is used as the Dolby-E source, the line position will NOT be displayed.

If you do not have the same reference as the SDI source, you will have to set the Reference Source and Dolby Timing Source to be the SDI input.



IMPORTANT: If Dolby-E is present on a fast frame rate signal (50p, 59p or 60p) then it should always be referenced to a interlaced reference at the same field rate as the packet length is longer than a single frame and must start at the beginning of an even numbered frame.

Start Gain	L1	R1	C1	Lfe	Ls	Rs	L2	R2
End Gain	0.0dB	0.0dB	0.0dB	0.0dB	0.0dB	0.0dB	0.0dB	0.0dB

AC3 Rate	Dialog Norm	Chan Mode
LFE	BsMod	Line Mode
RF Mode	Ctr DnMix	Sur.DnMix
Dolby Surnd	MixLevel	Room Type
DownMixMod	LR Ctr DnMix	LR Sur DnMix
LRo Ctr DnMix	LRo Sur DnMix	D Sur Ex
HPF	LPF	LFE Filter
Sur Ph-Filter	Sur 3dB Att	Copyright
Orig.Stream	RF Ov Prot.	

Meta-Data configuration: This displays the Program configuration (5.1+2 etc), the number of program in the meta-data, the frame rates and bit depths and time-code if any present.

Errors: This displays the number of CRC errors detected in the Dolby-E meta data.

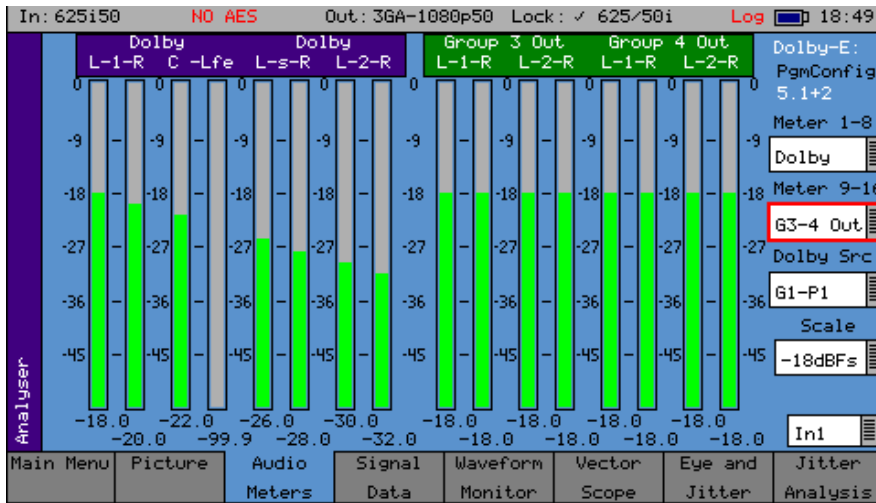
Start Gain: These fields indicate the gain to be applied to the specified channel at the beginning of the audio frame when decoding.

End Gain: These fields indicate the gain to be applied to the specified channel at the end of the audio frame when decoding.

Program selection: Selects which set of program meta data is shown. Up to 8 programs can be encoded in the Dolby-E packet dependent on the Program Configuration.

Program description: User defined description for the selected program.

Program Meta-Data: The meta data is displayed in a Dolby specified order. Any data not required for the Program Configuration specified is grayed out and the data hidden.



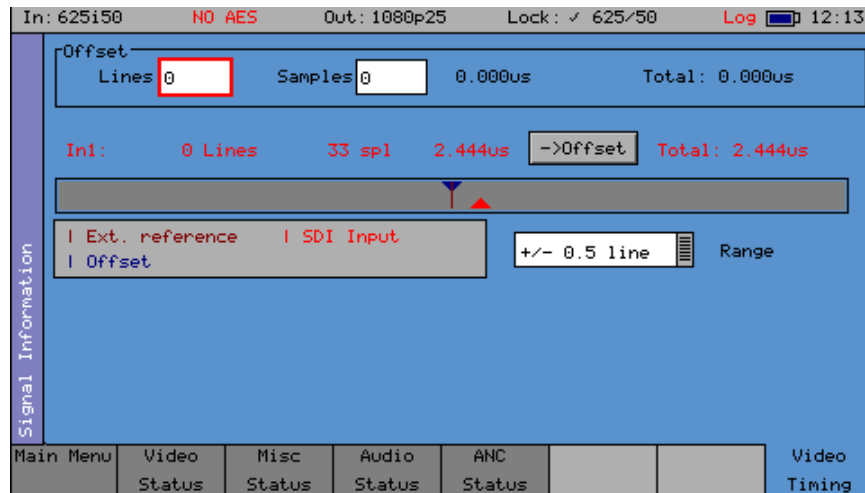
Peak Metering:

The peak audio levels are included in the Dolby-E meta data packet and may be displayed on the Analyser-Audio-Meters page. Select the appropriate set of meters to display Dolby levels and then they will follow the selected Dolby-E source. Note that audio cannot be decoded by the Sx range of products and so you will NOT be able to listen to the Dolby-E signal.

Note that the LFE channel audio levels do not seem to be metered by current Dolby encoding modules.

See the logging section for details on which changes of Dolby-E status may be logged.

VIDEO TIMING



The timing of SDI input signals is displayed relative to the external reference. If no reference is present then an error message is displayed. If the signal is timed to within +/- 2 samples the values are displayed in black in lines and samples (spl) If mis-timed, then they will be displayed in red. A bar graph also displays the timing value which may either be line timing (+/- 0.1 lines or +/- 0.5 lines) or frame timing (+/- 0.5 frame). The total timing value is also displayed in micro seconds.

The RED arrow on the bar shows the SDI input timing and the BLUE arrow shows the current target timing point. The BROWN line shows the timing of the reference signal.

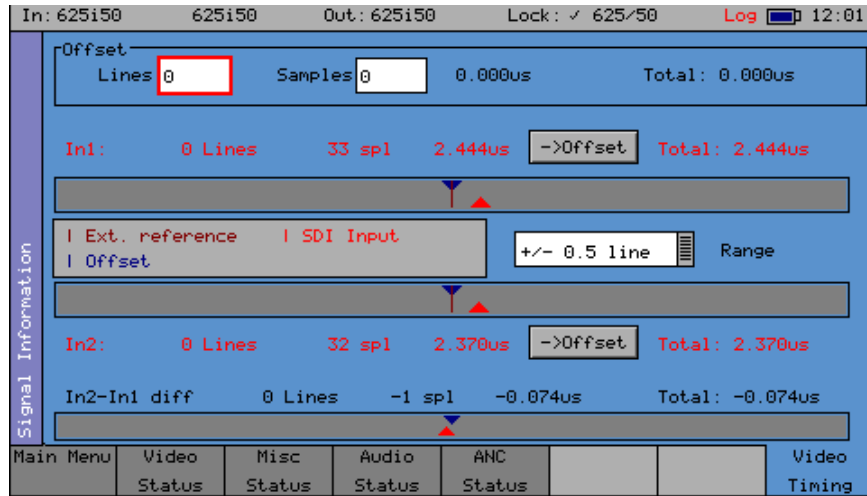
To compare timings of different signals, connect the signal to be compared to the SDI input and select the "Offset" button to make this the current offset. All future timings will be relative to this offset value.

To clear the current offset, move the focus to the 2 offset fields, press OK to edit them and then press default.



Note that all timing measurements are relative to line 1 on the SDI signal and line 1 on the reference signal. This can lead to different vaProductNamelues to other test and measurement instruments that include an SD (PAL/NTSC) offset in their calculations. By comparing line 1 timings, the Sx can be used to accurately measure time delays through up/down/cross converters.

SXD ADDITIONAL FEATURES

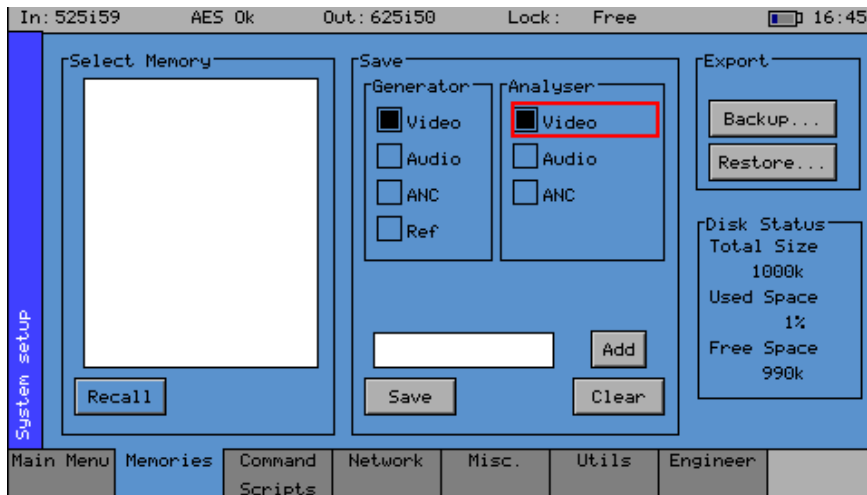


As the SxD has two inputs, the timing of each input may be displayed relative to the reference.

The timing difference between the two inputs may also be measured, even without a reference input. This allows Dual-Link signals to be measured for timing errors due to different cable lengths/types.

SYSTEM WIDE SETTINGS

MEMORIES



The current settings in the unit may be saved for future recall. The check boxes on the right-hand side determine what is saved in the memory. Non overlapping memories may then be combined together.

Note that if log-in has been enabled for an Sx unit, memories may only be added, edited, renamed or cleared and archives backed up by a user with “Modify Memories” permissions.

SAVING MEMORIES

Select the memory to save settings to by moving the cursor to the ‘Select Memory’ list and pressing ‘OK’. Use the up/down cursor keys to select the memory and then press ‘OK’. The name edit field next to the memory list will be updated with the name of the selected memory.

Specify which aspects of the unit are to be saved in the memory using the check boxes on the right hand side. If you want to change the name of the memory see the section ‘Renaming Memories’ below before saving.

Move the cursor to the ‘Save’ button and press ‘OK’. The text field under the Memory list will change to show the last Saved or Recalled memory.

RECALLING MEMORIES

Select the memory to be recalled by moving the cursor to the ‘Select Memory’ list and pressing ‘OK’. Use the up/down cursor keys to select the memory and then press ‘OK’. The name edit field next to the memory list will be updated with the name of the selected memory.

Move the cursor to the ‘Recall’ button and press ‘OK’. The text field under the Memory list will change to show the last Saved or Recalled memory.

RENAMING MEMORIES

Select the memory to be renamed by moving the cursor to the ‘Select Memory’ list and pressing ‘OK’. Use the up/down cursor keys to select the memory and then press ‘OK’. The name edit field next to the memory list will be updated with the name of the selected memory.

Move the cursor to the edit field and press ‘OK’. The menu keys at the bottom of the screen will change to show text keys similar to a mobile phone. Pressing a key repeatedly will cycle through the characters for that key. Pressing a different key will move the cursor to the next position and insert the first key value for that key. The cursor left and right keys can be used to move the position of the text cursor which is where the next character will be inserted. The ‘Back Space’ key will delete the key to the left of the cursor. The ‘Cancel’ key will cancel edit mode and restore the original text. Once you have finished editing the name, press ‘OK’ to rename the memory.

ADDING MORE MEMORIES

To add a new memory, press the ADD button. This will use the current memory name and settings.

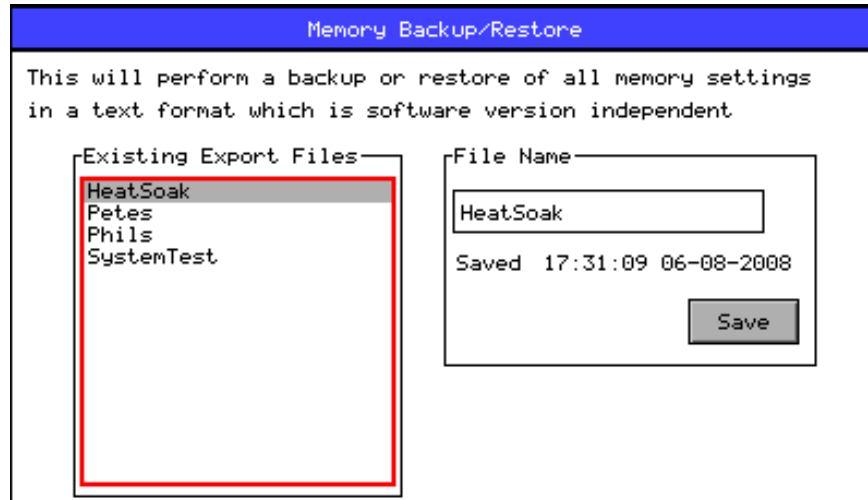
CLEARING MEMORIES

Select the memory to be cleared by moving the cursor to the ‘Select Memory’ list and pressing ‘OK’. Use the up/down cursor keys to select the memory and then press ‘OK’. The name edit field next to the memory list will be updated with the name of the selected memory.

Move the cursor to the 'Clear' button and press 'OK'. The memory list will show the default name for that memory. A cleared memory cannot be recalled.

EXPORT

Memories can be exported to a single file for backup purposes and re-imported into the internal format. This allows different sets of memories to be used for different tasks, such as command scripts. Exported memories are in a text format and so may be edited on a PC and downloaded to/from the backups directory on the unit via FTP or USB.



To export memories, select the **Backup...** button which will open a window to select the file to create. Existing files are shown and a new filename may be selected using the **File Name** edit box. Select the **Save** button to create the backup file. The filename created will have a .mem file extension.

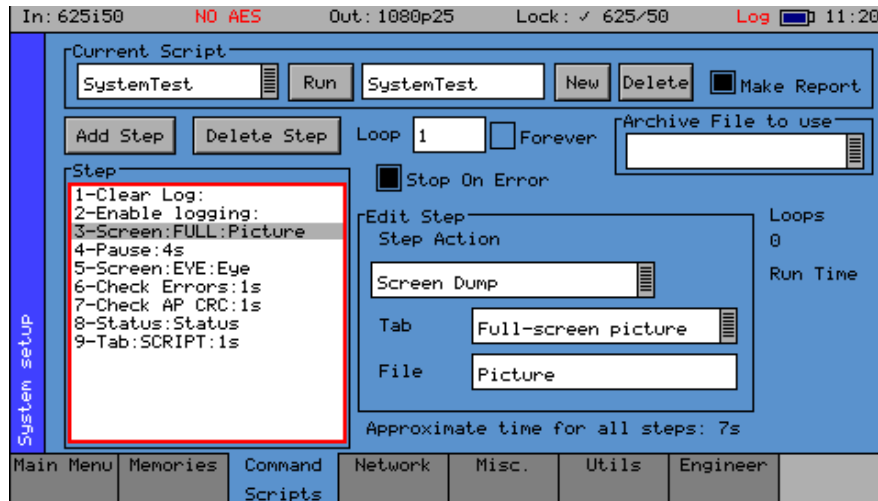
To import memories, select the **Restore...** button which will open a window to select the file to import. Existing files are shown and one should be selected before the **Load** button is pressed. Select the **Load** button to import the backup file.

NOTE: *When importing a backup file, all existing memories are deleted before the backup file is loaded so make sure that they are backed up first.*

DISK SPACE

The disk space section shows total size of the internal flash disk and how much is used as a percentage and how much is free.

COMMAND SCRIPTS (COST OPTION)



Command scripts allow sequences of actions to be stored and recalled thus allowing often repeated test procedures to be run. Each step of a sequence has an associated action and time that the action is valid for. Command scripts are stored in the 'Scripts' directory on the unit and may be downloaded to the unit via the USB port or via FTP transfers to the unit. See the section on Remote File access for further details. See also the section on file formats for details of command script formats.

A script requires a set of memories to set the unit up and then a script file which recalls those memories and specifies times and actions for each step. It is worth while keeping all the memories in an 'archive' file created using the Memory Backup feature above. This archive will then be recalled when selecting the script and all memories will be guaranteed to be present. When recalling memories, it is worth using the checkboxes so that only the relevant settings are saved in the memory.

A sample script, "SystemTest" is included in the software distribution. (Note that if an action refers to a screen not available on the hardware platform (e.g. EYE pattern on an SxA or SxD) that action will not be run.

Note that if log-in has been enabled for an Sx unit, scripts may only be added, edited, renamed or deleted by a user with "Modify Scripts" permissions.

MAKING A SCRIPT REPORT

If the 'Make Report' check box is checked, a web page will be created once the script has completed. The results of all actions will be shown in this report, including any screen dumps performed. This report can be viewed via the Downloads link on the web browser and thus printed for future reference. Each time a script is run, a new report is created with a unique name. Thus the same script may be run on multiple SDI sources and different reports created for each source.

CUSTOMISING REPORTS

By default, script reports display the Phabrix Logo at the top left hand corner. To replace this with your own companies logo or another image, replace the file "logo.jpg" in the /mnt/mmc/reports directory using FTP (see section at the end of the manual on how to use FTP)

The file "report_template.html" in the reports directory is used to create the web report. When creating a report the software looks for the following template filenames in this order:

SCRIPTNAME.tpl.html - where SCRIPTNAME is name of script file

SCRIPTNAME.tpl.htm - where SCRIPTNAME is name of script file

reports.tpl.html

report_template.html

This allows reports to all look the same or for certain reports to be further customised.

These template files are standard HTML web pages but with the ability to replace certain “tokens” with text created by the script.

See the standard file: report_template.html for examples of the tokens.

Tokens available (they are case insensitive)

<#REPORTNAME> insert the name of the report at this point in the report. Reportname includes the unique report number.

<#DATE>

<#USER> Insert the currently selected user (if any)

<#REPORT> Inserts the results of the report

Token Parameters

All tokens may be extended by adding optional parameters e.g.

<#USER before="" after="">

This will insert the html string before the user name and after the user name if user name is set.

Date Parameters

The <#DATE> token may also have a format string to define how the date will be displayed.

The format string may contain:

%a abbreviated weekday name

%A full weekday name

%b abbreviated month name

%B full month name

%d day of the month

%H hour - 24 hour clock

%I hour - 12 hour clock

%m month 1-12

%M minute 0-59

%p AM/PM flag

%S seconds

%U week number of year (Sunday is 1st day of week)

%W week number of year (Monday is 1st day of week)

%w weekday 0-6

%y year yy

%Y year yyyy

STOP ON ERRORS

If Stop on Errors is checked, then any error will cause the script to stop running.

CREATING A COMMAND SCRIPT:

Move the cursor to the 'New' button and press 'OK'. A new script will be created called 'NewScriptn' where 'n' is the next available script number. See also 'Renaming a command script'.

ADDING STEPS TO A COMMAND SCRIPT

Move the cursor to the 'Add Step' button and press 'OK'. A new step will be created with the default action of Recalling Memory 1 in 1 second. Multiple steps can be created at this stage and then the actions edited later.

EDITING STEPS IN A COMMAND SCRIPT

Select the step to be edited by moving the cursor to the step list and pressing 'OK' and then using the cursor keys to select the step. Press 'OK' again to select this step and update the action and time fields for the step. Move the cursor to the field to be edited and edit as required.

SCRIPT ACTIONS

Step Action is one of:

RECALL MEMORY,

Loads the memory specified in the Memory field. When recalling a memory you need to be aware that changing certain fields can take a few seconds before data stabilises. For instance when changing the generator output standard in a memory can take about 3 seconds before the input change is detected. This time will depend on the delay between output and input. During this time the input may come and go and errors may be detected on the line. Thus if you are logging errors you will get spurious errors during this 'switchover' time. A step with a PAUSE action should be inserted if this is the case.

CHECK INPUT ERRORS,

Check for any input errors for the selected input during the Time specified. If there are any errors an event is added to the event log .

CHECK EDH/CRC CHANGES

This will check if the active picture CRC value for the selected input changes and add an event to the log if one occurs during the specified time period. If a CRC value is included, this will be checked against the value detected and an error given if it doesn't match. Note that the CRC value is actually a 32 bit value as shown on the Sig.Info-Video status page which can optionally have a space between the 2 16bit fields. Thus if the CRC value is DA54 B111 then the value in the script CRC field may be "DA54B111" or "DA54 B111". If no value is included then only changes will be detected. This is useful for detecting errors in upstream equipment when used with fixed test patterns.

PROMPT USER

This will put a short prompt on screen in a dialog asking the operator a question and waiting for OK to be pressed to continue.

If log-ins are enabled for the unit (a log-in screen appears when starting the unit) this action is not required as the current user is already known.

CLEAR EVENT LOG

This will clear the event log which is useful when starting a test script so that the event log starts in a known state. If the script is looping, the event log will only be cleared on the first loop.

DISABLE LOGGING

This disables logging globally while a major change in output/input status is about to take place so that unwanted log events are not added to the log.

ENABLE LOGGING

This re-enables event logging after disabling it above.

CLEAR ERROR COUNTS

This clears all EDH/CRC error counts and should be run before checking for errors.

PAUSE

This waits for the specified time before running the next step in the script. (Normally used after a memory is recalled that can take time to complete or if external equipment needs settling time).

SAVE STATUS

This saves the current status of the unit as an XML file and also added to the report in text form. The file will be saved with the name specified in a directory with the same name as the Script file in the Scripts directory. Thus if the Script is called "TestSystem" and the file is set to "3GStatus" an xml file called /mnt/mmc/Scripts/TestSystem/3GStatus.xml will be created. Once the script has been run, all such created files may be downloaded using FTP to create a results file. The format of the XML file is determined by the default file "/mnt/mmc/scriptxmlformat.ini" which determines which control IDs are used to create the XML file. Note that if you edit this file, you should take a backup of it as it will be overwritten when a software update takes place. You can however copy this file to a new file with the same name as the script (The new name must match case) so if your script is called "TestSystem.cmd" the ini file should be called

“TestSystem.ini” The information in this file is in “comma separated values” format and you may delete any lines that you don’t want in the final status file.

SELECT TAB

The specified tab on the Sx will be displayed. This allows the user to check a screen, waveform display or event log etc. This action will normally be followed by a pause or prompt action.

SCREEN DUMP

The specified Tab will be displayed and saved to the current report directory as well as being added to the report file if active. The filename must be specified as a unique filename for this Script.

SELECT USER

This action will display a dialog with a list of users to choose between. The selected user may be displayed at the top of the report if required. User names are separated with commas (,)

CHECK AES I/P

Check for AES input errors in the step Time. If there are any errors an event is added to the event log.

CHECK EYE

Checks that the eye amplitude and rise/fall times are within the SMPTE specifications for the time period specified.

CHECK JITTER

Checks that the jitter levels are under those set in the logging jitter threshold fields for the time period specified. See logging setup section for further details.

CHECK METER LEVELS

This action checks that the level for any visible meters is at the level set by the meter scale. This level may be -18dB or -20dB. If the level is over 1dB greater or less than that value an error will be inserted in the log and report files. If any groups are missing, these will be ignored by the test. Testing may be limited to specified audio pairs as set up on the Log Setup page.

CHECK METERS OFF

This action checks that the level for any visible meters is below -70dB. If the level is above that value an error will be inserted in the log and report files. If any groups are missing, these will be ignored by the test. Testing may be limited to specified audio pairs as set up on the Log Setup page.

DELETING STEPS IN A COMMAND SCRIPT

Select the step to be deleted by moving the cursor to the step list and pressing ‘OK’ and then using the cursor keys to select the step. Press ‘OK’ again to select this step. Move the cursor to the ‘Delete Step’ button and press ‘OK’.

DELETING A COMMAND SCRIPT:

Move the cursor to the list of command scripts on the left hand side and select the script to be deleted as the current script. Then move the cursor to the 'Delete' button and press 'OK'. The currently selected script is the one that is deleted.

RENAMING A COMMAND SCRIPT:

Move the cursor to the list of command scripts on the left hand side and select the script to be renamed as the current script. Move the cursor to the name edit field and press 'OK'. The menu keys at the bottom of the screen will change to show text keys similar to a mobile phone. Pressing a key repeatedly will cycle through the characters for that key. Pressing a different key will move the cursor to the next position and insert the first key value for that key. The cursor left and right keys can be used to move the position of the text cursor which is where the next character will be inserted. The 'Back Space' key will delete the key to the left of the cursor. The 'Cancel' key will cancel edit mode and restore the original text. Once you have finished editing the name, press 'OK' to rename the script.

RUNNING A COMMAND SCRIPT:

Move the cursor to the list of command scripts on the left hand side and select the script to be run as the current script. Move the cursor to the 'Run' button and press 'OK'. The Run button will now become a 'Stop' button to stop the running script.

While the script is running the total number of errors detected is displayed on the scripting page as well as on the count-down timer dialog. Once the script has completed, the total number of errors is added to the end of the event log as well as to the report if created.

LOOPING A COMMAND SCRIPT:

By default a script will run all steps and then stop running. The 'Loop' check box allows a script to loop until stopped. This feature allows testing of a system forever for heat-soak testing in a manufacturing environment or to check for system reliability over a period of time. The Loop Count field shows how many loops have been run and how many hours and minutes the script has been running for.

LOADING ARCHIVE FILE AS PART OF A SCRIPT

An archive file may be loaded when the command script is run by selecting one in the 'Archive File to use' field.

The archive file contains all the memories used by the script – this is optional as not all scripts use memories.



Note that if the memories are updated while debugging a script, the memories **MUST** be saved to the archive or the settings will be lost. A dialog is shown confirming overwrite of memories when this happens.

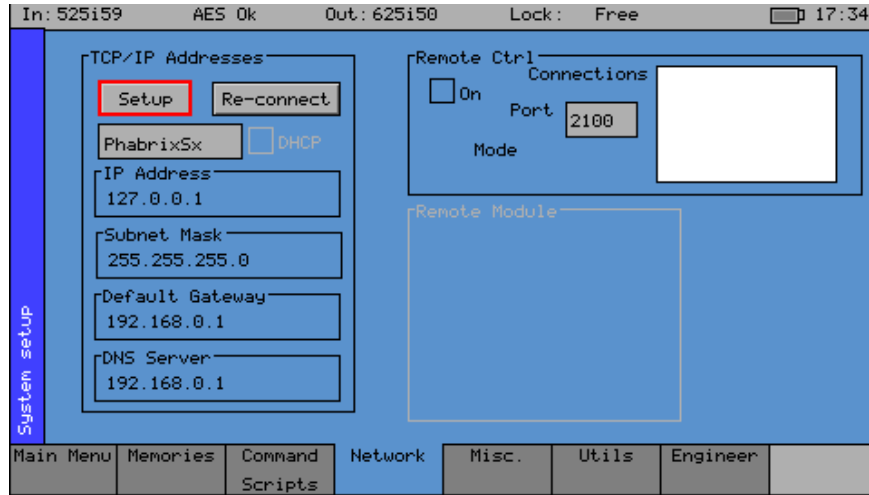
SCRIPT RESULTS

Once a script has completed (or a looping script has been aborted) a line will be added to the log (if enabled) and report file to show how many errors were detected during the running of the script. The log need only be examined if errors have been detected.

EDITING COMMAND SCRIPTS ON A PC:

Download the required Script file from the Sx using FTP over the Ethernet port connection. The file is a plain text file and can be edited using NotePad or a similar editor.

TCP/IP SETUP



PHABRIX Sx is fully networkable and has a complete network interface to allow control of any unit from any other unit. All units on a network need an ‘address’ so that the other systems know how to talk to them. To setup network addresses select the “Setup” button and edit the settings. If you have a DHCP server on your Ethernet network, check the DHCP box and a TCP/IP address will be assigned to the unit automatically. If your network has ‘static’ (non changing) addresses, you will need to see your network administrator to get an address assigned to your unit and to get the Subnet mask and default gateway address.



If your Sx was turned on without the network connected, you will have to select the “Re-connect” button to set networking up correctly. This is because the Ethernet connection auto senses whether it has to swap the cable over which means that you can use any Ethernet cable with the Sx but it also requires the Ethernet connection to be present when starting up the

Sx.

REMOTE CONTROL OF UNIT (COST OPTION)

To allow remote control of a unit, you must have the TCP/IP address of the unit set and the Remote Control ‘On’ check box must be checked.

The list box shows a list of current connections made to the unit. This includes the web browser connection (127.0.0.1) which may be seen intermittently as the web browser connects every few seconds and then disconnects again. See the remote control documentation available for download for more information on the protocol and method of control.

The Sx uses a default Port Number of 2100 for remote control access (See Remote Control SDK documentation on Download section of Web Site) This port number may now be changed if it conflicts with other applications in your system.

REMOTE WEB BROWSER ACCESS

The PHABRIX Sx may be controlled via your web browser. Operation has been tested using Firefox, Opera, Safari, Chrome and Internet Explorer but should work with any browser which allows JavaScript.

To connect to the PHABRIX Sx, find out its IP address and type it into the web browser.

You should see a screen like this:

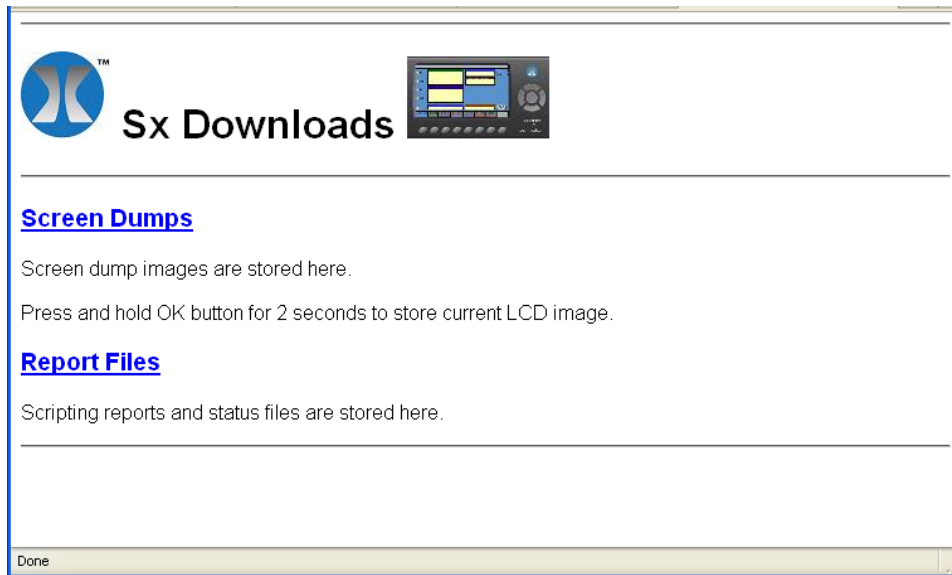


Clicking on the buttons works exactly like the unit that you are connected to (note that auto-repeat doesn't work due to browser speed limitations). The LCD screen on the browser image is updated every 10 seconds but may be refreshed manually by clicking the LCD area on the browser.

The "Log" link on the right hand side may be selected to fetch the current Event Log from the Sx.

The "Status" link on the right hand side may be selected to fetch the current unit status in XML format. It can be saved to a local PC for further processing. The control IDs displayed in the XML file are determined by the file "/mnt/mmc/xmlformat.ini" which may be edited by the user although note that it should be backed up as it will be over-written when software updates take place.

The "Downloads" link displays a further page allowing screen dumps and report files (Command script option) to be viewed.



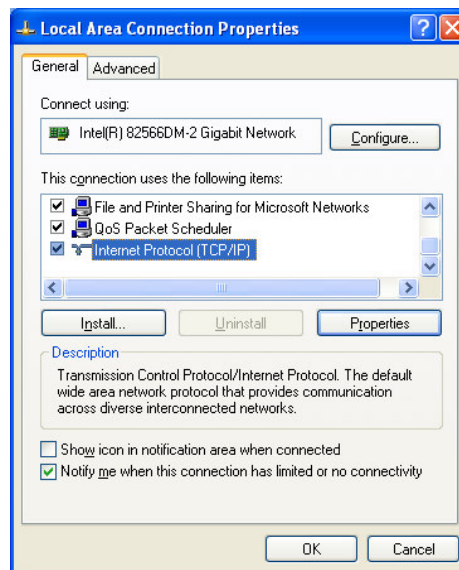
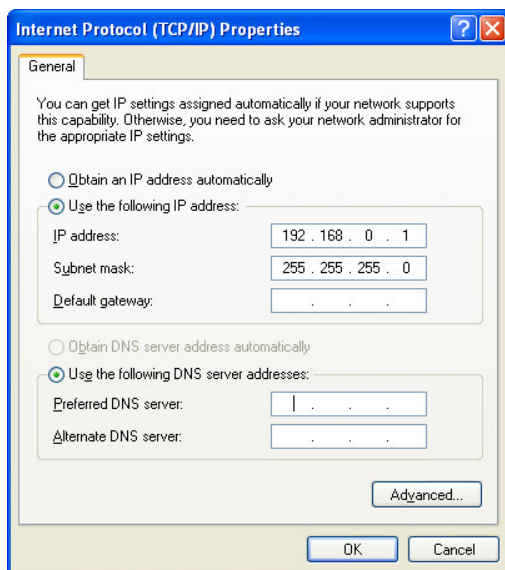
Screen dumps of the PHABRIX Sx can be made using the browser's or operating systems facilities. (On Windows(tm) Alt+Print Screen causes the web browser's window data to be stored on the clipboard).

SETTING UP A WINDOWS™ PC FOR DIRECT CONNECTION

A PHABRIX Sx may be connected to a PC via your network or directly using an Ethernet cable between your PC and the Sx. The PHABRIX Sx does not require a cross-over cable as it auto-senses the connection, thus any Ethernet cable may be used. The PHABRIX Sx should be set to a fixed IP address.

The PC's network settings should be set to give a fixed IP address in the same range as the PHABRIX Sx's IP address, but use a different address. To set up the PC, go to the Windows control panel and select Network Connections and then select Local Area Connection and get its properties dialog.

Select Internet Protocol (TCP/IP) which is at the bottom of the list and click the 'Properties' button.



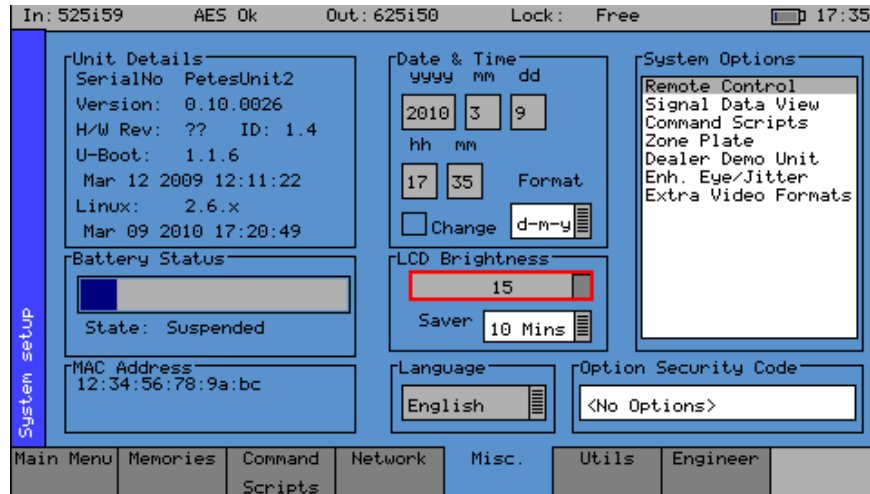
A new dialog should appear. Set the IP address to a different value to that of your PHABRIX Sx but keep the first 3 numbers the same. The Subnet mask should be the same as that on the PHABRIX Sx and should be as shown above.

The orange LED on the PHABRIX Sx Ethernet connector should light when connected and the green light should flash when network data is detected.

The PHABRIX Sx should be set with DHCP OFF and the other settings as shown. The DNS server setting MUST be set to the address of the PC that is directly connected for FTP and Web access to work.

The IP Address can be any value within the valid Subnet region.

MISC.



This page shows serial numbers, unit MAC address, version information and battery state. It also allows the date and time to be set and factory default settings to be recalled. The options security code is entered on this page if options are purchased.

CHANGING THE DATE/TIME:

Check the 'Enable Change' checkbox under the date and time fields and then use the cursor to move around the date and time. Press 'OK' to edit a field and again to complete the change. When all fields have been edited, uncheck the 'Enable Change' check box and the new date and time will be set.

Note that the date may not be changed while a 30 day trial option is active.

CHANGING THE DATE FORMAT:

The date format used on logging screens etc may be set using the Format selection control. Three formats are available: Date-Month-Year, Month-Date-Year and Year-Month-Date.

SETTING LCD BRIGHTNESS

Use the LCD brightness slider to set the LCD brightness, using a lower brightness will reduce the current drawn from the battery and thus lengthen battery life.

SETTING SCREEN SAVER MODE

When the unit is battery powered the screen saver will operate after a user defined time period and reduce the LCD brightness down to its lowest level. This will lengthen battery life. Pressing any key will restore the previously set LCD brightness.

SETTING USER LANGUAGE

The language used to display the menus in may be changed to one of the supported languages. (Currently only English is supported)

CHANGING OPTIONS SECURITY CODE

When new options are purchased for the unit a new Security Code will be supplied. This is specific to this unit and cannot be used on other units. The security code is entered using the Edit field below the System Option list and is edited by pressing OK and using the menu function keys. If an incorrect Security code is entered a dialog will be displayed. The new Security code will only be saved if it is valid, the old code will be used until a valid code is entered. Once a valid new code has been entered, the list of options provided by that code will be displayed. The options code is stored independently to memories and system settings.

UTILS

The screenshot shows the 'System Setup' menu on a PHABRIX Sx unit. The top status bar displays: In: Absent, NO AES, Out: 3GA-1080i50, Lock: Free, Log, and a battery icon with the time 17:31. The main menu is titled 'System Setup' and contains several sub-menus: Main Menu, Memories, Command Scripts, Network, Misc., Utils, and Engineer. The 'Utils' sub-menu is currently selected, displaying a 'Hardware Status' screen. This screen is divided into three sections: 'Hardware Status', 'Temperature', and 'Voltages'. The 'Hardware Status' section shows a table of errors and messages for various components. The 'Temperature' section shows the current temperature in Celsius and Fahrenheit. The 'Voltages' section shows the power input and various output voltages, including a note about Eye/Jitter ON.

Component	Errors	Messages
LM80	0	4171
CPLD	0	39724
Spkr DAC	0	13
AES SRC	0	16602
IDT PLL	0	6
SDI DRV-1	0	2
SDI EQ-1	0	16603
Eye Reclock	0	1

Temperature: 45.0 C 113.0 F

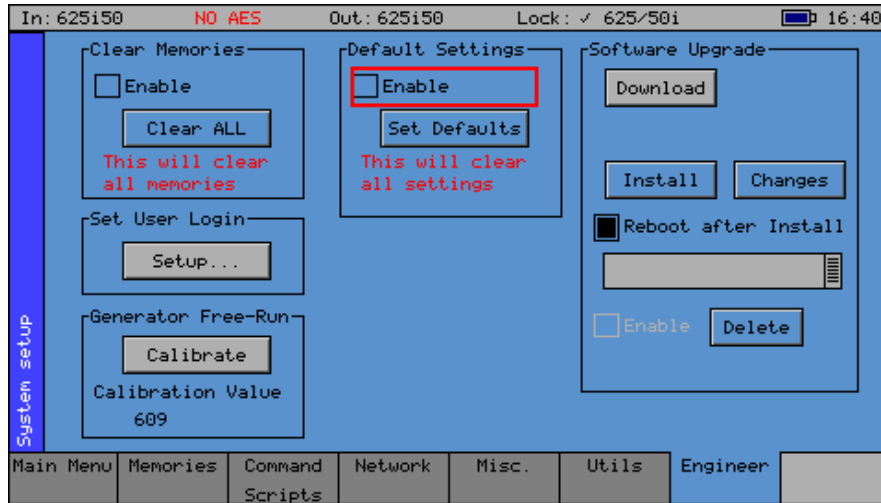
Voltages:

Power In	4.63V
2.5V	2.48V
3.3V	3.26V
Fan 5.0V	5.06V
3.5V	3.50V
-5.0V	-5.06V
3.3V	3.30V

N.B. Only ON if Eye/Jitter ON

This screen shows system voltages and temperature but only on the SxD and SxE and later versions of SxA.

Hardware error counts can also be viewed. Contact your local dealer if they are non-zero.



This page adds features for special use.

CLEAR MEMORIES

Check the 'Enable' checkbox above the 'Clear ALL' button. Press the 'Clear ALL' button and all the user memories will be deleted.

DEFAULT SETTINGS

Check the 'Enable' checkbox above the 'Set Defaults' button. Press the 'Set Defaults' button and the factory defaults will be recalled. This will not affect the system Security Code or Free Run frequency.

SET USER LOGIN

You can set up user log-in on your Sx unit by adding users to the system. With User log-in enabled a log-in screen will be displayed when the Sx is turned ON and a valid user and password is entered. Each user has an encrypted password and permissions which may be set.

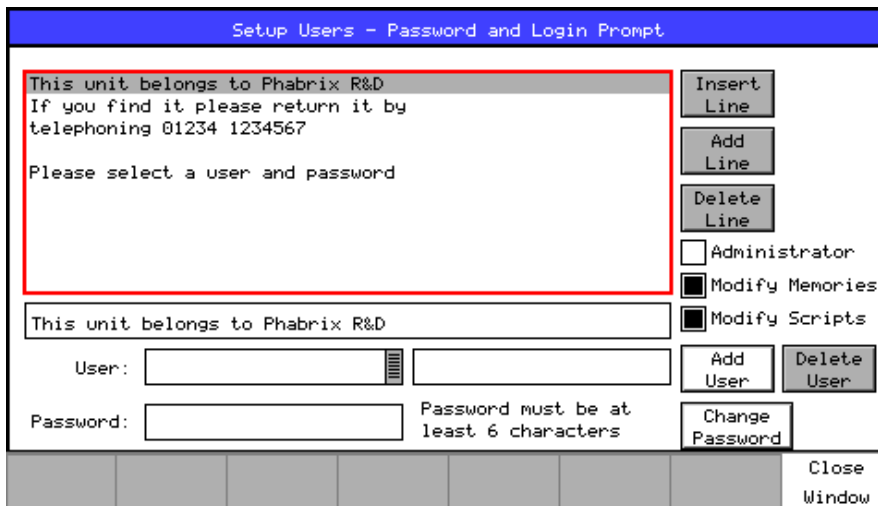
Using the User Login feature allows the Sx to be protected from operation by unauthorised users and the prompt feature can allow a message to be displayed so that if an Sx unit gets lost or stolen, someone finding it knows where to return it.



ADDING/DELETING USERS

Add a user by editing a new name in the User Edit box next to the “Add User” button and then editing a new password. Once the password is 6 characters or longer, the “Add User” button will become enabled and may be pressed. Make sure that your password is memorable. If all passwords to a unit are forgotten, you can contact Phabrix for an over-ride password. Users with administrator permission may add/delete users.

Once user log-in has been set up on your Sx a “Log out” button is added to the main menu which causes the log-in screen to be displayed. This may be used to protect a systems settings from being modified by other users. The system is still fully running while the log-in screen is visible.



The permissions are:

- Administrator:** This user may add/delete users and may also edit the Log-in prompt text.
- Modify Memories:** This user may create, save and delete memories and Archives.
- Modify Scripts:** This user may create, save and delete script files (if the command scripting option has been purchased)

Each user may modify their own password by entering a new password (6 or more characters) and pressing Change Password.

If all users are deleted, the unit reverts to starting up without a login screen.

EDITING THE PROMPT TEXT:

The simplest way to edit the prompt text is to FTP a prompt text file onto the Sx unit. This file should be called “loginprompt.txt” (it MUST be all lower case). The unit should then be re-started for the new file to be used.

Users with administrator permissions may also edit the prompt text by selecting a line in the prompt text list and editing it by pressing the OK button when in the line edit field using the text keyboard.

Add a new blank line after the selected line by pressing the “Add Line” button.

Insert a new blank line before the selected line by pressing the “Insert Line” button.

GENERATOR FREE-RUN

Press this button to calibrate the free running frequency using the External reference or Video Input as selected by the Generator – Genlock page. If no input is present or the Generator is free running, an error dialog will be shown. The calibration will take a few seconds to take place and once completed, the calibration value will be shown. This calibration value is not lost when memories are cleared or factory defaults recalled above.

SOFTWARE UPGRADE

The unit may download and install new versions of software when available. This process is a two stage process: Download the software and then install it.

DOWNLOAD

Make sure that the network settings are correct and that the unit is connected to the internet via the Ethernet connection. Note that the unit should be connected to the AC adaptor so that the battery state does not affect the download process.

Pressing the Download button will cause the current release of software to be downloaded from the PHABRIX Web Site. This will take a short time dependent on the connection to the Internet. Once the download has completed, the software will be checked for errors before being stored on the unit for future installation. If the latest software is already present on the Sx, no software will be downloaded and a message will be shown.

Multiple releases of software may be stored on the system so a unit may go back to a previous release if a test script requires it.

INSTALL

Note that the unit should be connected to the AC adaptor so that the battery state does not affect the installation process. The unit does NOT have to be connected to the Internet during installation.

Select the release of software to install using the field with releases listed. The largest number is the latest release. Select the ‘Install’ button and a confirmation dialog will be shown. Press “Yes” and the installation will start. This process takes several minutes to decompress the software, extract the files and then reprogram the hardware and during this time the unit MUST be connected to the AC adaptor or corruption of the unit can occur which will stop it working. If an error is given during the installation, retry the installation and or download. Do NOT turn the unit off until an installation has completed correctly.

Once the installation has completed, if “Reboot after Install” is checked the unit will re-start with the new software installed. If not checked then the unit should be turned off and on again manually.

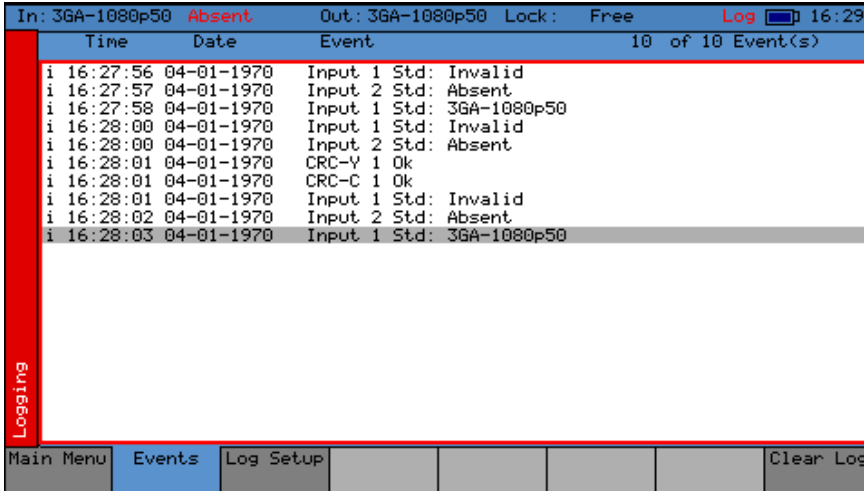
NOTE: As part of the installation procedure, all memories are archived to a backup file and then deleted. They can be restored from the System-Memories page using the Restore button and selecting the ‘_Before_Upgrade’ archive.

LOGGING

Logging allows events to be detected and recorded for future examination. The events to be logged can be specified so that unwanted events do not appear in the event log. If a system has a problem with intermittent signals, the PHABRIX Sx can be connected to that source and can be left for several days to log any errors. At the end of that period the log can be examined and the time and date of each error noted.

The error log is saved when the unit is powered off and may be downloaded from the unit via FTP .

EVENTS LOG



In: 3GA-1080p50 Absent		Out: 3GA-1080p50		Lock: Free	Log	16:29
Time	Date	Event		10 of 10 Event(s)		
i 16:27:56	04-01-1970	Input 1 Std: Invalid				
i 16:27:57	04-01-1970	Input 2 Std: Absent				
i 16:27:58	04-01-1970	Input 1 Std: 3GA-1080p50				
i 16:28:00	04-01-1970	Input 1 Std: Invalid				
i 16:28:00	04-01-1970	Input 2 Std: Absent				
i 16:28:01	04-01-1970	CRC-Y 1 Ok				
i 16:28:01	04-01-1970	CRC-C 1 Ok				
i 16:28:01	04-01-1970	Input 1 Std: Invalid				
i 16:28:02	04-01-1970	Input 2 Std: Absent				
i 16:28:03	04-01-1970	Input 1 Std: 3GA-1080p50				

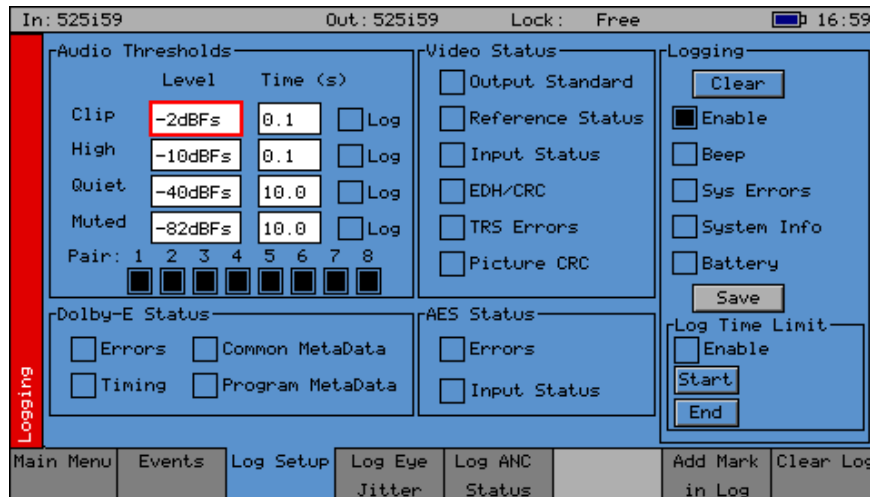
Main Menu Events Log Setup Clear Log

The event log displays a list of events with a time stamp showing when they occurred. Pressing OK on the event log page allows the event log to be scrolled through to view all events in the list. The currently selected event is shown on the event log header. The date format may be changed using the Date ‘Format’ control on the System-Misc page. The event log may be cleared by pressing ‘Clear Log’ button; a dialog will be shown asking the user to confirm the action. A date stamped ‘mark’ may be inserted into the event log to allow users to see when a test started or when a significant event happened using the ‘Add Mark in log’ button.



Note that the event log only shows changes in status, so if the input is always in error and never good, an event will not be shown. To get the full state of the instrument will require looking at the current status as well as the event log.

EVENTS LOG SETUP



The events to be logged are set up on this page by checking the appropriate 'Log' checkboxes.

AUDIO THRESHOLDS

This section allows the thresholds for audio events to be set. If the audio level for a channel is higher than that specified for the Clip or High fields for the number seconds specified then an event will be added to the event log. If the audio level for a channel is lower than that specified for the Quiet or Muted fields, then an event will be added to the event log. Logging may be limited to specified audio pairs.

VIDEO STATUS

OUTPUT STANDARD

A log event will be added whenever the generator video standard changes.

REFERENCE STATUS

A log event will be added whenever the external reference standard changes or the external reference input is lost or re-appears.

INPUT STATUS

A log event will be added whenever the input video standard changes or if the input is lost or re-appears.

EDH/CRC

A log event will be added whenever a EDH/CRC error state changes. If the EDH/CRC state is correct, the event will show OK, else it will show FAIL. Separate Luma and Chroma CRC events may be shown. Note that EDH/CRC events may occur when an SDI signal is connected or removed.

TRS ERRORS

If the number of lines changes or line length changes during a frame, the input video will be detected as the TRS changing and an event logged. If the signal stays changing only a single event will be logged. If the SDI signal has a static line count and line length for 5 seconds, a TRS OK event will be added to the log. This reduces the number of log events for a bad SDI signal.

PICTURE CRC

This should only be used for static single frame test patterns (do not use for Zone Plate, dynamic broadcast signals or CheckField/Pathological test patterns which are two frames long at HD). This can be used to log changes in the CRC for the active picture (a value which is unique for each test pattern). If the CRC changes and was previously OK an error is added to the event log. If the CRC is the same as the last frame for 5 seconds an OK event will be added to the event log. Thus, if the active picture CRC is continuously changing there will only be one event in the log until the picture remains static when an OK event will be added.

This feature is useful for checking that equipment is not corrupting static test patterns.

AES STATUS

ERRORS

A log event will be added whenever the embedded audio error status changes. This may be due to a Data Block Number error, ECC error or phase error status change. The event entry will detail which state has changed.

INPUT STATUS

A log event will be added if the AES signal disappears or appears.

DOLBY-E STATUS (REQUIRES DOLBY-E ANALYSIS OPTION)

ERRORS

This will add an event to the event log when a Dolby-E input stream is detected or lost. An event will also be added if a CRC error is detected in the Dolby-E meta-data stream. If an error is detected in the Dolby-E stream, it may mean that the Dolby-E stream has not been synchronised with the embedded audio clocks.

TIMING

An event will be added to the event log if the Dolby-E frame timing is outside the Dolby specified 'Ideal' range. A Warning event will be given if the signal is OK but slightly outside the range and an Error event if it is on an invalid line.

COMMON METADATA

If any of the common meta-data (Program Configuration, Bit Depth, Frame Rates) changes, then the changed meta-data will be added to the event log.

PROGRAM METADATA

If any of the program meta-data changes, then the changed meta-data will be added to the event log. This can be useful for following changes to a program stream over a long period of transmission.

AES STATUS

ERRORS

A log event will be added whenever an error is detected in the AES input stream. This is only available on SxA/SxE units.

INPUT STATUS

A log event will be added whenever the AES input status changes. This is only available on SxA/SxE units.

LOGGING

This section controls ALL logging events

CLEAR

This clears all entries in the event log.

ENABLE

Logging is enabled using the Enable CheckBox. If this is not checked, no events will be added to the log. This is a simple method of turning off ALL logging temporarily.

BEEP

If the 'Beep' CheckBox is checked, the Sx will emit a short tone when an Event is added to the log. Note that the beep will happen even if the Speaker is set to Mute.

SYS ERRORS

The Sys Errors checkbox allows system errors to be displayed in the Event Log if they happen. If you are having problems with your Sx, checking this box can add events that can help PHABRIX determine the nature of the problem.

SYSTEM INFO

The System Info checkbox allows system to report additional internal messages in the Event Log if they happen. If you are having problems with your Sx, checking this box can add events that can help PHABRIX determine the nature of the problem.

BATTERY

The Battery checkbox allows the system to log the battery voltage. If you are having problems with your Sx, checking this box can add events that can help PHABRIX determine the nature of the problem.

SAVE

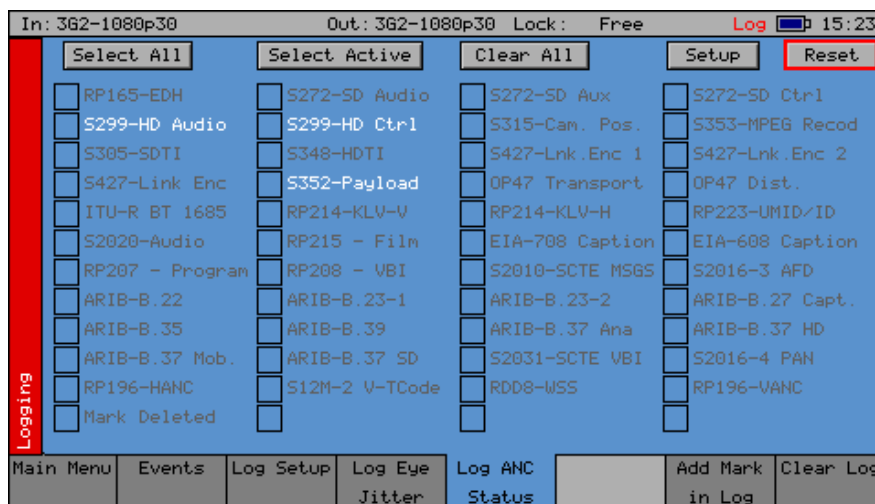
The 'Save' button saves the current event log to a text file in the currently specified language. The log file created, logfile.txt may be downloaded using a FTP connection.

LOG TIME LIMIT

The time when logging is enabled may be limited by time of day. Logging will start at the specified start time and end at the specified end time. The specified times **must** be after the current time. Uncheck the box to log at all times. Logging must be enabled using the check box above for this to work.

LOG ANC STATUS

This page allows customisation of which ANC packets to log for changes in status (e.g. Present, Checksum Error, Missing, Parity Error). Individual check-boxes are provided to determine which packet DID/SDID combinations are logged.

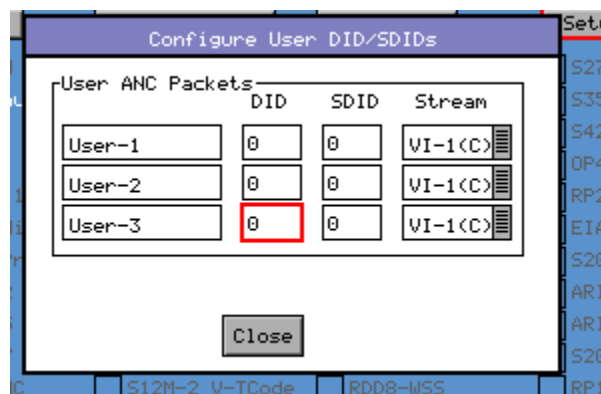


Select All Pressing this causes the checkboxes for all packets to be checked.

Select Active Pressing this causes the checkboxes for all packets currently present to be checked.

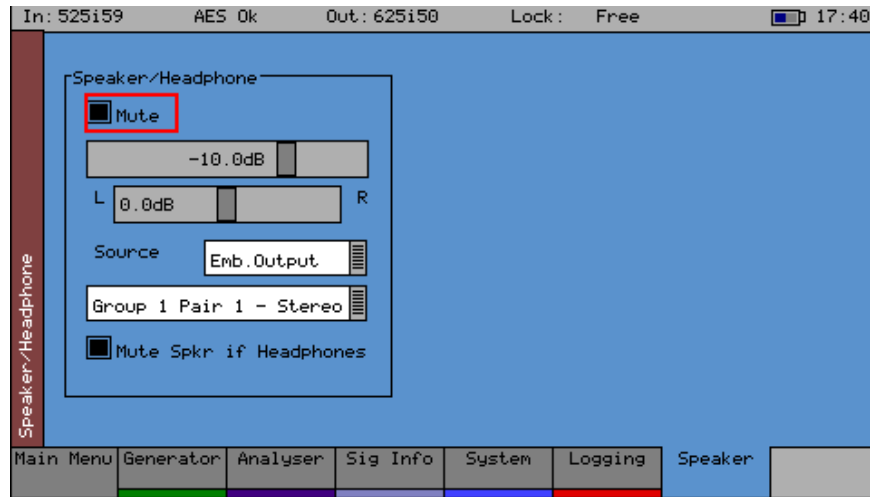
Select All Pressing this causes the checkboxes for all packets to be un-checked.

Setup This allows the user to define and name their own DID/SDID values for an ANC packet type.



Reset Clears the state for all packet types and thus a packet that was displayed as previously in error is shown as OK.

SPEAKER




The unit contains a single loud speaker and associated stereo headphone socket which can be connected to any of the audio input or output channels or pairs.

The 'Mute' checkbox allows both signals to be muted.

A volume control is provided to adjust the level to headphones and speaker together. The balance control can be used to adjust the Left-Right balance for the source being monitored.

The monitored source can be set to the input or output of the unit and the input and output sources can be set independently to either a stereo pair or single audio channel.

The speaker can be muted when headphones are plugged in by checking the 'Mute Spkr if Headphones' control.

 **Note:** When listening to an audio source, the Sx needs the audio to be synchronous with the Sx Generators' audio. If this is NOT the case, 'clicks' will be heard on the speaker. Either connect the Sx reference to the same reference as the SDI input source and set the Generator-GenLock source to Ref or set the genlock source to Input-1.

REMOTE FILE ACCESS

Files may be uploaded or downloaded from/to the PHABRIX Sx by a remote PC using the Ethernet connection.

FTP

You will need an Ethernet cable to connect the unit to a PC.

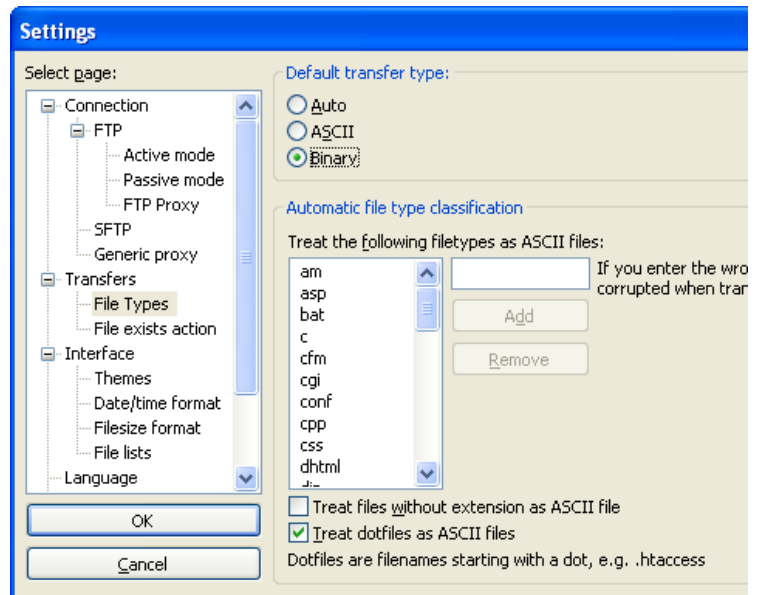
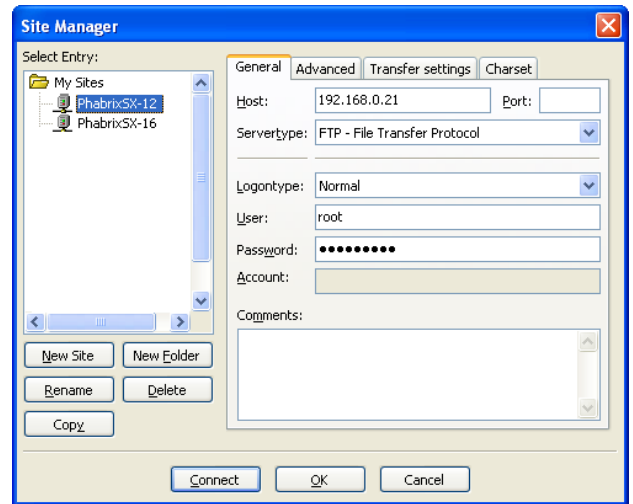
To connect to the unit you will need to use a FTP client which may be a GUI based one such as FileZilla or that built into windows. There is also a simple FTP Client available for download from the Phabrix Web Site which is optimised for the Sx range and has some extra Sx specific features such as downloading and deleting Screen-dumps.

If you do not use the Phabrix FTP Client you will need a login and password to connect to the Sx. The login for the system is 'sxuser' and the password is 'phabrixsx'.

'FileZilla' is available for download from

<http://filezilla-project.org/download.php>

Other FTP applications are available for other computer platforms. Once you have connected to the unit, you should be able to see the unit file structure below. When downloading software revisions to the Sx, you must ensure that your FTP application is set to transfer binary files without corrupting them. On FileZilla, this requires you to go to the "Edit - Settings" menu and select the Transfers – File Types page. Make sure that the "Treat files without extension as ASCII file" check box is NOT checked or corruption will occur.



SX FILE STRUCTURE

Several directories are provided for user files these are:

PATTERNS

This directory contains several sub-directories for the related video standards. Test pattern files should be placed in the correct directory for the video standard in use. i.e. if a 720p video standard is being used, only the test patterns in the 720yuv directory will be available. You may have a test pattern with the same name in different pattern directories but they should have the correct size and colour type (rgb/yuv) for the directory that they are in or they will be converted and may lose colour accuracy.

Patterns that are too large for the current standard will be clipped to fit; patterns that are too small will gain a black border and will be centred on the output image.

Test patterns are .pat files for the standard line based pattern files or user files. Supported user file formats are:

- Windows bitmap files (.bmp). We support 24bit uncompressed bitmap formats only.
- 10 bit video files (.dpx) We support 10bit RGB/YUV formats only in Left to Right orientation.
- Yuv and qnt files (8/10 bit packed yuv only)
- targa (.tg) files which are compressed or uncompressed 8bit RGB files. We support Left to Right orientation only.
- Phabrix specific .pat, .rgb, .yc4 files generated by the Phabrix pattern editor/convertor.

Note that bitmap files which are RGB will be converted to YUV internally as appropriate to the output standard. This will mean that not all valid YUV values can be output. If dpx YUV files are used then all valid values may be output.

SCRIPTS

Command scripts may be downloaded into this directory. See FileFormats-Command Scripts for more details.

SETUP

This directory contains the installer files for different releases of the software. Each release is comprised of a .tar.gz file and is self contained. If a release of software is copied onto the unit, the list of available releases will be updated within a minute.

IDENTS

This contains bitmap idents as used by the generator. Supported user file formats are: .bmp (Windows bitmap files: 24bit only), dpx files (10 bit video files) yuv files (8/10 bit packed yuv) and targa (.tga) files

Note that bitmap files are RGB and will be converted to YUV internally as appropriate to the output standard. This will mean that not all valid YUV values can be output. If YUV files are used(.dpx), then all valid values may be output.

FONTS

The fonts available for use by the generator to add text idents may be enhanced by downloading new True Type fonts (.ttf) into this directory.

FILE FORMATS

COMMAND SCRIPTS

Command scripts are text files with an file extension of .cmd. They are formatted with one step per line. The line is formatted as StepTime, StepAction, StepParameters

StepTime is a numeric value in seconds 0....n

StepAction is one of:

ARCHIVE

This is used to specify the archive file to be loaded when the script is run. This makes sure that all the memories required for the test have been loaded.



This archive file is loaded EVERY time the script is run so if you make changes to any memories you MUST use the Export/Archive section on the System-Memories tab to backup the current memories.

LOADMEM,

Loads the memory specified in the StepParameters field – must be a numeric value 1...num memories.

CHECKERRS,

Check for CRC/EDH/ANC checksum errors in StepTime seconds. If there are any errors an event is added to the event log and the sequence pauses with a message to continue or abort. If the SDI input signal is missing, this is treated as an error.CHECK_AP_CRC

Check for changes to the active picture CRC value in StepTime seconds. An event is added to the event log.

PROMPT

This will put a short prompt on screen in a dialog asking the operator a question and waiting for OK to be pressed to continue. The time field is ignored and the parameter following is the text displayed.

CLEARLOG

This clears the Event Log

DISABLEEVT

This disables Event logging

ENABLEEVT

This enables Event logging

CLEARERRORS

This clears all error counts (EDH/CRC etc.)

LOGCOMMENT

Add the specified comment to the log file – useful to document the stage in the test process

PAUSE

Pause for the specified number of seconds to allow another process such as loading test patterns to complete.

SAVESTATUS

Save the current system status as an XML file.

SAVEIMAGE

Save the selected image as a bitmap file in the current scripts directory. Filename must be specified.

SELECTTAB

Show the selected tab to allow the user to view something.

SEL_USER

Select user – users are comma separated

CHECK_EYE

Checks that the eye amplitude, overshoot, undershoot and rise/fall and difference between rise and fall times are within the SMPTE specifications for the time period specified.

CHECK_JITTER

Checks that the jitter levels are under those set in the logging jitter threshold fields for the time period specified. See logging setup section for further details.

CHECK_METER_OFF_LEVEL

This action checks that the level for any visible meters is at the level set by the meter scale. This level may be -18dB or -20dB. If the level is over 1dB greater or less than that value an error will be inserted in the log and report files. If any groups are missing, these will be ignored by the test. Testing may be limited to specified audio pairs as set up on the Log Setup page.

CHECK_METERS_OFF

This action checks that the level for any visible meters is below -70dB. If the level is above that value an error will be inserted in the log and report files. If any groups are missing, these will be ignored by the test. Testing may be limited to specified audio pairs as set up on the Log Setup page.

CHECK_AES_INP

This action checks that the AES input signal is present and has no errors for the specified time period.

ACTIVE PICTURE CRC TECHNICAL INFORMATION

The polynomial for the CRC is $X^{16} + X^{12} + X^5 + 1$, with an initial value of all ones (0xFFFF).

The C code below shows the CRC algorithm being performed on 1920x1080 samples of YCC422-10 black. This will calculate a luminance CRC (y_crc) of 0xB03E and a chrominance CRC (crc_c) of 0x714D.

```
#include <stdint.h>
#include <stdio.h>

#define IMAGE_SIZE (1920 * 1080)

static uint16_t calculate_crc_10(uint16_t crc, uint16_t d)
{
    int bit;
    int xor;

    for (bit = 10; bit; bit--)
    {
        xor = (crc & 0x8000) ^ ((d & 0x200) << 6);

        d <<= 1;
        crc <<= 1;

        if (xor)
            crc ^= 0x1021;          /* the polynomial (post-shift) */
    }

    return (crc);
}

int main(void)
{
    int i;

    uint16_t crc_y = 0xFFFF;
    uint16_t crc_c = 0xFFFF;

    for (i = 0; i < IMAGE_SIZE; i++)
    {
        crc_y = calculate_crc_10(crc_y, 0x040);    /* luma black value */
        crc_c = calculate_crc_10(crc_c, 0x200);    /* chroma black value */
    }

    printf("crc_y = 0x%04X\n", crc_y);
    printf("crc_c = 0x%04X\n", crc_c);

    return 0;
}
```

